

Data Sheet

# PLUS+1<sup>®</sup> Controllers

## MC090-010 and MC090-012



### Mobile Machine Management

This product is designed as flexible, expandable, powerful, cost effective stand-alone modules for smaller machined systems or as total machine management systems with intelligence in every node. These modules communicate with one another and other intelligent systems over a machine Controller Area Network (CAN data bus).

### Product Highlights

The MC090 controller employs a Digital Signal Processor (DSP), providing the controller with extremely fast single-cycle processing speed and 1.3 MB flash.

The MC090-012 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

PLUS+1<sup>®</sup> hardware modules have input or output pins that support multiple functions. Pins that support multiple input or output types are user-configurable using PLUS+1<sup>®</sup> GUIDE software. This Microsoft<sup>®</sup> Windows<sup>®</sup> based development environment features a user-friendly, field proven, icon-based graphical programming tool, application downloader, and service/diagnostic tool.

### Features

- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 2 MB serial flash vault memory
- 90 pins
  - 1: DEUTSCH DRC26-50 connector
  - 1: DEUTSCH DRC26-38 connector
  - 2: M5 power bolts
- 1 independent power supply for all outputs except C2-P30 and C2-P31
- 1 independent CPU and start up functions power supply 9 to 36 Vdc (also provides power to C2-P30 and C2-P31)
- Power supply for external sensors rated at 5 Vdc to 500 mA, regulated internally
- 2 LEDs, user controlled
- 2 Can 2.0B-ports



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

**9 user-defined inputs/outputs defined**

- 7: Digital inputs (DIN/DOUT 1.5 A); 1.5 A Digital output: Configured as source only
- 2: Digital inputs (DIN/DOUT 6 A); 6 A Digital output: Configured as source only

**22 user-defined inputs**

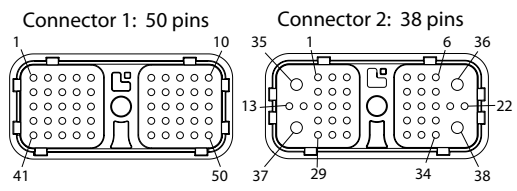
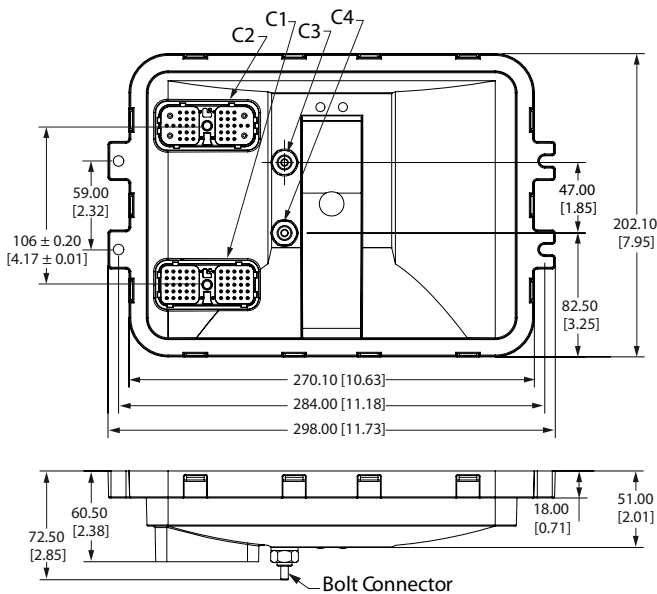
- 1: Digital/Analog/Frequency/4 to 20 mA Current (DIN/AIN/FreqIN/CrntIn)
- 3: Digital/Analog/Frequency (DIN/AIN/FreqIN)
- 13: Digital/Analog (DIN/AIN)
- 3: Analog/Rheostat (AIN/Rheo)
- 1: D+ Digital (D+DIN) fixed pull-up, specifically designed for alternator D+ signals
- 1: Analog/CAN shield (AIN/CAN shield), configured as 0 to 5.25 Vdc or CAN shield pin

**47 user-defined outputs**

- 2: NPN Digital: Configured as sink only (DOUT 6 A NPN)
- 4: 0.5 A Digital: Configured as source only (DOUT 0.5 A)
- 12: 1.5 A Digital: Configured as source only (DOUT 1.5 A)
- 3: 3 A Digital: Configured as source only (DOUT 3 A)
- 10: 6 A Digital/Digital Input: Configured as source only (DOUT 6 A)
- 14: Universal (PWMOUT/DOUT) that are user-defined as either: *Digital* (3A): Configured as source or sink; *PWM* (33 to 4000 Hz): Configured as open or closed loop with current control
- 2: Universal (PWMOUT/DOUT) that are user-defined as either: *Digital* (12 A): Configured as source or sink; *PWM* (1.144 kHz fixed): Open loop mode only

**Dimensions and pin connectors**

Dimensions in mm [in]

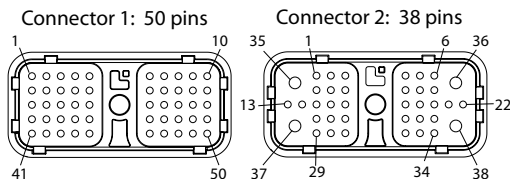


**! Caution**  
 This device is not field serviceable. Opening the device housing will void the warranty.

This device's entire back surface must be supported when mounting (flatness within 1 mm). Mount device any direction.

**MC090-010 and MC090-012 Controllers**

Pin assignments



Pin C1	Controller function	Pin C2	Controller function
C1-P1	DOUT 1.5 A	C2-P1	DOUT 6 A
C1-P2	CPU Power	C2-P2	DOUT 6 A
C1-P3	CAN0+	C2-P3	DOUT 6 A
C1-P4	CAN0-	C2-P4	DOUT 6 A
C1-P5	AIN/CAN Shield	C2-P5	DOUT 6 A
C1-P6	N/A	C2-P6	DOUT 6 A
C1-P7	N/A	C2-P7	DIN/AIN
C1-P8	5 Vdc Sensor Power +	C2-P8	DIN/AIN
C1-P9	Sensor Power Ground -	C2-P9	DIN/AIN
C1-P10	DOUT 6 A/NPN	C2-P10	DIN/AIN
C1-P11	DOUT 1.5 A	C2-P11	DIN/AIN
C1-P12	DOUT 1.5 A/DIN	C2-P12	DIN/AIN/FreqIn
C1-P13	DOUT 1.5 A/DIN	C2-P13	DIN/AIN
C1-P14	DOUT 1.5 A	C2-P14	DIN/AIN
C1-P15	DOUT 1.5 A	C2-P15	DIN/AIN
C1-P16	DOUT 1.5 A/DIN	C2-P16	DIN/AIN
C1-P17	DOUT 1.5 A	C2-P17	DIN/AIN
C1-P18	DOUT 1.5 A	C2-P18	DIN/AIN
C1-P19	DOUT 1.5 A/DIN	C2-P19	DIN/AIN
C1-P20	DOUT 1.5 A/DIN	C2-P20	DIN/AIN/FreqIn
C1-P21	DOUT 1.5 A	C2-P21	DIN/AIN/FreqIn
C1-P22	DOUT 1.5 A	C2-P22	DOUT 6A
C1-P23	DOUT 1.5 A	C2-P23	DIN/AIN
C1-P24	DOUT 1.5 A	C2-P24	AIN/Pheo
C1-P25	D+ DIN	C2-P25	AIN/Pheo

Pin C1	Controller function	Pin C2	Controller function
C1-P26	DOUT 1.5 A/DIN	C2-P26	DOUT 0.5 A
C1-P27	PWMOUT/DOUT	C2-P27	DOUT 0.5 A
C1-P28	PWMOUT/DOUT	C2-P28	DIN/AIN/Freq/CrntIn
C1-P29	PWMOUT/DOUT	C2-P29	AIN/Rheo
C1-P30	DOUT 6 A/NPN	C2-P30	DOUT 1.5 A
C1-P31	CAN1+	C2-P31	DOUT 1.5 A
C1-P32	CAN1-	C2-P32	DOUT 0.5 A
C1-P33	PWMOUT/DOUT	C2-P33	DOUT 0.5 A
C1-P34	PWMOUT/DOUT	C2-P34	DOUT 6 A
C1P-35	PWMOUT/DOUT	C2-P35	PWMOUT/DOUT 12 A
C1P-36	PWMOUT/DOUT	C2-P36	DOUT 6 A
C1-P37	PWMOUT/DOUT	C2-P37	PWMOUT/DOUT 12 A
C1-P38	PWMOUT/DOUT	C2-P38	DOUT 6 A
C1-P39	PWMOUT/DOUT	-	-
C1-P40	PWMOUT/DOUT	-	-
C1-P41	PWMOUT/DOUT	-	-
C1-P42	DOUT 1.5 A/DIN	-	-
C1-P43	DOUT 3 A	-	-
C1-P44	DOUT 3 A	-	-
C1-P45	DOUT 3 A	-	-
C1-P46	DOUT 6 A/DIN	-	-
C1-P47	PWMOUT/DOUT	-	-
C1-P48	PWMOUT/DOUT	-	-
C1-P49	DOUT 6 A/DIN	-	-
C1-P50	PWMOUT/DOUT	-	-

Use care when wiring mating connector. Pinouts listed are for device pins.  
 CPU power supply C1-P2 also provides power to pins C2-P30 and C2-P31.



*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>	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>	1378 g [3.038 lb]
<b>Maximum current, sourcing</b>	100 A
<b>Maximum current, sinking</b>	85 A

*Product part number*

<b>MC090-010</b>	11081997
<b>MC090-012</b>	11162814

*Related products part numbers*

<b>CG150 CAN/USB Gateway</b>	10104136	
<b>DEUTSCH mating connector bag assembly</b>	11071844 (16 to 20 AWG)	10105649 (20 to 24 AWG)
<b>PLUS+1<sup>®</sup> GUIDE Professional</b>	11179523	

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