



# SC controller series

The SC is an ESC3 family controller with an excellent performance-to-weight ratio. It can be used in wide range of applications, especially in industry and automotive. Using most modern technologies it achieves extreme dynamics and maximum efficiency, it implements smooth start or regenerative braking, all this with minimum dimensions. The SC controller is capable of driving all common types of electric motors.



## Applications:

- Automotive or Industrial motor control
- Electric hand tools and equipment
- Hi-end sport motorbikes, e-bikes, surf boards
- Combustion engine starter-generators
- Military inertial stabilization
- Professional drones, RC models
- Research & development
- Servo drive

## Features

- Motors: PMSM (BLDC, BLAC), Induction, Stepper
- Vector drive with DTC and FOC
- Block commutation Drive with DTC and hybrid sensorless control
- Zero-RPM sensorless control
- MOS-FET power stage with all kinds of protection incl. phase short circuit
- Designed for highest dynamic response
- Charge step-up conversion and SOC estimator with current and voltage logging
- Capacitors pre-charge option

## Firmware

- State-of-the-art sensorless control (including zero-RPM)
- Speed / Torque / Voltage control
- Proportional regenerative braking
- Flux weakening operation together with MTPA control for PMSM
- Advanced auto-diagnostics and fail-safe modes
- Motor parameters automatic identification
- Service logging (max. amps and rpm, total motor-hours, mileage, etc.)
- Deep customization with custom firmware branches

## Motor sensors

- Motor temperature sensor
- UVW Hall sensors
- Resolver / Sin-Cos
- SSI / BiSS
- A/B encoder

## Electrical parameters

| Version                       | 0440               | 0640               | 0840               | 1040               | 1220               |
|-------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Batt. Nominal voltage         | 28.8 V DC          | 43.2 V DC          | 57.6 V DC          | 72 V DC            | 84.6 V DC          |
| Battery configuration         | 8 S                | 12 S               | 16 S               | 20 S               | 24 S               |
| Min. operating voltage        | 18 V DC            | 18 V DC            | 18 V DC            | 18 V DC            | 18 V DC            |
| Max. operating voltage        | 34V DC             | 51 V DC            | 68 V DC            | 84 V DC            | 101 V DC           |
| Nominal power (60min, BLDC)   | 6 900 W            | 9 500 W            | 10 900 W           | 12 600 W           | 11 200 W           |
| Nominal current (60min, BLDC) | 240 A              | 220 A              | 190 A              | 175 A              | 130 A              |
| Power dissipation             | 120 W <sup>1</sup> | 120 W <sup>1</sup> | 120 W <sup>1</sup> | 120 W <sup>1</sup> | 120 W <sup>1</sup> |
| Peak power (10sec)            | 11 500 W           | 15 100 W           | 17 300 W           | 18 000 W           | 17 300 W           |
| Peak current (10sec)          | 400 A              | 350 A              | 300 A              | 250 A              | 200 A              |

<sup>1</sup> Controller bottom pad thermally connected to infinite heatsink which does not exceed 60°C

\* Variants 0440 and 1220 are available only on request

## Control I/O

- 5x analog or digital GPIO (galvanically isolated)
- On / Off input switch, safety switch, capacitor pre-charge
- Contactor output with PWM and current control
- Charge input up to 25 A with current measurement

## Wiring

- Power: solder pads, 15 cm AWG10 wires, Amass connectors or cable lugs
- Signal & communication: JST JWPF

## Connectivity

- Multiple addressed interfaces for service, debugging, application and firmware management
- USB, RS-232 (galvanically isolated), CAN-bus (galvanically isolated), external WIFI dongle

## Software tools

- Service tools: CLI for fast and effective set-up, GUI for easy set-up, Graphing and visualization tool
- Firmware update and remote management tool
- Custom software for PC or mobile devices can be designed on request

## Mechanical characteristics

- Box with aluminium bottom pad: 142 x 40 x 38 mm, 550 g

