

Troubleshooting Instruction

TROUBLESHOOTING (DDTC)

The DDTC temperature display contains three LED's with a decimal point between the first and second, this display is also used to display an error code if for some reason there is a failure within the heater control system or a DDTC internal fault. The DDTC will display the actual temperature or set-point temperature or OFF, as selected by the user. When DDTC detects an error, the display will show Exx, see Figure 27, where Exx is the error code of DDTC fault, see Table 13. Codes 1 through 9 indicate a "soft lockout" error that means after these errors are fixed, the heater will resume normal operation and restart immediately. Code ERR indicates a "hard lockout" error that means after these errors are fixed, you need to reset the power of the heater through the switch on the bottom of the electrical junction box on the right side of the cabinet.

NOTE: If Code ERR is shown on the LED display at any time, turn the heater off, (from power switch), then turn on the heater again. If the error code is still displayed, call a certified Pentair Service Technician for repair.

Error Code	Error Description
E01	System Low Voltage
E02	High Temperature Limit
E03	Thermal Fuse Open
E04	Fan Failure
E05	Ignition / Flame Failure
E06	Gas Valve / Module Failure
E07, E08, E09	Not Used
ERR	Call Pentair's Technical Service Department at: (800) 831-7133

Table 13.

TROUBLESHOOTING (GENERAL)

<i>Possible Cause</i>	<i>Remedy</i>
Heater will not come on	
Automatic ignition system fails	Check if electrical connections are correct and securely fastened – If YES, call serviceperson.
Pump not running	Place pump in operation
Pump air locked	Check for leaks
Filter dirty	Clean filter
Pump strainer clogged	Clean strainer
Defective wiring or connection	Repair or replace wires
Defective pressure switch	Replace switch
Defective gas controls	Call serviceperson
On-Off switch in "OFF" position	Turn switch to "ON"
Heater Short Cycling (Rapid On and Off Operation)	
Insufficient water flow	Clean filter and pump strainer
Defective wiring	Repair or replace wiring
Defective flow valve or out of adjustment	Call serviceperson
Defective hi-limit and/or thermostat	Call serviceperson
Heater Makes Knocking Noises, make sure all valves on system are open.	
Heater operating after pump has shut off	Shut off gas supply and call serviceperson
Heater exchanger scaled	Shut off gas supply and call serviceperson

SERVICE CHECKS—IGNITION MODULE

Symptom	Cause/Cure
1. Dead	A. Miswired B. Transformer bad C. Fuse/Circuit breaker bad D. Bad control
2. Thermostat on—no ignition	A. Miswired B. Bad thermostat no voltage at terminal
3. Valve on, no ignition	A. Defective ignitor B. Miswired C. Bad control (check voltage at ignitor)
4. Ignitor on, no valve action	A. Valve coil open B. Open valve wire C. Bad control (check voltage)
5. Flame okay during Try For Ignition (TFI), no flame sense (after TFI)	A. Bad flame sensor B. Bad wires C. Poor ground at burner D. Poor flame (check flame current)

Maintenance Instruction

It is recommended that you check the following items at least every six months and at the beginning of every swimming season.

1. Examine the venting system. Make sure there are no obstructions in the flow of combustion and ventilation air.
2. Visually inspect the main burner and the hot surface ignitor. The normal color of the flame is blue. When flame appears yellow, burners should be inspected and cleaned. Check ignitor for damage.
3. Inspect the heat exchanger for soot. Clean as necessary.
4. Remove burner tray and clean burners and main burner orifices.
5. Keep the heater area clean and free from combustibles and flammable liquids.
6. Check wire ends and wire connections. They should be clean and tight.
7. Check the gas pressure (supply and manifold) as described in this manual.

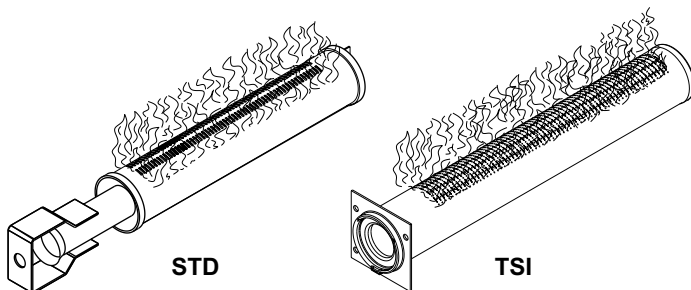


Figure 28.

ENERGY SAVING TIPS

1. If possible, keep pool or spa covered when not in use. This will not only cut heating costs, but also keep dirt and debris from settling in the pool and conserve chemicals.
2. Reduce the pool thermostat setting to 78° F. or lower. This is accepted as being the most healthy temperature for swimming by the American Red Cross.
3. Use an accurate thermometer.
4. When the proper maximum thermostat settings have been determined, tighten the thermostat knob stopper.

CAUTION

REMOVE THE FLOW VALVE ASSEMBLY WHEN DRILLING THE HOLE TO INSTALL A PRV, OTHERWISE, YOU WILL DRILL INTO THE VALVE ASSEMBLY.

PRESSURE RELIEF VALVE

In some installations, a pressure relief valve (PRV) is required on the MiniMax NT Series. To install a PRV, remove the access

doors, remove Flow Valve assembly, then carefully drill a 3/8 in. hole in center of 3/4 in. NPT port (on main header) being careful to drill *only* through wall at bottom of 3/4 in. NPT port and no deeper—now thread in the 3/4 in. NPT PRV.

NOTE: (A.S.M.E. version varies slightly. It is of bronze construction, and is supplied with the A.S.M.E. Section IV, pressure relief valve pre-installed at factory.)

Test the relief valve at least once a year by lifting up lever.

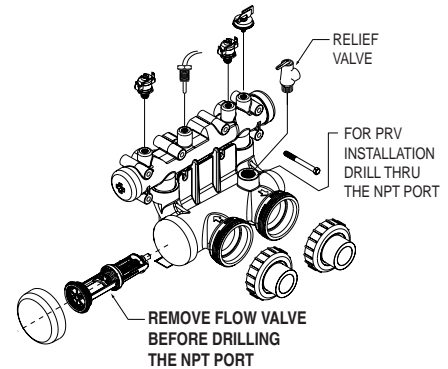
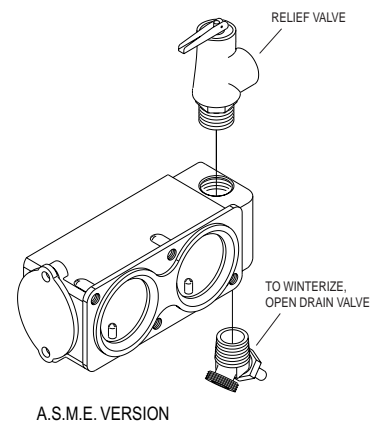


Figure 29.



A.S.M.E. VERSION

5. Set time clock to start circulation system no earlier than daybreak. The swimming pool loses less heat at this time.
6. For pools that are only used on the weekends, it is not necessary to leave the thermostat set at 78° F. Lower the temperature to a range that can be achieved easily in one day. Generally, this would be 10° F. to 15° F., if pool heater is sized properly.
7. During the winter or while on vacation, turn the heater off.
8. Set up a regular program of preventative maintenance for the heater each new swimming season. Check heat exchanger, controls, burners, operation, etc.

CHEMICAL BALANCE

POOL AND SPA WATER

Your Pentair Pool Products pool heater was designed specifically for your spa or pool and will give you many years of trouble-free service, provided you keep your water chemistry in proper condition.

Three major items that can cause problems with your pool heater are: improper pH, disinfectant residual, and total alkalinity. These items, if not kept properly balanced, can shorten the life of the heater and cause permanent damage.

CAUTION

Heat exchanger damage resulting from chemical imbalance is not covered by the warranty.

WHAT A DISINFECTANT DOES

Two pool guests you do not want are algae and bacteria. To get rid of them and make pool water sanitary for swimming - as well as to improve the water's taste, odor and clarity - some sort of disinfectant must be used.

Chlorine and bromine are universally approved by health authorities and are accepted disinfecting agents for bacteria control.

WHAT IS A DISINFECTANT RESIDUAL?

When you add chlorine or bromine to the pool water, a portion of the disinfectant will be consumed in the process of destroying bacteria, algae and other oxidizable materials. The disinfectant remaining is called chlorine residual or bromine residual. You can determine the disinfectant residual of your pool water with a reliable test kit, available from your local pool supply store.

You must maintain a disinfectant residual level adequate enough to assure a continuous kill of bacteria or virus introduced into pool water by swimmers, through the air, from dust, rain or other sources.

It is wise to test pool water regularly. Never allow chlorine residual to drop below 0.6 ppm (parts per million). The minimum level for effective chlorine or bromine residual is 1.4 ppm.

pH - The term pH refers to the acid/alkaline balance of water expressed on a numerical scale from 0 to 14. A test kit for measuring pH balance of your pool water is available from your local pool supply store; see Table 14.

Table 14. pH Chart

Strongly Acid			Neutral					Strongly Alkaline						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Muriatic Acid has a pH of about 0. Pure water is 7 (neutral). Weak Lye solution have a pH of 13-14.

RULE: 7.4 to 7.6 is a desirable pH range. It is essential to maintain correct pH, see Table 15.

If pH becomes too high (over alkaline), it has these effects:

1. Greatly lowers the ability of chlorine to destroy bacteria and algae.
2. Water becomes cloudy.
3. There is more danger of scale formation on the plaster or in the heat exchanger tubing.
4. Filter elements may become blocked.

If pH is too low (over acid) the following conditions may occur:

1. Excessive eye burn or skin irritation.
2. Etching of the plaster.
3. Corrosion of metal fixtures in the filtration and recirculation system, which may create brown, blue, green, or sometimes almost black stains on the plaster.
4. Corrosion of copper tubes in the heater, which may cause leaks.
5. If you have a sand and gravel filter, the alum used as a filter aid may dissolve and pass through the filter.

CAUTION: Do not test for pH when the chlorine residual is 3.0 ppm or higher, or bromine residual is 6.0 ppm or higher. See your local pool supply store for help in properly balancing your water chemistry.

RULE: Chemicals that are acid lower pH. Chemicals that are alkaline raise pH.

Table 15. pH Control Chart

6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4
Add Soda, Ash or Sodium Bicarbonate		Marginal	Ideal	Marginal	Add Acid			

ALKALINITY High or Low:

"Total alkalinity" is a measurement of the total amount of alkaline chemicals in the water, and control pH to a great degree. (It is not the same as pH which refers merely to the relative alkalinity/acidity balance.) Your pool water's total alkalinity should be 100 - 140 ppm to permit easier pH control.

A total alkalinity test is simple to perform with a reliable test kit. You will need to test about once a week and make proper adjustments until alkalinity is in the proper range. Then, test only once every month or so to be sure it is being maintained. See your local pool dealer for help in properly balancing the water chemistry.

SPRING AND FALL OPERATION

If the pool is being used occasionally, do not turn the heater completely off. Set the thermostat down to 65° F. This will keep the pool and the surrounding ground warm enough to bring the pool up to a comfortable swimming temperature in a shorter period of time.

WINTER OPERATION

⚠ CAUTION

- Operating this heater continuously at water temperatures below 68° F. will cause harmful condensation and will damage the heater and void the warranty.
- If the heater has been drained for freezing condition, do NOT turn "ON" until the system is circulating water.
- Water trapped in the heat exchanger can result in freeze damage to the exchanger or headers. Freeze damage is specifically not covered by the warranty.

If the pool won't be used for a month or more, turn the heater off at the main gas valve. For areas where there is no danger of water freezing, water should circulate through the heater all year long, even though you are not heating your swimming pool. **The MiniMax NT should not be operated outdoors at temperatures below 0° F. for propane and -20° F. for natural gas.** Where freezing is possible, it is necessary to drain the water from the heater. This may be done by opening the drain valve, located at the inlet/outlet header, (see [Figure 29.](#)), allowing all water to drain out of the heater. It would be a good practice to use compressed air to blow the water out of the heat exchanger. (*See additional notes under Important Notices in Introduction.*)

