Installation manual

Fuel Pressure Emulator

FPE-A

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AC S.A.
15-181 Białystok, ul. 42 Pułku Piechoty 50
tel. +48 85 743 81 00, fax +48 85 653 93 83
www.ac.com.pl I info@ac.com.pl

Contents:

1. Technical data

Supply voltage:	12V ±25%
Operating temperature:	-40°C ÷ +70°C
Protection Class:	IP40

2. Applications

The FPE-A fuel pressure emulator equipped with autoadaptation functionality is designed for use in a wide range of vehicle models, in which errors related to the pressure controller circuit in the fuel rail or high/low rail pressure occur during operation of the engine fuelled by LPG/CNG.

It is compatible with the following vehicle models:
Volvo: S40, S60, S60R, S80, XC70, XC90
Opel: Astra , Insignia
Chevrolet: Captiva

Exact versions of supported models are listed in the following sections.

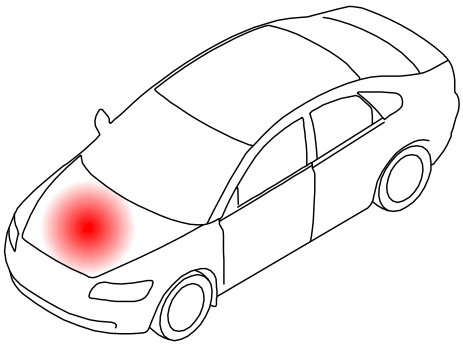
3. Operating principle

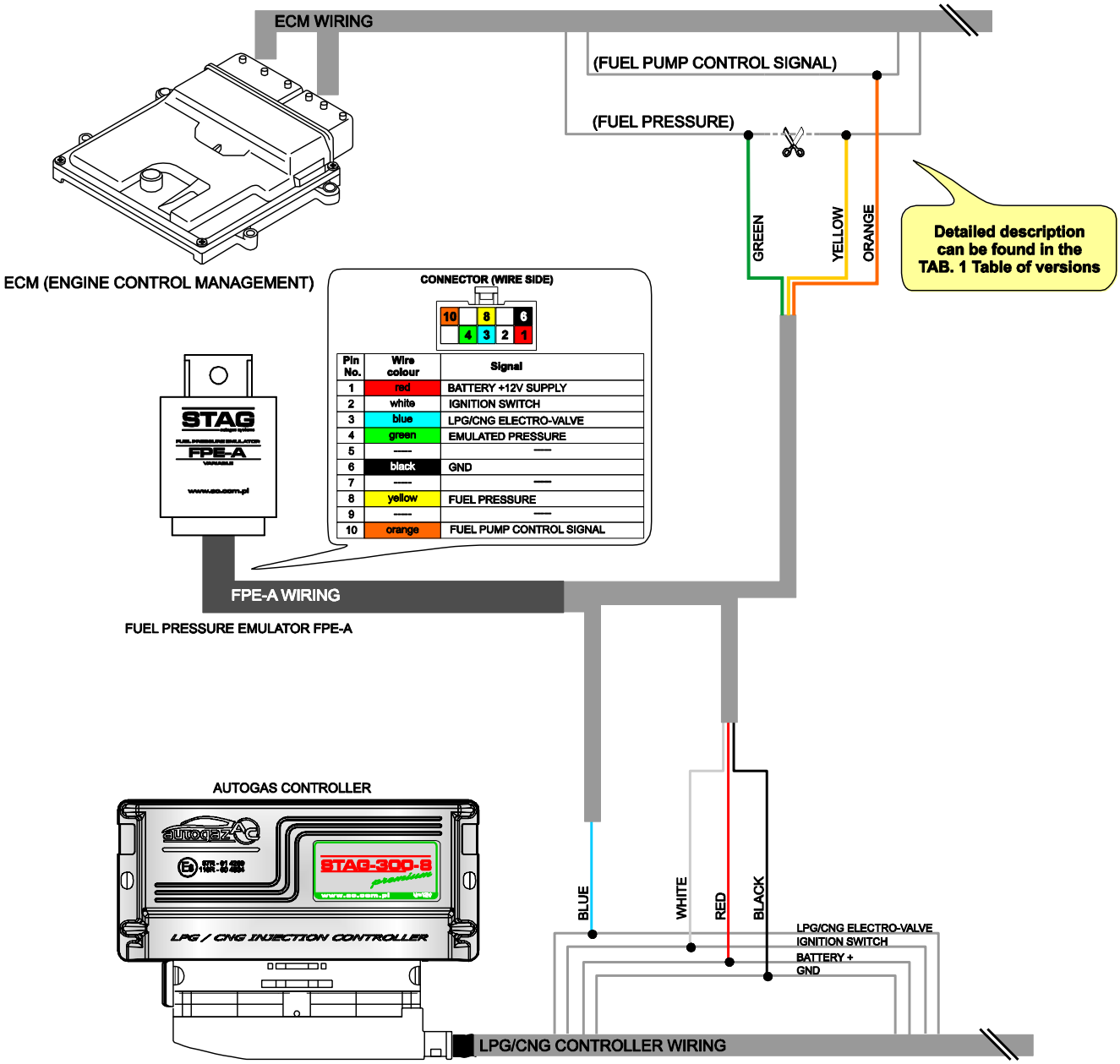
When the engine is fueled by LPG/CNG, there is no supply of petrol from the rail, so the rail pressure is not changing as expected by the petrol ECM. This is interpreted as an error in the pressure control circuit. As a consequence, the ECM shortens the injection time pulses and/or reports a failure that may make continuation of driving impossible. The FPE-A works with the regulator circuit and solves the problem. After installation and the first start-up, the activated adaptation function selects the parameters and emulation mode for a given car in an automatic mode. The settings are stored in system non-volatile memory and can be modified only with another adaptation cycle.

4. Wiring diagram and installation remarks

The supplied universal emulator harness should be connected in accordance with the indicated wiring diagram and recommendations of the table with versions dedicated to specific cars. The location of emulator installation depends on the wiring diagram for a specific version and configuration of the fuel pressure control system.

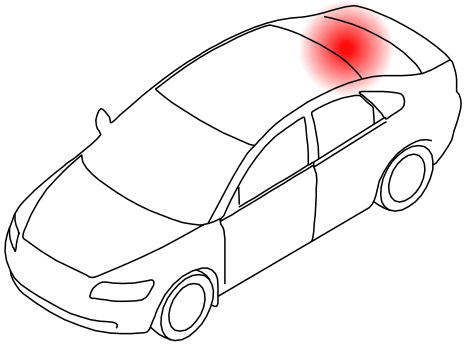
FPE-A emulator
connected in accordance with SCH1 wiring diagram
should be placed close to the ECM.

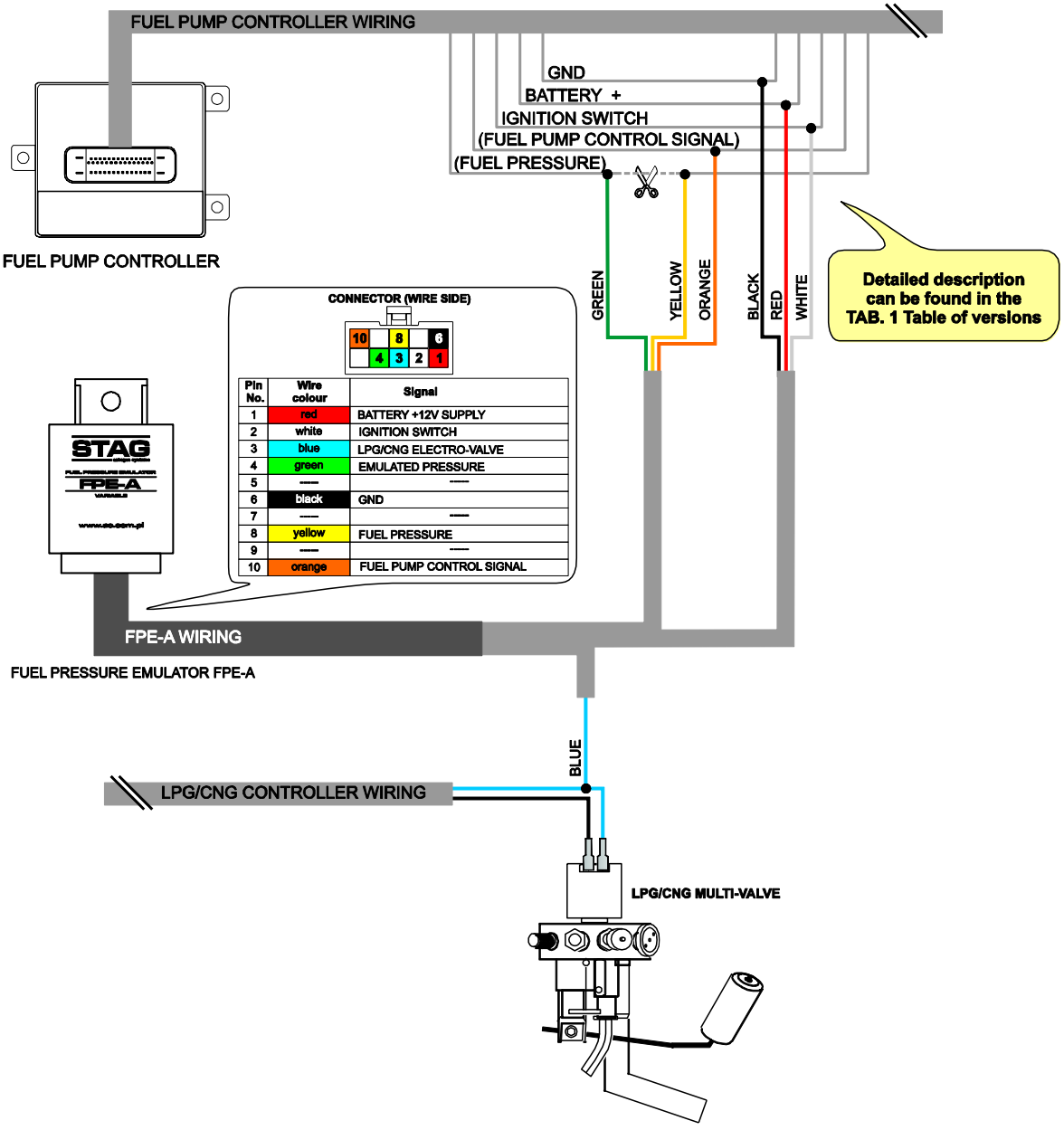




SCH1. Wiring diagram for connection of the FPE-A fuel pressure emulator with the vehicle system, close to the petrol ECM.

FPE-A emulator
connected in accordance with SCH2 wiring diagram
should be placed close to the fuel pump controller.

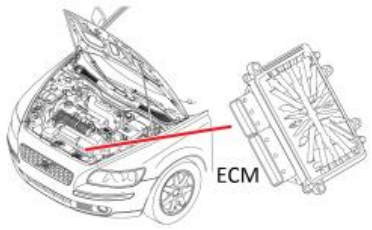




SCH2. Wiring diagram for connection of the FPE-A fuel pressure emulator with the vehicle system, close to the fuel pump controller.

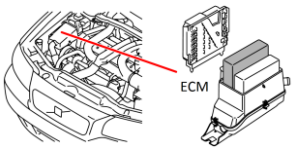
Tab. 1 Table of versions

VOLVO S40

Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2005	B	20	white-black	Fuel pump control signal		ECM location 
		A	91	white-blue	Fuel pressure sensor signal		
	2006 ÷ 2011	B	21	white-black	Fuel pump control signal		
		A	89	white-blue	Fuel pressure sensor signal		

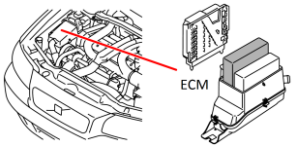
Wiring diagram: **SCH 1.**

VOLVO S60

Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2004 ÷ 2009	B	47	yellow	Fuel pump control signal		ECM location 
		A	2	green-grey	Fuel pressure sensor signal		

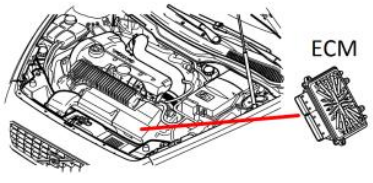
Wiring diagram: **SCH 1.**

VOLVO S60 R

Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2004 ÷ 2009	B	47	yellow	Fuel pump control signal		ECM location 
		A	2	green-grey	Fuel pressure sensor signal		

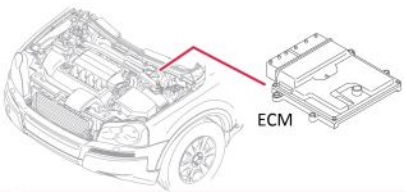
Wiring diagram: **SCH 1.**

VOLVO S80

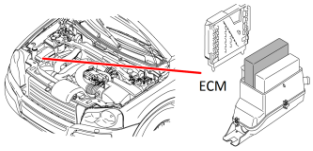
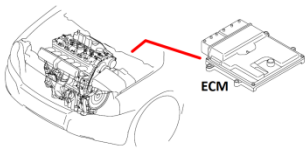
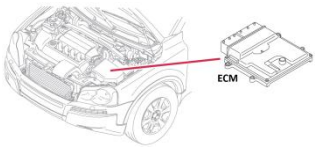
Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2004 ÷ 2006	B	47	yellow	Fuel pump control signal		ECM location 
		A	2	green-grey	Fuel pressure sensor signal		
	2007 ÷ 2011	B	21	yellow-orange	Fuel pump control signal		
		A	89	blue-brown	Fuel pressure sensor signal		

Wiring diagram: **SCH 1.**

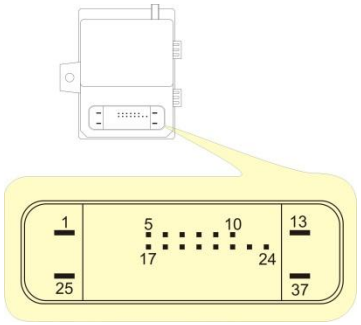
VOLVO XC70

Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2004 ÷ 2007	B	47	yellow	Fuel pump control signal		ECM location 
		A	2	green-grey	Fuel pressure sensor signal		
	2007 ÷ 2011	B	21	yellow-orange	Fuel pump control signal		
		A	89	blue-brown	Fuel pressure sensor signal		
							Wiring diagram: **SCH 1.**

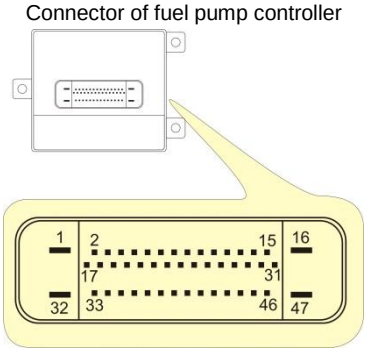
VOLVO XC90

Engine	Year of manufacture	Petrol ECM harness					Installation notes
		Connector	Pin No.	Wire colour	Signal		
2.5T	2004 ÷ 2011	B	47	yellow	Fuel pump control signal		ECM location 
		A	2	green-grey	Fuel pressure sensor signal		
							Wiring diagram: **SCH 1.**
3.3	2007 ÷ 2011	B	21	yellow	Fuel pump control signal		ECM location 
		A	71	green-grey	Fuel pressure sensor signal		
							Wiring diagram: **SCH 1.**
4.4	2007 ÷ 2011	B	20	yellow	Fuel pump control signal		ECM location 
		A	71	green-grey	Fuel pressure sensor signal		
							Wiring diagram: **SCH 1.**

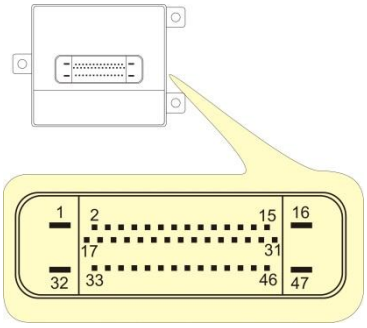
OPEL ASTRA

Engine	Year of manufacture	Fuel pump controller harness				Installation notes
		Pin No.	Wire colour	Signal		
1.4T 1.6	2009 ÷ 2014 2009	1	red-blue	Battery +12V supply		Connector of fuel pump controller  Wiring diagram: **SCH 2.**
		10	blue-white	Fuel pressure sensor signal		
		13	grey	Fuel pump control signal		
		21	violet-green	Ignition switch		
		25	black	GROUND		

OPEL INSIGNIA

Engine	Year of manufacture	Fuel pump controller harness				Installation notes
		Pin No.	Wire colour	Signal		
2.8T	2009 ÷ 2013	1	black	GROUND		Connector of fuel pump controller  Wiring diagram: **SCH 2.**
		10	blue-white	Fuel pressure sensor signal		
		15	violet-blue	Ignition switch		
		32	red-white	Battery +12V supply		
		47	grey	Fuel pump control signal		

CHEVROLET CAPTIVA

Engine	Year of manufacture	Fuel pump controller harness				Installation notes
		Pin No.	Wire colour	Signal		
2.4	2006 ÷ 2010	1	black	GROUND		Connector of fuel pump controller  Wiring diagram: **SCH 2.**
		10	yellow	Fuel pressure sensor signal		
		15	pink	Ignition switch		
		32	red-white	Battery +12V supply		
		47	grey	Fuel pump control signal		

5. Emulator start

Following the installation of FPE-A, adaptation must be performed.

1. Start the engine on petrol and keep it on idle until the rated operating temperature is reached.
2. Make sure that the LPG/CNG change-over switch is set in the petrol fuel mode and stop the engine.
3. Turn off the ignition switch.
4. Disconnect the FPE-A from the harness female connector, wait min. 5s and reconnect the emulator. When the rubber cover on the connector is pulled off, an lit internal red LED should be seen.
5. Turn on and turn off the ignition switch three times within 30s after emulator connection to the harness socket. The internal red LED should start flashes slowly.
6. Start the engine. The internal red LED should start flashes fast.
7. Leave the car on idle for about 2 minutes until the internal red LED light stops flashing and lights up permanently.
8. Switch car to gas and wait until the LED light will shut down. This means that the adaptation process is completed.

When the adaptation is completed, the emulator is ready to work on LPG/CNG mode. If the adaptation process is interrupted, the whole procedure must be restarted.

6. Notes

Correct operation of the emulator requires the following conditions to be met:

- The emulator should be connected in accordance with the wiring diagram and recommendations of the table with unit versions.
- The emulator has been installed in the correct location (SCH1 for the ECM area and SCH2 for the fuel pump controller area).
- The adaptation process has been completed successfully.

7. Warranty Document

Quality warranty terms and conditions:

AC S.A. with its registered seat in Bialystok ensures good quality, correct operation and efficient functioning of the purchased equipment for which this Warranty Document was issued on the territory of the country the purchase was made in. The warranty is given on the following terms and conditions:

1. **WARRANTY COVERAGE**
   1) this warranty concerns proper functioning of the equipment and is valid on the territory of the country the purchase was made in,
   2) the warrantor is only responsible for defects due to reasons within the sold equipment and for consequential damages to this equipment,
   3) the warranty does not cover
      a) normal operating wear of the equipment,
      b) equipment which has been modified, repaired or infringed in any way by the Customer or any third persons.
2. **WARRANTY TERMS AND CONDITIONS AND PROCEDURE**
   1) the basis for exercising the warranty rights is to submit the properly filled up original Warranty Document;
   2) to exercise the warranty rights, you should immediately report any noticed defect to the local Distributor of AC S.A. (for the valid list of Distributors, visit the website at www.ac.com.pl), delivering the defective equipment with the Warranty Document and a copy of the purchase receipt. The Distributor is responsible for delivery of defective goods to the Quality Control Department of AC S.A.
3. **WARRANTY PERFORMANCE TIME**
   1) the manufacturing defects of the equipment should be removed and inoperative components should be removed repaired or replaced within 14 days of equipment delivery to AC S.A.;
   2) in non-standard cases, the repair time may be extended.
4. **WARRANTY PERIOD**
   1) the warranty period is 24 months from the date of sale;
   2) the warranty expires in the event when the Customer fails to observe provisions of the Warranty Document, in particular in case of:
      a) misuse of the equipment,
      b) mechanical damages,
      c) any unauthorised alterations to the equipment,
      d) failure to observe the instructions of correct operation, in particular those in the Operating Manual,
      e) other damages through the fault of the user.
5. **FINAL PROVISIONS**

This warranty for sold goods does not exclude, restrict or suspend the Purchaser's rights arising from product's inconsistency with the agreement.

Any disputes under this warranty shall be settled by the court having jurisdiction over the seat of AC S.A.

.....	.....
date of sale	stamp and signature of the Seller