Mobile machine management

Danfoss PLUS+1® 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

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

Application development

The MC038-012 employs an application key that enables the use of Danfoss developed PLUS+1® GUIDE machine control solutions. The same PLUS+1® GUIDE HWD file is used with both controllers.

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
- Support of unlimited read-write FRAM, 2MB flash vault memory
- 38 pins: (1) DEUTSCH DRC connector
- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 15 inputs
- 13 outputs
- 9 to 36 VDC power supply, monitored internally
- 2 CAN 2.0 B ports, the fixed range analog input can be configured as the shield pin
- 1 independent ECU power supply, 6 VDC to 36 VDC, and regulated internally
- 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
- CE compliant
15 Inputs

- (3 universal (DIN/AIN/FreqIN) that are user-defined as either:
  - Analog: with configurable ranges 0 to 5.25 V DC (with over range protection) or 0 to 36 V DC
  - Digital: pull up (5 V DC), pull down (0 V DC) or pull to center (2.5 V DC)
  - Frequency (timing): 1 Hz to 10 kHz

- (2) digital (DIN) configurable as pull up (5 V DC), pull down (0 V DC)
- (9) digital/analog (DIN/AIN) that are user-defined as either:
  - Digital: pull up (5 V DC), pull down (0 V DC) or pull to center (2.5 V DC)
  - Analog: 0 to 5.25 V DC or 0 to 36 V DC

- (1) fixed range analog (AIN/CAN shield)0 to 5.25 V DC 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 only, 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.

Characteristics

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>9 to 36 V DC</td>
</tr>
<tr>
<td>Operating temperature (ambient)</td>
<td>-40 °C to +70 °C ([-40 °F to +158 °F])</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 °C to +85 °C ([-40 °F to +185 °F])</td>
</tr>
<tr>
<td>Programming temperature</td>
<td>0 °C to +70 °C (+32 °F to +158 °F)</td>
</tr>
<tr>
<td>IP rating (with mating connector attached)</td>
<td>IP 67</td>
</tr>
<tr>
<td>EMI/RFI rating</td>
<td>100 V/M</td>
</tr>
<tr>
<td>Weight</td>
<td>0.53 kg [1.16 lb]</td>
</tr>
<tr>
<td>Vibration</td>
<td>IEC 60068-2-64</td>
</tr>
<tr>
<td>Shock</td>
<td>IEC 60068-2-27 test Ea</td>
</tr>
<tr>
<td>Max. current, sourcing</td>
<td>70 A</td>
</tr>
<tr>
<td>Max. current, sinking</td>
<td>25 A</td>
</tr>
<tr>
<td>Max. current, power pins: C1-P36, C1-P37, C1-P38</td>
<td>25 A per pin</td>
</tr>
</tbody>
</table>
Dimensions and pin assignments

Mounting dimensions in mm

Caution
PCB damage may occur.
To prevent damage to the module all module power supply + pins must be connected to the vehicle power supply to support advertised module maximum output current capacity. DO NOT use module power supply + pins to supply power to other modules on a machine.

Caution
Warranty will be voided if device is opened.
Device is not field serviceable. Do not open the device.

Use care when wiring mating connector. Pinouts are for device pins.
### Product part number

<table>
<thead>
<tr>
<th>Part Number</th>
<th>MC038-010</th>
<th>MC038-012</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>11035917</td>
<td>11076594</td>
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</table>

### Related products part numbers

<table>
<thead>
<tr>
<th>Product</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG150 CAN/USB Gateway</td>
<td>11153051</td>
</tr>
<tr>
<td>DEUTSCH mating connector bag assembly</td>
<td>11027919 (16 to 20 AWG)</td>
</tr>
<tr>
<td>PLUS+1 GUIDE Professional</td>
<td>11179523</td>
</tr>
</tbody>
</table>

### Comprehensive information

- **MC0XX-0XX Controller Family Technical Information**, 520L0719
- **MC038-010 and MC038-012 Application Program Interface (API) document**