

Munchkin Boilers

An Important Note:

The latest revision of the Munchkin boiler will be prefixed with an R1 before the model number (R1 140M).

The R1 indicates that the boiler is equipped with a blocked flue safety switch, a Dungs gas valve, and an expanded control capacity within the Vision 1 package.

Be careful not to confuse the model numbering: the R1 is simply a prefix.

Munchkin continues to manufacture the boilers in 50K, 80K, 140K, 199K and 399K BTU models.

F00

If you experience an F00 code on startup of a new boiler, disconnect the two gray TT wires from whatever they are attached to and wire them together. Reset the boiler. The F00 code had appeared as a result of reversed polarity on the gray wires. This will also appear if the TT wires are shorted out to water pipes, conduit, or the like.

Another issue that can give you an F00 fault is a short circuit or grounding out in the low voltage (safety) circuitry. Check the water pressure switch for leakage. Temporarily jumping the water pressure switch leads together for diagnostic purposes (only) is acceptable. If viewing the status on a computer, a short will show as the air pressure, water pressure and both ECOs being open. Quite simply, in the event of a short, the low voltage transformer within the 925 control shuts down to protect itself, opening all of the safeties.

Questions

Call TSI Hydronics or Tech Service department at:

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800.776.2014

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800.366.0930

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Take a ½ in by 2 in pipe nipple and thread an EMT nut on one end. Insert the nipple through the open knock out and secure it with a second nut. This post will hold inward pressure on the handle, therefore assuring the connection.

If none of the above work, disconnect all but one boiler from the bus wires and see if the panel will recognize the single boiler. Also try swapping the A and B bus wires on the Vision 3 panel. In doing both of these, you are narrowing down the possibility of crossed or misplaced wires.

Everything operates but the loop is not heating correctly:

Disconnect the outdoor sensor to ascertain that the problem does not reside in the wiring or the set up of the heating curve. By disconnecting one outdoor sensor lead, the system will ignore the programmed curve and simply head for the highest target temperature.

Make certain that the **INDIVIDUAL BOILERS** are set for an operating temperature equal to or above the highest desired loop temperature (VIA the S3/program button).

This information covers standard Munchkin installations only.

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F09

An F09 that appears on initial startup of a Munchkin is usually the result of an improper air/gas mixture. Every unit is fired before delivery and set at 100 ppm, however gas has differing calorific values in different areas.

To initially start a challenging boiler, cover the air intake on the left side of the blower $\frac{1}{2}$ to $\frac{3}{4}$ of the way with your hand (essentially choking the unit). The unit should fire. Once a solid flame is established, you should be able to set the CO levels to 105 to 110 ppm on high fire by adjusting the throttle adjustment screw (page 10 in the manual).

Check through the viewing port that the ignitor (11 o'clock position on the face plate) is sparking. Ascertain that the gap is $\frac{1}{4}$ inch.

Be sure that the ignitor is directed downward toward the burner. The spark should be visible through the viewing port.

F11

An F11 fault occurs when the control senses a flame when one is not supposed to be present. This has also occurred when the boiler is short cycling and the combustion chamber is remaining super heated.

One cause of this is blocked exhaust flues. The 2 inch venting on the "T" model Munchkins is not quite as forgiving in this area as the 3 inch vents were, so proper pitch (1/4 in./ ft.) is critical.

Alarm Contact

The 925 control is equipped with an alarm contact that will provide 110 volts to an alarm or light whenever a fault code is encountered.

When considering an alarm/light, remember the limitations of amp draw on the control. Please call TSI for details.

F10

F10 is indicative of a failure while running.

Check that the condensate drain is clear, and that condensate can flow freely from the boiler. Back ups create steam which suffocates the flame, throws off rectification, or in the worst case, soaks the refractory plates, causing the spark to ground out instead of sparking.

Check what the flame rod is reading by depressing and holding the S4 button. It will display d1. Press and release the button until d7 appears. The d7 reading should be 4.0 or stronger, and is directly related to the CO output of the boiler (see below).

The CO levels at the exhaust breach should be 105-110 ppm on high fire on all units. See page 10 in the manual for adjustment procedures.

If you have the CO set properly with the flame current holding steadily, then suddenly the flame current begins to swing in large amounts, check the burner gasket. At higher temperatures, the burner flange can shift, causing gas (flame) leakage at the rear of the burner itself. This is not a common occurrence, and is generally associated with a condensate back-up.

If there is a concentric vent kit installed, check that it has been properly assembled and GLUED. Exhaust gas recirculation will cause the unit to fire then fail almost immediately.

On a Munchkin 80, check that the brass vent barb on the rear of the gas valve is not blocked by the rear of the boiler cabinet. If so, shift the boiler slightly forward in the cabinet.

Freeze Protection

The Munchkin boiler has built in freeze protection: When the boiler senses its internal (return water) temperature is 45 degrees, the central heating circulator is energized. If the temperature continues to fall, at 38 degrees the burner is energized until the internal temperature reaches 50 degrees.

The circulator pump(s) are exercised for 20 seconds every 24 hour period. If the unit is being used in a snow melt application where cold water will be returned during the exercising, special care should be taken.

Glycol / Antifreeze preferably 30% maximum mixture

At 30% glycol

Boiler BTU input loss is - 15% & a 5% increase in head against the circulator

At 50% glycol

Boiler BTU out put loss is - 30% & a 50% increase in head against the circulator

Flow Rates

The recommended flow rate for the Munchkin boiler is 1GPM for every 10,000 BTUs of boiler capacity (80,000 BTU boiler needs 8 GPM, 140,000- 14GPM, etc.)

The maximum flow rate is 125% of the above stated numbers (maximum for an 80M is 10GPM.)

Water Pressure Switch

The water pressure switch is designed to fault the boiler off (PrO) in the event that the system pressure falls below 10 psi. The maximum pressure that is allowed to the switch is 87 psi.

*If a water pressure switch is leaking internally it can short out the 24 volt transformer in the 925 control board, showing an **FOO** error code.*

This is seen more often with systems filled with anti-freeze.

Low Water Cut-off

*Although the Munchkin does not come with a factory installed LWCO, one can be wired in to the system very simply: Wire a field installed LWCO in series with the water pressure switch. If either safety faults, the boiler will shut down on a **Pro** fault. Once the low water/low pressure condition is remedied, the boiler will resume normal operation.*

Amps Draw

2.2 amps draw upon start up = 265 watts

1.2 amps draw running = 145 watts

*399-4 amps **WITHOUT PRIMARY CIRCULATOR** = 480 watts*

SECTION 7: TEST MODE

This function is intended to simplify the gas valve adjustment if needed. Listed below are the recommended limits on each Munchkin Heater and the Combustion Settings (**Fig. 7-2, pg. 16**).

Automatic modulation does not take place when the controller is in Test mode, only temperature limitation based on the Munchkin Central Heating set point. The user will be allowed to increase or decrease the fan speed by pressing in either the S1/-- or S2/+ /+ keys.

To activate the Test mode simply press the **S2/+** and **S3/Program** key together for 1 second. Once activated, you will see in the display **ser** and 1/10 of the actual fan speed. The measurement of the combustion levels should always be taken at the highest and lowest fan speed. After 10 minutes, the Test mode stops automatically. To exit Test Mode press S1/-- and S2/+ key together for 1 second.

While you are in TEST MODE, you will still have access to the Status menu, and while viewing STATUS, you can use the S1 and S2 buttons to alter the blower speed.

Status Menu

Installers are also able to check the current status of the Munchkin parameters by pressing the S/4 key for 3 seconds. Once activated, the display will show d1 alternating value of the actual outlet temperature.

Actual values are displayed for each function. To view the next value, simply press the S/4 key to go to the next displayed value. Listed below are the values which can be displayed. These values cannot be changed.

To exit this menu, simply press the S3/program key to resume normal operation.

Function Value

d1/ Actual Temperature from outlet sensor

d2/ Actual Temperature from inlet sensor

d3/ If using a standard mechanical control, the control will display **1** for closed **0** for open
If the sensor is connected to the SuperStor Indirect Fired Water Heater it will measure the actual temperature.

d4/ Not used

d5/ Actual Temperature from the outdoor sensor

d6/ Actual Fan speed multiplied by 10 (Example: If fan speed displayed is **410** RPM x 10 = 4100 actual fan speed)

d7/ Actual Ionization current read from Flame Rectification probe

d8/ Actual Status of the Central Heating Circulator Off = **0**, On = **1**

d9/ Actual Status of the Indirect Fired Circulator Off = **0**, On = **1**

d10/ Actual Status bus communication **0** = connected, **1** = not connected

Gas Valves

If you find that the **HONEYWELL** gas valve has been adjusted to the point of not knowing where it is, simply turn the throttle screw completely in (clockwise) until it seats, then turn it out (counter-clockwise) 6 ½ turns.

If the gas valve is a **DUNGS** (on the T50/T80 models), again, turn the Throttle adjustment screw clockwise until it seats, then back it out 7 full turns for LP gas, or 10 full turns for natural gas.

At that point the unit should at least operate and allow you the ability to perform combustion tests to attain peak efficiency.

When setting up a Dungs valve, be patient. The adjustment will not register as quickly as it had with the Honeywell valve. Turn the throttle screw in ¼ turn increments, then wait for the change to become apparent in the readings.

Pro

Indicates insufficient water pressure within the system. This will automatically re-set once pressure is restored to above 10 psi. See water pressure switch dialog below.

Boiler runs with no demand:

If the boiler is running steadily with no domestic HW or heat demand it may be operating under freeze protection. See **Freeze** Protection dialog below.