



FOR MORE  
INFORMATIONS



HYDROGEN

# POWER PACK

GAUSSIN

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GAUSSIN MANUGISTIQUE® is specialized in the auditing of handling processes, and the development of wheeled handling systems used to install and transport heavy, bulky or fragile loads. With more than 50,000 handling vehicles worldwide, GAUSSIN Manugistique boasts a strong reputation in four fast-expanding markets: Energy, Transport, the Environment and Raw Materials. GAUSSIN MANUGISTIQUE® has been listed on NYSE Alternext since 16 June 2010. GAUSSIN shares have been listed since 20 July 2012 in the E2 trading group E2 (public offer), since obtaining AMF Visa no. 12-360 on 17/07/12, as indicated in the Prospectus available free of charge on [www.gaussin.com](http://www.gaussin.com).



conception • latitude 90, fr



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- The new HYGROGEN technology brings together several benefits

- **Easy & fast to use**

- Only 3 minutes to change Powerpack® full Elec on ATT® or AIV®;

- **Reduced operating costs (OPEX) to manage your port operations**

- Zero maintenance neither on electrical components nor on batteries;
    - 95% performance thanks to the electric engine and to the optimized energy consumption;

- 20% energy recovery during the deceleration of the vehicle;

- Stop & Start when waiting under the cranes;

- **Availability rate close to 100%**. Therefore, less vehicles and less Powerpack® needed to carry out port operations.

- **Zero CO<sup>2</sup> and zero noxious particule emission** especially appreciated for the comfort of the dock personnel near the operations.

- **Silent vehicle (Db 0)** : ideal for the employees and the neighbourhood.

- **Quick accelerations** : the electric engine torque is impressive. It combines port operations increase with driving pleasure.

- **The CEA establishes this partnership through 2 institutes :**

- The CEA (French Alternative Energies and Atomic Energy Commission) is an active partner of the GAUSSIN MANUGISTIQUE Group through 2 institutes:

- **The LITEN** (Laboratory for Innovation in New Energy Technologies and Nanomaterials), with more than 50 years of proven experience in batteries and the fuel cells as well as electrification hybridization of vehicles. The LITEN brings its expertise to the GAUSSIN Group to design the Powerpack® FULL ELEC and its Batterie Management System to guarantee performance and safety.

- **The LIST** (Laboratory for Systems Integration and Technologies) develops calculators used in robotics and equipped with algorithms, which once embedded in an AIV®, ensures the autonomous navigation on the entire port area on the one hand ; and automatically manage the precise berthing operations with ATT® LIFT or AIV® LIFT near the DOCKING STATIONS® or under the cranes (TALK TO CRANE option) on the other.

- A concept designed to...

- Carry out the maintenance of the Power Pack without immobilizing the vehicle.

- Reach a service availability ratio of 99%.

- Directly access all the mechanical components defined as repairable.

- Considerably increase the service life of the vehicle.

- Exchange the Power Pack for another or change it to a different power.

- The principle of the powerpack is adaptable to any source of energy (diesel, electric, gas, hydrogen...)

- Limit the space required to perform maintenance to 4 m<sup>2</sup>.



- Technical specifications

- **Battery:**

- Li-ion (Iron phosphate without cobalt, safest technology)

- Multi-supplier system

- Voltage: 600V DC

- Energy: 80 kWh

- Power: 160 kW

- **Fuel cell Hydrogen:**

- Tank: 25kg Hydrogen

- Energy (usefull): 407kWh

- Autonomy: 1 day

- Power: 80 kW

- **Total:**

- Power: 240 kW

- Weight: 3 tons

- Cooling system: integrated

- Dimension: 1.2 x 1.2 x 3.2 m (HxWxL) [standard Gaussin's powerpack]

- Body: hermetic system, Shock resistant, harsh condition proof

- (-20oC/ +55oC)

- Life time: 10'000h

- Battery charger

- Charging time: 10 minutes (17kg) then 20-30 minutes (for the last 8 kg)

