Electric Motor Control Kit

Spin a Brushless DC Motor with Simulink® and Speedgoat

Included in the Delivery

- 100 W brushless DC Motor
- PWR- TPI6020 three-phase inverter
- Polycarbonate structure and flywheel
- Power supply and cables
- Simulink model of the closed-loop system
- Simulink driver blocks and Custom Implementation Package for the IO397 I/O module
- Comprehensive documentation

Note: Real-time target machine not included with kit

Capabilities

Design, test and validate motor control algorithms for electric motors using Simulink and Speedgoat hardware. The Electric Motor Control Kit enables you to spin a brushless DC motor using field-oriented control, tune parameters on-the-fly, and estimate motor parameters with just a few clicks. The kit includes the software, hardware and documentation needed to control a brushless DC motor using Simulink Real-Time™ and a Speedgoat real-time target machine.

The demo kit gets you started with the rapid control prototyping of electric motors with Simulink and Speedgoat hardware. Learn to deploy and run motor control algorithms in real-time: from scalar control (open-loop) to automatically tuning a field-oriented control algorithm on-the-fly. Speedgoat target computers with Simulink-programmable FPGAs can run algorithms with closed-loop rates in the MHz range and handle signal conditioning up to 250 MHz. The I/O connectivity of Speedgoat hardware includes PWM, quadrature encoder, resolver, synchro measurements and hundreds of more I/O types.

Common Applications

- Brushless DC (BLDC) motor control
- Induction motor control
- Switched reluctance machine control

Supported Target Machines

- Unit
- Baseline

Key Features

Hardware	Software
Integrated brushless DC motor and power inverter	Simulink model with field-oriented control (FOC)
Quadrature encoder for position feedback	Real-time monitoring and parameter tuning
Hall sensor integrated in the motor	Supervisory state machine using Stateflow®
High-speed PWM input/output	Open-loop sinusoidal control
Switching frequency up to 50 kHz	Data analysis using Simulation Data Inspector (SDI)
	Simulink Control Design™ for PID autotuning
	Parameter characterization using Simulink Design Optimization™

speedgoat
real-time simulation and testing

Technical Specifications

Physical	
Dimensions	170 x 85 x 180 mm
Weight	1485 g
Environmental	
Operating temperature	5 °C to +50 °C
Relative humidity	5 to 95 %, non-condensing
Electrical Characteristics – Power side	
Type	Two-Level Three-Phase Inverter
DC bus input voltage	12 to 60 V DC (electronic power supply self-supplied from DC bus)
DC bus continuous current	Up to 30 A
Phase continuous output current	Up to 20 A RMS
Switching frequency	Up to 50 kHz
Measurement Characteristics	
Linear measuring range (Current)	37.5 A
Sensitivity (Current)	66.6 mV/A
Bandwidth (Current)	120 kHz
Measuring range (Voltage)	110 V (±3.3 V voltage range)
Sensitivity (Voltage)	30 mV/V
Bandwidth (Voltage)	100 kHz
Three Phase Inverter Protections	
Voltage (DC Bus)	> 70 V
Current (DC Bus)	> 30 A
Current (AC output)	> 30 A
Reaction time (voltage & current)	< 5 us + sensor propagation delay
Temperature	> 70 °C (internal sensor)
Reaction time (temperature)	> 10 ms
Encoder Characteristics	
Supply voltage V_{cc}	5 V ± 10 %
Typical current draw	15 mA
Counts per turn	4096
Number of channels	2
Output current per channel	Max. 4 mA
Maximum operating frequency (kHz)	1000
Maximum speed (rpm)	6000
Encoder type	Encoder MILE 512-4096 CPT, 2 Channels, with Line Driver

Motor Characteristics	
Nominal voltage	24 V
No load speed	4300 min^{-1}
No load current	493 mA
Nominal speed	3730 min^{-1}
Nominal torque (max. continuous)	269 mNm
Nominal current (max. continuous)	5.14 A
Motor type	EC 60 flat, 60 mm, 3 phase, brushless, 100 Watt (Maxon Motor Art. Nr. 625855) with Hall Sensor

Order and Contact Information

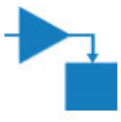
Item ID	Product Name	Components
305501X	Electric Motor Control Kit	Complete and fully assembled electric motor control kit for rapid control prototyping of electric motor controls with Simulink
		Brushless DC motor with a spinning flywheel and a polycarbonate plate
		Speedgoat PWR-TPI6020 three-phase inverter for 60V/20A
		Power supply and cables
		Simulink model for real-time testing is included
305502X	Electric Motor Control Kit - EDU	Complete and fully assembled electric motor control kit for rapid control prototyping of electric motor controls with Simulink
		Brushless DC motor with a spinning flywheel and a polycarbonate plate
		Speedgoat PWR-TPI6020 three-phase inverter for 60V/20A
		Power supply and cables
		Simulink model for real-time testing is included

* Please replace the X with the code number of the specific target machine for the I/O module installation:
7 = Unit real-time target machine
8 = Baseline real-time target machine

Contact Sales: sales@speedgoat.com

Switzerland	+41 26 670 75 50
USA	+1 508 233 26 50
Germany	+49 5139 97780 51

Benefits of Speedgoat Solutions


Made for Simulink


Vast Range of I/O & Protocols


Built for Speed


Scales with Your Projects


Configured to Your Needs


With Quality Services