

CHANGING THE BATTERIES

Ask any of the relevant truck manufacturers what information operators need to maintain a battery electric vehicle (BEV) and the answer will be the same across the board: directions, so they can find the way to their nearest dealer workshop, quips Lucy Radley

All joking aside, the bottom line with electric drivetrains is that they involve high voltage, and therefore shouldn't be messed about with by anyone other than a specifically large electric vehicle irtec-accredited technician. To find out more about how the systems differ, and what needs to be considered before working on them, three of the large vehicle manufacturers that offer BEVs comment on the subject.

MERCEDES-BENZ

Paul Tully is the relevant technical specialist at Mercedes-Benz Trucks UK, which in turn has more experience than most in this field thanks to the FUSO eCanter (pictured, top left). Launched at the 2016 IAA show in Hanover and built on the existing Canter chassis, eCanter is said to have been the first fully electric truck in series production. Ignoring everything already found on the original, what is left to be serviced and maintained?

"There are three cooling circuits that require regular coolant: the high voltage batteries, the inverter and the cabin," Tully replies. "These require replacing every two years, the same interval as the diesel FUSO Canter." Six-weekly inspections are basically the same as well, with one minor addition: a visual inspection of the high voltage

components, which have their own associated service sheet.

The eMotor itself doesn't require any servicing. "The oil used in the cooling circuits is good for six years, at which point the finance agreements on first-generation eCanters will be up, and we'll be looking to offer customers the next generation," Tully says. "The current generation of eCanter uses a reduction gearbox that only requires oil changes at 40,000km." The batteries themselves are tried and tested, are covered by extended warranties, and can be replaced by dealers.

Despite all this, there are certain precautions which must be taken whenever working on a truck. "All Mercedes-Benz truck technicians (who service FUSO trucks, too) carry out regular training to ensure they are familiar with high-voltage systems," Tully emphasises. This enables them to work within 50cm of high-voltage components. "To work on the high-voltage components themselves, or perform a commissioning or decommissioning of the system, a full product qualification is required."

Non-Mercedes technicians can attend the same training as Mercedes dealers, to become eCanter HV Product qualified. It also bears mentioning that the above comments relate purely to the FUSO eCanter, which has an eMotor and hub-reduction gearbox. "The



Mercedes-Benz eActros has just been launched and has an e-axle," Tully adds - so technicians will be trained differently on this product.

VOLVO

Volvo currently has two medium-duty BEVs available in Europe, the Volvo FL Electric (pictured above) and FE Electric. Paul Bull, product quality engineer for alternative fuel truck engines, electromobility & transmissions, starts by pointing out that these trucks still require six- to eight-weekly inspections, depending on vehicle usage and mileage. "There are some considerations when it comes to who can do what with regards to the traction voltage system," Bull says. "Specific Volvo e-learning and instructor-led training sessions are required to be completed prior to the undertaking of any tasks surrounding these areas."

He points out that de- and recommissioning is not required for



regular maintenance, but only for special operations.

One important point, however, relates to painting of the vehicle, something operators may consider doing in-house or at a non-Volvo paint shop. "Painting can be carried out, but the instructions contained within VBI (Volvo Bodybuilder Instructions) must be followed," Bull warns us. "The vehicle is required to be decommissioned, and the temperatures the vehicle can be subjected to are limited, along with the duration." The painting of any traction voltage cables is not permitted.

Finally, there are specific instructions to be followed should a Volvo BEV need recovery, and these can be found in the driver's handbook. As with all trucks, the prop shaft is required to be removed.

"There are no specific maintenance requirements on the traction voltage system itself, but the other mechanical parts are still required to have oils and filters replaced at regular intervals –

the gearbox, axle and air drier," Bull points out. "Basically, we still use all the conventional components in some form, other than the engine and exhaust systems themselves."

SCANIA

Scania, meanwhile, also has a rigid-bodied electric truck on offer, available in 4x2 (pictured above, lower left), 6x2 and 6x2*4 (rear steer) configurations. Aaron McGrath, head of people development at Scania GB, has produced an in-house guide to electric vehicle workshop preparation. The culmination of extensive research into both legislation and best practice guidance, the guide also benefits from irtec and IMI. HSE was also consulted, alongside other recognised health and safety experts and Scania CV, Sweden.

The guide identifies five main examples of risk: electrical, for example exposure to hazardous voltage and/or current; thermal, for example

flammability of materials; chemical, for example leakage of fluid or gas from ruptures or cracks due to damage or mechanical deformation; mechanical, for example trapping and crushing hazards due to rotating components; and operational, for example restriction on the workshop bays, working areas and in the yard.

Selection of technicians for training to work on electric vehicles needs to be particularly careful for Level 3 work and higher, which includes removing or replacing the EV components themselves. Strict adherence to procedure and protocol is vital, as is proof of aptitude via irtec accreditation for large electric vehicles for high-voltage isolation, reinstatement and safety, and IMI Tech Safe registration.

Vehicles entering workshops for any reason need a formal and dynamic risk assessment performed by a competent technician. Vehicles must be electrically isolated for safety, with a colour-coded lock-out/tag-out system utilised. This involves the use of hasps and padlocks on main switches, to ensure they aren't accidentally switched on during work.

For Level 3 work and above, a safety buddy must be present during isolation and testing – technicians must not work alone. A designated bay within the workshop must be cordoned off using barriers and signage, enforcing a mandatory exclusion zone. Insulated tools, gloves and footwear must be used; arc flash- and flame-resistant clothing must be worn, and other PPE deployed. Safety and medical equipment must be available, alongside diagnostic and electrical test equipment (see also www.is.gd/ajosor).

McGrath's guide finishes with overall skill requirements: "EV competence has a number of important points that must be fulfilled to ensure all work is performed in a safe manner: aptitude, training, assessment, procedures, tools & equipment and safe working." **TE**