



## Data Sheet

# PLUS+1® Controllers

## MC050-120 and MC050-122


**PLUS+1**

### Mobile Machine Management

MC050-120 and MC050-122 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

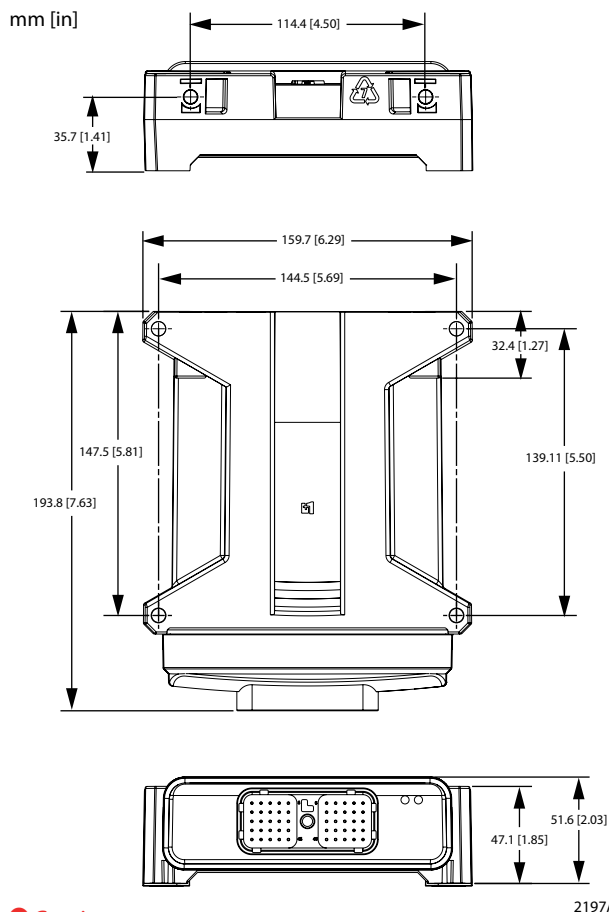
The MC050-120 employs a 32 bit Cortex-M3 Processor, providing the controller with extremely fast single cycle processing speed and 512K internal flash. The MC050-122 has an application key that enables the use of Danfoss developed GUIDE machine control solutions. The same GUIDE HWD file is used with both controllers.

### Application Development

Users develop MC050-120 and MC050-122 applications with PLUS+1 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 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
- 24 inputs
  - (6) 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
  - (10) digital (DIN) configurable as pull up (5 Vdc), pull down (0 Vdc)
  - (4) 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
  - (2) analog (AIN/Temp/Rheo) 0 to 5.25 Vdc or 0 to 10,000 ohm rheostat
  - (2) fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin
- 14 outputs
  - (6) universal (PWMOUT/DOOUT/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/DOOUT/PVGOUT can be used to provide reference power to one PVG valve
  - (6) digital (DOOUT) (3 A), configurable as source only
  - (2) digital/PVG power supply (DOOUT/PVG Pwr) (3 A), user-configurable; one DOOUT/PVG Pwr will power up to three PVGs
- 9 to 36 Vdc 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 Vdc to 500 mA, and regulated internally
- 2 LEDs under user control
- 3 mounting alternatives: stack, end, or side
- MC050-122 contains application key required to run Danfoss developed machine control application software
- CE compliant

**MC050-120 and MC050-122 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**

<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>	-40°C to 70°C [-40°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>	0.53 kg [1.16 lb]
<b>Vibration</b>	IEC 60068-2-64
<b>Shock</b>	IEC 60068-2-27 test Ea
<b>Maximum current, sourcing</b>	40 A
<b>Maximum current, sinking</b>	8 A

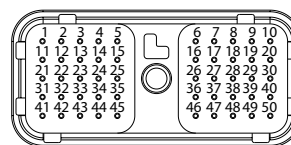
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**MC050-120 and MC050-122 50 Pin Connector**


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**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 Vdc 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 +

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

**Ordering Information**

<b>MC050-120</b>	11130956
<b>MC050-122</b>	11130957

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	10101000	

Danfoss product literature on line at:  
www.danfoss.com