

## Connection

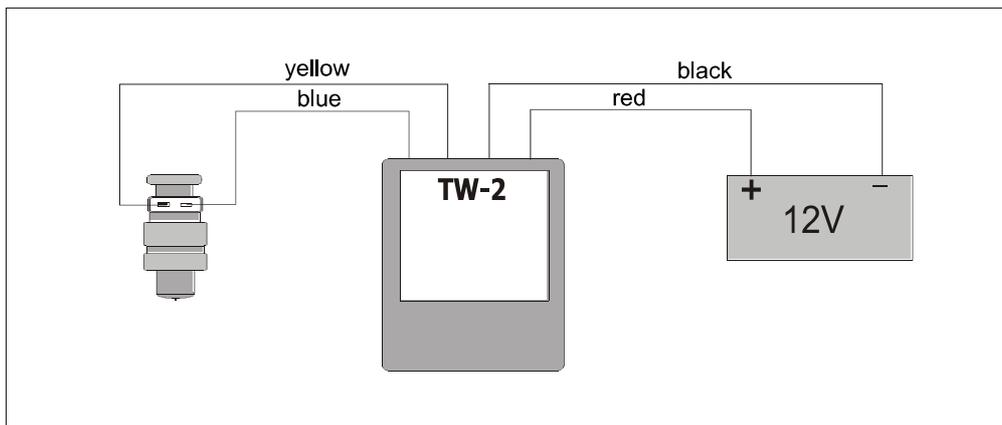
TW-2 tester has connection cable with four wires ended with crocodile clips. The description of individual wires is given below:

<i>Wire color</i>	<i>Description</i>
Red	Positive supply terminal B+
Black	Negative supply terminal B-
Blue	Injector test lead
Yellow	Injector test lead

Firstly, connect injector test leads – blue and yellow. Then connect power supply by attaching appropriate wires directly to 12 V battery.

**Do not power the tester from battery charger!**

After connecting the supply, the device will run self-test which is indicated by lighting up LED lights in sequence. After the self-test is done, the lower red light signals that device is ready for operation.



## Warning

Pay special attention to ensure that yellow wire is not touching the ground (negative terminal) and there is no short circuit between yellow and blue wires.

Do not disconnect the injector test leads while the test is performed. Ensure stable and reliable connection.

To test another injector, stop the previous test.

**Not following these rules may cause damage to device in a way that is not covered by the warranty.**

## Operation

Buttons description:



Pressing this button will start or stop injector test. If the test is active, an indicator light will light up.



This will switch to test parameter setting. If a red light appear on the LED line – the speed (rpm) adjustment is possible. Green light means injection time adjustment.



Pressing will increase test parameter: injection duration or RPM.



Pressing will decrease test parameter: injection duration or RPM.

After power up TW-2 has following test parameters: 1000 rpm and 10% that means that the injector is open for 10% cycle time. Parameters may be adjusted at any time by pressing appropriate button (see buttons description).

Test parameters are displayed via a line of LEDs. If one of red lamps is active – it displays current rpm value. If one of green LEDs are on – this indicates simulated duty cycle (injection duration)

Simulated injection parameters can be changed in the following ranges:

**speed simulation (RPM)** – adjustment possible in range from 1000 rpm to 10000 rpm in steps of 1000 rpm (assuming one injection per crankshaft revolution),

**injection duration simulation (injection time)** – adjustment from 10% do 30% in steps of 10%.

## Diagnostic method

Suggested diagnosing method for TW-2 device is based on observing the sound effect caused by tested injector. To do this determine maximum simulated rpm at which injector operation is audible.

If there is more than one injector to be tested, compare results for each of them. The injector with highest speed limit is in best condition in terms of mechanical resistance of needle valve.

The measurement results for all engine injectors should be comparable. If one of tested injectors fails to achieve performance comparable for others, this means that it has the largest mechanical resistance of valve needle.

## Workplace safety

When working with injectors please be aware that in fuel system connected to them may be fuel under pressure which causes risk of fire or explosion.

During the testing, the vehicle ignition must be set to 'off' position. Otherwise, the fuel pump may operate resulting in flow of fuel under pressure.

During normal operation, the injector is cooled and lubricated by flowing fuel. Prolonged injector testing without fuel supply may cause its seizure.

## WARNING!

**DeltaTech Electronics company is not responsible for any damage and consequences of misuse of the TW-2 injector tester. Please always refer to service manual supplied by the car manufacturer.**