MSD IGNITION INSTALLATION INSTRUCTIONS

MSD SCI Series
PN 6300 & PN 6320

IMPORTANT: Read these instructions before attempting this installation!

Parts Included:
1 - MSD SCI Series Ignition
1 - Harness, PN 8860
1 - Parts Bag, ASY 10506, SCI Only
1 - Parts Bag, ASY 15752, SCI-L Only
4 - RPM Modules 3,000, 6,000, 7,000, 8,000, SCI-L Only

WARNING: Before installing the MSD Sport Compact Ignition, disconnect the battery cables. When disconnecting the battery cables, always remove the Negative (-) cable first and install it last.

NOTES: Solid Core spark plug wires **cannot** be used with an MSD Ignition.
The MSD SCI **cannot** be used on vehicles with distributorless ignition systems (DIS).
Vehicles originally equipped with a CD ignition **cannot** use an MSD.

THEORY OF OPERATION

CAPACITIVE DISCHARGE

The MSD SCI Series Ignitions feature a capacitive discharge ignition design. The majority of stock ignitions are inductive ignitions. In an inductive ignition, the coil must store and step up the voltage to maximum strength in between each firing. At higher rpm, since there is less time to charge the coil to full capacity, the voltage falls short of reaching maximum energy which results in a loss of power or top end miss.

The MSD Ignition features a capacitor which is quickly charged (within one millisecond) with 460-480 volts and stores it until the ignition is triggered. The voltage sent to the coil is always at full power even at high rpm, which produces full combustion for more power.

MULTIPLE SPARKS

The MSD SCI Series produces a series of sparks for each firing of the spark plug through 3,000 rpm. The number of sparks that occur decreases as rpm increases, however the spark series lasts 36° of crankshaft rotation on 4-cylinders, 26° on 6-cylinders, and 20° on 8-cylinders. Above 3,000 rpm there is simply not enough time to fire the spark plug more than once, so there is only one powerful spark.

REV LIMITER

The SCI-L is equipped with a built-in adjustable Soft Touch Rev Control. This rev limit feature can be adjusted with plug-in modules which are available in 100 rpm increments. The Soft Touch circuitry provides a smooth and accurate rev limit by dropping the spark to individual cylinders. The Soft Touch produces a load-free rev limit that is accurate to within 1% of the selected rpm.

GENERAL INFORMATION

BATTERY

An MSD SCI Series Ignition will operate on any negative ground, 12 volt electrical system with a distributor. The MSD can be used with a 16 volt battery and can withstand a momentary 24 volts in case of a jump start. The ignition will deliver full voltage with a supply of 9 - 18 volts and will operate with a supply voltage as low as 5 volts.
If your application does not use an alternator, allow at least 15 amp/hour for every half hour of operation. If the engine is cranked with the same battery or other accessories such as an electric fuel pump, fan or water pump are used, the amp/hour rating must be increased.

COILS

The MSD Sport Compact Ignition can be used with most stock coils and aftermarket coils that are designed to replace the stock coils. There are some “race only” coils such as the MSD Pro Power Coil, PN 8201, that cannot be used with the SCI Series Ignition. For more information on recommended coils, consult the supplied Coil Application Chart or check with the manufacturer of the coil. If you have any questions concerning coils, contact our MSD Customer Service Department at (915) 855-7123.

TACHOMETERS/FUEL INJECTION

The MSD SCI Series Ignitions feature a Tach Output Terminal on the side of the unit. This terminal provides a trigger signal for tachometers, fuel injection, a shift light or other add-on devices that require a 12 volt square wave rpm signal with a 20% duty cycle. Some vehicles with factory tachometers may require a Tach Adapter to operate with the MSD. For more information on tachometers and MSD Tach Adapters, refer to the Tachometer Section on page 6.

SPARK PLUGS AND WIRES

Spark plug wires are very important to the operation of the SCI Series Ignition. A good quality, helically wound wire and proper routing are required to obtain the best performance from the SCI ignition. MSD recommends using a helically wound suppression type wire such as the MSD 8mm Heli-Core or 8.5mm Super Conductor Spark Plug Wire. This type of wire provides a good path for the spark to follow while keeping Electro Magnetic Interference (EMI) to a minimum. Excessive EMI, such as the amount that is produced by solid core spark plug wires, will interfere with the operation of the MSD.
Note: Solid Core spark plug wires cannot be used with any MSD Ignition products.

Routing: Correct routing of the plug wires is also important to performance. Wires should be routed away from sharp edges and engine heat sources. If there are two wires that are next to each other, the wires should be routed away from each other to avoid inducing a spark into the other wire. To add more heat protection to the wires, MSD offers Pro Heat Guard, PN 3411. This is a glass woven and silicone coated protective sleeve that can be slid over the plug wires. For extra protection of the spark plug boots, MSD also offers Pro-Heat Boot Guard, PN 3412.

Spark Plugs: Choosing the correct spark plug design and heat range is important when trying to get the best performance possible. Since there are so many engine combinations and manufacturers, MSD does not recommend which plug or gap is exactly right for your application. MSD suggests that you follow the engine builder or manufacturer’s specification for spark plugs. With that, you can then experiment with the plug gap to obtain the best performance. The gap of the plugs can be opened in 0.005” increments, then tested until the best performance is obtained. These examples are just starting points to get you headed in the right direction. Every application is different and should be tested and tuned.

Sealing: Do not attempt to seal the MSD. All circuits of an MSD receive a thick conformal coating of Humi-Seal. This sealant protects the electronics from moisture. If you were to seal the unit, any moisture or water that may seep in through the wiring grommets will not be able to drain and may result in corrosion.

Welding: If you plan on welding on your vehicle, to avoid possible damage to the ignition, always disconnect both the MSD Heavy Power cables from the battery. It is also recommended that the tach ground wire be disconnected.

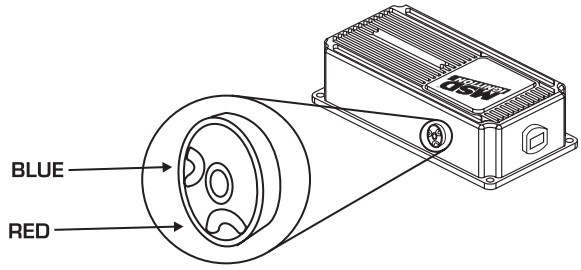
Distributor Cap and Rotor: It is recommended to install a new distributor cap and rotor when installing the Sport Compact Ignition. The cap should be clean inside and out especially the terminals and the rotor tip. On vehicles which use a small diameter cap, it is possible for the air inside the cap to become electrically charged causing crossfire which may result in misfire. This can be prevented by drilling a couple of vent holes in the cap. The holes should be placed between the terminals, at rotor height and away from any metal surfaces. If your environment demands it, place a small piece of screen over the hole to act as a filter.

Initial Spark: It is normal, yet not very common, for the MSD to produce a spark when the ignition key is turned On. This is due to the capacitor being charged and the distributor pickup being in the correct position to trigger the ignition to fire. This could also occur when installing the positive battery cable.

CYLINDER SELECT

The Soft Touch Rev Limiter that is built into the MSD SCI-L is programmed for operation on an 8-cylinder engine. If you are installing one of these units on a 4 or 6-cylinder even-fire engine, the ignition must be modified. This is easily achieved through the cylinder select device on the side of the ignition. To program the ignition:

1. Locate and remove the round black cover with a single Phillips screw.
2. There are two wire loops, a Red and Blue loop. Refer to the chart in Figure 1 to determine which loop to cut for your application.
3. After cutting the loop(s), turn the wire ends away from each other so they cannot come into contact. Install the cover and the screw.



CYLINDERS	CUT LOOPS
8	NONE
6	RED
4	RED & BLUE

Figure 1 Cylinder Select Loops.

MOUNTING

The MSD Ignition may be mounted in any location except on the engine or near the exhaust manifold. Excessive heat at these locations may cause damage to the ignition. It can be mounted in most positions, except directly upside down (if upside down, moisture or water cannot escape). It is not recommended to mount the unit in an enclosed area such as the glovebox. When selecting a mounting location, make sure the cable harness will reach the battery and coil/distributor assembly. When a suitable location is found, hold the ignition in place and mark the location of the mounting holes. Using a 1/8" drill bit, drill a hole in each of the locations marked. Use the supplied self tapping screws to mount the ignition unit.

WIRING

GENERAL WIRING INFORMATION

Wire Length: All of the wires of the MSD Ignition may be shortened as long as quality connectors are used and crimped or soldered in place. To lengthen the wires, use one size bigger gauge wire (10 gauge for the power leads and 16 gauge for all other wires) with proper connections. All connections must be soldered and sealed.

Grounds: A poor ground connection can cause many frustrating problems. When a wire is specified to go to ground, it should be connected to the battery negative terminal, engine block or chassis. The body is not a recomended ground. There should always be a ground strap between the engine and the chassis. Always securely connect the ground wire to a clean, paint free metal surface.

Ballast Resistor: If your vehicle has a ballast resistor in line with the coil wiring, it is not necessary to bypass or remove it. This is because the MSD receives its main power directly from the battery.

Routing Wires: The MSD wires should be routed away from direct heat such as the exhaust manifolds/headers and any sharp edges. The trigger wires should be routed separate from the other wires and spark plug wires. It is best if they are routed along a ground plane such as the block or firewall which creates an electrical shield. The magnetic pickup wires should always be routed separately and should be twisted together to help reduce extraneous interference.

WIRE FUNCTIONS

Power Leads	These are the two heavy gauge wires (12 gauge) and are responsible for getting direct battery voltage to the ignition. The ignition has an internal fuse so no fuse is necessary.
Heavy Red	This wire connects directly to the battery positive (+) terminal or to a positive battery junction or the positive side of the starter solenoid. Note: **Do not** connect to the alternator.
Heavy Black	This wire connects to a good ground, either at the battery negative (-) terminal or to the engine.
Red	Connects to a switched 12 volt source. Such as the ignition key or switch.
Orange	Connects to the positive (+) terminal of the coil. Note: This is the only wire that makes electrical contact with the coil positive (+) terminal.
Black	Connects to the negative (-) terminal of the coil. Note: This is the only wire that makes electrical contact with the coil negative (-) terminal.
Trigger Wires	There are two circuits that can be used to trigger the MSD Ignition; a points circuit (White wire) and a Magnetic Pickup circuit (Violet and Green wires). The two circuits will never be used together.
White	This wire is used to connect to the points, electronic ignition amplifier output or to the Yellow wire of an MSD Timing Accessory. When this wire is used, the Magnetic Pickup connector is not used.
Violet & Green	These wires are routed together in one harness to form the Magnetic Pickup connector. The connector plugs directly into an MSD Distributor or Crank Trigger. It will also connect to factory magnetic pickups or other aftermarket pickups. The Violet wire is positive (+) and the Green is negative (-). When these wires are used, the White wire is not used. Note: Most EFI applications will use the White wire to trigger the MSD.

Figure 2 shows the polarity of other common magnetic pickups. If using a different magnetic pickup, use the MSD 2-Pin connector, PN 8824, for a direct plug-in installation.

Common Mag Pickup Wires

Distributor	Colors	
	Mag+	Mag-
MSD	Org/Blk	Vio/Blk
MSD Crank Trigger	Violet	Green
Ford	Orange	Purple
Accel 46/48000 Series	Org/Blk	Vio/Blk
Accel 51/61000 Series	Red	Black
Chrysler	Org/Wht	Black
Mallory	Org/Blk	Vio/Blk

Figure 2 Common Magnetic Pickups.

WARNING: The MSD SCI Series Ignitions are capacitive discharge ignitions. High voltage is present at the coil primary terminals. Do not touch the coil or connect test equipment to the terminals.

PRESTART CHECK LIST

- The only wires connected to the coil terminals are the MSD Orange to coil positive and Black to coil negative.
- The small Red wire of the MSD is connected to a switched 12 volt source.
- If using a MSD SCI-L on a 4 or 6-cylinder engine the cylinder select must be modified.
- The MSD power leads are connected directly to the battery positive and negative terminals.
- The battery is connected and fully charged if not using an alternator.
- The engine is equipped with at least one ground strap to the chassis.

THEFT DETERRENT

The MSD provides the opportunity to easily install a theft deterrent kill switch, Figure 3.

White Wire Trigger: When using the White wire to trigger the MSD, install a single pole single throw switch (PN 8806) across the magnetic pickup Violet wire to ground. When the Violet wire is grounded, the vehicle will crank but not start.

Magnetic Pickup Trigger: When using the mag pickup to trigger the MSD, install a single pole single throw switch (PN 8806) to the White wire and the other side to ground. When the White wire is grounded, the vehicle will crank but will not start.

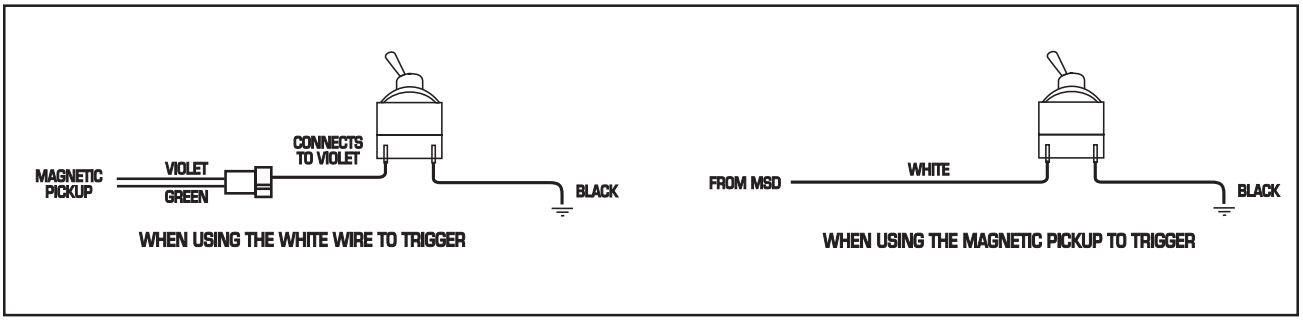


Figure 3 Connecting a Theft Deterrent Switch.

TROUBLESHOOTING

Every Sport Compact Ignition undergoes numerous quality control checks including a four hour burn-in test. If you experience a problem with your MSD, our research has shown that the majority of problems are due to improper installation or poor connections. The Troubleshooting section has several checks and tests you can perform to ensure proper installation and operation of the MSD. If you have any questions concerning your MSD, call our Customer Service Department at (915) 855-7123, Monday - Friday, 8am to 5pm mountain time.

TACH/FUEL ADAPTERS

If your tachometer does not operate correctly or if you experience a no-run situation with your vehicle you probably need an MSD Tach/Fuel Adapter.

Tachometers: The chart below lists the most common tachometers and if an Adapter is necessary. Before getting an Adapter, try connecting your tachometer trigger wire to the tach output terminal on the side of the MSD. This output produces a 12 volt square wave with a 20% duty cycle. If the tach still does not operate correctly, you will need a Tach Adapter. There are two Tach Adapters.
PN 8920: If you are using the Magnetic Pickup connector (Green and Violet wires) to trigger the MSD, you will need the PN 8920.
PN 8910: If you are using the White wire to trigger the MSD and your tachometer was triggered from the coil negative terminal (voltage triggered) you will need the PN 8910.

Fuel Injection: Some foreign vehicles with fuel injection systems may require an MSD Tach/Fuel Injection Adapter to run properly. This is because many of these systems use the same trigger source to operate the MSD, the tachometer and the fuel injection. This results in a voltage signal that is too low to accurately trigger the fuel injection. To fix this, an MSD Tach Adapter, PN 8910, will usually remedy the problem on the majority of vehicles. If the PN 8910 does not fix the problem, the PN 8910-EIS will be required.

Note: Toyotas and Ford Probes will require the PN 8910-EIS Adapter.

Tachometer Compatibility List

AFTERMARKET TACHOMETER	WHITE WIRE TRIGGER	MAGNETIC TRIGGER CONNECTOR
AUTOGAGE	8910	8920
AUTOMETER	NONE	NONE
FORD MOTORSPORTS	NONE	NONE
MALLORY	NONE	NONE
MOROSO	NONE	NONE
STEWART	8910	8920
S.W. & BI TORX	NONE	NONE
SUN	8910	8920
VDO	8910	8920
CHRYSLER	8910	8920
IMPORTS	8910	8920

Note: On the list above, the trigger wire on tachometers that are marked NONE may be connected to the Tach Output Terminal on the MSD 6 Series Ignition Unit using the supplied Female Faston Receptacle.

MISSES AND INTERMITTENT PROBLEMS

Generally, a miss or hesitation at higher rpm is usually not caused by the ignition. Most probable causes include a coil or plug wire failure, arcing from the cap or plug boot to ground or spark ionization inside the cap. Several areas to inspect are:

- Always inspect the plug wires at the cap and at the plug for a tight connection and visually inspect for cuts, abrasions or burns.
- Inspect the positive (+) and negative (-) coil terminal connections. Because the MSD is a Capacitive Discharge ignition and it receives a direct 12 volt source directly from the battery, there will not be any voltage at the coil positive (+) terminal even with the key turned On. During cranking or while the engine is running, very high voltage will be present at the coil. **Do not** connect any test equipment to the coil positive (+) or negative (-) terminals.

WARNING: Do not touch the coil terminals during cranking or while the engine is running.

- Make sure that the battery is fully charged and the connections are clean and tight. If you are not running an alternator this is an essential check. If the battery voltage falls below 10 volts during operation, the MSD output voltage will drop.
- Is the engine running lean? Inspect the spark plugs and complete fuel system.
- Inspect all wiring connections for corrosion or damage. Remember to always use proper connections followed by soldering and seal the connections completely.

If everything checks out, use the following procedure to test the ignition for spark. MSD also offers an Ignition Tester, PN 8995, which can be used to check the entire ignition system, tachometers, rpm activated switches and shift lights without removing them from the vehicle.

CHECKING FOR SPARK

If triggering the ignition with the White wire:

1. Make sure the ignition switch is in the “Off” position.
2. Remove the coil wire from the distributor cap and set the terminal approximately 1/2" from ground.
3. Disconnect the MSD White wire from the distributors points or ignition amplifier.
4. Turn the ignition to the On position. Do not crank the engine.
5. Tap the White wire to ground several times. Each time you pull the wire from ground, a spark should jump from the coil wire to ground. If spark is present, the ignition is working properly. If there is no spark skip to step 6 below.

If triggering the ignition with the Magnetic Pickup connector:

1. Make sure the ignition switch is in the “Off” position.
2. Remove the coil wire from the distributor cap and set the terminal approximately 1/2" from ground.
3. Disconnect the MSD magnetic pickup wires from the distributor.
4. Turn the ignition to the On position. Do not crank the engine.
5. With a small jumper wire, short the MSD Green and Violet magnetic pickup wires together. Each time you break this short, a spark should jump from the coil wire to ground. If spark is present, the ignition is working properly. If there is no spark skip to step 6 below.

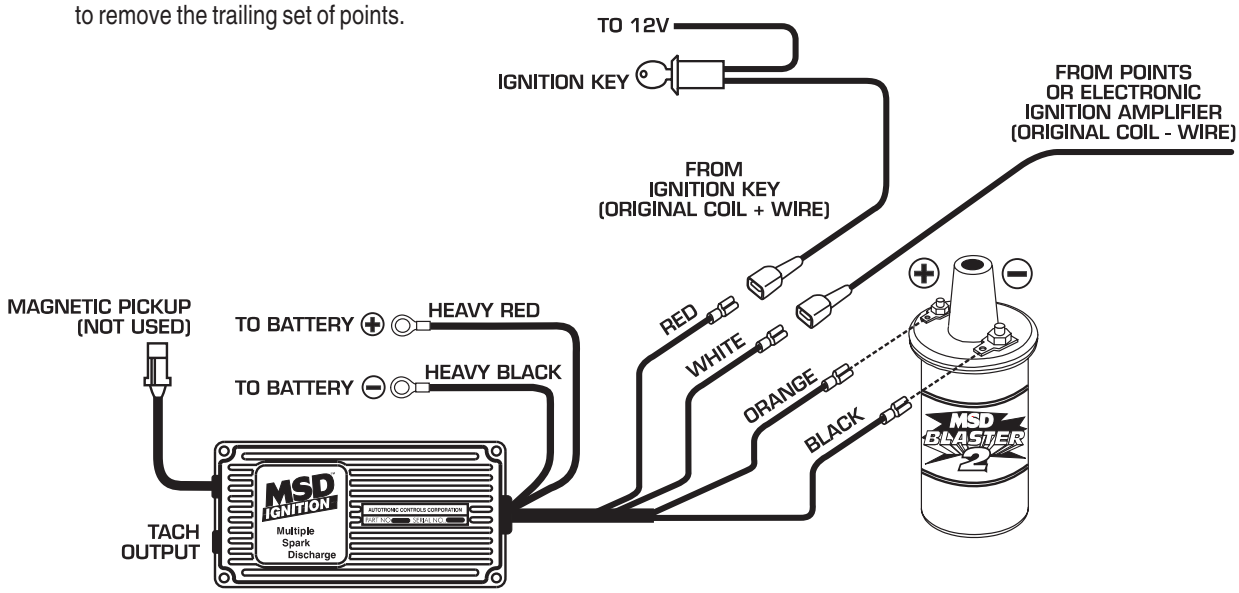
6. **If there is no spark:**
   A. Inspect all of the wiring.
   B. Substitute another coil and repeat the test. If there is now spark, the coil is at fault.
   C. If there is still no spark, check to make sure there is 12 volts on the small Red wire from the MSD when the key is in the On position. If 12 volts is not present, find another switched 12 volt source and repeat the test.
   D. If, after following the test procedures and inspecting all of the wiring, there is still no spark, the MSD Ignition is in need of repair. See the Warranty and Service section for information.

WIRING DIAGRAMS

The following wiring diagrams illustrate numerous installations on different vehicles and applications. If you experience difficulties when installing your MSD Sport Compact Ignition, contact our Customer Service Department at (915) 855-7123 Monday - Friday, 8am - 5pm mountain time or e-mail us at: msdtech@msdignition.com

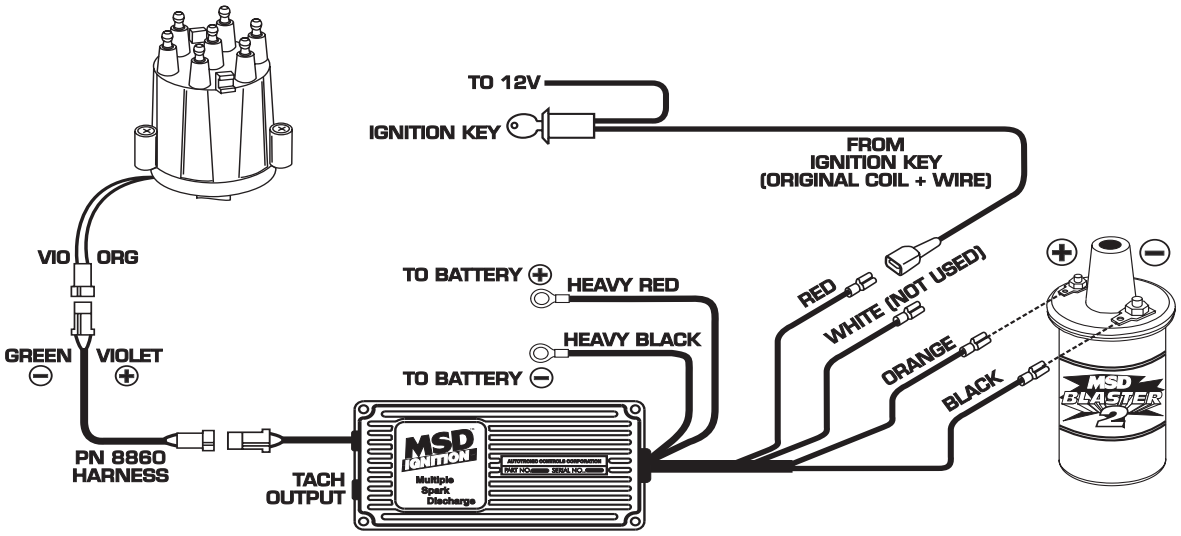
MSD SYSTEMS Installing to Points/Amplifier Style Ignitions

NOTE: On dual point setups, it is recommended to remove the trailing set of points.



MSD SYSTEMS Installing to a Magnetic Pickup Distributor

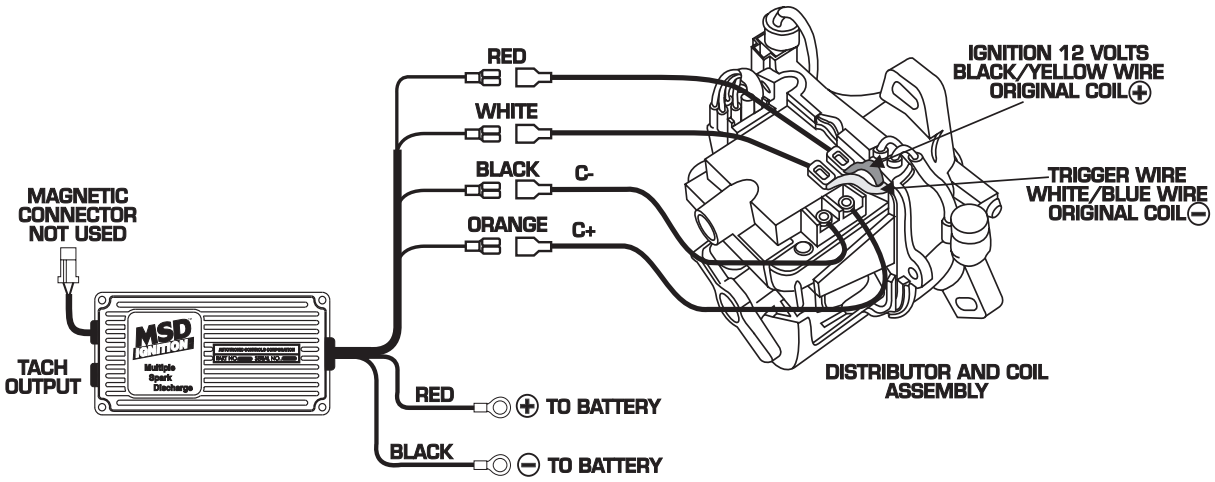
NOTE: The PN 8460 distributor has been discontinued.



ACURA IGNITIONS Wiring a Honda/Acura w/Internal Coil

Follow this procedure to install the MSD SCI Series Ignition to applications which will retain the use of the internal mounted coil. The distributor cap, rotor and dust cover must be removed during the wiring process. All wires must be routed to the locations described below, then cut to length and connected using the supplied solderless connectors.

1. Disconnect the Black/Yellow wire with ring lug terminal from the positive side of the coil. Cover the ring lug terminal with electrical tape to prevent shorting.
2. Disconnect the White/Blue jumper wire from the negative side of the coil.
3. Connect the MSD's Red wire to a switched 12 volt source, or splice it into the Black/Yellow wire leading into the distributor (original Coil + Wire).
4. Connect the MSD's Orange wire to the positive (+) side of the coil. No other wires should be connected to the positive side of the coil.
5. Connect the MSD's Black wire to the negative (-) side of the coil. No other wires should be connected to the negative side of the coil.
6. Connect the MSD's White wire to the White/Blue wire that used to be connected to coil (-).



ACURA IGNITIONS Wiring a Honda/Acura w/External Coil

	BLACK	RED
Honda Civic CRX 1.5L/1.6L 88-91 *Acura Integra 1.6L/1.8L 88-91*	**PN 8290**	**PN 82901**
Honda Civic 1.5L 1.6L w/VTEC & Hitachi Dist. 95-97 *Accord 2.2L w/Hitachi Dist. 93-97*	**PN 8291**	**N/A**
Honda Civic 1.5L 1.6L 92-97, Civic Del Sol 1.6L 93-97 *Acure Integra 1.8L 92-97*	**PN 8292**	**PN 82921**
Acura Integra 1.7L w/VTEC 94-97	**PN 8293**	**N/A**

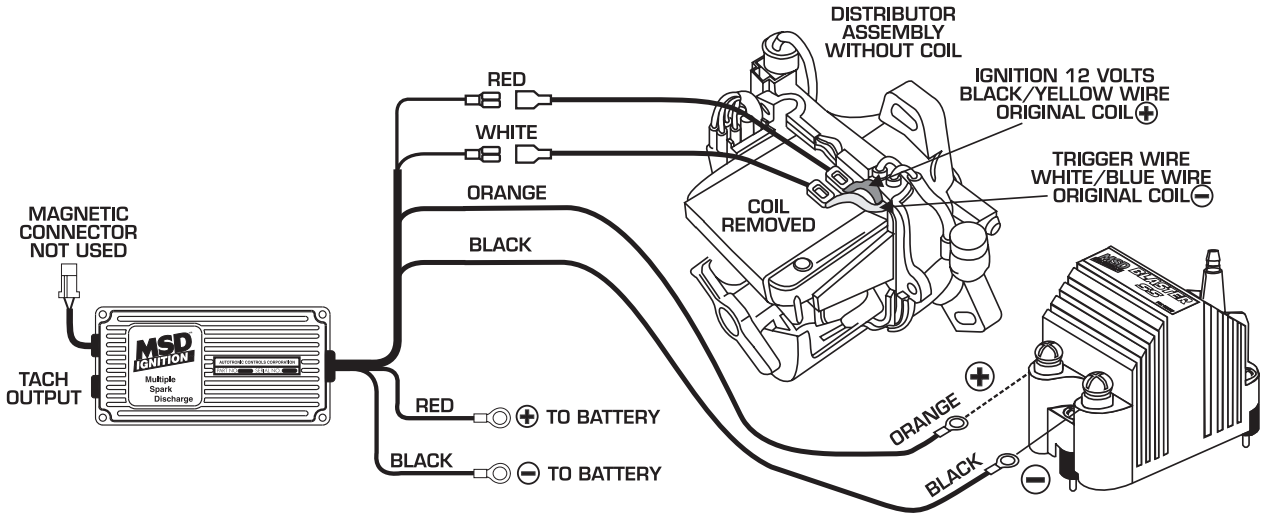
Modified Distributor Cap

On nitrous, turbocharged or supercharged engines, it is recommended that an external coil such as an MSD Blaster be used. In order to use an external coil, a modified MSD distributor cap will be required for this installation. If you would like to modify your factory distributor cap to accept an external coil, detailed instructions for this type of modification are shown on page 11.



Follow this procedure to install the MSD SCI Series Ignition to applications which will be using the modified distributor cap with external coil. The MSD Ignition and Blaster Coil must be mounted before proceeding. The distributor cap, rotor and dust cover must be removed during the wiring process. All wires must be routed to the locations described below, then cut to length and connected using the supplied solderless connectors.

1. Disconnect the Black/Yellow wire with ring lug terminal from the positive side of coil. Cover the ring lug terminal with electrical tape to prevent shorting.
2. Disconnect the White/Blue jumper wire from the negative side of the coil and ignitor module. Remove the coil from the distributor housing.
3. Connect the MSD's Red wire to a switched 12 volt source, or splice it into the Black/Yellow wire leading into the distributor.
4. Connect the MSD's Orange wire to the positive (+) side of the coil. No other wires should be connected to the positive side of the coil.
5. Connect the MSD's Black wire to the negative (-) side of the coil. No other wires should be connected to the negative side of the coil.
6. Connect the MSD's White wire to terminal "C" on the igniter or to the White/Blue wire.



HONDA IGNITIONS Modifying the Factory Honda/Acura Distributor Cap



On modified engines it is recommended that an external coil such as the MSD Blaster be used. To use an external coil, modification of the factory distributor cap is required. To complete this modification, an MSD SCI Power Tower, PN 8803, must be purchased from the MSD Customer Servcie Department (915) 855-7123. Detailed below are the modifications that need to be done to the factory distributor cap.

1. Remove the small aluminum insert where the factory coil tower contacts the distributor cap by drilling through the insert using a #21 - 5/32" drill bit. The insert will push out as you drill.

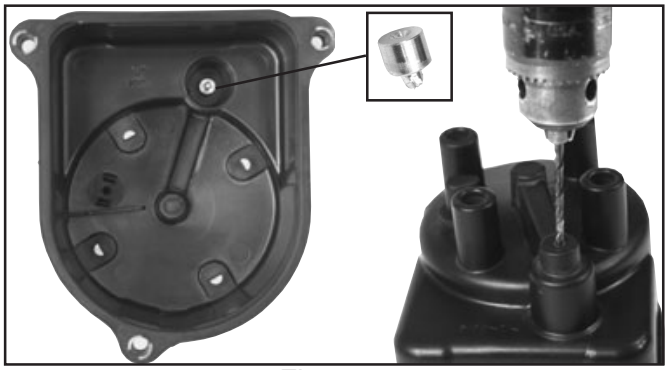


Figure 1

2. Insert the supplied Power Tower screw into the hole on the inside of the cap. Place the Power Tower over the portion of the screw that is protruding out of top side of distributor cap. Secure the Power Tower to the cap using the brass contact terminal.



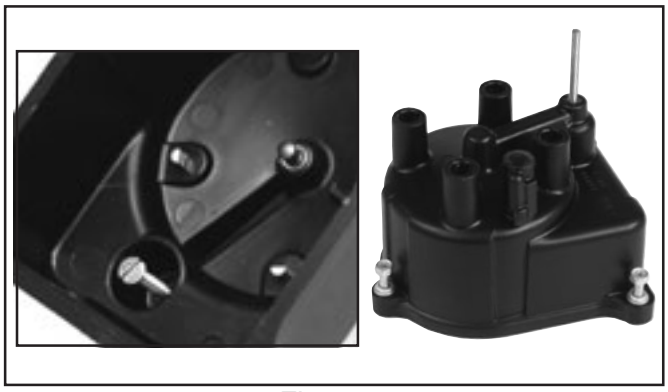


Figure 2

3. Fill the cavity surrounding the screw with silicone. Allow to dry for at least 24 hours.

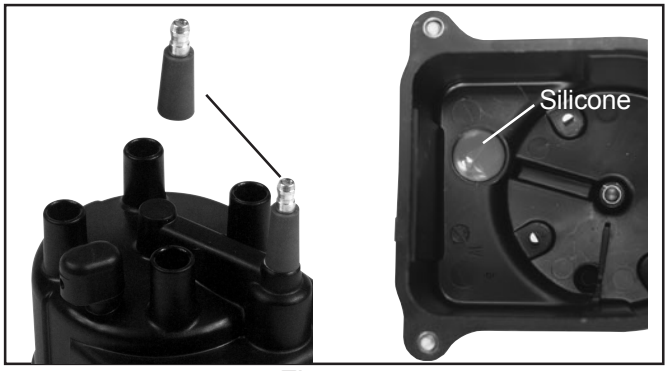
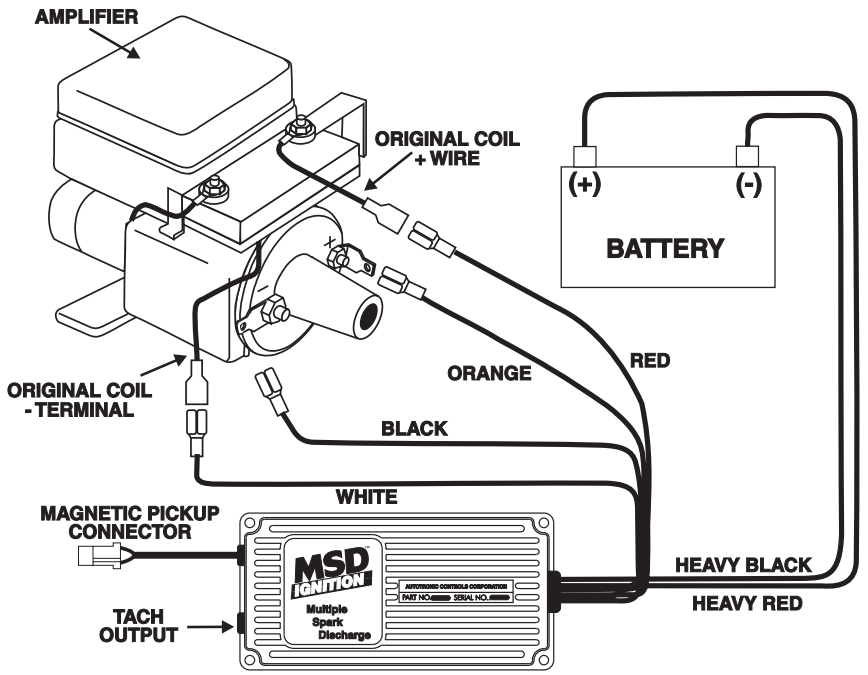


Figure 3

MSD IGNITION INSTALLATION INSTRUCTIONS

GENERAL IMPORT WIRING

NOTE: Remove the coil terminal wires. The negative (-) wire connects to the MSD White. The positive (+) wire connects to the MSD Red. The MSD Orange connects to the coil positive (+) terminal and the MSD Black connects to the coil negative (-) terminal.



Service

In case of malfunction, this MSD component will be repaired free of charge according to the terms of the warranty. When returning MSD components for service, Proof of Purchase must be supplied for warranty verification. After the warranty period has expired, repair service is charged based on a minimum and maximum charge.

Send the unit prepaid with proof of purchase to the attention of: **Customer Service Department, Autotronic Controls Corporation, 12120 Esther Lama, Suite 114, El Paso, Texas 79936**.

When returning the unit for repair, leave all wires at the length in which you have them installed. Be sure to include a detailed account of any problems experienced, and what components and accessories are installed on the vehicle.

The repaired unit will be returned as soon as possible after receipt, COD for any charges. (Ground Shipping is covered by warranty). All units are returned regular UPS unless otherwise noted. For more information, call the MSD Customer Service Line (915) 857-5200. MSD technicians are available from 8:00 a.m. to 5:00 p.m. Monday - Friday (mountain time).

Limited Warranty

Autotronic Controls Corporation warrants MSD Ignition products to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of Autotronic Controls Corporation. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Autotronic Controls Corporation be liable for special or consequential damages.

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