

User's Manual

Mobile Welding System for Inside Beadless Welding

EF 110-B



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Caution

The machine has to be operated exclusively with a power supply line equipped with a protective grounding conductor, as a power supply without this safety element may cause severe machine damage. If the machine is operated through a power supply without a grounding conductor, this will void any and all warranty under which the product may be.

1 Introduction

Dear Customer:

Thank you very much for purchasing our product. We are confident that it will meet your expectations.

The development, manufacture, and check of the mobile, i. e., overhead-welding-enabled, electrofusion welding system for inside beadless plastic pipe jointing has been guided by our concern to offer a unit characterized by superior operation safety and user-friendliness. The unit was manufactured and checked according to the most recent standards as they are applied, and bearing ergonomic aspects in mind.

To ensure maximum operation safety, please conform to the appropriate messages in this booklet and the regulations for the prevention of accidents. Carefully read the User's Manual to avoid damage to the machine or hardware in its environment as well as injury.

This manual is applicable to the following system:
agru EF 110-B

Thank you.

2 Safety Messages

This User's Manual contains important instructions for operating the mobile plastic welding system for inside beadless welding agru EF 110-B safely. Every person who operates the system will have to conform to the instructions of this manual.

The machine has been developed and checked with respect to welding AGRU pipes and fittings. For welding other makes, no experiential data are available and/or no liability or warranty can be assumed for the fitness and the reliable operation of the machine.

2.1 Reading the User's Manual

The User's Manual is presented according to sections which explain the different functions of the product.

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2.2 Explaining Icons

The following expressions and icons are used in this User's Manual to refer to safety-related issues:



Caution

This icon indicates that non-compliance may result in a hazardous situation that possibly causes bodily injury or material damage.



Important

This icon indicates important messages related to the correct use of the machine. Non-compliance may cause problems of important operation and damage to the machine.



Info

This icon indicates tips and useful information for using the machine more efficiently and more economically.

2.3 Safety Messages and Information on Remaining Risk

Protect the power supply cord from cutting edges. Have an authorized service shop replace damaged cables or lines immediately.

The machine has to be operated with a 230 V, 50/60 Hz power supply with safety fuse or breaker of 16 A maximum. If power is connected through a power line manifold, the power supply has to feature an earth-leakage circuit breaker.

Use only extension cables with the following conductor sections:

- max. length of cable 25 m (80 ft) min. section 2.5 mm²
- max. length of cable 50 m (160 ft) min. section 4.0 mm²



Parts Under Power

Caution

After opening the machine or removing the cover, parts of it are accessible that may be under power. The machine may be opened exclusively by an authorized service shop.



Facing Tool

Caution

Never switch the facing tool on when it is not in its regular working position. When working with the facing tool, do not wear any jewellery and put on a hair snood or net as needed. Removing the shavings from the work area while the facing tool is running, is prohibited. Make sure nobody is present in the danger zone.



Electrofusion Fitting

Caution

A welding process must never be repeated with the same fitting, since this may cause parts under power to be accessible to the touch.



Checking the Product for Damage

Caution

Before every use of the product, check safety features and possibly existing parts with minor damage for proper function. Make sure that the push-on connection terminals work properly, that contact is fully established, and that the contact surfaces are clean. All parts have to be installed correctly and properly conform to all conditions in order for the product to function as intended. Damaged safety features or functional parts should be properly repaired or replaced by an approved service shop.



Acceptable Work Conditions

Caution

The work zone has to be clean and has to have proper lighting. It is dangerous to operate in a humid environment or close to flammable liquids.

The electrofusion fitting manufacturer's installation instructions and all applicable rules and regulations have to be respected in all cases. Acceptable work conditions have to be ensured (e.g., sufficient distance between the machine and other functional areas of the workshop).

Overhead work is prohibited, unless:-

- the machine is safely and securely fastened and positioned;
- access to a large area around the worksite is controlled/limited (risk of falling objects); see also Sect. 2.5;
- a hardhat and safety goggles are worn (risk of falling objects and small blades of shaving during component facing)



Power Supply Only through Line with Protective Grounding Conductor

Important

The system has to be operated exclusively with a power supply line equipped with a protective grounding conductor, as a power

supply without this safety element may cause severe damage.
If the system is operated through a power supply without a grounding conductor, this will void any and all warranty under which the product may be.



Important

Competent Use of the System

Use the appropriate connection terminal that is compatible with the electrofusion fitting type used. Be sure the contact is firmly established and do not use connection terminals or terminal adapters that are burnt or not designed for the intended use. Do not carry the product by its cables and do not pull the power cord to unplug the unit from the socket. Protect the cables against heat, oil, and cutting edges.



Important

No Foreign Bodies in Work Area

The system must never be used if there are foreign bodies or objects that might interfere with the process in the work area; in particular, it must not be started if anything could compromise or damage the welding cable.



Info

User's Manual

The User's Manual has to be available at any time on the site where the machine is used. If the User's Manual should come to be incomplete or illegible replace it without delay. Feel free to contact us for assistance.

2.4 User/Operator Obligations

- The system may be operated exclusively by persons who are familiar with the applicable rules, the guidelines for the prevention of accidents, and the User's Manual.
- The system may be operated only when observed. Only persons who were properly trained by agru or another, authorized organization and whose training was acknowledged by an appropriate certificate are allowed to operate and observe the system. Other persons must neither operate nor observe it.
- The operating/owning organization engages to check at reasonable intervals if the system is operated by the users with the intended use and under proper guidelines of safe work.
- The user has to make sure that only one person is present in the zone where the system is operating.
- The system must be in proper state of repair when it is put into service. Prior to starting the system, the user is required to verify that the system is safe and in proper state of repair.

2.5 Worksite Description

- The conditions have to fully ensure that the system cannot slide. In case of overhead welding operations, the mechanical structure has to be securely fastened at the components to be jointed with the supplied belts.
- Worksite access limitations have to be provided. Appropriate equipment to achieve this can be requested from a service point or the selling entity.

2.6 Warranty

Warranty claims may be raised only if the conditions for warranty given in the General Terms and Conditions of Sale and Shipment obtain. One precondition is that proper maintenance according to the required schedule (see Sect. 7) is ensured.



The term of warranty under which the welding machine is shipped is 12 months:-
 — from the date of purchase, if the machine is bought as a new machine;
 — from the date of first use, if it is used independently of purchase (e.g. when lent) or not bought as a new machine.

2.7 Transport and Storage

During transport, the machine must be at all times in the transport box it is shipped in.

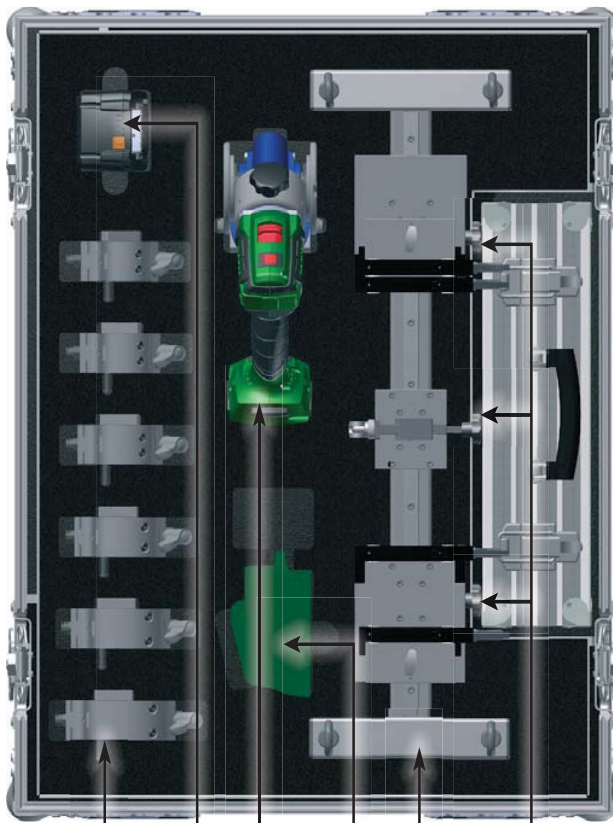


During transport, the movable parts have to be secured with the transport lock at all times (see guidelines and figures below).
 Important

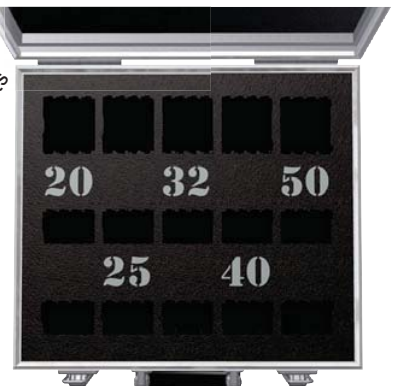
The transport box should also be used to store the machine. The machine has to be stored in a dry location, be clean or has to be cleaned, and be locked against unwanted operation.



When the printer is moved or shipped, the roll of labels in the printer has to be removed.
 Important



- Fitting Clamps
- Battery for Facing Tool
- Power Facing Tool !! Remove battery from power tool during transport !!
- Charger for Facing Tool
- Mechanical Structure
- Star Knobs Serving as Transport Lock
- Box for Welding Cable, Air Hoses for Cooler and Balloon, Accessories, etc.
- Balloon Tray
- Second Battery for Facing Tool
- Label Tag Printer
- !! Remove label roll during transport !!
- Control Unit
- User's Manual
- Case for Reducer Inserts



Inside view of the case for the reducer inserts

2.8 Identifying the Machine

Each machine is identified by a name plate. It shows the machine model (“Typ”), its year of manufacture (“Baujahr”), the serial number (“Geräte-Nr.”), the rated power (“Netz”), and the manufacturer (“Lizenzhersteller”).

Wulstlos-Elektroschweißsystem	
Typ	agru EF 110-B
Geräte-Nr.	11015801
Netz	230V 50Hz 2000VA 80% ED
Gewicht	21kg Baujahr: 2015
Lizenzhersteller	
HÜRNER Schweißtechnik GmbH	
Nieder-Ohmner Str. 26	
D - 32325 Mücke	

3 Product Description and Principles of Operation

3.1 Intended Use

The mobile welding system for inside beadless welding agru EF 110–B is intended exclusively for joining plastic pipes and fittings according to the electrofusion process, i. e. electrical-thermoplastic jointing with a heater coil fitting (also called an electrofusion fitting). See Sect. 3.3 for an overview of the welding process enabled by this system.

Typ	agru EF 110-B
Exklusives Produkt der Fa.	
agru Kunststofftechnik GmbH	
Ing.-Pesendorfer-Str. 31	
A - 4540 Bad Hall	
Tel. +43 7258 7900	
Fax +43 7258 3863	

Only the welding parameters encoded in the fitting-specific bar code can be used for a welding operation. When jointing with agru’s specialty fittings for inside beadless welding, RFID transponder cards are used instead of the bar code as the means of data input. If welding parameters are entered manually, conform to the fitting manufacturer’s instructions. Any modification of the control software or the welding parameters it contains is strictly prohibited.

It is also part of the intended use to conform to the instructions provided in the User’s Manual.



Important

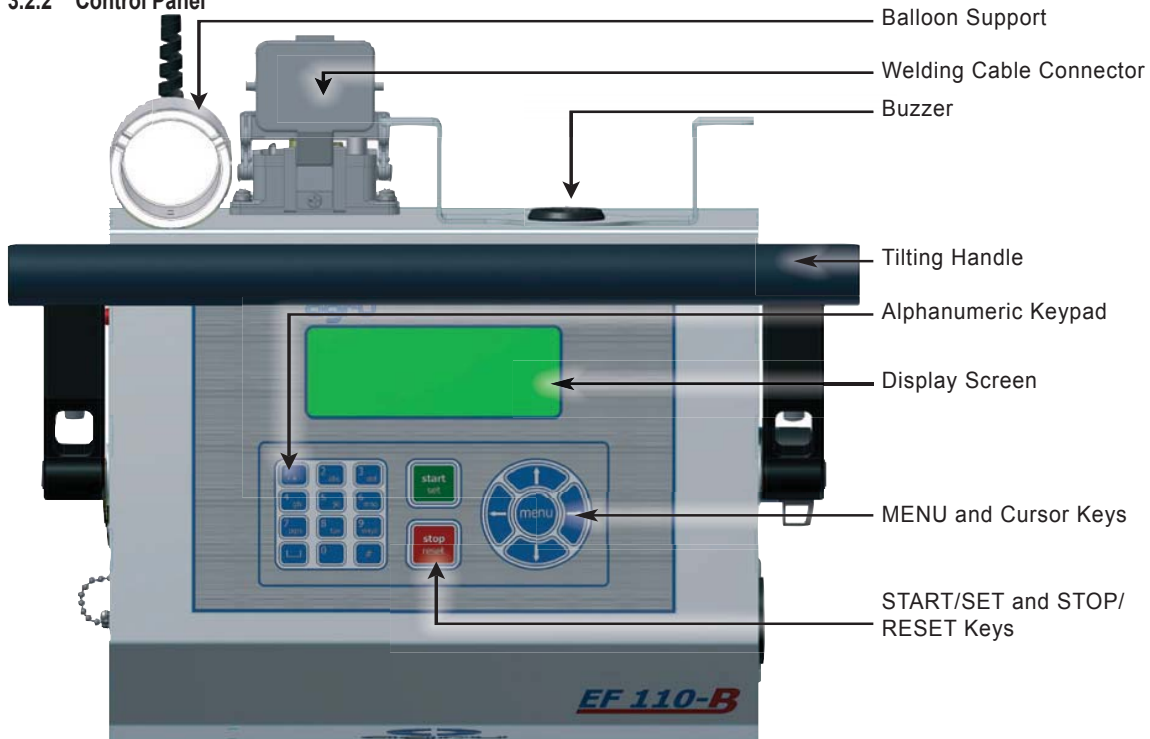
The manufacturer can in no circumstances be held liable for damage or consequential damage that occurs as a result of the non-compliance with the procedures described in the User’s Manual, the failure to use relevant welding parameters, or the non-intended use. Any such deviation will void any and all warranties under which the product may be.

3.2 Machine Description

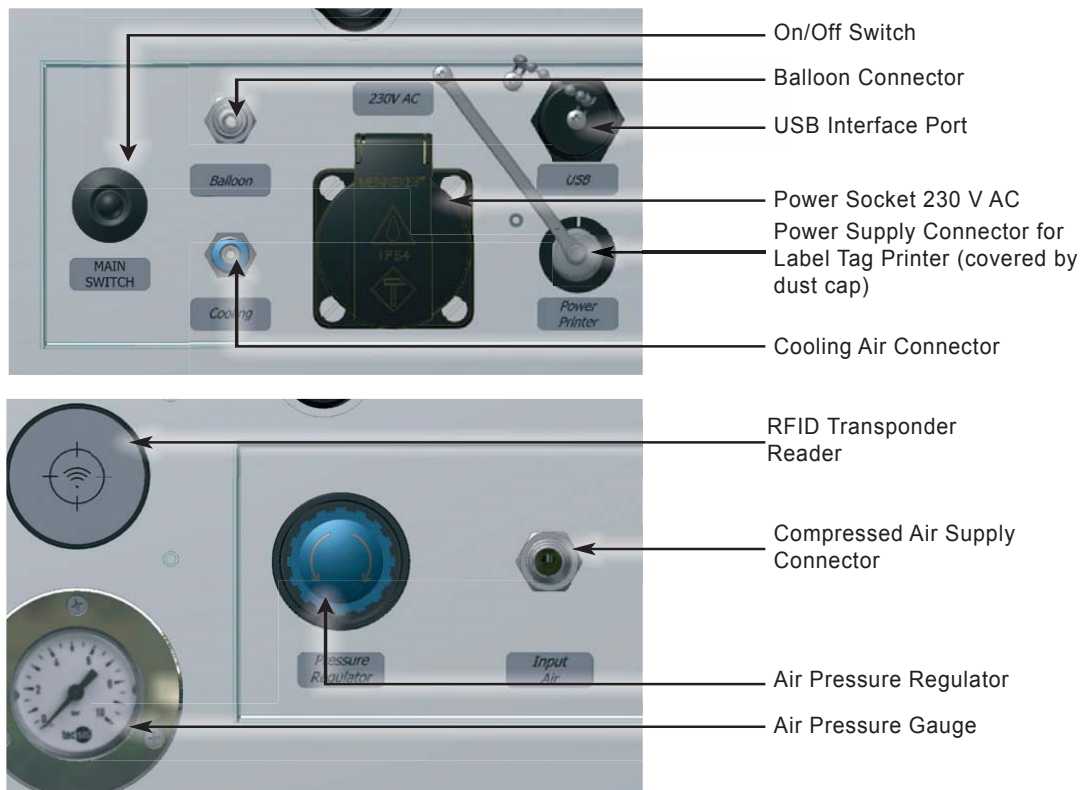
3.2.1 Component Overview



3.2.2 Control Panel



3.2.3 Ports and Switches



The machine can be used as an in-shop or worksite system and with anodized aluminum components, it is also suited for clean room applications. The machine enables users to enter the data that are relevant for the welding process and for the traceability of the welded joint. From the entered welding parameters, it calculates the applicable welding time and controls the welding process automatically.

All welding and traceability data are entered with the keypad on the front panel or read from a code card using RFID radio identification.

The welding process is monitored in its entirety and saved to a welding report. All welding reports can then be downloaded to a USB stick as an abstract or extended report in the PDF format or in the DataWork database management format.

Using the menus, the machine can be customized to the application at hand (see Sect. 4.3, Configuring the Machine).

3.2.4 Specifications

agru EF 110-B	
Power Supply Characteristics	
Voltage	230 V AC
Frequency	50 / 60 Hz
Rated Power	2000 VA, 80% duty cy.
Input Current	approx. 10 A
Max. Output Current	approx. 40 A
Output Voltage	8 V - 48 V
Welding Operation Specs	
Ambient Temperature (operation)	- 10°C to + 45°C (+ 14°F to 113°F)
Ambient Temperature (storage)	- 25°C to + 65°C (- 13°F to 149°F)
Operating Range	max. component size 110 mm
Ingress Protection	IP 54
Welding Report Memory Capacity	10,000 reports
USB Communication Interface	USB v 2.0 (480 mbit/s)
Dimensions and Weight	
Dimensions (W x D x H)	
Mechanical Structure	675 x 200 x 190 mm
Control Unit	420 x 320 x 240 mm
Transport Box	800 x 600 x 608 mm
Weight	
Mechanical Structure	approx. 6 kg
Control Unit	approx. 15 kg
Facing Tool	approx. 4 kg
Transport Box with All Elements	approx. 83 kg
Empty Transport Box	approx. 42 kg

3.3 Welding Process Overview

The welding system allows welding electrofusion fittings that feature a bar code. Every e-fitting is provided with a tag with one or two bar codes on it. The structure of this code is internationally standardized. The first code, encoding the data on proper welding, complies with ISO 13950, the second code, if present, encoding the component traceability data, complies with ISO 12176. The welding parameters can also be entered manually.

When using an inside balloon in the pipe, beadless welding is possible. To automate a beadless welding process, a special code with 34 digits, which builds on the abovementioned 24-digit code^s, has to be read from a RFID transponder card or entered manually. The parameters related to balloon pressure can also be entered manually.

The welding system is microprocessor-controlled and:-

- controls and monitors the welding process in a fully automated way, when the welder starts it after component preparation,
- determines welding duration depending on ambient temperature,
- shows all information on the display in plain text.

The welding process is performed as follows:

- All welding parameters and traceability data for the components are read from a RFID transponder card or a bar code or entered

manually on the front panel keypad (as and when requested on the screen by the system).

- The reducer inserts are set into the clamps of the mechanical structure of the system.
- The facing tool is set onto its carriage, and the component ends are faced.
- The outcome of facing is checked and, if o.k., the facing tool is replaced with the fitting clamp and the electrofusion fitting, set into it.
- The contact terminals of the welding cable are connected to the connectors of the the electrofusion fitting; push-on adapters appropriate for the fitting are added to the terminals previously if needed.
- Using the spacer bar for reference, first one component is inserted into the fitting, then the spacer bar, removed and the second component is inserted into the fitting.
- If a beadless joint is desired, the inside balloon is positioned before the second component is inserted into the fitting; when inserting the balloon, it has to be clean.
- When the correct position of the balloon is confirmed on the screen, the system fills it with compressed air, asks on the screen if all preparatory steps are done, and, when the answer is affirmative, performs the welding operation automatically through to the cooling stage.
- Only at the end of the cooling stage, the connection between the welding system and the electrofusion fitting may be disconnected. If this happens earlier, the welded joint is deemed incorrect and of poor quality. If the operation was a beadless welding, the system keeps the balloon inflated to the end of the cooling stage, and the user will have to release the air before the next jointing job.

4 Operation

Before putting the machine into operation, review the transport locks and safety auxiliaries as well as the way the machine is set into its transport box. Whenever the machine is moved or shipped, it has to be set into this box and secured for transport (see Sect. 2.7 for reference).



Important

When the printer is moved or shipped, the roll of labels in the printer has to be removed



Info


When installing the reducer inserts, place the narrower inserts into the inner clamps, the broader inserts, into the outer clamps. The insertion and the removal of the inserts is performed **without any tools**. The reducers are secured to the clamps by the force of the magnets only.


4.1 Check-out, Turning on, Selecting the Display Language

Place the machine, in particular the mechanical structure with the pipe clamps, on a level surface and ensure it cannot slide. Sufficient distance has to be kept to other areas, especially to those in which flammable materials are used. When starting the machine up, remove all transport locks (see Sect. 2.7) if they are locked, before applying power to the system. Furthermore, if the label tag printer is planned to be used later on, connect it to the machine and insert the roll of labels before the first welding operation.

Depending on the piece that is going to be welded, the outer clamps may have to be repositioned or removed. To do so, loosen the locking thumb screws and either remove the clamp or re-adjust it and secure it by tightening the locking screws again.


If the diameter of the pieces to be welded is smaller than the clamp, insert the reducer inserts. This can be done without using any tools since the inserts are fastened in the clamps by magnetic attraction.


 **Important** Pipe clamps and reducer inserts have to be clean or must be cleaned before welding starts. To insert or remove the inserts, do not use heavy tools (hammer, wrench). They may damage the inserts and the magnets.


 **Important** If power supply to the welding system is by a generator, read carefully and respect the manual that comes with the generator. Furthermore bear the following in mind:
The required nominal generator capacity as determined by the power supply requirement of the largest electrofusion fitting to be welded depends on the power supply specifications, the environment conditions, and the generator type itself including its control/regulation characteristics.

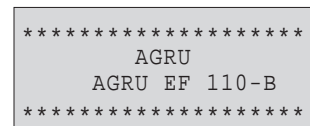
Nominal output power of a generator 1-phase, 220 - 240 V, 50/60 Hz:
d 20..... d 110 3.2 kW

Start the generator first, then connect the welding unit. The idle voltage should be set to approx. 240 volts. When turning the generator off, disconnect the welding unit first.
The working output power of the generator decreases by about 10% per 1,000 m of altitude. During the welding process no other device connected to the same generator should be operated.

 **Caution** Overhead work is prohibited, unless:-
• the machine is safely and securely fastened and positioned;
• access to a large area around the worksite is controlled/limited (risk of falling objects); see also Sect. 2.5;
• a hardhat and safety goggles are worn (risk of falling objects and small blades of shaving during component facing)

 **Important** Make sure all connectors are tight in their sockets and make sure that the machine is operated only if the conditions for safe and intended use are met (see also section 2). Safety on the power supply side will be ensured by a 16 A slow blow fuse. An earth-leakage/residual current breaker is required when the system is used on construction sites.

 **Important** If the label tag printer is going to be used with the machine, it, too, has to be fully connected **and switched on** before the machine is turned on. Failure to do so may result in loss of data and damage to the machine. First connect the power supply from the machine to the label tag printer, then switch the printer on, and finally connect the USB data cable to the appropriate ports of the machine and the printer, **then only** switch the welding system on.



Display 1

After preparing the machine for welding and connecting its power supply cord to the mains supply, the machine is turned on using the On/Off switch. The welcome screen reproduced in Display 1 appears on the screen.

The machine then takes the user to the welder code input screen if welder code input is enabled in the configuration menu.

If the machine finds that something is wrong or that the last joint was not properly welded (power supply failure, clock failure, etc.; see Sect. 4.7),

an error message is displayed instead of the welder code input screen. Then, the error has first to be cleared.

Read the welder identification code by holding a transponder card in front of the RFID reader. Alternatively reading it from a bar code or typing it on the front panel and saving it by pressing START/SET is also possible.

```
Enter Welder Code
*****
*****
```

Display 2



All inputs for which a data card is available can be entered by having the RFID reader read that card.



The alphanumeric keypad is designed and works like the keypad of a common mobile phone without touch screen display. All characters found on a key can be “browsed” by pressing that key repeatedly at short intervals. As soon as “browsing” generates the desired character on the screen, wait a little longer until you press the next key to use the displayed character. The first character always is the number on the respective key, then the letters or marks in the order on the key, i. e., for instance, with the key “2 | a | b | c” the 1st keypress brings up “2,” the 2nd “a,” the 3rd “b,” and the 4th brings up “c.” By default, lower-case letters appear on the screen. To enter upper-case letters, hold down the ↑ key while selecting the appropriate letter by one or several keypresses.

4.2 Entering Traceability Data for the Joint

After the welder identification code was entered, the traceability data for the joint have to be entered. All traceability data enabled in the configuration menu at “Data Recording” (see Sect. 4.4) have to be entered before the welding process. The welding unit prompts the user to enter them either before or after entering the e-fitting bar code (see Display 3). Depending on what data is entered, either its repeated input is mandatory (e. g., the welder ID code; see Sect. 4.1) or previously entered data can be changed and confirmed or confirmed without changes (e. g. the commission number; see Sect. 4.3).

```
Enter Fitting Code
10.10.14      08:24:58
Supply       229V  50Hz
No Contact
```

Display 3

Certain traceability data can also be accessed quickly, via a selection screen, by pressing the ⇐ cursor key (see Display 4), either for viewing or for entering or changing/confirming them (for the AutoWeld feature mentioned along with them on this screen, see Sect. 4.6.4).

When the traceability data were entered, the machine displays the bar code input screen again (see Display 3). In this display, the no-contact message on the last line disappears when the contact from the welding system to the electrofusion fitting has been established.

```
**** Recording ****
AutoWeld
>Welder Code
Commission No.
```

Display 4

4.3 Entering or Changing the Job Number and Joint Number

Entering these two traceability data is explained as an illustration for all these data, the input of which is performed in the same manner. Only the weather conditions are selected in a list using the ↑, ↓ cursor keys, and the selection is then confirmed by the START/SET key.

The commission number input screen is shown by the unit before welding or accessed by the user in the quick access screen (Display 4). It can be entered using the alphanumeric keypad (see last Info in Sect. 4.1) or by reading it from a bar code using the scanning pen or scanner or from an RFID card using the reader. The maximum length is 32 characters. Confirm your input by pressing the START/SET key. The job number will be saved to memory and will appear in the printed welding report.

```
* Commission Number*
*****
*****
```

Display 5

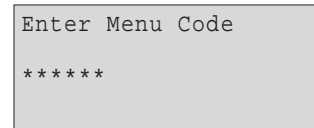
Provided it was enabled in the configuration menu (see Sect. 4.4), a commission number-related joint number is also recorded and saved to

the report. To say that the joint number is related to the job, or commission, number means that the system checks, when a commission number was entered, whether it exists already in the internal memory. If so, it takes the highest existing joint number for that commission, increments it by 1, and applies this new joint number to the next welding operation in that commission.

4.4 Configuring the Welding System

In Display 3, the welder has the possibility to:

- read the welding parameters from a bar code or a RFID card and start a welding process (move on to Section 4.6);
- enter the welding parameters for the next welding manually and start the welding process (move on to Section 4.5);
- change the systems settings in the configuration menu (press the MENU key).



Display 6

Accessing the menu requires an access code (see Display 6). The menu is structured according to three submenus, the third of which, “Sensor Parameters,” does not contain any parameters important for welding, but only for set-up and maintenance work. They are therefore protected by a second access code that is disclosed only to authorized personnel. The configuration menu has the items listed in the following table.

To toggle from « On » to « Off » or vice versa for an option, press the ⇨ cursor key, to open a submenu or go to an additional screen for an option, which is indicated by the letter – M –, press the MENU key.

Designation	Setting	Description / Data to be entered
—— “Settings” submenu ——		
AutoWeld	ON / OFF	"on" means that for two subsequent welding with identical welding/ fitting parameters, the parameters of the preceding one are applied automatically to the following one (see Sect. 4.6.4), "off," that the parameters have to be read or entered again for every new welding operation.
Check Code Expiry	ON / OFF	"on" means that the welder identification code has to be current and not expired (default period of validity 2 years from code issuance), or the welding operation cannot be started, "off," that the validity of the code is not checked at all.
Memory Control	ON / OFF	if ON: Machine stops when the memory is full; if OFF: Machine overwrites the oldest report when the memory is full.
Manual Input	On / Off	"on" means that the manual input of welding parameters or computed parameters is possible, "off," that the manual input is not allowed.
Welder Code Options	Menu	In a sub-menu, it can be determined when the welder code, if it is enabled at "Recording," has to be entered: always, i. e. before every single welding operation, only before the first welding operation after switching the unit on or only after the first welding operation of a new day/date..
Language	Menu	In a sub-menu, the language in which display texts and reports are edited can be selected.
Date/Time	Menu	In a sub-menu, date and time can be set.
Buzzer Volume	Menu	In a sub-menu, the volume of the audible signal that the machine emits to validate the execution of a given step in the process can be set.
Temperature Unit (°C / °F)	Menu	In a sub-menu, the temperature unit used for displaying and saving welding data can be selected.
Unit of Pressure (bar / psi)	Menu	In a sub-menu, the unit of pressure used for displaying and saving welding data can be selected.

Designation	Setting	Description / Data to be entered
Inventory Number	Menu	In a sub-menu, the number under which the unit is inventorized with the operating company can be entered.
Number of Tags	Menu	In a sub-menu, the number of tags to be printed with respect to a welded joint can be selected.
—— “Recording” submenu ————		
Welder Code	ON / OFF	“on” means that the welder identification code has to be entered as set with “Welder Code Options,” “off,” that this is impossible.
Commission Number	ON / OFF	“on” means that the commission number (job number) will have to be entered or confirmed before every new welding, “off” that the user is not prompted to enter it.
Joint Number	ON / OFF	“on” means that the unit assigns an automatically incremented joint number to every welding operation belonging to a commission already known, and displays this number on the screen next to the report number, “off” that no joint numbers will be assigned at all.
Additional Data	ON / OFF	“on” means that the additional data will have to be entered or confirmed before every new welding, “off” that the user is not prompted to enter them.
Fitting Code	ON / OFF	“on” means that the second, so-called traceability code of the electrofusion fitting has to be entered before every welding, “off,” that this is not possible.
Pipe Codes	ON / OFF	“on” means that the codes of both pipes/components (ISO-compliant welding and traceability codes) have to be entered before every welding, “off,” that this is not possible.
Pipe Length	ON / OFF	“on” means that the length of both pipes/components has to be entered before every welding, “off,” that this is not possible.
Weather Conditions	ON / OFF	“on” means that the weather has to be selected in a list before every welding, “off,” that this is not possible.
Installing Company	ON / OFF	“on” means that the company that performs the installation work has to be entered before every welding, “off,” that this is not possible.
Print Tags	Menu	means that by pressing the MENU key, the user can access a sub-menu for starting to print (a) label(s) with reference to a given welding operation, with the optional label tag printer.

4.5 Entering Welding Parameters Manually

To be able to enter the welding parameters manually, you have first to connect the electrofusion fitting to the welding unit with the welding cable. The manual input of the parameters can then be accessed by pressing the \downarrow arrow key. The screen will show a menu as reproduced in Display 7, provided manual input is enabled in the configuration menu (see Sect. 4.4). In other words, the manual parameter input replaces reading the bar code of the fitting with a scanning pen or scanner or reading a RFID transponder card (see Sect. 4.6).

Using the arrow keys \uparrow and \downarrow you can select “Enter Voltage/Time” or “Enter Fitting Code” (i.e., the numbers that represents the code of the fitting to be used). Confirm your selection by pressing the START/SET key.

```

**  MANUAL INPUT  **
>Enter Voltage/Time
Enter Fitting Code
    
```

Display 7

4.5.1 Manually Entering Welding Voltage and Time

If this option was chosen in the manual parameter input menu, a display like the one to the right appears on the screen. Use the alphanumeric keypad (see last Info in Sect. 4.1) to set the welding voltage (V) and the welding time (T1), according to the fitting manufacturer’s instructions, then press the START/SET key to confirm your input. The “Start ?” message displayed after the confirmation by START/SET (see Display 10) indicates that the unit is ready for welding.

```

V = 16V
Tc = 0000s
T1 = 0500s
P1 = 00.0bar
    
```

Display 8

If an inside beadless welding operation with balloon is at hand, manual data input must also include the pressure inside the balloon (P1) and the cooling time after the welding process (Tc). This cooling time has to be observed. If it were cancelled or aborted, the welding system will reference the joint as a faulty welding operation.

4.5.2 Entering the String of Numbers

If this option was chosen in the manual parameter input menu, the “Enter Fitting Code” display shows. The 24 or 34 characters of the electrofusion fitting code to be entered display as plus characters (+). Use the alphanumeric keypad (see last Info in Sect. 4.1) to enter the code and press START/SET to confirm your input and have it decoded. If the code entered is not correct, a “Code Error” message appears; check the string of numbers and correct as needed. If the code is correct, the decoded data is displayed, and the “Start ?” message (see Display 10) indicates that the unit is ready to start welding.

Inside beadless welding with inside balloon is possible only when a 34-character code is entered, since a 24-character code does not include any data on controlling balloon pressure and cooling time. If a 24-character code is entered, the system starts a welding process with balloon control.



Important

Only when the manual welding parameter input includes either a balloon pressure (P1) of more than 0 bar or a 34-character fitting code, inside beadless welding with balloon control is possible. If it does not, the balloon control subsystem is not even started when the welding process begins.



Info

If a cooling time (Tc) is entered in the manual parameters, this cooling time has to be waited before the cable between the system and the electrofusion fitting is disconnected. If a cooling time was entered and yet the cooling stage was cancelled, the system will assess the joint as being faulty.

4.6 Performing the Welding Process

4.6.1 Facing the Component Ends before Welding

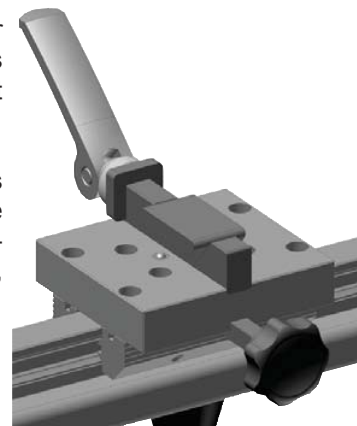
If the diameter of the components to be jointed is smaller than the maximum size of the clamps, install the appropriate reducers in the clamps. This does not require any tools. Magnets hold the reducer inserts in the clamps.

Unlock all three carriages (left-hand and right-hand clamp and facing tool/fitting clamp carriage) at their respective star knobs.

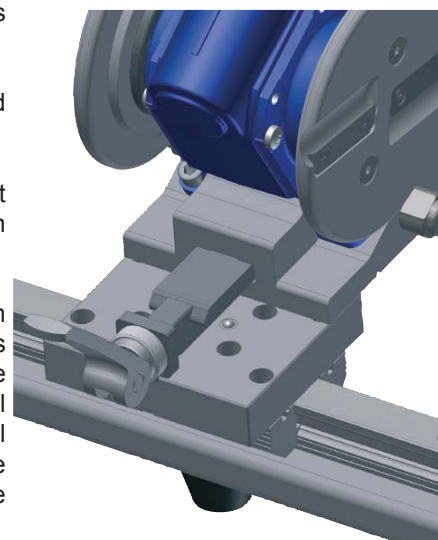
Then slide the power facing tool as far as it will go onto the seat on top of the carriage of the mechanical structure and lock it in place by pushing the quick release lever down.

Insert the components to be jointed into the clamps, one of them left, the other, right of the facing tool. Be sure that on both sides they project enough over the clamps on the inside for the blade of the facing tool to be able to cut a sufficient length of material while facing. The spacer pins on both sides of the facing tool will facilitate this process: when the component butts touch the the facing tool, the spacer pins must not touch yet the inside surface of the clamps.

Reposition the outer clamps on both sides as needed by loosening then retightening the thumb screw at their far end.



Star knob locking the fitting clamp/facing tool carriage (identical knob on the other carriages)



Sliding the facing tool onto the seat on top of its carriage; to lock, lower quick release lever on the front of the seat

In the next step, one of the two carriages that support the clamps has to be locked using the star knob, and the component in the other clamp has to be pressed manually and consistently against the facing tool. Ideally, therefore, a right-handed person will lock the left-hand carriage and press the component on the right against the facing tool, while a left-handed person will lock the right-hand carriage and press the component on the left against the facing tool.

Using its star knob, lock the carriage that is appropriate for you, switch the power facing tool on at its On/Off switch, and push the other carriage towards the facing tool. This will also align the facing tool properly right on the midline between the two components.



Verify that the direction of rotation of the facing tool is o.k. If it turns the wrong way, the direction of rotation can be reversed using the switch on the power facer.

Important

Go on facing until the spacer pins of the facing tool touch the inside surface of the inner clamps on both carriages. Then switch the facing tool off.

When you are done facing, check the outcome of the process and proceed to the next step only when the outcome is satisfactory. The facing process may also be repeated, if needed, after repositioning the components in the clamps.

4.6.1 Connecting the Electrofusion Fitting

Release the previously locked carriage by untightening the star knob. Move both carriages apart from the facing tool and lift the quick release lever to be able to slide the facing off its seat on the middle carriage of the mechanical structure.

Performing the same steps in reverse order, place the fitting clamp the matches the diameter of the components to be jointed onto the middle carriage. Insert the fitting into the fitting clamp and close the clamp around the fitting, making sure that the openings fall over the connectors of the fitting for the terminals of the welding cable. Lock the fitting clamp by tightening the thumb screw on its front.

Connect the connection terminals of the cable to the e-fitting and check for proper contact. Use terminal adapters if needed. The contact surfaces of the cable connection terminals or adapters and the fitting have to be clean. Dirty terminals may lead to improper welding and also to overheated and fused connection terminals. Protect the cable connectors against getting dirty at all times. Terminals and push-on adapters should be considered consumables and, therefore, have to be checked before every welding operation and replaced if damaged or dirty.

When the electrofusion fitting is connected, the “No Contact” message disappears and the number of the next welding report appears (see Displays 3 and 9).

4.6.2 Reading the Fitting Code with a Scanning Pen or Handheld Scanner

Only the bar code on the tag sticking on the fitting to be welded may be used. It is not acceptable to read the fitting code tag of a fitting of a different kind if the intended one is damaged or unreadable. The same holds by analogy for transponder cards encoding the welding parameters. **An inside beadless welding requires a transponder card with a special 34-digit code.**

Read the fitting code either by holding a transponder card in front of



Enter Fitting Code	
10.10.14	08:24:58
Supply	229V 50Hz
Rep. No:	0187/022

Display 9

Start ?	
Temp.:	20°C
HST	315mm 58s
SAT	40.00V 0.80Ω

Display 10

the transponder reader in the side panel of the system or by moving the scanning pen in one consistent, swift motion across the code tag or holding the scanner in front of the bar code at a distance of 5 to 10 cm (2 to 4 inches), where the red line indicates the reading area. Then push the reading button. If the data are correctly read, the welding unit confirms this by an audible signal and displays the decoded data on the screen (see Display 10).



The displayed values are the nominal welding parameters contained in the fitting bar code or computed based on these data. They are displayed before the actual resistance of the electrofusion fitting is measured. This means that even when the shown ohm value is o.k., a resistance error may still be detected (see Sect. 6.2). Only when the welding process starts, the display shows the actual, measured welding parameters.

The “Start ?” message means that the unit is ready to start the welding process. Check the read data and if you see that they are erroneous, delete them by pressing the STOP/RESET key. The read data are also deleted if the welding unit is disconnected from the electrofusion fitting.

4.6.4 Direct Welding with the AutoWeld Feature

If two welding operations with electrofusion fittings with the exact same welding parameters succeed each other, it is not necessary to read a fitting bar code or enter welding parameters manually. To start a welding operation that is fully identical to the preceding one, it is sufficient to use the AutoWeld feature, provided it was enabled in the configuration menu (see Sect. 4.4). It is accessible from the quick selection screen opened from the “Enter Fitting Code” screen with the ⇐ arrow key (see Sect. 4.3). In this screen, the selection cursor can be moved using the ↑ and ↓ cursor keys the selection is made with the START/SET key.



Important

It is under the user’s responsibility to rely on the AutoWeld feature only when the preceding and the planned welding operation and electrofusion fitting are really fully identical to each other. An erroneous or negligent use of the feature will result in a poor, unstable joint.

4.6.5 Inserting the Components and the Balloon at the Start of the Welding Process



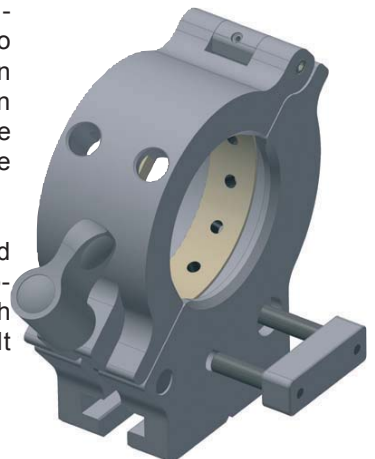
After the fitting bar code was read, the input of all traceability data related to the components themselves that were enabled in the configuration menu (see Sect. 4.3, 4.4), is requested by the system.

After reading or entering the fitting code, the welding process can be started using the START/SET key, when the “Start ?” message is displayed and there is no indication of a problem.

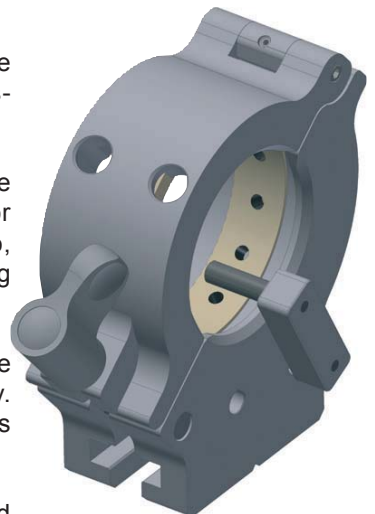
The START/SET must not be pressed before both components have been inserted into the electrofusion fitting — and the balloon as well for an operation that should be beadless. While the components and, if so, the balloon are being inserted, the thumb screw at the front of the fitting clamp must not be fully tightened yet.

With common electrofusion fittings that feature a midline abutment on the inside, the two components can be inserted into the e-fitting right away. With specialty e-fittings that allow inside beadless welding, the process has to be performed as explained in the following three paragraphs.

First pull the spacer bar away from its parking position on the right-hand side in the bottom of the fitting clamp and install it inside the fitting in



Locked fitting clamp (fitting not shown) with spacer bar pulled out from its parking position ...



... and spacer bar in its working position

its working position. Then insert the component lying in the left-hand clamp into the fitting as far as needed for its end to touch the spacer bar, which may require repositioning the component in the clamp. When the component touches the spacer bar, abutment of both components on the midline of the fitting is guaranteed.

When the component lies inside the fitting, bring the spacer back to its parking position and route the compressed air supply hose from the system to the fitting through the component already lying in it. Connect the fitting to the balloon and position the balloon in a central position in the fitting. This is the case when the mark printed on the balloon is just visible in front of the butt of the inserted component.

Then insert the component in the right-hand clamp over the balloon into the e-fitting, which, again, may require repositioning it in the clamp.

When both components have been inserted into the fitting, first lock the thumb screw of the fitting clamp, then lock both clamp carriages and the fitting clamp carriage by tightening all three star knobs.

Pressing the START/SET key in a welding operation without inside balloon will trigger a confirmation message "Pipe treated?," which in turn requires a confirmation with the START/SET key to start the welding proper (see Display 11).

Act. Time:	56sec
Nom. Time:	90sec
35.00V 1.57Ω 22.29A	

Display 11

In a welding operation with inside balloon, the various steps of component preparation have to be confirmed individually. First clean the component ends properly, face them, and do not touch them anymore with your bare hands as far as possible. Finally insert the previously cleaned inside balloon into the components to be jointed in such a position that is centered on the midline inside the electrofusion fitting when the welding process will start. Then the carriages have to be secured.

The welder will be prompted on the display screen for every one of these component preparation steps and will have to confirm them by pressing the START/SET key. When this is done, the welding process starts (see Display 12) by the system creating the balloon inside pressure that was previously entered or is contained in the code. Balloon pressure build-up is also indicated on the screen for information.

4.6.6 Welding Process

The welding process is monitored for its entire duration applying the welding parameters contained in the fitting code or entered manually. The welding voltage, the resistance, and the welding current are displayed in the lower line of the screen.

Act. Time:	56sec
Nom. Time:	90sec
Act. Pres.:	1.00bar
Cooling Time:	300sec

Display 12

4.6.7 End of Welding

The welding process ends successfully if the actual welding time corresponds to the nominal welding time and the buzzer can be heard twice.

The welding process has failed if a plain-text error is displayed on the screen and the audible signal buzzes continuously. An error has to be acknowledged by pressing the STOP/RESET key.

4.6.8 Cooling Time

The cooling time as given in the electrofusion fitting manufacturer's instructions has to be respected. If the bar code provided by the fitting manufacturer contains cooling time data, it will be displayed at the end of the welding process and will be counted down to zero. In principle, the cooling time countdown can be canceled by the STOP/RESET key

if it is clear by other means that the pipe-fitting joint which is still warm is not subjected to an external force. This is not recommended, though, because the system will assess as faulty a joint with canceled cooling. While the joint might still be in order, its documentation will not.



Important

In a welding operation with inside balloon, the cooling time **must never be cancelled/aborted**. The new joint cools down with full pressure inside the balloon. If the pressure were released too soon, an unwanted bead would form inside the components. Therefore, the welder can switch the system back to the enter-bar-code screen (Display 3) only when the cooling time has been waited out. To switch back, press START/SET or STOP/RESET-Taste (which exceptionally are equivalent in this case). This signifies the proper conclusion of the welding process, and, therefore, only now the screen asks whether the pressure in the balloon should be released. Answer this question by pressing START/SET.

```

WELDING ABORTED
Error Build-up Pres.

229°C ACT. 1.5bar
    
```

Display 13

4.7 Aborted Welding Process

All welding-relevant data are constantly monitored while the welding process is running. If one or more of the parameters are out of tolerance and the machine cannot adjust them, the welding process is aborted after a given period of time.

The error that made the welding abort is displayed on the screen (see Display 13).



If one or more errors occurs rather frequently, contact customer service. It may be possible to correct the error on site without further trouble, or at least to identify its cause.

Type of Error	Description
a. Data Input	
Input Error	Error while entering data with the alphanumeric and cursor keys.
Code Error	Error while reading data from a bar code or an RFID card.
b. System and Conditions	
System Error	The welding system has to be disconnected immediately from both the power supply and the electrofusion fitting. The auto-test has detected an error in the system. The welder must no longer be operated and has to be sent to an approved shop for check and repair.
Clock Error	The internal clock of the machine is defective; re-set the clock in the Configuration Menu.
Unit to Service	The recommended next service date for the welder is overdue. The service due message has to be acknowledged by pressing the START/SET key. Send the welding system to the manufacturer or an approved service point for service and check-up.
Power Supply Failure at Last Welding	The last welding is incomplete. The welding unit was disconnected from the power supply voltage while it was in progress. To go on using the unit, this error has to be acknowledged by pressing the STOP/RESET key.
Ambient Temperature high	Outside temperature outside the range from -10°C to $+45^{\circ}\text{C}$.
Ambient Temperature low	Outside temperature outside the range from -10°C to $+45^{\circ}\text{C}$.
Insufficient Voltage	The input voltage to the control unit is $< 185\text{ V}$; the welding process, if started, will likely be flawed and should not be started or repeated if the error appears during welding..
Excessive Voltage	The input voltage to the control unit is $> 280\text{ V}$; the welding process, if started, will likely be flawed and should not be started or repeated if the error appears during welding.

Type of Error	Description
Overheated	The temperature of the control unit is too hot. Let the welding system cool down for about 1 hour.
Pressure Sensor Defective	The sensor indicated on the display (balloon pressure, ambient temperature) is defective; where possible, check the connections/plug; have the machine inspected by an authorized service shop if needed.
Temperature Sensor Defective	
No Contact	There is no properly established electric contact between the welding unit and the electrofusion fitting (check push-on terminal on fitting), or the heater coil is defective.
Printer not Ready (refers only to label tag printer)	The optional tag printer is not ready (possible reasons: no communication or faulty cable).
Download Cancelled	During data transfer or printing, an error condition occurred which could not be cleared.
Memory Full	The system memory is full of welding reports. Print or download the reports in memory or switch memory control off. Without memory control, a new report overwrites the oldest existing one.
c. Electrofusion Process	
Low Voltage	The input voltage is below 175 volts. If the error condition persists for longer than 15 seconds, the welding process will be aborted. If the voltage goes down below 170 volts, the welding process will abort immediately.
Overvoltage	The input voltage is over 290 volts. If the error condition persists for longer than 15 seconds, the welding process will be aborted.
Resistance Error	The resistance value of the connected fitting is out of the read tolerance.
Frequency Error	The frequency of the input voltage is out of tolerance (42 Hz - 69 Hz)..
Low Current	The message is displayed if there is a momentary current failure or if the current decreases by more than 15% per second for 3 seconds.
Excess Current	The output current value is in excess; possible causes: short-circuit in the heater coil or the welding cable. During the start stage the upper abort threshold equals 1.18 times the value at start, in any other case the upper limit depends on the load value and is calculated as the current at start plus 15%.
Heater Coil Error	The dynamic current value during welding differs by more than 15% from the required value, indicating a short-circuit in the heater coil.
Balloon Pressure Error	The air pressure inside the balloon does not match the value contained in the bar code of the fitting or previously entered. A proper beadless joint cannot be guaranteed. The welding should be repeated.
Cooling Time Cancelled	The cooling time was cancelled before it was completely over. The joint as such may still be o.k., but the system will record it as being faulty.



If the information in this chart does not allow finding the solution to an issue, please contact an authorized service point.

4.8 Using ViewWeld to View Welding Reports and Print Tags

The ViewWeld feature offers viewing an abstracted version of the welding report recorded during the last welding process and printing it as a label tag to be affixed to the joint on the optionally available tag printer. The ViewWeld abstract shows the report number, the date and time of the welding and the welding parameters along with an evaluation of the quality of the joint/welding operation (see Display 14), where the first displayed abstract is that of the last performed welding operation.

To call the ViewWeld abstract of a welding report, press the \uparrow key in the bar code input screen (see Display 2). Browsing through the saved welding reports is then possible by pressing the \leftarrow or \rightarrow cursor keys.

```
0015 24.02.13 09:33
M/B MON HST 315
0058s 025.0V 1.57Ω
No Error
```

Display 14

To print a tag of the welding operation of which the abstract is currently displayed, the label tag printer has to be connected to the welder. Then press the START/SET key in the ViewWeld screen.

5 Downloading the Reports

Interface

USB A Interface Port

for connecting USB mass storage media (such as a memory stick)

The interface port complies with the USB version 2.0 specification (i.e., maximum data rate of 480 megabits per second).



Important

When transferring welding reports to a USB stick, always be sure to wait until the display shows the “Download finished” message before you disconnect the USB stick from the product. If you disconnect it too early, the unit may ask you whether you want to delete the reports in memory, although they were not properly transferred. In this case, if you delete the contents of the report memory, the welding reports would be irrevocably lost and would not be available elsewhere either.

5.1 Selecting the File Format

Connecting the storage media causes the the screen to appear in which the format of the output file with the welding reports can be selected: a PDF file with an abstracted or extended version of the report or the format of the welding data management application DataWork. Using the \uparrow and \downarrow arrow keys, select the file type you need and confirm your selection by pressing the START/SET key.

```
* Select File Type *
DataWork File
>PDF Abstract
PDF Ext'd Report
```

The Service Report option is not important for normal operation. In the scope of computer-assisted unit service, this report lists the events related to the maintenance of the welding unit.

Display 15

5.2 Downloading All Reports

After the file type was selected, the next screen offers a “Print All Reports” option. Selecting it will download all welding reports currently in system memory in the previously selected file format.

5.3 Downloading by Commission Number, Date or Report Range

After the file type was selected, the next screen offers a “By Commission Number,” a “By Date Range,” and a “By Report Range” options. Depending on the selection, the \uparrow and \downarrow arrow keys can be used to select from the commissions currently in system memory the desired one, of which the reports should be downloaded, or the alphanumeric keypad can be used (see last Info in Sect. 4.1) to enter a start date and an end date, or the first and the last report, that define a range of dates or a range of reports of which the reports should be downloaded. When you press the START/SET key, you cause the selected reports to be transferred to the storage media.

5.4 Understanding the Report Download Process

The download starts automatically after a selection was made among the options. Wait for all the selected reports to transfer and the “Download completed” message to appear on the screen.

If a problem occurs while the download is in progress, an error message

shows. After the problem condition is cleared, the download resumes automatically.



If the welding unit recognizes a problem that cannot be cleared while the data transfer is in progress, it does not resume the process and displays a “Download cancelled” error message. To acknowledge this error, press the START/SET key.

5.5 Deleting Data from Memory

The report data in memory can be deleted only after all welding reports were transferred, which is indicated by the “Download completed” message. When the storage media is unplugged, a “Delete Memory” message appears. If the START/SET key is pressed at this point, a further confirmation message “Delete Memory, sure?” is shown, which has to be confirmed by pressing the START/SET key once again. Then, the report data in memory are deleted.

5.6 Keeping Data in Memory

When the cable or storage media is unplugged, a “Delete Memory” message is displayed. Press the STOP/RESET key to keep the current report data in memory. They can then be printed off once again.



Important

Make a habit of handling the internal storage as described at the beginning of Sect. 5, to maintain data integrity and avoid any inadvertent deletion of the reports in memory.

6 System Data

6.1 Displaying Characteristics of the Welding Unit

The key technical information on the welding unit itself is displayed by pressing the ⇨ key at the “Enter Fitting Code” screen. They are the software version, the serial number of the unit, the date of the next scheduled maintenance, the number of remaining welding operations until the next maintenance, and the number of currently available, unused reports. To quit this screen, press the STOP/RESET key.

If the scheduled service is overdue or the maximum number of welding operations is reached, a service due message appears on the screen as soon as the unit is plugged into the mains or generator power supply. This message has to be acknowledged by pressing START/SET.

6.2 Measuring Resistance

When the START/SET key was pressed to initiate a welding process, the resistance value of the fitting is measured and compared to the value entered as part of the read fitting code. If the gap between the two values is smaller than the acceptable tolerance given in the code, the welding process starts. If the gap is greater than the preset tolerance, the welding unit aborts welding and displays a “Resistance Error” message. Furthermore, it displays the actual resistance value measured for the connected fitting.

The reason for a resistance error may be poorly contacting and/or worn connection terminals. Therefore, if this error occurs, check them for proper fit and, if worn, replace them with new ones.

6.3 Overheating Switch

The welding process aborts if the temperature of the transformer in the

welding unit is too high. The overheating circuit breaker for the transformer stops the welding if the temperature reading is too high and the remaining welding time is longer than 250 seconds. The display and the welding report will show an “Overheated” message.

6.4 Indication of Power Supply Failure at the Last Welding

The message “Power Supply Failure Last Welding” indicates that the previous welding aborted because of a power supply failure. The reason may be too weak a generator or too long or too thin an extension cable, or a tripped cut-out in the mounting box. The next welding operation is still possible after acknowledging the message by pressing the STOP/RESET key.

7 Service and Repair

As the machine is used in applications that are sensitive to safety considerations, it may be serviced and repaired only on our premises or by partners who were specifically trained and authorized by us. Thus, constantly high standards of operation quality and safety are maintained.



Non-compliance with this provision will dispense the manufacturer from any warranty and liability claims for the unit and any consequential damage.

Important

All machines that are new or newly programmed during maintenance or upon request is wished are shipped with the most recent software version.



At the date of shipment, the service and maintenance interval is set to 18 months or 5000 welding operations (different in some markets), whichever comes first.

Info

8 Service and Repair Contact

Asahi/America
655 Andover St.
Lawrence, MA 01843
1-800-343-3618
asahi@asahi-america.com



We reserve the right to change technical specifications of the unit without prior notice.

Info

8.1 Manufacturer Warranty

The warranty assumed by the licensed manufacturer is effective, on principle, for 1 year.

8.2 Technical Documentation

Wiring diagrams, computer-assisted designs and further technical literatures, as complements or more in depth, will be gladly provided by agru Kunststofftechnik upon request at the address given above.

8.3 Risk Assessment

A risk assessment under the provisions of the so-called machinery directive 2006/42/EC was conducted for the machine by a qualified person entitled to the performance of such an assessment.

8.4 Included in Standard Shipment

1 x Welding Machine

upon request

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