



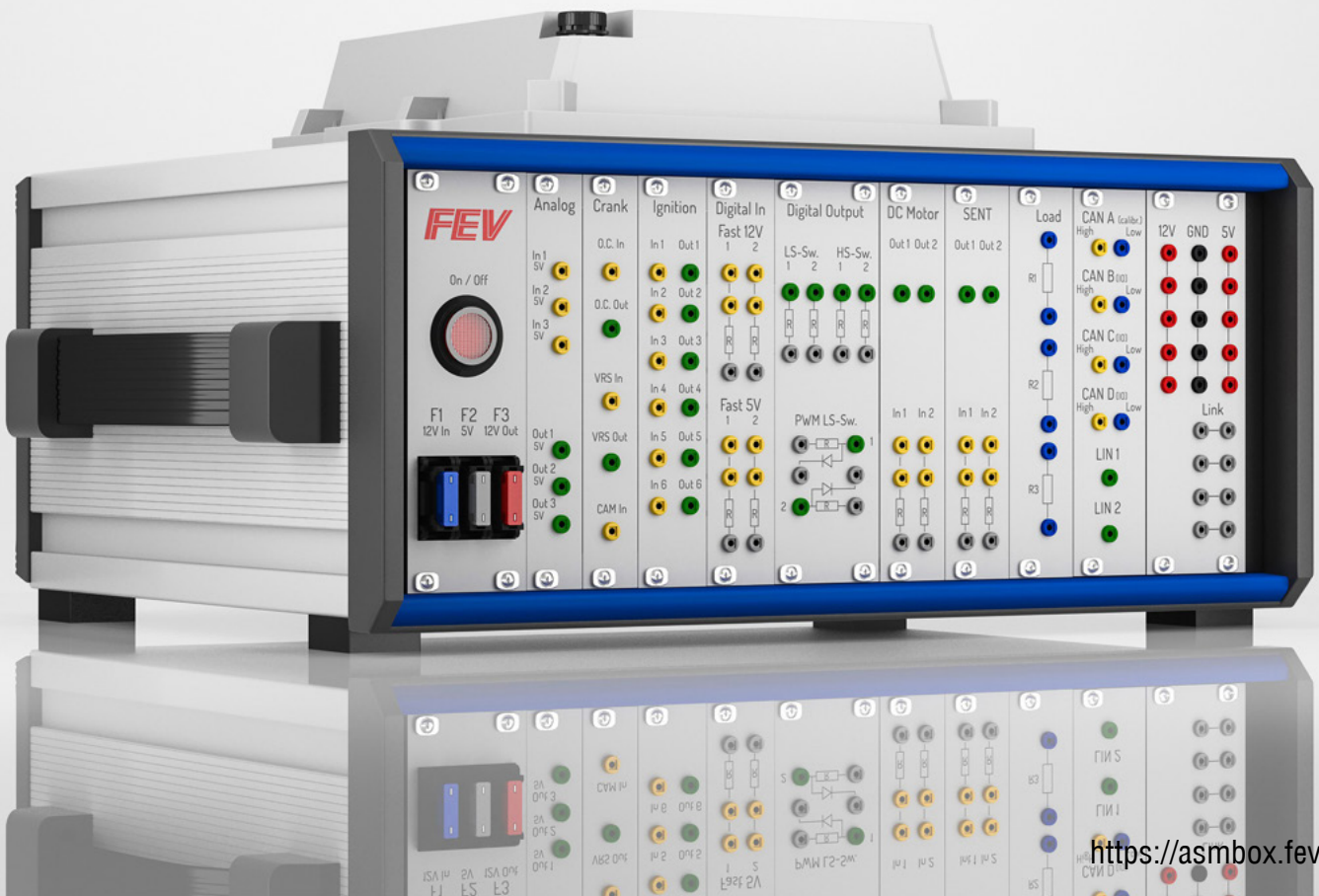
Universal Electrical Failure Generation and Simulation



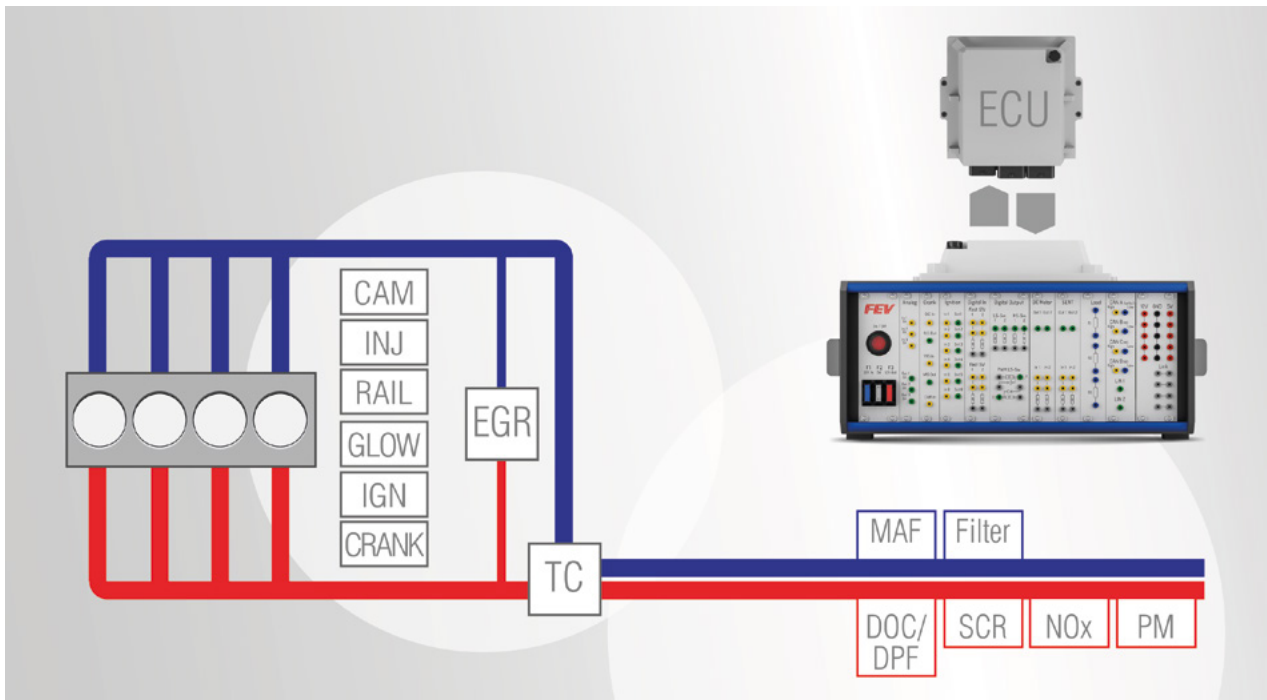
ONE SOLUTION COVERING ALL
SIGNAL MODULATION PATTERNS



ASM Box with ruggedly designed breakout box.



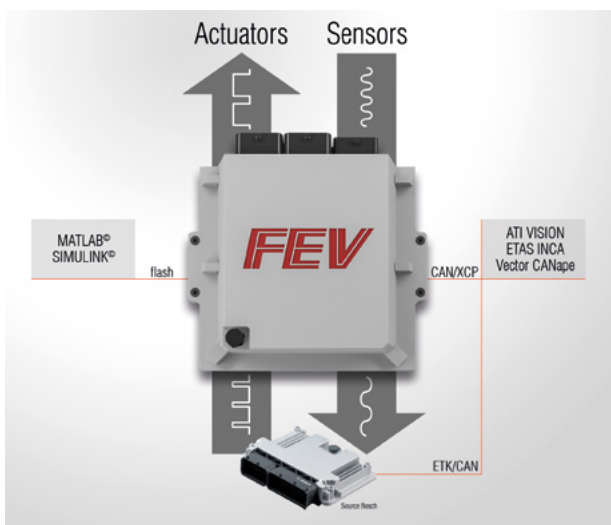
THE SYSTEM



The ASM Box allows efficient verification of PVE and OBD calibration via modulation of actuator and sensor signals, especially for homologation with government mode in addition to the common user mode. Because no faulty hardware is required for failure generation it achieves cost savings of at least 20 percent in typical use cases. Using the ASM Box for automated drifting of sensor signals for robustness testing improves the OBD system quality as well as the efficiency.

ASM Box comes in 4 modules in different stages of expansion. All modules are based on a model-based automotive RCP system. With predefined Simulink® models, efficient and fast simulation of any engine component can be realized. The standard models can be easily customized to satisfy individual needs. In the case of calibration tasks, it is possible to use a calibration tool with XCP support to control the model behavior and simultaneously handle ECU labels and signals. In the case of homologation, the ASM Box offers a user friendly GUI with the possibility of controlling the system via WiFi and LAN.

BENEFITS AT A GLANCE



- > Easy realization of complex fuel system failure patterns:
 - > Injection cut-off
 - > Changing start of injection and injection duration
 - > Applicable for each partial injection
- > Ignition turn-off
- > Convenient handling by versatile break-out box
- > Full flexibility by failure pattern development in MALAB/Simulink®
- > Includes a base set of failure models
- > Binary oxygen sensor signal simulation
- > Control system modulation e.g. SENT, LIN and CAN
- > XCP access for comfortable parametrization of failure models

ASM BOX - MOTORCYCLE



The ASM Box - Motorcycle was developed especially for the needs in two- and three-wheeler industry. Small dimensions and maybe distribution in separate housings are required. The main module provides the possibility to generate failures for e.g. temperature, dc-motor or binary lambda sensors. Only if misfire generation is required, the high-voltage-housing of the Misfire Module and the special misfire harness has to be connected. This approach reduces the connection effort as well as weight and size depending on the application. The system is produced for automotive use. Predefined motorcycle template models are included and with the ASM Box - toolchain the user can open and adjust the provided models. After recompilation in the toolchain the provided or adjusted models can be flashed with the delivered flash-tool or a calibration tools like e.g. INCA. The Homologation view for misfire generation is included other views are also possible on demand.

BENEFITS AT A GLANCE

- > Misfire patterns according to SAE J2910
 - > For solenoid, port-fuel and piezo injectors
 - > For coil-on-plug and switch-on-coil ignition
- > Analog inputs and outputs for e.g. temperature and pressure sensor signal modulation
- > H-bridge to drive DC motor
- > LS- and HS-switch for actuators like exhaust flap or crank-case ventilation valve
- > Includes a base set of motorcycle failure models
- > Signal modulation for binary lambda sensors
- > CAN message modulation
- > XCP access for comfortable parametrization of failure models

ASM BOX - MISFIRE



The ASM Box - Misfire is the smallest device in terms of functionality. It is based on the same hardware and model technology, but reduced in its functionality to realize a cost effective solution to generate misfire patterns.

The Homologation view for misfire generation has been implemented referring to the SAE J2901 standard which defines the settings, calculations, and visualizations for homologation and how to represent it to the user. The ASM Box - Misfire comes in a handy case with all necessary cables and extensions.

BENEFITS AT A GLANCE

- > Misfire patterns according to SAE J2910
 - > For solenoid, port-fuel and piezo injectors
 - > For coil-on-plug and switch-on-coil ignition
- > Failure patterns like subsequent or random cylinder
- > Percentage or interval based misfire generation
- > Complete shut-off function included
- > Complete set with harness and extension adapter
- > XCP access for comfortable parametrization of failure models

REFERENCES

*** BMW *** AUDI *** FORD *** VW *** PACCAR *** BOS
*** DAIMLER *** IAV *** KARMA *** FCA *** KTM

ASM BOX - SOLENOID / PIEZO



The ASM Box - solenoid or piezo is the product with the largest scope of functionality within the ASM Box family. It combines the largest variety of inputs and outputs which can be used to measure and reproduce electrical signals and a fully programmable power amplifier to drive injectors. The amplifier enables to control up to 8 injectors at the same time and thus the complete fuel injection. Various failure cases such as shift of the start of the injection, change the duration or hide one or more injection events are possible. Misfire patterns as required by SAE J2901 are also supported with the provided model. The ASM Box - piezo drives piezo injectors only and ASM Box - solenoid drives solenoid and port fuel injectors.

For example, temperature and pressure sensor signals can be easily changed as well as signal modulation for sensors and driving actuators, which are using PWM signals. Two or more h-bridges allow driving DC-motors like EGR, VGT or air flap at the same time.

BENEFITS AT A GLANCE

- > Easy realization of complex fuel system failure patterns:
 - > Injection cut-off
 - > Changing start of injection and injection duration
 - > Applicable for each partial injection
- > Turn-off of ignition and injection
- > Convenient handling by versatile break-out box
- > Full flexibility by failure pattern development in MATLAB/Simulink®
- > Includes a base set of failure models
- > XCP access for comfortable parametrization of failure models
- > Control system modulation e.g. SENT, LIN and CAN
- > ECU and combustion system independent

With both H-bridges it is possible to drive DC-motors like EGR, VGT or air flap. Depending of the model complexity it is possible to drive actuators together and depending on sensors inputs as well as closed-loop controlled. For example the control VGT and waste gate or a high pressure and low pressure EGR at the same time. The failures are only subject to the complexity of the model.

Four CAN busses can be used to control for example the messages of NOx or PM sensors, all other messages are fed through without interfering with other messages.

The two SENT busses can be used to change the feedback messages of for example EGR- or Delta-P-sensors. Both Lin busses can be used to modulate for example the engine fan or the air flaps. All inputs and outputs can be combined in complex models to drive several sensors and actuators at the same time and for simulation of very complex failure cases for homologation, production vehicle evaluation and as well for calibration. The ASM Box - breakout box is helpful for easy connection of sensors and/or actuators during development of complex models at the desk but for in-vehicle use the ASM Box harness is handy due to the size. Of course the customer can generate its own harnesses, because all plugs and sockets are freely available on the market.

The ASM Box tool chain allows to change the provided basic template models or to develop own models. Such a model has to be compiled and flashed on the ASM Box using the toolchain or directly from INCA.

The Homologation view allows the control the model behavior with an easy-to-use graphical user interface, because the signals and parameters are reduced to the minimum, which results in a self-explaining user interface. This Homologation view is intend to be used within web browser and can be started from any device with can be connected via LAN or WiFi.

The ASM Box - compact is reduced in functionality, size, inputs and outputs to have a cost effective module in case injector amplifier and crank-based functions are not necessary.

All ASM Box modules are completely ECU- and engine-independent.

SCH *** GM *** CUMMINS ***
I *** AND MANY MORE



ASM BOX IS AVAILABLE IN FOUR VARIATIONS



	ASM Box Solenoid	ASM Box Piezo	ASM Box Compact	ASM Box Misfire	ASM Box Motorcycle
Analog I/O	6 / 3	6 / 2	8 / 4	x	4 / 4
Digital I/O	10 / 6	10 / 6	8 / 8	x	4 / 4
Speed sensor I/O (VRS & Hall)	1 / 1	1 / 1	x	x	x
Injectors I/O	6 (+2) Solenoid	6 (+2) Piezo	x	8 / 8 Piezo & Solenoid	8 / 8 Piezo & Solenoid
Ignition signal I/O (5V & 12V)	6 TTL	6 TTL	x	8 / 8 CoP & SoC	8 / 8 CoP & SoC
CAN I/O	4 / 4	4 / 4	4 / 4	x	4 / 4
LIN I/O	1 / 1	1 / 1	x	x	x
SENT I/O	2 / 2	2 / 2	2 / 2	x	1 / 1
LS switch I/O	2 / 2	2 / 2	2 / 2	x	2 / 2
LH switch I/O	2 / 2	2 / 2	2 / 2	x	2 / 2
DC motor I/O	2 / 2	2 / 2	1 / 1	x	1 / 1
Break-out Box	standard	standard	optional	x	x
Homologation View ComModule	standard	standard	optional	Misfire	Motorcycle
ASM Box models	standard	standard	optional	Misfire	Motorcycle
ASM Box model generation toolkit	standard	standard	optional	x	optional
Cables and plugs	optional	optional	standard	standard	standard
Lambda Module	optional	optional	optional	x	optional
Case	optional	optional	standard	standard	standard

ASM BOX CASE



The ASM Box - Motorcycle, Misfire, and Compact are supplied as standard in a waterproof case including all associated modules and cables
 There is no standard case for the ASM Box - solenoid and piezo, but it is possible to order a suitcase separately.

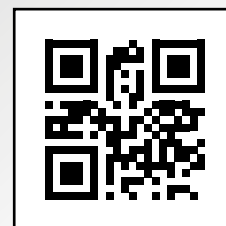


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FEV Software and Testing Solutions GmbH
Rafael Dziadek
Brehnaer Str, 3
D 06188 Landsberg/Saalekreis
Germany

phone +49 241 5689 - 838
e-mail: asmbox@FEV.com
<https://asmbox.fev.com/>



**Global Contact and Support
for FEV ASM Box**
e-mail dziadek@fev.com
phone: +49 241 5689-838

**FEV Software and Testing
Solutions GmbH**
Brehnaer Str. 3
06188 Landsberg/Saalekreis
Germany
Phone +49 241 5689 0
Fax: +49 241 5689 119

FEV North America Inc.
4554 Glenmeade Lane
Auburn Hills, MI 48326-1766,
USA
phone +1 248 373-6000
fax +1 248 373-8084
e-mail marketing@fev-et.com

FEV Japan Co., Ltd.
1008 Burex Kojimachi
3-5-2 Kojimachi, Chiyoda-ku
Tokyo 102-0083, Japan
phone +81 3-3222-0711
fax +81 3-3222-0721
e-mail fev-japan@fev.com

FEV China Co., Ltd.
No.35 Xinda Street Qixianling
High Tech Zone
116023 Dalian, China
Phone: +86 10 8492 3007
Fax: +86 10 8477 5230
E-Mail: fev-china@fev.com