

# Rating VFDs to AHRI Standard 1210/1211

## METHOD OF TEST

AHRI Standard 1210 (I-P)/1211 (SI), *Performance Rating of Variable Frequency Drives*, defines a method of test to provide valuable information on the performance of variable frequency drive (VFD)-motor combinations under various conditions. Typically, the test is utilized by end-users and VFD specifiers. It is not a pass/fail test.

## Benefits

AHRI Standard 1210/1211 allows users to rate and compare VFDs along three standard rating conditions:

- **Efficiency measurement of motor-drive combinations at various speeds and loads.** These loads and speeds emulate both variable torque (fans and pumps) and constant torque (compressor) loads.
- **Drive-generated harmonics at full load and speed**, which is the operating point that generates worst-case impacts on electrical power distribution systems.
- **Peak voltage and rise time** of that voltage seen at the motor terminals, with various lengths of wire between the motor and drive.

The data provided under those conditions provides guidance to:

- **Estimate overall system efficiencies.** The standard provides data for motor-drive

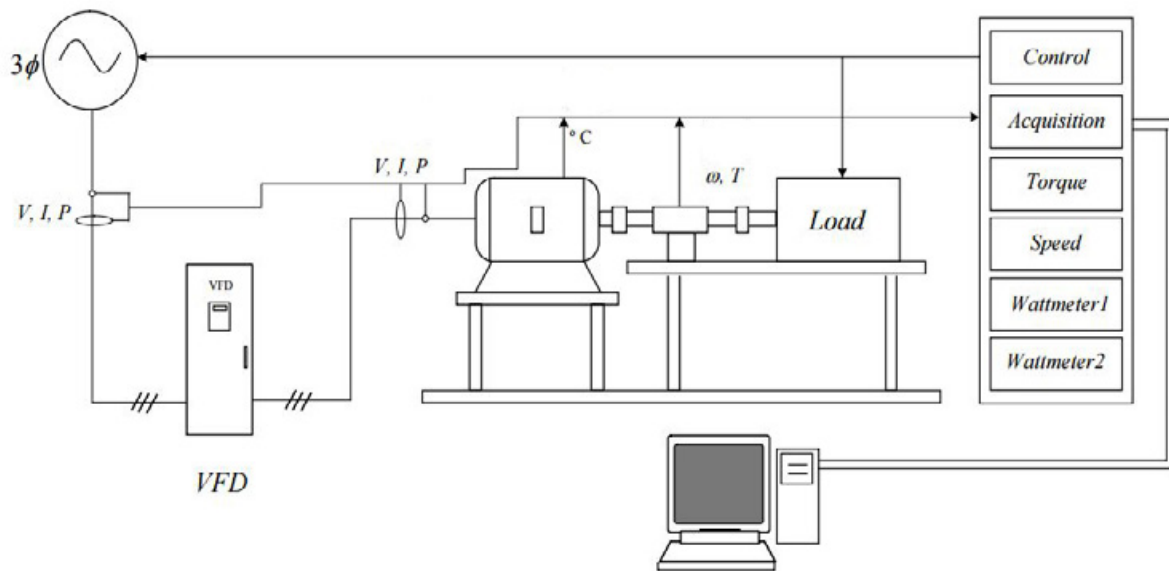
combinations, meaning users will be required to input equipment efficiencies to determine overall “system” efficiencies, which may be required to meet governing body standards.

- **Determine the need for harmonic mitigation where the effects of a VFD could impact building power systems.** IEEE-519 provides guidelines for acceptable harmonic distortion levels for entire building power systems. Data rated in accordance to AHRI Standard 1210/1211 may be used to model the VFD to determine the impact on a building’s power distribution system.
- **Determine the need for either output filtering on the VFD or for motors with more robust insulations systems.** These changes may be required to handle the peak voltages generated by those VFDs (also known as inverter duty motors). NEMA MG1 can be used as guidance for determining acceptable levels of voltage peak and rise time for specific motors.

continued ►

# Testing

The diagram below illustrates the test set-up for drive system efficiency and power line harmonics test methods. For more information, see Appendix C, Figure C1 of the standard.



## Scope

This standard applies to VFDs used in the control of asynchronous induction motors. The range includes all those found within a building, including low voltage ( $\leq 600$  V) and stand-alone drives, rather than only those that are mechanically integrated into motors.

The standard does not address all VFD voltages and sizes, nor does it address use with all motor types. It is limited to:

### Voltage Classes

- 200 Volt motor to 240 Volt motor
- 440 Volt motor to 480 Volt motor
- 550 Volt motor to 600 Volt motor

### Voltage Sizes

- 1 Horsepower
- 2 Horsepower
- 3 Horsepower
- 5 Horsepower
- 7.5 Horsepower
- 10 Horsepower
- 15 Horsepower
- 20 Horsepower
- 25 Horsepower
- 30 Horsepower
- 40 Horsepower
- 50 Horsepower
- 60 Horsepower
- 75 Horsepower

To download the standard, visit [www.ahrinet.org/search-standards](http://www.ahrinet.org/search-standards).

For more information about AHRI's VFD certification program, visit [www.ahrinet.org/VFD](http://www.ahrinet.org/VFD).

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