



## PLUS+1™ MC024-010 and MC024-012 Controllers

### Mobile Machine Management

MC024-010 and MC024-012 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.

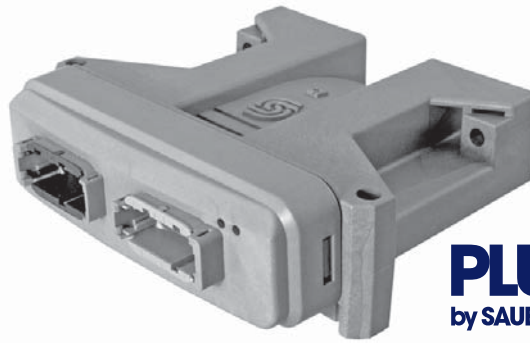
### Product Highlights

The MC024-010 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 128K internal flash. The MC024-012 has an application key that enables the use of Sauer-Danfoss developed GUIDE machine control solutions. The same GUIDE HWD file is used with both controllers.

### Application Development

Users develop MC024-010 and MC024-012 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.

Local Address:



**PLUS+1™**  
by SAUER-DANFOSS

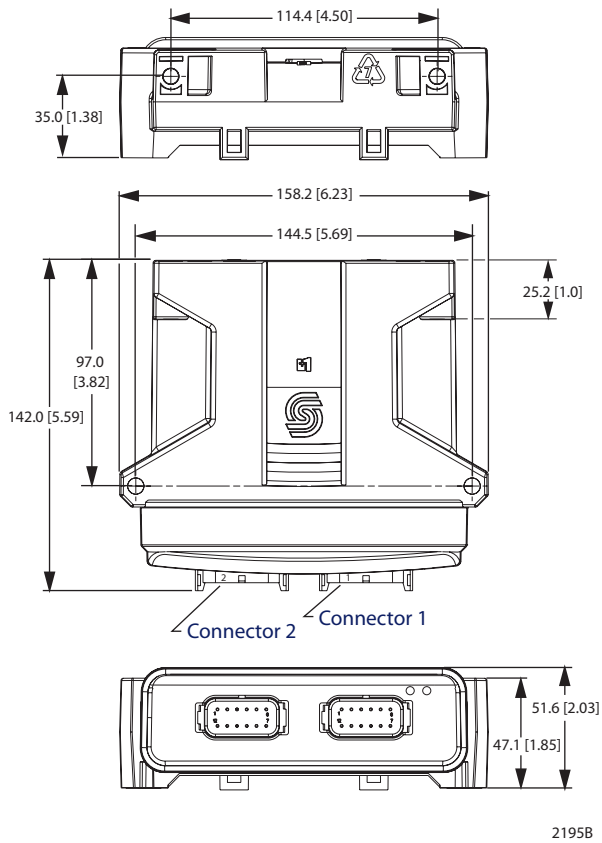
MC024-010 and MC024-012 Controllers

### 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
- 14 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
  - (6) digital (DIN) configurable as pull up (5 Vdc) or pull down (0 Vdc) or pull to center (2.5 Vdc)
  - (2) analog (AIN/Temp/Rheo) 0 to 5.25 Vdc or 0 to 10,000 ohm rheostat
  - (1) fixed range analog (AIN/CAN shield) 0 to 5.25 Vdc or CAN shield pin
- 4 outputs
  - (4) universal (PWMOUT/DOOUT/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/DOOUT/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 300 mA and regulated internally
- 2 LEDs under user control
- 3 mounting alternatives: stack, end, or side
- MC024-012 contains application key required to run Sauer-Danfoss developed machine control application software
- CE compliant

**Dimensions and Pin Assignments**

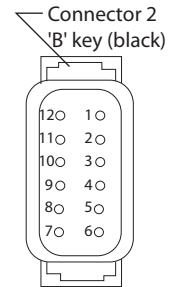
MC024-010 and MC024-012 Mounting Dimensions in Millimeters [Inches]



MC024-010 and MC024-012 24 Pin Connectors

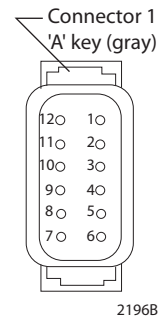
Connector 2

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



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
C1-P11	DIN
C1-P12	DIN



**Caution**

This device is not field serviceable. Opening the device housing will void 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	8 A
Maximum current, sinking	8 A

Product Part Numbers

MC024-010	10100899
MC024-012	11013732

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	

Comprehensive technical information: PLUS+1 Controller Family Technical Information, **520L0719**; MC024-010 Application Program Interface (API)10101267.doc; MC024-012 API Document Sauer-Danfoss product literature on line at: [www.sauer-danfoss.com](http://www.sauer-danfoss.com)