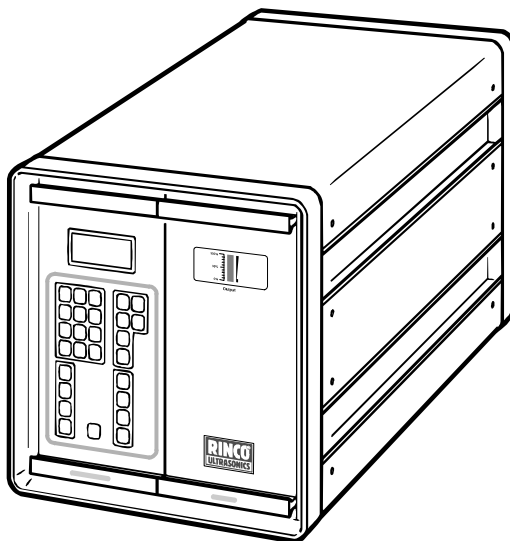


PCS 20 (Plug in module GM20)

with

Converter and Booster



.....

TECHSPAN GROUP

P O Box 1012, Mascot, NSW 1460

P O Box 15262, New Lynn, Auckland 0640

sales@techspanonline.com



AUS 1800 148 791 NZL++64 9 8276567



AUS 1800 148 799 NZL++64 9 8276596



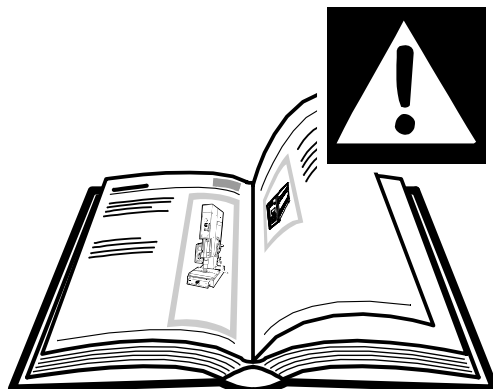
..... www.techspanonline.com

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

device

Sticker

Generator

Representative

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Preface

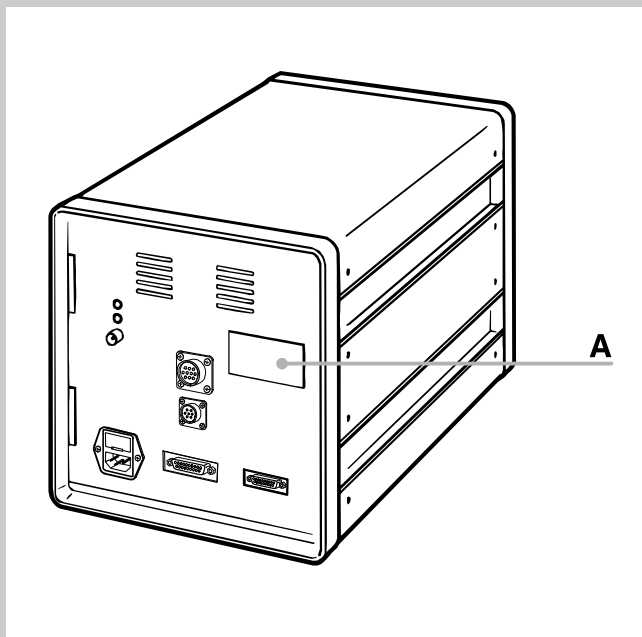
Congratulations on having purchased the Generator.

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

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

The manual is broken down into the following chapters:

Chapter	Safety information Contains notes and warnings concerning the operation of the welding system.	Chapter	Operation Explains the sequence and operation of a welding cycle.
Chapter	Product information Contains all the general information concerning: - function, design and mode of operation - technical data - warranty	Chapter	Elements Describes the various exchangeable elements.
Chapter	Transportation Contains necessary information on the transportation.	Chapter	Cleaning and maintenance Contains instructions and notes concerning the care and upkeep.
Chapter	Operating and display elements Describes the operating elements.	Chapter	Error messages and corrective action Describes possible errors, their likely sources and suggestions for corrective action.
Chapter	Initial start-up Provides important notes and instructions concerning the installation, connection and start-up of the device. Includes all the information and procedures necessary for the safe and efficient handling.	Other chapters	Diagrams and drawings



Important

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

You will find this data on the rating plate (A) at the back of the 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

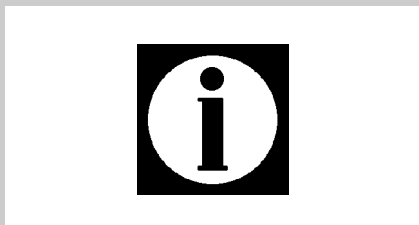


Ruled writing area consisting of 10 horizontal lines.

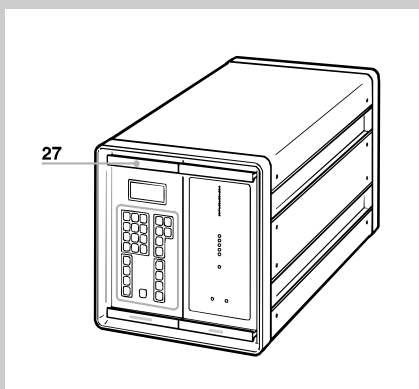
1 Explanation of symbols and signs

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.



The item numbers used in the illustrations and descriptions, e.g.:

PCS module handle (27)

correspond to the item numbering adopted in the product overview included in the chapter "Product information", or to adjacent drawings, generally on the same page.





2 Safety information

2.1 General

The design of the Generator 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 Generator 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 device for the first time, read this operation manual carefully.

Being badly informed about how to operate and look after the device and generator can result in damage.

Always keep the operating manual handy at the site of the Generator .

Do not perform any modifications, extensions or conversions on the Generator 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 Generator may only be performed by reliable staff. Only use trained or instructed staff, and make sure that staff responsibilities for operation, set-up, maintenance and repairs are clearly defined.

Make sure that the device is only used by authorized staff.

Work on the electrical installations of the Generator 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.

Only trained staff with knowledge and experience of pneumatic systems may work on the pneumatic equipment.

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.

Only use dry compressed air for operation. If necessary, install an upstream water trap.

2.6 Operation



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

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

Avoid any potentially unsafe working practices.

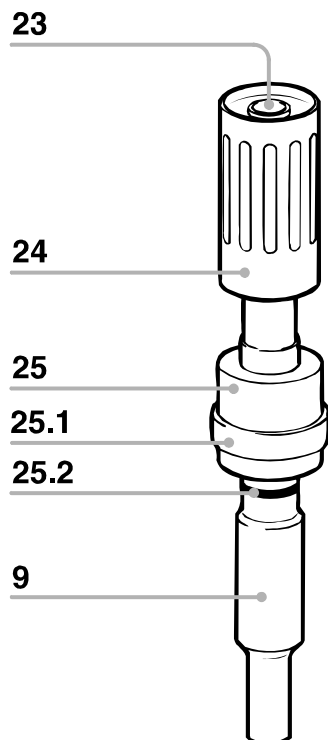
Correct operation and careful handling of the units and their associated tools during operation will

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

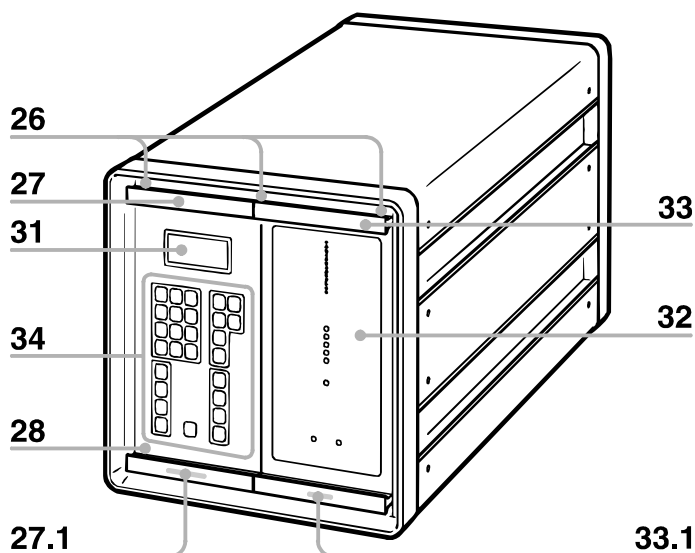




1



2



3 Product information

3.1 Product overview

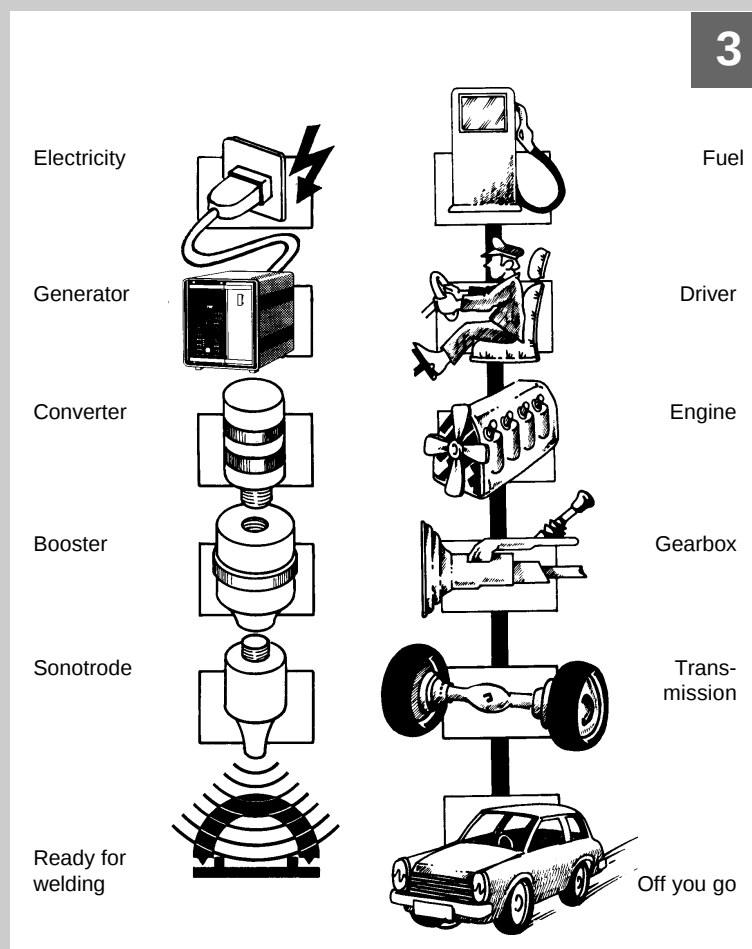
3.1.1 Vibration system

- 9 *Horn*
- 23 *RF socket*
- 24 *Converter*
- 25 *Booster*
- 25.1 *Type designation*
- 25.2 *Booster designation*

3.1.2 Ultrasonic generator

- 26 *Fastening screws*
- 27 *PCS module handle*
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- 28 *PCS module*
- 31 *LCD Display*
- 32 *Generator module*
- 33 *Generator module handle*
- 33.1 *Generator module handle with model designation*
- 34 *Keyboard*

3.2 Comparative example



3.3 Use of ultrasonics in the plastics industry

As you know, thermoplastics are available today in a large number of types and forms can be found in the most diverse products. The use of ultrasonic welding is therefore equally diversified. It covers all imaginable technical fields where plastic materials are processed in one way or another or where they find application as components.

3.4 Warranty statement

With the delivery of this system RINCO ULTRASONICS AG acknowledges its warranty obligation in accordance with VSM (Association of Swiss Machine Builders).

Fulfilment of the terms of this warranty by RINCO ULTRASONICS AG shall be conditional, however, on a number of requirements, for example:



The user must be familiar with the contents of this Operating Manual.

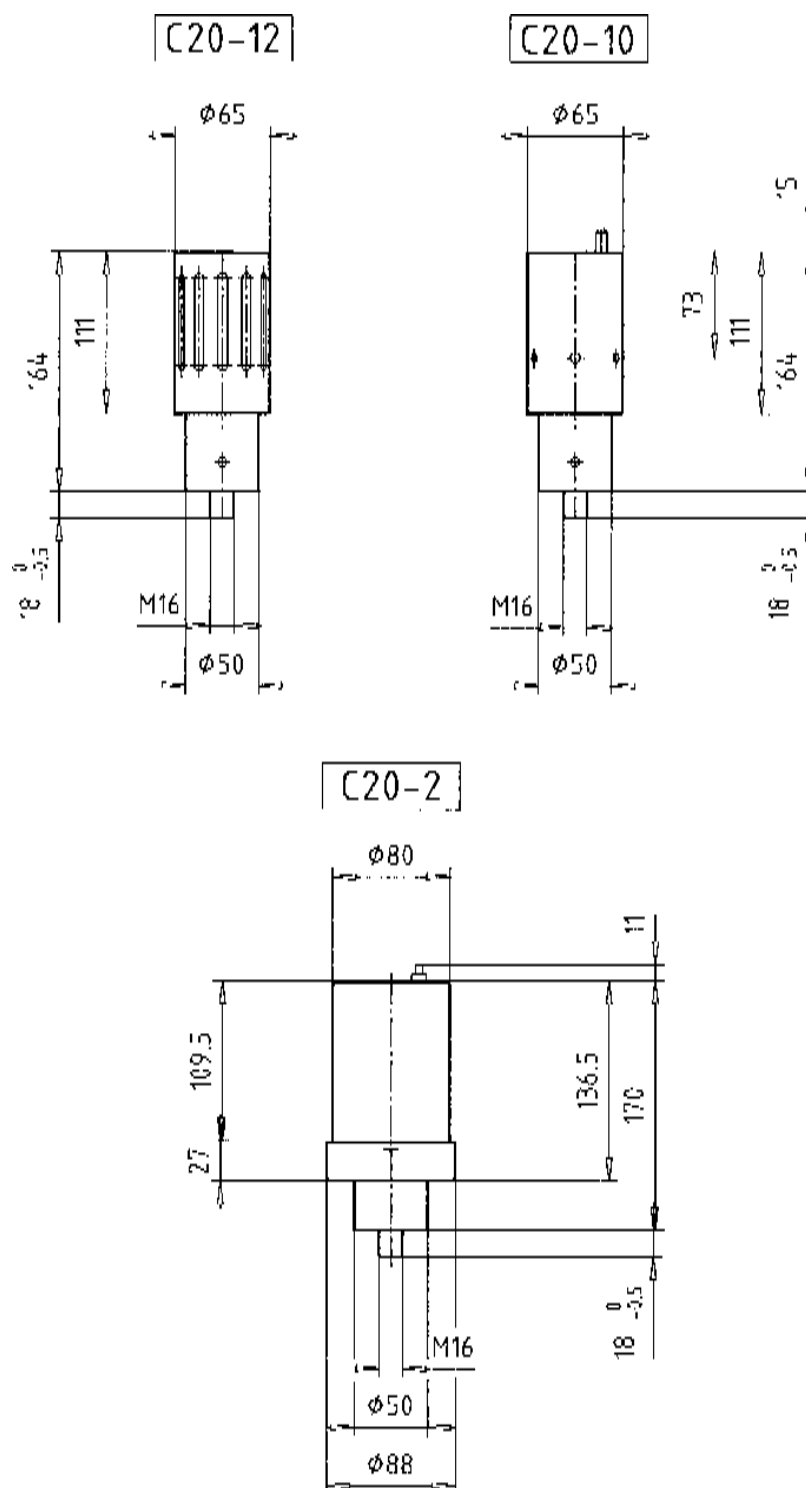
The instructions and warnings contained in this Operating Manual must be observed.

Unauthorized conversions or modifications to parts of the device and generator are prohibited.

RINCO ULTRASONICS AG shall be glad to clarify any unclear points on the phone or to provide instruction by capable specialists.

3.5 Converter C20-2 /10 /12 technical data

4



Dimensions en mm

3.5.1 Housing

C20-2

- closed aluminium housing
- with cooling air connection, hose Ø 5x3

C20-10

- closed steel housing
- with cooling air connection, hose Ø 5x3

C20-12

- slotted steel housing
- suitable for cooling with circulating air

3.5.2 Amplitude amplification

C20-2 / C20-10 / C20-12

Amplification: with booster

3.5.3 Fastening

Please see diagram in section 11 for exact details of converter fastening.



Never attach the converter at both clamping positions at the same time!

C20

- Fastening: directly to housing possible

3.5.4 HF connection

- Plug: Lemo 2

3.5.5 HF cable

- standard length: 2.5 m
- other lengths: to order

3.5.6 Dimensions

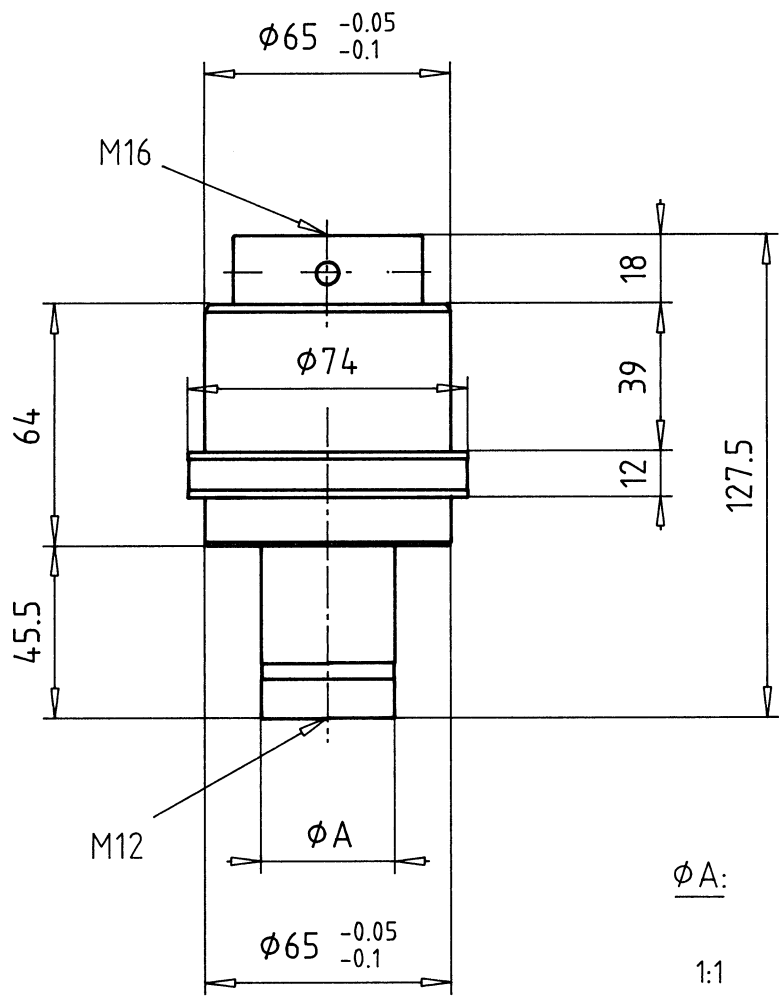
- **Dimensions:** see diagram (page 3-4)

3.5.7 Weight

- Weight: 1.5 kg (approx)

3.6 Booster 20 kHz technical data

5



Dimensions en mm

3.6.1 Housing

- nickel-plated steel
- with band

3.6.2 Amplification ratios

- 1:1
- 1:1.5
- 1:2
- 1:2.5
- 1:3

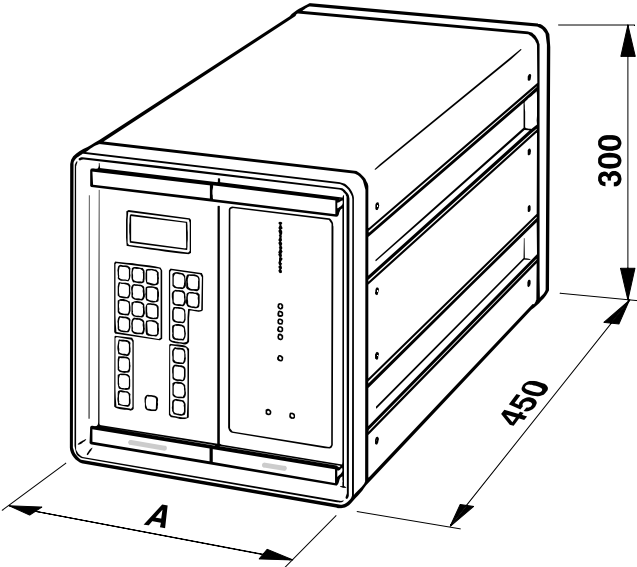
3.6.3 Dimensions

- Dimensions: see diagram (page 3-6)

3.6.4 Weight

- Weight: 1.5 kg (approx)

6



Power	A	Weight
1'000-1'500 W	260	11 kg
2'000-3'000 W	300	15 kg

3.7 Technical data of
the Ultrasonic Gene-
rator

Dimensions in mm

3.8 PCS Control

3.8.1 Concept

- Flexible modular system with various insertable modules.

3.8.2 Display

- 4-line alphanumeric LCD display.

3.8.3 Data Entry

- Keyboard with numerical keys and 14 function keys.

3.8.4 Operating Modes

- Time
- Energy
- Travel

3.8.5 Time Mode

- Constant Time with energy limits.

3.8.6 Energy Mode

- Constant energy with time limits.

3.8.7 Travel Mode

- Constant travel distance with energy limits.

3.8.8 Ultrasonic Actuation

- Using a trigger sensor or through the travel mode.

3.8.9 System Test

- Can be selected to be carried out before or after each weld.

3.8.10 Control Voltage

- 24 V DC

3.8.11 Menus

- Menus can be selected to appear in German, English, French, Italian or in Spanish.

* PCS II options

3.8.12 Databank*

- 40 sets of welding parameters can be stored in the databank.

3.8.13 Interface*

- RS 232 interface for a printer or for SPC data acquisition.

3.8.14 Generator Modules Available

Model	maximum power output
GM 20-1000 PCS GM 20-1500 PCS	1000 W 1500 W
PIM 20-2000 PIM 20-3000	2000 W 3000 W

3.8.15 Connected loads

- 230 V 50-60 Hz
- Maximum current consumption: 16 A

6

3.8.16 Dimensions

- see Fig. page 3-8





4 Transport



It is important to follow the directions for transporting given on the packing

4.1 Unpacking/inspection on arrival

The freight container for devices and accessories is designed to withstand the normal demands made by shipping by road, rail and air.

On delivery, check the consignment to ensure that the packing list agrees with the parts received and that no damage is evident. If damage is found, notify the carriers at once and keep the packaging material as evidence.

4.2 Transport damage

The carriers are liable for damage caused during transit. A full report describing the damage exactly must be delivered to the carriers and serves as the basis for a claim for damages.

Damage or loss caused to items delivered from us must be reported immediately to us and be confirmed with a copy of the above-mentioned report.

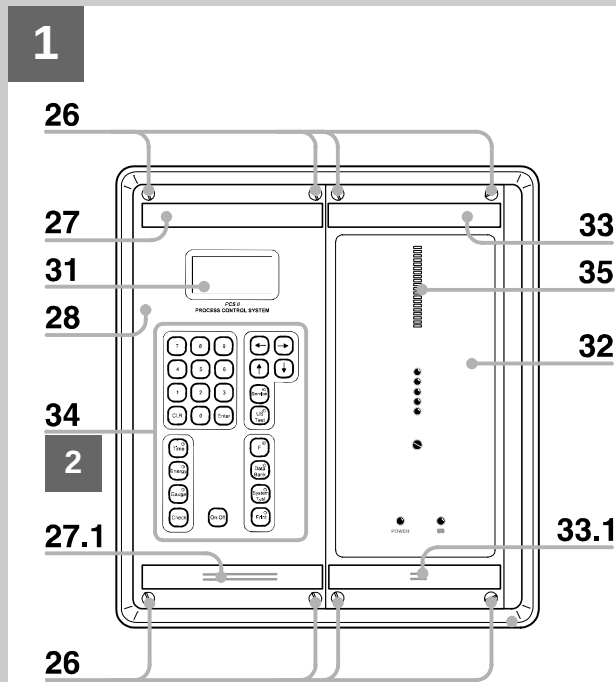
If RINCO ULTRASONICS AG delivers the consignment carriage paid or CIF, depending on circumstances, it will be replaced and an insurance claim will be made.

4.3 Locating the device

The location for the device is important. In order to ensure a long working life, the device should be installed in a clean environment. Care should be taken that the electronic units are stored in a place free of vibrations.

Factory settings are made at 20°C. The ambient temperature during device operation can range from 10°C to 45°C.





5 Controls and indicators

5.1 Ultrasonic Generator

26 Fastening screws

27 PCS 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 is never to be pulled out or plugged in while mains is connected. (high voltage)

27.1 PCS module handle with model designation

28 PCS module

31 LCD display

32 Generator module

33 Generator module handle

33.1 Generator module handle with model designation

34 Keyboard

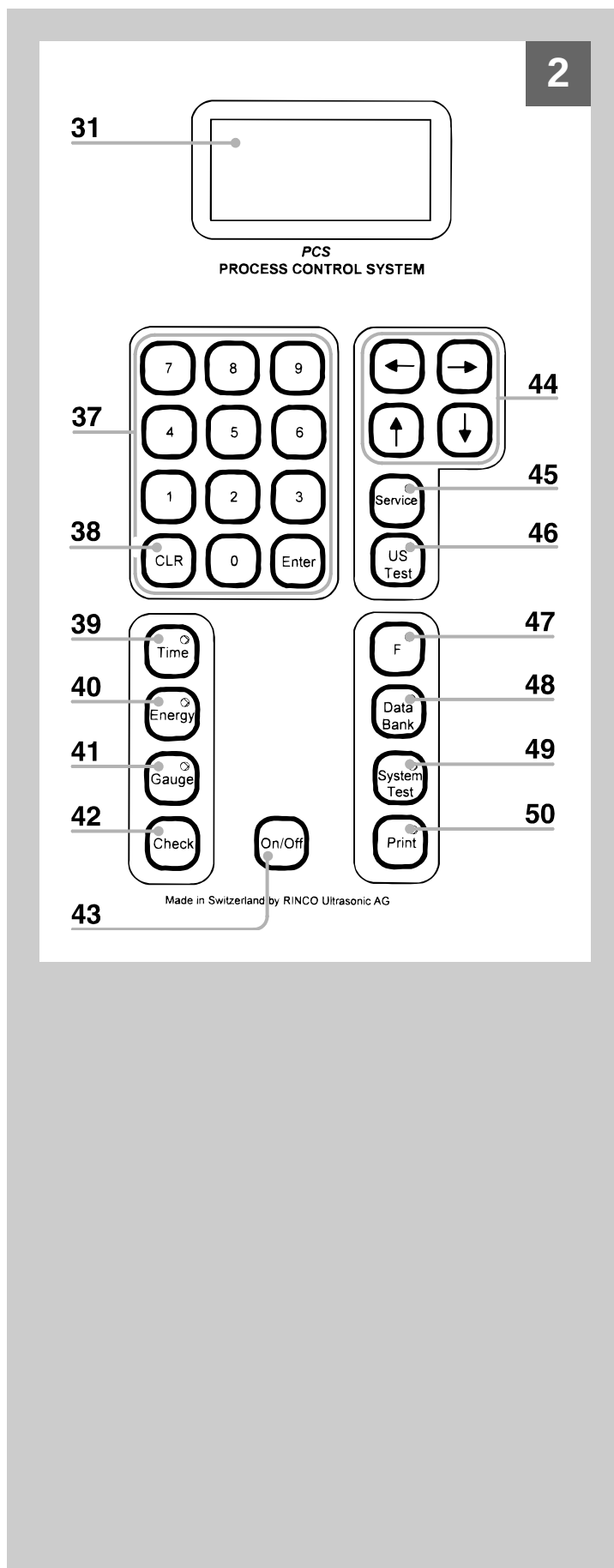
35 LED display

The display shows the power delivered during the welding procedure. A power level of 25% should not be exceeded when the sonotrode is not loaded.

If a value of 100% is exceeded, an error message appears.

5.2 Elements of the Operator's Panel

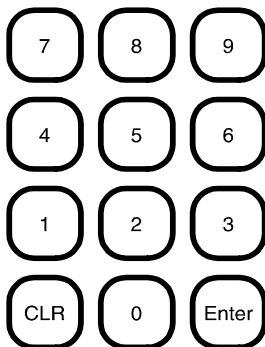
- 31 4-line LCD Display
- 37 Numerical Keyboard
- 38 CLR Key
- 39 Time Key
- 40 Energy Key
- 41 Gauge Key
- 42 Check Key
- 43 Power Switch
- 44 Cursor Keys
- 45 Service Key
- 46 US-TEST Key
- 47 F Key
- 48 Data Bank Key
- 49 System Test Key
- 50 Print Key



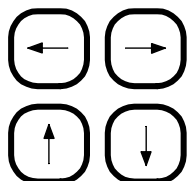
2a



2b



2c



5.3 Description of the Display and Keyboard

31 The Display

After turning on the device, the control unit carries out a self-test. The manufacturer's address and the software version are displayed. After 3 seconds, the control is switched to the current welding mode.

The welding parameters, messages and device settings are displayed.

The display is equipped with a background light. To increase the life span of the light, it is automatically turned off 5 minutes after the last key has been pressed. The light switches back on again as soon as any key is pressed.

37 The Numerical Keyboard

Using the **0-9**, **Enter** and **CLR** keys, certain welding data can be changed depending on the operating mode selected. When the **Enter** key is pressed, the value entered is checked and stored. If the value lies outside of the valid range for the value, then the previous value is redisplayed.

44 The Cursor Keys

Using the → and ← cursor keys, a certain value within a numerical range can be selected. The border values are automatically set by the number of digits.

Using the ↑ and ↓ cursor keys, you can jump to a different line. As the number of lines in the display is limited to 4 lines, the lowest line in the display is overwritten each time a new line of data is displayed.

All numerical data is entered as follows unless stated otherwise:

1. Place the cursor on the desired parameter line using the ↑ and ↓ keys.
2. Enter the value desired using the numerical keyboard.
3. Finally, press the **Enter** key.

2a

2b

2c

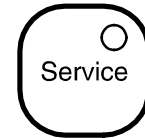
2d

45 The Service Key

After pressing the **Service** key, you are requested to enter a code. Code **23** releases the device so you can adjust the settings (unlock). The welding parameters can now be changed. To activate the feed without ultrasonics, the **Service** key must be pressed a second time. The feed can then be dropped down by pressing the dual safety switch. As soon as the activation mark is passed over, the switch can be released. Pressing the start key after that will return the feed back to its original position.

The setup operation is ended by pressing the **CLR** key (lock).

2d



2e

46 The US-TEST Key

The current sonotrode frequency and its power loss can be displayed using the **US-TEST** key.

The key must be pressed until the value in the display does not change anymore. The US-Test is automatically stopped after 5 seconds.



The vibration system must be connected.

Do not touch the sonotrode !

2e



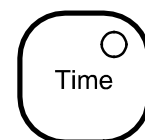
2f

39 The Time Key

The **Time** key activates the time mode.

The possible functions of the time mode are explained starting on page 7-6.

2f



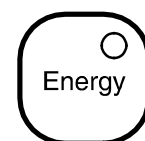
2g

40 The Energy Key

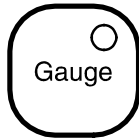
The **Energy** key activates the energy mode.

The possible functions of the energy mode are explained starting on page 7-12.

2g



2h



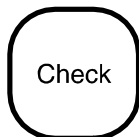
41 The Gauge Key

The **Gauge** key activates the travel mode.

The possible functions of the travel mode are explained starting on page 7-18.

2h

2i

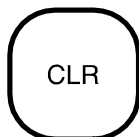


42 The Check Key

- Using the **Check** key, you can place the cursor at the beginning of the current menu.
- Using the **Check** key, you can reset the error relay.

2i

2k



38 The CLR Key

Using the **CLR** key, you can

- reset and clear error messages.
- reset input values.
- select fixed input values.

2k

2l

49 The System Test Key

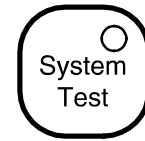
The vibration system currently connected can be tested using the **System Test** key.



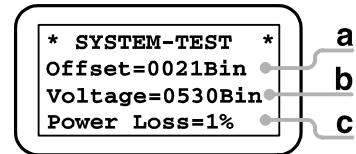
The vibration system must be connected.

Do not touch the sonotrode !

- a Offset of the A/D converter
- b Converter voltage
- c Converter power loss



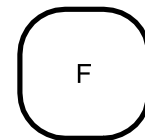
2l



2m

47 The F Key

The parameter menu is activated using the **F** key. After entering a code, you can adjust the device parameters.



2m

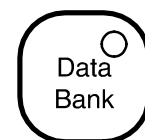
2n

48 The Data Bank Key*

The databank administration functions are activated using the **Data Bank** key.

Welding data can be stored, selected, deleted or printed out.

The possible functions of the data bank mode are explained starting on page 7-38.



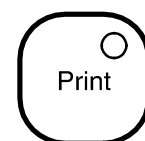
2n

2o

50 The Print Key*

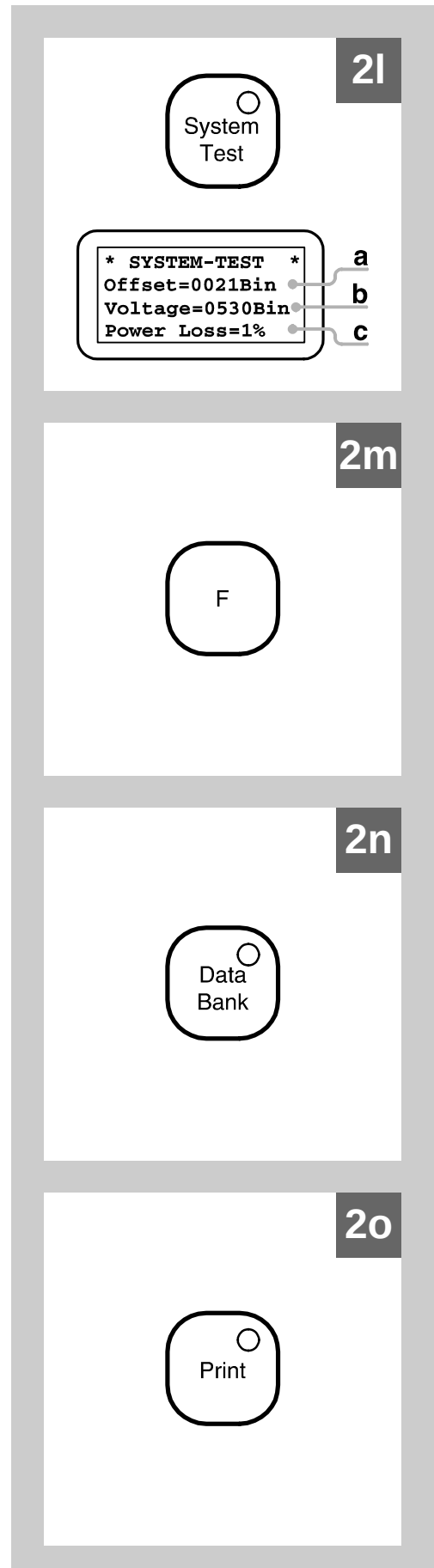
The **Print** key activates the print menu. Welding data can be printed out.

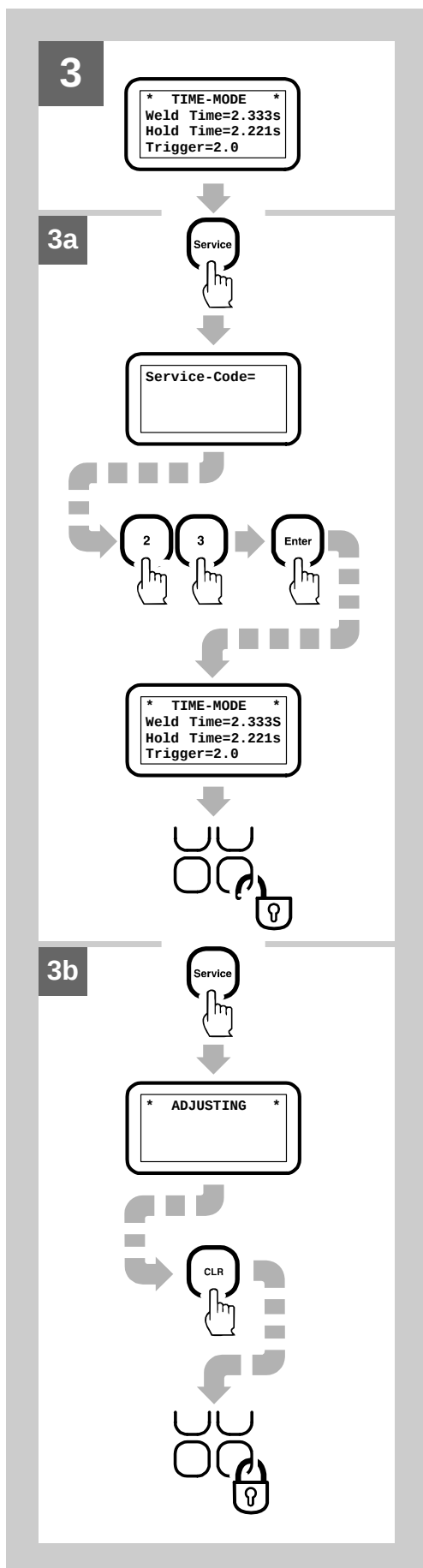
The possible functions of the print mode are explained starting on page 7-34.



2o

* only for the PCS II





5.3.1 Important Information

To protect the welding parameter settings from unwanted changes, all of the important key functions should be locked after turning on the device.

After turning the device on, the display shows the operating mode which will be used during actual welding.

5.3.2 Releasing the Keyboard Lock

1. Press the **Service** key.

The display switches to the code input request mode.

2. Enter the number "23" using the numerical keyboard and confirm the data entered by pressing the **Enter** key.

The display then returns to the previous operating mode display.

The keyboard is now unlocked and can be used to enter data.

5.3.3 Activating the Keyboard Lock

1. Press the **Service** key again.

Display.

2. Press the **CLR** key.

The keyboard is now locked again.



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 device and generator.

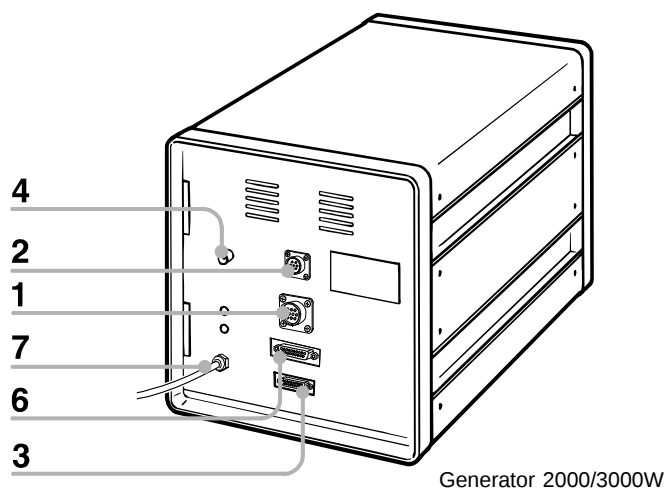
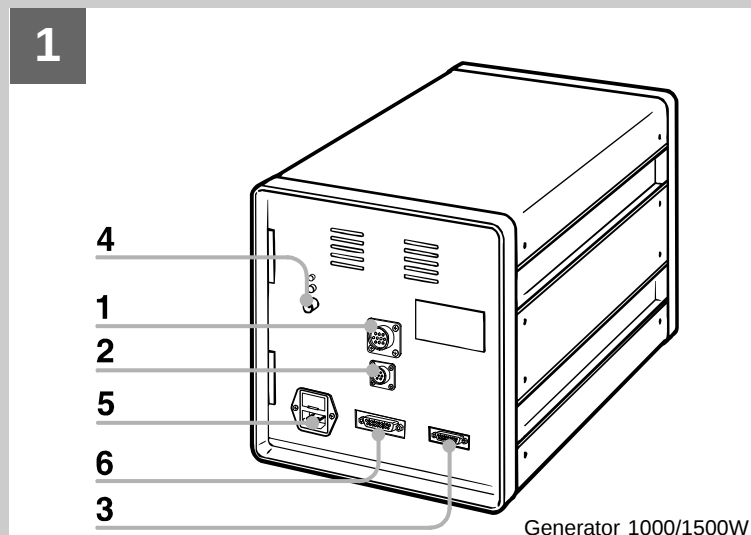


Be sure to fit the power connection with a grounded connector.

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*
- 6 *STO6 RS 232 (Option)*
- 7 *ST6 Mains cable*

1





7 Operation

7.1 Procedure for welding

7.1.1 Cycle sequence

Manual (standard setting)

1. The cycle is started by pressing the two starting buttons within 0.3 sec of each other.

The valve is activated and the forward feed lowers

2. The starting buttons must remain pressed until the safety switch is passed or the holding time has expired.



If the buttons are released too soon, the forward feed returns to its original position and an error message is issued.

Welding is started with the TRIGGER. After the welding and holding times have expired, the forward feed returns to its original position.

Options: US stop
 AFTER PULSE
 RESET



An error is acknowledged with key CLR.



These matters apply when using products manufactured by RINCO. If another lifting system is used, plugging connections according to the diagrams in section 11 must be taken into account.

Impulse (reduced level of safety)

1. The cycle is started by pressing the two starting buttons within 0.3 sec of each other.

The valve is activated and the forward feed lowers



The starting buttons need not now be held pressed.

Welding is started with the TRIGGER. After the welding and holding times have expired, the forward feed returns to its original position.

Options: US stop
 AFTER PULSE
 RESET



An error is acknowledged with key CLR.

Automatic (for automating without safety)

An impulse at input START 1 (ST02) of at least 100 ms begins the cycle. The valve is activated and the forward feed lowers. Welding is started with the TRIGGER. After the welding and holding times have expired, the forward feed returns to its original position.

Options: US stop
 AFTER PULSE
 RESET



An error is acknowledged with key CLR or with the next start.

The HARDWARE error can only be acknowledged by switching the device 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.

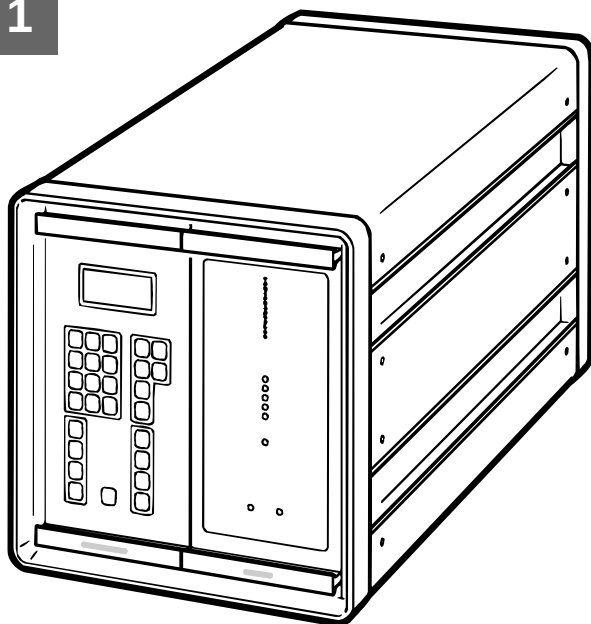


Never change several settings simultaneously!

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



1



7.2 Operating the PCS Controller

7.2.1 The Operating Modes

A PCS- controlled ultrasonic welding device offers a high degree of flexibility with respect to its use for welding plastic parts.

There are basically three different operating modes for the PCS controller which can be selected by pressing a button:

- a) constant time
- b) constant energy
- c) constant travel*



*** The device must be equipped with a travel measuring system.**

The choice of the operating mode is highly dependent on the welding application.

For a new user to become more familiar with the various operating modes, it is easiest to start with the "time" operating mode.

It is also advantageous to test the welding procedure on new parts while operating in this operating mode. The experience obtained while welding in this operating mode can be applied and expanded to the other operating modes.

The Applications Technology Laboratory of the RINCO company is available for any questions you may have.

7.3 The TIME Operating Mode

The time operating mode is the traditional operating mode for ultrasonic welding equipment.

The welding time is held constant in this operating mode.

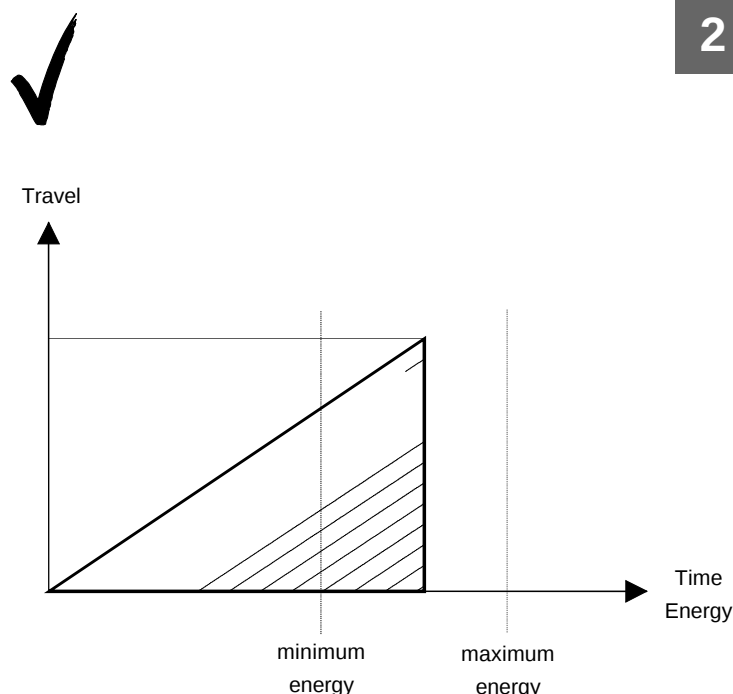
A minimum and a maximum energy limit can be set.

The amount of energy made available for welding can vary within the limits of a certain range. The range is affected by the tolerances of the parts to be welded. It may happen that small variations can be found on the welded parts.

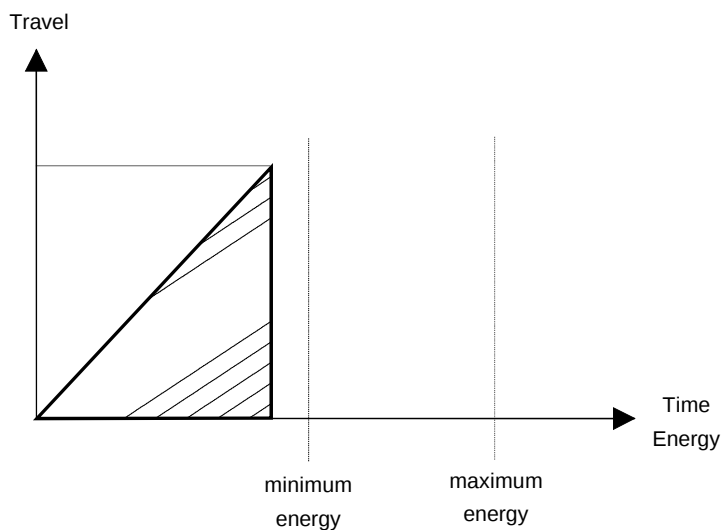
7.3.1 The Energy Range in the TIME Mode

Correct welding

The welding energy must remain within the set limits. If these limits are exceeded, an error message is displayed.



3



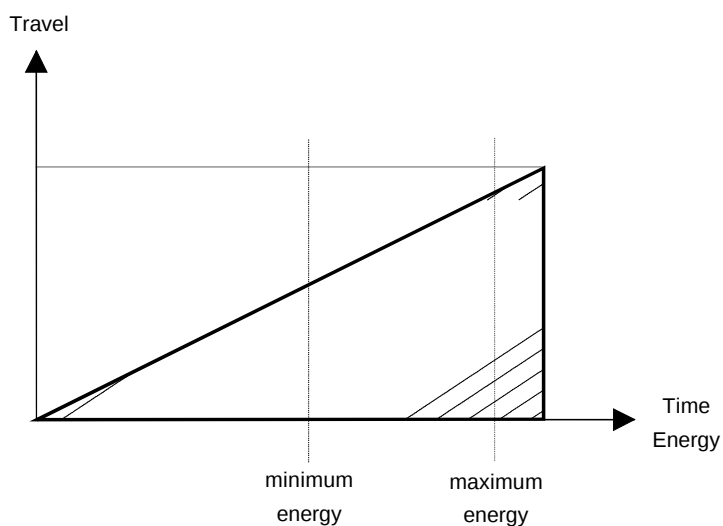
Energy is too low

If the minimum amount of energy is not reached, then the error message "Energy too low" is displayed.

Possible causes are:

- welding time is too short
- system pressure is too low
- amplitude too low
- object to be welded is not in the fixture
- object to be welded is defective

4



Energy too high

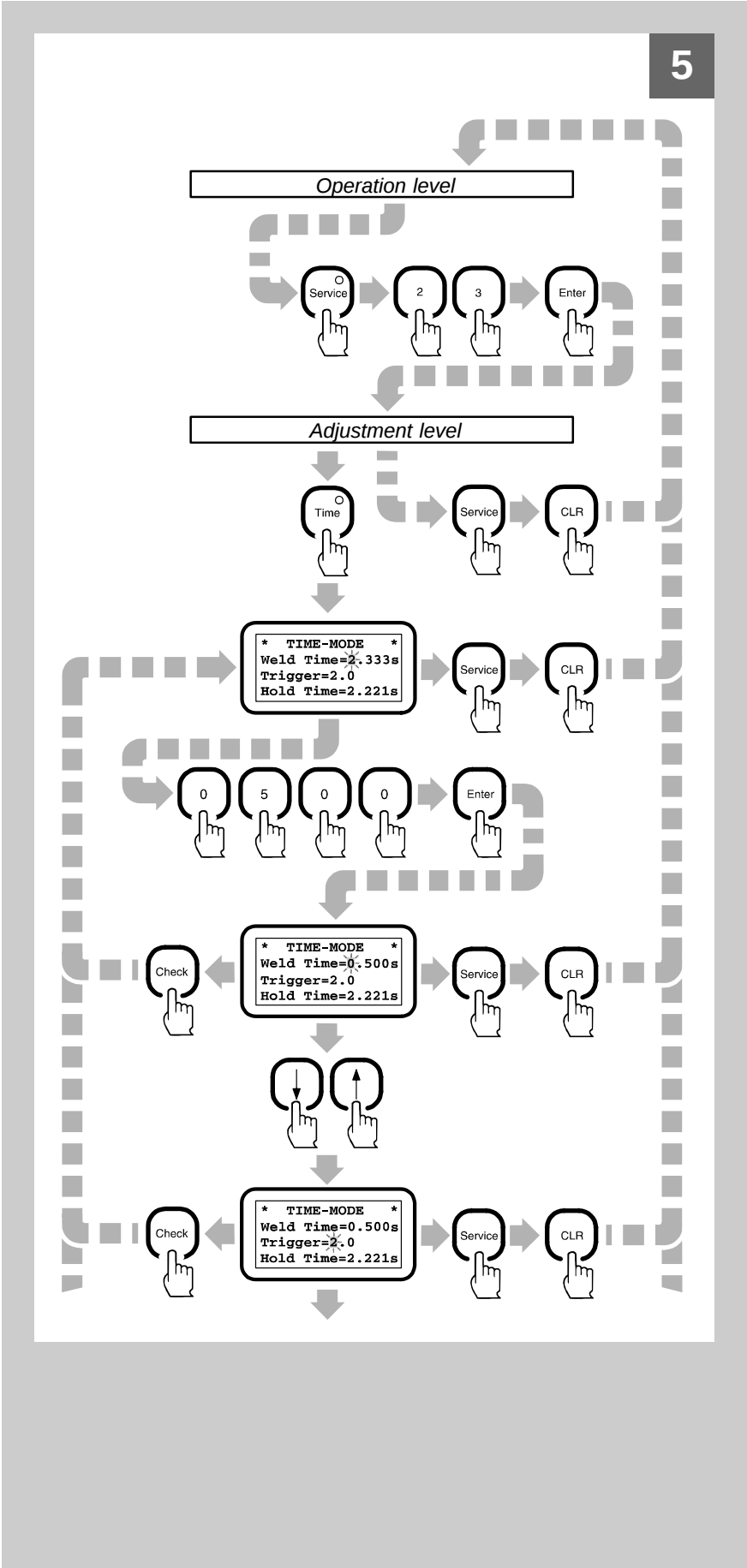
If the amount of energy exceeds the maximum energy limit, then the error message "Energy too high" is displayed.

Possible causes are:

- welding time too long
- system pressure too high
- amplitude too high
- object to be welded is defective

7.3.2 Overview of the TIME Mode Functions

 End each entry of new data by pressing the "Enter" key.



7.3.3 Parameters of the TIME Operating Mode

Parameter Display	Designation	Adjustment Range	Function ¹⁾
Weld Time=	Welding time	0.010 - 9.999 s	Parameter
Trigger=	Ultrasonic trigger	0.0 - 9.9	Parameter
Hold Time=	Hold time	0.000 - 9.999 s	Parameter
Amplitude=	Amplitude*	**1 to 9 [-] or 60 to 100 [%]	Parameter
En.max.=	Maximum energy	0 - 10'000 Ws	Limit
En.min.=	Minimum energy	0 - 10'000 Ws	Limit
Energy=	Current energy value		Measured value
Time=	Current time		Measured value
Parts=	Part counter		Measured value
Required=	Required part count		Limits
Rejects=	Rejected part counter		Measured value
Delaytime=	Impulse delay time	0.000 - 1.999 s	Parameter
US-Pulse=	Delayed impulse	0.000 - 1.999 s	Parameter
Power Peak=	Maximum power		Measured value
Power Loss=	Power loss		Measured value
Horn=	Horn number		Info
Fixture=	Fixture number		Info
Booster= 1:	Size of the booster		Info
Pressure=	System pressure		Info
Speed=	Flow control valve performance		Info

1)

Parameter

- Directly influences the welding result. The parameters can be changed.

Limits

- If a limit is exceeded, an error message is output. The values can be changed.

Measured Value

- Measured values. The values can be read but not changed.

Info

- These values are only for information. The values can be changed.

* The amplitude cannot be adjusted for the PCS I. The amplitude is always at 100%.

** For PCSII, the amplitude increment is depending on generator type: 1 to 9 [-] or 60 to 100 [%], where 1=60% and 9=100%

Weld Time

- This parameter sets the welding time.

Trigger

- This parameter adjusts the triggering of the ultrasonic generator. The higher the value, the higher the pressure on the object to be welded.

Hold Time

- After the welding time has run out, the holding time starts. The object welded can harden under pressure during the hold time.

Amplitude

- The output amplitude can be set to one of five levels from 100% down to 60%.
- The values are changed using the **CLR** button.
- The amplitude cannot be changed for the PCS I. The amplitude is always at 100%.

Maximum Energy

- If the amount of energy output is higher than the specified value, the error message "Energy too high" is displayed.

Minimum Energy

- If the amount of energy output is smaller than the specified value, the error message "Energy too low" is displayed.

Energy

- Effective measured energy.

Time

- Effective measured time.

Part Counter

- Counts the number of fault-free welded parts.
- The Part Counter can be reset using the **CLR** key.

Required Part Count

- After reaching the specified part count, the message "Part count reached !!" is displayed.
- Is only active if F 4729 has been initialized to ON.

Reject Counter

- Counts the number of incorrectly welded parts.
- The Reject Counter can be reset using the **CLR** key. The Reject Counter is automatically reset when the Part Counter is reset.

Delay Time

- The impulse delay time starts after the hold time has run out.

US-Pulse

- After the impulse delay time has run out, the ultrasonic pulse is activated. Using the us-pulse, an object sticking to the sonotrode can be shaken off.

Power Peak

- The setting for the maximum power is displayed.

Power Loss

- The power loss of the vibration system is displayed.

Horn Number

- The part number of the sonotrode can be noted for information purposes.

Fixture Number

- The part number of the fixture can be noted for information purposes.

Booster 1:

- The size of the booster can be noted for information purposes.

Pressure

- The pressure of the device system can be noted for information purposes.

Speed

- The flow control setting of the device can be noted for information purposes.

7.4 The ENERGY Operating Mode

The amount of energy output is held constant in the energy mode.

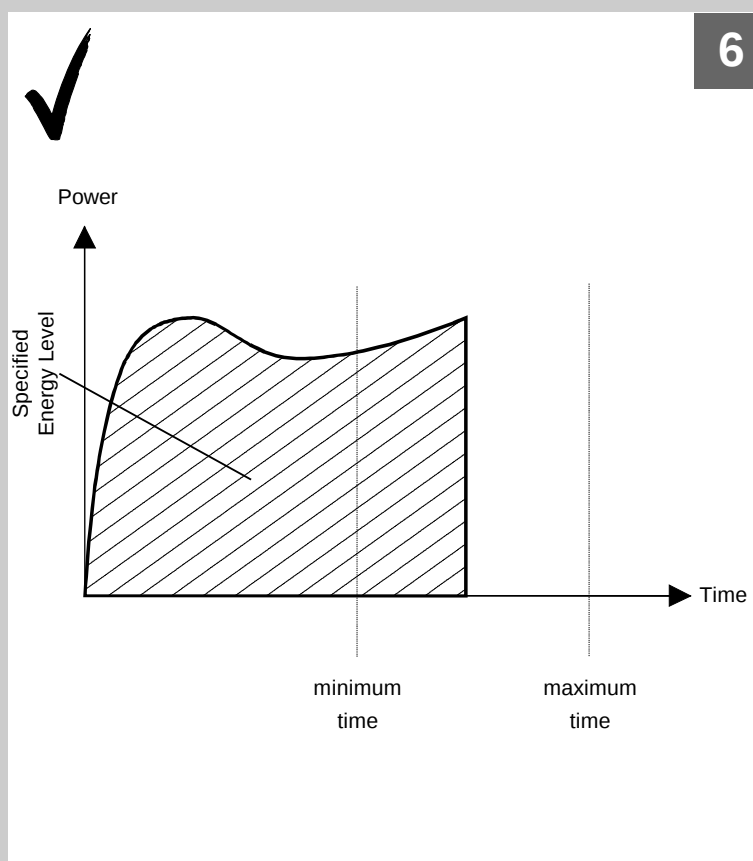
A minimum and a maximum welding time can be set as limits.

The length of the welding time can vary within the limits of a certain range. The range is affected by the tolerances of the parts to be welded. By holding the energy constant, certain variations can be eliminated.

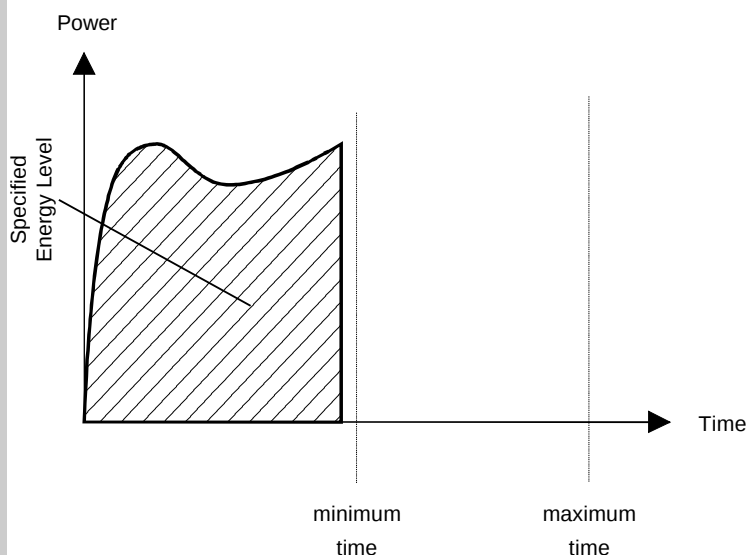
7.4.1 The Time Window in the ENERGY Mode

Correct welding

The welding energy must remain within the set limits. If these limits are exceeded, an error message is displayed.



7



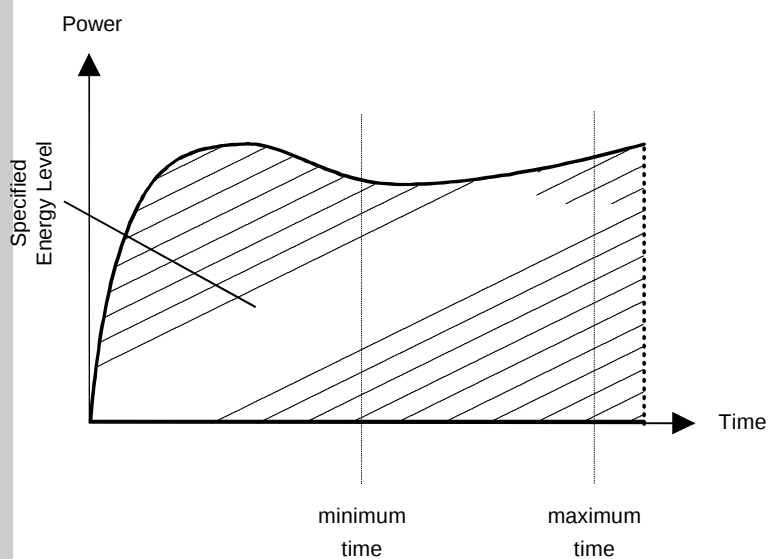
Time underflow

If the minimum time limit is not reached, then the error message "Time underflow" is displayed.

Possible causes are:

- minimum welding time too long
- system pressure too high
- amplitude too high
- object to be welded is defective

8



Time overflow

If the maximum time limit is exceeded, then the error message "Time overflow" is displayed.

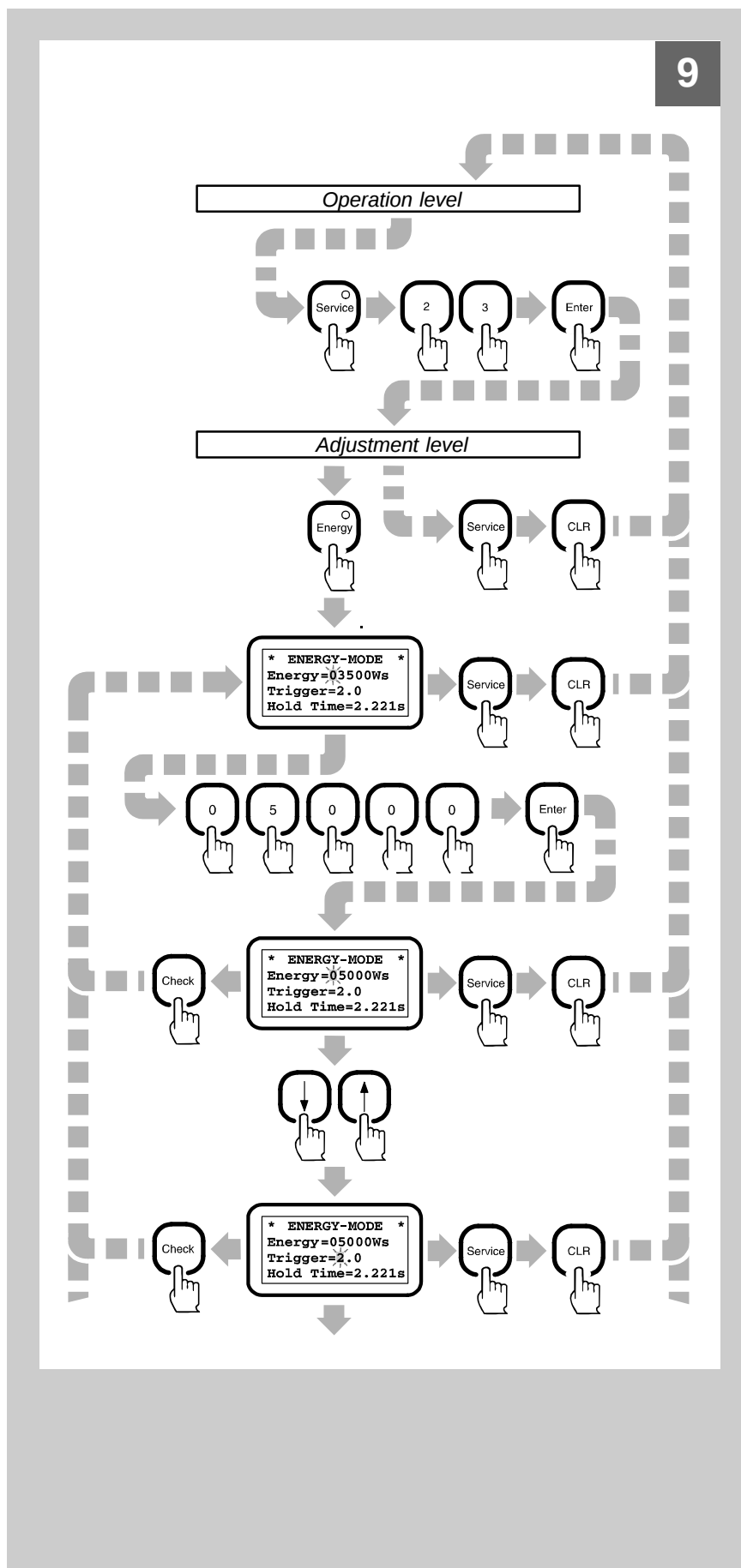
Possible causes are:

- maximum welding time too short
- system pressure too low
- amplitude too low
- no object in the fixture
- object to be welded is defective

7.4.2 Overview of the ENERGY Mode Functions



End each entry of new data by pressing the "Enter" key.



7.4.3 Parameters of the ENERGY Operating Mode

Parameter Display	Designation	Adjustment Range	Function ¹⁾
Energy=	Energy	0 - 10'000 Ws	Parameter
Trigger=	Ultrasonic trigger	0.0 - 9.9	Parameter
Hold Time=	Hold time	0.000 - 9.999 s	Parameter
Amplitude=	Amplitude*	**1 to 9 [-] or 60 to 100 [%]	Parameter
Time max.=	Maximum weld time	0.000 - 9.999 s	Limit
Time min.=	Minimum weld time	0.000 - 9.999 s	Limit
Energy=	Current energy value		Measured value
Time=	Current time		Measured value
Parts=	Part counter		Measured value
Required=	Required part count		Limit
Rejects=	Rejected part counter		Measured value
Delaytime=	Impulse delay time	0.000 - 1.999 s	Parameter
US-Pulse=	Delayed impulse	0.000 - 1.999 s	Parameter
Power Peak=	Maximum power		Measured value
Power Loss=	Power loss		Measured value
Horn=	Horn number		Info
Fixture=	Fixture number		Info
Booster= 1:	Size of the booster		Info
Pressure=	System pressure		Info
Speed=	Flow control valve performance		Info

1)

Parameter

- Directly influences the welding result. The parameters can be changed.

Limits

- If a limit is exceeded, an error message is output. The values can be changed.

Measured Value

- Measured values. The values can be read but not changed.

Info

- These values are only for information. The values can be changed.

* The amplitude cannot be adjusted for the PCS I. The amplitude is always at 100%.

** For PCSII, the amplitude increment is depending on generator type: 1 to 9 [-] or 60 to 100 [%], where 1=60% and 9=100%

Energy

- This parameter sets the energy level.

Trigger

- This parameter adjusts the triggering of the ultrasonic generator. The higher the value, the higher the pressure on the object to be welded.

Hold Time

- After the welding time has run out, the holding time starts. The object welded can harden under pressure during the hold time.

Amplitude

- The output amplitude can be set to one of five levels from 100% down to 60%.
- The values are changed using the **CLR** button.
- The amplitude cannot be changed for the PCS I. The amplitude is always at 100%.

Maximum Weld Time

- If the weld time is longer than the specified value, the error message "Time overflow" is displayed.

Minimum Weld Time

- If the weld time is shorter than the specified value, the error message "Time underflow" is displayed.

Energy

- Effective measured energy.

Time

- Effective measured time.

Part Counter

- Counts the number of fault-free welded parts.
- The Part Counter can be reset using the **CLR** key.

Required Part Count

- After reaching the specified part count, the message "Part count reached !!" is displayed.
- Is only active if F 4729 has been initialized to ON.

Reject Counter

- Counts the number of incorrectly welded parts.
- The Reject Counter can be reset using the **CLR** key. The Reject Counter is automatically reset when the Part Counter is reset.

Delay Time

- The impulse delay time starts after the hold time has run out.

US-Pulse

- After the impulse delay time has run out, the ultrasonic pulse is activated. Using the us-pulse, an object sticking to the sonotrode can be shaken off.

Power Peak

- The setting for the maximum power is displayed.

Power Loss

- The power loss of the vibration system is displayed.

Horn Number

- The part number of the sonotrode can be noted for information purposes.

Fixture Number

- The part number of the fixture can be noted for information purposes.

Booster 1:

- The size of the booster can be noted for information purposes.

Pressure

- The pressure of the device system can be noted for informational purposes.

Speed

- The flow control performance of the device can be noted for information purposes.

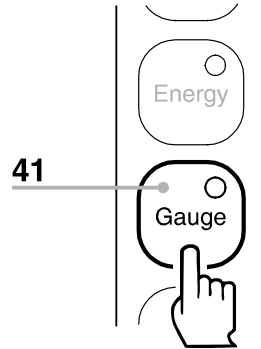
7.5 The TRAVEL Operating Mode

There are three different TRAVEL operating modes available.

1. Differential TRAVEL MODE
2. Absolute 1 TRAVEL MODE
3. Absolute 2 TRAVEL MODE

The TRAVEL MODE is activated by pressing the **GAUGE** button.

10



7.5.1 Differential TRAVEL MODE

With this operating mode, the exact same amount of material is to be melted for each weld. The weld depth (DEPTH) has the highest priority.

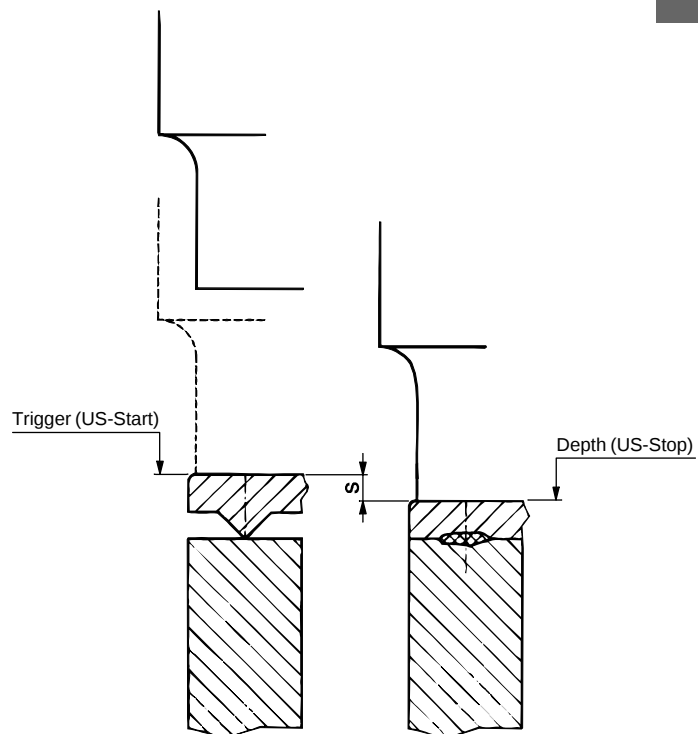
The advantage of the differential method is that differences in the size and density of the objects to be welded are continually compensated for.

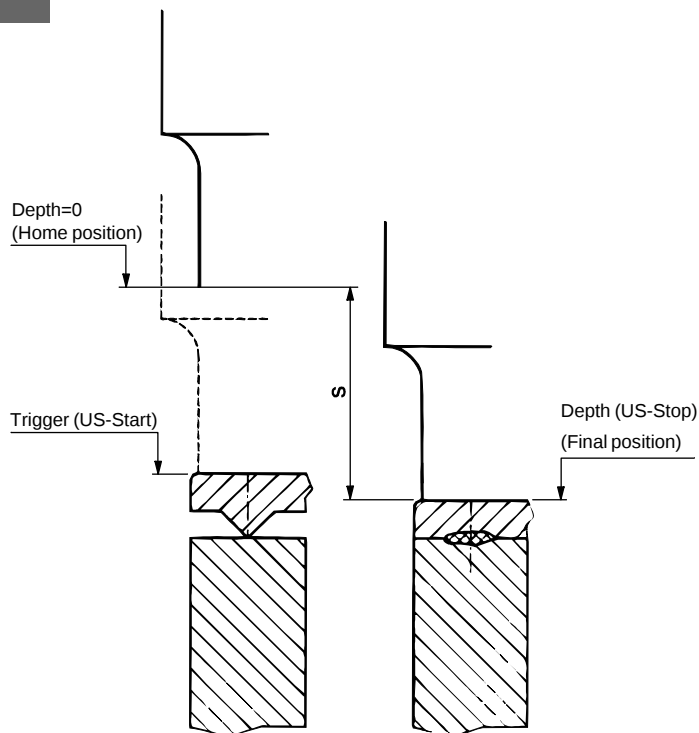
Cycle

After reaching the TRIGGER (Sensor), the welding process is activated. After activation, the objects are welded until the DEPTH [S] is reached.

The current travel value is measured at the end of the holding time. An energy range and a maximum weld time can be set as limits.

11



12


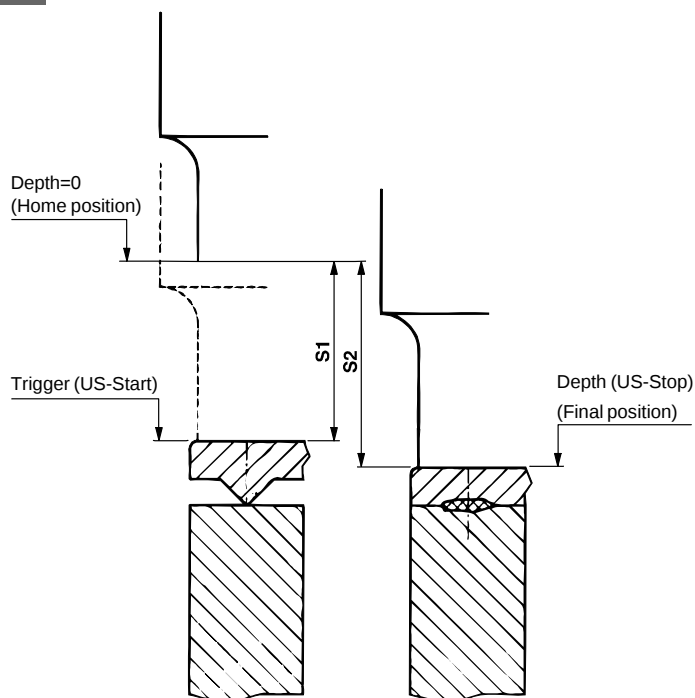
7.5.2 Absolute 1 TRAVEL MODE

With this operating mode, the same final size is to be achieved after each weld. The final size of the welded part has the highest priority.

Cycle

After reaching the TRIGGER (Sensor), the welding process is activated. After activation, the objects are welded until the DEPTH [S] is reached. The value of the DEPTH [S] is calculated starting from the upper home position.

The current travel value is measured at the end of the holding time. An energy range and a maximum weld time can be set as limits.

13


7.5.3 Absolute 2 TRAVEL MODE

With this operating mode, the same final size is to be achieved after each weld. The final size of the welded part has the highest priority.

Cycle

After reaching the TRIGGER [S1] (Travel), the welding process is activated. After activation, the objects are welded until the DEPTH [S2] is reached. The value of the DEPTH [S2] is calculated starting from the upper home position.

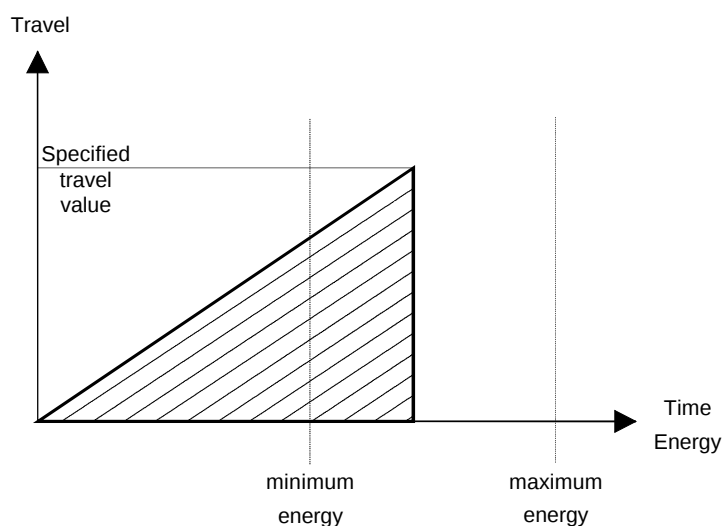
The current travel value is measured at the end of the holding time. An energy range and a maximum weld time can be set as limits.

Correct welding

The weld depth must be reached before the end of the maximum weld time and must use an amount of energy which is within the energy range, otherwise an error message is displayed.



14



Energy too low

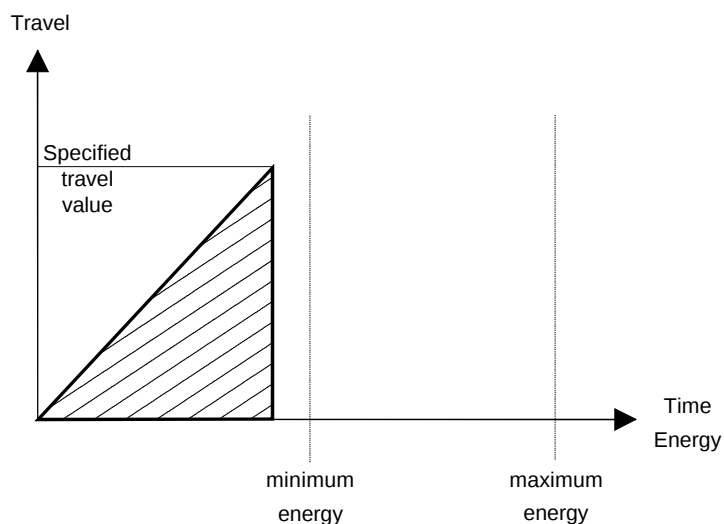
If the energy limit is not reached, the error message "Energy too low" is displayed.

Possible causes are:

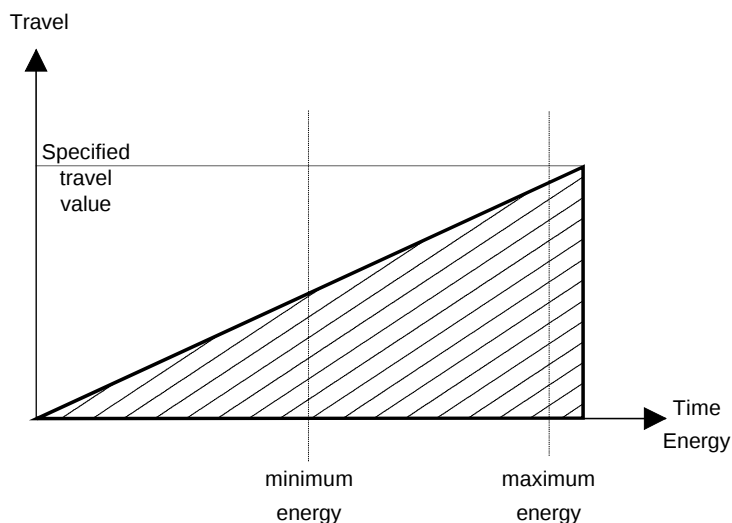
- System pressure too low
- Amplitude too small
- Object to be welded not in the fixture
- Object to be welded defective



15



16



Energy too high

If the energy used rises beyond the upper energy limit, the error message "Energy too high" is displayed.

Possible causes are:

- Travel value cannot be reached.
- System pressure too high
- Amplitude too high
- Object to be welded defective

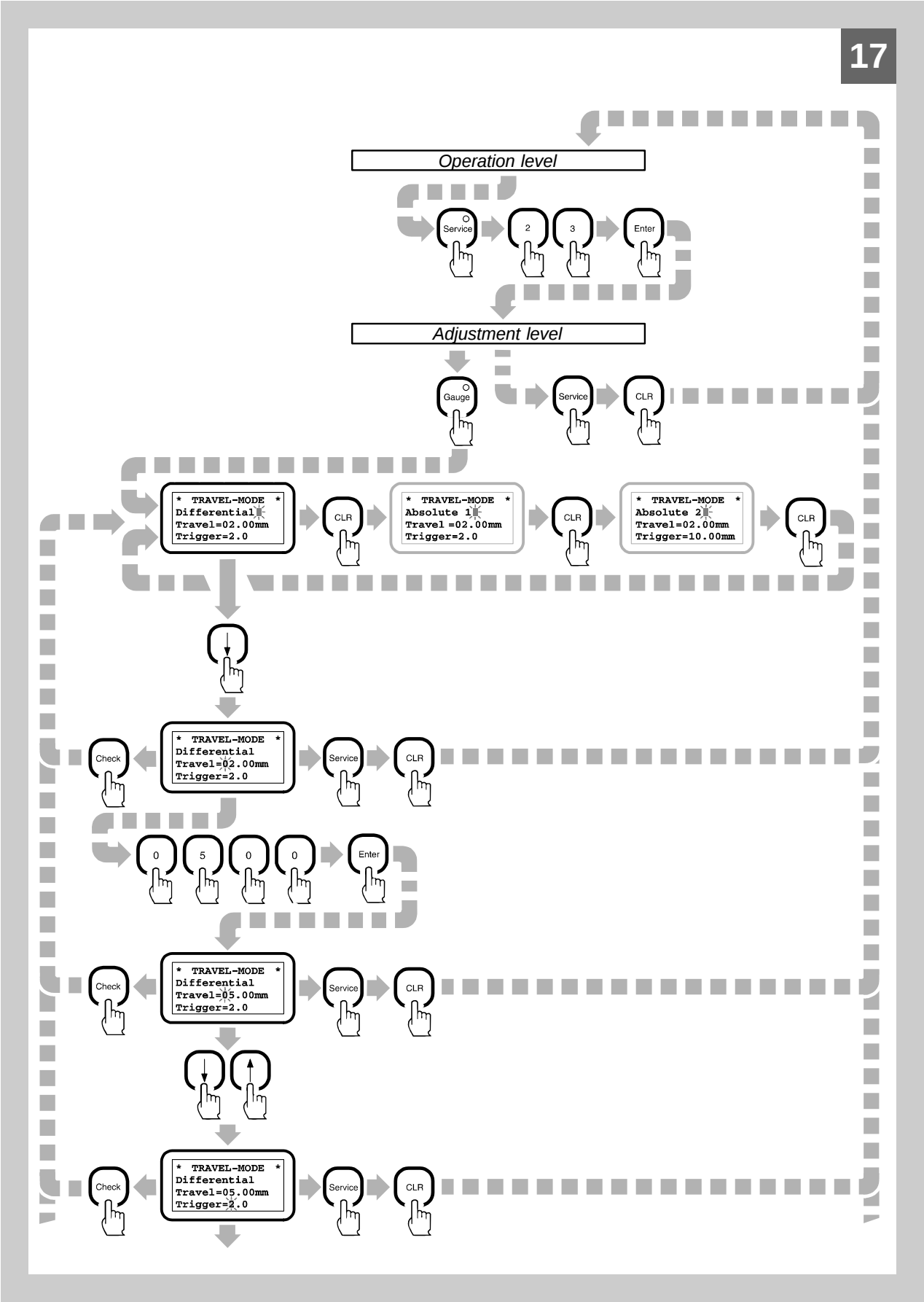
Time overflow

If the time limit is exceeded, the error message "Time overflow" is displayed.

Possible causes are:

- Travel value cannot be reached
- maximum weld time too short
- System pressure too low
- Amplitude too low
- No object to be welded in fixture
- Object to be welded defective

7.5.4 Overview of Functions for the Differential TRAVEL MODE



7.5.5 Parameters of the Differential TRAVEL Operating Mode

Parameter Display	Designation	Adjustment Range	Function ¹⁾
Differential			
Travel=	Weld depth	00.00 - 99.99 mm	Parameter
Trigger=	Ultrasonic trigger	0.0 - 9.9	Parameter
Hold Time=	Hold time	0.000 - 9.999 s	Parameter
Amplitude=	Amplitude*	**1 to 9 [-] or 60 to 100 [%]	Parameter
En.max.=	Maximum energy	0 - 10'000 Ws	Limit
En.min.=	Minimum energy	0 - 10'000 Ws	Limit
Energy=	Current energy value		Measured value
Travel=	Current travel value		Measured value
Time=	Current time		Measured value
Parts=	Part counter		Measured value
Required=	Required part count		Limits
Rejects=	Rejected part counter		Measured value
Delaytime=	Impulse delay time	0.000 - 1.999 s	Parameter
US-Pulse=	Delayed impulse	0.000 - 1.999 s	Parameter
Power Peak=	Maximum power		Measured value
Power Loss=	Power loss		Measured value
Horn=	Horn number		Info
Fixture=	Fixture number		Info
Booster= 1:	Size of the booster		Info
Pressure=	System pressure		Info
Speed=	Flow control valve performance		Info

1)

Parameter

- Directly influences the welding result. The parameters can be changed.

Limits

- If a limit is exceeded, an error message is output. The values can be changed.

Measured Value

- Measured values. The values can be read but not changed.

Info

- These values are only for information. The values can be changed.

* The amplitude cannot be adjusted for the PCS I. The amplitude is always at 100%

** For PCSII, the amplitude increment is depending on generator type: 1 to 9 [-] or 60 to 100 [%], where 1=60% and 9=100%.

Travel

- This parameter specifies the depth of the weld. The weld depth is calculated starting after the triggering.

Trigger

- This parameter adjusts the triggering of the ultrasonic horn. The higher the value, the higher the pressure on the object to be welded.

Hold Time

- After the welding time has run out, the holding time starts. The object welded can harden under pressure during the hold time.

Amplitude

- The output amplitude can be set to one of five levels from 100% down to 60%.
- The values are changed using the **CLR** button.
- The amplitude cannot be changed for the PCS I. The amplitude is always at 100%.

Maximum Energy

- If the amount of energy output is higher than the specified value, the error message "Energy too high" is displayed.

Minimum Energy

- If the amount of energy output is smaller than the specified value, the error message "Energy too low" is displayed.

Energy

- Effective measured energy.

Travel

- Effective measured depth.

Time

- Effective measured time.

Part Counter

- Counts the number of fault-free welded parts.
- The Part Counter can be reset using the **CLR** key.

Required Part Count

- After reaching the specified part count, the message "Part count reached !!" is displayed.
- Is only active if F 4729 has been initialized to ON.

Reject Counter

- Counts the number of incorrectly welded parts.
- The Reject Counter can be reset using the **CLR** key. The Reject Counter is automatically reset when the Part Counter is reset.

Delay Time

- The impulse delay time starts after the hold time has run out.

US-Pulse

- After the impulse delay time has run out, the ultrasonic pulse is activated. Using the us-pulse, an object sticking to the sonotrode can be shaken off.

Power Peak

- The setting for the maximum power is displayed.

Power Loss

- The power loss of the vibration system is displayed.

Horn Number

- The part number of the sonotrode can be noted for information purposes.

Fixture Number

- The part number of the fixture can be noted for information purposes.

Booster 1:

- The size of the booster can be noted for information purposes.

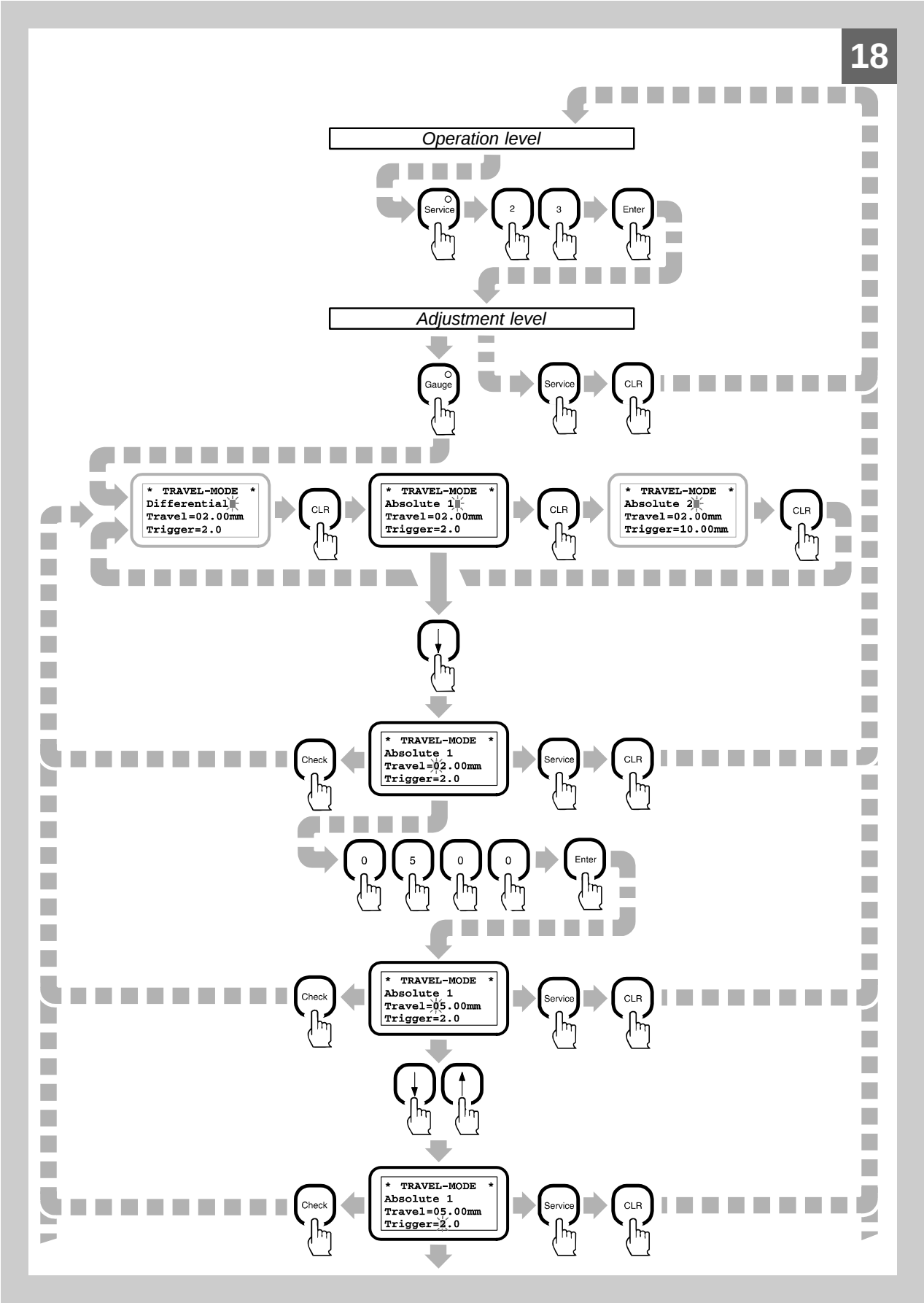
Pressure

- The pressure of the device system can be noted for information purposes.

Speed

- The flow control performance of the device can be noted for information purposes.

7.5.6 Overview of Functions for the Absolute 1 TRAVEL MODE



7.5.7 Parameters of the Absolute 1 TRAVEL Operating Mode

Parameter Display	Designation	Adjustment Range	Function ¹⁾
Absolute 1			
Travel=	Weld depth	00.00 - 99.99 mm	Parameter
Trigger=	Ultrasonic trigger	0.0 - 9.9	Parameter
Hold Time=	Hold time	0.000 - 9.999 s	Parameter
Amplitude=	Amplitude*	**1 to 9 [-] or 60 to 100 [%]	Parameter
En.max.=	Maximum energy	0 - 10'000 Ws	Limit
En.min.=	Minimum energy	0 - 10'000 Ws	Limit
Time max.=	Maximum time		Parameter
Energy=	Current energy value		Measured value
Travel=	Current travel value		Measured value
Time=	Current time		Measured value
Parts=	Part counter		Measured value
Required=	Required part count		Limits
Rejects=	Rejected part counter		Measured value
Delaytime=	Impulse delay time	0.000 - 1.999 s	Parameter
US-Pulse=	Delayed impulse	0.000 - 1.999 s	Parameter
Power Peak=	Maximum power		Measured value
Power Loss=	Power loss		Measured value
Horn=	Horn number		Info
Fixture=	Fixture number		Info
Booster= 1:	Size of the booster		Info
Pressure=	System pressure		Info
Speed=	Flow control valve performance		Info

1)

Parameter

- Directly influences the welding result. The parameters can be changed.

Limits

- If a limit is exceeded, an error message is output. The values can be changed.

Measured Value

- Measured values. The values can be read but not changed.

* The amplitude cannot be adjusted for the PCS I. The amplitude is always at 100%.

Info

- These values are only for information. The values can be changed.

Travel

- This parameter specifies the depth of the weld. The weld depth is calculated starting after the triggering.

Trigger

- This parameter adjusts the triggering of the ultrasonic horn. The higher the value, the higher the pressure on the object to be welded.

Hold Time

- After the welding time has run out, the holding time starts. The object welded can harden under pressure during the hold time.

Amplitude

- The output amplitude can be set to one of five levels from 100% down to 60%.
- The values are changed using the **CLR** button.
- The amplitude cannot be changed for the PCS I. The amplitude is always at 100%.

Maximum Energy

- If the amount of energy output is higher than the specified value, the error message "Energy too high" is displayed.

Minimum Energy

- If the amount of energy output is smaller than the specified value, the error message "Energy too low" is displayed.

Maximum time

- Error message "Time exceeded" will be issued if the maximum time limit is exceeded.

Energy

- Effective measured energy.

Travel

- Effective measured depth.

Time

- Effective measured time.

Part Counter

- Counts the number of fault-free welded parts.
- The Part Counter can be reset using the **CLR** key.

Required Part Count

- After reaching the specified part count, the message "Part count reached !!" is displayed.
- Is only active if F 4729 has been initialized to ON.

Reject Counter

- Counts the number of incorrectly welded parts.
- The Reject Counter can be reset using the **CLR** key. The Reject Counter is automatically reset when the Part Counter is reset.

Delay Time

- The impulse delay time starts after the hold time has run out.

US-Pulse

- After the impulse delay time has run out, the ultrasonic pulse is activated. Using the us-pulse, an object sticking to the sonotrode can be shaken off.

Power Peak

- The setting for the maximum power is displayed.

Power Loss

- The power loss of the vibration system is displayed.

Horn Number

- The part number of the sonotrode can be noted for information purposes.

Fixture Number

- The part number of the fixture can be noted for information purposes.

Booster 1:

- The size of the booster can be noted for information purposes.

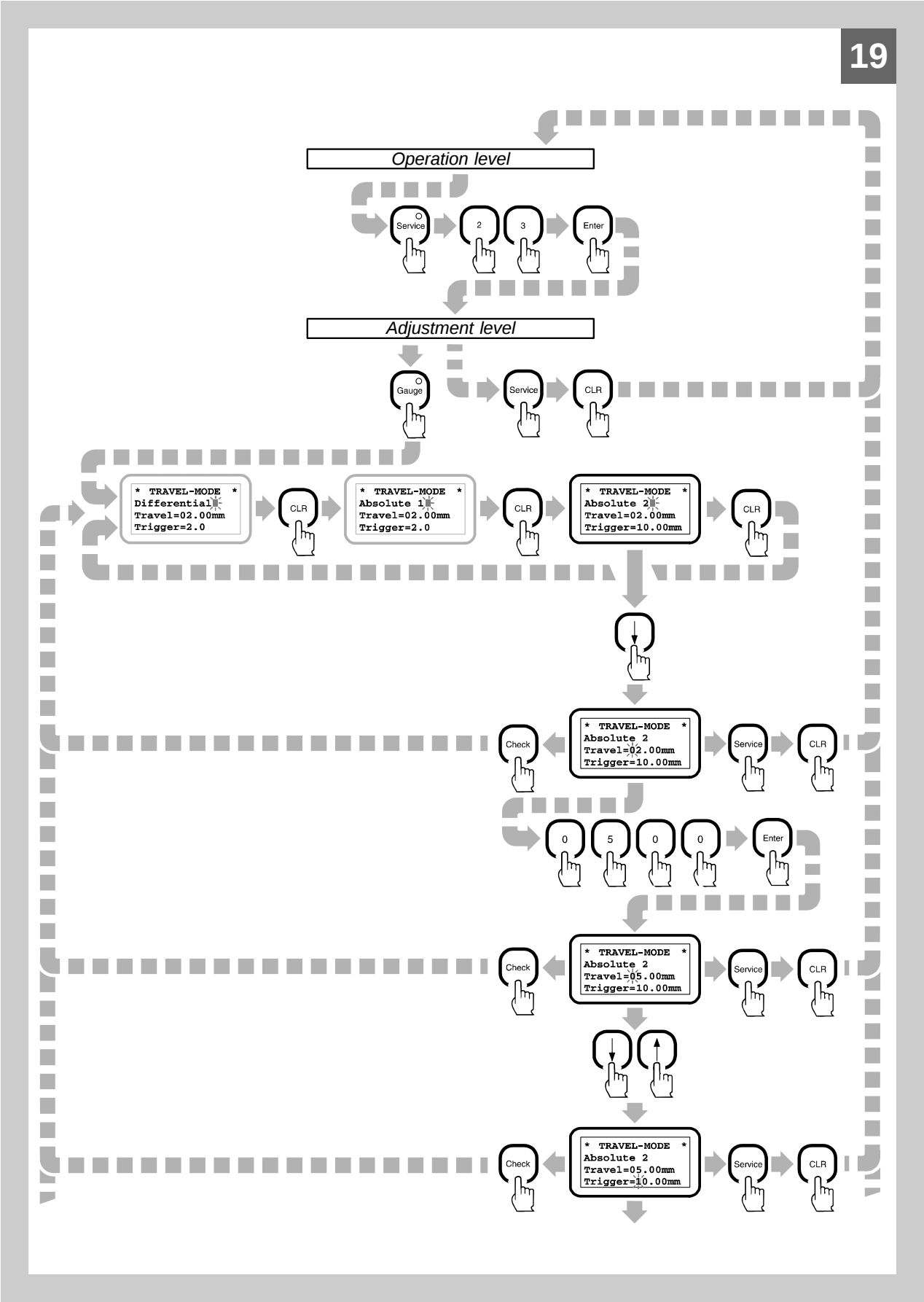
Pressure

- The pressure of the device system can be noted for information purposes.

Speed

- The flow control performance of the device can be noted for information purposes.

7.5.8 Overview of Functions for the Absolute 2 TRAVEL MODE



7.5.9 Parameters of the Absolute 2 TRAVEL Operating Mode

Parameter Display	Designation	Adjustment Range	Function ¹⁾
Absolute 2			
Travel=	Weld depth	00.00 - 99.99 mm	Parameter
Trigger=	Ultrasonic trigger	00.00 - 99.99 mm	Parameter
Hold Time=	Hold time	0.000 - 9.999 s	Parameter
Amplitude=	Amplitude*	**1 to 9 [-] or 60 to 100 [%]	Parameter
En.max.=	Maximum energy	0 - 10'000 Ws	Limit
En.min.=	Minimum energy	0 - 10'000 Ws	Limit
Energy=	Current energy value		Measured value
Travel=	Current travel value		Measured value
Time=	Current time		Measured value
Parts=	Part counter		Measured value
Required=	Required part count		Limits
Rejects=	Rejected part counter		Measured value
Delaytime=	Impulse delay time	0.000 - 1.999 s	Parameter
US-Pulse=	Delayed impulse	0.000 - 1.999 s	Parameter
Power Peak=	Maximum power		Measured value
Power Loss=	Power loss		Measured value
Horn=	Horn number		Info
Fixture=	Fixture number		Info
Booster= 1:	Size of the booster		Info
Pressure=	System pressure		Info
Speed=	Flow control valve performance		Info

1)

Parameter

- Directly influences the welding result. The parameters can be changed.

Limits

- If a limit is exceeded, an error message is output. The values can be changed.

Measured Value

- Measured values. The values can be read but not changed.

Info

- These values are only for information. The values can be changed.

* The amplitude cannot be adjusted for the PCS I. The amplitude is always at 100%.

** For PCSII, the amplitude increment is depending on generator type: 1 to 9 [-] or 60 to 100 [%], where 1=60% and 9=100%

Travel

- This parameter specifies the depth of the weld. The weld depth is calculated starting after the triggering.

Trigger

- This parameter adjusts the triggering of the ultrasonic horn. The higher the value, the higher the pressure on the object to be welded.

Hold Time

- After the welding time has run out, the holding time starts. The object welded can harden under pressure during the hold time.

Amplitude

- The output amplitude can be set to one of five levels from 100% down to 60%.
- The values are changed using the **CLR** button.
- The amplitude cannot be changed for the PCS I. The amplitude is always at 100%.

Maximum Energy

- If the amount of energy output is higher than the specified value, the error message "Energy too high" is displayed.

Minimum Energy

- If the amount of energy output is smaller than the specified value, the error message "Energy too low" is displayed.

Energy

- Effective measured energy.

Travel

- Effective measured depth.

Time

- Effective measured time.

Part Counter

- Counts the number of fault-free welded parts.
- The Part Counter can be reset using the **CLR** key.

Required Part Count

- After reaching the specified part count, the message "Part count reached !!" is displayed.
- Is only active if F 4729 has been initialized to ON.

Reject Counter

- Counts the number of incorrectly welded parts.
- The Reject Counter can be reset using the **CLR** key. The Reject Counter is automatically reset when the Part Counter is reset.

Delay Time

- The impulse delay time starts after the hold time has run out.

US-Pulse

- After the impulse delay time has run out, the ultrasonic pulse is activated. Using the us-pulse, an object sticking to the sonotrode can be shaken off.

Power Peak

- The setting for the maximum power is displayed.

Power Loss

- The power loss of the vibration system is displayed.

Horn Number

- The part number of the sonotrode can be noted for information purposes.

Fixture Number

- The part number of the fixture can be noted for information purposes.

Booster 1:

- The size of the booster can be noted for information purposes.

Pressure

- The pressure of the device system can be noted for information purposes.

Speed

- The flow control performance of the device can be noted for information purposes.

7.6 The PRINT Function *

7.6.1 Possible Selections in the Print Menu

Welding data and welding diagrams can be sent out over the serial interface to a printer for printout with the PCS.
The welding data can also be transferred to an SPC software program.

*only for the PCS II

7.6.2 Printing the Welding Data

1. Time Mode

20

☐	Date	Time	Piece	Mode	Trigger	Weld Time	Power	Energy	Errors	☐
☐	11.11.95	11:11	999999	T	2.0	1.000s	100 %	1000 Ws	Error 1	☐
☐										☐
☐										☐

2. Energy Mode

21

☐	Date	Time	Piece	Mode	Trigger	Weld Time	Power	Energy	Errors	☐
☐	11.11.95	11:11	999999	E	2.0	1.000s	100 %	1000 Ws	Error 1	☐
☐										☐
☐										☐

3. Differential Travel Mode

22

☐	Date	Time	Piece	Mode	Travel	Weld Time	Power	Energy	Errors	☐
☐	11.11.95	11:11	999999	D	99.99 mm	1.000s	100 %	1000 Ws	Error 1	☐
☐										☐
☐										☐

4. Absolute 1 Travel Mode

23

Date	Time	Piece	Mode	Travel	Weld Time	Power	Energy	Errors
11.11.95	11:11	999999	A 1	99.99 mm	1.000s	100 %	1000 Ws	Error 1

5. Absolute 2 Travel Mode

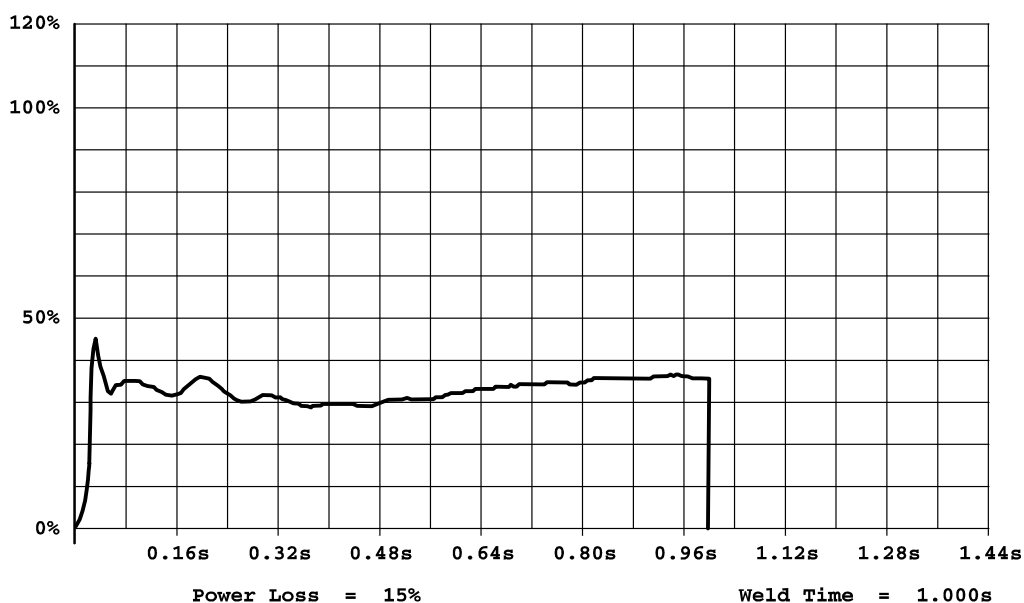
24

Date	Time	Piece	Mode	Travel	Weld Time	Power	Energy	Errors
11.11.95	11:11	999999	A 2	99.99 mm	1.000s	100 %	1000 Ws	Error 1

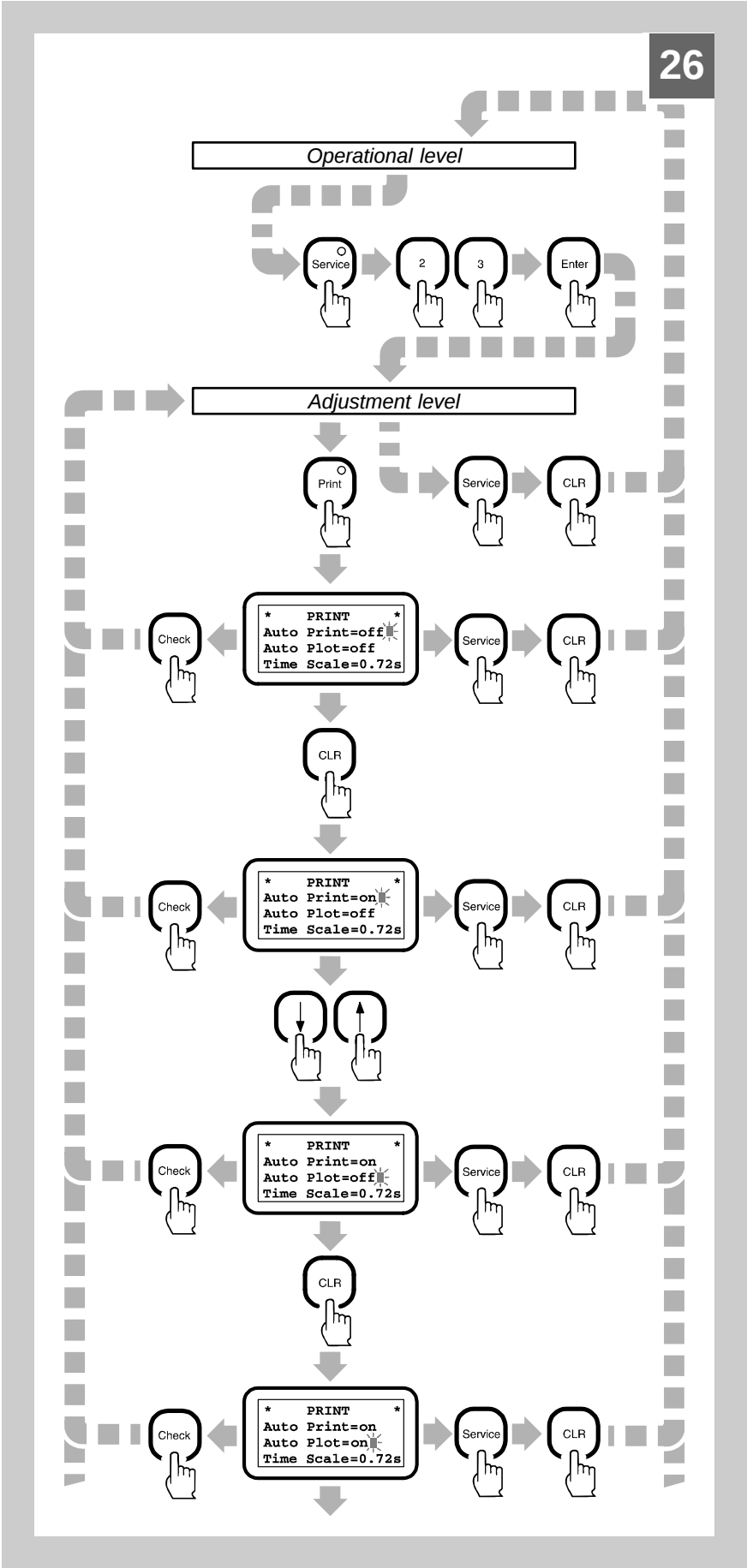
7.6.3 Printout of the Welding Diagram

25

Power 100% = 2000W Time hh:mm = 15:27 Date dd:mm:yy = 11:12:95



7.6.4 Overview of Functions



7.6.5 Parameter Settings of the PRINT / PLOT Functions

Parameter Display	Designation	Adjustments
Auto Print=	Print welding data	on / off
Auto Plot=	Print welding diagram	on / off
Time Scale=	Time axis	0.36, 0.72, 1.44, 2.88, 5.76, 9.72 s
Baud Rate=	Baud Rate	300, 1200, 9600
Print Gap=	Print interval	0 - 9999
Output=	Output	Printer, SPC

Print welding data

Using the **CLR** key, the printing of the welding data can be switched on or off. The printout depends on the setting of the print gap parameter. The data for faulty welds are always printed out. If the print gap is set to 0000, only the data for faulty welds is printed out.

The data for the last weld can be printed out after the weld has been completed by pressing the **Enter** key.

Print welding diagram

Using the **CLR** key, the printing of the welding diagram can be switched on or off. The printout depends on the setting of the print gap parameter. The diagrams for faulty welds is always printed out. If the print gap is set to 0000, only the diagrams for faulty welds are printed out.

The diagram for the last weld can be printed out after the weld has been completed by pressing the **Enter** key.

Time Scale

The appropriate time scale for the time axis must be selected according to the weld time. The value for the scaling can be changed by pressing the **CLR** key.

Baud Rate

The baud rate of the RS 232 interface can be selected. Different values for the baud rate can be selected by pressing the **CLR** key.

Output format: 8bit / no parity / 1 stop bit

Print Interval

If a printout is not to be sent to the printer after each weld, a print interval can be set. The data for faulty welds are always printed out. If the print gap is set to 0000, only the data for faulty welds is printed out.

Output

The output can be sent to a serial printer or transferred to an SPC program. The value can be changed by pressing the **CLR** key.

7.7 The DATA BANK Function*

7.7.1 Possibilities of the DATA BANK Function

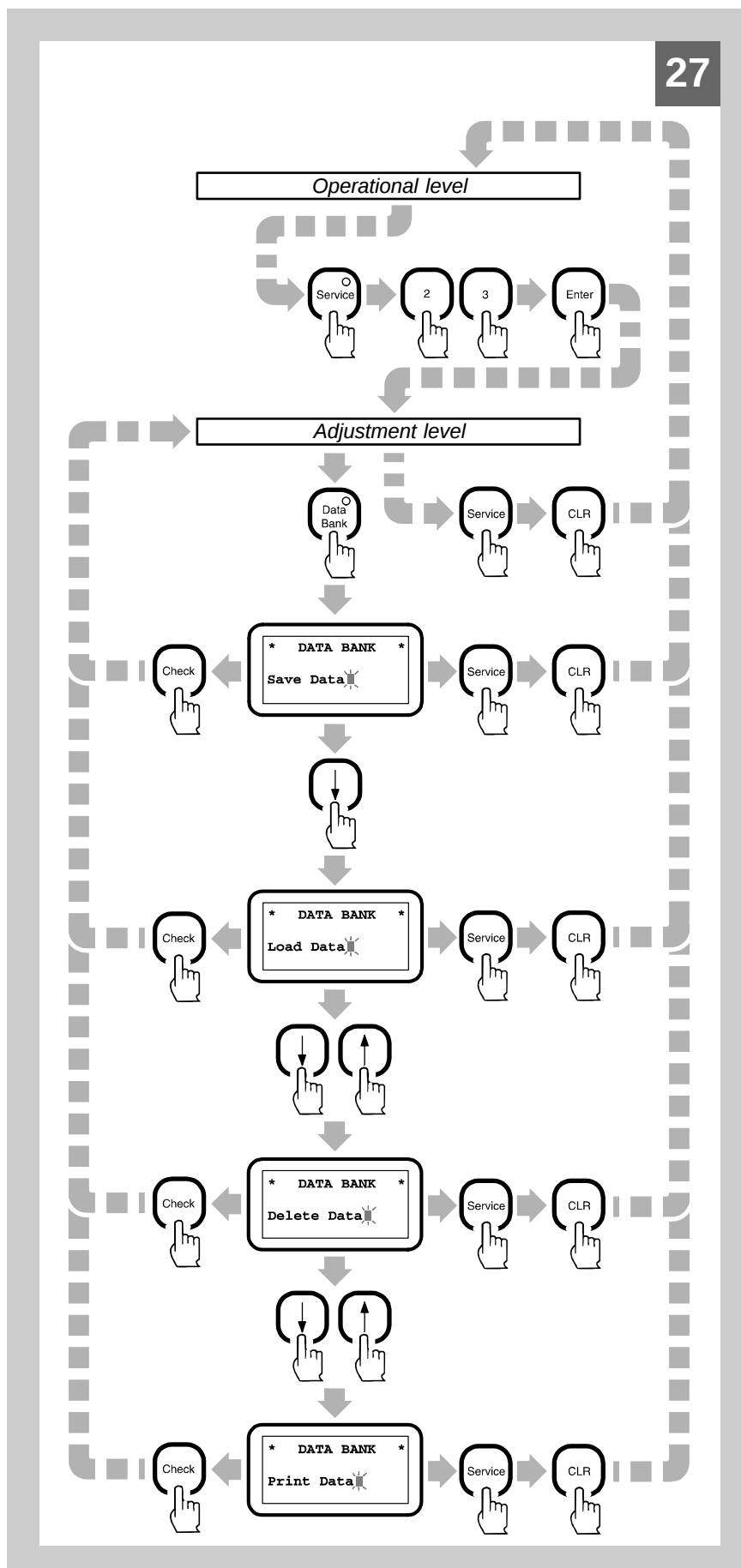
In actual applications, the same ultrasonic equipment is often used for welding several different types of materials in alternating operating modes.

The DATA BANK function offers a useful extension of the PCS system in this case.

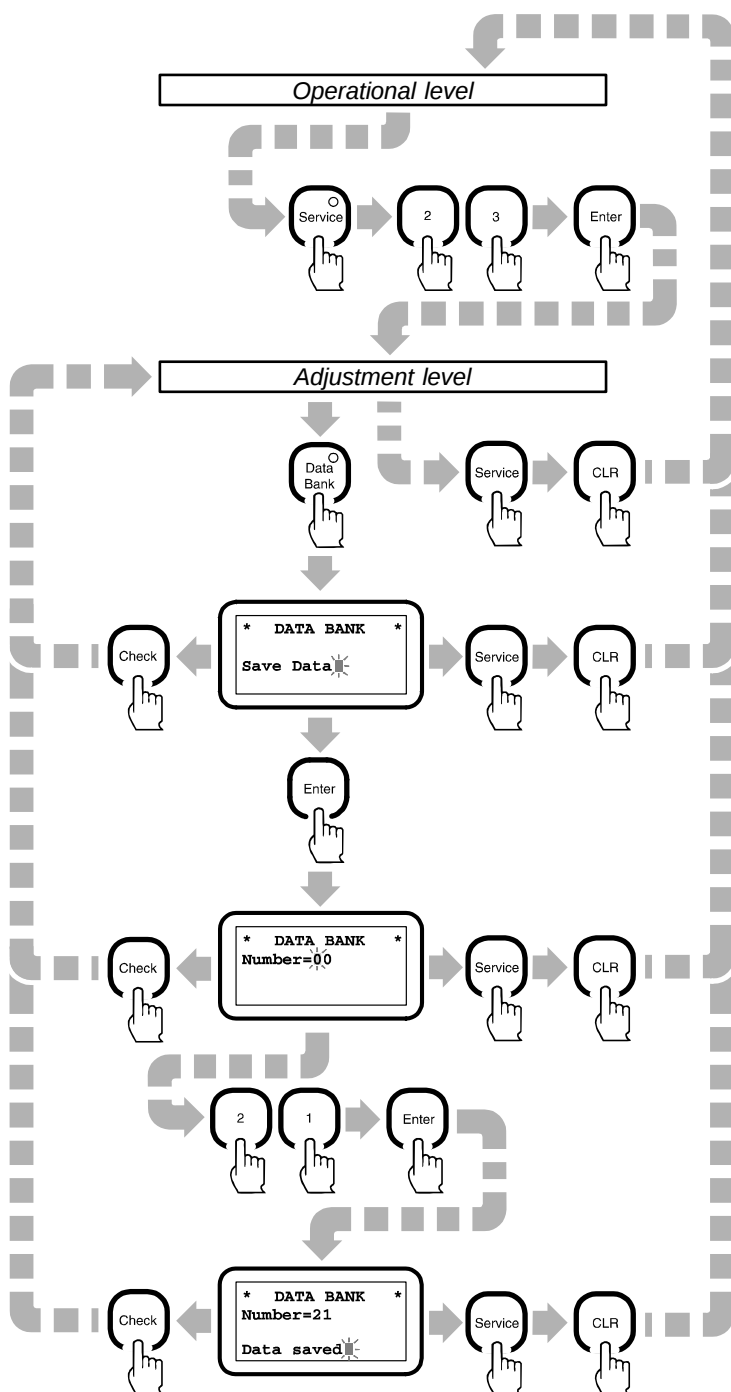
All of the most important settings and specified values can be stored. There are 40 storage locations available for storing data.

The individual databanks can also be optionally selected over the RS 232 interface.

* only for the PCS II



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7.7.2 Saving Data

To save the data entered, go into the adjustment level.

1. Press the **Service** key.
2. Enter the code **"23"**.
3. Confirm the entry by pressing the **Enter** key.

After you have changed to the adjustment level

4. press the **Data Bank** key.

The display shows the first databank function, "Save Data".

5. Press the **Enter** key.

The number of the next location available for storing data now appears in the display.

You can select this number or enter a different number.

6. Confirm the entry by pressing the **Enter** key.

If the desired storage location is invalid or is already in use, a message will appear in the display.

If the data has been saved correctly, the message "Data saved" appears in the display. By pressing the **Check** key, you return to the initial position.

7.7.3 Loading Data

After you have switched to the adjustment level,

1. press the **Data Bank** key.

The display now shows the first databank function "Save Data".

2. Using the cursor keys, select the "Load Data" function ..
3. Press the **Enter** key.

The number of the last occupied storage location then appears in the display.

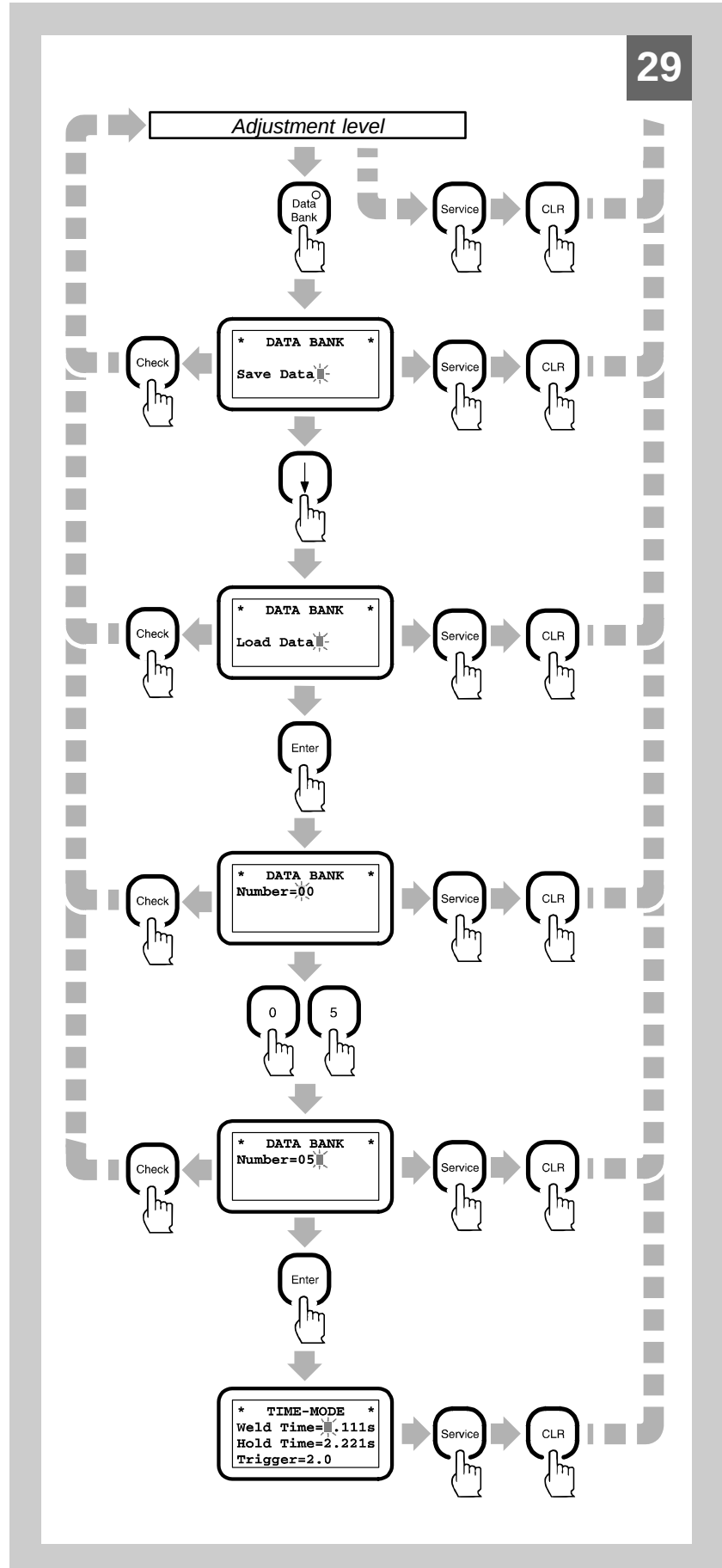
4. Enter the number of the desired storage location and confirm the entry by pressing the **Enter** key.

If the desired storage location is empty, the message "No Data" appears.

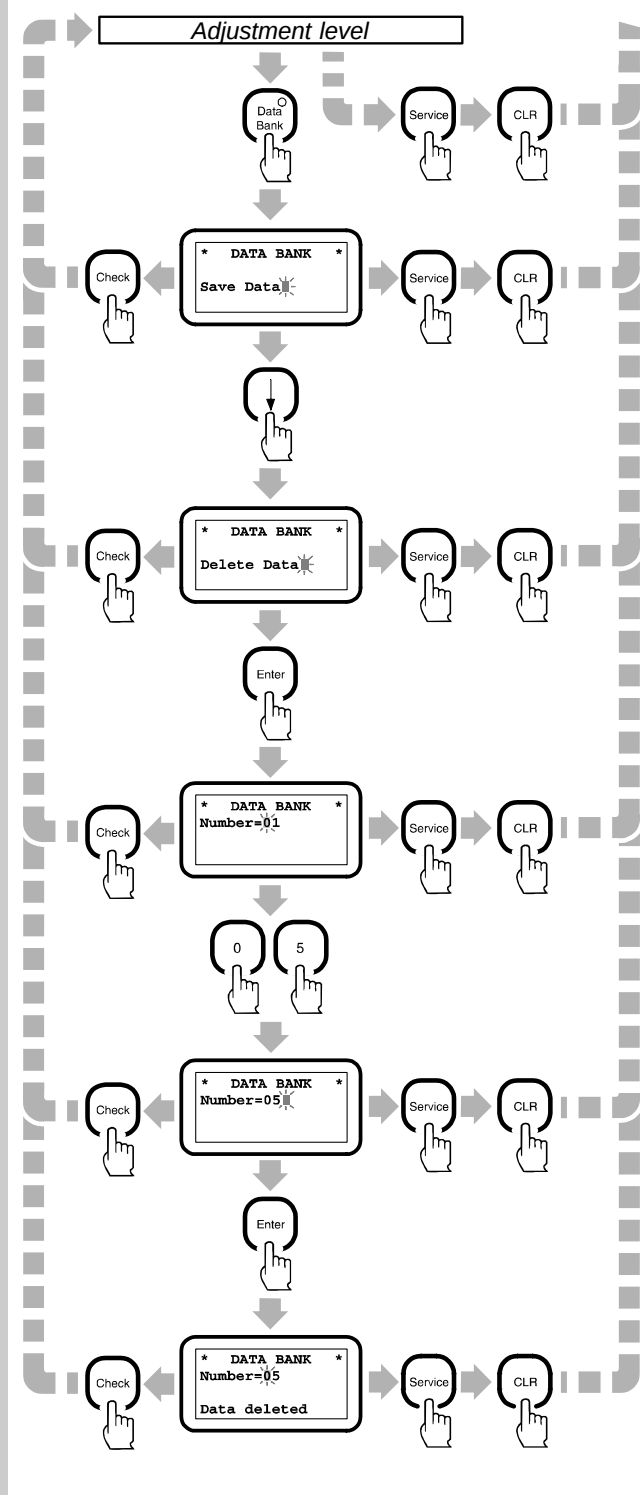
Select a valid number and confirm the number by pressing the **Enter** key.

After pressing the **Enter** key, the contents of the desired storage location appear in the display.

By pressing the **Check** key, you return to the initial position.



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7.7.4 Deleting Data

After you have switched to the adjustment level,

1. press the **Data Bank** key.

The display now shows the first databank function "Save Data".

2. Using the cursor keys, select the "Delete Data" function ..
3. Press the **Enter** key.

The number of the last occupied storage location then appears in the display.

4. Enter the number of the desired storage location and confirm the entry by pressing the **Enter** key.

If the desired storage location is empty, the message "No Data" appears.

Select a valid number and confirm the number by pressing the **Enter** key.

The data in the desired location is deleted.

The message "Data deleted" appears in the display.

By pressing the **Check** key, you return to the initial position.

7.7.5 Print Data



Before you print data, make sure that a printer is connected to the serial port and that the printer is ready.

To print saved data, switch to the adjustment level.

1. Press the **Service** key.
2. Enter the code "23" .
3. Confirm the entry by pressing the **Enter** key.

After you have switched to the adjustment level,

4. press the **Data Bank** key.

The display now shows the first databank function "Save Data".

5. Using the cursor keys, select the "Print Data" function ..
6. Press the **Enter** key.

The number of the last occupied storage location then appears in the display.

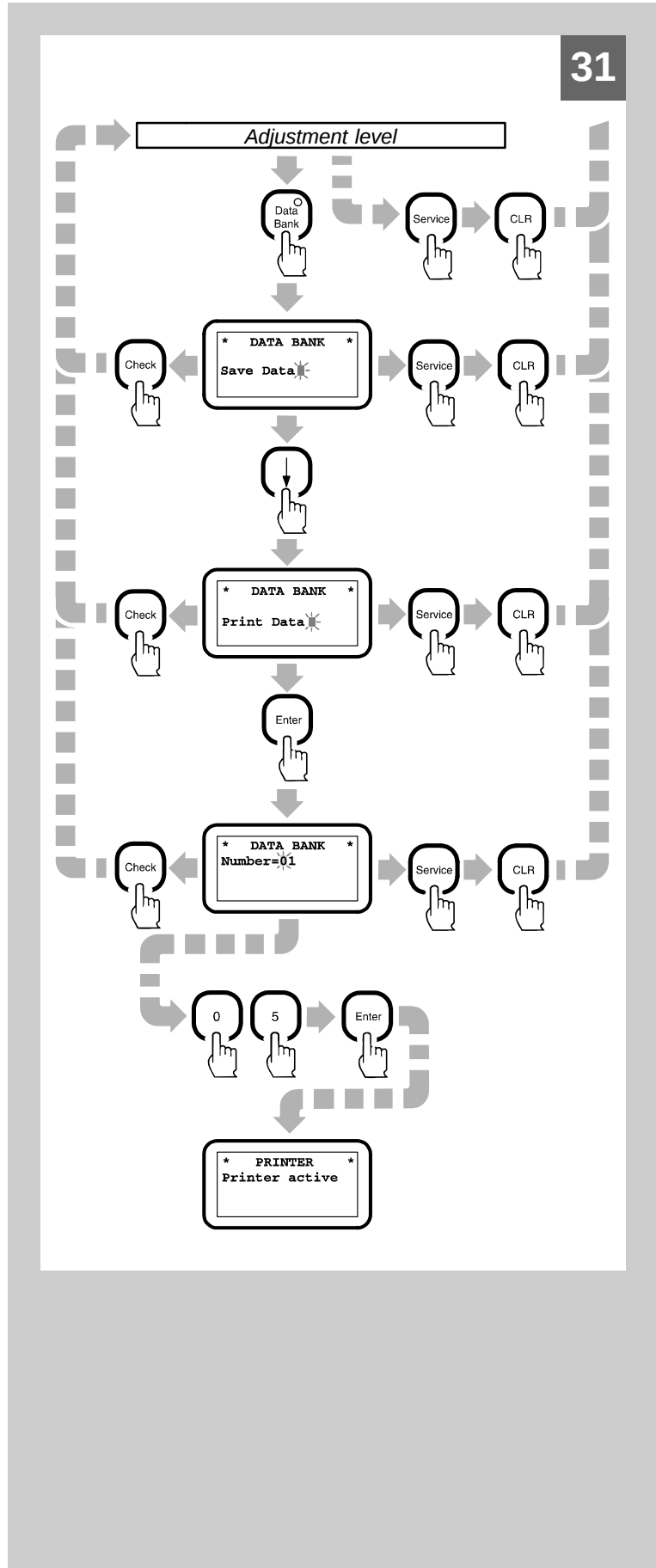
7. Enter the number of the desired storage location and confirm the entry by pressing the **Enter** key.

If the desired storage location is empty, the message "No Data" appears.

Select a valid number and confirm the number by pressing the **Enter** key.

All data stored in the databank can be printed out by selecting the number "00". After pressing the **Enter** key, the print job is started.

If the printer is not connected or not online, the message "Not ready" appears in the display.



7.7.6 Printout of the Data Bank

Date / Time	:	11.11.55 / 11.11
Data Bank Number	:	40
Welding Mode	:	Time-Mode
Weld Time	:	1.000s
Hold Time	:	1.000s
Amplitude	:	100%
Energy maximum	:	1000Ws
Energy minimum	:	0000Ws
Delay Time	:	0.000s
After Pulse	:	0.000s
Booster	:	1:2
Horn Number	:	123456
Fixture Number	:	123456
Max. System Pressure	:	5.5
Speed	:	4.4

7.8 The 'F' Function Key

7.8.1 System Initialization

To prepare the device and the Generator for the diverse tasks accorded them, the individual device functions are initialized depending on the application by the generator controller.

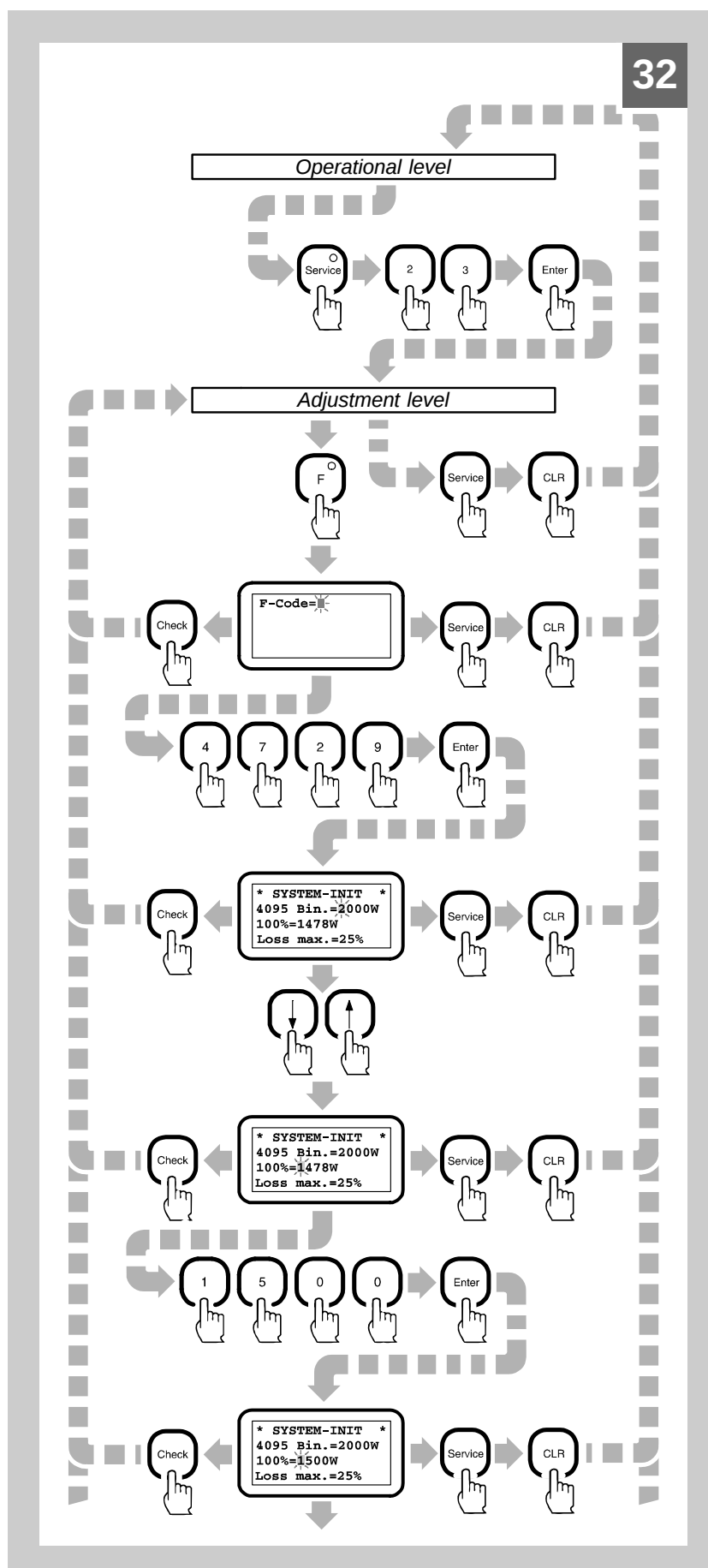
The hardware and software parameters of the welding device are changed using the **F** key.

F Code = 4711

Software parameters

F Code = 4729

Hardware parameters



7.8.2 F Code = 4729

Parameter Display	Setting
* SYSTEM-INIT *	
4095 Bin.=	2000 / 3125
100%=	1000:1500:2000:3000
Loss max.=	10 - 40
Voltage=	1000 Bin
Travel-Mode=	on / off
Encoder=	1:1 / 1:09132
Start=	Manual / Impulse / Automatic
Homeposition=	on / off
Required=	on / off
Loss-Test=	before / after
Reset=	on / off
US-Stop=	on / off
Trigger=	before / after

7.8.3 Parameter Adjustment Using Code 4729

4095 Bin.=

- see table.

Power [W]	4095 Bin.
1'000	2000
1'500	2000
2'000	3125
3'000	3125

100%=

- Generator power (see ratings plate).

Loss max.=

- If this value is exceeded during the self-test, a vibration system error is output.
- Standard setting: 25%

Travel Mode

- If the device is equipped with a travel measurement system, this must be initialized to *ON* .
- Change the setting by pressing the **CLR** key.

Encoder=

- Must be initialized to 0.9312.
- Change the setting by pressing the **CLR** key.

Start=

- Must be initialized to *MANUAL*.
- Change the setting by pressing the **CLR** key.

Homeposition=

- If the device is not equipped with a final upper position switch, then this must be initialized to *OFF*.
- Change the setting by pressing the **CLR** key.
- Standard setting: *ON*

Required=

- If the required piece count is not to be monitored, then this must be initialized to *OFF*.
- Change the setting by pressing the **CLR** key.
- Standard setting: *ON*

Loss-Test=

- The self-test can be run either *BEFORE* or *AFTER* the weld is completed.
- If *AFTER* has been selected, then a system test is run after turning the device on. After that, the system test is run after the delay time has run out. If the delay time is set to 0.000s, a system test is not conducted. It is better to run the device with the system test, if possible.
- Change the setting by pressing the **CLR** key.
- Standard setting: *BEFORE*

Reset=

- Must be initialized to *OFF*.
- Change the setting by pressing the **CLR** key.

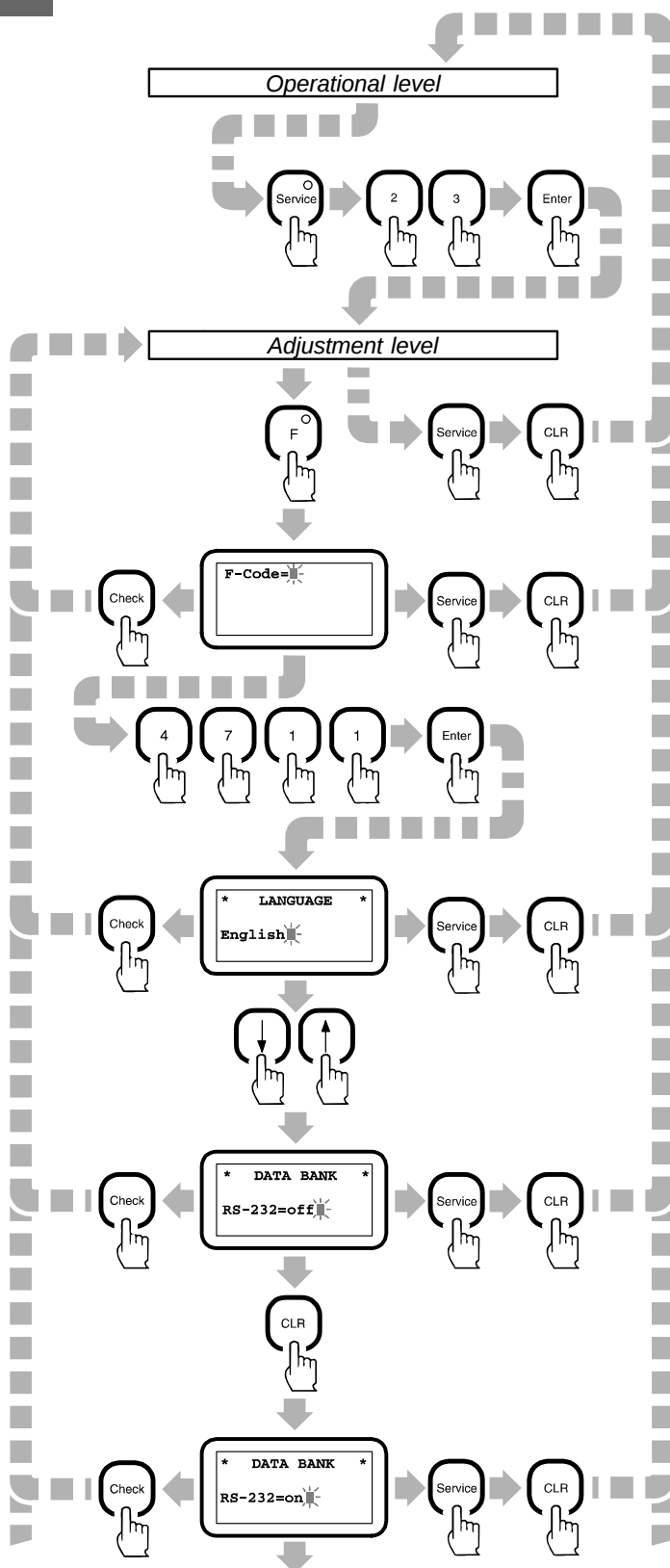
US-Stop=

- The differential travel mode can be run with a stop switch using an optional adapter box. If a stop switch is used, this parameter must be initialized to *ON*. The welding process is activated by the trigger and a signal on the input of the adapter box ends the welding process. If no signal is sent, the weld time parameter setting serves to control the weld time. A time overflow error is output.
- Using the ultrasonic (us-) pulse, you can weld after the weld time is up.
- Change the setting by pressing the **CLR** key.
- Standard setting: *OFF*

Trigger=

- The trigger only becomes active after the safety switch if set to *AFTER*.
- The trigger is active during the entire stroke if set to *BEFORE*. This is necessary if the welding distance is larger than 6 mm.
- Standard setting: *AFTER*

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7.8.4 F Code = 4711

Parameter Display	Setting
* SYSTEM_INIT *	
Language =	Deutsch / English / Francais / Italiano / Espanol
* DATA BANK *	
RS-232=	on / off
* TIME HH:MM *	11:11
DATE DD:MM:YY	11.11.95
* GENERATOR *	Power=2000W

7.8.5 Parameter Settings for Code 4711

Language

- The user can select operation in *German, English, French, Italian* or *Spanish*.
- Change the setting by pressing the **CLR** key.

Data Bank*

- A databank can be selected over the RS 232 interface if set to *ON*.
- Change the setting by pressing the **CLR** key.
- Standard setting: *OFF*

Time*

- Current time.

Date*

- Current date.

Generator*

- Generator power.

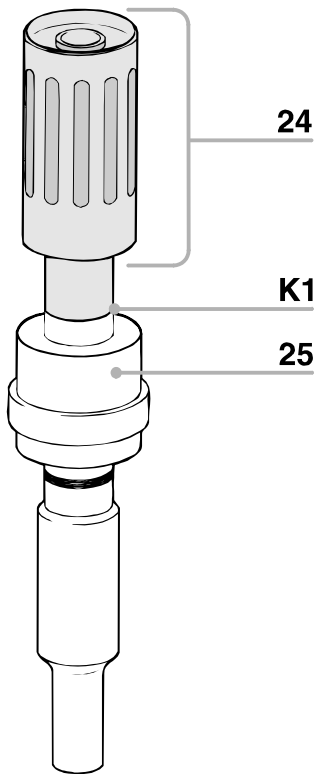


* only for the PCS II





1



8 Elements

8.1 Converter



The converter is a sensitive instrument.

Please handle with great care!

The converter (24) is the core of every ultrasonic welder.

A type C20-12 converter is used for the Ultrasonic Welding device. 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. 20 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 (24). The amplitude is usually too small to be used directly, so it is amplified by a booster (25).

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.

Residual heat is dissipated by natural convection thanks to the special design of the converter.

Special applications require dissipation of heat by additional ventilation (optional).



The converter must not be warmed up to more than 60°C at the contact point "K1". Converter, booster, horn and generator may be damaged by overheating.

The converter must be fastened with a tightening torque of 30-40 Nm.

8.2

 Booster

The correct amplitude at the horn is one of the most important factors for ultrasonics welding.

The geometrical form of the horn must match to the welding object. Finding the correct amplitude for the application is often difficult.

The booster intensifies the amplitude of the converter in a given ratio.

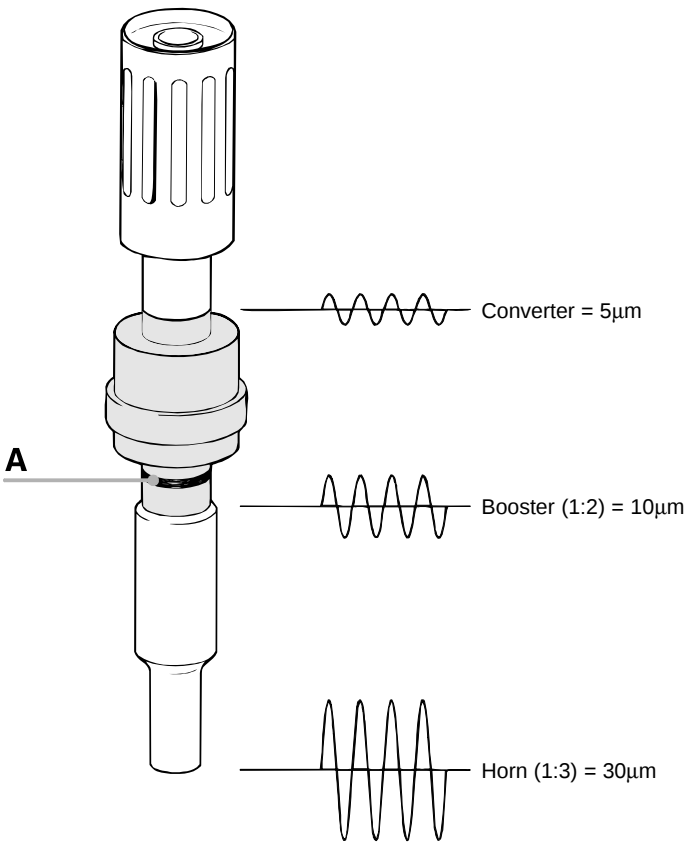
1:2 in our example.

The factor of reinforcement / attenuation is given in the corresponding ratio. The ratio is designated with a colour code and a numerical value (A). (see table)

The booster must be fastened with a tightening torque of 30-40 Nm.

Example:

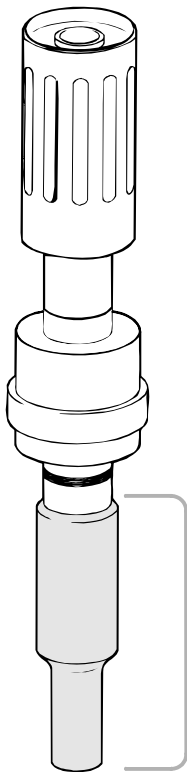
Converter:		5μ
Booster:	1:2	10μ
Horn:	1:3	30μ



Ultrasonic welders of the 20 series are available with the following booster types:

Reducing Booster	Color	Material	Booster	Color	Material
1 : 0.5 1 : 0.6	blue violet	Aluminium Aluminium	1 : 1 1 : 1.5	green yellow	Aluminium Aluminium
other ratios on request			1 : 2 1 : 2.5 1 : 3	white black brown	Titanium Titanium Titanium

3



9

8.3 Horn



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 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 20'000 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.

8.3.1 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 30-40 Nm.

8.4 Fixture

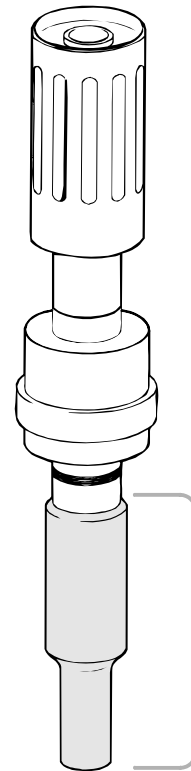
The fixture serves a variety of purposes:

- 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.

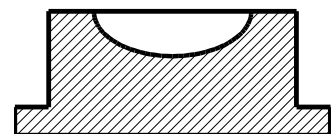
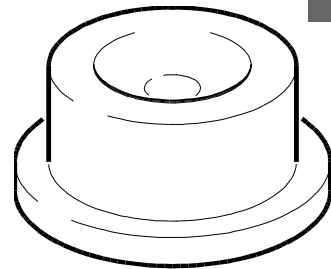
The degree of success and the level of quality depend in many ways on the design of the fixture.

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.

4



5







A series of ten horizontal lines for writing.

9 Cleaning and maintenance

9.1 General servicing



Work of cleaning and maintenance may only be carried out by properly trained personnel.



Before commencing maintenance work it must be ensured that all power supplies such as electricity and compressed air have been closed off.



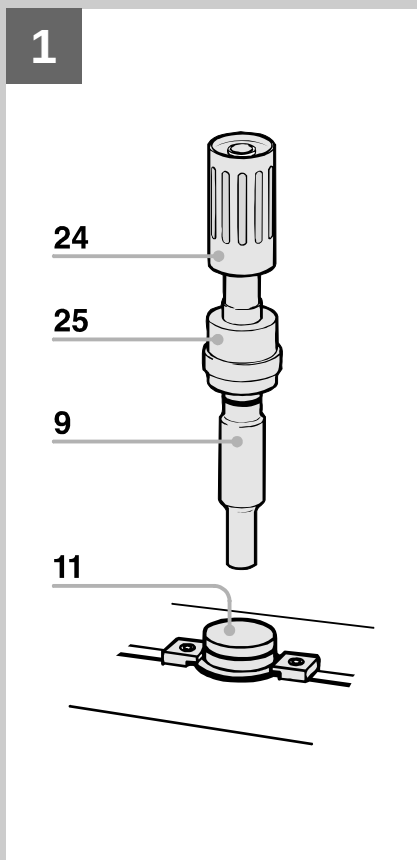
Warning: Never clean the keyboard or the generator foil with abrasive agents.

9.2 Generator

The generator requires no particular maintenance. However, cleaning the following parts guarantees long-term and trouble free operation for the pressing system

- workpiece seat (11)
- sonotrode (9)
- booster (25)
- converter (24)

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



9.3 Vibration system



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

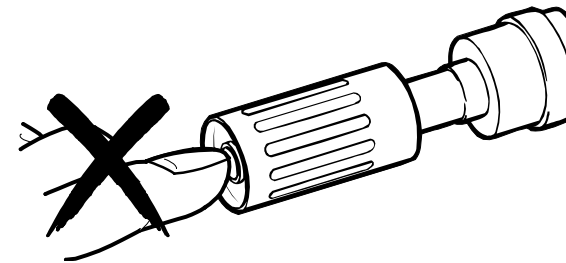
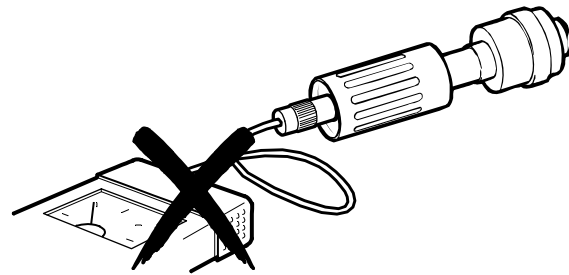
2



Avoid contact with the RF socket (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.



2

9.4 Threaded coupling

3

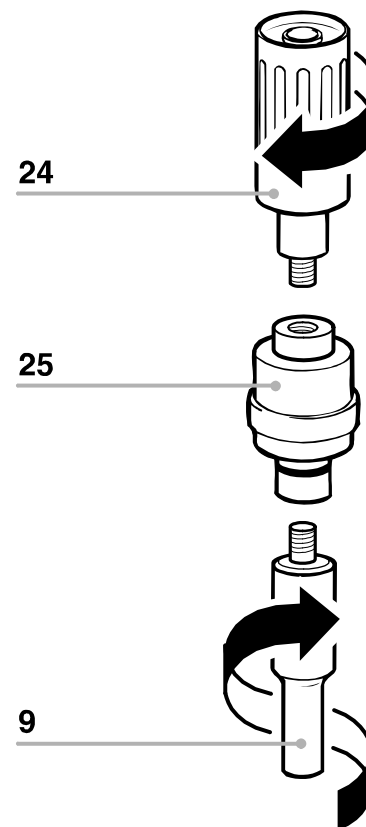
The converter (24), booster (25) and horn (9) are joined together by threading couplings.



Tightening torque: 30 - 40 Nm.

Black marks on the surface of the booster (25) or horn (9) are easy to remove.

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



3





10 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)

10.1 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

10.2 Generator error messages during operation

Error	Number	Possible cause
"OVERLOAD"	1	- Trigger set too high - maximum welding pressure too high - generator output too low for intended application - vibration system faulty
"TIME OVERFLOW"	2	- all of the energy has not yet flowed into the part after having reached the maximum welding time.
"TIME UNDERFLOW"	3	- all of the energy has flowed into the part before the maximum welding time has been reached.
"ENERGY TOO LOW"	4	- the minimum desired amount of energy has not been transferred to the part.
"ENERGY TO HIGH"	8	- the maximum allowable amount of energy has been exceeded.
"VIBRATION SYSTEM"	-	- faulty sonotrode or sonotrode incorrectly tuned - faulty booster - faulty converter - faulty HF cable or HF cable not connected - faulty generator - frequency change due to coupling with the fixture
"NO RF-SIGNAL"	-	- generator module incorrectly plugged in - faulty generator module
"ABORT"	-	- start button released before safety switch was reached or before hold time has run out
"HARDWARE"	-	- faulty valve in actuator - faulty pressure monitoring switch in actuator - faulty safety switch - faulty home position switch - home position switch not adjusted - stroke smaller than 6 mm - fault in generator - fault in dual safety switch

An error is acknowledged by pressing the **CLR** button. By pressing the **Check** button, you enter the current menu.

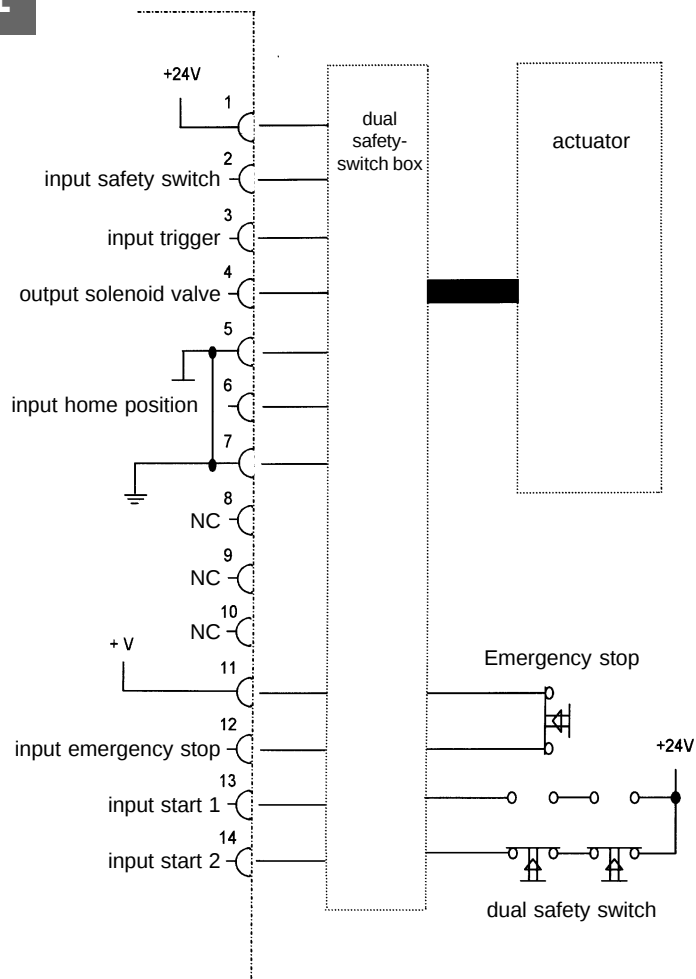


The "HARDWARE" error can only be canceled by switching the unit off.





1



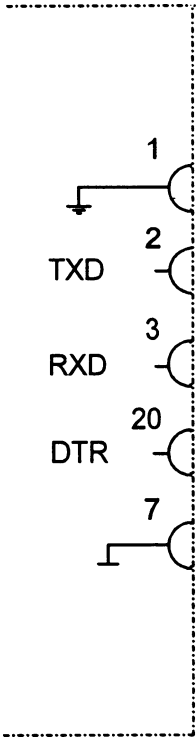
11 Electrical Diagrams

11.1 Electrical Diagrams for the PCS Generator

11.1.1 Actuator STO1 CE

11.1.2 RS 232 ST06

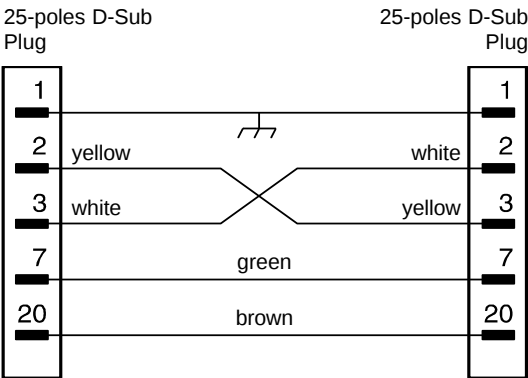
2



The other pins are not connected.

RS 232 Cable

3



11.1.3 Interface STO3

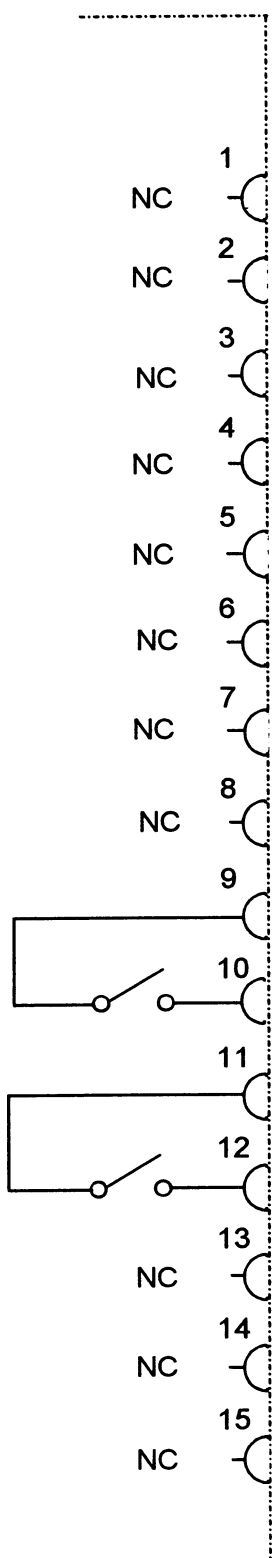
4

Error

- max. 24V / 0.5A
- Open, if error

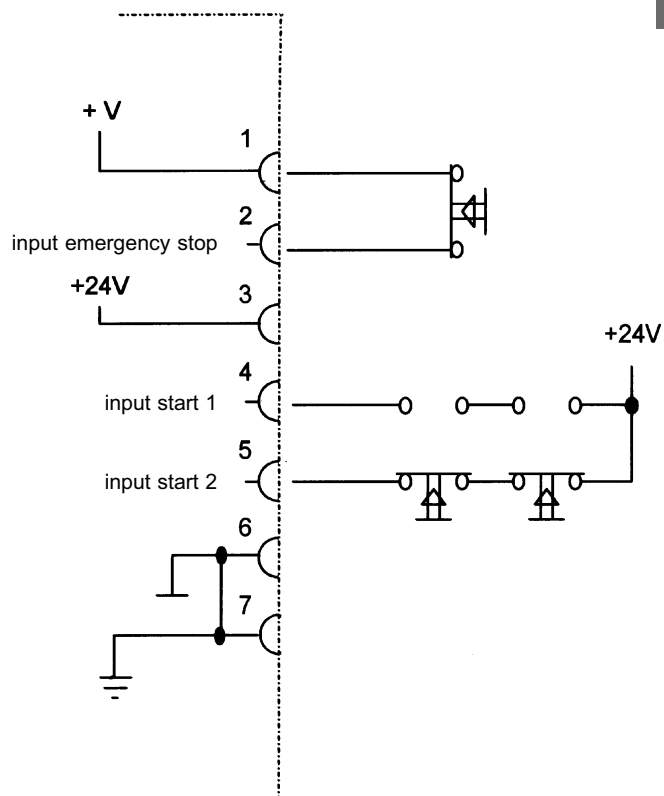
Ready

- max. 24V / 0.5A
- Open, if not ready

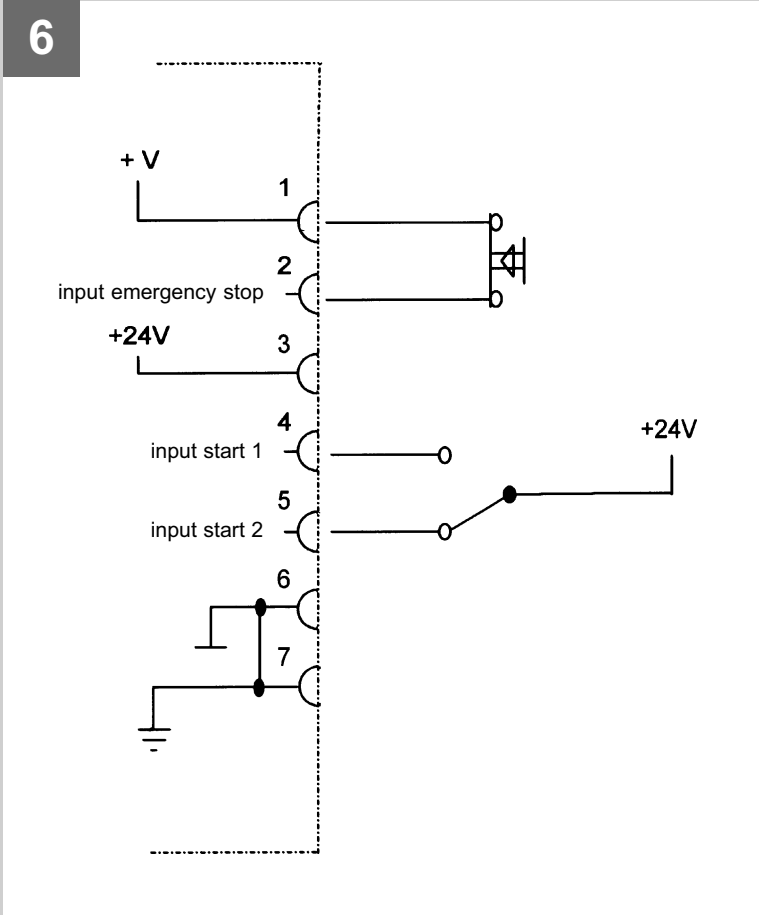


11.1.4 Start ST02 Manual (Standard)

5

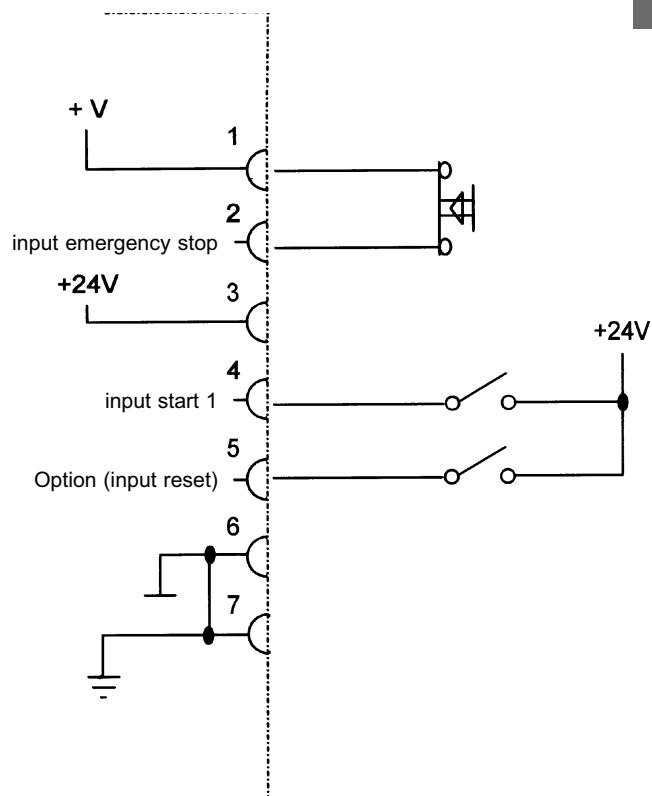


11.1.5 Start ST02 Manual
(Option)



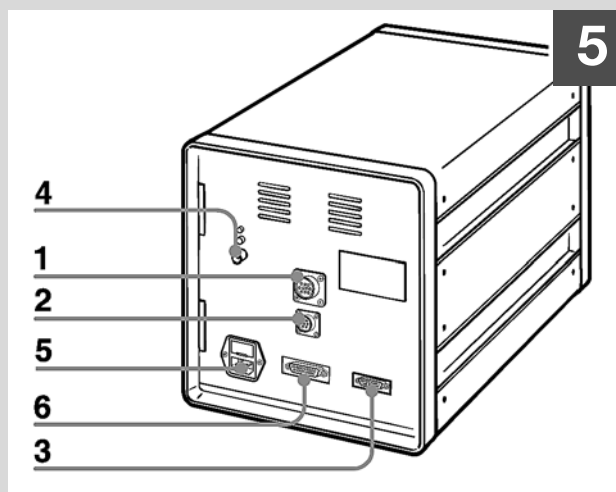
11.1.6 Start ST02 Automatic (Option)

7



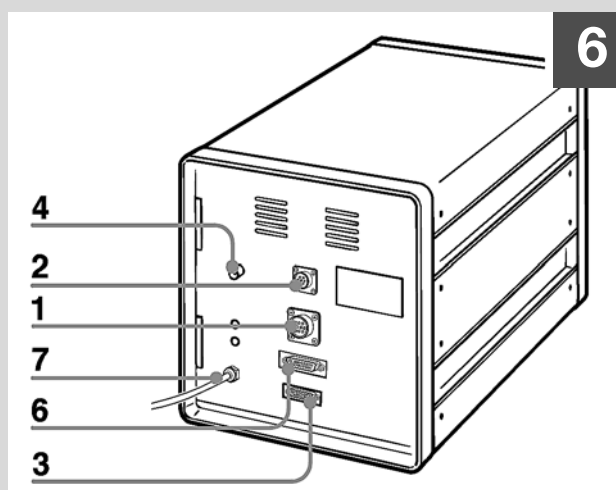
11.2 Generator rear panel 1000/1500W

- 1 STO1
- 2 STO2
- 3 STO3
- 4 STO4
- 5 STO5
- 6 STO6



11.3 Generator rear panel 2000/3000W

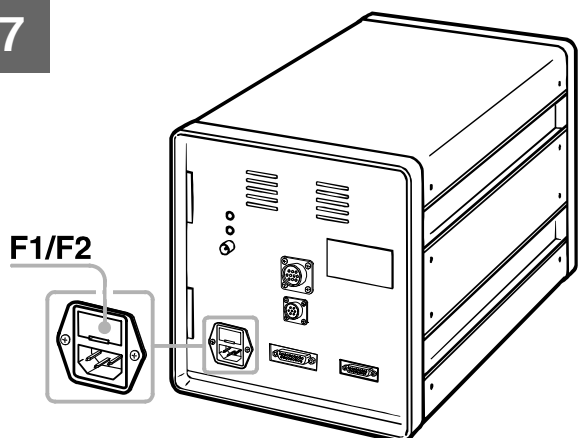
- 1 STO1
- 2 STO2
- 3 STO3
- 4 STO4
- 6 STO6
- 7 ST6



List of unit sockets			RINCO order-No.
STO1	Appliance socket	14 pole AMP	5445
STO2	Appliance socket	7 pole AMP	5442
STO3	Appliance socket	SUB-D 15 pole	5469
STO4	Appliance socket	Lemo 2	7255
STO5	Appliance socket	250V/8A	5053
STO6	Appliance socket	SUB-D 25 pole	5040

List of connection plugs			RINCO order-No.
ST1	Plug	14 pole AMP	5443
ST2	Plug	7 pole AMP	5440
ST3	Plug	SUB-D 15 pole	5446
ST4	Plug	Lemo 2	2647
ST5	Mains cable	250V	depending on country
ST6	Mains cable	250V	depending on country

7

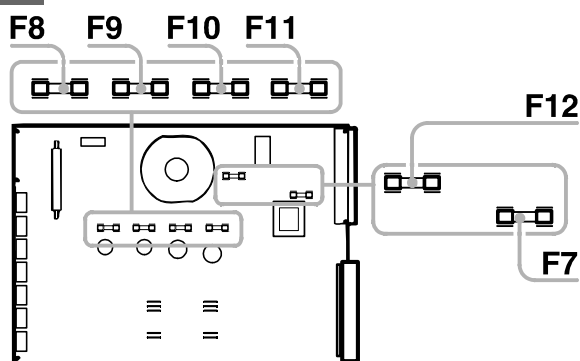


11.4 Fuses Generator 1000W / 1500W

Fuses are to be found in the following assemblies:

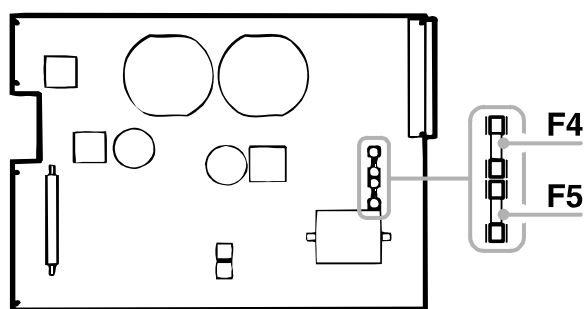
Power socket

8



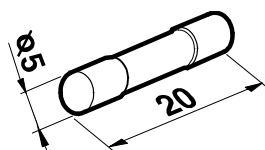
PCS Module

9



Generator module

10



All fuse dimensions: 5 x 20 mm.

11.5 Fuses Generator 2000 / 3000W

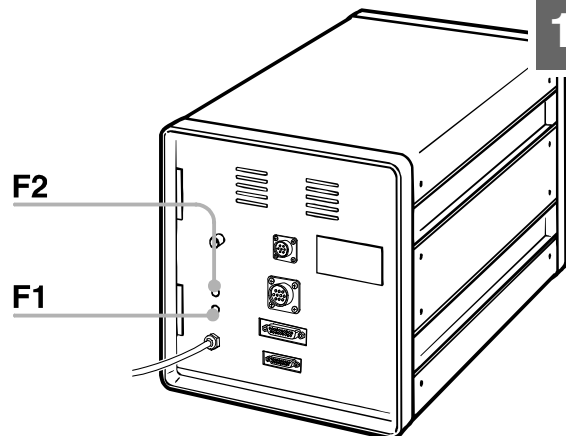
Fuses are to be found in the following assemblies:

Power socket

F2

F1

11



PCS Module

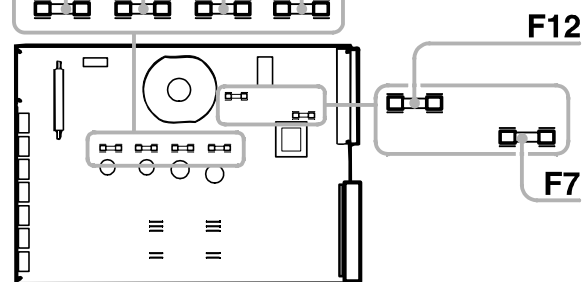
F8

F9

F10

F11

12



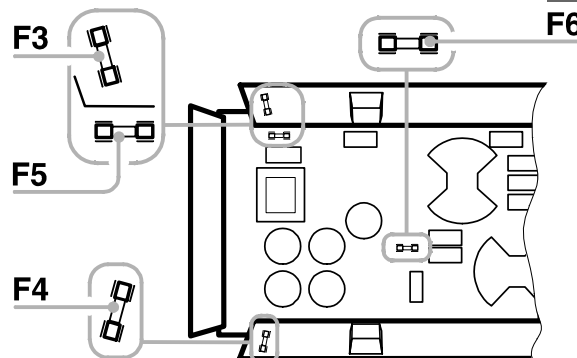
Generator module

F3

F5

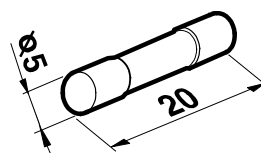
F4

13



All fuse dimensions: 5 x 20 mm.

14



11.6 List of fuses Generator 1000 / 1500W

Generator	Power socket		Generator module	
	F1	F2	F4	F5
GM20-1000	6.3 A/T	6.3 A/T	6.3 A/T	100 mA/T
GM20-1500	8 A/T	8 A/T	8 A/T	100 mA/T

11.7 List of fuses Generator 2000 / 3000W

Generator	Power socket		Generator module			
	F1	F2	F3	F4	F6	F5
PIM 20-2000	10 AT	10 AT	10 AT	10 AT	10 AT	400 mA/T
PIM 20-3000	16 AT	16 AT	16 AT	16 AT	16 AT	400 mA/T

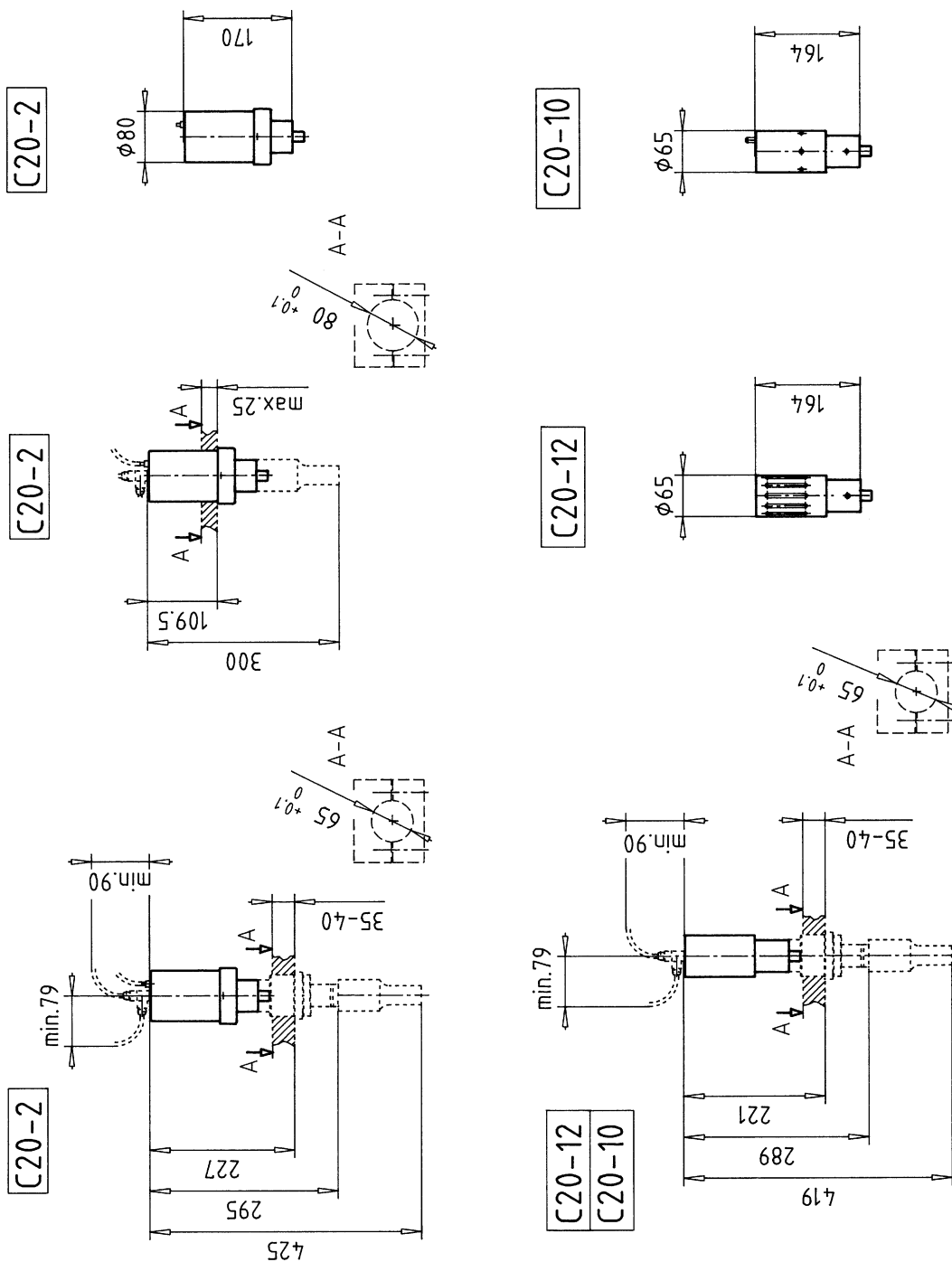
11.8 List of fuses PCS Module

PCS Module					
F7	F8	F9	F10	F11	F12
50 mA/T	400 mA/T	400 mA/T	400 mA/T	1.25 A/T	400 mA/T

12 Technical drawings and values

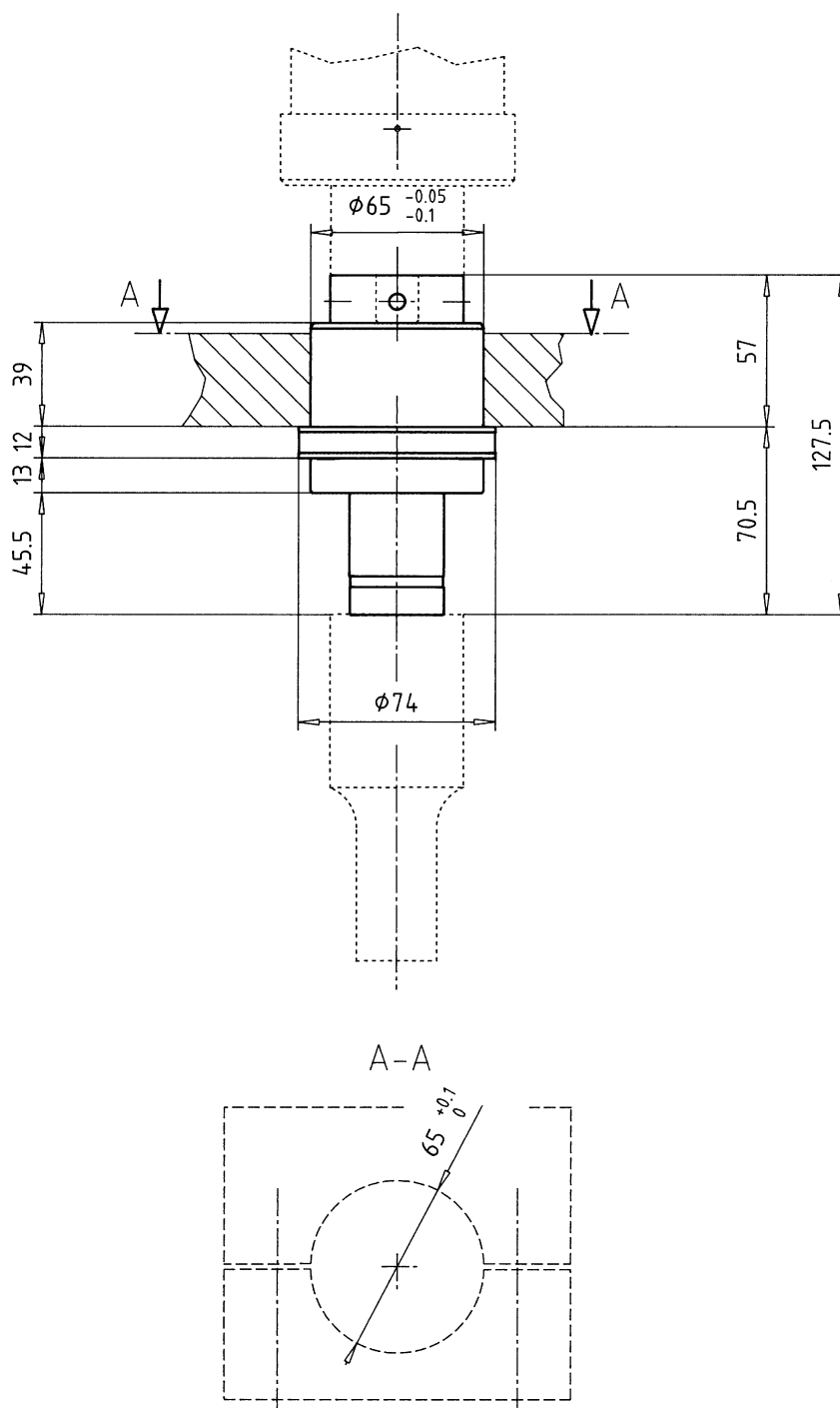
12.1 Diagram - converter C20-2 / 10 / 12

1

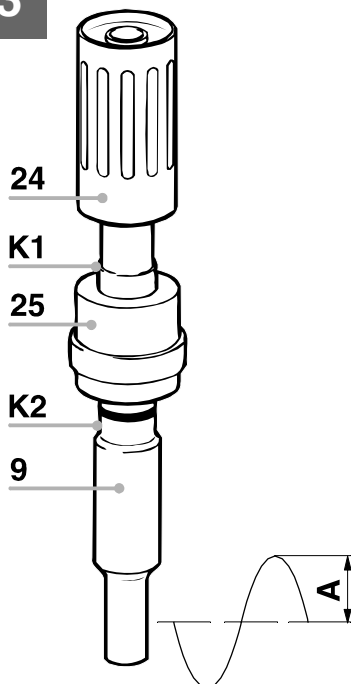


12.2 Diagram - booster 20 kHz

2



3



12.3 Amplitude values

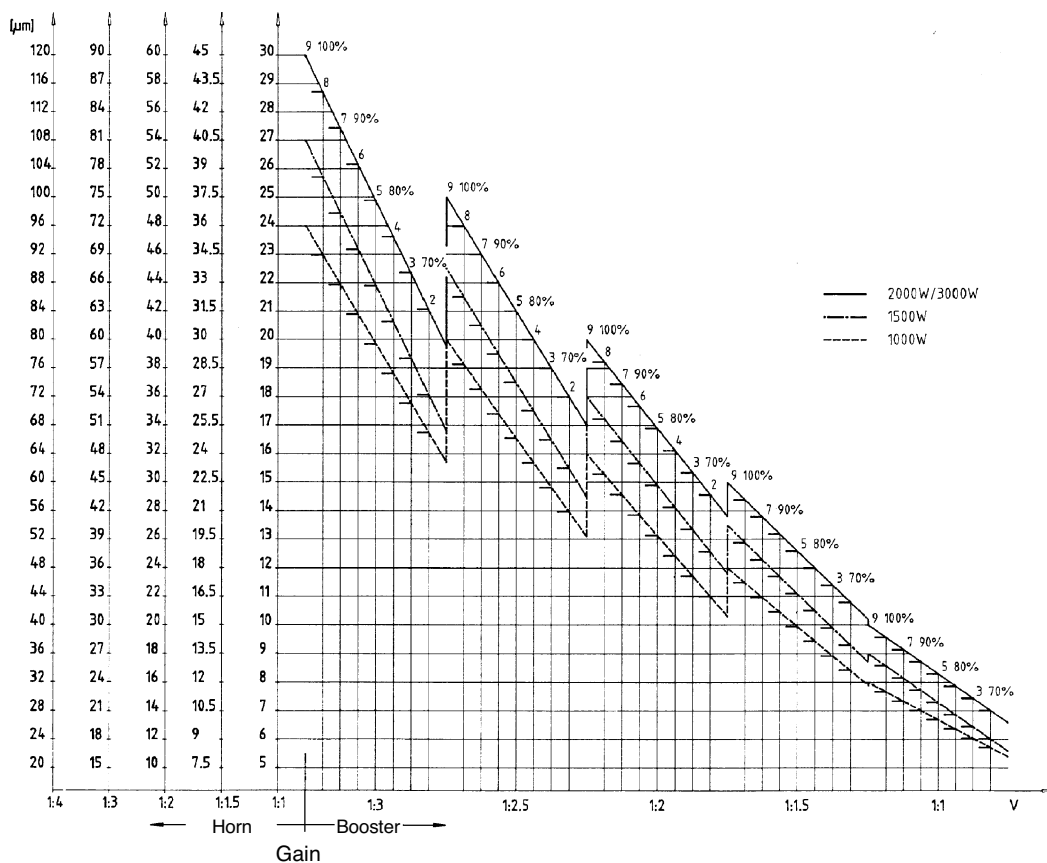
The different generator outputs result in different amplitudes. The amplitude value described in the following table refers to the respective generator/booster/horn configuration.

The effective welding amplitude can thus be read off directly.

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

12.4 Amplitudes of 20 kHz generators

4



5 12.5 Stud length of the vibration components; 20 kHz

24 Converter

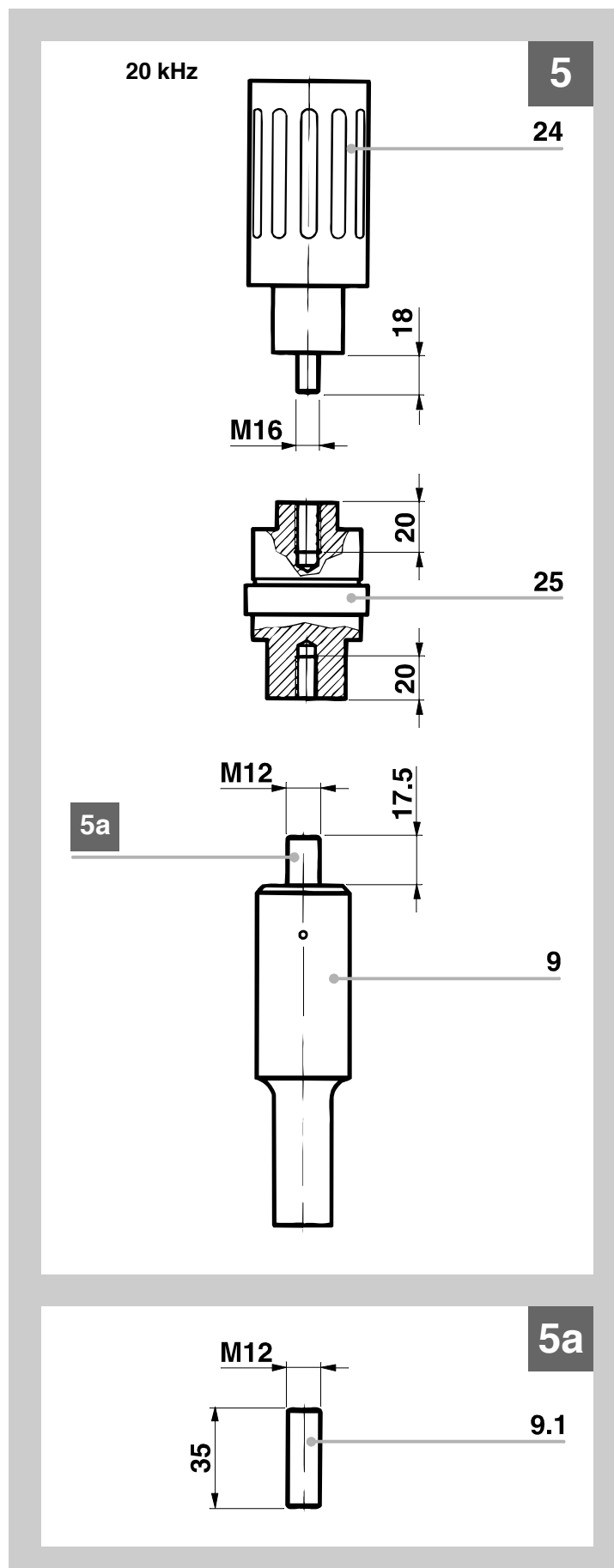


The converter stud is an integral component of the converter and cannot be detached!

25 Booster

The coupling faces are manufactured so as to be completely parallel and level.

9 Horn



5a

9.1 Horn stud

Horn stud made of high-strength steel or titanium.

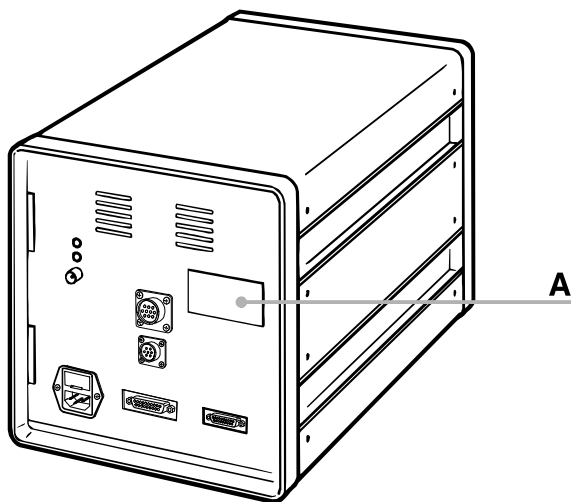
The horn stud is bonded in position in the factory.

Under certain circumstances, the stud may be detached.





1



13 Service center addresses

In the event of technical malfunctions or welding problems, the RINCO ULTRASONICS AG Aftersales 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
P O Box 1012, Mascot, NSW 1460
P O Box 15262, New Lynn, Auckland 0640
sales@techspanonline.com

Australia

☎ 1800 148 791
📠 1800 148 799

New Zealand

☎ ++64 9 827 6567
📠 ++64 9 827 6596