ENGINE ELECTRICAL SYSTEM

67U05X-501

OUTLINE

OVERVIEW OF SYSTEM

1. Ignition System (Australia Only)

- In order to improve fuel economy, increase performance and improve driveability, an electronic distribution and spark advance system has been adopted.
- In order to improve fuel economy and improve spark plug reliability, surface discharge type spark plugs which can withstand a voltage up to 40 kV have been adopted.

2. Charging System (alternator)

- The alternator output has been increased to cope with the increased electrical load. To improve alternator reliability, the IC regulator has been provided with temperature-compensating characteristics.

3. Starting System (starter)

- A coaxial (planetary gear) reduction-type starter has been adopted in order to reduce size and weight.

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SPECIFICATIONS

			Australia		Except Australia
			M/T	A/T	M/T
Voltage		(V)	12, Negative ground		
Battery	Type and capacity (20—hour rate)		50D20L : 50AH 65D23L : 55AH (65D23L : Cold proof area)		
Ignition system	Distribution		Control unit		Distributor
	Spark timing		Leading: 5°ATDC Trailing: 20°ATDC at idle (A/T: N range)		
	Spark advance		Control unit		Centrifugal T & L: 0°/500 rpm 15°/2000 rpm rpm: distributor revolution Vacuum T: 0°/100 mmHg 15°/400 mmHg L: 0°/100 mmHg 7.5°/400 mmHg
	Spark plug	Type	NGK: SD10A SD11A Nippon denso: S-29A S-31A		NGK: BR9ET, BR10ET Nippon denso: W27EBR, W29EBR
		Plug gap (mm (in))	2.0 (0.08)		1.05 ± 0.05 (0.04 ± 0.002)
Alternator	Type		Alternating type with IC regulator		
	Output	(V—A)	12—70		
	Regulated voltage	(V)	14.4 ~ 15.0 (with temperature—gradient characteristics)		
	Output test (at hot)	Voltage (V)	13.5		
		Current (A)	Min 55		
		Speed (rpm)	2,500		
	Brush length	Standard (mm (in))	16.5 (0.650)		
		Wear limit (mm (in))	8.0 (0.315)		
Starter	Type		Coaxial reduction		
	Output	(KW)	1.2	2.0	1.2
	Output (No load)	Voltage (V)	11.0		
		Current (A)	Max. 90		
		Speed (rpm)	Min. 3,000		
	Brush length	Standard (mm (in))	17.5 (0.689)		
		Wear limit (mm (in))	12.0 (0.472)		

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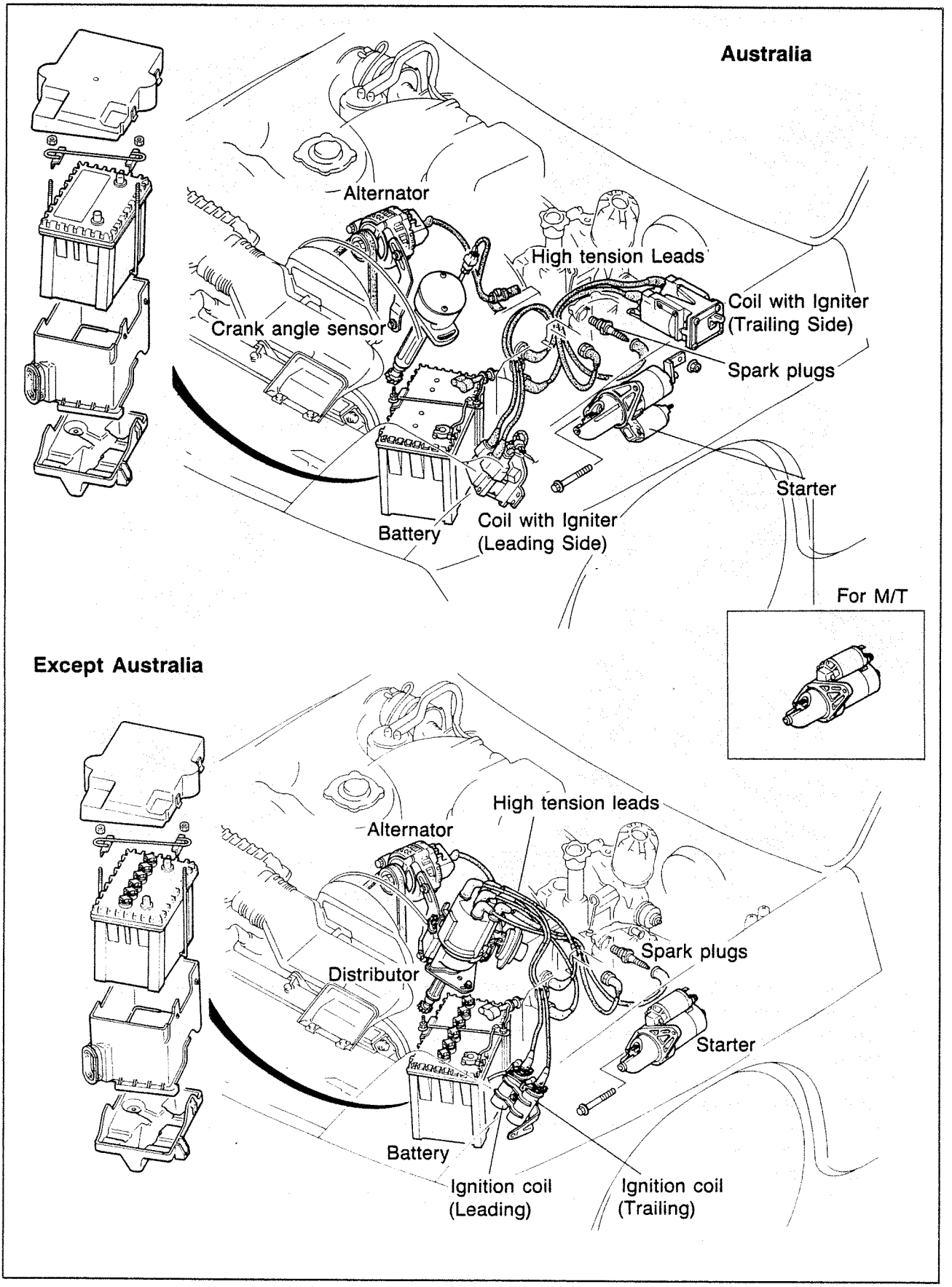
SCHEMATIC ILLUSTRATIONS



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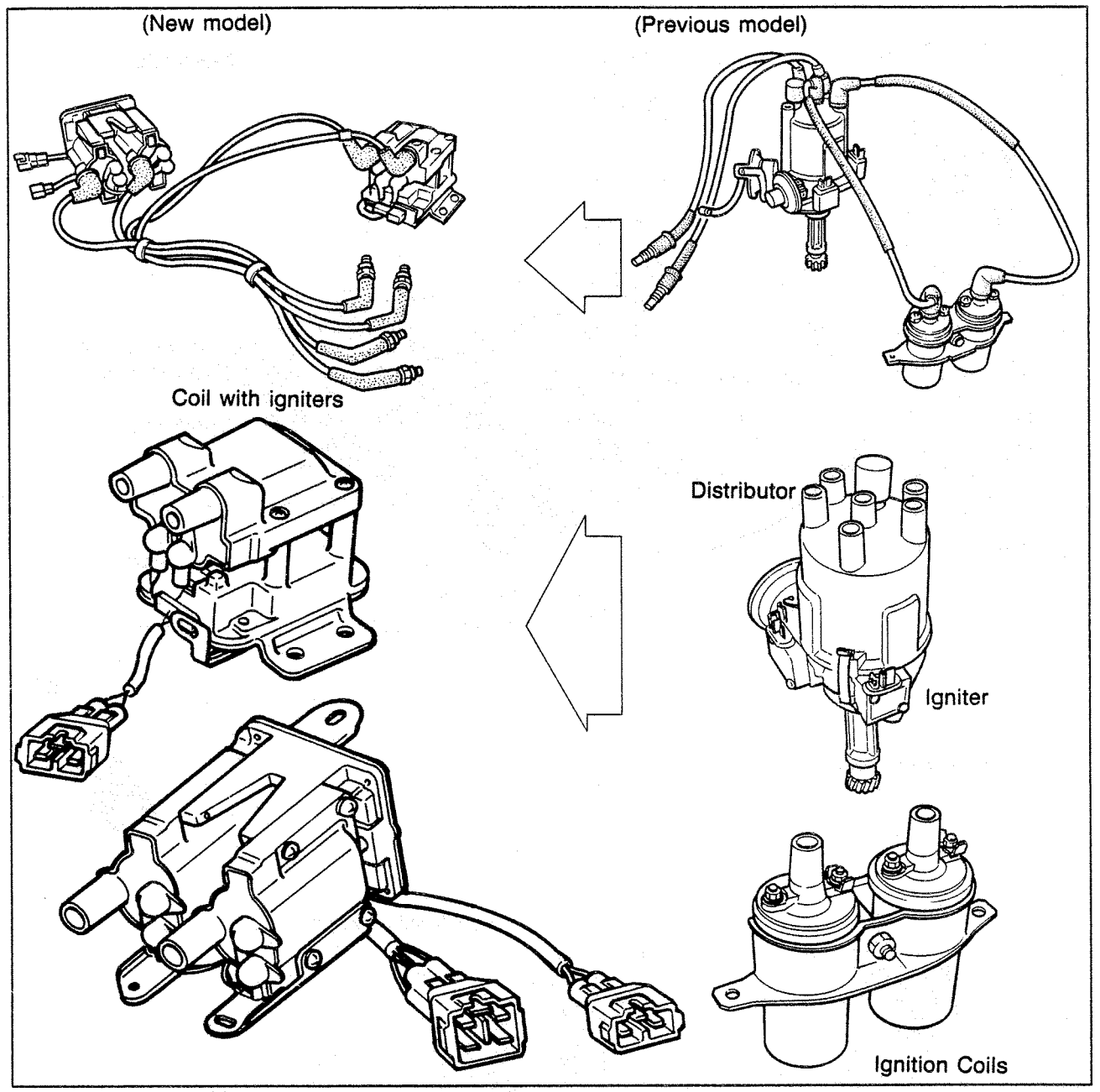
IGNITION SYSTEM (AUSTRALIA ONLY)



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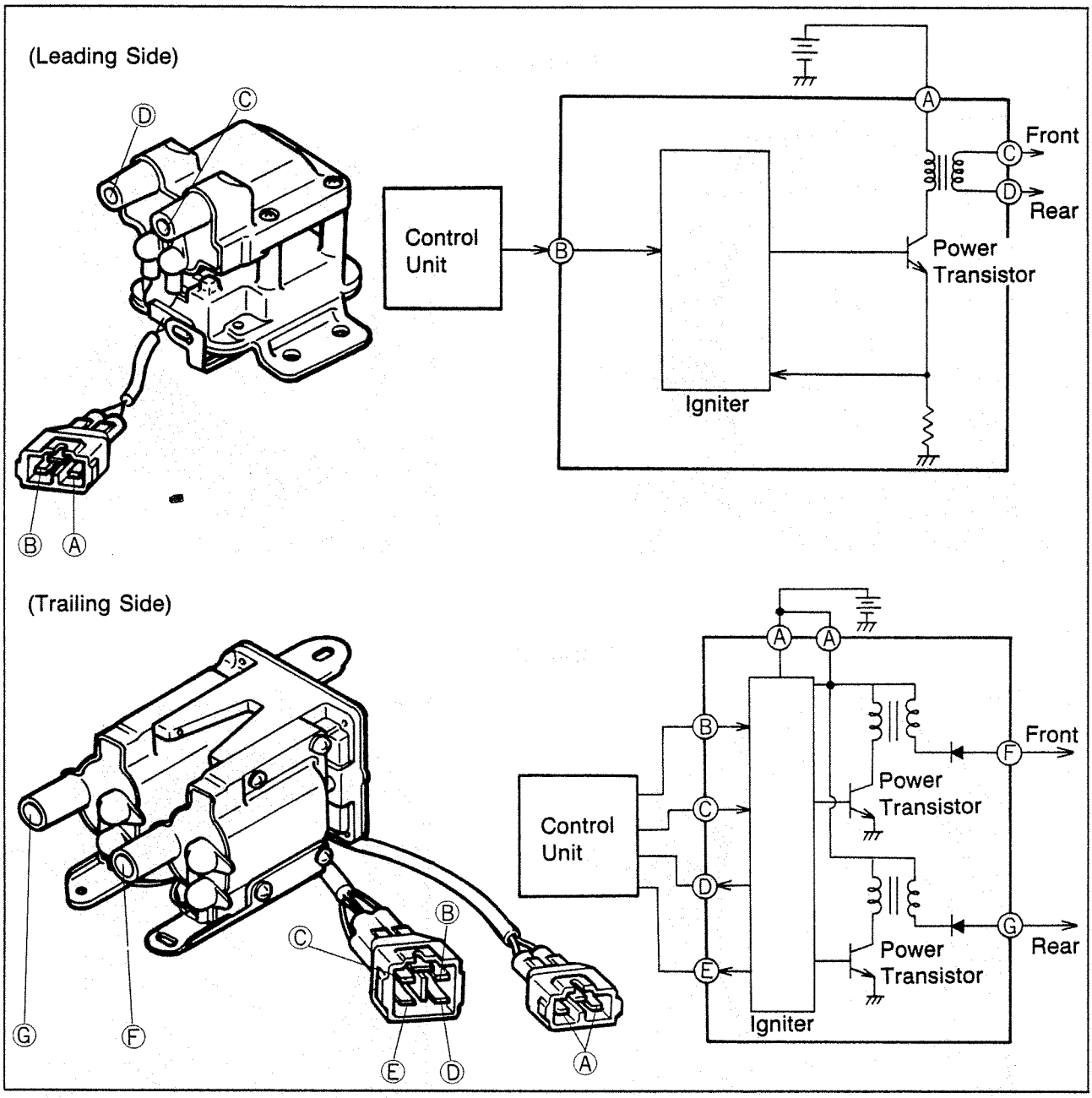
The function of the distributor and the interval of ignition (including advance) is performed electronically within the control unit.
The distributor has been eliminated and replaced by a crank angle sensor and a coil with igniter.

1. **Coil with igniter**
   Interrupts primary current of the coil.
2. **Crank angle sensor**
   Detects the angle of the eccentric shaft and sends a signal to the control unit thereby allowing it to control the point of ignition timing.
3. **Control unit**
   Performs the distributor function and determines point of ignition timing (including advance).

COIL WITH IGNITER



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The coil with igniter is composed of the ignition coil, power transistor and igniter.

Operation

Leading Side

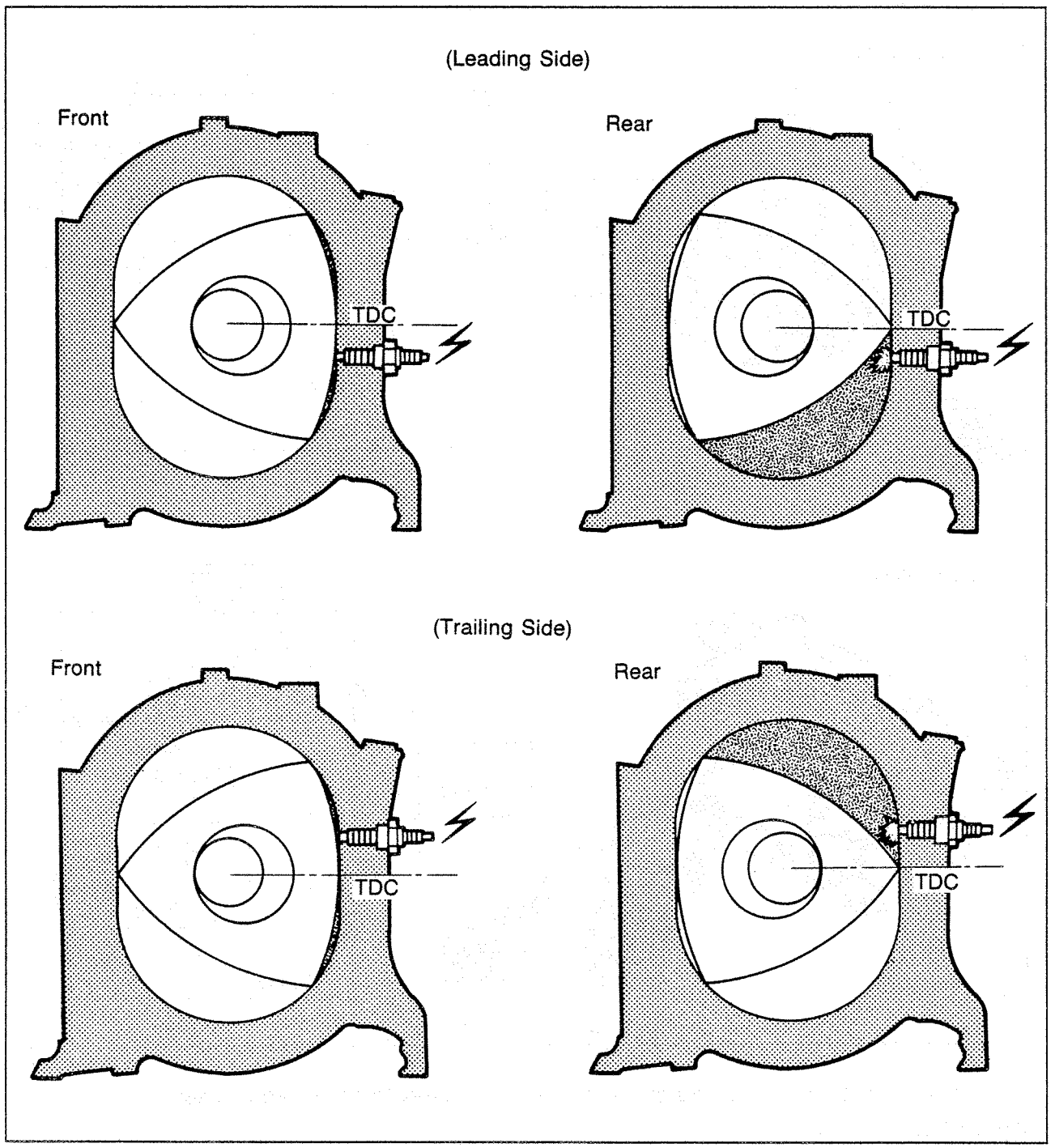
1. The power transistor is switched ON and OFF by the ignition signal from the control unit.
2. With the ON/OFF switching of the power transistor, a high voltage is generated within the secondary coil. Note that for the leading side, the front and rear rotors are ignited simultaneously.

Trailing Side

1. Either the front or rear power transistor is switched ON or OFF by the ignition signal and distribution signal from the control unit.
2. With the ON/OFF switching of the power transistor, a high voltage is generated in each secondary coil.

NOTE:
To check a "coil with igniter" requires an Igniter Checker (49 F018 002)

REFERENCE NOTE



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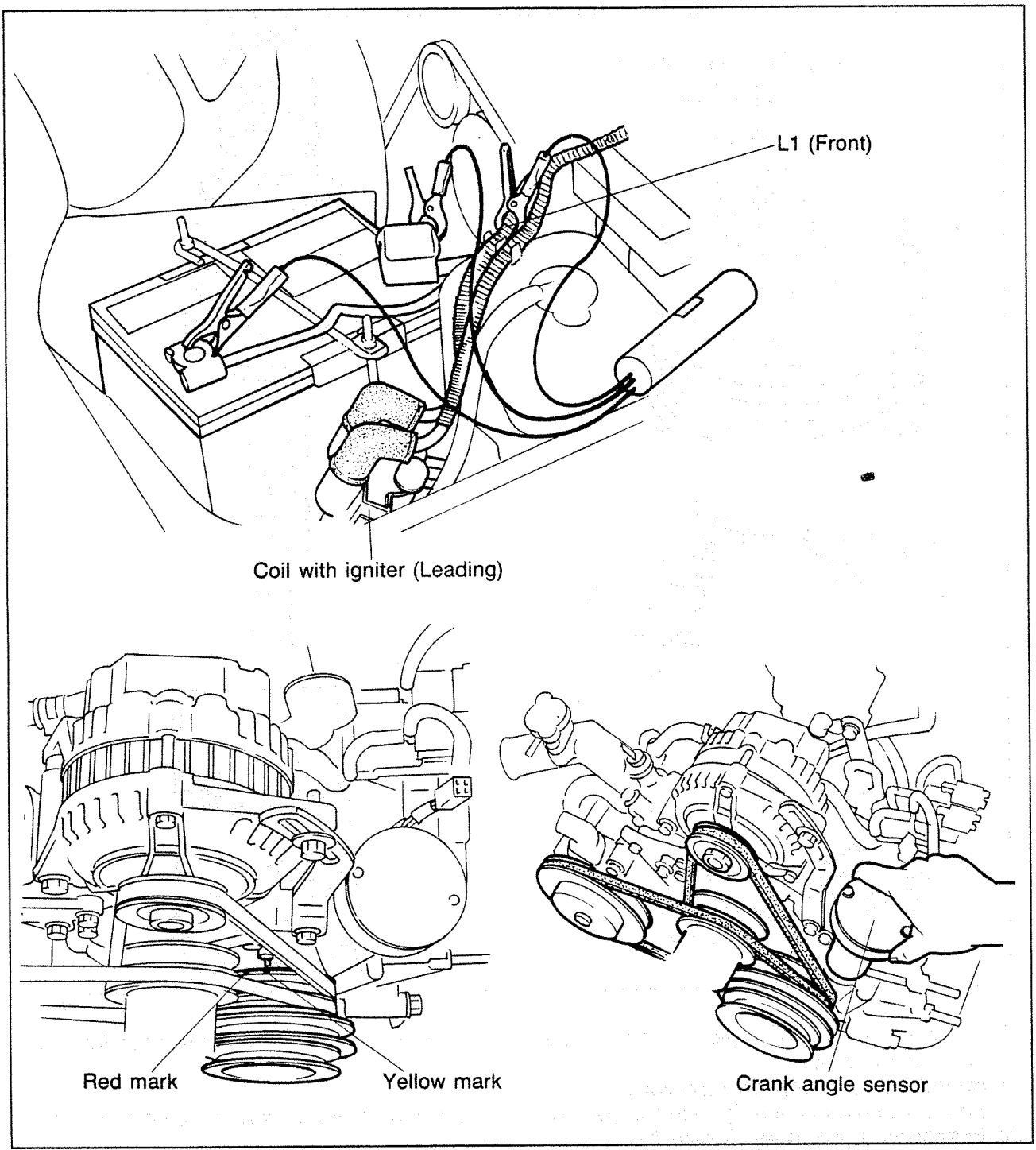
On the leading side, front and rear ignition occurs simultaneously.
Because the spark plug is located downward from compression top dead center for the leading side, simultaneous ignition of the front and rear rotors is possible.
However,for the trailing side, the plug is located upward from top dead center, so the front and rear rotor must be ignited individually.

SERVICE POINTS



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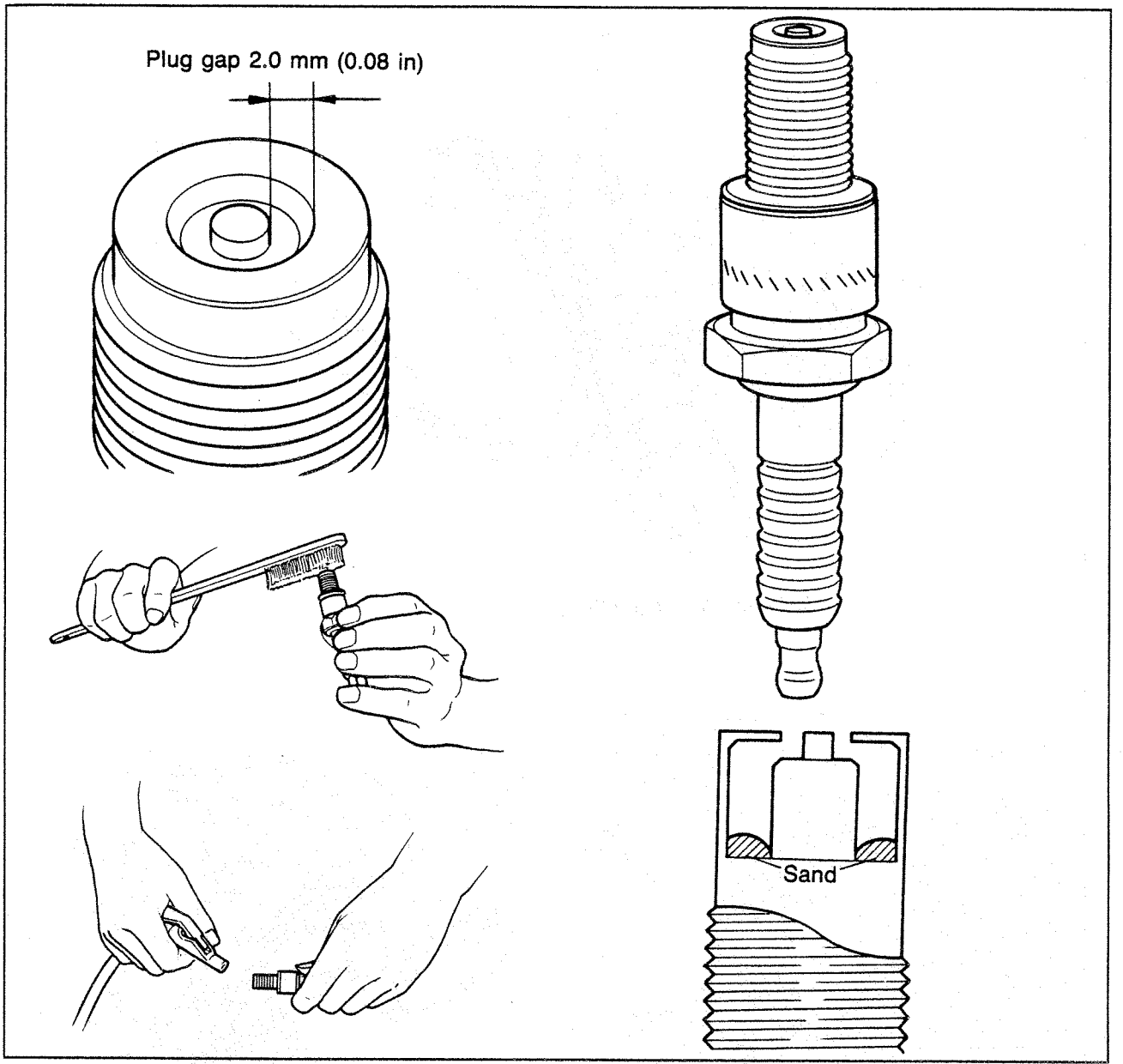
Adjustment of Ignition Timing

Warm up the engine and make sure the idle speed is correct prior to adjustment of the ignition timing. If the ignition timing is not correct, the crank angle sensor must be rotated until the timing marks are correctly aligned.

Leading	**5° ATDC (Yellow mark)**
Trailing	**20° ATDC (Red mark)**

SPARK PLUG



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The following points have been improved as a result of the adoption of the surface discharge ignition type of spark plugs.

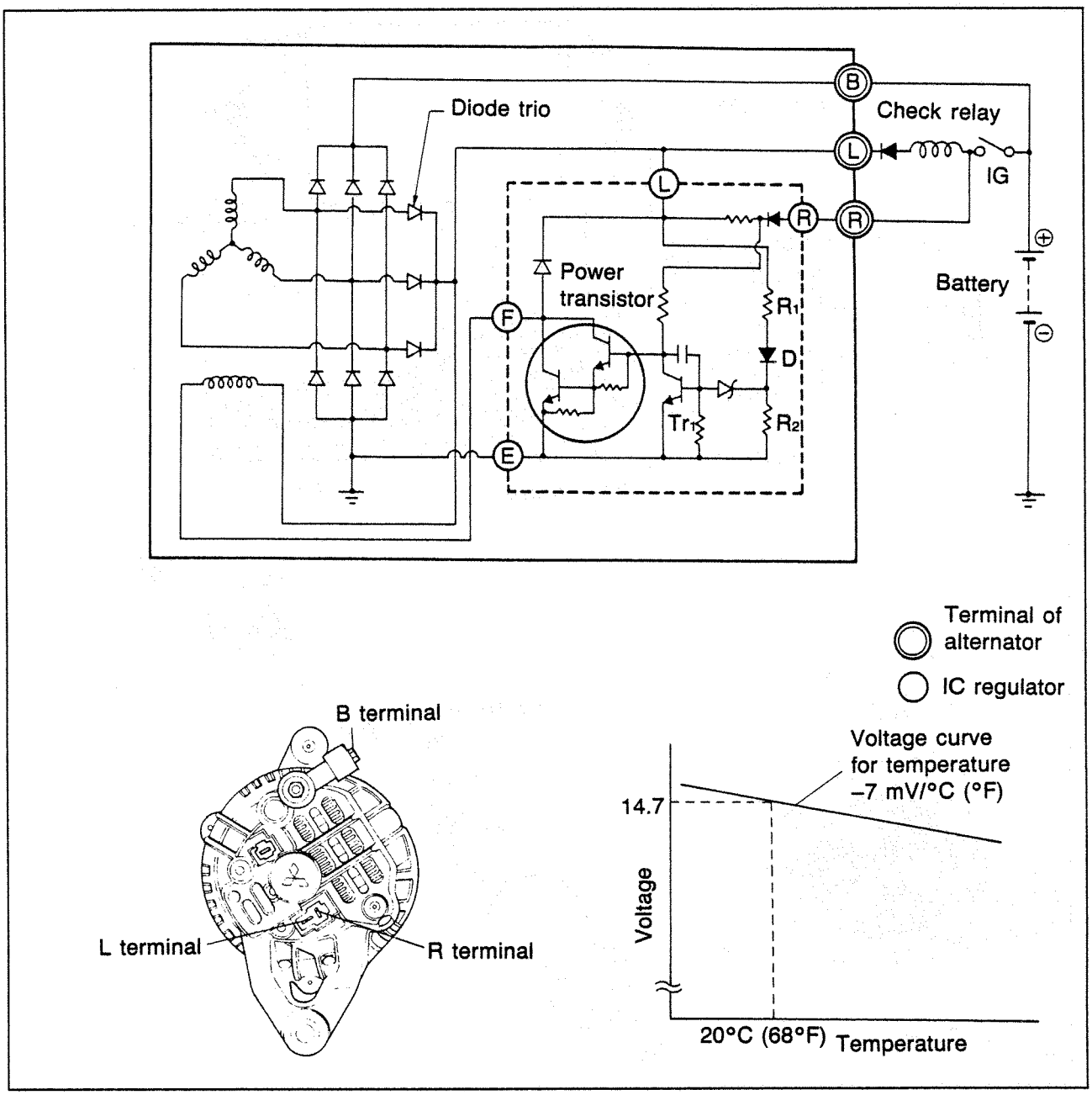
1. **Improved sparking performance ...**
   Because the gap is wide, ignition energy becomes higher, thus improving ignition of the air/fuel mixture.
2. **Improved spark plug durability ...**
   Because the spark jumps to a circumferential-type lateral electrode, the electrode lasts longer.

SERVICE POINTS

1. To clean the spark plugs, use a wire brush and then use compressed air.
2. Ignition performance will be poor if plugs with a plug gap other than **2.0 mm (0.08 in.)** are used. When replacing plugs therefore, be sure to use surface discharge ignition plugs with a plug gap of **2.0 mm (0.08 in)**.

NOTE
Do not use an abrasive plug cleaner to clean the spark plugs, because sand might remain inside the plug.

CHARGING SYSTEM (ALTERNATOR)



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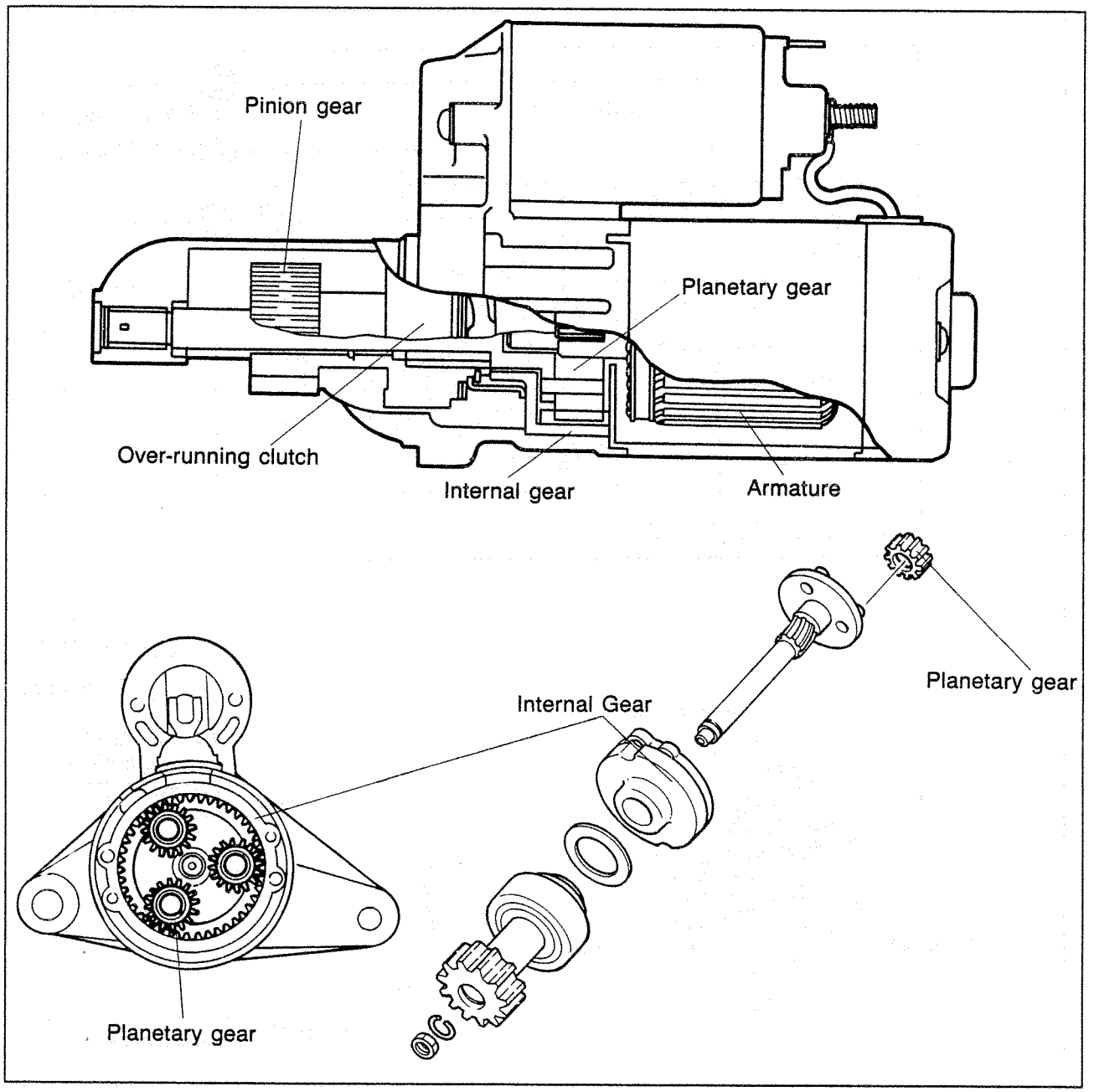
The charging system is basically the same as in the previous model. Changes are as follows:

Temperature compensation...
The IC regulator has a temperature curve which reduces the regulated voltage when the ambient temperature increases so that the battery charging voltage is maintained at the ideal level. Diode "D" is installed between the voltage-dividing resistors "R1" and "R2". When the temperature increases, the resistance of the diode which regulates current flow to "TR1" changes so that the current flows with greater ease. The result is that the regulated voltage is provided on a temperature curve.

STARTING SYSTEM (STARTER)



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The starter has been made smaller in size and lighter in weight by the use of a planetary gear and internal gear.

OPERATION

The number of armature rotations is reduced to approximately 1/5th of the planetary gear and internal gear. This reduction is output to the pinion gear.