

EMD™ TECHNOLOGY



## SOLUTION FOR BELT STARTER GENERATORS



Gates' advances in higher capacity EPDM Micro-V® belts and robust tensioners are driving Gates' research and development in belt-driven starter generators. Gates' Electro-Mechanical Drive (EMD) System allows starter-generator systems to use an advanced belt drive for an almost completely silent vehicle start-up and contributes to achieve the 2020 EU car regulations targeting 95g CO<sub>2</sub>/km.

### TECHNOLOGICAL ADVANCEMENTS

- > Up to 10% fuel reduction
- > Potential to reduce friction loss by lowering system tension
- > EMD™ belt driven technology enables:
  - Start-stop
  - Boost mode
  - Stall mode
  - Recoverable braking energy
  - Recuperation mode
- > Increases driving comfort due to silent start-stop
- > Elimination of starter motor results in weight reduction
- > Engine downsizing
- > Potential to eliminate tuning devices
- > Conversion of conventional belt drive within existing packaging
- > Easily incorporated in current customer assembly lines

### SYSTEMS ENGINEERING AND TECHNOLOGY

As our many worldwide OE partners have learned, Gates can enhance optimisation efforts by getting involved early – right at the design stage. Gates' approach is one of system engineering, to find the best solutions based on the highly interdependent nature of the individual components. Through the years, Gates has developed the engineering skills, including simulation programmes and rig test methods, to engineer complete, integrated and highly functional systems. Gates offers a wide range of experience in EMD™ belt driven system simulation and validation.

A SIMPLE SOLUTION FOR MICRO- AND MILD HYBRIDS









## GATES OFFERS THE SOLUTION FOR BELT-DRIVEN STARTER GENERATORS WITH ELECTRO-MECHANICAL DRIVE SYSTEMS



### TENSIONER

- > Gates has developed a variety of belt tensioners in order to ensure a suitable solution for all systems considering: function requirements, lifetime requirements, torque transmission, packaging constraints.

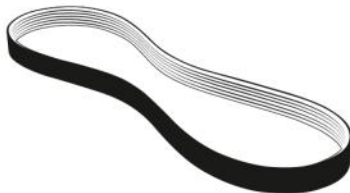
	Single tensioner concept		Dual tensioner concept			
Concept	Hydraulic	Rotating ALT	Hydraulic & Mechanical	Dual Mechanical	Bracket Tensioner	Mechanical Integrated Orbital
View						
Start torque	Up to 35 Nm		Up to 70 Nm			

- > All Gates tensioner concepts offer:
  - Increased lifetime up to 300,000 km and more than 600,000 start ups
  - Potential for elimination of tuning devices by asymmetrical tensioner design for higher energy absorption
  - Reduced noise and vibration levels
  - Proper alignment



### Gates new Orbital tensioner concept

- Improved system control by independent tuning of belt tension and damping
- Reduction of belt tension and slip through an increase alternator wrap angle
- Directly mounted on available alternator with 3-point mounting eliminating the need for additional brackets
- Reduction of assembly time at the customer's engine plant
- Reduction of handling cost as delivered as one single assembly



### BELT

- > Special high-load Micro-V® belt to provide the performance required in an engine starting function, being more than 600,000, start ups
- > Special belt composition using a high performance rubber compound, advanced adhesion technology and enhanced cord material
- > Improved noise robustness
- > Lifetime of more than 240,000 km
- > High load and flex capability
- > Packaging within the existing belt width

#### For more information:

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