Features

- User-programmable with PLUS+1 GUIDE (Graphical User Integrated Development Environment)
- 24 pins: (2) individually keyed Deutsch® DTM 12 pin connectors
- ARM 32 bit Cortex-M3 running at 120 MHz
  - 12 bit analog-to-digital converter
  - 16 bit timers/counters
- FRAM non-volatile memory
- 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
- MC024-122 contains application key required to run Danfoss developed machine control application software
- CE compliant

Mobile Machine Management
These general purpose modular housings, connectors, and control circuitry are 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 MC024-120 employs a 32 bit Cortex-M3 Processor, providing the controller with extremely fast single cycle processing speed and 512K internal flash. The MC024-122 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™ 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 GUIDE software. This Microsoft® Windows® based development environment features a user-friendly, field proven, icon-based graphical programming tool, application downloader, and service/diagnostic tool.
Dimensions and Pin Assignments

MC024-120 and MC024-122 Mounting Dimensions

Connector 2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Controller function</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2-P1</td>
<td>DIN/AIN/FreqIN</td>
</tr>
<tr>
<td>C2-P2</td>
<td>DIN/AIN/FreqIN</td>
</tr>
<tr>
<td>C2-P3</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P4</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P5</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P6</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P7</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P8</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P9</td>
<td>PWMOUT/DOUT/PVGOUT</td>
</tr>
<tr>
<td>C2-P10</td>
<td>Power supply +</td>
</tr>
<tr>
<td>C2-P11</td>
<td>Power supply +</td>
</tr>
<tr>
<td>C2-P12</td>
<td>Power supply +</td>
</tr>
</tbody>
</table>

Connector 1

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

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

Data Sheet PLUS+1® Controllers MC024-120 and MC024-122

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**: -40°C to 70°C [-40°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

- **MC024-120**: 11131280
- **MC024-122**: 11131281
- **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

Danfoss product literature on line at: www.danfoss.com

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.

Danfoss Power Solutions (US) Company
2800 East 13th Street
Amar, IA 50010, USA
Phone: +1 515 239 6000

Danfoss Power Solutions GmbH & Co. OHG
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss Power Solutions ApS
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss Power Solutions Trading (Shanghai) Co. Ltd.
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 3418 5200