

Installation, Operation and Maintenance

Rionfuser™ Electrofusion Processor

⚠ WARNING



Read this Manual **BEFORE** using this equipment. Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.



Keep this Manual for future reference.

⚠ DANGER



Electricity, electrocution and shock hazards.

⚠ WARNING

Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If the information provided here is not consistent with local building or plumbing codes, the local codes should be followed. This product must be installed by a licensed contractor in accordance with local codes and ordinances.

NOTICE

Follow the guidelines listed here for proper installation, operation, and maintenance.



ORION®

A WATTS Brand

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Getting Started

Congratulations on the purchase of your new Rionfuser-3000LE!

This manual covers the complete installation, operation and maintenance of the Rionfuser-3000LE. You will also find instruction on testing, commissioning, and troubleshooting the interface.

Important Safety Information

It is your responsibility to ensure that this control is safely installed according to all applicable codes and standards. Watts is not responsible for damages resulting from improper installation and/or maintenance.

⚠ WARNING



**THINK
SAFETY
FIRST**

Read manual and all product labels BEFORE using the equipment. Do not use unless you know the safe and proper operation of this equipment. Keep this manual available for easy access by all users. Replacement manuals are available at OrionFittings.com

NOTICE

Do not attempt to service the control. There are no user serviceable parts inside the control. Attempting to service the control voids the warranty.

⚠ WARNING

- Please read and understand this instruction manual before using **Rionfuser Electrofusion Processors**.
- Do not use or store **Rionfuser Electrofusion Processors** where volatile gas concentrations may be present.
- Only properly trained and qualified personnel should operate **Rionfuser Electrofusion Processors**.
- Treat electrical equipment as a potential source of ignition and follow proper practices for working in an explosive atmosphere.
- Power source and **Rionfuser Electrofusion Processor** must be located out of the trench.
- For protection against the risk of electric shock, connect **Rionfuser Electrofusion Processors** to properly grounded outlets only.
- Only use fusion information supplied by the manufacturer of the fitting.
- Under no circumstances should the **Rionfuser Electrofusion Processor** enclosures 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.

Introduction

Preface

The information contained herein is the technical data and specifications for the following **Rionfuser Electrofusion Processors**:

1. Rionfuser LT

2. RF-3000LE USB

3. RF-3000LE Bluetooth®

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

NOTICE

Operation of this equipment should only be performed by trained and qualified personnel.

NOTICE

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

Features

The **Rionfuser Electrofusion Processor** is a reliable, easy-to-use, rugged tool designed to withstand conditions found at typical construction sites throughout the world.

The **Rionfuser Electrofusion Processor** is splash proof and highly shock resistant.

The **Rionfuser Electrofusion Processor** has an intuitive user interface that is easy to use.

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

The Rionfuser Electrofusion Processor can be operated from any AC power source meeting the input power requirements listed in the Specifications Table on page 6.

Specifications

Parameter	Rionfuser LT	Rionfuser RF-3000LE USB	Rionfuser RF-3000LE Bluetooth
Supply Voltage	97 VAC to 150 VAC		
Supply Frequency	47 Hz to 70 Hz		
Supply Waveform	Sine Wave or Square Wave		
Output Current	20 Amps AC		
Output Voltage	95 volts AC at 120 Volts Input		
Operating Temperature Range	0°F to 120°F		
Operating Modes	CF, PVDF, Manual		
Output Cable Length	24 feet		
Input Cable Length	12 feet		
Fusion Information Storage	1000 Fusions		
Serial Port	9600, 8, n, 1	N/A	N/A
Type A USB Port	N/A	USB A type connector for attaching a USB flash drive to download fusion data.	N/A
Type B USB Port	N/A	USB B type connector for attaching the AutoCal® field calibration system.	N/A
Bluetooth	N/A	N/A	Internal Bluetooth module to download fusion data to the EF Utilities app.
Languages	English		
Fitting Adapters	Fixed 4.0 mm	Field replaceable 4.0 mm	
Environmental Protection	IP54 Splash Proof		
Calibration Interval	2 Years		
Warranty	1 Year		
Calibration/ Service	Field calibration capable		
	This device is fully compatible with the AutoCal® field calibration system.*		

*AutoCal trademarked owned by EF Technologies

Descriptions of Controls

Notes

1. References to controls in this section are displayed exactly as they appear throughout the remainder of this document.
2. The **START** button may mean START, CONTINUE, OK or SAVE depending upon the context of the operation being performed at the time.
3. The **STOP** button may mean STOP, RESET, or CANCEL depending upon the context of the operation being performed at the time.
4. The **UP** button and **DOWN** button are used to scroll through the various menus. These buttons should be used when the processor menu displays +/- selection options. (UP button for "+"; DOWN button for "-").

Carrying Case

RF-3000LE



Rugged Pelican™ case with lid CLOSED



Rugged Pelican™ case with lid OPEN

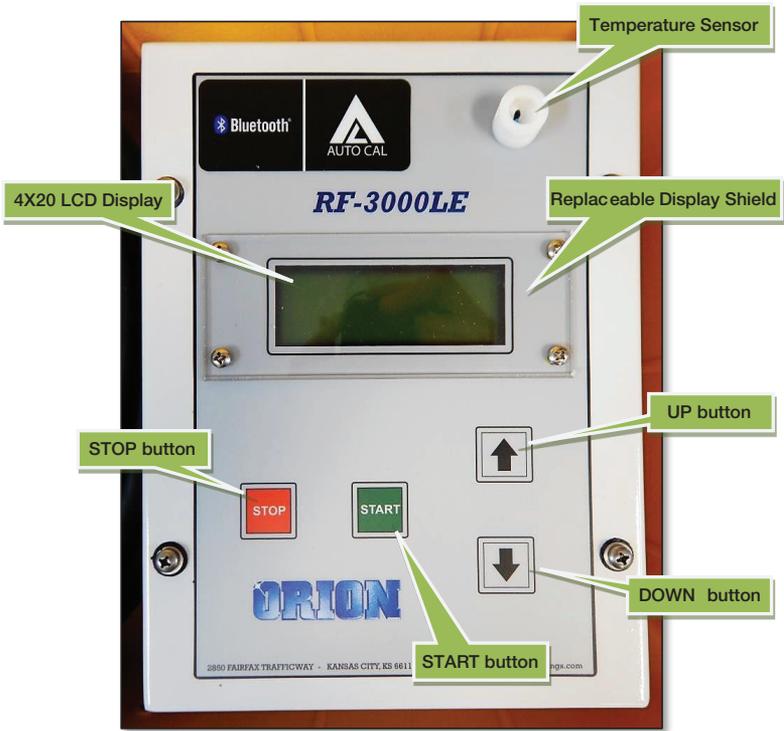
Rionfuser LT



Rugged Pelican™ case with lid CLOSED

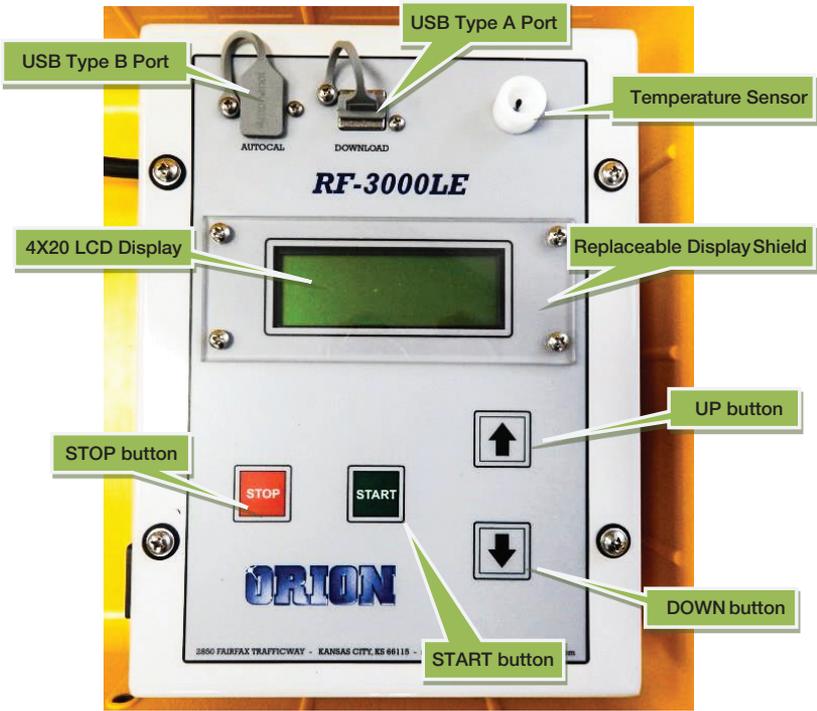
Faceplate Controls

RF-3000LE Bluetooth®



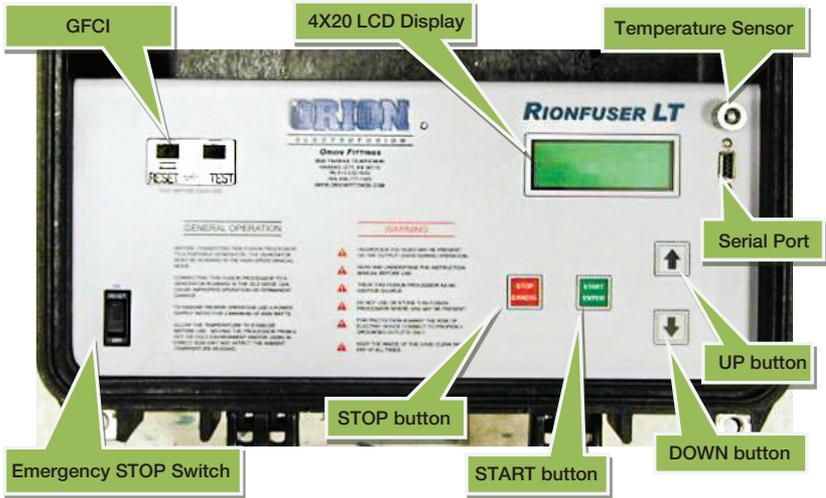
Faceplate Controls

RF-3000LE USB



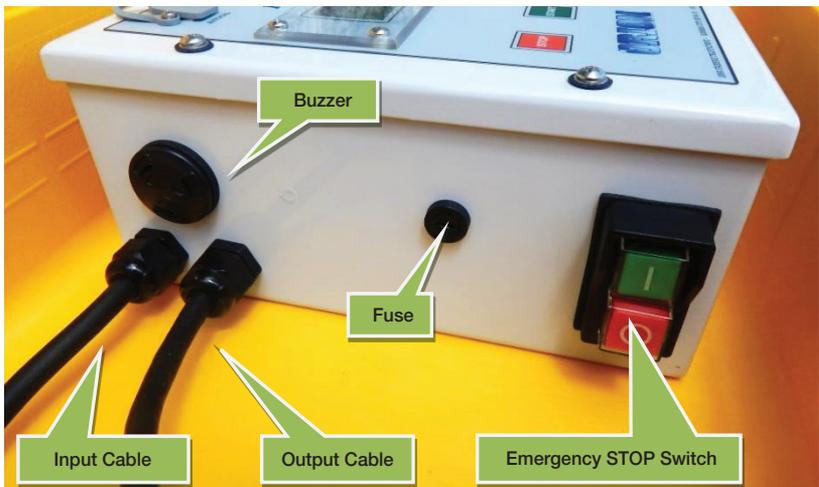
Faceplate Controls

Rionfuser LT



Side Panel Controls

RF-3000LE



Cables

Output Cable



4.0mm Lead Ends
(Field Replaceable Shown)

Input Cable

RF-3000LE



Customer Responsibilities

The **Rionfuser Electrofusion Processor** is a reliable, easy-to-use, rugged tool designed to withstand the conditions found at construction sites around the world. With proper care, 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.

NOTICE

The **Rionfuser Electrofusion Processor** is splash resistant, **NOT WATERPROOF**. It should be stored in a clean, dry environment at a temperature between 0-140°F. **DO NOT STORE THE PROCESSOR OUTSIDE. DO NOT WASH THE PROCESSOR WITH A HOSE.**

The enclosure is very durable and shock resistant; however, do not subject the processor to any unnecessary shocks or stresses including but not limited to:

- Tossing the processor into or out of a vehicle
- Dropping the processor
- Dragging the processor by the cables leads

Subscribe to the recommended calibration service offered by WATTS (See page 13).

The **Rionfuser Electrofusion Processor** will provide the proper outputs for a complete fusion based on the inputs received from the operator.

Always verify that the voltage and time displayed on the LCD display 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 the case.

NOTICE

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

⚠ WARNING

Failure to verify that the fusion information is correct before starting a fusion could result in significant damage to personal 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. If this sensor is reading incorrectly, fusion times may be affected and the integrity of the fusion may be compromised.
2. Make sure the fitting adapters are clean and properly attached to the Output Cable. Failure to do so may result in an improper output applied to the fitting.
3. Make sure power sources are appropriately rated and operating at the manufacturer's specified capacity. *Refer to page 30 for instructions and guidelines to use when choosing a power source.*

Proper care of the processor and output cable will greatly extend the life of your **Rionfuser 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 two (2) years. This will help ensure that the **Rionfuser Electrofusion Processor** is in proper calibration and should enable any potential problems to be identified early.

RF-3000LE

When the calibration period has expired the processor will display the message, "**Error 113: Calibration Required,**" informing the operator that the calibration date has passed. **When this occurs, the processor will stop performing fusions until it has been recalibrated.** See page 31 for more information about calibration reminders and lockdown.

Rionfuser LT

When the calibration period has expired the processor will display the message "Error 113: Calibration Required," informing the operator that the calibration date has passed. This will not prevent the processor from performing fusions; however, the processor should be calibrated as soon as possible.

NOTICE

The correct output voltage cannot be assured if the processor is not calibrated at least once every two (2) years.

Service Contact Information

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

NOTICE

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. WATTS is not responsible for damage caused in shipping.

General Operation

Power Up

Start by making sure the processor's Emergency STOP switch is in the OFF position.

Next, start the generator. Make sure it is running smoothly in high-speed manual mode before plugging in the Rionfuser Electrofusion Processor. It is strongly recommended that the Rionfuser 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 30 for guidelines on selecting an appropriately sized cord.

Plug the processor into the appropriately sized receptacle on the generator.

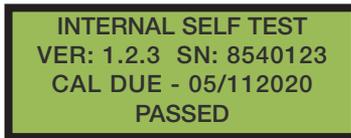
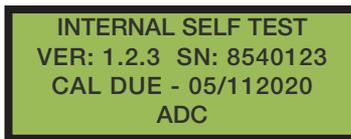
Press the Emergency STOP switch to turn the processor ON.

Test the GFCI by pressing the "Test" button followed by the "RESET" button.

NOTICE

If the processor does not turn OFF when the "TEST" button is pressed and then back ON when the "RESET" button is pressed, DO NOT FUSE.

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



After the INTERNAL SELF TEST, the processor will display the CONNECT LEADS screen. An example of the CONNECT LEADS screen is shown below:



On the CONNECT LEADS screen, the second line indicates the major firmware version of the processor, in this case version 1.0.

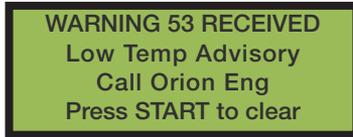
General Operation

Power Up (Cont.)

The third line indicates the ambient temperature the processor is measuring. Check to make sure 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. See page 32 for additional instructions about fusing in environments at low ambient temperatures.

NOTE:

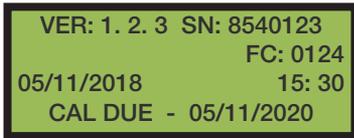
Fusions performed in ambient temperatures less than 50°F may require additional preparation and instruction. If the RF-3000LE Electrofusion Processor reads an ambient temperature of less than 50°F, it will display the following message screen before proceeding to the CONNECT LEADS screen:



See page 33 for Warning & Error Code Definitions. See page 32 for more information about fusing in low ambient environments.

The last line on the CONNECT LEADS screen indicates the generator status. The voltage and the frequency are displayed. It is important that the voltage measurement is within the allowable range and the frequency is stable. See Specifications Table on page 6.

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



This screen shows the following information:

- Software version of the processor (In this case, version 1.2.3).
- Processor serial number (In this case, 8540123).
- The number of fusions the processor has completed (In this case, 124).
- The Date and Time (In this case, May 11, 2018 at 3:30 PM).
- The date the processor will be due for calibration (In this case, May 11, 2020).

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

To begin the fusion process, start by connecting the **Output Leads** to the fitting.

NOTE:

If connecting more than one fitting at a time, consult page 25 for additional instructions.

Power Up (Cont.)

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



If you wish to view the resistance measurement made by the processor, press and hold the **UP button**.

After the resistance measurement, you will be prompted to select the fitting style:



Use the UP/DOWN buttons to highlight the desired fitting style. Press the START button to select the desired fitting style:

- **Rionfuse CF** allows the operator to automatically select between one of several fusion settings pre-programmed for a variety of CF fitting sizes.
- **Rionfuse PVDF** allows the operator to automatically select between one of several fusion settings pre-programmed for a variety of PVDF fitting sizes.
- **Manual Fusion** allows the operator to manually configure the fusion current and the fusion time.

Manual mode should only be used when it is not possible to use CF mode or PVDF mode. When using Manual Mode, the fitting manufacturer should be consulted to verify proper fusion current and time.

WARNING

Failure to verify that the fusion information is correct before starting a fusion could result in significant damage to personal property, personal injury, and/or death.

Once the desired fitting style is selected, follow the instructions in the following sections that correspond to the fitting style you chose.

Power Up (Cont.)

Rionfuse CF

To fuse a CF fitting, first choose the size:



Use the **UP/DOWN buttons** to scroll through the list of available sizes. When you get to the size that you want, press the **START button** to confirm the selection.

Next, you will be prompted to select the type of heat cycle:



Use the **UP/DOWN buttons** to highlight the desired heat cycle. Press the **START button** to select the desired heat cycle.

NOTE:

If this fusion is being performed in an environment where the ambient temperature is below 50°F, please consult Orion Engineering Department at 910-865-7530 for pre-heat instructions before proceeding. All other fusions should be performed using the STANDARD heat cycle. See page 32 for more information about fusing in low-ambient temperature environments.

Once the heat cycle type has been selected, see page 21 for instructions on completing the fusion.

NOTICE

Always consult with the fitting manufacturer for instructions pertaining to when a Preheat Cycle should be performed.

Power Up (Cont.)

Rionfuse PVDF

To fuse a PVDF fitting, first choose the size:



Use the **UP/DOWN buttons** to scroll through the list of available sizes. When you get to the size that you want, press the **START button** to confirm the selection.

Next, you will be prompted to select the type of heat cycle:



Use the **UP/DOWN buttons** to highlight the desired heat cycle. Press the **START button** to select the desired heat cycle.

NOTE:

If this fusion is being performed in an environment where the ambient temperature is below 50°F, please consult Orion Engineering Department at 910-865-7530 for pre-heat instructions before proceeding. All other fusions should be performed using the STANDARD heat cycle. See page 32 for more information about fusing in low-ambient temperature environments.

Once the heat cycle type has been selected, see page 21 for instructions on completing the fusion.

NOTICE

Always consult with the fitting manufacturer for instructions pertaining to when a Preheat Cycle should be performed.

Power Up (Cont.)

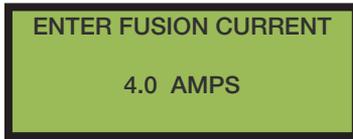
Manual Fusion

****Pre-configured CF or PVDF fittings are always preferred and should be used whenever possible. Manual Fusions require additional care and attentiveness on the part of the operator to ensure 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's manufacturer.**

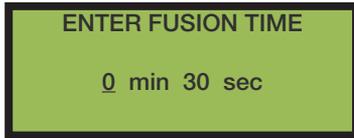
NOTE:

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

When beginning a Manual Fusion, the following screen will be displayed:



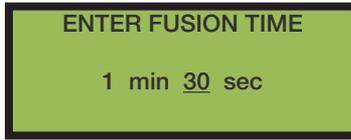
Enter the fusion current by using the **UP button** and **DOWN button** to increment and decrement the value. As either button is held, the numbers will continue to scroll, slowly at first and then faster as time passes. When the desired fusion current is displayed, press the **START button** to enter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



Enter the number of **MINUTES** to fuse using the **UP button** and **DOWN button** to increment and decrement the current value. 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 minutes is displayed, press the **START button** to enter the seconds:



Power Up (Cont.)



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

NOTICE

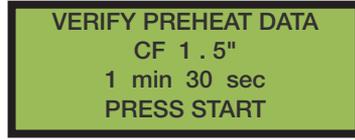
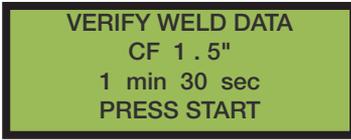
It is the responsibility of the operator to verify that all the information entered is correct per the fitting manufacturer's recommendations for using the attached fitting under the current ambient conditions.

⚠ WARNING

Failure to verify that the fusion information is correct before starting a fusion could result in significant damage to personal property, personal injury, and/or death.

Completing A Fusion

After selecting a fusion style, a verification screen similar to the one shown below will be displayed:



This screen shows :

- The type of cycle selected (*Standard* on the left screen, *Preheat* on the right screen).
- The type of fitting(s) selected (In this case, 1.5" CF couplings). *If the operator chose Manual Fusion, the text "CPLG UNKNOWN" will be displayed on the second line.*
- The fusion time (In this case, 1 minute 30 seconds).

NOTE:

If a Preheat Cycle is required, the processor will display the required preheat time on the last line of the display. See page 32 for details regarding the preheat cycle.

The **VERIFY SETUP** screen allows the operator a final opportunity to verify that the fusion parameters 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.**

NOTICE

It is the responsibility of the operator to verify that all the information displayed is correct per the fitting manufacturer's recommendations for using 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.

⚠ WARNING

Failure to verify that the fusion information is correct before starting a fusion could result in significant damage to personal property, personal injury, and/or death.

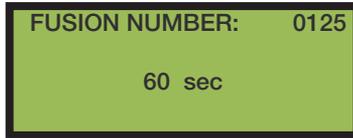
Once the START button is pressed the fusion process will begin.

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

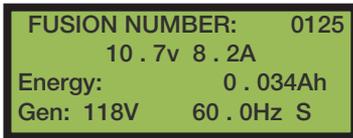


Completing A Fusion (Cont.)

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



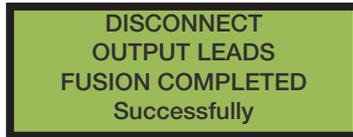
This screen shows the number of the current fusion as well as the time remaining (In this case, 60 seconds). If you want to see more detailed information, press and hold the **UP button** to display the following fusion information screen:



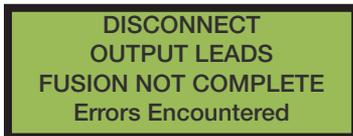
This screen displays the following information:

- The most recently measured voltage and current outputs of the processor.
- The total energy expended during this fusion, in amp-hours (In this case, 0.034 amp-hours).
This number increases during the fusion process as energy is expended.
- The present measured voltage of the generator (In this case, 118 volts).
- The current generator frequency. This number should remain relatively constant throughout the fusion.

When the fusion is complete, if no errors were encountered during the fusion process, the following screen will be displayed:



If errors were encountered during the fusion process, an **Error Code Message** will be displayed (See page 33 for a list of possible Error Codes), and the following screen will be displayed after the error message screen:

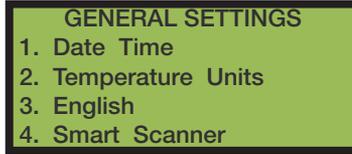


After the **Output Leads** are disconnected, the Rionfuser Electrofusion Processor will return to the **CONNECT LEADS** screen and will be ready to accept information for the next fusion.

User Menus

Basic User Menu

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



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

Setting the Date and Time

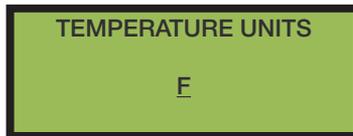
When Option 1 is highlighted, press the **START button** to select it. The following screen will be displayed:



With the keypad (*see page 25*), enter the correct date using the MM/DD/YYYY format and the correct time using the 24 hour (military) format. Press **START button** to save the information entered and return to the Basic User Menu.

Setting the Temperature Units

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



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

Advanced User Menus

Setting the Language

When Option 3 is highlighted, press the **START button** to select it. Use the **UP/DOWN buttons** to toggle between all supported languages. When the desired language is displayed, press the **START button** to save. The standard language supported by the **Rionfuser Electrofusion Processor** is English.

Smart Scanner

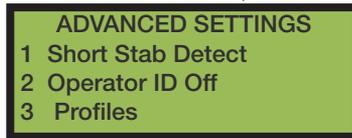
The Smart Scanner setting (Option 4) currently has no function. The processor will beep twice if accessed.

NOTICE

None of the settings in the advanced user menu should be adjusted without specific instructions from the factory or the fitting manufacturer.

Advanced User Menu

The Advanced User Menu is accessed by holding the **DOWN button** when the processor is first powered up. Keep holding the **DOWN button** through the **INTERNAL SELF TEST** screen, until you are prompted for a passcode that must be entered before proceeding. Contact an authorized representative (See page 13) to obtain the 4 digit passcode. The following example shows the options that are available in the Advanced User Menu once the correct passcode has been entered:



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

Short Stab Detect

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

NOTICE

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

The Operator ID setting (Option 2) currently has no function. The processor will beep twice if accessed.

Profiles

The profiles setting (Option 3) currently has no function. The processor will beep twice if accessed.

Advanced User Menus

Connecting Multiple Fittings

The **Rionfuser Electrofusion Processor** is capable of fusing multiple fittings at the same time. The number of fittings that one can fuse is dependent upon the size of the fitting and the quality of the power supply.

NOTICE

When fusing multiple fittings at the same time, always use fittings of the same type and size.

When attaching multiple fittings together, they should be connected in a series or "daisy chained" together.

1. Plug one end of the processor's output cable into the first pin of the first fitting.
2. Plug a jump cable from the second pin of the first fitting into the first pin of the second fitting.
3. Repeat step 2 until all fittings are attached. At this point the last fitting should have one open pin.
4. Plug the other end of the processor's output cable into the second pin of the last fitting in line.

NOTICE

It is important to have good electrical connections when fusing multiple joints. Errors caused by poor connections are multiplied by the number of fittings that are attached.

Make sure all electrical connections are clean and tight.

Use the jump cables supplied by the manufacturer.

Never fuse multiple fittings of different types or sizes.

Entering Data with the Keypad

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

Downloading Data

Data Stored

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

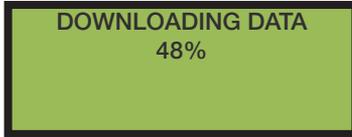
Field	Description
SN	The serial number of the processor.
Fusion #	The fusion number.
User Fusion #	The user resettable fusion counter.
Date	Date and time the fusion was performed.
Cal Due	The date the calibration is due.
Cal Req.	TRUE if the calibration date was expired when the fusion was completed.
Firmware	The firmware version of the processor loaded when the fusion was performed.
Result	The resulting error code.
Mode	The mode used for entering the fusion parameters.
Fitting	The fitting manufacturer type and size.
Control	The requested fusion output voltage.
Temp	The ambient temperature at the time of the fusion.
Nom. Time	The requested fusion time.
Comp Time	The fusion time after temperature compensation was applied.
Actual Time	The actual time the fitting was fused.
Mea Res	The resistance of the fitting specified in the barcode.
Tolerance	The specified resistance tolerance.
Mea Res Pre	The actual measured resistance of the fitting before the fusion.
Mea Res Post	The actual measured resistance of the fitting after the fusion.
Cooling Time	The cooling time of the fitting specified in the barcode.
ID Res.	The measured value of the ID Resistor for ID Resistance fusions.
Input Volts	The measured generator voltage taken before the fusion.
High Volts	The highest measured generator voltage during the fusion.
Low Volts	The lowest measured generator voltage during the fusion.
Wave	The type of supply waveform identified during the fusion (Sine or Square).
Frequency	The measured generator frequency made before the fusion started.
High Freq	The highest measured generator frequency during the fusion.
Low Freq	The lowest measured generator frequency during the fusion.
L Out V	The lowest measured output voltage during the fusion.
H Out V	The highest measured output voltage during the fusion.
L Out A	The lowest measured output current during the fusion.
H Out A	The highest measured output current during the fusion.
Ah Out	The total number of Amp-Hours expended during the fusion.

Downloading to a USB Flash Drive

Fusion data from an RF-3000LE USB or Rionfuser LT Electrofusion Processor is downloaded onto an external USB flash drive. The data is output in a binary format that is compatible with a free macro-enabled Excel Spreadsheet. Contact Orion Engineering Department at 910-865-7530 for more information.

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

1. Turn On the processor and allow it to proceed through the INTERNAL SELF TEST until it reaches the CONNECT LEADS screen.
2. Plug a formatted USB flash drive into the USB host connector on the face of the processor.
3. The USB flash drive will be detected automatically, and the fusion data will be written to the drive.
4. A progress screen similar to the following will be displayed as the download proceeds:



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

NOTE:

*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.*

Rionfuser LT

The **Rionfuser LT Electrofusion Processor** has a 9 pin D-sub connector instead of a USB host connector. To download fusion data from a **Rionfuser LT Electrofusion Processor** onto a USB flash drive, you will need a USB to Serial Port adapter.

The pictures below show a 9 pin D-sub connector and the installed adapter for your reference.



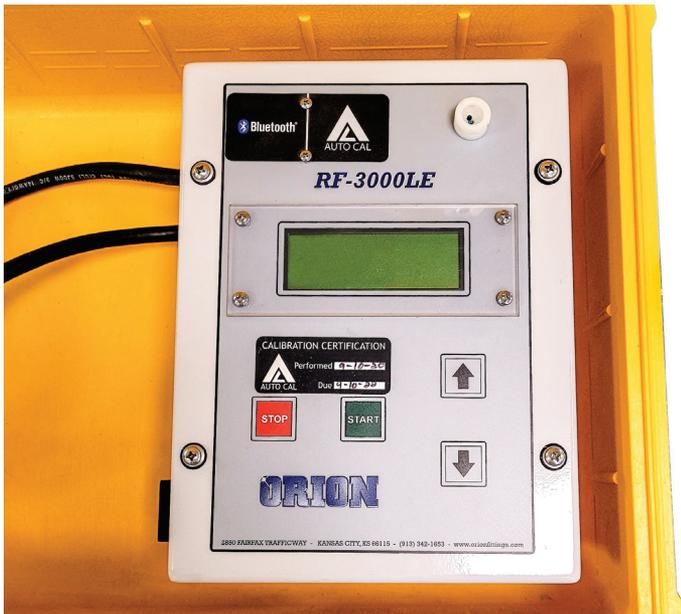
Downloading Wirelessly

Fusion data from an **RF-3000LE Bluetooth Electrofusion Processor** is downloaded wirelessly through the EF Utilities app. Once data has been downloaded, it can be viewed at any time with a smart phone, tablet, or computer.

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

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

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



General Maintenance

Changing the Fuse

*** This section applies to the RF-3000LE Electrofusion Processor only. The Rionfuser LT Electrofusion Processor has no external fuse that can be changed.*

Important Notes

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

Tools Required

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

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

Procedure

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

POWER SOURCES

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

- be well maintained and subjected to a periodic maintenance schedule.
- provide output voltage within the specified operating range.
- contain a matching outlet, which is required to connect with the plug equipped on the processor.

Utility Power

Utility power is a reliable and ideal power source for the **Rionfuser Electrofusion Processor**. However, it is not practical to gain access to this kind of power source in field applications. When fusing with utility power, a dedicated connection to the service panel is recommended because the potential amperage draw is very high.

Generators

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

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

Inverters

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

Power Specifications

Supply Voltage	97 VAC to 150 VAC
Supply Frequency	47 Hz to 70 Hz
Supply Waveform	Sine Wave or Square Wave
Output Current	20 Amps AC
Output Voltage	95 volts AC at 120 Volts Input

Extension Cords

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

Cord Length	Wire Gauge
Less than 25 feet	12/3
Less than 50 feet	10/3
Less than 100 feet	8.3

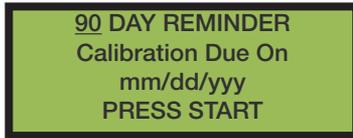
Extension cords should not be used when fusing multiple fittings at the same time.

Calibration Warnings

****This section applies to the *RF-3000LE Electrofusion Processor* only.**

Rionfuser Electrofusion Processors are programmed to provide operators with plenty of time to schedule a calibration. However, if the ***RF-3000LE Electrofusion Processor*** reaches its calibration due date, it will stop fusing until it has been calibrated.

When the calibration due date is within 90 days or less, the processor will display reminders whenever the machine is powered on. The calibration reminder will look similar to this:



The processor will countdown the number of days until calibration is due. The text mm/dd/yyyy shows the month, day, and year that the calibration is due.

To avoid being locked out of the processor, WATTS recommends scheduling a calibration as soon as it starts to display this reminder message.

On the date that calibration is due, the processor will display, "Error 113: Calibration Required," and stop fusing until it is calibrated.

When the *RF-3000LE Electrofusion Processor* displays Error 113, it will not fuse until it has been calibrated.

To schedule a calibration, please see page 13 for instructions and contact information.

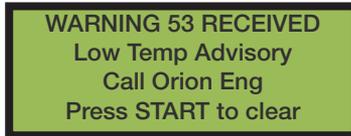
Temperature Measurements

The processor's temperature sensor is located on the face plate (See page 8). The temperature sensor does not respond immediately to thermal changes. In order to ensure accurate ambient temperature measurements, the processor should be left in the fitting environment for at least 15 minutes. Direct exposure to sunlight and other heat sources will adversely affect accuracy.

Low Ambient Temperature Warning

***This section applies to the **RF-3000LE Electrofusion Processor** only.*

Fusions performed in ambient temperatures less than 50°F may require additional preparation and instruction. If you attempt to perform a fusion in an environment where the ambient temperature is below 50°F, the **RF-3000LE Electrofusion Processor** will display the following message:



If the processor displays this message, please consult Orion Engineering Department at **910-865-7530** for preheat instructions before proceeding with the fusion.

Warnings & 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 may be displayed either before or after a fusion and will require operator acknowledgment 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
53	Low Temperature Advisory	Occurs when the ambient temperature read by the processor is less than 50°F.	Consult Orion Engineering Department at 910-865-7530 for pre-heat instructions before proceeding with fusions in temperatures at less than 50°F.

Error Codes

Code	Problem	Resolution
100	The barcode was scanned successfully, however the processor cannot decode the information into valid fusion parameters.	This is not a barcode wand error or scanning problem. Verify that the barcode is an ISO standard 24 digit fitting barcode.
101	Ambient temperature is out of range.	Verify the temperature displayed in the CONNECT LEADS screen is reasonable and within the range specified in the Specification Table (See page 6). 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 for excessive wear and/or damage. If the Output Lead Ends are in good condition, reattach the processor to the fitting and try again. If the problem persists, there is more than likely a calibration or output cable malfunction.
103	Shorted coil in fitting.	Check for a short stab or a shorted coil.
105	Can't maintain output voltage.	Verify the Output Lead Ends are clean, the power supply is sized correctly for the fitting you are fusing, and the power supply is operating correctly.
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.

Error Codes (Cont.)

Code	Problem	Resolution
109	Reference voltage out of tolerance.	Processor must be returned for calibration. You cannot fuse if the error is detected.
110	STOP pressed during previous fusion.	Do not press the STOP button during the fusion unless in an emergency situation.
111	Fusion complete with no other errors.	There were no problems with this fusion.
112	Fitting disconnected	Current drops close to 0 during the fusion. If the problem persists there is more than likely an output cable problem and the processor should be returned for service.
113	The calibration date has expired.	Send the processor in for calibration.
114	There is no valid calibration date set.	Send the processor in for calibration.
115	The processor is not capable of outputting the current required to fuse this fitting	As long as the fitting's fusion requirements are within the specified output range of the processor, this could be an output cable error or a calibration error. Try cleaning the Output Lead Ends. If the problem persists, the processor will need to be returned for service.
116	The processor is not capable of outputting the voltage required to fuse this fitting.	
117	Input voltage is out of range and the fusion cannot start.	Verify that the input voltage and frequency displayed on the CONNECT LEADS screen are reasonable and within the range specified in the Specification Table (See page 6). 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 LEADS screen is reasonable and within the range specified in the Specification Table (See page 6). If the temperature displayed differs significantly from the actual temperature 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. Contact the agency that issued the Operator ID card.
122	Not an Operator ID card.	
123	The Operator ID 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.

Error Codes (Cont.)

Code	Problem	Resolution
125	Resistor ID fusion cannot be completed because the value was not decoded into a valid fusion time.	Verify that the fitting and the processor both support the Resistor ID method. If so, the problem is with the fitting, the output cable or the processor calibration. If the problem persists with multiple fittings, the processor will have to be returned for service.
130	The fitting was disconnected before the specified cooling time.	Do not disconnect the fitting before the manufacturer's recommended cooling time has expired.
131	An undefined error was received before the fusion time was completed.	Processor must be returned for service.
132	Processor supports voltage control only and fusion specified is not voltage control.	Not all processors support current or energy control. Attach a fitting that requires voltage control or contact an authorized representative (See page 13) 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 shut off 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 times unless directed so by the fitting manufacturer.
143	The fitting was disconnected before the specified heat soak time was observed.	Do not disconnect the fitting before the 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.

⚠ WARNING

Need for Periodic Inspection/Maintenance: This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. All products must be retested once maintenance has been performed. Corrosive water conditions and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal and external components helps assure maximum life and proper product function.

NOTICE

Inquire with governing authorities for local installation requirements

Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge. **THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**

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