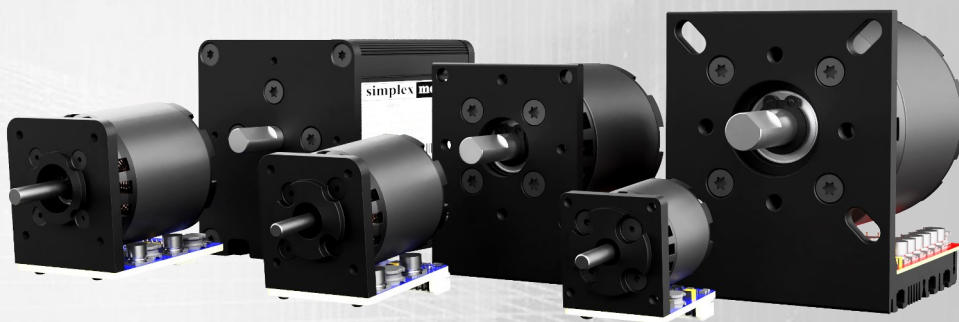


# **simplex motion**

MOTION CONTROL MADE SIMPLE

## **Product Information**

**Integrated  
Servomotors &  
RPM Controlled motors**



**Half Weight – Double Torque**

Compact  
High performance  
Complete system

# Features

## High Torque to Weight ratio

Reduce total weight and maintain high power output

## High Torque to Volume ratio

Make slim designs with high power output

## Unique encoder

A patented encoder technology, integrated on the PCBA, reduces the need for bulky and costly external encoders

## All in one

Motor, encoder and control electronics integrated on the same PCBA.

## Open frame for integration in machines

The SC and SH series are built on a minimal carrier, reducing both weight and size. The slim design makes them ideal for building into machines

## Non-PLC solutions

Save cost and cabling by using the motor as a control system. Let the motor control both the motion and peripheral components



## Built in functions

As a standard, the motors are delivered with many built in functions such as homing, sequence movements, heating, torque limitation and many more

## Customized application

Users can write their own applications and upload to the motor microprocessor for customized behavior

## Speed from 0 rpm

Speed control starts at 0 rpm

## High durability

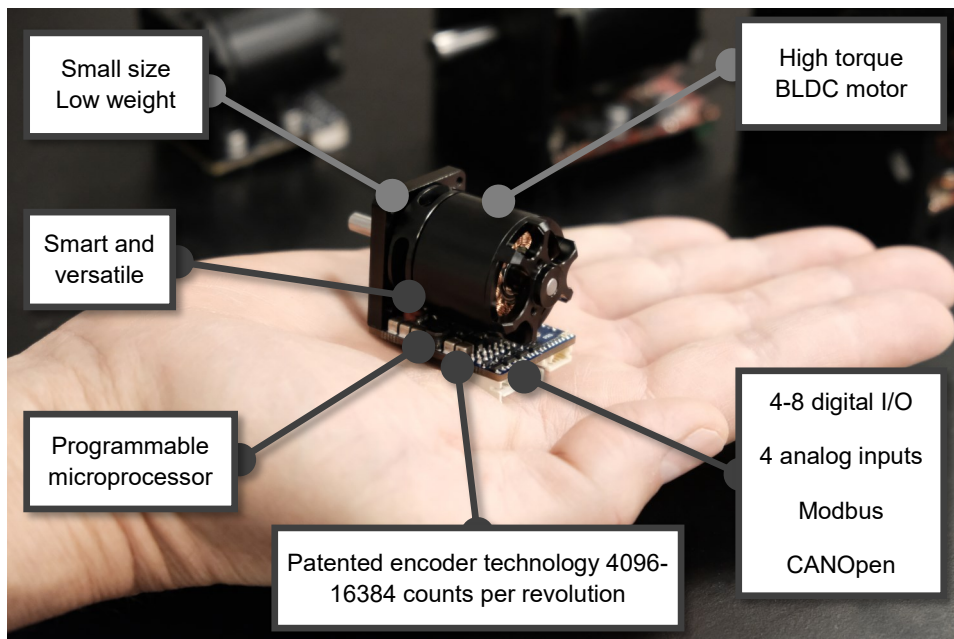
No moving parts except rotor bearings

## High efficiency

Less wasted energy

## Simplex Motion Tool

PC software available for easy startup and configuration



## Use an external Control System

All Simplex Motion motors can be controlled directly using Modbus or CANOpen. Other standard interfaces include Step/Dir and Encoder quadrature input. The digital and analog I/Os can easily be programmed to react on external signals or send status information.

### Modbus

Modbus RTU



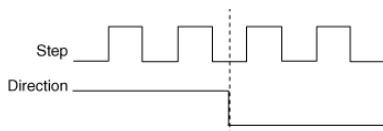
### CANOpen

CANOpen



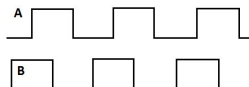
### Step/Dir

Step/direction interface (step motor emulation)



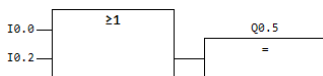
### Encoder

Quadrature encoder signal input



### PLC

Configure the motor I/Os to be controlled by a PLC



### Other

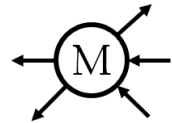
Any other system using digital and analog I/Os can be used for control

## ...or run the motor Stand Alone

The motor can be programmed to run as stand alone, and external control systems can be removed completely! Let the motor take full control by utilizing the built in functions. The I/Os can be used for controlling the motor and other components in the system. An API is also available for even more complex programming

### Analog inputs

Input for speed, torque, position control etc.



### Digital inputs and outputs

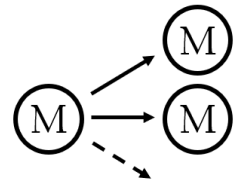
Inputs for start, direction, limit switches, sensors etc.

Outputs for relays, indicators, brakes etc.

### Master / Slave encoder signals

Synchronize motor movement without external system.

Encoder output and input is standard on each motor



### Master / Slave synchronization

Synchronize start/stop, movements, speed etc. using I/O logic

### Built in Event programming

Easy programming of complex functionality

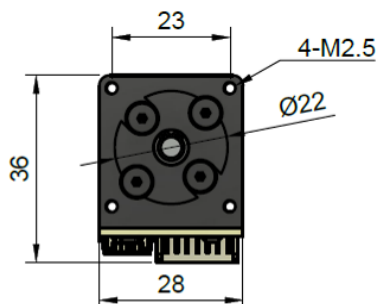
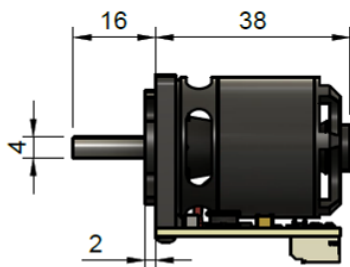


### Application Programming

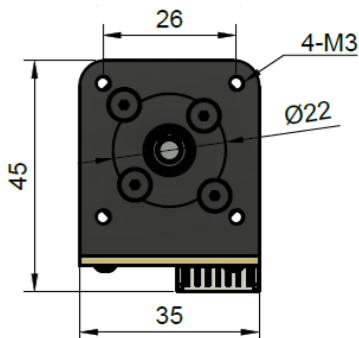
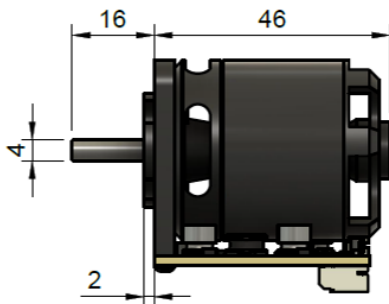
Make advanced programming using simple C code API

## SC-SERIES – COMPACT INTEGRATED SERVOMOTOR

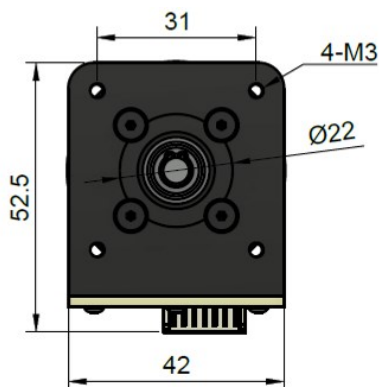
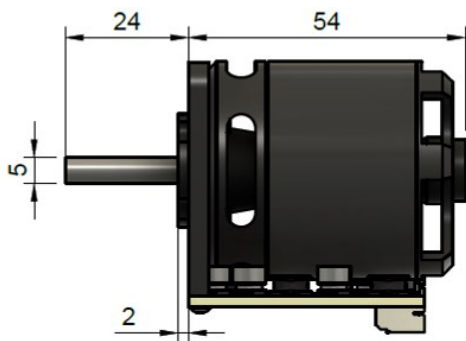
SC010



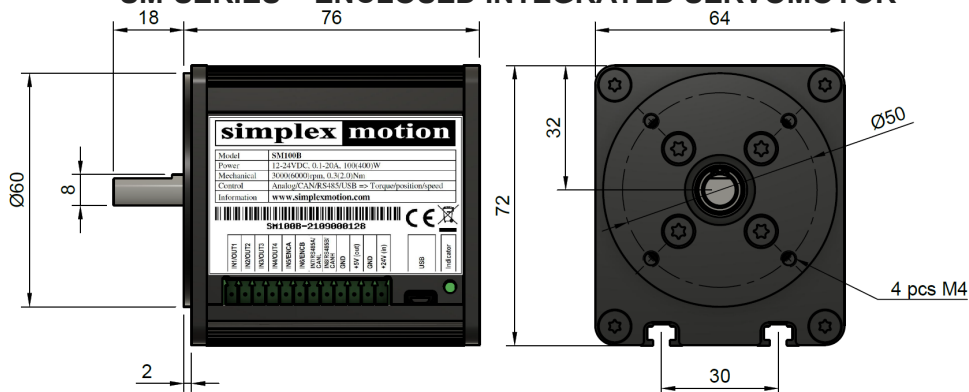
SC020



SC040

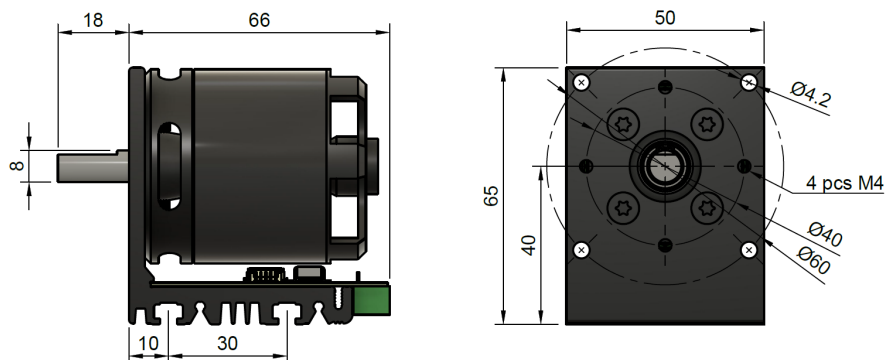


## SM-SERIES – ENCLOSED INTEGRATED SERVOMOTOR

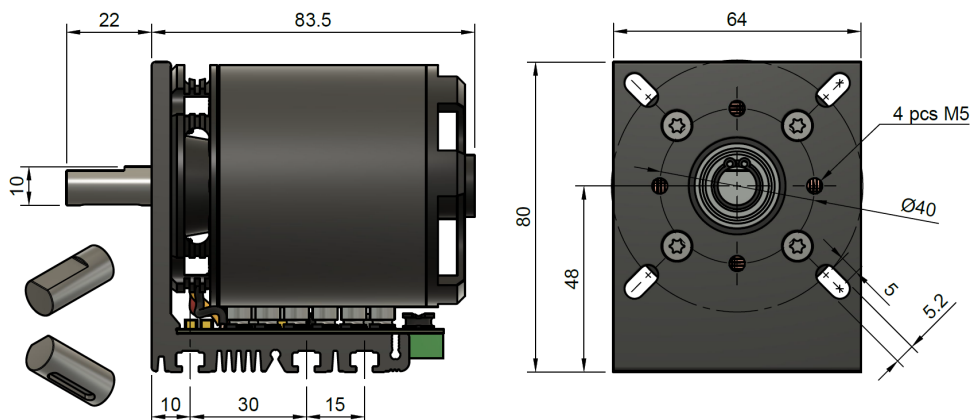


SM100

## SH-SERIES – OPEN FRAME INTEGRATED SERVOMOTORS



SH100



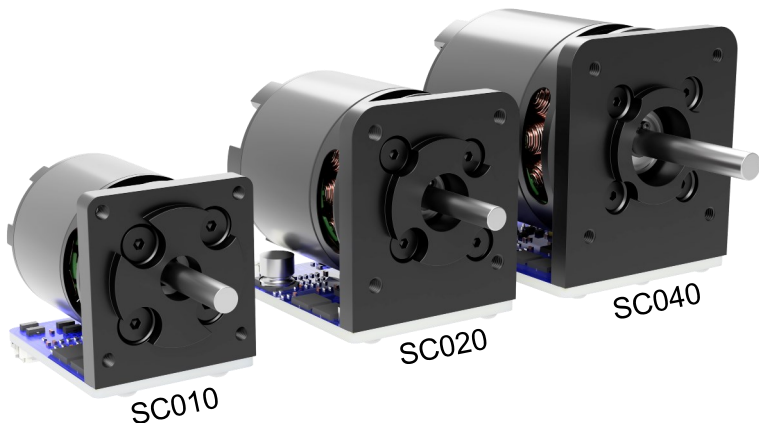
SH200



Download datasheet

## Technical Data

Motor specifications		SC010	SC020	SC040
Torque	Nominal at 4000 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)	400 mNm (56 oz-in)	800 mNm (113 oz-in)
Speed	Nominal	4000 rpm	4000 rpm	4000 rpm
	Peak	6000 rpm	6000 rpm	6000 rpm
Power (in open air)	Continuous	25 W	50 W	120 W
	Peak	75 W	150 W	360 W
Efficiency	Up to	70%	75%	80%
Electrical specifications				
Supply voltage	Min	8 V	8 V	8 V
	Typical	12 V	24 V	24 V
	Max	15 V	28 V	28 V
Supply Current	Idle	0.05 A	0.03 A	0.05 A
	Continuous	3.0 A	2.8 A	4.2 A
	Peak	9.0 A	9.0 A	12.5 A
Mechanical specifications				
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	D4 x 16 mm	D4 x 16 mm	D5 x 24 mm
Mounting		Screws in front	Screws in front	Screws in front
Weight		80 g	160 g	280 g
Controller specifications				
Simplex Motion Encoder Solution	Counts per revolution	4096 / 8192 / 16384		
	Resolution	0.09°		
Protection		overcurrent, torque, voltage, temperature, locked shaft		
Interfaces		RS485 / RS232 TTL / CANOpen / Step/Dir / Quadrature encoder / Analog control / I/O		
Digital Inputs, IN1-4	Maximum voltage	-0.5..+30V		
	Low/high threshold	Configurable 0..+3.3V		
	Pull up/down resistor	10kOhm to +3.3V or GND, or disabled		
Digital inputs, IN5-8	Maximum voltage	-0.5..+6.0V		
	Low/high threshold	Low < 0.7V, high > 2.4V		
	Pull up resistor	none		
Analog inputs, IN1-4	Maximum voltage	-0.5..+30V		
	Input range	0..+3.3V		
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control		
	Maximum voltage	-0.5..+30V		





# Technical Data



Motor specifications		SM100	SH100	SH200
Torque	Nominal at 3000 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 (in open air)	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%
Electrical specifications				
Supply voltage	Min	12 V	12 V	12 V
	Typical	24 V	24 V	48 V
	Max	28 V	28 V	52 V
Supply Current	Idle	0.1 A	0.1 A	0.05 A
	Continuous	8 A	8 A	8 A
	Peak	25 A	25 A	25 A
Mechanical specifications				
Dimensions	Body (L x W x H)	74 x 64 x 72 mm	71 x 50 x 65 mm	83.5 x 64 x 80mm
	Shaft	D8 x 18 mm	D8 x 16 mm	D10 x 22 mm
Mounting		Screws or square nut	Screws or square nut	Screws or square nut
Weight		0.65 kg	0.5 kg	1.13 kg
Controller specifications				
Simplex Motion Encoder Solution	Counts per revolution	4096 / 8192 / 16384		
	Resolution	0.09°		
Protection		overcurrent, torque, voltage, temperature, locked shaft		
Interfaces		USB / RS485 / RS232 TTL / CANOpen / Step/Dir / Quadrature encoder / Analog control / I/O		
Digital Inputs, IN1-4	Maximum voltage	-0.5..+30V		
	Low/high threshold	Configurable 0..+5V		
	Pull up/down resistor	10kOhm to +3.3V or GND, or disabled		
Digital inputs, IN5-8	Maximum voltage	-0.5..+8.0V		
	Low/high threshold	Low < 0.7V, high > 2.4V		
	Pull up resistor	None		
Analog inputs, IN1-4	Maximum voltage	-0.5..+30V		
	Input range	0..+5V		
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control		
	Maximum voltage	-0.5..+30V		

\*nominal at 4000 rpm



# Simplex Motion Speed series

## Stand alone BLDC motor with rpm control

The Simplex Motion Speed series provides a simple way to achieve an rpm regulated motor application.

- **Speed 0 - 6000 rpm**
- **Low speed mode 0 - 400 rpm**
- **Torque regulation**
- **Encoder signal output**
- **Set direction of rotation**
- **Excellent Torque to Size and Torque to Weight ratio**

### Speed

The speed of the motor is controlled using an analog input voltage. The built in control system allows for the speed regulation to start at 0 rpm.

### Low Speed

The low speed mode allows for a more precise control of speeds between 0 – 400 rpm.

### Torque

Maximum torque is adjustable using an analog input voltage.

### Encoder

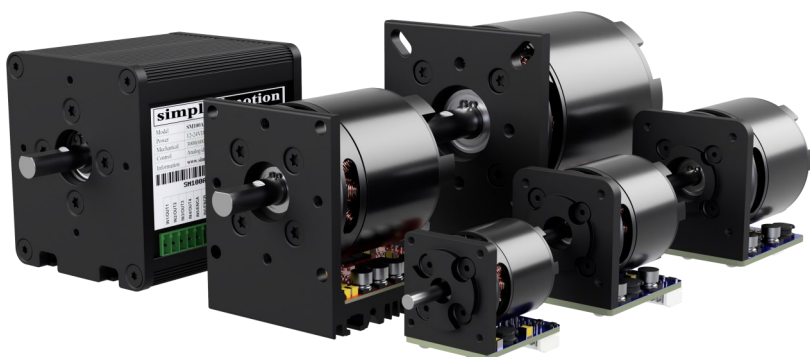
The motor offers a quadrature encoder output signal of 1024 PPR.

### Direction

Set the direction of rotation.

Download  
start up guide





## Alarm

An alarm signal makes it possible to monitor the status of the motor.

## All inclusive

No extra control electronics are required, all the necessary functions are integrated.

## Compact

The compact design of the models keeps both size and weight down in the total design.

Pin	Function
1	Speed regulation 0 - 3,3 or 5V
2	Start/Stop & Torque limitation 0 - 3,3 or 5V
3	Rotation direction
4	Alarm signal
5	Encoder A
6	Encoder B
7	Speed High / Low
8	Program

Specifications	SC010	SC020	SC040	SM100	SH100	SH200
Speed	0-6000 rpm					
Speed nom.	4000 rpm	4000 rpm	4000 rpm	3000 rpm	3000 rpm	4000 rpm
Torque peak	200 mNm	400 mNm	800 mNm	2 Nm	2 Nm	4 Nm
Torque nom.	60 mNm	120 mNm	240 mNm	0,32 Nm	0,51 Nm	0,72 Nm
Power nom.	25 W	50 W	120 W	100 W	160 W	300 W
Voltage	12 V	12 - 24 V	12 - 24 V	12 - 24 V	12 - 24 V	24 - 48 V
Control	0 - 3,3 V	0 - 3,3V	0 - 3,3V	0 – 5V	0 – 5V	0 – 5V

## “Half Weight – Double Torque”

The advantage of the Simplex Motion smart integrated motors is that it offers a very powerful motion control capability at the same time as its **weight and size** is only up to half of other integrated motors on the market.

By utilizing a **patented encoder technology**, Simplex Motion integrated motors are compact, high performance and a complete motor system. Compared with other existing integrated motors on the market, Simplex Motion motors excels in output torque for its size and weight as well as cost efficiency.



The **smart** Simplex Motion servomotors can easily be programmed for performance in all kind of applications. The microprocessor is programmable via a simple event sequence, or for more complex operations there is an open API. The servomotors can work as Stand alone with simple I/O control, or with a master control via Modbus or CANOpen.

### Example of application areas;

- OEM machines
- Actuators
- Automation
- Robotics, grippers and other equipment

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**Edition**

202110