

Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC024-020 and MC024-022



### 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 MC024-020 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 128K internal flash. The MC024-022 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

The MC024-022 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 MC024-022 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)
- 24 pins: (2) individually keyed DEUTSCH DTM 12 pin connectors
- 9 to 36 Vdc power supply, monitored internally
- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 16 bit timers/counters
- 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



**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**

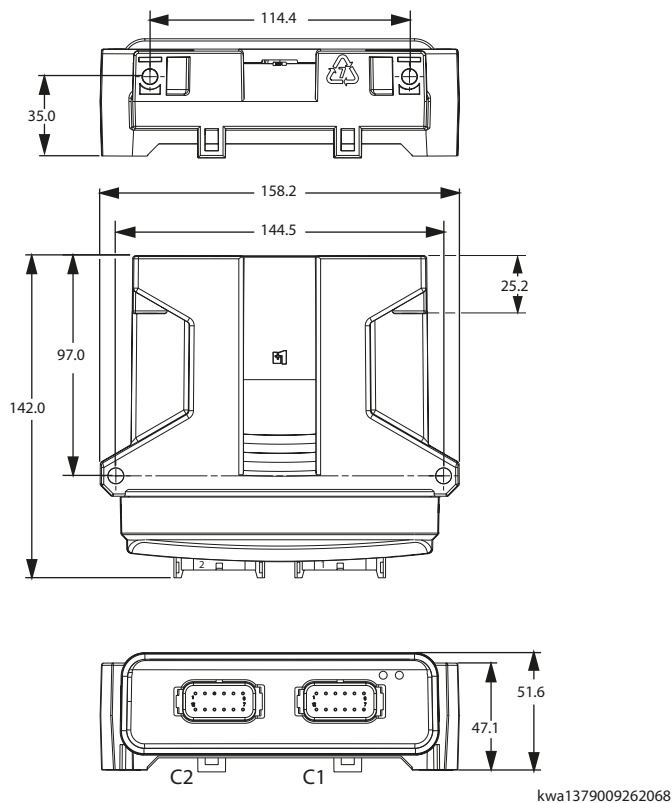
*Product parameters*

<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]



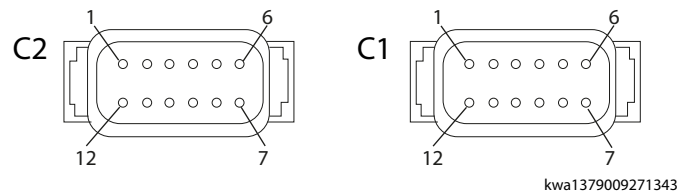
**⚠ Caution**

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>MC024-020</b>	10100993
<b>MC024-022</b>	11013733

*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	

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without changes being necessary in specifications already agreed.  
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.