TECHNICAL TRAINING SOLUTIONS

ELECTRICAL COURSES | INSTRUMENTATION COURSES | MECHANICAL COURSES

ELECTRICAL ISOLATION & LIVE WORKING

COURSE 420: 1 DAY: Max 8 Candidates

This course is designed to provide evidence that personnel can safely perform electrical isolations and live work. These two subjects are inextricably linked, since any electrician will at some point find themselves attempting to isolate equipment and that equipment will potentially be live. The course explores the correct procedures to be adopted and the protective equipment necessary for isolation and live working. Repeating the course at regular intervals ensures that personnel retain the essential knowledge and continue to employ best practices.

PARTICIPANTS

This course is not an entry-level course. Prior electrical competence is assumed. An eligibility assessment for access to this course is available on request.

COURSE PRESENTATION

The candidates work on a series of training rigs which simulate the most common scenarios that are likely to be encountered in industrial situations. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the dangers associated with electricity and moving machinery
- describe how mechanical isolations differ from electrical isolations
- correctly and safely test for dead in single and three phase systems
- perform safe electrical isolations in a range of common industrial scenarios
- understand how to legally justify live working
- recognise the precautions necessary for safety and protection of equipment
- understand the importance of using insulated tools
- safely carry out live functional testing procedures.

Candidates for this course should consider attending the course on the EAW Regs (380) first, unless they are already conversant with the legal requirements. This course (No 420), when combined with course 380, is available as one complete course called 'Duty Holder' - this is course No 400.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 420: Electrical Isolation & Live Working.

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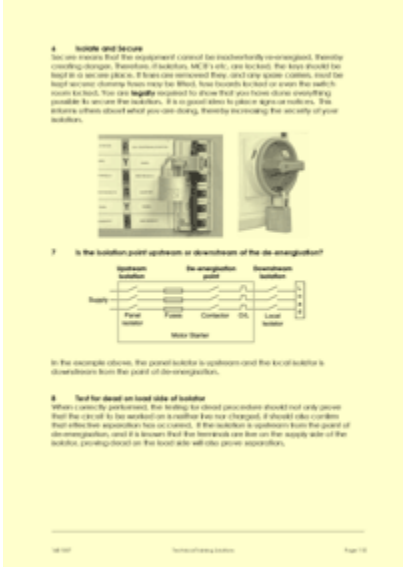
What do candidates on the Electrical Isolation & Live Working course actually do?

In order to ensure that the candidates really understand the legal requirements, they spend the first part of the course refreshing their understanding of the Electricity At Work Regulations and the issues of live working, isolation procedures, testing for dead etc. They are also introduced to typical examples of employer's electrical policies and procedures (Company-specific policies for courses that are being run on a customer's premises can be introduced into the course at this stage).

Page 13 of the course notes, showing the necessary steps which should be considered within an isolation procedure

The voltage testers and proving units that we use on the course



Page 17 of the course, detailing some of our recommended isolation procedures

The candidates then proceed to apply their knowledge in a demonstrable manner by completing a number of practical equipment isolation exercises. These isolations encompass single phase and three phase isolations on industrial, commercial and domestic systems. The following is one of the units that are used to check that the candidates are able to isolate a single-phase system properly:

This is one of the units that are used to check that the candidates are able to isolate a single-phase system.

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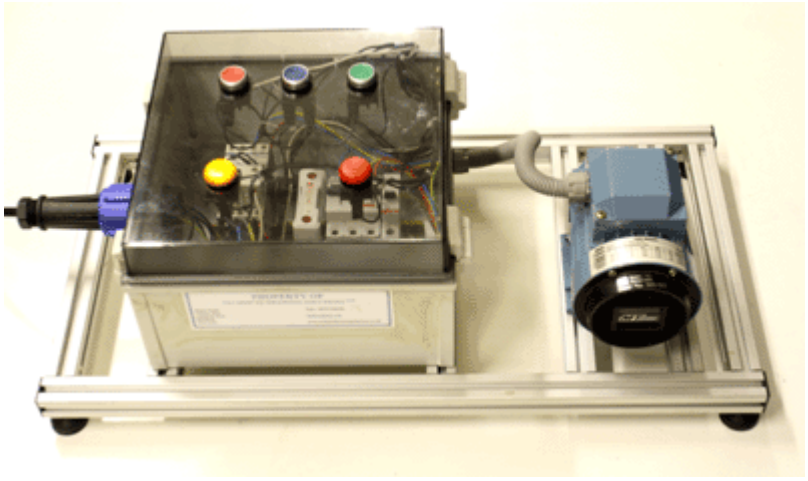
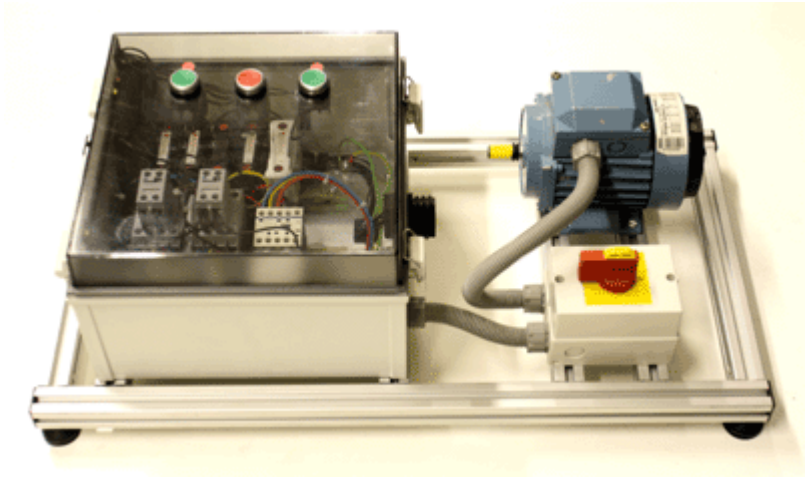
The following are two of the panels that are used to check that the candidates are able to isolate three-phase systems properly:



This is one of the panels that are used to check that the candidates are able to isolate three-phase systems.



This is one of the panels that are used to check that the candidates are able to isolate three-phase systems.

The rigs used are slightly different, requiring the candidates to think carefully about the advantages and disadvantages of panel isolations, local or remote isolation versus removal of fuses or locking off circuit breakers inside the panel. They can also explore the merits (or otherwise) of control circuit isolation rather than isolation of the load circuit and how this might be dangerous.

During the Electrical Isolation part of the course the candidates also have to show that they can create a sensitively thought-out isolation procedure for scenarios where production downtime versus the dangers of moving machinery have to be carefully balanced.

The act of testing for dead is explored, and the various ways in which this could be done is explained. We advocate using properly approved voltage testers and proving units. To ensure that the candidates understand this we use a rig that simulates three three-phase motor terminal boxes wired through three isolators. The candidates have to test for dead at each set of motor terminals and some will test out OK whereas others won't and the candidates have to explain what the reasons for this are.

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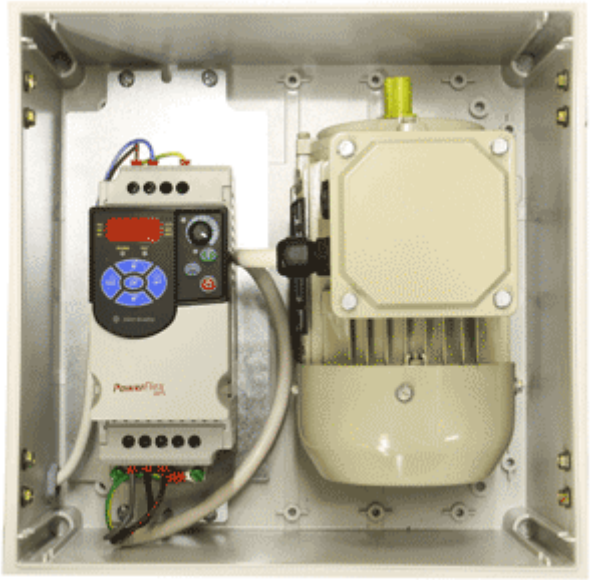
The voltage testing rig, where candidates use the voltage testers to test for dead on three sets of motor terminals: Some test out OK but some don't and the candidates need to be able to explain why this is.

We then look at live working. Many of the candidates will presume that they are never going to work live, but on exploration of the legal definition they invariably find that they already are - until equipment is proved dead or during live functional testing, for instance, they are technically working live. A short lecture/discussion around these issues follows, and we discuss the merits of live working risk assessments, the way in which hazardous voltage thresholds can be defined and how the environment can be categorised as kind or unkind. We explore examples of electrical accidents and get the candidates to think about the causes and how the accidents could have been avoided by not working live, using PPE, applying supervision, shrouding terminals etc.

Next we apply the aforementioned knowledge to a series of practical exercises, where the candidates practice making voltage, current and frequency measurements on live equipment. This is often characterised as 'live functional testing' in employers' policies.

The exercise that involves measuring three-phase voltages on the live working part of the course



The exercise that involves measuring frequency on the live working part of the course

The exercise that involves measuring three-phase currents on the live working part of the course

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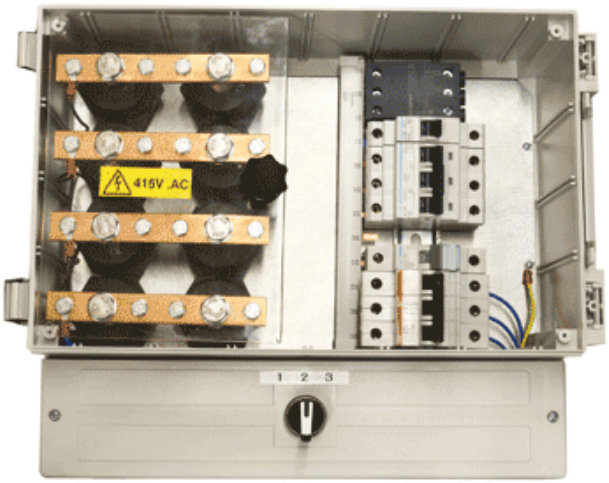
The final exercise on the course requires the candidates to attach a cable to a potentially live set of busbars.

This is obviously something that would be extremely difficult to justify and the reasoning behind this needs to be explored so that the candidates can make a meaningful distinction between what is justifiable and what isn't; so that they can clearly see how live functional testing might be allowable whereas the manipulation of live conductors might not be. This also provides the opportunity to explore what their own company policies have to say about these activities.



By presenting the candidates with this equipment they are forced to think these issues through, and this is the value of actually doing the exercise - enabling them to think, understand and remember the attendant issues and how they relate to their activities at work.

Note that even though we've put "Warning 415V" stickers on everything that we do in fact power all of the equipment that has exposed live parts from a three-phase 40V supply, so that the candidates are not in any danger. We don't necessarily tell the candidates about this though!

If you would like to learn more about the Electrical Isolation & Live Working course then please call us.

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