

EMC Awareness for Industrial Automation

With the increased use of variable frequency drives (VFD) and other switching devices, the overall Electro-magnetic interference (EMI) in plants has been increasing. This increase has caused many electro-magnetic compatibility (EMC) issues in both Automation system and in particular the communication systems that join automation components together.

This one-day course aims to raise awareness of the issues, the theory behind them, and how to ensure that the design and installation of Industrial Automation systems can reduce the likelihood of Electro-Magnetic Compatibility (EMC) related issues in the future.

Upon completion of this course, the student shall be able to:

- Understand how VFD basically work and the issues around them
- Know how a basic grounding system works
- Know the proper installation methods to mitigate against EMC issues
- Understand how to use the basic tools to test for EMC issues

Course outline

- Fundamentals
 - Impedance – Resistance / Inductance / Capacitance
 - Frequency / Wavelength
 - Resonance
 - Differential Mode v Common Mode currents
 - Methods of coupling
- Low voltage distribution systems
 - TN-C, TN-S, and others
 - EMC considerations
- Equipotential bonding techniques
 - Bonding straps v wires
 - Parallel earth conductors – wire / cable tray / conduit / armoured cable
 - CBN / MESH-BN
 - Pragmatic improvements for existing bonding systems
- EMC testing and equipment
 - Oscilloscopes
 - Spectrum analyzers
 - Clamps and probes
- Cable segregation and shielding
 - Cable segregation
 - Shielding theory
 - Shield connection techniques
 - EMC glands
- Enclosure (panel) design considerations
 - Panel layout (zoning)
 - Internal bonding
 - Use and purpose of a reference plane
 - Potential issues associated with apertures
 - CE compliance of panels and devices inside them
- Variable speed drives
 - Basis of operation
 - Supply cabling / filtering / harmonics / shielding / bearing protection / cable rating
 - Motor cabling / emissions / shielding
 - Common problems
- Installation and operation qualification
 - What to check and how to check it
 - IQ / OQ documentation

Class Day Information

- Attendees must bring a laptop or tablet which can read a USB drive.
- Attendees will receive a support USB drive with an electronic version of the materials plus key PI documents.
- Students will receive a certificate of attendance and 7.5 verifiable professional development hours



Course duration

This course requires 7.5 hours of instruction which includes two 15 minute breaks and one 30 minute lunch break.

Scheduled Classes

- Please check our website for scheduled classes or contact us to arrange a training date.
- On-site or online classes are available upon request

Course code and Prerequisites

- Course code: T-EMC-02
- There are no prerequisites for this course.

Instructor

James Powell, P.Eng., is the principal engineer and owner of JCOM Automation Inc. He has written many articles and two books: *HART Communication Protocol – a practical guide*, and *Catching the process fieldbus – An introduction to PROFIBUS and PROFINET*. James is a certified PROFIBUS DP, PA, and PROFINET network engineer, PROFIBUS System Design Engineer and has over 20 years of experience with PROFIBUS, PROFINET, EtherNet/IP, Modbus, and HART installations.

JCOM Automation is a member of PROFIBUS PROFINET North America and is a certified PROFIBUS and PROFINET training center and Competence Center.

To book this course for yourself or your team, please contact JCOM Automation at admin@jcomautomation.ca or +1-705-868-8745.