

Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC024-021 and MC024-024



### 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 MC024-021 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 256K internal flash.

### Application Development

The MC024-024 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 MC024-024 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)
- 24 pins: (2) individually keyed DEUTSCH DTM 12 pin connectors
- 32 bit fixed-point DSP running at 150 MHz
  - 12 bit analog-to-digital converter
  - 16 bit timers/counters
- 9 to 36 Vdc power supply, monitored internally
- 1 CAN 2.0 B port, the fixed range analog input can be configured as the shield pin
- Power supply for external sensors rated at 5 Vdc to 200 mA and regulated internally
- 2 LEDs under user control
- 3 mounting alternatives: stack, end, or side
- Contains 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)

**8 Inputs**

- (5) 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
- (2) digital (DIN) configurable as pull up (5 Vdc), pull down (0 Vdc)
- (1) fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin

**8 Outputs**

- (8) 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

**Specifications**

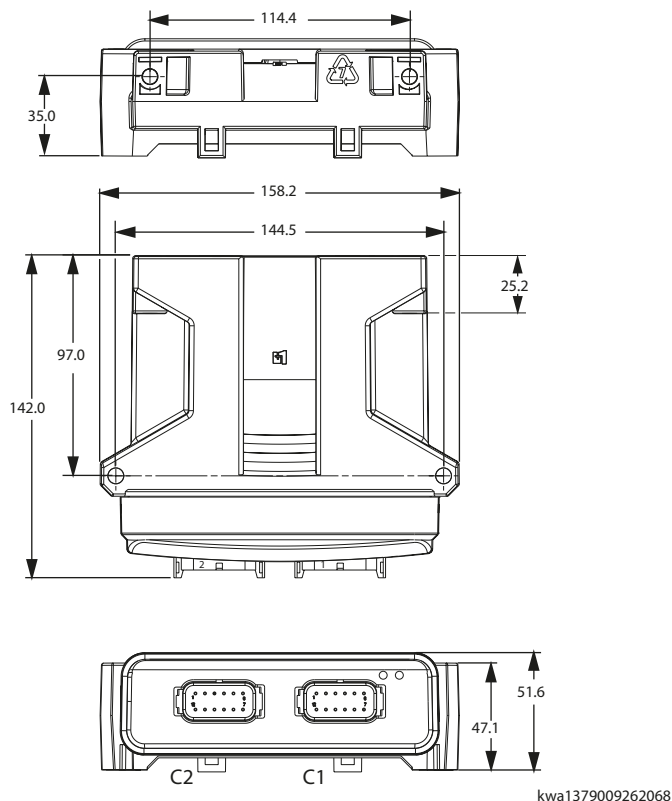
*Product parameters*

<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>	24 A
<b>Maximum current, sinking</b>	8 A

**Dimensions and pin assignments**

*Mounting dimensions and pin assignments*

Dimensions in mm [in]



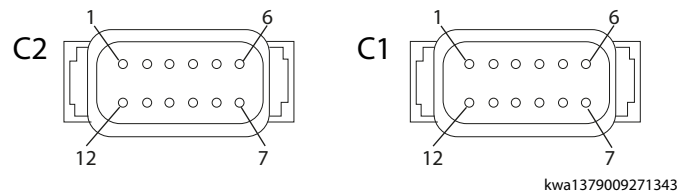
**⚠ Caution**

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

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

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

*Pin connector*



Pin	Controller function	Pin	Controller function
C2-P1	DIN/AIN/FreqIN	C1-P1	Power ground -
C2-P2	DIN/AIN/FreqIN	C1-P2	Power supply +
C2-P3	PWMOUT/DOUT/ PVGOUT	C1-P3	CAN +
C2-P4	PWMOUT/DOUT/ PVGOUT	C1-P4	CAN -
C2-P5	PWMOUT/DOUT/ PVGOUT	C1-P5	AIN/CAN shield
C2-P6	PWMOUT/DOUT/ PVGOUT	C1-P6	DIN
C2-P7	PWMOUT/DOUT/ PVGOUT	C1-P7	DIN
C2-P8	PWMOUT/DOUT/ PVGOUT	C1-P8	5 Vdc sensor power +
C2-P9	PWMOUT/DOUT/ PVGOUT	C1-P9	Sensor power ground -
C2-P10	PWMOUT/DOUT/ PVGOUT	C1-P10	DIN/AIN/FreqIN
C2-P11	Power supply +	C1-P11	DIN/AIN/FreqIN
C2-P12	Power supply +	C1-P12	DIN/AIN/FreqIN



**Ordering information**

*Product part number*

<b>MC024-021</b>	11014048
<b>MC024-024</b>	11026049

*Related products part numbers*

<b>CG150 CAN/USB Gateway</b>	11153051	
<b>DEUTSCH mating connector bag assembly</b>	10102023 (16 to 20 AWG)	10100945 (20 to 24 AWG)
<b>PLUS+1<sup>®</sup> GUIDE professional</b>	11179523	

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