

Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC012-110 and MC012-112



### Mobile Machine Management

These general purpose modular housings, connectors, and control circuitry are designed as flexible, expandable, powerful, cost effective stand alone modules for smaller machined systems or as total machine management systems with intelligence in every node. These modules communicate with one another and other intelligent systems over a machine Controller Area Network (CAN) data bus.



### 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. The MC012-112 controller has an application key that enables the use of Danfoss developed GUIDE machine control solutions. The same GUIDE HWD file is used with all four controllers.

### Application Development

PLUS+1<sup>®</sup> hardware modules have input or output pins that support multiple functions. Pins that support multiple input or output types are user-configurable using PLUS+1<sup>®</sup> GUIDE software. 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<sup>®</sup> GUIDE (Graphical User Integrated Development Environment)
- ARM 32 bit Cortex-M3 running at 120 MHz
  - 12 bit analog-to-digital converter
  - 16 bit timers/counters
- FRAM non-volatile memory
- 12 pin DEUTSCH DTM connector
- 9 to 36 Vdc power supply, monitored internally
- 1 CAN 2.0B port, the fixed range analog input can be configured as the shield pin
- Power supply for external sensors rated at 5 Vdc to 100 mA and regulated internally
- 2 LEDs under user control
- 3 mounting alternatives: stack, end , or side
- The MC012-112 controller contains the application key required to run Danfoss developed machine control application software
- CE compliant

Comprehensive technical literature online  
at [powersolutions.danfoss.com](http://powersolutions.danfoss.com)

**4 Inputs**

- (3) universal (DIN/AIN/FreqIN/Rheo) 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
  - *Resistance*: 0 to 10,000 ohm
- (1) fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin

- *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/DOUT/PVGOUT can be used to provide reference power to one PVG valve

**2 Outputs**

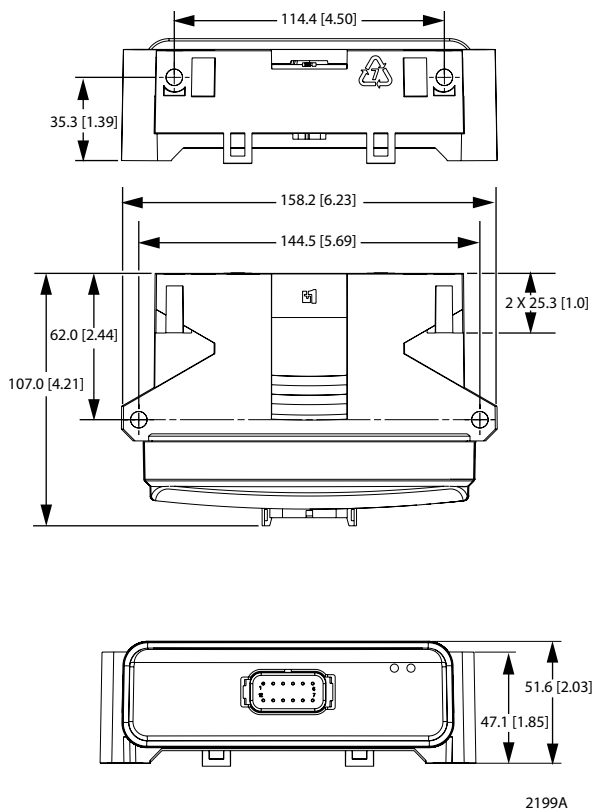
- (2) universal (PWMOUT/DOUT/PVGOUT) that are user-defined as either:

**Specifications**

*Product parameters*

<b>Supply voltage</b>	9 to 36 Vdc
<b>Operating temperature (ambient)</b>	-40°C to 70°C [-40°F to 158°F]
<b>Storage temperature</b>	-40°C to 85°C [-40°F to 185°F]
<b>Programming temperature</b>	0°C to 70°C [32°F to 158°F]
<b>IP rating (with mating connector attached)</b>	IP 67
<b>EMI/RFI rating</b>	100 V/M
<b>Weight</b>	0.40 kg [0.88 lb]
<b>Vibration</b>	IEC 60068-2-64
<b>Shock</b>	IEC 60068-2-27 test Ea
<b>Maximum current, sourcing</b>	8 A
<b>Maximum current, sinking</b>	8 A

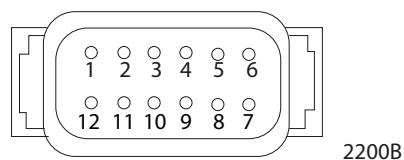
**Dimensions and pin assignments**



**! Caution**

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

*12 Pin Connector*



Pin	Controller function
C1-P1	Power ground -
C1-P2	Power ground +
C1-P3	CAN +
C1-P4	CAN -
C1-P5	AIN/CAN shield
C1-P6	5 Vdc sensor power +
C1-P7	Sensor power ground -
C1-P8	DIN/AIN/FreqIN/Rheo
C1-P9	DIN/AIN/FreqIN/Rheo
C1-P10	DIN/AIN/FreqIN/Rheo
C1-P11	PWMOUT/DOUT/PVGOUT
C1-P12	PWMOUT/DOUT/PVGOUT

Use care when wiring mating connector. Pinouts listed are for device pins.



**Ordering information**

*Product part number*

<b>MC012-110 part number</b>	11130915
<b>MC012-112 part number</b>	11130916

*Related products part numbers*

<b>CG150 CAN/USB Gateway</b>	10104136	
<b>DEUTSCH mating connector bag assembly</b>	10102025 (16 to 20 AWG)	10100944 (20 to 24 AWG)
<b>PLUS+1<sup>®</sup> GUIDE single user license</b>	10101000	

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