STAG®
autogas systems

Installation manual

Fuel Pressure Emulator
FPE-A

„04-141.00.00.1   24.04.2015"

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

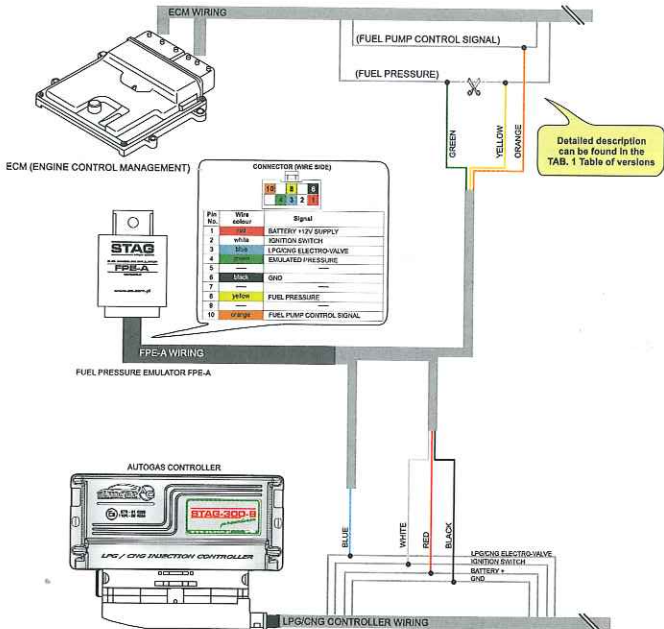Exact versions of supported models are listed in the following sections.

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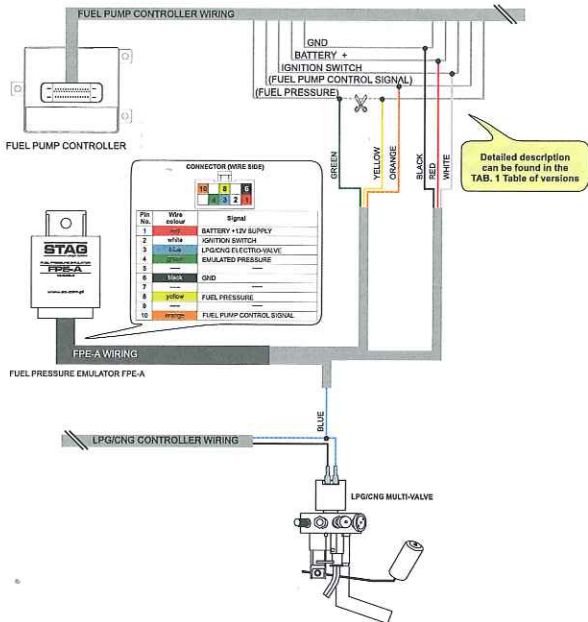
FPE-A emulator
connected in accordance with SCH1 wiring diagram
should be placed close to the ECM.

ECM WIRING

(FUEL PUMP CONTROL SIGNAL)

(FUEL PRESSURE)

GREEN   YELLOW   ORANGE

Detailed description
can be found in the
TAB. 1 Table of versions

ECM (ENGINE CONTROL MANAGEMENT)

CONNECTOR (WIRE SIDE)

STAG
FPE-A

Pin No.	Wire colour	Signal
1	red	BATTERY +12V SUPPLY
2	white	IGNITION SWITCH
3	blue	LPG/CNG ELECTRO-VALVE
4	green	EMULATED PRESSURE
5	—	—
6	black	GND
7	—	—
8	yellow	FUEL PRESSURE
9	—	—
10	orange	FUEL PUMP CONTROL SIGNAL

FPE-A WIRING

FUEL PRESSURE EMULATOR FPE-A

AUTOGAS CONTROLLER

STAG-200-8

LPG / CNG INJECTION CONTROLLER

BLUE   WHITE   RED   BLACK

LPG/CNG ELECTRO-VALVE
IGNITION SWITCH
BATTERY +
GND

LPG/CNG CONTROLLER WIRING

SCH1. Wiring diagram for connection of the FPE-A fuel pressure emulator with the vehicle
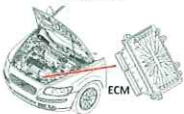system, close to the petrol ECM.
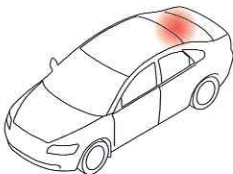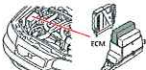
FPE-A emulator
connected in accordance with SCH2 wiring diagram
should be placed close to the fuel pump controller.

FUEL PUMP CONTROLLER WIRING

GND
BATTERY +
IGNITION SWITCH
(FUEL PUMP CONTROL SIGNAL)
(FUEL PRESSURE)

FUEL PUMP CONTROLLER

GREEN
YELLOW
ORANGE
BLACK
RED
WHITE

Detailed description
can be found in the
TAB. 1 Table of versions

STAG
FPE-A

CONNECTOR (WIRE SIDE)

| 10 | 8 | 6 |
| 4 | 3 | 2 | 1 |

Pin No.	Wire colour	Signal
1	red	BATTERY +12V SUPPLY
2	white	IGNITION SWITCH
3	blue	LPG/CNG ELECTRO-VALVE
4	green	EMULATED PRESSURE
5	—	----
6	black	GND
7	—	----
8	yellow	FUEL PRESSURE
9	—	----
10	orange	FUEL PUMP CONTROL SIGNAL

FPE-A WIRING

FUEL PRESSURE EMULATOR FPE-A

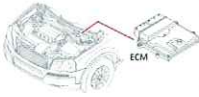LPG/CNG CONTROLLER WIRING

BLUE

LPG/CNG MULTI-VALVE

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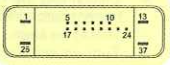
Engine	Year of manufacture	Petrol ECM harness				Installation notes
		Connector	Pin No.	Wire colour	Signal	
2.5T	2004 ÷ 2007	B	47	yellow	Fuel pump control signal	⌐
		A	2	green-grey	Fuel pressure sensor signal	✂
	2007 ÷ 2011	B	21	yellow-orange	Fuel pump control signal	⌐
		A	89	blue-brown	Fuel pressure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

ECM location

Wiring diagram: SCH 1.
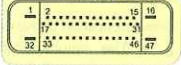
VOLVO XC90

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	⌐
		A	2	green-grey	Fuel pressure sensor signal	✂

ECM location

Wiring diagram: SCH 1.

3.2	2007 ÷ 2011	B	21	yellow	Fuel pump control signal	⌐
		A	71	green-grey	Fuel pressure sensor signal	✂

ECM location

Wiring diagram: SCH 1.

4.4	2007 ÷ 2011	B	20	yellow	Fuel pump control signal	⌐
		A	71	green-grey	Fuel pressure sensor signal	✂

ECM location
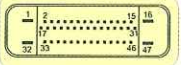
Wiring diagram: SCH 1.

OPEL ASTRA

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

Wiring diagram: SCH 2.

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
		10	blue-white	Fuel pressure sensor signal	✂	
		15	violet-blue	Ignition switch	⌐	
		32	red-white	Battery +12V supply	⌐	
		47	grey	Fuel pump control signal	⌐	

Wiring diagram: SCH 2.

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
		10	yellow	Fuel pressure sensor signal	✂	
		15	pink	Ignition switch	⌐	
		32	red-white	Battery +12V supply	⌐	
		47	grey	Fuel pump control signal	⌐	

Wiring diagram: SCH 2.

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.