

# Engine Control Unit MS 7.4



- ▶ Optimized for low- and high-pressure injection
- ▶ Data logger included
- ▶ Gearbox control optionally included
- ▶ Gigabit data interface

The MS 7.4 engine control unit manages gasoline engines up to 12 cylinders. The MS 7 line features a powerful digital processing core with floating point arithmetic and a high-end FPGA for ultimate performance and flexibility. The MS 7 line utilizes a software development process based on MATLAB/Simulink which significantly speeds up algorithm development by using automatic code and documentation generation. Custom functions can be generated quickly and easily. The flexible hardware design allows the MS 7.4 to support complex or unusual engine or chassis configurations.

## Application

### High pressure injection

Integrated power stages for triple injection and use of:

- 4 cylinders up to 14,600 rpm
- 6 cylinders up to 9,700 rpm
- 8 cylinders up to 7,300 rpm

(for supply voltages >10 V, depending on injection types and pressure ranges)

HP package for flat and V-engines inclusive (2nd Bank, fuel control valve 2, external cylinder 9-12)

### Low pressure injection

- Max. 12 cylinders up to 16,000 rpm, high impedance injectors only

Outputs can be used alternatively as low side switches 2.2 A with fast decay

### Ignition

- 8 integrated power stages up to 20 A
- alternatively, up to 12 drivers for use with external power stages

### 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 several gear cut systems
- Diagnostics
- Integrated safety strategy for 2 electronic throttle controls

Integrated support of manual gearshift

Electronic throttle control

Variable Valve Timing VVT

Turbo control

Traction control

Launch control

LTE Ethernet telemetry support

### Internal logger

- FULL\_LOG\_1 (4 GB memory on Recording 1) enabled
- PERF\_LOG\_1 (16 GB memory on Partition 1) optional
- FULL\_LOG\_2 (4 GB memory on Recording 2) enabled
- DATA\_USB (Data copy to USB flash drive) enabled

### Logging rates

- Usage of all features: 400 kB/s
- Primary logging use case: >800 kB/s
- Logging data download rate: up to 6.2 MB/s

## Technical Specifications

### Mechanical Data

Milled aluminum housing

4 motorsport connectors, 264 pins in total

Size without connectors	198 x 180 x 42 mm
Weight	1,610 g
Protection Classification	IP67
Temp. range (at internal sensors)	-20 to 85°C
Max. Vibration	Vibration Profile 1 (see Downloads or <a href="http://www.bosch-motorsport.com">www.bosch-motorsport.com</a> )

### Electrical Data

Power supply	6 to 18 V
CPU	Dual Core 1 GHz, FPGA

### Inputs

#### 41 analog inputs

#### 8 analog/digital inputs (shared)

#### 10 digital inputs

#### 21 internal measurements

- 1 x ambient pressure
- 1 x acceleration 3-axis
- 3 x ECU temperature
- 10 x ECU voltage (e.g., sensor supply)
- 6 ECU current (e.g., sensor supply)

#### 18 function related inputs

- 8 x combustion chamber pressure input
- 2 x thermocouple exhaust gas temperature sensors (K-type)
- 2 x Lambda interfaces for LSU 4.9 sensor types
- 1 x digital switch for engine ON/OFF
- 1 x digital input for beacon receiver
- 4 x knock sensors

### Sensor supplies and screens

- 4 x sensor supplies 5 V / 50 mA
- 3 x sensor supplies 5 V / 400 mA
- 1 sensor supply ubat, 250 mA
- 9 x sensor grounds
- 2 x sensor screens

### Outputs

#### 42 function related outputs

- High Pressure Injection
  - 2 x high pressure pump with fuel control valve
  - 8 x high pressure injection for magnetic injectors
- Low Pressure Injection
  - 12 x 2.2 A low pressure injection for high impedance injectors
- Ignition

- 12 x ignition control, IGBT or BJT, coils with integrated power stage, or max. 8 cylinders and coils without integrated power stage, 20 A

2 x 8.5 A H-bridge reserved for electronic throttle

2 x 3 A pwm lowside switch for Lambda heater

4 x 12 mA for control of Moog valves

#### 15 freely configurable outputs

- 1 x 8.5 A H-bridge
- 2 x 4 A pwm lowside switch
- 6 x 3 A pwm lowside switch
- 4 x 2.2 A pwm lowside switch
- 2 x 1 A pwm lowside switch low dump resistant

#### 5 output signals

- 5 x MUX outputs for internal signals like flywheel, knock signals, cylinder pressure

### Adaptation and Documentation

Configuration	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

### Software Tools (free download)

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

### Mating Connectors (not included)

LIFE (red)	AS618-35SN
Actuator (blue)	AS618-35SB
Combined (orange)	AS618-35SC
Sensor (yellow)	AS618-35SA

### Communication

- 1 Ethernet 1 Gbit
- 2 Ethernet 100 Mbit
- 3 CAN
- 1 LIN
- 1 USB
- 1 RS232 for GPS or Telemetry, switchable depending on SW version
- 1 Time sync synchronization Ethernet
- 2 Network 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.

## Legal Restrictions

The sale of this product in Mexico is prohibited. Due to embargo restrictions, sale of this product in Russia, Belarus, Iran, Syria, and North Korea is prohibited.

## Upgrades

### CCA Hardware Upgrade per device

Enable Customer Code Area

### PERF\_LOG\_1

Increase logging partition 1 from 4 GB to 16 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

## Accessories

- Rugged USB flash drive
- Mating connector for USB flash drive on car loom side
- Adapter cable to PC USB-Port
- Cylinder pressure detection base package
- Knock detection via cylinder pressure evaluation
- Programming interface cable

## Ordering Information

### Engine Control Unit MS 7.4

Order number **F02U.V02.514-03**

### Software Options

#### CCA Hardware Upgrade per device

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

#### PERF\_LOG\_1

Order number **F02U.V03.054-01**

#### Gear Control Package 1

Order number **please contact MEGA-Line**

#### Gear Control Package 2

Order number **F02U.V02.264-01**

#### Cylinder pressure detection base package

Order number **F02U.V02.543-01**

#### Knock detection via cylinder pressure evaluation

Order number **F02U.V02.544-01**

### Accessories

#### Breakout Box BOB 66-pole, Connector code blue

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

#### Breakout Box BOB 66-pole, Connector code orange

Order number **F02U.V02.296-01**

#### Breakout Box BOB 66-pole, Connector code yellow

Order number **F02U.V02.298-01**

#### Breakout Box BOB MS 7, LIFE-Connector code red

Order number **F02U.V02.293-02**

#### Programming interface cable

Order number **F02U.V02.327-01**

#### Rugged USB flash drive

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

#### 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**

### Represented by:

#### Europe:

Bosch Engineering GmbH  
Motorsport  
Robert-Bosch-Allee 1  
74232 Abstatt  
Germany  
Tel.: +49 7062 911 9101  
Fax: +49 7062 911 79104  
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  
Tel.: +1 248 876 2977  
Fax: +1 248 876 7373  
motorsport@bosch.com  
www.bosch-motorsport.com

#### Asia-Pacific:

Bosch Engineering Japan K.K.  
Motorsport  
18F Queen's Tower C, 2-3-5 Minato  
Mirai Nishi-ku, Yokohama-shi  
Kanagawa 220-6218  
Japan  
Tel.: +81 45 650 5610  
Fax: +81 45 650 5611  
www.bosch-motorsport.jp

#### Australia, New Zealand and South Africa:

Robert Bosch Pty. Ltd  
Motorsport  
1555 Centre Road  
Clayton, Victoria, 3168  
Australia  
Tel.: +61 (3) 9541 3901  
motor.sport@au.bosch.com