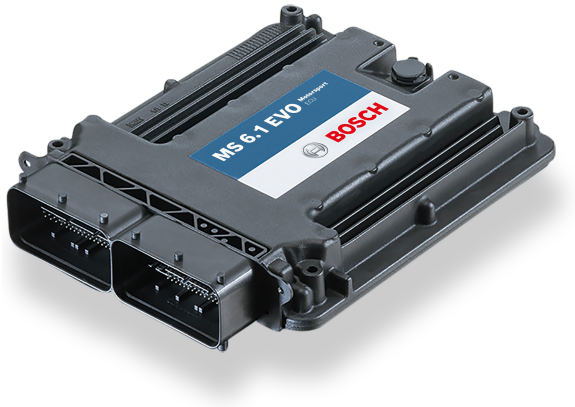
Engine Control Unit MS 6.1 EVO



- Optimized for low-pressure injection
- Measurement with 21 analog inputs
- 4 GB memory plus 4 GB upgrade
- SENT sensor support

The MS 6.1 EVO engine control unit manages gasoline engines up to 12 cylinders. As a member of our MS 6 family it features a powerful digital processing core with floating point arithmetic and a high-end FPGA for ultimate performance and flexibility. The MS 6 family utilizes a new software development process based on MATLAB/Simulink which significantly speeds algorithm development by using automatic code and documentation generation. Custom functions can be quickly and easily generated. The flexible hardware design allows the MS 6.1 EVO to support complex or unusual engine or chassis configurations.

Application

Low pressure injection
- Max. 12 cylinders up to 12,500 rpm, high impedance injectors only

Ignition
- 12 x ignition control, IGBT or BJT, coils with integrated amplifier

Physical engine model for fast application
- determine engine load by throttle position or air pressure signals
- mixture control and basic ignition guided by main signal relative load rl
- Subsystems pit speed-, launch-, rpm-limiter and ASR are integrated inside torque control
- Separated power cut functions to assist various gear cut systems
- Diagnostics
- Integrated safety strategy for electronic throttle control

Integrated support of manual gearshift	
Electronic throttle control	Optional, see Upgrades
Variable Valve Timing VVT	Optional, see Upgrades
Turbo control	Optional, see Upgrades
Traction control	Optional, see Upgrades
Launch control	Optional, see Upgrades
LTE Ethernet telemetry support	

Internal logger
- 4 GB memory on Partition 1 enabled
- 100 free configurable channels, 20 Hz
- FULL_LOG_1 (1,500 channels/1 kHz sampling rate on Partition 1) optional
- FULL_LOG_2 (4 GB memory/1,500 channels/1 kHz sampling rate on Partition 2) optional

Logging rates
- Usage of all features: 300 kB/s
- Primary logging use case: 600 kB/s
- Logging data download rate: up to 4 MB/s

Technical Specifications

Mechanical Data

Aluminum housing	
2 Bosch connectors	196 pins in total
Size	226 x 181 x 44 mm
Weight	1,086 g
Protection Classification	IP54
Temp. range (at internal sensors)	-20 to 80°C

Electrical Data

Power supply	6 to 18 V
CPU	Dual Core 667 MHz, FPGA

Inputs

21 analog inputs

- 6 x reserved for electronic throttle controls
- 3 x no integrated pull-up
- 3 x option for angle synchronous measurement, no integrated pull-up
- 4 x fixed 3.01 kOhm pull-up
- 5 x switchable 3.01 kOhm pull-up

6 internal measurements

- 1 x ambient pressure
- 1 x acceleration 6-axis
- 2 x ECU temperature
- 2 x ECU voltage

8 function related inputs

- 1 x Thermocouple exhaust gas temperature sensors (K-type)
- 2 x Lambda interfaces for LSU 4.9 sensor types
- 1 x Lap trigger/beacon input
- 4 x Knock sensors

18 digital inputs

- 1 x switchable Hall or inductive sensor for flywheel measurement
- 2 x Hall sensor for sync wheel detection
- 4 x switchable Hall or DF11 sensors for camshaft position or wheel speed
- 2 x switchable Hall or inductive sensors for turbo speed measurement
- 1 x digital switch for engine ON/OFF
- 8 x digital, e.g. SENT

Sensor supplies and screens

- 4 x sensor supplies 5 V / 50 mA
- 3 x sensor supplies 5 V / 150 mA
- 7 x sensor grounds
- 2 x sensor screens

Outputs

28 function related outputs

Low Pressure Injection

- 12 x 2.2 A controls, high impedance injectors

Ignition

- 12 x control, IGBT or BJT, coils with integrated amplifier

- 2 x 8.5 A H-bridge reserved for electronic throttle
- 2 x 4 A pwm lowside switch for Lambda heater

19 freely configurable outputs

- 1 x 8.5 A H-bridge
- 2 x 4 A pwm lowside switch
- 4 x 3 A pwm lowside switch
- 8 x 2.2 A pwm lowside switch
- 4 x 1 A pwm lowside switch

3 output signals

- 1 x engine rpm
- 1 x flywheel
- 1 x trigger wheel

Software Tools (free download)

- Data Analysis tool WinDarab V7
- System Configuration tool RaceCon 2.7.0.9 or later

Mating Connectors (not included)

Mating Connector 91 pins	F02U.B00.711-01
Mating Connector 105 pins	F02U.B00.712-01

Norms

Product Safety

- EN IEC 62368-1:2020+A11:2020

Materials

- REACH - Nr. 1907/2006

EMC

- UNECE10:rev.6/AMD1:2020
- KN41
- ISO11452-2
- ISO11452-4
- ISO10605
- ISO7637-2
- ISO7367-3
- ISO16750-2
- US FCC: Title 47, Part 15 Subpart B
- ICES-003

Testing

- SAEJ1211

Communication

- 2 Ethernet
- 3 CAN
- 1 LIN
- 8 SENT
- 1 RS232
- 1 Time sync synchronization Ethernet
- 3 Communication screens

Installation Notes

- Maintenance Interval: 220 h or a maximum of two years
- Depending on your experiences with calibration of ECUs, we recommend calibration support from Bosch Motorsport.

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

Application
Configurable flywheel- and trigger disc geometries, Selectable links between functions and in- or outputs

Function documentation
Automatically created during code generation

MatLab code generation
Support for customer own MatLab function development

Legal Restrictions

Generally blocked are direct and indirect business involving high risk destinations, including Russia, Belarus, Cuba, Iran, North Korea, Syria, Libya, Afghanistan, and certain non-governmental controlled Ukrainian regions. This list may change as geopolitics evolve.

Upgrades

Engine Function Package 1

- Electronic Throttle Control
- VVT
- Turbo Control

Engine Function Package 2

- Traction Control
- Launch Control

Measurement Package

17 Additional analog inputs
- 7 x no integrated pull-up
- 1 x option for angle synchronous measurement, no integrated pull-up
- 1 x fixed 3.01 kOhm pull-up
- 8 x switchable 3.01 kOhm pull-up

Extension of the use of 8 digital channels as analogue / digital inputs (shared)

1 Additional function related inputs
- 1 x Thermocouple K-type

CCA Hardware Upgrade per device

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

FULL_LOG_1

Extension for Partition 1
- 1,500 channels
- 1 kHz sampling rate

FULL_LOG_2

Activation of Partition 2
- 1,500 channels
- 1 kHz sampling rate
- 4 GB memory

Gear Control Package 1

Gear control MEGA-Line functionality, has to be used with MEGA-Line components (License model via MEGA-Line)

-- Link to MEGA-Line Support Request --

-- Link to MEGA-Line License Request Form --

Gear Control Package 2

Gear control Bosch Motorsport functionality

SW Package MS 6 Drag 1

- Launch Time
- Launch Distance
- Torque Pre-Control
- Launch RPM Control
- Universal Outputs for Time/Distance Controls

SW Package MS 6 Drag 2 (requires Drag 1 License)

- Acceleration Sensor MM5.10 included
- Time/Distance Boost Control
- Driveshaft Speed Control
- Driveshaft Gradient Control
- Acceleration Control
- Wheelie Control

Innovation License Device

Activation of a set of additional functions for a single device:
- Crank rotation direction detection (using sensor DG23i)
- Using a 2nd crank backup sensor
- Crank-Preset, quick start based on previous crank stop position
- Far-Bank, 2nd injector per cylinder possible
- Cam-only-synchronisation, engine run without crank sensor signal (specific cam trigger wheel needed)

Innovation Package Project

Innovation Package Project has the same content as Innovation License Device, but license is valid for the whole project instead of a single device

DATA_USB

Data copy to USB flash drive

Ordering Information

Engine Control Unit MS 6.1 EVO
Order number **F02U.V03.113-01**

Rugged USB flash drive
Order 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**

Software Options

Engine Function Package 1
Order number **F02U.V02.001-01**

Engine Function Package 2

Order number **F02U.V02.002-01**

Measurement Package
Order number **F02U.V02.000-01**

CCA Hardware Upgrade per device
Order number **F02U.V02.137-01**

FULL_LOG_1
Order number **F02U.V02.304-01**

FULL_LOG_2
Order number **F02U.V02.305-01**

Gear Control Package 1
Order number **please contact MEGA-Line**

Gear Control Package 2
Order number **F02U.V02.108-01**

SW Package MS 6 Drag 1
Order number **F02U.V0U.409-01**

SW Package MS 6 Drag 2
Order number **F02U.V0U.410-01**

Innovation License Device
Order number **F02U.V02.510-01**

Innovation Package Project
Order number **F02U.V02.511-01**

DATA_USB
Order number **F02U.V03.476-01**

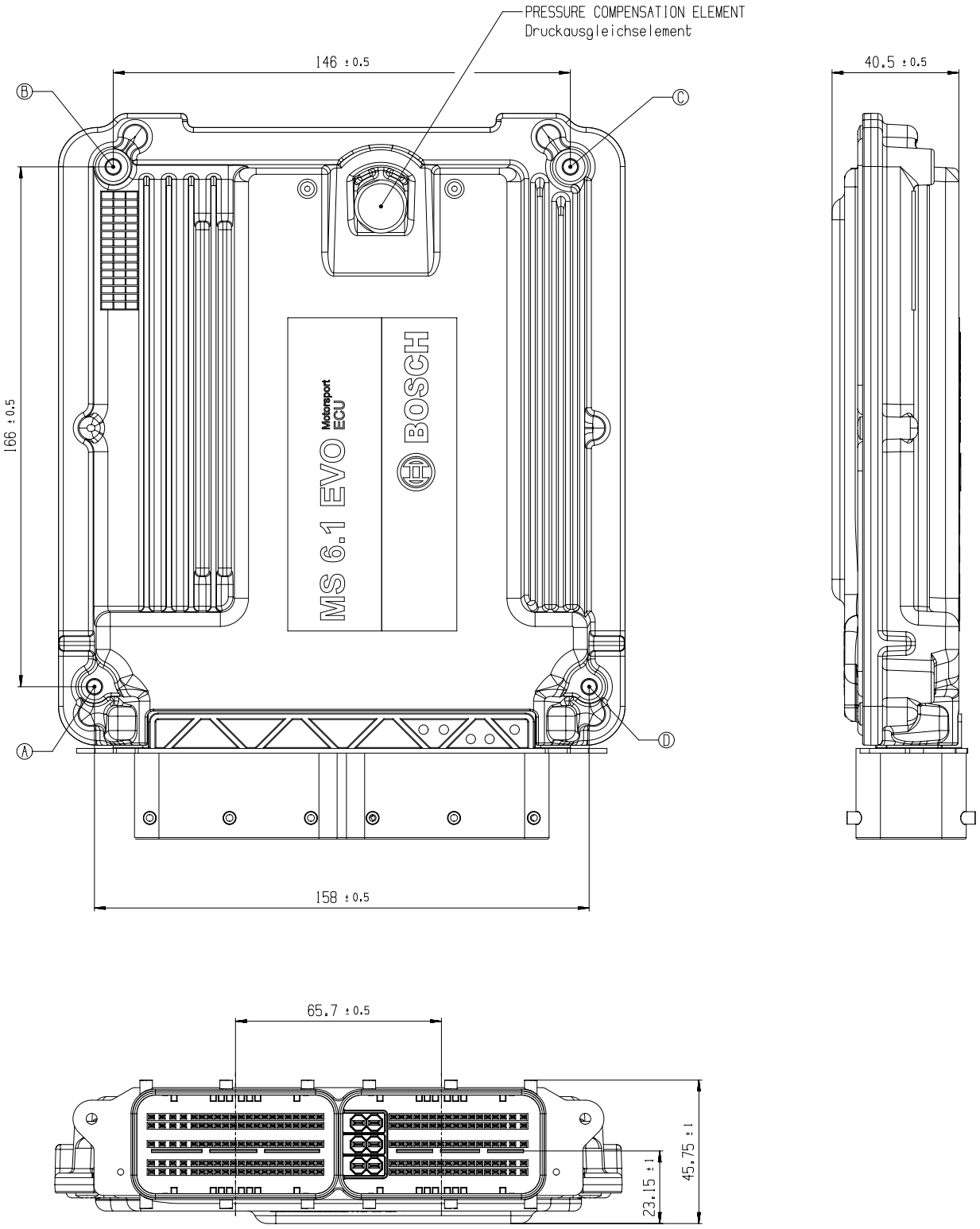
Accessories

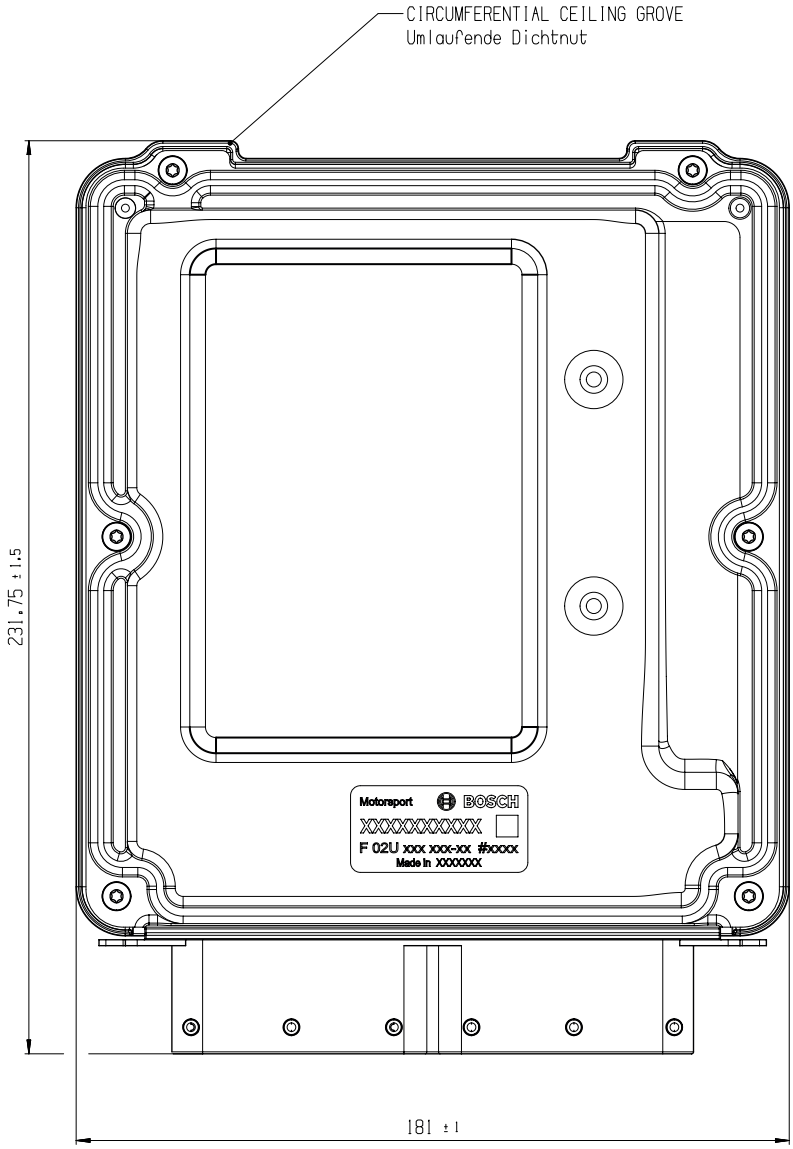
Breakout Box BOB MS 6 EVO
Order number **F02U.V02.294-02**

Mating Connector 91 pins
Order number **F02U.B00.711-01**

Mating Connector 105 pins
Order number **F02U.B00.712-01**

Dimensions


PRESSURE COMPENSATION ELEMENT
Druckausgleichselement
146 ±0.5
40.5 ±0.5
166 ±0.5
MS 6.1 EVO
Motorsport ECU
BOSCH
158 ±0.5
65.7 ±0.5
23.15 ±1
45.75 ±1



Represented by:

Europe:
Bosch Engineering GmbH
Motorsport
Robert-Bosch-Allee 1
74232 Abstatt
Germany
motorsport@bosch.com
www.bosch-motorsport.de

North America:
Bosch Engineering North America
Motorsport
38000 Hills Tech Drive
Farmington Hills, MI 48331-3417
United States of America
motorsport@bosch.com
www.bosch-motorsport.com

Asia-Pacific:
Bosch Engineering Japan K.K.
Motorsports Department
1-9-32 Nakagawachuo, Tsuzuki-ku
Yokohama-shi
Kanagawa, 224-8601
Japan
motorsport@jp.bosch.com
www.bosch-motorsport.jp

Australia, New Zealand and South Africa:
Robert Bosch Pty. Ltd
Motorsport
1555 Centre Road
Clayton, Victoria, 3168
Australia
motor.sport@au.bosch.com
www.bosch-motorsport.com.au

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