

IND Test Mode vs. Z-Fi Test Mode For AT7™ Series and AT5 Instruments

Motor Circuit Analysis (MCA™) uses three unique tests IND, Dynamic (DYN), and Z-Fi to test both the winding insulation and insulation resistance to ground. Dissipation Factor (DF), Capacitance (C) to ground, and insulation resistance to ground (INS) are used for testing the ground wall insulation. Capacitance is the capability of a body, system, circuit, or device to store an electric charge. DF is the ratio between the resistive power loss and the reactive power loss of the insulation material. This is used to detect contaminated or overheated windings. The primary reason for the INS test is safety. INS is performed by applying a high DC voltage between deenergized current-carrying conductors (windings) and the machine casing or Earth.

The IND Test Mode is used to test AC three-phase squirrel cage induction motors with rated voltage of less than 1000V. This test mode performs the Static and optional DYN tests on the winding insulation and insulation resistance to ground. Use the IND test during routine condition-based maintenance (CBM) on equipment that has a previously stored Test Value Static (TVS) Reference. TVS reference values are a quick and easy way to determine if the motor condition is changing. The DYN test can determine both rotor and stator condition if the motor is decoupled from the driven load.

The Z-Fi Test Mode is used on all types of AC motors (of any voltage), generators, and transformers. The low voltage tests automatically perform all the Static tests: DF/C, INS, impedance, induction, phase angle, current frequency response (I/F), and calculates a TVS. The Z-Fi test mode must be used on all medium or high voltage equipment (greater than 1,000V) and should be used on installed equipment with no TVS Reference. The reason the Z-Fi test is used on motors with no prior TVS is because you want to determine the current health of the motor. Once you generate a TVS value you can begin to trend the data. In the Z-Fi test mode you do not perform a DYN (dynamic stator & rotor test) because the load or drive is attached to the motor and the test is not practical.

Can you perform a DYN test in the Z-Fi mode?

A DYN test is not offered in the Z-Fi test mode. Think of it as a baseline to find out what the condition of the motor is without a reference test. This equipment is usually already installed without having the ability to rotate the motor shaft i.e. connected to gear box, submersible, or a pump.

