

INSTALLATION INSTRUCTIONS

Programmable 6AL-2 Ignition Control PN 6530

ONLINE PRODUCT REGISTRATION: Register your MSD product online. Registering your product will help if there is ever a warranty issue with your product and helps the MSD R&D team create new products that you ask for! Go to www.msperformance.com/registration.

Parts Included:

1 - Ignition Control, PN 6530	3 - Deutsch Connector Harnesses
1 - MSD Pro-Data+ Software	1 - Mag Pickup Harness, PN 8860
4 - Vibration Mounts and Screws	1 - Parts Bag

Accessories:

MAP Sensor, see page 6
Hand Held Programmer, PN 7550
Manual Launch RPM Control, PN 7551

WARNING: During installation, disconnect the battery cables. When disconnecting, always remove the Negative cable first and install it last.

Note: Solid core spark plug wires cannot be used with an MSD Ignition Control.

Note: If you're programming the timing functions of the ignition, the distributor must be locked out.

GENERAL INFORMATION

BATTERY

The MSD Programmable 6AL-2 Ignition Control will operate on any negative ground, 12 volt electrical system with a distributor. The MSD can be used with 16 volt batteries and can withstand a momentary 24 volts in case of jump starts. The Ignitions will deliver full voltage with a supply of 9-18 volts and will operate with a supply voltage as low as five 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 or water pump are used, the amp/hour rating should be higher.

COILS

The MSD Programmable 6AL-2 Ignition can be used with most stock coils and aftermarket coils 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 a 6-Series MSD Ignition Control. For more information on recommended coils, consult the supplied Coil Application Chart or check with the manufacturer of your coil. If you have any questions concerning coils, contact our Customer Service Department at (915) 855-7123.

TACHOMETERS

The Gray Tach Output Terminal produces a 12 volt square wave 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, see the Tachometer Section on page 15. If your GM vehicle has an inline filter it may cause the tach to drop to zero on acceleration. If this occurs, bypass the filter.

SPARK PLUGS AND WIRES

Spark plug wires are very important to the operation of your ignition system. A good quality, helically wound wire and proper routing are required to get the best performance from your ignition, such as the MSD Heli-Core or 8.5mm Super Conductor Wire.

Note: Solid Core spark plug wires cannot be used with an MSD Ignition.

A helically, or spiral wound wire must be used. This style 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 solid core wires produce, will interfere with the operation of the MSD.

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 in the engine's firing order, the wires should be routed away from each other to avoid inducing a spark into the other wire. For example, in a Chevy V8, the firing order is 1-8-4-3-6-5-7-2. The #5 and #7 cylinders are next to each other in the engine and in the firing order. If the voltage from the #5 wire is induced into #7 detonation could occur and cause engine damage.

To add more heat protection to your plug wires, MSD offers Pro-Heat Guard, PN 3411. This is a glass woven and silicone coated protective sleeve that you slide over your plug wires. For extra protection of the spark plug boots, MSD offers Pro-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.

It is recommended to 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. MSD judges the plug gap by compression and components:

These examples are just starting points to get you going in the right direction. Every application is different and should be tested and tuned.

Compression	Spark Plug Gap
Up to 10.5:1:	0.050"-0.060"
10.5:1-13.0:1:	0.040"-0.050"
Above 13.0:1:	0.035"-0.045"

MISCELLANEOUS INFORMATION

Sealing: Do not attempt to seal the MSD. All of the 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 are welding on your vehicle, to avoid the chance of damage, always disconnect both Heavy Power cables of the MSD (You should also disconnect the tach ground wire too).

Distributor Cap and Rotor: It is recommended to install a new distributor cap and rotor when installing the MSD Ignition Control. The cap should be clean inside and out especially the terminals and rotor tip. On vehicles with smaller caps, it is possible for the air inside the cap to become electrically charged causing crossfire which can result in misfire. This can be prevented by drilling a couple vent holes in the cap. The holes should be placed between the terminals, at rotor height and face away from the intake. 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 is first connected to the battery. This is due to the capacitor being charged.

MOUNTING

The MSD can be mounted in most positions, except directly upside down (if upside down, moisture or water cannot escape). It can be mounted in the engine compartment as long as it is away from direct engine heat sources. It is not recommended to mount the unit in an enclosed area such as the glovebox.

When you find a suitable location to mount the unit, make sure the wires of the ignition reach their connections. Hold the Ignition in place and mark the location of the mounting holes. Use a 3/16" drill bit and drill the holes for the supplied vibration mounts. Install the vibration mounts, then mount the Ignition.

WIRING

GENERAL WIRING INFORMATION

Wire Length: All of the wires of the MSD Ignition may be shortened as long as quality connectors are used or soldered in place. To lengthen the wires, use one size bigger gauge wire (12 gauge for the power leads and 16 gauge for the other wires) with the 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. 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 recommended to bypass it.

ROUTING WIRES

The MSD wires should be routed away from direct heat sources such as exhaust manifolds and 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.

The chart shows the polarity of other common magnetic pickups. If using a different magnetic pickup, use the MSD 2-Pin connector, available as 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	Violet
Accel ^{46/48000} Series	Org/Blk	Vio/Blk
Accel ^{51/61000} Series	Red	Black
Chrysler	Org/Wht	Black
Mallory	Org/Blk	Vio/Blk

Figure 1 Common Mag Pickup Wires.

WIRING		
2-PIN CONNECTOR	Heavy Red	Ignition supply wire, 14-gauge. Connects to battery positive (+) terminal or battery junction. Note: Do not connect to the alternator.
	Heavy Black	Ignition ground, 14-gauge. Connect to battery negative (-) terminal or engine block.
Primary Coil Leads (18-gauge)		
2-PIN CONNECTOR	Orange	Connects to the coil positive (+) terminal. This is the only wire that makes contact to the coil positive terminal.
	Black	Connects to the coil negative (-) terminal. This is the only wire that makes contact to the coil negative terminal.
WARNING: High voltage is present at the coil primary terminals. Do not touch the coil or connect test equipment to the terminals while the engine is running or cranking.		
Trigger Wires(18-gauge)		
	Violet/ Green 2-Pin	Magnetic pickup, 2-pin connector. Plugs into an MSD Distributor or Crank Trigger pickup. Violet is positive, Green is negative. When this connector is used, the White and White/Blue wires are not connected.
8-PIN CONNECTOR	White/ Blue	Hall-Effect or ECU trigger. This wire connects to the trigger wire of the Hall-Effect pickup. It can also be connected to an ECU trigger source (low voltage and current). See page 6. When used, the White and Magnetic Pickup wires are not connected.
	White	Trigger input for electronic ignition amplifiers, an ECU's trigger or points. When this wire is used, the magnetic pickup and White/Blue wires are not connected.
	Red	On/Off switch wiring. Connects to a switched 12 volt source.
	Dark Blue	Launch Rev Limit. When 12 volts are applied to this wire it will activate the Launch Rev Limit and reset the Launch Retard. This overrides other rev limits.
	Light Blue	Burnout Rev Limit. When 12 volts are applied the Burnout Rev Limit is active.
	Gray	Tach output. This wire provides a 12 volt, 20° signal that is compatible with most tachs and data acquisition systems.
	Pink	Retard Step. This retard is activated when 12 volts are applied and rpm is above the Step1 Rpm value.
3-Pin Connector, MAP Sensor		
Connects to an external MAP or gauge pressure sensor.		
	Brown/Violet	+5 volt supply
	Brown/Yellow	Ground
	Dark Brown	Map Signal

WARNING: The MSD 6-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.
- 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.
- If running a 4 or 6-cylinder, the cylinder count must be modified in the Pro-Data+ Software. Default is 8-cylinder.

LED

The LED on the side of the MSD monitors several operating conditions of the MSD. If the LED indicates that there is a problem with the ignition system, follow the steps through the Troubleshooting section. The LED will appear to be on steady at above idle speeds when everything is functioning properly.

- When 12 volts are applied to the small Red wire, the LED will turn on to indicate power.
- When cranking or running, the LED will blink for each trigger signal.
- Code 2 will flash for low battery voltage.
- Code 3 will flash for high battery voltage.
- Code 4 will flash for converter off (ignition problem).

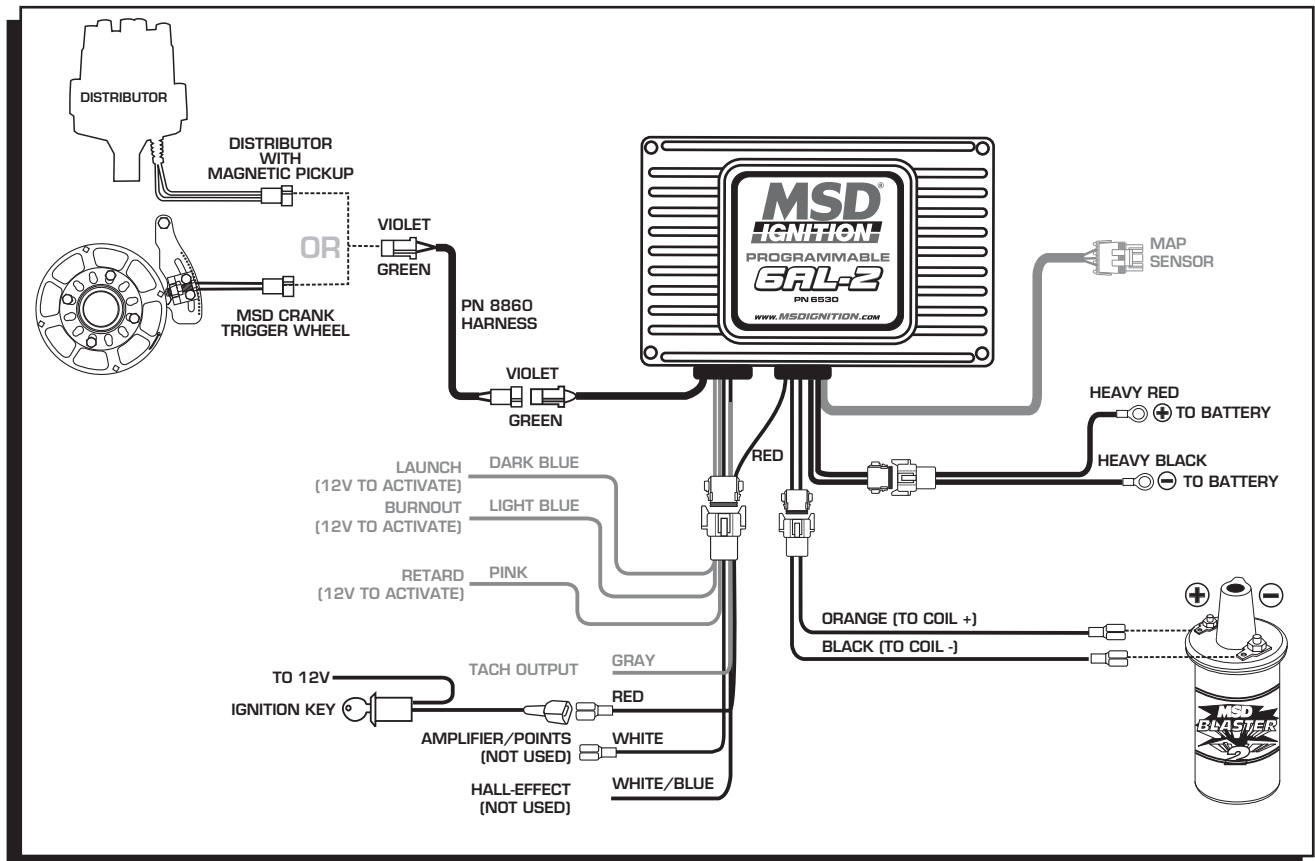


Figure 2 Wiring the Programmable 6AL-2 Ignition with a Magnetic Pickup.

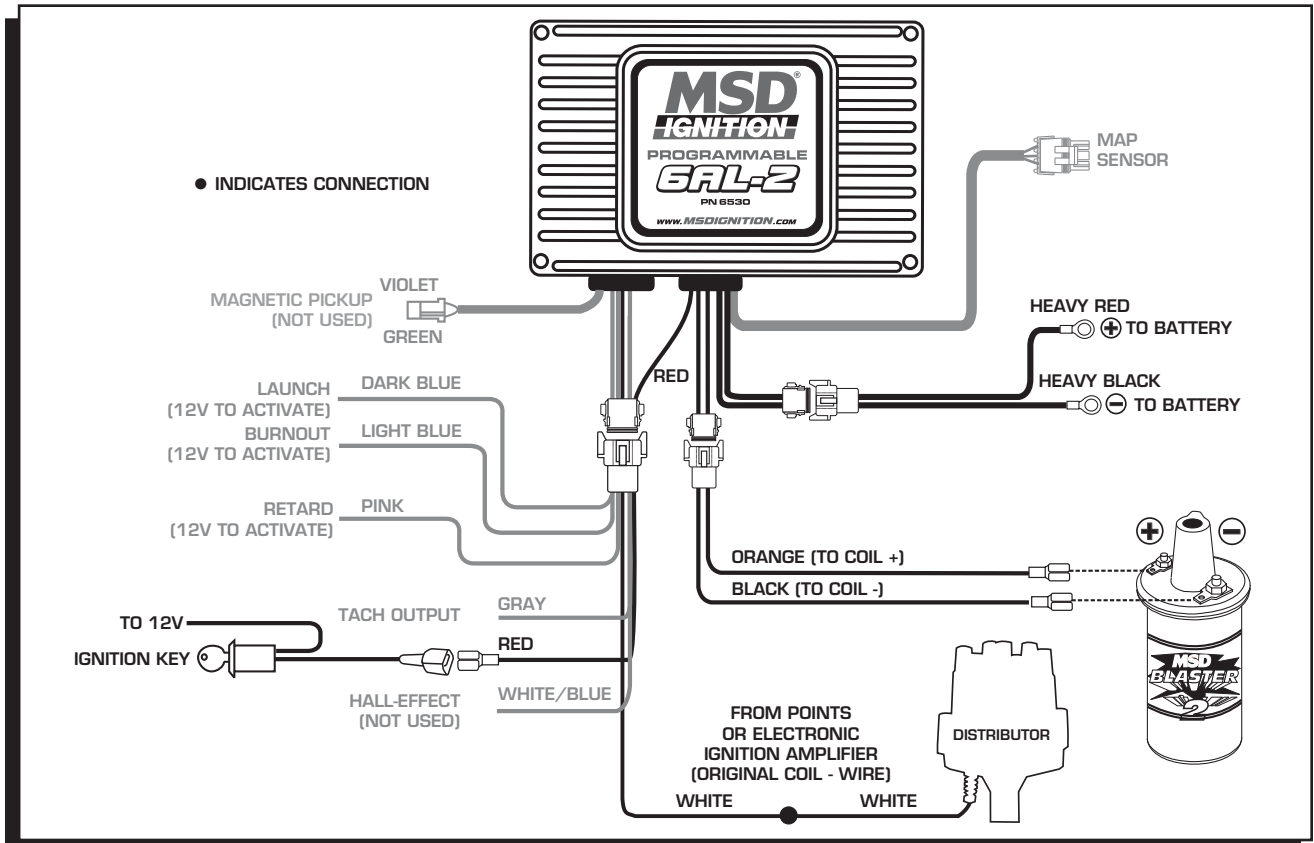


Figure 3 Wiring the Programmable 6AL-2 Ignition with Points Trigger.

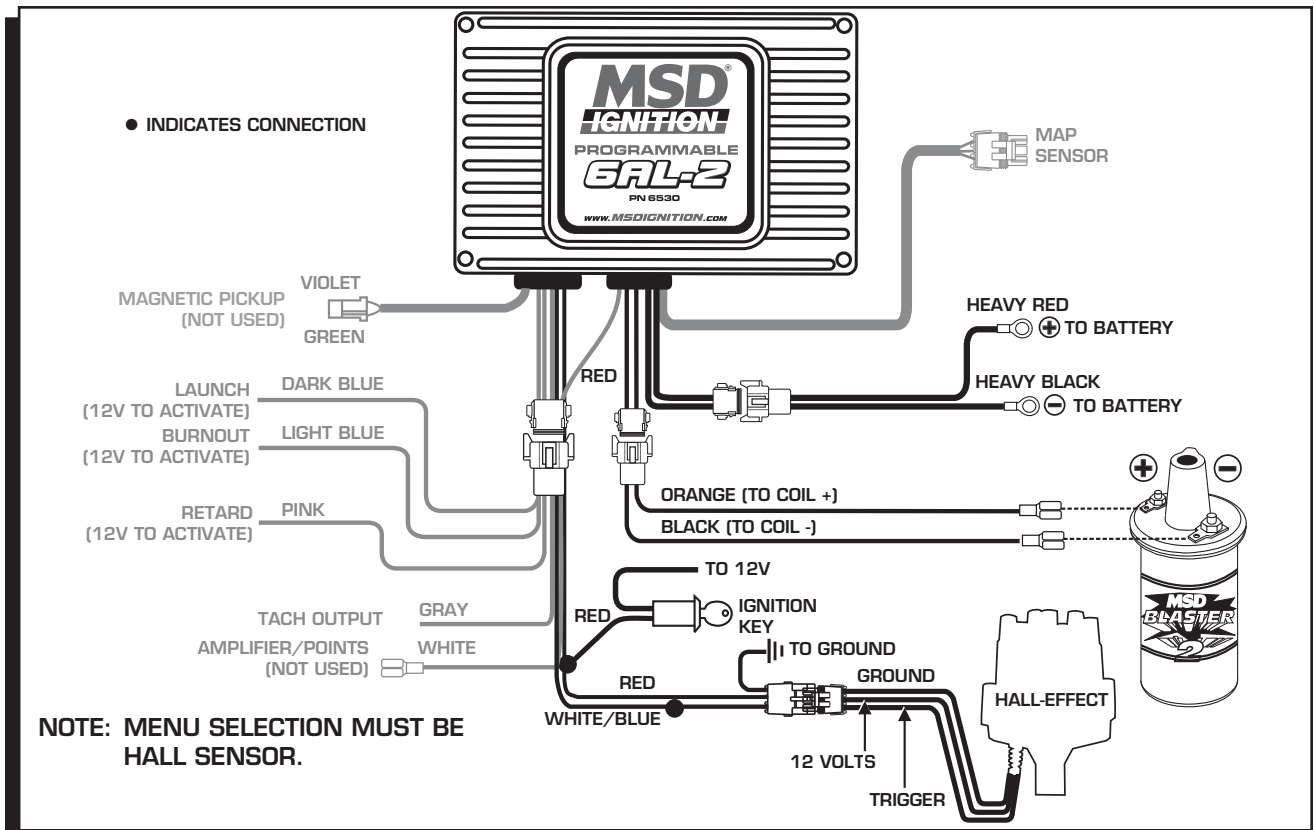


Figure 4 Wiring the Programmable 6AL-2 Ignition using Hall-Effect Trigger.

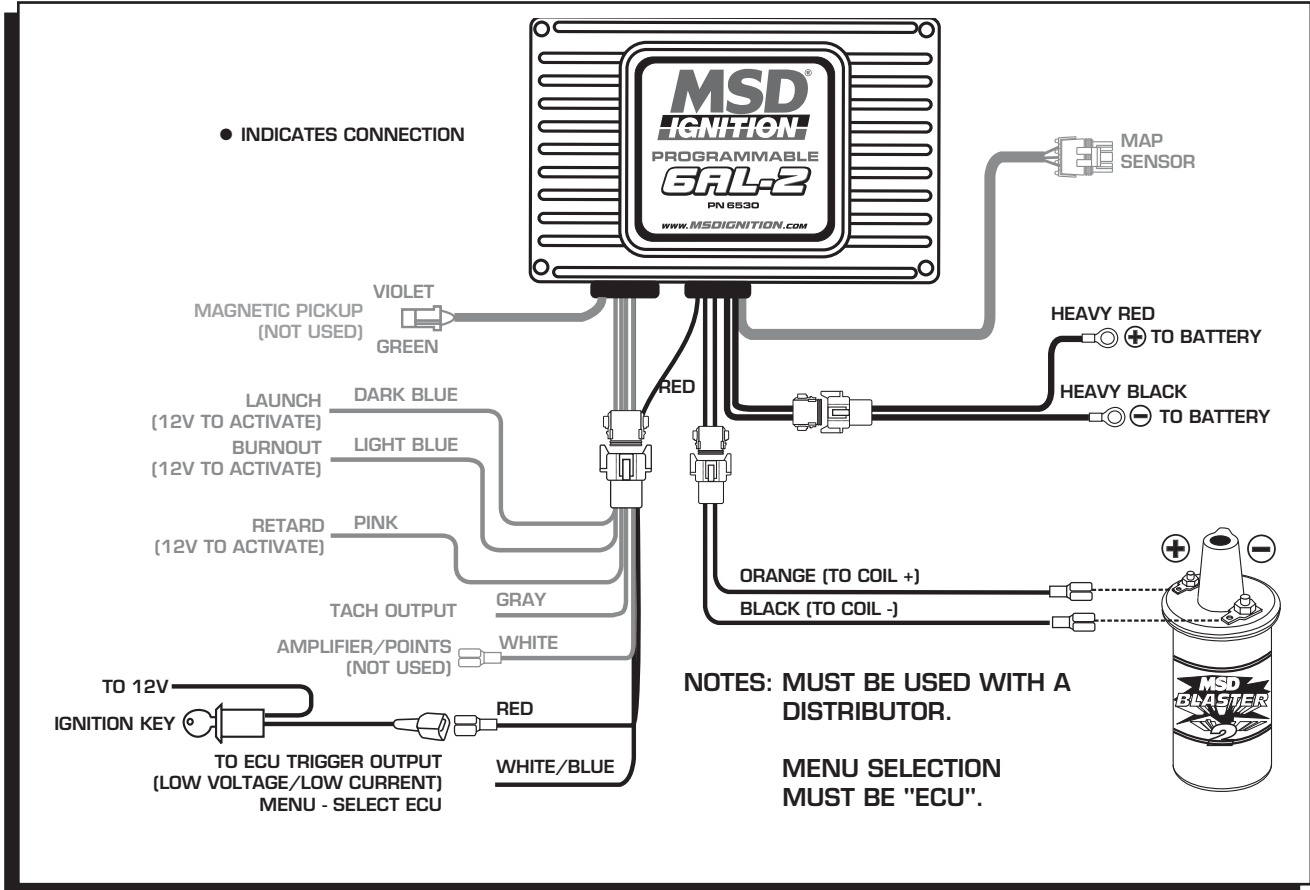


Figure 5 Wiring the Programmable 6AL-2 with an ECU Trigger.

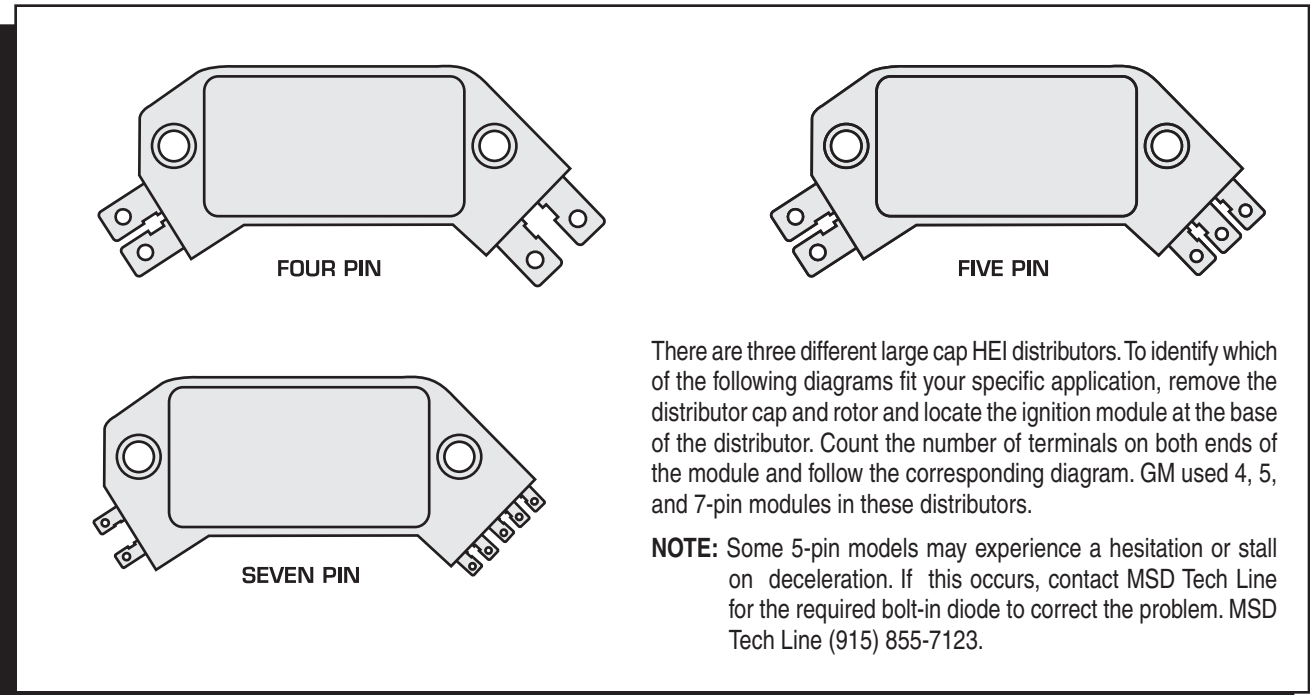


Figure 6 GM Large Cap HEI Distributors.

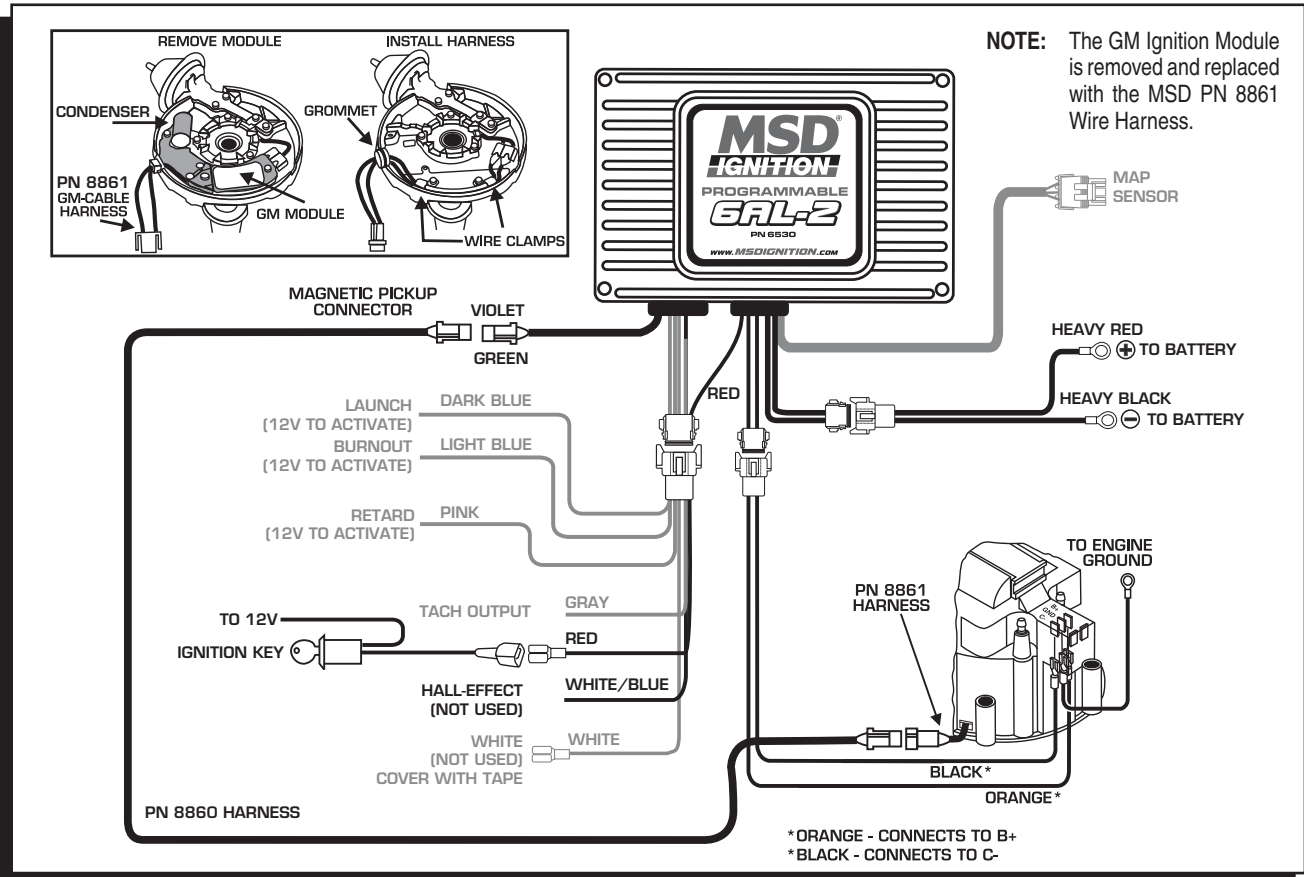


Figure 7 Wiring the Programmable 6AL-2 with an HEI 4-pin Module (Magnetic Pickup Trigger).

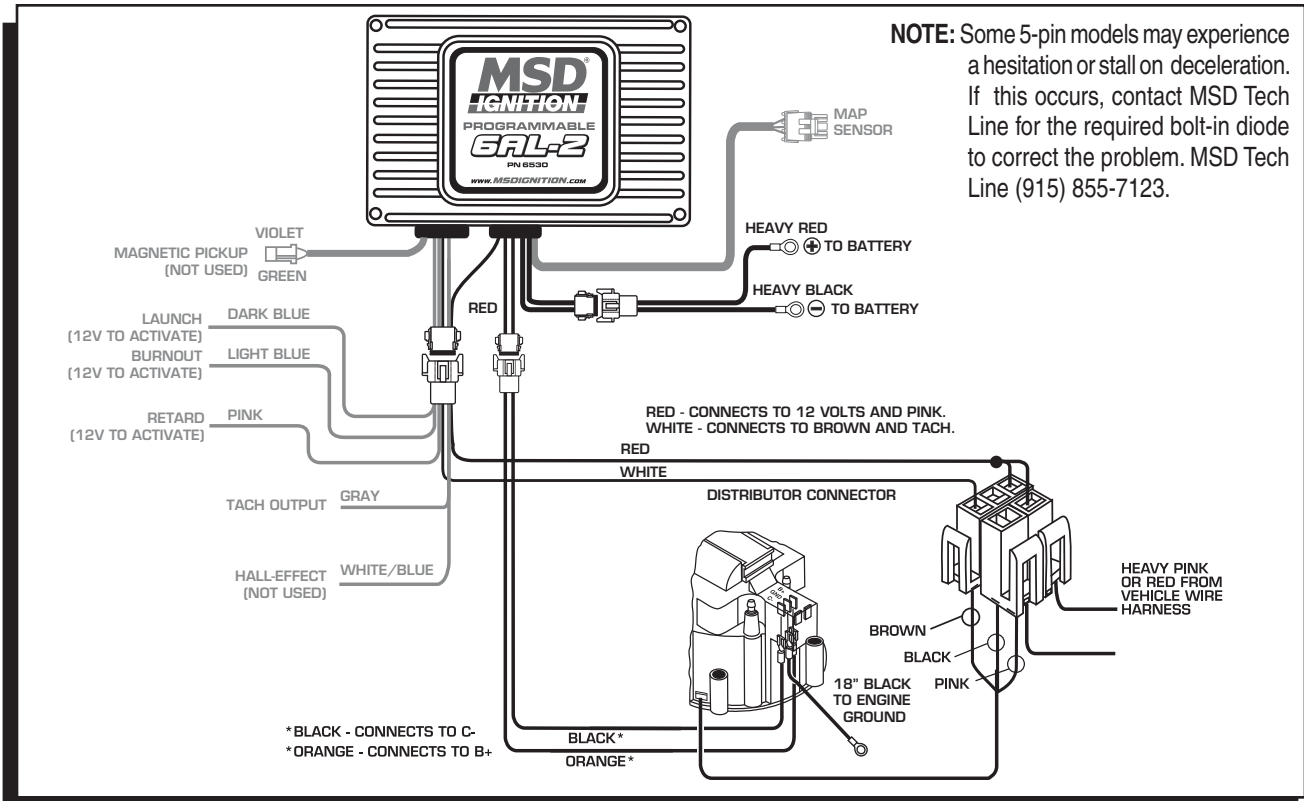


Figure 8 Wiring the Programmable 6AL-2 with an HEI 5 or 7-pin module (Amplifier Trigger).

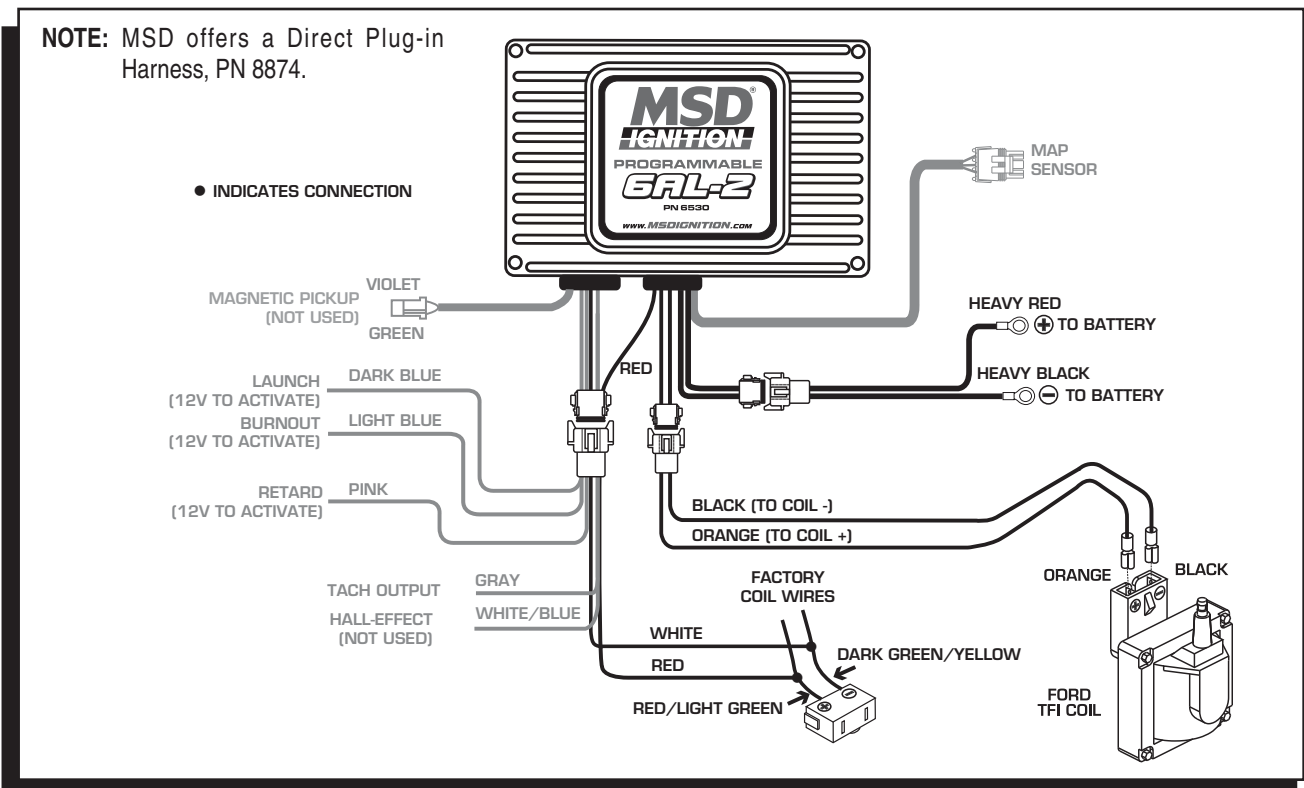


Figure 9 Wiring the Programmable 6AL-2 with a Ford TFI (without Harness).

PRO-DATA+

INSTALLATION OF THE PRO-DATA+ SOFTWARE

1. Insert the installation CD into your CD drive.
2. In Windows, click on Start then select Run.
3. In the box type, "A:Setup" (or whichever drive is for the CD) and press Enter.
4. The screen will walk you through several steps.
5. Once loaded, your monitor will have an MSD Graph View logo. Click on it to open the software.
6. A program will open. Go to the upper left corner of the screen and click on File, then Open.
7. This will open a menu of part numbers. Select "6530".
8. This will open another menu of versions. Highlight and open the "6530vxx.IGN" (xx determines the versions, such as 02). This will open the Pro-Data+ software for the Programmable 6AL-2 Ignition.

SAVES AND TRANSFERS

Whenever a change is made to a program, it either must be saved to a file in your PC or it needs to be transferred to the ignition. You will notice that whenever you make a change to a program, the bullet next to the modified value will turn red. It will remain red until you save it to a file or to the MSD. There are two ways to save your files.

Save to MSD: This step will save any changes directly into the ignition. If you are only making one or just a couple modifications this works well.

Save to PC: This will save your changes to only show on the PC screen (indicated by a red bullet point next to any altered values). These modifications will not be active or saved until you save the file or transfer the information to the MSD.

You can create numerous files on your PC and download them for testing purposes or by saving programs you used at different races or events.

PROGRAMMABLE FEATURES

The following explains the programmable features of the PN 6530 Ignition. These instructions serve as an overview of the features and their operation. The Pro-Data+ software also has a Help Menu that explains many features in great detail. The features are listed in the same order that they show on the Data Editor list in the software.

Note: If you are programming the timing functions of the ignition, the distributor will require being locked-out.

STATS

Stat 1: This is only used with the Hand Held Monitor, PN 7550.

REV LIMITS

Up to three different rev limits can be programmed in 100 rpm increments.

RevBurn: Burnout Rev Limit. This limit is activated when 12 volts are applied to the Light Blue wire. It is adjustable from 2,000 to 12,500 rpm.

RevLaunch: Launch Rev Limit. This limit is activated when 12 volts are applied to the Dark Blue wire. It is adjustable from 1,000 to 12,500 rpm.

RevMax: Max Speed Rev Limit. This is the over-rev limit and is active whenever the Launch and Burnout limits are off.

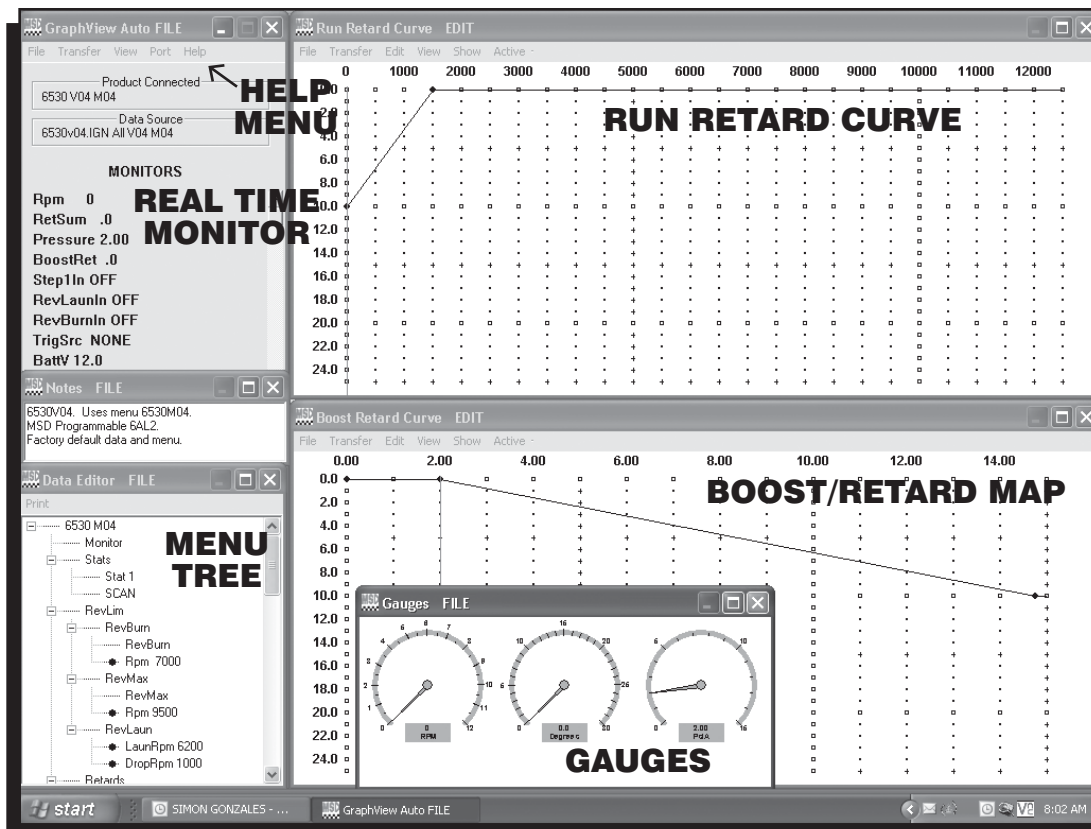


Figure 10 Pro-Data+ Screen and Program Windows.

DROP RPM

This option is for Manual shift applications using the clutch between shifts. This RPM value will set up a window so the Launch limiter will not reactivate when using the clutch between shifts. This RPM will be set lower than Launch RPM.

CONNECTING THE REV LIMITS

When you connect the Burnout and Launch, it is important to pay close attention to the wiring. The Light Blue wire is responsible for the Burnout Rev Limit. The Dark Blue is responsible for turning on the Launch Rev Limit. The Launch Rev Limit will override the Burn Rev Limit if both are activated.

LAUNCH RPM

The launch RPM is activated by applying 12 volts to the Launch Wire (Dark Blue Wire), this is normally wired to a trans-brake button, brake line lock switch, or clutch switch on a manual shift transmission. When 12 volts is removed from the Launch Wire the launch rpm will release and the Max RPM Value will be in control of the engine RPM.

LAUNCH RETARD

The launch retard can be activated multiple ways depending on the application. In order to customize this feature to your application there are 3 adjustments that need to be made (Figure 11).

1st Delay: This is a time delay that starts counting once 12 volts is removed from the Launch Wire (Dark Blue Wire). If this delay is set at 0 seconds, then the launch retard will become active as soon as 12 volts is applied to the Launch Wire. If you have anything other than 0 seconds (example: .10 or more), then the launch retard will not become active until 12 volts is removed from the Launch Wire and the Delay time is achieved.

2nd Retard: This is the amount of timing that will be retarded once 12 volts is removed from the Launch Wire. The retard amount will become active when 12 volts is applied to the Launch wire if the Delay is set to 0 seconds.

3rd Ramp: This adjustment determines the rate (over time) that timing will be ramped back into the motor until the run curve timing is met. When the Launch Wire is removed from 12 volts and the Launch Delay value is timed out then timing will begin ramping back into the motor. The Ramp determines how fast this is done.

Always remember all timing retards (Launch, Step, Boost and the Run Curve retards) are all added together in the total retard amount. When using multiple retards be sure to check the timing in order to insure that they don't overlap.

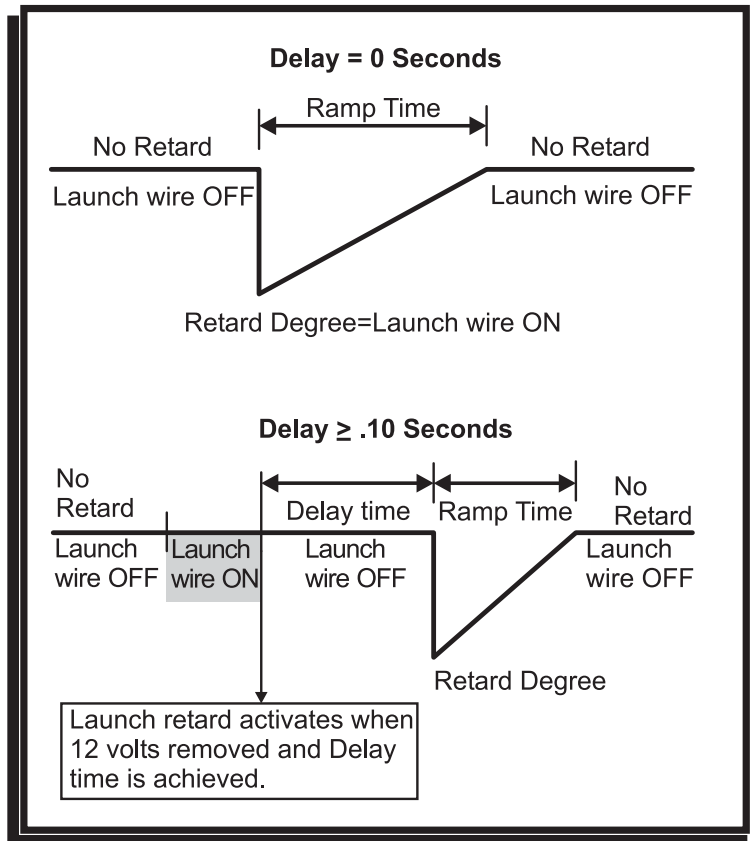


Figure 11 Launch Retard Delay Example.

STEP RETARDS

There is a single step retard that is controlled through the Pink activation wire or through rpm. It can also have an rpm point that the engine must reach before the retard becomes active (a minimum rpm can also be programmed that must be reached before a step becomes active). A time based ramp can be programmed to gradually bring the retard to its full On amount, or to ramp the retard amount out (back to no retard) from its setting.

Activation through Wiring: The retard is activated when 12 volts are applied to the Pink wire. The maximum retard allowed by the ignition is a total of 30° (including other retard amounts or a boost map).

Activation through RPM: The step retard can also be activated through rpm. In order to achieve this, 12 volts must still be applied to the Pink wire, and an rpm value must be selected from the Step RPM menu. When 12 volts are applied, the retard will not activate until the rpm value is reached. Note that the retard will remain active above this rpm. It will deactivate when the rpm drops below the set amount or when 12 volts are removed from the Pink wire.

Note: If you prefer to activate the step retard through the activation wire and not rpm, then the rpm value of the retard step menu must be set to 800 rpm.

Step Retard Ramp: The retard step can be ramped to and from its full retard amount over a time based program (Figure 12). It is adjustable from 0-2.5 seconds in 0.01 second increments. Default is zero for both On and Off.

RPM: The minimum engine rpm that must be reached before a step retard is activated.

On: The amount of time it takes for the step retard to reach its Retard Degree. Allows a gradual ramp On time to reach the Retard Degree. User adjustable from 0.00 to 2.50 sec. (0.01 sec. increments).

Off: The amount of time it takes for the step to retard to reach NO retard. Allows a gradual ramp Off time to reach NO Retard. User adjustable from 0.00 to 2.50 sec. (0.01 sec. increments).

Deg: The amount of retard.

Note: All of the retard amounts are cumulative and the maximum amount of retard is 30°.

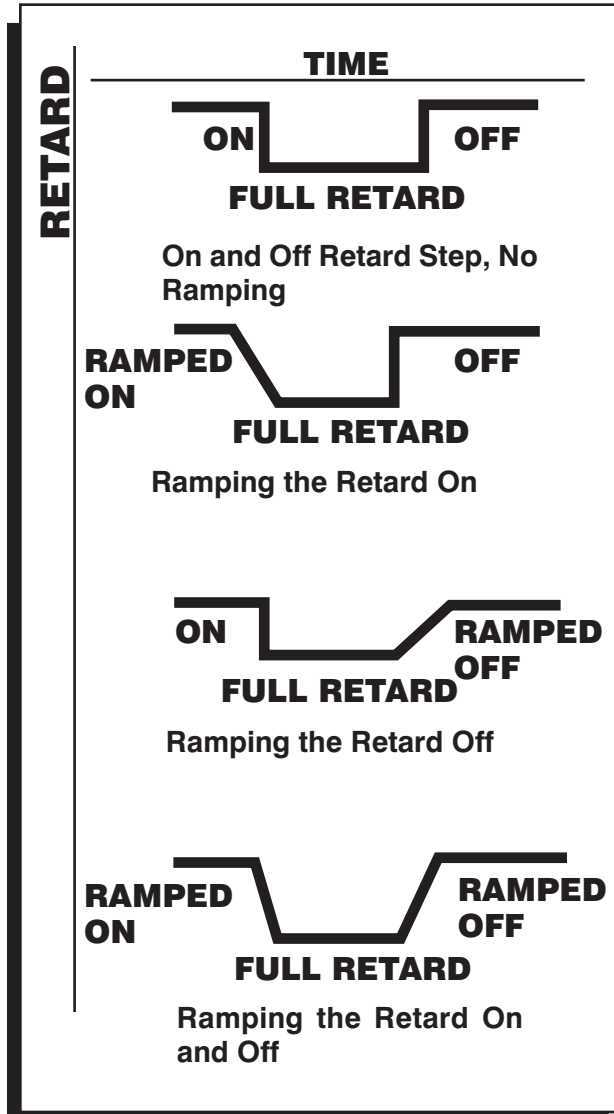


Figure 12 Different Retard Activation Options.

BOOST RETARD CURVE

This timing curve can be programmed in relation to boost/vacuum pressure within the intake manifold. The curve can be programmed from 2 psia-45 psia in 0.25 psia from 0°-25° in 0.1° increments. Up to 32 different points can be input on the Boost Chart. Also, all of these points are interpolated every millisecond to create a smooth (no steps) curve. This curve can easily be edited using the Boost Curve chart in the Pro-Data+ software. An MSD MAP sensor is required to use this feature and three are offered:

- 1-Bar, for normally aspirated engines, PN 23111
- 2-Bar, for 2-30 psia, PN 23121
- 3-Bar, for 2-45 psia, PN 23131

Note: The Boost Retard Curve default is 0° retard.

Rev Average: This allows you to program the number of engine revolutions that occur to produce an average boost value. It is adjustable in 2, 4, 6 or 8 crankshaft revolutions. This function is designed to help average the boost pressure to provide an accurate reading. The default is two revolutions which should be ideal for the majority of applications.

PSI Sensor: This allows you to input the specification of the MAP sensor. Select a 15 psia, 30 psia or 45 psia sensor. Default is 15 psia.

RUN RETARD CURVE

This program provides the ability to create a timing curve. The curve can be programmed from 0-12,500 rpm in 0.1° increments for every 100 rpm. You can program up to 32 different points on the map. Also, all of these points are interpolated every millisecond to create a smooth (no steps) curve.

CYLINDER COUNT

CylCnt: This is the number of cylinders of the engine. Programmable for 4, 6 and 8-cylinders. Once a change has been made, turn the ignition Off and On to reset.

HALL-EFFECT/ECU TRIGGER

The White/Blue wire can be used as the ignition trigger source with a Hall-effect distributor or ECU trigger signal. Default is for Hall sensor. To use as an ECU trigger, ECU must be selected in the menu (see page 14). Figure 4 and 5 show diagrams with the ECU trigger. Note that a distributor is still required.

ALERTS

This is only used with the Hand Held Monitor, PN 7550. You can program an alert to interrupt the screen on the monitor. You can select which alerts to show and how often. The alert is for Low Battery.

Fault: Program the number of counts that occur for a Low Voltage alert.

BrownOut 0: This is the count of low voltage resets. This should always be set at 0.

WatchDog: The count of Watch Dog resets. This should always be set at 0.

TEST

Can be set to spark On for normal operation. Set to spark Off to disable the output as an antitheft setting.

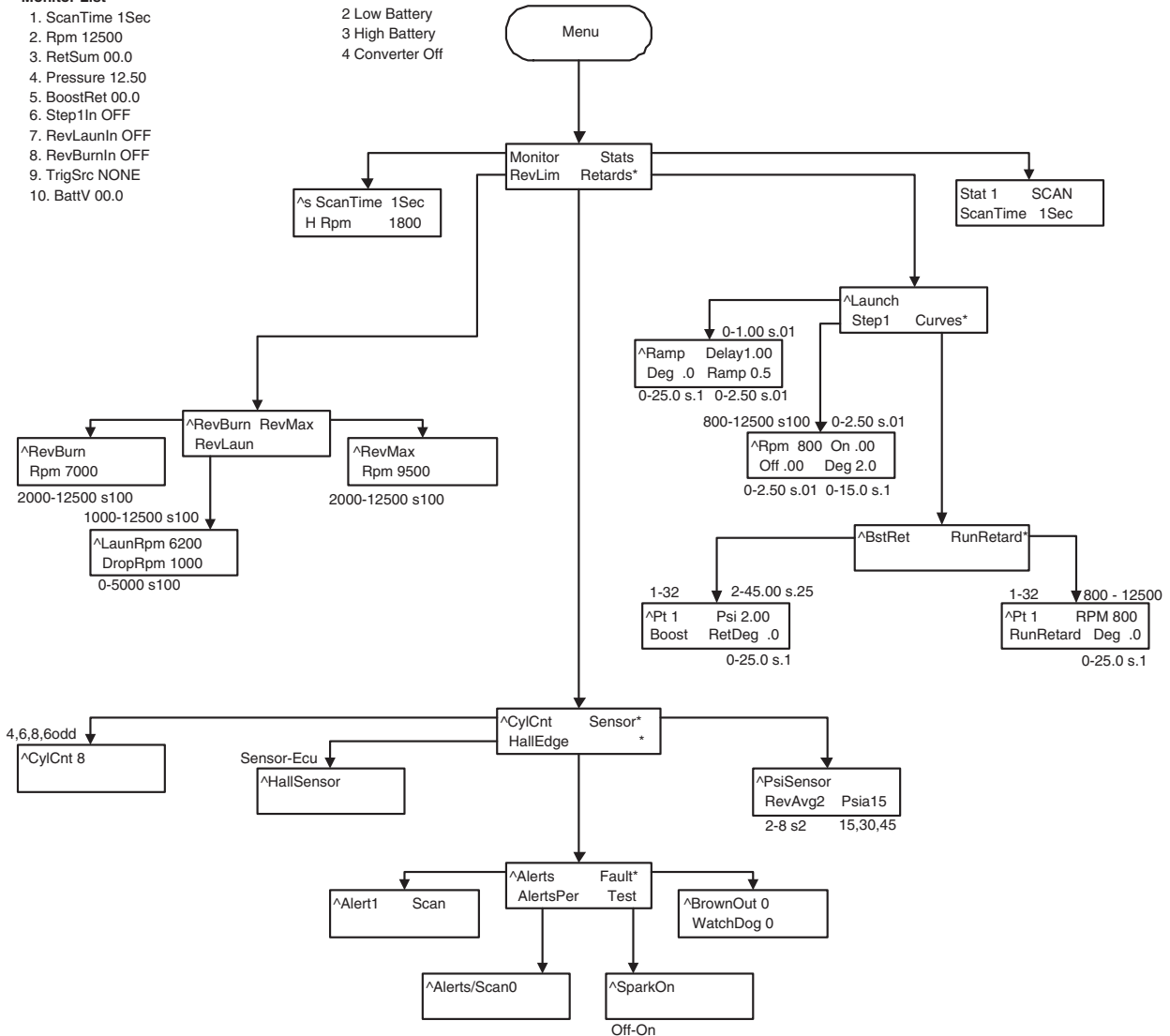
MSD 6530M4 Programmable 6AL2

Monitor List

1. ScanTime 1Sec
2. Rpm 12500
3. RetSum 00.0
4. Pressure 12.50
5. BoostRet 00.0
6. Step1In OFF
7. RevLaunIn OFF
8. RevBurnIn OFF
9. TrigSrc NONE
10. BattV 00.0

Alert List

- 2 Low Battery
- 3 High Battery
- 4 Converter Off



DEFAULT MENU

Notes: 6530V04. Uses menu 6530MO MSD Programmable 6AL-2 Ignition. Factory default data and menu.

<p>6530M04 Monitor Stats Stat 1</p> <p>RevLim RevBurn RevBurn *RPM 7000</p> <p>RevMax RevMax *RPM 9500</p> <p>RevLaun * LaunRPM 6200 * DropRPM 1000</p> <p>Retards Launch Ramp * Delay .00 * Deg .0 *Ramp .50</p>	<p>Step1 * RPM 800 * On .00 * Off .00 * Deg 2.0</p> <p>Curves BstRet Pt 1 Psi .00 Boost RetDeg .0</p> <p>RunRet Pt 1 Rpm 000 RunRet Deg .0</p> <p>CylCnt * CylCnt 8</p>	<p>Sensor Psi Sensor * RevAvg2 * Psia15</p> <p>HallEdge * HallSensor</p> <p>Alerts Alert 1 (1) (2) (3)</p> <p>Fault * BrownOut 0 * WatchDog 0</p> <p>AlertsPer * Alerts/Scan 0</p> <p>Test * SparkOn</p>
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TROUBLESHOOTING

Every MSD 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 Support Department at (915) 855-7123, 7 - 6 mountain time.

TACH/FUEL ADAPTERS

If your tachometer does not operate correctly or if you experience a no-run situation with your foreign vehicle you probably need an MSD Tach Adapter. The chart below lists common tachometers and if an Adapter is necessary.

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 (voltage triggered)	8910	8920
S.W. & BI TORX	NONE	NONE
SUN	8910	8920
VDO	8910	8920
AMC (JEEP)	8910	8920
CHRYSLER	8910	8920
FORD (voltage triggered)	8910	8920
GENERAL MOTORS	Bypass In-Line Filter	Bypass In-line filter
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.

NO-RUN ON FOREIGN VEHICLES

Some foreign vehicles with fuel injection systems may require an MSD Tach/Fuel Injection Adapter to run with an MSD 6-Series Ignition. 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 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.

INOPERATIVE TACHOMETERS

If your tachometer fails to operate with the MSD installed you may need an MSD Tach Adapter. 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 (see page 1). If the tach still does not operate, 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 your tachometer was triggered from the coil negative terminal (voltage trigger) and you are using the White wire to trigger the MSD you will need the PN 8910.

BALLAST RESISTOR

If you have a current trigger tach (originally coil positive) and use the White wire of the MSD, you can purchase a Chrysler Dual Ballast Resistor (used from 1973-1976) and wire it as shown in Figure 13.

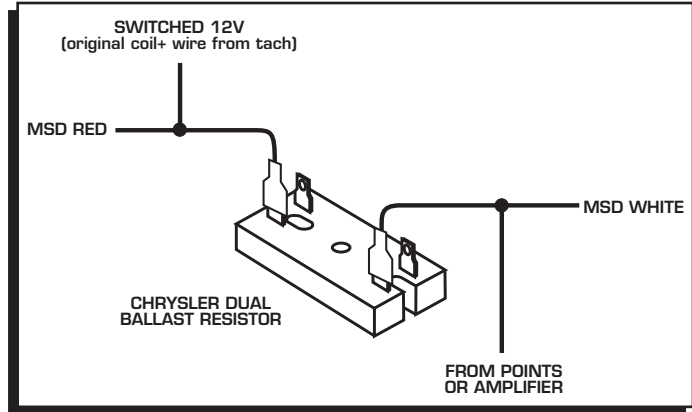


Figure 13 Wiring the Dual Ballast Resistor.

ENGINE RUN-ON

If your engine continues to run even when the ignition is turned Off you are experiencing engine Run-On. This usually only occurs on older vehicles with an external voltage regulator. Because the MSD receives power directly from the battery, it does not require much current to keep the unit energized. If you are experiencing Run-On, it is due to a small amount of voltage going through the charging lamp indicator and feeding the small Red wire even if the key is turned off.

Early Ford and GM: To solve the Run-On problem, a Diode is supplied with the MSD in the parts bag. By installing this Diode in-line of the wire that goes to the Charging indicator, the voltage is kept from entering the MSD. Figure 14 shows the proper installation for early Ford and GM vehicles.

Note: Diodes are used to allow voltage to flow only one way. Make sure the Diode is installed facing the proper direction (as shown in Figure 14).

Ford: Install the Diode in-line to the wire going to the #1 terminal.

GM: Install the Diode in-line to the wire going to terminal #4.

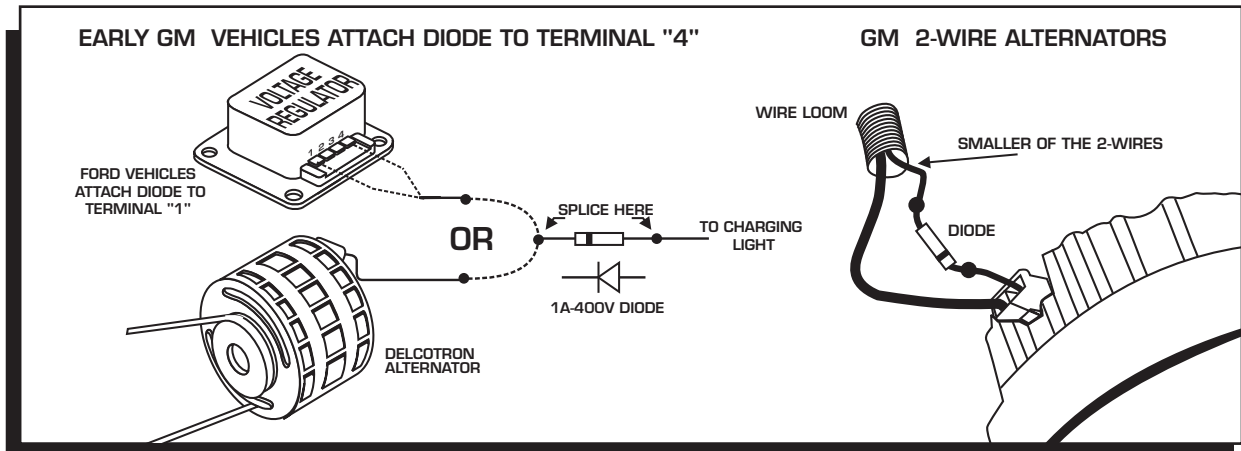


Figure 14 Installing the Diode to fix Run-On.

GM 1973 - 1983 with Delcotron Alternators

GM Delcotron Alternators use an internal voltage regulator. Install the Diode in-line on the smallest wire exiting the alternator (Figure 14). It is usually a Brown wire.

Most other applications: On other applications where engine Run-On is experienced, a Resistor can be put in-line to the MSD's small Red wire (Figure 15). This resistor will keep voltage from leaking through to the MSD unit.

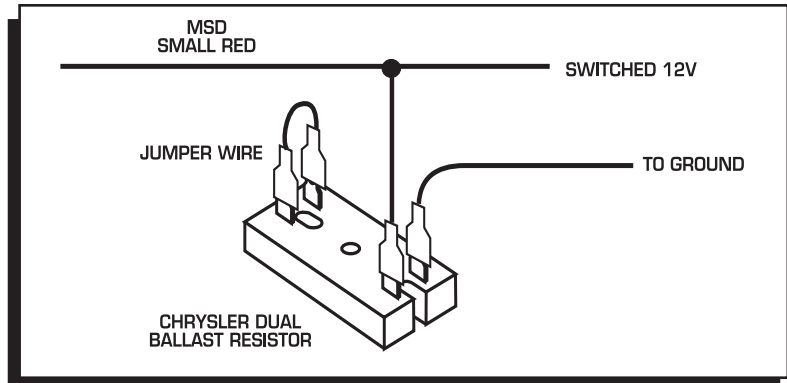


Figure 15 Wiring the Dual Ballast Resistor for Run-On.

MISSES AND INTERMITTENT PROBLEMS

Experience at the races has shown that if your engine is experiencing a miss or hesitation at higher rpm, it is usually not directly ignition. Most probable causes include a coil or plug wire failure, arcing from the cap or boot plug to ground or spark ionization inside the cap. Several items 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 Primary Coil Wire connections. Because the MSD is a Capacitive Discharge ignition and it receives a direct 12 volt source 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 and no test equipment should be connected.

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 imperative check. If the battery voltage falls below 10 volts during a race, 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 positive, use the following procedure to test the ignition for spark. MSD also offers an Ignition Tester, PN 8998. This tool allows you to check your complete ignition system while it is in the car as well as the operation of rpm limits, activated switches and shift lights.

CHECKING FOR SPARK

If triggering the ignition with the White or White/Blue 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 or White/Blue wire from the distributor's points or ignition amplifier.
4. Turn the ignition to the On position. Do not crank the engine.
5. Tap the White or White/Blue wire to ground quickly several times (Figure 16). 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:

If triggering with the Magnetic Pickup:

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's Green and Violet magnetic pickup wires together quickly several times (Figure 17). 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 a known good 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 are 12 volts on the small Red wire from the MSD when the key is in the On position. If 12 volts are 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.

If you experience difficulties when installing your MSD, contact our Customer Support Department at (915) 855-7123 (7 - 6 Mountain time) or e-mail us at: msdtech@msdignition.com

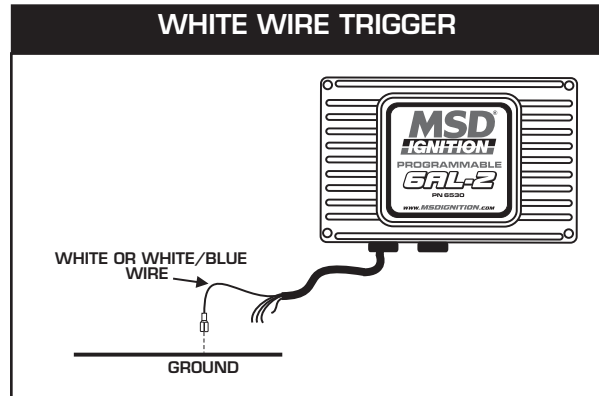


Figure 16 Checking for Spark with the White or White/Blue Wire.

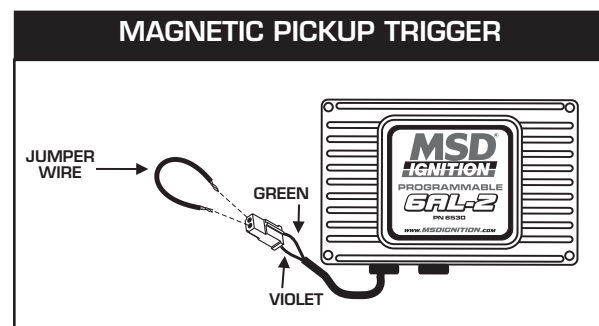


Figure 17 Checking for Spark with the Mag Pickup.

TECH NOTES

Lined area for technical notes.

TECH NOTES

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 warranty service, **Proof of Purchase** must be supplied for verification. After the warranty period has expired, repair service is based on a minimum and maximum fee.

All returns must have a Return Material Authorization (RMA) number issued to them before being returned. To obtain an RMA number please contact MSD Customer Service at 1 (888) MSD-7859 or visit our website at www.msdpower.com/rma to automatically obtain a number and shipping information.

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 using Ground shipping methods (ground shipping is covered by warranty). For more information, call MSD at (915) 855-7123. MSD technicians are available from 7:00 a.m. to 5:00 p.m. Monday - Friday (mountain time).

Limited Warranty

MSD warrants this product to be free from defects in material and workmanship under its intended normal use*, when properly installed and purchased from an authorized MSD dealer, for a period of one year from the date of the original purchase. This warranty is void for any products purchased through auction websites. If found to be defective as mentioned above, it will be repaired or replaced at the option of MSD. Any item that is covered under this warranty will be returned free of charge using Ground shipping methods.

This shall constitute the sole remedy of the purchaser and the sole liability of MSD. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representation whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall MSD or its suppliers be liable for special or consequential damages.

*Intended normal use means that this item is being used as was originally intended and for the original application as sold by MSD. Any modifications to this item or if it is used on an application other than what MSD markets the product, the warranty will be void. It is the sole responsibility of the customer to determine that this item will work for the application they are intending. MSD will accept no liability for custom applications.