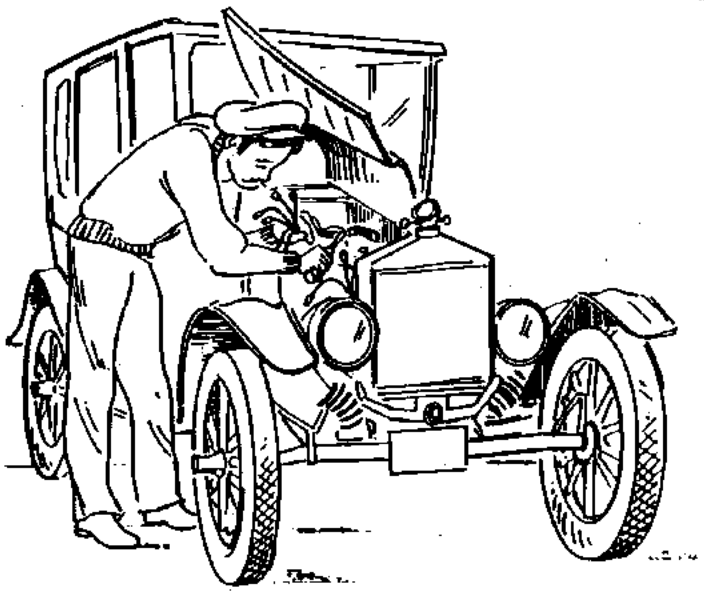
GMC MOTORHOMES INTERNATIONAL CLUB

GMC IGNITION SYSTEM



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Bob Lamey
Graphics Assistance: Zay Brand

Marion, North Carolina Convention
October 11-17, 1998

The contents of this document are based upon personal experience gained by "Hands-On" vehicle maintenance over many years. They are "One Man's" viewpoint & do not represent authorized data pertaining to the GMC Motorhome. It is the Reader's responsibility to establish His/Her position associated with each subject matter before vehicle repair &/or modifications are accomplished.

HEI GENERAL TEST PROCEDURE (CONT'D)

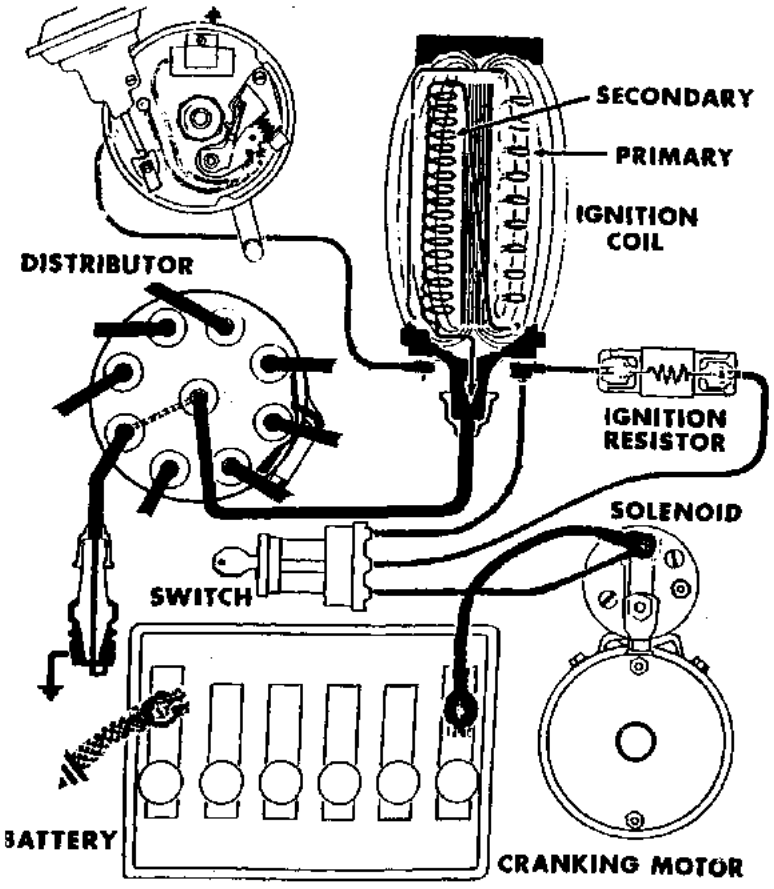
(ON VEHICLE MODULE TEST)

- MODULE TEST:
- CONNECT GROUNDED HEI TESTER TO DISTRIBUTOR'S CENTER TERMINAL
- REMOVE PICK-UP COIL MODULE CONNECTOR & TURN ON IGNITION SWITCH
- CONNECT TEST LITE TO +12v SOURCE
  - MOMENTARILY TOUCH THE OTHER TEST LITE LEAD TO THE MODULE'S SMALL TERMINAL
  - -SPARK AT HEI TESTER INDICATES PICK-UP COIL IS NOT WORKING : REMOVE DIST. & REPLACE PICK-UP COIL
  - -NO SPARK AT HEI TESTER INDICATES MODULE IS NOT WORKING: REPLACE MODULE

Note: Clean & Check Terminals for Tightness Before Test

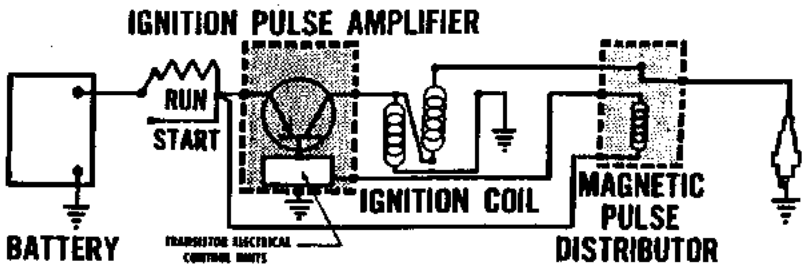
THE IGNITION SYSTEM

POINT TYPE IGNITION

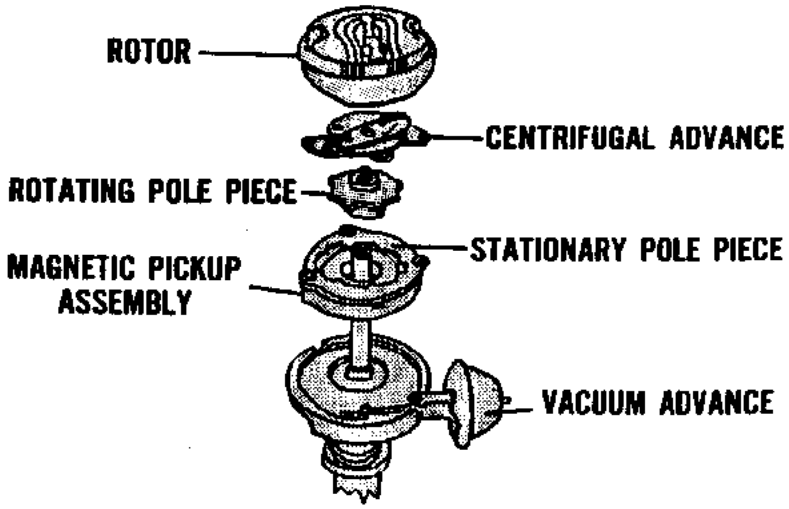


TRANSISTOR IGNITION SYSTEMS

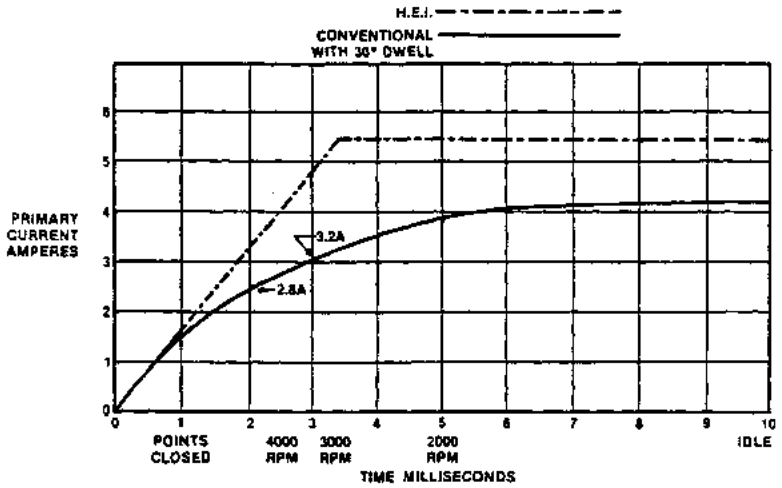
MAGNETIC PULSE TYPE



TRANSISTOR IGNITION SYSTEM



MAGNETIC PULSE DISTRIBUTOR



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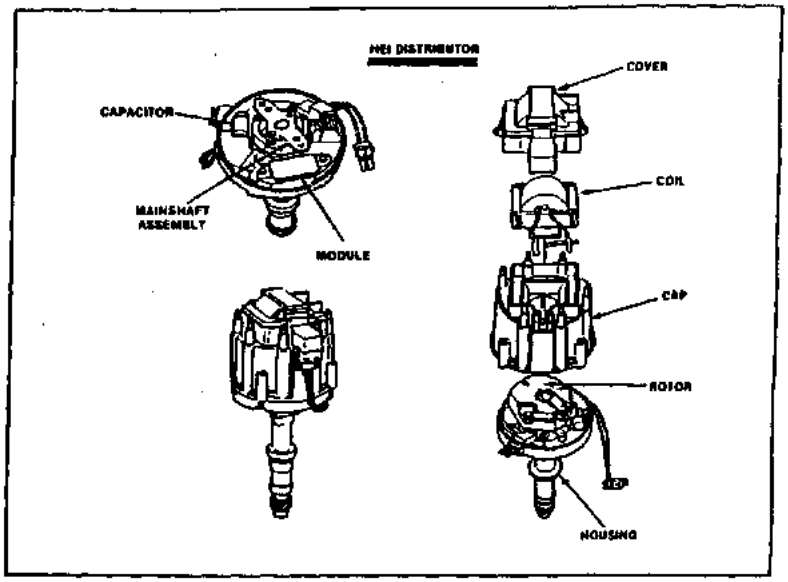
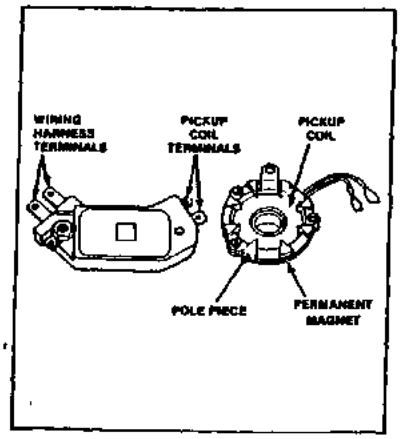
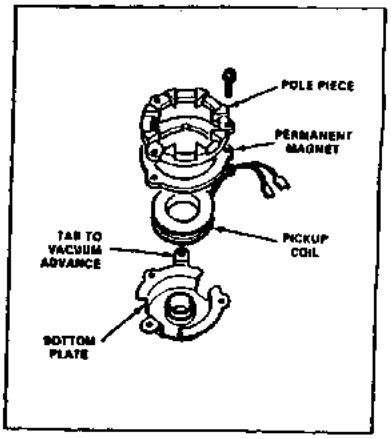


Integral HEI Distributor

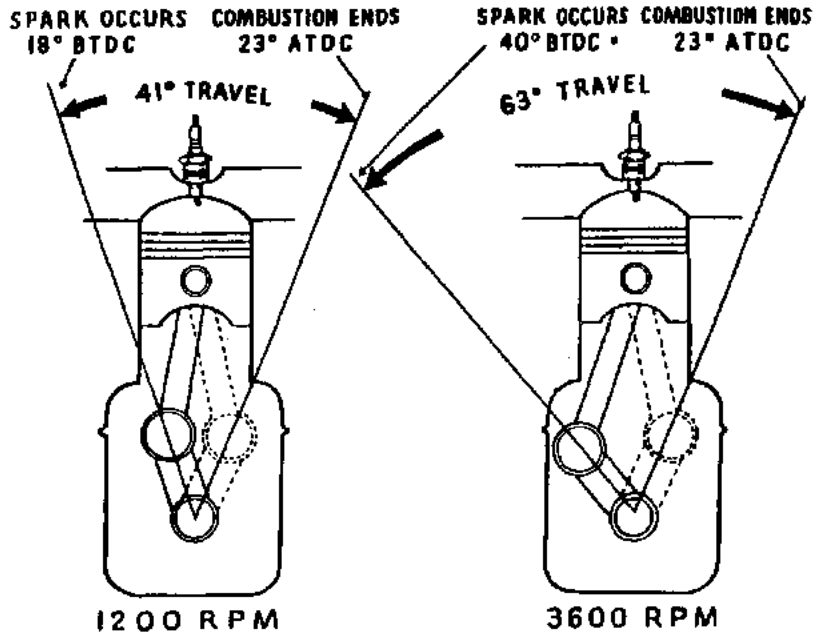


Module and Pulse Generator



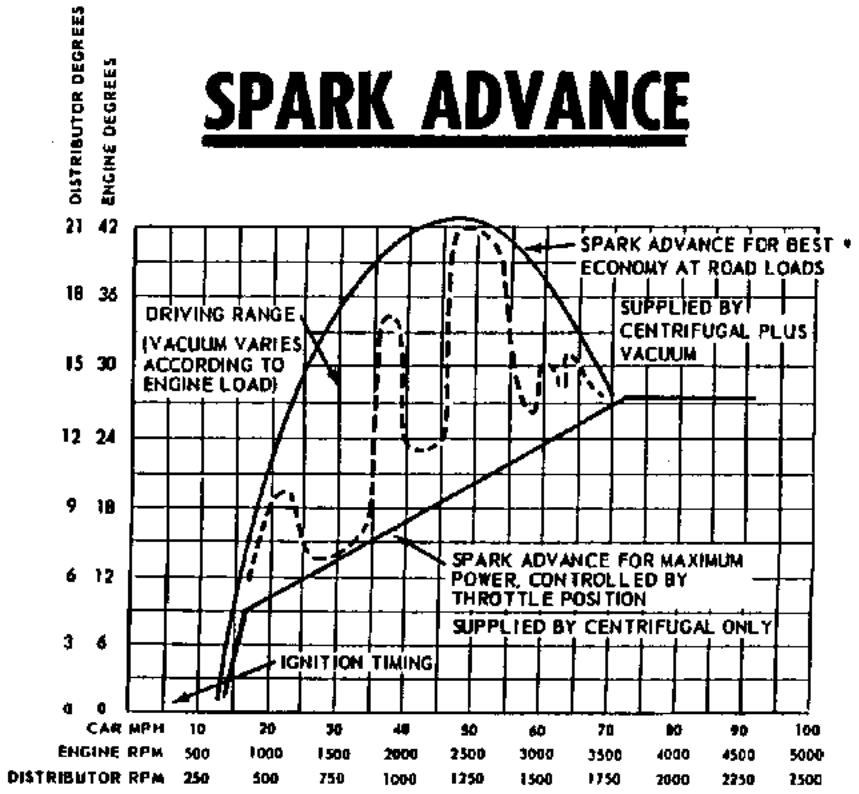
Pulse Generator Construction

AS ENGINE SPEED INCREASES SPARK MUST BE TIMED EARLIER



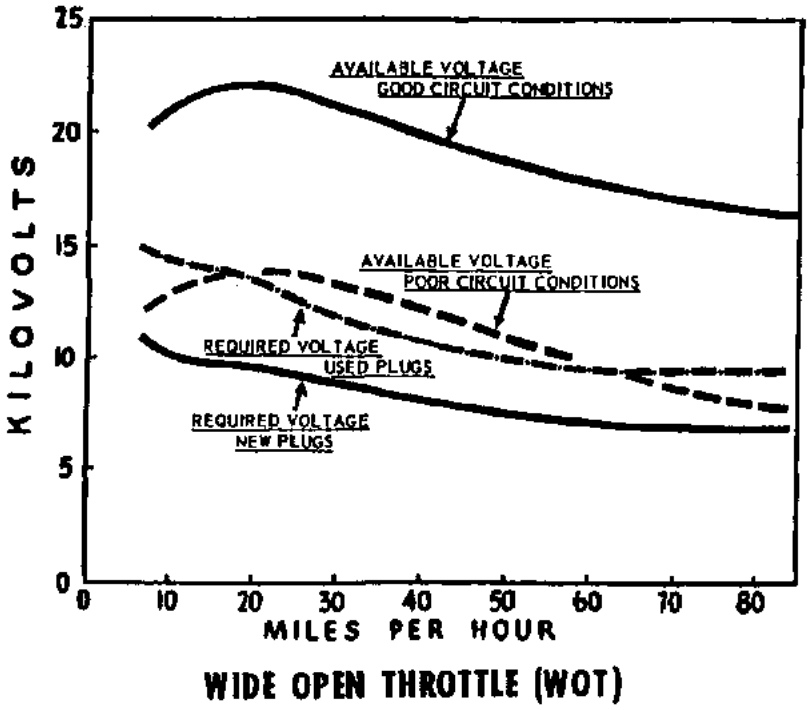
• Emperically Determined to be Limited to Approx. 36 Degrees for GMC Motorhome with 8.5:1 Compression Ratio & RV Cam (455/403 Engines).

SPARK ADVANCE



* Emperically Determined to be Limited to Approx. 36 Degrees for GMC Motorhome with 8.5:1 Compression Ratio & RV Cam (465/403 Engines).

COMPARISON OF AVAILABLE AND REQUIRED SECONDARY VOLTAGE



WIDE OPEN THROTTLE (WOT)

HEI ADVANTAGE Over POINT SYSTEM

- PROVIDES 35,000 VOLTS SECONDARY
- INCREASES SPARK PLUG LIFE
- 40% MORE VOLTAGE AT THE SPARK PLUGS
- 85% MORE ENERGY LEVEL
- LOWER SCHEDULED MAINTENANCE

Note: Introduced by GM in 1974 Cars

ELECTRONIC IGNITION UPGRADE *CALIFORNIA ACCEPTABLE

- "ELECTRONIC IGNITIONS
  E I systems that replace original point type systems are acceptable as long as the Vacuum & Centrifugal Advance controls are maintained.
  FOR EXAMPLE, a HEI Ignition Distributor could be used to replace the points distributor in a 1972 Chevrolet if the advance controls were maintained."

Note: *Reference California Smog Requirement, Appendix K-
Smog Check Requirements For Modifications & Add-On Parts.
Dated: Rev 2 (6-92)

HEI COMPONENT MISS-MATCH PROBLEM

GM INTRODUCED IDENTICALLY SHAPED COMPONENTS FOR HEI THAT FUNCTIONALLY ARE NOT INTERCHANGEABLE:

IGNITION COIL*		PICK-UP COIL*
Bk-Red-White Leads (White Tach Lead)	➡	Black Connector Body (Or Blue Tie)
Bk-Red-Yellow Leads (Yellow Tach Lead)	➡	Yellow Connector Body (Or Yellow Tie)

MISS-MATCH COMPONENTS CREATE ERRATIC TIMING (JITTER) & HARD TO START CONDITIONS. IT'S **BEST** TO PROPERLY MATCH COMPONENTS. HARD TO DETECT (SCOPE REQUIRED)!

NOTE: *MAGNETIC POLARITY DIFFERENT

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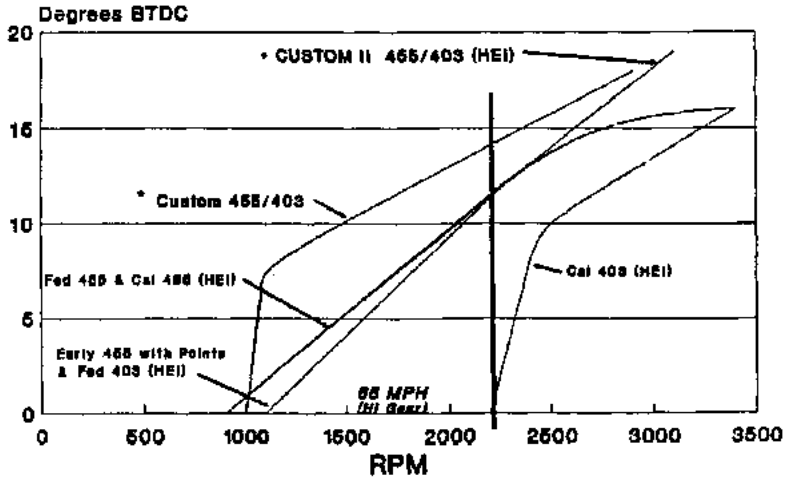
GMC MOTOR HOME DISTRIBUTOR SPECIFICATIONS

	Early 455 Points	FED 455 HEI	CAL 455 HEI	FED 403 HEI	CAL 403 HEI	*Custom I 455/403	*Custom II 455/403
Dist. #	1112172	1112893	1112945	1103267	1103309	xxxxxxx	xxxxxxxx
Mech. Adv. (Deg.)							
Start	0 @ 1100	0 @ 900	0 @ 900	0 @ 1100	0 @ 2200	0 @ 1000	0 @ 900
Mid.	9 @ 2000	9 @ 2000	9 @ 2000	9 @ 2000	11 @ 2800	8 @ 1100	10 @ 2000
Max.	16 @ 3400	16 @ 3400	16 @ 3400	16 @ 3400	16 @ 3400	18 @ 2900	19 @ 3100
Vac. Adv. #	1973408	1973523	1973560	1973609	1973634	1973577	1973577
Start (" Hg)	8"-10"	8"-10"	14"-15"	4"-5"	11"	6"	6"
Max.(" Hg)	19"-20"	18"-20"	18"-19"	7"-8"	14"	9"	9"
Max. Adv.(Deg.)	24	24	10	8	10	10	10"
Init. Timing (Deg.)	8 @ 1100	8 @ 1100	8 @ 1100	12 @ 1100	12 @ 2000	8 @ 850	8 @ 850
Total Adv.(Deg.)							
Mech. + Vac. + I	48	48	34	38	38	38	37
**"Effective"	24	21	18	30	12	32	29

Note:
* Not Certified for Smog Controlled Vehicle
** "Effective" is the Total Advance @ 2200 RPM & 11" Vac. (65 MPH Cruise)

Centrifugal Advance Vs RPM

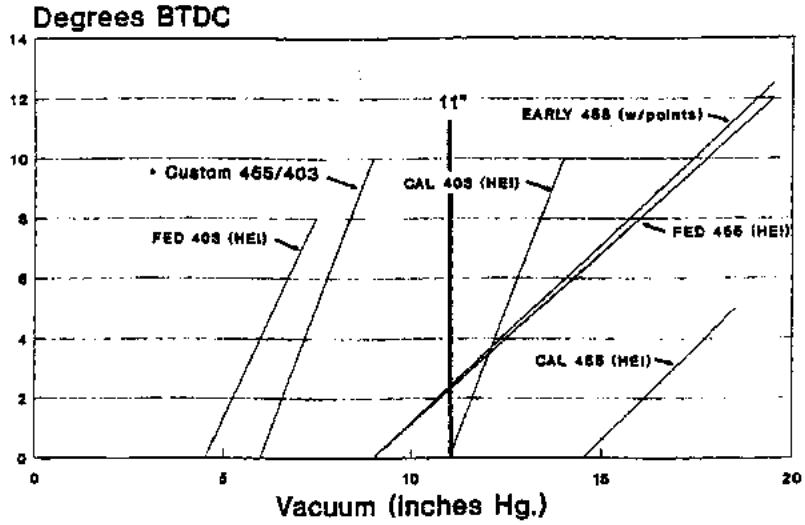
GMC Specifications



Note: • Not Certified for Smog Control
9/26/94

Vacuum Advance Vs Vacuum

GMC Specifications



Note: • Not Certified for Smog Control

IGNITION SYSTEM FAILURES - GENERAL

- BAD IGNITION WIRES
  - High Resistance & Voltage Leakage/Breakdown
- LIMITED MECHANICAL ADVANCE
  - Worn Pins/Weights (Shaft/Bearing Wear)
- LIMITED VACUUM ADVANCE
  - Diaphragm Failure (Hole)
  - Sticky/Stuck Bearing
- DISTRIBUTOR SHAFT BEARING WORN
  - Erratic/Change of Ignition Timing
- IGNITION COIL FAILURE
  - Internal Breakdown
  - Low Secondary "High Voltage" Output

IGNITION SYSTEM FAILURES - POINT TYPE

- POINT CLOSURE
  - Change of Initial Ignition Timing (retards Timing)
- POINT BURN/PITTED
  - Limited Current Flow/Low Voltage Output
- IGNITION RESISTOR FAILURE
  - Becomes High Resistance with Poor Performance
- CAPACITOR FAILURE
  - Changes Value (Open) with Poor Performance

IGNITION SYSTEM FAILURES - HEI

- ELECTRONIC MODULE*
  - Electronic Failure Preventing Operation (Sometimes with Engine Backfires)
  - Missing or Wrong Thermal Conducting Compound -Required Under Module

- LOST OF COIL GROUND
  - Ignition Failure with Erratic or Non Operation

- IGNITION COIL*
  - Ignition Failure with Erratic or Non Operation

- WRONG DISTRIBUTOR
  - Original Dist. Replaced with Car Type Dist. Which Limits Performance (Wrong Mech. & Vac. Advance)

- SHORTED TACH CIRCUIT
  - Short in Tachometer Wiring/Unit can Disable Ignition

Note: * Highly Recommended as Spare Compoent

SPECIALTY SPARK PLUGS

(PLATINUM, SPLIT FIRE, ETC)

- PRIMARY ADVANTAGE
  - -REQUIRES LESS ARC-OVER VOLTAGE
  - -ALLOWS SPARK GAP TO BE JUMPED A HIGHER PERCENTAGE OF THE TIME (PARTICULARLY IN WEAK SYSTEMS)

- PRIMARY DISADVANTAGE
  - -LOWER ARC-OVER VOLTAGE /LESS ENERGY WHEN IT FIRES
  - -ONLY PROVIDES PERFORMANCE IMPROVEMENTS IN WEAK IGNITION SYSTEMS BY REDUCING THE NUMBER OF MISFIRES (OVER SHADOWS REDUCED SPARK ENERGY)
  - -MASK PROBLEMS INHERENT IN WEAK IGNITION SYSTEMS

- WHY THEY WORK
  - -PLATINUM METAL REQUIRES LESS ARC-OVER VOLTAGE THAN STEEL OF SAME CONFIGURATION
  - -SPARK JUMPS BETER TO & FROM "POINTY OBJECTS" "V" SHAPE GIVE MORE "POINTY" AREAS

Ref: Jacobs Electronics Team News, Issue 2 (9/94)

HEI GENERAL TEST PROCEDURE

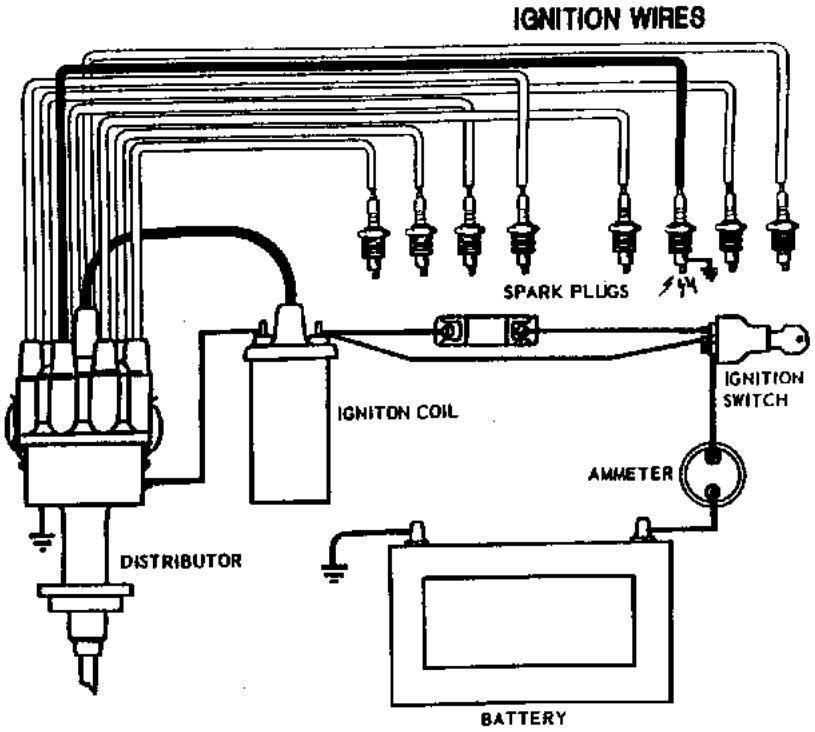
ON VEHICLE TEST

- CONNECT SPARK PLUG WIRE TO GROUNDED HEI TESTER
  -SPARK PRESENT: IGNITION SYSTEM OK (TEST COMPLETED)
  -NO SPARK: IGNITION SYSTEM PROBLEM (CONTINUE TEST)

- REMOVE PLASTIC COIL COVER (TOP OF DIST. CAP-2 SCREWS) & CONNECT 12v TEST LITE BETWEEN DIST. TACK TERMINAL & GRD
  -TURN ON IGNITION: TEST LITE SHOULD GLOW
  -IF NOT: CHECK FOR +12v AT DIST. BAT TERMINAL
  -NO POWER: CIRCUIT WIRING OR IGN. SWITCH PROBLEM
  -POWER PRESENT: PRIMARY COIL IS OPEN (REPLACE COIL)
  -IF TEST LITE GLOWS, CRANK ENGINE: LITE SHOULD FLICKER
  -FLICKER INDICATES MODULE & PICK-UP COIL FUNCTIONAL
  -REMOVE DIST. CAP & TEST FOR SPARK AT CENTER TERMINAL USING HEI TESTER & JUMPER WIRE
  -SPARK INDICATES ROTOR NOT WORKING (REPLACE)
  -NO SPARK INDICATES COIL NOT WORKING (REPLACE)
  -NO FLICKER, PERFORM MODULE TEST

Note: Clean & Check Terminals for Tightness Before Test

THE IGNITION CIRCUIT



PREVENTITIVE MAINTENANCE ITEMS

"IGNITION"

- REPLACE OEM IGNITION WIRES or REPLACE WITH PERMANENT AFTER-MARKET METALLIC CONDUCTOR/SILICON WIRES) - 20K
- REPLACE SPARK PLUGS
  - HEI - 20K
  - POINTS - 10K
- VACUUM ADVANCE - VERIFY SMOOTH ACTION - 5K
- MECHANICAL ADVANCE - INSPECT FOR WEAR & ACTION - 5K
- DISTRIBUTOR SHAFT BEARING
  - INSPECT FOR RADIAL WEAR - 10K
  - REBUILD DISTRIBUTOR - 80K
- DISTRIBUTOR CAP*/ROTOR* - INSPECT & CLEAN - 5K
- HEI MODULE* & COIL* - REPLACE FAILURES - AS REQD
- POINTS*, CAPACITOR* & ROTOR* - REPLACE - 10K
- COIL* (POINT SYSTEM) - REPLACE FAILURES - AS REQD

NOTE: *Always Carry a Known Good Spare