



OBD Adapter Manual

adapter of version 1.0A

**Fully compatible with the gas controller 30H
and Diego 3.0.5.0 software**

1. Purpose and characteristics

The OBD adapter enables communication between Diego gas injection system and petrol controller that uses OBSII diagnostic interface. The applications of the adapter are as following:

- reading parameters form the OBDII system, and their visualization in the Diego application,
- reading and controlling (including deleting) recorded and awaiting errors (trouble codes) of the petrol controller,
- automatic regulation and adaptation gas system on the basis of the corrections read from OBD (only in Diego G3 of versions 3.0H or newer).

Adapter may be used only for the time of calibration. In that case it is a tool facilitating the calibration, and – to some extend – automatizing it. Adapter may also be installed in car permanently. In that case it works as an interface between petrol and gas controllers and enables the gas controller to introduce constant, adaptive correction.

The OBD adapter may be applied in cars equipped with Diego 1.4x 1.5x or 3.0x families gas system. Gas controllers in versions 3.0H or newer are fully compatible with adapter, that is they have functionality of adaptive corrections on the basis of the OBD corrections. Older versions of controllers enables only functionality of OBD scanner (that is: reading parameters and erasing engine errors.)

The adapter may be connected to OBD using protocols that are applied in most of new European cars:

- ISO9141,
- KWP2000slow,
- KWP2000fast,
- CAN_11bitID_500kbps,
- CAN_29bitID_500kbps,
- CAN_11bitID_250kbps,
- CAN_29bitID_250kbps.

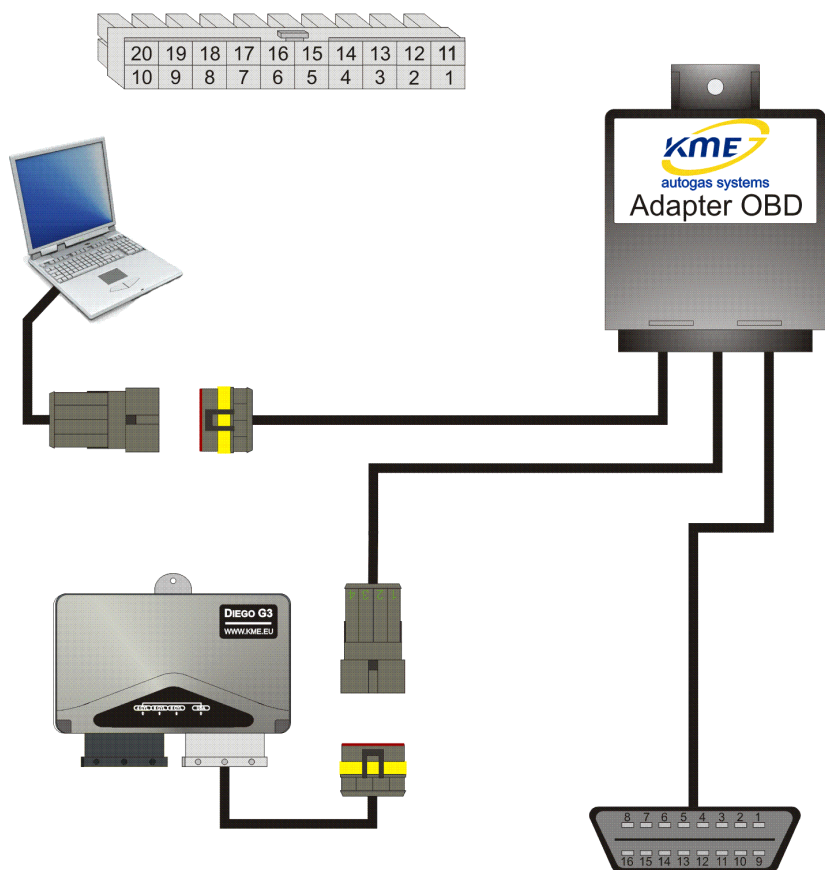
2. Assembly

The adapter is designed to make its installation as easy as it is possible. The assembly requires only connecting three plugs: two to the communication interface (one to the PC and one to Diego), and one to OBD. Adapter is installed serially into the communication path between PC computer and the controller and should be mounted inside the driver cabin, which requires putting the communication wire through into the driver cabin. For the convenience, extension cords to communication interface are added to the installation set. If the gas controller has an old, non-hermetic standard of the communication plug, it needs to be replaced by a plug in a new, hermetic standard (trade number: 239 000 033).

The connection diagram is shown on the figure below.

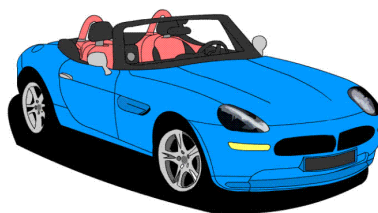
The plug view from the wires side

20	19	18	17	16	15	14	13	12	11
		K	CAN H	TXO PC	12V OUT	RX1 Diego			
		L	CAN L	RXO PC	GND	TX1 Diego	GND	12V	
10	9	8	7	6	5	4	3	2	1



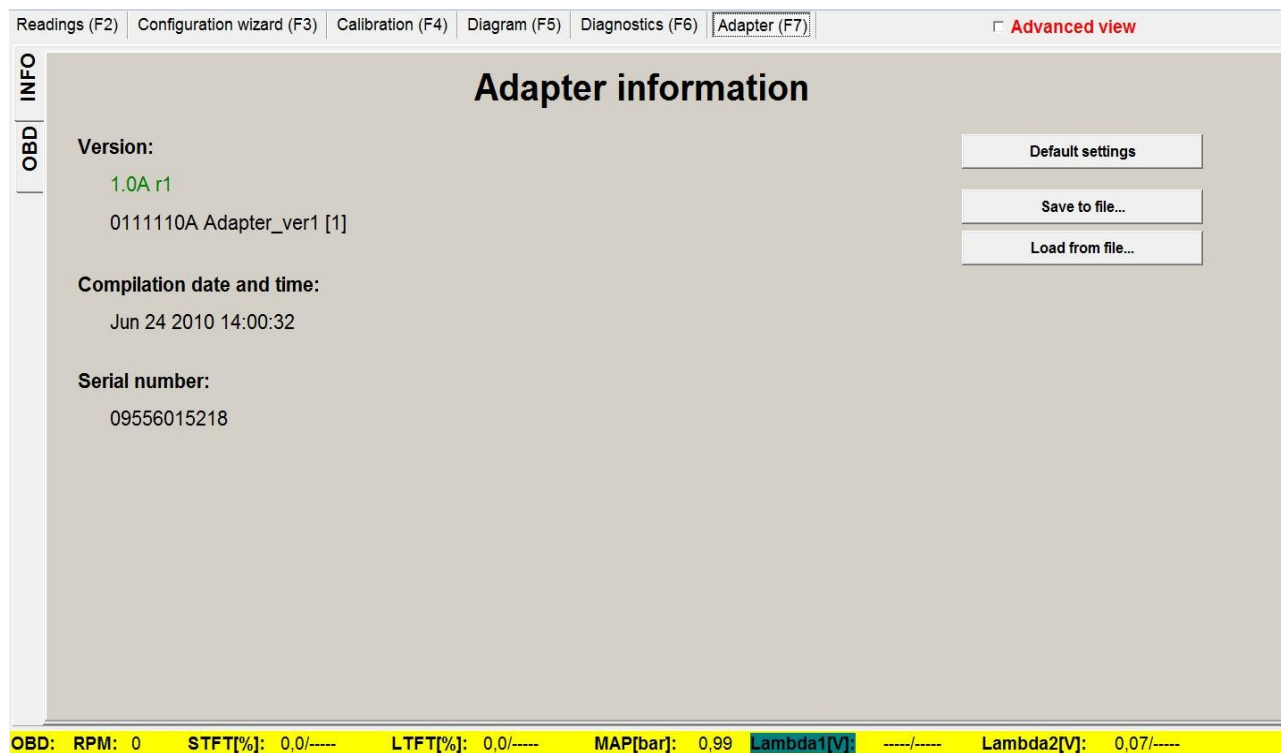
View from the wires side

1	2	3	4	5	6	7	8
			GND	GND	CAN H	K	
					CAN L	L	12V
9	10	11	12	13	14	15	16



3. Usage

Configuration and maintenance of the adapter can be done with application Diego 3.0.5.0 or newer. Options and functions for the adapter are gathered on the tab sheet **Adapter**, (see figure below) that may be opened with the F7 shortcut. On the **INFO** tab, basic information of adapter as: version, time and date of compilation and serial number are shown. The default configuration can be restored by pressing **Default configuration** button. The configuration can be saved and read by pressing **Save to file...** and **Read from File...** buttons.



Options available on the **OBD** tab enables management of the adapter.

- **Configuration Tab**

OBD protocol – is used to determine the protocol of the communication with the OBD.

Detect – enables to automatically detect the proper protocol.

Connect – connects with the OBD using the chosen or the detected protocol.

Automatic connecting after engine starts – when turned on, this option makes adapter to automatically connect to the OBD after engine starts.

Reset adaptation corrections – clears the corrections collected during adaptation on the basis of LTFT and STFT read from OBD.

Enable adaptation – switching this option on causes activation of the OBD-based adaptation, that modifies corrections on the basis of information gathered from the on-board diagnostic interface of the petrol controller. Corrections of the mixture can be calculated on the basis of short term fuel trim STFT and long term fuel trim LTFT. STFT is in charge of temporary adjusting the mixture, and LTFT is changed rather slowly and depends mainly on long standing conditions as environmental conditions.

Adaptation type – enables possibility of choosing adaptation type: either adaptation on the basis of RPM and petrol time or on the basis of RPM only.

Minimal RPM – option that specifies the minimal RPM value at which the adaptation is active. This functionality can be used to turn the adaptation off at idle. In that case

Maximal correction – is the maximal value of the correction that can be set as a result of the adaptation.

Inverted corrections – turning this option causes, that the sign of the LTFT and STFT corrections are interpreted in an opposite way than normally. Normally, positive value of the FT is treated as a necessity of increasing dose of petrol. In case of inverse corrections, positive value of the FT means that the decrease of petrol dose is needed, so, the gas controller has to make a negative correction. Inverse corrections can be found rarely in some cars of the VAG group as VW Golf 4 1.6l 2002yr.

STFT base – is the value of the STFT correction, which achieving is purpose of the OBD adaptation. The corrections in gas controller are changed in a such way that causes changes of STFT correction towards the value of STFT base.

Readings (F2) | Configuration wizard (F3) | Calibration (F4) | Diagram (F5) | Diagnostics (F6) | Adapter (F7) | ☒ **Advanced view**

OBD protocol [Detect] [Disconnect]
 [ISO9141] [Connected (ISO9141)]
☒ Automatic connecting after engine start

☒ **Enable adaptation** [Reset adaptation corrections]
 Adaptation type: [based on RPM and Tb]
☐ Min. RPM: [1200]
 Max. correction: [25] [%]
☒ **Inverted corrections**
 STFT base: [0] [%] STFT range: [2] [%] **STFT: -2 -:- 2 [%]**
☒ **Control LTFT**
 LTFT B1 base: [-19] [%] LTFT range: **LTFT B1: -23 -:- -15 [%]**
 LTFT B2 base: [0] [%] **LTFT B2: -4 -:- 4 [%]**

RPM: 860 PETROL: 3.9 GAS: 0.00 Pressure: 0.71 Vacuum: 0.36 T vaporizer: 49.8 T gas: 30.7

OBD: RPM: 878 STFT[%]: -6.3/----- LTFT[%]: -15.6/----- MAP[bar]: 0.34 **Lambda1[V]: -----** Lambda2[V]: 0.12/-----

STFT range – is the maximal difference of the read value and STFT base at which the adaptation does not yet changes corrections. For example, if STFT base is 10 and the STFT range is 5, the adaptation is active if the STFT correction from OBD is smaller than 5 or larger than 15. In that case the adaptation tries to bring the STFT in range from 5 to 15. The range is displayed with the green font.

LTFT controlling – the option modifies the algorithm of the adaptation to consider also the value of the long term fuel trim.

LTFT base (B1 and B2) – just like in the case of STFT base – LTFT base is the value that the adaptation aims to when changing gas corrections. In case of the two-bank cars, it is necessary to correctly choose cylinders that are in the second bank. (tab Calibration → Corrections, F11).

LTFT range – just like the STFT range, the LTFT range defines the range in which adaptation by LTFT makes no more changes, as it has accomplished its aim.

- **Live Data tab**

Live Data tab provides functionality of controlling the readings from OBD. By every value there is a check box, which turning on causes cyclic reading of the chosen value and displaying it. If some values are not visible, they cannot be read from the OBD interface in the particular car. Any two of the values read from OBD can be displayed on the chart of the Diego system's recorder (tab Diagnostics → Recorder)

Readings (F2)
Configuration wizard (F3)
Calibration (F4)
Diagram (F5)
Diagnostics (F6)
Adapter (F7)

☒ Advanced view

OBD INFO

Trouble Codes

Live Data

Configuration

Corrections		Bank 1	Bank 2
Short Term Fuel Trim (STFT)	<input checked="" type="checkbox"/>	1250	----- [%]
Long Term Fuel Trim (LTFT)	<input checked="" type="checkbox"/>	- 17.9	----- [%]

Live Data	
RPM	<input checked="" type="checkbox"/> 886 [r.p.m.]
Speed	<input checked="" type="checkbox"/> 000 [km/h]
Load	<input checked="" type="checkbox"/> 980 [%]
Coolant Temperature	<input checked="" type="checkbox"/> 6300 [°C]
Intake Manifold Pressure (MAP)	<input checked="" type="checkbox"/> 031 [bar]
Timing Advance	<input checked="" type="checkbox"/> 750 [deg]
Intake Air Temperature (IAT)	<input checked="" type="checkbox"/> 4400 [°C]
Mass Air Flow (MAF)	<input checked="" type="checkbox"/> ----- [g/sec]
Absolute Throttle Sensor Position (TPS)	<input checked="" type="checkbox"/> 353 [%]

Oxygen sensors		Bank 1	Bank 2
Lambda 1		-----	----- [V]
Lambda 2	<input checked="" type="checkbox"/>	0.15	----- [V]

		Bank 1	Bank 2
UEGO	<input checked="" type="checkbox"/>	-005	----- [mA]
		099	----- [lam]

Fuel System Status	
Bank 1	Closed loop
<input checked="" type="checkbox"/>	
Bank 2	

RPM	PETROL	GAS	Pressure	Vacuum	T vaporizer	T gas
1000	350	0.00	0.71	0.33	50.8	30.5

OBD: RPM: 886 STFT[%]: 12,5/----- LTFT[%]: -17,2/----- MAP[bar]: 0.31 Lambda1[V]: ----- Lambda2[V]: 0.15/-----

- **Trouble Codes tab**

This tab provides functionality of monitoring, controlling and deleting recorded and awaiting errors (trouble codes) of the petrol controller. To read recorded and awaiting trouble codes press the **Read** button. To delete all trouble codes, the **Clear** button is used.

Readings (F2) | Configuration wizard (F3) | Calibration (F4) | Diagram (F5) | Diagnostics (F6) | Adapter (F7) ✓ Advanced view

INFO
OBD
Configuration
Live Data
Trouble Codes

Check engine

Trouble Codes

Reading recorded trouble codes...
Finished reading recorded trouble codes
Finished reading pending trouble codes

Recorded Trouble Codes:
Error 1: P0302 (Cylinder 2 Misfire Detected)

Pending Trouble Codes:
Error 1: P0302 (Cylinder 2 Misfire Detected)

Freeze Frame

Reading freeze frame...
Finished reading freeze frame

Freeze Frame 1:
Code: P0302 (Cylinder 2 Misfire Detected)
Fuel System Status B1: Closed loop
Fuel System Status B2: -----
Load: 7,06 [%]
Coolant Temperature: 65,00 [°C]
ShortTermFuelTrim B1: -53,91 [%]
LongTermFuelTrim B1: -18,75 [%]
MAP: 0,40 [bar]
RPM: 867 [rpm]
Speed: 0,00 [km/h]

Read **Clear**

RPM: 870 PETROL: 353 GAS: 403 Pressure: 1.08 Vacuum: 0.42 T vaporizer: 52.4 T gas: 3 1.2

OBD: RPM: 876 STFT[%]: 0,0/----- LTFT[%]: -19,5/----- MAP[bar]: 0,41 Lambda1[V]: ----- Lambda2[V]: 0,04/-----