



TORQUEEDO

Deep Blue High Power Systems

- **Turn-key solution from one single source**
- **World's first marine high-power series system for full electric- and hybrid electric propulsion**
- **First fully integrated system in this power class, compliant to all relevant standards on system level**



Efficient Storage of Energy

High-End Lithium Batteries

Shore Power Charging

- Low Cost Energy
- High Efficiency



**Deep Blue
System
Management**

Electric Propulsion

- High Voltage
- High Efficiency
- Low Noise

Examples



Private Motor Boats



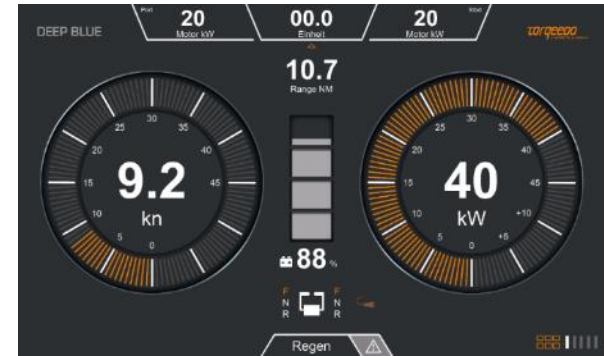
Commercial Transportation

System Control and Energy Management

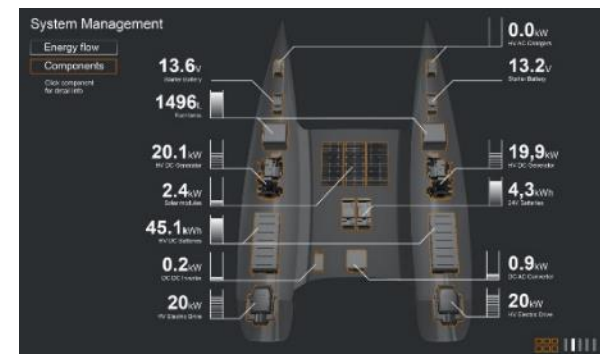


- Full digital system integration of all components
- Monitor and control system parameters
 - Energy flows
 - State of batteries
 - State of system components
- State-of-the art user guidance
 - Preventing operating errors
 - Optional fully automatic operation, minimizing the level of user interaction
- Advanced Hybrid Energy Management
 - Automatic generator control modes
 - Comfort features for silence on board
 - HV-LV energy transfer management

Full Electric Propulsion Screen



Advanced Hybrid Energy Management



- **Modular approach for systems tailored to customer needs**
- **High-end industrial components**
- **Fully tested and qualified in the integrated system**
- **Torqeedo warranty with international service network**
- **Remote maintenance via wireless connectivity**
- **Wide range of components**
 - High-end user interface and remote servicing
 - Propulsion and hydrogeneration
 - Energy storage
 - Shore power charging
 - AC Hotel Load Supply
 - Low voltage network supply
 - Hybrid diesel power
 - Solar energy

- **High Voltage DC Motors**
- **Top efficiency**
- **Low weight**
- **Advantageous torque curve**
- **Hydrogeneration integrated**
- **Raw water cooled**



Inboard shaft drives, 25 kW, 50 kW with two rpm levels

- 1400 rpm (prop shaft)
- 1800 rpm (prop shaft)
- 80kg incl. electronics



Saildrive 25kW

- 1360 rpm (prop shaft)
- 125 kg incl. electronics



Outboard Motors, 25 kW and 50 kW, short and long leg versions

- tiller or throttle control
- 2400 RPM (prop)
- Standard prop shaft spline
- 139 kg incl. electronics

- **High resolution marine displays**

- Color touch-screen
- Waterproof
- Good sunlight readability



- **Electronic Throttles**

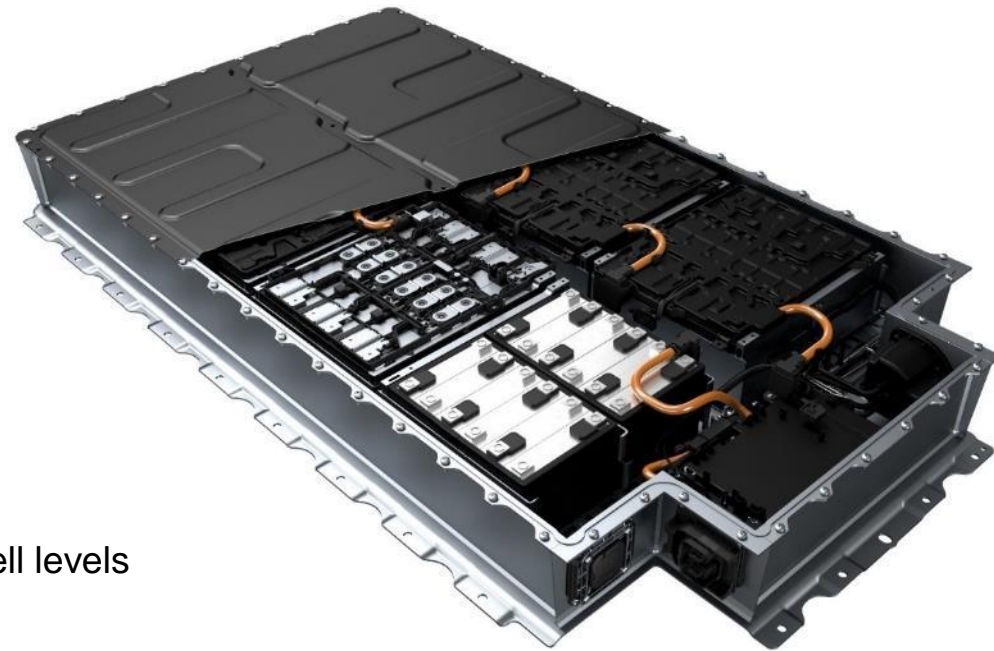
- Single & twin
- Side mount & top mount



BMW i-series High Voltage Batteries



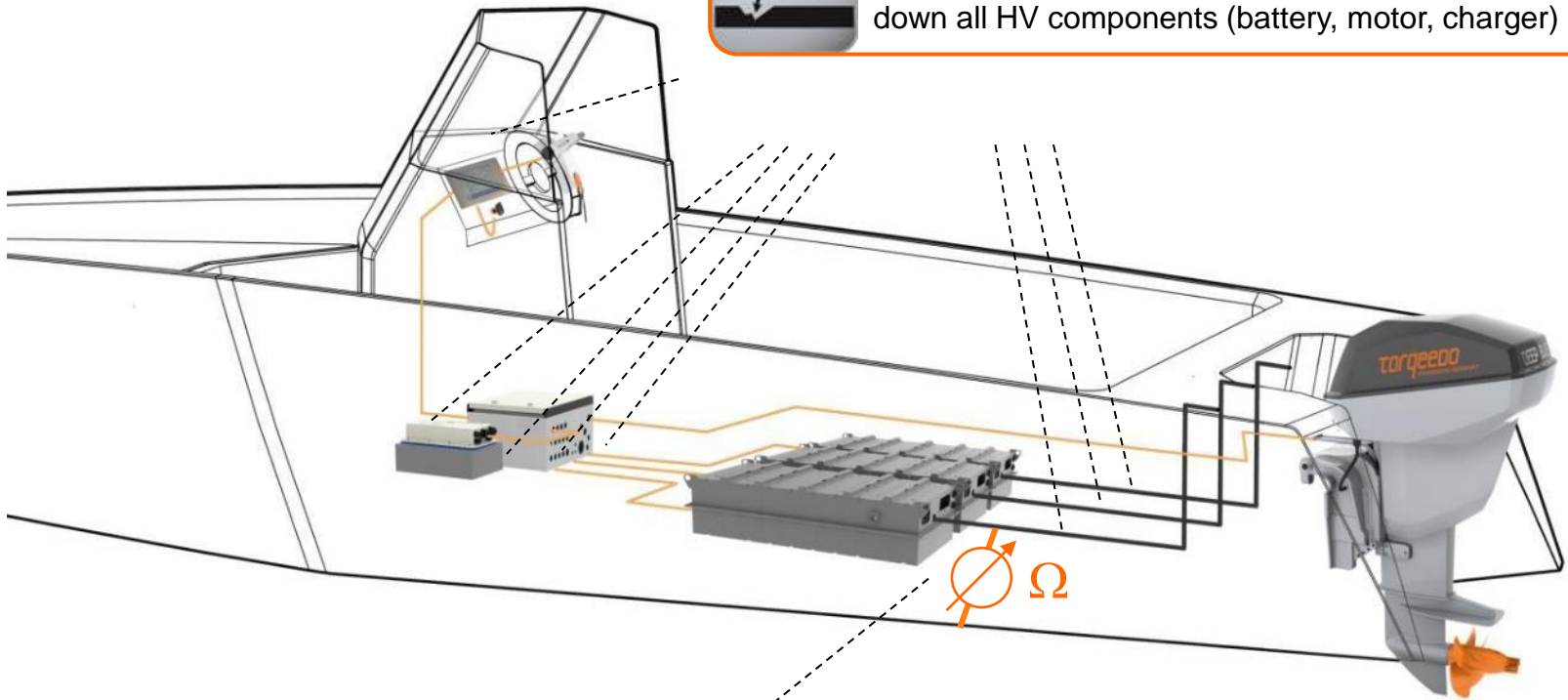
- Compact i8 model and high-capacity i3 model
- Latest generation Li-Technology
- High-end automotive safety features
- Internal modules exchangeable for service
- Water resistant IP67
- Prismatic NMC cells, BMS at module- and cell levels
- Laser welded electrical connections
- Long service life with compressor cooling
- Warranty for up to 4500 cycles, depending on use case



Deep Blue Safety: Pilot lines & isolation monitoring



In case of disconnection of any high voltage cable (or if safety switch pulled), pilot line immediately shuts down all HV components (battery, motor, charger)

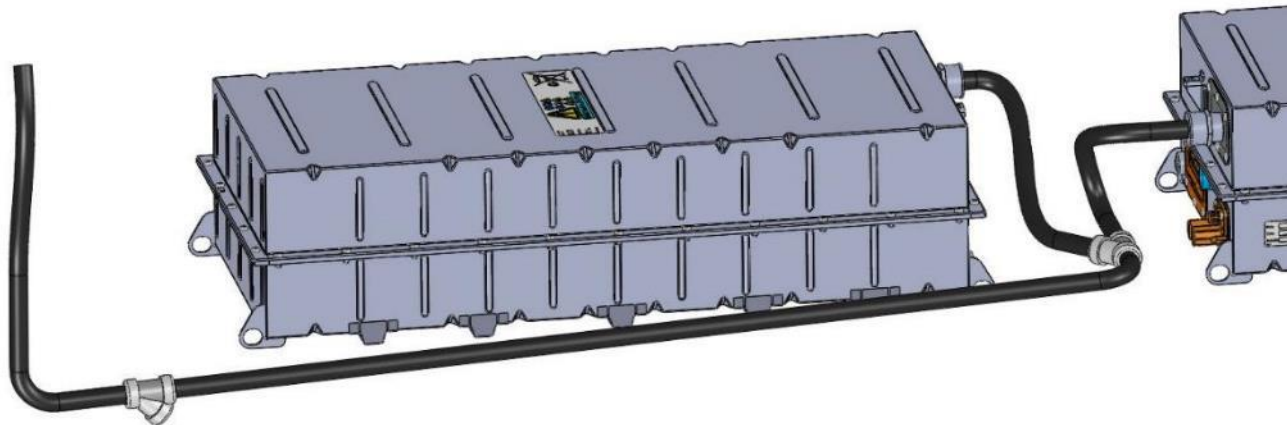
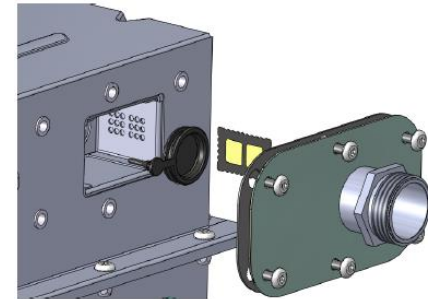


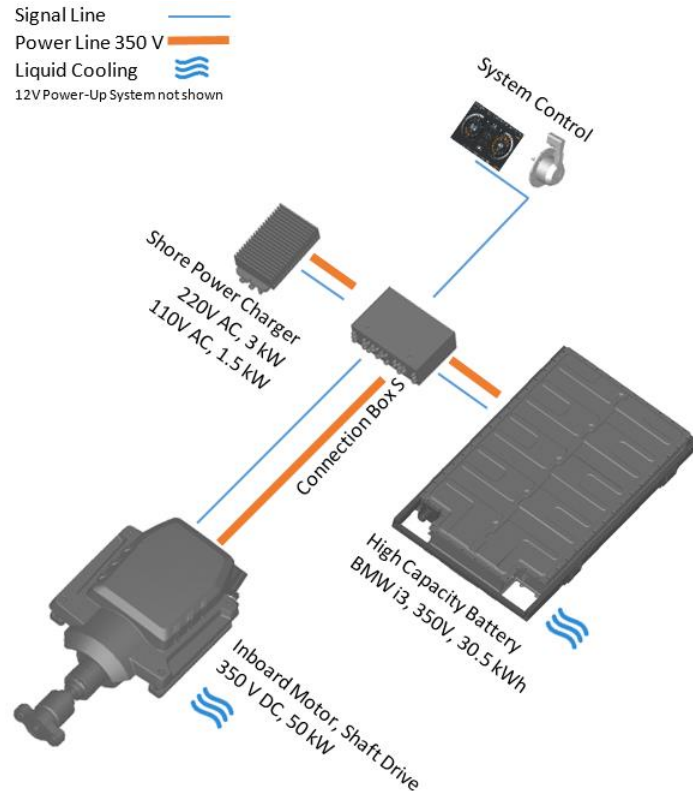
Continuous isolation monitoring for all high-voltage components

Deep Blue Safety: Emergency exhaust venting



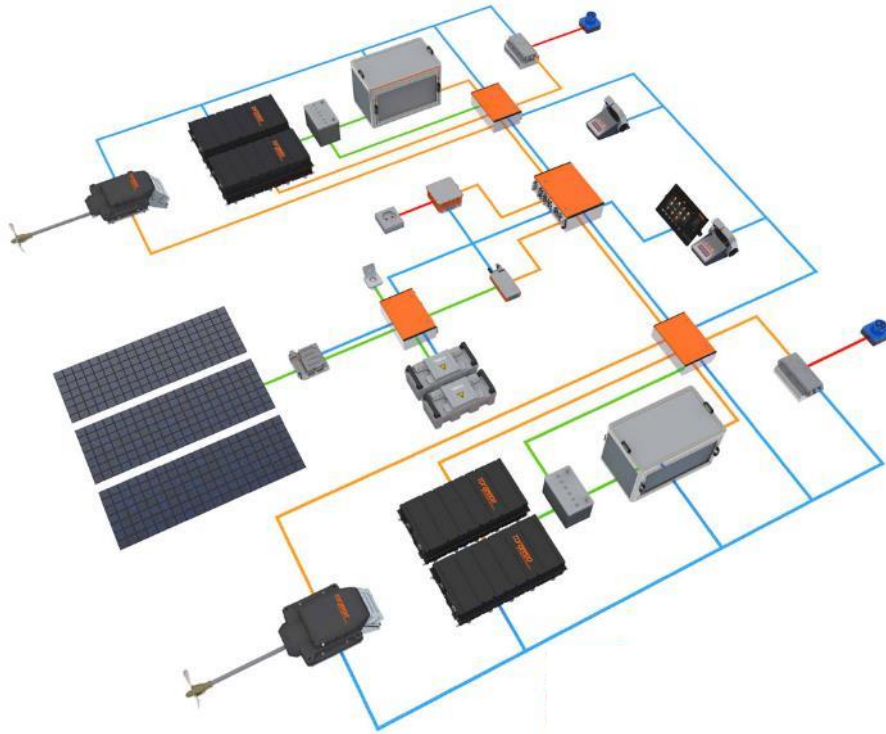
- In the unlikely event of a battery venting, large battery banks can emit dangerous gases.
- These gases can be
 - Hot
 - Toxic
 - Flammable
 - Heavier than air
- Electric cars vent these gases simply to the street. For boats, manufacturers need to ensure that the gases do not stay inside the boat or harm passengers.





Standard Configuration Single Drive Train

- Electronic Throttle, Side Mount
- System Control Screen 7"
- One 30.5 kWh Battery
- One Motor, 25 kW or 50 kW Inboard/Outboard/Saildrive
- 3 kW Charging Power
- System weight 420 kg (excl. cables)



Customized Catamaran Configuration

- Electronic Throttles, Dual Station, Twin Top Mount
- System Control Screen 12"
- 4x 12.8 kWh Batteries
- Twin Deep Blue 80i Inboard Motors 50 kW
- 4x3 kW Charging Power
- Two 25kW Converter Generators
- 24V Low Voltage System
- AC Inverter 6 kW
- 1 kW Solar Charge Controller

References: Leisure Applications

TORQUEEDO

More than 100 Deep Blue Systems in the Field





Metaltec Naval, Santander/Spain

- Planned launch October 2017
- Installation ongoing
- 120 passengers
- Length: 18 m
- Displacement 12 tons
- Full electric propulsion
- 100 kW motor power, 2 x DB80
- 45 kW installed solar power

