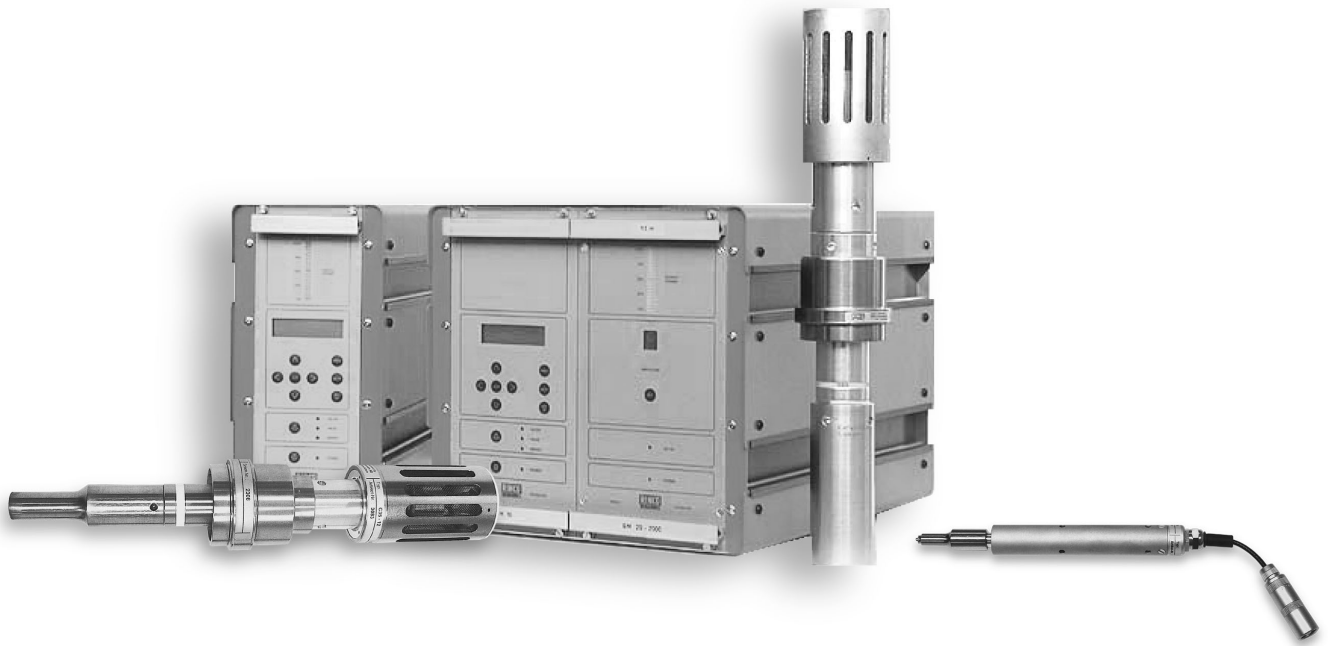


Operating Manual



Generator SL20,35,70/SLH20 with Converters and Boosters

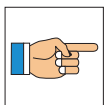




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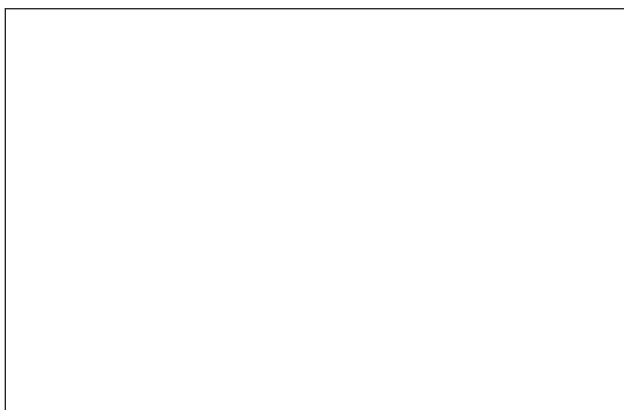
Note



Read this operating manual and study it carefully before unpacking and putting the machine into operation.

The machine 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.

Representative



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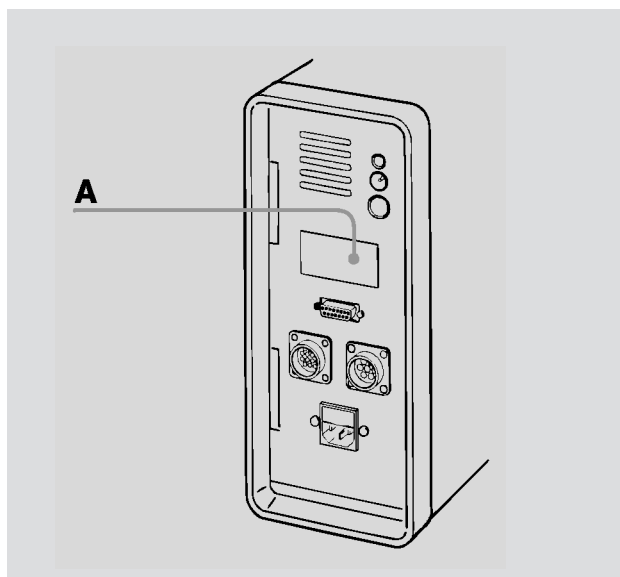
Important!

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.

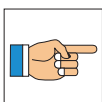
RINCO ULTRASONICS AG
Romanshorn, Switzerland



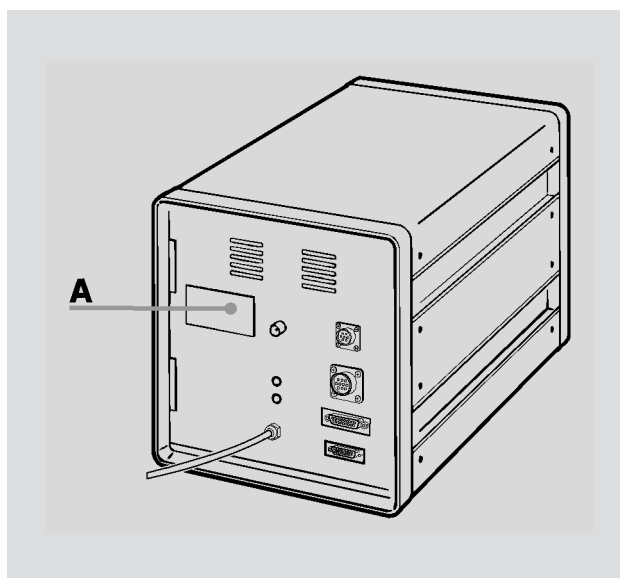
Preface

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

To ensure that the system is always ready for operation, it is necessary to follow the notes and instructions in this manual.



These instructions describe the generators SL20, 35, 70 and SLH20 with converter and booster.



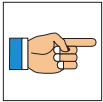
1 Safety

1.1 Explanation of symbols and signs

Symbols are used to highlight risks and pointers to avoid them. The symbols are used in the operating instructions. All risk and advisory symbols describe certain circumstances in which there is a risk of damage to the unit or the environment or of personal injury if the advice is not followed.

The risk symbols in the operating instructions follow a systematic scheme.

System of risk symbols



Note!

Particularly important information or operating hints for trouble-free operation.



Caution!

This symbol accompanies comments about risks which need to be observed in order to avoid injury or damage to the unit.



Danger!

This symbol accompanies comments about risks which need to be observed in order to avoid very serious injury or death.

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.
- Lack of knowledge about the operation and supervision can cause damage to the equipment and lead to operator injury.
- 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



Limits: Ultra sound 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.

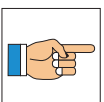
(Specifications according to SUVA-Information no. 86048 d 4.94)

2.8 Guarantee

In supplying the system, RINCO ULTRASONICS AG has entered a guarantee obligation in accordance with VSM (Verein Schweizerischer Maschinenindustrieller = Association of Swiss Machine Manufacturers).

The following conditions apply to validate the guarantee by RINCO ULTRASONICS AG, amongst others:

- The user must be familiar with the content of these operating instructions.
- The warning notes and instructions contained in these operating instructions must be followed.
- It is not permitted to carry out unauthorised modifications or changes on parts of the press, the oscillation system or the generator.



RINCO ULTRASONICS AG is happy to discuss via telephone any points that may not be clear or to carry out an induction with qualified 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 TECHSPAN GROUP, the damaged component 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.

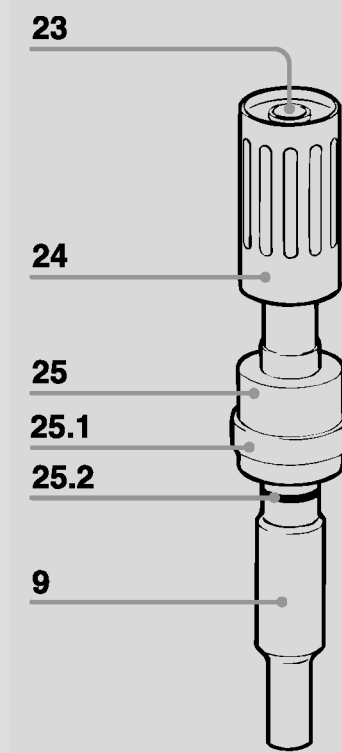
The factory settings are performed at 20° C. The ambient temperature can range between 10° C and 45° C during operation.

4 Product Information

4.1 Product overview

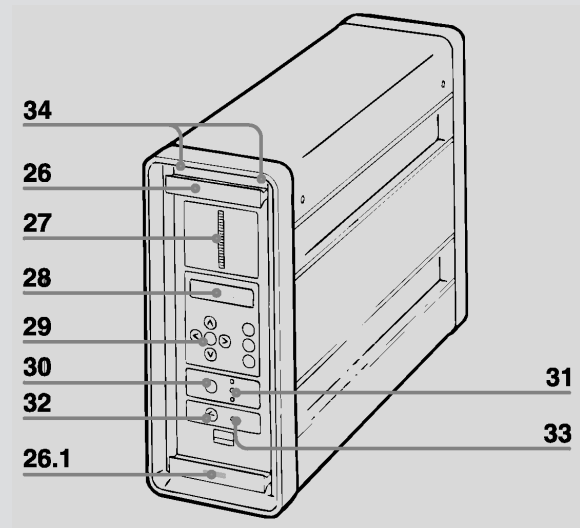
4.1.1 Oscillator unit

- 9 Horn
- 23 HF-connection
- 24 Converter
- 25 Booster
- 25.1 Booster type plate
- 25.2 Booster designation



4.1.2 Ultrasonic generator SL20, 35, 70

- 26 Generator module grips
- 26.1 Type designation
- 27 LED bar
- 28 2-line LCD display
- 29 Input keypad
- 30 Function key
- 31 Status displays US TEST
US ON (green)
VALVE (green)
ERROR (red)
- 32 Key "ON/OFF"
- 33 LED "POWER"
- 34 Fastening screws



4.1.3 Ultrasonic generator SLH20

26 Generator-module-grips

26.1 Type designation

27 LED-bar

28 LCD-display, 2-line

29 Input keypad

30 Function keys US-TEST

31 Status display

US ON (green)

VALVE (green)

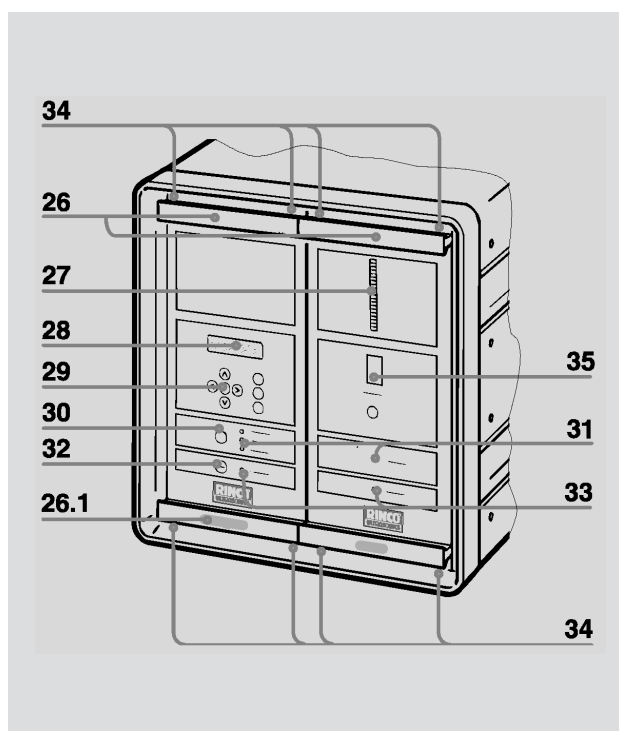
ERROR (red)

32 Key "ON/OFF"

33 LED "POWER"

34 Fastening screws

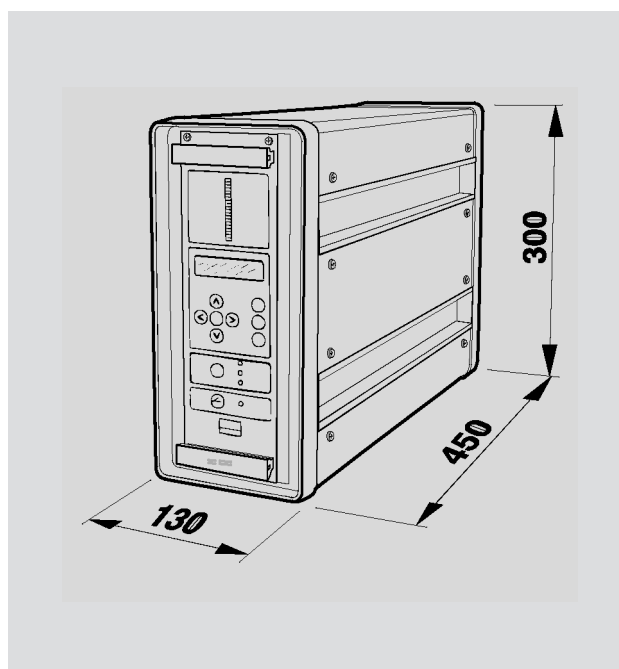
35 Amplitude indicator



4.2 Technical data of the Ultrasonic Generator

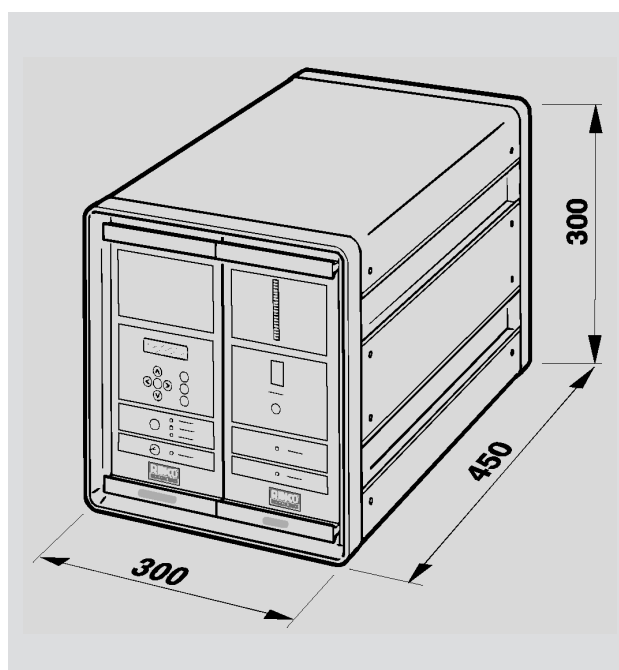
4.2.1 Dimensions SL20, 35, 70

Dimensions in mm



4.2.2 Dimensions SLH20

Dimensions in mm



4.2.3 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.

4.2.4 Available generator modules

Type	max. power	max. current consumption
GM 70-100	100 W	1.2 A
GM 35-400	400 W	
GM 35-600	600 W	6.3 A
GM 35-900	900 W	
GM 20-1000	1000 W	8 A
GM 20-1500	1500 W	
GM 20-2000	2000 W	16 A
GM 20-3000	3000 W	

4.2.5 Connected loads

- 230 V 50–60 Hz
- Option 200 V
110 V (up to 600 W)

4.2.6 Dimensions

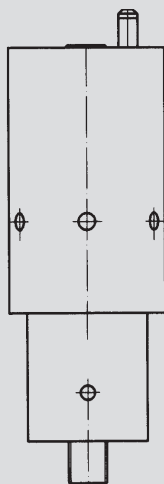
- Dimensions: see Fig. page 12

4.2.7 Weight

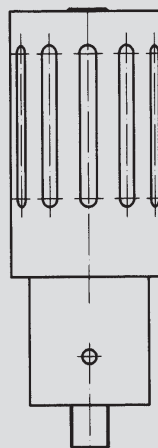
- Weight SL20, 35, 70: 7 kg
- Weight SLH20: 17 kg

4.3 Technical data of the converters C20/10/12/14/15

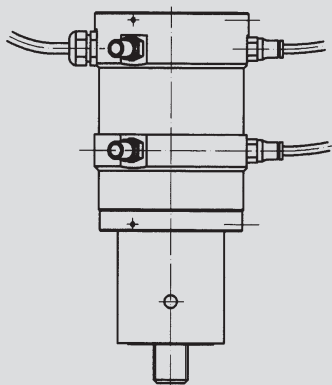
C20-10



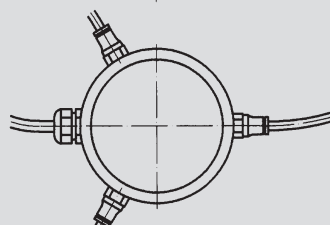
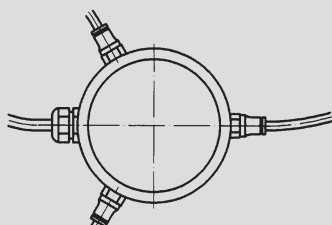
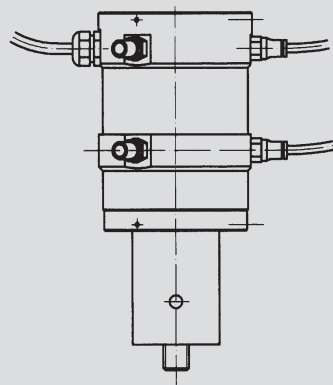
C20-12



C20-14



C20-15



4.3.1 Housing

C20-10

- Closed steel housing
- with cooling air connection, hose 5 x 3

C20-12

- Ribbed steel housing
- Suited for cooling air circulation

C20-14

- Closed steel housing with separate closed cooling circuit
- Splash-proof
- Food-safe

C20-15

- Closed steel housing with separate closed cooling circuit
- Splash-proof
- Food-safe
- Amplification factor 1:1.5

4.3.2 Amplitude amplification

- Amplitude amplification: with booster

4.3.3 Mounting

The exact mounting instructions of the converter can be taken from the scaled illustration in chapter 13.



Never mount the converter on both hitch backs at the same time!

- | | |
|----------|----------------------------------|
| – C20-10 | on the booster |
| – C20-12 | on the booster |
| – C20-14 | possible directly on the housing |
| – C20-15 | possible directly on the housing |

4.3.4 HF-connector

- Plug: Lemo 2

4.3.5 HF-cable

- Standard length: 3.0 m
- other lengths: 1, 5, 7, 9, 11, 12, 15 m

4.3.6 Dimensions

- Dimensions: see scaled illustration (chapter 13)

4.3.7 Weights

- | | |
|----------|--------|
| – C20-10 | 1.2 kg |
| – C20-12 | 1.2 kg |
| – C20-14 | 1.4 kg |
| – C20-15 | 1.4 kg |

4.4 Technical data of 20 kHz booster

4.4.1 Housing

- Steel plated
- Housing with collar

4.4.2 Amplification factor

1 : 0.4 / 1 : 0.5 / 1 : 0.6 / 1 : 0.8 (reducing booster)

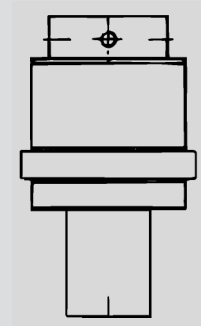
1 : 1 / 1 : 1.5 / 1 : 2 / 1 : 2.5 / 1 : 3

4.4.3 Dimensions

- Dimensions: see scaled illustration
(chapture 13)

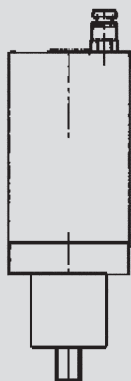
4.4.4 Weight

- weight: 1.5 kg



4.5 Technical data of the converters C35-10/11/12/13/14/17

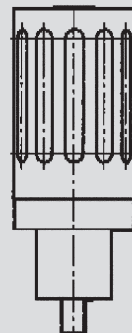
C35-10



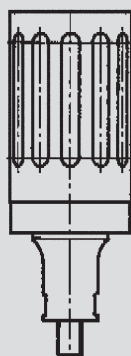
C35-11



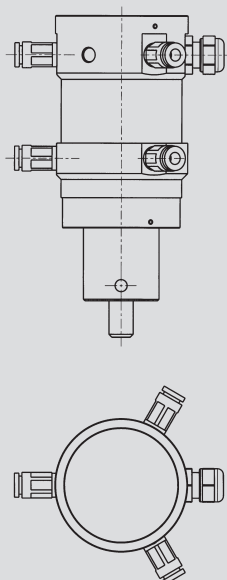
C35-12



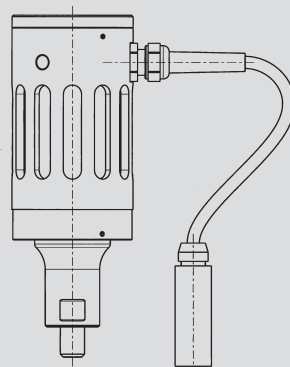
C35-13



C35-14



C35-17



4.5.1 Housing

C35-10 / C35-11

- Closed steel housing
- with cooling air connection, hose $\varnothing 4 \times 2.5$.

C35-12 / C35-13

- Ribbed steel housing
- Suited for air cooling circuit

4.5.2 Amplitude amplification

C35-10 / C35-12

Amplification: with booster

C35-11 / C35-13

Amplification: auto amplification converter

Amplifications ratio: 1 : 1.4

C35-14

- Closed steel housing for special machines
that can be screwed directly onto the cover
- Amplification factor 1:1.4

C35-17

- Slotted steel housing for special machines
that can be screwed directly onto the cover
- Amplification factor 1:1.4

4.5.3 Mounting

Please refer to the scaled illustration in chapter 13
for the exact mounting instructions of the converter.



Never mount the converter on both hitch backs at the same time!

- Mounting: possible directly to the housing
or on the booster

4.5.4 HF-connection

- Socket: Lemo 1

4.5.5 HF-cable

- Standard lengths: 3.0 m
- other lengths: 1, 5, 7, 9, 11, 13, 15 m

4.5.6 Dimensions

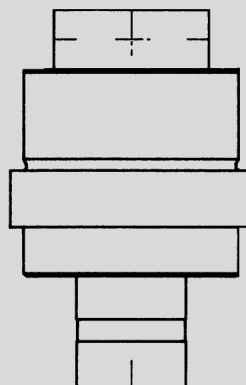
- Dimensions: see scaled illustration
(chapter 13)

4.5.7 Weight

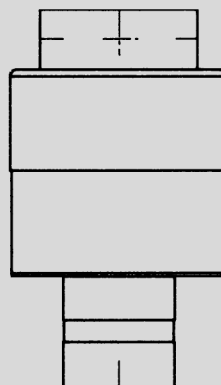
- Weight: ca. 0.3 kg

4.6 Technical data of 35 kHz booster

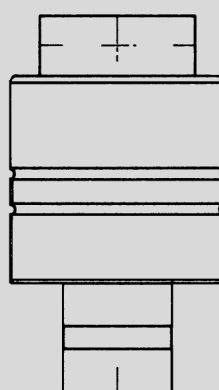
A



B



C



4.6.1 Housing

Type A

- Steel plated
- with flange

Type B

- Steel plated
- without flange
- adjustable axially

Type C

- Steel plated
- without flange
- adjustable axially
- Fine adjustment with M40 x 1 thread

4.6.2 Amplification factors

1 : 0.4 / 1 : 0.5 / 1 : 0.6 / 1 : 0.8 (reducing booster)

1 : 1 / 1 : 2.5 / 1 : 1.5 / 1 : 2 / 1 : 3

4.6.3 Dimensions

- Dimensions: see scaled illustration
 (chapture 13)

4.6.4 Weight

- Weight: ca. 0.3 kg

4.7 Technical data of the converters

C70-2/3/4/5



4.7.1 Housing

- Steel housing
- with ventilation ducts

4.7.2 Mounting

Please refer to the scaled illustration in chapter 13 for the exact mounting instructions of the converter.



Never mount the converter on several hitch backs at the same time!

4.7.3 HF-connection

Converter	HF-cable	HF-socket	Applications	supplementary capacities HF-cable extensions
C70-2	4.35 m ± 1 m	Lemo 0	Standard	0
C70-3	5 cm	Lemo 1	Adapter MP351	Adapter set MP351
C70-4	ca. 140 cm	Lemo 0	Snb	3.6 m
C70-5	ca. 160 cm	Lemo 0	Jaq	2.8 m

4.7.4 Dimensions

- Dimensions: see scaled illustration (chapter 13)

4.7.5 Weight

- Weight: ca. 100 g

5 Controls and indicators

5.1 Ultrasonic Generator

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

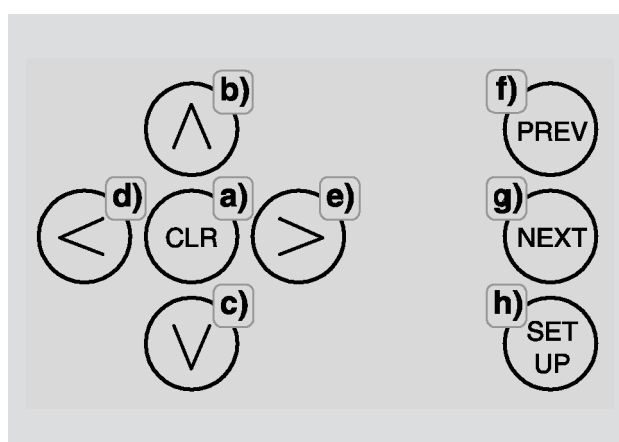
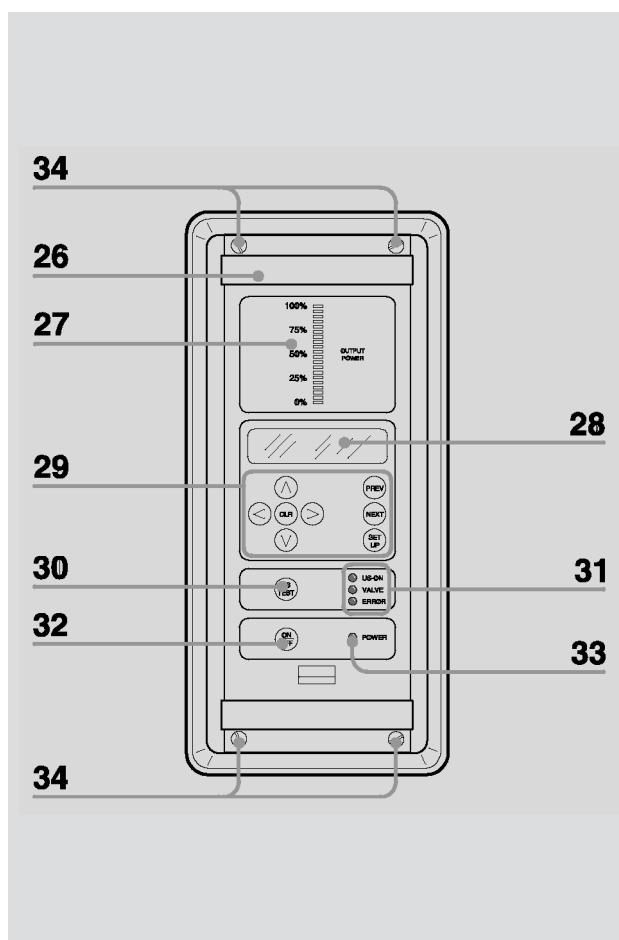
d) select number to the left

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 for more 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

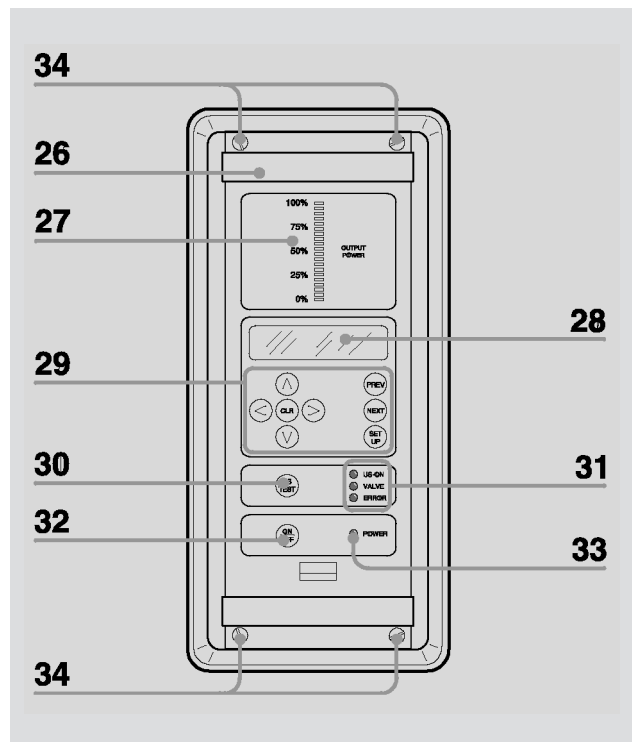
32 Key "ON/OFF"

33 LED

"POWER" indicator.

34 Fastening screws

Must be locked in operation !



5.2 Ultrasonic generator SLH20

26 Generator-module-hand grips

When required pull the generator module out using these hand grips. The mounting screws (34) to open the generator modules are above and below the rails of the hand grip.

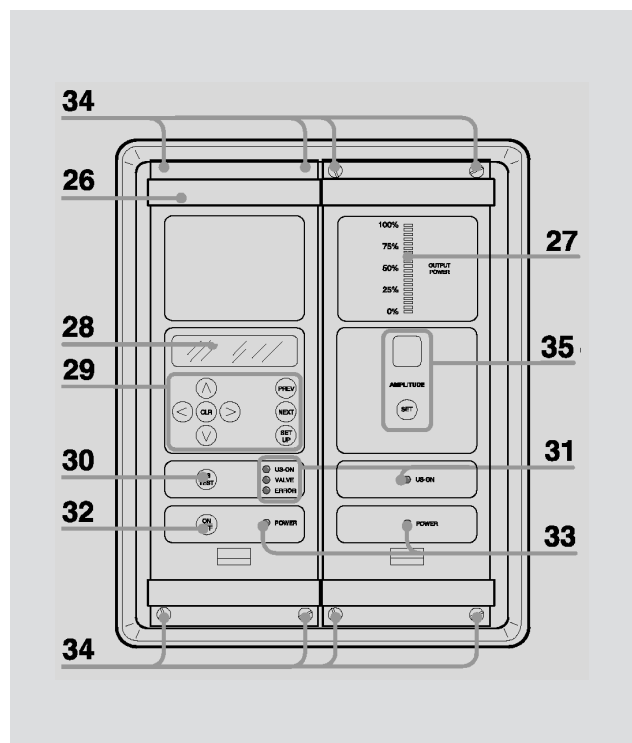


Never remove or insert the generator module while the mains is still connected! (high voltage)

27 LED-bar

Displays performance during welding. Under no load condition (horn is oscillating freely in the air) horn display should not exceed the 25% marking. If the 100%-marking is exceeded an error message is displayed.

After the welding process the maximal power output (peak) is shown with a blinking LED display.



28 LCD-Display, 2-line

The LCD-display serves to show:

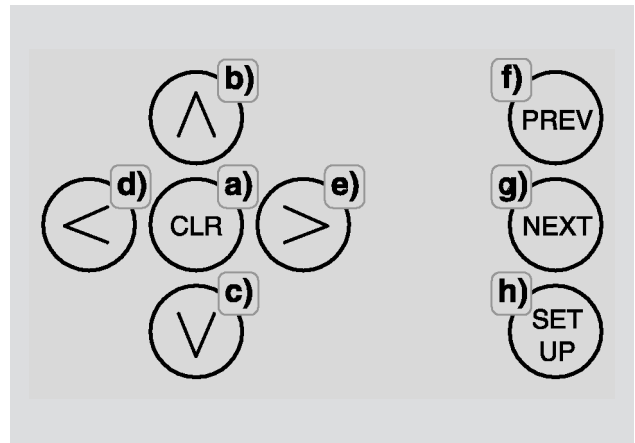
- welding parameters
- Error messages
- Operating conditions

29 Input keypad

With this keypad:

- Generator functions can be activated
- Welding parameters can be altered.

- a) Setting values to zero
- b) Increase numerical values
- c) Decrease numerical values
- d) Numerical value selection to the left
- e) Numerical value selection to the right
- f) Return by one program line
- g) Advance by one program line
- h) Enter/ quit the program



30 Key "US-TEST"

Key to activate the ultrasonic test. If the key is pressed for more than 5 seconds an error message is displayed.



Do no touch the horn!

31 LED

- "US-ON" Ultra sound active
- "VALVE" Magnetic valve active
- "ERROR" error message active

32 Key "ON/OFF"

33 LED "POWER"

"POWER" indicator.

34 Mounting screws

Must be in stop position during operations !

35 Amplitude display

By pressing the "SET" key the currently set amplitude value is displayed for one second.

6 Initial start-up

6.1 Selecting a location

Choose a location that fits the following criteria:

- Clean surroundings
- A level and solid standing surface
- Vibration-free seating for the electronic units
- Ambient temperature:

in operation: 10° C – 45° C

for adjustments: 20° C

6.2 Assembling and connecting up the units

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

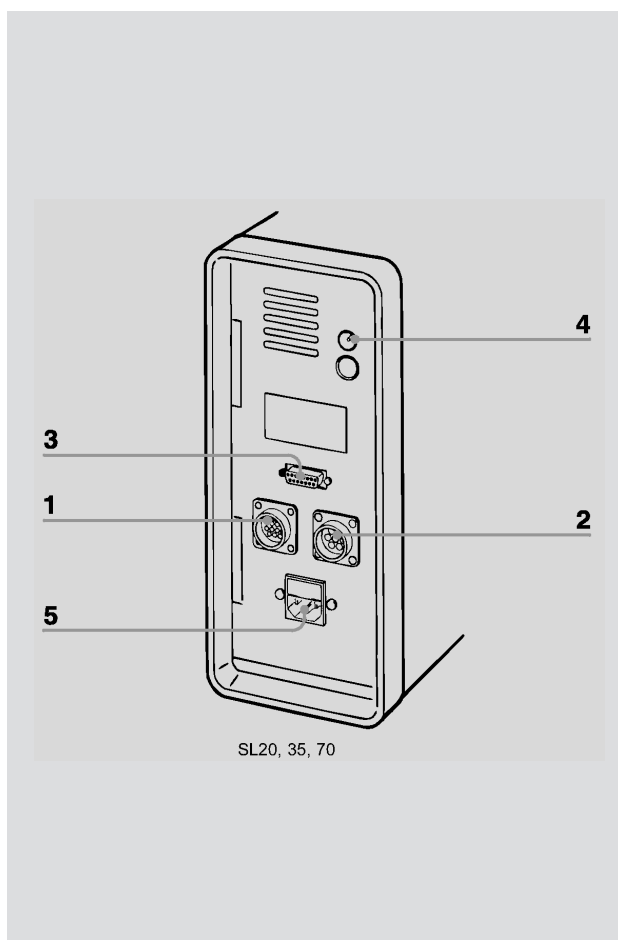
1. Connect up the cables between the press and generator.



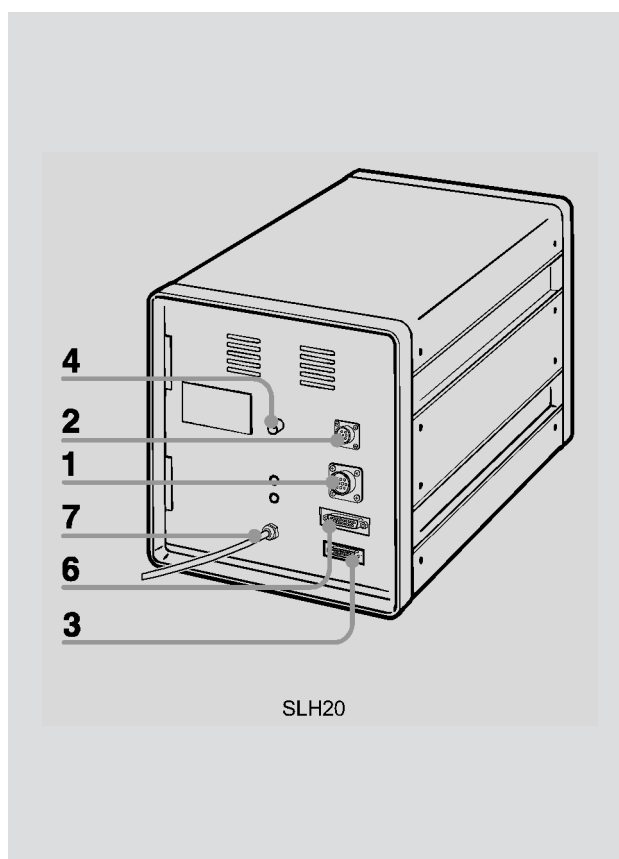
Be sure to fit the power connection with a grounded connector.

2. Plug the unit plugs in the sockets of the Generator:

- 1 STO1 Actuator
- 2 STO2 Start (optional)
- 3 STO3 Interface (optional)
- 4 STO4 Converter connection
- 5 STO5 Power connection



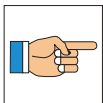
- 1** STO1 Feed
- 2** STO2 Start (option)
- 3** STO3 Interface (option)
- 4** STO4 Converter connection
- 6** STO6 (no function)
- 7** ST6 Mains connection



7 Operations

7.1 Welding procedure

7.1.1 Cycles



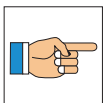
These specifications are valid when using actuators from the RINCO-product program. When using other lifting systems the plug connections must be made according to the scheme in chapter 12.

Manual (standard setting)

1. Pressing both start up key within 0,3 seconds starts the cycle.

The valve is activated and the feeder lowers itself.

2. The start up keys must remain pressed until the safety switch is reached or the halt period has expired.



If the start up key is released prematurely the feeder returns to its original position. An error message is displayed.

Errors are acknowledged with "CLR".

Welding commences with the TRIGGER.

After the welding and hold time have expired, the feeder returns to its original position.

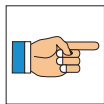
Options: END SWITCH
 POST IMPULS
 RESET

- A 24VDC signal at the inlet RESET stops the cycle. The machine returns to its original position and an error message is displayed.

Impulse (reduced security)

1. Press both start buttons within 0.3 seconds to start the cycle.

The solenoid valve is activated and the actuator is lowered.

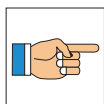


From now on the start buttons don't need to be actuated.

Welding is actuated by the TRIGGER. As soon as the welding and hold time have run out, the actuator moves back to the home position.

Options: US-STOP
 AFTER-PULSE
 RESET

- A 24VDC signal at the RESET input interrupts the cycle. The machine returns to the starting position and an error message is output.



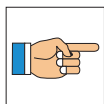
Acknowledge error by pressing the CLR key.

Automatic (for automation, without security)

An impulse of at least 100ms at the input START 1 (ST02) starts the cycle. The solenoid valve is activated and the actuator is lowered. As soon as the welding and hold time have run out, the actuator moves back to the home position.

Options: US-STOP
 AFTER-PULSE
 RESET

- A 24VDC signal at the RESET input interrupts the cycle. The machine returns to the starting position and an error message is output.



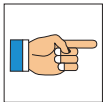
Acknowledge error by pressing the CLR key or by starting the unit again.

The HARDWARE error can only be acknowledged by switching the unit off.

7.1.2 Optimization

To optimize the welding operation:

- only ever change one setting at a time
- assess the welding results after each changed setting.



Never change several settings simultaneously!

When several settings are changed simultaneously, it is very difficult to establish which changes have actually affected the welding results.

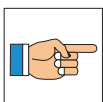
7.1.3 Parameter setup

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

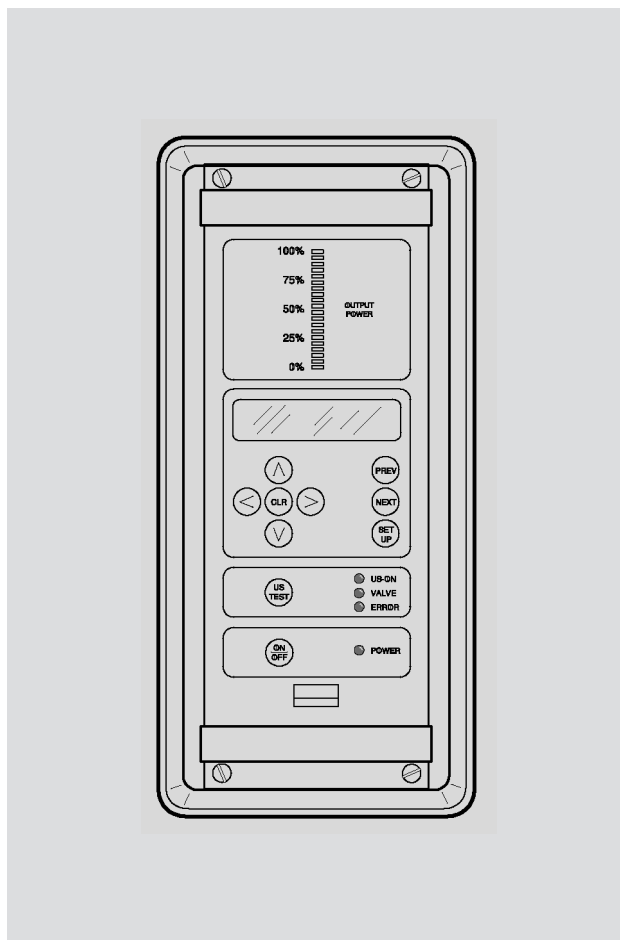
For activating the parameter setup see following page.

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 :]

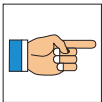
- Press both start buttons within 0.3 seconds to lower the actuator. Keep the start buttons actuated until safety switch is reached. Press start buttons again to move actuator back to the home position.

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



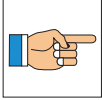
This parameter is operative only if the function [WELDTIME: TIMER] is operative in the * SYSTEM--INIT *.

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 :]

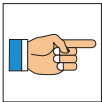
- Upon reaching the TRIGGER, the generator is started. The FU-trigger point is determined by a force sensor.
- Setting range: 0.00 – 9.9 FU
- Standard setting: 4.0 FU



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

Trigger [TRIGGER :]

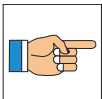
- Upon reaching the TRIGGER, the welding is released.
- Setting range: 0.01 – 3.99 s
- Standard setting: 0.00 s



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

After impulse [AFTER.PULSE]

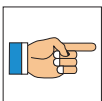
- Duration of after impulse after end switch shut off:
- Setting range: 0.00 - 1.99 s
- Standard setting: 0.00 s



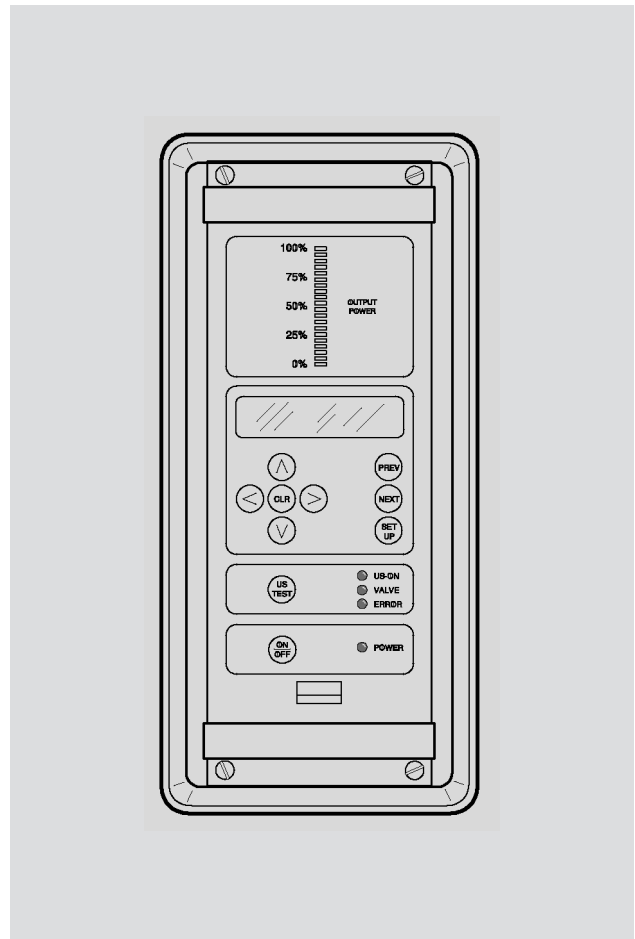
These parameter are only effective when in the * SYSTEM--INIT * the [ENDSWITCH: ON] function has been activated.

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 table page 66
- Setting range: 1 – 9 (9 = 100%)
- Standard setting: 5



Maximum output power drops with a reduction of the amplitude.



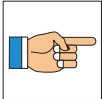
Performance limits [POWER.MIN:] **
[POWER.MAX:]**

- These values can be changed in 5% steps with cursor UP (⬆) and cursor DOWN (⬇).
The maximum may not be less than the minimum.

- Standard setting:

PERFORMANCE MIN: 00%

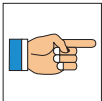
POWER.MAX: 95%



These parameters are only effective if in the * SYSTEM–INIT * the [POWER.LIMIT:ON] function is active.

After impulse (shake-off puls) [AFTERPULS :]

- Time of after impulse (shake-off impulse) during return stroke.
- Setting range: 0.00 – 1.99s
- Standard setting: 0.50 s



These parameters are only effective if in the * SYSTEM–INIT * the [AFTERPULSE:ON] function is active.

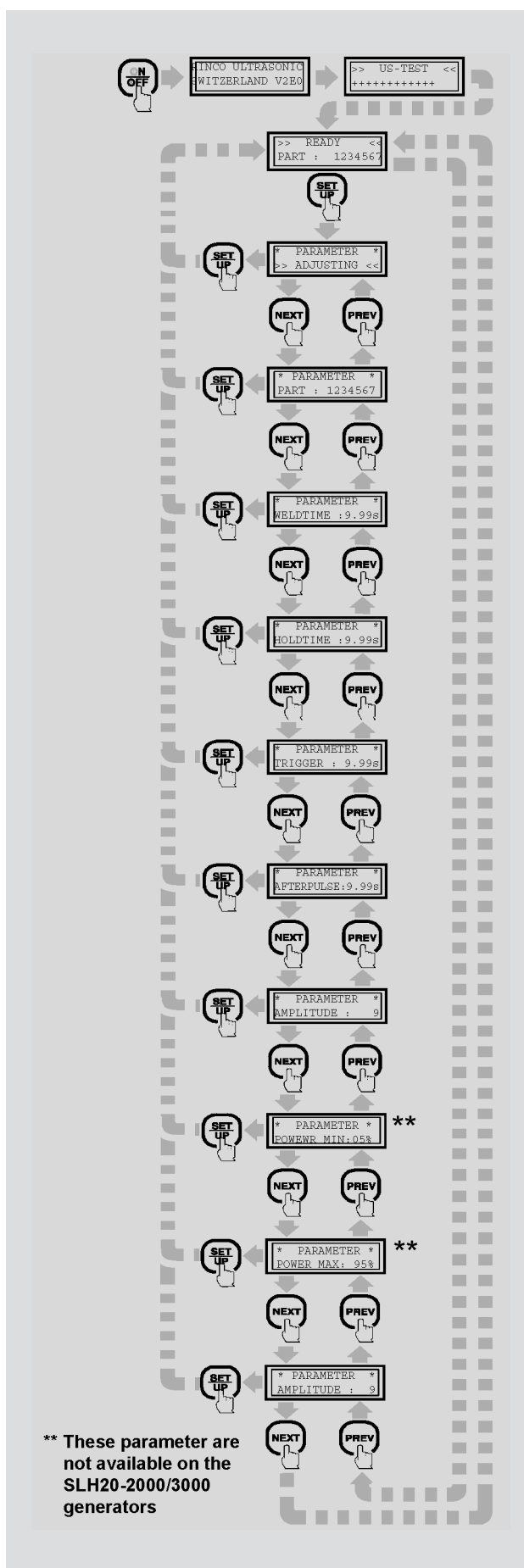
** These parameter are not available on the SLH20-2000/3000 generators

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 **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.



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 ultrasonic 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.

Optionally, for special applications the heat build up must be dissipated with additional ventilators.

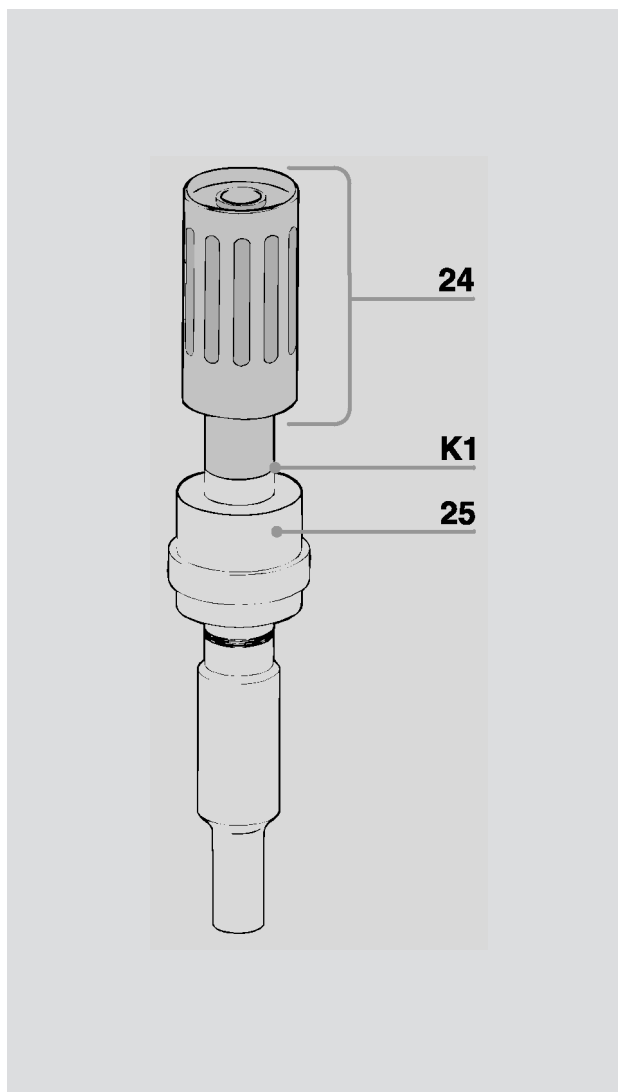


The converter should not be warmer than 50° (40° with 70 kHz) centigrades at the contact point "K1".

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.

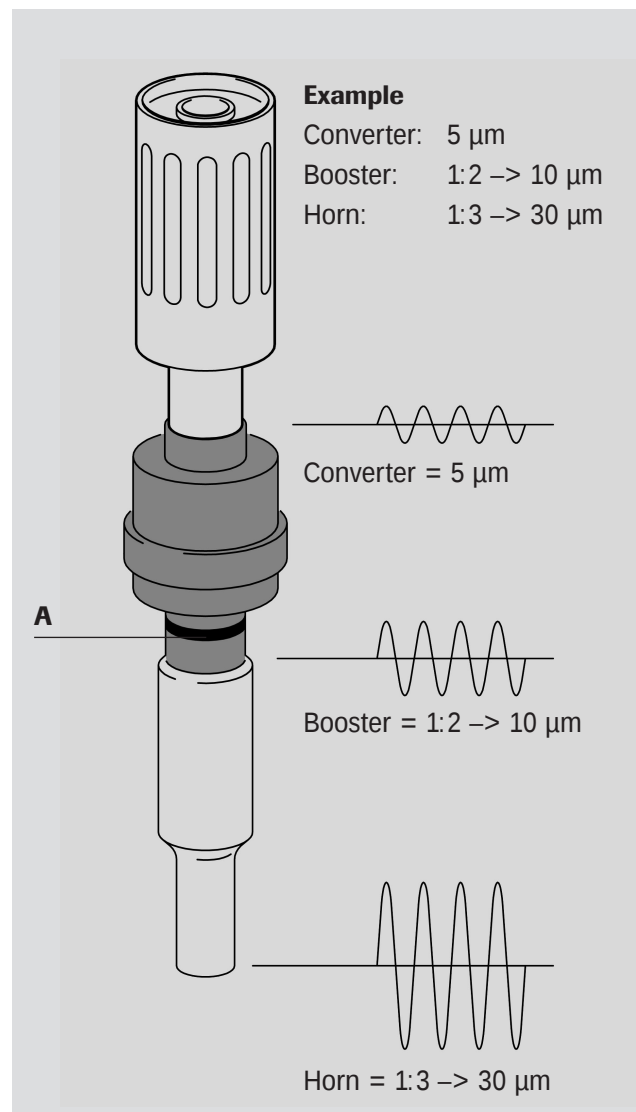
The amplification resp. dampening factor is specified as a ratio. The ratio is color coded and has a numerical designation (A).

(see table)

Frequency	Torque
20 kHz	30-40 Nm
35 kHz	15-25 Nm

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

Reducing Booster	Color	Material	Booster	Color	Material
1:0.5	blue	aluminium	1:1	green	aluminium
1:0.6	violet	aluminium	1:1.5	yellow	aluminium
other ratio available on request			1:2	white	titan
			1:2.5	black	titan
			1:3	brown	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.

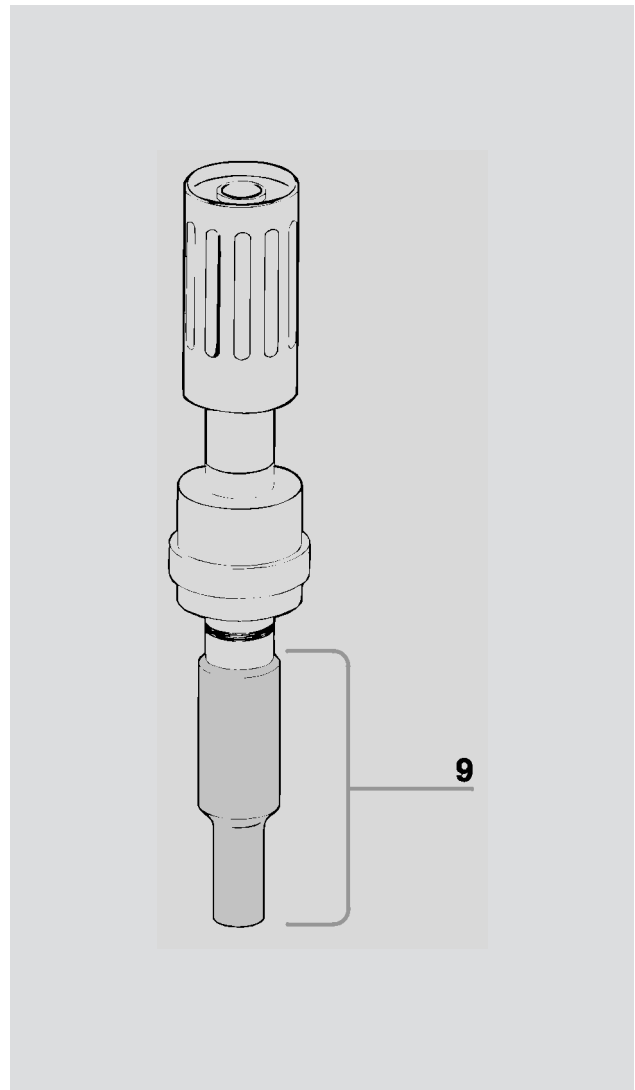
The geometric shape of the horn should be kept as simple as possible.

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
20 kHz ± 50 Hz	+150 / -250 Hz
35 kHz ± 50 Hz	+150 / -250 Hz
70 kHz ± 50 Hz	+250 / -500 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 increases its life span.

RINCO ULTRASONICS AG has years of experience in manufacturing horns.

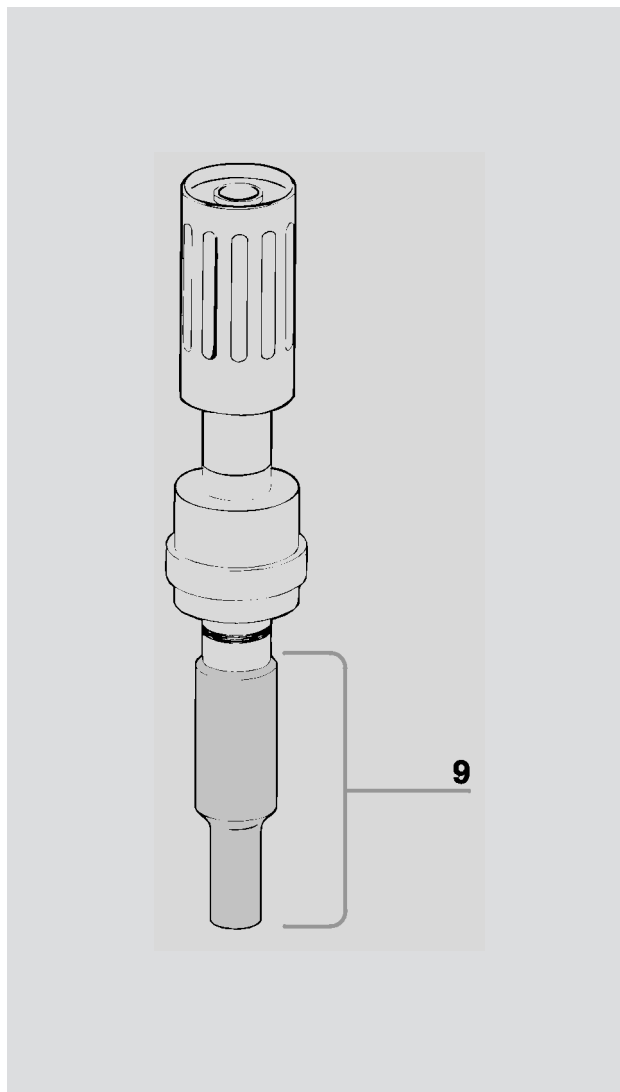
Manufacturing horns without the theoretical and practical experience leads to unsatisfactory and bad welding results and to poor product quality.



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

The horn must be fastened with a tightening torque according to the following table

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

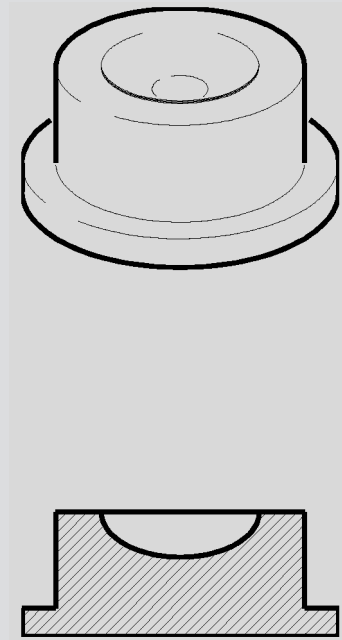


8.4 Fixture

The fixture serves a variety of purposes:

- It holds the welding object in the same position throughout the welding operation.
- It simplifies the assembly process (laying up of various parts).
- It has a positive effect on the acoustic process of the ultrasonic welding.
- It prevents damage to the welding object surface.

The degree of success and the level of quality depend in many ways on the design of the fixture. It is therefore vitally important for the fixture and the horn to be produced by the same manufacturer. He knows the requirements to be met by the application.



9 Retooling

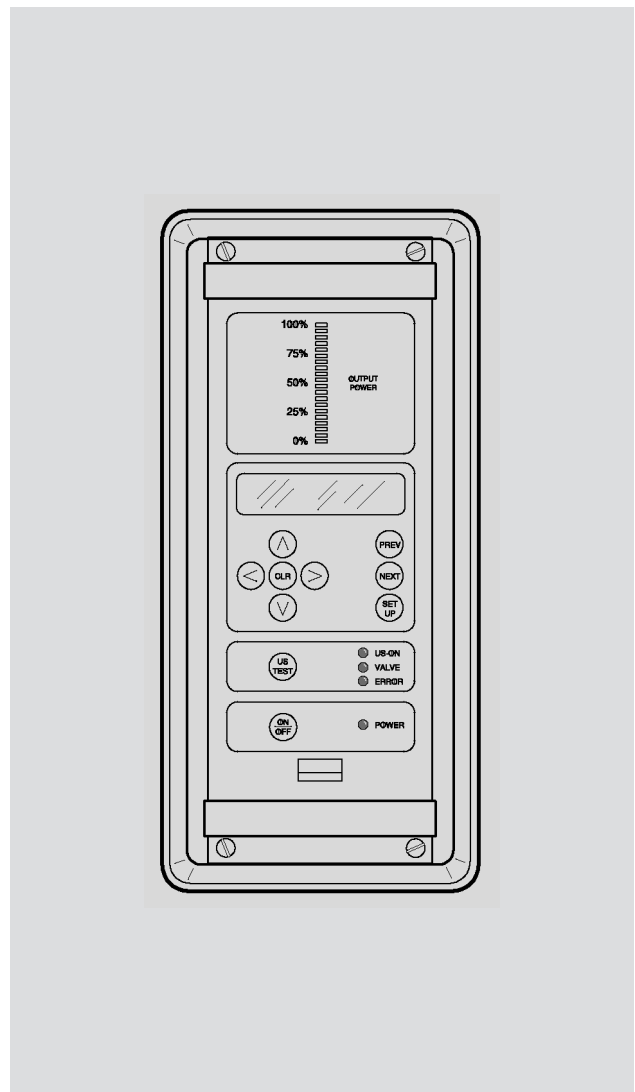
9.1 Parameter initialization

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.

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 [ON/OFF]
- LIMIT*

* These functions are not available on the SLH20-2000/3000 generators



9.1.1 Describing the selectable functions

START [MANUAL/IMPULSE/AUTOMATIC]

MANUAL

- Welding cycle is started with the two-hand start button. The start buttons must remain pressed until the welding cycle is over.

IMPULSE

- Welding cycle is started with the two-hand start button (reduced safety, as unlike in MANUAL setting, the buttons do not have to remain pressed).

AUTOMATIC

- Welding cycle is started by an impulse of at least 100ms at the START 1 (ST02) inlet.
- Standard setting MANUAL

TRIGGER [FU/TIMER/EXTERNAL/RS/OFF]

FU

- Welding is triggered by the FU-TRIGGER in the feed. The parameter can be set in the PARAMETER menu.

TIMER

- Welding starts after a timed delay. The delay time can be set in the PARAMETER menu.

EXTERN

- Welding starts via a 24V signal at the TRIGGER (ST01) inlet.

RS

- This setting is required for older models of welding instruments (MP201etc.) in RINCO's product line up.

OFF

- This setting starts the welding process right after the start signal is triggered.
- Standard setting: FU

WELDING [TIMER/EXTERNAL]

TIMER

- Weld time is set in the PARAMETER menu.

EXTERNAL

- The ultra sound is activated for as long as the start signal lasts.
- Standard setting TIMER

VALVE [ON/OFF]

- The outlet VALVE is active when initialization was done under ON settings.
- Standard setting ON

END SWITCH [ON/OFF]

- This function is active when initialization was done under ON settings.
- A signal at the input 2 or 3 of the interface shuts the ultra sound off. After shut off after welding can still take place (see page 31). Without a signal, the ultra sound shuts off after reaching weld time and TIMEOVERRUN error is displayed.
- Standard setting OFF

AFTERIMPULSE [ON/OFF]

- If after impulse was initialized to ON then 50ms after hold time the impulse is activated.
- The duration of the impulse can be set in the PARAMETER menu.
- Standard setting OFF

LANGUAGE [ENGLISH/GERMAN/etc.]

- Select the menu language.
- Standard setting ENGLISH

AMPLITUDE [INTERNAL/EXTERNAL] ***INTERNAL**

- The amplitude can be set in the PARAMETER menu.

EXTERNAL

- The amplitude can be set with an external potentiometer or an analogue voltage of 0-5VDC.
- Setting range of the amplitude: 40% – 60%

OPTION A

- With a potentiometer of 10kW at the AMPLITUDE input.

OPTION B

- With a voltage of 0 - 5V at the AMPLITUDE input of the Interface.
- If the internal +5V feed line is not used, the GND 5V has to be connected to the external GND.
- Standard setting INTERNAL

SDF [ON/OFF] *

- This function is only active when ON was the setting initialized on and serves to initiate oscillation in large volume horns.
- Standard setting OFF

* These functions are not available in SLH20-2000/3000 generators.

SOFTSTART [1-9] *

- The period in which the oscillation starts unit full amplitude can be set in 9 stages.
 - 1 slow start up for large volume horns
 - 9 fast start up for small volume horns
- Standard setting: 7 (see fig.)

TRIGGER [BEFORE /AFTER]**AFTER**

- The trigger is only active after the safety switch.

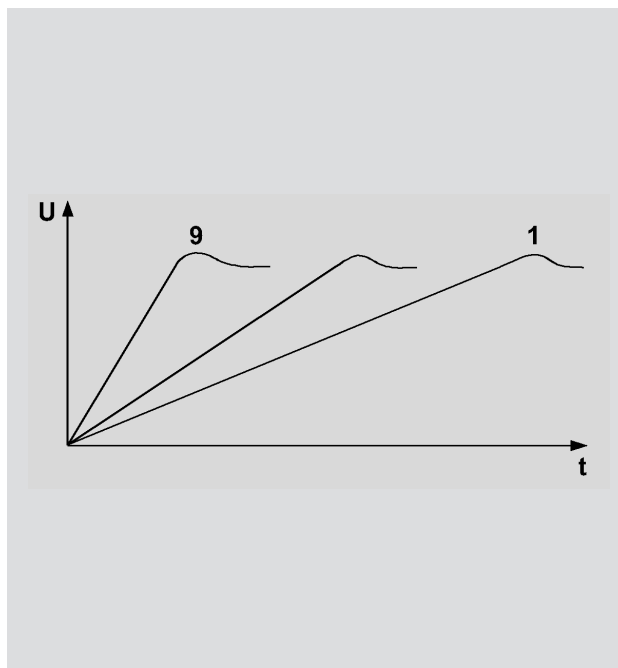
BEFORE

- The trigger is active during the entire stroke movement. This function is required when the welding distance is more than 6mm.
- Standard setting AFTER

POWER.LIMIT [ON/OFF] *

- This function is active when initialization was done with ON.
- With [WELD: TIMER] power monitoring is activated after softstart has been completed. If power input exceeds the limits for 50ms the error message POWER.LIMIT is displayed.
- With [WELD: EXT.] power monitoring is activated after the softstart has been completed and the lower power limit has been exceeded. If power input exceeds the limits for 200ms the error message POWER.LIMIT is displayed. If the lower power limit is not reached for 2,5s welding is stopped and the error message POWER.LIMIT is displayed.
- The parameters for the power limits can be set in the PARAMETER menu.
- Standard setting OFF

* This function is not available in SLH20-2000/3000 generator.



9.1.2 System initialization process



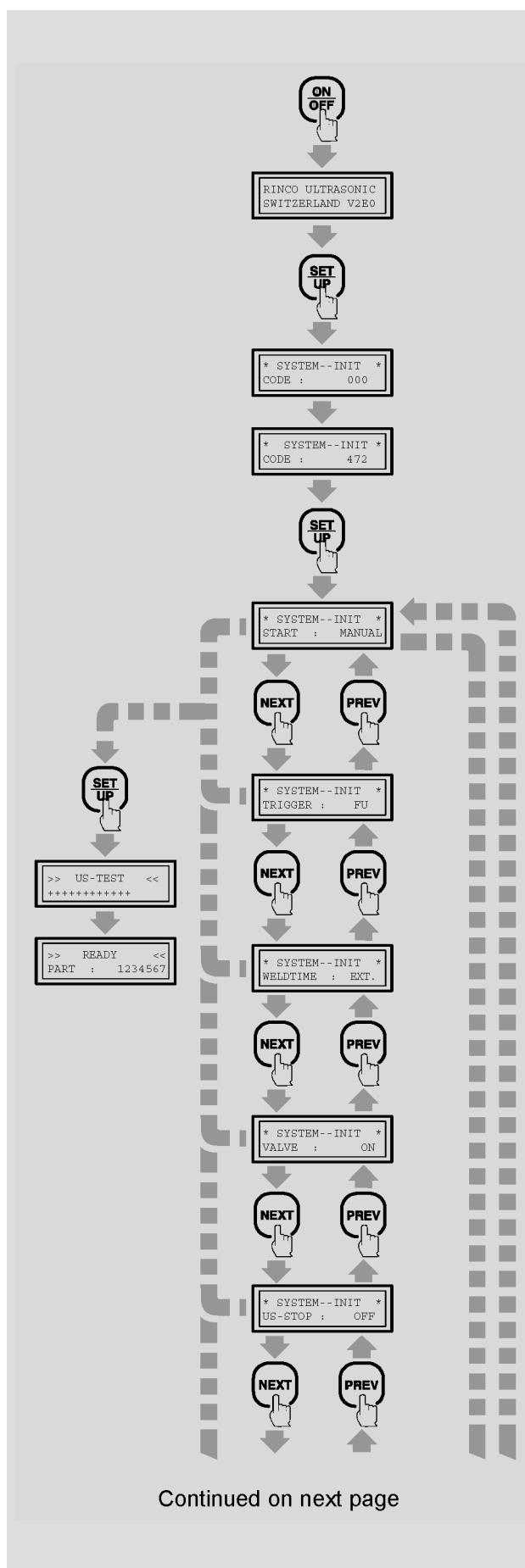
**A oscillating system must be connected.
Do not touch the horn.**

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.



Continued on next page



An oscillating system must be connected.

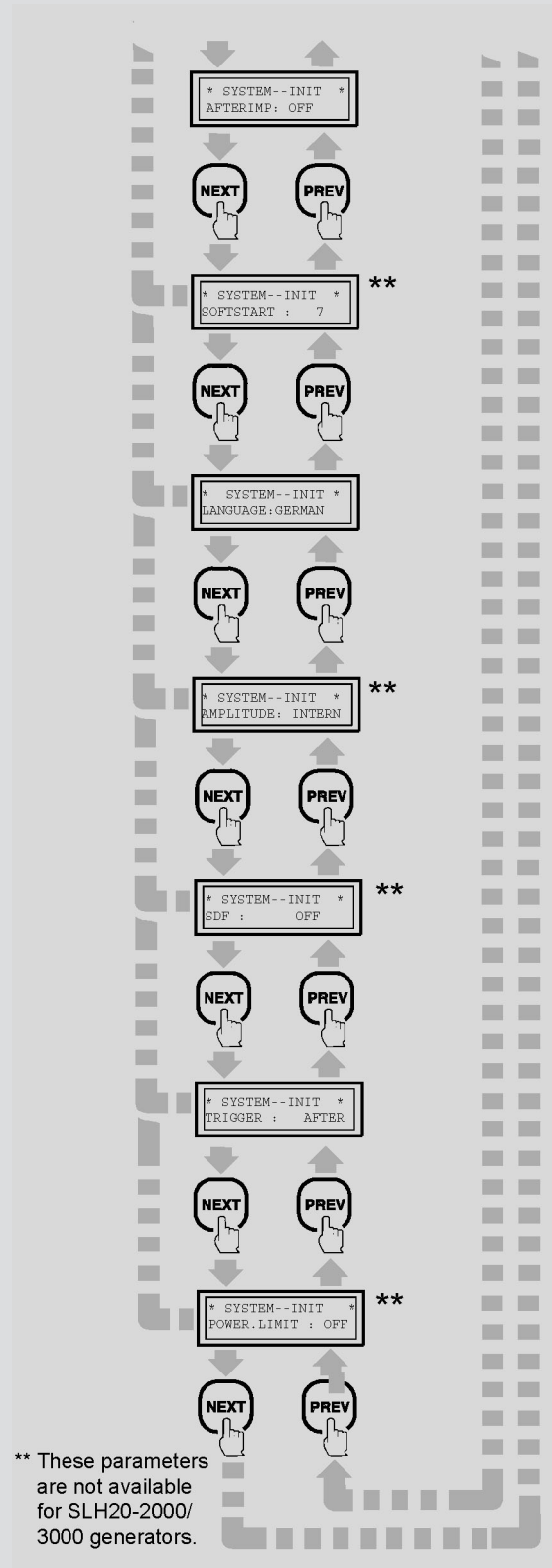
Do not touch the horn.

1. Press the **ON/OFF** key.
2. The generator performs a self-test for two seconds during start up.
3. During the self-test keep the **PREV** key pressed.

The display shows:

* STANDARD--INIT *
PRESS CLR

4. Press the **CLR** key.



10 Cleaning and maintenance

10.1 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.

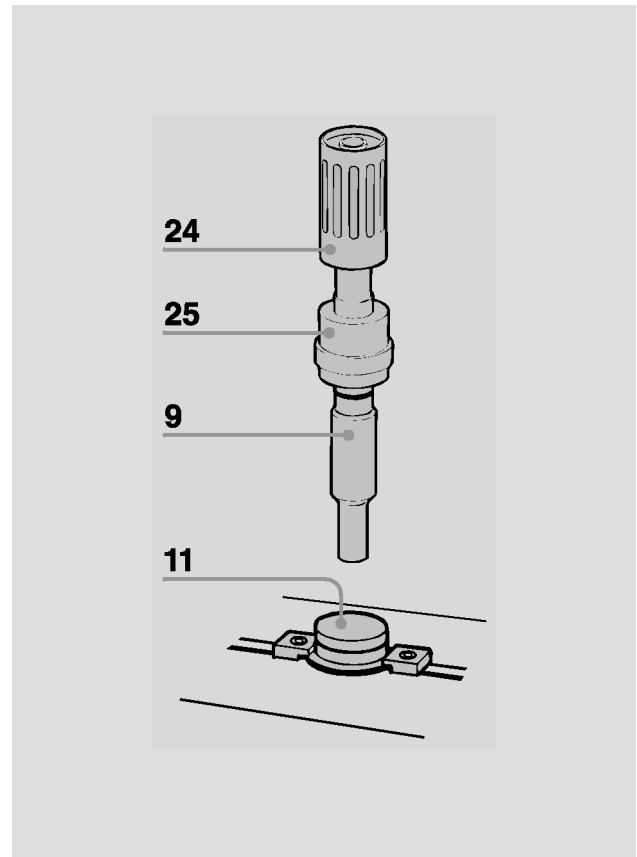
Attention: Never clean the keypad or plastic sheeting of the generator with caustic agents.

10.2 Generator

The Generator requires no special maintenance. However, regular cleaning of

- fixture (11),
- Horn (9),
- Booster (25),
- Converter (24)

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



10.3 Oscillating system



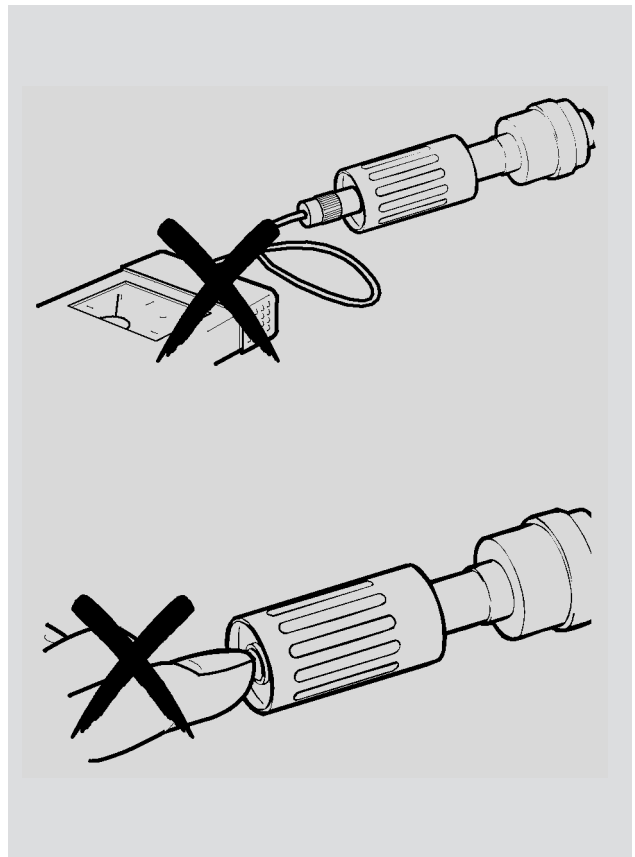
Work may only be carried out on the vibration system and converter housing when the mains voltage is switched off! High voltage!



Avoid contact with the HF connection (23) 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.



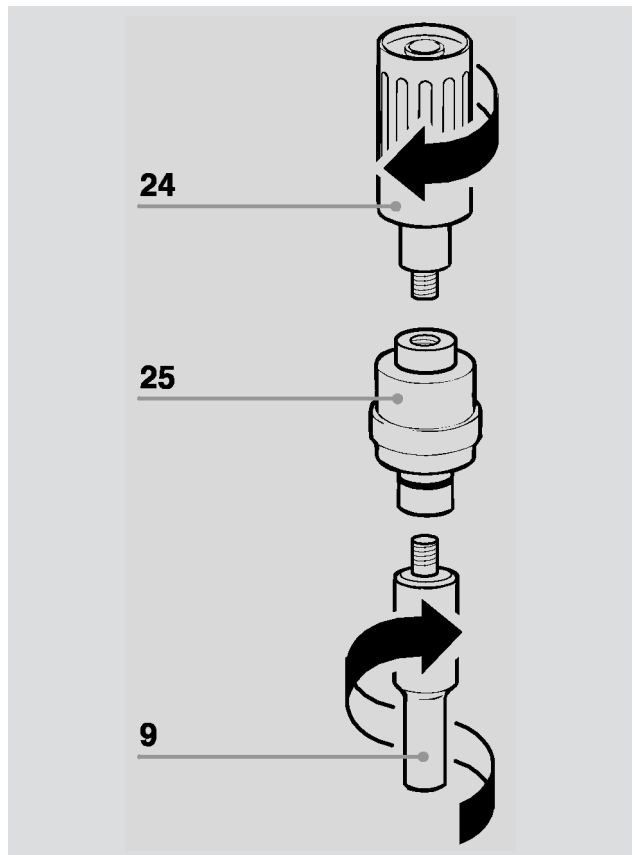
10.4 Threaded coupling

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

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

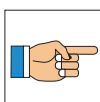
11.1 Error messages / corrective action: switching on

Error	Possible cause	Corrective action
Generator cannot be switched on	– no voltage supply – EMERGENCY STOP button pressed – fuse faulty – module not in its housing	– insert mains plug – release EMERGENCY STOP button – test fuses F1–F5 – insert module and bolt together
After being switched on, the display shows: ERROR FREQUENCY	– oscillator unit not in use – RF cable not plugged in at oscillator unit or generator – error in oscillator unit: a) not screwed together firmly enough b) horn defective or outside the frequency c) booster defective d) converter defective	– use oscillator unit – plug in RF cable – screw together more firmly – replace horn – replace booster – replace converter

11.2 Generator error messages during operation

Error	Possible cause
"OVERLOAD 1" The generator was charged over 100% of nominal power.	– Trigger set too high – Maximum welding pressure too high – Generator output too low for intended application – Vibration system faulty
"OVERLOAD 2" The generator had to utilise to the full the final stage reserve capacity.	– Amplitude too low at contact cut off during cutting operations – mains voltage below nominal tolerance
"TRIGGER" Trigger point not reached after 10 seconds.	– Trigger set too high – wrong Parameter initialization – Trigger system faulty
"FREQUENCY" Vibration system out of frequency range of generator.	– 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.	– 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.	– Abort via 24V signal at input 7 of the interface
"ABORT" Welding could not be carried out according to programm.	– Start button released before safety switch was reached or before hold time has run out – hold time run out
"HARDWARE 1"	– defective valve in the feeder – defective pressure monitoring switch in the feeder – defective safety switch – defective upper end position switch – upper end position switch not adjusted – Stroke less than 6 mm – Malfunction in the generator – defective two-hand trigger
"HARDWARE 2"	– Start 2 not available
POWER LIMIT: xx% Power limits were exceeded or undercut.	– Wrong welding parameters – Faulty or wrong welding parts

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

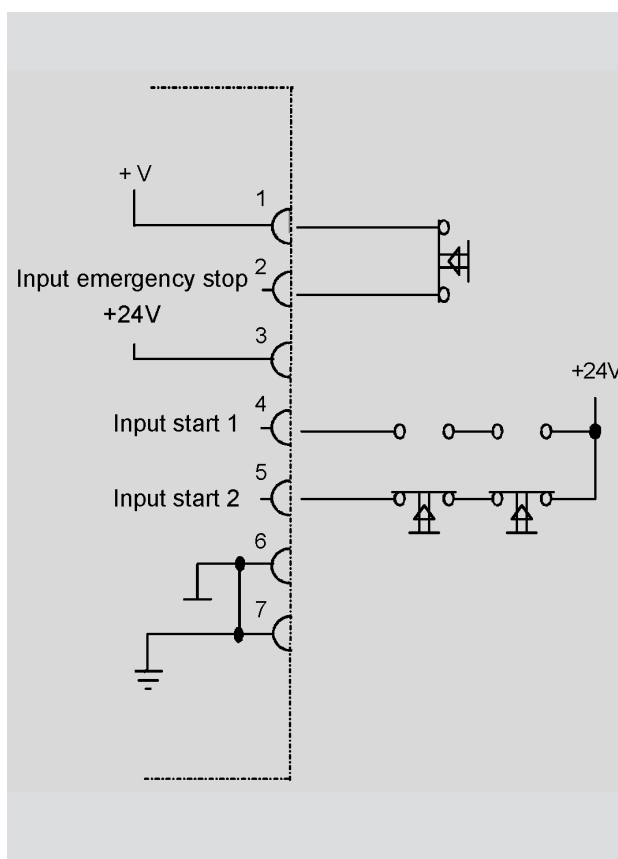


The "**HARDWARE1**" and "**HARDWARE2**" error can only be canceled by switching the unit off.

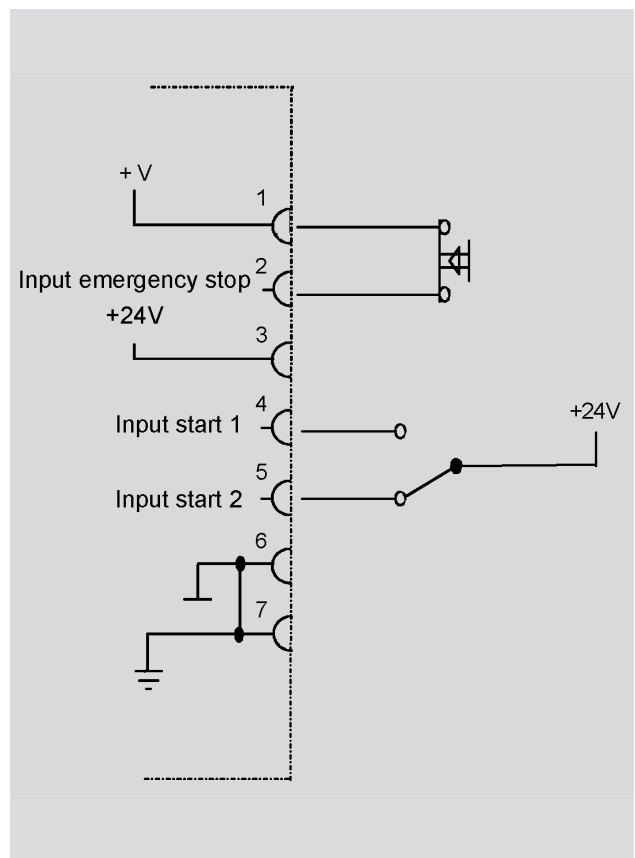
12 Electronic scheme

12.1 Connection plans Housing SL

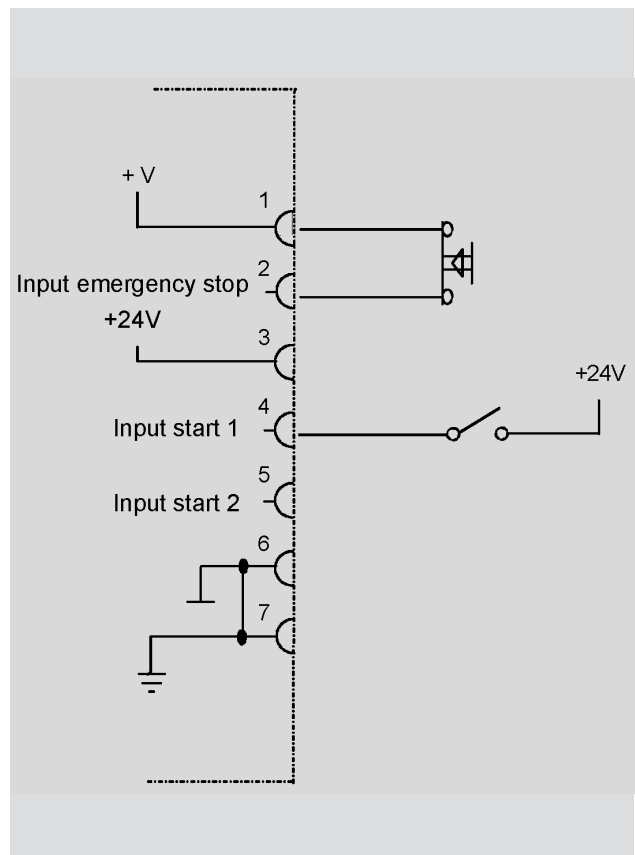
12.1.1 Start ST02 manual (Standard)



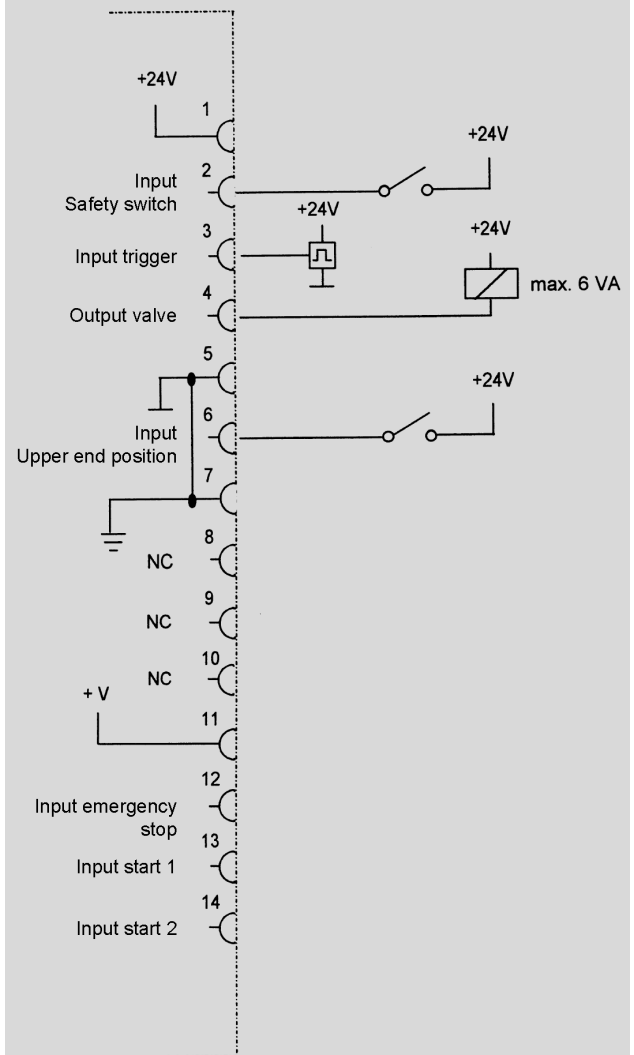
12.1.2 Start ST02 manual (Option)



12.1.3 Start ST02 automatic (Option)

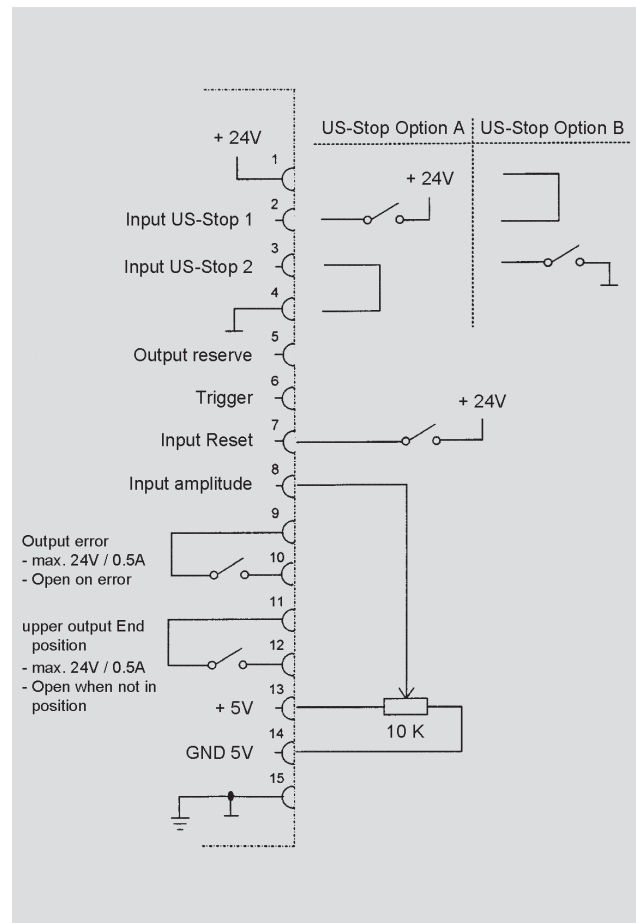


12.1.4 Feeder ST01 (Standard)



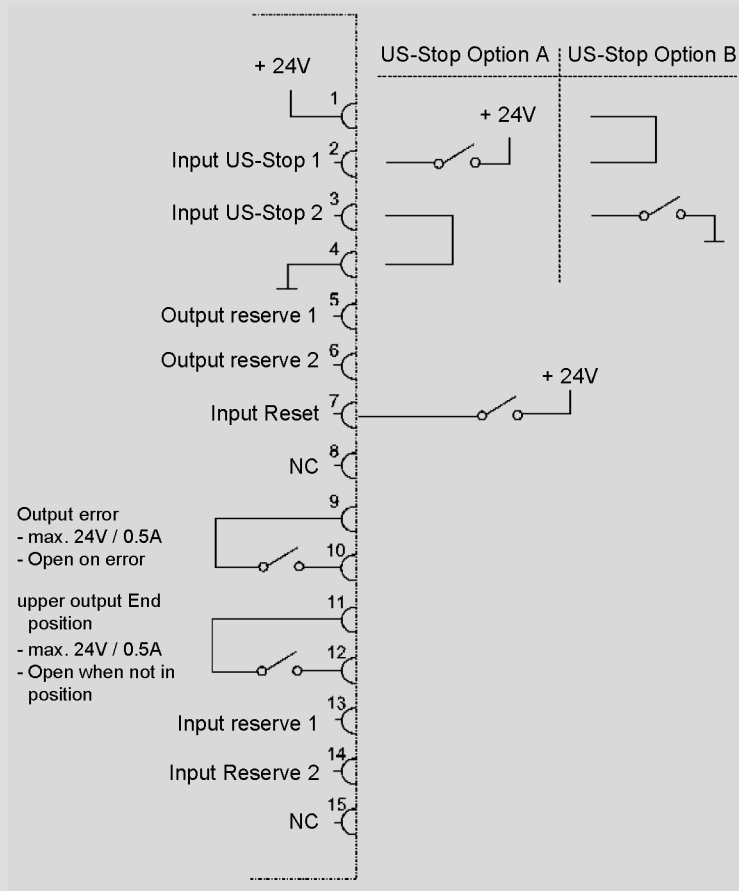
12.1.5 Interface ST03

SL20, 35, 70



12.1.6 Interface ST03

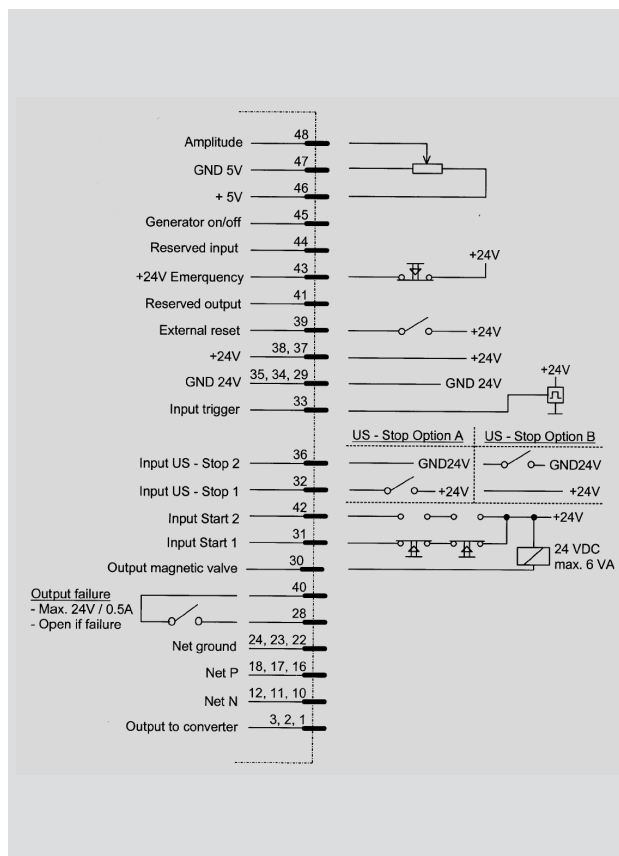
SLH20



12.1.7 Generator module

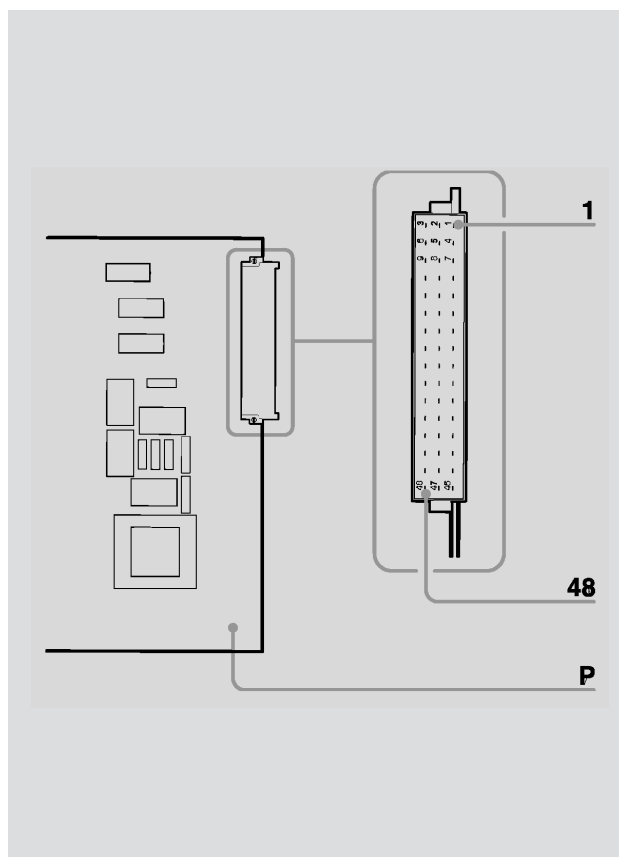
GM 20, 35, 70

Print socket according to
DIN41612 form F48



Detail of plug connection

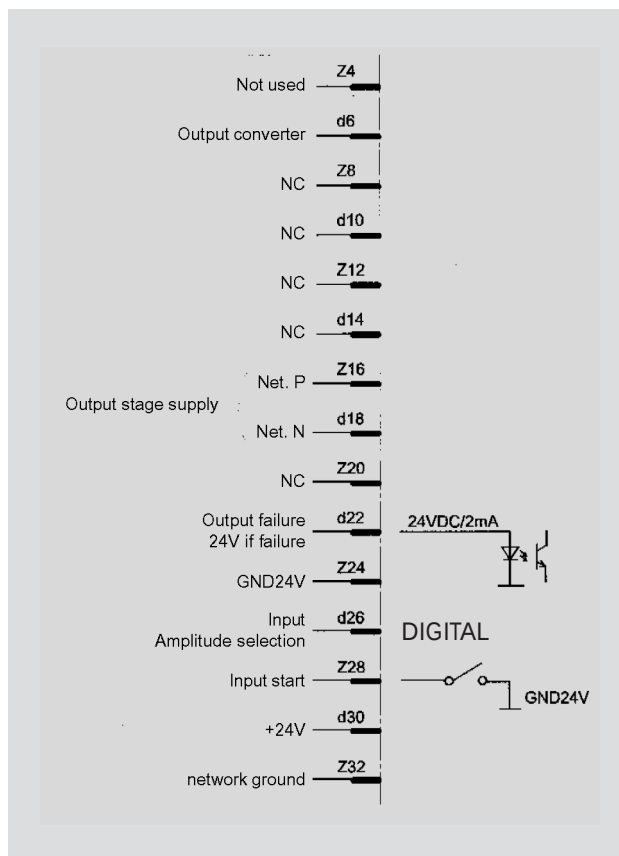
- 1 Connection '1'
- 48 Connection '48'
- P Main board



12.1.8 Generator module

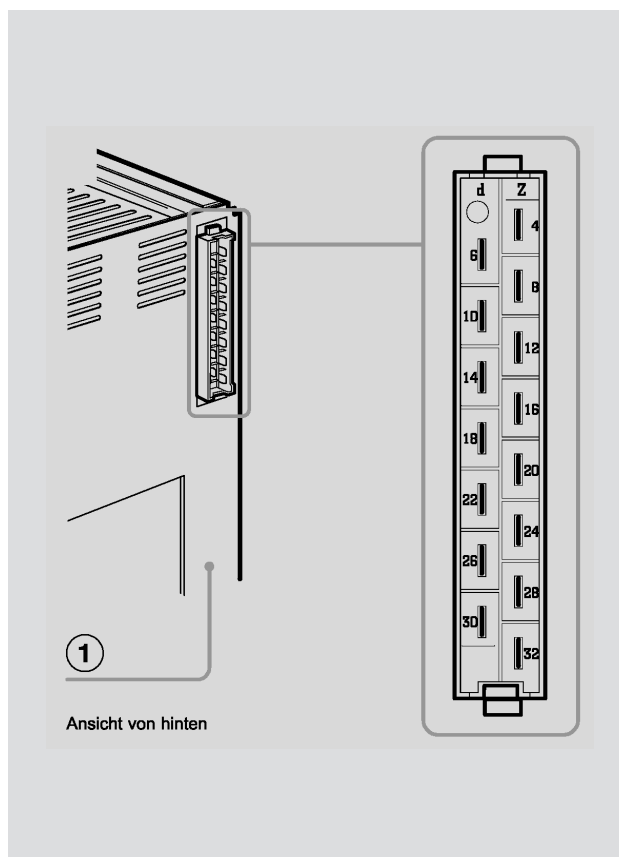
GM20-2000/3000

Print socket according to DIN41612
form H15



Detail of plug connection

- ① Generator module
GM20-2000/3000

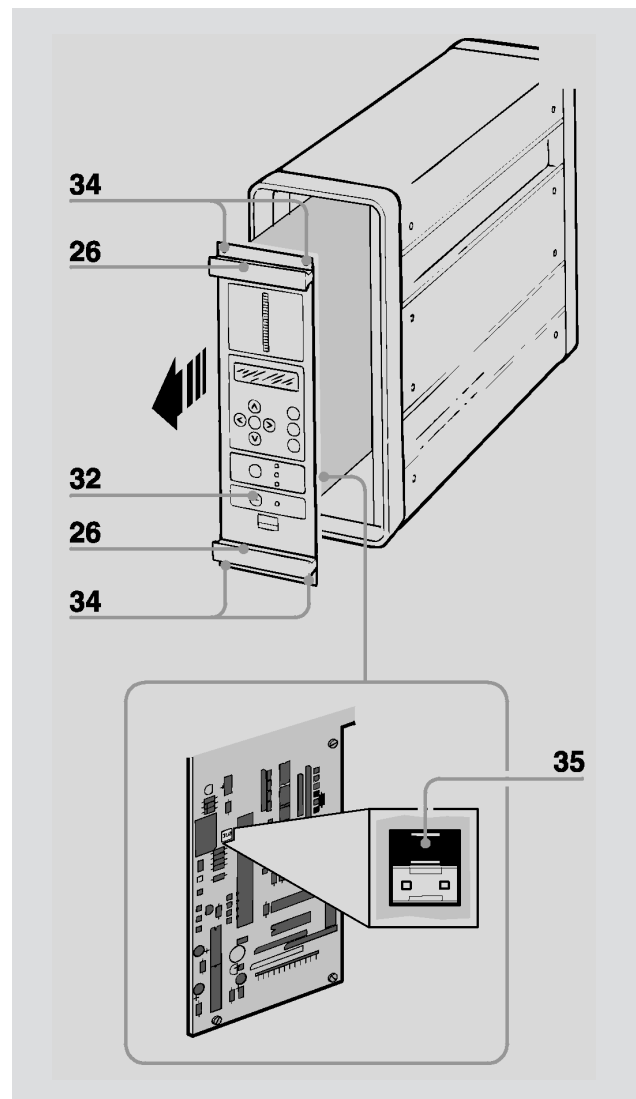


12.2 ON/OFF switch bridge-over

The mains switch of the Ultrasonic Generator can be set either active or inactive.

The bridge-over of the ON/OFF switch (32) is carried out as follows:

1. Unscrew the 4 fastening screws (34).
2. Carefully take out the generator module by pulling the handles (26) in direction as shown until the jumper (35) is within reach.

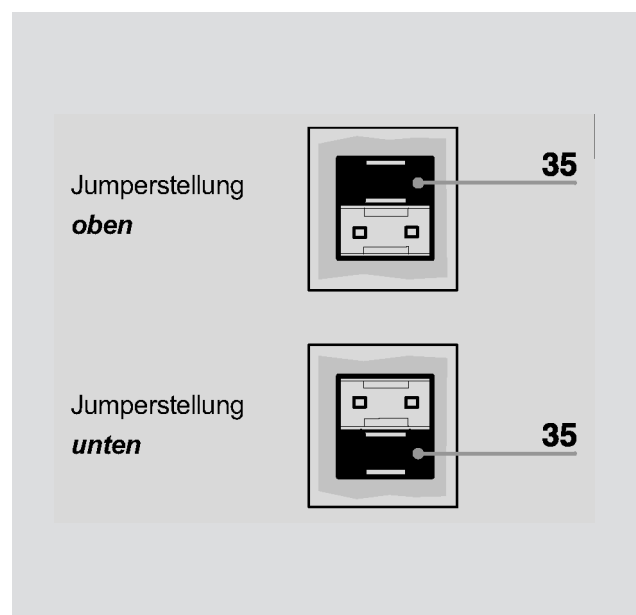


In-house setting

The jumper (35) is set to top position i.e. the ON/OFF switch (32) remains active.

Option

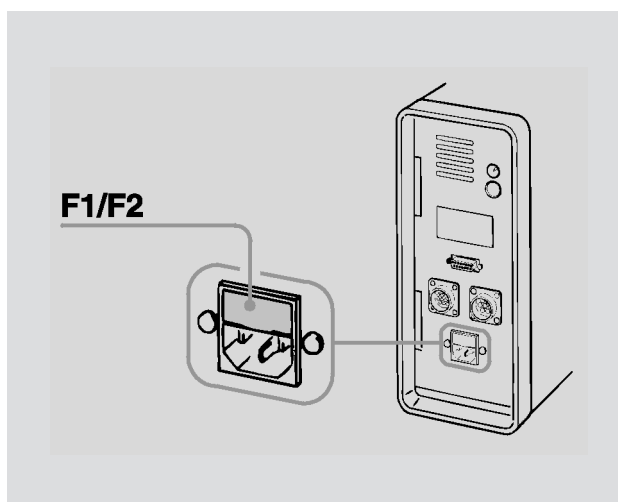
The ON/OFF switch (32) is set inactive, when the jumper (35) is set to bottom position i.e. the generator automatically switches on as soon as the mains plug in connected to the power supply.



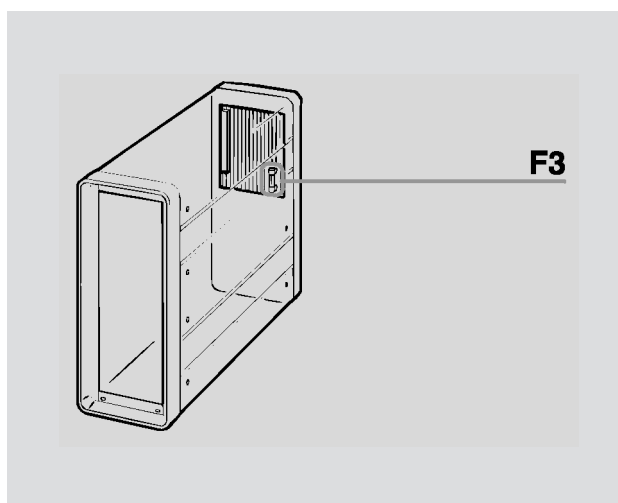
12.3 Fuses generator SL20, 35, 70

Fuses are to be found in the following assemblies:

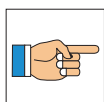
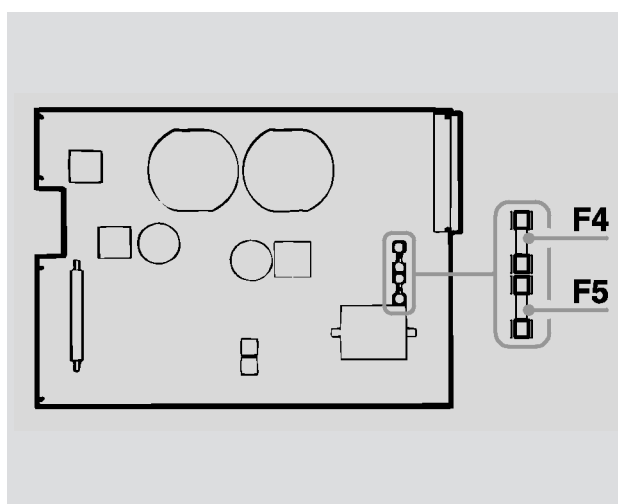
Power socket



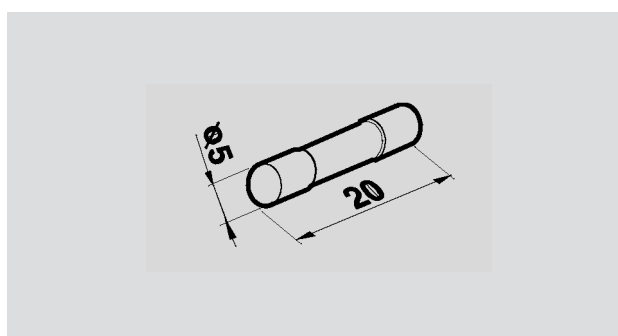
Bus print



Generator module



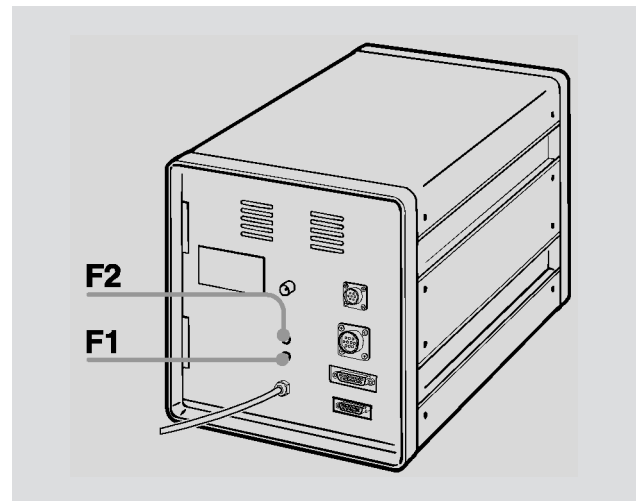
**All fuse dimensions:
5 x 20 mm.**



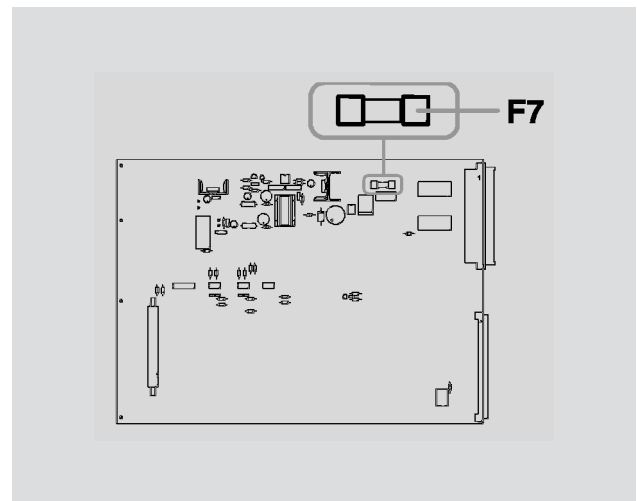
12.4 Fuses generator SLH20

Fuses are to be found in the following assemblies:

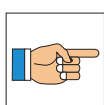
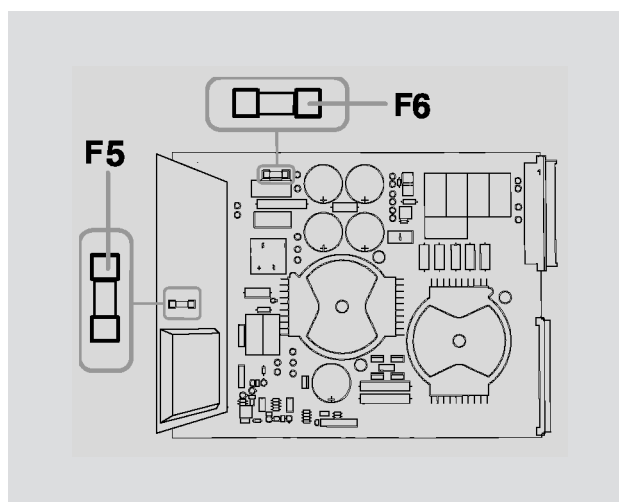
Power socket



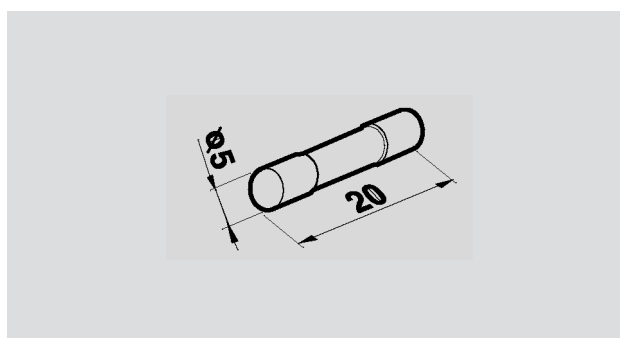
TIM10 module



Generator module GM 20-2000/3000



**All fuse dimensions:
5 x 20 mm.**



12.5 List of fuses generator SL20, 35, 70

12.5.1 Fuses 230 Volt / 200 Volt

Generator	Power socket		Generator module		
	F1	F2	F3	F4	F5
GM70-100	1.25A/T	1.25A/T	400mA/T	1.25A/T	100mA/T
GM35-400	4A/T	4A/T	400mA/T	4A/T	100mA/T
GM35-600	4A/T	4A/T	400mA/T	4A/T	100mA/T
GM35-900	6.3A/T	6.3A/T	400mA/T	6.3A/T	100mA/T
GM20-1000	6.3A/T	6.3A/T	400mA/T	6.3A/T	100mA/T
GM20-1500	8A/T	8A/T	400mA/T	8A/T	100mA/T

12.5.2 Fuses 110 Volt

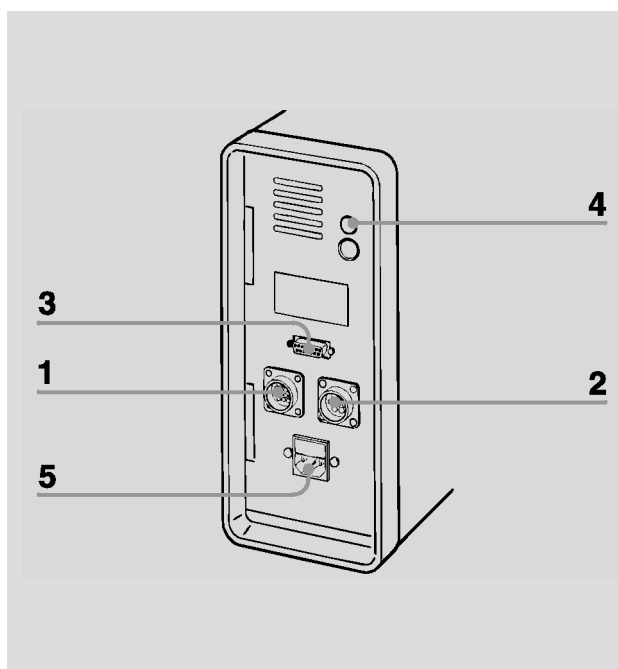
Generator	Power socket		Generator module		
	F1	F2	F3	F4	F5
GM70-100	2A/T	2A/T	400mA/T	2A/T	160mA/T
GM35-400	8A/T	8A/T	400mA/T	8A/T	160mA/T
GM35-600	8A/T	8A/T	400mA/T	8A/T	160mA/T

12.6 List of fuses generator SLH 20

Generator	Power socket		Generator module			
	F1	F2	F3	F4	F6	F5
GM 20-2000	16A/T	16A/T	–	–	16A/T	160mA/T
GM 20-3000	16A/T	16A/T	–	–	16A/T	160mA/T
Fuse TIM 10 Modul		F7	3,15A/T			

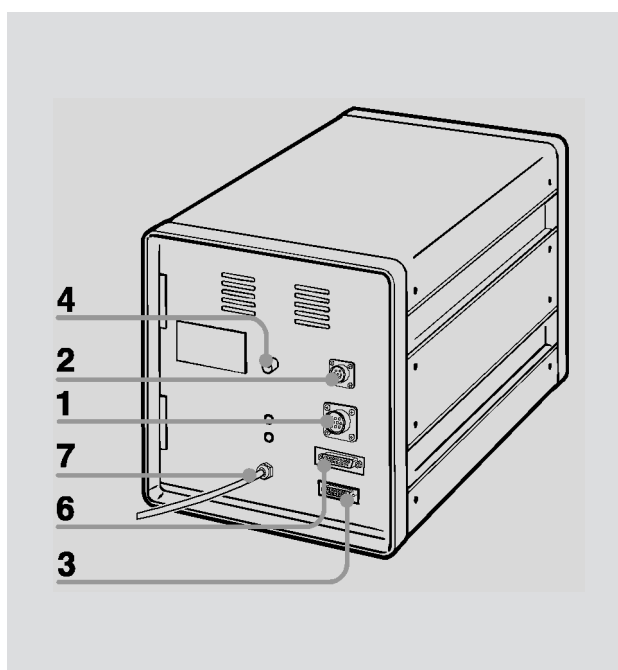
12.7 Generator back panel SL 20, 35, 70

- 1 ST01
- 2 ST02
- 3 ST03
- 4 ST04
- 5 ST05



12.8 Generator back panel SLH 20

- 1 ST01
- 2 ST02
- 3 ST03
- 4 ST04
- 6 ST06
- 7 ST6



12.9 List of unit sockets and connection plugs SL20, 35, 70

List of appliance sockets

STO1	Appliance socket	14 pol. AMP
STO1	Appliance socket	14-pol. AMP
STO2	Appliance socket	7-pol. AMP
STO3	Appliance socket	SUB-D 15 pol.
STO4	Appliance socket	Lemo 2/1/0
STO5	Appliance socket	250V / 8A

List of connection plugs

ST1	Plug	14-pol. AMP
ST2	Plug	7-pol. AMP
ST3	Plug	SUB-D 15 pol.
ST4	Plug	Lemo 2/1/0
ST5	Mains cable	250V

12.10 List of unit sockets and connection plugs SLH20

List of appliance sockets

STO1	Appliance socket	14 pol. AMP
STO2	Appliance socket	7 pol. AMP
STO3	Appliance socket	SUB-D 15 pol.
STO4	Appliance socket	Lemo 2
STO5	Appliance socket	250V / 8A
STO6	Appliance socket	SUB-D 25 pol.

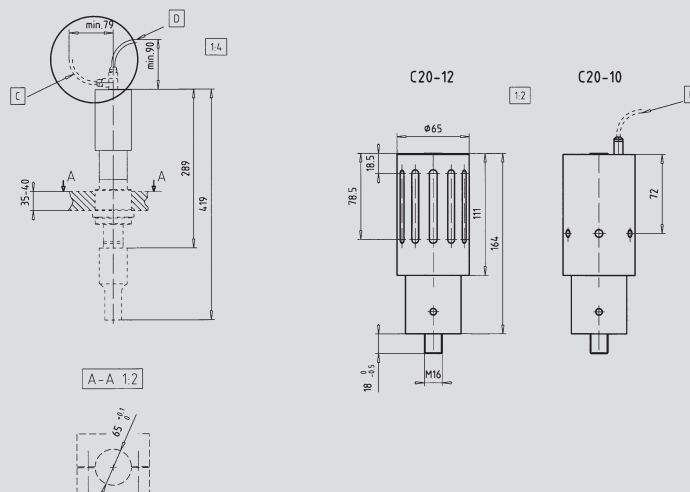
List of connection plugs

ST1	Plug	14 pol. AMP
ST2	Plug	7 pol. AMP
ST3	Plug	SUB-D 15 pol.
ST4	Plug	Lemo 2
ST5	Mains cable	250V
ST6	Mains cable	250V

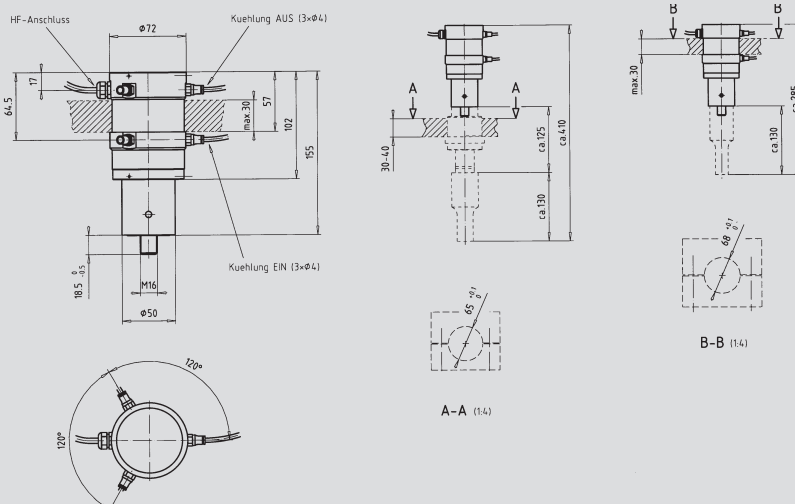
13 Technical drawings and values

13.1 Dimensions drawing of the converter C20-10/12/14/15

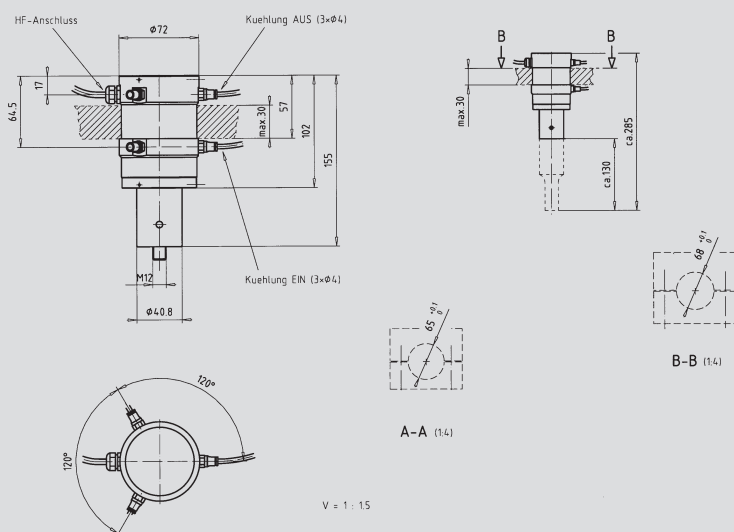
C20-10/12



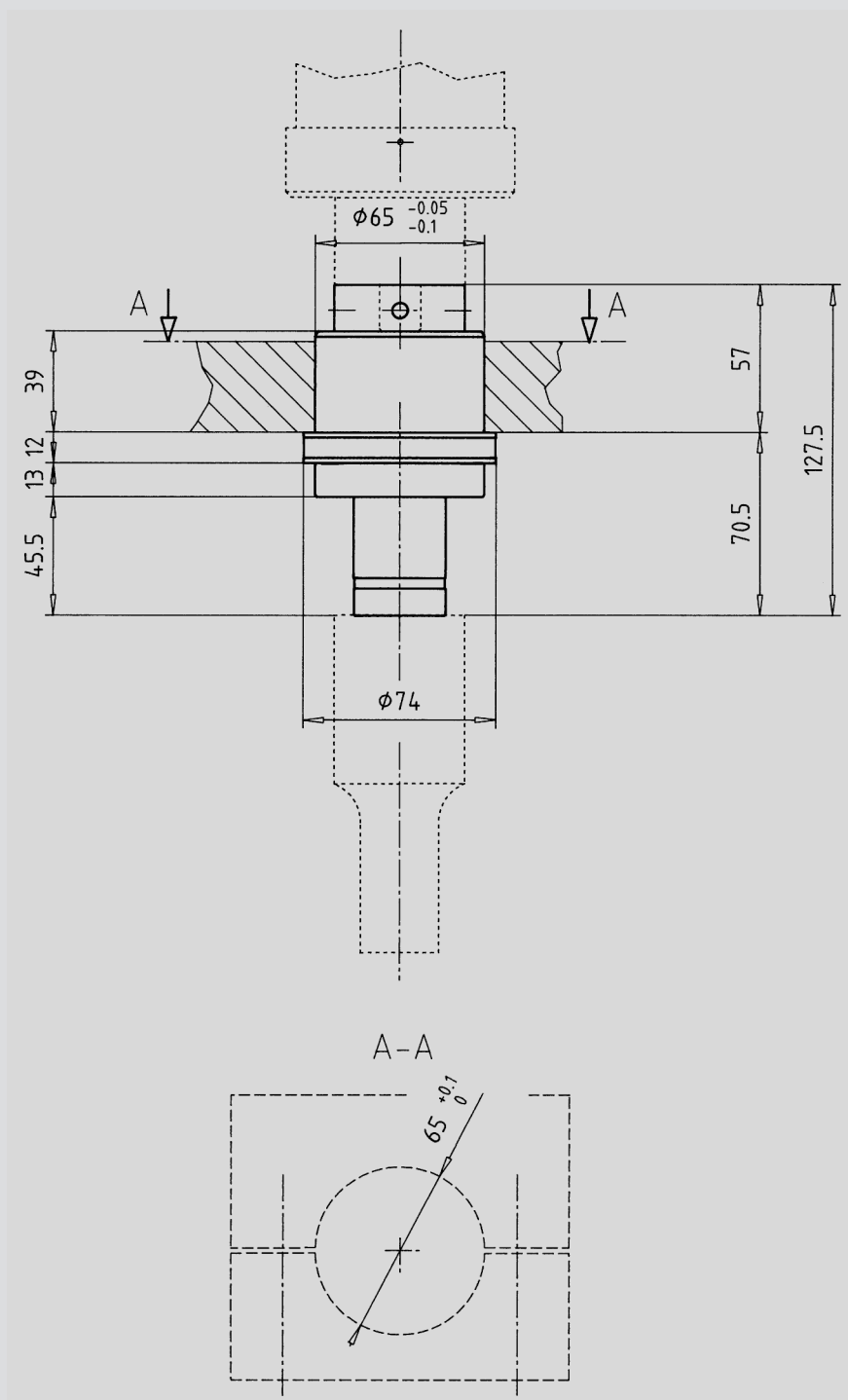
C20-14



C20-15



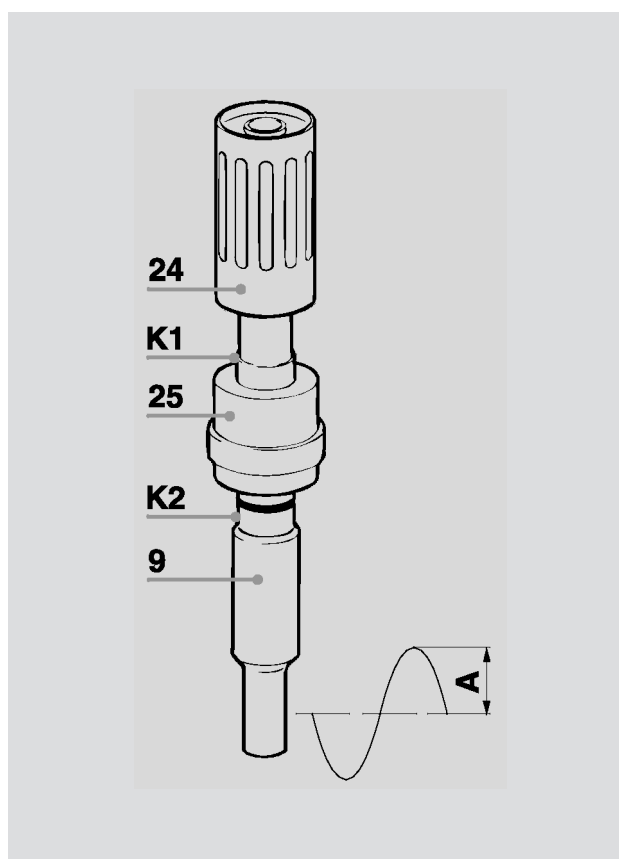
13.2 Dimensions drawing of the 20 kHz booster



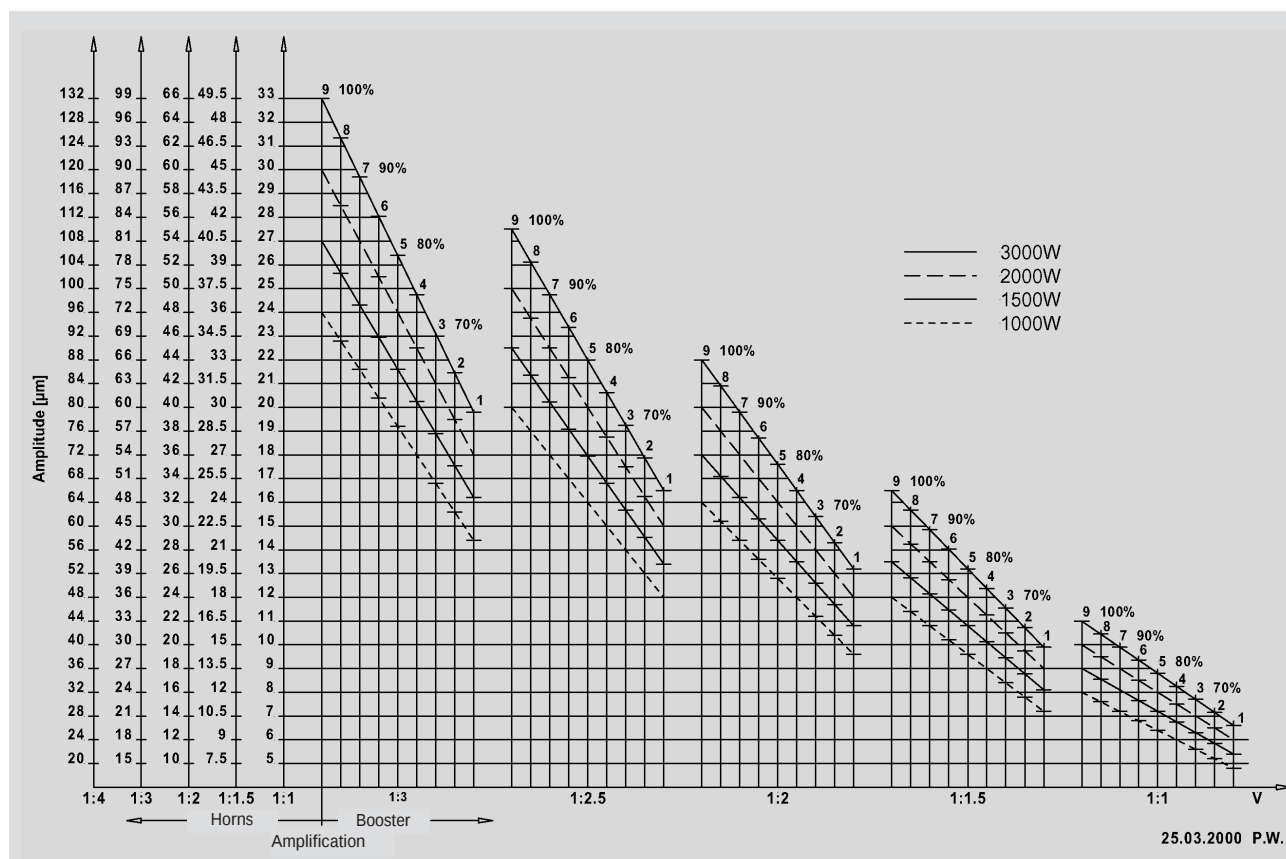
13.3 Amplitude values of the series of generator modules GM

The various generator performances result in differing amplitudes. The amplitude values described in the following table are valid for the resp. generator/booster/horn configuration. The actual welding amplitude can be read off directly.

- 9 Horn
- 24 Converter
- 25 Booster
- A Amplitude
- K1 Coupling point
- K2 Coupling point

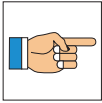


13.4 Amplitude of 20 kHz generators



13.5 Length of the bolt of the oscillating components; 20 kHz

24 Converter



The converter bolt is a fixed part of the converter and cannot be loosened!

25 Booster

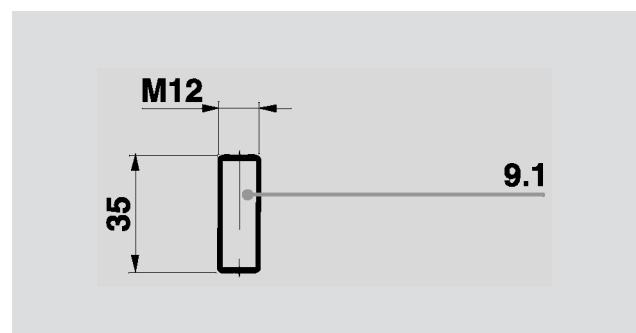
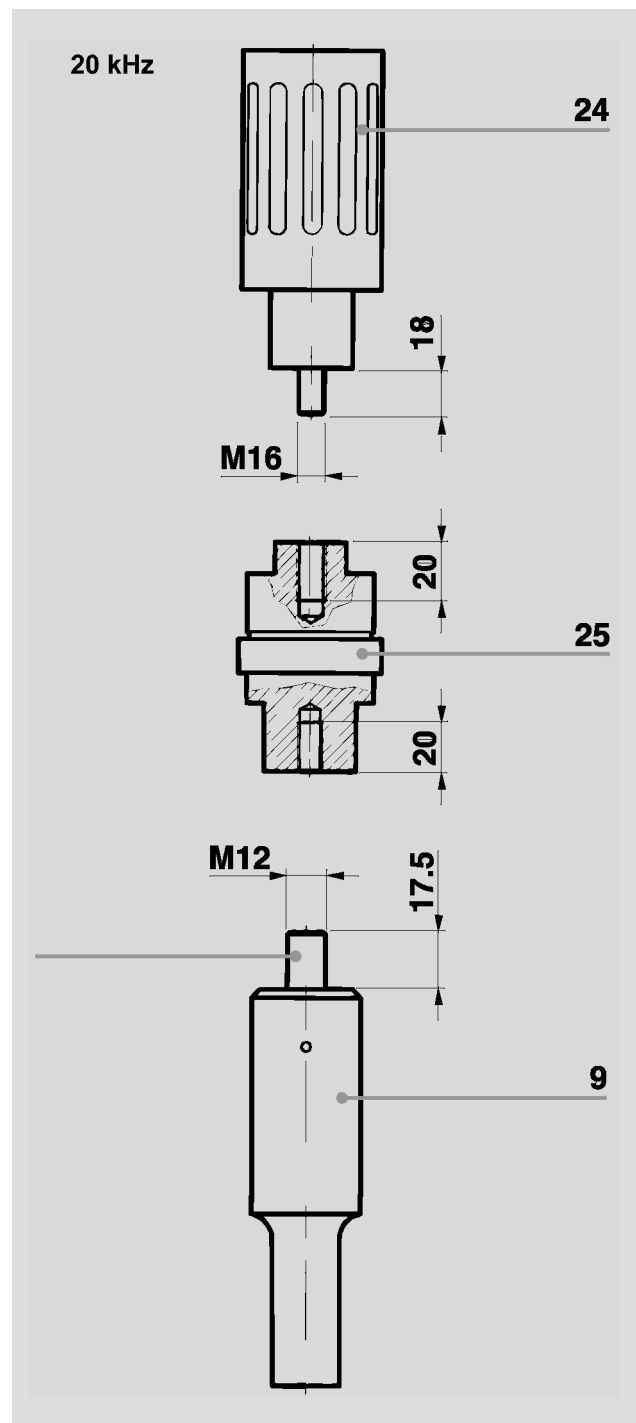
The coupling surfaces are manufactured to be totally parallel and flat.

9 Horn

9.1 Horn bolts

Horn bolts manufactured of high strength steel or titan.

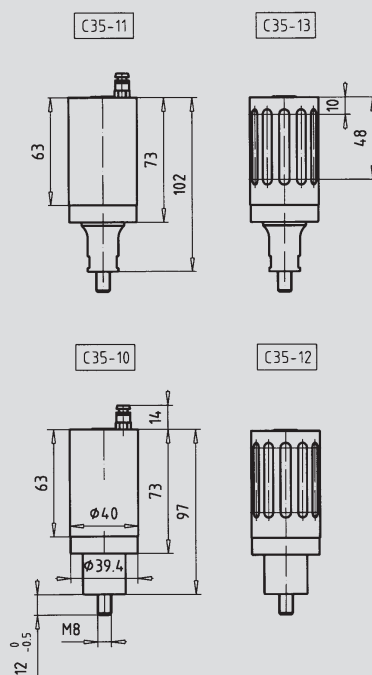
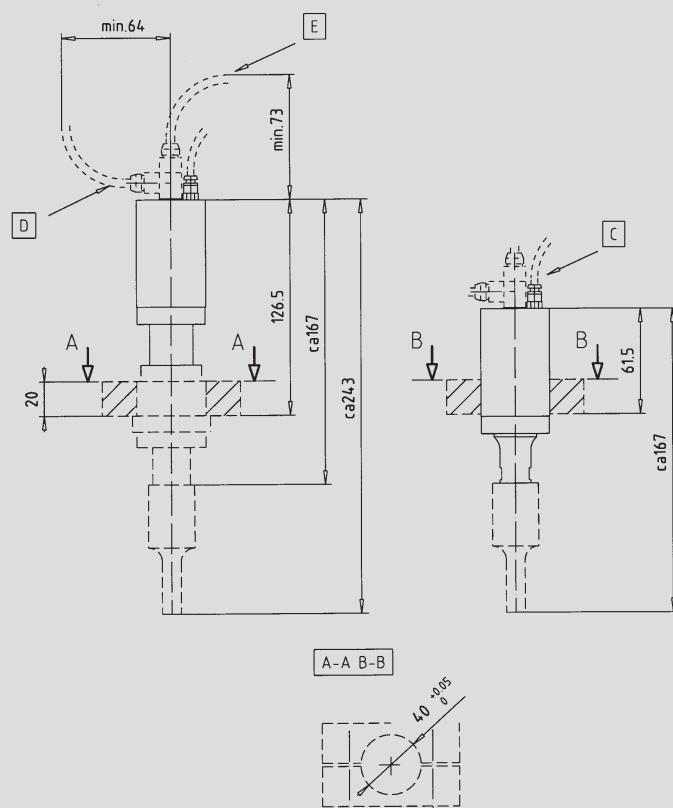
The horn bolt is glued on by the manufacturer.
Under certain circumstances the bolt can be loosened.



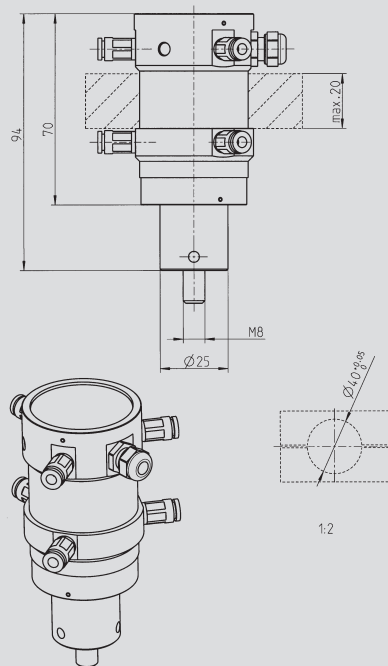
13.6 Dimension drawing of the converter

C35-10/11/12/13/14/17

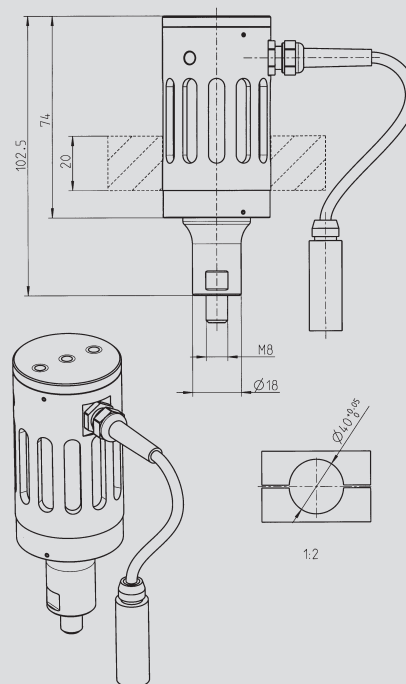
C35-10/11/12



C35-14

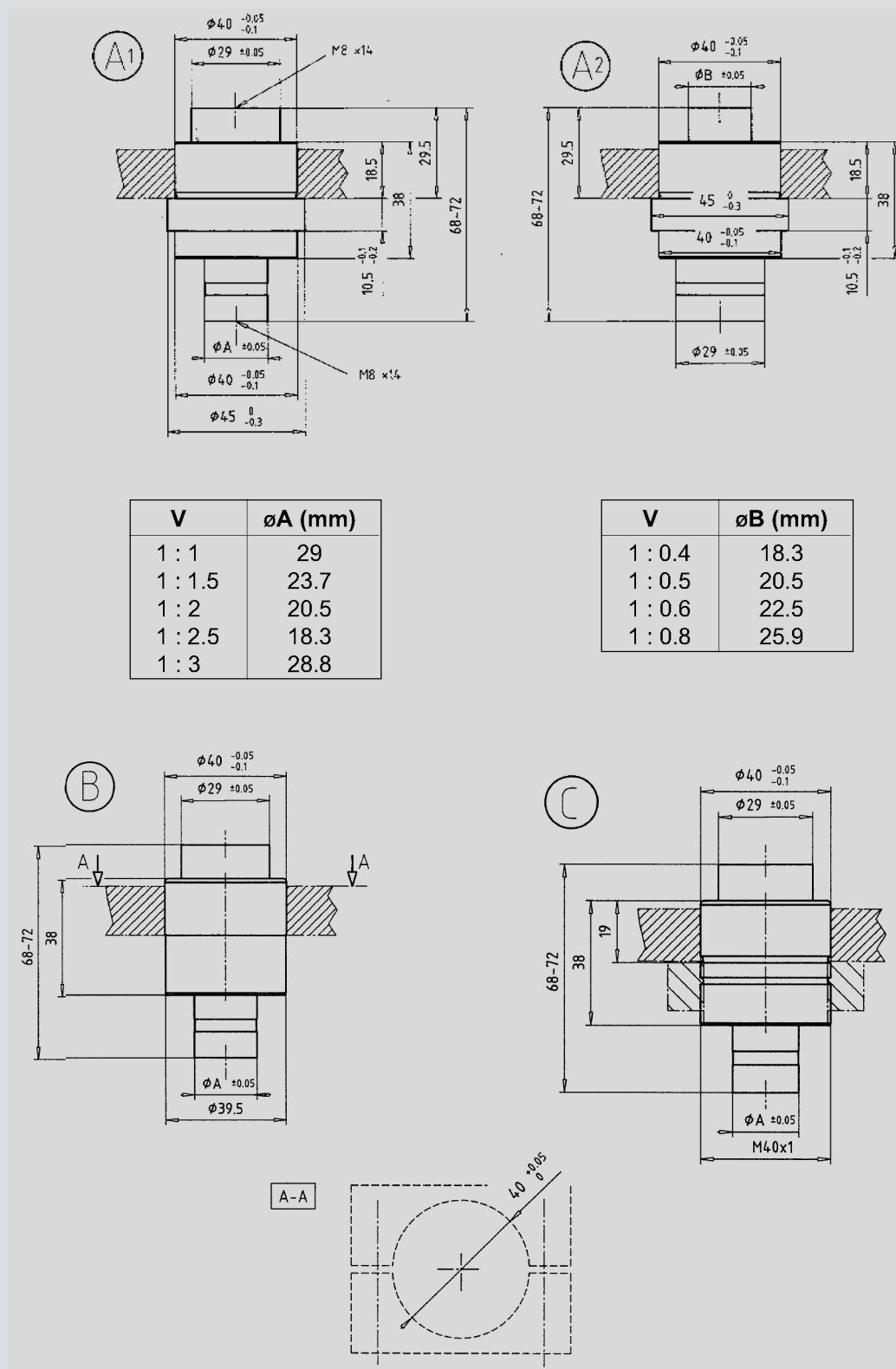


C35-17



13.7 Dimension drawing of the booster

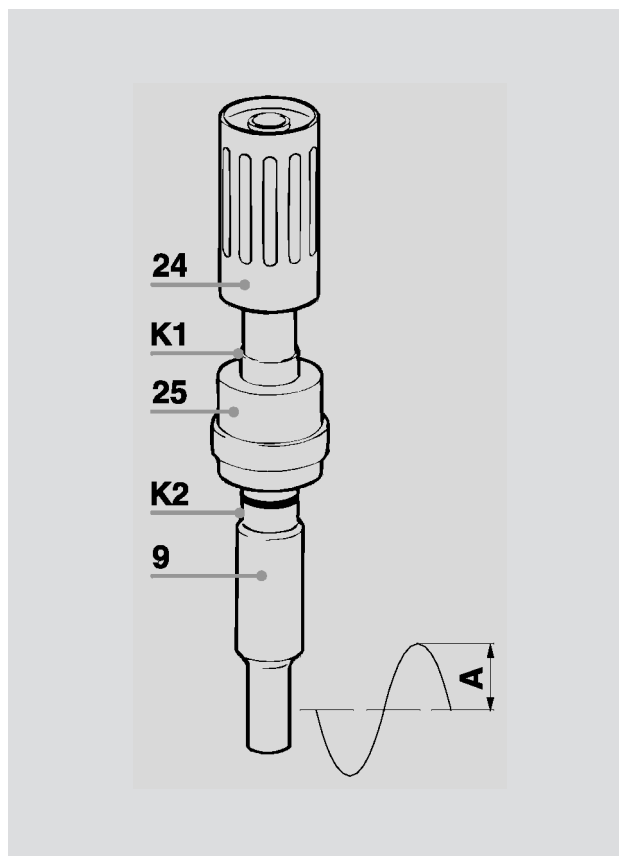
C35-10/11/12/13



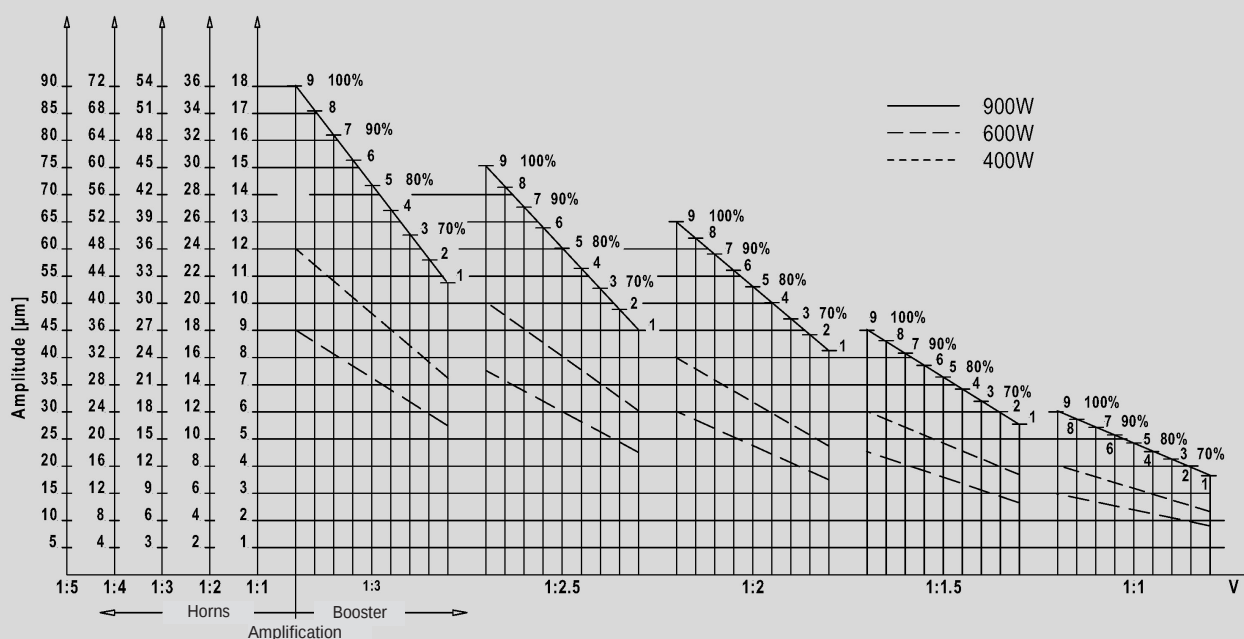
13.8 Amplitude values of the series of generator modules GM

The various generator performances result in differing amplitudes. The amplitude values described in the following table are valid for the resp. generator/booster/horn configuration. The actual welding amplitude can be read off directly.

- 9** Horn
- 24** Converter
- 25** Booster
- A** Amplitude
- K1** Coupling point
- K2** Coupling point

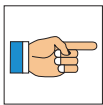


13.9 Amplitude of 35 kHz SL generators



13.10 Length of the bolt of the oscillating components; 35 kHz

24 Converter



The converter bolt is a fixed part of the converter and cannot be loosened!

25 Booster

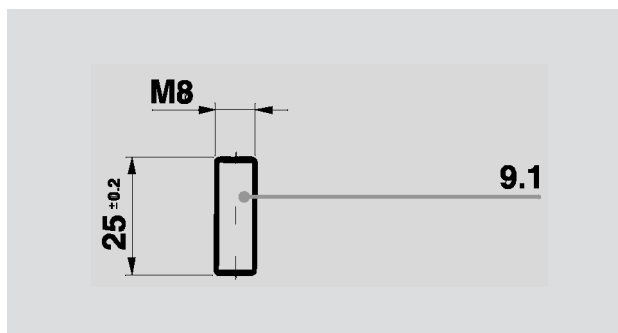
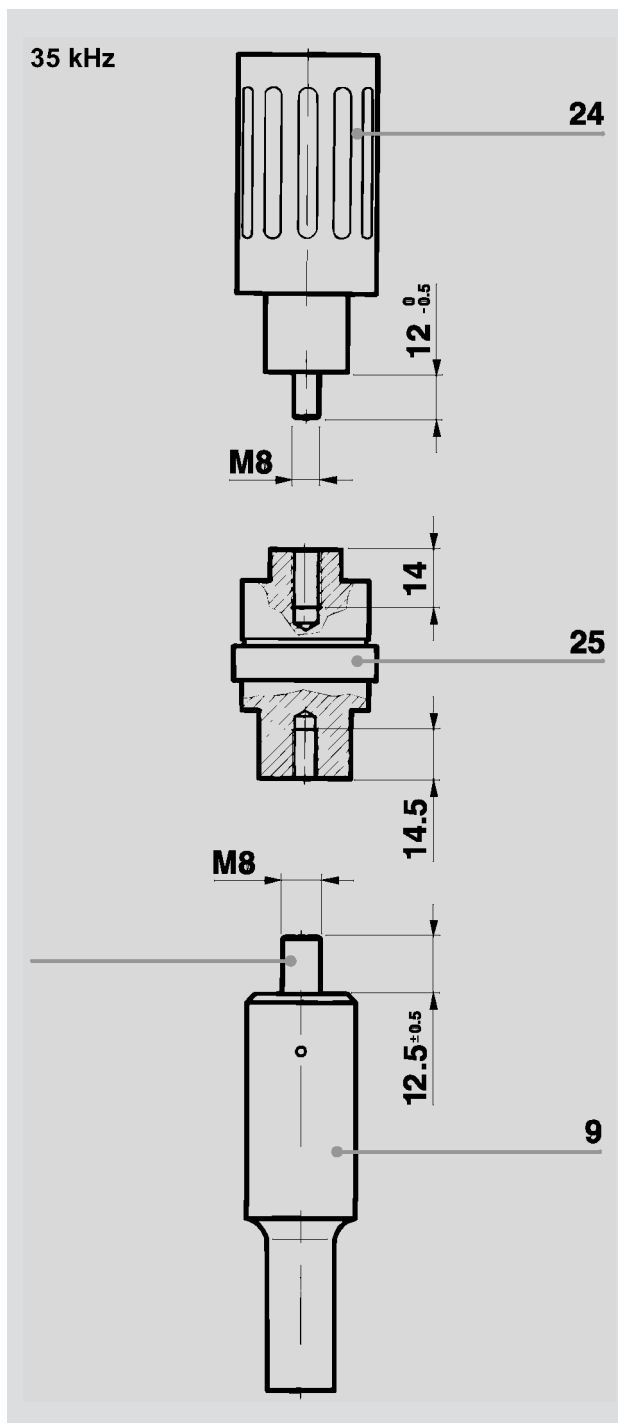
The coupling surfaces are manufactured to be totally parallel and flat.

9 Horn

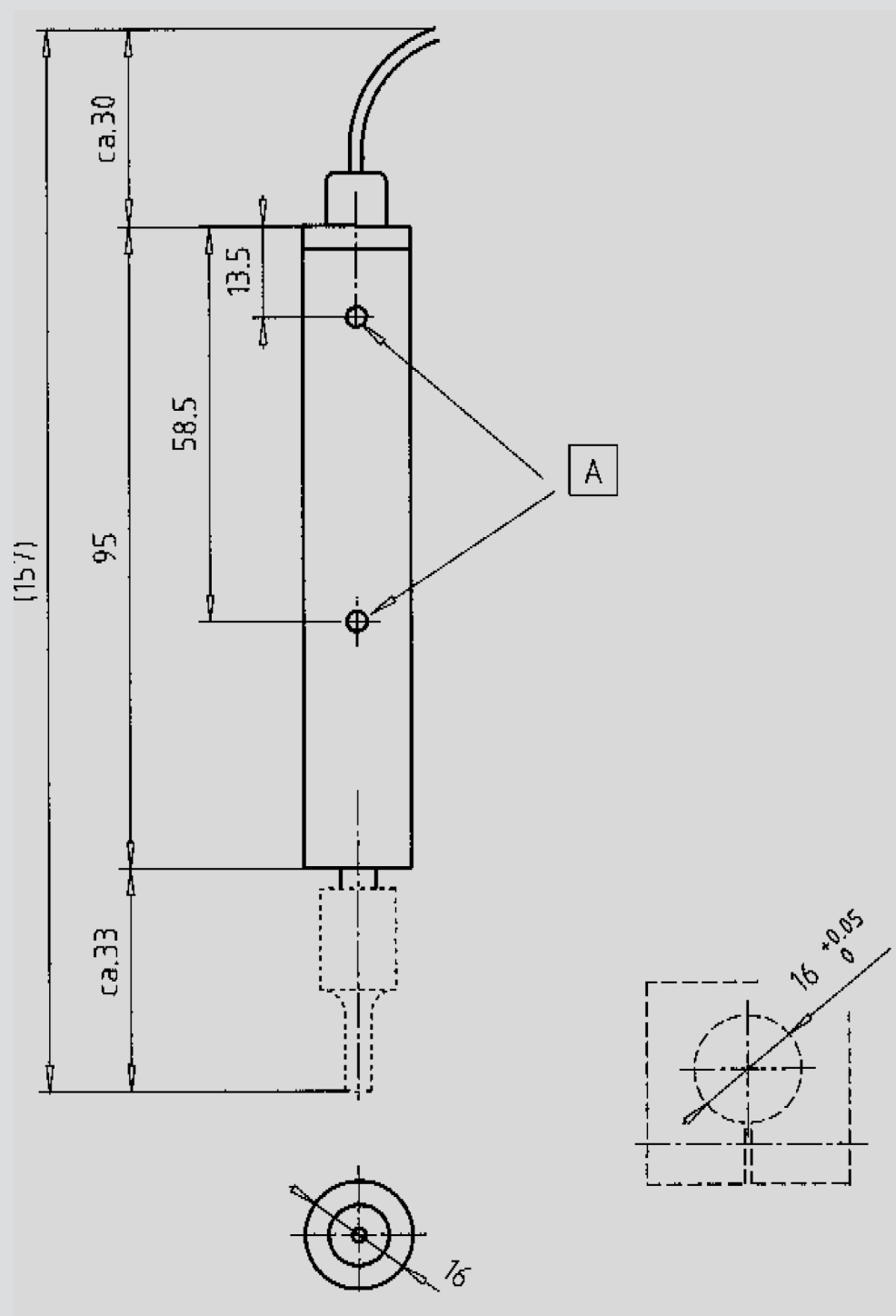
9.1 Horn bolts

Horn bolts manufactured of high strength steel or titan.

The horn bolt is glued on by the manufacturer. Under certain circumstances the bolt can be loosened.

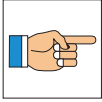


13.11 Dimension drawing converter

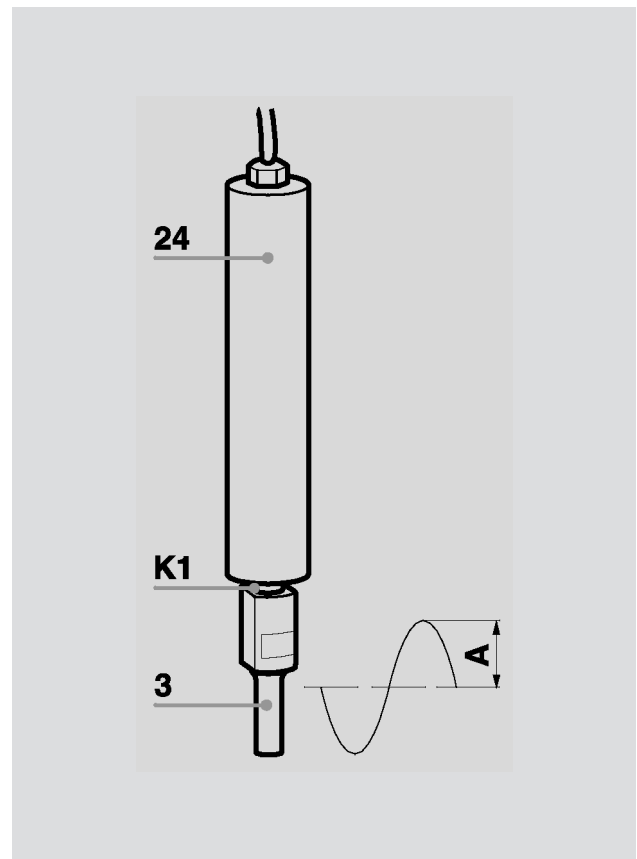


13.12 Amplitude values of the series of generator modules GM

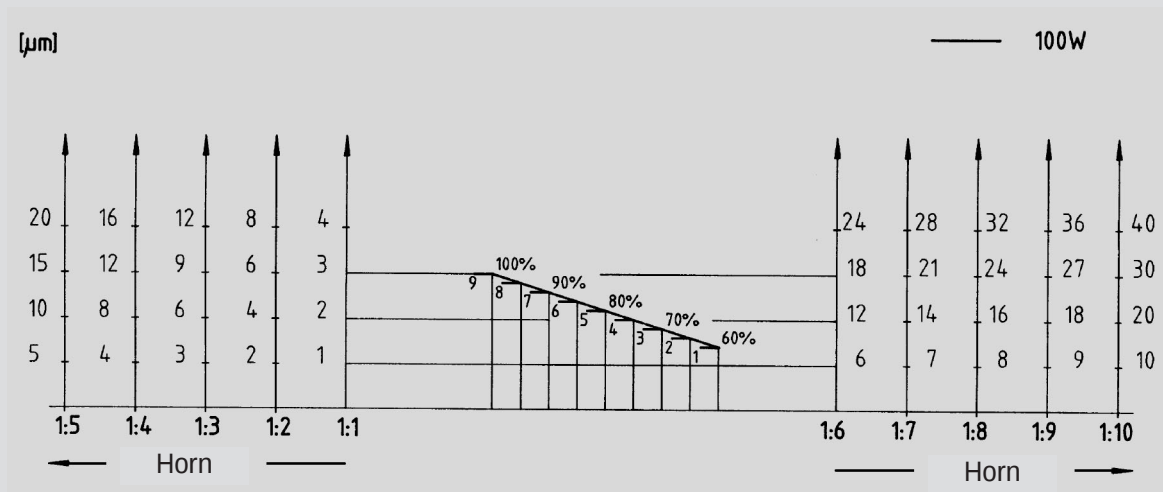
- 3 Horn
- 24 Converter
- K1 Coupling point



The amplitude at the coupling point "K1" is 3 μm

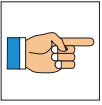


13.13 Amplitudes of 70 kHz SL generators



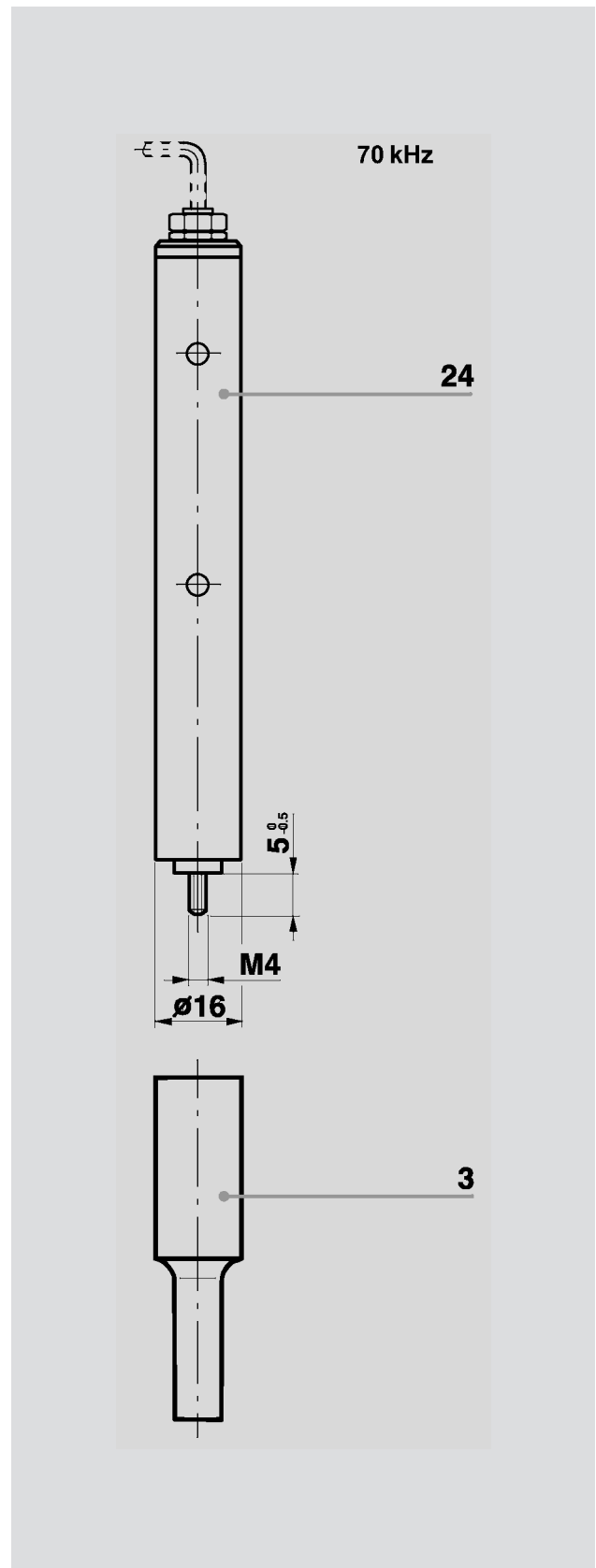
13.14 Length of the bolts of the oscillating components; 70 kHz

24 Converter



The converter bolt is a fixed part of the converter and cannot be loosened!

3 Horn



14 Service center addresses

In the event of technical malfunctions or welding problems, the TECHSPAN GROUP Technical Service Center will be glad to help.

To provide useful advice, our Aftersales Service Center needs the following information:

1. The type designation and serial number of the unit.
2. An exact description of the technical malfunction or welding problem.

Our address:

TECHSPAN GROUP

Australia : P O Box 1012, Mascot, NSW 1460

New Zealand : P O Box 15262, New Lynn, Auckland

New Zealand

Tel. ++64-9-827-6567

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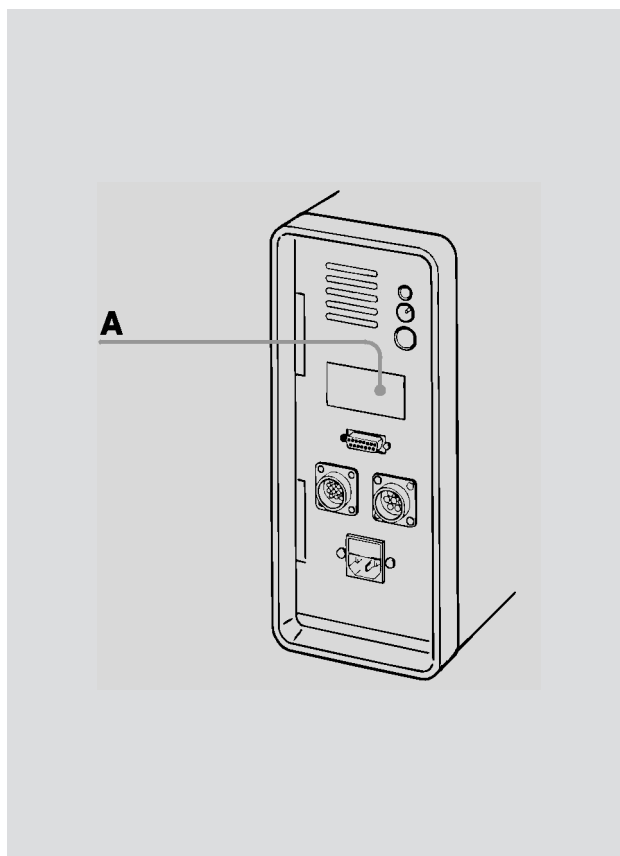
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