

Basic

Troubleshooting Information and Guidelines

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**Troubleshooting Information and Guidelines**  
May 2017

**PRIOR TO CONTACTING CLIMATEMASTER TECHNICAL SUPPORT, FOLLOW THESE GUIDELINES TO TROUBLESHOOT NON-OPERATIONAL EQUIPMENT.**

**⚠ WARNING! ⚠**

**WARNING!** To avoid possible injury or death due to electrical shock, open the power supply disconnect switch and secure it in an open position during installation.

**⚠ WARNING! ⚠**

**WARNING!** To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state, and federal proficiency requirements.

**⚠ CAUTION! ⚠**

**CAUTION!** To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters will quickly become clogged with construction dirt and debris, which may cause system damage.

**⚠ WARNING! ⚠**

**WARNING!** The installation of water-source heat pumps and all associated components, parts, and accessories which make up the installation shall be in accordance with the regulations of ALL authorities having jurisdiction and MUST conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.

**⚠ WARNING! ⚠**

**WARNING!** The EarthPure® Application and Service Manual should be read and understood before attempting to service refrigerant circuits with HFC-410A.

**Unit install manuals must be obtained from:**  
[www.climatemaster.com](http://www.climatemaster.com)

**DO NOT INSTALL REFRIGERATION GAUGES TO PERFORM THIS ANALYSIS**

# Do not reset the power to the unit until you have retrieved the fault code.....

## 1. Retriving Error Codes. (fault codes)

### a. CXM digital heat pump controller

**Test Mode** - Test Mode allows the service personnel to check the operation of the control in a timely manner. By momentarily shorting the test terminals which is located near the dip switches on the board, the CXM control enters a 20 minute Test Mode period in which all time delays are sped up 15 times. Upon entering Test Mode, the Status LED will flash a code representing the last fault. Count the number of flashes between the ten second pause and compare to fault code chart below.

If CXM is in restart mode (slow flash), test pins may require additional shorting until fast flash (lockout) occurs. When fast flash occurs short pins once to obtain fault code.

*EX: LED flashing and alarm relay cycling 6 times every ten seconds in Test Mode.  
See chart below.*

**Test Mode – CO Fault in Memory. (Condensate fault - check drain pan and trap for restriction).**

Description of Operation	LED	Alarm Relay
Normal Mode	On	Open
Normal Mode w/UPS warning	On	Cycle (Closed 5 sec. Open 25 sec.)
CXM is non-Functional	Off	Open
Fault Retry	Slow flash	Open
Lockout	Fast flash	Closed
Over/Under Voltage Shutdown	Slow flash	Open (Closed after 15 Minutes)
Test Mode - No Fault in Memory	Flashing Code 1	Cycling Code 1
Test Mode - HP Fault in Memory	Flashing Code 2	Cycling Code 2
Test Mode - LP Fault in Memory	Flashing Code 3	Cycling Code 3
Test Mode - FP1 Fault in Memory	Flashing Code 4	Cycling Code 4
Test Mode - FP2 Fault in Memory	Flashing Code 5	Cycling Code 5
Test Mode - CO Fault in Memory	Flashing Code 6	Cycling Code 6
Test Mode - Over/Under Shutdown in Memory	Flashing Code 7	Cycling Code 7
Test Mode - UPS in Memory	Flashing Code 8	Cycling Code 8
Test Mode - Swapped Thermistor	Flashing Code 9	Cycling Code 9

### **▲ CAUTION! ▲**

**CAUTION!** Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

## b . DXM digital heat pump controller

**Test Mode** - Test Mode allows the service personnel to check the operation of the control in a timely manner. By momentarily shorting the test terminals on the board, the DXM Control enters a 20 minute Test Mode period in which all time delays are sped up 15 times. During Test Mode, the Amber test LED will turn on. Unlike the CXM board above Test Mode is not required to retrieve the last fault. The DXM board automatically flashes fault or status codes. Count the number of flashes on fault (red) or status (green) LED's between the pause and compare to fault code chart below. Red fault LED codes are same as CXM above.

EX: Green status LED 3 times every ten seconds.

ESD (Emergency shut down). This is normally connected to Fire alarm input, check for dry contact closure from input at ESD terminal and C.

Description of Operation	Status LED (Green)	Status LED (Green)	Status LED (Green)	Alarm Relay
Normal Mode	On	-	Off	
Normal Mode with UPS	On	-	Flashing Code 8	Cycle (Closed 5 seconds, open 25 seconds)
DXM is non-functional	Off	Off	Off	Open
Fault Retry	Slow Flash	-	Flashing Fault Code	Closed
Lockout	Fast Flash	-	Flashing Fault Code	-
Test Mode	-	On	-	-
Night Setback	Flashing Code 2	-	-	-
ESD	Flashing Code 3	-	-	-
Invalid T-stat Inputs	Flashing Code 4	-	-	-
HP Fault	Slow Flash	-	Flashing Code 2	Open
LP Fault	Slow Flash	-	Flashing Code 3	Open
FP1 Fault	Slow Flash	-	Flashing Code 4	Open
FP2 Fault	Slow Flash	-	Flashing Code 5	Open
CO Fault	Slow Flash	-	Flashing Code 6	Open
Over/Under Voltage	Slow Flash	-	Flashing Code 7	Open (Closed after 15 min)

### ⚠ CAUTION! ⚠

**CAUTION!** Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

### c . DXM2 digital heat pump controller

**Test Mode** - Test Mode allows the service personnel to check the operation of the control in a timely manner. By momentarily pressing the test button on the board, the DXM2 Control enters a 20 minute Test Mode period in which all time delays are sped up 15 times. During Test Mode, the status LED will be fast flashing or display ECM airflow. See chart below.

Use below chart same as CXM and DXM above.

DXM2 CONTROLLER FAULT CODES			
DXM2 Fault and Status Operation with Test Mode Not Active	Fault LED Red	Status LED Green	Alarm Relay
DXM2 is Non-functional	Off	Off	Open
Normal Operation- No Active Communications	On	On	Open
Normal Operation- With Active Communications	Very slow flash	On	Open
Control is currently in Fault Retry Mode	Slow Flash	-----	Open
Control is currently locked out	Fast Flash	-----	Closed
Control is currently in an over/under voltage condition	Slow Flash	-----	Open (Closed after 15 min)
Hot water mode active	-----	Slow Flash	Open
(NSB) Night Setback Condition Recognized.	-----	Flashing Code 2	-----
(ESD) Emergency Shutdown Condition Recognized	-----	Flashing Code 3	-----
Invalid thermostat input combination	-----	Flashing Code 4	-----
High hot water temp. lockout active	-----	Flashing Code 5	-----
Hot water mode sensor fault active	-----	Flashing Code 6	-----
DXM2 Fault and Status Operation with Test Mode Active	Fault LED Red	Status LED Green	Alarm Relay
No fault since power up in memory	Flashing Code 1	-----	Cycling Code 1
High pressure fault in memory	Flashing Code 2	-----	Cycling Code 2
Low pressure fault in memory	Flashing Code 3	-----	Cycling Code 3
Low temp. protection 1 in fault memory	Flashing Code 4	-----	Cycling Code 4
Low temp. protection 2 in fault memory	Flashing Code 5	-----	Cycling Code 5
Condensate overflow fault in memory	Flashing Code 6	-----	Cycling Code 6
Over/Under voltage shutdown in memory	Flashing Code 7	-----	Cycling Code 7
UPS warning in memory	Flashing Code 8	-----	Cycling Code 8
UPT fault in memory	Flashing Code 9	-----	Cycling Code 9
ECM air flow fault in memory	Flashing Code 10	-----	Cycling Code 10
Test mode active with no ECM connected or operating	-----	Fast Flash	-----
Test mode active with ECM operating	-----	Flashing ECM Airflow	-----
<ul style="list-style-type: none"> <li>- Fast Flash = 2 Flashes every 1 second.</li> <li>- Slow Flash = 1 Flash every 2 second.</li> <li>- Very Slow Flash = 1 Flash every 5 second.</li> <li>- Numeric Codes = On pulse 1/3 second: Off pulse 1/3 second followed by a 10 second delay.</li> <li>- ECM Airflow = 1 flash per 100 CFM: On pulse 1/3 second: Off pulse 1/3 second followed by a 10 second delay.</li> <li>- Alarm Relay Open = Alarm signal off: Alarm relay closed = Alarm signal on:</li> </ul>			

**▲ CAUTION! ▲**

**CAUTION!** Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

## ⚠ CAUTION! ⚠

**CAUTION!** Verify that ALL water control valves are open and allow water flow prior to engaging the compressor. Freezing of the coax or water lines can permanently damage the heat pump.

## ⚠ CAUTION! ⚠

**CAUTION!** To avoid equipment damage, DO NOT leave system filled in a building without heat during the winter unless antifreeze is added to the water loop. Heat exchangers never fully drain by themselves and will freeze unless winterized with antifreeze.

## 2. Water Flow Diagnostic: HE and HR analysis

To be able to determine if the water side of the system is performing within unit Installation and operation manual parameters, perform Heat of Extraction (Heating) and Heat of Rejection (Cooling) calculations. The following data will be required to perform this analysis. Refer to HE and HR data tables in the IOM and troubleshooting form for the formula.

- a. Delta T (Entering and leaving water temperature difference)
- b. Delta P (Entering and leaving water pressure difference)
- c. GPM ( Water flow in Gallons per Minute)
- d. Antifreeze protection %

***(Do not install Refrigeration gauges to perform this analysis)***

## 3. Mechanical Diagnostic

Verify that the mechanical components are operational and functioning as designed.

### a. Compressor Operation

- Check and correct any lockout condition present. (Check fault code)
- If compressor is operational, Verify that the voltage and amperage drawn is within designed parameters. Generally within 10% of the data plate rating.
- If the compressor is non-operational, Check compressor for open or shorted out windings, both internally and externally.
- Verify contactor is engaged and contacts are in good condition.
- Check wiring for burnt or loose connections.
- Check overload and capacitor if applicable.
- Check correct rotation if three phase compressor is applied.

### b. Blower Operation

- Check and correct any lockout condition present. (Check fault code)
- If blower motor is operational, Verify that the voltage and amperage drawn is within designed parameters. Generally within 10% of the data plate rating.
- If the blower motor is non-operational, Check motor for open or shorted out windings, both internally and externally.
- Verify blower contactor or blower relay is engaged and contacts are in good condition.
- Check wiring for burnt or loose connections.
- Check capacitor and correct capacitor wiring if applicable.
- Check correct rotation if three phase motor is applied.

### c. Valve and Pump Operation

- Check and correct any lockout condition present. (Check fault code)
- If pump or valve motor is operational, Verify that the voltage and amperage drawn is within designed parameters. Generally within 10% of the data plate rating.
- If the pump or valve motor is non-operational, Check motor for open or shorted out windings, both internally and externally.
- Check wiring for burnt or loose connections.
- Check end switch on the valve actuator for correct operation.

### d. Reversing valve Operation

- Check wiring at the reversing valve solenoid.
- Perform a "Touch Test" to determine if the RV is functional.

### e. Thermal Expansion Valve (TXV) Operation

*(Do not install Refrigeration gauges to perform this analysis)*

- Verify that the sensing bulb is placed upstream of Equalizer line. (Between the reversing valve and equalizer line)
- Verify that the bulb is placed at 4 o'clock and 8 o'clock locations on a horizontal run and it is insulated.
- Verify that the capillary tube is in good condition with no cracks or rub-through leaks.

## 4. Electrical Circuit Diagnostic

*(Do not install Refrigeration gauges to perform this analysis)*

**WARNING!** When the disconnect switch is closed, high voltage is present in some areas of the electrical panel. Exercise caution when working with energized equipment. Verify that the ground terminal is connected to the cabinet.

### a. Line Voltage Verification

- Verify the supply line voltage match the data plate information.
- Verify all phase voltage and Neutral from the main panel is present if applicable.
- Verify that all terminals are tight.

### b. Control Voltage Verification

- Check and verify that the correct voltage tap is used on the line (Primary) side of the transformer.
- Check and verify that the 24 volt output is present at the "R" terminal of the control board.

### c. Thermostat Operation

- Verify that the correct thermostat is used and refer to Instructions manual for operation.

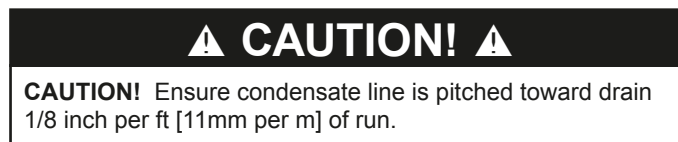
### d. Heat Pump Controller

- Refer to "Error Code" section at the top of this document.
- Refer to complete trouble shooting guide in the unit IOM for in depth analysis.

**e. "No run" and "No fault code" present**

- Open overload. (Compressor or Fan motor)
- Loss of 24v. Call from thermostat.
- Inoperative contactor or blower relay.
- Control wiring. Verify input from thermostat and output from the controller.
- Inoperative control board.

*Tip: check for blocked or restricted condensate lines even if the drain pan is dry and you have CO fault in memory.*



## 5. Airflow Diagnostic

**a. Correct unit configuration and installer settings**

- Verify that the unit configuration is performed before the startup where applicable. (DXM2 controller)

**b. Correct speed tap setting**

- Refer to wiring diagram specific to the unit as attached to the panel.

**c. Clean filters and coils**

- Verify that the correct filters (MERV) are in use and are of the correct size.
- Clean or replace filters if needed.

**d. Damper operation as applicable**

- Verify that the Dampers are operational.
- Fire dampers are open and operational.

**e. Unit and duct sizing**

- Verify that the duct is correctly sized per sizing software. (Manual J and D).
- Verify that the load capacity matches the equipment.

**f. Duct work obstructions**

- Verify that the ductwork is clear of all debris and obstructions including dampers.



## 6. Refrigeration Circuit Diagnostic:

*ClimateMaster does not recommend installing refrigeration gauges to perform this analysis until all of the above has been verified and all other options have been exhausted. Please have the Troubleshooting form completed for both modes of operation prior to calling ClimateMaster Tech Support.*

<b>⚠ WARNING! ⚠</b>
<b>WARNING!</b> When the disconnect switch is closed, high voltage is present in some areas of the electrical panel. Exercise caution when working with energized equipment.
<b>⚠ CAUTION! ⚠</b>
<b>CAUTION!</b> Verify that ALL water control valves are open and allow water flow prior to engaging the compressor. Freezing of the coax or water lines can permanently damage the heat pump.

Complete the **TROUBLESHOOTING FORM** (see links below) including refrigerant pressures to calculate superheat and sub cooling. Compare and verify this data using various operating condition tables provided in the unit IOM. Unit performance is acceptable if found within 10% of the published data.

Follow the troubleshooting flow charts below for assistance. Call ClimateMaster technical support if further assistance is needed. Expect delays if TS form and pertinent basic information is not readily available...

You may be asked to call back with the information and a completed TS form.

### **Packaged Units Water to Air and Split:**

<http://www.climatemaster.com/geothermal-dealer/wp-content/uploads/2014/11/RP929-climate-master-residential-packaged-water-to-air-troubleshooting-form-geothermal-heating-and-cooling-systems-form.xls>

### **Water to Water Units:**

<http://www.climatemaster.com/downloads/RP931-climate-master-residential-water-to-water-heating-and-cooling-troubleshooting-form.pdf>

*Tip: Use Clamp-on type thermocouple or stab-in type probe to measure Temperatures. Infrared thermometer is not recommended for temperature reading.*

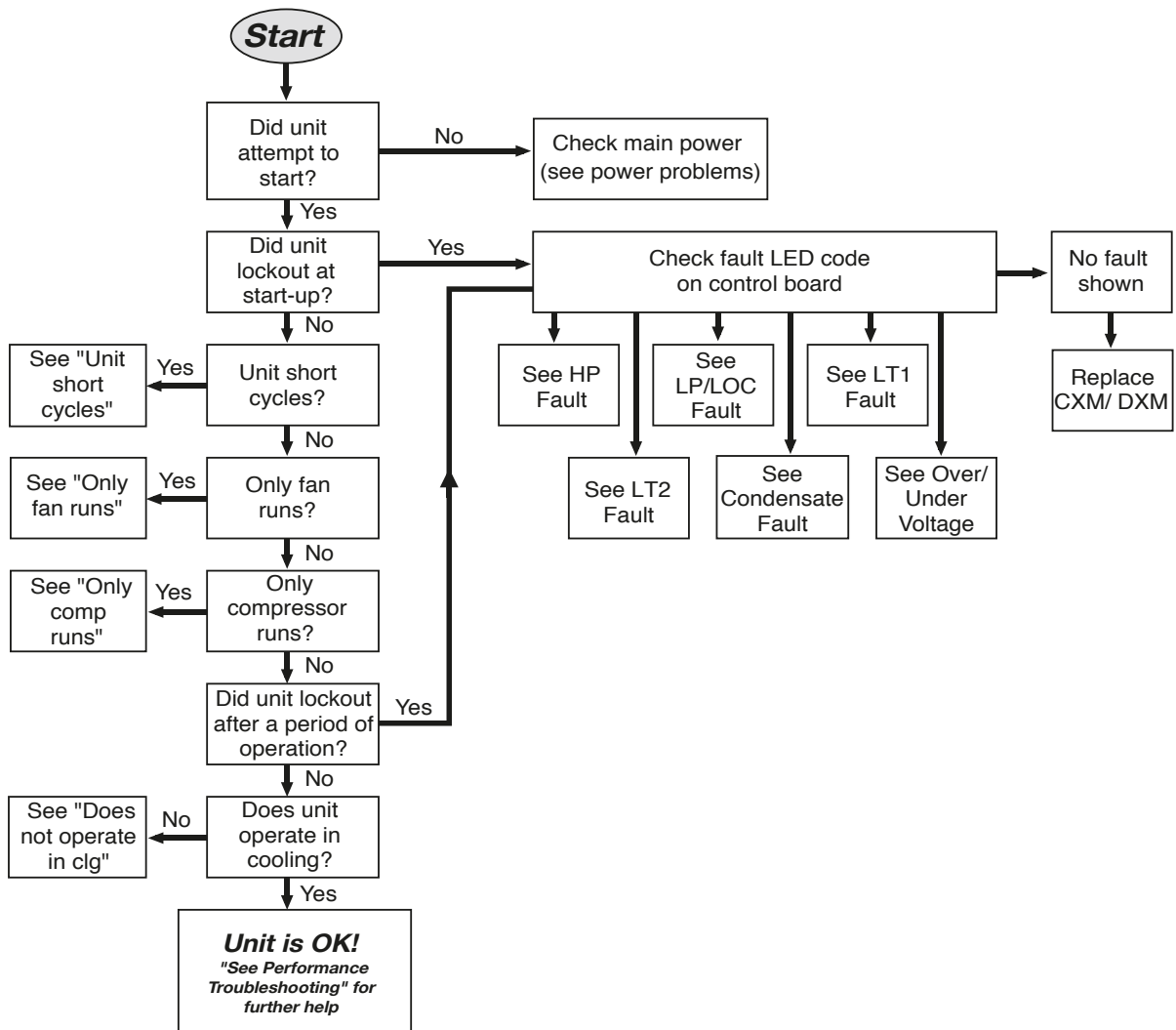
## 7. Troubleshooting flow charts

Use the following flow charts as applicable to the unit controller type in conjunction with the unit installation and operation manual.

### Troubleshooting Chart – CXM board

Use the following troubleshooting flow chart to find appropriate troubleshooting strategies on the Functional Troubleshooting pages of the unit IOM.

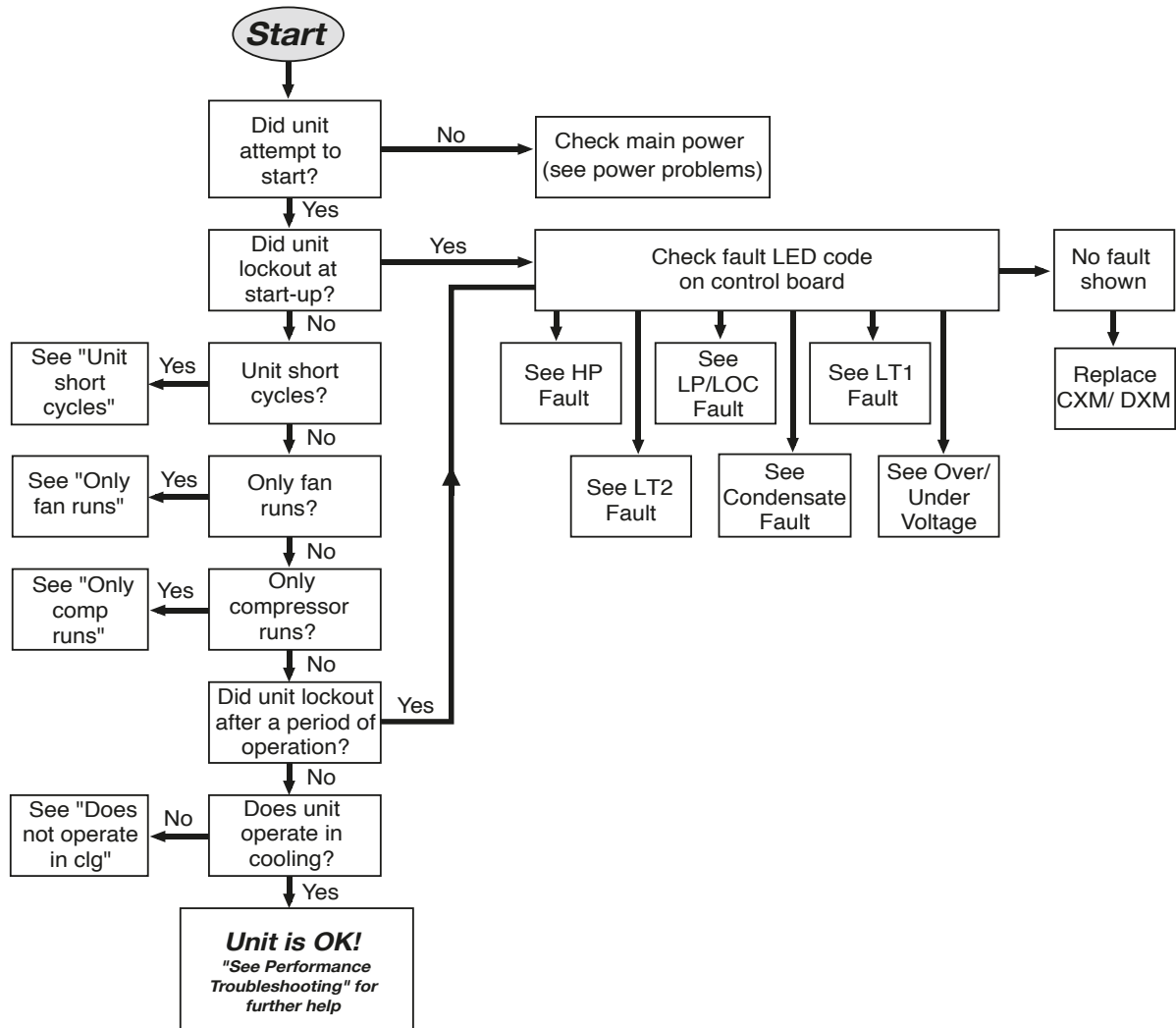
<http://www.climate-master.com/commercial/wp-content/uploads/sites/2/97b0003n12-climate-master-cxm-controls-heat-pump-application-manual.pdf>



## Troubleshooting Chart – DXM board

Use the following troubleshooting flow chart to find appropriate troubleshooting strategies on the Functional Troubleshooting pages of the unit IOM.

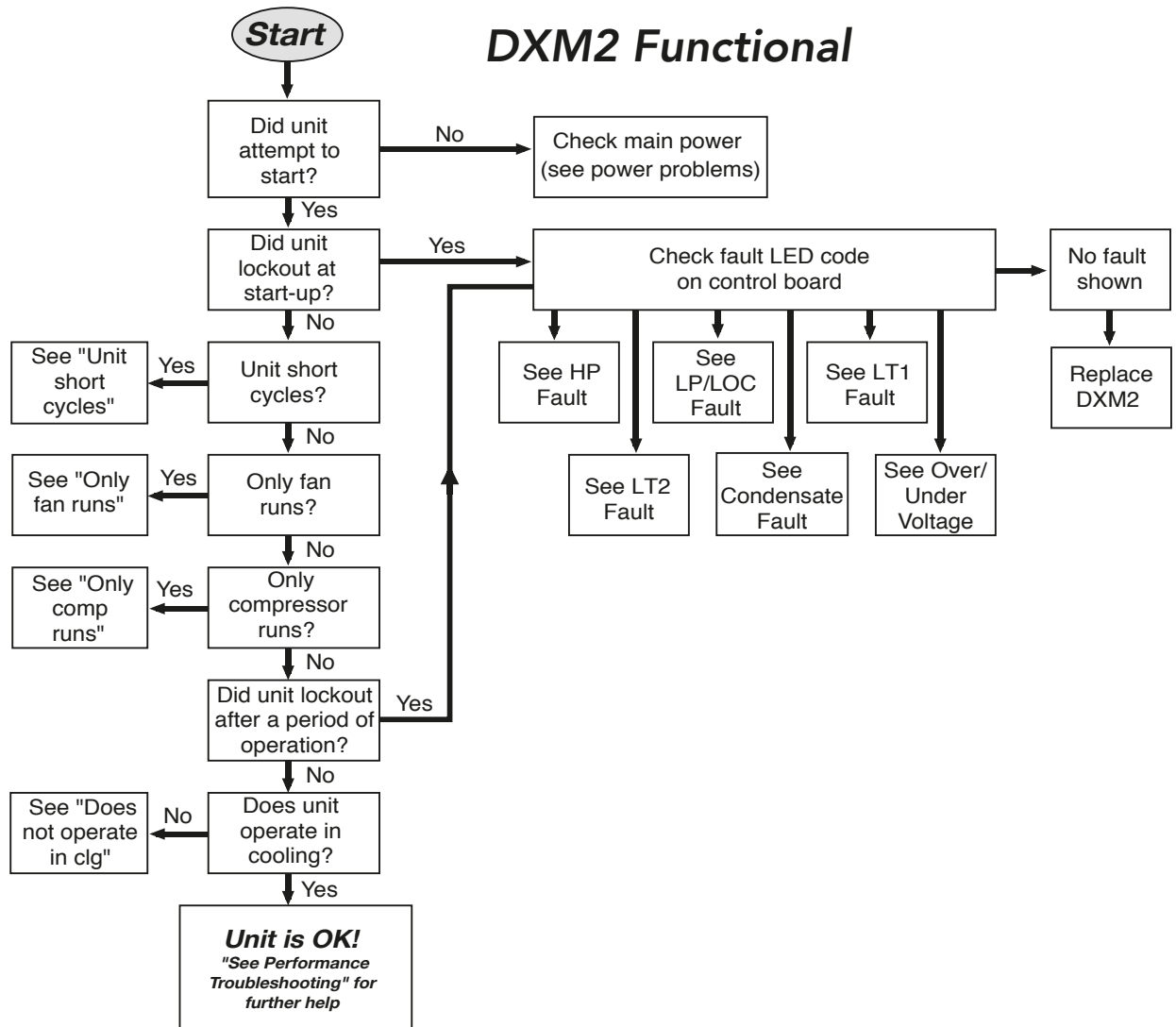
<http://www.climate-master.com/commercial/wp-content/uploads/sites/2/97b0003n13-climate-master-dxm-controls-heat-pump-application-manual.pdf>



## Troubleshooting Chart – DXM2 board

Use the following troubleshooting flow chart to find appropriate troubleshooting strategies on the Functional Troubleshooting pages of the unit IOM.

<http://www.climate-master.com/commercial/wp-content/uploads/sites/2/97b0003n15-climate-master-commercial-dxm2-manual-geothermal-heating-and-cooling-systems-controls-application-maintenance-manual.pdf>







7300 S.W. 44th Street  
Oklahoma City, OK 73179  
Phone: 405-745-6000  
Fax: 405-745-6058  
[climatemaster.com](http://climatemaster.com)

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