

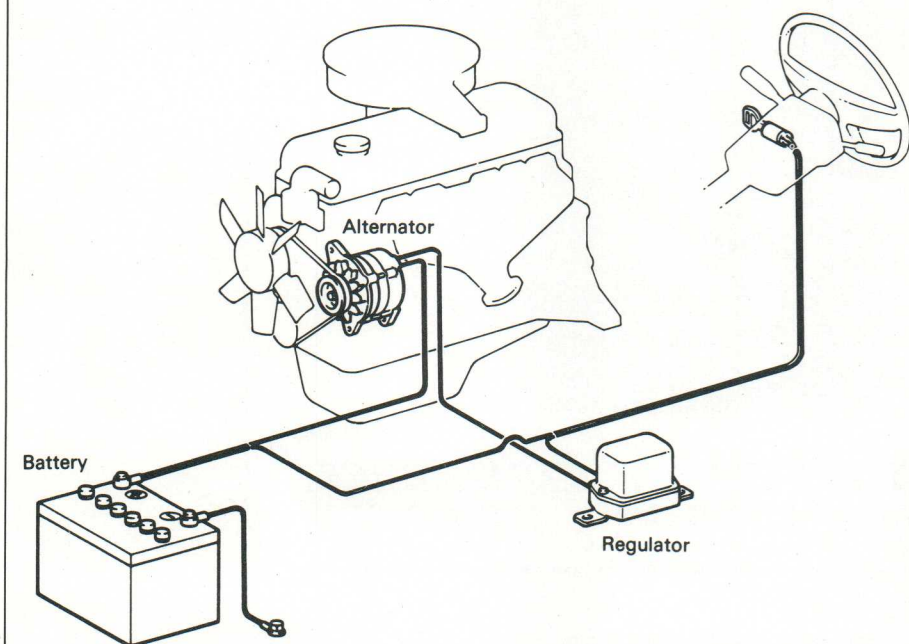
TOYOTA

SERVICE NEWS

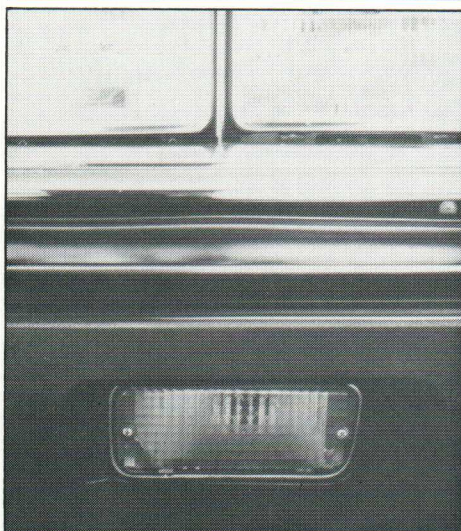
Bulletin No. 13

August 1984

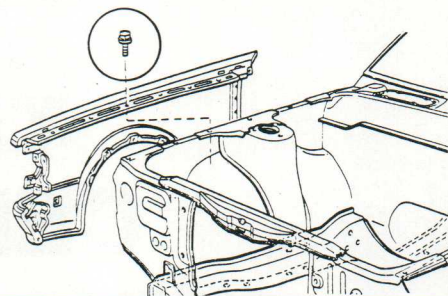
Troubleshooting Toyota Charging Systems



TOYOTA
GENUINE PARTS
WHOLESALE



Damage Repair Improvements





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**TOYOTA
ENCOURAGES
PROFESSIONALISM
THROUGH
TECHNICIAN
CERTIFICATION**

TOYOTA SERVICE NEWS

Bulletin No. 13

August 1984

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TOYOTA
GENUINE PARTS
WHOLESALE

Toyota Service News is published by the Corporate Service and Parts Departments of Toyota Motor Sales, U.S.A., Inc. Contents may be reprinted. Address all correspondence and inquiries to Editor, Toyota Service News, P.O. Box 2991, Torrance, CA 90509, Telephone (213) 618-4000.

TROUBLESHOOTING TOYOTA CHARGING SYSTEMS

Normally, the driver will be aware that something is wrong with the charging system if the charge warning lamp comes on. In addition, it is often discovered that the charging system is at fault if the engine cannot be cranked due to a weak battery or by changes in the luminous intensity of the headlights.

Whenever it is suspected that the charging system is faulty, the cause must be located and the faulty components repaired or replaced.

A weak battery is often due to the battery itself, such as insufficient electrolyte in the cells or sulfated plates. A weak battery could also be caused by insufficient tension of the drive belt which is causing the belt to slip.

However, there are also cases when trouble is caused by the manner in which the vehicle is used and not by a faulty battery or charging system. This could be the case if the vehicle is used for short distance trips only. In such a case, the battery current is largely consumed by frequent engine starting and, because the trips are short, the battery doesn't have time to fully recharge. This would be especially true if the vehicle is used in this manner at night because almost all current generated by the alternator is supplied to the headlights, resulting in insufficient recharging of the battery.

REMEMBER — When troubleshooting the charging system, it is essential to have a good understanding of the trouble and to identify its symptoms.

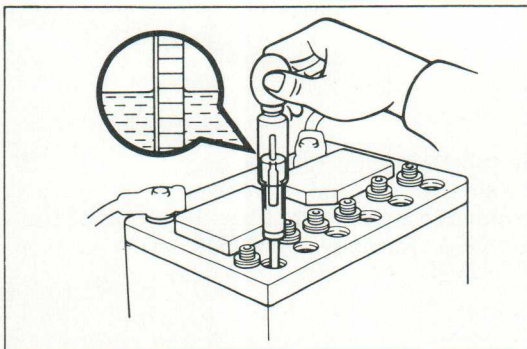
PRECAUTIONS

1. Check that the battery cables are connected to the correct terminals.
2. Disconnect the battery cables whenever the battery is given a quick charge.
3. Do not perform tests with a high voltage insulation resistance tester.
4. Never disconnect the battery when the engine is running.

TROUBLESHOOTING

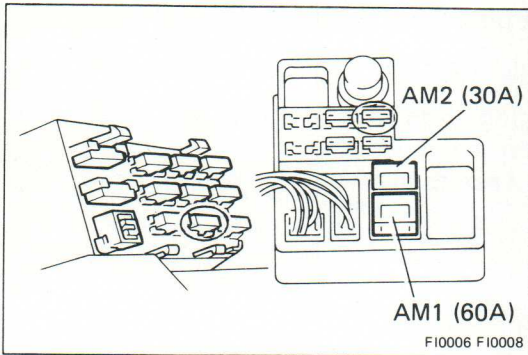
Problem	Possible Cause	Remedy
Discharge warning light does not light with ignition "ON" and engine off	Fuse blown Light burned out Wiring connection loose Alternator voltage regulator faulty Charge light relay faulty	Check "CHARGE" and "ENGINE"* fuses Replace light Tighten loose connections Replace regulator Check relay Replace IC regulator
Discharge warning light does not go out with engine running (battery requires frequent recharging)	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown Alternator voltage regulator, charge light relay,* IC regulator or alternator faulty Wiring faulty	Adjust or replace drive belt Repair or replace cables Check "ENGINE" fuse Replace fusible link Check charging system Repair wiring

*IC Regulator Type only



ON-VEHICLE INSPECTION

1. **CHECK BATTERY SPECIFIC GRAVITY**
Check the specific gravity of each cell.
Standard specific gravity: 1.25 — 1.27 at 20°C (68°F)
This operation may not be possible for certain maintenance-free batteries.
2. **CHECK BATTERY TERMINALS**
Check that the battery terminals are not loose or corroded.



3. CHECK FUSES AND FUSIBLE LINK

Check the fuses and fusible link for continuity.

FUSIBLE LINK AM1, AM2
Fuse ENGINE (15A)
Fuse CHARGE (7.5A)

4. INSPECT DRIVE BELT

(a) Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not touch the bottom of the pulley groove.

If necessary, replace the drive belt.

(b) Using a belt tension guide, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or
 Borroughs No. BT-33-73F

Drive belt tension:

New belt 125 ± 25lb
Used Belt 80 ± 20lb

If necessary, adjust the drive belt tension.

5. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

(b) Check that there is no abnormal noise from the alternator while the engine is running.

6. CHECK DISCHARGE WARNING LIGHT CIRCUIT

(a) Warm up the engine and then turn it off.

(b) Turn off all accessories.

(c) Turn the ignition switch to ON. Check that the discharge warning light is lit.

(d) Start the engine. Check that the light goes out.

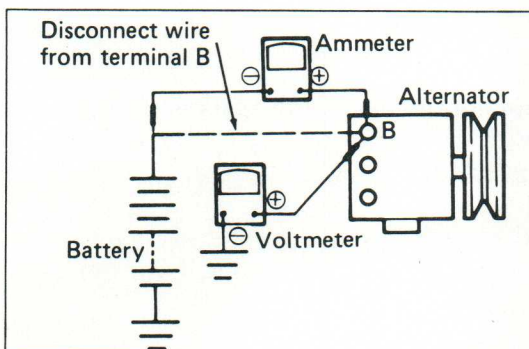
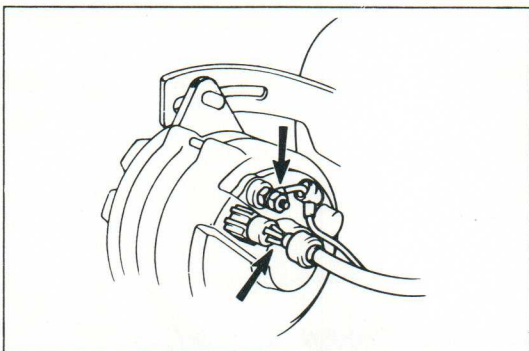
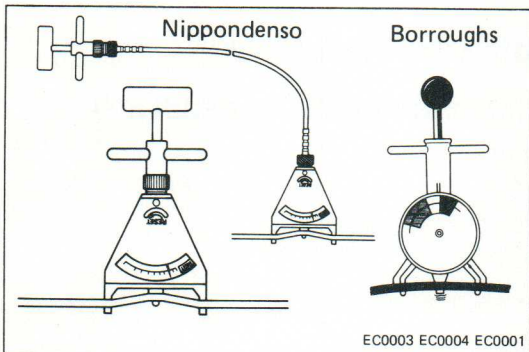
If the light does not come on and go off as specified, troubleshoot the warning light circuit. (See page 13-7)

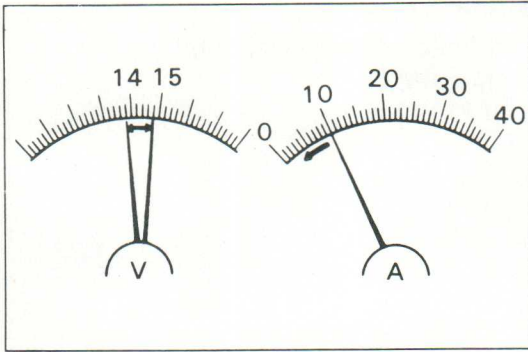
7. CHECK CHARGING CIRCUIT WITHOUT LOAD (NON IC)

NOTE: If a battery/alternator tester is available, connect the tester to the charging circuit as per the manufacturer's instructions.

(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:

- Disconnect the wire from terminal B of the alternator and connect the wire to the negative terminal of the ammeter.
- Connect the test lead from the positive terminal of the ammeter to terminal B of the alternator.
- Connect the positive lead of the voltmeter to terminal B of the alternator.
- Connect the voltmeter negative lead to ground.





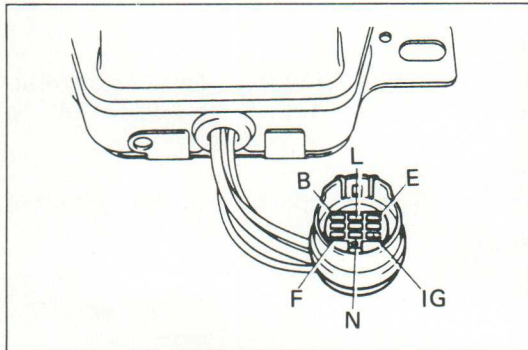
(b) Check the charging circuit as follows:

TIRRILL REGULATOR TYPE

With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: Less than 10A

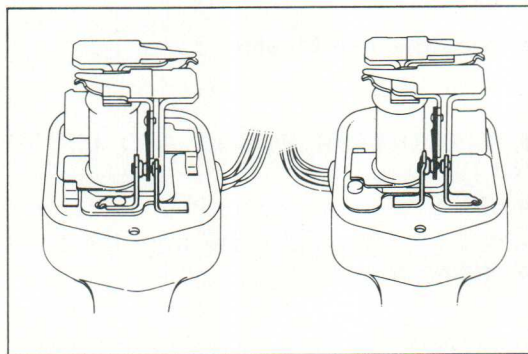
Standard voltage: 13.8 — 14.8V



(A) INSPECTION OF TIRRILL REGULATOR TYPE

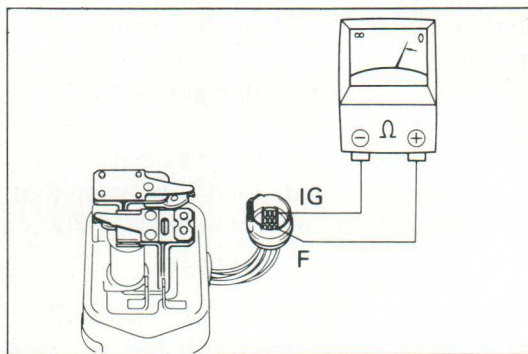
(1.) DISCONNECT REGULATOR CONNECTOR

(2.) REMOVE TWO MOUNTING BOLTS AND REGULATOR



(3.) INSPECT POINT SURFACES FOR BURN AND DAMAGE

If defective, replace the regulator.



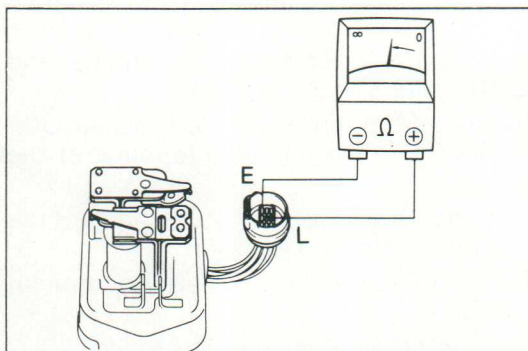
(4.) MEASURE RESISTANCE BETWEEN TERMINALS

(a) Using an ohmmeter, measure the resistance between terminals IG and F.

Resistance (Voltage regulator):

At rest 0

Pulled in Approx. 11

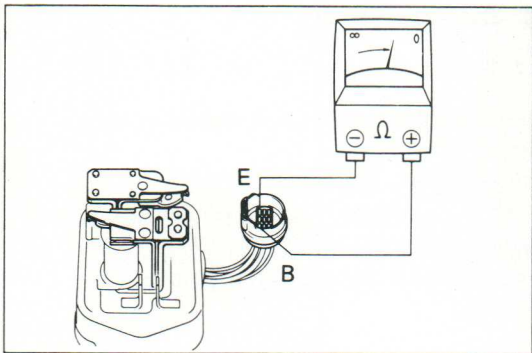


(b) Using an ohmmeter, measure the resistance between terminals L and E.

Resistance (Voltage relay):

At rest 0Ω

Pulled in Approx. 100Ω

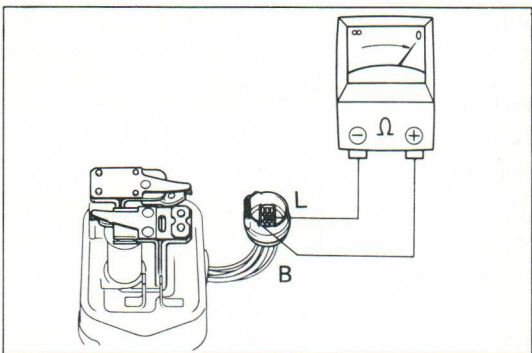


(c) Using an ohmmeter, measure the resistance between terminals B and E.

Resistance (Voltage relay):

At rest infinity

Pulled in Approx. $100\ \Omega$

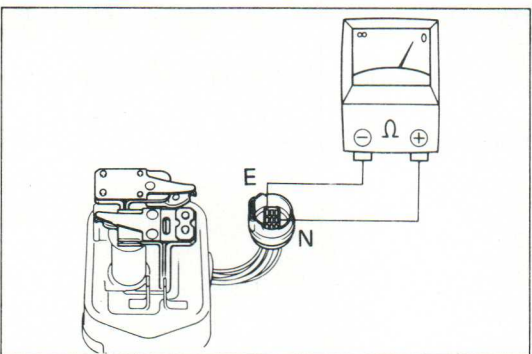


(d) Using an ohmmeter, measure the resistance between terminals B and L.

Resistance (Voltage relay):

At rest infinity

Pulled in $0\ \Omega$



(e) Using an ohmmeter, measure the resistance between terminals N and E.

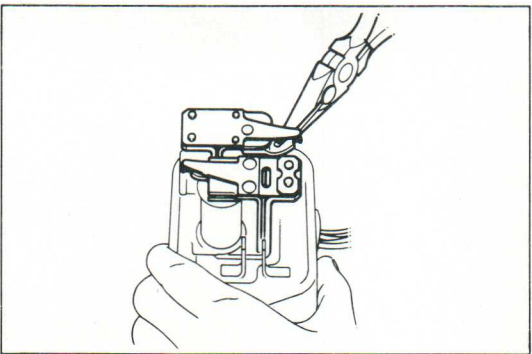
Resistance: Approx. $24\ \Omega$

If any of the above checks are not correct, replace the alternator regulator.

(B) VOLTAGE ADJUSTMENT OF ALTERNATOR REGULATOR

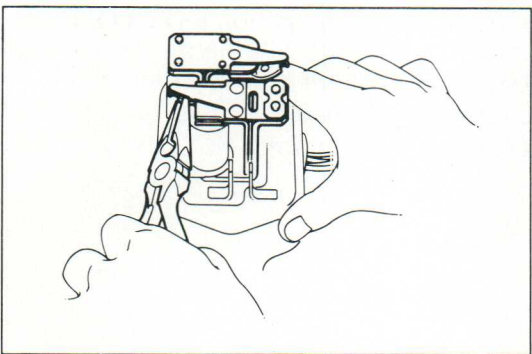
TO ADJUST VOLTAGE REGULATOR, BEND REGULATOR ADJUSTING ARM

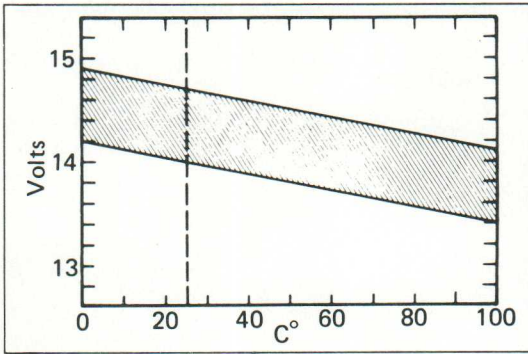
Regulating voltage: 13.8 — 14.8V



TO ADJUST VOLTAGE RELAY, BEND RELAY ADJUSTING ARM

Relay actuating voltage: 4.5 — 5.8V





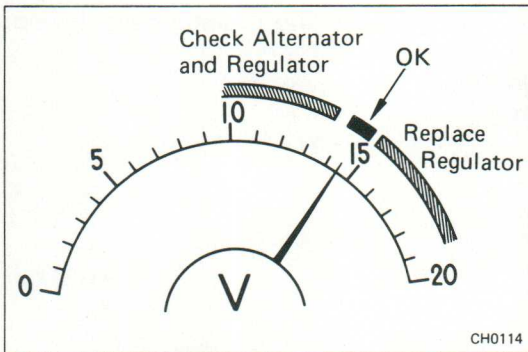
INSPECTION OF REMOTE IC REGULATOR TYPE

With the engine running at 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: Less than 10A

Standard voltage: 14.0 — 14.7V (25°C or 77°F)

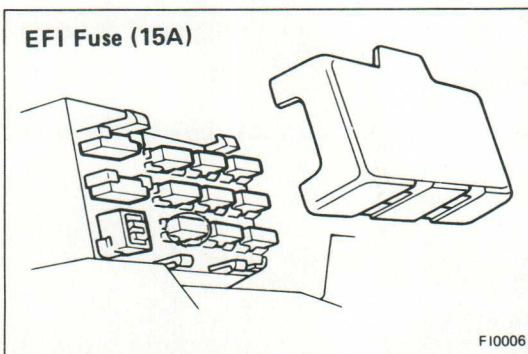
NOTE: If the temperature is not 25°C (77°F), find the voltage limits in the chart for the correct temperature.



- (1.) If the voltage reading is greater than 15.0V, replace the IC regulator.

If the voltage reading is less than 13.5V, check the regulator and alternator as follows:

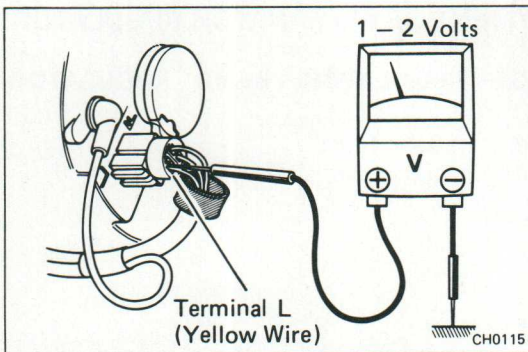
- Turn off the engine.
- Disconnect the connector from the IC regulator.
- Turn the ignition switch to ON.



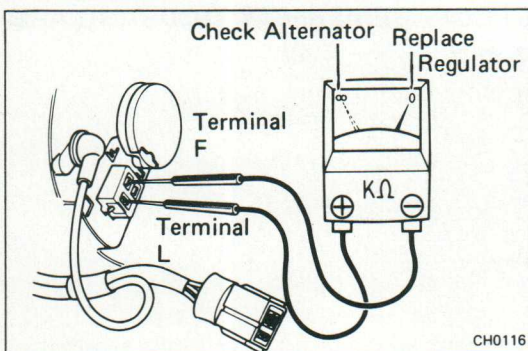
- (2.) • Check the voltage reading at the red wire terminal as shown.

If no voltage, check the "ENGINE" fuse and/or ignition switch.

- Connect the connector to the IC regulator.



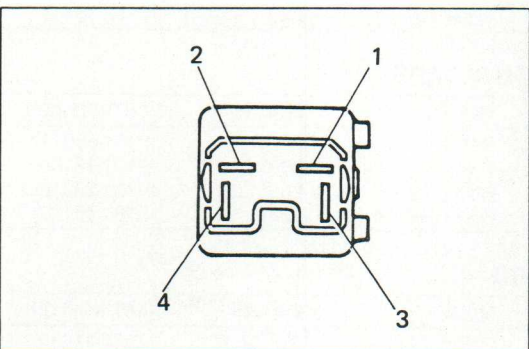
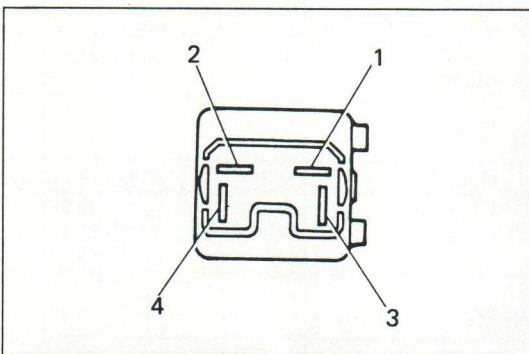
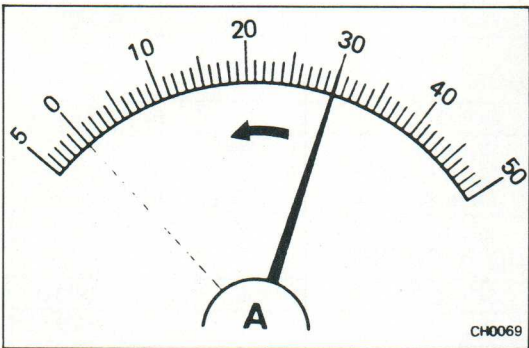
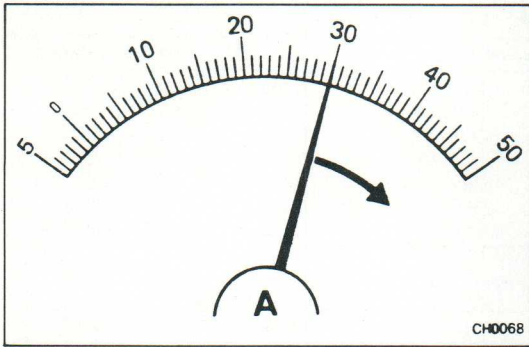
- (3.) • Check the voltage reading at the alternator terminal L. If the voltage reading is 1 — 2 V, check the alternator.



If the same as battery voltage, turn ignition switch OFF and disconnect the connector from the alternator. Check that there is continuity between alternator terminals L and F.

No continuity — Check the alternator.

Continuity — Replace the IC regulator.



8. CHECK CHARGING CIRCUIT WITH LOAD

- (a) Check alternator belt and connectors.
- (b) Discharge battery slightly.
- (c) Load Test. Connect ammeter and voltmeter to charging circuit. Start engine and turn on all lights and accessories. Run to 2,000 rpm.

Standards: 13.8 - 14.8v; more than 30A.

- (d) If no alternator output check for battery voltage at regulator terminal IG. If no voltage check charge light relay circuit.
- (e) Test for voltage at charge light relay wire BY. If there is voltage at BY, relay is not functioning or there is an open wire to the alternator.

CHARGE LIGHT RELAY (IC Regular Type)

INSPECTION OF CIRCUIT AND PARTS

1. INSPECT POWER SOURCE LINE TO CONNECTOR

Inspect the power source line between terminal 2 and body ground with ignition switch on.

2. INSPECT GROUND CONNECTION

Inspect the ground connection between terminal 1 and body ground.

3. INSPECT RELAY CONTINUITY

Inspect that there is continuity between terminals 1 and 2. Inspect that there is continuity between terminals 1 and 4. If the continuity is not as specified, replace the relay.

(TIRRILL Regulator Type)

INSPECTION OF CIRCUIT AND PARTS

1. INSPECT RELAY CONTINUITY

Inspect the continuity between terminals 3 and 4 of the relay. If there is no continuity, replace the relay.

Inspect the continuity between terminals 1 and 2.

If there is continuity, replace the relay.

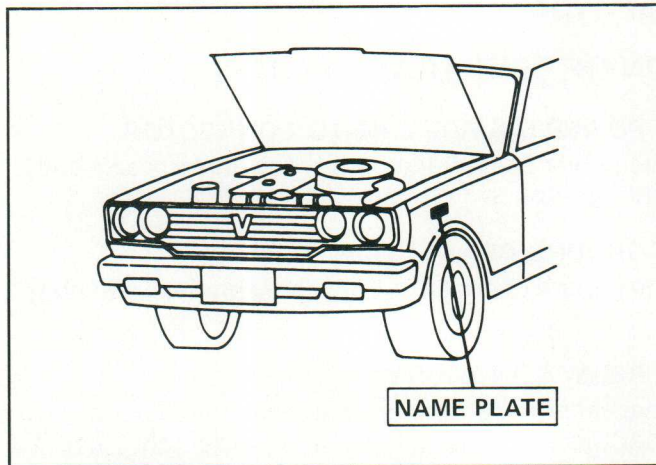
2. INSPECT RELAY OPERATION

Connect a positive (+) lead from the battery to terminal 3 of the relay. Connect a negative (-) lead to terminal 4. Using an ohmmeter, check for continuity between terminals 1 and 2. If there is continuity, replace the relay.

TOYOTA
GENUINE PARTS

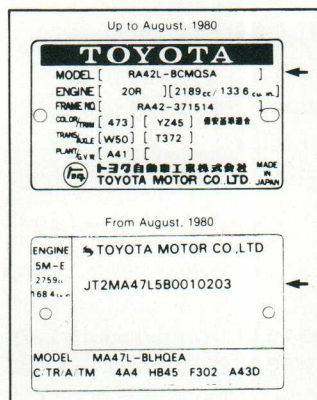
TRUCK PARTS APPLICATION GUIDE

Toyota parts are specified by model number, engine type and/or production date. Here's where to find this information on your vehicle:



Model number and engine type are printed on the metal plate located on the firewall.

Production date is printed on the metal plate attached to the doorjamb.



GAS CAPS

PROD. DATE	MODEL	LOCKING	NON-LOCKING
8/74-8/77	RN2#	None	77310-12041
8/77-8/80	RN2#, 3#, 4#	None	77310-14070
8/80-8/83	RN3#, 4#	None	77310-12100
8/83-	RN5#, 6#	None	77310-16010
1/81-8/81	LN40	None	77310-35060
8/81-8/83	LN40	None	77310-35061
8/83-	LN5#, 65	None	77310-32010

TUNE-UP KITS

PROD. DATE	MODEL	ENGINE	PART NUMBER
5/69-8/71	RN1#	3RC, 8RC	04193-31021
3/71-8/74	RN1#, 2#	8RC, 18RC	04193-36021
9/73-8/74	RN2#	18RC	04193-25021
8/74-9/75	RN2#	20R	04193-38010

SPARK PLUGS

PROD. DATE	MODEL	ENGINE	PART NUMBER
4/69-8/74	RN1#, 2#	3RC, 8RC	90919-01083
8/73-8/80	RN2#, 3#, 4#	18RC, 20R	90919-01059
8/80-	RN3#, 4#, 5#, 6#	20R, 22R#	90919-01064

SPARK PLUG WIRE SETS

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-8/76	RN2#	20R	90999-99025
8/76-8/77	RN2#	20R	90999-99030
8/77-7/78	RN2#	20R	90999-99043
8/78-8/79	RN3#, 4#	20R	90999-99048
8/79-8/80	RN3#, 4#	20R	90919-21300
8/80-8/82	RN3#, 4#	22R	90919-21297
8/82-8/83	RN3#, 4#	22R	90919-21320
8/83-	RN5#, 6#	22R	90919-21343

POINTS

PROD. DATE	MODEL	ENGINE	PART NUMBER
4/69-8/71	RN1#	3RC, 8RC	04191-40010
3/71-8/74	RN1#, 2#	8RC, 18RC	19145-26060
8/74-8/77	RN2#	20R	04191-41010

CONDENSERS

PROD. DATE	MODEL	ENGINE	PART NUMBER
4/69-11/69	RN1#	3RC	19133-41010
12/69-8/71	RN1#	8RC	90099-52060
3/71-8/74	RN1#, 2#	8RC, 18RC	90099-52050

DISTRIBUTOR ROTORS

PROD. DATE	MODEL	ENGINE	PART NUMBER
3/71-8/79	RN1#, 2#, 3#, 4#	8RC, 18RC, 20R	19102-33012
8/79-8/80	RN3#, 4#	20R	19102-15021
8/80-	RN3#, 4#, 5#, 6#	22R	19102-38210

DISTRIBUTOR CAPS

PROD. DATE	MODEL	ENGINE	PART NUMBER
5/75-7/78	RN2#	20R	19101-38011
8/78-8/79	RN3#, 4#	20R	19101-38150
8/79-8/82	RN3#, 4#	20R, 22R	19101-38210
8/82-	RN3#, 4#, 5#, 6#	22R#	19101-35120

AIR FILTERS

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-8/83	RN2#, RN3#, RN4#, RN5#, RN6#	20R, 22R	17801-41090
8/83-	RN5#	22REC	17801-70010
1/81-	LN40, 5#, 65	L, 2L	17801-54030

FUEL FILTERS

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-7/78	RN23, 28	20R	23300-25020
8/78-8/80	RN3#, 4#	20R	23300-34100
8/80-8/82	RN3#, 4#	22R	23300-15010
8/82-	RN3#, 4#, 5#, 6#	22R	23300-34100
8/83-	RN5#	22REC	23300-39025
1/81-8/83	LN40	L	23303-54071
8/83-	LN5#, 65	2L	23303-64010

PCV VALVES

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-8/76	RN2#	20R	12204-51012
8/76-8/79	RN2#, 3#, 4#	20R	12204-31020
8/79-8/80	RN3#, 4#	20R	12204-45010
8/80-8/82	RN3#, 4#	22R	12204-35010
8/82-	RN3#, 4#, 5#, 6#	22R	12204-35030
8/83-	RN5#	22REC	12204-35020

OIL FILTERS

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-	RN2#, 3#, 4#	20R, 22R#	15601-44011
	RN5#, 6#		
1/81-	LN40, LN5#, 65	L, 2L	15600-41010

OIL DRAIN PLUG & WASHER

PROD. DATE	MODEL	ENGINE	PLUG PART NUMBER	WASHER PART NUMBER
4/69-1/75	RN1#, 2# RN2#, 3# 4#, LN40	3RC, 8RC, 18RC, 20R	90344-25054	90430-25013
1/75-	LN5#, 6#	20R, 22R#, L, 2L	90341-18089	90430-18244

OIL FILLER CAPS

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-	RN2#, 3#, 4# 5#, 6#, LN40	20R, 22R#, L	12180-13010
8/83-	LN5#, 65	2L	12180-70010

RADIATOR CAPS

PROD. DATE	MODEL	ENGINE	PART NUMBER
5/72-7/78	RN2#	18RC, 20R	16401-36010
8/78	RN3#, 4#, LN40, RN5#, 6#, LN5#, 65	20R, 22R#, L, 2L	16401-36011

UPPER HOSES — RADIATOR

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-9/75	RN2#	20R	16571-38030
9/75-8/79	RN2#, 3#, 4#	20R	16571-38012
8/79-3/81	RN3#, 4#	20R, 22R	16571-37010
3/81-8/83	RN3#, 4#	22R	16571-35040
1/81-8/83	LN40	L	16571-54050
8/83-	RN5#, 6#	22R	16571-35070
8/83-	RN5#	22REC	16571-35080
8/83-	LN5#, 65		16571-54130

LOWER HOSES — RADIATOR

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-9/75	RN2#	20R	16572-38030
9/75-7/78	RN2#	20R	16572-38050
8/78-8/80	RN32, 42	20R	16572-38090
1/79-8/83	RN37, 38, 47, 48	20R, 22R	16572-38080 (1)
1/79-8/83	RN37, 38, 47, 48	20R, 22R	16573-38020 (2)
8/80-9/80	RN34, 44	22R	16572-35010
9/80-8/83	RN34, 44	22R	16572-35011
1/81-8/83	LN40	L	16572-54050
8/83-	RN5#, 6#	22R#	16572-35030 (1)
8/83-	RN5#, 6#	22R#	16573-38020 (2)
8/83-	LN5#	2L	16572-54100
8/83-	LN65	2L	16572-54120

(1) Radiator Side (2) Pump Side

BYPASS HOSES — RADIATOR

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-7/78	RN2#	20R	16261-38010
8/78-8/80	RN3#, 4#	20R #1	16261-38010
8/78-8/79	RN3#, 4#	20R #2	16264-38020
8/79-8/80	RN3#, 4#	20R #2	16264-38030
8/80-8/82	RN3#, 4#	22R	16261-35010
8/82-	RN3#, 4#, 5#, 6#	22R	16261-35040
8/83-	RN5#	22REC	16261-35030
8/83-	LN5#, 65	2L	16261-54030

THERMOSTATS & GASKETS

PROD. DATE	MODEL	ENGINE	PART NUMBER
12/69-8/82	RN1#, 2#, 3#, 4# HLF, 3QT, HVY	20R, 8RC, 18RC	90916-03037/ 16341-41010
8/76-8/82	RN2#, 3#, 4#	20R, 22R	90916-03036/ 16341-41010
8/82-	RN3#, 4#, 5#, 6#	22R#	90916-03055/ 16341-35010
1/81-8/83	LN40	L	90916-03062/ 16341-41010
8/83-	LN5#, 65	2L	90916-03062/ 16341-54011

BELTS, FAN & ALTERNATOR

PROD. DATE	MODEL	ENGINE	PART NUMBER
8/74-8/79	RN2#, 3#, 4#	20R	99331-00875
8/79-	RN3#, 4#, 5#, 6#	20R, 22R#	99331-10880
1/81-7/82	LN40	L	99332-10985
7/82-8/83	LN40	L	99332-11000
8/83-	LN5#, 65	2L	90916-02132

IGNITION COILS

PROD. DATE	MODEL	ENGINE	PART NUMBER
9/73-9/75	RN2#	18RC, 20R	90919-02058
9/75-8/77	RN2#	20R	90919-02078
9/75-8/76	RN2#	20R	90919-02077
8/76-8/80	RN2#, 3#, 4#	20R	90919-02083
8/79-8/80	RN3#, 4#, RN42, HVY	20R	90919-02117
8/80-	RN3#, 4#, 5#, 6#	22R	90919-02106
8/83-	RN5#	22REC	90919-02117

CLUTCH COVERS

PROD. DATE	MODEL	ENGINE	PART NUMBER
12/79-7/81	RN1#, 2#, 3#, 4#	3RC, 18RC, 20R, 22R	31210-20130-84/ 35050-84*
8/80-	RN3#, 4#	22R	31210-24010-84

*Heavy Duty Clutch Cover

CLUTCH DISCS

PROD. DATE	MODEL	ENGINE	PART NUMBER
9/71-7/78	RN2#	18RC, 20R	31250-35050-84
8/78-8/80	RN3#, 4#	20R	31250-35110-84
8/80-	RN3#, 4#	22R	31250-35100-84

CLUTCH BEARINGS

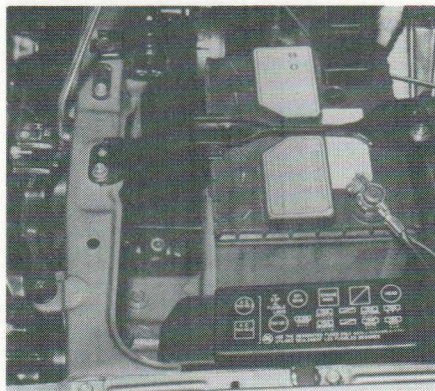
PROD. DATE	MODEL	CLUTCH/RELEASE BEARING	INPUT/SHAFT BEARING
11/71-8/78	RN14, 2#	90363-40010	97143-06201
8/78-8/80	RN32, 42	90363-40008	97143-05201
1/79-8/80	RN37, 47	90363-40010	97143-06201
8/80-	RN3#, 4#, 5#, 6# LN40, 5#, 65	90363-40022	90363-12002

TOYOTA DAMAGE REPAIR IMPROVEMENTS

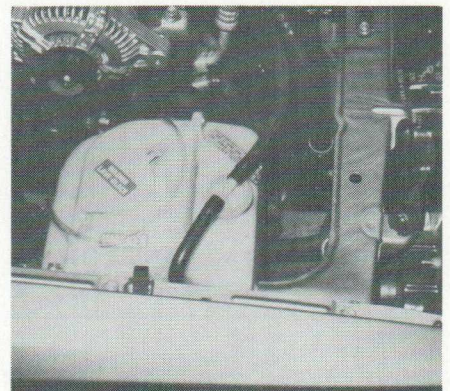
Basic vehicular design, as it affects collision damage repair expenses, has received Toyota's intense interest and involvement in recent years. Relationships between Toyota and the insurance industry were developed to help us accomplish our goal of reduced collision damage through improved design. We believe that these relationships with the insurance industry and the useful exchange of information and ideas have inspired Toyota to take a position of leadership in vehicular design. Indeed, Toyota is on the leading edge of technology in respect to the features built into the vehicle to reduce its susceptibility to collision damage, and improve the ease and speed of collision damage repair.

DAMAGEABILITY IMPROVEMENTS

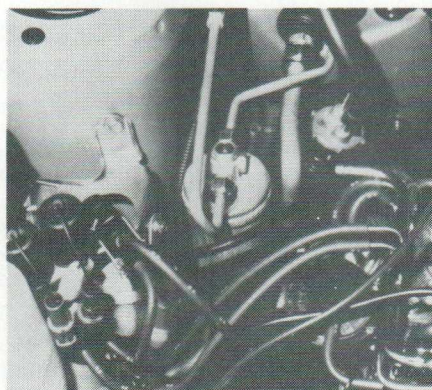
The susceptibility of a vehicle to collision damage, or damageability, has a great effect on the cost of collision repair. Toyota has made many significant design improvements to reduce the damageability of critical areas of our vehicles and a multitude of individual components.



Battery & Fuse Panel



Windshield Washer Tank



A/C Dehydrator

The merits of this program have most recently been acknowledged by a major insurance company, which has awarded a discount status to the insurance premium of the 1983 Toyota Camry based upon a technical analysis of the damageability and reparability of this new vehicle.

We are confident that you will find this section most informative as we discuss how Toyota has created a product that is designed to help curb the spiraling cost of collision damage repair.

MAJOR COMPONENT RELOCATION

Many major components have been relocated rearward to decrease their damage potential in relatively minor frontal impacts. Such high cost items as the battery, the A/C dehydrator and fuse panels have all been protected in this fashion.

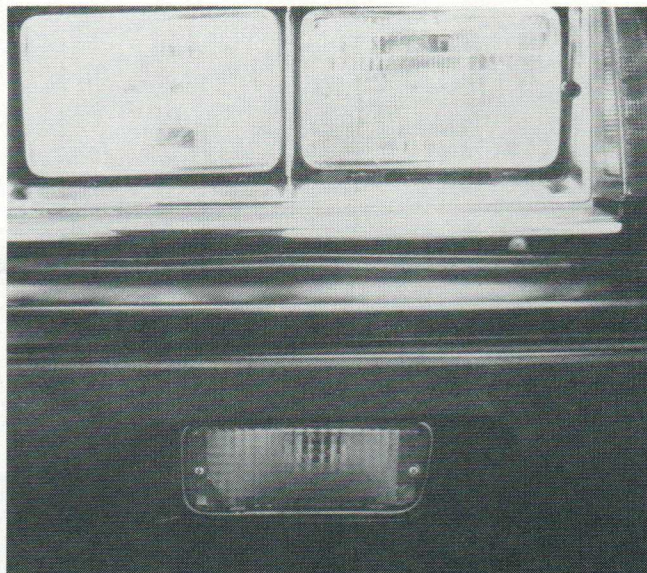
URETHANE BUMPERS/RECESSED PARKING LIGHTS

All Toyota passenger cars are equipped with large pad urethane foam bumpers to reduce low speed impact damage. Through model year 1983, all bumpers on Toyota passenger cars are designed to meet the 5

mph bumper standard. Also, to preclude their involvement in slow speed impacts, the parking light assemblies have been recessed into the bumper.



Front Bumper



Parking Lights

REPAIRABILITY IMPROVEMENTS

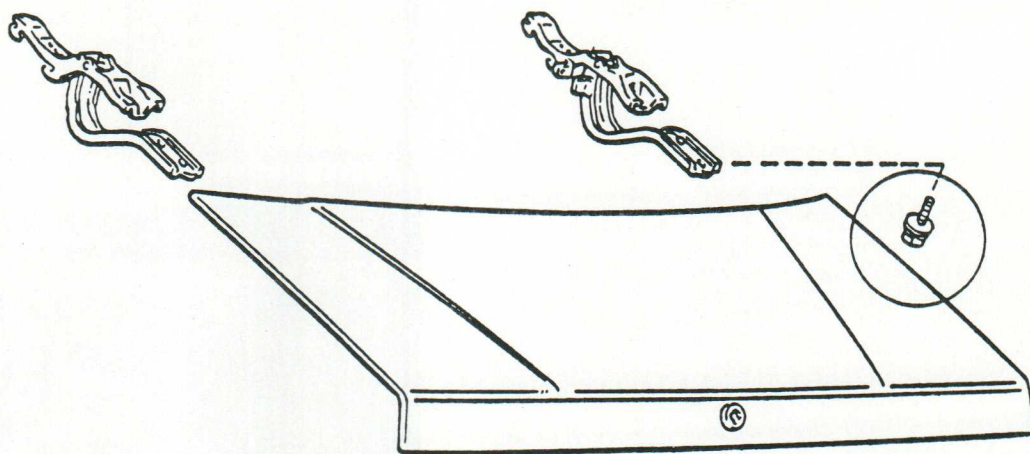
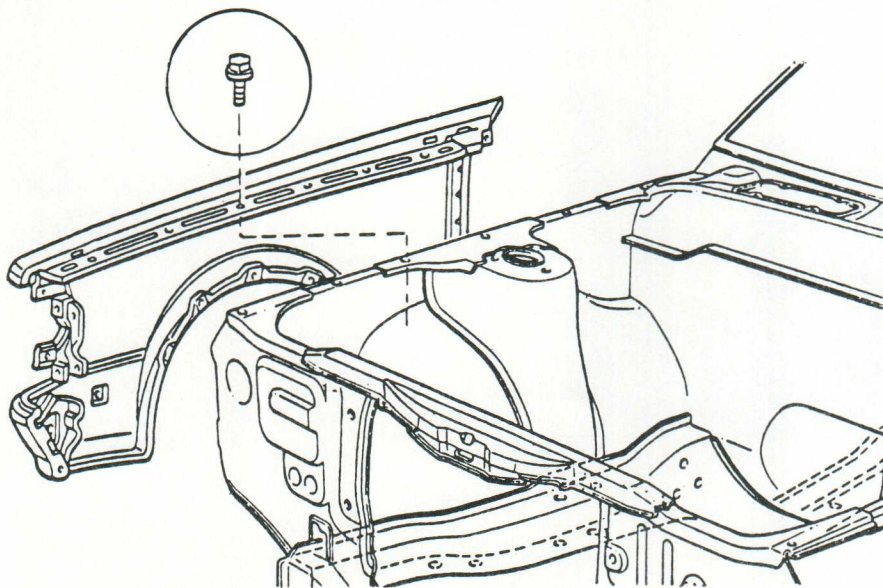
Repairability, or the ease by which a vehicle can be repaired, contributes greatly to either the high or low cost of collision repair. This is dependent upon the number of positive repairability features incorporated

into the collision damaged vehicle. Toyota has made major improvements in this area that offset labor expenditures, and these improvements have a large positive impact on the collision industry.

BOLT-ON BODY PANELS

Toyota continues to use bolt-on fenders, and also door, hood, and liftgate/deck lid hinges as opposed to the easy-to-manufacture weld-on attachment. This provides valuable time savings during both the dis-

mantling and reassembly processes. It also allows for easy adjustment after the repair has been completed.

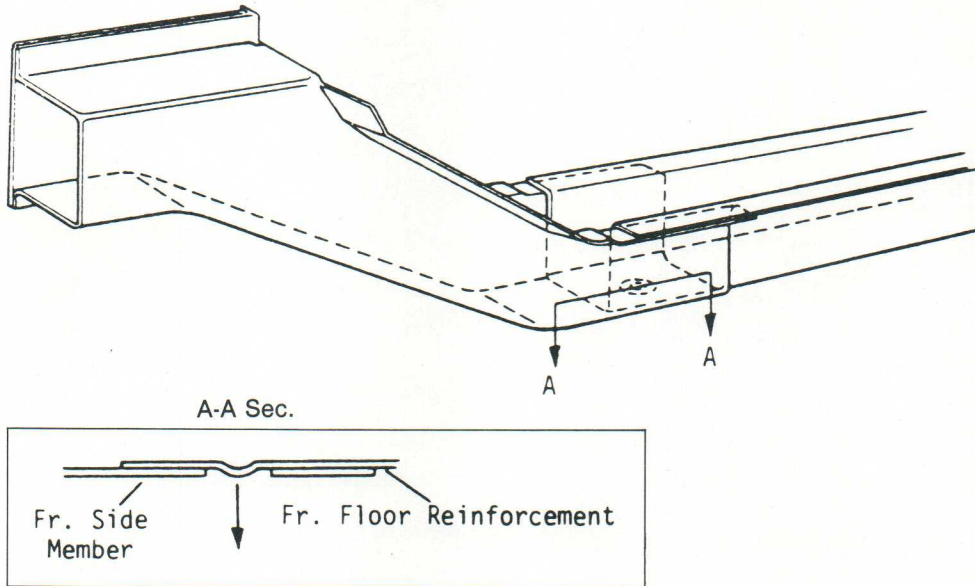


PANEL OVERLAPPING SEQUENCE

The sequence of panel overlapping can result in significant labor savings. Therefore, we have reversed our old procedure of lapping the center floor reinforcement over the front side member (frame horn).

We now overlap the frame horn onto the floor support so that it is no longer necessary to peel back the floor support to remove the frame horn.

Since we know that the frame horn suffers a higher frequency of collision damage, we expect this improvement to result in major labor savings.

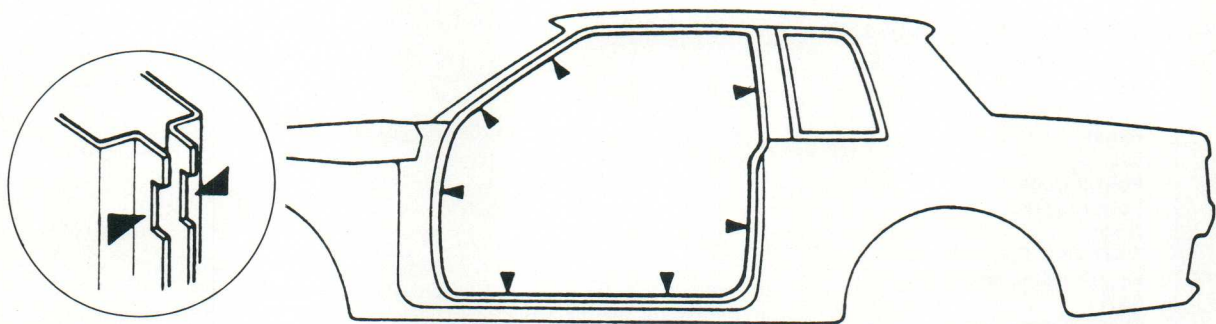


As you can see, alignment reference marks are also provided to insure easy and proper installation.

MATCHING CUTAWAYS

Realigning major panels has traditionally been a cumbersome, awkward operation due to the precision measurement required to properly install each panel. Most Toyota passenger vehicles are now equipped with matching cutaways that will make

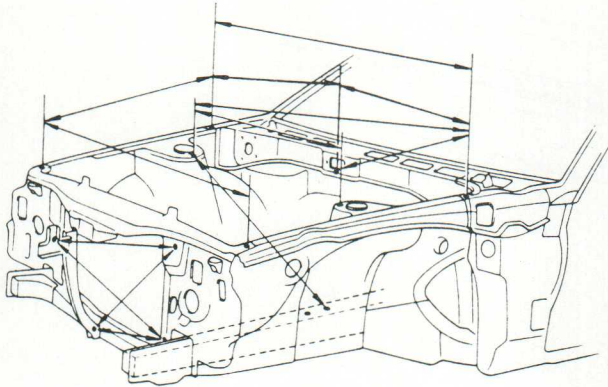
replacement panel positioning nearly automatic. We expect to have all Toyota passenger vehicles equipped with this feature with the introduction of our 1984 model line.



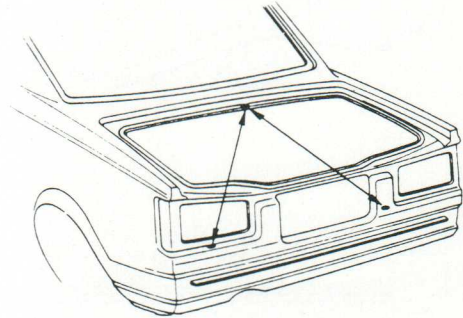
ALIGNMENT REFERENCE MARKS

Alignment reference marks and specifications are also provided in many areas to aid in properly relocating replacement parts. For example, reference marks are

seen here inside the engine compartment and trunk area. Underbody dimensions/specifications are available to facilitate utilization of these reference marks.



Engine Compartment



Trunk Area

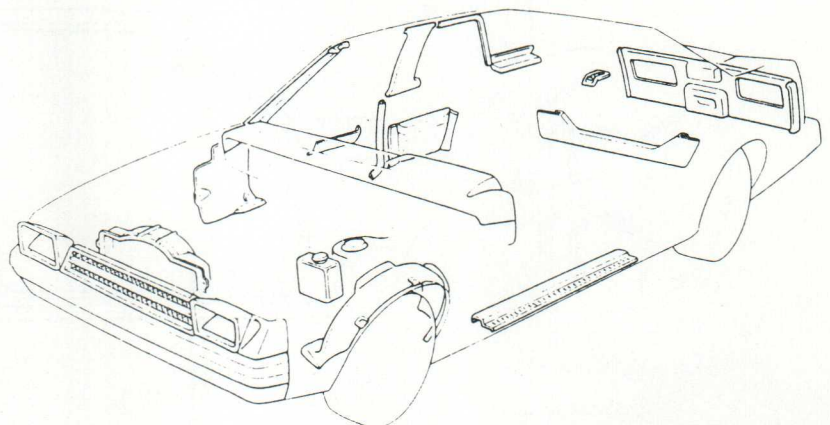
PLASTIC MATERIAL CODES

The use and variety of plastics has grown rapidly in the automotive industry. Many of these materials are easily repaired if the material type can be identified. Toyota, realizing that the results of the commonly us-

ed practice of burning a sliver of the plastic were easily misinterpreted, has now placed a plastics material code on each plastic component to eliminate the possibility of error.

PLASTIC IDENTIFICATION — CODE LIST

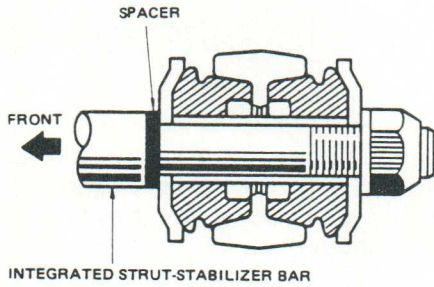
SYMBOL	PLASTIC MATERIAL
ABS	ABS
ABS/PVC	ABS/Vinyl
PA	Nylon
PC	Lexan
PE	Polyethylene
PP	Polypropylene
PPO	Nolyl
PUR	Thermoset Polyurethane
PVC	Polyvinyl Chloride (Vinyl)
SAN	SAN
TPUR	Thermoplastic Polyurethane
UP	Polyester (Fiberglass)
TPR	Thermoplastic Rubber
EPDM	Ethylene Propylene Diene Monomer



WHEEL ALIGNMENT ADJUSTMENT

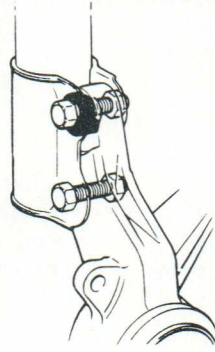
With today's unibody type construction, proper wheel alignment is to a large degree dependent on the inter-relationship of chassis and body alignment. Post collision repair driveability characteristics of a vehicle can be inferior to the pre-collision characteristics. To

alleviate this problem, Toyota now provides front end alignment adjustments on most current production vehicles. Rear toe-in and toe-out adjustments are also provided on those vehicles with independent rear suspension.

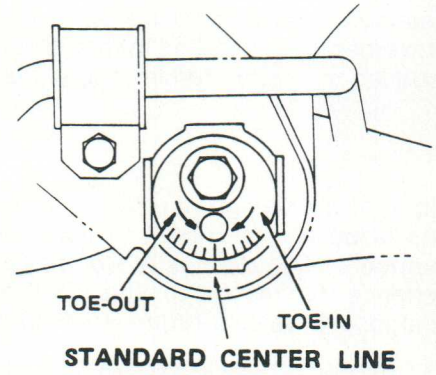


Caster

TURN CAM TO ADJUST



Camber

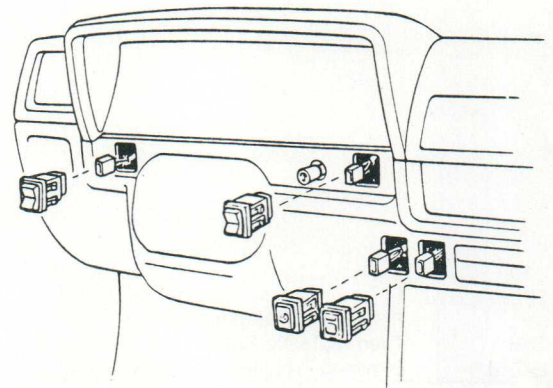
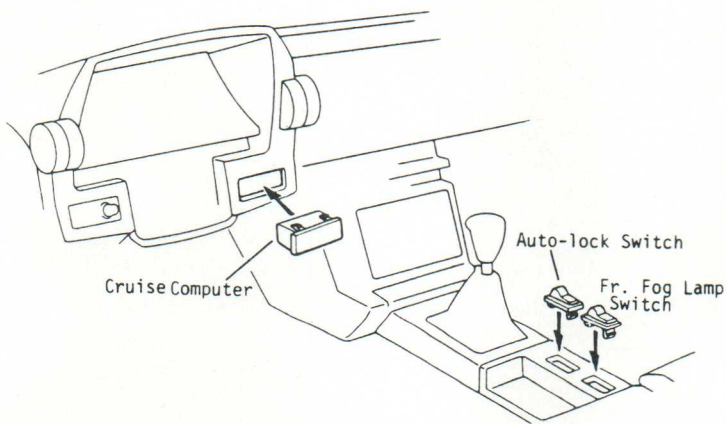


Rear Toe-In/Toe-Out

QUICK MOUNT COMPONENTS

Repair technicians can more easily access and remove components which in the past were somewhat troublesome, because Toyota has mounted the urethane bumper system on four easily accessible

bolts, made instrument panel switches removable from the front, and provided independently removable panels for the instrument panel and grille.



CONCLUSION

Toyota's success is directly related to our strong efforts to maintain customer satisfaction. Reducing the cost of owning our vehicles will directly enhance

Your industry and ours share the same customers. Our mutual customers' satisfaction, therefore, depends upon all of our efforts. Toyota's design improvements, as detailed in this issue of TSN, result in reduced collision repair costs that can favorably

Many of the design improvements you have seen in this issue are the result of recommendations from members of your industry who have the practical experience to recognize the best way to improve design. We believe future accomplishments can be

the satisfaction of Toyota customers, and collision repair cost reduction has a major impact on reducing this overall ownership cost.

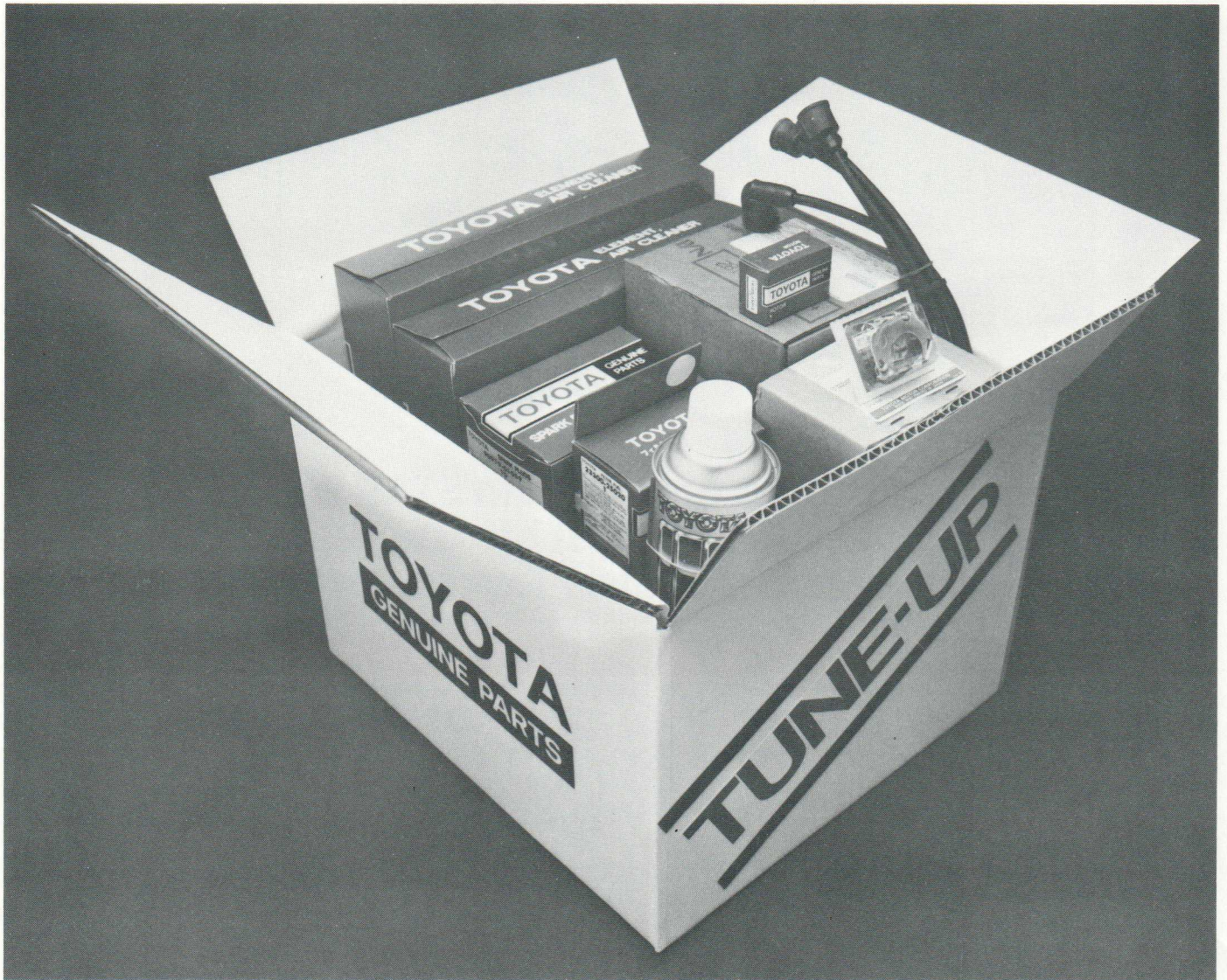
impact your industry. The reduced insurance premium costs that will result from this repair cost decrease will achieve an increased level of satisfaction for our mutual customers.

achieved by our mutual efforts. We look forward to working closely with you and your industry to create products with reduced collision repair costs and reduced insurance premium cost.



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