Installation Instructions for
HI-6 CD IGNITION
With Rev Limiter and Timing Retard

For more information, see www.cranecams.com

READ THIS BEFORE YOU BEGIN!
Before proceeding with the installation, read the introductory material below so that you will understand the basic features and operation of the unit. The installation instructions are organized by application; use the Applications Index to find the appropriate section for your vehicle.

For hookup of optional TRC-2 Timing Retard Control, additional information is provided in the TRC-2 section starting on page 17.

CAUTION—READ THE FOLLOWING CAREFULLY:

- Crane HI-6 Digital CD ignitions are primarily intended for use on most 1985 and earlier cars and trucks. These CD units are fully encapsulated with urethane and capable of operation in severe environments. Crane HI-6 part number 6000-6440 includes a magnetic trigger input for use with most 1980 and earlier cars and 1985 and earlier light trucks.

- Cutting off the wire harness voids the warranty!

- Make sure that all original equipment wires are disconnected from coil.

- Tape up any unused wires after completing the installation.

APPLICATIONS INDEX

Late Model except Ford, GM, and Honda ........Page 5
(most 1981–95 cars and 1986–95 light trucks with OE electronic ignition and engine control computer and 1972–86 Mopar with 4 or 5 pin module)
Ford ..........................................................Page 10
(with Duraspark or TFI-IV electronic ignition)
GM .............................................................Page 10
(with computer engine control and Coil-In-Cap, dual plug external coil, or LT-1 style coil)
Honda and Acura Integra ...............................Page 10
(with OE electronic ignition and external or internal coil)
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(pre-1980 vehicles with aftermarket ignitions including Mallory Unilite or points)

INTRODUCTION
Crane capacitive discharge (CD) type ignition systems are intended for racing and performance street vehicles. These CD units are 50 states street legal (California Air Resources Board E.O. D-225-63 and D-225-64 for 1995 and prior non-OBD II vehicles).

MULTIPLE SPARK
Under low RPM cranking conditions, the CD unit generates up to 12 sparks. This assures quick starting even under the most adverse conditions. At idle and cruise, the number of sparks fired is adjusted to maintain a total spark duration of approximately 20 degrees (crankshaft), assuring smooth idle, improved throttle response, and eliminating the lean surge characteristic of some late model emission controlled vehicles. Above 3,000 RPM, the CD unit generates a single powerful spark with many times the spark gap current of most competitive systems.

CAUTION: Crane CD units are not compatible with any odd firing engines or distributorless ignition systems.

DIGITAL SEQUENTIAL REV LIMITER
All CD units have an externally activated stage rev limiter that can be digitally set from 600 to 9,900 RPM in 100 RPM increments via rotary switches. The yellow/white wire (yellow with thin white stripe) is used to activate the stage rev limiter. Since most late model vehicles have onboard engine control computers that set a safe maximum rev limit, the stage limit feature on the CD unit can be used for selecting a lower rev limit for drag racing.

The rev limiter can be set to operate with 4, 6 or 8 cylinder engines. Accuracy is +/-30 RPM. The rev limiter is not compatible with any odd firing engines.

The CD unit utilizes a sequential firing program to equalize cylinder firing at the rev limit. When engine RPM exceeds the rev limit, firing stops. The CD unit counts the number of cylinder firings that are skipped. Once RPM drops below the rev limit, firing is resumed when the count reaches an odd number. If the engine is held against the rev limit, RPM will stay within a narrow band. All cylinders will be fired equally in rotation. Fuel loading and plug fouling will be greatly reduced.
Sequential firing also minimizes harmonics and vibrations that can stress engine and drivetrain parts.

**RETAIL CAPABILITY**

All CD units have a timing retard capability. Several retard modes are supported including boost proportional retard. An optional TRC-2 Timing Retard Control module is required to make use of the timing retard capability. The TRC-2 attaches to the brown/white wire (brown with thin white stripe). Refer to the TRC-2 section starting on page 17 for details.

**DIAGNOSTICS**

When the ignition switch is turned on, the CD unit completes an internal diagnostic check and lights up the status LED. When the engine is cranked, the status LED will rapidly blink to indicate that a valid trigger signal is being received.

**COIL COMPATIBILITY**

Most original equipment (OE) coils are compatible with the CD units. We recommend the Crane Cams LX92 and PS92. The LX91 and PS91 can be used for four cylinder street applications.

**SPARK PLUGS AND WIRES**

*WARNING: High voltage is present at the coil primary and secondary terminals. Do not touch the coil while the engine is running. Do not connect any test equipment to the coil.*

Do not use solid core wire, as this may generate electrical noise that may interfere with the CD unit or other on-board computer and radio equipment. Do not use high resistance carbon wire, as this may burn out from the high energy levels. Optimum wire resistance is less than 800 ohms per foot.

For optimum performance in racing applications use only non-resistor spark plugs. Resistor spark plugs are required for all street applications unless recommended otherwise by vehicle manufacturer. Recommended plug gap is .045” for normally aspirated engines used for off-road racing.

*CAUTION: Use only low resistance spark plug wires such as Crane FireWire.*

**MOUNTING THE CD UNIT**

Preferred mounting location for the CD unit is within the passenger compartment. If the CD unit is mounted within the engine compartment, make sure that the mounting location is away from exhaust system heat, protected from water splash, and has good airflow for cooling. Orient the cable exit downward.

When you have picked a mounting location, make sure that the wire harness will reach and that the rev limit switches are accessible. Rubber shock mounts are recommended for racing.

**BASIC HOOKUP**

This section provides generic hookup information that can be used for applications not specifically referenced in the Applications Index.

Use melt liner type crimp splices to connect to the OE wiring. After crimping carefully heat the splices with a hot air gun or butane cigarette lighter to form a watertight seal.

All connections must be made with stranded copper wire. Make sure all terminals are clean and free of corrosion.
Scrape off paint, dirt, and grease when making connections to ground. You will require common hand tools including proper wire stripping and crimping tools. Low cost crimping tools are available at many auto parts stores. Do not attempt to use pliers to crimp terminals.

**POWER AND GROUND**

**Heavy Red**: Connect to Battery+ or battery cable at starter solenoid.

**Heavy Black**: Connect to chassis ground. Scrape off paint to insure good contact.

**CAUTION:** If the heavy red wire must be extended, use 10 or 12 gauge copper wire and read the filter capacitor note on page 16.

**COIL, SWITCHED +12V AND TRIGGER HOOKUP**

Refer to Fig. 2 for computer controlled vehicles The CD unit will be triggered from the output of the OE ignition module. Refer to Fig. 3 for earlier magnetic triggered applications for part number 6000-6440 only.

Identify Coil- and Coil+. If you are unsure, refer to your vehicle wiring diagram or use the following procedure. Label and then disconnect OE wires from the coil. Turn the ignition switch on. Use a 12 volt test light or voltmeter. The wire from the ignition switch to Coil+ will be hot. Cut the wires several inches from the coil and connect to the CD unit harness as shown. If more than one OE wire goes to a given coil terminal, cut both wires and connect them to the CD unit as shown in Figs. 2 or 3. All OE wiring to the coil must be interrupted and routed through the CD unit.

**MAGNETIC TRIGGER HOOKUP FOR HI-6 PART NUMBER 6000-6440 ONLY**

**Violet**: Connect to Mag+

**Green**: Connect to Mag-

**White**: Not used — tape up.

Correct polarity of the magnetic trigger is important. Magnetic pickup distributor: the reluctor tooth should be lined up with the center pole piece when the coil fires. Crank trigger: the magnet or lug should be centered on the pickup. Both systems should remain that way throughout the RPM range. Use the color code chart below for reference, but double check with a timing light. If timing appears off by more than 10 degrees after installing the 6000-6440, the magnetic pickup polarity is most likely reversed.

**MAGNETIC TRIGGER COLOR CODES**

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>MAG+</th>
<th>MAG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accel/Chrysler dist.</td>
<td>Orange/White</td>
<td>Black</td>
</tr>
<tr>
<td>Accel crank trig.</td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Moroso crank trig.</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>MSD crank trigger</td>
<td>Violet/Orange</td>
<td>Green/Black</td>
</tr>
<tr>
<td>MSD/Ford dist.</td>
<td>Orange</td>
<td>Violet</td>
</tr>
<tr>
<td>GM HEI dist.</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>GM Magna Pulse</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Hayes Stinger</td>
<td>Black/Green</td>
<td>Black</td>
</tr>
</tbody>
</table>

**TACH OUTPUT**

In most cases the OE connections to the tach are made to the Coil- terminal. Sometimes these connections are within the wire harness and are not brought out to Coil- as separate wires. If you connected all OE wires that went to Coil- to the white wire on the CD unit as shown in Fig. 2, your tach and fuel injection should continue to function. Part number 6000-6440 magnetic trigger applications will require tach hookup to the green wire as shown in Fig. 3.

Connect an aftermarket tach or RPM activated accessory switch to the green tach output wire as shown in Figs. 2 or 3. If you are not using this output, you can tape up. Some tachs may require an adapter. Refer to the Tach Hookup section on page 14 for details.

**HOOKUP INSTRUCTIONS FOR SPECIFIC APPLICATIONS**

**VEHICLES WITH HALL EFFECT SYSTEMS**

Many late model vehicles, especially European vehicles, have OE Hall Effect ignition systems. Use the basic hookup shown in Fig. 2 and explained starting on page 3. The Hall Effect pickup cannot directly trigger the CD unit; the OE ignition module must be functioning correctly and remain installed.

**1972–86 MOPAR VEHICLES WITH 4 OR 5 PIN MODULES**

Use the basic hookup shown in Fig. 2 and explained starting on page 3. All these Mopar vehicles have a ceramic ballast resistor mounted on the firewall. Five pin modules use a four terminal ballast resistor.

The ballast resistor also supplies power to the five pin module. Bypassing the resistor may damage the module.
Figure 2. Basic Module or Points Trigger Hookup

- **12 Volt Battery**
- **Ignition Switch**
- **Breaker Points**
- **Ballast Resistor (if used)**
- **Condenser**
- **Tachometer**
- **OE Electronic Ignition Module**
- **OE Coil**
- **Surge Absorber**

**Grounds**
- **Heavy Black**
- **Yellow / White**
- **Blue**
- **Orange**
- **Red**
- **White**
- **Black**

**Wires**
- **Red**
- **White / Yellow**
- **Green / White**
- **Brown / White**
- **Green**
- **Red**
- **Green**
- **Black**
- **Ground**

- **CUT WIRE AND REMOVE CONDENSER IF NECESSARY**
- **CUT OE WIRES TO COIL AND RECONNECT AS SHOWN**
- **YELLOW/WHITE WIRE MUST BE CONNECTED TO +12V IN ORDER FOR REV LIMITER TO BE ACTIVE. REFER TO PAGE 6 FOR DETAILS.**

**Typical Melt Liner Splice Used to Connect to OE Harness**
**Typical Line Lock or Transmission Brake Solenoid Valve Used for Staging on Some Drag Racing Applications**
FORD VEHICLES WITH TFI-IV ELECTRONIC IGNITION

Make the power, coil, and trigger connections as shown in Fig. 4. Then follow the instructions starting on page 3 and refer back to Fig. 2 to hookup the ground wire, cylinder select, and any additional inputs.

FORD VEHICLES WITH DURASPARK ELECTRONIC IGNITION

Use the basic hookup shown in Fig. 2.

GM VEHICLES

Early GM vehicles with 4 or 5 pin HEI modules (typically 1974-1980 model years and distributor with vacuum advance) require triggering directly from the magnetic pickup. Use Crane HI-6 CD part number 6000-6440 and the hookup shown in Fig. 16 on page 20 for these early GM HEI applications. Then refer to Fig. 3 for ground, power, and other wire hookups.

All other GM applications, make the power, coil, and trigger connections as shown in Figs. 5-7. Then follow the instructions starting on page 3 and refer back to Fig. 2 to hookup the ground wire, cylinder select, and any additional inputs.

HONDA AND ACURA INTEGRA

Late model Honda and Acura Integra have either a distributor with internal coil or an external coil. The OE internal coil is not suitable for use with the CD unit and must be replaced with a Crane LX91 or PS91. Internal coil distributors can easily be converted to external coil by changing the distributor cap. Detailed instructions are given in the following sections.

HONDA EXTERNAL COIL HOOKUP

Use Fig. 8 to make the power, coil, and trigger connections. Then follow the instructions starting on page 3 and refer back to Fig. 2 to hookup the ground wire, cylinder select, and any additional inputs. Note that OE wire colors may vary, but the +12V wires to COIL+ are generally yellow/black.

The switched +12V that went to Coil+ is connected to the red CD unit wire and the trigger signal from the ignition module and any tach wire that went to Coil-. Trace out these wires and connect them to the green tach output wire from the CD unit. If this doesn’t work, you may need a tach adapter.

HONDA INTERNAL COIL CONVERSION

Refer to Fig. 9. You will require an external coil distributor cap.

Remove the distributor cap and dust shield. You should keep the dust shield for high boost turbo applications as it reduces the possibility of arcing. You may have to modify it to fit the new cap. Carefully note the OE wiring within the distributor. Remove the OE coil (held in place with two screws). Install a 2 position terminal block, like a Radio-Shack P/N 274-656. Tie wrap the terminal block to one of the coil mounting holes or fabricate a support bracket from aluminum channel material. Connect the OE coil wires to the terminal block as shown.

Use Fig. 9 to make the power, coil, and trigger connections. Then follow the instructions starting on pg. 3 and refer back to Fig. 2 to hookup the ground wire, cylinder select, and any additional inputs.

You will have to fabricate a high voltage cable for use between the coil and new distributor cap.

AFTERMARKET IGNITIONS

Crane Cams XR700 and XR3000 points conversion systems and Mallory Unilite, are compatible with the Crane CD. Accel, Holley, Jacobs, Mallory, and MSD-6 units are not compatible and must be removed.

VEHICLES WITH MALLORY UNILITE

Use the hookup shown in Fig. 10 if you are adding an CD unit to a vehicle equipped with a Mallory Unilite system. Tach and fuel injection: in most cases the tach and fuel injection (if equipped) wires would originally have been connected to Coil-. Trace out these wires and connect them to the green tach output wire from the CD unit. If this doesn’t work, you may need a tach adapter.

VEHICLES WITH CRANE XR700 AND XR3000

Use the basic hookup shown in Fig. 2 and treat the Crane Cams XR700 or XR3000 as if it were the OE ignition module. The yellow wire from the XR700 or XR3000 will be used to trigger the CD unit white wire. Additional details are given in the XR700 or XR3000 instructions.

Tach and fuel injection: in most cases the tach and fuel injection (if equipped) wires would originally have been connected to Coil-. Trace out these wires and connect them to the green tach output wire from the CD unit. If this doesn’t work, you may need a tach adapter.

EARLY VEHICLES WITH POINTS

Directly triggering the CD unit from mechanical breaker points is possible but not recommended, due to problems with points bounce and wear. If you must trigger from points, use the hookup shown in Fig. 2. Be sure to remove the condenser. You will no longer be able to use adwell meter. However, the points gap is not critical when the points are only used for triggering and do not carry any coil current. Use a feeler gauge and set the points gap to .016".

A much better approach is to replace the mechanical breaker points with an optical trigger system, such as Crane Cams XR700 or XR3000 as if it were the OE ignition module. Use the XR700 or XR3000 instructions.

Use the hookup shown in Fig. 10 if you are adding an CD unit to a vehicle equipped with a Mallory Unilite system. Tach and fuel injection: in most cases the tach and fuel injection (if equipped) wires would originally have been connected to Coil-. Trace out these wires and connect them to the green tach output wire from the CD unit. If this doesn’t work, you may need a tach adapter.

FINAL CHECK

Before starting the engine for the first time, double check all electrical connections and set a safe rev limit. Start the engine and check the ignition timing. The timing may change a few degrees after CD unit installation. If required, reset timing to manufacturer’s specifications.

REV LIMITER

Rev limiter is activated only if +12V is applied to stage limit input. Select a safe stage rev limit that is less than the red line for your engine. Set the rotary switches on the CD unit to the selected stage rev limit. Settings are X100 engine RPM (i.e. 57 = 5,700 RPM). The rev limit can be set over the range of 600 to 9,900 RPM. Use a small screwdriver to set the
Figure 3. Magnetic Trigger Hookup (6000-6440 Only)

- **12 VOLT BATTERY**
- **IGNITION SWITCH**
  - START
  - RUN
  - +12V
  - TAPE UP
  - BALLAST RESISTOR (if used)
- **GROUND**
- **HEAVY RED BAT +**
- **+12V**
- **BROW WAYL LINES**
- **MAG - (GREEN)**
- **MAG + (VIOLET)**
- **MAGNETIC PICKUP DISTRIBUTOR OR CRANK TRIGGER**
- **BLACK**
- **ORANGE**
- **GREEN**
- **YELLOW/WHITE WIRE MUST BE CONNECTED TO +12V IN ORDER FOR REV LIMITER TO BE ACTIVE. REFER TO PAGE 6 FOR DETAILS.**
- **TYPICAL MELT LINER SPLICE USED TO CONNECT TO OE HARNESS**
- **TYPICAL LINE LOCK OR TRANSMISSION BRAKE SOLENOID VALVE USED FOR STAGING ON SOME DRAG RACING APPLICATIONS**
- **HEAVY BLACK CHASSIS GROUND**
- **4 CYLINDER CYLINDER SELECT HOOKUP**
- **8 CYLINDER NO CONNECTION**
- **6 CYLINDER GROUND**
- **CHASSIS GROUND**
- **HI-6**
- **HEAVY BLACK**
- **BLUE**
- **STAGE INPUT**
- **YELLOW/WHITE**
- **BROWN/WHITE**
- **TACH OUTPUT**
- **RED**
- **GROSS**
- **SHIFT LIGHT**
- **TACH OUTPUT REFER TO FIGURE 14**
- **RED WHITE BLACK GROUND**
- **+12V DASH LIGHTS**
- **TACH OUTPUT**
- **RED WHITE BLACK GROUND**
- **INSTALL SURGE ABSORBER IF SOLENOID VALVE IS USED**
- **OPTIONAL STAGE LIMIT SWITCH**
- **OPTIONAL EQUIPMENT HOOKUP**
- **RED WHITE BLACK GROUND**
- **GROUND**
- **+12V**
- **YELLOW/WHTIE**
- **MAG + (VIOLET)**
- **MAG - (GREEN)**
- **TYPICAL MELT LINER SPLICE USED TO CONNECT TO OE HARNESS**
- **TYPICAL LINE LOCK OR TRANSMISSION BRAKE SOLENOID VALVE USED FOR STAGING ON SOME DRAG RACING APPLICATIONS**

**Red Tape**
- **RED**
- **WHITE**
- **BROWN / WHITE**
- **GREEN**
- **TACH OUTPUT**
- **RED WHITE BLACK GROUND**
- **GROUND**
- **+12V**
- **INSTALL SURGE ABSORBER IF SOLENOID VALVE IS USED**
- **OPTIONAL STAGE LIMIT SWITCH**
- **OPTIONAL EQUIPMENT HOOKUP**
- **RED WHITE BLACK GROUND**
- **GROUND**
- **+12V**
- **YELLOW/WHTIE**
- **MAG + (VIOLET)**
- **MAG - (GREEN)**
- **TYPICAL MELT LINER SPLICE USED TO CONNECT TO OE HARNESS**
- **TYPICAL LINE LOCK OR TRANSMISSION BRAKE SOLENOID VALVE USED FOR STAGING ON SOME DRAG RACING APPLICATIONS**

**Figure 3. Magnetic Trigger Hookup (6000-6440 Only)**
Figure 4. Ford TFI-IV Hookup

Figure 5. GM Coil-In-Cap HEI Hookup

Note: Refer to Figure 2 for cylinder select and additional signal hookup.

CAUTION: USE THIS HOOKUP ONLY FOR 1981 AND LATER GM MODELS WITH 7 PIN HEI MODULE (DISTRIBUTOR WITHOUT VACUUM ADVANCE)
Note: Refer to Figure 2 for cylinder select and additional signal hookup.
switches. Special switch settings are:

- **00**: Disables the internal rev limiter and allows operation above 9,900 RPM.
- **01**: Disables multiple spark and internal rev limiter.
- **02**: Disables the internal rev limiter and timing retard. Special compatibility mode for external Crane rev limiters and engine controls.

The CD unit reads rev limit settings when ignition power is first turned on. If you change the rev limit setting, you must turn the ignition switch off momentarily for the new setting to become effective.

**TROUBLESHOOTING**

**TACH HOOKUP**

Most factory and aftermarket tachs will work correctly when connected using the instructions given in the previous hookup sections. If you are adding an aftermarket tach or shift light, refer to Fig. 2 for hookup. If your tach will not work:

1. Trace the original tach trigger wire or refer to service manual. If it was connected to Coil-, you can connect it to the green CD unit tach output wire. If the original tach wire was connected to Coil+, you will require a tach adapter.

2. **GM vehicles** have an inline tach filter (refer to Fig. 11). On vehicles with HEI coil-in-cap, trace the wire from the TACH terminal on the distributor cap. All others, trace wires from Coil-. Locate the filter and disconnect it. Then connect the tach as explained in step 1 above.

**FUEL INJECTION AND FUEL PUMP RELAYS**

Some import vehicles are equipped with electronic fuel injection or a fuel pump cut-out relay. These systems require a RPM signal the same as the tach. If the engine will not start, first try installing a tach adapter.

Japanese vehicles with fuel injection will require a module trigger hookup where the CD unit white wire is connected to the output of the OE electronic ignition.

**RUNNING ON**

Running on is a condition where the engine continues to run after the ignition switch is turned off. First, verify that the condition is due to the ignition system. Dieseling can cause running on. The engine will run very rough when it is dieseling. This may be due to an overly rich mixture, excessive timing, or heavy carbon deposits. Dieseling can usually be cured by installing colder spark plugs.

With ignition run on, the engine continues to run smoothly, as if the ignition had not been turned off. Ignition run on is caused from current leaking back to the CD unit through the charging system indicator. To solve this problem, install a diode on the voltage regulator. Some import vehicles with Delcotron alternator and internal regulator: refer to Fig. 12. Install a diode in the thin brown wire going to the indicator light.

GM or Ford with external voltage regulator: refer to Fig. 13. For GM vehicles, install a diode on the #4 terminal. For Ford vehicles, install a diode on the terminal marked “I”.

Installation of the diode may not correct the run on problem on some AMC vehicles. Refer to Fig. 14. Use a 1973-76 Chrysler dual ballast resistor (available at most parts stores). Solder a jumper wire across both terminals on one end. Then connect the terminals on the other end to ground and to the red ignition switch wire from the CD unit.

**RADIO NOISE**

A powerful multiple spark system such as the CD unit will tend to generate more noise than the OE ignition. To some extent this is unavoidable, but steps can be taken to reduce the noise level.

Radio frequency (RF) noise is radiated from coil and spark plug wires. RF noise primarily affects AM and CB radios. Conducted noise appears as a whine that follows engine RPM and may affect all systems including tape players and FM radio. Use the following check list to reduce RF noise:

1. Make sure a ground strap is installed between the engine and chassis.
2. Make sure that radio, tape and CB systems are grounded direct to the chassis.
3. Mount the CD unit as far away as possible from the antenna (including windshield antenna) and other electronic devices. Make sure the CD unit is grounded direct to the chassis. Keep the ground wire short, preferably no more than 6”.
4. Replace spark plug wires with spiral core type wire. Replace rotor and cap. Apply a small amount of silicone dielectric grease to the rotor tip and to all high voltage terminals. Use only resistor spark plugs when running on the street.

Conducted noise from the CD unit is carried through +12 volt power connections. Conducted noise can be reduced by installing a power line noise filter (available at Radio Shack) near the affected radio.

**NOISE SUPPRESSION ON STAGE LIMIT INPUT**

In some applications the stage input (yellow/white wire) is connected to a switch that also controls a line lock or transmission brake solenoid valve. When the switch opens and current flow to the solenoid is interrupted, electrical transients (up to 500 volts) occur. These transients can lead to glitches in on-board electronics. Arcing also occurs in switch contacts greatly decreasing switch life and possibly resulting in erratic operation. This may cause inconsistent launch and 60 foot times.

The solution is to install a surge absorber. It will limit the maximum voltage to about 40 volts. The surge absorber appears as a small 1/2 inch diameter disk with two wire leads. Solder one lead to the stage switch and the other lead to a terminal that connects to ground as shown in Figs. 2 or 3.
NOTES:
1. Refer to Figure 2 for cylinder select and additional signal hookup.
2. Cut wires at Honda coil plugs and connect wire harness to HI-6 as shown.
3. Use LX91 coil in place of Honda coil.
Figure 9. Honda Internal Coil Hookup

NOTES:

1. Refer to Figure 2 for cylinder select and additional signal hookup.
2. Remove internal coil, use LX91 coil and Honda cap 30102-pts-A12 for external coil. Drill hole thru cap for HI-6 wire exit.
POWER SUPPLY FILTER CAPACITOR HOOKUP

A filter capacitor on the 12 volt supply is recommended if the CD unit power wires are extended, the battery is located in the trunk, or solenoid valves drawing more than 10 amps are used. Use a minimum 38,000 microfarad (uF) 16 volt capacitor such as Crane Cams P/N 9000-0014. Install the capacitor across the 12 volt supply (heavy red wire) and chassis ground near the CD unit.

TROUBLESHOOTING OPERATION

Did the engine run properly before installation of the CD unit? If not, remove the CD unit, reinstall the OE ignition or another known good unit and then find and correct the original problem. Did the CD unit function correctly before the problem occurred? If the answer is yes, did you change anything that may have affected it? If you connected an external control or changed ignition coils, try going back to the last setup that worked OK to help isolate the problem.

If the engine will not start, or runs rough or intermittently, use the following check list steps:

INTERNAL DIAGNOSTICS

When the ignition switch is turned on, the CD unit completes an internal diagnostic check and lights up the status LED. When the engine is cranked, the status LED will rapidly blink to indicate that a valid trigger signal is being received.

If the status LED doesn’t light up after the ignition switch is turned on, check power and ground connections. Use a volt meter to verify +12 volts at the two CD unit red wires. Make sure you also have +12 volts when the ignition switch is in start position. The CD unit requires a minimum voltage of about +9.5 volts when the ignition switch is first turned on. During cranking, the CD unit will continue to operate down to about +5 volts.

ENGINE WILL NOT START

1. If the status LED lights up when the ignition switch is turned on but the engine will not start, verify that the status LED blinks while the engine is cranking.

2. If the status LED doesn’t blink, the CD unit is not receiving a trigger signal. Recheck trigger signal electrical connections and trigger source. Make sure the magnetic trigger leads are not shorted together or to ground. Make sure the white points trigger wire is not shorted to ground.

3. If the status LED blinks, but engine will not start, recheck coil primary connections or replace coil. The only wires going to the coil primary should be the orange and black wires from CD unit coil cable. Note: GM internal HEI coils require a ground wire that grounds the secondary and core to the distributor.

4. If the engine momentarily starts and then dies, go back to the Fuel Injection And Fuel Pump Relay section on page 14.

WARNING: High voltage is present at the coil primary and secondary Terminals. Do not touch the coil while the engine is running. Do not connect any test equipment to any coil terminal.

CHECKING FOR SPARK

To crank the engine without starting or to check for spark, use a KD Tools HEI test plug. The test plug comes with an alligator clip that can be attached to chassis ground. Make up a length of spark plug wire to connect the test plug to the coil.

Figure 10. Mallory Unilite Hookup
MISFIRE OR INTERMITTENT OPERATION

1. A weak battery may cause misfire or intermittent operation, especially at high RPM, if battery voltage drops below +10 volts. If in doubt, charge or replace the battery.

2. Field experience has shown that misfire at high RPM is usually not an electrical problem within the CD unit. Coil failure, including internal arcing or arcing at the high voltage terminal, is a common cause. Arcing across spark plug boots or the distributor cap is also common.

3. Route all magnetic trigger connections away from any other wiring, especially CD unit coil cable and any high voltage coil and spark plug wires.

4. Replace spark plugs. Check that spark plugs are proper type, heat range, and gap size.

5. Replace distributor high voltage rotor and cap.

6. Replace spark plug wires. Do not use solid core wires or high resistance wires. Use only spiral core type wires.

7. Check for loose or corroded connections and broken wires at magnetic pickup, CD unit, coil, and distributor cap. Also check distributor for loose, missing, or jamming parts in pickup or advance mechanism (if used). Magnetic pickups and crank trigger: check for proper air gap.

TRC-2 TIMING RETARD CONTROL INSTALLATION AND OPERATION

The Crane TRC-2 is an accessory that provides driver-adjustable retard. The TRC-2 can provide continuous timing retard (0° –20°), retard using a switch (0° – 20°), or retard proportional to boost (up to 4° per psi) on supercharger or turbocharger installations (with an optional MAP sensor, not included).

INSTALLATION

Complete the installation of the CD unit ignition module prior to installing the TRC-2. Fig. 15 shows hookup of the TRC-2 to the CD unit. The red wire from the TRC-2 is connected to a key switched +12 volt supply. You may splice it into the thin red wire on the CD unit. The yellow wire from the TRC-2 is connected directly to ground for continuous retard control, through a boost/nitrous switch to ground for retard on demand, or taped off when using the optional MAP sensor. When using retard on demand, the switch must complete the circuit to ground to activate the retard (use a normally open switch or relay).

FINAL CHECK

Before starting the engine for the first time, double check all electrical connections. Set the TRC-2 knob to 0° (fully counterclockwise), then start the engine and check the ignition timing. The timing may change a few degrees after installation. Reset timing to manufacturer’s specs. Upon starting the engine, the LED on the TRC-2 module will be lit only if the yellow wire is grounded.

OPERATION

The TRC-2 module allows you to adjust the amount of retard produced by the CD unit. It also contains an LED that indicates when the retard function is activated. How you use the TRC-2 depends on whether you have connected it for continuous, demand, or boost-proportional retard.

CONTINUOUS RETARD

Refer to Fig. 15. Connect the yellow wire from the TRC-2 directly to chassis ground for continuous retard. Since the retard feature is active all the time, the LED on the TRC-2 will be illuminated whenever the key is on.

Turning the knob fully counterclockwise (0°) produces no retard. Turning the knob clockwise increases the retard up to 20°. The TRC-2 is approximately linear throughout its range, so half scale is about 10° of retard. For precise retard calibration, you must use a high-quality timing light.

The uses for this type of timing control include adjusting timing to prevent knock because of inferior fuel quality or insufficient octane, altitude adjustments, etc. As you drive, you can apply just the amount of retard required to prevent spark knock and optimize fuel economy. In racing applications the retard control can be used to tune the vehicle to specific track and atmospheric conditions. The TRC-2 also may be used on vehicles with mechanical advance distributor or computer engine controls to change the total ignition timing.

DEMAND RETARD

Refer to Fig. 15. Connect the yellow wire from the TRC-2 to a normally open switch or relay that will complete a path to chassis ground when retard is desired. Example: A pressure switch that closes at a certain boost level. The LED on the TRC-2 will light up when the yellow wire is grounded. When the LED is lit, the retard feature is active and the spark is retarded by the amount set on the TRC-2 knob from 0°–20°. The TRC-2 is approximately linear throughout its range, so half scale is abut 10° of retard. For precise retard calibration, you must use a high-quality timing light. The diagram in Fig. 15 shows an example with the knob set for 10° of retard.

This type of timing control is great for nitrous oxide and supercharged applications, or any vehicle that requires adjustable retard. For nitrous applications, Fig. 15 shows how a normally-open relay is used to ground the yellow wire when nitrous and fuel solenoids are activated. The pin numbers are for a standard automotive relay such as Radio Shack P/N 275-226. Fig. 15 also shows a pressure activated switch designed to retard timing when the boost pressure reaches a pre-set value. NAPA Balkamp offers two adjustable pressure switches: P/N 701-1591 (3-7 psig range) and P/N 701-1603 (1.1-3 psig range).

Demand retard mode is also great for crank trigger systems where a momentary start retard is required. A manual switch or a normally open relay energized by the starter solenoid can be used to ground the yellow wire during cranking to provide up to 20° of starting retard. Once the switch is released, timing returns to normal.
BOOST PROPORTIONAL RETARD

Refer to Fig. 15. An optional MAP sensor (Crane Cams P/N 9000-0110) is required for boost proportional retard. This sensor is a rugged unit that can measure pressures up to 15 psi above normal atmospheric pressure. The sensor comes with vacuum tubing and adapters for plumbing it to the intake manifold. The yellow wire from the TRC-2 should be taped up when using the MAP sensor.

When the MAP sensor is connected, the retard setting on the TRC-2 now refers to a retard slope from 0° to 4° per psi of boost. Simply divide the knob setting by 5 to determine the retard slope (see Figure 15). For example, if the knob is set to 5° the retard slope is 1° per psi and at 5 psi of boost the retard is 5°. As boost rises further, the retard increases at this same slope up to a maximum of 20°. If the boost level exceeds 15 psi, the retard levels off as shown in Figure 15 below (sensor damage may occur above 18 psi).

The status LED on the TRC-2 illuminates when retard is being applied. Under most conditions, this occurs between 0.5 and 1.0 psi of boost. As boost rises, retard rises with a slope determined by the knob setting. Note that the retard slope stops rising when the boost reaches 15 psi or the retard reaches 20°. The TRC-2 is approximately linear throughout its range, but for precise retard calibration use a timing light to obtain retard value.

TROUBLESHOOTING

Did the engine run properly before installation of the TRC-2? If not, remove the both the TRC-2 and HI-6S units, reinstall the OE ignition or another known good unit and then find and correct the original problem. Make sure the HI-6S system functions properly before installing or troubleshooting the TRC-2 accessory. Did the TRC-2 function correctly before the problem occurred? If the answer is yes, did you change anything that may have affected it? If you connected an external control or changed ignition coils, try going back to the last setup that worked to help isolate the problem. Refer to the HI-6S installation instructions for more details, including the use of the HI-6S built-in diagnostic LED located on the ignition module.

If you are not getting the amount of retard you expect, check the LED on the TRC-2 module; it lights up when retard is being applied. If it does not light up in continuous or demand retard modes, check the yellow wire from the TRC-2. It must contact a good chassis ground when retard is needed. Also re-check the brown/white wire connection from the TRC-2 to the HI-6S.

In boost retard mode the amount of retard should be proportional to the pressure measured by the optional MAP sensor. The amount of retard may vary in a given application if local atmospheric (barometric) pressure changes significantly. This occurs most often with a change in altitude of 1000 feet or more.

If the TRC-2 settings seem to be off, check the travel of the knob from no-retard (0°) to maximum (20°). Make sure that the pointer is properly aligned when the knob is at each limit.
CAUTION: SWITCHED +12V MUST BE HOT DURING START AND RUN

YELLOW WIRE FROM TRC-2 TIMING RETARD CONTROL

NORMALLY OPEN RELAY

YELLOW WIRE FROM TRC-2 TIMING RETARD CONTROL

TAPE UP WHEN USING BOOST RETARD FEATURE

CONTINUOUS RETARD

YELLOW WIRE PERMANENTLY GROUNDED

DEMAND RETARD

YELLOW WIRE GROUNDED VIA SWITCH OR RELAY

NOTE: Remaining HI-6 Connections not shown for clarity
Refer to appropriate hookup diagrams.

Figure 15. TRC-2 Hookup
Figure 16. GM Magnetic Triggered HEI Hookup (6000-6440 Only)

**STEP 1**
PREPARE HI-6 MAGNETIC TRIGGER CABLE

**STEP 2**
REMOVE GM MODULE AND HARNESS

**STEP 3**
INSTALL HI-6 MAGNETIC TRIGGER CABLE

**STEP 4**
CONNECT HI-6 TO GM COIL-IN-CAP

**WARNING:**
GM COIL MUST BE GROUNDED WITH BLACK JUMPER WIRE AS SHOWN. GROUND TO HEI MODULE MOUNTING SCREW INSIDE DISTRIBUTOR.