

Vehicle Control Unit MS 50.4 CAN-FD



The VCU MS 50.4 CAN-FD is a highly powerful processing / logging unit for race applications.

Based on our broad base of platform function, we support you with customized VCU functions for a tailor-made solution.

In addition, you can quickly develop your individual customer software based on MATLAB/Simulink to significantly speed up algorithm development (automatic code and documentation generation, requires CCA package) – including extensive simulation capabilities.

Application

Processor for customer code 667 MHz Dual Core

Processor for logger 667 MHz Dual Core

Configurable math channels

User configurable CAN in/out messages

Online data compression

Internal logger

- 1,500 channels
- FULL_LOG_1 (4 GB memory on Partition 1) enabled
- PERF_LOG_1 (16 GB memory on Partition 1) optional
- FULL_LOG_2 (4 GB memory on Partition 2) enabled
- High Speed Logging Package (Sampling rate 5 μ s) optional
- DATA_USB (Data copy to USB flash drive) enabled

Logging rates

- Usage of all features: 600 kB/s
- Primary logging use case: >1,200 kB/s
- Logging data download rate: up to 6.2 MB/s

LTE Ethernet telemetry support

RS232 interface for GPS

- ▶ 667 MHz Dual Core Processor exclusively for vehicle control functionality (MATLAB based)
- ▶ Identical, dedicated 667 MHz Dual Core Processor exclusively for logging purposes
- ▶ High Speed Logging 200 kHz of 6 analog inputs (optional)
- ▶ Up to 8 CAN buses, CAN 3 to CAN 8 are CAN-FD compatible

Technical Specifications

Mechanical Data

Size	166 x 121 x 41 mm
Weight	≤ 660 g
Protection classification	IP67
3 motorsport connectors, 198 pins in total	
Max. vibration	Vibration profile 1 (see Downloads or www.bosch-motorsport.com)
Operating temperature internal	-20 to 80°C

Electrical Data

Supply voltage	5 to 18 V
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Inputs

20 x Analog channels 0 to 5 V, 0.5 % precision between 0.2 and 4.8 V, switchable pull-up
8 x Digital PWM inputs $f_{\max}$ =30 kHz Hall-type speed measurement possible, Switchable pullup 2.15 kOhm, (required for Hall), Tooth count differential*
4 x Digital PWM inputs $f_{\max}$ =30 kHz Hall- and DF11 type speed measurement possible, Fixed pullup 2.15 kOhm (required for Hall), Tooth count differential*
4 x universal Thermocouple
1 x Bosch Laptrigger
1 x TimeSync master and slave (specific to Bosch measurement system)
Internal measurements:

1 x ambient pressure
 1 x ECU temperature
 20 x supply voltage
 20 x supply current
 1 x battery voltage (external VCU supply)
 1 x external VCU supply current
 4 x HS output current
 1 x 3-axis acceleration plus roll/pitch/yaw rate

Outputs

2* x 7.5 A each, PWM High side, 50 Hz
 4* x 2.2 A each, PWM Low side, 10 kHz
 *can be enhanced by Upgrade I/O Package

Sensor Supplies and Screens

5* x 12 V, 400 mA each
 5* x Switchable 5 V/12 V, 400 mA each
 4 A max overall current on all 12 V
 2 A max overall current on all 5 V
 12 V $\pm$ 1 % precision on the pin
 5 V $\pm$ 0.1 % precision on the pin
 20 x Sensor ground
 *can be enhanced by Upgrade I/O Package

Adaptation and Documentation

Function documentation	Automatically created during code generation
MatLab code generation	Support for customer own MatLab function development

Software Tools (free download)

Data Analysis tool WinDarab 7	
System Configuration tool RaceCon	Logger configuration, calibration, and online measurement

Connectors

Connector LIFE (red) AS018-35PN	Mating connector AS618-35SN (not included)
Connector SENS-A (yellow) AS018-35PA	Mating connector AS618-35SA (not included)
Connector SENS-B (blue) AS018-35PB	Mating connector AS618-35SB (not included)

Communication

3 Ethernet 100 Mbit
 4 CAN (+4 with Upgrade I/O Package), CAN 3 to CAN 8 are CAN-FD compatible
 1 LIN
 1 USB
 1 RS232 interface for GPS or Telemetry, switchable depending on SW version
 1 Time sync synchronization Ethernet

Installation Notes

Maintenance Interval: 220 h or a maximum of two years

Please remember that the mating connectors and the programming interface MSA-Box II are not included and must be ordered separately.

Upgrades

CCA Hardware Upgrade per device

Provides the option to run customer developed software code on Bosch device

Multi CCA Hardware Upgrade per device

Enables the use of an extra core to utilize more computing power in the device

I/O Package

Communication

4 CAN

Inputs

4 Analog channels
 0 to 5 V,
 0.5 % precision between 0.2 and 4.8 V, switchable pull-up

4 Digital PWM inputs
 f_{max} =30 kHz
 Hall-type speed measurement possible,
 Fixed pullup 2.15 kOhm (required for Hall),
 Tooth count differential**

4 LVDT, 5 pin configuration,
 excitation frequency 1 to 20 kHz,
 excitation voltage 0 to 5 V (rms)

Outputs

4 "TTL" Digital output, 10 kHz, PWM, 25 mA each
 2 PWM High side; 7.5 A each, PWM, 50 Hz
 4 PWM Low side; 2.2 A each, PWM, 10 kHz

Power Supplies

5 x 12 V, 400 mA each
 5 switchable 5 V/12 V, 400 mA each

** The tooth count differential between any two of the PWM inputs is available to measure e.g., shaft torsion.

High Speed Logging Package

6 ANA 0 to 5 V, 200 kHz logging rate

CCP/XCP_MASTER

Enables CCP/XCP master functionality to request data from foreign devices via CAN/CCP protocol, XCP over Ethernet (UDP) or XCP via CAN.
 (ASAP2 file from ECU manufacturer required)

Ordering Information

Vehicle Control Unit MS 50.4 CAN-FD
 Order number **F02U.V03.514-01**

Rugged USB flash driveOrder number **F02U.V03.534-01****Connector for USB flash drive on car loom side**Order number **F02U.002.996-01****Adapter cable to PC USB-Port**Order number **F02U.V01.343-01****Breakout Box BOB 66-pole**

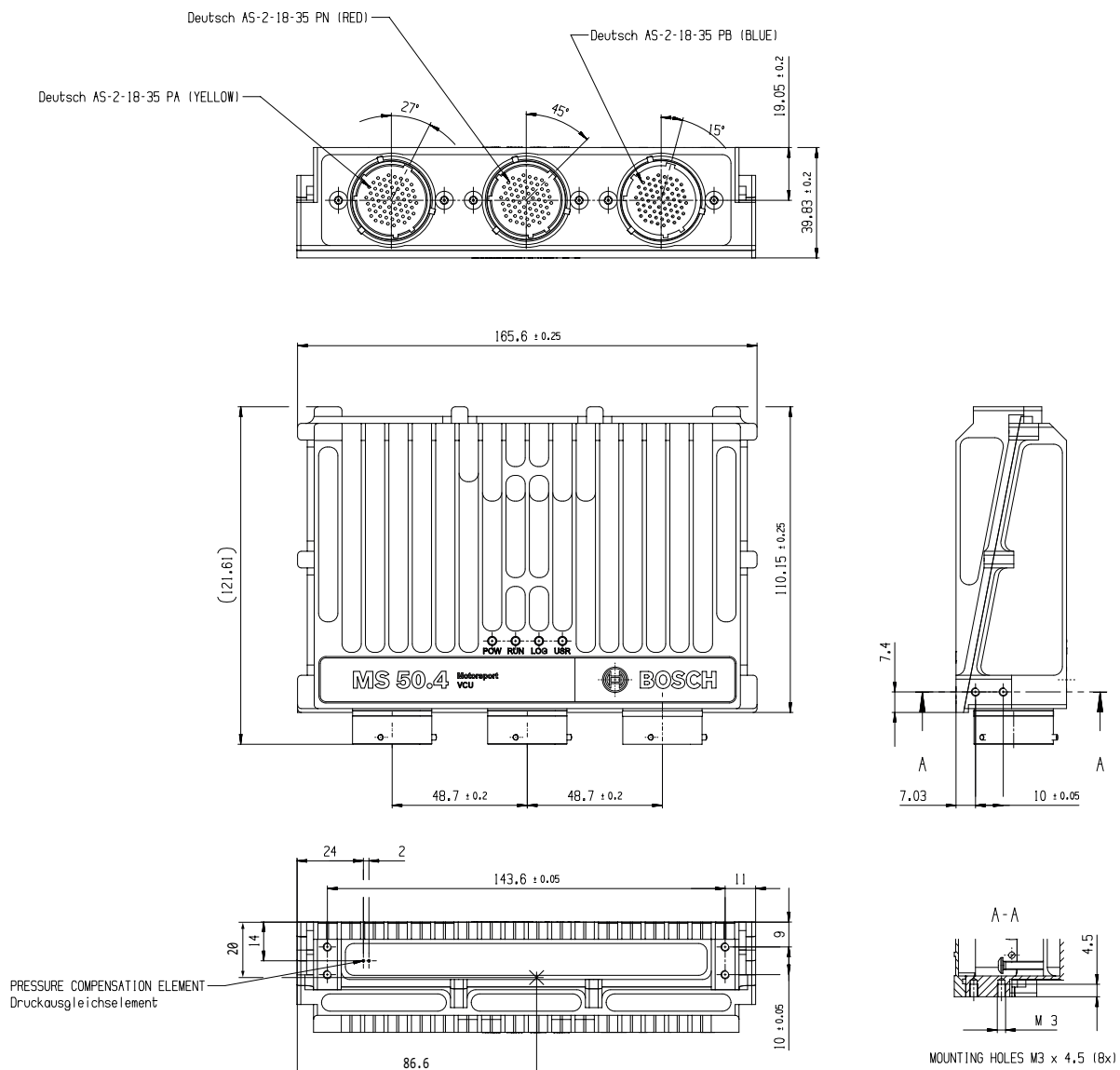
Connector code: blue

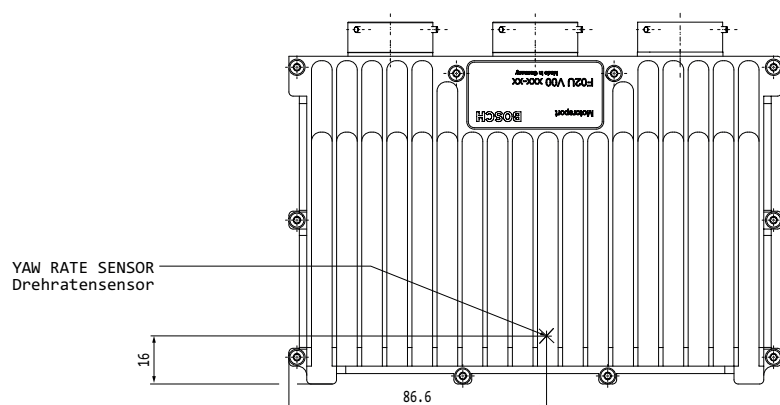
Order number **F02U.V02.295-01****Breakout Box BOB 66-pole**

Connector code: yellow

Order number **F02U.V02.298-01****Breakout Box BOB MS 7**

Connector code: red

Order number **F02U.V02.293-01****Software Options****CCA Hardware Upgrade per device**Order number **F02U.V02.137-01****Multi CCA Hardware Upgrade VCU per device**Order number **F02U.V03.222-01****I/O Package**Order number **F02U.V02.777-01****High Speed Logging Package**Order number **F02U.V02.779-01****CCP/XCP_MASTER**Order number **F02U.V02.213-01****Real Time Ethernet**Order number **F02U.V02.782-01****Accessories****Opening tool for shellsize 18**Order number **F02U.V01.394-01****Dimensions**

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