User's Manual

Inside and Outside Beadless Butt-welding Machine

SP 110-B

Contents

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 butt-welding machine for 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 state-of-the-art technology and widely recognized safety regulations.

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 machines:
agru SP 110-B

Thank you.

2 Safety Messages

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

The machine has been developed and checked with respect to welding AGRU materials. 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.

21 The User's Manual

The User's Manual is presented according to sections which explain the different functions of the machine. All rights, in particular the right to copy or reproduce (in print or electronic form) and distribute as well as to translate, are reserved and subject to prior written authorization.

22 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 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

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. If power is connected through a power line manifold, the power supply has to feature an earth-leakage circuit breaker.

The length of the power supply cord is 4 m (13 feet). The length of an extension cable will preferably not exceed 10 m (30 feet).


Caution

Parts Under Power
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.


Caution

Pipe Facing Tool
Start the pipe facing tool only when it is in its working position. When facing pipes, do not wear jewellery; if needed, wear a hair snood or net. It is forbidden to remove shaving from the machine while the facing process is running. Make sure nobody is present in this danger zone.


Caution

Heating Plate
When working with the machine, be extremely cautious while the heating plate is operating. Since the heating plate and its guard present a very high temperature during the welding process, it must not be operated if unobserved, and sufficient distance has to be ensured to combustible materials in its surroundings. Do not touch the heating plate or the heating plate guard.


Caution

Danger of Bruises and Injury
Do not remain in the danger zone while the machine opens or closes and be sure not to have your hands between the moving and the fixed parts of the machine. The forces exercised by the machine are so high that it will not be able to detect and recognize parts of the body.


Caution

Acceptable Work Conditions
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. In regard of this, acceptable work conditions have to be ensured (e.g., sufficient distance between the machine and other functional areas of the workshop).


Important

Power Supply Only through Line with Protective Grounding Conductor
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.**


Important

Power Only to Operational Machine
Power must never be applied to the machine before it is completely installed and ready for operation.


Important

No Foreign Bodies in Work Area
The machine must never be used if there are foreign bodies or

objects in the work area; in particular, it must not be started if anything obstructs the smooth movement of any movable part or component of the machine.


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.

24 Welder and Operator Obligations

- The machine may be operated exclusively by persons who are familiar with the applicable regulations, the guidelines for the prevention of accidents, and the User's Manual.
- The machine may be operated only when observed. Welders must have been introduced properly to operating the machine or must have participated in a dedicated training. The operating/owning company engages to check at reasonable intervals if the machine is operated by the welders with the intended use and under proper guidelines of safe work.
- The machine must never be operated if not in proper state of repair. Before welding, the welder is required to make sure that the state of the machine is in order.


Important

During transport, the movable parts of the machine superstructure have to be secured with the transport lock at all times. Prior to putting the machine into operation remove the transport lock.

25 Warranty

Warranty claims may be raised only if the conditions for warranty given in the General Terms and Conditions of Sale and Shipment obtain. Furthermore, the provisions and instructions contained in the User's Manual have to have been respected.


Info

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 the machine is used independently of purchase (e.g. when lent) or if it is not bought as a new machine.

At the date of shipment, the service and maintenance interval is also set to 12 months.

26 Transport and Storage

During transport, the machine must be at all times in the transport box it is shipped in. Ensure that transport lock is engaged during transport.

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.

27 Identifying the Machine

Each machine is identified by a name plate. It shows the machine model ("Typ"), the serial number ("Nr."), and the manufacturer.

Infrarot-Stumpfschweißmaschine	
Typ	agru SP 110-B
Nr.	01211039
Netz	230V IP54 50/60Hz 1700W
Hersteller	**agru Kunststofftechnik**
	Ing.-Pesendorfer-Str. 31
	A - 4540 Bad Hall
CE	Tel. +43 7258 7900

3 Product Description and Principles of Operation

31 Intended Use

The agru SP 110-B Welding Machine is designed exclusively for welding plastic pipes and fittings using the inside and outside beadless butt-welding technique.

Only the welding parameters shown on the touchscreen display (preprogrammed by the manufacturer or defined by the user) can be selected for a welding operation. Any modification of the welding parameters contained in the control software is strictly prohibited.

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

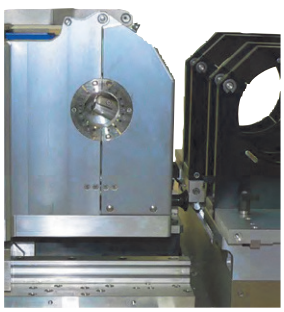
Important

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 modification of the manufacturer-programmed welding parameters, or non-intended use. Any such deviation or modification will cancel any and all warranties under which the product may be.

32 Machine Description

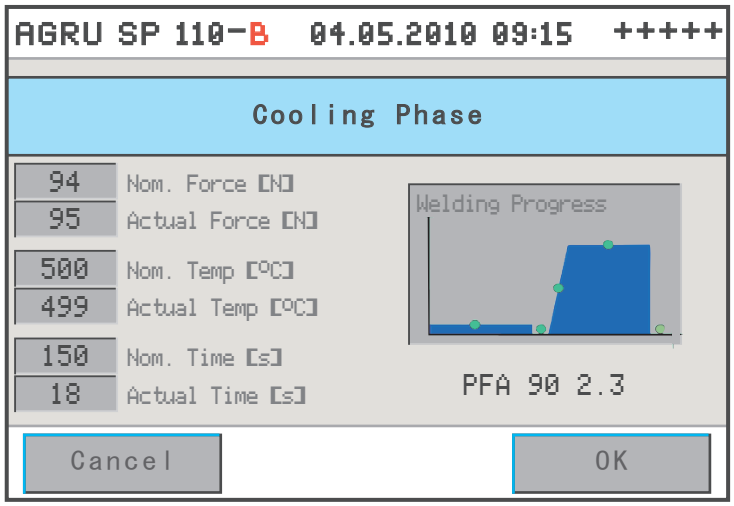
321 Component Overview

Heating Element
Open, Tilted up



Heating Element
Closed, Locked

322 Touchscreen /Control Panel



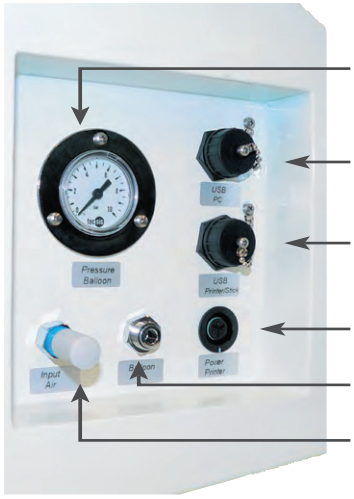
Status Bar

Title Band

Multifunctional Area (changes depending on context of display)
- Display of/data on welding progress
- Parameter menus to configure operation settings
- Input keyboards
- Error messages/Notes

Navigation Bar with User Interface Buttons

323 Ports and Switches



Inside Balloon Pressure Gauge

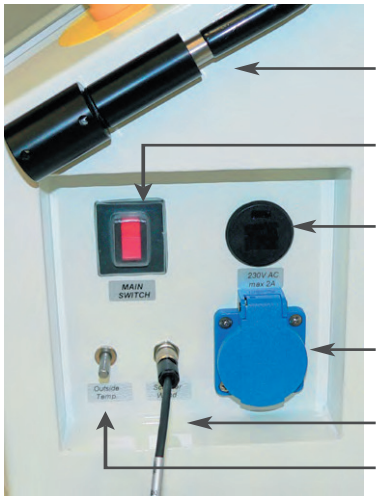
USB B-Port (PC)

USB A-Port (Tag Printer)

Tag Printer Power Supply

Out Port to Inside Balloon

In Port from Air Supply



Scanning Pen

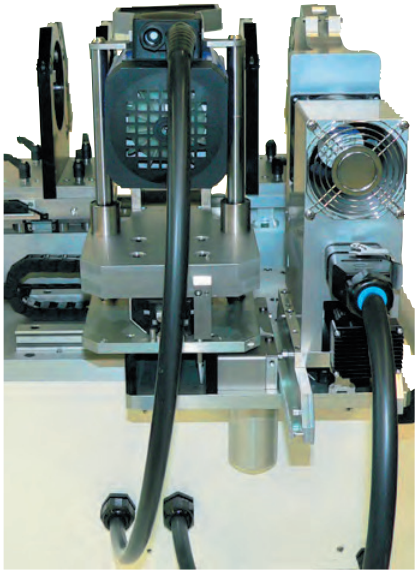
On/Off Switch

Buzzer

230V Power Socket

Scanning Pen Cable

Ambient Temperature Sensor



Rear View with Connections to Facing Tool (LH) and Heating Element (RH)

The machine can be used as an in-shop installation 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 forces and temperatures and controls the welding process automatically.

All welding and traceability data are entered either directly on a touch-screen panel or read from a bar code using a scanning pen. The welding

process in monitored in its entirety and saved to a welding report. All welding reports can the be printed or transferred to a computer with a suitable pipeline management software (such as DataWork agru).

Using the menus displayed on the touchscreen, the machine can be customized to the application at hand (see section 4.3, Configuring the Machine).

3.2.4 Specifications

agru SP 110-B	
Power Supply Characteristics	
Voltage	230 V AC
Frequency	50 Hz
Total Rated Power	3.6 kW
Welding Operation Specs	
Welding Force	10 - 500 N
Speed of Facing Tool	approx. 45 rpm
Ambient Temperature (operation)	+0°C to +40°C (32°F to 104°F)
Ambient Temperature (storage)	–5°C to +50°C (23°F to 122°F)
Operating Range	20 - 63 mm (4/5" - 2-1/2"), optional to 110 mm (12-1/2")
Dimensions and Weight	
Dimensions (W x D x H)	
Machine	660 x 800 x 660 mm (2' 3/4" x 2' 1/5" x 2' 3/4")
Transport Box	800 x 1200 x 790 mm (2' 1/5" x 3' 15/16" x 2' 11/16"")
Weight	
Machine	100 kg (220 lbs))
Transport Box	52 kg 114-1/2" lbs)
Heating Elements	approx. 2.4 kg (5-1/4 lbs) each

3.3 Welding Process Overview

The welding process is performed as follows:

- Pipes are clamped into the frame; depending on the form of the component to be welded, this may mean that the outer clamps have to be re-adjusted or that reducer inserts have to be inserted.
- Pipe butts are worked by the facing tool, which is inserted automatically, to obtain abutment along a fully parallel plane.
- Pipe alignment is checked and confirmed on the touchscreen.
- The inside balloon is positioned in the pipes and its correct position is confirmed on the screen.
- The heating element is placed; when inserting it, the heating element has to be clean.
- After the heating element was inserted, the pipes close in automatically at the predefined force.
- When the carriages close in, they also align the heating element exactly in-between the pipe butts.
- At the same time, the pipe butts are heated to the predefined temperature and the inside balloon is filled with air.
- When the heat-soaking phase is over, it is followed by a steady force increase until the fusion force is reached.
- The pipe then cools down at the predefined force.
- After the cooling time is over, force is automatically removed from the heating scales, the balloon is emptied, and the heating element can be opened and the balloon and the pipe or fitting, taken out.

4 Operation

Important

Prior to the first use of the machine, the transport lock has to be removed. Damage due to non-compliance with this provision will no be ineligible for warranty.

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

Place the machine on a level surface and ensure it cannot slide. Sufficient distance has to be kept to other areas in the workshop, especially to those in which combustible materials are used, in order for the heating element temperature of up to 500°C (930°F) not to be hazardous.

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 bolts and either remove the clamp or re-adjust it and secure it by tightening the locking bolts again.

If the diameter of the pieces to be welded is smaller than the clamp, insert the reducer inserts. This can be done with the enclosed Allen key.

Important

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

Important

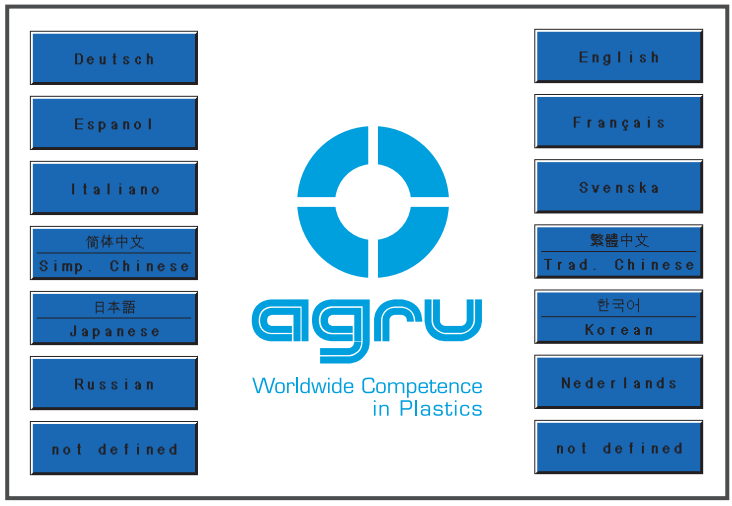
The surfaces of the heating scales have to be free of grease and clean, or they have to be cleaned.

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).

Prior to every welding operation, change the heating element if the diameter of the components that are going to be joined is not the same as the diameter of the last welded joint.

After preparing the machine for welding and connecting the power supply cord to the mains power supply, the machine is turned on using the On/Off switch. The welcome screen, as reproduced in Display 1, appears on the touchscreen panel. Touch the appropriate button to select the display language that the machine will use.



Display 1

After the language was selected, the machine takes the user to the welder code entry screen. Without a valid welder identification code, it is impossible to start welding processes on the machine, since the machine is unblocked for operation only after a valid welder identification code was entered.

If the machine finds that something is wrong or that the last joint was not properly welded (power supply failure, emergency stop, clock failure, etc.), an error message is displayed instead of the welder code input screen. Then, the error has first to be cleared.

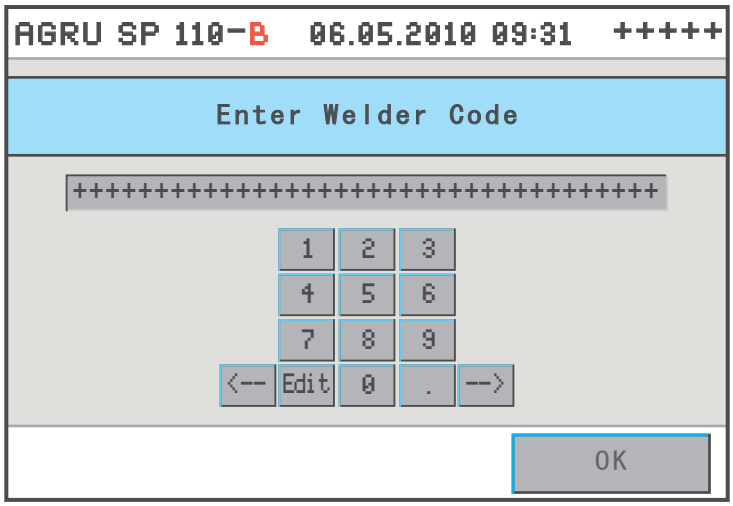
Enter the welder identification code by typing it on the touchscreen and saving it to memory by touching the "Ok" button. If a bar code for the welder code is available, you can also read it from the bar code using the scanning pen.

Info

All inputs for which a bar code is available can be entered from the bar code using a scanning pen.

Important

Entering data on the touchscreen must always be performed with the bare finger. Using objects (ballpoint pens, screwdrivers, etc.) may cause unrecoverable damage to the surface of the touchscreen.



Display 2

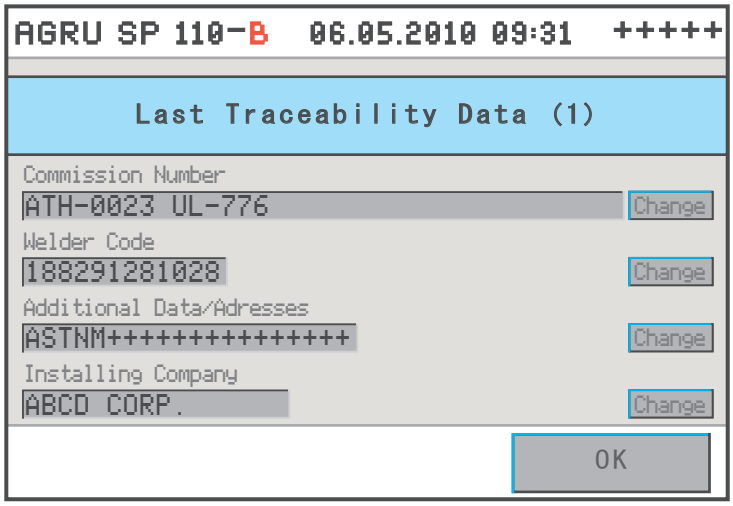
42 Entering Traceability Data for the Joint

After the welder identification code was entered, the traceability data for the joint have to be entered. The machine displays the traceability data for the last joint that was welded (see Display 3), which can be re-used for the next welding operation by simply touching the "Ok" button.

If traceability data are not the same as for the last joint, change the data that are different by touching the appropriate "Change" button. Depending on the kind of data you want to change, the machine displays either a numeric keypad (see Display 2) or an alphanumeric keyboard (see Display 4). To confirm and save your data input to memory, touch the "Ok" button.

Info

Depending on the software version installed in your machine, some screens may differ slightly on your machine from the reproductions in this manual.

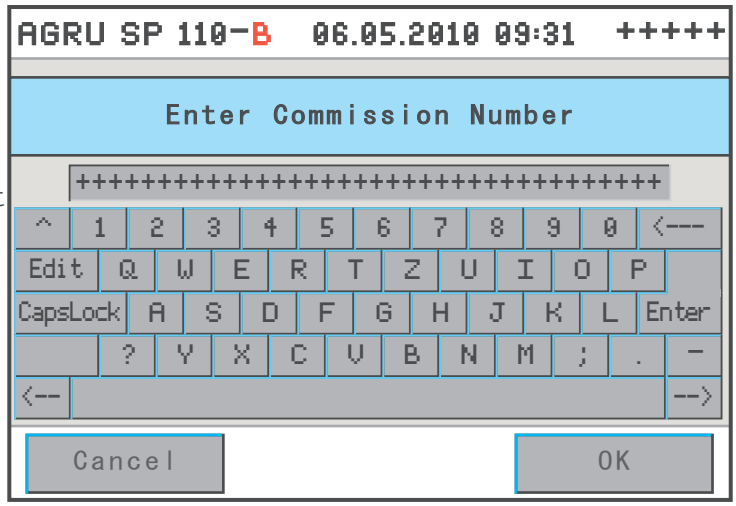


Display 3

When the traceability data were entered, the machine displays the first input screen of the welding process proper (see Display 5). In this display, it is possible to start the welding process and to customize the configuration of the machine.

Important

If at this point the machine is not ready for welding for some reason (repositioning heating element, facing tool or carriage needed), then it displays a message to this effect. In case the welder neglects to do as told by this message, the machine is exposed to severe damage.



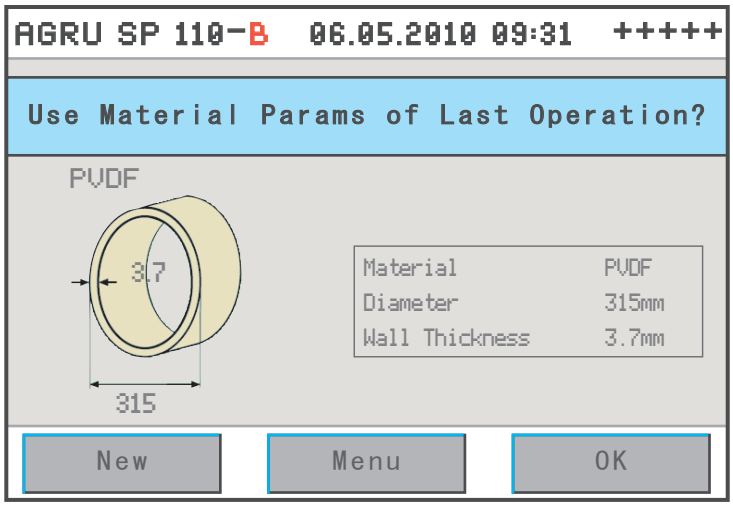
Display 4

When going on from traceability data input to the welding process proper or the input of characteristic welding parameters, the machine performs a calibration of the points of reference for its movable parts (support console and heating element motors). Make sure this short process is not interrupted.

The welder will enter all settings and perform all control actions on the touchscreen panel.

4.3 Configuring the Machine

In the first input screen of the welding process proper (Display 5), the key parameters of the last welding are shown (material, diameter, and wall thickness of the welded pipe). Furthermore, the status bar at the top of the screen shows the date, time of day, and also either the current ambient temperature or the power supply voltage or the welder's name or code.

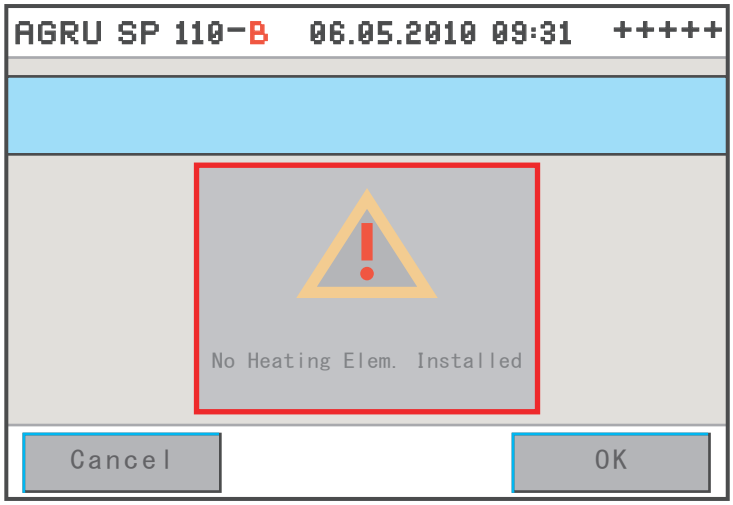


Display 5

In the event that no heating element was installed, an error message to this effect is displayed by the machine (see Display 6) instead of the welding parameter overview.

In Display 5, the welder has the possibility to:

- immediately start a welding process that will be performed with the same welding parameters as the previous welding (touch the "Ok" button and move on to section 4.6);
- enter new pipe-related data for the next welding (touch the "New" button and move on to section 4.4);
- change the machine settings in the configuration menu (touch the "Menu" button);
- to read a new welder ID code using the scanning wand; or
- display the date for the next scheduled maintenance on the screeen by touching "New" button for some time.

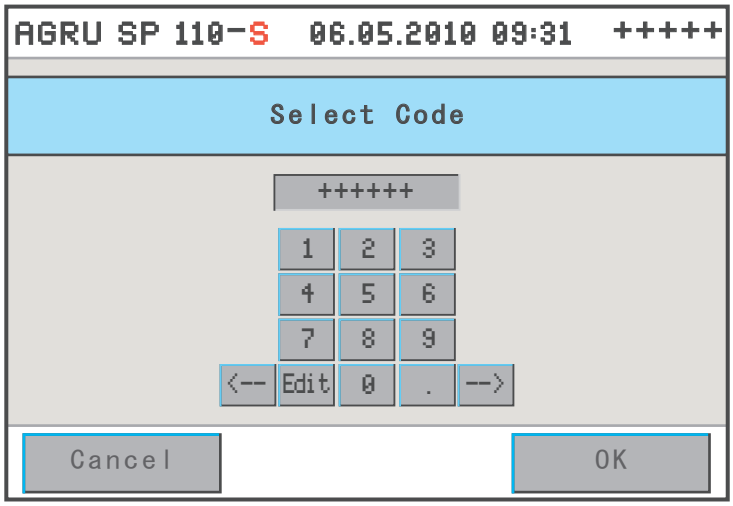


Display 6

Info

The green confirmation pushbutton on the front allows locking the machine functions at any time when it is held down for a minimum of 3 seconds.

The first three pages of the configuration menu are immediately accessible, the other options will be displayed only after an access code for the machine, the so-called selection code, was entered (see Display 7). The menu has the items listed in the following table. To toggle between various possible settings, or to open a sub-menu for a given menu item, touch the appropriate button.



Display 7

Info

Some of the buttons next to menu option change their color when they were pressed and are then displayed as though the button is held down. In this case the "held down" button mean that this menu option is the selected option.
To browse to the respective next page of the configuration menu, touch the "Next" button of the page you are viewing.

Designation	Setting	Description /Data to be entered
Number of Tags	Menu	In a sub-menu, the number of tags to be printed for sticking them onto the welded pipes, can be selected.

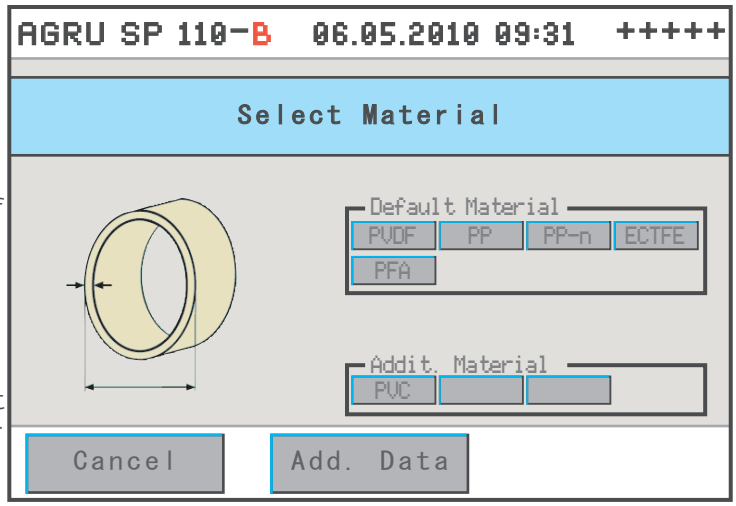
Designation	Setting	Description / Data to be entered (continued)
Show Reports	Menu	In a sub-menu, it is possible to select a job number in order to display the welding reports of this commission. In report display mode, it is also possible to print a label tag for this welding once again (see section 5.2).
Unit of Length (mm / inch)	Menu	In a sub-menu, the unit of length used for displaying and saving welding data can be selected.
Temperature Unit (°C / °F)	Menu	In a sub-menu, the temperature unit used for displaying and saving welding data can be selected.
—— New Page in Menu ————————		
Audible Signal	On / Off	By touching this button, the signal sound that the machine emits to validate the execution of a given step in the process can be enabled or disabled. Whatever this setting, the sound will be heard to indicate the imminence of the change-over phase.
Force Control	On / Off	When force control is enabled, as soon as the nominal welding force is reached, the machine keeps the remainder of the welding process at this nominal value.
Constant Force Control	On / Off	When constant force control is enabled, the machine sets the welding process to the nominal value immediately after its begin, thus ensuring a constant force throughout the entire process.
Select Language	Menu	In a sub-menu, the language in which display texts and reports are edited can be selected.
—— New Page in Menu ————————		
Print Welding Data	ON / OFF	If this feature is enabled, the parameters of the current welding are sent real-time to a printer or other data-downloading device connected to the machine.
Clean Heating Element	Menu	In a sub-menu, the heating scale cleaning process can be launched and managed.
—— New Page in Menu ————————		
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.
Machine Parameters	Menu	In a sub-menu, the machine number can be entered and the temperature of the heating mirror and the welding force can be zeroed/calibrated. *Access to this sub-menu requires an additional access code that is available from the manufacturer/distributor.*
Date/Time	Menu	In a sub-menu, date and time can be set.
Delete Reports	Menu	In a sub-menu, it is possible to delete **all** welding reports currently in memory. *To access this sub-menu, the so-called selection code is required (see at the beginning of this sub-section); the reports will be deleted only after another safety warning was confirmed.*
—— New Page in Menu ————————		
Additional Materials	Menu	In a sub-menu, the key data for welding can be defined for pipe materials that are not available yet.
PFA License	Menu	In a sub-menu, the license key for working PFA pipes can be entered. Without it, using these pipes is neither authorised nor possible with the machine.

4.4 Changing Key Data of the Welding

In the welding-individual start screen (see Display 5), it is possible to change the weld-specific key data for the joint to be welded. To do so, touch the "New" button. The screen that allows selecting the material of the pipes that are going to be welded, is then displayed on the touch-screen panel (see Display 8). To select a material, touch the appropriate button on the screen.

Default Materials are those pipe materials that are defined by default when the machine is shipped. Additional Materials, if any, are those pipe materials that were defined by the user in the definition screens accessible from the appropriate configuration menu option (see section 4.5). The maximum number of additional materials is three.

When the appropriate button was touched to select a pipe material, the screen changes and displays the selection of pipe diameters, with default and additional diameters just as for the materials. Finally, a third, similar screen allows selecting the appropriate wall thickness.



Display 8

Info

If the label on the button of an additional material is not exact enough because there are several similar materials with all their material-related and welding-related parameters, then touching the button will open a screen that shows all its user-defined parameters and allows browsing the similar materials page by page to select the right one from that information screen.

Note that a screen will not appear if it would not make sense to display it. For instance, if only one wall thickness is defined for a given pipe diameter, the wall thickness selection screen will not show. Moreover, when you select an additional material, this has to be confirmed by entering the so-called selection code (see sub-section 4.3). Default materials can be welded without entering this code.

Important

The machine must never be used to weld pipe materials, diameters, and thicknesses other than those available in the welding parameter screens. The manufacturer is in no circumstances liable for damage or consequential damage that occurs as a result of deviations from these pipe data or of modifications or attempted modifications to the control software. Furthermore, this will cancel any claims to warranty expressed for the machine. To make a material available in this screen, it has to be entered previously with all its technical welding parameters in the configuration menu.

Info

Welding PFA pipes is subject to a valid license for this pipe material. Therefore, when this material is selected (either from the default materials or from the additional materials, if defined), a message to this effect is displayed. The license key is disclosed either by the manufacturer or the distributor of the machine or when you purchase the PFA pipes and can then be entered in the configuration menu.

In all screens that allow changing the key data for the welding operation, by touching the "Additional Data" button, it is possible to access the additional traceability data and change them as needed.

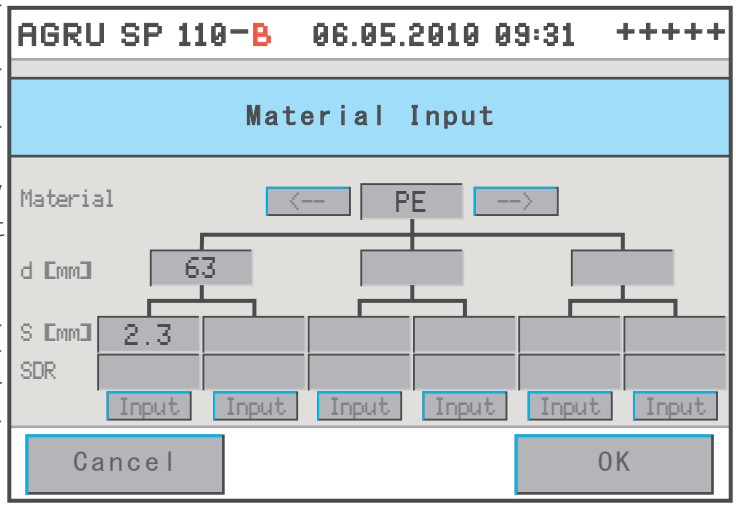
The following messages may occur in relation to the material selection:

- Failure to retrieve data means that no additional material definition was found.
- Failure to retrieve a function means that there are applicable data, but they are not valid in the circumstances.
- Failure to retrieve a license means that a material that requires a license to be processed was selected, but no license key is stored.

4.5 Definition of Welding Parameters for Additional Materials

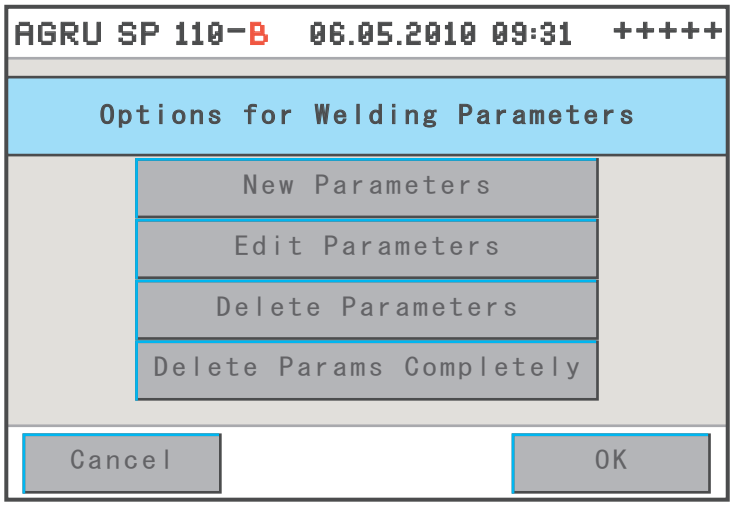
The configuration menu (see section 4.3) has an option "Additional Materials," which allows defining the key data the machine should use when welding pipes of a material that is not currently available in the machine.

If no additional, operator-defined pipe material has been saved to system memory, the unit displays an input screen that allows entering the name of the material for which the key data for welding it shall be defined. Enter the name on the touchscreen keyboard (see Display 4) and confirm it by touching the "Ok" button. The machine moves on to the next input screen, in which a pipe diameter for this material has to be entered on the numeric keypad (see Display 2). After having confirmed this input by "Ok" once more, another screen allows entering the wall thickness for this material and size. After the wall thickness, the pressure level per SDR has to be entered in the next screen. After this, define the key welding parameters for the material just entered, e.g. 63 mm PE pipe with a wall 2.3 mm thick. To define them, the unit guides the operator through a series of input screens in which the following can be entered: balloon pressure, joining force, heating element temperature, maximum heat-soaking time, joining time, maximum cooling time, facing force, fan speed, maximum cooled temperature. Confirm every entered value by touching "Ok."



Display 9

If parameters for welding additional, user-defined materials have already been entered and saved previously, the unit shows a screen that resembles Display 9. Use the arrow keys in the upper area of the screen to switch back and forth between the various additional pipe materials currently in memory. For every pipe material, up to three pipe diameters can be defined, and for each diameter, up to two wall thicknesses or SDR values. By touching one of the "Input" buttons on this screen, the parameters for welding this material can be edited. Touching the leftmost "Input" button in Display 8 will allow entering, changing, or deleting the welding parameters for 63 mm PE pipe with a 2.3 mm wall. Using the second "Input" button from the left, the welding parameters for 63 mm PE pipe with another wall thickness can be entered, and all other "Input" buttons allow entering the parameters for PE pipe with other diameters.



Display 10

As soon as one of the "Input" buttons was touched, Display 10 shows. From this screen, it is possible to edit in various ways the specific data "branch" of which the "Input" button was used to access Display 10. The button "New Parameters" allows entering from scratch all welding parameters for the branch in the data "tree" of which the "Input" button was touched. Data input proceeds as described at the beginning of section 4.5: from the name of the pipe material through to the cooled temperature.

Touch the "Edit Parameters" button to change the value of a single welding parameter in the appropriate data "branch". Touching this button will let you access a screen in which the parameter you want to change can be

selected from all the key data that need to be defined. From that screen, an input screen is accessed in which the value can be changed; then confirm the change by touching the "Ok" button.

The "Delete Parameters" button can be used to delete the "branch" of the data "tree," of which the "Input" button was used to access Display 10. Deleting has to be confirmed in another safety message, and then the key data for welding the material, from joining force to plate temperature, are deleted along with the appropriate wall thickness or SDR. If this wall thickness or SDR is the only one left for the pipe diameter in question, then the diameter is deleted from the data "tree" too. And if the thus deleted diameter is the only one left for this pipe material, the entire "tree," including the material itself, is deleted.

By touching the "Delete Parameters Completely" button, it is possible to delete the parameter of **all** additional, user-defined pipe materials. Here too, deleting is possible only after cofirming it in a safety message. After deleting them, only the default materials with which the machine is shipped, remain.

Info

If the material that was used in the last welding operation is deleted, then the next welding operation of necessity requires a new material to be selected for welding.

4.6 Welding Process

Important

The welding machine operates in two-hand mode at any time. For any step in the welding process that may put the operator's hands at risk of injury because the carriage starts moving, the operator must confirm the step on the touch screen and use the second hand to keep pressed the green confirmation push button on the machine front.

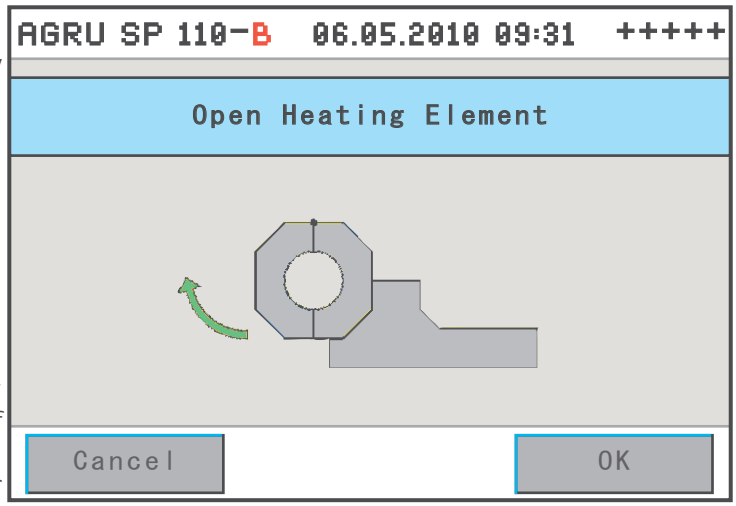
4.6.1 Facing the Pipe Butts

In the input screen reproduced in Display 5, when the "Ok" button was touched, the welding process proper starts by the insertion of the pipe facing tool. The machine alerts the welder to this next step.

Facing requires three steps:

- Zeroing the facing tool position before clamping the pipes
- Securing the pipes in the clamps und determining the facing road
- Facing the butts

First, the machine asks the operator to open the heating element (see Display 11), which, when done, has to be confirmed by the "Ok" button. The next thing the machine asks is to put the facing tool into Position 1. This is the position for zeroing the facing tool in relation to the movable carriage. Slide the facing tool in-between the carriages of the machine so as to place the position handle into the rest that is labeled "Pos. 1" at the facing tool support.

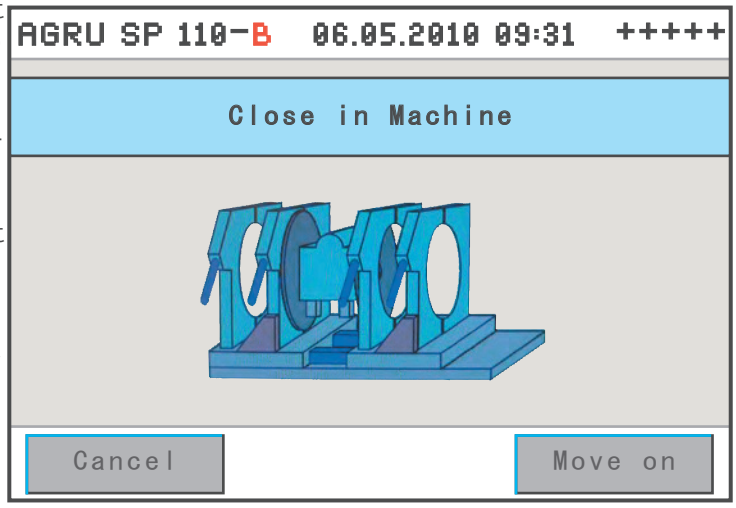


Display 11

Important

While the machine automatically performs a zeroing calibration of the carriage position when it is switched on (including when power is re-applied after it was switched off using the emergency off button), it is critical to zero the facing tool prior to the facing operation proper, failing what it is not possible to ensure a joint of appropriate quality.

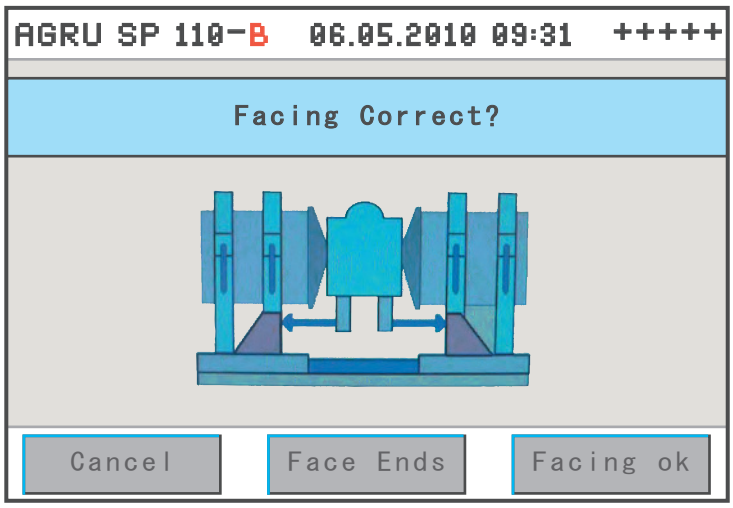
When the facing tool handle is located at Position 1, the machine asks the operator to close in the carriage (see Display 12). This is done by touching the "Move on" button and simultaneously holding down the green confirmation push button on the machine front. Then follow the steps the machine indicates on the screen: determine the facing road that is going to be observerd, clamp in the pipes and move the facing tool to Position 2, the facing position. Remember that every action that makes the carriage close in or pull away has to be confirmed in two-hand mode: with the appropriate button on the touchscreen panel and the confirmation push button on the machine front.



Display 12

Before starting the facing process proper, you can determine the facing road, i.e. the distance that the carriage must travel during facing. To change the value displayed on the screen when the process reaches this step, use the "+" and "–" buttons. The travel length must be a minimum 3 mm. After you changed the facing road, you have to clamp in the pipes anew. During facing, the machine displays nominal and actual force along with the effective facing road so far achieved.

When the pipe butts are faced, the machine shows an end-of-facing message (see Display 13). Visually check the pipe butts and, if they are o.k., confirm by "Facing Ok". The machine moves the carriage apart to let you remove the facing tool. If the result of facing is poor, the process can be repeated after touching the "Face Ends" button. To face the butts once again, in most cases the pipes have to be re-adjusted in the clamps.



Display 13

Info

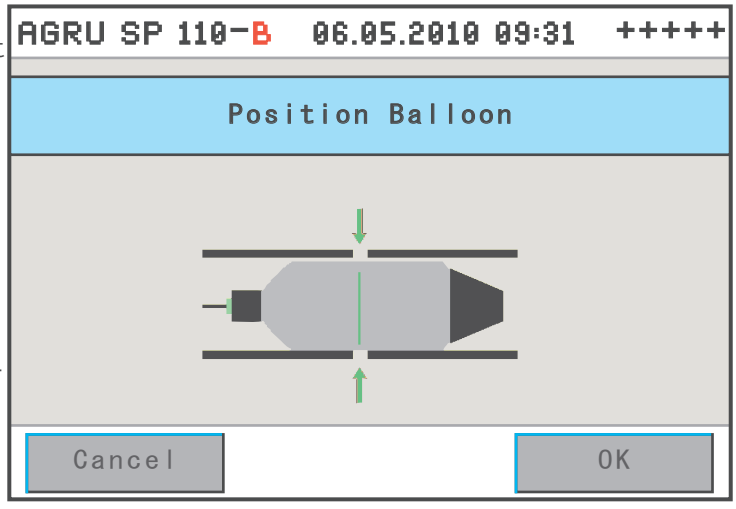
When pipe facing is successfully finished, it is recommended not to touch the pipe butts with your bare hands. To avoid fatty layers on the pipe, use special pipe handling towels.

462 Positioning the Inside Balloon

When the pipe butts are level to satisfaction, the inside balloon has to be properly lined up inside the pipes. To do this, the screen first asks the welder to close the pipes in on each other. As soon as this is done, they have to be set apart a little again, about 2 mm

In this small gap between the pipes, the green mark on the inside balloon has to be visible, when it is, touch the "Ok" button, which will cause the machine to pump some air into the balloon.

Whenthe balloon is full of air, the machine asks again, "Balloon positioned?" If the balloon aligns properly inside the pipe, touch the "Ok" button, which will cause the machine to close the pipes in fully on each other. On the other hand, if the balloon does not align

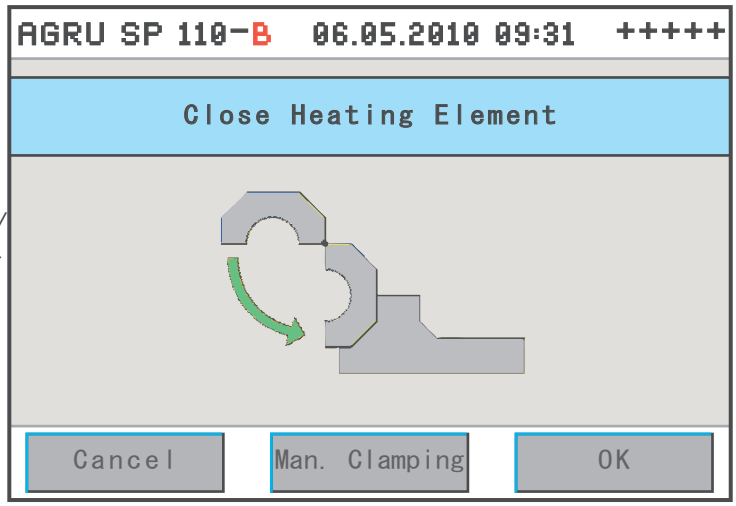


Display 14

properly, touching the "Cancel" button causes the release of the air in the balloon and allows starting the positioning procedure over.

4.6.3 Inserting the Heating Element

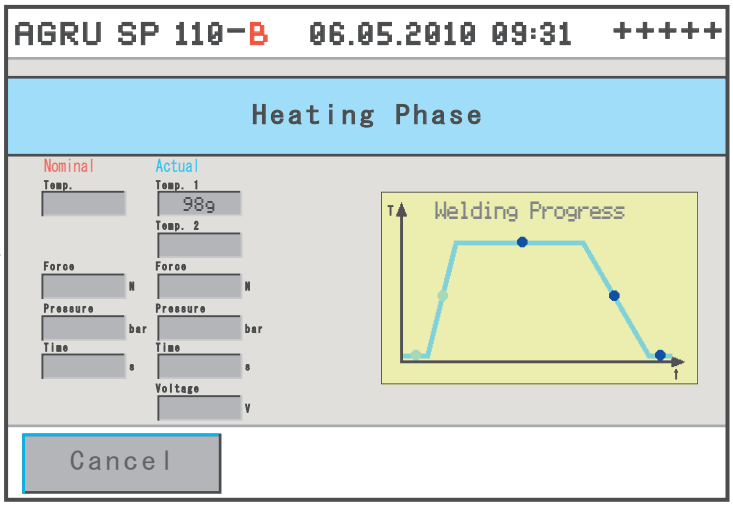
When the balloon is correctly placed, the machine tells the welder first to reposition the facing tool and heating element assembly to the right. As all actions before, this one has to be confirmed in two-hand mode: touching the appropriate button on the touchscreen and holding down the confirmation push button on the front of the machine. When the facing/heating assembly is in the ready-to-heat position, the machine shows the display asking the welder to insert the heating scale.



Display 15

In the next step, the machine asks that the heating scale be closed around the pipe butts. The welder can then either start the standard welding process by touching the "Ok" button, thereby launching the heat-soaking phase, or by pressing the "Manual Clamping button, re-clamp the pipes again in the holding clamps. If he decides to manually re-clamp, a further message has still to be confirmed to the effect that manual clamping is actually desired. When done, the manual clamping has to be declared done in another confirmation message. Touching "Cancel" will return the machine to the previous screen.

While the welding procedure is starting by bringing the inside balloon to the preset air pressure, the machine controls and monitors constantly the temperature of the heating element and the welding force and time. Nominal values and tolerance ranges are defined by the parameters for the welding operation previously entered or confirmed. If a value is not within the applicable tolerance thresholds, the machine shows an error message to this effect and the welding process is aborted.

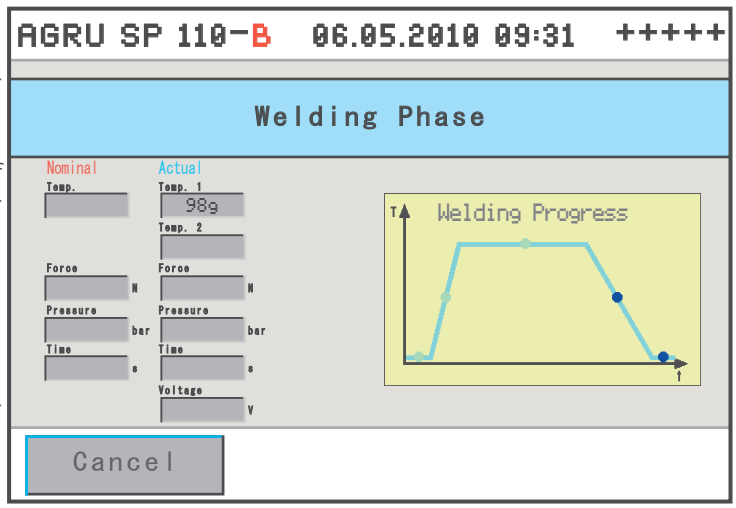


Display 16

4.6.4 Heat-Soaking Phase

In the first welding phase, the pipes are heated by the heating scale with the defined welding force to the defined welding temperature.

On the touchscreen, the welding progress diagram indicates in which phase the welding currently is (green LED icon). In case of malfunction, the welding process can be aborted by touching the "Cancel" button. If the machine detects a malfunction, the color of the LED icon for the appopriate phase changes from green to red.



Display 17

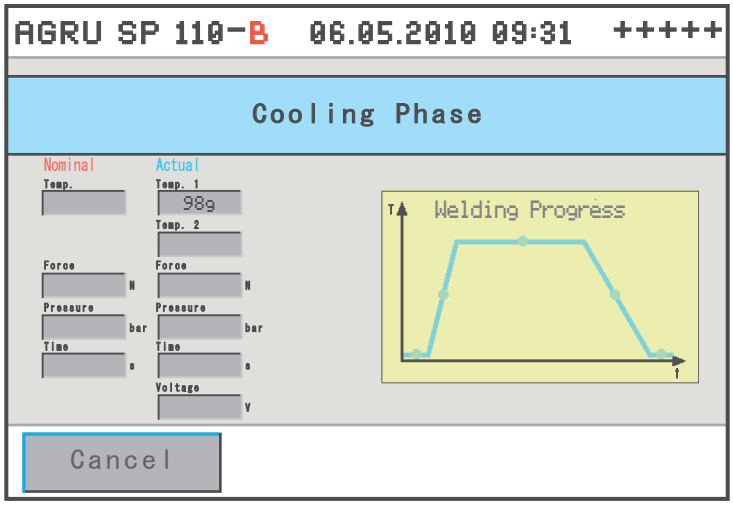
4.6.5 Welding Phase

In the welding phase (or, joining phase) the machine keeps the butts at the preset temperature and force to ensure that the joint will be seamless and beadless. This phase is also indicated on the touchscreen panel.

466 Cooling Phase

At the end of the joining stage, the machine moves on automatically to the cooling phase (second-last LED in Display 16). The machine maintains the new joint at the predefined force and monitors and control the level of force if this feature is enabled (see Sect. 4.3 on the machine configuration options).

At the end of the cooling phase, the air in the inside balloon is released (last LED in Display 18).

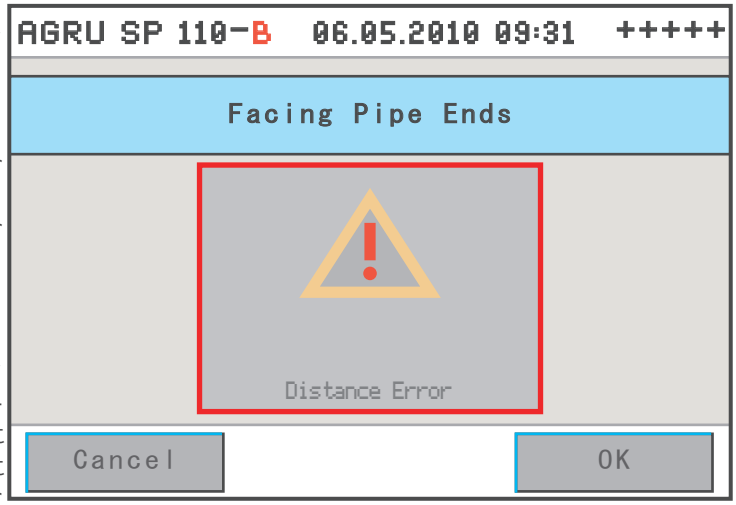


Display 18

467 End of Welding

After a successful welding operation, which can also be recognized in the welding diagram, the heating element is released. It still has to be tilted up by the weler. Then the clamps can be opened and the pipes can be taken out of them. The machine hints at all this steps on the touch screen.

When the welding process is finished, the machine displays an overview with the welding and traceability data that will be saved to the report (the screen resembles the one in Display 22), and asks the welder to visually check the quality of the joint. In case he finds that the joint is of poor quality, although the machine did not alert him to any welding error, he can manually classify the welding result as poor by touching the "Error" button. This causes the machine to mark the joint as poor rather than good in the the welding report.



Display 19

47 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 19). Additionally, the LED icon in the welding diagram that belongs to the welding phase with the malfunction turns red.

The errors listed in the following table can be displayed on the screen.

Type of Error	Description
a. Data Input	
Input Error	Error while entering data on the touchscreen.
Code Error	Error while reading data from a bar code.
b. System	
Clock Error	The internal clock of the machine is defective; re-set the clock in the configuration menu.
Memory Full	The memory to which the welding reports are saved is full and memory control is enabled.

Type of Error	Description (continued)
System Error	Malfunction in the control system of the machine; power to the machine has to be turned off and the machine unplugged immediately, and it has to be sent to the manufacturer or an authorized service point for check and repair.
Power Supply Voltage Error	The voltage of the power supply is too high or too low; welding has to be suspended provisionally.
Printer not Ready	The printer or PC connected to the machine is not ready (no communication, faulty cable or – if serial interface – bad interface configuration).
Unit Maintenance Due	The recommended service interval for the machine is over. It should be sent to the manufacturer or an authorized service point for scheduled maintenance and service.
No Function Available	A control (touchscreen button, switch) was used for which no function is defined.
c. Welding Process	
Ambient Temperature Error	The ambient temperature is out of the acceptable range from 0°C through to 40°C; welding is not possible.
Balloon Error	It was impossible to position the balloon correctly and/ or to inflate it correctly.
Welding Aborted	A stage of the welding process or the entire process was interrupted by the user's touching "Cancel."
Distance Error	The stroke of the carriage (at facing or joining) does not correspond to the expected distance it should travel; welding has to be repeated.
Force Error	The applied force is out of tolerance; welding has to be repeated.
Visual Check Error	A welded joint was declared defective by the welder upon visual check.
Power Supply Failure	In the course of the last welding operation, a power supply failure occurred; welding has to be repeated.
Emergency Stop	The welder has turned the machine off using the Emergency Stop switch. If this was done because of a malfunction of the machine, it must not be turned on again, unless it is beyond doubt that it works properly.
Heating Element Temperature Low	The heating element temperature is out of tolerance and cannot be adjusted; as long as this error is not cleared, welding or repeating a welding operation is not possible.
Heating Element Temperature Exceeds Max	The heating element temperature is higher than the maximum allowable limit; the machine has to be turned off.

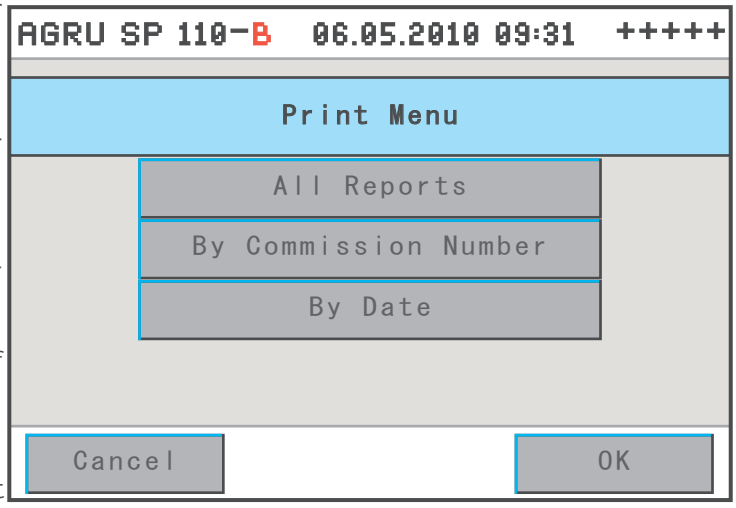
5 Printing and Transferring Welding Reports

The machine is equipped with USB A interface that gives you the opportunity to connect the tag printer or, if permitted, a USB stick and a USB B interface through which data can be transferred to a PC, e.g. with an installation of the DataWork agru software.

5.1 The Print Menu and Printing/Transferring Reports

When a data communication cable is connected while the standard data screen (see Display 5) is showing, the machine displays the print menu. According to the selection made on this menu, data will be sent

to the connected device: to the a printer for print-out or to a PC for further processing and archiving.

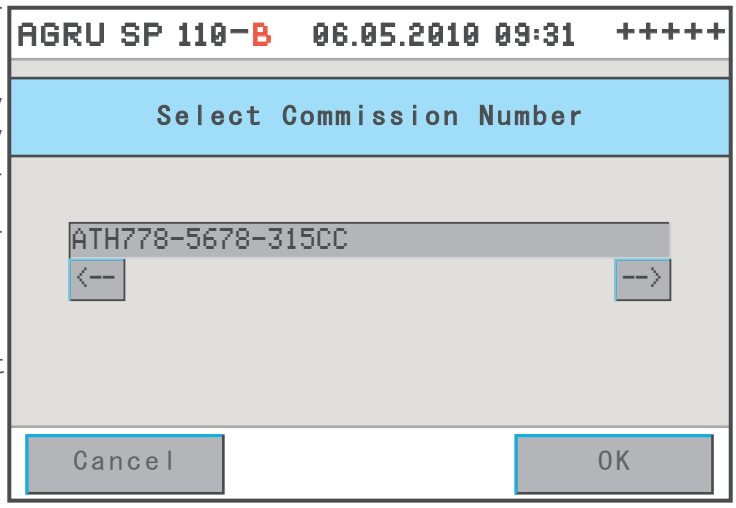


Display 20

Touch the appropriate button to select printing "All Reports", printing "By Commission Number", or printing "By Date".

The option "All Reports" causes all the welding reports stored in system memory to be printed. While the machine transfers the reports, a countdown indicates how many of them remain to be printed or transferred.

The options "By Commission Number" and "By Date" lead the operator to the next screen in which arrow buttons can be used to browse through the reports in system memory to select the desired commission or date from which reports should be printed or transferred (see Display 21). The options show the first available commission number or date, and once the desired one is found, the selection has to be confirmed by "Ok" to start the transfer to printer or PC.



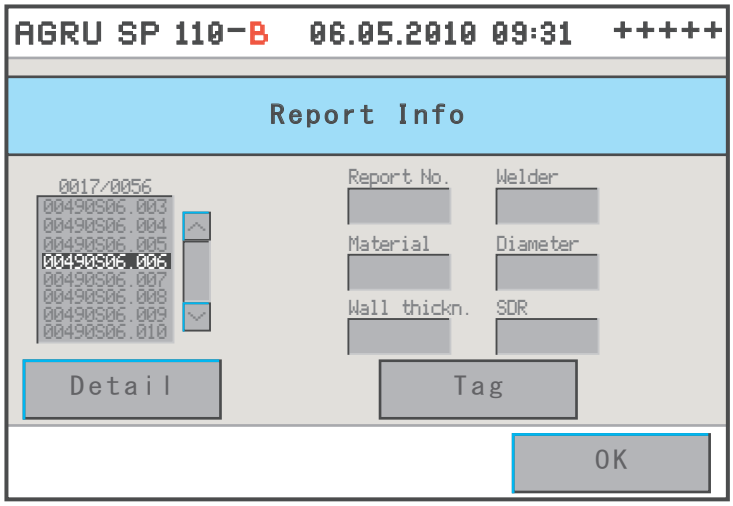
Display 21

If the machine displays a "Printer not Ready" error message after you touched the "Ok" button, the printer has to be switched to online mode. Check for potentially damaged connections from the machine to the printer or the PC.

After successful printing, the machine displays a message telling the welder that printing was o.k.

5.2 Showing Reports in Memory, Reprinting Tags

Using the appropriate option of the configuration menu (see section 4.3), it is possible to display on the screen the welding reports saved to memory. A screen like the one in Display 22 appears. It is similar to the welding and traceability data overview shown at the end of each successful welding. operation. This is only an abstracted overview with the main welding parameters. By touching the "Detail" button, a new screen is displayed and show all data relevant to the welding operation. In this detailed view, an "Error" button allows assessing a weld as unfit upon visual inspection, even when the machine did not throw any error.



Display 22

Near the left edge of the Report Info screen, you will find a list of all welding reports currently in memory. Above this list, the number of the selected report is given (before the slash), along with the total number of reports in memory (after the slash). To move the selector bar through the list, touch the scrollbar arrows to the right of the list. The longer you touch them, the faster the bar scrolls through the list.

To display the detailed view of the report, touch the "Detail" button or to reprint an extra tag of this welding operation for sticking it onto the pipe, the "Tag" button.

5.3 Deleting Reports from Memory

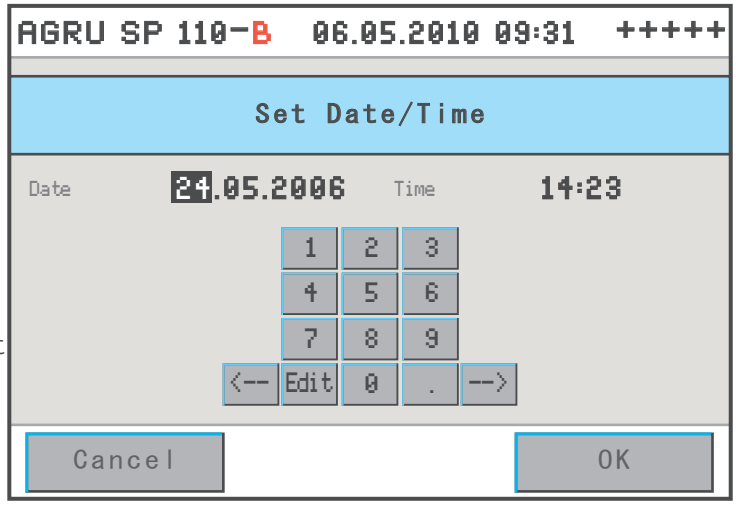
To delete the reports stored in memory, use the appropriate option in the configuration menu (see sub-section 4.3). Upon touching this button, a safety warning asking if you really want to delete them appears on the screen and has to be confirmed to effectively delete the reports currently in memory.

6 System Data

Setting the Date and the Time of Day

When the "Date/Time" sub-menu was selected in the configuration menu (see sub-section 4.3), the screen shows what is reproduced in Display 23.

The time of day and the date can be set using the keypad shown on the touchscreen panel.



Display 23

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, excepting the maintenance steps given below. Thus, constantly high standards of operation quality and safety are maintained.

Important

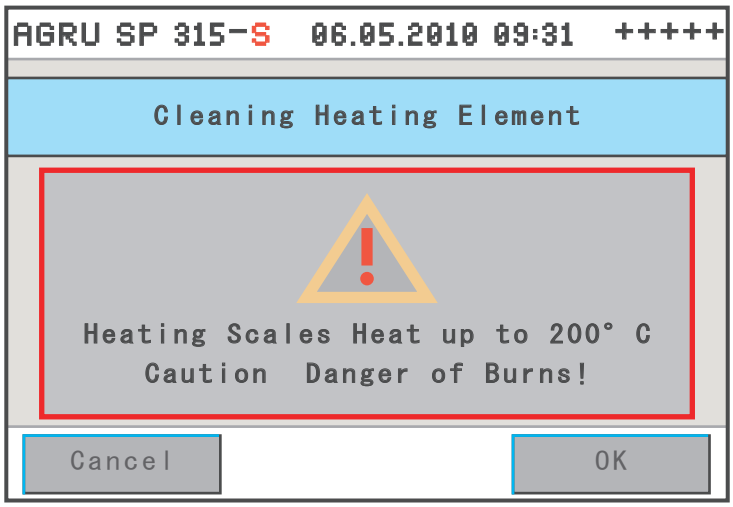
Non-compliance with this provision will dispense the manufacturer from any warranty and liability claims for the unit and any consequential damage.

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

Cleaning the Heating Element

The heating scales should be rid of residues that may result from welding operations regularly and **with a lint-free cloth and a dedicated polyethylene cleaner**. The heating element cleaning feature is accessible on the third page of the configuration menu (see Sect. 4.3).

The initial warning to the effet that the temperature of the heating scales will be dangerously high has to be confirmed by "Ok" in order for the process to begin. Then the heating-up of the scales, which is needed to be able to clean them, follows the same steps as their being heated up during a welding operation (see Sect. 4.6.3). During the heating, a be-patient message is displayed, which disappears when the heating element reached and has kept the 200°C for 1 minute. Then, being extremely cautious, clean the heating scales.



Display 22

That the scales can now be cleaned is displayed on the screen. When the message to this effect appears, the welder can open the heating scale. When it is open, it is no longer heated. If the temperature decreases to the point where residues cannot be removed anymore, close the scale again and heating will resume automatically in an analogous manner as previously.

Important

It is **not acceptable** in any circumstances to use sharp or pointed objects to clean the heating scales. The may seriously damage the heating surfaces, which will void any warranty assumed for the product.

At the end of the cooling of the heating element after the cleaning, the element is retracted from the working position in a manner analogous to the end of a welding procedure, except that there are no pipes.

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