



Moixa Smart Battery 2 & 3kWh units

Installation Manual





Moixa® Smart Battery.

This is your installation manual.

Notes on the Installation Manual:

1. Installer manual for guidance and subject to revision and version updates
2. Commercial confidential and copyright Moixa Technology Ltd
3. This document is not for publication or online use without Moixa approval
4. Approved installer programmes in development with bronze, silver, gold level installer partner levels, by Moixa approval and terms and conditions

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03B.01 Introduction

This document outlines the installation of the Maslow system, the electrical and mechanical aspects of system components:

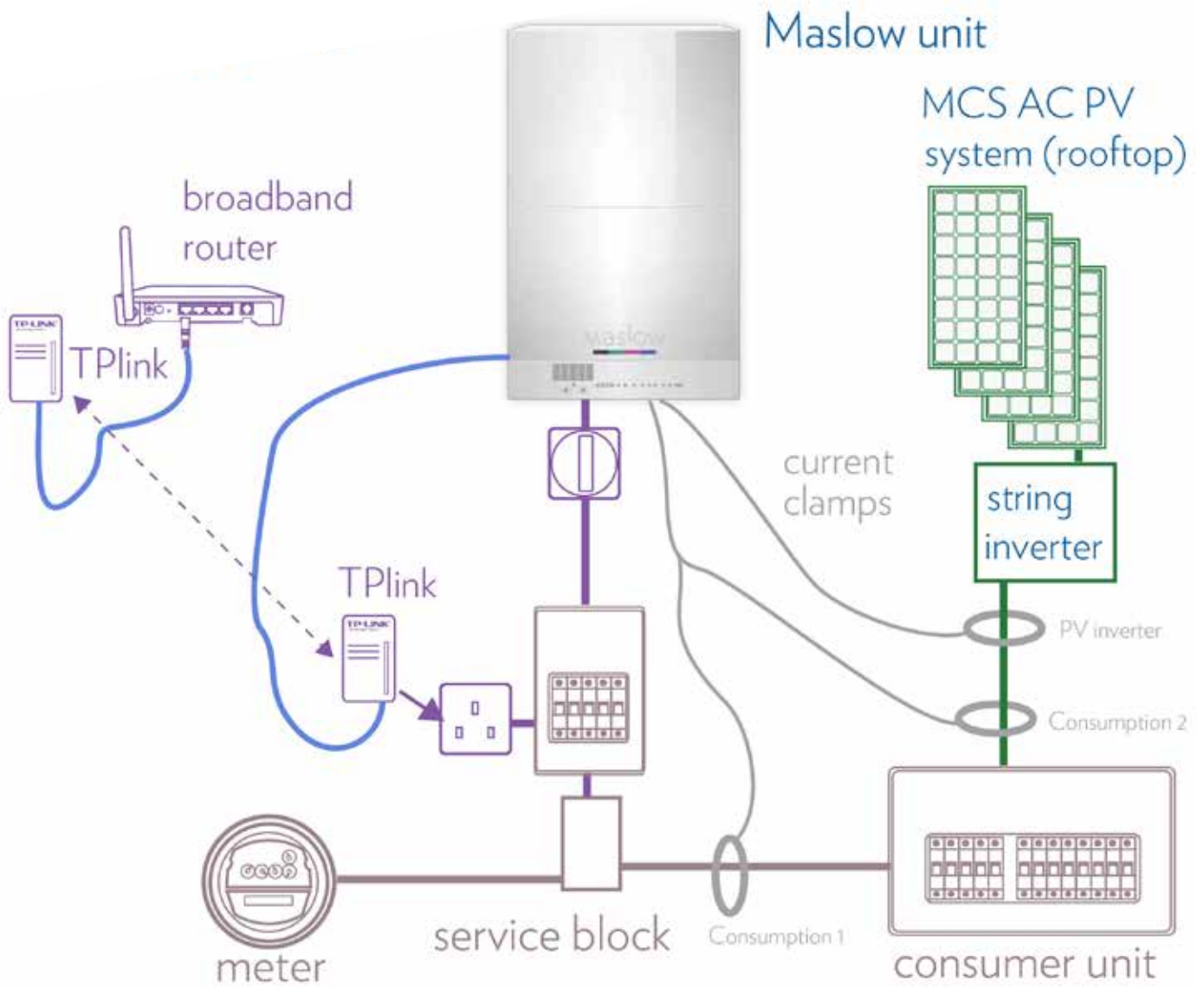
- Moixa — The Moixa Smart Battery consists of two assemblies: The Maslow Control Unit (MCU) and the Battery Modules

Also described are ancillary components, installation scenarios, testing and commissioning.

The system can be installed in 3 possible standard configurations, which are illustrated on the following pages, these are:

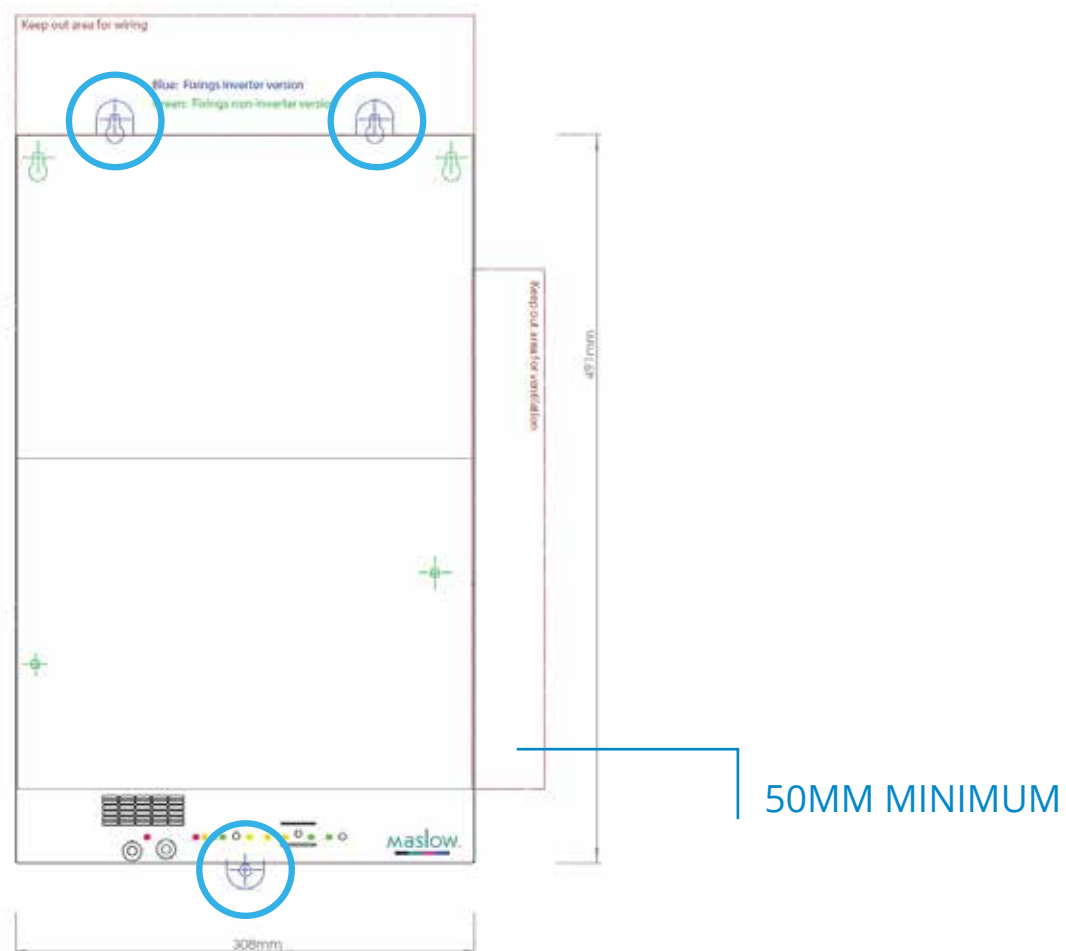
- 1. Install at the same time as an AC PV (MCS/FITs) solar install**
- 2. Install in a household that already has an AC solar PV system, retro fitting the Maslow**
- 3. Install in a household without AC PV (economy 7 type tariffs)**

Over the following pages we shall look at each configuration and how the wiring and installation for the config works. The base configuration is for solar self-consumption which consist of an inverter enabled 2/3kwh maslow.



03B.02 Typical Fixing of Moixa Unit

The Moixa 2kwh unit (with or without inverter panel) requires secure fixing. In masonry $\geq 38\text{mm}$, M6 stainless steel coach screws and heavy-duty raw plugs or other suitable heavy duty fixings are recommended. If fixing to a partition or stud wall then a $\geq 18\text{mm}$ plywood board should be screwed to span the underlying studs and the Unit screwed or bolted to the board. There are two weight bearing, slotted fixings located at the top corners of the MCU and two anchoring holes for smaller screws at the bottom. The Maslow can be presented to the wall and holes marked through. Alternatively the provided paper template can be used for marking out. The fixings are then screwed in place and the MCU slotted over the heads. Once hanging in position, the anchor points can be marked through; the Maslow removed to allow drilling for fixings. Finally the Maslow is slotted into position again the anchor screws located and the main fixings tightened. Make sure the unit is mounted on a flat surface so that the chassis is not distorted on tightening the fixings.



03B.03 Electrical connections of the Moixa Control Unit



- The Maslow has two 230 VAC connections. AC In(White) AC Out(Black). Both are connected through a 4 pole AC Rotary Isolator. The two wires are junctioned inside the rotary isolator.
- The Maslow has one Input for 2 x 250W Solar panels and (MC4 Connectors.)

Please note: If a Henley block is required then the main fuse will be required to be removed - if an isolator switch is not fitted. The below process is that recommended.

Service Head Fuse Removal Process

- contact the supplier of the property
- ask for the supply department
- tell them that you want to carry out maintenance in the property and this requires the temporary removal of the fuse.
- they will contact the meter operators and then let you know the date of the fuse removal and the cost of this process. (This can take up to 10 working days)

REMOVAL OF THE FUSE WITHOUT PERMISSION FROM THE SUPPLIER IS A CRIMINAL OFFENCE AND YOU MIGHT GET PROSECUTED

03B.04 Installing with grid connected solar PV systems.

Install a 2 pole Rotary AC Isolator which will connect both the AC Supply(White) and AC out(Black) to the grid. The Maslow inverter output, from this isolator and the Maslow supply input, are then connected to the grid in one of the following ways:

- Preferred install configuration is to use a mini-consumer unit for the Maslow (and PV) with a Henley (service) block, as this leads to more reliable power monitoring.
- This will either have a 100A RCD main switch, plus 16A type B CB or a 100A (non-RCD) main switch and 16A/30mA RCBO or 16A type B CB*.

The feed for this DB is taken from spare ways on an exiting service block using appropriate size tails. Or if no spare ways present, a new service block/s installed as necessary

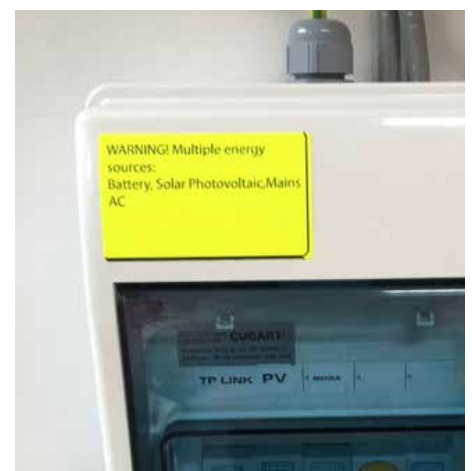
- If there are spare ways on the consumer unit **Main switch** then this could be used, the Maslow power and inverter cables are connected to a 16A type B circuit breaker or 16A Type B/30mA, RCBO*.
- If there are spare ways on an **RCD** protected switch this can be used as above.

* The choice of residual current device or circuit breaker will depend on the cable installation method/location according to BS7671.

Appropriate labels for all this need to be fixed to the system when it is installed:

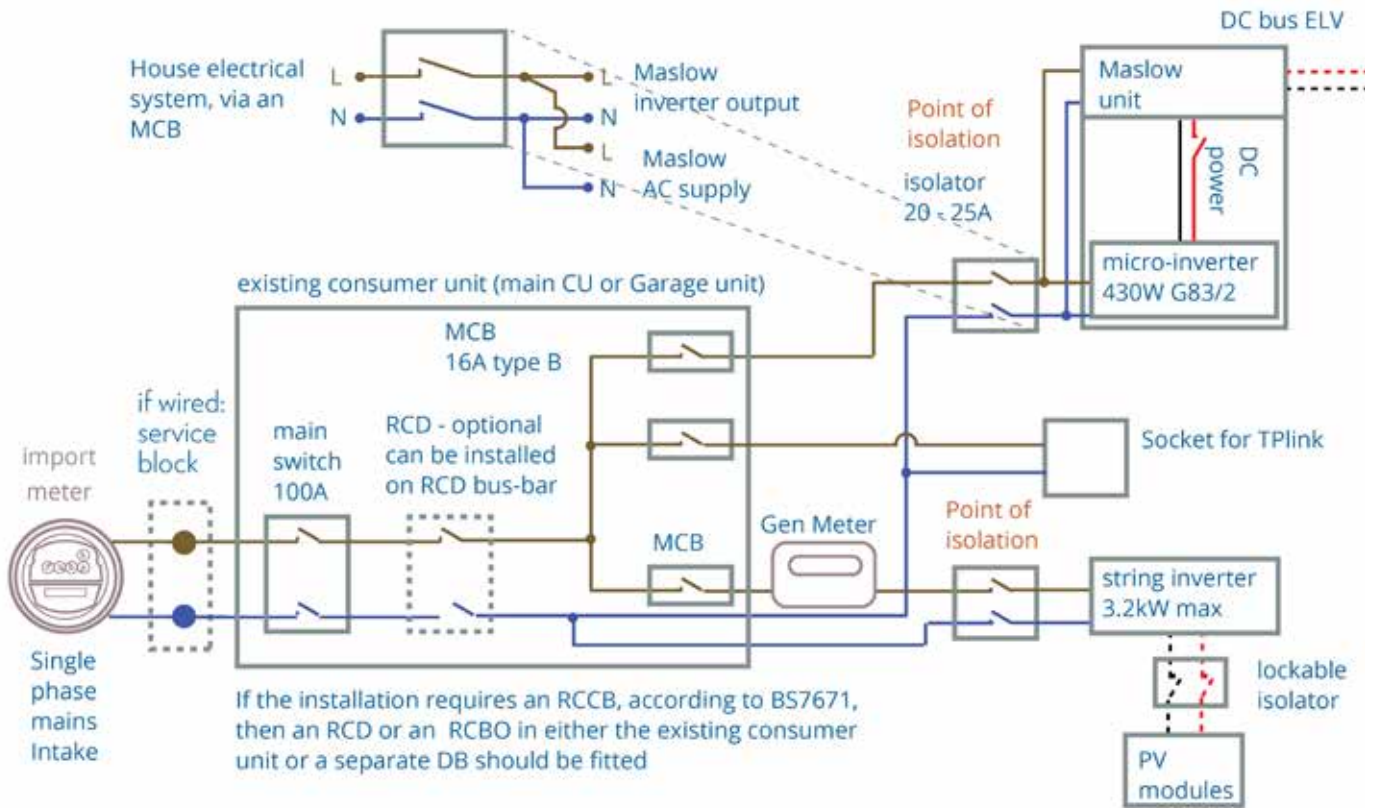
- Rotary isolator: "Onsite Generators Isolator" for combined Moixa unit and string inverter, or
- Rotary isolator: "Maslow Isolator"
- Consumer unit: "Maslow" –above CB/RCBO
- Distribution Board: "Maslow".- on face of unit

Labels to be black lettering on white background.





Type 1&5 Install wiring - co-install with AC PV



Note: If there is a solar load device such as an imersun solar water heater fitted then a special wiring approach must be adopted to ensure that both the Moixa Smart Battery and the third party device work correctly. Please contact Moixa technical team for advice.

Note: Is there is any voltage limiting device, or voltage optimiser in the household then the Moixa Smart Battery must be installed before this system - ie closer to the fiscal meter.



03B.05 Current Clamp installation

Introduction

It is very important to install the Maslow AC current clamps correctly otherwise the Maslow will not operate as designed. This procedure describes how to install them:

- The positioning of the clamps varies according to the install type and this should be established in a site survey prior to installation that will also determine what types of clamp you use.

Method

There are two types of current clamps:

1. A single current clamp entitled "PV Inverter" that measures the current delivered by the photovoltaic (PV) system. This clamp is used in all install types.
2. A pair of clamps cabled together (Y-clamp) entitled "Consumption 1" which measures the current consumed by the house and "Consumption 2" which measures the current delivered by the PV system. The Maslow calculates the difference between them to determine the power the household is using.



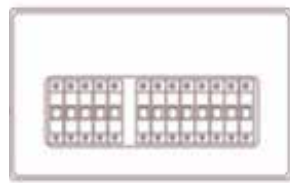
Clamp types

Y clamp configuration



ENSURE CONSUMPTION ARROWS
POINT TO CONSUMER UNIT

CONSUMPTION
Y CLAMP

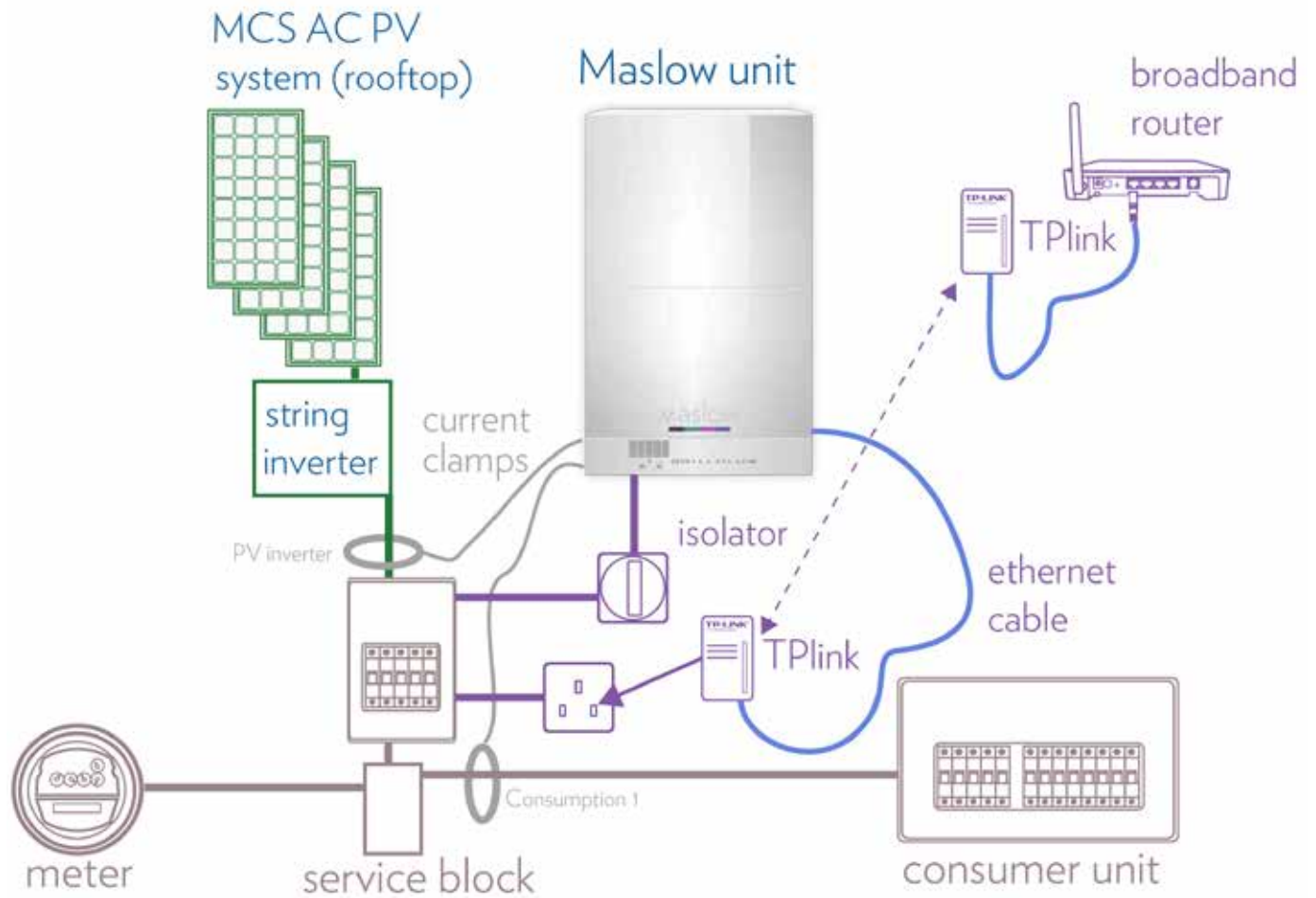


CONSUMER UNIT



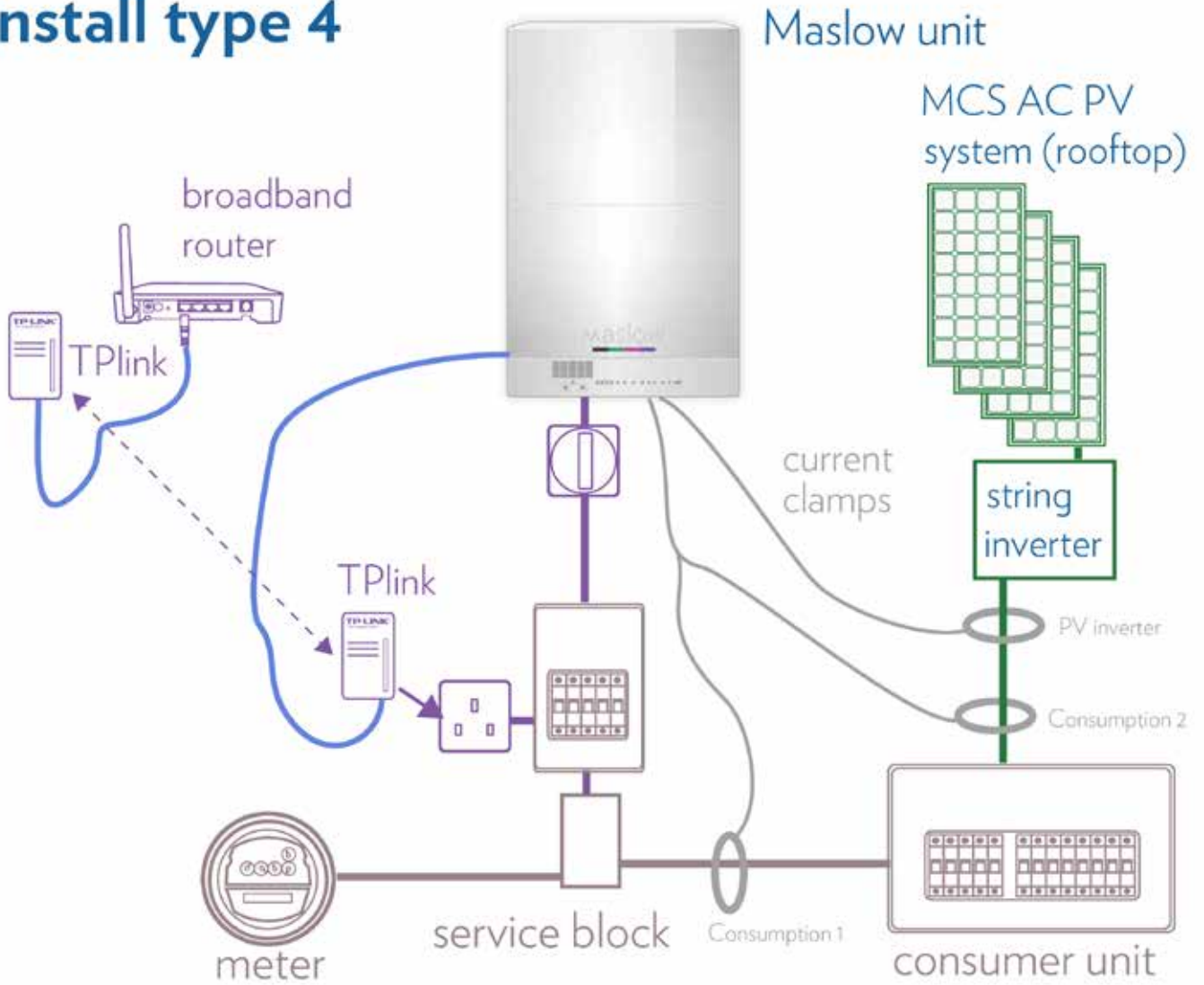
CONSUMPTION
Y CLAMP

Install type 5



Preferred install with mini consumer unit (with PV)
Single clamp

Install type 4



Install with mini consumer unit (with PV) to main consumer unit. Y clamp

In most cases the cable between the generation meter and the consumer unit is a PVC-sheathed cable. To get at the line conductor you will need to strip back roughly 20cm of the cable so that you have enough free to clamp the current sensors around. You cannot do this without installing an enclosure of some sort to protect the cable since it will lose its exterior protection. Therefore, we strongly recommend that you install a junction box that will house the current clamps and the unprotected cable and re-run the cable inside the box.



Example of a junction box protecting the current sensors

3B.06 Battery Installation

1. Connect the battery plug to the Moixa Base Unit, ensuring that the plug is fully home – clicked- into place in the socket. Pull on the plug to ensure that it is secure
2. Use the provide allen key bolts to secure the battery module into place.
3. Repeat with the second battery module.
4. Switch the unit on



equalizing batteries



connecting battery 1



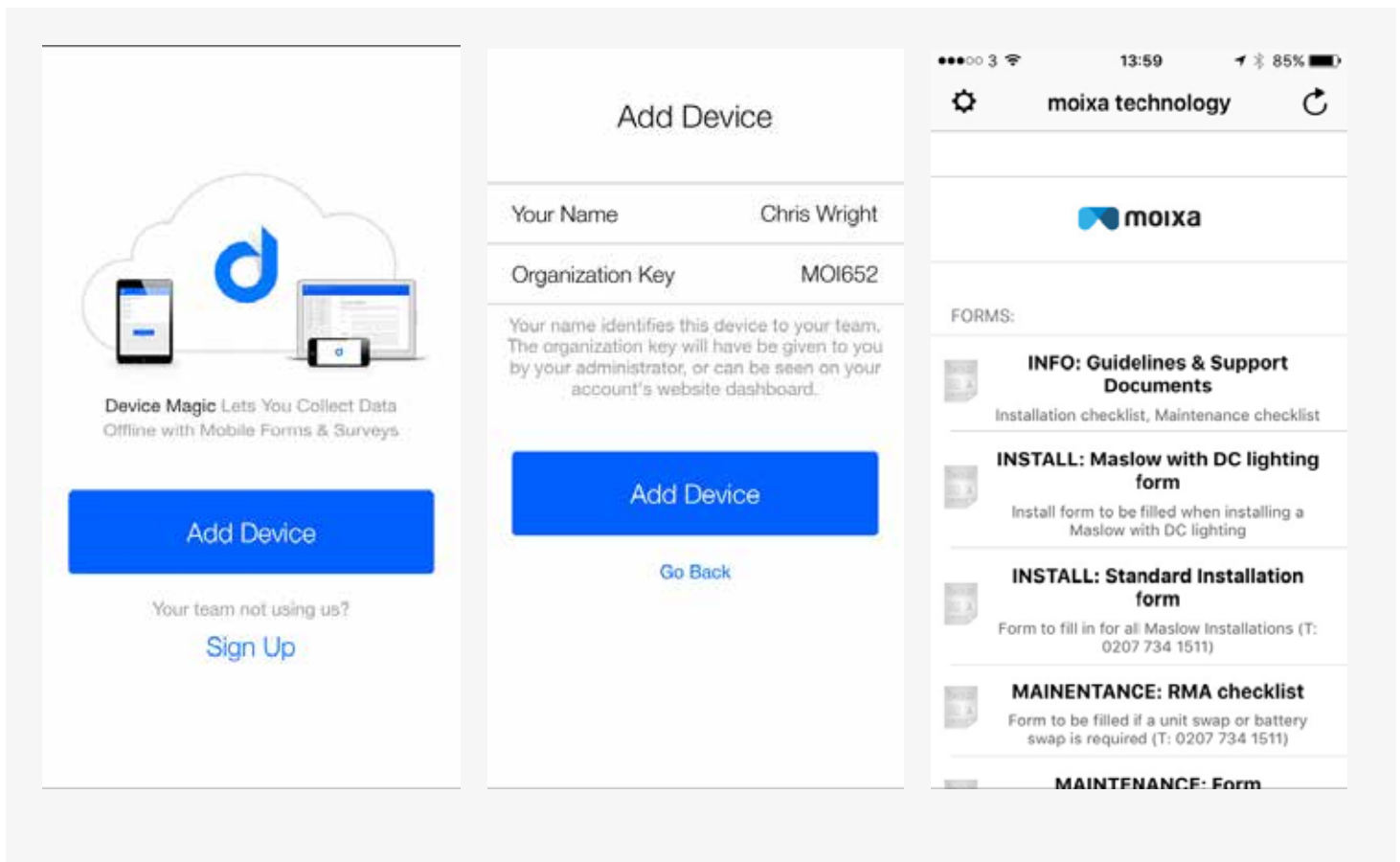
connecting battery 2

03B.07 Installation App

It is **very important** that all installs are recorded using the Moixa APP.

This prompts you through the steps required, and records vital information needed to configure and troubleshoot the unit. If you do not have access to the App please get in touch with Moixa. The App can be installed on most smart phones and tablets.

- a) For an iPhone go to the App store, and for an Android go to the Google Play store. Search for Device Magic, download and install the forms app.
- b) Click on the Add Device button, Enter your name and the Moixa organization key "MOI652"
- c) Your device will now request authorization from the Moixa Technology team, if this does not come through in a minute or two then ring the tech team on 0207 734 1511 and ask them to authorize your device.
- e) Your device will then download the list of forms for Moixa, you are now ready to start using them.



03B.08: Data connection to the Moixa server

The Moixa Smart Battery is reliant on a connection to the Moixa Grid Share server to enable Moixa to continuously monitor system performance and make sure that the system continues to work efficiently and delivers the maximum value to the client.

The following sections of the manual describe the recommended methods of connecting the system.

Options:

- Ethernet cable wired direct from broadband router to Moixa unit (preferred option)
- TP-link powerline connection. The TP link units transmit the signal over electrical cabling to an ethernet connection.
- Wifi. This means that if the client changes their broadband password then the unit will need to be logged into locally to reset the stored password.

For all these the connectivity LED will go ON when Maslow is successfully connected to the server. Call moixa to confirm successful connection and to perform commissioning process (tests to ensure that the system is correctly installed)



Direct Ethernet and TP-Link ethernet

Unless it has been agreed that the Moixa units will ship with ethernet connection then they will be shipped as WiFi (since this requires more testing at the factory). This means that for both direct ethernet and TP-link systems the **WiFi module will need to be disconnected**, and an ethernet cable run into the inside of the Battery unit. If the install is going to be in a location with limited access this is best done before the install has started - or back at the office.

Disabling WiFi and fitting the Ethernet cable.

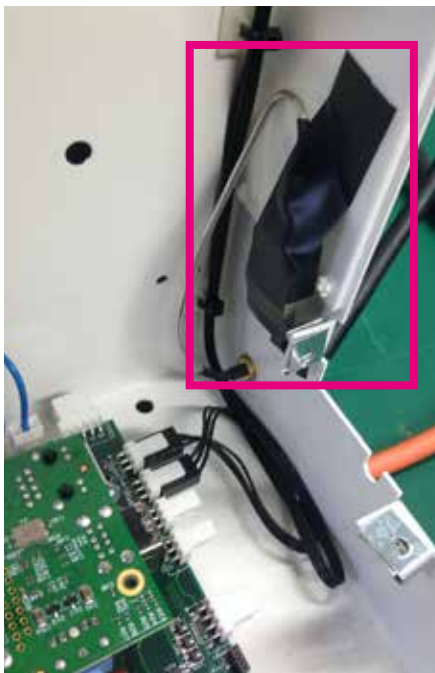
1. Remove cover from the Moixa Unit – 7 Allen key screws

1.



2. Locate the Ethernet port on the raspberry Pi. Remove the WiFi Dongle from the USB socket in the Pi. Tape it securely to the inside of the Moixa unit - in case WiFi is needed in the unit in future, or put in plastic bag and tape to the inside of the unit. You must not leave the arial wire dangling, it must be secured.
3. Plug the ethernet cable into the Pi module, run the cable out of the Moixa unit to the TP link module, either through the recess to the side of the Pi, or up to the top of the Moixa unit.
4. Secure Ethernet cable with cable ties.
5. Replace the cover and the battery units, switch on the Moixa unit

2.



3.



4.



Ethernet direct connection.

Run the ethernet cable neatly, using cable ties, to the broadband router location and plug it in. The Moixa unit will detect the connection type automatically when the unit is turned on.

TP-link powerline ethernet connection.

A socket will be needed close to the Moixa unit - and in many cases will need to be fitted specially to an existing circuit or a spur.

1. If no mains socket is available immediately next to the Moixa Smart Battery, then add one on a new or existing circuit, this can be a spur.
2. Plug in the TP link unit into the new socket and connect the ethernet cable now coming out of the Moixa unit. Use the standard TP-link, not the plug through one.
3. Plug in the pass through TP-link into the wall socket Socket next to the router, this should be direct into the wall socket not on an extension. It is best if this is on a circuit with things 'always' plugged in such as the router or TV to discourage the TP-link from ever being unplugged.
4. The TP-link units should come paired, lights will be blinking on both. If this is not the case then press the **"Pair"** button on both devices within a few seconds and check again that both lights are flashing.

1.

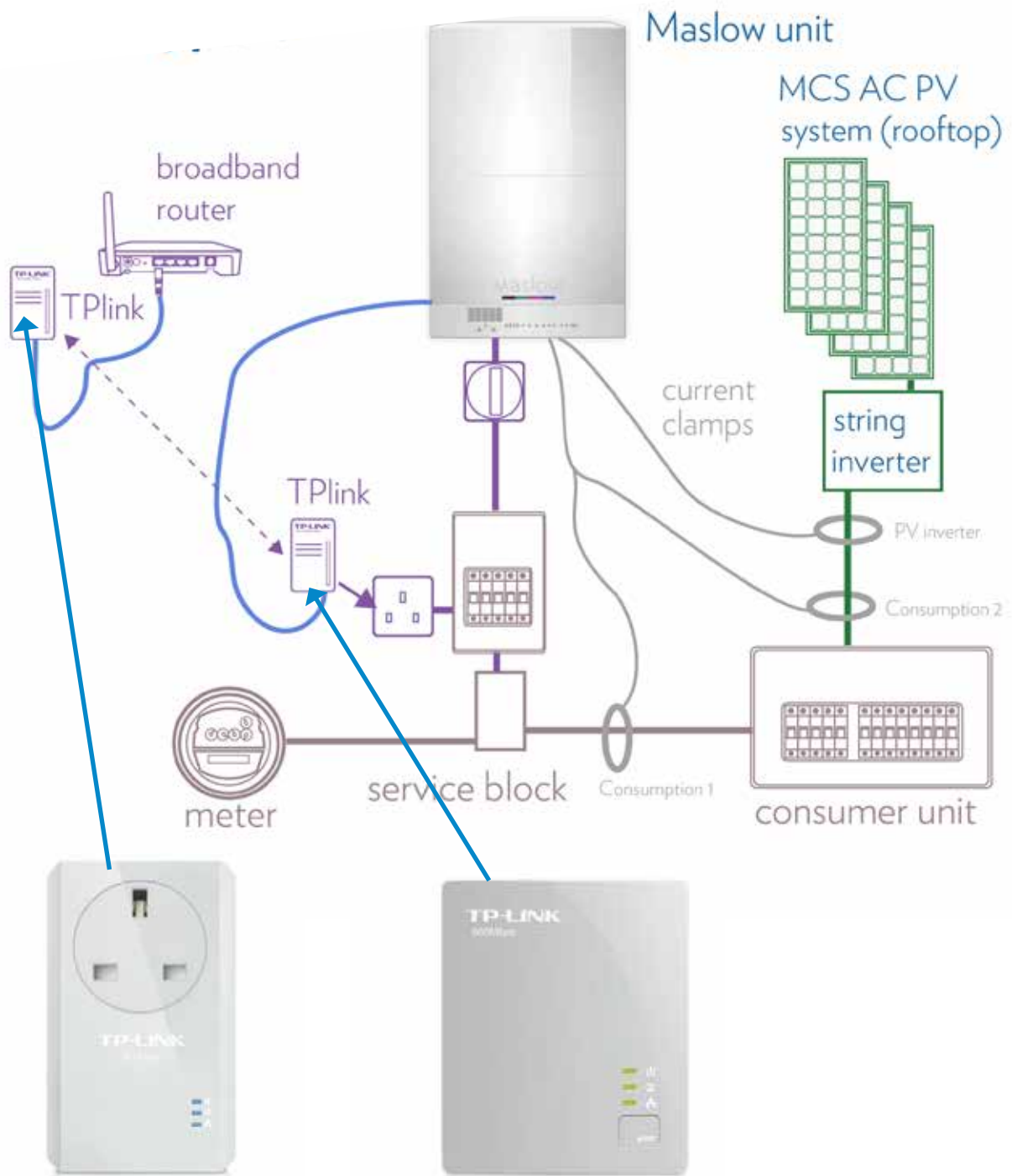


2.



3.





Connect Moixa Smart Battery using WiFi

1. If the Maslow is off then turn it on. Ensure that the Wifi Antenna is fitted.
2. The Maslow should be in AP mode, this will mean that the unit is acting as a Wifi node. Check on a smartphone or laptop to see if a wifi network starting with maslow and including the serial number is detected, for example [maslow-b827eb96da41](#) . Log onto this network. **Password = MaslowPass**
3. If the unit is not in AP mode then place the unit in AP mode by setting bypass switch to on, pressing mode button for 1 second, and then clicking out of bypass mode.
4. Select the Moixa Wi-Fi network from your Wi-Fi network chooser. This will be in the format [maslow-UnitSerialNo.](#)
5. When prompted for a password enter "MaslowPass".
6. Once your device has connected to the Moixa Smart Battery, open a web browser and navigate to the following page: <http://10.74.8.254/>
7. In the page that is displayed enter the SSID (In this case, "BT-VM-SK123") and password (in this case, "abc123xyz") of the wi-fi network that you wish the Moixa Smart Battery to connect to then click **Set**.
8. A confirmatory message will be displayed and your device will be disconnected from the Moixa Smart Battery.
9. [Ring Moixa technical team](#) - request that they login to the unit to commission

4.



5.



6 / 7 / 8



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www.moixa.com

03B.09: Commissioning the Moixa system

The Moixa app will guide you through the steps involved in the commissioning process for the Moixa smart battery. You will need to ring the technical team on 0207 734 1511 to complete this process - this must be done while you are on site at the clients home.

The installation is **not complete** until :

1. The unit is online
2. Moixa has received the installation form (using the APP)
3. Clamps are located in the right place - confirmed by Moixa team
4. Installer has called Moixa **while still on site** to verify the unit is online and the readings are OK. The Moixa Technical team will ask the installer to perform some tests, for example putting a full kettle on in the house to see the consumption spike and isolating the PV to see the change in PV feed.

Moixa Technical Team has to approve the installation for it to be signed off to the customer, the customer will not be able to access the extended 5 year warranty until the install is signed off by Moixa.

Please also see the installer agreement for details

03B.10 System Certification Protocol and Testing

System Certification Protocol and testing:

Either an Electrical Installation Certificate or a current Electrical Installation Condition Certificate for the mains ac installation, is desirable to ensure that it complies with relevant wiring standards (BS7671) The extent of responsibility for the existing installation is ultimately a matter of judgement by the contractor. Issues that must be addressed include:

- All installed protection measures should be viable.
- Equipotential bonding and Main earth conductor should be present and correct
- Anything immediately unsafe, noticed during initial survey or installation work, must be rectified or discussed with the customer to agree the required remedial work.
- If the customer does not agree to the remedial work, the contractor should refuse to carry out any new installation work.
- Any deviations from current regulations that do not pose an immediate safety concern should be noted and the customer informed as appropriate.
- Installation additions or alterations must be carried out to current wiring regulations.
- The extent and limitations of the new work must be clearly defined on the Electrical Installation Certificate.
- The installation should be left in as safe or safer condition as before the new work was performed.
- The standard EIC schedule(s) should be supplemented by the Maslow dc lighting schedule1, where appropriate.
- The Maslow technical specification- including output capability, protection settings etc, along with system schematic should be provided to the client. A laminated copy should be affixed adjacent to the Maslow.

Building Regulations Part P

As the Maslow system involves significant modification to the LV ac mains, fixed wiring installation and is effectively bonded to the LV ac MET, the installation will come within the scope of Part P of the wiring regulations in premises defined as residential by that regulation. Part P requires that such installations are carried out by competent and suitably qualified persons, approved for self certification, by an accreditation body such as NICEIC. The latest version of Part P should be consulted for current requirements.

03B.11 System labeling requirements

Labeling requirements generally

Durable, warning and identification labels must be attached to various parts of the installation. **Warning labels to be black lettering on yellow background.**

- First fix identification tape
- Consumer unit, label A
- Light switches and junction boxes B
- MCU labels B, C, D
- MCU label

Labels for install:

A. Warning! Some circuits have been re-assigned and re-terminated in adjacent equipment for ELV dc use.

B. ELV dc nominal 24V, max 35V Negative line earth bonded at source only.

C. Warning! Multiple energy sources: Battery, Solar Photovoltaic, Mains AC.

D. Negative line bonded to earth terminal internally and to Mains |AC MET via CPC of MCU power cable. Do Not Disconnect!

Appropriate labels for isolators etc need to be fixed to the system when it is installed:

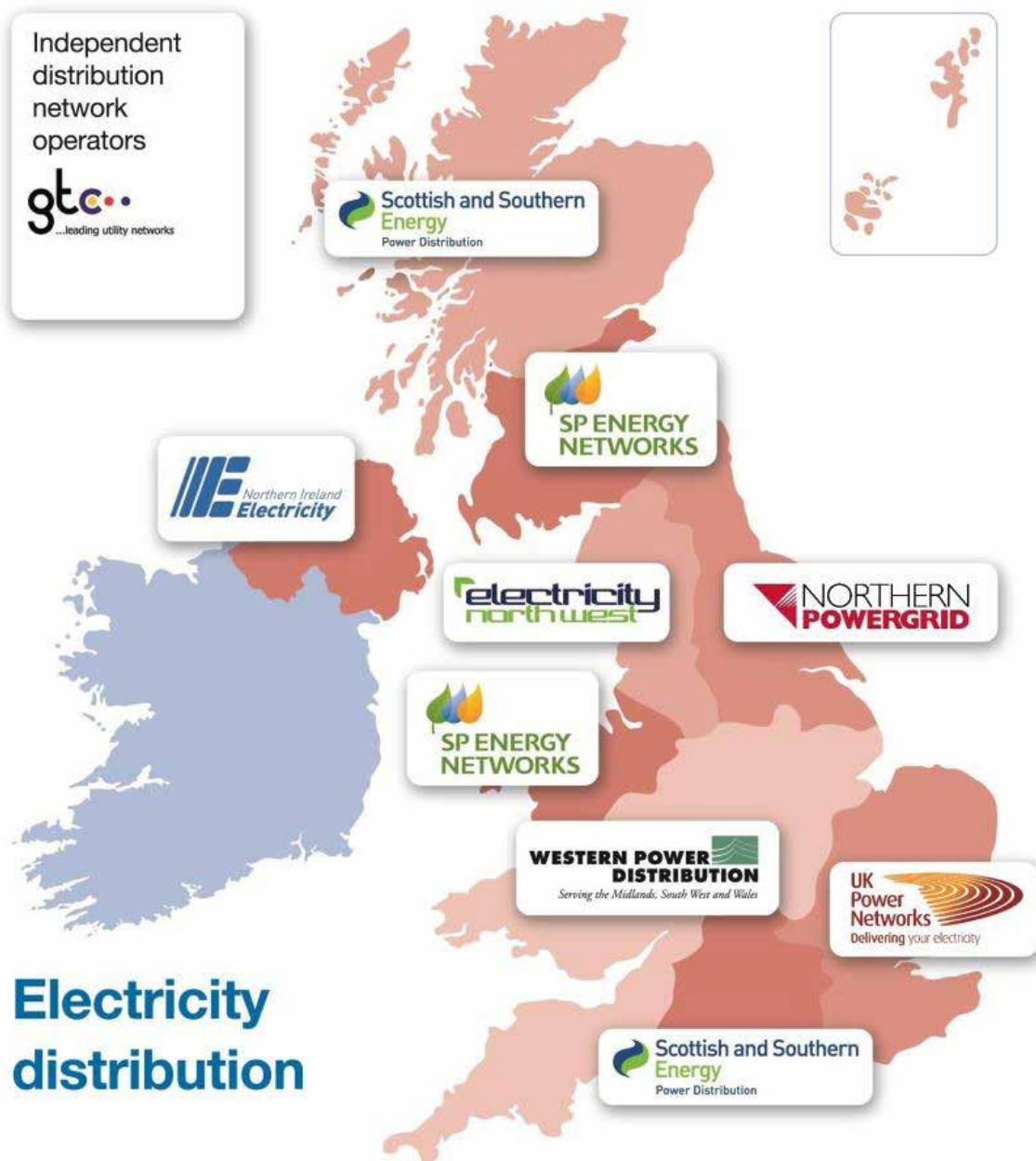
- Rotary isolator: "Onsite Generators Isolator" for combined Maslow and string inverter, or
- Rotary isolator: "Maslow Isolator"
- Consumer unit: "Maslow" –above CB/RCBO
- Distribution Board: "Maslow".- on face of unit

Informative labels to be black lettering on white background

APPENDIX 1: G83 and G59 applications required Installer responsibility

When systems with an inverter included are fitted then either a G83 or G59 application will need to be made to the local DNO authority.

The UK electricity network is split into regions and each region has different DNO. DNO contacts:



DNO	Covering	Application
Electricity North West	North West England	Email: connectionapplication@ewl.co.uk
Northern Ireland Electricity Networks	Northern Ireland	Online: www.nienetworks.co.uk
SP Energy Networks	Scotland England & Wales	Email Scotland: SPNCNorth@scottishpower.com Email England & Wales: SPNCsouth@scottishpower.com
S SE Power Distribution	North Scotland Southern England	Email: notifications.northmicrogen@sse.com , notifications.southmicrogen@sse.com
UK power Networks	Eastern England London South East England	Email: G83notification@ukpowernetworks.co.uk , connections.gateway@ukpowernetworks.co.uk
Western Power Distribution	South Wales Midlands South West	Email: wpdnewsupplieswales@westernpower.co.uk , wpdnewsuppliesmids@westernpower.co.uk , wpdnewsupplies@westernpower.co.uk
Northern Power Grid	North East England Yorkshire	Online: www.northernpowergrid.com
ESB Networks	Ireland	Web: www.esb.ie

Different forms that apply:

- **G83/2:** Commissioning Confirmation
- **G83/2:** Multiple sites
 - Application for Connection (ask permission to DNO)
 - Location map
- **G59/3:** Application for Connection (ask permission to DNO)

All forms are free to download on: <http://www.energynetworks.org/electricity/engineering/distributed-generation/distributed-generation.html>

Which form to use?

1. Single Maslow unit: *G83/2 Commissioning Confirmation* (max 28 days after commissioning)
2. Multiple Maslow units in the same area: *G83/2 Multiple sites, Application for Connection* (ask confirmation to the DNO)
3. Maslow retrofit to an existing AC PV
 - a. If ACPV system is < 3.25kW (ie. 3.68kW - 0.43kW) → G83/2 Commissioning Confirmation
 - b. If ACPV system is > 3.25kW single phase → G59/3 Application for Connection (ask confirmation with the DNO)

Information required:

1. DNO details
2. Installer details
3. Installation details
 - a. MPAN number
4. Existing generating units (where applicable):

Example:

Manufacturer /Reference	Proposed Date of installation	Technology Type	G83/ G59	Type test Ref No. if available	Generating Unit installed capacity kw				Power Factor
					3-Phase Units	Single Phase Units			
						PH1	PH2	PH3	
SMA- Sunny Boy 3600TL	June 2013	PV	G83	M215-60-230-S22		3.68 kW			

5. Proposed Additional Generating Unit(s):

Example:

Manufacturer /Reference	Proposed Date of installation	Technology Type	G83/ G59	Type test Ref No. if available	Generating Unit installed capacity kw				Power Factor
					3-Phase Units	Single Phase Units			
						PH1	PH2	PH3	
Enphase Energy Inc.	February 2016, ASAP	Micro inverter from DC stored energy	G83	M215 60-230-S22		0.43			



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Moixa Technical file part 03B — Install Manual

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Revision	Comments	Date	Author
Rev A	First version issued for comment	24/06/2013	CW
Rev B	Revised with connectivity method	02/05/2014	CW/GH
Rev C	Revised with Solar install methodology and 2kwh Maslow	19/09/2014	SB
Rev D	R Revised commissioning process	24/10/2014	CW
Rev E	Added Economy 7 configuration and updated PV config	11/02/2015	CW
Rev F	Revised installation approach with y clamps	07/07/2015	SB/MR/CW
Rev G	Revised clamp labelling	10/02/2016	DM/CW/MR
Rev H	Added notes	03/12/16	CW/AM



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