



# Core Drive Electronics (CODE)

The Core Drive Electronics (CODE) has been reduced to the essential functions, yielding a light weight, compact stepper motor driver for high reliability applications

## Overview

---

The COre Drive Electronics (CODE) is a generic low-cost two-axes stepper motor controller capable of operating various types of mechanisms such as antenna pointing mechanisms, solar arrays or thruster pointing mechanisms. It has been optimized for small volume and low mass.

The CODE is manufactured in a modular way. One CODE module can independently control two bipolar stepper motors. Two modules can be stacked vertically to form a redundant unit or to increase the number of drive channels. The modules are mechanically separated and operated in cold redundancy.

Each CODE contains an isolated DC/DC converter with EMC filters providing a protected, hardware-adjustable motor drive voltage. The CODE represents a compact, light weight motor controller yielding high operational reliability. Each of the two stepper motor interfaces has its own dedicated connector, housing the motor power signals and 7 additional mechanism signals.

These signals are directly routed to the common control connector and can be used for sensors (switches, thermistors) or heaters (up to 115V). The motor control is performed by receiving 3 discrete signals ENABLE/DIRECTION/STEP per motor on the common control connector. Having dedicated motor connectors and a common control connector allows an easy integration with minimum cabling effort.

## Features

---

- 2 dedicated actuator interfaces per module
- 1 common control interface per module
- Compatible with externally LCL-protected power bus
- Wave-/full-/half-step operation modes
- Auto-Start function or On/Off High-Power-Command

## Interfaces

---

- Primary power bus: 22 V to 38 V
- On/Off: High power command (optional)
- Discrete TM: Digital health status, unit temperature
- 2 x 3 discrete motor control (Enable/Direction/Step): Differential, RS-422 type
- 14 sensor feed-through signals including 4 high-voltage heater feed-through

## Performance

---

- Start-up time: <500 ms
- Motor drive voltage: 18 to 26 V (adjustable)
- Motor current: max. 0.5 A
- Stepping rate: max. 1000 steps/s
- Standby power consumption: < 3 W (typ)
- Motor driver efficiency: >75%
- Failure rate: 227 FIT (Class 1 parts)

## Protection

---

- Secondary supply short-circuit protection
- Over-current protection of motor driver
- WAVE mode protection (to avoid overheating the motor in failure case)

## Physical / environment

---

- Size: 190 x 125 x 58 mm<sup>3</sup>
- Weight: < 1.1 kg
- Operating temperature: -30°C to +65°C (qual)
- Non-operating temperature: -40°C to +75°C (qual)
- Minimum switch-on temperature: -30°C
- Radiation: up to 50 kRad (Si), unit provides 2mm eq. aluminum shielding
- Passive cooling of the entire unit

## New Variant under Development

---

- Software defined CODE
- Serial commanding I/F for autonomous operations
- On-board sensor acquisitions and TM reporting
- Micro-stepping

**Product availability: Please contact our Sales team.**

Beyond Gravity  
electronics@beyondgravity.com