Dynell®

The power league.

Ground Support

dynell.at

The all-electric GPU

DEM 045-090
84.5–193 kWh

Discover the future of green aviation ground support equipment.

“The best way to predict the future is to create it.”

Peter Drucker

Dynell stands for: dynamic, electrical, electrifying – and that is exactly what we are. The company was founded with the goal to revolutionize the supply of ground support equipment and to set new standards in the field of power supply for aircrafts. The core of Dynell is the team, with its high degree of pioneering spirit, teamwork and commitment.

The innovative product range includes efficient battery and diesel-driven ground power units, a completely new concept for solid-state ground power units and all kinds of connection systems such as cable coils and pit systems. AC and DC chargers for GSE equipment complete the Dynell portfolio.

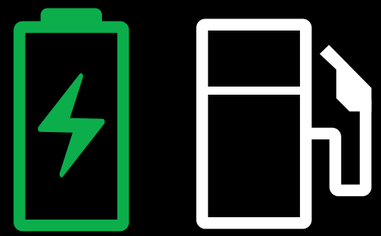
3

The all-electric GSE

Ground Support

Dynell

Empower a CO_2-free future with Dynell's all-electric mobile ground power unit. The latest battery design combined with innovative solid-state technology provides green 400 Hz and 28 VDC power wherever needed at non electrified places.



Battery vs. Diesel engine

→ **Zero emission** – Air pollution from carbon dioxide and nitrogen oxides is a thing of the past and carbon monoxide poisoning no longer poses a risk.

→ **Minimal noise** – Battery units produce less noise and can also be used inside without ear protection.

→ **Low maintenance** – Removing the engine also means eliminating all associated maintenance requirements.

The highly efficient solid-state GPU marks the first step towards a greener airport. However, we are committed to a sustainable future and to reducing carbon emissions at airports, also in non-electrified places – the key: battery powered solutions by the power league.

Dynell Inverter Module - DIM

The Dynell Inverter Module (DIM) is the core element of the all-electric GPU. One DIM contains all the electronic components to transform the DC voltage from the battery into 400 Hz.

Highlights:

- All-in-one system: combines the functions of an inverter and a rectifier in a single module
- Each DIM is compatible with any Dynell unit, reducing the need for multiple spare parts
- Maintenance-free modules: fully automated configuration that requires no manual intervention
- Plug-and-play system: DIMs can be easily replaced in less than a minute
- Utilizes the latest semiconductor technology, enabling redundant operation and efficiency of up to 99%
- Compact and small design with a weight of only 9 kg per DIM
- Scalable from 22.5 up to 90 kVA, allowing for easy upgrades or downgrades

Northvolt Voltpack Core - Battery Pack

The Voltpack Core is based on state-of-the-art Li-ion technology with high energy density for demanding industrial applications. The battery pack is designed in accordance with the highest safety and quality requirements; it is fully CE marked and manufactured in Europe.

Highlights:

- Higher performance in a compact design – greater energy density compared to LFP batteries
- Renowned European manufacturer
- Recyclable

Our product highlights

Modularity and scalability

A modular and clearly structured layout allows easy and safe access to all areas of the unit. The design concept enables flexible adaptations to changing requirements. The nominal output power of one DIM is 22.5 kVA and the capacity of one battery is either 84.5 or 96.5 kWh. This allows scalable output power of one unit in steps of 22.5 kVA up to 90 kVA and storage capacity between 84.5 and 193 kWh. In case of unexpected changes in power requirements in the future, the output power and capacity can be easily adapted upwards or downwards.

Efficiency

The efficiency of up to 99% of one DIM module leads to an overall output efficiency of 97% from low load to full load. This enables the most efficient use of battery capacity and extends the operation time before recharging is required.

Individuality and extras

The plug storage is at an ergonomic height, where the plug's position is monitored by the system. If not properly stowed, the drawbar is fixed in the parking position and the GPU cannot be towed away. Different lights can be mounted on the roof to visualize various states of the all-electric GPU, according to local airport standards. Optionally, charging via 400 Hz is possible and existing infrastructure can be used to recharge the unit.

Central control and remote access

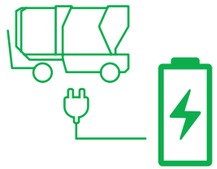
The modular Dynell PLC in combination with a touch display is built for the most demanding conditions. A modern and clearly designed user interface allows easy operation and the best overview of all information. The messages are displayed in plain text and are provided with a detailed description and problem solution. All Dynell units are equipped with a data/GPS module for quick and easy support in case of an error. Software updates are possible via remote access, laptop, or USB flash drive.

Reliability and MTTR

For Dynell, mean time to repair (MTTR) is more than just a number. The carefully thought-out modular GPU concept is based on multiply used components which can be easily exchanged. The spare parts inventory can be reduced accordingly. In most cases, system faults only lead to partial shutdowns, and operation with reduced power is possible.

Portable Power Station

The DEM 090 (Dynell) is an all-in-one electric GPU, designed not only for 400 Hz supply but can be optionally also used as a portable power station. This allows it to charge various other Ground Support Equipment (GSE) through different utility sockets, supporting up to 32 A. With this approach, we support the way of pollution-free airports, ensuring efficient and effective powering of multiple types of equipment while promoting a cleaner environment.



Battery safety

Cells (1st layer)

- Cylindrical cells reduce risk of fire propagation – smaller individual units of energy with built-in current interruptive devices (CID)
- Liquid cooling channels separate the cells and keep them in the optimal temperature profile
- Clamshells fixate the cells
- Wire bonds between cell and collector plates act as safety fuse

Voltpack Core (3rd layer)

- Battery management system ensuring operation in safe boundary conditions
- Ventilation to evacuate off-gases in case of cell venting
- Robust mechanical design to pass severe vibration and shock loads
- Module mechanical design to prevent a cascading fire event
- Bottom leakage valves to drain coolant in case of leakage preventing potential short circuits

Voltblock (2nd layer)

- No cell to cell cascading thermal runaway with passing IEC 62619 propagation test

An industrial-grade battery pack with high energy density – designed to replace diesel engines.

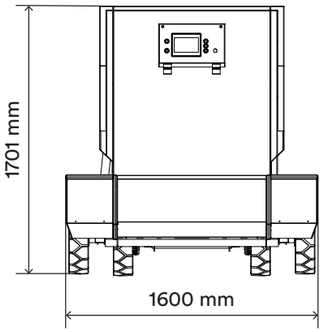
- State-of-the-art Li-ion technology
- Integrated liquid cooled/heated channels to optimize battery performance and battery lifetime
- High focus on uncompromising system safety
- CE marked with industrial battery compliance (EN 62485-5, EN 62485-6, EN 62619, UN 38.3, ISO 13849-1, ISO 13849-2)

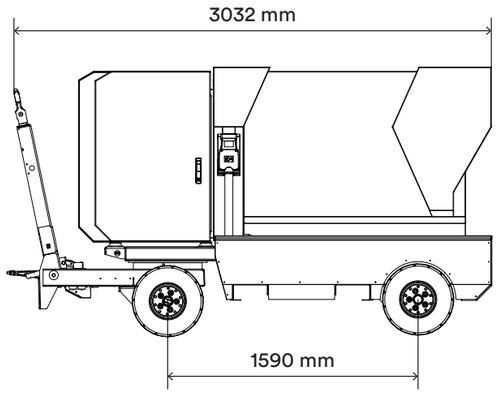
DEM

Weight DEM 045-090

	84.5 kWh	96.5 kWh	169 kWh	193 kWh
DEM 045	1759 kg	1834 kg	2312 kg	2362 kg
DEM 090	1777 kg	1852 kg	2330 kg	2480 kg

A 7" touchscreen with simple and structured layout and up to five pushbuttons allows easy and efficient handling.





Technical data – all-electric GPU DEM 045-090

Onboard charger	
Frequency	50/60 Hz +/- 5%
Voltage	3/N/PE AC 230/400 V (other voltage levels on request)
Power	40/80 kW
Power factor	0.99
Current	63/125 A
Current distortion	≤ 5%
Efficiency	> 95.5%
Battery	
Installed energy	84.5/96.5/169/193 kWh
Charging time	84.5 kWh/96.5 kWh – 1 charger (40 kW) ~ 2 hours/2 charger (80 kW) ~ 1 hour
	169 kWh/193 kWh – 1 charger (40 kW) ~ 4 hours/2 charger (80 kW) ~ 2 hours
Technology	Li-ion NMC
Inverter – output	
Power	45–90 kVA (other output power on request)
Voltage	3 × 200/115 V
Frequency	400 Hz
Efficiency	> 97%
Load power factor	0.6 lagging/inductive to 0.95 leading/capacitive
Static voltage regulation	< 0.5%
Crest factor	1.414 +/- 3%
Phase angel symmetry	120° +/- 1° for balanced load
	120° +/- 2° for 30% unbalanced load
Total harmonic content	< 1%
Protection	
Protection class	IP 55 – electronic components
Input/output	Short circuit protection
	Over and under voltage
	Overload protection
General	No break power transfer
	Over-temperature protection
Battery	Isolation monitoring
	Cell safe temperatures and overcurrent monitoring
	Cell safe overvoltage and undervoltage supervision
	HVIL supervision
Overload	According to ISO 6858:2017 Type 1

Ambient conditions		
Operating temperature	-20° C – +50° C (with discharge and charge power limitations)	
Relative humidity	Up to 95%	
Noise level	< 65 dB (A) at 1 m	
Product		
Mean-time to repair	< 5 min	
Colours	RAL 9002 and RAL 9004	
Materials	Stainless steel, aluminium, steel	
Standard Features	Full rubber tyres and torsion trailer axles	
	Using the unit while charging (pass-through charging)	
	7” touchscreen and up to five pushbuttons	
	Large cable trays and forklift pockets	
	Remote assistance	
	Maintenance disconnector	
Options	Leakage current supervision	Gate-Charging – 400 Hz
	Broken neutral supervision	Drive away lock
	Beacon & indication lights	Heating/cooling
	Neutral voltage supervision	Portable Power Station
	Protective isolation (DFS 400 – 4 kV)	Integration of external telematic system
28 VDC output (option)		
Nominal output voltage / current	28 VDC/600 A (800 A) continuously	
Static regulation (not fully loaded)	1%	
Overload capacity	2500 A for 5 sec. / 2000 A for 10 sec. / 1500 A for 90 sec.	
Versions	Simultaneous and non-simultaneous operation	
Current limitation	Configurable	

Standards	
ISO 6858:2017	Aircraft – Ground support electrical supplies – General requirements
EN 2282	Characteristics of aircraft electrical supplies
EN 1915-1&2	Aircraft ground support equipment – General requirements
DFS 400	Spezification for 400 Hz aircraft ground power supply
MIL-STD-704F	Department of defense interface standard: Aircraft electric power characteristics
SAE ARP 5015	Ground Equipment – 400 Hz Ground Power – Performance requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Immunity
EN 61000-6-4	Electromagnetic compatibility (EMC) – Emission
EN 12312-20	Aircraft ground support equipment – Specific requirements
UN 38.3	Certified battery system for transportation
EN 62619:2017	Safety requirements for batteries
EN 62485-5:2021	Safety requirements for secondary batteries and battery installations
EN 62485-6:2021	Safety requirements for secondary batteries and battery installations

For more details visit dynell.at

Based on a balanced mix of knowledge, experience and innovation, we design, build, distribute and maintain aviation ground support and charging equipment. Our ground-breaking ideas generate the greatest possible customer value for future markets around the globe.

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