

Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC012-020 and 022



### Mobile machine management

MC012-020 and 022 controllers are elements of the flexible, powerful, expandable, and affordable PLUS+1<sup>®</sup> 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 Digital Signal Processor (DSP), providing the controllers with extremely fast single-cycle processing speed and 128K internal flash. Both controllers feature multifunction input pins that are capable of receiving inputs from RTD temperature sensors. The MC012-022 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

Users develop MC012-020 and 022 applications with PLUS+1<sup>®</sup> 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<sup>®</sup> GUIDE (Graphical User Integrated Development Environment)
- 32 bit fixed-point DSP running at 150 MHz
  - 12 bit analog-to-digital converter
  - 16 bit timers/counters
- 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 MC012-022 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**

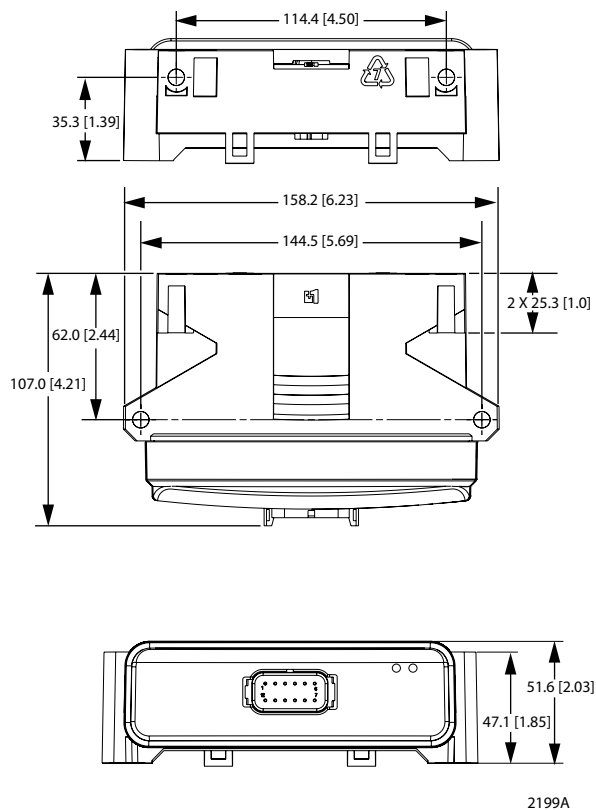
- (2) universal (PWMOUT/DOUT/PVGOUT) that are user-defined as either:

**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

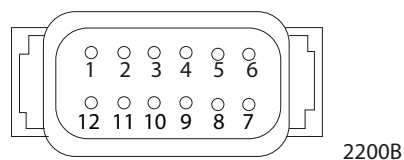
**Dimensions and pin assignments**



**⚠ 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>MC012-020</b>	11085514
<b>MC012-022</b>	11085515

*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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