

## Comparison Chart between SC and SE series

Motor specifications		SC010A	SE010A	SC020B	SE020A	SC040B	SE040A
Torque	At nominal rpm	60 mNm (8.5 oz-in)	60 mNm (8.5 oz-in)	120 mNm (17 oz-in)	120 mNm (17 oz-in)	280 mNm (30 oz-in)	280 mNm (30 oz-in)
	Continuous stall	50 mNm (7.1 oz-in)	50 mNm (7.1 oz-in)	100 mNm (14 oz-in)	100 mNm (14 oz-in)	280 mNm (30 oz-in)	280 mNm (30 oz-in)
	Peak	200 mNm (28.0 oz-in)	200mNm	400 mNm (57 oz-in)	500 mNm (71 oz-in)	800 mNm (113 oz-in)	800 mNm (113 oz-in)
Speed	Nominal	4000 rpm	4000 rpm	4000 rpm	4000 rpm	4000 rpm	4000 rpm
	Peak	6000 rpm	6000 rpm	6000 rpm	6000 rpm	6000 rpm	6000 rpm
Power	Continuous	25 W (in open air)	25 W (in open air)	50 W (in open air)	50 W (in open air)	120 W (in open air)	120 W (in open air)
	Peak	75 W	75 W	150 W	150 W	360 W	360 W
Efficiency	Up to	70%	70%	75%	75%	80%	80%
Rotor inertia		3.43 E-6 kgm2	3.43 E-6 kgm2	12.60 E-6 kgm2	12.60 E-6 kgm2	33.00 E-6 kgm2	33.00 E-6 kgm2
Electrical specifications							
Supply voltage	Min	8 V	8 V	8 V	8 V	8 V	8 V
	Typical	12 V	24 V (12-48 V)	24 V	24 V (12-48 V)	24 V	24 V (12-48 V)
	Max	15 V (absolute maximum 20V)	55 V (absolute maximum 60V)	28 V (absolute maximum 30V)	55 V (absolute maximum 60V)	28 V (absolute maximum 30V)	55 V (absolute maximum 60V)
Supply Current at 24V	Idle	0.05 A	0.03A	0.03 A	0.03A	0.05 A	0.03A
	Continuous	3.0 A	1.5A	2.8 A	3.0A	4.2 A	6.3A
	Peak	9.0 A	4.5A	9.0 A	9.0A	12.0 A	19A
Controller specifications							
Integrated incremental encoder resolution	Counts per revolution	4096 / 8192 / 16384					
	Resolution	0.09° / 0.044° / 0.022°					
Switching frequency		32 kHz					
Motor commutation	Method	space vector modulation with field orientation control					
	Rate	16 kHz					
PID controller	Sample rate	2 kHz					
	Control	Torque, Position, Speed					
Ramping control	Speed	speed limit + controlled acceleration/deceleration					
	Position	controlled speed + acceleration/deceleration					
Protection		overcurrent, torque, voltage, temperature, locked shaft					
Status indicator		green + red light, blink pattern provides status					
Interfaces	RS485/RS232-TTL	max 115kbit/s, Modbus RTU protocol					
	CAN	N/A	SMCAN / CANOpen max 1Mbit/s, CiA DS 301	N/A	SMCAN / CANOpen max 1Mbit/s, CiA DS 301	N/A	SMCAN / CANOpen max 1Mbit/s, CiA DS 301
	Step/direction	Step/direction inputs, 3.3/5V logic inputs, max 2.2MHz.					
	Quadrature encoder	3.3/5V logic inputs, max 2.2MHz voltage 0..+3.3V					
Digital Inputs, IN1-4	Maximum voltage	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V
	Low/high threshold	Configurable 0..+3.3V	Configurable 0..+3.3V	Configurable 0..+3.3V	Configurable 0..+3.3V	Configurable 0..+3.3V	Configurable 0..+3.3V
	Pull up/down resistor	10kOhm to +3.3V or GND, or disabled	10kOhm to +3.3V or GND, or disabled	10kOhm to +3.3V or GND, or disabled	10kOhm to +3.3V or GND, or disabled	10kOhm to +3.3V or GND, or disabled	10kOhm to +3.3V or GND, or disabled
	Maximum voltage	-0.5..+6.0V	-0.5..+6.0V	-0.5..+6.0V	-0.5..+6.0V	-0.5..+6.0V	-0.5..+6.0V
Digital inputs, IN5-8	Low/high threshold	Low < 0.7V/high > 2.4V	Low < 0.7V/high > 2.4V	Low < 0.7V/high > 2.4V	Low < 0.7V/high > 2.4V	Low < 0.7V/high > 2.4V	Low < 0.7V/high > 2.4V
	Pull up resistor	None	10kOhm to 3.3V	None	10kOhm to 3.3V	None	10kOhm to 3.3V
	Maximum voltage	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V
Analog inputs, IN1-4	Input range	0..+3.3V	0..+3.3V	0..+3.3V	0..+3.3V	0..+3.3V	0..+3.3V
	Resolution	16bits	16bits	16bits	16bits	16bits	16bits
	Accuracy	10bits	10bits	10bits	10bits	10bits	10bits
	Input impedance	300kOhm with pullup/down disabled	>1MOhm with pullup/down disabled.	300kOhm with pullup/down disabled	>1MOhm with pullup/down disabled.	300kOhm with pullup/down disabled	>1MOhm with pullup/down disabled.
Digital outputs, OUT1-4	Control	Logic, single pulse, PWM, RC servo control	Logic, single pulse, PWM, RC servo control	Logic, single pulse, PWM, RC servo control	Logic, single pulse, PWM, RC servo control	Logic, single pulse, PWM, RC servo control	Logic, single pulse, PWM, RC servo control
	Output circuit	Open collector, transistor.	3.3V TTL 4700Ohm	Open collector, transistor.	3.3V TTL 4700Ohm	Open collector, transistor.	3.3V TTL 4700Ohm
	Maximum voltage	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V	-0.5..+30V	-0.5..+6.0V
	Maximum current	1A	5mA	1A	5mA	1A	5mA
	Pull up/down resistor	10kOhm to +3.3V or GND, or disabled	10kOhm resistance	10kOhm to +3.3V or GND, or disabled	10kOhm resistance	10kOhm to +3.3V or GND, or disabled	10kOhm resistance
Mechanical specifications							
Dimensions	Body (L x W x H)	38 x 28 x 36 mm	38 x 28 x 36 mm	46 x 35 x 45 mm	46 x 35 x 45 mm	54 x 42 x 52.5 mm	54 x 42 x 52.5 mm
	Shaft	D4 x 16 mm	D5 x 20 mm	D4 x 16 mm	D5 x 24 mm	D5 x 24 mm	D5 x 24 mm
Mounting / recommended fastening torque		M2.5 screws in front / 0.6 Nm	M2.5 screws in front / 0.6 Nm	M3 screws in front / 1.7 Nm	M3 screws in front / 1.7 Nm	M3 screws in front / 1.7 Nm	M3 screws in front / 1.7 Nm
	Weight	80 g (2.85 oz)	80 g (2.85 oz)	160 g (5.65 oz)	160 g (5.65 oz)	280 g (8.9 oz)	280 g (8.9 oz)
Shaft loading	Radial load	75N	75N	100N	100N	125N	125N
	Axial load	20N	20N	30N	30N	40N	40N
Ambient specifications							
Protection class		IP00, needs external protection					
Temperature	Operating	0..+40°C	0..+40°C	0..+40°C	0..+40°C	0..+40°C	0..+40°C
	Derating of output power	0.42 W/C	0.42 W/C	0.84 W/C	0.84 W/C	1.34 W/C	1.34 W/C
	Storage	-40..+85 °C	-40..+85 °C	-40..+85 °C	-40..+85 °C	-40..+85 °C	-40..+85 °C

  = Specification has changed from SC-series