Vehicle Control Unit VCU 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 analogue 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	
Sampling rate logger	1 ms
Optional: Sampling rate high speed logger	5 µs
Online data compression	
Logging rate	Max. 600 kB/s
Internal storage capacity	6 GB
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
Operating temperature internal	-20 to 80°C
3 motorsport connectors, 198 pins in total	
Max. vibration	Vibration profile 1 (see www.bosch-motorsport.com)

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, see below

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 ± 1 % on the pin Precision 5 V ± 0.1 % on the pin	
Sensor ground	20

*can be enhanced by Upgrade I/O Package, see below

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

Upgrade Customer Code Area CCA

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

Upgrade 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 two measure e.g. shaft torsion.

Upgrade High Speed Logging Package

6 ANA	0 to 5 V, 200 kHz logging rate

Upgrade CCP Master

Enables CCP master functionality to request data from foreign devices via CAN/CCP protocol.

Upgrade 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 Accessories

Rugged USB flash drive

Mating connector for USB flash drive on car loom side

Adapter cable to PC USB-port

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

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, see below

Installation Notes

Inspection services recommended after 220 h or 2 years, no components to replace.

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

Ordering Information

Vehicle Control Unit VCU MS 50.4
Order number **F02U.V02.965-02**

Vehicle Control Unit VCU MS 50.4 + CCA
Order number **F02U.V03.012-01**

Vehicle Control Unit VCU MS 50.4 + I/O_PACK + CCA
Order number **F02U.V03.013-01**

Software Options

Customer Code Area CCA
Order number **F02U.V02.137-01**

I/0 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**

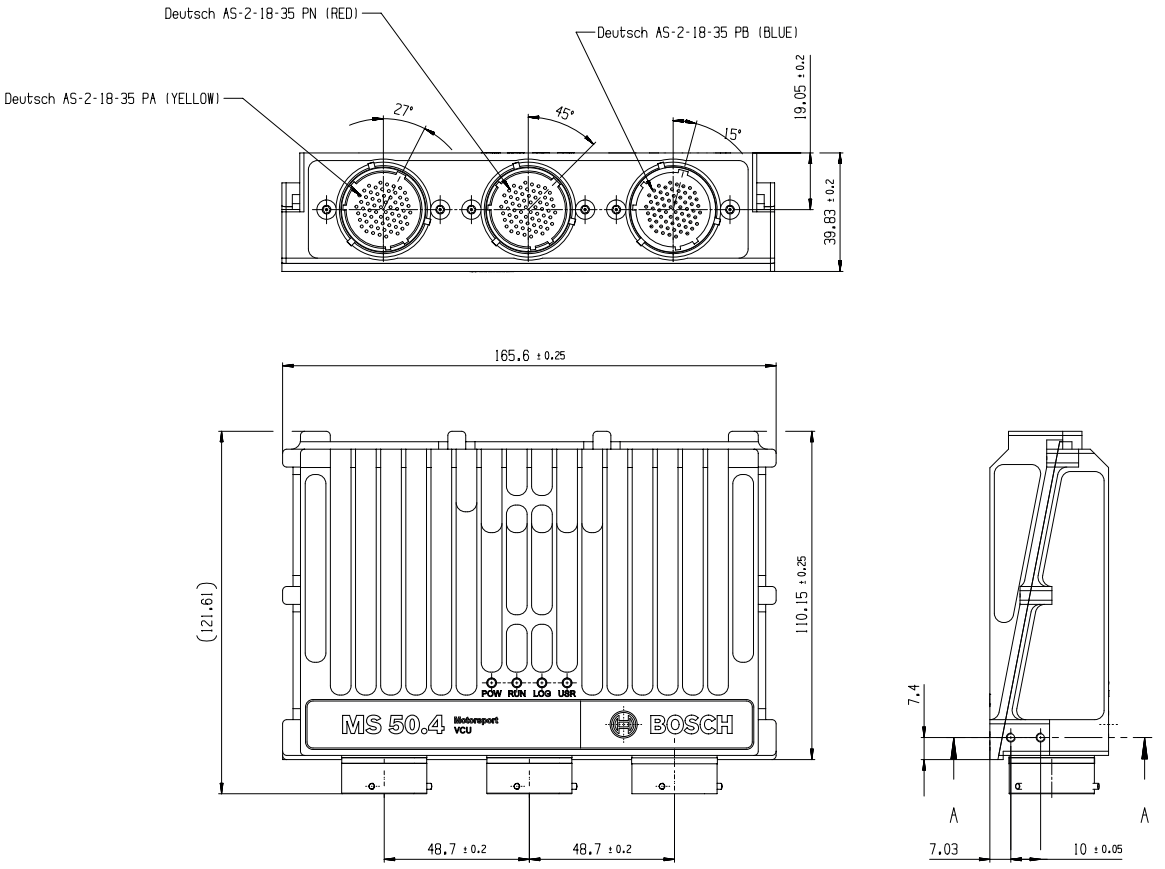
Opening tool for shellsize 18
Order number **F02U.V01.394-01**

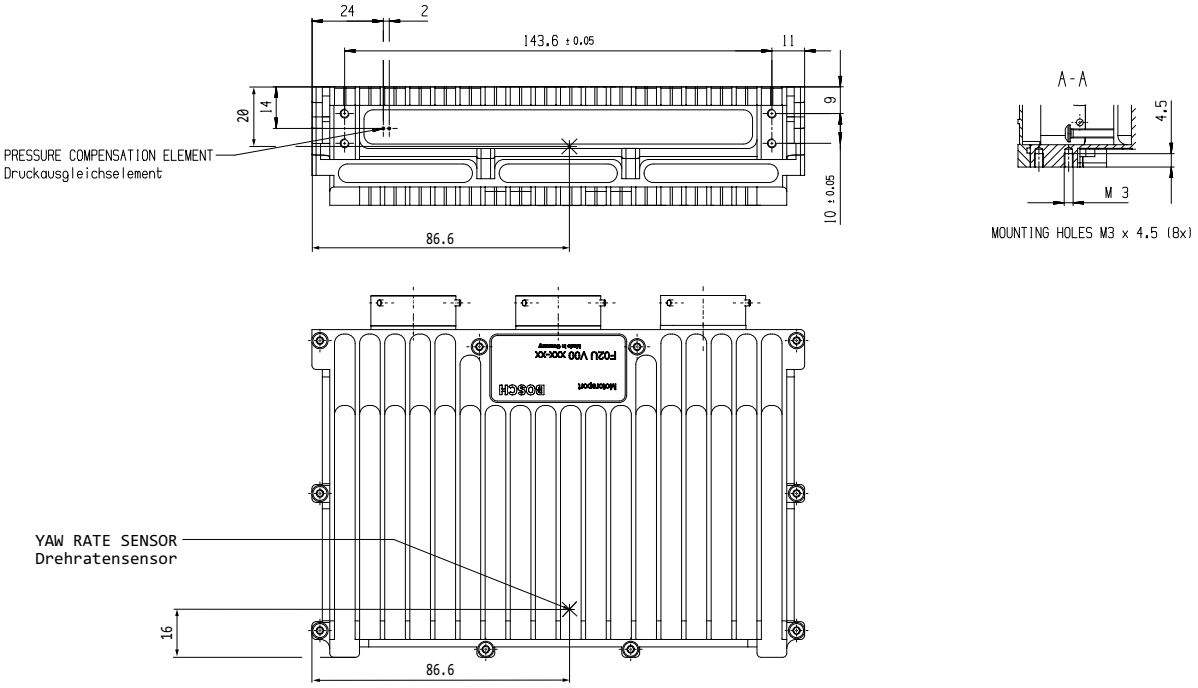
Breakout Box BOB 66-pole
Connector code: blue
Order number **F02U.V02.295-01**

Breakout Box BOB 66-pole
Connector code: yellow
Order number **F02U.V02.298-01**

Breakout Box BOB MS 7
Connector code: red
Order number **F02U.V02.293-01**

Dimensions





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