

The hybrid marine propulsion system by Transfluid is composed of transmission, electric motor and marine gear, and could be integrated into a complete electric propulsion system, whose main applications so far are pleasure and workboats.

MARINE HYBRIDS MAKING WAVES

Transfluid's HM hybrid electric system being used for both pleasure craft and workboats

The hybrid marine (HM) propulsion system developed and launched by Transfluid earlier this year (see March 2016 *Diesel Progress International*) has been utilized in applications such as pleasure and professional marine, including fishing boats, sea taxis, passenger and cargo transport.

The company said that more than 10 shipyards have decided so far to install the HM module in their vessels. In the recreational sector is the German manufacturer Bavaria that chose Transfluid as a partner to launch its first displacement boat with hybrid propulsion. Solarwave-Yachts has chosen the HM system for its Solarwave 62 Cruiser catamaran, where the Transfluid hybrid system is integrated with solar panels and batteries.

The HM propulsion system is integrated into three different Transfluid Electric Propulsion Systems (EPS) with different electric motor versions — the EPS35, with a 35 kW motor, the EPS 50 with 50 kW motor and the ESP75 with 75 kW motor. Transfluid developed all of the electric motors.

All EPS versions are also offered with Transfluid's Revermatic 11-700 gearbox or Rangermatic 31-700, 21-700, and 22-700 gearboxes. All systems include the Type

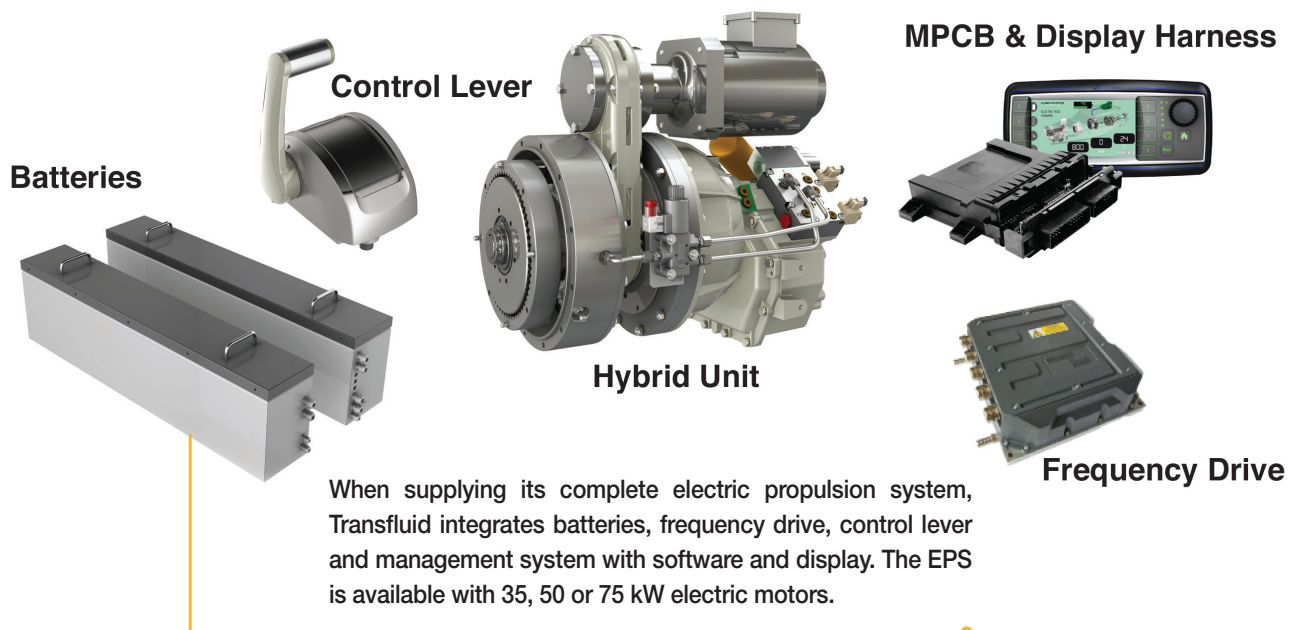
75 frequency drive powered at 300 Vdc, the MPCB-5R management system with software and display and an electronic control system for the combustion engine.

Transfluid said that the Revermatic 11-700 RBD marine transmission coupled to the electric motor allows maneuverability of the boat to be maximized and performance of the electric motor to be enhanced. This is because through the reduction ratio of the marine gear, it is possible to size the propeller of the boat to the maximum power delivered by the electric motor, fully exploiting the motor's potential at 3000 r/min.

Reverse drive is performed by the gearbox, which the company said preserves the electrical components from transient current peaks. Transfluid added that the system could be used as an extra drive system on higher power engines, connecting the output of the EPS system to the power take-in (PTI) of the installed marine transmission. As an example, with an 228 kg EPS system of compact dimensions powered at 300 Vdc, it is possible to obtain on the PTI a torque of 2750 Nm, which could be used to assist in propulsion of a large boat, according to Transfluid.

continued on page 8

Transfluid Scope Of Supply



When supplying its complete electric propulsion system, Transfluid integrates batteries, frequency drive, control lever and management system with software and display. The EPS is available with 35, 50 or 75 kW electric motors.

The company said the development of the hybrid system is ongoing to better adapt to market and customer's needs. Some enhancements, such as simplification of the full hybrid system, have already been added to the product series, Transfluid said.

The simplification process involved all the components installed on board that are interrelated in operation. Transfluid created a kit that can be fitted on board by the shipyard, without having to deal with specific problems, complex installation and installations with nontraditional logic.

With this approach, Transfluid provides all components connected to the system — the Transfluid HM hybrid module, the batteries with its charger, the controls, the cooling water pump, CANbus cables, on board system's main electrical components that connect to the actual hybrid system, and where necessary, a marine inverter.

Another important concept that guided Transfluid in the further development of the marine hybrid system was integration of the hybrid system's potential with onboard electrical and hydraulic power systems.

In terms of integration of hydraulic power, such as with cranes, thrusters, stabilizer fins, walkways or other utilities, a hybrid system of the right size enables the integration of a hydraulic pump in the module itself. This allows the use of cranes and other utilities with combustion engines turned off, thus counting on a fully operational boat even in zero-emissions mode, the company said.

For the integration of electrical power, the batteries are the source that supply all the onboard operational utilities, such as thrusters, stabilizer fins, bow anchors, etc., to air conditioning and other comfort-orientated systems. In this

case, the hybrid module constitutes the main power supply, relying on the optimization of power generated. It uses the excess power during propulsion by the main engine and at the same time receives energy from other sources such as solar panels.

This type of electrical power integration ensures a better onboard efficiency, even to reconsideration of the need for generator sets, Transfluid said. It also allows the operational utilities to be used in zero-emissions mode, without noise, vibrations or fuel consumption.

Accessibility is another characteristic of the Transfluid HM system, applicable both to the user interface and to the system's diagnostic and maintenance. The user interface was improved with the addition of a Booster mode to the control lever. Also, the system's power switches are all in a single key, which activates the electrical panel of the hybrid system and the systems connected to it.

Managing the transition between the combustion engine mode to electric motor and vice versa, can be done with the boat at sea, so the operator decides when to switch over and the system will make the necessary checks automatically. As safety at sea is important, Transfluid decided to leave the choice of the most suitable mode depending on navigational conditions up to the vessel operator.

For monitoring and diagnostics, a communications system can be installed that enables remote control of stored data and for checking for warnings during sailing. [dpi](#)

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