POWERING A CLEANER FUTURE

Hydrogen Power Generators · Energy Storage Systems · Hybrid Power Systems

BLUE DIAMOND MACHINERY | NetZero EQUIPMENT

Blue Diamond Machinery - leader in clean power solutions

Blue Diamond is committed to being at the forefront of the energy transition and assisting in Australia's commitment to net zero carbon emissions by 2050.

As such, we are heavily investing in alternative power solutions to the traditional diesel offerings.

We believe there will need to be a variety of solutions available to achieve this goal particularly, in relation to reducing carbon emissions from powering construction sites. Blue Diamond aims to be at the forefront of these solutions which include hybrid generators, energy storage systems (ESS) and Hydrogen powered generators.

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POWERING A CLEANER FUTURE

GEH2: The zero- emission hydrogen power generator

Blue Diamond is proud to be the Australian Distributor for the GEH2 Hydrogen Power Generator

In search of innovative solutions for alternative engines that reduce C02 emisions and our commitment to an environmental approach, Blue Diamond has partnered with French company EODev (Energy Observer Developments) to bring you an electro-hydrogen power generator - the GEH2®

The GEH2® was developed with the aim of easily integrating into all industries and environments. Companies like Europe's largest equipment rental company LOXAM have already embraced the use of this new technology.

After more than a year of tests and obtaining certifications, GEH2® electro-hydrogen unit enables electricity to be produced without pollution and emissions of CO2.

The combined use of a fuel cell and a Lithium Ion Iron Phosphate battery massively reduces noise emissions and provides instant start-up. This combination of power enables the GEH2® to deliver nearly 80 kW of electricity and its double hydrogen supply system allows continuous operation.

Depending on the power requirements, communication boxes allow several GEH2® to be parallelised but also to associate them with diesel, gas, etc, as well as with the network to produce electricity in 'peak shaving' mode while reducing CO2 emissions.

Very easy to use, the GEH2® is equipped with event-driven electrical outlets, standardised frequency and voltage levels (230V / 400V - 50Hz & 60Hz) as well as remote control and data acquisition.

GEH2: Hydrogen power generator

In case of grid failure, or simply when the grid does not exist, the GEH2® electro-hydrogen generator brings you the energy you need, without CO2 emissions or fine particles. With the GEH2 and its record-breaking energy density, you benefit from instant power from 100kVA to 1MVA in an optimized volume.

The ally of the energy transition... and of your sense of smell

No more noise and black fumes forcing you to wear earphones and anti-pollution mask. The GEH2 does not emit CO2, HC, NOx or other fine particles. Only hot water and filtered air. And with the heat dissipated by the fuel cell, you can realize cogeneration.

As we know, the energy transition will not happen overnight. That's why the GEH2 is also capable of connecting with diesel or gas generators, and even the grid. It is this flexibility in its implementation that makes the GEH2 the ideal partner for the supply of autonomous decarbonated energy.

Smart and connected power generator

Thanks to its on-board intelligence, the GEH2 informs you if the hydrogen level is low or if a maintenance operation is required. If you wish, it can even warn our technicians directly. Its 4G connection allows continuous online monitoring of your GEH2 fleet via the cloud (location, usage profile, hydrogen reserve status, etc).

To offer you greater flexibility in your work, a remote interface complements the unit's touchscreen interface. This means that control and data acquisition are always at your fingertips.

GEH2: Hydrogen power generator

→ Start decarbonizing your business today

Construction Sites	Events	EV charging	Telecom
Film shooting	Grid maintenance		Ports and airports
Isolated sites	Regulated areas	Peak shaving	Back-up

Kennards Hire first-to-market with Blue Diamond's GEH2® Electro-Hydrogen Generator

Iconic Australian family-owned equipment hire company, Kennards Hire, is accelerating the clean power transition for the hire and rental sector by purchasing two new EODEV GEH2® Electro-Hydrogen Generators. Kennards Hire is first in the Australian hire industry to offer such an alternative with clean energy, zero-emissions solution for large-scale projects. Through Kennards Hire, equipment rental products such as the GEH2® hydrogen power generator are now becoming a more viable sustainable solutions option on the path to Net Zero 2050.

→ GE**H2**® facts and figures

The EODev GEH2® is a hydrogen fuel cell power generator designed to replace diesel or gas gensets in both mobile, prime and emergency stand-by applications. This cutting-edge generator is completely zero emission, only rejecting water and heat as by-products. No noise, no fumes, no CO2 or fine particules. Scalable, efficient and easy-to-use the GEH2® is equipped with the latest generation of hydrogen fuel cell from our partner Toyota, giving it an exceptional reliability and a record life span.

PERFORMANCES

Power output - ESP ISO rating	110 kVA / 88 kW
Power output - PRP ISO rating	100 kVA / 80 kW
Voltage output	3-phase 400 V / 480 V
Frequency output	50 — 60 Hz
Operating temperature	5° F to 104° F without derating
Protection index	IP 43

MAIN COMPONENTS

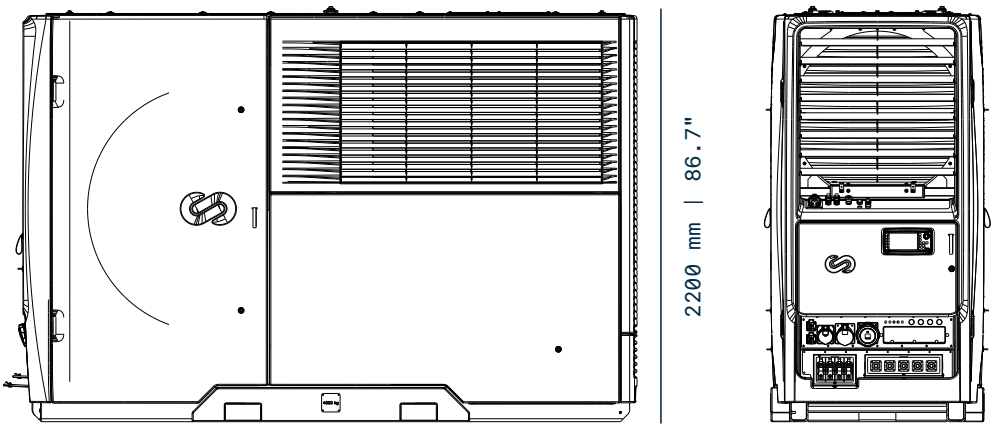
Fuel cell brand	Toyota
Fuel cell type	PEM
Fuel cell efficiency	50 %
Battery type	LiFePO4
Battery capacity	44 kWh
External hydrogen expansion system included	

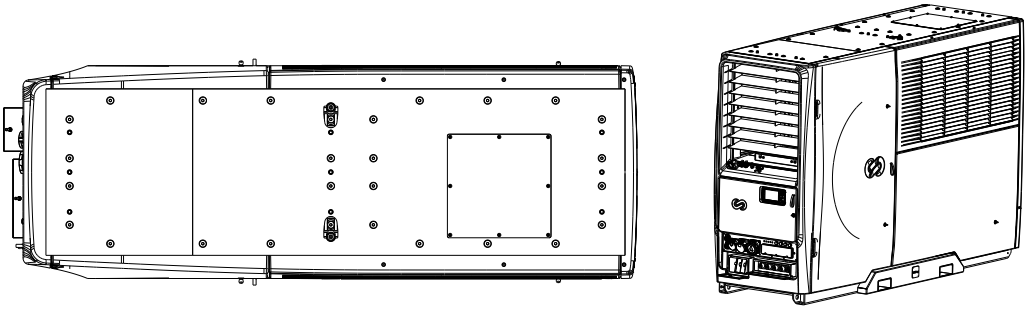
GEH2: Hydrogen power generator

Made in France

DIMENSIONS

Mass: 3 960 kg





MAIN BENEFITS

NO CO_2	EASY-TO-USE	STACKABLE	LOW MAINTENANCE
NO NOX	RELIABLE	INSTANT START	HIGH EFFICIENCY
QUIET	SCALABLE	LOAD SHARING	REMOTE MONITORING

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AMPD Battery Energy Storage System

The AMPD Enertainer

Ampd Energy is driven by its vision for an emission-free future for construction. Ampd Energy pioneered the use of battery energy storage systems (BESS) in urban construction with its flagship product, the “Enertainer”. The Enertainer electrifies construction sites and provides clean, quiet and fully automated energy delivery, allowing construction to transition away from fossil fuels.

Compared to fossil fuel generators, the Enertainer:
- reduces carbon footprint by up to 85%;
- is 32x quieter; - emits zero diesel fumes
- eliminates diesel handling and usage risks;
- has zero maintenance and refuelling downtime;
- and is economically justified for operational cost savings.

As an IoT enabled device, the Enertainer can be remotely monitored anytime and anywhere, providing a deep level of data-transparency for data-driven decision making.
To date, Ampd Energy has eliminated 10,000 tonnes of CO2/year and removed an equivalent of 20,000 cars worth of air pollution from our city’s streets.

Electrifying Multiplex ‘The Grove’ in Western Australia with lithium-ion battery

Blue Diamond Machinery are proud to be first movers in the supply of commercial-scale batteries to construction sites in Western Australia. The Enertainer will offer Multiplex at ‘The Grove’ development, an 80 per cent cost saving on fuel and eliminate 100 per cent of diesel-produced emissions on site, by replacing the diesel power with clean power. For Multiplex, it has eliminated the need for noisy diesel power and with access to grid power, overall CO2 emissions will be cut by about 85 per cent.

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POWERING A CLEANER FUTURE

AMPD Battery Energy Storage System

The Ampd Enertainer is an advanced energy storage system which provides diesel-free power for the next-generation of construction projects. Available in various configurations, the Ampd Enertainer is designed for the tough, dynamic and space-constrained needs of construction sites, without compromise.

Significant Cost Savings

Up to 75% lower all-inclusive OPEX[1] & lower total cost of ownership

Ultra Low Noise Footprint

32 times quieter[1], enabling use during noise sensitive hours

Minimise Carbon Footprint

Up to 85% carbon reduction[1] & zero direct NO_X, PM & SO_2 fumes

Enhance On-Site Safety

Eliminate diesel fire hazards & reduce on-site diesel storage quantity

Maximise Productivity

Zero recharging downtime and near-zero annual maintenance downtime

Internet Connected, 24/7

Connect to the Enertainer's IoT platform, anywhere & any time

[1]Compared to generators of a similar capacity

70+ units

Delivered + on order

450,000+ hrs

Fleet-wide operational time

60+ projects

Powered by Enertainers

10

Repeat customers

10,000 tonnes

CO_2 eliminated per year, to date

20,000 cars

Air pollution impact

25

Unique customers

AMPD Battery Energy Storage System

Advanced Manufacturing Centre
Client: Science Park
Contractor: Gammon Construction
Contract sum: US$610m
Application: Tower Crane, 24h, Semi-indoor

Murray Road 2
Client: Henderson Land
Contractor: Hip Hing Construction
Contract sum: US$180m
Application: 64 Ton Tower Crane

Multi-welfare Complex (SS F506)
Client: ArchSD
Contractor: Shui On
Contract sum: US$242m
Application: Tower Crane, Hybrid recharge, MiC project

Lamma HKE Gas & Steam Turbine Po Station Extension
Client: HKE
Contractor: Paul Y
Contract sum: Undisclosed
Application: Tower Crane

Kai Tak 6565 Residential
Client: Henderson
Contractor: Paul Y
Contract sum: Undisclosed
Application: Tower Crane + Hoist

Tin Wing Station residential
Client: MTR, SHKP
Contractor: Sanfield
Contract sum: Undisclosed
Application: Tower Crane

AMPD Battery Energy Storage System

Sky City
Client: New World, Airport
Contractor: NWC (Hip Seng)
Contract sum: Undisclosed
Application: Auto on/off, Tower Crane

TaiKoo Place Two
Client: Swire
Contractor: Hip Hing Construction
Contract sum: Undisclosed
Application: Tower Crane + Welder

Kai Tak Sports Park
Client: New World Development
Contractor: Hip Hing Construction
Contract sum: US$3,800m
Application: Tower Crane

Shek Wu Hui Treatment Plant
Client: Drainage Services Department
Contractor: Chun Wo
Contract sum: US$170m
Application: Welders

United Christian Hospital
Client: The Hospital Authority
Contractor: Build King - Hyundai JV
Contract sum: US$1,200m
Application: Tower Crane, Welder

Siu Hong Residential Development
Client: SHKP
Contractor: Sanfield
Contract sum: Undisclosed
Application: Tower Crane

AMPD Battery Energy Storage System

Case Study

Gammon Construction deployed two Ampd Enertainers to power four tower cranes to build the Advanced Manufacturing Centre ("AMC"), a new flagship manufacturing facility by the Hong Kong Science and Technology Parks Corporation (HKSTP) in Hong Kong. The first unit was deployed in October 2019 with the second being added in May 2020, with both units replacing a total of four generators. Using only 70A of grid power to power four cranes, the Enertainers have enabled a significant cost and environmental reduction. In addition due to its quieter operation, the Enertainer improves noise levels in the local community while allowing for quiet operations at the site beyond normal working hours.

Site Setup

Figure 1. 'Block' diagram of the connection between the utility mains, Enertainers and the loads.

Results

- 78% lower OPEX costs[1]
- 85% CO_2 footprint reduction[2] **–almost 500 tonnes per year**
- **Zero direct PM emissions (99.99% less indirect)**[3]
- **Over 30 times quieter than a diesel generator**

"The Enertainer worked perfectly from the very beginning. Not only did we vastly reduce our CO_2 emissions–a key focus for Gammon–but we did so with a lower OPEX. Even though this was the first time we deployed this technology, the performance data reporting system of the Enertainer gave us confidence. We are very excited about using this technology at other sites in future."

Andy Wong (Senior Innovation Manager), Gammon Construction

"From a site perspective, the Enertainer was a great fit for AMC. We put it through its paces and it responded to everything we threw at it. It was very simple to set up and operate with almost no downtime to site operations. We're particularly excited about the lower noise levels which will really help us get government approval to continue working at noise sensitive hours."

Sammy Lai (Director, Building Projects), Gammon Construction

Figure 2. Performance metrics for the Enertainer at the AMC project on 8 July 2020, one of the busiest days for the tower crane on the project.

[1] Assuming a wholesale market diesel price of HK$5.50 (US$0.71 per litre).

[2] Assuming an energy intensity of 0.51 kg_{CO2} per kWh (Source: Response to the Long-Term Decarbonisation Strategy Public Engagement, CLP (September 2019).

[3] Assuming a Tier III generator and using Hong Kong's electricity grid

AMPD ENERGY

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POWERING A CLEANER FUTURE

AMPD Battery Energy Storage System

Parameter		Specification	
Model		**Enertainer M**	**Enertainer L**
Maximum output current per phase	Peak (<1 minute)	455 A	795 A
	Continuous	380 A	665 A
Energy storage subsystem chemistry		Lithium-ion NMC	
Example applications		Tower cranes, material hoist, passenger hoists, welders, bar benders, grouting station	
Power conversion subsystem	Type	Heavy-duty, modular power conversion system	
	Input voltage range	320 – 440 VAC (3Ph + N + PE)	
	Maximum input current	80 A (standard)	
		50 A (with optional input leakage current reduction system)	
	Output voltage	380 – 415 VAC ± 1% (3Ph + N + PE)	
	Output frequency range	50 Hz ± 0.5 Hz	
Thermal management subsystem	Type	Industrial, wall-mounted recirculating air-conditioning system	
	Number of cooling units	2 units	
	Refrigerant type	R134a	
Mechanical	Dimensions (L x W x H)[2]	3.21m (L) x 2.44m (W) x 2.6m (H) (10' container)	
	Net weight	7.85 tons	8.75 tons
	Fire extinguishing subsystem	Aerosol based, triggered by heat and/or smoke sensors	
	Ingress protection	IP54	
	Operating temperature range	0 to +45 °C external ambient temperature	
	Sound power level[3]	85-89 dB(A) (32 times quieter vs. comparable diesel generator)	
Connectivity		Cellular data, RS-485	
Expected Lifetime[4]		10+ years	
Standards		UL, UN 38.3, CE, IEC, IEEE, ENA G99	

Recommended Combination & Input Requirement[5]

2 x mid-size tower cranes	Enertainer L	25 A
1 x large-size tower crane	Enertainer L	25 A
1 x mid-size tower crane + 1 x material/passenger hoist	Enertainer M	15 A
5 x welders	Enertainer M	40 A

Available Options

Input leakage current reduction system		Optional
Warranty and field engineering	5-year on-site warranty	Included
	8-Year extended on-site warranty	Optional
	Standard support plan	Included
	Premium (Gold) support plan	Optional
	Premium (Platinum) support plan	Optional
Remote access and data	Standard web monitoring interface	Included
	Premium web monitoring interface	Optional
	Data analytics package	Optional

AMPD ENERGY

[1]In the interests of continual product improvement, specifications are subject to change without notice. Please contact us for the latest specifications.

[2]An additional 0.9 m clearance on all sides of the Enertainer should be provided for maintenance access.

[3]ISO 3746:2010 measurement methodology.

[4]Provided for guidance purpose. Life is defined as the ability of the Enertainer to provide the specified rated power. Actual life may vary and will depend on factors such as (but not limited to): (i) operating temperature; (ii) quality of maintenance of the system; (iii) frequency of use; and (iv) time duration spent at different battery states.

[5]Provided for guidance purposes. Actual grid input requirement will depend on factors such as (but not limited to): (i) actual equipment electrical requirements; (ii) utilisation/duty cycle; (iii) daily duration of availability of input power supply; (iv) state-of-health and age of the Enertainer; (v) duration of daily construction site operations.

Powr2 Battery Energy Storage System

Powr2 Emission Free, Silent Power

- Sustainable Energy Storage Solutions

POWR2 is a manufacturer of rental-ready, reliable, safe, and emission-free portable power products. POWR2's portable power solutions help businesses run their operations on clean energy and meet their energy efficiency and sustainability goals. Innovative solutions from POWR2 drive profitability and sustainability with cutting-edge technology. POWR2 is headquartered in Bethel, CT, USA with distribution worldwide.

POWR2 POWRBANK energy storage can be used in combination with diesel or renewable power generators in temporary power applications to reduce CO2 emissions, fuel consumption, and noise.

POWR2 maximizes the use of battery power for the electrical load by automatically switching between diesel or renewable generators and POWRBANK stored energy. The result is seamless and sustainable energy for any event, construction site, remote location and beyond.

Features & Benefits

- Environmentally friendly; helps in meeting emissions regulations and sustainability goals
- Save on fuel, reducing both CO2 emissions and costs
- Increased reliability; manages variable loads and eliminates light load periods
- Delivers zero noise; ideal for projects where sound needs to be kept to a minimum
- Intelligent on board energy control module that communicates with the generator
- Flexible maneuverability options with forklift pockets, lift & drag skid and lifting ring
- Monitor and manage energy online

80% Carbon Offset

Reduce CO2 emissions by up to 80% when compared to running a diesel generator alone

Quick 4-Hour Charge Time

Full battery charge in around 4 hours when integrated with a diesel generator

20 Hours of Clean Energy

Full charge supplies up to 20 hours of clean silent energy in typical applications

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POWERING A CLEANER FUTURE

Powr2 Battery Energy Storage System

Powr2 Emission Free, Silent Power

Sample Applications

Office Trailers (Night Loads)

Keep construction security systems running uninterrupted all night long without unwanted noise and emissions.

Low Loads 24/7

Reduce up to 80% of fuel burn and prevent generator damage that results from low load periods.

Noise Ordinance

POWRBANK energy is discharged completely silently to keep power running while complying with city noise ordinances.

Live Events

Silent power provides a more enjoyable experience for both attendees and hosts, and prevents audio issues in live streams.

Remote Sites

Eliminate costly refueling and maintenance challanges by lowering fuel need and reducing service frequency.

Eco-Sensitive Sites

Lower your carbon footprint and make the easy transition to clean energy with significant reduction in CO_2 emissions.

Powr2 Battery Energy Storage System

POWRBANK

The POWR2 **POWRBANK** is a rental ready energy storage system that integrates with diesel generators to optimize efficiency of power generation and consumption while reducing noise, emissions and fuel waste by minimizing engine run-time and maximizing use of stored energy.

With the onboard energy control module the POWRBANK constantly monitors load levels and automatically switches between generator power and stored energy as necessary, only using the generator when necessary for higher loads.

ZERO EMMISSIONS
SILENT POWER

Find out more at powr2.com

MODEL	P45.60/400
Volts	400
kVA	45
kWH	60
Phase	3

		MODEL #	P45.60/400	
POWER	Output (stand alone)	Standby Rating 30 min (kVA) @ 25°C [1]	45	
		Prime Rating (kW) @ 25°C / @ 40°C [1]	36	30
		Full Load Current	64.95A per phase	
	Output (when external source available)	Maximum Load per Phase Before Generator Start Command (kW) [1, 2]	10.2 (Immediate Start) 9 (5mins)	
		Maximum Load (all phases) Before Generator Start Command (kW) [5]	26.9 (2 hours)	
	Combined System Output	Continuous Pass Through per phase (External Source Only) (A)	100	
		Max Combined Output per phase (External Source + HES) (A)[1]	150	
		Max Power Assist (kVA)[1]	25	
	Input/Output	AC Input Voltage Range (V)	400 (320 - 460)	
		AC Output Voltage - 50 Hz (V)	400	
		Input Connections	125A 400V & 16A 230V CEE-Forms, 400V BusBar	
		Output Connections	125A 400V & 16A 230V CEE-Form & 400V BusBar	
		Protection	Overload, Overheat, Short Circuit, Earth Fault	
STORAGE		Type	LFP (Lithium Iron Phosphate)	
		Nominal Capacity @ 25°C (kWh)	54	
		Charge Time (hours) @ 25°C [3]	3	
		Maximum System Efficiency @ 25°C	90%	
		Battery Management System	Industrial Grade Intelligent Passive BMS Optimised for HES Applications	
		Expected Cycle Life (To 80% Original Capacity)	6,000	
		Maintenance Charge Cycle	≤ 3 week	
CONTROL		Control Panel	ECM 7" Touch Screen Control Module	
		Temperature Control	Analogue Voltage Controlled Forced Air Cooling	
		Remote Generator Start	Dry Contact Relay	
		Remote Communication	3G/4G Dual SIM Modem/Router, Powr2 Portal	
ENVIRONMENTAL		Water/Ingress Protection Rating	IP55	
		Operating Temperature Range (°C) [4]	-12 to +50	
		Sound Level (dBA) @ 0% / 100% Fan Speed	Acoustic Pressure @ 3m: 0 /66	
MECHANICAL		Dimensions L x W x H (mm)	1140 x 1450 x 1730	
		Weight (kg)	1440	
		Lift Points	Forklift Pockets, Lift & Drag Skid, Lifting Ring	

[1] Depending on battery bank SoC [2] Multiple start conditions available upon request for bespoke applications. [3] Charge time dependent on available power of external source and operating temperature. [4] When the internal battery temperature reaches below 2°C or above 45°C, the charge current is reduced to 0.06C to protect the batteries. [5] Without exceeding Max. Load per Phase

Datasheet P45.60-400_v1

POWR2

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POWERING A CLEANER FUTURE

Powr2 Battery Energy Storage System

POWRBANK

The POWR2 **POWRBANK** is a rental ready energy storage system that integrates with diesel generators to optimize efficiency of power generation and consumption while reducing noise, emissions and fuel waste by minimizing engine run-time and maximizing use of stored energy.

With the onboard energy control module the POWRBANK constantly monitors load levels and automatically switches between generator power and stored energy as necessary, only using the generator when necessary for higher loads.

ZERO EMMISSIONS
SILENT POWER

Find out more at powr2.com

MODEL	X90.120/400
Volts	400
kVA	90
kWH	128
Phase	3

		MODEL #	X90.120/400	
POWER	Output (stand alone)	Standby Rating 30 min (kVA) @ 25°C [1]	90	
		Prime Rating (kW) @ 25°C / @ 40°C [1]	72	60
		Full Load Current	129.90A	
	Output (when external source available)	Maximum Load per Phase Before Generator Start Command (kW) [1, 2]	20.4 (Immediate Start) 18 (5mins)	
		Maximum Load (all phases) Before Generator Start Command (kW) [5]	53.9 (2 hours)	
	Combined System Output	Continuous Pass Through per phase (External Source Only) (A)	200	
		Max Combined Output per phase (External Source + HES) (A)[1]	250	
		Max Power Assist (kVA)[1]	55	
	Input/Output	AC Input Voltage Range (V)	400 (320 - 460)	
		AC Output Voltage - 50 Hz (V)	400	
		Input Connections	125A 400V & 16A 230V CEE-Forms, 400V BusBar	
		Output Connections	125A 400V & 16A 230V CEE-Form, 400V BusBar	
		Protection	Overload, Overheat, Short Circuit, Earth Fault	
STORAGE		Type	LFP (Lithium Iron Phosphate)	
		Nominal Capacity @ 25°C (kWh)	117.9	
		Charge Time (hours) @ 25°C [3]	3h	
		Maximum System Efficiency @ 25°C	90%	
		Battery Management System	Industrial Grade Intelligent Passive BMS Optimised for HES Applications	
		Expected Cycle Life (To 80% Original Capacity)	6,000	
		Maintenance Charge Cycle	≤ 4 week	
CONTROL		Control Panel	ECM 7" Touch Screen Control Module	
		Temperature Control	Analogue Voltage Controlled Forced Air Cooling	
		Remote Generator Start	Dry Contact Relay	
		Remote Communication	3G/4G Dual SIM Modem/Router, Powr2 Portal	
ENVIRONMENTAL		Water/Ingress Protection Rating	IP55	
		Operating Temperature Range (°C) [4]	-12 to +50	
		Sound Level (dBA) @ 0% / 100% Fan Speed	Acoustic Pressure @ 3m: 0 /66	
MECHANICAL		Dimensions L x W x H (mm)	2250 x 1300 x 2065	
		Weight (kg)	2800	
		Lift Points	Dual Rotable Lifting Ring (2 Point Lift), Forklift Pockets, Lift & Drag Skid	

[1] Depending on battery bank SoC [2] Multiple start conditions only available with optional Powr2 Control Module. [3] Charge time dependent on available power of external source and operating temperature. [4] When the internal battery temperature reaches below 2°C or above 45°C, the charge current is reduced to 0.05C to protect the batteries. [5] Without exceeding Max. Load per Phase

Datasheet X90.120-400_v1.0

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Hybrid Power System

powered by Denyo

Made exclusively for:

BLUE DIAMOND MACHINERY by Makinex

Hybrid Power System (HPS) - powered by Denyo is the most versatile and advanced off grid power system. Providing grid like electricity in areas where grid power is either unavailable or directly replacing expensive/ unreliable grid power.

The system consists of a roof or ground mounted solar panels, a battery bank to store energy, an integrated backup diesel generator and an inverter to act as an interface between the different inputs.

FEATURES

- Reduced fuel and service costs
- Significant emission reduction
- Silent, low noise on generator run time
- Portable, rapid deployement, easy to install
- Remote monitoring, diagnostics and remote start/stop
- High customisation – run time, quiet time
- Australian built generators using Yanmar engines
- Additional solar if required
- Longer service life

REMOTE MONITORING

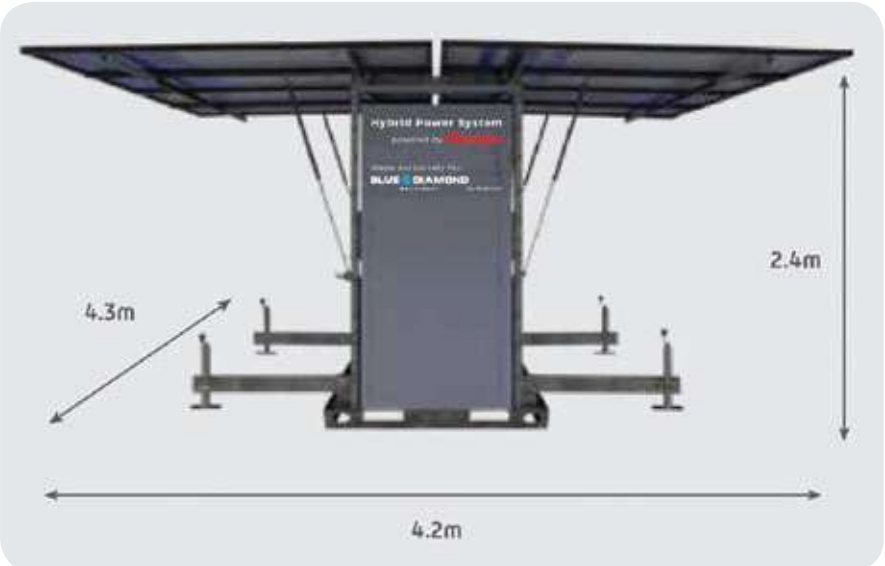
LOWER EMISSIONS

PORTABLE

SILENT POWER

Hybrid Power System - powered by Denyo

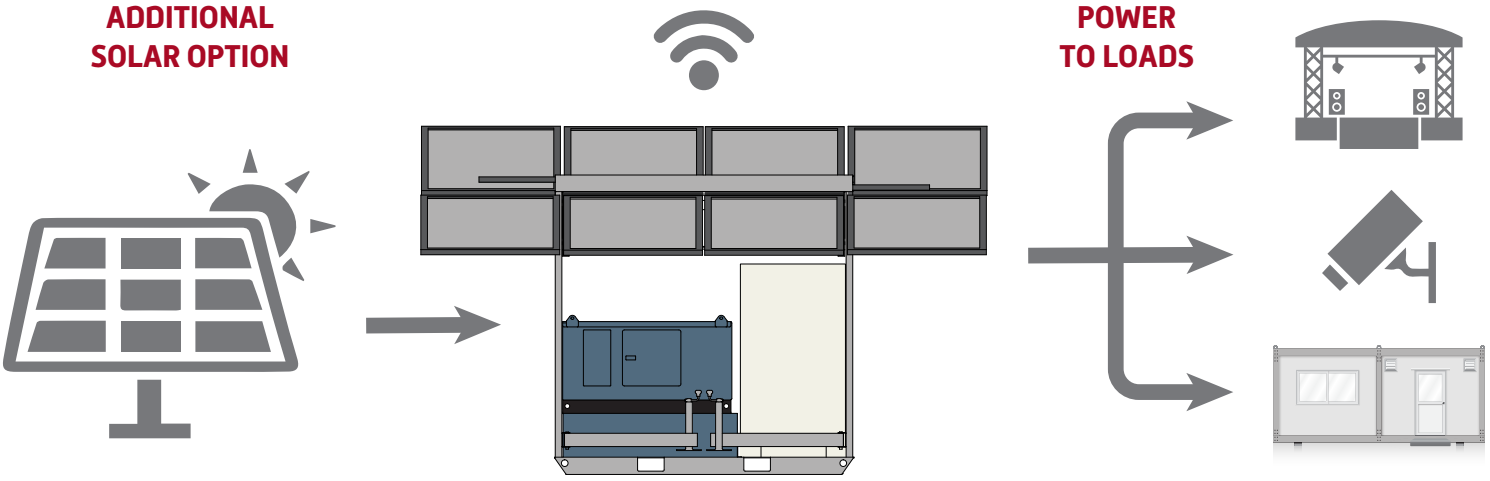
EASY TO STORE **EASY TO SETUP ON SITE** **EASY TO TRANSPORT**



REMOTE MONITORING & CONTROL

ADDITIONAL SOLAR OPTION

POWER TO LOADS



Hybrid Power System - powered by Denyo

HPS20 - Portable, silent and clean energy

REMOTE MONITORING

LOWER EMISSIONS

PORTABLE

SILENT POWER

Model	HPS20
Voltage	240/415V
Inverter Power	20kVA
Battery	32kWh
Solar Power	3.6kW
Generator 4 Pole	20kVA/16kW Diesel
Outlets	32A 3-phase and 15A single phase
Remote Monitoring	Online Portal/Alarms, GSM/WIFI
Noise(7m)	60dBA
Dimensions(OPEN)	4.2m (L) x 4.3m (W) x 2.4m (H)
Dimensions(TRANSPORT)	1.35m (L) x 2.4m(W) x 2.6m (H)
Weight(dry)	1.9 Tonne
Fuel Tank Capacity	400L

Kilowatts/hr[*1]	Battery Run Time[*2]	Solar Run Time[*3]	Total Run Time	Recharge Time No Load	Recharge Time With Load[*1]	Gen Run Time on 24 hr Usage[*4]	Total Kilowatt Hours[*5]	Gen Run Time Reduction[*5]
3	6 h 54 min	4 h 48 min	11 h 42 min		1 h 42 min	3 h 30 min	72 kWhrs	86%
4	5 h 12 min	3 h 36 min	8 h 48 min		1 h 54 min	4 h 48 min	96 kWhrs	80%
5	4 h 12 min	2 h 54 min	7 h 6 min		2 h 6 min	6 h 12 min	120 kWhrs	74%
6	3 h 30 min	2 h 24 min	5 h 54 min	1 h 24 min	2 h 18 min	8 h 42 min	144 kWhrs	64%
7	3 h	2 h 6 min	5 h 6 min		2 h 36 min	10 h 6 min	168 kWhrs	58%
8	2 h 36 min	1 h 48 min	4 h 24 min		3 h	11 h 48 min	192 kWhrs	51%
9	2 h 18 min	1 h 36 min	3 h 54 min		3 h 30 min	13 h 12 min	216 kWhrs	45%
10	2 h 6 min	1 h 24 min	3 h 30 min		4 h 12 min	14 h 18 min	240 kWhrs	41%

[*1] Based on constant load
[*2] Based on total battery 32kWh (65% DOD)
[*3] Based on 3.6kw solar array of the HPS and 4 hours average direct sunlight based on Sydney NSW averaged over 12 months
[*4] Based on fuel economy – 3.38 L/h @ 75% load
[*5] Based on 24 hour continous usage

BLUE DIAMOND MACHINERY | NetZero EQUIPMENT

POWERING A CLEANER FUTURE

Hybrid Power System - powered by Denyo

HPS45 - Portable, silent and clean energy

REMOTE MONITORING

LOWER EMISSIONS

PORTABLE

SILENT POWER

Model	HPS45	Remote Monitoring	Online Portal/Alarms, GSM/WIFI
Voltage	240/415V	Noise(7m)	60dBA
Inverter Power	45kVA	Dimensions(OPEN)	2 x 4.2m (L) x 4.3m (W) x 2.4m (H)
Battery	64kWh	Dimensions(TRANSPORT)	2 x 1.35m (L) x 2.4m(W) x 2.6m (H)
Solar Power	7.2kW	Weight(dry)	2 Ton per skid
Generator 4 Pole	45kVA/36kW Diesel	Fuel Tank Capacity	400L
Outlets	32A 3-phase & 15A single phase		

Kilowatts/hr*1	Battery Run Time*2	Solar Run Time*3	Total Run Time	Recharge Time No Load	Recharge Time With Load*1	Gen Run Time on 24 hr Usage*4	Total Kilowatt Hours*5	Gen Run Time Reduction*5
5	8 h 18 min	5 h 48 min	14 h 6 min	1 h 5 min	1 h 48 min	1 h 48 min	120 kWhrs	92%
10	4 h 12 min	2 h 54 min	7 h 6 min		2 h 18 min	6 h 54 min	240 kWhrs	71%
14	3 h	2 h 6 min	5 h 6 min		3 h	10 h	336 kWhrs	58%
18	2 h 18 min	1 h 36 min	3 h 54 min		4 h 12 min	13 h 12 min	432 kWhrs	45%
22	1 h 54 min	1 h 18 min	3 h 12 min		6 h 54 min	17 h 6 min	528 kWhrs	29%
26	1 h 36 min	1 h 6 min	2 h 42 min		20 h 48 min	20 h 48 min	624 kWhrs	13%

*1 Based on constant load
*2 Based on total battery 64kWh (65% DOD)
*3 Based on 7.2kw solar array of the HPS and 4 hours average direct sunlight based on Sydney NSW averaged over 12 months
*4 Based on fuel economy – 7 L/h @ 75% load
*5 Based on 24 hour continous usage

BDM Solar

An Australian-designed ground mount, east-west (typically), modular solar solution designed to be safer, more cost effective and faster to deploy for offgrid, commercial and industrial, and large-scale solar power generation. Robust and redeployable, each BDM Solar array consists of up to 90 solar modules, mounted on 9 domed racks between 10 composite steel-concrete beams. It's optimised for the workhorse 540-550W module class of the utility-scale solar industry at just under 50 kWp per structure with plug-and-play wiring designed to interface with a variety of DC reticulation solutions. The self-ballasted feature enables rapid deployment supported by an additional beam anchoring solution for higher wind loads. The prefabricated nature of the solution reduces on-site cost, time and safety risk by confining the construction of the solar array from the field to the factory, with improved quality control measures and waste processing; the number of people on site is reduced by substituting manual labour activities with machines in the factory and in the field.

Why choose BDM Solar?

SAFER

No working at height and minimal manual handling significantly reduces risk of injury.

No need for work under the array when deployed.

FASTER deployment

Deployment team capable of deploying **1 MWp+ in 1 week**, scalable with parallel work teams.

Reduced ground penetration, limits the need for excessive equipment, ground preparation and labour for anchoring.

Pre-wired and Plug & Play.

LESS LABOUR for less time/shorter periods on site

Factory environment enables accelerated machine enabled assembly and loading, as well as factory based quality and reliability systems.

Deployment vehicles with spotting assist requires **only 3 people to deploy** 1 MWp + per week.

Sight oversight forms part of overarching project management and control, avoiding additional cost.

UP to 30% SAVINGS on cost of energy

Optimised supply chain and logistics.

Modular, standardised solar PV block and BoS.

Minimal soft costs and engineering.

Ballasted & minimally-ground penetrating (and civil works).

No moving parts post deployment, limiting O&M requirements.

Redeployable assets allowing for extended asset life even after the primary energy need is extinguished.

UP to 2x ENERGY per land area

Typically East-west topology, dense compact layout that enables the **same energy output in half the land** at certain latitudes.

The low tilt angle of the technology allows for maximum site energy density with array deployment in any orientation resulting in minor reductions in energy yield (<1%).

CIRCULAR LIFECYCLE

Factory assembly provides **more control** for waste processing.

Waste on site limited to the size of a carry on bag.

Self-ballasted nature with reduced ground penetration needs, simplifies site remediation required.

High energy density of modules limited light and rainfall ingress and thus vegetation growth.

BLUE DIAMOND MACHINERY | NetZero EQUIPMENT

POWERING A CLEANER FUTURE

BDM Solar

Performance Characteristics

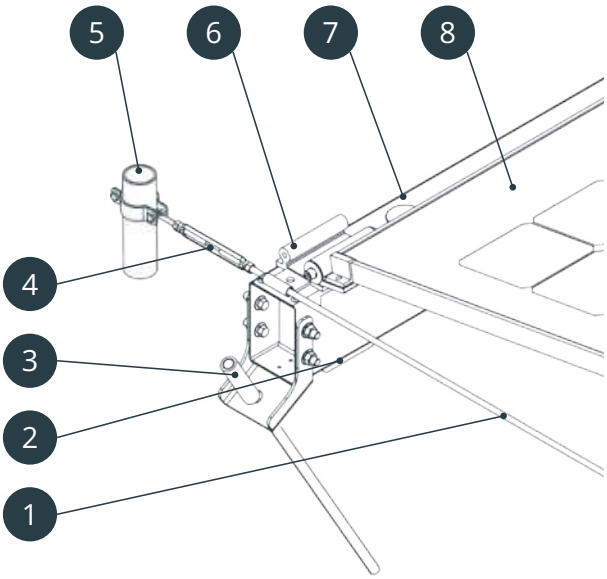
Type	Performance Characteristics
Wind Load	High Wind Region - 73 m/s or 174 mph (~ 3.4kPA, importance II ASCE 7-16) Low Wind Region - 41 m/s or 92 mph (~1.1 kPA, AS1170.2)*
Design life	25-30 years
Durability	All weather-proofing and UV resistant up to corrosion levels of C3 configurable up to C4 (specifically High Wind Region)
Warranty	10 years workmanship warranty to the 5B Maverick structure. Standard module warranties apply.

*High wind sites will likely use a combination of high wind region and low wind region **BDM Solar**, dependant on the local wind pressure interpretations and intended product design life, wind pressures provided assume a gust measurement of 0.2s at a height of 10m.

Deployment Characteristics

Deployment through an Ecosystem of Licenced Partners by an 8T all terrain forklift/telehandler. Estimated at least 1 MWp in 1 week with an onsite crew of 3 people.

Type	Deployment Characteristics
Ground Penetration	The solution is ballasted supported by beam anchors depending on wind loading requirements and lateral force resistance provided by shallow tether anchors
Redeployment	Re-deployable within or at the end of product life
Site Requirements	Deployment on ground up to 3° inclination in all directions (± 100 mm over 4 m)



Ground Mounting Example

1. Tether
2. Pads
3. Beam Anchor
4. Turnbuckle
5. Tether Anchor
6. Base Plate
7. Beam
8. PV Module

*Exact arrangement specified to application

Technical Characteristics

Type	Technical Characteristics
Power	48.6 kWp assuming 90 x 540 Wp modules arranged into 9 domes of 10 modules between 10 beams, modular scaling to multi-megawatt systems
Orientation	Fixed tilt modules to 10°, 45 modules facing east and 45 modules facing west (typically)
Modules	~545 Wp module class: Width 1133 - 1134 mm, Length: 2256 - 2279 mm, Frame Profile Height: 35 mm
Strings	Module string length supported: 18, 27, 30 to support a range of central and string inverters from 1,000 - 1,500 V
Earthing	All metal and electrical wiring components are continuous according to maximum requirements in electrical standards
Logistics	4 MAVs (~194 kWp) per 40' HQ container or flatbed Weight ~5.7 - 6T per MAV
O&M	No moving parts post deployment, limited light ingress inhibiting vegetation growth and low profile protect inner modules from soiling
GCR	Ground coverage ratio of up to 86% depending on O&M access provision

POWERING A CLEANER FUTURE

Hydrogen Power Generators · Energy Storage Systems · Hybrid Power Systems

Blue Diamond Machinery is dedicated to the transition towards an emission-free future for construction and mining sites. Our range of innovative rental power solutions for alternative energy output provides a sustainable alternative to lower emissions and optimise energy generation.

Call us for expert guidance on your customised clean power rental solution.

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