Harvey
FIRST CLASS SERVICES

Photovoltaics (PV) Installation

Highgate Newtown Community Centre

TS-ME-06
REV 0

PROJECT NAME	**Highgate Newtown Community Centre**	
PROJECT NO	**02/1418**	
SUBMISSION No	**TS-ME-006**	
DESCRIPTION	**Technical Submittal** Photovoltaics (PV) Installation	
MAIN CONTRACTOR	**Farrans**	
CONSULTING ENGINEER	**FLOH**	
HARVEY GROUP SUBMITTED BY:	**Hugh Glackin**	**Date: 28/03/2022**
CLIENT APPROVAL SECTION BELOW		
DATE COMMENTS DUE	**11.04.22 - APSP**	
CONSULTANTS COMMENTS	Specific designs will be required for each roof system due to the makeup of the roofs	

Indicate appropriate box below:				**Date:**	
A		B		C	

Technical submission

Contents

1.0 Check list
2.0 Equipment Selection Information
3.0 Drawing

1.0 Check list

Optimum position of Panels considered against building design restrictions	✓
Total loads confirmed (Panels/Inverters, Frame & Ballast	✓
Total loads checked by Structural engineer & confirmed acceptable	✓
Consideration given to cleaning & maintenance procedures	✓

2.0 Equipment Selection Information

PRODUCT DATA SHEET

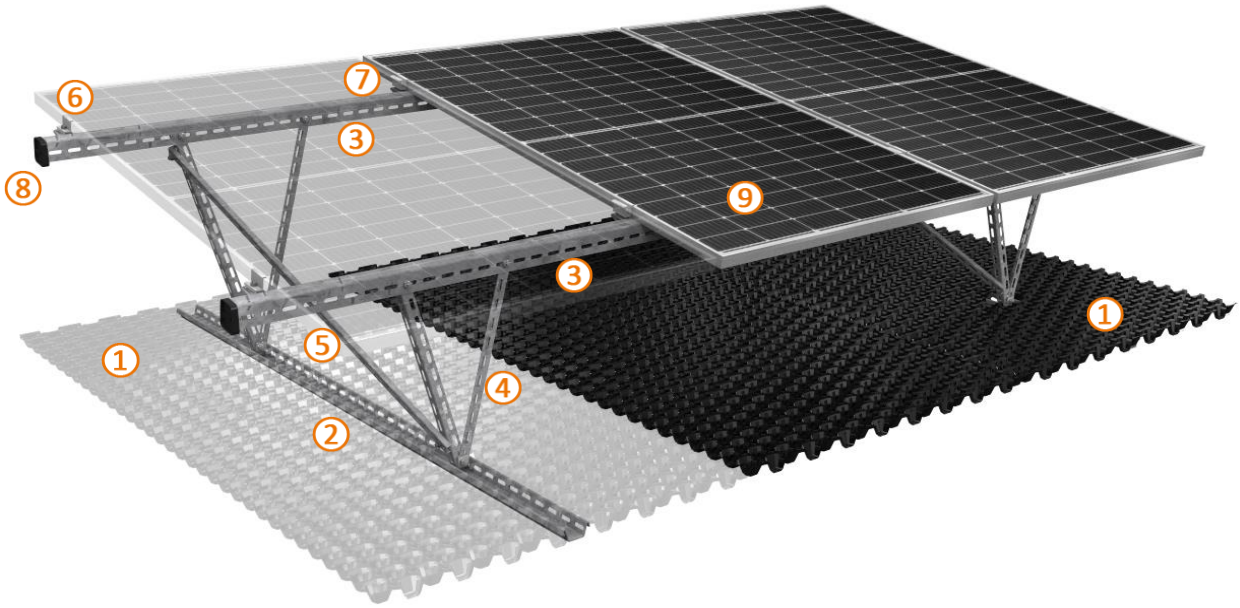
Bauder BioSolar G2 Solar PV Mounting System

Bauder BioSOLAR G2 is an integrated solar PV mounting system specifically for Bauder biodiverse or extensive green roofs.

Intended Use

Bauder BioSOLAR G2 is designed for applications where both a green roof and solar PV solution are required together to meet project requirements. The green roof substrate and vegetation provide the ballast mechanism for the entire solution which removes the need for additional ballast or penetrating the waterproofing to secure the units to the roof and maximises the available area for vegetation.

Bauder Biosolar should be used in conjunction with our BauderFlora 3 seedmix which contains both drought and shade tolerant herb and wildflower species and is suitable for roofs with a fall of up to 5°.



	Part	Unit	Value
1	**DSE 40 Anchor Board**		Pre-cored Bauder DSE 40 Drainage Board
	Material		HDPE, black
	Weight (dry)	kg/m2	1.8
	Material nominal thickness	mm	1.8
	Depth	mm	40
	Water storage capacity	l/m2	13.5
	Filling capacity (for mineral drain etc)	l/m2	21.0
	Support surface underside	%	42
	Compressive strength	Kpa	80
	Dimensions	mm	1040 x 2030
	Ballast	kg/m2	BS EN 1991 Eurocode 1 + BS EN 1991-1-1/ related load calculation for wind protection

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	Part	Unit	Value
Profile rails			
2	**Base rail**		
	Material		Powder coated steel - FVZS420GD+ZM310AC (Zinc Magnesium)
	Dimensions (L x W x H)	mm	3994 (long) or 1994 (short) x 36 x 72.2; Thickness 3
	Weight	kg/unit	13.06/6.52
3	**Module carrier rail**		
	Material		Powder coated steel - FVZS420GD+ZM310AC (Zinc Magnesium)
	Weight	kg/unit	15.59
	Dimensions (L x W x H)	mm	4700 x 61.9 x 47.5; Thickness 3
4	**V-beams**		
	Material		L- Profiles: Powder coated steel FVZS250GD+ZM310AC (Zinc-Magnesium), including Adapter + Screw
	Dimensions (Pre-assembled L x W x H)		Long v-beam - 749 x 399 x 54 Short v-beam – 550 x 343 x 54 Thickness 2
	Weight	kg	Long -1.50 Short - 1.15
5	**Diagonal profile**		
	Material		Powder coated steel - S250GD+ Z275 (Zinc)
	Dimensions (L x W x H)		1245 x 30 x 15; Thickness 1.5
	Weight	kg	0.952
Accessories			
6 & 7	**Module Clamp Set**	Piece	Module clamping hooks with thread (zincmagnelis- coating) pre-assembled
8	**Module carrier rail end cap**	Piece	Polypropylene

PRODUCT INFORMATION AND TECHNICAL PERFORMANCE			
Characteristic	**Test method**	**Unit**	**Value**
Weight	EN 1848-1	Kg/m²	176kg/m²*

*Includes weight of Bauder BTRS roof system with 160mm PIR insulation and saturated Biodiverse green roof based on a substrate depth of 100mm

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CERTIFICATION AND ENVIRONMENTAL INFORMATION	
International Standards Organisation (ISO)	ISO 9001:2015 Quality Management Certificates EN1271 (UK) and 70499/03-15_e (Germany). ISO 14001:2015 Environmental Management Certificates A10552 (UK) and 70499/03-15_d (Germany). ISO 50001 :2011 Energy Management Certificate 70499/03-15_c (Germany)

INSTALLATION GUIDANCE

Bauder Biosolar G2 is designed to be installed by a Bauder approved and trained contractor only. Please see Bauder Biosolar installation guidelines for a full breakdown of the system installation methodology.

The number of mounts and fixings required will vary from project to project. Please contact Bauder for a project specific technical report for further information. Windload and snowload calculations will also be provided on a project specific basis and will determine ballast requirements and substrate depths.

Bauder Biosolar G2 can be installed on slopes of up to 5° and is intended to be used with Bauder Biodiverse and substrate based extensive green roofs only.

Specific test standards and results are stated in Bauder product datasheets and our specification service should be used to confirm suitability to each individual project

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BAUDER

BAUDER BIOSOLAR G2

INSTALLATION GUIDE

Bauder BioSolar G2
Installation guidelines

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1 Symbols Used

CAUTION!

Non-compliance could result in serious property damage, or impairment to operational safety.

TIP!

Useful information for installing the mounting system.

2 System Overview

Bauder BioSOLAR G2 is designed for applications where both a green roof and solar PV solution are required together to meet project requirements. The green roof substrate and vegetation provide the ballast mechanism for the entire solution which removes the need for additional ballast or penetrating the waterproofing to secure the units to the roof and maximises the available area for vegetation.

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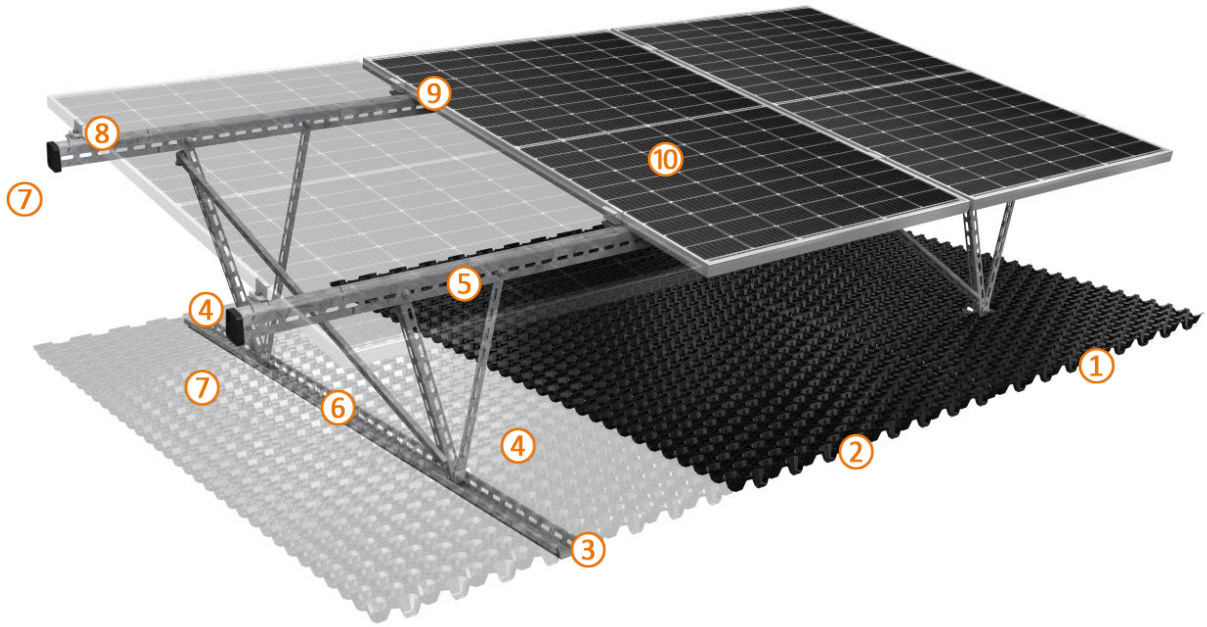


(1) DSE40 anchor board
(2) Standard DSE40 drainage board
(3) Base rail
(4) Pre-assembled V-beam short & long
(5) Module carrier rail
6 Diagonal support
(7) Module rail end cap
(8) Module end clamp
(9) Module middle clamp
(10) Photovoltaic module

3 Parts List

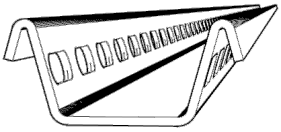
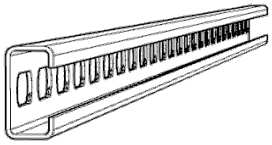
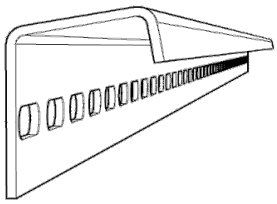
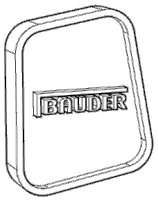
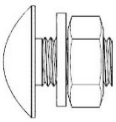
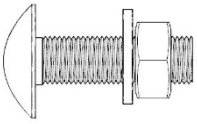
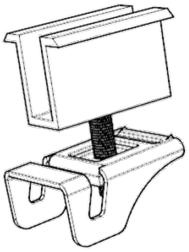
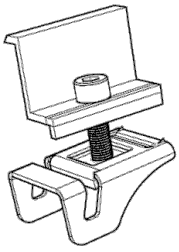
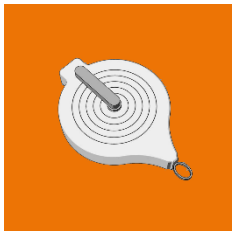
Image	Part name	Description
	Bauder DSE 40 anchor board	Pressure-resistant drainage and water storage element for green roofs and accessible traffic areas; HDPE; 1.04 x 2.03 x 0.04 m
	Base rail 2 meters or 4 meters	Profile rail 2000 mm or 4000 mm perforated, d = 3 mm, support surface 77 mm, S420GD + ZM310AC
	V-carrier units long and short version pre-assembled	L-profiles 745 mm and 545 mm, 30 mm x 30 mm d = 2 mm perforated, hot-dip coated S250GD, ZM310 - zinc-magnesium alloy with adapter, spring lock washer and screw pre-assembled, can be folded out
	Diagonal support profile	C-profile perforated L = 1.24 m, d = 1.5 mm Hot-dip coated S250GD, Z275 - zinc
	Module carrier rail 6 meters	Profile rail 6000 mm perforated, d = 3 mm, FVZS420GD + ZM310AC (zinc-magnesium)

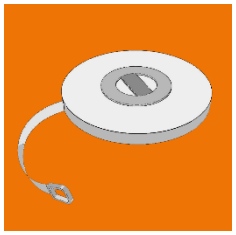
Image	Part name	Description
	Bauder module rail end cap	End cap for module support rail, polypropylene (PP)
	Buttonhead screw M10x20	Carriage bolt with square attachment self-locking in profile perforation, with washer; A2-70
	Buttonhead screw M10x30	Carriage bolt with square attachment self-locking in profile perforation, with washer; A2-70
	Pre-assembled module clamping hook set with middle clamp	Middle clamp M8, L = 70 mm, aluminium, distance 19 mm - module height 35 mm with cylinder screw DIN 912 M8x35 hexagon socket, locking washer and counter holder with thread M8, zinc-magnelis coating with earthing
	Pre-assembled module clamping hook set with end clamp	End clamp M8, L = 70 mm, aluminium, distance 19 mm - module height 35 mm with cylinder screw DIN 912 M8x35 hexagon socket, locking washer and counter holder with thread M8, zinc-magnelis coating with earthing

4 Required Tools

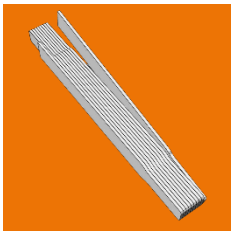
› Measuring and installation tools and accessories



Chalkline



Tape measure › 15 m



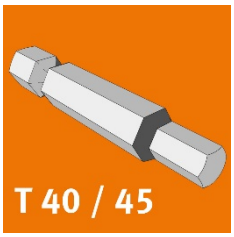
Folding rule

Pen / chalk / marker

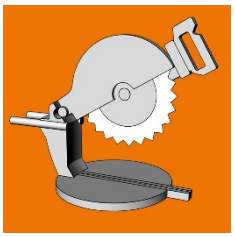
› Assembly Tools

Cordless screwdriver

Socket wrench
wrench size 17 (M10)
for cordless screwdriver



Bit Allen screw
6 mm (M8)



Mitre saw

Torque wrench
torque-setting type

Box nut
wrench size 17 (M10)
for torque wrench

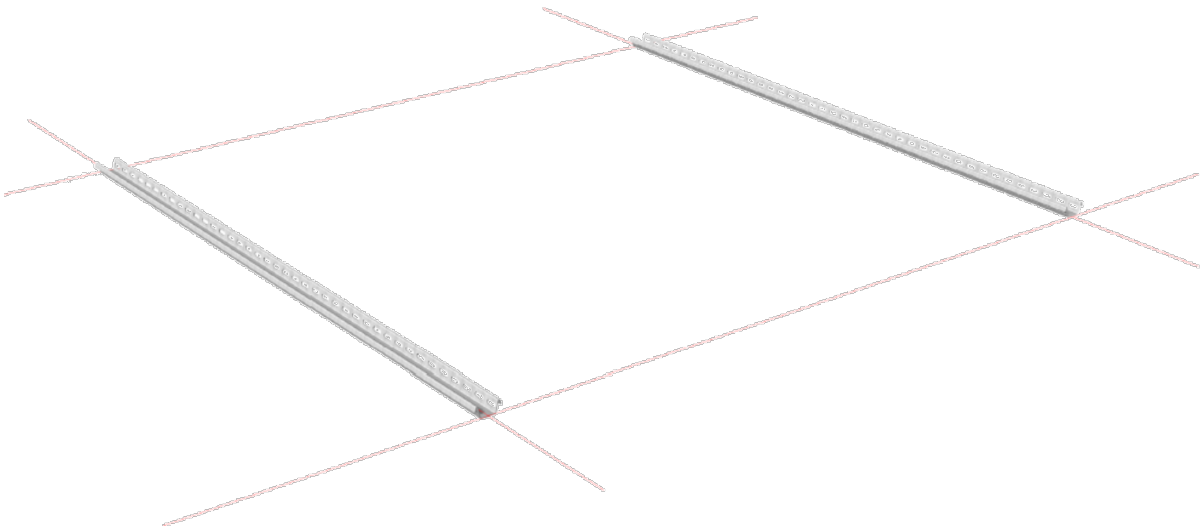
5 Assembly

5.1 Levelling and alignment of base rails

The roof should be clean of debris and coarse materials.

Mark out the installation grid on the roof surface/protection layer using a chalk line and measure the distances to roof edges or existing roof installations.

Align base rails according to the BauderSolar dimensioned roof layout.

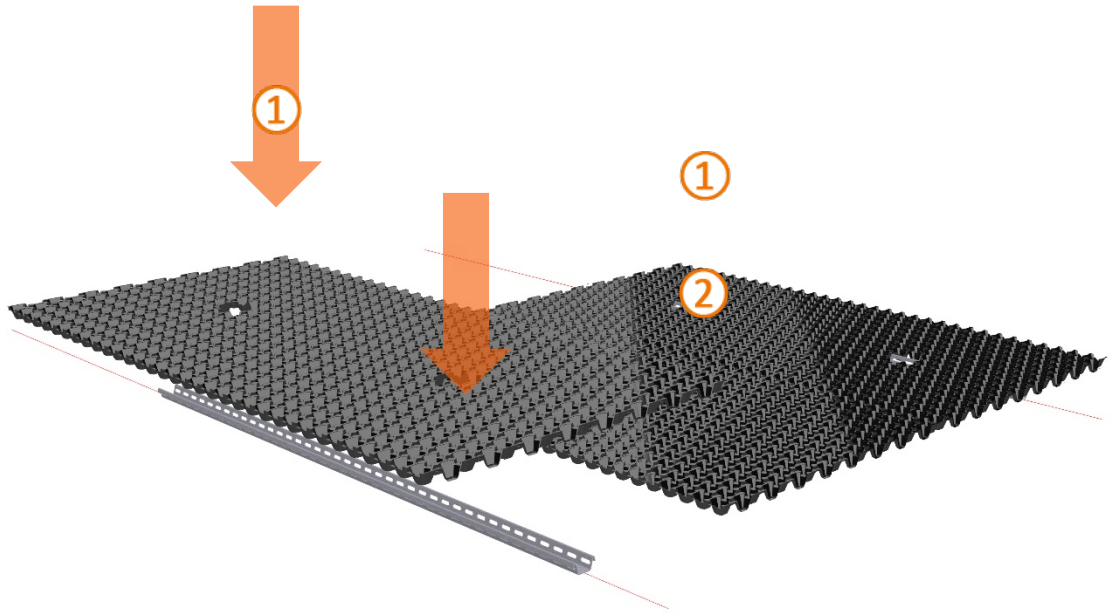


TIP! Observe base rail layout plan

The alignment and measurement of the base rails is carried out according to the Bauder base rail plan.

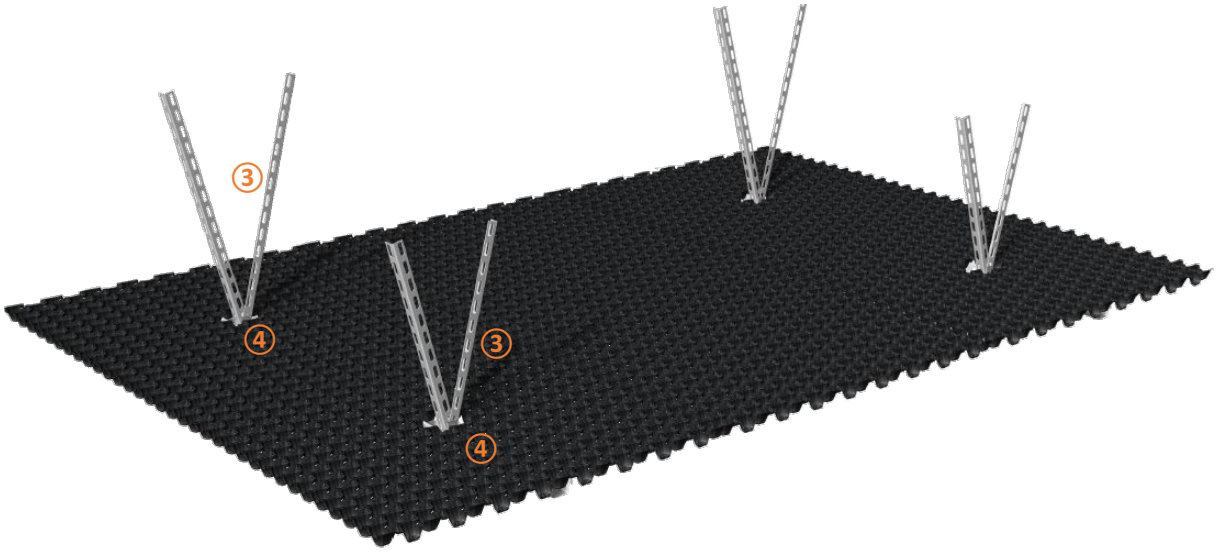
5.2 Laying the Bauder DSE 40 drainage board

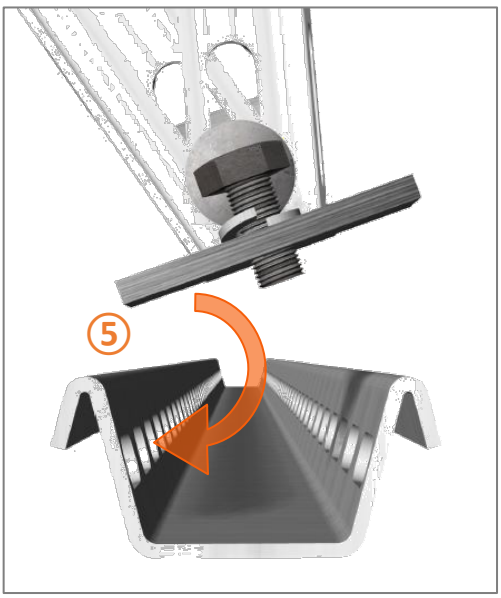
Install DSE40 anchor boards over base rails (1) with holes centered over the base rails.
Close the remaining gaps with the unperforated DSE40 boards (2).

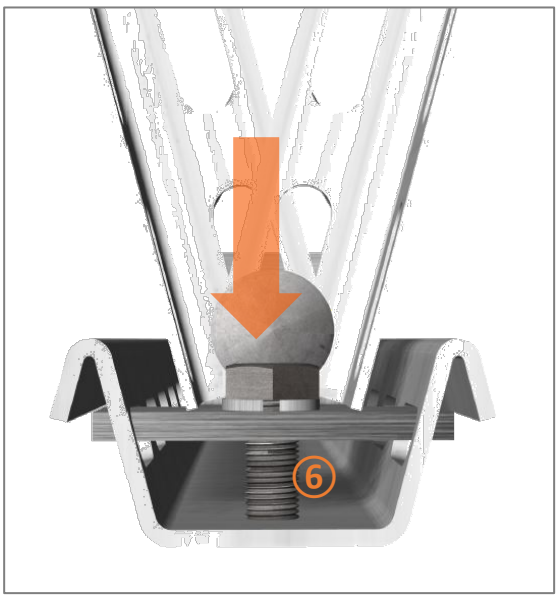


5.3 Install V-carrier units into base rails

Guide long and short V-carrier units ③ alternately through the openings of the Bauder DSE 40 anchor boards with perforation ④ sideways into the opposite elongated holes of the base rails ⑤ and tighten with the support screw until you reach final suspension point ⑥



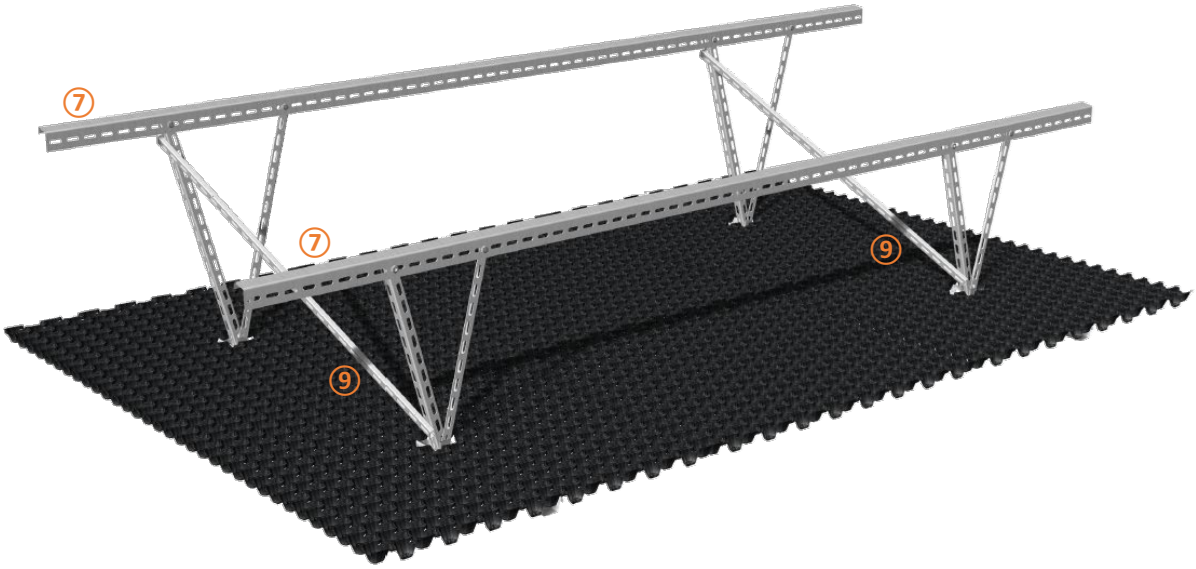


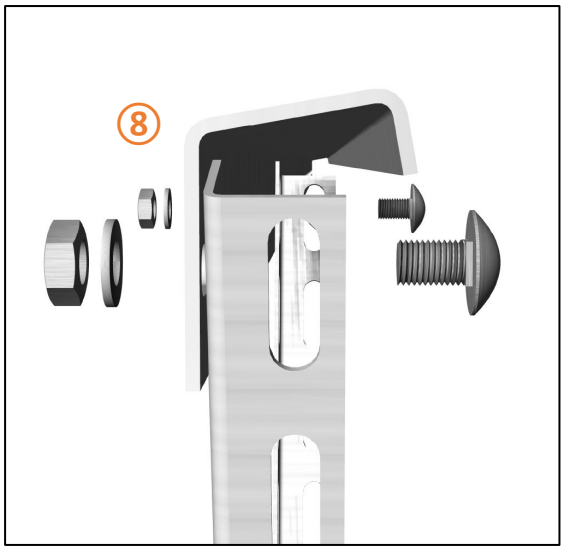


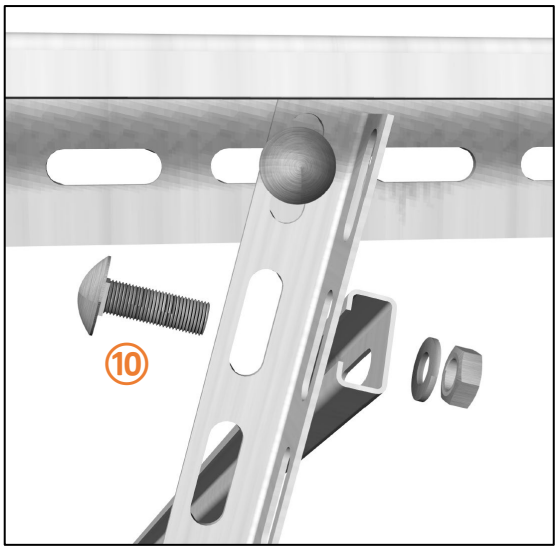
5.4 Mounting of module support profiles and diagonal support profiles

Fasten the diagonal profiles ⑨ as reinforcement of the supporting structure to the short and long V-carrier units with button-head screws, washers and nuts through the overlapping elongated holes ⑩ Tightening torque 35 Nm.

Then fasten the module support profiles ⑦ to the V-carrier units through the overlapping elongated holes with button-head screws with square neck, washers and nuts ⑧ Tightening torque 35 Nm.







5.5 Filling Bauder DSE 40 drainage layers with substrate

Apply the substrate ⑪ evenly over the Bauder DSE 40 mats at the appropriate depth according to the project-specific static ballast calculation.

Attach protective caps ⑫ to the ends of the module support profiles.

CAUTION! Wind uplift and ballast requirements

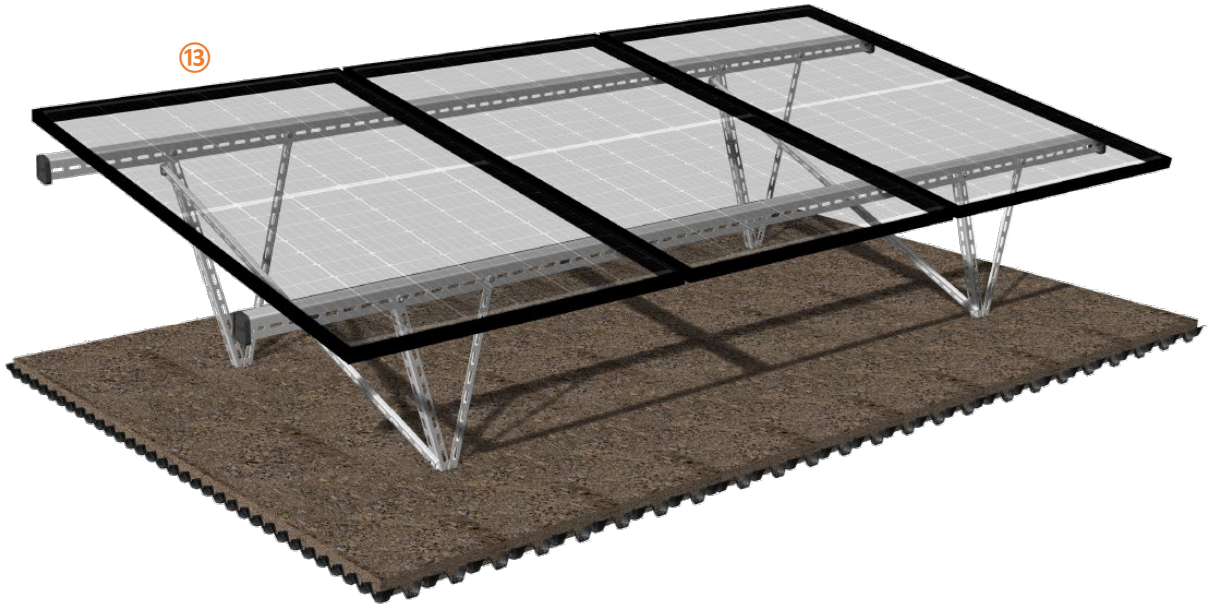
The volume/thickness of substrate per unit area is project specific and will vary between different wind load zones.

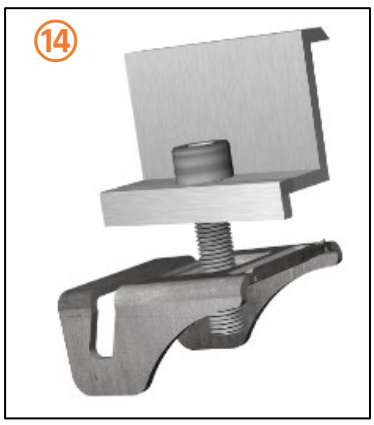
Please refer to the Bauder BioSolar G2 ballast layout plan for confirmation of substrate depths

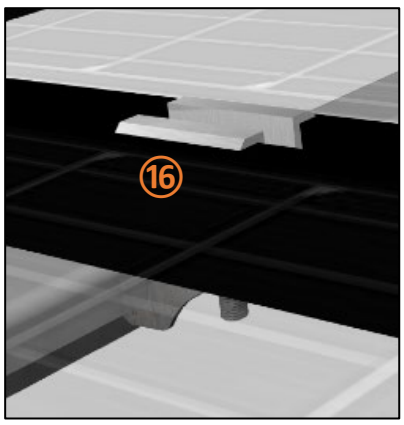
5.6 Fastening of solar modules with clamping hook sets

Fasten the solar modules ⑬ centred above the module support profiles using the supplied clamping hook sets with ⑭ end clamps ⑮ and middle clamps ⑯ as appropriate.

To do this, guide the notch on the clamping hook in the module support profiles and tighten the module clamp using the screw connector.







CAUTION! Tightening torque of module clamps

When installing the module clamps, the tightening torque specified by the manufacturer of the solar modules should be followed.

Please follow manufacturer guidance for module installation

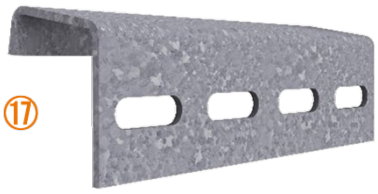
5.7 Manufacture and assemble rail connectors for module carriers

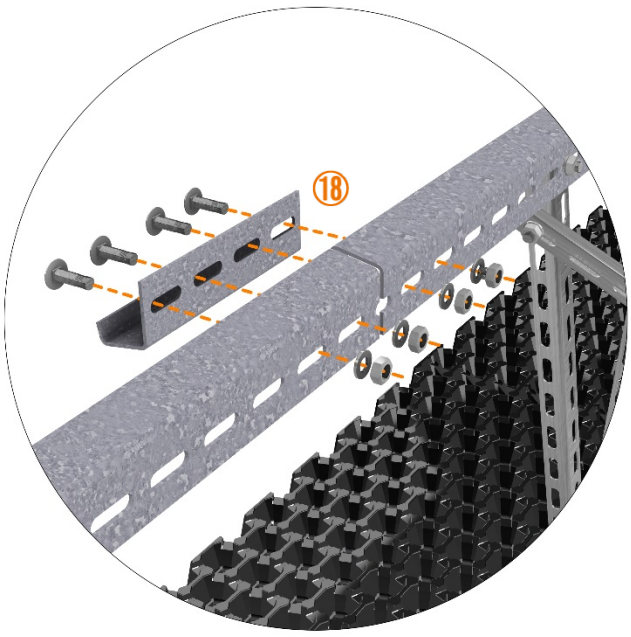
For longer module rows, the module carriers profiles must be connected to each other via a profile connector (17)

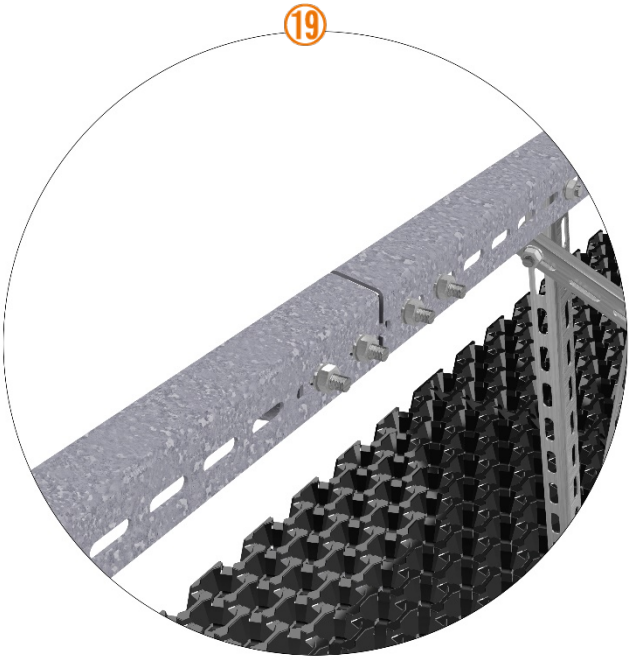
For this purpose, 200mm module rail connectors can be cut from the waste module rails. Spray zinc spray on all cut edges for corrosion protection.

The profile connectors then mount the profiles between the module carriers to be connected each via 2 pieces of flat round head screws M10x30 with square attachment, washer and nut (18) (19)

Tightening torque 35 Nm.







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bauder.ie

Harvest the Sunshine

Mono

390W MBB Half-Cell Module

JAM60S20 365-390/MR Series

Introduction

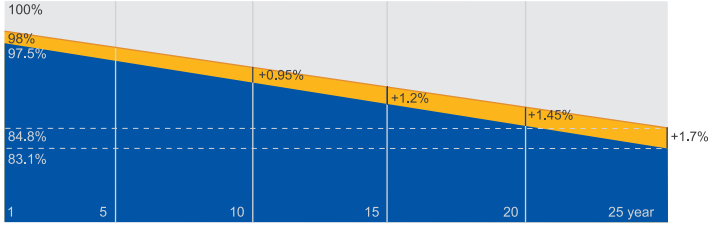
Assembled with multi-busbar PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.

- 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

JA SOLAR

www.jasolar.com

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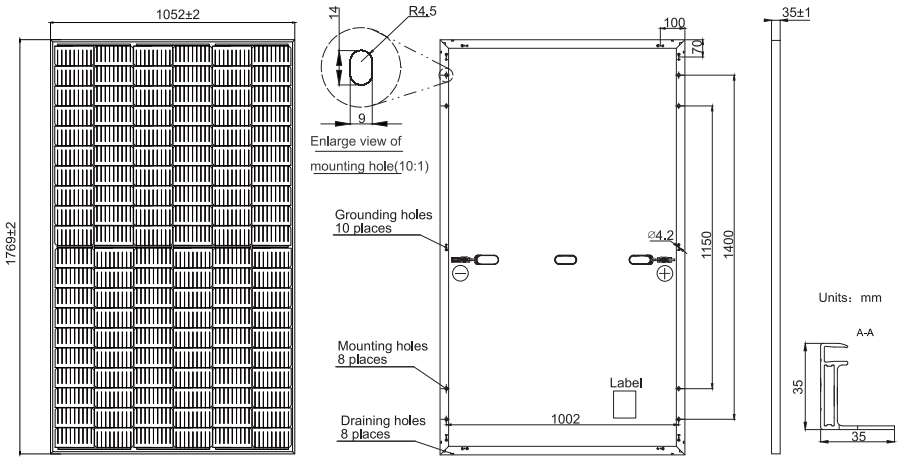
JAM60S20 365-390/MR Series

MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	20.5kg±3%
Dimensions	1769±2mm×1052±2mm×35±1mm
Cable Cross Section Size	4mm²（IEC）,12 AWG(UL)
No. of cells	120(6×20)
Junction Box	IP68, 3 diodes
Connector	MC4(1000V) MC4-EVO2(1500V)
Cable Length (Including Connector)	1200mm(+)/1200mm(-)
Packaging Configuration	31pcs/Pallet 806pcs/40ft Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM60S20 -365/MR	JAM60S20 -370/MR	JAM60S20 -375/MR	JAM60S20 -380/MR	JAM60S20 -385/MR	JAM60S20 -390/MR
Rated Maximum Power(Pmax) [W]	365	370	375	380	385	390
Open Circuit Voltage(Voc) [V]	41.13	41.30	41.45	41.62	41.78	41.94
Maximum Power Voltage(Vmp) [V]	33.96	34.23	34.50	34.77	35.04	35.33
Short Circuit Current(Isc) [A]	11.30	11.35	11.41	11.47	11.53	11.58
Maximum Power Current(Imp) [A]	10.75	10.81	10.87	10.93	10.99	11.04
Module Efficiency [%]	19.6	19.9	20.2	20.4	20.7	21.0
Power Tolerance	0~+5W					
Temperature Coefficient of Isc(α_Isc)	+0.044%/°C					
Temperature Coefficient of Voc(β_Voc)	-0.272%/°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.

ELECTRICAL PARAMETERS AT NOCT

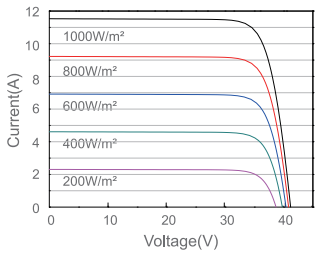
TYPE	JAM60S20 -365/MR	JAM60S20 -370/MR	JAM60S20 -375/MR	JAM60S20 -380/MR	JAM60S20 -385/MR	JAM60S20 -390/MR
Rated Max Power(Pmax) [W]	276	280	284	287	291	295
Open Circuit Voltage(Voc) [V]	38.41	38.65	38.89	39.14	39.38	39.63
Max Power Voltage(Vmp) [V]	32.05	32.30	32.55	32.72	32.96	33.20
Short Circuit Current(Isc) [A]	9.15	9.20	9.25	9.30	9.35	9.40
Max Power Current(Imp) [A]	8.61	8.66	8.71	8.78	8.83	8.88
NOCT	Irradiance 800W/m², ambient temperature 20°C, wind speed 1m/s, AM1.5G					

OPERATING CONDITIONS

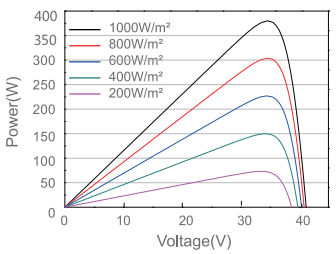
Maximum System Voltage	1000V/1500V DC
Operating Temperature	-40°C~+85°C
Maximum Series Fuse Rating	20A
Maximum Static Load,Front	5400Pa（112 lb/ft²）
Maximum Static Load,Back	2400Pa（50 lb/ft²）
NOCT	45±2°C
Safety Class	Class Ⅱ
Fire Performance	UL Type 1

CHARACTERISTICS

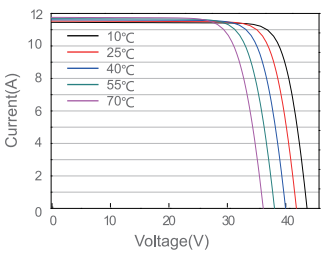
Current-Voltage Curve JAM60S20-380/MR



Power-Voltage Curve JAM60S20-380/MR



Current-Voltage Curve JAM60S20-380/MR



Solis-3P(3-20)K-4G

Solis Three Phase Inverters

360 degree

Features:

- Max. efficiency 98.7%
- Wide voltage range and low startup voltage
- 2 MPPT design with precise MPPT algorithm
- THDi<1.5%, low harmonic distortion against grid
- Multiple protections levels
- Intergrated Export Power Manager (EPM)

Model:

Solis-3P3K-4G	Solis-3P4K-4G	Solis-3P5K-4G
Solis-3P6K-4G	Solis-3P8K-4G	Solis-3P9K-4G
Solis-3P10K-4G	Solis-3P12K-4G	Solis-3P15K-4G
Solis-3P17K-4G	Solis-3P20K-4G	

solis

Datasheet

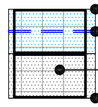
Model Name	Solis-3P3K-4G	Solis-3P4K-4G	Solis-3P5K-4G	Solis-3P6K-4G	Solis-3P8K-4G	Solis-3P9K-4G	Solis-3P10K-4G	Solis-3P12K-4G	Solis-3P15K-4G	Solis-3P17K-4G	Solis-3P20K-4G
Input DC											
Recommended max. PV power	3.6kW	4.8kW	6kW	7.2kW	9.6kW	10.8kW	12kW	14.5kW	18kW	20.4kW	24kW
Max. input voltage	1000V										
Rated voltage	600V										
Start-up voltage	180V										
MPPT voltage range	160-850V										
Max. input current	11A/11A							22A/22A			
Max. short circuit current	17.2A/17.2A							34.3A/34.3A			
MPPT number/Max. input strings number	2/2							2/4			
Output AC											
Rated output power	3kW	4kW	5kW	6kW	8kW	9kW	10kW	12kW	15kW	17kW	20kW
Max. apparent output power	3.3kVA	4.4kVA	5.5kVA	6.6kVA	8.8kVA	9.9KVA	11kVA	13.2kVA	16.5kVA	18.7kVA	22kVA
Max. output power	3.3kW	4.4kW	5.5kW	6.6kW	8.8kW	9.9KW	11kW	13.2kW	16.5kW	18.7kW	22kW
Rated grid voltage	3/N/PE, 220/380V, 230/400V										
Rated grid frequency	50/60Hz										
Rated grid output current	4.6A/4.3A	6.1A/5.8A	7.6A/7.2A	9.1A/8.7A	12.2A/11.5A	13.7A/13.0A	15.2A/14.4A	18.2A/17.3A	22.8A/21.7A	25.8A/24.6A	30.4A/28.9A
Max. output current	4.7A	6.4A	7.9A	9.5A	12.7A	14.3A	15.9A	19.1A	23.8A	27A	31.8A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)										
THDi	<1.5%										
Efficiency											
Max. efficiency	98.3%				98.7%						
EU efficiency	97.8%				98.1%						
Protection											
DC reverse-polarity protection	Yes										
Short circuit protection	Yes										
Output over current protection	Yes										
Surge protection	Yes										
Grid monitoring	Yes										
Anti-islanding protection	Yes										
Temperature protection	Yes										
Integrated AFCI (DC arc-fault circuit protection)	Yes										
Integrated DC switch	Optional										
General Data											
Dimensions (W*H*D)	310*563*219 mm										
Weight	17.3kg				18kg			18.9kg		19.8kg	
Topology	Transformerless										
Self consumption	<1W (night)										
Operating ambient temperature range	-25 ~ +60°C										
Relative humidity	0-100%										
Ingress protection	IP65										
Cooling concept	Natural convection							Intelligent redundant fan-cooling			
Max. operation altitude	4000m										
Grid connection standard	VDE-AR-N 4105, VDE V 0124, VDE V 0126-1-1, UTE C15-712-1, NRS 097-1-2, G98, G99, EN 50549-1/-2, RD 1699, UNE 206006, UNE 206007-1, IEC 61727										
Safety/EMC standard	IEC 62109-1/-2, IEC 62116, EN 61000-6-1/-2/-3/-4										
Features											
DC connection	MC4 connector										
AC connection	Quick connection plug										
Display	LCD										
Communication	RS485, Optional: Wi-Fi, GPRS										

3.0 Drawing

Bauder Bio Solar G2 - JA Solar module

Key:

Bauder Bio Solar G2 - JA Solar module



= 1M Perimeter Zone

Design Information	
Short Mounting Rails:	0
Long Mounting Rails:	34
Module Rails:	34
Type of Optimizer:	N/A
Area of PV Panels:	126.548m2
General Information	
Total power DC:	26.18 kWp
BAUDER System type:	Bauder Bio Solar G2
Module type:	JAM60S20 - 385/MR (385wp)
Module amount:	68 Units
Azimuth:	16 & 23 Degrees SW

All Dimensions, positions of Rooflights and Outlets/SVP's/mansafe systems are to be checked on site for clashes BEFORE the PV design is ordered.

Rev	Date	Description	Drawn By
6	21.03.22	Ballast requirement updated.	DAM
5	14.03.22	Panels relocated.	DAM
4	25.02.22	System switched to Bio Solar G2.	DAM

BAUDER

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bauder.ie

Contractor to be responsible for checking this scheme against architects drawings/site requirements and to advise Bauder immediately of any discrepancies. Orders placed against this drawing reference assume approval of this scheme. Any materials required over and above the quantities given, will be charged accordingly.

Contract Name:
Highgate Newtown Community Centre
High Bertram Street
London, N19 5DG

Roof Area Name:	Roof Height:	Membrane Type:	No. Panels:	No. Mounts:	No. Weld Sleeves:	Inverter Type 1:	Inverter Type 2:
Block A1 Roof	12.00m	BTGRS	42	42	N/A	SOL-12.0-3PH-4G-DC x1	-
Block A2 Roof	12.00m	BTGRS	0	0	N/A	-	-
Block B Roof	12.00m	BTGRS	16	16	N/A	SOL-5.0-3PH-4G-DC x1	-
Block D Roof	12.00m	BTGRS	10	10	N/A	SOL-3.6-5G-DT-DC x1	-

Required Ballast In Kg/m²:

= 84 = 120 = 150

Bauder Bio SOLAR G2 PV Layout Plan

Contract No:	B173242		
Drawing No:	B173242PV - 20210909		
Designed to Drawing No:			
Scale:	N.T.S		
Drawn By:	D.Mitchell	Date:	09.09.21