

RIONFUSE CF- CLAMP FREE PIPING SYSTEMS CONTROLLED FUSION TECHNOLOGY

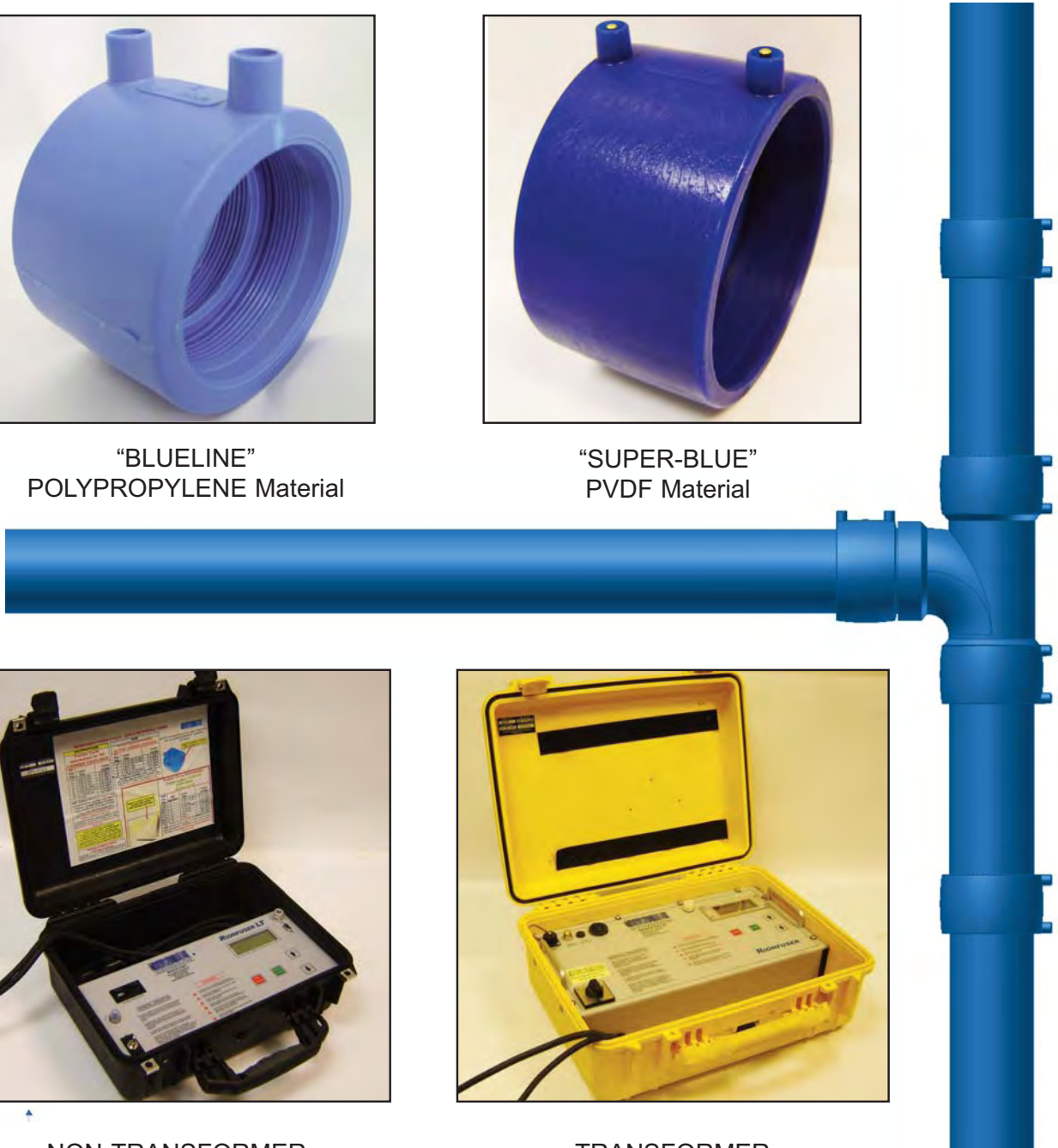
POLYPROPYLENE AND PVDF MATERIALS



“BLUELINE”
POLYPROPYLENE Material



“SUPER-BLUE”
PVDF Material



NON-TRANSFORMER
RIONFUSER UNIT



TRANSFORMER
RIONFUSER UNIT

RIONFUSE CF DESCRIPTION AND SITE PREPARATION

The instructions detailed in this booklet are for installing the ***Rionfuse CF system*** with Molded-In fusion coils and plain end fittings. The ***RIONFUSER*** electrofusion micro-processor must be used to install the “CF” system.

Before beginning any Rionfuse CF installation, the installer must be sure that there is adequate power on the jobsite. See page 11 for details. This booklet is intended to provide the installer with general guidelines on how to install the Rionfuse CF system. It is up to the installing contractor to follow these guidelines and make practical adjustments if necessary. Good practical plumbing practice sense should be used.

Although this guide is comprehensive, the steps for installing the Rionfuse CF system are quick and simple.

RIONFUSE CF COUPLING

Clamp-Free Design with Molded-In electrofusion wire



CONSIDERATIONS BEFORE BEGINNING A RIONFUSE CF INSTALLATION:

Prior to fusing joints, the installer should confirm that the fusion unit is in good working order. A Rionfuser unit or Rionfuser LT (transformer-less unit) must be used. These units may be grey, yellow or black and are all supplied as a plastic carry case. Orion’s original metal fusion unit (colored blue) will NOT fuse the Rionfuse CF system. Photos of all three Rionfuser versions that are designed for Rionfuse CF are pictured at left.

The fusion unit should be plugged into a nominal 115v permanent power source (maximum 150v) or a 5000 watt generator-dedicated to running Rionfusers ONLY. The power source should have a minimum 20 amp breaker. *In general, the tow-able diesel welding generators should not be used since they may supply inconsistent (dirty) power.* Once the power source is checked, the installer should turn on the power switch on the Rionfuser Unit and allow it to perform the ***automated self test***. Three seconds after the self test has been completed, the installer can press and hold the up arrow to display the software version installed on the fusion unit as well as the date when the unit should be returned for regular maintenance (calibration date). As of 11/15/07, the current software version is 2.4.5. Although the fusion unit will work with older software versions, we recommend that the newest software is installed on the Rionfuser unit. Orion can update the software program usually within 24 to 48 hours after receipt of the unit. Please contact Orion to arrange the return of the unit for upgrading and hard drive downloading. This process is typically done within 24 hours and is free of charge. If the installer requires a download print-out of all joints for a particular installation, please contact the local Orion factory representative for assistance.

RIONFUSE CF INSTALLATION GUIDELINES

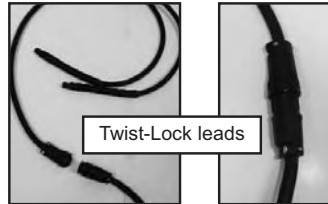
STEP 1 - FUSION UNIT START-UP



Rionfuser Unit

```
INTERNAL SELF TEST
Rionfuser
Cal Due - 10/03/2009
PASSED
initial start-up/self test display
```

```
VER:2.4.5
SN: 00866 FC:00025
Cal Due - 10/03/2009
12/21/2007 09:44
Software & Calibration display
```



Twist-Lock leads

```
CONNECT LEADS
SW Ver 2.4.5
Temperature: +70 F
Genn: 118V 60.0 Hz
```

Genn: = Input Voltage from power source

Turn on power switch on the Rionfuser Unit and allow it to perform the **automated "Internal self test"**. Keep track of the calibration date that is displayed on the screen upon start-up of the unit. This date can be checked at any time by pressing and holding the UP arrow when the leads are not connected to a fitting. Check the software version of the unit and be sure that the proper voltage is being supplied to the unit (displayed as "Genn" - see above photos). The photos above detail the screen displays during the Rionfuser start-up process.

If the fusion unit has a "Twist-Lock" connection on the output cable, be sure it is fully connected and tightened.

STEP 2 - JOINT PREPARATION



Cut Pipe with Plastic Wheel cutter-Pictured at left, then de-burr edges of cut side



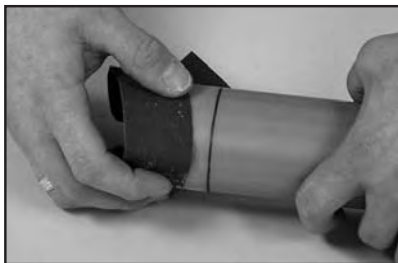
Size	Depth
1-1/2"	1"
2"	1"
3"	1-3/8"
4"	1-3/8"
6"	2"
8"	2-5/8"
10"	2-5/8"
12"	2-5/8"

Mark coupling socket depth on pipe (or fitting)

Cut pipe if necessary. Using the chart above, mark the correct coupling depth on the pipe/fitting. This mark is used so that the installer can visually confirm that the pipe/fitting is fully inserted into the coupling and will avoid fusing joints with insufficient insertion into the coupling. It is important that the pipe/fitting is **FULLY SEATED** into the coupling prior to fusing the coupling.

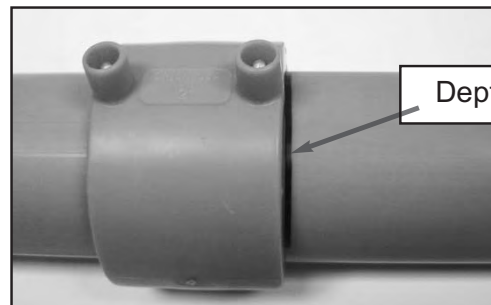
Note: Make sure to cut the pipe straight and de-burr the edges before marking the coupling depth. We suggest using a plastic wheel cutter to cut pipe straight.

STEP 3 - JOINT PREPARATION continued



Using 60 to 80 grit emery cloth or similar, abrade the pipe/fitting area that is to be fused. After abrading, clean all joint surfaces with Isopropyl Alcohol to remove any dirt, grease and the contaminants left from the sandpaper and any other foreign matter from the surface. We suggest using a spray bottle with 90% or higher isopropyl to soak a rag used to thoroughly wipe the joint surface. Acetone can be used as an alternative for Isopropyl, however, Isopropyl has been found to be better at removing contaminants off of polypropylene material

STEP 4 - JOINT PREP - DEPTH MARKING



Insert the pipe/fitting that is to be fused fully into the coupling. Verify that the pipe/fitting is fully inserted into the coupling by making sure the edge of the coupling is even with the mark on the pipe from step#2.

Note: If pipe/fitting pulls out before the joint is fused, be sure to push the joint fully back together before fusing to avoid a "short-stabbed" joint (insufficient intertion).

RIONFUSE CF INSTALLATION GUIDELINES

STEP 5 - SELECT STYLE OF FITTING



CONNECT LEADS
 SW Ver 2.4.5
 Temperature: +70 F
 Genn: 118V 60.0 Hz

Display will show "Connect Leads" until **both** leads are properly connected to the coupling (leads pictured at left)

SELECT FITTING STYLE
 1. RIONFUSE CF
 2. RIONFUSE PVDF
 3. MANUAL FUSION

Select Fitting Style screen

Connect Leads and Select Fitting Style:

Once the joint has been properly prepared and assembled, connect the leads from the Rionfuser unit to the terminal pins on the coupling. Once connected properly, the display on the fusion unit will change from "Connect Element" to "SELECT FITTING STYLE".

NOTE: THE INSTALLER MUST SELECT THE CORRECT TYPE OF FITTING THAT IS TO BE FUSED. SELECTING THE WRONG TYPE OF FITTING STYLE WILL RESULT IN THE WRONG TYPE OF FUSION CYCLE BEING USED.

SEE **STEP 6** FOR FITTING STYLE SELECTION INFORMATION

STEP 6 - FITTING STYLE DESCRIPTION

SELECT FITTING STYLE

1. RIONFUSE CF
2. RIONFUSE PVDF
3. MANUAL FUSION

Select Fitting Style screen

SELECT FITTING STYLE INFORMATION:

Select #1. For POLYPROPYLENE CF 1-1/2" thru 12"

Select #2. For PVDF CF 1-1/2" thru 6"

Select #3. For anything other than the above listed types of couplings. This includes couplings such as Extended length CLOSURE COUPLINGS for Double Containment or other special molded couplings of sizes or materials not found in The #1 or #2 selections above.

Note: Selections #1 and #2 have fusion parameters pre-programmed on the fusion unit and do not require fusion parameters to be entered by the installer. Selection #3 is a manual cycle which requires the fusion times and currents to be entered manually by the installer. See page 6-8 for fusion information.

NOTE: ONLY SIMILAR MATERIALS CAN BE FUSED TOGETHER. POLYPROPYLENE AND PVDF CANNOT BE FUSED TOGETHER. They can be joined using Orion's "No-Hub" couplings - (see Orion's 2 page "No-Hub/Mechanical Joint Assembly" Instruction guide dated May 2002).

FITTING STYLE DETAILS

STYLE #1-
 PP COUPLINGS
 (STANDARD SINGLE WALL)
 Light Blue in color - see front cover



STYLE #2
 PVDF COUPLINGS
 (STANDARD SINGLE WALL)
 Dark Blue in color - see front cover

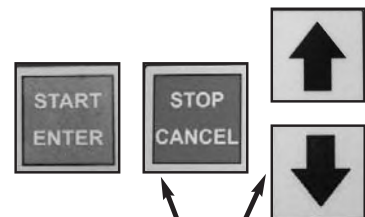


STYLE #3
 CLOSURE COUPLINGS
 (EXTENDED LENGTH FOR
 DOUBLE CONTAINMENT)
 Beige-Grey in color



Rionfuser Face-plate Detail

SELECT FITTING STYLE
 1. RIONFUSE CF
 2. RIONFUSE PVDF
 3. MANUAL FUSION



Use UP & DOWN Arrows to select fitting style, then press START

RIONFUSE CF INSTALLATION GUIDELINES

Step 7 FUSION CYCLE

Select SIZE.

Once the proper fitting style is selected, the fusion unit will display **SELECT SIZE**. Enter the correct size using the up/down arrows, then press **START/ENTER**.

```
SELECT SIZE
3.0 INCH
```

Select TYPE OF CYCLE

Once the *proper* size is selected, the Rionfuser will display, **SELECT TYPE OF CYCLE**. Under "Normal" environmental conditions, select **Standard**, then press start.

NOTE: If ambient temperatures are below 40 degrees F, the joints must be **preheated**. In this case, select the **PREHEAT** cycle, then press start.

```
SELECT TYPE OF CYCLE
1. STANDARD
2. PREHEAT/WARM-UP
```

Refer to the chart on page 5 for pre-heat instructions. *If preheat is selected, the Rionfuser will first preheat the joints and then automatically begin the standard fusion cycle after a 2 minute "Heat Soak Time". During the heat soak time, the unit will not be fusing the joint, but the leads cannot be removed. If they are removed, the Rionfuser will stop the cycle and sound an audible alarm as well as display Error 112 or Error 143.*

PRESS START TO BEGIN FUSION CYCLE

After the standard cycle is selected, the Rionfuser will automatically select the proper current and fusion time and will display the "Verify Weld Data" screen. If the weld data is correct, press start to begin the fusion cycle. If the wrong size or material has been selected, do NOT press start. Instead, press STOP to go to the previous screen and re-enter the proper size/material before beginning the fusion cycle. Once the proper weld data has been verified, press start to begin the fusion cycle.

```
VERIFY WELD DATA
CF 3.0 IN
03 min 00 sec
PRESS START
```

Note: Once the fusion cycle has started, the display will show the weld number, the remaining fusion time and the fitting resistance. Additional weld information can be displayed if the installer presses and holds the UP ARROW during the fusion process. See screen at right. **While holding the UP Arrow, the display will show the weld number, the Output VOLTS and AMPS, the total Energy in Amp Hours and the INPUT Volts and Hz and the type of wave signal (S=Sine, Q= Square).** For Trace-ability purposes, we suggest that the installer writes the weld number for each joint on the coupling itself. The weld number is displayed at the top of the screen during the fusion cycle and each weld has a different number (in sequence). All welds are stored in the Rionfuser's memory for downloading purposes.

```
WELD NUMBER 00025
03 min 00 sec
Res: 2.415 Ohms
```

```
WELD NUMBER 00025
OUTPUT 22.6V 14.25 AMPS
Energy: 0.035Ah
Genn: 115V 60.0Hz S
```

Example of display during fusion cycle WHEN HOLDING UP ARROW

FUSION CYCLE COMPLETED

```
DISCONNECT
OUTPUT LEADS
WELD COMPLETED
SUCCESSFULLY
```

FUSION CYCLE COMPLETED:

Once the fusion cycle is completed, the Rionfuse Unit will automatically end the fusion process and sound an audible beeping sound. This beep pattern is a series of **equal** beeps to indicate that the weld was fully completed. Once the weld is completed, remove the leads and begin the next fusion cycle.

FUSION CYCLE ERRORS:

If the fusion unit sounds an **irregular** beep pattern, a fusion error has occurred and the cycle has stopped before it was completed. When the fusion cycle is stopped due to a fault, it will display an Error Code (number) and description of the error that has occurred. The fusion unit will not allow a complete cycle for reasons such as bad power supply or dis-connected leads. These error codes can be found on page 9 of this manual. All error codes are stored

```
ERROR 112 RECEIVED
Fitting Disconnected
While Fusing
HOLD START TO CLEAR
```

```
ERROR 128 RECEIVED
RE-WELD JOINT #00250
AFTER FULLY COOLED
PRESS START OR STOP
```

```
ERROR 108 RECEIVED
POWER SUPPLY CUT-OFF
FUSED 00020 SEC
HOLD START TO CLEAR
```

Sample Displays for FUSION ERRORS:
See page 9 for more details

FUSION CYCLE PARAMETERS

--Standard Couplings--



**STANDARD CF COUPLING
(POLYPROPYLENE)**

The fusion times for Standard Polypropylene CF couplings are Pre-Programmed in the Rionfuser. Select **Option 1-Rionfuse CF** in the Select Fitting Style Menu (Step 5/6).

POLYPROPYLENE		
Fusion Cycle Information		
STANDARD PP COUPLINGS		
Pipe Size	Fusion Time	Fusion Current
1-1/2"	2:00 (2 min)	8.25 AMPS
2"	2:00 (2 min)	8.25 AMPS
3"	3:00 (3 min)	14.25 AMPS
4"	3:00 (3 min)	14.25 AMPS
6"	4:30 (4-1/2min)	19.00 AMPS
8"	4:45 (4-3/4 min)	19.00 AMPS
10"	7:20 (7min+20Sec)	17.00 AMPS
12"	8:00 (8 min)	16.50 AMPS

Rionfuse CF Multiple Jointing (# of FULL Couplings) Polypropylene (standard carrier PP couplings)

Pipe Size:	1-1/2"	2"	3"	4"	6"	8"	10"	12"
Max # of Couplings	3	3	2	2	1	1	1	1

NOTE: Each coupling fuses BOTH sides at once. 2 Sides = 1 coupling.
Currents and times do not change when fusing multiple couplings per the above chart.



**STANDARD CF COUPLING
(PVDF)**

PVDF		
Fusion Cycle Information		
STANDARD PVDF COUPLINGS		
Pipe Size	Fusion Time	Fusion Current
1-1/2"	2:00 (2 min)	8.25 AMPS
2"	2:00 (2 min)	8.25 AMPS
3"	3:00 (3 min)	14.25 AMPS
4"	3:00 (3 min)	14.25 AMPS
6"	4:30 (4-1/2min)	19.00 AMPS
8"	5:00 (5 min)	19.00 AMPS

Rionfuse CF Multiple Jointing (# of FULL Couplings) Polypropylene

Pipe Size Metric:	1-1/2"	2"	3"	4"	6"	8"
Max # of Couplings	3	3	2	2	1	1

NOTE: Each coupling fuses BOTH sides at once. 2 Sides = 1 coupling.
Currents and times do not change when fusing multiple couplings per the above chart.

The fusion times for Standard PVDF - CF couplings are Pre-Programmed in the Rionfuser. Select **Option 2-PVDF** in the Select Fitting Style Menu (Step 5/6).

FUSION CYCLE PARAMETERS

--Special Coupling types--Manual Fusion Option--



**SPECIAL POWERPOP COUPLING
(POLYPROPYLENE)**

POLYPROPYLENE-GREY-METRIC
"POWER-POP" Couplings

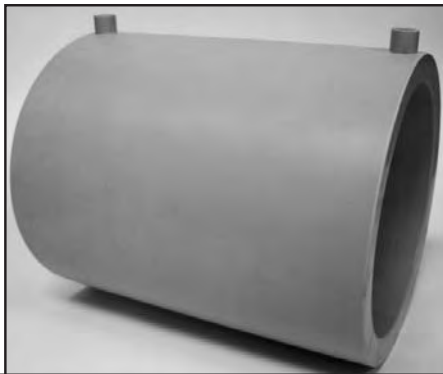
Fusion Cycle Info

(Times shown in Minutes and seconds)

METRIC GREY PP COUPLINGS with (red) Fusion Indicators

Pipe Size	Fusion Time	Fusion Current
32 mm	3:05	4.00 AMPS
50 mm	3:05	4.00 AMPS
63 mm	3:05	4.00 AMPS
90 mm	3:05	4.00 AMPS
110 mm	4:00	4.00 AMPS

To Fuse Power-Pop Couplings--Select **Option 3 - MANUAL FUSION** in the Select Fitting Style Menu (Step 5/6) and then enter the appropriate current (amps) and Time before fusing PowerPop Couplings. The above fusion times are NOT Pre-Programmed in the Rionfuser and therefore the Manual Fusion option must be used. The above fusion times are based on ambient temperatures of 60 TO 80 F. If outside of this temperature range, consult the factory for adjusted fusion times.



**SPECIAL CLOSURE COUPLING
EXTENDED LENGTH-POLYPROPYLENE**

CLOSURE (EXTENDED) COUPLINGS

Fusion Cycle Information

(Times shown in Minutes and seconds)

PP CLOSURE (extended) COUPLINGS

Pipe Size	(Metric) Equivalent	Fusion Time	Fusion Current
3"	90 mm	3:45	14.50 AMPS
4"	110 mm	4:15	14.50 AMPS
6"	160 mm	5:00	19.00 AMPS
8"	200 mm	5:30	18.00 AMPS
10"	250 mm	7:00	17.00 AMPS
12"	315 mm	8:00	16.50 AMPS

To Fuse Closure Couplings--Select **Option 3 - MANUAL FUSION** in the Select Fitting Style Menu (Step 5/6) and then enter the appropriate current (amps) and Time before fusing Closure Couplings. The above fusion times are NOT Pre-Programmed in the Rionfuser and therefore the Manual Fusion option must be used.

Note:Special couplings should be fused individually. Multiple joint fusions of special style couplings should not be attempted due to higher voltage/amperage requirements.

RIONFUSE CF PRE-HEAT/WARM UP GUIDELINES

At temperatures below 40 Deg F, heat should be brought to the fusion area. In addition, all material should be shielded from the wind and kept dry during the installation. The use of heating blankets and tenting is the standard method for handling cold ambient conditions. Once the area is heated, the pre-heat cycle can be used as detailed below.

When the pre-heat cycle is used, the Rionfuser will automatically begin the standard fusion cycle after a 2 minute heat soak cycle (machine will display a countdown timer during this time). **The Rionfuser automatically defaults to a 30 second pre-heat cycle**, which is sufficient for many applications. However, due to a wide range of variables that occur in cold weather installations (wind, UV absorption, etc) additional pre-heat times may be necessary and it is up to the installing contractor to determine what the proper pre-heat time is based on these varying field conditions. The typical maximum pre-heat time is 60 seconds-depending on ambient temperature and wind.

The Rionfuser will prompt the installer to select the type of cycle. For pre-heat, select OPTION 2- Preheat/Warm Up Cycle

```

SELECT TYPE OF CYCLE
1. STANDARD
2. PRE-HEAT/WARM UP
    
```

The warm up time defaults to **30 seconds**. This time can be changed by pressing the up/down arrows to the desired time.

Once the correct time is selected, press start.

Note: 30 seconds is suitable for MOST conditions-depending on wind and temperature. The pre-heat time should not need to exceed 60 seconds. Do not install plastic piping at temperatures below zero.

```

WARM UP TIME
30 SECONDS
    
```

Once the proper preheat time is entered, the Rionfuser will prompt the installer to verify the correct information prior to beginning the fusion cycle. If something is not correct, **DO NOT START THE FUSION CYCLE.**

```

VERIFY PREHEAT DATA
CF      2.0 INCH
0 MIN 30 SECONDS
PRESS START
    
```

The Rionfuser will display the Preheat Cycle remaining time, the weld number and the fitting resistance-during the preheat cycle

```

WELD NUMBER: 00025
PREHEAT CYCLE
0 MIN 30 SECONDS
RES. 2.515 OHMS
    
```

After completion of the preheat cycle, the Rionfuser will automatically switch to the 2 minute HEAT SOAK TIME. After completion of the heat soak cycle, the Rionfuser will automatically begin the standard fusion cycle. Do not disconnect leads during the Heat Soak Cycle. If disconnected, the fusion unit will display Error #143

```

HEAT SOAK TIME
AUTO START AFTER
02 MIN 00 SECONDS
    
```

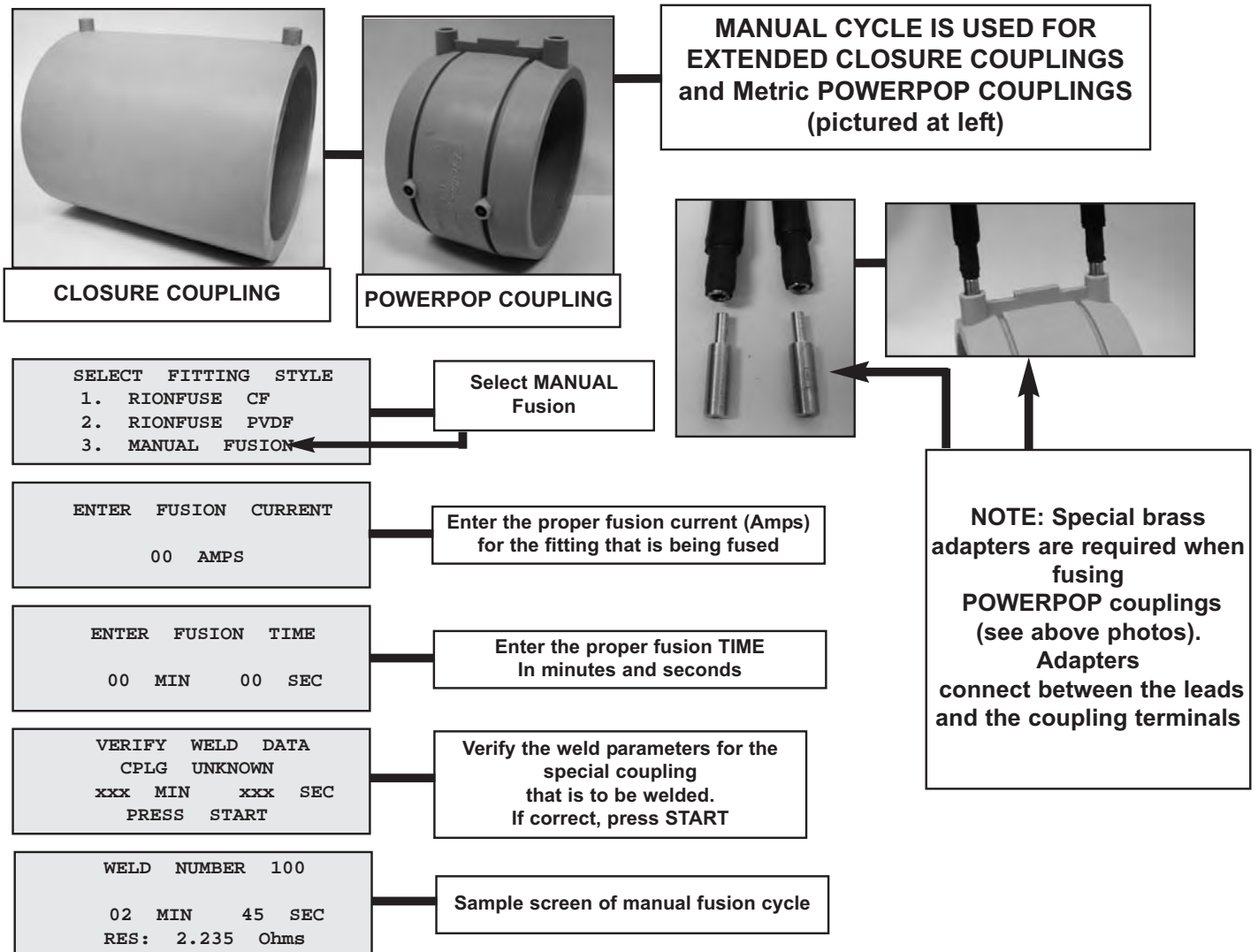
MANUAL FUSION GUIDELINES

In some instances, it may be necessary to use the manual fusion mode in the Rionfuse unit in order to enter times and/or currents that are not pre-set in the unit. The Manual Fusion function may also be used to fuse other materials-only if the fusion parameters (time and current) are known by the installer.

The basic instructions for using the manual override are as follows:

1. When prompted to SELECT FITTING STYLE (from step #5) select OPTION #3 MANUAL FUSION as detailed on the screen sample below
2. Enter the weld current for the fitting being fused by pressing the UP/DOWN arrows. The weld current is shown in amps. Once current has been entered, press START.
3. Enter the proper fusion time for the fitting being fused by pressing the UP/DOWN arrows. Once the proper fusion time has been entered, press start.
4. The machine will ask the installer to "Verify the Weld Data". If the welding parameters shown on the display are correct, press start to begin the "Manual" fusion cycle. At the end of the fusion cycle, the unit will stop the fusion and sound an audible alarm. Disconnect the leads and fuse another fitting if necessary. *The fusion parameters must be manually entered for each joint that is fused using the manual cycle.*

Note: If the weld data is incorrect, do not begin the fusion cycle. Disconnect the leads and go back to step #1. Also, pressing stop will cause the Rionfuser to go back one menu item.



TROUBLESHOOTING / FUSION ERROR CODES

The Rionfuser allows for a relatively broad range of input power fluxuations and power source inconsistencies. However, if the input power source is highly inconsistent and/or outside of the acceptable range, the Rionfuser will automatically stop the fusion cycle and display an Error code and description of the error. Most errors are the result of incorrect power supply or the use of a bad generator. In addition diesel welding generators may cause errors since they do not supply consistent power supply and/or may supply “dirty” power (fluctuating wavelengths). The use of multiple pieces of equipment such as chop saws and other high power use tools on a single receptacle may also cause errors since these other tools may cause the input power to dramatically fluctuate. In view of this, we recommend that the Rionfuser is connected to a dedicated power supply or a power supply that has limited equipment being used when the Rionfuser unit is fusing joints. Standard 5000 watt generators used as a dedicated power source are typically sufficient. The below information outlines the most common Error Codes and descriptions as well as the typical procedures of how to troubleshoot the problem.

Error Codes and troubleshooting

Error Code	Description	Remedy
108	Power Supply cut off.	The fusion unit was un-plugged or the power supply was shut off. Look at the power supply
110	Fusion aborted by operator	The installer pressed the STOP Button during Fusion cycle. Re-start the unit and perform a complete weld.
112	Element Disconnected	The leads of the fusion unit came off of the terminal pin of the coupling. Re-connect the leads and perform a complete weld. Be sure the coil Has not been damaged.
115 or 116	Current/Voltage exceeds Maximum rating	The fusion unit has been instructed to perform a fusion that exceeds the max voltage/current Verify that the correct size/style of coupling was selected and then try to begin the fusion cycle again.
117 or 118	Generator voltage/frequency Out of Spec.	Bad Power supply. Check the power source Verify that the voltage/frequency displayed in the “Connect Fitting” screen are within the acceptable range of the Rionfuser.
128	Cannot maintain output current`	The power supply is insufficient. Check the area for multiple tools connected to the power supply. Check for excessive length or damaged extension cord. Try reducing the number of multiple joints being fused.

Other error codes are possible. If an error occurs that is not detailed above please contact Orion for more information. The Rionfuser will typically stop the fusion cycle and display an error instead of allowing the fusion cycle to continue under un-desireable conditions. In general If an error occurs, the installer should determine the cause of the error, correct the issue and then re-weld the joint that was being fused at the time of the error. The installer should weld this joint after it has sufficiently cooled. Re-fusing a joint immediately following an error may result in over-fusing the joint. If the joint is not re-welded, it will likely leak due to insufficient melt. If it is unknown whether a joint has been fully welded, we suggest to wait until fully cooled and weld the joint as if it is a new joint that has not been previously welded

ADDITIONAL PRECAUTIONS AND INSTALLATION SUGGESTIONS

1. Installation is not recommended at ambient temperatures below 40 degrees F. If fusion is to be performed at below 40 degrees, precautions must be made to be sure that the area is properly covered and heated.
2. **Do not test with compressed air or gases. Test hydrostatically only. Typically a 10ft hydrostatic head pressure test is sufficient.**
3. Store pipe and fittings out of direct sunlight. If material is to be stored outside, it should be covered with a black tarp and shielded from UV rays and kept dry. Polypropylene can be damaged by exposure to UV light and may not fuse properly if it has been stored in direct sunlight.
4. The Rionfuser performs self checks for calibration. The unit will display the “Cal Date” to indicate when it is time for factory re-calibration (approximately every 2 years) This maintenance schedule must be strictly followed to insure proper machine function. If joints are fused with a unit that is out of calibration, problems may occur.
5. Portable generators must be a minimum of 5kW and be dedicated to the Rionfuser Unit only. **Diesel generators will NOT work because they typically supply inconsistent power output. Spider boxes must be connected to an adequate & reliable power supply. Spider boxes used with Diesel generators may be problematic due to “dirty” power supply from the dielsel generator itself (not from the spider box).**
6. The maximum allowable extension cord is 100 ft of 10 gauge wire.
7. The Rionfuser unit allows for normal power variations. It is important to make sure that the power source can supply a minimum of 100 volts (max of 150) before making Rionfuse joints. The Rionfuser will not start the fusion cycle if the supply voltage is not within 100-150 volts. If the Rionfuser cannot maintain output current due to drops in power supply during the fusion cycle, or there is a loss in continuity during the fusion cycle, the Rionfuser will end the cycle and sound an audible alarm. If this occurs, the problem with the power source must be corrected (or the continuity fixed) before attempting to fuse any further joints. If power fluxuations or drops in power are allowed to continue, leaks in joints may occur as a result.
8. If a leak occurs, the system must be drained and the joints dried out. Re-connect the Rionfuser leads and fuse the joint using the warm up cycle setting (30 seconds). Upon completion of the warm up cycle the unit will automatically start the standard fusion cycle after a 2 minute heat soak.
9. Proper support of all joints must be achieved during the fusion and during cooling cycles (approx 10 minutes after the end of the fusion cycle). Typically, the permanent supports are adequate for installation, but depending on the type of fittings and system layout, additional temporary supports may be required. In most situations, hose clamps can be placed on the OD of a coupling that requires additional support.
11. The Rionfuser unit should be plugged into a 110 volt nominal power supply with a 20 amp minimum breaker. Do not plug the Rionfuser into 220 volt power unless it has been modified for 220 volt usage. The Rionfuser has GFI circuitry, but should not be used in damp conditions. If the GFI breaker “faults” it can be reset by pressing the re-set button. If large power surges occur, the Rionfuser’s internal safety mechanisms may clamp down to protect the internal circuitry. If this happens, the machine will likely continue to blow fuses and the clamping mechanisms must be repaired by Orion.
12. This brochure is meant to provide guidelines for fusing the Rionfuse CF system. Good typical plumbing installation practices as well as common sense should also be used. When in doubt, contact your local Orion Representative for installation suggestions.

ORION

REPRESENTED BY:

ORION FITTINGS

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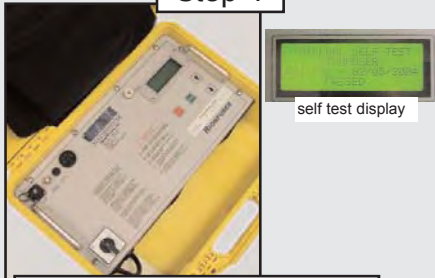
RIONFUSE **CF** INSTALLATION GUIDELINES

The instructions below are for installing the New **Rionfuse CF system** using the **RIONFUSER** electrofusion micro-processor. It is up to the installing contractor to follow these guidelines and make practical adjustments if necessary. [If installing the Original Rionfuse system, please refer to Original Rionfuse installation instruction booklet.](#)



RIONFUSE CF COUPLING
Clamp-Free Design with Molded-In electrofusion wire

Step 1



Rionfuser Micro-Processor

Turn on power switch on the Rionfuser Unit and allow it to perform the **automated self test**.

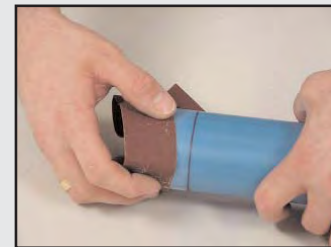
Step 2



Size	Depth
1-1/2"	1"
2"	1"
3"	1-3/8"
4"	1-3/8"
6"	2"
8"	2-5/8"

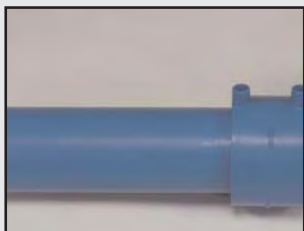
Using the chart above mark the correct coupling depth on the pipe/fitting.
Note: If using pipe, make sure to cut the pipe straight and de-burr before marking the coupling depth.

Step 3



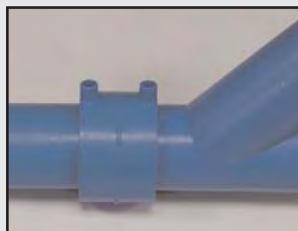
Using 60 grit emery cloth, abrade the pipe/fitting area that is to be fused.
Note: Do not over-sand the pipe surface. Only abrade the pipe enough to remove the shiny surface of the pipe.

Step 4



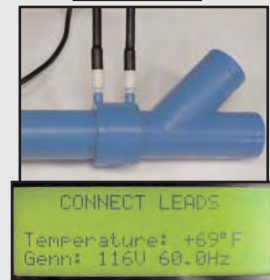
Insert the pipe/fitting completely into the coupling. Verify that the pipe/fitting is fully seated into the coupling by making sure the edge of the coupling is even with the mark on the pipe from step 2.

Step 5



The coupling fuses both sides at once so repeat steps 2 thru 4 for the other side of the coupling.

Step 6



Once both sides of the coupling has pipe/fitting properly seated, connect the Rionfuser leads to coil terminals. Rionfuser will display "Connect Leads" until the leads are attached.

Step 7

Once continuity is confirmed, the display show **SELECT FITTING STYLE** (Rionfuse CF or Original) *There is also a Manual Over-ride option. See manual override instruction pages when using that option.*

Select Rionfuse CF.

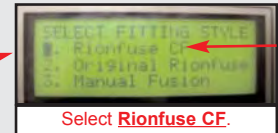
After selecting Rionfuse CF, the machine will ask you to select **Size**. Enter the correct size using the up/down arrows, then press **start**.

Once the *proper* size is selected, the Rionfuser will display, **SELECT TYPE OF CYCLE** . Under "Normal" environmental conditions, select **Standard**, then press start.

If ambient temperatures are below 50 degrees F, the joints must be **preheated**. In this case, select the **PREHEAT** cycle, then press start.

Refer to the chart on page 3 for pre-heat instructions. *If preheat is selected, the Rionfuser will first preheat the joints and then automatically begin the standard fusion cycle after a 2 minute "Heat Soak Time". During the heat soak time, the unit will not be fusing the joint, but the leads cannot be removed. If they are removed, the Rionfuser will stop the cycle and sound an audible alarm as well as display Error 112.*

If the standard cycle is selected, the Rionfuser will automatically calculate the proper current and fusion time and will display the "Verify Weld Data" screen. If the weld data is correct, press start to begin the fusion cycle. If there is a problem with the fusion times or currents, do NOT press start. Instead, press STOP to go to the previous screen and confirm that the proper size has been entered. Once the proper weld data has been verified, press start to begin the fusion cycle.



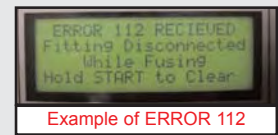
Select **Rionfuse CF**.



Select **SIZE**.



Select **TYPE of Cycle**.



Example of **ERROR 112**

Most Common Error Codes

Error 108 Power Supply cut off

Error 110 Fusion aborted by operator

Error 112 Element Disconnectd

Error 128 Cannot maintain output current

Other error codes are possible. Please consult the Rionfuser manual or contact Orion for more information. Most errors are the result of incorrect power supply or the use of a bad generator. Do not use diesel welding generators to power the Rionfuser unit since they do not supply consistent power supply. Standard 5000 watt generators used as a dedicated power source are typically sufficient.

Step 8



As an alternative to pressing start on the control box, the installer can press the start button on the output leads.

Fusion cycle information is shown to the right.

The machine will automatically stop the fusion process and sound an audible alarm when the fusion cycle is complete. Disconnect the leads. Repeat steps 2-8 for additional fittings.



Disconnect Output Leads

Fusion Cycle Information

Pipe Size	Fusion Time	Fusion Current
1-1/2"	2:00 (2 min)	8.25 AMPS
2"	2:00 (2 min)	8.25 AMPS
3"	3:00 (3 min)	14.25 AMPS
4"	3:00 (3 min)	14.25 AMPS
6"	4:30 (4-1/2min)	19.00 AMPS
8"	4:45 (4-3/4 min)	19.00 AMPS
10"	00000	000AMPS
12"	00000	000AMPS

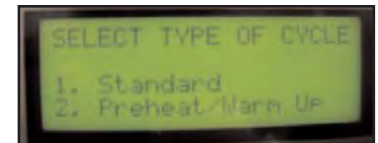
*Note: If necessary, the Rionfuser has a **MANUAL OVERRIDE** function. To perform this function, select the **MANUAL OVERRIDE** option (Option #3 in the **SELECT FITTING STYLE** menu).*

RIONFUSE CF PRE-HEAT/WARM UP GUIDELINES

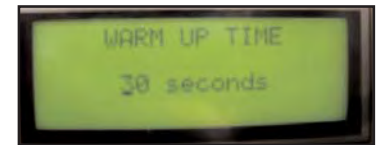
Fusion should NOT be attempted below 30 degrees F. At very cold temperatures, heat should be brought to the fusion area to bring it to temperatures above 30 degrees. In addition, all material should be shielded from the wind and kept dry.

In cold weather applications (below 50 degrees F) the joints should be pre-heated prior to performing the standard fusion cycle. If the pre-heat cycle is used, the Rionfuser will automatically begin the standard fusion cycle after a 2 minute heat soak cycle (machine will display a countdown timer during this time). **The Rionfuser automatically defaults to a 30 second pre-heat cycle**, which is sufficient for many applications. However, due to a wide range of variables that occur in cold weather installations (wind, UV absorption, etc) additional pre-heat times may be necessary and it is up to the installing contractor to determine what the proper pre-heat time is based on these varying field conditions.

The Rionfuser will prompt the installer to select the Preheat/Warm Up Cycle (Option #2)



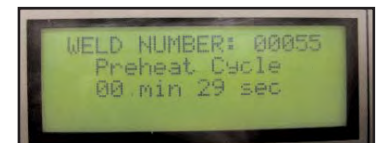
The warm up time defaults to 30 seconds. This time can be changed by pressing the up/down arrows to the desired time, then press start.



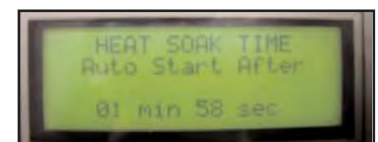
Once the proper preheat time is entered, the Rionfuser will prompt the installer to verify the correct information prior to beginning the fusion cycle. If something is not correct, DO NOT START THE FUSION CYCLE.



The Rionfuser will display the preheat cycle remaining time (as well as the weld number)



After completion of the preheat cycle, the Rionfuser will automatically switch to the 2 minute heat soak time. After completion of the heat soak cycle, the Rionfuser will automatically begin the standard fusion cycle.



Rionfuse CF Multiple Jointing (# of FULL Couplings)								
Pipe Size:	1-1/2"	2"	3"	4"	6"	8"	10"	12"
Max # of Couplings	3	3	2	2	1	1	1	1

RIONFUSE CF MANUAL OVERRIDE GUIDELINES

In some rare instances, it may be necessary to manually override the Rionfuse unit in order to enter times and/or currents that are not preset in the unit. The Manual Override function can also be used to fuse other materials-only if the fusion parameters (time and current) are known by the installer.

The basic instructions for using the manual override are as follows:

1. When prompted to SELECT FITTING STYLE (from step #7) **select option #3 MANUAL OVERRIDE**
2. Enter the weld current for the fitting being fused by pressing the UP/DOWN arrows. The weld current is shown in amps. Once current has been entered, press START.
3. Enter the proper fusion time for the fitting being fused by pressing the UP/DOWN arrows. Once the proper fusion time has been entered, press start.
4. The machine will ask the installer to "Verify the Weld Data". If the welding parameters shown on the display are correct, press start to begin the "Manual" fusion cycle. At the end of the fusion cycle, the unit will stop the fusion and sound an audible alarm. Disconnect the leads and fuse another fitting if necessary.

Note: If the weld data is incorrect, do not begin the fusion cycle. Disconnect the leads and go back to step #1. Also, pressing stop will cause the Rionfuser to go back one menu item.

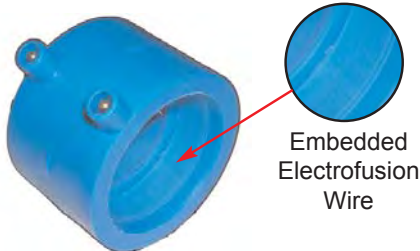
PRECAUTIONS AND ADDITIONAL INSTALLATION SUGGESTIONS

1. Installation is not recommended at ambient temperatures below 40 degrees F. If fusion is to be performed at below 40 degrees, precautions must be made to be sure that the area is properly covered and heated.
2. **Do not test with compressed air or gases. Test hydrostatically only. Typically a 10ft hydrostatic head pressure test is sufficient.**
3. Store pipe and fittings out of direct sunlight. If material is to be stored outside, it should be covered with a black tarp and shielded from UV rays and kept dry.
4. The Rionfuser has internal re-calibration capabilities. This unit will remind the user when it is time for factory re-calibration (approximately every 2 years) This maintenance schedule must be strictly followed to insure proper machine function.
5. Portable generators must be a minimum of 5kW and be dedicated to the Rionfuser Unit only. **Diesel generators will NOT work because they typically supply inconsistent power output .**
6. The maximum allowable extension cord is 100 ft of 10 gauge wire.
7. The Rionfuser unit allows for normal power variations. It is important to make sure that the power source can supply a minimum of 100 volts (max of 150) before making Rionfuse joints. The Rionfuser will not start the fusion cycle if the supply voltage is not within 100-150 volts. If the Rionfuser cannot maintain output current due to drops in power supply during the fusion cycle, or there is a loss in continuity during the fusion cycle, the Rionfuser will end the cycle and sound an audible alarm. If this occurs, the problem with the power source must be corrected (or the continuity fixed) before attempting to fuse any further joints. If power fluctuations or drops in power are allowed to continue, leaks in joints may occur as a result.
8. If a leak occurs, the system must be drained and the joints dried out. Re-connect the Rionfuser leads and fuse the joint using the **warm up** cycle setting (30 seconds). Upon completion of the warm up out cycle proceed to step 8 to re-start the standard fusion cycle.
9. Proper support of all joints must be achieved during the fusion and cooling cycles (approx 10 minutes)
10. This brochure is meant to provide guidelines for fusing the Rionfuse CF system. Good typical plumbing installation practices as well as common sense should also be used. When in doubt, contact your local Orion Representative for installation suggestions.

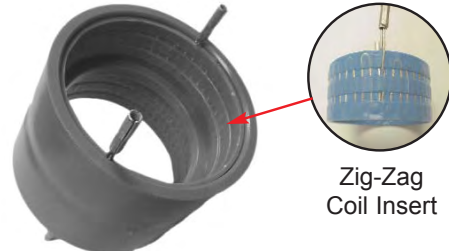
RIONFUSE CF vs. ORIGINAL RIONFUSE FUSION SETTINGS

The below information should be used in addition to and in conjunction with our published installation instructions.

Orion currently manufactures two distinctly different electrofusion systems:



RIONFUSE CF



ORIGINAL RIONFUSE

Each system fuses at different fusion parameters. Times and fusion currents are different between Rionfuse CF and Original Rionfuse. It is important to understand the difference between these two systems and the fact that they fuse at different fusion parameters. The Rionfuser fusion units are capable of fusing both types of joints and therefore have programming for both systems. The installing contractor must set the Rionfuser to fuse the correct system. If a contractor incorrectly sets the Rionfuser unit, joints may be over-fused or under-fused and coil shorts or joint failures can occur.

RIONFUSE CF FUSION SETTINGS

Once continuity is confirmed, the display will show **SELECT FITTING STYLE** (Rionfuse CF or Original) *There is also a Manual Override option.*

Select **Rionfuse CF**. **DO NOT PICK RIONFUSE ORIGINAL IF FUSING RIONFUSE CF**

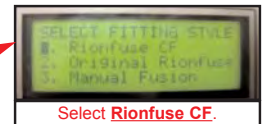
After selecting Rionfuse CF, the machine will ask you to select **Size**. Enter the correct size using the up/down arrows, then press **start**.

Once the *proper* size is selected, the Rionfuser will display, **SELECT TYPE OF CYCLE**. Under "Normal" environmental conditions, select **Standard**, then press start.

If ambient temperatures are below 50 degrees F, the joints must be **preheated**. In this case, select the **PREHEAT** cycle, then press start.

If preheat is selected, the Rionfuser will first preheat the joints and then automatically begin the standard fusion cycle after a 2 minute "Heat Soak Time". During the heat soak time, the unit will not be fusing the joint, but the leads cannot be removed. If they are removed, the Rionfuser will stop the cycle and sound an audible alarm as well as display Error 112.

If the standard cycle is selected, the Rionfuser will automatically calculate the proper current and fusion time and will display the "Verify Weld Data" screen. **For your reference, Rionfuse CF fusion times are on the back of this instruction sheet.** If the weld data is correct, press start to begin the fusion cycle. If the incorrect fusion style is selected, do NOT press start. Instead, press STOP to go to the previous screen and confirm that the proper size and style has been entered. Once the proper weld data has been verified, press start to begin the fusion cycle. **The Rionfuser unit remembers the last fusion cycle parameters entered, so if sizes or styles are to be changed, you MUST press STOP to back out of the current cycle and re-select the correct fusion parameters before continuing in order for the joint to fuse correctly. Failure to do so may result in an incorrect fusion.**



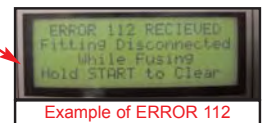
Select **Rionfuse CF**.



Select **SIZE**.



Select **TYPE of Cycle**.



Example of **ERROR 112**



Verify **Weld Data**

Rionfuse CF Fusion Cycle Information

Pipe Size	Fusion Time	Fusion Current
1-1/2"	2:00 (2 min)	8.25 AMPS
2"	2:00 (2 min)	8.25 AMPS
3"	3:00 (3 min)	14.25 AMPS
4"	3:00 (3 min)	14.25 AMPS
6"	4:30 (4-1/2min)	19.00 AMPS
8"	4:45 (4-3/4 min)	19.00 AMPS

USE THESE FUSION
PARAMETERS FOR
RIONFUSE CF
ONLY!!!

ORIGINAL RIONFUSE FUSION SETTINGS

The base fusion time for Original Rionfuse is 2:00 at 17.5 amps for all sizes

Once continuity is confirmed, the display will show **SELECT FITTING STYLE** (Rionfuse CF or Original) *There is also a Manual Override option.*

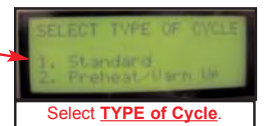
Select **Original Rionfuse**. **DO NOT PICK RIONFUSE CF IF FUSING RIONFUSE ORIGINAL**

After selecting Original Rionfuse, the Rionfuser will display, **SELECT TYPE OF CYCLE** . Under "Normal" environmental conditions, select **Standard**, then press start.

The fusion parameters for Original Rionfuse are 2:00 mins. at 17.5 amps for polypropylene, and 2:30 mins. at 17.5 amps for PVDF, regardless of size. This fusion time is at 73°F or higher. There is an automatic temperature compensation for Original Rionfuse which adds 0.4 secs. for every degree below 73°F. For example: At 50°F, the fusion time would be approx. 2:09 at 17.5 amps. The amperage for Original Rionfuse never changes. Whether or not the time is compensated for, the fusion current will always remain at 17.5 amps. If you are fusing Original Rionfuse, confirm that the fusion current is 17.5 amps BEFORE beginning the fusion cycle (Verify Weld Data Screen). **If the parameters displayed are different, you MUST press STOP on the Rionfuser to back out of the current cycle and re-select the correct fitting style and cycle type.**



Select **Original Rionfuse**.



Select **TYPE of Cycle**.



Verify **Weld Data**

ORION

ORION FITTINGS
2850 FAIRFAX TRAFFICWAY
KANSAS CITY, KANSAS 66115
PHONE: (913) 342-1653 FAX: 800-777-1653
www.orionfittings.com

ORION

RIONFUSE CF **PVDF** INSTALLATION GUIDELINES

The following pages are for installing the **Rionfuse CF system in PVDF MATERIAL** using the **RIONFUSER** electrofusion micro-processor. It is up to the installing contractor to follow these guidelines and make practical adjustments if necessary. **If installing the Original Rionfuse system, or Rionfuse CF in POLYPROPYLENE material please refer to Original Rionfuse installation instruction booklet.**



PVDF MATERIAL

RIONFUSE CF COUPLING
*Clamp-Free Design with Molded-In
electrofusion wire*
PVDF MATERIAL
*(DARK BLUE MATERIAL-DARKER
THAN POLYPROPYLENE)*

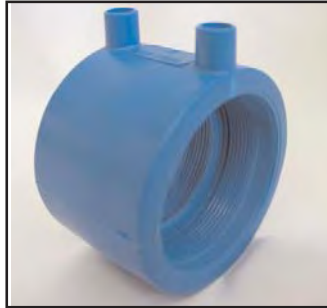


POLYPROPYLENE MATERIAL

RIONFUSE CF COUPLING
*Clamp-Free Design with Molded-In
electrofusion wire*
PVDF MATERIAL
(Polypropylene also available)

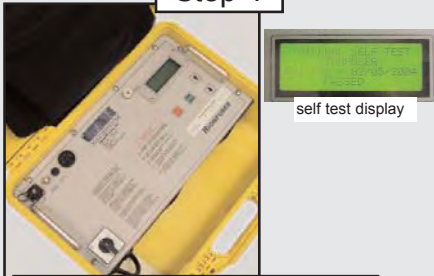
RIONFUSE **CF** INSTALLATION GUIDELINES

The instructions below are for installing the New **Rionfuse CF system** using the **RIONFUSER** electrofusion micro-processor. It is up to the installing contractor to follow these guidelines and make practical adjustments if necessary. [If installing the Original Rionfuse system, please refer to Original Rionfuse installation instruction booklet.](#)



RIONFUSE CF COUPLING
Clamp-Free Design with Molded-In electrofusion wire

Step 1



Rionfuser Micro-Processor

Turn on power switch on the Rionfuser Unit and allow it to perform the **automated self test**.

Step 2



Size	Depth
1-1/2"	1"
2"	1"
3"	1-3/8"
4"	1-3/8"
6"	2"
8"	2-5/8"

Using the chart above mark the correct coupling depth on the pipe/fitting.
Note: If using pipe, make sure to cut the pipe straight and de-burr before marking the coupling depth.

Step 3



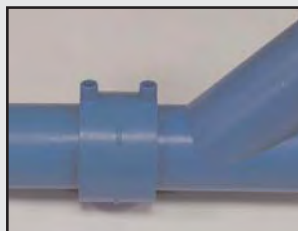
Using 60 grit emery cloth, abrade the pipe/fitting area that is to be fused.
Note: Do not over-sand the pipe surface. Only abrade the pipe enough to remove the shiny surface of the pipe.

Step 4



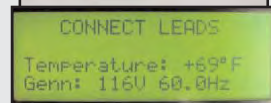
Insert the pipe/fitting completely into the coupling. Verify that the pipe/fitting is fully seated into the coupling by making sure the edge of the coupling is even with the mark on the pipe from step 2.

Step 5



The coupling fuses both sides at once so repeat steps 2 thru 4 for the other side of the coupling.

Step 6



Once both sides of the coupling has pipe/fitting properly seated, connect the Rionfuser leads to coil terminals. Rionfuser will display "Connect Leads" until the leads are attached.

RIONFUSE CF-**PVDF** MANUAL OVERRIDE INFO

The Manual Override function **MUST** be used to fuse RIONFUSE CF IN **PVDF** MATERIAL fuse other materials-only if the fusion parameters (time and current) are known by the installer.

The basic instructions for using the manual override are as follows:

1. When prompted to SELECT FITTING STYLE (from step #7) **select option #3 MANUAL OVERRIDE**
2. Enter the weld current for the fitting being fused by pressing the UP/DOWN arrows. The weld current is shown in amps. Once current has been entered, press START.
3. Enter the proper fusion time for the fitting being fused by pressing the UP/DOWN arrows. Once the proper fusion time has been entered, press start.
4. The machine will ask the installer to "Verify the Weld Data". If the welding parameters shown on the display are correct, press start to begin the "Manual" fusion cycle. At the end of the fusion cycle, the unit will stop the fusion and sound an audible alarm. Disconnect the leads and fuse another fitting if necessary.

Note: If the weld data is incorrect, do not begin the fusion cycle. Disconnect the leads and go back to step #1. Also, pressing stop will cause the Rionfuser to go back one menu item.

PRECAUTIONS AND ADDITIONAL INSTALLATION SUGGESTIONS

1. Installation is not recommended at ambient temperatures below 40 degrees F. If fusion is to be performed at below 40 degrees, precautions must be made to be sure that the area is properly covered and heated.
2. **Do not test with compressed air or gases. Test hydrostatically only. Typically a 10ft hydrostatic head pressure test is sufficient.**
3. Store pipe and fittings out of direct sunlight. If material is to be stored outside, it should be covered with a black tarp and shielded from UV rays and kept dry.
4. The Rionfuser has internal re-calibration capabilities. This unit will remind the user when it is time for factory re-calibration (approximately every 2 years) This maintenance schedule must be strictly followed to insure proper machine function.
5. Portable generators must be a minimum of 5kW and be dedicated to the Rionfuser Unit only. **Diesel generators will NOT work because they typically supply inconsistent power output .**
6. The maximum allowable extension cord is 100 ft of 10 gauge wire.
7. The Rionfuser unit allows for normal power variations. It is important to make sure that the power source can supply a minimum of 100 volts (max of 150) before making Rionfuse joints. The Rionfuser will not start the fusion cycle if the supply voltage is not within 100-150 volts. If the Rionfuser cannot maintain output current due to drops in power supply during the fusion cycle, or there is a loss in continuity during the fusion cycle, the Rionfuser will end the cycle and sound an audible alarm. If this occurs, the problem with the power source must be corrected (or the continuity fixed) before attempting to fuse any further joints. If power fluxuations or drops in power are allowed to continue, leaks in joints may occur as a result.
8. If a leak occurs, the system must be drained and the joints dried out. Re-connect the Rionfuser leads and fuse the joint using the **warm up** cycle setting (30 seconds). Upon completion of the warm up out cycle proceed to THE TOP OF THIS PAGE to re-start the fusion cycle.
9. **Proper support of all joints must be achieved during the fusion and cooling cycles (approx 10 minutes)**
10. This brochure is meant to provide guidelines for fusing the Rionfuse CF system. Good typical plumbing installation practices as well as common sense should also be used. When in doubt, contact your local Orion Representative for installation suggestions.

Fusion Parameters

SINGLE-WALL COUPLINGS

Zig-Zag Shaped Coil (original Orion Rionfuse design)

POLYPROPYLENE - ALL SIZES (1-1/2" thru 10").....17.5 amps for 2:00 (2 min)
PVDF - ALL SIZES (1-1/2" thru 10").....17.5 amps for 2:30 (2-1/2 min)

CF (Clamp Free) With Embedded Wires

POLYPROPYLENE:

1-1/2".....8.25 AMPS for 2 minutes
2"..... 8.25 AMPS for 2 minutes
3"..... 14.25 AMPS for 3 minutes
4"..... 14.25 AMPS for 3 minutes
6"..... 19.00 AMPS for 4-1/2 minutes
8" 19.00 AMPS at 4-3/4 minutes (4:45)

PVDF *(must use MANUAL cycle option on Rionfuser Unit)*

1-1/2".....8.25 AMPS for 2-1/2 minutes
2"..... 8.25 AMPS for 2-1/2 minutes
3"..... 14.25 AMPS for 3-1/2 minutes
4"..... 14.25 AMPS for 3-1/2 minutes

POWERPOP COUPLINGS - Embedded wire with Red Fusion Indicators:

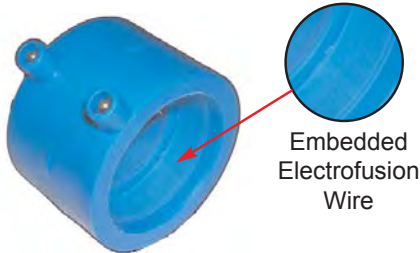
POLYPROPYLENE:

32mm thru 63mm..... 4 AMPS for 3 minutes
90mm..... 4 AMPS for 3 minutes
110mm.....4 AMPS for 4 minutes

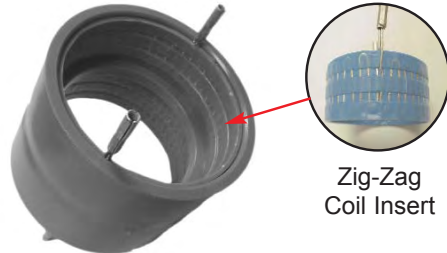
RIONFUSE CF vs. ORIGINAL RIONFUSE FUSION SETTINGS

The below information should be used in addition to and in conjunction with our published installation instructions.

Orion currently manufactures two distinctly different electrofusion systems:



RIONFUSE CF- Polypropylene & PVDF



ORIGINAL RIONFUSE

Each system fuses at different fusion parameters. Times and fusion currents are different between Rionfuse CF and Original Rionfuse. It is important to understand the difference between these two systems and the fact that they fuse at different fusion parameters. The Rionfuser fusion units are capable of fusing both types of joints and therefore have programming for both systems. The installing contractor must set the Rionfuser to fuse the correct system. If a contractor incorrectly sets the Rionfuser unit, joints may be over-fused or under-fused and coil shorts or joint failures can occur.

ADDITIONAL FUSION INFORMATION

RIONFUSE CF PVDF FUSION INFORMATION

The Rionfuser fusion unit is generally programmed for Polypropylene "CF" systems WHEN FUSING **PVDF RIONFUSE CF**, THE INSTALLER MUST USE THE **MANUAL CYCLE** AND **MANUALLY ENTER** THE FUSION TIMES AND CURRENTS AS SHOWN ON **PAGE 2 and 3** OF THIS INSTRUCTION BOOKLET

Most Common Error Codes			
<p>Error 108 Power Supply cut off</p> <p>Error 112 Element Disconnectd</p>	<p>Error 110 Fusion aborted by operator</p> <p>Error 128 Cannot maintain output current</p>		
<p>Other error codes are possible. Please consult the Rionfuser manual or contact Orion for more information. Most errors are the result of incorrect power supply or the use of a bad generator. Do not use diesel welding generators to power the Rionfuser unit since they do not supply consistent power supply. Standard 5000 watt generators used as a dedicated power source are typically sufficient.</p>			

Rionfuse CF Multiple Jointing (# of FULL Couplings)								
Pipe Size:	1-1/2"	2"	3"	4"	6"	8"	10"	12"
Max # of Couplings	3	3	2	2	1	1	1	1