Genesis F3™ Electrofusion Processor

Genesis F3™

Operator's Guide

Genesis F3™

- Reliable and easy to use
- Splash proof and shock resistant
- Equiped with internal memory for data storage

IPEX

We build tough products for tough environments®

<u>SAFETY</u>

- Please read and understand this instruction manual before using **The *Genesis F3* ™ Electrofusion Processor.**

- Gas company safety standards and precautions should be followed at all times.

- Do not use or store **The *Genesis F3* ™ Electrofusion Processor** where volatile gas concentrations may be present.

- Only properly trained and qualified personnel should operate **The *Genesis F3* ™ Electrofusion Processor.**

- Treat electrical equipment as a potential source of ignition and follow proper practices for working in an explosive atmosphere.

- Power source and Fusion Processor must be located out of the trench.

- For protection against the risk of electric shock, connect **The *Genesis F3* ™ Electrofusion Processor** to properly grounded outlets only.

- Only use fusion information supplied by the manufacturer of the fitting.

- Under no circumstances should **The *Genesis F3* ™ Electrofusion Processor** enclosure be opened. All warranties are void if the factory seal has been broken.

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WARRANTY AND LIMITATION OF LIABILITY

1. IPEX USA LLC warrants the Genesis F3 Electrofusion Processor against defects resulting from faulty workmanship or materials for a period of one year from the date of the new unit calibration. Any Processor repaired or replaced pursuant to this warranty within the original warranty period will be warranted for the remainder of the original warranty period. IPEX USA LLC also warrants the calibration and repair services it provides on the Processor against defects resulting from faulty workmanship for a period of 60 days upon which the calibration or repair services are complete. These warranties are subject to the limitations, exceptions, disclaimers and conditions stipulated hereunder or posted, updated or amended on IPEX USA LLC's website with respect to the Genesis F3 Electrofusion Processor.

2. If IPEX USA LLC receives notice of such defects during the warranty period, IPEX USA LLC will repair or replace, free of charge, including ground shipping charges, any Processors or Services which are found to be defective in workmanship or material, provided that the following conditions are met:

   a) IPEX USA LLC is notified in writing of such defect immediately upon discovery of same and the defective Processor is promptly returned to IPEX USA LLC (at the location designated by IPEX USA LLC for those purposes), freight prepaid. Claimant must provide documentary evidence of failure, as well as the components that are alleged to have failed and agree to inspection by IPEX USA LLC of the circumstances in which the alleged defective Processor(s) was/(were) used.

   b) the Processor has been maintained, calibrated, serviced and used in full compliance with this Manual and other technical information or literature provided by IPEX USA LLC from time to time.

   c) the Processor has not been altered or modified after leaving IPEX USA LLC's premises, shows no evidence of disassembly or tampering, is not and has not been subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair and the defect is not due, without limitation, to faulty installation, maintenance, calibration or use, improper site preparation or maintenance, ordinary wear and tear, corrosion, acts of nature such as earthquakes, fire, flood or lightning or any other event of force majeure.

   d) IPEX USA LLC does not warrant that the operation of the Genesis F3 Electrofusion Processor will be uninterrupted or error free.

   e) Replacement Processor may be either new or like-new.

3. IPEX USA LLC disclaims any liability or responsibility:

   a) for labor, materials and/or other expenses required to replace the defective Processor or Service or to repair any damage resulting from the use thereof.

   b) for loss or damage resulting from failure to abide by manufacturer's warnings, safety instructions or other precautionary guidelines.

4. ANY CLAIM OF LIABILITY ASSERTED AGAINST IPEX USA LLC WHETHER IN CONTRACT OR IN TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, WITH RESPECT TO OR ARISING OUT OF THE SALE, DELIVERY, INSTALLATION, REPAIR OR USE OF ANY PROCESSORS OR SERVICES SOLD BY IPEX USA LLC SHALL NOT EXCEED THE PURCHASE PRICE OF THE

PROCESSORS OR SERVICES FOUND TO BE DEFECTIVE. It is the responsibility of the owner to obtain and pay for emergency repairs.

5.   IPEX USA LLC'S LIABILITY IN RESPECT TO THE SALE IS STRICTLY LIMITED TO THE REPLACEMENT OF PROCESSORS OR SERVICES AS HEREINBEFORE SPECIFIED AND IPEX USA LLC SHALL NOT, IN ANY EVENT, BE LIABLE FOR ANY DAMAGES WHETHER FOR THE LOSS OF USE OR BUSINESS INTERRUPTION OR ANY OTHER CLAIM FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR PUNITIVE DAMAGES.

6.   THE ABOVE MENTIONED WARRANTIES ARE THE SOLE AND EXCLUSIVE WARRANTIES TO ANY PURCHASER, CUSTOMER OR USER OF THE PROCESSOR OR SERVICES. THERE IS NO WARRANTY, CONDITION OR REPRESENTATION OF ANY NATURE WHATSOEVER, EXPRESSED OR IMPLIED, BY STATUTE OR OTHERWISE, EXCEPT AS HEREIN CONTAINED AND IPEX USA LLC DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS OF ITS PROCESSORS OR SERVICES FOR A SPECIAL PURPOSE OR OTHER WARRANTY OF QUALITY.

INTRODUCTION

Preface

The information contained herein is the technical data and specifications for IPEX USA LLC's *Genesis F3* ™ **Electrofusion Processor**.

This publication was written to assist trained personnel in the proper procedures and operating functions of **The** *Genesis F3* ™ **Electrofusion Processor.**

Operation of IPEX USA LLC equipment should only be performed by trained and qualified personnel.

The technical data and advice contained herein is based upon tests and information believed to be reliable. However, the user should not rely upon it absolutely for specific applications. All data is given and accepted at the users risk and confirmation of its validity and suitability in particular cases should be obtained independently. IPEX USA LLC makes no guarantee of results and assumes no obligation or liability in connection with its advice. The integrity of the piping system is the ultimate responsibility of the installer. This publication is not to be taken as a license to operate under, or recommendation to infringe any patents.

Features

The *Genesis F3* ™ **Electrofusion Processor** is a reliable, easy-to-use, rugged tool designed to withstand conditions found at typical construction sites throughout the world. To obtain service or additional products, please contact IPEX USA LLC at (800) 463-9572 or visit us on the World Wide Web at **www.ipexamerica.com**.

The *Genesis F3* ™ **Electrofusion Processor** can be operated from any AC power source meeting the input power requirements listed in the *Specifications* section on page 7.

The *Genesis F3* ™ **Electrofusion Processor** is splash proof and highly shock resistant. The processor can fuse all manufacturers' fittings at voltages ranging from 8 to 48 volts. The fitting connectors are the 90 degree non-rotating type.

The *Genesis F3* ™ **Electrofusion Processor** is most efficiently and reliably operated in the barcode mode; however it can be operated in a variety of manual modes and can fuse Resistor ID fittings. **The** *Genesis F3* ™ **Electrofusion Processor** has an intuitive user interface and requires minimal operator training.

The *Genesis F3* ™ **Electrofusion Processor** is equipped with internal memory for data storage and can be downloaded to determine installation conditions and fusion cycle status.

Specifications

Parameter	Value
Supply Voltage	97 VAC to 150 VAC
Supply Frequency	47 Hz to 70 Hz
Supply Waveform	Sine Wave or Square Wave
Maximum Supply Current	30 Amps at 60 Amps Output (120VAC)
Output Voltage	8 VAC to 48 VAC +/- 1.5%
Output Current	4 AAC to 60 AAC +/- 1.5% (80 AAC @ 42 VAC output)
Operating Temperature Range	0°F to 140°F
Operating Modes	Barcode, Manual, Manual Barcode, Resistor ID
Barcode Readability without Leads Attached	YES
Output Cable Length	12 feet
Input Cable Length	12 feet
Fusion Information Storage	1000 Fusions
Type A USB Port	USB A type connector for attaching a USB flash drive to download fusion data.
Type B USB Port	USB B type connector for attaching the AutoCal® field calibration system.
Languages	English/Spanish
Fitting Adapters	90 degree non-rotating
Environmental Protection	IP54 Splash-Proof
Calibration Interval	3 Years
Warranty	1 Year
Scanning	Interchangeable Smart Scan/Smart Scan with GPS
GPS	Optional
IEC Protection Class	Class 1 Grounded
Calibration/Service	Field calibration capable
	This device is fully compatible with the AutoCal® field calibration system.

Descriptions of Controls

NOTES

1   References to controls in this section are displayed exactly as they appear throughout the remainder of this document.

2   The **START button** may mean START, CONTINUE, OK or SAVE depending upon the context of the operation being performed at the time.

3   The **STOP button** may mean STOP, RESET or CANCEL depending upon the context of the operation being performed at the time.

4   The **UP button** and **DOWN button** are used to scroll through the various menus. These buttons should be used when the processor menu displays +/- selection options. (UP button for "+"; DOWN button for "-")

Carrying Case

Rugged plastic case with carrying handles CLOSED

Rugged plastic case with carrying handles OPEN

Faceplate View

- 4X20 LCD Display
- Display and Replaceable Shield
- STOP button
- UP button
- DOWN-button
- START button

Left Side

- Fuse
- USB Type A Port
- Emergency STOP
- USB Type B Port
- Output Cable
- Input Cable

Output Cable Options

- ID Resistor End
- 90 Degree End
- Temperature Sensor
- Barcode Wand/SMART Scanner
- Output Cable

Fitting Adapter

- 4.0mm Pin
- 4.7mm Pin
- 4.7mm 90 degree with ID pin
- 4.7mm 90 degree without ID pin.

Scanner Options

SMART Scanner

Pen Wand
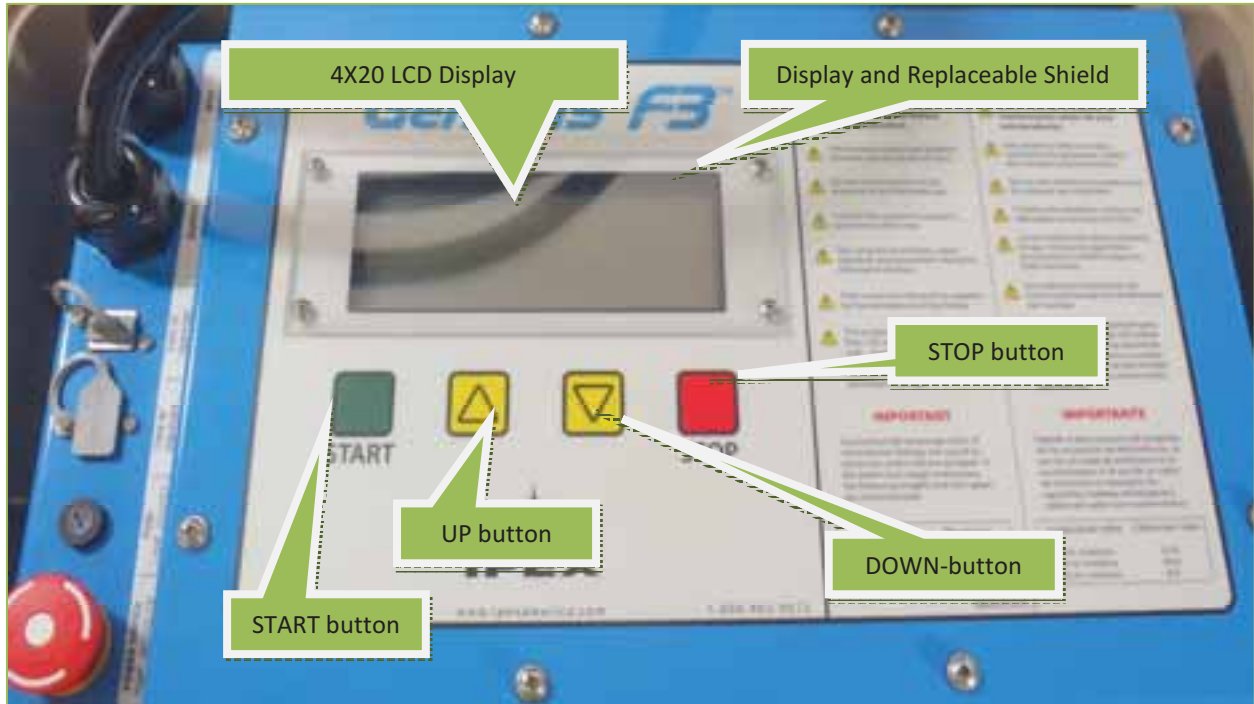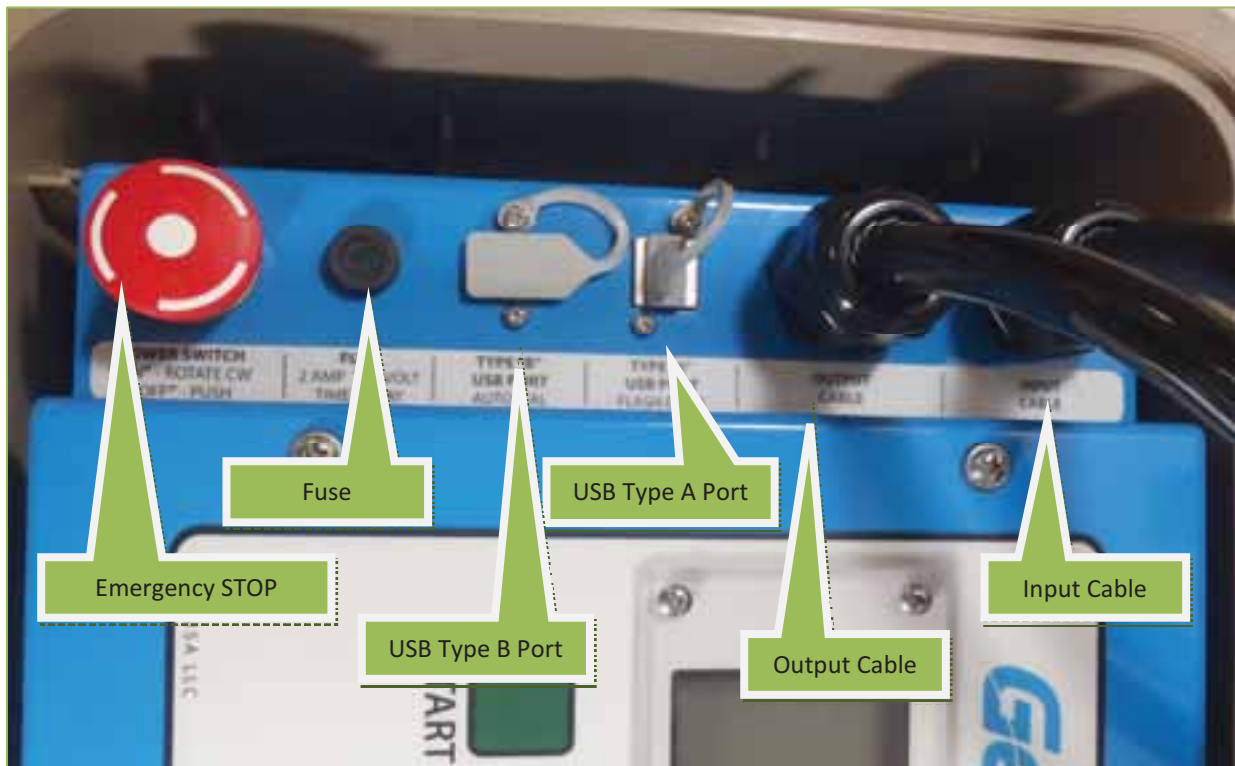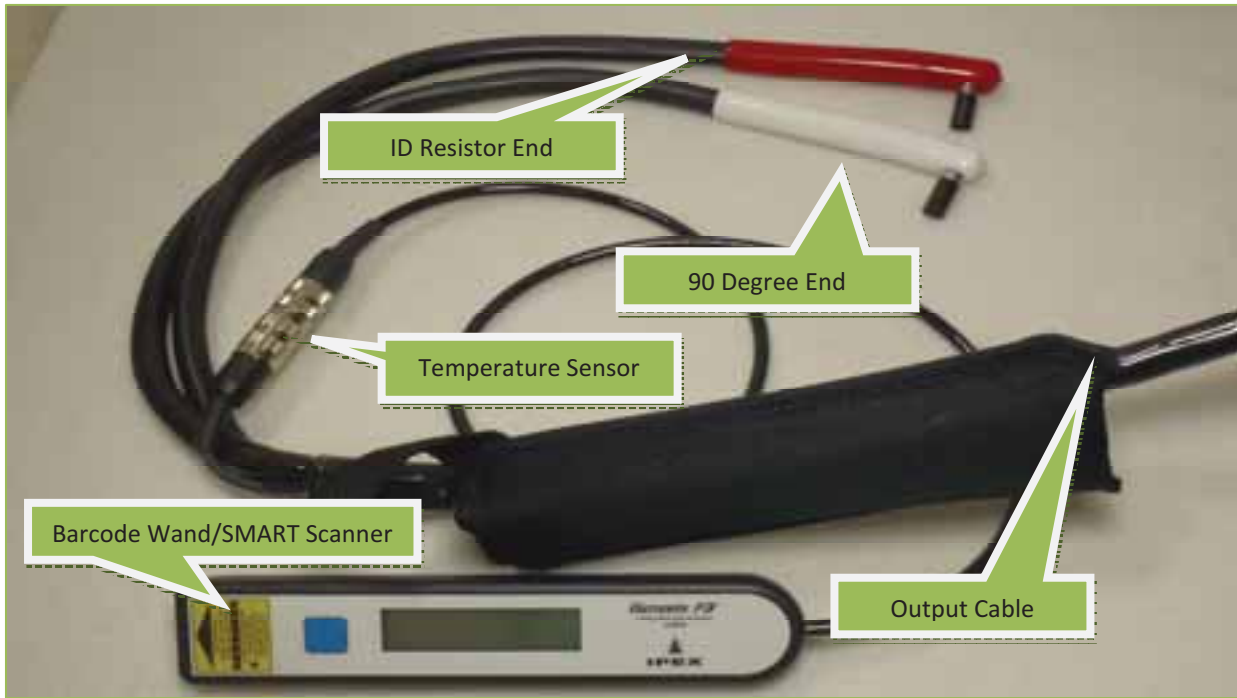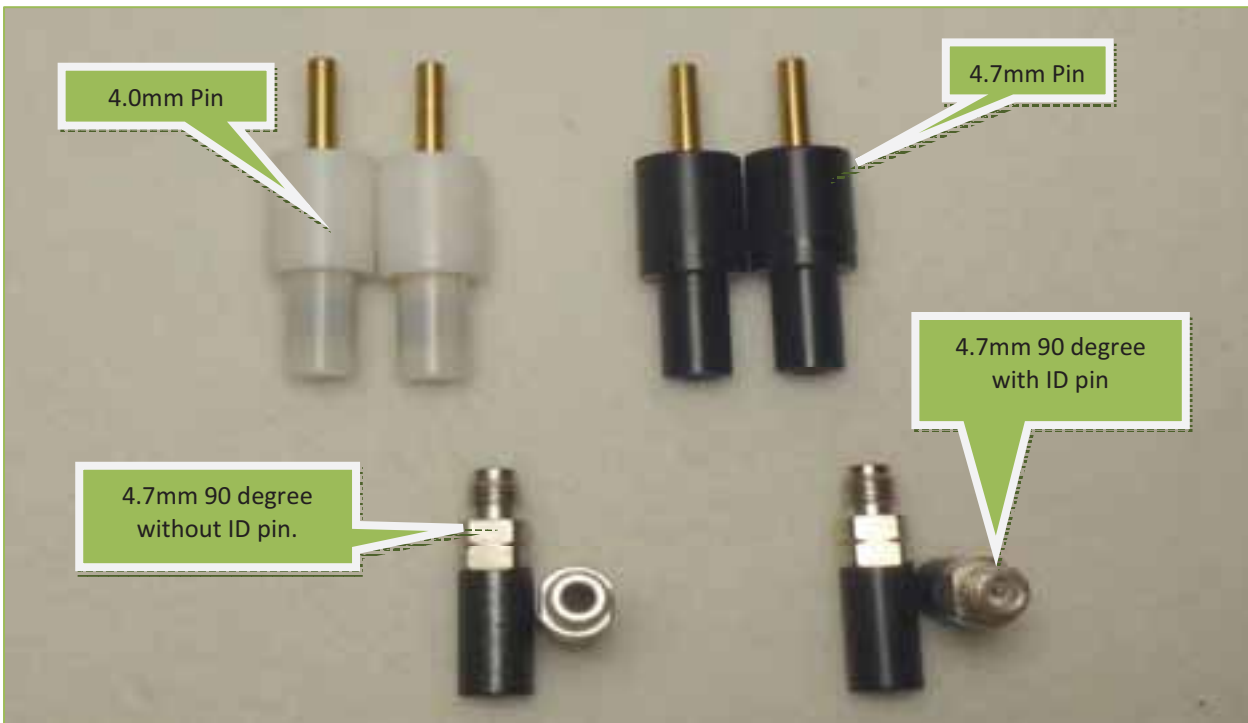
Customer Responsibilities

The $Genesis\ F3$ ™ **Electrofusion Processor** is a reliable, easy-to-use, rugged tool designed to withstand the conditions found at construction sites around the world. With proper care, the unit will perform for many years.

There are, however, some general guidelines that should be followed to extend the life of the unit and keep it in warranty.

1. **The $Genesis\ F3$ ™ Electrofusion Processor** is splash resistant, *NOT WATERPROOF*. It should be stored in a clean, dry environment at a temperature between 0-140ºF. *DO NOT STORE THE UNIT OUTSIDE. DO NOT WASH THE UNIT WITH A HOSE.*

2. The enclosure is very durable and shock resistant; however, do not subject the processor to any unnecessary shocks or stresses including but not limited to:
    * Tossing the processor into or out of a vehicle
    * Dropping the processor
    * Dragging the processor by the leads

3. Subscribe to the recommended calibration service offered by IPEX USA LLC.

The $Genesis\ F3$ ™ **Electrofusion Processor** will provide the proper outputs for a complete fusion based on the inputs received from the scanned barcode (in Barcode mode), from the fitting itself (in Resistor ID mode) or from the operator (in one of the alternate fusion modes). Whenever possible, the Barcode mode should be used.

Always scan the fitting manufacturers' barcode affixed directly to the fitting about to be fused. If this barcode is damaged to the point it cannot be scanned, use the barcode from an identical fitting made by the same manufacturer.

UNDER NO CIRCUMSTANCES SHOULD THE BARCODE FROM A SIMILAR FITTING BE USED.

Always verify the voltage and time displayed on the LCD is the same as the value specified by the fitting manufacturer. In many cases these values are printed on a tag affixed to the fitting, however, this is not always true. Remember that manual temperature compensation may be required when fusing fittings in manual mode.

When in doubt, always check the fusion information with data supplied from the fitting manufacturer.

Service Recommendations

Customer Maintenance

There are a few simple services that can be performed by the user that will help ensure proper operation.

1. Keep the area around the Temperature Sensor clean and free of obstructions by wiping with a soft dry towel. This is a critical area to keep clean, as dirt will affect the ambient temperature reading. The temperature reading is used to compensate fusion times based on the ambient temperature during a barcode fusion. If this sensor is reading incorrectly, fusion times may be affected and the integrity of the fusion may be compromised.

2. Make sure the fitting adapters are clean and properly attached to the output cable. Failure to do so may result in an improper output applied to the fitting.

3. Insure that power sources are appropriately rated and operating at the manufacturer's specified capacity.

Proper care of the Processor and **Output Cable** will greatly extend the life of the *Genesis F3* ™ **Electrofusion Processor** and will help reduce service times and costs.

Factory Service

It is strongly recommended that each unit be calibrated at least once every 3 years. This will help ensure that **The** *Genesis F3* ™ **Electrofusion Processor** is in proper calibration and should enable any potential problems to be identified early.

When the calibration period has expired the unit will display the message, "**Calibration Required**", informing the user that calibration date has past. This will not prevent the processor from performing fusions; however, the unit should be calibrated as soon as possible for calibration.

THE CORRECT OUTPUT VOLTAGE CANNOT BE ASSURED IF THE PROCESSOR IS NOT CALIBRATED AT LEAST ONCE EVERY 3 YEARS.

There are two options for calibrating your *Genesis F3* ™ **Electrofusion Processor:**

1. Send the processor in to an IPEX USA LLC service center and let our technicians do it. This is the recommended method and will help ensure the maximum service life of the processor.

2. Rent one of our field calibration systems and perform as many calibrations as you would like at your facility and at your convenience.

Call (800) 463-9572 to make arrangements for service and to obtain an RMA number for the return. Every effort will be made to return Processors within 2 business days.

Consult your carrier for the proper method of packaging the unit for return shipments.

Always insure the package for the full replacement value.

Keep in mind that most carriers will not honor insurance claims if the product is not shipped in accordance with their guidelines.

IPEX USA LLC is not responsible for damage caused in shipping.

GENERAL OPERATION

Modes of Operation

The *Genesis F3* ™ **Electrofusion Processor** has several modes of operation.

Barcode Mode - infers that fusion parameters are input into the processor by scanning the barcode label. When a label is scanned at the appropriate prompt, the processor deciphers fusion parameters from the barcode value. Barcode values typically indicate the following fitting details: manufacturer, type, size, energy (voltage), fusion time, cool time, resistance, tolerance, and compensation factors.

Resistor ID Mode - infers that fusion time is specified by measuring the value of a resistor molded into the fitting and decoding that value into a time. This mode is only supported by a few fitting manufacturers.

Manual Barcode Mode – infers that the fusion parameters are obtained from a 24 digit barcode number that the user manually inputs from the keypad.

Manual Mode - infers that the fusion voltage and time are obtained directly from the user at the time of the fusion. *Manual mode should only be used when the barcode is malfunctioning or unavailable*. In this mode, it is difficult to insure the proper implementation of time/temperature compensation for fittings requiring this feature. Since compensation factors vary for different fitting types and manufacturers, the fitting manufacturer should be consulted to verify proper fusion time, voltage, and cooling time.

Quick Start

This section shows a brief summary of the steps needed to perform a fusion in each one of the available modes. Before starting any fusion:

1. Be sure the generator is in high speed manual mode.
2. Turn the processor OFF.
3. Plug the processor into the 30 amp outlet of the power supply.
4. Turn the processor ON.
5. Enter Operator ID if required.
6. The processor is now in the CONECT FITTING SCREEN. Perform the following steps based on the type of fusion you are performing.

Barcode	Barcode Scan First	ID Resistor	Manual Barcode	Manual
	Scan the barcode.		Connect the Fitting.	Connect the Fitting.
Connect the Fitting. Put the White lead on the ID pin.	Connect the Fitting. Put the White lead on the ID pin.	Connect the Fitting. Put the Red lead on the ID pin.	Press **UP/Down Buttons** at the same time.	Press **UP/Down Buttons** at the same time.
			Select Manual Barcode Menu Option.	Select Manual Menu Option.
Scan the barcode.			Enter the 24 digit barcode.	Enter the fusion voltage and time.

Now after the mode specific operations are complete:

1. Verify the fusion parameters are correct per the fitting manufacturer's recommendations for the current conditions.
2. Verify the setup is completed properly based on the fitting manufacturer's procedures.
3. Press **the START button**.

Power Up

Start by pressing the **Emergency Stop Switch** to be sure the processor is off before plugging it into the generator.

Next, start the generator. Be sure that the generator is running smoothly in the high speed manual mode before plugging in **The *Genesis F3* ™ Electrofusion Processor**. It is strongly recommended that **The *Genesis F3* ™ Electrofusion Processor** is the only device being powered from the generator. Do not use an extension cord if it is at all possible. If an extension cord must be used, see page 37 for guidelines on selecting an appropriately sized cord.

Plug the 30 Amp twist lock into the appropriately sized receptacle on the generator. Using a receptacle with a rating of less than 30 amps may cause generator breakers to trip when fusing larger couplings.

Rotate the **Emergency Stop Switch** clockwise to turn the processor on.

After the Processor has been turned on, start-up screens similar to the following will be displayed one after another.

```
INTERNAL SELF TEST
 VER:1.1.7 SN:0123
CAL DUE – 05/11/2014
        ADC
```

```
INTERNAL SELF TEST
    GENESIS F3
CAL DUE – 10/01/2010
       PASSED
```

After INTERNAL SELF TEST, if the Processor is equipped, the TRACEABILITY SCREEN will be displayed. If this screen appears see page 32 for instructions on how to enter the data. After the traceability data is entered the Processor will display the CONNECT FITTING SCREEN. An example of the CONNECT FITTING screen is shown below.

```
  CONNECT FITTING


Temperature:  +75° F
Genn:     120V 60.0Hz
```
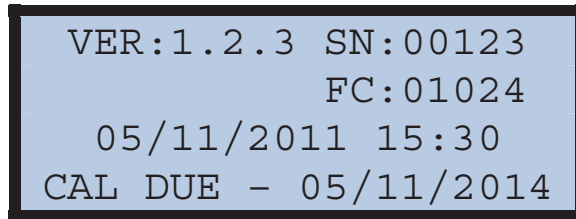
The second line indicates the ambient temperature the Processor is measuring and will be used to modify the fusion time if required by the fitting manufacturer.

Check to make sure that the temperature is reasonable. If the Processor has been in direct sunlight or has been moved from a hot or cold environment the temperature may not be correct. If the temperature indicated is not correct, allow the Processor time to adapt to the correct temperature.

The last line indicates the generator status. The voltage and the frequency are displayed. It is important that the voltage measurement is within the allowable range and the frequency is stable.

Pressing and holding down the **UP Button** while the Processor is at the CONNECT FITTING SCREEN will show a screen similar to the following.

```
VER:1.2.3 SN:00123
            FC:01024
   05/11/2011 15:30
CAL DUE - 05/11/2014
```

This screen shows the following information:
- Software version of the Processor (In this case version 1.2.3).
- Processor serial number (In this case, 00123).
- The number of fusions the Processor has done (In this case, 1024).
- The Date and time (In this case May 11, 2011 at 3:30 PM)
- The date the Processor will be due for calibration (In this case it is due May 11, 2014)

Releasing the **UP Button** returns the user to the CONNECT FITTING SCREEN.

To begin the fusion process follow the instructions in the following section that corresponds to the fusion mode that you wish to use.

Barcode Fusions

When beginning a Barcode fusion, start from the CONNECT FITTING SCREEN.

Connect the **Output Leads** to the fitting.

NOTE:
 If performing a barcode fusion on a fitting with Resistor ID capabilities, be sure to connect the white lead to the ID pin on the fitting or the processor will bypass the barcode mode and try to perform a Resistor ID fusion.

When the **Output Leads** are connected to the fitting, the processor will verify the fitting resistance and display the following screen.

```
      VERIFYING
     RESISTANCE
```
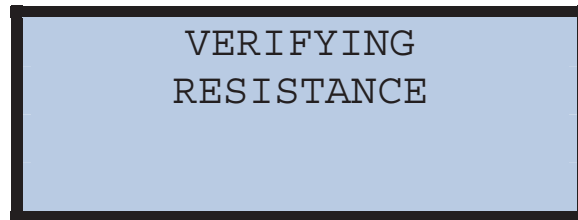
Press and hold the **UP Button** if you wish to view the resistance measurement made by the processor.

```
     SCAN BARCODE
```

Scan the barcode from the fitting attached to the processor. Remove the Barcode Wand from the protective sheath. See page 28 for some scanning techniques with the various barcode wand options.

When possible, use the barcode affixed to the fitting about to be fused. If this is not possible, use a barcode from an identical fitting made by the same manufacturer to insure that the fusion will be completed properly.

UNDER NO CIRCUMSTANCES SHOULD A BARCODE FROM A SIMMILAR FITTING BE USED.

NOTE:
 If the barcode wand is inoperative, please consult the section on page 21 for details about how a fusion can be completed without using the barcode wand.

Once the barcode has been successfully scanned, The *Genesis F3* ™ **Electrofusion Processor** will display a screen similar to the following.

```
     VERIFY SETUP
     IPEX 4" COUPL
     40.0V  330 sec
      PRESS START
```
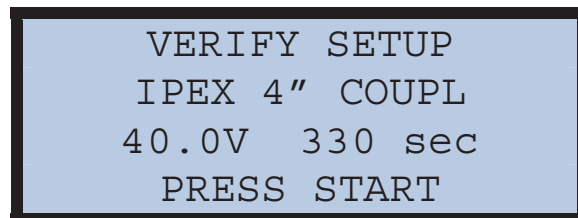
This screen shows the following information:

- The fitting type (IPEX 4" Coupler).
- The requested output (40.0 Volts)
- The total fusion time in seconds (330 sec in this case).

The processor will BEEP once per second and the text "PRESS START" on the bottom line of the display will flash on and off.

This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START button** to begin the fusion.

BE SURE THAT THE DATA DISPLAYED IS CORRECT BEFORE YOU CONTINUE.

See page 24 for instructions on monitoring the progress of a fusion.

Scan First

Sometimes it may be necessary to scan the fitting barcode before connecting the fitting. In this case, start from the CONNECT FITTING screen as above and scan the barcode. A screen similar to the following will be displayed.

```
    VERIFY SETUP
   IPEX 4" COUPL
  40.0V  330 sec
  CONNECT FITTING
```

This screen is identical to the one shown earlier. It displays the fitting information decoded from the barcode scanned. The only difference is that line 4 requests that the fitting be connected. This text will flash on and off about once every second and the processor will BEEP.

Once the fitting is connected, the resistance will be verified.

```
     VERIFYING
     RESISTANCE
```

After the verification, The *Genesis F3* ™ **Electrofusion Processor** will display a screen similar to the following.

```
    VERIFY SETUP
   IPEX 4" COUPL
  40.0V  330 sec
    PRESS START
```

The processor will BEEP once per second ant the text "PRESS START" on the bottom line of the display will flash on and off.

This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START Button** to begin the fusion.

BE SURE THAT THE DATA DISPLAYED IS CORRECT BEFORE YOU CONTINUE.

See page 24 for instructions on monitoring the progress of a fusion.

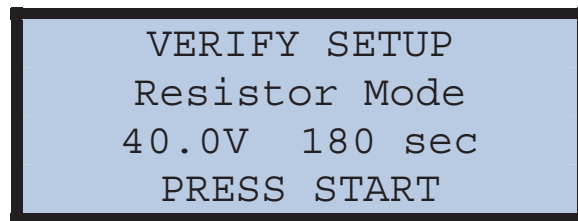# Resistor ID Mode Fusions

When beginning a Resistor ID Mode fusion, start from the CONNECT FITTING SCREEN.

Connect the **Output Leads** to the fitting in the proper orientation (the red lead goes on the ID pin on the fitting). When the **Output Leads** are connected to the fitting, the processor will verify the fitting resistance and display the following screen.

```
      VERIFYING
      RESISTANCE
```

Press and hold the **UP Button** if you wish to view the resistance measurement made by the processor. If a valid Resistor Mode fitting is detected, a screen similar to the following will be displayed.

```
     VERIFY SETUP
     Resistor Mode
    40.0V   180 sec
     PRESS START
```

This screen shows the following information:
- The current fusion mode (Resistor ID in this case).
- The requested output (40.0 Volts)
- The fusion time in minutes and seconds (180 sec in this case).

The processor will BEEP once per second and the text "PRESS START" on the bottom line of the display will flash on and off.

This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START Button** to begin the fusion.

BE SURE THAT THE DATA DISPLAYED IS CORRECT BEFORE YOU CONTINUE.

See page 24 for instructions on monitoring the progress of a fusion.

If a valid Resistor Mode fitting is not detected, **The *Genesis F3* ™ Electrofusion Processor** will default to a barcode fusion and will prompt the user to scan a barcode. See page 17 for instructions explaining how to perform a barcode fusion.

If a Resistor Mode fusion does not begin and **The *Genesis F3* ™ Electrofusion Processor** as well as the fitting to be fused supports this mode, try switching the **Output Leads** on the fitting. They are polarity sensitive. The red end must attach to the ID pin on the fitting.

Alternate Fusion Methods

Whenever possible, the Barcode method of fusing should be used. The alternate fusion methods described in this section are provided for emergency use only.

THE ALTERNATE FUSION METHODS SHOULD ONLY BE USED BY PROPERLY TRAINED INDIVIDUALS. IMPROPER USE OF ONE OF THE ALTERNATE FUSION METHODS WILL RESULT IN AN IMPROPER FUSION.

The Alternate fusion selection screen can be entered by holding the **UP Button** and the **DOWN Button** down at the same time when the processor is displaying the SCAN BARCODE screen.

The Alternate fusion selection screen looks like the following:

```
        SELECT METHOD
1 Manual Barcode
2 Manual
```
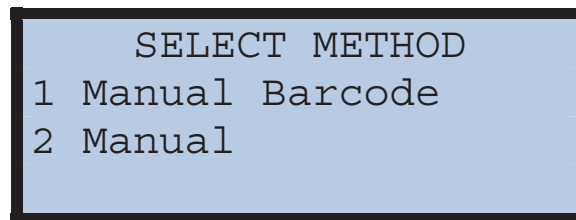
Select the desired method by using the **UP Button** and the **DOWN Button**. When the desired method is highlighted, press the **START button**.
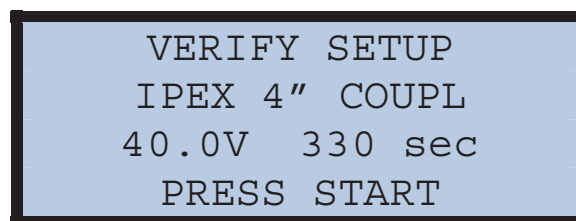
Manual Barcode Entry

While in the manual barcode mode, the user can manually input the numbers from the barcode attached to the fitting to be fused. The following screen will be displayed:

```
   ENTER BARCODE DATA
      000000000000
      000000000000
```
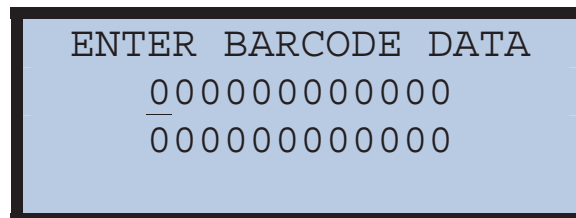
The cursor will begin under the first digit of the barcode. Enter the data from the barcode attached to the fitting to be fused using the keypad *(see page 32)*. Once the data has been entered, press the **START Button** one last time to decode the information.

If no errors were encountered, The *Genesis F3* ™ **Electrofusion Processor** will display a screen similar to the following.

```
     VERIFY SETUP
   IPEX 4" COUPL
   40.0V  330 sec
    PRESS START
```

The processor will BEEP once per second and the text "PRESS START" on the bottom line of the display will flash on and off.

This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START Button** to begin the fusion.

BE SURE THAT THE DATA DISPLAYED IS CORRECT BEFORE YOU CONTINUE.

See page 24 for instructions on monitoring the progress of a fusion.

If errors were encountered while decoding the barcode number that was manually entered, you will receive an error and will be forced to check the number and reenter it.

Manual Data Entry

THE MANUAL FUSION METHOD SHOULD ONLY BE USED BY EXPERT OPERATORS WITH THE ASSISTANCE OF THE FITTING MANUFACTURER.

NOTE:

The *Genesis F3* ™ **Electrofusion Processor** will provide the appropriate outputs for a complete fusion based on the inputs entered by the operator. Therefore, be sure to enter the information *EXACTLY* as specified by the fitting manufacturer.

When entering the manual Fusion mode, the following screen will be displayed:

```
ENTER FUSION VOLTAGE


   40.0 Volts
```
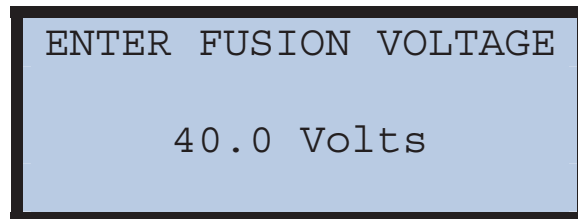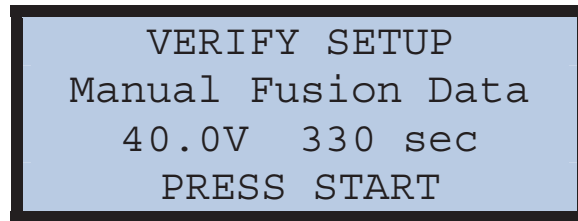
Enter the voltage by using the **UP Button** and **DOWN Button** to increment and decrement the value. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired output level is displayed, press the **START Button**. The following screen will be displayed and you will be able to enter the fusion time in minutes and seconds.

```
ENTER FUSION TIME


     0 sec
Temperature: +75°F
```
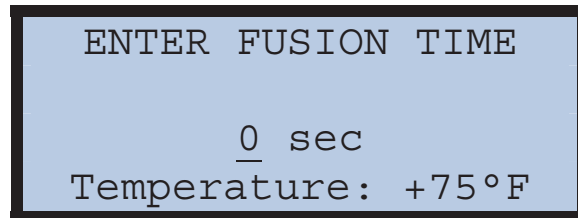
Enter the number of minutes to fuse using the **UP Button** and **DOWN Button** to increment and decrement the current value by 1 second. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired time is displayed, press the **START Button**.

Once the data has been successfully entered, The *Genesis F3* ™ **Electrofusion Processor** will display a screen similar to the following.

```
    VERIFY SETUP
 Manual Fusion Data
  40.0V   330 sec
    PRESS START
```

The processor will BEEP once per second and the text "PRESS START" on the bottom line of the display will flash on and off.

This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START Button** to begin the fusion.

BE SURE THAT THE DATA DISPLAYED IS CORRECT BEFORE YOU CONTINUE.

See page 24 for instructions on monitoring the progress of a fusion.

Monitoring a Fusions Progress

Once the **START Button** is pressed the fusion process will begin. The fusion process begins with a fitting resistance verification. During the verification process, The $Genesis\ F3$ ™ **Electrofusion Processor** will display a screen similar to the following.

```
VERIFYING FUSION
   PARAMETERS
```

When operating in Resistor ID, or Manual mode, the resistance check is used simply to verify that the fitting is still attached. In any other mode, this resistance check is to be sure that the fitting connected matches the resistance of the fitting described in the fusion parameters. Although many fittings have similar resistances and this check is not fool-proof, it will help to ensure that the correct fitting is attached.

If equipped with the optional GPS, the processor will attempt to read the GPS coordinates now. A screen similar to the following will be displayed.

```
Waiting for GPS Data
   STOP TO IGNORE
```
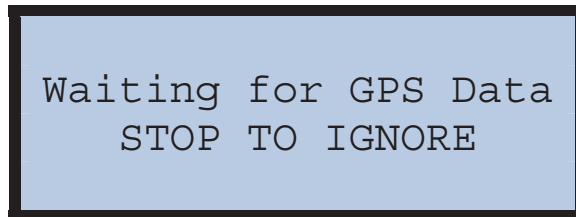
Once the coordinates are obtained, the fusion will proceed normally. To ignore the GPS data and force the fusion to begin, press the **STOP Button**. If the GPS screen is bypassed, *NO GPS DATA WILL BE STORED IN THE PROCESSOR'S MEMORY*.

As the fusion proceeds, the following screen will be displayed.
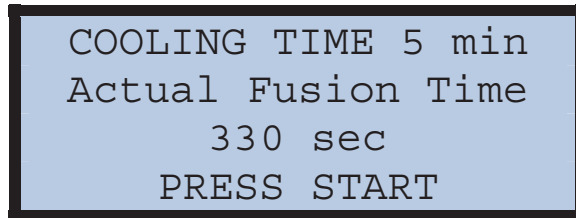
```
FUSION NUMBER: 01025

     323 sec
```
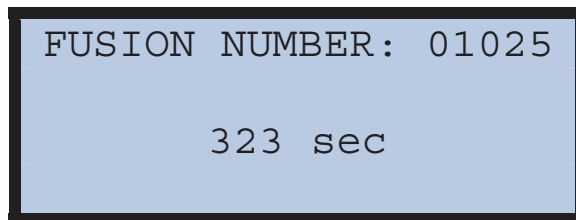
This screen displays the number of the current fusion as well as the time remaining (323 seconds in this case). If you desire to see more detailed information, press and hold the **UP Button** to display the following detailed fusion information screen.

```
FUSION NUMBER: 01025
      40.0V 15.2A
Energy:        0.085Ah
Genn: 118V 60.0Hz S
```
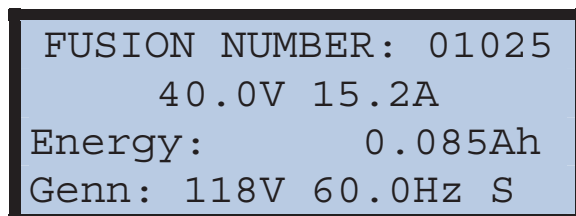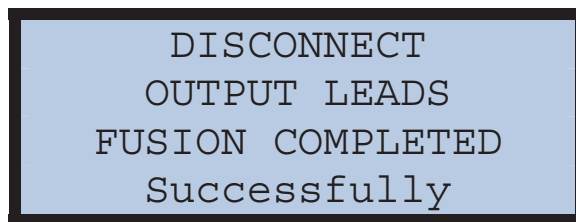
This screen displays the following information

- The most recently measured voltage and current outputs of the processor.
- The total energy expended during this fusion, in amp-hours (In this case 0.085 amp-hours.) Note: This number increases during the fusion process as energy is expended.
- The present measured voltage of the generator (In this case 118 volts).
- The current generator frequency. This number should remain relatively constant throughout the fusion.

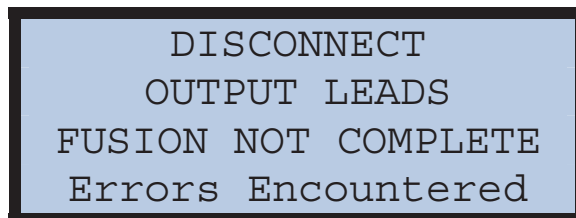When the fusion is complete, the following screen will be displayed.

```
COOLING TIME 5 min
Actual Fusion Time
     330 sec
   PRESS START
```

The first line indicates the cooling time if specified. The third line indicates the actual amount of time that the fitting was fused. Press the **START Button** to continue. The following screen will be displayed if no errors were detected.

```
   DISCONNECT
  OUTPUT LEADS
FUSION COMPLETED
  Successfully
```

If errors were encountered during the fusion process a screen similar to the following will be displayed (this screen will be displayed after the error message screen).

```
    DISCONNECT
   OUTPUT LEADS
FUSION NOT COMPLETE
 Errors Encountered
```

Either way, the Processor prompts the user to disconnect the leads and will not recognize any inputs until this task is complete.

After the output leads are disconnected, the *Genesis F3* ™ **Electrofusion Processor** will return to the CONNECT FITTING SCREEN and is ready to accept information for the next fusion.

NOTE
 If traceability is enabled, remember that the Operator ID Codes entered previously will remain attached to any additional fusions until the power is shut off or until the information is changed by the operator.
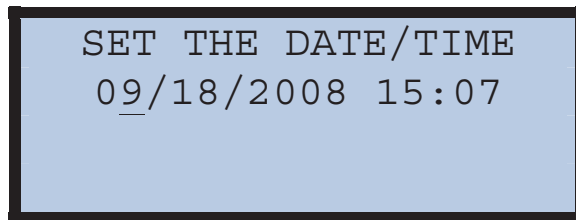
USER MENUS

Basic User Menu

The Basic User Menu is accessed by holding the **UP Button** when the unit is first powered up. The following example shows the options that are available in the Basic User Menu.

```
   GENERAL SETTINGS
1 Set Date/Time
2 Disp Temp in °F
3 English
4 Smart Scanner YES
```
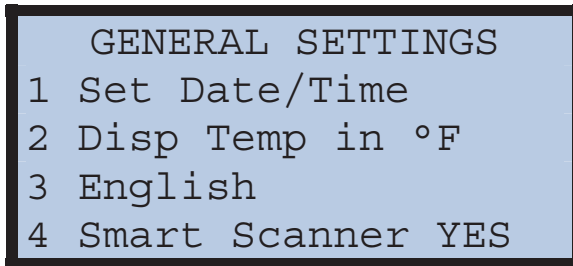
Use the **UP/DOWN Buttons** to highlight the desired option, press **START Button** to access the option. Press the **STOP Button** to return to normal unit operation.

Setting the Date and Time

The following screen will be displayed when setting the date and the time

```
SET THE DATE/TIME
 09/18/2008 15:07
```

Enter the correct date *(see page 32)* using the MM/DD/YYYY format and the correct time using the 24 hour (military) format. Pressing the **START Button** to save the information entered and return to the Basic User Menu.

Setting the Temperature Units

When option 2 is highlighted, pressing the **START Button** will toggle the default temperature units setting between ºF and ºC.

Setting the Language

When option 3 is highlighted, pressing the **START Button** will toggle the default language between English Spanish and French.

SMART Wand

When option 4 is highlighted, pressing the **START button** will toggle the SMART Scanner activation flag. A value of YES enables the display and the remote button functionality of the SMART Scanner. A value of NO disables this functionality. The SMART Scanner will scan a barcode with either setting.

Advanced User Menu

NONE OF THE SETTINGS IN THE ADVANCED USER MENU SHOULD BE ADJUSTED WITHOUT SPECIFIC INSTRUCTIONS FROM THE FACTORY OR THE FITTING MANUFACTURER

The Advanced User Menu is accessed by holding the **DOWN Button** when the unit is first powered up. You will be prompted for a code that must be entered before proceeding. The following example shows the options that are available in the Advanced User Menu once the correct code has been entered.

```
 ADVANCED SETTINGS
1 Short Stab Detect
2 Soft Start
3 Profiles
4 Operator ID  On
```
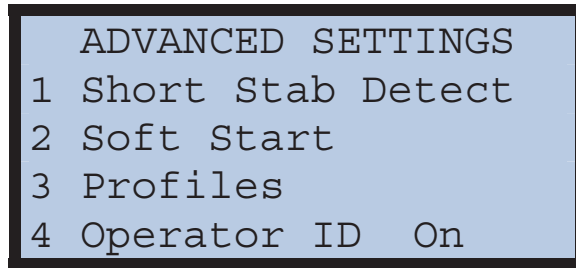
Use the **UP/DOWN Buttons** to highlight the desired option, press the **START Button** to access the option. Press the **STOP Button** to return to normal unit operation.

Short Stab Detect

The short stab detection is accomplished by tracking the lowest output current during the fusion and looking for a rise greater than an established percentage. This option allows the user to set the percent rise in current above which an error will be generated.

BECAUSE THE SHORT STAB IS MEASURED INDIRECTLY THROUGH CURRENT, AUTOMATIC DETECTION OF A SHORT STAB IS NOT 100% GUARANTEED.

PROPER ASSEMBLY TECHNIQUES ARE THE RESPONSIBILITY OF THE OPERATOR

Soft Start

The soft start settings allow the user to fine-tune the fusion start-up to accommodate weak or marginal power supplies.

Profiles

The profiles setting currently has no function. The processor will beep twice if it accessed.

Operator ID

This setting controls the operator traceability functions. Values are "Off" or "On".
- "Off" disables the operator traceability function.
- "On" enables the operator traceability function.

This option can only be turned on by pressing *the* **START button** when menu option 4 is highlighted.

ONCE THE TRACEABILITY FUNCTION IS TURNED ON, THE ONLY WAY TO TURN IT OFF IS TO SCAN A VALID OPERATOR OFF BARCODE.

To obtain operator barcodes, contact IPEX USA LLC customer service.

APPENDIX

Scanning Barcodes

Pen Wand

While holding the wand at a slight angle, as you would a pencil, position the point slightly to one side of the label and move the wand rapidly across the barcode stopping at a point slightly off the label on the other side.

NOTE:
The barcode may be scanned left to right or from right to left as long as the scan speed is brisk and consistent. Do not change the speed of the wand as it travels across the barcode label.

*WHEN SCANNING, MOVING THE WAND FASTER IS BETTER THAN SLOWER.*

SMART Scanner

The **Smart Scanner™** can be operated in one of three modes depending whether or not the **Smart Scanner™** has the integrated GPS installed. The three available modes are as follows:

1. Scan Only Mode
2. Smart Scan Mode
3. GPS Mode

THE SMART SCANNER IS NOT MULTI LINGUAL. THE ONLY LANGUAGE AVAILABLE IS ENGLISH.

Scan Only Mode

To operate The **Smart Scanner™** in Scan Mode, set the SMART SCANNER option in the Basic User Menu to "NO". In this mode, when the processor is powered up, The **Smart Scanner™** will automatically turn on and display a screen similar to the following.

```
PRESS BUTTON
  TO SCAN
```
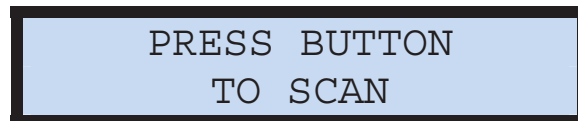
At this point, you should follow the normal procedure for beginning a barcode fusion. When the processor prompts you to scan a barcode, use The **Smart Scanner™** to do the scan. See the
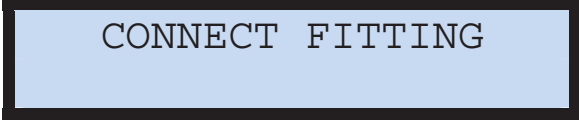
Scanning Techniques section on page 31 for tips on how to reliably scan a barcode.

Smart Scan Mode

To operate The **Smart Scanner™** in Scan Mode, set the SMART SCANNER option in the Basic User Menu to "YES". In Smart Scan mode, additional features not available in Scan Mode can be used. Smart Scan mode allows you to:
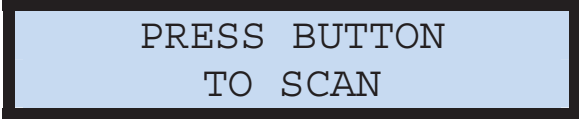
1. View fitting data on the screen before beginning a fusion
2. Start and Stop a fusion using The **Smart Scanner™ Button**.

When operating in Smart Scan Mode, The **Smart Scanner™** will provide feedback to the user on the display to assist in the completion of the fusion without getting in and out of the ditch. When The **Smart Scanner™** is powered up in Smart Scan Mode; the display will look something like this.
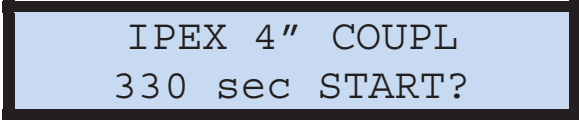
```
CONNECT FITTING
```

The processor is now ready for you to connect the Output Cable to the fitting. Once you connect the fitting the display will look something like this.

```
PRESS BUTTON
TO SCAN
```

The processor is now ready for you to scan the fitting barcode. See the Scanning Techniques section on page31 for tips on how to reliably scan a barcode. Once the barcode has been successfully scanned, the fitting information will be shown on the display. It could look something like this:

```
IPEX 4" COUPL
330 sec START?
```

This should be the same data that is displayed on the screen of the electrofusion processor and is an indication that the fusion is ready to be started. At this point in time the fusion can be started by pressing and holding the **Button** on The **Smart Scanner™** for a few seconds. As the fusion is in progress the display of, The **Smart Scanner™** will look something like this.

```
FUSION IN PROCESS
Press Button to STOP
```

At any time, you may press and hold the **Button** to stop the fusion.

If errors are encountered during the fusion process The **Smart Scanner™** will alert the user by showing the following message.
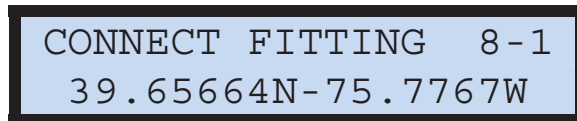
```
ERROR RECIEVED
Check Processor!
```

At this point, you should consult the display of the electrofusion processor for the specific error code and take an appropriate corrective action based on the information on the display of the electrofusion processor.

GPS Mode

Operating The **Smart Scanner™** in GPS Mode is the same as operating The **Smart Scanner™** in Smart Scan Mode with the addition of GPS data, for this reason, only the differences are highlighted in this section. When The **Smart Scanner™** prompts the user to connect the fitting; the current GPS position will be displayed after the satellites have been acquired. The screen will look something like this:

```
CONNECT FITTING  8-1
39.65664N-75.7767W
```
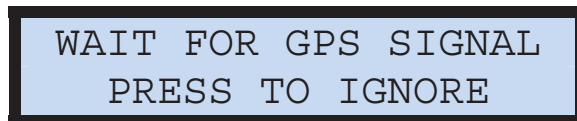
The display shows the current latitude and longitude as well as the number of satellites that The **Smart Scanner™** is currently tracking and the Position Error Indicator. The **Smart Scanner™** can only accurately report the current position when it is tracking more than 5 satellites. The example above shows that is tracking 8 satellites, the level of signal confidence is 1 and the current position is 39.65664 degrees North latitude and 75.7767 degrees West longitude. In general, the higher the number of satellites and the lower the Position Error Indicator Number, the better the position accuracy will be.

When the device is first started, it will take up to 2 minutes to acquire 5 satellites. During the acquisition process the display will look something like this.

```
CONNECT FITTING  3
GPS Searching . . .
```

If after a few minutes, The **Smart Scanner™** still has not acquired 5 satellites, you may try to follow some of the suggestions in the GPS section on page 34, or you can bypass the GPS data by simply connecting the fitting. The **Smart Scanner™** will show you a message similar to the following.
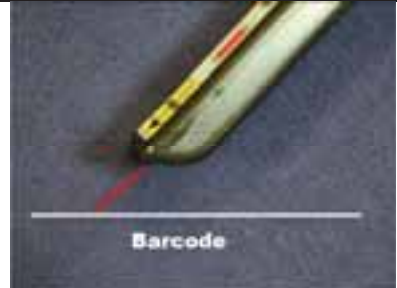
```
WAIT FOR GPS SIGNAL
PRESS TO IGNORE
```

IF YOU CHOOSE TO PRESS THE BUTTON, YOU WILL BE ABLE TO SCAN THE BARCODE AND COMPLETE THE FUSION NORMALLY; HOWEVER, GPS DATA WILL NOT BE STORED WITH THE FUSION.

Scanning Techniques

To scan a barcode, start by holding The **Smart Scanner™** about 6-8 inches from the barcode to be scanned. Next, press and hold the **Button**. A red laser line will emanate from the end of the device as long as the **Button** is held. Simply move the line over the barcode to be scanned. The **Smart Scanner™** will beep once when the barcode is recognized. After the barcode is recognized, release the button. The following pictures illustrate a few simple tips that will improve scanning reliability.

	YES	For best results, hold The **Smart Scanner™** so that the beveled scanning end is parallel to the barcode to be scanned.
	YES	The scanning laser should be centered and evenly spaced over the barcode to be scanned.
	NO	Do not hold The **Smart Scanner™** perpendicular to the barcode to be scanned. Although there are many cases where this scanning technique will produce satisfactory results, it does not work in all cases.
	NO	Do not hold the scanning laser at an angle to the barcode
	NO	Make sure the scanning laser completely covers the barcode.

Entering Data with the Keypad

To enter data in any field manually, press the **UP Button** or the **DOWN Button** to scroll through the list of valid characters. When you find the one you wish to use press the **START Button** to move to the next character. If an invalid character is entered, press the **STOP Button** to back the cursor up to the previous character and change it (if the **STOP Button** is pressed while on the first character the Processor will back up to the previous screen). Repeat this procedure until all data is displayed. When the **START Button** is pressed after the last character the Processor will accept the data and move to the next screen (if the **START Button** is pressed when a blank character is displayed, the Processor will skip the rest of the field and move to the next screen).

NOTE:

> The Processor will not allow an operator to enter invalid or out of range data. Example: If the maximum number allowed in a field is 40.0 the Processor will not allow the user to enter a number greater than 40.0.

NOTE:

> When entering data, the Processor will acknowledge valid data with one beep and continue. If there is an error encountered the Processor will beep twice and not continue.

Traceability

Operator ID

The Operator ID codes are an option that can only be enabled through the Advanced Users menu (see page 27) and can only be turned off with a valid "Operator Off" badge. Contact customer service to find out more about generating this badge.

If the operator codes are enabled, the following screen will be displayed after the Processor has passed its INTERNAL SELF TEST. This Operator ID data will not affect the fusion but will be associated with each fusion in the download.

```
 ENTER OR SCAN DATA
Operator:
```
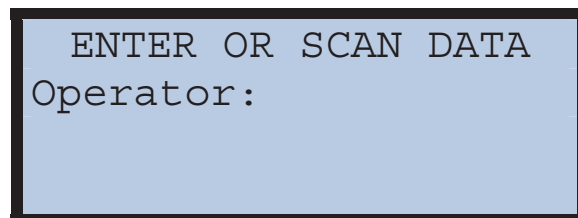
Data may be entered here and will be attached to all fusions done by this Processor until the power is turned off or the data is manually changed. Enter data by scanning a valid Operator ID barcode. Once a valid badge is scanned, the processor will automatically advance to the CONNECT FITTING screen. See page 14 for details on how to perform a fusion.

OPERATOR DATA CANNOT BE ENTERED THROUGH THE KEYPAD.

Downloading Data

Data Stored

The following data is stored for each fusion that the processor performs. The data stored in the processor can be downloaded to a USB Flash drive. The data is output in a binary format that is compatible with the free macro enabled Excel Spreadsheet available from IPEX USA LLC.

| Field	Description
SN	The serial number of the unit.
Fusion #	The fusion number.
Date	Date and time the fusion was performed.
Cal Due	The date that the calibration is due.
Cal Req.	TRUE if the calibration date was expired when the fusion was completed.
Firmware	The firmware version of the processor loaded when the fusion was performed.
Result	The resulting error code.
Mode	The mode used for entering the fusion parameters.
Fitting	The fitting manufacturer type and size
Control	The requested fusion output voltage.
Temp	The ambient temperature at the time of the fusion.
Nom. Time	The requested fusion time.
Comp Time	The fusion time after temperature compensation was applied.
Actual Time	The actual time the fitting was fused.
Mea Res	The resistance of the fitting specified in the barcode.
Tolerance	The specified resistance tolerance.
Mea Res Pre	The actual measured resistance of the fitting before the fusion.
Mea Res Post	The actual measured resistance of the fitting after the fusion.
Cooling time	The cooling time of the fitting specified in the barcode.
ID Res.	The measured value of the ID Resistor for ID Resistance fusions.
Input Volts	The measured generator voltage taken before the fusion.
High Volts	The highest measured generator voltage during the fusion.
Low Volts	The lowest measured generator voltage during the fusion.
Wave	The type of supply waveform identified during the fusion (Sine or Square)
Frequency	The measured generator frequency made before the fusion started.
High Freq	The highest measured generator frequency during the fusion.
Low Freq	The lowest measured generator frequency during the fusion.
L Out V	The lowest measured output voltage during the fusion.
H Out V	The highest measured output voltage during the fusion.
L Out A	The lowest measured output current during the fusion.
H Out A	The highest measured output current during the fusion.
Ah Out	The total number of Amp-Hours expended during the fusion.
Position	The GPS latitude and longitude at the time of the fusion
Sat	The number of satellites used when determining the GPS fix.
Q	The GPS signal quality 0=no good, 1=GPS, 2=DGPS.
HDOP	GPS Horizontal Dilution of Precision
Operator	The operator code if used

Downloading to a USB Flash Drive

To download the fusion data to a Flash Drive, perform the following steps.

1. Be sure the processor is off.
2. Plug a formatted drive into the USB Host connector on the face of the processor.
3. Turn the processor on...
4. The drive will be automatically detected and the fusion data will be written to the drive.
5. A progress screen will be displayed as the download proceeds.

```
DOWNLOADING DATA
       48%
```
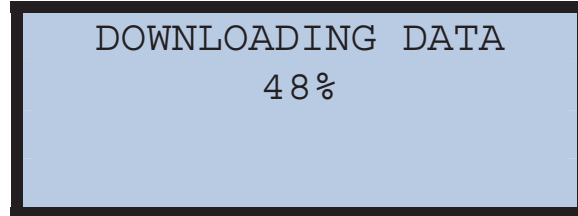
Once the download is complete, the processor will return to the CONNECT FITTING Screen. You may disconnect the drive from the USB Host Port to resume normal operation.

ONLY NEW FUSIONS PERFORMED SINCE THE LAST DOWNLOAD WILL BE WRITTEN TO THE DRIVE.

A USB FLASH DRIVE MUST BE FORMATTED USING FAT OR FAT32 WITH A SECTOR SIZE OF 512 BYTES.

GPS

The optional GPS in the **Smart Scanner™** can be used to record the latitude and longitude of the control box when the fusion is done.

- The GPS coordinates are accurate to within 10-15 meters.
- The latitude and the longitude as well as the number of satellites used when generating the fix is stored with each fusion and output during the download.
- Once Downloaded, the coordinates can be input into many commercially available mapping programs to obtain position information.

Trouble

The most common cause of GPS signal trouble is poor signal quality. This can be caused by:
1. Antenna Orientation.
2. Obstructions such as buildings or trees.
3. The weather.

Other than moving the receiver or waiting for the weather to clear, there is not a great deal of control that one has over a poor signal. Be sure to hold the device with the antenna (the side with the sticker) is pointing up and there is a clear view of the sky.

When the device is in the Connect Fitting screen, the "-"between the latitude and the longitude measurement will flash. This flashing indicates that The **Smart Scanner™** is receiving a signal from the GPS. If this dash is not flashing then there is a problem with the GPS receiver itself and it should be returned.

Position Accuracy

GPS accuracy is affected by a number of factors, including satellite positions, noise in the radio signal, atmospheric conditions, and natural barriers to the signal. Noise can create an error between 1 to 10 meters and results from static or interference from something near the receiver or something on the same frequency. Objects such as mountains or buildings or even clouds between the satellite and the receiver can also produce error, sometimes up

to 30 meters. The most accurate determination of position occurs when the satellite and receiver have a clear view of each other and no other objects interfere.

THE SMART SCANNER™ WAS NEVER DESIGNED TO GIVE A POSITION ACCURATE ENOUGH TO GO FIND A FITTING AND DIG IT UP. IT IS PROVIDED TO ALLOW THE USER TO DETERMINE THE GENERAL LOCATION WHERE THE FITTING CAN BE FOUND.

Position Error Indicator

The Position Error Indicator gives the user an indication of how much confidence the user should place in the accuracy of the current position reading.

Value	Rating	Description
1	Ideal	This is the highest possible confidence level to be used for applications demanding the highest possible precision at all times.
1-2	Excellent	At this confidence level, positional measurements are considered accurate enough to meet all but the most sensitive applications.
2-5	Good	Represents a level that marks the minimum appropriate for making business decisions. Positional measurements could be used to make reliable in-route navigation suggestions to the user.
5-10	Moderate	Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended.
10-20	Fair	Represents a low confidence level. Positional measurements should be discarded or used only to indicate a very rough estimate of the current location.
>20	Poor	At this level, measurements are inaccurate by as much as 300 meters with a 6 meter accurate device (50 DOP × 6 meters) and should be discarded.

As a general rule, confidence indications above 2 should not be used although The **Smart Scanner™** will not prohibit the user from using any reading.

Although it is beyond the scope of discussion for this manual, the number we refer to as the Position Error Indicator is actually the "Horizontal Dilution of Precision" value (HDOP) rounded to the nearest integer for those with a more advanced knowledge of GPS terminology

General Maintenance

Changing the Fuse

Background Notes
- This fuse protects the internal electronic circuitry. If the display lights up when power is turned on then you DO NOT need to replace the fuse.
- This procedure should be performed in a "shop" environment, not a "field" environment.
- The most probable cause of a fuse failure is a defective or inappropriately sized generator. If you have a fuse problem, check your generator.

Tools Required:
- 1/8" Flat Blade Screwdriver
- 5 X 20mm, 250V, 2 Amp Slow Blow Fuse.

Use a Cooper Bussmann Fuse Part Number BK1/S506-2-R or equivalent.

Procedure:
1. Insert a screwdriver into the slot in the fuse holder cap. Press in slightly, while turning counter-clockwise, then remove the cap. The fuse should come out when the cap is removed.
2. Remove the old fuse and replace it with the new one.

3.   Replace the fuse cap by pushing down and turning it clockwise.

Power Sources

For the installation of electrofusion fittings in field applications, it will be necessary to have a reliable source of AC power for the electrofusion processor. The selected AC power source should:
- •   be well maintained and subjected to a periodic maintenance schedule
- •   provide output voltage within the specified operating range

A matching outlet is needed to mate with the plug equipped on the processor:
- •   115V models — 30 Amp, 125 Volt, NEMA L5, twist-lock

Utility Power

Utility power is a reliable and ideal source of energy for the Electrofusion processor. However, it is not practical to access such a source in most field applications. When fusing with utility power, a dedicated connection to the service panel is recommended, since the potential amperage draw is very high.

Generators

Fuel powered generators are typically a good source of electrical power for the electrofusion processor. Minimum fitting power requirements must be noted, and additional power capacity is recommended for intangibles (powering other accessories, wear & tear, etc.). Prior to beginning a fusion, it is important to insure the following:
- •   the generator has enough fuel to complete the electrofusion cycle
- •   the auto-throttle is disengaged (in anticipation of immediate power draw).

Inverters

Inverters are an acceptable AC power source for the Electrofusion processor, though some produce output waveforms that are troublesome with specific fittings. We recommend performing compatibility tests using the lightest and heaviest anticipated loads before approving an inverter system. Feel free to contact us to discuss issues regarding the use of inverters.

Sizing a Power Supply

IPEX USA LLC does not recommend or endorse any particular type or brand of generator.

Power requirements will vary depending on the fitting manufacturer, size and ambient temperature.

Every generator manufacturer determines the size of their generators differently. A 5000 watt generator from one company may or may not be equivalent to a 5000 watt generator from another company.

In order to determine the correct generator size one must first determine the maximum current required to fuse a particular fitting. This information can be obtained through the manufacturer of the fitting. Please note that the largest fitting does not necessarily take the most current.

Once the maximum fitting current has been established, simply divide this number by 1.90 to determine the amount of current required by the generator.

Once the current required by the generator has been established, simply multiply that number by 120 to obtain the number of Watts that the generator will need to supply.

Example
Maximum fitting current = 50 Amps

50.0 Amps / 1.9 = 26.3 Amps required by the generator
26.3 Amps * 120 = 3156 Watts

In this example it can be seen that, in order to fuse a fitting that requires 50 Amps, it is necessary to have a 3200 Watt generator capable of supplying 26.3 amps continuous. Please note that the generator must be capable of supplying this amount of current for sustained periods of time (10 + minutes). Consult the manufacturer of the generator to be sure that the output meets this requirement.

This is an oversimplified calculation; however it is a good rule of thumb and will work in most cases. Please give our service department a call if you would like to discuss generator sizing issues in more detail

Extension Cords

Due to the high amperage draw of electrofusion fittings, the use of an extension cord is not encouraged. In the event such usage is necessary, the following lengths and wire gages are recommended:

Cord Length	Wire Gage
Less than 25 feet	12/3
Less than 50 feet	10/3
Less than 100 feet	8/3

Extension cords should not be used on 14" and larger couplers.

A pigtail is an adapter for converting from a 30 amp twist-lock to a 15 amp straight-blade plug. Its purpose is for powering the processor where a NEMA L5 socket is not available, especially while downloading. Its use is not recommended in field applications with electrofusion fittings.

Temperature Measurements

The processor's temperature sensor is located near the end of the fusion cable in the barcode connector. The temperature sensor does not respond immediately to thermal changes. In order to assure accurate ambient temperature measurements, the cable end should be left in the fitting environment for at least 15 minutes. Direct exposure to sun light and other heat sources will adversely affect accuracy.

Temperature Compensation

When using the electrofusion processor in barcode mode or manual barcode mode to fuse fittings that require temperature compensation, it is essential that care be given to insure that the correct initial fusion temperature is measured. The processor will automatically adjust the fusion time per the measured temperature as specified by the fusion parameters.

When using the electrofusion processor in manual mode to fuse fittings that require temperature compensation, it is necessary to enter the appropriately adjusted time as specified by the fitting manufacturer.

THE PROCESSOR WILL NOT AUTOMATICALLY COMPENSATE FUSION TIME IN MANUAL MODE OR RESISTOR ID MODE.

ERROR CODES

Code	Problem	Resolution
100	The barcode was scanned successfully, however the processor cannot decode the information into valid fusion parameters.	This is not a wand error or scanning problem. Verify that the barcode is an ISO standard 24 digit fitting barcode.
101	Ambient temperature is out of range.	Verify the temperature displayed in the CONNECT FITTING screen is reasonable and within the range specified in the specification table. If the temperature displayed differs significantly from the actual temperature then there is a control box problem and it must be returned for service.
102	Measured resistance does not match resistance identified in the barcode.	Check output cable connectors and adapters for excessive wear and/or damage. If the output connectors and adapters are in good condition, reattach the Processor to the fitting and try again. If the problem persists, there is more than likely a calibration or Output Cable malfunction.
103	Shorted Coil in Fitting	Check for a short stab or a sorted coil.
105	Can't maintain output voltage.	Verify the output ends are clean, the power supply is sized correctly for the fitting you are fusing and that the power supply is operating correctly.
108	The power supply was shut off during the previous fusion	This could be anything from an improperly sized generator to someone switching the unit off during a fusion.
109	Reference voltage out of tolerance	Unit must be returned for calibration. You cannot fuse if this error is detected.
110	STOP pressed during previous fusion	Do not press the STOP button during the fusion unless it is an emergency situation.
111	Fusion complete with no other errors	There were no problems with this fusion.
112	Fitting disconnected.	Current drops close to 0 during the fusion. If the problem persists there is more than likely an output cable problem and the unit should be returned for service.
113	The calibration date has expired.	Send the unit in for calibration.
114	There is no valid calibration date set	Send the unit in for calibration.
115	The processor is not capable of outputting the current required to fuse this fitting.	As long as the fittings fusion requirements are within the specified output range of the processor. This could be an output cable error or a calibration error. Try cleaning the Output Adapters, if the problem persists, the unit will need to be returned for service.
116	The processor is not capable of outputting the voltage required to fuse this fitting.	
117	Input voltage is out of range and the fusion cannot start	Verify that the input voltage/frequency displayed in the CONNECT FITTING SCREEN are reasonable and within the range specified in the

118	Frequency is out of range and the fusion cannot start	specification table. If the parameters displayed differ significantly from the actual input then there is a control box problem and it must be returned for service.
119	Internal control box temperature is out of range	Allow the processor to cool before fusing again. This error can be seen if multiple large fittings are fused one after the other.
120	A time of 0 seconds for the fusion was entered or calculated	This is more than likely a temperature measurement problem. Verify the temperature displayed in the CONNECT FITTING screen is reasonable and within the range specified in the specification table. If the temperature displayed differs significantly from the actual temperature then there is a control box problem and it must be returned for service.
121	Invalid operator ID card scanned	Verify the system date is correct and if so, contact the agency that issued the Operator ID card.
122	Not an operator card.	Contact the agency that issued the Operator ID card.
123	The operator card scanned does not contain privileges for the functions this machine is capable of performing.	Contact the agency that issued the Operator ID card.
124	Current offset is out of spec	Unit must be returned for calibration. You cannot fuse if this error is detected.
125	Resistor ID fusion cannot be completed because the value was not decoded into a valid fusion time.	Verify the fitting and the control box support the Resistor ID method. If so the problem is with the fitting, the output cable or the control box calibration. If the problem persists with multiple fittings, The control box will have to be returned for service.
130	The fitting was disconnected before the specified cooling time.	Do not disconnect the fitting before the manufacturers recommended cooling time has expired.
131	An undefined error was received before the fusion time was completed.	Unit must be returned for service.
132	Control box supports voltage control only and fusion specified is not voltage control.	Not all control boxes support current or energy control. Attach a fitting that requires voltage control or contact PIEX USA LLC to see if an update is available for your control box.
138	The fitting was disconnected before the specified countdown time elapsed.	Do not disconnect the fitting before the manufacturers recommended countdown time has expired.
140	The fusion was shutoff to protect the control box from damage due to extremely high fusion current.	This is typically caused when a direct short is made across the output leads. If there are no obvious problems with the fitting or the Output Cable, then the unit will need to be returned for service.
141	The ambient temperature is too low to fuse fittings of this type.	Same as error 101.
142	The processor believes that the same fitting was fused twice.	Do not fuse a fitting more than two times unless directed so by the fitting manufacturer.

143	The fitting was disconnected before the specified heat soak time was observed.	Do not disconnect the fitting before the manufacturers recommended heat soak time has expired.
144	The output is cycling and cannot be controlled to the requested level	This is more than likely caused by a fluctuating power supply. Eliminate all extension cords and ensure that the electrofusion machine is the only device operating on the circuit.
145	There is an error communicating with the USB Flash Drive.	Be sure the drive is formatted as FAT or FAT32 with a cluster size of 512 bytes.