



Product	ESC Velocity
Currawong part number	CE1101
Bulletin issue date	26 November 2018
Serial numbers range	n/a

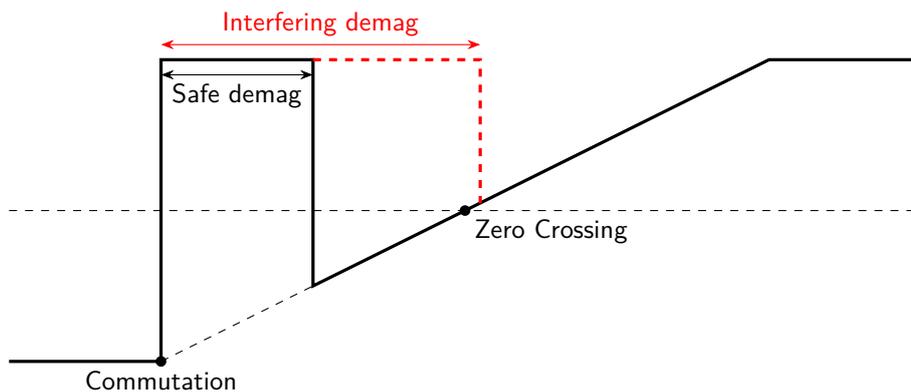
From December 2018 onwards, ESCs ordered under the -03 variant will ship with motor control firmware 3.19 (or later). Auxiliary processor firmware 1.30 (or later) will be required to support the new motor control features.

Customers that require the legacy 2.93 motor control firmware must now order the ESC using the CE1101-07 product code. This may incur a configuration management fee.

## Update Description

The ESC uses the back EMF of the unenergised motor phase to estimate rotor position. When the motor commutates to the next active phase, the energy in the now inactive phase must be dissipated. This 'demagnetisation' current creates a large noise pulse in the measured back EMF.

If the width of the demag pulse becomes large enough, it may overlap with the zero crossing point and cause a 'desynchronisation' event where the ESC is unable to commutate to the next phase correctly.



This behaviour will only occur for some combinations of motor, propeller and operating power point. In many existing applications it may be avoided by increasing the timing advance parameter, which will result in commutation occurring further ahead of the zero crossing and hence providing more time for the demagnetisation current to dissipate.

Motor control firmware 3.19 and above introduces a new feature that measures the demagnetisation time each commutation. If the demag time approaches the threshold at which desync might occur, the ESC automatically winds back the duty cycle. At this point no additional power will be delivered to the motor even if the commanded duty cycle increases, however the chance of a desync will be greatly reduced.

The 'foldback' bit in the status telemetry will be set while operating at or above this threshold. Note that while this bit is in the error status field (in order to maintain backwards compatibility with the existing ICD), this behaviour is not necessarily an error and should be handled appropriately by the flight controller.

Due to a re-architecture of the motor control routine to accommodate this new feature, the starting behaviour of the ESC has changed. The duty cycle ramp during starting is now only updated on each successful commutation. Larger motors may exhibit more aggressive starting due to the greater change in current per commutation.