

The new synchronous-reluctance drive system

As a complete drive system, the reluctance motor with the gearbox and the frequency converter are perfectly coordinated and enable best-in-class operational results when combined together. This results in cost-effective operation of the whole system and high efficiency performance.



SIMOGEAR
reluctance
geared motor

Highlights

- ✓ High dynamic performance
- ✓ Excellent thermal behaviour
- ✓ High energy efficiency

Published by Siemens

Digital Industries
Motion Control
P.O. Box 31 80
91050 Erlangen, Germany

For the U.S. published by
Siemens Industry Inc.
100 Technology Drive
Alpharetta, GA 30005
United States

Article-No DFMC-B10090-00-7600
Dispo 21500
WÜ/1000173743 WS 07191.0
© Siemens AG 2019

Subject to change without prior notice

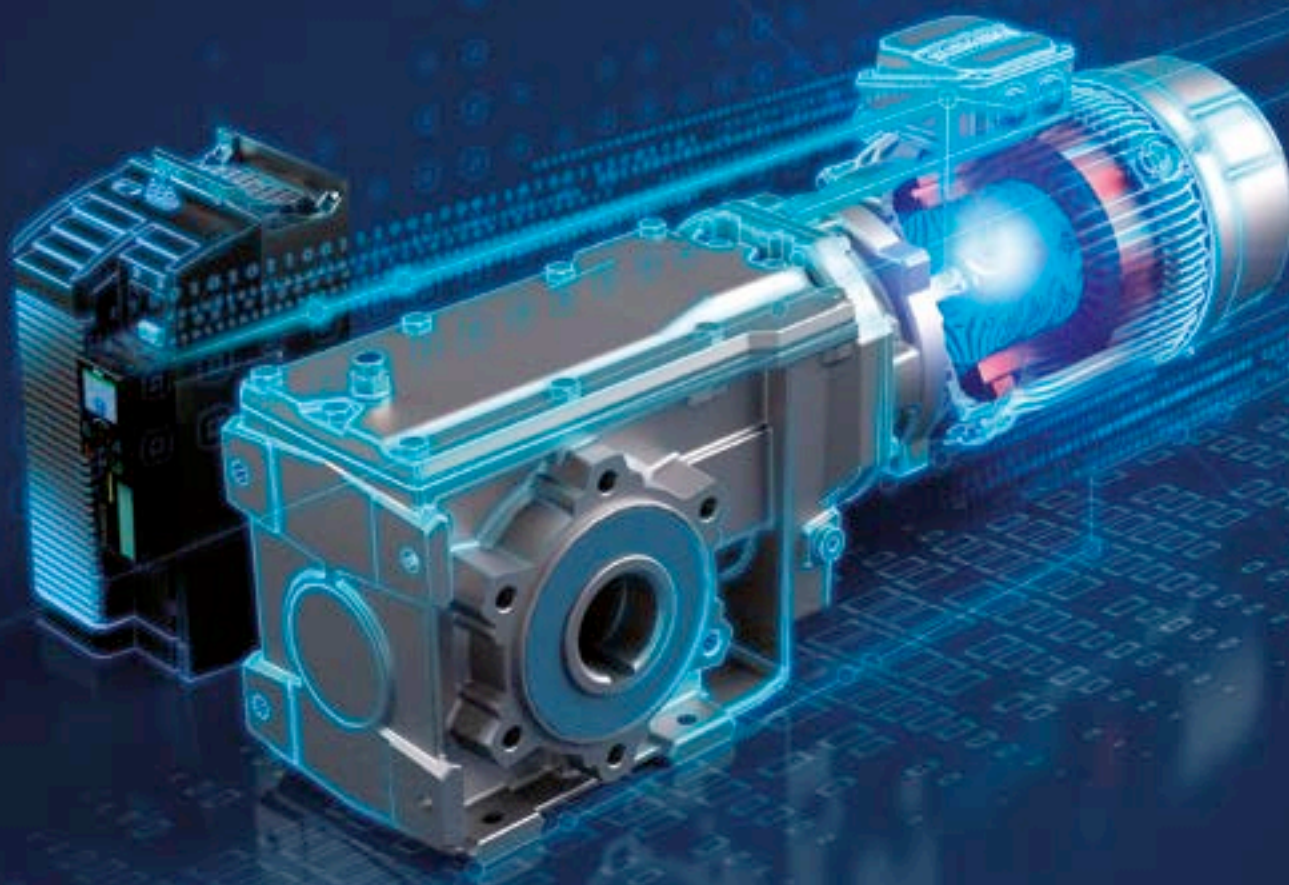
The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

To secure plants, systems and machines as well as networks against cyber attacks, a holistic Industrial Security concept must be implemented (and continuously updated) corresponding to current state-of-the-art technology. Products and solutions from Siemens are just one component of such a concept.

You can find additional information about Industrial Security at <http://www.siemens.com/industrialsecurity>

SIEMENS

Ingenuity for life



SIMOGEAR reluctance geared motor

The new synchronous-reluctance drive system.

[siemens.com/simogear](https://www.siemens.com/simogear)

Compact. Rugged. Energy efficient.

The new SIMOGEAR synchronous-reluctance drive system consists of SIMOGEAR standard gear units, SIMOTICS synchronous-reluctance motors and SINAMICS frequency converters. With this solution, Siemens is widening the SIMOGEAR geared motors portfolio by newly combining the gearbox with the reluctance motor from SIMOTICS as a completely new offering for the customer. By combining the aforementioned products the customer benefits especially from the efficiency class compared and even exceeding IE4, which scores with higher efficiency and lower losses, especially in a partial load than to comparable asynchronous motors. Highly energy efficient, the motor heats up less and provides a high operation reliability due to its excellent thermal behavior. Because of that high service factors are achieved. This solution also boasts high dynamics thanks to the motor's lower moment of inertia and optimized control. Commissioning is established quickly and easily by entering the motor code into the converter. The constant torque-speed characteristics up to the rated speed make an external fan redundant. In the drive system, all components are perfectly coordinated together.



The synchronous-reluctance solution allows for application in many different areas and with the major technical benefits compared to a standard asynchronous solution. The SIMOGEAR reluctance geared motor is particularly suited to conveyor technology and general machinery systems where applications with high energy efficiency are demanded. Together with the right frequency converter, the portfolio is very extensive.

The drive system is typically used for rollers, chains and belt conveyors within the baggage and cargo handling facilities at airports. It also fits within warehouses and distribution logistics and in postal and packaging. It is commonly used in hoisting gears, scissor lift tables and monorail conveyors as well as in rollers, chains, belts and skids for the automotive industry.

Synchronous-reluctance solution

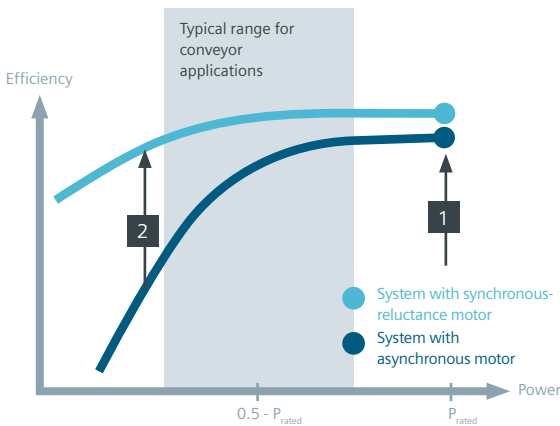
Demands on the efficiency of drive systems are high nowadays so there is a big chance for synchronous-reluctance motors to show their efficiency improvements. The synchronous-reluctance solution is the step forward. The entire drive system benefits from the synchronous-reluctance solution which differs from the asynchronous in several ways.

As previously mentioned, the biggest advantage is the higher efficiency of the synchronous-reluctance drive system compared to the efficiency of the drive system with asynchronous motors. Also thermal limits are different; synchronous-reluctance motors reach high reliability of operation due to low motor temperature.

In synchronous-reluctance motors, the speed is perfectly known due to the synchronous mode of operation. Precise speed is reached even without encoder. The system boasts with high dynamic performance through optimized control and low moment of inertia.

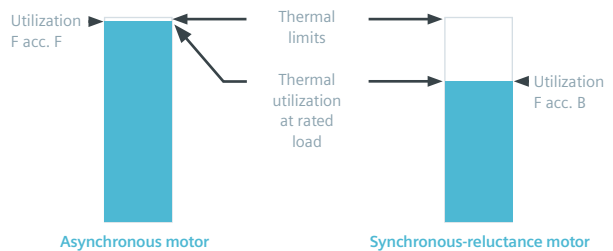
The SIMOGEAR reluctance geared motor has an output range from 0.55 to 4 kW and is available for SINAMICS G110M, G120D, G120, G120X and S120 converters. Optimum functionality of the drive system is provided by the interaction of the reluctance motor, gear unit and converter which are precisely matched to each other. This results in economical operation and efficient performance of the entire drive system.

Energy efficiency at rated load and partial load



- 1 Efficiency at rated load**
The efficiency of the drive system with the synchronous-reluctance motor is higher at rated load compared to the efficiency of the drive system with the IE4 asynchronous motor
- 2 Efficiency at partial load**
The efficiency of the drive system with the synchronous-reluctance motor is much higher at partial load than the efficiency of the drive system with the IE4 asynchronous motor

Thermal behaviour: High reliability of operation due to low motor temperature



Synchronous-reluctance motor has almost no losses in the rotor compared to the asynchronous motor. That results in a significant temperature reserve in the synchronous-reluctance motor. Based on that the synchronous-reluctance motor can be operated down to 10% of a rated speed with a rated torque (but the torque reduction is not necessary). Consequently the reluctance motor can be operated with a higher overload in a lower speed range compared to the asynchronous motor.

Efficient with precise functions

Therefore Siemens is expanding the SIMOGEAR portfolio which meets customer requirements as well as market standards regarding mounting dimensions. Shorter and compact design together with fine torque graduation is a standard for the SIMOGEAR gearboxes. Coupled with SIMOTICS reluctance motors and SINAMICS frequency converters, the new drive systems with an excellent operation appear. When you demand for highly efficient motors with the highest performance, this system is a perfect solution for your application.



Compact



Rugged



Energy efficient

Technical data

Type	Synchronous-reluctance drive system
Efficiency class	System efficiency class IES 2, motor efficiency exceeds IE4
Shaft height	SH80, SH90, SH112
Power range	0.55 kW – 4 kW*
Certificates	CE, UL/CSA, CCC**
Overload capacity	Up to 200%
Service	Synchronous-reluctance motor is easy to service due to absence of permanent magnets
Insulation system	Insulation system is optimized for converter operation
Gearboxes compatible	Helical Parallel shaft Helical worm Bevel
Converters compatible	SINAMICS G110M SINAMICS G120 SINAMICS G120D SINAMICS G120X SINAMICS S120

* 2.2 kW and 3 kW are implemented in SH112

** in preparation

SIMOGEAR reluctance geared motors are compatible with SINAMICS converters



SINAMICS G110M



SINAMICS G120



SINAMICS G120D



SINAMICS G120X



SINAMICS S120



SIMOGEAR reluctance geared motor is included in Drive Technology Configurator
[siemens.com/dt-configurator](https://www.siemens.com/dt-configurator)