



FAST TRACK TO SKILLS.

AVL Remote Training Catalog



Fast track to skills

Experience the new AVL Skills Center online training portfolio. This is especially relevant in view of current restrictions related to mobility and while testing laboratories and development departments might be less occupied.

We are offering fully fledged live technical training sessions including the use of relevant equipment (e.g. simulators) for the participants.

In this catalog you will find all our trainings that are currently conducted remotely and dedicated to a single customer organization. The date is agreed individually with the customer.

Some of these trainings are also available as “Open Training or Seminars”. These training courses and seminars are open for participants from various companies and are carried out on fixed dates. You only pay for the trainee participating, not the entire training class. This allows you to keep training costs down. They are marked in the catalog as follows:

Also available as Open Training - ONE SEAT

Also available as Open Seminar - ONE SEAT

For more details please explore: <https://www.avl.com/open-trainings-seminars>

Set out to achieve fast track to skills - our offering is constantly expanding!

Your AVL Skills Center Team

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1 TRAINING FOR TESTBED SYSTEMS

1.1 TRAINING OPERATING ENG.TESTBED STANDARD

TRAINING – OPERATING A PUMA ENGINE TESTBED STANDARD

This training refers to PUMA Open versions 1.5.3 and PUMA 2 – for a training dealing with older versions than the mentioned ones, please get in contact with your local representative.

Target Group

Operation (Test Operator)

Target

The participants are able to operate a testbed. They can execute predefined test runs and adjust basic parameters online. The participants are able to modify displays and to evaluate the results.

The training includes:

- 1 day preparation time according to customer requirements
- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Operation of the system in manual and automatic mode
- Operating states and monitoring
- Measurement, display and storage based on predefined parameterization (e.g.: temperatures, pressures)
- Operation of one AVL measurement device e.g.: Fuel consumption, Oil conditioning or Smoke Meter
- Operation of one PUMA-function e.g.: Recorder, PID-, PT2/3 controller or engine electronic interface
- Definition of simple layouts for data post processing

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of mechanics, measurement techniques, control and the operation of an engine on a testbed

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

1.2 TRAINING OPERATING ENG.TESTBED EXTENDED

TRAINING – OPERATING A PUMA ENGINE TESTBED EXTENDED

This training refers to Puma Open versions 1.5.3 and PUMA 2 – for a training dealing with older versions than the mentioned ones, please get in contact with your local representative.

Target Group

Operation (Test Operator)

Target

The participants are able to operate a testbed system. They can execute predefined test runs and adjust basic parameters online. The participants are able to modify parameters, displays and evaluate results.

The training includes:

- 1,5 days preparation time according to customer requirements
- 6 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Operation of the system in manual and automatic mode
- Operating states and monitoring
- Measurement, display and storage based on predefined parameterization (e.g.: temperatures, pressures)
- Operation of two AVL measurement devices e.g.: Fuel consumption, Oil conditioning or Smoke Meter
- Operation of two PUMA-functions e.g.: Recorder, PID-, PT2/3 controller or engine electronic interface
- Definition of simple layouts for data post processing

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of mechanics, measurement techniques, engine operation and control on a testbed

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

2 TRAINING FOR MONITORING, CONTROL, SIMULATION

2.1 TRAINING TESTBED CONTROLLER

TRAINING – OPERATION TESTBED CONTROLLER (STAND ALONE ADVANCED)

This training refers to version EMCON 6.

Target Group

Operation (Test Operator), Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to operate the Testbed Controller. They understand and parametrize the principal functions of the Testbed Controller and are able to adjust the engine-dyno controllers.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Hardware system overview
- Connection possibilities and hardware environment
- Dyno Interface
- Explanation of the Testbed Controller by means of practical examples
- Adjustment of engine and dynamometer controllers for stationary purposes
- Operation of the Testbed Controller via operating panel
- Parameter menu
- Recall mode

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

2.2 TRAINING AVL ARTE.LAB

TRAINING – OPERATION OF AND MODEL INTEGRATION WITH ARTE.LAB

This training refers to version 2.0 or above – for a training dealing with older versions, please contact your representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to build and run a simulation model using AVL ARTE.Lab™ Studio. In addition, they know how to integrate this model in PUMA Open systems. Furthermore, the trainees are able to view and change the model parameters online.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Installation of AVL ARTE.Lab™ Studio, licensing
- Building and running of a Simulink example model
- ARTE channel interface library
- Parameter design and usage in Simulink models
- Parameter checker/updater/preprocessor design
- Model Parameter Editor (MPE), AVL ARTE.Lab™ Explorer
- Deployment on PUMA Open systems (if available)
- Development of a simple application by the trainee

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PUMA Open knowledge (basics) recommended
- MATLAB/Simulink & MS Visual Studio knowledge
- A computer with one of required SW versions:
 - MATLAB, Simulink, RealTimeWorkshop (any version from R13.1 (6.5.1) to R2015a)
 - Microsoft Visual Studio 2005SP1, 2008SP1, 2010 or 2012

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

2.3 TRAINING AVL TESTBED.CONNECT

TRAINING – OPERATION OF AND MODEL INTEGRATION WITH Testbed.CONNECT™

This training refers to version 1R3 of Testbed.CONNECT™, Model.CONNECT™ version R2017b as well as AVL fmi.LAB™ version 1R3 or higher. It covers only the integration of real-time models. For the usage of non – real-time models within Model.CONNECT™ separate trainings by AVL AST are offered.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to build simulation models using AVL fmi.LAB™ and know how to integrate these models into a PUMA system or at a Testbed.CONNECT™ workstation. Furthermore, the trainees can define, view and adapt the model parameters online.

Information: The functions are explained using example models. The integration of customer models is not part of the training – if there is any need, additional application support can be ordered at AVL.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Installation of AVL fmi.LAB™ and Model.CONNECT™, licensing
- Building and executing a Simulink example model
- Usage of interface functions of the PUMA automation system (system channels, messages)
- Parameter design and usage in Simulink models
- Parameter checker/updater/preprocessor design
- Model Parameter Editor (MPE), Testbed.CONNECT™ Explorer
- Deployment at PUMA systems (if available) or Testbed.CONNECT™ Workstation
- Development of a simple application by the trainee
- Usage of the Model.CONNECT™ configurator to link several models

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PUMA knowledge (basics) when using a PUMA system
- MATLAB/Simulink knowledge
- A computer with the required SW versions installed:
 - MATLAB, Simulink, Simulink Coder & MATLAB Coder (R2012b to R2018b – 64 bit only!)
 - Microsoft Visual Studio 2010 Prof., 2012 Prof. (from MATLAB R2013b), 2015 Prof. (from MATLAB R2016a) or 2017 Prof. (from MATLAB R2017b)

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3 TRAINING FOR TESTBED AUTOMATION

3.1 TRAINING PUMA E-MOTOR TESTBED

TRAINING – OPERATION & PARAMETERIZATION OF PUMA E-MOTOR TESTBED

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the PUMA E-Motor testbed automation system. Furthermore, the trainees can modify the parameters regarding the main automation system tasks for controlling, measurement and monitoring. Additionally, they know the main tools to perform automatic test runs.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Testbed Operating
 - Start the PUMA system
 - PUMA operating steps and operator Interface
 - Control of AVL E-Storage System, UUT and dyno
 - Operation and main states of the AVL E-Storage system
 - Control modes and demand values
 - Operating with panel, manual operation window and in automatic mode
 - Monitoring
 - Handling of testbed and limit monitoring
 - Measurement
 - Operation of stationary and recorder measurement
 - Simple data evaluation with AVL CONCERTO
- PUMA parameterization
 - Parameterization tools – the navigator
 - Parameter set overview and handling
 - Data acquisition and quantities in general
 - Measurement
 - Parameterization of steady state and recorder measurement
 - UUT Control
 - Overview of main UUT parameters (max. speed, start, stop...)
 - E-Motor Torque Controller (only in case of version PUMA 2 E-MOTOR)
 - Monitoring
 - Parameterization of testbed monitoring, limit monitoring and the post mortem recorder
 - Formulas
 - Parameters and functions of cyclic and on demand formulas in PUMA
 - Automatic test run
 - Overview of main tools for program flow control and Dyno/UUT control
 - Parameterization of simple automatic test runs

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons
- Training regarding „e-STORAGE SYSTEM” will be performed on operator level in this training.
Detailed training regarding „e-STORAGE SYSTEM” is not part of supply.

- If an AVL e-Power measurement system is installed at the testbed we recommend to order the "TRAINING HW E-POWER MEASUREMENT SYSTEM" (TTEPOWEROP.01) in addition.

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation on a unit under test
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.2 TRAINING PUMA 2 FUEL CELL

TRAINING – PUMA 2 FUEL CELL – FUEL CELL SYSTEM TESTING

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the AVL PUMA 2 Fuel Cell System testbed automation system. The trainees are able to run a Fuel Cell System, define and execute manual measurements, run automatic test runs and modify testbed parameters in general.

The training includes:

- 4 days Remote Training (9 am – 4 pm)
- Training Material
- AVL Certificate for participants

Content

- Basic functions and architecture of a Fuel Cell System testbed
- Testbed Operating
 - Starting the automation system and PUMA application programs
 - Control:
 - Control structure and control modes of the testbed
 - Manual and automatic operation of the unit under test
 - Monitoring:
 - Testbed Monitoring
 - Limit monitoring
 - Measurement:
 - General data acquisition on the testbed
 - Definition and execution of manual measurements
 - Data online display and basic data evaluation with AVL CONCERTO
- PUMA parameterization
 - Parameterization tools – the navigator
 - Parameter set overview and handling
 - Data acquisition and quantities in general
 - Measurement
 - Parameterization of steady state and recorder measurement
 - Overview of UUT parameters
 - Basic Parameterization of a test cell controller
 - Overview of the test cell controller for UUT and Load Unit
 - Monitoring
 - Parameterization of testbed monitoring, limit monitoring and the post mortem recorder
 - Formulas
 - Parameters and functions of cyclic and on demand formulas in PUMA
 - Automatic test run
 - Overview of main tools for program flow control and Dyno/UUT control
 - Parameterization of simple automatic test runs

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation on a unit under test
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.3 TRAINING PUMA ENGINE TESTBED

TRAINING – OPERATION & PARAMETERIZATION OF PUMA ENGINE TESTBED

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the PUMA Engine testbed automation system. Furthermore, the trainees are able to modify the parameters regarding the main automation system tasks for controlling, measurement and monitoring. Additionally, they know the main tools to perform automatic test runs.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Testbed Operating
 - Starting the PUMA system
 - PUMA operating steps and operator interface
 - Control of UUT and dyno
 - Control modes and demand values
 - Operating with panel, manual operation window and in automatic mode
 - Monitoring
 - Handling of testbed and limit monitoring
 - Measurement
 - Operation of stationary and recorder measurement
 - Simple data evaluation with AVL CONCERTO
- PUMA Parameterization
 - Parameterization tools – the navigator
 - Parameter set overview and handling
 - Data acquisition and quantities in general
 - Measurement
 - Parameterization of steady state and recorder measurement
 - UUT Control
 - Overview of main UUT parameters (max. speed, start, stop...)
 - Overview of main UUT set values and controllers (ALPHA, TORQUE, SPEED)
 - Monitoring
 - Parameterization of testbed monitoring, limit monitoring and the post mortem recorder
 - Formulas
 - Parameters and functions of cyclic and on demand formulas in PUMA
 - Automatic test run
 - Overview of main tools for program flow control and Dyno/UUT control
 - Parameterization of simple automatic test runs

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation of a unit under test
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.4 TRAINING PUMA OPEN HYBRID ENGINE TESTBED

TRAINING – OPERATION & PARAMETERIZATION OF PUMA HYBRID ENGINE TESTBED

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the PUMA Hybrid Engine testbed automation system. Furthermore, the trainees can modify the parameters regarding the main automation system tasks for controlling, measurement and monitoring. Additionally, they know the main tools to perform automatic test runs.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Testbed Operating
 - Start the PUMA system
 - PUMA operating steps and operator Interface
 - PUMA hybrid control strategy
 - Control of E-Storage System, UUT and dyno
 - Operation and main states of the AVL E-Storage system
 - Control modes and demand values
 - Operating with panel, manual operation window and in automatic mode
 - Monitoring
 - Handling of testbed and limit monitoring
 - Measurement
 - Operation of stationary and recorder measurement
 - Simple data evaluation with AVL CONCERTO
- PUMA parameterization
 - Parameterization tools – the navigator
 - Parameter set overview and handling
 - Data acquisition and quantities in general
 - Measurement
 - Parameterization of steady state and recorder measurement
 - UUT Control
 - Overview of main UUT parameters (max. speed, start, stop...)
 - Demand value to the HCU
 - Monitoring
 - Parameterization of testbed monitoring, limit monitoring and the post mortem recorder
 - Formulas
 - Parameters and functions of cyclic and on demand formulas in PUMA
 - Automatic test run
 - Overview of main tools for program flow control and Dyno/UUT control
 - Parameterization of simple automatic test runs

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons
- Training regarding „e-STORAGE SYSTEM” will be performed on operator level in this training. Detailed training regarding „e-STORAGE SYSTEM” is not part of supply.

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation on an unit under test
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.5 TRAINING PUMA OPEN VEHICLE TESTING

TRAINING – OPERATION & BASIC PARAMETERIZATION PUMA OPEN VEHICLE TESTING

This training refers to PUMA Open version 1.5.3a.

Target Group

Operation (Test operator), parameterization (Test engineer)

Target

The participants are able to operate the automation and control software PUMA Open for Vehicle Testing. They have basic knowledge about PUMA, tools and parameters. They are able to operate manual and automatic test runs.

The training includes:

- 6 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basics knowledge of chassis dynamometer physics, mechanics & electrics
- System architecture
- Safety on chassis dynamometer testbed
- Starting / stopping the software PUMA Open vehicle testing
- Operator Interface and Display of values (e.g. actual values, demand values, channels...)
- Workflows like mounting of the vehicle and coast down / load adaption
- Vehicle Settings: Driveline- and coupling type, general vehicle values
- Overview of functions
 - Preparation and manual operation / automatic operation
 - Extended control modes for UUT control (robot)
 - Basic functions and general settings and recording
 - Execution and definition of steady state measurement
- Post-mortem recorder
- Data acquisition and data evaluation
- Basic PUMA tools and parameters
 - Modification and activation of PUMA parameters
 - Limit monitoring / testbed monitoring

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation of a vehicle

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.6 TRAINING PUMA TEST RUN PREPARATION

TRAINING – DEVELOPMENT OF AUTOMATIC TEST RUNS IN PUMA

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to parameterize automatic test runs according to complex test requirements and display the results.

The training includes:

- 3 days Remote Training (9am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Functions and tools
 - General functions like cut / copy / paste ..., search, compare
 - Quantities versus local variables
 - Link status, import functions and version handling
- BSQ (Block SeQuences)
 - General properties (timing) and program flow elements
 - Operator interface commands and online window (debugging)
 - Structural elements (group, subroutine, exception)
- SSQ (Step SeQuences)
 - SSQ demand value definition, properties of steady state and dynamic SSQ
 - Step buffer handling, export/import example
- Recorder
- Steady State Measurement
- Exception Handling
 - Exception types, definition of exception handlers, remind / recover
- Library Handling
 - Purpose and overview
 - Functions and tools
- Creation of a complex automatic test run example

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.7 TRAINING SCRIPTING IN PUMA

TRAINING – DEVELOPMENT OF VB SCRIPTS IN PUMA

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Parameterization (Test Engineer)

Target

The participants understand the basic usage of scripting in PUMA (Activation Objects, Scripting, Extensibility Scripts, State Machine and BSQ/SSQ). They can create, modify and test the scripts in the PUMA system.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction into the VB programming language
- VB script syntax and best practices
- VB concepts: variables, constants and control structures
- VB concepts: functions, subroutines, data arrays
- Basic introduction into scripting in PUMA
- Creation and modification of script contexts
- Definition of hand-over parameters (system channels / script parameters)
- Integration of scripts into the automatic test run (BSQ/SSQ)
- Execution of scripts from other PUMA components
- Practical exercises using extensibility scripts
- Debugging and problem analysis

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- It is necessary to have basic knowledge in programming languages e.g. C++, VBA, VBS and to understand the fundamental concepts of those, e.g. functions/subroutines, hand-over of parameters by reference and by value, indexed data types
- Experience in operation and parameterization of the PUMA System
- Knowledge of creating automatic test runs with BSQ / SSQ

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.8 TRAINING ASAP3-MC INTERFACE

TRAINING – OPERATION & PARAMETERIZATION ASAP3-MC INTERFACE

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to connect the ECU-application system with the PUMA automation system based on ASAP 3. They are capable to vary data in the engine electronics.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Adaptation of an ECU-application system to the PUMA automation system
- Parameterization of the ASAP3-MC interface
- Reading actual values from the ECU-application system
- Reading, writing and varying parameters and engine maps
- Implementation of the ECU interface in automatic test runs

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.9 TRAINING CAN INTERFACE

TRAINING – PARAMETERIZATION & APPLICATION CAN INTERFACE

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to connect the “In Vehicle Network” CAN Bus interface with the PUMA automation system by means of an A2L or DBC description file. They are familiar with application examples on PUMA with CAN Bus data.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Adaptation of a CAN-Bus system to the PUMA automation system
- Parameterization of the CAN Interface
- Examples for data transfer via the CAN Bus interface and CAM Modules
- PUMA application examples with CAN Bus data (e.g. limit monitoring, recording)

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.10 TRAINING TEST CELL CONTROL (TCC)

TRAINING – SETUP & PROGRAMMING TEST CELL CONTROL (TCC)

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to define and test the programmable test cell control according to their requirements.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Function of the Automation System Controller (ASC)
 - Editing Extensibility scripts
- Functions of the Test Cell Control (TCC)
 - States
 - Actions
 - Triggers
- PUMA application examples with ASC and TCC

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA System
- Basic knowledge about VB Scripts

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.11 TRAINING DATA PLAUSIBILITY PODD

TRAINING – OPERATION & PARAMETERATION OF PUMA ONLINE DIAGNOSTIC DEVICE - PODD

This training refers to PUMA Open version 1.5.3 – for a training dealing with older versions, please contact your local representative.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to operate PODD and understand the working principle. They are able to adapt existing settings according to their requirements.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Functionality of PODD
- Explanation and operation of standstill diagnosis
- Explanation and operation of cyclic online diagnosis
- Explanation and operation of the measurement synchronous diagnosis
- Change settings on parameterized system according to test run requirements

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA Open System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.12 TRAINING ISAC 400

TRAINING – OPERATION & PARAMETERIZATION OF ISAC 400

This training refers to PUMA versions 1.5.3 and 2 – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to parameterize and operate the dynamic testbed. They are able to execute and adjust the parameters to pass statutory dynamic test profiles, parameterize various vehicles, different road load definitions and different drivers.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic description of the vehicle and driver simulation model
- Parameterization of a vehicle and road-load definition
- Adjustment of the driver
- Operation of the dynamic testbed
- Creation of dynamic sequences
- Optimization of gear shifts and controllers according to legal cycles

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.13 TRAINING ISAC 400 SIMULATION ATR

TRAINING – PARAMETERIZATION OF ISAC 400 - ATR

Target Group

Parameterization (Test Engineer)

Target

The participants are able to parameterize the simulation of an automatic transmission according to specific data.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Working principles of a real automatic transmission
- Basic description of the simulation model
- Parameterization of the torque converter and the planetary gear set
- Definition of gear shift criteria and of locking conditions for the converter lock-up
- Creation of dynamic sequences
- Optimization of parameter sets and execution of dynamic profiles

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA system

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.14 TRAINING ISAC 400 SIMULATION CVT

TRAINING – PARAMETERIZATION OF ISAC 400 - CVT

Target Group

Parameterization (Test Engineer)

Target

The participants are able to parameterize the simulation of a variable transmission according to specific data.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Working principles of a real variable transmission
- Basic description of the simulation model
- Parameterization of a variable transmission according to specific data
- Creation of dynamic sequences
- Optimization of parameter sets and execution of dynamic profiles

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Operating and Parameterization ISAC 400

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.15 TRAINING ISAC 400 ATR & CVT SIMUL.

TRAINING – PARAMETERIZATION OF ISAC 400 - ATR & CVT

Target Group

Parameterization (Test Engineer)

Target

The participants are able to parameterize the simulation of an automatic transmission and a variable transmission according to specific data.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Working principle of a real automatic transmission
- Working principle of a real variable transmission
- Basic description of the simulation models
- Parameterization of the torque converter and the planetary gear set
- Definition of gear shift criteria and of locking conditions for the converter lock-up
- Parameterization of a variable transmission according to specific data
- Creation of dynamic sequences
- Optimization of parameter sets and execution of dynamic profiles

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Operating and Parameterization ISAC 400

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.16 TRAINING ISAC 40Y POWERTRAIN TESTBED

TRAINING – PARAMETERIZATION & OPERATION OF ISAC 40Y - POWERTRAIN TESTBED

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to parameterize and operate the dynamic Powertrain testbed. In addition, the trainees are able to define dynamic test sequences, create several types of drivers and setup the requested vehicle according to specific data.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic vehicle and driver simulation model for the powertrain configuration
- Parameterization of a vehicle with several drivers
- ISAC 40y controller structure for one customer configuration (e.g. 402 or 404)
- Operation of the dynamic testbed
- Creation of dynamic sequences
- Optimization of gear shifts and controllers according to legal cycles
- Simulation of driving sequences

Notes

- All the course content is with respect to the specific customer configuration and deals with one out of the four possible configurations. In the case of different configurations, the “TRAINING ISAC 4XY MULTICONF. TESTBED” (TT03BA020A.01) has to be ordered additionally
- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PUMA knowledge (basics) recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.17 TRAINING ISAC 41Y DRIVELINE TESTBED

TRAINING – PARAMETERIZATION & OPERATION OF ISAC 41Y - DRIVELINE TESTBED

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to parameterize and operate the dynamic Driveline testbed. They are able to parameterize an electrical drive unit to replicate an internal combustion engine. In addition, the trainees can define dynamic test sequences, create several types of drivers, activate the combustion engine simulation and set up the requested vehicle according to specific data.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic vehicle and driver simulation model for the driveline configuration
- Parameterization of a vehicle with several drivers
- ISAC 41y controller structure for one customer configuration (e.g. 412 or 414)
- Parameterization of a torque map to simulate the engine
- Activation of the combustion engine simulation and operation of dynamic testbed
- Creation of dynamic sequences
- Optimization of gear shifts and controllers according to legal cycles
- Simulation of driving sequences

Notes

- All the course content is with respect to the specific customer configuration and deals with one out of the four possible configurations. In the case of different configurations, the “TRAINING ISAC 4XY MULTICONF. TESTBED” (TT03BA020A.01) has to be ordered additionally
- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PUMA knowledge (basics) recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.18 TRAINING ISAC 4XY MULTICONF. TESTBED

TRAINING – SETUP & OPERATION OF ISAC 4XY - MULTICONFIGURATION TESTBED

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to set up and operate the multi configuration testbed. In addition, the trainees are able to activate different testbed configurations and parameterize the needed PUMA / EMCON function blocks and the used testbed controller. Setting up the requested vehicle parameters according to specific data and testbed configuration are conveyed as well.

The training includes:

- 1,5 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Vehicle and driver simulation model for the different testbed configuration
- ISAC 4xy controller structure for the customer configurations
- Controller set up and optimization
- Operation of the multi configuration handling
- Creation of SYS and UUT parameters for different configuration
- Optimization of the online visualization in POI

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PUMA knowledge (basics) recommended
 - “TRAINING ISAC 40Y POWERTRAIN TESTBED” (TT03BA018A.01)
 - “TRAINING ISAC 41Y DRIVELINE TESTBED” (TT03BA019A.01)

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.19 TRAINING CONCERTO EVALUATION

TRAINING – FROM DATA SOURCE TO REPORT WITH CONCERTO

This training refers to all AVL CONCERTO 5 releases – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Data Evaluation (Post Processing Personnel)

Target

The participants can handle the complete post-processing workflow with AVL CONCERTO from data import to visualization and evaluation.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Overview of the data structure and data management
- Import of test result data from a wide variety of sources (for example: AVL PUMA, ETAS INCA, AVL iFiles, CSV, etc.)
- Creation of diagrams, tables and reports
- Evaluation and interpretation of measurement data
- Data comparison (of test results from the same data source)
- Exporting and merging of data
- Management of layouts and data sources in work environments and libraries
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- PC and Windows knowledge
- Computers with installed and running AVL CONCERTO software must be provided by the customer. CONCERTO licenses can be provided by AVL for the duration of the training on prior notice

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.20 TRAINING CONCERTO ADVANCED

TRAINING – AUTOMATIC DATA PROCESSING WITH CONCERTO

This training refers to all AVL CONCERTO 5 releases; for a training dealing with older versions, please contact your local representative.

Target Group

Data evaluation (Post Processing Personnel with established CONCERTO experience), Data Post Processing.

Target

The participants can design and implement advanced post-processing applications using AVL CONCERTO. This includes development of formulae/macros/scripts to extend the basic CONCERTO functionality and to automate large post processing tasks and create a GUI to guide operators through complex evaluation processes.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Creation of CONCERTO formulae, macros and scripts
 - Resource management
 - Organization of CONCERTO components in multi user environments
 - Library concept
 - Advanced data source configuration
- Application development
 - Data handling (resampling, extracting, filtering, etc.)
 - Creation of GUI
 - Automation of work flows
 - Data export
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Training CONCERTO Evaluation or equivalent knowledge
 - "TRAINING CONCERTO EVALUATION" (TT03AD001A.01)
- Computers with installed and running AVL CONCERTO software must be provided by the customer. CONCERTO licenses can be provided by AVL for the duration of the training on prior notice

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.21 TRAINING PYTHON IN AVL CONCERTO

TRAINING – IMPLEMENTATION OF PYTHON CODE WITH CONCERTO

This training refers to all AVL CONCERTO 5 R3 releases and newer.

Target Group

Data Evaluation Engineers with knowledge in Python. Experienced CONCERTO App Developer.

Target

The participants understand how Python functions can be embedded in CONCERTO post processing applications. Practical examples should highlight the advantages of Python over CONCERTO scripting language.

The training includes:

- 3 days Remote Training (9 am – 1 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction / Overview of the Python implementation
- Data transfer between CONCERTO / Python
- Data structures in Python
- Calculations / Automation with Python
- Comparison to existing CONCERTO scripting functionality
- Exercises with application examples for above topics

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Training CONCERTO Advanced (TT03AD002A.01) or equivalent knowledge
- Basic skills with Python are mandatory, this is NOT a training for Python coding
- Computers with installed and running AVL CONCERTO software for practical exercises must be provided by the customer. CONCERTO licenses can be provided by AVL for the duration of the training on prior notice

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Training - ONE SEAT

3.22 TRAINING ONLINE CLASSIFICATION

TRAINING – PARAMETERIZATION OF ONLINE CLASSIFICATION IN PUMA / CONCERTO

This training focuses on parameterizing online classifications within a PUMA BSQ.

Target Group

Parameterization (Test Engineer)

Target

The participants are able to parameterize online classifications within PUMA BSQ, e.g. to insert a classification device into a test run, to select the data channels to be classified and to connect them to the classification methods by means of a graphical editor.

They classify the measured data online and use the classification results afterwards in CONCERTO or map them to multi-dimensional vectors, to setup reactions / or to save them inside the ASAM ODS data base.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Insert, start and stop online classifications in a test run in PUMA BSQ
- Parameterize classifications (selecting the data channels to be classified as well as the desired classification method, defining classification range, number of classes etc.)
- Usage of classification results in CONCERTO or PUMA CONCERTO
- Usage of classification results inside the online system:
 - Setup online visualizations
 - Save it inside the data base
 - Setup limit reaction on classes
- Import classification results as ASCII-files into other SW-tools (e.g. MS-EXCEL®) for post processing respectively in order to display it as graphics

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.23 TRAINING iGEM 2 ENGINE LD

TRAINING – OPERATION & BASIC PARAMETRIZATION OF iGEM 2 ENGINE LD TESTING

This training refers to version iGEM 2 Engine LD on engine test cell.

Target Group

Operation (Test Operator, Test Engineer)

Target

The participants understand the function of AVL iGEM 2 and are able to operate the test bed automation system. The meaning of Manual Data Entry window (pre-test dialog) is known and AVL iGEM 2 test runs can be executed. In addition, they can evaluate test results with CONCERTO and create test specific reports.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction to AVL iGEM 2 software structure, vehicle simulation
- Overview Light Duty emission legislation and calculations
- Basic Parametrization and settings of measurement devices
- Emission Cycle Definition, Emission Limit Definition, Signal mapping (ECD, ELD blocks, EMA Library)
- TST structure overview (BSQ, SSQ, DSQ)
- Joint execution of (two standard) AVL iGEM 2 test runs (e.g. WLTP, FTP75)
- Manual Data Entry window (Pre-Test Dialog)
- Report generation and contents explanation
- Result evaluation and analysis (e.g. with CONCERTO 5, MS Excel)

Notes

- Training class is conducted either in English or German (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in exhaust emissions and related legislation
- Experience in operation and parameterization of PUMA 2 system

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.24 TRAINING iGEM 2 ENGINE HD

TRAINING – OPERATION & BASIC PARAMETERIZATION OF iGEM 2 ENGINE HD TESTING

This training refers to version iGEM 2 Engine HD.

Target Group

Operation (Test Operator, Test Engineers).

Target

The participants understand the function of AVL iGEM 2 and can operate the testbed automation system. The meaning of Manual Data Entry window (pre-test dialog) is known and AVL iGEM 2 test runs can be executed. In addition, they can evaluate test results with CONCERTO and create test specific reports.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Overview Heavy Duty and/or Off-Road emission legislation and calculations
- Introduction to AVL iGEM 2 software structure
- Basic Parameterization and settings of measurement devices
- Emission Cycle Definition, Emission Limit Definition, Signal Mapping (ECD, ELD blocks, EMA Library)
- TST structure overview (BSQ, SSQ, DSQ)
- Joint execution of (two standard) AVL iGEM 2 test runs (e.g. WHSC, WHTC)
- Manual Data Entry window (Pre-Test Dialog) and test run execution
- Report generation and content explanation
- Result evaluation and analysis (e.g. CONCERTO 5, MS Excel)

Notes

- Training class is conducted either in English or German (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of PUMA 2

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.25 TRAINING iGEM 2 VEHICLE

TRAINING – OPERATION & BASIC PARAMETRIZATION OF iGEM 2 VEHICLE TESTING

This training refers to version iGEM 2 VEHICLE for chassis dyno

Target Group

Operation (Test Operator, Test Engineer)

Target

The participants understand the function of AVL iGEM 2 VEHICLE and can operate the chassis dyno automation system. Meaning of Manual Data Entry windows (pretest dialog) is known and AVL iGEM 2 VEHICLE test runs can be executed.

The training includes:

- 5 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction to AVL iGEM 2 VEHICLE software structure
- Overview Light Duty emission legislation and calculation
- Basic Parametrization and settings of measurement devices
- Emission Cycle Definition, Emission Limit Definition, Signal Mapping (ECD, E blocks, EMA Library)
- TST structure overview (BSQ, SSQ, DSQ)
- with IDA Integrated Driver's Aid and chassis dyno
- Joint execution of (two standard) AVL iGEM 2 VEHICLE test runs (e.g. FTP75 and WLTP)
- Manual Data Entry window (Pre-Test Dialog)
- Report generation and contents explanation
- Result evaluation and analysis (e.g. with CONCERTO 5 – MS Excel)

Notes

- Training class is conducted either in English or German (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in the topics of exhaust emission and related legislation
- Experience in operation and parameterization of the PUMA 2 system

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.26 TRAINING iGEM ENGINE LD

TRAINING – OPERATION & BASIC PARAMETERIZATION OF iGEM ENGINE LD

This training refers to versions iGEM Engine LD 2011 and 2012 (based on PO 1.5.3) and includes the online part and the topic offline test evaluation.

Target Group

Operation (Test Operator)

Target

The participants understand the function of iGEM Engine LD and can operate the test bed-automation system. The meaning of pre-test dialog values is known and iGEM test runs can be executed. In addition, they can use iGEM Offline and CONCERTO (Excel resp.) to evaluate test results and create test specific reports.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction to iGEM Engine LD software structure
- Basic integration of your emission measurement devices in iGEM Engine LD
- Basic Light Duty emission legislation and emission calculation
- Basic introduction on vehicle simulation (ISAC parametrization)
- Online part:
 - Operating of iGEM Online Application
 - Parameterization and execution of Light Duty emission test runs (Pre-Test Dialog)
- Offline part:
 - Overview of Offline Data Evaluation interfaces and tools
 - Report generation and contents overview

Notes

- Training class is conducted either in English or German (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.27 TRAINING iGEM ENGINE HD

TRAINING – OPERATION & BASIC PARAMETERIZATION OF iGEM ENGINE HD

This training refers to versions iGEM Engine HD 2011 and 2012 (based on PO 1.5.3) and includes the online part and the topic offline test evaluation.

Target Group

Operation (Test Operator)

Target

The participants understand the function of iGEM Engine HD and can operate the testbed-automation system. The meaning of pre-test dialog values is known and iGEM test runs can be executed. In addition, they can use iGEM Offline and CONCERTO (Excel resp.) to evaluate test results and create test specific reports.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction to iGEM Engine HD software structure
- Basic integration of your emission measurement devices in iGEM Engine HD
- Basic Heavy Duty and Off-Road emission legislation and emission calculation
- Knowledge about denormalization and regression analysis
- Online part:
 - Operating of iGEM Online Application
 - Parameterization and execution of Heavy Duty/ Off-Road emission test runs (Pre-Test Dialog)
- Offline part:
 - Overview of Offline Data Evaluation interfaces and tools
 - Report generation and contents overview

Notes

- Training class is conducted in either English or German (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

3.28 TRAINING iGEM VEHICLE

TRAINING – OPERATION & BASIC PARAMETERIZATION OF iGEM VEHICLE

This training refers to versions iGEM Vehicle 2011 and 2012 and includes the online part and the topic offline test evaluation.

Target Group

Operation (Test Operator)

Target

The participants understand the function of iGEM Vehicle and can operate the testbed automation system. Meaning of pre-test dialog windows is known and iGEM test runs can be executed. In addition, they can use iGEM Offline and CONCERTO (resp. Excel) to evaluate test results and create specific reports.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction to iGEM Vehicle software structure
- Basic knowledge about PUMA (Parameters, Operator Interface, Channels...)
- Basic Integration of your emission measurement devices in iGEM Vehicle
- Basic Light Duty emission legislation and emission calculation
- Communication with drivers aid and chassis dyno
- Online part:
 - Parameterization and execution of iGEM Vehicle emission test runs (Pre-Test Dialog)
- Offline part:
 - Overview of Offline Data Evaluation interfaces and tools
 - Report generation and contents overview

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open system

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

4 TRAINING FOR POWERTRAIN CALIBRATION

4.1 TRAINING CAMEO BASICS

TRAINING – BASIC PARAMETERIZATION / OPERATION / MODELLING IN CAMEO

This training refers to version CAMEO 3R9 and above – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants understand the function of CAMEO. They are able to set up test runs with different variation strategies. They know the functionality to optimize the engine map based on CAMEO results.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction of functionality and operation of CAMEO
- Database with project and system handling
- Set-up CAMEO and interfaces:
 - Installation of CAMEO - PUMA Open
 - CAMEO connection - ECU interface connection
- Basic about DoE background
- Test preparation in CAMEO
 - DoE based test planning
 - Test strategies
 - Limits
 - Actions
 - Device Services
 - Measurements/Recorder
- Model based evaluation in CAMEO
 - Raw data plausibility check
 - Modeling
 - Optimization
 - Map calculation

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Knowledge of combustion engine and ECU
- Basic knowledge of engine testbed and operation

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

5 TRAINING FOR INFORMATION MANAGEMENT

5.1 TRAINING AVL PUMA 2 SHARE

TRAINING – ADMINISTRATION & MAINTENANCE OF PUMA 2 SHARE (formerly Santorin HOST)

This training refers to PUMA 2 Share (formerly Santorin HOST 5.5) or above. For a training dealing with older versions, please contact your local representative.

Target Group

Test Field Administrator, IT Administrator

Target

The participants are able to administrate and parameterize a PUMA 2 Share system according to test field requirements and are also able to carry out necessary maintenance task to ensure data security/safety

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- System design / Test field set up
- Administration
 - PUMA quantities
 - Projects
 - Users
 - Database (STORM)
- Parameterization via AVL Navigator
- Functions
 - Result replication
 - Weather station
 - Tables (Central/Master-Data)
 - Test field data distribution (TFDD)
- Automation of administrative tasks
 - Email Distributor (EMD)
 - AutoProc
- Archiving
- AVL Santorin Backup

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Knowledge of PC data management in a network environment
- Experience in operation and parameterization of the PUMA System

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

6 TRAINING FOR COMBUSTION MEASUREMENT

6.1 TRAINING INDICOM EVALUATION

TRAINING – POST PROCESSING AND EVALUATION AT INDICOM

This training refers to version 2.7 or above – for a training dealing with older versions, please contact your local representative.

Target Group

Operation (Test Operator), Data Evaluation (Post Processing Personnel)

Target

The participants are able to display measurement results for post processing, evaluation and archiving.

The training includes:

- 2 days Remote Training with hands-on practical exercises (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Data management
 - Data Explorer
- Visualization of the measurement results via diagrams, tables and reports; creation of layouts
- Analysis of data
 - Data synchronization (crank angle and time base)
 - Calculations with CalcGraf and calculator
 - Data comparison and series analysis
- CalcGraf library and creation of models
- Data import / export
- Archiving data and layouts
- iFile Editor and correction possibilities

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Engine testing knowledge
- PUMA Basic knowledge recommended (if the indicating system is connected to a PUMA system)

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7 TRAINING FOR EMISSION ANALYSIS AND MEASUREMENT

7.1 TRAINING AMAI60 LEGIS. CHECKS AND REPORTS

TRAINING – LEGISLATIONAL CHECKS AND REPORTS AT AMA i60

This training refers to both AMA i60 generation series I and II.

Target Group

Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to perform the required legislation checks as well as reporting of these checks.

The training includes:

- 4 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Bench checks and settings
 - Drift check – analyzer drift
 - ANR check- accuracy, noise, repeatability
 - Lincheck GDU-linearity check GDU (optional)
 - Span gas bottle check (optional) and span gas purge check (optional)
- Stream checks
 - Leak checks: Vacuum, CO₂, O₂ and tunnel FID / CLD
 - System- and pressure sensor check
- Analyzer Checks
 - Linearization / LinCheck and manual LinCheck
 - Analyzer response time check
 - CH₄ cutter efficiency check
 - CLD quench check – CO₂/H₂O cross sensitivity for CLD analyzers
 - CO cross check – CO₂/H₂O cross sensitivity for CO analyzer
 - NO_x converter check – check of the NO_x converter efficiency
 - H₂O rejection ratio check – H₂O cross sensitivity in CO₂ analyzer
 - HangUp check
 - HC response factor checks for THC (optional)

Notes

- Training class is conducted in either German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Technical, electrical/electronic and physical background
- Profound knowledge of operating the AMAi60 system

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7.2 TRAINING MICRO SOOT SENSOR 2

TRAINING – OPERATION & BASIC MAINTENANCE AT MICRO SOOT SENSOR 2

Target Group

Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to operate the AVL Micro Soot Sensor 2, to perform measurements and to carry out simple maintenance.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic knowledge of emissions measurement
- Overview of system set-up (mechanical, pneumatical and electrical installation)
 - Comparison to former Micro Soot Sensor device and special features of the sensor & base unit
- Explanation of the installation of both sampling probe and sampling line
- Operation
 - Measurement principle and different measurement procedures
 - Operating states and functions and operation via PUMA system or PC
 - Explanation of important parameters and functionality of implemented options
- Maintenance
 - Cleaning windows, measuring cell, sampling lines, dilution cell and high pressure option
 - Changing the filter elements
 - Calibration check
 - Relative calibration
 - Leak check

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7.3 TRAINING MICRO SOOT SENSOR

TRAINING – OPERATION & BASIC MAINTENANCE AT MICRO SOOT SENSOR

Target Group

Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to operate the AVL Micro Soot Sensor, to perform measurements and to carry out simple maintenance.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic knowledge of emissions measurement
- Overview of system set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both sampling probe and sampling line
- Operation
 - Measurement principle and different measurement procedures
 - Operating states and functions and operation via PUMA system or PC
 - Explanation of important parameters and functionality of implemented options
- Maintenance
 - Cleaning windows, measuring cell, sampling lines, dilution cell and high pressure option
 - Changing the filter elements
 - Calibration check
 - Laser / microphone linearity check
 - Leak check

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Device onsite
- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7.4 TRAINING PARTICLE COUNTER

TRAINING – OPERATION & BASIC MAINTENANCE AT PARTICLE COUNTER

Target Group

Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to operate the AVL Particle Counter, to perform measurements and to carry out simple maintenance.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic knowledge of emissions measurement & legislation
- Overview of system set-up (mechanical, pneumatical and electrical installation)
- Explanation of the installation of both sampling probe and sampling line
- Operation
 - Measurement principle and different measurement procedures
 - Operating states and functions and operation via PUMA system or PC
 - Explanation of important parameters and functionality of implemented options
- Maintenance
 - Cleaning Venturi pump (at Particle Counter Advanced) and high pressure option
 - Changing the filter element and replacing filter mats
 - Function checks: leak check, response check and flow check
 - Refill Butanol

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Device onsite
- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7.5 TRAINING OPACIMETER

TRAINING – OPERATION & BASIC MAINTENANCE AT OPACIMETER

Target Group

Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Target

The participants are able to operate the Opacimeter, to perform measurements and to carry out simple maintenance.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic knowledge of emissions measurement
- Overview of system set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both sampling probe and sampling line
- Operation
 - Measurement principle and different measurement procedures
 - Operating states and functions, operation via instrument controller, PUMA system or PC (Opacimeter software)
 - Explanation of important parameters, functionality of implemented options
- Maintenance
 - Cleaning window modules, measuring chamber and sampling lines
 - Changing the filter element
 - Leak check, calibration and linearity check

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Device onsite
- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- PC and Windows knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

7.6 TRAINING SMOKE METER

TRAINING – OPERATION & BASIC MAINTENANCE AT SMOKE METER

Target Group

Operation (test operator), maintenance & service (calibration / maintenance / service personnel)

Target

The participants are able to operate the AVL Smoke Meter, to perform measurements and to carry out simple maintenance.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basic knowledge of particulate measurement
- Overview of system set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both sampling probe and sampling line
- Operation
 - Measurement principle and different measurement procedures
 - Operating states and functions, operation via instrument controller, PUMA system or PC
 - Explanation of important parameters; functionality of implemented options
- Maintenance
 - Cleaning reflectometer head, light gates, camshaft, sampling probe, sampling lines, white value plate
 - Changing the Filter Element
 - Leak check, sampled volume check (using volume tester) and reflectometer head check (using reflectance standards)

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Device onsite
- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

8 TRAINING FOR VEHICLE TESTBEDS

8.1 TRAINING VECON 2016 OPERATING

TRAINING – OPERATION & BASIC PARAMETERIZATION OF VECON 2016

This training refers to operation and control software for vehicle test beds VECON 2016.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the automation and control software VECON 2016. They have basic knowledge about VECON, tools and parameters. They are able to operate the testbed manually.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basics knowledge of chassis dynamometer physics, mechanics & electrics
- System architecture
- Safety on chassis dynamometer test bed
- Starting / stopping the software VECON 2016
- Display of values (e.g. actual values, demand values, channels...)
- Operator interface
- Workflows: mounting of the vehicle and coast down
- Vehicle settings: Driveline- and coupling type, general vehicle values
- Overview of functions
 - Preparation and manual operation
 - Basic functions and general settings
 - Recording and post mortem-recording

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Technical basic knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

8.2 TRAINING PUMA OPEN VEHICLE TESTING

TRAINING – OPERATION & BASIC PARAMETERIZATION PUMA OPEN VEHICLE TESTING

This training refers to PUMA Open version 1.5.3a.

Target Group

Operation (Test Operator), Parameterization (Test engineer)

Target

The participants are able to operate the automation and control software PUMA Open for Vehicle Testing. They have basic knowledge about PUMA, tools and parameters. They are able to operate manual and automatic test runs.

The training includes:

- 6 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Basics knowledge of chassis dynamometer physics, mechanics & electrics
- System architecture
- Safety on chassis dynamometer testbed
- Starting / stopping the software PUMA Open vehicle testing
- Operator Interface and Display of values (e.g. actual values, demand values, channels...)
- Workflows like mounting of the vehicle and coast down / load adaption
- Vehicle Settings: Driveline- and coupling type, general vehicle values
- Overview of functions
 - Preparation and manual operation / automatic operation
 - Extended control modes for UUT control (robot)
 - Basic functions and general settings and recording
 - Execution and definition of steady state measurement
- Post-mortem recorder
- Data acquisition and data evaluation
- Basic PUMA tools and parameters
 - Modification and activation of PUMA parameters
 - Limit monitoring / testbed monitoring

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of the operation of a vehicle

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

9 TRAINING FOR IN-VEHICLE MEASUREMENT

9.1 TRAINING CONCERTO 5 MDT

TRAINING – AVL CONCERTO 5 M.O.V.E DATA TOOL BOX

Target Group

Testing and Data Evaluation Engineers

Target

Participants receive an update regarding (prior to training defined) legislation, get an overview of the functionalities of CONCERTO 5 MDT (last official release) and can independently evaluate AVL M.O.V.E measurement data.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Legislation Update (depending on customer needs)
- CONCERTO 5 MDT (last release), overview on functionalities
- Post processing and discussion of demo data (ideally provided by the customer)
- Independent repetition of post processing with the support of the trainer
- Additional functionalities of CONCERTO 5 MDT
- Q&A-Session

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic technical understanding, Knowledge of PC's and Windows
- Scope / Contents to be agreed on prior to training
- Ideally demo measurement data to be provided by customer prior to training

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

10 TRAINING FOR BATTERY TEST SYSTEMS

10.1 TRAINING PUMA 2 BATTERY EMULATOR

TRAINING – OPERATION & PARAMETERIZATION OF PUMA 2 AS BATTERY EMULATOR

This training refers to PUMA 2 and E-STORAGE BE Hardware.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the E-STORAGE BE system by starting and stopping. They are able to select an existing battery model and edit its parameters. They are also able to parameterize values of the system. In addition, they know the function of the system and are able to connect the Unit Under Test.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Introduction into general safety instruction
- Description of the different system components
- Operation of the systems via operating panel / web interface
- PUMA 2 (TAS)
- Battery model
 - Basic knowledge of battery behavior
 - Activation of the standard battery models delivered by AVL
 - Adaptation of initial values
 - Adaptation of basic parameters
- Procedure for connecting the Unit Under Test

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic knowledge of electrics and electronics, handling of high voltage

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

10.2 TRAINING LYNX BATTERY TESTING OPERATION

TRAINING – OPERATION OF LYNX FOR BATTERY TESTING

This training refers to the product E-STORAGE BT (Tester) and LYNX version 2.0 or above.

Target Group

Operation (Test Operator), Parameterization (Test Engineer)

Target

The participants are able to operate the LYNX automation system. They are able to define and execute manual measurements and run pre-defined test runs.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of LYNX parameter sets (test cell-, stand-, battery- and test parameters)
- Selection of parameter sets
- Reviewing data with the Data Browser
- Using the message window
- Using the help functions

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

10.3 TRAINING LYNX BATTERY TESTING SETUP

TRAINING – SET-UP OF LYNX FOR BATTERY TESTING

This training refers to LYNX version 2.0 and above in combination with E-STORAGE BT (Tester)

Target Group

Parameterization (Test Engineer)

Target

The participants are able to configure the LYNX automation system. They are able to set up channels, connect input/output devices, and parameterize automatic test runs.

The training includes:

- 3 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Overview of hardware architecture
- Content of testcell-, stand-, battery- and test parameter sets
- Setting up input / output channels
- CAN channel configuration
- Writing automatic test runs, startup and shutdown routines
- Sequence library and subroutines
- Creating and use datasheets
- Setup of exception routine
- Creating and editing formulas
- Setting up of testcell limits and engine limit groups
- Data post processing with data browser (check of results)
- Importing and exporting of test run parameters

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- “TRAINING LYNX BATTERY TESTING OPERATION” (TT03EA020A.01) or equivalent knowledge about automation technics

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

10.4 TRAINING E-LIB. BATT. PACK TEST. METHOD.

TRAINING – E-LIBRARY BATTERY PACK & MODULE – STANDARD TESTING METHODOLOGY

The E-Library training focuses on tool details. Training provides knowledge on common global standard test cases and implementation methodologies in an automation system (AVL LYNX). Data analysis and report generation are as well covered. This module focuses on battery testing - Pack & Module.

Target Group

Testing (Test Engineers, Application Engineers), Operation (Test Operator, Lab Engineers), Product Development (Development Engineers)

Target

The participants gain complete knowledge about installation, use and customization/creation of tests using AVL Automation system (AVL LYNX). Participants gain insight on global tests procedure and ability to analyze data using AVL CONCERTO.

The training includes:

- 2 days Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Overview of battery testing & development
 - Key battery characteristics & parameters review
 - E-Library relevance to testing and development
- E-Library architecture & installation (how to, file structure)
- Global test procedures & methodology contained in E-Library
- Performance tests
 - Reliability / Environment test
 - Abuse Test
- Data analysis
 - Implementation principles
 - "Pass / Fail" criteria & calculations
- Installation, use & customization (theoretically)

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 6 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Battery basics
- AVL LYNX & AVL CONCERTO
- PC and Windows Knowledge
- Simulator with AVL LYNX & AVL CONCERTO

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

11 SEMINARS FOR TECHNOLOGY

11.1 SEMINAR FUEL CELL TECHNOLOGY BASICS

SEMINAR – FUEL CELL TECHNOLOGY BASICS

Introduction to functionality and technology of fuel cells and complete fuel cell systems, their test and applications.

Target Group

Participants with technical background, decision makers interested in the topic

Target

The participants are able to understand the functionality of fuel cells, identify all components, have an insight into materials and production methodologies, understand the integration to a complete fuel cell system and the integration of the system into different vehicles. They have an overview over test methodologies and testbeds and knowledge about most of the fuel cell applications.

The training includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Fuel Cell Chemistry and Physics (PEMFC, SOFC)
- Fuel Cell System Setup
- Fuel Cell Vehicle Integration
- Fuel Cell Design Challenges and H2 Infrastructure
- Fuel Cell Testing and Validation
- AVL Fuel Cell Testbeds and Devices
- Fuel Cell Applications

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Participation in the Seminar Electric Vehicle Basics; System Setup, Development and Test or equivalent knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Seminar - ONE SEAT

11.2 SEMINAR EMISSIONS TECHNOLOGY BASICS

SEMINAR EMISSIONS TECHNOLOGY BASICS

Target Group

Specialists, technicians, engineers in the automotive industry mainly active in the development of products for the mobility of the future.

Target

The participants get an overview on transport emissions and emission legislation as well as emission reduction technologies.

The seminar includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Overview and principles of emissions legislation
- Exhaust of combustion engines
- Emissions reduction in combustion engines
- Oxidation catalyst
- Three-way catalyst
- Particle filter
- NOx Reduction
- Exhaust aftertreatment $\Lambda = 1$
- Exhaust aftertreatment $\Lambda > 1$
- Continuity of masses and atoms

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

11.3 SEMINAR REAL DRIVING EMISSIONS (RDE)

SEMINAR REAL DRIVING EMISSIONS (RDE)

Target Group

Participants with general knowledge and interest in emissions and emission testing. Specialists and generalists from the automotive industry involved in any aspect of vehicle emissions, its impacts and requirements for meeting future targets for clean mobility.

Target

The participants have an overview on the complex topic of real driving emissions and its drivers for legislative implementation into EURO 6 vehicle tailpipe emissions legislation. Participants will also get an impression on the complexity of the RDE implementation at present and possible scenarios for its evolvement in future. Finally participants should know the impacts on the different stakeholders to this wide topic (Policymakers, EU Member States, Automotive Industry, Customers, NGOs).

The seminar includes:

- 1 day Remote Training (9 am – 2 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Drivers for implementation of RDE (Health, Air Quality)
- RDE policy and implementation within EU certification framework
- Some background – Emissions from Diesel and Gasoline engines – hotspots to be tackled by RDE
- Overview on real driving emission measurement (RDE) & technology
- Equipment and other infrastructure and operational requirements for RDE testing
- Some theory on RDE testing boundary conditions, obstacles and validity criteria
- Considering RDE during the automotive product engineering process
- Current strengths and weaknesses of RDE legislation
- Future roadmap on RDE

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Seminar - ONE SEAT

11.4 SEMINAR ELECTRIC VEHICLE BASICS

SEMINAR ELECTRIC VEHICLE BASICS – SYSTEM SETUP, DEVELOPMENT AND TEST

Target Group

Participants with technical background, decision makers interested in the topic.

Target

The participants have an overview of the background of the current electrification development. They know the basic components of an electric vehicle and their working principle. They know the applications to test these and have an overview of electrification testbeds in general and the devices they contain.

The seminar includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Background and drivers of current electrification development
 - xEV definitions
- Components of an electrical drivetrain
 - Battery technology
 - E-Motor technology
 - Inverter technology
 - Fuel Cell Technology
- Electrification tests, applications
- Electrification testbeds and devices

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Basic technical knowledge

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Seminar - ONE SEAT

11.5 SEMINAR E-MOTOR AND INVERTER

SEMINAR E-MOTOR AND INVERTER TECHNOLOGY

Target Group

Participants with general knowledge of electrification components of an electric or hybrid vehicle that want to get more in-depth knowledge of e-vehicle, e-motor and inverter technology and testing.

Target

The participants have an overview of the anatomy and functionality of a vehicle e-motor and the corresponding inverter. They get an idea what considerations to take into account when developing e-motors and inverters for vehicles and an overview of common e-motor and inverter test scenarios.

The seminar includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Vehicle traction motor (e-Motor):
 - Functional principle of the dominating vehicle e-motors
 - Review of Traction Motor candidates: Induction, Synchronous
 - Measures of traction motors: Torque/speed curve, field weakening, constant power/speed
 - Torque production: Magnet vs. reluctance
 - Production processes
 - Thermal considerations
 - Current challenges and development targets
- Power electronics for xEV (Inverter)
 - Traction drives
 - Schematics principle
 - Current challenges and development targets
- e-motor and inverter test scenarios
- e-motor and inverter testbed structures and devices

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Successful participation at the “SEMINAR ELECTRIC VEHICLE BASICS” (TT08EVB01O.01) or comparable knowledge level

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Seminar - ONE SEAT

11.6 SEMINAR BATTERY TECHNOLOGY

SEMINAR BATTERY TECHNOLOGY

Target Group

Participants with general knowledge of electrification components and battery building blocks who want to get more in-depth knowledge of e-vehicle battery technology and testing.

Target

The participants have an overview of the components of a vehicle battery, its common metrics and comparative numbers for the different technologies. They get an idea what considerations to take into account when developing vehicle batteries and have an overview of common battery test scenarios.

The seminar includes:

- 1 day Remote Training (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants

Content

- Background and overview of electric storage systems for vehicles
- Common units and measures in batteries
- Battery electrochemistry, cell mechanical structures and vehicle battery components
- Current challenges and development targets
- SOx functions and their estimation
- Role of the Battery Management System
- Thermal management considerations
- Common battery test scenarios
- Common battery test devices

Notes

- Training class is conducted either in German or English (based upon customer request)
- Max. participants: 15 persons

Prerequisites

- Remote training via Web-Services: Stable internet connection required
- Headset, Webcam and 2nd screen recommended
- Successful participation in the “SEMINAR ELECTRIC VEHICLE BASICS” (TT08EVB01O.01) or comparable knowledge level

Cancellation and Rescheduling

Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:

- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

Also available as Open Seminar - ONE SEAT