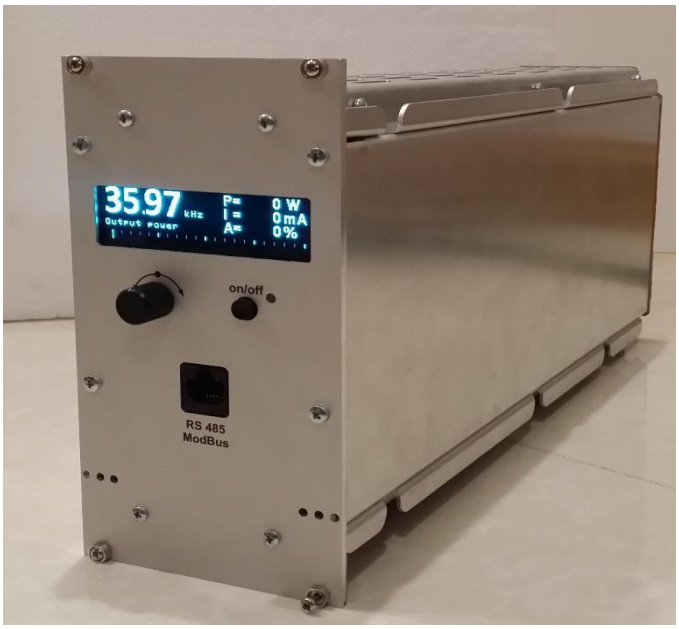
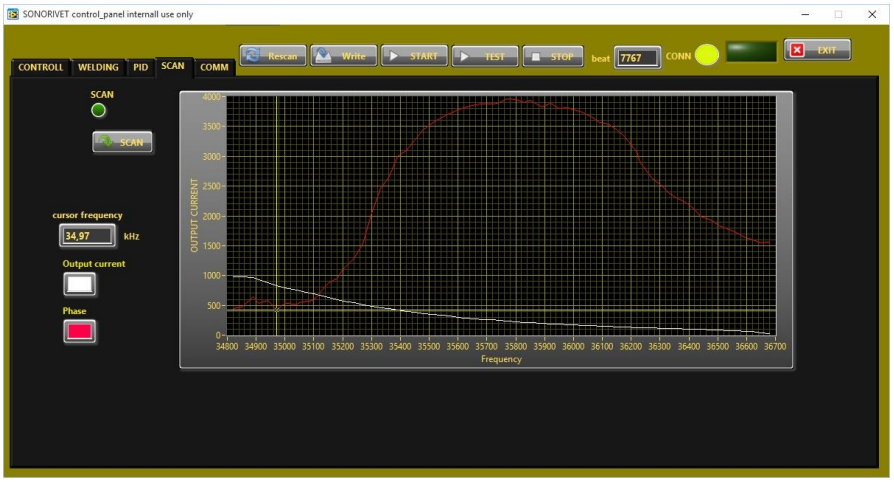
SONOWELD GENERATOR

ULTRASONIC GENERATOR – Manual





CONTENTS

INTRODUCTION

Dear Customer,
Thank you for your purchase of the product.
This ultrasonic SONOWELD-generator has been developed using the latest technologies to allow for greater overall performance and stability.

Please read and follow these operating instructions carefully before installing or commissioning your product. As with any electrically powered device, failure to observe these instructions can present a risk to life.

The device may only be operated and maintained by personnel who have read and understood
this operating manual and are familiar with the applicable legal regulations for accident prevention and workplace safety. Failure to comply with this will result in a loss of warranty rights.

General information

This ultrasonic generator is a device which is used for ultrasonic plastic- and metal-welding applications as well as for different special applications such as: Sieving, atomizing, etc.

The main features are:

- Autotuning circuit to tune automatically to the resonant frequency of the connected horn.
- Fully digital frequency generation.
- High speed microcontroller to control all functions of the generator.
- LCD-display with rotary encoder
- Modbus on all generators
- Constant / adjustable amplitude 0 – 100 %
- Protected against : Short circuit
  Overtemperature
  Overload

SAFETY INSTRUCTIONS

Symbols in manual:

	Immediate imminent danger – health and live (bad injuries or dead)
	hot surface. Do not Touch!
	Possible damage, without danger for people
	Electrical voltage!

Before starting up your device, please read through the following instructions carefully, both for your own safety and for the safety of the device.

Keep this manual where it can be readily accessed by all systems users.

- **Installation is to be carried out by qualified technical personnel only!**
- This ultrasonic generator is to be operated by properly trained personnel only!
- Due to the way it operates, additional safety measures must be taken if the device is to be used in areas posing an explosion risk.
- The electromagnetic compatibility corresponds to the standards and regulations listed in the specifications.
- All necessary settings were either made in the factory or are described in this handbook.

However, should problems occur on start-up, please do not make any prohibited adjustments to the device, as this would endanger your warranty rights. If in doubt, please contact our technical service staff.

- Please contact our technical service if at all in doubt. Please see the last page.
- Inspection or diagnostic work inside the device may only be carried out to the extent described and, as with the electrical connection should only be performed by skilled personnel. When performing such work, the ultrasonic generator must be completely disconnected from the main power source. (unplug the mains connection).
- The device must always be disconnected from the mains before cleaning or when installing/uninstalling an option. Do not use liquid cleaners or sprays. Only use a damp cloth.

- Inputs or outputs that are used for controlling or monitoring purposes should be twisted and shielded.
- The device must not be in close proximity to electrically charged components or cables.
- The shielding should be connected to the generator‘s earth on one side of the generator.

Attention: All connections for the signal or control lines are galvanically connected to the generator.

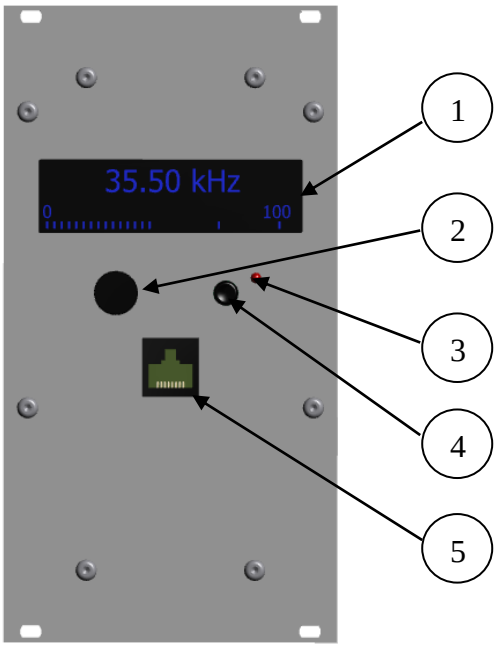
- Always observe any warnings or instructions provided on the device itself.
- The platform for the device must be sufficiently stable, as the device being jolted or falling could cause severe damage.
- Ensure that the power supply specifications given on the device are met.
- Only those transducers which have the correct frequency, power output and dimensions may be used with this generator.
- HF cables from the generator to the transducer as well as mains cables to the generator may not be rolled up if they are too long. Instead, they must be shortened to the required length due to the risk of overheating.
- With the exception of the permitted tasks listed in the handbook, you should never attempt to repair or modify the device yourself.

In the following cases you should disconnect the device from the mains and contact a qualified service engineer:

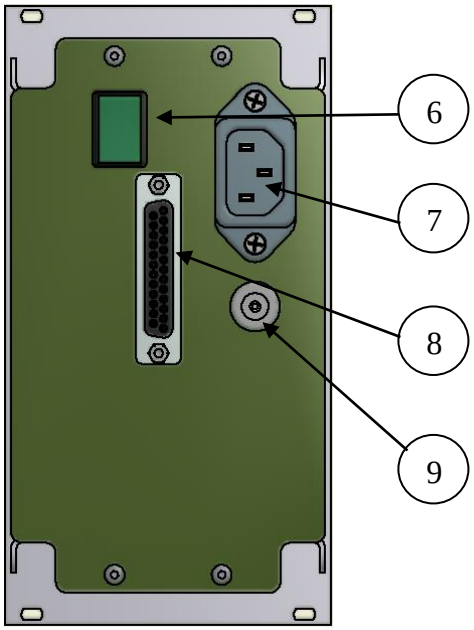
· If the mains cable or plug is damaged
· If liquid has penetrated into the device
· If the device has fallen over or the housing is damaged
· If the device displays noticeably different behaviour than standard operation

Repairs and modifications may only be carried out by competent, skilled personnel

GENERAL VIEW



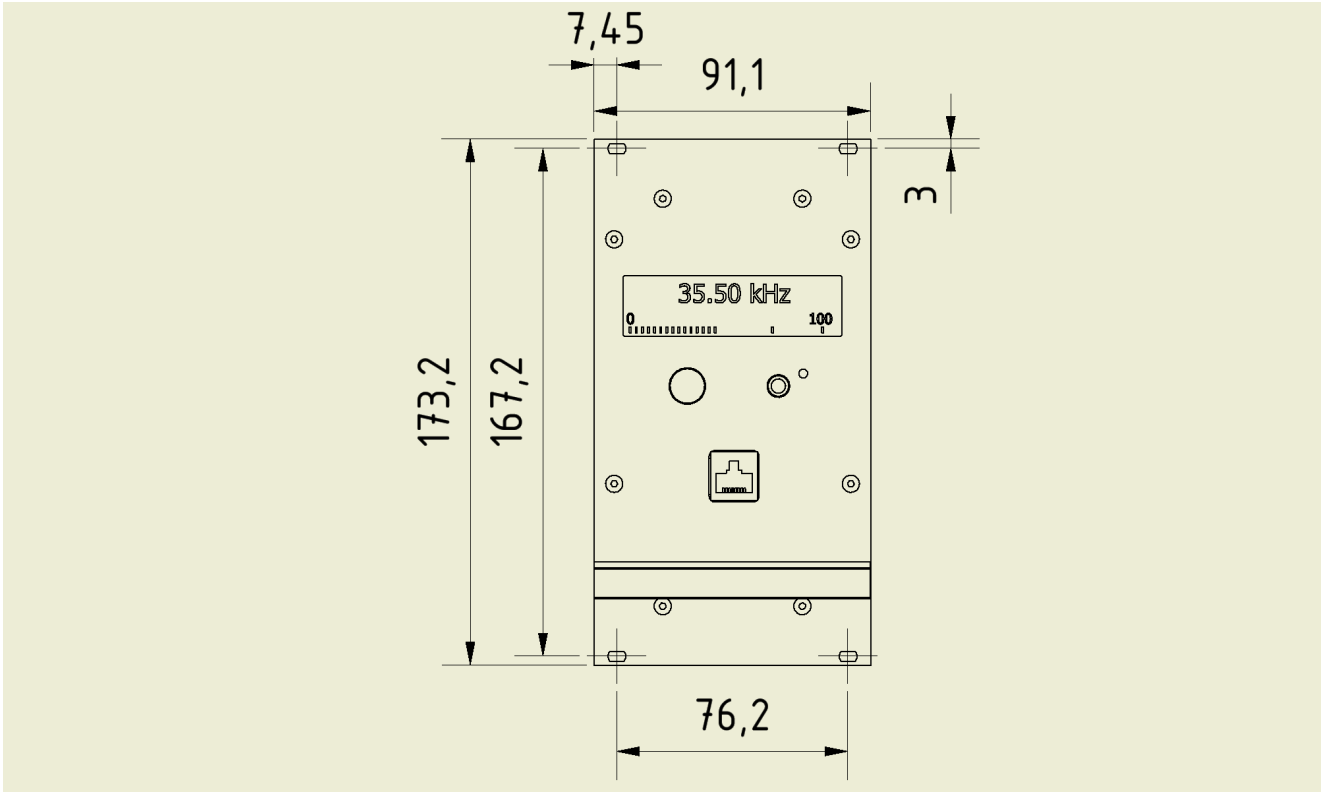
Front view

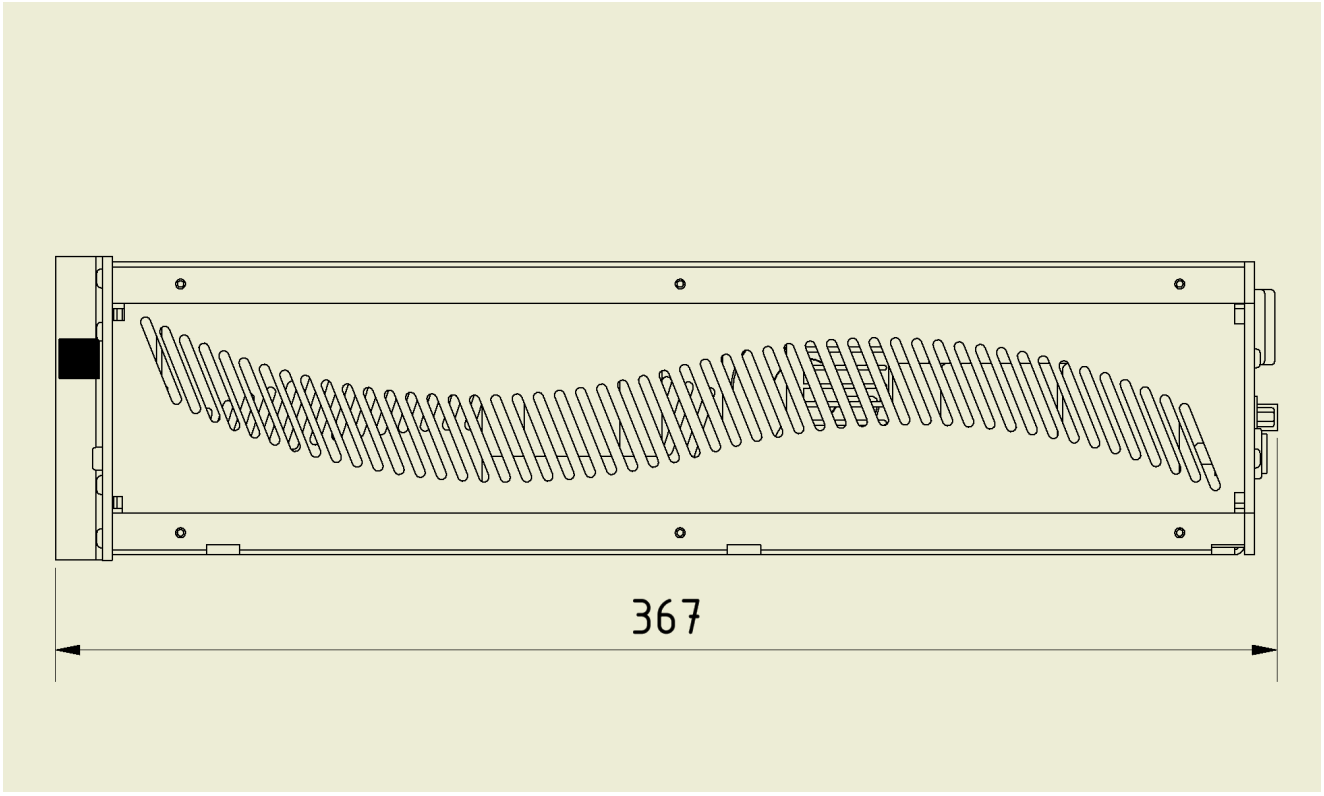


Back view

1	**Display high resolution – 72x20mm**
2	**Knob encoder**
3	**Bi color LED**
4	**Command for US ON**
5	**RJ45 connector**
6	**Main Switch ON/OFF**
7	**Power socket 210-250V**
8	**25-POLE DSUB I/O SOCKET**
9	**HF Lemo Plug**

DIMENSIONS





INSTALLATION & ENVIRONMENT

Choose a suitable location that will protect the device from moisture, water, excessive sunlight and heat. The selected location for the device should be in an area where ambient temperatures do not exceed 40°C.

If the generator cannot dissipate the heat sufficiently, it will display an error message due to excess temperature (see also the “OVER TEMPERATURE” error description).

ATTENTION:

- **Choose a location that will prevent steam or any other aggressive vapours from penetrating the device.** Ambient temperatures of over 30°C should be avoided.
- **Over a period of time, chemically contaminated ambient air can lead to the device being irreparably damaged.**

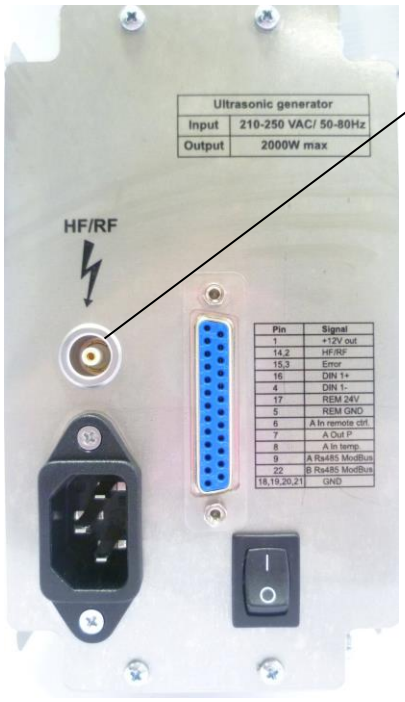
Power supply

The ultrasonic generator draws its power (210-250VAC/50-80Hz) via the connection cable with **Power socket.**

It has an internal main fuse (10 AF).
If you need to change the fuses, unscrew the cover of the housing.

- **For safety reasons, always disconnect the unit from the mains before changing fuses.**
- **Plug racks into earthed sockets only.**
- **Always replace blown fuses with new fuses of the same type.**
- **This should only be performed by qualified, skilled personnel.**
- **Only use cables with sufficient cross-section.**
- **Minimum cross-section: 1.5 mm2.**

HF connector

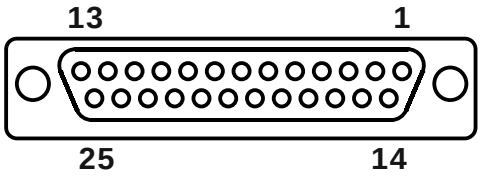


HF OUTPUT

HF connector is Lemo connector

- **Output voltage could be between 600V and 1200V AC.**
- **Only use cables specified by the manufacturer.**
- **Use only shielded transducer connection cables.**

25-pin DSUB I/O socket



Pin Number	Signal	Direction	Signal level	Description
1	+12V	Output	+12Vdc	Supply voltage for external use 100mA max
14,2	HF/RF	I/O	Up to 24Vdc	Input and output Relay HF-DA. Contact is closed Contact is closed depending of selected mode. See chapter HF_DA Relay mode. (seeFig.3)
15,3	Error	I/O	Up to 24Vdc	Input and output Relay Error. Contact is closed up on error. (seeFig.3)
16	DIN_1+	Input	Up to 24Vdc	Digital input for external STOP (seeFig.2)
4	DIN_1-	Output	Up to 24Vdc	Digital input for external STOP (seeFig.2)
17	REM 24V	Input	Up to 24Vdc	Remote input (active high). Reference is “REM GND” (see Fig.2)
5	REM GND	Output	Up to 24Vdc	Remote input ”REM GND” (see Fig.2)
6	Analog input remote control	Input	0-10V	Input for amplitude control. 2.5V=50% Output power. 5V=100% Output Power. Reference is GND.
7	Analog output power	Output	0-10V	Voltage corresponding to the current output power 0- 100%. Reference is GND.
8	Analog input temperature	Input		Voltage corresponding to the transducer temperature. Reference is GND. 0V=0°C; 10V=100°C
9	A RS485 ModBus	I/O		A signal RS485 ModBus Protocol
22	B RS485 ModBus	I/O		B signal RS485 ModBus Protocol
18,19,20,21	GND	Output		Internal GND

Fig.2

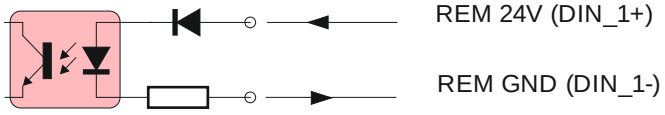
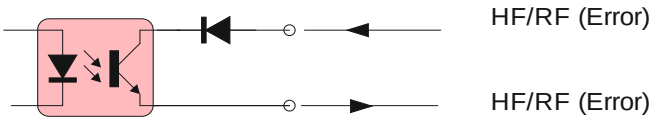


Fig.3



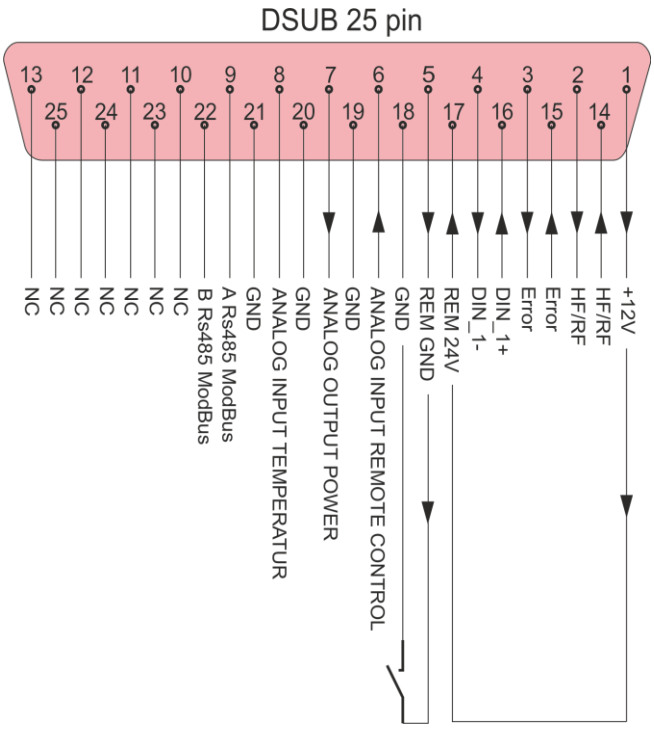
Wiring for start

There are 2 ways to start the Ultrasonics on the generator :

- by a signal 12-24V
- by using the GND

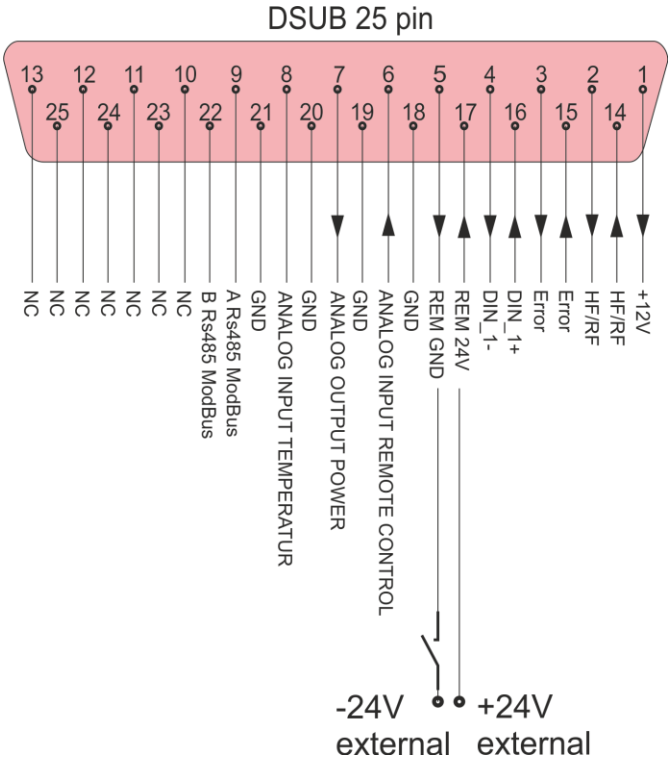
using a signal 12 V

The generator has internal supply of +12V on pin 1.

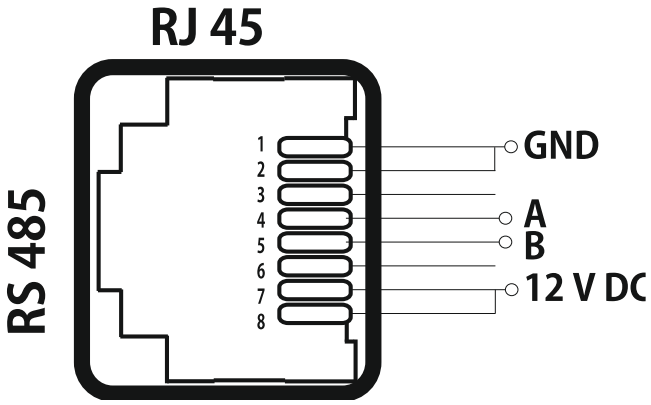


Using an external +24V

If user wants to use +24V, it must use an external supply.

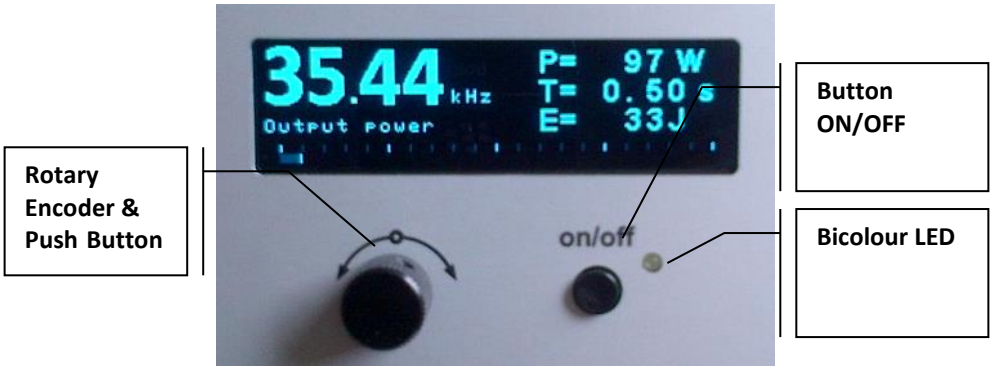


Interface socket RS485 ModBus - RJ 45 CONNECTOR:



PINS	DESCRIPTION
1	GND
2	GND
3	N/C
4	A
5	B
6	N/C
7	Output 12 V DC(max 100mA)
8	Output 12 V DC(max 100mA)

Operator elements and display on the front panel



Bicolour LED: Lights up green when generator is switched on and works properly
Lights up red in the event of an error

ON/OFF button: The functionality of the button could be selected from System window (6) or in LabView software PROPERTIES tab.

Rotary Encoder & Push Button

Multifunction button:

1. By pressing the encoder you can move the cursor and select parameters on the current window;
2. By rotating you can change the value of the current parameter.
3. By press + hold for 2 seconds, you will WRITE TO MEMORY all present settings of the generator.
4. Fast double pressing returns to the main starting window.

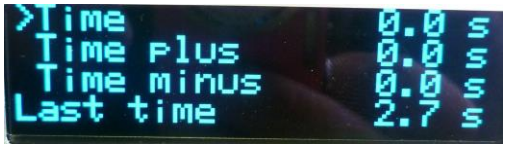
Main starting window

After the generator is powered on, the initial screen contains the following status information.
Freq – Actual frequency of the generator.
P = Power – Actual consumed power (in Watts)
I = Current – Output current through the transducer (in mA)
A = Actual Amplitude(100% = 1000V).
Dynamic bar shows the Output Power Value.

Power window

Power – setting for maximal power (in W)
Amplitude – setting for maximal amplitude (in % where 100% = 1000V)
Frequency – setting for starting frequency (in kHz)
P – Actual Output Power Value (in Watts)
I – Actual Output current through the transducer (in mA)

Time window



These are welding regime settings. Welding by time:
Time – time when the generator is on (in seconds)
Time plus – shows the maximum duration of the control signal (in seconds)
Time minus – minimum duration of the control signal (in seconds)
*Note: If entered a control signal from external control unit (PLC) out of limits **Time Plus** and **Time minus**, the bicolour LED will light in red and an error message **Limit Time** will be displayed.*
Last time - duration of the last working cycle (in seconds)

Energy window

These are welding regime settings. Welding by energy:
Energy – setting of nominal energy during the welding process (in Ws). If the setting is different from 0 and the generator reaches the set value the Welding Time(see page 23-24) automatically stops.
Energy plus – maximum allowed energy reached during the welding process.(in Ws)
Energy minus – minimum allowed energy reached during the welding process (in Ws)

*Note: If the energy during the welding process is out of limits **Energy Plus** and **Energy Minus**, the bicolour LED will light in red and an error message **Limit Energy** will be displayed.*

Last Energy – energy of the last working cycle (in Ws)

Peak power window

These are welding regime settings. Welding by peak power:
Peak Power – setting of the peak power (in W). If the setting is different from 0 and the generator reaches the set value of the peak power, the Welding Time(see page 23-24) automatically stops.
Peak plus – maximum allowed peak power reached during the welding process (in W)
Peak minus– minimum allowed peak power reached during the welding process (in W)

*Note: If the Peak Power during the welding process is out of limits **Peak Plus** and **Peak minus**, the bicolour LED will light in red and an error message **Limit Peak Power** will be displayed.*

Last pk Power – peak power of the last working process (in W)

Delay, Hold and Afterbirst window

Delay – after the start signal, the generator delays starting with the set value of the delay (in seconds) (see page 23-24)
Hold – the generator delays with the set hold value before executing Afterburst (in seconds) (see page 23-24)
Afterburst – setting the value of afterburst (in seconds)
Last time - time for the last working process (in seconds)

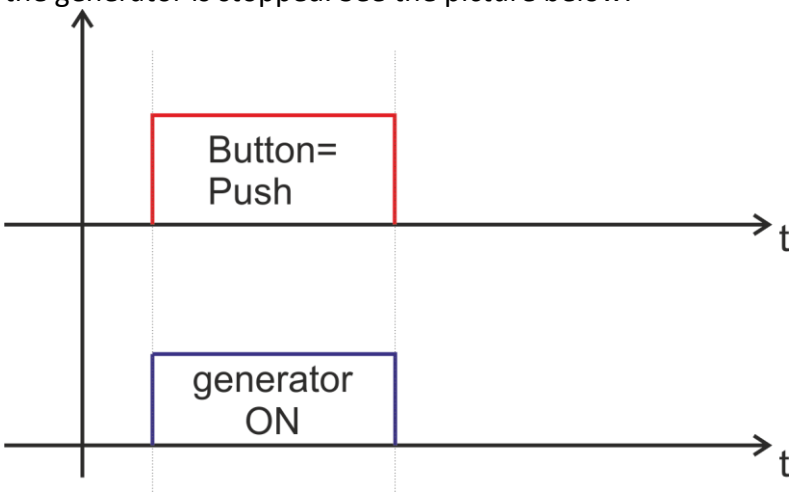
System window

Modbus Address – shows the address of the generator in the Modbus network. The default Modbus Address is 6.
Speed – communication speed
Ext temp – the value of the external temperature, in °C, depending of the signal on pin 8, where 0 to 10Volts= 0 to 100 °C.
The generator could generate error signal, when the temperature is over the set limit.
The limit for the Ext temp is set in Labview software in CONTROLL Tab

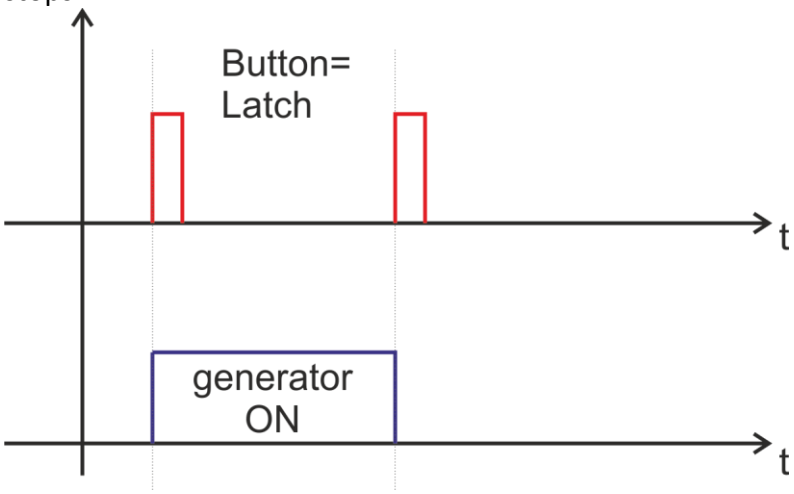
Button – setting the functionality of the button

There are 4 options:
OFF – the button is off.

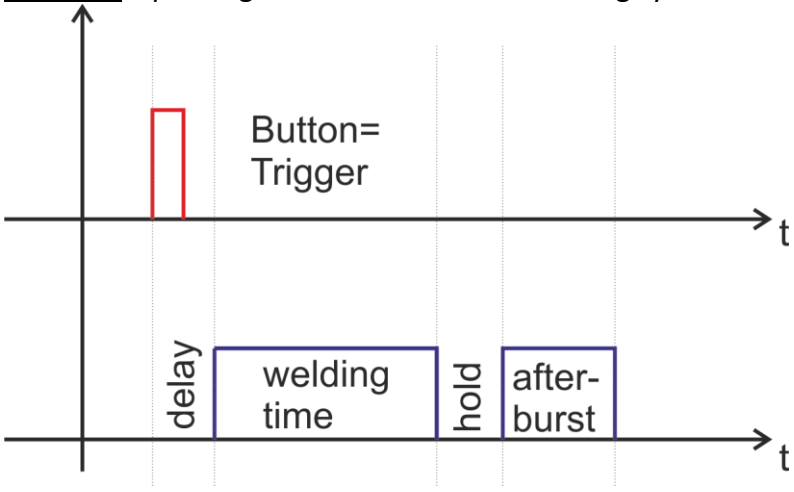
PUSH – the button works as a test button – while pushed the generator is on, while released the generator is stopped. See the picture below:



LATCH- pushing the button once the generator starts, pushing the button again the generator stops.



TRIGGER – pushing the button once the welding cycle starts.



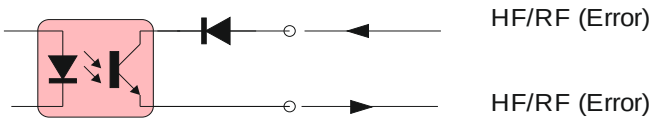
If time, power or energy parameters are settled, Trigger mode must be selected.

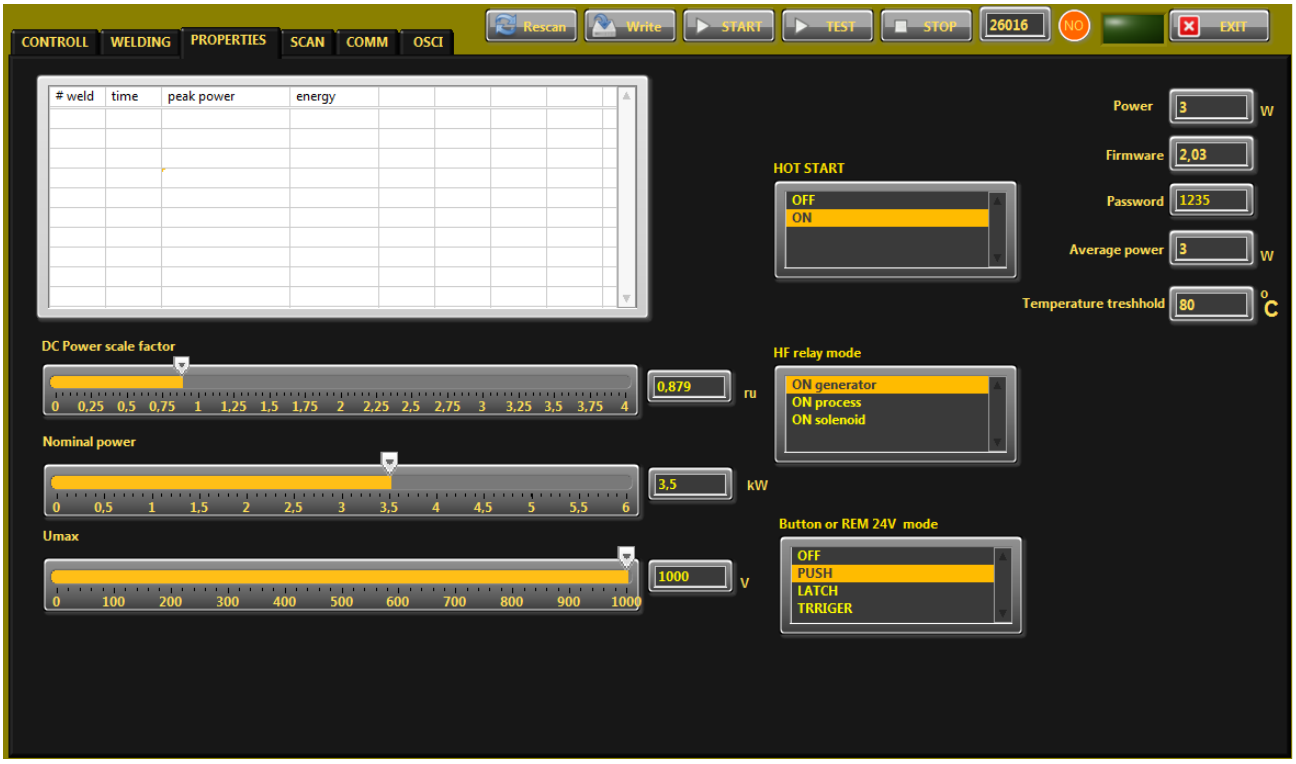
Firmware – is the software version

Write to memory window

This window appears when you PRESS AND HOLD the Rotary Encoder for 2 sec.

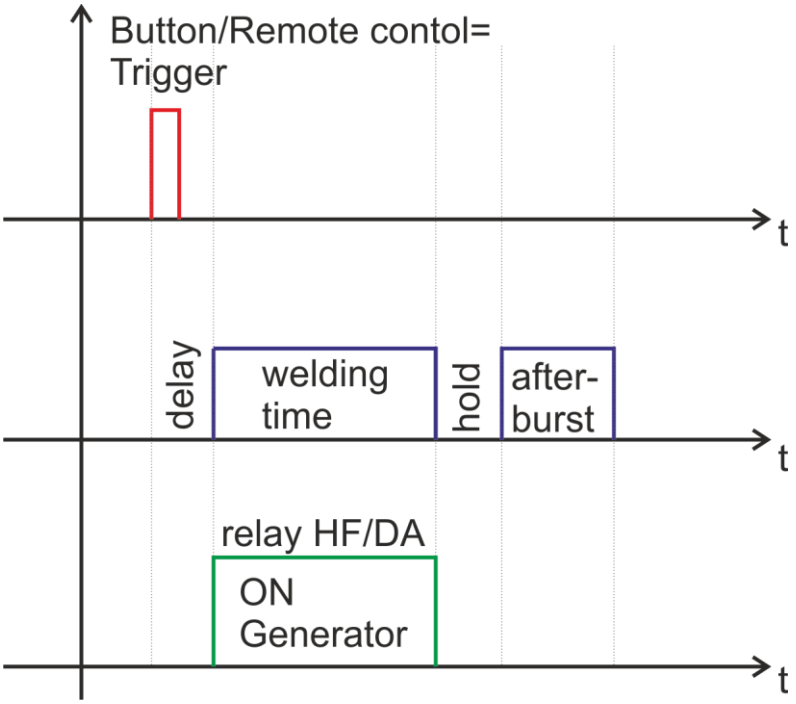
HF-DA RELAY MODE



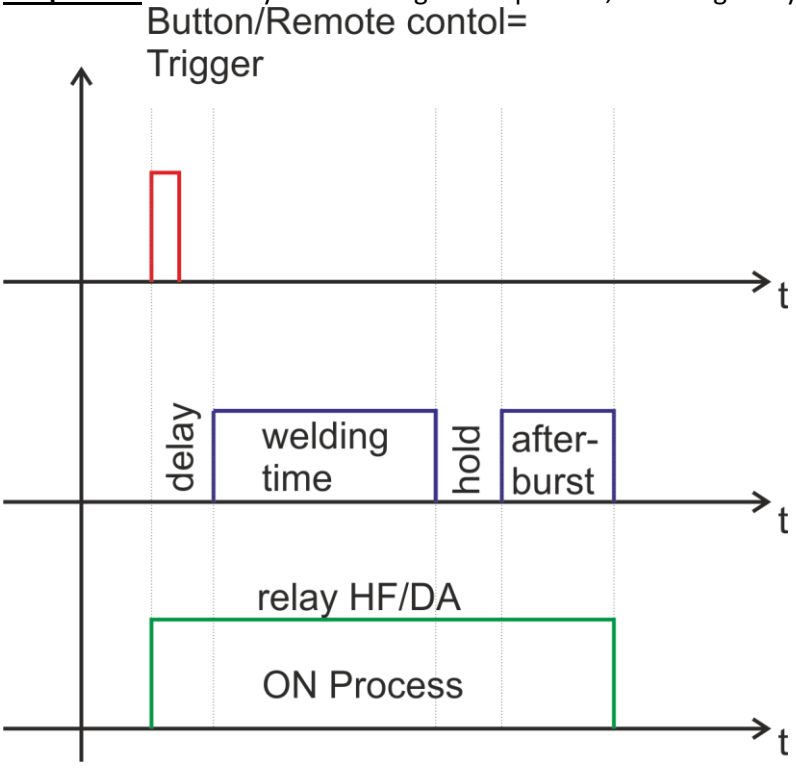


In PROPERTIES Tab you can select the HF Relay Mode(see right bottom corner) from three options:

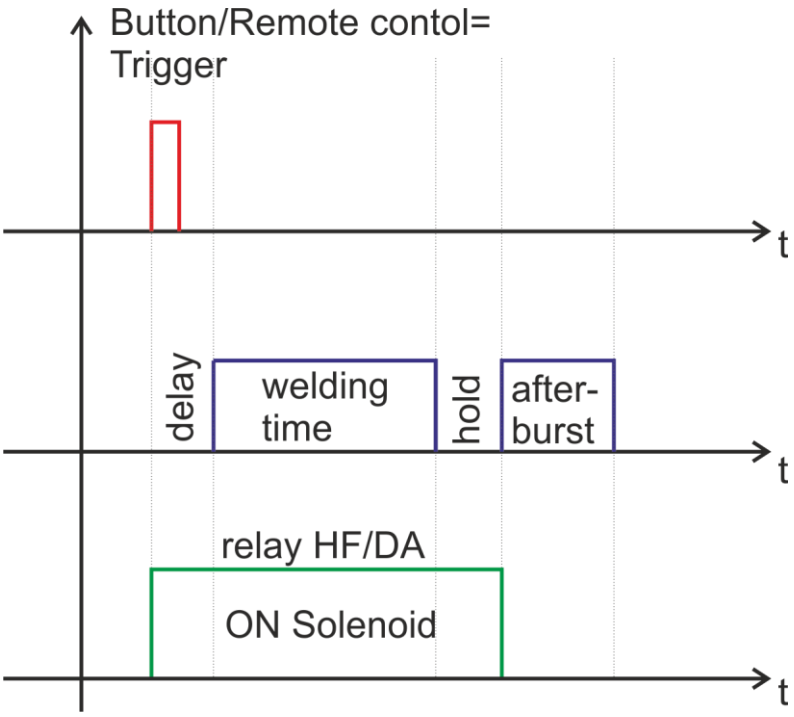
ON generator – the relay is ON only during welding time.

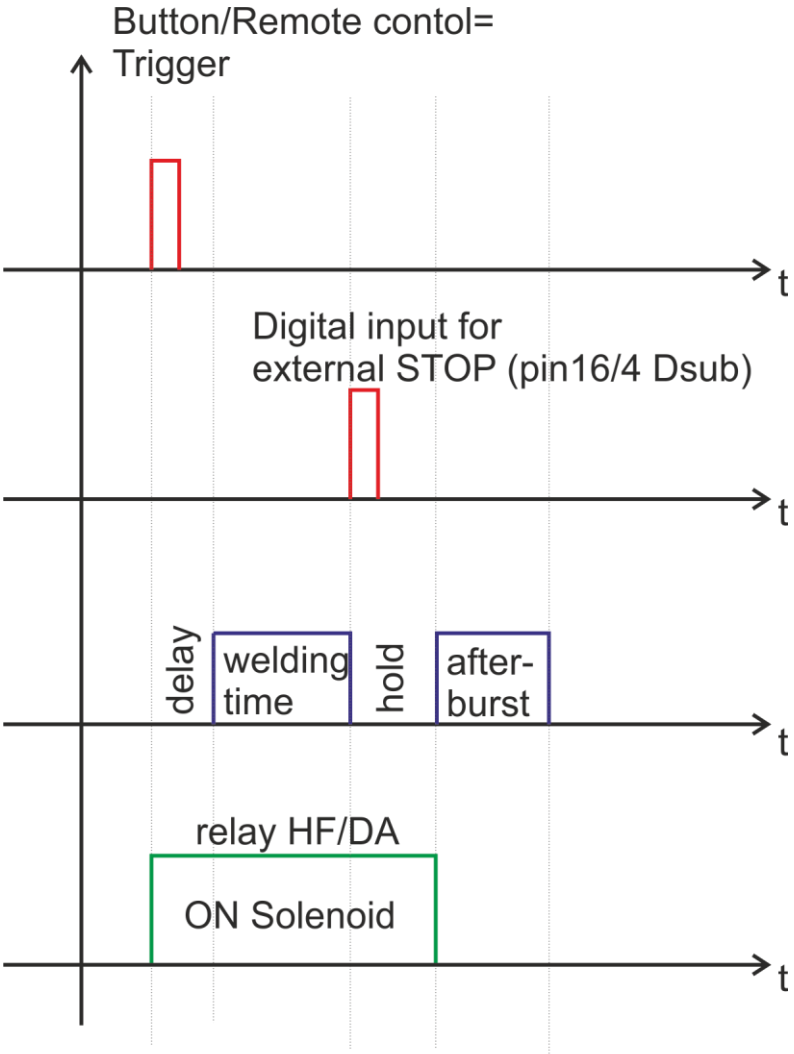


ON process – the relay is ON during whole process, including delay, welding time, hold and afterburst.

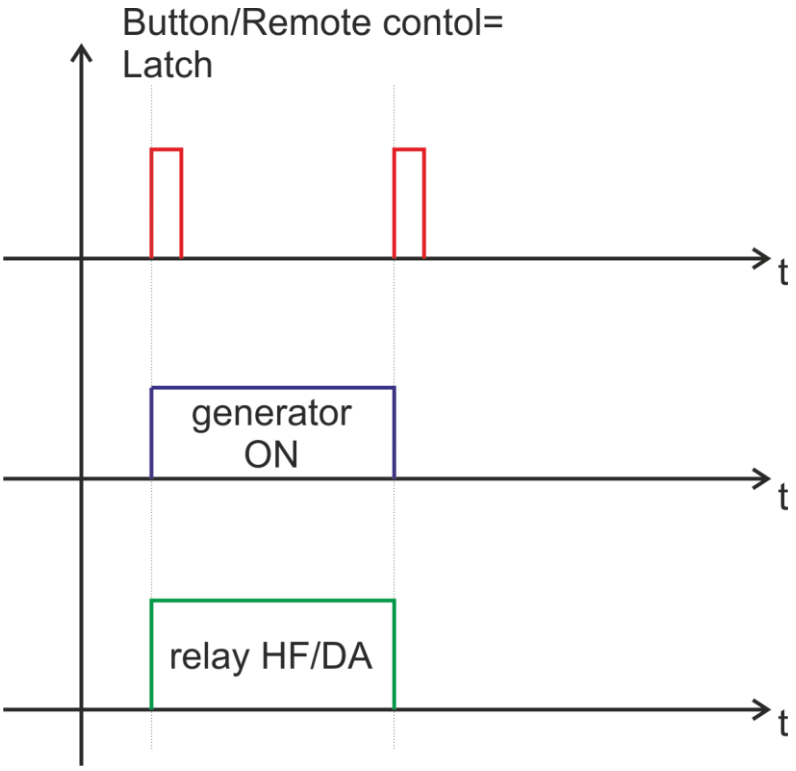


ON solenoid - the relay is ON during delay, welding time and hold.





When the button mode is not trigger, but Latch or Push:


Button/Remote contol=
Latch
t
generator
ON
t
relay HF/DA
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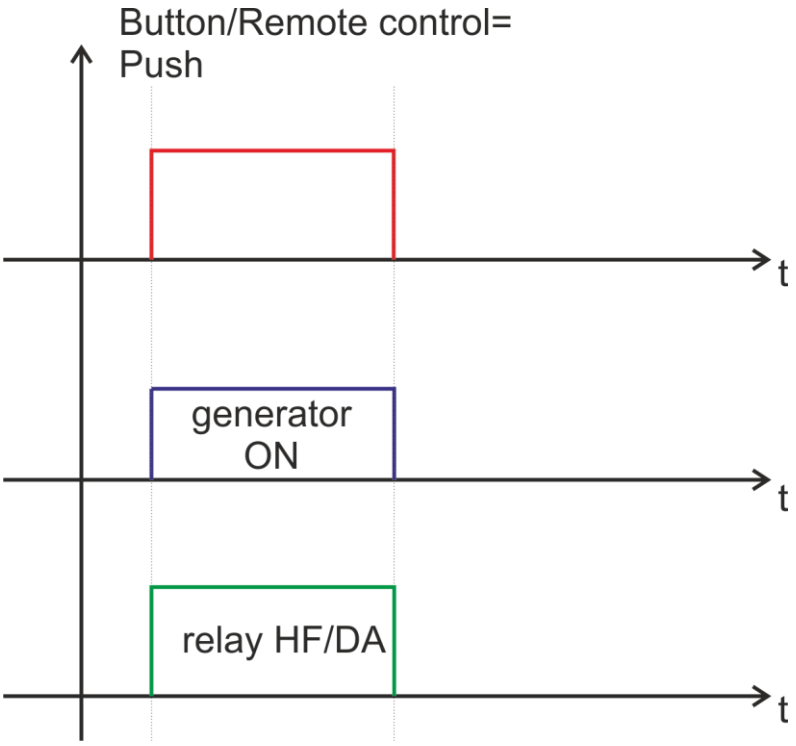
Button/Remote control=
Push
t
generator
ON
t
relay HF/DA
t

ERROR MESSAGES AND TROUBLESHOOTING

When error event occurs the bicolor LED will ligh up in red. The error message will appear over the dynamic bar graph. If you want to see it properly you need to press the rotary encoder once, to move to next window of the display (Power window), where on the last row an error message will be displayed.

All types of error messages will be cleared after restarting the generator. No need to reset the generator.

OVERCURRENT	**Possible causes**	· Short circuit in the cable or transducer · Starting frequency selected is too HIGH · Starting frequency selected may be too LOW · There is a problem with the transducer.
	How to fix	· Switch on the generator without the transducer connected. If OVERCURRENT message does not appear on the display, this means that the generator is in good working condition. · Check the cable between the generator and the transducer. · Check the transducer for short circuit. · Change and set properly the starting frequency, if it is not in range as described in this manual (see on page 17-22)

OVERHEATING	**Possible causes**	· Not enough space around the generator. · Ambient temperature is too high. · The fan is dirty or malfunctioning .
	How to fix	· reduce ambient temperature · Check the fan and clean it

OVERVOLTAGE	**Possible causes**	· The cable between the generator and transducer is broken or just disconnected. · Starting frequency selected is too HIGH · Starting frequency selected may be too LOW
	How to fix	· Rescan and re-adjust the generator · replace HRF cable

LOAD ERROR	**Possible causes**	· Starting frequency selected is too HIGH · Starting frequency selected may be too LOW – below the resonance frequency · Span selected may be too LOW · The cable between the generator and the transducer is broken · The transducer is defective
	How to fix	· Rescan and re-adjust the generator as described in this manual (see on page 17-22) · Check the cable between the generator and the transducer. · Check the transducer for disconnection · Window of frequency is too small, increase the window

FREQUENCY ERROR	**Possible causes**	· Bad frequency settings · control board is damaged
	How to fix	· check the frequency settings

LIMIT TIME ERROR	**Possible causes**	· The Time during the welding process is out of limits **Time plus** and **Time minus**
	How to fix	· check the time settings

LIMIT ENERGY ERROR	**Possible causes**	· The Energy during the welding process is out of limits **Energy plus** and **Energy minus**
	How to fix	· check the Energy settings · Check the welding process for lapses

LIMIT Peak POWER ERROR	**Possible causes**	· The Peak Power during the welding process is out of limits **Peak Plus** and **Peak minus**
	How to fix	· check the Peak Power settings settings · Check the welding process for lapses

EXT OVERHEAT	**Possible causes**	· **the signal for** External temperature is too high and is over the set limit (pin 8 of the 25 pin DSUB connector)
	How to fix	· check the external temperature

MAINTENANCE

The ultrasonic generator does not need special maintenance.

Dust and dirt should be removed regularly using a damp cloth.

ATTENTION:
- **Do not use aggressive cleaners!**
- Not suitable for ultrasonic cleaning

SPECIFICATIONS:

Frequency	**SONOWELD 2000** **35 kHz**
Operating voltage	210-250 V , 50-80 Hz
Power consumption	9 A
Maximum output	2,000 W
Fuse protection	10 A
Dimension casing (mm)	**W x H x D** 90x180x370
Weight	3.3 kg

Operating Temperature range	-10 to +40°C
Protection class	IP 20, IEC 60 529, EN 60 525

WARRANTY

The length and coverage of the warranty can be found in the terms of delivery as part of the general terms and conditions (valid at the time of purchase) or in the sales contract / order confirmation, should any special agreements have been made.

The following cases are not covered by warranty:

- Damage caused by inappropriate operation
- The device not being used for its intended purpose
- Inappropriate alterations or modifications made without prior authorization from the manufacturer
- Damage caused by extreme circumstances, such as knocks, falling over, moisture and dirt
- Insufficiently qualified operating staff
- Non-compliance with current safety and accident-prevention regulations
- Damage resulting from modifications made to the operating instructions

SPARE PARTS

Parts are available upon request. Please provide us the serial number of your device, to ensure we supply you with the appropriate replacements.

SERVICE HOTLINE

Should you still have questions after reading through this operating manual,
please feel free to call our service hotline.

Service contact details
ADDRESS
TEL
FAX
EMAIL
SKYPE
Etc.

Please have the device type and serial number at hand, to help us quickly answer your questions
(the serial number is on the backside of the generator)