



Franklin Fueling Systems

EF1-230V Hand-Held Welder

Operating Manual

For use Only with UPP™ Electrofusion Components



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UPP™ welding units must never 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). Further guidelines are found in IEC 60079-10-1, "Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres"

Safety

- The EF1 is designed for usage on construction sites and meets applicable European and International safety standards. The machine should be handled with the care usually given to electrical equipment, especially during transport.
- The machine must only be used outside of hazardous areas (zones 0, 1 and 2).
- Each time it is used, check the condition of the machine, particularly the mains power cable. If any damage is discovered, contact the supplier immediately and do not use the machine.
- Check the state of the welding cables before use and replace them if there is any doubt about their condition.
- Protect the welder from getting wet.
- Always check that the power source is within the parameters shown below before using the EF1.
- Never lift or pull the machine by its power cable or the welding cables. Never disconnect welding cables by pulling the cable; always pull off the connectors.
- Never re-weld a fitting that is still warm. Serious fire or burn damage can occur and hot material may be ejected from the weld zone. **Power conducting elements may become exposed creating an electrical shock hazard.**

Liability Restrictions

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

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

Technical Specifications

| | |
|--------------------------------|--|
| Stock code _____ | EF1-230V |
| Supply voltage _____ | 230 V +/- 15% (194 V to 264 V) |
| Supply frequency _____ | 50/60 Hz (40 Hz to 70 Hz) |
| Supply power _____ | 2.8 kW / 3.5 kVA |
| Supply protection _____ | Class 1 earthed (grounded) |
| Environmental protection _____ | IP65 |
| Operating temperature _____ | -15°C (5°F) to +45°C (113°F) |
| Shipping dimensions | 460 mm (18") wide x 210 mm (8.3") deep x 210 mm (8.3") high |
| Shipping weight _____ | 3.6 kg (8 lb) |

Power Supply

Welder must be powered with:

- A quality 230 VAC, 50Hz power supply with maximum tolerance of $\pm 15\%$.
- A quality generator capable of supplying a minimum of 2.8 kW (3.5 kVA).
Note that an earth-spike (grounding rod) must be used with generators.

If used with a 110v to 230v step-up transformer follow these specifications:

- Safety Isolating transformer: 3.3 kVA minimum.
- Auto transformer: 3.3 kVa minimum.

Extension Cords/Cables

Extension cables must comply with or be equivalent to H07RN-F specifications. Cable use must comply with the following table.

| Wire Size Metric | AWG Wire Size | Maximum Length, meters | Maximum Length, feet |
|---------------------|------------------|------------------------------|-------------------------|
| 1.5 mm | 15 | 25 | 82 |
| 2.5 mm | 13 | 50 | 164 |
| 4.0 mm | 11 | 75 | 246 |

Note: All cable must be unwound from reel to prevent inductive heating effects.

Note: EF1 welding cables use special 7 pin connectors.

Parts



Application

The EF1 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 Colour | Size of Welding Pin (mm) | Current (amps) | Weld Time @ 20C (Seconds) |
|---------------------------------------|----------------------|--------------------------|----------------|---------------------------|
| Primary and Gemini Secondary fittings | 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 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 automatically recognizes the fitting when connected and applies the correct amount of energy for a successful weld.



The EF1 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 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 3.5kVA and power input must be between 194 and 264 volts at 40 to 70 Hz.

The EF1 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

- 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 required welding lead to the EF1 Welder:
PRIMARY and GEMINI SECONDARY fittings = RED (ORANGE) cable
SECONDARY fittings = GREEN cable
FUSION CHAMBER = WHITE cable
10 AMP fittings = BLACK cable
2. Connect the welding lead to the UPP™ fusion fitting(s), making sure connectors are firmly pushed onto the pins.
3. Connect the EF1 Welder to suitable 230V power supply.
4. Turn the unit ON. All LEDs light in sequence, then green Power LED remains on.
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



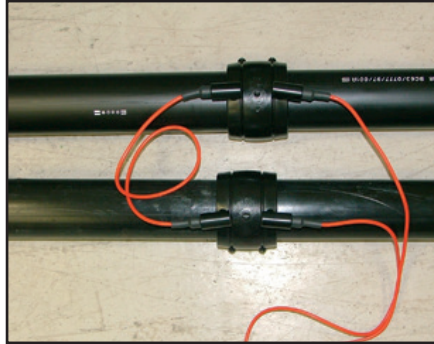
Power conducting elements may become exposed creating an electrical shock hazard.

Multiple Welds

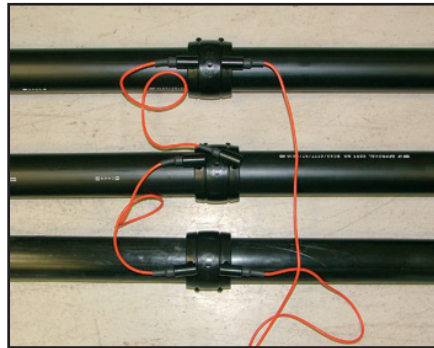
In Primary mode the EF1 can simultaneously weld up to three UPP™ fittings, provided that:

- The sum of the resistance values (circled number on UPP™ fittings) does not exceed 10.
- The UPP™ fittings are connected to the EF1 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

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.
- 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.

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 |
| 3 | Power supply out of limits | Supply frequency not between 40 and 70 Hz, or Voltage not between 194 & 264V | <ul style="list-style-type: none"> • Check and rectify generator output • Check mains supply • Make sure supply is to required specification |
| 4 | Ambient temperature out of range | Temperature of the EF1 is not between -15° C (5°F) and +45° C (113°F) | <ul style="list-style-type: none"> • Allow EF1 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 • Move generator closer and use shorter extension cord • 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 • Check extension leads being used are to specification |
| 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 to supplier |

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

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 2008/
35/ EC

According to the European Directive 2008/34/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 2008/35/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:

- 2004/108/EC Electromagnetic compatibility.
- 2006/95/EC Low voltage equipment.
- 98/37/EC Machinery safety.
- 94/62/EC Packaging and packaging waste.
- 2008/34/EC Waste electrical and electronic equipment.
- 2008/35/EC Restriction of hazardous substances.

Andrea Ticci

Signed on behalf of Franklin Fueling Systems

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