Operating Manual

Hand Welding Device
HG 35-3
with Generator SL35
Notes

Before unpacking and starting up the unit you should read and observe these operating instructions.
This machine may only be operated, serviced and repaired by persons who are familiar with these operating instructions as well as the current statutory provisions regarding health and safety at work and the prevention of accidents.

Details about this machine

Sticker Hand Device

Sticker Generator

Representative
# Table of Contents

1 Explanation of Symbols and Signs

2 Safety Notes
   2.1 General
   2.2 Use ‘as intended’
   2.3 Use other than ‘as intended’
   2.4 Important note
   2.5 Qualification of personnel
   2.6 Installing the unit
   2.7 Operation
   2.8 Noise emission
   2.9 Guarantee statement

3 Transport
   3.1 Receiving the delivery
   3.2 Transport damage
   3.3 Placing the unit

4 Product Information
   4.1 Product overview/technical data
      4.1.1 Hand welding gun
      4.1.2 Ultrasonic generator SL35
      4.1.3 Available generator modules
      4.1.4 Connection details
      4.1.5 Cooling (optional)

5 Operating and Display Elements
   5.1 Hand welding device
   5.2 Valve box (optional)
   5.3 Ultrasonic generator SL35

6 First Start-Up
   6.1 Selecting the location
   6.2 Installing and connecting the unit
   6.3 First welding

7 Retooling
   7.1 Basic setting of generator for hand-held units
   7.2 Changing sonotrodes
   7.3 Selecting the amplitude
   7.4 Amplitude values of the GM generator module series
   7.5 Amplitudes of 35 kHz SL generators

8 Cleaning and Servicing
   8.1 General servicing
   8.2 Hand welding gun
   8.3 Generator
   8.4 Oscillator system
   8.5 Screw cover

9 Internal Machine Service
   9.1 Fuses of generator SL35
   9.2 List of SL35 generator fuses
   9.2.1 230 volt / 200 volt fuses
   9.2.2 110 volt fuses

10 Error Messages and Troubleshooting
    10.1 Error messages and troubleshooting when switching on
    10.2 Error messages from the generator during operation

11 Service Addresses
Important!
When you make enquiries about your machine we ask you to state the exact type of designation and serial number of the unit. You will find these details on the type plate (A) on the back of the gun as well as on the inside cover of these operating instructions. The construction and electric installation of these machines are subject to continuous development and improvement and represent the latest state of technology.

RINCO ULTRASONICS AG
Romanshorn, Switzerland

Vorwort
We are pleased that you have decided to purchase a RINCO product. We are convinced that you will achieve maximum cost benefit and product quality when using this machine. This manual aims at providing the buyer and user with all necessary information for the handling, fitting, operation and maintenance of the unit. In order to ensure that the system is always ready for operation, it is necessary to follow the instructions and notes in this manual.
1 Explanation of Symbols and Signs

Please take special note of sections of text marked with the following symbols:

**Special information or notes for operation.**

**Symbol for danger of personal injury or damage to parts of the equipment.**
2 Safety Information

2.1 General
The construction of this unit represents the latest state of technology and is safe in operation. The individual components as well as the complete unit have been checked by our quality control department prior to delivery.

2.2 Intended purpose
This unit has been designed exclusively for welding and cutting of materials suited to this purpose. Any other use of the machine is considered ‘not as intended’. The manufacturer does not accept any liability for damage due to using the machine ‘not as intended’. The user is solely responsible for that risk. This machine is intended for industrial applications!

2.3 Not used as intended
- Operating the system with insufficient knowledge about operation, servicing and maintaining the system.
- Carrying out modifications, fitting extra items or converting the machine or the generator without the approval of RINCO ULTRASONICS, where these can impair the safety of operation.
- Making changes to the software of the control system!
- Using the machine with unsuitable materials.
- Opening the generator housing during operation.
- Accessing live parts of the installation while the machine is switched on.

2.4 Important note
Please read these operating instructions carefully before starting up the unit. The operating instructions should be kept within easy reach at the place where the machine is used!

2.5 Qualification of personnel
Only qualified and trained personnel may carry out work on the welding device. The organisation in charge of the unit needs to give clear directives as to the responsibility of the personnel for operating, tooling up, maintenance and repair! It is the responsibility of the organisation in charge to ensure that only authorised personnel carries out duties on the equipment. Any work to the electrical installation of the equipment may only be carried out by a qualified electrician in accordance with the regulations for electrical installations. Work on pneumatic devices may only be carried out by trained personnel with knowledge and experience in handling pneumatic equipment!

2.6 Installing the unit

Danger!
Do not carry out any connections to the equipment unless the mains cable has been disconnected!
The mains connection must have an earth connection in all cases!
Any statutory safety provisions specific to the country must be observed!
If these regulations are not observed, the manufacturer does not accept any liability for damage or personal injury!
Before the unit is started up, it is imperative that it is closed and brought into a safe condition.
Only use dry compressed air for operating the unit. To this end, it may be necessary to install an air treatment unit upstream in the air line.

2.7 Operation

Caution!
Never open the generator or the converter housing during operation.
Danger!
There is a high voltage installation within this unit – danger of injury!
• Do not undertake any work that is questionable from the safety point of view!
• Do not use the machine unless all protection devices and safety features, e.g. openable protective covers, soundproofing, are in place and functioning.
• Before switching the unit on it is important to ensure that nobody is at risk by the unit starting up.

If the machine is operated with competence and is handled with care during operation including all tools
• the machine’s readiness for service will be maintained,
• the service life of the machine will be increased and
• downtimes will be reduced to a minimum.

2.8 Noise emission

Caution!
Limit values: according to the current state of knowledge, ultrasound does not cause any damage if the maximum level remains under 140 dB and the linear average level for 8 hours per day is under 110 dB.

Care needs to be taken with the sub-harmonics, i.e. audible vibrations which vary considerably according to the application and can have strong nuisance and damaging effects. The relevant limit is the energy-equivalent continuous sound pressure level Leq related to a representative work period (min. 8 hours per day, max. 2000 hours per year) of 85-87 dB(A).

When welding special materials the noise level may exceed 70dB(A).
Countermeasures:
• Wear hearing protection
• Fit a soundproofing hood (optional)
(See SUVA information no. 86048 d 4.94)

For further measured data see ‘Report of Sound Measurements on RINCO Systems’ no. 920-3903/1.95

2.9 Guarantee statement
In connection with the supply of this unit, RINCO ULTRASONICS AG is entering a guarantee undertaking in accordance with VSM (VSM = Association of Swiss Machine Manufacturers). The following conditions must be met, amongst others, for RINCO ULTRASONICS AG to accept liability under this guarantee:
• The user must be familiar with the content of these operating instructions.
• The instructions and warnings contained in these operating instructions must be observed.
• It is not permitted to carry out conversions or modifications on parts of the unit, the oscillator system or the generator without expressed permission.

RINCO ULTRASONICS AG will be pleased to clarify any open questions via telephone or to carry out an instruction with our qualified staff.
3 Transport

It is imperative to observe the transport instructions on the packaging.

3.1 Receiving the delivery
The transport container for machines and equipment can withstand normal wear and tear resulting from road, rail and air transport. Upon receipt of the delivery you should check for completeness of all parts listed on the packing list and that there is no visible damage. If there is any damage you should immediately contact your transport company and retain the packaging as evidence.

3.2 Transport damage
Any damage that has been caused during transport is the responsibility of the haulier. In order to substantiate the claim, a complete report with an accurate description of the damage must be submitted to the haulier as a basis for the claim. Any damage to or loss of goods provided by ourselves is to be reported to us immediately, sending a copy of the above report as confirmation. If the delivery from RINCO ULTRASONICS AG was ‘free house’ or CIF, the damaged delivery will be replaced and the appropriate claim made under the relevant transport insurance provided the respective conditions are met.

3.3 Placing the unit
It is important to select a suitable place for the unit. In order to guarantee a long service life, the machine should be operated in a clean environment. It is important to ensure that the electronic components are kept free from vibrations.

The settings at the works are carried out at 20º C. The ambient temperature during operation may range from 10º to 50º C.
4 Product Information

4.1 Product overview/technical data

4.1.1 Hand welding device

HG35-3 without booster
1 Handgrip
2 Converter C35-11, amplification factor 1:1.5
3 Converter screw cover
4 Sonotrode
5 Air cooling tube for sonotrode (optional)
6 Support eyelet

Dimensions in mm
Weight 1.1 kg

HG35-3 with booster
7 Booster unit, amplification factor 1:1.5/1:2
8 Converter screw cover and booster support
Converter C35-10, amplification factor 1:1

Dimensions in mm
Weight 1.6 kg
4.1.2 Ultrasonic Generator SL35

1. Housing
2. Generator module
3. Type designation

Dimensions in mm
Weight: 7 kg

Unit can be supplied with modules of different ratings.

4.1.3 Available generator modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. output</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM 35-400</td>
<td>400 W</td>
</tr>
<tr>
<td>GM 35-600</td>
<td>600 W</td>
</tr>
</tbody>
</table>

4.1.4 Connection details

- 230 V 50-60 Hz
- Optional 200 V
  - 110 V (up to 600 W)
- Maximum power input 5 A

4.1.5 Cooling (optional)

In heavy duty applications it is necessary to provide cooling for the sonotrode and the converter. The cooling system illustrated can be fitted as an upgrade.

Valve box for precise handling of the cooling air
To be used with dry and filtered compressed air of max. 7 bar or 105 psi.
5 Operating and Display Elements

5.1 Hand welding device

1 Start button
Button to activate the ultrasonics.
Do not touch the sonotrode when activated!

2 Converter screw cover

3 Sonotrode

⚠️
Important: Do not modify mechanically the calibrated sonotrodes. This can lead to subsequent damage to the oscillator system and generator!

5.2 Valve box (optional)

⚠️
The temperature at the converter and sonotrode must not exceed 50°C during operation. If higher temperatures occur, compressed air cooling needs to be fitted.

18 Pressure controller
The pressure controller of the system is used for adjusting the air pressure. To adjust to the required setting, pull the adjuster knob out, turn to the required setting and push back in to fix the setting.
Maximum pressure: 7 bar.

19 Pressure gauge
The pressure gauge indicates the maximum welding pressure set.

20 Cooling air controller for converter
This controller can be used to adjust the quantity of cooling air to the converter. The cooling air flowing out of the converter can be guided to the sonotrode via a tube designed for this purpose. The second air controller is for units with separate cooling air systems.

21 Compressed air supply
Use dry, filtered compressed air of max. 7 bar or 105 psi.
5.3 Ultrasonic Generator SL35

26 Handle for generator module
This handle is used to withdraw the generator module when required. The fixing screws (34) for opening the generator module are located above and below the bar of the handle.

Never attempt to withdraw or insert the generator module while it is connected to the mains network! (High voltage)! Do not touch the printed circuit board – the capacitors carry high voltage!

27 LED bars
This display indicates the output provided during the welding process.
With no load on the sonotrode (free oscillation in the air), the display should not indicate more than 25%. If the 100% mark is exceeded, an error message appears.
After the welding process, a flashing LED indicates the maximum output (peak).

28 2-line LCD display
The LCD display indicates:
• welding parameters
• error messages and
• operational modes

29 Keyboard
These keys can be used to
• activate the generator functions;
• change welding parameters;
a change the programme/welding operation;
b move to next programme line;
c move to previous programme line;
d move number selection to the right;
e move number selection to the left;
f reduce numeric value;
g increase numeric value;
h set value to zero.
30 ‘US-TEST’ key
Key for activating the ultrasonic test. The display will indicate the current sonotrode frequency. If the key is activated for more than 5 seconds, an error message appears. Do not touch the sonotrode!

31 LED
- ‘US-ON’ ultrasound active
- ‘VALVE’ solenoid valve active
- ‘ERROR’ error output active

32 ‘ON/OFF’ key

33 ‘POWER’ LED
Indicates power on or off

34 Fixing screws
During operation the fixing screws must be fitted properly!
6 First Start-Up

6.1 Selecting the location
Select the location for the unit in accordance with the following criteria:
• clean environment
• support for electronic equipment to be free from vibrations
• ambient temperature during operation:
  10º C – 50º C, for settings: 20ºC

6.2 Installing and connecting the unit
Before the unit is ready for operation the following steps must be carried out:
1. Make the cable connection between the hand welding device and the generator.

⚠️ The mains connection must be earthed!

2. Push the plugs into the sockets on the generator:
   1. STO1 not used for hand guns
   2. STO2 start
   3. STO3 not used for hand guns
   4. STO4 converter connection
   5. STO5 mains connection

3. Welding tool (sonotrode)
With a newly supplied unit the sonotrode is normally fitted at the works. If this is not the case, please observe the fitting instructions in chapter 7, ‘Retooling’.

6.3 First welding
Normally, the generator has been preset at the works for the respective welding unit. However, if any adjustments are necessary, please refer to chapter 7, ‘Retooling’.
7 Retooling

7.1 Basic setting of generator for hand-held units

While starting up (the LED bar starts building up) keep the ‘SET UP’ key depressed in order to open the code dialogue box. Use the curser keys d to g to enter the code 472 and then press again the SET UP key.

A dialogue box for initialisation will appear; enter the following settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Automatic</td>
</tr>
<tr>
<td>Trigger</td>
<td>Off</td>
</tr>
<tr>
<td>Welding</td>
<td>External / timer*)</td>
</tr>
<tr>
<td>Valve</td>
<td>Off</td>
</tr>
<tr>
<td>Afterpulse</td>
<td>Off</td>
</tr>
<tr>
<td>Soft start</td>
<td>7</td>
</tr>
<tr>
<td>Amplitude</td>
<td>Internal</td>
</tr>
<tr>
<td>SDF</td>
<td>Off</td>
</tr>
<tr>
<td>Output limit</td>
<td>Off</td>
</tr>
</tbody>
</table>

*) Timer: for continuously adjustable welding time

Important: It is imperative that the mains switch on the generator has been switched off before unplugging the HF cable!

7.2 Changing sonotrodes

1. Detach the sonotrode (A) from the converter (3) using fork spanners (G).

Never use a vice or similar clamping device for holding either of those two parts!

2. Before fitting the sonotrode, clean the contact surface K1 with a clean rag. If one of the two surfaces is scored, please contact your RINCO service centre. Screw on the new oscillator system and tighten.

The sonotrode must be tightened with a torque of 15 – 25 Nm.
7.3 Selecting the amplitude
If required, the amplitude A (half of the oscillation width) can be changed by pressing ‘SET UP’ and cursor ‘vertical’.

7.4 Amplitude values of the GM generator module series
The different generator outputs result in different amplitudes. The amplitude value listed in the table below refers to the respective generator/booster/horn configuration.

For the HG35-3 without booster one can read the amplitude in the range ‘Booster 1:1.5’ due to the direct amplification of the converter.

The amplitude will be displayed as a number 1 to 9; the corresponding value in [µm] can be found in the diagram below.

![Amplitude diagram]

Never go directly to the maximum setting of number 9. This could lead to the destruction of the horn.

7.5 Amplitudes of 35 kHz SL generators

![Amplitude graph]
8 Cleaning and Servicing

8.1 General servicing

⚠️ Only trained personnel may carry out cleaning and maintenance tasks.

Before carrying out any servicing it is imperative to ensure that all sources of energy, such as the power supply, are disconnected.

Important: Never use any caustic cleansers to clean the keyboard or foil of the generator.

8.2 Hand welding device

The hand welding gun does not require any specific servicing. However regular cleaning of
  • the converter (3),
  • the sonotrode (4),
ensure a long and trouble-free operation of the ultrasonic system.

8.3 Generator

The generator does not require servicing.
8.4 Oscillator system

⚠️

Do not carry out any work on the oscillation system and converter housing unless the mains power has been switched off! High voltage!

Avoid any contact with the HF connection of the converter.

Do not connect any measuring instruments to the HF connection of the converter!

The converter will retain an electric charge even after the generator has been switched off.

8.5 Screw cover

After the sonotrode has been in operation for some time, it should be disconnected and checked for soiling, following the instructions in chapter 7 ‘Retooling’.

Torque: 15 – 25 Nm

Black patches on the contact surface K1 can be cleaned as follows:

1. Use oil-free cleansing agent and wool rag or paper.
2. If the surface is scored or otherwise uneven, please inform your service centre.
9 Internal Machine Service

9.1 Fuses of generator SL35
The following components are fitted with fuses:

Mains socket

Bus print

Generator module

Dimensions of all fuses: 5 x 20 mm.

9.2 List of fuses for generator SL35

9.2.1 230 volt / 200 volt fuses

<table>
<thead>
<tr>
<th>Generator</th>
<th>Mains socket</th>
<th>Generator module</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
<td>F2</td>
</tr>
<tr>
<td>GM35-400</td>
<td>4A/T</td>
<td>4A/T</td>
</tr>
<tr>
<td>GM35-600</td>
<td>4A/T</td>
<td>4A/T</td>
</tr>
</tbody>
</table>

9.2.2 110 volt fuses

<table>
<thead>
<tr>
<th>Generator</th>
<th>Mains socket</th>
<th>Generator module</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
<td>F2</td>
</tr>
<tr>
<td>GM35-400</td>
<td>8A/T</td>
<td>8A/T</td>
</tr>
<tr>
<td>GM35-600</td>
<td>8A/T</td>
<td>8A/T</td>
</tr>
</tbody>
</table>
10 Error Messages and Troubleshooting

Any faults may only be attended to by qualified personnel with the appropriate training.
In case of doubt, contact the service centre or the manufacturer directly (see appendix).

10.1 Error messages and troubleshooting when switching on

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
<th>Troubleshooting</th>
</tr>
</thead>
</table>
| Generator does not switch on | - No voltage supply  
- Control cable HG to generator (STO2) not plugged in  
- Fuse defective  
- Module not in housing | - Insert plug  
- Check fuses F1 to F5  
- Insert module and screw home |
| After switching-on the displays indicates: FREQUENCY ERROR | - Oscillation system not inserted  
- HF cable not connected at oscillation system or generator | - Insert oscillation system  
- Connect HF cable |
| | - Oscillation system faulty:  
  a) not screwed home tightly  
  b) sonotrode defective or out of frequency  
  c) booster defective  
  d) converter defective | - Screw home tightly  
- Replace sonotrode  
- Replace booster  
- Replace converter |
### 10.2 Error messages from the generator during operation

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;OVERLOAD 1&quot;</td>
<td>- Contact pressure too high</td>
</tr>
<tr>
<td>The generator was overloaded to over 100% of the nominal output.</td>
<td>- Generator output not high enough for required duty</td>
</tr>
<tr>
<td></td>
<td>- Oscillation system defective</td>
</tr>
<tr>
<td>&quot;OVERLOAD 2&quot;</td>
<td>- Amplitude too low</td>
</tr>
<tr>
<td>The generator had to use the reserves of the end stage to the maximum.</td>
<td>- Mains voltage below nominal tolerance</td>
</tr>
<tr>
<td>&quot;FREQUENCY&quot;</td>
<td>- Sonotrode defective or needs adjusting</td>
</tr>
<tr>
<td>The oscillation system is outside the frequency range of the generator.</td>
<td>- Booster defective</td>
</tr>
<tr>
<td></td>
<td>- Converter defective</td>
</tr>
<tr>
<td></td>
<td>- HF cable not plugged in or defective</td>
</tr>
<tr>
<td></td>
<td>- Generator defective</td>
</tr>
<tr>
<td></td>
<td>- Change frequency by connecting to the take up</td>
</tr>
<tr>
<td>&quot;TIME OUT&quot;</td>
<td>- The US-TEST key was pressed for longer than 5 seconds</td>
</tr>
<tr>
<td>The set operating time has been exceeded.</td>
<td>- In an application with contact switching the control time was exceeded.</td>
</tr>
<tr>
<td>&quot;HARDWARE 1&quot;</td>
<td>- Generator defective</td>
</tr>
<tr>
<td></td>
<td>- Trigger defective</td>
</tr>
</tbody>
</table>

Confirm errors by pressing the CLR key.

The errors Hardware 1 und Hardware 2 can only be confirmed by switching the machine off.
11 Service Addresses

If you experience problems with welding or technical faults with the equipment, please contact the Technical Customer Service of RINCO ULTRASONICS AG, who will be pleased to help you. For an efficient response our Customer Service requires the following information:

- A precise description of the technical fault or welding problem.

Our address:
RINCO ULTRASONICS AG
Industriestrasse 4
CH-8590 Romanshorn
Switzerland

National calls
Tel. 071 466 41 00
Fax 071 466 41 01

International calls
Tel. ++41 71 466 41 00
Fax ++41 71 466 41 01
www.rincoultrasonics.com
info@rincoultrasonics.com