



Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC050-155 and MC050-15B



### Mobile machine management

MC050-155 and MC050-15B controllers are elements of the flexible, powerful, expandable, and affordable PLUS+1 family of mobile machine management products. These devices are general-purpose controllers that are equally suited for use as members of a distributed machine control system, with intelligence in every node, or as stand-alone controllers.

### Product highlights

Both controllers employ a 32 bit Cortex-M3 Processor, providing the controllers with extremely fast single cycle processing speed and 512K internal flash. Both controllers feature three CAN ports, one 1.66 and one 3.3 or 5 volt regulated sensor supply. The MC050-15B has an application key that enables the use of Danfoss developed GUIDE machine control solutions. The same GUIDE HWD file is used with both controllers.

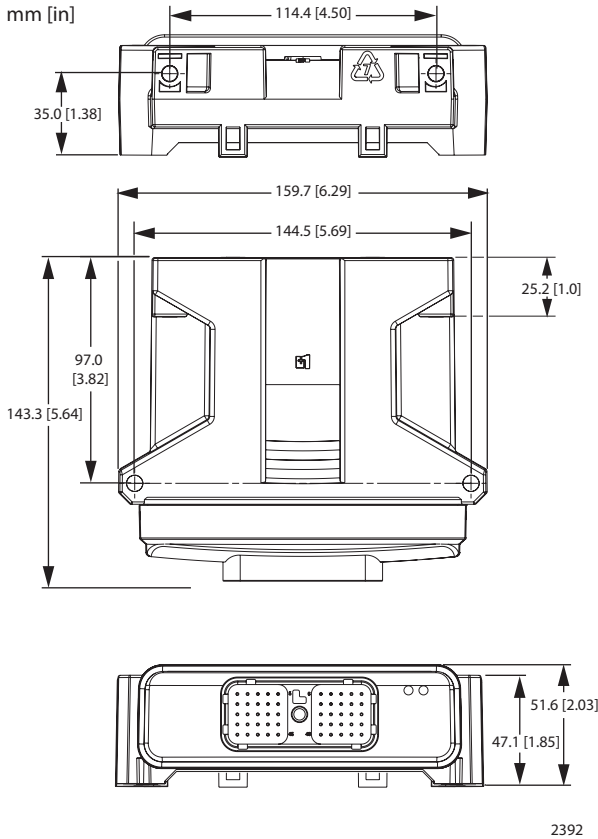
### Application development

Users develop MC050-155 and MC050-15B applications using PLUS+1 GUIDE. This Microsoft<sup>®</sup> Windows<sup>®</sup> based development environment features a user-friendly, field proven, icon-based graphical programming tool, application downloader, and service/diagnostic tool.

### Features

- User-programmable with PLUS+1 GUIDE (Graphical User Integrated Development Environment)
- 50 pins: 1 DEUTSCH DRC connector
- ARM 32 bit Cortex-M3 running at 120 MHz
- FRAM non-volatile memory
- 12 bit analog-to-digital converter
- 36 inputs
  - 4 universal (DIN/AIN/FreqIN) that are user-defined as either:
    - Analog:* with configurable ranges 0 to 5.25 Vdc (with over range protection) or 0 to 36 Vdc
    - Digital:* pull up (5 Vdc), pull down (0 Vdc) or pull to center (2.5 Vdc)
    - Frequency (timing):* 1 Hz to 10 kHz
  - 29 digital/analog (DIN/AIN) that are user-defined as either:
    - Digital:* pull up (5 Vdc), pull down (0 Vdc) or pull to center (2.5 Vdc)
    - Analog:* 0 to 5.25 Vdc or 0 to 36 Vdc
  - 3 fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin
- 3 outputs
  - 2 universal (PWMOUT/DOU/PVGOUT) that are user-defined as either:
    - Digital:* (3 A), configurable as source or sink
    - PWM:* (30 to 4000 Hz), configurable as open or closed loop with current control
    - Analog voltage:* open loop PWM at 4000 Hz
  - Any PWMOUT/DOU/PVGOUT can be used to provide reference power to one PVG valve
  - 1 digital/PVG Pwr (DOU/PVG Pwr) sourcing only
    - One DOU/PVG Pwr will power up to 3 PVG's
- 9 to 36 Vdc power supply, monitored internally
- 3 CAN 2.0 B ports, the fixed range analog inputs can be used as the shield pin
- Power supply for external sensors, monitored and regulated internally
  - 1.6 Vdc rated at 500 mA
  - 3.3 Vdc rated at 450 mA
  - 5.0 Vdc rated at 450 mA
- 2 LEDs under user control
- 3 mounting alternatives: stack, end, or side
- MC050-15B contains the application key required to run Danfoss developed machine control application software
- CE compliant

**MC050-155 and MC050-15B dimensions and pin assignments**



**Caution**

PCB damage may occur. All device power supply + pins must be connected to battery +.

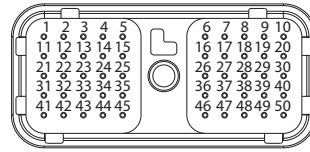
**Caution**

This device is not field serviceable. Opening the device housing will void the warranty.

**Specifications**

|  |                                |
|--|--------------------------------|
| Supply voltage                             | 9 to 36 Vdc                    |
| Operating temperature (ambient)            | -40°C to 70°C [-40°F to 158°F] |
| Storage temperature                        | -40°C to 85°C [-40°F to 185°F] |
| Programming temperature                    | -40°C to 70°C [-40°F to 158°F] |
| IP rating (with mating connector attached) | IP 67                          |
| EMI/RFI rating                             | 100 V/m                        |
| Weight                                     | 0.40 kg [0.88 lb]              |
| Maximum current, sourcing                  | 8 A                            |
| Maximum current, sinking                   | 6 A                            |

MC050-155 and MC050-15B 50 pin connector



Connector

2198B

| Pin    | Controller function      | Pin    | Controller function |
|--------|--------------------------|--------|---------------------|
| C1-P1  | Power ground -           | C1-P26 | DIN/AIN             |
| C1-P2  | Power supply +           | C1-P27 | DIN/AIN             |
| C1-P3  | CAN0+                    | C1-P28 | DIN/AIN             |
| C1-P4  | CAN0-                    | C1-P29 | DIN/AIN             |
| C1-P5  | AIN/CAN0 shield          | C1-P30 | DOU/PVG Pwr         |
| C1-P6  | CAN1+                    | C1-P31 | DIN/AIN             |
| C1-P7  | CAN1-                    | C1-P32 | DIN/AIN             |
| C1-P8  | 3.3/5 Vdc sensor power + | C1-P33 | DIN/AIN             |
| C1-P9  | Sensor power ground -    | C1-P34 | DIN/AIN             |
| C1-P10 | 1.66 Vdc sensor power +  | C1-P35 | DIN/AIN             |
| C1-P11 | CAN2+                    | C1-P36 | DIN/AIN             |
| C1-P12 | CAN2-                    | C1-P37 | DIN/AIN             |
| C1-P13 | AIN/CAN1 shield          | C1-P38 | DIN/AIN             |
| C1-P14 | AIN/CAN2 shield          | C1-P39 | DIN/AIN             |
| C1-P15 | DIN/AIN                  | C1-P40 | PWMOUT/DOU/PVGOUT   |
| C1-P16 | DIN/AIN                  | C1-P41 | DIN/AIN             |
| C1-P17 | DIN/AIN                  | C1-P42 | DIN/AIN             |
| C1-P18 | DIN/AIN                  | C1-P43 | DIN/AIN             |
| C1-P19 | DIN/AIN                  | C1-P44 | DIN/AIN             |
| C1-P20 | DIN/AIN                  | C1-P45 | DIN/AIN             |
| C1-P21 | DIN/AIN                  | C1-P46 | DIN/AIN/FreqIN      |
| C1-P22 | DIN/AIN                  | C1-P47 | DIN/AIN/FreqIN      |
| C1-P23 | DIN/AIN                  | C1-P48 | DIN/AIN/FreqIN      |
| C1-P24 | DIN/AIN                  | C1-P49 | DIN/AIN/FreqIN      |
| C1-P25 | DIN/AIN                  | C1-P50 | PWMOUT/DOU/PVGOUT   |

Use care when wiring mating connector. Above pinouts are for device pins.

**Ordering information**

|           |          |
|-----------|----------|
| MC050-155 | 11130958 |
| MC050-15B | 11130959 |

| Related product                       | Danfoss material number |                         |
|---------------------------------------|-------------------------|-------------------------|
| CG150 CAN/USB Gateway                 | 10104136                |                         |
| DEUTSCH mating connector bag assembly | 10102024 (16 to 20 AWG) | 10100946 (20 to 24 AWG) |
| PLUS+1 GUIDE single user license      | 10101079                |                         |

Danfoss product literature on line at: [www.danfoss.com](http://www.danfoss.com)

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