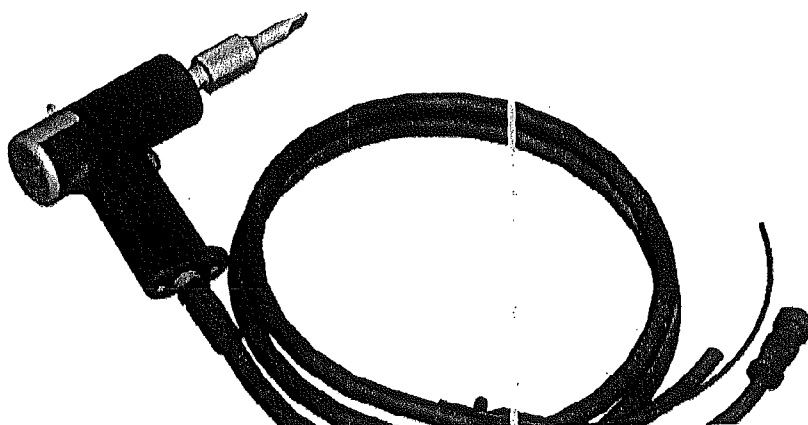
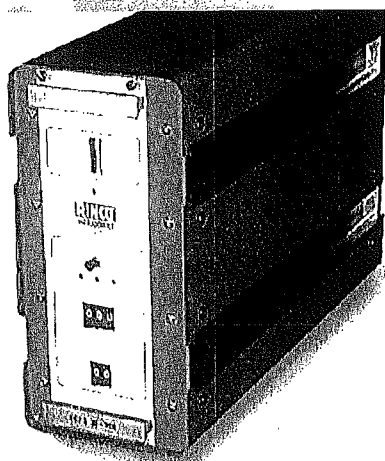
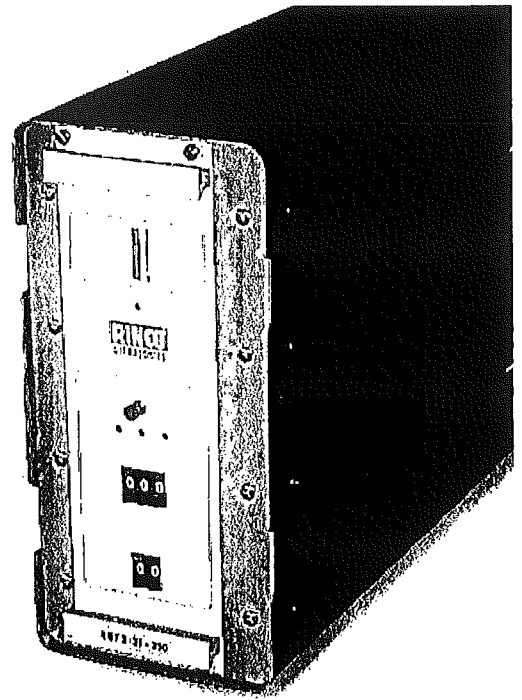


Operating Manual

CE



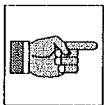
HAND WELDING DEVICE HG35-3
WITH GENERATOR RL35



Copyright by Rinco Ultrasonics AG, Switzerland

Version 1.0, gb, Art.-No. 34851

Note



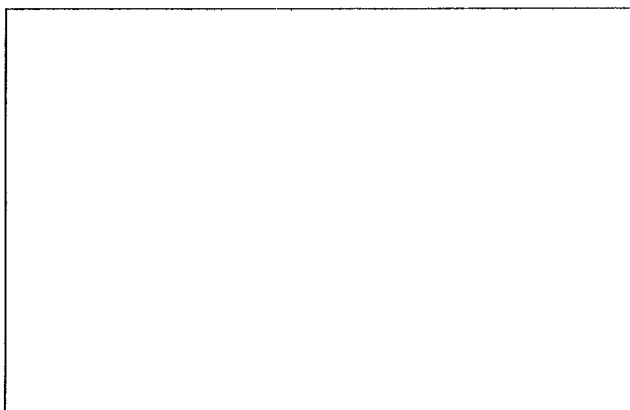
Read this operating manual and study it carefully before unpacking and putting the device into operation. The device may only be used, maintained and repaired by persons who are familiar with the operating manual and the applicable regulations concerning working safety and accident prevention.

Device specification

Sticker hand device

Sticker Generator

Representative



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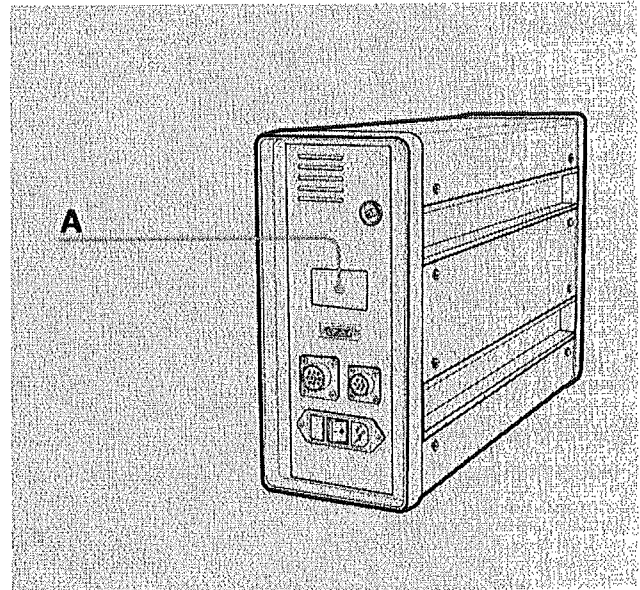
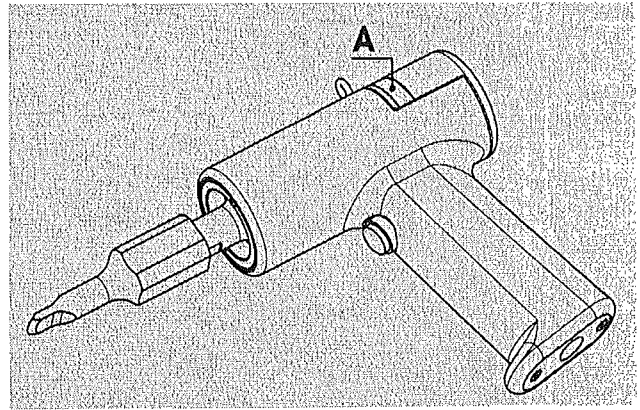
Important!

Please quote the exact type designation and the device serial numbers in all enquiries concerning your device.

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

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

RINCO ULTRASONICS AG
Romanshorn, Switzerland



Preface

Congratulations on having purchased the device.

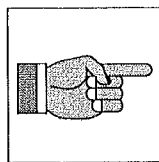
This manual is designed to provide buyers and users with all the information they will need to handle, install, operate and maintain the device.

To ensure that the system is always ready for operation, it is necessary to follow the notes and instructions in 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 device conforms to the current state of engineering and is safe to operate. The individual modules and the completed device are subject to continual inspection by our quality assurance department.

2.2 Intended purpose

! This device 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. This product is intended for industrial use.

2.3 Not used as intended

- Operating the equipment without required knowledge of how to operate, maintain and service the equipment.
- Alterations, additions and modifications to the welding equipment and the generator that could impede safety without the explicit written permission of Rinco Ultrasonics.
- Software alterations at the software control level
- Working with improper materials.
- Opening the equipment during operations
- Improper handling of the converter while under voltage.
- Setting off the two hand trigger by a second person.

2.4 Special points to note

Before you start up the device for the first time, read this operation manual carefully. Always keep the operating manual handy at the site of the device.

2.5 Choosing staff

Only authorised personnel should work on the welding press. Only deploy trained personnel. Responsibilities for operation, set-up, maintenance and repair work must be clearly defined. Ensure that only authorised personnel carry out any work on the welding press. Any work on the electrical equipment of the welding press should only be carried out by a trained electrician or by suitably trained personnel working under the guidance and supervision of a trained electrician, in accordance with electrotechnical regulations. Only personnel with knowledge and experience of pneumatics should work on the pneumatic equipment.

2.6 Installation



Danger!

Peripheral connection work should only be carried out after the mains cable is disconnected. The power connection should always be earthed.

Any safety regulations in force in the country of installation must be observed.

The manufacturer accepts no responsibility for any damage to property or personal injury caused if any such regulations are not observed.

Make sure the equipment is in a secure and safe condition before starting to operate it. Only dry compressed air should be used with the equipment. If necessary a water separator must be installed to ensure the air is dry.

2.7 Operation



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



Danger!

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

- Carry out all operations in such a way as to maximise personal safety.
- The welding press should only be used when all safety and security equipment such as detachable safety equipment, the EMERGENCY STOP button, sound protection are available and usable.
- Before switching the welding press on, make sure that nobody could be injured by the starting press.



The correct operation and the careful handling of equipment and their tools:

- maintains operational readiness,
- lengthens the working life and
- reduces downtime to a minimum.

2.8 Noise emissions



Caution!

Limits: According to currently accepted thinking on the subject, ultrasound doesn't cause any damage, so long as the maximum noise level is under 140 dB and the average, over the course of an 8 hour day, is under 110 dB.

Special care should be taken in respect of the sub-harmonic, i.e. audible oscillations which can fluctuate greatly and can have very uncomfortable and damaging effects. Of importance here is the energy equivalent long-term noise level (Leq) limit of 85-87 dB(A) based on a typical working period of a min. 8 hour day / max. 2,000 hours/year.



While welding certain materials the noise level may exceed 70 dB (A). Counter measures:

- Wear ear plugs
- Wear noise dampening helmet (optional)
- Operation with sound protection box
(Data taken from SUVA Information No. 86048 d 4.94)

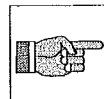
For further measured values, see "Sound measurement report of RINCO systems", No. 920-3903/1.95

2.9 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 Manufacturers).

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.

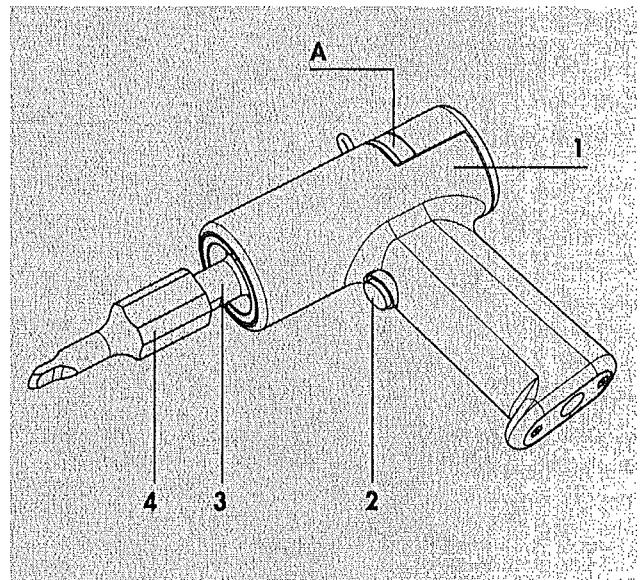
The factory settings are performed at 20° C. The ambient temperature can range between 10° C and 45° C during operation.

4 Product information

4.1 Product overview

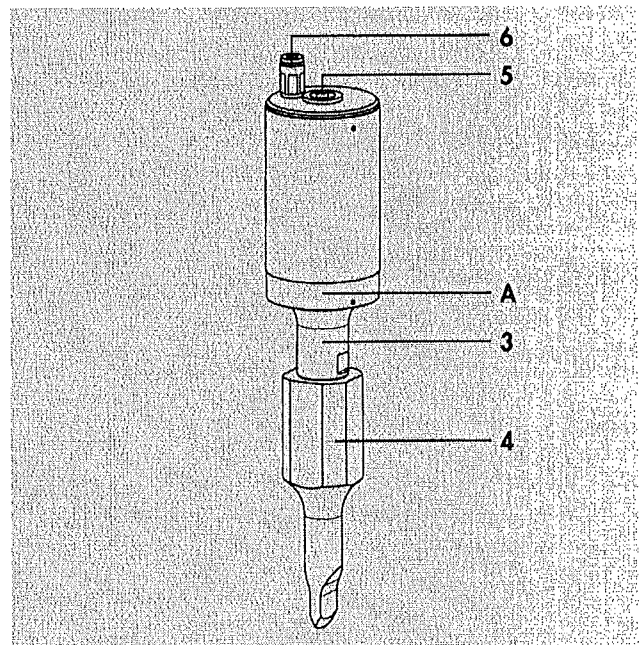
4.1.1 Hand held welding device

- 1 Handle
- 2 Trigger switch
- 3 Converter
- 4 Horn
- A Name plate



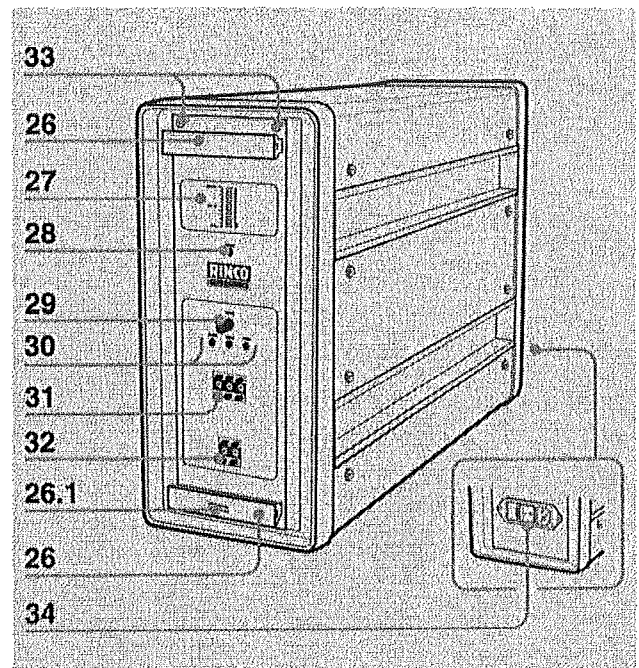
4.1.2 Vibration system

- 3 Converter
- 4 Horn
- 5 HF socket
- 6 Cooling connection
- A Type designation

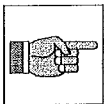


4.1.3 Ultrasonic generator RL35

- 26 Generator module handle
- 26.1 Model designation
- 27 LED bar
- 28 LED, power
- 29 Function key "US-TEST"
- 30 Status displays
 - US ON (green)
 - VALVE (green)
 - ERROR (red)
- 31 Weld time
- 32 Hold time
- 33 Fastening screws
- 34 Mains switch

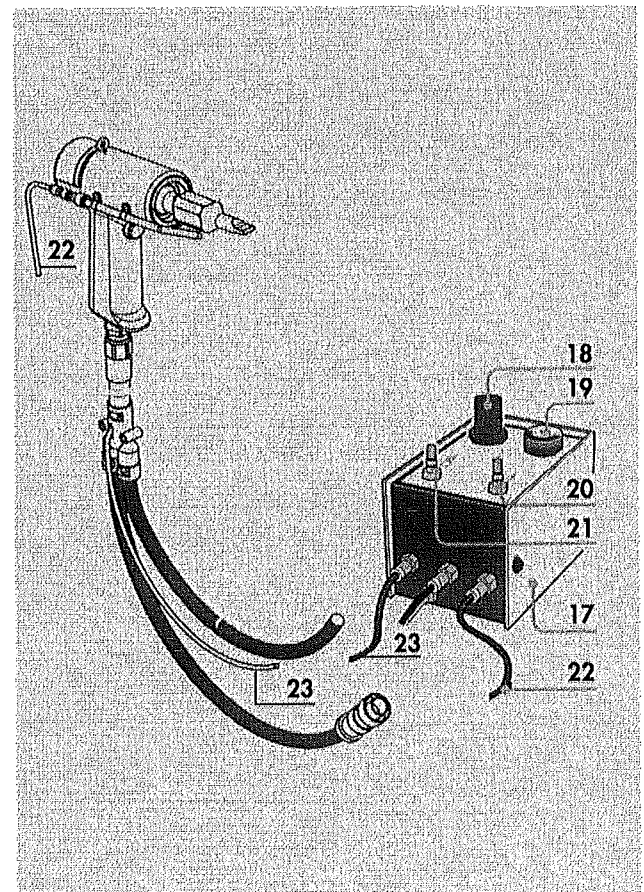


4.1.4 Cooling (optional)



It is necessary to cool the horn and the converter for heavy duty use. The cooling system illustrated can be additionally fitted.

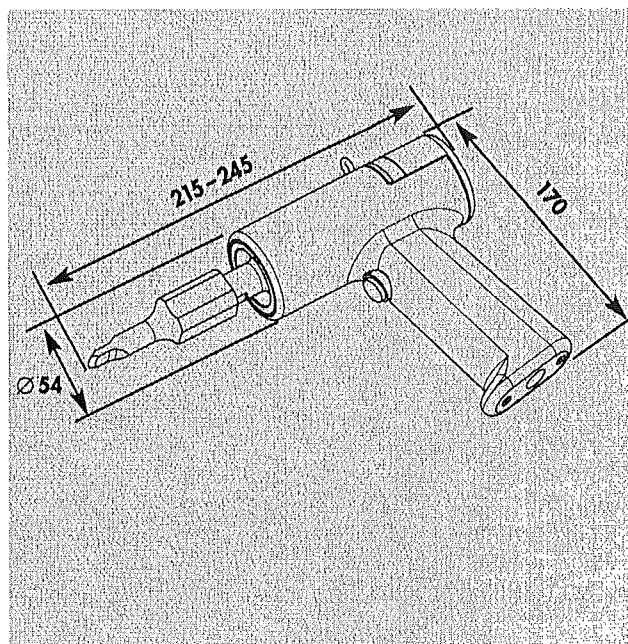
- 17 Valve box
- 18 System pressure control
- 19 System pressure indicator
- 20 Horn cooling-air controller
- 21 Converter cooling-air controller
- 22 Horn cooling-air hose
- 23 Converter cooling-air hose



4.2 Technical data

Hand welding device HG35-1

Dimensions in mm



4.2.1 Concept

- Robust handy housing
- Ergonomic trigger switch
- Piezoelectric converter
- Connecting screw thread for horn: M8

4.2.2 Compressed air

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

4.2.3 Dimensions

- Dimensions: see fig. page 14

4.2.4 Weight

- With converter and horn: 1.1 kg

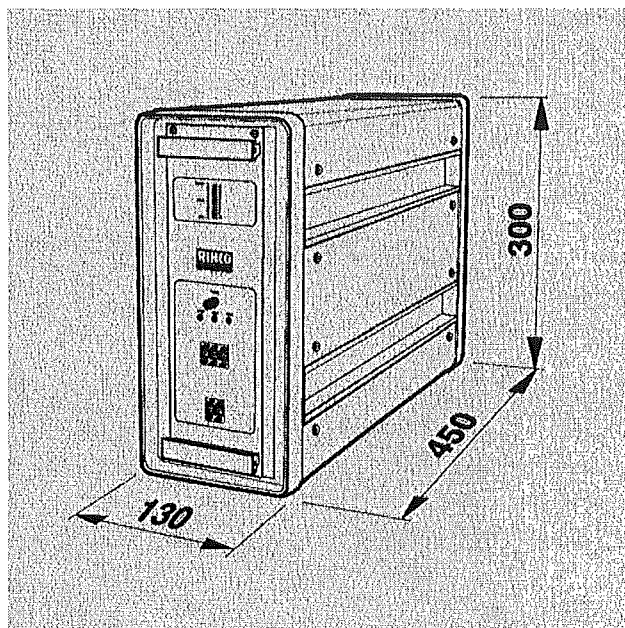
4.2.5 Connecting cables

- With integrated air hose
- Standard length: 3m
- Other lengths: on request

4.3 Technical data

Ultrasonic Generator RL35

Dimensions in mm
Weight: 7 kg



4.3.1 Concept

- Flexible modular system with various insertable modules.
- Well arranged and simple input of parameters.
- Optimum efficiency and low power loss.
- Detection of system malfunctions.
- Interface to higher-level PLC control system

3.4.2 Available generator modules

Type	max. power
UGF 35-250	250 W
UGF 35-400	400 W
UGF 35-600	600 W

4.3.3 Connected loads

- 230 V 50-60 Hz
- Optional 200 V
110 V (bis 600 W)
- Maximum current consumption 5 A

4.3.4 Dimensions

- Dimensions: see fig. page 16

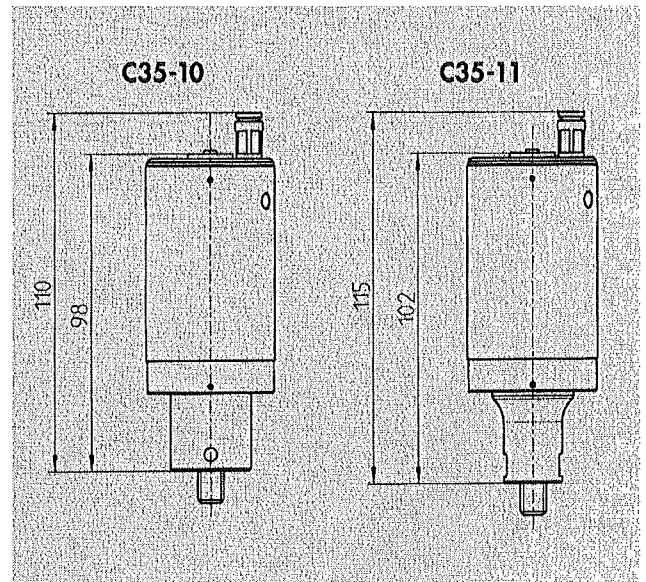
4.3.5 Weight

- Weight: 7 kg

4.4 Technical data

converters C35-12 / 13

Dimensions in mm



4.4.1 Housing

C35-12 / C35-13

- closed steel housing
- With connection for cooling air, hose $\varnothing$ 4 x 2,5

4.4.2 Amplitude amplification

C35-12

Amplification: none

Amplification ratio: 1 : 1

C35-13

Amplification: Converter with integral amplifier

Amplification ratio: 1:1.4

4.4.3 Fastening

- Fastening: directly to the housing

4.4.4 RF connection

- Appliance socket: Lemo 1

4.4.5 Dimensions

- Dimensions: see fig. page 18

4.4.6 Weight

- Weight: ca. 0.3 kg

5 Controls and indicators

5.1 Hand held welding device

2 Trigger switch

This activates the ultrasonic vibrations.



Do not touch the horn !

8 Clamping ring

This tightens the converter.

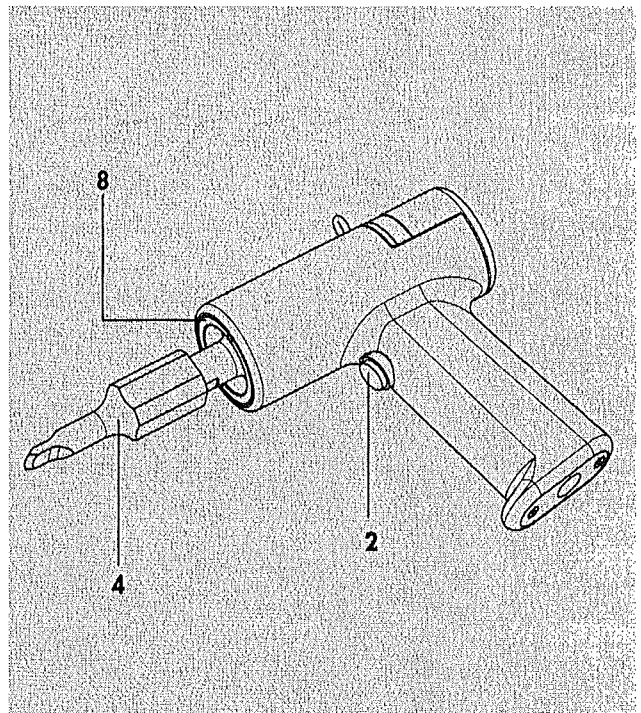
4 Horn



Never alter a tuned horn mechanically.

This can result in damage to the vibration system und generator.

The horn is the actual sonic tool. It is tuned to the resonance frequency by the manufacturer-ers.



5.2 Valve box (optional)

18 System pressure controller

The air pressure is set with the system pressure controller. Setting the required value is made by withdrawing the rotary adjusting knob. When the knob is in the desired position, lock it by pressing it downwards.

Maximum connected pressure: 7 bar

19 System pressure indicator

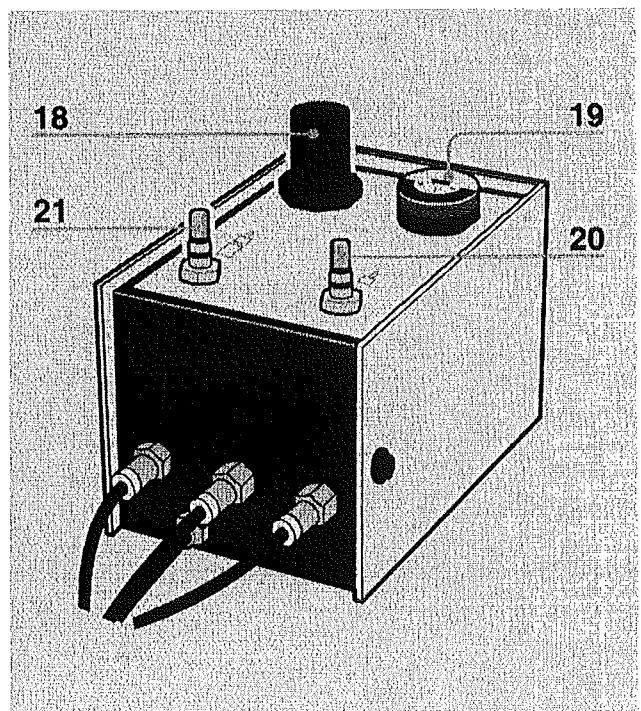
The pressure manometer shows the preset maximum welding pressure.

20 "Horn" cooling-air controller

The horn cooling-air flow is set with this controller

21 "Converter" cooling-air controller

The flow of the converter cooling-air is set with this controller.



5.3 Ultrasonic Generator RL35

26 Generator module handle

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 must not 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.

28 LED "POWER"

"POWER" indicator.

29 Key "US-TEST"

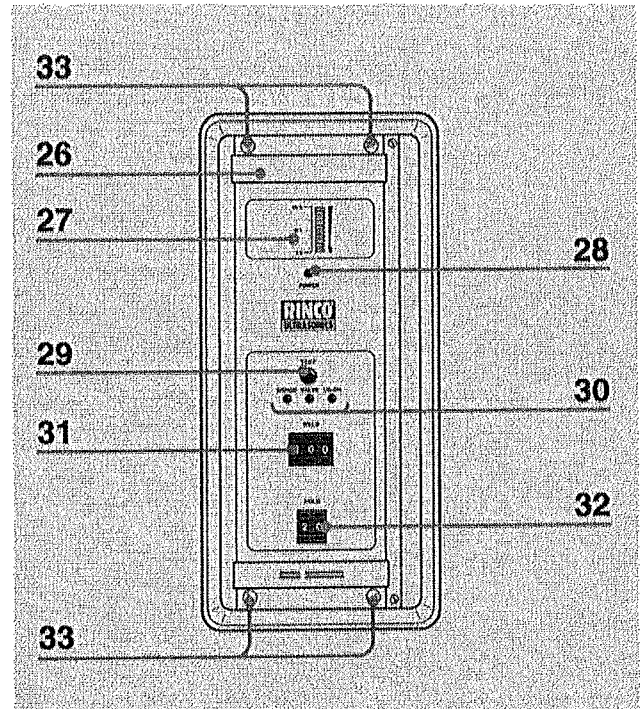
Key to activate ultrasonics test.



Do not touch horn!

30 LED

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



31 Weld time

Using this keypad you can

- change the weld time.
 - a) increase numeral
 - b) decrease numeral



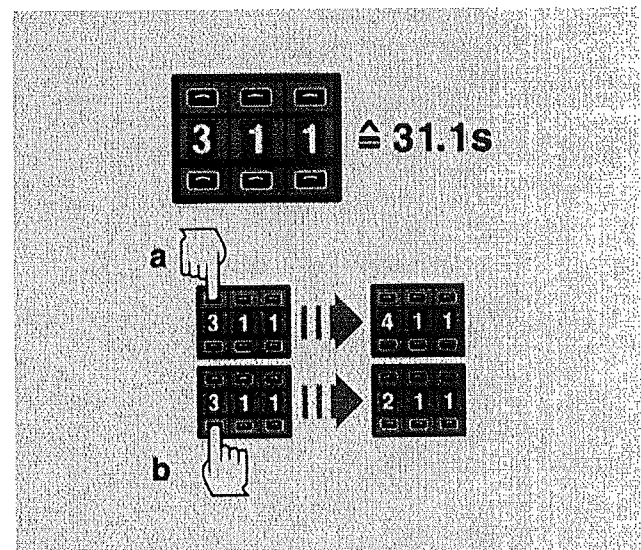
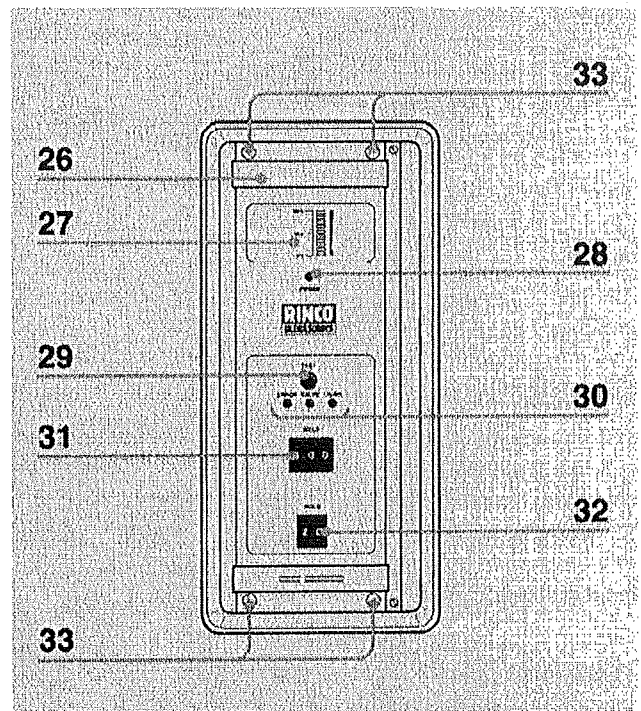
With the initialisation on the internal program selection switch (level 9) following section 8 „Resetting“, the welding time is increased by a factor of ten (99.9 sec.) and can be set to “ON-OFF” switching function given corresponding initialisation

32 Hold time

This setting does not apply to hand held device.

33 Fastening screws

Must be locked in operation !



6 Initial start-up

6.1 Choice of location

Select the location for the device according to the following criteria:

- clean surroundings
- a base for the electronic devices which is free from vibration
- an ambient temperature during operation:
10 °C - 45 °C
when setting: 20 °C

6.2 Assembling and connecting up the devices

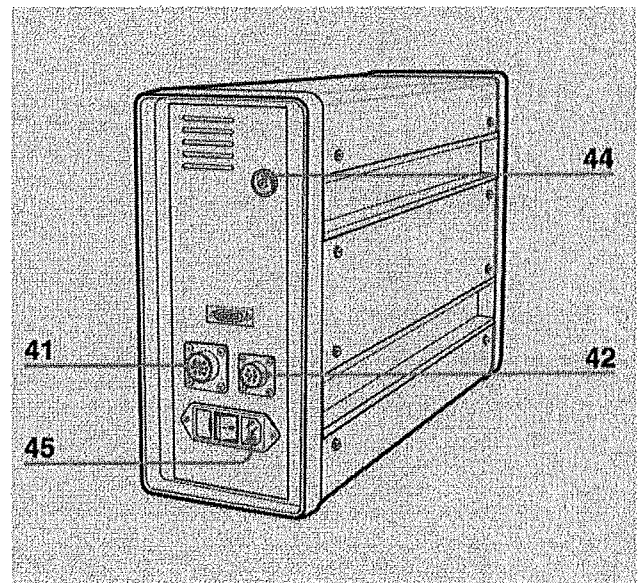
To prepare the devices for operation, carry out the following steps:

1. Connect up the cables between the hand welding device and generator.

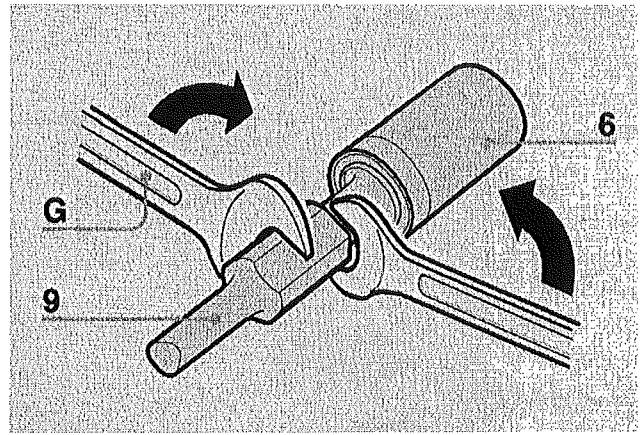


Be sure to fit the power connection with a grounded connector.

2. Plug the device plugs in the sockets of the Generator:
41 STO1 Valvebox (optional cooling)
42 STO2 Start
44 STO4 Converter connection
45 STO5 Mains connection

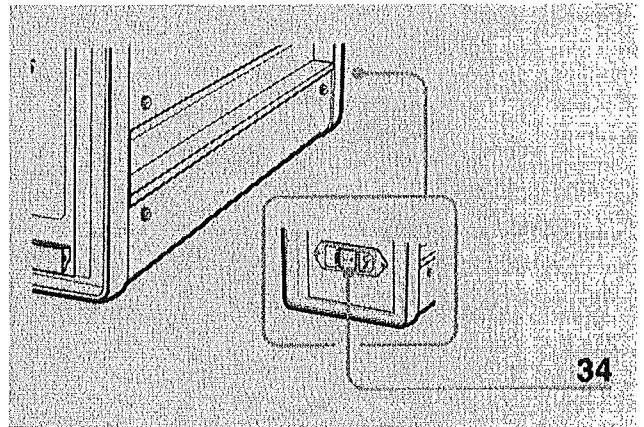


3. Tighten the horn (9) and converter (6) with two spanners of correct size (G)



Do not touch the horn!

4. The device is switched on at the main switch (34). The device is ready for operation after a builtin check.

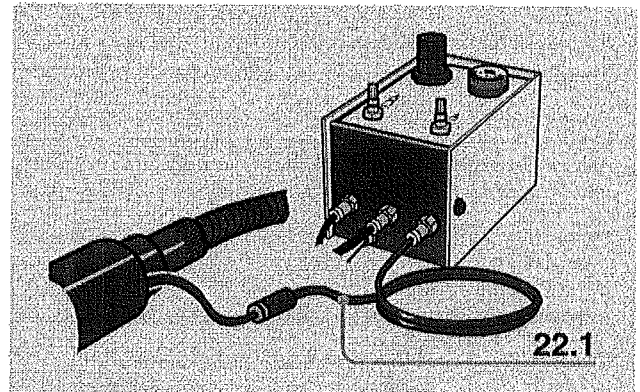
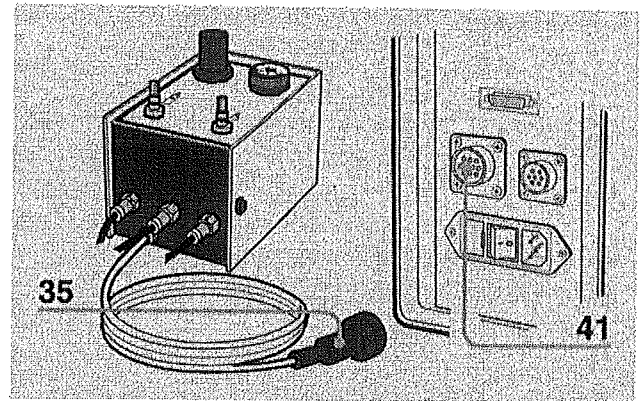


6.3 Air Cooling System

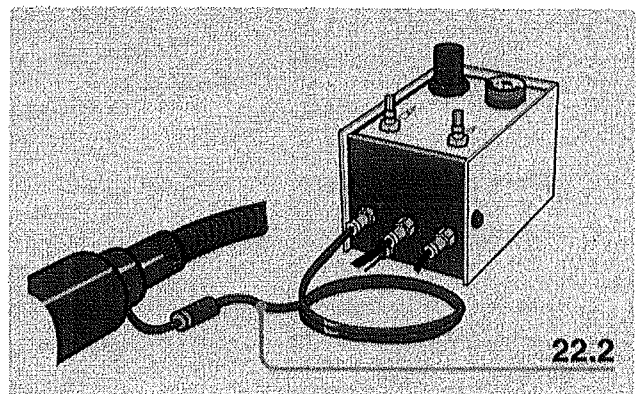


Use only dry, filtered compressed air. Maximum air pressure: 7 bar

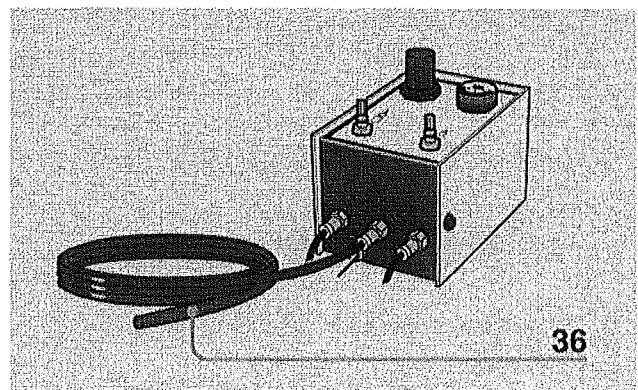
1. Insert connector plug (35) into socket "ST01" (41) on the generator.
2. Attach supply hose for "horn cooling " (22.1).



3. Connect supply hose for "converter cooling" (22.2).



4. Connect compressed air supply hose (36) to the compressed air system.



7 Elements

7.1 Converter



**The converter is a sensitive instrument.
Please handle with great care!**

The converter (3) is the core of every ultrasonic welder.

It belongs to the category of piezo-electric converters. Piezoelectric converters consist of several ceramic disks that change their size when an electric voltage is applied.

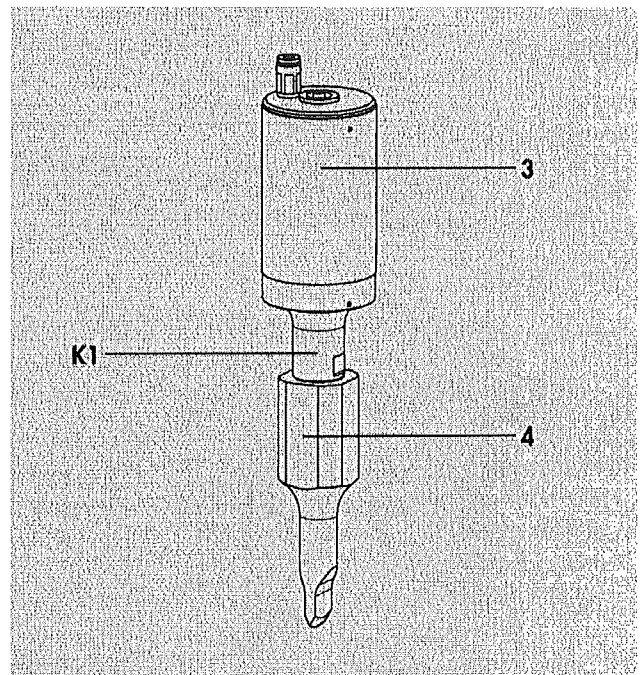
In the case of the ultrasonic welding converter, an alternating voltage with the nominal frequency (e.g. 35 kHz) is applied. This electric signal is converted by the piezoelectric elements into a mechanical vibration of identical frequency. A mechanical vibration in the axial direction is thus available at the front end "K1" of the converter (3). The efficiency of a piezoelectric converter is extremely high. The small losses which occur during the conversion are noticeable in a rise in temperature of the converter

In high-performance applications, residual converter heat is drawn off by the built-in air-supply connection and compressed air.



The converter must not be warmed up to more than 50°C at the contact point "K1". Converter, horn and generator may be damaged by overheating.

The converter must be fastened with a tightening torque of 15-25 Nm.

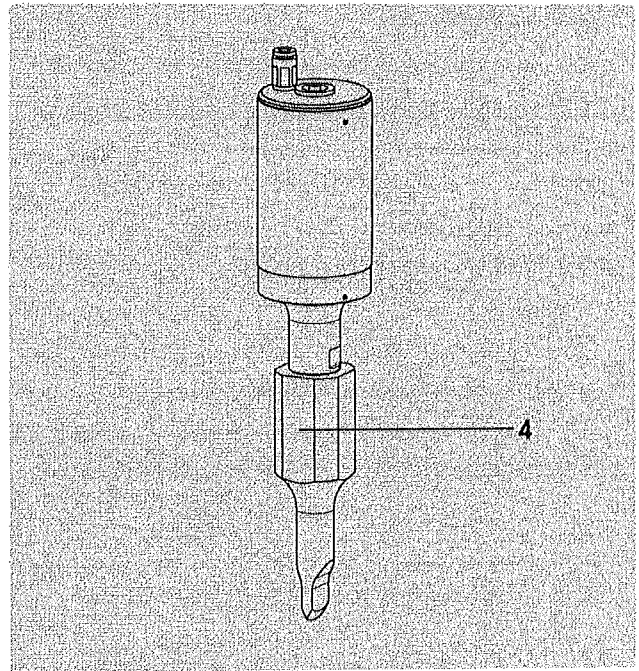


7.2 Horns



Any changes to the metallic body of the horn will affect its vibration characteristics and should not be performed without consulting the manufacturer!

The horn (4) is the tool that transfers the ultrasonic energy produced by the converter to the welding object in the form of an intensive vibration. Since workpieces come in a variety of forms, horns have to be adapted to the specific requirements. The horn is an acoustic body tuned to the resonance frequency. This accounts for restricted shaping possibilities. The geometrical form of the horn should be kept as simple as possible.



Other important factors in addition to the geometrical shape of a horn are:

1. The horn must be tuned to the resonance frequency of 35'000 Hz (± 50 Hz) at 20°C. During operation a tolerance of +150 Hz / -250 Hz is permitted.
2. For the horn to vibrate correctly it must be designed as far as possible to move in an axial direction at its transmission surface.
The aim is to produce pulses on the horn face that act as far as possible in an axial direction and which can be transmitted to the welding object.
3. The amplitude of the horn is determined by means of its design.
For the production of horns it is vital:
 - to have a knowledge of the load capacity of various materials.

7.2.1 Horn materials

Horns are manufactured exclusively from specifically high-strength materials; namely high-strength aluminium, titanium and steel alloys.

The choice of material depends largely on the intended application.

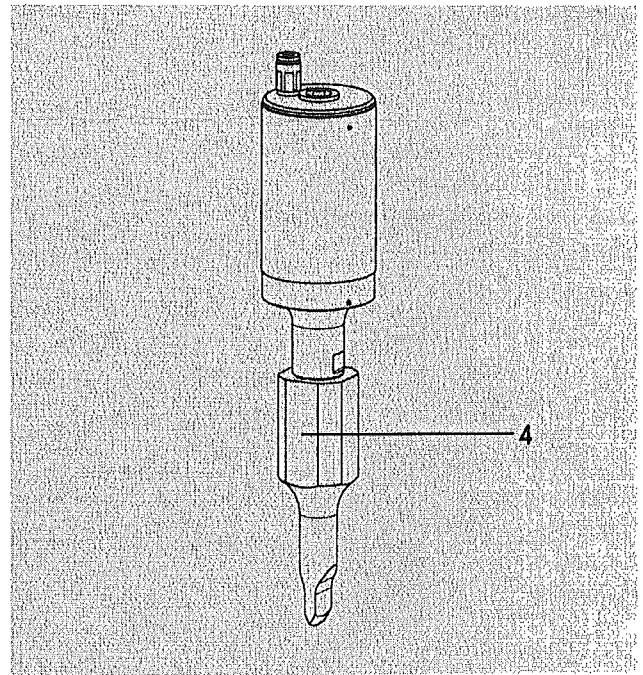
Various factors are crucial for choosing the material:

1. The strength of the horn material in conjunction with the amplitude to be attained.
2. The surface condition of the material and its related surface finishing characteristics.
3. The ultrasonic transmission characteristics.
4. The heat conducting characteristics of the horn material.

Allowance must also be made for the fact that horns are subject to immense mechanical loads. It is extremely important, therefore, to design the horn in such a way as to enable the plastic part to be joined under optimal conditions. The horn surface may have a coating for abrasive plastics for longer service life.

RINCO has a long record and a lot of experience in horn manufacture.

Horns that are manufactured without the necessary theoretical and practical experience are bound to lead to unsatisfactory and poor welding results and hence to inferior product quality.



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

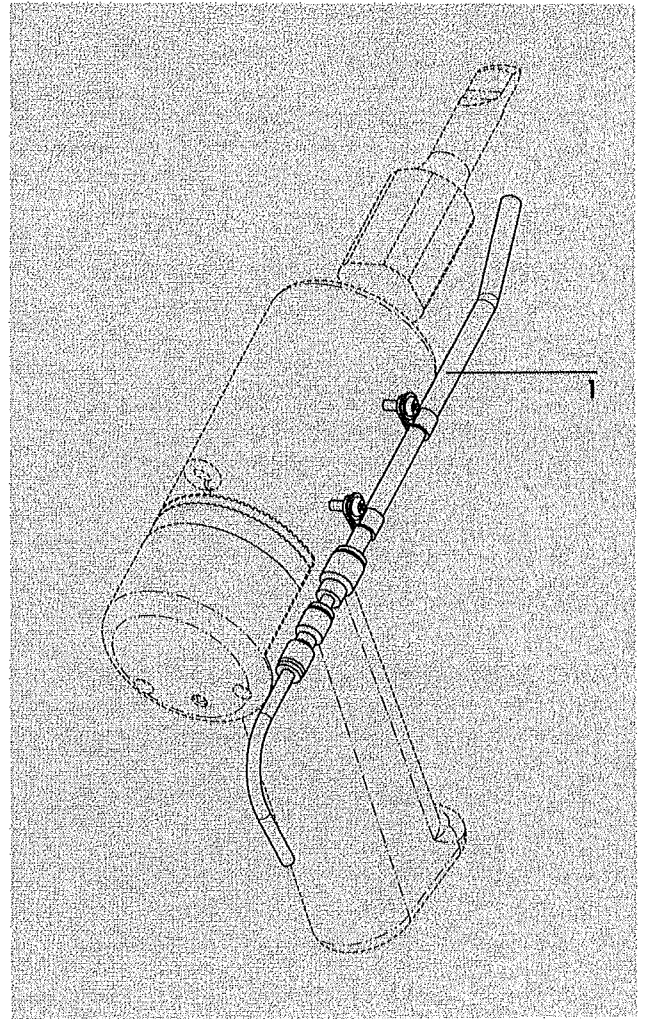


The horn must be fastened with a tightening torque of 15 - 25 Nm.

7.2.2 Horn cooling

Sonotrode cooling is available as an option. The sonotrode cooling unit (1) can be added as a pre-assembled module.

The length of the air-cooling hose corresponds to the length of the connection cable. The hose is attached to the tubular casing with cable clamps.



8 Retooling

8.1 Changing the horn



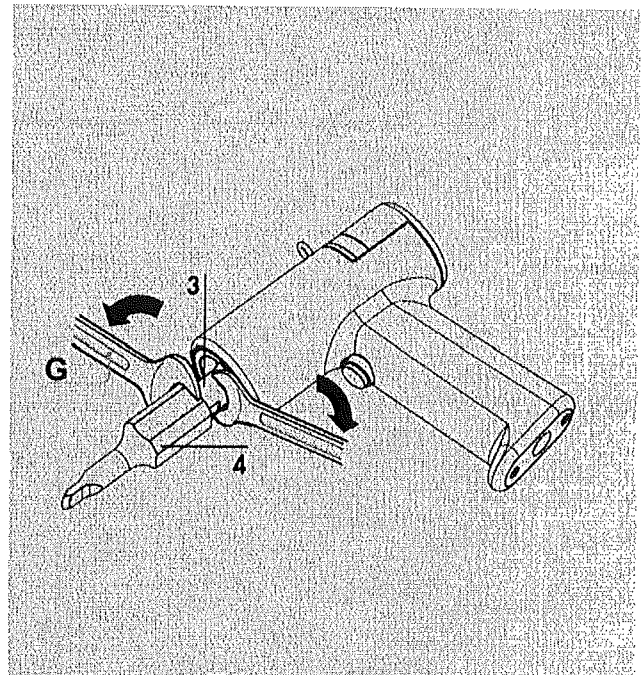
It is important to ensure that the mains switch on the generator has been switched off before unplugging the RF cable!

1. Separate the horn (4) from the converter (3) with spanners (G).



Never put the two parts in a vice or similar tool!

2. Screw on the new welding tool and tighten.



8.2 Detailed description of functions from the program selector switch

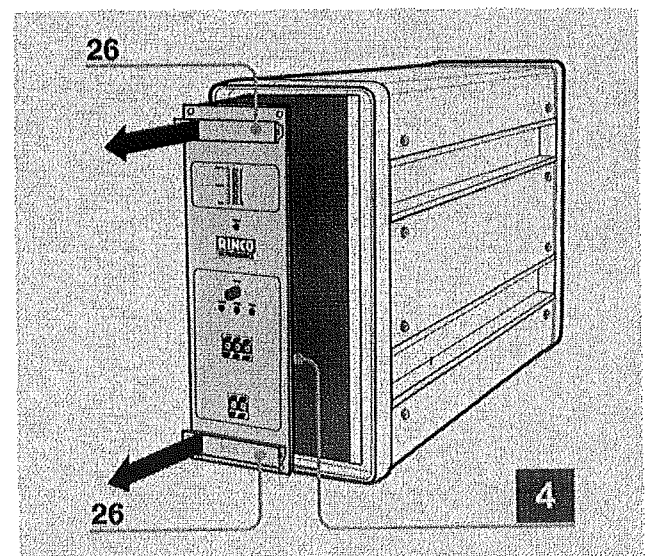
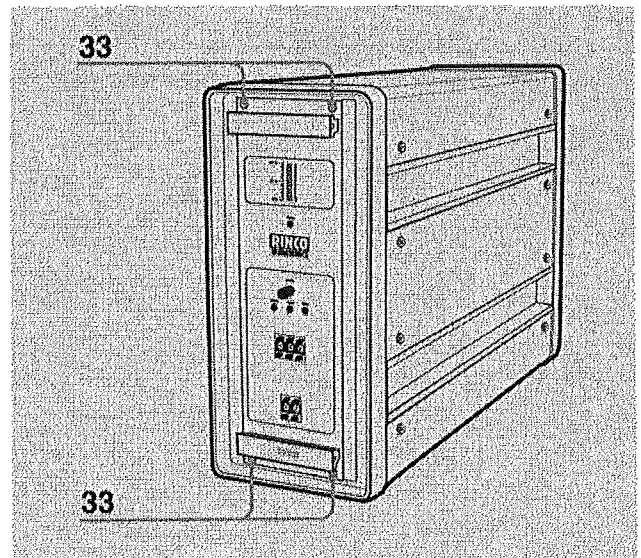
Ultrasonic devices are used in a wide range of fields today, so that users have a variety of different control requirements. A welding installation needs to be able to be connected to the available peripheral devices.

For this reason, a number of programmes have been created to suit the most common peripheral requirements. These programmes are permanently installed in an integrated computer and can be pre-selected via rotary switches.

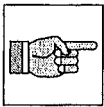
The program selector switch is deliberately located on the card module (see figure) inside the housing in order to prevent unauthorised changes to the program.

8.2.1 Before changing a program

1. Disconnect the device from the power supply.
2. Unscrew the 4 fastening screws (33).
3. Take out the generator module by pulling the grips (26).



The program selector switch has 10 settings.
For US-operations without pneumatic tool advance.



The standard setting for portable units is '0'.

Mode	Adjustment
0	external welding time
1	internal welding time
9	Pulse with settable welding time; max. 99.9s



With setting level "9":

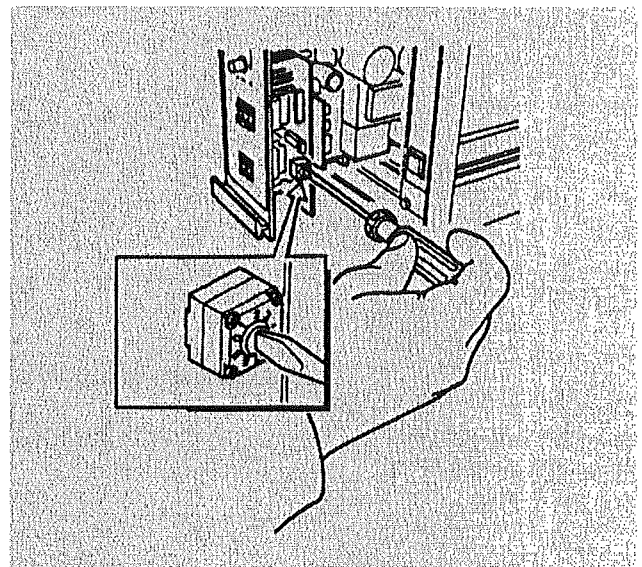
Trigger switch 1:

Ultrasonic operates automatically according to the pre-set time without holding "start 1".

Re-activating "start 1":

The ultrasonic is stopped.

If the time has been set at "00.0" the
ultrasonic is maintained with
"start 1".



8.2.2 Afterpulse (shake-off impulse)

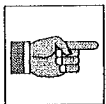
The afterpulse can be activated with a jumper on the main circuit board. The afterimpulse occurs 0.3 seconds after the holding time has expired.

J4 Jumper "Hardware test program" (only for use by the manufacturer)

J5 Jumper "US afterpulse"

P Main circuit board

The standard setting of J4 and J5 is "OFF".



The time of the afterpulse can not be changed.

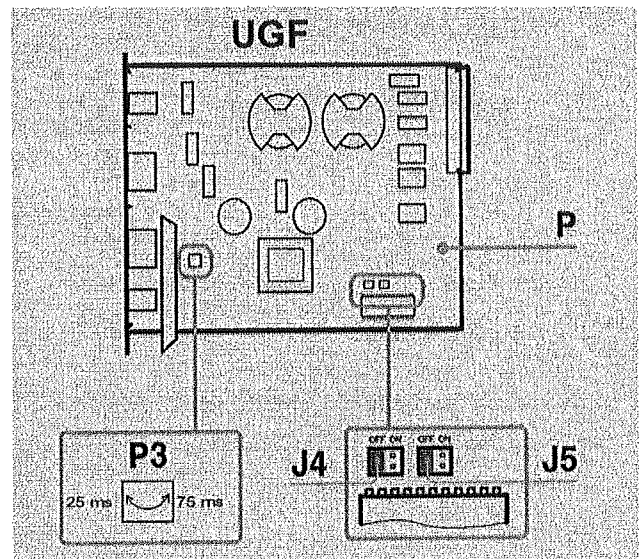
8.2.3 Soft Start

The greatest strain on the transducer system occurs when the oscillations are first stimulated. To avoid overloading and resultant damage, a soft-start device has been installed in the RINCO generator, which can be continuously adjusted from 25ms to 75ms. Your device is supplied with a setting of 50ms.

The adjustment potentiometer (P3) for the soft-start device is located on the card module inside the housing in order to prevent accidental alterations of the setting. (only UGF)



Important: Before switching on the card module again, always make sure that it is fully and correctly reinserted (front panel flush).



9 Cleaning and maintenance

9.1 General maintenance jobs



Cleaning and maintenance jobs may only be carried out by specially trained staff.

Before beginning maintenance jobs, make sure that all energy sources such as the power and compressed air supply are disconnected.

Attention: Never clean the keypad or plastic sheeting of the generator with caustic agents.

9.2 Hand held welding device

The hand held welding device requires no special maintenance.

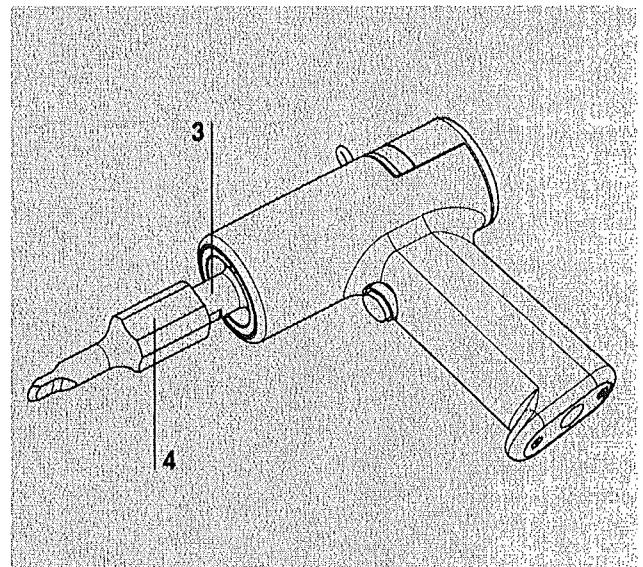
However, regularly cleaning of the

- converter (3),
- horn (4),

is essential for a long and trouble-free operation of the ultrasonic system.

9.3 Generator

The generator requires no maintenance.



9.4 Vibration system

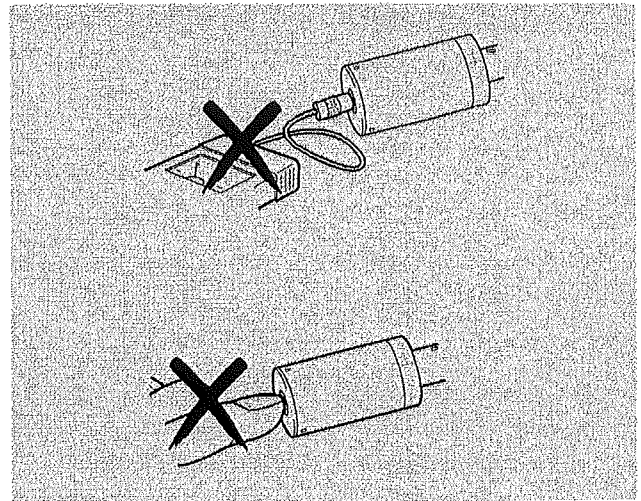


Work may only be carried out on the vibration system and converter housing when the mains voltage is switched off! High voltage!

Avoid contact with the RF socket of the converter.

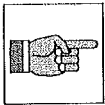
Never connect any measuring instruments to the RF socket of the converter!

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



9.5 Threaded coupling

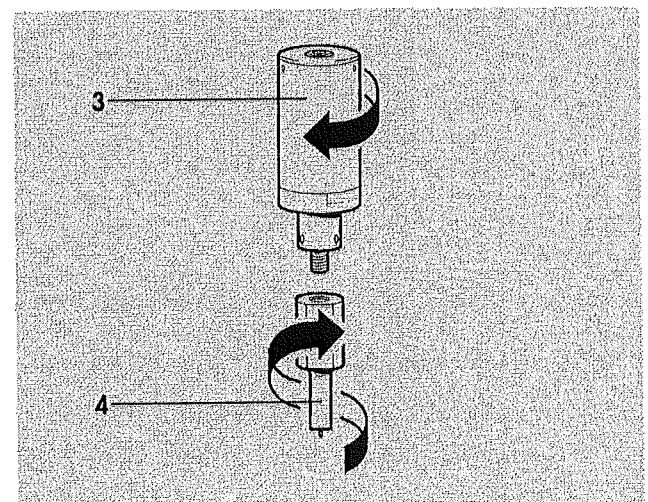
The converter (3) and horn (4) are joined together by threading couplings.



Tightening torque: 15 - 25 Nm

Black marks on the surface of the horn (4) are easy to remove.

1. Lay out a polishing cloth on a level surface.
2. Draw the blackened area over the polishing cloth.



10 Error messages and trouble shooting



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

10.1 Error messages / trouble shooting: switching on

Error	Possible cause	Trouble shooting
Generator cannot be switched on	– no voltage supply – EMERGENCY STOP button pressed – fuse faulty – module not in its housing	– insert mains plug – check status EMERGENCY STOP – check F1–F5 – insert and bolt module

10.2 Generator error messages during operation

Error	Possible cause
red LED is blinking (500 ms)	– maximum welding pressure too high – generator output too low for intended application – faulty vibration system
red LED lights	– no trigger signal within 10 seconds – no US stop signal – Start 1 not held before the safety switch was reached or the holding time has expired – No start 2

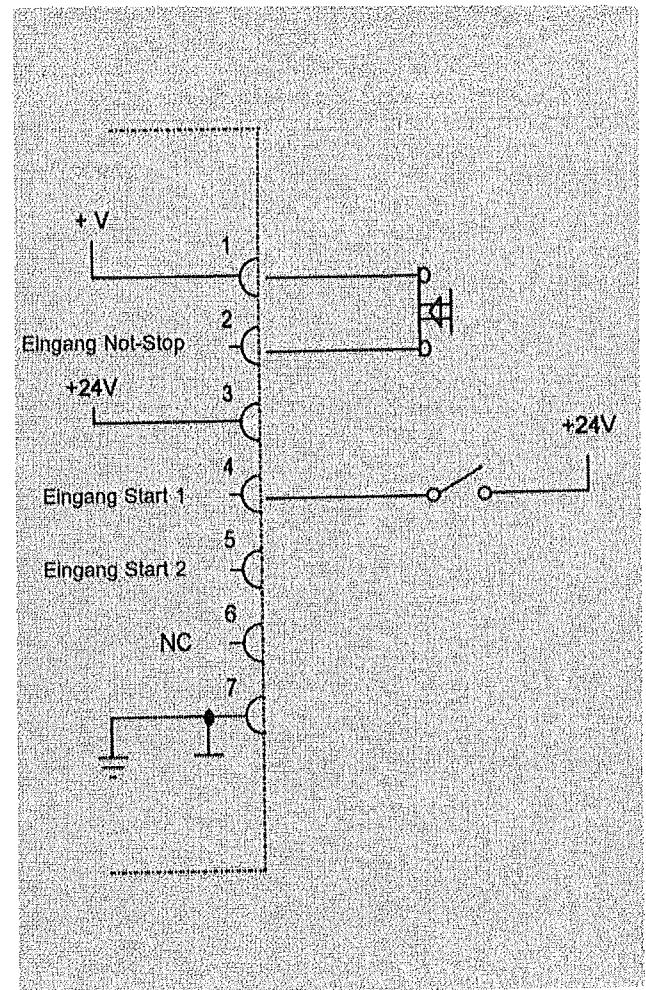


if three faults occur in a row the generator is blocked and must be acknowledged with key "US TEST".

11 Electrical diagrams

11.1 Wiring diagram for housing RL

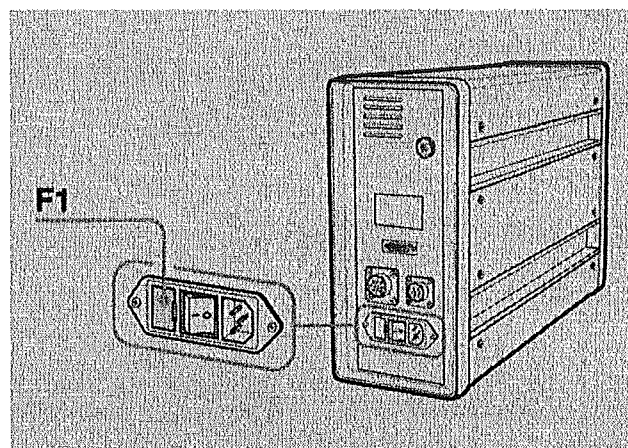
11.1.1 Start ST02 automatic (standard)



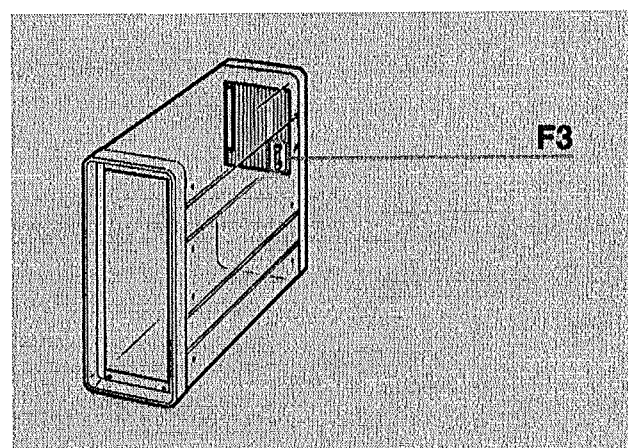
11.2 Fuses Generator RL35

Fuses are to be found in the following assemblies:

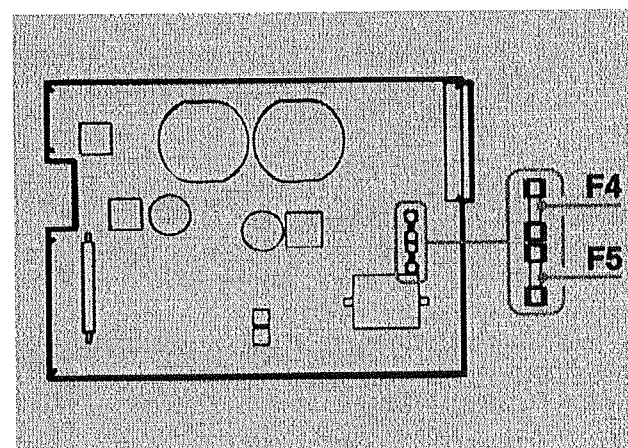
Power socket:



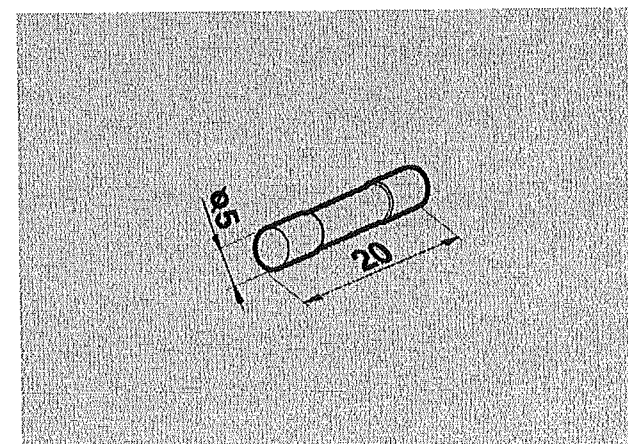
Bus print



Generator module



All fuse dimensions: 5 x 20 mm.



11.3 List of fuses Generator RL35

11.3.1 Fuses 230 Volt / 200 Volt

Generator	Power socket		Bus print F3	Generator module	
	F1	F2		F4	F5
UGF35-250	3.15 A/T		400 mA/T	3.15 A/T	100 mA/T
UGF35-400	4 A/T		400 mA/T	4 A/T	100 mA/T
UGF35-600	4 A/T		400 mA/T	4 A/T	100 mA/T

11.3.2 Fuses 110 Volt

Generator	Power socket		Bus print F3	Generator module	
	F1	F2		F4	F5
UGF35-250-110	6.3 A/T		400 mA/T	6.3 A/T	160 mA/T
UGF35-400-110	8 A/T		400 mA/T	8 A/T	160 mA/T
UGF35-600-110	8 A/T		400 mA/T	8 A/T	160 mA/T

12 Technical drawings and values

12.1 Amplitude values of the generator RL

The different generator outputs result in different amplitudes. The amplitude value described in the following table refers to the respective generator/horn configuration.

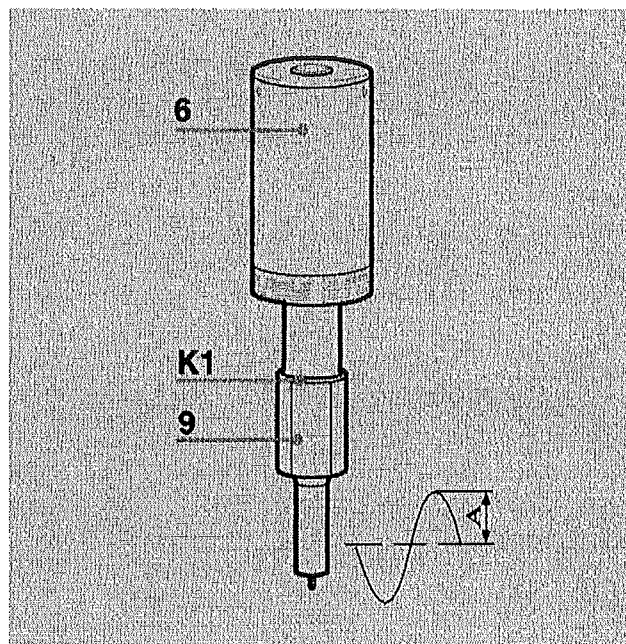
The effective welding amplitude can thus be read off directly.

3 Converter

4 Horn

A Amplitude

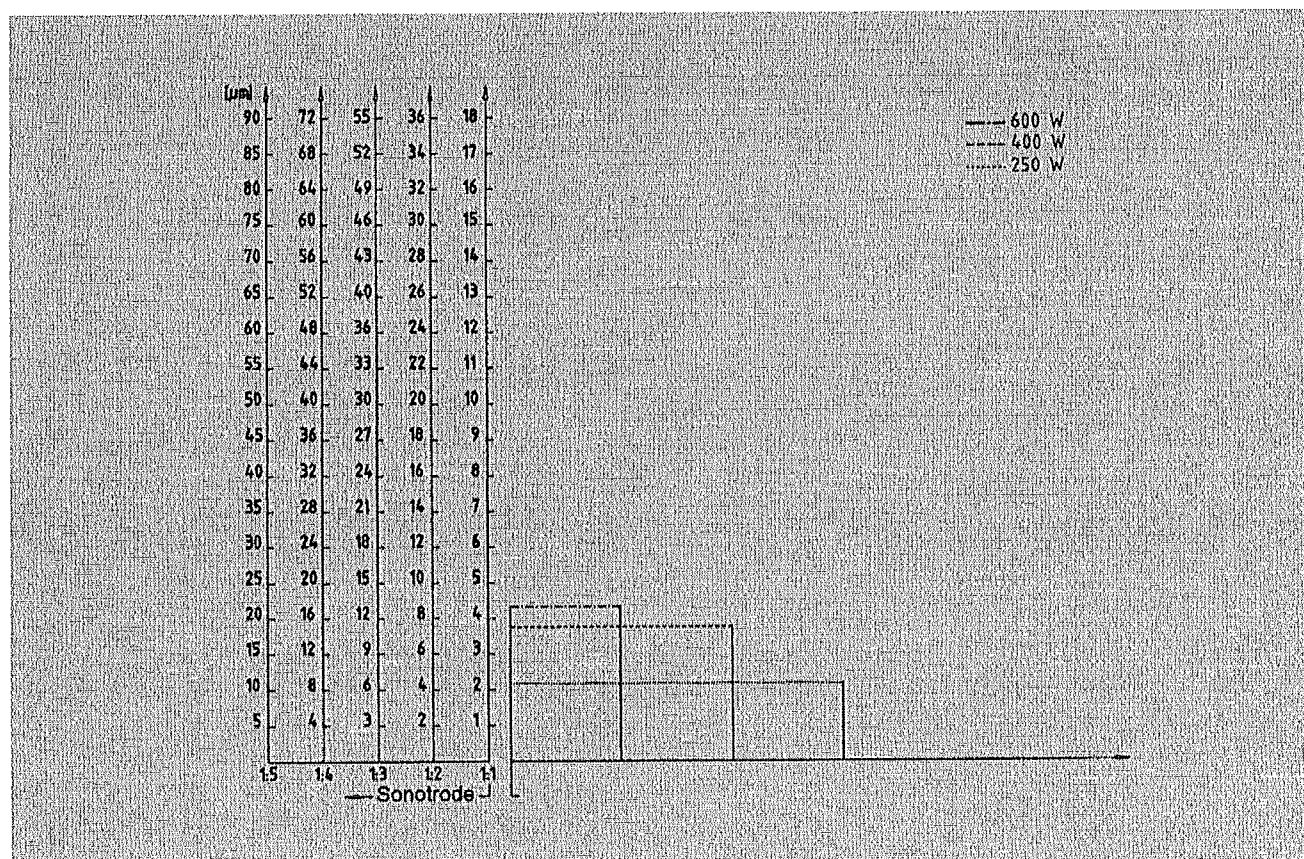
K1 Coupling point



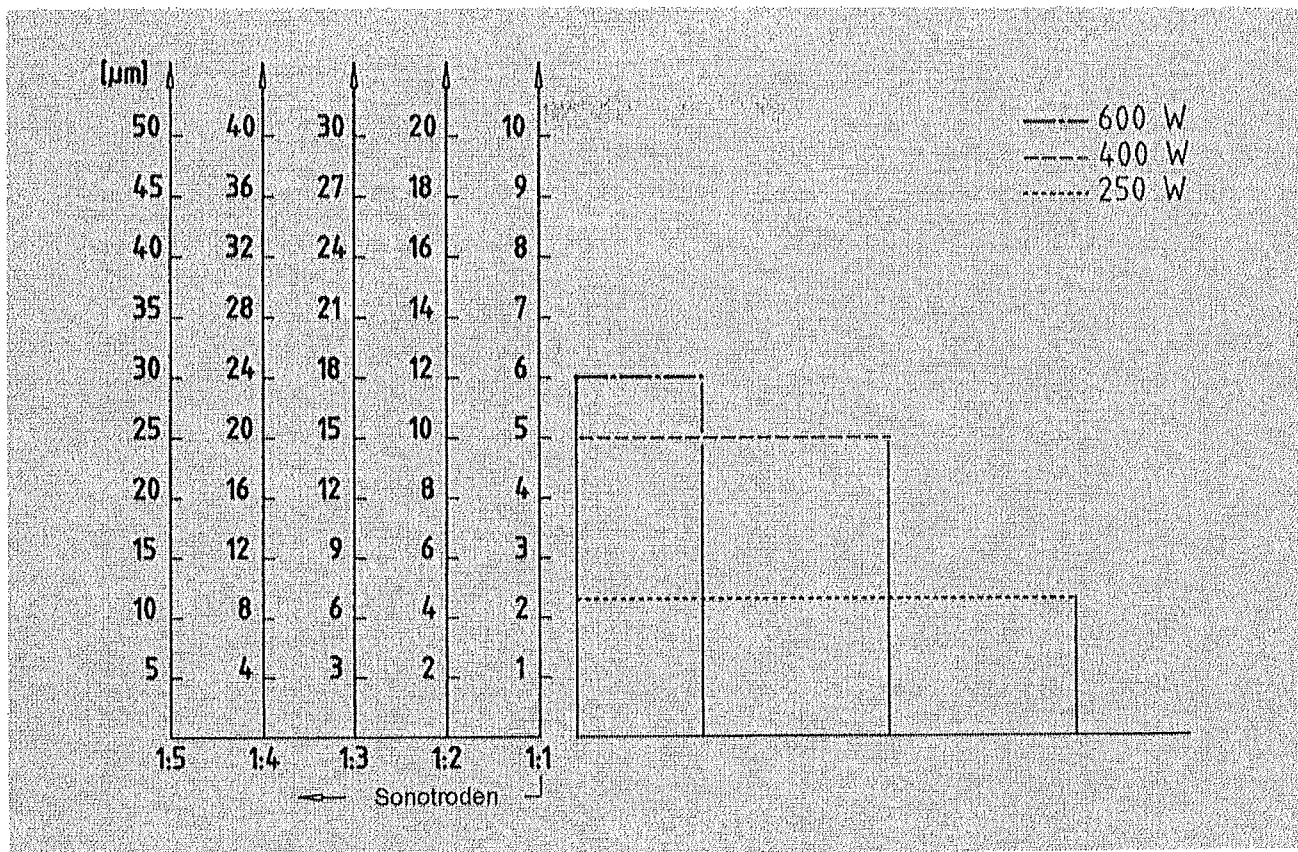
12.2 Amplitudes of 35 kHz RL generators

12.2.1 Amplitudes with unamplified

converter C35-10



12.2.2 Amplitudes with amplified converter C35-11



12.3 Stud length of the vibration components; 35 kHz

3 Converter



The converter stud is an integral component of the converter and cannot be detached!

4 Horn

