

*AutoFuse™*



*BatteryFuse™*



*MiniMAXX*



# Operators Manual



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## **SAFETY**

- Please read and understand this instruction manual before using **AutoFuse™, BatteryFuse™, or MiniMAXX Electrofusion Processors**.
- Gas company safety standards and precautions should be followed at all times.
- Do not use or store **AutoFuse™, BatteryFuse™, or MiniMAXX Electrofusion Processors** where volatile gas concentrations may be present.
- Only properly trained and qualified personnel should operate **AutoFuse™, BatteryFuse™, or MiniMAXX Electrofusion Processors**.
- Treat all electrical equipment as a potential source of ignition and follow proper practices for working in an explosive atmosphere.
- Both the power source and the processor must be located out of the trench.
- For protection against the risk of electric shock, always connect **AutoFuse™** and **MiniMAXX Electrofusion Processors** to properly grounded outlets only.
- When operating a **BatteryFuse™ Electrofusion Processor**, remember to 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.
- Only use fusion information supplied by the manufacturer of the fitting.
- Under no circumstances should the enclosure of a **AutoFuse™, BatteryFuse™, or MiniMAXX Electrofusion Processor** 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.

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## **WARRANTY AND LIMITATION OF LIABILITY**

1. THE MANUFACTURER warrants the AutoFuse™, BatteryFuse™, and MiniMAXX Electrofusion Processors 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. THE MANUFACTURER 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.
2. If THE MANUFACTURER receives notice of such defects during the warranty period, THE MANUFACTURER 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) THE MANUFACTURER is notified in writing of such defect immediately upon discovery of same and the defective Processor is promptly returned to THE MANUFACTURER (at the location designated by THE MANUFACTURER 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 THE MANUFACTURER 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 THE MANUFACTURER from time to time.
  - c) The Processor has not been altered or modified after leaving THE MANUFACTURER'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) THE MANUFACTURER does not warrant that the operation of the AutoFuse™, BatteryFuse™, or MiniMAXX Electrofusion Processor will be uninterrupted or error free.
  - e) Replacement Processor may be either new or like-new.
3. THE MANUFACTURER 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 manufacturers' warnings, safety instructions or other precautionary guidelines.
4. ANY CLAIM OF LIABILITY ASSERTED AGAINST THE MANUFACTURER 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 THE

MANUFACTURER 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. THE MANUFACTURER'S LIABILITY IN RESPECT TO THE SALE IS STRICTLY LIMITED TO THE REPLACEMENT OF PROCESSORS OR SERVICES AS HEREINBEFORE SPECIFIED AND THE MANUFACTURER 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 THE MANUFACTURER 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 **MTD TRIFUSION Electrofusion Processors**:

1. **AutoFuse™**
2. **AutoFuse™ Deluxe**
3. **BatteryFuse™**
4. **BatteryFuse™ Deluxe**
5. **MiniMAXX**

This publication was written to assist trained personnel in the proper procedures and operating functions of a **MTD TRIFUSION Electrofusion Processor**.

Operation of MT DEASON COMPANY, INC equipment should only be performed by trained and qualified personnel.

The technical data and advice contained herein is based upon tests and information believed to be reliable. However, the 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. MT DEASON COMPANY, INC 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**

**MTD TRIFUSION Electrofusion Processors** are reliable, easy-to-use, rugged tools designed to withstand conditions found at typical construction sites throughout the world.

**MTD TRIFUSION Electrofusion Processors** are splash proof and highly shock resistant.

**MTD TRIFUSION Electrofusion Processors** operate most efficiently and reliably in the Barcode Fusion Mode; however, they can be operated in Alternate Fuse Modes. (Resistor ID Fusion Mode is only available in the *AutoFuse™* and *BatteryFuse™*). **The Barcode Fusion Method is always preferred and should be used whenever possible.**

**MTD TRIFUSION Electrofusion Processors** have an intuitive user interface that is easy to learn.

**MTD TRIFUSION Electrofusion Processors** are equipped with internal memory for data storage and can be downloaded to determine installation conditions and fusion cycle status.

**MTD TRIFUSION Electrofusion Processors** are capable of scanning and recording both ASTM F2897-11 and ISO 12176-4 Traceability barcodes.

The **AutoFuse™** and **MiniMAXX Electrofusion Processors** can be operated from any AC power source meeting the input power requirements listed in the *Specifications* section on page 8.



The **BatteryFuse™ Electrofusion Processor** is powered by a 48 volt 9ah lead acid battery pack and is capable of fusing all fittings with a current requirement of 35 amps or less.

**AutoFuse™** and **BatteryFuse™ Electrofusion Processors** may be optionally equipped with a printer (to access on-site fusion results for operator qualification records) and/or a field replaceable output cable.

**MiniMAXX Electrofusion Processors** are equipped with an internal GPS system to record the latitude and longitude of the processor when a fusion is performed.

**MiniMAXX Electrofusion Processors** are Bluetooth-enabled.

## Specifications

Parameter	MiniMAXX	AutoFuse™	BatteryFuse™
Supply Voltage	97 VAC to 150 VAC		48 Volts DC
Supply Frequency	47 Hz to 70 Hz		N/A
Supply Waveform	Sine Wave or Square Wave		N/A
Maximum Supply Current	30 Amps at 60 Amps Output (120VAC)		35 Amps
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 35 AAC +/- 1.5%
Storage Temperature	0°F to 140°F		0°F to 140°F (Processor) 41°F to 104°F (Batteries)
Operating Temperature Range	0°F to 140°F		
Operating Modes	Barcode ( <i>recommended</i> ), ID Resistor ( <i>AutoFuse™ and BatteryFuse™ only</i> ), Manual Barcode, Manual		
Output Cable Length	20 feet	25 feet	
Output Cable Type	Fixed mounted standard	Fix mounted standard (optional field replaceable version available)	
Fitting Adapters - BASE	Field replaceable 90 degree (4.7 & 4.0mm)		
Fitting Adapters - DELUXE	N/A	Universal Tips (4.7, 4.0 & 3mm)	
Input Cable Length	12 feet		N/A
Fusion Information Storage	1000 Fusions		
Downloading	Internal Bluetooth module for downloading fusion data to EF Utilities app.	USB A type connector for attaching a USB flash drive to download fusion data.	
Languages	English/Spanish		
Printer (optional)	N/A	On-site fusion results for operator qualification records.	
Environmental Protection	IP54 Splash-Proof		
Calibration Interval	3 Years		
Warranty	1 Year		
Scanning	Barcode wand or interchangeable <i>AutoScan</i>		
GPS	Included	Optional	
IEC Protection Class	Class 1 Grounded		N/A
Calibration/Service	Field calibration capable		
AutoCal® Compatibility	This device is fully compatible with the AutoCal® field calibration system.		
Bluetooth	Enabled	Upgrade available	

## Descriptions of Controls

### NOTES

- References to controls in this section are displayed exactly as they appear throughout the remainder of this document.
- The **START button** may mean START, CONTINUE, OK or SAVE depending upon the context of the operation being performed at the time.
- The **STOP button** may mean STOP, RESET or CANCEL depending upon the context of the operation being performed at the time.
- 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

**AutoFuse™**



**BatteryFuse™**



**MiniMAXX**

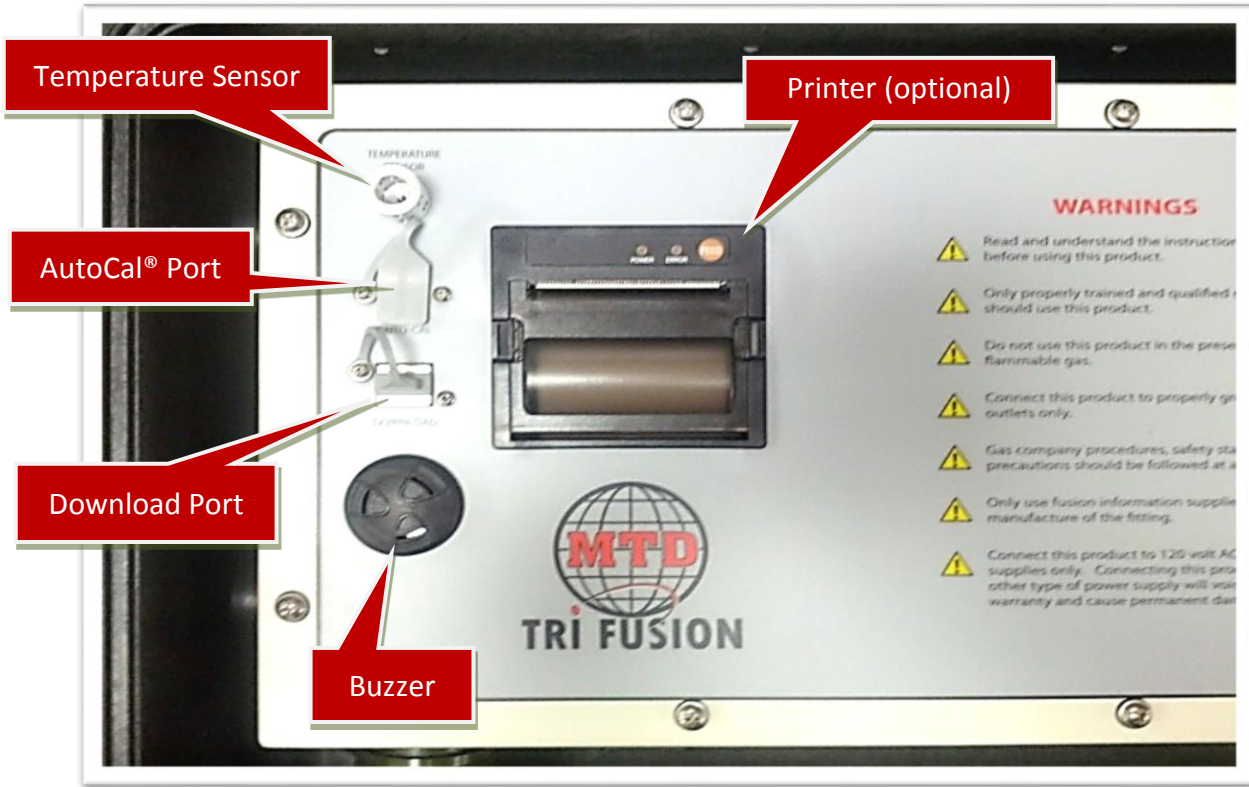


Rugged plastic Pelican™ carrying case with lid CLOSED

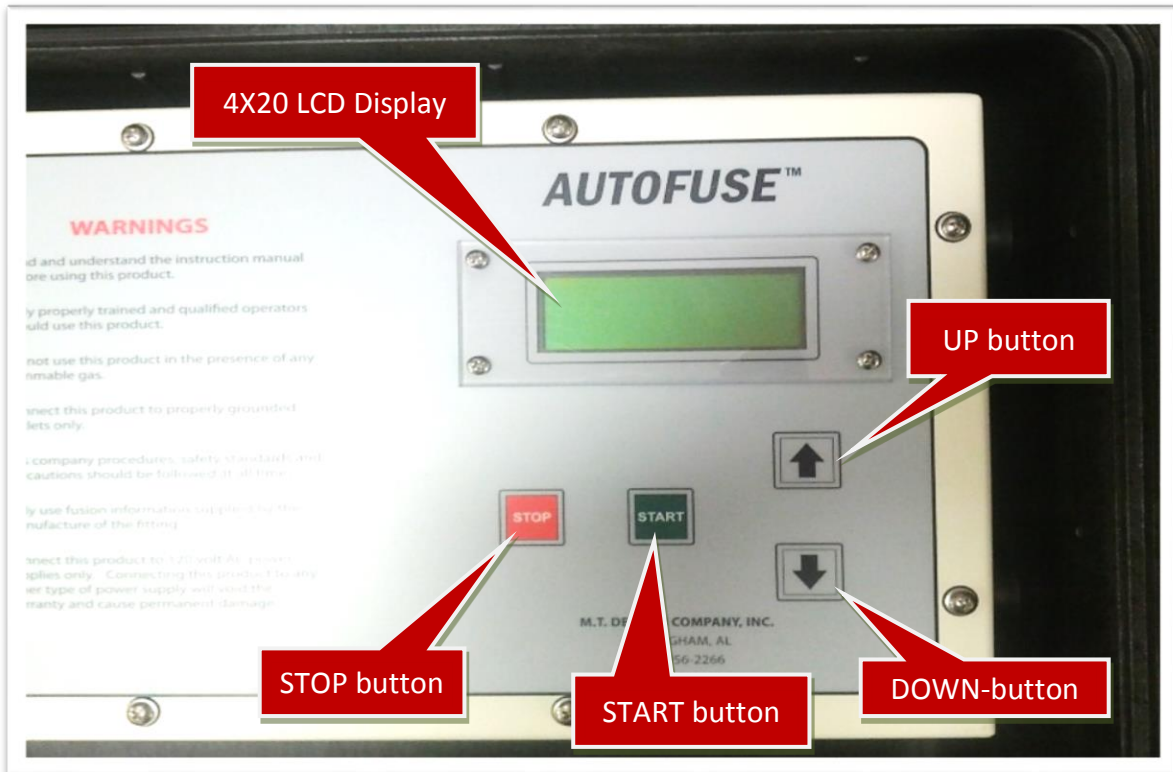


Rugged plastic Pelican™ carrying case with lid OPEN

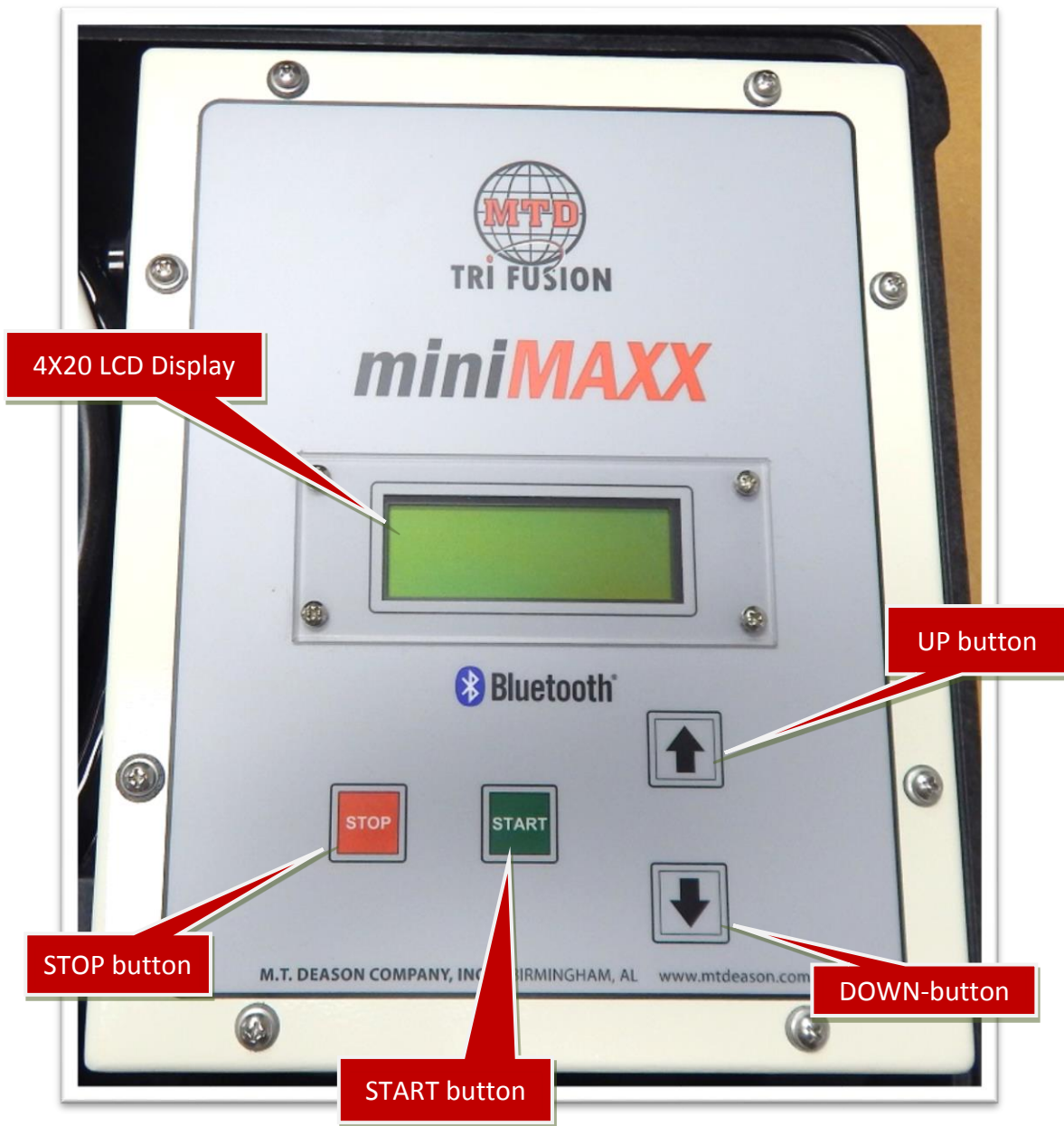
**Faceplate View: *AutoFuse™ & BatteryFuse™***



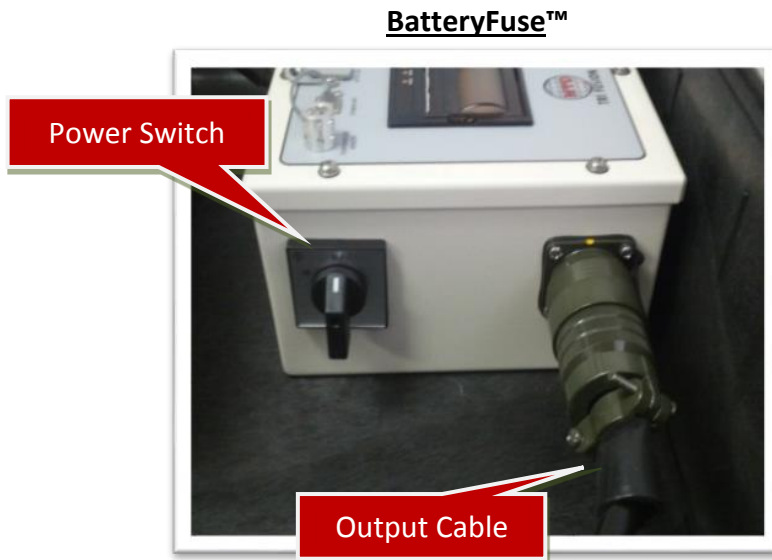
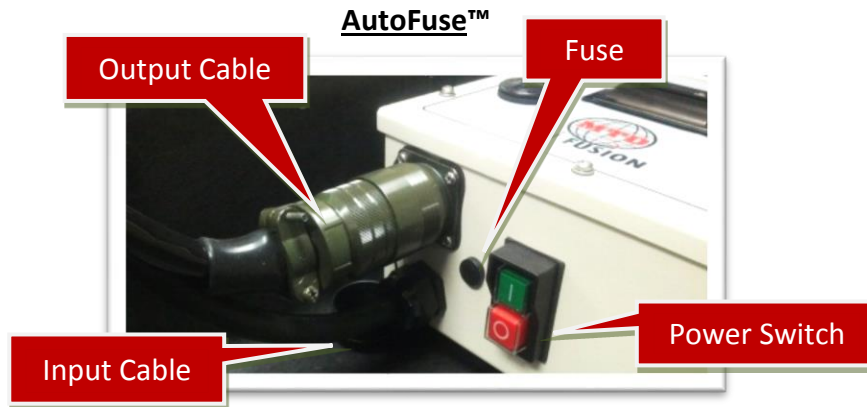
*(AutoFuse™ Shown, BatteryFuse™ similar)*



**Faceplate View: MiniMAXX**



**Inside Face View**



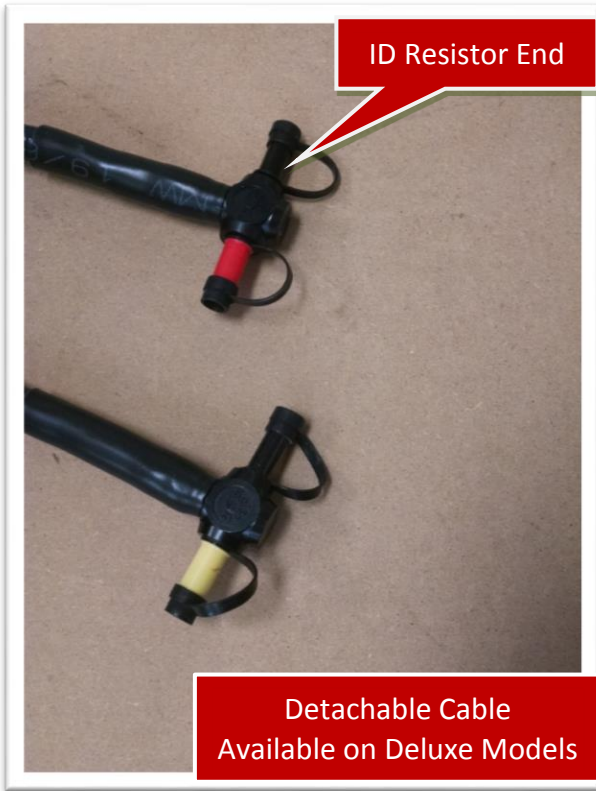
**Battery Pack & Pigtail: *BatteryFuse™***



**GPS Receiver: *MiniMAXX***



**Output Cable Options: *AutoFuse™* & *BatteryFuse™***

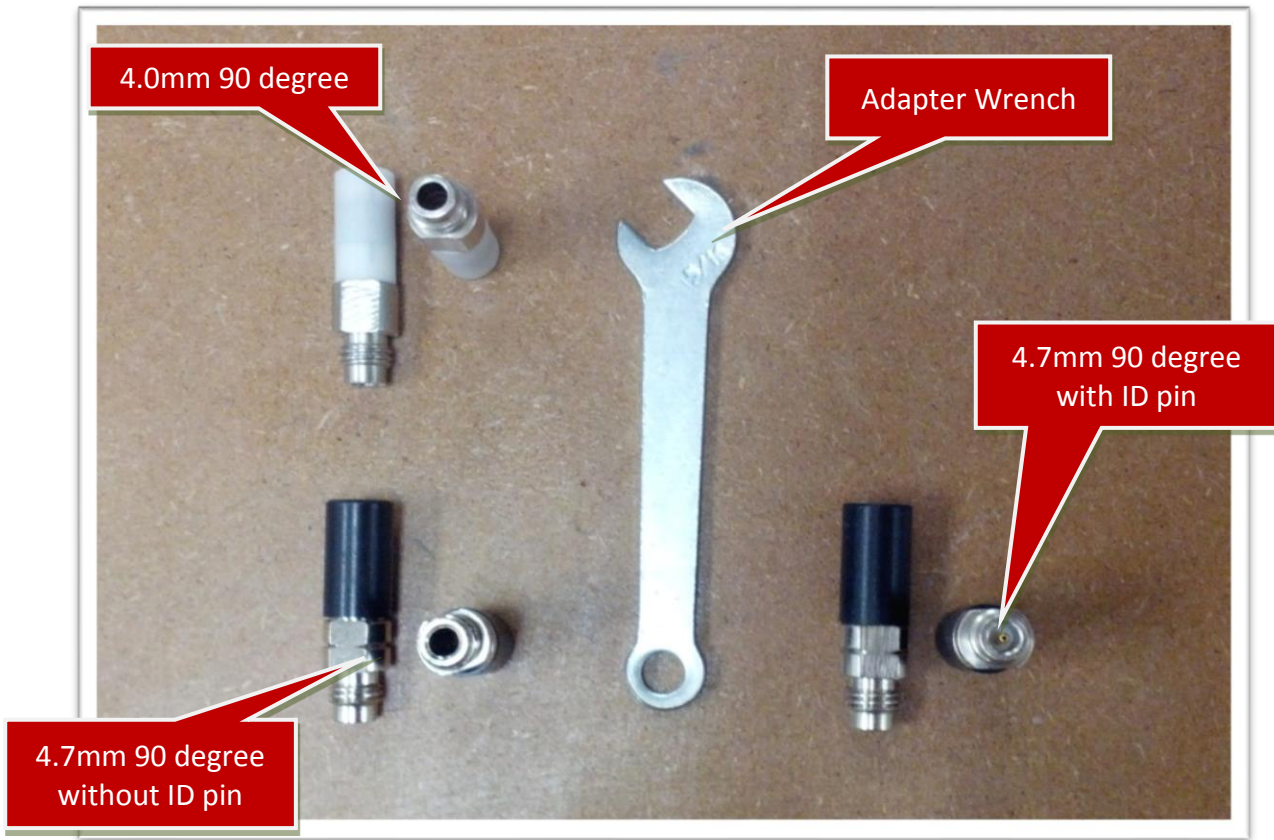


**Output Cable Options: *MiniMAXX***

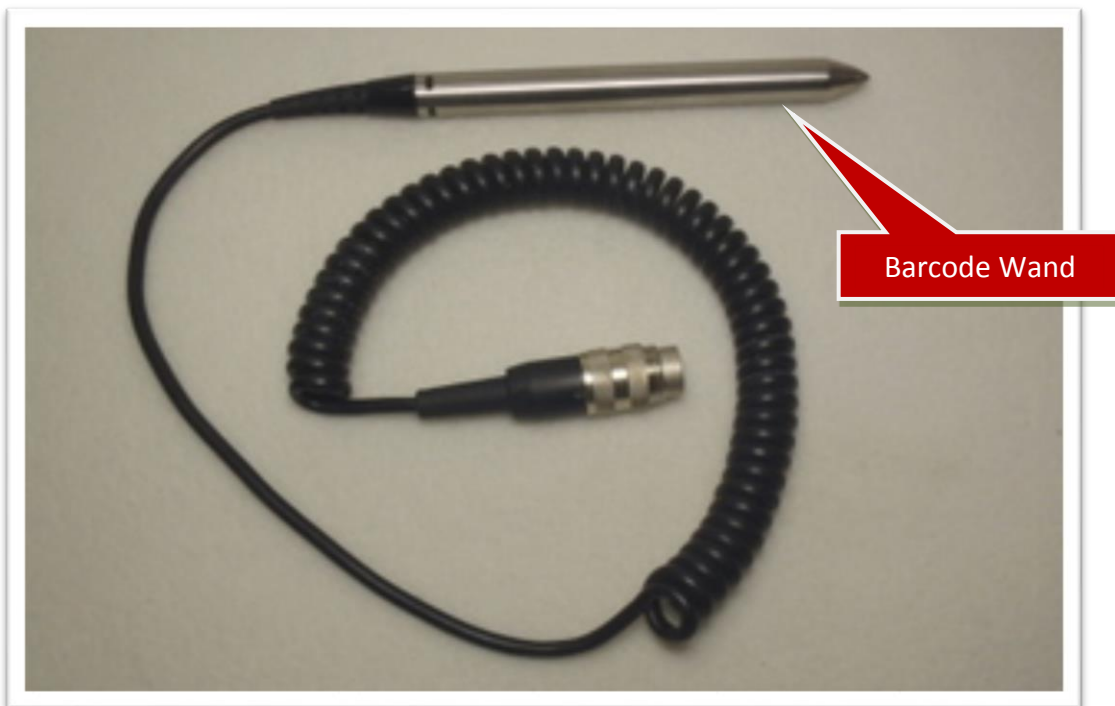




**Replaceable Fitting Adapters (for *MiniMAXX* & Base Models)**



## Scanner Options



## Customer Responsibilities

**MTD TRIFUSION Electrofusion Processors** are reliable, easy-to-use, rugged tools designed to withstand the 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:

AutoFuse™ & MiniMAXX	BatteryFuse™
<p><b>MTD TRIFUSION Electrofusion Processors</b> are splash resistant, <b>NOT WATERPROOF</b>. They should be stored in a clean, dry environment. <b>DO NOT STORE THE PROCESSORS OUTSIDE. DO NOT WASH THE PROCESSORS WITH A HOSE.</b></p>	
<p>The enclosures are very durable and shock resistant; however, do not subject the processors to any unnecessary shocks or stresses including but not limited to:</p> <ul style="list-style-type: none"> <li>• Tossing the processors into or out of a vehicle</li> <li>• Dropping the processors</li> <li>• Dragging the processors by the cables or leads</li> </ul>	
N/A	Fully charge the battery pack after each day’s use.
N/A	When not in use, recharge the battery pack at least once per month. It is recommended that the battery pack be left on charge when not in use.
N/A	Turn the processor OFF after each use to prevent the batteries from discharging. It is recommended that the battery pigtail be disconnected after use to ensure the unit is not accidentally turned ON. <b><u>LEAVING THE PROCESSOR ON WHILE IN STORAGE WILL DESTROY THE BATTERY PACK. THIS IS CONSIDERED CUSTOMER ABUSE AND IS NOT COVERED UNDER WARRANTY.</u></b>
<p>Subscribe to the recommended calibration service offered by MT DEASON COMPANY, INC (See page 19).</p>	

**MTD TRIFUSION 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 other 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 the voltage and time displayed on the LCD screen 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 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 Lead Ends. Failure to do so may result in an improper output applied to the fitting.
3. Make sure that power sources are appropriately rated and operating at the manufacturer's specified capacity.
4. Always store the barcode wand or **AutoScan** in its sheath when not in use.

Proper care of the processor and output cable will greatly extend the life of your **MTD TRIFUSION 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 **MTD TRIFUSION Electrofusion Processor** is properly calibrated 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 user that calibration date has past. This will not prevent the processor from performing fusions; however, the processor 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 (3) YEARS.***

## **Service Contact Information**

**There are two (2) options for calibrating your *MTD TRIFUSION Electrofusion Processor*:**

1. Send the processor to a factory authorized service center and let our technicians do it. This is the recommended method and will help ensure the maximum service life of the processor.
2. Rent one of our field calibration systems and perform as many calibrations as you would like at your facility and at your convenience.

Call **(800) 633-7131** to make arrangements for service and to obtain a PRA number for the return. Every effort will be made to return processors within 15 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.***

***MT DEASON COMPANY, INC is not responsible for damage caused in shipping.***

## **GENERAL OPERATION**

### **Modes of Operation**

*MTD TRIFUSION Electrofusion Processors* have several 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 label 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.** The 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 **AutoFuse**) 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 (*AutoFuse™ and BatteryFuse™ ONLY*)**

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 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 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.**

## Power Up

### AutoFuse™ & MiniMAXX

The **AutoFuse™** and **MiniMAXX Electrofusion Processors** cannot be turned “ON” until they have been connected to an adequate source of AC power. This feature is designed to protect the processor from input voltage spikes during the power up sequence. **This feature will not protect the processor from voltage spikes after initial power up.** Due to the way the protection circuit works, you may need to press and hold the GREEN button for approximately one (1) second until the unit powers up. This will not occur every time the unit is powered up but is more likely to happen the first time the unit is powered up each day.

**DO NOT, UNDER ANY CIRCUMSTANCES, PRESS AND HOLD THE POWER SWITCH IN THE “ON” POSITION WHILE STARTING A GENERATOR THAT THE PROCESSOR IS PLUGGED INTO. DOING SO WILL BYPASS THE PROTECTION CIRCUIT AND EXPOSE THE PROCESSOR TO VERY HIGH INPUT VOLTAGE SPIKES WHICH WILL LIKELY CAUSE INTERNAL DAMAGE.**

The correct power up sequence is as follows:

1. Start the generator. Make sure the generator is running smoothly in high speed manual mode before plugging in the **AutoFuse™** or **MiniMAXX Electrofusion Processor**.
2. Plug the **AutoFuse™** or **MiniMAXX Electrofusion Processor** into the generator. It is strongly recommended that the **AutoFuse™** or **MiniMAXX 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 56 for guidelines on selecting an appropriately sized cord.
3. After steps 1 & 2 have been completed, press and hold the GREEN button on the power switch until the processor powers up.

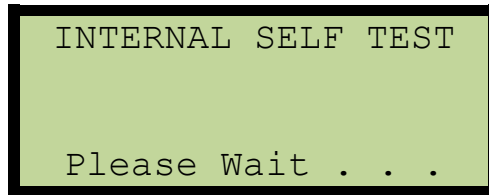
### BatteryFuse™

The **BatteryFuse™ Electrofusion Processor** is powered by a 48 volt battery pack and is connected to the processor by a 2-wire pigtail located at the back of the processor’s enclosure. Before attempting to power up the processor, always make sure the battery pack is fully charged.

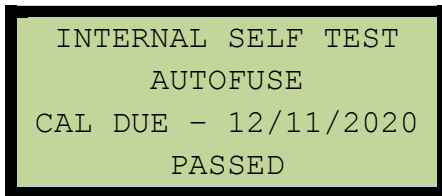
The correct power up sequence is as follows:

1. Place the battery pack in its mounting bracket located in the back of the case. *See page 56 for guidelines on the installation and removal of the battery pack from its mounting bracket.*
2. Plug the battery pack pigtail into the receptacle located at the rear of the processor. The connectors are color coded and should mate easily with little force. **DO NOT FORCE THE CONNECTORS TOGETHER.**
3. Rotate the power switch on the left side of the unit counterclockwise (backwards) to the ON position.

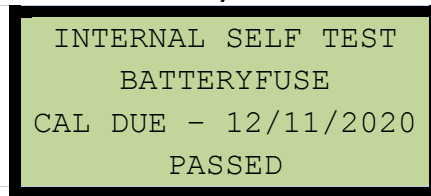
After the processor has been turned “ON”, start-up screens similar to the following will be displayed one after another:



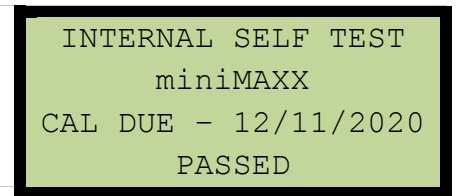
AutoFuse™



BatteryFuse™



MiniMAXX

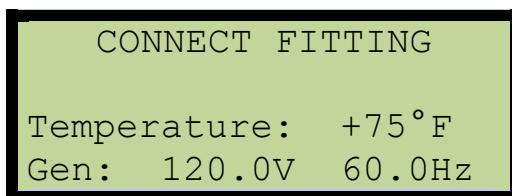


After the INTERNAL SELF TEST, if the feature is enabled, the TRACEABILITY screen will be displayed, allowing you to enter Operator Traceability Data. *If this screen appears, see page 48 for instructions how to enter the data.*

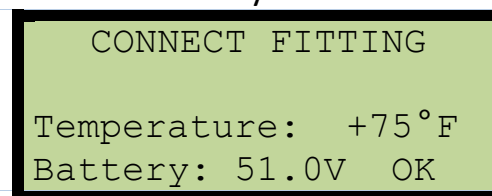
After the Operator Traceability Data is entered, if the feature is enabled, the ENTER LOCATION CODE screen will be displayed, allowing you to enter the work or job location. *If this screen appears, see page 43 for instructions how to enter the data.*

After the work location is entered, the processor will display the CONNECT FITTING screen. An example of the CONNECT FITTING screen is shown below:

AutoFuse™ & MiniMAXX



BatteryFuse™



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 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 status of the processor's power source. If operating an **AutoFuse™** or **MiniMAXX Electrofusion Processor**, the voltage and frequency of the generator are displayed. If operating a **BatteryFuse™ Electrofusion Processor**, the voltage and charge state of the battery are displayed. It is important that the voltage measurement is within the allowable range and the frequency is stable, or that the battery state is "OK."

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

```
1.2.3      SN:9680123
SW: OFF    FC:1024
01/12/2018 15:30
CAL DUE - 12/11/2020
```

This screen shows the following information:

- Software version of the processor (In this case, version 1.2.3).
- Processor serial number (In this case, 9680123).
- **AutoScan** status (In this case, OFF)
- The number of fusions the processor has performed (In this case, 1,024).
- The Date and Time (In this case, January 12, 2018 at 3:30 PM)
- The date the processor will be due for calibration (In this case, December 11, 2020)

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

If operating a **MiniMAXX Electrofusion Processor**, press the **DOWN button** while the processor is at the CONNECT FITTING screen to display a screen similar to the following:

```
GPS INFORMATION
39.65678N 75.77673W
Satellites: 8
Signal: Ideal
```

This screen shows the following information:

- Current latitude and longitude (In this case, 39.65678 degrees North latitude and 75.77673 degrees West latitude).
- Number of satellites being tracked (In this case, 8 satellites).
- GPS signal confidence (In this case, Ideal).

**NOTE:**

*See page 53 for information about the Position Error Indicator and how signal confidence is determined.*

Press the **STOP button** to return to the CONNECT FITTING screen.

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

## Fusion Modes

**MTD TRIFUSION Electrofusion Processors** have three possible fusion modes available:

- Barcode (*Recommended*)
- Resistor ID (*Available in AutoFuse™ and BatteryFuse™ only*)
- Manual

**\*\*The Barcode Fusion Method is always preferred and should be used whenever possible.** The manual fusion modes described in this section are provided for emergency use only.

**THE MANUAL FUSION MODE SHOULD ONLY BE USED BY PROPERLY TRAINED INDIVIDUALS. IMPROPER USE OF ONE OF THE MANUAL FUSION MODES WILL RESULT IN AN IMPROPER FUSION, AND COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.**

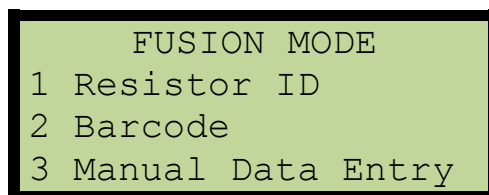
Begin the fusion process by connecting the processor to the fitting you would like to fuse.

### **NOTE:**

*When performing a Resistor ID fusion, it is important to correctly connect the Output Lead Ends to the fitting being fused. They are polarity sensitive. See page 26 for instructions how to connect the Output Lead Ends to the fitting during a Resistor ID fusion.*

If Pipe/Fitting Traceability is set to ON or SCAN, the operator will be prompted to scan or manually enter traceability data at this time. Refer to the appropriate section on page 48 for instructions that detail how to gather this data.

Unless the processor has been set to Barcode Only (see below), the FUSION MODE selection screen will now be displayed:



To select a fusion mode, use the **UP/DOWN buttons** to highlight the desired option. Press the **START button** to access the desired option.

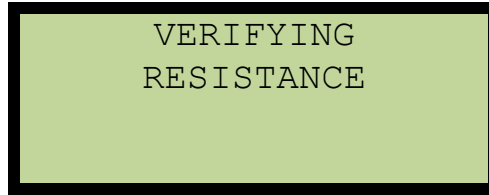
### **NOTE:**

*If the Barcode Only setting is turned ON, the processor will bypass the FUSION MODE screen and proceed directly to the SCAN BARCODE screen. If you wish to perform a fusion in Manual Mode, see page 32 for instructions how to access the Manual Mode selection screen.*

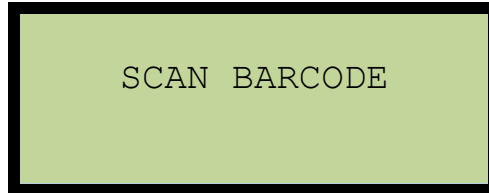
## Barcode Fusions

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

To begin a Barcode Fusion, select Option 2 from the FUSION MODE screen. 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 **AutoScan**) from the protective sheath. Scan the barcode from the fitting about to be fused. *See page 45 for scanning techniques and suggestions with the various barcode wand options.*

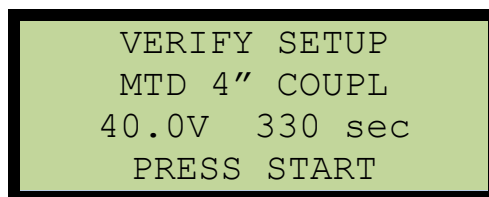
Whenever possible, use the barcode label attached to the fitting about to be fused. If this is not possible, use a barcode from an **identical** fitting made by the same manufacturer to ensure that the fusion parameters are correct.

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

**NOTE:**

*If the barcode wand is inoperative, see page 26 for details about how a fusion can be completed without using a scanning device.*

Once the barcode has been successfully scanned, the **MTD TRIFUSION Electrofusion Processor** will display a screen similar to the following:



The VERIFY SETUP screen shows the following information:

- The fitting type (MTD 4" Coupler).
- The requested output (40.0 Volts)
- The total temperature-compensated fusion time in seconds (In this case, 330 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.***

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 33 for instructions on monitoring the progress of a fusion.

## Alternate Fusion Methods

### Resistor ID Fusions

**\*\*Resistor ID Fusions are not supported by the MiniMAXX Electrofusion Processor.**

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

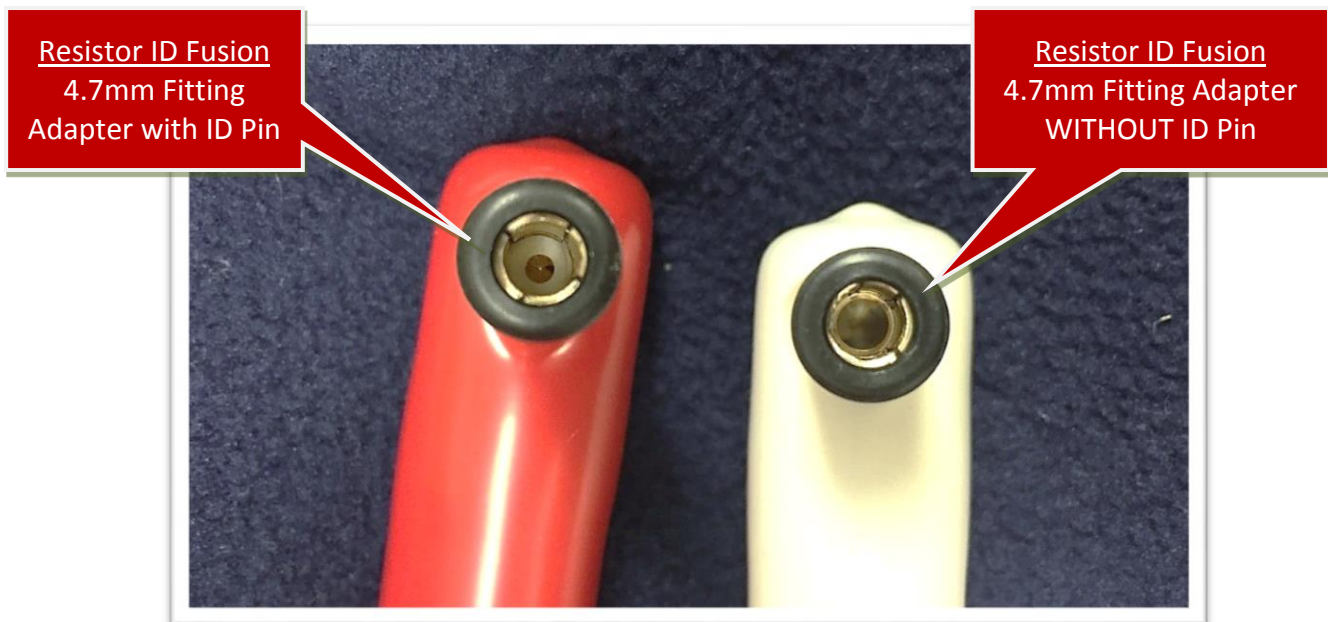
***DURING A RESISTOR ID FUSION, THE FITTING ADAPTERS ARE NOT CONNECTED TO THE OUTPUT LEAD ENDS IN THE SAME ORDER THEY ARE CONNECTED TO THE OUTPUT LEAD ENDS DURING A BARCODE FUSION. PLEASE READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.***

Make sure the **4.7mm Fitting Adapters** are connected 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):*

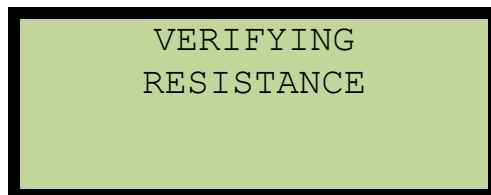


Connect both **Output Lead Ends** to the fitting. **The RED Output Lead End goes on the ID Pin (See below).** During a Resistor ID Fusion, it is important to connect the correct Output Lead End to the correct side of the fitting:

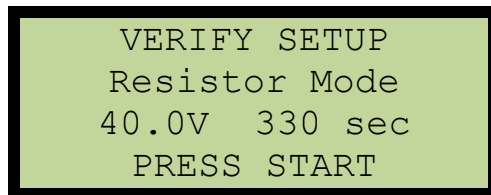


To begin a Resistor ID fusion, select Option 1 from the FUSION MODE screen.

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



This screen shows the following information:

- The current fusion mode (In this case, Resistor Mode).
- The requested output (40.0 Volts)
- The fusion time in seconds (In this case, 330 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.***

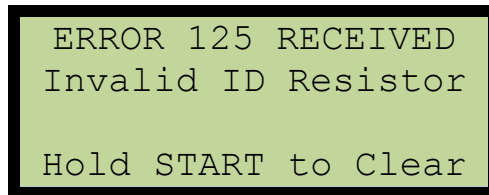
The processor will BEEP once per second and the text “PRESS START” on the bottom line of the display will flash on and off.

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 33 for instructions on monitoring the progress of a fusion.

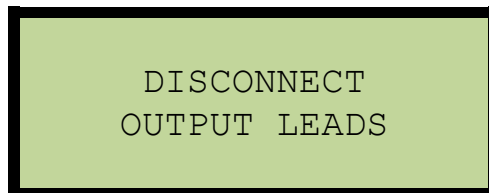
If a valid Resistor ID fitting is not detected, the **AutoFuse™ or BatteryFuse™ Electrofusion Processor** will BEEP once per second and display the following screen:



ERROR 125 RECEIVED  
Invalid ID Resistor  
Hold START to Clear

Hold the **START button** to clear the error.

Once the error has been cleared the following screen will be displayed:



DISCONNECT  
OUTPUT LEADS

If a Resistor ID Fusion does not begin and both the **AutoFuse™ or BatteryFuse™ 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.***

After the Output Lead Ends are disconnected, the processor will return to the CONNECT FITTING screen and be ready to start the process again.

## 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.*

To begin a Manual Barcode Fusion, select Option 3 from the FUSION MODE screen. The following screen will be displayed:

```
Select Method
1 Manual Barcode
2 Manual
```

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

### **NOTE:**

*If the Barcode Only setting is turned ON, the processor will bypass the FUSION MODE screen and proceed directly to the SCAN BARCODE screen. If you wish to perform a Manual Barcode Entry Fusion, see page 32 for instructions how to access the Manual Method selection screen.*

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:

```
ENTER BARCODE DATA
000000000000
000000000000
```

The cursor will begin under the first digit of the barcode. Enter the data from the barcode attached to the fitting using the keypad (*See page 48*). 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 **MTD TRIFUSION Electrofusion Processor** will display a screen similar to the following:

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

**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 33 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 Message, and will be forced to check the number and reenter it.

## **Manual Entry**

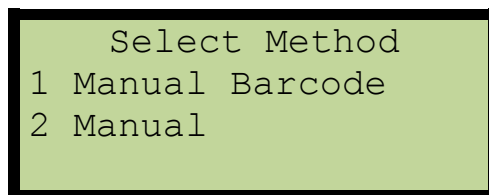
**\*\*The Barcode Fusion Method is always preferred and should be used whenever possible.**

**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:**

**MTD TRIFUSION Electrofusion Processors** provide 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.

To begin a Manual Barcode Fusion, select Option 3 from the FUSION MODE screen. The following screen will be displayed:



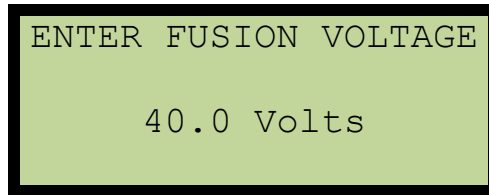
### **NOTE:**

*If the Barcode Only setting is turned ON, the processor will bypass the FUSION MODE screen and proceed directly to the SCAN BARCODE screen. If you wish to perform a fusion in Manual Entry Mode, see page 32 for instructions how to access the Manual Method selection screen.*

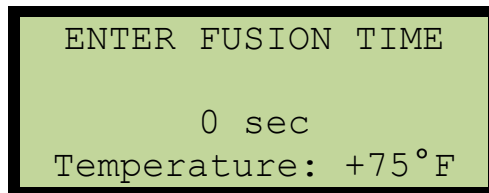
Select Manual Mode by using the **UP button** and the **DOWN button**. When Manual Mode is highlighted, press the **START button**.

The following screen will be displayed:



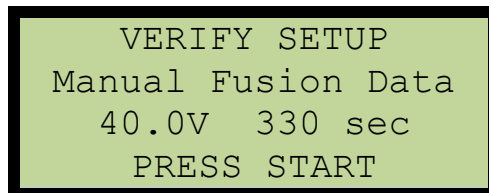


Enter the voltage by using the **UP button** and **DOWN button** to increment and decrement the value. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired output level is displayed, press the **START button**. The following screen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



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 **MTD TRIFUSION 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 measurements and parameters are correct, press the **START button** to begin the fusion.

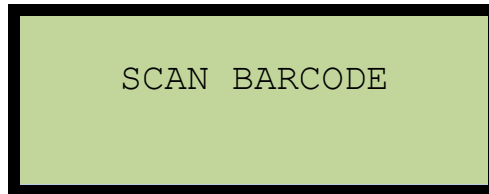
***FAILURE TO VERIFY THAT THE FUSION INFORMATION IS CORRECT BEFORE STARTING A FUSION COULD RESULT IN SIGNIFICANT DAMAGE TO PROPERTY, PERSONAL INJURY, AND/OR DEATH.***

See page 33 for instructions on monitoring the progress of a fusion.

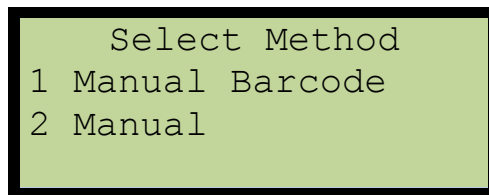
### **Manual Entry (Barcode Only)**

If the Barcode Only setting is turned ON, the processor will bypass the FUSION MODE screen and proceed directly to the SCAN BARCODE screen.

If this happens, the Manual Method selection screen can be accessed by pressing the **UP button** and the **DOWN button** at the same time when the processor displays the SCAN BARCODE screen:



The processor will then display the following screen:

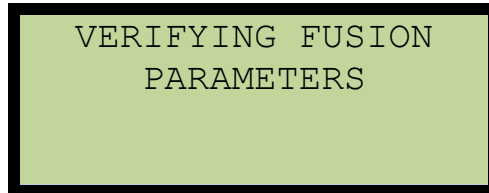


You may now select and perform the desired Manual Entry fusion by following the instructions listed above.

## Monitoring Fusion Progress

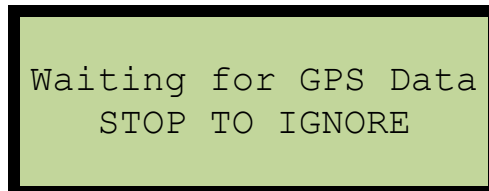
Once the **START button** is pressed the fusion process will begin.

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



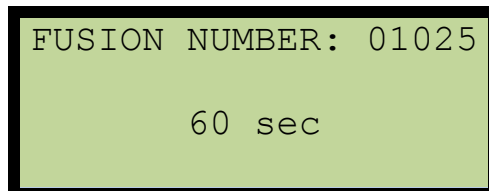
When operating in Barcode Fusion Mode, this resistance check is to make sure that the actual fitting connected matches the resistance of the fitting described in the fusion parameters. When operating in an Alternate Fusion Mode, this resistance check is used to verify that the fitting is still attached. **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 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 FOR LATER DOWNLOADS.**

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 (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:

AutoFuse™ & MiniMAXX	BatteryFuse™
FUSION NUMBER: 01025 40.0V 15.2A Energy: 0.085Ah Gen: 120.0V 60.0Hz	FUSION NUMBER: 01025 40.0V 15.2A Energy: 0.085Ah Battery: 51.0V

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 or battery (In this case 120.0 volts and 51.0 volts).
- The current generator frequency or battery voltage. The generator frequency should remain relatively constant throughout the fusion, while the charge status may change from OK to LOW depending on the state of charge.

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

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

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 330 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:

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

If errors were encountered during the fusion process, an Error Code Message will be displayed (see page 58 for a list of possible Error Codes), and the following screen will be displayed after the error message screen:

DISCONNECT  
OUTPUT LEADS  
FUSION NOT COMPLETE  
Errors Encountered

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

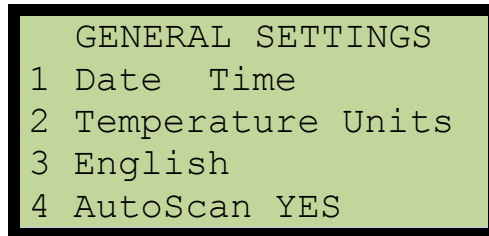
**NOTE:**

*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 unit 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:

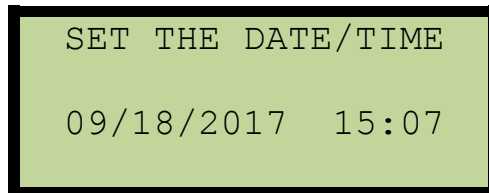


```
GENERAL SETTINGS
1 Date Time
2 Temperature Units
3 English
4 AutoScan YES
```

Use the **UP/DOWN buttons** to highlight the desired option, press **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:



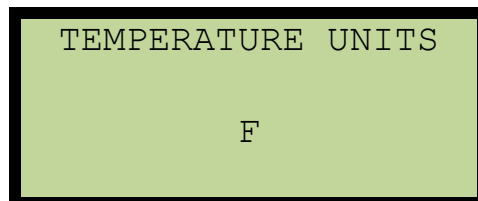
```
SET THE DATE/TIME

09/18/2017 15:07
```

With the keypad (*see page 48*), 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:



```
TEMPERATURE UNITS

F
```

Use the **UP/DOWN buttons** to toggle the default temperature unit setting between °F and °C. 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. *English and Spanish are the only languages currently supported by MTD TRIFUSION Electrofusion Processors.*

## AutoScan

When Option 4 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle between the AutoScan 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 AutoScan. A value of NO disables this functionality. The AUTOSCAN 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 AutoScan). 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 unit 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 19) to obtain the 4 digit passcode. After the correct passcode has been entered, the processor will display a screen similar to the following:

```
ADVANCED SETTINGS
1 Short Stab Detect
2 Operator ID OFF
3 Profiles
```

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 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.***

## 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.

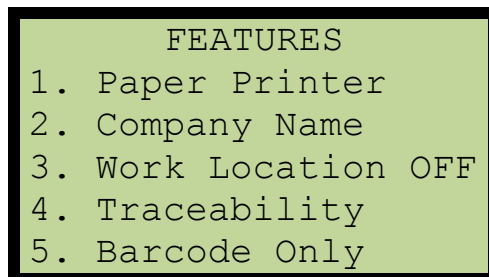
To obtain operator barcodes, contact an authorized representative (See page 19).

## Profiles

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

## 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.



## Paper Printer

**\*\*Paper Printer not available in the *MiniMAXX Electrofusion Processor*.**

The optional paper printer is an accessory that allows an operator to retrieve on-site fusion results and/or fusion data history without a flash drive and computer. Refer to the picture below to determine whether or not your processor is equipped with a printer. If your processor is not equipped with a printer option and you are interested in upgrading, please contact an authorized representative (see page 19).

(Shown with AutoFuse™)



From the FEATURES screen, use the **UP/DOWN buttons** until Option 1 is highlighted. Press the **START button** to select it. A screen similar to the following will be displayed:

```
          PRINTER
1.Auto Print      ON
2.Print from Memory
3.View from Memory
```

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.

### **Auto Print**

This option allows an operator to enable or disable automatic post-fusion printing. Values are “ON” or “OFF.”

- “ON” sets the printer to print a Results Ticket automatically after each fusion cycle is complete.
- “OFF” disables the printer from printing a Results Ticket automatically. *If Auto Print is disabled, you can still retrieve fusion data history using the Print from Memory option (see below).*

From the PRINTER screen, use the **UP/DOWN buttons** until Option 1 is highlighted. Press the **START button** to select it. Use the **UP/DOWN buttons** to toggle through available Auto Print setting values. When the desired value is displayed, press the **START button** to save.

## Print from Memory

This option allows an operator to retrieve fusion data history from the processor's memory and print it for record keeping and/or analysis purposes. From this setting, the operator may also choose the range of fusions they wish to print.

From the PRINTER screen, use the **UP/DOWN buttons** until Option 2 highlighted. Press the **START button** to select it. A screen similar to the following will be displayed:

```
PRINT FROM MEMORY
Select Print Range
From Fusion#      25
To Fusion#       75
```

Using the keypad (*see page 48*), enter the range of fusions that you wish to print.

After entering the desired range of fusions, press the **START button**. A verification screen similar to the following will be displayed.

```
SELECTED PRINT RANGE
From Fusion#      25
To Fusion#       75
PRESS START
```

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

Use this screen to confirm the desired print range before you begin. When you have verified you are printing the print range you want, press the **START button** to begin printing. If at any time during the printing process you wish to stop the operation, press the **STOP button** to cancel.

If the printer runs out of paper during a print job, the processor will prompt the operator to replace the paper roll. After the roll is replaced, the processor will resume the print job from the point the paper ran out.

### Note:

*The printer uses approximately 5" of paper per fusion record. In the example above, 51 fusion records will be printed. This adds up to approximately 255" of paper.*

## View from Memory

This option allows an operator to retrieve fusion data history from the processor's memory and view it on the processor screen for data analysis purposes. From this setting, the operator may also select the specific fusion they wish to see.

From the PRINTER screen, use the **UP/DOWN buttons** until Option 3 is highlighted. Press the **START button** to select it. A screen similar to the following will be displayed:

```
VIEW FROM MEMORY
Select Fusion
Fusion #           25
```

Using the keypad (*see page 48*), enter the fusion you wish to view.

After entering the desired fusion number, press the **START button**. A verification screen similar to the following will be displayed:

```
FUSION TO VIEW
Fusion#           25

PRESS START
```

The processor will BEEP once per second and the text “PRESS START” will flash on and off.

Use this screen to confirm the desired fusion data before you begin. When you have verified you are selecting the fusion data you want, press the **START button** to view the data. If at any time during the process you wish to stop the operation, press the **STOP button** to cancel.

After pressing the **START button**, a screen similar to the following will be displayed:

```
Work Date : 05/15/12
Serial #   :      0125
Operator   :
Location   :
```

From this screen, the operator can view all stored data pertaining to the specific fusion record selected. Each fusion record contains numerous data fields. Use the **UP/DOWN buttons** to scroll through the fusion record line by line. Press the **STOP button** to return to the VIEW FROM MEMORY screen and select another fusion to view.

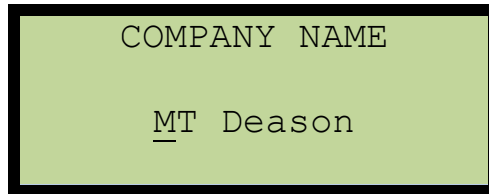
The following table shows possible data fields available for viewing:

<b>Field</b>	<b>Description</b>
Location	The location entered by the operator before the fusion was performed.
Work Date	The date on which the fusion was performed.
Serial #	The serial number of the processor that performed the fusion.
Operator	The operator at the time the fusion was performed.
GPS Lat	The Latitude recorded by the GPS (if equipped) when the fusion was performed.
GPS Lon	The Longitude recorded by the GPS (if equipped) when the fusion was performed.
Fusion #	The fusion number that the data applies to.
Temperature	The ambient temperature measurement at the time the fusion was performed.
Mode	The fusion mode that was used to perform the fusion.
MFG	The manufacture of the fitting fused as specified in the fitting barcode (barcode mode only)
Type	The type of fitting fused as specified in the fitting barcode (barcode mode only)
Size	The size of the fitting fused as specified in the fitting barcode (barcode mode only)
Specify Time	The requested fusion time.
Fusion Time	The actual time fused.
AC IN	The minimum and maximum input voltage measured during the fusion.
AC OUT	The minimum and maximum output voltage measured during the fusion.
Amps Out	The minimum and maximum output current measured during the fusion.
10%	The minimum and maximum output current measured between 0% and 10% fusion time.
20%	The minimum and maximum output current measured between 11% and 20% fusion time.
30%	The minimum and maximum output current measured between 21% and 30% fusion time.
40%	The minimum and maximum output current measured between 31% and 40% fusion time.
50%	The minimum and maximum output current measured between 41% and 50% fusion time.
60%	The minimum and maximum output current measured between 51% and 60% fusion time.
70%	The minimum and maximum output current measured between 61% and 70% fusion time.
80%	The minimum and maximum output current measured between 71% and 80% fusion time.
90%	The minimum and maximum output current measured between 81% and 90% fusion time.
100%	The minimum and maximum output current measured between 91% and 100% fusion time.
Approval	The result of the fusion.
Traceability	Up to 6 barcode numbers from the pipe/fitting traceability barcodes.

## Company Name

This option allows the owner of the processor to input their company name, if desired. The text is limited to 20 characters and will be displayed on the printout every time the paper printer option is used.

From the FEATURES screen, use the **UP/DOWN buttons** to scroll until Option 2 is highlighted. Press the **START button** to select it. A screen similar to the following will be displayed:



The default company name is blank and the cursor will be positioned to the left side of the screen. If a name has previously been entered the cursor will be positioned under the leftmost character and you can edit the name if desired. Enter the text you wish to be displayed using the keypad (*see page 48*). Once the data has been entered, press the **START button** to save. The sample text shown above is representative of a completed customer entry.

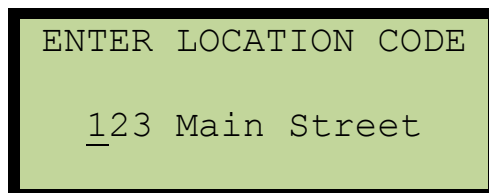
## Work Location

This option controls the Work Location functions, which allow an operator to tag fusions with a specific work or job location. Values for Work Location are “OFF” or “ON.”

- “OFF” disables the Work Location function.
- “ON” enables the Work Location function.

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

If Work Location is enabled, the following screen will be displayed after the processor has passed its INTERNAL SELF TEST and the operator has entered the Operator ID code (if enabled):



Work or job locations entered here will be attached to all fusions performed by this processor until it is powered off or the location text is changed. The work location will also be displayed on the printout every time the paper printer option is used. This data will not affect the fusion but will be associated with each fusion in the download.

If the Work Location function is set to “ON,” manually enter the desired work or job location. *See page 48 for details about how to enter data with the keypad.* Work Location text may contain up to 20 characters and

include letters and/or numbers. The default work location is blank. If a location has previously been entered, the cursor will be positioned under the leftmost character and you can edit the location if desired. When the **START button** is pressed after the last character, the processor will advance to the CONNECT FITTING screen.

See page 24 for details how to perform a fusion.

## **Traceability**

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

- “OFF” disables the Pipe/Fitting Traceability function.
- “ON” enables the Pipe/Fitting Traceability function and allows the operator to either scan or manually enter an ASTM F2897-11 or ISO 12176-4 compliant barcode.
- “SCAN” enables the Pipe/Fitting Traceability function but disables the manual data entry option. The operator can only input the data by scanning a barcode.

From the FEATURES screen, use the **UP/DOWN buttons** to scroll until Option 4 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/FITTING TRACEABILITY WILL ONLY APPLY TO FUSIONS DONE IN BARCODE MODE.***

To learn more about Pipe/Fitting Traceability, contact an authorized representative (See page 19).

## **Barcode Only**

This option requires the operator to enter fitting data by scanning a barcode only. Values are “OFF” or “ON”:

- “OFF” allows the operator to use the Resistor ID or Manual Modes as well as Barcode Mode.
- “ON” turns off the Resistor ID and Manual Modes and requires the operator to use Barcode Mode to complete a fusion.

From the FEATURES screen, use the **UP/DOWN buttons** to scroll until Option 5 is highlighted. Press the **START button** to select it.

Use the **UP/DOWN buttons** to toggle through available Barcode values. When the desired value is displayed, press the **START button** to save.

## APPENDIX

### Scanning Barcodes

#### Barcode Wand

When using a Barcode Wand, make sure the AUTOSCAN setting is “OFF” (see page 37).

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

#### **NOTE:**

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

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

#### AutoScan

**THE AUTOSCAN IS NOT MULTI LINGUAL. THE ONLY LANGUAGE AVAILABLE IS ENGLISH.**

#### **AutoScan Mode**

To operate the **AutoScan** in AutoScan Mode, set the AUTOSCAN option in the Basic User Menu to “YES”. In AutoScan Mode, additional features not available in Scan Mode can be used. AutoScan Mode allows you to:

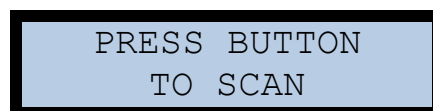
- View fitting data on the **AutoScan** screen before beginning a fusion.
- START and STOP a fusion using the **AutoScan** button.
- Scan Pipe/Fitting Traceability barcodes.

When operating in AutoScan Mode, the **AutoScan** will provide operator feedback on the device display to assist in the completion of the fusion without getting in and out of the ditch. When the **AutoScan** is powered up in AutoScan Mode; the display will look something like this:



CONNECT FITTING

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:



PRESS BUTTON  
TO SCAN

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 45 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:

CPL 2" COUPL  
90 sec START?

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.

Begin the fusion by pressing and holding the **button** on the **AutoScan** for a few seconds. As the fusion progresses, the **AutoScan** display will look something like this:

FUSION IN PROCESS  
Press Button to STOP

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

If errors are encountered during the fusion process, the **AutoScan** will alert the operator by showing the following message:

ERROR RECEIVED  
Check Processor!

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 **AutoScan** in GPS Mode is the same as operating the **AutoScan** in AutoScan Mode with the addition of GPS data. For this reason, only the differences are highlighted in this section.

When the **AutoScan** 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:

CONNECT FITTING 8-1  
39.65678N-75.77673W

The display shows the current latitude and longitude as well as the number of satellites that the **AutoScan** is currently tracking and the Position Error Indicator. The **AutoScan** can only accurately report the current position when it is tracking more than 5 satellites. The example above shows that is tracking 8 satellites, the level of signal confidence is 1 and the current position is 39.65678 degrees North latitude and 75.77673 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:



CONNECT FITTING 3  
GPS Searching . . .

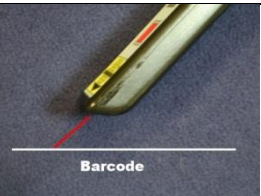

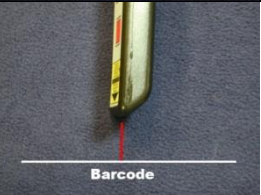


If, after a few minutes, the **AutoScan** still has not acquired 5 satellites, you may try to follow some of the suggestions in the GPS section on page 52, or you can bypass the GPS data by simply connecting the fitting. The **AutoScan** will show you a message similar to the following:

WAIT FOR GPS SIGNAL  
PRESS TO IGNORE

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

### Scanning Techniques

To scan a barcode, start by holding the **AutoScan** about 6-8 inches from the barcode to be scanned. Next, press and hold the **button**. A red laser line will emanate from the end of the device as long as the **button** is held. Move the line over the barcode to be scanned. The **AutoScan** 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.

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

## 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.*

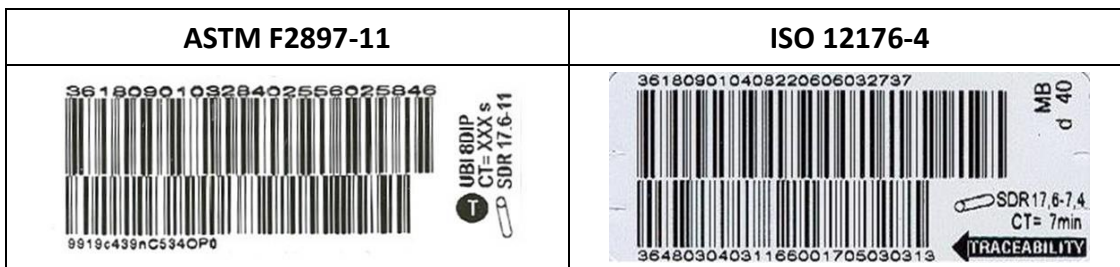
**NOTE:**

*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

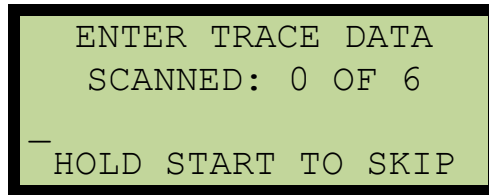
### Pipe/Fitting

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:



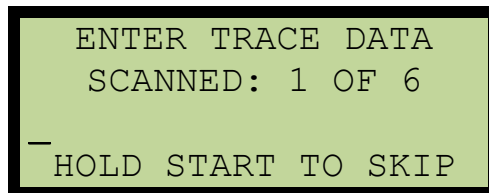
The pipe/fitting traceability option can only be enabled through the Features Menu (see page 44). When this option is set to “ON” or “OPT”, the operator will be prompted to scan or enter one or more traceability barcodes that are attached to the pipe and/or the fitting. This data will not affect the fusion; however, it will be associated with the fusion in the download.

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



The operator can scan or manually enter up to six (6) traceability barcodes. *Refer to the Manual Data Entry section on page 48 for instructions on how to manually enter the barcode.*

As the barcodes are entered, the display will be updated as follows:



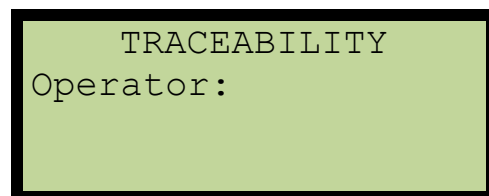
When you are finished scanning or entering traceability barcodes, press the **START button** to advance to the VERIFY SETUP screen. Alternately, if the maximum number of traceability barcodes (6) has been scanned, the processor will automatically advance to the VERIFY SETUP screen.

## Operator ID

Operator ID codes are an option that can only be enabled through the Advanced User Menu (see page 37), 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 19) 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 number. *See page 48 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 ENTER LOCATION CODE screen (if enabled—see page 43) and then to the CONNECT FITTING screen. See page 24 for details on how to perform a fusion.

If the Operator ID function is set to “SCAN”, use a barcode wand or **AutoScan** to scan the desired Operator ID barcode. Press the **START button** to accept the scanned Operator ID. The processor will advance to the ENTER LOCATION CODE screen (if enabled—see page 43) and then to the CONNECT FITTING screen. See page 24 for details on how to perform a fusion.

## Downloading Data

### Data Stored

The following data is stored for each fusion that the processor performs. The data stored in the processor may be downloaded to a USB Flash drive or wirelessly via Bluetooth. The data is output in a binary format that is compatible with a free macro enabled Excel Spreadsheet available from MT DEASON COMPANY, INC.

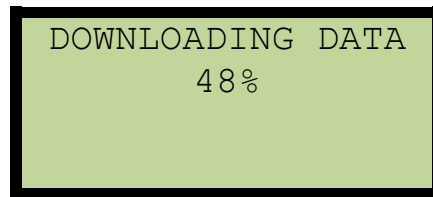
Field	Description
SN	The serial number of the unit.
Fusion #	The fusion number.
Date	Date and time the fusion was performed.
Cal Due	The date that the calibration is due.
Cal Req.	TRUE if the calibration date was expired when the fusion was completed.
Firmware	The firmware version of the processor loaded when the fusion was performed.
Result	The resulting error code.
Mode	The mode used for entering the fusion parameters.
Fitting	The fitting manufacturer type and size
Output	The requested fusion output voltage.
Temperature	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.
Cooling time	The cooling time of the fitting specified in the barcode or, for a Resistor ID or manual fusion, MT Deason’s recommended cooling time.
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.
ID Res.	The measured value of the ID Resistor for ID Resistance fusions.
Position	The GPS latitude and longitude at the time of the fusion
Num Sat	The number of satellites used when determining the GPS fix.
Fix	The GPS signal quality 0=no good, 1=GPS, 2=DGPS.
HDOP	GPS Horizontal Dilution of Precision.
Input Volts Pre Fusion	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 Pre Fusion	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.
Operator	The operator ID code if enabled.
Traceability	The pipe/fitting traceability codes if enabled.

### **Downloading to a USB Flash Drive (AutoFuse™ & BatteryFuse™)**

To download fusion data from your processor to a USB Flash Drive, perform the following steps:

1. Start with the processor turned OFF.
2. Access the Basic User Menu by holding the **UP button**, turning ON the processor, and advancing to the GENERAL SETTINGS screen (see page 36).
3. Plug a formatted USB Flash Drive into the USB Host Port on the face of the processor.
4. The USB Flash Drive will be detected automatically, and the fusion data will be written to the drive.
5. A progress screen will be displayed as the download proceeds:



6. After the download is complete, the processor will return to the CONNECT FITTING screen. Disconnect the USB Flash Drive from the USB Host 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 WITH A SECTOR SIZE OF 512 BYTES.***

### **Downloading Wirelessly (MiniMAXX)**

Wireless downloading of fusion data is handled entirely through the EF Technologies app (EF Utilities). All progress indications and user feedback are communicated through the app.

Turn the processor ON. Allow it to proceed through the INTERNAL SELF TEST to the CONNECT FITTING screen before attempting a download.

Bluetooth capability comes standard in the **MiniMAXX Electrofusion Processor**.

**AutoFuse™ and BatteryFuse™ Electrofusion Processors** can be upgraded by MT DEASON COMPANY, INC to enable this functionality.

For more information please contact an authorized representative (See page 19).

## GPS

GPS may be used to record the latitude and longitude of the processor where the fusion is completed:

- The GPS coordinates are accurate to within 10-15 meters (30-50 feet).
- 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.

GPS comes standard in the *MiniMAXX Electrofusion Processor*.

GPS is available as an option in *AutoFuse™ and BatteryFuse™ Electrofusion Processors* via the *AutoScan* device.

## Trouble

The most common cause of GPS signal trouble is poor signal quality. This can be caused by:

1. Antenna orientation.
2. Obstructions such as buildings or trees.
3. 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 there is 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 device is receiving a signal from the GPS. If this dash is not flashing, then there is a problem with the GPS receiver itself and it should be returned.

## Position Accuracy

GPS accuracy is affected by a number of factors, including satellite positions, noise in the radio signal, atmospheric conditions, and natural barriers to the signal. Noise can create an error between 1 to 10 meters and results from static or interference from something near the receiver or something on the same frequency. Objects such as mountains or buildings or even clouds between the satellite and the receiver can also produce error, sometimes up to 30 meters. The most accurate determination of position occurs when the satellite and receiver have a clear view of each other and no other objects interfere.

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

## Position Error Indicator

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

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

As a general rule, confidence indications above 2 should not be used although the device will not prohibit the user from using any reading.

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

## General Maintenance

### Changing the Fuse (*AutoFuse™ & MiniMAXX Only*)

#### Background Notes

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

#### Tools Required

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

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

## Procedure

1. Insert the 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.

## AC Power Sources

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

- be well maintained and subjected to a periodic maintenance schedule.
- provide output voltage within the specified operating range.

A matching outlet is needed to mate with the plug equipped on the processor:

- 115V models — 30 Amp, 125 Volt, NEMA L5, twist-lock

## Utility Power

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

## Generators

Fuel powered generators are typically a good source of electrical power for **AutoFuse™ and MiniMAXX Electrofusion Processors**. Minimum fitting power requirements must be noted, and additional power capacity is recommended for intangibles (powering other accessories, wear & tear, etc.). Prior to beginning a fusion, it is important to insure the following:

- The generator has enough fuel to complete the electrofusion cycle
- The auto-throttle is disengaged (in anticipation of immediate power draw).

## Inverters

Inverters are an acceptable AC power source for **AutoFuse™ and MiniMAXX 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**

MT DEASON COMPANY, INC does not recommend or endorse any particular type or brand of generator.

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

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

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

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

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

### **Example**

Maximum fitting current = 50 Amps

50.0 Amps / 1.9 = 26.3 Amps required by the generator

26.3 Amps \* 120 = 3156 Watts

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

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

## **Battery Care & Maintenance**

### **Battery Pack**

The battery pack used in the **BatteryFuse™ Electrofusion 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 are 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 three (3) months without being charged, its service life may be shortened. Do not store the battery pack at temperatures below 41° F or in excess of 104° F.

## **Battery Installation and Removal**

The battery pack used in the **BatteryFuse™ Electrofusion Processor** is held in place by a steel mounting bracket attached to the back of the processor's carrying case. When the lid of the carrying case is closed, it rests on rubber bumpers on top of the battery pack trapping it within the mounting bracket. This mounting technique holds the battery pack firmly in place during transit and can easily be removed or replaced without the use of tools while in use.

***WHEN CLOSING THE LID OF THE CASE MAKE SURE THE OUTPUT CABLE DOES NOT CROSS OVER TOP OF THE BATTERY PACK. THE CABLE CAN GET PINCHED BETWEEN THE CASE LID AND THE BATTERY PACK CAUSING DAMAGE TO ONE OR BOTH OF THESE COMPONENTS.***

Removing the battery pack from its mounting bracket is a simple 3-step process:

1. Disconnect the battery pigtail attaching the battery pack to the processor.
2. Loosen the bumper screws and remove the bracket lid.
3. Grasp the pack with two hands and lift it vertically out of the mounting bracket.

To reinstall the battery pack, perform the previous 3 steps in reverse:

1. Grasp the pack with two hands and lower it vertically into the mounting bracket. **During reinstallation, remember to orient the battery pack so the pigtail is pointing to your right.**
2. Replace the bracket lid and tighten the bumper screws.
3. Reconnect the battery pigtail 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 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.***

## **Extension Cords**

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

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

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

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

## Temperature Measurements

The processor's temperature sensor is located near the end of the output cable in the barcode wand/**AutoScan** connector. The temperature sensor does not respond immediately to thermal changes. In order to assure 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 **MTD TRIFUSION Electrofusion Processors** in Barcode Fusion Mode or Manual Barcode Mode to fuse fittings that require temperature compensation, it is essential that care be given to ensure 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 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
50	High Average Current	<p>This warning occurs if the average output current during a fusion exceeds the maximum current rating of the batteries used to power the processor.</p> <p>This is a post fusion warning and only applies to battery powered processors.</p>	<p>Discontinue the use of the fitting that was fused when the warning was generated. The fusion parameters of the particular fitting exceed the operating specifications of the processor.</p> <p style="text-align: center;"><b><i>FAILURE TO HEED THIS WARNING WILL REDUCE THE SERVICE LIFE OF THE BATTERIES.</i></b></p>

### 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 Specifications Table ( <i>See page 8</i> ). 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 Output Lead Ends and fitting adapters for excessive wear and/or damage. If the Output Lead Ends and fitting adapters are in good condition, reconnect 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 the Output Lead Ends are clean, the power supply is sized correctly for the fitting you are fusing, and that the power supply is

		operating correctly.
108	The power supply was shut off during the previous fusion.	This could be anything from an improperly sized generator to someone switching the processor off during a fusion.
109	Reference 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/frequency displayed in the CONNECT FITTING screen are reasonable and within the range specified in the Specification Table ( <i>See page 8</i> ). 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 ( <i>See page 8</i> ). 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 privileges	

	for the functions this machine is capable of performing.	
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 the fitting and the processor support the Resistor ID mode. 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.
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 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 ensure that the processor is the only device operating on the circuit.
145	There is an error communicating with the USB Flash Drive.	Be sure the drive is formatted as FAT or FAT32 with a cluster size of 512 bytes.





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