

# Safety

- ! Please read and understand this instruction manual before using the **Easy Fuse** electrofusion processor.
- ! Safety standards and precautions should be followed at all times.
- ! Do not use or store the **Easy Fuse** electrofusion processor where volatile gas concentrations may be present.
- ! Only properly trained and qualified personnel should use the **Easy Fuse** electrofusion processor.
- ! Treat electrical equipment as a potential source of ignition and follow proper practices for working in an explosive atmosphere.
- ! Fusion Processor must be located out of the trench.
- ! For protection against the risk of electric shock, connect the **Easy Fuse** electrofusion processor only to properly grounded outlets.
- ! Use only up-to-date fusion information supplied by the manufacturer of the fitting when fusing in manual mode.
- ! Under no circumstances should the **Easy Fuse** electrofusion processor's electronics enclosure be opened for service in the field. All warranties are void if the factory seal has been broken.

# Preface

The information contained herein is the technical data and specifications for Central Plastics Company's **Easy Fuse** electrofusion processor.

This publication was written to assist trained personnel in the proper procedures and operating functions of the **Easy Fuse** electrofusion processor.

Operation of Central Plastics Company's **Electrofusion System** should only be performed by trained and qualified personnel.

The technical data and advice contained herein is based upon tests and information believed to be reliable. However, the user should not rely upon it absolutely for specific applications. All data is given and accepted at the users risk and confirmation of its validity and suitability in particular cases should be obtained independently. Central Plastics Company 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.

## Procedures to Follow to Maintain the Warranty And Insure Reliable Performance

- **DO NOT** pull on the input or output cables.
- **DO NOT** place the Processor in water.
- **DO NOT** store the Processor in unprotected outdoor environment.
- **DO NOT** leave the Processor in the rain.
- **DO NOT** wash with a hose.
- **DO NOT** remove the face or open electronics compartment
- **DO NOT** mutate fitting connectors.
- **DO NOT** modify power plug.

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# **Introduction**

The **EASY FUSE** electrofusion processor is designed to provide precision control of the power parameters specified for an electrofusion fitting. The processor will monitor ambient conditions and fitting output, insuring proper energy delivery.

The **EASY FUSE** electrofusion processor is a reliable, easy-to-use, rugged tool designed to withstand conditions found at construction sites. This AC powered processor will fuse all Central Plastics' fittings. The processor can also fuse other manufacturers' fittings via manual or barcode modes.

The **EASY FUSE** electrofusion processor is splash proof and highly shock resistant.

The **EASY FUSE** electrofusion processor is designed to fuse a variety of electrofusion fittings from small service sizes to large diameter couplers. It can be powered by voltage from utility service, portable generators, or inverters (square, quasi, and true-sine waveforms).

The **EASY FUSE** electrofusion processor can fuse fittings at voltages ranging from 8 to 48 volts up to a maximum output current of 100 amps.

The **EASY FUSE** electrofusion processor is most efficiently and reliably operated in barcode mode. However, manual mode is also available, and the use of either mode requires minimal operator training. (Note: fitting and pipe preparation typically requires specialized techniques, and training is required for most applications. Consult the fitting manufacturer and concerned transportation authorities for assistance.)

The **EASY FUSE** electrofusion processor is equipped with memory for data storage and can be downloaded to determine installation conditions and completion status of fusion cycles.

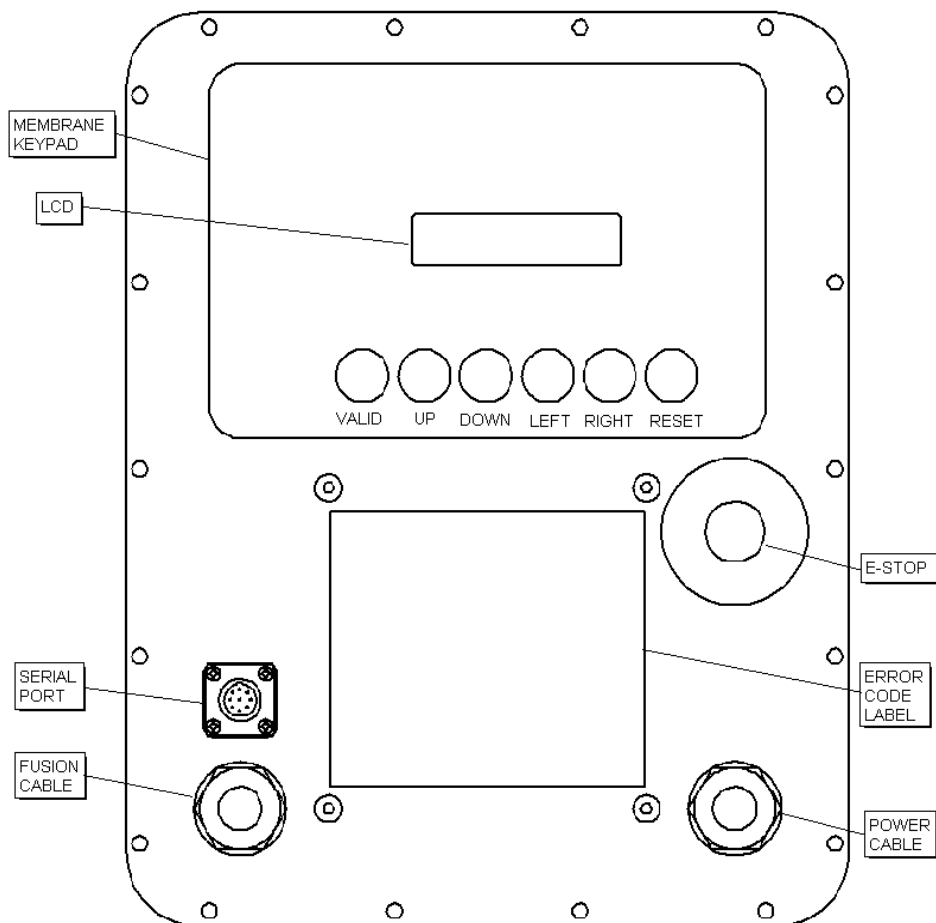
# Specifications

Size .....	13.5" x 16.8" x 12.5"
Weight .....	51.5 pounds
Input cable length .....	12 feet
Output cable length .....	25 feet
Input waveform .....	AC (sine, square, or quasi-sine)
Input voltage .....	115 VRMS $\pm$ 20% (230 V available)
Input frequency .....	48 to 65 Hz
Maximum input power.....	6.0 kW
Maximum output current .....	100 A, 50 A continuous
Output voltage .....	8 to 48 VAC $\pm$ 1.5%
Operating temperature range .....	10 to 120 °F
Fusion identification modes .....	Barcode and Manual
Fusion traceability modes .....	Seven
Fusion information storage .....	300 fusion cycles
Download port .....	Serial (RS232)
Serial port specifications .....	9600 baud, 8 data bits, 1 stop bit, no parity
Environmental protection .....	IP54 (splash proof)
Calibration interval .....	2 years
Warranty .....	1 year
Serial download cable .....	Optional
3.0 mm universal tips .....	Included
4.0 mm universal tips .....	Optional
4.7 mm universal tips .....	Included

# Control Descriptions

**NOTE:**

References to controls in this section are displayed as they appear throughout the remainder of this document.



# Customer Responsibilities

The **EASY FUSE** electrofusion processor is a reliable, easy to use, rugged tool designed to withstand the conditions found at construction sites. With proper care the unit will perform reliably for many years. Central Plastics offers a one-year parts and service warranty covering defects in materials and workmanship. There are, however, some general guidelines that should be followed to extend the life of the unit and keep it in warranty.

The **EASY FUSE** electrofusion processor is highly splash resistant, **NOT WATERPROOF**. It should be stored in a clean dry place at a temperature between -20°F and 140°F. **DO NOT STORE THE UNIT OUTSIDE. DO NOT WASH THE UNIT OFF 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 leads.

Under no circumstances should the control panel of the **EASY FUSE** electrofusion processor be opened. Repairs are only to be performed by authorized personnel.

The **EASY FUSE** electrofusion processor will provide the proper output to complete a fusion based on the barcode data (in Barcode Mode) or from the inputs provided by the operator (in Manual Mode). Always insure that the voltage is the same and the time on the LCD is relative to the time on the fitting label, noting that temperature compensation is often recommended for fittings. (*See details in the appendix on page 30.*) If circumstances necessitate the use of Manual Mode, be sure the fusion data (voltage and time) is correct for the temperature at which the fitting is to be fused. This information should be obtained from the fitting manufacturer. **DO NOT, UNDER ANY CIRCUMSTANCES, FUSE AN INCORRECTLY IDENTIFIED FITTING!!!**

# Service Recommendations

## Customer Maintenance

There are a few simple services that can be performed by the user that will help to insure product longevity and provide proper operation.

1. When not in use:
  - A. keep cables coiled and stored inside the enclosure;
  - B. keep lid closed with latches fully activated and handles retracted;
  - C. keep the cap on the RS-232 port.
2. Keep fitting connectors clean and insure that they make positive contact.
3. Insure that power sources are appropriately rated and operating at the manufacturer's specified capacity (*see appendix on page 29*).

4. If needed, use appropriately sized extension cords with appropriate plugs and sockets (*see appendix on page 29*).
5. Consult the Error Code table on page 17 when problems occur.

Proper care of the Processor and cables will greatly extend the life of the **EASY FUSE** electrofusion processor and will help reduce service time and costs.

## **Factory Service**

It is recommended that each unit be returned once every 2 years for factory calibration. This will ensure that the **EASY FUSE** electrofusion processor is in proper calibration and will allow potential problems to be identified and corrected.

When the calibration period has expired the unit will display the message, **Maintenance Required**, informing the user that calibration is needed. This will not prevent the Processor from performing fusions (the prompt can be bypassed by pressing RESET). However, the unit should be returned as soon as possible for calibration.

**Call a Customer Service Representative at 1-800-654-3872 to make arrangements for service and to obtain an RRA number for the return.**

Determine the serial number before calling. A brief trouble synopsis is also helpful if repairs are required. Repair and calibration returns should be sent to:

**Central Plastics Company  
1901 West Independence  
Shawnee, OK 74801**

*The correct output voltage cannot be guaranteed if the processor is not calibrated at least once every two years.*

## **General Operation**

### **Modes**

Mode is used to describe the various levels of functional behavior of the **EASY FUSE** electrofusion processor. Mode may be used to refer to the use of a barcode versus the manual entry of fusion parameters. It may refer to the configuration of desired LCD prompts and data fields stored for each fusion (traceability modes). It may also refer to the activation and implementation of procedures that allow for machine adjustments to occur (calibration mode) or desired operating parameters to be invoked (configuration mode).

### **Barcode Versus Manual Mode**

The **EASY FUSE** electrofusion processor can fuse in either barcode or manual mode. Barcode mode infers that fusion parameters are input into the processor by scanning the barcode label. When a label is scanned at the appropriate prompt, the processor deciphers fusion parameters from the barcode value. Barcode values typically indicate the following fitting details: manufacturer, type, size, energy



(voltage), fusion time, cool time, resistance, tolerance, and compensation factors. Barcode information is also automatically stored in memory for later reference. Manual mode allows an operator to select fusion time up to 999 seconds and fusion voltage from 8 to 48 volts. This mode is entered by pressing either the up or down arrow key when prompted as follows.

				M	O	D	E	?											
	B	A	R	C	O	D	E	/	M	.	C	.							

**Manual mode should only be used when the barcode is malfunctioning or unavailable.** In this mode, it is difficult to insure the proper implementation of time/temperature compensation for fittings requiring this feature. Since compensation factors vary for different fitting types and manufacturers, the fitting manufacturer should be consulted to verify proper fusion time, voltage, and cooling time.

### Traceability Modes

The **EASY FUSE** processor is an accommodating electrofusion controller that can be configured to operate in a variety of traceability modes (fusion operating modes). These modes entail options to include or exclude fusion characteristics from being prompted and stored in memory. Modes 1 through 7 are currently available. Pages 10 through 16 indicate the prompts that are displayed for the various mode settings. (Shaded prompts indicate messages that are only exhibited during error conditions.) Prompts for modes 1 through 5 have been separated into the following categories: initial, barcode, manual, fusion, and download. The pages of these categories have a check mark in a table to the left to indicate if the prompt is displayed for the corresponding mode.

The data that is entered for each prompt is maintained in memory and can be printed from the download record. The lower modes provide the ability to store the most data concerning an individual fusion. The particular traceability mode that is invoked is ultimately the choice of the proprietor. Central Plastics Company will typically configure units to operate in mode 5, since it requires the least amount of operator input, yet maintains a record that is capable of being downloaded.

### Fusing

The **EASY FUSE** electrofusion processor is a resourceful controller that is capable of fusing a wide variety of fittings. Its operating behavior is programmable to allow for customization to meet the requirements of the operator.

### Prelude

As previously described, the processor can be configured to prompt the operator to provide data concerning various parameters as each fusion is performed. The following operating summary indicates the prompts that are displayed in traceability mode 5. Note that other prompts will be displayed on variably configured machines. Keyboard and prompt characteristics have been standardized to provide for predictable operating behavior. Refer to the appendix on page 27 for details regarding data entry with the keyboard.

## Initiating the Fusion Sequence

After powering the machine, a similar prompt should be displayed (unless the input parameters are out of range).

			6 0	,	0 0		H z												
			1 2 0	,	5		V												

It is necessary for the operator to press “VALID” to advance to the next prompt. Afterwards, the following displays will follow.

			W E L C O M E																
			D i a m e t e r				I n c h												

			P R G . C H E C K .			2 . 0 0 a													
			E a s y			F u s e				N . 0 2 0 0 0 0									

			M O D E			?													
			B A R C O D E			/				M . C .									

At this point, the operator must choose the desired fusion method, barcode / m.c. or manual mode. Typically, “VALID” is pressed to perform a barcode fusion, the default option. However, any **arrow** key can be pressed to toggle the prompt to display as follows.

			M O D E			?													
			M A N U A L																

When the desired mode is displayed, the operator must press “VALID” to advance to the next prompt. *Details regarding the manual fusion sequence are on page 8.*

## Barcode Fusion Sequence

When operating in barcode mode the following prompt will be displayed.

			R E A D			D A T A													
			T E M P E R A T U R E			+ 6 8 ° F													

It is necessary for the operator to effectively scan the barcode label of a fitting to advance to the next prompt. Once a successful scan has occurred the following prompts will toggle on the display, indicating the present ambient temperature. *See the appendix on page 29 regarding temperature measurement issues.* To proceed to the next prompt, “VALID” must be pressed.

			R E A D			D A T A													
						→ V A L I D													

			R E A D			D A T A													
			T E M P E R A T U R E			+ 6 8 ° F													

*(Optionally, an unrecognized barcode label may cause Error 1 to be displayed. Trouble shooting information is given on on page 30.)*

After pressing “VALID” the following prompt will display.

			S	C	R	A	P	I	N	G	?				
			C	L	E	A	N	?							

This prompt notifies the operator that a properly scraped and clean fusion assembly is necessary to insure good performance. To proceed to the next prompt, “VALID” must be pressed. A similar prompt will display.

C	P			I		2		I	P	S					
4	0	V		→	V	A	L	I	D		0	4	5	s	

The display indicates the following fitting characteristics: manufacturer, type, size, fusion voltage, and fusion time. It is important that this information is compared with the data on the fitting label in order to insure that appropriate identification has been made. If the results do not match, the fitting manufacturer should be notified. To proceed to the next display, “VALID” must be pressed.

			C	O	N	T	R	O	L	Ω	O	K			
T	E	M	P	E	R	A	T	U	R	E	+	6	8	°	F

*(Optionally, “CONNECT FITTING” may be prompted.)*

If the fitting and barcode resistance are in agreement, a similar prompt will be displayed. The processor will automatically advance to the energy sequence. *Details regarding the energy sequence are on page 9.*

### Manual Fusion Sequence

When operating in manual mode the following prompt will be displayed.

			V	O	L	T	S					T	I	M	E
			3	9	,	5	V					0	1	0	s

The desired fusion voltage and time should be selected by pressing the appropriate **arrow** keys. It should be noted that an adjusted fusion time may be required. *See the appendix on page 18 for details concerning this issue.* After making all desired adjustments, “VALID” must be pressed to proceed to the next prompt. Then the following prompt will display.

			S	C	R	A	P	I	N	G	?				
			C	L	E	A	N	?							

This prompt notifies that a properly scraped and clean fusion assembly is necessary to insure proper performance. To proceed to the next prompt, “VALID” must be pressed. A similar prompt will display.

4	0	V		→	V	A	L	I	D		0	4	5	s	

The display reaffirms previous selections. To proceed to the next prompt, “VALID” must be pressed. The processor will advance to the energy sequence.

## Energy Sequence

After completing the steps of the manual or barcode fusion sequences, a similar prompt will be displayed.

4	0	V				t =	0	0	4	4	s			
N	.	0	0	1		0	J	+	6	8	°	F		

The display indicates the following: fusion voltage, remaining fusion time, fusion identification number, applied energy, and initial ambient temperature. During the fusion process, the “**VALID**” key can be pressed to view the actual fusion voltage and current. When doing so, a similar display may appear.

3	9	.	9	V			t =	0	0	3	4	s		
3	5	.	7	A	4	.	3	K	+	6	8	°	F	

Once the processor has completed a successful fusion cycle, a similar display will appear.

4	0	V				O	K			4	5	s		
N	.	0	0	1	2	2	K	J	+	6	8	°	F	

Alternately, the fusion cycle may be interrupted due to an error condition, and an appropriate error prompt will be displayed. *A detailed list of errors is given on page 17.* To proceed to the next prompt, “**VALID**” must be pressed. A similar prompt will be displayed.

C	O	O	L	I	N	G	c	f	T	A	B	L	E	
			t =	0	1	0	m	i	n					

From Manual Mode, the operator can enter the actual cooling time if so desired. Pressing “**VALID**” again will advance to the following display.

E	N	D	D	I	S	C	O	N	N	E	C	T		

## Repeat Sequence

After disconnecting the fitting and pressing “**VALID**”, the processor will return to the relevant step preceding the energy sequence prompts. For barcode mode the operator is prompted to “**READ DATA**”. For manual mode the operator is prompted to enter “**VOLTS**” and “**TIME**”. Previously chosen values are displayed, since it is assumed that identical fusion characteristics apply. If this is not true, press “**RESET**” to move back in the selection process, then proceed in a relevant manner. Optionally, unwanted data gathered during prompts can be erased by turning the processor off, eliminating information that was entered prior to the initiation of a fusion cycle.

**INITIAL PROMPTS**

MODE	PROMPT	EDIT
1	ADVANCE	
2	AUTO	
3		
4		
5		
✓	VALID	↑↓←→
✓		
✓		
✓	VALID	
✓		
✓	VALID	
✓		
✓	AUTO	↑↓
✓	VALID	
✓		
✓	AUTO	
✓	VALID	
✓		
✓	AUTO	↑↓←→
✓	VALID	
✓		
✓	AUTO	↑↓←→
✓	VALID	
✓		
✓	AUTO	↑↓←→
✓	VALID	
✓		
✓	VALID	↑↓←→

DISPLAY AFTER ENERGIZING

Memory test...

Memory failed!

MAINTENANCE  
REQUIRED

60.00 Hz  
120.5 V

WELCOME  
Diameter Inch

PRG. CHECK. 2.00a  
Easy Fuse N.020000

DATE  
d/mm/yy

"PRINTING ?" PROMPT ONLY DISPLAYED WHEN ATTACHED TO ACTIVE RS232 PORT  
FOR DETAILS, CONTINUE TO DOWNLOAD PROMPTS

OPERATOR ?  
- - - - -

PLACE  
- - - - -

INFORMATION ?  
- - - - -

BARCODE / M.C.  
MODE ?  
MANUAL

CONTINUE TO BARCODE OR MANUAL PROMPTS

PROMPTS IN YELLOW ARE ONLY DISPLAYED DURING ERROR CONDITIONS









## DOWNLOAD PROMPTS

RESUME FROM INITIAL PROMPTS

THESE PROMPTS ARE DISPLAYED AFTER DETECTING AN ACTIVE RS232 PORT (MODES 1 TO 6)

PROMPT	EDIT
ADVANCE	↕
VALID	↕
VALID	
VALID	↕
VALID	↕↔
VALID	↕↔
VALID	↕↔
VALID	↕↔
VALID	↕↔
VALID	
VALID	
AUTO	
VALID	↕
VALID	↕

PRINTING ?	PRINTING ?
YES→VALID	NO→VALID

ERROR 1 4
-----------

SELECTION ?	SELECTION ?
ALL	
SELECTION ?	PLACE
OPERATOR	OPERATOR ?
SELECTION ?	DATE1 01/01/90
NUMBER ?	NUMBER ?
0.01	0.01
NOT FOUND	

PRINTER ?
-----------

PRINTING
----------

ERASE ?	ERASE ?
NO→VALID	YES→VALID

CONFIRMATION ?	CONFIRMATION ?
NO→VALID	YES→VALID

RETURN TO INITIAL PROMPTS

PROMPTS IN YELLOW ARE ONLY DISPLAYED DURING ERROR CONDITIONS

## MODES PROMPTS

PROMPT	EDIT
ADVANCE	
VALID	
VALID	
↕↔↔	
AUTO	↕↔
VALID	
VALID	
VALID	
VALID	
SWIPE	↕↔↔
VALID	
AUTO STROBE	
VALID	
VALID	
VALID	
ATTACH	
VALID	
AUTO	
AUTO	VALID
VALID	AUTO COUNT

MAINTENANCE  
REQUIRED

Memory failed!

EMIE N.00000000 WELCOME EMIE N.00000000 BONJOUR

60.0H 2.120.5V  
MODE 123

PREPARATION ?  
→VALID

1 CONNECT  
FITTING

BARCODE MODE 2 READ DATA BARCODE MODE 2 READ DATA BARCODE MODE 2 t=010 39.5V MANUAL MODE

2 READ DATA →VALID BARCODE OR MANUAL MODE

3 START  
CYCLE

BARCODE OR MANUAL MODE

AFTER 88 WELD  
MEMORY FULL

BARCODE OR MANUAL MODE  
CONNECT FITTING

BARCODE MODE CONTROL OK TEMPERATURE +68°F

BARCODE OR MANUAL MODE 40V t=017.9s 40.1V t=016.5s N.001 0J +68°F 27.5A 3.2K +68°F

NORMAL COMPLETION 40V OK 200S ERROR INTERRUPT

→Info. mm:ss

PROMPTS IN YELLOW ARE ONLY DISPLAYED DURING ERROR CONDITIONS (OTHER FUSION INTERRUPTION ERRORS ARE POSSIBLE)



# Error Codes

The following table describes errors that can occur before and during a fusion as well as a more detailed description of the error.

Error	Description	Type	Actions
1	Barcode Error	a) Bad reading. b) Bad code. c) Code not managed by firmware. d) Barcode reader damage.	a) Attempt to re-scan bar code label. b) Manufacturer's error, refer to mfr. c) Verify controller's firmware version. d) Replace bar code wand.
2	Ambient Temperature Error	a) Ambient temperature outside the operating limits. b) Temperature sensor damage.	a) The temperature limits are set by Central to -10° F to +120° F. b) Have unit serviced.
3	Resistance Error	a) Fitting ohms value does not match the bar code calculation. b) Faulty fitting. c) Bar code from different fitting. d) Incompatible power source e) Unit malfunctioning.	a) Check the connection between fitting and cable. b) Fitting manufacturing problem. c) Use bar code on fitting being fused. d) Some waveforms are incompatible. e) Have unit serviced.
4	Short Stab Error	a) Wires shorted excessively causing current to increase. Proper intensity must be configured by operator (set at 20% by Central). b) Unit malfunctioning.	a) Change fitting, use alignment tools. Set intensity to value recommended by fitting mfr. (Use configuration mode; power up while pressing + -). c) Have unit serviced.
5	Secondary Open Error	a) Bad connection to fitting. b) Fitting's ohmic value too high. c) Unit malfunctioning.	a) Check the fitting-to-cable connection. b) Fitting manufacturing problem. c) Have unit serviced.
6	Regulation Error	a) Power supply voltage unstable or too low. b) Improper extension cord. c) Unit malfunctioning.	a) Change or service power supply.  b) Use proper wire gauge and length. c) Have unit serviced.
9	Power Error	a) Entered parameters are not compatible with connected fitting. Asked regulated volts too high with regard to fitting resistance. b) Fitting resistance too small with regard to asked regulated voltage. c) Unit malfunctioning.	a) Check the fusion voltage recommended by the manufacturer .  b) Check that the correct fitting is connected with regards to parameters. c) Have unit serviced.
11	Memory Full Error	a) Maximum memory capacity has been reached.	a) Download and save memory to invoke clear-memory command; or, press valid at prompt and new data will replace oldest fusion data.
12	Internal Temperature Error	a) Controller too hot to operate safely. b) Unit malfunctioning.	a) Wait for the unit to cool before performing new fusions. b) Have unit serviced.
13	Power Supply Interruption	a) Input power was interrupted during previous fusion cycle.	a) Acknowledge error by pressing valid at prompt. Check power source.
14	Memory Empty Error	a) Attempted download/print when fusion memory was empty.	a) Perform fusion cycles to create data; or, service controller's memory IC.
22	Reset Error	a) Operator canceled fusion by pressing RESET key.	a) Validate message at prompt and continue.
32	Triac Shorted Error	a) Fundamental regulating device has faulted.	a) Controller requires service, component needs replaced.

# Configuration Mode

Configuration mode is used to modify the basic operation of the machine. The following provides an outline of the choices, prompts, and procedures for making desired modifications. When modifying a value, be sure to press the VALID key to invoke changes before turning the unit off. See the details of the appendix on page 27 for details concerning the use of the keypad and entry of values.

To set the traceability mode, default temperature units (F° or C°), and other settings, turn the **Power/Emergency Stop Switch** clockwise from the **OFF** position to the **ON** position while pressing the **UP** and **DOWN** buttons. The following will be displayed.

P	R	O	:	0	1	M	M	Y	Y						
R	E	V	:	D	D	/	M	M	/	Y	Y				

This screen indicates the processor's manufacturing date and the date that calibration is due (DD = day, MM = month, YY = year).

Press the VALID key to advance to the next prompt.

M	O	D	E					:	#						

A literal number from 1 to 7 will appear in place of the “#” character. This number represents the traceability mode and dictates the prompts that will be displayed to an operator. Press the UP or DOWN key (↑↓) to modify the setting. Behavior for the various traceability modes is described on page 6.

Press the VALID key to advance to the next prompt

			V	O	L	T	A	G	E						
			X	X	X	,	X	V							

The line voltage is measured and displayed during this prompt. To update the display, press the LEFT or RIGHT arrow key (←→).

Press the VALID key to advance to the next prompt.

C	O	D	E					:							

A barcode label can be scanned during this prompt to insure that the wand is working correctly or to determine if a barcode label possibly has problems. After swiping a label with the wand, the character value should be displayed.



fitting manufacturer. (Central Plastics Company's fittings typically fuse from -10 °F to 120 °F.) To update the displayed reading, press any of the arrow keys (↑↓←→).

Press the VALID key to advance to the next prompt.

I	N	T	E	N	S	I	T	Y	M	A	X	:							

The maximum allowable increase of current can be set at this prompt. During a fusion, it is not uncommon for a few of the heating element turns to short together, thus causing the current to increase. When too many turns become shorted, overheating may occur. Setting the value to zero disables this monitoring feature. Using too low of value may cause Error #4 to become epidemic. Refer to the fitting manufacturer for desired setting. Central Plastics' fittings should fuse without errors at a 10% monitoring level. (The value is configured at 20% by CP personnel to allow for robust utilization with fittings from unknown manufacturers.)

Press the VALID key to advance to the next prompt.

Either of the following screens will appear.



The processor can be configured for limited use by personnel that possess a valid operator's badge. Press the UP or DOWN key (↑↓) to modify the setting. For fusion modes 1 through 3, the processor will not advance beyond the "OPERATOR ?" prompt until swiping the barcode of an operator's badge. The operator data is added to the fusion record.

Press the VALID key to advance to the next prompt.

Either of the following screens will appear.



The processor can be configured for barcode use only. Press the UP or DOWN key (↑↓) to modify the setting. For fusion modes 1 through 6, the processor will only prompt for barcode fusions. The operator will not be able to perform a manual fusion.

At this point, all steps of the Configuration Mode have been reviewed. Pressing the VALID key will cause the unit to return to the first prompt.

# Downloading Fusion Data

The fusion data stored in the **EASY FUSE Processor** may be downloaded from the Processor with a personal computer using Hyperterminal software, an accessory program provided with Windows.

## HyperTerminal Overview

Hyperterminal is a program designed to interface through the P.C.'s various internal serial communications devices, such as modems and D9 COM ports. File transfers and text communications can be achieved when appropriately matched systems are attached. Since the **EASY FUSE** processor transfers text data in serial format, HyperTerminal can be used for downloading stored fusion data.

To perform a successful download, Hyperterminal must be properly configured to match the following:

- 1) the computer's internal communications device(s) (COM 1, 2, etc., modem);
- 2) the communications protocol of the externally attached device (processor).

Item 1 refers to the appropriate selection of the desired COM device. When interfacing to a processor, the desired device is a D9 serial COM port. Though a computer may have one or two D9 connectors on the back, it may be uncertain which COM port corresponds to it. Therefore, experimentation may be required to determine the correct port address. Furthermore, devices may be turned off at the BIOS level, making them unselectable and their presence merely a decoy. Often this is the situation when a modem has been installed that requires the same COM port address as the interface for the D9 connector. However, good systems will allow for the address of these devices to be changed, thus re-enabling their use at some other COM port. Advanced computer knowledge is mandatory to invoke such changes. Furthermore, administrative privilege is necessary to make related changes to networked computer.

Item 2 refers to the appropriate selection of baud rate, data bits, parity, and stop bits required to communicate with the processor. The use of incorrect values will prevent meaningful data transfers. The setting of specific values required by the processor is discussed later. When an invalid COM device is selected, HyperTerminal will not allow these settings to be configured. Making an attempt to configure these settings will provide insight to the existence of available devices. However, it may remain difficult to determine if the selected device corresponds with the desired D9 connection.

HyperTerminal's main window consists primarily of a text field for displaying communicated data. (It should be noted that the main window is the background view when new configurations are being made.) Drop-down list options are located along the top side. The main window is further enhanced when the "View" options: "Tool Bar" and "Status Bar" are checked. The "Tool Bar" has icons that can be clicked on to invoke shortcuts to various functions. In this document, accessing



specific functions is described by the path of the dropdown list. As an operator becomes familiar with the program, invoking functions through the use of icons may be preferred. The “Connection” status is an important detail of the “Status Bar” and is located in the lower left corner of the window. When determining a valid COM port, it may be necessary to toggle the connection status to reset the program. The other pertinent options of the other drop-down lists are discussed throughout the instructions.

## **Hardware**

### **1) Hardware connections:**

- a) A proprietary RS-232 cable (C.P.#5900091) is necessary to link the processor to the P.C. The protection cap from the processor’s serial port should be removed, and the circular connector should be attached. The D9 connector of the cable should be attached to the appropriate serial connection of the P.C.
- b) If the computer is not already switched on, do so at this time.

## **Software and Configuration**

### **2) Running and configuring HyperTerminal:**

- a) HyperTerminal is run by clicking the Windows “Start” icon and the following list selections:  
**Programs >> Accessories >> Communications >> HyperTerminal.**  
At this point, multiple configurations of HyperTerminal are typically displayed. Select the one labeled “Hyperterminal”. Note: Spelling may vary and the extension “.exe” may be included. If a successful configuration has already been created and stored for the purpose of downloading processors, it should be selected. For this situation, proceed to step (2g).
- b) The “Connection Description” window should appear. Any suitable name can be entered, and an icon to represent this new configuration file should be selected. A meaningful name such as “EFP-Download” or “Easy Fuse” should be given to the configuration file. Click “OK” to proceed.
- c) The “Phone Number” or “Connect To” window should appear. Move to the “Connect Using” field and choose the desired serial port of the computer. The correct selection is likely to be COM 1. Configuration of other COM ports may need to be attempted if communications cannot be established. “Country Code, Area Code, and Phone Number” can no longer be modified when a COM port has been selected. Click “OK” to proceed.



- k) Press VALID again to begin the download process. The text field of the HyperTerminal window should begin to fill with data, and the LCD should display the following:

			P	R	I	N	T	I	N	G				

Note that specific records can be “printed” by pressing the UP or DOWN when prompted for selection. Various filter methods are displayed in the download prompts on page 14.

- l) When the processor has finished transferring the data, the following screen is displayed:

			E	R	A	S	E		?					
			N	O	→	V	A	L	I	D				

- m) At this point, the memory can be erased. This is done by pressing the UP or DOWN key to modify the prompt, then pressing the VALID key to initiate the function. A verification step is in place to prevent accidental erasing. Prior to completing the erase command, the following prompts must be displayed:

			E	R	A	S	E		?					
			Y	E	S	→	V	A	L	I	D			

			C	O	N	F	I	R	M	A	T	I	O	N	?		
			Y	E	S	→	V	A	L	I	D						

- n) HyperTerminal’s download episode must be terminated at this point. To do this, the following list selections should be made: **Transfer >> Capture Text >> Stop.**
- o) The download process has been completed. The processor can be turned off. Otherwise, it will resume with the initialization prompts as indicated on page 10. HyperTerminal can be closed out. During first application, the session configuration should be saved for easy access during future downloads.

### 3) Selecting a Different COM Port:

If HyperTerminal fails to establish a communications link with a selected COM port, an active session cannot begin. However, it is possible to begin an active session by selecting a valid COM device, yet not truly address the intended port. For the latter situation it may appear as though HyperTerminal is ready to download a processor, but the processor will not enter communications mode. For either situation, a different COM port will need to be selected.

It is necessary to insure that communication software is not activated for other devices such as PDA’s, etc. The presence of such TSR software is typically indicated by a related icon in the lower right corner of the Windows toolbar.

- a) Faulty cable connections may be the culprit. Check to see if all pins are in tact or if the cable has been pinched. (Note: problems for first-time users are typically related to configuration.)
- b) Cancel any function windows that are open in order to return to HyperTerminal's main screen.
- c) Begin the selection of a different COM port by making the list selection: **File >> Properties.**
- d) The "\* Properties" window should appear. Change the "Connect using:" value by selecting a different COM port.
- e) Click on the "Configure..." button and verify that the settings are as follows:
  - Bits per second 9600
  - Data bits 8
  - Parity None
  - Stop bits 1
  - Flow Control None

If the "COM Properties" window is not displayed after clicking the "Configure..." button, connection to an invalid communications device is being attempted. Try a different COM port.

- f) Click OK to validate any changes to "COM Properties".
- g) Click OK again to validate any changes to "\* Properties".
- h) Only the main Hyperterminal window should be displayed at this time.
- i) See notes 1 and 2 on page 26.
- j) The processor checks for a communications device after the following prompt is displayed. Be sure to advance or return to this prompt when verifying if communications are established. (See prompt sequence on page 10.)

		D	A	T	E					H	O	U	R				
d	d	/	m	m	/	y	y			h	h	H	m	m			

- k) If communications are established, the processor will display the following screen. Go to step (2g).

		P	R	I	N	T	I	N	G	?							
		Y	E	S	→	V	A	L	I	D							

- l) If communications are not established, repeat steps (3b) through (3i).

Note 1. The connection status of HyperTerminal to the P.C.'s internal communications device(s) is indicated in the lower left corner of the program window (**View >> Status Bar** must be checked). When HyperTerminal is able to establish a link to the P.C.'s COM port hardware, the word "Connected" will display in the lower left corner of the window. It may be necessary to invoke this connection by performing the following list selection: **Call >> Connect**. Though a link is established, it may be to some other communications device other than the intended D9 serial port (such as a modem). Careful observation and experimentation may be required to determine if the correct communications device is being selected.  
***\*\*The connection status does not indicate that the processor is connected.\*\****

Note 2. When changing COM port properties from an invalid but active connection, HyperTerminal may or may not "Disconnect". If the connection is not discontinued during this modification, it may be necessary to force a reset by toggling from "Connected" to "Disconnected" and back to "Connected" again. This can be done by the following list selections: **Call >> Disconnect** and **Call >> Connect**. When determining a valid COM port, it is a good idea to toggle the connection after every change. The processor should also be attached and turned on. Viewing the processor's LCD for the "printing" prompt will help to ascertain that the correct link has been established.

Note 3. If communications cannot be established after attempting to use all available COM ports, advanced trouble-shooting is required. Contact Central Plastics Company at 1-800-654-3872 for further technical assistance.

## **Viewing Downloaded Data**

Transferred data can be viewed with a simple text-editing word processor such as Notepad. In Windows, this program is typically located in the Accessories options of the Programs folder. It is a good idea to verify that the download file has been properly stored in the given file name and directory. After creating and successfully storing a text file, the "fixed width" file can be imported into a spread sheet program such as Excel or 123. When this is done, all data will be displayed in columnar format, and charts can be created to generate termination reports. The file can then be saved in the spread sheet's format (\*.xls or \*.wk4).

# Appendix

## Entering Data with the Keypad

The Easy Fuse processor has been equipped with a six-button keypad to allow data entry by the operator. The “**VALID**” button is typically pressed to advance prompts and to validate data entry. The “**RESET**” button is typically pressed to retreat to the previous prompt thus allowing the operator to reset entered data. The “**RESET**” button can also be used to terminate a fusion cycle, should this be necessary. To enter data in an applicable field, press the **UP** button or the **DOWN** button to scroll through the list of valid characters, and/or press the **LEFT** button or the **RIGHT** button to move from one character to the next. When acceptable data has been entered into a field, The “**VALID**” button should be pressed so the Processor will accept the data and move to the next prompt.

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 48 the Processor will not allow the user to enter a number greater than 48.

## Setting Date/Time

To set the time or the date, the processor must be configured in traceability mode 1, 2, or 3. The mode of traceability can be determined by the procedures listed in the section related to Configuration Mode on page 18.

Apply power to the unit without pressing any keys. After the “frequency/voltage” prompt is displayed, press **VALID** repetitiously to advance beyond the “welcome” and “software version” prompts. The next prompt will display the date and time. To make modifications, the **LEFT** or **RIGHT** key must be pressed before the unit auto-advances to the next prompt. A cursor is displayed beneath the editable character. Use the **UP** or **DOWN** key to modify to the desired value. Press the **VALID** key after making all desired changes.

				6	0	,	0	0		H	z				
				1	2	0	,	5		V					

				W	E	L	C	O	M	E						
				D	i	a	m	e	t	e	r		I	n	c	h

				P	R	G	.	C	H	E	C	K	.	2	.	0	0	a			
				E	a	s	y		F	u	s	e		N	.	0	2	0	0	0	0

				D	A	T	E															
				H	O	U	R															
				d	d	/	m	m	/	y	y											
				h	h	H	m	m														

## Power Requirements

### Fitting Power

Electrofusion power requirements will vary depending on the fitting size and ambient temperature. Power requirements for Central Plastics' fittings can be generally categorized per the following table.

<b>Fitting Power Table</b>	
<b>Minimum Power</b>	<b>Fitting Range</b>
5.0 KVA	All fittings including 24" DIPS / 630 mm couplings
3.5 KVA	Couplings up to 8" / 225 mm, all reducers, and all saddles (service tapping tees, high volume tapping tees, & branch)
2.0 KVA	Couplings up to 1¼" / 25 mm, all reducers, and all saddles (service tapping tees, high volume tapping tees, & branch)

### Important note for cold weather installations:

Cold weather affects both fittings and equipment. Electrofusion fittings require more energy at the beginning of the fusion cycle. This requirement is increased in cold weather situations. Make sure that your generator is in good mechanical condition and that it meets the minimum wattage output.

### Power Sources

For the installation of electrofusion fittings in field applications, it will be necessary to have a reliable source of AC power for the **Easy Fuse** electrofusion processor. The selected AC power source should conform to the following:

- be well maintained and subjected to a periodic maintenance schedule;
- provide output voltage within the specified operating range (see page 2);
- have a minimum wattage capacity per the fitting power table.

A matching outlet is needed to mate with the plug equipped on the **Easy Fuse** electrofusion processor:

- 115V models — 30 Amp, 125 Volt, NEMA L5, twist-lock
- 230V models — 15 Amp, 250 Volt, NEMA L6, twist-lock.

### Utility Power

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

## Generators

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

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

## Inverters

Inverters are an acceptable AC power source for the **Easy Fuse** electrofusion processor, though some produce output waveforms that are troublesome with specific fittings. Central recommends performing compatibility tests using the lightest and heaviest anticipated loads before approving an inverter system. Feel free to contact Central to discuss issues regarding the use of inverters.

## Extension Cords & Pigtails

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

<b>Cord Length</b>	<b>Wire Gage</b>
25 ft.	# 12/3 (4 mm <sup>2</sup> )
50 ft.	# 10/3 (6 mm <sup>2</sup> )

**Extension cords should not be used on 14 IPS & larger couplers.**

A pigtail is an adapter for converting from a 30 amp twist-lock to a 15 amp straight-blade plug. Its purpose is for powering the processor where a NEMA L5 socket is not available, especially while downloading. Its use is not recommended in field applications with electrofusion fittings. However, its use is tolerable with saddles and smaller couplers, elbows, end-caps, & reducers (2 IPS / 25 mm maximum).

## Temperature Measurements

### Thermal Sensor

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

### Temperature Compensation in Fittings

It is not uncommon for particular fittings to require modified fusion times when operating in cold or hot conditions. The contents of the barcode data provide for



such adjustments to be made automatically. When characters 22 & 23 of a 24-character label are not equal to 1, such adjustments are needed.

## **Fusing Temperature Compensated Fittings**

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

When using the **Easy Fuse** electrofusion processor in *manual mode* to fuse fittings that require temperature compensation, it is necessary to enter the appropriately adjusted time as specified by the fitting manufacturer. The processor will not automatically compensate fusion time in manual mode.

## **Trouble Shooting Barcode Problems**

### **Clarifying the Problem**

Does a system problem occur (the processor recognizes that a label has been scanned then reports ERROR 1), or do scanning problems occur (the processor continues to prompt the operator to scan the code)? A combination of troubleshooting techniques can be employed to help determine the problem.

### **Built-in Trouble Shooting**

The **Easy Fuse** electrofusion processor's diagnostics mode can be used to verify interpretation of a bar code label. Enter diagnostics mode by turning the unit on while holding in on both **UP & DOWN** arrow keys. See *Configuration Mode details on page 18*. Press the valid key until the display prompts for a bar code. A label with known values can be scanned, and the values on the display can be compared for agreement.

### **System Problems**

Error 1 is displayed when an illegal code is detected. Always try to rescan the label (press reset first in order to reinitialize the unit). If the problem persists, try a different label for the same type of fitting. As a last resort, consult with the fitting manufacturer and/or Central Plastics Company, since some code combinations may not presently be programmed into the unit.

### **Scanning Problems**

- Is the label damaged? Try a different label for the same type of fitting.
- Is the operator trying to read the label with the wand at an improper scanning angle? Try to hold wand 15 to 30 degrees from perpendicular to the surface.
- Is the operator failing to maintain a constant scan speed? A continuous swiping motion should be used.
- Is the operator failing to scan the full length of the label. Begin swiping in advance of the label's edge and continue beyond the end. It is not important that swiping begins from left to right or visa versa.

- Whose bar code label is it? Some labels used by the competition are small, making the labels more difficult to read. This will be the case regardless of the processor or bar code wand manufacturer.
- Is the wand damaged? Try the wand assembly from a known working processor. If this fixes the problem, the original wand needs replaced.
- Is a label being scanned on a fitting that was recently fused? When operating in bar code mode, the processor will not normally allow a second consecutive fusion to be made on the same fitting. This is because the resistance of the fitting increases due to heating and is no longer in the tolerance range specified by the bar code label.
- Is scanning a problem related to the power source? It has been noted that some inverters will cause scanning problems. This is due to the high noise content associated with the inverter's output waveform. It is possible (though unlikely) that this may be true for some generators. Efforts have been made to improve noise immunity, however there may always be exceptions. This symptom can be confirmed by noting if the problem goes away when operating with utility power.