

# SolShare Design and Installation Guidelines

## Version B.11

### **DISCLAIMER**

This document is intended to provide guidance on how to design a safe and effective shared solar system using the SolShare. This document does not override the local electrical safety standards and wiring rules. It is the responsibility of the installer to ensure the shared solar installation meets the relevant electrical safety and wiring standards in the installation locality.

### **SOLSHARE SYSTEM DESIGN GUIDELINES**

There are certain criteria that should be kept to when designing SolShare systems.

#### **A. POWER INPUT**

The SolShare power input is three-phase. Any three-phase supply can be used, including multiple inverters connected in parallel.

The total input (including from the inverter and any AC-coupled batteries) must not exceed the maximum current rating of the SolShare. The SolShare35 is rated to 35 amps per phase.

Further information on the rating of the SolShare35 can be found on the product datasheet.

#### **B. SOLSHARE CONNECTIONS**

A SolShare unit has 5 three-phase outputs, which can be split and connected as individual phases to create 15 single-phase outputs. These outputs can be connected in any configuration, as long as there is at least a connection made to each of R1, W1 and B1, and the phase of the output matches the phase that it is connected to. It is highly recommended to have at least 2 connections per phase.

Not all of the 15 outputs need to be used. Example configurations:

- 4 three-phase connections. 3 connections not used.
- 11 single-phase connections. 4 connections not used.
- 2 three-phase & 4 single-phase connections. 5 connections not used.

In certain circumstances, the SolShare can connect to just one or two phases of a three-phase connected unit. Please refer to 'Installing the SolShare onto Three-Phase Apartments' document for more information on this.

## PHASE BALANCING

A three-phase inverter splits the generated power across its three phases. For example, a 15 kW three-phase inverter will supply 5kW of power on each phase. The SolShare distributes the power on each phase separately: 5 connections on red, 5 connections on white, and 5 connections on blue.

The solar can only be shared between units on the same phase, so this should be considered when designing the system. For example, if a 15kW system has been installed and connected to 14 single-phase apartments, with 5 on red, 5 on white and 4 on blue, then the 5 on red will share 5kW (averaging 1kW each), the 5 on white will share 5kW (averaging 1kW), and the 4 on blue will share 5kW (averaging 1.25kW), therefore, the 4 apartments on blue-phase will receive slightly more solar than the 10 on red and white.

Designing the system to balance the loads on each phase will help ensure all participants receive a compelling and equitable allocation of solar energy.

As three-phase units receive power from all three phases, the above does not apply.

## SERVICE SIDE VS. LOAD SIDE POINT OF CONNECTION (POC)

SolShare installations must follow one of the options provided in the following sub-sections for the relevant geography. As mentioned in the Disclaimer above, how the installer wires the SolShare connections is ultimately their choice and responsibility.

**It is important that an installer inform Allume if an installation does not follow one of the below options, as this would be non-compliant with Allume's guidelines.**

### QLD, NSW, VIC & TAS

There are 2 options:

1. It is highly recommended that the SolShare's outputs' point of connection (POC) be behind the meter, on the **service (line) side of the Tenancy Main Switch (Normal Supply)**<sup>1</sup>. When a SolShare is wired this way, the appropriate warning label supplied with the SolShare should be applied to the meter panel to indicate service side wiring.
2. Should the installer decide to connect the SolShare's outputs on the load side of the *Tenancy Main Switch (Normal Supply)*, **the installer must use a 2 pole breaker for the Tenancy Main Switch (Normal Supply) and Tenancy Main Switch (Inverter Supply)**.

### South Australia

Follow 1 of the 4 options provided in the *SAPN Interconnection Requirements for SolShare* document.

### ACT

There is 1 option:

EvoEnergy has stated that the SolShare's outputs' point of connection (POC) should be behind the meter, on the **service (line) side of the Tenancy Main Switch (Normal Supply)**<sup>1</sup>. When a SolShare is wired this way, the appropriate warning label supplied with the SolShare should be applied to the MSB to indicate service side wiring.

1. See Section F for more information about switchgear and the template SLD at the end of this document

## C. METERING

### RETAIL ELECTRICITY METERS

The apartments must be fitted with bi-directional capable 'smart' meters. These meters should be ganged on a central meter panel, or on separate meter panels for each floor.

### SOLSHARE CT METERING

15 current transformers (CTs) are supplied with each SolShare, one corresponding to each output connection. These CTs must be clipped on the incoming supply to each participating unit, between their meter and the point of connection (POC) of the solar. See the Installation Manual and template SLD for further detail.

The standard CTs are rated at 75A and supplied with 10m tails, which must wire back to the SolShare's CT terminals. The tails on the standard CTs **cannot** be extended.

**If the SolShare is located more than 10m from the POC (or a higher current rating than 75A is required), then the installer will need to order an upgraded CT kit from Allume at the time of ordering.** Upgraded CTs are rated to 200A and their tails can be extended to up to 100m. Only twisted pair, 24 AWG cabling should be used to extend the lengths.

## D. SOLSHARE INSTALLATION LOCATION

The SolShare has been tested and certified for IP56, meaning it can be installed in an outdoor unconditioned environment. However, it should not be installed in direct sunlight or in the path of falling debris, such as under a tree (a shade should be provided if installed outdoors).

The dimensions and clearance requirements of the SolShare are included in the Installation Manual. Most crucially, there needs to be a 50cm clearance both above and below the SolShare enclosure, and 15cm to the left and right.

It is also recommended that the SolShare not be installed directly under a cable tray or similar, which would block or weaken 4G/wireless internet signals.

To minimise cabling cost and prevent extension of CT tails being required, it is recommended that the SolShare be installed as close to the location of the *Tenancy Main Switches (Normal Supply)* as possible (e.g. adjacent to the MSB).

**A 4G signal or other wireless internet network must be available at the SolShare's installation location.** The SolShare cannot be commissioned (and ongoing monitoring cannot be provided) if there is no 4G connectivity or the SolShare cannot connect to wireless internet.

## E. CABLING

4 core + earth cable is recommend for both the input and output connections to the SolShare. For the output cables, a cable tray is recommended to allow all output cables to be laid relatively quickly and easily.

The gauge of the AC output cable of the inverter should be sized in the same way as is done for a standard solar installation, considering max current, distance to POC, temperature, cable specifications and cable spacing. This cable will form the input to the SolShare.

**All output cables of the SolShare must be the same gauge as this input cable,** as at points in time the SolShare may direct all current to one unit on each phase.

## F. SWITCHGEAR

Please refer to the template SLD contained in the Installation Configurations section for context on the following switchgear categories.

### INVERTER SUPPLY MAIN SWITCH

Each shared solar system must have a single point of isolation. This should be labelled the *Inverter Supply Main Switch*. Its location should be accessible and clearly labelled from the main switchboard (MSB). The SolShare's input will be fed from the *Inverter Supply Main Switch*.

### TENANCY MAIN SWITCHES (NORMAL SUPPLY)

Centrally located Tenancy Main Switches (or "Unit Main Switches") on the load side of each unit's meter are required for SolShare connection. These switches are the point of connections (POCs) of the SolShare outputs. Typically, these are in an MSB adjacent to the meter panel. If this is not the case, then a switchboard will need to be installed with Tenancy Main Switches included.

The SolShare's connection to these *Tenancy Main Switches (Normal Supply)* will depend on the installation design adopted, see the *DNSP & Installation Configurations* section.

### TENANCY MAIN SWITCHES (INVERTER SUPPLY)

Each connected unit requires its own individual *Tenancy Main Switch (Inverter Supply)*. This breaker will need to be wired between the output of the SolShare and the POC of that unit.

If space permits, the *Tenancy Main Switches (Inverter Supply)* should be installed adjacent to their respective *Tenancy Main Switches (Normal Supply)* in the MSB. If space does not allow for this, it is advised that the *Inverter Supply Main Switch* of the whole system be mounted in the MSB. In this case, the location of the *Tenancy Main Switches (Inverter Supply)* should be indicated via a label in the MSB.

The *Tenancy Main Switches (Inverter Supply)* should be sized above the max current output of the inverter, e.g. 40A if a 20kW system is installed.

### SOLSHARE MAINTENANCE ISOLATORS (GRID)

For ease of isolation of the SolShare, it is highly recommended that an enclosure be installed below the SolShare containing *SolShare Maintenance Isolators (Grid)* for each output. Only once all these isolators are open, along with the *Inverter Supply Main Switch*, will the SolShare be isolated. As the SolShare is a 3-phase device, it is recommended that these Maintenance Isolators are 3 pole.

The *SolShare Maintenance Isolators* should have the same current rating as the *Tenancy Main Switches (Inverter Supply)*.

## G. NETWORK PROTECTION UNITS (NPU)

As with other solar installations more generally, NPUs may be required in installations involving a SolShare, based on rules set out by the relevant DNSP, Australian Standards or other regulations.. Please consult Allume's *0370\_A1\_NPU\_Guidance\_for\_SolShare\_Installations* document for more information.

## H. LABELLING

A label kit is provided with each SolShare. This label kit contains those labels specific to the SolShare. Other labels for other parts of the solar system should be provided by the installer. Please consult Allume's *0355\_A1\_SolShare\_Labelling\_Advice* document for more information.

## I. SHARING

The SolShare is a smart solar sharing device, sensing which tenants are using electricity, and sending solar generation to where it is needed most on a continual basis. This sharing is done between tenants connected to the same phase outputs of a SolShare (no sharing is done between phases).

The SolShare can share solar generation between connected tenants under 2 different modes:

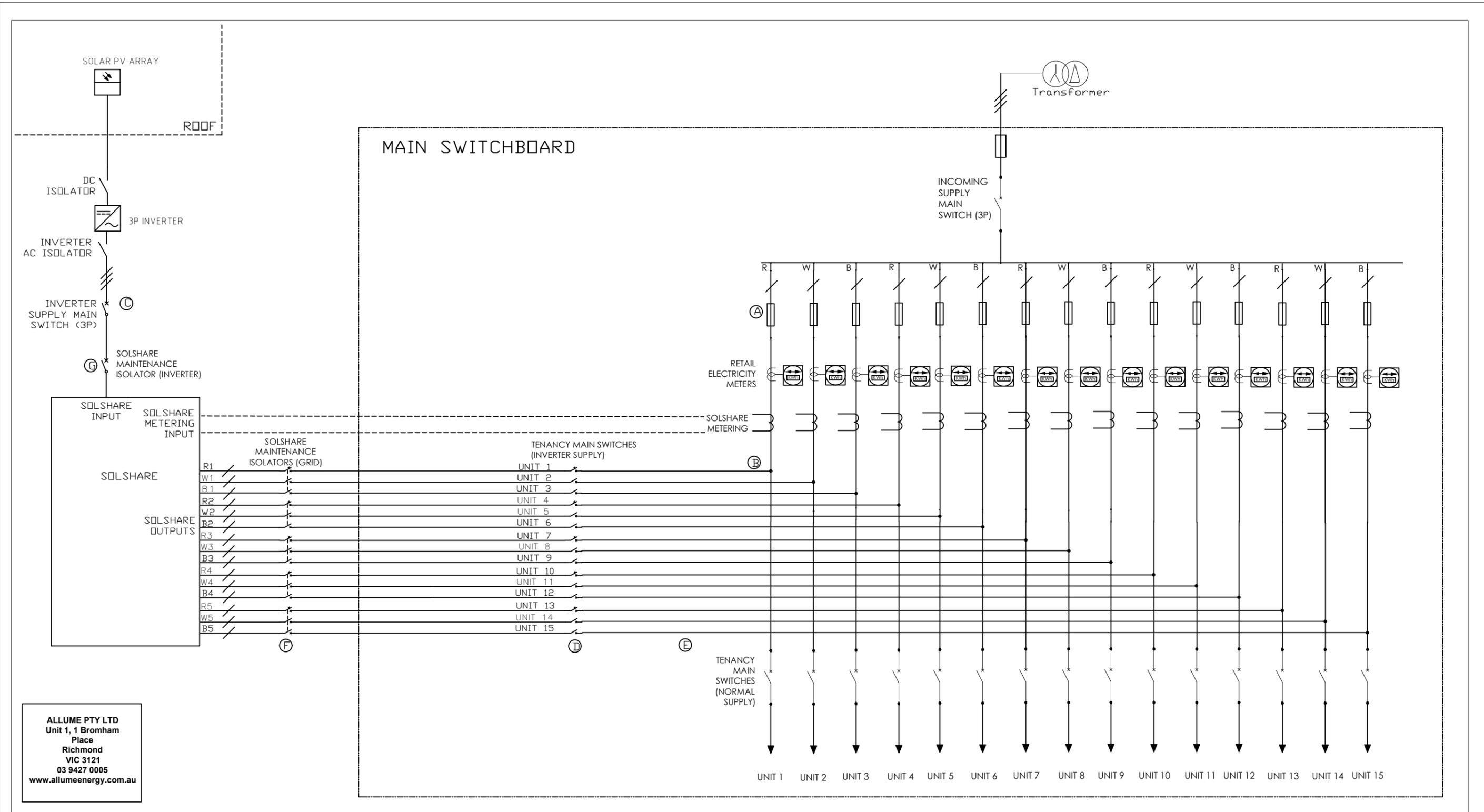
1. **Optimised:** Regardless of how much energy is sent to each tenancy, the SolShare shares solar generation according to what will maximise self-consumption within the building. This mode is often used for social housing projects, or where the building owner/manager has paid for the solar system and is trying to maximise the benefits of the solar system across the whole building.
2. **Optimised and Even:** This mode follows the same rules as the *Optimised* mode, but the SolShare also tracks the cumulative energy (kWh) sent to each tenant over the course of each calendar month. It then prioritises certain tenants over others to ensure that an even allocation of energy (kWh) is delivered to each tenant over the course of every month.

## DNSP & INSTALLATION CONFIGURATIONS

Follow the table below to select the appropriate installation configuration depending on the Distribution Network Service Provider (DNSP) corresponding to the installation location.

The template SLD included in the following page displays which installation configuration should be adopted for a typical installation of 15 single phase units. This must be altered to suit each installation. Notes are included in the SLD to annotate key considerations of your design.

<b>DNSP</b>	<b>Approval to install</b>	<b>Other comments</b>
CitiPower/PowerCor	Yes	
Jemena	Yes	
United	Yes	
AusNet	No	
Tas Networks	Yes	
South Australian Power Networks	Yes	See additional <i>SAPN Interconnection Requirements for SolShare</i> document
AusGrid	Yes	
Endeavour Energy	Yes	
Essential Energy	No	
Energex / Ergon	Yes	
Evo Energy	Yes	
Western Power	No	
NT Power and Water Corporation	No	



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**NOTES**

<p><b>(A)</b></p> <p>In South Australia Service Side fuses will be replaced by meter isolators.</p> <p>If this is the case the system should be configured for SYSTEM LEVEL ANTI-ISLANDING.</p>	<p><b>(B)</b></p> <p>It is advised that the point of connection is on the service side of the Main Switch (Normal Supply) for each unit. This means operating the Tenancy Main Switch (Normal Supply) will isolate both grid and solar supply to tenancy.</p> <p>Clear labelling must be included on the meter panel to indicate this wiring configuration (label provided with SolShare).</p>	<p><b>(C)</b></p> <p>If possible, the Inverter Supply Main Switch should be housed in the MSB. If not possible then clear labeling of location of Inverter Supply Main Switch must be included in MSB</p>	<p><b>(D)</b></p> <p>Tenancy Main Switches (Inverter Supply) should be housed in MSB. If this is not possible then Inverter Supply Main Switch must be in MSB (see point C).</p>	<p><b>(E)</b></p> <p>Cable gauge from Tenancy Main Switches (Inverter Supply) should match cable gauge of grid into Tenancy Main Switches (Normal Supply).</p>	<p><b>(F)</b></p> <p>SolShare Maintenance Isolators (Grid) are always advised but only required if Tenancy Main Switches (Inverter Supply) are not readily accessible from the SolShare.</p>	<p><b>(G)</b></p> <p>SolShare Maintenance Isolator (Inverter) is only required if Inverter Supply Main Switch is not easily accessible from the SolShare.</p>
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<b>Title: SERVICE SIDE POC</b>		
<b>Issued For: DESIGN</b>		
Drawing NO:	Scale	Date
A_4_SSP	No Scale	10/06/2021
Drawn	Checked	Approved
C.KNOX	M.DART	C.KNOX