

# Dynell®

The power league.

## The all-electric GPU

DEM 045-090  
82–188 kWh



Ground Support

[dynell.at](https://dynell.at)

# 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.

Empower a CO<sub>2</sub>-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.

### — DIM

The Dynell Inverter Module (DIM) is the core element of the all-electric GPU. The DIM is already used in all Dynell's solid-state GPUs and is interchangeable between all Dynell products. No configuration is required – just plug & play.

One DIM contains all the electronic components to transform the DC voltage from the battery into 400 Hz. The latest semiconductor technology ensures highest efficiency of up to 99% for one DIM.



### — Batteries

The batteries are 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.

# 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 82 or 94 kWh. This allows scalable output power of one unit in steps of 22.5 kVA up to 90 kVA and storage capacity between 82 and 188 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.



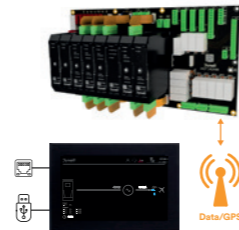
## Individuality and extras

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. An optional DC charging socket (CCS2) provides faster charging and the possibility of integrating the unit into a charging or load management system. Different lights can be mounted on the roof to visualize various states of the all-electric GPU, according to local airport standards.



## 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.



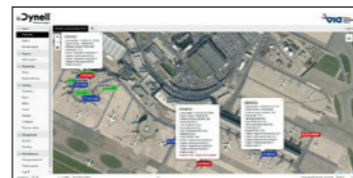
## Reliability and MTTR

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.

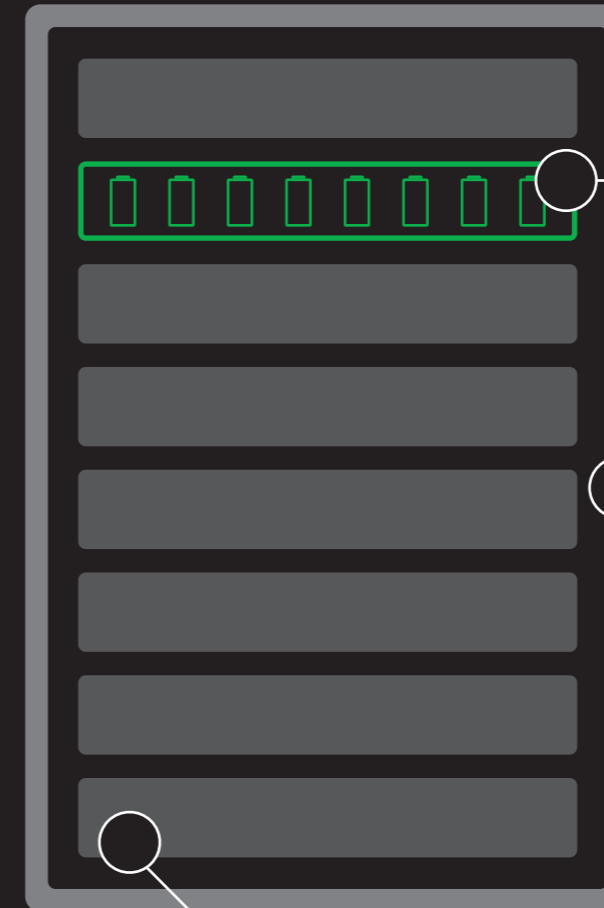


## Smart services

Cloud solutions provide a fully customizable telematics system according to customer requirements, including GPS tracking, battery charge status, running hours and many more. The system also contains a fleet management with status reports and predictive maintenance service.



# Battery safety



## Cells (1<sup>st</sup> layer)

- Small cells along with state-of-the-art module design enable a safe handling of the energy

## Battery Pack (3<sup>rd</sup> layer)

- Battery management system ensuring operation in safe boundary conditions
- Ventilation to evacuate off-gases in case of cell venting
- Robust design for the use in heavy duty industrial vehicles
- Module mechanical design to prevent a cascading fire event

## Battery Module (2<sup>nd</sup> 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)



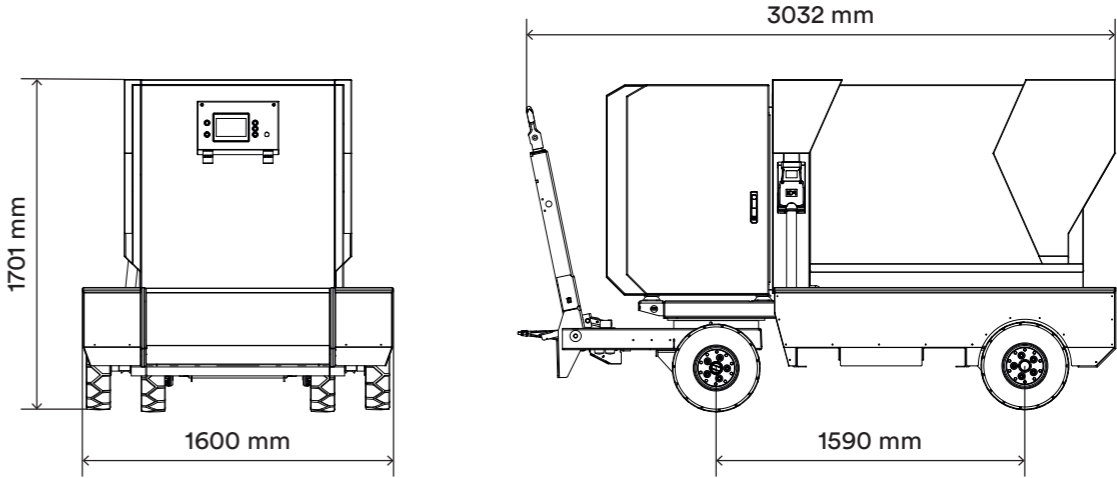
Weight DEM 045-090

	one onboard charger		two onboard chargers	
	82 kWh	94 kWh	164 kWh	188 kWh
DEM 045	1759 kg	1834 kg	2332 kg	2482 kg
DEM 090	1777 kg	1852 kg	2350 kg	2500 kg

# DEM



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



<b>Onboard charger</b>	
Frequency	50/60 Hz +/- 5%
Voltage	3 × 380–400 V +/- 10% (other voltage levels on request)
Power	40/80 kW
Power factor	0.99
Current	63/125 A
Current distortion	≤ 5%
Efficiency	> 95.5%
<b>Battery</b>	
Installed energy	82/94/164/188 kWh
Charging time	82kWh/94kWh – 1 charger (40kW) ~ 2 hours
	164kWh/188kWh – 2 chargers (80kW) ~ 2 hours
Technology	Li-ion NMC
<b>Inverter – output</b>	
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%
<b>Protection</b>	
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	Cell safe temperatures supervision
	Cell safe overcurrent supervision
	Cell safe overvoltage and undervoltage supervision
	HVIL supervision
<b>Overload</b>	According to ISO 6858:2017 Type 1

<b>Ambient conditions</b>		
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	
<b>Product</b>		
Mean-time to repair	< 5 min	
Colours	RAL 9002 and RAL 7012	
Materials	Stainless steel, aluminium, steel	
<b>Standard Features</b>		
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		
<b>Options</b>		
Leakage current supervision		Super-fast DC-charging socket (CCS2)
Broken neutral supervision		Drive away lock
Beacon & indication lights		Heating/cooling
Neutral voltage supervision		Smart services
Protective isolation (DFS 400 – 4kV)		Telematic system
<b>28 VDC output (option)</b>		
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	
<b>Standards</b>		
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	Spezifikation 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	
UN38.3	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](https://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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