

INTRODUCTION

LEVEL 3 AWARDS IN THE INSTALLATION AND MAINTENANCE OF SMALL-SCALE PHOTOVOLTAIC SYSTEMS LEARNING GUIDE

	Page No
A WORD FROM CERTSURE LLP	III
INTRODUCTION	V
QUALIFICATIONS	V
EXAMINATION STRUCTURE	V
BREAKDOWN OF CONTENT OF THE EXAMINATIONS	VII
EXAMINATION CONDITIONS	VIII
GUIDANCE ON TAKING THE EXAMINATIONS	VIII

CERTSURE LLP

CERTSURE LLP

A WORD FROM CERTSURE LLP

During the time that the update to this Learning Guide has been under development many things have happened which have a bearing on the solar PV industry and, in particular, the installation of new solar PV systems. These changes are summarised below:

Publication of BS 7671: 2018 - Requirements for electrical installations (IET wiring regulations 18th Edition)

BS 7671: 2018 came into effect from 1st January 2019. In addition to Section 712 of the standard which contains particular requirements relating to the installation of solar PV systems, many of the general requirements of BS 7671 are also applicable, including those relating to isolation and switching (chapter 46 and Section 537), low voltage generating sets (Section 551) and initial & periodic verification (Part 6).

Feed-in tariffs

On 1 April 2010, the Government introduced the Feed-in Tariffs (FIT) scheme designed to promote the uptake of renewable and low-carbon electricity generation technologies. The scheme required participating licensed electricity suppliers to make payments on both generation and export from eligible installations.

When first introduced these payments were generous to account for the higher capital cost of installing early solar PV systems. In subsequent years and with the wider adoption of solar PV systems in turn driving down capital costs, the payments have been reduced progressively.

The FIT was closed to new applicants from 1 April 2019 and this will inevitably have a negative impact on the number of new solar PV systems being installed.

Energy Networks Association (ENA) Distributed Energy Resource connection standards

In order to comply with a change in European law, from 27 April 2019 Engineering Recommendations (EREC) G98 and G99 supersede the requirements covered by EREC G83 and G59 respectively. These connection standards are technical requirements which all Distribution Code Users are bound to comply with.

As of 27 April 2019, all generating equipment connected to any electricity distribution network, regardless of whether that network is owned by a Distribution Network Operator (DNO) or by an Independent Distribution Network Operator (IDNO), must comply with the requirements of the ENA's new Engineering Recommendations G98 and G99. In addition, any generation equipment for connection requiring compliance to G98/G99 must be registered on the ENA Type Test Verification Report Register.

Full details of these changes can be found on the ENA website:

<http://www.energynetworks.org/electricity/engineering/distributed-generation/>

Although these changes do not affect generating equipment that is already connected to the electricity distribution network, they may be applicable where existing equipment is modified or to projects that have not yet been connected to the distribution network.

Implications for the content of this Guide

Whilst every effort has been made to reflect the updated requirements of *BS 7671* in this Guide, it has not been possible to take on board the other changes relating to Feed-in Tariffs and ENA connection standards.

The decision to not fully update the content of the Guide at this current time has been made due in part because these significant changes occurred relatively late in the Guide's development.

It also acknowledges that it will inevitably take some time for the examination bodies offering qualifications to update their offerings, in terms of course content and examination question banks. As such, Certsure LLP believes that it would be unreasonable to remove information that will, realistically, be covered in qualifications for some time yet.

INTRODUCTION

This Guide has been produced by Certsure LLP as a learning resource based on the Level 3 Awards in:

- the installation of small-scale solar photovoltaic systems, and
- the installation and maintenance of small-scale solar photovoltaic systems

This Guide has been produced to support practising electricians who wish to increase their skills and knowledge relating to solar photovoltaic systems. It is of particular benefit to students attending or planning to attend courses covering the Level 3 Awards mentioned above.

Students taking these qualifications would be expected to have:

- N/SVQ level 3 or equivalent qualification in electrical installations (buildings and structures) i.e. 2356 or 2357.
- Additionally, if the level 3 qualification was based on an earlier edition of the wiring regulations, an 18th Edition qualification i.e. 2382-602.

Students should also have good written communication skills to allow them to complete the necessary certification and documentation requirements and relay information in a clear, accurate and concise manner that is likely to be understood by the person ordering the work.

QUALIFICATIONS

EAL offer the following units relating to small-scale solar PV systems:

Level 3 Units relating to the installation and maintenance of small-scale solar photovoltaic systems		
Unit code	Title	Details of assessments
QET3/002SPV	Know the requirements to install, commission and handover small scale solar photovoltaic systems	On-screen multiple choice examination
QET3/003SPV	Install, commission and handover small-scale solar photovoltaic systems	Practical assignments
QET3/004SPV	Know the requirements to inspect, service and maintain small-scale solar photovoltaic systems	On-screen multiple choice examination
QET3/005SPV	Inspect, service and maintain small-scale solar photovoltaic systems	Practical assignments

In order to receive the Level 3 award in the installation of small-scale solar photovoltaic systems candidates must successfully complete units QET3/002SPV and QET3/003SPV.

In order to receive the Level 3 award in the installation and maintenance of small-scale solar photovoltaic systems candidates must successfully complete units QET3/002SPV, QET3/003SPV, QET3/004SPV and QET3/005SPV.

It should be noted that this Guide does not contain guidance specifically relating to the practical assessments. This will be provided as part of your coursework when studying for the qualifications.

EXAMINATION STRUCTURE

The examinations consist of questions presented in a multiple-choice format.

The examinations are taken online, (See Fig 1). This means you must be able to use a computer but does not require any particular level of competence in using IT equipment. To ensure you are fully prepared in terms of use of the computer you will have the opportunity to sit a practice paper before you take the examination.

The actual examination time starts when you open the examination program.



Fig 1. Exam undertaken using a personal computer

Fig 2 shows a typical view of the screen as it appears during the examination.

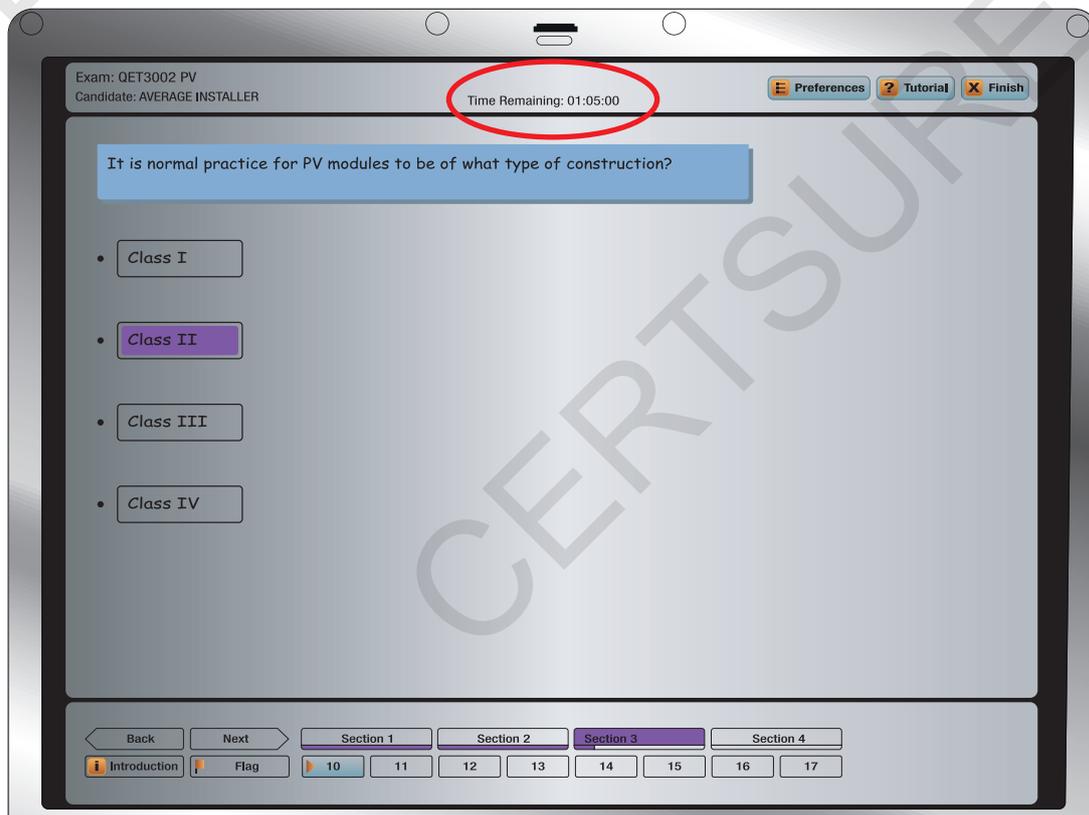


Fig 2. Representation of exam interaction with the candidate

With reference to Fig 2, the amount of time remaining is shown at the top in the centre (highlighted). At the bottom of the screen are a series of buttons that allow the candidate to navigate through the questions in the examination by section.

Also the bottom left-hand side of the screen there is a 'Flag' button which if pressed will mark the question currently displayed on the main part of the screen as flagged in

the left-hand question listing. This feature is very useful if you don't want to answer a particular question straightaway or if you have selected an answer but want to be able to find it easily later for further consideration.

On completion of the examinations the candidate will be informed whether they have passed or failed. There are no other grading options.

BREAKDOWN OF CONTENT OF THE EXAMINATIONS

Unit QET3/002SPV

Know how to install, commission and handover small-scale solar photovoltaic systems

Duration: 90 minutes. Number of questions: 45

	Outcome	Percentage of test
1	Know the health and safety risks and safe systems of work associated with solar photovoltaic system installation work	4
2	Know the requirements of the relevant regulations/standards relating to practical installation, testing and commissioning activities for solar photovoltaic system installation work	5
3	Know the fundamental differences between AC and DC circuits within solar photovoltaic systems	4
4	Know the purpose of solar photovoltaic system components	7
5	Know the types, silicon characteristics and typical conversion efficiencies of solar photovoltaic modules	11
6	Know the fundamental design principles used to determine solar photovoltaic system module array size and position requirements.	11
7	Know the preparatory work required for solar photovoltaic system installation work	4
8	Know the layouts and the requirements for installing solar photovoltaic module arrays	25
9	Know solar photovoltaic system DC and AC circuit installation layouts within the scope of the relevant Engineering Recommendation for grid tied systems	4
10	Know solar photovoltaic system protection techniques and components	5
11	Know the requirements to test and commission solar photovoltaic systems	16
12	Know the requirements to handover solar photovoltaic systems	4
	Total	100

Unit QET3/004SPV

Know the requirements to inspect, service and maintain small scale solar photovoltaic systems

Duration: 40 minutes. Number of questions: 20

	Outcome	Percentage of test
1	Know the requirements for the routine inspection, service and maintenance of solar photovoltaic system installations	40
2	Know how to diagnose faults in solar photovoltaic system installations	35
3	Know how to rectify faults in solar photovoltaic systems	25
	Total	100

EXAMINATION CONDITIONS

The examinations are 'closed-book' and so you cannot take any sources of information into the examination.

Your mobile phone must be switched off and not on the desk.

You cannot leave the room once the examination has started unless you are accompanied by an invigilator. If you leave the room unaccompanied you will not be allowed to continue with the examination.

GUIDANCE ON TAKING THE EXAMINATIONS

If you have prepared correctly beforehand you should be able to answer all the questions within the given examination period. You may find the following tips will help you to do this:

- Read through all the questions before you attempt to answer any of them.
- You can answer the questions in any order. If you think it will help, go through the paper answering the questions you are most sure that you know the correct answer for first. Then return to the beginning of the paper and attempt the remaining questions that you feel most confident about, leaving the ones about which you are least certain until last.
- You can change your mind and select a different answer. But be careful when doing so, as you may have been correct in the first place!
- Alternatively, you have the option to 'flag' the answer you think is correct in any number of questions so you will know to revisit them later.
- Answer **every** question. One of the four options to each question is correct. If there are any questions that you are really struggling with, try to eliminate the incorrect options as much as possible and make an educated guess.