ServiceFirst™

Troubleshooting

TOL02057, GE TECMate XL™

PART-SVD01A-EN

Troubleshooting

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- *GE* is a registered trademark of General Electric Corporation.

The GE TECMate XL™ is designed to assist field service technicians by troubleshooting GE ECM™ 2 Series motors independently of the HVAC system. Analysis of field returns show that quite often the GE ECM is misdiagnosed as faulty. This is due in large part to the unavailability of effective troubleshooting tools for the ECM motor. The TECMate is designed to isolate motor failures from other HVAC system controller failures. ECM motors are used in one of two modes: Thermostat Mode and Variable Speed Mode. Thermostat Mode is controlled by a 24 Vac signal usually from a thermostat; Variable Speed Mode is controlled by a Pulse Width Modulating (PWM) signal. In all modes, the Troubleshooter is capable of identifying a motor failure versus other HVAC controller failures.

Troubleshooting Steps

The table below shows expected results for various settings.

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

1. Remove the 16-pin connector from the motor. Connect the 16-pin connector from the Troubleshooter to the motor. *Do not disconnect the 5-pin AC power connector from the motor.* (See Figure 1).
2. Connect the two alligator clips from the troubleshooter to 24 Vac.
3. Place all switches on the troubleshooter in the OFF position.
4. Reconnect ac power to the system. The Power LED light should illuminate when connected properly to 24 Vac.

Troubleshooting

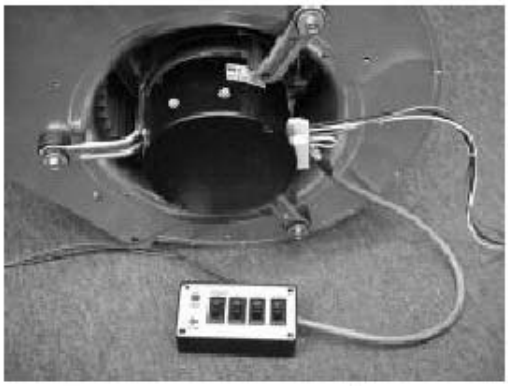
5. Place the correct switches in the ON position and observe the motor for 15 seconds. If the motor starts up, then the motor/control is good. (Refer to Table 1 for switch selections of the various test mode settings.)
6. When finished testing a mode, place all switches in the OFF position and wait for the motor to completely stop before testing the next switch selections. (Based on the OEM program, sometimes the motor will not shut-off immediately after a setting has been tested; this is normal.)
7. If the motor passes these tests, then some other component in the HVAC system is faulty.
8. If after these tests, the motor does not start, then proceed to replace the motor control module.

Note: Before replacing the control module, test to insure the motor module is not damaged, check for mechanical integrity by rotating the shaft by hand. Follow the instructions below to complete these tests.

A. Remove the control module by locating and removing the two standard ¼" bolts from the back of the control. The control module is now free of mechanical attachment to the motor module endshield, but is still connected by a plug and three wires inside the control.

B. Carefully rotate the control to gain access to the plug at the control end of the wires. With thumb and forefinger, reach the latch holding the plug to the control and release it by squeezing the latch tab and the opposite side of the connector plug. Gently pull the plug out of the connector socket in the control. **DO NOT PULL ON THE WIRES. GRIP THE PLUG ONLY.** The control module is now completely detached from the motor.

Figure 1. Troubleshooter testing a system



C. Verify with a standard ohmmeter that the resistance from each connector pin (in the motor plug just removed) to the motor end shield is >100K ohms. (This test determines that motor winding is properly insulated).

D. Rotate the motor shaft to test for rubbing and/or mechanical defect. (Note: A pulsating resistance caused by the rotor aligning with the stator is normal with this motor design.)

Troubleshooting

E. If any motor connector pin fails this test and/or the shaft does not rotate easily, **THEN THE MOTOR AND CONTROL IS DEFECTIVE AND BOTH MUST BE REPLACED. CONTACT YOUR DEALER FOR A REPLACEMENT MOTOR MODULE AND CONTROL MODULE.** If the motor module passes this test, but failed the TECMate tests, **THEN THE CONTROL MODULE NEEDS TO BE REPLACED. CONTACT YOUR AUTHORIZED DEALER FOR A REPLACEMENT CONTROL MODULE.**

Operation	Test Mode	Switch Selection				Expected result of a typical system
		Cont. Fan	Heat	Cool	Bk/PWM	
Tstat	Fan only	On	Off	Off	Off	Motor runs at fan airflow
	Heating	On	On	Off	Off	Motor runs at heating airflow (higher than fan only)
	Cooling	On	Off	On	On	Motor runs at cooling airflow (higher than fan only)
	Dehumidify	On	Off	On	Off	Motor runs at dehumidification airflow (lower than cooling airflow)
VSPD	Variable speed	On	Off	Off	On	Motor runs at 50% airflow

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