Computron 8000 Pressure Fryer

Error Codes & Warnings

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Henny Penny Computron 8000 Pressure Fryer
This document describes the error messages and operating details of the Henny Penny Computron 8000 (C8000) controller on four-head pressure fryers and eight-head pressure fryers and open fryers. In *general* terms, error code meanings are standardized across the entire line of Henny Penny equipment controllers. However, the *specific* details provided in this document should be understood to apply only to the C8000 controller, and might not apply to other Henny Penny equipment.

Document Revision Record

September 23, 2004
- Added E-12 error for FPS (Frypot Protection System) fryers.
- Updated E-20 C and E-20 D errors to indicate they now also apply to 4-head fryers equipped with spark ignition (electronic ignition).
- Various small improvements and clarifications, changes in wording, etc.

December 8, 2003
- Updated E-47 Error information to indicate E-47 can be caused by Amp Sensors being plugged on backwards.

April 22, 2003
- Updated the page with the C8000 picture and features
- Added E-1 Low Oil / Dry-Fire Error Code (Specially equipped units only)
- Added E-20 Error codes (Ignition Failures) for Gas 8-Head controllers
- Fixed some references in the E-25 (High Amps) and E-27 (Low Amps) Errors
- Added notes to E-92 (24v Fuse) to check for jammed pressure solenoid
- Re-ordered some error codes in the "Order of Reporting Priority" table (pg. 6)

October 11, 2002
- Initial release

C8000 Pressure Fryer Controller:
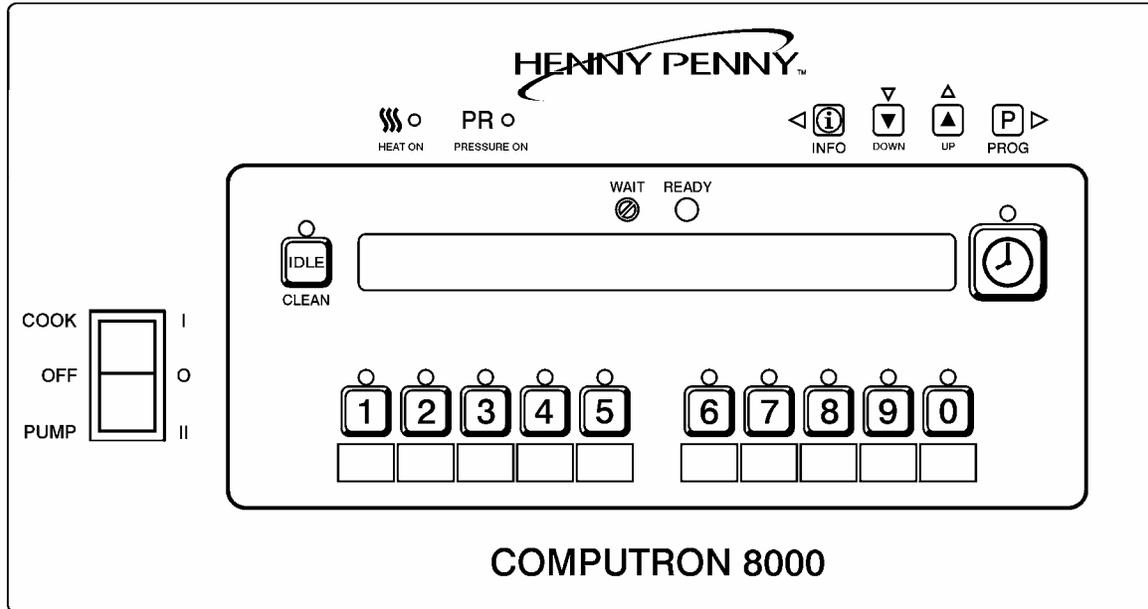
Model 500/560/600 (4-Head) pictured. Model 591/691 (8-Head) similar, but ON/OFF/PUMP power switch is located on the fryer rather than on the C8000 control panel.

The C8000 Pressure Fryer Controller has the following features:

- Available for both 4-Head and 8-Head fryers.
- 4-Head controller: one controller supports Gas and Electric (auto-detect). Several panel versions are available, to match current production fryers as well as to support older version sheet metal.
- 8-Head controller: one controller supports Gas and Electric, Open Fryer and Pressure Fryer (auto-detect). A separate version is available to support PFG-581 models.
- 16-digit Alphanumeric display (14-segment LED digits)
- Indicator lights (LED's) for Heat and Pressure outputs
- "Wait" and "Ready" indicator lights
- Controller stays live while power switch is in the OFF or PUMP positions
- Monitored interlocks for 24 VAC Fuse, High Limit, Drain Switch, Power Switch
- Speaker-driven tone output (not piezo beeper), with programmable tone and volume
- Ten programmable products, with up to 10 intervals and 4 alarms per product
- Text-based error displays for probe errors, high limit, drain open, etc.
- Statistics tracking: Last Load, Daily Stats, Review Usage, Error Log, Activity Log, etc.
- Filter enforcement -- after X cook cycles, further cooking is disabled until after the oil is filtered (hardware support for confirming that filtering is performed)
- Oil Management functions: "Change Oil" prompt based on total cook cycles and/or running hours
- Clean-out (boil out) mode
- Password-protected programming modes
- Programmable settings, Review Usage data, Error Log, Statistics data stored in EEPROM memory (10+ year retention even when fryer is unplugged)
- Activity Log statistics stored in capacitor backed-up RAM (typically retained for several weeks, even when fryer is unplugged)
- 4-Head Electric Fryers: Amps monitoring -- display of current draw for each supply leg

C8000 Pressure Fryer Error Codes

Code	Description
E-1	Low Oil / No Oil (Dry Fired) *Specially Equipped "FPS" 4-Head Gas units -- requires second temperature probe*
E-4	Controller (CPU) Circuit Board Overheated *The controller board temperature is too hot.*
E-5	Oil Overheated (Software high limit) *Oil too hot -- contactor or burner locked on?*
E-6	Main Temperature Probe Failure *Faulty or damaged probe? Probe unconnected? Broken wire or bad crimp in connector? Other CPU input failure? E-6A = Open Circuit. E-6B = Shorted.*
E-10	Electro-mechanical High Limit Device Tripped *Oil too hot. Contactor or burner locked on? Dry-fired, or oil level too low? Faulty temperature probe or probe not inserted far enough? Faulty high limit or connection?*
E-12	FPS Temperature Probe Failure (FPS fryers ONLY) (*Specially Equipped "FPS" 4-Head Gas units -- requires second temperature probe.*) *Faulty or damaged probe? Probe unconnected? Broken wire or bad crimp in connector? Other CPU input failure? E-12A = Open Circuit. E-12B = Shorted.*
E-15	Drain Handle Open (While Fryer is On) *User should open drain <u>only</u> when fryer power switch is off.*
E-20	Gas Ignition System Error (8-hd Gas fryers, 4-hd Gas with Spark Ign) E-20 A: Fan vacuum sensor stuck closed even when fan is off. *Faulty vacuum sensor? Or wiring shorted?* E-20 B: Fan vacuum sensor failed to close after fan turned on *Failure of the fan or the vacuum sensor? Wires broken or disconnected?* E-20 C: Ignition module(s) not responding. *Module locked out after losing flame 4 times? Module faulty or disconnected?* E-20 D: Failed to ignite. Ign Module(s) were trying but flame did not light. *Gas valve turned off? Still purging air from gas line?*
E-25	Heat Amps Too High (4-hd Electric fryers only) *Heating elements are drawing too much current.*
E-26	Heat Amps Locked On (4-hd Electric fryers only) *Heating elements are still drawing current when controller has tried to turn them off*
E-27	Heat Amps Too Low (4-hd Electric fryers only) *Heating element current draw is lower than expected*
E-41	Programmed Settings Lost *Voltage spikes or dropouts? Failure of backup capacitor or battery on CPU board?*
E-46	EEPROM Memory Write Error *Faulty EEPROM on CPU board? Other faults or contamination on CPU board?*

E-47	**A-to-D Failure (Analog Converter chip)** *12-Volt supply failed on I/O board? Analog 5v supply or a-to-d chip bad?* *Amp Sensors plugged on backwards, causing analog 5v supply shutdown?*
E-48	**Input System Error (CPU can't read buttons, digital inputs)** *Contamination or fault on the CPU board? Wires in 12-pin cable (to I/O board) shorted to* *ground? 12-volt supply (on I/O board) failed or shorted to ground?*
E-70 A	**Fan Vacuum Jumper Missing** *4-head pressure fryers should have a jumper wire in the "vacuum switch" interlock pos'n.*
E-70 B	**Power Switch Failure or Wiring Error** *Power switch wires not connected properly? Power switch contacts failed?*
E-92	**24 Volt Current Limiter (Fuse) Tripped (on I/O board)** *Wiring shorted to ground or melted onto burner? Broken drain switch shorting to ground?* *Check wiring to high limit, drain, vacuum sensor, ignition module or heat contactor, etc.* *Pressure solenoid gummed up -- current overdraw if solenoid plunger can't move.*

Error Codes, General

Error Code displays generally result from some *hardware* problem or anomaly. (The E-15 "Drain Open" error code is an exception, as it is really the result of operator error.)

When an error code is generated, the error code itself (i.e. "E-15") is displayed in the left side of the display window, and a descriptive message ("DRAIN IS OPEN") is displayed in the right side. The speaker sounds "whoop-whoop-whoop-whoop-whoop" followed by a quiet pause (about 10 seconds or so), then repeats.

Press any button to acknowledge the error and silence the alarm. Some error codes will vanish as soon as they are acknowledged, while other codes will remain for as long as the hardware problem persists.

Error Codes -- Order of Priority

The following table lists the order of priority for the error codes in the C8000 pressure fryer. When multiple errors are detected simultaneously, only the highest priority error code is reported. If that error is corrected or otherwise vanishes, then the next highest priority error code will be reported (if that error condition still persists).

Error Codes in Order of Reporting Priority

	Error Code	Description
1.	E-48	Input System Error (can't read inputs)
2.	E-47	A-to-D (Analog input) Failure
3.	E-26	Heat Amps Locked On (4-Head Electric Fryer Only)
4.	E-4	Controller (CPU) Circuit Board Overheated
5.	E-92	24 Volt Current Limiter (fuse) tripped
6.	E-10	Electro-mechanical High Limit Device Tripped
7.	E-15	Drain Handle Open (While Fryer is On)
8.	E-6	Main Temperature Probe Failure
9.	E-5	Oil Overheated (Software high limit)
10.	E-25	Heat Amps Too High (4-Head Electric Fryer Only)
11.	E-1	Dry-Fire / Low Oil Level (only on specially equipped units)
12.	E-20	Gas Ignition Failure (Gas 8-hd / 4-hd Spark Ign. fryers Only)
13.	E-70 B	Power Switch Failure or Wiring Error
14.	E-70 A	"Fan Vacuum" jumper missing
15.	E-41	Programmed Settings Lost
16.	E-27	Heat Amps Too Low (4-Head Electric Fryer Only)
17.	E-12	FPS Probe Failed (only on specially equipped units)
18.	E-46	EEPROM Memory Write Error

Error Code	Display Message	Description
E-1	" E-1 LOW OIL " " IS POT FILLED? " " 1=YES 2=NO "	*--- On Specially-Equipped "FPS" Gas 4-Heads Only ---* *(Frypot Protection System)* **Low Oil Level or Firing with Empty Frypot.** Units fitted with a second temperature probe and special "Frypot Protection" software generate this error when the fryer is fired with significantly low oil or no oil at all. In all heating modes, the controller monitors the two temperature probes and continually analyzes whether or not the observed heating characteristics are putting the frypot at risk. The controller's mission is first of all to protect the frypot -- by shutting down the heat when certain conditions are observed -- and secondly to alert the user to the fact that there appears to be insufficient oil in the frypot. It generally takes several pulses of heat before the E-1 "LOW OIL" error code is generated. While producing these heat pulses, however, the controller is careful to not allow damage to the frypot. When the E-1 error is generated, a special error tone -- different from the normal error siren -- is sounded. A series of 32 fast beeps (approx. 8 beeps per second) is sounded during the "E1 LOW OIL" part of the message, then the controller asks "IS POT FILLED?" / "1=YES 2=NO". Pressing the #1 button instructs the controller to resume heating. Pressing the #2 button results in a message "TURN OFF UNTIL FILLED". Any other button silences the error beeps and the "E1 LOW OIL" part of the message, but the "IS POT FILLED?" display continues until the user acknowledges by pressing the #1 button. If the fryer is turned off during an "E1" error code display, the controller activates the normal "IS POT FILLED?" prompt at the next power up. In all cases, the fryer will not resume heating until the user presses the #1 button in response to the "IS POT FILLED?" prompt. **E-1 Possible Causes:** 1. Firing the fryer with low oil level or empty frypot. 2. Possibly: faulty main temperature probe or probe not inserted into the frypot far enough, so that it reads abnormally low temperatures.

E-4	"E-4 CPU " "E-4 TOO " "E-4 HOT "	**Controller (CPU) Circuit Board Overheated.** This error is generated when the thermistor temperature sensor on the controller board reaches or exceeds 160°F. The error will disappear automatically, with no user intervention, if the temperature drops below 160°F again. **E-4 Possible Causes:** 1. Controller actually too hot, due to missing insulation or blocked airflow. 2. Moisture or contamination on the controller board affecting the analog circuits or a-to-d converter chip. 3. CPU° calibration incorrect. 4. Failure of the thermistor temperature sensor on controller board (very rare possibility).
E-5	"E-5 OIL " "E-5 TOO " "E-5 HOT "	**Oil Overheated (Software high limit).** This error is generated when the pot temperature reading (RTD temperature probe) reaches or exceeds 425°F. The error will disappear automatically, with no user intervention, if the pot temperature drops below 425°F again. **E-5 Possible Causes:** 1. Oil too hot (over 425°F), due to heat contactor or gas valve locked on, heat relay on the I/O board locked on, or failure (shorted on) of heat output driver chip on the controller board. 2. Intermittent failure of the RTD Temperature Probe in such a way that it sometimes reads artificially low values and consequently overheats the oil. Controller thinks everything is fine, but is regulating oil temperature well above the correct value. When probe reading returns to "accurate" reading, controller immediately sees that the oil temperature is too hot. 3. Failure of the Temperature Probe in such a way that it reads artificially high values (greater than 425°F) but not an open circuit. 4. Moisture or contamination on the controller board affecting the analog circuits or a-to-d converter chip. This can cause failures 2 and 3 noted above.

| E-6 | *Open Circuit or Unplugged:*

"E-6 A OIL"
"E-6 A TEMP"
"E-6 A SENSOR"
"E-6 A FAILED"

Short Circuit or Short to Ground:

"E-6 B OIL"
"E-6 B TEMP"
"E-6 B SENSOR"
"E-6 B FAILED" | **Main Temperature Probe Failure**
This error generally indicates a problem with the RTD temperature probe in the frypot.

The E-6 error is generated when the temperature probe input shows abnormally low values (shorted, or nearly shorted) or abnormally high values (open circuit, or nearly so).

The error will disappear automatically, with no user intervention, if the temperature probe resumes good readings.

Subcodes: E-6A = Open Circuit / High Reading
                 E-6B = Short Circuit / Low Reading

E-6 Possible Causes:
1. Failure of the RTD sensor inside the probe, due to physical damage to the probe inside the frypot. Try simply plugging on a good probe and powering up to check it out before actually replacing the probe in the frypot.

2. E-6A only: Probe unplugged from controller. Probe pass-through cable *inside* controller unplugged. Bad crimp or connection in the temperature probe connector (especially if E-6 is intermittent).

3. Probe wires cut or broken, or shorted to sheet metal.

4. Moisture or contamination on the controller board affecting the analog circuits or a-to-d converter chip. |

| E-10 | "E-10 HIGH LIMIT"
"E-10 TRIPPED " | **Electro-mechanical High Limit Device Tripped.**
The electro-mechanical high limit (bulb and capillary) is one of the series-connected safety interlocks. The high limit device must provide continuity in order for the fryer heating circuits to operate.

High limit devices must be manually reset. Once the high limit trips out and opens up the circuit, it must be reset by manually pressing a reset button (on the high limit module) after the bulb and capillary have cooled down sufficiently.

Wiring from the I/O board monitors the continuity of the high limit by sending 24 VAC out on one wire leading to the high limit and confirming that 24VAC is returning on the other wire.

The E-10 error is generated when the circuit on the I/O board that monitors the high limit indicates that the high limit is "open" -- no 24 VAC is coming back from the high limit.

The error will disappear automatically, with no user intervention, if the monitor circuit detects 24 VAC again.

E-10 Possible Causes:
1. High Limit device is actually tripped, due to dry firing or due to the oil overheating as described for the E-5 error. E-10 error will persist -- even if the fryer is turned off and back on -- until the high limit is manually reset.
2. High Limit device is defective or damaged. Mechanical damage to the high limit bulb or the fragile capillary tube can occur when user scrapes the frypot. A dent or compression in the high limit bulb can result in a high limit that trips out prematurely, at relatively low oil temperatures. A leak in the bulb or capillary can result in a permanently "tripped" high limit.
3. High limit wiring is damaged or disconnected: broken wire leading to or from the high limit, loose connection at the high limit, or bad crimp in the terminals that attach to the high limit.
4. Very low oil level -- heating fryer when then oil level is below the temperature probe can cause the oil to overheat.
5. Failure of the opto-coupler chip on the I/O board that monitors the 24 VAC returning from the high limit. If the Info Mode "Digital Inputs" display (with the power switch ON) shows "V_D", or possibly shows an intermittent "H" in between the V and D, it is likely that the opto chip has failed. Replace the I/O board, but only if "D" is shown when "H" is not. |

E-12	Open Circuit or Unplugged:	--- On Specially-Equipped "FPS" Gas 4-Heads Only --- (Frypot Protection System)
	"E-12 A FPS PROBE" "E-12 A FAILED"	**FPS Temperature Probe Failure** The E-12 error is generated when the FPS (pot wall) temperature probe input shows abnormally low values (shorted, or nearly shorted) or abnormally high values (open circuit, or nearly so).
	Short Circuit or Short to Ground:	The error will disappear automatically, with no user intervention, if the temperature probe resumes good readings.
	"E-12 B FPS PROBE" "E-12 B FAILED"	Subcodes: E-12A = Open Circuit / High Reading E-12B = Short Circuit / Low Reading
		When the FPS probe fails on an FPS fryer, the C8000 controller reverts to "normal" (non-FPS) operation, and the fryer remains fully functional, albeit without the protection of the FPS system.
		An E-12 error is signaled only at the moment the FPS probe reading goes from "good" to "bad". E-12 is displayed until acknowledged by the user, then the error message vanishes. The E-12 error code cannot repeat unless the FPS probe returns to a "good" state again, and then goes bad again.
		When an FPS probe is intermittent, the E-12 error may come and go repeatedly. If the FPS probe fails and remains failed, however, just a one-time E-12 error is signaled -- at the time of the initial failure. Once acknowledged, the E-12 is suppressed in order to allow normal fryer operation. However, an "FPS PROBE FAILED" reminder message and beep appear in the power up display sequence each time the fryer is powered up.
		E-12 Possible Causes: 1. Failure of the RTD sensor inside the probe, due to physical damage to the probe inside the frypot. Try simply plugging on a good probe and powering up to check it out before actually replacing the probe in the frypot.
		2. E-12A only: Probe unplugged from controller. Probe pass-through cable *inside* controller unplugged. Bad crimp or connection in the temperature probe connector (especially if E-12 is intermittent).
		3. Probe wires cut or broken, or shorted to sheet metal.
		4. Moisture or contamination on the controller board affecting the analog circuits or a-to-d converter chip.

| E-15 | "E-15   DRAIN "<br>"E-15   IS   "<br>"E-15   OPEN   " | **Drain Handle Open (While Fryer is On).**
This error is generated when the frypot drain handle is opened with the power switch in the ON position.

The drain micro-switch is one of the series-connected 24 VAC interlock circuits. Wiring from the I/O board monitors the continuity of the drain switch by sending 24 VAC out on one wire leading to the drain switch and confirming that 24 VAC is returning on the other wire.

When functioning correctly, the drain handle micro-switch should provide continuity only when the drain is fully closed, and should be open circuit as soon as the handle is opened.

The E-15 error will disappear automatically, with no user intervention, if the drain handle is closed again, or if the fryer is turned off.

NOTE: When the handle is closed again, the controller will prompt the user "IS POT FILLED?" / "1=YES 2=NO". The fryer will not resume heating until the user presses the #1 button to indicate that there *is* oil in the frypot.

E-15 Possible Causes:
1. Drain Handle open when power switch is on.

2. Drain Handle Micro-switch is damaged or not properly adjusted (no continuity on switch even when handle <u>is</u> closed). Open the mounting bracket housing and check the switch. If manually pressing on the lever makes the E-15 disappear, then the switch is operating but needs to be adjusted so the lever properly contacts the drain handle shaft.

3. Damaged or disconnected wiring to the drain handle micro-switch.

4. Failure of the opto-coupler chip on the I/O board that monitors the 24 VAC returning from the drain handle micro-switch. |

| E-20 A | ```   \ / " *IGN*   1   "   / \ ...30 seconds... "E-20 A: FAN SENSR " "E-20 A: STUCK ON   "``` | *--- Gas 8-Head Fryers Only ---*

Fan Vacuum Sensor Contacts Closed While Fan is Off. This error is generated when the fryer sees continuity at the vacuum sensor and the fan has not yet been turned on.

The vacuum sensor is one of the series-connected 24 VAC interlock circuits. Wiring from the I/O board monitors the continuity of the vacuum sensor by sending 24 VAC out on one wire leading to the sensor and checking to see if 24 VAC is returning on the other wire.

When functioning correctly, the vacuum sensor should provide continuity only when the draft fan is running and drawing air through the heat exchanger tubes. The sensor should be an open circuit when the fan is not running.

In the first step of the ignition sequence, the controller checks to see that the sensor is an open circuit before the draft fan is turned on. (In the second step, the controller turns the fan on and confirms that the vacuum sensor closes.)

If the vacuum sensor is closed (has continuity) before the draft fan is turned on, and remains closed for 30 seconds, an E-20 A error is activated. (If the sensor is initially closed but opens up within 30 seconds, the controller proceeds to step 2 of the ignition sequence.)

An E-20 A error remains until the user presses a button to acknowledge it, or until the fryer is turned off.

If the user simply presses a button to acknowledge the error, the error message vanishes and the controller prompts "PRESS 'TIMER' TO RETRY". The controller will not attempt the gas ignition again until the user presses the Timer button, at which point the ignition sequence is restarted.

E-20A Possible Causes:
1. Defective vacuum sensor, or wiring or connections shorted together.

2. Fault in blower wiring or blower relay on I/O board such that the blower is running even when the controller wants it off. The blower normally does not begin to run until step 2 of the ignition sequence.

3. Fault in the 12-pin harness connecting the CPU board and the I/O board, such that the digital inputs from the I/O board cannot be read reliably. |

| E-20 B | ```   \ /
" *IGN*   1 2   "
         / \

...30 seconds...

"E-20 B: *FAILURE*   "
"E-20 B: DRAFT FAN " ``` | *--- Gas 8-Head Fryers Only ---*

Vacuum Sensor Contacts Do Not Close After Fan Output is Turned On.
The E-20 B error is generated when the controller turns the draft fan output on but does not get confirmation from the vacuum sensor that the fan is running and drawing air.

The vacuum sensor is one of the series-connected 24 VAC interlock circuits. Wiring from the I/O board monitors the continuity of the vacuum sensor by sending 24 VAC out on one wire leading to the sensor and checking to see if 24 VAC is returning on the other wire.

When functioning correctly, the vacuum sensor should provide continuity only when the draft fan is running and drawing air through the heat exchanger tubes.

In the first step of the ignition sequence, the controller confirms that the sensor is open circuit before the draft fan is turned on. In the second step, the controller turns the fan on and confirms that the vacuum sensor closes.

If the vacuum sensor does not close within 30 seconds after the controller turns the fan output on, an E-20 B error is activated.

An E-20B error remains until the user presses a button to acknowledge it, or until the fryer is turned off.

If the user simply presses a button to acknowledge the error, the error message vanishes and the controller prompts "PRESS 'TIMER' TO RETRY". The controller will not attempt the gas ignition again until the user presses the Timer button, at which point the ignition sequence is restarted.

E-20B Possible Causes:
1. Fault in blower, wiring, or blower relay on I/O board such that the blower does not turn on as expected.

2. If blower is running: defective vacuum sensor, faulty, kinked, or disconnected vacuum hose, or faulty wiring or connections to the vacuum sensor.

3. Low line voltage or wrong voltage blower, such that blower does not run fast enough to draw sufficient air.

4. Faulty opto-coupler chip on the I/O board. |

| E-20 C | 8Hd: Left Side Fails:
　　　　\ /
" *IGN* 1 2 3 4   _ R"
　　　　/ \
...30 seconds...

"E-20 C: *FAILURE* "<br>"E-20 C: LEFT IGN "<br>"E-20 C: NO "PV" "

8Hd: Right Side Fails:
　　　　\ /
" *IGN* 1 2 3 4   L _"
　　　　/ \
...30 seconds...

"E-20 C: *FAILURE* "<br>"E-20 C: RIGHT IGN"
"E-20 C: NO "PV" "

8Hd: Both Sides Fail:
　　　　\ /
" *IGN* 1 2 3 4   _ _"
　　　　/ \
...30 seconds...

"E-20 C: *FAILURE* "<br>"E-20 C: L+R   IGN "<br>"E-20 C: NO "PV" "

4Hd Spark Ign:
　　　　\ /
" *IGN* 1 2 3 4   _ R"
　　　　/ \
...30 seconds...

"E-20 C: *FAILURE* "<br>"E-20 C: IGN MOD "<br>"E-20 C: NO "PV" " | --- Gas 8-Head, Gas 4-Head Spark Ign. Only ---

Ignition Module is Not Responding (Locked Out?).
The E-20 C error is generated during the fourth step of the ignition sequence if the controller turns the ignition module(s) on but does not see both* ignition modules in turn activate their "PV" Pilot Valve outputs. Lack of a PV signal indicates that an ignition module is either locked out (after repeated loss of its flame sense signal) or is not functioning correctly.

The controller turns the ignition module(s) on at the start of step 4 of the ignition sequence. When functioning correctly, each ignition module should turn its Pilot Valve output on and begin sparking within a few seconds.

If the controller does not detect both* ignition module PV signal(s) within 30 seconds after turning the ignition module on, an E-20 C error is activated.

The E-20C error remains until the user presses a button to acknowledge it, or until the fryer is turned off. As with other E-20 errors, the "PRESS 'TIMER' TO RETRY" prompt is presented after the error is acknowledged.

If the fryer is easily able to re-ignite after an E-20C error is cleared, it is likely that a module was simply "locked out" due to repeated loss of its flame sense signal.

Most of the time, the pilot flame itself is not actually lost -- just the sensing of it. This can be due to a bad flame sense rod or connection, a low pilot flame, or a pilot flame that is blown around.

E-20C Possible Causes:
1. Some Ignition Modules "lock out" after losing flame sense four times. As a safety precaution, the module may refuse to light after a certain number of "loss of pilot flame" events. After the E-20 code, the controller turns the ignition module off and back on, which resets the module's counts and enables ignition again.

2. If E-20C occurs repeatedly and the ignition module never even tries to spark, there could be a problem with the module, the wiring to the module, or the ignition module relay on the I/O board, etc.

3. If both* modules do begin sparking but controller stays stuck on Ign Seq step 4: faulty "PV" opto-coupler chip on the I/O board. (Ign Seq should always go on to step 5 once both modules begin sparking.)

*Note: 8-Head fryers have two ignition modules. 4-Head Spark Ignition fryers only have a single ignition module. |

| E-20 D | *8Hd: Left Side Fails:*
            \ /
" *IGN* 1 2 3 4 5 _ R"
            / \
...60 or 120 seconds...

"E-20 D NO FLAME "<br>"E-20 D   "<br>"E-20 D   CHECK   "<br>"E-20 D   LEFT   IGN "

8Hd: Right Side Fails:
            \ /
" *IGN* 1 2 3 4 5 L _"
            / \
...60 or 120 seconds...

"E-20 D NO FLAME "<br>"E-20 D   "<br>"E-20 D   CHECK   "<br>"E-20 D RIGHT IGN "

8Hd: Both Sides Fail:
            \ /
" *IGN* 1 2 3 4 5 _ _"
            / \
...60 or 120 seconds...

"E-20 D NO FLAME "<br>"E-20 D   "<br>"E-20 D   CHECK   "<br>"E-20 D GAS VALVE"

4Hd Spark Ign:
            \ /
" *IGN* 1 2 3 4 5 _ _"
            / \
...60 or 120 seconds...

"E-20 D NO FLAME "<br>"E-20 D   "<br>"E-20 D   CHECK   "<br>"E-20 D   IGN MOD " | *--- Gas 8-Head, Gas 4-Head Spark Ign. Only ---*

Unable to Light the Pilot Flame(s).
The E-20 D error is generated during the fifth step of the ignition sequence if the controller sees the ignition modules trying to light the pilot flames but both* pilot flames are not established within the allotted time. (Software version F and earlier allowed 60 seconds. Software version G and later allows 120 seconds).

The controller turns the ignition module(s) on at step 4 of the ignition sequence. When both* modules have their PV outputs on, the controller advances to step 5 of the ignition sequence: waiting for the pilot flame(s) to be detected.

Once a pilot flame is lighted and is detected by a module's flame sense rod, the module stops sparking and turns on its "MV" Main Valve output. When the controller sees the MV signal from <u>both</u>* modules, it knows both pilot flames have been ignited successfully and that the ignition sequence is complete.

If the controller does not detect <u>both</u>* MV signals within 60 (or 120) seconds after the ignition modules turn their PV outputs on, an E-20 D error is activated. This indicates that pilot ignition was attempted for 60 (120) seconds but pilot flame was not detected on one or both sides.

An E-20 D error remains until the user presses a button to acknowledge it, or until the fryer is turned off. As with other E-20 errors, the "PRESS 'TIMER' TO RETRY" prompt is presented after the error is acknowledged.

E-20D Possible Causes:
1. If neither side lights: Manual gas valve knob in "Off" position, gas supply line disconnected, or still purging air from the gas supply line.
2. If neither side lights: Faulty gas valve solenoid, or problem with wiring. (On Ignition Sequence steps 4 and 5, should see 24 VAC between P & C terminals at gas valve.)
3. If flame lights but module keeps sparking and 24 VAC never appears at MV output of ign module: faulty flame sense rod or flame sense rod not positioned correctly; problem with flame sense wire or ground wire; pilot flame too low to be sensed. Possibly a faulty ign module, but check other items first.
4. If flame actually lights and 24 VAC <u>does</u> appear at MV output of ignition module, but controller stuck on Ign Seq step 5: faulty "MV" opto-coupler chip on I/O board.

Note: 8-Head fryers have two ignition modules. 4-Head Spark Ignition fryers only have a single ignition module. |

| E-25 | "E-25 HEAT AMPS "<br>"E-25   WERE   "<br>"E-25 TOO HIGH   "<br>"E-25   31 37 37 " | *--- Electric 4-Head Fryers Only ---*

Heat Amps (Current Draw) Too High
The E-25 "Heat Amps Too High" error is activated if the amperage reading (electrical current) for any of the three amps sensors is more than the SP-14 "AMPS RDG. HIGH LIMIT" setting (when the heat output is on).

The Min and Max amps limits are set as percentages below and above the programmed "Nominal Amps Reading" (Special Program parameter SP-12).

To view the Nominal, Min and Max amps limits, activate Info Mode by pressing INFO and PROG at the same time, then press INFO once to circle around to the Amps display on the last step. Press the DOWN button to view the Nominal (expected) amps value. Press DOWN a second time to view the amps Low Limit. Press DOWN a third time to view the amps High Limit.

Typically, this error results from a wrong wattage or wrong voltage element, or some other wiring problem. It might also result from excessively supply high voltage -- as when running a 208 V fryer on 240 V.

By the time the warning message is displayed the controller has already turned the heat off (due to the Error Code). The amps values shown in the error message are "latched" copies of the amps readings that triggered the error.

NOTE: To clear this Error you MUST turn the power switch off and back on!

E-25 Possible Causes:

1. Wrong SP-12 "Nominal Amps Rdg" setting. The controller sets the Min and Max Amps Limits based on the programmed "Nominal" amps value.

2. Wrong wattage heating element installed.

3. Wiring problem, such that one or more supply legs ends up feeding more heating coils than normal.

4. Fryer voltage excessively high (compared to fryer's nominal design voltage).

5. Fault in the amperage monitoring circuits.

Note: All Amps errors can be disabled by simply unplugging the transducer harness. Do this ONLY if you are <u>absolutely certain</u> that the problem is due to a defective current transducer assembly and <u>not</u> a fault in the fryer. |

| E-26 | "E-26 HEAT AMPS "<br>"E-26   ARE   "<br>"E-26 LOCKED ON "<br>"E-26   31 31 31   " | *--- Electric 4-Head Fryer Only ---*

Heat Amps Locked On (Controller can't turn heat off)
The E-26 "Amps Locked On" error is activated if the amperage reading (electrical current) for any of the three amps sensors exceeds a hard-coded limit of 4 amps when the heat output is <u>off</u>.

This error essentially signals that the controller is trying to turn the heat off but the amps sensors indicate that one or more legs is still drawing significant current.

NOTE: This is one of the few error codes that will be displayed even with the power switch off, if the fault condition persists! If turning the power switch off does not shut down the current flow then the user must unplug the fryer or shut off a breaker to the fryer.

E-26 Possible Causes:
1. One or both contactors with contacts "welded on".

2. Controller output(s) to relay coil(s) shorted "on" (contactors okay but 24vac on/off signal from controller is stuck on).

3. Fault in the amperage monitoring circuits.

Note: All Amps errors can be disabled by simply unplugging the transducer harness. Do this ONLY if you are <u>absolutely certain</u> that the problem is due to a defective current transducer assembly and <u>not</u> a fault in the fryer. |

| E-27 | "E-27 HEAT AMPS "<br>"E-27   TOO LOW   "<br>"E-27   31 18 18   " | *--- Electric 4-Head Fryer Only ---*

Heat Amps (Current Draw) Too Low
The E-27 "Heat Amps Too Low" error is activated if the amperage reading (electrical current) for any of the three amps sensors is less than the SP-13 "AMPS RDG. LOW LIMIT" setting (when the heat output is on).

The Min and Max amps limits are set as percentages below and above the programmed "Nominal Amps Reading" (Special Program parameter SP-12). The Nominal, Min, and Max amps limits can be viewed in Info Mode. (See the E-25 error above for details.)

To avoid confusion while cooking, <u>E-27 errors that occur during a cook cycle are postponed until after the cook cycle has completed</u>. Also, to avoid continuous nuisance alarms when a heater is burned out, the E-27 error will not repeat for at least 60 minutes.

Typically, the E-27 "low amps" error results from a failed element or a failed contactor. It might also result from a wrong wattage or wrong voltage element, from a wiring problem, or from excessively low supply voltage -- as when running a 240 V fryer on 208 V.

If the error condition is still present when the error message is displayed, the amps readings are "live" values. Otherwise -- i.e. if the heat output is now off or if the readings are now good -- the amps values shown in the error message are "latched" copies of the amps readings that last triggered the error.

E-27 Possible Causes:
1. Wrong SP-12 "Nominal Amps Rdg" setting. The controller sets the Min and Max Amps Limits based on the programmed "Nominal" amps value.

2. Defective contactor, such that one or more poles is not conducting properly.

3. Wrong wattage or wrong voltage heating element(s) installed.

4. Fryer voltage excessively low (compared to fryer's nominal design voltage).

5. Fault in the amperage monitoring circuits.

Note: All Amps errors can be disabled by simply unplugging the transducer harness. Do this ONLY if you are <u>absolutely certain</u> that the problem is due to a defective current transducer assembly and <u>not</u> a fault in the fryer. |

| E-41 | *System settings lost: (Special Prog settings, Heat Ctrl settings, etc.)*

"E-41 SYSTEM "<br>"E-41 DATA   "<br>"E-41 LOST   "

Product settings lost: (Product number identified on first line)

"E-41 -1-   "<br>"E-41 DATA "<br>"E-41 LOST "

Note: Each product is managed individually, so a loss of all six product settings would result in six different E-41 errors.

Also, loss of a single product would result in just that product being re-initialized, leaving the other products intact. | **Programmed Settings Lost.**
This error indicates that some problem caused memory to be scrambled and resulted in the loss of programmed settings. By the time this error appears in the display, the settings in question will have already been reset to factory default values.

The error will persist until the user acknowledges it by pressing any button, or until the power switch is turned off and back on.

Normal heating will continue even while the E-41 error code is being signaled, as the error message occurs after the fact: the settings are fixed automatically as soon as the problem is detected, and then the error code is started.

This error should be very rare. All programmed settings are stored in two locations, so if one location gets wiped out the controller can generally restore it from the other location. It is only when both locations get wiped out at the same time that an E-41 occurs.

However, E-41 errors <u>can</u> be expected if new software is installed into an old controller board, and the controller is not properly re-initialized via Mfg. mode. If the newer software has additional product settings or system settings, the old settings stored in the controller won't properly match up to the new software's settings. In this case, one or more E-41's may be signaled on the first power up. The controller automatically initializes the appropriate settings to factory defaults when an E-41 is detected, so simply powering down again and powering up a second time should clear all the E-41 codes.

E-41 Possible Causes:
1. Extreme voltage spikes or dropouts on power supply or line voltage supply.

2. Installation of new software, as described above.

3. Moisture or contamination on the controller board, or other defect affecting the EEPROM and PSD memory chips. |

| E-46 | "E-46   DATA   "<br>"E-46   SAVE   "<br>"E-46   FAILED" | **EEPROM Memory Write Error.**
This error is generated when the controller attempts to write to the EEPROM memory chip -- to save program settings or statistics data -- and the write operation fails.

The EEPROM chip is a "permanent storage" device, where program settings may be stored for indefinite periods of time, even if the fryer is turned off or unplugged.

Each time the controller writes something to the EEPROM chip, it immediately reads back the information to confirm that the chip received it and saved it correctly. If for some reason the data was not saved correctly, the controller will automatically try a second time, and even a third time. If the operation still fails on the third attempt, an E-46 error is signaled.

The E-46 error will persist until the user acknowledges it by pressing any button, or until the power switch is turned off and back on.

Normal heating will continue even while the E-46 error code is being signaled. Fryer operation *might* still be possible with a failed EEPROM, as the controller may still be able to operate with a RAM copy of the settings.

However, E-46 errors are likely to pop up repeatedly, each time the controller tries to save statistics data to the EEPROM (about every two hours), or tries to save new system or product settings.

E-46 Possible Causes:
1.   Failed EEPROM chip, or problems with related solder joints or traces on the circuit board.

2.   Moisture or contamination on the controller board affecting the EEPROM chip. |

| *E-47* | "E-47   ANALOG   "<br>"E-47   SYSTEM   "<br>"E-47   OR 12 VOLT "<br>"E-47   FAILED   " | **Analog System Error**
This error code indicates the controller has detected a problem with the analog input system. This problem could be the result of a failure on the controller board, on the I/O board, or in the wires connecting the two, <u>or can result from plugging the Amp Sensors connector on backwards</u>.

The a-to-d converter chip is needed to read the probe temperature, the CPU temperature, the pressure sensor, the current sensors, and the lid switch, etc. The E-47 failure, however, does <u>not</u> indicate there is anything wrong with the probe itself or with any of the other sensors.

The controller continually monitors an internal reference channel in the a-to-d chip. If the a-to-d is working properly, the reference input should always return a specific value. When the value read in does not match the expected value, the controller generates an E-47 error.

The similar E-48 "Input System Error" (below) is generated in the event that all of the shift register inputs appear to be shorted to ground. This likely indicates that the microprocessor cannot communicate with some of the other chips on the controller board.

If the controller detects an E-47 fault and an E-48 fault at the same time, it will signal an E-48 "Input System Error" rather than the E-47 code. The presumption is that the E-47 fault is actually the result of problems with the microprocessor input system -- there might not be a problem with the analog system itself.

The error will disappear automatically, with no user intervention, if the a-to-d converter chip resumes sending good data.

E-47 Possible Causes:
1. <u>Failure of 12 volt DC supply on the I/O board</u>. The 12 volt supply feeds the analog 5v regulator. To test if the 12v supply has failed, turn the fryer off and back on: if the WAIT and READY lights DO NOT light up when the 8888's are displayed, the CPU board is not getting 12v. Also, a failed 12v supply will generally result in quieter or "messed up" speaker sounds.

2. <u>Amp Sensors Plugged on Backwards.</u> This puts a 20 Ohm load on the 5v regulator, causing it to go into thermal shutdown. Unplug Amps Sensors and see if error goes away.

3. Failure of the small 5 Volt regulator (on the controller board) that supplies 5v DC to the analog circuits.

4. Failure of the A-to-D converter chip, or problems with the signal traces leading to it. |

| E-48 | "E-48   INPUT   "<br>"E-48   SYSTEM   "<br>"E-48   ERROR   " | **Input System Error**
This error code indicates the controller has detected a problem reading certain chips on the controller board.

The E-48 error is generated in the event that all of the shift register inputs appear to be shorted to ground. (The shift register chips are used to read the button inputs and the inputs from the I/O board.)

This error likely indicates that one or more solder connections on the controller board are shorted or have some other failure, such that the microprocessor cannot communicate with other chips on the controller board.

The error will disappear automatically, with no user intervention, if the controller is once again able to read the shift register inputs correctly.

E-48 Possible Causes:
1. Solder bridge or other short, or moisture or contamination on the controller board, affecting any of the following chips: 74LS165 shift registers, 74LS244 buffer, TLC2543 a-to-d converter, X25128 EEPROM chip, TPIC2603 outputs driver, 5450 display drivers, 5891 display bank driver.

2. Failure of any of the above chips, such that the chip's failure causes a problem with the shared communications traces leading to the microprocessor.

3. Failure of the 12 volt DC supply on the I/O board. The 12 volt supply feeds the analog 5v regulator, which in turn powers the a-to-d converter chip. To test if the 12v supply has failed, check to see if the speaker works normally or not. A failed 12v supply will result in no speaker sounds (no key beeps), or perhaps very, very faint sounds. Also, the WAIT and READY lights (above the display digits, in the center) will generally not light up at power up if the 12v supply has failed.

4. Failure of the small 5 Volt regulator (on the controller board) that supplies 5v DC to the a-to-d converter. |

E-70 A	"E-70 A FAN VAC " "E-70 A JUMPER " "E-70 A MISSING "	--- *4-Head Fryers Only* ---
		"Fan Vacuum" Jumper Missing Four-head C8000 Pressure Fryers <u>do not</u> have a vacuum switch, but instead require a wire jumper to complete the interlock circuit. The E-70A error is generated when the controller observes that the wire is missing. The 6-pin wiring harness with the Drain and High Limit connections should have a small loop of wire between pins 1 and 2, shorting across the "Vacuum Switch" inputs. Without this wire, the controller cannot turn the heating circuits on. If the 6-pin connector is simply not plugged onto the controller, an E-10 High Limit error will be reported. High Limit (E-10) and Drain Open (E-15) errors are both higher priority and would be reported before an E-70A is reported. *Note: <u>Electric 8-Head Fryers</u> also do not have a vacuum sensor and do require a wire jumper to complete the interlock circuit. However, these fryers will not generate an E-70A error if the wire jumper is missing. Instead, a controller in an 8-Head fryer that powers up without a wire jumper in the vacuum switch position assumes it is in a <u>Gas</u> 8-Head fryer. Any Electric 8-Head fryer that auto-detects as a Gas 8-Head is likely missing the vacuum jumper wire.* **E-70 A Possible Causes:** 1. Missing or broken wire in pins 1 and 2 of I/O board P11 connector (High Limit and Drain connector), or faulty connector. 2. Failure of one of the opto-couplers (on the I/O board) that monitors the power switch signals. Try replacing the I/O board.

| E-70 B | "E-70 B   PWR SW   "<br>"E-70 B   OR WIRES"
"E-70 B   FAILED   " | **Power Switch Failure or Wiring Error.**
This error is generated when the controller observes that the connections to the power switch do not operate as expected.

All C8000 pressure fryers are "soft" power switch systems. Line voltage runs directly to the I/O board, so the controller is live anytime the fryer is plugged in. The power switch on these fryers is actually wired with 24 VAC -- not line voltage. These fryers show "-OFF-" in the controller display when the power switch is in the Off position.

On "soft" power switch systems such as this, one set of power switch contacts lets the controller know whether the switch is in the On, Off, or Pump position. The other side of the switch is part of the series-wired 24 VAC interlock circuit and provides continuity for the interlocks only in the On position.

Normally, the controller should see the signal from the power switch *interlock* contacts at the same time it sees the power switch is in the On position. If it sees the switch is On but does not see the interlock signal, or if it sees the interlock signal but does not see the switch is On, then it generates an E-70 B error.

This error can result if any of the power switch wires are disconnected, or connected improperly, or if the switch itself has failed.

The error will disappear only if the wiring error is fixed, or if the power switch is changed to a position that <u>does</u> behave as expected.

E-70 B Possible Causes:
1. Power switch or power switch connector on the I/O board wired incorrectly.

2. Power switch failure / bad contacts.

3. Failure of one of the opto-couplers (on the I/O board) that monitors the power switch signals.

4. Wrong Software or Wrong I/O Board: Software version "E" and later knows how to work with both 4-Head and 8-Head I/O boards. Running software "D" or earlier (before 8-Head fryers were supported) with an 8-Head I/O board can result in an E-70B error when the power switch is -OFF-. (i.e. might have installed an 8-Head I/O board into a 4-Head fryer controller.) |

E-92	"E-92 24 VOLT " "E-92 FUSE "	**24 Volt Current Limiter (Fuse) Tripped** E-92 is generated when the controller detects that no 24 Volt AC signal is present at the start of the interlock chain. The self-resetting 24 VAC current limiter -- located near the upper-left corner of the I/O board -- is the very first monitor point in the entire interlock chain. 24 VAC should always be detected there anytime the controller is powered -- whether or not the high limit and drain are closed, etc. Failure to detect 24 VAC normally means that the current limiter has been tripped. If indeed the limiter *has* tripped, look for places where any of the interlock connections may be shorted to the fryer sheet metal. A short to chassis ground is the most likely cause of a blown 24 VAC fuse. **Check for a jammed pressure solenoid.** If the plunger is gummed up and can't move, the solenoid draws too much current. (It might not trip out the 24 Volt fuse until several minutes into the cook cycle.) Check the drain micro-switch to see if the switch itself is broken, if any wires have come off or have been cut, or if any terminals might be shorting to the sheet metal. Check the 24V wiring to the high limit, power switch, and heat contactor (or ignition module) as well. Look for wires that may be pulled tight against sharp sheet metal edges, or melted against burners or other hot sheet metal. *Note that a false E-92 can result from the failure of the <u>internal</u> 14-pin cable that connects the CPU board and the I/O board.* When this cable is damaged or unplugged, *none* of the interlock signals can be detected by the controller board (or the signals are detected intermittently). Since the 24 VAC fuse is the first test point in the chain, an E-92 error is generated. (If the connection is intermittent, other false errors like E-10 and E-15 may also occur.) **E-92 Possible Causes:** 1. 24 VAC current limiter on I/O board is tripped, due to wire or terminal shorting to sheet metal ground. 2. 24 VAC current limiter on I/O board is tripped, due to current overdraw to <u>a jammed pressure solenoid</u>, or a shorted contactor coil or ignition module, etc. 3. Damaged or unconnected 14-pin cable between the CPU board and the I/O board (inside controller). 4. Failed opto-coupler chip on I/O board, or bad trace or solder connections. If Info Mode Digital Inputs display shows "_HD", possibly with an intermittent "V" before the "H", then the opto may be bad. Replace the I/O board, <u>but only if the "H" is shown when the "V" is not</u>.