

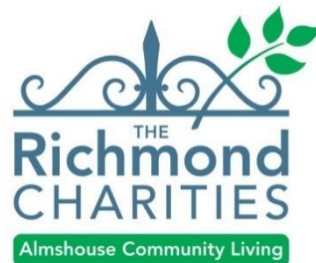
PV PANELS - U0160162

ON BEHALF OF
THE RICHMOND CHARITIES

MITRE MEWS TO THE REAR OF 20-34 ST MARY'S GROVE,
RICHMOND

(22/2082/FUL)

SEPTEMBER 2024



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1.0 Requirements

1.1 Condition

U0160162 - Notwithstanding the details shown on the approved drawings, prior to the occupation of the development hereby approved, further details of the photovoltaic panels shall be submitted to and approved in writing by the Local Planning Authority. The details shall include:

- o Siting
- o Design
- o Energy savings

The development shall only be implemented in accordance with the approved details and maintained as such unless otherwise agreed in writing by the Local Planning Authority.

REASON: In the interests of promoting sustainable forms of developments and to meet the terms of the application.

2.0 Development Description

The proposed Mitre Mews development is for 5 No. 1- bed single-storey dwellings (Use Class C3 (a)) with associated landscaped amenity, providing 100% affordable housing for the over 65s. All the units are designed to 'Passivhaus' standards, with four units to be M4(3) wheelchair user dwellings and one to M4(2) wheelchair accessible and adaptable standards.

3.0 Siting

Refer to drawing: SMGG-112 C5 Roof Plan.

3.1 Design

Each of the five dwellings is provided with 8 x JA Solar 410 watt panels per property, together with 1 x Givenergy Hybrid 3.6kW inverter and 5.2kW Gen I battery. That is a total of 40 panels, or a photovoltaic system of 3.28kWp.

Harvest the Sunshine

DEEP BLUE 3.0

Mono 420W MBB Half-cell Module
JAM54S31 395-420/GR/1000V Series

Introduction
Assembled with 11BB PERC cells and gapless ribbon connection technology, the modules can offer higher output power with improved module efficiency, the reduction of cells gaps brings outstanding module appearance. The half-cell configuration makes less shading effect, lower risk of hot spot, as well as more reliable and stable power generation.



Higher output power



Lower LCOE



Less shading and lower resistive loss



Better mechanical loading tolerance

Superior Warranty

- 12-year product warranty
- 25-year linear power output warranty



■ New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems



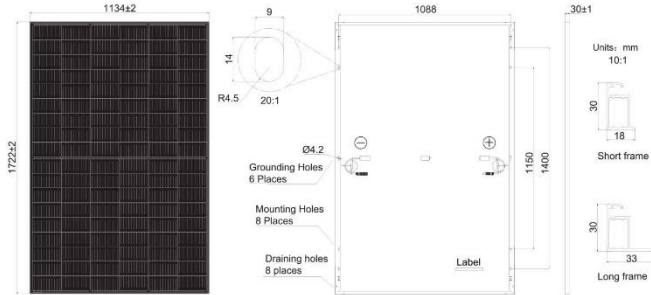
JA SOLAR

www.jasolar.com

Specifications subject to technical changes and tests.
JA Solar reserves the right of final interpretation.
Shanghai JA Solar Technology Co., Ltd.



MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

| | |
|---------------------------------------|--|
| Cell | Mono |
| Weight | 19.5kg or 21.5kg |
| Dimensions | 1722±2mm×1134±2mm×30±1mm |
| Cable Cross Section Size | 4mm ² (IEC) , 12 AWG(UL) |
| No. of cells | 108(6x18) |
| Junction Box | IP68, 3 diodes |
| Connector | Staubli MC4 QC Solar QC 4.10 |
| Cable Length (Including Connector) | Portrait: 200mm(+)/300mm(-); Landscape: 1200mm(+)/1200mm(-) |
| Front Glass | 2.8mm or 3.2mm |
| Country of Manufacturer | China/Vietnam |

ELECTRICAL PARAMETERS AT STC

| TYPE | JAM54S31 -395/GR/1000V | JAM54S31 -400/GR/1000V | JAM54S31 -405/GR/1000V | JAM54S31 -410/GR/1000V | JAM54S31 -415/GR/1000V | JAM54S31 -420/GR/1000V |
|--|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Rated Maximum Power(Pmax) [W] | 395 | 400 | 405 | 410 | 415 | 420 |
| Open Circuit Voltage(Voc) [V] | 36.98 | 37.07 | 37.23 | 37.32 | 37.45 | 37.58 |
| Maximum Power Voltage(Vmp) [V] | 30.84 | 31.01 | 31.21 | 31.45 | 31.61 | 31.80 |
| Short Circuit Current(Isc) [A] | 13.70 | 13.79 | 13.87 | 13.95 | 14.02 | 14.10 |
| Maximum Power Current(Imp) [A] | 12.81 | 12.90 | 12.98 | 13.04 | 13.13 | 13.21 |
| Module Efficiency [%] | 20.2 | 20.5 | 20.7 | 21.0 | 21.3 | 21.5 |
| Power Tolerance | 0~+5W | | | | | |
| Temperature Coefficient of Isc(α_Isc) | +0.045%/°C | | | | | |
| Temperature Coefficient of Voc(β_Voc) | -0.275%/°C | | | | | |
| Temperature Coefficient of Pmax(γ_Pmp) | -0.350%/°C | | | | | |

STC Irradiance 1000W/m², cell temperature 25°C, AM1.5G
 Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer.They only serve for comparison among different module types.
 Measurement tolerance at STC: Pmax ±3%, Voc ±3% and Isc ±4%.

ELECTRICAL PARAMETERS AT NOCT

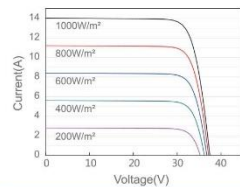
| TYPE | JAM54S31-395 /GR/1000V | JAM54S31-400 /GR/1000V | JAM54S31-405 /GR/1000V | JAM54S31-410 /GR/1000V | JAM54S31-415 /GR/1000V | JAM54S31-420 /GR/1000V |
|--------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Rated Max Power(Pmax) [W] | 298 | 302 | 306 | 310 | 314 | 318 |
| Open Circuit Voltage(Voc) [V] | 34.75 | 34.88 | 35.12 | 35.23 | 35.37 | 35.50 |
| Max Power Voltage(Vmp) [V] | 29.08 | 29.26 | 29.47 | 29.72 | 29.89 | 30.09 |
| Short Circuit Current(Isc) [A] | 10.96 | 11.03 | 11.10 | 11.16 | 11.22 | 11.29 |
| Max Power Current(Imp) [A] | 10.25 | 10.32 | 10.38 | 10.43 | 10.50 | 10.57 |

OPERATING CONDITIONS

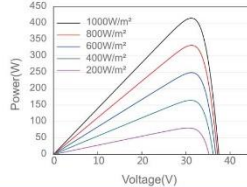
| | |
|---|---|
| Maximum System Voltage | 1000V DC |
| Operating Temperature | -40 C~+85 C |
| Maximum Series Fuse Rating | 25A |
| Maximum Static Load,Front Maximum Static Load,Back | 3600Pa, 1.5 1600Pa, 1.5 |
| NOCT | 45±2 C |
| Safety Class | Class II |
| NOCT | Irradiance 800W/m ² , ambient temperature 20°C,wind speed 1m/s, AM1.5G |
| Fire Safety Class | Class C |

CHARACTERISTICS

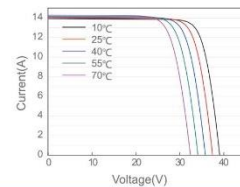
Current-Voltage Curve JAM54S31-415/GR/1000V



Power-Voltage Curve JAM54S31-415/GR/1000V



Current-Voltage Curve JAM54S31-415/GR/1000V



Premium Cells, Premium Modules

Version No. : Global_EN_20220902A



The 5.2kWh battery pack is our most versatile battery and can be installed in a wider range of locations due to its compact design and can either be wall mounted or floor stood.

This battery is primarily used in a modular way ensuring the system can grow with the needs of the consumer. Utilising lithium iron phosphate technology, our batteries are extremely safe and can be installed in a wide range of locations. The battery chemistry does not contain any Cobalt, making it non-flammable and the battery pack is 99% recyclable.



Remote Firmware

Control and monitor your Smart System on the move via our GivEnergy Monitoring App and Portal.



IP65 Rating

Our IP65 rated enclosure gives protection against water and dust. Ideal for lofts and outdoor installation.



Retrofit Compatible

Add the battery to an existing Solar PV System without affecting the Government Incentive.



12 Year Warranty

Supplied with a full manufacturer's warranty. Our UK team are on hand to help you should any issues arise.



Standalone Battery System

A standalone battery can be used without the need for Solar Panels. Charge the battery off-peak when it's cleaner, greener and less costly then discharge the battery during peak times for maximum saving.

Giv-Bat 5.2 Gen 1

SPECIFICATIONS

| | |
|---|---|
| Dimensions | 515H X 223D x 480W (mm) |
| Weight | 63Kg |
| Capacity | 5.2 kWh / 102 Ah |
| Voltage | 51.2V |
| Current | 50A |
| Technology | LiFePO ₄ Cell |
| IP Grade | IP65 |
| BMS | Robust Multi Point Monitoring BMS Pre Installed |
| Life Cycling (Optimal: 80% DOD at 25°C) | 10 Years |
| Charging Temperature | 0°C - 55°C |
| Discharging Temperature | -10°C - 55°C |
| Storage Temperature | -30°C - 60°C |
| Warranty BTT | 52MWh / 12 Years |
| Standard | UN 38.3, IEC61000 |

ELECTRICAL PARAMETERS

| | |
|-------------------------------------|----------------------------------|
| Operating Voltage Range | 45V - 58V |
| Maximum Charging Voltage | 59V |
| Max. Charging / Discharging Current | 50A / 50A |
| Networking Interface | RS485 |
| Communication Protocols | Modbus |
| Advantages | Stackable, BMS Upgradeable, IP65 |
| Depth of Discharge | 80% |



Hybrid Inverter 3.6 Gen 3

The third generation of the GivEnergy Hybrid Inverter is a battery and solar inverter in one unit.

It can be coupled directly with solar panels to generate usable electricity in the property as well as store any excess energy for later use in a battery. The Hybrid Inverter aims to minimise export by storing excess energy in the battery during generation hours. Additionally, it will minimise import by discharging to meet demand in the property.



In-built WiFi and LAN

Includes in-built WiFi and LAN for a hard-wired network connection.



Higher Charge/Discharge Rate

Increased efficiency, higher discharge rates of up to 3.6kW.



Flexible Rate Tariff

Charge the battery off-peak when it's cleaner, greener and less costly then discharge the battery during peak times for maximum saving.



12 Year Warranty

Supplied with a full manufacturer's warranty. Our UK team are on hand to help you should any issues arise.

INPUT DATA (PV)

| | |
|--|-------------|
| Max. DC Input Power (per string) | 7.5kWp |
| Start-up Voltage | 150V |
| Max. PV Voltage | 580V |
| MPPT Range | 120V - 550V |
| Nominal Voltage | 360V |
| Max. Short Circuit Current (per string) | 20A |
| Max. Input Current (per string) | 15A |
| MPPT Tracker / No. of Strings per MPPT Tracker | 2/1 |

OUTPUT DATA (AC)

| | |
|--|----------------------------|
| Nominal AC Output Power | 3600W |
| Max. Apparent Power Output to Utility Grid | 3800VA |
| Max. Output Current | 16A |
| Nominal Voltage / Range | 230V (180 - 272) VAC |
| Frequency Range | 50 / 60 Hz; ±5 Hz |
| Power Factor (Full Load) | >0.99 |
| Power Factor Range | 0.8 Lagging... 0.8 Leading |
| THDI (Nominal Power) | <3% |
| AC Connection | Single Phase |

BATTERY

| | |
|-------------------------------|---------------------|
| Battery Type | LiFePO ₄ |
| Battery Voltage Range | 45V - 58V |
| Nominal Voltage | 51.2VDC |
| Charge* / Discharge Current | 65A / 81A |
| Max. Charge / Discharge Power | 3300W / 3600W |
| Communication Interface | RS485 |

BACKUP TERMINAL PARAMETER (AC)

| | |
|-------------------------|--------|
| Nominal AC Output Power | 3600W |
| Nominal Voltage | 230Vac |
| Max. Output Current | 16A |
| Nominal Frequency | 50 Hz |
| Automatic Switch Time | 10ms |
| THDv (Linear Load) | <3% |

* Charge current increased to 70A via firmware update

PROTECTION DEVICES

| | |
|--|----------|
| DC Reverse Polarity Protection | Yes |
| DC Switch Rating for each MPPT | Yes |
| Output Overcurrent Protection | Yes |
| Output Overvoltage Protection Varistor | Yes |
| Ground Fault Monitoring | Yes |
| Grid Monitoring | Yes |
| Max. Inrush Current | 30A Peak |
| Max. Output Fault Current | 40A Peak |
| Max. Output Overcurrent Protection | 25A RMS |
| Earth Leakage Current Monitoring | Yes |

GENERAL DATA

| | |
|-------------------------------|------------------------------------|
| Dimensions | 588H x 214D x 480W (mm) |
| Weight | 32Kg |
| Charge / Discharge Efficiency | 94% / 94% |
| PV Max. Efficiency | 97.6% |
| Euro Efficiency | 97% |
| MPPT Efficiency | 99.9% |
| Protection Class | IP65 |
| Noise Emission (Typical) | <30dB |
| Operational Temperature | -20°C - 60°C with derating at 50°C |
| Relative Humidity | 0 ~ 100% |
| Altitude | 4000m (derating above 2000m) |
| Inverter Topology | Transformerless |
| Self-Consumption | <5W |

FEATURES

| | |
|-------------|-----------|
| Display LCD | LED & APP |
|-------------|-----------|

INTERFACE

| | |
|---------------|--|
| Communication | BMS: RS485 Meter - Meter: RS485 Portal - WiFi (USB) or LAN |
|---------------|--|

CERTIFICATES AND APPROVALS

TÜV CE,
TÜV IEC 62109-1&2,
TÜV VDE 0126-1-1,
AS4777&AS/NZS 3100,
EN50549,
SAA,
G98,
G100



3.2 Energy Saving

The estimated output of the PV system based on the total size of the array, irradiance (sunlight) for the postcode, shading, and the orientation of the panels is:

$$1,150.00 + 1,207.96 = 2,357.96 \text{ kWp (refer to following data sheet).}$$



Key Performance Summary

| A. Installation Data | | |
|---|--------------|---------|
| Installed capacity of PV system – kWp (stc) | 1.64 | kWp |
| Orientation of the PV system – degrees from South | 100 | ° |
| Inclination of system – degrees from horizontal | 12 | ° |
| Postcode region | 1 | |
| B. Performance Calculations | | |
| kWh/kWp (Kk) from table | 806 | kWh/kWp |
| Shade Factor (SF) | 0.87 | |
| Estimated annual output (kWp x Kk x SF) | 1,150.00 | kWh |
| C. Installation Data | | |
| Assumed occupancy archetype | Home All Day | |
| Assumed annual electricity consumption, kWh | 5,300.00 | kWh |
| Assumed annual electricity generation from solar PV system, kWh | 1,150.00 | kWh |
| Expected solar PV self-consumption / Self-sufficiency (PV Only) | 805.00 | kWh |
| Grid electricity independence / Self-sufficiency (PV Only) | 15 | % |



Key Performance Summary

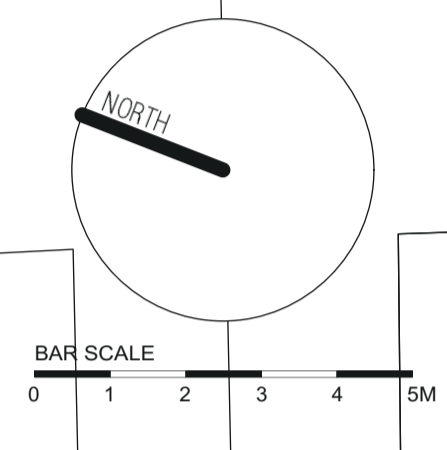
| A. Installation Data | | |
|---|--------------|---------|
| Installed capacity of PV system – kWp (stc) | 1.64 | kWp |
| Orientation of the PV system – degrees from South | 80 | ° |
| Inclination of system – degrees from horizontal | 12 | ° |
| Postcode region | 1 | |
| B. Performance Calculations | | |
| kWh/kWp (Kk) from table | 837 | kWh/kWp |
| Shade Factor (SF) | 0.88 | |
| Estimated annual output (kWp x Kk x SF) | 1,207.96 | kWh |
| C. Installation Data | | |
| Assumed occupancy archetype | Home All Day | |
| Assumed annual electricity consumption, kWh | 5,300.00 | kWh |
| Assumed annual electricity generation from solar PV system, kWh | 1,207.96 | kWh |
| Expected solar PV self-consumption / Self-sufficiency (PV Only) | 773.09 | kWh |
| Grid electricity independence / Self-sufficiency (PV Only) | 15 | % |

ACCOMMODATION SCHEDULE

SELF-CONTAINED DWELLINGS FOR THE OVER 65s
 4 No. 1 BED / 2 PERSON WHEELCHAIR ACCESSIBLE M4(3) UNITS @ 60M²
 1 No. 1 BED / 2 PERSON ACCESSIBLE & ADAPTABLE UNIT WITH WET ROOM M4(2) @ 50M²
 5 No. UNITS TOTAL

PARKING:
 1 No. BLUE BADGE DISABLED PARKING BAY (ELECTRIC CHARGING)
 2 No. VISITOR BAYS

NOTE:
 DRY RISER REQUIRED FOR FIRE BRIGADE ACCESS.
 EXISTING NEIGHBOUR GATE AND GARAGE ACCESS RETAINED.
 BOUNDARY FENCE REPLACEMENT SUBJECT TO CONSULTATION WITH NEIGHBOURS.



KEY - ROOF PLAN

- +8.000 PROPOSED PARAPET LEVELS
- COLOUR CODES DENOTE VARIED PARAPET HEIGHTS
- SVP SOIL VENT PIPE
- RWP RAINWATER PIPE
- AIR EXHAUST/INTAKE DUCTWORK
- MVHR UNIT
- AC/DC/TV CABLES THROUGH ALWITRA
- WATER SPOUT 75MM HIGH x 215MM WIDE
- TV AERIAL DISH
- ECO BAT BOX / STARLING BOX / SPARROW TERRACE / BUG HOTEL



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Notes:
 Levels on this drawing are adjusted to OS GPS and Ordnance Datum; refer to Twickenham Survey's drawing 23119LSa, dated OCT 2023 & MAY 2012.
 Please refer to Twickenham Survey's drawing 1272LSa, dated MAY 2012, for previous arbitrary datum levels.

REVISIONS:
 C1: 15.11.2023: MVHR intake/exhaust positions updated.
 C2: 16.01.2024: MVHR intake/exhaust positions updated. Levels updated to OS GPS.
 C3: 21.02.2024: SVP locations updated. Compost bin/food waste added.
 C4: 21.03.2024: PV panel and green roof layout has been updated.
 C5: 17.07.2024: AC/DC/TV cables and water spouts added. TV Aerial dish indicated.
 C6: 29.09.2024: Bat, bird boxes, and insect hotel added to plan.
 Dry-riser inlet position moved due to pipework below ground/brick enclosures removed.

CONSTRUCTION

Project
ST MARY'S GROVE GARAGES, RICHMOND TW9
 Drawing
GA - ROOF PLAN
 Drawing No
SMGG-112 C6
 Scale
1:100 @ A1
 Date
09.11.2023