Genesis F3™

Operators Manual

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SAFETY

- 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 the ***Genesis F3™ Electrofusion 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.
- Before any fusion is performed, it is the responsibility of the operator to always verify that all the information displayed is correct per the fitting manufacturer's recommendations for fusing the attached fitting under the current ambient conditions.

CONTENTS

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 HEREIN BEFORE 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 the following electrofusion processors:

- ***Genesis F3™ USB***
- ***Genesis F3™ Bluetooth***

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

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

The technical data and advice contained herein are based upon tests and information believed to be reliable. However, the operator should not rely upon it absolutely for specific applications. All data is given and accepted at the user's 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

Genesis F3™ Electrofusion Processors are reliable, easy-to-use, rugged tools designed to withstand conditions found at typical construction sites throughout the world.

Genesis F3™ Electrofusion Processors are splash proof and highly shock resistant.

Genesis F3™ Electrofusion Processors can fuse all manufacturers' fittings at voltages ranging from 8 to 48 volts.

Genesis F3™ Electrofusion Processors operate most efficiently and reliably in Barcode Fusion Mode; however, they can be operated in Alternate Fuse Modes and can fuse Resistor ID fittings. **Barcode Fusion Method is always preferred and should be used whenever possible.**

Genesis F3™ Electrofusion Processors have an intuitive user interface that is easy to learn.

Genesis F3™ Electrofusion Processors are equipped with internal memory for data storage and can be downloaded to determine installation conditions and fusion cycle status.

Genesis F3™ Electrofusion Processors are capable of scanning and recording both ASTM F2897-11 and ISO 12176-4 Traceability barcodes.

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

Specifications

Parameter	120 Volt Version	240 Volt Version
Supply Voltage	97 VAC to 150 VAC	180 VAC to 264 VAC
Supply Frequency	47 Hz to 70 Hz	
Supply Waveform	Sine Wave or Square Wave	
Maximum Supply Current	30 Amps at 60 Amps Out (120VAC)	25 Amps at 80 Amps Out (240VAC)
Output Voltage	8 VAC to 48 VAC +/- 1.5%	
Output Current	4 AAC to 60 AAC +/- 1.5% (80 AAC @ 42 VAC output)	4 AAC to 80 AAC +/- 1.5%
Duty Cycle	60% (based on four 15-min cycles, 9 min ON and 6 min OFF for 1 hour)	
Operating Temperature Range	0°F to 140°F	
Operating Modes	Barcode *(Recommended)*, ID Resistor, Manual Barcode, Manual	
Barcode Readability without Leads Attached	YES	
Output Cable Length	12 feet	
Input Cable Length	12 feet	
Fusion Information Storage	1000 Fusions	
Downloading	USB models have a USB 'A' type connector for a USB flash drive to download fusion data. Bluetooth models have a Bluetooth module for downloading fusion data to the EF Utilities app.	
Languages	English/Spanish	
Fitting Adapters	90 degree non-rotating	
Environmental Protection	IP54 Splash-Proof	
Calibration Interval	3 Years	
Warranty	1 Year	
Scanning	Barcode wand or interchangeable SMART Scanner™	
GPS	Optional	
Pipe Fitting Traceability	Code 128 A, B or C barcodes	
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.

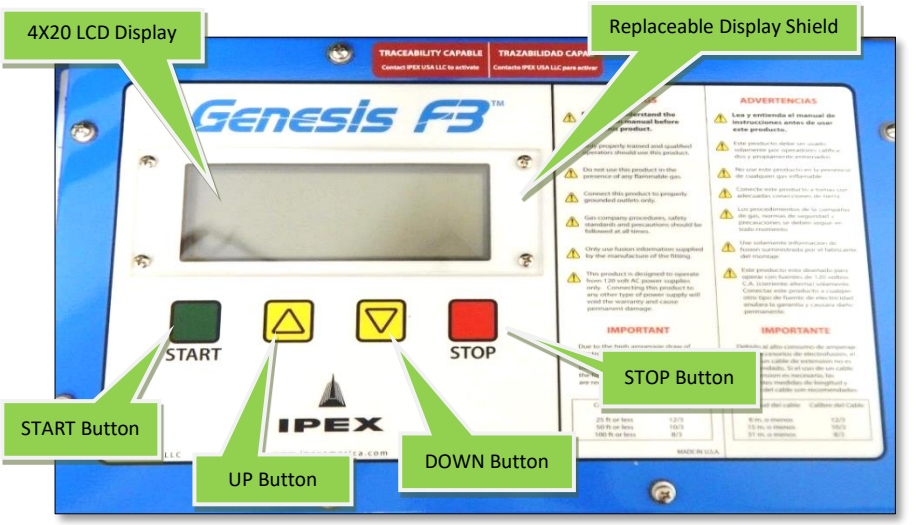
2 The **START button** may mean START, CONTINUE, OK or SAVE depending upon the context of the operation being performed at the time.

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

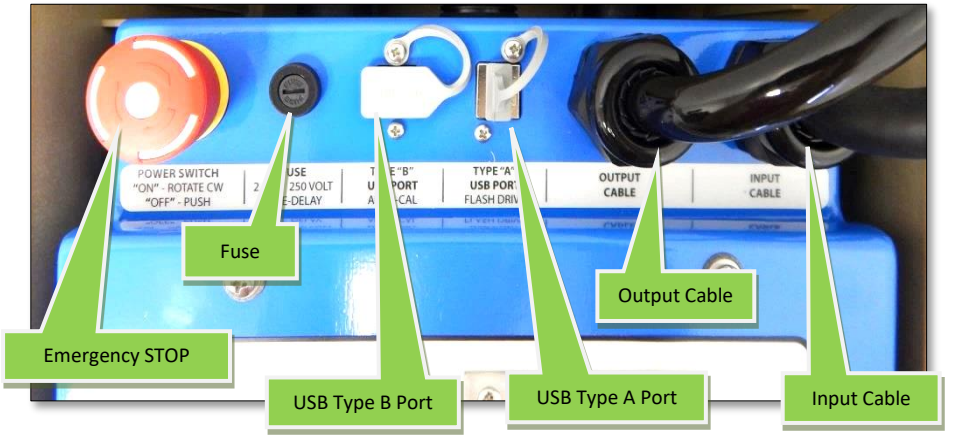
4 The **UP button** and **DOWN button** are used to scroll through the various menus. These buttons should be used when the processor menu displays +/- selection options (UP button for "+"; DOWN button for "-").

Carrying Case

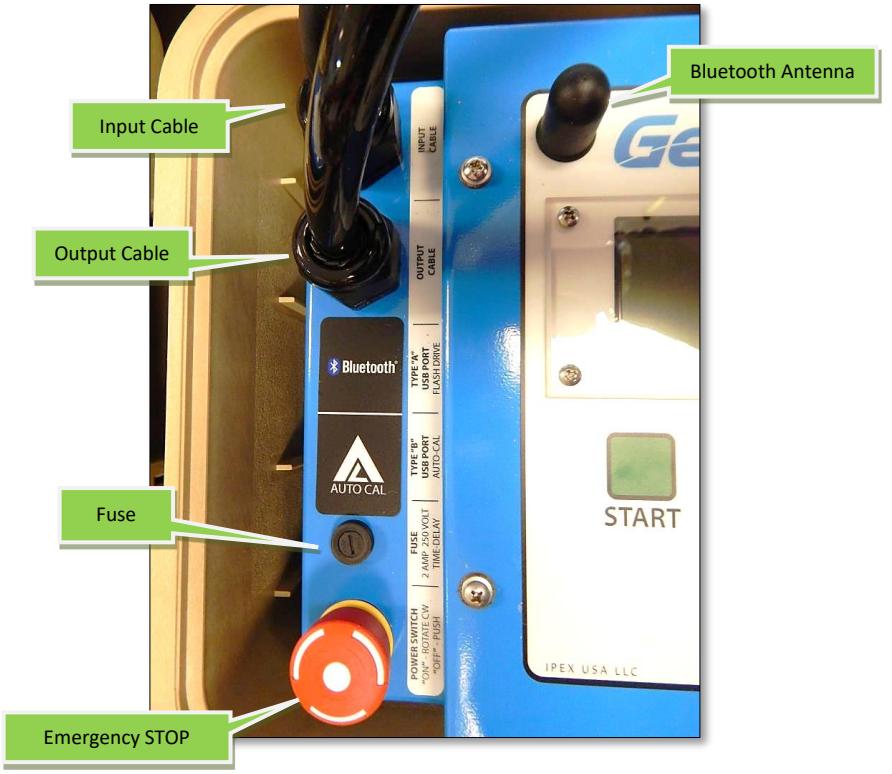
Faceplate View



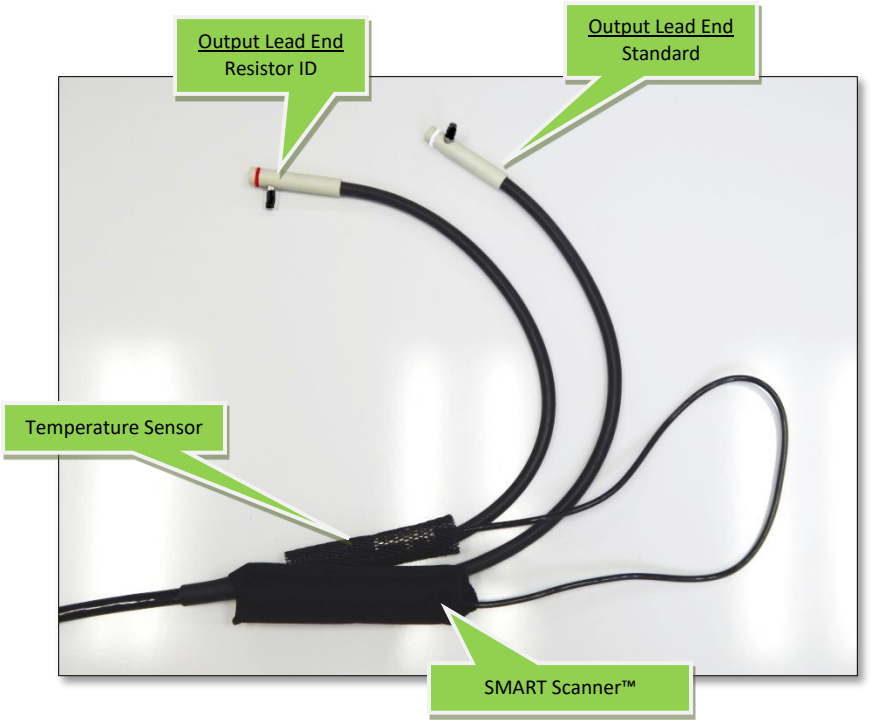
Left Side: *Genesis F3™ USB*



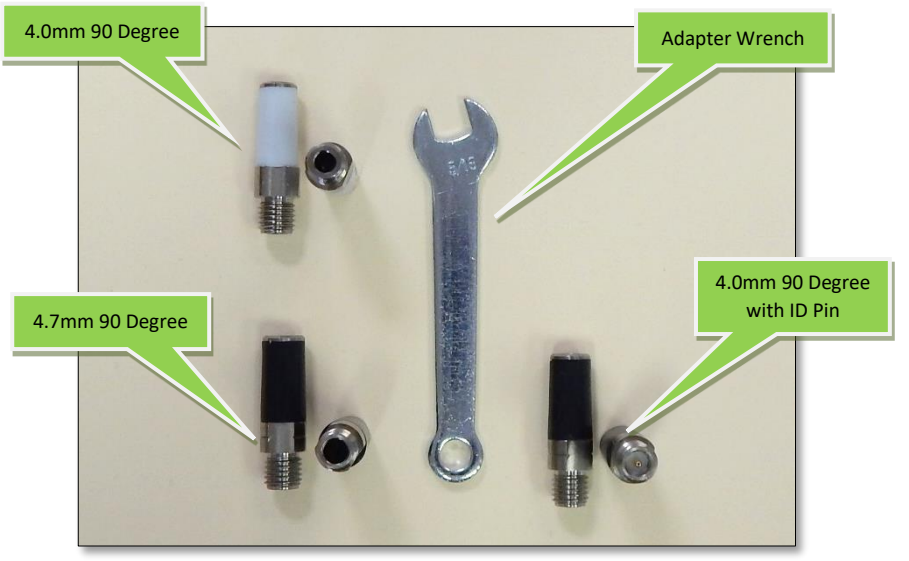
Left Side: ***Genesis F3™ Bluetooth***



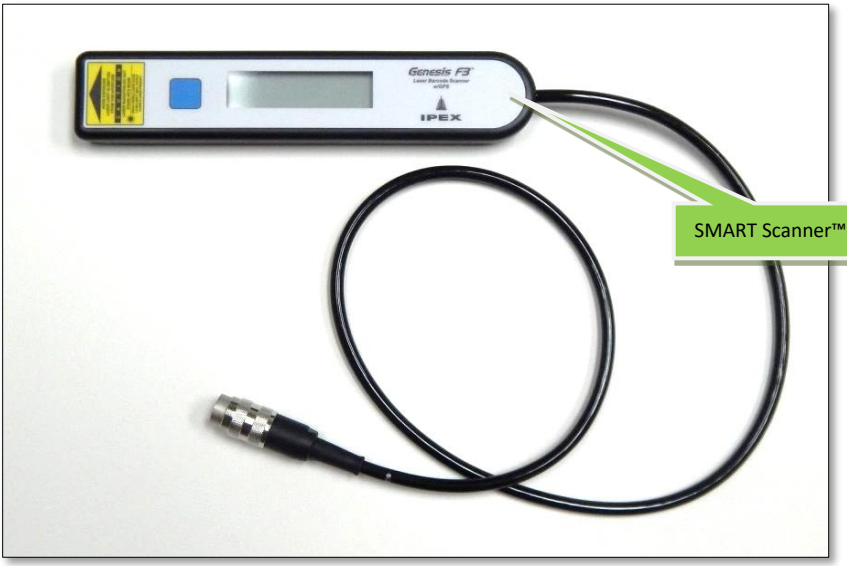
Output Cable Options

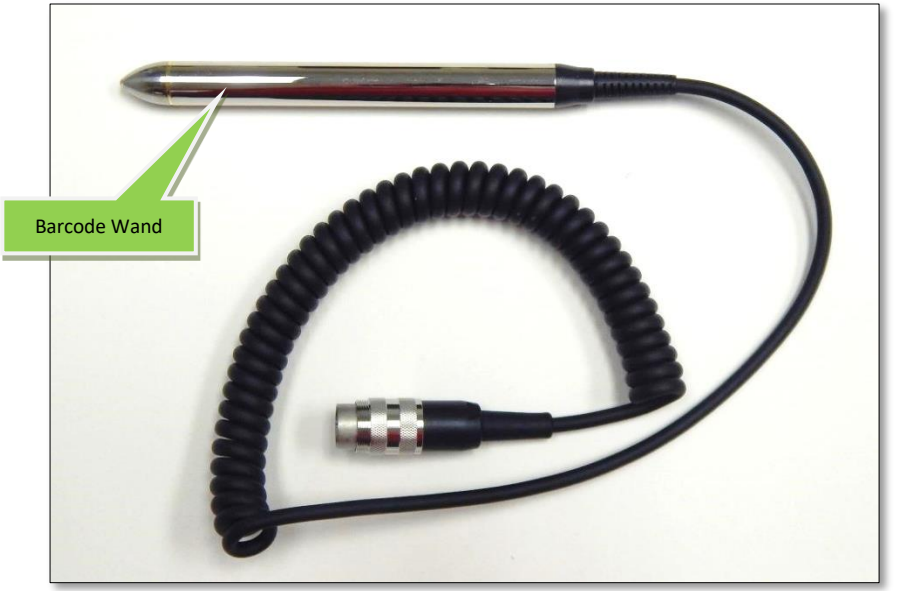


Fitting Adapters



Scanner Options





Customer Responsibilities

Genesis F3™ Electrofusion Processors are reliable, easy-to-use, rugged tools designed to withstand conditions found at construction sites around the world. With proper care, your processor will perform for many years.

Here are some general guidelines that should be followed to extend the life of your processor and keep it in warranty:

Genesis F3 ™ Electrofusion Processors are splash resistant, ***NOT WATERPROOF***. They should be stored in a clean, dry environment at a temperature between 0-140ºF. ***DO NOT STORE THE PROCESSORS OUTSIDE. DO NOT WASH THE PROCESSORS WITH A HOSE.***
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 cables or leads
Subscribe to the recommended calibration service offered by IPEX USA LLC (See page 15).

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

Always scan the fitting manufacturer's barcode affixed directly to the fitting about to be fused. If this barcode is missing or 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 that the voltage and time displayed on the LCD are the same as the values 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 by the fitting manufacturer.

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

Service Recommendations

Customer Maintenance

There are a few simple services that can be performed by the user to 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 time 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 Lead Ends. Failure to do so may result in an improper output applied to the fitting.

3. Pull the Output Lead Ends straight off the fitting when disconnecting and avoid side loads.

4. Make sure that power sources are appropriately rated and operating at the manufacturer's specified capacity. *Refer to page 49 for instructions and guidelines to use when choosing a power source.*

5. Always store the barcode wand or SMART Scanner™ in its sheath when not in use.

Proper care of the processor and output cable will greatly extend the life of your ***Genesis F3™ Electrofusion Processor*** and will help reduce service times and costs.

Calibration Recommendations

It is strongly recommended that each processor be calibrated at least once every three (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 processor will display the message, **"Error 113: Calibration Required,"** informing the operator that the calibration date has passed. This will not prevent the processor from performing fusions; however, the processor should be calibrated as soon as possible. *See page 51 for more information about calibration reminders.*

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

Service Contact Information

There are two (2) 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 **(302) 451-1088** to make arrangements for service and to obtain an RMA number for the return. Every effort will be made to return processors within two (2) business days.

Consult your carrier for the proper method of packaging the processor 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

Genesis F3™ Electrofusion Processors have multiple modes of operation:

Primary Fusion Mode

Barcode Fusion Mode

Barcode Fusion Mode infers that fusion parameters are input into the processor by scanning a barcode label attached to the fitting being fused. When the barcode is scanned at the appropriate prompt, the processor reads the fitting's specific fusion parameters. Barcode labels generally provide the following details needed to fuse that particular fitting: manufacturer, type, size, energy (voltage), fusion time, cool time, resistance, tolerance, and compensation factors.

It is strongly recommended that Barcode Fusion Mode be used to perform fusions whenever possible. Barcode Fusion Mode includes additional automated features and pre-fusion machine checks which are not always available when using Alternate Fusion Modes. Some of these additional features include:

- Automatic calculation of fusion time adjustments based on ambient temperature.
- Pre-fusion resistance checks against manufacturer-specified tolerances.

These features help ensure that the proper fusion parameters are entered**. However, it is important to understand that no amount of machine checks will ever negate the requirement for a well-trained observant operator to make a final GO/NO GO decision, regardless of which Mode of Operation is being used.**

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

Alternate Fusion Modes

Alternate Fusion Modes are used when the barcode scanning device (i.e. barcode wand or SMART Scanner™) is malfunctioning or unavailable. Alternate Fusion Modes require additional care and attentiveness on the part of the operator to ensure that the proper fusion parameters are entered. **For this reason, the following Alternate Fusion Modes should ONLY be performed by a fully trained operator using the fitting manufacturer's specifications regarding fusion time, voltage, and cooling time:**

ID Resistor 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 the 24 digit barcode number that the operator manually inputs from the keypad.

Manual Mode

FOR EXPERT OPERATORS ONLY! Manual Mode infers that the fusion voltage and time are obtained directly from the operator at the time of the fusion. ***Manual Mode should only be used when the barcode is malfunctioning or unavailable***. The temperature compensation must be calculated and entered manually, making it difficult to ensure 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 always be consulted to verify proper fusion time, voltage, and cooling time.**

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

Quick Start

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

1. Turn the processor OFF.
2. Make sure the generator is running in high speed manual mode.
3. Plug the processor into the 30 amp outlet of the power supply.
4. Turn the processor ON.
5. Enter Operator ID, if enabled.
6. The processor is now at the CONNECT FITTING screen. Perform the following steps based on the type of fusion you are performing:

<table>
<tr><th>Barcode</th><th>Barcode
Scan First</th><th>ID Resistor</th><th>Manual Barcode</th><th>Manual</th></tr>
<tr><td rowspan="2">Attach adapter with ID pin to the White Output Lead End. Connect Fitting.</td><td>Scan the barcode.</td><td rowspan="4">Attach adapter with ID pin to RED Output Lead End. Connect Fitting. The RED Output Lead End goes on Fitting ID pin.</td><td>Connect Fitting.</td><td>Connect Fitting.</td></tr>
<tr><td rowspan="3">Attach adapter with ID pin to the White Output Lead End. Connect Fitting.</td><td>Press UP/Down Buttons at the same time.</td><td>Press UP/Down Buttons at the same time.</td></tr>
<tr><td>Select Manual Barcode Option.</td><td>Select Manual Option.</td></tr>
<tr><td>Scan the barcode.</td><td>Enter 24 digit barcode number.</td><td>Enter the fusion voltage and time.</td></tr>
</table>

After the mode-specific operations are complete:

1. Verify the fusion parameters are correct per the fitting manufacturer's recommendations under 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 make sure the processor is OFF.

Next, start the generator. Make sure the generator is running smoothly in 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 by that generator. Do not use an extension cord if it is at all possible. If an extension cord must be used, see page 51 for guidelines on selecting an appropriately sized cord.

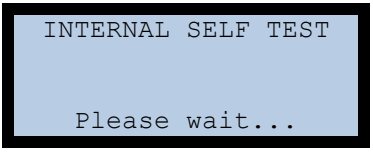
Plug the 30 amp twist-lock into the appropriately sized receptacle on the generator.

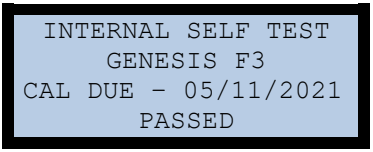
NOTE:

Using a receptacle with a rating of less than 30 amps may cause generator breakers to trip while fusing larger couplings.

Rotate the **Emergency STOP switch** clockwise to turn the processor ON.

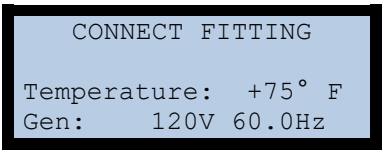
After the processor has turned ON, start-up screens similar to the following will be displayed one after another:





After the INTERNAL SELF TEST, if the feature is enabled, the TRACEABILITY screen will be displayed, allowing you to enter Operator Traceability Data. *If this screen appears, see page 41 for instructions on how to enter the data.*

After the Operator Traceability Data is entered, the processor will display the CONNECT FITTING screen. An example of the CONNECT FITTING screen is shown below:

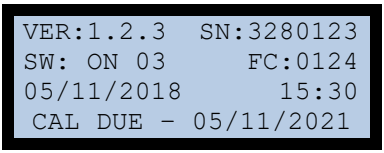


The second line indicates the ambient temperature the processor is measuring and will be used to modify the fusion time if required by the fitting manufacturer.

Check to make sure the temperature reading is accurate. 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, approximately 15-20 minutes.

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. *See Specifications Table on page 7.*

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



This screen shows the following information:

- Software version of the processor (In this case, version 1.2.3).
- Processor serial number (In this case, 3280123).
- SMART Scanner™ status (In this case, ON).
- The number of fusions the processor has completed (In this case, 124).
- The Date and Time (In this case, May 11, 2018 at 3:30 PM)
- The date the processor will be due for calibration (In this case, May 11, 2021)

Release the **UP button** to return to the CONNECT FITTING screen.

To begin the fusion process, follow the instructions in the following section that corresponds to the fusion method that you wish to perform.

Barcode Fusions

The Barcode Fusion Method is always preferred and should be used whenever possible.

When beginning a Barcode Fusion, start from the CONNECT FITTING screen.

Secure the correct fitting adapters to the **Output Lead Ends**:

1. If the fitting requires **4.0mm adapters** (White - Pictured on page 11):
    a. Connect one adapter securely to each of the Output Lead Ends.
    b. The white 4.0mm fitting adapters are the same, so it does not matter which adapter is connected to which Output Lead End.

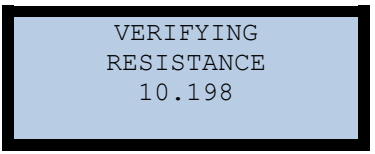
2. If the fitting requires **4.7mm adapters** (Black - Pictured on page 11):
    a. Connect the adapter WITHOUT ID Pin to the RED Output Lead End.
    b. Connect the adapter WITH ID Pin to the WHITE Output Lead End.

NOTE:

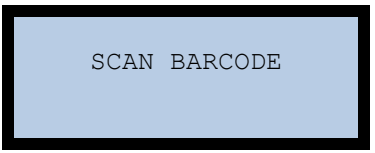
The 4.7mm Fitting Adapters are NOT the same. It is important to connect the correct fitting adapter to the correct Output Lead End (See below):

Connect both **Output Lead Ends** to the fitting. When performing a Barcode Fusion, it does not matter which Output Lead End is connected to which end of the fitting.

When the **Output Lead Ends** are connected to the fitting, the processor will measure the fitting resistance and display a screen similar to the following:



After measuring the fitting resistance, the processor will display the following screen:



Remove the scanning device (i.e. barcode wand or SMART Scanner™) from the protective sheath. Scan the barcode from the fitting about to be fused. See page 37 for scanning techniques and suggestions with the various barcode wand options.

Whenever possible, use the barcode label attached 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 ensure that the fusion parameters are correct.

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

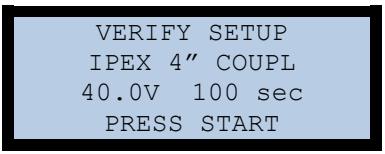
NOTE:

If the scanning device is inoperative, see page 25 for details about how a fusion can be completed without using a scanning device.

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

NOTE:

If Pipe/Fitting Traceability is set to ON or OPT, the operator will be prompted to scan traceability data at this time. Refer to the appropriate section on page 41 for instructions that detail how to gather this data.



The VERIFY SETUP screen shows the following information:

- The fitting type (IPEX 4” Coupler).
- The requested output (40.0 Volts).
- The total temperature-compensated fusion time in seconds (In this case, 100 seconds).

The VERIFY SETUP screen allows the operator a final opportunity to verify that the fusion parameters displayed are correct and match the parameters specified by the fitting manufacturer before starting the fusion. ALWAYS pay close attention and verify the information on this screen is correct before pressing START.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL THE INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

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

Once you have verified that all measurements and parameters are correct, press the **START button** to begin the fusion.

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

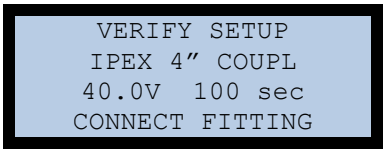
NOTE:

If Calculated Resistance is enabled and the operator receives a Warning Code 55, refer to the appropriate section on page 43 for instructions that detail how to proceed.

See page 29 for instructions on monitoring the progress of a fusion.

Scan First

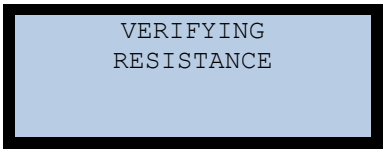
It may be necessary to scan the fitting barcode before connecting the output lead ends to the fitting. In this case, start from the CONNECT FITTING screen as above and scan the fitting barcode. A screen similar to the following will be displayed:



This VERIFY SETUP screen also displays the fitting information decoded from the scanned barcode. The only difference is that last line requests that the fitting be connected. The processor will BEEP once per second and the text "CONNECT FITTING" will flash on and off.

Secure the correct fitting adapters to the **Output Lead Ends** *(See page 20)*. Connect both Output Lead Ends to the fitting. When performing a Barcode Fusion, it does not matter which Output Lead End is connected to which end of the fitting.

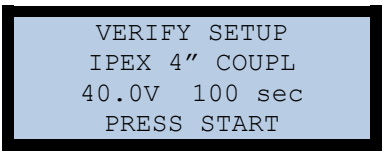
Once the fitting is connected, the processor will measure the fitting resistance:



After measuring the fitting resistance, the ***Genesis F3™ Electrofusion Processor*** will display a screen similar to the following:

NOTE:

If Pipe/Fitting Traceability is set to ON or OPT, the operator will be prompted to scan traceability data at this time. Refer to the appropriate section on page 43 for instructions that detail how to gather this data.



This VERIFY SETUP screen allows the operator a final opportunity to verify that the fusion parameters displayed are correct and match the parameters specified by the fitting manufacturer before starting the fusion. ALWAYS pay close attention and verify the information on this screen is correct before pressing START.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL THE INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

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

Once you have verified that all measurements and parameters are correct, press the **START button** to begin the fusion.

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

NOTE:

If Calculated Resistance is enabled and the operator receives a Warning Code 55, refer to the appropriate section on page 43 for instructions that detail how to proceed.

See page 29 for instructions on monitoring the progress of a fusion.

Alternate Fusion Methods

ID Resistor Fusions

****The Barcode Fusion Method is always preferred and should be used whenever possible.** *ID Resistor Fusions require additional care and attentiveness on the part of the operator to ensure that the appropriate fusion parameters are entered. For this reason, ID Resistor Fusions should ONLY be performed by a fully trained operator using specifications provided by the fitting manufacturer.*

ID Resistor Mode can be enabled or disabled using the Features Menu. *See page 23 for instructions.*

DURING AN ID RESISTOR FUSION, THE FITTING ADAPTERS ARE NOT CONNECTED TO THE OUTPUT LEAD ENDS IN THE SAME ORDER THEY ARE CONNECTED TO THE OUTPUT LEAD ENDS DURING A BARCODE FUSION. PLEASE READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.

When beginning an ID Resistor Fusion, start from the CONNECT FITTING screen.

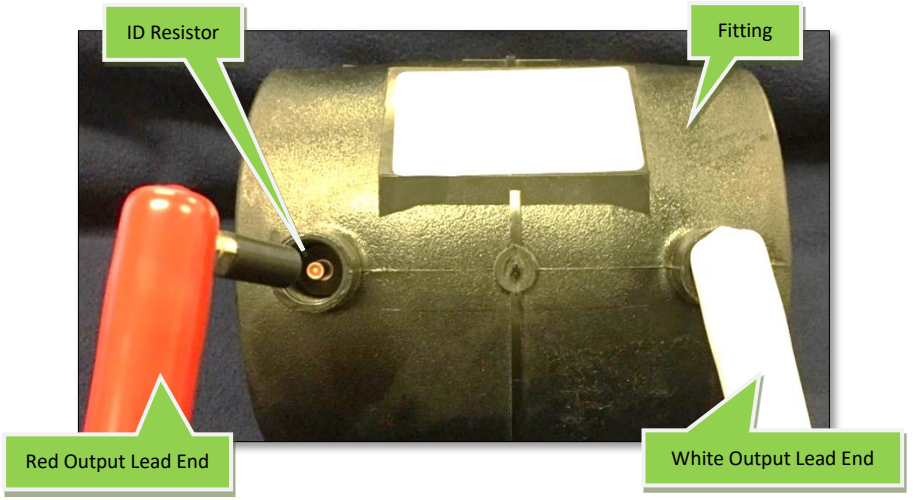
Secure the **4.7mm Fitting Adapters** to the correct **Output Lead Ends**:

1. Connect the adapter WITH ID Pin to the RED Output Lead End.
2. Connect the adapter WITHOUT ID Pin to the WHITE Output Lead End.

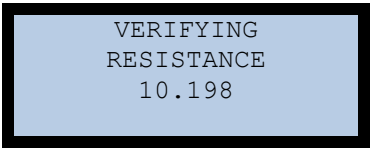
NOTE:

The 4.7mm fitting adapters are NOT the same. It is important to connect the correct fitting adapter to the correct Output Lead End (See below):

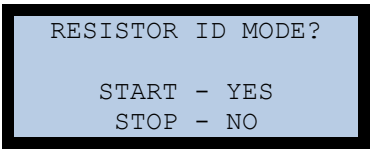
Connect both **Output Lead Ends** to the fitting. ***The RED Output Lead End goes on the ID Resistor (See below).*** *During an ID Resistor Fusion, it is important to connect the correct Output Lead End to the correct side of the fitting:*



When the **Output Lead Ends** are each connected to the correct sides of the fitting, the processor will measure the fitting resistance and the ID resistance, and display the following screen:

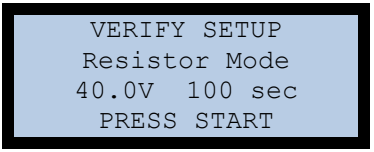


If a valid ID Resistor fitting is detected, a screen similar to the following will be displayed:



If you do not want to perform the fusion in ID Resistor Mode, press the **STOP button**. The processor will default to Barcode Fusion Mode and prompt the operator to scan a barcode. *See page 20 for instructions explaining how to perform a Barcode Fusion*.

If you want to perform the fusion in ID Resistor Mode, press the **START button**. A screen similar to the following will be displayed:



The VERIFY SETUP screen shows the following information:

- The current fusion mode (In this case, ID Resistor Mode).
- The requested output (40.0 Volts)
- The total fusion time in seconds (In this case, 100 seconds).

The VERIFY SETUP screen allows the operator a final opportunity to verify that the fusion parameters displayed are correct and match the parameters specified by the fitting manufacturer before starting the fusion. ALWAYS pay close attention and verify the information on this screen is correct before pressing START.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL THE INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

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

Once you have verified that all measurements and parameters are correct, press the **START button** to begin the fusion.

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

See page 29 for instructions on monitoring the progress of a fusion.

If a valid ID Resistor fitting is not detected, the ***Genesis F3™ Electrofusion Processor*** will default to Barcode Fusion Mode and prompt the operator to scan a barcode. *See page 20 for instructions explaining how to perform a Barcode Fusion.*

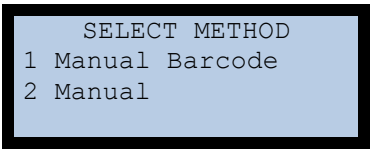
If an ID Resistor Fusion does not begin and both the ***Genesis F3™ Electrofusion Processor*** and the fitting to be fused support this mode, double-check the Output Lead Ends and make sure they are connected correctly. They are polarity sensitive. ***The fitting adapter WITH ID Pin must be attached to the RED Output Lead End. The RED Output Lead End must be connected to the ID pin on the fitting.***

Manual Barcode Entry

****The Barcode Fusion Method is always preferred and should be used whenever possible.*** *Manual Barcode Entry Fusions require additional care and attentiveness on the part of the operator to ensure that the appropriate fusion parameters are entered. For this reason, Manual Barcode Fusions should ONLY be performed by a fully trained operator using specifications provided by the fitting's manufacturer.*

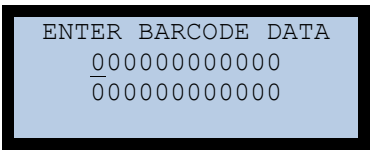
The Alternate Fusion selection screen can be accessed by pressing the **UP button** and the **DOWN button** at the same time when the processor is displaying the SCAN BARCODE screen.

The Alternate Fusion selection screen looks like the following:



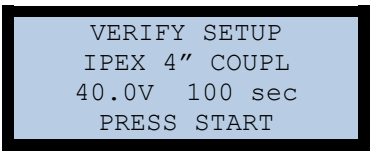
Select the desired method by using the **UP button** and the **DOWN button**. When the desired method is highlighted, press the **START button**.

While in Manual Barcode Mode, the operator can manually input the numbers from the barcode label attached to the fitting to be fused. The following screen will be displayed:



The cursor will begin under the first digit of the barcode. Enter the data from the barcode attached to the fitting using the keypad *(see page 41).* When the **START button** is pressed after the last character is entered, the processor will move to the next screen.

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



The VERIFY SETUP screen allows the operator a final opportunity to verify that the fusion parameters displayed are correct and match the parameters specified by the fitting manufacturer before starting the fusion. ALWAYS pay close attention and verify the information on this screen is correct before pressing START.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL THE INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

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

Once you have verified that all measurements and parameters are correct, press the **START button** to begin the fusion.

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

FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

NOTE:

If Calculated Resistance is enabled and the operator receives a Warning Code 55, refer to the appropriate section on page 43 for instructions that detail how to proceed.

See page 29 for instructions on monitoring the progress of a fusion.

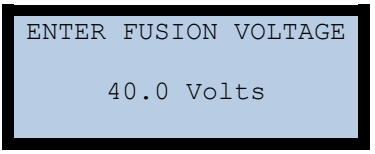
Manual Data Entry

****The Barcode Fusion Method is always preferred and should be used whenever possible. *Manual Mode should only be used when the barcode is malfunctioning or unavailable. FOR EXPERT OPERATORS ONLY.* Manual Data Entry Fusions require additional care and attentiveness on the part of the operator to ensure that the appropriate fusion parameters are entered. For this reason, Manual Fusions should ONLY be performed by a fully trained operator using specifications provided by the fitting manufacturer.**

NOTE:

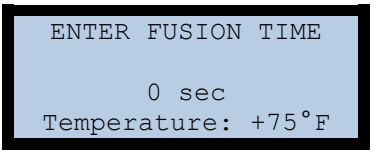
The **Genesis F3™ Electrofusion Processor** *provides outputs for a complete fusion based on parameters manually entered by the operator. Remember to enter all parameters **EXACTLY** as specified by the fitting manufacturer.*

After selecting Manual Fusion Mode from the Alternate Fusion selection screen (see page 26), the following screen will be displayed:



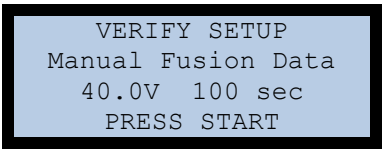
Enter the voltage by using the **UP button** and **DOWN button** to increment and decrement the value. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired voltage is displayed, press the **START button**.

The following screen will be displayed and you will be able to enter the fusion time:



Enter the total number of **SECONDS** to fuse using the **UP button** and **DOWN button** to increment and decrement the current value by one (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 number of seconds are 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:



The VERIFY SETUP screen allows the operator a final opportunity to verify that the fusion parameters displayed are correct and match the parameters specified by the fitting manufacturer before starting the fusion. ALWAYS pay close attention and verify the information on this screen is correct before pressing START.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL THE INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

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

Once you have verified that all measurements and parameters are correct, press the **START button** to begin the fusion.

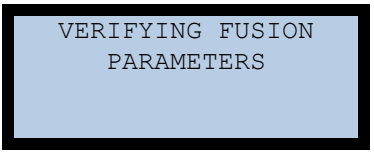
FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

See page 29 for instructions on monitoring the progress of a fusion.

Monitoring a Fusion's Progress

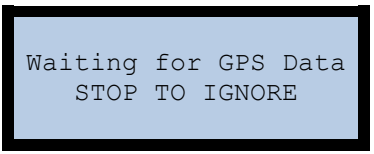
Once the **START button** is pressed the fusion process will begin.

The fusion process begins with a Fitting Resistance Verification. The ***Genesis F3™ Electrofusion Processor*** will display a screen similar to the following:



When operating in Barcode Fusion Mode, this resistance check is to make sure that the actual fitting connected matches the resistance of the fitting described in the fusion parameters. When operating in an Alternate Fusion Mode, this resistance check is used to verify that the fitting is still attached. **Although many fittings have similar resistance measurements 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 next attempt to read the GPS coordinates. A screen similar to the following will be displayed:

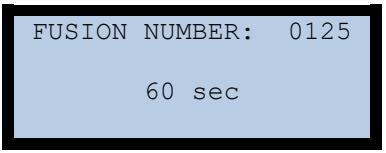


Once the coordinates are obtained, the fusion will proceed normally. To ignore the GPS data and force the fusion to begin, press the **STOP button**. **If the GPS screen is bypassed, *NO GPS DATA WILL BE STORED IN THE PROCESSOR'S MEMORY.***

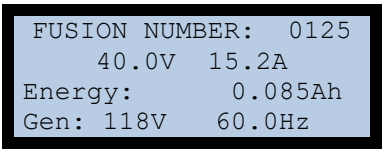
NOTE:

The fusion always begins with a Soft Start. Depending on the requested fusion time for that fitting, a "Soft Start in Progress" screen may be displayed until the processor reaches full output level. See page 51 for more information about the Soft Start.

As the fusion proceeds, the following screen will be displayed:



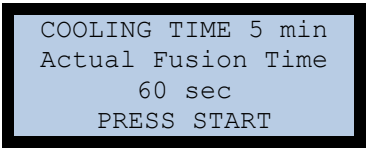
This screen shows the number of the current fusion as well as the time remaining (in this case, 60 seconds). If you want to see more detailed information, press and hold the **UP button** to display the following fusion information screen:



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.) *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:



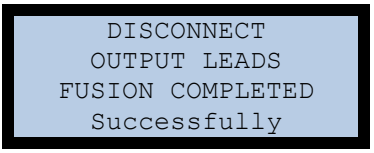
This screen displays the following information:

- The cooling time, if specified (In this case, 5 minutes).
- The actual amount of time that the fitting was fused (In this case 60 seconds).

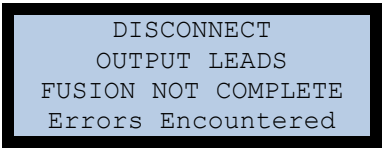
Press the **START button** to continue.

After the fusion process has ended, the processor will prompt the operator to disconnect the Output Lead Ends and will not recognize any other inputs until this task is complete.

If no errors were encountered during the fusion process, the following screen will be displayed:



If errors were encountered during the fusion process, an Error Code Message will be displayed (see page 54 for a list of possible Error Codes), and the following screen will be displayed after the error message screen:



After the Output Lead Ends are disconnected, the ***Genesis F3™ Electrofusion Processor*** will return to the CONNECT FITTING screen and will be ready to accept information for the next fusion.

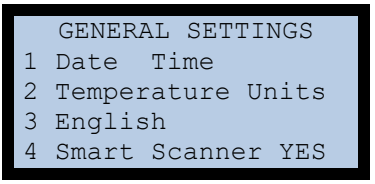
NOTE:

If Operator 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

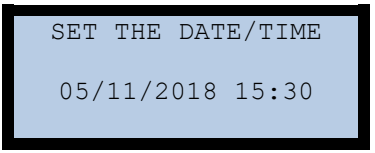
The Basic User Menu is accessed by holding the **UP button** when the processor is first powered up. Keep holding the **UP button** through the INTERNAL SELF TEST screen until the processor displays a screen similar to the following:



Use the **UP/DOWN buttons** to highlight the desired option. Press the **START button** to access the desired option. Press the **STOP button** to return to normal operation.

Setting the Date and Time

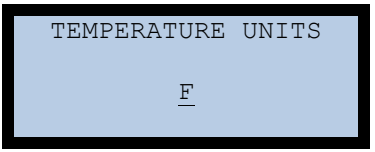
When Option 1 is highlighted, press the **START button** to select it. The following screen will be displayed:



With the keypad *(see page 41),* enter the correct date using the MM/DD/YYYY format and the correct time using the 24-hour (military) format. Press the **START button** to save the information entered and return to the Basic User Menu.

Setting the Temperature Units

When Option 2 is highlighted, press the **START button** to select it. The following screen will be displayed:



Use the **UP/DOWN buttons** to toggle the default temperature unit setting between ºF and ºC. When the desired unit is displayed, press the **START button** to save and return to the Basic User Menu.

Setting the Language

When Option 3 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle between all supported languages. When the desired language is displayed, press the **START button** to save. The languages supported by ***Genesis F3 Electrofusion Processors*** are English and Spanish.

SMART Scanner™

When Option 4 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle between the SMART SCANNER activation values. When the desired activation value is displayed, press the **START button** to save. A value of YES enables the display and remote button functionality on the SMART Scanner™. A value of NO disables this functionality. The SMART Scanner™ will scan a barcode with either setting.

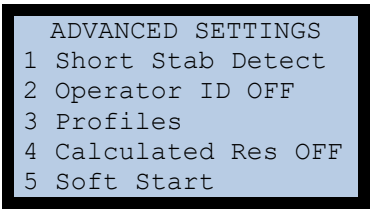
NOTE:

This option should be set based on the type of scanning device attached to the machine (i.e. barcode wand or SMART Scanner™). An incorrect setting may cause unexpected intermittent errors.

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 processor is first powered up. Keep holding the **DOWN button** through the INTERNAL SELF TEST screen, until you are prompted for a passcode that must be entered before proceeding. Contact an authorized representative (see page 15) to obtain the 4 digit passcode. The following example shows the options available in the Advanced User Menu once the correct passcode has been entered:



Use the **UP/DOWN buttons** to highlight the desired option. Press the **START button** to access the desired option. Press the **STOP button** to return to normal operation.

Short Stab Detect

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 operator 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.

Operator ID

This setting controls the Operator Traceability functions. This option is different than Pipe/Fitting Traceability. Pipe/Fitting Traceability is discussed below. Values for Operator Traceability are "OFF", "ON", or "SCAN":

- "OFF" disables the Operator Traceability function.
- "ON" enables the Operator Traceability function.
- "SCAN" enables the Operator Traceability function with a requirement to scan an ISO 12176-3 compliant Operator ID Badge.

When Option 2 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle through available Operator Traceability function values. When the desired value is displayed, press the **START button** to save.

To obtain operator barcodes, contact an authorized representative (See page 15).

Profiles

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

Calculated Resistance

This setting controls the Calculated Resistance option. Values for Calculated Resistance are "OFF" or "ON."

- "OFF" - *RECOMMENDED*: The processor always measures resistance using a lab quality 4-wire measurement. This is the processor's primary method of resistance measurement and is frequently used during Quality Control testing by fitting manufacturers.
- "ON" – If a processor displays Warning Code 55 (see page 54), an operator has the option to perform a secondary Calculated Resistance check. During this secondary check, the unit calculates a resistance estimate based on fusion voltage and current.

DO NOT TURN CALCULATED RESISTANCE ON UNLESS A 4-WIRE MEASUREMENT FAILS.

TURNING ON CALCULATED RESISTANCE DOES NOT GUARANTEE THAT A FUSION WILL BE SUCCESSFUL.

BEFORE TURNING ON CALCULATED RESISTANCE, ALWAYS CONFIRM WITH THE FITTING MANUFACTURER THAT IT IS AN ACCEPTABLE METHOD OF MEASUREMENT FOR THEIR SPECIFIED FITTING.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

When Option 4 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle between the Calculated Resistance values. When the desired value is displayed, press the **START button** to save.

See page 43 for instructions how to operate the processor with Calculated Resistance.

Soft Start Adjustment

During a fusion, the initial output level starts low and then increases to full output. The time it takes the processor to reach full output is called the Soft Start. The length of the Soft Start varies depending on the length of fusion time requested for a particular fitting.

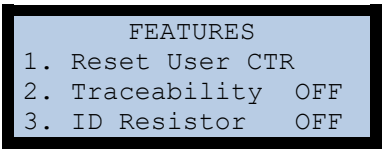
The Soft Start Adjustment option allows the operator to adjust the initial output level. If the breaker on the generator keeps tripping during the Soft Start portion of the fusion operation, adjusting the initial output level may resolve the issue. See page 51 for more information about when a Soft Start Adjustment may be appropriate.

DO NOT MAKE ADJUSTMENTS TO THE SOFT START INITIAL VALUE IF THE BREAKER ON THE GENERATOR TRIPS AFTER THE PROCESSOR HAS REACHED FULL OUTPUT LEVELS.

ALWAYS RULE OUT OTHER POTENTIAL CAUSES FOR THE TRIPPED BREAKER BEFORE ATTEMPTING A SOFT START ADJUSTMENT.

Features Menu

The Features Menu is accessed by holding the **UP and DOWN buttons** at the same time when the processor is first powered up. Keep holding the **UP/DOWN buttons** through the INTERNAL SELF TEST screen, until the processor displays a screen similar to the following:



Use the **UP/DOWN buttons** to highlight the desired option. Press the **START button** to access the desired option. Press the **STOP button** to return to normal operation.

Reset User Counter

The User Counter is a feature designed for processors that are rented out. The User Counter is a user-adjustable fusion counter that acts independent of the main fusion counter. It allows the user to reset a fusion counter each time a processor is rented and track the fusions completed by each customer.

THE USER COUNTER IS COMPLETELY SEPARATE FROM THE MAIN FUSION COUNTER. THE MAIN FUSION COUNTER CANNOT BE RESET.

When Option 1 is highlighted, press the **START button** to select it. You will be prompted to enter a 4 digit passcode. Contact an authorized representative (see page 15) to obtain the 4 digit passcode.

After the code is successfully entered, the User Counter will reset, and when the next fusion is performed, it will show up as fusion number 1.

Traceability

This setting controls the Pipe/Fitting Traceability functions. Values are “OFF”, “ON” or “OPT”:

- “OFF” disables the Pipe/Fitting Traceability function.
- “ON” enables the Pipe/Fitting Traceability function. The machine WILL NOT allow a fusion to proceed unless at least one (1) traceability barcode is scanned.
- “OPT” (Optional) enables the Pipe/Fitting Traceability function but will allow a fusion to proceed if the operator decides not to scan a traceability barcode.

When Option 2 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle through available Pipe/Fitting Traceability function values. When the desired value is displayed, press the **START button** to save.

PIPE AND FITTING TRACEABILITY WILL ONLY APPLY TO FUSIONS DONE IN BARCODE MODE.

To learn more about Pipe and Fitting Traceability, contact an authorized representative (See page 15).

ID Resistor Mode

****The Barcode Fusion Method is always preferred and should be used whenever possible.**

This setting controls whether ID Resistor Mode is “ON” or “OFF.” When it is turned “OFF,” ID Resistor Mode is completely disabled, and ID Resistor Fusions cannot be performed.

It is strongly recommended that ID Resistor Mode be turned “OFF” unless the operator is performing an actual ID Resistor Fusion.

When Option 3 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle through available ID Resistor Mode setting values. When the desired value is displayed, press the **START button** to save.

APPENDIX

Scanning Barcodes

Barcode Wand

When using a Barcode Wand, set the SMART SCANNER option in the Basic User Menu to “NO” (See page 33).

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 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™ IS NOT MULTI-LINGUAL. THE ONLY LANGUAGE AVAILABLE IS ENGLISH.

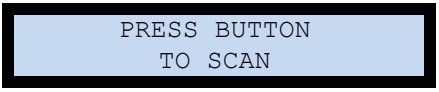
Smart Scan Mode

To operate the SMART Scanner™ in Smart 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:

- View fitting data on the SMART Scanner™ screen before beginning a fusion.
- START and STOP a fusion using the SMART Scanner™ button.
- Scan Pipe/Fitting Traceability barcodes.

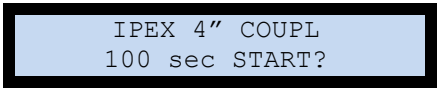
When operating in Smart Scan Mode, the SMART Scanner™ will provide operator feedback on the display to assist in the completion of the fusion without getting in and out of the ditch. When the SMART Scanner™ is powered up in Smart Scan Mode, the display will look something like this:

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



The processor is now ready for you to scan the fitting barcode and Pipe/Fitting Traceability barcodes (if enabled). See the Scanning Techniques section on page 40 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:



This should be the same data that is displayed on the screen of the processor and is an indication that the fusion is ready to be started. The fusion can be started by pressing and holding the **button** on the SMART Scanner™ for a few seconds. While the fusion is in progress, the SMART Scanner™ display will look something like this:

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 operator by showing the following message:

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

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 operator to connect the fitting, the current GPS position will be displayed after the satellites have been acquired. The screen will look something like this:

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 it 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.

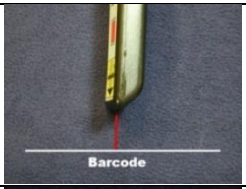
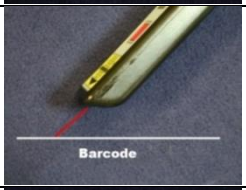
When the device is first started, it may take up to 2 minutes to acquire 5 satellites. During the acquisition process the display will look something like this:

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 47, or you can bypass the GPS data by simply connecting the fitting. The SMART Scanner™ will show you a message similar to the following:

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 aiming light 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™ perpendicular to the barcode to be scanned.
	YES	The aiming light should be centered and evenly spaced over the barcode to be scanned.
	NO	Do not hold the SMART Scanner™ so that the beveled scanning is parallel 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 aiming light at an angle to the barcode.
	NO	Make sure aiming light 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 return to the previous screen.) Repeat this procedure until all data is entered. When the **START button** is pressed after the last character, the processor will 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 operator 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

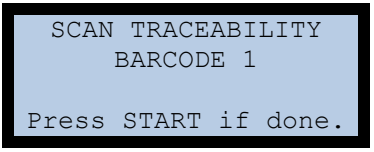
Pipe/Fitting

The Gas industry has been promoting the adoption of traceability barcodes by manufacturers of pipe and fittings, through the ASTM F2897-11 and ISO 12176-4 standards. These barcodes contain the manufacturer's data that pertains to the construction of the pipe/fittings that are being fused. For those manufacturers that have incorporated this traceability feature, it can be found on an additional barcode appearing on the pipe and fittings, separate from the standard fusion barcodes. Examples of these barcodes are shown below:

ASTM F2897-11	ISO 12176-4
	

The Pipe/Fitting Traceability option can only be enabled through the Features Menu (see page 35). When this option is set to "ON" or "OPT", in addition to the fitting barcode, the operator will be prompted to scan one or more traceability barcodes that are attached to the pipe and/or the fitting. This data will not affect the fusion; however, it will be associated with the fusion in the download.

If the Pipe/Fitting Traceability option is set to “ON” or “OPT,” the operator will be prompted to scan the barcodes immediately after the fitting barcode is scanned. The screen will look similar to the following:



You can scan one (1) or more traceability barcodes at this time, up to six (6) barcodes. When you scan multiple barcodes, the display will update accordingly to indicate the number of barcodes scanned.

THE OPERATOR MUST SCAN AT LEAST ONE (1) TRACEABILITY BARCODE UNLESS THE PIPE/FITTING OPTION IS SET TO “OPT” (OPTIONAL).

When you are finished scanning traceability barcodes, or if you do not wish to scan any traceability barcodes during this fusion, press the **START button** to advance to the VERIFY SETUP screen. Alternately, if the maximum number of traceability barcodes (6) has been scanned, the processor will automatically advance to the VERIFY SETUP screen.

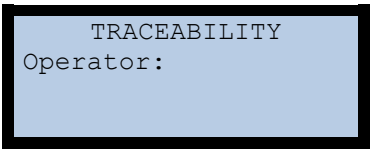
FOR DATA INTEGRITY REASONS, THERE IS NO METHOD TO MANUALLY INPUT TRACEABILITY DATA.

Operator ID

The Operator ID codes are an option that can only be enabled through the Advanced User Menu (see page 33), When enabled, Operator ID codes can be entered in two ways:

- “ON” requires the operator to manually enter an Operator ID code before a fusion may proceed.
- “SCAN” requires an operator to scan an ISO 12176-3 compliant Operator ID Badge before a fusion may proceed. Contact an authorized representative (See page 15) to find out more about generating this badge.

If Operator ID codes are enabled, the following screen will be displayed after the processor has passed its INTERNAL SELF TEST:



Operator ID codes entered here will be attached to all fusions performed by this processor until the power is turned off or the Operator ID code is changed. This Operator ID data will not affect the fusion but will be associated with each fusion in the download.

If the Operator ID function is set to “ON”, manually enter the desired Operator ID code. *See page 41 for details on how to enter data with the keypad*. Manually entered Operator ID codes can contain up to 10 characters and include letters and/or numbers. When the **START button** is pressed after the last character, the processor will advance to the CONNECT FITTING screen. See page 20 for details on how to perform a fusion.

If the Operator ID function is set to "SCAN", use a barcode wand or SMART Scanner™ to scan the desired Operator ID barcode. Press the **START button** to accept the scanned Operator ID and advance to the CONNECT FITTING screen. See page 20 for details on how to perform a fusion.

Calculated Resistance

An operator can perform a secondary Calculated Resistance check. See page 34 for an explanation how Calculated Resistance works and instructions how to turn the option on.

NOTE:

A secondary Calculated Resistance check can only be performed when fusing in Barcode or Manual Barcode Modes. It will not work if fusing in Manual Mode.

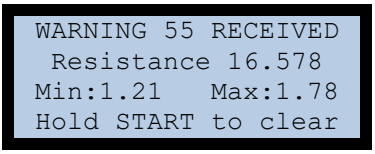
DO NOT TURN ON CALCULATED RESISTANCE UNLESS A 4-WIRE MEASUREMENT FAILS.

TURNING ON CALCULATED RESISTANCE DOES NOT GUARANTEE THAT A FUSION WILL BE SUCCESSFUL.

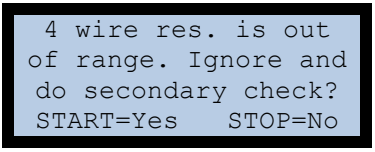
BEFORE TURNING ON CALCULATED RESISTANCE, ALWAYS CONFIRM WITH THE FITTING MANUFACTURER THAT IT IS AN ACCEPTABLE METHOD OF MEASUREMENT FOR THEIR SPECIFIED FITTING.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY THAT ALL INFORMATION DISPLAYED IS CORRECT PER THE FITTING MANUFACTURER'S RECOMMENDATIONS FOR FUSING THE ATTACHED FITTING UNDER THE CURRENT AMBIENT CONDITIONS.

If you press the **START button** to begin a fusion and receive Warning Code 55 (see page 54 for Error & Warning Code Definitions), the processor will display a screen similar to the following:



Press the **START button** to clear the warning code. The processor will display a screen similar to the following:

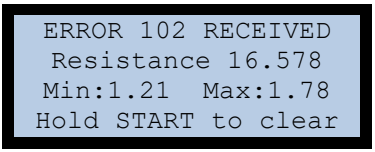


At this time, the operator has two options:

1. Cancel the fusion.
2. Perform a secondary check and attempt to continue fusing the fitting.

To CANCEL THE FUSION:

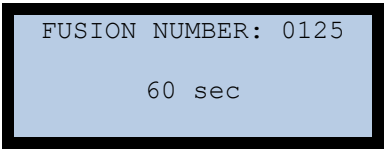
1. Press the **STOP button** to cancel the fusion now. The processor will display a screen similar to the following:



2. Press and hold the **START button** to clear the error code. Follow the prompts on the processor display. See page 54 for information how to troubleshoot an Error Code 102.

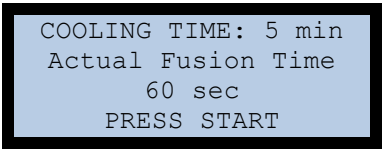
To PERFORM SECONDARY CHECK:

1. Press the **START button** to begin a Calculated Resistance check and attempt to continue the fusion. The processor will begin the fusion process and display a screen similar following:



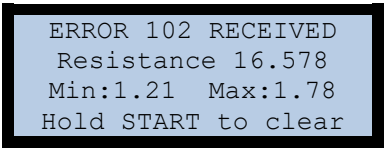
FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.

2. If the Calculated Resistance check is successful, the fusion will proceed normally. When the fusion is complete, a screen similar to the following will be displayed:



Press the **START button** to continue.

3. If the Calculated Resistance check fails, the processor will display a screen similar to the following:



Press and hold the **START button** to clear the error code. Follow the prompts on the processor display. See page 54 for information how to troubleshoot an Error Code 102.

Downloading Data

Data Stored

The following data is stored for each fusion that the processor performs. Depending on the processor model, data stored in the processor can be downloaded to a USB flash drive or wirelessly via Bluetooth with the EF Utilities app.

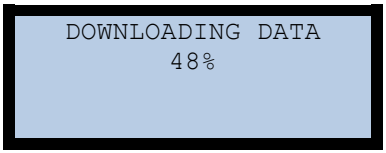
Field	Description
SN	The serial number of the processor.
Fusion #	The fusion number.
User Fusion #	The user resettable fusion counter.
Date	Date and time the fusion was performed.
Cal Due	The date that the calibration is due.
Cal Req.	TRUE if the calibration date was expired when the fusion was completed.
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 ID code if enabled.
Traceability	The pipe/fitting traceability codes if enabled.

Downloading to a USB Flash Drive (USB models only)

Fusion data from a ***Genesis F3™ USB Electrofusion Processor*** is downloaded onto an external USB flash drive. The data is output in a binary format that is compatible with a free macro-enabled Excel Spreadsheet available from IPEX USA LLC.

To download fusion data from the processor to a USB flash drive, perform the following steps:

1. Turn ON the processor and allow it to proceed through the INTERNAL SELF TEST until it reaches the CONNECT FITTING screen.
2. Plug a formatted USB flash drive into the Type A USB Port on the left side of the processor.
3. The USB flash drive will be detected automatically and the fusion data will be written to the drive.
4. A progress screen will be displayed as the download proceeds:



5. After the download is complete, the processor will return to the CONNECT FITTING screen. You may now disconnect the USB flash drive from the USB Port to resume normal operation.

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

THE USB FLASH DRIVE MUST BE FORMATTED USING FAT OR FAT32.

Downloading Wirelessly (Bluetooth models only)

Fusion data from a ***Genesis F3™ Bluetooth Electrofusion Processor*** is downloaded wirelessly through the EF Utilities app. Once the data has been downloaded, it can be viewed at any time with a smart phone, tablet, or computer.

To download fusion data from the processor to the EF Utilities app, perform the following steps:

1. Turn ON the processor and allow it to proceed through the INTERNAL SELF TEST until it reaches the CONNECT FITTING screen.
2. Open the EF Utilities app on your smart phone or tablet and select, “Connect to EF Machine.”
3. Follow the download instructions in the app.

All progress indications and user feedback are communicated through the EF Utilities app which is available on the iOS and Android app stores. To set up an account and register your Bluetooth electrofusion processor(s), contact IPEX USA LLC.

GPS

The optional GPS in the SMART Scanner™ can be used to record the latitude and longitude of the processor where 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, are 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 may be caused by:

- Antenna orientation.
- Obstructions such as buildings or trees.
- Weather conditions.

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) pointing up and with a clear view of the sky.

When the device is in the CONNECT FITTING screen, the "-" in 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, 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, buildings, or even clouds in between the satellite and the receiver can also produce an 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 OPERATOR TO DETERMINE THE GENERAL LOCATION WHERE THE FITTING CAN BE FOUND.

Position Error Indicator

The Position Error Indicator gives the operator an indication of how much confidence the operator 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 operator.
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 a value of 2 should not be used although the SMART Scanner™ will not prohibit the operator 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

Important Notes

- The fuse protects the internal electronic circuitry. If the display lights up when power is turned on, you DO NOT need to replace the fuse.
- This procedure should only be performed in a “shop” environment, never a “field” environment.
- The most probable cause of fuse failure is a defective or inappropriately sized generator. If you have a fuse problem, check your generator first.

Tools Required

- 1/8” Flat Blade Screwdriver
- 5 X 20mm, 250V, 2 Amp Slow Blow Fuse

Use a Cooper Bussmann Fuse (Part# 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

When installing electrofusion fittings in field applications, it is necessary to have a reliable source of AC power for the electrofusion processor. This AC power source should:

- be well maintained and subjected to a periodic maintenance schedule.
- provide output voltage within the specified operating range.
- contain a matching outlet, which is required to connect 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 power source for the processor. However, it is not always practical to gain access this kind of power source in field applications. When fusing with utility power, a dedicated connection to the service panel is recommended because the potential amperage draw is very high.

Generators

Fuel powered generators are also a good power source of electrical power for the electrofusion processors. Always make note of the minimum fitting power requirements. Additional power capacity is recommended for intangibles (i.e. powering other accessories, wear and tear, etc.). Before starting a fusion, it is important to make sure:

- 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 ***Genesis F3™ Electrofusion Processors***, 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 vary depending on the fitting manufacturer, fitting size and ambient temperature.

Every generator manufacturer determines the size of their generators differently. For example, a 5,000 watt generator from one company may or may not be equivalent to a 5,000 watt generator from another company.

When determining the correct generator size, an operator must:

1. Determine the maximum current required to fuse a particular fitting. This information can be obtained from the fitting manufacturer. **Please note, the largest fitting does not necessarily require the most current.**
2. Once the maximum fitting current has been established, divide this number by 1.90 to calculate the amount of current required by the generator.
3. After the current required by the generator has been obtained, multiply that number by 120 to obtain the number of watts the generator will need to supply in order to successfully perform a fusion.

   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, to fuse a fitting requiring 50 amps, the operator needs a 3,200 watt generator capable of supplying 26.3 amps continuously. Also note that the generator must be capable of supplying this amount of current for sustained periods of time (10 or more minutes). Consult the generator's manufacturer to make sure the output meets this requirement.

NOTE:
This is an oversimplified calculation. However, it is a good rule of thumb and will work in most cases. Please contact our service department if you would like to discuss generator sizing issues in more detail (See page 15).

Extension Cords

Because electrofusion fittings produce a high amperage draw, the use of an extension cord is not encouraged. However, in the event such usage is necessary, the following lengths and wire gauges are recommended:

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

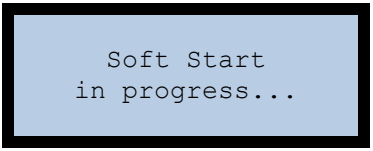
Extension cords should not be used on 14" and larger couplers.

A pigtail converts a 30 amp twist-lock to a 15 amp straight-blade plug. It is designed to power the processor when a NEMA L5 socket is not available, especially while downloading. Its use is not recommended in field applications with electrofusion fittings.

Soft Start

When a fusion operation begins, the initial output level starts low and then increases to full output. The time that it takes the processor to reach full output is called the Soft Start. The length of the Soft Start varies depending on the length of the fusion time requested for a particular fitting. Some fittings can take up to 10 seconds to reach full output levels.

While the Soft Start is in progress, you may see a screen similar to the following:



The screen is displayed until the full requested output level is reached. Once at full output level, the processor will proceed to the Fusion Countdown screen which shows the fusion counter and number of seconds left until the fusion is complete (See page 29).

If the breaker on a generator repeatedly trips during the Soft Start portion of the fusion operation, try to resolve the issue first by eliminating other potential causes, such as an inadequately sized generator, an incorrectly rated input plug, input adapters, extension cords, or other equipment being powered by the same generator.

If the breaker on the generator continues to trip during the Soft Start even after eliminating other possible causes, you can try resolving the issue by adjusting the processor's initial output level. See page 35 for instructions how to access the Soft Start Adjustment setting.

The default initial output level is 0%. It should be kept at this level unless it is necessary to adjust it. Start by increasing the initial output level to 25%. If the processor continues to trip the breaker on the generator, call our service center for additional support. ***DO NOT increase the initial output level above 25% unless instructed to do so by a service technician.***

NOTE:

Adjusting the initial output level is a potential resolution ONLY if the breaker repeatedly trips during the Soft Start portion of the fusion operation. If the breaker trips after the Soft Start, adjusting the initial output level will not resolve the issue.

DO NOT MAKE ADJUSTMENTS TO THE SOFT START INITIAL VALUE IF THE BREAKER ON THE GENERATOR TRIPS AFTER THE PROCESSOR HAS REACHED FULL OUTPUT LEVELS.

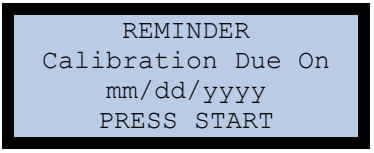
REMEMBER TO RULE OUT OTHER POTENTIAL CAUSES FOR THE TRIPPED BREAKER BEFORE ATTEMPTING A SOFT START ADJUSTMENT.

Calibration Warnings

The ***Genesis F3™ Electrofusion Processor*** is programmed to provide operators with plenty of time to schedule a calibration. As the calibration due date approaches, the processor will display reminders whenever the machine is powered on. The reminders are displayed according to the following schedule:

Interval	Frequency
60 days	60 days before the calibration due date, the operator will receive a reminder on that day only.
30 days	30 days before the calibration due date, the operator will receive a reminder on that day only.
15 days	Beginning 15 days before the calibration due date, the operator will receive a reminder every time the machine is turned on.

The calibration reminder will look similar to this:



The text mm/dd/yyyy shows the month, day and year that the calibration is due. On this date, the processor will start displaying Error 113. Press the **START button** to bypass the screen.

THIS IS ONLY A REMINDER TO ASSIST WITH SCHEDULING AND DOES NOT INDICATE THAT THE PROCESSOR NEEDS A CALIBRATION. IT IS OK TO CONTINUE USING THE MACHINE.

To schedule a calibration, please see page 15 for instructions and contact information.

Temperature Measurements

The processor's temperature sensor is located near the end of the output cable in the barcode wand/SMART Scanner™ connector. The temperature sensor does not respond immediately to thermal changes. In order to ensure accurate ambient temperature measurements, the output 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 ***Genesis F3™ Electrofusion Processor*** in Barcode Fusion Mode or Manual Barcode Mode to fuse fittings that require temperature compensation, it is essential that care be given to ensure 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 processor in Manual Mode to fuse fittings that require temperature compensation, it is necessary to manually enter the appropriately adjusted time as specified by the fitting manufacturer.

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

WARNING & ERROR CODES

Warning Codes

A warning code will be displayed when a situation exists that (in the manufacturer's opinion) may adversely affect the performance of the processor over time. Warning codes are designed for informational purposes only and have no effect on the outcome of a fusion. A warning code could be displayed either before or after a fusion and will require user acknowledgement before normal operation can resume.

IT IS STRONGLY RECOMMENDED THAT OPERATORS FAMILIARIZE THEMSELVES WITH ALL WARNING CODES AND THEIR CAUSES AND ADHERE TO THE RECOMMENDATIONS BELOW WHEN THEY ARE RECEIVED.

Code	Description	Cause	Recommendation
55	Resistance out of range	Occurs when the measured resistance does not match the resistance identified in the fitting barcode. Only applies when Calculated Resistance setting is turned on.	The operator may choose to continue and perform a secondary Calculated Resistance check, or they may cancel the fusion and resolve the problem. See Error Code 102 for possible resolutions. ***USING CALCULATED RESISTANCE IS NOT RECOMMENDED UNLESS A 4-WIRE MEASUREMENT FAILS. SEE PAGE 34 FOR DETAILS.***

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 barcode 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 *(See page 7)*. If the temperature displayed differs significantly from the actual temperature, then there is a processor problem and it must be returned for service.
102	Measured resistance does not match resistance identified in the barcode.	Check the Output Lead Ends and fitting adapters for excessive wear and/or damage. If the Output Lead Ends and fitting 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 shorted coil.
105	Can't maintain output voltage.	Verify that the Output Lead Ends are clean, the power supply is sized correctly for the fitting you are fusing, and the power supply is operating correctly.

Code	Problem	Resolution
108	The power supply was shut off during the previous fusion.	This could be anything from an improperly sized generator to someone switching the processor off during a fusion.
109	Referenced voltage out of tolerance.	Processor 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 in 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 processor should be returned for service.
113	The calibration date has expired.	Send the processor in for calibration.
114	There is no valid calibration date set.	Send the processor in for calibration.
115	The processor is not capable of outputting the current required to fuse this fitting.	As long as the fitting's 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 Lead Ends, if the problem persists, the processor 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 and frequency displayed on the CONNECT FITTING screen are reasonable and within the range specified in the Specification Table *(See page 7)*. If the parameters displayed differ significantly from the actual input, then there is a processor problem and it must be returned for service.
118	Frequency is out of range and the fusion cannot start.	
119	Internal processor 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 *(See page 7)*. If the temperature displayed differs significantly from the actual temperature, then there is a processor 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 operator privileges for the functions this machine is capable of performing.	

Code	Problem	Resolution
124	Current offset is out of spec.	Processor 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 that the fitting and the processor both support the Resistor ID method. If so, the problem is with the fitting, the output cable, or the processor calibration. If the problem persists with multiple fittings, the processor will have to be returned for service.
130	The fitting was disconnected before the specified cooling time.	Do not disconnect the fitting before the manufacturer's recommended cooling time has expired.
131	An undefined error was received before the fusion time was completed.	Processor must be returned for service.
132	Processor supports voltage control only and fusion specified is not voltage control.	Not all processors support current or energy control. Attach a fitting that requires voltage control or contact an authorized representative *(See page 15)* to see if an update is available for your processor.
138	The fitting was disconnected before the specified countdown time elapsed.	Do not disconnect the fitting before the manufacturer's recommended countdown time has expired.
140	The fusion was shutoff to protect the processor from damage due to extremely high fusion current.	This is typically caused when a direct short is made across the Output Lead Ends. If there are no obvious problems with the fitting or the output cable, then the processor 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 (2) times unless directed to do 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 manufacturer's 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 make sure that the processor is the only device operating on the circuit.
145	There is an error communicating with the USB Flash Drive.	Make sure the drive is formatted as FAT or FAT32 with a cluster size of 512 bytes.

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