



Powell Training Academy

POWERED BY EXPERTISE



Powered by Safety®

Commitment to Improve

Our commitment to continually improve our technical expertise, our product designs, and our processes is the basis for our drive to perform. It is our catalyst for growth and we are proud of our past and confident in who we are. Our past performance is the sound foundation upon which we build our future.

These are our most popular training courses. If you are looking for a course tailored to your needs, please let us know as we would be happy to develop one.

Need more information?

Email: psdtraining@powellind.com

Phone: 1 800 480 7273

TABLE OF CONTENTS

EL101 Electrical Equipment Basics	6
EL102 Electrical Safety & Arc Flash Awareness	7
SWGR102 Low Voltage Switchgear and Circuit Breaker	8
SWGR202 Medium Voltage Switchgear	9
SWGR203 Power/Vac® Switchgear and Circuit Breaker	10
Essential Series: Combo 1 & Combo 2	11
MCC102 Low Voltage Motor Control Center	12
MCC202 Medium Voltage Motor Control Center	13
HRG102 Resistance Grounding Fundamentals	14
RELAY101 Protection Relay Basics	15
CB102 Medium Voltage Circuit Breaker	16
CB202 Direct Current Circuit Breakers	17
SWGR401 Direct Current Switchgear and Circuit Breakers	18
RCT401 Rectifiers and Rectifier Transformers	19
Custom Courses	20
Additional Information	21

OUR LOCATIONS





EL101 Electrical Equipment Basics

Industrial electrical equipment basics covering industry history, equipment component basics and theory of operation.

**COURSE DURATION:
1 DAY (8 HOURS)**

WHO SHOULD ATTEND?

Non-electrical or electrical personnel new to the industry who wish to gain a basic understanding of the history, theory and equipment used in today's market.

COURSE OBJECTIVES (CLASSROOM)

- Electrical History
- AC versus DC
- Motors
- Generators
- General Electrical Transmission and Distribution
- Transformers
- Switchgear
- Protection Relays
- Grounding

HANDS-ON APPLICATION

This course has no hands on applications

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- 10 question review exam (optional)

EL102 Electrical Safety & Arc Flash Awareness

NFPA70E Electrical Safety and Arc Flash Awareness in the work place.

**COURSE DURATION:
1 DAY (8 HOURS)**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel working in, on or around electrical equipment, who wish to gain an understanding of the dangers associated with arc faults and flashes as well as how to reduce potential risks.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basics of electrical equipment safety and how to achieve an electrically safe condition in compliance with NFPA70E
- Discuss electrical boundaries and approach distances as they pertain to NFPA70E
- Examine the causes, properties and results of arc faults and flashes
- Discuss worker safety procedures

HANDS-ON APPLICATION

- Walk through of Basic Lock Out Tag Out Procedures
- On-site discussion regarding approach boundaries and use of proper PPE.

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



SWGR102 Low Voltage Switchgear and Circuit Breaker

Low voltage switchgear and circuit breaker operation, control schemes, ratings, testing and general preventative maintenance.

COURSE DURATION:
½ DAY (4 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding on Powell's low voltage switchgear design and operation.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic construction and design properties of Powell's low voltage switchgear
- Examine individual switchgear components, their locations and function
- Discuss circuit breaker components
- Discuss operational procedures

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- Insertion and removal demonstrations and exercises using manual and remote electrical as well as associated auxiliary equipment
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

SWGR202 Medium Voltage Switchgear

PowlVac® 5kV to 38kV switchgear operation, control schemes, ratings, testing and preventative maintenance.

COURSE DURATION:
1 DAY (8 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding on Powell's medium voltage switchgear design and operation.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic construction and design properties of Powell's medium voltage switchgear
- Examine individual switchgear components, their locations and function
- Discuss circuit breaker components
- Discuss operational procedures

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- Insertion and removal demonstrations and exercises using manual and remote electrical as well as associated auxiliary equipment
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



SWGR203 Power/Vac® Switchgear and Circuit Breaker

Power/Vac® 5kV to 15kV switchgear and ML-17 circuit breaker operation, control schemes, ratings, testing and general preventative maintenance

**COURSE DURATION:
1 DAY (8 HOURS)**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of Power/Vac® switchgear and ML-17 internals and requirements as well as learn the diagnostic techniques to accurately identify mechanical and electrical problems when they occur

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic construction and design properties of Power/Vac® switchgear
- Examine individual switchgear components, their locations and function
- Discuss ML-17 circuit breaker componentry and internal circuit design
- Discuss operational procedures

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- Insertion and removal demonstrations and exercises using manual and remote electrical as well as associated auxiliary equipment
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

Essential Series: Combo 1 & Combo 2

Our Essential Series are offered as standard course at our facility, you can take either Combo1 or Combo 2, or both.

**COURSE DURATION:
Combo 1: 2 DAYS (16 HOURS)
Combo 2: 1 DAY (8 HOURS)**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of Switchgear & Motor Control Center requirements as well as learn the diagnostic techniques to accurately identify mechanical and electrical problems when they occur

COMBO 1

This course combines the following two courses:

- SWGR202 Medium Voltage Switchgear
- CB102 Medium Voltage Circuit Breaker

COMBO 2

This course combines the following two courses:

- SWGR102 Low Voltage Switchgear
- MCC202 Medium Voltage Motor Control Center

Please review the course details in this catalog for a full understanding of the course objectives, hands-on application and the learning tools.



MCC102 Low Voltage Motor Control Center

Low voltage motor control center and contactor operation, control schemes, ratings, testing and general preventative maintenance.

COURSE DURATION:
½ DAY (4 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding on low voltage motor control center design and operation.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic construction and design properties of low voltage motor control centers
- Examine individual equipment components, their locations and function
- Discuss operational procedures

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- Demonstrations/Exercises on LV MCC operation with contactor insertion and removal
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

MCC202 Medium Voltage Motor Control Center

Medium voltage motor control center and contactor operation, control schemes, ratings, testing and general preventative maintenance.

COURSE DURATION:
½ DAY (4 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding on medium voltage motor control center design and operation.

COURSE OBJECTIVES (CLASSROOM)

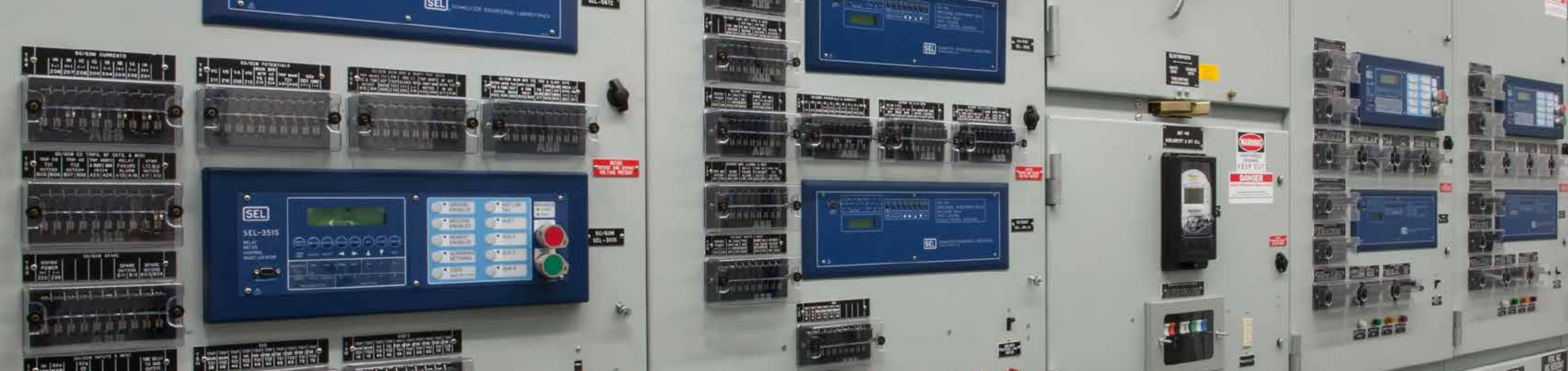
- Discuss the basic construction and design properties of medium voltage motor control centers
- Examine individual equipment components, their locations and function
- Discuss operational procedures

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- Demonstrations/Exercises on MV MCC operation with contactor insertion and removal
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



HRG102 Resistance Grounding Fundamentals

Basic theory and operation of Powell Ground-Gard® and Ground Protect Plus control equipment.

COURSE DURATION:
½ DAY (4 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of resistance grounding purpose, design and applications.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic needs of equipment grounding with regards to safety
- Examine the basic theory behind high resistance grounding
- Discuss LRG/HRG equipment types and componentry
- Review basic equipment setup and operation
- Discuss basic ground fault location techniques

HANDS-ON APPLICATION

- Demonstration of equipment controls and procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

RELAY101 Protection Relay Basics

Basic theory as well as application and operation of microprocessor based protection relays

COURSE DURATION:
Standard - ½ DAY (4 HOURS)
Customized - 1 DAY (8 HOURS)

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of protection theory and relay design, operation and testing

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic functions, differences and similarities of digital and microprocessor relays
- Review the capabilities of feeder, transformer and motor protection relays
- Review interrogation procedure and basic settings functions of common microprocessor relays
- Discuss the communications and security protocols of common microprocessor relays

HANDS-ON APPLICATION

- A walk through of computer setup and communications connections with relays discussed in the classroom
- Set up of various settings screens offline
- Development of a basic relay settings file
- View and understand real-time relay information
- Walkthrough fault interrogation techniques
- Navigate through relay face plate human machine interface (HMI/GUI) menus to access, understand and clear relay target event information

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



CB102 Medium Voltage Circuit Breaker

PowlVac® circuit breaker operation, control schemes, ratings, testing and preventative maintenance.

**COURSE DURATION:
1 DAY (8 HOURS)**

**RECOMMEND SWGR202 AS A PREREQUISITE
COURSE**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of our PowlVac® Circuit Breaker internals and requirements as well as learn the diagnostic techniques to accurately identify mechanical and electrical problems when they occur.

COURSE OBJECTIVES (CLASSROOM)

- Examine PowlVac® circuit breaker components
- Discuss the internal circuit design
- Discuss operational procedures

HANDS-ON APPLICATION

- Overview of the tools and safety requirements for PowlVac® breakers
- Exercises on preventative maintenance
- Demonstration of the removal, replacement and adjustment of common field replaceable parts
- Demonstration on testing procedures
- Demonstration on basic troubleshooting techniques

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

CB202 Direct Current Circuit Breakers

Powell Legacy DC circuit breaker operation, control schemes, ratings, testing and general preventative maintenance.

**COURSE DURATION:
1 DAY (8 HOURS)**

**RECOMMEND SWGR401 AS A PREREQUISITE
COURSE**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of our DC Circuit Breaker internals and requirements as well as learn the diagnostic techniques to accurately identify mechanical and electrical problems when they occur.

COURSE OBJECTIVES (CLASSROOM)

- Examine Powell NDC circuit breaker components
- Discuss the internal circuit design
- Discuss operational and maintenance procedures

HANDS-ON APPLICATION

- Overview of the tools and safety requirements for DC breakers
- Exercises on preventative maintenance
- Demonstration of the removal, replacement and adjustment of common field replaceable parts
- Demonstration on testing procedures
- Demonstration on basic troubleshooting techniques

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



SWGR401 Direct Current Switchgear and Circuit Breakers

Direct current switchgear and circuit breaker operation, control schemes, ratings, testing and general preventative maintenance.

**COURSE DURATION:
1 DAY (8 HOURS)**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding on DC distribution switchgear design and operation.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the basic construction and design properties of traction power switchgear
- Examine individual switchgear components, their locations and function
- Discuss design characteristics and basic components of the DC circuit breaker operation in relationship to downstream and upstream safety systems
- Discuss alarms specific to DC equipment
- Discuss operational procedures

HANDS-ON APPLICATION (OPTIONAL)

- Utilize equipment for identification and explanation of components and functionality
- Insertion and removal demonstrations and exercises using manual and remote electrical as well as associated auxiliary equipment
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

RCT401 Rectifiers and Rectifier Transformers

Theory and application of Traction Power rectifier systems.

**COURSE DURATION:
½ DAY (4 HOURS)**

WHO SHOULD ATTEND?

Electricians, Maintenance, Operating and Engineering personnel who wish to gain an understanding of the purpose, design and application of rectifiers, rectifier transformers and applicable safety systems.

COURSE OBJECTIVES (CLASSROOM)

- Discuss the purpose of design and ratings for rectification equipment in traction power substations.
- Examine the basic electronic theory of wave shaping and voltage rectification.
- Discuss the major components and operation of traction power specific transformers and silicon diode rectifiers.
- Discuss the purpose and operation of the embedded power safety systems
- Discuss the importance of positive and negative bus distribution, monitoring and relay protection associated with DC systems.
- Discuss SCADA systems indications, alarms, applicable troubleshooting techniques and grounding safety.
- Discuss preventative maintenance

HANDS-ON APPLICATION (OPTIONAL)

- Utilize equipment for identification and explanation of components and functionality

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)



Custom Courses

Are you looking for a program that is tailored to match your equipment or even the requirements of your safety program? We can combine elements for existing courses or work with you to develop training material to suit your application.

COURSE DURATION:
TBD

WHO SHOULD ATTEND?

Individuals you feel would benefit from the course material.

COURSE OBJECTIVES (CLASSROOM)

- Discuss theory and practical applications tailored to meet the requirements of your team
- Information and teaching to are custom to your specific equipment

HANDS-ON APPLICATION

- Utilize equipment for identification and explanation of components and functionality
- insertion and removal demonstrations and exercises using manual and remote electrical as well as associated auxiliary equipment
- Exercises on preventative maintenance
- Demonstration on testing procedures

LEARNING TOOLS

- Classroom discussion utilizing presentations, equipment manuals and project electrical drawings, as applicable.
- Hands-on training using on-site customer equipment or equipment from the manufacturing floor.
- 10 question review exam (optional)

Additional Information

Training Location

Courses can be held at a Powell Facility or at on-site at our customer's facilities. Other facilities can be arranged and are subject to additional room and equipment charges. Trainees' accommodation, travel costs and expenses are not included; this should be handled directly by the customers travel external travel arrangement. Powell will provide directions as well as a list of preferred hotels once booking is confirmed, upon request.

For flights greater than 6 hours in duration or overseas travel, the trainer will travel business class or equivalent. The trainer's standby and travel time will be charged at an additional rate.

If required a fixed cost can be agreed upon once the location and number of trainees have been confirmed.

Language

Courses are all presented in the English language. The courses can be given in any language by the customer's technical translator or Powell can provide one for an additional cost. Timing of courses may need to be extended to cover translations.

Learning Assessments

When requested, a course assessment can be carried out during the training and the results provided to the training organizer upon completion of the course. Powell does not confirm the competency of participants based solely on their attendance during training courses.

Training Aids

When deemed practical, at least one of each device being covered in the training course will be made available for trainees to use during the course. Powell believes that training is an interactive environment, presented in an informal manner by experienced engineers and subject matter experts in the topics covered. Powell as a result, does not release or allow the copying of any of the original visual training aids and material used on the courses. Copies of all presented material will be given to each trainee in the form of hard copy manuals or on USB flash drives in PDF format which is available upon request.

Scheduling

Training courses are offered subject to availability. Two (2) to four (4) weeks minimum notice is required. Training classes are scheduled and accepted only when confirmed by receipt of Purchase Order.

Standard Courses

Visit our website for a calendar of our standard course offerings that take place at our facility.

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