

## Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC024-021 and MC024-024




### Mobile Machine Management

These PLUS+1 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 MC0XX-0X1 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 256K internal flash.

### Application Development

The MC0XX-0X4 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.

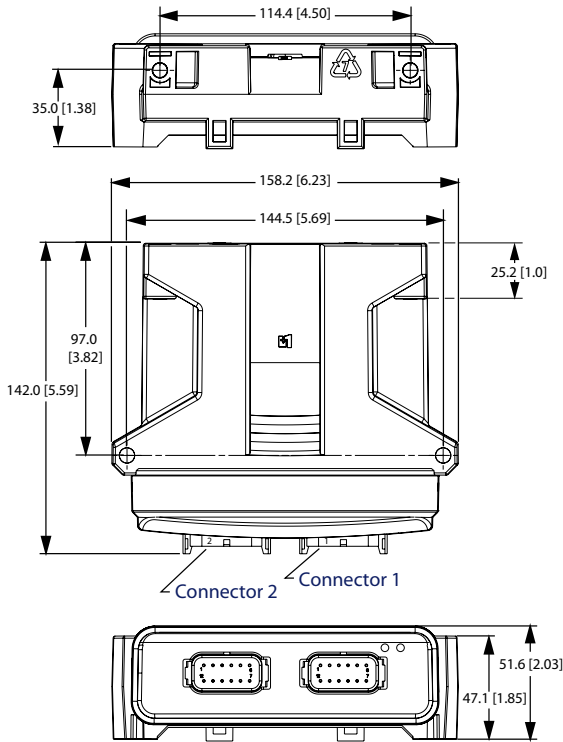
Users develop these controllers' applications with PLUS+1 GUIDE. This Microsoft® Windows® based development environment features a user-friendly, field proven, icon-based graphical programming tool, application downloader, and service/diagnostic tool.

### Features

- User-programmable with PLUS+1 GUIDE (Graphical User Integrated Development Environment)
- 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
- 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
- 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
- MC024-024 contains application key required to run Danfoss developed machine control application software
- CE compliant

Dimensions and Pin Assignments

Mounting Dimensions in Millimeters [Inches]



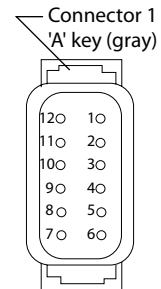
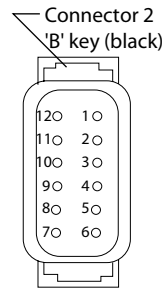
Pin Connectors

Connector 2

Pin	Controller function
C2-P1	DIN/AIN/FreqIN
C2-P2	DIN/AIN/FreqIN
C2-P3	PWMOUT/DOUT/PVGOUT
C2-P4	PWMOUT/DOUT/PVGOUT
C2-P5	PWMOUT/DOUT/PVGOUT
C2-P6	PWMOUT/DOUT/PVGOUT
C2-P7	PWMOUT/DOUT/PVGOUT
C2-P8	PWMOUT/DOUT/PVGOUT
C2-P9	PWMOUT/DOUT/PVGOUT
C2-P10	PWMOUT/DOUT/PVGOUT
C2-P11	Power supply +
C2-P12	Power supply +

Connector 1

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



**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 voids the warranty.

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

Specifications

Product Parameters

Supply voltage	9 to 36 Vdc
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	0.40 kg [0.88 lb]
Vibration	IEC 60068-2-64
Shock	IEC 60068-2-27 test Ea
Maximum current, sourcing	24 A
Maximum current, sinking	8 A

Product Part Numbers

MC024-021	11014048
MC024-024	11026049

Related Products Part Numbers

CG150 CAN/USB Gateway	10104136	
Deutsch® mating connector bag assembly	10102023 (16 to 20 AWG)	10100945 (20 to 24 AWG)
PLUS+1 GUIDE single user license	10101000	

Reference Documentation at [www.danfoss.com](http://www.danfoss.com)

PLUS+1 Controller Family Technical Information, 520L0719
Application Program Interface (API)

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