

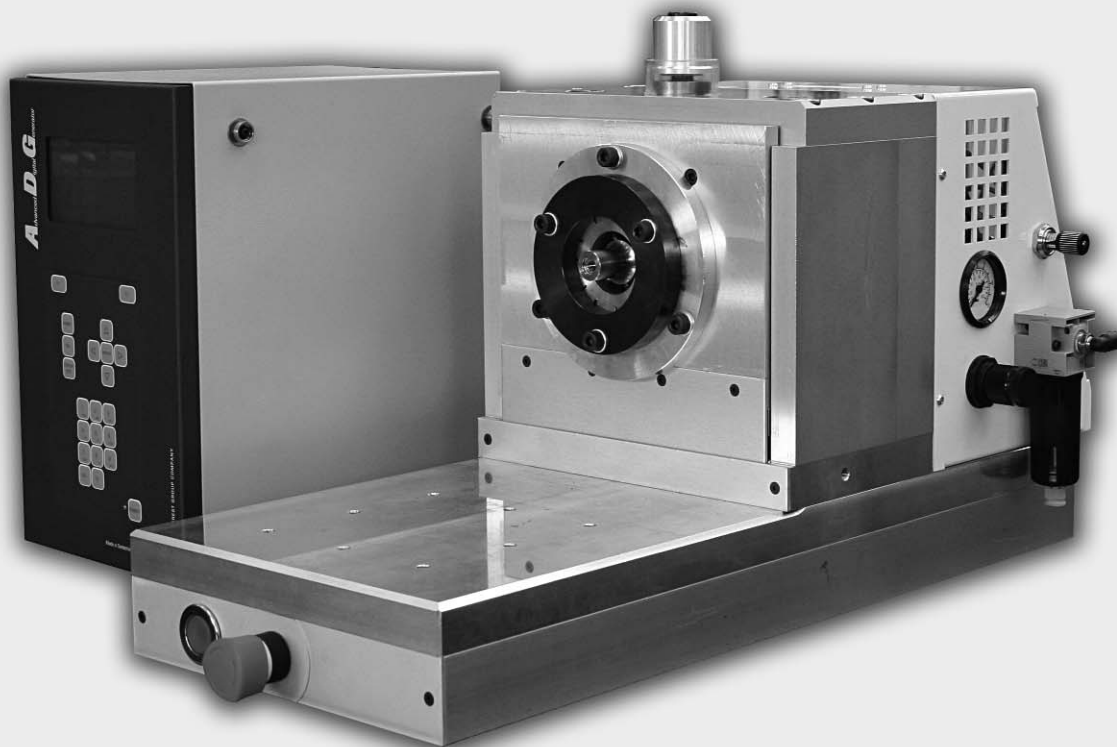
Operating Instructions



MW40-1

with generator ADG





Disclaimer

The information in this brochure corresponds to our current state of knowledge. However, it is not to be understood as a warranty for certain characteristics or for suitability of the products for certain applications. Our general contractual terms apply in this regard, and reference should also be made to these terms with regard to liability. No industrial property rights of any kind are granted to the user along with this brochure, nor are any assurances made with regard to a licence. Corresponding separate agreements would be necessary for this purpose. The suitability of the products for particular applications may only be checked with our own specialists. The German version of the brochure is binding with regard to accuracy of the information given.

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Version 2 ADG, gb, Art.-No. 39337

Manual established with:

ADG40-800P-230-B1

AUI V120

0C70

PUA1 V1.2.1

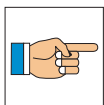
DGC0400 Beflex / DGC 0G64

ADG Standby Print V1.4

ADG Distributor Print V1.3

Creation date: 30.04.2009

Note



Read and precisely follow the information in this operating manual before unpacking the unit and putting it into operation!

The unit may only be used, maintained and repaired by people, who are familiar with the operating manual and the applicable regulations on work safety and accident prevention.

Agency

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Content

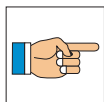
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Preface

We are very pleased that you chose to buy a RINCO product. We are convinced that you will achieve a maximum degree of economy of operation and product quality when using this unit.

The purpose of this manual is to give the purchaser and the user all the information they need in terms of the handling, assembly, operation and care of the welding press.

To ensure that your system is always in an operational state, you should take note of and follow all the tips and instructions contained within this manual.



These instructions describe the MW40 in operation with the generators ADG40-800.



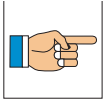
1 Safety

1.1 Explanation of symbols and signs

A system of symbols indicates dangerous behaviour as well as correct behaviour. The symbols are used in the operating manual. All danger and note symbols describe conditions, during which people, things or the environment could be put at risk, if these symbols are ignored.

Danger symbols in the operating manual are structured according to a unified schema.

Structure of the danger warnings



Note!

Especially important information or operating notes for problem-free operation.



Caution!

Denotes a danger warning. Ignoring this warning can lead to severe injury or damage to parts of the unit.



Danger!

Denotes a severe danger warning. Ignoring this warning can lead to death or severe injury.

1.2 Safety information

General information

The construction of the welding system, the generator and the control correspond to the current status of technology and are dependable. The individual components as well as the complete unit are checked in an ongoing manner by our quality control system.

Intended use



The welding unit is intended exclusively for the ultrasonic welding of the plastics for which it is suited. Different use or use beyond that does not count as intended use. The producer does not accept any liability for damage caused by unintended use. The user bears sole responsibility. This system is intended for industrial use!

Unintended use

- Using the system with insufficient knowledge of how to operate, maintain or care for the system.
- Altering the welding system and the generator with, for example, attachments or conversions that could influence the safety, without the approval of RINCO ULTRASONICS.
- Making modification in the control software!
- Using unsuitable working materials.
- Opening the generator housing during operation.
- Handling the converter while energised.
- Allowing a second person to operate the two-hand start button

Special points to note

Before putting the machine into operation, carefully read the operating manual in hand. The operating manual is to be kept near the welding system, where it can be accessed!

Choosing staff

Only trained and instructed personnel should perform work with the welding system.

The responsibility of the personnel to operate, set up, maintain and repair the equipment is to be clearly defined by the operating company! The operating company must make sure that only authorised personnel use the welding system. Work on the electrical equipment of the welding system may only be carried out by trained electricians according to electrical regulations.

Work on the pneumatic equipment may only be carried out by trained personnel who are qualified and experience in the field of pneumatics!

Installation



Danger!

Do not attempt to hook up the equipment when it is plugged in! The electrical connection is to be earthed in all cases! Country-specific, statutory safety measures must be followed during installation! If these regulations are not adhered to, the producer refuses to accept any and all liability for personal and property damages!

The equipment must be put in a closed and secure state each time before it is put into operation.

Only use dry compressed air for operation. If necessary, an air service unit can be added.

Operation



Caution!

Under no circumstances should the generator or the converter housing be opened during operation of the welding system.



Danger!

High voltage prevails inside the device – risk of injury!

- Refrain from any and all possible methods of work which may put safety at risk!
- Only operate the welding system when all protection and safety equipment, e.g. detachable protection equipment, emergency stop button, noise insulation, are present and functional.
- If safety measures such as the sound enclosure are not ordered and operated by the customer, then the producer refuses all responsibility for damages which could have been avoided, had the safety mechanisms been applied.
- Before turning on the welding system, make sure that no one can be harmed by the system starting up.



Danger!

During normal operation, the two-hand start buttons are to be actuated by one person using both hands.

If the buttons are bypassed by a second person or by other conceivable means, the producer refuses to accept any liability for personal or material damages! Technically correct operation and careful use of the units and accompanying tools during operation

- maintain the operational readiness,
- increase the life of the device and
- reduce down time to a minimum.

1.3 Noise emissions



Caution!

Limit value: according to current understanding, ultrasonic causes no damage when the maximum level remains below 140 dB and the median level, referring to 8 hrs/day, remains under a linear 110 dB.

Pay attention to the sub-harmonic, i.e. audible pulsations, that, depending on use, fluctuate greatly and have an annoying and harmful effect. Here, the standard measure is the equivalent sound level L_{eq} over a representative working period (at least 8 hrs/day, max. 2000 hrs/year), with a maximum level of 85-87 db(A).



When welding special materials, the 70 dB (A) sound level may be exceeded.

Counter measures:

- Wear ear protection
- Install a sound hood (optional)
- Operate with sound enclosure

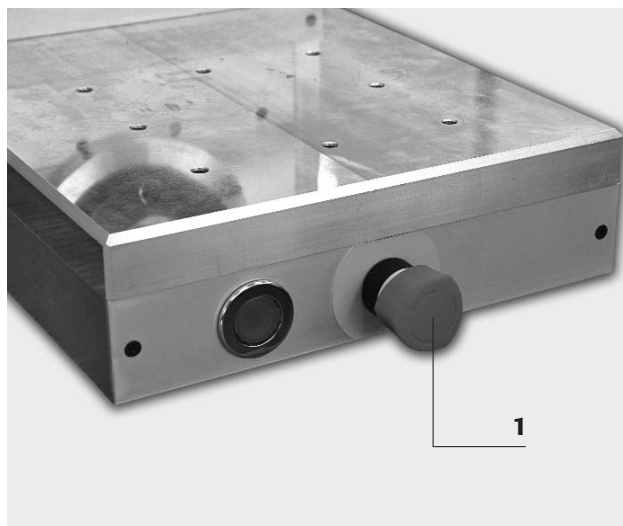
(Information according to SUVA, the Swiss Accident Insurance Fund, no. 86048 d 4.94)

For more measured values see "Sound Measuring Protocol in the RINCO supplements"
no. 920-3903/1.95

Emergency stop functions

If there is a risk that the user will be injured or that the press will be damaged: press the emergency stop button (1).

- When you do this, the press equipment immediately returns to its home position.
- The electrical supply to the system is switched off.

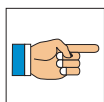


Guarantee

RINCO ULTRASONICS delivers the system with a guarantee that corresponds to VSM (Swiss Association of Machinery Manufacturers).

The conditions for RINCO ULTRASONICS fulfilling its guarantee are, among other things, the following:

- The user possesses knowledge of the contents of this operating manual.
- The instructions and warnings in this operating manual are followed.
- The operating company is not permitted to undertake any changes or conversions of the individual parts of the press, the oscillator system or the generator of its own accord.



RINCO ULTRASONICS is happy to explain any possible ambiguities or to provide instructions by our qualified staff via telephone.

2 Product information

2.1 The entire system

The entire system consists of:

- 1 Press
- 2 Generator/control
- 3 Converter
- 4 Booster

2.2 Press

Drive

Double-acting cylinder, diameter 50 mm

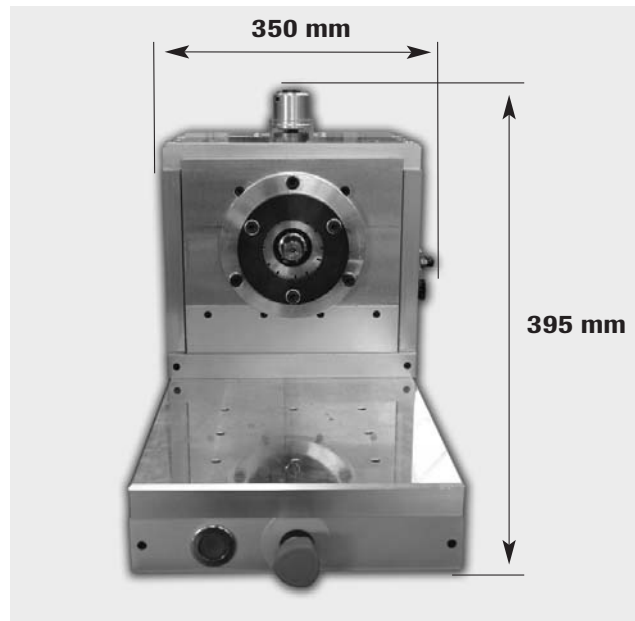
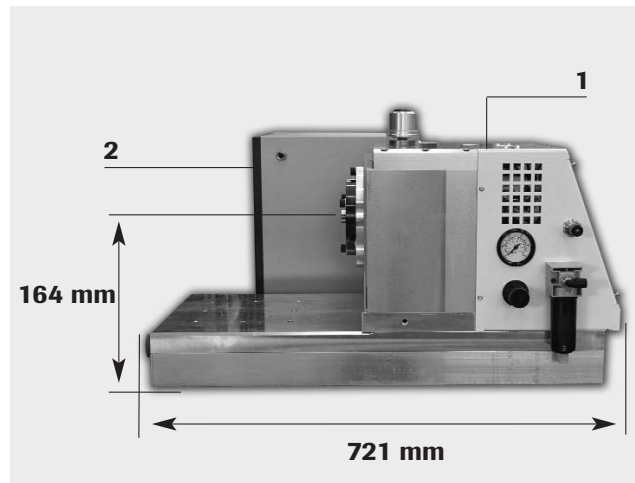
- Tool stroke maximum 25 mm
- Power at 6 bar ~100 N
- Travel measurement $\pm 0,01$ mm
- Pressure difference sensor for starting the ultrasonic (trigger)

Ultrasonic

Working frequency, 40 kHz

Weight

- Weight, 59 kg
(without generator)



2.3 Generator / control

Technical data

- Dimensions (WxLxH) 205 x 340 x 345 mm
- Power classes 800 W
- Supply voltage 230 V, 50/60 Hz
- Connection One-phase electrical supply
- Active communication RS 232
- LCD display 16x40 font size
- Parameter database 32 weld data sets
- Measured values database The last 25 welds remain saved
- Weight approx. 16 kg

The generator fulfils the demands of the following basic technical norms for the industry area:

- EN 61000-6-4 EMV, emitted interference industry area
- EN 61000-6-2 EMV, interference resistance industry area
- EN 55011 class A/group 1, High frequency equipment radio interference
- Low voltage guidelines 73/23/ EWG



3 Initial operation

3.1 Power supply and connections

Take the following steps to put the equipment into operating condition:

1. Anchor the work table and screw on the press on the back side.
2. Connect the cables between the press and the generator.



Danger!

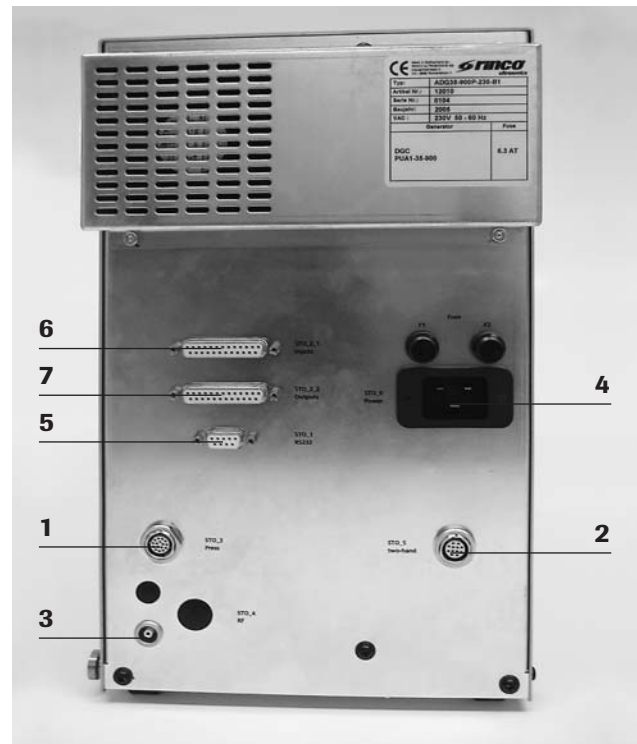
Only use an earthed electrical connection.

3. Insert the unit plug into the socket on the generator:
 - 1 Press
 - 2 Two-hand start
 - 3 RF (converter connection)
 - 4 Power (electrical supply)

Active communication

- 5 RS232 (9-pole SUB-D)
- 6 Digital input (25-pole SUB-D)
- 7 Digital output (25-pol SUB-D)

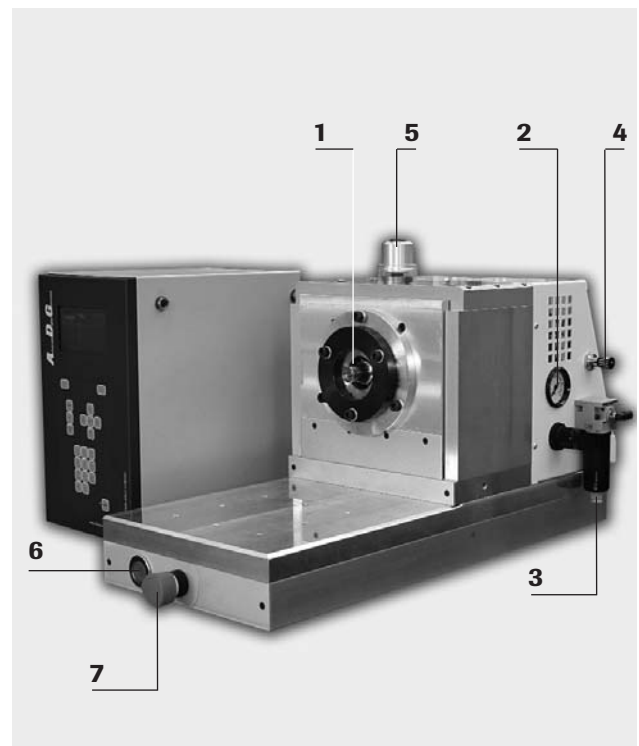
For additional information, see Chapter 8 “Data analysis”; for plug allocation see Chapter 9 “PIN Assignment”.



3.2 Operation and display elements

3.2.1 Welding press

- 1** Mobile assembly bearing the ultrasonic components
- 2** Head pressure manometer
- 3** Head pressure regulator
- 4** Speed adjustment
- 5** Mechanical stop and electrical stop
- 6** Power button
- 7** Emergency stop button



3.2.2 Control module AUI

The program dialog and the representation of the process results occur on the display.

3.2.2.1 Keyboard

After the process has been started, process data cannot be changed. Queries are, however, possible and easily carried out.

The keyboard is divided into four groups:

1 The function keys F1 and F2 (1)

They correspond to the lines displayed at the very bottom of the screen and lead step by step through the menu.

2 Jump keys (2)

System test:

Ultrasonic oscillator test at idle.

Display of power loss and frequency as well as the ADG software version, press type, generator type and generator software version, project name, database number

PIN:

For entering the respective access code

Home:

Exit from all PIN codes to the top program level
After F1 is pressed (logout), the ADG is blocked of all changes.

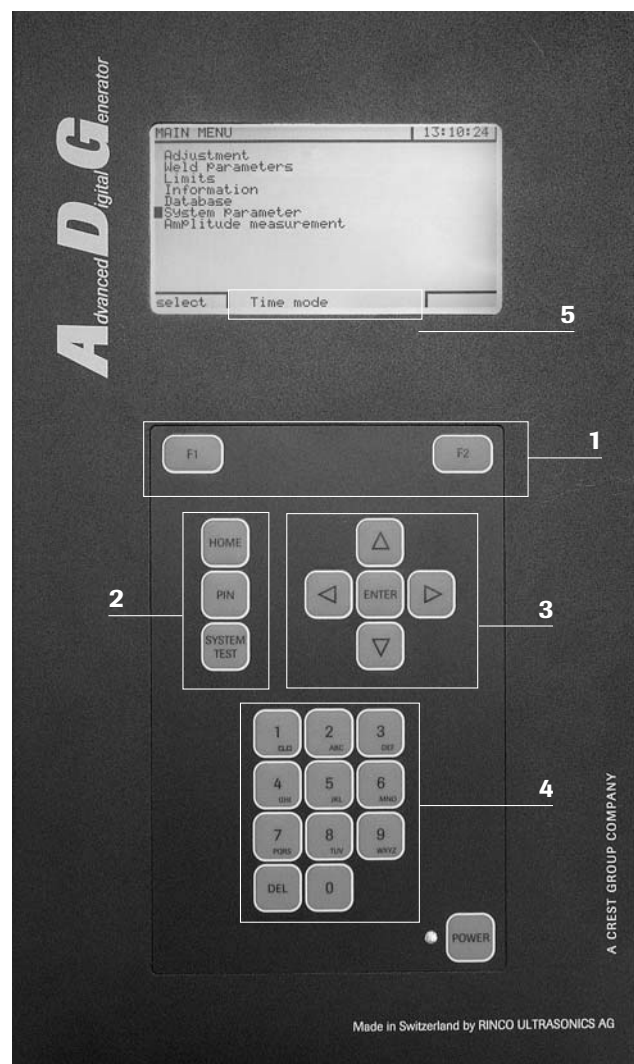
3 Cursor field (3)

✧ Cursor functions for writing and changing data.

<> Additional functions for changing preset values.

Enter: Confirmation of delete functions

When parameters are entered, «Enter» does not have to be pressed.



4 Data input field

Numbers 0-9; letters A-Z

DEL: Delete

The 'internal' PIN codes defined by RINCO are as follows:

PIN 1000 (operator PIN)

PIN 3000 (setup PIN)

PIN 5000 (analysis PIN)

These PIN codes can be modified to meet your own needs by setting the PIN code to internal.

5 Status line (5)

The status line provides information on the last step run by the generator. The parameterised welding mode can be set to indicate for a new welding cycle. Information is given on the following states:

- Cycle active
- Start confirmation
- Pv measurement
- Pretravel
- US active
- Afterwelding
- Solidification
- Return stroke
- Afterpulse waiting time
- Afterpulse
- Ready confirmation
- Cycle ended
- Datastring

Program access PIN standard values

PIN		Adjustment, parameterisation (operator PIN)	
PIN		System functions (Adjuster PIN)	
PIN		Analysis (Analysis PIN)	

4 Starting up the system

4.1 Welding operation

After the system has been started, the results of the “system test” are shown on the display. Using the button **System test**, the system test can be repeated. This occurs to protect the system in the case of a very deeply set amplitude. For measuring a higher amplitude, the corresponding PIN code must be input in order to gain access to the menu «Amplitude measurement».

For determining a possible system change, it is important to enter the **Initial value of the power loss P_v** for a system test on the backmost page of the manual.

Via **System test**, the respective software version installed on the generator and the process control ADG are displayed.



4.1.1 Starting the generator

The generator can be started by means of the POWER button at the front or automatically when the operating voltage is applied. The is selected by means of a jumper, which is located inside the generator underneath the means filter on the Standby Print and is labelled «Engaging». The settings of the jumper are marked with «manual» for startup via the POWER button and «automatic» for use in special machines.



4.2 Process programming

In order to make changes to the system, an appropriate PIN code must be entered. All functions are always visible. For parameters, which cannot be changed with the PIN entered, no cursor is displayed. The PIN codes are pre-set as standard values, but they can be modified individually. The PIN codes are arranged as follows:

4.2.1 Adjustment/parameterisation PIN

Block	Access	Description
Adjustment		Move the press to the lower attachment points for aligning the lower tool.
Weld parameter		Selection of the welding modes; setting the weld parameters. For setting see Chapter 7.1 «System functions».
Limits		Set the limits of the stop conditions Time; Travel differential and absolute; Energy; Power and Part counter. ...Limit: Value beyond limit = machine stop Warning: Value beyond limit = notification on the display without machine stop
Information		Entry of project information and production data
Database		System parameters, limits and information are backed up to save, load, delete and log data sets. To track the last 25 welding operations.
<i>System parameter</i>		See 7.1 “System functions” concerning the display of background settings for information.

5 Welding technology

In order to guarantee an ultrasonic welding process of high quality and low tolerances, the parameters

- **amplitude A [μm]** as energy source and
- **contact force F [N]** as a coupling between the plastic parts to be welded are of decisive importance for building the melting intensity.

The more precise these two quantities are controlled, the better the welding process can be reproduced.

Plastics are partly very different in their melting-on characteristics. Special semi-crystalline thermoplastics such as PP or POM require a high melting-on energy and are very thin fluid immediately thereafter.

The stop conditions (welding modes)

The stop conditions can be preset as constant for:

- **Time**
- **Energy**
- **Travel**
- **Contact cut-off**

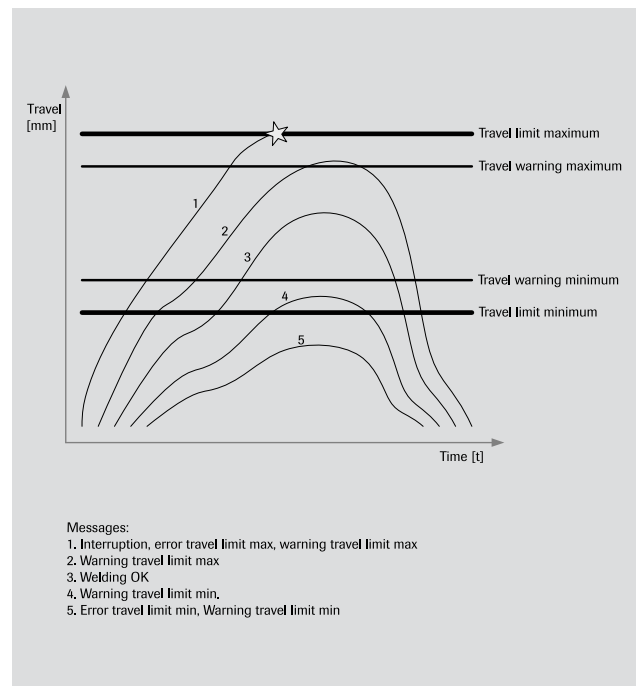
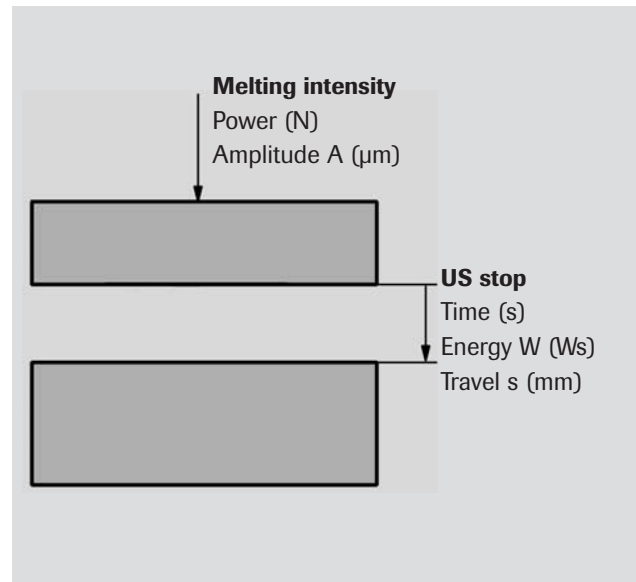
Using **Limits**, you can set limit value windows, which lead to an interruption of the process if they are passed over.

In addition, a warning window can be generated on the display.

The ultrasonic start moment (Trigger)

In order to guarantee a high level of reproducibility, the ultrasonic is preferably triggered at a determined pretensioning force. This happens by measuring the pressure difference in the pneumatic cylinder.

See Trigger DP in Chapter 6.2. Other triggers such as travel and time can be set under “system parameters”.



5.1 Process description

A welding cycle can be divided into six sequences:

The individual process steps

0 – 1 Pretravel:

Rapid advance of the welding tool.

1 – 2 Brake:

Reduction of the lowering speed according to the throttle settings to produce a soft setting down on the welding object.

2 – 3 Power development:

Successive development of the contact force according to the throttle and regulator settings up to the trigger point.

3 – 4 Welding:

Melting of both of the plastic parts by means of power and amplitude.

4 – 5 Solidification:

Hardening and cooling of the plastic melting under power that increases with time.

5 – 6 Return stroke:

A quick return stroke of the welding tool to the upper rest position.

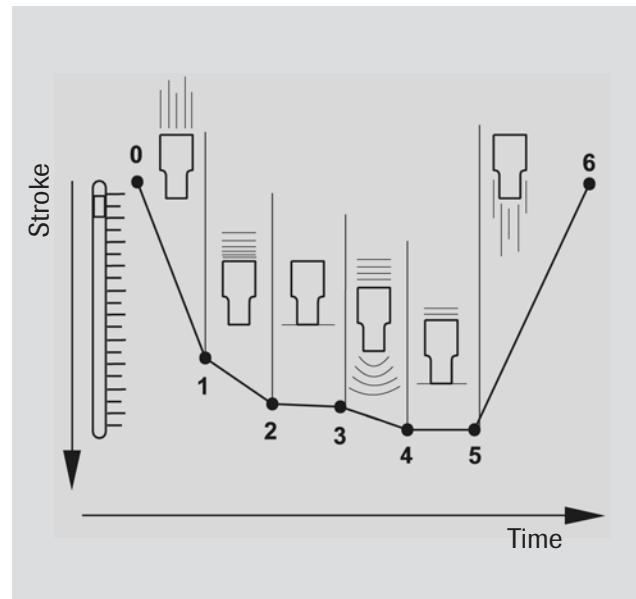
The cycle sequence is controlled by time, travel or energy depending on the welding mode.

The start of the ultrasonic (trigger)

The presses of the “Standard” generation contain a pressure differential measuring system, which measures the current pressure difference between the top side and bottom side of the piston.

Options for starting the ultrasonic:

- Contact force of the horn on the welding object (pressure difference measurement).
- Vertical travel coordinate of the horn
- Time from the press rest position.



5.2 Programming an initial operation

Preparation:

If the press is set in its height, the installed booster and the horn are to be recorded as gain factors under *Info / Oscillator* info.

Thus the control system calculates the corresponding correct value in [μm]

System pressure DR:

The longer the welding joint, the higher the system pressure.

Example:

Circular ERG diameter 16 mm (length approx. 50 mm); material ABS

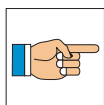
System pressure approx. 3 [bar]

Throttle VD:

The throttle forces the power changes over time during parts contact. The larger the value, the faster the change and the higher the melting intensity.

The practical range is between 1 and 5.

Setting for the example above: *Throttle 3*



Note:

The steeper the power development (large throttle opening), the more intensive the melting.

Amplitude:

The range is preset with the selection of the booster and the horn gain.

In addition, the generator allows for fine variation in the range of 40% to 100% in 1% steps.

Trigger DP:

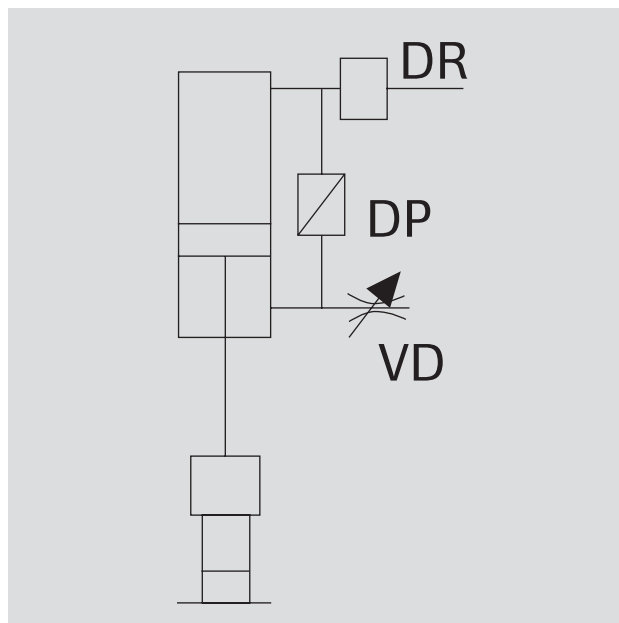
Switches the ultrasonic on according to a preset value (pressure difference between the top side and bottom side of the piston).

Set value for the example above: *Trigger 1.0 [-]*

Mode:

Determines the ultrasonic stop. It is simplest to begin in *Time mode*. It is not a problem to switch to a different mode later.

Limits: Limits are meant for optimised production and should therefore not be programmed until later.



5.3 The individual modes

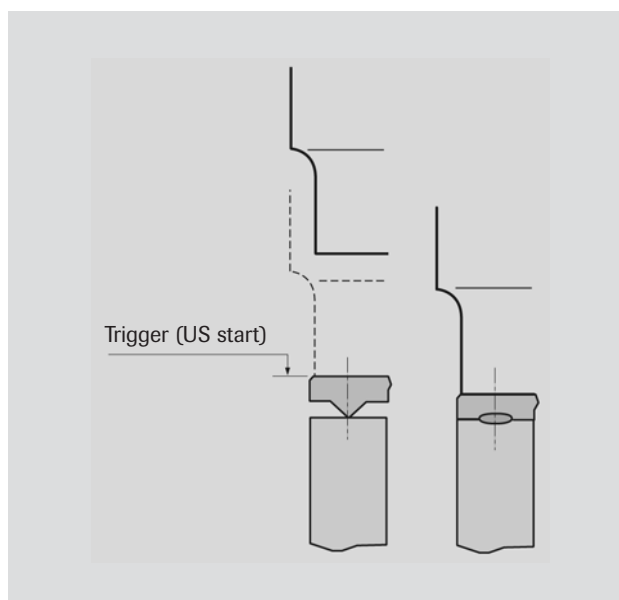
The ultrasonic start moment (trigger) can be set for all welding modes under System parameters / Mode options as pressure (power), travel, time or external. For most applications, the pressure trigger makes the most sense and travel can be selected in few cases.

TIME MODE

In this type of operation, the welding process is ended after the preset time has expired.

Cycle

After the trigger is achieved, the welding is started. Welding occurs from the start until the programmed time is achieved.



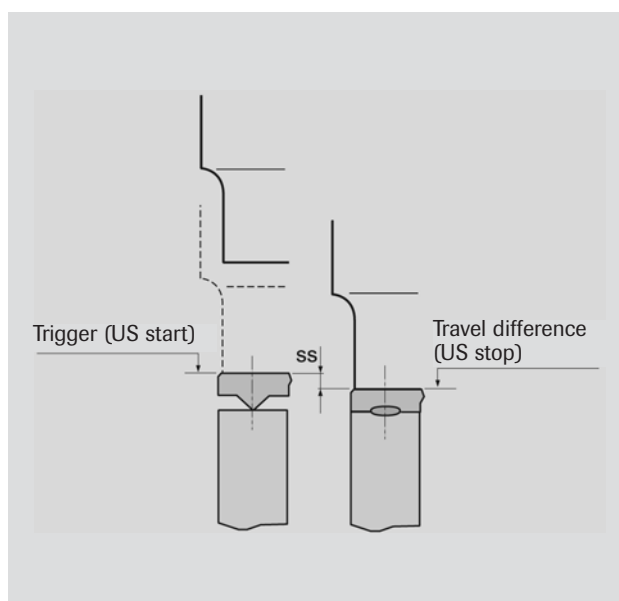
TRAVEL MODE difference

With this type of operation, the welding process is ended when the melting depth is reached.

Cycle

After the trigger is achieved, the welding is started. Welding occurs from the start until the depth [ss] is achieved.

The actual travel value is analysed after the hold time has expired (travel during solidification is displayed as welding travel).



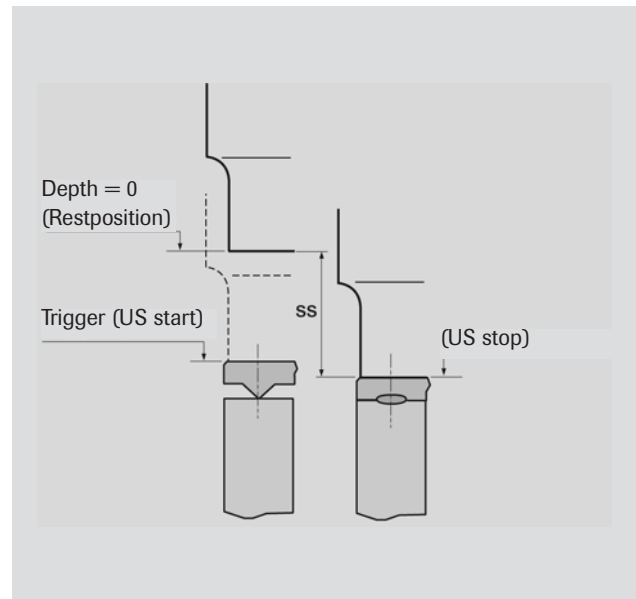
TRAVEL MODE absolute

In this type of operation, the welding process is ended after the absolute difference from the upper rest position is achieved.

Cycle

After the trigger is achieved, the welding is started. Welding occurs from the start until the depth [ss] is achieved.

The actual travel value is analysed after the hold time has expired (travel during solidification is displayed as welding travel).



ENERGY MODE

In the energy mode, the instant power absorbed by the welding object in short time intervals is added up.

In order to detect a consistent welding quality, the energy flow is contained over time using «Limits».

Cycle

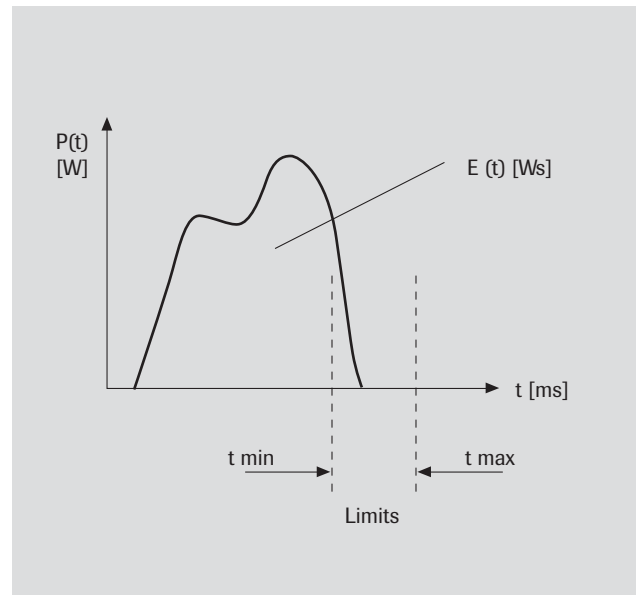
After the trigger (power) is achieved, the welding is started. The ultrasonics stops according to energy achieved.

CONTACT SWITCH OFF

For the stamping of fabrics and non-woven materials, the ultrasonic can be stopped when the metallic contact between the horn and the counter tool produces a potential of 24 V.

Signal socket STO 2_1 Inputs on the back panel of the generator is set up for this.

This is to be supplied externally with 24 V DC to Pin 1 or 2. Pin 8 is connected to the metal anvil which is insulated to the machine table.



6 In-depth system handling

With the corresponding PIN, access to the sequences **System parameters** and **Amplitude measurements** is expanded.

The menu enables expanded access:

- Adjustment
- Weld parameters
- Limits
- Information
- Database
- **System parameters**
- **Amplitude measurements**

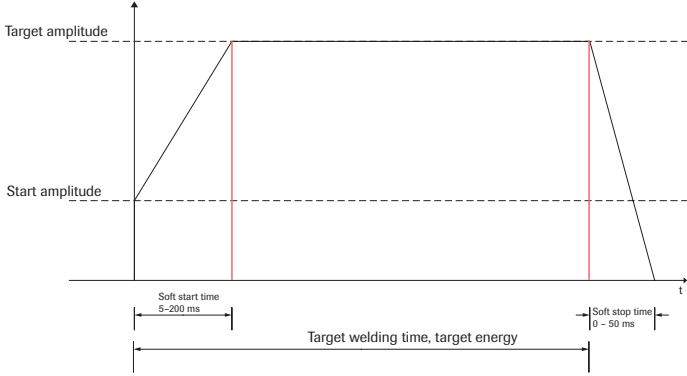
For descriptions of “Adjustment – Database” see chapter 5.2.1.

6.1 System functions (PIN)

System parameters

Block	Access	Description
Options 1		Press: Enter the welding unit used. Trigger mode: Select the ultrasonic trigger: • Pressure; Afterwards in the built-in differential pressure sensor. • Time: After a certain time from the start of the cycle. • Travel: After a programmed distance from the upper rest position • Off: No trigger exists. • External: Digital input Trigger mode before according to SSW: Select the condition SSW for the ultrasonic trigger • before: For a welding stroke longer than 6 mm > before; that means the ultrasonic start before the 6 mm safety switch (SSW). • after: For all welding operations within 6 mm of the stroke. The ultrasonic starts after the 6 mm safety switch (SSW). After-pulse: A light ultrasonic pulse on the return stroke of the press; prevents the plastic piece from sticking to the horn. System pressure measurement: Disabling of the pressure gauge on the ADG display for special machine configurations. Travel measurement: Disabling of the travel gauge on the ADG display for special machine configurations and selection of various travel gauges. Amplitude mode: External control of the amplitude for special machine configurations. Hold condition: To allow the weld to harden, the horn can be variously held on the part. • Time • Travel difference • Travel absolute Resting position: Switches of the position of rest monitoring in the case of specific machine configurations.

Block	Access	Description
Options 2		Start mode: • Manual (CE) • Automatic: CE conformity is no longer guaranteed. The system operator must adapt the machine design to conform with the CE machine guidelines. When switching to “automatic” the online data window is switched-off by default. Error position: Press position when blocked after an “error”. Datastring: Weld data transfer via RS 232 to an external computing system. interval datastring: Readout interval, a data string is always sent if there an error occurs during welding. • 000 none • 001 every Database switching: External transfer of data sets. • Off • dec (decimal) • bin (binary) • RS232 Sound enclosure: Program for operating the sound enclosure SSK Start confirmation: If this option has been activated, input START_CONFIRM_IN must have been set in order for the generator to start the cycle. Ready confirmation: If this option has been activated, the input START_CONFIRM_IN must have been set in order for the generator to end the cycle and to set the output READY_OUT. Good part counter output: • Impulse: 300 ms long High pulse indicates a correct welding operation. • Signal: The output is set to High-Level until the start of the next cycle in the event of a correct welding operation. Bad part counter output: • Impulse: 300 ms long High pulse indicates an incorrect welding operation. • Signal: The output is set to High-Level until the start of the next cycle in the event of an incorrect welding operation. Online data window: An information window that displays the travel, trigger and power is opened during the cycle. Statistics: If the statistics function has been switched on, you can select “ongoing”, “groups” and “values” via ther < and > in the “Welding” window (HOME). The F1 button is given a new function as a result (See section 8.1 “Statistics”).
Horn		Power loss measurement: Setting the measurement before or after the welding cycle Max. power loss: Max. limit value • 10% to 40% Power loss measuring interval: Measuring interval • 0 to 9999; 0 = no measuring

Block	Access	Description
Generator parameter		Start amplitude: Is the start value for generating a soft start (see picture above). • Max value 10 - 40%  Soft start time: • 5 to 200 ms Soft stop time: • 0 to 50 ms For the soft oscillating of complicated horns. Frequency reset: Normally the frequency most recently used is set. If this is not desired, frequency reset must be set to «On». Upper frequency limit: • +50 to +500 Hz Lower frequency limit: • -50 to -500 Hz Overload delayed shut down: For disabling extremely short power peaks (in continual mode) • 5 to 9999 ms Overload level: Maximum power value for the operational limit of the generator. • 5 W min. -1.2 x nominal generator power Cable length: 1-15 m
Settings		PIN variation; adjusting time date; baud rate External operator PIN: • 0 to 7999 PIN code: • external/internal If the PIN code has been set to internal, then the default PIN codes 1000, 3000 and 5000 are active. If the option has been set to external, then the operator can determine the PIN codes. Baud rate: • Standard 19200 Time/date
Country settings		Language Time format Travel unit • [mm]; [inch] Pressure unit • [bar]; [psi]

Amplitude measurement

Block	Access	Description
Actuation system test		For setting and measuring the amplitudes. Preparation: For automatically calculating the amplitude, enter the gain factors under: Information/oscillator system info/ input factors booster and horn. Measurement: Using the “System test” button or digital input «US_TEST_IN»

6.2 Analysis (PIN)

For analysis in the case of error-free machine function.

No settings are, however, possible.

Block	Access	Description
Cycle analysis		Display of the switch and measurement sizes
Cycle phases		Time and travel dependent display of all cycle phases in their switch moments
Press status		Display of the switch and position status of all switch and measuring members of the welding press
Inputs		Analysis of the signal inputs (STO_2.1)
Outputs		Analysis of the signal outputs (STO_2.2)

6.3 Reset functions (PIN)

Resets all settings to the standard values.

Block	Access	Description
PIN Reset		Sets PIN to “internal” and activates the standard PIN codes
Generator reset		Initialises the generator to the standard settings
Default data set		Deletes all data sets and generates a dataset “0”
Statistic Reset		Resets the statistics and the measured values database
Factory settings		Executes directly all the above-mentioned resets

7 Data analysis

7.1 Statistics

Ongoing:

The median values of the travel, energy and the welding time are shown in the ongoing statistics. In addition, standard deviation is shown as a value and as a percentage. This listing of median values relates to all welding operations shown so far, meaning either from the last time that the machine was started or since the values were last reset. As soon as the parts counter has been set up, the statistics are transferred via the RS232 interface, if serial communication is used. The statistics menu appears on the display instead of the welding menu.

Groups:

These statistics are intended primarily for use when setting up. The last 25 welding operations are shown in groups of a maximum of 5. No parameter changes are permitted within a group of 5, otherwise a new group is started. If there was an incorrect welding operation within the group, this is excluded from the statistics. The number of welding operations within a group is displayed underneath the group number. Correct welding operations are shown with an "o" and incorrect welding operations are shown with an "x".

The following displays result from the relevant welding mode:

Time

Energy, travel differential and travel absolute

Travel differential

Energy, time and travel absolute

Travel absolute

Energy, time and travel differential

Energy

Time, travel differential and travel absolute

Contact

Energy, time travel differential

The statistics can be shown at any time via the serial interface. Selection for triggering is done by means of the F1 and ENTER keys. The statistics and the database of measured values can be deleted at any time by pressing the DEL key.

If the energy value is greater than four digits plus one decimal place (xxxx.x), then only five digits with no decimal places (xxxxx) are shown.

Values:

The measured values of the last 25 welding operations are specified. The measured values are output via the datastring option. Otherwise, no output is possible via the serial interface.

Example of output after multiple errors in a welding cycle

The datastring shows the relevant current error code in the event of an error. If there is more than one error, then this is indicated with the coding 100:00X. X stands for the number of errors. Warnings are not shown in the datastring.

Examples:

Error "Energy limit min" occurs:

Display: #1
Code: 5:3
Info: Energy limit min
Datastring: 005:003

Errors "Time limit max" and "Energy limit min" occur:

Display: #1
Code: 5:0
Info: Time limit max
Display: #2
Code: 5:3
Info: Energy limit min
Datastring: 100:002

Example of output after exceeding the warning window

Warning "Time warning min" is given:

Display: #1
Code: 20:1
Info: Time warning min
Datastring: 000:000

7.3 Logging the parameter data set via RS232

The contents of a data set can be shown in the "Database – Parameter database" menu by selecting RS232. The following data are output via the RS232 serial interface:

General information:

Date	Time
Project name	Data set No.
Generator type	AUI software version

Information on the press:

Press type	Set pressure
Throttle position	Press position, depth stop position

Information on the oscillator:

Converter No.	Booster No.
Amplification booster	Horn No.
Amplification horn	Holder No.

Information on the generator parameters:

DGC software version	Start amplitude
Soft start time	Soft stop time

Information on the welding parameters:

Amplitude
Start condition (pressure, travel, time trigger)
Stop condition (time, travel, energy, contact)
Holding condition (time, travel)

Example 1

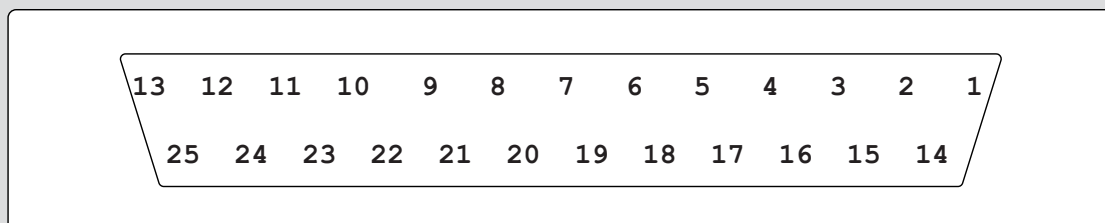
13.06.06;14:01:13;HUGO;1;ADG70-100;AUI
0C70;Standard50;5.5bar;3.5;100mm;99mm;
111111;222222;1:1.5;333333;1:1.5;444444;DGC
0G64;30%;20ms;0ms;60%;Pressure:3.0;
Timemode:333ms;Time:350ms;

Example 2

13.06.06;14:01:11;VRENI;2;ADG70-100;AUI
0C70;Standard50;79.8psi;3.5;3.9370inch;
3.8976inch;111111;222222;1:1.5;333333;1:1.5;444444;
DGC 0G64;30%;20ms;0ms;60%;
Time:150ms;Travel absolute:2.5846inch;Time:350ms;

8 PIN Assignment

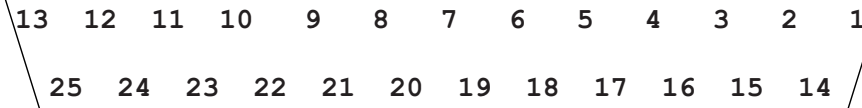
STO_2_1 Inputs



8.1 Inputs on STO_2_1 (DSUB25)

Pin	Signal	Description
1	+24VDC_IO_IN	external supply voltage +24VDC
2	+24VDC_IO_IN	external supply voltage +24VDC
3	START_1_EXT_IO_IN	external start signal for start mode automatic
4	START_2_EXT_IO_IN	external start signal for start mode automatic
5	STOP_IN	abort cycle
6	US_TEST_IN	power loss measurement
7	US_STOP_1_IN	stop ultrasonic (24VDC)
8	US_STOP_2_IN	contact cut off (GND)
9	RESET_IN	error acknowledgment
10	TRIGGER_IN	external trigger
11	START_CONFIRM_IN	start confirm (option enable)
12	READY_CONFIRM_IN	ready confirm (option enable)
13	RESERVE_13_IN	
14	DATASET_1_IN	data set switching
15	DATASET_2_IN	data set switching
16	DATASET_3_IN	data set switching
17	DATASET_4_IN	data set switching
18	DATASET_5_IN	data set switching
19	SSK_CABINE_IN	sound enclosure door closed (option enable)
20	SSK_CABINE_LIFT_IN	lift door not closed (option enabled)
21	RESERVE_21_IN	
22	RESERVE_22_IN	
23	AMPL_AIN	analogue amplitude input 0-10VDC (0-100% amplitude)
24	GND24VDC_IO_IN	external supply voltage GND
25	GND24VDC_IO_IN	external supply voltage GND

STO_2_2 Outputs

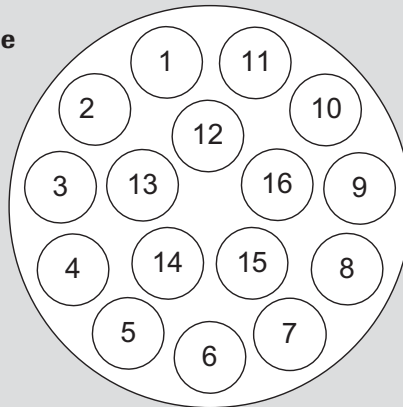


8.2 Outputs on STO_2_2 (DSUB25)

Pin	Signal	Description
1	+24VDC_IO_IN	external supply voltage +24VDC
2	+24VDC_IO_IN	external supply voltage +24VDC
3	ERROR_HIGHPRIO_OUT	high priority error (turn off generator)
4	ERROR_OUT	error
5	ERROR_CODE1_OUT	error code
6	ERROR_CODE2_OUT	error code
7	ERROR_CODE3_OUT	error code
8	READY_OUT	ready for new cycle
9	US_ACTIVE_OUT	ultrasonic activated
10	RESTPOS_OUT	rest position press
11	RESERVE_11_OUT	
12	START_OUT	start cycle done
13	MV_OUT	magnetic valve set (cylinder pre stroke/down)
14	START_RETURN_OUT	back stroke active (cylinder back stroke/up)
15	GOOD_PART_COUNT_OUT	successful cycle finished
16	BAD_PART_COUNT_OUT	cycle finished with error
17	RESERVE_17_OUT	
18	RESERVE_18_OUT	
19	RESERVE_19_OUT	
20	SSK_MV_LIFTDOOR_OUT	magnetic valve lift door (option enable)
21	RESERVE_21_OUT	
22	RESERVE_22_OUT	
23	POWER_AOUT	analogue power output 0-10VDC (0-120% power)
24	GND24VDC_IO_IN	external supply voltage GND
25	GND24VDC_IO_IN	external supply voltage GND

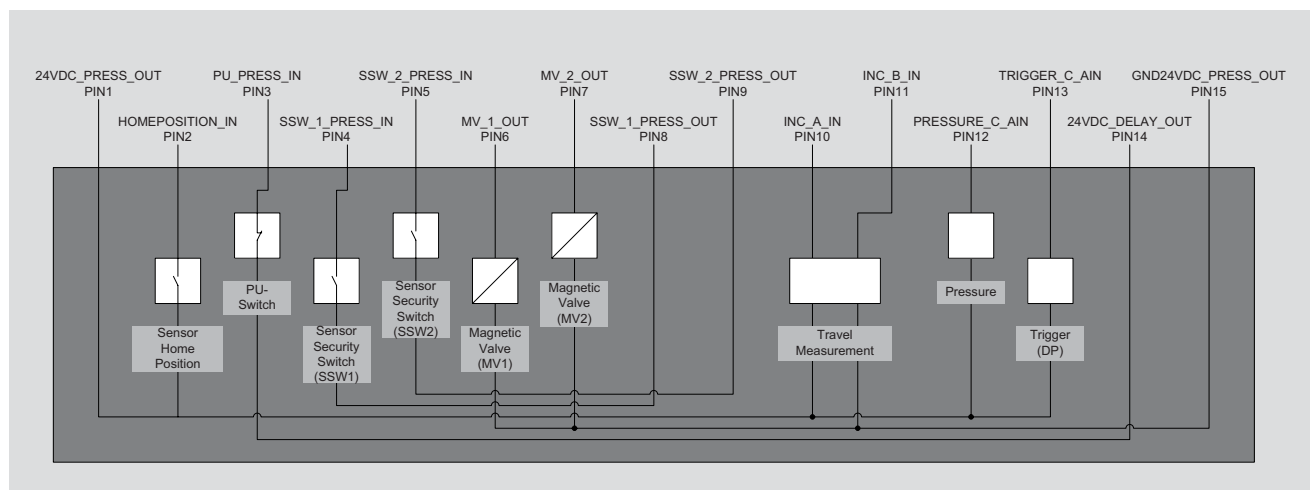
STO_3 Press

Overview Generator Backside

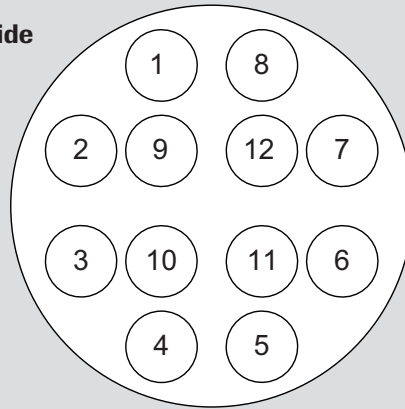


8.3 Press on STO_3

Pin	Signal	Description
1	+24VDC_PRESS_OUT	supply voltage +24VDC press
2	HOMEPOSITION_IN	input sensor resting position
3	PU_PRESS_IN	input PU- switch (supervision magnetic valves)
4	SSW_1_PRESS_IN	input security switch 1 press (6mm)
5	SSW_2_PRESS_IN	input security switch 2 press (6mm)
6	MV_1_OUT	output magnetic valve 1
7	MV_2_OUT	output magnetic valve 2
8	SSW_1_PRESS_OUT	output security switch 1 press (6mm)
9	SSW_2_PRESS_OUT	output security switch 2 press (6mm)
10	INC_A_IN	travel measurement canal A
11	INC_B_IN	travel measurement canal B
12	PRESSURE_C_AIN	analogue input system pressure (4-20mA)
13	TRIGGER_C_AIN	analogue input differential pressure trigger (4-20mA)
14	24VDC_DELAY_OUT	delayed supply voltage for PU- switch
15	GND24VDC_PRESS_OUT	supply voltage GND press

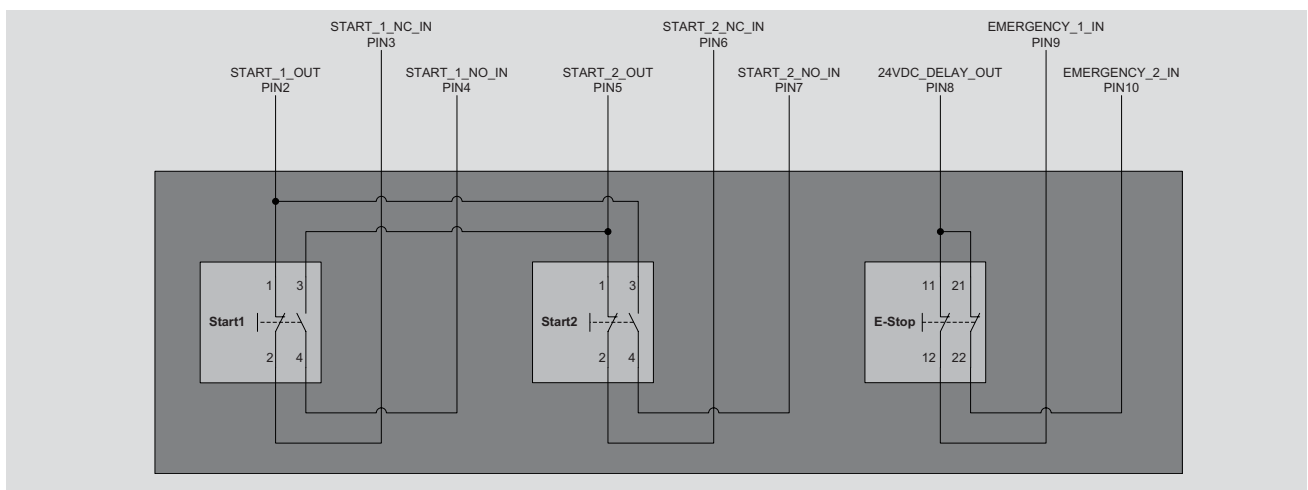


STO_5 Two-hand Overview Generator Backside



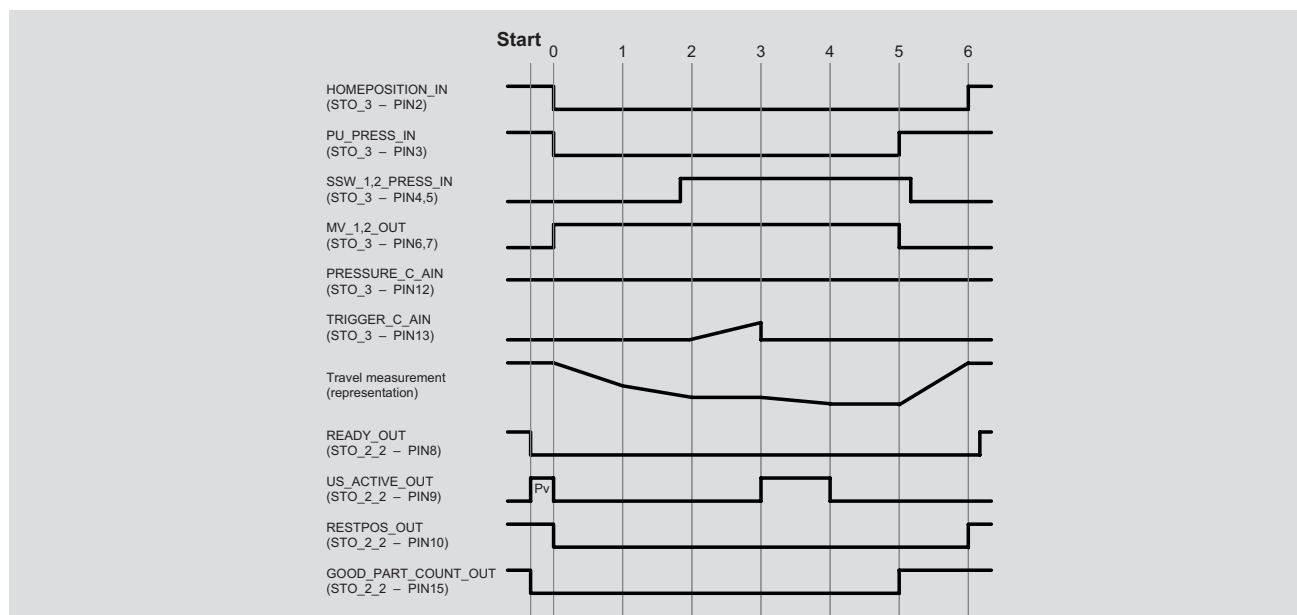
8.4 Two-hand start on STO_5

Pin	Signal	Description
1	nc	
2	START_1_OUT	output start switch 1
3	START_1_NC_IN	input start switch 1 (normally close)
4	START_1_NO_IN	input start switch 1 (normally open)
5	START_2_OUT	output start switch 2
6	START_2_NC_IN	input start switch 2 (normally close)
7	START_2_NO_IN	input start switch 2 (normally open)
8	24VDC_DELAY_OUT	delayed suppl voltage fpr emergency stop
9	EMERGENCY_1_IN	input emergency stop 1
10	EMERGENCY_2_IN	input emergency stop 2
11	nc	
12	GND24VDC_PRESS_OUT	supply voltage GND press



9 Example applications

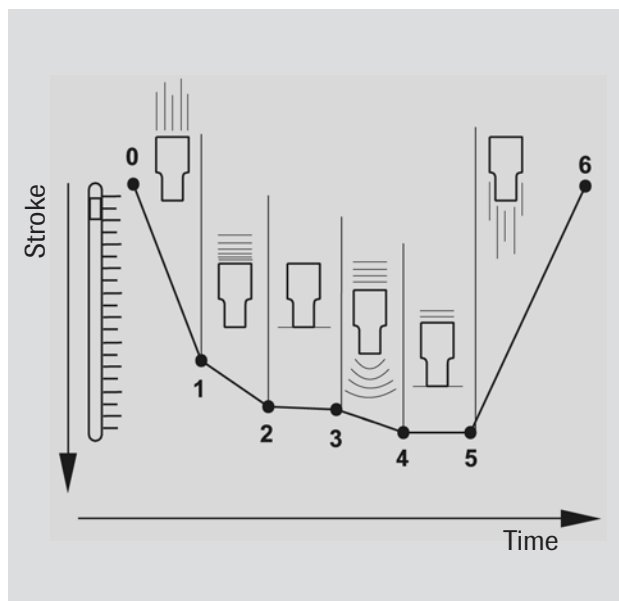
9.1 Standard ADG



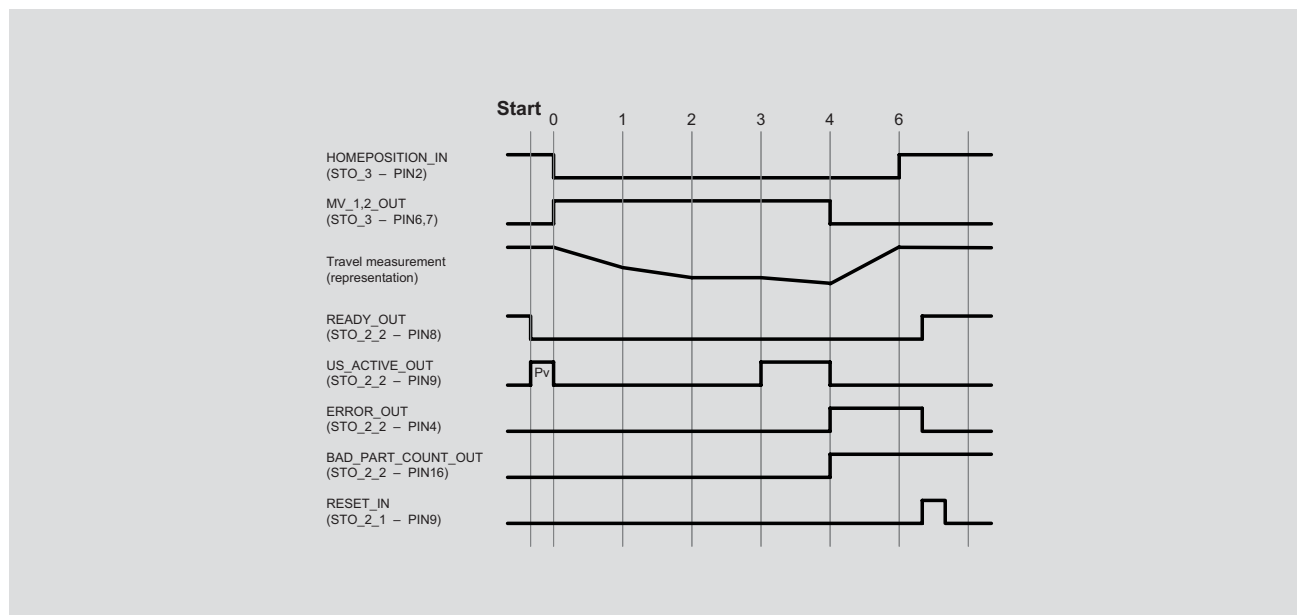
Process step

- 0 > 1 Pretravel
- 1 > 2 Stroke braked
- 2 > 3 Power development
- 3 > 4 Melting on
- 4 > 5 Solidification
- 5 > 6 Return stroke

The cycle is initiated by pressing the two-hand start. Output **READY_OUT** drops out and the power loss measurement (Pv) is shown by output **US_ACTIVE_OUT**. The solenoid valves (**MV_1,2_OUT**) are set after a successful Pv measurement, whereby the press leaves the position of rest. This is indicated by output **RESTPOS_OUT**. The ultrasonics are started when the trigger pressure is reached. This is indicated by output **US_ACTIVE_OUT**. Outputs **MV_1_OUT** and **MV_2_OUT** are reset after the welding and solidification phases. The press is brought back into the position of rest as a result. Output **RESTPOS_OUT** indicates that the position of rest has been reached. Output **READY_OUT** is set as soon as the generator is ready for the next welding operation. An error-free welding operation is indicated by output **GOOD_PART_COUNT_OUT**. This signal is applied until the start of the next cycle.



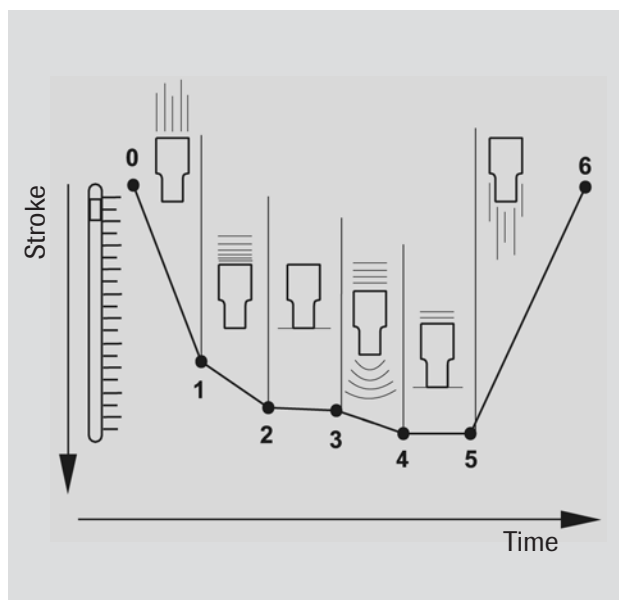
9.2 ADG error signals



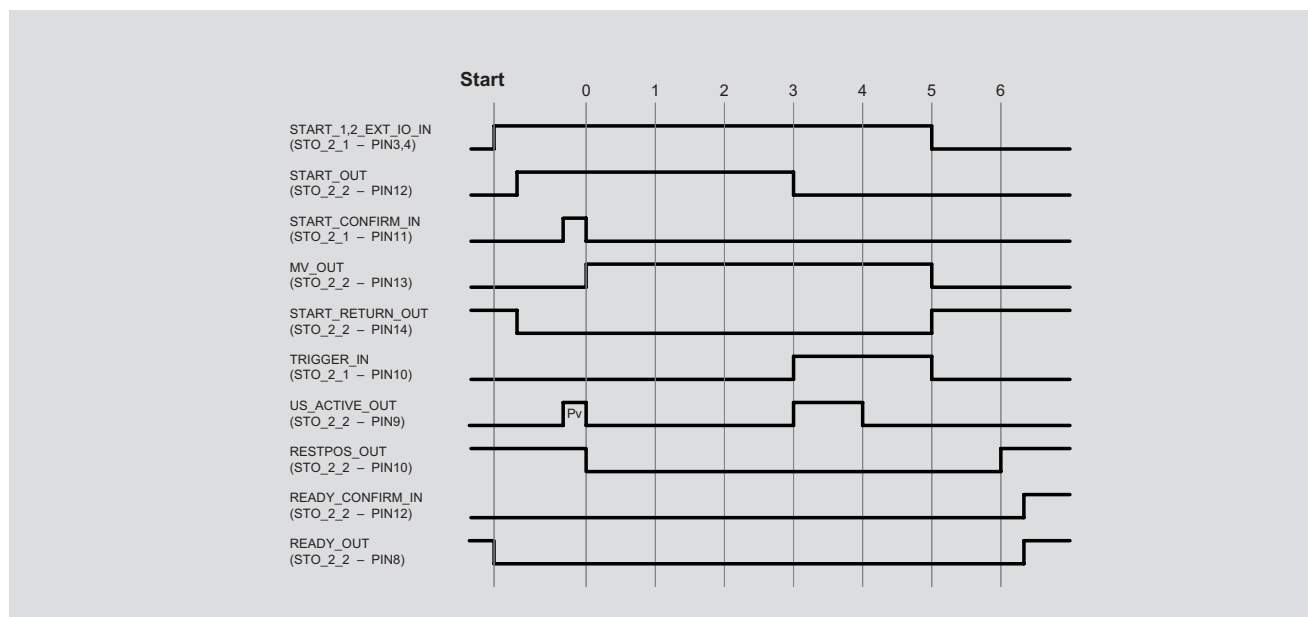
Process step

- 0 > 1 Pretravel
- 1 > 2 Stroke braked
- 2 > 3 Power development
- 3 > 4 Melting on
- 4 > 5 Solidification
- 5 > 6 Return stroke

The cycle is initiated by pressing the two-hand start. Output **READY_OUT** drops out and the power loss measurement (Pv) is shown by output **US_ACTIVE_OUT**. The solenoid valves (**MV_1,2_OUT**) are set after a successful Pv measurement, whereby the press leaves the position of rest. This is indicated by output **RESTPOS_OUT**. The ultrasonics are started when the trigger pressure is reached. This is indicated by output **US_ACTIVE_OUT**. An error occurs during the welding operation, as a result of which the welding operation is broken off. This is indicated by output **US_ACTIVE_OUT** dropping out and the setting of output **ERROR_OUT**. The press is brought back into the position of rest by resetting the solenoid valve outputs **MV_1,2_OUT**. In addition to the error display, output **BAD_PART_OUT** indicates an incorrect welding operation. This signal remains until the start of the next cycle. The current error can be cleared by applying a signal at input **RESET_IN**. If there are no further errors, the generator indicates this with output **READY_OUT**.



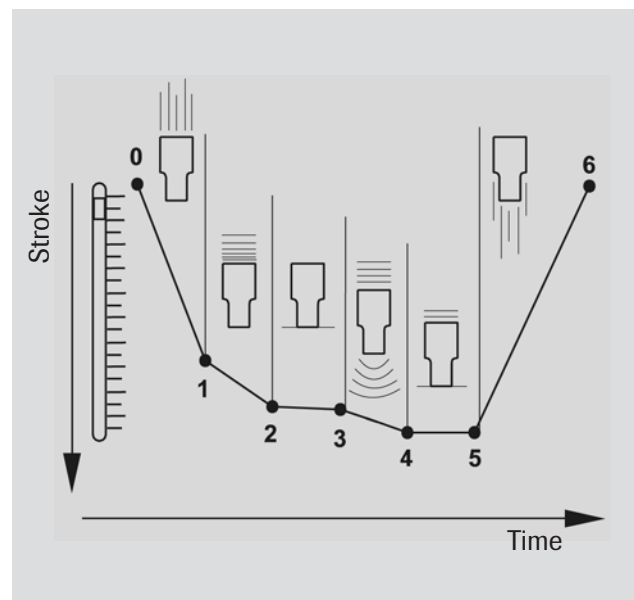
9.3 ADG with special actuators (Start mode automatic)



Process step

- 0 > 1 Pretravel
- 1 > 2 Stroke braked
- 2 > 3 Power development
- 3 > 4 Melting on
- 4 > 5 Solidification
- 5 > 6 Return stroke

Engaging the inputs START_1_EXT_IO_IN and START_2_EXT_IO_IN starts the process which is indicated by the output START_OUT. The two start inputs START_1,2_EXT_IO_IN must be engaged until the output START_RETURN_OUT indicates that the press is on the return stroke, In this application the options «Confirm start» and «Confirm stand by» are activated. For that reason, the power loss reading (Pv) is only issued after the input START_CONFIRM_IN is engaged. Equally, the stand by signal for the next welding cycle READY_OUT is only indicated if the input READY_CONFIRM_IN is engaged.



9.4 Data set switching

Data set switching is used to initiate multiple welding applications with one generator.

The welding parameters, limits, information and system parameters are stored in a data set. The data sets can be switched over according to the setting of the “Data set switching” option.

Option „Data set switching“ dec

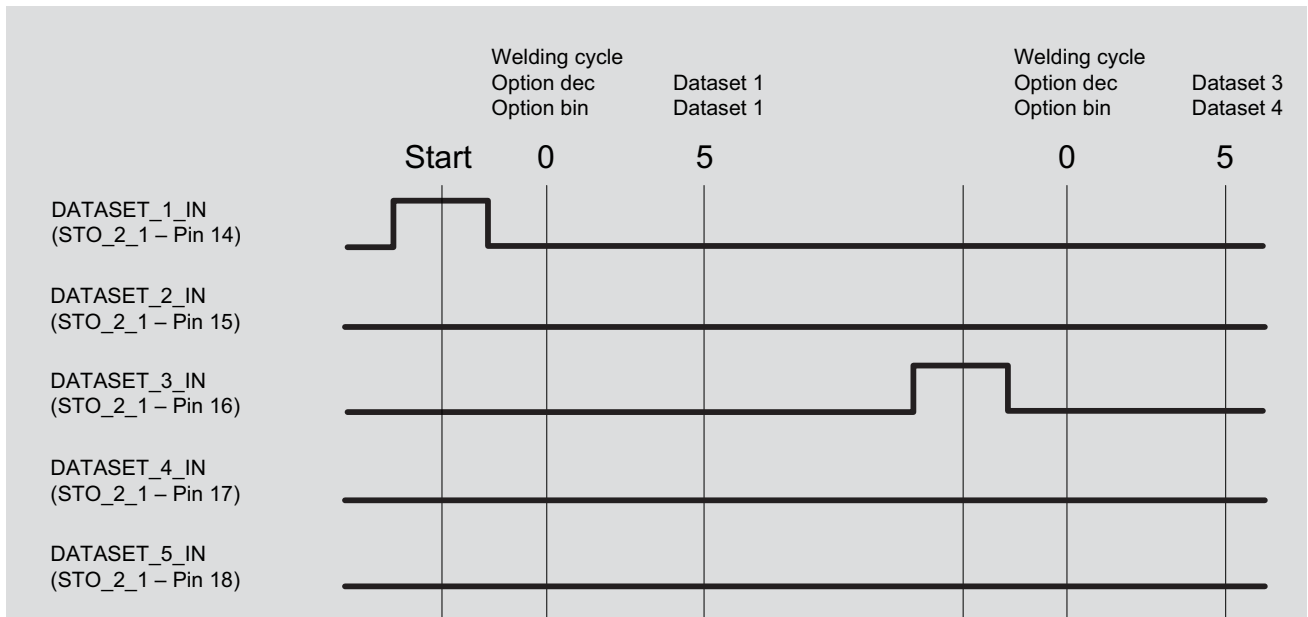
DATASET_1_IN	DATASET_2_IN	DATASET_3_IN	DATASET_4_IN	DATASET_5_IN	Dataset no action
0	0	0	0	0	
1	0	0	0	0	1
0	1	0	0	0	2
0	0	1	0	0	3
0	0	0	1	0	4
0	0	0	0	1	5

Option „Data set switching“ bin

DATASET_1_IN	DATASET_2_IN	DATASET_3_IN	DATASET_4_IN	DATASET_5_IN	Dataset no action
0	0	0	0	0	
1	0	0	0	0	1
0	1	0	0	0	2
1	1	0	0	0	3
...	...	...	...	...	...
0	1	1	1	1	31
1	1	1	1	1	32

Option „Data set switching“ RS232

Dataset	ASCII-Types	Dataset	ASCII-Types	Dataset	ASCII-Types	Dataset	ASCII-Types
1	1	11	;	21	E	31	O
2	2	12	<	22	F	32	P
3	3	13	=	23	G		
4	4	14	>	24	H		
5	5	15	?	25	I		
6	6	16	@	26	J		
7	7	17	A	27	K		
8	8	18	B	28	L		
9	9	19	C	29	M		
10	:	20	D	30	N		



The process is started by applying inputs START_1_EXT_IO_IN and START_2_EXT_IO_IN in automatic mode or by operating the two-hand start in manual mode. Inputs DATASET_1_IN to DATASET_5_IN are checked at this time. Once the option has been selected, the corresponding data set is used for the welding. Note the changeover time of 200 ms for the HF switchover boxes that are used.

10 Technical data

10.1 Power supply

The generator is operated at the nominal voltage specified on the type plate. A deviation of $\pm 10\%$ of the nominal voltage is permissible.

10.2 Analog and digital inputs/outputs

10.2.1 Power supply and voltage level

The digital inputs/outputs require an external power supply (+24 V DC_IO_IN) of 24 V. The voltage levels of the power supply and the digital inputs/outputs are shown in the following table.

Parameter	Condition	Min	Typ	Max	Unit
+24VDC_IO_IN		20	24	28	V
Digital Input High Signal		15			V
Digital Input Low Signal			1		V
Digital Output High Signal	Vsupply = 24V			24	V
Digital Output Low Signal	Vsupply = 24V		0	0.5	V

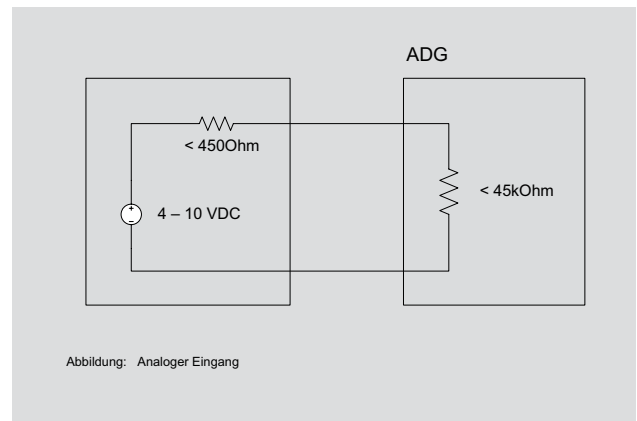
10.2.2 Overview of the inputs/outputs

The following table gives an overview of the inputs/outputs.

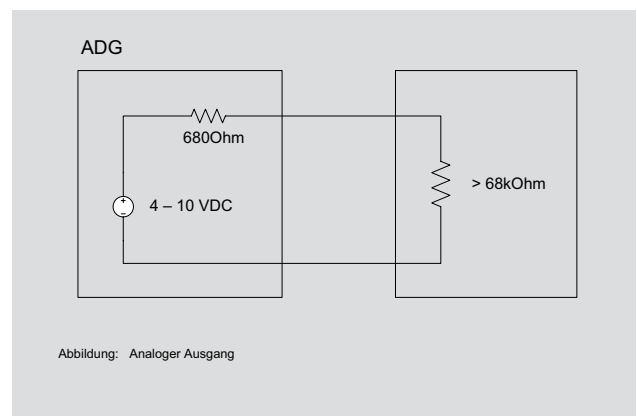
Signal type	Voltage level
Digital inputs	24VDC Input current = 5mA type. Input resistance = 8.4k Ω
Analog inputs	0 - 10VDC Precision $\pm 3\%$ Input current = 0.3mA typ. Input resistance = 45k Ω
Digital outputs	24VDC Output current = 100mA max.
Analog outputs	0 - 10VDC Output current = 10mA max. Output resistance = 680 Ω

10.2.3 Analog input and output

In order to ensure that no errors occur at the analog input, the internal resistance of the supply source may not be greater than 450 Ω .

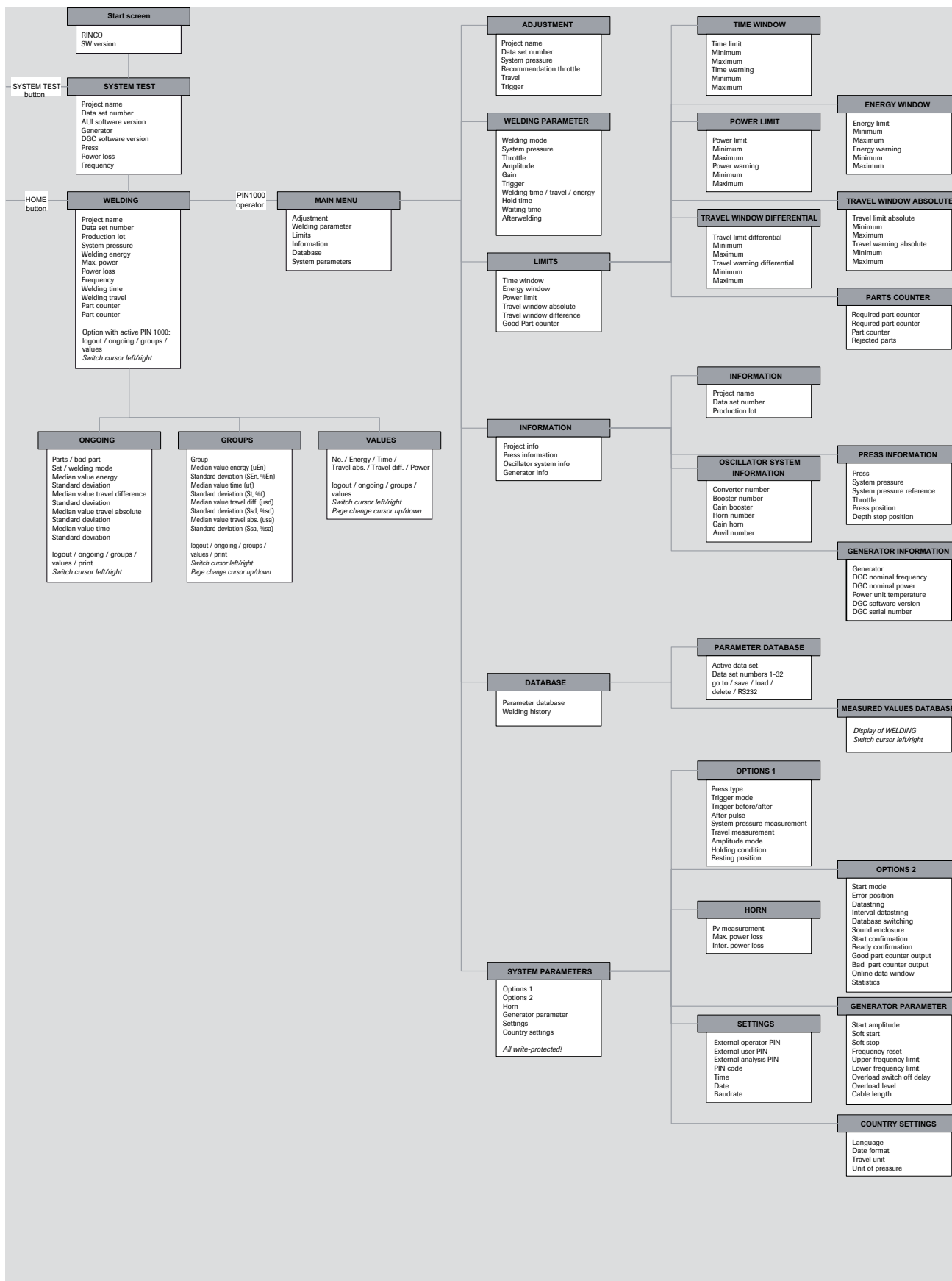


In order not to generate errors at the analog power output, the internal resistance of the sink that is connected must be greater than 68 k Ω .

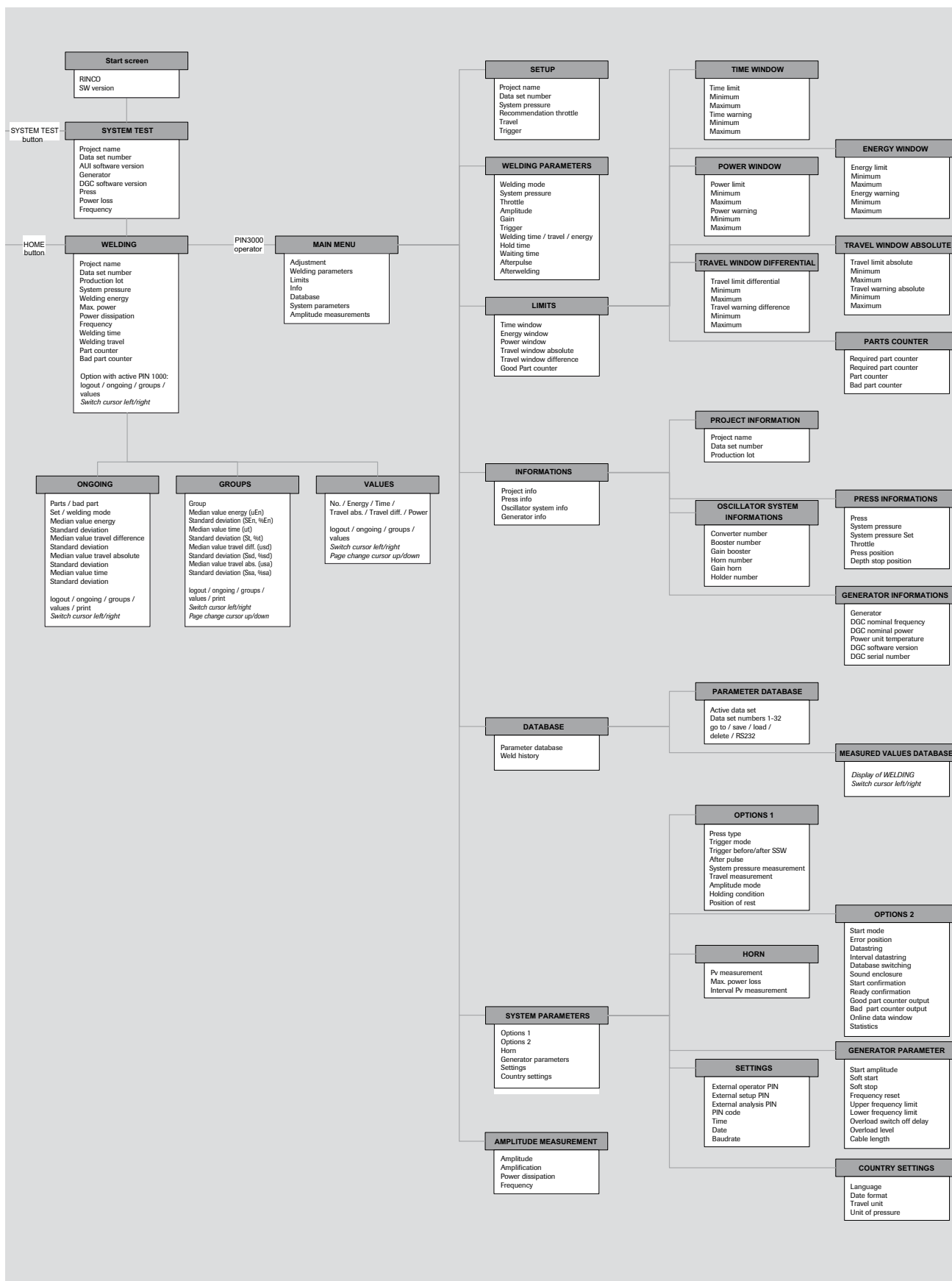


11 Maintenance and service

11.1 Menu tree PIN 1000



11.2 Menu tree PIN 3000



11.3 Description of error areas (error groups)

Error groups

002	Error generator
003	Error press
004	Error sound enclosure
005	Error Limits
006	Error digital I/Os
007	Error hardware
008	Error RS232
009	Error CANopen
020	Warning limits
021	Warning parameters

11.4 Detailed description of errors (error numbers)

11.4.1 Explanation concerning priority

Low: These errors can be cleared with buttons F1, F2 or input RESET_IN (STO_2_1 PIN9).

High: errors cannot be cleared. The generator must be switched off.

Warning: These messages are for information only. Warnings do not need to be cleared.

Error generator (error group 002:xxx)				ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
Error	Description	Priority	Type of error					
002:000	Maximum power loss reached (Pv test)	low	Oscillator	0	1	1	0	0
002:001	Supply voltage too low	high	Generator	1	1	0	1	0
002:002	Power pack +12V defective	high	Generator	1	1	0	1	0
002:003	Minimal level control final stage	high	Generator	1	1	0	1	0
002:004	Temperature final stage too high	high	Generator	1	1	0	1	0
002:005	Frequency minimum undershot	low	Oscillator	0	1	1	0	0
002:006	Frequency maximum exceeded	low	Oscillator	0	1	1	0	0
002:007	Maximum converter voltage exceeded	low	Oscillator	0	1	1	0	0
002:008	Power overload level exceeded	low	Oscillator	0	1	1	0	0
002:009	Full level control of the final stage reached	low	Oscillator	0	1	1	0	0
002:010	Converter not connected	low	Oscillator	0	1	1	0	0

Error press (error group 003:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
003:000	Error when measuring travel	low	Cycle	0	1	0	1	1
003:001	Error valves	low	Cycle	0	1	0	1	1
003:002	Error two-hand start	low	Cycle	0	1	0	1	1
003:003	Rest position of press not reached	low	Cycle	0	1	0	1	1
003:004	Error safety switch	low	Cycle	0	1	0	1	1
003:005	Maximum cycle time reached	low	Cycle	0	1	0	1	1
003:006	Welding interrupted	low	Cycle	0	1	0	1	1
003:007	Error trigger set	low	Cycle	0	1	0	1	1
003:008	Error ultrasonic active	low	Cycle	0	1	0	1	1
003:009	Error system pressure too low	low	Cycle	0	1	0	1	1

Error sound enclosure (error group 004:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
004:000	Error during initialisation	low	Cycle	0	1	0	1	1
004:001	Lifting door not open at start of cycle	low	Cycle	0	1	0	1	1
004:002	Time overrun lower lifting door	low	Cycle	0	1	0	1	1
004:003	Time overrun raise lifting door	low	Cycle	0	1	0	1	1
004:004	Enclosure door open	low	Cycle	0	1	0	1	1
004:005	Lifting door open during cycle	low	Cycle	0	1	0	1	1

Error limits (error group 005:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
005:000	Limit time max exceeded	low	Limit	0	1	1	1	0
005:001	Limit time min undershot	low	Limit	0	1	1	1	0
005:002	Limit energy max exceeded	low	Limit	0	1	1	1	0
005:003	Limit energy min undershot	low	Limit	0	1	1	1	0
005:004	Limit power max exceeded	low	Limit	0	1	1	1	0
005:005	Limit power min undershot	low	Limit	0	1	1	1	0
005:006	Limit travel absolute max exceeded	low	Limit	0	1	1	1	0
005:007	Limit travel absolute min undershot	low	Limit	0	1	1	1	0
005:008	Limit travel differential max exceeded	low	Limit	0	1	1	1	0
005:009	Limit travel differential min undershot	low	Limit	0	1	1	1	0
005:010	Target part count reached	low	Limit	0	1	1	1	0

Error digital I/Os (Error group 006:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
006:000	Stop cycle	low	Cycle	0	1	0	1	1
006:001	Stop 1 set	low	Cycle	0	1	0	1	1
006:002	Stop 2 set	low	Cycle	0	1	0	1	1
006:003	Reset set	low	Cycle	0	1	0	1	1
006:004	Start external dropped out	low	Cycle	0	1	0	1	1
006:005	External start still requested	low	Cycle	0	1	0	1	1
006:006	Inputs for data set transfer incorrect	low	Cycle	0	1	0	1	1
006:007	Analog amplitude input too low	low	Cycle	0	1	0	1	1

Error hardware (error group 007:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
007:001	Short circuit output group 1	high	Hardware	1	1	1	0	1
007:002	Short circuit output group 2	high	Hardware	1	1	1	0	1
007:003	Short circuit output group 3	high	Hardware	1	1	1	0	1
007:004	Short circuit output group 4	high	Hardware	1	1	1	0	1
007:005	Short circuit output group 5	high	Hardware	1	1	1	0	1
007:006	Short circuit output group 6	high	Hardware	1	1	1	0	1
007:007	Pressure input <1mA	low	Hardware	0	1	1	0	1
007:008	Trigger input <1mA	low	Hardware	0	1	1	0	1
007:009	Analogue amplitude input >12V (120%)	low	Hardware	0	1	1	0	1

Error RS232 (Error group 008:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
008:000	Bit overrun error (characters were lost)	low	Hardware	0	1	1	0	1
008:001	Parity error (incorrect parity character)	low	Hardware	0	1	1	0	1
008:002	Framing error (no valid stop bit, incorrect bit rate)	low	Hardware	0	1	1	0	1
008:003	Break interrupt (byte too long, incorrect bit rate)	low	Hardware	0	1	1	0	1
008:004	No receiver connected	low	Hardware	0	1	1	0	1

Error CANopen (Error group 009:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
009:000	SDO read error (possible timeout)	low	Hardware	0	1	1	0	1
009:001	SDO write error (possible timeout)	low	Hardware	0	1	1	0	1
009:002	SDO service (incorrect parameter)	low	Hardware	0	1	1	0	1
009:003	SDO access error (incorrect value range)	low	Hardware	0	1	1	0	1
009:004	SDO other error	low	Hardware	0	1	1	0	1

Warnings Limits (Warning group 020:xxx)

Error	Description	Priority	Type of error	ERROR_HIGHPRIO_OUT	ERROR_OUT	ERROR_CODE1_OUT	ERROR_CODE2_OUT	ERROR_CODE3_OUT
020:000	Time max exceeded	Warning	Warnings	0	0	0	0	1
020:001	Time min undershot	Warning	Warnings	0	0	0	0	1
020:002	Energy max exceeded	Warning	Warnings	0	0	0	0	1
020:003	Energy min undershot	Warning	Warnings	0	0	0	0	1
020:004	Power max exceeded	Warning	Warnings	0	0	0	0	1
020:005	Power min undershot	Warning	Warnings	0	0	0	0	1
020:006	Travel absolute max exceeded	Warning	Warnings	0	0	0	0	1
020:007	Travel absolute min undershot	Warning	Warnings	0	0	0	0	1
020:008	Travel differential max exceeded	Warning	Warnings	0	0	0	0	1
020:009	Travel differential min undershot	Warning	Warnings	0	0	0	0	1

Warnings Parameters (Warning group 021:xxx)

021:000	Data set empty / data not loaded	Warning	Warnings	0	0	0	0	1
021:001	Warning data not deleted	Warning	Warnings	0	0	0	0	1

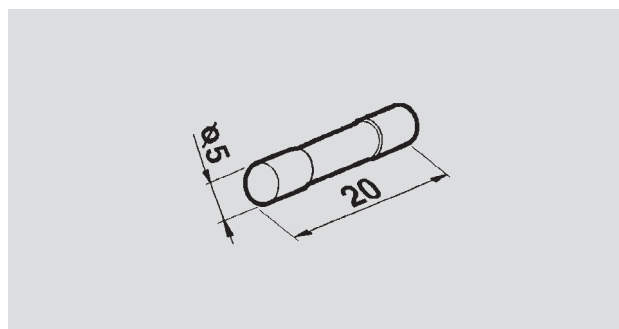
11.5 Fuse on the generator

All fuse dimensions: 5 x 20 mm.

List of the fuses for the generators

800 W

Generator	F1	F2
ADG40-800	6.3 A/T	6.3 A/T



12 Service addresses

The RINCO ULTRASONICS AG technical service agents are happy to answer any questions you may have concerning any technical malfunctions or welding problems which may occur. Our customer service agents need the following information for earnest advice:

- an exact description of the technical problem or the welding problem.
- article number and serial number of the unit

Our address:

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Date	Work performed	Technician	Remarks



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