

EF1-110V Case-Mounted Welder

Operating Manual

For use Only with UPP Electrofusion Components



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Introduction

This manual covers the operation of the FFS EF1-110V electrofusion welder. This unit is used to weld UPP piping. Refer to manual FFS-0123 for electrofusion process instructions.

Users should read and understand the manual before using the welder. Keep the manual with the welding unit.

WARNING - UPP WELDING UNITS MUST NOT BE OPERATED IN ZONE 1 OR ZONE 0 AREAS!

Hazardous area definitions are from European Directive 1999/92/EC (further guidelines can be found in the APEA Blue Book 2nd Edition).

Safety

Warning



For use outside of hazardous areas (ATEX zones 0, 1 and 2).

Warning



Do not open the welder unit. No user-serviceable parts inside unit.

- This welding unit is only to be used by trained persons, certified by Franklin Fueling Systems.
- Visually inspect welding unit, cables and connectors and replace any damaged parts prior to use.
- To avoid damage to the welding unit, do not interrupt the supply voltage or disconnect the output lead, while the unit is in operation.
- Never lift or pull the welder by its cables
- Never disconnect the welding cables by pulling on them. Only remove the cables by pulling on the connectors.
- Bystanders must stay a safe distance from the welder during welding operations.
- Always use safety equipment (Hi-visibility jacket, safety boots, safety helmet and eye protection when working on-site.
- Always disconnect the welding unit from its power supply before adjusting, cleaning, untangling cables or leaving the welder unattended for any period.
- The operator is responsible for keeping the work area safe.
- Do not weld in the rain or let the welder get wet.
- Properly connect welding cables before starting the unit.
- Do not touch the fitting during the welding cycle.

Technical Specifications

FFS Stock Code Number	_____	EF1-110V
Operating Voltage	_____	110V +/-10%
Operating Frequency	_____	45 to 65 Hz
Power Rating	_____	115VA
Protection Class	_____	IP65
Operating Temperature	_____	Between -15° C (5° F) and +45° C (113° F)
Shipping Dimensions	_____	420 mm wide x 340 mm deep x 180 mm high
Shipping Weight	_____	11.3 kg

Power Supply

Welder must be powered with:

- A quality 110 VAC, power supply with maximum tolerance of $\pm 15\%$.
- A quality generator capable of supplying a minimum of 3,500 watts. Note that an earth-spike (grounding rod) must be used with generators.

If used with a 110v transformer follow these specifications:

- Safety Isolating transformer: 4,000 watts minimum
- Auto transformer: 2,000 watts minimum

Liability Restrictions

All liabilities of the supplier are invalidated in the following cases:

- The EF1-110V is used outside the indicated application area
- Non-UPP fittings or pipe are used
- The operator has not been trained to use the EF1-110V or the UPP system
- Operating instructions have not been observed
- Unauthorised repairs, maintenance or modifications have been carried out
- The EF1-110V has been used outside of its technical specification
- Safety instructions have not been observed
- Improper or inadequate maintenance
- Misuse or any use not in accordance with the operating manual or good industry practice
- Physical abuse of the product
- Improper site preparation or site maintenance

Note: EF1-110V welding cables use special 7 pin connectors.

Parts



Application

The EF1-110V is designed to automatically weld UPP Primary and Secondary Containment electrofusion fittings, Electrofusion Chambers and Large diameter 10 amp fittings. This is done by using color-coded welding leads as shown below.

Type of Fitting	Welding Cable Color	Size of Welding Pim (mm)	Current (amps)	Weld Time @ 20C (Seconds)
Primary	Red	4	4	184
Secondary	Green	2	5	80
Fusion Chamber	White	2.3	7	360
Large Diameter (10amp)	Black	2	10	365

The EF1-110V can be used in ambient temperatures between -15 °C (5 °F) and +45 °C (113 °F). Only personnel fully trained and certified in the use and installation of the UPP system should use this equipment.

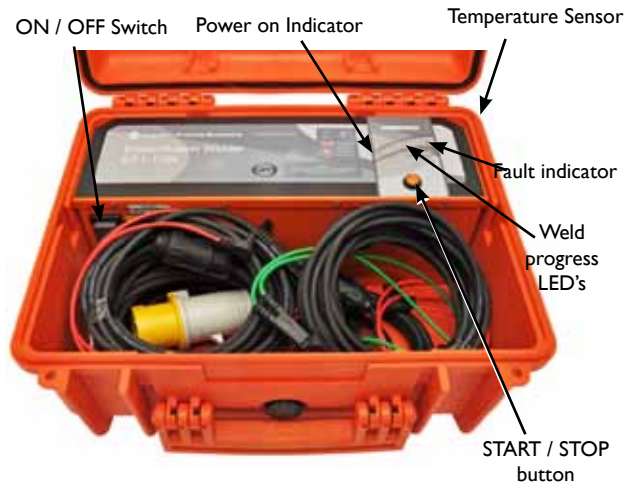
Main Features

UPP electrofusion fittings are welded using a constant current. The EF1-110V automatically recognizes the fitting when connected and applies the correct amount of energy for a successful weld.

The EF1-110V takes the ambient temperature into account when calculating the energy required to weld correctly. It must therefore be allowed to reach ambient temperature before use and must be at the same temperature as the fitting to be welded. The temperature sensor is located adjacent to the power cable entry gland.

The EF1-110V works on standard alternating current and either a mains connection or a generator can be used. Generators must have a rated output of at least 4 kW and power input must be between 98 and 121 volts at 45 to 65 Hz.

The EF1-110V has an on/off button, a weld start button and an LED display showing the weld progress. The LEDs can also show any fault conditions that may affect the weld.



Using the EF1-110V


- Ensure that the machine is positioned outside hazardous zones ATEX 0, 1 and 2
- Allow the machine and fittings to reach the ambient temperature of the site.
- Keep the machine out of direct sunlight and free of any obstruction.
- Make sure fittings and pipe have been prepared in accordance with UPP Installation instructions.

Follow the steps below to weld Electrofusion fittings.

1. Connect the EF1-110V Welder to suitable 110V power supply.
2. Connect the required welding lead to the EF1-110V Welder:
PRIMARY fittings = RED (ORANGE) cable
SECONDARY fittings = GREEN cable
FUSION CHAMBER = WHITE cable
10 AMP fittings = BLACK cable
3. Turn the unit ON. All LEDs light in sequence, then green Power LED remains on.
4. Connect the welding lead to the UPP fusion fitting(s), making sure connectors are firmly pushed onto the pins.
5. Momentarily depress the orange START button until first weld light illuminates. The first weld light comes on, then successive LEDs light up until green 100% LED is lit, showing weld is complete.
6. Disconnect welding lead from fitting. The 100% LED and Power LED remains on.
7. ALWAYS Reset for next weld by holding START button for 3 seconds. All LEDs will light in sequence, then the green power LED remains on.

Other Important Tips

- Switch off the machine during breaks and at the end of the job.
- The weld cycle can be stopped at any time by pressing the START/STOP button. This will generate an error code and you must wait for the fitting to cool before attempting to continue.
- If you have any doubt about a welded joint, UPP fittings can be welded again provided they are left to cool at ambient temperature for a minimum of one hour.

Warning  **Never re-weld a fitting that is still warm. Serious fire damage can occur and hot material may be ejected from the weld zone creating a burning hazard.**

Warning  **Power conducting elements may become exposed creating an electrical shock hazard.**

Multiple Welds

In Primary mode the EF1-110V can simultaneously weld up to three UPP fittings, provided that:

- The sum of the resistance values (circled number on UPP fittings) does not exceed 10.
- The UPP fittings are connected to the EF1-110V in series using the bridging leads provided (see photos A & B).

You can ensure that you have connected the fittings correctly and that the welds are successful by checking that all of the connected fittings get warm and that all of the indicator pins are exposed at the end of the welding time. Fusion fittings with X or no marking may NOT be welded in series.



A



B

Fault Indicators

When an error has occurred during the weld cycle that will have an effect on the success of the joint, the red warning LED on the right side of the display will light up. Also one of the “weld progress” lights will light up at the same time to show what type of fault has occurred.

Error LED	Fault Indicated	Meaning	Solution
1	Power supply failure during weld	The power supply was off at sometime during the weld	<ul style="list-style-type: none"> Check and repair power supply Check plug connection Check cables are not damaged or broken Re-weld fitting only after it is allowed to cool to ambient temperature
2	Stop button pressed during weld	Stop button was pressed	<ul style="list-style-type: none"> Re-weld fitting only after it is allowed to cool to ambient temperature for 60 minutes
3	Power supply out of limits	Supply frequency not between 45 and 65 Hz.	<ul style="list-style-type: none"> Check and rectify generator output Check mains supply
4	Ambient temperature out of range	Temperature of the EF1-110V is not between -15° C (5°F) and +45° C (113°F)	<ul style="list-style-type: none"> Allow EF1-110V and fitting to cool in the shade Wait for ambient temperature to return to range
5	No output current (open circuit)	Loose connection to terminal pin Loose contact in the welding circuit Faulty fitting Start button not depressed for long enough	<ul style="list-style-type: none"> Make sure connectors are pushed firmly on to terminal pins Check welding cable connection and continuity Replace fitting See operating sequence, step 5
6	Low output current	Resistance value of fitting is too high Too many fittings connected in series (Primary mode only) Input voltage too low	<ul style="list-style-type: none"> Use only UPP electrofusion fittings and correct welding cable Check resistance codes on fittings - do not exceed a sum total of 10 Check supply voltage
7	High output current	Regulation error in electronics	<ul style="list-style-type: none"> Switch off machine and switch on again after 10 seconds. Ensure welder is within temperature range If problem persists, return EF1-110V to supplier

The EF1-110V can be reset after a fault has been remedied by pressing and holding the START / STOP button for 3 seconds.

Maintenance

- There are no user serviceable parts inside the EF1 welding unit.
- Damaged or defective products should be returned to an approved service agent for repair or calibration.
- The EF1 welding unit should be tested for electrical safety every twelve months and in accordance with local regulations.
- Welding unit and cables should be checked for damage or defects and parts repaired or replaced prior to each use.
- The welding unit can be cleaned using a soft brush or cloth.
- After use carefully coil cables and store in the compartments provided in the carry case.
- Electrical Safety Testing “Portable Appliance Test” (PAT) should be carried out in accordance with local legislation.
- It is recommended that the welder is returned to Franklin Fueling Systems on a regular basis, at around 3 year intervals, for checking and recalibrating.

Disposal



The equipment and packaging should be sorted for environmentally friendly recycling.

IMPORTANT!

Do not dispose of this equipment into household waste.

RoHS Compliant

Directive 2005/ 95/ EC

According to the European Directive 2002/96/EC Waste Electrical and Electronic Equipment (WEEE), when no longer suitable for use, this equipment must be separately collected and sent for recycling.



According to the European Directive 2005/95/EC Restriction of Hazardous Substances (RoHS), this equipment does not contain more than the agreed levels of Lead, Cadmium, Mercury, Hexavalent Chromium, Polybrominated Biphenyl (PBB) and Polybrominated Diphenyl Ether (PBDE) flame retardants.

Declaration of Conformity

This welding unit has been designed to comply with the harmonised standards under “New Approach” directives and has been CE Marked accordingly.

The applicable standards are:

- 89/336/EEC Electromagnetic compatibility
- 73/23/EEC Low voltage equipment
- 98/37/EC Machinery Safety

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Signed on behalf of Franklin Fueling Systems



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