

New B.O.S.S. III

Lead Acid Electrofusion Processor Manual

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Safety

- Please read and understand this instruction manual before using the **B.O.S.S. III Lead Acid Electrofusion Processor**.
- Gas company safety standards and precautions should be followed at all times.
- You should regularly inspect the batteries and charger for damage. The charger does not contain any serviceable components. If this component gets damaged it will need to be replaced.
- Do not use or store the **B.O.S.S. III Lead Acid Electrofusion Processor** where volatile gas concentrations may be present.
- Only properly trained and qualified personnel should operate the **B.O.S.S. III Lead Acid Electrofusion Processor**.
- Treat electrical equipment as a potential source of ignition and follow proper practices for working in an explosive atmosphere.
- Power source and Fusion Processor must be located out of the trench.
- Only use fusion information supplied by the manufacturer of the fitting.
- Under no circumstances should the **B.O.S.S. III Lead Acid Electrofusion Processor** enclosure be opened. All warranties are void if the factory seal has been broken.

Warranty

The **B.O.S.S. III Lead Acid Electrofusion Processor** is warranted against defects in materials and workmanship for a period of one year. If notice is received of any such defects during the warranty period, the manufacture will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

The warranty period begins on the date of delivery.

The warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) parts or supplies not supplied by the manufacture (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.

Things You Should Do

- **DO** turn the processor off when not in use
- **DO** recharge the batteries fully after each daily use.
- **DO** be sure that the fitting adaptors are connected tightly.

Things You Should NOT Do

- **DO NOT** pull on the input or the output cables.
- **DO NOT** place the processor in water.
- **DO NOT** store the unit outside.
- **DO NOT** leave the processor in the rain.
- **DO NOT** wash with a hose.

Introduction

PREFACE

The information contained herein is the technical data and specifications for the **B.O.S.S. III Lead Acid Electrofusion Processor**.

This publication was written to assist trained personnel in the proper procedures and operating functions of the **B.O.S.S. III Lead Acid Electrofusion Processor**.

Operation of the **B.O.S.S. III Lead Acid Electrofusion Processor** should only be performed by trained and qualified personnel.

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

FEATURES

The **B.O.S.S. III Lead Acid Electrofusion Processor**:

- is a reliable, easy-to-use, rugged tool designed to withstand conditions found at typical construction sites throughout the world.
- is a battery powered processor designed to fuse electrofusion fittings for service installations and small diameter repairs without the use of a generator.
- is splash proof and highly shock resistant. The processor can fuse all manufacturers' fittings at voltages ranging from 8 to 48 volts.
- is most efficiently and reliably operated in the barcode mode, however it can be operated in a variety of manual modes and is equipped to fuse Georg Fischer Central Plastics ID fittings.
- has an intuitive user interface and requires minimal operator training.
- is equipped with internal memory for data storage and can be downloaded to determine installation conditions and fusion cycle status.

SPECIFICATIONS

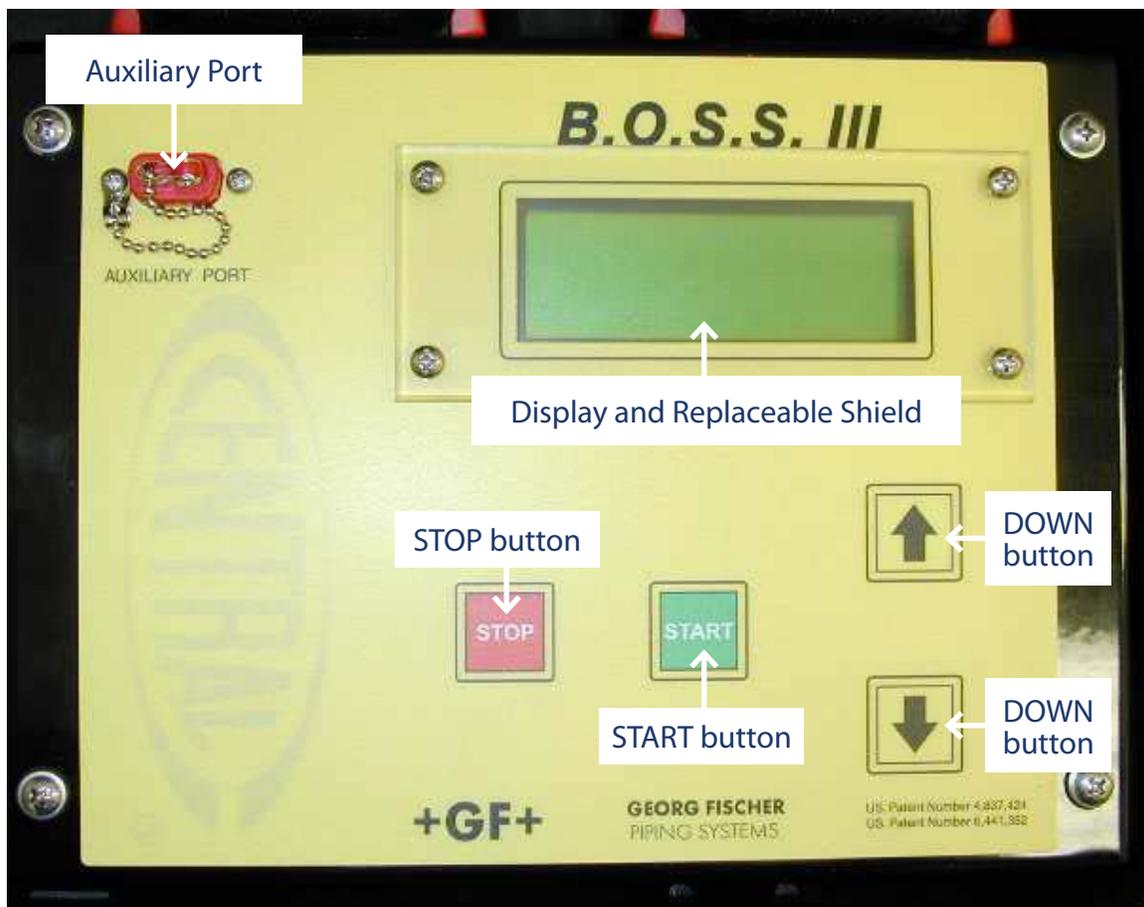
Parameter	Value
Supply Voltage	48 VDC
Maximum Output Current	35 Amps AC
Output Voltage	8 VAC to 48 VAC +/- 1.5%
Operating Temperature Range	0°F to 140°F
Battery storage Temperature	0°F to 104°F
Operating Modes	Barcode, Manual, Resistor ID
Fusion Information Storage	4000 Fusions
Download Port	Serial
Serial Port Specifications	9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity
Languages	English
Fitting Adapters	4.7mm
Environmental Protection	IP54 Splash-Proof
Calibration Interval	1 Year
Warranty	1 Year (Extended Warranty Option Available)

DESCRIPTIONS OF CONTROLS

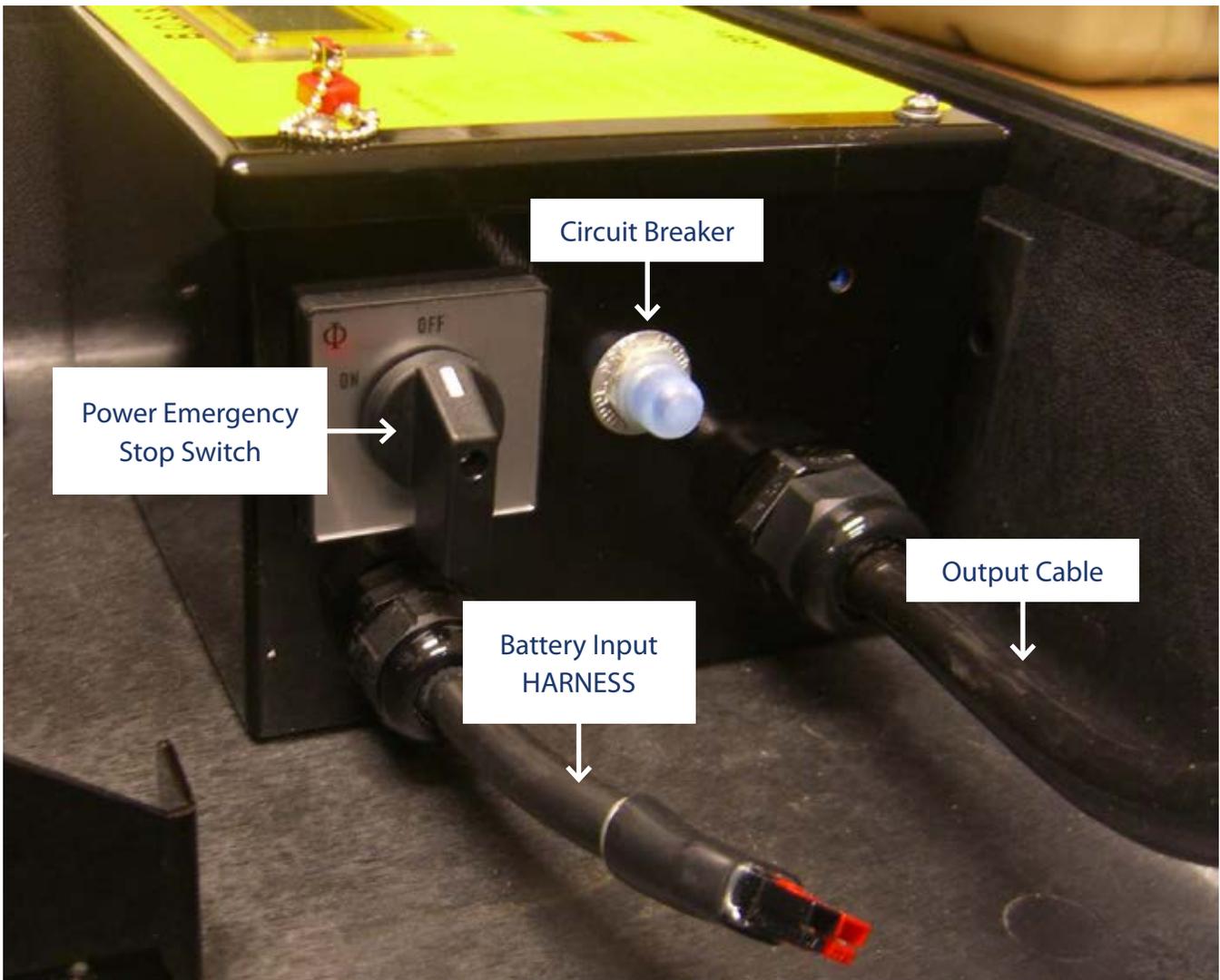
NOTES:

1. References to controls in this section are displayed exactly as they appear throughout the remainder of this document.
2. The GREEN button may mean START or CONTINUE depending upon the context of the operation being performed at the time.
3. The RED button may mean STOP or RESET 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 "-")

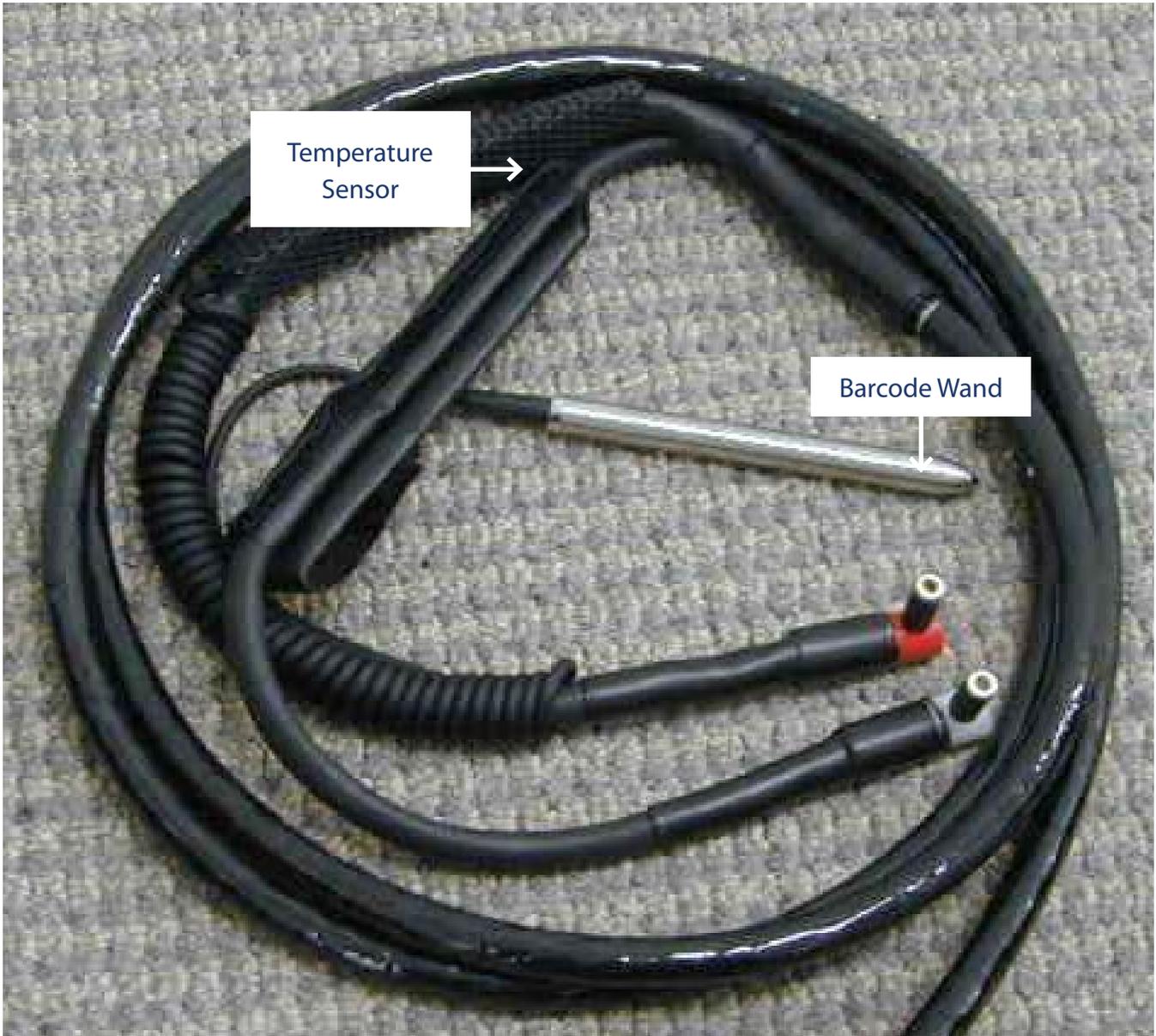
Faceplate View



Left Side View



Output Cable



BATTERY INSTALLATION AND REMOVAL

The battery pack used in the **B.O.S.S. III Lead Acid Electrofusion Processor** is held in place by a steel bracket which is attached to the back right corner of the processors outer case. When the lid of the case is closed it comes in contact with the rubber bumpers on top of the battery pack trapping it within the bracket. As a result of this mounting technique the battery pack is held firmly in place during transit and can easily be removed or replaced without the use of tools while in use.

Removing the battery pack from its mounting bracket is a simple two-step process.

1. Disconnect the wire harness attaching the battery pack to the processor.
2. Grasp the pack with two hands and lift it vertically out of the mounting bracket.

To reinstall the battery pack simply preform the previous two steps in reverse.

1. Grasp the pack with two hands and lower it vertically into the mounting bracket. Orient the pack so the wire harness is pointing to your left during reinstallation.
2. Reconnect the wire harness to the processor.

THE CONNECTION BETWEEN THE BATTERY PACK AND THE PROCESSOR IS POLARITY SENSITIVE. THE POSITIVE AND NEGATIVE TERMINALS ON THE BATTERY PACK ARE COLOR CODED AND THE CONNECTORS THEMSELVES ARE DESIGNED IN SUCH A WAY TO PREVENT INCORRECT INSTALLATION.

UNDER NO CIRCUMSTANCES SHOULD THE CONNECTORS BE FORCED TOGETHER. IF FOR ANY REASON THIS CONNECTION BECOMES DAMAGED IT SHOULD BE REPAIRED IMMEDIATELY BEFORE BEING PUT BACK INTO SERVICE.

OUTPUT CABLE STORAGE

The **B.O.S.S. III Lead Acid Electrofusion Processor** is designed to be a very compact, yet versatile fusion tool. Due to its small size and high output capability, you may find it difficult to store the output cable in the space provided when the processor is not in use. Stowing the output cable is actually quite easy to do and only takes about 15 seconds to get the job done. The following pictures and accompanying text illustrate process clearly.



The key to this process is using all of the available space to wrap the cables.

1. Start by disconnecting the battery pack from the wire harness attached to the processor. This is done to provide additional room and also prevents the power switch from accidentally being turned ON while the processor is being transported.
2. Begin wrapping the cable in a clockwise direction following the contours of the available space. As more of the cable is wrapped it will begin to climb the wall of the case leaving a void down the center of the coil. In the picture above roughly 80% of the cable has already been wrapped.
3. Once the coil has reached the top of the case, wrap the remainder of the cable in the center of the coil using the same technique as above. The picture below shows the cable completely wrapped and ready for the lid to be closed.



CUSTOMER RESPONSIBILITIES

The **B.O.S.S. III Lead Acid Electrofusion Processor** is a reliable, easy-to-use, rugged tool designed to withstand the conditions found at construction sites around the world. With proper care, the unit will perform for many years.

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

1. The **B.O.S.S. III Lead Acid Electrofusion Processor** is splash resistant, **NOT WATERPROOF**. It should be stored in a clean, dry environment at a temperature between 0-120°F. **DO NOT STORE THE UNIT OUTSIDE. DO NOT WASH THE UNIT WITH A HOSE.**
2. The enclosure is very durable and shock resistant; however, do not subject the processor to any unnecessary shocks or stresses including but not limited to:
 - Tossing the processor into or out of a vehicle
 - Dropping the processor
 - Dragging the processor by the leads
3. Subscribe to the calibration service offered by the manufacture of the **B.O.S.S. III Lead Acid Electrofusion Processor**

The **B.O.S.S. III Lead Acid Electrofusion Processor** will provide the proper outputs for a complete fusion based on the inputs received from the scanned barcode (in Barcode mode), from the fitting itself (in Georg Fischer Central Plastics ID mode) or from the operator (in one of the alternate fusion modes). Whenever possible, the Georg Fischer Central Plastics ID mode or the Barcode mode should be used.

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

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

Always verify the voltage and time displayed on the LCD 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 from the fitting manufacturer.

SERVICE RECOMMENDATIONS

Customer Maintenance

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

1. Keep the area around the Temperature Sensor clean and free of obstructions by wiping with a soft dry towel. This is a critical area to keep clean, as dirt will affect the ambient temperature reading. The temperature reading is used to compensate fusion times based on the ambient temperature during a barcode fusion. If this sensor is reading incorrectly, fusion times may be affected and the integrity of the fusion may be compromised.
2. Make sure the fitting adapters are clean and properly attached to the output cable. Failure to do so may result in an improper output applied to the fitting.
3. Be sure to recharge the batteries fully after each days use.
 - **Refer to page 39** for detailed instructions on the care and handling of the batteries
4. Proper care of the Processor and Output Cable will greatly extend the life of the B.O.S.S. III Lead Acid Processor and will help reduce service times and costs.

Factory Service

It is strongly recommended that each unit be returned once every three years for factory calibration. This will ensure that the **B.O.S.S. III Processor** is in proper calibration and will enable any potential problems to be identified early.

When the calibration period has expired the unit will display the message, Calibration Required, informing the user that calibration is required. This will not prevent the processor from performing fusions, however, the unit should be returned as soon as possible for calibration.

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

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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 2 business days.

Repair and calibration returns should be sent to:

E.F. Technologies
119B Sandy Drive
Newark, DE 19713

**CONSULT YOUR CARRIER FOR THE PROPER METHOD OF PACKAGING
THE UNIT FOR RETURN SHIPMENTS.**

ALWAYS INSURE THE PACKAGE FOR THE FULL REPLACEMENT VALUE.

**KEEP IN MIND THAT MOST CARRIERS WILL NOT HONOR INSURANCE CLAIMS IF THE
PRODUCT IS NOT SHIPPED IN ACCORDANCE WITH THEIR GUIDELINES.**

EF TECHNOLOGIES IS NOT RESPONSIBLE FOR DAMAGE CAUSED IN SHIPPING.

Service Contracts/Extended Warranty Plans

Contact EF Technologies at (302) 451-1088 for details regarding service contracts and extended warranty programs.

General Operation

MODES OF OPERATION

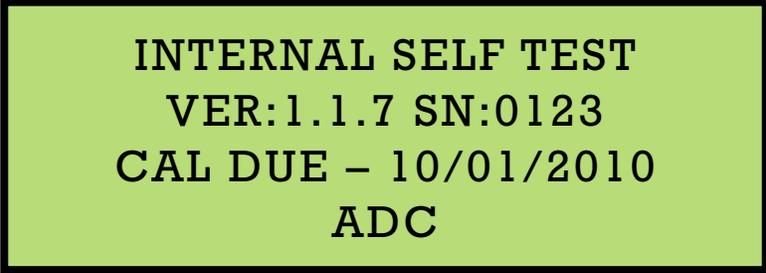
The **B.O.S.S. III Lead Acid Electrofusion Processor** has four modes of operation:

1. **Barcode Mode** - infers that fusion parameters are input into the processor by scanning the barcode label. When a label is scanned at the appropriate prompt, the processor deciphers fusion parameters from the barcode value. Barcode values typically indicate the following fitting details: manufacturer, type, size, energy (voltage), fusion time, cool time, resistance, tolerance, and compensation factors.
2. **Georg Fischer Central Plastics ID Mode** - infers that fusion time is specified by measuring the value of a resistor molded into the fitting and decoding that value into a time.
3. **Manual Barcode Mode** – infers that the fusion parameters are obtained from a 24 digit barcode number that the user manually inputs from the keypad.
4. **Manual Mode** - infers that the fusion voltage and time are obtained directly from the user at the time of the fusion. Manual mode should only be used when the barcode/Georg Fischer Central Plastics ID mode is malfunctioning or unavailable. In this mode, it is difficult to insure the proper implementation of time/temperature compensation for fittings requiring this feature. Since compensation factors vary for different fitting types and manufacturers, the fitting manufacturer should be consulted to verify proper fusion time, voltage, and cooling time.

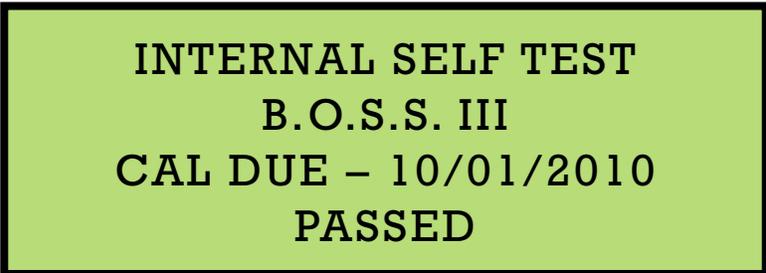
POWER UP

Plug the batteries in and turn the **Power/Emergency Stop Switch** from the **OFF** to **ON** position.

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

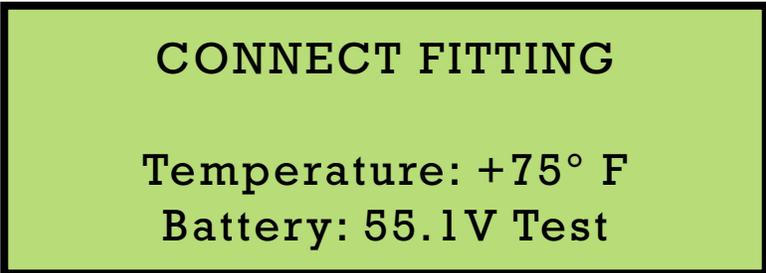


INTERNAL SELF TEST
VER:1.1.7 SN:0123
CAL DUE - 10/01/2010
ADC



INTERNAL SELF TEST
B.O.S.S. III
CAL DUE - 10/01/2010
PASSED

After SELF TEST, if the Processor is equipped, the TRACEABILITY SCREEN will be displayed. If this screen appears see page 31 for instructions on how to enter the data. After the traceability data is entered the Processor will display the CONNECT FITTING SCREEN which should appear similar to the following example.



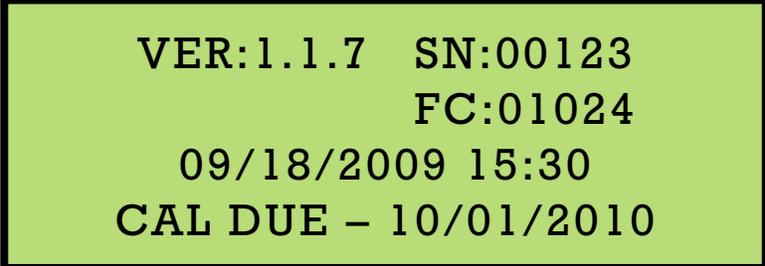
CONNECT FITTING
Temperature: +75° F
Battery: 55.1V Test

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

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

The last line indicates the battery voltage and reminds the user to test the battery capacity before proceeding. For detailed instructions on the care and handling of the batteries/charger consult the Milwaukee® Tool manual PN 58-14-3910d2. A copy of this manual was supplied with the processor or can be downloaded online.

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



VER:1.1.7 SN:00123
FC:01024
09/18/2009 15:30
CAL DUE - 10/01/2010

This screen shows the following information:

- Software version of the Processor (In this case version 1.1.7).
- Processor serial number (In this case, 00123).
- The number of fusions the Processor has done (In this case, 1024).
- The Date and time (In this case Sept 18, 2009 at 3:30 PM)
- The date the Processor will be due for calibration (In this case it is due October 1, 2010)

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

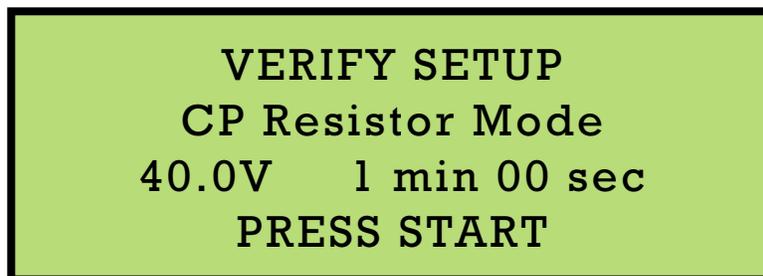
GEORG FISCHER CENTRAL PLASTICS ID MODE FUSIONS

When beginning a Georg Fischer Central Plastics ID Mode fusion, start from the CONNECT FITTING SCREEN.

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



If a valid Georg Fischer Central Plastics Resistor Mode fitting is detected, a screen similar to the following will be displayed.



This screen shows the following information:

- The current fusion mode (Georg Fischer Central Plastics ID in this case).
- The requested output (40.0 Volts)
- The fusion time in minutes and seconds (1 min 00 sec in this case).

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

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

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VERIFY SETUP
CP Resistor Mode
40.0V 1 min 00 sec
PRESS START

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

See page 25 for instructions on monitoring the progress of a fusion.

If a valid Georg Fischer Central Plastics Resistor Mode fitting is not detected, the **B.O.S.S. III Lead Acid Processor** will default to a barcode fusion and will prompt the user to scan a barcode. See page 15 for instructions detailing how to complete a barcode fusion.

If a Georg Fischer Central Plastics Resistor Mode fusion does not begin and the **B.O.S.S. III Lead Acid Processor** as well as the fitting to be fused supports this mode, try switching the **Output Leads** on the fitting. They are polarity sensitive. The red end must attach to the ID pin on the fitting.

BARCODE FUSIONS

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

Connect the **Output Leads** to the fitting. If performing a barcode fusion on a fitting with Georg Fischer Central Plastics ID capabilities, be sure to connect the white lead to the ID pin on the fitting. When the **Output Leads** are connected to the fitting, the processor will verify the fitting resistance and display the following screen.



Scan the barcode from the fitting attached to the processor. Remove the Barcode Wand from the protective sheath. While holding the wand at a slight angle, as you would a pencil, position the point slightly to one side of the label and move the wand rapidly across the barcode stopping at a point slightly off the label on the other side.

NOTE:

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

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

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

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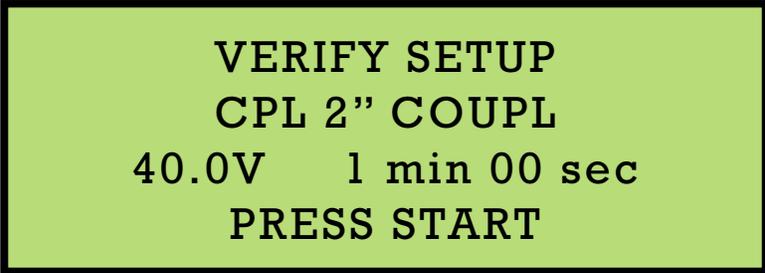


SCAN BARCODE

NOTE:

If the barcode wand is inoperative, **please consult the section on page 22** for details about how a fusion can be completed without using the barcode wand.

Once the barcode has been successfully scanned, the **B.O.S.S. III Lead Acid Processor** will display a screen similar to the following.



VERIFY SETUP
CPL 2" COUPL
40.0V 1 min 00 sec
PRESS START

This screen shows the following information:

- The fitting type (CPL 2" Coupler).
- The requested output (40.0 Volts)
- The fusion time in minutes and seconds (1 min 00 sec in this case).

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

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

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

See page 25 for instructions on monitoring the progress of a fusion.

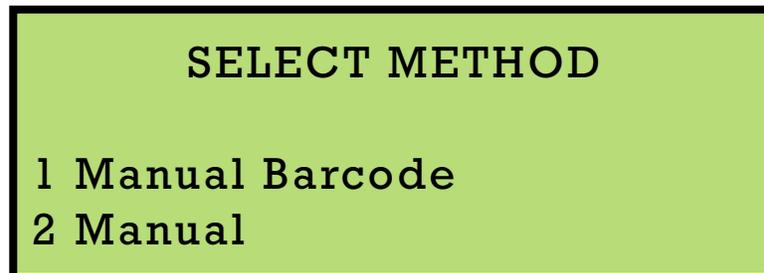
ALTERNATE FUSION METHODS

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

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

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

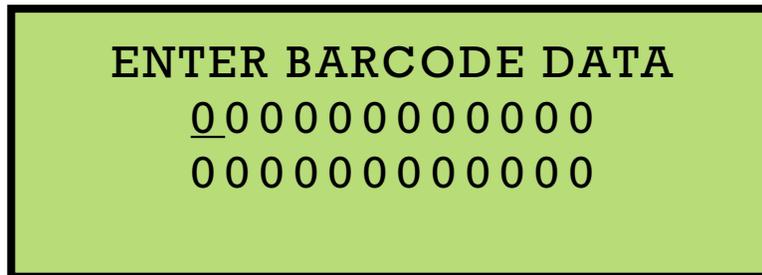
The Alternate welding selection screen looks like the following:



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

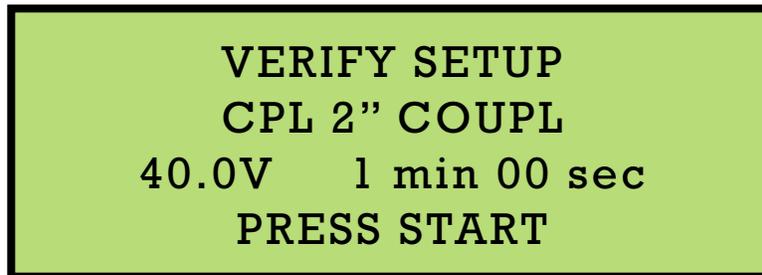
Manual Barcode Entry

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



The cursor will begin under the first digit of the barcode. Enter the data from the barcode attached to the fitting to be fused using the keypad (**see Entering Data with the Keypad on page 31**). Once the data has been entered, press the **START button** one last time to decode the information.

If no errors were encountered, the **B.O.S.S. III Lead Acid Processor** will display a screen similar to the following.



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

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

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

See page 25 for instructions on monitoring the progress of a fusion.

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

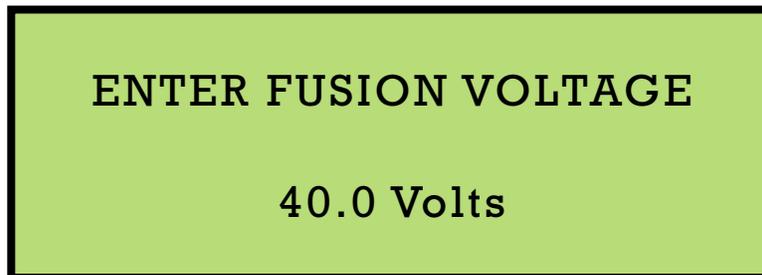
Manual Data Entry

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

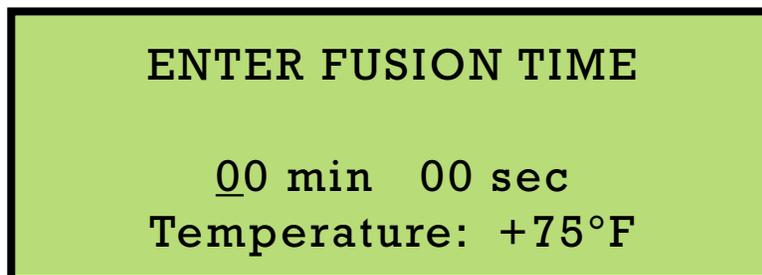
NOTE:

The **B.O.S.S. III Lead Acid Processor** will provide the appropriate outputs for a complete fusion based on the inputs entered by the operator. Therefore, be sure to enter the information **EXACTLY** as specified by the fitting manufacturer.

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

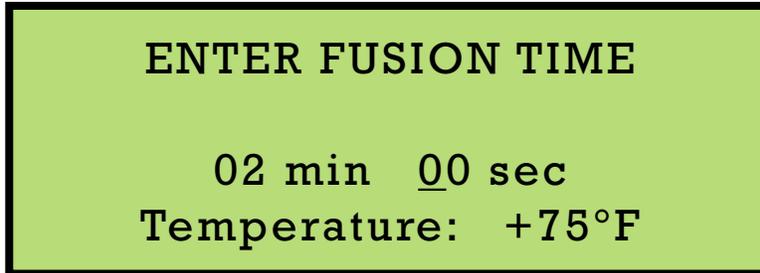


Enter the voltage by using the **UP button** and **DOWN button** to increment and decrement the value. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired output level is displayed, press the **START button**. The following screen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



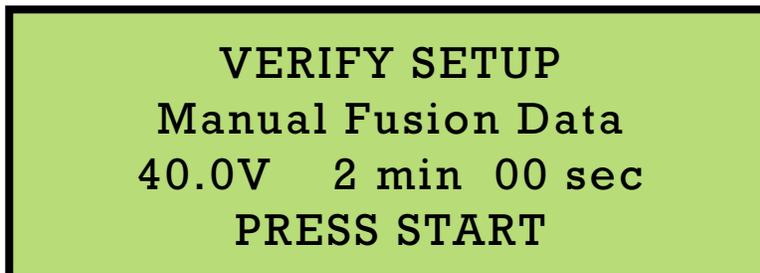
Enter the number of minutes to fuse using the **UP button** and **DOWN button** to increment and decrement the current value by 1 minute. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired time is displayed, press the **START button**. The following screen will be displayed.

continued next page



Enter the number of seconds to fuse using the **UP button** and **DOWN button** to increment and decrement the current value by 1 second. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired time is displayed, press the **START button**.

Once the data has been successfully entered, the **B.O.S.S. III Lead Acid Processor** will display a screen similar to the following.



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

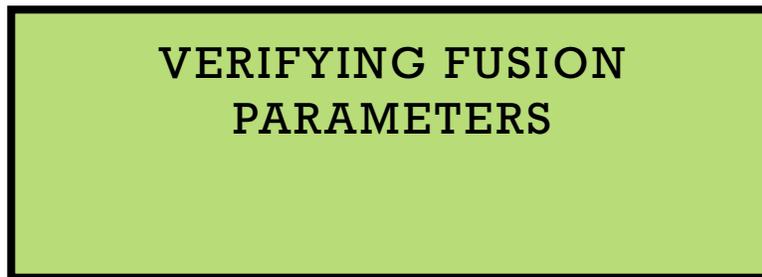
This screen simply confirms the fusion data and gives you a chance to check the setup before the fusion begins. Once you have verified that everything is OK, simply press the **START button** to begin the fusion.

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

See page 25 for instructions on monitoring the progress of a fusion.

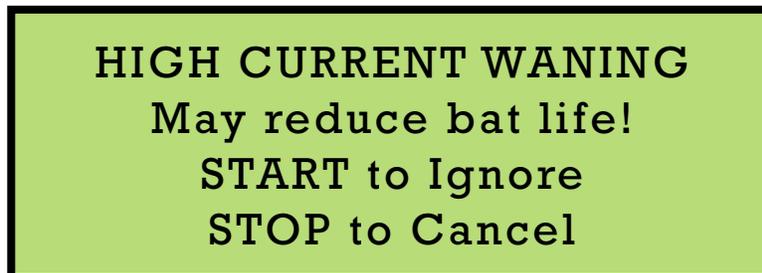
MONITORING A FUSION'S PROGRESS

Once the **START button** is pressed the fusion process will begin. The fusion process begins with a fitting resistance verification. During the verification process, the **B.O.S.S. III Lead Acid Processor** will display a screen similar to the following.



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

After the resistance check, the **B.O.S.S. III Lead Acid Processor** will perform a high current test. This test is done to protect the batteries and the processor from physical damage. If the current is within the specified limits the fusion will proceed normally. If the current is too high an error 115 will be displayed and you will not be allowed to continue ([see Error Codes on page 41](#)). If the current is marginally high the following warning will be displayed.

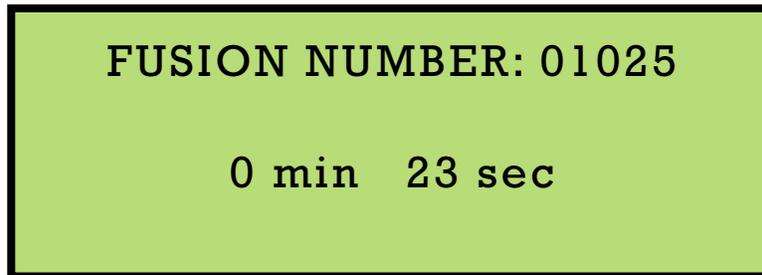


This warning can be ignored by pressing the **START button** and the fusion will begin normally. Press the **STOP button** to cancel the fusion.

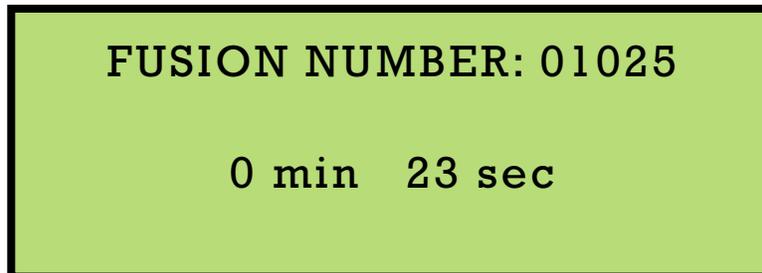
NOTE:

Although no physical damage will occur to the processor if this error is ignored, repeated fusions at levels higher than the processor is rated will result in decreased battery life.

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



This screen displays the number of the current fusion as well as the time remaining (0 minutes 23 seconds in this case). If you desire to see more detailed information, press and hold the **UP button** to display the following detailed fusion information screen.



This screen displays the following information:

The most recently measured voltage and current outputs of the processor.

- The total energy expended during this fusion , in amp-hours (In this case 0.085 amp-hours.)
- **Note:** This number increases during the fusion process as energy is expended. The present measured voltage of the battery (In this case 49.0 volts). For detailed care and handling of the batteries/charger consult the Milwaukee Tool manual PN 58-14-3910d2. A copy of this manual was supplied with the processor or can be downloaded online.

NOTE:

As the capacity of the battery decreases, the battery voltage will be closer and closer to the output voltage. A good way to judge the strength of the batteries is to take a look at these two numbers while you are fusing. If the battery voltage drops quickly even immediately after a charge, it is an indication that the batteries are reaching the end of their life.

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

Barcode Mode

The cooling time will be displayed if a barcode fusion was performed.

A green rectangular display screen with a black border showing the following text:

COOLING TIME 5 min
Actual Fusion Time
2 min 00 sec
PRESS START

The first line indicates the cooling time if specified. The third line indicates the actual amount of time that the fitting was fused. Press the **START button** to continue.

Central ID Mode

The check clamp time will be displayed if a Central ID fusion was performed.

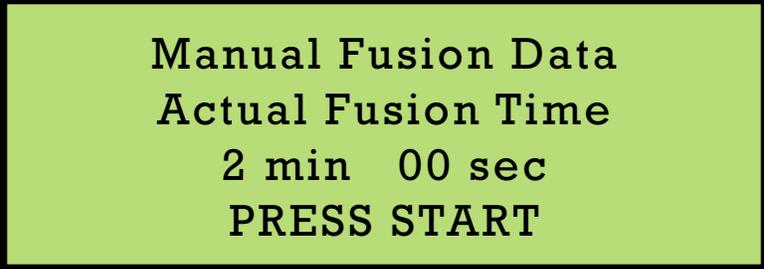
A green rectangular display screen with a black border showing the following text:

CLAMP TIME ON LABEL
Actual Fusion Time
2 min 00 sec
PRESS START

The third line indicates the actual amount of time that the fitting was fused. Press the **START button** to continue.

Manual Fusion

The following screen will be displayed if a Manual Fusion was performed.

A green rectangular screen with a black border containing the following text:

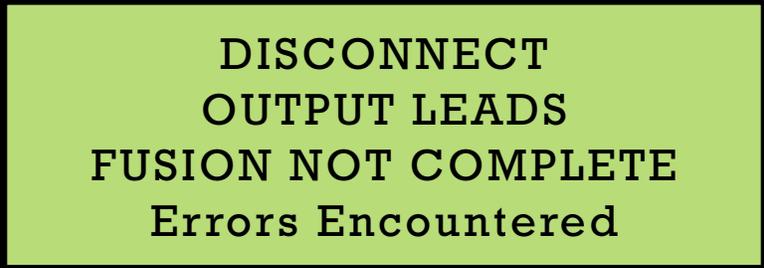
Manual Fusion Data
Actual Fusion Time
2 min 00 sec
PRESS START

The third line indicates the actual amount of time that the fitting was fused. Press the **START button** to continue. After the **START button** is pressed, the following screen will be displayed if no errors were detected.

A green rectangular screen with a black border containing the following text:

DISCONNECT
OUTPUT LEADS
FUSION COMPLETED
Successfully

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

A green rectangular screen with a black border containing the following text:

DISCONNECT
OUTPUT LEADS
FUSION NOT COMPLETE
Errors Encountered

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

After the output leads are disconnected, the **B.O.S.S. III Lead Acid Processor** will return to the CONNECT FITTING SCREEN and is ready to accept information for the next fusion.

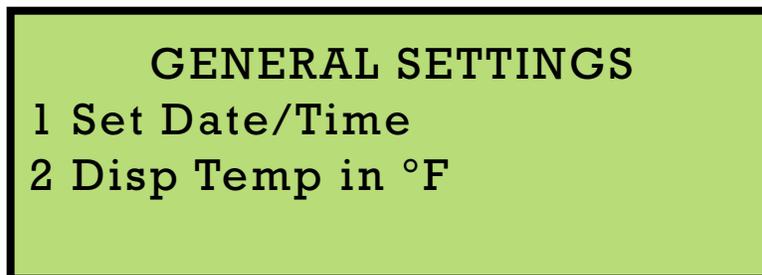
NOTE:

If traceability is enabled, remember that any Operator ID Codes fields 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

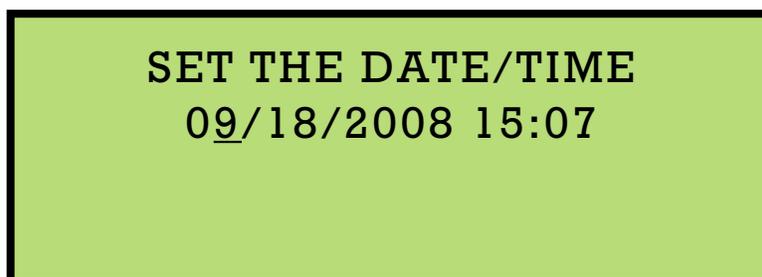
The Basic User Menu is accessed by holding the **UP button** down when the unit is first powered up. The following example shows the options that are available in the Basic User Menu.



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

Setting the Date and Time

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



Enter the correct date (**see Entering Data with the Keypad on page 31**) using the MM/DD/YYYY format and the correct time using the 24 hour (military) format. Pressing the **START button** to save the information entered and return to the Basic User Menu.

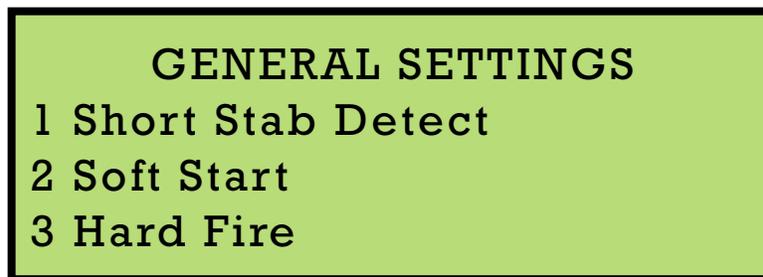
Setting the Temperature Units

When option 2 is highlighted, pressing the **START button** will toggle the **B.O.S.S. III Lead Acid Processor** default temperature units setting between °F and °C.

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** down when the unit is first powered up. You will be prompted for a code. The following example shows the options that are available in the Advanced User Menu once the correct code has been entered.



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

Short Stab Detect

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

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

PROPER ASSEMBLY TECHNIQUES ARE THE RESPONSIBILITY OF THE OPERATOR

Soft Start

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

Hard Fire

The hard fire settings are another way to modify the fusion start-up for certain power supplies.

Appendix

ENTERING DATA WITH THE KEYPAD

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

NOTE:

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

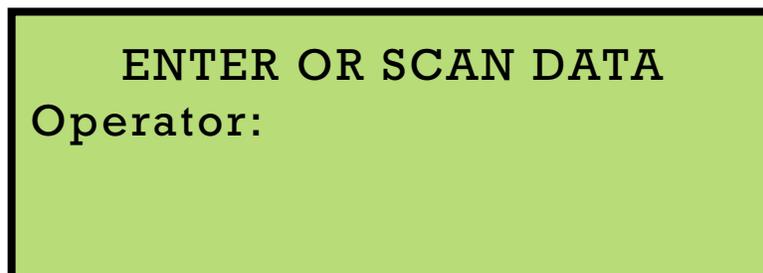
NOTE:

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

TRACEABILITY

NOTE:

The traceability codes are an option that can only be enabled at the factory. If the option is enabled, the following screen will be displayed after the Processor has passed its internal self test. This data will not affect the fusion but will be associated with the fusion in the download data.



Data may be entered here and will be attached to all fusions done by this Processor until the power is turned off or the data is manually changed. Enter data by scanning a valid Operator ID barcode or by using the keypad. If you do not wish to enter any data in a particular field simply press the START button to bypass.

Operator ID

NOTE:

Company policy may require valid operator information be entered into the Operator Field. If an operator ID is required, the Processor will not allow the operator to proceed unless valid data is scanned (Data cannot be entered through the keypad if the Operator ID is required).

When an Operator ID barcode is scanned with the barcode wand, the following information will be recorded and utilized:

- **Operator ID Code:** This code is a 6 digit alphanumeric code used to identify the individual operator.
- **Expiration Date of the Card:** This field allows supervisors to set an expiration date on the ID Card. When this date has passed, the Processor will display the following screen when the ID Card is scanned and will not recognize this card as valid. The operator will not be permitted to continue until a valid ID Card has been scanned.

When the Operator ID number is entered via the keypad only the 6 digit Operator ID Code is recorded.

The operator ID information will be associated to any fusion performed until the Processor is turned off or a new operator code is entered.

DOWNLOADING DATA

Data Stored

The following data is stored for each fusion that the processor performs. The data stored in the processor can be downloaded to a personal computer or to an EMM. The data is output in a standard comma separated text file.

Field	Description
SN	The serial number of the unit.
Cal Req.	"Y" if the calibration date was expired when the fusion was completed.
Fusion #	The fusion number.
Date	Date and time the fusion was performed.
Mode	The mode used for entering the fusion parameters.
Mea Res	The measured resistance of the fitting before 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.
MFG	The fitting manufacturer
Type	The fitting type.
Size	The fitting size.
Output	The requested output voltage or current.
Temp	The ambient temperature at the time of the fusion.
Req Time	The requested, temperature compensated fusion time.
Actual Time	The actual time fused.
Result	The resulting error code.
High Volts	The highest measured battery voltage during the fusion.
Low Volts	The lowest measured battery voltage during the fusion.
High DC	The highest battery duty cycle during the fusion.
Low DC	The lowest battery duty cycle during the fusion.
Operator	The 6 digit operator code if used
Fin Res	The measured resistance at the end of 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.
DL	The version of firmware loaded when the fusion was performed.
Rec	The version of firmware loaded when the fusion was downloaded.

Downloading to a Computer

To download the fusion data to a PC you will need a serial cable described above and some PC based terminal emulation software. These instructions assume you are using "HyperTerminal" a free piece of software that installs with Windows. If you are using a different software package, you will need to refer to its documentation for instructions on how to set it up. Factory support is not available for software other than HyperTerminal.

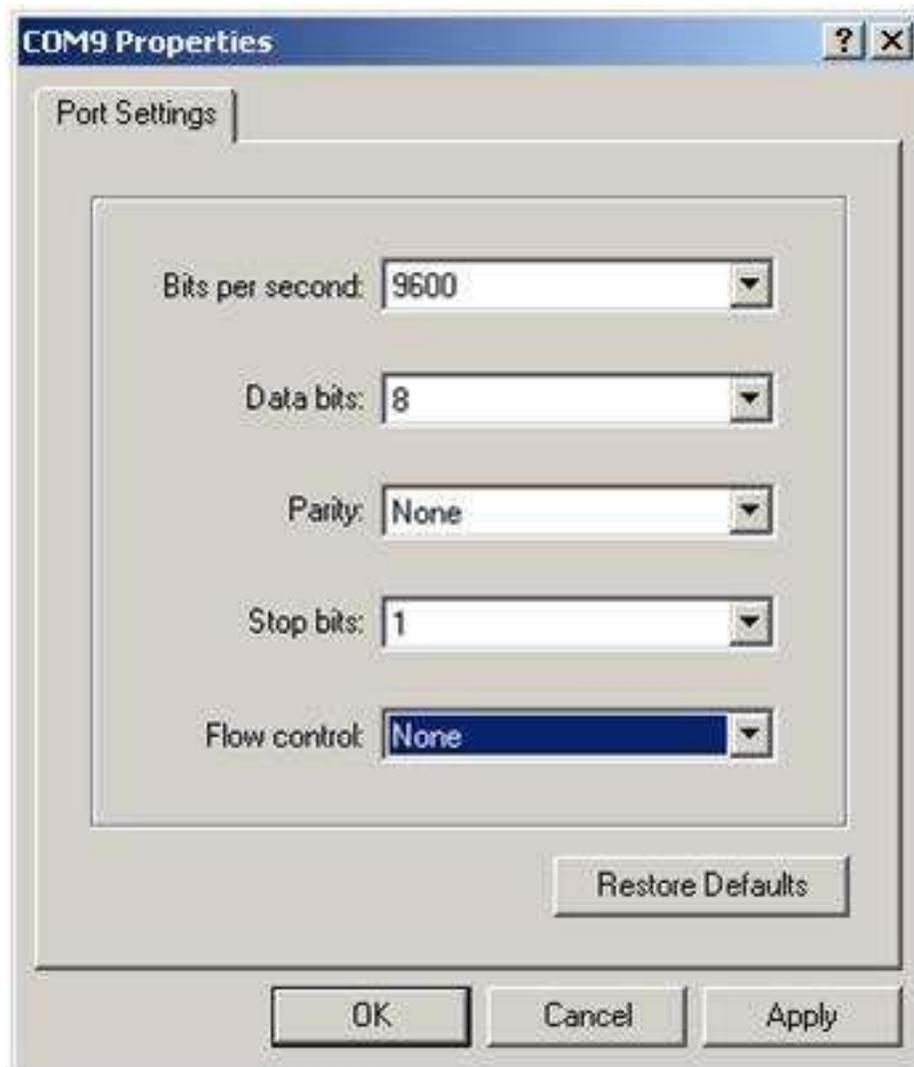
HyperTerminal Setup

If this is the first time you are downloading a processor, you may need to do this setup, otherwise, you can use a previous HyperTerminal session and skip this section.

1. Run HyperTerminal. Click START, PROGRAMS, ACCESSORIES, COMMUNICATIONS then select the "HyperTerminal" executable.
2. When prompted with the screen shown below, enter a name for the connection and select the icon you like best. This is the name of the menu option you will use when running HyperTerminal next time so you will not have to run setup again.
3. Click 'OK'
4. Select the port that you want to use.. The port settings depends on the computer you are using. Typically the number is 1 or 2. Setup the port using the settings shown below.



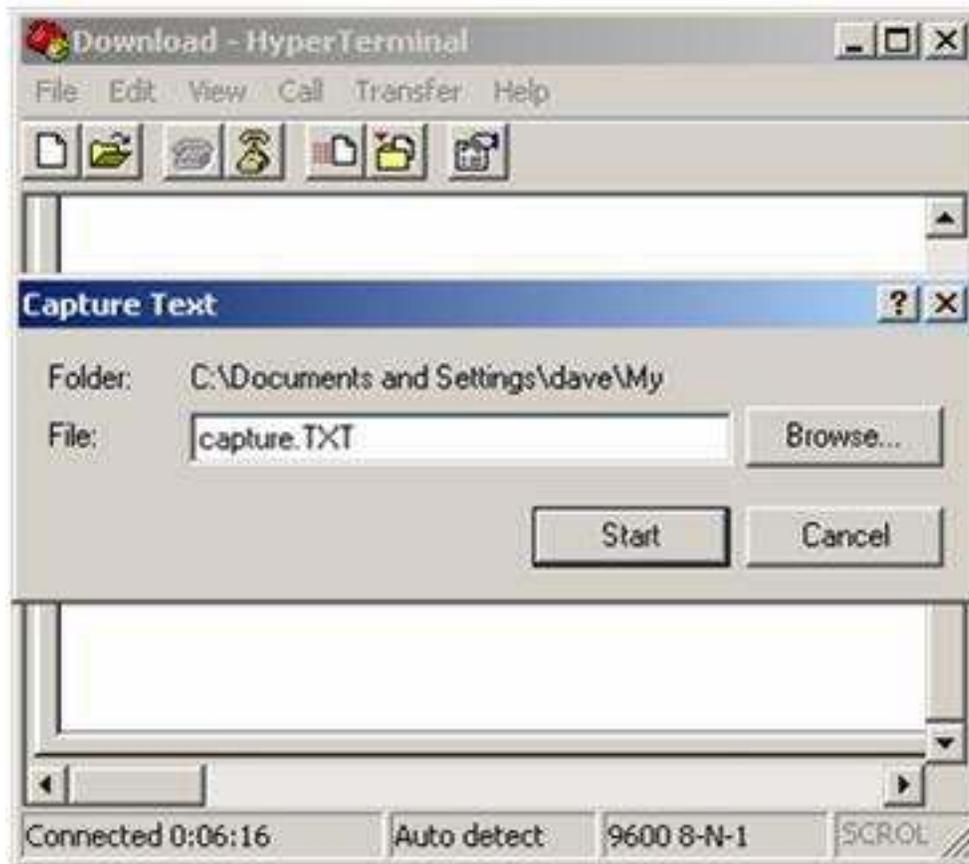
5. Setup the port using the settings shown below.



6. Click "OK"

Downloading

1. Bring processor to a location near the computer
2. Remove the serial interface jack cover on the processor and connect the serial cable to the jack.
3. Plug the other end of the serial cable into the serial port of the computer.
4. Run the HyperTerminal session. **You should be here only after HyperTerminal has been set up.**
5. Select the "Capture Text" option from the "Transfer" menu.
6. Enter/Select a file, **REMEMBER WHERE IT IS** and click "Start"



7. 7. Once the hardware is set up, turn the control box on. You will be presented with the following screen instead of the CONNECT FITTING SCREEN

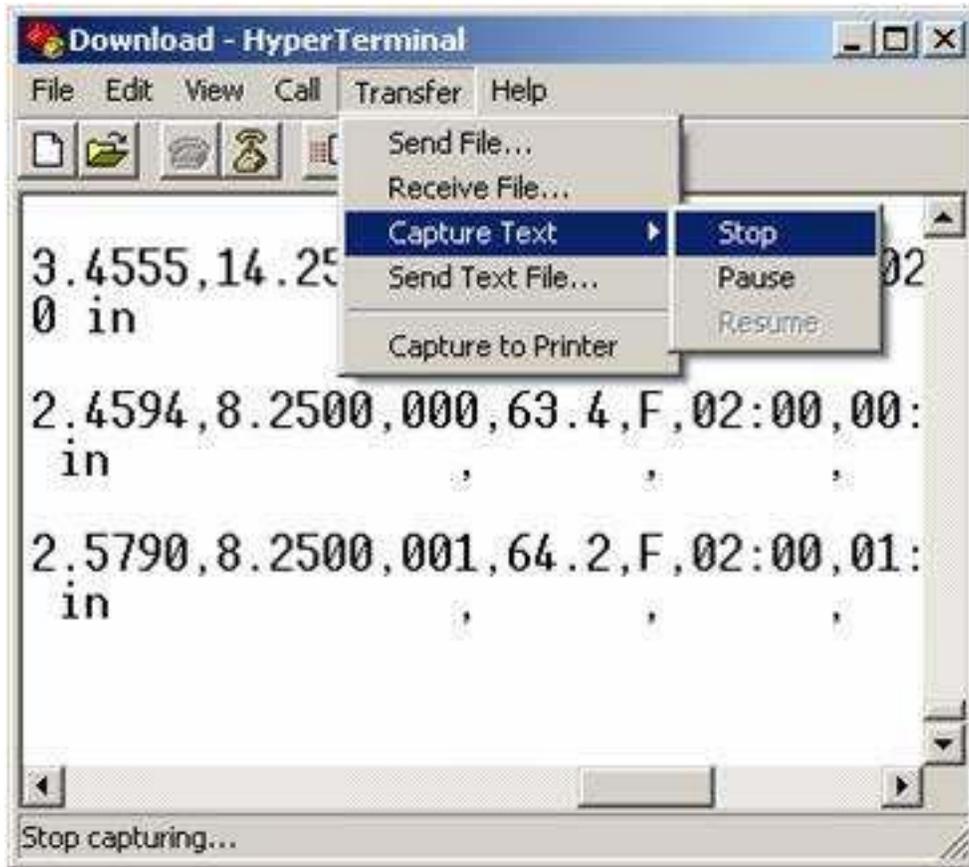
SERIAL DEVICE FOUND

- 1 Download Data
- 2 Program Processor

8. Select the "Download Data" option and press the START button.
9. While the download is in progress, you should see text whizzing by in the HyperTerminal window and the processor will display the download progress.

DOWNLOADING DATA**48%****Press STOP to Cancel**

10. Once the download is complete, select the "Stop" option from the "Transfer" menu to save the download data in the specified text file.

**NOTE:**

You cannot do anything useful with the data shown in the HyperTerminal window. You must open the text file in a different program like Excel, Note Pad, WordPad or Word. Refer to the appropriate software documentation for instructions on viewing/importing comma separated text files.

GPS

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

- The GPS coordinates are accurate to within 3 meters.
- The latitude and the longitude as well as the number of satellites used when generating the fix is stored with each fusion and output during the download.
- The coordinates can be input into many commercially available mapping programs to obtain position information.

BATTERY/CHARGING INFORMATION

Battery Pack

The battery pack used in the **B.O.S.S. III Lead Acid Processor** is a 48 volt 9 ah sealed lead acid design which contains internal short circuit protection.

UNDER NO CIRCUMSTANCES SHOULD THE BATTERY PACK ENCLOSURE BE OPENED OR TAMPERED WITH. THERE ARE NO FIELD SERVICABLE COMPONENTS INSIDE THE PACK AND THE WARRANTY WILL BE VOID IF THE FACTORY SEAL HAS BEEN BROKEN.

Charger/Charging

Proper charging and maintenance of the batteries can extend their life considerably and is required to maintain the warranty. Proper charging can only be assured if you charge the battery pack with the charger supplied with the unit when it was new.

The charger supplied with the unit is not designed for outdoor or field use. It is designed to be used in an office, lab or warehouse environment.

As a general rule, it is recommended that you completely charge the batteries after each day that the unit is used. If the batteries are not used, make sure that they are charged at least once per month. It is recommended that the batteries are left on charge until they are needed.

Battery Storage

The battery pack should always be stored fully charged in a cool dry place to maintain maximum service life. If the battery pack is stored for longer than 3 months without being charged its service life may be shortened. Do not store the battery pack at temperatures in excess of 104° F.

TEMPERATURE MEASUREMENTS

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

Temperature Compensation

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

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

THE PROCESSOR WILL NOT AUTOMATICALLY COMPENSATE FUSION TIME IN MANUAL MODE OR GEORG FISCHER CENTRAL PLASTICS ID MODE.

Error Codes

Code	Problem	Resolution
100	The barcode was scanned successfully, however the processor cannot decode the information into valid fusion parameters.	This is not a wand error or scanning problem. Verify that the barcode is an ISO standard 24 digit fitting barcode.
101	Ambient temperature is out of range.	Verify the temperature displayed in the CONNECT FITTING screen is reasonable and within the range specified in the specification table. If the temperature displayed differs significantly from the actual temperature then there is a control box problem and it must be returned for service.
102	Measured resistance does not match resistance identified in the barcode.	Check output cable connectors and adapters for excessive wear and/or damage. If the output connectors and adapters are in good condition, reattach the Processor to the fitting and try again. If the problem persists, there is more than likely a calibration or Output Cable malfunction.
103	Output current rise by given % from lowest current during a fusion (Short-Stab) detection	Check for a short stab or a broken fitting.
105	Measured output deviates from requested by >2%	Verify the output ends are clean, the power supply is sized correctly for the fitting you are fusing and that the power supply is operating correctly.
106	Not enough capacity to fuse requested fitting	Charge the batteries.
107	Write to memory failed	Data is not being saved to memory. Unit must be returned for service.
108	The power supply was shut off during the previous fusion	This could be anything from an improperly sized generator to someone switching the unit off during a fusion.
109	Reference voltage out of tolerance	Unit must be returned for calibration. You cannot fuse if this error is detected.

Code	Problem	Resolution
110	STOP pressed during previous fusion	Do not press the STOP button during the fusion unless it is an emergency situation.
111	Fusion complete with no other errors	There were no problems with this fusion.
112	Fitting disconnected.	Current drops close to 0 during the fusion. If the problem persists there is more than likely an output cable problem and the unit should be returned for service.
113	The calibration date has expired.	Send the unit in for calibration.
114	There is no valid cal date set	Send the unit in for calibration.
115	The process is not capable of outputting the current required to fuse this fitting.	As long as the fittings fusion requirements are within the specified output range of the processor. This could be an output cable error or a calibration error. Try cleaning the Output Adapters, if the problem persists, the unit will need to be returned for service.
116	The process is not capable of outputting the voltage required to fuse this fitting.	
117	Input voltage is out of range and the fusion cannot start	Verify that the input voltage/frequency displayed in the CONNECT FITTING SCREEN are reasonable and within the range specified in the specification table. If the parameters displayed differ significantly from the actual input then there is a control box problem and it must be returned for service.
118	Frequency is out of range and the fusion cannot start	
119	Internal control box temperature is out of range	Allow the processor to cool before fusing again. This error can be seen if multiple large fittings are fused one after the other.
120	A time of 0 seconds for the fusion was entered or calculated	This is more than likely a temperature measurement problem. Verify the temperature displayed in the CONNECT FITTING screen is reasonable and within the range specified in the specification table. If the temperature displayed differs significantly from the actual temperature then there is a control box problem and it must be returned for service.
121	Invalid operator ID card scanned	Verify the system date is correct and if so, contact the agency that issued the Operator ID card.

Code	Problem	Resolution
122	Not an operator card.	
123	The operator card scanned does not contain privileges for the functions this machine is capable of performing.	Contact the agency that issued the Operator ID card.
124	Current offset is out of spec	Unit must be returned for calibration. You cannot fuse if this error is detected.
125	Georg Fischer Central Plastics ID fusion cannot be completed because the value was not decoded into a valid fusion time.	Verify the fitting and the control box support the Georg Fischer Central Plastics ID method. If so the problem is with the fitting, the output cable or the control box calibration. If the problem persists with multiple fittings, The control box will have to be returned for service.
126	Internal charger output voltage error.	The internal charger cannot maintain the required output voltage.
127	Internal charger output current measurement error	Unit must be returned for service.
128	Internal charger current control error.	Unit must be returned for service.
130	The fitting was disconnected before the specified cooling time.	Do not disconnect the fitting before the manufacturers recommended cooling time has expired.
131	An undefined error was received before the fusion time was completed.	Unit must be returned for service.
132	Control box supports voltage control only and fusion specified is not a voltage control.	Not all control boxes support current or energy control. Attach a fitting that requires voltage control.
133	Multiple fittings are attached with different current control requirements.	Some fitting manufacturers permit the user to fuse multiple fittings simultaneously. When fusing multiple joints, all attached fittings must be identical.
134	Multiple fittings are attached with different fusion time requirements.	Some fitting manufacturers permit the user to fuse multiple fittings simultaneously. When fusing multiple joints, all attached fittings must be identical.

Code	Problem	Resolution
135	The user is trying to fuse too many fittings at once.	There are too many fittings attached.
136	Multiple fittings are attached with different temperature compensation requirements.	Some fitting manufacturers permit the user to fuse multiple fittings simultaneously. When fusing multiple joints, all attached fittings must be identical.
137	Possible broken coil in multiple fitting set.	Some fitting manufacturers permit the user to fuse multiple fittings simultaneously. Either the number of fittings was specified incorrectly or one of the attached fittings is damaged.
138	The fitting was disconnected before the specified countdown time elapsed.	Do not disconnect the fitting before the manufacturers recommended countdown time has expired.
139	The battery connected did not have a smart chip or the smart battery chip is broken.	If the battery is a smart battery, then the unit will need to be returned for service.
140	The fusion was shutoff to protect the control box from damage due to extremely high fusion current.	This is typically caused when a direct short is made across the output leads. If there are no obvious problems with the fitting or the Output Cable, then the unit will need to be returned for service.
141	The ambient temperature is too low to fuse fittings of this type.	Same as error 101.
142	The processor believes that the same fitting was fused twice.	Do not fuse a fitting more than two times unless directed so by the fitting manufacturer.
143	The fitting was disconnected before the specified heat soak time was observed.	Do not disconnect the fitting before the manufacturers recommended heat soak time has expired.
144	The output is cycling and cannot be controlled to the requested level	This is more than likely caused by a fluctuating power supply. Eliminate all extension cords and ensure that the electrofusion machine is the only device operating on the circuit.