The EDIA-PRO is an enhanced version of the proven EDIA-5 analyzer. To meet expectations of our customers we created a system for automatic evaluation of injection system parameters based on measured waveforms. This makes the diagnosis easier and faster. Additional possibility of fast evaluation of cylinder compression and ability to check starting performance along with control valve measurement mode are perfect complement to diagnostic capabilities of EDIA device.

Comparison of EDIA versions:

<table>
<thead>
<tr>
<th>Feature</th>
<th>EDIA-5</th>
<th>EDIA-PRO</th>
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Recoding of injectors and pressure waveform
X
X

Performing manual measurement using markers
X
X

Automatic evaluation of injection parameters
 &nbsp; X

Fast electrical measurement of cylinder compression
 &nbsp; X

Easy diagnosis of a battery, starter, and alternator
 &nbsp; X

Measurements of DRV and SCV/IMV valve control signals
 &nbsp; X

Additionally, the EDIA-PRO kit includes a set of five pressure sensor connectors compatible with different sensor manufacturers.

EDIA-PRO diagnostic system is an innovative solution for rapid diagnosis of Common Rail injection engines developed by Polish company DeltaTech Electronics. This device is useful in diagnosis of both electromagnetic and piezoelectric injectors. With its help it is possible also to analyze unit injectors control signals. Connected to a computer via USB port EDIA-PRO allows recording of injector current change of four injectors at the time and a signal from high pressure rail sensor.

With innovative probes it is possible to visualize injection signal with minimum interference, without removing the injectors or damaging wire insulation. Recorded waveforms can be used for accurate diagnosis and failure detection of injectors, sensors, high pressure pump and other components of Common Rail system. Unlike traditional oscilloscopes, difficult to use in a garage, EDIA-PRO offers simple and user-friendly operation, without complicated configuration. Acquired waveforms can be stored and compared with each other which gives the user additional possibilities.

EDIA-PRO allows accurate measurement of injection signal times of four injectors and enables to observe rail small pressure changes caused by working injectors. Additional DRV and SCV/IMV valve measurement enables simultaneous acquisition of pressure waveform and control signals of both valves. With automatic PWM signal interpretation, the user receives easy to read set of pressure and PWM duty cycle waveforms (in %).
This gives very good diagnostic capabilities. An important advantage of the analyzer is small size, simplicity of use and favorable price.

With the EDIA-PRO system, we can obtain information on:

- electrical part of injection system
- hydraulic part of injection system
- overall engine condition

Diagnosis of the electrical part of injection system allows you to:

- check of injector solenoid condition or a piezoelectric stack through analysis of current control waveform of the injector;
- check connection (contact) quality through analysis of control waveform;
- check connection quality between injector plug and the controller;
- check controller high voltage capacitors charging;
- validate parameters (voltage, current, time) of control signals generated by ECU;
- check starting dose timing during engine start;
- verify correct operation of the rail pressure sensor.

Diagnosis of the hydraulic part of injection system allows you to:

- check the rate of rail pressure rise which gives information about functionality of high pressure pump;
- check the pressure of first injector opening at the time of engine starting;
- check the operation of individual injectors at the time of starting the engine;
- check the transition from starting dose to normal idling dose;
- check injection timing and dosage on idling;
- check injection timing and dosage on increasing speed;
- check injection timing and dosage on decreasing speed - reduced or no injections;
- check pilot injection timing and dosage;
- check main injection timing and dosage;
- check after-injection timing and dosage;
- check speed of pressure decay after switching off the engine;
- check rail control valve operation;

Diagnosis of the mechanical part of injection system allows you to:

- check the difference in injection times resulting from efficiency of individual cylinders - different angular accelerations measured by ECU;
- diagnosis of DRV and SCV/IMV valves by performing PWM duty cycle measurements.

- indirect check of individual cylinder tightness - cracked cylinder head gasket, piston rings, cylinder, piston, etc.

Additionally, PRO version offers:

- automatic evaluation of running engine parameters;
troubleshooting tips in the form of messages;
fast and automated measurement of cylinder compression by an indirect method for engines of 2 to 8 cylinders, both gasoline and Diesel;
diagnosis of the vehicle electrical system &ndash; battery, starter and alternator of all types of cars.

Specifications:

Supply voltage
5V DC (powered by USB, does not need external supply)

Operating conditions
0-50°C

Voltage range □ pressure signal
0..5V

Voltage measurement accuracy
1%

Kit contents:
EDIA-PRO device
Measurement cable with injector probes and pressure signal connector
Battery measurement cable with alligator clips
Adapter cable for Bosch
Adapter cable for Denso
Adapter cable for Delphi
Universal adapter cable with thin terminals
Universal adapter cable with wide terminals
USB cable
User manual
CD-ROM with software and driver

Quick diagnosis of common rail system with EDIA-PRO.

Injection system initial check.
It is assumed that the user is familiar with the user manual and therefore the following procedures does not describe how to operate the device.

- Place current probes on injector wiring and connect rail pressure sensor according to Manual,
- Connect the device to a computer via USB cable,
- Verify connection status - green or red indicator (see Manual),
- Select 'Timing analysis' mode,
- Select recording duration, eg 5 s,
- Select type and range of pressure sensor consistent with the type installed in the car,
eg 150 MPa,
- Select pressure coupling, eg. ‘Absolute’,
- If required select measurement starting delay,
- Click ‘Start’ and start the engine while maintaining all necessary precautions,
- After 5 seconds the measurement is complete and the floppy icon will appear. Click the icon to save the waveform to a file,
- If the user does not plan further measurement, disconnect device probes and USB cable. The vehicle will not be necessary for user while analyzing the results,
- If the computer was turned off or EDIA-PRO application closed, run the program and open the previously saved file,
- By moving the graph we firstly see pressure rise in the rail during starting phase. It should increase steadily to about 15 - 25 MPa. Irregular increase may indicate malfunctions in high pressure pump or high pressure control valve,
- After stabilization of idling speed, we can see waveforms similar to examples given below:

nbsp;
The proper pressure waveform is characterized by similar drops in rail pressure (orange).

Proper pressure drops for one cycle. Orange line accurately visualize pressure drop after injector opening. Initially there is a pre-injection followed by a smaller pressure drop and then the main injection followed by greater pressure drop. The exact value of pressure drop depends mostly on duration of injector opening. For our consideration, without losing much accuracy we can state that rail pressure drop after injection is proportional to injection duration, more precisely, to real injector opening duration. The dose itself is dependent also on rail pressure value. Measurements are performed in set conditions therefore we can assume that pressure is constant - for given injection.
If we assume that for every 100 us of injection duration the pressure decline by 0.1 MPa, and if the injectors No. 1, 2 and 3 has injection time of 700 us and pressure drop of 0.7 MPa, and injector No. 4 has injection time of 1000 us and pressure drop of 1 MPa, we can clearly state that injection systems operates well, but cylinder No. 4 for some reason develops lower angular acceleration which is later compensated by increasing fuel dose. This acceleration value is usually lower due to lower cylinder compression rate, e.g. leaky valves or problems with piston-cylinder assembly. For diagnosis to be 100% accurate it is necessary to observe not just one cycle but few or several repeating phenomena.

The most important to remember is that the value of rail pressure drop is directly proportional to the real injector;
The graph above shows that at the moment of opening No. 3 injector (red line) the pressure drop (orange) is significantly lower that in case of other injectors. This means that this injector delivers significantly lower amount of fuel than others. This situation may be caused by injector occlusion, seizure, etc. Most often the ECU measures lower angular acceleration of the crankshaft and increase the dose by augmenting fuel injection time. Then we may easily observe anomalies involving increased injection time and not proportional pressure drop in the high pressure rail. The most important information we get is that the third cylinder injector needs cleaning or maintenance, and the others performs well.

In this graph it is easy to see that pressure drop cause by injector of No. 3 cylinder is significantly greater that pressure drops caused by other injectors. Situation like this
occurs then injector leaks fuel to the leak off port or leaks to cylinder depending on injector design. You can see that leak measurements, often inconvenient, can be replaced by examination with the EDIA-PRO system. In this case the most important thing we get from this measurement is that the No. 3 injector needs maintenance.

The graph below shows that number 2 cylinder injector (yellow) is not operating. Any current change has been detected by the probe. Lack of pressure drop on the rail in the moment the injection should occur is further confirmation. The most common cause of this fault is open injector circuit, e.g. lack of contact in the plug, broken wire, burnt injector solenoid, damaged ECU power stage.
No injection on the No. 2 injector with rapidly increasing rail pressure during engine starting.

The above waveforms shows a case in which the controller 'cut' injection after a sudden pressing and depressing the acceleration pedal. This is one example of how accurately we can analyze the phenomena occurring in the Common Rail injection system.
COMMON RAIL Electronic Diesel Injection Analyzer EDIA-PRO

EDIA-PRO not only enables the accurate observation of waveform shapes in injection systems, but it also allows you to make accurate measurements. In the above screen shot we can see how to make measurements using markers. Green horizontal markers are for pressure measurement. Markers can be moved freely but in this case they are set to measure the pressure drop during injection in No. 2 cylinder injector. The green box corresponding to horizontal markers shows a value of pressure drop equal to 0.9 MPa.

Violet vertical markers are used to measure time. In the above example they are set to measure the main injection duration in No. 2 injector, which is 580 us. These measurements allow us to precisely determine injection parameters and test rule of pressure drop and injection time proportionality.
For in-depth analysis of injector current waveform the user may use 'Waveform analysis' mode. The graph shows the exact waveform of current changes in injector No. 2. 'Waveform analysis' enables precise measurement and may be useful in determining important parameters such as response times, etc.

EDI-PRO system allows to freely move the individual current change waveforms. Above there is a superimposition of individual injector waveforms, this enables in detail comparison of signals.
COMMON RAIL Electronic Diesel Injection Analyzer EDIA-PRO
The above graph shows one possible waveform placement for comparison. It is clearly visible that No. 4 cylinder injector waveform differ from another. Having in mind that waveforms show control current change, we can conclude that lower current flows through No. 4 injector. Examination has confirmed that in this case the improper contact in plug was responsible for this defect.

Measurement of high voltage injection beginning duration - the result of 88 us.
## COMMON RAIL Electronic Diesel Injection Analyzer EDIA-PRO

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<th>Price</th>
<th>3690.00EUR</th>
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Availability: This product was added to our catalog on Friday 27 July, 2018