

Vehicle Control Unit MS 50.4



- ▶ 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)
- ▶ Real time Ethernet SERCOS 3
- ▶ Event logging, Configurable pre-event logging

The VCU MS 50.4 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.

The device offers real time Ethernet functionality to exchange e.g. data used in control algorithms between devices (guaranteed latency time 1 ms).

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
- 4 GB memory on partition 1
- 4 GB memory on partition 2
- Fastest sampling 1 ms or 1 syncro
- Optional: Sampling rate high speed logger 5 µs
- Long-term recording
- Own data protection code

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

Copy data of partition 1 to USB data stick

LTE Ethernet telemetry support

RS232 interface for GPS

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 www.bosch-motorsport.com)

Operating temperature internal -20 to 80°C

Electrical Data

Supply voltage 5 to 18 V

Inputs

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

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

4 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 universal Thermocouple

1 Bosch Laptrigger

1 TimeSync master and slave (specific to Bosch measurement system)

Internal measurements:

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

Outputs

PWM High side 2*; 7.5 A each, PWM, 50 Hz
 PWM Low side 4*; 2.2 A each, PWM, 10 kHz

*can be enhanced by Upgrade I/O Package

Power Supplies

12 V, 400 mA each 5*

Switchable 5 V/12 V, 400 mA each 5*

Max overall current 4 A on all 12 V
 2 A on all 5 V

Precision 12 V \pm 1 % on the pin
 Precision 5 V \pm 0.1 % on the pin

Sensor ground 20

*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) Mating connector AS018-35PN AS618-35SN (not included)

Connector SENS-A (yellow) Mating connector AS018-35PA AS618-35SA (not included)

Connector SENS-B (blue) Mating connector AS018-35PB AS618-35SB (not included)

Communication

3 Ethernet 100 Mbit

2 Realtime Ethernet SERCOS3

4 CAN*

1 LIN

1 USB

1 RS232 interface for GPS

1 Time sync synchronization Ethernet

*can be enhanced by Upgrade I/O Package

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.

Legal Restrictions

The sale of this product in Mexico is prohibited.

Upgrades

Hardware Upgrade for CCA per device

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

Hardware Upgrade for Multi CCA 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 x12 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_MASTER

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

Real Time Ethernet

Enables the VCU to operate as a real time Ethernet master or slave. Guaranteed latency time of 1 ms. Ideal for time critical data transfer as needed in online control algorithms involving data from different devices.

Two interfaces allow for a ring topology (redundancy in case the RTE line experiences damage).

The VCU features a reasonable set of SERCOS3 instructions although not the full SERCOS3 standard is implemented. The ECU side can act as a SERCOS3 master; the logger side can act as a SERCOS3 slave.

USB Kit

Rugged USB flash drive

Mating connector for USB flash drive on car loom side

Adapter cable to PC USB-port

Ordering Information

Vehicle Control Unit MS 50.4

Order number **F02U.V02.965-02**

Vehicle Control Unit MS 50.4 incl. CCA HW Upgrade

Order number **F02U.V03.012-01**

Software Options

Hardware Upgrade for CCA per device

Order number **F02U.V02.137-01**

Hardware Upgrade for Multi CCA 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_MASTER

Order number **F02U.V02.213-01**

Real Time Ethernet

Order number **F02U.V02.782-01**

Accessories

Rugged USB flash drive

Order number **F02U.V01.342-03**

Mating 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**

Opening tool for shellsize 18

Order number **F02U.V01.394-01**

Breakout Box BOB 66-pole

Connector code: blue

Order number **F02U.V02.295-01**

Breakout Box BOB 66-pole

Connector code: yellow

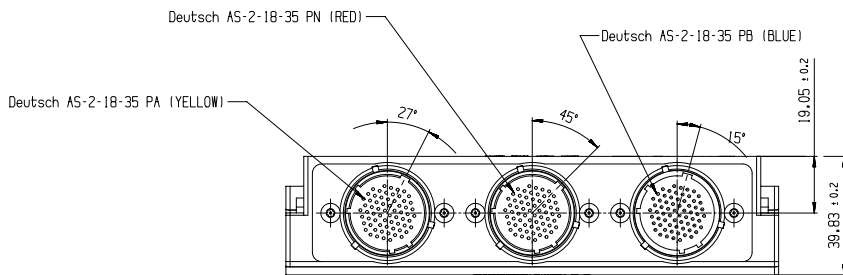
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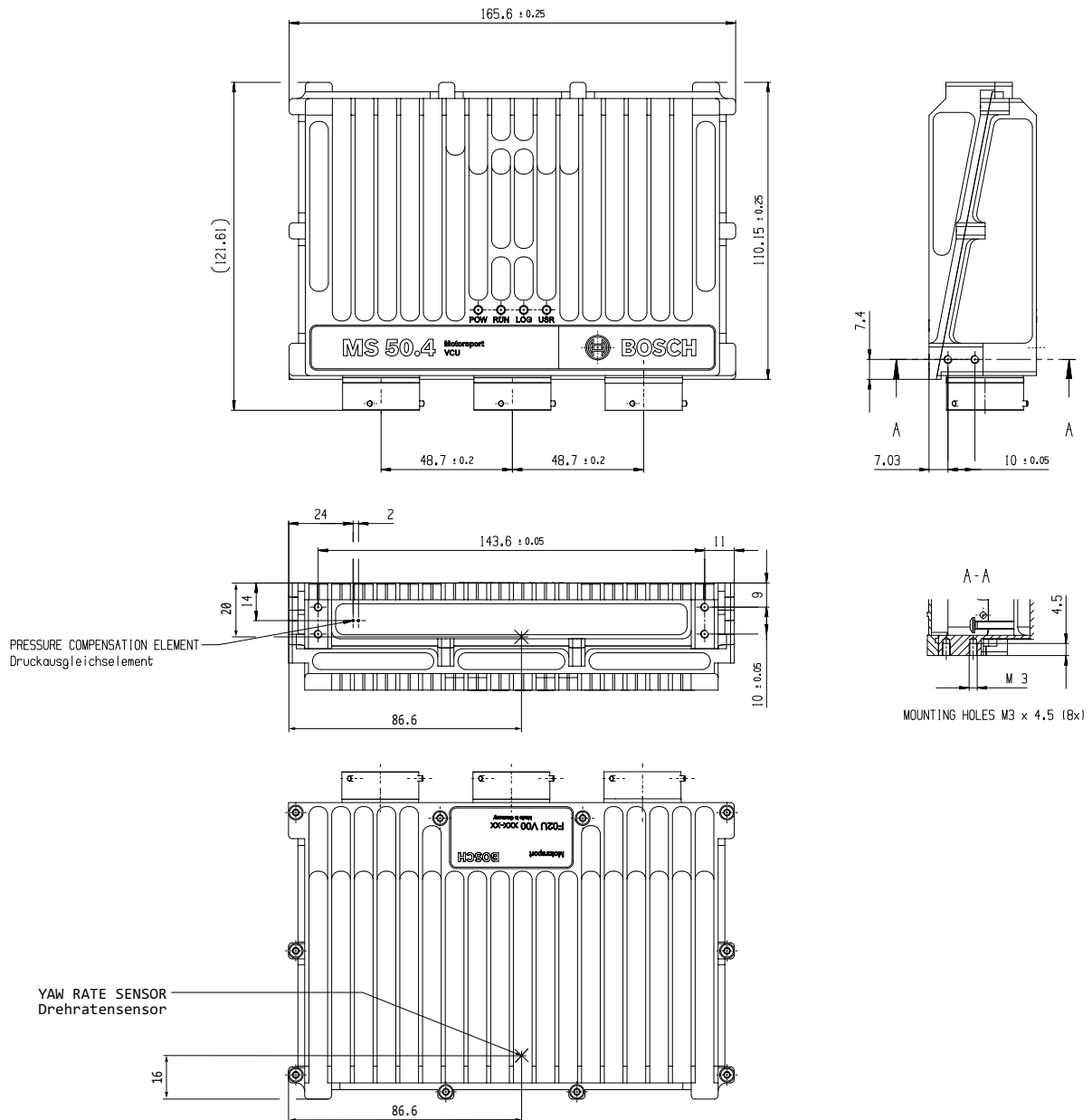
Breakout Box BOB MS 7

Connector code: red

Order number **F02U.V02.293-01**

Dimensions





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