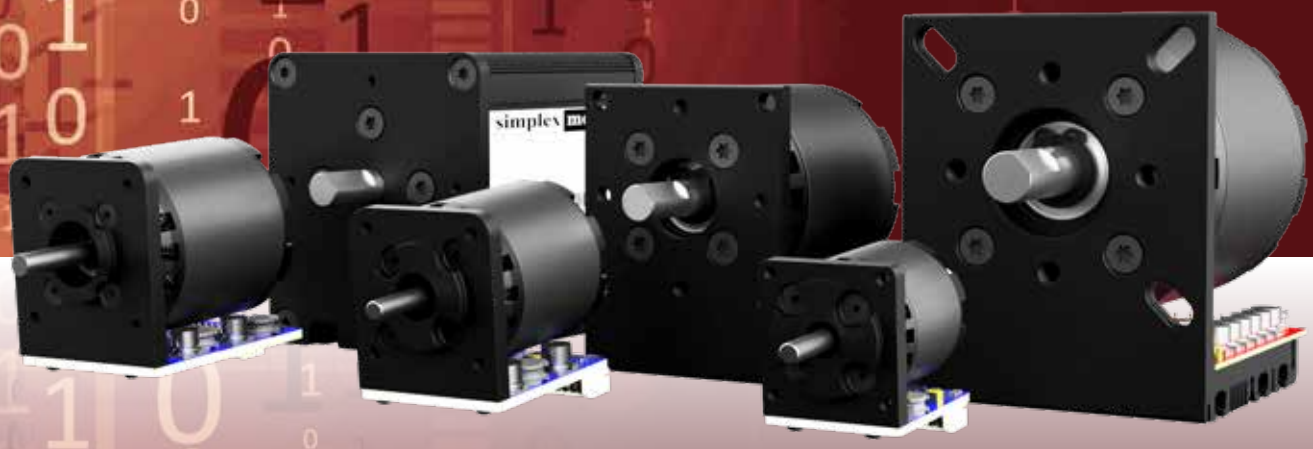
simplex
motion

Servomotors

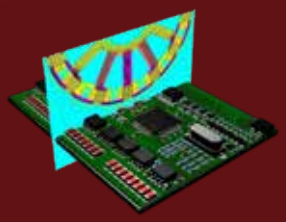
and compact motor solutions



MADE IN SWEDEN

Integrated Servomotors

The Simplex Motion integrated servomotor is a brushless DC motor with integrated electronics. The outrunner rotor design, with permanent magnets, makes the motor compact and powerful relative its size.

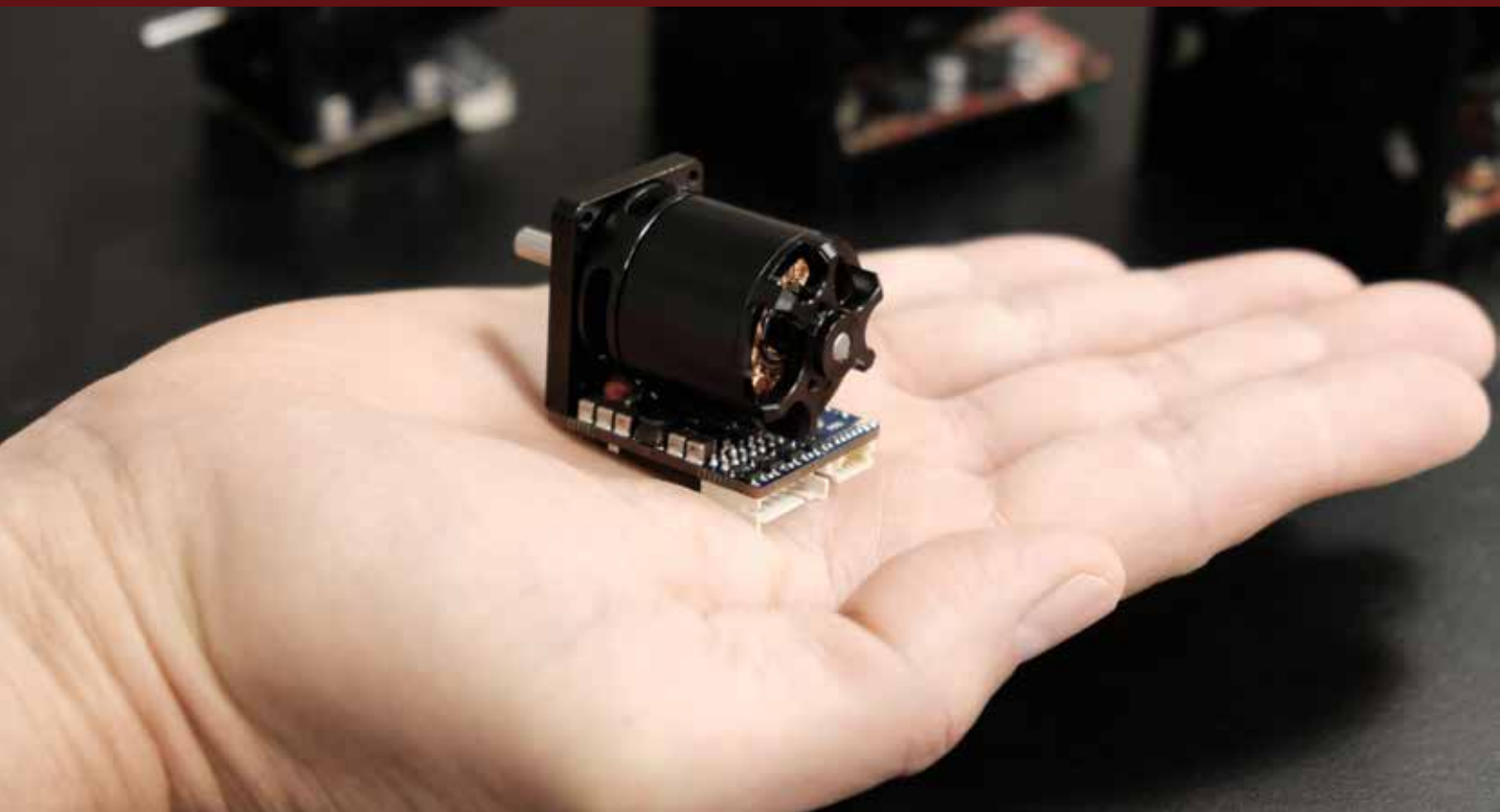


Thanks to a patented sensor technology, the traditional encoder solution is replaced and there are no rotating parts for positioning feedback. The unique sensor technology ensures smooth running and precise control. Together with the integrated drive and control, the servomotors become very energy efficient.

The motors are designed as open frame, optimizing the possibility for better cooling and increased performance using a large enclosure. This design provides an outstanding power density (torque/weight),

The motors can be configured for external control systems, programmed to run as stand-alone or in combination as hybrid control.

Simplex Motion Tool
Programming and configuration are possible with the free software Simplex Motion Tool, a straightforward and easy to use software. Connect to the motor via serial, USB or CAN communication to configure and monitor the function and behavior. Read out all of the parameters including speed, torque, power consumption, temperature and more.



Half weight – double torque

Reduce weight and maintain high power output – excellent torque/weight ratio

Make slim and **compact designs** – high torque to volume ratio

Reduce components – all in one, motor, encoder and control electronics integrated on the same PCBA

Decentralized control – Use the motor as a control system with the built-in PLC function and let the motor control both the motion and peripheral units.

Enclosed or open design – Maximize the power output with no enclosure. Reduce weight, size, and cost with open design, ideal for designing into machines.

Run the motor **stand-alone** – built-in control functions

Synchronize the motors – built-in master/slave, slave/master communication

Customized application – write your own applications and download to the motor microprocessor for customized motion.

High durability – the only wearing parts are the rotor bearings

Less wasted energy – the motors have high efficiency

Easy startup – program and configure with our free software Simplex Motion Tool

Functions

Decentralized functions
Use the motor as a decentralized part of a control system. The stand-alone feature in combination with bus communication, makes it possible to move all, or part of, the logic to the motor.

Master/Slave synchronization
Synchronization of position or speed is done easily when connecting the motors with SMCAN. The motors interact and manage all the synchronization, without the need of any external control system.

Motor information sharing
Apart from synchronizing, the SMCAN makes it easy to share information. Start/stop signals, sensor data, running data etc. can be shared between motors and external systems.

Logic Event programming
Easy programming of complex functionality directly into the motor with simple logic event expressions.

Application Programming
Take motor control to the next level by downloading your customized applications in C code to the motors.

Heating
In cold environments, the motors can be used as a heating source, both when stationary and rotating.

Homing
Homing is standard on all models. The homing is triggered by an external limit switch or by a configured torque limit.

Sequence control
For repetitive motions, the sequence programming can be used to control both position/speed and time.

Systemization

Stand-alone
Let the motor run as stand-alone and take full control by utilizing the built-in functions. The I/Os can be used for controlling the motor, other motors, or peripheral components in a system. Customer specific applications can also be used for complex control.

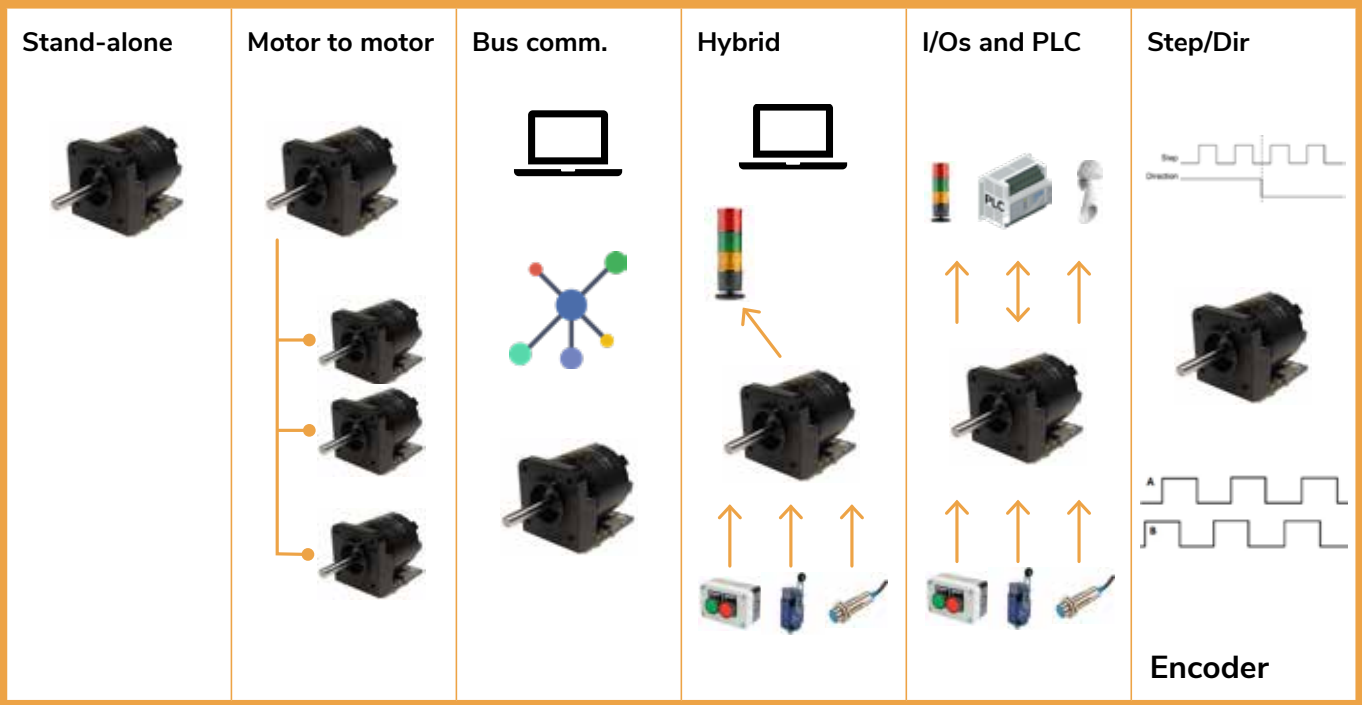
Motor to motor communication
Simplex Motion servomotors can communicate with each other, without any external control system. Synchronize position, speed, and share other control parameters easily.

BUS communication
Operate the motor with bus communication and access all functions and parameters of the motors. Available interfaces are Modbus, Wireless Modbus, CANOpen and SMCAN.

Hybrid control
The motors can be controlled with a bus and other external systems in combination with the integrated PLC functions. Control the motor externally, utilize the stand-alone feature and let the integrated PLC function control peripheral components and units.

I/O interface and PLC
Analog inputs and digital I/Os are available for the motor control. Analog inputs for speed, torque, position control etc. Digital inputs for start, direction, limit switches, sensors etc. Digital outputs for relays, indicators, brakes etc.

Step/Dir and Encoder
The motors can be controlled through Step/Dir interface or quadrature encoder signals. This can be used to facilitate a replacement of e.g., a stepper motor.



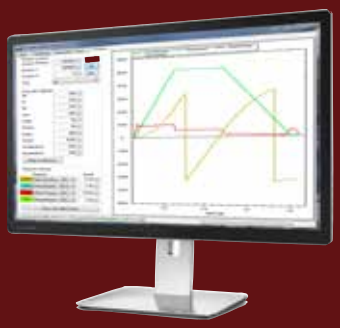
Simplex Motion Tool

Simplex Motion Tool is a free software available for download at our website simplexmotion.com. The Software runs on Windows and is used to connect to and configure the Simplex Motion motors.

The motors are connected to the computer using USB and with the software, the motors can be updated to the latest available firmware.

Simplex Motion Tool can monitor the motor information in run-time giving you full control of the motor performance. This is an ideal function for development, fine tuning the parameters such as power, speed, torque, temperature and many more making sure they are in line with expectations. The software has a visual interface ideal for troubleshooting and fast iterative development.

The software gives the user full access to all registers of the motors for a straightforward configuration. Optimizing and setting PID-parameters or programming a sequence, setting up sequential running of multiple motors and many other use cases are supported by documentation guiding the user through the procedures step by step.



Accessories

Simplex Motion offers a variety of boards and cables for communication, operation, configuration and test.

SM Com board
For easy and quick startup, a communication and configuration board is available. It includes a USB to Modbus functionality for easy communication with Simplex Motion Tool as well as switches and potentiometer for startup and testing.

SM Interface
Interface boards to isolate I/O and encoder signals between the motor and an external system in applications when required.

SM CAN I/O
I/O board with CAN communication. Gives all motors on the bus access to distributed inputs and outputs. It increases versatility and reduces cabling. It comes with an I2C interface, which also is available through the CAN bus.

SM Wireless
Wireless communication modules for Bluetooth and Wireless Modbus. Operate the motor and get condition and parametric data without cables.

SM Dump
To handle excessive energy when the regeneration of power cannot be handled by the power source.

Cabling
Various cables are available for easy connection between motors and accessories.

For more information on available accessories, please contact us!

Gearboxes

Planetary gearboxes with high precision and low backlash, adapted to fit each motor size. Available in gear ratios between 2:1- 32:1 as standard, others on request.

Planetary
Available for the complete servomotor range.

Planetary, angled
Available for motor sizes from 040 to 200.

Wheel mount planetary
Available for motor sizes from 040 to 200.

Wheel mount planetary, angled
Available for motor sizes from 040 to 200.

Brakes

Electromechanical brakes are available in different sizes, depending on the application needs. Brake and holding torque 0,5-4 Nm. Can be delivered with flange and axis adapter. Other variants available upon request.

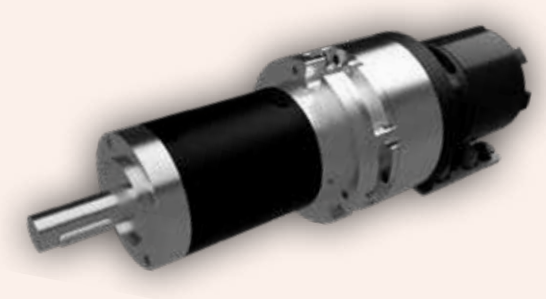
Drive Units

Combine the Simplex Motion integrated servomotor with a brake, a gearbox, or both, and get a compact drive unit matched to your application needs.

- Compact design when space is limited
- Standalone with programmable all-in-one motor solution
- Synchronized motion between drive units to avoid drawer effect and misalignment
- Exact position with integrated sensor technology
- Load feedback with torque control measurement
- Torque homing – no need for limit switches
- Easy startup with the free software Simplex Motion Tool
- Brake control integrated in motor
- Reduce components – built-in PLC function

Motor Drive Units

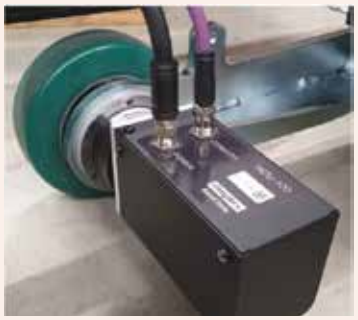
Servomotor combined with a gearbox, brake, or both. Typical applications are actuators, linear modules and axis, ball and roller screws drives.
Can be delivered with open design, enclosure and cable connectors, or, enclosure and cables with open end.



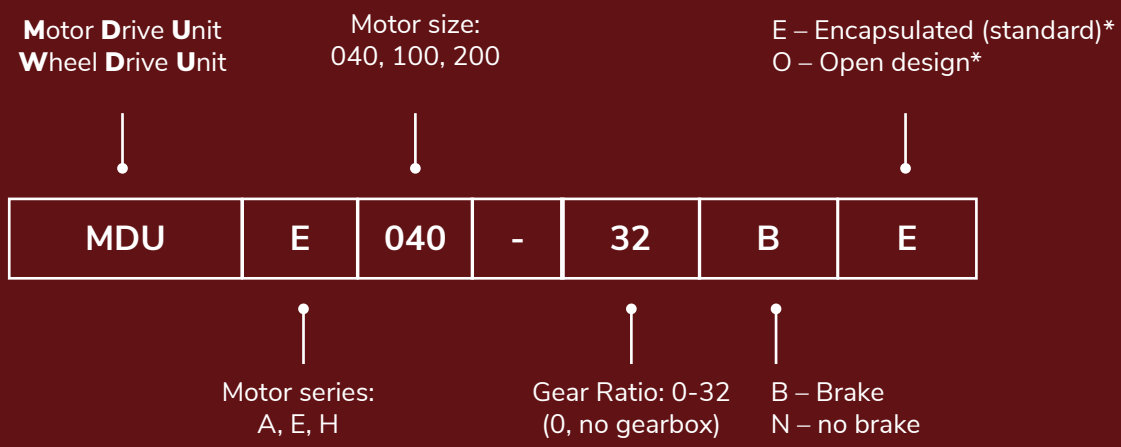
Wheel Drive Units

Servomotor combined with a wheel gearbox, brake, or both. Typical application are AMRs and AGVs, applications with high radial load on gear output, indexing table.

Can be delivered with open design, enclosure and cable connectors, or enclosure and cables with open end.



Specifications and ordering key



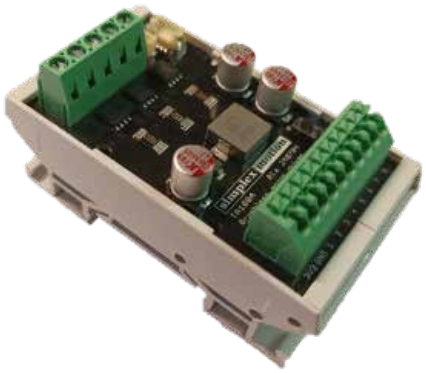
*The encapsulated drive units come with M12 connectors or cable with open end. The open design units are delivered with Simplex Motion motor standard connector

Example, technical data for MDU040-32BO

Power (Peak)	120W (300W)
Supply	12-48 VDC
Torque	9Nm (peak 25,6Nm)
Brake/holding torque	1,0Nm
Length, excl. shaft	160mm
Diameter	55mm
Connector	-

Motor controller

The TA series is a motor controller designed for sensorless operation of PMSM (Permanent Magnet Synchronous Motor) and BLDC (Brushless DC) motors. The advantage of sensorless operation is that it eliminates the need for encoders or electronic components within the motor, leading to reduced cabling and fewer or no connectors.



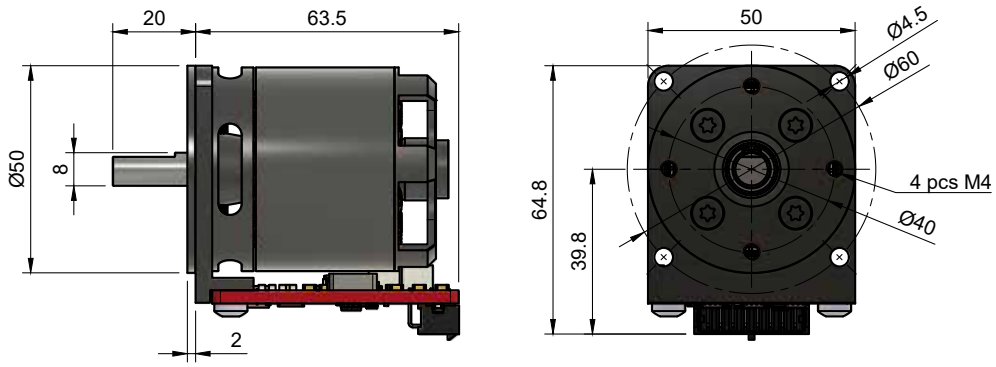
The TA motor driver is a cost effective solution when high performance motor control is needed, but a servomotor is too advanced. The driver can be placed separate from the motor, which can be advantageous in applications that have space or weight limitations or operate in harsh environment

Typical operational speed ranges from 10% to 100% of the motor's rated speed. For applications that demand more precise low-speed control, the motor controller includes an encoder input for low-speed operation.

ELECTRICAL SPECIFICATION - TA100		
Power Supply voltage	Range	12 – 48VDC
Supply Current	Idle	0.01 A
	Continuous	10 A
	Peak	20 A
CONTROLLER SPECIFICATION		
Switching frequency		20 kHz
Motor commutation	Sensorless	Space vector modulation with field orientation control
Motor control	Constant speed regulator	
Analog input, up to 4	A/D range	0-10V
Digital input, up to 4		10-30V
Digital output	Open drain	30V/100mA
Interfaces	RS485	Modbus RTU
	RS232 TTL	Modbus RTU
	I2C bus	QWIIC connector
	Quadrature encoder	Encoder input for low-speed control
MOTOR REQUIREMENTS		
Motor type	PMSM or BLDC	Inrunners and outrunners
Pole pairs		4-14
Speed		Up to 10 000 rpm
Power		Up to 200W (mechanical)
MECHANICAL SPECIFICATIONS		
Dimensions	Body (L x W x H)	83 x 46 x 41 mm (with DIN rail enclosure)
Weight		50g
AMBIENT SPECIFICATIONS		
Protection class		IP00
Temperature	Operating	-20..+60°C, power derating above 40°C
	Storage	-40..+85 °C

Technical data SA-series

MOTOR SPECIFICATIONS		SA100
Torque	At nominal rpm	0.51 Nm (72 oz-in)
	Continuous stall	0.55 Nm (78 oz-in)
	Peak	2.0 Nm (280 oz-in)
Speed	Nominal	3000 rpm
	Peak	6000 rpm
Power	Continuous	160 W (in open air)
	Peak	400 W
Efficiency	Up to	80%
Torque*/Weight		1,04 Nm/kg
ELECTRICAL SPECIFICATIONS		
Supply voltage	Range (Typical)	12 – 60VDC (48VDC)
Supply Current at 48V	Idle	0.05A
	Continuous	4A
	Peak	12.5A
MECHANICAL SPECIFICATIONS		
Dimensions	Body (L x W x H)	66 x 50 x 64 mm
	Shaft	D8 x 20 mm
Mounting		M4x6mm screws in front / 2.1 Nm
Weight		450 g (15.9 oz)
Temperature	Operating	-20..+60°C, power derating above 40°C
CONTROLLER SPECIFICATIONS		
Simplex Motion Encoder Solution	Counts per revolution	4096 (12 bits) as default, 8192 (13bits) and 16384 (14 bits) available
	Resolution	0.09° as default, 0.044° and 0.022° available
Protection		overcurrent, torque, voltage, temperature, locked shaft
Interfaces	USB / RS485 / RS232 TTL / CAN / Step/Dir / Quadrature Encoder / Analog input / Digital I/O	
Digital Inputs, IN1-8	Maximum voltage	-0.5..+6.0V
Analog inputs, IN1-4	Maximum voltage	-0.5..+6.0V
	Input range	0..+3.3V
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control
	Maximum voltage	-0.5..+6.0V

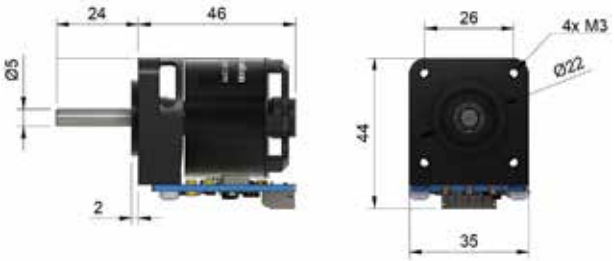


Technical data, SE series

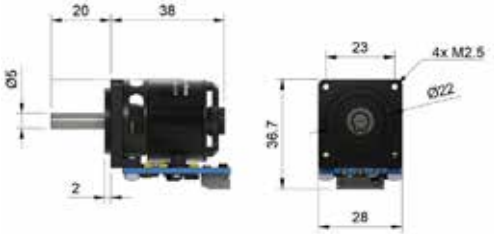
MOTOR SPEC.		SE010A	SE020A	SE040A
Torque	At nominal rpm	60 mNm (8.5 oz-in)	120 mNm (17 oz-in)	280 mNm (30 oz-in)
	Continuous stall	50 mNm (7.1 oz-in)	100 mNm (14 oz-in)	280 mNm (30 oz-in)
	Peak	200 mNm (28 oz-in)	500 mNm (71 oz-in)	800 mNm (113 oz-in)
Speed	Nominal	4000 rpm	4000 rpm	4000 rpm
	Peak	6000 rpm	6000 rpm	6000 rpm
Power	Continuous	25 W (in open air)	50 W (in open air)	120 W (in open air)
	Peak	75 W	150 W	360 W
Efficiency	Up to	70%	75%	80%
Power Density (Torque/Weight)	Nominal	0,75 Nm/kg	0,75 Nm/kg	1,00 Nm/kg
ELECTRICAL SPEC.				
Supply voltage	Range	12-48 V	12-48 V	12-48 V
Supply Current at 24V	Idle	0.03 A	0.03 A	0.03 A
	Continuous	1.5 A	3.0 A	6.3 A
	Peak	4.5 A	9.0 A	19 A
MECHANICAL SPEC.				
Dimensions	Body (L x W x H)	38 x 28 x 36 mm	46 x 35 x 45 mm	54 x 42 x 52.5 mm
	Shaft	D5 x 20 mm	D5 x 24 mm	D5 x 24 mm
Nema size		Nema 11	Nema 14	Nema 17
Mounting		M2.5 screws	M3 screws	M3 screws
Weight		80 g (2.85 oz)	160 g (5.65 oz)	280 g (8.9 oz)
CONTROLLER SPEC.				
Simplex Motion Encoder Solution	Counts per revolution	4096 (12 bits) as default, 8192 (13bits) and 16384 (14 bits) available		
	Resolution	0.09° as default, 0.044° and 0.022° available		
Protection		overcurrent, torque, voltage, temperature, locked shaft		
Interfaces	RS485 / RS232 TTL / CAN / Step/Dir / Quadrature Encoder / Analog input / Digital I/O			
Digital Inputs, IN1-8	Maximum voltage	-0.5..+6.0 V		
Analog inputs, IN1-4	Maximum voltage	-0.5..+6.0 V		
	A/D range	0..+3.3 V		
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control		
	Maximum voltage	-0.5..+6.0V		

Dimensions

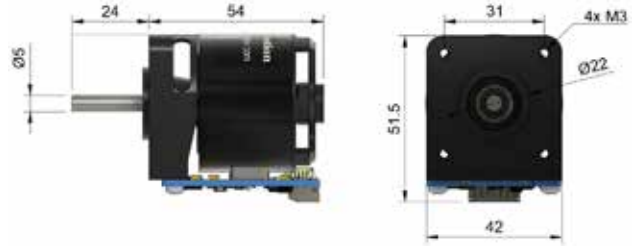
SE020



SE010



SE040

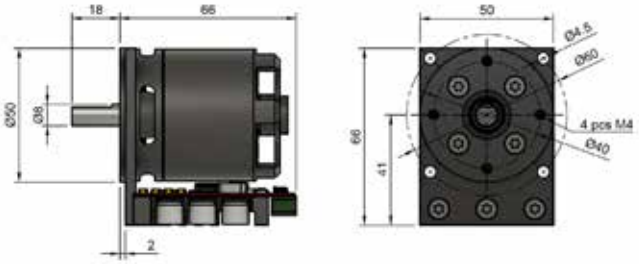


Technical data, SH and SM

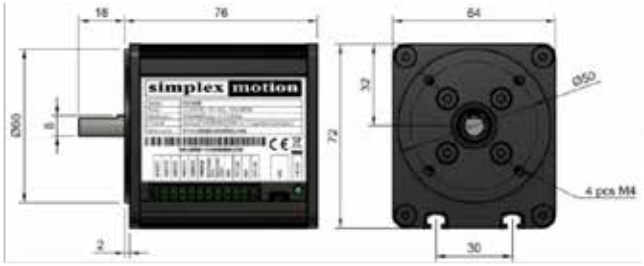
MOTOR SPEC.		SM100	SH100	SH200
Torque	At nominal rpm	0.32 Nm (45 oz-in)	0.51 Nm (72 oz-in)	0.72 Nm (100 oz-in)
	Continuous stall	0.55 Nm (78 oz-in)	0.55 Nm (78 oz-in)	1.10 Nm (150 oz-in)
	Peak	2.00 Nm (280 oz-in)	2.00 Nm (280 oz-in)	4.00 Nm (565 oz-in)
Speed	Nominal	3000 rpm	3000 rpm	4000 rpm
	Peak	6000 rpm	6000 rpm	6000 rpm
Power	Continuous	100 W (in open air)	160 W (in open air)	300 W (in open air)
	Peak	400 W	400 W	900 W
Efficiency	Up to	80%	80%	86%
Power Density (Torque/Weight)	Nominal	0,49 Nm/kg	1,02 Nm/kg	0,64 Nm/kg
ELECTRICAL SPEC.				
Supply voltage	Range	12-48V	12-48V	12-48V
Supply Current at 24V	Idle	0.1 A	0.1 A	0.05 A (at 48V)
	Continuous	8 A	8 A	8 A (at 48V)
	Peak	25 A	25 A	25 A (at 48V)
MECHANICAL SPEC.				
Dimensions	Body (L x W x H)	74 x 64 x 72 mm	71 x 50 x 66 mm	83.5 x 64 x 80mm
	Shaft	D8 x 18 mm	D8 x 16 mm	D10 x 22 mm
Mounting		M4 Screws	M4 Screws	M5 Screws
Weight		0.65 kg (22,9 oz)	0.5 kg (17,6 oz)	1.13 kg (39,9 oz)
CONTROLLER SPEC.				
Simplex Motion Encoder Solution	Counts per revolution	4096 (12 bits) as default, 8192 (13bits) and 16384 (14 bits) available		
	Resolution	0.09° as default, 0.044° and 0.022° available		
Protection		overcurrent, torque, voltage, temperature, locked shaft		
Interfaces	USB / RS485 / RS232 TTL / CAN / Step/Dir / Quadrature encoder / Analog control / I/O			
Digital Inputs, IN1-4	Maximum voltage	-0.5..+30 V		
Digital inputs, IN5-8	Maximum voltage	-0.5..+8.0 V		
Analog inputs, IN1-4	Maximum voltage	-0.5..+30 V		
	A/D range	0..+5 V		
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control		
	Maximum voltage	-0.5..+30 V		

Dimensions

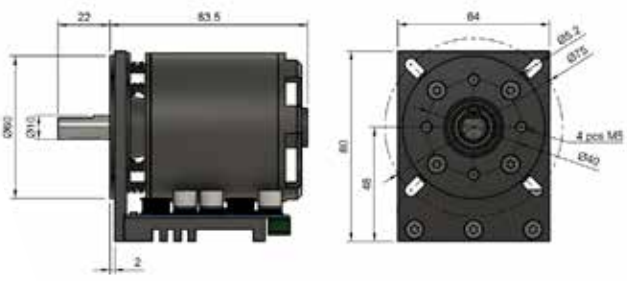
SH100



SM100



SH200



The company

Simplex Motion AB is based in Gothenburg, Sweden.
The company develops servomotors and motion controls with production in Sweden. Our vision is to be the natural choice of motors and solutions for controlled motion through simplicity and superior functionality. We strive to always provide cost efficient, sustainable, and innovative alternatives with high reliability, and, to lead the development of controlled motion and simplify the integration of our motors and solutions.

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