E-X-Drive™ is QinetiQ’s electric drive transmission for tracked vehicles. E-X-Drive™ offers a lightweight, compact and efficient system compared to conventional transmission systems.

E-X-Drive™ low weight and compact design is achieved through a combination of good packaging, the use of mechanical regeneration of steer power, and range-shift, providing an optimal combination of electrical and mechanical components.

E-X-Drive™ is a low risk solution as stress levels are low in the motors, gear, shaft and bearing components.

E-X-Drive™ advantages
• Very high power density and specific power.
• Control differential and range shift minimizes propulsion motor power and torque and consequentially power electronics power rating.

Key Capabilities
• Reduced mass
• Reduced volume
• Improved efficiency
• Fault tolerant
• Improved acceleration
• Configurable for a wide range of vehicles and technology insertion programmes
Mechanically regenerative steering

The use of mechanical power regeneration through a cross-shaft arrangement for a tracked hybrid electric transmission is the alternative to independent sprocket drives. The use of independent sprocket drives requires the drives and associated power electronics units to be rated such that they can regeneratively brake the inside sprocket and transmit this power electrically to the outside sprocket.

A cross-shaft arrangement transmits this power mechanically, reducing the required motor and inverter power rating.

Patented QinetiQ control differential

An innovative part of the transmission is the central gearbox – or control differential – that combines steer motor torque, propulsion motor torque and a mechanical steer regeneration mechanism. In addition to minimizing motor torques, it eliminates the bulk and weight of the external cross shaft used in conventional and other HED solutions.

Technical Specification

- Mass ~400kg
- Volume ~112 litres
- Nominal power ~330 kW
- Specific power ~ 0.825 kW/kg
- Power density ~ 2.9 kW/l
- PGW cooling
- Quick release electrical connectors

Developmental status

Major sub-systems and complete prototype transmissions have been built and tested.

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