



▶ Capabilities | Motors + Drives

Consulting | Training | Testing | Research

The versatility of our power, load and monitoring equipment enable us to provide customized testing of motors, drives and other electrical equipment. Combined, we offer more than 100 years of engineering experience and have performed detailed tests on more than 2,000 motors in our lab.

“Having this type of resource available to us has been incredibly valuable.”

— Ivan Spronk, AC Drive product line manager for Schneider Electric

Our motor systems engineers work with our customers to design test plans targeted at identifying desired characteristics at a high level of accuracy. As a result, we have provided solutions to many complex motor and drive issues for the public, private and governmental sectors, including motor manufacturers, motor distributors, original equipment manufacturers [OEMs], the U.S. Department of Energy and the U.S. Navy.

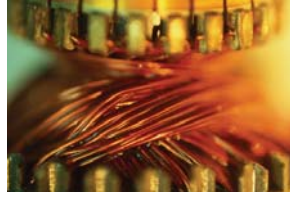
▶ Power Systems

- ▶ Two alternating current [AC] power systems with independent phase voltage control
 - Single or three phase closed loop voltage control
 - 0-700V; 490A max continuous, 2000A max short intervals
 - Clean power [in-line isolation transformer]
 - Controlled injection of harmonics at various frequencies
 - Point-on-wave control of power interruptions — both location on waveform and duration controlled
 - AC variable frequency PWM drives: 1-500Hp, 230/460V
- ▶ Direct current (DC) power system with voltage control
 - 0-500V; 510A max continuous, 770A max short intervals [max 200kW]

- In-line battery pack and generator provides clean continuous power [no ripple]
- DC Drives: Four-quadrant 125Hp, armature 265-530V at 205A, field 216-432V at 10A

▶ High speed data acquisition and control

- ▶ Simultaneous acquisition of voltage, current, power, torque, speed, temperature and other device outputs
 - 32 single ended [16 differential] analog input channels with 16 bit resolution [$\pm 0.0015\%$ of full scale] at a max of 1MHz scan rate
 - Four analog output channels with 16 bit resolution at 1.25MHz
- ▶ Capture of waveforms distorted by power semiconductor devices and other short duration transients
 - Additional simultaneous acquisition on 12 channels of voltage [max 2kV] and / or current [max 500A, 0-150kHz] with true 12 bit resolution [± 0.024 percent of full scale] at up to 1MHz scan rate
- ▶ Central data acquisition and control
 - All measurements coordinated by centralized data acquisition and control system permitting real-time simultaneous readings from all metering sources
 - Acquisition for high-speed recording initiated by either



Advanced Energy Motors + Drives Capabilities, continued

an external trigger or a threshold based on any measured parameter

- Available I / O channels permit control of any device under test and/or test apparatus for coordinated initiation and acquisition of transient phenomenon
- Real-time data processing facilitates adjustments to the test plan during the test
- Custom LabView programming

► Precision electrical measurements

- True RMS AC or DC voltage [0-700V] and AC current [0-500A] on individual phases to $\pm 0.25\%$ of full scale, 0-150 kHz
- True RMS 1- or 3-phase power [0.003kW- 300kW] for three or four wire delta or wye configurations at $\pm 0.2\%$ of full scale
- DC current measurement [0-1200A] at $\pm 0.3\%$ of full scale

► Dynamometer capacity

- Dynamometer configurations
 - Constant torque, high load inertia: 1200Nm [800lb-ft], 0-1800RPM, 300Hp max
 - Variable torque, low load inertia: 1320Nm [880lb-ft], 0-8000RPM, 250Hp max [up to 9000RPM at 125Hp max]
 - 0-6000 RPM, 350Hp
 - Small motor capability down to $\frac{1}{4}$ Hp
 - Sub-fractional Hp
- Shaft power measurement
 - 0.5-1320Nm [0.4-880lb-ft] torque for 0-8000RPM at $\pm 0.2\%$ of full scale

- 0.5-560Nm [0.4-410lb-ft] torque up to 9000RPM
- Speed measurement 0-15000RPM at ± 0.1 RPM

► Other testing capabilities

- Vibration testing [NEMA frames 42 thru 449 per NEMA MG1-2006 [Part 7]
- Sound testing
 - $\frac{1}{4}$ -300Hp per IEEE85-1973 [Test procedure for airborne sound measurements on rotating electrical machinery]
- Reliability testing
 - $\frac{1}{4}$ -7.5Hp with auxiliary air cooling for higher cycling rate and quicker results
 - Methods include:
 - Start-stop cycling
 - DC injection braking for single phase system endurance
 - Plug reverse testing for three phase motors
 - Bearing load durability testing
 - Elevated ambient for thermal aging
 - Motor and drive thermal mapping
 - Comparison testing for vendor evaluations

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