



Langstone Technology Park
Phases 3a & 3b

Langstone Road
Havant
PO9 1SA

Sustainability Features

Condition 34 Discharge: Issue 1



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

Applicant Address: Silver House
31-35 Beak Street
London
W1F 9DP

Site Address: Langstone Technology Park – Phases 3a & 3b
Langstone Road
Havant
PO9 1SA

Project Reference: 5880

Issue: Issue 1: Condition 34 Discharge

Date: May 2026

Prepared by: MDC/RB

Checked by: MDC

Validated by: MDC



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Appendix B – Manufacturer's Data Sheets

Appendix C – Maintenance Schedules



1.00 INTRODUCTION

The purpose of this document is to provide the details of the proposed sustainability features to be installed as part of Phases 3a and 3b of the proposed warehouse development at Langstone Technology Park, Havant, in support of the discharge of Condition 34 attached to planning permission reference APP/2022/00172.

Phase 3a comprises the construction of Units 8 and 9, and Phase 3b comprises the construction of Units 10, 11 and 12.

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.

This document specifically relates to the proposed low and zero carbon (LZC) technologies serving Units 8-12 of the development. The LZC technologies for each warehouse unit are summarised below.

LZC Technology	Proposed Application
Photovoltaic (PV) Panels	Roof-mounted PV panels will provide on-site renewable electricity generation and offset regulated electrical energy consumption associated with each warehouse unit.
Air Source Heat Pumps (ASHPs)	R-32 reversible ASHPs in the variable refrigerant flow format will provide space heating and cooling to the office accommodation and reception/entrance lobby areas within each warehouse unit.
Air to Water Heat Pumps	Dedicated air to water heat pumps with low GWP refrigerant will provide domestic hot water generation, with electric immersion heaters for temperature top-up.

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 PHOTOVOLTAIC PANEL INSTALLATION

The warehouse units will incorporate roof-mounted photovoltaic (PV) panels as the primary on-site renewable electricity generation technology.

The project aspiration is for each warehouse unit to achieve an EPC A+ rating, equivalent to a net zero regulated carbon outcome.

Dynamic thermal and Part L compliance modelling have been undertaken to assess the regulated energy performance of each warehouse unit and determine the indicative PV area required to offset regulated carbon emissions relative to the Part L 2021 Notional Building benchmark.

The information requested in relation to the proposed PV installations is summarised below, with supporting drawings and technical information included within the appendices where applicable.

2.01 Proposed Location and Extent

The warehouse units benefit from large, predominantly unshaded roof areas suitable for the installation of roof-mounted photovoltaic arrays. The available roof space will be utilised to maximise on-site renewable electricity generation, subject to coordination with roof access requirements, maintenance zones, rooflights, and other technical constraints.

Indicative PV layouts for Units 8-12 are provided in Appendix A.

Stage 2 dynamic thermal modelling has been undertaken to estimate the minimum PV area required for each warehouse unit to achieve a net zero regulated carbon outcome. A representative panel efficiency of 20% is assumed, reflecting a conservative assumption relative to commercially available high-efficiency modules currently available on the market.

The indicative minimum PV areas and associated renewable electricity generation outputs derived from Stage 2 thermal modelling are summarised below.

Unit	Minimum Area to achieve EPC A+	Assumed Panel Efficiency	Estimated kWp	Estimated Energy Generation (kWh/year)
Unit 8	320m ²	20%	64.87	41,228.19
Unit 9	365m ²	20%	73.99	46,999.04
Unit 10	380m ²	20%	77.03	48,985.80
Unit 11	300m ²	20%	60.82	38,678.44
Unit 12	580m ²	20%	117.58	74,708.75
Total	1,945m ²		394.29	250,600.22

A total PV area of 1,945m² is estimated across Units 8-12 to achieve a net zero regulated carbon outcome both on an individual unit basis and across the development as a whole.

The final PV specification, arrangement and installed capacity will be confirmed through detailed design development and coordination.



2.02 Manufacturer's Datasheets

The equipment schedule and the associated manufacturer's data sheets are included in Appendix B.

2.03 Metering Details

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

2.04 PV Maintenance Schedule

The PV maintenance schedule is included in Appendix C.



3.00 AIR SOURCE HEAT PUMP INSTALLATION

Air source heat pumps (ASHPs) are proposed as the primary low carbon technology for space conditioning and domestic hot water generation across the development.

Space heating and cooling to the office accommodation and associated reception/entrance lobby areas within each warehouse unit will be provided via reversible ASHPs in the variable refrigerant flow format using low global warming potential (GWP) R-32 refrigerant. The system will consist of outdoor condensing units connected to indoor fan coil units via refrigerant pipework.

Domestic hot water (DHW) generation will be provided by dedicated air to water heat pump systems incorporating low GWP refrigerants.

The use of low GWP refrigerants supports the wider environmental objectives of the development by reducing the potential environmental impact associated with refrigerant leakage over the system operational lifecycle.

The information requested in relation to the proposed ASHP installations is summarised below, with supporting drawings and technical information included within the appendices where applicable.

3.01 Proposed Location

The external condenser units associated with the ASHPs will be located at ground floor level within unobtrusive external service areas adjacent to the warehouse units.

Indicative locations of the external condenser units are shown on the site layout drawings included within Appendix A, identified as “AC” on the site plan.

The air to water heat pumps, together with associated buffer vessels and storage cylinders, will be located within dedicated enclosed plant rooms at ground floor level within each warehouse unit.

3.02 Proposed Systems

The proposed ASHP systems serving the office accommodation and associated reception/entrance lobby areas will comprise:

- Daikin R-32 VRV 5 REYA-A series VRF air source heat pump systems.

DHW generation will be provided via dedicated air to water heat pump systems, comprising either:

- Daikin Altherma EDLA-EV3 R-32 low temperature monobloc air to water heat pump systems; and/or
- Daikin EWYE-CZP R-454C inverter-driven air to water heat pump systems.

The final plant specification will be confirmed through detailed design development and coordination.



3.03 Seasonal Coefficient of Performance

The proposed ASHP systems for space heating and cooling are anticipated to achieve the following minimum seasonal performance efficiencies:

Space Heating SCOP = 4.00

Space Cooling SEER = 5.00.

The proposed DHW heat pump systems are anticipated to achieve the following minimum seasonal performance efficiency:

Domestic Hot Water SCOP (including electric immersion top-up) = 2.50 at 60°C.

3.04 Manufacturer's Datasheets

The equipment schedule and the associated manufacturer's data sheets are included in Appendix B.

3.05 Metering Details

The 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.

3.06 ASHP Maintenance Schedule

The ASHP maintenance schedule is included in Appendix C.



APPENDICES

Appendix A **Layout Drawings**

Indicative PV Roof Plans

11747 PL 015	Proposed Roof Plan, Units 8 & 9
11747 PL 016	Proposed Roof Plan, Units 10 & 11
11747 PL 017	Proposed Roof Plant, Unit 12

ASHP Condenser Locations

11747 PL 004	Proposed Site Plan
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Note: The ASHP external condenser units are noted as
AC on the plan

Appendix B **Manufacturer's Data Sheets**

JA Solar	Commercial PV Panels, Inverters and Metering
Daikin	Space Heating and Cooling
Daikin	Domestic Hot Water

Appendix C **Maintenance Schedules**

PVs
ASHPs



APPENDIX A

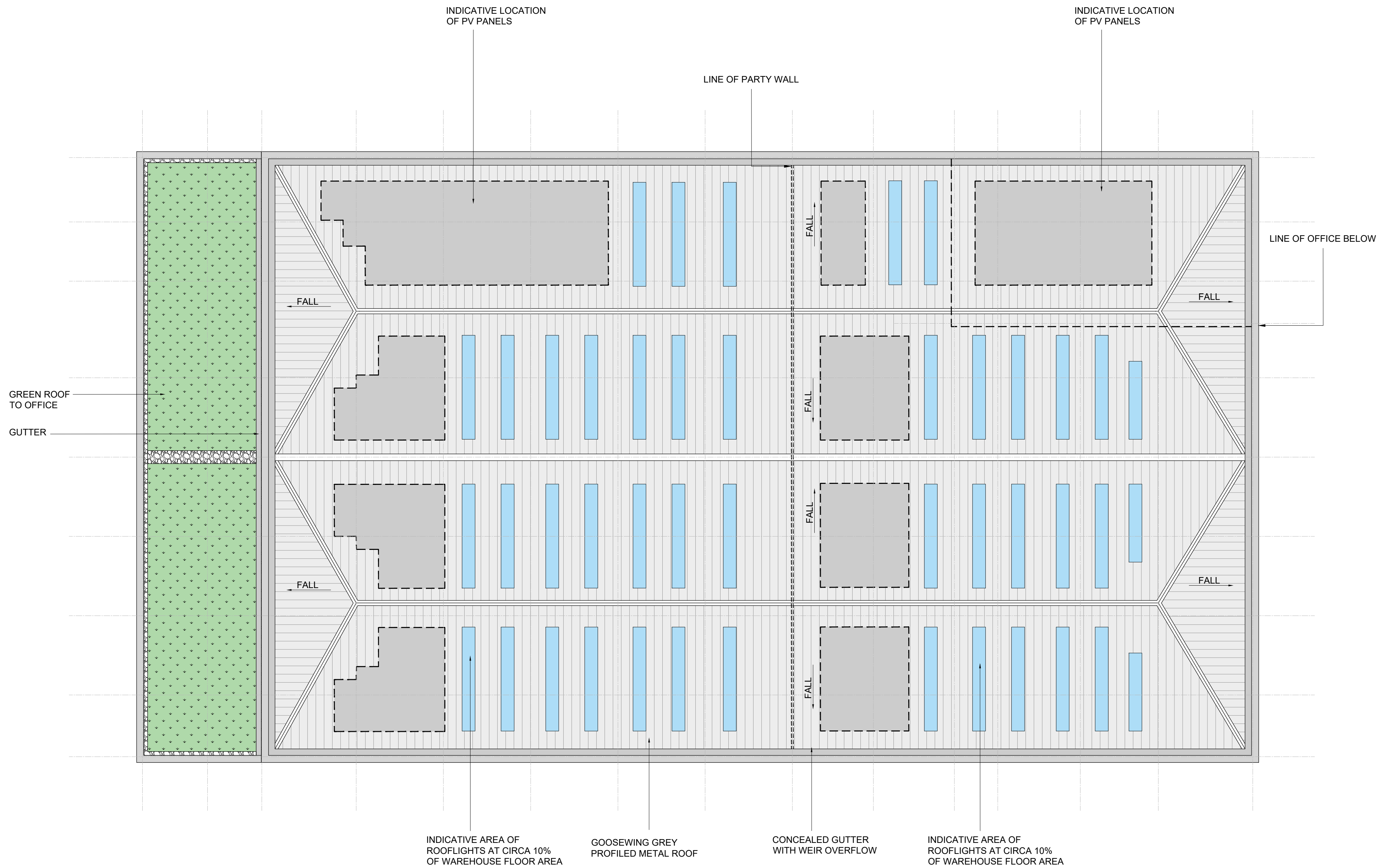
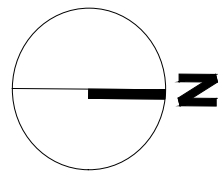
Layout Drawings

Indicative PV Roof Plans

- 11747 PL 015** Proposed Roof Plan, Units 8 & 9
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- 11747 PL 017** Proposed Roof Plant, Unit 12

ASHP Condenser Locations

- 11747 PL 004** Proposed Site Plan

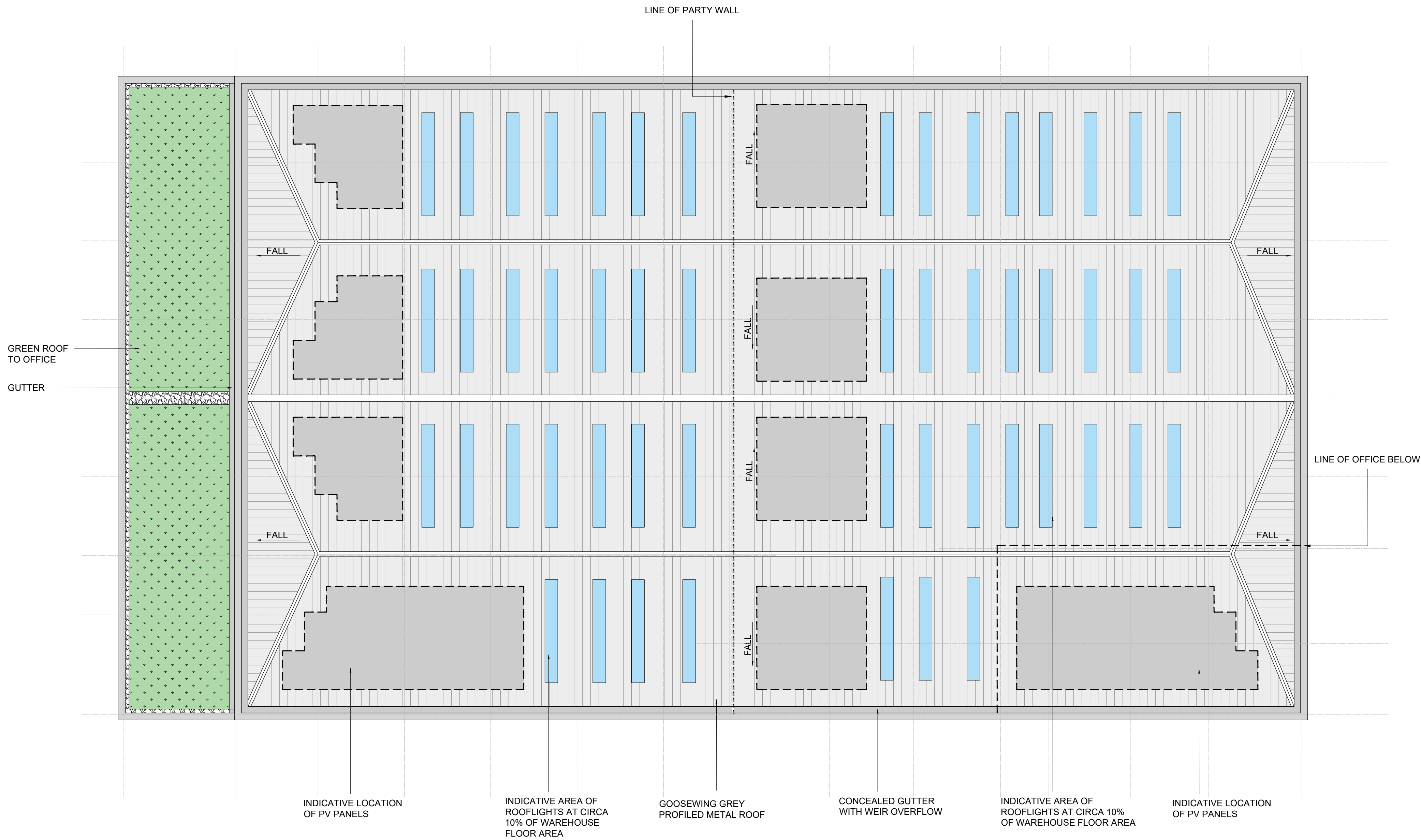
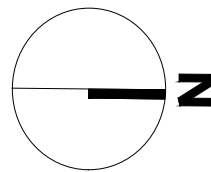


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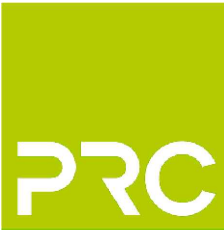
Figured dimensions only are to be used. All dimensions to be checked onsite. Differences between drawings and between drawings and specification or bills of quantities to be reported to the PRC Group.

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Revisions: Drawn/Chkd: Date:



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Scale 1:200



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Masterplanning
Urban Design

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Client **HAVANT SARL**

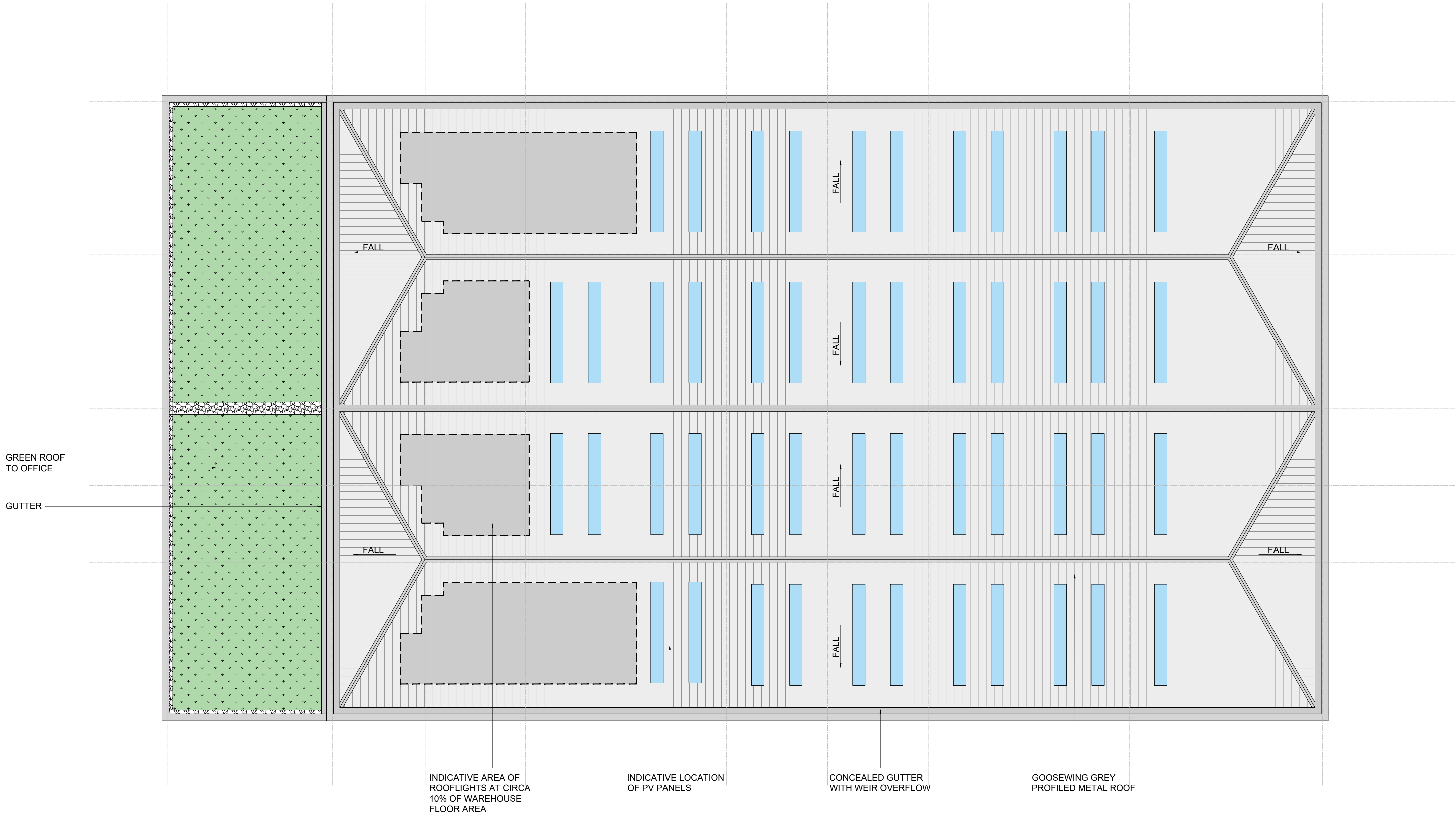
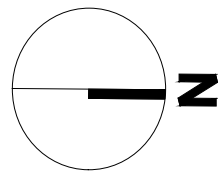
Project **LANGSTONE PHASE 3A / 3B**

Drawing Title **PROPOSED ROOF PLAN
UNITS 10-11**

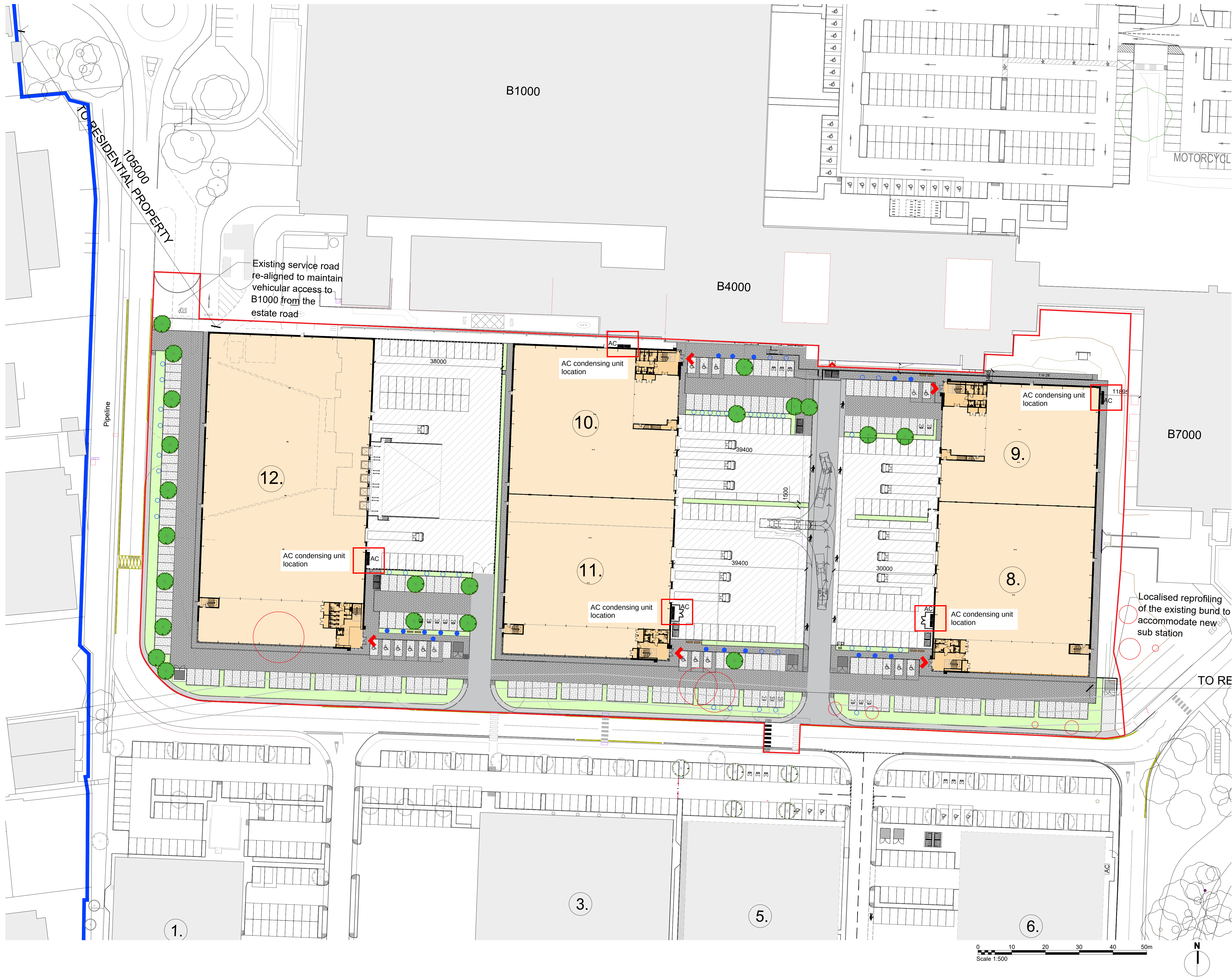
Job No: **11747** Project Stage: **PL** Status: **PLANNING**
First Issue Date: **MAY 26** Scale: **@A1** 1:200 Lead/Checker: **ME**

Project	Originator	Zone	Level	Type	Role	Orig. No.	Rev.
-	-	-	-	-	-	016	-

BIM File Name:



0 5 10 15 20m
Scale 1:200



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.

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Revisions: Drawn/Chkd: Date:

PHASE 3A				GEA			
Ut	GF (m²)	FF (m²)	Total (m² / ft²)	Ut	GF (m²)	FF (m²)	Total (m² / ft²)
8.	2,294	405	2,699 / 29,051	2,817	30,321		
9.	1,624	286	1,910 / 20,559	1,996	21,484		
SUB			4,609 / 49,610	4,813	51,806		
PHASE 3B				GEA			
10.	2,159	296	2,455 / 26,425	2,546	27,404		
11.	2,313	409	2,722 / 29,299	2,831	30,472		
12.	4,437	606	5,043 / 54,282	5,214	56,123		
SUB			10,220/11,000	10,591/114,000			
TOTAL			14,829/159,618	15,404/166,074			

- KEY
- PHASE 3A / 3B BOUNDARY
 - SOFT LANDSCAPE
 - TARMACADAM SURFACING
 - BRUSHED CONCRETE SERVICE YARD
 - NATURAL BLOCK PAVING TO VEHICLE PARKING BAYS
 - CHARCOAL BLOCK PAVING TO VEHICLE AREAS
 - CHARCOAL BLOCK PAVING TO PEDESTRIAN AREAS
 - WELL CONSOLIDATED GRAVEL
 - RETAINING WALL, HANDRAIL TO TOP OF WALL
 - 2.4m HIGH SECURITY FENCE
 - TWO TIER CYCLE SHELTER - PROVIDING 20 SPACES PER SHELTER
 - DOUBLE ELECTRIC VEHICLE CHARGING POINTS / DUCTS FOR FUTURE POINT (10%)
 - DUCTS FOR FUTURE DOUBLE CHARGING POINTS (20%)
 - CAR SHARE PARKING SPACES (5%)
 - DROP KERB
 - PROPOSED TREES
 - EXISTING TREES TO BE RETAINED
 - EXISTING TREES APPROVED FOR REMOVAL UNDER OUTLINE CONSENT (AS PER ECOLOGIST SURVEY)
 - INDICATIVE LOCATION OF BAT BOXES (AS PER ECOLOGIST SURVEY)
 - INDICATIVE LOCATION OF BIRD BOXES (AS PER ECOLOGIST SURVEY)
 - PEDESTRIAN PRIORITY ROUTE

PARKING PROVISIONS:

Layout proposes a total of 342 car parking spaces.

Unit 8 - 62 car parking spaces.
Unit 9 - 41 car parking spaces.
Unit 10 - 42 car parking spaces.
Unit 11 - 62 car parking spaces.
Unit 12 - 135 car parking spaces.

CYCLE STORAGE PROVISIONS:

The layout proposes a total storage for 100 cycles across the site.



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Architecture
Landscape
Town Planning
Masterplanning
Urban Design

Client: HAVANT SARL

Project: LANGSTONE PHASE 3A / 3B

Drawing Title: PROPOSED SITE PLAN

Job No: 11747 Project Stage: PL Status: PLANNING
First Issue Date: MAY 26 Scale: 1:500 Lead Checker: ME

Project:	Originator:	Zone:	Level:	Type:	Rate:	Eng No:	Rev:
-	-	-	-	-	-	004	-

BM File Name:



APPENDIX B

Manufacturer's Data Sheets

JA Solar	Commercial PV Panels, Inverters and Metering
Daikin	Office Space Heating and Comfort Cooling
Daikin	Domestic Hot Water

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

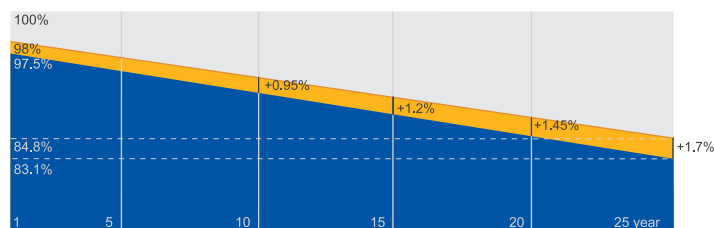


Better mechanical loading tolerance

Superior Warranty

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

0.55% Annual Degradation
Over 25 years



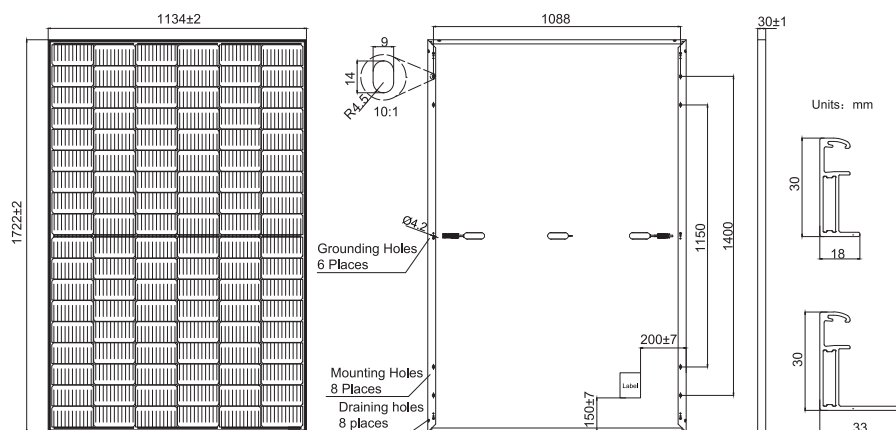
■ New linear power warranty ■ Standard module linear power warranty

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					

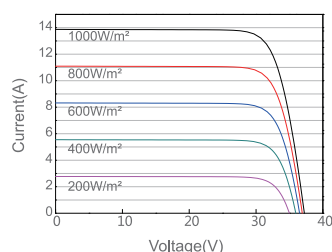
Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

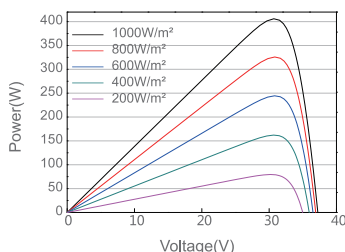
TYPE	JAM54S30 -390/MR	JAM54S30 -395/MR	JAM54S30 -400/MR	JAM54S30 -405/MR	JAM54S30 -410/MR	JAM54S30 -415/MR	OPERATING CONDITIONS	
Rated Max Power(P _{max}) [W]	294	298	302	306	310	314	Maximum System Voltage	1000V/1500V DC
Open Circuit Voltage(V _{oc}) [V]	34.62	34.75	34.88	35.12	35.23	35.37	Operating 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

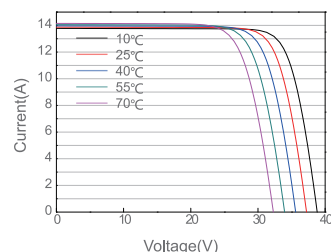
Current-Voltage Curve JAM54S30-405/MR



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

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

Ingress protection

IP54, to BS EN 60529

Physical

Terminal arrangement

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

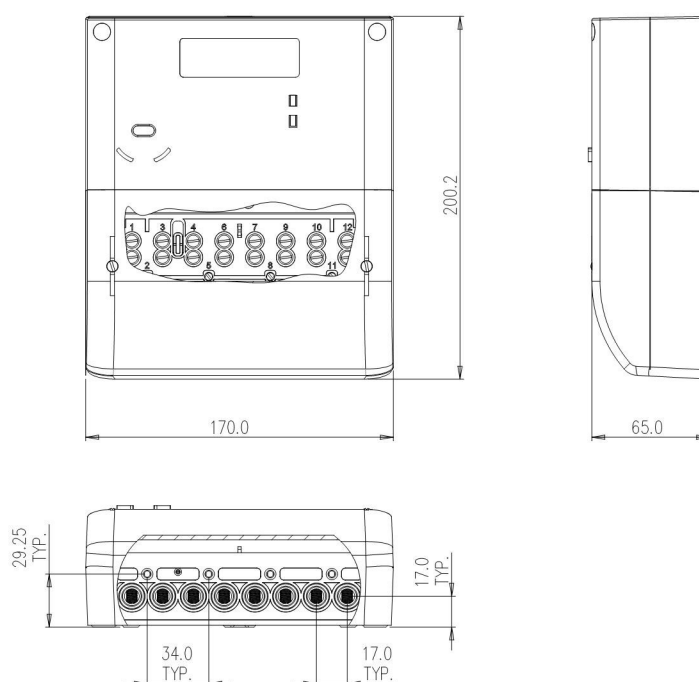
Main Terminal size

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

Smarter and
more sustainable

VRV 5 Heat Recovery



Purpose-built to support the decarbonisation
of commercial buildings

Climate
360^{NET}



Air Conditioning
Product of the Year



Lower CO₂
equivalents



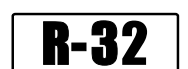
Industry-leading
real life efficiencies



Flexibility to take care
of every room



Variable Refrigerant
Temperature

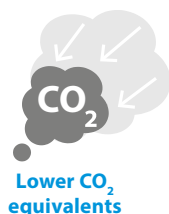


BLUEVOLUTION

VRV 5 Heat Recovery

Purpose-built to support the decarbonisation of commercial buildings

- › Reduced CO₂ equivalent thanks to the use of lower GWP R32 refrigerant and lower refrigerant charge
- › Single component refrigerant, easy to re-use and recycle
- › Greatest sustainability over the entire lifecycle, thanks to market leading real-life seasonal efficiency
- › "Free" heating through efficient 3-pipe heat recovery, transferring heat from areas requiring cooling to areas requiring heating
- › Tackle small-room applications without any additional measures, thanks to Shīrudo Technology
- › Specially designed indoor units for R32, ensuring low sound and maximum efficiency
- › Simultaneous cooling and heating for the perfect personal comfort of guests/tenants
- › Like-for-like R410A installation flexibility with piping lengths up to 165 meters and a total length of 1,000 meters
- › Sound pressure down to 40dB (A) thanks to 5 low sound steps
- › ESP up to 78 Pa to allow ducting
- › Wide operation range of up to +46°C in cooling and down to -20°C in heating



Lower CO₂ equivalents



Five low sound steps

Widest R32 VRV range in the market



REYA-8-12A



Completely redesigned BSSV boxes for faster installation and easier servicing



R-32

BLUEVOLUTION

REYA-A (8 to 28hp)

VRV 5 Condensing Units Heat Recovery Single Modules



Outdoor Units			5hp (Multi Only) REMA5A	8 hp Single REYA8A	10 hp Single REYA10A	12 hp Single REYA12A	14 hp Single REYA14A	16 hp Single REYA16A	18 hp Single REYA18A	20 hp Single REYA20A
Capacity	Nominal Cooling	kW	14.0	22.4	28.0	33.5	40.0	45.0	50.4	55.9
	Nominal Heating	kW	16.0	25.0	31.5	37.5	45.0	50.0	56.5	63.0
Seasonal Efficiency	Cooling	η _{s,c} %	–	290.8	282.6	285.3	306.1	281.0	280.6	262.2
	Heating	η _{s,h} %	–	161.5	170.2	176.4	168.3	167.5	172.5	162.7
Dimensions	Height × Width × Depth	mm	1685 × 930 × 765	1685 × 930 × 765	1685 × 930 × 765	1685 × 930 × 765	1685 × 1240 × 765	1685 × 1240 × 765	1685 × 1240 × 765	1685 × 1240 × 765
Weight		kg	213				296		319	
Electrical Details	Power Supply	Phase / Hz / V	3 / 50 / 380~415							
	Fuse Rating	amps	20	20	25	32	32	40	40	50
	Nominal Running Current – Cooling	amps	5.6	10.5	13.0	15.6	18.5	21.0	27.8	32.8
Refrigerant Circuit	Refrigerant Type		R32							
	Refrigerant Charge	kg	9.0	9.0	9.0	9.0	10.6	10.6	10.6	10.6
Sound Pressure (Cooling)	Cooling	dBA	56.3	56.3	58.0	60.8	58.1	61.4	63.0	67.0
Sound Power (Cooling)	Heating	dBA	58.1	58.1	58.8	61.9	61.3	64.5	64.0	68.0
	Cooling	dBA	78.3	78.3	78.8	82.5	78.7	83.7	83.4	87.9
	Heating	dBA	79.4	79.4	80.7	83.3	82.9	86.3	85.1	89.6
Piping Limits	Maximum Total Length	m	1000							
Piping Connections – Systems	Liquid	inch (mm)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
	Discharge	inch (mm)	1/2 (12.7)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	7/8 (22.2)
	Gas	inch (mm)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	1 1/8 (28.6)
Operation Range (Cooling)	Min / Max	°CDB	-5 / 46							
Operation Range (Heating)	Min / Max	°CWB	-20 / 15.5							



R-32 BLUEEVOLUTION

REYA-A (10 to 20hp)

VRV 5 Heat Recovery with Continuous Heating

Outdoor Units			10 hp Multi		13 hp Multi		16 hp Multi		18 hp Multi		20 hp Multi	
			REMA5A	REMA5A	REMA5A	REYA8A	REYA8A	REYA8A	REYA8A	REYA10A	REYA8A	REYA12A
Capacity	Nominal Cooling	kW	28.0		36.4		44.8		50.4		55.9	
	Nominal Heating	kW	31.5		41.0		50.0		56.5		62.5	
Seasonal Efficiency	Cooling	ηs,c %	301.9		296.5		293.0		287.5		287.6	
	Heating	ηs,h %	160.6		161.5		170.9		170.5		172.2	
Dimensions	Height	mm	1685	1685	1685	1685	1685	1685	1685	1685	1685	1685
	Width	mm	930	930	930	930	930	930	930	930	930	930
	Depth	mm	765	765	765	765	765	765	765	765	765	765
Electrical Details	Power Supply	Phase / Hz / V	3 / 50 / 380~415									
	Fuse Rating	amps	40		40		40		50		50	
	Nominal Running Current – Cooling	amps	11.2		16		20.9		23.4		26.1	
Refrigerant Circuit	Refrigerant Type		R32									
	Refrigerant Charge	kg	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Sound Pressure (Cooling)	Cooling	dBA	59.3		59.3		59.3		60.2		62.1	
	Heating	dBA	61.1		61.1		61.1		61.5		63.4	
Sound Power (Cooling)	Cooling	dBA	81.3		81.3		81.3		81.6		83.9	
	Heating	dBA	82.4		82.4		82.4		83.1		84.8	
Piping Limits	Maximum Length	m	1000									
Piping Connections – Systems	Liquid	inch (mm)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	1/2 (12.7)
	Discharge	inch (mm)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)
	Gas	inch (mm)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	7/8 (22.2)
Operation Range (Cooling)	Min / Max	°CDB	-5 / 46									
Operation Range (Heating)	Min / Max	°CWB	-20 / 15.5									

R-32 BLUEEVOLUTION

REYA-A (22 to 28hp)

VRV 5 Heat Recovery with Continuous Heating



Outdoor Units			22 hp Multi		24 hp Multi		26 hp Multi		28 hp Multi	
			REYA10A	REYA12A	REYA8A	REYA16A	REYA12A	REYA14A	REYA12A	REYA16A
Capacity	Nominal Cooling	kW	61.5		67.4		73.5		78.5	
	Nominal Heating	kW	69.0		75.0		82.5		87.5	
Seasonal Efficiency	Cooling	ηs,c %	283.6		283.4		296.2		282.8	
	Heating	ηs,h %	272.1		277.3		286.4		275.6	
Dimensions	Height	mm	1685	1685	1685	1685	1685	1685	1685	1685
	Width	mm	930	930	930	1240	930	1240	930	1240
	Depth	mm	765	765	765	765	765	765	765	765
Electrical Details	Power Supply	Phase / Hz / V	3 / 50 / 380~415							
	Max Fuse Amp (MFA)	amps	63		63		63		63	
	Nominal Running Current – Cooling	amps	28.6		31.5		34.1		36.7	
Refrigerant Circuit	Refrigerant Type		R32							
	Refrigerant Charge	kg	9.0	9.0	9.0	10.6	9.0	10.6	9.0	10.6
Sound Pressure	Cooling	dBA	62.6		62.6		62.7		64.1	
	Heating	dBA	63.6		65.4		64.6		66.4	
Sound Power	Cooling	dBA	84.0		84.8		84.0		86.2	
	Heating	dBA	85.2		87.1		86.1		88.1	
Piping Limits	Maximum Length	m	1000							
Piping Connections – Systems	Liquid	inch (mm)	3/8 (9.5)	1/2 (12.7)	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
	Discharge	inch (mm)	5/8 (15.9)	3/4 (19.1)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)	3/4 (19.1)
	Gas	inch (mm)	3/4 (19.1)	7/8 (22.2)	3/4 (19.1)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
Operation Range (Cooling)	Min / Max	°CDB	-5 / 46							
Operation Range (Heating)	Min / Max	°CWB	-20 / 15.5							

Multi branch selector (BSSV) for VRV 5 Heat Recovery

Specifically developed for lower GWP R32

- › **Reduced CO₂ equivalent** thanks to the use of lower GWP R32 refrigerant and lower refrigerant charge
- › Unique range of multi BS boxes allowing **efficient 3-pipe** heat recovery
- › No limitation on room size, thanks to **Shîrudo Technology** (1)
The integrated shut-off valves in the BSSV box ensure that in case of a refrigerant leak only the specific branch is closed off.



Reduced CO₂
equivalent

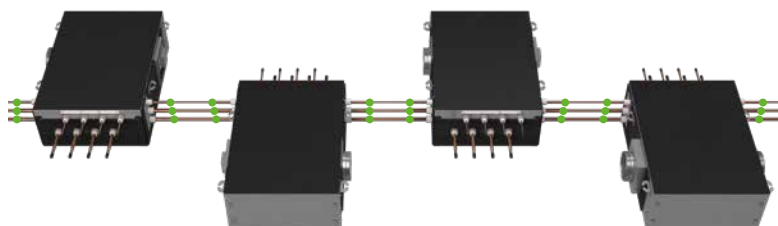


Flexibility to take care
of every room

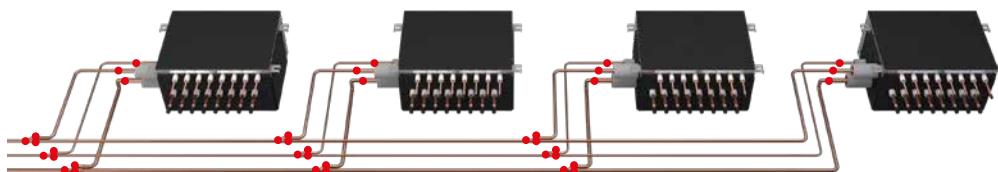
Completely redesigned for faster installation and easier servicing

- › Faster installation thanks to **Refrigerant Flow Through** reducing the number of brazing points and joint kits

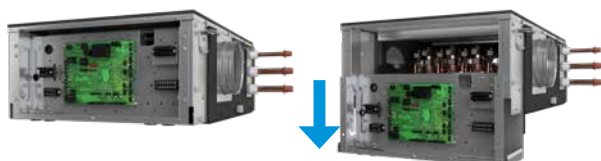
VRV 5: only 24 brazings point and no joint kits



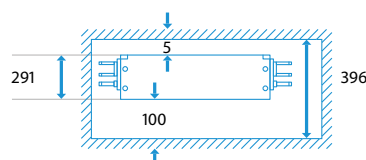
VRV 5: 39 brazing points and 3 joint kits



- › Easy servicing in false ceilings thanks to **sliding down PCB**



- › Limited ceiling void required as the box can be installed at just 5mm from the ceiling



(1) Refer to Xpress selection software to ensure compliance to specific product standard. Field supplied duct and fan might be required to install the BS box in very small spaces

- › Unique range of multi BS boxes allowing efficient 3-pipe heat recovery
- › **NEW** No limitation on room size, thanks to Shirudo Technology (1)
- › **NEW** Faster installation thanks to Refrigerant Flow Through reducing the number of brazing points and joint kits
- › **NEW** Easy servicing in false ceilings thanks to sliding down PCB
- › **NEW** Limited ceiling void required as the box can be installed at just 5mm from the ceiling
- › **NEW** Quick on-site settings, indication of service parameters and easy read out of errors thanks to 7 segment display
- › Up to 16kW capacity available per port
- › Connect up to 250 class unit (28kW) by combining 2 ports
- › No limit on unused ports allowing phased installation
- › Faster installation thanks to open port connection
- › Allows multi tenant applications
- › Connectable to REYA-A heat recovery units



		BS4A14AV1B	BS6A14AV1B	BS8A14AV1B	BS10A14AV1B	BS12A14AV1B
Connectivity	Maximum number of connectable indoor units (per BS box)	20	30	40	50	60
	Maximum number of connectable indoor units per branch	5	5	5	5	5
	Number of branches	4	6	8	10	12
	Maximum capacity index of connectable indoor units (per BS box)	400	600	750		
	Maximum capacity index of connectable indoor units per branch	140 per port 250 if 2 ports are combined				
Piping restrictions	Maximum piping length between BSSV box and indoor unit m	40				
Flowthrough of header pipes	Total amount of ports allowed in flowthrough	16				
	Maximum allowed amount of BSSV box in flowthrough	4 (4 × 4 port BSSV box = 16 ports)				
	Maximum capacity index of indoor units connected to all BSSV box in flowthrough combined	750				
General	Refrigerant type	R32				
	Unit weight kg	40	56	65	83	89
	Power supply V	220-240 V / 50 Hz / 1 Phase				
	Installation direction	Horizontal (0° – max 1° toward drain opening)				
	Drain piping	VP20 (ID, 20mm/OD, 26mm)				
	Unit casing	Galvanized steel plate				
	Height mm	291	291	291	291	291
	Max Fuse Amps (MFA) amps	6	6	6	6	6
	Width (casing only) mm	600	1000	1000	1400	1400
	Width (casing + header piping) mm	870	1270	1270	1670	1670
	Depth (casing only) mm	845	845	845	845	845
	Depth (casing + branch piping) mm	1039	1039	1039	1039	1039
	Piping connection type	Braze				
	Main pipe size – Suction gas inch (mm)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
	Main pipe size – HP/LP gas inch (mm)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
	Main pipe size – liquid inch (mm)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)	5/8 (15.9)
	Branch pipe size – gas inch (mm)	3/8 (9.5) / 1/2 (12.7) / 5/8 (15.9)				
	Branch pipe size – liquid inch (mm)	1/4 (6.4) / 3/8 (9.5)				

Daikin Altherma low
temperature monobloc
Technical Data
EBLA04-08EV3 /
EBLA04-08E3V3 /
EDLA04-08EV3 /
EDLA04-08E3V3



2 Specifications

Technical specifications					EDLA04EV3	EDLA06EV3	EDLA08EV3
Heating capacity	Nom.			kW	4.30 (1) / 4.60 (2)	6.00 (1) / 5.90 (2)	7.50 (1) / 7.80 (2)
Power input	Heating	Nom.		kW	0.840 (1) / 1.26 (2)	1.24 (1) / 1.69 (2)	1.63 (1) / 2.23 (2)
COP					5.10 (1) / 3.65 (2)	4.85 (1) / 3.50 (2)	4.60 (1) / 3.50 (2)
Casing	Colour				Ivory white		
	Material				Zinc coated low carbon steel		
Dimensions	Unit	Height		mm	770		
		Width		mm	1,250		
		Depth		mm	362		
	Packed unit	Height		mm	920		
		Width		mm	1,350		
		Depth		mm	500		
Weight	Unit			kg	88.0		
	Packed unit			kg	95		
Packing	Material				Carton / EPS / Wood (pallet)		
Heat exchanger	Length			mm	920		
	Rows	Quantity			2		
	Fin pitch			mm	1.40		
	Face area			m ²	0.658		
	Stages	Quantity			32		
	Tube type				ø7 Hi-XD		
	Fin	Type			Waffle Hydrophilic Blue		
		Treatment			Hydrophilic		
Fan	Type				Propeller fan		
	Quantity				1		
Fan motor	Discharge direction				Horizontal		
	Quantity				1		
	Model				KFD-325-77-10A		
	Speed	Steps			10		
		Heating	Nom.	rpm	620	680	740
	Output			W	77		
Compressor	Quantity				1		
	Model				2YC71EXD#C		
PED	Type				Hermetically sealed swing compressor		
	Category				Category II		
	Most critical part	Name			Compressor		
Operation range		Ps*V		Bar*I	110		
	Heating	Ambient	Min.	°CDB	-25		
			Max.	°CDB	25 (3)		
		Water side	Min.	°C	9 (3)		
			Max.	°C	65 (3)		
	Domestic hot water	Ambient	Min.	°CDB	-27		
			Max.	°CDB	35		
		Water side	Min.	°C	25		
			Max.	°C	55 (3)		
Sound power level	Heating	Nom.		dBA	58.0 (1)	60.0 (1)	62.0 (1)
Sound pressure level	Heating	Nom.		dBA	44.0 (1)	47.0 (1)	49.0 (1)
Refrigerant	Type				R-32		
	GWP				675.0		
	Charge			kg	1.35		
	Charge			TCO2Eq	0.910		
	Control				Expansion valve		
	Circuits	Quantity			1		
Refrigerant oil	Type				FW68DA		
	Charged volume			l	1.1		
Defrost method					Reversed cycle		
Defrost control					Sensor for outdoor heat exchanger temperature		
Capacity control	Method				Inverter controlled		
Safety devices	Item	01			High pressure switch		
Pump	Quantity				1		
	Nr of speeds				PWM		
	Power input			W	75		
Water side Heat exchanger	Type				Plate heat exchanger		
	Quantity				1		
	Water volume			l	1.01		
	Water	Heating	Nom.	l/min	12.3 (1) / 13.2 (2)	17.2 (1) / 16.9 (2)	21.5 (1) / 22.4 (2)
	flow rate						
	Insulation material				Kaiflex		
	Heater			W	50.0		

2 Specifications

Technical specifications					EDLA04EV3	EDLA06EV3	EDLA08EV3
Space heating	Average climate water outlet 55°C	C Condition (7°CDB/6°CWB)	PERd	%	176.0	179.6	185.6
		D Condition (12°CDB/11°CWB)	Cdh (Degradation heating)		1.0		
			COPd		6.10		6.22
			Pdh	kW	3.3		4.1
			PERd	%	244.0		248.8
		Tol (temperature operating limit)	COPd		1.37	1.53	1.64
			Pdh	kW	3.99	5.36	7.05
			PERd	%	54.8	61.2	65.6
			TOL	°C	-10		
			WTOL	°C	55		
		Rated heat output supplementary capacity	Psup (at Tdesign -10°C)	kW	2.01	1.64	0.95
		Tbiv (bivalent temperature)	COPd		1.97	2.12	1.90
			Pdh	kW	5.3	6.1	7.5
			PERd	%	78.8	84.8	76.0
			Tbiv	°C	-7	-6	-8
Cold climate water outlet 55°C	General	Annual energy consumption	kWh		4,468	5,300	6,886
		ηs (Seasonal space heating efficiency)	%		107	109	112
		Prated at -22°C	kW		5.0	6.0	8.0
		Qhe Annual energy consumption (GCV)	Gj		16	19	25
Warm climate water outlet 55°C	General	Annual energy consumption	kWh		1,660	1,858	2,669
		ηs (Seasonal space heating efficiency)	%		148	158	159
		Prated at 2°C	kW		4.7	5.6	8.1
		Qhe Annual energy consumption (GCV)	Gj		6	7	10
	B Condition (2°CDB/1°CWB)	Cdh (Degradation heating)			1.0		
		COPd			2.11	2.15	2.09
		Pdh	kW		4.7	5.6	6.8
		PERd	%		84.4	86.0	83.6
	C Condition (7°CDB/6°CWB)	Cdh (Degradation heating)			1.0		
		COPd			3.28	3.45	3.42
		Pdh	kW		3.0	3.6	5.3
		PERd	%		131.2	138.0	136.8
	D Condition (12°CDB/11°CWB)	Cdh (Degradation heating)			1.0		
		COPd			5.13	5.48	5.52
		Pdh	kW		3.1	2.3	2.8
		PERd	%		205.2	219.2	220.8
	Tbiv (bivalent temperature)	COPd			2.11	2.15	2.66
		Pdh	kW		4.7	5.6	6.9

Technical Data Sheet

Project:

Unit:

EWYE019CZP-A1

- > Air to water reversible heat pump
- > Daikin DC-Inverter Scroll Compressor with Vapour Injection
- > High Efficiency
- > R-454C refrigerant



EWYE019CZP-A1

Unit description

Daikin air to water reversible heat pump with inverter driven scroll compressors and R454C refrigerant. Unit colour: Daikin White

Compressor

Inverter driven hermetic orbiting scroll are combined on each unit. Inverter compressors continuously adjust compressor speed to actual demand. Fewer power-consuming starts and stops result in decreased energy consumption and more stable temperatures. Compressors are equipped with oil heaters that keeps the oil from being diluted by the refrigerant when the chiller is not running. The compressor is combined with the vapour injection technology to increase the unit envelope and the capacity control steps

Water Side Heat Exchanger

The unit is equipped with a direct expansion plate to plate type water heat exchanger. It is made of stainless steel brazed plates and covered with nitrile rubber based elastomeric foam. Unit is equipped with the necessary devices for plant integration, such as: flow switch, treated water connections, air purge and drain valves, safety valve, shut off valve.

Air Side Heat Exchanger

Fins and tubes air cooled coil. Fins are designed with non-symmetric waffle louvres to enhance the heat exchange and improve the efficiency and compactness of the unit. The presence of hydrophylic and anti-corrosion treatment on the coil fins enhances the resistance to the aggressive environments.

Air Side Heat Exchanger fans

Air Side Heat Exchanger fans are propeller type with high efficiency design blades to maximize performances. The blades are made of glass-reinforced resin and a guard protects each fan. Units are standardly equipped with inverter driven fans.

Refrigerant circuit

Each refrigerant circuit includes: Compressors, Refrigerant, Air Cooled Condenser, Electronic expansion valve, Oil separator, High pressure switch, refrigerant stop valves (liquid and gas).



Unit Overview

Model Name	Boost	Pump	Power supply
EWYE019CZP-A1	Yes	Low lift pump	400 V/ 50 Hz / 3N~

Performances calculated according to EN14511-3

Cooling mode performances

Cooling capacity	17.83 kW	IPLV.IP	4.862 kW / kW
Power input	6.507 kW	SEER	3.880 kW / kW
Cooling Efficiency EER	2.740 kW / kW	$\eta_{s,c}$	152.2 %
Lw / Lp @ 1m	82.0 dB(A) / 66.2 dB(A)	SEPR	8.570 kW / kW
Ambient temperature	35.0 °C		
Evaporator			
Fluid IN/OUT	12.00 °C / 7.00 °C	Fluid Flow	0.8400 l/s
Pressure Drops	8.41 kPa		
Fluid	Water	Fouling Factor	0.00e+0°C m ² /W

IPLV.IP is calculated according to AHRI 550/590. SEER declared according to EN14825, fan coil application 12/7°C (inlet/outlet) water temperatures. SEPR declared according to EN14825, high temperature process cooling application (not Eurovent certified). Sound power in heating mode, measured according to the EN12102 and under test method following the ISO9614. IPLV.IP and seasonal efficiency data generally refer to standard unit without option.

Heating mode performances

Heating capacity	16.48 kW	SCOP LT	4.00kW/kW
Power input	10.99 kW	$\eta_{s,h^{LT}}$	157.0 %
COP Heating Efficiency	1.500 kW / kW	SCOP MT	2.83 kW/kW
Ambient temp dry/wet bulb	-4.0°C/-5.0°C	$\eta_{s,h^{MT}}$	110.0 %
Lw / Lp @ 1m(1)	77.0 dB(A) / 61.2 dB(A)	Lw / Lp @ 1m(2)	82.0 dB(A) / 66.2 dB(A)
Condenser			
Fluid IN/OUT	60.00 °C / 65.00 °C	Fluid Flow	0.8020 l/s
Pressure Drops	7.92 kPa	Fluid	Water
Fouling Factor	0.00e+0°C m ² /W		

SCOPLT declared according to EN14825, average climate, low temperature application; seasonal efficiency data refers to standard unit.

SCOPMT declared according to EN14825, average climate, medium temperature application



Instantaneous heating performance not taking in consideration the defrost effect.

(1) Sound power in heating mode, measured according to the EN12102 and under test method following the ISO9614. (2) Sound power level according to ISO9614-1.

Unit information

Capacity control	InverterControlled	Refrigerant type	R454C
Compressor type	Scroll	Refrigerant charge	6.6 kg
Circuit N°	1	Condenser type	CuAl
Compressor N°	1	Evaporator type	BrazedPlate
Condenser fans control	Variable Frequency Drive	Condenser fans N°	1
Nominal air flow	2770 l/s	Altitude	0 m
ESP	0 Pa		

Refrigerant charge data is intended as guideline only, refer to unit nameplate for specific value.

Refrigerant information

Refrigerant type	R454C	Refrigerant charge	6.6 kg
GWP100 (F-GAS)	145.5	ASHRAE Safety Classification	A2L
CO2 equivalent	0.96t		

Electrical information

Power supply	400 V/ 50 Hz / 3N~	Compressor starting method	Variable Frequency Drive
Running current	12.0 A	Max. current wires sizing	33.9 A
Max. Running current	30.6 A	Max. inrush current	0.00 A

Voltage tolerance $\pm 10\%$. Phase Voltage unbalance $\pm 3\%$. Electrical data are referred to base unit without additional options, refer to unit nameplate for specific value.

Physical information

Connections size	31.8 mm	Length	802 mm
		Width	1152 mm
Weight shipping/operating	298 kg / 300 kg	Height	1878 mm

Information referred to standard unit configuration without options, refer to certified unit drawing.



Acoustic information

Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
74.8	71.4	66.7	62.4	60.1	57.0	55.6	52.5	66.2

Values referred to Evap. IN/OUT 12/7°C and 35°C Amb, full load operation, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.

Sound power level (rif. 1 x 10 ⁻¹² W)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
90.6	87.2	82.5	78.2	75.9	72.8	71.4	68.3	82.0

Values referred to Evap. IN/OUT 12/7°C and 35°C Amb, full load operation, to base unit without additional options. Sound power in octave band is for intended as guideline only and not considered binding.

Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
70.4	62.9	59.8	59.5	56.8	49.5	46.2	46.3	61.2

Values referred to heating mode, measured according to the EN12102, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.

Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
74.8	71.4	66.7	62.4	60.1	57.0	55.6	52.5	66.2

Values referred to Evap. IN/OUT 40/45°C and 7°C Amb, full load operation, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.





APPENDIX C

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