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Working Instructions Translation

Barcode Electro Fusion Control Box

WIDOS ESI 3000

WIDOS
Welding. Together.

CE

Keep for further use!

INSTRUCTION MANUAL

Tiny M(F)
Tiny Data M(F) USB
Tiny M(F) (Bluetooth)
Tiny Data M(F) USB (Bluetooth)

Electrofusion control unit
Electrofusion Control Unit with Bluetooth capability

Table of contents

1. Safety

The basic condition for safely handling and a hassle-free operation of the product is the knowledge about the fundamental safety guidelines and safety regulations. This instruction manual contains important information about the safe operation and handling of the electrofusion control unit. Everyone working with electrofusion control unit shall read and understand these instructions. These instructions shall be read and implemented in accordance with the relevant standards, workplace health and safety legislation, installation instructions, Codes of Practice and technical connection guideline in force in your country.

1.1 General safety guidelines for power tools

a) Read and make sure you understand all safety guidelines and instructions. Failure to follow the safety guidelines and instructions can lead to electric shock, fire and/or serious injury.

b) Keep these safety guidelines and instructions for future use.

c) The term "power tool" used in the safety guidelines relates to mains-operated power tools (with cord) as well as battery-operated power tools (without cord).

2) Safety in the work area

a) Keep your work area clean and well lit. Working in cluttered or dark areas can easily lead to accidents. Prevent the electrofusion control unit from unintentional movement or dropping.

b) Do not work with the electrofusion control unit **in potentially explosive areas** in which flammable liquids, gases or dust are present. Power tools can produce sparks, which can ignite dust or fumes.

c) Keep children and bystanders at distance while operating a power tool. Distractions can cause you to lose control over the electrofusion control unit. Do not allow other people touch the electrofusion control unit or cables and keep them away from your working place. Run cables neatly to avoid trip accidents. It is preferable to elevate cables on cable stands.

3) Electrical safety

a) The plug of the electrofusion control unit must fit in the outlet. Never modify the plug in any way. Do not use any adapters in combination with earthed/grounded electrofusion control units. Unmodified plugs and matching outlets will reduce the risk of electric shock.

b) Avoid physical contact with earthed/grounded surfaces or objects such as pipes, radiators, stoves and refrigerators whilst operating power tools. There is an increased risk of electric shock if your body is earthed/grounded.

c) Keep electrofusion control units clear of rain and wetness. Water entering a electrofusion control unit will increase the risk of an electric shock.

d) Do not misuse the cord of the electrofusion control unit for carrying it, hanging it up or pulling the plug out of the socket. Keep the cord away from heat, oil and sharp edges. Damaged or bent cords increase the risk of an electric shock.

e) Do not carry the electrofusion control unit with the finger on the power switch. Pull out the plug when you do not use the electrofusion control unit or when changing the adapters and attachments.

f) When operating an electrofusion control unit outdoors, use an extension cord suitable and approved for outdoor use. Usage of a cord suitable for outdoor use reduces the risk of an electric shock.

g) **Always** use a residual current-operated protective device (RCD). Using an RCD reduces the risk of an electric shock.

4) Personal safety

a) Stay alert! Watch what you are doing and use common sense when operating an electrofusion control unit. Do not use an electrofusion control unit while being tired or under the influence of drugs, alcohol or medication. One moment of inattention while operating an electrofusion control unit can cause serious personal injury.

b) Use personal protective equipment and always wear eye protection. The use of protective equipment such as a dust mask, non-skid safety shoes, a hard hat or hearing protection, depending on the electric tool and its use will reduce personal injuries.

c) Prevent unintentional starting of the device. Make sure that the electrofusion control unit is switched off before connecting it to the mains and/or battery or before picking it up/carrying it. Carrying the electrofusion control unit with a finger on the switch or energising electrofusion control units that are switched on can cause injuries and accidents.

5) Power tool usage and care

a) Do not overload the electrofusion control unit! Use the appropriate electrofusion control unit for your application. When using an appropriate power tool you can work better and more safely in its range of capacity.

b) Do not use an electrofusion control unit if the switch is broken. An electrofusion control unit, which cannot be turned on or off, is dangerous and must be repaired.

c) Keep and store electrofusion control units away from children. Do not let people, who are not familiar with the electrofusion control unit or have not read and understood the instruction manuals, use it. Electrofusion control units are dangerous if being used by inexperienced users.

d) Maintain electrofusion control units with care. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the electrofusion control unit's operation. If damaged, have the electrofusion control unit repaired before use. Many accidents are caused by poorly maintained electrofusion control units.

e) Keep your electrofusion control units clean. Follow the servicing instructions and the instructions for changing the tools. Keep oil and grease away from the handles.

f) Use the electrofusion control unit, accessories etc. in accordance with these instructions. Take the working conditions and the work to be performed into account. The use of the electrofusion control unit for applications differing from the application scope could result in a hazardous situation.

6) Service

a) Have your electrofusion control unit repaired only by a qualified technician with genuine spare parts. This ensures that the safety of the electrofusion control unit is maintained.

1.2 Specific safety guidelines for the electrofusion control unit

1) Electrical safety

a) The use of n residual current-operated protective device (RCD) is mandatory when working at outdoor construction sites. Note all directives and technical connection regulations in force in your country. It can be mandatory to always use a residual current-operated protective device (RCD).

b) According to national and international guidelines, the use of > 230 V AC or higher (or > 110 V AC or higher) in trenches and confined spaces is only permitted if additional security measures are taken. Each electrical device operated in such an environment has to be powered by its own safety isolating transformer or its own insulation protective device.

c) Only use accessories, particularly extension cords and generators, that are specified/recommended in this instruction manual. The use of any other accessories can damage the electrofusion control unit and increases your risk of injury.

d) Before each use, the user must visually inspect that the electrofusion control unit, its cables and accessories as well as its electrical supply cord to ensure that all parts are free from damage correctly installed. Damaged protection facilities and device parts must be repaired or replaced by an authorized service agent.

e) In accordance with the workplace health and safety legislation in force in your country for connection and usage of electric devices you must ensure that the electrofusion control unit, any extension cords and RCDs are regularly inspected (tested and tagged) by a licensed electrician or other competent person.

f) It is very important that there is a Protective Earthing (PE) conductor which is continuous (i.e. <0.5 Ohms) from the earth terminal of the generator to the earth terminal of the plug on the flexible supply cord of the electrofusion control unit. If the protective earthing conductor is interrupted or becomes higher in resistance, there is a risk of electric shock.

7) Personal safety

a) Pipes and other workpieces must be firmly clamped or fixed. Poorly clamped or fixed workpieces may hurt you or affect your safe foothold.

b) If the electrofusion control unit is used on a generator, the generator shall be grounded. Otherwise there is a risk of an electric shock.

c) The electrofusion control unit shall only be used on a power circuit with a protective earthing conductor. Otherwise there is a risk of an electric shock.

This symbol indicates a general advice.

These advices describe recommended courses of action to enable the user to perform steps quicker and safer. The symbol can also underline certain required precondition or mean that the user must follow certain mandatory steps.

Read the provided documentation!

Read this instruction manual and the relevant safety guidelines carefully before turning on the electrofusion control unit!

2. Introduction

Different variants of the electrofusion control unit

This instruction manual describes several different variants of the electrofusion control unit. These variants differ in the range of available functions and in the number of menu entries. The differences are pointed out where necessary. Please check which variant you have.

2.1 Scope of application

The electrofusion control units of type Tiny M(F) (Bluetooth) and Tiny Data MF USB (Bluetooth) are solely meant for the welding of thermoplastic pipes (e.g. made of PE-HD, PE80, PE100 or PP) when used with electrofusion fittings that have an input voltage of less than 48 V. These devices are conforming to the standards DVS 2208-1 and ISO 12176-2, of which the applicable standards for the electrofusion fittings to be used are derived from.

The electrofusion control units of type tiny M(F) (Bluetooth) and Tiny Data M(F) USB (Bluetooth) feature a built-in Bluetooth module for the communication with the "ElectroFusion Studio" app.

It is not allowed to use the electrofusion control unit for any application not covered by the above stated terms.

Intended use

It is not allowed to use the electrofusion control unit for any application not covered by the above stated terms. Modifying the electrofusion control unit without consulting the manufacturer is forbidden and shall be considered as improper use.

The manufacturer is not liable for the use of the electrofusion control unit outside of the intended use! When in doubt always consult your supplier or the manufacturer.

2.2 Maintenance and service

Should the electrofusion control unit fail despite the great care taken in manufacturing and testing it, the necessary repairs should only be carried out by an after-sales service centre authorised by the manufacturer. Please note that the product is a technically demanding machine for field application. In accordance to the applicable standards like DVS 2208-1, BGV A3, ISO 12176-2 and most national and international standards, these machines are subject to a periodical maintenance. The maintenance interval is 12 months, with heavy use shorter intervals are recommended.
During maintenance, the electrofusion control unit will be upgraded to the current technical standard of our devices and you get a 3-month guarantee on function for the maintained electrofusion control unit.
The maintenance and the related checks are important for you safety and the continuous working reliability of the electrofusion control unit. Therefore, the maintenance and all necessary repairs, have to be carried out by the manufacturer or an authorised service point.
For further information about our after-sales service centres please contact:

PF-Schweißtechnologie GmbH	**Tel.: +49-6631-9652-0**
Karl-Bröger-Str.10	**Fax: +49-6631-9652-52**
DE-36304 Alsfeld	**E-Mail: info@pfs-gmbh.com**
Germany	**Web: www.pfs-gmbh.com**

In all correspondence, please provide the serial number (S/N) as shown on the type plate of the tool.

2.3 Handling and maintenance

To achieve an optimum work results the tool has to be handled with care and maintained frequently. Pollution by sand and dirt has to be avoided or, if necessary, removed with a soft cloth or a Q-tip.

2.4 Disposal

For EU countries only: Do not dispose of electric devices in the household waste.
According to the European directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE) and its implementation into national legislation, electric devices which are no longer serviceable/usable must be collected separately and be recycled in an environment-friendly manner.

3. Input of welding parameters

The electrofusion control units of type Tiny M(F) (Bluetooth) and Tiny Data M(F) USB (Bluetooth) provide the following means for entering the welding parameters:

3.1 Barcode (ISO TR 13950, Type 2/5i, 24-digits)

The barcode attached on most electro fusion fittings on the market contains all necessary data for processing them. After the read-in with the reading device (reading pen or scanner) the data is automatically transferred and processed by the electrofusion control unit. The barcodes mainly contain the following data: Manufacturer, type, diameter, fusion voltage, fusion time (with temperature correction, if applicable), resistance and resistance tolerance.

3.2 SmartFuse-System**

By reading out the reference resistor in one of the connector pins of the SmartFuse-fitting the control unit automatically determines the welding parameters for the fitting.

3.3 Manual input of the barcode digits.

If the barcode on the fitting or the barcode reading device is damaged or defective, it is possible to enter the barcode digits (if available) into the control unit manually.

3.4 Manual input of welding voltage and -time

If no barcode is available, it is possible to enter the fusion parameters provided by the fitting manufacturer (like voltage and time) manually.

****) Not all electrofusion control units have the SmartFuse-System. Please ask your dealer for further information. Electrofusion control units without the SmartFuse-System can be recognised by the two welding terminals partially covered by black pvc caps. Electrofusion control units with the system have one terminal covered by a red pvc cap and one terminal covered by a black one.**

4. Bluetooth functionality***

The electrofusion control units of type Tiny M(F) (Bluetooth) and Tiny Data M(F) USB Bluetooth feature a built-in Bluetooth LE module. That makes it possible to control and record the welding procedure with the PFS app "ElectroFusion Studio". The app for smartphones and tablets is available for Android in the Google Play Store and for iOS in the Apple App Store. When using Bluetooth, the electrofusion control unit can only be used together with this app.

Attention!
To be able to use the app with the electrofusion control unit it is mandatory to have a registered account. Please ask your distributor.

*****) Only with electrofusion control units that have Bluetooth functionality.**

5. Range of fitting dimensions

The range of fitting dimensions for which an electrofusion control unit can be used depends essentially on the power consumption of the used fittings. Since the power consumption of the fittings is different for different fitting manufacturers, it is not possible to provide a general rule which covers all the possible fitting dimensions. When in doubt, each fitting size has to be checked separately. For electrofusion control units of type Tiny M(F) (Bluetooth) and Tiny Data M(F) USB (Bluetooth), when all welding work is performed successively, such that the control unit has pauses in welding that correspond to the preparation time of the next fitting, the following rule applies:

Usage for dimensions **from 20 to 355 mm** without limitation.

When working with dimensions from 400 mm on, longer cool-down times must be provided for because otherwise the device might show the "Device too hot" error message. In this case, it is necessary to let the electrofusion control unit cool down before putting it to use again.
Before processing fittings in this dimension range, you have to check that the welding current demand of the fitting does not continuously exceed the output current of the device and that the maximum output current is not exceeded.

The above rule assumes an ambient temperature of 20 °C.

6. Scope of delivery

	Tiny M / Tiny M (Bluetooth)		**Enclosed**
	1 ×	Instruction manual	EN007
	1 ×	Adapter 4.0/4.7 mm (optional)	
	1 ×	Wooden box	1_2800_010/3

	Tiny MF / Tiny MF (Bluetooth)		**Enclosed**
	1 ×	Instruction manual	EN007
	1 ×	Adapter 4.0/4.7 mm (optional)	
	1 ×	Wooden box	1_2800_010/3

	Tiny Data M USB / Tiny Data M USB (Bluetooth)		**Enclosed**
	1 ×	Instruction manual	EN007
	1 ×	USB memory stick	5_5001_512
	1 ×	Adapter 4.0/4.7 mm (optional)	
	1 ×	Wooden box	1_2800_010/3

	Tiny Data M USB / Tiny Data M USB (Bluetooth)		**Enclosed**
	1 ×	Instruction manual	EN007
	1 ×	USB memory stick	5_5001_512
	1 ×	Adapter 4.0/4.7 mm (optional)	
	1 ×	Wooden box	1_2800_010/3

A Flightcase is available as an alternative to the wooden box.

7. Technical data

	Tiny M (Bluetooth) / Tiny MF (Bluetooth) Tiny Data M USB (Bluetooth) / Tiny Data MF USB (Bluetooth)			
General				
Output voltage	**[V]**	8 to 48 AC		
Data recording		Yes		
Power (60 % ON time) according to ISO 12176-2		2050 W (55.9 A)		
Operating temperature range	**[°C]**	-10 to +50		
International protection		IP54		
Appliance class		1		
Conformity		CE		
ISO 12176-2 Class - classification Tiny M (Bluetooth) Tiny MF (Bluetooth)		P_2 3 U S_1 V AK X		
ISO 12176-2 Class - classification Tiny Data M USB (Bluetooth) Tiny Data MF USB (Bluetooth)		P_2 3 U S_1 V AK D X		
Input of welding parameters				
	Yes	**No**	**Opt.**	
Barcode with reading pen ♣(optional with scanner)	☒	☐	☐	
SmartFuse Tiny M (Bluetooth)	☐	☒	☐	
SmartFuse Tiny MF (Bluetooth)	☒	☐	☐	
SmartFuse Tiny Data M USB (Bluetooth)	☐	☒	☐	
SmartFuse Tiny Data MF USB (Bluetooth)	☒	☐	☐	
Manual input of the barcode digits.	☒	☐	☐	
Manual input of welding parameters	☒	☐	☐	**U_{OUT}: 8 to 48 V** **t_{WELD}: 0 to 9999 s**
Manual input of welding parameters	☐	☒	☐	**U_{OUT}: 40 V (preset)** **t_{WELD}: 0 to 9999 s**

Input/Mains		230 V devices	110 V devices
Nominal voltage (tolerance)	**[V]**	230 AC (190 to 300)	110 AC (90 to 150)
Nominal frequency (tolerance)	**[Hz]**	50/60 (40 to 70)	50/60 (40 to 70)
Power factor cos ρ		0.6 to 0.9 (phase-angle control)	0.6 to 0.9 (phase-angle control)
Nominal current	**[A]**	16	40
Power consumption	**[VA]**	3200	3680
Length of cord	**[m]**	4.5	On request
Plug type		Euro Schuko plug	On request
Output			
Output voltage	**[V]**	8 to 48 AC	
Output current (max.)		110	
Output current (t → ∞)	**[A]**	30	
Output current (min.)	**[A]**	2	
Energy adjustment		Temperature compensation	
Welding cable length	**[m]**	4, other lengths on request	
Welding cable mounting		Fixed	
Welding terminals	**[mm]**	Optional 4.0, 4.7 or universal terminals for 4.0 und 4.7	
Monitoring functions			
Input		Voltage, current, frequency	
Output		Voltage, current, resistance, contact, short circuit	
Other		System, working temperature, service	
Error messages		Plain text, acoustic signal	
Casing/Display			
Material		Steel plate	
Display		4×20 characters, alphanumeric, background lighting	
Dimensions, weights and packaging			
Product dimensions L × W × H	**[mm]**	325 × 275 × 290	
Product weight (incl. welding cable)	**[kg]**	16.5*	
Product weight (excl. welding cable)	**[kg]**	14*	
Packaging dimensions L × W × H	**[mm]**	390 × 320 × 340	
Packaging material		Wood	
Packaging type		Box*	
Packaging weight	**[kg]**	5.5	
Transport weight	**[kg]**	22	

The given technical information is valid for the standard setup of the electrofusion control unit. Depending on the ordered setup there may be variations.

7.1 Data recording Tiny M(F)

The electrofusion control units of type Tiny M and Tiny MF do not generate reports.

7.2 Data recording Tiny M(F) (Bluetooth)

When using the PFS app and the connection via Bluetooth, the electrofusion control units of type Tiny M(F) (Bluetooth) transfer reports to the connected smartphone or tablet. An internal memory is not available in the electrofusion control unit.

7.3 Data recording Tiny Data M(F) (Bluetooth)

The electrofusion control units of type Tiny Data M(F) USB (Bluetooth) provide data recording for approx. 1000 welding cycles and their barcode identifier conforming to ISO 12176-4 (traceability).

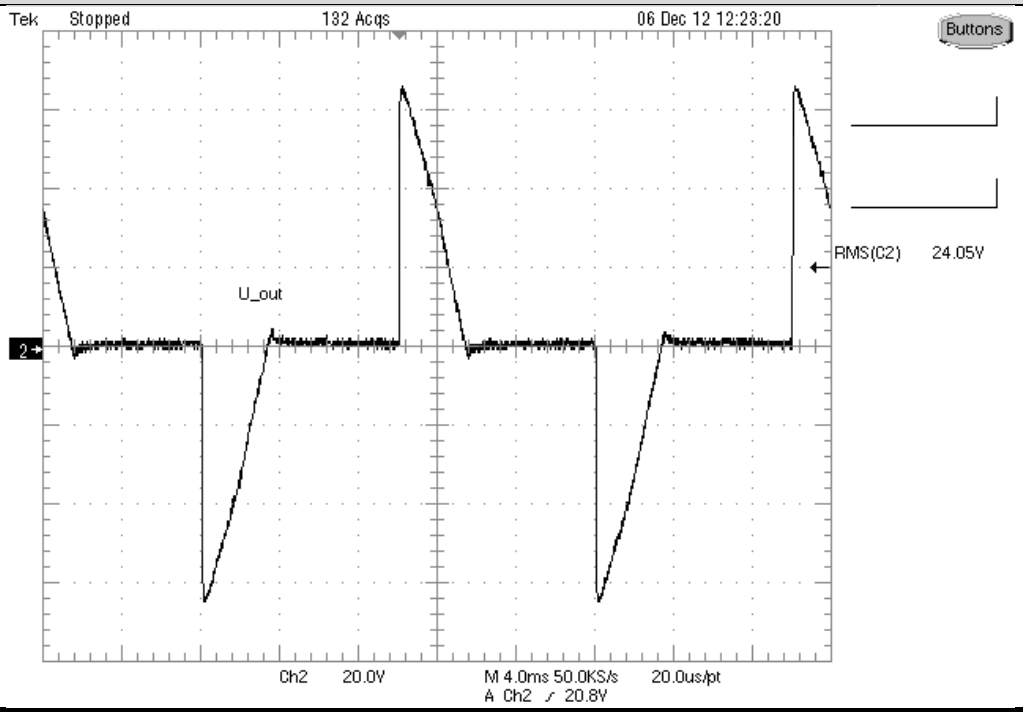
Tiny Data M USB (Bluetooth) **Tiny Data MF USB (Bluetooth)**		
Data recording		
Number of reports		Approx. 1000
Interface		USB (USB memory stick, USB printer)
Data format		PDF, CSV
Recorded data		
General data		Time, date, report number, ambient temperature, welder name, job number max. 40-digits (alphanumerical)
Fusion data		Voltage, current, energy, nominal and actual welding time, mode, resistance, error messages with 10 voltage and current values
Fitting data		Barcode Information (ISO/TR 13950), Type, Dimension, Manufacturer
Device data		Serial number, inventory number, date of last service, working hours, system configuration
Worker code		Barcode (PF or ISO 12176-3) for operator identification and access to manual input and system configuration
Traceability functions		
Job number		Max. 40 digits (alphanumerical), input by barcode or manual
Worker code		ISO 1276-3
Weather condition		DVS 2207 / 2208
Welding Barcode		ISO/TR 13950
Traceability barcode of fitting		ISO 12176-4
Traceability Barcode of 1st pipe		ISO 12176-4
Traceability Barcode of 2nd pipe -		ISO 12176-4
Traceability barcode of 3rd pipe / infotext		ISO 12176-4 / 40 digits (alphanumerical)

Additional functions		
Output options		Whole memory, selectable by job number
Job code input/selection		Barcode, manual, internal list of job numbers for selection
Input of position data / free text		40 characters, per joint

The given technical information is valid for the standard setup of the electrofusion control unit. Depending on the ordered setup there may be variations.

7.4 Technical file according to ISO 12176-2

	Tiny M / Tiny M (Bluetooth) **Tiny MF / Tiny MF (Bluetooth)** **Tiny Data M USB / Tiny Data M USB (Bluetooth)** **Tiny Data MF USB / Tiny Data MF USB (Bluetooth)**
Classification Tiny M / Tiny M (Bluetooth) / Tiny MF / Tiny MF (Bluetooth)	
Device type	Tiny M / Tiny M (Bluetooth) Tiny MF / Tiny MF (Bluetooth)
Classification	P_2 3 U S_1 V AK X
Classification Tiny M / Tiny M (Bluetooth) / Tiny MF / Tiny MF (Bluetooth)	
Device type	Tiny Data M USB / Tiny Data M USB (Bluetooth) Tiny Data MF USB / Tiny Data MF USB (Bluetooth)
Classification	P_2 3 U S_1 V AK D X
Simulation curved at 24 V output voltage	



Duty cycle according to ISO 12176-2 at 30 %, 60 % and 100 %, Test time t = 60 minutes

Test time 60 min	Output power at U_{OUT} = 36 V	Output power at U_{OUT} = 40 V	Output current I_{OUT}
30 %	2700 W	3000 W	74.1 A
60 %	2050 W	2250 W	55.9 A
100 %	1600 W	1800 W	44.7 A

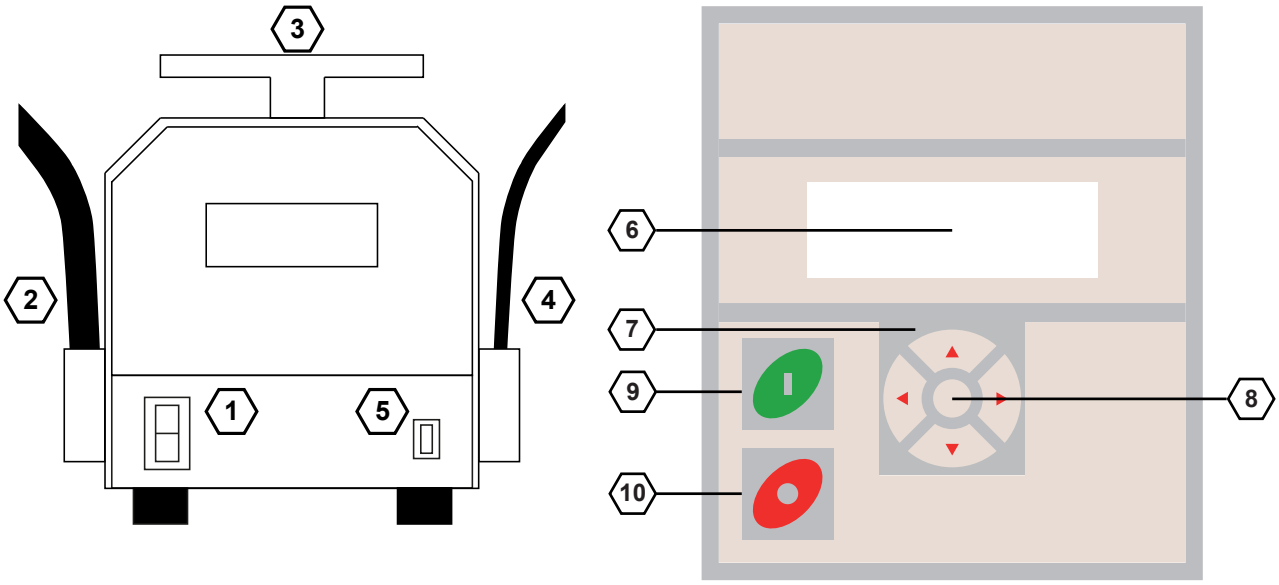
Additional Information	
Soft Start	At least 3 seconds (ramp)
Ambient temperature compensation	According to ISO 13950
Fitting temperature compensation	No
Data recording Tiny M / Tiny MF Tiny M (Bluetooth) / Tiny MF (Bluetooth)	No
Data recording Tiny Data M / Tiny Data M USB (Bluetooth) Tiny Data MF / Tiny Data MF USB (Bluetooth)	Yes
Bluetooth module Tiny M / Tiny MF Tiny Data M USB / Tiny Data MF USB	No
Bluetooth module Tiny M (Bluetooth) Tiny MF (Bluetooth) Tiny Data M USB (Bluetooth) Tiny Data MF USB (Bluetooth)	Bluetooth LE

The given technical information is valid for the standard setup of the electrofusion control unit. Depending on the ordered setup there may be variations.

8. Spare parts and accessories

Description	Code
Scanner with cable and pouch	2_0120_001
Welding Terminal 4.7mm, standard	1_0200_001
Welding Terminal 4.0mm, standard	1_0200_003
Welding terminal 4.7mm, Smart/Fuse (with detection tip)	2_0200_003
Welding terminal 4.0mm, Smart/Fuse (with detection tip)	2_0200_004
Universal terminal for 4.0 and 4.7 mm SmartFuse (with detection tip)	2_0200_051
Universal terminal for 4.0 and 4.7 mm, standard	2_0200_052
PVC-cap, red	1_0410_004
PVC-cap, black	1_0410_003
Adapter 4.7 to 4.7 angular	1_0300_009
Adapter 4.7 to 4.0 angular	1_0300_001
Adapter 4.0 to 4.7 angular	1_0300_004
Adapter 4.0 to 4.0 angular	1_0300_011
Adapter SmartFuse 4.7 to 4.7	1_0200_005
Adapter SmartFuse 4.7 to 4.0	1_0200_006
Adapter SmartFuse 4.0 to 4.7	1_0200_007
Adapter 4.0 to 4.7, straight	1_0300_010
Adapter 4.7 to GF (for loose ends)	1_0300_003
Adapter 4.0 to GF (for loose ends)	1_0300_014
Adapter 4.7 to FF-flat	1_0300_002
Adapter 4.0 to FF-flat	1_0300_012
Adapter 4.7 to FF-pin	1_0300_008
Adapter 4.0 to FF-pin	1_0300_013

9. Controls and plugs



1	ON-OFF-switch	6	Display
2	Welding cable	7	Arrow keys ▲ ▼ ◄ ►
3	Cable holder and carrying handle	8	Enter button
4	Mains supply cable	9	Green start button
5	USB-interface (only version DATA)	10	Red stop button

10. Connection to the power supply

10.1 General

Attention!

GERMANY: The conditions for connecting the electrofusion control unit in this instruction manual, the technical connection regulations of the local power supply company, the VDE regulations, the regulations for accident prevention as well as other DIN/CEN regulations in force must always be observed.

OTHER COUNTRIES: It is mandatory to observe the connection regulations for the electrofusion control unit in this instruction manual as well as all international and national health and safety regulations and the respective technical connection regulations in force.

Electrofusion control units may only be used by trained and, according to national and international standards, certified personnel.

The user must supervise and observe the electrofusion control unit during the whole welding procedure.

The electrofusion control unit must only be operated within the following operation ranges:

	230 V devices	**110 V devices**
Input voltage:	190 V to 300 V (AC)	90 V to 150 V (AC)
Input Frequency:	50/60 Hz (40 to 70 Hz)	50/60 Hz (40 to 70 Hz)
Ambient temperature:	-10 °C to +50 °C	-10 °C to +50 °C
Input current	16 A	34 A
Max. input current	19 A	38 A
Input power	3680 VA	3200 VA
Max. input power	4400 VA	4400 VA
Minimum Fuse/ Circuit breaker rating	16 A (slow)	40 A (slow)

Attention!

- Operation of the electrofusion control unit is only allowed if a properly dimensioned and intact RCD is used. The information for proper fuse protection in the circuit are shown in the table above.
- The electrofusion control unit's mains supply cord as well as any extension cords must be fully unwound prior to usage.

10.2 Extension cables

Attention!

- The extension cords must provide a protective earthing contact.
- It is forbidden to extend the welding cable.
- **Always observe all international and national legislation and guidelines for extending mains supply cords.**

10.2.1 General

The mains supply cord shall only be extended in accordance with the following specifications.

Cable length	Cross Section (230 V)	Cross Section (110 V)
Up to 20 m	3 × 1.5 mm²	3 × 4 mm²
20-50 m	3 × 2.5 mm²	3 × 4 mm²
50-100 m	3 × 4 mm²	-

10.2.2 For Australia

The mains supply cord must only be extended using approved extension cords These can be obtained on request from your local distributor of electrofusion control boxes made by PF-Schweißtechnologie GmbH.

Attention!

- **For electrofusion control boxes used in Australia only extension cords acknowledged and approved by PF-Schweißtechnologie GmbH, a local distributor or an official PF service station shall be used.**
- **Using a non-approved extension cord is a health safety risk.**
- **Using a non-approved extension cord voids the manufacturer's warranty on the unit.**

10.3 Generator compatibility

Important notes for the usage together with generators!

- **AUSTRALIA: Ensure that the generator is regularly inspected, tested and tagged by a licensed electrician or other competent person in accordance with workplace health and safety legislation and national Standards.**
- **The generator must be grounded!**
- **The outlet which the electrofusion control unit is used together with must have a protective earthing conductor!**
- **It is very important that there is a Protective Earthing (PE) conductor which is continuous (i.e. <0.5 Ohms) from the earth terminal of the generator to the earth terminal of the plug on the flexible supply cord of the electrofusion control unit. If the protective earthing conductor is interrupted or becomes higher in resistance, there is a risk of electric shock. For this reason, always ensure that only extension cords of the approved type are used. Ensure that the electrofusion control unit, all accessories and extension cords are regularly inspected, tested and tagged by a licensed electrician or other competent person.**
- **First start the generator, then plug in the electrofusion control unit.**
- No other machine or device must be connected to the generator.
- 400 V devices: The open circuit voltage should be set between 415 V and 430 V.
- Unplug the mains supply cable of the electrofution control unit before turning the generator off.
- The usable generator power will decrease by 10 % per 1000 m of height above sea level.
- **Check the fuel level before starting the welding process.**
- **The instruction manual of the generator as well as its operating instructions are part of this instruction manual. Always read them carefully!**

The electrofusion control units of type Tiny M(F) (Bluetooth) and Tiny Data M(F) USB (Bluetooth) provide the following features to increase the generator suitability:

- High tolerance for the input voltage
  - 190 V to 300 V at 230 V nominal
  - 90 V to 150 V at 110 V nominal
- High tolerance for the input frequency
  - 40 Hz to 70 Hz
- Display of current input voltage and frequency.
- Soft-Start for limitation of the generator load.

Despite these characteristics, the used generators must meet the following requirements and recommendations, in order to avoid damage to the electrofusion control unit. This ensures that the internal monitoring functions of the control unit do not interrupt the welding process:

- Suitable for phase-angle control
- 230 V:
  - No-load voltage adjustable between 240 V and 260 V
  - Output current of 18 A on one phase
- 110 V:
  - No-load voltage adjustable to 120 V – 130 V
  - Output current of 36 A on one phase
- Stable output voltage and engine RPM even with rapidly changing load
- Synchronous generators with mechanical RPM control preferred
- Voltage peaks must not exceed 800 V

10.3.1 Required generator rated output power

Attention!

It is not possible to make a statement for the necessary generator output power in each individual case, because every fitting manufacturer has different specifications.

The information in the following table below is to be used only as a guide as it can differ from your actual requirements.

The usable generator power will decrease by 10 % per 1000 m of height above sea level.

For an individual recommendation you can download our App „PFS Barcode Decoder“. With this app you can scan a fitting barcode and get detailed information about the fitting and a recommendation for the necessary generator output power.

Our App „PFS Barcode Decoder“ is available for Android in the Google Play Store as well as for iOS in the iTunes App Store.

Fitting diameter	Output Power
20-160 mm	3.2 kW
180-500 mm	4.5 kW (mechanically controlled) 5 kW (electronically controlled)
> 500 mm	6.5 kW (mechanically controlled) 7.5 kW (electronically controlled)

For generators with a poor control response or for generators with a bad tension stability, the guaranteed output power must be 3 to 3.5 times of the load to ensure a trouble free operation. The suitability of electronically controlled generators must be tested before usage due to the fact that the rotational speed of some generators tend to fluctuate, which results in extreme voltage peaks. Furthermore unexpected shutdown of the generator may occur.

11. Starting a welding process

The electrofusion control units of type Tiny M (Bluetooth) and Tiny Data M USB (Bluetooth) allow the input of the welding parameters by barcode using a reading pen/scanner or manual input of the barcode digits. The welding parameters "voltage" (8 V to 48 V) and "time" (0 s to 9999 s) can alternatively be entered manually.

The electrofusion control units of type Tiny MF (Bluetooth) and Tiny Data MF USB (Bluetooth) allow the input of the welding parameters by barcode using a reading pen/scanner, manual input of the barcode digits or by using the SmartFuse system. The welding parameters "voltage" (8 V to 48 V) and "time" (0 s to 9999 s) can alternatively be entered manually.

Attention!

- **The generator must be grounded!**
- **If the electrofusion control unit is used on a generator which is not grounded or on mains without protective earthing conductor there is a risk of an electric shock.**

11.1 Preparation

Before starting up the following steps have to be performed in the given order:

Step	Action
1	Check the electrofusion control unit, cables and adapters optically and replace them in case of defects or damage.
2	Fully unwind the power supply cable and the welding cable.
3	Connect the detachable welding cable to the control unit.
4	Switch off the ON-OFF-switch of the electrofusion contol unit.
5	**Start the generator before plugging in the electrofusion control unit. Wait until the generator output voltage has stabilized.**
6	Plug in the power cord of the electrofusion control unit.

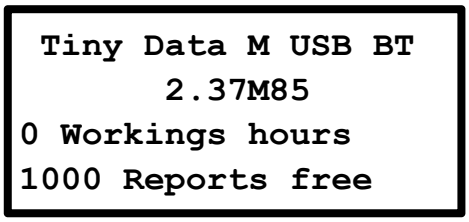
11.2 Switching the electrofusion control unit on

11.2.1 Tiny M(F) (Bluetooth)

Step	Action
1	**Switch the ON-OFF-switch to "ON" position.**
1.1	The electrofusion control unit signals its readiness by two bleeps. The background lighting of the display turns on automatically. The display shows the following message for approx. 7 seconds:  Display after switching on Row 1 shows the device type. BT will only appear if it is an electrofusion control unit with Bluetooth capability***. Row 2 shows the software version. Row 3 shows the total amount of working hours (summed up welding times). Row 4 shows the number of free reports in the memory.

***) Only with electrofusion control units that have Bluetooth functionality.

11.2.2 Tiny Data M(F) USB (Bluetooth)

Step	Action
1	**Switch the ON-OFF-switch to "ON" position.**
1.1	The electrofusion control unit signals its readiness by two bleeps. The background lighting of the display turns on automatically. The display shows the following message for approx. 7 seconds:  Display after switching on Row 1 shows the device type. BT will only appear if it is an electrofusion control unit with Bluetooth capability***. Row 2 shows the software version. Row 3 shows the total amount of working hours (summed up welding times). Row 4 shows the number of free reports in the memory.

***) Only with electrofusion control units that have Bluetooth functionality.

11.2.3 Other display messages

After the startup display is shown, other messages might be displayed before the main display is shown.

11.2.3.1 System config. at last welding process

If the system configuration is changed before the next restart of the electrofusion control unit, a message in the display is shown which indicates, that the system configuration has been changed and what was changed. This is also stored in a report.

- This message is acknowledged by pressing the red stop button.

11.2.3.2 Error occurred

If an error during or before the last welding has occurred (for example resistor error), a special message will appear in the display as a reminder.

- This message is acknowledged by pressing the red stop button.

1	**Example**

1.1	The following example is meant to show how the device will indicate that an error has occurred before switching the electrofusion control unit off.
	
	`Resistance error`
	`at last welding proc`
	`ess`
	
	Display after switching on

Attention!

These messages do not show current errors/problems. They are only meant to remind the user that an error/ problem occurred before the electrofusion control unit was switched off the last time!

11.2.3.3 Service

This message is displayed as soon as the service interval has passed. This can happen, if the set time for the service interval (e. g.12 months) has passed, or, for electrofusion control units with no data recording, after 200 operating hours.

- This message is acknowledged by pressing the red stop button.

Attention!

It is recommended to send the electrofusion control unit in for service as soon as this message appears. The display of this message is a recommendation or reminder to you, that the service interval of the electrofusion control unit is reached. The display of this message does not mean, that the electrofusion control unit cannot be used anymore before service.

By acknowledging with a press on the red stop button the electrofusion control unit switches back to the main display.

11.3 Pairing via Bluetooth*

Attention!

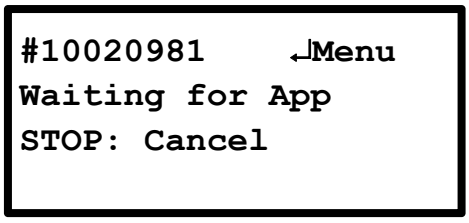
The Bluetooth functionality is only available in electrofusion control units made by PF-Schweißtechnologie GmbH that are equipped with a Bluetooth module.

In order to make the electrofusion control unit visible for your mobile device, the option "BT on" must be activated in the system configuration.

Pairing is possible only when using the app of the manufacturer of the electrofusion control unit. To use the app and its functions a registration is mandatory. For further information please contact you distributor or PF-Schweißtechnologie GmbH.

11.3.1 Option „BT on“ active, „BT only“ inactive

Step	Action
1	**Display after switching on, if "BT on" is active**
1.1	The electrofusion control unit shows the following display. Now you can use the app to pair the electrofusion control unit with your mobile device.



Display after switching on

Row 1 shows the ID that can be used to detect the device, using Bluetooth. By pressing the enter button you can access the system configuration.

Row 2 shows the Text "Waiting for App". The electrofusion control unit signalizes its readiness for pairing via the app.

Row 3 shows the text "STOP: Cancel". To proceed without Bluetooth connection press the red stop button.

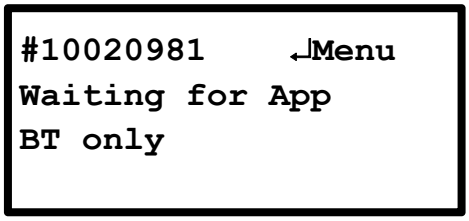
Enter button	By pressing the enter button you can access the system configuration. You will need, depending on the setting ("Code Sys" on or off) an admin code to get access.
Red stop button	You can abort the Bluetooth pairing and return to the main display of the electrofusion control unit by pressing the red stop button.

1.2 OPT	Now continue the pairing procedure in the "ElectroFusion Studio" app on your mobile device. As soon as the electrofusion control unit is successfully detected and paired by the app, it can be used to operate it.
1.2 OPT	If you want to proceed without Bluetooth connectivity, press the red stop button. You will be taken to the main display of the electrofusion control unit. The operation must be done on the controller. (To do that, "BT only" must be deactivated in the system configuration.)

***) Only with electrofusion control units that have Bluetooth functionality.

11.3.2 Option „BT on“ active, „BT only“ active

Step	Action
1	**Display after switching on, if "BT on" and "BT only" are active**
1.1	The electrofusion control unit shows the following display. Now you can use the app to pair the electrofusion control unit with your mobile device.



Display after switching on

Row 1 shows the ID that can be used to detect the device, using Bluetooth. By pressing the enter button you can access the system configuration.

Row 2 shows the Text "Waiting for App". The electrofusion control unit signalizes its readiness for pairing via the app.

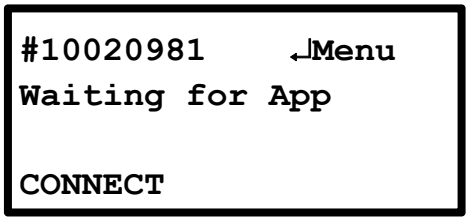
Row 3 shows the text "BT only". The electrofusion control unit signalises that with the current setting it can only be controlled by the app via Bluetooth connection.

Enter button — By pressing the enter button you can access the system configuration. You will need an admin code to get access.

1.2	Now continue the pairing procedure in the "ElectroFusion Studio" app on your mobile device. As soon as the electrofusion control unit is successfully detected and paired by the app, it can be used to operate it.

11.3.3 Pairing via Bluetooth is finished

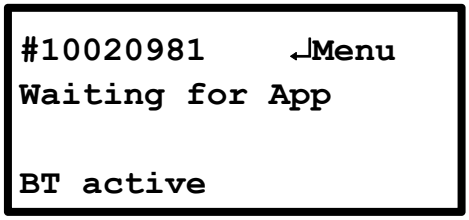
Step	Action
1	**Display after pairing**
1.1	The electrofusion control unit shows the following display.



Display after pairing

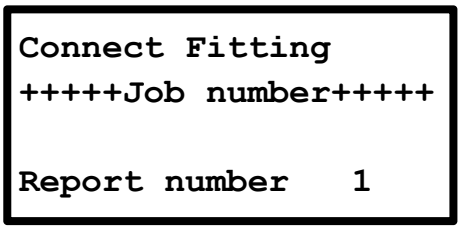
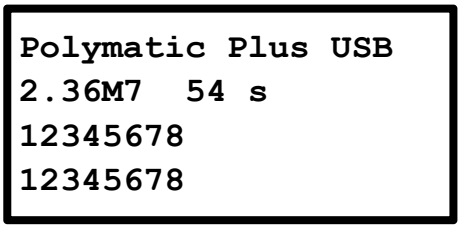
Row 4 shows the text "CONNECT". The electrofusion control unit signalizes that the pairing was successful.

1.2	Now continue to operate the controller using the "ElectroFusion Studio" app on your mobile device.

Step	Action
2	**Display after pairing**
2.1	The electrofusion control unit shows the following display.  Display after proceeding in the app Row 4 briefly shows the text "BT active". The electrofusion control unit indicates that it is operated by a mobile device.
1.2	Now continue to operate the controller using the "ElectroFusion Studio" app on your mobile device. The electrofusion control unit shows the displays in accordance to the currently active step in the welding procedure.

11.4 Displaying device data

When the main display is shown you can display device data of the electrofusion control unit by pressing and holding the ► button.

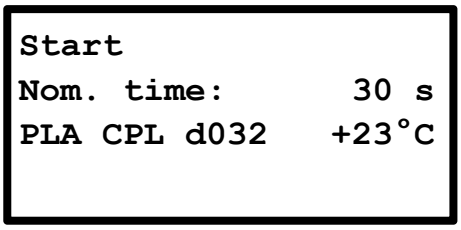
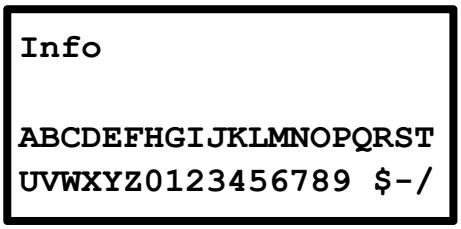
Step	Action
1	**Before connecting a fitting, the display shows the main display:**  Main display* Row 1 shows the message that a fitting must be connected. Row 2 shows the currently active job number. Row 4 shows the number of the report under which the following weld will be stored. Alternatively the joint number of the following weld is shown, if the option is activated in the system configuration**.
2	**Press and hold the right arrow button ► to display device data of the electrofusion control unit.**  Device data Row 1 shows the device type. Row 2 shows the software version as well as the total welding time in seconds. Row 3 shows the device number. The device number is preset and cannot be changed. Row 4 shows the inventory number. The inventory number can be set in the system configuration, At first the device number is used as inventory number.
3	**Release the right arrow button to stop the display of the device data.**

***) Devices that have a built-in temperature sensor show the ambient temperature in the second row of the main display after the mains voltage. Additionally the ambient temperature will be shown in the welding report.**

****) Only with electrofusion control units that have data recording capability.**

11.5 Manual input of GPS coordinates / free text

After a fitting is connected and the welding parameters have been entered manually, by barcode or using the SmartFuse system you can manually enter GPS position data. This function can also be used to enter any text. The maximum length is 40 characters. The input is done by using a letter field. The operation resp. input of characters using the letter field is described in chapter 12.1 „Using the letter field to enter data“.
The entered position data resp. text is stored into the welding report for each weld.

Step	Action
1	**Valid welding parameters have been entered**
1.1	If valid welding parameters were transmitted, the electrofusion control unit indicates its readiness by showing the following message:  Display of the welding parameters Row 1 indicates that you have to press the green start button to start the welding process. Before continuing you are obliged to cross check if the welding time, manufacturer, diameter and type are compliant to the connected fitting. Row 2 shows the welding time. Row 3 shows the manufacturer, type and diameter of the fitting as well as the ambient temperature.
1.2	Now press the enter button to enter GPS position data or text for the current weld manually.
2	**Input of GPS coordinates resp. a text for a weld**
2.1	Use the letter field for the input.  Letter field Row 1 shows "Info" by default. You can simply overwrite this text. Row 3 shows the first part of the letter field. Row 4 shows the second part of the letter field.
2.2	After finishing the input, press the green start button. The electrofusion control unit will then again show the entered parameters. If you want to correct your input, press the enter button again.

11.6 Welding in Barcode-Mode

11.6.1 Connection of a fitting

Attention!

The contact surfaces of the welding terminals and the pins of the fitting must be clean. Dirty or coated terminals lead to overheating and scorching on the areas of contact inside the welding terminals.

The welding terminals must be replaced as soon as they develop a coating on the contact surfaces or a loss of contact force is noticeable.

Attention!

- **Pay attention to the installation instructions of the fitting, special instructions (ISO, CEN, DVGW, DVS), European and national directives as well as to the instructions of the manufacturers.**
- **After the welding parameters have been automatically determined it is imperative that you cross check the displayed parameters with the ones shown on the fitting to make sure, that the correct welding parameters are used.**

Step	Action
1	**Before connecting a fitting, the display shows the main display:** Row 1 shows the message that a fitting must be connected. Row 2 shows the currently active job number. Row 4 shows the number of the report under which the following weld will be stored. Alternatively the joint number of the following weld is shown, if the option is activated in the system configuration.

Attention!

Should the SmartFuse measurement begin as soon as you connect a fitting, unplug the terminals and switch them. If you do not want to work with this functionality, the red welding terminal must not be connected to the fitting contact with the red marking. Alternatively, you can deactivate the SmartFuse functionality in the system configuration.

Step	Action
2	**Fitting is connected**

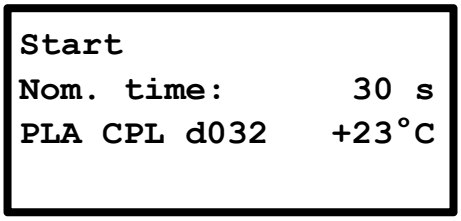
2.1	This display message indicates the readiness of the device to accept welding parameters by barcode input. Data input can be done by reading pen/scanner (barcode on fitting) or manually. Any errors are displayed in the fourth row of the display. When using a generator the voltage should be set and regulated between 240 V and 260 V (for 230 V devices) resp. between 120 V and 130 V (for 110 V devices).
	
	`Fittingcode`
	`50 Hz  230 V  +23°C`
	`30.06.2014  11.50`
	
	Prompt for the fittingbarcode
	
	Row 1 signals readiness for input of the fittingbarcode.
	Row 2 shows the measured mains frequency, the mains voltage and the ambient temperature.
	Row 3 shows the set date and time.

11.6.2 Starting the welding procedure by using a barcode

Attention!

For welding in Barcode-Mode, only read in the barcode label, which is attached to the fitting you want to process. If it is not readable, you can use by the way of exception the readable barcode of

	an identical fitting of the same manufacturer and size or enter the numeric code manually into the device. **It is strictly forbidden to alternatively use a barcode of a different fitting.**

Step	Action
3	**Read barcode**
3.1	To read-in the barcode use the scanner or reading pen. If you read in a barcode, which is defect, or invalid the error ("Code error") will be displayed and indicated by a long bleep.
4	**Using the barcode reading device**
4.1 OPT	OPTIONAL: Devices with reading pen: Place the tip of the reading pen to the left or right of the barcode. Move the reading pen in a continuous movement over the whole barcode.
4.1 OPT	OPTIONAL: Devices with a barcode scanner: Aim for the barcode and push the button on the scanner.
5	**Valid fittingbarcode was read**
5.1	If the electrofusion control unit detects a valid barcode, it indicates its readiness by showing the following message:  Display of the welding parameters Row 1 indicates that you have to press the green start button to start the welding process. Before continuing you are obliged to cross check if the welding time, manufacturer, diameter and type are compliant to the connected fitting. Row 2 shows the welding time. Row 3 shows the manufacturer, type and diameter of the fitting as well as the ambient temperature. The type information is read out of the barcode and according to ISO 13950 coded as follows: **CPL** Coupler **SKT** End cap **SAD** Saddle **BOW** Elbow **TEE** T-piece **RED** Reduction **ERS** Transition **TDW** Tapping saddle Row 4 shows possible error messages.

Step	Action
6	**Starting the welding procedure**
6.1	To start the welding procedure with the displayed parameters press the green start button.
7 OPT	**OPTIONAL: Clamping**

7.1 OPT	After pressing the green start button a display message reminds you of your duty to fix and clamp the pipes. If your electrofusion control unit has this option and you have activated it in the system configuration, the following message will appear in the display:
	
	`Pipes clamped?`
	`Nom. time: 30 s`
	`PLA CPL d032 +23°C`
	
	Prompt for confirmation of performed pipe clamping
	
	Green start button — By pressing the green start button you confirm that you have clamped the pipes according to the regulations.
	
	Red stop button — By pressing the red stop button you confirm that you do not have clamped the pipes.
	
	The statement you make here will be logged in the welding report.

8	**Reminder**

8.1	After pressing the green start button a message will remind you of your duty to fix and prepare the pipes according to the general guidelines. If you have any doubt about the correct preparation, you can quit the procedure by actuating the red stop button. Otherwise, confirm that you prepared everything properly by pressing the green start button.
	
	`Is the pipe scraped`
	`and clamped?`
	
	Reminder

Step	Action
9	**Measuring the fitting resistance**

9.1	The electrofusion control unit begins to measure the fitting resistance. Should the measured fitting resistance be out of the valid range, an error message will be shown on the display and the error will be indicated by a bleep. The bleep can be interrupted by pressing the red stop button.
	
	`0.15<  0.05 <35.00`
	`Nom. time:  30 s`
	`Report number  3`
	`Resistance error`
	
	Display when a resistance error has occurred
	
	Row 1 shows lower and upper limit on the left and right and the measured resistance in the middle.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the error report is stored*.
	Row 4 shows “Resistor Error”

9.2	Unplug the welding cable from the fitting. Check that the contacts of the fitting and the welding terminals are clean. Should the fitting, after cleaning the contact surfaces, produce another resistor error then it could be defective. Use another fitting.
10	**No resistance error detected**
10.1	The electrofusion control unit begins the welding procedure automatically if no resistance error occurred.

Attention!

Do not touch the fitting or the contact surfaces during the welding process. Keep a minimum safe distance of 1 m to avoid the risk of injury by molten PE mass.

***) Only with electrofusion control units that have data recording capability.**

11.6.3 During the welding procedure

Step	Action
11	**During the welding procedure**

11.1	The display shows the actual and nominal welding time:
	
	`Act. time:  1 s`
	`Nom. time:  30 s`
	`PLA  CPL d032`
	
	Display during the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the specifications of the fitting.
	Row 4 shows possible error messages.

11.6.4 After the end of the welding procedure

Step	Action
12	**End of the welding procedure**

12.1	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: 30 s`
	`Nom. time: 30 s`
	`Report number 3`
	`30.06.2014 14.07`
	
	Display after the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the weld is stored*.
	Row 4 shows date and time of the weld.

13	**After the end of the welding procedure**
13.1	After completion of the welding procedure, the welding terminals can be unplugged cautiously from the fitting. After that, the display of the device shows the startup message again.

Attention!

- Do not forcefully remove the welding terminals from the fitting.
- Before transporting the electrofusion control unit, unplug the welding terminals from the fitting.
- Observe the cooling time, the processing instructions as well as the processing guidelines of the fitting manufacturer as well as those of the pipe manufacturer.

Step	Action
14 OPT	**OPTIONAL: Display of weld-related data**

14.1 OPT	After completion of the welding procedure, the following information of the welding can be displayed by keeping the ▲-button on the keypad pressed.
	
	`2.25 Ohm`
	`40 V`
	`10.596 kJ`
	`30.06.2014 14.07`
	
	Display of the welding parameters
	
	Row 1 shows the measured resistance before welding in units of Ohm (Ω).
	Row 2 shows the nominal voltage in units of Volt (V).
	Row 3 shows welding energy in units of Kilojoule (kJ).
	Row 4 shows possible error messages.

15	**Back to main display**
15.1	By pressing the enter button you can return to the main display.

***) Only with electrofusion control units that have data recording capability.**

11.7 Welding with SmartFuse*

11.7.1 Connection of a fitting

Attention!

The contact surfaces of the welding terminals and the pins of the fitting must be clean. Dirty or coated terminals lead to overheating and scorching on the areas of contact inside the welding terminals.

The welding terminals must be replaced as soon as they develop a coating on the contact surfaces or a loss of contact force is noticeable.

Attention!

- **Pay attention to the installation instructions of the fitting, special instructions (ISO, CEN, DVGW, DVS), European and national directives as well as to the instructions of the manufacturers.**
- Dirty and/or damaged contacts in the terminals or on the fitting can be a reason for the SmartFuse system to determine wrong welding parameters.
- **After the welding parameters have been automatically determined it is imperative that you cross check the displayed parameters with the ones shown on the fitting to make sure, that the correct welding parameters are used.**

Step	Action
1	**Before connecting a fitting, the display shows the main display:** Row 1 shows the message that a fitting must be connected. Row 2 shows the currently active job number. Row 4 shows the number of the report under which the following weld will be stored. Alternatively the joint number of the following weld is shown, if the option is activated in the system configuration.

Attention!

If you want to weld using the SmartFuse function then the display must show the following after connecting a fitting. If the message "Fittingcode" appears it may be due of one of the following reasons:

- The connected fitting is not SmartFuse capable.
- The contact of the fitting marked in red is not connected with the red welding cable.
- There is a problem.

Check and make sure that you have connected the fitting in the right manner and that it is SmartFuse capable. If the problem persists, contact your dealer or the manufacturer.

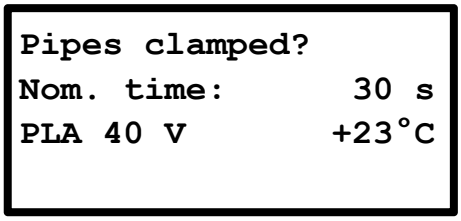
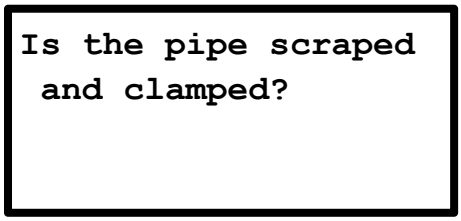
***) Only with electrofusion control units that are SmartFuse capable.**

Step	Action
2	**A SmartFuse capable fitting is connected.**

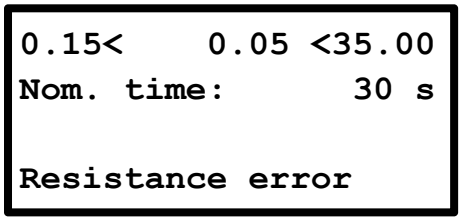
2.1	To weld with the SmartFuse system the red terminal must be connected to the contact of the fitting that bears a red marking. After a fitting has been connected correctly in this manner, the electrofusion control unit begins to determine the welding parameters based on the built-in resistor in the contact of the fitting. During this procedure the display shows the following message:
	
	`SmartFuse measure`
	`50 Hz  230 V  +23°C`
	`30.06.2014 11.50`
	
	Determination of the welding parameters
	
	Row 1 shows that the SmartFuse resistor in the fitting is measured.
	Row 2 shows the measured mains frequency, the mains voltage and the ambient temperature.
	Row 3 shows the set date and time.

3	**After the welding parameters have been determined, the electrofusion control unit shows the following information in the display:**
	
	`Start`
	`Nom. time:  30 s`
	`PLA 40 V  +23°C`
	
	Display of the determined welding parameters
	
	Row 1 indicates that you have to press the green start button to start the welding process. Before continuing you are obliged to cross check if the welding time, manufacturer, diameter and type are compliant to the connected fitting.
	Row 2 shows the welding time.
	Row 3 shows the manufacturer, type and welding voltage of the fitting as well as the ambient temperature.
	
	It is imperative that the parameters displayed match the parameters written on the fitting by its manufacturer.

11.7.2 Starting the welding procedure with SmartFuse

Step	Action
4	**Starting the welding procedure**
4.1	To start the welding procedure with the displayed parameters press the green start button.
5 OPT	**OPTIONAL: Clamping**
5.1 OPT	OPTIONAL: After pressing the green start button a display message reminds you of your duty to fix and clamp the pipes. If your electrofusion control unit has this option and you have activated it in the system configuration, the following message will appear in the display:  Prompt for confirmation of performed pipe clamping Green start button — By pressing the green start button you confirm that you have clamped the pipes according to the regulations. Red stop button — By pressing the red stop button you confirm that you do not have clamped the pipes. The statement you make here will be logged in the welding report.
6	**Reminder**
6.1	After pressing the green start button a message will remind you of your duty to fix and prepare the pipes according to the general guidelines. If you have any doubt about the correct preparation, you can quit the procedure by actuating the red stop button. Otherwise, confirm that you prepared everything properly by pressing the green start button.  Reminder

Step	Action
7	**Measuring the fitting resistance**
7.1	The electrofusion control unit begins to measure the fitting resistance. Should the measured fitting resistance be out of the valid range, an error message will be shown on the display and the error will be indicated by a bleep. The bleep can be interrupted by pressing the red stop button.



Display when a resistance error has occurred

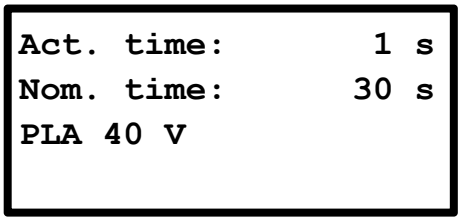
Row 1 shows lower and upper limit on the left and right and the measured resistance in the middle.
Row 2 shows the nominal welding time.
Row 3 shows the report number under which the error report is stored.
Row 4 shows “Resistor Error”

7.2	Unplug the welding cable from the fitting. Check that the contacts of the fitting and the welding terminals are clean. Should the fitting, after cleaning the contact surfaces, produce another resistor error then it could be defective. Use another fitting.
8	**No resistance error detected**
8.1	The electrofusion control unit begins the welding procedure automatically if no resistance error occurred.

Attention!
Do not touch the fitting or the contact surfaces during the welding process. Keep a minimum safe distance of 1 m to avoid the risk of injury by molten PE mass.

11.7.3 During the welding procedure

Step	Action
9	**During the welding procedure**
9.1	The display shows the actual and nominal welding time:



Display during the welding procedure

Row 1 shows the actual welding time, which is counted upwards.
Row 2 shows the nominal welding time.
Row 3 shows the specifications of the fitting.
Row 4 shows possible error messages.

11.7.4 After the end of the welding procedure

Step	Action
10	**End of the welding procedure**

10.1	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: 30 s`
	`Nom. time: 30 s`
	`Report number 3`
	`30.06.2014 11.50`
	
	Display after the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the weld is stored*.
	Row 4 shows date and time of the weld.

11	**After the end of the welding procedure**
11.1	After completion of the welding procedure, the welding terminals can be unplugged cautiously from the fitting. After that, the display of the device shows the startup message again.

Attention!

- Do not forcefully remove the welding terminals from the fitting.
- Before transporting the electrofusion control unit, unplug the welding terminals from the fitting.
- Observe the cooling time, the processing instructions as well as the processing guidelines of the fitting manufacturer as well as those of the pipe manufacturer.

Step	Action
12 OPT	**OPTIONAL: Display of weld-related data**

12.1 OPT	After completion of the welding procedure, the following information of the welding can be displayed by keeping the ▲-button on the keypad pressed.
	
	`2.25 Ohm`
	`40 V`
	`10.596 kJ`
	`- OK -`
	
	Display of the welding parameters
	
	Row 1 shows the measured resistance before welding in units of Ohm (Ω).
	Row 2 shows the nominal voltage in units of Volt (V).
	Row 3 shows welding energy in units of Kilojoule (kJ).
	Row 4 shows possible error messages.

13	**Back to main display**
13.1	By pressing the enter button you can return to the main display.

***) Only with electrofusion control units that have data recording capability.**

11.8 Welding with manual input of the fitting code

11.8.1 Connection of a fitting

Attention!

The contact surfaces of the welding terminals and the pins of the fitting must be clean. Dirty or coated terminals lead to overheating and scorching on the areas of contact inside the welding terminals.

The welding terminals must be replaced as soon as they develop a coating on the contact surfaces or a loss of contact force is noticeable.

Attention!

- **Pay attention to the installation instructions of the fitting, special instructions (ISO, CEN, DVGW, DVS), European and national directives as well as to the instructions of the manufacturers.**
- Dirty and/or damaged contacts in the terminals or on the fitting can be a reason for the SmartFuse system to determine wrong welding parameters.
- **After the welding parameters have been automatically determined it is imperative that you cross check the displayed parameters with the ones shown on the fitting to make sure, that the correct welding parameters are used.**

Step	Action
1	**Before connecting a fitting, the display shows the main display:** Row 1 shows the message that a fitting must be connected. Row 2 shows the currently active job number. Row 4 shows the number of the report under which the following weld will be stored. Alternatively the joint number of the following weld is shown, if the option is activated in the system configuration.

Attention!

Should the SmartFuse measurement begin as soon as you connect a fitting, unplug the terminals and switch them. If you do not want to work with this functionality, the red welding terminal must not be connected to the fitting contact with the red marking. Alternatively, you can deactivate the SmartFuse functionality in the system configuration.

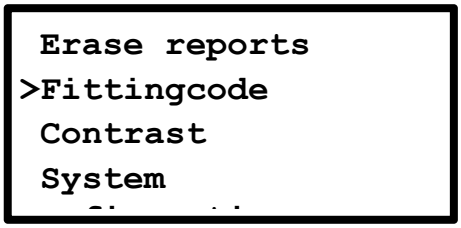
Step	Action
2	**Fitting is connected, SmartFuse measurement inactive**

2.1	Make sure that the fitting is not connected in the SmartFuse way.
	The following display is shown:
	
	`Fittingcode`
	`50 Hz  230 V  +23°C`
	`30.06.2014  11.50`
	
	Prompt for the fittingbarcode
	
	Row 1 signals readiness for input of the fittingbarcode.
	Row 2 shows the measured mains frequency, the mains voltage and the ambient temperature.
	Row 3 shows the set date and time.

11.8.2 Starting the welding procedure with manual input of the fitting code

Attention!

For welding with manual input of the fittingbarcode digits it is only allowed to use the barcode label, which is attached to the fitting you want to process. If it is not readable, you can use by the way of exception the readable barcode of an identical fitting of the same manufacturer and size or enter

	the numeric code manually into the device. **It is strictly forbidden to alternatively use a barcode of a different fitting.**
Step	**Action**
3	**Open function menu**
3.1	Press the enter button to access the function menu.
4	**Selecting the entry "Fittingcode"**
4.1	Select the entry "Fittingcode" in the function menu, using the ▲- and ▼-buttons.  Function menu
4.2	Press the enter button. A number field for input appears.
5	**Input fitting barcode**
5.1	Put in the numbers of the fitting barcode with the arrow buttons ◄▲▼► and the enter button. The operation resp. the input of characters with the number field is described in chapter 12.1 "Using the letter field to enter data".  Number field Row 1 signals readiness for input of the fittingbarcode. Row 3 shows the text "Fittingcode". Row 4 contains the numbers that are necessary for the input of the fittingbarcode. After complete input of the digits of a fittingbarcode press the green start button. If you want to abort the input you can press the red stop button at any time. In this case, the main display is shown again.

Attention!

If a valid fittingbarcode has been entered, the welding parameters are displayed in the following display. If the welding procedure is complete and the menu entry "Fittingcode" is selected again, the last entered fittingbarcode will still be present and shown in the display. Now you can proceed as follows:

- Press the red stop button: This deletes the digits of the last entered fittingbarcode and requires a new input.
- Press the green start button: This accepts the shown (last used) fittingbarcode and shows the welding parameters in the next display.

Attention!

After the welding parameters have been automatically determined it is imperative that you cross check the displayed parameters with the ones shown on the fitting to make sure, that the correct welding parameters are used.

Step	Action
6	**Valid fittingbarcode was entered**

6.1	If the electrofusion control unit detects a valid barcode, it indicates its readiness by showing the following message:
	
	`Start`
	`Nom. time: 30 s`
	`PLA CPL d032 +23°C`
	
	Display of the welding parameters
	
	Row 1 indicates that you have to press the green start button to start the welding process. Before continuing you are obliged to cross check if the welding time, manufacturer, diameter and type are compliant to the connected fitting.
	Row 2 shows the welding time.
	Row 3 shows the manufacturer, type and diameter of the fitting as well as the ambient temperature. The type information is read out of the barcode and according to ISO 13950 coded as follows:
	
	CPL Coupler — **TEE** T-piece
	SKT End cap — **RED** Reduction
	SAD Saddle — **ERS** Transition
	BOW Elbow — **TDW** Tapping saddle
	
	Row 4 shows possible error messages.

7	**Starting the welding procedure**
7.1	To start the welding procedure with the displayed parameters press the green start button.

Step	Action
8 OPT	**OPTIONAL: Clamping**

8.1 OPT	OPTIONAL: After pressing the green start button a display message reminds you of your duty to fix and clamp the pipes. If your electrofusion control unit has this option and you have activated it in the system configuration, the following message will appear in the display:
	
	`Pipes clamped?`
	`Nom. time: 30 s`
	`PLA 40 V +23°C`
	
	Prompt for confirmation of performed pipe clamping
	
	Green start button — By pressing the green start button you confirm that you have clamped the pipes according to the regulations.
	
	Red stop button — By pressing the red stop button you confirm that you do not have clamped the pipes.
	
	The statement you make here will be logged in the welding report.

9	**Reminder**

9.1	After pressing the green start button a message will remind you of your duty to fix and prepare the pipes according to the general guidelines. If you have any doubt about the correct preparation, you can quit the procedure by actuating the red stop button. Otherwise, confirm that you prepared everything properly by pressing the green start button.
	
	`Is the pipe scraped`
	`and clamped?`
	
	Reminder

10	**Measuring the fitting resistance**

10.1	The electrofusion control unit begins to measure the fitting resistance. Should the measured fitting resistance be out of the valid range, an error message will be shown on the display and the error will be indicated by a bleep. The bleep can be interrupted by pressing the red stop button.
	
	`0.15< 0.05 <35.00`
	`Nom. time: 30 s`
	`Report number 3`
	`Resistance error`
	
	Display when a resistance error has occurred
	
	Row 1 shows lower and upper limit on the left and right and the measured resistance in the middle.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the error report is stored*.
	Row 4 shows “Resistor Error”

10.2	Unplug the welding cable from the fitting. Check that the contacts of the fitting and the welding terminals are clean. Should the fitting, after cleaning the contact surfaces, produce another resistor error then it could be defective. Use another fitting.

***) Only with electrofusion control units that have data recording capability.**

Step	Action
11	**No resistance error detected**
11.1	The electrofusion control unit begins the welding procedure automatically if no resistance error occurred.

Attention!
Do not touch the fitting or the contact surfaces during the welding process. Keep a minimum safe distance of 1 m to avoid the risk of injury by molten PE mass.

11.8.3 During the welding procedure

Step	Action
12	**During the welding procedure**
12.1	The display shows the actual and nominal welding time:

```
Act. time:        1 s
Nom. time:       30 s
PLA CPL d032   +23°C
```

Display during the welding procedure

Row 1 shows the actual welding time, which is counted upwards.
Row 2 shows the nominal welding time.
Row 3 shows the specifications of the fitting.
Row 4 shows possible error messages.

11.8.4 After the end of the welding procedure

Step	Action
13	**End of the welding procedure**

13.1	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: 30 s`
	`Nom. time: 30 s`
	`Report number 3`
	`30.06.2014 14.07`
	
	Display after the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the weld is stored*.
	Row 4 shows date and time of the weld.

14	**After the end of the welding procedure**
14.1	After completion of the welding procedure, the welding terminals can be unplugged cautiously from the fitting. After that, the display of the device shows the startup message again.
	**Attention!** • Do not forcefully remove the welding terminals from the fitting. • Before transporting the electrofusion control unit, unplug the welding terminals from the fitting. • Observe the cooling time, the processing instructions as well as the processing guidelines of the fitting manufacturer as well as those of the pipe manufacturer.
15 OPT	**OPTIONAL: Display of weld-related data**

15.1 OPT	After completion of the welding procedure, the following information of the welding can be displayed by keeping the ▲-button on the keypad pressed.
	
	`2.25 Ohm`
	`40 V`
	`10.596 kJ`
	`30.06.2014 14.07`
	
	Display of the welding parameters
	
	Row 1 shows the measured resistance before welding in units of Ohm (Ω).
	Row 2 shows the nominal voltage in units of Volt (V).
	Row 3 shows welding energy in units of Kilojoule (kJ).
	Row 4 shows possible error messages.

16	**Back to main display**
16.1	By pressing the enter button you can return to the main display.

***) Only with electrofusion control units that have data recording capability.**

11.9 Welding with manual input of the welding parameters

11.9.1 Connection of a fitting

Attention!

The contact surfaces of the welding terminals and the pins of the fitting must be clean. Dirty or coated terminals lead to overheating and scorching on the areas of contact inside the welding terminals.

The welding terminals must be replaced as soon as they develop a coating on the contact surfaces or a loss of contact force is noticeable.

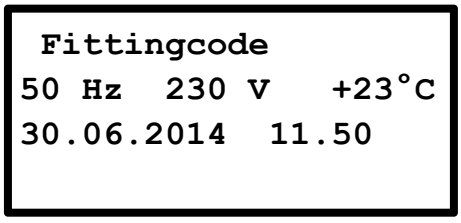
Attention!

- **Pay attention to the installation instructions of the fitting, special instructions (ISO, CEN, DVGW, DVS), European and national directives as well as to the instructions of the manufacturers.**
- Dirty and/or damaged contacts in the terminals or on the fitting can be a reason for the SmartFuse system to determine wrong welding parameters.
- **After the welding parameters have been automatically determined it is imperative that you cross check the displayed parameters with the ones shown on the fitting to make sure, that the correct welding parameters are used.**

Step	Action
1	**Before connecting a fitting, the display shows the main display:** Row 1 shows the message that a fitting must be connected. Row 2 shows the currently active job number. Row 4 shows the number of the report under which the following weld will be stored. Alternatively the joint number of the following weld is shown, if the option is activated in the system configuration.

Attention!

Should the SmartFuse measurement begin as soon as you connect a fitting, unplug the terminals and switch them. If you do not want to work with this functionality, the red welding terminal must not be connected to the fitting contact with the red marking. Alternatively, you can deactivate the SmartFuse functionality in the system configuration.

Step	Action
2	**Fitting is connected, SmartFuse measurement inactive**
2.1	Make sure that the fitting is not connected in the SmartFuse way. The following display is shown:  Manual input of welding parameters Row 1 signals readiness for input of the fittingbarcode. Row 2 shows the measured mains frequency, the mains voltage and the ambient temperature. Row 3 shows the set date and time.

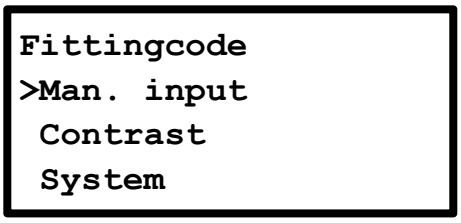
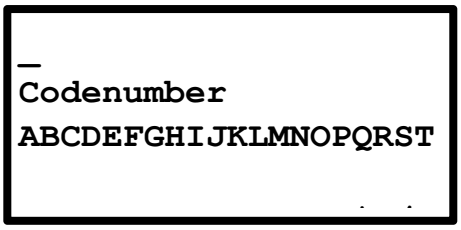
Attention!

The electrofusion control unit shows the last used welding parameters by default.

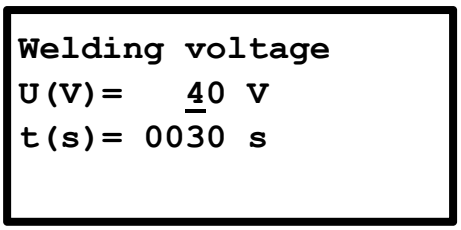
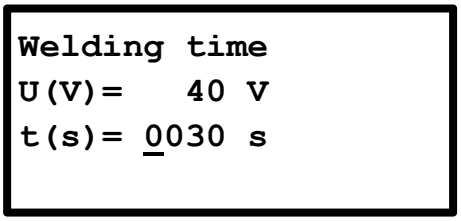
Never rely on these shown parameter to be suitable for the currently connected fitting. It is mandatory for you to cross-check the parameters with the specifications of the fitting manufacturer written on the fitting and to set these given parameters accordingly in the electrofusion control unit.

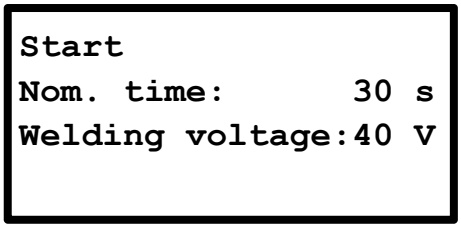
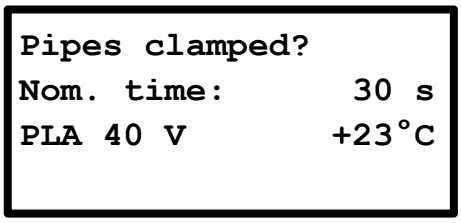
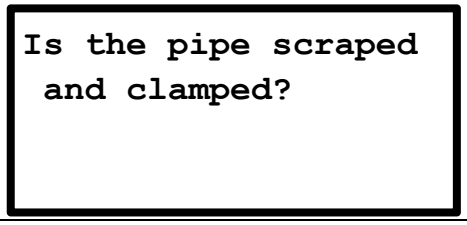
The manufacturer of the electrofusion control unit cannot be held liable for wrong or unsuitable welding parameters that are use to weld a fitting.

11.9.2 Starting the welding procedure with manual input of the welding parameters

Step	Action
3	**Open function menu**
3.1	Press the enter button to access the function menu.
4	**Selecting the entry "Man. input"**
4.1	Select the entry "Man. input" in the function menu, using the ▲- and ▼-buttons.  Function menu
4.2	Press the enter button.
5 OPT	**OPTIONAL: Input of an unlocking- resp. supervisor code* to unlock the function**
5.1 OPT	OPTIONAL: If the option "Code Man." is activated, the following prompt will appear when trying to access the manual input option. Enter an unlocking- resp. supervisor code here to gain access to the manual input.  Prompt for the unlocking- resp. supervisor code
5.2 OPT	OPTIONAL: The unlocking- resp. supervisor code can either be read in using the reading pen/scanner, or be entered manually using the arrow buttons ◄▲▼► and the enter button. If you enter the unlocking- resp. supervisor code manually, press the green start button after the entry of the last character. For a detailed description of how to use the letter field please read chapter 12.1 "Using the letter field to enter data".
5.3 OPT	OPTIONAL: After input of the unlocking- resp. supervisor code, if "Code Man." is activated, the following display is shown:

***) The manufacturer can provide you with an unlocking- resp. supervisor code on request.**

Step	Action
6	**Setting the welding voltage**
6.1	The cursor is active in the line U(V) as soon as the display appears. The position of the cursor is indicated by regular flashing. Pushing the arrow buttons ▲ and ▼ will change the value of the currently selected digit of the welding voltage whereas pushing the arrow buttons ◄ and ► will move the cursor to the next digit.  Welding voltage U(V)= 40 V t(s)= 0030 s Manual setting of the welding parameters Row 1 shows that the input for the welding voltage is active. Row 2 shows the current setting for the welding voltage. Row 3 shows the current setting for the welding time.
6.2	After the desired value for the welding voltage has been set, confirm the input by pressing the green start button. This moves the cursor one row down to set the welding time.
7	**Setting the welding time**
7.1	The position of the cursor is indicated by regular flashing. Pushing the arrow buttons ▲ and ▼ will change the value of the currently selected digit of the welding time whereas pushing the arrow buttons ◄ and ► will move the cursor to the next digit.  Welding time U(V)= 40 V t(s)= 0030 s Manual setting of the welding time Row 1 shows that the input for the welding time is active. Row 2 shows the current setting for the welding voltage. Row 3 shows the current setting for the welding time.
7.2	After the desired value for the welding time has been set, confirm the input by pressing the green start button.

Step	Action
8	**Welding parameters have been entered**
8.1	the following display is shown, in which the entered welding parameters are shown once more.  Display that shows the welding parameters Row 1 indicates that you have to press the green start button to start the welding process. Row 2 shows the current setting of the welding time. Row 3 shows the current setting of the welding voltage.
9	**Starting the welding procedure**
9.1	To start the welding procedure with the displayed parameters press the green start button.
10 OPT	**OPTIONAL: Clamping**
10.1 OPT	OPTIONAL: After pressing the green start button a display message reminds you of your duty to fix and clamp the pipes. If your electrofusion control unit has this option and you have activated it in the system configuration, the following message will appear in the display:  Prompt for confirmation of performed pipe clamping Green start button — By pressing the green start button you confirm that you have clamped the pipes according to the regulations. Red stop button — By pressing the red stop button you confirm that you do not have clamped the pipes. The statement you make here will be logged in the welding report.
11	**Reminder**
11.1	After pressing the green start button a message will remind you of your duty to fix and prepare the pipes according to the general guidelines. If you have any doubt about the correct preparation, you can quit the procedure by actuating the red stop button. Otherwise, confirm that you prepared everything properly by pressing the green start button.  Reminder

Step	Action
12	**Measuring the fitting resistance**

12.1	The electrofusion control unit begins to measure the fitting resistance. Should the measured fitting resistance be out of the valid range, an error message will be shown on the display and the error will be indicated by a bleep. The bleep can be interrupted by pressing the red stop button.
	
	`0.15<  0.05  <35.00`
	`Nom. time:  30 s`
	
	`Resistance error`
	
	Display when a resistance error has occurred
	
	Row 1 shows lower and upper limit on the left and right and the measured resistance in the middle.
	Row 2 shows the nominal welding time.
	Row 4 shows “Resistor Error”

12.2	Unplug the welding cable from the fitting. Check that the contacts of the fitting and the welding terminals are clean. Should the fitting, after cleaning the contact surfaces, produce another resistor error then it could be defective. Use another fitting.
13	**No resistance error detected**
13.1	The electrofusion control unit begins the welding procedure automatically if no resistance error occurred.

Attention!

Do not touch the fitting or the contact surfaces during the welding process. Keep a minimum safe distance of 1 m to avoid the risk of injury by molten PE mass.

11.9.3 During the welding procedure

Step	Action
14	**During the welding procedure**

14.1	The display shows the actual and nominal welding time:
	
	`Act. time:  1 s`
	`Nom. time:  30 s`
	`Welding voltage:40 V`
	
	Display during the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the current setting of the welding voltage.
	Row 4 shows possible error messages.

11.9.4 After the end of the welding procedure

Step	Action
15	**End of the welding procedure**

15.1	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: 30 s`
	`Nom. time: 30 s`
	`Report number 3`
	`30.06.2014 11.52`
	
	Display after the welding procedure
	
	Row 1 shows the actual welding time, which is counted upwards.
	Row 2 shows the nominal welding time.
	Row 3 shows the report number under which the weld is stored*.
	Row 4 shows date and time of the weld.

16	**After the end of the welding procedure**
16.1	After completion of the welding procedure, the welding terminals can be unplugged cautiously from the fitting. After that, the display of the device shows the startup message again.

Attention!

- Do not forcefully remove the welding terminals from the fitting.
- Before transporting the electrofusion control unit, unplug the welding terminals from the fitting.
- Observe the cooling time, the processing instructions as well as the processing guidelines of the fitting manufacturer as well as those of the pipe manufacturer.

Step	Action
17 OPT	**OPTIONAL: Display of weld-related data**

17.1 OPT	OPTIONAL: After completion of the welding procedure, the following information of the welding can be displayed by keeping the ▲-button on the keypad pressed.
	
	`2.25 Ohm`
	`40 V`
	`10.596 kJ`
	`30.06.2014 14.07`
	
	Display of the welding parameters
	
	Row 1 shows the measured resistance before welding in units of Ohm (Ω).
	Row 2 shows the nominal voltage in units of Volt (V).
	Row 3 shows welding energy in units of Kilojoule (kJ).
	Row 4 shows possible error messages.

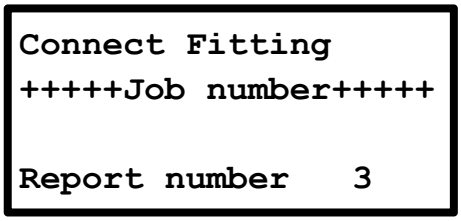
18	**Back to main display**
18.1	By pressing the enter button you can return to the main display.

***) Only with electrofusion control units that have data recording capability.**

12. Function menu

Different variants of the electrofusion control unit

This instruction manual describes several different variants of the electrofusion control unit. These variants differ in the range of available functions and in the number of menu entries. The differences are pointed out where necessary. Please check which variant you have.

Step	Action
1	**Displaying the function menu**
1.1	When the main display is shown, press the enter on the keypad. The function menu is displayed:  Main display
2	**The function menu**
2.1.	After pressing the enter button the function menu will be displayed.  Display of the function menu The menu contains a list of all available functions. The symbol > is the selection indicator that marks the entry that is selected or activated when the enter button is pressed. ▲▼ These buttons move the selection indicator up and down. Enter button The enter button selects the function marked by the selection indicator >. Red stop button Abort and return to the main display

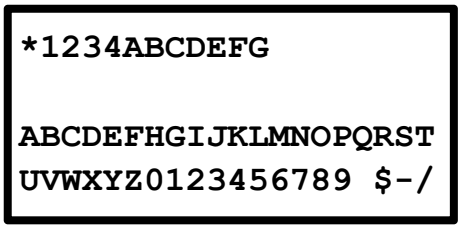
The following table shows the available functions.

Function	Description	Page
Job no.	Entering a job number (commission number)*	56
USB	Data transfer to a USB memory stick or printout*	57
Erase reports	Erasing the reports per job number*	64
Fittingcode	Manual input of the fittingbarcode	65
Man. Input	Allows for manual input of welding voltage and -time.	66
Contrast	Setting of the display contrast	67
System config.	System configuration options	68

***) Only with electrofusion control units that have data recording capability.**

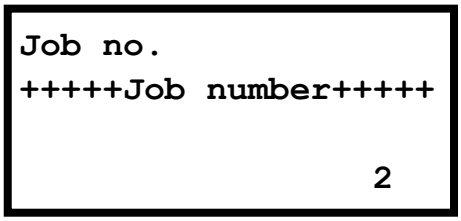
12.1 Using the letter field to enter data

To manually enter data a letter field will be displayed. Using the letter field to enter letters or digits is always done in the same way, which is why it is presented here comprehensively.

Step	Action
1	**Using the letter field to enter data**
1.1	The displayed letter field looks like this:  Letter field The first two rows display the letters and numbers that have been entered. Depending on the function a default string may already be set. The last two rows list all available letters and numbers.
2	**Entering a string of characters** When you begin, the first position is marked. The mark is indicated by flashing. Move the cursor (star *) under the character you want to enter by pressing the arrow buttons ◄▲▼►. Enter the selected character by pressing the enter button. The selected and entered character appears in the first row of the display at the flashing position. Enter all desired characters one by one.
2.1	**Editing a string of characters** If you want to edit an entered character in the string, move the cursor from the letter field to the first row by pressing the ▲-button. The star * disappears and you can move the flashing cursor by pressing the ◄ and ►-buttons to any position in the already entered string. To change the marked character push the enter button to get the star * back in the letter field and proceed as described under 1).
2.2	**Input of a string with a barcode reading device (if your electrofusion control unit has a reading pen/scanner)** You also can enter a string of characters by using a barcode which can be read using a reading pen or scanner. Move the flashing cursor, as described under 2) to the position to which the string in the barcode should be attached to and press the enter button to make the star * cursor appear in the letter field again. Now read in the barcode using a reading pen or scanner. The barcode is attached to the selected position and the cursor is placed behind it. You can read multiple barcodes in a row. If the entered barcode is too long to be attached or entered in the first row, the part which is too long will be ignored and not displayed! You can also use the alphanumerical code table in the appendix of this instruction manual. This code table is also available as an accessory sealed in a waterproof foil.
2.3	**Finishing the input** Finish the input of the string by pressing the green start button. Alternatively, you can leave the letter field by pressing the red stop button to cancel the entry. In this case, your input will not used for the following process.

12.2 Job no.*

To show the currently active 40-digit job number and to change it, select the function "Job no."in the function menu. Now the currently set job number (commission number) is displayed. The last row of the display shows the number of reports that already have been stored under this job number. In this menu you can select a job number under which the following reports will be stored. Alternatively you can create a new job number with the help of a letter field.

Step	Action
1	**Displaying the job numbers**
1.1 1.2	Select the entry "Job no." in the function menu, using the ▲- and ▼-buttons. Then press the enter button to select the function.
2	**The menu "Job no."**  Setting the job number ▲ ▼ Cycles through the already entered job numbers. Enter button Creates a new job number Green start button Sets the currently displayed job number active. Red stop button Abort and return to the main display. You have three ways of changing the job number (commission number) under which the following reports are stored.
2.1	**OPTIONAL: Reading in a barcode that contains the job number (commission number).** If for example you have a contract with a commission number available as barcode you can read this in as job number. The maximum length of the barcode may not exceed 40 digits (alphanumerical). Preferably, a barcode of type Code128, 2/5i or Code39 extended should be used. The prompt that follows the successful reading in of a barcode should be acknowledged by pressing the green start button to accept the barcode. It will then be copied to the internal list and set as currently active job number (commission number). Finish your selection by pressing the green start button.
2.1	**OPTIONAL: Selecting an already existing job number and activating it.** You can browse through the list of already entered job numbers by pressing the ▲ and ▼-buttons. To set the displayed job number to the active job number press the green start button.
2.1	**OPTIONAL: Entering a new job number with the help of the letter field** Press the enter button to activate the letter field for input of the job number. Now you can, as described in the previous section, enter a new job number. The current job number is displayed. Now you can enter a new job number. Confirm your the input by pressing the green start button or cancel the function by pressing the red stop button. Your entry will then be copied to the internal list and set as active job number. Close the job number selection by pressing the green start button.

***) Only with electrofusion control units that have data recording capability.**

12.3 USB*

The menu item "USB" includes functions to transfer reports to a USB memory stick and to print reports to a directly connected printer.

Attention!

Before selecting the menu entry "USB" connect the desired terminal equipment, USB memory stick or printer, to the USB interface of the electrofusion control unit.

After selecting the menu entry "USB" the electrofusion control unit checks if a device is connected. If this is not the case, an error will be shown.

Function	Memory	Appearance in PDF
All (short)	Whole memory (all reports)	Tabulated
All (long)	Whole memory (all reports)	1 page per report
Job no. (short)	Per job number	Tabulated
Job no. (long)	Per job number	1 page per report

When transferring the reports to a USB memory stick two files are created: one PDF file and one file with the extension "log", which contains the reports in CSV format.

PDF-Format: The electrofusion control unit generates a PDF file on the USB memory stick, which contains the already formatted welding reports. The PDF file can be opened with Adobe Acrobat Reader (Version 3.0 or higher; www.adobe.com).

CSV-Format: This format contains the report data in a tabular format, in which the report data is stored in one row each. The data fields are separated by semicolons. This file type can be opened by standard spreadsheet or database applications. We highly recommend using the EXCEL macro stored on the supplied USB memory stick to transfer the data unadulterated to an EXCEL-spreadsheet. The macro is stored on the supplied USB memory stick in the folder </macro/de>. Also, read the manual for this macro, which is stored in the same folder. In addition, the content of the folder should be copied to a computer and the EXCEL macro should only be run from a local hard drive.

The CSV file can also be opened with the Datamatic software. To do so use the function "Open as text file" and select the appropriate file.

Location/file name: The electrofusion control unit generates a sub folder </PF> on the USB memory stick, in which the generated files are stored. The file names are generated by the electrofusion control unit according to the following syntax: <PFnnnnn.PDF> for PDF files and <PFnnnnn.log> for CVS-files. <nnnnn> stands for an incremental numbering, which ensures that already existing files are not overwritten.

Attention!

The USB memory stick is not a suitable medium for permanent storage of data. Backup your data regularly.

Transfer the reports to a PC or Notebook as soon as possible and erase the files on the USB memory stick. The number of files per folder on the USB memory stick is limited to 30 per file format. If more than 30 files are created, the electrofusion control unit will create a new folder on the USB memory stick with the name PF and a progressive number.

***) Only with electrofusion control units that have data recording capability.**

12.3.1 Transferring reports to a USB memory stick

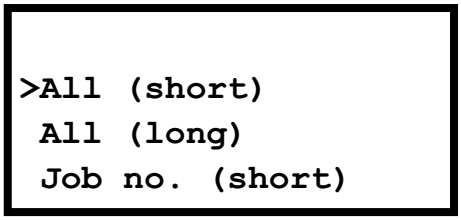
Attention!

The functionality of the USB data transfer can only be guaranteed when using the supplied USB memory stick.

If you use a different USB memory stick, it should match the following specifications to increase the probability of being compatible:

Capacity: up to 2 resp. 4 GB

File system: FAT

Step	Action
1	**Selecting the entry "USB"**
1.1	Insert the supplied USB memory stick into the USB interface of the electrofusion control unit. If you want to use a different USB memory stick, make sure it is not write-protected.
1.2	Select the entry "USB" in the function menu, using the ▲- and ▼-buttons.
1.3	Then press the enter button to select the function. The message "Check USB" is displayed for a short time. The terminal device which is connected to the USB interface is now tested. After that, a display with the available printing options is shown.
2	**The menu "USB"**
	 Display in the "USB" menu.
	▲ ▼ Browses through the menu entries Enter button Selects the marked entry Green start button No function Red stop button Abort and return to the main display
2.1	• Make your selection here. You can choose if you want to print all reports or only those that are stored under a certain job number. Navigate to the desired entry by pressing the ▲- and ▼-buttons and confirm the selection by pressing the enter button to begin data transfer. • If you chose to transfer the reports per job number, select the respective job number with the arrow buttons ▲- and ▼ and confirm your selection with the green start button.

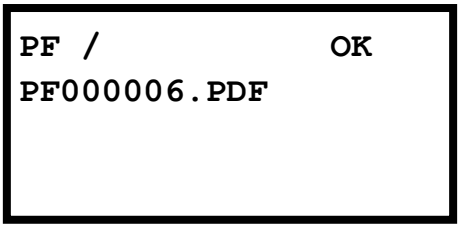
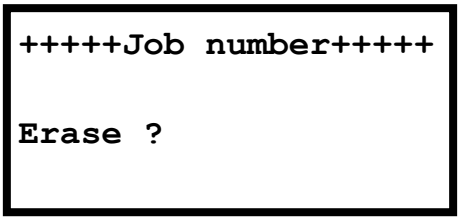
Step	Action
3	**Beginning the data transmission**

3.1	Data transfer begins. During data transfer, the following message appears in the display. (The data shown here are but an example and are different depending on the conditions.)
	
	`PF /`
	`PF000006.PDF`
	`00010`
	
	Display during data transfer
	
	Row 1 shows the name of the folder in which the reports are stored on the USB memory stick.
	Row 2 shows the file, in which the reports are written.
	Row 3 shows the number of transferred pages.

4	**End of data transmission when transmitting all reports**
4.1	**After successful data transfer the following display will be shown, if you chose to transfer all reports.** (In case you only want to transmit the reports **for one job number** please continue reading **Step 6**.) `Erase ?` Prompt for deletion after the data transfer
5 OPT	**OPTIONAL: Deletion of the transferred reports**
5.1	The prompt "Erase?", which is shown if **all reports** were transferred, makes it possible to delete all reports in the electrofusion control unit.
5.2	If you want to erase the reports, press the enter button. A confirmation prompt "Are you sure?" will be displayed.
5.3	If you confirm this prompt by pressing the green start button, the respective reports will be erased. The display will then show the main display.
5 OPT	**OPTIONAL: Leaving the transmitted reports in the device's memory**
5.1	If you do not want to delete the reports and leave them stored in the memory of the device, press the red stop button. The display will then show the main display.

Attention!
The prompt for deletion of the transferred reports only appears if "Secure data" is deactivated in the system configuration.

Attention!
The deletion can take up to a couple of minutes.
To avoid possible errors in the memory management or loss of data, ensure that the electrofusion control unit is not cut off from power during deletion of the reports. This could lead to the destruction of the electronics!
NEVER switch the electrofusion control unit off during the deletion of welding reports.

Step	Action
6	**End of data transmission when transmitting reports per job number**
6.1	After successful data transfer of the reports for one job number the following display will be shown:  Display after the transfer of the reports for one job number Row 1 shows the name of the folder in which the reports are stored on the USB memory stick, as well as the message "OK". Row 2 shows the file, in which the reports are written. You can return to the main display by pressing the red stop button. By pressing the green start button you are taken to the deletion prompt for the transmitted reports.  Erase prompt for the reports of this job number.
7 OPT	**OPTIONAL: Deletion of the transferred reports**
7.1	The prompt "Erase ?" which is displayed together with the job number offers the possibility to delete the last transmitted reports from the memory of the electrofusion control unit.
7.2	If you want to erase the reports, press the enter button. A confirmation prompt "Are you sure?" will be displayed.
7.3	If you confirm this prompt by pressing the green start button, the respective reports will be erased. The display will then show the main display.
7 OPT	**OPTIONAL: Leaving the transmitted reports in the device's memory**
7.1	If you do not want to delete the reports and leave them stored in the memory of the device, press the red stop button. The display then shows again the selection of the job numbers.

Attention!

The deletion can take up to a couple of minutes.

To avoid possible errors in the memory management or loss of data, ensure that the electrofusion control unit is not cut off from power during deletion of the reports. This could lead to the destruction of the electronics!

NEVER switch the electrofusion control unit off during the deletion of welding reports.

12.3.2 Printing reports on a USB printer

Attention!

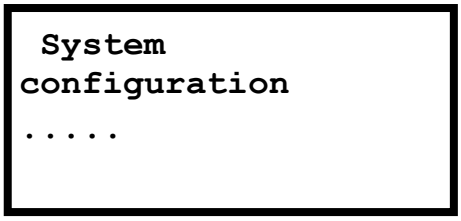
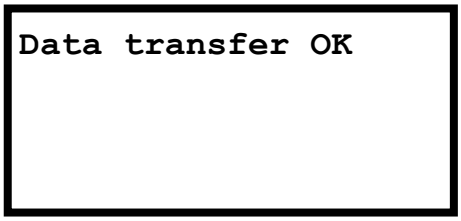
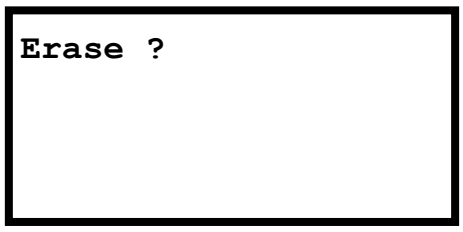
The connection between electrofusion control unit and printer should be established before selecting the menu entry "USB".

The manufacturer does not guarantee that the electrofusion control unit will work with every USB-printer model. Depending on the manufacturer and type of the printer is is possible that no connection can be established.

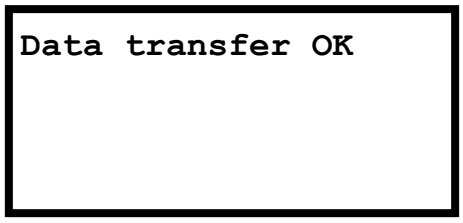
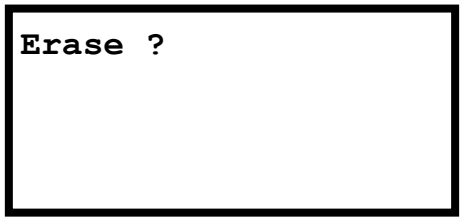
Step	Action
1	**Selecting the entry "USB"**
1.1	Connect the printer with the USB interface of the electrofusion control unit.
1.2	Select the entry "USB" in the function menu, using the ▲- and ▼-buttons.
1.3	Then press the enter button to select the function. The message "Check USB" is displayed for a short time. The terminal device which is connected to the USB interface is now tested. After that, a display with the available printing options is shown.

2	**The menu "USB"**
	
	`>All (short)`
	` All (long)`
	` Job no. (short)`
	
	Display in the "USB" menu.
	
	▲ ▼ — Browses through the menu entries.
	Enter button — Selects the marked entry.
	Green start button — No function
	Red stop button — Abort and return to the main display

2.1	• Make your selection here. You can choose if you want to print all reports or only those that are stored under a certain job number. Navigate to the desired entry by pressing the ▲- and ▼-buttons and confirm the selection by pressing the enter button to begin data transfer. • If you chose to transfer the reports per job number, select the respective job number with the arrow buttons ▲- and ▼ and confirm your selection with the green start button.
3	**Beginning the data transmission**
3.1	Data transfer and printing starts. During data transfer, the following message appears in the display. `Data trasmission` Display during data transfer

Step	Action
4	**End of data transmission**
4.1	After the data transfer this display is shown.  Prompt for the printout of the system configuration The electrofusion control unit prompts whether the current system configuration shall also be printed out. In this case continue reading step 6 OPT. If you press the green start button then the system configuration will be printed out. In this case continue reading step 5 OPT. If you press the red stop button, the system configuration will not be printed out.
5 OPT	**OPTIONAL: Without printing the system configuration**
5.1	If you do not want to print the current system configuration, press the red stop button. The following display is shown:  Data transmission was successful.
5.2 OPT	OPTIONAL: To return to the main display press the red stop when this display is shown.
5.3 OPT	OPTIONAL: To be able to erase the recently printed reports press the green start button. The following display is shown:
6 OPT	**OPTIONAL: Deletion of the transferred reports**
6.1 OPT	OPTIONAL: If you want to erase the reports, press the enter button. A confirmation prompt "Are you sure?" will be displayed. OPTIONAL: Confirm this prompt by pressing the green start button. The reports will be deleted and the electrofusion control unit again shows again the main display.  Prompt for deletion after the data transfer If you chose the job number printing you are offered the possibility to erase the reports that are stored under a single job number.
6.2 OPT	OPTIONAL: Press the red stop button to leave the reports in the memory of the device. The electrofusion control unit will then show the main display again.

Attention!
The prompt for deletion of the transferred reports only appears if "Secure data" is deactivated in the system configuration.

Step	Action
7 OPT	**OPTIONAL: With printing the system configuration**
7.1	If you want to print the current system configuration, press the green start button. The following display is shown:
	 Data transmission was successful.
7.2 OPT	OPTIONAL: After the data transmission the following display is shown:
8	**OPTIONAL: Deletion of the transferred reports**
8.1 OPT	OPTIONAL: If you want to erase the reports, press the enter button. A confirmation prompt "Are you sure?" will be displayed. OPTIONAL: Confirm this prompt by pressing the green start button. The reports will be deleted and the electrofusion control unit again shows again the main display.
	 Prompt for deletion after the data transfer
	If you chose the job number printing you are offered the possibility to erase the reports that are stored under a single job number.
8.2 OPT	OPTIONAL: Press the red stop button to leave the reports in the memory of the device. The electrofusion control unit will then show the main display again.

Attention!
The prompt for deletion of the transferred reports only appears if "Secure data" is deactivated in the system configuration.

Attention!

The deletion can take up to a couple of minutes.

To avoid possible errors in the memory management or loss of data, ensure that the electrofusion control unit is not cut off from power during deletion of the reports. This could lead to the destruction of the electronics!

NEVER switch the electrofusion control unit off during the deletion of welding reports.

12.4 Erase reports?*

This function enables you to delete the reports that are stored in the electrofusion control unit. The reports can be deleted per job number. You can press the red stop button at any time. This will take you back to the main display.

Attention!
You can lock this option so that you are prompted for an access code when trying to access it. Refer to chapter Code Del. "" of the system configuration.

Attention!
If you erase the reports of one job number then you will automatically delete the job number from the memory of the device. If you still need the respective job number, you must enter it again after the deletion.

Attention!
The deletion can take up to a couple of minutes.
To avoid possible errors in the memory management or loss of data, ensure that the electrofusion control unit is not cut off from power during deletion of the reports. This could lead to the destruction of the electronics!
NEVER switch the electrofusion control unit off during the deletion of welding reports.

Step	Action
1	**Accessong the menu "Erase reports"**
1.1	Connect the printer with the USB interface of the electrofusion control unit.
1.2	Select the entry "Erase reports" in the function menu, using the ▲- and ▼-buttons.
1.2	Then press the enter button to select the function.
1.3 OPT	OPTIONAL: If you have locked the erase function by activating the "Code Del." option in the system configuration you will be prompted for an unlocking- resp. supervisor code. The manufacturer can provide you with an unlocking- resp. supervisor code on request. Read in the unlocking- resp. supervisor code using the reading pen/scanner or press the enter button to do the input by using the letter field. If you use the letter field, press the green start button after the input to confirm the entered code.
1.3 OPT	OPTIONAL: If you have not locked the erase function in the system configuration ("Code Del." is deactivated by default) a display with job numbers will be shown after pressing the enter button.
2	**The menu "Erase reports"**
2.1	Select the job number that you want to erase and press the green start button.

```
Job no.
TEST

                    2
```

Display in the menu "Erase reports"

▲ ▼	Cycles through the already entered job numbers.
Green start button	Erase reports of the displayed job number.
Red stop button	Abort and return to the main display.

***) Only with electrofusion control units that have data recording capability.**

Step	Action
3	**Erasing of reports that are stored under the selected job number**
3.1	After you have pressed the green start button, the following display will be shown:

```
TEST

Erase ?
```

Prompt before erasure

Enter button	Confirms the prompt for erasure
Green start button	No function
Red stop button	Abort and return to the main display

3.2	Confirm this prompt by pressing the enter button. Confirm the following safety prompt "Are you sure ?" by pressing the green start button. The reports stored under the job code are erased and the job number is erased from the memory of the electrofusion control unit.
3.3	After the erasure the display with the job numbers will be shown. You can delete other reports or press the red stop button to return to the main display.

12.5 Fittingcode

This function offers the possibility to enter the code number of a damaged fittingbarcode manually.

Step	Action
1	**Selecting the entry "Fittingcode"**
1.1	Select the entry "Fittingcode" in the function menu, using the ▲- and ▼-buttons.
1.2	Then press the enter button to select the function.
2	**Input of the fittingbarcode**
2.1	Put in the numbers of the fitting barcode with the arrow buttons ◄▲▼► and the enter button. The operation resp. the input of characters with the number field is described in chapter 12.1 "Using the letter field to enter data".

```
_

Fittingcode
 0123456789
```

Number field

Row 1 signals readiness for input of the fittingbarcode.
Row 3 shows the text "Fittingcode".
Row 4 contains the numbers that are necessary for the input of the fittingbarcode.

2.2	After complete input of the digits of a fittingbarcode press the green start button. If you want to abort the input you can press the red stop button at any time. In this case, the main display is shown again.
2.3	The electrofusion control unit will now work as if the barcode had been read in using the reading pen/scanner. For further information please read chapter 11.8 „Welding with manual input of the fitting code“.

Attention!

If a valid fittingbarcode has been entered, the welding parameters are displayed in the following display. If the welding procedure is complete and the menu entry "Fittingcode" is selected again, the last entered fittingbarcode will still be present and shown in the display. Now you can proceed as follows:

- Press the red stop button: This deletes the digits of the last entered fittingbarcode and requires a new input.
- Press the green start button: This accepts the shown (last used) fittingbarcode and shows the welding parameters in the next display.

12.6 Man. Input

The menu item "Man. input" enables you to manually enter the welding parameters "welding voltage" and "welding time". The welding voltage can be set in the range of 8 V to 48 V and the welding time can be set in the range of 1 s to 9999 s.

Step	Action
1	**Selecting the entry "Man. input"**
1.1 1.2	Select the entry "Man. input" in the function menu, using the ▲- and ▼-buttons. Then press the enter button to select the function.
2 OPT	**OPTIONAL: Input of an unlocking- resp. supervisor code to unlock the function**

2.1
OPT
	OPTIONAL: If the option "Code Man." is activated, the following prompt will appear when trying to access the manual input option. Enter an unlocking- resp. supervisor code here to gain access to the manual input.
	
	`_`
	`Codenumber`
	`ABCDEFGHIJKLMNOPQRST`
	
	Prompt for code

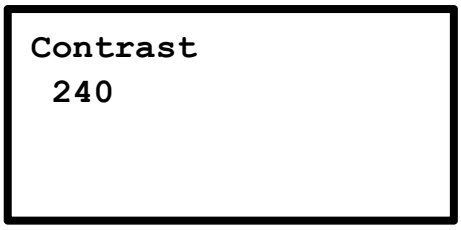
2.2 OPT	OPTIONAL: The unlocking- resp. supervisor code can either be read in using the reading pen/scanner, or be entered manually using the arrow buttons ◄▲▼► and the enter button. If you enter the unlocking- resp. supervisor code manually, press the green start button after the entry of the last character. For a detailed description of how to use the letter field please read chapter 12.1 "Using the letter field to enter data".
2.3 OPT	OPTIONAL: After input of the unlocking- resp. supervisor code, if "Code Man." is activated, the following display is shown:
3	**Manual input of the welding parameters**

3.1	Here you can manually enter the welding parameters.
	
	`Welding voltage`
	`U(V)=  40 V`
	`T(s)= 0030 s`
	
	Manual setting of the welding parameters

3.2	Please read chapter 11.9 „Welding with manual input of the welding parameters“ for further information on the manual input of the welding parameters.

12.7 Contrast (Display)

This function enables you to adjust the display contrast to the lighting condition in your work area.

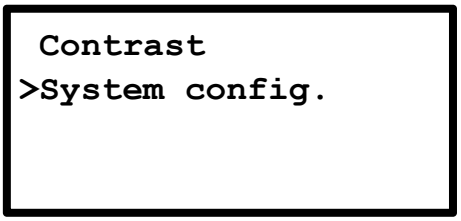
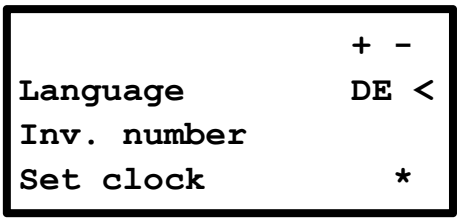
Step	Action
1	**Selecting the entry "Contrast"**
1.1	Select the entry "Contrrast" in the function menu, using the ▲- and ▼-buttons.
1.2	Then press the enter button to select the function.
2	**Setting of the contrast**  Setting of the contrast ▲ Increases the contrast value ▼ Decreases the contrast value Green start button Accepts the indicated contrast value Red stop button Pressing the red stop button cancels and returns to the main display.
2.1	If you have changed the contrast value and acknowledged it by pressing the green start button a safety prompt will be displayed. You can acknowledge the prompt by pressing the green start button. Press the red stop button to return to the main display.

12.8 System config.

Different variants of the electrofusion control unit

This instruction manual describes several different variants of the electrofusion control unit. These variants differ in the range of available functions and in the number of menu entries. The differences are pointed out where necessary. Please check which variant you have.

In the menu "System config."different settings and functions of the electrofusion control unit can be changed. Depending on the basic configuration of the device, it is possible that an unlocking- resp. supervisor code is required to gain access to this menu. This restriction can be deactivated in this menu.

Step	Action
1	**Accessing the system configuration**
1.1	Select the entry "System configuration" in the function menu, using the ▲- and ▼-buttons.  Function menu
1.2	Press the enter button to access the system configuration.
2	**The system configuration**  System config.
	< This symbol is the selection indicator that marks the currently selected menu item.
	▲▼ These buttons move the selection indicator up and down.
	Enter button The enter button selects the function marked by the selection indicator <.
	* The star shows the status of the option. If the star is in the + row, the respective option is activated. If the star is in the - row, the respective option is deactivated.
	◄ ► Pressing these buttons changes the option status (ON/OFF).
	Green start button Pressing the green start button accepts/saves the values and returns to the main display.
	Red stop button Pressing the red stop button cancels and returns to the main display.

The following table shows the available functions.

Function	Description	Value	Page
Language	Setting the display language	Short code for language	70
Inv. number	Issuing an inventory number for the electrofusion control unit	Number	71
Set clock	Setting of time and date*	Time	72
Memory control	Memory control*	ON/OFF	72
Daylight time	Automatic changeover for summer and winter time*	ON/OFF	73
Workercode	Mandatory input of a worker code after switching on the electrofusion control unit*	ON/OFF	73
Weldername	Prompt for a welder name after switching on the electrofusion control unit*	ON/OFF	74
Job no.	Mandatory input of a job number*	ON/OFF	75
Weather condition	Mandatory input of the weather conditions*	ON/OFF	75
Joint number	Mandatory input of a joint number*	ON/OFF	77
Traceab. code	Mandatory input of a traceability code of a fitting*	ON/OFF	78
Pipe code	Mandatory input of pipe code 1 and 2 as well as optionally pipe code 3 or geo-information*	ON/OFF	79
Pipe length	Mandatory input of the pipe lengths*	ON/OFF	80
Trench depth	Mandatory input of the trench depth*	ON/OFF	81
South	Summer-/Winter time for the southern hemisphere*	ON/OFF	81
Cont. numbers	Consecutive numbering of the reports*	ON/OFF	82
SmartFuse	Switch SmartFuse on/off**	ON/OFF	82
Clamping	Additional prompt for clamping before the welding procedure	ON/OFF	83
Code Lock	Activate the locking functions of the controller	ON/OFF	84
Code Sys.	Locking of the system configuration	ON/OFF	85
Code Man.	Mandatory input of an unlocking- resp. supervisor code when trying to access manual input of welding parameters	ON/OFF	86
Code Del.	Locking the option for erasure of reports*	ON/OFF	87
Secure Data	Mandatory input of a code when trying to access report erasing function*	ON/OFF	88
BT on	Switching Bluetooth on and off***	ON/OFF	88
BT only	Operation of the device only possible by app via Bluetooth***	ON/OFF	88

***) Only with electrofusion control units that have data recording capability.**

****) Only with electrofusion control units that are SmartFuse capable.**

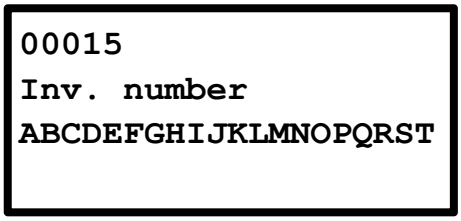
*****) Only with electrofusion control units that have Bluetooth functionality.**

12.8.1 Language

Step	Action
1	**Accessing the language setting**
1.1	Select the entry "Language" in the system configuration, using the ▲- and ▼-buttons.
1.2	Press the enter button to access the setting of the language.
2	**Setting of the language**
2.1	When the "Language" option is selected, a list of country codes is displayed which represent the languages.(DE = German, GB = English, SE = Swedish, ES = Spanish, IT = Italian, DK = Danish, PF = Portuguese, FR = French, PL = Polish, TR = Turkish, RO = Romanian, etc.) Please note, that the electrofusion control unit has seven languages to choose from.  **>DE** **GB** **FR** Setting the language ▲▼ — These buttons move the selection indicator up and down. Enter button — The enter button selects the language indicated by the selection indicator >. Green start button — Pressing the green start button accepts/saves the values and returns to the main display. Red stop button — Pressing the red stop button cancels and returns to the main display.
2.2	After having selected the desired language, press the enter button. Acknowledge the following prompt by pressing the green start button to accept the new time and date or cancel the operation by pressing the red stop button.

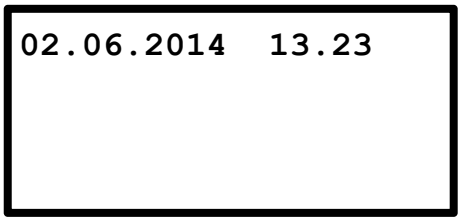
12.8.2 Inv. number

The inventory number can be defined to identify the electrofusion control unit in your stock. The inventory number can be defined to identify the electrofusion control unit in your stock. You can use the displayed letter field for input or use a barcode together with the reading pen/scanner. The entered inventory number will be shown on the reports.

Step	Action
1	**Accessing the setting of the inventory number**
1.1	Select the entry "Inv. number." in the system configuration, using the ▲- and ▼-buttons.
1.2	Press the enter button to access the setting of the inventory number.
2	**Setting the inventory number**
2.1	Use the letter field for input of the desired inventory number.  Setting the inventory number with the help of the letter field. For further information on how to operate the letter field read chapter 12.1 "Using the letter field to enter data". After the input of the inventory number press the green start button once to accept the input and when the following confirmation prompt "Are you sure ?"is displayed press the green start button once again to confirm. You can abort the input by pressing the red stop button. By default the device number of the electrofusion control unit is set as inventory number.

12.8.3 Set clock*

After selecting the set clock function from the system configuration menu the display will show the current time and date.

Step	Action
1	**Accessing the setting of time and date**
1.1	Select the entry "Set clock" in the system configuration, using the ▲- and ▼-buttons.
1.2	Press the enter button to access the setting of time and date.
2	**Setting of the clock**
	 Setting of the clock
	▲▼ These buttons alter the currently marked value. ◄ ► These buttons move the indicator to the next position. Enter button Pressing the enter button confirms the new setting. Red stop button Abort and return to the main display
2.1	Set the time and date accordingly. The value that is currently selected is flashing. Confirm the following safety prompt "Are you sure ?" by pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.4 Memory control*

When the memory control option is activated, the electrofusion control unit will not begin another welding procedure as soon as the internal memory is full. This can help to prevent an unintentional loss of data. In any case, you are warned by a display message when switching the electrofusion control unit on as soon as there less than 50 free report spaces available.

Step	Action
1	**Accessing the "Memory control" option**
1.1	Select the entry "Memory control" in the system configuration, using the ▲- and ▼-buttons.
2	**Activating resp. deactivating the option "Memory control"**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.5 Daylight time*

With this option, you can activate or deactivate the automatic changeover for summer and winter time. If the automatic changeover is active on the 21st of March resp. on the 21st of October a prompt "Change time" will be shown each time the device is switched on. If the prompt is confirmed by pressing the green start button the respective changeover will be made. If you press the red stop button, the changeover will not be made and the prompt will reappear the next time the device is switched on.

Step	Action
1	**Accessing the "Daylight time" option**
1.1	Select the entry "Daylight time" in the system configuration, using the ▲- and ▼-buttons.
2	**Activating resp. deactivating the option "Daylight time"**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

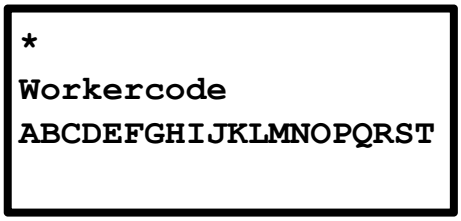
12.8.6 Workercode*

The worker code is used to identify the user of the electrofusion control unit. If the function is activated, only users with a worker code can use the electrofusion control unit. The code passes can be ordered from the manufacturer with three different levels:

Level	Permission
Welder	Welding with barcode and SmartFuse system
Foreman	Welding with barcode, SmartFuse-system and manual input of the welding parameters.
Supervisor	Welding with barcode, SmartFuse-system and manual input of the welding parameters and the right to change the system configuration.

On request the codes can be issued conforming to ISO 12176-3. With activated worker code request, the electrofusion control unit prompts the user for the input of a valid worker code before the welding procedure.

Attention!
This function requires the user to hold a valid worker code according to manufacturer specifications or ISO 12176-3.

Step	Action
1	**Accessing the "Workercode" option**
1.1	Select the entry "Workercode" in the system configuration, using the ▲- and ▼-buttons.
2	**Activating resp. deactivating the option "Workercode"**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the workercode**
3.1	If the option "Workercode" is activated, a prompt for a Workercode will be shown when you switch on the device (before the main display is shown).  Prompt for the workercode after switching on the device.

***) Only with electrofusion control units that have data recording capability.**

12.8.7 Weldername*

If this function is activated, a prompt for entering a welder name is shown after switching on the electrofusion control unit. The can be entered with the help of the displayed letter field.

- After completion of the input, confirm it by pressing the green start button.
- You can skip resp. abort the input by pressing the red stop button.

Step	Action
1	**Accessing the "Weldername" option**
1.1	Select the entry "Weldername" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Weldername" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.8 Job no.*

If this function is activated, a prompt for the input/selection of job number, under which the report will be stored, is displayed after connecting a fitting. The job number can consist of numbers and letters.

Step	Action
1	**Accessing the "Job no." option**
1.1	Select the entry "Job no." in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Job no." option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa. For further information please read chapter 12.8.8 „Job no.*“.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.9 Weather*

If this function is activated, it can be used to enter the weather condition and protective measures against it according to DVS 2208. The input in two levels must be done each time the electrofusion control box is switched on:

Step	Action
1	**Accessing the "Weather" option**
1.1	Select the entry "Weather" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Weather" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Setting the weather option**

3.1	The first prompt is used for the input of the current weather.
	
	`>Sunny`
	`Dry`
	`Rain/Snow`
	`Windy`
	
	Display of the prompt for the current weather after switching on the electrofusion control unit
	
	▲▼ These buttons move the selection indicator up and down.
	Enter button The enter button selects the entry that is marked by the selection indicator.
	* The star indicates the selected entry.

3.2	Select the entry that describes the current weather best.
3.3	Then press the green start button to confirm the selection.
4	**Entering the protective measures**

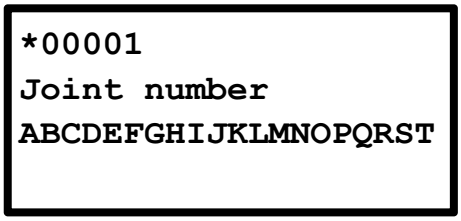
4.1	The second prompt is for entering the applied protective measures.
	
	`>No`
	`Shield`
	`Tent`
	`Heating`
	
	Display of the prompt for the protective measures after switching on the electrofusion control unit
	
	▲▼ These buttons move the selection indicator up and down.
	Enter button The enter button selects the entry that is marked by the selection indicator.
	* The star indicates the selected entry.

4.2	Mark the entry that describes the applied protective measure best. You can select multiple entries.
4.3	Then press the green start button to confirm the selection.

***) Only with electrofusion control units that have data recording capability.**

12.8.10 Joint number*

If this function is activated, you can manually add a 6-character joint number to a weld.

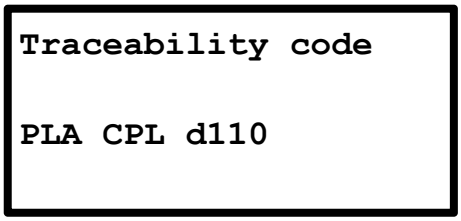
Step	Action
1	**Accessing the "Joint number" option**
1.1	Select the entry "Joint number" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Joint number" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the joint number.**
3.1	If this function is activated, the input of the joint number is prompted after the input of a fitting code:  Prompt for the joint number.
3.2	Enter the joint number with the letter field.

Attention!
If "Joint number" is activated, the entered joint number will incrementally be increased by 1 for the next weld. You can enter a different joint number anytime.

***) Only with electrofusion control units that have data recording capability.**

12.8.11 Traceability code*

If this function is activated, a prompt for the traceability code for the fitting will be shown after the input of a fitting code (before the welding procedure begins). This code can be used to trace the used fittings from a manufacturer.

Step	Action
1	**Accessing the "Traceability code" option**
1.1	Select the entry "Traceability code" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Traceability code" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the traceability code**
3.1	When this display is shown, you have the following options to continue:
3.2 OPT	OPTIONAL: Read in the traceability code of the fitting as barcode using the reading pen/scanner.
3.2 OPT	OPTIONAL: Enter the traceability code manually, using the letter field and the buttons. To do so, press the enter button to let the letter field appear. After the input is complete, confirm by pressing the green start button.
3.2 OPT	OPTIONAL,You can skip the input of a traceability code by pressing the green start button.
	 Prompt for the traceability code
3.3	When you have entered the traceability code or skipped its input the display shows the next prompt. Which prompt comes next is highly dependant on the system configuration.

***) Only with electrofusion control units that have data recording capability.**

12.8.12 Pipe code*

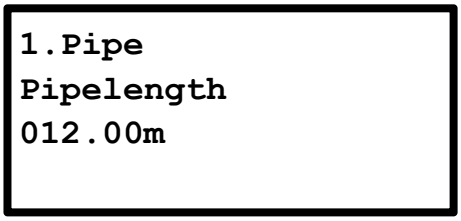
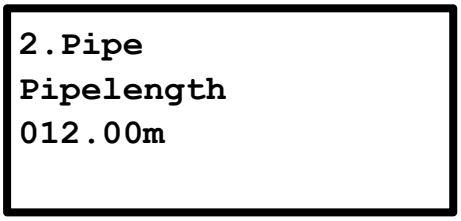
If this function is activated a prompt for the input of the pipe codes for the pipes to be welded is shown after the input of a fitting code (before beginning the welding procedure).

Step	Action
1	**Accessing the "Pipe code" option**
1.1	Select the entry "Pipe code" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Pipe code" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the pipe code**
3.1	When this display is shown, you have the following options to continue:
3.2 OPT	OPTIONAL: Read in the pipe code using the reading pen/scanner.
3.2 OPT	OPTIONAL: Enter the pipe code manually using the letter field and the buttons. To do so, press the enter button to let the letter field appear. After the input is complete, confirm by pressing the green start button. The manually entered pipe code is displayed. The topmost row shows "man." as an additional indicator for manual input of the pipe code. To confirm the manual input press the green start button.
	 Prompt for the first pipe code  Prompt for the second pipe code
3.3	After that, a prompt for the pipe length of the first pipe will be shown, if this function is activated in the system configuration. Alternatively, a prompt for the second pipe code follows. The input procedure is identical to the one for the first pipe code.

***) Only with electrofusion control units that have data recording capability.**

12.8.13 Pipelength*

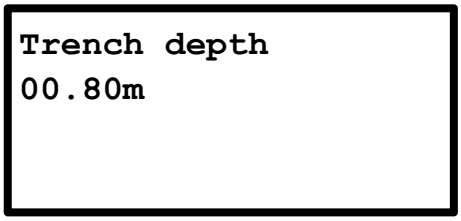
If this option is activated, a prompt for the input of the pipe length of the first and second pipe is displayed after the input of the fitting code.

Step	Action
1	**Accessing the "Pipe length" option**
1.1	Select the entry "Pipe length" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Pipe length" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the pipe lengths**
3.1	When this display is shown, you have the following options to continue:  Prompt for the first pipe length  Prompt for the second pipe length ▲▼ These buttons alter the currently marked value. ◄ ► These buttons move the indicator to the next position. Red stop button Abort and return to the previous prompt. Green start button Accepts the set value and takes you to the next display.
3.2	Enter the lengths of the used pipes and afterwards press the green start button.

***) Only with electrofusion control units that have data recording capability.**

12.8.14 Trench depth*

If this option is activated, a prompt for entry of the trench depth will be displayed before each welding procedure. The entered value for trench depth will be stored in the report for each weld.

Step	Action
1	**Accessing the "Trench depth" option**
1.1	Select the entry "Trench depth" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Trench depth" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for trench depth**
3.1	Enter the trench depth for the pipeline.  Trench depth 00.80m Prompt for the traceability code ▲▼ These buttons alter the currently marked value. ◄ ► These buttons move the indicator to the next position. Red stop button Abort and return to the previous prompt. Green start button Accepts the set value and takes you to the next display.
3.2	Enter the trench depth of the pipeline and afterwards press the green start button.

***) Only with electrofusion control units that have data recording capability.**

12.8.15 South*

If this option is activated the automatic changeover between summer and winter time will be done like on the southern hemisphere. Deactivate this option if you are on the northern hemisphere.

Step	Action
1	**Accessing the "South" option**
1.1	Select the entry "South" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "South" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.16 Cont. numbers*

If this option is activated, the reports will be numbered consecutively. If this option is deactivated, the numbering for each job number begins at 0001.

Step	Action
1	**Accessing the "Cont. numbers" option**
1.1	Select the entry "Cont. numbers" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Cont. numbers" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

12.8.17 SmartFuse**

If this option is deactivated, the electrofusion control unit will not try to measure the SmartFuse resistor in the contact of a connected fitting.

Step	Action
1	**Accessing the "SmartFuse" option**
1.1	Select the entry "SmartFuse" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "SmartFuse" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

****) Only with electrofusion control units that are SmartFuse capable.**

12.8.18 Clamping

If this option is activated, another prompt appears before the prompt "Is the pipe scraped and clamped?" specifically asking "Pipes clamped?".

Step	Action
1	**Accessing the "Clamping" option**
1.1	Select the entry "Clamping" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Clamping" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

Only if this option is available in your electrofusion control unit.

12.8.19 Code Lock

When activating this function the controller checks, if already activated locking functions (depending of the type of controller "Code Sys.", "Code Man.", "Code Del." and "Secure Data") are sufficient to ensure, that their deactivation can only be done after entering an unlocking- or supervisor code to access the system configuration. That way an efficient security measure can be set to prevent, that locking functions can be easily deactivated (bypassed) in the system configuration.
If "Code Lock" is deactivated, the electrofusion control unit can be freely configured to your liking. It is then possible that, for example, "Code Man." can be activated without locking the system configuration by activating "Code Sys." as well.

Attention!

This option can be preset, depending on the device type. Contact your retailer or the manufacturer of the electrofusion control unit before activating this option.

In any case you will need an unlocking- or supervisor code for accessing the locked functions if this option is activated and "Code Sys." is also active.

Step	Action
1	**Accessing the "Code Lock" option**
1.1	Select the entry "Code Sys" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Code Lock" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	Please note, that when activating this option, independently from other options that may already be active, "Code Sys." will automatically also be activated. This prevents, bypassing and deactivating of locking functions in the system configuration without an unlocking- or supervisor code.
2.3	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

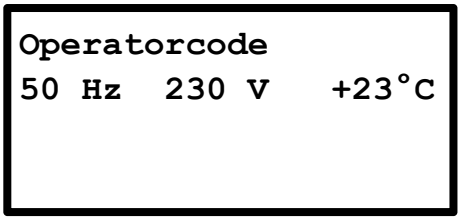
12.8.20 Code Sys.

If this option is activated, the system configuration can only be accessed after entering an unlocking- resp. supervisorcode. If this option is deactivated, each user can change the system configuration. By activating this option, only users with the respective access level can change the system configuration.

Attention!

This option can be preset, depending on the device type. Contact your retailer or the manufacturer of the electrofusion control unit before activating this option.

In any case you will need an unlocking- or supervisor code for accessing the system configuration if this option is activated.

Step	Action
1	**Accessing the "Code Sys." option**
1.1	Select the entry "Code Sys" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Code Sys." option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the unlocking- resp. supervisor code** If the option "Code Sys." is activated, the following prompt will appear when trying to access the system configuration. Enter an unlocking- resp. supervisor code here to gain access to the system configuration.  Prompt for the unlocking- resp. supervisor code
3.1	Read in the unlocking- resp. supervisor code using the reading pen/scanner or press the enter button to do the input by using the letter field. If you use the letter field, press the green start button after the input to confirm the entered code.

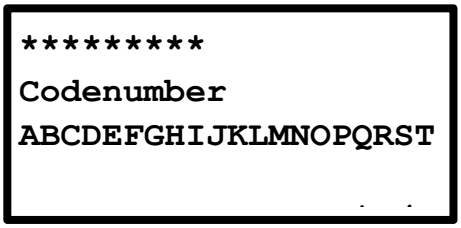
Attention!

If "Code Lock" and "Code Sys." are active and "Code Sys." is deactivated, "Code Man.", "Code Del." and "Secure data" will be deactivated automatically as well.

This shall show the user that by deactivating "Code Sys." there will be no sufficient safeguard against manipulation anymore. Without the prompt for the unlocking- resp. supervisor code before getting access to the system configuration the locking functions can easily be deactivated by any user.

12.8.21 Code Man.

If this option is activated, the access to manual input of the welding parameters is only possible after entering an unlocking- resp. supervisorcode. By activating this option, only users with the respective access level (unlocking- resp. supervisor cord) can enter welding parameters manually.

Step	Action
1	**Accessing the "Code Man." option**
1.1	Select the entry "Code Man." in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Code Man." option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Prompt for the unlocking- resp. supervisor code** If the option "Code Man." is activated, the following prompt will appear when trying to access the manual input option. Enter an unlocking- resp. supervisor code here to gain access to the manual input.  Prompt for the unlocking- resp. supervisor code
3.1	Read in the unlocking- resp. supervisor code using the reading pen/scanner or press the enter button to do the input by using the letter field. If you use the letter field, press the green start button after the input to confirm the entered code.

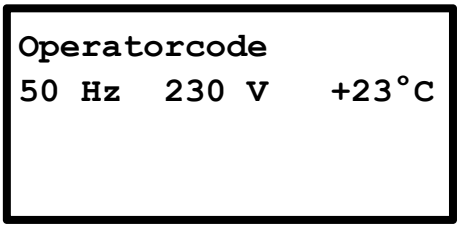
Attention!

If "Code Lock" is active when "Code Man." is activated, "Code Sys." will be activated automatically.

This ensures that the welding parameters "Welding voltage" and "Welding time" can only be entered manually if an unlocking- resp. supervisor code is entered beforehand. Additionally "Code Sys." prevents access to the system configuration without an unlocking- resp. supervisor code.

12.8.22 Code Del.*

If this option is activated you will have to enter an access code when trying to acces the "Erase reports" entry in the device menu.

Step	Action
1	**Accessing the "Code Del." option**
1.1	Select the entry "Code Del." in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Code Del." option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.
3	**Menu entry "Erase reports ?" is locked**
3.1	Accessing the function "Erase reports".
3.2	If the option "Code Del." is activated, the following prompt will appear:  Prompt for an unlocking- resp. supervisor code to unlock the erase-function for the stored reports.
3.3	Read in the unlocking- resp. supervisor code using the reading pen/scanner or press the enter button to enter the code by using the letter field. If you use the letter field, press the green start button after the input to confirm the entered code.

Attention!

If "Code Lock" is active when "Code Del." is activated, "Code Sys." will be activated automatically.

This ensures, that reports can only be deleted from the memory of the electrofusion control unit if an unlocking- resp. supervisor code is entered beforehand. Additionally "Code Sys." prevents access to the system configuration without an unlocking- resp. supervisor code.

***) Only with electrofusion control units that have data recording capability.**

12.8.23 Secure data*

If this option is activated you will not be prompted after printing reports (USB or printer) to delete the printed reports. This prevents deletion by unauthorised personnel.

Step	Action
1	**Accessing the "Secure data" option**
1.1	Select the entry "Secure data" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "Secure data" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

Attention!

If "Code Lock" is active when "Secure data" is activated, "Code Sys." and "Code Del." will be activated automatically.

This ensures, that reports can only be deleted from the memory of the electrofusion control unit if an unlocking- resp. supervisor code is entered beforehand. Additionally "Code Sys." prevents access to the system configuration without an unlocking- resp. supervisor code.

***) Only with electrofusion control units that have data recording capability.**

12.8.24 BT on***

If this option is activated, the electrofusion control unit can be detected by other devices via Bluetooth. Pairing with a smartphone or tablet that runs Android or iOS and is connected to the internet is now possible. After successful pairing you can control the electrofusion control unit by using the PFS app.

Attention!

Without prior registration, the connection to the electrofusion control unit will not be possible.

Step	Action
1	**Accessing the "BT on" option**
1.1	Select the entry "BT on" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "BT on" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

*****) Only with electrofusion control units that have Bluetooth functionality.**

12.8.25 BT only***

Attention!

If this option is activated, the electrofusion control unit can only be controlled by the app via Bluetooth.

To deactivate this option after a restart, you must have permission to access the system configuration.

Step	Action
1	**Accessing the "BT only" option**
1.1	Select the entry "Compensation" in the system configuration, using the ▲- and ▼-buttons.
2	**Changing the "BT only" option**
2.1	The ◄ ► buttons are used to move the marking (*) from the "activated" (+) column to the „deactivated“ (-) column and vice versa.
2.2	After having this option changed in the system configuration press the green start button to accept the change and acknowledge the following safety prompt "Are you sure?"by again pressing the green start button. You can abort the input by pressing the red stop button.

***) Only with electrofusion control units that have Bluetooth functionality.

13. Usage of the reading pen

Attention!

Make sure that you use the electrofusion control unit on a socket that provides a protective earthing conductor.

If you work with a generator, make sure that it is grounded.

Otherwise the reading pen might not work correctly.

Step	Action
1	**Using the reading pen**
1.1	Put the tip of the reading pen on the white space to the right or left of a barcode.
2	**Pull reading pen over the barcode**
2.1	Pull the reading pen in a continuous movement over the barcode. Reading in a barcode works best if you hold the reading pen like a regular pen.
2.2	Only stop moving the reading pen when you have moved the tip over the last bar. To work correctly you must read in the complete barcode with a little white space at the beginning and at the end. This way the electronics will recognise beginning and end of the barcode.

14. Troubleshooting and maintenance

14.1 Replacement of the welding terminals

The welding terminals should be checked on a regular basis and, if necessary, replaced as soon as they are damaged or lose contact force (see chapter 8 "Spare parts and accessories").

Step	Action
1	**Switch off the electrofusion control unit and disconnect it from the mains supply or generator!**
2	**Pull off the red resp. black PVC cap.**
3	**Hold the front part of the brass contact with a pipe wrench and screw the welding terminal with a 8 mm wrench out of the brass contact.**
4	**If your electrofusion control unit is SmartFuse-capable, then note that, when changing the welding terminals, the red terminal contains a probe tip! Only use spare parts and welding terminals provided by PFS.**
5	**Screw a new terminal plug into the brass piece. Check for firm fit.**
6	**Shove the PVC cap back over the welding terminal. Approximately 15 mm of the terminal must stand out of the PVC cap.**

14.2 Replacing the reading pen

You can change the reading pen yourself if it repeatedly fails to read in a valid barcode. Proceed as follows.

Attention!
Slipping with the knife can cause severy injuries. Be extremely careful when performing this task.

Step	Action
1	**Cut open the shrink tube**
1.1	Carefully cut the shrink tube covering the plug with a sharp knife. Make sure that you do not damage the welding cable.
2	**Loosen the screwing resp. disconnect the plug**
2.1	Remove the shrink tube and remove the reading pen plug from the connector on the welding cable.
3	**Connect new reading pen with the welding cable**
3.1	Connect the new reading pen with the connector on the welding cable.
4	**Perform a function test**
4.1	Perform a test for proper function before you apply the provided shrink tube.
5	**Mount shrink tube**
5.1	Use the provided shrink tube to cover the connection and use hot air blower to shrink the shrink tube without overheating the welding cable.

15. Error messages

Error messages are indicated by a bleep. A permanent bleep can be interrupted by pressing the red stop button.

15.1 General error messages

Code	Error	Cause	Reaction
	EMI Error	Electronic out of order or defect	Contact service
	EMI Error 2	Electronic out of order or defect	Contact service
	Emergency cut-out	Welding was interrupted by pressing the red stop button	Welding is faulty!
	Memory overflow	Report memory is full	Print reports or deactivate the memory control option.
	System error	Danger !Selftest has detected an error in the system.	Immediately disconnect the device from the power supply. Do not connect the device to the power supply. Send the controller to a certified service point
	Clock error	Internal clock does not work properly	Set clock, change battery if necessary
	Service	The recommended service interval of 12 months or 200 working hours are exceeded.	The device must be serviced by certified personnel or a service point. The device remains usable. The manufacturer is not liable until the device has undergone maintenance.

15.2 Error messages before and during the welding procedure

Code	Error	Cause	Reaction
E1	**Contact error**	Invalid SmartFuse©-detection resistor.	Clean terminals, use another fitting if possible
E2	**Power failure**	Last welding was interrupted by a break of the power supply.	Last welding is faulty! Prepare pipe again and use a new fitting!
E3	**No contact**	No sufficient electrical contact with the fitting	Check connection to the fitting.
		Heating coil or welding cable is defect	Use another fitting, change welding cable
E4	**Clean SmartFuse tip**	Welding contact dirty	Check welding terminal resp.clean it
E5	**Code error**	Faulty input	Move the reading pen over the barcode in a continuous move with constant speed.
		Barcode defect or error in code structure	
E6	**Temperature error**	Ambient temperature is out of limit (-10 to +50 °C)	
E7	**Temp. meas. error**	Temperature measurement is faulty	Plug in the removable welding cable. Switch the device off and on again Welding cable or sensor defect
E8	**Resistance error**	Fitting resistance is out of the range of operation	Use another fitting.
		Fitting resistance is out of the valid working range when using barcode input	Use another fitting.
E9	**Device too hot**	Temperature of transformer is too high	Let the device cool down for about 45 min
E10	**Frequency error**	Input frequency out of working range (40-70 Hz)	Check generator.
E11	**Interturn short circuit**	Current increases during welding by more than 15 % Short circuit in the heating coil	Welding is faulty!
E12	**Input volt. low**	Input voltage < 190 V	Fully unwind mains supply cord, use mains supply cord with suitable cross section, readjust generator voltage
E13	**Input volt. high**	Input voltage > 300 V	Adjust generator voltage to 260 V
E14	**Peak Error**	Peak value of the input voltage too high	Check generator

Code	Error	Cause	Reaction
E15	**Output volt. error**	Output voltage deviates from the rated value	Check generator, RPM fluctuates or generator too weak
E16	**Current error (DUALMATIC)**	Input voltage too high, resistance of the load too low	Check generator, use another fitting
E17	**Current low**	Momentary interruption of welding current	Welding is faulty!
		Current drops about 15-20 % within 3 s	Welding is faulty!
E18	**Current high**	Output current is more than 15% higher than the starting current.	Short-circuit in the heating coil or welding cable
E19	**Stop button**	The red stop button was pressed during the welding process.	
E20	**SHORT CUT**	Fault in electronics	Contact service
E21	**Power error**	Output power too high	Use another fitting.

15.3 Error messages during USB data transfer*

Attention!
The USB memory stick is not a suitable medium for permanent storage of data.

Transfer the reports to a PC or Notebook as soon as possible and erase the files on the USB memory stick. Devices with a software version < 2.35 show clear text error messages in the display. Devices with a software version > 2.35 show error codes in the display: "USB Error x". The x represents the number of the error code.

Attention!
It is possible that USB errors resulting from internal errors are not recurring after a restart of the device. To restart, switch the electrofusion control unit off and wait for a few seconds. Then switch the electrofusion control unit on again and retry the action which produced the error. If the error is displayed again, look in the column "Reaction" in the following table.

15.3.1 General USB error messages

Errorcode	Cause	Reaction
USB Error 1	USB–port system failure	Electrofusion control unit must be checked.
USB Error 2	No USB device is plugged in	Plug in a USB device before selecting the USB option.
USB Error 3	Internal checksum error	Electrofusion control unit must be checked.
USB Error 4	Unknown USB error	Electrofusion control unit must be checked.
USB Error 5	Internal error in the USB system.	Electrofusion control unit must be checked.
USB Error 6	The red stop button has been pressed during data transfer.	Do not interrupt data transfer by pressing the red stop button.

***) Only with electrofusion control units that have data recording capability.**

15.3.2 Error codes when using a USB memory stick*

Errorcode	Cause	Reaction
USB Error 7	The USB memory stick in not plugged in correctly. The USB memory stick was not detected.	Plug in USB memory stick properly. Remove USB memory stick and plug it in again. Use another USB memory stick.
USB Error 8	File/folder cannot be created.	Remove write-protection of the USB memory stick. Repeat data transfer
USB Error 9	Internal error	Restart the device and repeat action. If the error occurs again, the device needs to be checked.
USB Error 10	Error while writing to a directory.	Restart the device and repeat action. If the error occurs again, the device needs to be checked.
USB Error 11	Error in the number of directories on the USB memory stick.	Restart the device and repeat action. If the error occurs again, the device needs to be checked.
USB Error 12 **USB Error 13**	Error while creating a file.	Remove write-protection of the USB memory stick. Repeat data transfer If the error occurs again, the device needs to be checked.
USB Error 14 **USB Error 15**	Internal error	Repeat data transfer If the error occurs again, the device needs to be checked.
USB Error 16	Internal error	Repeat data transfer If the error occurs again, the device needs to be checked.

***) Only with electrofusion control units that have data recording capability.**

15.3.3 Error codes when using a USB-printer*

Errorcode	Cause	Reaction
USB Error 17	No PCL-capable printer is connected resp. printer is not supported.	Connect PCL-capable printer and restart printing.
USB Error 18	Printer error	Restart the device and repeat action. If the error occurs again, the device needs to be checked.
USB Error 19 **USB Error 20**	Printer memory error	Restart printer and repeat action. Test with a different printer.
USB Error 21 **USB Error 22** **USB Error 23** **USB Error 24**	Error in printer	Restart printer and repeat action. Test with a different printer. Check printer.

***) Only with electrofusion control units that have data recording capability.**

15.3.4 Bluetooth error messages

Errorcode	Cause	Reaction
Checking BT module	Connector loose, defect in Bluetooth module	Restart the device and repeat action. Electrofusion control unit must be checked.
BT module not found	Connector loose, defect in Bluetooth module, Bluetooth module not available	Restart the device and repeat action. Electrofusion control unit must be checked.

*****) Only with electrofusion control units that have Bluetooth functionality.**

16. Declaration of conformity CE

We declare herewith under our sole responsibility, that the product described under "Technical data" is compliant to the following standards or normative documents:

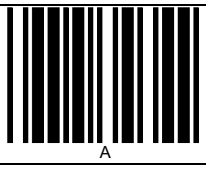
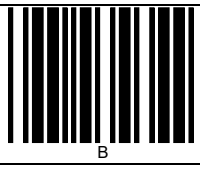
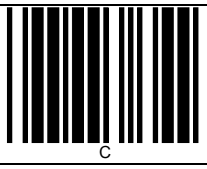
Document	Description	Edition	Classification
2006/95/EEC	Low-voltage directive	2007	D

This declaration loses its validity as soon as changes are made to the product without consulting the manufacturer first.

Technical documentation is available at:	Achim Spychalski-Merle, CEO PF-Schweißtechnologie GmbH Karl-Bröger-Str.10 36304 Alsfeld Germany
Place, date	Alsfeld, 01.04.2014

The declaration printed here represents only an extract. The full document can be provided to you on request.

17. Alphanumeric code table

 A	 B	 C
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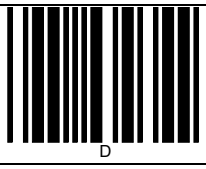
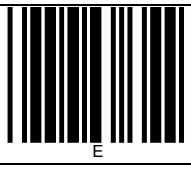
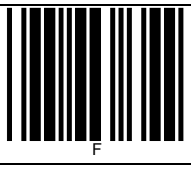
 D	 E	 F
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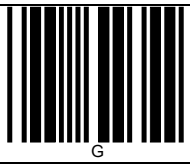
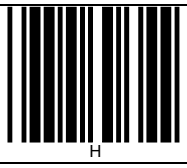
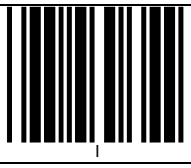
 G	 H	 I
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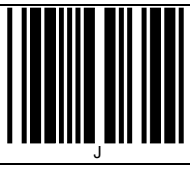
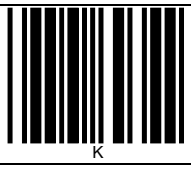
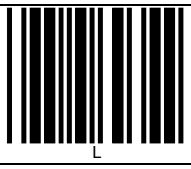
 J	 K	 L
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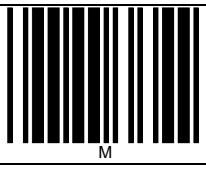
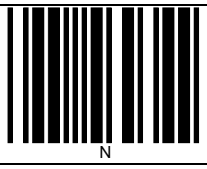
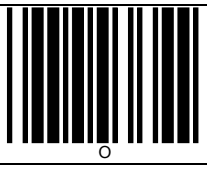
 M	 N	 O
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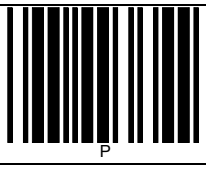
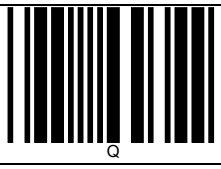
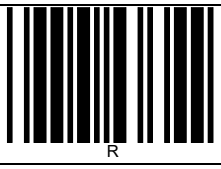
 P	 Q	 R
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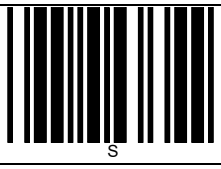
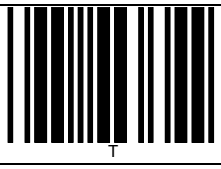
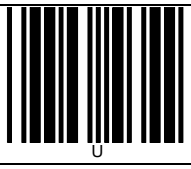
 S	 T	 U
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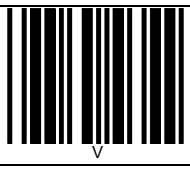
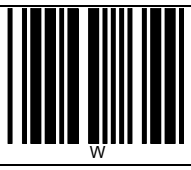
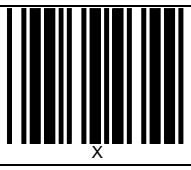
 V	 W	 X
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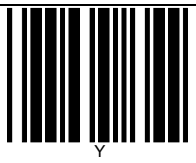	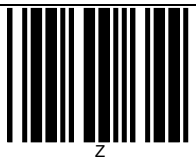	
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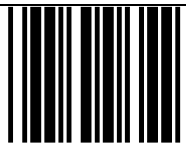	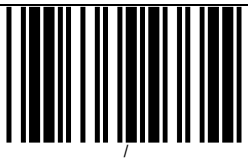	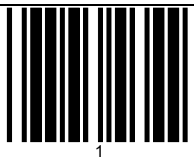
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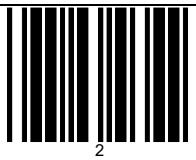	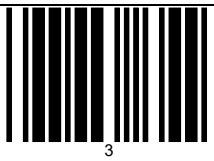	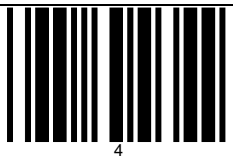
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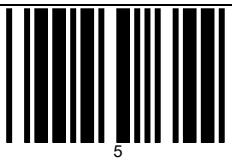	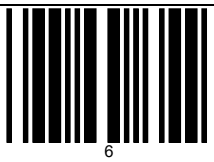	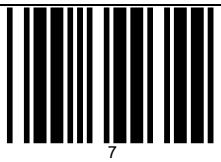
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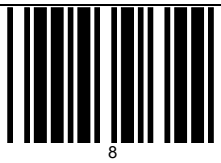	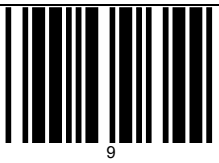	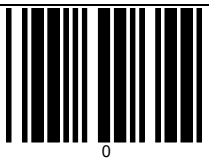
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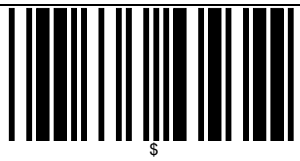	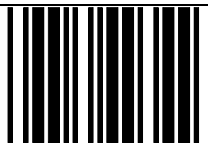	
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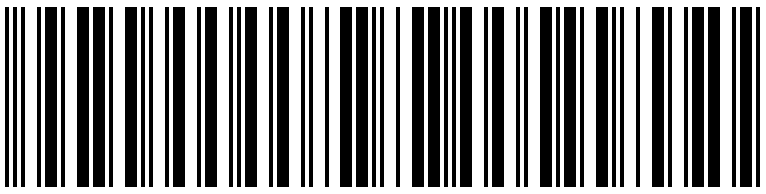
17.1 Operator code (Admin)

You can use this operator code to change the display language for your electrofusion control unit if the option „System config.“ is locked.



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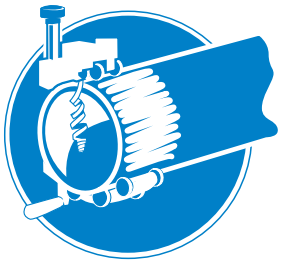
General

Read complete manual!
Observe fitting manufacturer‘s installation guide!
Follow national and international directives!

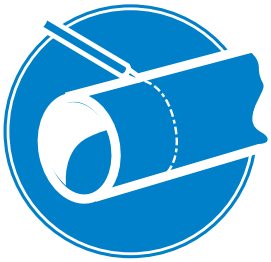


Scraping

Remove dirt from the pipe!
Mark welding area!
Use rotational scraper tools only!

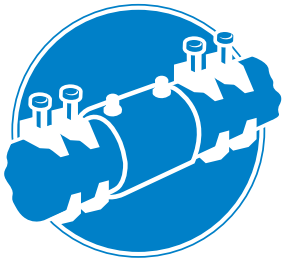
Cleaning

Wipe around the pipe!
Use approved cleaning agent!
Use lint-free cloths!



Marking

Do not touch the cleaned welding areas!
Mark insertion depth of fitting!
Use approved markers!



Alignment

Use proper alignment tools!
Avoid mechanical stress on pipes and fitting!
Wait for cooling before pressurising!

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