



# POWER UP WITH THE INDUSTRY EXPERTS



**Service Training Courses**

**STAMFORD | AvK™**

POWERING TOMORROW, TOGETHER

# CONTENTS

---

About Us	4
Basics of AC Generators	6
Fundamentals of AC Generators	7
Bearings I	8
Bearings II	9
Sleeve Bearings	10
AVR Adjustments	11
STAMFORD Analogue AVR	12
AVR Paralleling	13
Basler I	14
Basler II	15
ABB Unitrol AVR	16
PFC3 Power Factor Controller	17
Excitation Boost System	18
Grid Code Compliance (Europe)	19

---

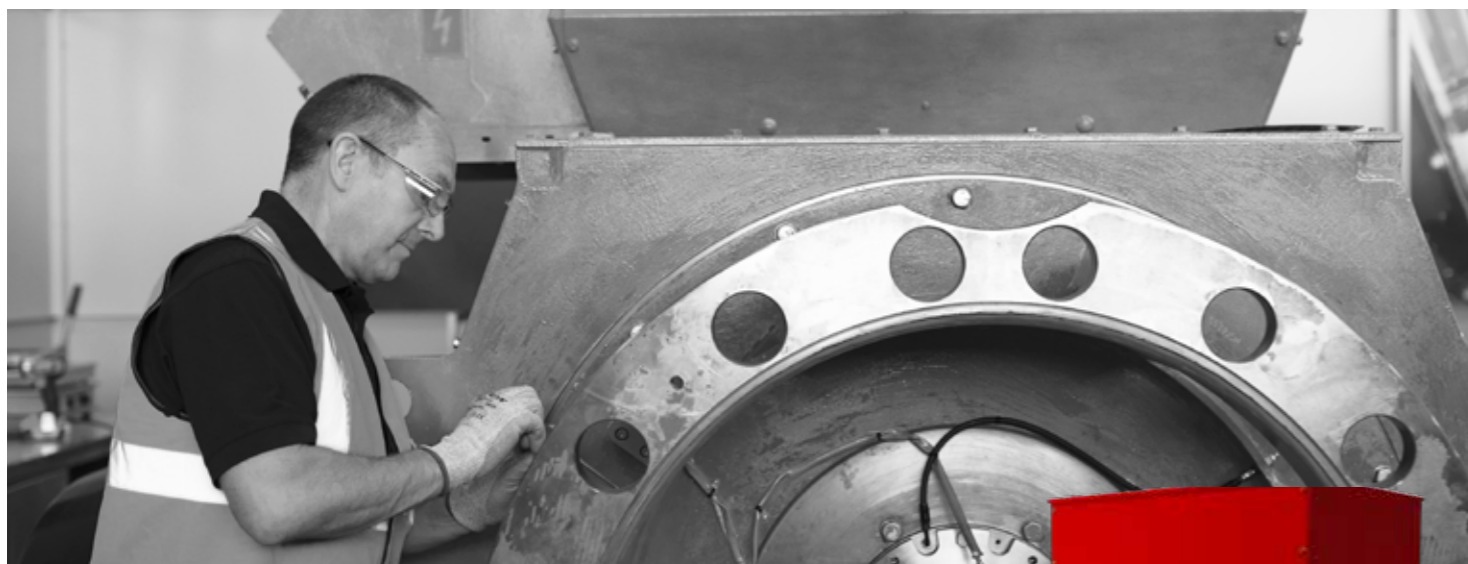
**POWER UP WITH INDUSTRY EXPERTS, WORLD CLASS LEADING FACILITIES AND THE VITAL KNOWLEDGE TO EXCEL.**



High quality, interactive and theory based training is essential for proven competent and qualified working support and effective cost control. To help meet these demands, the the training team have curated the perfect suite of courses to introduce, refresh, develop or expand your existing knowledge of both STAMFORD and AvK genuine products.

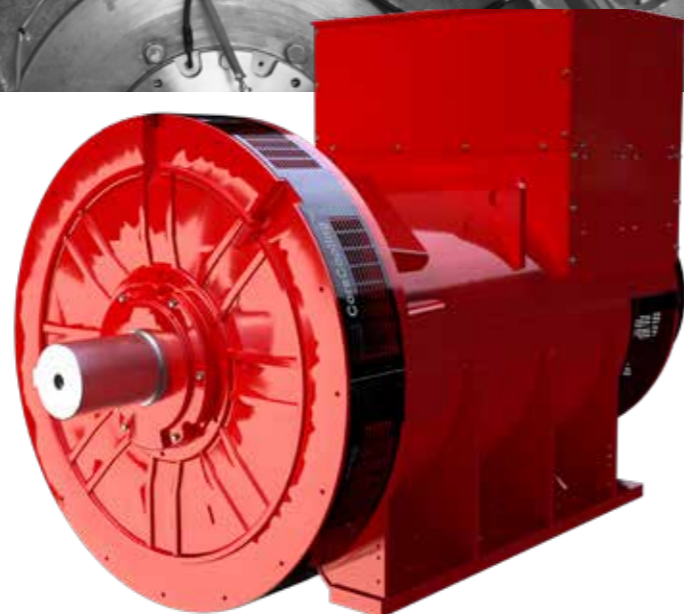
Whether a dealer technician, service manager or sales personnel, stay up-to-date with the very latest alternator and gen-set innovations, developments and implementation. From classroom based qualifications, to customer specific courses delivered at our dedicated Training Centres or at your location.

# ALWAYS INNOVATING



Whether it's accessing application variables – for individual alternators or complete generating sets, simulating environments, stress analysis, upgrades, or accelerating integration, you can trust our leading industry experts to analyse, validate, train, educate, investigate, solve, facilitate and inspire.

Generating opportunities to transform performance, eradicating risk and enhance product life delivery. Spanning the basics to the inordinately complex and everything in between.



For over a century, our experience and knowledge gathered from a large and diverse number of applications of synchronous generator installations help our customers operate with greater efficiency, making it possible for them to compete more successfully throughout the world.

To best support our customers, **STAMFORD | AvK** strives to develop and maintain the highest level of service capability possible. Continuous education, available through cutting-edge instruction, helps to make this possible..

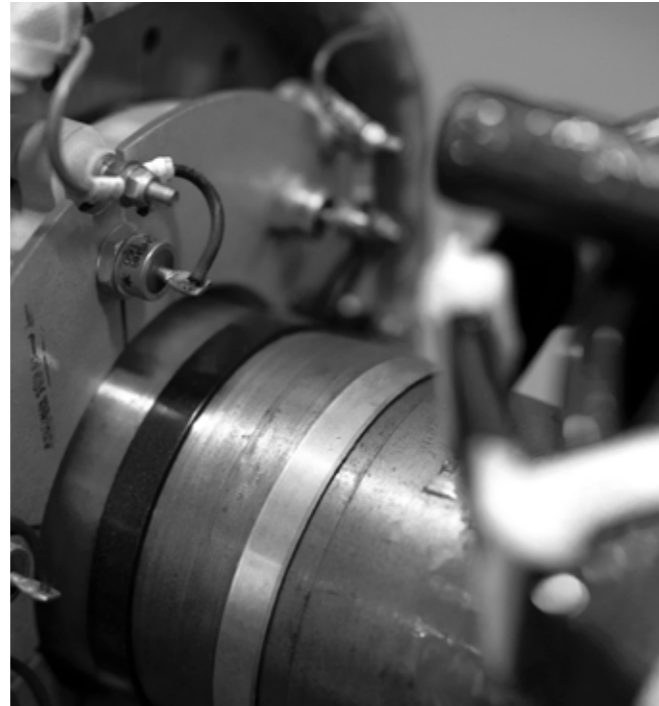


# BASICS OF AC GENERATORS

## COURSE DESCRIPTION

This course is intended for service technicians seeking certification for the STAMFORD I AvK brand family of AC Generators. Completion of this course satisfies one of the pre-requisites for attending Fundamentals of alternators classroom training.

Participants who successfully complete this training will have a basic understanding and knowledge of the construction and operation of alternators.

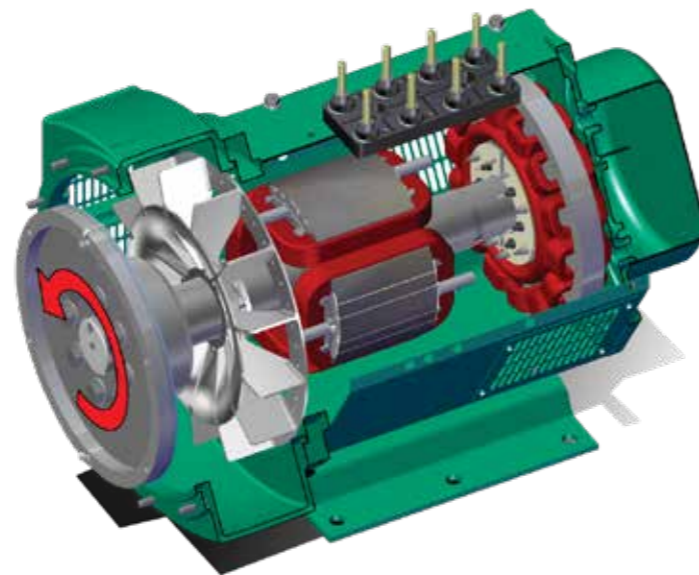


**Timing & Delivery**  
4 hours  
Online or Classroom

**Pre-requisite Knowledge**  
None

**Products Covered**  
Basic AC Generator Theory

- Topics**
- Background and Overview
  - Generator Construction
  - Component Features
  - Operation and Excitation
  - Generator Output



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# FUNDAMENTALS OF AC GENERATORS

## COURSE DESCRIPTION

The Fundamentals of AC Generators training course is a comprehensive introduction to the inner workings of alternators manufactured by STAMFORD I AvK. The course material expands on basic AC electricity and magnetism theory to provide a complete understanding of alternator operation. Topics include alternator design and build, theory of operation, excitation processes, troubleshooting, and components testing.



**Timing & Delivery**  
3 Days  
Classroom

**Pre-requisite Knowledge**  
Basics of AC Generators

**Products Covered**  
STAMFORD and AvK;  
All Frames Basic Theory

- Topics**
- Generator Overview
  - Generator Build
  - Main Alternator – Rotor and Stator
  - Excitation Systems
  - AVR Systems
  - Wiring and Reconnections
  - Accessory Components
  - Operation
  - 5-Step Troubleshooting Approach
  - Troubleshooting Exercises
  - Bearings



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# BEARINGS I

## COURSE DESCRIPTION

STAMFORD product ranges from HC6 to P80 and AvK ranges from DSG 62-125 and DIG 110-156 are offered with differing bearing types. The Bearings I course covers antifriction bearing theory, regreasing procedures and bearing maintenance. It also covers a basic understanding of fault analysis and service procedures focusing on bearing removal and installation. Ball bearing and roller bearing types are covered, excluding special configurations for DIG 142 machines which are covered in Bearings II.



### Timing & Delivery

3 days  
Classroom



### Pre-requisite Knowledge

Basics of AC Generators  
Fundamentals of AC Generators



### Products Covered

HC6 to P80, S6, S7, S9, DSG62-125 and DIG 110-156



### Topics

- Identification and Operation
- Regreaseable Bearing Maintenance
- Bearing Removal
- Bearing Failures
- Troubleshooting
- Bearing Installation



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# BEARINGS II

## COURSE DESCRIPTION

AvK model DIG 142 machines are manufactured with a clamped ball and roller bearing design. The Bearings II course covers the justification for a clamped bearing arrangement, maintenance procedures focusing on regreasing procedures, and service procedures focusing on bearing removal and installation. The unique bearing arrangement and specialised tools used for installation make this an advanced course for experienced technicians.



### Timing & Delivery

4 Days  
Classroom



### Pre-requisite Knowledge

Basics of AC Generators  
Fundamentals of Alternators  
Bearings I



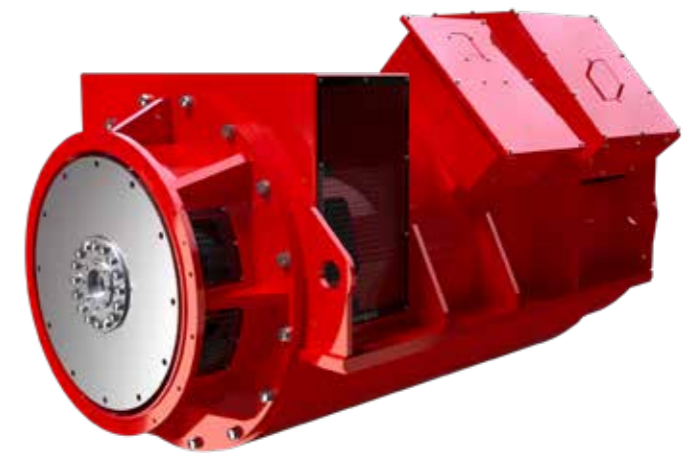
### Products Covered

AvK DIG 142



### Topics

- Identification and Operation
- Regreaseable Bearing Maintenance
- Bearing Removal
- Bearing Installation
- Bearing Failures and Troubleshooting



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# SLEEVE BEARINGS

## COURSE DESCRIPTION

This course provides theory of operation of sleeve bearings along with maintenance, troubleshooting, servicing procedures and techniques to provide the participant adequate knowledge to service sleeve bearings used on machines manufactured by STAMFORD I AvK. Course instruction includes inspection, cleaning and sealing techniques along with complete disassembly and assembly of a sleeve bearing.



**Timing & Delivery**  
3 days  
Classroom

**Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators

**Products Covered**  
DSG and DIG Generators

- Topics**
- Theory of Operation
  - Troubleshooting
  - Lubrication Systems
  - Assembly
  - Disassembly
  - Maintenance
  - Construction



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# AVR ADJUSTMENTS

## COURSE DESCRIPTION

This course is intended to be a pre-requisite for service technicians seeking certification on any STAMFORD, Basler, or ABB Unitrol Automatic Voltage Regulator courses. AVR Adjustments course will cover the theory of analog AVR's, their adjustments and trim settings, and effects of adjustments. All AVR certificated courses will build upon this course.

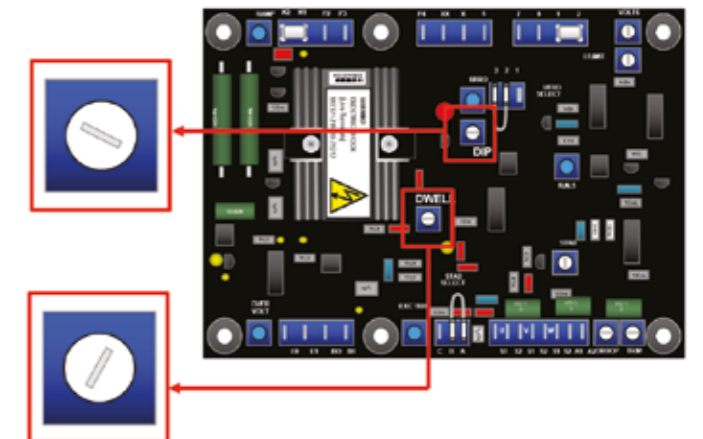


**Timing & Delivery**  
2-4 hours  
Online or Classroom

**Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators

**Products Covered**  
All principle voltage regulator settings.

- Topics**
- Theory of Operation
  - Adjustments
  - Overview of Types and Models
  - Installation and Set-up
  - Troubleshooting
  - Troubleshooting Exercises

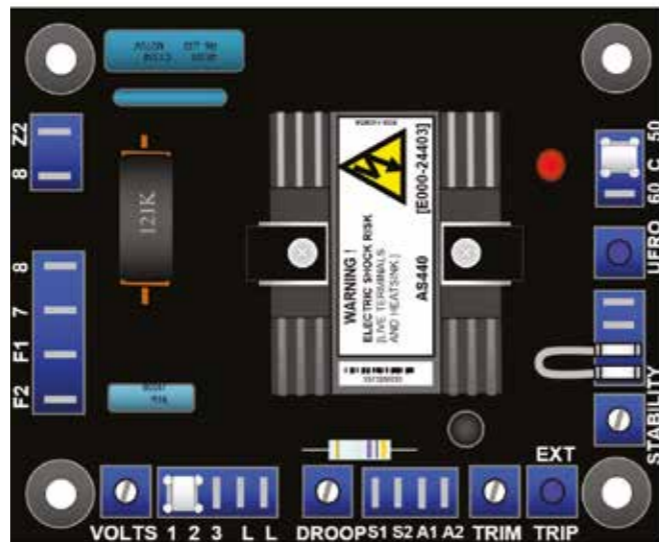


For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# STAMFORD ANALOGUE AVR

## COURSE DESCRIPTION

This course provides technical and practical understanding of the STAMFORD family of analog AVR models. The course material identifies the various connecting terminals and adjustment potentiometers, then provides hands-on experience with connecting and tuning the AVR.



### Timing & Delivery

2 days  
Classroom



### Pre-requisite Knowledge

Basics of AC Generators  
Fundamentals of AC Generators  
AVR Adjustments



### Products Covered

MX321™, AS440, AS480, SX421,  
MX341, MA330, MVR, MX322™, AS540



### Topics

- Theory of Operation
- Adjustments
- Overview of Types and Models
- Installation and Set-up
- Troubleshooting
- Troubleshooting Exercises

For registration information on this course, please contact our Service Training department at:  
[stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# AVR PARALLELING

## COURSE DESCRIPTION

This course trains paralleling theory at the most fundamental level. The course material expands on a prior knowledge of AC electrical and alternator excitation theory. Course topics include synchronization, the droop circuit, power factor, power sharing, and reactive load sharing. Demonstrations of synchronisation, setting of a droop circuit, and live paralleling using STAMFORD AVR's are included.



### Timing & Delivery

2 days  
Classroom course at limited global venues  
Course to be placed online in the future



### Pre-requisite Knowledge

Basics of AC Generators  
Fundamentals of AC Generators  
AVR Adjustments



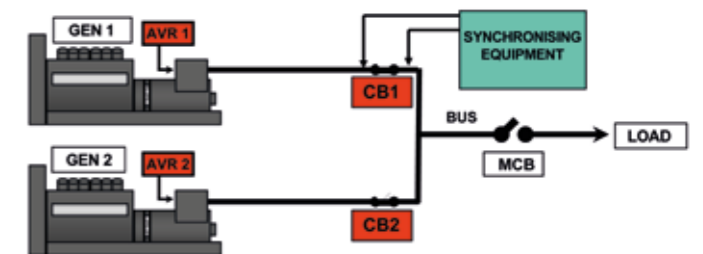
### Products Covered

Paralleling Theory



### Topics

- Parallel Operation
- Synchronization of Alternators
- Load Sharing
- Droop
- Reverse Power
- Parallel Operation with Utility
- Troubleshooting







For registration information on this course, please contact our Service Training department at:  
[stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# BASLER I AVR

## COURSE DESCRIPTION

This course provides a fundamental understanding of the Basler DECS 100 and 200 digital AVR models as well as covering the STAMFORD DM110 digital AVR. The course material provides exposure to the digital interface software for AVR Set-up and monitoring in addition to hands-on practice with connecting and troubleshooting these digital AVR models. (Note: Please view the Basler I content for newer Basler AVR models).



-  **Timing & Delivery**  
3 days  
Classroom
-  **Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators  
AVR Adjustments
-  **Products Covered**  
DECS 100, 200 and DM110
-  **Topics**
  - Theory of Operation
  - Adjustments
  - Overview of Types and Models
  - Installation and Set-up
  - Troubleshooting
  - Troubleshooting Exercises





For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# BASLER II AVR

## COURSE DESCRIPTION

This course provides a fundamental understanding of the New Basler DECS 150 and 250 digital AVR models. The course material provides exposure to the new digital interface software for AVR Set-up and monitoring in addition to hands-on practice with connecting and troubleshooting these digital AVR models. (Note:- Please view the Basler I content for the earlier Basler AVR models).



-  **Timing & Delivery**  
3 days  
Classroom
-  **Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators  
AVR Adjustments
-  **Products Covered**  
DECS 150, 250
-  **Topics**
  - Theory of Operation
  - Adjustments
  - Overview of Types and Models
  - Installation and Set-up
  - Troubleshooting
  - Troubleshooting Exercises

For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)







# ABB UNITROL AVR

## COURSE DESCRIPTION

This course provides technical understanding of the ABB Unitrol 1010 and 1020 digital AVR models. The course material provides exposure to the digital interface software for AVR Set-up and monitoring in addition to hands-on practice with connecting and troubleshooting these digital AVR models.



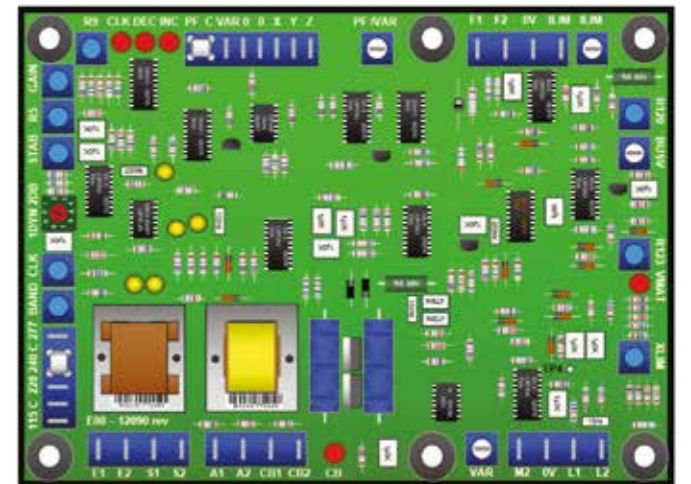
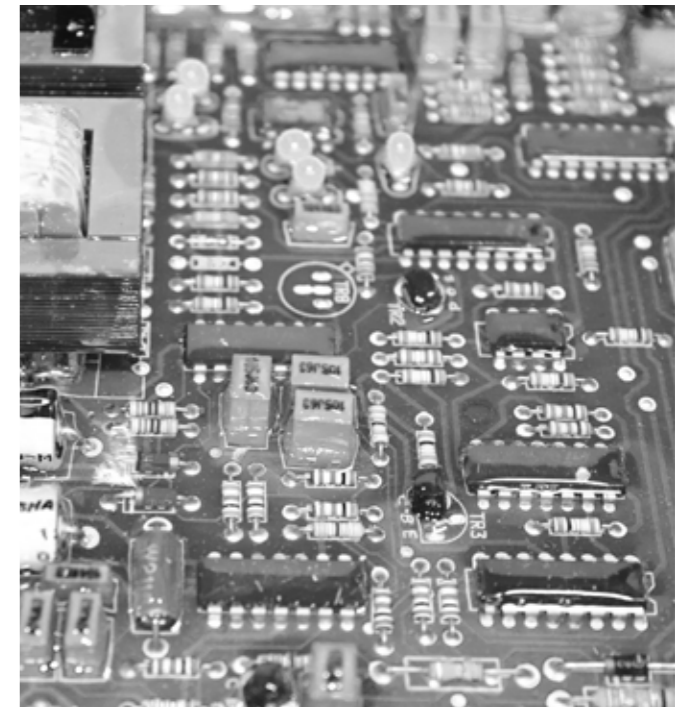
- 
**Timing & Delivery**  
 3 days  
 Classroom
- 
**Pre-requisite Knowledge**  
 Basics of AC Generators  
 Fundamentals of AC Generators  
 AVR Adjustments
- 
**Products Covered**  
 ABB Unitrol 1010 and 1020
- 
**Topics**
  - Theory of Operation
  - Adjustments
  - Overview of Types and Models
  - Installation and Set-up
  - Troubleshooting
  - Troubleshooting Exercises





For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# PFC3 POWER FACTOR CONTROLLER

## COURSE DESCRIPTION

This course covers the purpose of using a power factor controller, followed by the layout, function, and interconnection of the STAMFORD PFC3 with other support equipment. Topics include operating theory, PFC3 connections, interaction with the AVR, remote control interface, voltage matching, and excitation loss module.



- 
**Timing & Delivery**  
 2-4 hours  
 Online or Classroom
- 
**Pre-requisite Knowledge**  
 Basics of AC Generators  
 Fundamentals of AC Generators  
 AVR Adjustments  
 Paralleling
- 
**Products Covered**  
 DECS 100, 200 and DM110
- 
**Topics**
  - Background and Configurations
  - Protection Systems
  - Basic Systems
  - PFC3 Features





For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

# EXCITATION BOOST SYSTEM

## COURSE DESCRIPTION

This course is a familiarisation training course meant to give the participant a clear understanding of how the Excitation Boost System works and how to troubleshoot it. This course is designed for service technicians seeking certification on the P0/P1 range of STAMFORD AC Generators.



-  **Timing & Delivery**  
1 hour  
Online or Classroom
-  **Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators
-  **Products Covered**  
**STAMFORD P0/P1**
-  **Topics**
  - Background and Theory
  - Troubleshooting





For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

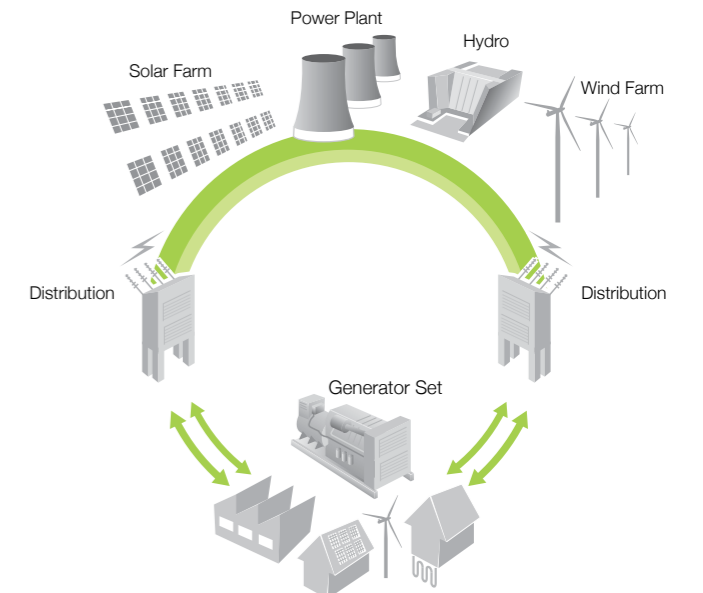
# GRID CODE COMPLIANCE (EUROPE)

## COURSE DESCRIPTION

This course will offer an awareness of Grid Code Compliance and give participants a greater knowledge of how alternators produced specifically for grid applications differ from the standard equipment.



-  **Timing & Delivery**  
1-2 hours  
Online or Classroom
-  **Pre-requisite Knowledge**  
Basics of AC Generators  
Fundamentals of AC Generators
-  **Products Covered**  
**STAMFORD and AvK**  
All Frames
-  **Topics**
  - Introduction
  - Grid Code
  - Product Changes



For registration information on this course, please contact our Service Training department at: [stamford-avkservicetraining@cummins.com](mailto:stamford-avkservicetraining@cummins.com)

[stamford-avk@cummins.com](mailto:stamford-avk@cummins.com)

[www.stamford-avk.com](http://www.stamford-avk.com)



Copyright 2022, Cummins Generator Technologies Ltd. All rights reserved.  
Cummins and the Cummins logo are registered trade marks of Cummins Inc.  
STAMFORD and AvK are registered trademarks of Cummins Generator Technologies Ltd.

Part No. PG\_STC\_S\_EN\_AF Rev. 4

**STAMFORD | AvK** <sup>TM</sup>

POWERING TOMORROW, TOGETHER