Side Winder™

ECM Motor Winding Section Analyzer

“Mini-Manual”

Model SW-5

Contents

Specifications

Maximum Input Voltage 9VDC
Maximum Phase Voltage.....Hand-Spun
Unit Size .....6.5”L. x 4.75”W. x 2.25” H.
Unit Weight .....12 oz.
Warranty .....One Year Limited Warranty

Adapters for new winding section connectors are available; see our website (ZebraInstruments.com) for details.

This manual has information to help you safely use your *SideWinder* tool to test ECM Winding Sections. Please read it completely before using your tool.

Safety Information

• This manual is NOT comprehensive training. Do not use this tool if you are not a trained and experienced HVAC Technician. Additionally, study the training videos located on our website before using this tool or a new adapter.

• ECM Motors and their power supply circuits have voltages that can be lethal. Capacitors inside the Modules retain high voltages ***after the power has been removed;*** heed the motor's cautions and warnings to remain safe, even after the power has been removed.

• Inspect this tool before each use. If any part of the tool (including, but not limited to: the case, wire insulation, connection clips, or wire harness) becomes damaged, loose, broken, or frayed; discontinue use of the tool until repaired or replaced. An accessory case for our companion product (Universal Zebra) designed to protect your tool and its companion adapters, is available from your Distributor, #UZACC.

Using Your *SideWinder*

First, use a voltmeter and other tools (such as *ZebraHVAC's Universal Zebra*) to diagnose the *system.* Don't just assume the *motor* has a problem, because the thermostat calls for fan, and it isn't running. Do you have the proper power (120v or 240v) at the motor's input terminals? Do you have an incoming low-voltage signal commanding the motor to run? Remember, ECM motors always have main power connected to the motor, it's the low voltage signal, on one or more command lines, that starts/stops the motor, and determines its speed.

Next, disconnect any plugs and wires from the motor. Don't remove the module yet. Spin the shaft by hand, feeling for any unusual resistance. You are feeling for something that might feel like a "tight bearing", but with strong "pulses". Experience will help you feel the normal, slight "pulses" in the shaft rotation, or notice much more resistance than usual. That strong resistance would indicate a shorter path than usual in the windings section. But wait - a problem in the module could cause that as well, (like shorted output transistors) so you need to *remove the module* and *disconnect the module/winding connector.* Now, try the "spin test" again. If the resistance went away, or decreased dramatically, then the problem is in the module, not the windings.

However, if there was no unusual resistance at all, proceed by connecting the *SideWinder's* harness (including an adapter, if necessary) to the winding section. Connect the ground clip to the motor frame.

(continued)

Spin the motor's shaft. Spin briskly, but only by hand. The three phase LED's should all glow, and with about the same brightness, until the shaft slows down. The relative brightness will vary; the 3/4 and 1 HP models will be the brightest, the 1/3 and 1/2 HP models will be somewhat dimmer. Uneven brightness *between* LEDs or not all three LED's being lit indicate a winding problem; replace it.

If everything works well to this point, do a final test. First, press the Battery Check position on the switch. The Red LED should light. If not, replace the battery. Now, press the Short Test position on the switch. NO LED should light. If any LED does light, it is an indication that there is a short between that winding phase and the frame of the motor, creating a dangerous condition. (No spinning in this test.)

If none of the tests on these two pages indicate a winding section problem, you now have a clear conclusion: if the motor does not operate, but the winding section checks out fine, then the problem *must* be in the module section.

When a *winding* problem is discovered, most unit manufacturers recommend replacing the entire motor; modules can be adversely affected when windings fail. The reverse is not usually true: If a module fails, it usually does not affect the winding section, making for an easier and less costly repair.

Training Videos & Adapters

Our website (ZebraInstruments.com) has short tutorial videos for the *SideWinder* tool and each adapter and accessory.

Since the number of available adapters is expected to increase in the future, we encourage you to use our website regularly to get information about new accessories and adapters for the *SideWinder* system.

At the time of printing, the standard plug on the *SideWinder's* harness fits about 85% of all ECM motors, including most made by GE, Genteq, Evergreen, and Regal-Beloit.

Two other adapters are now available to fit Emerson's ECM's (ZSWAE) and Broad Oceans ECM's (ZSWAB).

Check our website frequently for new additions:

ZebraInstruments.com

Avoiding Problems & Help

Remember that this tool is designed to help you determine *which* portion of an ECM Motor is having problems. It is important to *first* determine if the motor (or some other component) is at fault. Specific tools, some made by ***Zebra Instruments***, are available to isolate those system problems. Once a problem is confirmed to be in the motor, this tool should be used to further isolate which specific section of the motor - the *module* or the *winding section* - is causing the fault. Many unit manufacturers indicate that a very high percentage of ECM motors returned to them have either “No Problem Found” or the only problem found is in the less expensive module section. Like the introduction of emission control systems on cars and trucks, ECM’s and other devices are a part of our future HVAC systems. As Technicians, we have to understand and use the best available diagnostic tools to make correct decisions about these systems. ***Zebra Instruments*** has been at the fore-front of helpful, diagnostic tools to assist you in your career. Please let us know about issues and suggestions to make your profession the most respectable in the

One-Year Limited Warranty

For a period of one year from the original end-user's date of purchase, Zebra Instruments warrants that this tool is without manufacturing defects. Should you encounter any problems, please contact us and we will attempt to resolve your problem as quickly as possible. This resolution may include replacement, exchange, or repair of a defective tool; at our option. This warranty does not apply to tools that have been exposed to: voltages and/or currents that are higher than those specified in this manual; abuse or rough handling; any damage to connectors, harnesses, or adapters; or damage from moisture or chemicals. Out-of-warrant repairs are available for nominal charge plus shipping. Please contact us for an RMA (return merchandise authorization) before returning a tool for repair.

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