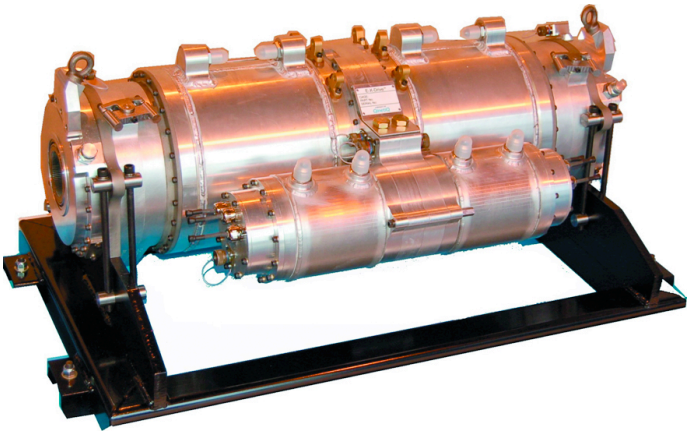
E-X-Drive™ (Electric Drive Propulsion for Tracked Vehicles)

E-X-Drive™ offers a lightweight, compact and efficient system compared with conventional transmission systems.

- Lower mass
- Reduced volume
- Improved efficiency
- Fault tolerant
- Improved acceleration
- Configurable for a wide range of vehicles and technology insertion programs



E-X-Drive™ transmission

E-X-Drive™ offers a compact and lightweight solution for electric drive tracked vehicles based on an optimal combination of electrical and mechanical components. This is achieved through efficient packaging, mechanical transfer of steer power, range-shift mechanisms and permanent magnet motor technology.

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

E-X-Drive™ advantages

- High power & torque density
- Control differential and range shift minimises propulsion motor power and torque requirements leading to lower power electronics kVA rating
- Permanent magnet motors give best efficiency
- Small 'diameter' allows installation with compact, light weight inline final drives
- Simple electro-mechanical actuated gear change mechanism
- Twin traction and steer motors provide redundancy, maximising fault tolerance
- Safe, reliable and uninterrupted steering using mechanical regeneration
- Integrated lubrication system
- Integrated mechanical brakes
- No high pressure hydraulic systems
- Configurable and scalable for a wide range of vehicles
- Modular

Enables design innovation

The combination of an E-X-Drive™ transmission and series electric drive offers the opportunity for innovative tracked vehicle configurations founded on a fundamental shift in platform design trade space options.

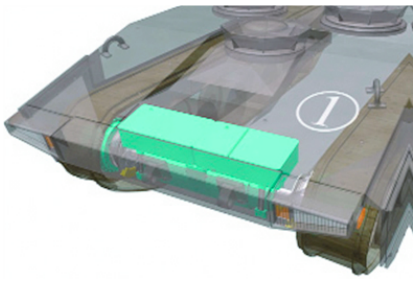
An E-X-Drive™ based transmission package is not only smaller and lighter than comparable conventional transmissions, but also in a series electric drive configuration it offers the opportunity for novel configurations of power pack design and location to improve survivability, agility, and mission success.

Electrical power generation capability and capacity is easier to upgrade, manage and control for different propulsion and new mission system requirements and supports simpler technology insertion as more energy dense power sources become available.

Mechanically regenerative steering
The combination of electric traction motors coupled with the use of mechanical power regeneration through the transmission main-shafts is the preferred alternative to independent sprocket drives.

For independent sprocket drives to be able to regenerate steering power the traction machines and associated power electronics must be rated so that they can electrically transmit the power generated by the slowing inner track to speed up the outer track in a turn.

E-X-Drive™ transmits this 'steering' power mechanically without the need for a separate cross-shaft, reducing the required motor and inverter power ratings.



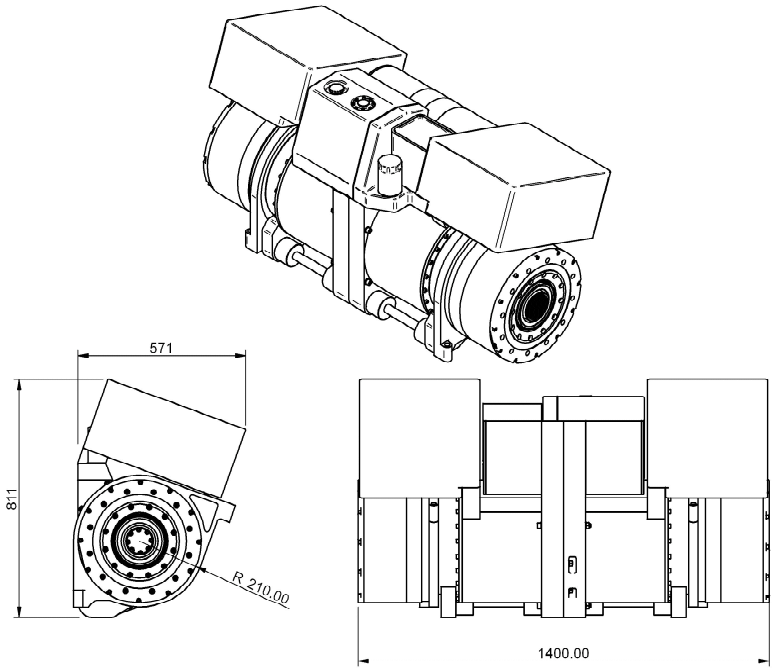
E-X-Drive™ installed in a typical vehicle

When combined with a three-speed range reduction, the drive system requires a corner power rating less than 25% compared to an independent sprocket drive system. This reduces the stress on the components and therefore the technical risk of the solution.

Patented QinetiQ Control Differential
An innovative part of the transmission is the central control differential – this combines steer motor torque and traction motor torque to provide differential steering torque across the tracks.

In addition to minimising motor torques, this arrangement eliminates the bulk and weight of a separate additional cross shaft required by conventional transmissions.

Technical Specification (45-50t class)
- Mass ~900Kg (incl. inverters & brakes)
- Volume ~0.45m3
- Nominal input power ~800kW
- Specific Power ~0.89 kW/kg
- Power density ~1.7MW/m3
- PGW Cooling
- Multi-plate PGW cooled brakes
- Quick release electrical/coolant connectors



E-X-Drive™ approximate dimensions for 45-50t vehicle

FS 73052

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