



MARINE DIESEL ENGINES

**HYBRID**

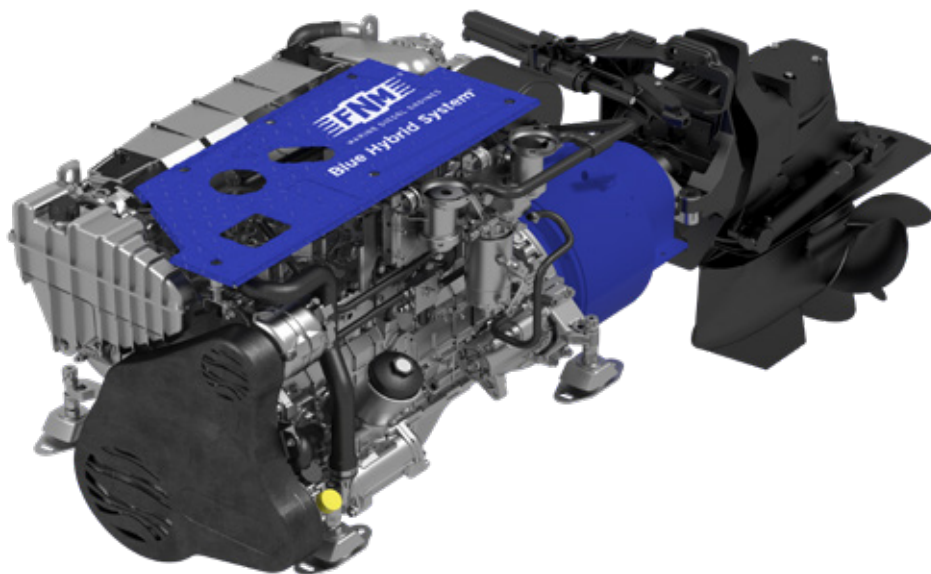
## **HYBRID** POWERTRAINS RANGE

**13HPE BHS** 13.7kW @ 48V

**20HPE/P BHS** 25kW @96V

**30HPE/P BHS** 25kW @96V

**42HPE/P BHS** 25kW @96V



**The pleasure of silent navigation and low-emission mobility.**

It's the perfect combination of all advantages between conventional drive system and an electric motor.

The Hybrid system **combines a traditional marine endothermic engine and an electric motor with batteries and on-board units**, exploring new opportunities to incorporate varying degrees of hybrid power into recreational or commercial boats.



*Thanks to our high technology, powertrain management and **full electric / endothermic propulsion mode changing** take place in easy and fast way through the **HCU** (Hybrid Control Unit) supervision device entirely designed by CMD.*

Specific algorithms, implemented on the HCU control system, allow to navigate:

- In **Full Electric** propulsion: 6/7 knots max;
- In endothermic propulsion: **automatically recharging batteries.**

### **HCU additional features**



Start/stop  
function



Battery Recharge management  
during the navigation



Electric recharge  
management on dockside



On-board units management, cooling pump, hydroguide pumps



Management of CANBUS  
parameters sent to the  
supplied display

***High safety and no distractions during navigation.***



# RANGE DIESEL / HYBRID POWER

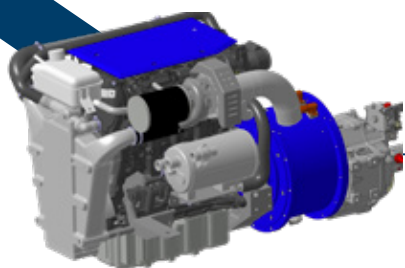
## Blue Hybrid System®

HYBRID KIT FOR MARINE ENGINES

13 HPE BHS 48Vdc



20 HPE BHS 96Vdc



30 HPE BHS 96Vdc



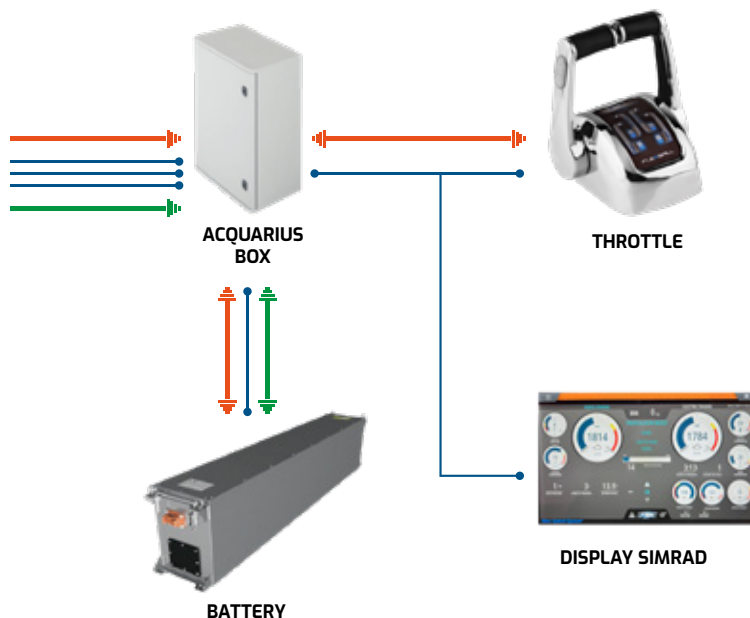
42 HPE BHS 96Vdc



CAN BUS SIGNAL



CHARGING SIGNAL



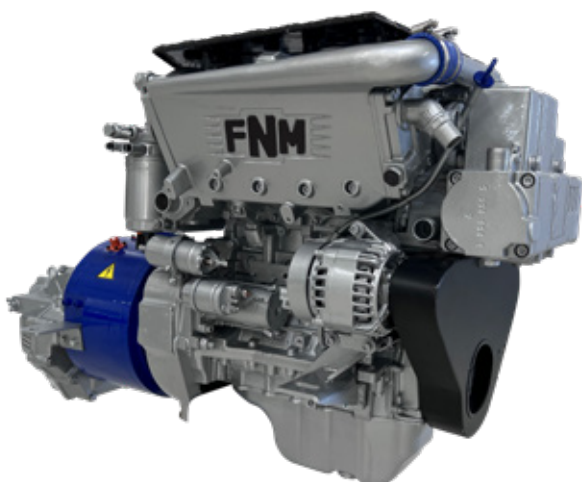


The perfect combination  
between conventional drive system  
and electric motor.



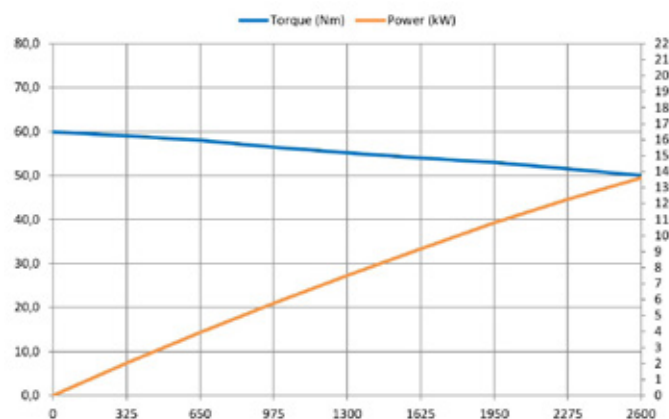
***We are  
the green future  
of sailing.***





### Electric motor / generator

Type	Brushless
Cooling	Liquid cooled
Number of poles	12
Nominal speed	2600 RPM
Nominal power	13.7 kW @ 48V
Nominal torque	50 Nm
Nominal current	260 A
Efficiency	96 %



### Acquarius BOX is composed by

- Inverter specifications	
Type	AC motor controller
Cooling	Liquid cooled
Nominal Voltage	48 VDC
Minimum - Maximum voltage	36-120 VDC
IP Grade	IP66
Continuous current (60min)	460 A
- Safety contactor, internal wiring, relays and fuses	
- Supervision control system (HCU - Hybrid Control Unit)	

### Battery specification

Type	LiNMC
BMS	Included
Nominal Voltage	48,1 Vdc
Capacity	150 Ah
Standard / Quick discharge	0,5 C / 1,25 C
Maximum discharge for 30s	1,3 C
Energy density	96 Wh/kg
Dimensions	685x375x265 mm (L x W x H)
Weight	approx. 75 Kg
Certificate	Yes

### DC / DC Converter

Typical input voltage	48 Vdc
Typical output voltage	12 Vdc
Output power	300 W
IP Grade	IP67

### Display

Brand	SIMRAD
Series	GO XSE con OP box
Standard screen	9 inches
Internal App (BHS System)	Visualization of all system parameters (electrical and endothermic)

### Throttle Remote control

Type	Electronic, top mounting, CAN bus
Series	Flexball 4500
Control Area	Both endothermic engine and electric motor are managed by the same throttle
Communication TYPE	CAN Open

### Battery Charger

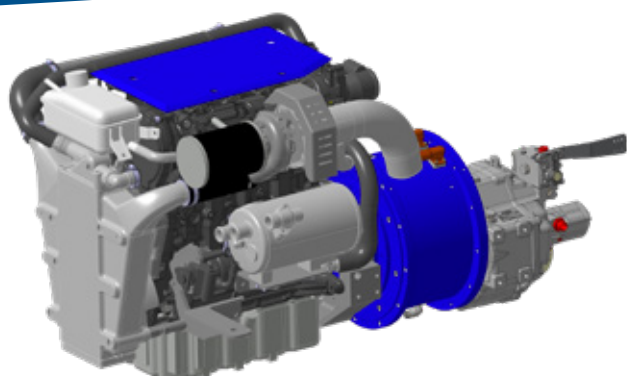
Type	sealed single-phase standard
Input voltage	230Vac (95-265 Vac)
Input frequency	50-60 Hz
Charging Power	2.5 Kw
IP Grade	IP65
Location	On board
Dimensions	324x204x142mm
Weight	8 kg

### Wiring

Standard lenght	Up to 8m boats
Extension harness	Available
Type	Power, signal

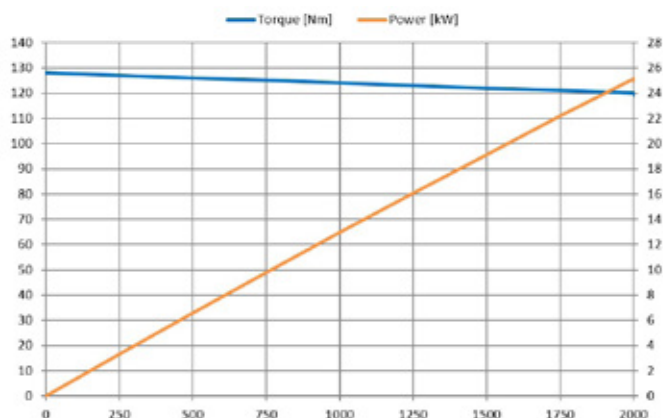
### Cooling system (external)

Equipment	Heat exchanger Seawater pump Coolant circulation pump(s)
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### Electric motor / generator

Type	Brushless
Cooling	Liquid cooled
Number of poles	12
Nominal speed	2000 RPM
Nominal power	25kW @ 2000 rpm @ 96V
Nominal torque	120 Nm
Nominal current	256A
Efficiency	96 %



### Acquarius BOX is composed by

- Inverter specifications	
Type	AC motor controller
Cooling	Liquid cooled
Nominal Voltage	96 VDC
Minimum - Maximum voltage	39-116 V
IP Grade	IP66
Continuous current (60min)	220A
- Safety contactor, internal wiring, relays and fuses	
- Supervision control system (HCU - Hybrid Control Unit)	

### Wiring

Standard lenght	Up to 8m boats
Type	Power, signal

### Battery specifications

Type	LiNMC
BMS	Included
Nominal voltage	88,8 Vdc
Capacity	200 Ah
Standard/fast discharge	0,5 C / 1C
Maximum discharge	1,3 C
Energy density	148 Wh/kg
Dimensions	1158x310x339 mm (L x W x H)
Weight	approx. 150 Kg
Certificate	YES

### DC / DC Converter

Typical input voltage	96 Vdc
Typical output voltage	12 Vdc
Output power	500 W
IP Grade	IP67

### Display

Brand	SIMRAD
Series	GO XSE con OP box
Standard screen	9 inches
Internal App (BHS System)	Visualization of all system parameters (electrical and endothermic)

### Throttle Remote control

Type	Electronic, top mounting, CAN bus
Series	Flexball 4500
Control Area	Both endothermic engine and electric motor are managed by the same throttle. CAN Open

### Battery Charger

Type	sealed single-phase standard
Input voltage	230Vac (95-265 Vac)
Input frequency	50-60 Hz
Charging Power	3 Kw
IP Grade	IP65
Location	On board
Dimensions	324x204x142mm
Weight	8 kg

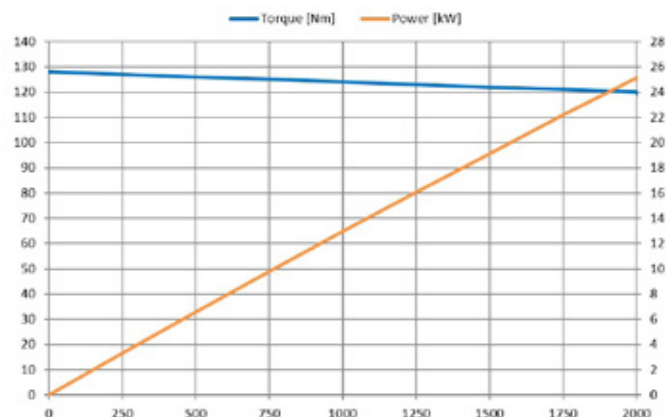
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### Throttle Remote control

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Series	Flexball 4500
Control Area	Both endothermic engine and electric motor are managed by the same throttle. CAN Open.

### Battery Charger

Type	sealed single-phase standard
Input voltage	230Vac (95-265 Vac)
Input frequency	50-60 Hz
Charging Power	3 Kw
IP Grade	IP65
Location	On board
Dimensions	324x204x142mm
Weight	8 kg

### Wiring

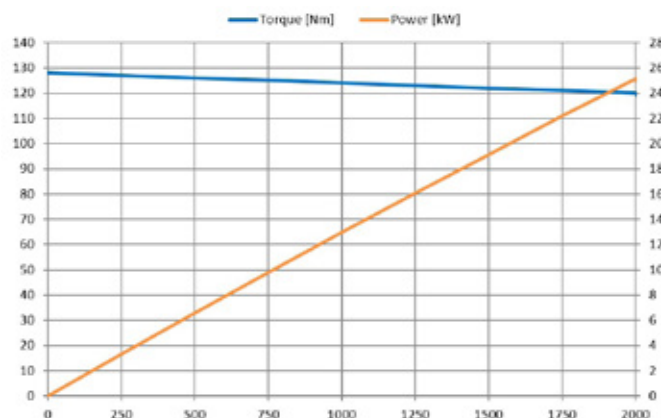
Standard lenght	Up to 8m boats
Extension harness	Available
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Weight	8 kg

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Standard lenght	Up to 8m boats
Type	Power, signal

# TECHNICAL DATA

## Blue Hybrid System®

### HYBRID KIT FOR MARINE ENGINES



#### Everything under control

Thanks to the collaboration with SYMRAD, an innovative app has been developed for showing you the main information during navigation:

- engine/generator data
- battery status
- all parameters necessary to navigation and whole system's control.

Everything is under control and clearly visible through the supplied display.

#### Choose your navigation style

The entire powertrain is managed by a single engine throttle enable to switch from endothermic to electric navigation with a simple action.

#### ECU developed in house

All system is controlled by a CMD ECU entirely designed by CMD. This control unit uses CANBUS technology to communicate with all powertrain's components and decides the operating status of the hybrid system.

#### Operating time

The battery capacity can be customized according to the customer's navigation needs. Protected and insulated in an inox box of 1.5mm thickness, LiNMC batteries cells ensure great reliability. CMD uses an advanced systems simulation software to define the right battery pack capacity based on the mission profile such as: MATLAB / SIMULINK.





For listening **only the sea sound**,  
you can choose now.



Discover more on  
***fnm-marine.it***



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