

Lunch & Learn

Medium Voltage Variable Frequency Drives & Motors



An informal information session for engineers focusing on the real world applications and fundamentals of medium voltage variable frequency drives and motors in the Mining Industry.

metals

cranes

mining

testing

oil & gas

solar inverters

utilities

cement

Variable Frequency Drives & MV Motors

Lunch
& Learn

Variable Frequency Drive (VFD) Applications

- 1-A. VFD Applications Overview** 35 min.
Overall factors in the design of a successful adjustable speed drive system. Load considerations and design requirements for constant and variable torque applications.
- 1-B. Specifying Variable Frequency Drives** 30 min.
Considerations for specifying Adjustable Speed Drives. How to avoid adding unnecessary costs or missing important requirements.
- 1-C. Designing VFDs for Reliability & Maintainability** 40 min.
Trends for the voltage source inverter (VSI) applied to very large scale drive equipment. How practices and principles adopted during component selection, design, testing and VFD manufacturing increase reliability. Example field experiences for maintaining the VFD will be presented.
- 1-D. VFDs vs. Mech. Fluid Couplings Comparison** 40 min.
Complete analysis for both technologies covering efficiency, installation, operation, maintenance, spare parts and life cycle cost of the entire system.
- 1-E. VFD Cooling Systems** 30 min.
Evaluation of water-cooled vs. air-cooled VFDs. Discussion of issues that can arise due to leaks, materials used, water incompatibility, etc. Application stories from past installations will be presented.

Case Studies in Real World Applications

- 2-A. Experience** 15 min.
Discussion about projects, applications and industries TMEIC has supplied, engineered, commissioned & supported, and field installations of Variable Frequency Drives.
- 2-B. Drive Application Stories** 20 min.
The best way to learn about Adjustable Speed Drives is to see how they have been applied in practice. These short modules give examples. Any number of case studies can be added to a Lunch & Learn session.

VFD Considerations

- 3-A. Savings Calculations for VFDs** 15 min.
Defining energy savings & other financial benefits associated with an adjustable speed drive.
- 3-B. Effects of VFDs on Power Systems** 30 min.
Overall impact of an Adjustable Speed Drive to the power system's harmonics, power factor and energy demand.
- 3-C. Process Control & VFD Control Interfaces** 10 min.
Presentation on how drives can improve process controls in various industries and VFD control interfaces available.

Power Systems

- 4-A. MV Switchgear** 40 min.
Overview of the types of electrical switchgear available and how it is commonly applied
- 4-B. MV Substations** 30 min.
Substation design and practices
- 4-C. MV Motor Starters and Control** 30 min.
Overview of the methods available for starting medium voltage motors.
- 4-D. Protective Relays** 45 min.
A discussion of the goals and protection principles of electrical feeders, bus, transformers and motors. Importance of protective zones, coordination and relay settings.
- 4-E. Transformers and Reactors** 40 min.
Fundamentals of transformers and how to pick the correct transformer for VFD applications for drive input and output.

Medium Voltage Motors

- 5-A. MV Induction Motors** 35 min.
Fundamentals of induction motors. Discussion of the design considerations that go into various applications. Brief introduction to global motor standards.
- 5-B. MV Synchronous Motors** 35 min.
Fundamentals of Synchronous Motors. Discussion of the design considerations that go into various applications. Brief introduction to global motor standards.

Fundamentals

- 6-A. Fundamentals of Adjustable Speed Drives** 45 min.
Fundamentals of Adjustable Speed Drives, basic motor and AC drive theory to give an engineer the understanding of how the motor speed and torque are controlled by adjustable speed drives.
- 6-B. System Diagrams & Basics** 10 min.
Discussion of the fundamental electrical circuits and symbols used in variable speed drive system one-line diagrams and the basis for drive topologies.
- 6-C. Power System Basics** 40 min.
Theory behind power systems studies, short circuit calculations and protection, electrical faults, arc flash and circuit coordination.

TMEiC
We drive industry