

Electronic Speed Controllers for Radio Controlled Models.

The Dawnmist Studio ESC range comprises reversing and non-reversing models ranging in output current from 20 to 50 Amps, and all are rated to operate at input voltages of up to 30 volts maximum (except for the low-voltage ESC-20-LV, which is rated up to 14V). A single control input plugs directly into a standard R/C receiver and provides control of the motor at the output. A range of failsafe and diagnostic features are built in. Dawnmist ESCs employ advanced technology developed for high-speed computing applications to regulate the motor's speed with maximum efficiency and minimum heat dissipation (wasted energy). Generous safety margins in the design allow the ESCs to be operated at up to *twice* their rated power for short surges (up to 5 seconds). The microprocessor in the speed controller constantly performs self-test functions and will shut the motor down safely if it develops a fault.

Dawnmist ESCs set a new standard in efficiency, reliability and safety, and are the result of a long and involved (and ongoing) research program aimed at developing the very best in model avionics.

Wiring Up

Wiring the ESC into your R/C system is simple: just plug the black-and-white lead into the receiver's throttle channel, connect the battery and motor to the cables as labelled on the unit. The Rx plug is non-polarized so it will fit any make of R/C, and needs to be connected in the correct polarity — black is the R/C negative (which corresponds to the black wire on the other servos) while white is the data line.

When connecting the battery and motor, be sure that your connections are good enough to stand the large currents involved. The cables of the ESC can be cut down to length if required. It is preferable to keep the power cables as short as possible in order to minimize energy loss and possible radio interference from the motor. A fast-acting fuse connected between the battery and the input of the ESC is advisable — because of the very high conduction efficiency of the switching circuit in the ESC, enormous (and possibly dangerous) currents of up to kilo-amp magnitude could flow if the motor were short-circuited.

The ESC may be mounted using double-sided tape. On the ESC-50, please be aware that the protruding brass heatsink is *not* isolated from the circuit and should therefore not be allowed to touch any bare wires or system earth.

The ESC does not draw any power at all from the Rx, and is entirely powered from the battery. If a battery eliminator (BEC) is required to power the Rx and servos from the main battery, we recommend the Dawnmist Studio HyperBEC range, which are designed to complement the ESC range.

The ESC range includes basic suppression for motor-generated electrical noise, though supplementary suppression might be advisable for some applications. This is normally effected by a capacitor across the motor. Motor manufacturers often give specific advice about suppression of their products; the diagnostic LED on the ESC may be used to verify that the motor does not interfere with the R/C (see below).

Operation

Basic operation is simple: for the non-reversing ESC models, the zero point is with the stick fully back, while with the reversing RevESC units, the zero is in the centre of the stick's travel. Pulling

back reverses the motor, forward gives forward motion. The reverse 'gear' is limited to 50% of full power (except if the 'EQ-R' option has been ordered). The PPM timing corresponding to particular stick positions is set within the industry-standard calibration points so that the ESC will operate correctly with any standard R/C.

The ESCs have a number of safety features. First of these is an automatic failsafe which cuts the power to the motor if the signal from the Rx is lost or corrupted. When this happens, the diagnostic LED lights up solidly (no flashing). When signal is restored, the unit immediately begins to obey the commanded setting again and the LED is extinguished.

Secondly, a false-start interlock exists to avoid accidents in case the system is switched on with the throttle stick not at zero. In this case, the LED flashes rapidly and the motor does not move. The interlock is released as soon as a valid signal is received with the stick at the zero point. This interlock only applies when battery power is first switched on.

During operation, the LED remains off when the motor is stopped, and indicates 'motor on' by giving a very short 'heartbeat' flash a couple of times per second. These very short flashes should not be confused with the signal loss indication described above; the facility is provided to give an at-a-glance indication of whether any power is applied to the motor, as a safety feature.

Technical Specifications

Product Title:	Dawnmist ESC and RevESC family
Size/Rating (ESC20):	20A cont, 40A surge, non-reversing, 40×28×9 mm, 9 gram (ex. cables)
Size/Rating (ESC30):	30A cont, 60A surge, non-reversing, 40×28×9 mm, 9 gram (ex. cables)
Size/Rating (ESC50):	50A cont, 100A surge, non-reversing, 78×28×9 mm, 17 gram (ex. cables)
Size/Rating (RevESC20):	20A cont, 40A surge, reversing, 78×28×19 mm, 36 gram (ex. cables)
Size/Rating (RevESC20LV):	20A cont, 40A surge, reversing, 78×28×19 mm, 36 gram (ex. cables)
Size/Rating (RevESC30):	30A cont, 60A surge, reversing, 78×28×19 mm, 36 gram (ex. cables)
Supply Voltage (ESC):	7.2V min, 30V max.
Supply Voltage (RevESC):	8.4V min, 30V max.
Supply Voltage (RevESC20LV):	4.8V min, 14V max.
Input:	1 channel from Rx
LED:	Daylight-visible Red, multi-function
Failsafe:	Automatic, built in
Processor:	20MHz RISC
Approvals:	Meets relevant CE specifications

Warranty and Support

The ESC range comes with a limited warranty against defects in parts and workmanship for a period of one year after purchase. This does not cover damage caused by overload, misuse, impact or unauthorised modification, and is limited to the repair or replacement of the defective unit. Consequential losses of any sort are not covered, and it is stressed that it is the purchaser's responsibility to ensure that this product is used safely and properly. This does not affect your statutory rights.

Dawnmist products are engineered to a high standard, and we want you to get the best out of them. If you have any difficulties, please email tech@dawnmist.org.

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