

# **Ignition Expert** **(Coil Tester)**

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## Safety Precautions

To prevent accidents that could possibly result in serious injury and/or damage to vehicles and/or test equipment, carefully observe all safety rules and test procedures when working on vehicles.

1. When the engine is running, it produces carbon monoxide, a toxic and poisonous gas. Always operate the vehicle in a well ventilated area. Do not breathe exhaust gases – they are hazardous that can lead to death if inhaled in excessive amount.
2. Fuel and battery vapors are highly flammable. DO NOT SMOKE NEAR THE VEHICLE DURING TESTING
3. Before starting the engine for testing or trouble shooting, always make sure the parking brakes are firmly engaged. Put the transmission in Park (automatic transmission) and Neutral (manual transmission).
4. Always block the drive wheels. Never leave vehicle unattended while testing.
5. Engine parts become very hot when the engine has been run for awhile even though it was switched OFF. To prevent severe burns, avoid contact with hot engine parts.
6. Never lay tools on vehicle battery. You may short the terminals together causing harm to yourself, the tools or the battery.
7. When the engine is running, be cautious when working around the ignition coil, distributor cap, ignition wires and spark plugs. They are HIGH VOLTAGE components that can cause electrical Shock.
8. Always keep a fire extinguisher readily available and easily accessible in the workshop

## Precautions to be taken during usage

1. Do not operate the Ignition Coil Tester for more than 5 minutes on the coil being tested to avoid over heating and damage it.
2. Spark gap distance of the Spark Tester needs to be adjusted according to the type of the coil. The higher the engine cylinder capacity, the bigger the gap distances are.
3. Use only 12VDC power supply - which can be powered either by the car battery or external 12VDC power source when doing tests on the work bench.
4. The described testing procedures in this manual are for references only. Always refer to the Car Service manuals for better information.
5. Always turn the ignition speed adjustment knob to the lowest speed before connecting or disconnecting the signal cable to the coil.
6. Always check the hook up connections again to ensure that it was correctly connected before applying power.

## Functions



1. Power LED indicator (RED). This red LED lights up when 12VDC is supplied to the unit.
2. Ignition speed adjustment knob. To increase the simulated ignition speed, turn the knob to clockwise direction. Likewise turn to counter clockwise will reduce the speed. Adjustable speed ranges from 180 – 12,000 RPM.
3. Power input socket. When the 12VDC power is plugged into this socket, the unit powers up and the red LED indicators will light up.
4. Power supply cable with battery terminal clips. Clip this cable to the battery terminals to supply power to the unit. (Red clip to positive (+) and Black clip to negative (-) of the battery terminals)
5. Ignition speed LED indicator (GREEN). This green LED will light up after self test for about 2 seconds

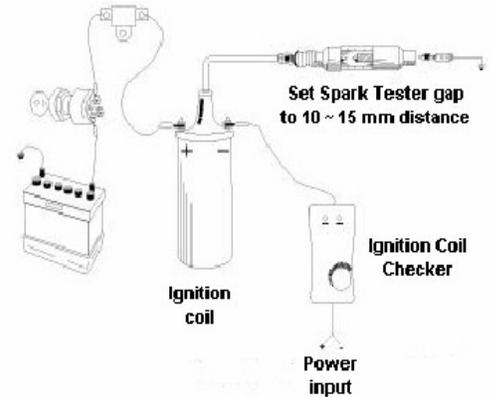
## Operation

### Single Ignition Coil System

Example: Ford Laser – Year 1988 or other similar ignition system.



1. Switch the ignition key to 'Off' position
2. Unplug the high tension ignition coil cable from the distributor cap and connect it to the Spark Tester. Set the Spark Tester gap to 10 ~ 15 mm and connect the other end with the cable provided to the chassis ground or the battery negative (-) terminal.



3. Ensure that the tester's speed adjustment knob is turned to the extreme left (minimum), connect the coil tester's power supply clips to the battery terminals [Red to positive (+), Black to negative (-)].
4. When the power is connected, the tester's red power LED indicator lights up. The unit will run through a Self-test for about 2 seconds and the green LED will light up.
5. Select a cable from the kit and use it to connect the negative (-) or signal input of the ignition coil to the signal output located at the top of the tester.
6. Turn the ignition key to "ON" position. DO NOT crank or start the engine.
7. Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



8. Adjust to the lowest speed, observe spark color (should be bluish purple color) at the spark tester sight glass.
9. Observe the spark created. Normal spark should have a straight and continuous arc line.



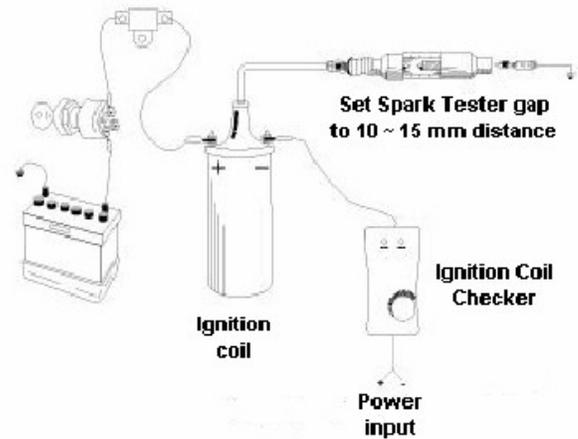
10. If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.
11. Turn the coil tester to higher ignition speed until the coil is slightly heated.
12. Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.

13. If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.
14. To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



**Current Leakage Checker**

15. If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.
16. After checking procedures has finished and there is a need to disconnect the tester, first turn the ignition key to the off position.
17. If everything is normal, turn down the ignition speed adjustment.

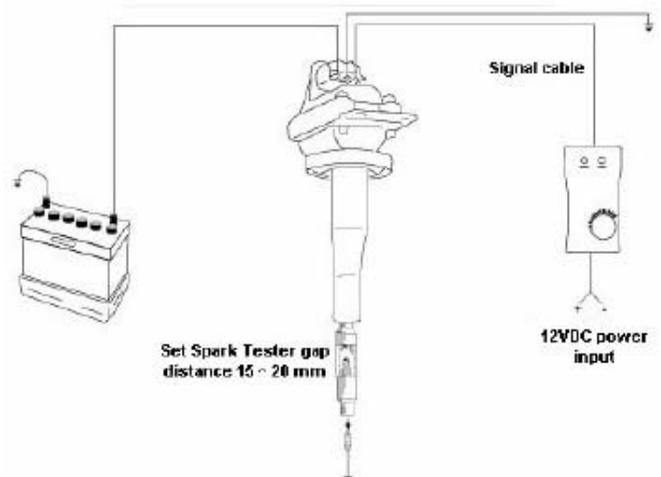


18. Then unplug the 12VDC power from the tester and then remove the connections and put them back safely into the carry case.

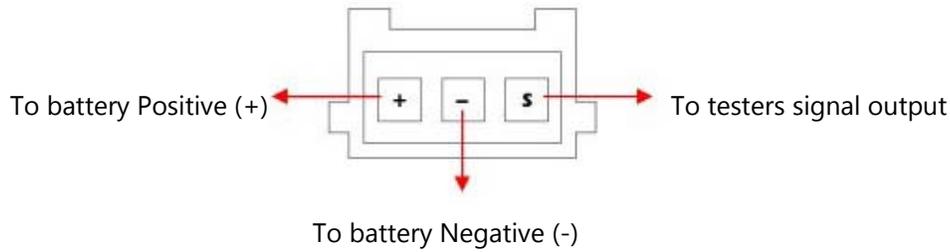
## Coil – On – Plug (COP) System

Example: BMW 520 (E34) – Year 1995 or other similar ignition system.

1. Switch the ignition key to 'OFF' position
2. Unplug and remove the ignition coil from the engine. Plug the Spark Tester to the coil. Set the Spark Tester gap to 15 ~ 20mm and connect its end with the cable provided to the chassis ground or the battery negative (-) terminal.



- Using the cables provided from the kit, connect them from coil positive (+) to the battery positive (+) terminal. The negative (-) side cable to the battery negative (-) terminal. See coil pin out diagram to follow.



- Ensure that the testers speed adjustment knob is turned to the extreme left (minimum), connect the coil testers power supply clips to the battery terminals (Red to positive, Black to negative).
- When the power is connected, the testers red power LED indicator lights up. The unit will run through a Self Test for about 2 seconds and the green LED will light up.
- Select a cable from the kit and use it to connect the signal input (S) of the ignition coil to the signal output located at the top of the tester
- Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



- Adjust to the lowest speed, observe
- be bluish purple color) at the spark tester sight glass.



spark color (should



- Observe the spark created. Normal spark should have a straight and continuous arc line.
- If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.
- Turn the coil tester to higher ignition speed until the coil is slightly heated.
- Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.
- If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.
- To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



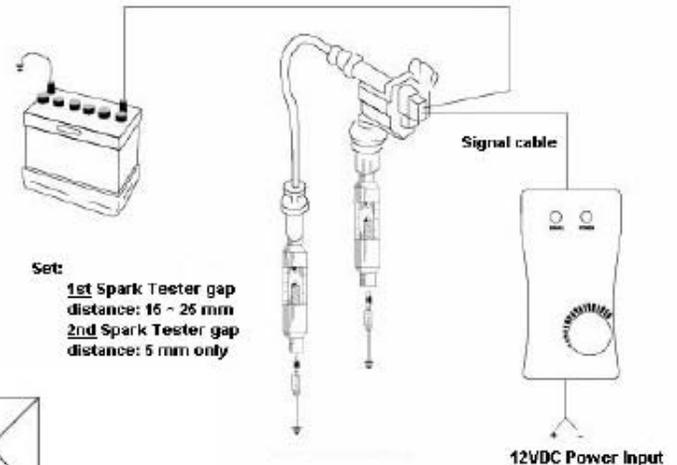
## Current Leakage Checker

15. If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.
16. After checking procedures has finished and there is a need to disconnect the tester, first turn the ignition key to the off position.
17. Then unplug the 12VDC power from the tester and then remove the connections and put them back safely into the carry case.

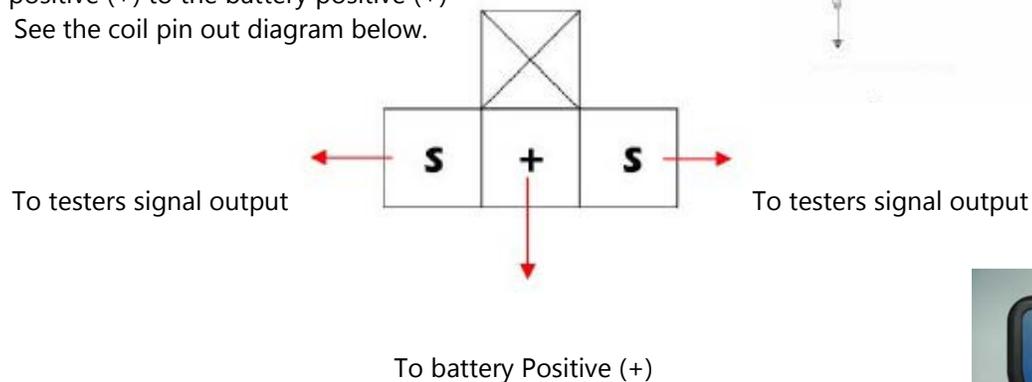
## Double Ended Coil – On – Plug (DECOP) System:

Example: Mercedes Benz E320 (W210 & M104) Year 1995 or other similar system

1. Switch the ignition key to the 'OFF' position
2. Unplug and remove the coil from the engine. Plug both the Spark Testers to coil. Set the 1<sup>st</sup> Spark Tester gap to 15 – 25mm at the rigid coil end side and the 2<sup>nd</sup> Spark Tester gap: 5mm at the high tension cable side and connect them with the cable provided to the chassis ground or the battery negative (-) terminal.



3. Using the cable provided from the kit, connect it from coil positive (+) to the battery positive (+) terminal. See the coil pin out diagram below.



4. Ensure that the testers speed adjustment knob is turned to the extreme left (minimum), connect the coil testers power supply clips to the battery terminals (Red to positive, Black to negative).



- When the power is connected, the testers red power LED indicator lights up. The unit will run through a Self Test for about 2 seconds and the green LED will light up.
- Select a cable from the kit and use it to connect the signal input (S) of the ignition coil to the signal output located at the top of the tester.



- Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



- Adjust to the lowest speed, observe spark color (should be bluish purple color) at the spark tester sight glass.



- Observe the spark created. Normal spark should have a straight and continuous arc line.
- If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.
- Turn the coil tester to higher ignition speed until the coil is slightly heated.
- Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.
- If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.
- To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



**Current Leakage Checker**

- If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.
- If everything is normal, turn down the ignition speed adjustment.
- Then disconnect the power to the Tester by unclipping the Tester by unclipping the positive (+) red clip from the battery terminal.

Switch the location of the Spark Testers: Vice Versa – 1<sup>st</sup> Spark tester will move to the high tension cable side and the 2<sup>nd</sup> Spark tester to the coil side. (Note: Do not adjust the Spark Tester arc gap which has been adjusted previously)

- Power up the Tester again by clipping the positive (red) clip to the battery terminal. Repeat steps 6-16 again to determine the coil conditions.



4. Ensure that the testers speed adjustment knob is turned to the extreme left (minimum), connect the coil testers power supply clips to the battery terminals (Red to positive, Black to negative).

5. When the power is connected, the testers red power LED indicator lights up. The unit will run through a Self Test for about 2 seconds and the green LED will light up.

6. Turn the ignition key to 'ON' position. Do not crank or start the engine.



7. Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



8. Adjust to the lowest speed, observe spark color (should be bluish purple color) at the spark tester sight glass.

9. Observe the spark created. Normal spark should have a straight and continuous arc line.

10. If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.

11. Turn the coil tester to higher ignition speed until the coil is slightly heated.

12. Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.

13. If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.

14. To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



### Current Leakage Checker

15. If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.

16. After the checking procedure has finished, turn the ignition speed to the minimum.

17. Then disconnect the power to the coil Tester by unclipping the Tester by unclipping the positive (+) red clip from the battery terminal. Unplug the Spark Testers and plug it to the remaining untested spark plug cables

18. Power up the Tester again by clipping the positive (red) clip to the battery terminal. Repeat steps 5-15.

19. After the checking procedure has finished and there is a need to disconnect the tester, first turn the ignition key to "OFF" position

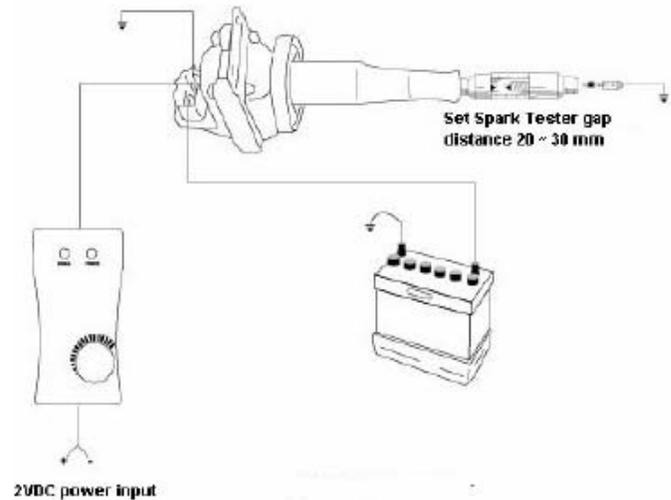
20. Turn down the ignition speed adjustment

21. Then unplug the 12VDC power from the coil tester and then remove the connections and put them back safely into the carry case.

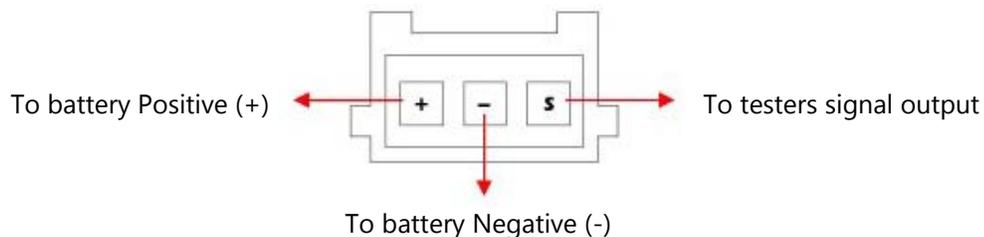
## Coil – On – Plug System

Example: BMW 520 (E34) – Year 1995 or other similar ignition system.

1. Switch the ignition key to 'OFF' position
2. Unplug and remove the ignition coil from the engine. Plug the Spark Tester to the coil. Set the Spark Tester gap to 20 ~ 30mm and connect its end with the cable provided to the chassis ground or the battery negative (-) terminal.



3. Using the cables provided from the kit, connect them from coil positive (+) to the battery positive (+) terminal. The negative (-) side cable to the battery negative (-) terminal. See coil pin out diagram to below.



4. Ensure that the testers speed adjustment knob is turned to the extreme left (minimum), connect the coil testers power supply clips to the battery terminals (Red to positive, Black to negative).
5. When the power is connected, the testers red power LED indicator lights up. The unit will run through a Self Test for about 2 seconds and the green LED will light up.
6. Select a cable from the kit and use it to connect the signal input (S) of the ignition coil to the signal output located at the top of the tester.
7. Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



- Adjust to the lowest speed, observe spark color (should be bluish purple color) at the spark tester sight glass.



- Observe the spark created. Normal spark should have a straight and continuous arc line.



- If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.
- Turn the coil tester to higher ignition speed until the coil is slightly heated.
- Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.
- If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.
- To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



**Current Leakage Checker**

- If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.
- After checking procedures has finished and there is a need to disconnect the tester, turn down the ignition speed adjustment to the minimum.
- Then unplug the 12VDC power from the tester and then remove the connections and put them back safely into the carry case.

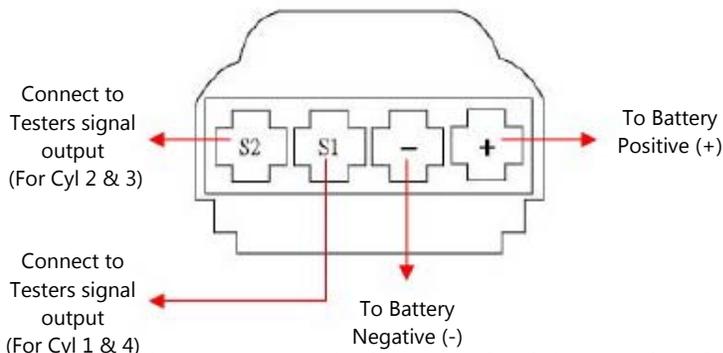
## Double Ended Coil – On – Plug System

Example: Isuzu / Rodeo 2000 or other similar ignition systems.

- Switch the ignition key to 'OFF' position
- Unplug and remove the DECOP coil from the engine. Plug both the Spark Tester into the coil outlets. Set the 1<sup>st</sup> Spark Tester (cyl 1) gap to 20 ~ 25mm and the 2<sup>nd</sup> Spark Tester (cyl 4) gap 5mm and connect its end with the cable provided to the chassis ground or the battery negative (-) terminal.



- Using the cables provided from the kit, connect them from coil positive (+) to the battery positive (+) terminal. The negative (-) side cable to the battery negative (-) terminal. See coil pin out diagram to below.



- Ensure that the testers speed adjustment knob is turned to the extreme left (minimum), connect the coil testers power supply clips to the battery terminals (Red to positive, Black to negative).
- When the power is connected, the testers red power LED indicator lights up. The unit will run through a Self Test for about 2 seconds and the green LED will light up.
- Select a cable from the kit and use it to connect the signal input (S1) of the ignition coil to the signal output located at the top of the tester.
- Turn the coil tester ignition speed knob clockwise to switch on. Adjust this switch fast or slow according to requirement.



- Adjust to the lowest speed, observe spark color (should be bluish purple color) at the spark tester sight glass.



- Observe the spark created. Normal spark should have a straight and continuous arc line.



- If the spark has an abnormal shape or is weak or intermittent, the coil may be faulty.

- Turn the coil tester to higher ignition speed until the coil is slightly heated.

- Then turn it down to a lower ignition speed; observe whether the arc is continuous or intermittent.

- If 'clicking' electrical noises are heard but there is no arc present, it means that the ignition coil has an internal high voltage leakage.

- To check the leaks, use the DAT Equipment TE022 Ignition Leak Checker to probe the coil to see whether there is any voltage leakage or not.



**Current Leakage Checker }**

- If there is a high voltage leakage, a visible spark is noticed and the Ignition Leak Checker indicator LED will blink simultaneously.

- If everything is normal, turn down the ignition speed adjustment to the minimum.

17. Disconnect the power to the coil Tester by unclipping the positive (red) clip from the battery terminal.

Switch the location of the Spark Testers: Vice versa - 1st Spark Tester to coil output - CYL. 4 and the 2nd Spark Tester to coil output - CYL. 1. (Note: Do not adjust the Spark Tester arc gap which has been adjusted previously.)

18. Power up the coil Tester again by clipping back the positive (red) clip to the battery terminal. Repeat Steps 6 to 16 again to determine the coil conditions.

19. When finished testing, disconnect the 12VDC power from the tester by unclipping the positive clip from the battery. Then unplug the Spark Testers and plug them to the remaining untested coil outlets (CYL 2 & 3).

20. Disconnect the cable from the coil signal (S1) and plug it into the second signal input (S2).

21. Power up the Tester again by clipping back the positive clip to the battery terminal. Repeat Steps 6 to 17 again to determine the coil conditions.

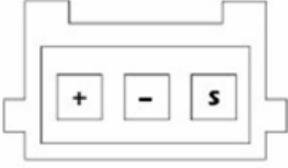
22. When finished testing, unplug the 12VDC power from the tester and then remove the connections and put them back safely into the carry case.

Note: Repeat the Steps 6 to 21 for coil signal (S3) if present but always determine which two cylinders are controlled by which signal input (example: S1 – CYL.1 & 4, S2- CYL.2 & 5 and S3 – CYL.3 & 6 ). Always refer to service manuals for information.

## Ignition Coil Connection Pin Out

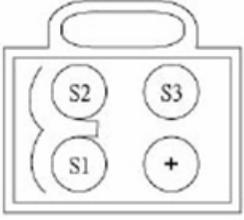
BMW	Models	Year	Capacity
	E39	96 ~ 98	2.0L
M52	96 ~ 98	2.5L	
520	91 ~ 95	2.8L	
525	91 ~ 95		

	<p>S: Ignition Signal                  +: Positive Voltage                  -: Negative Voltage</p>
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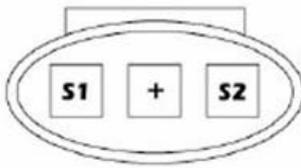
CHRYSLER	Model	Year	Capacity
	Concord		93 ~ 97
		96 ~ 97	3.5 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4                  S2: Ignition Signal – Cylinder 2 &amp; 5                  S3: Ignition Signal – Cylinder 3 &amp; 6                  + : Positive Voltage</p>
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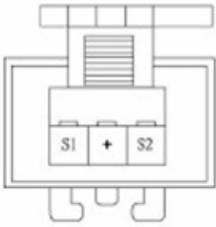
CHRYSLER	Model	Year	Capacity
	Neon	95 ~ 96	2.0 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 3                  S2: Ignition Signal – Cylinder 2 &amp; 4                  + : Positive Voltage</p>
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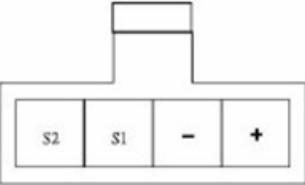
CHRYSLER	Model	Year	Capacity
	Stratus	95 ~ 00	2.0 L 2.4 L 2.5 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 3                  S2: Ignition Signal – Cylinder 2 &amp; 4                  + : Positive Voltage</p>
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DAEWOO	Model	Year	Capacity
	Magnus	2000	2.0 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4                  S2: Ignition Signal – Cylinder 2 &amp; 3                  + : Positive Voltage                  - : Negative Voltage</p>
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FORD	Model	Year	Capacity
	Escape	2000	2.0 L 3.0 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4                  S2: Ignition Signal – Cylinder 2 &amp; 3                  + : Positive Voltage</p>
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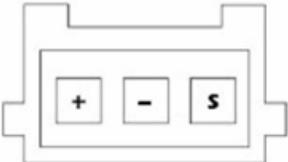
FORD	Model	Year	Capacity
	Mondeo Metrostar	97 ~ 99 01 ~ 02	2.0 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4                  S2: Ignition Signal – Cylinder 2 &amp; 3                  + : Positive Voltage</p>
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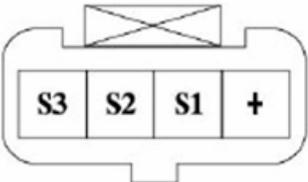
HONDA	Models	Year	Capacity
	CRV	2003	

	<p>S: Ignition Signal                  +: Positive Voltage                  - : Negative Voltage</p>
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MAZDA	Model	Year	Capacity
	MPV	99 ~ 02	2.5 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 5                  S2: Ignition Signal – Cylinder 2 &amp; 6                  S3: Ignition Signal – Cylinder 3 &amp; 4                  + : Positive Voltage</p>
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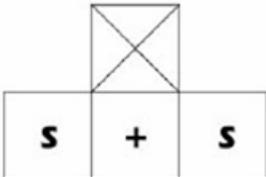
MAZDA	Model	Year	Capacity
	<u>Premacy</u>	01 ~ 03	1.8 L 2.0 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4            S2: Ignition Signal – Cylinder 2 &amp; 3            - : Negative Voltage            + : Positive Voltage</p>
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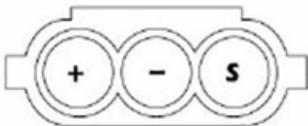
M. BENZ	Model	Year	Capacity
	C180 C200 C240 C320	00 ~ 02 00 ~ 02 00 ~ 02 00 ~ 02	All

	<p>S: Ignition Signal            +: Positive Voltage</p>
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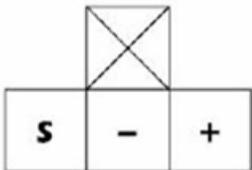
MITSUBISHI	Model	Year	Capacity
	<u>Savrin</u>	01 ~ 02	2.0 L

	<p>S: Ignition Signal            + : Positive Voltage            - : Negative Voltage</p>
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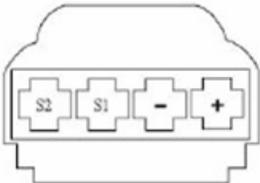
NISSAN	Model	Year	Capacity
	<u>Cefiro</u> Sentra	95 ~ 97 00 ~ 01	1.8 L 2.0 L 3.0 L

	<p>S: Ignition Signal  <u>+</u> : Positive Voltage            - : Negative Voltage</p>
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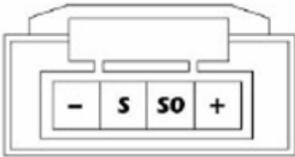
OPEL	Model	Year	Capacity
	<u>Corsa</u>	94 ~ 00	1.4 L

	<p>S1: Ignition Signal – Cylinder 1 &amp; 4            S2: Ignition Signal – Cylinder 2 &amp; 3  <u>+</u> : Positive Voltage            - : Negative Voltage</p>
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TOYOTA	Model	Year	Capacity
	Camry	2003	2.0 L 3.0 L

	<p><u>S</u> : Ignition Signal            S0: Ignition Signal Return  <u>+</u> : Positive Voltage            - : Negative Voltage</p>
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TOYOTA	Model	Year	Capacity
	Camry	97 ~ 99	2.2 L
	<u>Hiace</u>	96 ~ 00	2.7 L

	<p>S: Ignition Signal  S0: Ignition Signal Return  + : Positive Voltage  - : Negative Voltage</p>
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TOYOTA	Model	Year	Capacity
	<u>Premio</u>	97 ~ 01	2.0 L

	<p>S: Ignition Signal  S0: Ignition Signal Return  + : Positive Voltage  - : Negative Voltage</p>
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