Series hybrids is the future as Mastervolt continues to expand electrical drives for boat range

‘Series’ hybrids is the future as Mastervolt continues to expand its range of electrical drive for boats up to 17m (56ft).

Mastervolt, the Dutch-based electrical specialist, is continuing its mission to develop the most efficient and powerful range of marine electric and hybrid drives available, with new ‘series’ systems at the forefront of ongoing research.

‘Series’ hybrids use a battery bank topped up by a small, remote generator to provide power to an electric motor. The motor can be mounted either in an underwater pod (PodMaster) installed on a saildrive (SailMaster) or connected directly to a drive shaft (DriveMaster).

Because the generator can be housed almost anywhere on board, this allows a huge range of design and installation opportunities. The real advantage of a series hybrid is that it overcomes the ‘range anxiety’ associated with battery-powered boats. You can cruise silently all day, knowing that if your batteries run too low, you can fire up the generator to extend the range. The batteries can then be fully replenished from shore power when the boat is berthed.

Mastervolt has always been a complete ‘one stop shop’ for self-sufficient power systems. Since acquiring the leading propulsion experts, Bellmann, in November 2009, the company has made giant strides in the entire field of hybrid and full electrical drives.

Key to the latest developments is the increasing ability to recharge the batteries from the prop shaft, either when under power from an inboard combustion engine, or from a freewheeling propeller when under sail. In fact, under ideal sailing conditions, it is quite possible for a yacht to regenerate all of its propulsive and hotel loads from its propeller alone. Currently Mastervolt’s e-power applications fall into three main categories: full electric, parallel hybrid and series hybrid.

Full Electric installations rely entirely on battery power, which include anything from Mastervolt’s slim-case AGM types, or gel right through to its unique deep-cycle Lithium Ion. The motors themselves typically range in power from 2.0kW (3hp) to 20kW (30hp), with customer specific motors up to 65kW (97.5hp). Mastervolt’s intelligent control, monitoring and recharging systems ensure that every amp is used as efficiently as possible.
In parallel hybrid installations, the main engine is the primary source of propulsion, yet a belt also connects an electric motor to the propeller shaft. Due to the high torque of the electric motor and a reduction ratio to suit the propeller, these systems are primarily in applications for a few hours of silent cruising with a high degree of maneuverability. They also double as an emergency drive if the main engine fails.

Recent developments include new additions to the HybridMaster Ultra range, providing a 5-model line up from 3.5kW (5.2hp) to 20kW (30hp). The brushless 48V or 96V synchronous motors require virtually no maintenance, and when being spun by the main engine can silently generate between 60A to 200A to quickly replenish the batteries.

The most exciting developments, however, are in the series hybrid range, where Mastervolt’s complimentary technology is providing a wide range of options. For example, power can come from a variable-speed diesel generator, an inverter and an intelligent battery charger, all of which work together to optimise and distribute the available energy.

Mastervolt is currently expanding the size range at which full electric and hybrid installations will be effective, making hybrid available for much larger craft. The PodMaster drives are being increased into the 13.5m – 17m (45ft – 56ft) sailboat range, with the SailMaster models expanded to straddle 5.4m – 11.4m (18ft – 38ft) sector. Meanwhile, the new series hybrids are being targeted at the 8.4m – 17m (28ft – 56ft) range for yachts, and the 8.4m – 14.4m (28ft – 48ft) range for motor cruisers.

“For some larger yachts, hybrid is definitely the way forward,” said Marc Persoon, Mastervolt’s Marketing Manager. “For example, the HybridMaster Ultra allows you to benefit from both worlds, electric propulsion for short to medium distances, and Diesel for extended distances. For sailing yachts, regeneration from a freewheeling propeller is zero-emission energy, which is intelligently harnessed by the Mastervolt control systems. At the other side our series hybrids solutions are gaining a lot of interest from boat designers, as they enhance the interior design by allowing greater flexibility in power component locations.

Looking to the future, CEO Paul Kenninck remarked, “It is fair to say that in a few years, rather than decades, electric boats will have transformed the marine industry. There is already a lot of government legislation promoting environmentally friendly boating. Electric boats are very cost effective to run, particularly with the price of oil increasing. There is no doubt that, just like hybrid cars, electric boats will take off. The stakes are high for the marine industry.”