Mastervolt brings automotive hybrid technology to marine sector

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Mastervolt, the Dutch-based pioneer of electrical independence, is proud to announce the ongoing development of a new vision for the future, where domestic loads and marine electrical propulsion are all sourced and managed from a single on-board ‘power station’.

Although still work in progress, the eventual result will be a design ethos for a complete system based around the ground-breaking GPX, an ultra-compact unit combining a generator, battery charger and inverter hub.

Mastervolt first launched the GPX concept at the METS marine equipment show in 2010, and the fact that all of a boat’s electrical needs could come from one easily-installed ‘box’ caught the imagination of yachtsmen and boat builders alike. Since then, and working closely with other leading electrical manufacturers within the Actuant parent company, Mastervolt has greatly advanced the GPX platform to meet the growing needs of electric propulsion.

The result is the GPX-E (the ‘E’ denoting its e-propulsion credentials). Whilst not yet a final product, this is a design philosophy that allows a boat to be powered purely by an electric motor, yet with enough energy in reserve to also run both the 12/24VDC and the 240VAC domestic systems on board, plus provide power boosts for manoeuvring and the use of thrusters.

Hybrid technology is now well known within the automotive sector, with cars such as the Toyota Prius parallel hybrid, Chevrolet Volt and Opel Ampera (plug-in full/series hybrids) all proving reliable and popular. With this E-extension to the GPX concept, Mastervolt will be able to make plug-in full series hybrid propulsion available to the general marine leisure market, both power and sail.
Intelligent electronics is a hallmark of Mastervolt via its MasterBus system, and the GPX-E uses these to sense the demands being made on it from the various types of equipment on-board. This sensing switches the current draw between batteries, shore power, and the starting of the generator to provide the ideal power and voltage required. With all the components coming from one supplier, the energy-demand controls are totally attuned to each other.

In a typical application, such as the ONJ-built test boat, the GPX-E feeds a synchronous 400VDC electric motor via two built-in DC-DC converters and a 12kW motor drive. Should the crew wish to cook on the electric hob when underway, the GPX-E will quickly detect the extra loading and fire up the genset on its lowest RPM setting, even though the inverters could probably supply the extra 1kW required. The power drain is then carefully managed, with the generator taking over the bulk of the propulsion, and feeding any excess into the batteries until the hob is switched off.

Should a faster cruising speed be required, then the generator’s fuel supply is cleverly controlled to avoid any black smoke from unburnt fuel as the revs are increased. The generator can also be used as a ‘range extender’ propelling the vessel for as far as the tank capacity will allow. When a yacht is under sail, the GPX-E is also able to partially recharge from the freewheeling propeller, just as hybrid cars recharge when braking. Once the trip is over, the boat can be reconnected to shorepower, with the GPX-E managing the optimum three-step recharging of the batteries.

Daan Hobbelen, Actuant’s Product Development Manager (Mobile & Marine), is delighted with the extra benefits the GPX-E vision provides. “This is the first full integrated series hybrid for the marine market, and is a breakthrough for electric vessels of more than 7-metres in length,” he said. “This is particularly true for sailing yachts, which will often require a genset anyway. This new dedicated GPX system is even more compact than before, which can be placed anywhere on-board, provides silent running and requires only one diesel engine on-board. Because this generator can be smaller than conventional units, being backed up by batteries, the cost - equivalent to the sum of all the individual components - will also be cheaper. The real benefit of the advanced power management technology is that these components are all built in to a small-footprint case, which can be housed wherever is convenient.”