



STAG – XL

LAMBDA SENSOR CONTROLLER

INSTALLATION & PROGRAMMING MANUAL

version : V1.77 - V1.79



Manufacturer:

AC Spółka Akcyjna.

15-182 Białystok, ul. 27 Lipca 64, Poland

tel. +48 85 7438148, fax +48 85 653 8649

www.ac.com.pl, e-mail: autogaz@ac.com.pl



SET COMPONENTS

1. STAG-XL - lambda sensor controller
2. Actuator (stepping motor) & base plate
3. A group of wires
4. Programming & operation manual

APPLICATION OF THE CONTROLLER

The STAG-XL lambda sensor controller has been designed for controlling of operation of engines adapted for LPG and fitted with a lambda sensor .

CONTROLLER OPERATION

The LPG output is controlled with a actuator and depends on lambda sensor indications. All STAG-XL parameters are set with an external tester , a PC (AcLpgWin software) or manual .

WIRING DIAGRAM AND INSTALLATION MANUAL

The STAG-XL controller should be mounted within the engine room in the place, which is not exposed to high temperature, water and fuel.

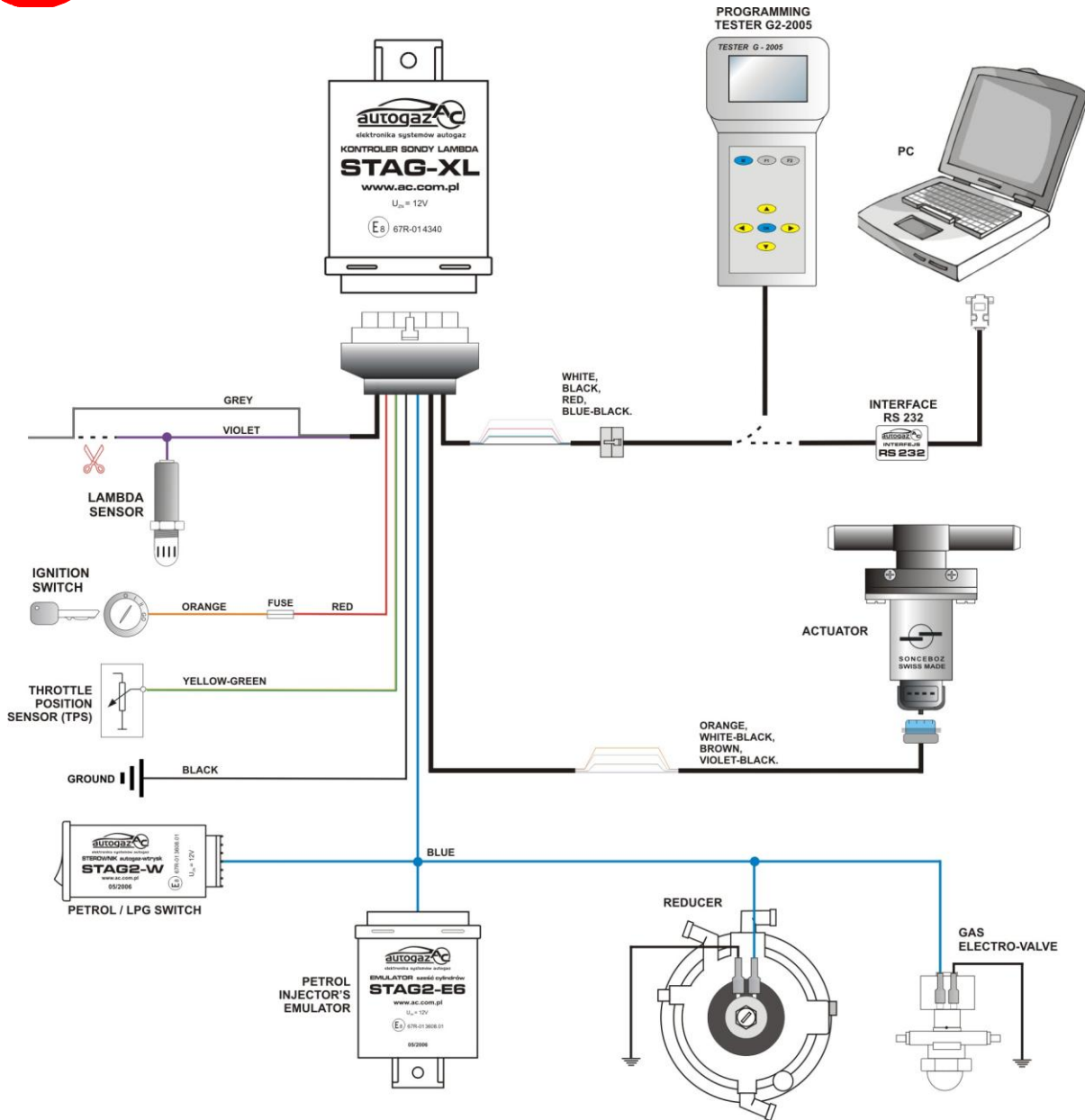
CAUTION!

It is recommended to install the controller vertically using its mounting eye and a screw, placing sockets downward to avoid water penetration.

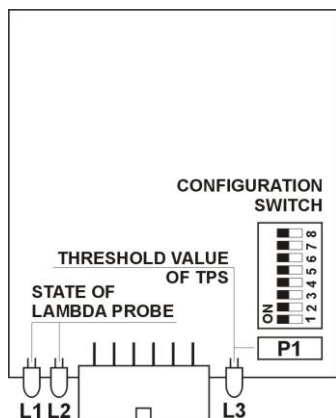
Install bundle protecting rubbers carefully to seal the entire housing.

Electrical connections should be soldered, carefully insulated and protected from humidity to avoid shorting.

NO	CABLE COLOUR	DESCRIPTION
1	BLACK	GND
3	RED	+ 12V IGNITION SWITCH
7	BLUE	LPG SWITCH ON
2	YELLOW-GREEN	TPS
8	VIOLET	LAMBDA SENSOR
9	GREY	CAR COMPUTER
4	ORANGE	ACTUATOR
5	BROWN	ACTUATOR
10	VIOLET-BLACK	ACTUATOR
11	WHITE-BLACK	ACTUATOR
6	WHITE	RXD
12	BLUE-BLACK	TXD



STAG-XL installation diagram



In configuration mode using switches (SW1-ON)
 L1 and L2 LEDs indicate state of lambda sensor
 and L3 LED indicates position of TPS:

- L1 LED red – SENSOR RICH**
- L2 LED green – SENSOR WEAK**
- L3 LED red – TPS BELOW THRESHOLD VALUE**

P1 potentiometer is used to set up THRESHOLD VALUE OF TPS

STAG-XL Position of configuration and signalling elements.



STAG-XL - PROGRAMMING WITH A SWITCH

NOTE!

Configuration of STAG-XL controller by means of switches is carried out when **SW1** switch is **ON**

Mode:	PC (RS232 interface)	MANUAL (switches)		
SW 1	OFF	ON		
TPS:	0 – 5V	0 – 12V	5 – 0V	12 - 0V
SW 2	OFF	ON	OFF	ON
SW 3	OFF	OFF	ON	ON
Simulation:	Wave on*	Fault to frame		
SW 4	OFF	ON		
Sensor:	Standard	(+) Rez.	(-) Rez.	TA **
SW 5	OFF	ON	OFF	ON
SW 6	OFF	OFF	ON	ON
Type of sensor:	0 – 1V	5 – 0V	0 – 5V	0,8 – 1,6V
SW 7	OFF	ON	OFF	ON
SW 8	OFF	OFF	ON	ON

* 0.8s/0.8s wave

** TA – EMERGENCY MODE, REGULATION OFF
- actuator at the position of 200 steps

Parameter values in MANUAL mode (SW1- ON):

TPS TYPE	set up by SW2 and SW3
TPS THRESHOLD	set up by P1 potentiometer
HYSTERESIS.....	0.06[V]
ENRICHMENT.....	50 steps (at max. TPS stroke)
WEAKENING.....	30 steps (at max. TPS stroke)
ACTUATOR SPEED.....	250
OPENING OPTION.....	YES
ACTUATOR AT POSITION.....	130 steps
ACTUATOR SPEED.....	250
SENSOR TYPE	set up by SW7 and SW8
SENSOR	set up by SW5 and SW6
ACTUATOR SPEED ABOVE TPS THRESHOLD.....	250
ACTUATOR SPEED BELOW TPS THRESHOLD.....	100
SIMULATION	set up by SW4
SWITCHING POSITION.....	120 steps
MAX. ACTUATOR POSITION.....	200 steps
MIN. ACTUATOR POSITION.....	60 steps



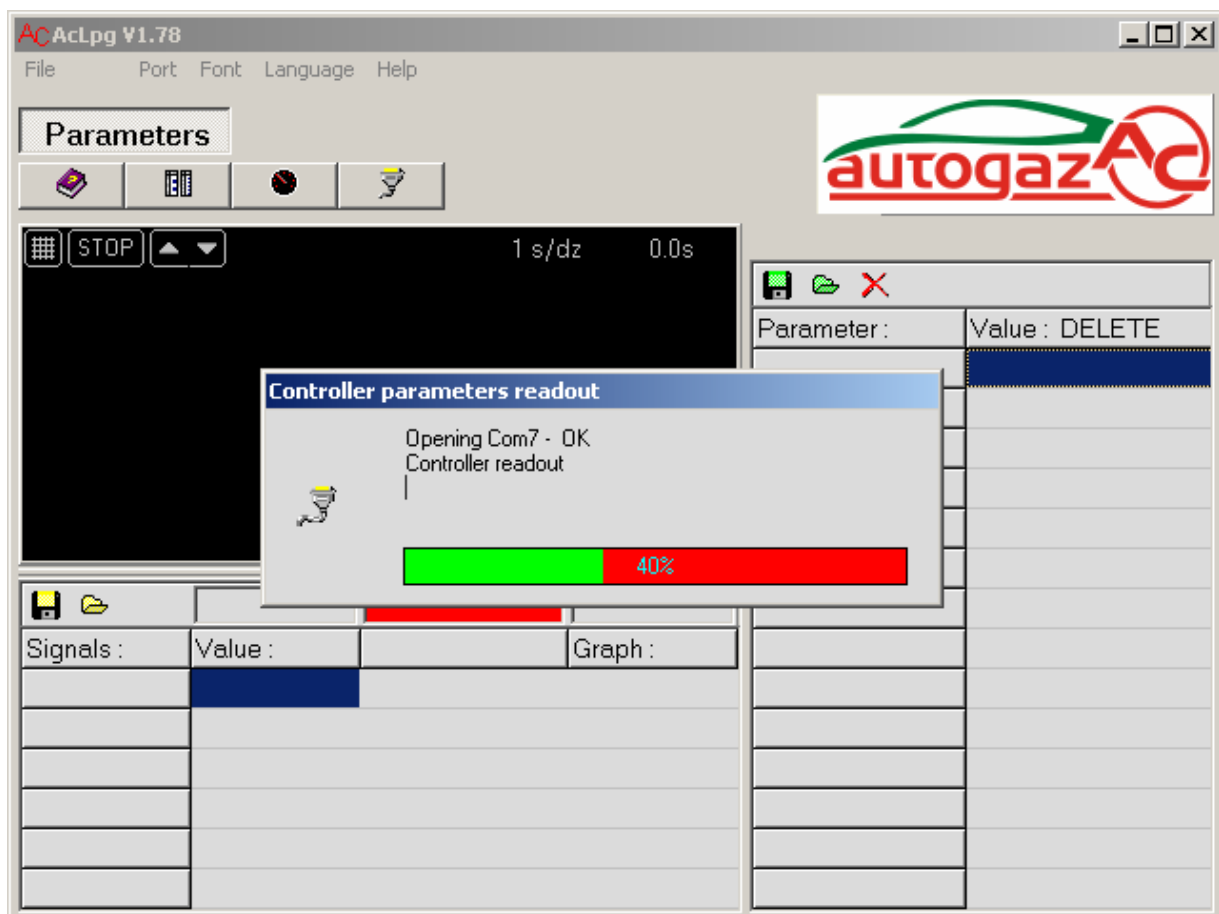
STAG-XL - PROGRAMMING WITH A PC AND AcLpgWin SOFTWARE

NOTE!

Configuration of STAG-XL controller using a computer and AcLpgWin.exe application is carried with **SW1** in **OFF** position

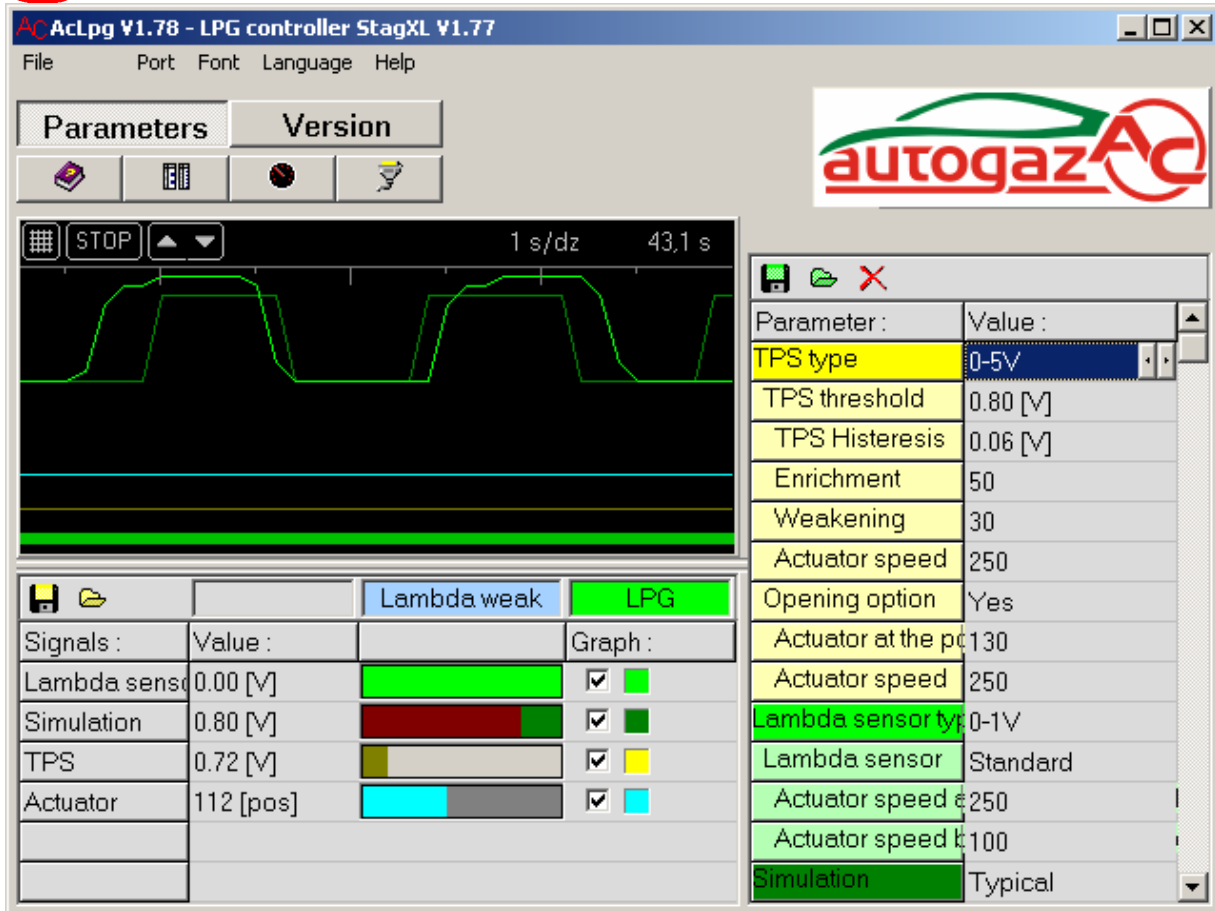
Every time SW1 is switched to ON position, manufacturer's parameters are set up and all parameters set up by the computer are lost.

To set STAG-XL parameters using a PC it is indispensable to connect the PC through a RS socket and a RS-232 interface to the STAG-XL programming socket and start the AcLpgWin.exe software.



During communication appears the screen **PARAMETERS** and transmission percentage indicator. If after a few trials the software cannot establish communication with the controller then instead of the transmission percentage indicator appears the window **CONNECT**, which should be activated to renew communication. If there is no communication check RS-232 connection or change the serial port number .

If the communication is established appears the window **PARAMETERS**, oscilloscope function is on.

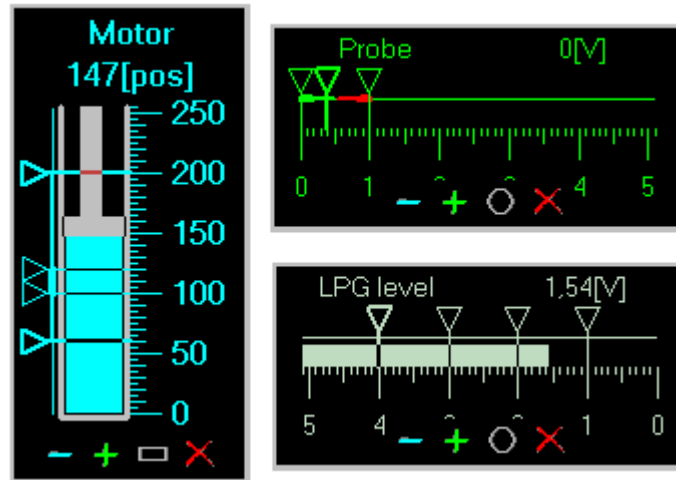


- open help file
- window layout
- open gauges window
- controller parameters readout
- grid on
- start / stop oscilloscope
- oscilloscope time base change
- save visualisation file
- open visualisation file
- oscilloscope on / off; graph colour change
- save controller configuration file
- open controller configuration file
- restore manufacturer's parameters

On the oscilloscope you can see basic STAG-XL controller signals: lambda sensor, simulation, TPS and stepping motor positions – ACTUATOR.

Below the graph there is a signal table.

You can enable each graph and select its colour in the “Graph” column. Apart from the oscilloscope, signal values are displayed in the “Values” column and visualised as line graphs.



Additionally, the windows of additional gauges are also accessible. They are displayed by clicking a list below the “Gauges” button or by double-clicking relevant line in the signal table. It is possible, separately for each such window, to change its position (using left mouse button), size ([-] [+] buttons), shape ([O] button) and close ([X] button).

KEYBOARD SHORTCUTS

- F1** - full function switch names / abbreviations
- F3** - screen PARAMETERS
- F6** - screen VERSION
- F7** - parameter table activation for the screen PARAMETERS
- F9** - font change
- F10** - start of communication with the controller

QUICK CHANGE OF PARAMETERS

To change parameters and their values it is possible to use mouse buttons through clicking on selected parameter as well as keyboard keys:

- UP / DOWN** - parameter change
- RIGHT / LEFT** - parameter value change



STAG-XL ADJUSTMENT PARAMETERS

TPS TYPE - after connection of a throttle opening sensor choose its type and voltage range.

TPS THRESHOLD – voltage level, which causes switching over from idle operation to operation with load

TPS HISTERESIS - removal of voltage noise from the TPS sensor

ENRICHMENT - number of actuator steps proportional to accelerator's pressing

WEAKENING - number of actuator steps proportional to accelerator's loosing

ACTUAROR SPEED - actuator speed during enrichment / weakening

OPEN - additional opening of actuator after reaching of TPS level

ACTUATOR AT THE POSITION - number of actuator steps during additional opening

ACTUATOR SPEED - actuator speed during opening

LAMBDA SENSOR TYPE - lambda sensor operation range

LAMBDA SENSOR - lambda sensor type:

STANDARD – zirconium

RESISTIVE (-) – load from the frame

RESISTIVE (+) – load from the positive pole (+)

ACTUATOR SPEED ABOVE TPS THRESHOLD - actuator speed during LPG – air mixture adjustment set by the sensor during idle operation

ACTUATOR SPEED BELOVE TPS THRESHOLD - actuator speed during LPG – air mixture adjustment set by the sensor during idle operation

SIMULATION - during running with LPG vehicle's computer receives simulated signal with adjustable parameters instead of lambda sensor signal

TYPICAL - square wave 08 / 08 s.

AUTO - simulation of the sensor regarding petrol engine characteristics

FRAME - vehicle's computer input connected to the frame

USER - square wave adjusted freely

TIME HI - duration of simulation pulse upper course

TIME LO - duration of simulation pulse lower course

TIME OFF - total time of pauses between pulses' groups, 0 = no pause

PULSE NUMBER - number of pulses within a group, 0 = no groups

DISCONNECTED - vehicle's computer input disconnected from the sensor



SWITCHING POSITION – position of actuator during switching on the LPG

MAX LEVEL FOR ACTUATOR - number of steps for max. actuator opening.

MIN LEVEL FOR ACTUATOR - number of steps for min. actuator opening.

FAULTS DETECTED BY THE STAG-XL CONTROLLER

DATA FAULT - faults within controller's memory (damage or improper assembly)

LAMBDA SENSOR FAULT - long-lasting lack of voltage from the sensor

TPS FAULT - long-lasting lack of TPS voltage change

PRESSURE REGULATOR ADJUSTMENT

Adjustment should be done using menu **PARAMETERS**.

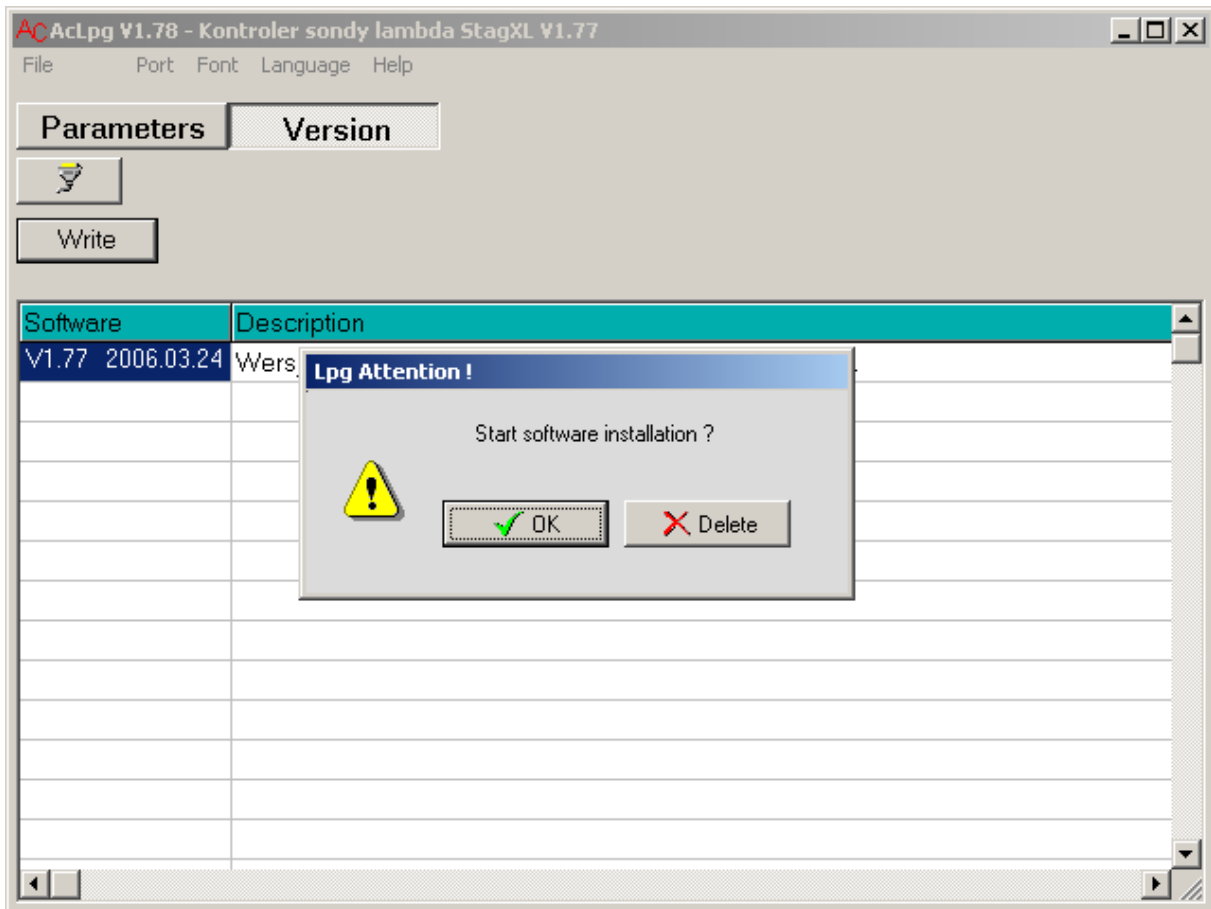
- start the engine in gasoline mode and wait for proper lambda sensor operation
- set the controller for **GASOLINE** mode. Check lambda sensor operation for idle and 3000 rpm (sensor indications should be between upper and lower voltage value).
- Set the controller **STAG2-W** for **AUTO**
- Increase rpm to ca. 2000 to switch over to LPG
- Watching lambda sensor graph at the oscilloscope adjust LPG output (with an adjustment screw located on the pressure regulator) so that the actuator works in the range 50 - 100 steps (idle engine rpm)
- Check sensor balancing at 3000 rpm
- If the sensor shows long return time to balancing during rpm change check pressure regulator membrane tension and adjust it with a screw, if necessary.

NOTE: if during pressure regulator adjustment it is impossible to obtain sensor balance at high rpm and the mixture is weak, it means that the system pressure regulator - mixer does not work properly, thus before adjustment of electronics some mechanical components must be adjusted.

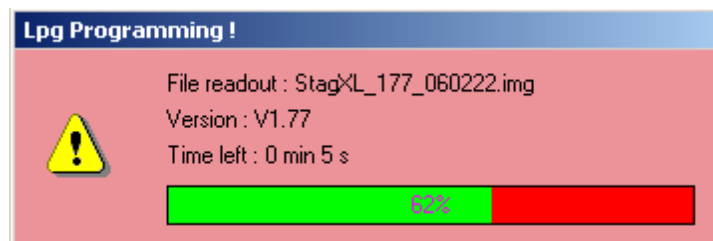


VERSION

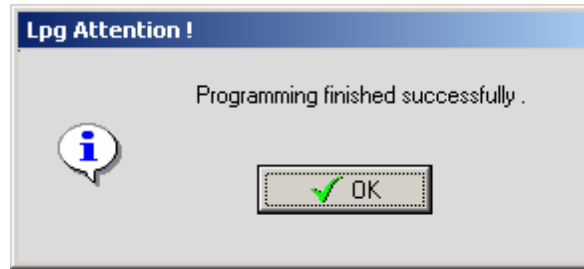
The STAG-XL controller is provided with the option of user-made software modification. After connecting the controller to a PC the new window VERSION appears. If the folder containing the program AcLpgWin.exe includes also a batch program of the STAG-XL controller marked with the wildcard .img, the batch program will be also displayed after activation of the VERSION window; this enables controllers software exchange.



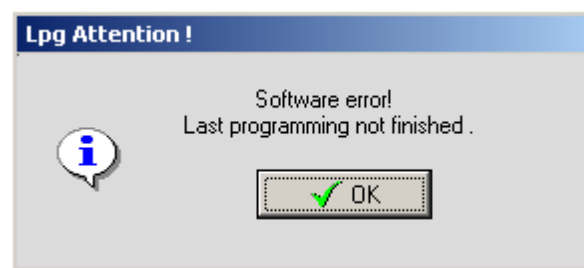
Click with the mouse on the program, which should be copied into the controller software
Click the button Write when the question “Start software installation?” appears, press OK.



Wait until the installation progress bar reaches 100%



when the message “Programming finished successfully” appears, press OK. The controller performs restart and begins to work with the new version of the software.



If the programming process is interrupted or there are some errors, diagnostic software will display the “Software error ...” message. Press OK and repeat the controller programming procedure.



TECHNICAL DATA

Operation voltage.....12V (+30% - 25%)
Max current consumption.....0,3A

PROGRAMMABLE FUNCTIONSE

Type of throttle position sensor0-5V, 5-0V linear, switch 0-12/12-0V
Lambda sensor type 0-1V, 0-5V, 5-0V, 0.8-1.6V, standard or resistive
Lambda sensor emulationsquare wave, disconnected, frame
Zakres pracy silnika krokowego0 - 255 steps
Prędkość silnika krokowego0 - 255
Opcja dodatkowego otwarcia silnika podczas przyśpieszaniaon / off
Opcja parametrów domyślnychyes
Identyfikacja błędówTPS, lambda sensor