Acu-Tech EF300 Electrofusion Welder - Operating Manual

Models EF300 & EF300GPS

The Acu-Tech EF300 Pressure Welder has been designed and built by a reputable company in Germany, with its portability and compact dimensions not compromising the top-notch performance ability and unconditional reliability. New technology has led to the development of a generation of HDPE welding products that boasts an array of unique and revolutionary features, including the GPS function on the EF300GPS electrofusion welder.

Contents:

1. Introduction

This product is designed exclusively for jointing PE pressure pipelines assembled with electrofusion fittings.

The product is manufactured with state-of-the-art technology and checked according to widely recognized safety regulations and is equipped with the appropriate safety features.

In the event of errors of handling or misuse, however, the following may be exposed to hazards:
- The operator's health,
- The product and other hardware of the operator,
- The efficient operation of the product.

All persons involved in the installation, operation, maintenance, and service of the product must be fully qualified, and be able to operate the product when required. All persons involved with the welding process should carefully read and conform to this Operating Manual before working with the product.

2. Safety Requirements

a. Using the Correct Connection Terminal

Use the appropriate connection terminal that is compatible with the 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.

b. Improper Use of the Welding and Power Supply Cables

Do not carry the product by one of its cables and do not pull the power cord to unplug the unit from the electrical socket. Protect the cables against heat, oil, and cutting edges.

c. Securing the Fitting and the Joint

Use appropriate clamps to secure the fitting and the joint before welding. The fitting manufacturer's installation instructions, local and national regulations must be respected in all cases. Welding processes must never be repeated with the same fitting, as this may cause live wires to be accessible to touch.

d. Cleaning the Welding Unit

The product must not be sprayed with or immersed in water. First unplug the unit, then use a damp cloth to clean the exterior of the unit, cords and feet. Ensure the product has dried before turning it on again.

e. Checking for Damage

Before operating the product every time, carefully check safety features and any existing parts with minor damage, for intended and proper function. Ensure that the push-on connection terminals work properly, that contact is fully established, and that the contact surfaces are clean.

All parts must be installed correctly and properly conform to all conditions in order for the operator to be sure that the product will work as intended. Damaged safety features or functional parts should be properly repaired or replaced by a qualified organization/service shop.

Caution: The cover of the product may be removed only by Acu-Tech Piping Systems personnel, or of a partner organization properly trained and approved by the manufacturer.

f. Data Interface Cover Cap

Unless a USB is plugged in, replace the dust cap for the USB port, to prevent contamination and damage.

g. Mains Power Supply Specifications

Utility suppliers' wiring requirements, occupational safety rules, national codes including Australian standards, regulations, and local or state laws must be respected.

Caution: When using power distributions on the worksite, rules for the installation of earth-leakage circuit breakers (RCD) must be respected, and operation requires an installed breaker.

The product must be protected against rain, humidity, mud, puddles of water or other fluids. Any extension cords used should be deemed suitable for this welder in accordance with the technical information in this operating manual, in accordance with site or company standards, and in accord with electrical standards.

h. Generator Power Supply

The required nominal generator capacity as determined by the power supply requirement of the largest fitting to be welded depends on the power supply specifications, the environment conditions, and the generator type itself including its control/regulation characteristics.

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.

Note that the working output power of the generator decreases by about 10% per 1,000 m of altitude. During the welding process, other devices connected to the same generator should not be operated. Generator or mains power fuse protection should be 16 A (slow blow). The product must be protected against rain and humidity.

3. Service and Repair

As the product is used in applications that are sensitive to safety considerations, it may be serviced and repaired only by the manufacturer or its duly authorized and trained partners. By stipulating this, consistently high standards of operation quality and safety are maintained.

Failure to comply with this provision will release the manufacturer from any warranty and liability claims for the product, including any consequential damage.

When serviced, the unit is upgraded automatically to the technical specifications of the product at the time it is serviced, and we grant a three-month functional warranty on the serviced unit. We recommend having the product serviced at least every twelve months. Any provisions in the law pertaining to an electrical safety inspection must be complied with.

4. Principles of Operation

The EF300 welder allows welding electrofusion fittings that feature a barcode. Every fitting is provided with a tag that has one or two barcodes on it. The structure of these codes is internationally standardized. The first code contains welding parameter information and complies with ISO 13950. The second code, if present, contains the component traceability data and complies with ISO 12176-4.

The EF300GPS model version with GPS functionality can additionally be used to record the geographic coordinates of the place where the welding operation is performed, which will then be added to the relevant welding report. This is not possible with the standard EF300 model.

The welding control program supports the extended data encoding specifications under the ISO 12176-4 standard, (e.g. pipe and fitting traceability codes). To use this feature, the desired data must be enabled in the configuration menu, at "Recording" (see Section 6). Welding parameters can also be entered manually.

The microprocessor-controlled EF300 Welding Unit:

- Controls and monitors the welding process in a fully automated fashion,
- Determines welding duration depending on ambient temperature,
- Shows all information on the display in plain text.

All data that is relevant for the weld or for traceability is saved to the internal memory and can be down-loaded onto a USB stick. Welding data transfer is enabled through a USB type A interface port, compatible with most USBs. See Section 13 for further optional accessories related to the USB connection.

5. Check-out and Operation

Before operating the welding unit;

- Be sure that it is set on a stable, level surface.
- Be sure that power supply/generator protection is 16 A (slow blow).
- Plug the power supply cord into the mains power supply or the generator, then turn on the switch.

a. Turning the Welding Unit On

After the power supply cable is connected to a suitable power source, turn the welding unit on using the on/off switch. After a start-up screen *Display 2* is shown.
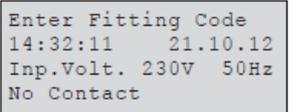

```
Enter Fitting Code
14:32:11    21.10.12
Inp.Volt. 230V  50Hz
No Contact
```
Display 2

b. CAUTION in case of System Errors!

If an error is detected during the auto-test that the unit performs at start-up, a "System Error" message shows on the display. If this happens, the welding unit must be disconnected immediately from the power supply and the fitting, and it must be shipped for repairs to Acu-Tech Piping Systems, the manufacturer, or to a partner company properly trained and approved by the manufacturer.

c. Entering the Welder ID Code

The alpha-numeric keypad 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 and the displayed character will be inserted. The first character always is the number on the respective key, then the letters or marks in the order shown on the key. For example, 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 the ↑ key while selecting the appropriate letter.

The welding unit can be configured to ask for the welder identification code before the fitting code is entered. The display screen then shows the message "Enter Welder Code." (This screen can be accessed by a quick access routine; see Section 10e). The numeric code can be entered either by reading it from a tag with the scanner, or by using the alpha-numeric keypad. Whether the welder identification code must be entered and if so, when or how often, is determined in the "Settings" sub-menu of the configuration menu.

When the welder code is read from a barcode using the scanner, it is confirmed by an audible signal, and the screen shows the identified code and switches to the next input display. When the code is entered manually, it is saved by pressing the START/SET key. If the code entered is not correct, a "Code Error" message appears; check the sequence of numbers and correct as needed. If the code entered is correct, it is saved to system memory and inserted into the welding reports to be printed.

Only an ISO standard-compliant welder identification code is accepted by the unit. If the welder code feature is disabled, the input screen for the welder code will not show.

d. Connecting the Fitting

Insert the connection terminals into the fitting and check for proper contact. Use terminal adapters if needed. The contact surfaces of the cable connection terminals or adapters and the fitting must be clean. Dirty terminals may lead to improper welding and to overheated and fused connection terminals.

The cable connectors must always be protected against getting dirty. Terminals and push-on adapters should be considered consumables and, therefore, must be checked before every welding operation and replaced if damaged or dirty.

When the fitting is connected, instead of the "No Contact" message (see *Display 2*) the number of the next welding report appears (e.g. "Pro. No.: 0015").

e. Reading the Fitting Code with a Handheld Scanner

Only the barcode on the tag attached to 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.

Read the fitting code by holding the scanner in front of the barcode at 5 to 10 cm away, where the red line indicates the reading area, then push the reading button. If the data is read correctly, the welding unit confirms this with an audible signal and displays the decoded data on the screen (see *Display 4*).


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

Display 4

The displayed values are the nominal welding parameters contained in the fitting barcode 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 showing ohm value is OK, a resistance error may still be detected (see Section 11b). Only when the welding process starts will the display show 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 it contains errors, delete the reading by pressing the STOP/RESET key. The read data is also deleted if the welding unit is disconnected from the fitting.

f. Direct Welding with the *AutoWeld* Feature

If two welding operations of electrofusion fittings with the exact same welding parameters succeed each other, it is not necessary to read a fitting barcode or enter welding parameters manually. To start a welding operation that is completely identical to the preceding one, it is sufficient to use the *AutoWeld* feature, provided it was enabled in the configuration menu (see Section 10a).

The *AutoWeld* feature is also accessible from the quick selection screen opened from the "Enter Fitting Code" screen with the ← key (see Section 6a). In this screen, the selection cursor can be moved using ↑ and ↓ keys, and the selection is made with the START/SET key.

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

g. Starting the Welding Process

After the fitting barcode was read or the *AutoWeld* feature was used, the input of all traceability data that is enabled in the configuration menu (see Section 10e), 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.

Pressing the START/SET key will trigger a confirmation message "Pipe treated?" which in turn requires a confirmation with the START/SET key to start the welding process.

h. Welding Process

The welding process is monitored for the entire duration of the welding parameters contained in the fitting code. The welding voltage, current, and resistance are displayed in the lower line of the screen (Display 5).

i. 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.

```
Act. Time: 56sec
Nom. Time: 90sec

35.00V  1.57Ω 22.29A
```
Display 5

j. Aborted Welding Process

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

k. Cooling Time

The cooling time as given in the fitting manufacturer's instructions must be respected. If the barcode of the fitting contains cooling time information, it will be displayed at the end of the welding process and will be counted down to zero.

This countdown can be acknowledged and cancelled at any time by the STOP/RESET key. However, note that for the time that the pipe fitting joint is still warm, it must not be subjected to any external force. No cooling time will be displayed if the fitting code does not contain such information.

l. Returning to the Start of Parameter Input

After welding is finished, disconnecting the cables from the fitting will cause the unit to return to the beginning of the welding process. An additional safety feature prevents the electrofusion fitting from being inadvertently welded twice: after a properly completed or an aborted welding operation, the welding unit must be first disconnected from the fitting, in order to proceed with the next weld.

m. Using *ViewWeld* to Manage Logged Welding Reports, Print Tags, and GPS data

The *ViewWeld* feature offers viewing an abstracted version of the welding reports recorded during the welding processes and printing it as a label tag to be affixed to the joint on the optionally available tag printer. The *ViewWeld* abstract shows the

```
0015  24.02.13 09:33
M/B  MON HST  315
0058s  025.0V  1.57Ω
Welding OK
```
Display 6

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 6*), where the first displayed abstract is that of the last performed welding operation.

To call the *ViewWeld* abstract of a welding report, press the ↑ key in the barcode input screen (see *Display 2*). Browsing through the saved welding reports is then possible by pressing ← or → keys. To print a tag of the welding operation of which the abstract is currently displayed, the label tag printer must be connected to the welder. Then press the START/SET key in the *ViewWeld* screen.

ViewWeld also enables assigning the geo-data of a joint after it was made, in case they were not recorded with enabled geo-data logging at the welding operation (see Section 6g). To do this, call the *ViewWeld* screen and, if needed, browse to the welding abstract of the joint that needs to have its geo-data assigned. Then press the ↑ cursor key in the *ViewWeld* screen displaying the desired welding operation. The unit will ask you if you want to record geo-data (see *Display 12*). Confirm by pressing the START/SET key and log the geo-data according to the procedure described in Section 6g.

6. Additional Information in the Welding Report

Every welding report saved to system memory contains welding and traceability data that the operator can decide to enter or not to enter in the set-up menu. The data can be downloaded as a PDF report file or in the DataWork format.

```
***  Recording  ****
  AutoWeld
>Welder ID Code
  Enter Job No.
```
Display 7

a. Entering Preformatted and User-defined Traceability Data

All traceability data enabled in the configuration menu at "Data Recording" (see Section 10) must be entered before the welding process begins. The welding unit prompts the user to enter data either before or after entering the fitting barcode (see *Display 2*). Depending on what data is entered, either its repeated input is mandatory (e. g., the welder ID code; see Section 5c) or previously entered data can be changed and confirmed or confirmed without changes (e. g. the commission number; see Section 6b).

Certain traceability data can also be accessed quickly, via a selection screen, by pressing the ← key (see *Display 7*), either for viewing or for entering or changing/confirming them (for the *AutoWeld* feature mentioned along with them on this screen, see Section 5f).

b. Entering or Changing the Commission Number (Job Number) and Joint Number

The commission number input screen is shown by the unit before welding or accessed by the user in the quick access screen (*Display 7*). It can be entered using the alpha-numeric keypad or by reading it from a barcode using the scanner. The maximum length is 32 characters. Confirm your input by pressing the START/SET key. The job number is saved to the memory and will appear in the welding report.

Provided it was enabled in the configuration menu (see Section 10e), a commission number-related joint number is also recorded and shown along with the report number (see section 5d). To say that the joint number is related to the commission number (job 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, increases it by 1, and applies this new joint number to the next welding operation in that commission.

c. Entering or Changing Additional Data

The additional data input screen is shown by the unit before welding; first the screen that allows entering the first additional data, then the one for the second additional data. This input can be entered either using the alpha-numeric keypad (see Section 5c) or by reading from a barcode using the scanner.

```
** Addit'l Data 1 **

********************
```
Display 9

For the first additional data input, the maximum length is 20 characters. For the second data input, the maximum length is 15 characters. Confirm your input by pressing START/SET. The additional data will be saved to the memory and appear in the welding report. To skip this screen without any input, press the STOP/RESET key. You are free to define any additional data you see fit, such as information on pipe length, ditch depth, or comments that help with welded joint traceability.

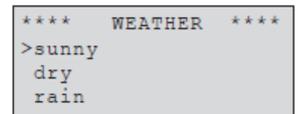### d. Entering the Fitting Traceability Code

If this feature is enabled in the configuration menu, after the fitting code was entered, another input "Fitting Code" is required. This is the so-called "traceability code" or "second fitting code" of the fitting.

This input is entered either from a barcode using the scanner or manually using the alpha-numeric keypad (see Section 5c). Press the START/SET key to confirm your input. If the code entered is incorrect, a "Code Error" message appears; check the string of numbers and correct as needed. If the code entered is correct, it will be saved to the system memory and inserted into the welding reports to be printed. By pressing the STOP/RESET key, this input will be skipped.

e. Entering Weather Conditions

If the weather conditions feature is enabled in the system menu, this input is required before the fitting code can be entered.

```
****   WEATHER   ****
>sunny
 dry
 rain
```
Display 11

Use the ↑or ↓ keys to select from "sunny", "dry", "rain", "wind", "tent", and "heating". Press the START/SET key to confirm your selection. The selection is saved to memory and will appear in the printed welding report.

f. Entering Data on the Jointed Components

Using the same procedure as entering the fitting traceability code (see Section 6d) prior to welding, the length and ISO-compliant pipe codes, as well as the name of the installing company can be entered for inclusion in the welding reports. To do this, they must be enabled in the configuration menu.

g. Recording the Geo-data of the Planned Joint

Note: This section applies only to the product version with GPS module (EF300GPS).

```
Record Geo-Data
>Yes
 No
```
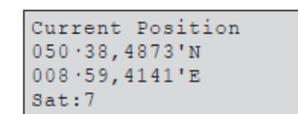*Display 12*

Provided that geo-data recording is enabled in the configuration menu (see Section 10e), the geographic coordinates can be recorded, if the GPS module is on, as soon as *Display 12* shows on the screen.
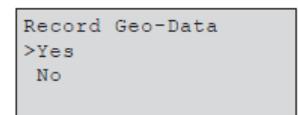
Wait at least one minute from switching the GPS module on, until the actual recording of the geo-data, or the GPS module will show a not-ready error. During the first minute after switching the GPS module on the following messages may appear on the screen: "No signal", "GPS module failed", "GPS Error, Restarting", and "GPS Module not Ready". These are not actual errors during the starting minute of initialization - if they appear after a full minute, only then must they be considered actual error messages. In this case, the restart after a GPS (signal) error will be performed by the module itself, without any user action. The "Not Ready" message will disappear automatically as soon as the GPS module is ready to record.

The geo-data is recorded after you selected "Yes" in *Display 12* using ↑ and ↓ keys and when you have confirmed this selection by pressing the START/SET key. A message confirms that the data has been recorded. The recorded data then shows on the screen (see *Display 13*). A second screen is used to display additional

```
Current Position
050·38,4873'N
008·59,4141'E
Sat:7
```
Display 13

information on the GPS accuracy at the time of recording. Press the → key to switch back and forth between both geo-data screens.

If it is likely that a satisfactorily precise position cannot be recorded because of relatively poor signal strength, a warning message will tell you, after pressing the START/SET key in *Display 12*, "Poor GPS signal; record

data?". When this message is showing, you can still start recording the position by pressing the START/SET key or you can go on without recording by pressing the STOP/RESET key.

Note that the recorded position will be the location of the welder when the START button is pressed in *Display 12* above. This means that in situations where the welding unit cannot be set near the joint that is to be welded, it is possible to first record the correct GPS location by placing or holding the welder above or next to the future joint, then to record the geo-data, and finally to put the welder back in a suitable place to complete the welding process.

7. Entering Welding Parameters Manually

To be able to enter the welding parameters manually, you must first connect the fitting to the welding unit with the welding cable. The manual input of parameters can then be accessed by pressing the ↓ arrow key. The screen will show a menu as in *Display 14*, provided manual input is enabled in the configuration menu (see Section 10a). In other words, the manual parameter input replaces using the barcode to read the fitting.

```
**  MANUAL INPUT  **

>Enter Voltage/Time
 Enter Fitting Code
```
Display 14

Using the ↑ and ↓ keys 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.

a. Manually Entering Welding Voltage and Time

If this option was chosen in the manual parameter input menu, a screen like *Display 15* appears on the screen. Use the alpha-numeric keypad (see Section 5c) to set the welding voltage and the welding time, according to the fitting manufacturers' requirements, then press the START/SET key to confirm your input. The "Start ?" message displayed after the confirmation by START/SET indicates that the unit is ready for welding.

```
Voltage/Time

U= 40 V  t=  1000 s
```
Display 15

b. Entering the String of Numbers

If this option was chosen in the manual parameter input menu, the "Enter Fitting Code" display shows. The 24 characters of the fitting code to be entered display as asterisks (*). Use the alpha-numeric keypad (see Section 5c) 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 indicates that the unit is ready to start welding.

8. Downloading the Reports

The USB A Interface Port connects USB mass storage media (such as a memory stick) to the welder. The interface port complies with the USB version 2.0 specification (i.e. maximum data rate of 480 Mbps).

Before transferring data, it is highly recommended to switch the welding unit off and on again. If this is not done, there is a risk of data transfer failure, or that the reports in the welding unit will be corrupted.

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 welder's internal memory, the welding reports would be irrevocably lost and may not be available on the USB or elsewhere.

a. Selecting the File Format

Connecting a USB will prompt the selection of the output file format (see *Display 16*). Select the file type by using the ↑ and ↓ keys and press the START/SET key to confirm. The following formats are available:

- A PDF file with an abstracted or extended version of the report,
- DataWork file format (A common welding data management application),
- A CSV file (comma-separated values), which allows data to be imported into a database or spreadsheet application, such as Microsoft Excel.

```
* Select File Type *
 DataWork File
>PDF Abstract
 PDF Ext'd Report
```
Display 16

The Service Report option is not used by operators, as this report lists the events related to the maintenance of the welding unit and is only used in the scope of computer-assisted unit service.

b. Downloading All Reports

After the file type is 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.

c. Downloading by Commission Number, Date or Report Range

After the file type was selected, the next screen shows 'By Commission Number', 'By Date Range", and 'By Report Range' options. Depending on the selection, the ↑ and ↓ keys can be used to select from the commissions currently in system memory, or the alpha-numeric keypad can be used to enter a start date and an end date, or the first and the last report, that define a range of dates or reports to be downloaded. When you press the START/ SET key, the selected reports will be transferred to the storage media.

d. Understanding the Report Download Process

The download starts automatically after a selection was made from among the options. Wait for the transfer to finish and the "Download completed" message to appear on the screen. If a problem occurs while the download is in progress, a "Not ready" 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. Restart the unit and attempt the download procedure again.

e. Deleting Data from Memory

The report data in the 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 must be confirmed by pressing the START/SET key once again.

Then, the report data in the memory is deleted.

f. Keeping Data in the 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 the memory. They can then be printed off once again.

Make a habit of handling the internal storage as described at the beginning of Section 8, to maintain data integrity and avoid any inadvertent deletion of the reports in memory.

9. Dedicated Welding Unit Information

a. 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. This includes the software version, the serial number of the unit, the date of the next scheduled maintenance, and the quantity of available reports. To exit this screen, press the STOP/RESET key.

If the scheduled service is overdue, a "service due" message appears on the screen as soon as the unit is plugged into the mains or generator power supply. This message must be acknowledged by pressing START/SET. If you see this message, it is wise to get the unit serviced as soon as possible.

b. 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 pre-set 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 correct fit and, if worn, replace them with new ones.

c. Overheating Switch

The welding process will abort if the temperature of the transformer in the welding unit is too high. The overheating circuit breaker for the transformer will stop the welding process if the temperature reading is too high and the remaining welding time is longer than 800 seconds. The display and the welding report will show an "Overheated" message.

d. Indication of Power Supply Failure at the Last Welding

The message "Power Supply Failure Last Welding" indicates that the previous weld was aborted because of a power supply failure. The reason may be that the generator output is too weak, or that the extension cable is too long or under-rated, 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.

10. Configuring the Welding Unit

With the operator identity card, the welding unit can be reconfigured. When the MENU key is pressed, the "Enter Menu Code" message appears on the screen. After the code was read from the operator card, the selection menu in *Display 17* shows.


```
>Settings        -M-
 Recording       -M-
```
Display 17

Under "Settings", the parameters related to the welding unit itself and its operation can be set. Under "Recording", the traceability data that must or need not be recorded and written into the reports can be enabled or disabled. The desired sub-menu is selected using the ↑ and ↓ keys. Whenever "M" is shown next to a set-up option, it indicates a sub-menu is available by pressing the MENU key.

In both parts of the configuration menu, use the ↑ and ↓ keys to select the desired set-up option. Use the → arrow key to toggle between "on" and 'off' for that set-up option. Press the START/SET key to confirm the set-up and save it to memory.

a. Understanding the "Settings" Sub-menu


```
***  SET-UP MENU  ***
>AutoWeld          on
 Check Cd Expiry  off
 Memory Control    on
```
Display 18

"AutoWeld" 'On' means that the *AutoWeld* feature can be used (see Section 5f). 'Off' means that the feature is not available.

"Check Cd Expiry" 'On' means that the welder identification code must be current and not expired (default period of validity 2 years from code issuance), or the welding operation cannot be started. 'Off' means that the validity of the code will not be checked before welding.

"Memory Control" 'On' means that when the system memory is full of reports, the unit cannot start welding until the reports are printed or downloaded. 'Off' means that it works but that the oldest report will be overwritten. If these old reports are not transferred onto a USB, the data will be irretrievably lost.

"Manual Input – M – " means that by pressing the MENU key, the user can access a sub-menu that will determine the manual input of welding parameters (see Section 7).

"Wldr Code Option – M – " means that by pressing the MENU key, the user can access a sub-menu that allows determining when the welder code, if it is enabled under "Recording", must 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 – M – " means that by pressing the MENU key, the user can access a sub-menu for selecting the display and report language (see below).

```
***  SET-UP MENU  ***
 Manual Input     -M-
 Wldr Code Option-M-
>Language          -M-
```
Display 19

"Date/Time – M – " means that by pressing the MENU key, the user can access a sub-menu for setting the clock (see below).

"Buzzer Volume – M – " means that by pressing the MENU key, the user can access a sub-menu for setting the volume of the status buzzer (see below).

```
***  SET-UP MENU  ***
 Date/Time        -M-
 Buzzer Volume    -M-
>Temp. Unit       -M-
```
Display 20

"Temp. Unit – M – " means that by pressing the MENU key, the user can access a sub-menu for selecting Celsius or Fahrenheit as the unit for the temperature.

"Inventory No. – M – " means that by pressing the MENU key, the user can access a sub-menu for entering the number under which the unit is inventoried with the operating company.

"Number of Tags – M – " means that by pressing the MENU key, the user can access a sub-menu for entering the number of tags that are printed automatically after welding with the optional label tag printer, if such a printer is connected.

```
***  SET-UP MENU  ***
>Temp. Unit       -M-
 Inventory No.    -M-
 Number of Tags   -M-
```
Display 21

b. Selecting the Display Language

When the "Language" sub-menu was selected, the screen changes and *Display 22* appears. Use the ↑ and ↓ keys to select one of the options; "Deutsch", "English", and "Français" and confirm by pressing the START/SET key.

```
***** LANGUAGE *****
>Deutsch
 English
 Francais
```
Display 22

c. Setting the Clock

When the "Date/Time" sub-menu was selected, the screen changes and *Display 23* appears. The time of day and the date can be set using the keypad. The sections "Hour", "Minute", "Day", "Month", and "Year" are set separately. Press the START/SET key to confirm your settings.

```
Date/Time

21.06.13        14:28
```
Display 23

d. Setting the Buzzer Volume

When the "Buzzer Volume" sub-menu was selected, the screen changes and *Display 24* appears. The buzzer can also be heard. Turn the buzzer volume up or down to the desired value using the ← and → keys (from 0 to 100). Press the START/SET key to confirm your settings.

```
Buzzer Volume
< ------20-------- >
```
Display 24

e. Understanding the "Recording" Sub-menu

- "Welder Code" 'On' means that the welder identification code must be entered as set with "Welder Code Options". 'Off' means that the welder identification code is not required.
- "Commission No." 'On' means that the commission number (job number) will have to be entered or confirmed before every new weld. 'Off' means that the user will not be prompted to enter a commission number.

- "Joint No." 'On' means that the unit assigns an automatically incremented joint number to every weld belonging to a commission already known and displays this number on the screen next to the report number. 'Off' means that no joint numbers will be assigned at all.
- "Additional Data" 'On' means that the additional data will have to be entered or confirmed before every new weld. 'Off' means that the user will not be prompted to enter additional data.
- "Fitting Code" 'On' means that the 2nd so-called traceability code of the electrofusion fitting must be entered before every weld. 'Off' means that the traceability code will not be required.
- "Pipe Codes" 'On' means that the codes of both pipes and components (ISO-compliant welding and traceability codes) must be entered before every weld. 'Off' means that this will not be required.
- "Pipe Length" 'On' means that the length of both pipes and components must be entered before every weld. 'Off' means that this information will not be required.
- "Weather Cond." 'On' means that the current weather must be selected from a list before every weld. 'Off' means that this information will not be required.
- "Geo-data" (only EF300GPS model) 'On' means that the geographic coordinates must be recorded for every weld (see Section 6g for details). 'Off' means that this information will not be required.
- "Installing Comp." 'On' means that the name of the company that performs the installation work must be entered before every weld. 'Off' means that this information will not be required.
- "Print Tags – M – " means that by pressing the MENU key, the user can access a sub-menu for printing label/s with reference to a given welding operation, with the optional label tag printer.

All data can also be read from a barcode with the scanner, provided such a barcode is available.

11. Self-Monitoring Functions Overview

a. Errors during data input

Errors that may show during data input include:

- **'System Error' - CAUTION! The welding unit must be disconnected immediately from both the power supply and the fitting. The auto-test has detected an error in the system. The unit must no longer be operated and must be sent to Acu-Tech Piping Systems or a partner company, approved by the manufacturer, for a check-up and repair.**
- 'Code Error' - An erroneous input has occurred; a code tag is poor or has an error in code symbology or the code reading was improper.
- 'No Contact' - There is no properly established electric contact between the welding unit and the fitting (check the push-on terminal on the fitting), or the fitting heater coil is defective.
- 'Low Voltage' - The input voltage is below 175 volts. Adjust generator output voltage.
- 'Overvoltage' - The input voltage is over 290 volts. Decrease generator output voltage.
- 'Overheated' - The transformer temperature is too hot. Turn the welding unit off and put it in the shade or an airconditioned office and let it cool down for about an hour. Do not put it in a freezer.
- 'Temperature Error' - The ambient temperature measured is outside the operating range of the welding unit. (i.e. less than – 20°C or over + 60°C). Only use the product within its limits.
- 'Temperature Sensor Defective' - The welding cable's temperature sensor is damaged or defective and will need to be replaced. Send the unit to Acu-Tech Piping Systems for a check-up and repair.
- 'Clock Error' - The internal system clock is not working properly or is defective. Reset it or send the welding unit to the Acu-Tech Piping Systems or the manufacturer, for a check-up and service.

- 'Unit to Service' - The recommended next service date for the welding unit is overdue. The service due message must be acknowledged by pressing the START/SET key. Send the welding unit to Acu-Tech Piping Systems or the manufacturer for service and check-up, or future warranties may be void.
- 'Input Error' - A code that was entered is incorrect. Either at manual welding parameter input, the welding time was not entered, or an incorrect value was selected in the date setting.
- 'Memory Full' - The system memory is full of welding reports. Print or download the reports in the memory or switch memory control off. Without memory control, a new report overwrites the oldest existing one. If these old reports are not copied onto a USB, the data will be irretrievably lost.
- 'Download Cancelled' - During data transfer or printing, an error condition occurred which could not be cleared. Try the download again.
- 'GPS Module Not Ready' (EF300GPS model only) – The one minute of waiting since you switched on the GPS module on has not passed yet. Wait a bit longer and try again.
- 'Poor GPS Signal' (EF300GPS model only) - The signal strength is so weak that no precise position can be recorded. Repeating the recording is recommended.
- 'No GPS Signal' (EF300GPS model only) - There is no reliable signal from the relevant satellites to the GPS antenna of the module.

b. Errors During Welding

All errors that occur while welding is in progress are also indicated by an audible alarm. These include:

- '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).
- 'Voltage Error' - Check generator voltage and current. The output voltage does not correspond to the value previously read; the welding unit must be sent to the manufacturer for a check-up.
- 'Low Current' - 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 include a 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%.
- 'Emergency Off' - The welding process has been interrupted by pressing the STOP/RESET key.
- '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 of the fitting. It is suggested to return the fitting to the supplier to investigate the cause of failure.
- 'Power Supply Failure at Last Welding' - The last weld 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 must be acknowledged by pressing the STOP/RESET key (see also Section 9d).

12. Technical Specifications

Specification:	Value:
Nominal Voltage:	230 V
Frequency:	50 Hz - 60 Hz
Power:	3295 VA/ 2800 VA, 80 % duty cycle
Ingress Protection:	IP 54
Primary Current:	Max. 16 A
Ambient Temperature:	– 20 °C to + 60 °C
Output Voltage:	8 V - 48 V
Max. Output Current:	110 A
Operating Range:	20mm to 1200mm EF fittings
Welding Report Memory:	10,000 reports
Data Interface Port:	USB v 2.0 (480 Mbps)
Tolerances:	**Value:**
Temperature:	± 5 %
Voltage:	± 2 %
Current:	± 2 %
Resistance:	± 5 %

If you wish to sell or dispose of your welder, or it is irreparably damaged, please get in touch with Acu-Tech Piping Systems to discuss options. Acu-Tech may be able to recycle some parts of a damaged welder, and thereby reduce landfill waste and damage to the environment.

13. Accessories and Parts

Please contact Acu-Tech if you are unsure which parts or adapters come with the EF300 welder.

- Connection Terminal 4.7 threaded (fitting connector of welding cable), compatible with Uponor, DURA-Pipe, Simona, Strengweld, Plasson (216023430)
- Push-on Adapter FF flat - compatible with Friatec (216010070)
- Push-on Adapter FF round 4.0 - compatible with Friatec, GF, Agru, Wavin, Euro Std. (216010080)
- Push-on Adapter FF pin - compatible with Friatec Friafit (waste water) (216010400)
- Push-on Adapter GF - compatible with GF, Agru, Wavin, with free wires (216010090)
- Push-on Elbow Adapter 4.7 - 4.7 90° (216010580)
- Adapter Bag (216030310)
- DataWork Software for Windows (216080505)
- PC software for downloading and archiving data on PC (for most Windows operating systems).
- Label tag printer for printing an identifier label for the new joint right after the welding operation.

14. Service & Repair

a. Service and Repair Contact in Australia

Acu-Tech Piping Systems (Acu-Tech Pty Ltd)

Phone: 1300 270 270 | Website: www.acu-tech.com.au

Address: 119 Kelvin Rd, Maddington, Western Australia, 6109

Sales Email: sales@acu-tech.com.au or Service Email: equip@acu-tech.com.au

To book a welder service, go to this link: https://www.acu-tech.com.au/service/

For the latest operating manual version, go to this link: https://www.acu-tech.com.au/efmanual/