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General Information

KES-200 is a tool specially designed for automobile test and analysis with the following functions: **4channel oscilloscope, digital multimeter, ignition waveform test, engine analysis, PC link, print and Internet update,** etc.

4channel oscilloscope function can be used to test the output waveform of automobile sensors, and perform high-speed acquisition test. KES-200 has a built-in dynamic memory for saving 50 waveforms.

The information of several main sensors and 16 standard waveforms is provided. The user can make comparison of tested waveform with the standard waveform, and analyze sensor troubles. In addition, the test method and troubleshooting help information have been given for more than 10 types of commonly used sensors.

The oscilloscope has a complete display control mode capable of displaying 4 tested waveforms at the same time.

Multimeter function is used mainly for measuring voltage, current, resistance, output frequency, duty ratio, battery voltage, RPM, starting current and charging current test.

Ignition waveform test function can be used to test the primary and secondary waveforms of gasoline engine and display them in single cylinder waveform, parade waveform, raster waveform or bar graph. It can be used to test ignition systems with or without distributor, and obtain ignition peak voltage, spark voltage and spark duration (with distributor). The system gives standard and faulty primary and secondary waveforms to help the user to analyze automotive engine troubles.

Cylinder analysis function includes power balance test, cylinder efficiency test, and relative cylinder compression pressure test.

Power balance test is applicable to distributor engines with less than 6 cylinders. This function is used to analyze the uniformity of each cylinder. Both auto and manual test modes are provided.

Cylinder efficiency test is to judge the power performance of each cylinder by testing the primary ignition interval of two cylinders adjacent with each other.

Relative cylinder compression pressure test is applicable to engines with less than 6 cylinders. This function is used to analyze the uniformity of compression pressure of each cylinder.

PC link function can transmit test result from KES-200 to PC for further analysis, processing, and print. This function can also used to perform software update.

KES-200 is also equipped with printer interface, which supports common printers with PCL language. The printed result may be used to perform further data analysis and reserve.

KES-200 is easy to operate, for it provides help information to guide the user how to operate.

KES-200 can be updated quickly and easily through Internet. The user may download the latest version of the test software and update their KES-200 from LAUNCH website: http://www.cnlaunch.com, to obtain the latest test technique of LAUNCH.

Components

KES-200 is composed of the main unit, engine analysis cartridge, and test cable as shown in Figure 01.

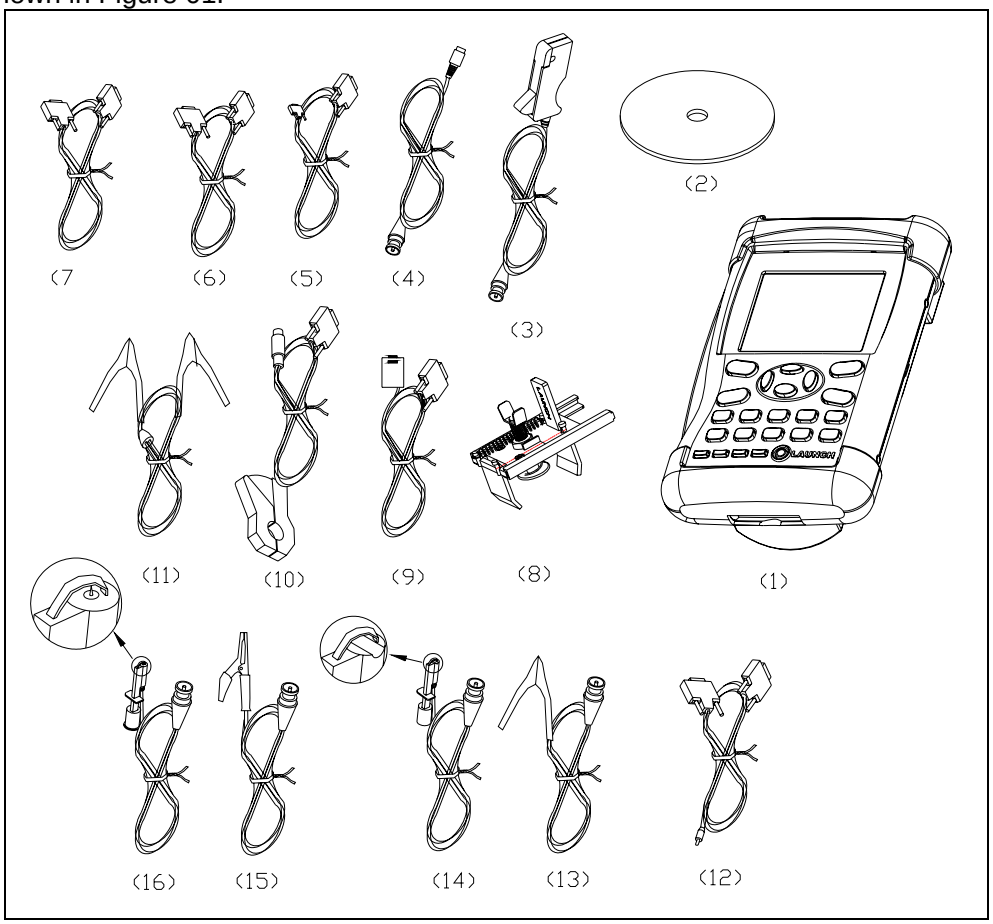

Figure 01

No.	Name	Qty	Description
1	KES-200 main unit	1	Test
2	PC-LINK CD	1	For PC link
3	Cylinder 1 signal cable	1	To get signal of cylinder 1
4	Secondary signal connecting cable	1	To connect the secondary signal slice sensor and the main unit
5	Printer cable	1	To connect the printer

No.	Name	Qty	Description
6	Update cable	1	To perform software update
7	PC link cable	1	To perform PC link
8	Secondary signal slice sensor	1	To induce secondary signal
9	Cylinder inhibited adapter	1	To automatically disable the cylinder when performing cylinder test
10	Starting current adapter	1	To test starting current
11	Battery cable	1	To get power from the battery
12	Main cable	1	Test, update
13	Ground cable	1	Connected to the channel 5 of KES-200 (GND)
14	Secondary signal cable	1	To get secondary signal
15	Oscilloscope cable w/clip	2	Oscilloscope
16	Oscilloscope cable w/probe	2	Oscilloscope
17	12V DC switch power	1	Input: AC 110~240V, Output: DC 12V
18	Electronic converting cable 1	4	Pickup signal
19	Electronic converting cable 2	4	Pickup signal
20	Electronic converting cable 3	10	Pickup signal
21	Electronic converting cable 4	4	Pickup signal
22	Engine analysis cartridge	1	Oscilloscope/Multimeter/Ignition waveform/Engine analysis
23	Charging current adapter	1	To test charging current
24	Inductive secodary adapter	1	
25	User's manual	1	
26	Parts manual	1	

Note:

- *17-26 are not shown in Figure 01.*
- *The configuration in the table is for your reference only, which is subjected to changed at any time without prior notice. For the right configuration of your KES-200, please refer to the packing list.*

Connection

Interface of Main Unit

The construction of KES-200 is shown in Figure 02.

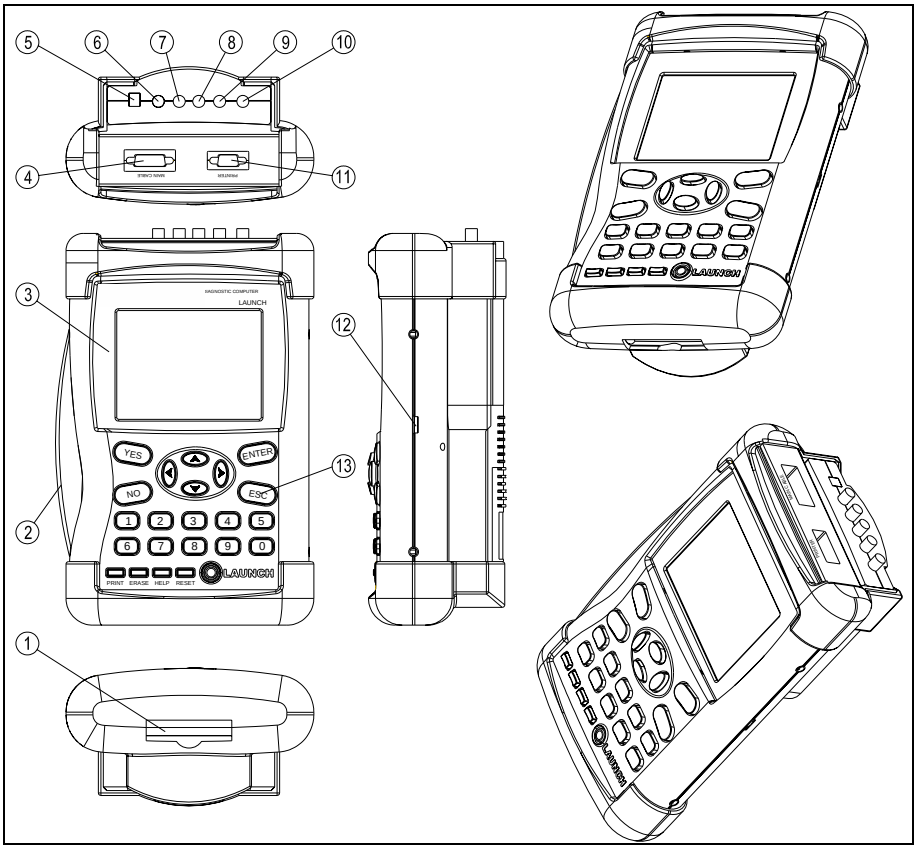

Figure 02

1. Cartridge slot
2. Handle
3. LCD Screen
4. Main cable interface
5. 12V DC switch power interface
6. Channel 5 (ground cable) interface
7. Channel 4 interface
8. Channel 3 interface
9. Channel 2 interface
10. Channel 1 interface
11. PC & printer interface
12. Contrast adjuster
13. Keypad

Oscilloscope

Four oscilloscope cables and one ground cable are provided with the unit. Refer to Figure 03 for cable connection of oscilloscope.

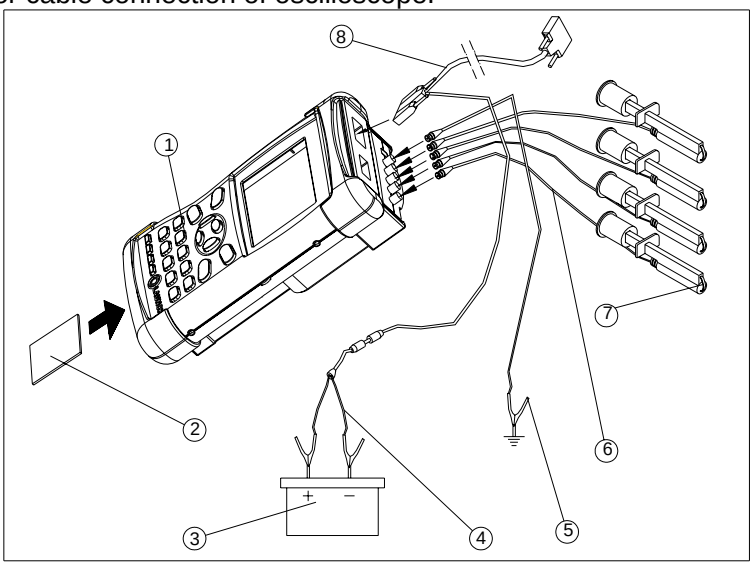

Figure 03

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Ground cable
6. Oscilloscope cable
7. Sensor to be tested
8. Main cable

Multimeter

Voltage, Current, Resistance, Duty Cycle, Frequency and Battery Voltage

The measuring signal for multimeter can be input only through CH1 or CH2. When testing voltage, current, resistance, duty cycle, frequency and battery voltage, the connection is as shown in Figure 04.

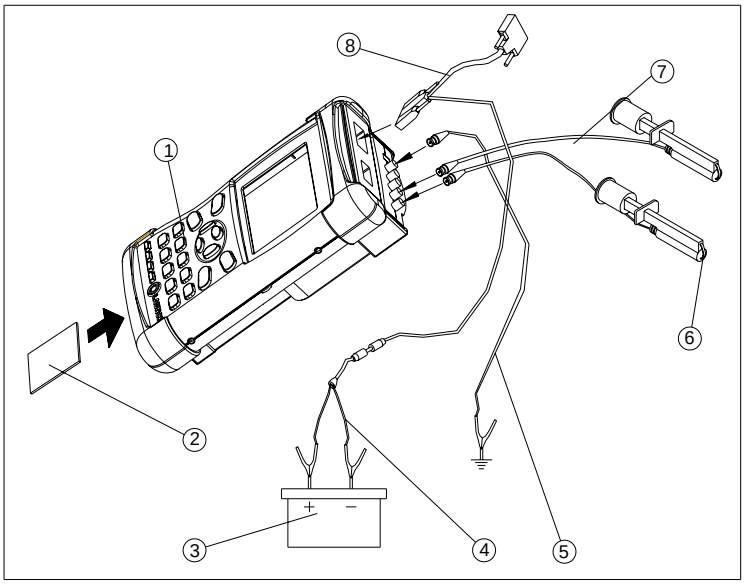

Figure 04

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Ground cable
6. Object to be tested
7. Oscilloscope cable
8. Main cable

RPM Measuring Mode

The connection for measuring of RPM is as shown in Figure 05.

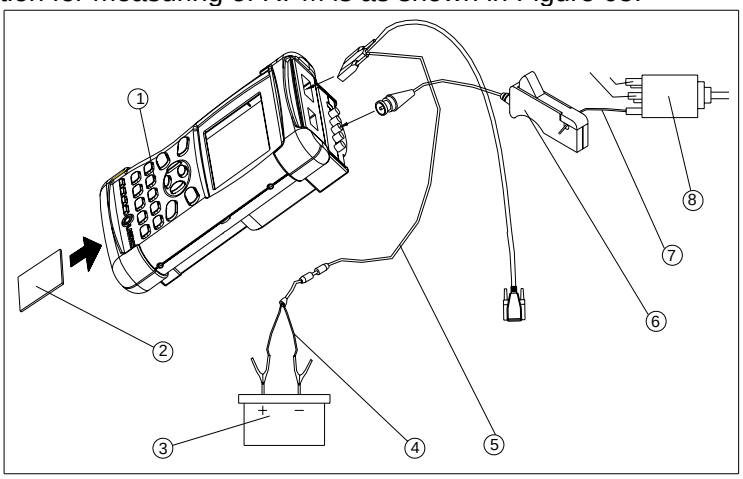

Figure 05

1. KES-200 main unit

2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Secondary signal cable
7. Secondary signal wire
8. Distributor/Ignition coil

Starting Current Measuring Mode

To measure the starting current, the starting current adapter must be connected to the current wire of the starter, and then take measurement through CH4, as shown in Figure 06.

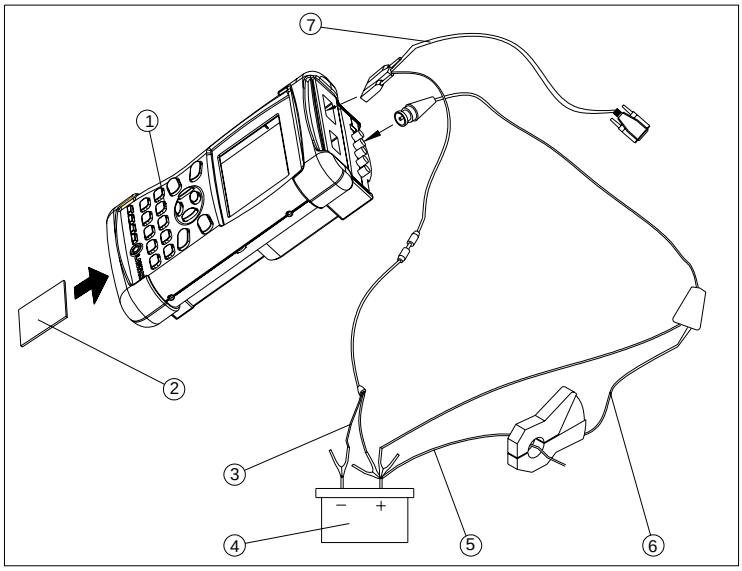

Figure 06

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery cable
4. Battery
5. Starter current wire
6. Starting current adapter
7. Main cable

Charging Current Measuring Mode

The connection for charging current measuring mode is as shown in Figure 07.

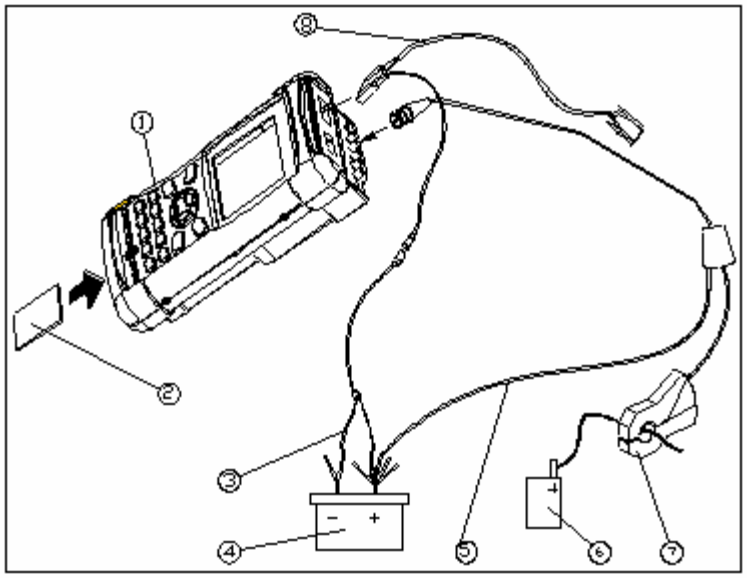

Figure 07

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery cable
4. Battery
5. Charging current adapter
6. Generator
7. Charging current adapter
8. Main cable

Ignition Waveform

When a test item on the main menu is selected, the screen will remind the user to connect the test cable. The connection is different for each type of ignition system. The following connecting methods are typical and can demonstrate how to test the engine no matter with or without a distributor.

Traditional Mode

CONNECTION 1: The connection for ignition waveform test of engines with distributors is shown in Figure 08. This method is applicable to engines with secondary high-tension cores.

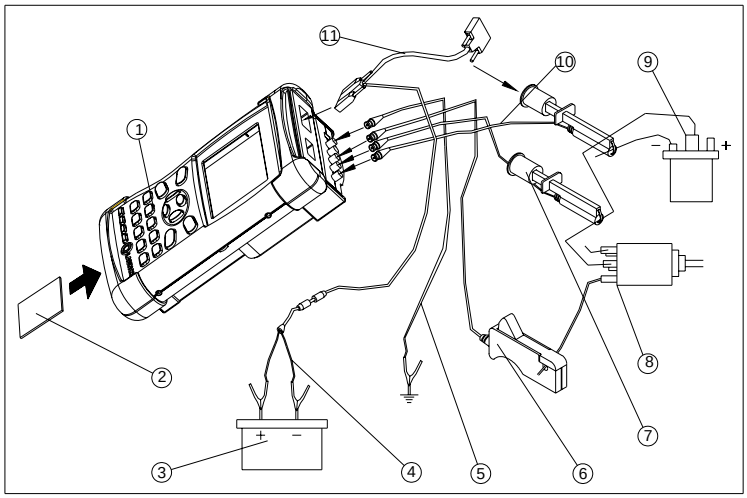

Figure 08

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Ground cable
6. Cylinder 1 signal cable
7. Secondary signal cable
8. Distributor
9. Ignition coil
10. Oscilloscope cable
11. Main cable

CONNECTION 2: The connection for ignition waveform test of engines with distributors is shown in Figure 09. This method is applicable to engines without secondary high-tension cores.

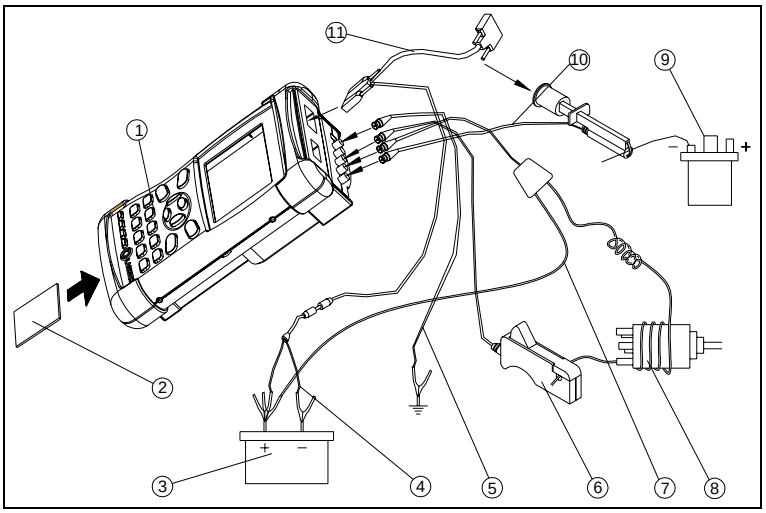

Figure 09

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Ground cable
6. Cylinder 1 signal cable
7. Inductive secodary adapter
8. Distributor
9. Ignition coil
10. Oscilloscope cable
11. Main cable

DLI EFS

CONNECTION 3: Connection for primary/secondary ignition waveform test of one cylinder ignition mode with DLI is as shown in Figure 10. This connection is applied when the high-tension wire and primary negative lead of ignition coil are easily accessible. When such connection is used to test the secondary ignition waveform, select primary trigger mode to get the stable secondary ignition waveform. If the primary negative lead of the ignition coil cannot be found, select the secondary trigger mode to get the secondary ignition waveform.

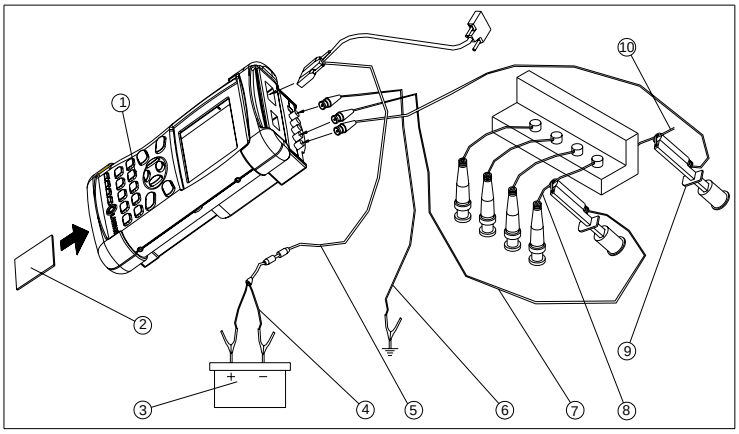

Figure 10

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Ground cable
7. Secondary signal cable
8. Secondary high-tension wire
9. Oscilloscope cable
10. Negative lead of ignition coil

CONNECTION 4: Connection for secondary ignition waveform test of 4 cylinders is as shown in Figure 11. This connection method is applied when all high-tension wires are easily accessible.

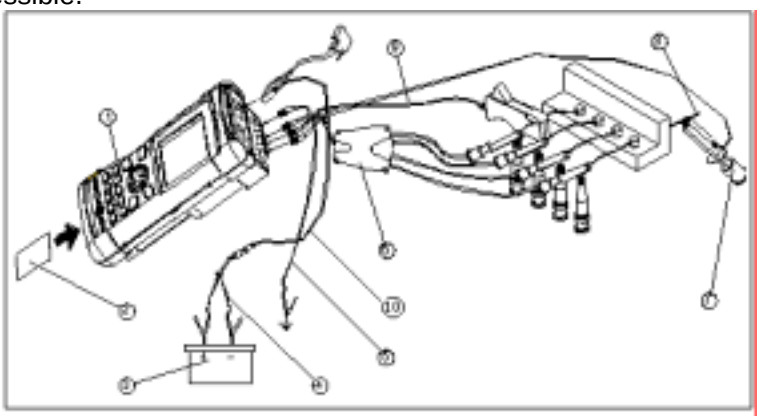

Figure 11

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Ground cable
6. DIS adapter (red) 2

7. Oscilloscope cable
8. Negative pole of ignition coil cable
9. Cylinder 1 signal cable
10. Main cable

DLI DFS

The connection to test the primary/secondary ignition waveform for single cylinder

There are three ways (connection 5, 6, 7):

CONNECTION 5: The high-tension wire of one plug is located outside and that of another plug is hidden in the coil. The primary lead can be found. In this case, the unit can test the primary and secondary ignition waveform. The connection is as shown in Figure12. When such connection is used to test the secondary ignition waveform, select primary trigger mode to get the very stable secondary ignition waveform. If the primary negative lead of the ignition coil can't be found, select the secondary trigger mode to get the secondary ignition waveform. To test the high-tension ignition signal waveform hidden in the ignition coil, use the secondary signal slice sensor to get the secondary ignition waveform.

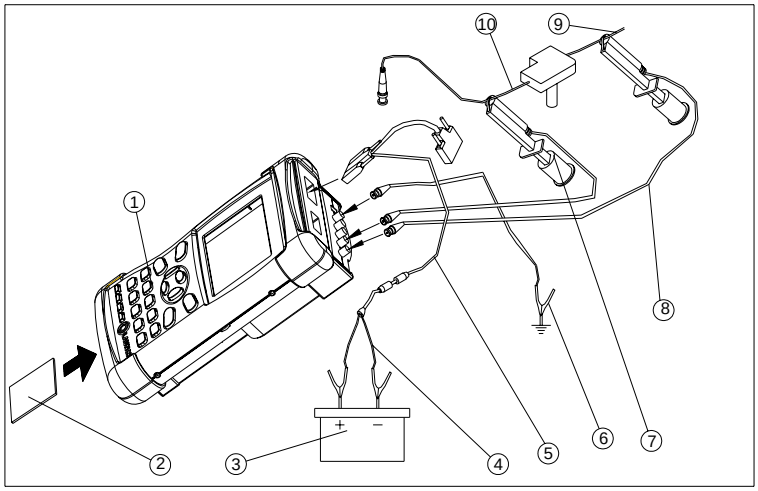

Figure 12

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Ground cable
7. Secondary signal cable
8. Oscilloscope cable
9. Primary lead of ignition signal
10. Secondary high-tension wire

CONNECTION 6: The high-tension wires of both spark plugs are exposed. The

primary negative lead of ignition coil is hidden. In this case, just the secondary ignition waveform can be tested. The connection is as shown in Figure 13. Remember to select secondary trigger mode to get the secondary ignition waveform for this connection.

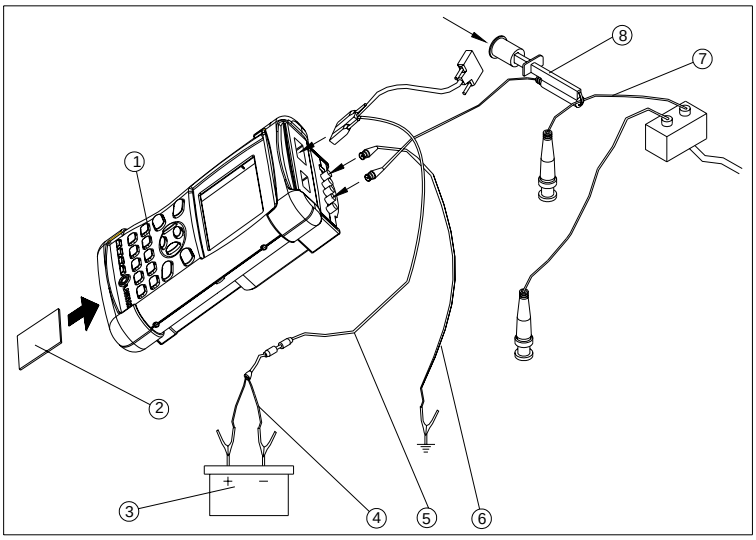

Figure 13

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Ground cable
7. Secondary ignition signal wire
8. Secondary signal cable

CONNECTION 7: The high-tension wire of one plug is exposed and that of another plug is located inside the ignition coil. The primary lead is hidden. In this case, only the secondary ignition waveform can be tested. Select secondary trigger mode to get the secondary ignition waveform. To test the high-tension ignition signal waveform hidden in the ignition coil, use the secondary signal slice sensor to get the secondary ignition waveform. The connection is as shown in Figure 14.

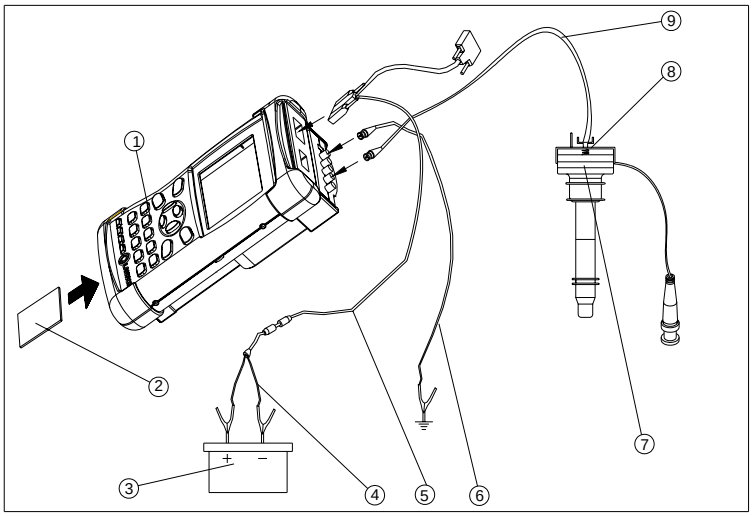

Figure 14

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Ground cable
7. Ignition coil
8. Secondary signal slice sensor
9. Secondary signal connecting cable

Precautions on Connection

- Use oscilloscope cable as primary signal cable. Use needle or alligator clip to impale the negative lead of primary ignition coil.
- Do not touch the needle by hand for it has high voltage while testing.
- When using cylinder 1 signal cable, be sure to put the clips' side marked with "SPARK PLUG SIDE" facing the spark plug of cylinder 1. The plug next to the alternator is usually cylinder 1 spark plug. After cylinder 1 signal cable is connected, the unit will show a ground mark (▼) with twinkling on condition that the signal triggering is good.
- If cylinder 1 signal cable is not connected correctly, the waveform may not be displayed. In case the high-tension wire of cylinder 1 is ineffective or cylinder 1 can't be fired, connect the signal cable to the high-tension wire of other cylinder. The firing order should be re-determined.
- KES-200 defaults that the cylinder 1 signal cable is connected to cylinder 1. The firing order for 4-cylinder engine is normally 1-3-4-2. When the cylinder 1 signal clip is connected to cylinder 3, the ignition waveforms should be displayed in the order of 3-4-2-1, but the screen still shows the cylinder numbers in the order of 1-3-4-2. Likewise, when the cylinder 1 signal clip is connected to cylinder 2, the ignition waveforms should be displayed in the order of 2-1-3-4. And while cylinder 1 signal clip is connected to cylinder 4, the display order should be 4-2-1-3.
- When the secondary signal cable is connected to the secondary high-tension wire,

its bronze arc face of the probe must touch the high-tension wire tightly. No gap is allowed. When testing primary/secondary ignition waveform, be sure the ground cable is connected to ground.

- The secondary signal slice sensor should be installed in place whenever it is used.
- The ignition waveform may be unstable if the secondary trigger mode is selected.

Cylinder Analysis

Power Balance

Refer to Figure 15 for connection of the test cables.

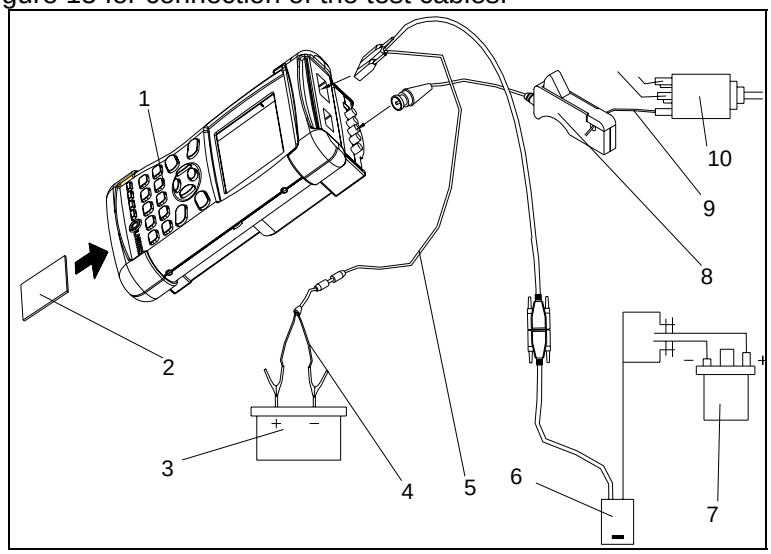

Figure 15

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Cylinder inhibited adapter
7. Ignition coil
8. Cylinder 1 signal cable
9. Cylinder 1 high-tension cable
10. Distributor

- Connect the clips of the battery cable to the terminals of the battery; connect the other end to the main cable.
- Connect one end of the cylinder 1 signal cable to the channel 3 of KES-200, and clip the other end (signal clamp) to the cylinder 1 high-tension cable. Make sure to let the side printed “plug side” towards the spark plug.
- Connect the end with clamps of the cylinder inhibited adapter to the primary ignition coil (red to “+” and black to “-”); connect the 15PIN connector to the main cable. Connect the other end of the main cable to KES-200 main unit.
- Insert the engine analysis cartridge into the cartridge slot of KES-200 main unit.

Note:

- ***Make sure to connect the test cable before starting the engine;***
- ***As there is voltage on the probe while testing, take care not to touch the probe;***
- ***The power balance test cannot be performed if the unit is not properly connected.***

Cylinder Efficiency Test

Refer to Figure 16 for connection of the test cables.

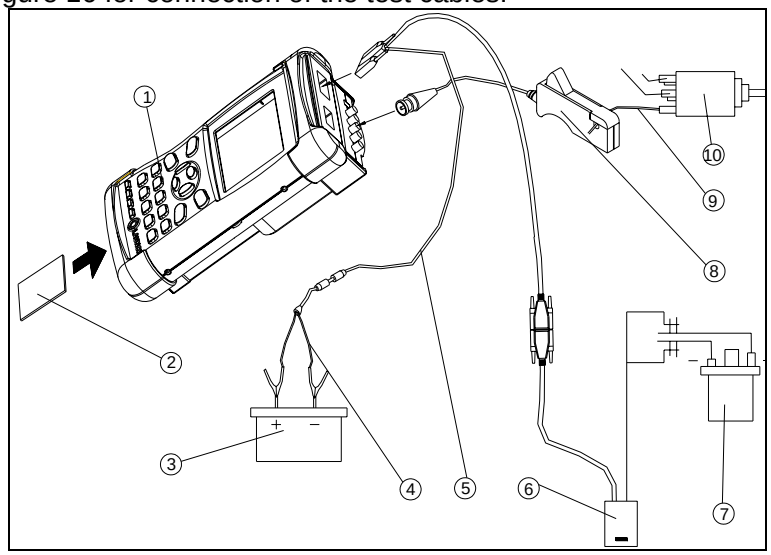

Figure 16

1. Main unit
2. Engine analysis cartridge
3. Battery
4. Battery cable
5. Main cable
6. Cylinder inhibited adapter
7. Ignition coil
8. Cylinder 1 signal cable
9. Cylinder 1 high-tension cable
10. Distributor

- Connect the clips of the battery cable to the terminals of the battery; connect the other end to the main cable.
- Connect one end of the cylinder 1 signal cable to channel 3 of KES-200, and the other end (with cylinder 1 signal clamp) to the high-tension cable of cylinder 1 on vehicle (Note: Let the side printed “plug side” towards the spark plug).
- Connect the end with clamp of the cylinder inhibited adapter to the primary ignition coil (Note: red to positive pole and black to negative pole), and the end with 15PIN male connector to the main cable. Connect the other end of the main cable to the “main cable” interface of KES-200 main unit.
- Insert the Engine analysis cartridge into the cartridge slot of KES-200 main unit.

Note:

- ***Make sure to start the engine after cable connection.***
- ***Do not touch the probe during testing, for it has very high voltage.***
- ***Cylinder test cannot be performed if the connection is wrong.***

Relative Compression Pressure Test

Refer to Figure 17 to connect the unit and the vehicle.

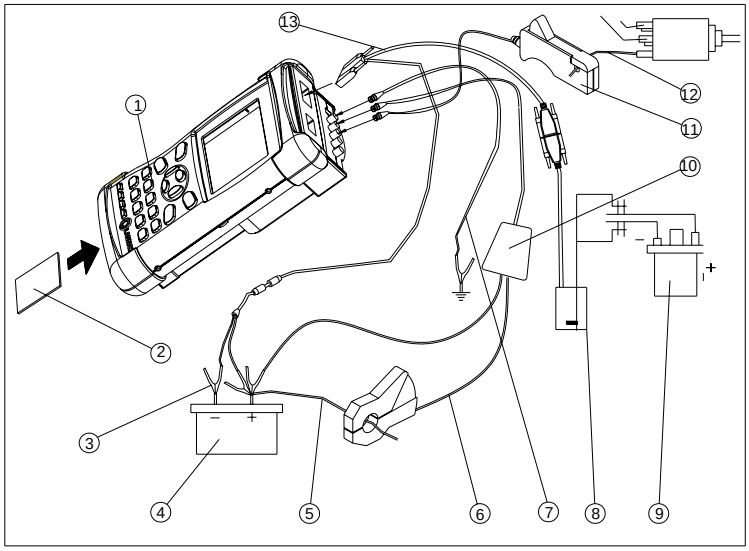

Figure 17

1. KES-200 main unit
2. Engine analysis cartridge
3. Battery cable
4. Battery
5. Starter current wire
6. Starting current adapter
7. Ground cable
8. Cylinder inhibited adapter
9. Ignition coil
10. Another end of starting current adapter (to CH 4)
11. Cylinder 1 signal cable
12. Cylinder 1 high-tension cable
13. Main cable

- Connect the clip ends of the battery cable to the battery. Connect the other end to the main cable.
- Connect one end of the starting current adapter to the channel 4 of KES-200, and the other end (with starting current clip) to the starter current wire that connects to the battery on vehicle. (Make sure that the arrow direction on the large current clip accords with the current direction of the generator: if the clip is connected to positive pole, the arrow should point to outside from positive pole; if the clip is connected to the negative pole, the arrow should point to negative pole from outside)
- Connect one end of the ground cable to the grounding part of vehicle, and the other end to channel 5 of KES-200.
- Connect the clip end of the cylinder inhibited adapter to the primary ignition coil (red to “+” and black to “-“), and the 15pin male connector to the main cable. Connect the other end of the main cable to the KES-200 main unit.

- Insert the Engine analysis cartridge into the slot of KES-200 main unit.

Note:

- ***Make sure that all cables are connected well before starting the engine***
- ***Take care not to touch the probe, as there is voltage on the probe while testing.***
- ***If the unit is not properly connected, the relative compression test cannot be performed.***
- ***Make sure that the ground cable is well connected when performing the relative compression test.***

PC Link

Connect the 15PIN end of PC cable to the “PC/Printer” interface on KES-200; connect the other end to COM1 (or COM2) port of PC. See Figure 18.

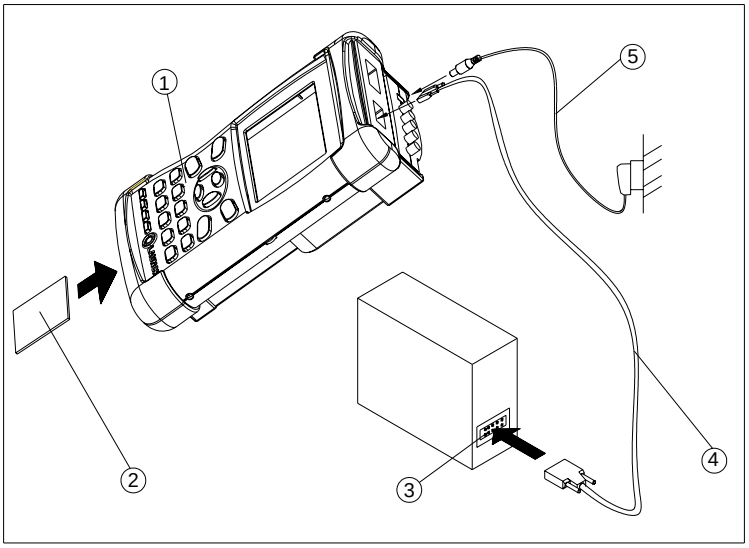

Figure 18

1. KES-200 main unit
2. Engine analysis cartridge
3. COM1 or COM2 port of computer
4. PC link cable
5. 12V DC switch power

Internet Update

See Figure 19.

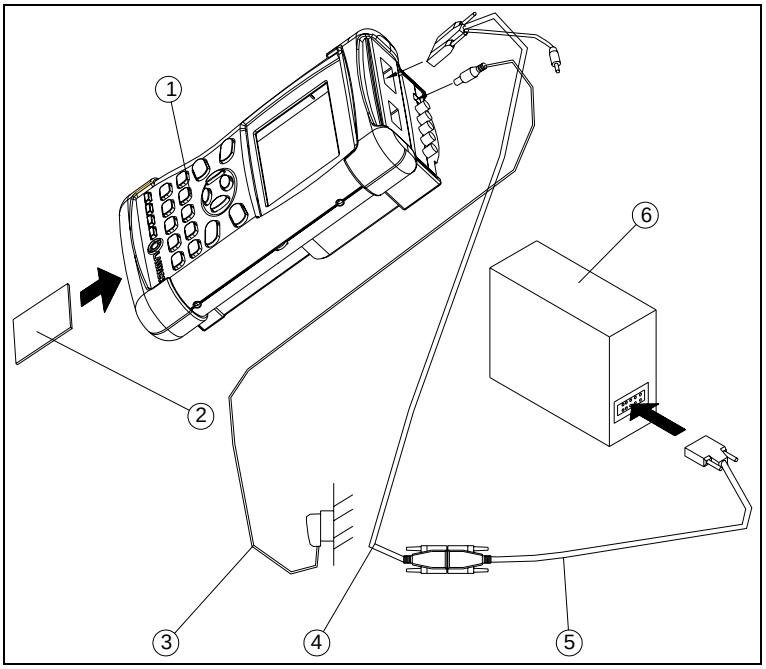

Figure 19

1. Main unit
2. Cartridge
3. DC 12V switch power
4. Main cable
5. Updating cable
6. PC set

- Connect one end of the main cable (4) to the socket of main unit (1), the other end to the updating cable (5).
- Connect the other end of updating cable (5) to the COM port of PC set (6).
- Connect the DC 12V switch power (3) to the power socket of main unit.
- After connection, insert the cartridge (2) to be updated, start KES-200 main unit, and press [0] button to enter the system setting interface, in which press [4] button to enter the PC updating interface. Press [2] button to select BPS38800 (main cable), the system will enter the updating waiting status, the screen displays: Wait command …