

Instruction for checking the ERORR CODES:

1. Relieve pressure leave prime valve open and power switch OFF.
2. If sprayer has no display, remove the control box cover to view the control board LED status light.
3. Plug sprayer into correct AC power, grounded outlet.
4. Turn pressure control knob clockwise ½ turn.
5. Turn Power switch ON.
6. View digital display. If digital display is not available, view the control board LED status light instead.

The Codes below are for several different models.

DIGITAL DISPLAY	CONTROL BOARD STATUS LIGHT.	INDICATION	GO TO PAGE
<u>Digital Display</u> <u>Blank</u>	Never Lights	No power to microprocessor on control board.	13
<u>----</u> <u>PSI icon not</u> <u>blinking</u>	Blinks once and stops	Power to board is ok, No RUN command to motor.	14
<u>----</u> <u>PSI icon</u> <u>blinking</u>	Constant on	Control is commanding motor to run.	15
Unreadable	1 Blink every 3 seconds	Board is trying to start up. Unplug transducer, pot and display. If still blinking replace board. If it stops blinking one of the 3 parts are faulty. Reconnect the parts one at a time to find the faulty part.	
<u>Displays high</u> <u>pressure</u>		Improper pressure signal from transducer	16
<u>E=02</u>	Blinks 2 x repeatedly	High pressure signal from transducer	17
<u>E=03</u>	Blinks 3 x repeatedly	Transducer failure or connection error	18
<u>E=04</u>	Blinks 4 x repeatedly	Excessive Wall voltage	19
<u>E=05</u>	Blinks 5 x repeatedly	High current or motor is not turning.	20-22
<u>E=06</u>	Blinks 6 x repeatedly	Motor is too hot or motor/thermal device connection may be bad.	23
<u>E=07</u>	Blinks 7 x repeatedly	Exceeded 2000 psi during timed flush cycle.	24
<u>E=08</u>	Blinks 8 x repeatedly	Low wall voltage	24
<u>E=09</u>	Blinks 9 x repeatedly	Motor sensor failure	25
<u>E=10</u>	Blinks 10 x repeatedly	High control board temperature	26
<u>E=11</u>	Blinks 11 x repeatedly	Excessive motor speed	26
<u>E=12</u>	Blinks 12 x repeatedly	High Current	27
<u>E=13</u>	Blinks 13 x repeatedly	Model not selected	27
<u>EMPTY</u>		Watchdog mode is activated. Sprayer will stop running when pressure drops sharply	28
Cal <i>Older Ultra- Max's</i>		Unplug the display, If sprayer operates Replace the Display. If the sprayer does not operate replace the control board.	
8888	Digital Display Switches not set.	Set switches on back of digital display to the appropriate settings.	
Motor Hums	Constant on	Perform appropriate motor tests, if motor tests ok, replace control board.	

Symptoms:

- Sprayer does not run at all
- Digital Display is blank
- Control board status light never lights



What does this mean?

No power to the control board or display or control board is likely the problem.

Troubleshooting Procedure:

1. Set sprayer to OFF. Unplug digital display. Set sprayer to ON. If sprayer runs, replace display. If not, go to next step.
2. Set sprayer ON and check for A.C. voltage at the control board. If no voltage, check power source and wiring back to power cord.
3. Set sprayer to OFF and **disconnect power to sprayer**. Check continuity from power cord plug (through power switch) to control board.
4. If power cord, switch, EMI filter and wiring continuity is ok, replace control board.

Symptoms:

- Sprayer does not run at all
- Digital Display shows dashes and Psi icon is not blinking
- Control board status light blinks once when switch is turned on but then stays off.



What does this mean?

Power to board is ok but there is no RUN command to the motor. Either the potentiometer or control board is likely the problem.

Troubleshooting Procedure:

Check potentiometer & connections to control board. Set sprayer to OFF.

Disconnect potentiometer from control board socket. Check that potentiometer and control board contacts are clean and secure.

Reconnect potentiometer to control board socket. Set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, set sprayer to OFF and go to next step.

Connect a known good potentiometer to control board socket and set sprayer ON and control knob to ½ turn clockwise. If ok, replace pot. Replace control board if sprayer still does not run. But first, verify transducer and connections are ok. See next page.

OR

Short center pin of socket to each outer pin. Install new potentiometer if sprayer runs. Replace control board if sprayer does not run. But first, verify transducer and connections are ok. See next page.

Check transducer & connections to control board. Set sprayer to OFF and **disconnect power to sprayer**.

Disconnect transducer from control board socket. Check that transducer and control board contacts are clean and secure.

Reconnect transducer to control board socket. Connect power, set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, set sprayer to OFF and go to next step.

Connect a known good transducer to control board socket.

Set sprayer ON and control knob to ½ turn clockwise. Install new transducer if sprayer runs. Replace control board if sprayer does not run.

Symptoms:

- Sprayer does not run at all
- Digital Display shows dashes and Psi icon is blinking
- Control board status light blinks and stays on constant.
- E5 error code – brushless unit



What does this mean?

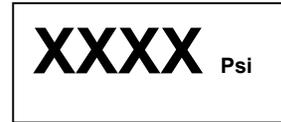
There is power to control board, the potentiometer and transducer are ok and the control is commanding the motor to run. Either the motor, motor connections, capacitor connections (brush type motor) or control board is likely the problem.

Troubleshooting Procedure:

1. **Check motor and connections to control board.** Also check capacitor connections to control board for brush style motor.
2. Set sprayer to OFF and **disconnect power to sprayer.**
3. Disconnect motor connector from control board socket. Check that motor connector and control board contacts are clean and secure.
Check that connections at capacitor are secure. CAUTION
CAPACITOR MAY STILL HAVE A CHARGE ON IT!
4. **Check motor.** Remove pump pin and connect a D.C. voltmeter across two motor wires – red & black (brush type) red, black, blue (brushless type) Spin motor fan and check for a voltage to register on meter. Repeat for all motor wire combinations – brushless type only. If voltage **not** present, check brushes. If ok, replace motor. If voltage present, go to next step.
5. Reconnect motor connector to control board socket. Connect power, set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, replace control board.

Symptoms:

- Sprayer does not run at all
- Digital Display shows a pressure reading and Psi icon on
- Control board status light off.
- E2 error code – Brushless unit (possible)



What does this mean?

Improper pressure signal to control board, with no pressure in sprayer. The transducer or connections is likely the problem.

Troubleshooting Procedure:

1. Set sprayer to OFF and **disconnect power to sprayer**.
2. **Check transducer & connections** to control board.
3. Disconnect transducer from control board socket. Check that transducer and control board contacts are clean and secure.
4. Reconnect transducer to control board socket. Connect power; set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, set sprayer to OFF and go to next step.
5. Connect a known good transducer to control board socket. Set sprayer ON and control knob to ½ turn clockwise. Install new transducer if sprayer runs. Replace control board if sprayer does not run.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=02
- Control board status light blinks 2x repeatedly.

E=02

What does this mean?

The control board is detecting an excessive pressure. The transducer or connections is likely the problem.

Troubleshooting Procedure:

1. Make sure there is no pressure in the system (see pressure relief procedure). Check fluid path for clogs, such as clogged filter.
2. If running Auto Clean, open prime valve and trigger gun.
3. Use airless paint spray hose with no metal braid. ¼ in. x 50 ft minimum. Smaller hose or metal braid hose may result in high-pressure spikes.
4. Set sprayer to OFF and **disconnect power to sprayer**.
5. **Check transducer & connections** to control board.
6. Disconnect transducer from control board socket. Check that transducer and control board contacts are clean and secure.
7. Reconnect transducer to control board socket. Connect power, set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run properly, set sprayer to OFF and go to next step.
8. Replace transducer. Connect power, set sprayer ON and control knob to ½ turn clockwise. Install new transducer if sprayer runs properly. Replace control board if sprayer does not run properly.

E=03

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=03
- Control board status light blinks 3x repeatedly.

What does this mean?

The control board is not detecting a pressure signal.
The pressure transducer or connections are likely the problem.

Troubleshooting Procedure:

1. Set sprayer to OFF and disconnect power to sprayer.
2. Check transducer & connections to control board.
3. Disconnect transducer from control board socket. Check that transducer and control board contacts are clean and secure.
4. Reconnect transducer to control board socket. Connect power, set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, set sprayer to OFF and go to next step.
5. Connect a known good transducer to control board socket.
6. Set sprayer ON and control knob to ½ turn clockwise. Install new
7. transducer if sprayer runs. Replace control board if sprayer does not run.
8. You can also check transducer resistance with an ohmmeter;
Between red & black wires – less than 9 k ohm and 3-6 k ohm between green & yellow wires.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=04
- Control board status light blinks 4x repeatedly.



E=04

What does this mean?

Voltage applied to the sprayer is too high.

Troubleshooting Procedure:

1. Make sure the sprayer is plugged into the proper AC power source. Less than **138** volts for 120V sprayers and less than **260V** for 230V sprayers.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=05
- Control board status light blinks 5x repeatedly.

E=05

What does this mean?

The control is commanding the motor to run but the motor shaft does not rotate. Possibly locked rotor condition, an open connection exists between the motor and control, there is a problem with the motor or control board or the motor amp draw is excessive.

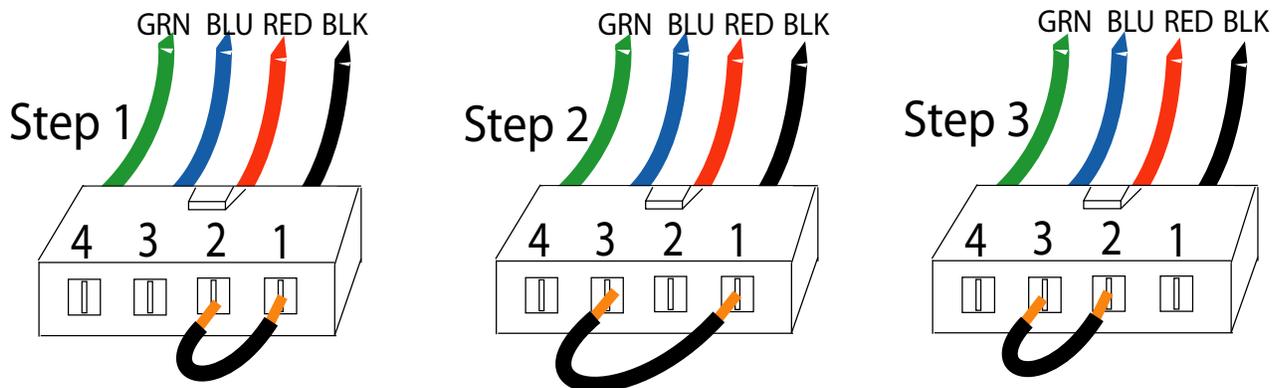
Ultamax IIs: Brushless motors test when the motor *is running at the start of the test*. For all others go to step 1.

With the prime valve open and pressure relieved, start and stop the motor 15 times using the set point pot (Pressure Switch). If the motor restarts each time at no load Motor is probably bad (Resolver in the motor) replace the motor. If the motor will not restart every time then the board is at fault (running on 2 phase) replace the circuit board.

Troubleshooting Procedure ULTRA-MAX II(Brushless Type Motors)

1. Remove the pump pin and try to run the sprayer. If the motor runs check for locked or frozen pump or drive train. If sprayer does not run, go to next step.
2. Set sprayer to OFF and disconnect power to sprayer .
3. Disconnect motor connector(s) from control board socket(s). Check that motor connector and control board contacts are clean and secure. If tests ok go to step 4.
4. Set sprayer to OFF spin the motor fan 1/4 turn. Restart sprayer. If sprayer runs, replace control board. If not, go to step 5.
5. Spin Test: Test at the large 4-pin motorfield connector. Disconnect the fluid pump from the sprayer. Test motor by placing a jumper across pins 1 & 2. Rotate the motor fan at about 2- revolutions/second. A cogging resistance to motion should be felt at the fan. The motor needs replacing if no resistance is felt. Repeat for pin combinations 1 & 3 and 2 & 3. Pin 4, the green ground wire, is not used in this test. If it tests good go to step 5 Resolver test

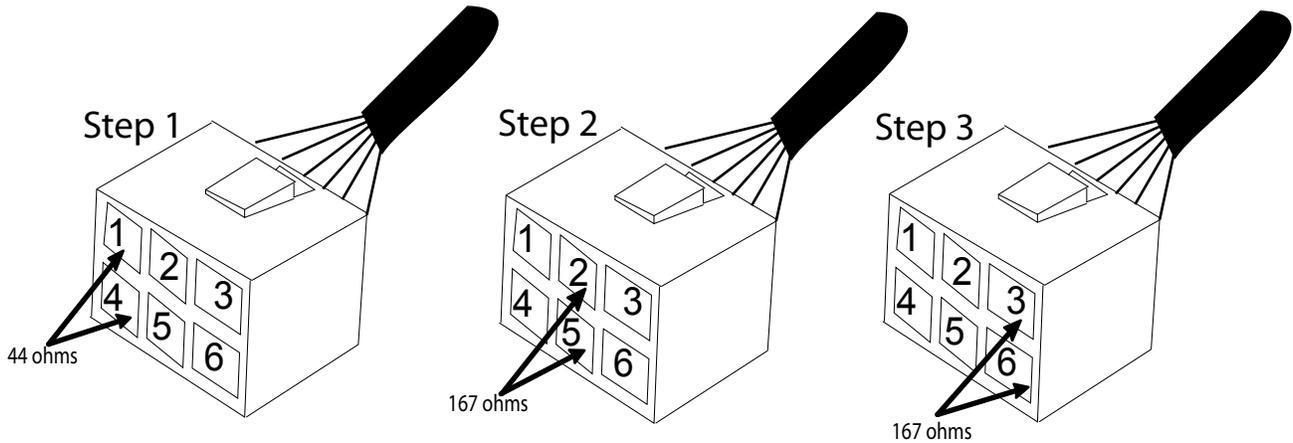
Spin Test



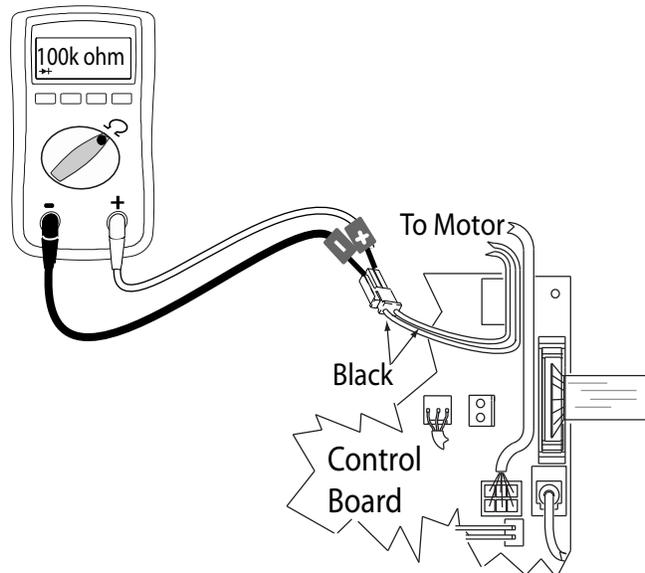
NOTE: 490II, 495II and 595II Brushless motors will not have a resolver plug.

5. Resolver Test: Test the 6-pin Resolver connector on the end of the cable that connects the motor to the circuit board. Use a volt-ohm meter to test resistance. Should read 44 ohms across pins 1 & 4, 167 ohms across pins 2 & 5, and 167 ohms across pins 3 & 6. Inspect the 6 sockets in the connector to make sure they are not causing a bad connection. Squeeze the socket back to size if one appears too large. If it tests good go to step 6.

Resolver Test



6. Field Short Test: Test at the large 4-pin motor field connector. There should not be continuity from pin 4, the ground wire, to any of the remaining 3 pins. If it tests good replace the Control Board.
7. Checking the motor thermistor: Unplug the Black wires. Set meter to Ohms. Meter should read 100K(+ or -)10%. Note: motor should be cooled down.



Troubleshooting Procedure for Brush Type Motors:

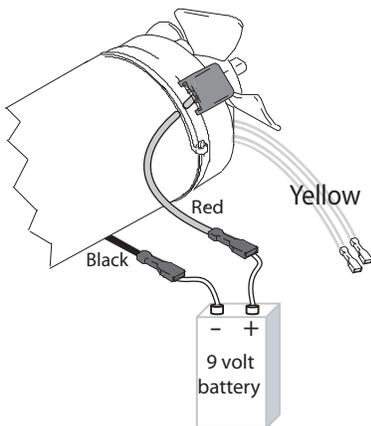
1. Remove the pump pin and try to run the sprayer. If the motor runs check for locked or frozen pump or drive train. If sprayer does not run, go to next step.
2. Set sprayer to OFF and disconnect power to sprayer .
3. Disconnect motor connector(s) from control board socket(s). Check that motor connector and control board contacts are clean and secure. If ok go to Step 4.
4. [See capacitor test page](#). CAUTION - CAPACITOR MAY STILL HAVE ACHARGE! If it test ok go to step 5.
5. Check motor. Connect a D.C. voltmeter across two motowires – red & black spin the motor fan and check for a voltage to register on the meter. If voltage not present, check brushes. If ok, replace motor. If voltage present, go to next step.
6. Reconnect motor connector(s) to control board socket(s). Connect power, set sprayer ON and control knob to ½ turn clockwise. If motor does not run, replace control board.

OR

Use CAUTION not to distort the connectors when inserting the meter probes.

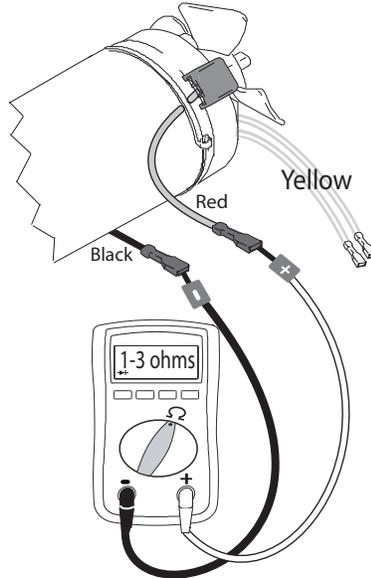
Step 1

Perform a spin test by connecting a 9 volt battery or larger to the motor leads. Motor leads may vary in style and size. Locate the 2 wires going to the carbon brushes normally Red and Black.



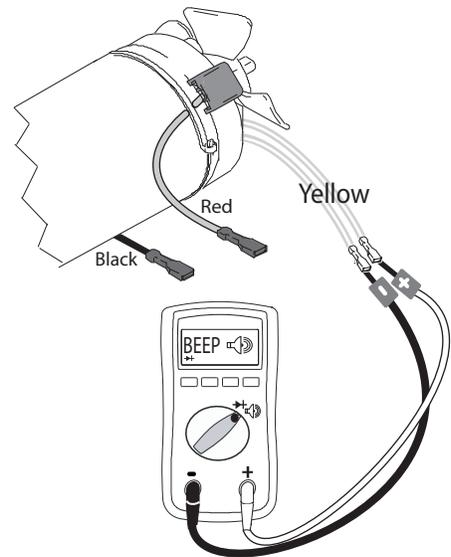
Step 2

Spin the motor while checking. If a open is found replace the motor.



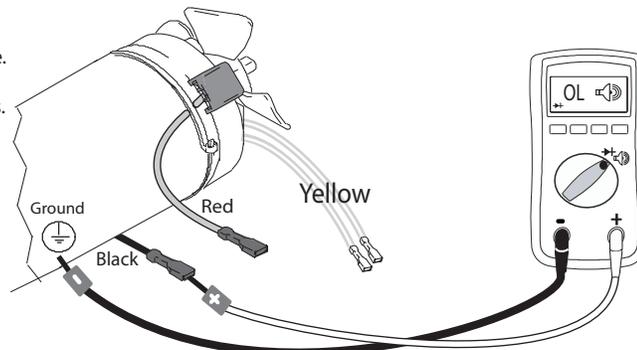
Step 3

Checking the motors thermal protection. Meter should read continuity or Ohms depending on the motor. Note: motor should be cooled down.



Step 4

Checking the motor wires for a short. Put the (-) meter lead on the motor case. Move the (+) meter lead to each wire. Meter should read open on all the wires.



Symptoms:

- Sprayer does not run at all
- Digital Display shows E=06
- Control board status light blinks 6x repeatedly.

E=06

What does this mean?

Motor is too hot or motor/thermal device connections are likely the problem.

Troubleshooting Procedure:

Quick test for Ultra –Max II's Only:

Note: This test is only for the BRUSHLESS MODELS. For all others go to step 1.

Motor must be cooled down for the test. Unplug thermistor wires from the control board, turn the sprayer on, if motor starts the thermistor switch is bad, replace the motor. If motor still does not start or error code is still present replace the control board. Step 3 should also be performed if a VOM is available to confirm that the thermistor is shorted.

1. Check thermal sensor and connections to control board. Set sprayer to OFF and **disconnect power to sprayer**.
2. Disconnect motor / temp connector from control board socket. Check that transducer and control board contacts are clean and secure.
3. Measuring the resistance of the thermal device. NOTE: A low resistance reading would be indicating to the control board that the motor is hot. The resistance for most motors with yellow sensor wires will be about 100 k ohm. If the reading is not correct, replace motor. Motors with a thermal switch you will test for continuity. If open replace the motor.
4. Reconnect motor / temp connector to control board socket. Connect power, set sprayer ON and control knob to ½ turn clockwise. If sprayer does not run, replace control board.
5. If connections are all OK, allow sprayer to cool. If sprayer runs when cool, correct cause of overheating. Keep sprayer in cooler location with good ventilation. Make sure motor air intake is not blocked.
6. If the sprayer still does not run after cooling off, replace the motor.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=07
- Control board status light blinks 7x repeatedly.

E=07

What does this mean?

Pressure exceeded 2000 psi while using the flush timer (AutoClean Timer)

Troubleshooting Procedure:

1. This error only occurs when using the flush timer. Do not use the flush timer mode when spraying.
2. When using the flush timer for AutoClean , make sure that the gun trigger, prime valve and AutoClean valve are all open before starting the motor.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=08
- Control board status light blinks 8x repeatedly.

E=08

What does this mean?

Voltage applied to the sprayer is too low.

Troubleshooting Procedure:

Make sure the sprayer is plugged into the proper AC power. More than 90 volts for 120V sprayers and at least 200 volts for 230V sprayers) Check the voltage at the control board. If below 90 or 200 volts repair or replace cord or switch. If voltage at the boars is above 90 or 200 replace the control board.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=09
- Control board status light blinks 9x repeatedly.

E=09

What does this mean?

The control is not receiving a motor position sensor signal. The resolver or connections is likely the problem.
(Ultra Max II motors only)

Troubleshooting Procedure:

1. Set sprayer to OFF.
2. Disconnect motor and resolver connectors from control board sockets. Check that connector and control board contacts are clean and secure.
3. Check the resolver connections and resistance. Take three resistance readings at the resolver connector, between the two rows. The readings should be about: 44 ohms and 167 ohms twice. If any reading is open, replace motor.
4. Make sure the connector sockets are not (or do not get) spread out or damaged. This may cause the motor not to run. If any of the sockets are out of shape or enlarged, the sockets can be pinched tighter for a better contact.
5. Reconnect motor connectors to control board sockets. Set sprayer ON and control knob to ½ turn clockwise. If motor does not run, replace control board.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=10
- Control board status light blinks 10x repeatedly.

E=10

What does this mean?

Control board power module high operating temperature. The module is likely too hot or motor running too hot.

(Ultra Max II motors only)

Troubleshooting Procedure:

1. Make sure the motor air intake is not blocked
2. Make sure control board is properly connected to the back plate and that conductive thermal paste is used on the power components.
3. Replace control board.
4. Replace motor.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=11
- Control board status light blinks 11x repeatedly.

E=11

What does this mean?

Excessive motor speed. The control is sensing abrupt motor speed change. The sprayer drive or motor resolver is likely the problem.

(Ultra Max II motors only)

Troubleshooting Procedure:

1. Check for damaged gears or disconnected pump.
2. Run sprayer at low pressure to check for normal operation.
3. Replace drive or motor as needed.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=12
- Control board status light blinks 12x repeatedly.

E=12

What does this mean?

The control board is detecting an excessive amp draw. The motor circuit is possibly shorting out, a locked rotor condition exists or the control boards has a problem. (Ultra Max II motors only)

Troubleshooting Procedure:

1. Set sprayer to OFF.
2. Disconnect motor connector from control board socket. Check that motor connector and control board contacts are clean and secure.
3. With the motor unplugged turn the control knob fully counter clockwise. Set sprayer ON. If E=12 does not display, control board is ok. If E=12 is displayed, control board is faulty, before replacing the board check for possible short circuits in motor wiring.
4. Reconnect motor connector to control board socket.
5. Set sprayer to OFF. Remove the pump pin and try to run the sprayer. If the motor runs check for locked or frozen pump or drive train. If display shows E=12 (or control board status light blinks 12x Repeatedly) replace motor.

Symptoms:

- Sprayer does not run at all
- Digital Display shows E=13
- Control board status light blinks 13x repeatedly.

E=13

What does this mean?

Model select resistors on control board not properly selected.
(Ultra Max II motors only)

Troubleshooting Procedure:

Resistors on control board must be properly clipped to identify model type, see replacement control board instruction manual.

Symptoms:

- Sprayer does not run at all
- Digital Display shows EMPTY



EMPTY

What does this mean?

Watchdog mode is activated. Sprayer will stop running when pressure drops sharply. This prevents pump “runaway” when out of paint, clogged inlet strainer, severe leak.

Troubleshooting Procedure:

Watchdog mode can be deactivated (See sprayer instruction manual)

To restart the sprayer after a Watchdog trip, turn pressure control to zero and back up or turn power off/ then on.