

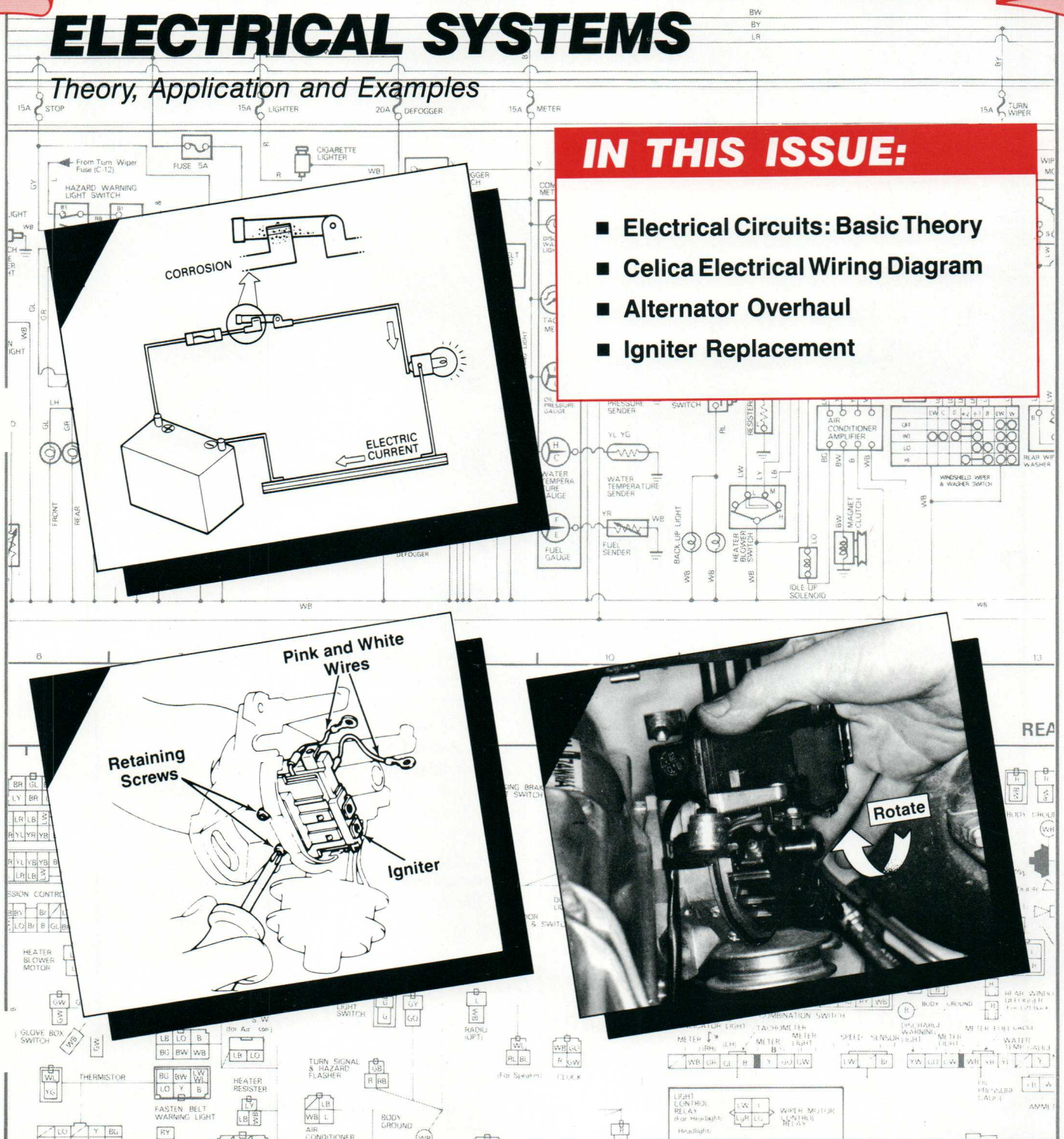
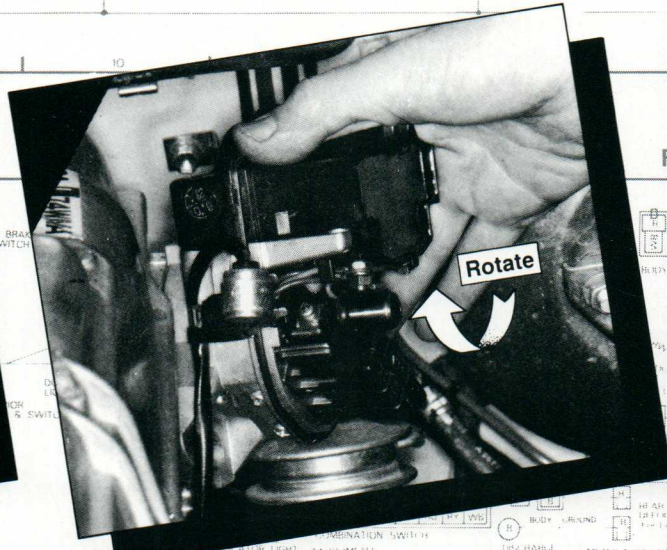
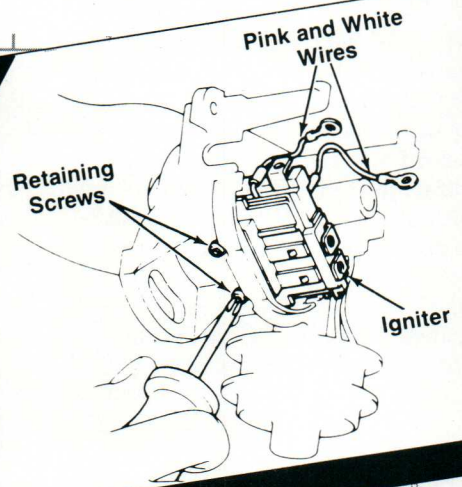
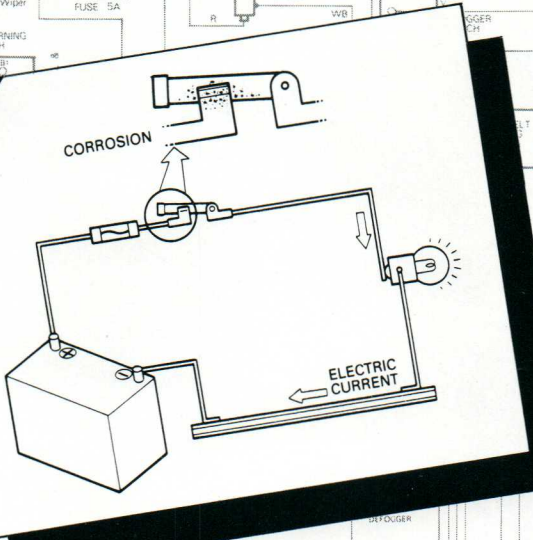
FIFTH ANNIVERSARY ISSUE

ELECTRICAL SYSTEMS

Theory, Application and Examples

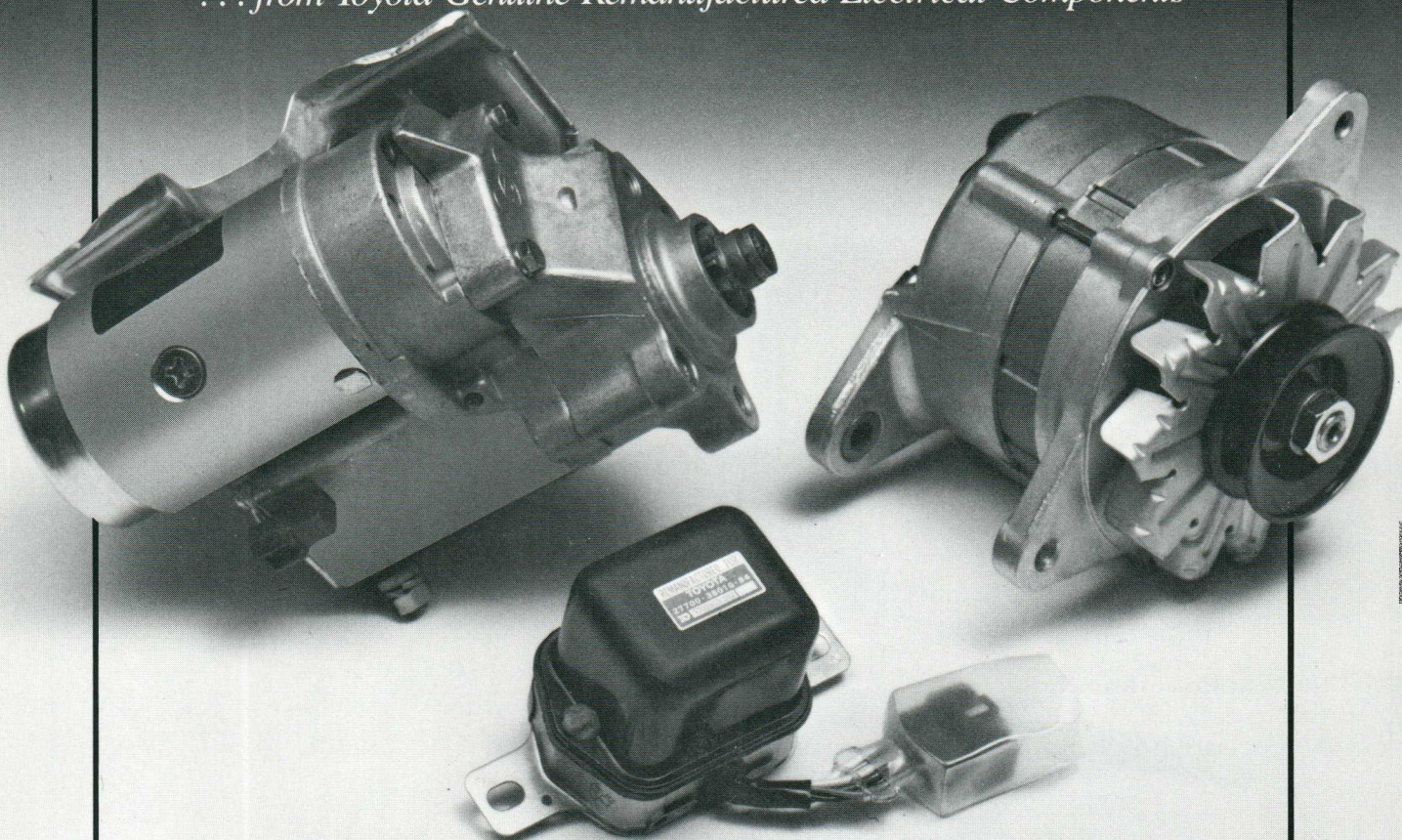
IN THIS ISSUE:

- Electrical Circuits: Basic Theory
- Celica Electrical Wiring Diagram
- Alternator Overhaul
- Igniter Replacement



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... from *Toyota Genuine Remanufactured Electrical Components*



Don't settle for rebuilt electrical parts when you can get Toyota genuine remanufactured starters, alternators and voltage regulators. Why? Because rebuilders typically recondition by only repairing or replacing worn out parts.

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TOYOTA

GENUINE PARTS

REMANUFACTURED

TOYOTA SERVICE NEWS

Summer 1986

Bulletin 20

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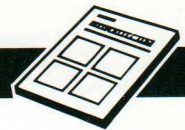
On the Cover



From basic electrical theory to practical application and replacement of electrical parts, this issue takes you through common and specific electrical procedures for Toyota vehicles. Also featured in this issue is the 1979 Celica.

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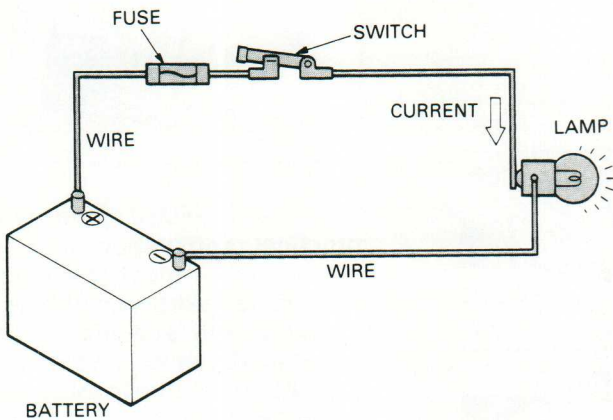


Article No. 179

ELECTRICAL CIRCUITS: BASIC THEORY

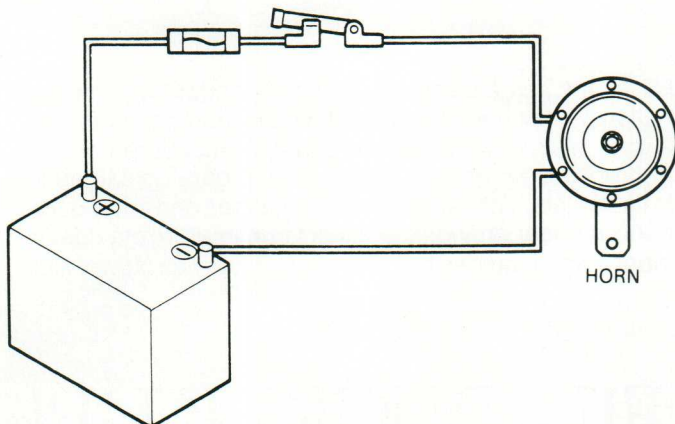
1. WHAT IS AN ELECTRICAL CIRCUIT?

The diagram below shows a battery, fuse, switch and lamp connected by wires. When the connection is made, current flows from the positive terminal of the battery through the wire, the fuse, the switch, another wire, the lamp, a wire and to the negative terminal of the battery. The route along which the electricity flows is called an electrical circuit.



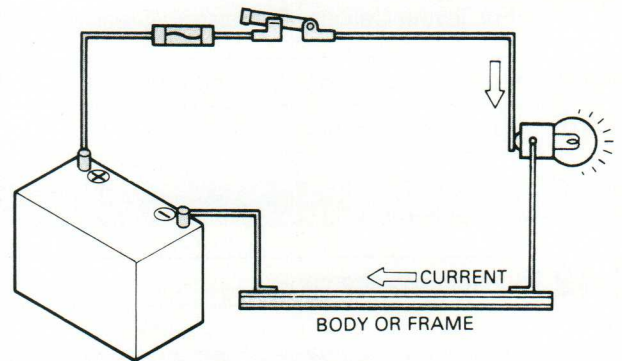
2. LOAD

The picture below has a horn in a place of the lamp. The device (lamp, horn, or wiper motor) that consumes electricity is called the load. In an electrical circuit, they are all regarded as resistance.



3. AUTOMOTIVE ELECTRICAL CIRCUITS

In an automotive electrical circuit, one end of the wire from each load returning to the battery is connected to the vehicle body or frame. Therefore, the vehicle body or frame itself functions as a conductor, allowing current to flow through the body or frame and back to the battery. The body or frame is then referred to as the ground or earth of the circuit (meaning that part of the circuit that returns the current to the battery).



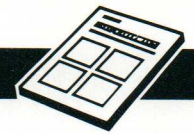
4. RESISTANCE IN A CIRCUIT

Other than the resistance of the loads and of the wires themselves, resistance in a circuit includes the contact resistance of the switch connections, the insulation resistance of the insulators, etc.

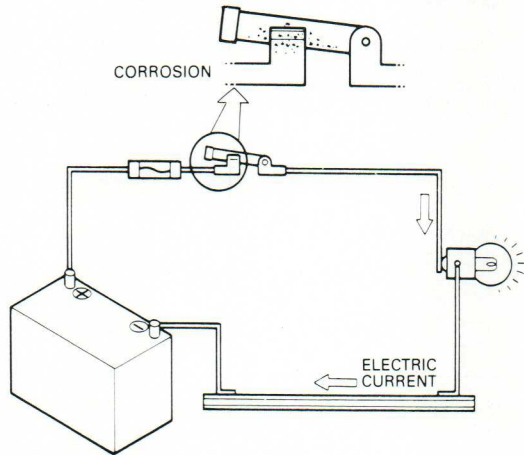
CONTACT RESISTANCE

When a wire is not connected firmly to the battery or a load, or when a switch connecting two parts is corroded, electricity flows less easily. The resistance caused by this incomplete contact is called contact resistance.

When electricity flows through areas in which contact resistance is present, it generates heat. This heat promotes further corrosion, and contact resistance becomes even greater as a result. Contact resistance can be reduced by tightening the connection or cleaning the contacting areas.



ELECTRICAL CIRCUITS: BASIC THEORY (Continued)

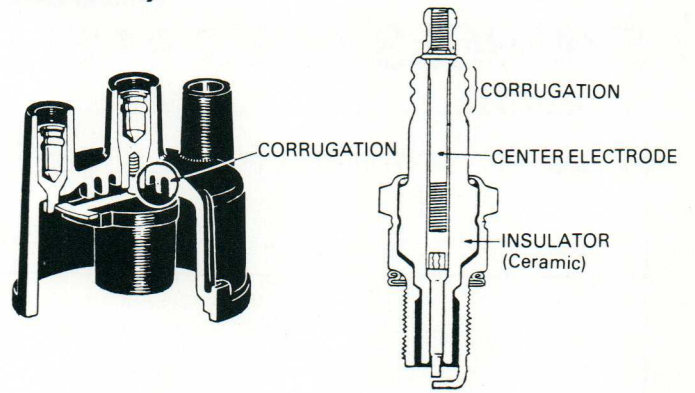
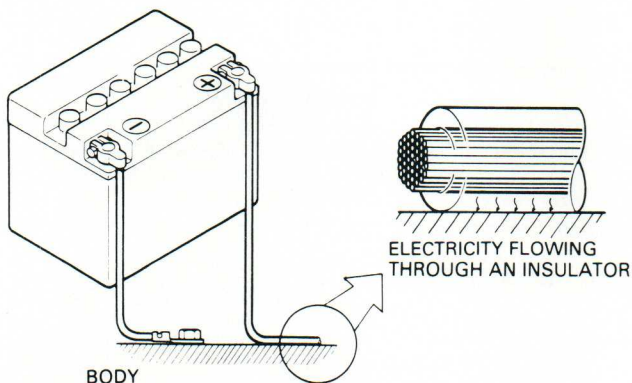


INSULATION RESISTANCE

Rubber, vinyl, mica, ceramic, etc., are used to prevent electricity from flowing between conductors. The insulating property of these materials is called insulation resistance, and is indicated by resistance values.

The fact that we can talk about insulation "resistance" indicates that electricity can, to some extent, flow between conductors through an insulator under certain conditions. Such conditions include breakage of the insulator, which allows a leak current to flow through the insulator; and flashover, involving dirt, water and other materials adhering to the surface of the insulator. In the latter case, the adhering materials act as conductors of electricity.

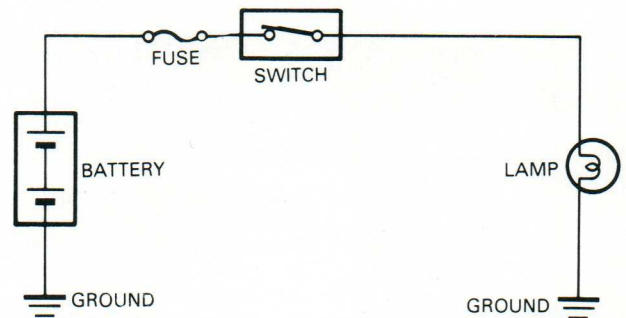
Leak current can be prevented by using wires having an appropriate thickness of insulation. Flashover can be prevented by adding corrugation to spark plugs and the inside of distributor caps in order to increase the amount of surface area.



5. ELECTRICAL CIRCUIT DIAGRAM

Attempting to draw an electrical circuit using pictures would normally result in a very complicated illustration, and one which would be extremely difficult to understand. For this reason, circuits are drawn using various symbols that represent electrical components and wires.

For example, a circuit diagram involving a battery, fuse, switch and lamp is expressed as shown below.



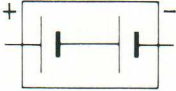


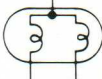

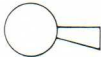

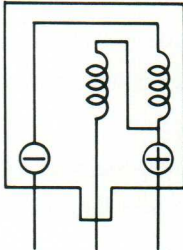



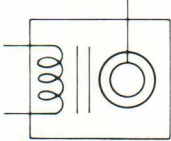







6. SYMBOLS

The following symbols are used in electrical circuit diagrams to represent electrical components that are used in automobiles.



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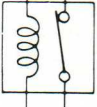


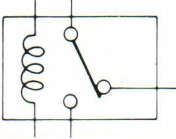
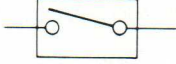
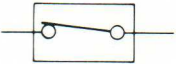

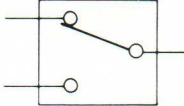

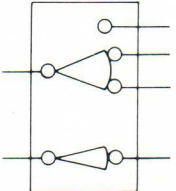

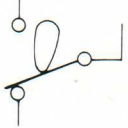
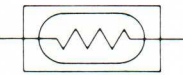





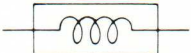
SYMBOLS USED IN ELECTRICAL CIRCUITS

 <p>BATTERY Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.</p>	<p>1. SINGLE FILAMENT</p>  <p>HEADLIGHTS Current flow causes a headlight filament to heat up and cast light. A head light may have either a single (1) filament or a double (2) filament.</p>
 <p>CAPACITOR (Condenser) A small holding unit for temporary storage of electrical current. Capacitors with a ground connection are frequently called condensers.</p>	<p>2. DOUBLE FILAMENT</p> 
 <p>CIGARETTE LIGHTER An electric resistance heating element.</p>	 <p>HORN An electric device which sounds a loud audible signal.</p>
 <p>CIRCUIT BREAKER Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.</p>	 <p>IGNITION COIL Converts low-voltage DC current into high-voltage ignition current for firing the spark plugs.</p>
 <p>DIODE A semiconductor which allows current to flow in only one direction.</p>	
 <p>DIODE, ZENER A diode which allows current flow in one direction but blocks reverse flow up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.</p>	 <p>LIGHT OR LAMP Current flow through a filament causes the filament to heat up and emit light.</p>
 <p>DISTRIBUTOR, INTEGRATED IGNITION ASSEMBLY Channels high-voltage current from the ignition coil to the individual spark plugs.</p>	 <p>LED (LIGHT EMITTING DIODE) Upon current flow, these diodes cast light without emitting the heat of a comparable light. Used in instrument displays.</p>
 <p>FUSE A thin metal strip which burns through when too much current flows through it, thereby stopping current flow and protecting a circuit from damage.</p>	 <p>METER, ANALOG Current flow activates a magnetic coil which causes a needle to move against a background calibration.</p>
 <p>FUSIBLE LINK A heavy-gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit.</p>	 <p>METER, DIGITAL Current flow activates one or many LED's, LCD's, or fluorescent displays, which provide a digital display.</p>
 <p>GROUND The point at which wiring attaches to the chassis, thereby providing a return path for an electrical circuit; without a ground, current cannot flow in an automobile.</p>	 <p>MOTOR A unit which converts electrical energy into mechanical energy, especially rotary motion.</p>



(Continued)

SYMBOLS USED IN ELECTRICAL CIRCUITS

<p>1. NORMALLY CLOSED</p>  <p>2. NORMALLY OPEN</p> 	<p>RELAY Basically, an electrically operated switch which may be normally closed (1) or open (2). Current flow through a small coil creates a magnetic field which either opens or closes an attached switch.</p>	 <p>SPEAKER An electromechanical device which creates sound waves from current flow.</p>
	<p>RELAY, DOUBLE THROW A relay which passes current through one set of contacts or the other.</p>	<p>1. NORMALLY OPEN</p>  <p>2. NORMALLY CLOSED</p> 
	<p>RESISTOR An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.</p>	 <p>SWITCH, DOUBLE THROW A switch which continuously passes current through one set of contacts or the other.</p>
	<p>RESISTOR, TAPPED A resistor which supplies two or more different non-adjustable resistance values.</p>	 <p>SWITCH, IGNITION A key operated switch with several positions which allow various circuits, especially the primary ignition circuit, to become operational.</p>
	<p>RESISTOR, VARIABLE A controllable resistor with a variable rate of resistance. Also called a potentiometer or rheostat.</p>	 <p>SWITCH, WIPER PARK Automatically returns wipers to the stop position when the wiper switch is turned off.</p>
	<p>THERMISTOR A resistor which varies its resistance with temperature, thus acting as a temperature sensor.</p>	 <p>TRANSISTOR A solid-state device typically used as an electronic relay; stops or passes current depending on the applied base voltage.</p>
	<p>SENSOR, ANALOG SPEED Uses magnetic impulses to open and close a switch to create a signal for activation of other components.</p>	<p>1. NOT CONNECTED</p>  <p>2. CONNECTED</p>  <p>WIRES Wires are always drawn as straight lines on wiring diagrams. Crossed wires (1) without a black dot at the junction are not connected; crossed wires (2) with a black dot at the junction are connected.</p>
	<p>SHORT PIN Used to provide a connection within a junction block.</p>	
	<p>SOLENOID An electromagnetic coil which creates a magnetic field upon current flow to move a plunger, etc.</p>	



Article No. 181

ELECTRICAL WIRING DIAGRAM NOTES

(1979 CELICA)

NOTE: The following information is typical of Toyota Wiring Diagrams. The following example is for a 1979 Toyota Celica. This information is available in **all** Toyota Repair Service/Shop Manuals at your Local Toyota Dealer.

1. Each wiring diagram consists of the Index and three drawings.
Index Shows the location of each part in figures 1, 2 and 3.
Fig. 1 Shows the wiring circuit and wire colors.
Fig. 2 Shows the connectors and wire colors. If the wire colors on the part side and harness side differ, the colors of each are indicated.
Fig. 3 Shows the vehicle as divided into section.

2. WIRE COLOR

Wire colors on the vehicle are identified in the following diagram by an alphabetical code. The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

- Br = Brown
- G = Green
- Gr = Grey
- L = Light Blue
- Lg = Light Green
- O = Orange
- R = Red
- W = White
- Y = Yellow

Example: R-G indicate a Red wire with a Green stripe.

3. The legend in bracket () of the wiring diagram shows the grid location of the mating connection.
4. Broken lines in the wiring diagram indicate varied or optional equipment.

FIG. 1

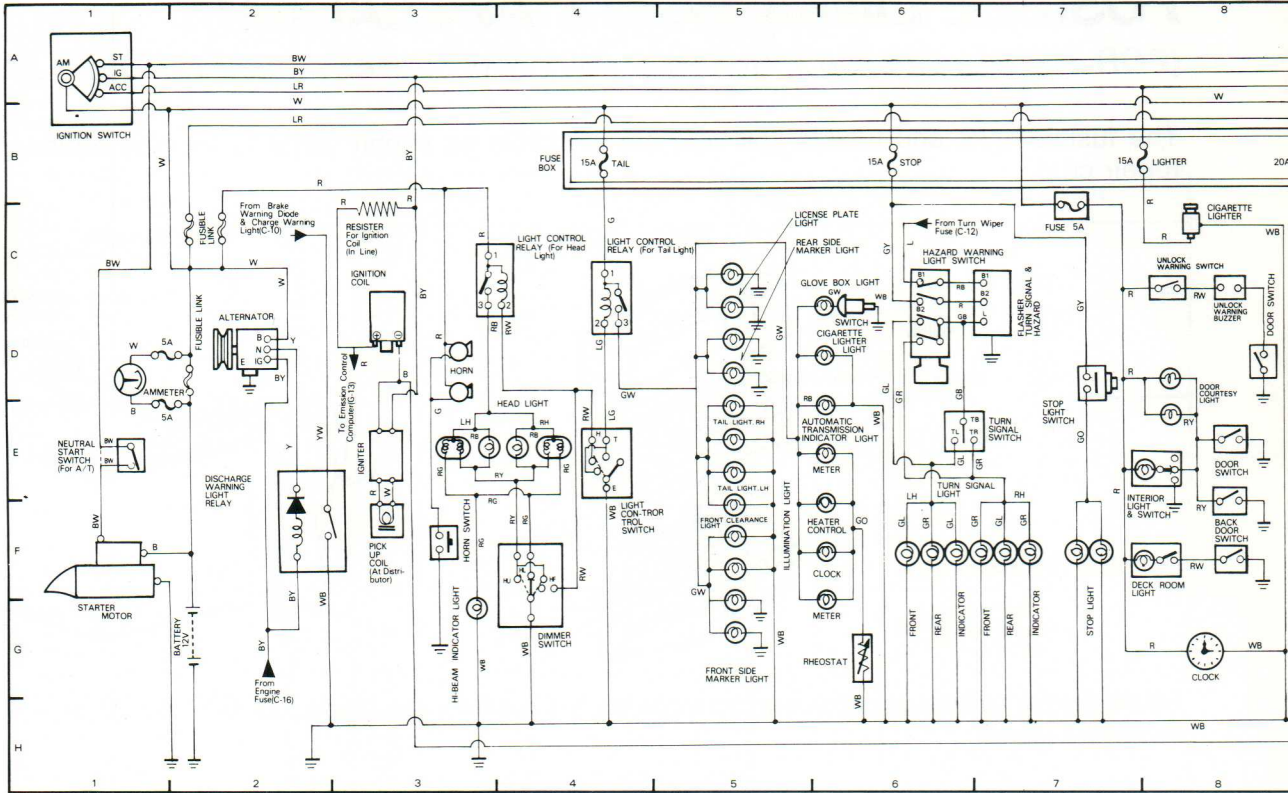
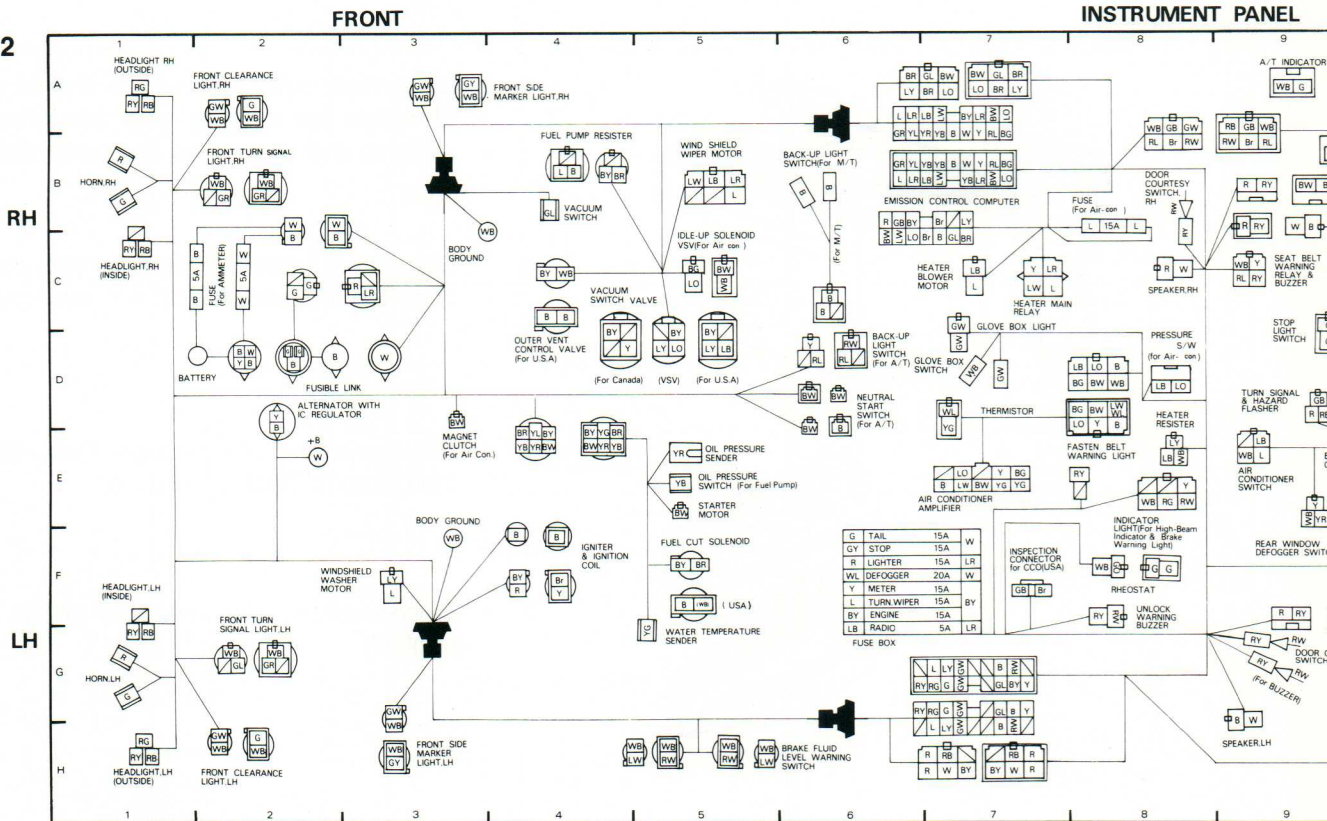


FIG. 2



WIRING DIAGRAM (1979 CELICA)

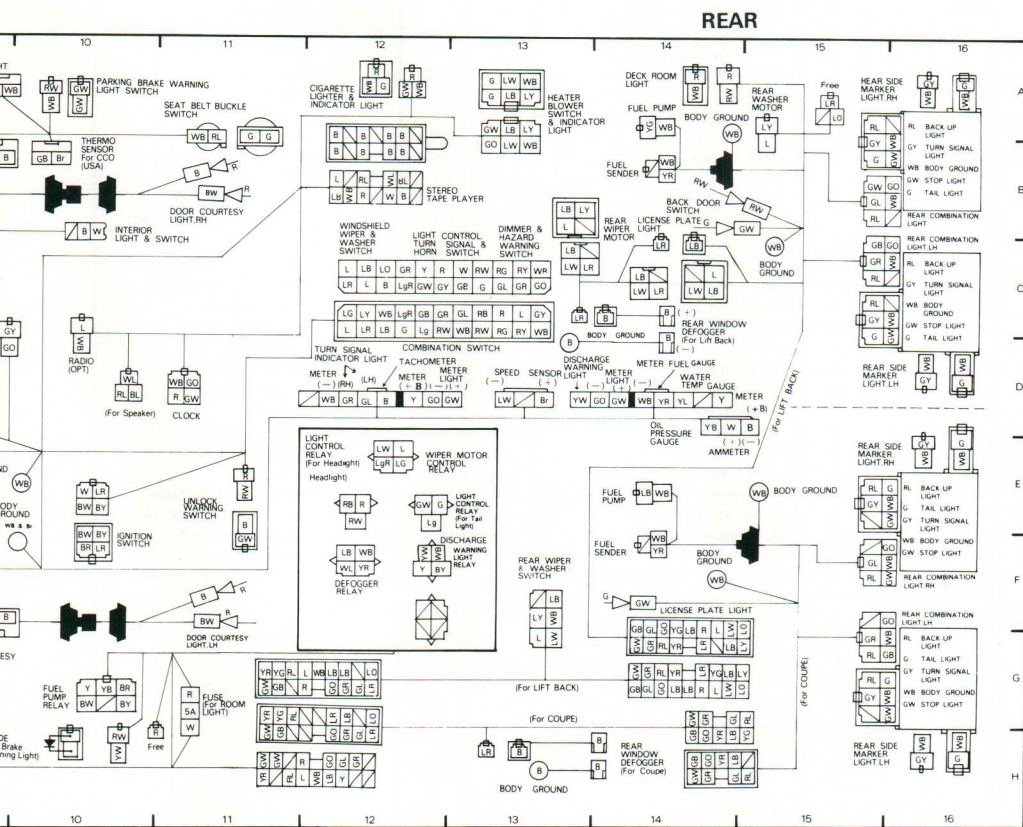
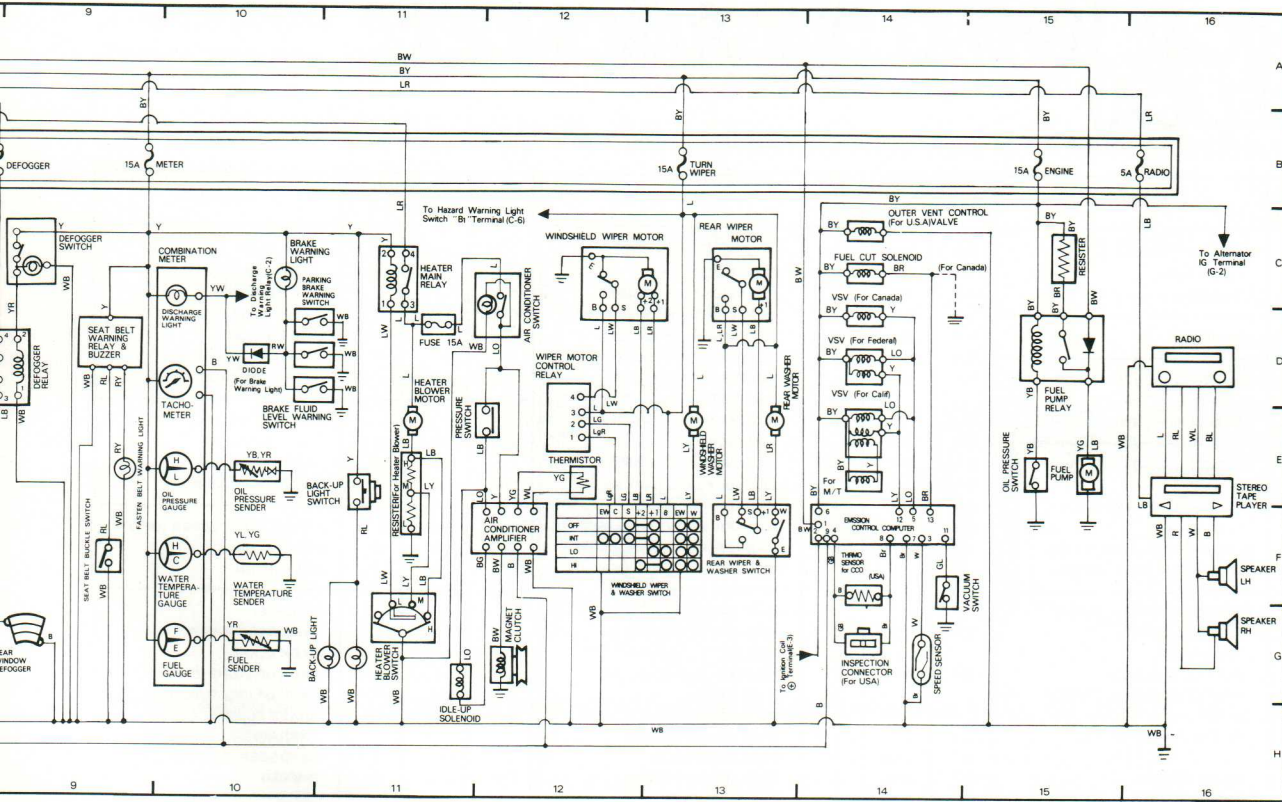
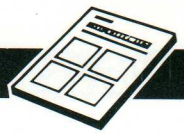
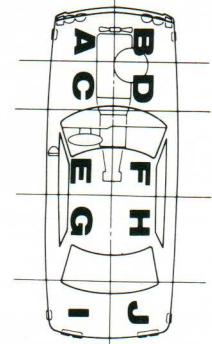


FIG. 3



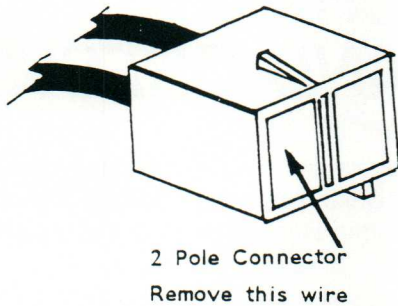
Wiring color code is shown with alphabetical letter/s. The first letter indicates the basic color for the wire, and the second letter indicates the spiral line color.

- B = Black
- Br = Brown
- G = Green
- Gr = Grey
- L = Light Blue
- O = Orange
- R = Red
- W = White
- Lg = Light Green

Example: RG is for Red and a Green line.



FUSIBLE LINKS PARTS AVAILABILITY (Continued)



5. Remove the indicated terminal from this connector to allow installation of the new fusible link wire.
6. Remove previous fusible link wire from wire harness, and tape the new wire to the harness.
7. Reinstall under cover to Relay Block #3 and then reinstall block to vehicle.
8. Connect new fusible link wire terminal to positive terminal of battery. Tighten securely.
9. Reconnect ground cable to negative terminal of battery.
10. Reset digital clock/radio if so equipped.

PART NUMBER INFORMATION:

<u>Item</u>	<u>Part Number</u>	<u>Part Name</u>	<u>Model</u>
1	90982-08125	Fusible Link (1.0 Yellow)	RA/MA
2	90982-08157	Fusible Link (0.3 Pink)	RA/MA
3	90982-08197	Fusible Link (0.3 Pink)	RA
3	90982-08199	Fusible Link (0.3 Pink)	MA
4	82991-14010	Wire, Fusible Link Repair	MA/MX
4	82991-14020	Wire, Fusible Link Repair	RA

NOTE: These parts apply to 1982 models and on.

LEGEND

VEHICLE

Cressida
Supra
Celica

MODEL

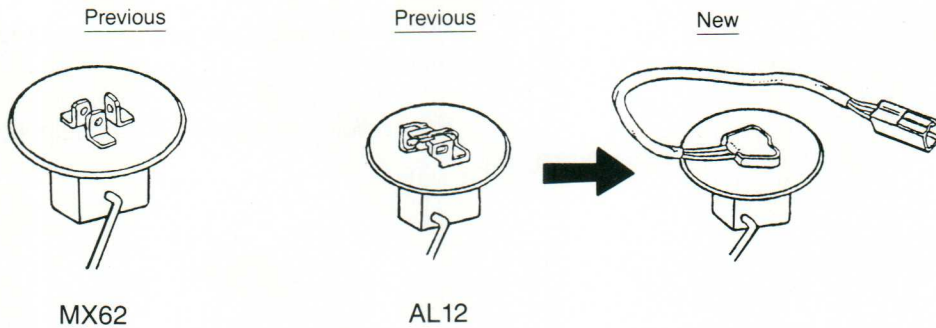
MX
MA
RA



Article No. 185

FUEL GAUGE SENDER CHANGE FOR THE 1981 TERCEL AND CRESSIDA

The fuel senders and related wiring harnesses for 1981 model Terrels and Cressida Sedans have been changed to relocate the wiring harness connector. The location of the connection has been changed from the top of the sender to the rear floor of the luggage compartment. The new sender assemblies have a short wiring lead included, and use a new smaller sized harness connector.



PRODUCTION EFFECTIVE:

From Frame No.

AL12-199878
MX62-004846 Sedan only

Production Date

December, 1980
December, 1980

PART NUMBER INFORMATION:

	<u>Previous Part No.</u>	<u>New Part No.</u>	<u>Part Name</u>
MX62	83320-29425	83320-29505	Gauge Assembly, Fuel Sender Wiring Assembly, Chassis Connector Kit
	82420-22450	82420-22451	
		90980-08136	
AL12	83320-19455	83320-19515	Gauge Assembly, Fuel Sender (w/fuel light)
	83320-19445	83320-19505	Gauge Assembly, Fuel Sender (w/o fuel light)
		90980-08136	Connector Kit
		90480-26043	Grommet



FUEL GAUGE SENDER CHANGE FOR THE 1981 TOYOTA TERCEL AND CRESSIDA (Continued)

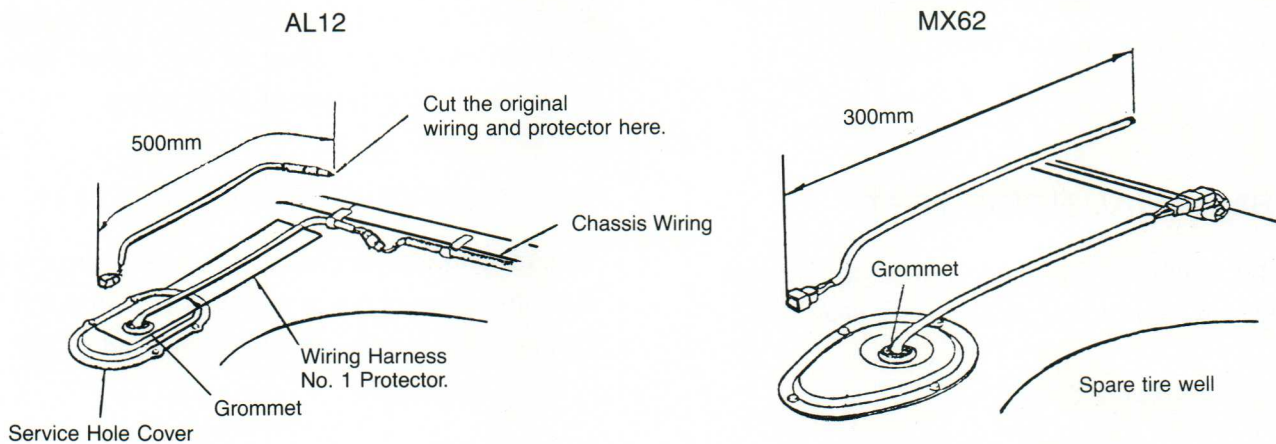
REPLACEMENT PROCEDURE:

Please follow the instructions below when installing a new fuel sender on early 1981 model Terrels and Cressida Sedans.

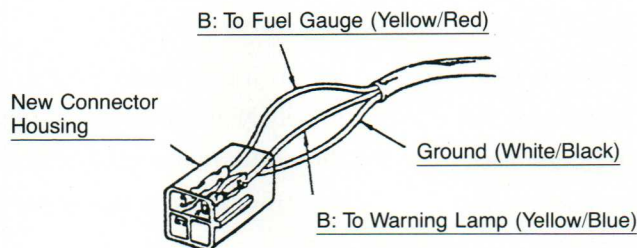
- 1) Disconnect battery
- 2) Remove and replace the fuel sender according to Repair Manual instructions.

CAUTION: Avoid sparks or flame while working with the fuel tank and sender.

- 3) Route the fuel sender wiring through the hole in the service cover and reinstall the original grommet.
- 4) Cut the body wiring harness at approximately the same length as the new sender lead wire (AL = 500mm, MX = 300mm).



- 5) Install the new connector kit (P/N 90980-08136) to the end of the shortened body wiring harness.
 - a. Strip approximately 0.25 inch of insulation from the three wires.
 - b. Crimp the new terminals onto the wires.
 - c. Insert the terminals into the plastic connector housing, according to the illustration below.



- 6) Connect the fuel sender to the wiring harness.
- 7) Secure the wire harness in place using the original wiring clamps and adhesive sheet (No. 1 protector).
- 8) Connect the battery and check the fuel gauge for proper operation.



Article No. 186

ALTERNATOR OVERHAUL AND TESTING PROCEDURES (TYPICAL TOYOTA ALTERNATOR)

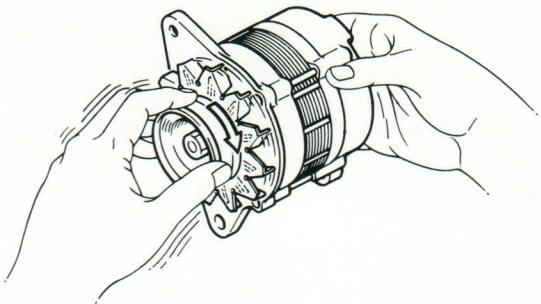
To insure that work is being done in the proper procedure, refer to the repair manual whenever disassembling or inspecting the alternator. The following are some precautions to be observed:

PRE-INSPECTION

Before disassembling the alternator, perform the following pre-checks. The results of these pre-checks will prove helpful when inspecting each individual component later on.

1. ABNORMAL NOISE TEST

Turn the alternator by hand. Check for smooth rotation and listen for any abnormal noise.



The alternator has bearings inside. If these bearings are damaged in some way the alternator will not turn smoothly and you will hear a noise. Also, to some extent, you can tell if the brushes or slip rings are damaged by turning the alternator.

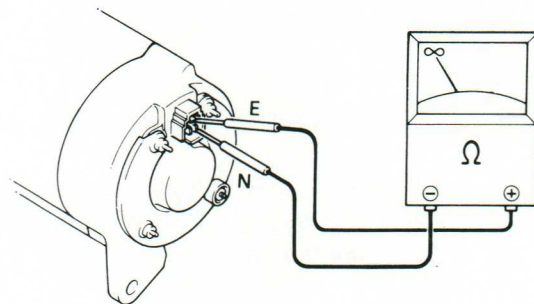
This same test should also be done after reassembling the alternator to check that it has been reassembled properly.

2. CONTINUITY TEST

The circuit tester utilizes dry cell batteries. A very small amount of current will flow when the tester probes make contact with the circuit to be tested, and the resistance value of the circuit can be measured by the extent of this current.

NEGATIVE SIDE RECTIFIER SHORT TEST

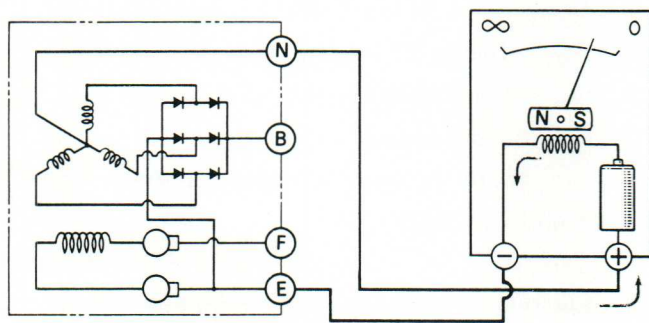
By checking the continuity between terminal N and E of the alternator, it is possible to find out if the positive side diodes are short circuited or not.



When the 2 tester probes make contact with terminals N and E of the alternator, the indicator needle of the tester may or may not fluctuate, depending on whether or not there is battery current flowing.

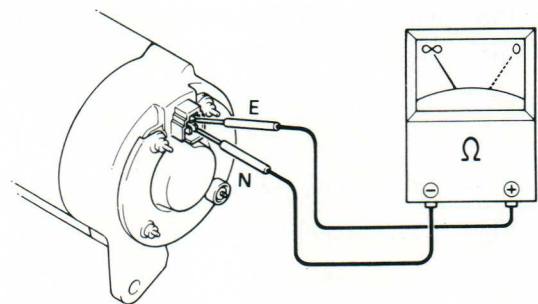
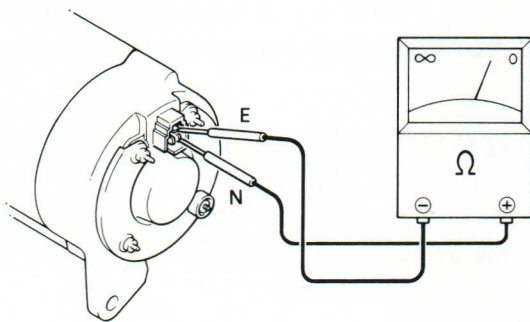
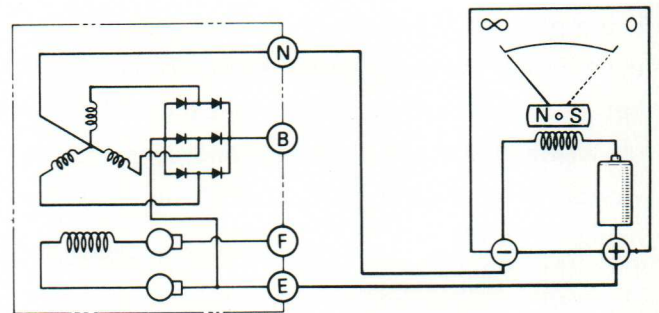


The positive (+) pole of the tester batteries is connected to the negative (-) probe and the negative (-) pole of the batteries is connected to the positive (+) probe. Therefore, when the positive probe is touched to terminal N and the negative probe touched to terminal E, there will be a flow of battery current and the tester needle will fluctuate if there is continuity between all diodes on the negative side.



If the diodes are normal, current will flow in one direction only.

If current flows in both directions, the diodes are defective and this is called a short-circuit. On the other hand, if current does not flow in either direction, it is called an open-circuit.



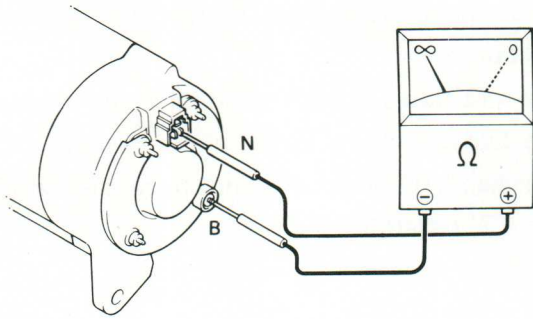
NOTE: The extent of the current, or the resistance value of the diodes, will change, depending on the selected range of the circuit tester. Therefore, it is difficult to tell if a semi-conductor, such as a diode is bad or not by the resistance value.

Conversely, it can be determined that there is no continuity between the negative side diodes if there is no battery current when the negative (-) probe is touched to terminal N and the positive (+) probe is touched to terminal E. If the tester needle does fluctuate, it means that there is current flowing and there are one or more short-circuited diodes on the negative side.

POSITIVE SIDE RECTIFIER SHORT TEST

It can be known if there is a short-circuit in the positive side diodes by checking the continuity between terminals N and B of the alternator.

If all the diodes on the positive side are normal, the tester needle will not fluctuate when the negative (-) tester probe is touched to terminal B and the positive (+) probe touched to terminal N. If the needle does fluctuate, that is, if there is continuity, a short is indicated at the positive side diodes.



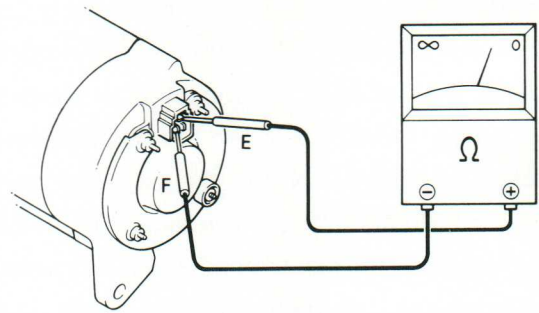
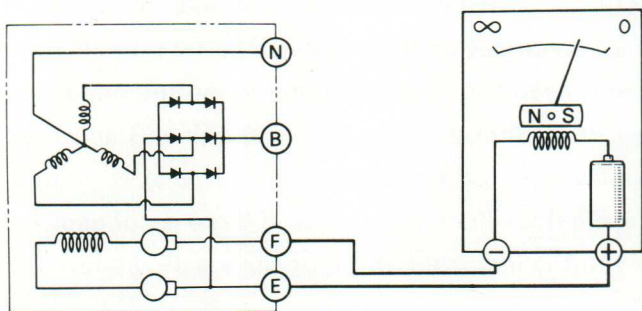
If the positive (+) tester probe is touched to terminal B and the negative (-) probe to terminal N, battery current will be flowing and the tester needle will fluctuate under normal conditions. In other words, there should be continuity between terminals B and N.

However, if there is an open-circuit between all the positive side diodes, the tester needle will not fluctuate when the probes are touched to the terminals. In this case, the charge lamp will go out the same as when the engine is started, but the battery will not be recharged because there is no output current from terminal B of the alternator.

It is a rare possibility, however, that all diodes on the positive side would be open-circuited.

ROTOR COIL RESISTANCE TEST

By checking for continuity between terminals F and E of the alternator, it can be known whether or not the rotor coil is severed or if there is bad contact between the brushes and slip rings.



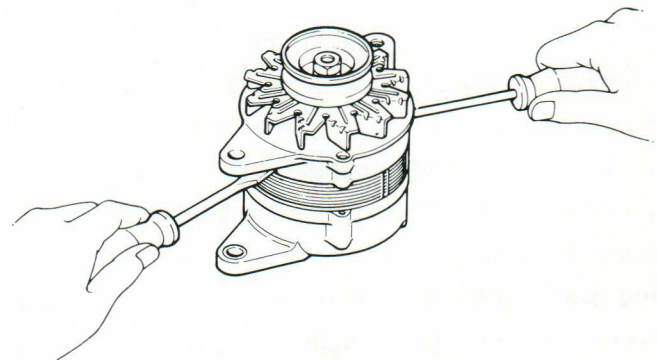
As field current for the rotor coil is flowing in the circuit between terminals F and E, there would be continuity between these two terminals, and the resistance value should be around 4 ohms. If there is no continuity, either the rotor coil is severed or there is poor contact between the brushes and slip rings.

With this test, the positive and negative probes may touch either terminal E or F. In other words, as the rotor coil is not a semiconductor, tester battery current can flow in either direction.

DISASSEMBLY & INSPECTION

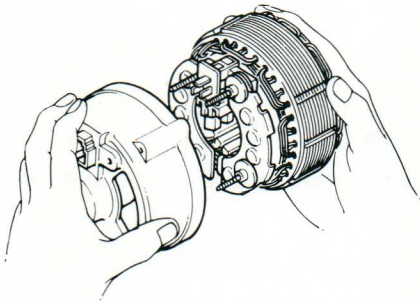
Refer to the appropriate repair manual for disassembly and inspection procedures of the alternator.

To separate the front end frame and stator, first pry them apart with two screwdrivers and then tap off the end frame with a plastic hammer. Be careful not to push the screwdrivers in too far as the stator coil could be damaged.

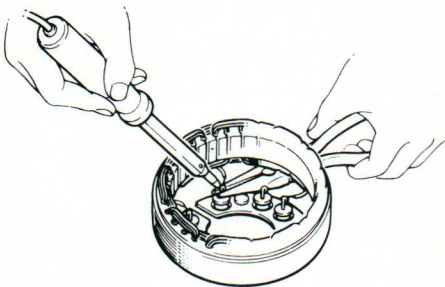




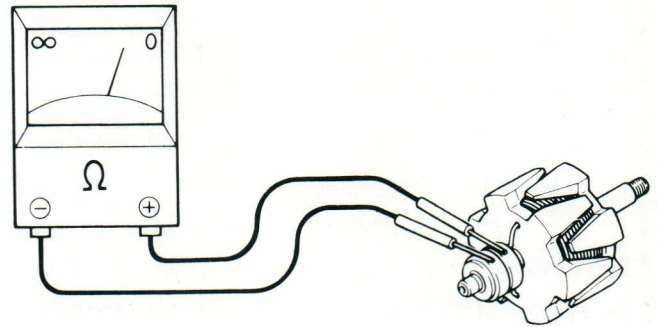
Also, be careful not to lose the insulator washer or insulator bushings between the end frame and rectifier (diode) holder. Make a note of where the insulators are installed and be sure to position them in the same manner when reassembling the rear end frame and stator.



The diode holder must be removed from the stator before the stator coil or diodes can be checked. Using a soldering iron, melt the solder at the connection. Try to do this as short a time as possible, and hold the diode lead with a pair of pliers so that the heat of the soldering iron is not transmitted to the diode. The diodes are semiconductors and can be damaged by heat. The same precautions should be observed during reassembly.



A circuit tester or ohmmeter is used to measure the resistance of the rotor coil. The rotor coil is connected to a slip ring at both ends so the resistance between the two slip rings should be measured. The amount of resistance will vary with the capacity of the alternator but normally it should be less than 5 ohms.

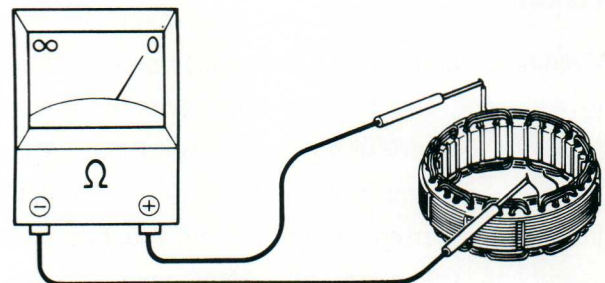


When measuring the resistance, take care not to scratch the surface of the slip rings. As the slip rings come into contact with carbon brushes, a scratch on the ring would cause early wear of the brushes. If the slip ring is accidentally scratched, it can be repaired with fine-grain sandpaper.

A circuit tester is also used for checking the stator. Three stator coils are assembled to the stator. The continuity between each lead and coil connection (neutral point) should be checked.

As the stator coil used thick copper wire, the resistance is very low—generally less than 1.0 ohm, and it is rare that the wire will break. If there is no continuity, carefully check the connections.

As there is insulation between the stator coil and stator core, there should not be continuity. If a mega tester is available, measure the resistance of the insulation. Normally, there is 0.1 megaohm of resistance with 500 megavolts.

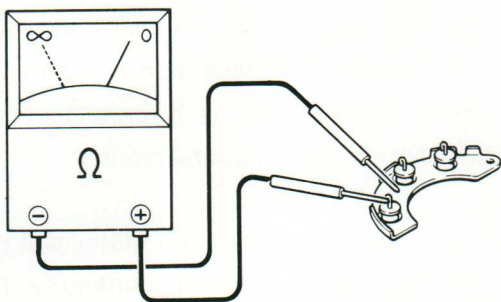




A circuit tester or ohmmeter is used to check for a short-circuit or an open-circuit of the diodes. A mega tester, used for measuring insulation resistance, should never be used as it would apply too many volts to the diodes.

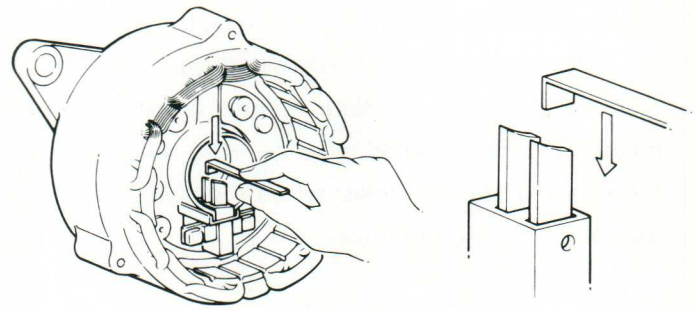
The circuit tester and ohmmeter utilize drycell batteries. Resistance is measured in accordance with the amount of current flow of these batteries. The resistance of the diodes will vary in accordance with the battery voltage of the tester or meter and, therefore, it is not possible to tell if a diode is good or bad by measuring the diode resistance.

For this reason, when inspecting the diodes, the tester needle should deflect widely only either when one of the tester probes is touched to the diode body and the other to the terminal or vice versa.



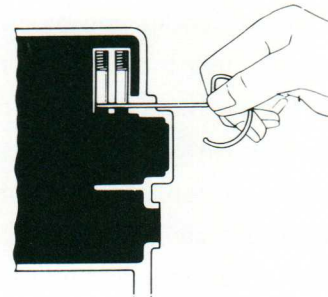
ASSEMBLY

When re-assembling the front-end frame, containing the rotor, and the rear-end frame, containing the stator, be careful not to damage the brushes. The rear-end frame has a service hold into which a pin can be inserted to support the brushes while assembling the alternator. After assembly, this hold should be resealed to prevent entry of water.

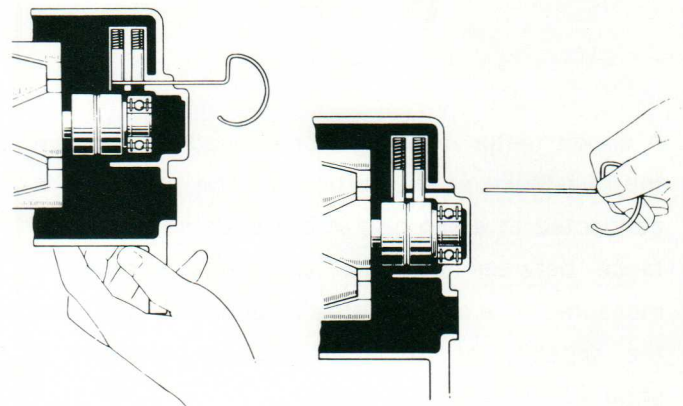


First push the two brushes up into the brush holder and then insert the pin from the rear of the end frame.

As the pin is sharp, take care not to insert it in too strongly and damage the brushes.

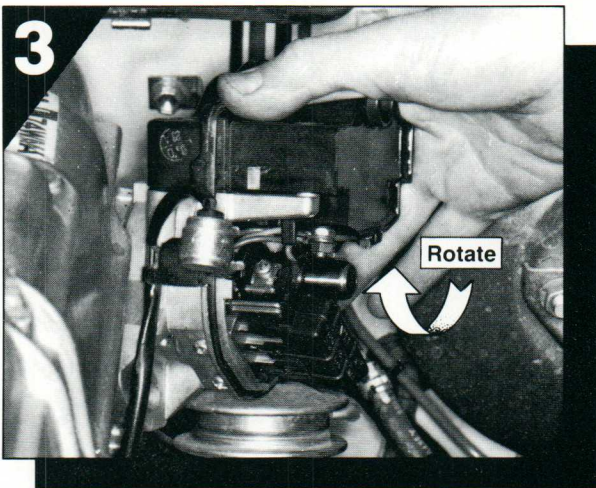
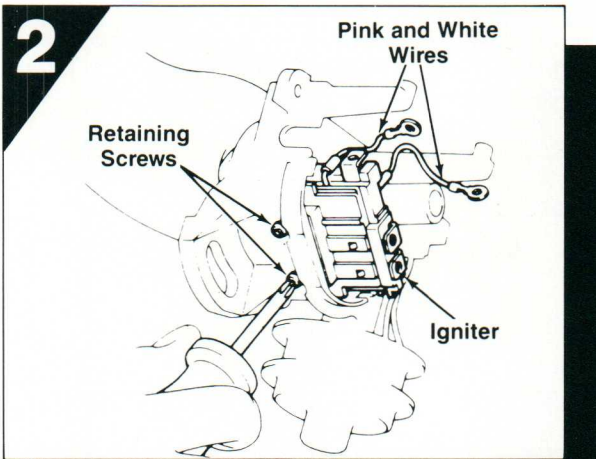
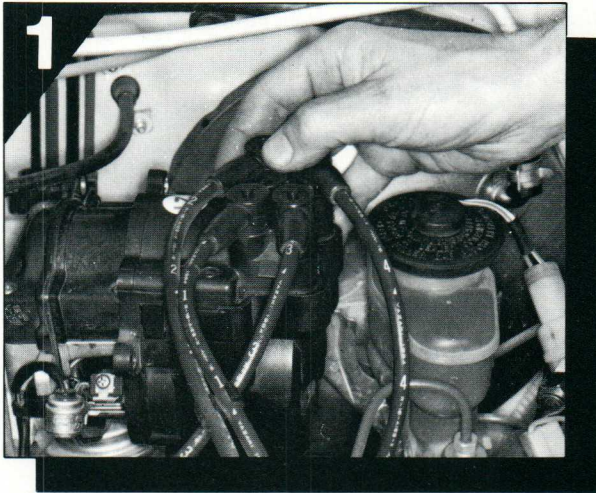


Also, do not allow grease or oil to come into contact with the brushes or slip rings. Grease or oil on the contact surfaces would increase the contact resistance and prevent a sufficient flow of field current to the rotor coil.





Article No. 187



IGNITER REPLACEMENT

HOW TO REPLACE THE IIA IGNITER WITHOUT REMOVING THE DISTRIBUTOR

1. Remove distributor cap, rotor and dielectric insulator covers.
2. Disconnect red and yellow wires from coil and pink, white and black wires from igniter.
3. Remove igniter. It may be necessary to mark and rotate the distributor to gain access to the igniter retaining screws. Timing should be checked after the distributor is returned to the mark.
4. Install new igniter using the two new retaining screws.
5. Twist pick-up coil wires together, install white wire first then pink and black wires in their **original** locations. Make sure wires do not touch housing, generator or advance plate.
6. Route red and yellow wires from igniter so they do not contact moving parts. Connect red wire to right coil terminal (with brown wire) and yellow wire to left terminal (with blue wire).
7. Replace covers, rotor and cap.

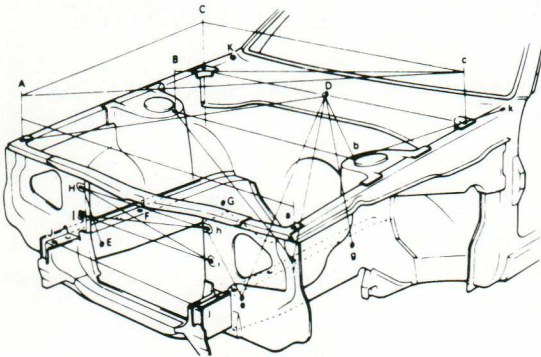
APPLIES TO FOLLOWING VEHICLE MODELS

<u>VEHICLE</u>	<u>MODEL</u>
'83 Tercel to date	AL
'83 Corolla to date	AE
'83 Camry to date	SV
'84 Van to date	YR



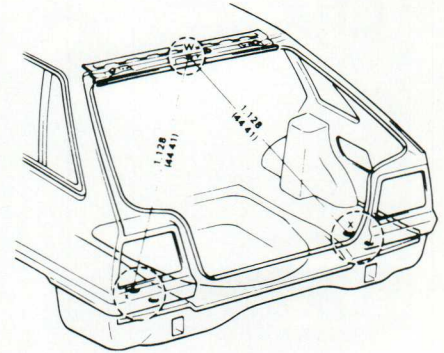
Article No. 188

REPAIR MANUAL FOR COLLISION DAMAGE



FEATURING:

- Factory recommended repair procedures
- Weld locations & types
- Body dimensions
- Body sealing points
- Plastics type & locations



MODEL	MODEL YEAR	PUBLICATION NO.
Starlet	1981, 82, 83, 84	36158
Tercel	1980, 81, 82	98367
Tercel	1983, 84, 85, 86	36431E
Tercel 4 x 4	1984, 85, 86	36432E
Corolla	1980, 81, 82, 83	36001
Corolla (RWD & FWD)	1984, 85, 86	36434E
Celica & Supra	1982, 83, 84, 85	36182
Celica	1986	BRM001E
Camry	1983, 84, 85, 86	36433E
Cressida	1981, 82, 83, 84	36118
Cressida Sedan	1985, 86	36441E
Cressida Wagon	1985, 86	36442E
MR2	1985, 86	36440A
Van	1984, 85, 86	BRM003E
Fundamental Painting Procedure	All	36438E

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1. WHAT ARTICLES WOULD YOU LIKE TO SEE IN TOYOTA SERVICE NEWS?

GENERAL REPAIR

ARTICLE	MAKE	MODEL	YEAR
<input type="checkbox"/> Engine Repair <input type="checkbox"/> Gas <input type="checkbox"/> Diesel	_____	_____	_____
<input type="checkbox"/> Transmission/Transaxle Repair	_____	_____	_____
<input type="checkbox"/> Brake Repair	_____	_____	_____
<input type="checkbox"/> Suspension and Steering	_____	_____	_____
<input type="checkbox"/> Electrical Systems	_____	_____	_____
<input type="checkbox"/> Heating and Air Conditioning Repair	_____	_____	_____
<input type="checkbox"/> (Other)	_____	_____	_____

COLLISION REPAIR

ARTICLE	MAKE	MODEL	YEAR
<input type="checkbox"/> Refinishing Information	_____	_____	_____
<input type="checkbox"/> Corrosion Protection Restoration	_____	_____	_____
<input type="checkbox"/> High Strength Steel Locations	_____	_____	_____
<input type="checkbox"/> Underbody Dimensions	_____	_____	_____
<input type="checkbox"/> Welding Procedures	_____	_____	_____
<input type="checkbox"/> Electrical Diagrams	_____	_____	_____
<input type="checkbox"/> (Other)	_____	_____	_____

2. WHAT TYPE OF BUSINESS DO YOU HAVE?

<input type="checkbox"/> Brake Shop	<input type="checkbox"/> Garage (General Repair Shop)	<input type="checkbox"/> Gasoline Service Station
<input type="checkbox"/> Muffler Shop	<input type="checkbox"/> Body Shop	<input type="checkbox"/> Radiator Repair Shop
<input type="checkbox"/> Parts Store	<input type="checkbox"/> Transmission Repair Shop	<input type="checkbox"/> Other

3. WHAT DO YOU FIND USEFUL ABOUT THE ILLUSTRATIONS IN TOYOTA SERVICE NEWS?

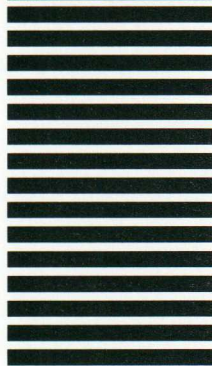
- Speeds up repairs/service
- Makes text easier to understand
- Other (please specify) _____

4. WHAT OTHER RECOMMENDATIONS OR COMMENTS WOULD YOU LIKE TO MAKE CONCERNING TOYOTA SERVICE NEWS?

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Starters

Part No.	Model	Model No.	Year	Note
28100-26043-84*	Corolla	TE3#, 51, 72	1975-80	1.0 KW (STD)
28100-26053-84*	Corolla	TE3#, 51, 72	1975-80	1.4 KW (OPT)
28100-27040-84*	Corolla	TE72	1981-82	1.4 KW
28100-34044-84*	Corona	RT10#, 11#, 13#	1974-80	1.4 KW
"	Truck	RN2#, 3#, 4#	1974-80	1.4 KW
"	Celica	RA2#, 4#	1975-80	1.4 KW
28100-36020-84	Mark II	RT6#, 7#	1969-72	1.0 KW
"	Truck	RN1#, 2#, 3#, 4#	1970-80	1.0 KW
"	Celica	RA2#, 4#	1971-80	1.0 KW
"	Corona	RT8#, 9#, 10#, 11#, 13#	1971-80	1.0 KW
28100-45022-84*	Mark II & Cressida	MX1#, 2#, 3#, 6#	1972-81	1.4 KW
"	Supra	MA4#	1979-81	1.4 KW

* GEAR REDUCTION TYPE

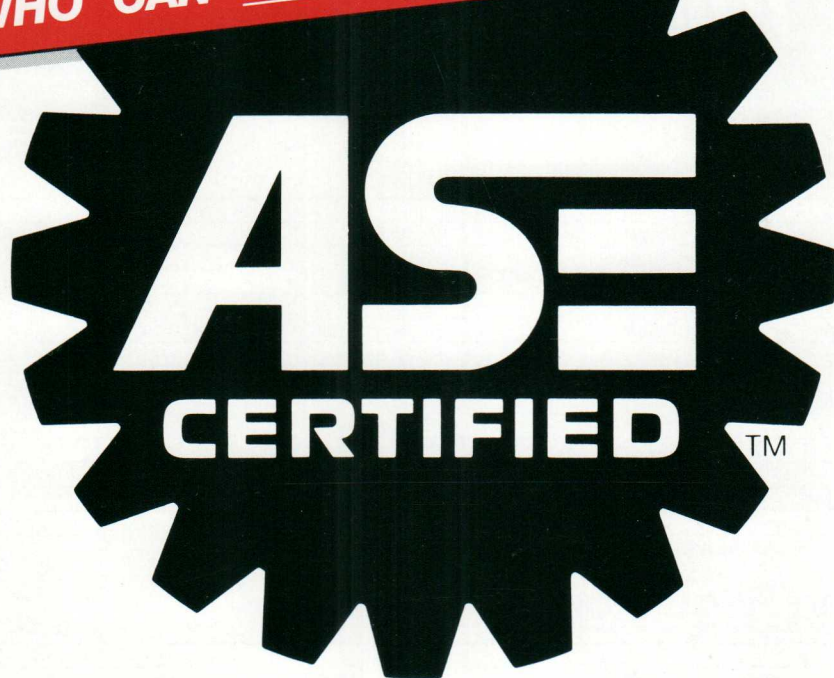
Voltage Regulators

Part No.	Model	Model No.	Year
27700-36010-84	Crown	MS5#, 6#, 75	1969-72
"	Corona	RT43, 52, 8#, 9#, 10#, 11#	1969-74
"	Truck	RN1#, 2#	1969-74
"	Mark II	RT6#, 7#, MX1#, 2#	1969-74
"	Celica	RA20, 21	1971-74
"	Land Cruiser	FJ55	1971-77
"	Carina	TA12	1972-73
27700-38010-84	Corolla	TE3#	1975-76
"	Celica	RA22, 24, 29	1975-76
"	Corona	RT10#, 11#	1975-76
"	Mark II	MX13, 23, 29	1975-76
"	Truck	RN23, 28	1975-76
27700-38060-84	Celica	RA24, 29, 42	1977-78
"	Corona	RT10#, 11#	1977-78
"	Cressida	MX36	1977-78
"	Corolla	TE3#, 51, 72	1977-80
"	Truck	RN2#, 3#, 4#	1977-82
"	Tercel	AL1#	1980
27700-43010-84	Cressida	MX6#	1981-83
"	Tercel	AL2#	1981-84
"	Corona	RT13#	1982
"	Corolla	TE72; AE71	1982-83
"	Supra	MA61	1982-83
"	Celica	RA6#	1982-84

Alternators

Part No.	Model	Model No.	Year	Note
27020-26091-84	Corolla	TE3#, 51	1978-79	40A
"	Truck	RN2#, 3#, 4#	1978-81	40A
27020-33011-84	Mark II	RT62	1969-70	40A
"	Corona	RT8#, 9#, 104	1970-73	40A
"	Celica	RA20, 21	1971-73	40A
"	Corolla	TE2#, 3#, 51	1971-77	40A
"	Carina	TA12	1972-73	40A
"	Truck	RN2#	1972-77	40A
27020-35040-84	Truck	RN3#, 4#	1982-84	40A
27020-38061-84 (OPT)	Celica	RA42	1978	55A
"	Corona	RT105	1978	55A
27060-43030-84	Cressida	MX6#	1981-83	65A
"	Supra	MA6#	1972-83	65A

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