



Langstone Technology Park
Phase 2
Havant

Sustainability Features

Condition 34 Discharge: Issue 2



Applicant Name: Havant S.a.r.l. (Luxembourg)
c/o XLB Property Ltd

Property: Langstone Technology Park
Havant

Project Reference: 5490

Issue: Issue 2: Condition 34 Discharge

Date: February 2024

Prepared by: FD / PdJ

Checked by: MDC

Validated by: MDC



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APPENDIX

1.00 Layout Drawings
2.00 Manufacturer's Data Sheets
3.00 Maintenance Schedules



1.00 INTRODUCTION

The purpose of this document is to provide the details of the sustainability features to be installed as part of the Phase 2 development at Langstone Park, Havant for the purposes of discharging condition 34 attached to planning permission ref: APP/2022/00172.

For clarity condition 34 is repeated below:

Sustainable Features

Prior to the commencement of development in each phase (excluding site clearance and demolition), details of sustainable features such as Green Roofs, Photovoltaic cells and heat pumps for that phase shall be submitted to and approved in writing by the Local Planning Authority for that phase. The approved features shall be provided on site prior to the buildings in that phase being brought into use and thereafter retained and maintained unless otherwise agreed in writing by the Local Planning Authority.

For clarity, this report only deals with the low and zero carbon technologies proposed for the Phase 2 development. The LZC technologies proposed to each of the units are:

Photovoltaic panels	The PV panels will provide a contribution to the electrical demand to each unit.
Air source heat pumps	ASHPs in their variable refrigerant flow format will provide heating and cooling to the office areas and the reception/entrance lobbies to each unit.

For the photovoltaic panels the following information is provided.

- Drawings showing the location and extent
- Manufacturer's data sheets
- Predicted energy generation of the photovoltaic cells
- Metering details of the output of the PV installation
- A lifetime maintenance schedule

For the ASHP installations the following information is provided:

- Drawings showing the location of the ASHPs
- Manufacturer's data sheets
- Seasonal Performance Factor
- Metering details
- An ASHP maintenance schedule

2.00 PV INSTALLATION

The requested information for the PVs is summarised below with the full details, where applicable, included in the appendices.

Location & Extent

PV panels are provided to contribute to the electrical demand for the commercial office demise.



The PV panels utilise the available roof space. The drawings that show the PV locations are included in appendix 1.

The primary performance factor for the PV installation is the Building Regulations Part L carbon emission saving. The initial thermal modelling of the units indicates that Part L compliance will be achieved. The 2021 Part L calculation method adds PV to the notional building dependant on the servicing strategy of the unit. The domestic hot water generation servicing strategy is direct electric. This strategy adds PV to the notional building as part of the integral Part L calculation process. Therefore, the proposed scheme incorporates an element of PV to pass the Part L requirements.

Using unit 5 as an example the 'lean' scheme incorporates 24 m² of PV to meet the notional building requirements and to pass Part L.

The project aspiration is to provide an A+ EPC. The final amount of PV required to meet this aspirational target will be derived from the final detailed design at this stage of the project, again, using unit 5 as an example, 432 m² of PV is required to deliver an EPC rating of A+. This area of PV will be confirmed as part of the detailed design.

Manufacturer's Data Sheets

The equipment schedule and the associated manufacturer's data sheets are included in appendix 2

Metering Details

The output of the PV panels is metered. See the manufacturer's data in Appendix 2 for details of the proposed meter.

PV Maintenance Schedule

The PV maintenance schedule is included in appendix 3

3.00 AIR SOURCE HEAT PUMP INSTALLATION

The information for the ASHPs is summarised below with the full details, where applicable, included in the appendices.

Location

The external condenser component of the ASHPs are all located at ground floor level in unobtrusive areas adjacent to the units. See the site plan included in appendix 1. The condensers for each unit are referenced as 'AC' on the site plan.

Manufacturer's Data Sheets

The equipment schedule and the associated manufacturer's data sheets are included in appendix 2

Seasonal Performance Factor

The seasonal performance factors for the commercial office underfloor ASHPs are as set out below:

SEER - cooling	= 5.5
SCOP - heating	= 4.5



Metering Details

The VRF ASHPs will be fed from the office area distribution boards. The circuit to the ASHPs will be sub metered to allow the energy consumption of the ASHPs to be monitored.

ASHP Maintenance Schedule

The ASHP maintenance schedule is included in appendix 3



APPENDIX

Appendix 1 Layout Drawings

Indicative PV Roof Plans

11629 PL 017 Proposed Roof Plan, Unit 5

11629 PL 018 Proposed Roof Plan, Unit 6 & 7

ASHP Condenser Locations

11629 PL 004 Proposed Site Plan

Note: The ASHP external condenser units are noted as
AC on the plan

Appendix 2 Manufacturer's Data Sheets

JA Solar Commercial and Residential PV Panels,
Inverters and Metering

Daikin Office Heating and Comfort Cooling

Appendix 3 Maintenance Schedules

PVs

ASHPs



APPENDIX 1

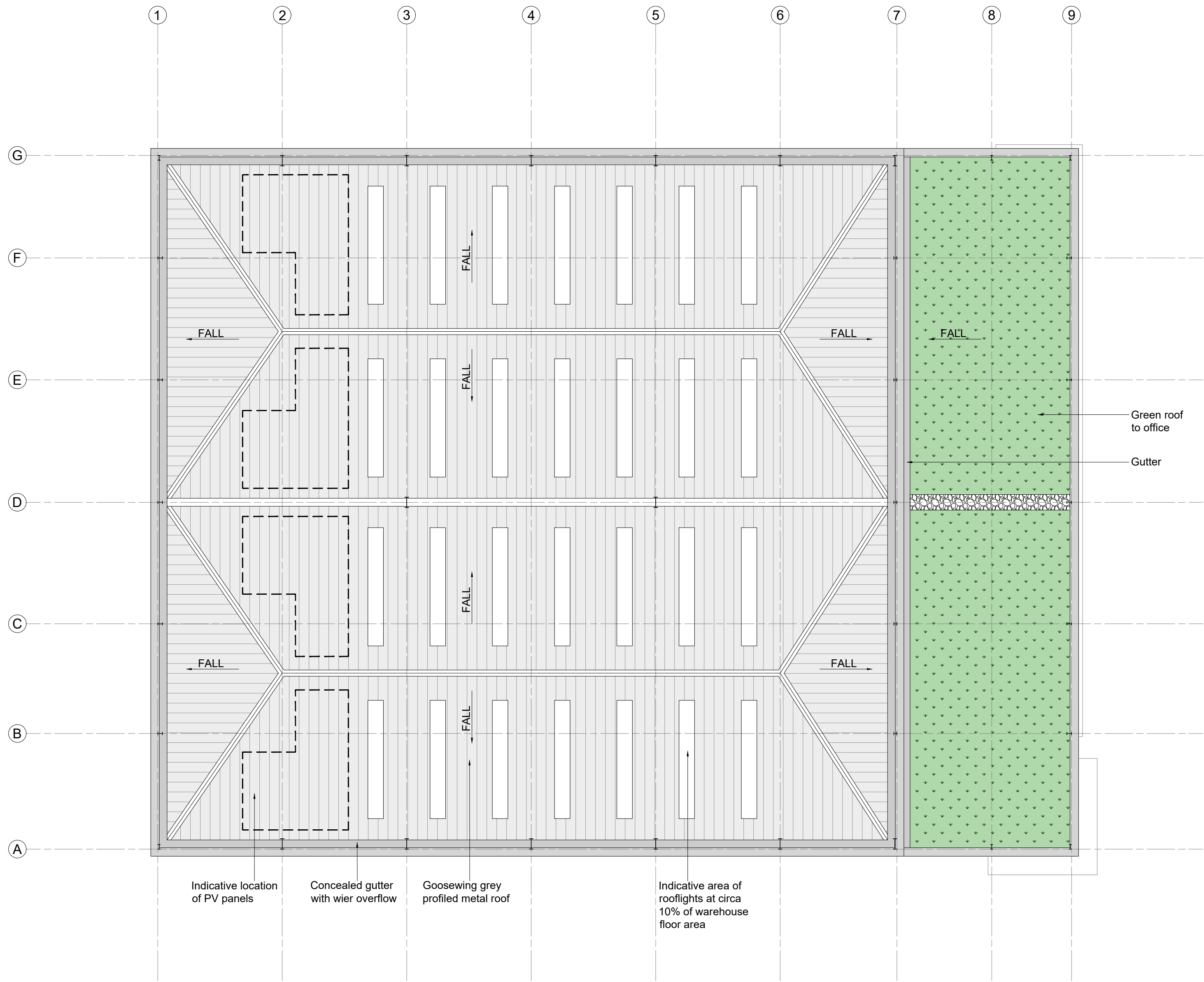
Layout Drawings

Indicative PV Roof Plans

- 11629 PL 017 Proposed Roof Plan, Unit 5
- 11629 PL 018 Proposed Roof Plan, Unit 6 & 7

ASHP Condenser Locations

- 11629 PL 004 Proposed Site Plan



Client:
XLB LLP



Project:
LANGSTONE PHASE 2

12 Warren Yard,
Warren Park,
Milton Keynes,
MK12 5NW
01908 305 246

info@prc-group.com
www.prc-group.com

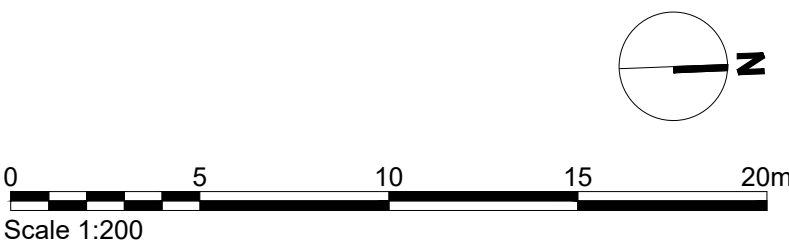
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PROPOSED ROOF PLAN
UNIT 5

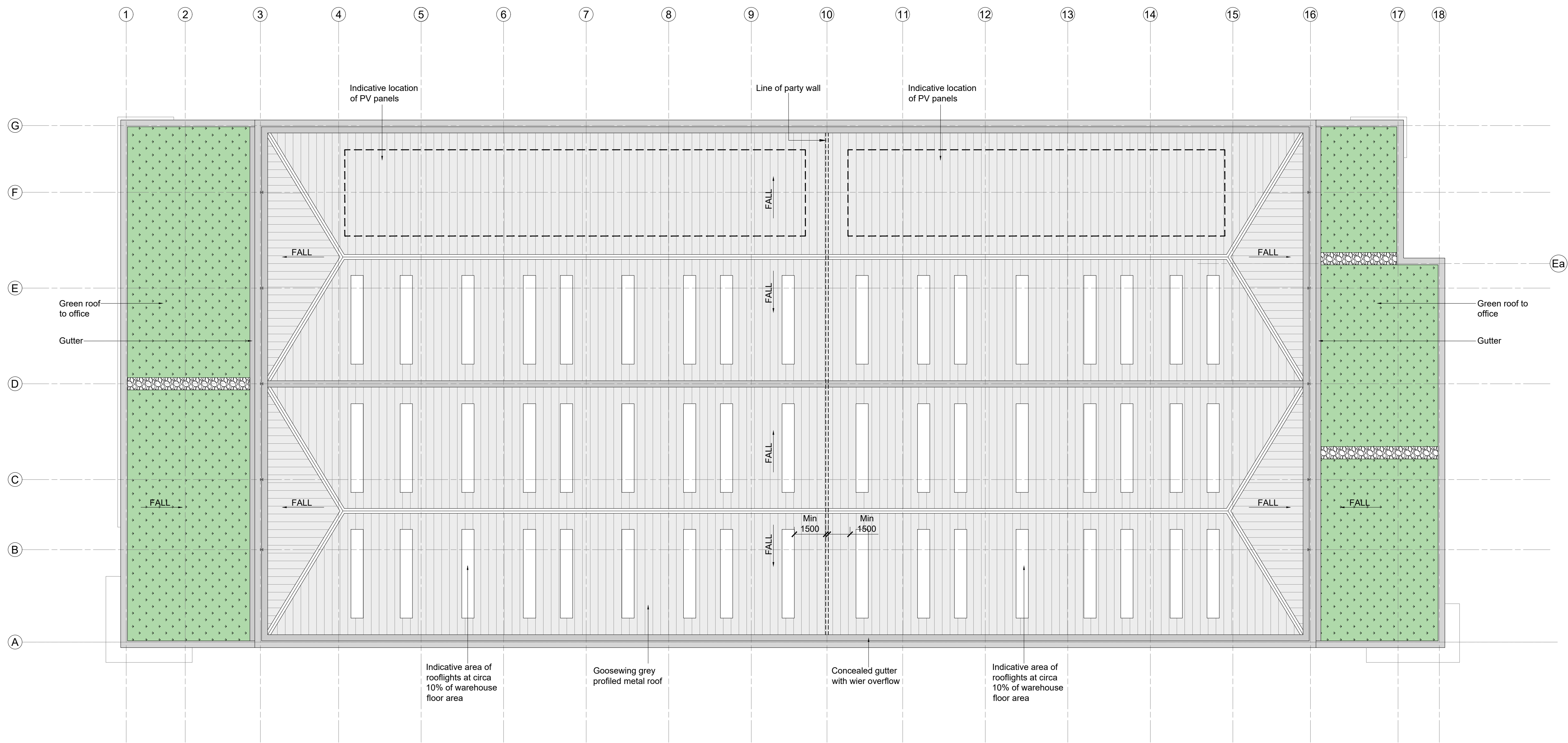
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Checked by: ME
Date: SEP 23

Job No: 11629
Stage: PL 017
Drawing No: P2
Rev:

Issue Status:
Construction ☐ Preliminary ☐
Information ☐ Approval ☐
Tender ☐
Working
London
Milton Keynes
Warsaw

PRC Architecture & Planning





Client:
XLB LLP



Project:
LANGSTONE PHASE 2

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Drawing Title:
PROPOSED ROOF PLAN
UNITS 6 & 7

Scale @ A1: 1:200
Checked by: ME
Date: SEP 23

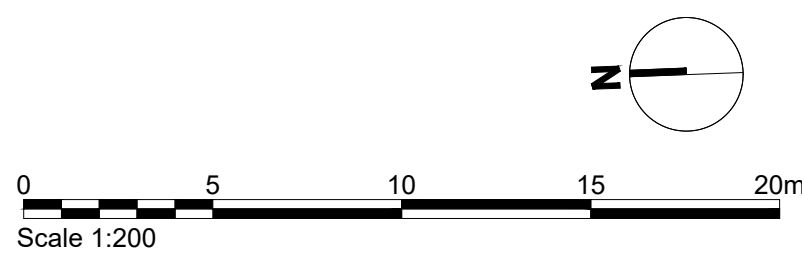
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Stage: PL 018
Drawing No: P2

Issue Status:
Construction ☐ Preliminary ☐
Information ☐ Approval ☐
Tender ☐

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

Offices
Woking
London
Milton Keynes
Warsaw

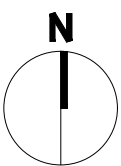
PRC Architecture & Planning



Figured dimensions only are to be used. All dimensions to be checked onsite. Differences between drawings and between drawings and specification or bills of quantities to be reported to the PRC Group.

The copyright of the drawings and designs contained therein remains vested in the PRC Group.

Revisions: Drawn/Chkd: Date:



GIA (m²)				GEA (m²)	GEA (ft²)
	Grnd	First	Total		
5.	2,618	476	3,094	3,229	34,756
6.	2,380	439	2,819	2,932	31,559
7.	2,041	385	2,426	2,529	27,221
T.	7,039	1,300	8,339	8,690	93,536

KEY

- APPLICATION AREA
- SOFT LANDSCAPE
- TARMACADAM SURFACING
- BRUSHED CONCRETE SERVICE YARD
- NATURAL BLOCK PAVING TO VEHICLE AREAS
- CHARCOAL BLOCK PAVING TO PEDESTRIAN AREAS
- WELL CONSOLIDATED GRAVEL
- TWO TIER CYCLE STORAGE AND SHELTER - TOTAL 37 SPACES REQUIRED
- DOUBLE ELECTRIC VEHICLE CHARGING POINTS / DUCTS FOR FUTURE POINT
- CAR SHARE PARKING SPACES
- DROP KERB
- PROPOSED TREES
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- INDICATIVE LOCATION OF BAT BOXES (AS PER ECOLOGIST SURVEY)

PARKING PROVISIONS:

Revised layout proposes a total of 192 car parking spaces.

Unit 5 - 71 car parking spaces.
Unit 6/7 - 121 car parking spaces.

Client:
XLB LLP

Project:
LANGSTONE PHASE 2

Drawing Title:
PROPOSED SITE PLAN

Scale @ A1: 1:500
Checked by: ME
Date: JAN 24

Job No: 11629
Stage: PL 004
Drawing No: *
Rev: *

Issue Status:
Construction ☐ Preliminary ☐
Information ☐ Approval ☐
Tender ☐
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Architecture
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Warsaw

0 10 20 30 40 50m
Scale 1:500



APPENDIX 2

Manufacturer's Data Sheets

JA Solar	Commercial and residential PV panels, inverters and metering
Daikin	Office Heating and Comfort Cooling

DEEP BLUE 3.0

Mono

415W MBB Half-cell Module JAM54S30 390-415/MR Series

Introduction

Assembled with 11BB PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.



Higher output power



Lower LCOE



Less shading and lower resistive loss

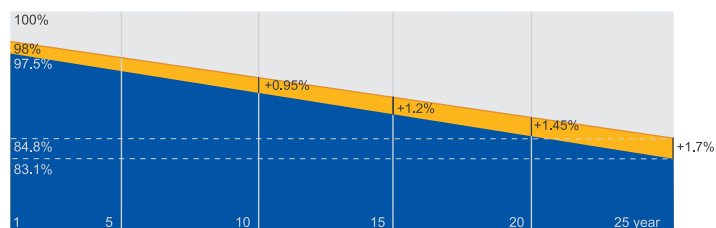


Better mechanical loading tolerance

Superior Warranty

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

0.55% Annual Degradation
Over 25 years



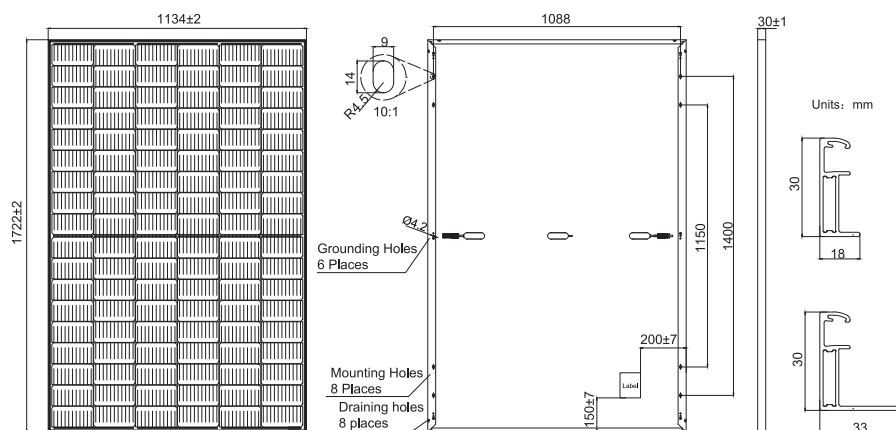
■ New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval



MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	21.5kg±3%
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	MC4(1000V) MC4-EVO2(1500V)
Cable Length (Including Connector)	Portrait: 300mm(+)/400mm(-); Landscape: 1200mm(+)/1200mm(-)
Packaging Configuration	36pcs/Pallet, 936pcs/40ft Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM54S30 -390/MR	JAM54S30 -395/MR	JAM54S30 -400/MR	JAM54S30 -405/MR	JAM54S30 -410/MR	JAM54S30 -415/MR
Rated Maximum Power(P _{max}) [W]	390	395	400	405	410	415
Open Circuit Voltage(V _{oc}) [V]	36.85	36.98	37.07	37.23	37.32	37.45
Maximum Power Voltage(V _{mp}) [V]	30.64	30.84	31.01	31.21	31.45	31.61
Short Circuit Current(I _{sc}) [A]	13.61	13.70	13.79	13.87	13.95	14.02
Maximum Power Current(I _{mp}) [A]	12.73	12.81	12.90	12.98	13.04	13.13
Module Efficiency [%]	20.0	20.2	20.5	20.7	21.0	21.3
Power Tolerance	0~+5W					
Temperature Coefficient of I _{sc} (α _{Isc})	+0.045%/°C					
Temperature Coefficient of V _{oc} (β _{Voc})	-0.275%/°C					
Temperature Coefficient of P _{max} (γ _{Pmp})	-0.350%/°C					
STC	Irradiance 1000W/m ² , cell temperature 25°C, AM1.5G					

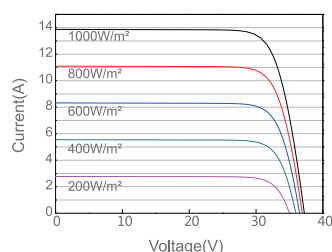
Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

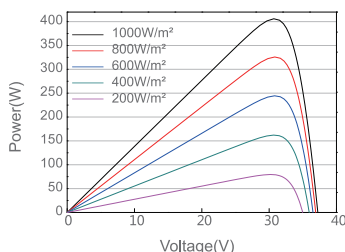
TYPE	JAM54S30 -390/MR	JAM54S30 -395/MR	JAM54S30 -400/MR	JAM54S30 -405/MR	JAM54S30 -410/MR	JAM54S30 -415/MR	OPERATING CONDITIONS	
Rated Max Power(P _{max}) [W]	294	298	302	306	310	314	Maximum System Voltage	1000V/1500V DC
Open Circuit Voltage(V _{oc}) [V]	34.62	34.75	34.88	35.12	35.23	35.37	Operating Temperature	-40°C~+85°C
Max Power Voltage(V _{mp}) [V]	28.87	29.08	29.26	29.47	29.72	29.89	Maximum Series Fuse Rating	25A
Short Circuit Current(I _{sc}) [A]	10.89	10.96	11.03	11.10	11.16	11.22	Maximum Static Load, Front* Maximum Static Load, Back*	5400Pa(112lb/ft ²) 2400Pa(50lb/ft ²)
Max Power Current(I _{mp}) [A]	10.18	10.25	10.32	10.38	10.43	10.50	NOCT	45±2°C
NOCT	Irradiance 800W/m ² , ambient temperature 20°C, wind speed 1m/s, AM1.5G						Safety Class	Class II
							Fire Performance	UL Type 1

CHARACTERISTICS

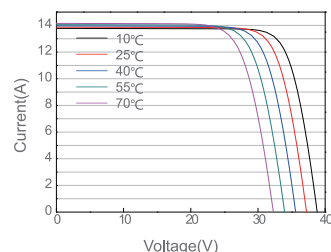
Current-Voltage Curve JAM54S30-405/MR



Power-Voltage Curve JAM54S30-405/MR



Current-Voltage Curve JAM54S30-405/MR



Enphase IQ 7A Microinverter

The high-powered smart grid-ready **Enphase IQ 7A Micro™** dramatically simplifies the installation process while achieving the highest system efficiency for systems with 60-cell and 72-cell modules.

Part of the Enphase IQ System, the IQ 7A Micro integrates with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



High Power

- Peak output power 366 VA @ 240 VAC and 295 VA @ 208 VAC

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Efficient and Reliable

- Optimized for high powered 60-cell and 72-cell modules
- Highest CEC efficiency of 97%
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Envoy and Internet connection required
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)



Enphase IQ 7A Microinverter

INPUT (DC)		IQ7A-72-2-US	
Commonly used module pairings ¹	295 W–460 W +		
Module compatibility	60-cell, 66-cell, and 72-cell PV modules		
Maximum input DC voltage	58 V		
Power point tracking voltage range ²	18 V–58 V		
Min/Max start voltage	33 V / 58 V		
Max DC short circuit current (module Isc) ³	15 A		
Overvoltage class DC port	II		
DC port backfeed current	0 A		
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit		
OUTPUT (AC)		@ 240 VAC	@ 208 VAC
Peak output power	366 VA		295 VA
Maximum continuous output power	349 VA		290 VA
Nominal (L-L) voltage/range ⁴	240 V / 211–264 V		208 V / 183–229 V
Maximum continuous output current	1.45 A (240 VAC)		1.39 A (208 VAC)
Nominal frequency	60 Hz		
Extended frequency range	47–68 Hz		
AC short circuit fault current over 3 cycles	5.8 Arms		
Maximum units per 20 A (L-L) branch circuit ⁵	11 (240 VAC)		11 (208 VAC)
Overvoltage class AC port	III		
AC port backfeed current	18 mA		
Power factor setting	1.0		
Power factor (adjustable)	0.85 leading ... 0.85 lagging		
EFFICIENCY		@240 VAC	@208 VAC
CEC weighted efficiency	97.0 %		96.5%
MECHANICAL			
Ambient temperature range	-40°C to +60°C		
Relative humidity range	4% to 100% (condensing)		
Connector type: DC (IQ7A-72-2-US)	MC4		
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)		
Weight	1.08 kg (2.38 lbs)		
Cooling	Natural convection — No fans		
Approved for wet locations	Yes		
Pollution degree	PD3		
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure		
Environmental category / UV exposure rating	NEMA Type 6 / outdoor		
FEATURES			
Communication	Power Line Communication (PLC)		
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy		
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.		
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer’s instructions.		

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

2. CEC peak power tracking voltage range is 38 V to 43 V.

3. Maximum continuous input DC current is 10.2A.

4. Voltage range can be extended beyond nominal if required by the utility.

5. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

Enphase Envoy-S Standard

The **Enphase Envoy-S Standard™** communications gateway delivers solar production data to Enphase Enlighten™ monitoring and analysis software for comprehensive, remote maintenance and management of the Enphase System.

With multiple powering and connection options, Envoy-S Standard allows for greatest installation flexibility.



Smart

- Enables web-based monitoring and control
- Bidirectional communications for remote upgrade

Simple

- Easy system configuration using Enphase Installer Toolkit™ mobile app
- Flexible networking with Wi-Fi, Ethernet, or mobile

Reliable

- Designed for installation indoors or in an outdoor enclosure
- Five-year warranty

Enphase Envoy-S Standard

MODEL NUMBERS	
Envoy-S Standard ENV-S-WB-230-F, G, and I	Enphase Envoy-S communications gateway with basic PV production monitoring (+/- 5%).
ACCESSORIES (Order Separately)	
Enphase Mobile Connect™ CELLMODEM-02	Plug and play industrial grade mobile modem with five-year data plan for systems up to 60 microinverters. (Available where there is adequate mobile service in the installation area.)
POWER REQUIREMENTS	
Cord connected	230 VAC, 50 Hz. Max 20 A over current protection required.
Hardwired	230 VAC or 400Y/230 VAC, 50 Hz. Max 20 A over current protection required.
CAPACITY	
Number of microinverters polled	Up to 600
MECHANICAL DATA	
Dimensions (WxHxD)	213 x 126 x 45 mm
Weight	0.5 kg
Ambient temperature range	-40° to 65° C -40° to 46° C if installed in an enclosure
Environmental rating	IP30. If installed outdoors, install the Envoy-S in an IP54-rated (or better) enclosure.
Altitude	To 2000 meters
USB ports	Two USB 2.0 ports, auto-sensing, auto-negotiation
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n (2.4 GHz, 5 GHz)
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Mobile	Optional, CELLMODEM-02 (not included)
COMPLIANCE	
Compliance	IEC/EN 61010-1:2010, EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2

To learn more about Enphase offerings, visit enphase.com/uk

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2016/05/13



The emlite EMP1 Three phase metering range offers high quality accurate meters that are suitable for direct connected domestic, commercial, Solar PV and light industrial applications.

Features -

- Fully MID approved
- 4 quadrant power measurement (Import and Export, Active and Reactive Energy)
- Optional Power Quality Information - Volts, Current, Power etc.
- Optional pulsed outputs
- Optical communications port
- Solid brass terminals

The EMP1.az and EMP1.av are the entry models of the emlite three phase metering range. They are suitable for a host of different applications where basic consumption or generation metering is required. The EMP1.az and EMP1.av variants covered in this information sheet are of solid high quality construction and benefit from features normally found in more expensive metering.

- Accuracy Class A or B (MID) [active energy] and Cl 2 [reactive energy*]
- 4 quadrant energy measurement
- Optional power quality information*
- Configurable pulsed outputs**
- Multiple terminal cover options (Short, Extended(Standard), Extended plus)
- Clear easy to read 8 digit LCD with specific symbols for different quantities.
- Solid Brass terminals
- Optional finger guard for main terminals

NB: * denotes standard setting, ** pulse set for kWh import as standard



Supplied by: J W Smart Meters Ltd, 1 Church Lane, Normanton, West Yorkshire, WF6 2DE.

Email: sales@smartelectricitymeters.co.uk Tel: 01924 891049 Fax: 01924 220846



Three Phase Whole Current Meter

EMP1.AV only

Pulsed Output

An opto-isolated pulse output can provide data for collection by an energy management system or AMR data logger. These pulses are output via the meter's auxiliary terminals.

The output conforms to IEC 62053-31.



Technical Data - Meter

Electrical

Voltage	Nominal voltage	3 x 230v
	Voltage withstand	400V continuously
Frequency	Nominal frequency	50Hz, variation $\pm 5\%$
Current	Basic current (Iref)	5, 10, 15 and 20*
	Maximum (Imax)	100A

Metrology

Accuracy	Active energy	Class B, to EN 50470 1-3*
	Reactive energy	Class 2, to IEC 62053-23

Environmental

Temperature Range -25°C to +55°C

Physical

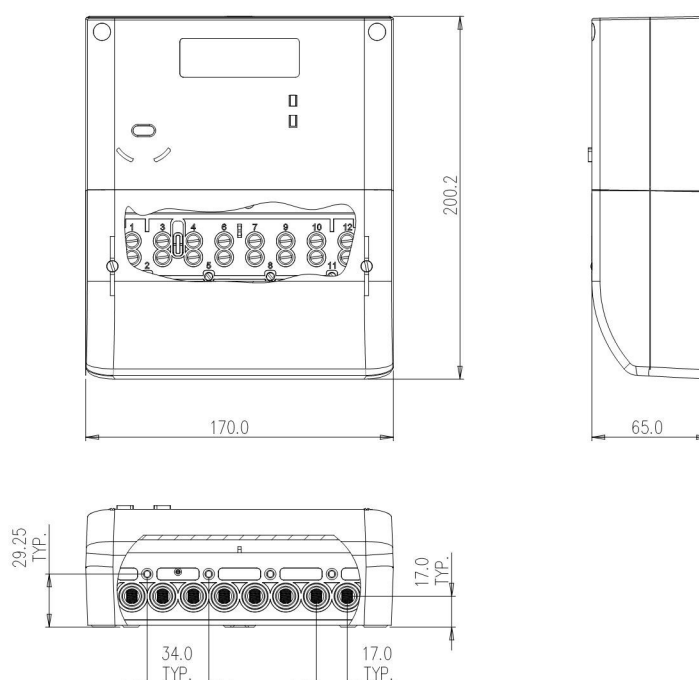
Ingress protection IP54, to BS EN 60529

Terminal arrangement DIN43857-Part 2, fixing centres of 150 $\pm$ 1mm

Main Terminal size 8.2mm $\varnothing \pm 0.2$

Terminal Construction Solid brass

Dimensions



NB * denotes standard setting

Supplied by: J W Smart Meters Ltd, 1 Church Lane, Normanton, West Yorkshire, WF6 2DE.

Email: sales@smartelectricitymeters.co.uk Tel: 01924 891049 Fax: 01924 220846

2 Specifications

2-1 Technical Specifications					RYYQ8U	RYYQ10U	RYYQ12U	RYYQ14U	RYYQ16U	RYYQ18U	RYYQ20U
Continuous heating					Yes						
Recommended combination					4 x FXFQ50AV EB	4 x FXFQ63AV EB	6 x FXFQ50AV EB	1 x FXFQ50AV EB + 5 x FXFQ63AV EB	4 x FXFQ63AV EB + 2 x FXFQ80AV EB	3 x FXFQ50AV EB + 5 x FXFQ63AV EB	2 x FXFQ50AV EB + 6 x FXFQ63AV EB
Recommended combination 2					4 x FXSQ50A2 VEB	4 x FXSQ63A2 VEB	6 x FXSQ50A2 VEB	1 x FXSQ50A2 VEB + 5 x FXSQ63A2 VEB	4 x FXSQ63A2 VEB + 2 x FXSQ80A2 VEB	3 x FXSQ50A2 VEB + 5 x FXSQ63A2 VEB	2 x FXSQ50A2 VEB + 6 x FXSQ63A2 VEB
Recommended combination 3					4 x FXMQ50P7 VEB	4 x FXMQ63P7 VEB	6 x FXMQ50P7 VEB	1 x FXMQ50P7 VEB + 5 x FXMQ63P7 VEB	4 x FXMQ63P7 VEB + 2 x FXMQ80P7 VEB	3 x FXMQ50P7 VEB + 5 x FXMQ63P7 VEB	2 x FXMQ50P7 VEB + 6 x FXMQ63P7 VEB
Cooling capacity	Prated,c		kW		22.4 (1)	28.0 (1)	33.5 (1)	40.0 (1)	45.0 (1)	50.4 (1)	52.0 (1)
Heating capacity	Prated,h		kW		13.7	16.0	18.4	20.6	23.2	27.9	31.0
	Max.	6°CWB	kW		25.0 (2)	31.5 (2)	37.5 (2)	45.0 (2)	50.0 (2)	56.5 (2)	63.0 (2)
SEER					7.6	6.8	6.3		6.0		5.9
SEER recommended combination 2					6.9	6.8	5.9	6.3	5.9	6.0	5.9
SEER recommended combination 3					7.5	6.8	6.2		5.8	6.0	5.9
SCOP					4.3		4.1	4.0		4.2	4.0
SCOP recommended combination 2					4.2	4.3	4.1	4.0	4.1	4.2	4.0
SCOP recommended combination 3					4.2	4.1		4.0		4.1	3.9
ηs,c			%		302.4	267.6	247.8	250.7	236.5	238.3	233.7
ηs,c recommended combination 2					273.6	270.5	233.5	250.0	234.2	236.8	233.9
ηs,c recommended combination 3					295.2	267.1	246.3	246.7	230.4	238.2	233.1
ηs,h			%		167.9	168.2	161.4	155.4	157.8	163.1	156.6
ηs,h recommended combination 2					165.4	170.6	161.3	157.2	159.5	164.8	158.2
ηs,h recommended combination 3					165.6	162.0	160.6	155.7	156.8	159.6	153.4
Capacity range			HP		8	10	12	14	16	18	20
Maximum number of connectable indoor units					64 (3)						
Indoor index connection	Min.				100.0	125.0	150.0	175.0	200.0	225.0	250.0
	Max.				260.0	325.0	390.0	455.0	520.0	585.0	650.0
Dimensions	Unit	Height	mm		1,685						
		Width	mm		930			1,240			
		Depth	mm		765						
	Packed unit	Height	mm		1,820						
		Width	mm		995			1,305			
		Depth	mm		860						
Weight	Unit		kg		252			319		378	
	Packed unit		kg		265			335		395	
Packing	Material				Carton						
	Weight		kg		1.8			2.2			
Packing 2	Material				Wood						
	Weight		kg		11.0			14.0			
Packing 3	Material				Plastic						
	Weight		kg		0.5			0.6			
Capacity control	Method				Inverter controlled						
Casing	Colour				Daikin White						
	Material				Painted galvanized steel plate						
Heat exchanger	Type				Cross fin coil						
	Indoor side				Air						
	Outdoor side				Air						
	Air flow rate	Cooling	Rated	m³/h	9,720	10,500	11,100	13,380	15,600	15,060	15,660
		Heating	Rated	m³/h	9,720	10,500	11,100	13,380	15,600	15,060	15,660
Compressor	Quantity				1			2			
	Type				Hermetically sealed scroll compressor						
	Crankcase heater			W	33						

2 Specifications

2-1 Technical Specifications					RYYQ8U	RYYQ10U	RYYQ12U	RYYQ14U	RYYQ16U	RYYQ18U	RYYQ20U	
Fan	Quantity				1			2				
	External static pressure	Max.	Pa	78								
Fan motor	Quantity				1			2				
	Type				DC motor							
	Output			W	550			750				
Sound power level	Cooling	Nom.	dBA	78.0 (4)	79.1 (4)	83.4 (4)	80.9 (4)	85.6 (4)	83.8 (4)	87.9 (4)		
	Heating	Nom.	dBA	62.7 (4)	64.8 (4)	64.9 (4)	68.3 (4)	68.6 (4)	66.3 (4)	67.0 (4)		
Sound pressure level	Cooling	Nom.	dBA	57.0 (5)		61.0 (5)	60.0 (5)	63.0 (5)	62.0 (5)	65.0 (5)		
Operation range	Cooling	Min.~Max.	°CDB	-5.0~43.0								
	Heating	Min.~Max.	°CWB	-20.0~15.5								
Refrigerant	Type				R-410A							
	GWP				2,087.5							
	Charge			TCO ₂ eq	12.3	12.5	13.2	21.5	21.7	24.4	24.6	
				kg	5.9	6.0	6.3	10.3	10.4	11.7	11.8	
Refrigerant oil	Type				Synthetic (ether) oil FVC68D							
Piping connections	Liquid	Type			Braze connection							
		OD	mm		9,52		12,7			15,9		
	Gas	Type			Braze connection							
		OD	mm		19.1	22.2	28.6					
	Total piping length	System	Actual	m	1,000 (6)							
Defrost method					Reversed cycle							
Safety devices	Item	01			High pressure switch							
		02			Fan driver overload protector							
		03			Inverter overload protector							
		04			PC board fuse							
		05			Leakage current detector							
PED	Category				Category II							
	Most critical part	Name			Accumulator							
		Ps*V	Bar*l		325			415		493		
Space cooling	A Condition (35°C - 27/19)	EERd			3.0	2.3	2.4	2.6	2.1	1.9		
		Pdc	kW		22.4	28.0	33.5	40.0	45.0	50.4	52.0	
	B Condition (30°C - 27/19)	EERd			5.2	4.7	4.3	4.1	3.9	3.8	3.7	
		Pdc	kW		16.5	20.6	24.7	29.5	33.2	37.1	38.3	
	C Condition (25°C - 27/19)	EERd			9.5	8.3	7.7	7.8	7.7	7.5	7.3	
		Pdc	kW		10.6	13.3	15.9	18.9	21.3	23.9	24.6	
	D Condition (20°C - 27/19)	EERd			18.8	17.0	13.9	14.3	14.2	18.3		
		Pdc	kW		8.0	9.3	9.4	8.4	9.5	11.5		
	Space cooling recommended combination 2	A Condition (35°C - 27/19)	EERd			2.6	2.4		2.6	2.1	1.9	
			Pdc	kW		22.4	28.0	33.5	40.0	45.0	50.4	52.0
B Condition (30°C - 27/19)		EERd			4.9	4.7	4.0	4.1	3.8	3.7	3.6	
		Pdc	kW		16.5	20.6	24.7	29.5	33.2	37.1	38.3	
C Condition (25°C - 27/19)		EERd			8.8	8.5	7.1	7.9	7.6	7.5	7.3	
		Pdc	kW		10.6	13.3	15.9	18.9	21.3	23.9	24.6	
D Condition (20°C - 27/19)		EERd			15.1	17.2	13.1	14.0		18.1	18.9	
		Pdc	kW		8.8	9.3	9.1	8.4	9.5	11.4	10.9	
Space cooling recommended combination 3		A Condition (35°C - 27/19)	EERd			3.0	2.3	2.4	2.6	2.1	1.9	
			Pdc	kW		22.4	28.0	33.5	40.0	45.0	50.4	52.0
	B Condition (30°C - 27/19)	EERd			5.1	4.7	4.2	4.0	3.7		3.6	
		Pdc	kW		16.5	20.6	24.7	29.5	33.2	37.1	38.3	
	C Condition (25°C - 27/19)	EERd			9.6	8.4	7.7		7.4	7.6	7.3	
		Pdc	kW		10.6	13.3	15.9	19.0	21.3	23.9	24.6	
	D Condition (20°C - 27/19)	EERd			16.0	16.9	13.7	14.0	14.1	18.3		
		Pdc	kW		9.1	9.3	9.4	8.4	9.5	11.6		

2 Specifications

2-1 Technical Specifications				RYYQ8U	RYYQ10U	RYYQ12U	RYYQ14U	RYYQ16U	RYYQ18U	RYYQ20U
Space heating (Average climate)	TBivalent	COPd (declared COP)		2.5	2.4	2.0	2.3	2.2	1.9	1.8
		Pdh (declared heating cap)	kW	13.7	16.0	18.4	20.6	23.2	27.9	31.0
		Tbiv (bivalent temperature)	°C	-10						
	TOL	COPd (declared COP)		2.5	2.4	2.0	2.3	2.2	1.9	1.8
		Pdh (declared heating cap)	kW	13.7	16.0	18.4	20.6	23.2	27.9	31.0
		Tol (temperature operating limit)	°C	-10						
	A Condition (-7°C)	COPd (declared COP)		2.7	2.6	2.4	2.6		2.4	2.1
		Pdh (declared heating cap)	kW	12.1	14.2	16.3	18.2	20.5	24.7	27.4
	B Condition (2°C)	COPd (declared COP)		3.9			3.5		3.7	3.6
		Pdh (declared heating cap)	kW	7.4	8.6	9.9	11.1	12.5	15.0	16.7
	C Condition (7°C)	COPd (declared COP)		6.3	6.4	6.1		6.3	6.7	6.5
		Pdh (declared heating cap)	kW	5.0	5.5	6.4	7.1	8.0	9.7	10.7
	D Condition (12°C)	COPd (declared COP)		7.9	8.2	7.9	8.5	8.6	9.0	9.1
		Pdh (declared heating cap)	kW	5.9		6.3	4.9		7.1	
Space heating (Average climate) recommended combination 2	A Condition (-7°C)	COPd (declared COP)		2.7		2.4	2.6		2.4	2.2
		Pdh (declared heating cap)	kW	12.1	14.2	16.3	18.2	20.5	24.7	27.4
	B Condition (2°C)	COPd (declared COP)		3.9	4.0	3.9	3.5		3.8	3.7
		Pdh (declared heating cap)	kW	7.4	8.6	9.9	11.1	12.2	15.0	16.7
	C Condition (7°C)	COPd (declared COP)		6.3	6.5	6.1		6.3	6.8	6.5
		Pdh (declared heating cap)	kW	5.0	5.5	6.4	7.1	8.0	9.7	10.7
	D Condition (12°C)	COPd (declared COP)		7.8	8.3	7.9	8.6	8.7	9.1	9.2
		Pdh (declared heating cap)	kW	5.9	6.0	6.4	4.9	5.0	7.2	
	TBivalent	COPd (declared COP)		2.4		1.9	2.3	2.2	1.9	1.8
		Pdh (declared heating cap)	kW	13.7	16.0	18.4	20.6	23.2	27.9	31.0
		Tbiv (bivalent temperature)	°C	-10						
	TOL	COPd (declared COP)		2.4		1.9	2.3	2.2	1.9	1.8
		Pdh (declared heating cap)	kW	13.7	16.0	18.4	20.6	23.2	27.9	31.0
		Tol (temperature operating limit)	°C	-10						

2 Specifications

2

2-1 Technical Specifications					RYYQ8U	RYYQ10U	RYYQ12U	RYYQ14U	RYYQ16U	RYYQ18U	RYYQ20U	
Space heating (Average climate) recommended combination 3	A Condition (-7°C)	COPd (declared COP)			2.7	2.6	2.4	2.6		2.4	2.1	
		Pdh (declared heating cap)	kW		12.1	14.2	16.3	18.2	20.5	24.7	27.4	
	B Condition (2°C)	COPd (declared COP)			3.9	3.7	3.9	3.5		3.7	3.6	
		Pdh (declared heating cap)	kW		7.4	8.6	9.9	11.1	12.5	15.0	16.7	
	C Condition (7°C)	COPd (declared COP)			6.2	6.4	6.0	6.1	6.2	6.5	6.3	
		Pdh (declared heating cap)	kW		4.9	5.5	6.4	7.1	8.0	9.7	10.7	
	D Condition (12°C)	COPd (declared COP)			7.8	8.1	7.8	8.5	8.6	8.7		
		Pdh (declared heating cap)	kW		5.8	5.9	6.2	4.9		6.9		
	TBivalent	COPd (declared COP)			2.5	2.4	2.0	2.3	2.2	1.9	1.8	
		Pdh (declared heating cap)	kW		13.7	16.0	18.4	20.6	23.2	27.9	31.0	
		Tbiv (bivalent temperature)	°C		-10							
	TOL	COPd (declared COP)			2.5	2.4	2.0	2.3	2.2	1.9	1.8	
		Pdh (declared heating cap)	kW		13.7	16.0	18.4	20.6	23.2	27.9	31.0	
		Tol (temperature operating limit)	°C		-10							
Cooling	Cdc (Degradation cooling)				0.25							
Heating	Cdh (Degradation heating)				0.25							
Power consumption in other than active mode	Crankcase heater mode	Cooling	PCK	kW	0.000							
		Heating	PCK	kW	0.052			0.077		0.089		
	Off mode	Cooling	POFF	kW	0.041			0.074		0.075		
		Heating	POFF	kW	0.052			0.077		0.089		
	Standby mode	Cooling	PSB	kW	0.041			0.074		0.075		
		Heating	PSB	kW	0.052			0.077		0.089		
	Thermostat-off mode	Cooling	PTO	kW	0.005			0.010				
		Heating	PTO	kW	0.056			0.097		0.098		
Indication if the heater is equipped with a supplementary heater					no							
Supplementary heater	Back-up capacity	Heating	elbu	kW	0.0							

Standard Accessories : Installation manual; Quantity : 1;

Standard Accessories : Operation manual; Quantity : 1;

Standard Accessories : Connection pipes; Quantity : 1;

2-2 Electrical Specifications				RYYQ8U	RYYQ10U	RYYQ12U	RYYQ14U	RYYQ16U	RYYQ18U	RYYQ20U
Power supply	Name			Y1						
	Phase			3N~						
	Frequency		Hz	50						
	Voltage		V	380-415						
Voltage range	Min.		%	-10						
	Max.		%	10						
Current	Nominal running current (RLA) - 50Hz	Cooling	A	7.2 (7)	10.2 (7)	12.7 (7)	15.4 (7)	18.0 (7)	20.8 (7)	26.9 (7)
Current - 50Hz	Starting current (MSC) - remark			(8)						
	Zmax	List		No requirements						
	Minimum circuit amps (MCA)		A	16.1 (9)	22.0 (9)	24.0 (9)	27.0 (9)	31.0 (9)	35.0 (9)	39.0 (9)
	Maximum fuse amps (MFA)		A	20 (10)	25 (10)	32 (10)		40 (10)		50 (10)
	Full load amps (FLA)	Total	A	1.2 (11)	1.3 (11)	1.5 (11)	1.8 (11)	2.6 (11)		
Wiring connections - 50Hz	For power supply	Quantity		5G						
	For connection with indoor	Quantity		2						
		Remark		F1,F2						
Power supply intake				Both indoor and outdoor unit						

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APPENDIX 3

Maintenance Schedules

PV
ASHPs



PV Maintenance Schedule

Panel Cleaning

- Annual panel cleaning

Inspection and Testing

- Annual site inspection

Scope of Inspection and Testing Visit

- Visual inspection of modules, mounting system, DC cable
- Inspection and testing of inverters
- AC electrical testing of solar PV circuit
- String voltage checks
- Inspection of protection devices
- Inspection of accessible connections
- Testing of remote monitoring system
- Full written report



Air Source Heat Pump Maintenance Schedule

Twice per quarter undertake the following:

General

- Inspect Heat pump control display, and connections.
- Check control operation, and interconnections between internal units and the heat pump
- Review programming and record setpoints in use if revised.
- Audible and visual examination of equipment in operation.
- Check coil for any signs of leaks or deterioration
- Check compressor/ water pump
- Inspect pipework and insulation
- Check water pressure and re-fill system if required
- Wipe clean.

Electrical / Control

- Check wiring terminations for tightness.
- Check all contactors and mcb's for operation and signs of wear.
- Check temperature sensor(s) are fixed correctly on valve assembly.
- Check control box wiring terminations for tightness in the internal units
- Check fan motors for correct and free rotation and review

Fans

- Wipe Casing Clean.
- Operate control board to fully open/closed to check cooling

Cooling

- Check chilled supply temperatures.
- Check hot supply temperatures.

Heating

- Operate control board to fully open/closed to check heating
- Inspect and brush Clean

Cleaning

- Clean unit