

## Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC050-020 and MC050-022

**Mobile machine management**

Danfoss PLUS+1<sup>®</sup> controllers are elements of the flexible, powerful, expandable, and affordable family of mobile machine management products. These devices are general-purpose controllers that are equally suited for use as a member of a distributed machine control system, with intelligence in every node, or as a stand-alone controller.

**Product highlights**

The MC050-020 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 256K internal flash.

**Application development**

The MC050-022 employs an application key that enables the use of Danfoss developed PLUS+1<sup>®</sup> GUIDE machine control solutions. The same PLUS+1<sup>®</sup> GUIDE HWD file is used with both controllers.

Users develop MC050-020 and MC050-022 applications with PLUS+1<sup>®</sup> GUIDE. This Microsoft Windows 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)
- 50 pins: (1) DEUTSCH DRC connector
- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 24 inputs
- 14 outputs
- 9 to 36 V<sub>DC</sub> power supply, monitored internally
- 2 CAN 2.0 B ports, the fixed range analog input can be configured as the shield pin
- Power supply for external sensors rated at 5 V<sub>DC</sub> to 500 mA, and regulated internally
- 2 LEDs under user control
- 3 mounting alternatives: stack, end, or side
- MC050-022 contains application key required to run Danfoss developed machine control application software
- CE compliant

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

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## 24 Inputs

- (6) universal (DIN/AIN/FreqIN) that are user-defined as either:  
Analog: with configurable ranges 0 to 5.25 V<sub>DC</sub> (with over range protection) or 0 to 36 V<sub>DC</sub>;  
Digital: pull up (5 V<sub>DC</sub>), pull down (0 V<sub>DC</sub>) or pull to center (2.5 V<sub>DC</sub>);  
Frequency (timing): 1 Hz to 10 kHz
- (10) digital (DIN) configurable as pull up (5 V<sub>DC</sub>), pull down (0 V<sub>DC</sub>)
- (4) digital/analog (DIN/AIN) that are userdefined as either:  
Digital: pull up (5 V<sub>DC</sub>), pull down (0 V<sub>DC</sub>) or pull to center (2.5 V<sub>DC</sub>);  
Analog: 0 to 5.25 V<sub>DC</sub> or 0 to 36 V<sub>DC</sub>
- (2) analog (AIN/Temp/Rheo) 0 to 5.25 V<sub>DC</sub> or 0 to 10,000 ohm rheostat
- (2) fixed range analog (AIN/CAN shield) 0 to 5.25 V<sub>DC</sub> or CAN shield pin

## Characteristics

### Specifications

Supply voltage	9 to 36 V <sub>DC</sub>
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	0 °C to 70 °C [32 °F to 158 °F]
IP rating (with mating connector attached)	IP 67
EMI/RFI rating	100 V/M
Weight	0.53 kg [1.16 lb]
Vibration	IEC 60068-2-64
Shock	IEC 60068-2-27 test Ea
Max. current, sourcing	40 A
Max. current, sinking	8 A

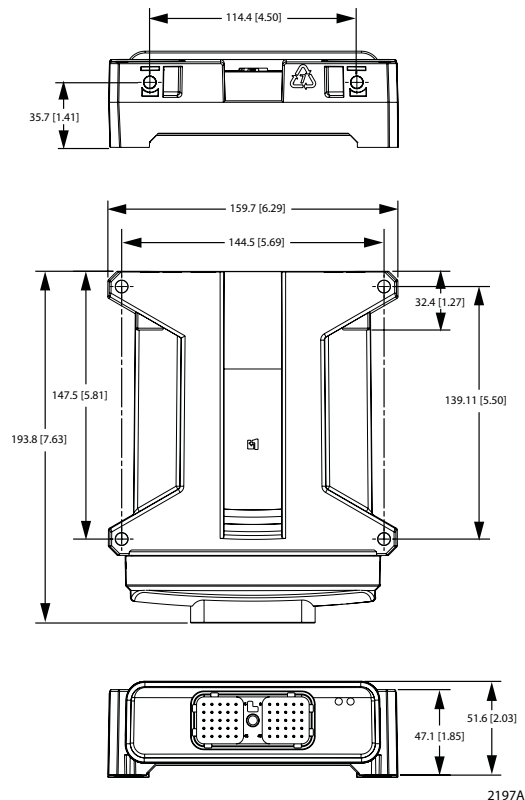
## 14 Outputs

- (6) universal (PWMOUT/DOUT/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/DOUT/PVGOUT can be used to provide reference power to one PVG valve
- (6) digital (DOUT) (3 A), configurable as source only
- (2) digital/PVG power supply (DOUT/PVG Pwr) (3 A), user-configurable; one DOUT/PVG Pwr will power up to three PVGs

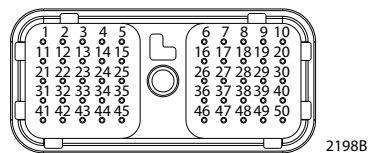
## Dimensions and pin assignments

### Mounting dimensions and pin assignments

Dimensions in mm [in]



### Pin connector



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

### ! Caution

PCB damage may occur.

To prevent damage to the module all module power supply + pins must be connected to the vehicle power supply to support advertised module maximum output current capacity. DO NOT use module power supply + pins to supply power to other modules on a machine.

### ! Caution

Warranty will be voided if device is opened.

Device is not field serviceable. Do not open the device.

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

*Product part number*

<b>MC050-020</b>	10100994
<b>MC050-022</b>	11013735

*Related products part numbers*

<b>CG150 CAN/USB Gateway</b>	11153051	
<b>DEUTSCH mating connector bag assembly</b>	10102024 (16 to 20 AWG)	10100946 (20 to 24 AWG)
<b>PLUS+1<sup>®</sup> GUIDE Professional</b>	11179523	

*Comprehensive information*

<i>MC0XX-0XX Controller Family Technical Information</i>	<b>520L0719</b>
<i>MC050-020 Application Program Interface (API)</i>	<b>10102372.doc</b>