

65-10-95/830 Inspection and test records

- **Reports:**
 - **Construction phase:** System design is commissionable;
Post-installation;
System cleanliness;
and System commissionable.
- **Records for air systems:** In accordance with BSRIA BG 49/2015.
- **Record sheets:**
 - **Submission:** On completion.
 - **Number of copies:** Three.

65-10-95/840 Demonstrations

- **Running of plant:**
- **Instruction:** Instruct and demonstrate the purpose, function and operation of the installations.

65-10-95/850 Documentation for ventilation systems

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system as a whole giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Electronic copies in agreed format.
- **Record drawings:**
 - **Content:** Location, size and route of ductwork;
Location and identification of regulating dampers and fire dampers;
and Location of outlets.
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** Three.
- **Submittal date:** At handover.

70-50-45/110 Incoming low voltage electricity supply

System outline

70-50-45/110 Incoming low voltage electricity supply

- **System performance:** 70-50-45/210 Design of incoming low voltage electricity supply;
70-50-45/220 Supply characteristics type A;
70-50-45/230 Connecting generators to the public supply network;
and 70-50-45/220 Supply characteristics type B.
- **Nature of current:** Alternating.
- **Phase:** Three phase 4 wire.
- **Voltage:** 400 V.
- **Electricity distributor:** UK Power Networks.
- **Electricity supplier:** The user will choose the energy supplier. Include for liasing with the client and arranging for the meter to be installed before practical completion.
- **Metering:** Provide new Ofgem / mid Class B&D billing meters for the tenant distribution boards.
- **Execution:** 70-50-45/640 Location of incoming point of supply
- **System completion:** 70-50-45/810 Site supply characteristics;
70-50-45/820 Phase sequence;
and;
70-50-45/830 Documentation.

System performance

70-50-45/210 Design of incoming low voltage electricity supply

- **Standards:** In accordance with BS 7671 and the Electricity Distributor's guidelines.
- **Design:** Complete the design of the low voltage supply.
- **Requirement:** Submit detailed design drawings showing equipment positions and routes, technical information and calculations.
- **Evidence of agreement with Electricity Distributor:** Submit.

70-50-45/220 Supply characteristics type A

- **Anticipated maximum demand (kV·A):** 100 KVA approximately. The contractor shall validate the maximum demand.
- **Earthing type:** TN-C-S.
- **Overcurrent device at incoming point of supply:**
 - **Type:** MCCB
 - **Rating:** 200A

Execution

70-50-45/640 Location of incoming point of supply

- **Incoming point of supply:** Coordinate the location and establish the spatial requirements for the Electricity Distributor's equipment and metering.
- **Location and colour coding of equipment:** In accordance with NJUG guidelines on the positioning and colour coding of underground utilities' apparatus.

System completion

70-50-45/810 Site supply characteristics

- **Prospective short-circuit current (P_{sca}):** Measure and submit results.
- **External earth fault loop impedance (Z_s):** Measure and submit results.

70-50-45/820 Phase sequence

- **Phase sequence:** Verify.
- **Means of identification:** Describe within the operation and maintenance manual.

70-50-45/830 Documentation

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy.
 - **Number of copies:** Three.
- **Record drawings:**
 - **Content:** Refer to project specific documentation; ensure; all low voltage distribution circuits, the cable origin at the site boundary, route to service cut out, method of installation, depth of trench, details of ducts including sizes and position of cable joints.
 - **Drawing format:** A1 paper print drawing.
 - **Number of copies:** Three.

70-65-60/115 Stand-alone photovoltaic system

System outline

70-65-60/115 Stand-alone photovoltaic system

- **System performance:** 70-65-60/210 Design of photovoltaic systems;
70-65-60/220 Structural and weatherproofing considerations;
and 70-65-60/230 Photovoltaic arrays.
- **System manufacturer:** Solarwatt panels. 10 m²/sq on panels is required
- **Input source:** 90-50-80/310 Photovoltaic modules.
- **Mounting:** 90-90-60/330 Free standing mounting frame for solar modules.
- **Switchgear and controls:** 90-60-40/330 Power conditioning units;
90-50-45/450 Switch-disconnectors type C;
90-60-25/490 PV array junction boxes;
and 90-60-05/310 d.c. battery charge controllers.
- **Cable type:** 90-55-15/324 Thermosetting insulated and thermoplastic sheathed (LSHF) armoured cables type B and 90-55-15/352 Thermosetting insulated and PVC sheathed cables (XLPE/ PVC singles) type B.
- **Cable sizes:** Contractor's design.
- **Rewireable installation:** Required.
- **Concealed installation:** Required.
- **Cable containment:** 90-55-10/360 Flexible conduit.
- **Containment accessories:** Contractor's design.
- **System accessories:** 90-90-60/310 Battery shelving racks;
90-65-55/340 Energy meter;
and 90-60-30/410 Transient overvoltage surge suppression devices for mains power supplies.
- **Execution:** 70-65-60/630 Installing PV module arrays;
70-65-60/660 Installing d.c. isolation switches;
70-65-60/670 Installing PV array junction boxes;
70-65-60/690 Installing a.c. isolation switches;
70-65-60/700 Installing batteries and battery charge controllers;
70-65-60/730 Installing energy meters;
and 70-65-60/770 Labelling.
- **System completion:**

System performance

70-65-60/210 Design of photovoltaic systems

- **Design:** Complete the design of the photovoltaic system.
- **Standards:** In accordance with BS 7671, BS EN 62124 and ENA G83/2.
- **Testing and commissioning:** Incorporate adequate measures to allow full testing and commissioning of the completed system.
- **Proposals:** Submit detailed design drawings, manufacturers' literature and technical information, and calculations showing estimated annual energy yield using the Photovoltaic Geographical Information System (PVGIS) calculator.
- **Approvals:** Obtain written approval of the Electricity Distributor.

70-65-60/220 Structural and weatherproofing considerations

- **Supports and fixings:**
 - **Requirement:** No impairment to the thermal and weatherproofing performance of the building fabric.
 - **Arrangement of fixings or proposed supporting structure:** Submit proposals.

70-65-60/230 Photovoltaic arrays

- **Nominal output:**
 - **Peak power:** Technical & Operational details. 10 m sq of panels
 - **Number of strings:** Technical & Operational details.
 - **String voltage (maximum):** Technical & Operational details.

Products

90-65-55/340 Energy meter

- **Manufacturer:** Dimplex
- **Product reference:** Free-E 230 V
- **Execution:** 90-65-55/620 Installing electrical monitoring and metering equipment.

Execution

70-65-60/620 Installing photovoltaic systems generally

- **Standards:** In accordance with ENA G83/2.
- **Installer:** Microgeneration Certification Scheme accredited.
- **Materials:** Separate dissimilar metallic materials to prevent bi-metallic corrosion.
- **Fixing equipment:** Fix independently of any other systems installation with zinc electroplated fasteners indoors and stainless steel fasteners outdoors.
- **Orientation:** Accurate and square to vertical and horizontal axes. Align adjacent items of switchgear on the same horizontal axis.
- **Cable installation:**
 - **Timing:** Complete installation of d.c. cabling before connecting to PV array.
 - **Routes and arrangement:** Minimize length of d.c. cable runs.
- **Cable terminations:** Label string cables with push-on plastics markers showing unique circuit reference and Label main incoming d.c. and outgoing a.c. cables at power conditioning unit with push-on plastics markers showing unique circuit reference.

70-65-60/630 Installing PV module arrays

- **General requirements:** 70-65-60/620 Installing photovoltaic systems generally.
- **Fixings:** Suitable for wind loading and Minimum of four clamps per module, placed symmetrically.
- **PV modules:**
 - **Layout:** Portrait.
 - **Mounting:** Allow adequate ventilation between building fabric and underside of PV module.

- **Electrical connection:** Interconnect between PV modules using integrated connection cables, connector plugs and string cables to form an array consisting of two strings, each string consisting of four modules.

- **Interconnecting string cable routes:** Contractor's choice.

70-65-60/660 Installing d.c. isolation switches

- **Position:** Conveniently accessible for operation inspection and maintenance.

70-65-60/670 Installing PV array junction boxes

- **Position:** Conveniently accessible for operation inspection and maintenance.
- **Separate positive and negative junction boxes:** Required.

70-65-60/690 Installing a.c. isolation switches

- **Position:** Next to power conditioning unit.

70-65-60/700 Installing batteries and battery charge controllers

- **Position:** Conveniently accessible for operation inspection and maintenance.

70-65-60/730 Installing energy meters

- **Position:** Contractor's choice.
- **Meters to show:** a.c. energy imported into the premises.

70-65-60/770 Labelling

- **Dual supply warning notices (grid connected systems only):**
 - **Requirement:** Provide danger warning notices stating that the system has a dual supply and is energized from more than one source.
 - **Position:** Electricity supplier's meter; At distribution board to which output from power conditioning unit is to be connected; and PV a.c. isolation switch.
 - **Electricity Distributor's approval of text:** Obtain.
- **PV modules:** 'Danger, do not disconnect under load. Isolate a.c. supply first'. Label with warning notices describing the presence of live terminals.
- **Connectors:** Label with notices stating 'Do not disconnect d.c. plugs and sockets under load - turn off a.c. supply first'.
- **d.c. switch disconnecter:** 'PV array d.c. isolator- Danger - contains live parts during daylight'.
- **dc.junction boxes:** Label with notices stating 'PV array d.c. junction box - Danger, contains live parts during daylight'.
- **Power conditioning units (PCUs):** Label with notices stating 'Isolate a.c. and d.c. before carrying out work'.
- **a.c. isolation switches:** Label with notices stating 'PV system - main a.c. isolator'.
- **Circuit diagram:** Provide at point of interconnection to a.c. distribution board.
- **Details of protective settings incorporated in the PCU:** Provide at PCU.
- **Contact telephone number for the maintainer of the system:** Provide at point of PCU.
- **Fuses, terminal blocks and other assembly components:** Label, describing their purpose.
- **Spare fuses:** Label, describing their rating and purpose.

90-55-10/700 Installing conduit, trunking and ducting type B

- **Standards:** To BS 7671 and in accordance with IET Guidance Note 1.