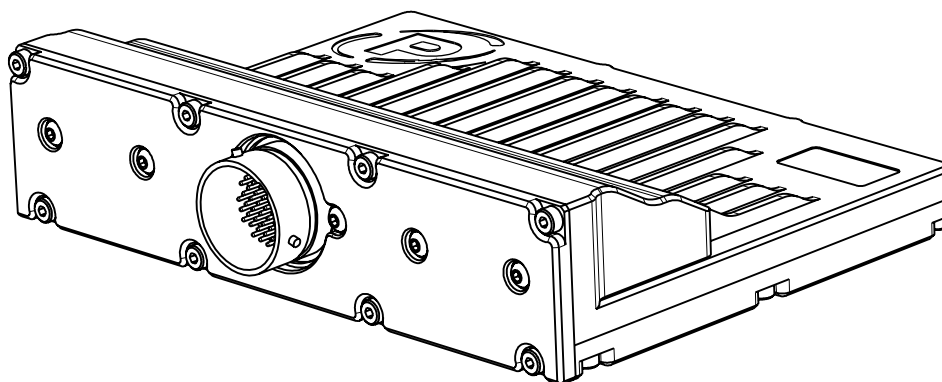




Gearbox control unit



Introduction

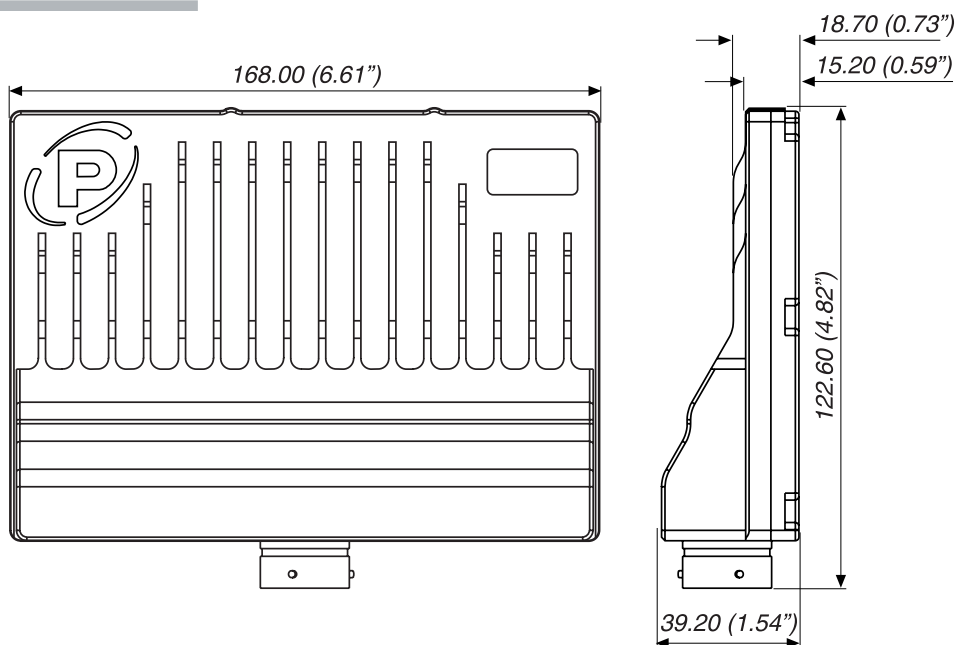
The Gearbox control unit (GCU) sets the benchmark for high-performance gearbox control systems. Its Freescale MPC565 microprocessor and dedicated timer co-processor bring class leading performance in a cost-effective package.

Description of inputs and outputs

| Inputs and outputs | Description |
|--------------------|--|
| PWMs 7 to 10 | Configurable as alternative analog inputs |
| PWMs 1 to 6 | These are low-side driver outputs. Each output has a 10k Ohm pull-up resistor and a current re-circulation diode to the battery voltage. |
| H-bridge | The two outputs can be used either as a full-bridge or as two half-bridges, driven separately. The maximum peak current into or out of the H-bridge is 10 Amps. |
| Digital inputs | These are digital inputs to be used with switches or sensors. The input threshold levels are configurable and each input has a software-selectable 3k Ohm pull-up resistor to 5 volts. Alternatively these outputs can be used as 10-bit analog inputs. |
| Analog inputs | These are 12-bit analog inputs. Each input has two software-selectable pull-up resistors to 5 volts. Analogue inputs 1 to 8 have 3k Ohms and a 33k Ohms selectable pull-up resistors. Analog inputs 9 to 10 have 3k Ohms and 33k Ohm selectable pull-up resistors. |

All of these features are enabled by software—there are NO hardware build options. Designed to be robust, the GCU has reverse-battery, over-voltage and load dump protection built in as standard. Sensor supply and signal ground pins are also protected against shorts to battery positive and negative.

Dimensions



Dimensions in millimetres (and inches)

Specifications

| Description | Value |
|---------------------|---|
| Processor | Freescall MPC565 @ 56MHz, 4MB flash memory & 4MB non-volatile RAM |
| Supply Voltage | >8V to 18V reverse battery, over-voltage and load dump protection |
| Digital Outputs | 6 PWM dedicated |
| Logging throughput | 1000 samples/second |
| Digital Inputs | 10 dedicated |
| Sensor | 1 Hall Effect/Inductive |
| Analog Inputs | 10 dedicated (12 bit) |
| Internal Sensors | ECU Internal Temperature x 4 Battery Voltage |
| Auxiliary Outputs | 1 Full Bridge (12A) |
| Communication | 1 RS232 2 CAN 2.0B 1 Ethernet (10MBit) |
| Operating Case Temp | -20°C to +60°C |
| Weight | 500g |

Ordering information

| Product | Part number |
|----------------------|-------------|
| Gearbox Control Unit | 01E-500881 |

This is a special order long lead time product.



Connector Details

| GCU connector | Mating connector |
|---------------|------------------|
| AS2-16-35PA | AS6-16-35SA |

Pin information

| Pin | Name | Comment |
|-----|-------------|--------------------------------|
| 51 | AIN1 | 12-bit Analog inputs |
| 45 | AIN2 | |
| 37 | AIN3 | |
| 30 | AIN4 | |
| 52 | AIN5 | |
| 39 | AIN6 | |
| 31 | AIN7 | |
| 38 | AIN8 | |
| 46 | AIN9 | |
| 41 | AIN10 | |
| 1 | ENG GND | Battery Negatives |
| 6 | ENG GND | |
| 12 | ENG GND | |
| 19 | ENG GND | |
| 8 | VBAT | Battery Positives |
| 14 | VBAT | |
| 36 | CAN1 LOW | CAN Communication Port |
| 11 | CAN1 HIGH | |
| 44 | CAN2 LOW | |
| 18 | CAN2 HIGH | |
| 13 | CRANK1 | Crank input |
| 23 | ETHER TXPOS | Ethernet PC Communication Port |
| 22 | ETHER TXNEG | |
| 9 | ETHER RXPOS | |
| 15 | ETHER RXNEG | |

| Pin | Name | Comment |
|-----|---------------|-----------------------------|
| 21 | DIN1 | Digital Inputs |
| 29 | DIN2 | |
| 20 | DIN3 | |
| 33 | DIN4 | |
| 26 | DIN5 | |
| 28 | DIN6 | |
| 27 | DIN7 | |
| 7 | DIN8 | |
| 42 | DIN9 | |
| 34 | DIN10 | |
| 55 | ANG GND | Protected Sensor Grounds |
| 54 | CRANK/CAM GND | |
| 24 | DIG GND | |
| 16 | COMMS GND | |
| 50 | OUT 5V0 / 12V | Programmable Sensor Grounds |
| 49 | OUT 12V / 5V | |
| 47 | HB3A | DC Motor Drivers |
| 17 | HB3B | |
| 5 | INJ10 | Injector Outputs |
| 2 | INJ11 | |
| 3 | INJ12 | |
| 4 | INJ9 | |
| 53 | PWM1 | PWM Outputs |
| 48 | PWM2 | |
| 40 | PWM3 | |
| 10 | PWM4 | |
| 32 | PWM5 | |
| 25 | PWM6 | |
| 35 | RS232TX | RS232 Port |
| 43 | RS232RX | |

Recycling and Environmental Protection

Cosworth Electronics is committed to conducting its business in an environmentally responsible manner and to strive for high environmental standards.



Manufacture

Cosworth products comply with the appropriate requirements of the Restriction of Hazardous Substances (RoHS) directive (where applicable).

Disposal

Electronic equipment should be disposed of in accordance with regulations in force and in particular in accordance with the Waste in Electrical and Electronic Equipment directive. (WEEE)

Battery

This equipment contains a battery. (Lithium Thionylchloride)

The equipment may be returned to Cosworth Electronics for a replacement battery. (A charge may be made for this service)

Removal of the battery by the user may void any warranty on the equipment.

To remove the battery for recycling:

- Remove the case cover(s).
- Remove the printed circuit boards from the case.
- Remove the battery from the printed circuit board.

Dispose of the battery in accordance with regulations in force.

Declaration of Conformity

We, the undersigned,

Pi Research
Brookfield Motorsports Centre,
Cottenham,
Cambridgeshire, CB4 8PS
United Kingdom

Certify and declare under our sole responsibility that the following equipment:

GCU – part number 01E-500881

A Gearbox Controller for use only in motorsport applications

Conforms to the following EC directives including applicable amendments:

EMC Directive 89/336/EEC, 72/245/EEC (last amended 2004/104/EC)

The following standards have been applied:

2004/104/EC

Cottenham, 21 June 2007

George Lendrum - Director of Motorsport