

## Media Release

Innovative solution for a wide range of electric and hybrid applications with 15 % efficiency increase

# Oerlikon Graziano launches 4 Speed Electric Drive

Pfäffikon SZ, Switzerland / Rivoli, Italy, 25 July 2013 – Transmission specialist Oerlikon Graziano, part of Oerlikon's Drive Systems Segment, is presenting its innovative 4SED (4 Speed Electric Drive) to customers around Europe. This new compact, lightweight transmission boasts increased efficiency, seamlessly smooth shifting and a scalable design making it suitable for a wide range of vehicle types. "This is a fully new transmission concept which will advance the development of electric vehicles", says Heriberto Diarte, CEO of the Drive Systems Segment.

Oerlikon Graziano, with more than 20 years of experience in electric and hybrid drivetrain design and manufacture, proactively developed the 4SED transmission in anticipation of market need for increasingly efficient transmissions for low and zero emission vehicles. The mechanical design concept has been developed by Oerlikon Graziano, while the shift control system was engineered by UK controls specialist Vocis Driveline.

The 4SED, based on Graziano's original eDCT, uses two traction motors in a very compact powertrain which provides four speeds to allow running closer to peak efficiency – approximately 90 percent. The result is an overall efficiency improvement of up to 15 percent, which translates into increased range or improved performance for the vehicle.

"The design of the gearbox is very simple", says Paolo Mantelli, Head of Oerlikon Graziano Performance Automotive. "The transmission's unique configuration uses two input shafts, each driven by its own electric motor. The two motors replace the twin clutches and the synchronizers, allow pre-selection of the next gear before the previous one has been disengaged, and can synchronize shaft speeds". The use of the traction motors also permits a reduced set of software algorithms compared to a normal automated gearbox, and since there are no hydraulics, there is no need for valve control.

The technology is scalable to suit a wide range of different vehicle types, urban electric cars, high performance cars, hybrid 4WD applications, electric buses and trucks. It is also suitable for applications with 48V motors, allowing significant cost savings and reducing risks of high voltage 4SED speaks for itself", continues Mantelli, "it is seamless, it is clutch less, it needs no synchronizer and is truly innovative!".

A demonstrator has been fitted to an electric Mercedes Vito minibus and is currently touring renowned European vehicle manufacturers to showcase its unique features. Initial customer feedback is very positive: "As a first demonstrator the shifting function is very impressive, there is no feeling of torque interruption and they are very smooth". "This transmission is perfectly scalable to the needs of the customer through different platforms and performance requirements".

More details on this innovative 4SED will follow at CTI symposium in Berlin in December 2013.

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**About Oerlikon**

Oerlikon (SIX: OERL) is a leading high-tech industrial group specializing in machine and plant engineering. The Company is a provider of innovative industrial solutions and cutting-edge technologies for textile manufacturing, drive, vacuum, coating, and advanced nanotechnology. A Swiss company with a tradition going back over 100 years, Oerlikon is a global player with around 12 700 employees at around 160 locations in 34 countries and sales of CHF 2.9 billion in 2012. The Company invested in 2012 CHF 106 million in R&D, with over 1 000 specialists working on future products and services. In most areas, the operative businesses rank either first or second in their respective global markets.

**About Oerlikon Graziano**

Oerlikon Graziano is a global player in power transmission field with more than 60 years of experience. Today the company is focused on the major markets as Off-Highway (Agricultural and Construction), Automotive and Industrial Application. Through its global footprint - in America (USA), Asia (China and India) and Europe (Italy, Russia and UK) – and its innovation, experience and high-tech solutions, Oerlikon Graziano is able to meet the customer needs, providing complete driveline systems as well as single gearing components. Recognized as a technology innovator, it is appreciated for the high quality of its products and services and the unique ability to manage high complexity-challenging time to market programs.



4SED, multi speed transmission provides EVs with greater range while reducing vehicle weight and battery pack size

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