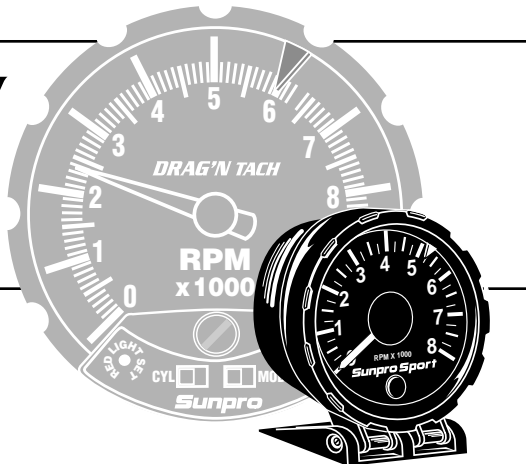


**DRAG'N
TACH™**

SPORTACH™



TACHOMETER INSTALLATION INSTRUCTIONS

Sunpro®
by **actron**

GENERAL INFORMATION

Please read this instruction manual and review the installation procedures carefully before attempting the installation of your tachometer.

NOTE

If additional wire is needed, use # 18 or # 20 AWG stranded automotive primary wire. For exposed underhood wiring, teflon insulated wire with its associated high temperature capability is recommended. Additional connectors, and hardware, that is not included with this unit may also be needed. As the mounting configuration will vary significantly from vehicle to vehicle,

limited hardware to mount the tachometer to the vehicle is included. If additional hardware is required, regardless of whether you use self tapping or a machine screw and nut configuration, # 8 hardware including flat and lockwashers is recommended for the Sport Tach, and # 10 hardware including flat and lockwashers is recommended for the Drag'n Tach.

CAUTION

These units are designed for use on twelve (12) volt negative (-) ground four (4) cycle automotive type engines. They are not designed for use on positive (+) ground electrical systems, two (2) cycle engines, aircraft or marine applications. They are compatible with most distributorless ignition systems.

SUGGESTED TOOLS

Wire and terminal crimping, stripping and cutting tool(s)

Screwdrivers and Nut drivers as required by hardware used

Small open end wrench set: 1/4" to 3/8" sizes may be required

Electric drill

Drill bits:

Sport Tach #29 or 9/64" drill bit, #18 or 11/64" drill bit, 1/4" drill bit, 3/8" drill bit

Drag'n Tach #18 or 11/64" drill bit, #10 or 13/64" drill bit, 1/4" drill bit, 3/8" drill bit

PACKAGE CONTENTS

Tachometer
Tachometer Perimeter Clamp
Tachometer Mounting Base
Tachometer Mounting Base Pad
Installation hardware kit consisting of:
Wire splices
Ring Terminals
1/4" Quick Connect Receptacle
Grommet

Sport Tach only...

8-32 X 1" Machine Screw, Black 2 ea
8-32 X 2" Machine Screw, Black 1 ea
8 Internal Tooth Washer, Black 3 ea
8-32 Nut, Black 3 ea

Drag'n Tach only...

10-32 X 1" Machine Screw, Black 2 ea
10 Internal Tooth Washer, Bright 2 ea
10-32 Nut, Black 2 ea
1/4-20 X 3" Machine Screw, Black 1 ea
1/4" Internal Tooth Washer, Bright 1 ea
1/4-20 Nut, Black 1 ea

SAFETY GUIDELINES

To prevent accidents that could result in serious injury and/or damage to your vehicle or test equipment, carefully follow these safety rules and test procedures.

SAFETY EQUIPMENT

Fire Extinguisher

Never work on your car without having a suitable fire extinguisher handy. A 5-lb or larger CO₂ or dry chemical unit specified for gasoline/chemical/electrical fires is recommended.

Fireproof Container

Rags and flammable liquids should be stored only in fireproof, closed metal containers. A gasoline-soaked rag should be allowed to dry thoroughly outdoors before being discarded.

Safety Goggles

We recommend wearing safety goggles when working on your car, to protect your eyes from battery acid, gasoline, and dust and dirt flying off moving engine parts.

NOTE: Never look directly into the carburetor throat while the engine is cranking or running, as sudden backfire can cause burns.

LOOSE CLOTHING AND LONG HAIR (MOVING PARTS)

Be very careful not to get your hands, hair or clothes near any moving parts such as fan blades, belts and pulleys or throttle and transmission linkages. Never wear neckties or loose clothing when working on your car.

JEWELRY

Never wear wrist watches, rings or other jewelry when working on your car. You'll avoid the possibility of catching on moving parts or causing an electrical short circuit which could shock or burn you.

VENTILATION

The carbon monoxide in exhaust gas is highly toxic. To avoid asphyxiation, always operate vehicle in a well-ventilated area. If vehicle is in an enclosed area, exhaust should be routed directly to the outside via leakproof exhaust hose.

SETTING THE BRAKE

Make sure that your car is in **Park** or **Neutral**, and that the **parking brake is firmly set**.

NOTE: Some vehicles have an automatic release on the parking brake when the gear

shift lever is removed from the **PARK** position. This feature must be disabled when it is necessary (for testing) to have the parking brake engaged when in the **DRIVE** position. Refer to your vehicle service manual for more information.

HOT SURFACES

Avoid contact with hot surfaces such as exhaust manifolds and pipes, mufflers (catalytic converters), radiator and hoses. Never remove the radiator cap while the engine is hot, as escaping coolant under pressure may seriously burn you.

SMOKING AND OPEN FLAMES

Never smoke while working on your car. Gasoline vapor is highly flammable, and the gas formed in a charging battery is explosive.

BATTERY

Do not lay tools or equipment on the battery. Accidentally grounding the "HOT" battery terminal can shock or burn you and damage wiring, the battery or your tools and testers. Be careful of contact with battery acid. It can burn holes in your clothing and burn your skin or eyes.

When operating any test instrument from an auxiliary battery, connect a jumper wire between the negative terminal of the auxiliary battery and ground on the vehicle under test. When working in a garage or other enclosed area, auxiliary battery should be located at least 18 inches above the floor to minimize the possibility of igniting gasoline vapors

HIGH VOLTAGE

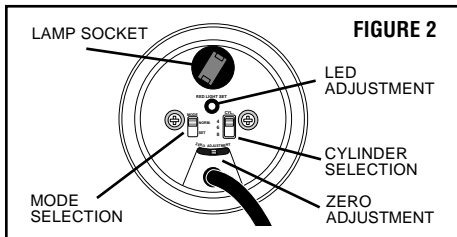
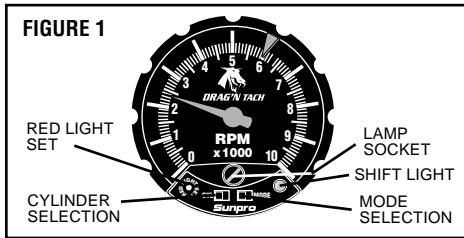
High voltage — 30,000 to 50,000 volts — is present in the ignition coil, distributor cap, ignition wires and spark plugs. When handling ignition wires while the engine is running, use insulated pliers to avoid a shock. While not lethal, a shock may cause you to jerk involuntarily and hurt yourself.

JACK

The jack supplied with the vehicle should be used only for changing wheels. Never crawl under car or run engine while vehicle is on a jack.

CYLINDER SELECTION

This tachometer should be checked for cylinder setting before installation. See figures 1 and 2. Position the **CYL**inder selector switch (**rear** of the *Sport Tach*; **front** of the *Drag'n Tach*) so that the switch actuator is opposite the number which matches the number of cylinders in the engine. As noted in the **DISTRIBUTORLESS IGNITION SYSTEM CONNECTIONS** section of this manual under Chrysler Corporation, connection to Pin 43 of the Single Board Engine Controller on Distributorless Ignition equipped Chrysler vehicles requires that the **CYL**inder selector switch be set to the four (4) cylinder position, regardless of the number of cylinders in the engine.



LAMP SUBSTITUTION OR REPLACEMENT

Your tachometer is supplied with an automotive type, wedge base (*Sport Tach*) or subminiature wedge base (*Drag'n Tach*) lamp for illumination. This lamp should provide satisfactory illumination intensity in most applications, however the following substitute lamps are available at or through your local auto or electronics parts store, and may allow you to custom tailor the illumination characteristics of the tachometer to your application. Note the higher the MSCD (Mean Spherical Candela) of the lamp, the brighter it is. The *Sport Tach* is supplied with a #194 lamp, and the *Drag'n Tach* is supplied with a #74 lamp.

The lamp socket is located at the top rear of the *Sport Tach*, and in the lower front control housing of the *Drag'n Tach*. To remove the lamp, gently grasp the black lamp socket (use

LAMP #	MSCD	COLOR	BASE	LIFE EXPECTANCY (HOURS)
73	.3	CLEAR	SUBMINIATURE WEDGE	8000
37	.5	CLEAR	SUBMINIATURE WEDGE	2500
74	.75	CLEAR	SUBMINIATURE WEDGE	1000
70	1.5	CLEAR	SUBMINIATURE WEDGE	100
161	1	CLEAR	WEDGE	4000
161B	-	BLUE	WEDGE	4000
161B2	-	BLUE-GREEN	WEDGE	4000
194	2	CLEAR	WEDGE	2500
194A	-	AMBER COATED	WEDGE	2500
194B	2	BLUE	WEDGE	2500
194G	2	GREEN	WEDGE	2500
194R	2	RED	WEDGE	2500
168	3	CLEAR	WEDGE	1500

pliers if necessary) and twist it counterclockwise approximately 1/8 turn until it stops. Pull the socket with lamp straight out of the tachometer housing. Remove the lamp from its socket by pulling it straight out. Replace the lamp as required following the chart above. Reinstall the socketed lamp by rotating it against the tachometer's PC board until it drops into place, and then rotate it approximately 1/8 turn clockwise until it reaches its mechanical stop.

ZERO ADJUSTMENT

Sport Tach - The tachometer pointer can be positioned precisely on "0" RPM. This sliding tab adjustment is located on the rear of the tachometer housing. With the engine OFF slide the adjustment tab from side to side until the pointer rests on "0". This adjustment may have to be reset once the tachometer is installed in the vehicle.

Drag'n Tach - This tachometer uses an air core meter movement. Electronic zero adjustment has been precisely set and locked in place at the factory. No further adjustment is required.

NOTE

METER POINTER POSITION

As with many metered instruments equipped with air core meter movements, it is normal for the meter pointer to randomly stop at any point on the meter scale when power is removed (key is turned OFF). This is not indicative of a defect!

LED (LIGHT EMITTING DIODE) INDICATOR - RPM THRESHOLD ADJUSTMENT

The RPM at which the RED LED indicator (located at the lower front of the tachometer) turns on, is adjustable from approximately 1500 to 8000 RPM or higher. Some possible uses for this indicator are:

Engine RED LINE (maximum safe operating speed of the engine)

Engine maximum torque RPM (for maximum performance shifting) Desired shift speed (manual transmission applications).

Maximum desired high gear vehicle speed (can act as a warning that a safe speed has been exceeded).

Adjustment is made after the tachometer is installed in the vehicle as follows:

1. Turn the ignition key to the **ON** or **RUN** position. The engine does not have to be running.
2. Slide the **MODE** switch to the **SET** position. (The **LED** indicator will turn **ON**).
3. Rotate the **RED LIGHT SET** control until the tachometer indicates the RPM at which "LED turn on" is desired.
4. Slide the **MODE** switch to the **NORMAL** position. (The **LED** indicator will turn **OFF**).

WARNING - SAFETY PRECAUTION!

Neither the driver nor any passenger should compromise the safe operation of the vehicle by attempting to readjust the tachometer in any way while the vehicle is in motion!

RED LINE SHIFT POINTER

Adjust the **RED LINE SHIFT POINTER** by sliding it around the meter bezel. This pointer may be set at any point on the meter scale, such as engine red line, or transmission shift point. Note that the setting of the **RED LINE SHIFT POINTER** does not affect the setting of the "LED turn on" point.

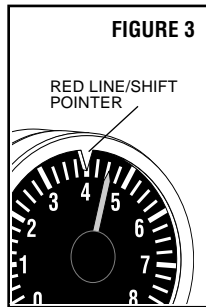


FIGURE 3

RED LINE/SHIFT
POINTER

suitable means) following the steps below, and an electrical functional check of the tachometer be made, prior to making a permanent installation.

1. Clip the **BLACK** lead from the tachometer to the negative (-) battery terminal.
2. Clip the **RED** lead from the tachometer to the positive (+) battery terminal.
3. Clip the **GREEN** lead from the tachometer to the negative (-) side of the ignition coil or tach signal connection point as indicated in the **ELECTRICAL CONNECTIONS** section of this manual. **Do not allow this connection to touch ground!**
4. The **WHITE** lead is for instrument panel lighting, and need not be connected for this check.
5. When all connections are secure, start the vehicle's engine. Confirm the operation of the tachometer throughout the operating temperature range of the engine, and at both curb idle, and higher engine speeds. The tachometer should follow the speed of the engine smoothly, and show no signs of erratic operation. In the case of an automatic transmission equipped vehicle, place the gear selector in **DRIVE** with the engine at curb idle. Tachometer operation should remain smooth.

Should you encounter unsatisfactory tachometer operation (erratic, no reading, etc.) on engines equipped with high performance and/or aftermarket ignition systems or ignition coils, you may have selected the incorrect tach connection point for the tachometer's **GREEN** lead, or a tachometer filter assembly may be required.

Contact the manufacturer of the ignition system or ignition coil for information regarding tachometer connection to his product and/or the availability of an electrical filter assembly if required.

When you are satisfied with tachometer performance, proceed to the permanent installation instructions which follow.

NOTE

FUNCTIONAL QUICK CHECK

Although every attempt has been made to make this tachometer electronically compatible with as many different ignition systems as possible, new ignition systems are being developed continually. It is suggested (especially if you have an engine that has a non OEM, or aftermarket ignition system) that the tachometer be electrically connected to the vehicle, (using alligator clip leads or other

MOUNTING THE TACHOMETER

Your tachometer is designed to be mounted on any flat surface, horizontal, vertical, or virtually any angle in between. Swivel adjustment has been provided in all axes of rotation, allowing for precise positioning of the tachometer for optimal viewing by the driver.

FIGURE 4

DASH HARDWARE INCLUDED

RUBBER PAD TO HELP SECURE TACH MOUNTING

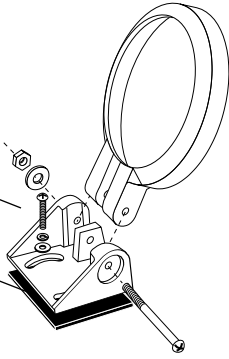
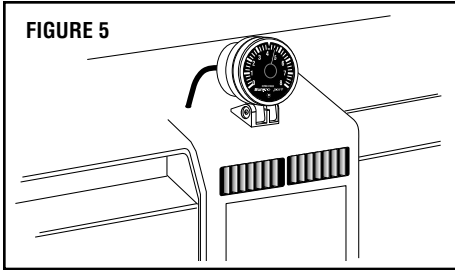


FIGURE 5



NOTE

SPORT TACH ONLY

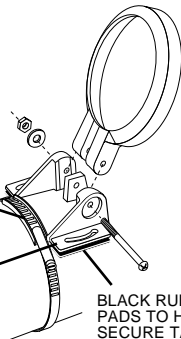
If you will be readjusting the LED (LIGHT EMITTING DIODE) INDICATOR RPM THRESHOLD (RED LIGHT SET control) regularly, as described above, be sure to mount the tachometer in a location which allows easy access to the switch and control on the rear of the tachometer.

FIGURE 6

MOUNTING BRACKET CAN BE HOSE CLAMPED TO STEERING COLUMN. (HOSE CLAMP NOT INCLUDED)

MOUNTING BRACKET CAN BE SCREWED DOWN TO DASH BY OUTSIDE FLANGES. (SCREWS NOT INCLUDED)

BLACK RUBBER PADS TO HELP SECURE TACH MOUNTING



NOTE

DRAG'N TACH – STEERING COLUMN MOUNTING

The Drag'n Tach may also be mounted on the steering column, as shown in Figure 6. If you choose this mounting configuration, it will be necessary to obtain a hose clamp which is large enough in diameter to encircle the steering column. Cut off any excess strap from the hose clamp, when clamp mounting is complete.

CAUTION

Some steering columns are made to be collapsible upon impact. Care should be taken when tightening the clamp to avoid damage to the column. Be sure not to interfere with the movement or mechanism of adjustable/tilt steering columns.

Select a mounting location that allows a clear view of the tachometer, but does not obstruct access or view of controls, or view of other dashboard instruments, or the road.

CAUTION

Position the tachometer in its specific location and determine wire routing and connection locations before drilling any holes! Be sure to check behind areas of intended drilling for obstructions before drilling!

Mark hole locations, and drill holes as required per the following chart.

Sport Tach

- #8 Self-tapping screws - #29 or 9/64" drill bit
- #8 Machine screw hardware - #18 or 11/64" drill bit

Drag'n Tach

- #10 Self-tapping screws - #18 or 11/64" drill bit
- #10 Machine screw hardware - #10 or 13/64" drill bit
- Clearance hole for wiring harness - 1/4" drill bit

The hardware configurations which mount the tachometer to the vehicle, and the tachometer perimeter clamp to the tachometer base, are shown in figures 4 and 6. Once the tachometer is adjusted to its final position, securely tighten all hardware.

ELECTRICAL CONNECTIONS

Refer to figures 7 through 16 while carefully following the wiring instructions.

CAUTION

For your own personal safety, and to prevent possible damage to the electrical system of your vehicle during the installation, disconnect the negative (-) battery cable. Reconnect this cable after installation is complete.

BLACK, RED, AND WHITE WIRE CONNECTIONS – ALL SYSTEMS

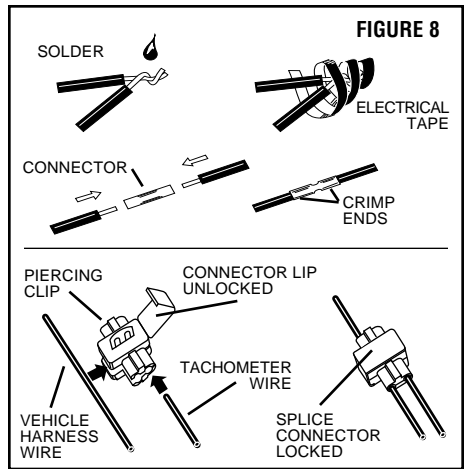
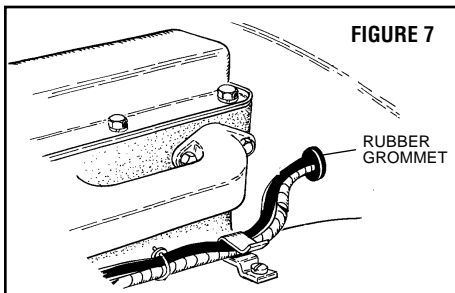
Route all wires carefully. Securing them with nylon tie wraps (not included) is suggested. Do not route wires along or against sharp edges which could cut the insulation. Also, do not route them along hot engine surfaces, such as exhaust manifolds, where high temperature could melt the insulation, or near spark plug wires.

Route wires through an existing hole in the firewall, or drill a 3/8" hole where desired, making sure there are no hidden wires, hoses, etc. that could be damaged. Insert the supplied rubber grommet in this hole for added protection against wire damage or shorting. See figure 7.

1. Connect the **BLACK** wire to the negative (-) battery terminal, or a clean unpainted chassis ground using a ring terminal or other suitable means. (See figure 9.)

IMPORTANT

Although electrical ground (**BLACK** wire connection) is available under the dashboard, grounding the instrument near or under the dash may cause it to operate erratically, as any ground connection other than the negative (-) battery terminal may be "electrically noisy".

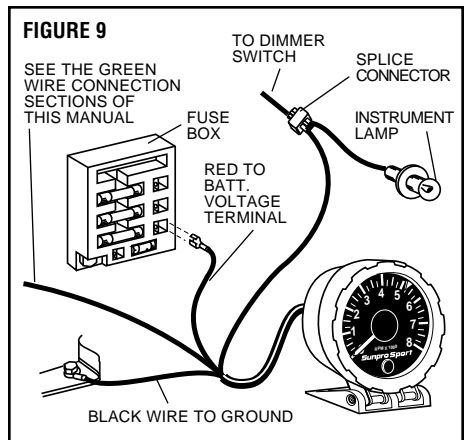


Make the following connections with splice connectors, or by an alternative method if desired. (See figure 8.)

2. Connect the **RED** wire to any vehicle harness wire which is energized with battery voltage, **ONLY** when the ignition key is in the ON (RUN) position, **NOT OFF OR ACCESSORIES**. (See figure 8.)
3. Connect the **WHITE** wire to the instrument panel lighting circuit or any lead that is controlled by the instrument panel dimmer control. (See figure 9.)

NOTE

Some vehicles (typically imported) wire the dimmer control into the ground side of the instrument panel lighting circuit, as opposed to the more conventional "hot" or twelve (12) volt side. In vehicles which use this circuit, connect the **WHITE** wire to a circuit which is energized by the headlamp switch.



GREEN WIRE CONNECTION

The GREEN wire provides the tachometer with the engine RPM (speed) signal. If your vehicle's engine is equipped with a DIS (DISTRIBUTORLESS IGNITION SYSTEM) proceed to the DISTRIBUTORLESS IGNITION SYSTEM CONNECTIONS section of this manual. DIS equipped engines are characterized by their lack of an ignition distributor. In place of the distributor, will be one or more "ignition coil packs". Unlike the ignition distributor which has a basically round shape, the coil pack is typically a square or rectangular package.

GREEN WIRE CONNECTION – DISTRIBUTOR EQUIPPED ENGINES

Connect the GREEN wire to the negative (-) side of the ignition coil. This terminal may also be referred to as the TACH, TACH TEST, DEC, or ECU terminal. Select the figure (10 through 16) which matches your application. Consult your vehicle service manual for systems not shown.

GREEN WIRE CONNECTION – DISTRIBUTORLESS IGNITION SYSTEM EQUIPPED ENGINES

Many domestically built vehicles (and some imports) are now using a new type of ignition system which does not use a distributor, but instead, a system of multiple ignition coils, and the necessary sensors and computer controls to fire them in the proper order. This type of system is commonly referred to as a **DISTRIBUTORLESS IGNITION SYSTEM** or **DIS**. Your tachometer is designed to work with these systems, however proper connection to them is important. The **BLACK** (ground), **RED** (12-14 volt supply), and **WHITE** (instrument lamp) connections are the same as for distributor equipped vehicles, however connection of the **GREEN** (tach signal) wire to the ignition is specific to the engine and ignition system. The most common configurations are described below. Note that the engine's identification code (when specified), is the eighth (8th) character in the vehicle's VIN (vehicle identification number). When wire color is specified with a /, the first color listed is the base color of the wire, and the second color listed is the color of the tracer or stripe on the wire. The letter L in the engine description denotes engine displacement in liters.

FIGURE 10: FORD ELECTRONIC IGNITION SYSTEM

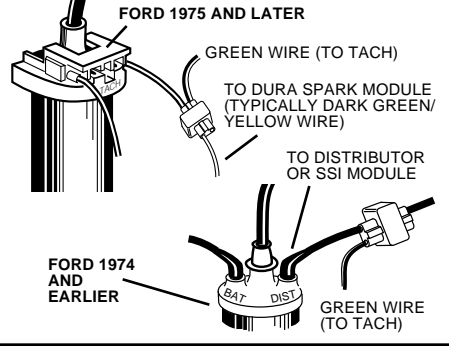


FIGURE 11: FORD TFI SYSTEM 1980 and later

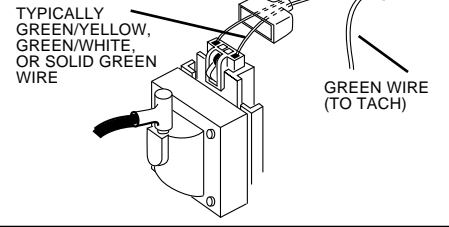


FIGURE 12: GM EXTERNAL COIL HEI 1986 and later

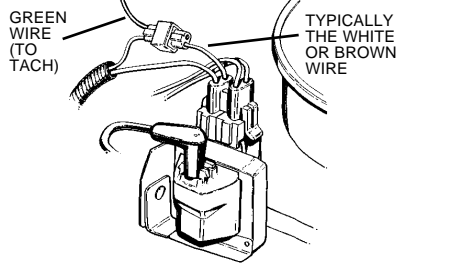
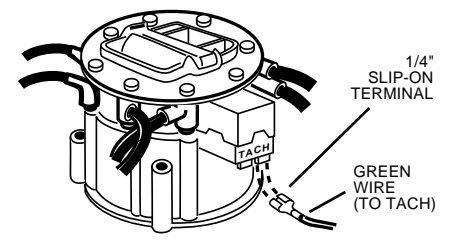
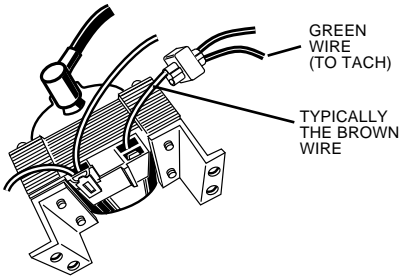


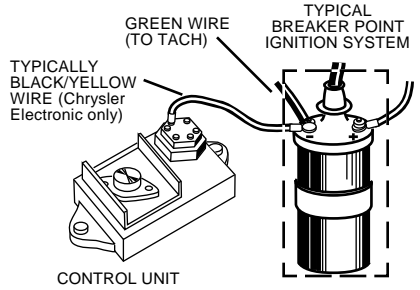
FIGURE 13: GM INTEGRAL COIL HEI



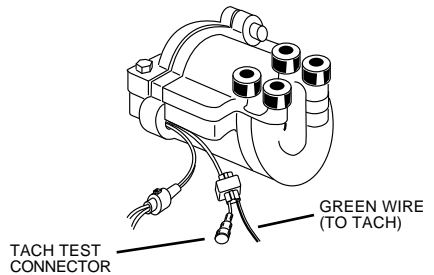
**FIGURE 14: GM EXTERNAL COIL HEI
1985 and earlier**



**FIGURE 15: CHRYSLER ELECTRONIC IGNITION
and BREAKER POINT IGNITION**



**FIGURE 16: TOYOTA IIA
(Integrated Ignition Assembly)**



CHRYSLER CORPORATION & MITSUBISHI MOTOR CORPORATION ¹

ENGINE		CONNECTION DETAILS		
		LOCATION/CONNECTOR	PIN NO.	WIRE COLOR
1989	1.6 L	IGNITION COIL PACK, 4 PIN	3	WHITE
1990	1.6 L	IGNITION COIL PACK, 3 PIN	2	YELLOW/BLACK
1990	2.0 L	IGNITION COIL PACK, 4 PIN	3	WHITE
1990-93	3.3L, VIN R	SINGLE BOARD ENGINE CONTROLLER	43 ²	GRAY/LT BLUE ³
1990-93	3.8 L	SINGLE BOARD ENGINE CONTROLLER	43 ²	GRAY/LT BLUE ³
1991-92	3.0 L, VIN U	SINGLE BOARD ENGINE CONTROLLER	43 ²	GRAY/LT BLUE ³
1992-93	2.0 L	IGNITION COIL PACK, 3 PIN	2	YELLOW/GREEN

¹ The 1.6 and 2.0 liter engines are manufactured by Mitsubishi, and are also used in vehicles produced under their name. The same connection configuration applies.

² When using pin 43 of the **SBEC** (Single Board Engine Controller) as the tach connection point, the **NUMBER OF**

CYLINDERS selector on the tachometer is set to the 4 cylinder position regardless of the number of cylinders in the engine!

³ In some applications, there may not be a wire connected to pin 43 of the Single Board Engine Controller, however the tach signal is available at this pin.

FORD MOTOR COMPANY

ENGINE	CONNECTION DETAILS		
	LOCATION/CONNECTOR	PIN NO.	WIRE COLOR
1989-93 2.3 L, VIN A	DIS MODULE, PIN 7-12 6 PIN ¹	12	BLACK/YELLOW
1989-92 3.0 L, SHO	DIS MODULE, PIN 7-12 6 PIN ²	12	GRAY/ORANGE
1989-01 3.8 L, SC	DIS MODULE, PIN 7-12 6 PIN ³	12	DARK GREEN/YELLOW
1990 4.0 L	EDIS MODULE, 12 PIN ⁴	2	DARK GREEN/YELLOW
1991-92 1.9 L	EDIS MODULE, 12 PIN ⁵	11	YELLOW/DARK BLUE
1991-92 2.3 L, VIN M	DIS MODULE, PIN 7-12 6 PIN ¹	12	TAN/YELLOW
1991-93 4.0 L	TACH TEST CONNECTOR ⁸	–	TAN/YELLOW
1991 4.6 L	EDIS MODULE, 12 PIN ⁴	2	WHITE/LT BLUE
1992 4.6 L	EDIS MODULE, 12 PIN ⁴	2	TAN/YELLOW
1993 4.6 L	ICM, 12 PIN ⁶	2	TAN/YELLOW
1993 1.9 L	ICM, 12 PIN ⁷	B	YELLOW/DARK BLUE
1993 2.3 L, VIN M	TACH TEST CONNECTOR ⁸	–	TAN/YELLOW
1993 3.0 L	ICM, 12 PIN ⁹	2	WHITE/PINK
1993 3.0 L, SHO	TACH TEST CONNECTOR ¹⁰	–	TAN/YELLOW
1993 3.2 L, SHO	TACH TEST CONNECTOR ¹¹	–	GRAY/ORANGE
1993 3.8 L, SC	TACH TEST CONNECTOR ¹²	–	TAN/YELLOW

¹ On Ford 2.3 liter dual spark plug engines, the **DIS** module is typically located slightly above, and in front of, the oil filter. There are two (2) 6-pin connectors, one at each end of the module. Pin 12 is the **IDM** or Ignition Diagnostic Monitor connection, and will be the end pin of the "PIN 7-12" connector. The letters **DIS** will be molded into the Distributorless Ignition System module housing.

² On Ford 3.0 liter *Super High Output* engines, the **DIS** module is typically located near the top/front of the engine, above the serpentine accessory drive belt. There are two (2) 6-pin connectors, one at each end of the module. Pin 12 is the **IDM** or Ignition Diagnostic Monitor connection, and will be the end pin of the "PIN 7-12" connector. The letters **DIS** will be molded into the Distributorless Ignition System module housing.

³ On Ford 3.8 liter *Supercharged* engines, the **DIS** module is typically located behind the serpentine accessory drive belt tensioner assembly. There are two (2) 6-pin connectors, one at each end of the module. Pin 12 is the **IDM** or Ignition Diagnostic Monitor connection, and will be the end pin of the "PIN 7-12" connector. The letters **DIS** will be molded into the Distributorless Ignition System module housing.

⁴ On Ford 4.0 liter V-6 engines, the **EDIS** (Electronic Distributorless Ignition System) module is typically located on the fender. On the 4.6 liter V-8 engine, module location may vary. There is one (1) 12-pin connector on the module. Pin 2 is the **IDM** or Ignition Diagnostic Monitor connection.

⁵ On Ford 1.9 liter 4 cylinder engines, the **EDIS** (Electronic Distributorless Ignition System) module location may vary. There is one (1) 12-pin connector on the module. Pin 11 is the **CTO** or Clean Tach Output connection.

⁶ On the 1993 Ford 4.6 liter engine, the **ICM** (Ignition Control Module) is mounted on the left front fender apron. There is one (1) 12-pin connector on the module. Pin 2 is the **IDM** of Ignition Diagnostic Monitor connection.

⁷ On the 1993 Ford 1.9 liter engine, the **ICM** (Ignition Control Module) is mounted above the left wheel well. There is one (1) 12-pin connector on the module. Pin B is the **CTO** or Clean Tach Output connection.

⁸ On the 1991-1993 Ford 4.0 liter V-6 and 1993 2.3 liter 4 cylinder engines, there is a single Contact Tach Test (Service) connector located under the hood. This connector has a tan wire with yellow stripe connected to it.

⁹ On the 1993 Ford 3.0 liter **FLEX FUEL** V-6 engine, the **ICM** (Ignition Control Module) is mounted on the right side of the engine. There is one (1) 12-pin connector on the module. Pin 2 is the **IDM** or Ignition Diagnostic Monitor connection. Note that this connection applies only to the Flex Fuel engine.

¹⁰ On the 1993 Ford 3.0 liter **SUPER HIGH OUTPUT** V-6 engine, there is a single Contact Tach Test (Service) connector located under the hood on the side of the right shock tower. This connector has a tan wire with yellow stripe connected to it.

¹¹ On the 1993 Ford 3.2 liter **SUPER HIGH OUTPUT** V-6 engine, there is a single Contact Tach Test (Service) connector located under the hood on the side of the right shock tower. This connector has a gray wire with orange stripe connected to it.

¹² On the 1993 Ford 3.8 liter **SUPER CHARGED** V-6 engine, there is a single Contact Tach Test (Service) connector located under the hood in the right rear corner of the engine compartment. This connector has a tan wire with yellow stripe connected to it.

GENERAL MOTORS CORPORATION

ENGINE	CONNECTION DETAILS		
	LOCATION/CONNECTOR	PIN NO.	WIRE COLOR
1985-89 3.0 L, VIN L	DIS MODULE, 14 PIN ¹	E	WHITE
1987-89 2.0 L, VIN 1	DIS MODULE, 6 PIN ¹	A	WHITE ²
1987-92 2.5 L, VIN R&U	DIS MODULE, 6 PIN ¹	A	WHITE ²
1987-89 2.8 L, VIN W	DIS MODULE, 6 PIN ¹	A	WHITE ²
1987-89 3.8 L, VIN 3	DIS MODULE, 14 PIN ¹	E	WHITE
1988-89 2.3 L, VIN D	IDI MODULE, 11 PIN ³	F	LT BLUE/BLACK
1989-93 3.1 L, VIN T	DIS MODULES, 6 PIN ¹	C	WHITE ²
1989-93 3.3 L, VIN N	DIS MODULE, 14 PIN ¹	E	WHITE
1990-91 2.2 L, VIN G	DIS MODULE, 6 PIN ¹	A	WHITE ²
1990-92 2.3 L	IDI MODULE, 11 PIN ³	F	WHITE ²
1990-91 3.8 L, VIN C	DIS MODULE, 14 PIN ¹	E	WHITE
1991-92 1.9 L	DIS MODULE, 6 PIN ¹	E	WHITE
1991-93 3.4 L	DIS MODULE, 6 PIN ¹	C	WHITE ²
1991-93 3.8 L, VIN L	DIS MODULE, 14 PIN ¹	E	WHITE
1992-93 2.0 L, VIN H	ECM, 24 PIN ⁴	A6	WHITE
1992-93 2.2 L, VIN 4	DIS MODULE, 6 PIN ¹	A	WHITE ²
1992-93 3.8 L, VIN 1	DIS MODULE, 14 PIN ¹	E	WHITE
1993 2.3 L	ECM, CONNECTOR C2 ⁵	B11	WHITE

¹ The **DIS** module is mounted to, and located at the base of, the ignition coil pack.

² This may be either a solid white wire, or a white wire with a black stripe.

³ The **IDI** (Integrated Direct Ignition) module with connector is mounted underneath the Integrated Direct Ignition system cover.

⁴ The tach output signal is available at pin A6 of the 24-pin light blue connector of the **ECM** (Electronic Control Module).

⁵ The tach output signal is available at pin B11 of connector C2 of the **ECM** (Electronic Control Module).

NISSAN MOTOR COMPANY

In some vehicle applications, Nissan (Datsun) uses a 4 cylinder engine with two (2) spark plugs per cylinder. This engine has one ignition distributor with two (2) ignition coils. One coil is referred to as the INTAKE COIL, and the other is referred to as the EXHAUST COIL. Engines produced prior to 1986 use discreet cylindrical

ignition coils, and the **GREEN** tachometer wire is connected to the negative side of the INTAKE COIL. Beginning in 1986, most applications began using multi-pin connectors which attached to the ignition coil/power transistor module. See the table below for the connection point of the **GREEN** tachometer wire.

ENGINE	CONNECTION DETAILS	
	LOCATION/CONNECTOR	WIRE COLOR
1986-89 Z24i	IGNITION COIL INTAKE & POWER TRANSISTOR	BLUE
1987-89 CA20E	IGNITION COIL INTAKE & POWER TRANSISTOR	BLUE ¹
1990 KA24E (van)	IGNITION COIL INTAKE & POWER TRANSISTOR	BLUE

¹ The wire color on the Stanza **WAGON** is **BROWN**.

FULL ONE (1) YEAR WARRANTY

Actron Manufacturing Company, 9999 Walford Avenue, Cleveland, Ohio 44102, warrants to the user that this unit will be free from defects in materials and workmanship for a period of one (1) year (from the date of original purchase). Any unit that fails within this period will be repaired or replaced at Actron's option and without charge when returned to the Factory. Actron requests that a copy of the original, dated sales receipt be returned with the unit to determine if the warranty period is still in effect. This warranty does not apply to damages caused by accident, alterations, or improper or unreasonable use. Expendable items, such as batteries, fuses, lamp bulbs, flash tubes are also excluded from this warranty. **ACTRON MANUFACTURING COMPANY DISCLAIMS ANY LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WRITTEN WARRANTY ON THE UNIT.** Some states do not allow the disclaimer of liability for incidental or consequential damages, so the above disclaimer may or may not apply to you. This warranty gives specific legal rights, and you may also have rights which vary from state to state.