



Data Sheet

PLUS+1[®] Controllers

MC038-010 and MC038-012



Mobile Machine Management

MC038-010 and MC038-012 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

Both controllers employ a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 128K internal flash. The MC038-012 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.

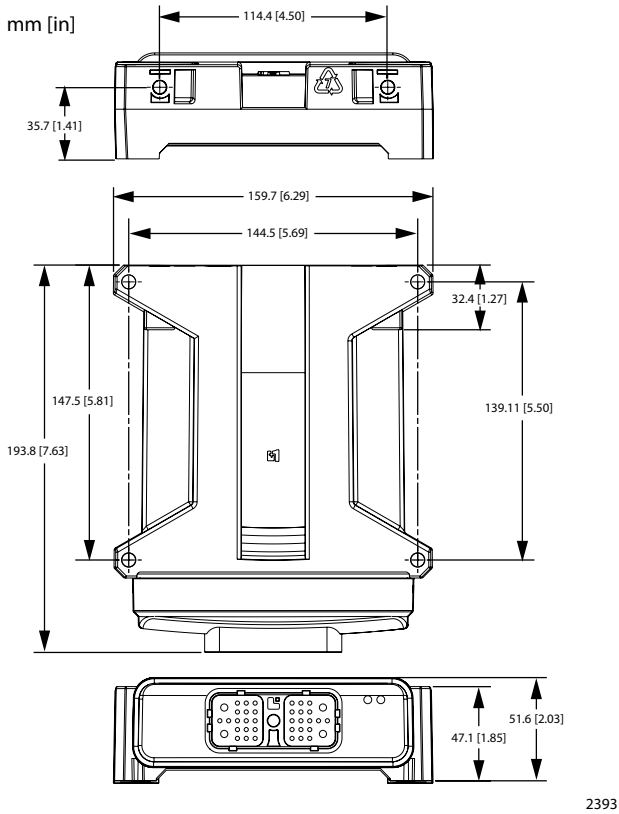
Application Development

Users develop MC038-010 and MC038-012 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.

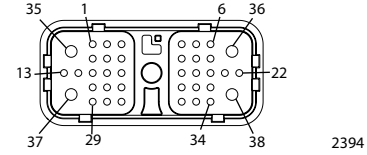
Features

- User-programmable with PLUS+1 GUIDE (Graphical User Integrated Development Environment)
- Power saving sleep mode functionality
- 38 pins: 1 Deutsch® DRC26-38SA connector
- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 15 inputs
 - 3 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)
 - 9 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
 - 1 fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin
- 13 outputs
 - 2 DOUT (2 A) configurable as source only
 - 3 HDOUT (6 A) configurable as source only
 - 3 HPWMOUT/DOUT (6 A), configurable as source only
 - 4 HPWMOUT/DOUT (10 A) configurable as source or sink, can be used as bi-directional pairs, (see [Dimensions and Pin Assignments](#), back page for pair assignments)
 - 1 HPWMOUT/DOUT (10A) configurable as source only
 - Outputs are powered by three independent power supply pins (see [Dimensions and Pin Assignments](#), back page for output pin power supply assignments and maximum allowable current per power supply pin)
 - All PWM outputs operate as open loop. The output is a constant voltage.
- 1 independent ECU power supply, 6 to 36Vdc
- 3 independent power supplies for powering output pins, 9 to 36 Vdc
- 1 CAN 2.0B port. The fixed range analog (AIN/CAN Shield) pin may be configured as a shield pin
- 5 Vdc power supply for external sensors rated at 150 mA, monitored and regulated internally
- 2 LEDs under application software control
- MC038-012 contains application key required to run Danfoss developed machine control application software
- CE compliant

Dimensions and Pin Assignments



38 Pin Connector



Pin	Controller function	Pin	Controller function
C1-P1	CPU power ground -	C1-P20	DIN/AIN
C1-P2	CPU power supply +	C1-P21	HPWM/DOUT (6A-Pwr = C1-P37, source only)
C1-P3	CAN0+	C1-P22	HPWM/DOUT (10A-Pwr = C1-P37, source only)
C1-P4	CAN0-	C1-P23	DOUT (2A-Pwr = C1-P38, source only)
C1-P5	AIN/CAN shield	C1-P24	DIN/AIN
C1-P6	DIN	C1-P25	DIN/AIN
C1-P7	DIN	C1-P26	DIN/AIN
C1-P8	5 Vdc sensor power +	C1-P27	DIN/AIN
C1-P9	Sensor power ground -	C1-P28	DOUT (2A-Pwr = C1-P38, source only)
C1-P10	DIN/AIN/FreqIN	C1-P29	HPWM/DOUT (10A-Pwr = C1-P36, pair with C1-P34)
C1-P11	DIN/AIN/FreqIN	C1-P30	DOUT (6A-Pwr = C1-P38, source only)
C1-P12	DIN/AIN/FreqIN	C1-P31	DOUT (6A-Pwr = C1-P38, source only)
C1-P13	HPWM/DOUT (10A-Pwr = C1-P37, pair with C1-P15)	C1-P32	HPWM/DOUT (6A-Pwr = C1-P36, source only)
C1-P14	DIN/AIN	C1-P33	HPWM/DOUT (6A-Pwr = C1-P36, source only)
C1-P15	HPWM/DOUT (10A-Pwr = C1-P37, pair with C1-P13)	C1-P34	HPWM/DOUT (10A-Pwr = C1-P36, pair with C1-P29)
C1-P16	HDOUT (6A-Pwr = C1-P38, source only)	C1-P35	Output power ground -
C1-P17	DIN/AIN	C1-P36	Output power supply +
C1-P18	DIN/AIN	C1-P37	Output power supply +
C1-P19	DIN/AIN	C1-P38	Output power supply +

This device is not field serviceable. Opening the device housing voids the warranty.

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

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

Specifications

Supply voltage, CPU	6 to 36 Vdc
Supply voltage, device	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	0.53 kg (1.16 lb)
Vibration	IEC 60068-2-64
Shock	IEC 60068-2-27 test Ea
Device maximum current, sourcing	70 A
Device maximum current, sinking	25 A
Maximum current, power pins: C1-P36, C1-P37, C1-P38	25 A per pin

Ordering Information

MC038-010 part number	11035917
MC038-012 part number	11076594

Related product	Danfoss part numbers
CG150 CAN/USB gateway	10104136
Deutsch® mating connector bag assembly	11027919 (16 to 20 AWG)
PLUS+1 GUIDE single user license	10101000

Danfoss comprehensive technical information
PLUS+1 Controller Family Technical Information, **520L0719** and
MC038-010 and MC038-012 Application Program Interface (API)
Document are on line at: www.danfoss.com
and/or embedded in product HWD file.

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