

Bosch Engineering Training Center Program for 2012



BOSCH

Invented for life



The essential **capital:** **Knowledge**

Knowledge is a crucial capital for any company. Today's knowledge determines tomorrow's success. Cutting-edge automotive electronic systems are performing an increasing number of functions and becoming ever more complex. This also results in a growing demand for extensive targeted knowledge transfer – a demand that is met by the training courses we have developed in close co-operation with Robert Bosch GmbH.



Greater knowledge – greater ability

Our **seminar program** **at the Training Center**

This document provides you with an overview of our seminar program for 2012. It focuses on Bosch gasoline engine management, the Bosch hybrid system, bus systems, and AUTOSAR for automotive applications. As in previous years, we are fully committed to delivering a high-quality, up-to-date, interesting, and clearly structured program. If you have any specific requirements, please let us know so that future seminar programs can be adjusted perfectly to your needs.

Target groups

To get the most out of Bosch vehicle and engine management systems as well as out of communication between networked automotive components they have to be applied correctly. Our training courses provide this knowledge to those working on powertrains or vehicle bus systems at engine and automotive manufacturers:

- ▶ Engineers in technical sales, project management, development and application who use Bosch systems or are involved in networking
- ▶ Employees who are working with Bosch systems and the appropriate documentation for the first time
- ▶ New personnel and staff switching from other systems

Training objectives

The training courses provide you with knowledge applicable to your area of activity and thus enable you to make your work even more successful and efficient:

- ▶ Scope of performance regarding Bosch vehicle and engine management systems
- ▶ Bosch Motronic and hybrid system components and their way of interaction
- ▶ Physical models, background information, and their functional implementation in subsystems and main functions
- ▶ Functionality of bus systems and the relevant AUTOSAR basic software

Customer benefits

Make yourself and your team strong:

- ▶ More successful project processing with clear targeting
- ▶ Shorter induction period for new personnel and staff switching from other systems
- ▶ Better evaluation of Bosch systems' performance
- ▶ Accelerated implementation of your own system modifications



Successful project management with the right knowledge

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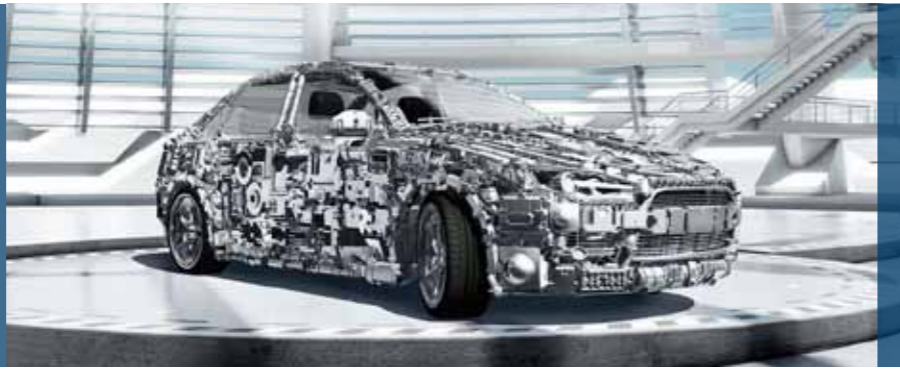
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BEG-TM001

Basics of gasoline engine management

Training structure

The Training Center's modular program structure offers the ideal solution for all levels of training – from a one-day basic training course to an intensive five-day seminar.

In each case, the knowledge provided ranges from the physical basics and system components to the functions of the ECU software. Training courses on bus systems provide an in-depth insight into the relevant communication protocols, also in connection with AUTOSAR. The training content is regularly extended and adapted to new developments.

Venue

Trainings take place at Bosch Engineering GmbH in Abstatt in German language. English trainings on request.

Customized in-house seminars in English or German can also be arranged for groups of eight or more. The content is based on our wide range of seminars. We are happy to provide such training at your company.

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Powertrain Systems
Training Center
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74232 Abstatt
Germany

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www.bosch-engineering.de

Seminar contents

Introduction

History, thermodynamic basics, mixture formation, combustion processes, MI/DI comparison, new engine concepts

Torque structure

Motronic system structure, torque demand, torque structure, operating modes

Air charge

Charge determination, charge control

Fuel system

Fuel supply, mixture control, mixture adaptation, injection

Ignition

Ignition timing, knock control

Exhaust gas treatment

Exhaust gas aftertreatment, three-way catalytic converter, lambda control, exhaust gas recirculation

Vehicle diagnosis

On-board diagnosis, fault storage management, monitoring

Participation details

Requirements

None

Number of participants

Minimum 8, maximum 16

Duration

1 day

9 a.m. - 5 p.m.

Teaching method

Lecture, discussion

Fee

€630

Seminar dates

On request



Bosch Engineering GmbH, an engineering service provider and a subsidiary of Robert Bosch GmbH, offers customized adaptations for electronic systems. Customers benefit from our personal service and consultancy, combined with the tried-and-tested technology of the global Bosch Group. Everything is supplied from a single source – from the initial study to

the series production stage. We are headquartered in Abstatt, which is conveniently situated around 40 km north of Stuttgart, close to the Weinsberg interchange. To find us, leave the A 81 at exit 11 (Heilbronn/Untergruppenbach) and follow the Bosch signs

BEG-TM003

Diagnostic functions of Motronic ME/MED

Seminar contents

Day 1: Legislation regarding emissions and diagnosis

Background and objectives of legislation requirements, emissions legislation in the EU and U.S., fuel consumption legislation in the EU and U.S./worldwide, OBD legislation in the EU and U.S.

On-board diagnosis

Catalytic converter diagnosis, lambda sensor diagnosis, canister purging diagnosis

Day 2: On-board diagnosis

Misfire detection, engine coolant system diagnosis, sensor diagnosis, power stage diagnosis, tank leakage diagnosis

Day 3: Diagnostic system

Diagnostic concept, DSM overview, diagnostic fault path management, diagnosis scheduler, inhibit handler, diagnosis validator

Monitoring

Failure modes, detection in ECU, monitoring concept, component monitoring, function and computer monitoring, error responses and emergency operation, torque monitoring, torque limitation

Participation details

Requirements

Basic knowledge of vehicle engines and engine management

Number of participants

Minimum 8, maximum 16

Duration

3 days
9 a.m. - 5 p.m. on first 2 days
9 a.m. - 4 p.m. on final day

Teaching method

Lecture, discussion, and exercise

Fee

€1,890

Seminar dates

On request

BEG-TM003

Diagnostic functions of Motronic ME/MED – Single modules

Seminar contents

BEG-TM003-A – On-board diagnosis

Day 1: Legislation regarding emissions and diagnosis

Background and objectives of legislation requirements, emissions legislation in the EU and U.S., fuel consumption legislation in the EU and U.S./worldwide, OBD legislation in the EU and U.S., deficiency/recall

On-board diagnosis

Catalytic converter diagnosis, lambda sensor diagnosis, canister purging diagnosis

Day 2: On-board diagnosis

Misfire detection, engine coolant system diagnosis, sensor diagnosis, power stage diagnosis, tank leakage diagnosis

BEG-TM003-B – Diagnostic system and Monitoring

Diagnostic concept, DSM overview, diagnostic fault path management, diagnosis scheduler, inhibit handler, diagnosis validator

Failure modes, detection in ECU, monitoring concept, component monitoring, function and computer monitoring, error responses and emergency operation, torque monitoring, torque limitation

Participation details

Duration

2 days
9 a.m. - 5 p.m. on both days

Fee

€1,270

Seminar dates

On request

Duration

1 day
9 a.m. - 4 p.m.

Fee

€620

Seminar dates

On request

BEG-TM010

Motronic ME/MED – Legislation regarding emissions and diagnosis

Seminar contents

Legislation regarding emissions and diagnosis

Background and objectives of legislation requirements, emissions legislation in the EU and U.S., fuel consumption legislation in the EU and U.S./worldwide, OBD legislation in the EU and U.S., deficiency/recall

Participation details

Requirements

Basic knowledge of vehicle engines and engine management

Number of participants

Minimum 8, maximum 16

Duration

1/2 day 9 a.m. - 1 p.m.

Teaching method

Lecture, discussion, and exercise

Fee

€360

Seminar dates

On request

BEG-TH001

Basics of the hybrid system for motor vehicles

Seminar contents

Basic seminar hybrid and electric vehicles

Central ideas in hybridization, main objectives and requirements of a hybrid vehicle.

Overview of components used in hybridization and the employed power train topologies.

Motivation

Driver of electrification

Components

Motor/Generator, power electronics, high voltage energy storage system (battery) and battery management, braking system

Configuration

Hybrid families, topologies
Serial, parallel, and powersplit hybrids, configuration comparison

Operation strategy

Requirements and tasks of the operation strategy, vehicle operational states, switching of the combustion engine, torque distribution, developing operation strategies

Participation details

Requirements

Basic knowledge of internal-combustion engines and powertrains

Number of participants

Minimum 10, maximum 16

Duration

1 day 9 a.m. - 5 p.m.

Teaching method

Lecture, discussion

Fee

€635

Seminar dates

On request

BEG-TH002

Hybrid system – vehicle and engine management

Seminar contents

Hybrid-specific torque structure

Torque model, torque coordination, torque demand and distribution, torque conversion, functions of torque structure (vehicle motion “VehMot”, coordination vehicle “CoVeh”, powertrain “PT”)

Start-stop strategy

What is start-stop, strategy for manual/automatic transmissions, components, synchronization with crankshaft and camshaft position, thermal management, emissions

Participation details

Requirements

Basic knowledge of internal-combustion engines and powertrains

Number of participants

Minimum 8, maximum 14

Duration

1 day 9 a.m. - 5 p.m.

Teaching method

Lecture, discussion, and exercise

Fee

€635

Seminar dates

On request

BEG-FR001

Basic FlexRay training

Seminar contents

Introduction

Key features and properties of FlexRay, overview of FlexRay Consortium

FlexRay Physical Layer

Topologies, cables, connections, electrical signal level

FlexRay protocol

Communication structure, clock synchronization, starting the network

Current developments

FlexRay communication controller, FlexRay bus transceiver

FlexRay tools

Restbus simulation, monitoring, analysis

Objectives

Basic knowledge of FlexRay properties, physical layer, and bus protocol (FlexRay protocol)

Participation details

Target group

System and application engineers in all sectors whose work involves automotive bus systems or the relevant ECU bus connections

Requirements

Basic knowledge of electronics

Number of participants

Minimum 10, maximum 16

Duration

1 day 9 a.m. - 5 p.m.

Teaching method

Lecture

Fee

€630

Seminar dates

On request

BEG-CN001

Basic CAN training

Seminar contents		Participation details	
Introduction Thinking behind and properties of CAN, applications		Target group System and application engineers in all sectors whose work involves automotive bus systems or the relevant ECU bus connections	
CAN physical layer Low-speed/high-speed CAN, terminals, electrical signal level		Requirements None	
CAN protocol Addressing, bus access, message format, fault detection/handling, bit timing		Number of participants Minimum 10, maximum 20	
Implementation options CAN controller, CAN transceiver, Basic-CAN/Full-CAN, Demonstration CANoe and creation of CAN matrix (dbc file) with CANdb++ (Admin)		Duration 1 day 9 a.m. - 5 p.m.	
Objectives Familiarization with the basic properties of CAN, the CAN physical layer, and the bus protocol (CAN protocol)		Teaching method Lecture, exercise, and discussion	
		Fee €630	
		Seminar dates On request	

BEG-AR001

AUTOSAR CAN stack

Seminar contents		Participation details	
Introduction - Architecture layers - Training on CAN stack software modules		Target group Software engineers	
Control flow - ECU State Manager (EcuM) - Communication Manager (ComM) - CAN State Manager (CanSM) - Network management		Requirements Basic knowledge of CAN	
Signal flow CAN interface, CAN driver, PDURouter, COM, DCM (communication-related part)		Number of participants Minimum 10, maximum 16	
Objectives Brief overview of the AUTOSAR software architecture and detailed training on the AUTOSAR CAN stack		Duration 2 days 9 a.m. - 5 p.m. on both days	
		Teaching method Lecture and practical exercise	
		Fee €1,260	
		Seminar dates On request	

BEG-TC001

The Electronic Stability Control and Value Added Functions

Seminar contents

Electronic Stability Control

- Basics of Vehicle Dynamics
- ESC hardware components
- Basics of ESC
- Legal requirements
- ESC Value Added Functions
- Torque Vectoring

Objectives

You are familiar with the basics of vehicle dynamics as well as the functionality of the ESC system. You have an overview of the necessary hardware components and their interaction concerning vehicle dynamics. Furthermore you are familiar with the main value added functions and how they contribute to improved safety, vehicle dynamics and comfort.

Participation details

Requirements

None

Number of participants

Minimum 8, maximum 20

Duration

1 day 9.00 a.m. - 17.00 p.m.

Teaching method

Lecture, discussion (in german)

Fee

€630

Seminar dates

On request

BEG-FS001

Lecture on functional safety

Seminar contents

Basic principles

Basic principles of standard ISO 26262 - Functional safety of electrical/electronic safety systems. Comprehensive overview of the various parts of standard ISO 26262

Basic elements of the standard

- Hazard and risk analysis
- Management of functional safety and processes
- Requirements regarding system, hardware, and software engineering in the product safety life cycle
- Independent evaluation (assessment, auditing) of functional safety

Objectives

Understanding the key aspects of standard ISO 26262 on functional safety and being able to apply these in a development engineering context. The seminar provides a quick introduction to the topic and provides guidance on the standard's complex and abstract regulations

Participation details

Target group

Management and development engineering staff who are involved in developing safety systems or use processes developed for this purpose

Requirements

None

Number of participants

Minimum 16, maximum 28

Duration

1/2 day 8.30 a.m. – 12.30 p.m.

Teaching method

Lecture

Fee

€190

Seminar dates

On request

Terms and conditions



By offering these training courses, Bosch Engineering GmbH and Robert Bosch GmbH are supporting their customers by providing information about Bosch gasoline engine management systems and the Bosch hybrid system. Participants from other disciplines need the explicit approval of the Gasoline Systems division of Robert Bosch GmbH, which we are happy to request on your behalf.

Application and participation requirements

To apply, please complete the enclosed form and fax it at least seven days before the start of the relevant event to **+49 7062 911-6201** or e-mail it to **Trainingcenter.BEG@de.bosch.com**. Your application becomes binding on receipt by Bosch Engineering GmbH. It is not possible to make applications/reservations by phone. Applications will be dealt with on a first-come-first-served basis. Upon entry participants will receive a written confirmation of their booking or will be informed if the required date is already fully booked.

Approximately four weeks before the start of the seminar or lecture, participants will receive an invitation with all the relevant organizational details (time, place, and directions). The number of seminar participants is restricted in order to ensure a smooth implementation. Thus, an early application is recommended. According to demand, additional dates can be offered.

Seminar participants will receive a certificate on completion of the event.

Copyright

All seminar documents contain information that is protected by copyright. No part of these documents may be reproduced in any form without the prior written permission of Robert Bosch GmbH. This also applies in particular to utilizing electronic systems for the processing, copying, distribution or public reproduction of such documents.

Terms of payment and cancellation

Fees will be invoiced after the training. Participants attending only part of a seminar or lecture are not entitled to a discount. Payments must be made in full within 30 calendar days of the invoice date.

Cancellations are accepted without charge until 28 days before the training starts. In case of later cancellation or non-appearance, fees will be invoiced in full. Any substitute is accepted to take the participant's place without any additional charge. All cancellations must be made in writing.

Bosch Engineering GmbH reserves the right to cancel or postpone seminars or parts up to seven days before the start date in case of insufficient interest or events that prevent the technical and economical implementation. Affected participants will be informed immediately. No liability shall be accepted for canceling or postponing seminars.



The Training Center is located at the Bosch Engineering Center in Abstatt

Terms and conditions



Scope of services and prices

Fees are per person and include comprehensive seminar documentation, lunch, refreshments during breaks, and drinks. Seminar documents will be handed out in printed form at the start of the training. The allocation of documents in electronic form is not possible.

Participants are responsible for their own hotel reservations, travel arrangements and their accommodation expenses, but we will be happy to help you select a hotel.

All prices in this program are subject to VAT at the applicable rate. The place of performance shall be the relevant event venue.

A separate contract will be drawn up for each in-house seminar. In addition to the seminar price agreed in the relevant contract and VAT at the applicable rate, the travel time/costs and hotel expenses of those providing the training will be invoiced if the event takes place outside the Greater Stuttgart/Heilbronn region. If the maximum permitted number of participants do not attend an in-house seminar, there will be no entitlement to a reduction in the agreed price.

Guarantee, liability

Trainers are voicing their own opinions. Bosch Engineering GmbH provides no guarantee as to the content of the statements made or the information and data provided. Nor does it guarantee that the products, processes, and other names mentioned during the seminar are not subject to third-party rights.

Bosch Engineering GmbH reserves the right to alter the contents of seminars and/or seminar documents, the duration of the seminar or the venue. No compensation claims or other claims will be accepted in this respect.

Software and data that participants bring with them may only be used in consultation with the trainer.

General information

In order to cater to the needs of participants from different sectors, we designed the seminars and their contents modular and not specific to any particular customer.

With the publication of this program, all prior programs and prices lose their validity.

Newsletter

If you are interested in receiving regular information about our training courses, please call us on **+49 7062 911-6339** or simply send a quick e-mail to **Trainingcenter.BEG@de.bosch.com**.

You will then receive our newsletter, which keeps our customers informed about new topics, additional seminar/lecture dates, and other news.



Seminar application

Seminar details

Course number

Date

Participant

Surname, first name, title

Company

Department

Street / PO box

Postal/zip code, town/city

Phone, fax

E-mail

Nationality

Date, signature

Data protection declaration

Bosch Engineering GmbH will use your details to organize the event. By signing the application, you allow us to contact you by e-mail, phone or fax. Should you not wish to be contacted via one or more of these methods, please delete the relevant parts of the previous sentence or get in touch with us. You may withdraw your permission at any time.

To apply

Please send us the completed application form no later than seven days before the start of your chosen event:

Fax **+49 7062 911-6101**

E-mail **Trainingcenter.BEG@de.bosch.com**

Any questions?

We will be happy to help you, simply contact:

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