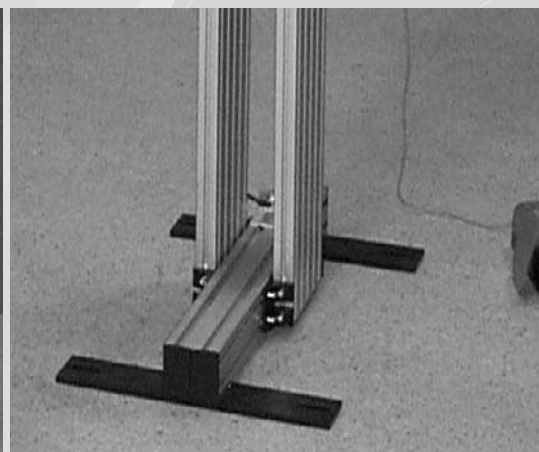
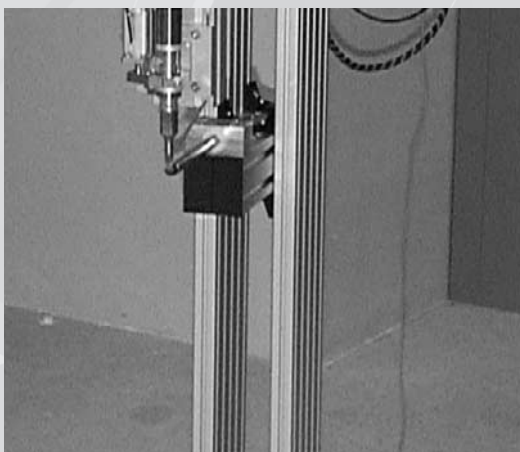
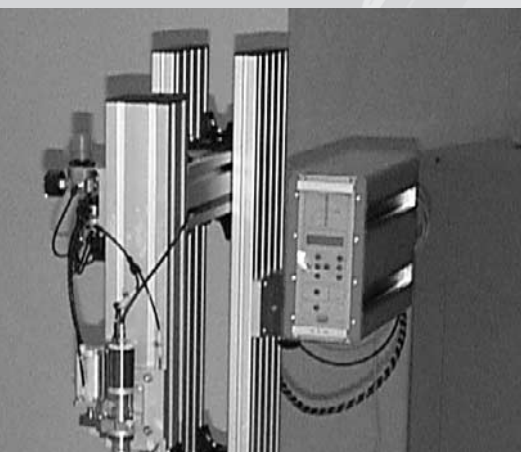
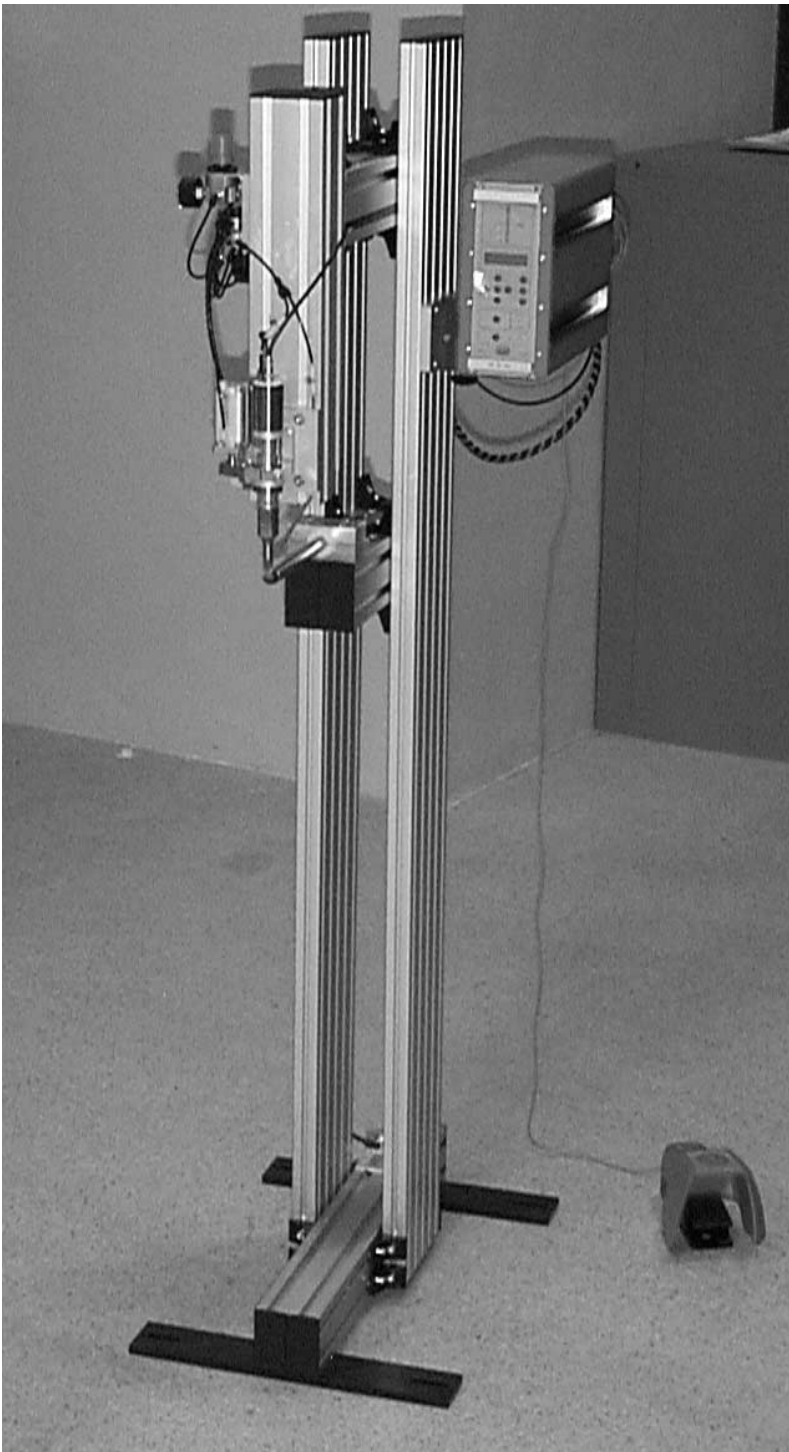


Operating Instructions



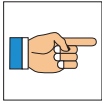
CUTTING STATION TYPE 3 BASE/TYPE 5 TABLE
WITH A GENERATOR SL35



Copyright by Rinco Ultrasonics AG, Switzerland

Version 2.0, gb, Art.-No. 34134

Note



Before the machine is unpacked and started up, these operating instructions must be read and their content must be observed when operating the machine. The machine may only be operated, serviced and repaired by persons who are familiar with these operating instructions and the current statutory regulations for health and safety at work.

Specification

Maschine

3 21 1390 Typ 3

Article: 31836

Series: 1004

Year: 2002

Generator

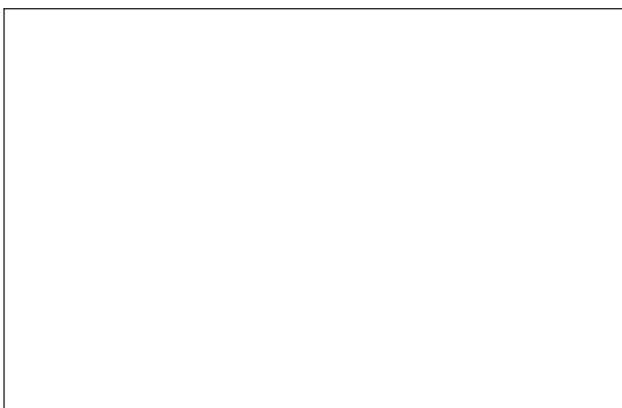
SL 35 für 600 W

Article: 2772

Series: 1898

Year: 2002

Agency



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Important

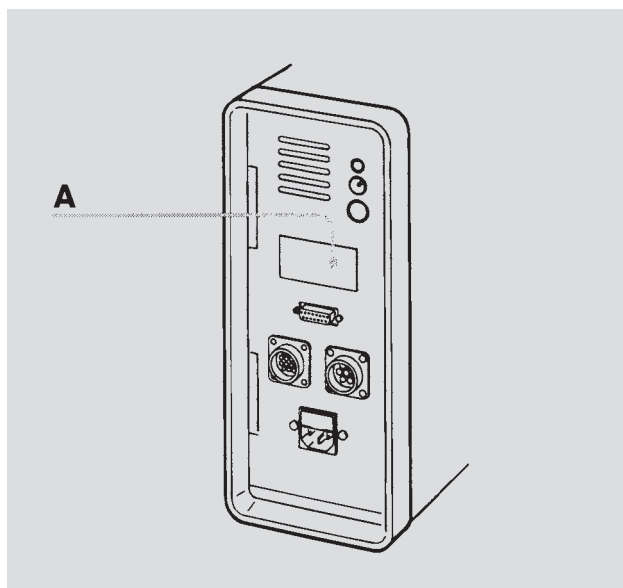
Please quote the exact type designation and the unit serial numbers in all enquiries concerning your Multipress and your Generator.

You will find this data on the rating plate (A) at the back of each unit, as well as on the inside cover flap of this operating manual.

The design and circuitry of these units are subject to continuous further development and improvement, and represent the latest state of the art.

RINCO ULTRASONICS AG

Romanshorn, Schweiz



Preface

Congratulations on the purchase of your cutting station.

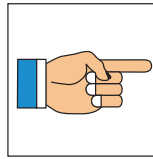
The purpose of this manual is to give the purchaser and the user all the information they need in terms of the handling, assembly, operation and care of the cutting station.

To ensure that your system is always in an operational state, you should take note of and follow all the tips and instructions contained within this manual.

1 Explanation of symbols and signs

Special attention should be paid to passages with the following symbols:

Special information or operating instructions.



Warnings regarding risk of personal injury or damage to parts of the equipment.



2 Safety information

2.1 General

The design of this unit conforms to the current state of engineering and is safe to operate.

The individual modules and the complete unit are subject to continual inspection by our quality assurance department.

2.2 Intended purpose

The unit is intended exclusively for the ultrasonic welding of suitable plastics. Any other use is regarded as inconsistent with the intended purpose, and is undertaken at the user's own risk.

The manufacturer is not liable for any resultant damage. Intended for industrial use.

2.3 Special points to note

- Before you start up the unit for the first time, read this operation manual carefully.
- Being badly informed about how to operate and look after the generator can result in damage.
- Always keep the operating manual handy at the site of the unit.
- Do not perform any modifications, extensions or conversions on the unit which might endanger safety without the supplier's consent.
- Do not alter the programming (software) of programmable control systems.

2.4 Choosing staff

Work on the electrical installations of the unit may only be performed by an electrical specialist or instructed staff under the management and supervision of an electrical specialist, according to electrical engineering standards.

2.5 Installing the units



Always unplug the power cable before making any connections to peripheral units.

Be sure to fit the power supply with a grounding connector!

Observe any statutory safety regulations in force in your country!

Failure to observe these regulations will exempt the manufacturer from all liability for injury to persons or damage to materials!

Before starting up the unit, always make sure it is in a closed and safe condition.

2.6 Operation



Never open the generator or converter housing while the Multipress is in operation.

There is a high voltage inside the units – risk of injury!

Avoid any potentially unsafe working practices.

Correct operation and careful handling of the units and their associated tools during operation will

- keep the system ready for service,
- prolong its useful life, and
- reduce stoppage times to a minimum.

2.7 Noise emissions



Caution!

Limits: Ultrasonic does not cause any damage according to present scientific research as long as the maximum noise level remains below 140 dB and the average level, assuming an 8h/day, remains below 110 dB.

Keep an eye on the sub harmonic i.e. audible frequencies, which fluctuate depending on application and are annoying and harmful. Significant are the energy equivalent, continuous sound levels assuming a representative working period (min. 8 h/day max. 2000 h/year) of 85-87 dB(A) as limit.



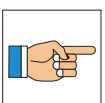
If these limits are exceeded, the personnel must have sound protection devices at their disposal or else a machine specific sound protection is required. (Specifications according to SUVA-Information no. 86048 d 4.94)

2.8 Guarantee

With the supply of the unit, RINCO Ultrasonics AG enters a guarantee in accordance with VSM (Verein Schweizerischer Maschinen-Industrieller = Association of Swiss Machine Manufactureres).

The following conditions apply in order for RINCO ULTRASONICS AG to uphold the guarantee:

- The user must be familiar with the content of these operating instructions.
- The instructions and notes contained in these instructions must be observed.
- No reconstruction or changes to parts of the machine or the generator are permitted.



In case of difficulties or questions, RINCO ULTRASONICS AG offers telephone support through qualified specialist personnel.

3 Transportation



Transportation instructions on the packaging must be observed.

3.1 Unpacking / receiving inspection

The shipping container used for our machines and units withstands the normal wear and tear of road, rail and air transportation.

After receiving the consignment, check whether all the parts conform to the packing list and look for any visible signs of damage. If you discover any damage, notify the carrier immediately and keep the packaging as evidence.

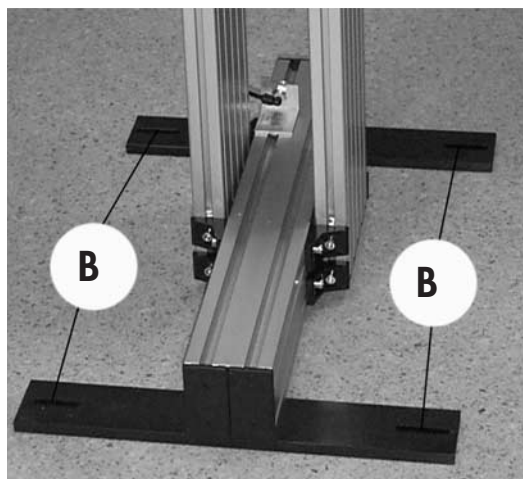
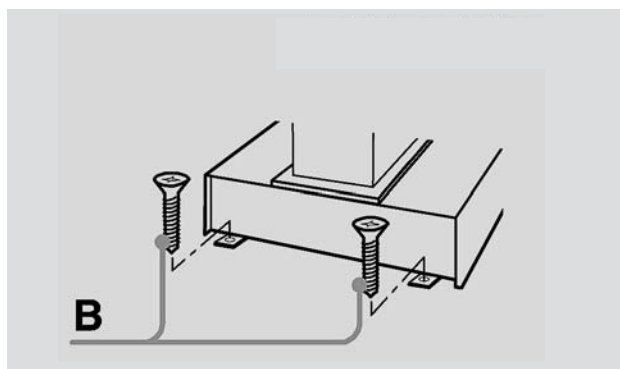
3.2 Damage during transit

The carrier is responsible for any damage incurred during transit.

A complete report containing an exact description of the damage must be submitted to the carrier as the basis for the damages claim.

Incidents of damage or loss involving goods delivered by us must be reported to us immediately and they must be confirmed with a copy of the above mentioned report.

If the delivery is arranged carriage paid or CIF by RINCO ULTRASONICS AG, the damaged consignment will be replaced if necessary and claims will be levelled against the relevant transit insurance.



3.3 Positioning the plant

The location of the unit is important. In order to guarantee a long service life, the unit should be installed in clean surroundings.

Make sure that the electronic equipment is mounted in a vibration-free environment.

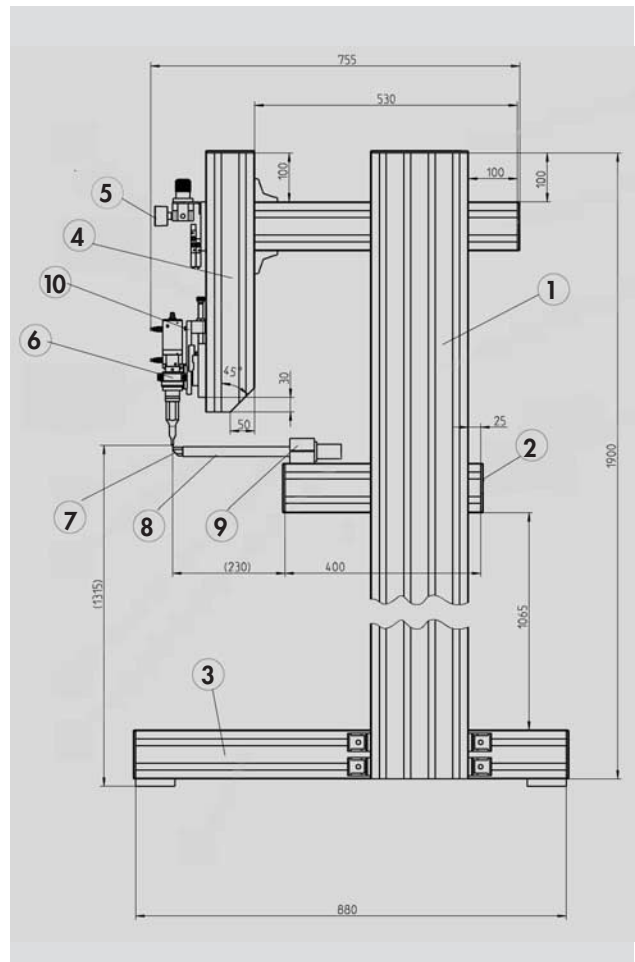
The factory settings are performed at 20° C. The ambient temperature can range between 10° C and 45° C during operation.

4 Product Information

4.1 Side view of cutting station

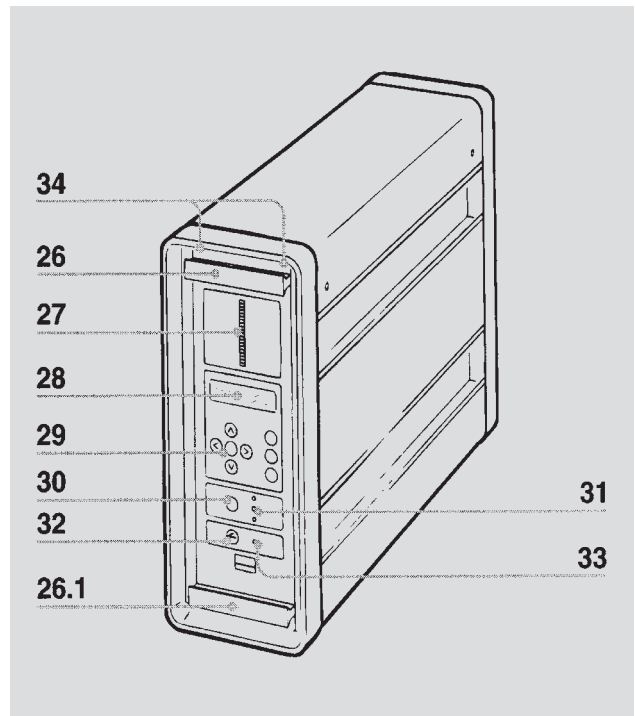
4.1.1 Cutting station

- 1 Main column
- 2 Support arm of anvil
- 3 Fixing plate
- 4 Support arm for insert
- 5 Pneumatics group
- 6 Vibration system
- 7 Anvil
- 8 Fixing axis of anvil
- 9 Fixing clamp of anvil
- 10 Insert carriage

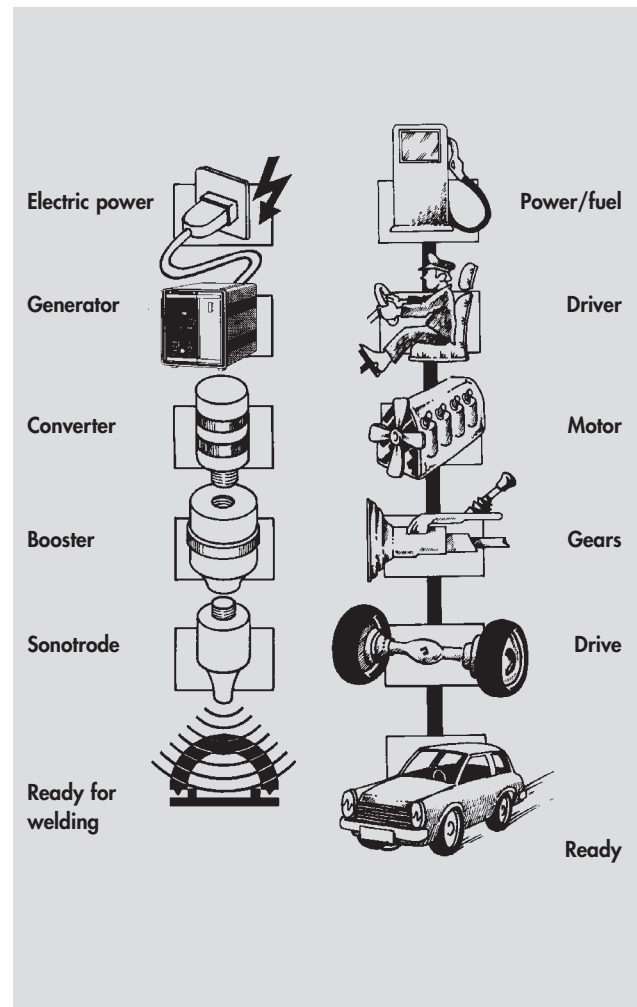


4.1.2 Ultrasonic generator SL35

- 26 Handle of generator module
- 26.1 Handle of generator module when specifying the model
- 27 LED display
- 28 Two-line LCD screen
- 29 Input keyboard
- 30 Key TEST US
- 31 Displays
 - US ON (green)
 - VALVE (green)
 - ERROR (red)
- 32 "On / Off" key
- 33 LED display for the unit during operation
- 34 Fixing screws



4.2 Examples for application



4.3 Using ultrasoncis in the plastics and synthetic fabrics industry

It is well known that thermoplastic materials come in many shapes and sizes and are used in very different application areas. It is also known that one can cut and weld synthetic fabrics with ultrasonic. This is an example for the diversity of the applications possible with ultrasound technology.

4.4 Advantages of welding and cutting with ultrasonic

Ultrasonic welding is used as part of an assembly process for the manufacture of large series of quality products. Its major advantage is the cost effectiveness. Cutting with ultrasonic has the great advantage that it will result in a clean cut and that the edge of the fabric is fused so that any tearing is prevented.

Ultrasonic is an environment-friendly technology without additional input materials. For this reason, ultrasonic welding is recommended in sterile areas since there is no danger of contamination from additives.

The typical work cycle of an ultrasonic welding process is no longer than a fraction of a second. Once the welding process has been completed the melted seam will become hard again.

At this point it is possible to process and transport the work piece, i.e. it is ready for the next process step. No additional work sequence is required.

Ultrasonic welding is carried out with the material of the item itself, i.e. no external additives have to be added such as bonding agents, solvents, etc. This means that the assembly processes can be easily automated and productivity increased.

Not much energy is required for the welding process. The efficiency of the welding system is 95%.

4.5 Cutting station functions and characteristics

The cutting station and generator developed by us combine to a system with mechanical precision as well as durability and versatility. At the same time, we have endeavoured to make the operation and use of the unit as easy as possible.

The vertical level of the machine can be adjusted with the help of the fixing screws of the brackets. An adjustment mechanism can be used to align the anvil in parallel to the front face of the sonotrode.

4.6 Technical data of cutting station

Dimensions in mm

4.6.1 Insert

- Maximum travel of insert: 40 mm
- Adjustable depth stop
- Precision guides of linear ball bearings in insert
- Double action cylinder
- Switch for top position of cylinder (optional)
- Piezoelectrical converter
- Connection thread / fixing thread for sonotrode M 8

4.6.2 Booster

Reduce Booster	Colour	Material	Booster	Colour	Material
1:0.5	blue	aluminium	1:1	green	aluminium
1:0.6	violet	aluminium	1:1.5	yellow	aluminium
Further characteristics in accordance with order			1:2	white	titanium
			1:2.5	black	titanium
			1:3	brown	titanium

4.6.3 Structure

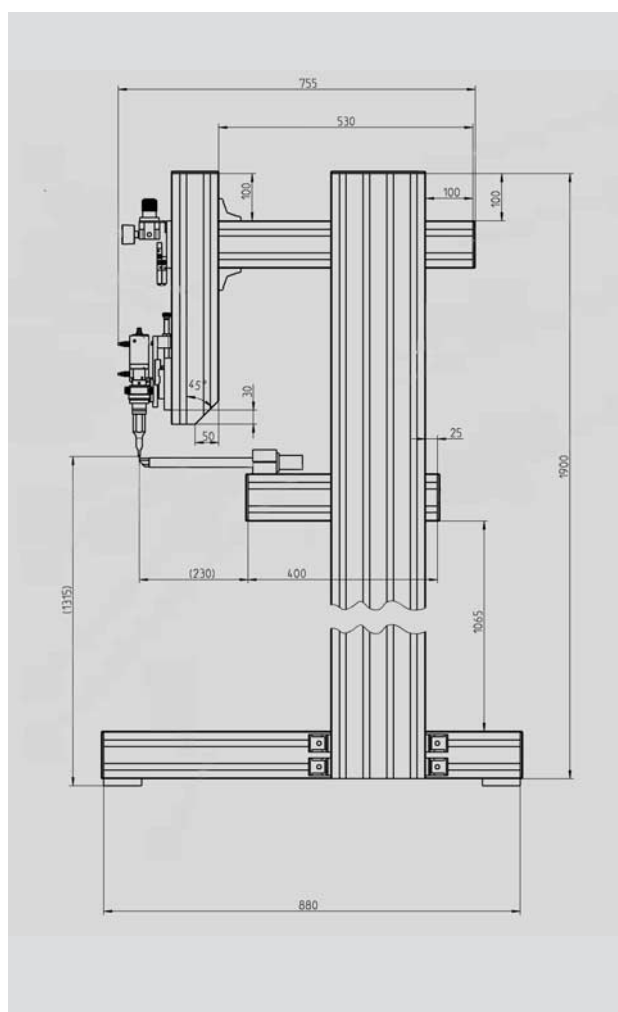
- Construction with 'Heron' brand aluminium profile
- Fixing axis of anvil with fixing clamp
- Pedal

4.6.4 Compressed air

- Dry compressed air, maximum 7 bar (105 PSI)

4.6.5 Weight

- Weight: 90 kg

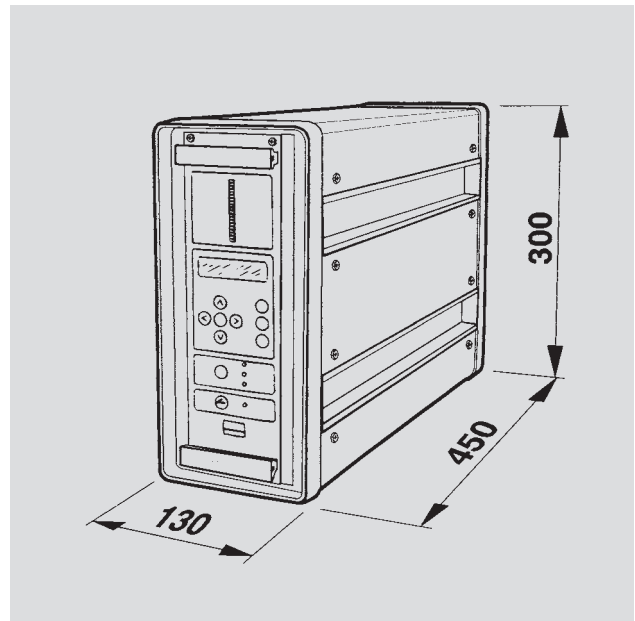


4.7 Technical data of ultrasonic generator

4.7.1 Dimensions SL35

Dimensions in mm

Weight 7 kg



4.7.2 Concept

- Flexible module system with various insert modules.
- Clear and simple parameter input with 2- line LCD display.
- Optimal efficiency and minimal energy dissipation by using microprocessor regulated frequency control.
- Real time microprocessor regulator to maintain constant amplitude under varying loads.
- Maintains constant amplitudes during power fluctuations.
- Recognizes system errors and outputs detailed error messages on the LCD display.
- Electronically adjustable amplitude output.
- Variable start-up characteristics (softstart) for optimal adaptation to large size welding equipment (except SLH20).
- Interface to connect to SPS master control.

4.7.3 Available generator modules

Type	max. power
GM 35-400	400 W
GM 35-600	600 W
GM 35-900	900 W

4.7.4 Connected loads

- 230 V 50-60 Hz / maximum current consumption 6.3 A
- consumption 110 V (up to 600 W)

4.7.5 Dimensions

- see Fig. page 16

5 Control and display elements

5.1 Pneumatic group

1 Pressure controller

The pressure controller is used to reduce the welding pressure. In order to select a nominal value, pull out the control knob and turn to the required position. Push the knob back in order to fix it in that position.

Maximum connection pressure: 7 bar

2 Pressure indicator

The pressure gauge indicates the maximum pressure selected for welding.

3 Solenoid valve of cylinder

The cylinder is activated via an electric signal in order to move towards the cutting position.

4 Solenoid valve for cooling

An electric signal activates a fan in the areas with a heat load (converter and sonotrode).

5 Fan switch for converter

6 Fan switch for sonotrode

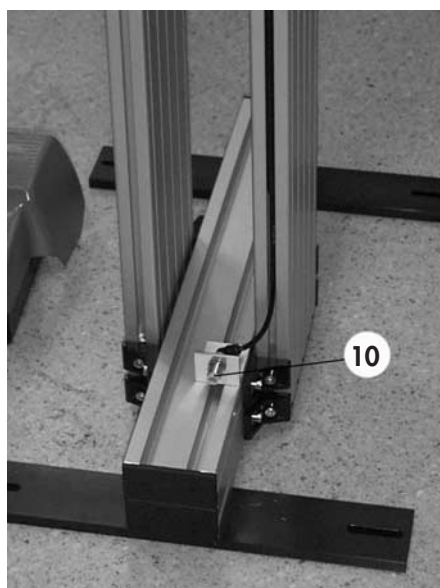
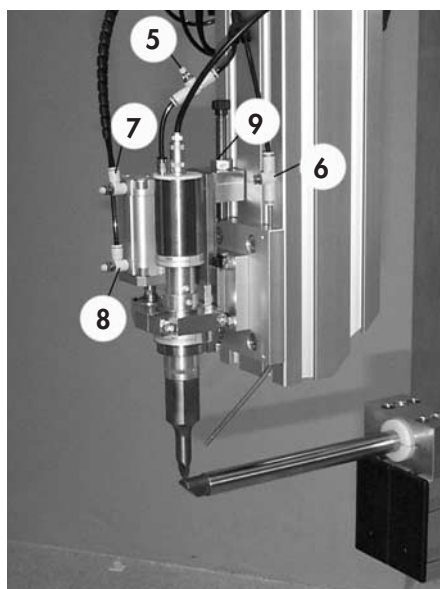
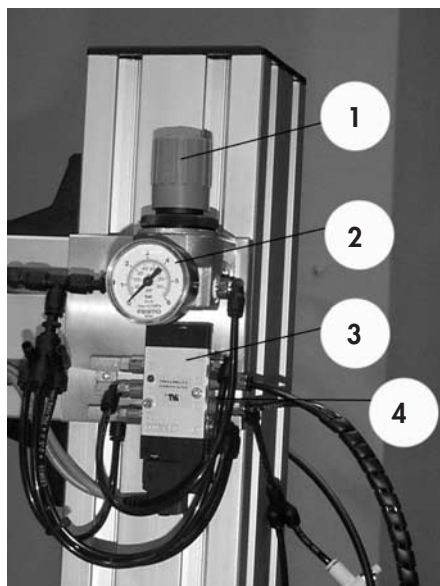
7 Speed switch for the upwards movement of the insert

8 Speed switch for the downwards movement of the insert

9 Control screw for the downward movement stop

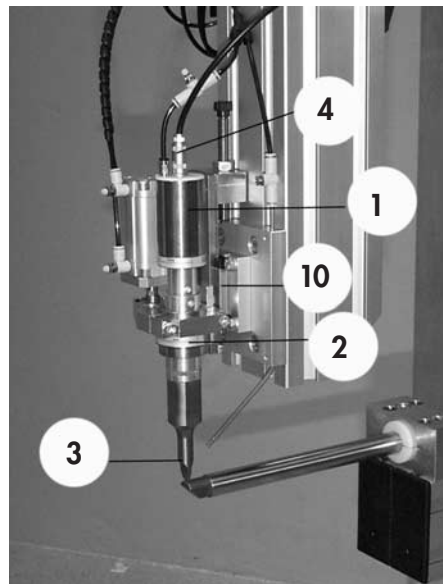
Release the counter nut and adjust the screw with the insert in the lower position until it touches the point of the anvil; then retighten the counter nut.

10 Connection for compressed air



5.2 Vibration system

- 1 Converter
- 2 Booster
- 3 Sonotrode
- 4 HF connection
- 10 Carriage insert

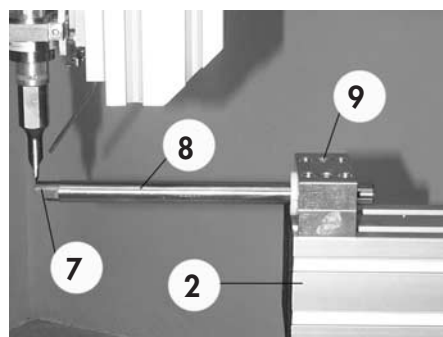


5.3 Anvil

- 7 Anvil

5.4 Fixing axis of anvil

- 8 Fixing axis of anvil



5.5 Fixing clamp of anvil

- 9 Fixing clamp of anvil

5.6 Support arm of anvil

- 2 Support arm of anvil

5.7 Controls and indicators

26 Generator module grips

If necessary, you can pull out the generator module by holding these grips. The fastening screws (34) for opening the generator module are located above and below the grip bars.



The generator module is never to be pulled out or plugged in while mains is connected. (high voltage)

27 LED bar

This display indicates the power supplied during the welding operation. When the horn is idle (vibrating freely in the air), the display should not rise above the 25% mark.

An error message will be issued if the 100% mark is exceeded.

After the welding operation a flashing LED indicates the peak power supplied.

28 2-line LCD display

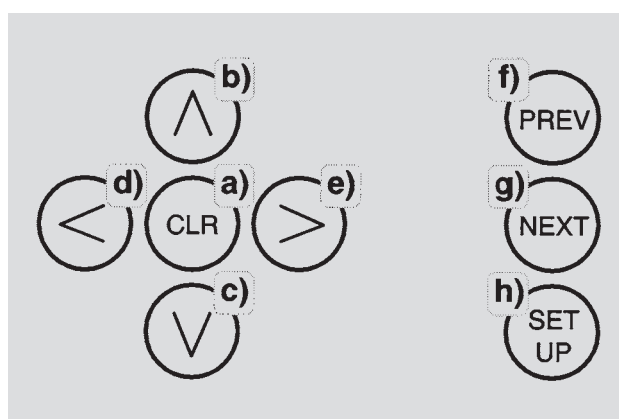
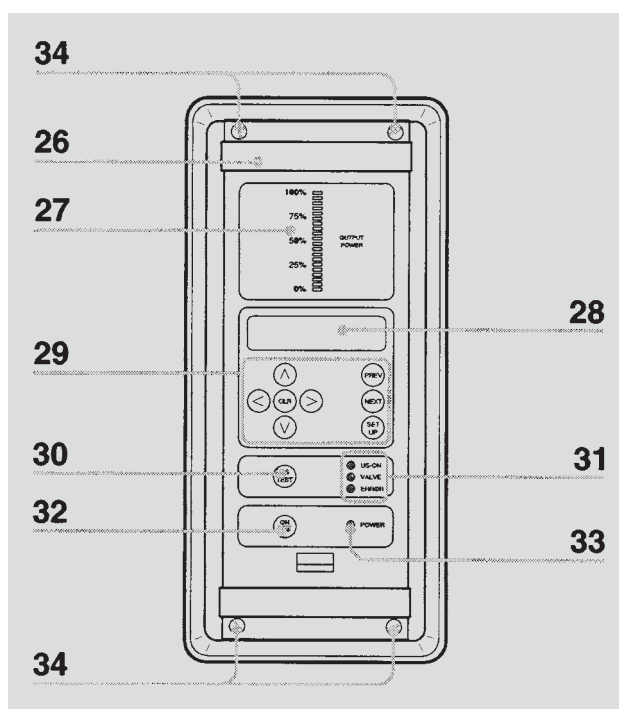
The LCD display shows:

- Welding parameters
- Error messages
- Operating conditions

29 Input keypad

Using this keypad you can

- activate generator functions.
- change welding parameters.
 - a) zeroes, display
 - b) increase number
 - c) decrease number
 - d) select number to the left
 - e) select number to the right
 - f) return by one program line
 - g) to next program line
 - h) enter / exit program



30 Key "US-TEST"

Key to activate ultrasonics test. The display shows the current horn frequency. If the key is activated formore than 5 seconds, the error message comes on.



Do not touch horn!

31 LED

- "US-ON" Ultrasonics active
- "VALVE" Solenoid valve active
- "ERROR" Error output active

32 Key "ON/OFF"

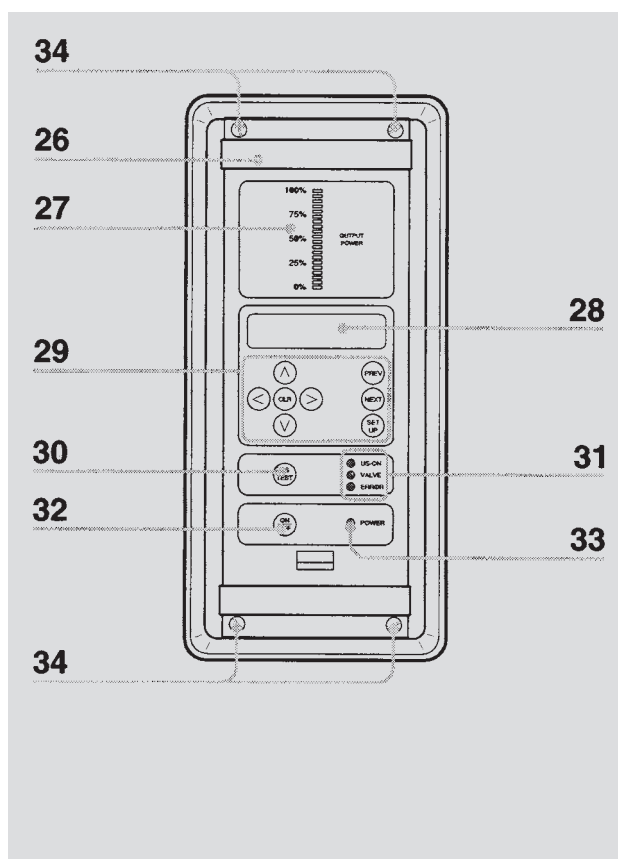
Mains switch

33 LED

"POWER" indicator

34 Fastening screws

Must be locked in operation!



6 Commissioning

6.1 Setting up

Select the location for setting up the unit under the following criteria:

- Clean environment
- Firm and level surface
- The cutting table area must free from vibrations
- Ambient temperature:
During operation: 10° C – 45° C
While adjusting settings: 20° C

6.2 Space requirement

The location where the machine is set-up must afford sufficient space for servicing as well as adjustment activities.

6.3 Preparing and connecting the unit

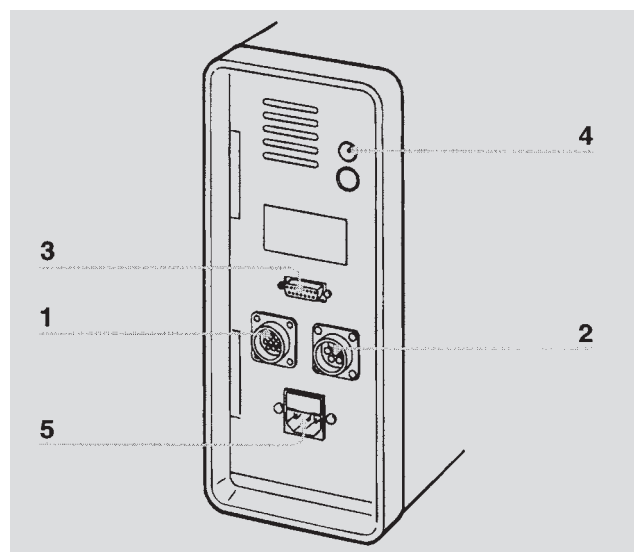
When setting up the unit, please proceed as follows:

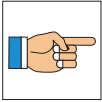
1. Attach the cutting station.
2. Connect the cables between the cutting station and the generator.



Only earthed mains connections may be used.

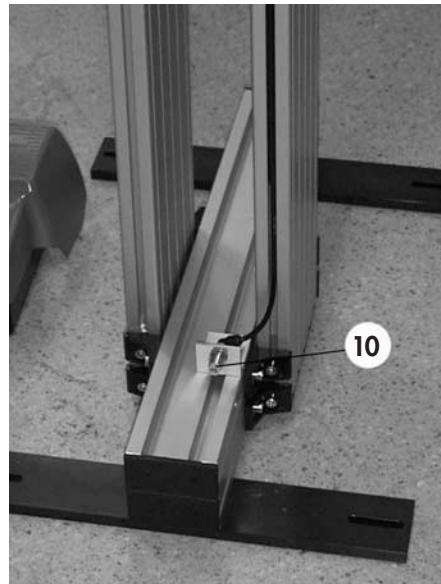
3. Plug the cutting station connectors into the generator sockets.
 - 1 STO1 Insert
 - 2 STO2 Start (optional)
 - 3 STO3 Interface (optional)
 - 4 STO4 Converter connection
 - 5 STO5 Mains connection





Compressed air connection: maximum 7 bar

4. Connect the pneumatic hose to the pneumatic connection on the cutting station (10).

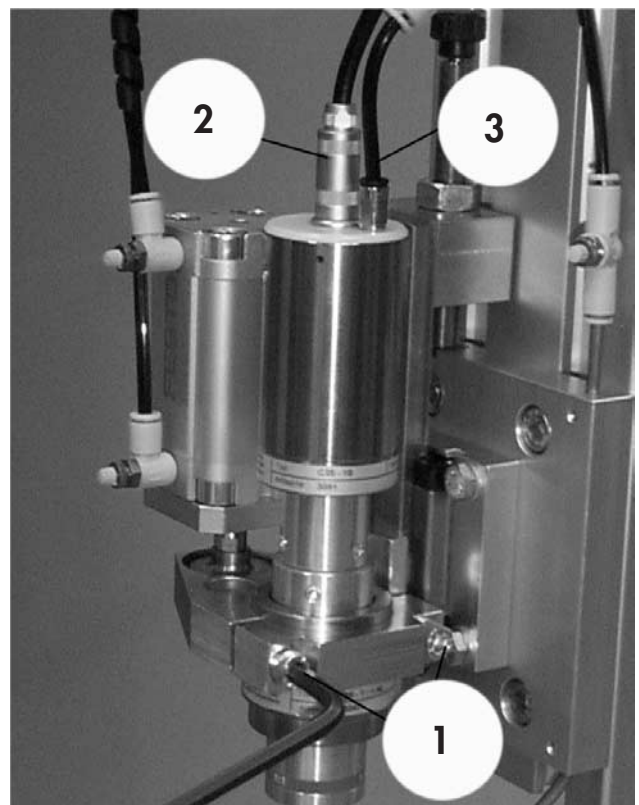
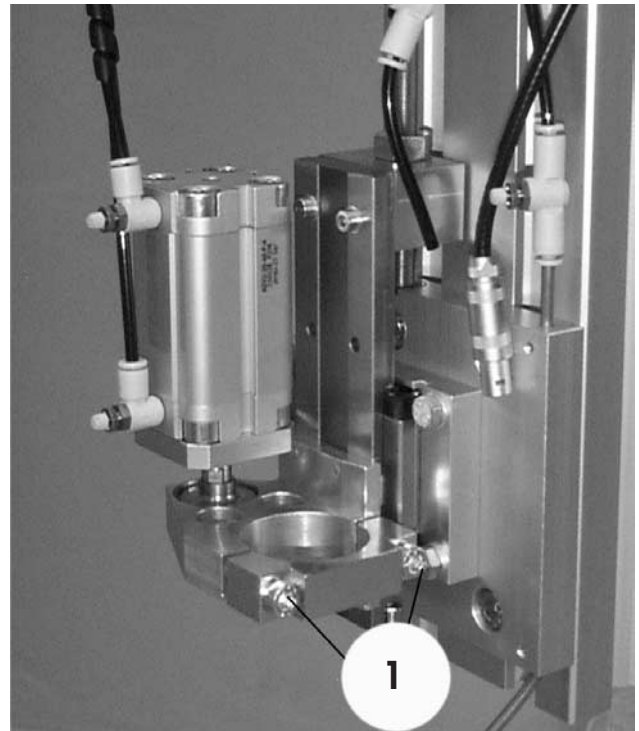


6.4 Fitting the vibration system



It is imperative to switch off the generator prior to fitting the vibration system.

1. Release the screws (1) with the allen key (6 mm).
2. Insert the converter and the booster (already assembled) through the lower part up to the stop and then tighten the screws (1).
3. Connect the HF plug to the HF terminal (2) of the converter and connect the cooling pipe (3).

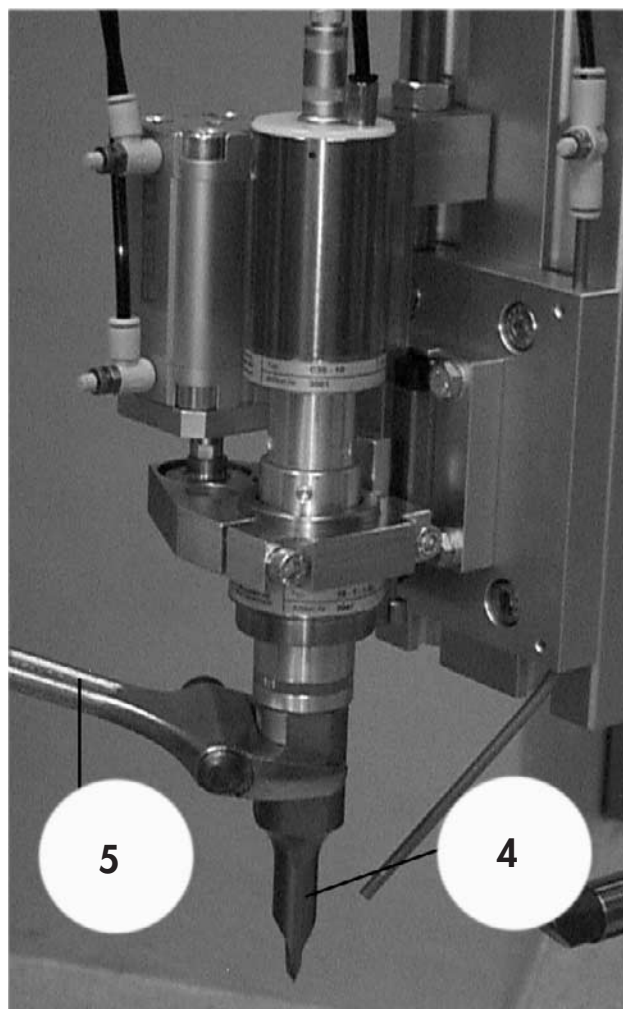


4. Put the sonotrode (4) in place and fix it with the spanner (5).



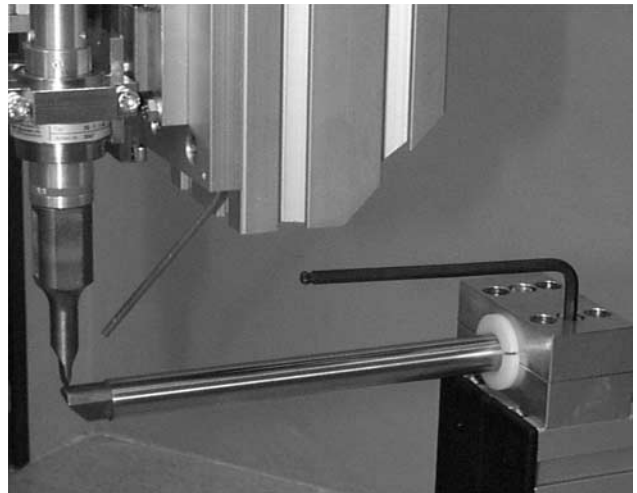
Tightening moment: 15 – 25 Nm

The ultrasound transmission system is now ready for operation.

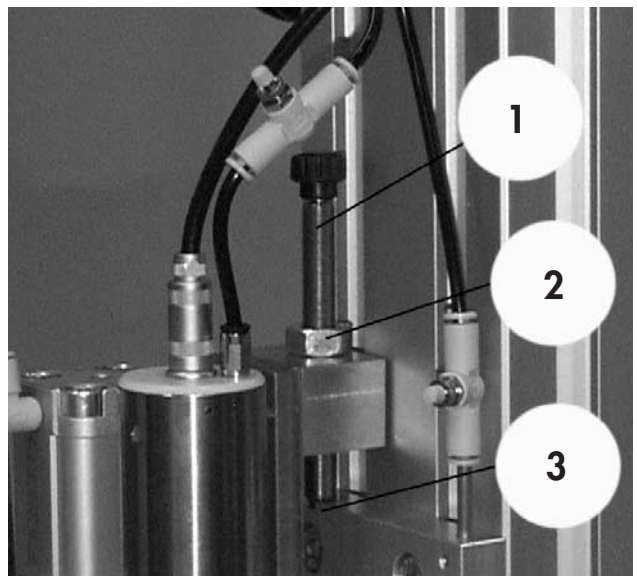


6.5 Adjustments

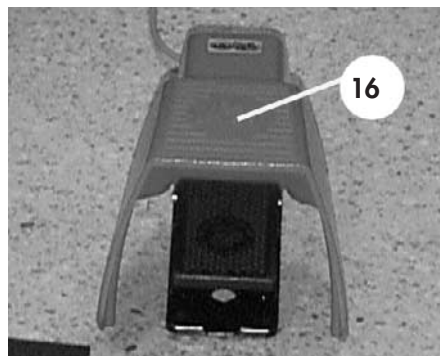
1. Release the pressure from the cylinder and set the pressure controller to "0 bar"; lower the insert manually down to the stop above the anvil.
2. Place the cutting edge of the sonotrode exactly to the cutting edge of the anvil at the end of the radius.



3. Release the nut (2) and tighten the screw (1) up to the stop of the cutting table (3). Then remove the sonotrode by a few decimal units from the anvil.
4. Adjust the pressure to 2 kg and step on the pedal (16) in order to activate cutting. Then proceed to adjust the screw (1) until the machine performs a clean cut of the fabric.
5. Lock the nut (2) and the machine is now ready for operation.



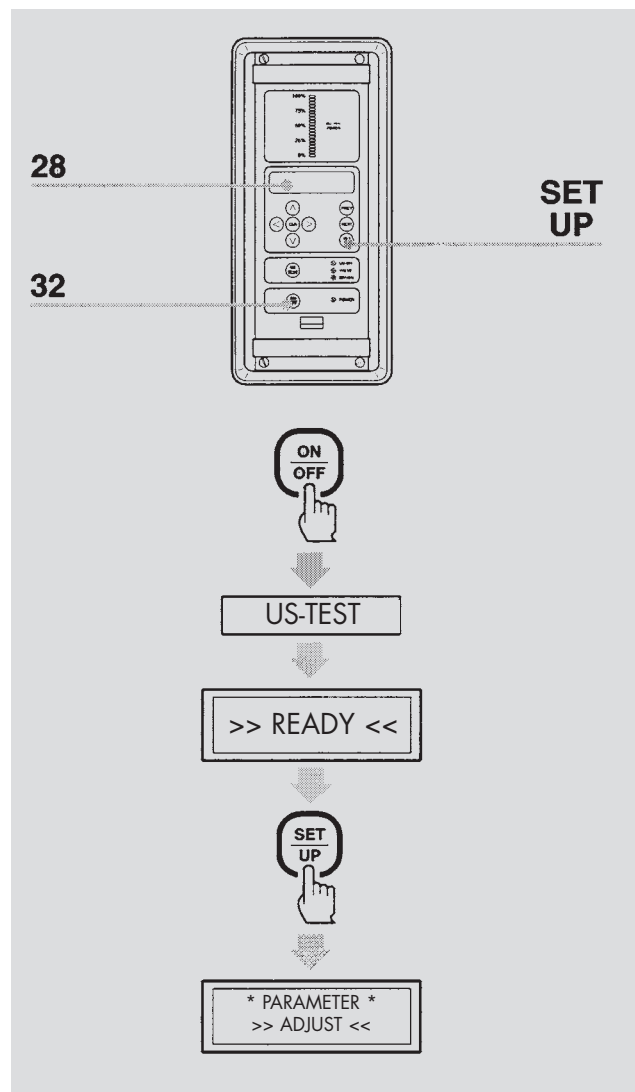
Do not touch the sonotrode.



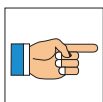
6. Switch the unit on using the "ON/OFF" button (32).

After the US-TEST, the message
>> READY <<
is shown on the display (28).

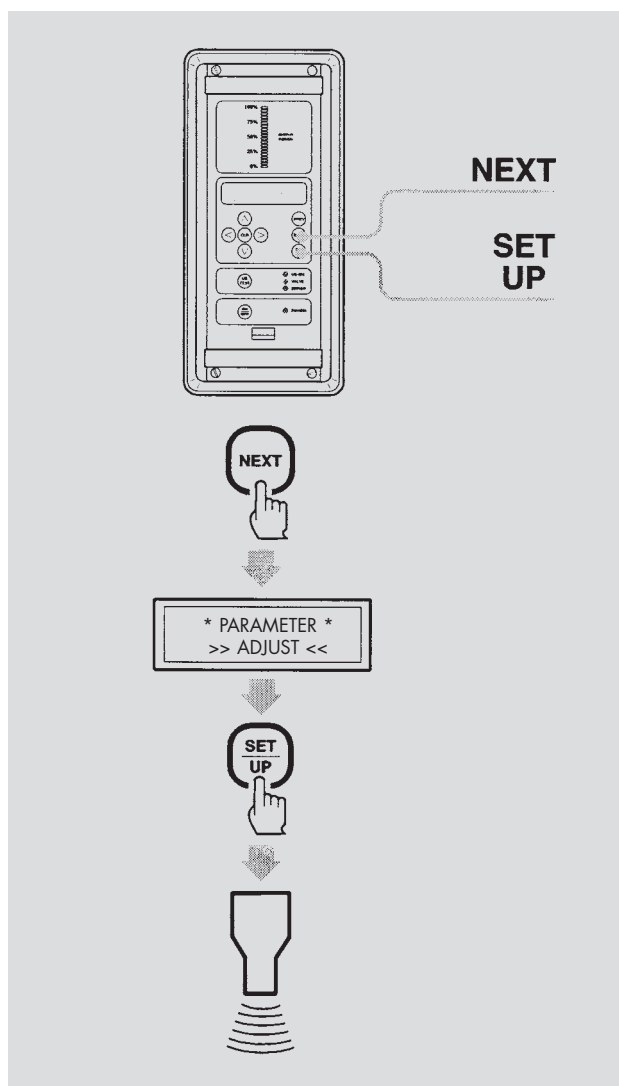
7. Use the "SETUP" key to change to the
* PARAMETER *
>> ADJUST <<.



8. After pressing the "SETUP" key, check all parameters using the "NEXT" key and enter the nominal values, if these are known from the specification.
9. Use the "SETUP" key to change to normal operation and the unit is now ready for the first cut of fabric.

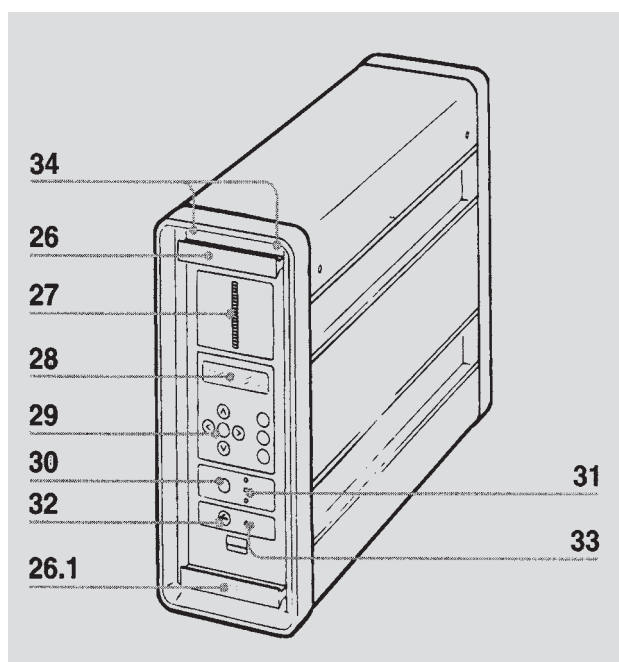


Please refer to "Parameter adjustment", page 34, for further information on the adjustments.



6.6 Switching off

1. Use the ON/OFF key (32) to switch off the generator.



7 Operation

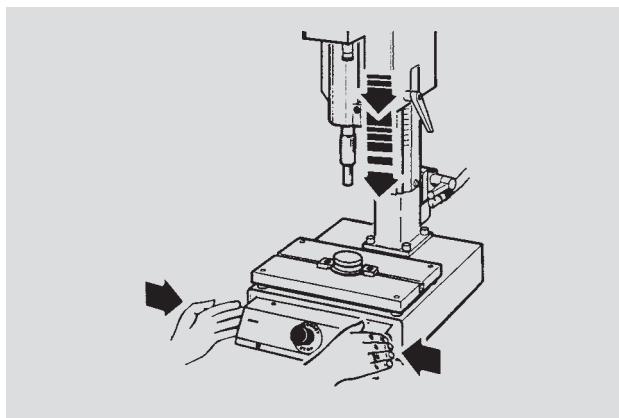
7.1 Sequence of welding process

7.1.1 Work cycle

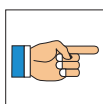
Manual starter (standard mode)

1. After pressing the two buttons of the two-handed control (START) simultaneously with an interval of 0.3 seconds, the work sequence (cycle) starts.

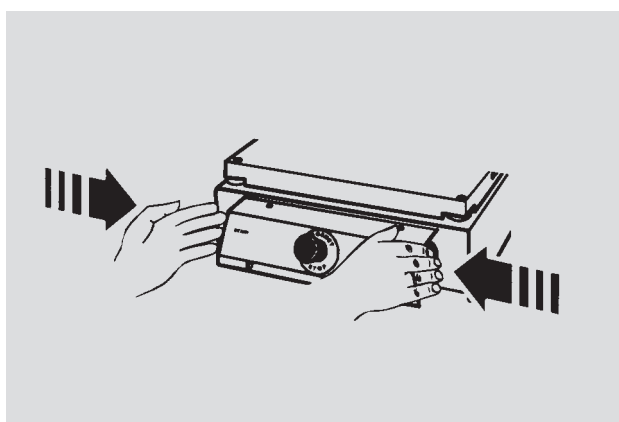
The solenoid valve is activated and the insert is lowered.



2. Continue to press the two-handed controls until the ultrasound is activated.

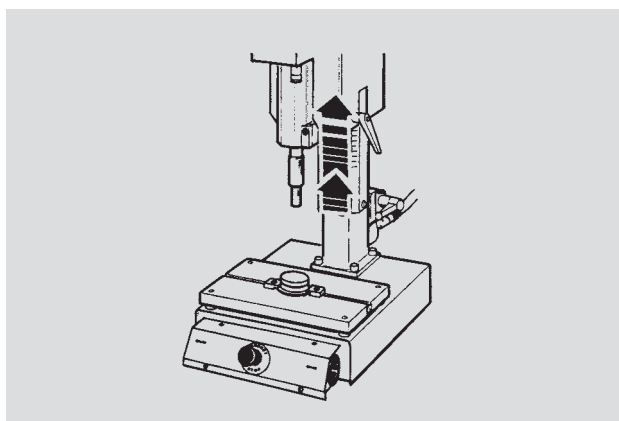


If the two-handed controls are released too early, the insert retracts to its home position.

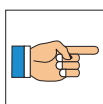


The ultrasonic is initiated by the trigger. The ultrasonic will stay in operation until the end of the pre-set welding time. After the expiry of the welding time, the sonotrode will remain over the welded object until the cooling time has expired. This provides pressure for the setting of the welded seam.

After completion of the cycle the insert returns to its home position. The machine is ready for the next cycle.



Options: US-STOP
FOLLOW IMPULSE
RESET

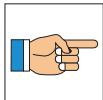


To clear an error press the CLR button.

Impulse (reduced safety)

1. When the two buttons of the two-handed control (START) are pressed simultaneously in an interval of 0.3 seconds, the work sequence (cycle) starts.

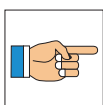
This activates the solenoid valve and the insert is lowered.



From this point onwards the buttons of the two-handed control must not be kept depressed.

The ultrasonic is initiated by the trigger. The ultrasonic will stay in operation until the end of the pre-set welding time. After the expiry of the welding time, the sonotrode will remain over the welded object until the cooling time has expired. This provides pressure for the setting of the welded seam. After completion of the cycle the insert returns to its home position. The machine is ready for the next cycle.

Options: US-STOP FOLLOW IMPULSE RESET

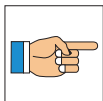


To clear an error press the CLR button.

Automatic (for automatic operation without safety)

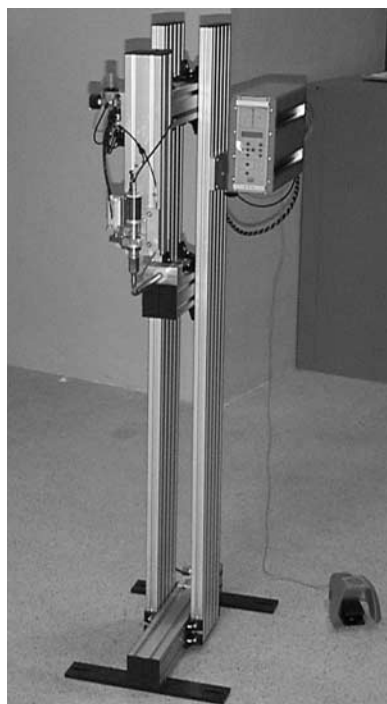
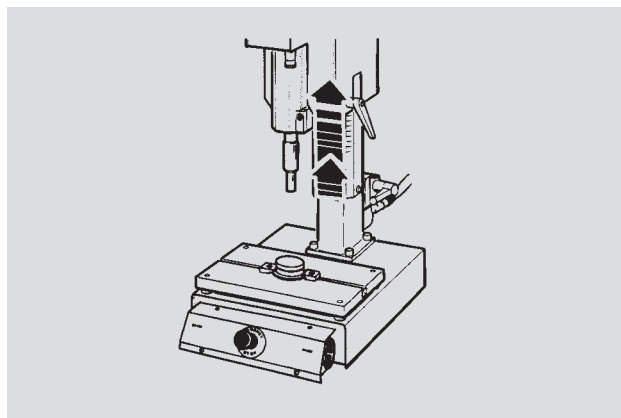
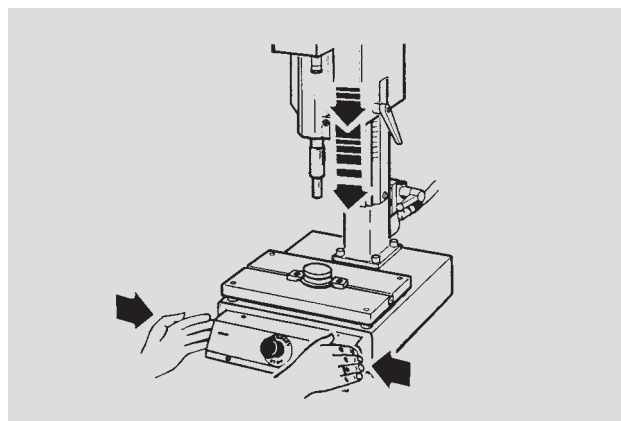
The work sequence is started by an impulse lasting 100 ms at the input of START 1 (STO2). The solenoid valve is activated and the insert is lowered. The ultrasonic is now activated and will be in operation while the pedal is being depressed. After completion of the work cycle, the insert will retract to its home position. The machine is ready for the next cycle.

Options: US-STOP FOLLOW IMPULSE RESET



To clear an error press the CLR key or start a new work sequence.

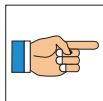
If there is a HARDWARE error, the error can only be cleared by switching off the unit.



7.1.2 Optimisation

In order to optimise the welding process,

- only one parameter must be changed at a time,
- the welding result must be checked after each change of a parameter.



Never change several parameters at the same time.

If one changes several parameters at the same time, it is not possible to establish which of the parameters has had an effect on the welding result.

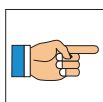
7.1.3 Parameter setup

Setting parameters are available according to initialization of generator. They can be modified as required.

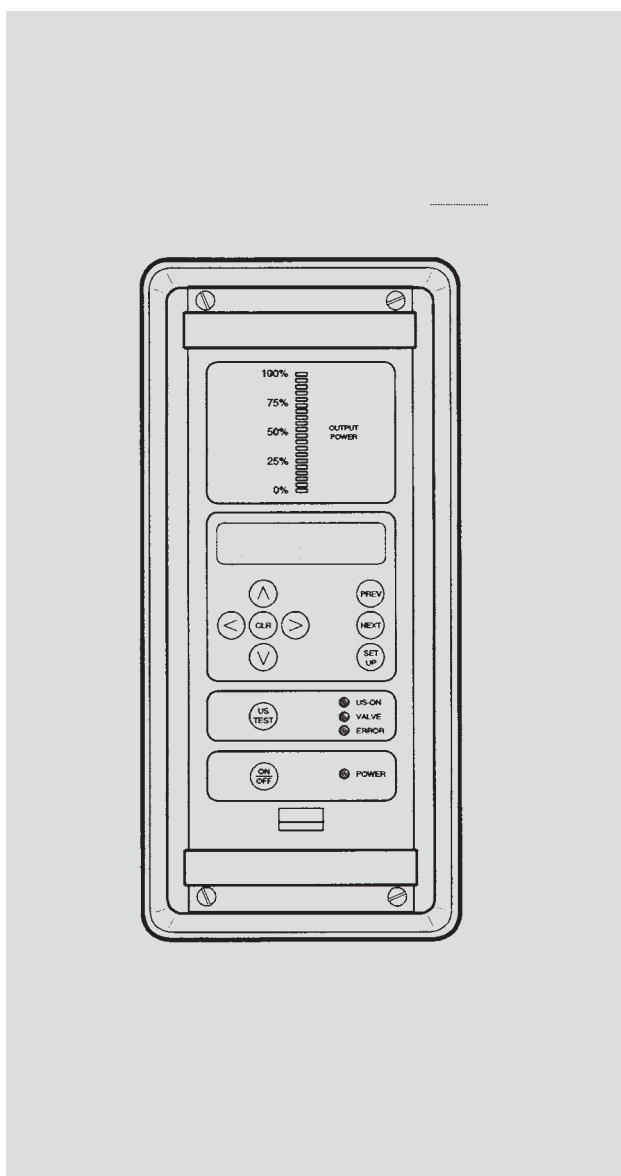
For activating the parameter setup see following page.

Parameters to be set up

Setting	[ADJUSTING :]
Part counter	[PART :]
Welding time	[WELDTIME :]
Hold time	[HOLDTIME :]
Trigger	[TRIGGER :]
After-pulse	[AFTERPULSE :]
Amplitude	[AMPLITUDE :]
Performance limits	[PERFORMANCE MIN:] [PERFORMANCE MAX:]
After impulse	[AFTERPULS :]



It is advisable to record the respective changes in a setup log in order to be able to return to existing settings whenever necessary.



7.1.4 Description of setting parameters

Setting [ADJUSTING :]

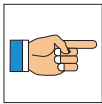
- Press both start buttons within 0.3 seconds to lower the actuator. Keep the start buttons actuated until safety switch is reached. Press start buttons again to move actuator back to the home position.

Part counter [PART :]

- The part counter steps up by one after each sound welding. Press CLR key to reset part counter.
- Maximum display: 9999999

Welding time [WELDTIME :]

- Duration of welding.
- Setting range: 0.00 – 9.99 s
- Standard setting: 1.00 s



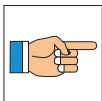
This parameter is operative only if the function [WELDTIME: TIMER] is operative in the * SYSTEM--INIT *.

Hold time [HOLDTIME :]

- Upon expiration of the welding time the horn keeps exerting pressure on the welding object for the HOLD TIME.
- Setting range: 0.00..9.99 s
- Standard setting: 1.00 s

Trigger [TRIGGER :]

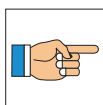
- Upon reaching the TRIGGER, the generator is started. The FU-trigger point is determined by a force sensor.
- Setting range: 0.00 – 9.9 FU



This parameter is operative only if the [TRIGGER: FU] function is operative in the * SYSTEM--INIT *.

Trigger [TRIGGER :]

- Upon reaching the TRIGGER, the welding is released.
- Setting range: 0.00 – 3.99 s



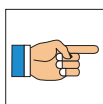
This parameter is operative only if the [TRIGGER: TIMER] function is operative in the * SYSTEM--INIT *.

After impulse [AFTER.PULSE]

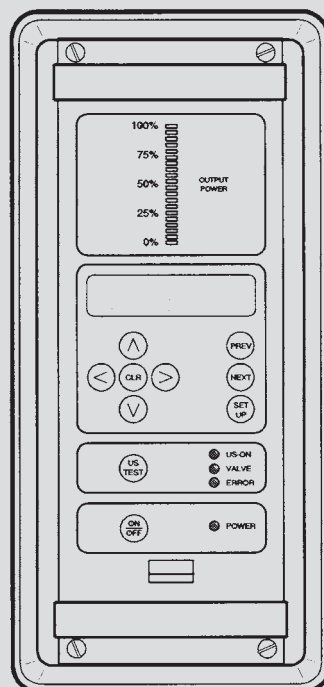
- Duration of after impulse after end switch shut off:
- Setting range: 0.00 – 1.99 s
- Standard setting: 0.00 s

Amplitude [AMPLITUDE :]

- The amplitude may be reduced from 100% to 60% by step of 5%. A change of the booster may thus be avoided.
- Output amplitude: see page 64
- Setting range: 1 – 9 (9 = 100%)
- Standard setting: 5



Maximum output power drops with a reduction of the amplitude.

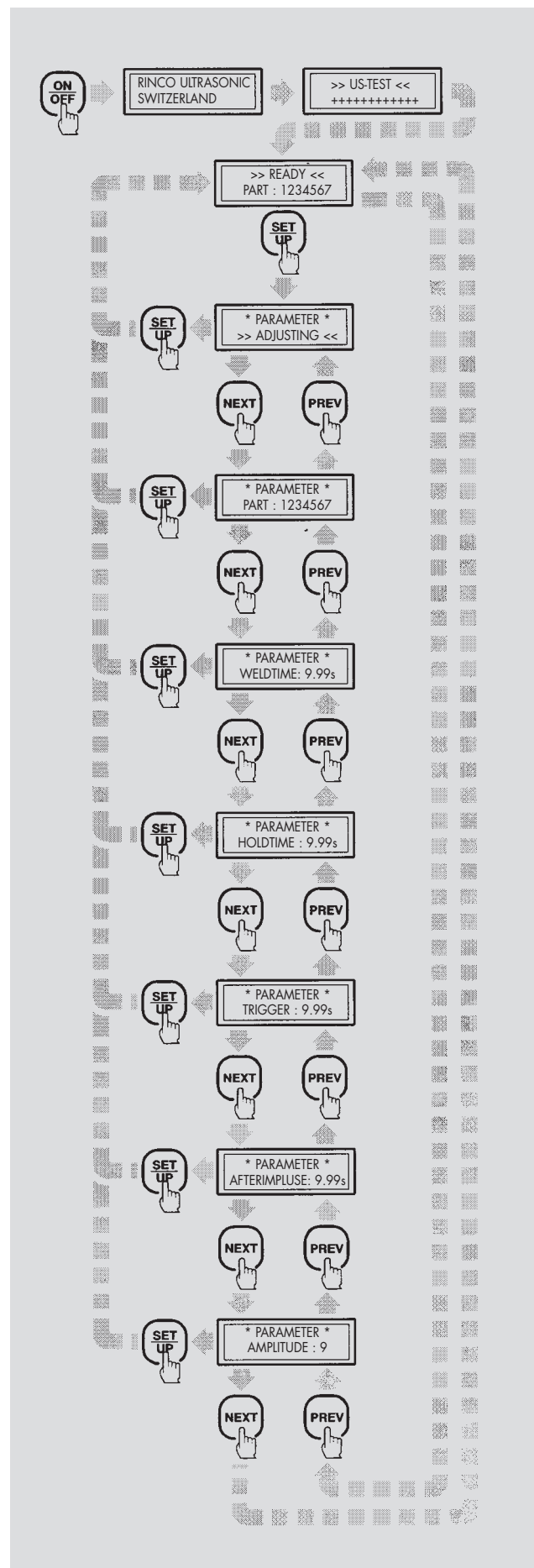


7.2 Parameter set-up procedure



An ultrasonic vibration system must be connected.
Do not touch horn!

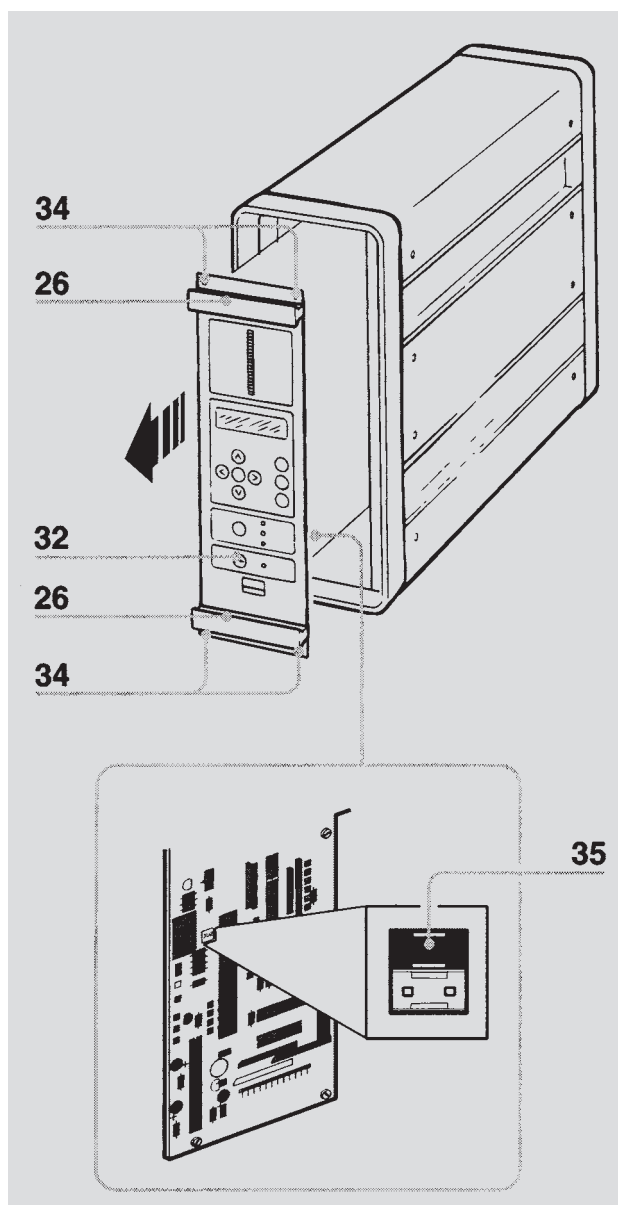
1. Press the **ON/OFF** key.
2. The generator starts with a two seconds' self-test while warming up. After the self-test the vibration system is tested again for a 1/2 second.
3. Upon termination of tests the message
 >> READY <<
 PART: 1234567 appears on the display.
4. Press the **SETUP** key.
5. To move to the next parameter setting: press the **NEXT** key. The display shows the next parameter. To return to the previous parameter setting press the **PREV** key.
6. Move to the required point on the counter with the cursor keys **LEFT** (<-) or **RIGHT** (->).
7. Increase the value with the **UP** (↑) cursor key or decrease the value with the **DOWN** (↓) cursor key.
8. To move to the next parameter setting: press the **NEXT** key. The display shows the next parameter.
9. Exit the parameter set-up with the **SETUP** key. The system is ready for welding.



7.3 Automatic connection

The operating switch (ON / OFF) can be activated or deactivated. To open the generator module (32) it is necessary to,

1. release the four screws (34),
2. pull the handles (26) outwards towards the guides. The steady is in the rear top position (35).

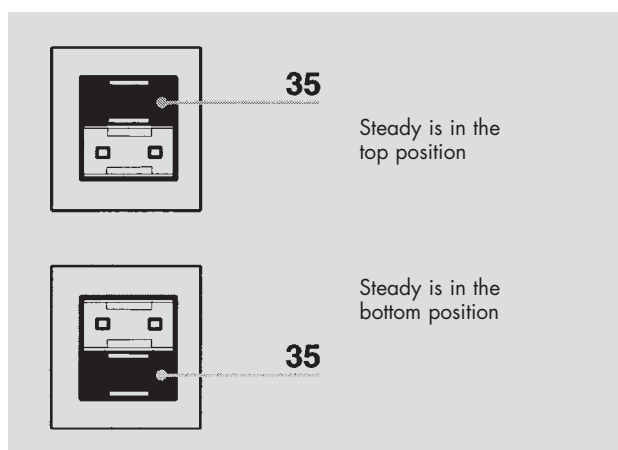


Standard position

The steady is in the top position and the ON / OFF switch (32) is activated.

Automatic option

The steady is in the bottom position and the ON / OFF switch (32) is deactivated. Start-up will be initiated automatically when the unit is connected to mains power.



8 Elements

8.1 Converter

The converter is a sensitive instrument. Please handle it with great care! The converter (24) is the core of every ultra sonic welding instrument. It belongs to the group of piezoelectric converters.

Piezoelectric converters are composed of several ceramics disks that change their shapes under voltage.

With an ultra sonic welding converter, an AC voltage with a nominal frequency of (e.g. 20 kHz) is used. This electric signal is turned into mechanical oscillations of the same frequency by the piezoelectric elements. At the front end, "K1" of the converter (24) a mechanical oscillation in axial direction is created. The oscillating amplitude is normally too minute to be useful and is therefore amplified with a booster (25).

The efficiency of a Piezo converter is extremely high. The minute energy losses during conversion are traceable in the heat build up in of the converter. The special build of converters enable remaining heat to dissipate by natural convection. Optimally, for special applications the heat build up must be dissipated with additional ventilators.

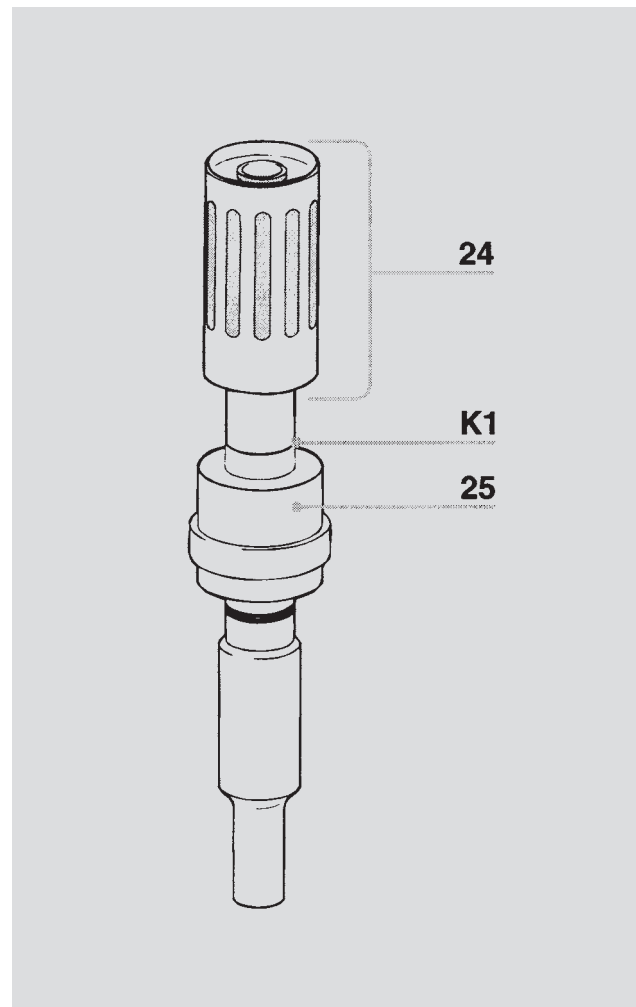


The converter should not be warmer than 50° (40° with 70 kHz) centigrades at the contact point "K1".

Converters, boosters, horns and generators may sustain damage if overheated.

The converter must be tightened with torque values listed in the following table.

Frequency	Torque
20 kHz	30-40 Nm
35 kHz	15-25 Nm
70 kHz	1.8-2.2 Nm



8.2 Booster

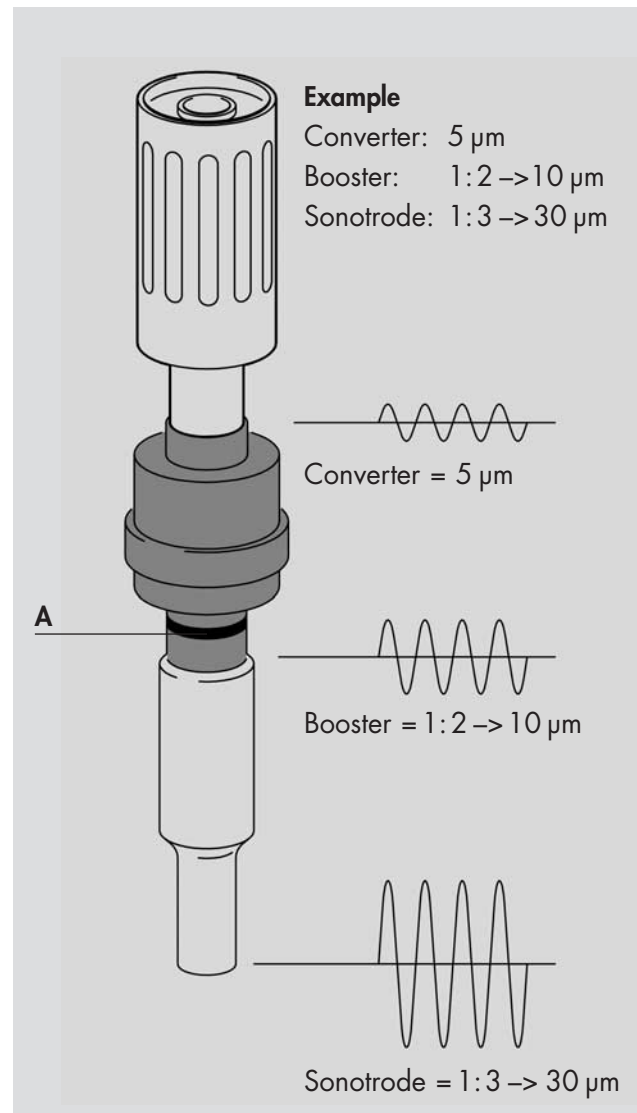
Applying the correct amplitude to the horn is one of the most important factors in ultra sonic welding. The geometric shape of the horn must be adapted to the object to be welded. Setting the correct amplitude is often difficult. The booster amplifies the amplitude of the converter at a preset ratio. In our example 1:2.

The amplification resp. dampening factor is specified as a ratio. The ratio is color coded and has a numerical designation (A). (see table)

Frequency	Torque
35 kHz	15-25 Nm

The ultrasonic welding instruments can be delivered with the following types of boosters:

Reduce Booster	Colour	Material	Booster	Colour	Material
1:0.5	blau	Aluminium	1:1	grün	Aluminium
1:0.6	violett	Aluminium	1:1.5	gelb	Aluminium
andere Verhältnisse auf Anfrage			1:2	weiss	Titan
			1:2.5	schwarz	Titan
			1:3	braun	Titan



8.3 Horn



Any kind of change to the metallic body of the horn influences the oscillating characteristics and therefore none should be made without consulting the manufacturer!

The horn transmits the ultra sonic energy to the object to be welded in form of intense oscillations created by the converter.

Work pieces come in various shapes and the horns must be adapted to the shapes as required. The horn is an acoustic body tuned to the frequency of resonance.

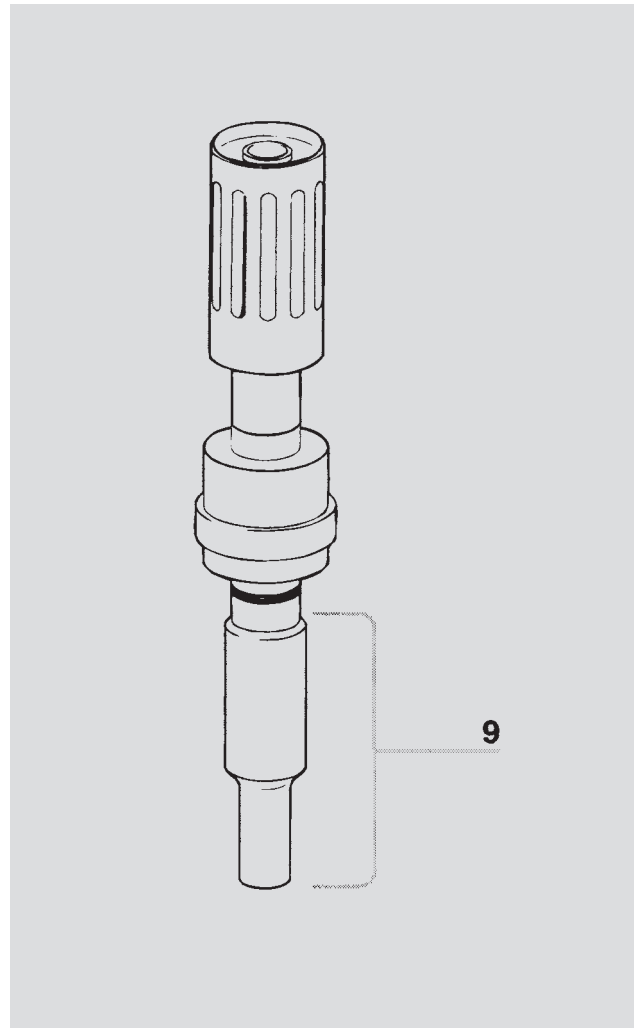
That sets limits to the shapes it may take. The geometric shape of the horn should be kept as simple as possible.

In addition to the geometric shapes, other important factors are to be considered:

1. The horn has to be tuned to the frequencies of resonance according to the table.
frequency of resonance Tolerance
35 kHz ± 50 Hz +150 / -250 Hz
2. To let the horn oscillate correctly, it should be shaped to move in the most axial direction to the surface to be welded, with the aim of transmitting the most pulses from the frontal area of the horn onto the object to be welded.
3. The amplitude of the horn is determined by the shape of the horn.

Most important in manufacturing the horn is:

- Extensive knowledge about the load factors of the various materials.



8.3.1 Horn materials

Horns must be made of special high load material. Only high load aluminum, titan and steel alloy are used.

The choice of material depends mostly on the intended application.

Other factors also influence the choice of material:

1. Rigidity of the material used for the horn in connection with the targeted oscillation amplitude.
2. Surface properties of the work piece and the related surface treatment properties.
3. The sound transmission properties.
4. The heat transmission properties of the horn material.

It must be taken into consideration that the horn is subjected too extreme mechanical loads.

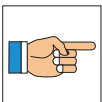
It is therefore of utmost importance to shape the horn in such a way that the plastics part to be welded is welded under optimal conditions.

With abrasive plastics, a coating of the horn surface will increase its life span.

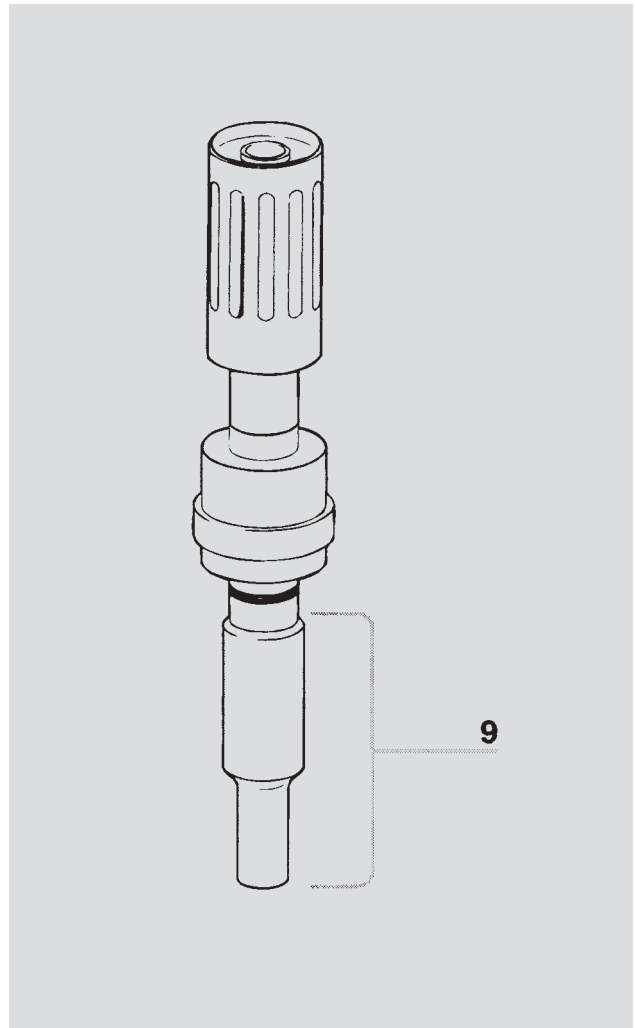
RINCO has years of experience in manufacturing horns. Manufacturing horns without the theoretical and practical experience leads to unsatisfactory and bad welding results and to poor product quality.



In some cases the oscillating system and the generator may be damaged.



The horn must be fastened with a tightening torque to 15 – 25 Nm.



8.4 Cutting table for work piece (anvil)

The cutting table for the work piece or anvil has several functions:

- to maintain the distance between the cutting edge of the work piece and the cutter,
- counter plate for the cutter so that this will carry out a clean cut,
- absorbing any vibrations and avoiding excessive wear.

In many cases, the quality of the cut depends on the shape of the cutting table and the work piece. It is recommended that the manufacturer of the sonotrode also produces the cutting table since he will be more familiar with the requirements of the application.



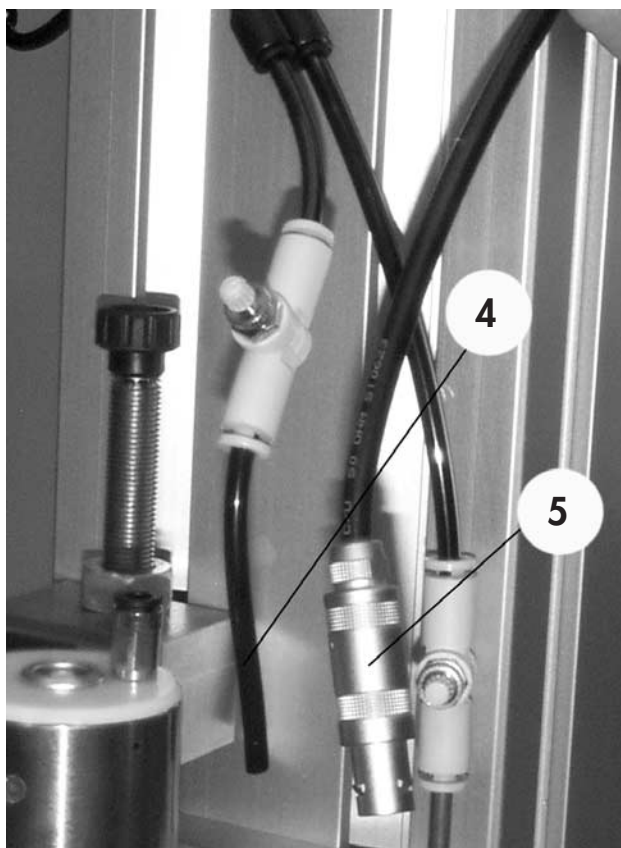
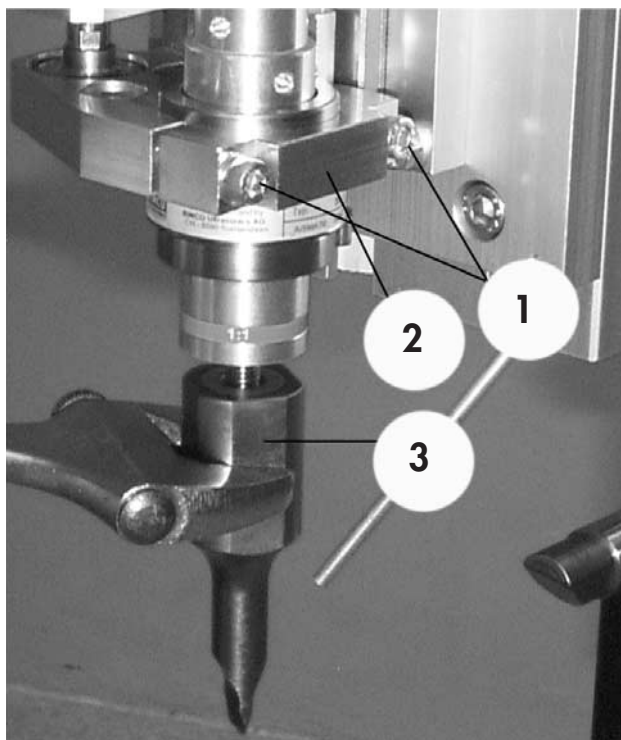
9 Replacement

9.1 Replacing the booster

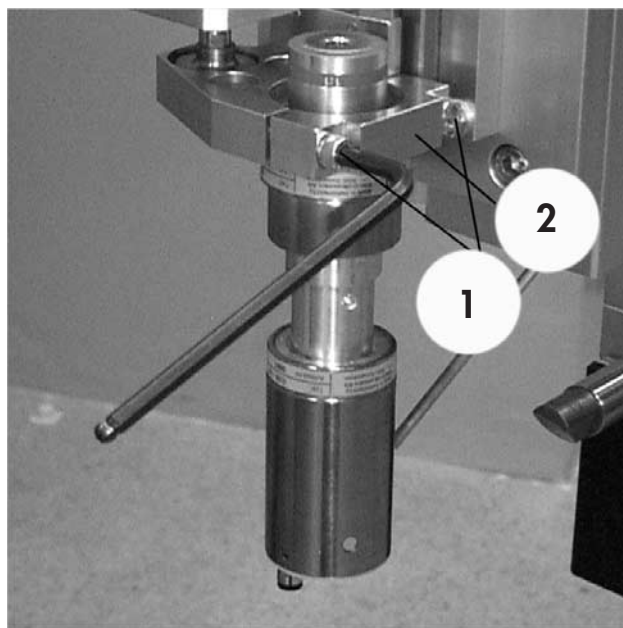


Before releasing the converter clamp (2) it is imperative that the main power switch is turned "OFF".

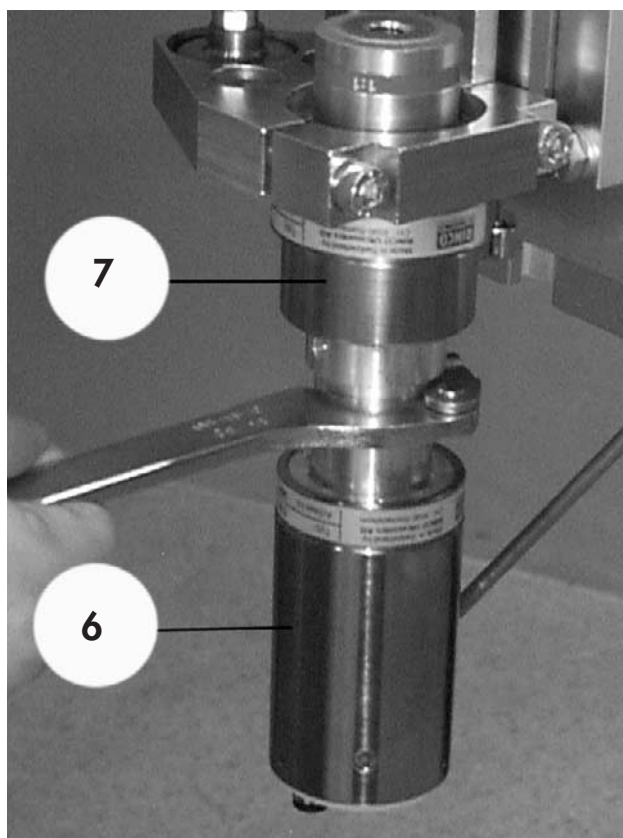
1. Release the bolts and the sonotrode (3) using the spanner.
2. Release the screw fixing (1) with the allen key (5mm).
3. Pull out the cooling pipe (4).
4. Remove the plug from the HF terminal (5) of the converter.
5. Move the whole vibration system downwards.

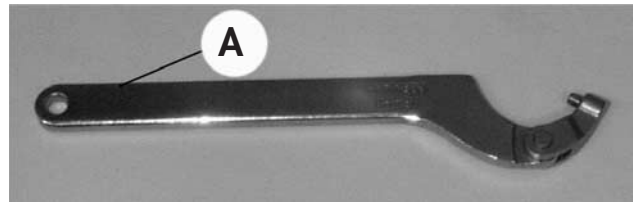


6. Move the vibration system through the lower part of the clamp (2) with the booster upwards.
7. Use the allen key 5 to tighten the screws (1) of the clamp (2).



8. Release the converter (6) with the special spanner (A) and detach the booster (7) by releasing the screws.
9. If the thread is slightly seized up, loosen the converter (6) with a light tap with your hand; use the spanner (A) as shown in figure 5.

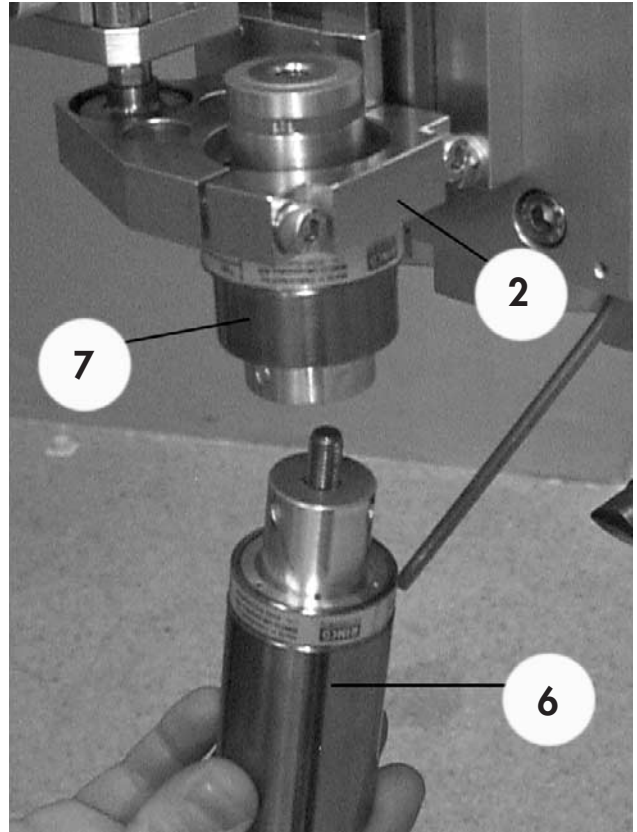




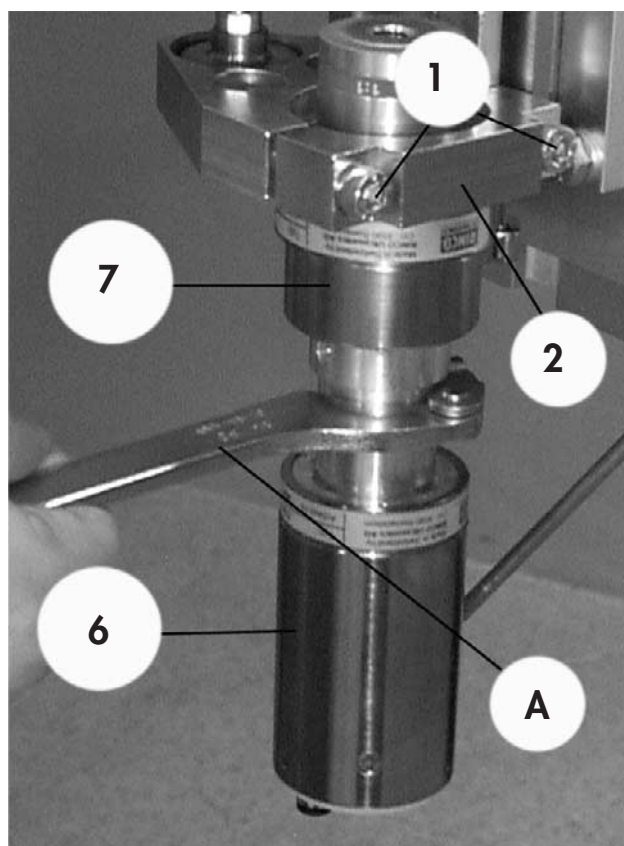
10. Again release the clamp (2).

11. Pull the booster (7) out.

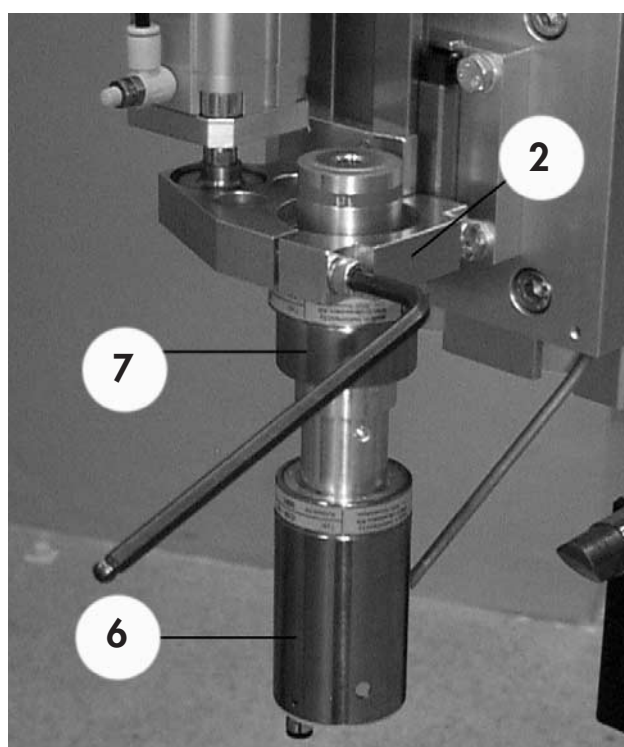
12. Attach a new booster to the bracket (2) with the thread facing downwards so that it can be screwed to the converter (6).



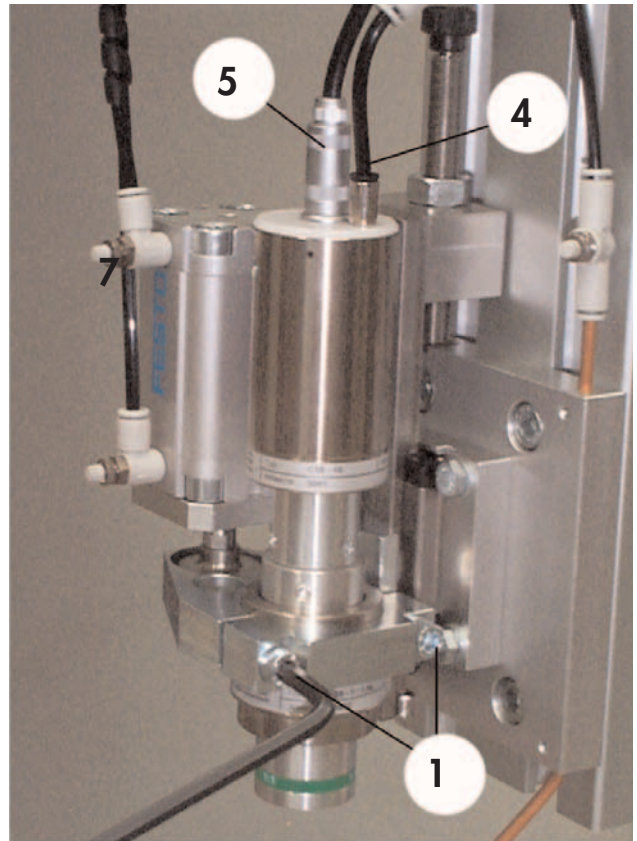
13. Lock the clamp (2) by tightening the screws (1).
14. Make the screw connection between the converter (6) and the booster (7) and use the special spanner (A) to pull tight.



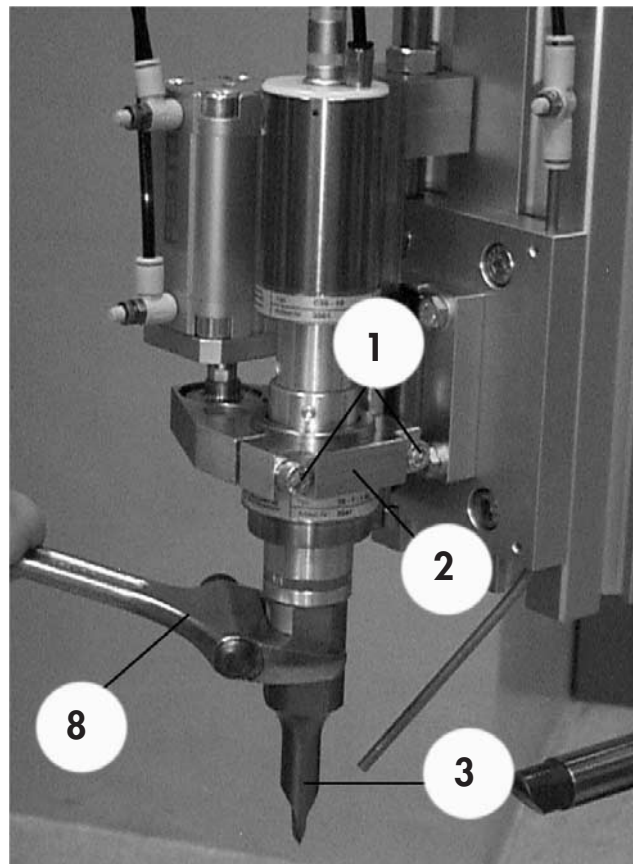
15. Again release the clamp (2).
16. Pull the converter (6) together with the booster (7) (which has been screwed to the converter) out and turn it.



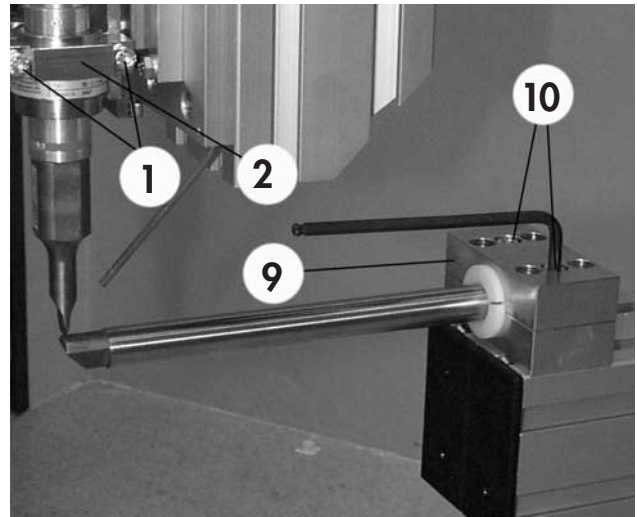
17. Again place the complete vibration system with the converter (6) uppermost.
18. Connect the plug to the HF terminal (5) and connect the cooling pipe (4).



19. Turn the screws (1) to tighten the clamp (2) of the converter.
20. Again make the screw connection between the sonotrode (3) and the booster (7).
21. Tighten the sonotrode (3) with the spanner (8).

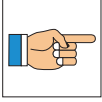


22. Align the sonotrode vertically at the anvil by releasing the clamp (2) with the screws (1) and then tightening the clamp (2) again once it has been positioned.
23. Release the fixing clamp of the anvil (9) with the screws (10). Slide the bar of the anvil along until the cutting edge of the sonotrode is placed exactly at the end of the radius; then retighten the clamp (9).
24. For further information regarding the adjustment of the cutting edge see section 6.5 Adjustments.



9.2 Parameter initialization

To prepare the Multipress and the Generator for their various tasks, the individual press functions are initialized according to the mode of operation via the generator control system.

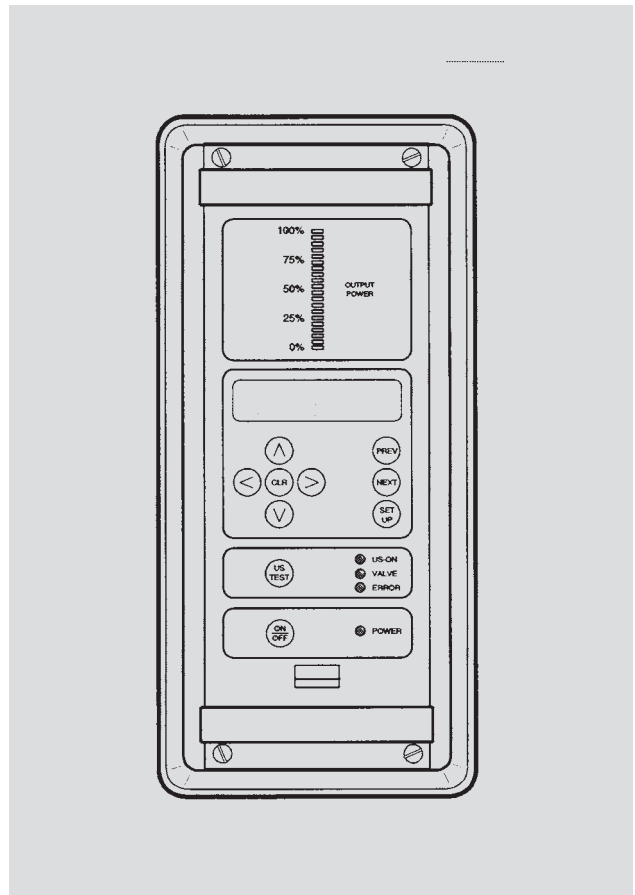


Press the PREV key and keep this depressed during firing up in order to activate the standard start-up. Press the CLR key in order to confirm the standard start-up.

When pressing the SETUP key the standard start-up will be interrupted.

In the * SYSTEM-INIT * menu you can select the following functions:

- START [MANUAL/IMPULSE/
AUTOMATIC]
- TRIGGER [FU/TIMER/EXTERNAL/RS/OFF]
- WELDING [TIMER/EXTERNAL]
- VALVE [ON/OFF]
- END SWITCH [ON/OFF]
- SOFTSTART [1-9]
- AFTERPULSE [ON/OFF]
- LANGUAGE [GERMAN/
ENGLISH/
FRENCH/
ITALIAN/
SPANISH/
DUTCH/
DANISH/
NORWEGIAN/
SWEDISH/
FINNISH]
- AMPLITUDE* [INTERNAL/EXTERNAL]
- SDF* [ON/OFF]
- TRIGGER [BEFORE/AFTER]
- PERFORMANCE
LIMIT* [ON/OFF]



9.2.1 Description of selectable functions

START (MANUAL)

- The generator must be started up MANUALLY.

TRIGGER (FU/TIME)

- The TRIGGER can be confirmed with FU or TIME.
- Standard setting: FU

WELDING TIME (TIME)

- The generator must be started up in TIME.

VALVE (YES/NO)

- The generator must be started up in the YES position.

F-C US (YES/NO)

- This function is activated when a unit was started with YES.
- Standard setting for initiation: NO
- A signal at input 2 or 3 of the connection interface interrupts the ultrasound. After the interruption a second welding can be carried out by pressing the two-handed controls. If no signal is emitted, the ultrasound will be interrupted once the welding time has elapsed. An error message is activated.

LANGUAGE (SPANISH/ENGLISH)

- Standard setting: ENGLISH

AMPLITUDE (YES/NO)

- If NO has been selected for starting up, the amplitude can be selected in the parameter submenu.
- Standard setting: NO
- When YES has been selected for start-up, the amplitude can be selected outside with the potentiometer or with a voltage of 0 – 5 V DC.

Option A

- With the 10 Ω potentiometer

Option B

- With a voltage of 0 – 5 V.
- If the internal voltage is not used, the earth connection GND 5 V is connected outside to GND.
- 0 V = 60%, 5 V = 100%

SOFTSTART (1-9)

- The duration from starting up to reaching the full amplitude can be adjusted in 9 steps.
 - 1 Slow start of vibration for sonotrodes with a large volume
 - 9 Fast start of vibration for small sonotrodes
- Standard setting: 7 (See illustration)

SDF (YES/NO)

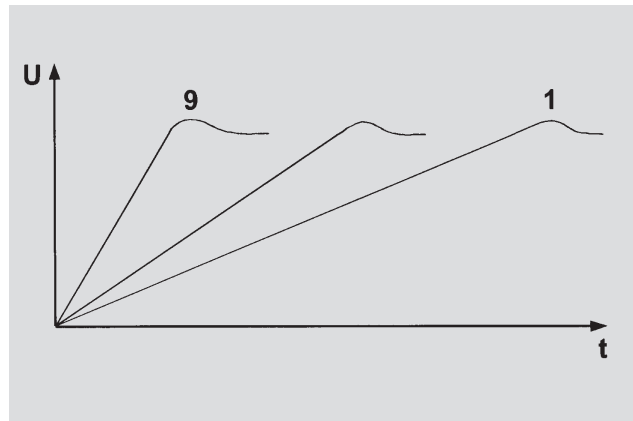
- This function is not activated unless YES is selected for start-up.
- Standard setting: NO
- Starting aid for starting up sonotrodes with large volume.

TRIGGER (BEFORE/AFTER)

- In the case of AFTER, the trigger is activated after the safety contact.
- In the case of BEFORE, the trigger is activated during the lowering movement. It is required when the welding distance is more than 6 mm.
- Standard setting: AFTER

RESET

- A signal of 24 V DC at the RESET input will interrupt the work cycle.
The machine will retract to its home position and indicate an error.

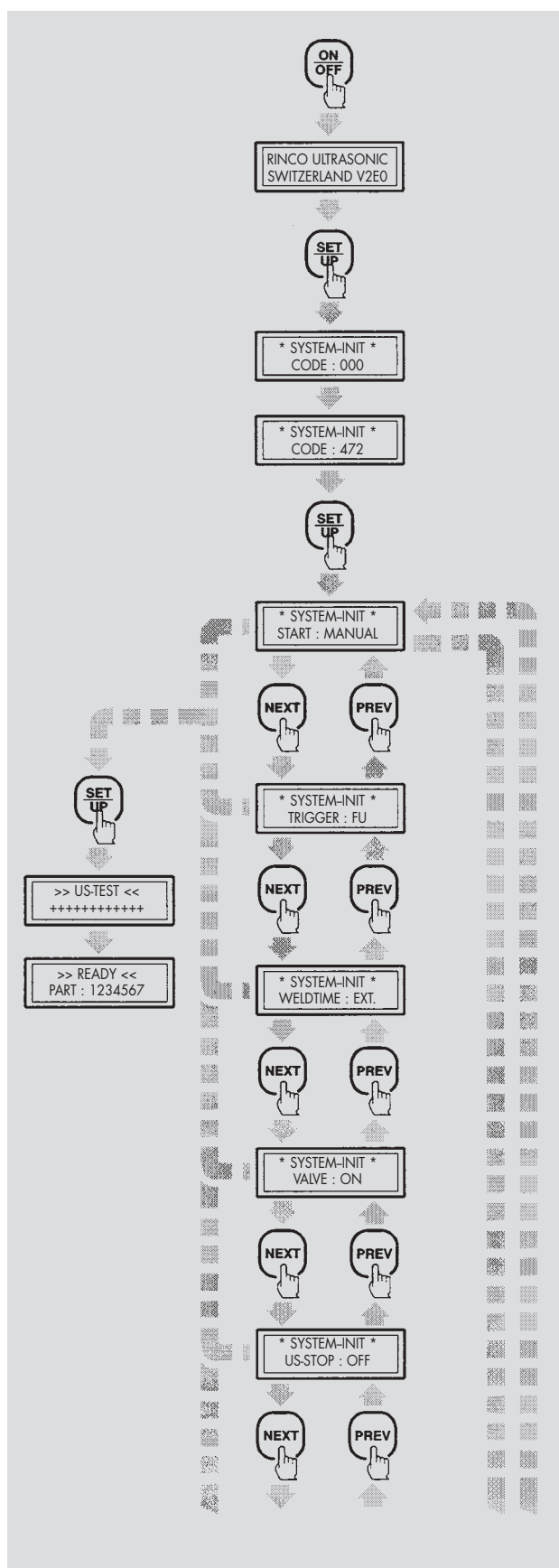


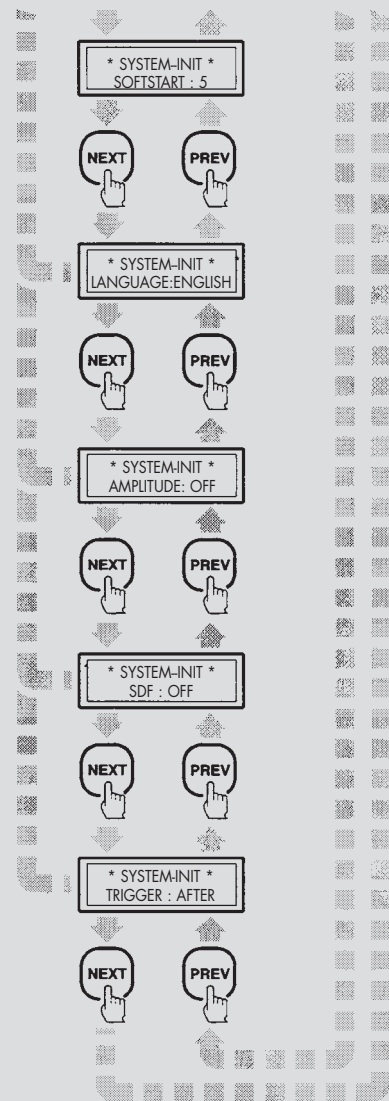
9.2.2 System initialization process



**A oscillating system must be connected.
Do not touch the horn.**

1. Press **ON/OFF** button.
2. The generator performs a self-test for two seconds during start up.
3. Keep the **SETUP** key pressed during start up.
The display shows:
* SYSTEM-INIT *
CODE : 000
4. Using the cursor keys, set code to 472.
Acknowledge by pressing the **SETUP** key.
5. Within the menus individual settings can be selected with the **CLR** key. Numerical input are made with the cursor keys.
6. Jump to next function. Press **NEXT** key. The next selectable function is displayed. To return to the previous selectable function press **PREV** key.
7. Quit SYSTEM - INIT with the **SETUP** key.
After the self-test the oscillating system is tested for half a second.





10 Cleaning and Servicing

10.1 General servicing tasks



All cleaning and servicing must be carried out by qualified personnel.

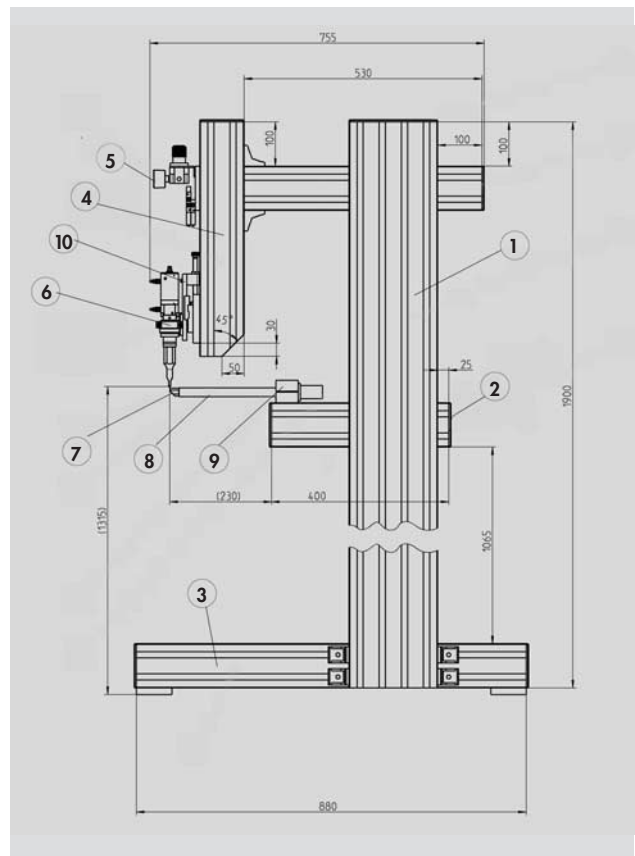
Prior to starting servicing, it is imperative to check that all services, such as power and compressed air, have been switched off.

Important: never clean the keyboard and the front of the generator with corrosive agents.

Neither the cutting station nor the generator require special servicing.

However, regular cleaning of the following parts enhances the service life of the unit:

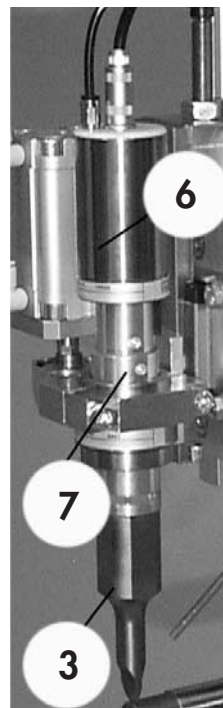
- pneumatics group (5),
- vibration system (6),
- anvil (7),
- carriage (10)



10.2 Vibration system and carriage

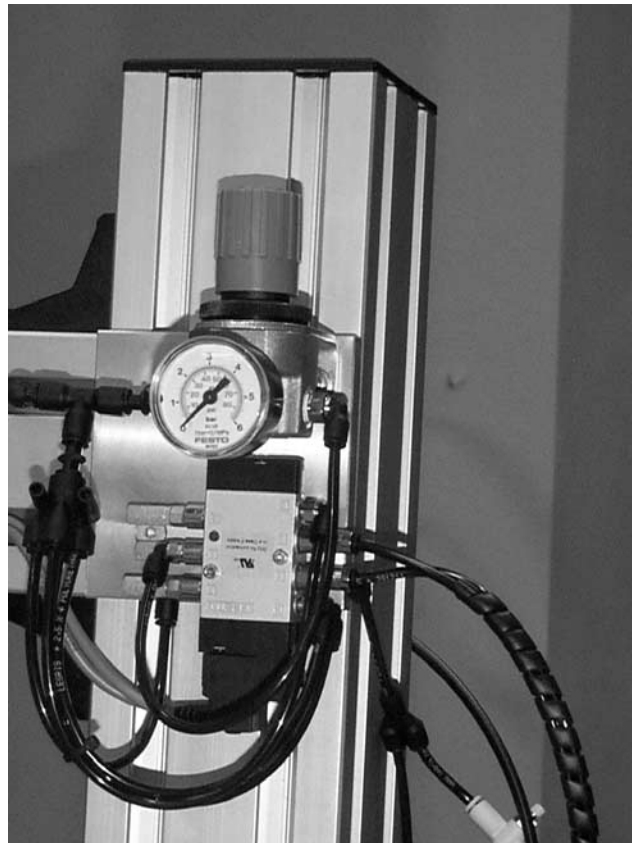
Daily cleaning:

- Converter (6)
- Booster (7)
- Sonotrode (3)



10.3 Pneumatics group

No servicing required.



10.4 Generator

Ensure that the display screen of the generator is always clean.

10.5 Oscillating system

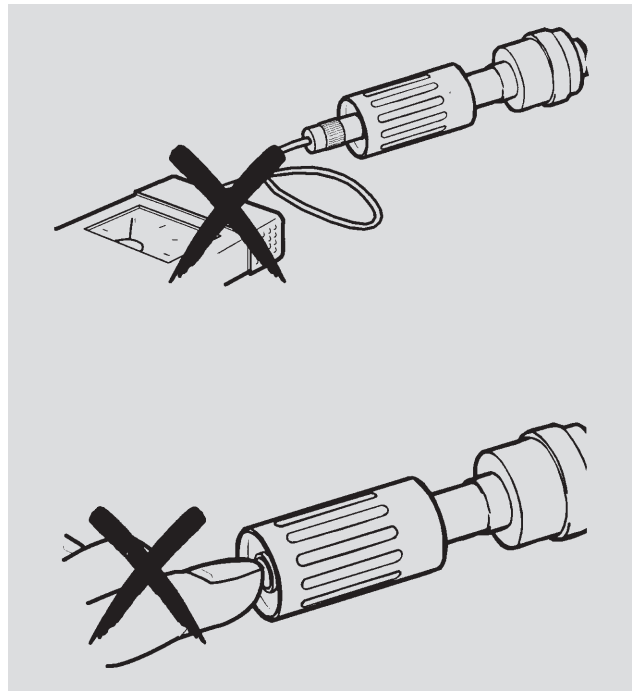


Work may only be carried out on the vibration system and converter housing when the mains voltage is switched off! High voltage!

Avoid contact with the RF connection of the converter.

Never connect any measuring instruments to the RF socket of the converter!

The converter is electrically charged even after switching off the generator.



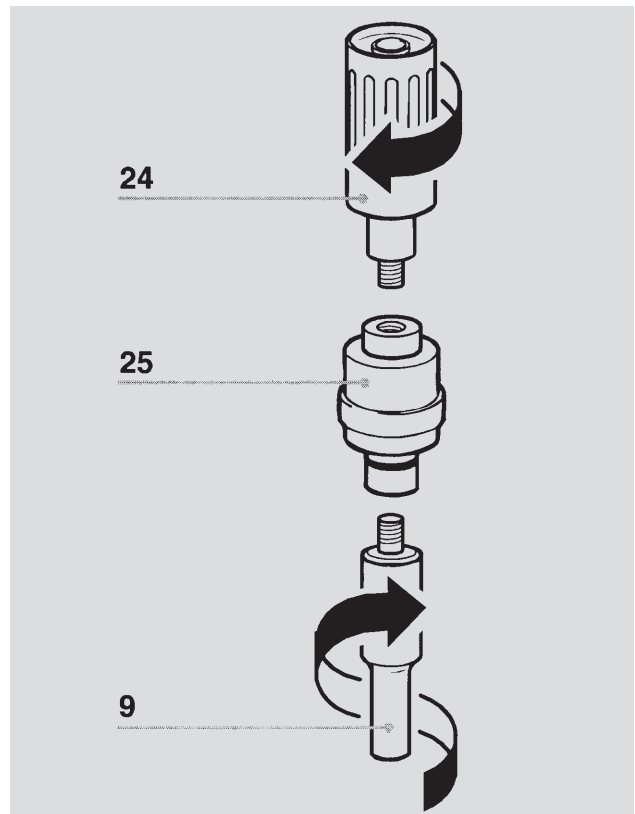
10.6 Threaded coupling

Converter (24), booster (25) and horn (9) are screwed together.

Torque: 35 kHz 15-25 Nm

Black spots on the surfaces of the booster (25) or the horn (9) are easily removed.

1. Place a polishing cloth on an even surface
2. Draw blackened spot over the cloth.



11 Error messages and trouble shooting



Troubleshooting may only be carried out by specially trained staff. In case of doubt, contact the service centre or the manufacturer directly (see appendix).

11.1 Error messages / corrective action: switching on

Error	Possible cause	Error elimination
Generator cannot be switched on	<ul style="list-style-type: none">– no voltage supply– EMERGENCY STOP button pressed– fuse faulty– module not in its housing	<ul style="list-style-type: none">– insert mains plug– release EMERGENCY STOP button– test fuses F1–F5– insert module and bolt together
After being switched on, the display shows:	<ul style="list-style-type: none">– vibration system not in use– RF cable not plugged in the vibration system or generator– error in vibration system:<ul style="list-style-type: none">a) not screwed together firmly enoughb) horn defective our outside the frequencyc) booster defectived) Converter defective	<ul style="list-style-type: none">– use vibration system– plug in RF cable– screw together more firmly– replace horn– replace booster– replace converter

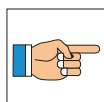
11.2 Error messages and error elimination during adjustments and welding

Error	Possible cause	Error elimination
The insert is lowering but the ultrasonic does not work	<ul style="list-style-type: none">– The setting of the trigger is very high– The pressure sensor is defective	<ul style="list-style-type: none">– Select a lower setting– Replace the pressure sensor
In spite of increasing the welding time, the parts do not fuse	<ul style="list-style-type: none">– The stop setting is very low	<ul style="list-style-type: none">– Adjust the stop to a higher setting
The machine retracts to its home position without welding	<ul style="list-style-type: none">– The safety switch was not reached	<ul style="list-style-type: none">– Keep the two-handed controls depressed until the unit reaches the safety switch or starts welding

11.3 Generator error messages during operation

Error	Possible causes
«OVERLOAD1» The generator was charged over 100% of nominal power	<ul style="list-style-type: none"> – Trigger set too high – maximum welding pressure too high – Generator output too low for intended application – Vibration system defective
«OVERLOAD2» The generator had to utilise to the full the final stage reserve capacity	<ul style="list-style-type: none"> – Amplitude too low at contact cut off during cutting operations – Mains voltage below nominal tolerance
«TRIGGER» Trigger point not reached after 10 seconds	<ul style="list-style-type: none"> – Trigger set too high – wrong Parameter initialization – Trigger system defective
«FREQUENCY» Vibration system out of frequency range of generator	<ul style="list-style-type: none"> – faulty horn or horn incorrectly tuned – faulty booster – faulty converter – faulty RF cable or RF cable not connected – faulty generator – frequency change due to coupling with the fixture
«TIME OVERFLOW» Operation time has exceeded	<ul style="list-style-type: none"> – the US-TEST key was pressed longer than 5 seconds – the control time has been exceeded during an application using contact cut off.
«RESET» The plant returns to stop as a result of an external signal	<ul style="list-style-type: none"> – 24V signal was aborted at entrance 7 of the Interfaces
«ABORT» Welding could not be carried-out according to program	<ul style="list-style-type: none"> – start button releases before safety switch was reached or before hold time run out
«HARDWARE»	<ul style="list-style-type: none"> – defective valve in the feeder – defective pressure monitoring switch in the feeder – defective safety witch – defective upper end position switch – upper end position switch not adjusted – Stroke less than 6 mm – Malfunction in the generator – defective two-hand trigger

Cancel error by pressing the **CLR** key.

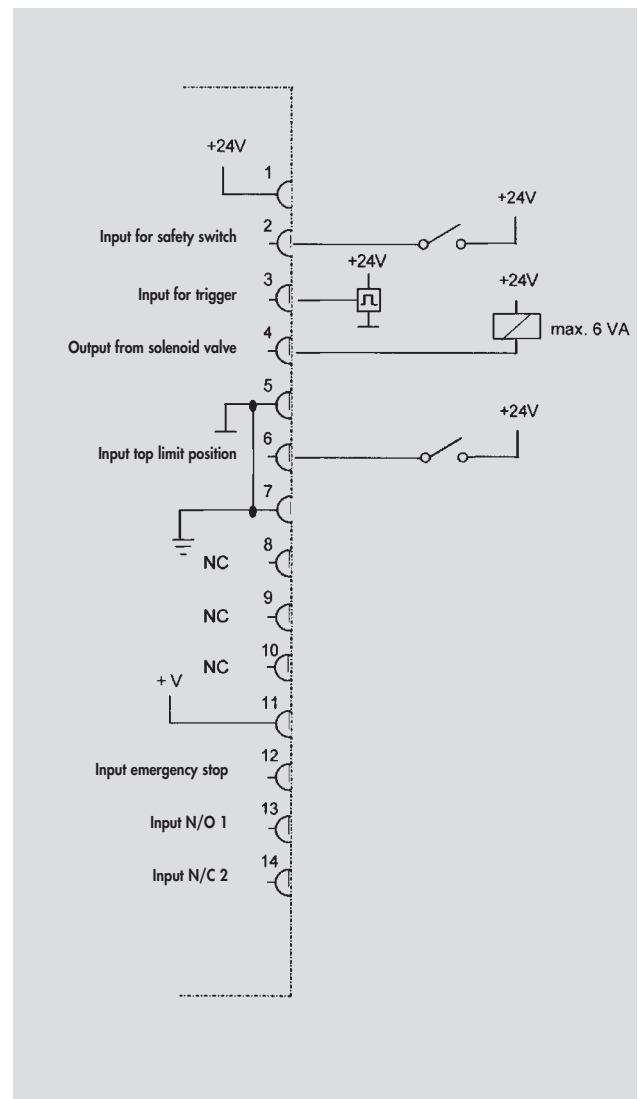


The «Hardware» error can only be canceled by switching the unit off.

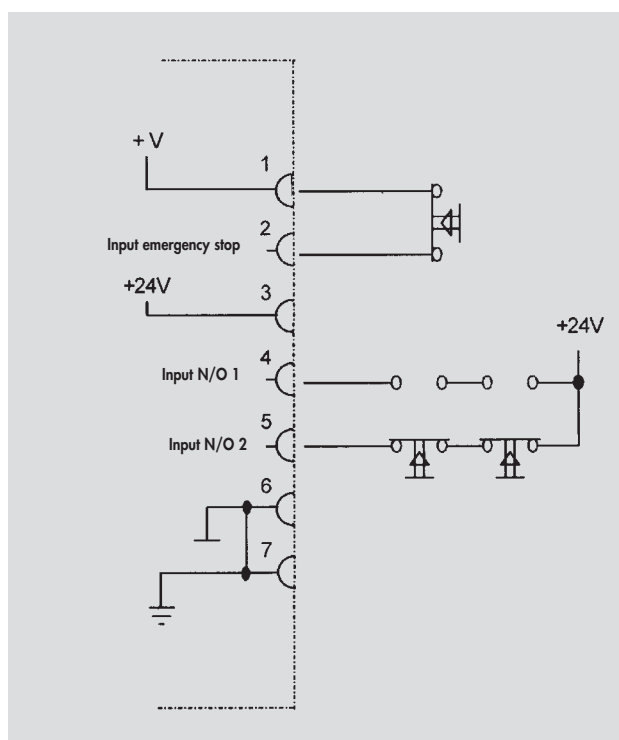
12 Electric wiring diagrams

12.1 Wiring diagram for the SL generator

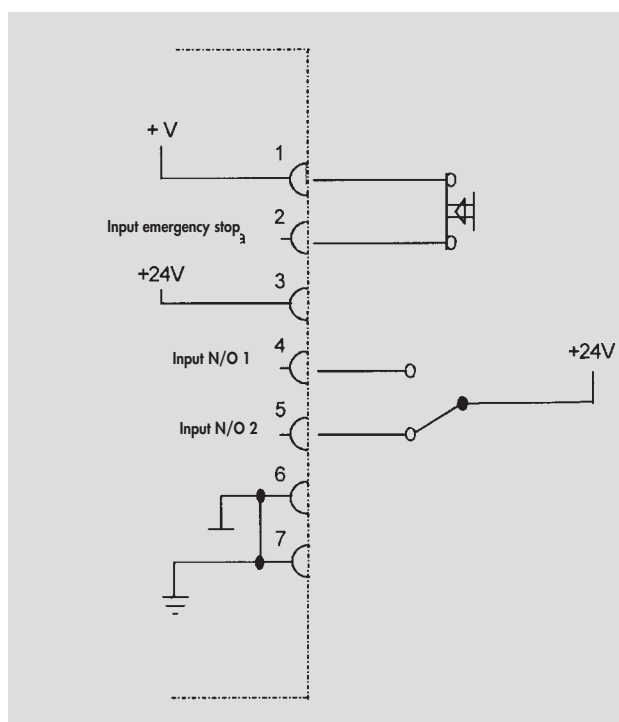
12.1.1 Operating element STO1



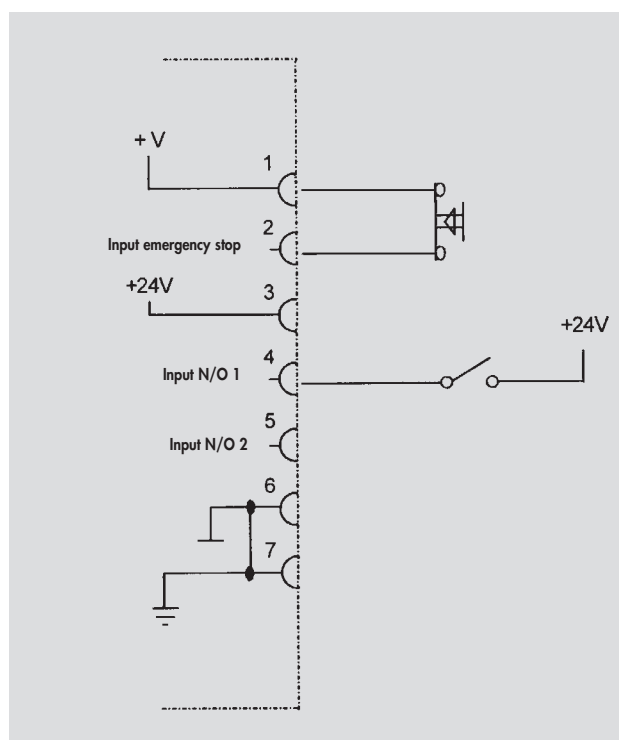
12.1.2 Manual starter STO2 (standard)



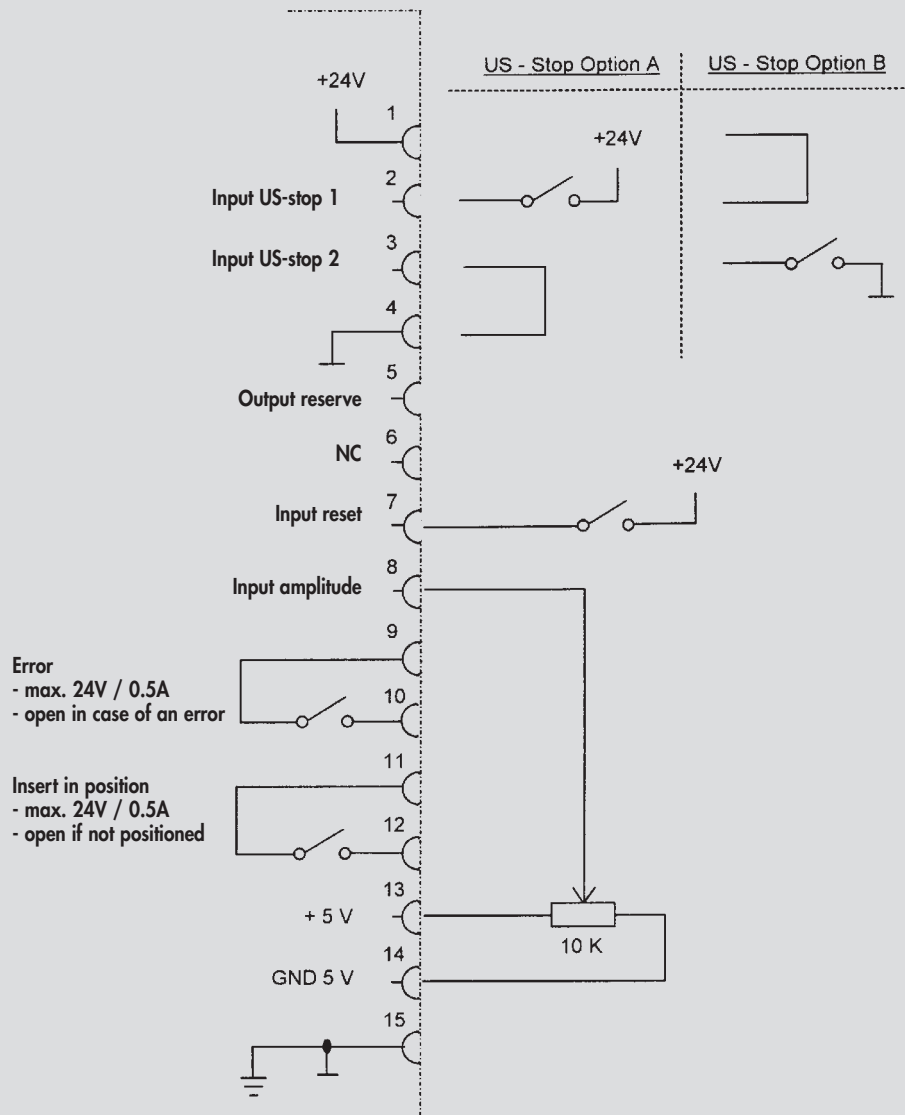
12.1.3 Manual starter STO2 (optional)



12.1.4 Automatic start-up STO2 (pedal)



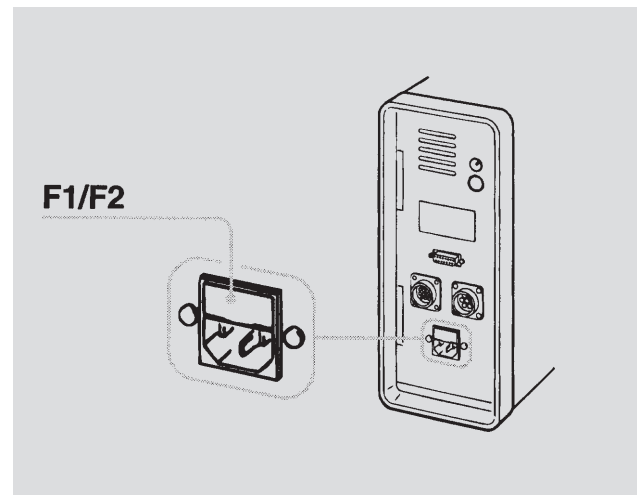
12.1.5 Interface STO3



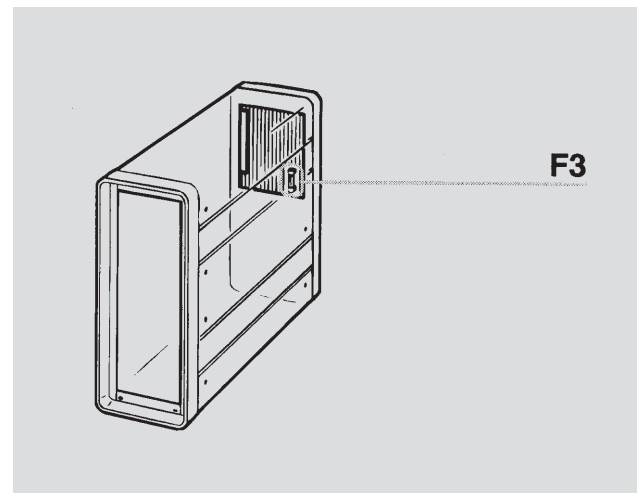
12.2 Melting strips

The melting strips are situated on the following components:

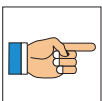
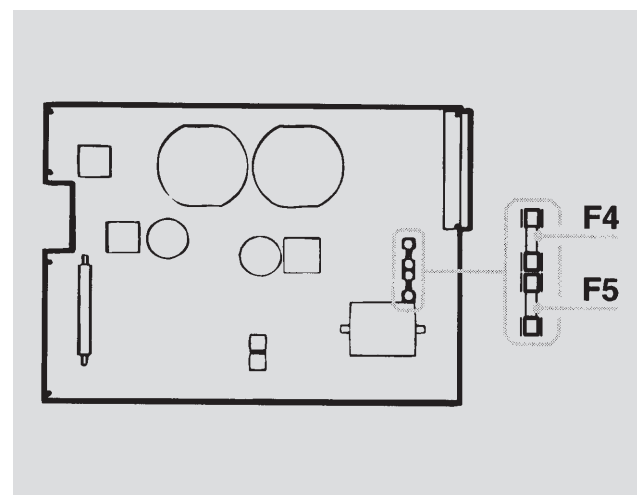
On the base of the mains terminal



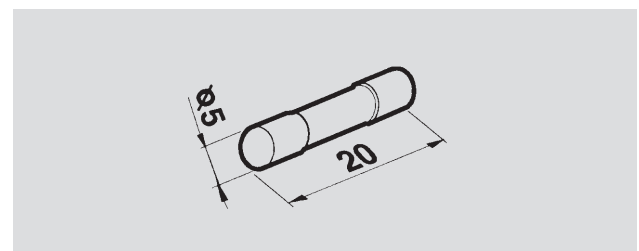
Bus print



Module of generator



All fuses are of equal size: 5 x 20 mm

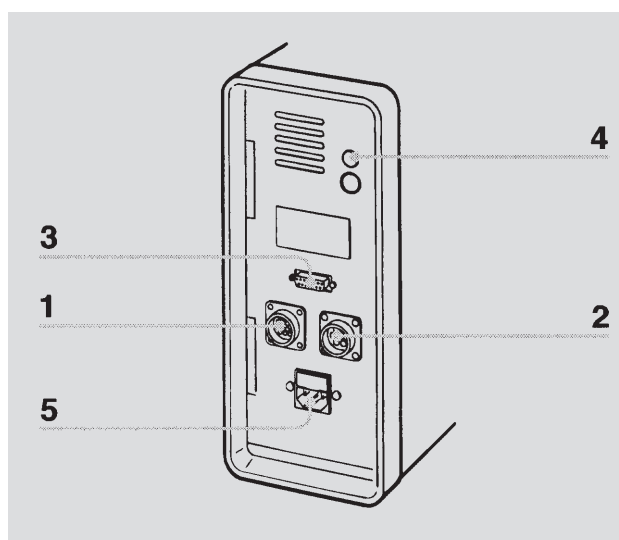


12.3 Listing of fuses

Generator	Base of mains terminal		Bus print F3	Module of generator	
	F1	F2		F4	F5
GM35-400	4 A/T	4 A/T	400 mA/T	4 A/T	100 mA/T
GM35-600	4 A/T	4 A/T	400 mA/T	4 A/T	100 mA/T
GM35-900	6,3 A/T	6,3 A/T	400 mA/T	6,3 A/T	100 mA/T

12.4 Back part of generator SL 35

- 1 STO1
- 2 STO2
- 3 STO3
- 4 STO4
- 5 STO5



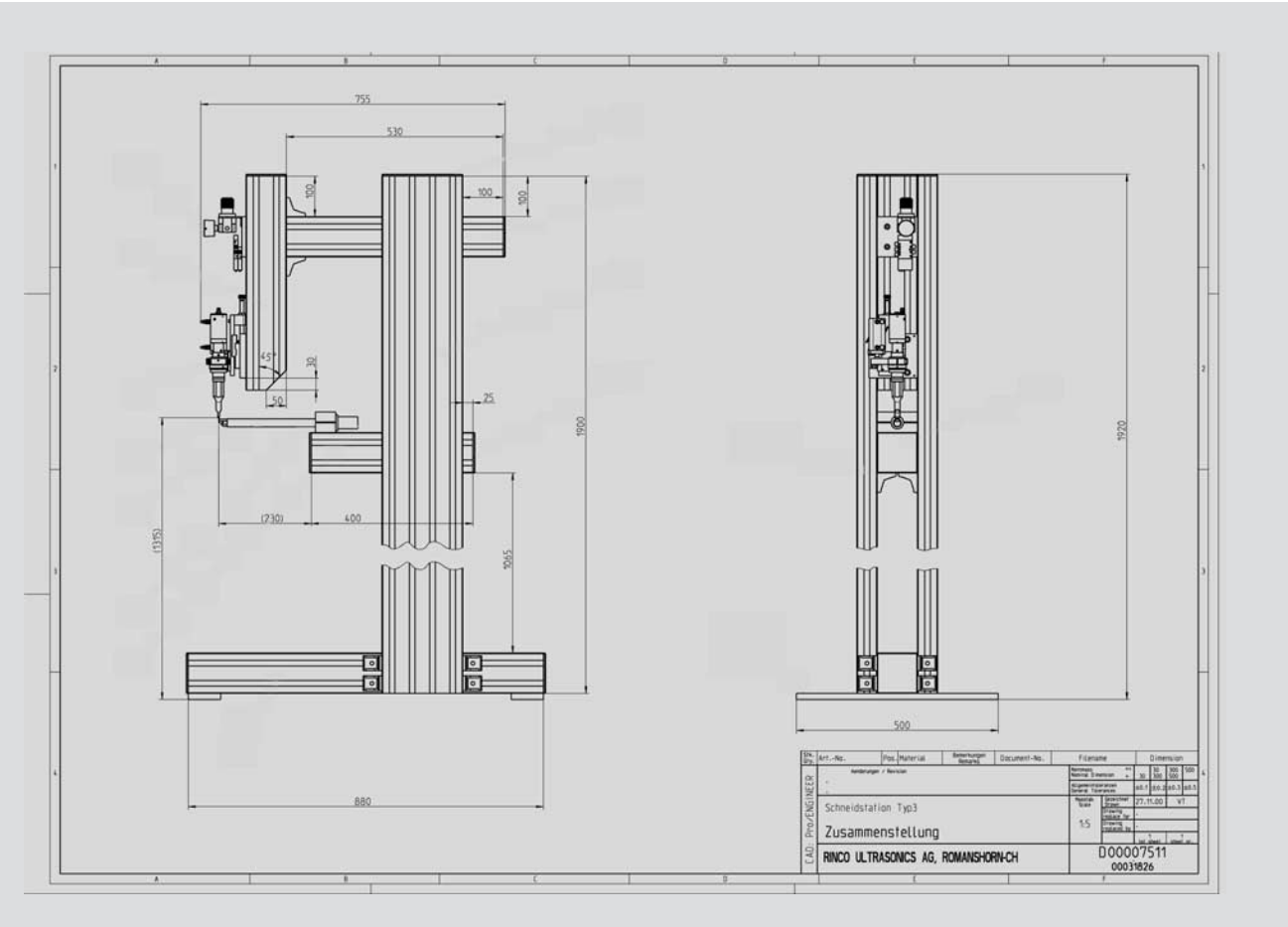
12.5 Listing of the connection terminals of the unit

List of generator base plates			RINCO order number
STO1	Base plate	14-pole AMP	5445
STO2	Base plate	7-pole AMP	5442
STO3	Base plate	SUB-D 15-pole	5469
STO4	Base plate	Lemo 1	7255
STO5	Base plate	250V / 8A	120-1517

List of terminal connections			RINCO order number
ST1	Plug	14-pole AMP	5443
ST2	Plug	7-pole AMP	5440
ST3	Plug	SUB-D 15-pole	5446
ST4	Plug	Lemo 1	2647
ST5	Mains cable	250V	depending on country

13 Technical drawings and dimensions

13.1 Drawing of cutting station

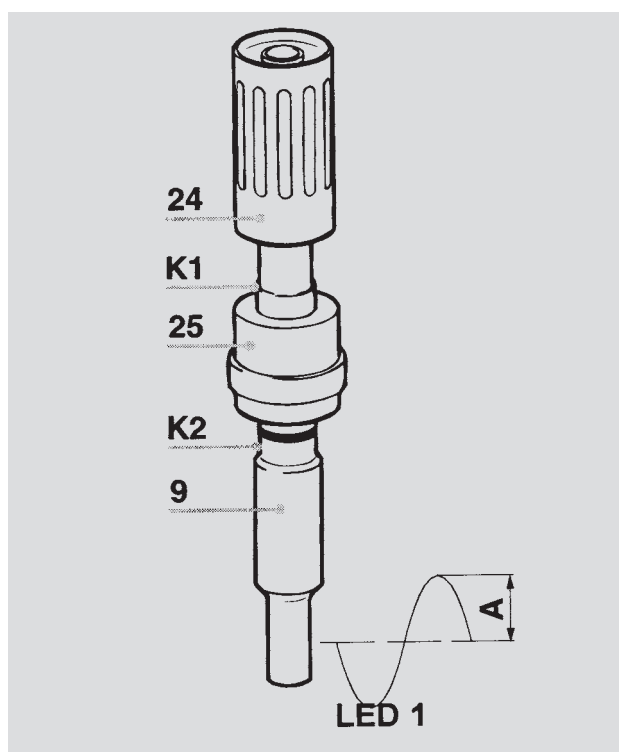


13.2 Amplitude values of the GM generator module series

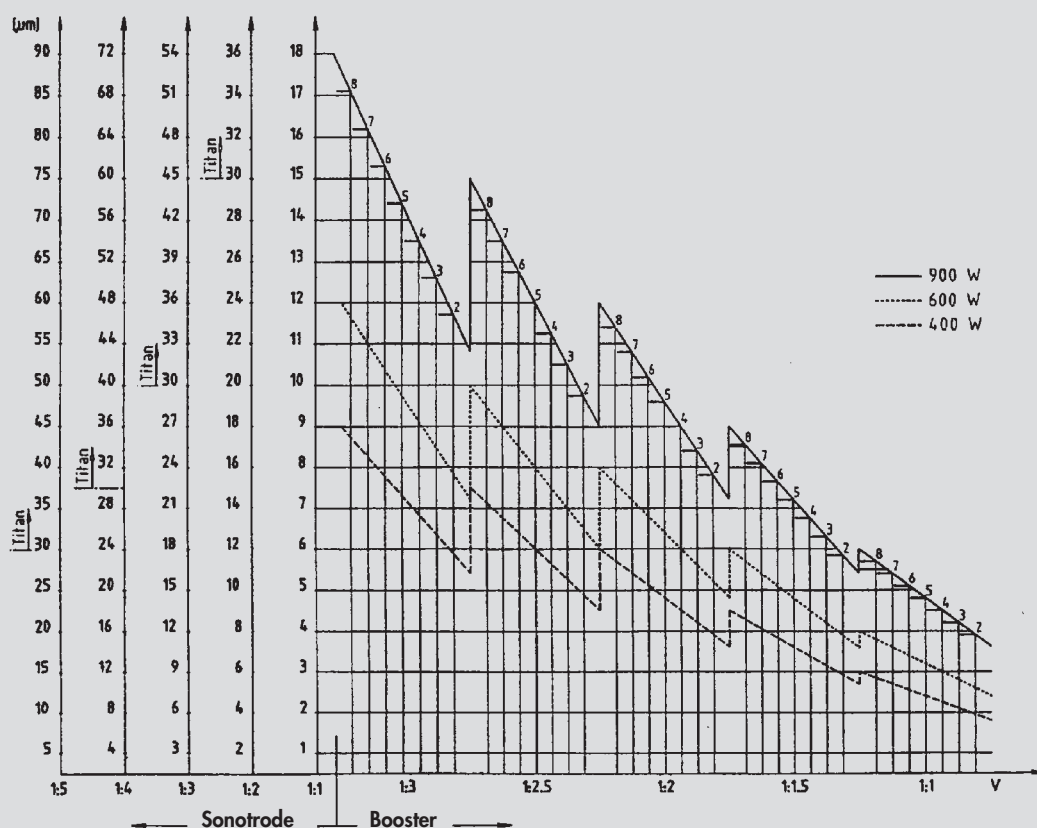
The different generator outputs generate different amplitudes. The value of the amplitude described in the diagram below refers to the respective configuration of the generator/booster/sonotrode.

The effective amplitude of the welding is directly listed.

- 9 Sonotrode
- 24 Converter
- 25 Booster
- A Amplitude
- K1 Connecting surface
- K2 Connecting surface

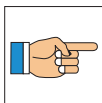


13.3 Amplitude of SL generators with 35 kHz



13.4 Length of screws of the different components of the vibration system for 35 kHz

2.4 Converter



The screw is an integral part of the converter, it cannot be removed.

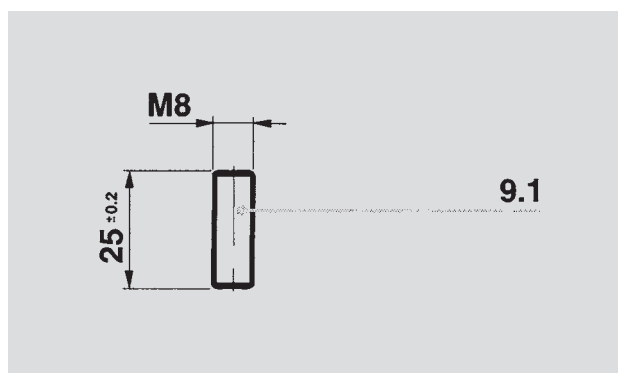
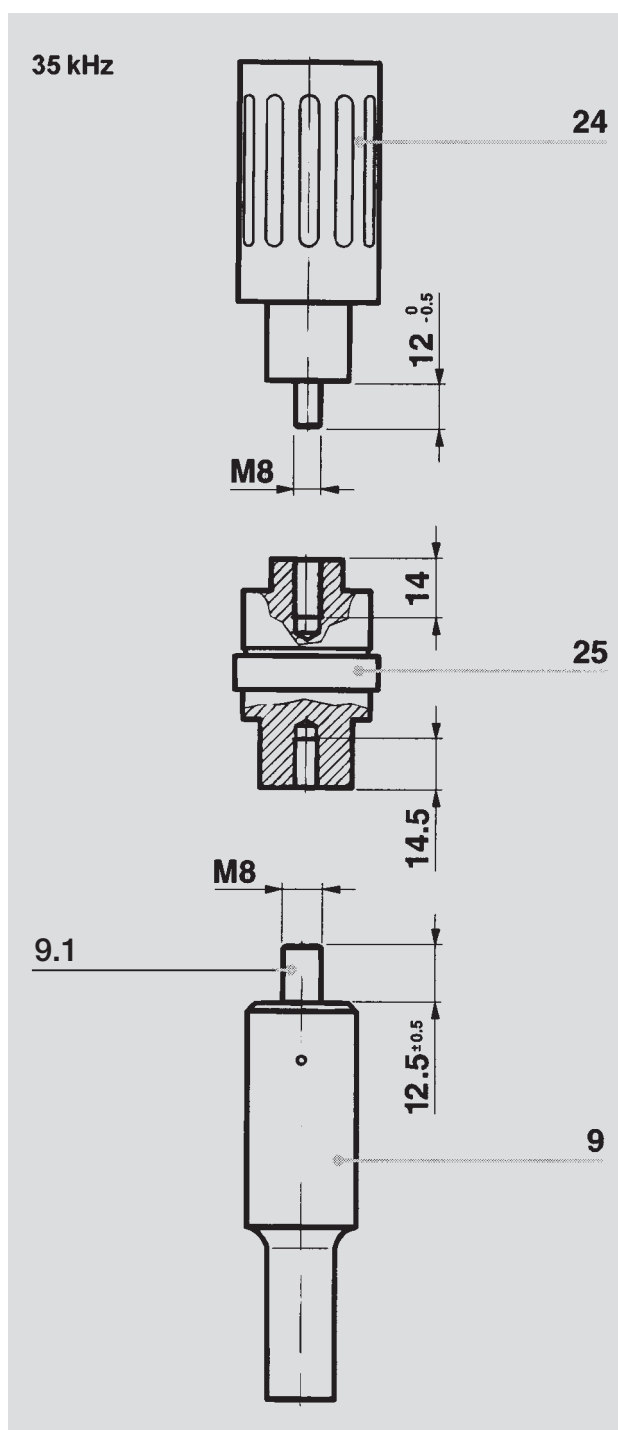
25 Booster

The connecting surfaces are placed exactly parallel between the front and connection face.

9 Sonotrode

9.1 Sonotrode screw

The sonotrode screw is manufactured from highly resistant steel or titanium.



14 Addresses of technical customer service

The RINCO ULTRASONICS customer service is available for you in case of faults or welding problems.

In order to be able to give you correct advice, our customer service requires the following data:

1. Model and serial number of your unit
2. An exact description of the fault or cutting problem

Our address:

RINCO ULTRASONICS AG

Industriestrasse 4
CH-8590 Romanshorn
Switzerland

Switzerland

Phone 071 466 41 00

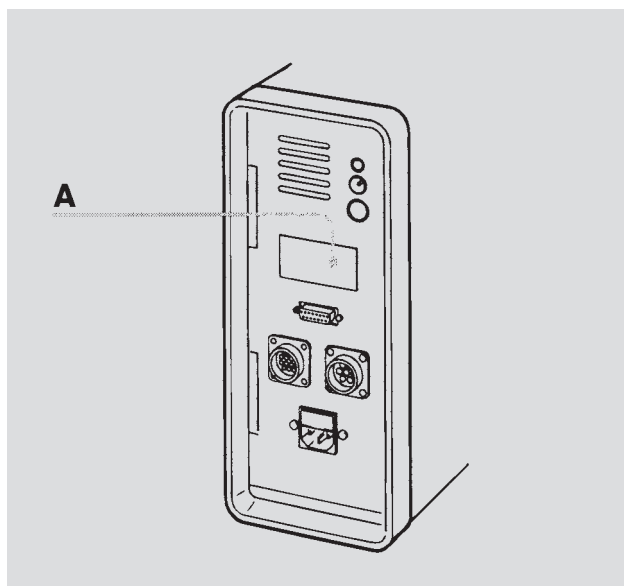
Fax 071 466 41 01

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