

# **Proweld™ Equipment Owner & Maintenance Manual**

## **Polymatic Electrofusion Machine**



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# TABLE OF CONTENTS

<b>Section</b>	<b>Page</b>
<b>I. Safety Precautions</b>	<b>3</b>
<b>II. Controls and Plugs</b>	<b>4</b>
<b>III. Flow Chart</b>	<b>5</b>
<b>IV. Connecting and Generator Conditions</b>	<b>7</b>
<b>V. Starting a Welding Process</b>	<b>10</b>
<b>VI. Contrast and Language</b>	<b>13</b>
<b>VII. Trouble Shooting</b>	<b>15</b>
<b>VIII. Asahi/America Contacts</b>	<b>19</b>

## **Section I - Important Safeguards**

**Warning! With the use of electric tools, you have to note the following basic safety directions to protect against electric shock, injury and fire.**

**1. Keep your work area in order!**

A clean work area reduces the risk for potential harm or injury.

**2. Consider the influence of the environment!**

Do not expose electric tools to rain. Do not use electric tools in wet or damp surroundings or in the neighborhood of combustible liquids or gases.

**3. Protect yourself against electric shock!**

Avoid bodily contact with grounded components (e.g. steel, metal pipes) or live cables. Do not carry the device with your finger on the power switch. Pull out the plug when you do not use the tool or when changing the adapters and attachments.

**4. Keep unauthorized people away!**

Do not allow other people to touch the device or cables. Keep them away from your work place.

**5. Store your device safely!**

Machines not in use should be kept in a dry and locked location.

**6. Use permitted accessories only!**

Only use accessories, especially power sources and extension cables, that are supplied with the device or recommended by the manufacturer. The use of attachments that are not recommended by the manufacturer involves a certain danger to you. Use only approved and marked extension cables outdoors.

**7. Do not expose the cable to avoidable loads!**

Do not carry the machine with the cable, and do not use the cable to pull out the plug. Protect the cable against heat, oil and sharp edges.

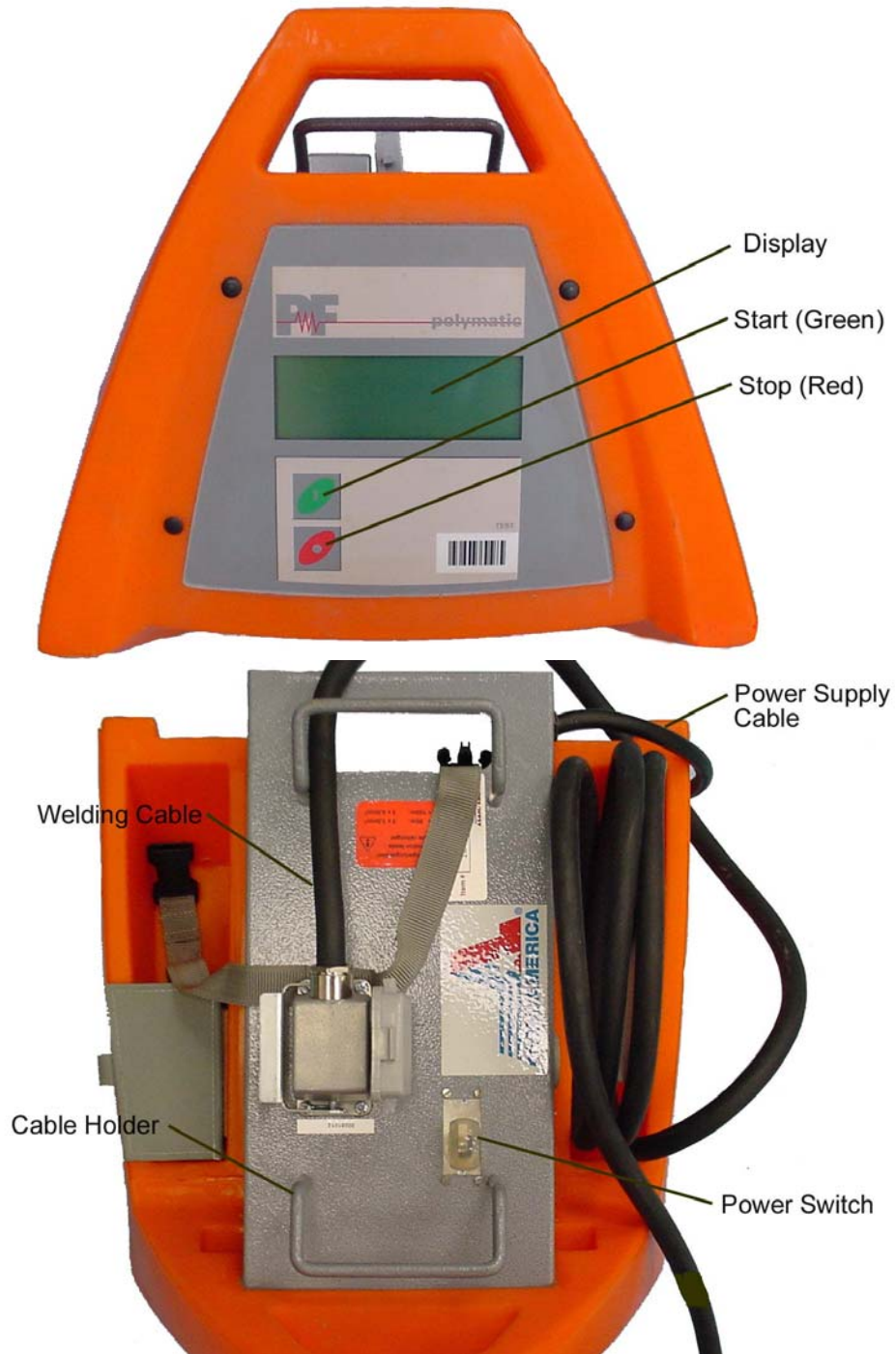
**8. Look after your tool carefully!**

Keep your device clean. Follow the servicing instructions and the instructions for changing the tools. Keep oil and grease away from the straps.

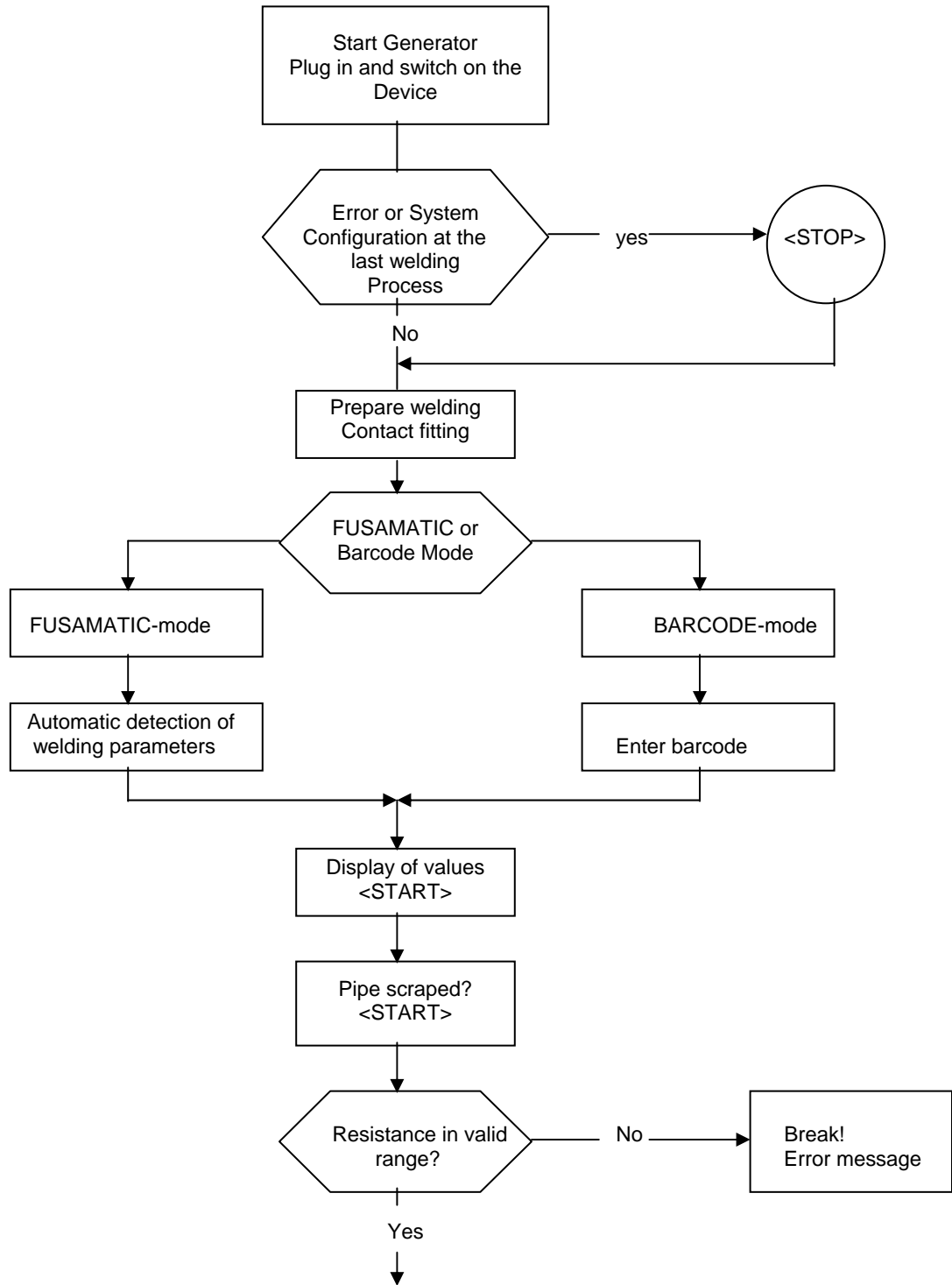
**9. Check your device for damages!**

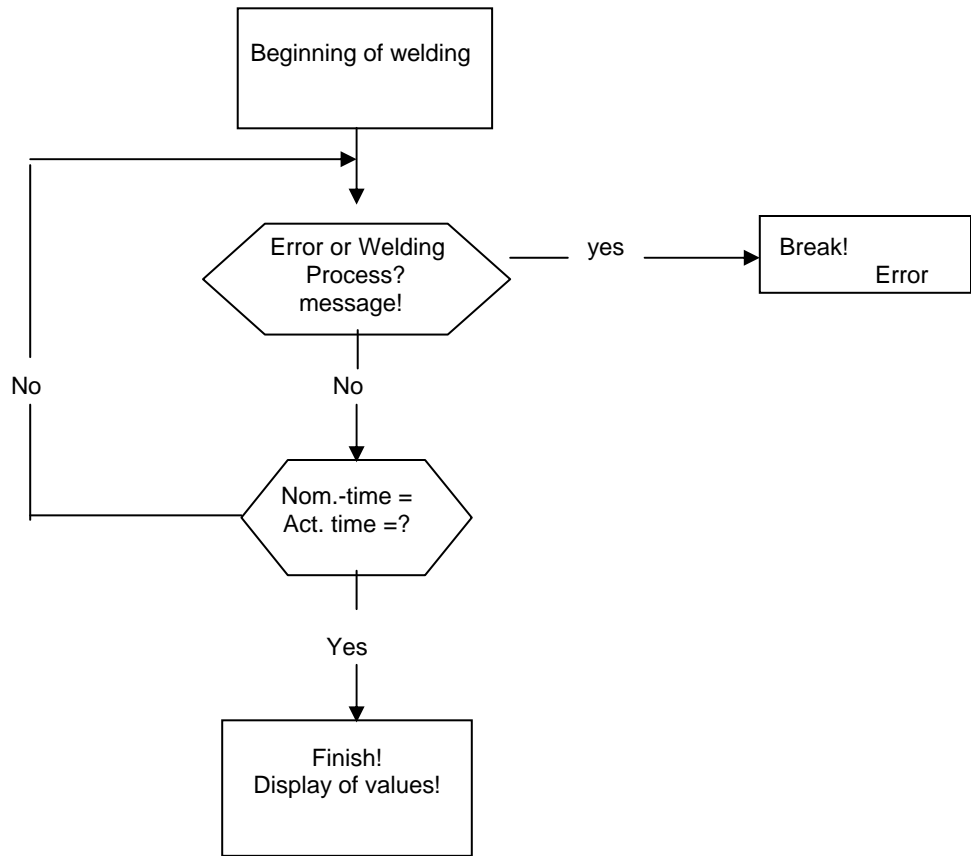
Check your tool before every use for damages and function of the protection devices and machine parts. All parts have to be mounted in the right way. They have to fulfill all conditions for proper running of the tool. Damaged protection devices and machine parts have to be repaired or replaced by an authorized service point.

## Section II - Controls and Plugs



### Section III - Flow Chart





## Section IV - Connecting and Generator Conditions

### 1. Connections

- A. Power supply connections must meet local and federal guidelines.

Electro Fusion Control Units must only be used by trained and authorized operators and must conform to the national and international standards and directives. The operator must supervise the electro fusion control box during the entire fusion process.

The Electro Fusion Control Unit has to be used within the following ranges:

Parameter	230V Control Units	110V Control Units
Input Voltage:	185V – 300V (AC)	90V – 150V (AC)
Input Frequency:	40Hz – 70Hz	40Hz – 70Hz
Ambient Temperature:	-10°C – +50°C (14°F – 122°F)	-10°C – +50°C (14°F – 122°F)
Max. Output Power:	Polymatic: 4000W Polymatic Light: 3600W	Polymatic: 4000W Polymatic Light: 3600W

**Caution: 110V Control Units shall not be used at 230V power supply and vice versa.**

When operating the main power supply of nominal 230V, a min. 16 Amps slow fuse comprising a *residual current-operated protective device* (RCCB) should be used (110V: min. 32Amps).

- B. Power Extension Cords

To extend the power supply cord you must adhere to the following rules:

Cable length	Cross Section (230V)	Cross Section (110V)
Up to 20m	3 x 1.5mm <sup>2</sup>	3 x 4mm <sup>2</sup>
20 to 50m	3 x 2.5mm <sup>2</sup>	3 x 4mm <sup>2</sup>
50-100m	3 x 4mm <sup>2</sup>	-

**Extending the welding cable is not permitted!**

## 2. Generators

### A. Important notes for the use of generators:

- First start generator, then plug in the device.
- No other machine or device shall be connected to the generator.
- The idle running voltage should be regulated to 240V – 260V (AC) at nominal 230V (nominal 110V: 120V – 130V (AC)).
- Unplug welding device before turning off the generator.
- Check the fuel lever before starting the welding process.

### B. Generator Suitability

The Electro Fusion Controllers of type **Polymatic / Polymatic Light** provide the following means to increase the generator suitability:

- Wide tolerance for input voltage and Input frequency.
- Display of current input voltage and frequency.
- Soft-Start for limitation of the generator load.

Despite these characteristics, the generators to be used must fulfill the following requirements and recommendations, in order to avoid damage of the control unit and to ensure that the internal monitoring function of the control unit will not interrupt the welding process:

- suitable to drive inductive loads and phase cut systems
- no-load voltage adjustable to 240V-260V at nominal 230V (nominal 110V: 120V-130V(AC)).
- output current of 18 Amps at one phase at nominal 230V (nominal 110V: 36Amps).
- stable output voltage and engine speed, also at fast alternating loads
- synchronous generators with mechanical speed control preferred
- voltage peaks must not exceed 800V

**Min. required generator output power 230V, 50Hz, 1-phase**

<b>Diameter</b>	<b>Output Power</b>
20-75 mm	2kW
90-160 mm	3,2kW
180-710mm	4.5kW (mechanically controlled) 5kW (electronically controlled)

For generators with insufficient control performance or voltage control, it is recommended to select a generator with 3-3.5 times higher output power than the stated ones, to achieve an undisturbed operation. Electronically controlled generators tend to oscillate with the control of the welding process, which can lead to high output voltage peaks. Please test suitability before using that kind of generator.

Manufactures like HONDA, EISEMANN, GEKO, FISCHER, PANDA and KIRSCH provide generators designed for this kind of application.

**Caution: 110V Control Units shall not be used at 230V power supply and vice versa.**

## Section V - Starting a Welding Process

### 1. Preparation

- A. Before starting the weld, you must visually check the device cables and adapters for damage. If necessary, they must be replaced.
- B. The removable welding cables must be plugged into the device before connecting to the power supply. Corresponding to the precautions stated in Section I, the power cable must be unrolled and connected to the power supply. After turning on the power switch at the topside of the welding device, it signals its readiness with two beeps. In addition, the display backlight is turned on automatically. The following display message appears:

PF polymatic  
Version 1.06aa  
25 Working hours

- C. If any error or change of the system configuration occurred at the last weld before turning off the device, this will be indicated by a message in the display once again. After pressing the red **STOP**-key, you are able to carry out a new weld process. After confirming all error messages, the following message will appear in the display:

Connect Fusamatic  
Voltage:           120V  
Frequency:       60 Hz  
No contact

As long as no fitting is connected, no welding process can be started. The message **No contact** shows you that no fitting is connected to the welding device.

- D. Put the welding connectors in the plugs of the fitting. It is important that there is a firmly fixed fit. The contacts of the welding connector and the fitting plug must be clean. Dirty or coated contacts can lead to overheating and burn at the connectors. Protect the connectors against dirt. If there is a coating or loss of stick force on the connectors, they have to be checked before every use.

**NOTE:** Pay attention to the installation instructions of the fitting, any special instructions (AWS, ISO, and DVS), and national directions as well as the layout instructions!

The control box is normally provided with 4.7mm terminals. If you would like to process fittings with 4.0mm plugs, you have to use the adapter 4.7/4.0. The fittings are normally designed as follows:

- 4.7mm Plug:           AGRU, PLASSON, DURAPIPE, STRENG, and FUSION
- 4.0mm Plug:           FRIATEC, GF, VON ROLL, DURAPIPE, and EUROSTANDARD

## 2.     **Welding with the Barcode-Mode**

Attention: Do not touch the contacts of the welding cable with the reading pen!

- A.     After preparing and connecting the fitting, the following message asks you to read in a fitting barcode with the reading pen or scanner.

Fitting code	
Voltage:	120V
Frequency:	60 Hz

- B.     For welding in the Barcode-mode, read in the barcode label, which is attached to the fitting you want to process. If it is not readable because of damage, you can use the readable barcode of an identical fitting of the same manufacturer. In any case it is forbidden to use the barcode of a different fitting. If you read in a barcode which is defective or invalid, the error will be displayed and be indicated by a bleep. You read in the barcode by using the scanner or reading pen. If the device detects a valid barcode, it indicates its readiness by showing the following message:

Start	
Nom. Time:	0200s
+PF+ d063	20°C

The places **+PF+** (manufacture), [ (type) and **d063** (diameter) will be replaced by the corresponding data from the barcode. The lowest row of the display contains possible error messages (**6 error messages**). After pressing the green **START**-key a message will remind you of your duty to fix and prepare the pipes according to the general guidelines:

Is the pipe scraped?
----------------------

- C. If you have any doubt about the right preparation, you can break off the procedure by actuating the red **STOP**-key. Otherwise confirm the proper preparation by pressing the green **START**-key. Now the welding device begins to measure the fitting resistance. In the case that it is outside the valid range, the error will be indicated by a bleep and an appropriate message will appear in the display.

01.68<02.00<1.93 Nom. time: 0200s +PF+ d063 Resistor error
---

The first row shows the range borders at the left and right side. In the middle the measured resistance is displayed. Pull off the welding connector from the fitting plugs. Check the connectors of the fitting and welding cable for dirt or coating. If the fitting causes another **Resistor error**, it is defective. Replace it. If no **Resistor error** occurs, the welding device starts the welding process automatically. To avoid danger to your health, do not touch the fitting or cables during the welding process. The display shows the actual and nominal welding times:

Act. Time: 0099s Nom. time: 0200s +PF+ d063 20°C
--

The places **+PF+** (manufacture), and **d063** (diameter) will be replaced by the corresponding data from the barcode. The lowest row of the display contains possible error messages (**6 error messages**). The welding process will stop automatically when the actual time reaches the nominal time. This will be indicated by two bleeps and the following message:

Act. Time: 0200s Nom. time: 0200s +PF+ d063 20°C OK
--

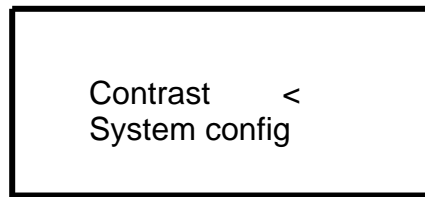
After the welding process has stopped, pull off the welding connectors to go back to the start message.

## Section VI - Contrast and Language

The PF-Polymatic provides the option to change the display language and contrast.

### 1. Adjusting the display contrast

- A. Simultaneously press the **START** and **STOP**-keys. The following two menu items will be shown in the display:



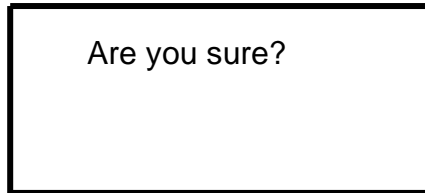
The cursor marks the item to be selected. Move the cursor by pressing the red **STOP**-key. To choose one item, move the cursor beside the wanted entry and press the green **START**-key.

- B. Choose the contrast item, as described above. The following message will appear in the display:



The shown value is given by the orientation. It can show numbers from 100 to 255. The higher the number, the stronger the contrast.

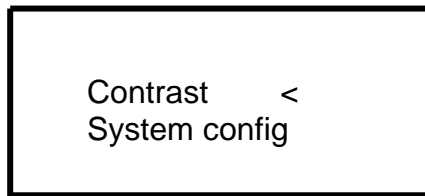
- C. Use the red **STOP**-key to increase the value. If the value reaches 255, it will switch back to 100. Adjust the contrast to a value where you can read the display best. Confirm your adjustment with the green **START**-key. The following security message appears in the display:



Press the green **START**-key to save the adjustment or the red **STOP**-key to take the last setting.

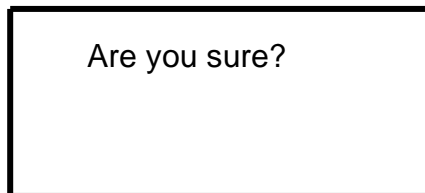
## 2. Changing the display language

- A. Simultaneously press the **START** and **STOP**-keys. The following two menu items will be shown in the display:



The cursor marks the item to be selected. Move the cursor by pressing the red **STOP**-key. To choose one item, move the cursor beside the wanted entry and press the green **START**-key.

- B. Choose the **System config**. item, as described above. Confirm the next message (**Language <**) by pressing the green **START**-key. Now the display will show the available languages. Please note that only four languages can be shown at the same time. The first language is marked by a cursor <. Move the cursor by pressing the red **STOP**-key to the wanted language. Then select the wanted language by pressing the green **START**-key. The following message will appear in the display:



You can confirm your choice of language by pressing the green **START**-key or cancel the function by pressing the red **STOP**-key.

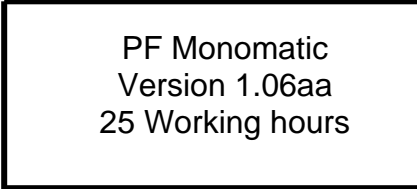
## Section VII - Trouble Shooting

### 1. Using and servicing the Reading Pen

- A. Do not touch the contacts of the welding cable to the reading pen.
- B. To use the reading pen, place the tip of the reading pen left or right beside the bar code. Move the reading pen with a constant speed over the entire barcode. Do not stop the motion or lift the pen.
- C. If the reading pen does not work properly, it can be replaced. Slice open the shrink tube, which protects the plug, with a sharp knife with care not to damage the cables. Replace the reading pen and test before the new shrink tube is applied.

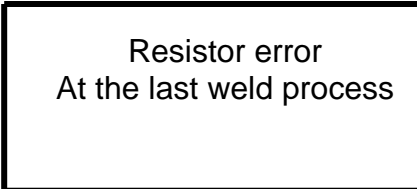
### 2. Start Messages

- A. After switching on the device, the following message appears on the display:



PF Monomatic  
Version 1.06aa  
25 Working hours

- B. If there occurred any error or change of the system configuration of the last weld before turning off the machine (e.g. Resistor Error), this will be indicated by the following message in the display.



Resistor error  
At the last weld process

- C. Press the red **STOP**-key to carry out the next weld.

### 3. Error Messages

Error messages will be indicated by a beep. Pressing the red STOP-key can interrupt a sustained beep. The following table lists possible error messages that may appear.

<b>Error</b>	<b>Cause</b>	<b>Reaction</b>
<b>Code error</b>	Faulty Input	Move the reading pen with a constant velocity over the barcode
	Barcode or error of code structure.	
<b>Contact error</b>	Invalid FUSAMATIC detection resistor.	Clean contacts. Replace fitting if necessary
<b>Current high</b>	Output current is more than 15% higher than the starting current.	Shortcut to fitting coil or welding cable
<b>Current low</b>	Interrupt of the welding current.	Welding is faulty!
	Current drops down about 15-20% for at least 3 seconds.	Welding is faulty!
<b>Device too hot</b>	Temperature of transformer is too high	Let the device cool down for about 45 minutes.
<b>Emergency cutout</b>	Welding was interrupted by pressing the STOP-key	Welding is faulty!
<b>Frequency error</b>	Input frequency out of working range (40-70Hz)	Check generator or power supply.
<b>Input voltage high</b>	Input voltage > 300V	Adjust generator voltage to 260V
<b>Input voltage low</b>	Input voltage < 190V	Unroll the power supply cable. Use power supply cable with the correct diameter. Adjust generator voltage.
<b>Interturn shortc.</b>	The current rises more than 15% during the welding. Shortcut of the fitting coil.	Welding is faulty!
<b>No contact</b>	No complete electrical contact with the fitting.	Check connection to the fitting
	Fitting coil or welding cable is defective.	Use another fitting. Change welding cable.
<b>Output volt. Error</b>	The output voltage deviates from the rated voltage.	Check the generator. Revolutions fluctuate or power too weak.
<b>Power failure</b>	Last weld was interrupted by a break in the power supply.	Last weld is faulty. Prepare pipe again and use a new fitting.
<b>Resistor error</b>	Fitting resistance is out of the valid working range.	Clean the contacts. Use another fitting.
	Fitting resistance outside the valid tolerance range given by the barcode.	Clean the contacts. Use another fitting.
<b>Service</b>	The recommended service interval of 200 working hours is exceeded.	The device has to be checked by an authorized service point. The device is still usable, but the manufacturer does not accept any liability for the device until it is checked out.
<b>System error</b>	Danger! Self-test found an error in the system.	Disconnect power supply immediately. Do not connect the device to the power supply anymore. Send it to the nearest service point.
<b>Temp. Meas. Error</b>	Temperature measurement is faulty.	Plug in the removable welding cable. Switch device off and on. Welding cable or sensor defect.
<b>Temperature error</b>	Surrounding temperature out of working range (-10+ 50°C, 14°F – 122°F).	

**Notes:**

**Notes:**

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