

TROOPER

GENERAL INFORMATION

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GENERAL INFORMATION

CONTENTS

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General Repair Instruction

- If a floor jack is used, the following precautions are recommended.
Park vehicle on level ground, "block" front or rear wheels, set jack against the recommended lifting points (see "Lifting Instructions" in this section), raise vehicle and support with chassis stands and then perform the service operations.
- Before performing service operations, disconnect ground cable from the battery to reduce the chance of cable damage and burning due to short circuiting.
- Use a cover on body, seats and floor to protect them against damage and contamination.
- Brake fluid and anti-freeze solution must be handled with reasonable care, as they can cause paint damage.
- The use of proper tools and recommended essential and available tools, where specified, is important for efficient and reliable performance of service repairs.
- Use genuine Isuzu parts.
- Used cotter pins, plastic clips, gaskets, O-rings, oil seals, lock washers and self-locking nuts should be discarded and new ones should be installed, as normal function of the parts cannot be maintained if these parts are reused.
- To facilitate proper and smooth reassembly operation, keep disassembled parts neatly in groups. Keeping fixing bolts and nuts separate is very important, as they vary in hardness and design depending on position of installation.
- Clean the parts before inspection or reassembly. Also clean oil ports, etc. using compressed air, and make certain they are free from restrictions.
- Lubricate rotating and sliding faces of the parts with oil or grease before installation.
- When necessary, use a sealer on gaskets to prevent leakage.
- Carefully observe all specifications for bolt and nut torques.
- When removing or replacing parts that require refrigerant to be discharged from the air conditioning system, be sure to use the Vehicle Refrigerant Recovery and Recycling Equipment (VRRRE) to recover and recycle Refrigerant-134a.
- When a service operation is completed, make a final check to be sure the service has been done properly and the problem has been corrected.

15. SUPPLEMENTAL RESTRAINT SYSTEM

The vehicle is equipped with a Supplemental Restraint System. (SRS)—Air Bag.

This system is not to be serviced without consulting the appropriate service information.

Consult Sections 9J1 and 9J "SRS System" if work is to be done on the front of the vehicle such as bumper, sheet metal, seats, wiring, steering wheel or column.

Also review SRS system information if any arc welding is to be done on the vehicle.

The SRS system equipped vehicle can be identified by:

- "AIR BAG" warning light on the instrument panel.
- A Code "J" or "K" for fifth digit of vehicle Identification Number.

Mileage Only Items

MILEAGE ONLY ITEMS		7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	DESCRIPTION
1	CHANGE FRONT AND REAR AXLE OIL		■										■					
2	CHANGE MANUAL TRANSMISSION OIL		■										■					
3	• CHECK AND ADJUST OR CHANGE AUTOMATIC TRANSMISSION FLUID (IF NECESSARY)																	
4	CHECK AUTOMATIC TRANSMISSION FLUID LEAKAGE		■				■						■					
5	CHANGE TRANSFER CASE OIL		■										■					
6	CHECK EXTENSION OIL LEVEL (2WD ONLY)		■										■					
7	• REPLACE AIR CLEANER FILTER		■										■					
8	REPLACE SPARK PLUGS																	Replace every 100,000 miles
9	CHANGE ENGINE COOLANT		■										■					
10	* (1) REPLACE TIMING BELT																	Replace every 100,000 miles
11	CHECK AND ADJUST VALVE CLEARANCE (IF NECESSARY)																	If noisy
12	ROTATE TIRES		■										■					
13	REPACK FRONT WHEEL BEARINGS		■										■					
14	CLEAN RADIATOR CORE AND A/C CONDENSER																	

* (1) : Replacement of the timing belt is recommended at every 100,000 miles (160,000 km).
 • : UNDER SEVERE DRIVING CONDITIONS, MORE FREQUENT MAINTENANCE IS REQUIRED. REFER TO "SCHEDULED MAINTENANCE UNDER SEVERE DRIVING CONDITIONS".

SHADED AREA INDICATES SERVICE TO BE PERFORMED.

Battery fluid level

Check fluid level in the battery.

Fluid Leak Check

Check for fuel, water, oil or other fluid leaks by looking at the surface beneath the vehicle after it has been parked for a while. Water dripping from the air conditioning system after use is normal. If you notice gasoline fumes or fluid at any time, locate the source and correct it at once.

Engine Oil and Oil Filter Replacement

Always use API SE, SF, SG, SH or ILSAC GF-1 quality oils of the proper viscosity.

When choosing an oil, consider the range of temperatures the car will be operated in before the next oil change. Then, select the recommended oil viscosity from the chart.

Always change the oil and the oil filter as soon as possible after driving in a dust storm.

Engine Cooling System Inspection

Inspect the coolant/anti-freeze. If the coolant is dirty or rusty, drain, flush and refill with new coolant. Keep coolant at the proper mixture for proper freeze protection, corrosion inhibitor level and best engine operating temperature. Inspect hoses and replace if cracked, swollen or deteriorated. Tighten the hose clamps if equipped with screw-type clamps. Clean outside of radiator and air conditioning condenser. Wash filler cap and neck. To help ensure proper operation, a pressure test of both the cooling system and the cap is also recommended.

Exhaust System Inspection

Visually inspect the exhaust pipes, muffler, heat shields and hangers for cracks, deterioration, or damage.

Be alert to any changes in the sound of the exhaust system or any smell of fumes. These are signs the system may be leaking or overheating. Repair the system at once, if these conditions exist. (See also "Engine Exhaust Gas Safety" and "Three Way Catalytic Converter" in the Owner's manual.)

Fuel Cap, Fuel Lines, and Fuel Tank Inspection

Inspect the fuel tank, the fuel cap and the fuel lines every 60,000 miles (96,000 km) for damage which could cause leakage.

Inspect the fuel cap and the gasket for correct sealing and physical damage. Replace any damaged parts.

Drive Belt Inspection

Check the serpentine belt driving for cracks, fraying, wear, and correct tension every 30,000 miles (48,000 km). Replace as necessary.

Wheel Alignment, Balance and Tires Operation

Uneven or abnormal tire wear, or a pull right or left on a straight and level road may show the need for a wheel alignment. A vibration of the steering wheel or seat at

normal highway speeds means a wheel balancing is needed. Check tire pressure when the tires are "cold" (include the spare).

Maintain pressure as shown in the tire placard, which is located on the driver's door lock pillar.

Steering System Operation

Be alert for any changes in steering action. An inspection or service is needed when the steering wheel is harder to turn or has too much free play, or if there are unusual sounds when turning or parking.

Brake Systems Operation

Watch for the "BRAKE" light coming on. Other signs of possible brake trouble are such things as repeated pulling to one side when braking, unusual sounds when braking or between brake applications, or increased brake pedal travel. If you note one of these conditions, repair the system at once.

For convenience, the following should be done when wheels are removed for rotation: Inspect lines and hoses for proper hookup, bindings, leaks, crack, chafing etc. Inspect disc brake pads for wear and rotors for surface condition.

Inspect other brake parts, including parking brake drums, linings etc., at the same time. Check parking brake adjustment.

Inspect the brakes more often if habit or conditions result in frequent braking.

Parking Brake and Transmission Park Mechanism Operation

Park on a fairly steep hill and hold the vehicle with the parking brake only. This checks holding ability. On automatic transmission vehicles, shifting from "P" position to the other positions cannot be made unless the brake pedal is depressed when the key switch is in the "ON" position or the engine is running.

WARNING: BEFORE CHECKING THE STARTER SAFETY SWITCH OPERATION BELOW, BE SURE TO HAVE ENOUGH ROOM AROUND THE VEHICLE. THEN FIRMLY APPLY BOTH THE PARKING BRAKE AND THE REGULAR BRAKE. DO NOT USE THE ACCELERATOR PEDAL. IF THE ENGINE STARTS, BE READY TO TURN OFF THE KEY PROMPTLY. TAKE THESE PRECAUTIONS BECAUSE THE VEHICLE COULD MOVE WITHOUT WARNING AND POSSIBLY CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

Starter Safety Switch Operation (Automatic Transmission)

Check by trying to start the engine in each gear while setting the parking brake and the foot brake. The starter should crank only in "P" (Park) or "N" (Neutral).

Starter Safety Switch Operation (Manual Transmission)

To check, place the shift lever in "Neutral", push the clutch pedal halfway and try to start. The starter should not

0B-4 MAINTENANCE AND LUBRICATION

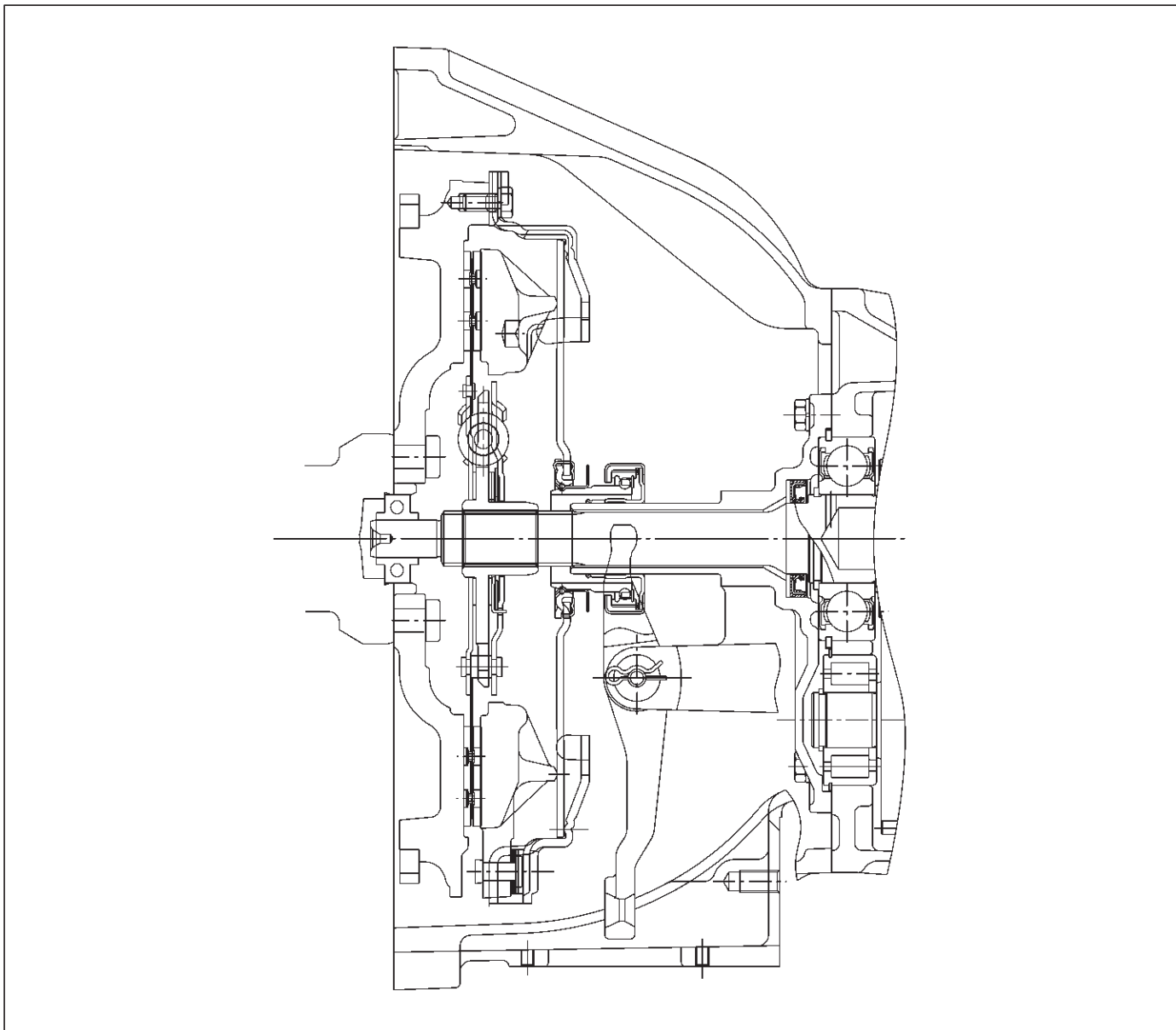
		IN THOUSANDS OF MILES (USE ODOMETER READING)													DESCRIPTION					
		7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5		105	112.5	120		
EVERY		(x 1000 miles)																		
MONTHS																				
	MILEAGE/MONTHS whichever comes first																			
20	LUBE BODY AND CHASSIS	6																		
21	*LUBE FRONT PROPELLER SHAFT	6																		
22	LUBE REAR PROPELLER SHAFT	6																		
23	CHECK PROPELLER SHAFT FLANGE TORQUE	12																		
24	CHECK SHIFT ON THE FLY SYSTEM GEAR OIL	12																		
25	CHECK AUTO CRUISE CONTROL LINKAGE AND HOSES	12																		
26	CHECK CLUTCH LINES AND HOSE	12																		
27	LUBE CLUTCH PEDAL SPRING, BUSHING AND CLEVIS PIN	6																		
28	CHECK CLUTCH PEDAL FREE PLAY	12																		
29	CHECK STARTER SAFETY SWITCH	12																		
30	CHECK ACCELERATOR LINKAGE	12																		
31	LUBE KEY LOCK CYLINDER	12																		

* Except TOD system model
 • UNDER SEVERE DRIVING CONDITIONS, ADDITIONAL MAINTENANCE IS REQUIRED. REFER TO "MAINTENANCE SCHEDULE UNDER SEVERE DRIVING CONDITIONS" LATER IN THIS SECTION

SHADED AREA INDICATES SERVICE TO BE PERFORMED.

General Description

Clutch



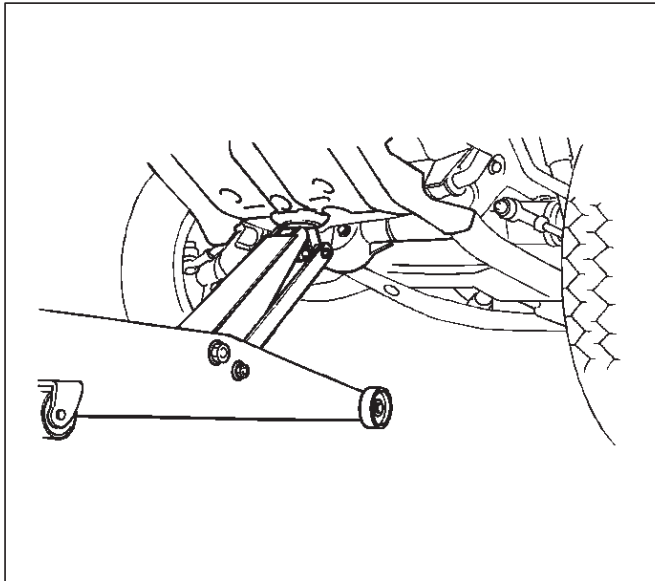
A07RW046

For 6VE1 (3.5L) engine model, the pull-type clutch is employed. The pull-type clutch is disengaged by pulling

the release lever (release bearing) to disengage the pressure plate.

Lifting Point; Front

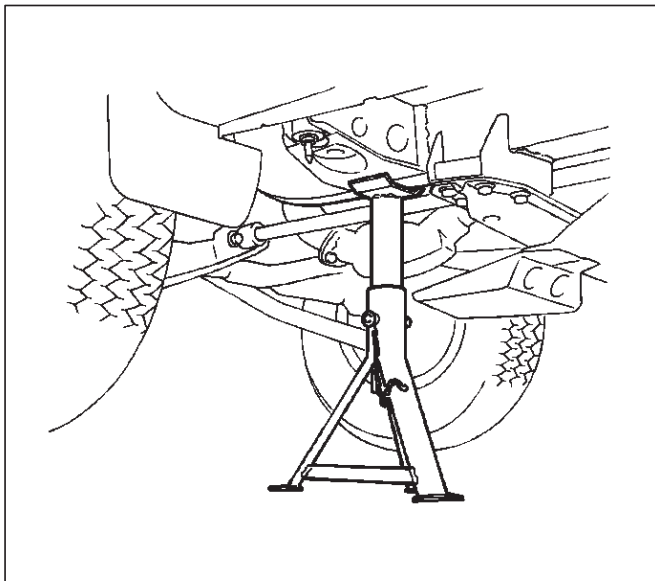
- When using a floor jack, lift on the center of the skid plate.



545RS001

Supportable Point; Front

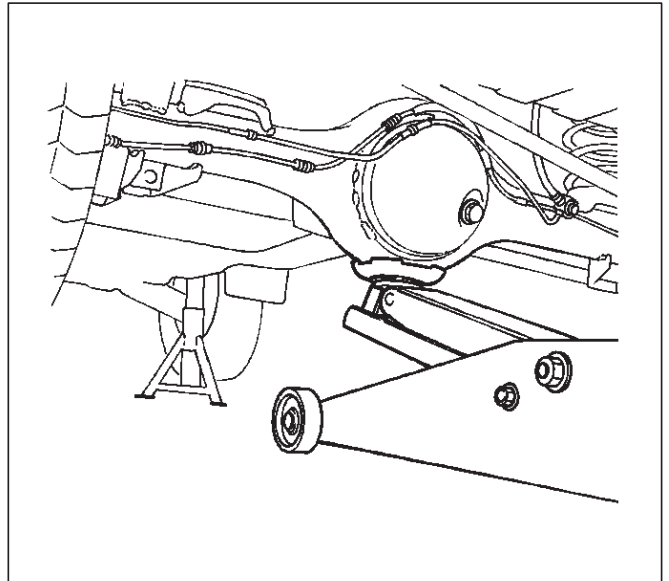
- Position the chassis stands at the bottom of the frame sidemember, behind the front wheel.



501RS003

Lifting Point; Rear

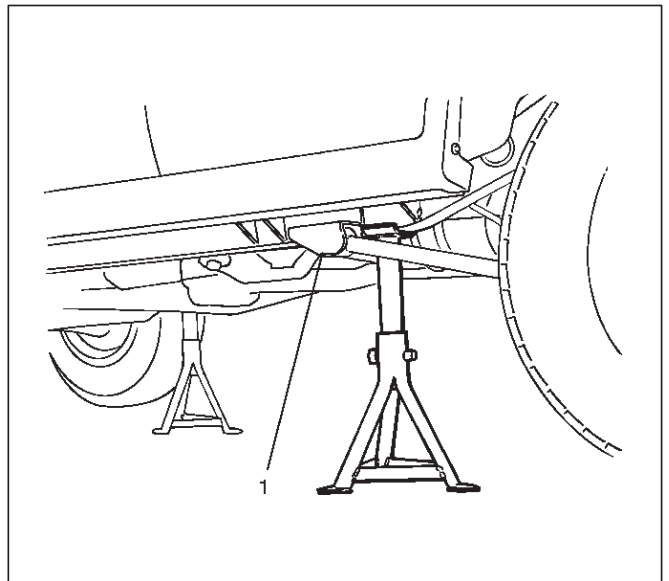
- Position the floor jack at the center of the rear axle case when lifting the vehicle.



420RS002

Supportable Point; Rear

- Position the chassis stands at the bottom of the frame sidemember, just behind the trailing link bracket.

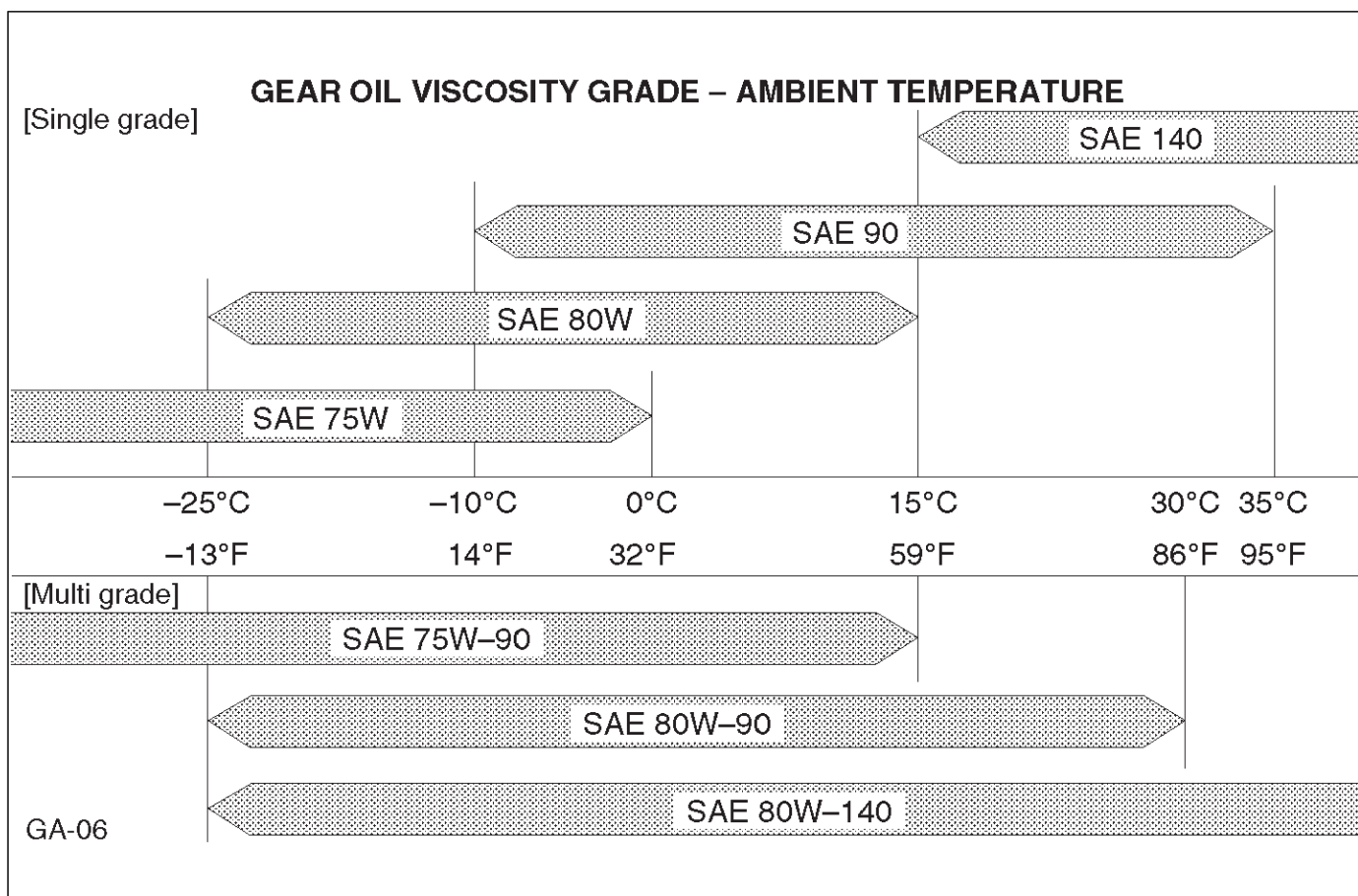


501RW002

Legend

- (1) Trailing Link Bracket

Oil Viscosity Chart for Rear Axle



B00RW004

Recommended Liquid Gasket

Type	Brand Name	Manufacturer	Remarks
RTV* Silicon Base	Three Bond 1207B	Three Bond	For Engine Repairs For Axle Case Repairs. T/M Repairs. T/M
	Three Bond 1207C	Three Bond	
	Three Bond 1215	Three Bond	
	Three Bond 1280	Three Bond	
	Three Bond 1281	Three Bond	
Water Base	Three Bond 1141E	Three Bond	For Engine Repairs
Solvent	Three Bond 1104	Three Bond	For Engine Repairs
	Belco Bond 4	Isuzu	
	Belco Bond 401 Belco Bond 402	Isuzu Isuzu	
Anaerobic	LOCTITE 515	Loctite	All
	LOCTITE 518	Loctite	
	LOCTITE 17430	Loctite	

* RTV: Room Temperature Vulcanizer

NOTE:

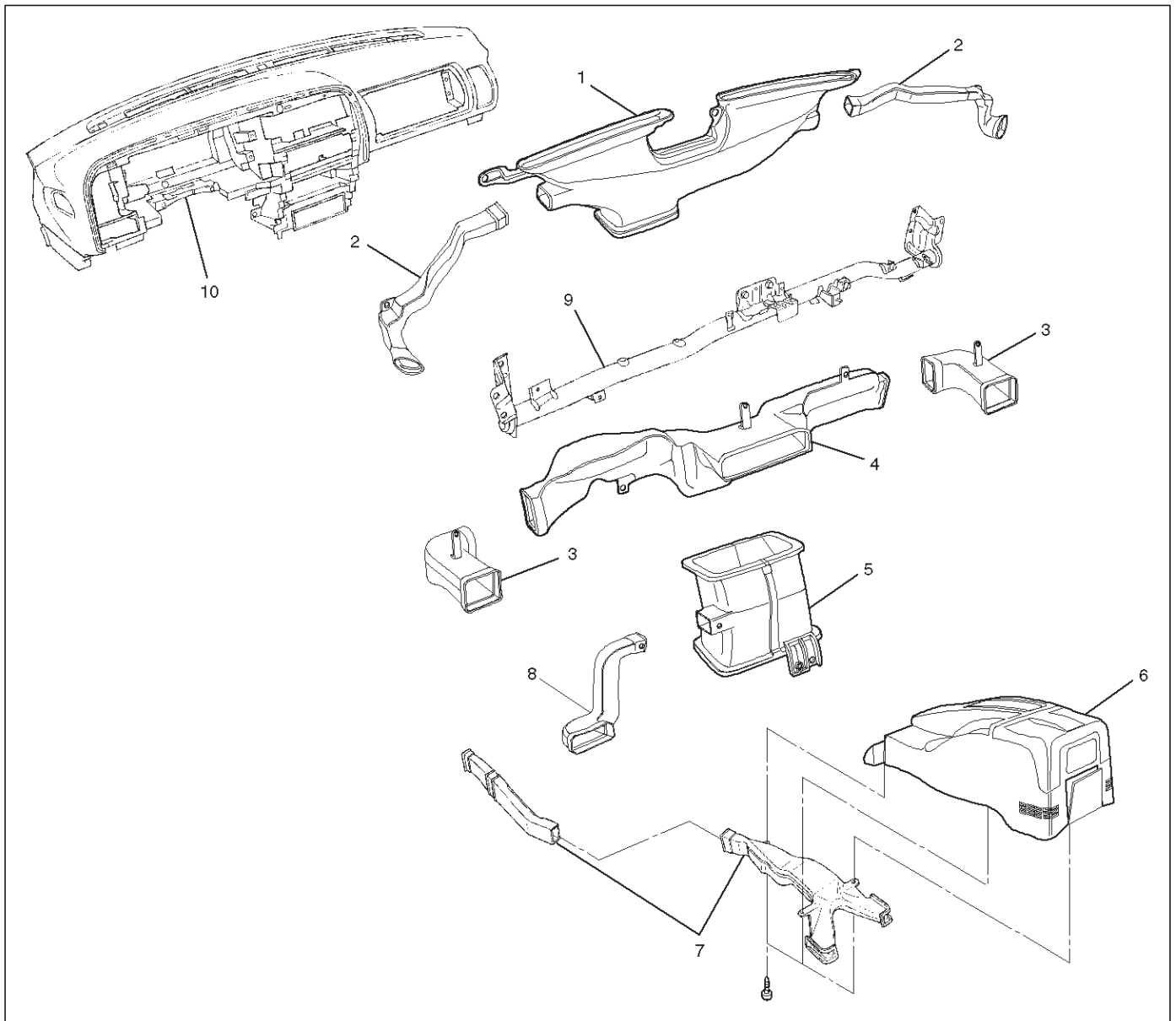
1. It is very important that the liquid gaskets listed above or their exact equivalent be used on the vehicle.
2. Be careful to use the specified amount of liquid gasket.
Follow the manufacturer's instructions at all times.

3. Be absolutely sure to remove all lubricants and moisture from the connecting surfaces before applying the liquid gasket.
The connecting surfaces must be perfectly dry.

4. Do not apply LOCTITE 17430, LOCTITE 515 and LOCTITE 518 between two metal surfaces having a clearance of greater than 0.25 mm (0.01 in). Poor adhesion will result.

Rear Heater Duct, Defroster Nozzle and Ventilation Duct

Rear Heater Duct, Defroster Nozzle, Ventilation Duct and Associated Parts



874RS017

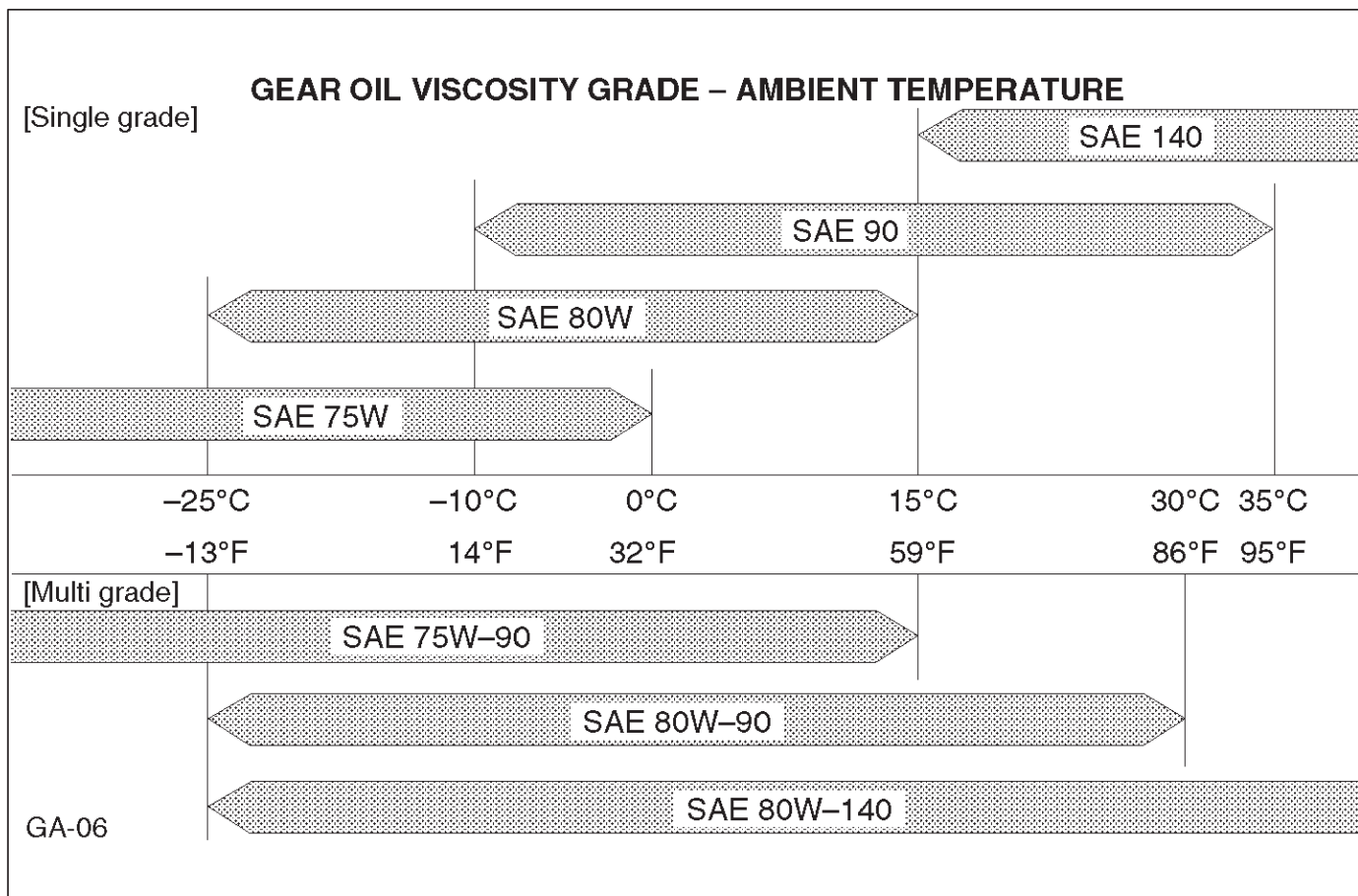
Legend

- | | |
|-----------------------------------|--------------------------------|
| (1) Center Defroster Nozzle | (6) Center Console |
| (2) Side Defroster Nozzle | (7) Rear Heater Duct |
| (3) Side Ventilation Duct | (8) Driver Lap Duct |
| (4) Center Ventilation Upper Duct | (9) Cross Beam Assembly |
| (5) Center Ventilation Lower Duct | (10) Instrument Panel Assembly |

Removal

1. Disconnect the battery ground cable.
2. Remove instrument panel assembly.
 - Refer to Instrument Panel Assembly in Body and Accessories section.
3. Remove center ventilation upper duct.
4. Remove side ventilation duct.
5. Remove center ventilation lower duct.
6. Remove driver lap duct.
7. Remove center console.
8. Remove rear heater duct.
 - Refer to Consoles in Body and Accessories section.
9. Remove cross beam assembly.
 - Refer to Cross Beam Assembly in Body and Accessories section.

Oil Viscosity Chart for Rear Axle



B00RW004

Recommended Liquid Gasket

Type	Brand Name	Manufacturer	Remarks
RTV* Silicon Base	Three Bond 1207B	Three Bond	For Engine Repairs For Axle Case Repairs. T/M Repairs. T/M
	Three Bond 1207C	Three Bond	
	Three Bond 1215	Three Bond	
	Three Bond 1280	Three Bond	
	Three Bond 1281	Three Bond	
Water Base	Three Bond 1141E	Three Bond	For Engine Repairs
Solvent	Three Bond 1104	Three Bond	For Engine Repairs
	Belco Bond 4	Isuzu	
	Belco Bond 401 Belco Bond 402	Isuzu Isuzu	
Anaerobic	LOCTITE 515	Loctite	All
	LOCTITE 518	Loctite	
	LOCTITE 17430	Loctite	

* RTV: Room Temperature Vulcanizer

NOTE:

1. It is very important that the liquid gaskets listed above or their exact equivalent be used on the vehicle.
2. Be careful to use the specified amount of liquid gasket.
Follow the manufacturer's instructions at all times.

3. Be absolutely sure to remove all lubricants and moisture from the connecting surfaces before applying the liquid gasket.
The connecting surfaces must be perfectly dry.

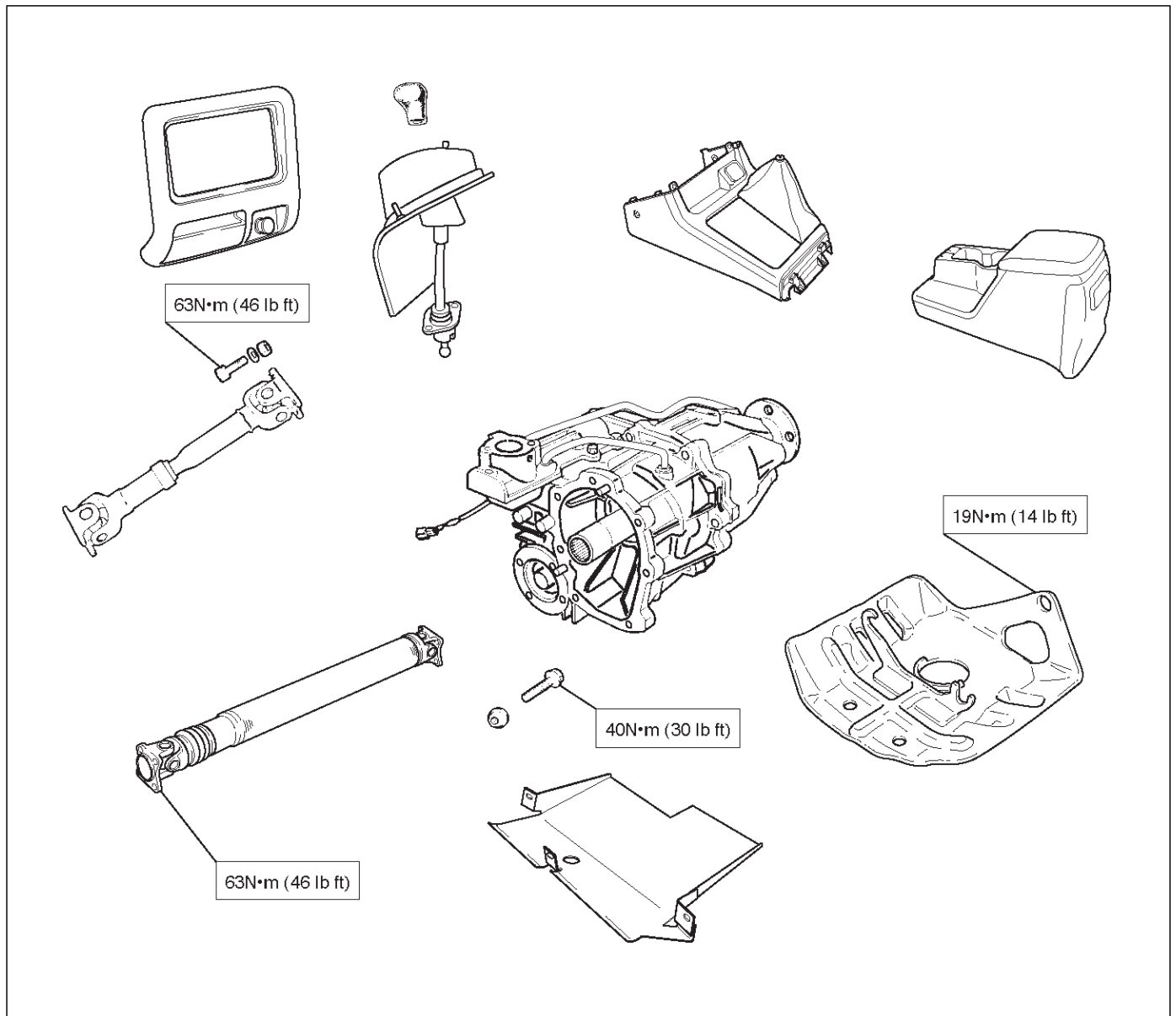
4. Do not apply LOCTITE 17430, LOCTITE 515 and LOCTITE 518 between two metal surfaces having a clearance of greater than 0.25 mm (0.01 in). Poor adhesion will result.

Main Data and Specifications

General Specifications

Type	Synchronized type gears shifting between the 2 and 4 wheel drive mode. Constant mesh type gears shifting between "low" and "high".
Control method	Remote (A/T) and direct (M/T) control with the gear shift lever on the floor for gears shifting between "low" and "high". Electric control with the button switch on the instrument panel for gears shifting between the 2 and 4 wheel driver mode.
Gear ratio	High; 1.000 Low; 2.050
Oil capacity	1.45 lit. (1.53 U.S. quart)
Type of lubricant	Engine oil Refer to chart in Section 0

Torque Specifications



Battery

General Description

There are six battery fluid caps on the top of the battery. These are covered by a paper label.

The battery is completely sealed except for the six small vent holes on the side. These vent holes permit the escape of small amounts of gas generated by the battery. This type of battery has the following advantages over conventional batteries:

1. There is no need to add water during the entire service life of the battery.
2. The battery protects itself against overcharging. The battery will refuse to accept an extensive charge. (A conventional battery will accept an excessive charge, resulting in gassing and loss of battery fluid.)
3. The battery is much less vulnerable to self discharge than a conventional type battery.

Diagnosis

1. Visual Inspection

Inspect the battery for obvious physical damage, such as a cracked or broken case, which would permit electrolyte loss.

Replace the battery if obvious physical damage is discovered during inspection.

Check for any other physical damage and correct it as necessary.

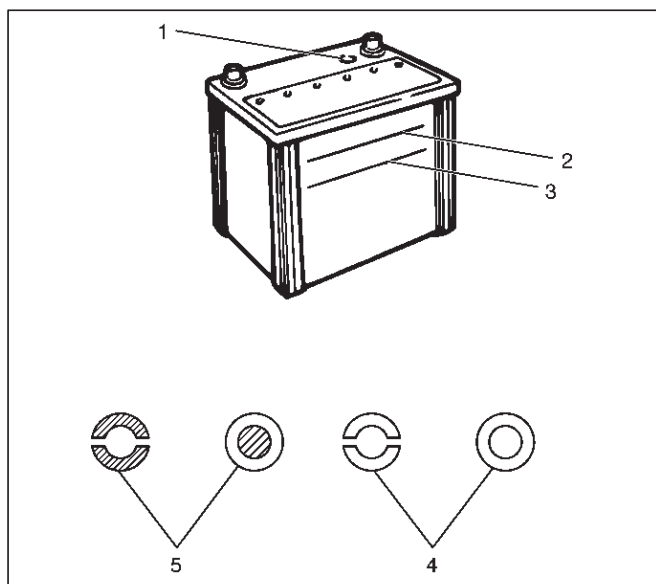
2. Hydrometer Check

There is a built-in hydrometer (Charge test indicator(1)) at the top of the battery. It is designed to be used during diagnostic procedures.

Before trying to read the hydrometer, carefully clean the upper battery surface.

If your work area is poorly lit, additional light may be necessary to read the hydrometer.

- a. BLUE RING OR DOT VISIBLE(5) – Go to Step 4.
- b. BLUE RING OR DOT NOT VISIBLE(4) – Go to Step 3.

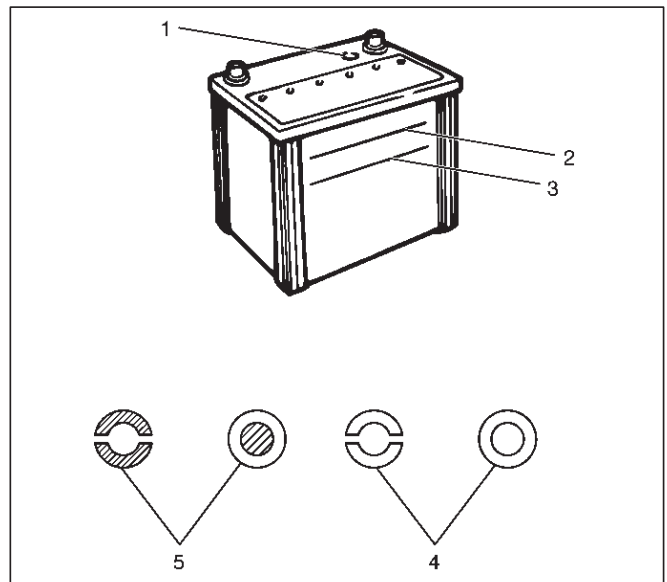


061RX001

3. Fluid Level Check

The fluid level should be between the upper level line(2) and lower level line(3) on side of battery.

- a. CORRECT FLUID LEVEL – Charge the battery.
- b. BELOW LOWER LEVEL – Replace battery.



061RX001

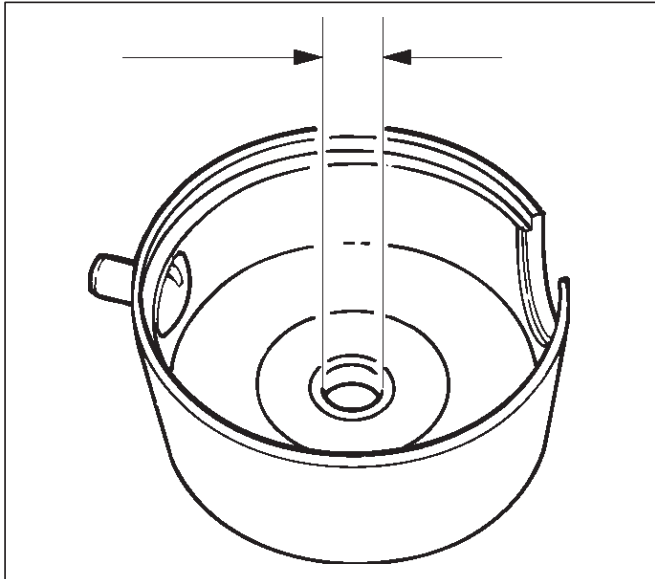
4. Voltage Check

1. Put voltmeter test leads to battery terminals.
 - a. VOLTAGE IS 12.4V OR ABOVE – Go to Step 5.
 - b. VOLTAGE IS UNDER 12.4V – Go to procedure (2) below.
2. Determine fast charge amperage from specification. (See Main Data and Specifications in this section). Fast charge battery for 30 minutes at amperage rate no higher than specified value. Take voltage and amperage readings after charge.
 - a. VOLTAGE IS ABOVE 16V AT BELOW 1/3 OF AMPERAGE RATE – Replace battery.
 - b. VOLTAGE IS ABOVE 16V AT ABOVE 1/3 OF AMPERAGE RATE – Drop charging voltage to 15V and charge for 10 – 15 hours. Then go to Step 5.
 - c. VOLTAGE IS BETWEEN 12V AND 16V – Continue charging at the same rate for an additional 3-1/2 hours. Then go to Step 5.
 - d. VOLTAGE BELOW 12V – Replace Battery.

Measure inner diameter of bushing in the rear cover, and replace if it exceeds the limit.

Standard: 12.50 mm to 12.527 mm (0.492 in to 0.4932 in)

Limit: 12.60 mm (0.4961 in)

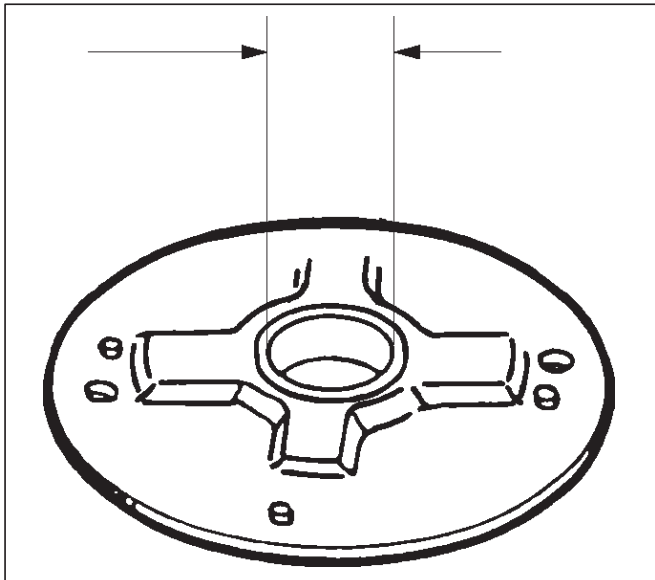


065RS028

Measure inner diameter of bushing in the center bracket (P), and replace if it exceeds the limit.

Standard: 18.01 mm to 18.127 mm (0.7091 in to 0.7137 in)

Limit: 18.15 mm (0.7146 in)



065RS029

Reassembly

To install, follow the removal steps in the reverse order, noting the following points:

Grease application places

- Bushing in rear cover and center bracket
- Gears in reduction gear
- Shift lever operating portion
- Sliding portion of pinion
- Plunger sliding portion of magnetic switch

Reassembling Yoke Assembly

Before reassembly, make sure that no metallic parts attach to the yoke assembly. Because of strong magnetic force, hold the yoke assembly and insert it slowly into the armature.

Torque

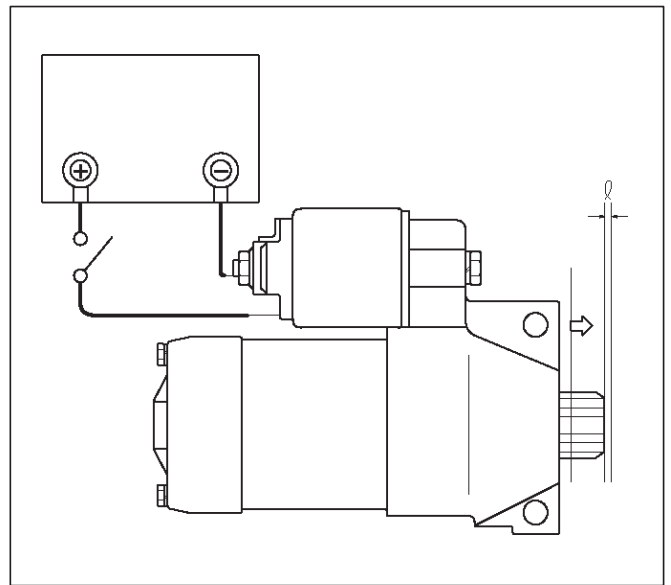
Torque for each part (See Torque Specifications in this section)

Pinion Jump-out Dimension

Connect the “+” cable of battery to terminal S and the “-” cable to terminal M. Turn the switch on, and measure pinion travel dimension in thrust direction from the jump-out position.

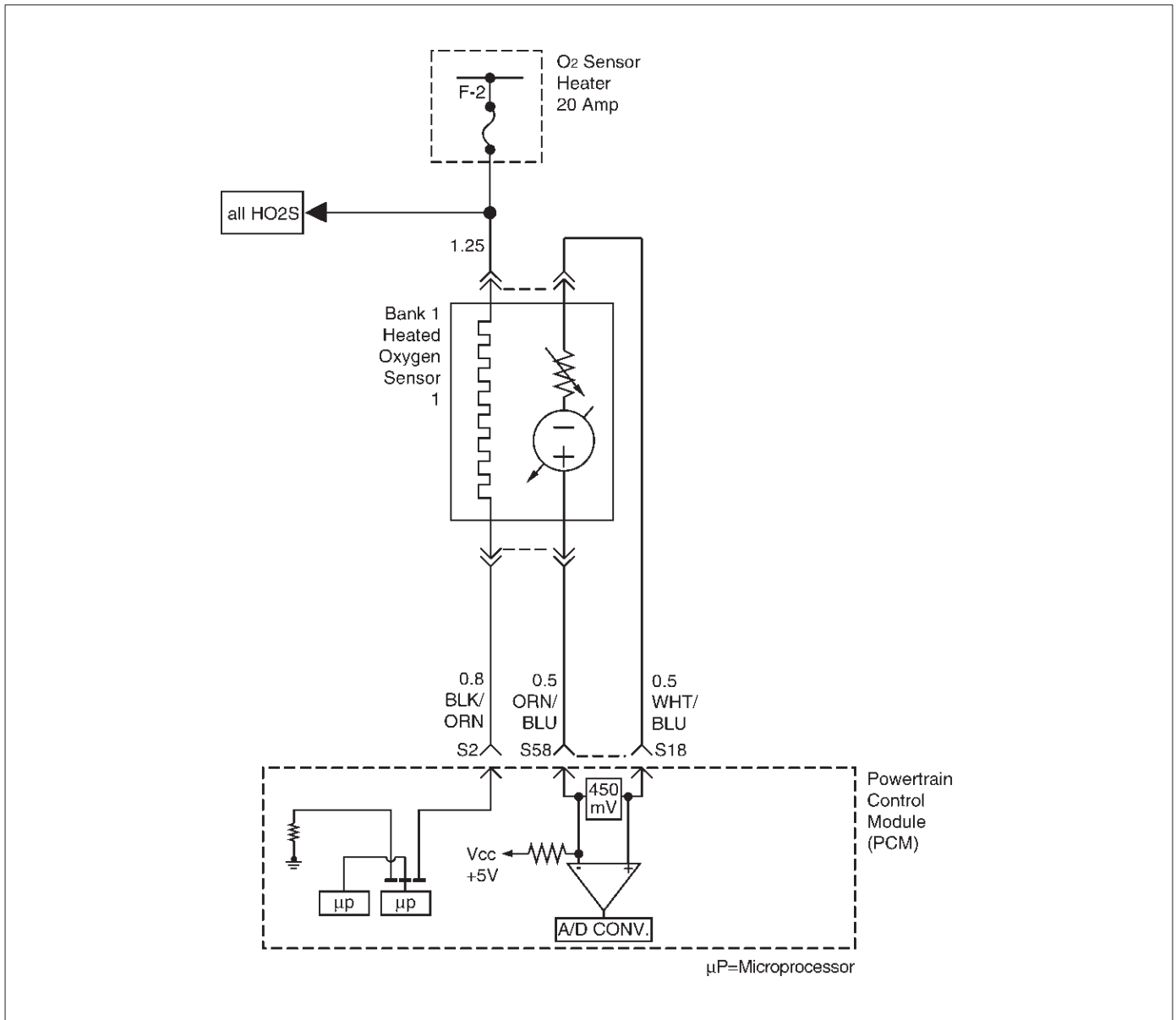
In measuring the dimension, pull the pinion out a little in the arrow direction.

Dimension(L): 0.05 mm to 1.5 mm (0.002 in to 0.06 in)



065RS030

Diagnostic Trouble Code (DTC) P0172 Fuel Trim System Rich Bank 1



D06RY00144

Circuit Description

To provide the best possible combination of driveability, fuel economy, and emission control, a "closed loop" air/fuel metering system is used. While in "closed loop," the powertrain control module (PCM) monitors the Bank 1 heated oxygen sensors (HO₂S) 1 and Bank 2 HO₂S 1 signals and adjusts fuel delivery based upon the HO₂S signal voltages. A change made to fuel delivery will be indicated by the long and short term fuel trim values which can be monitored with a Tech 2. Ideal fuel trim values are around 0%; if the HO₂S signals are indicating a lean condition the PCM will add fuel, resulting in fuel trim values above 0%. If a rich condition is detected, the fuel trim values will be below 0%, indicating that the PCM is reducing the amount of fuel delivered. If an excessively rich condition is detected on Bank 1, the PCM will set DTC P0172.

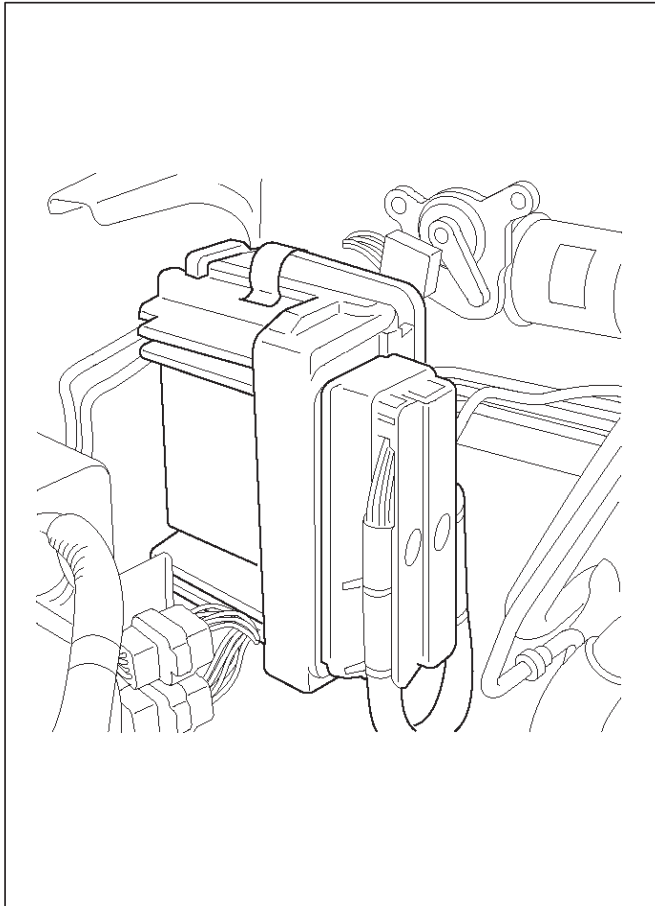
The PCM's maximum authority to control long term fuel trim allows a range between -15% (automatic transmission) or -12 (manual transmission) and +20%.

The PCM's maximum authority to control short term fuel trim allows a range between -11% and +20%. The PCM monitors fuel trim under various engine speed/load fuel trim cells before determining the status of the fuel trim diagnostic.

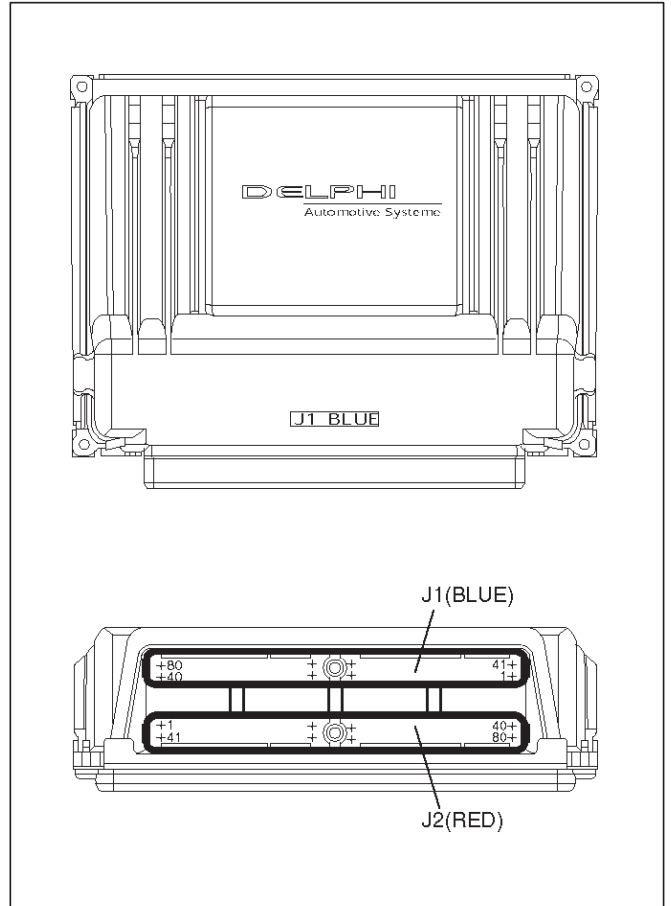
Conditions for Setting the DTC

- No Tech 2 test is being run.
- None of the following was set: EGR DTCs, HO₂S DTCs, (response, transition, open, low volts, no activity), MAF DTCs, TPS DTCs, MAP DTCs, IAT DTCs, canister purge DTCs, EVAP DTCs, injector circuit DTCs, or misfire DTCs.
- Engine coolant temperature is between 25°C (77°F) and 100°C (212°F).
- Intake air temperature is between -40°C (-40°F) and 120°C (248°F).
- Manifold absolute pressure is between 24 kPa and 99 kPa.
- Throttle angle is steady below 95%.

**OBD II Diagnostic Management System
Powertrain Control Module (PCM) Location**



826RY001



826RY002

Class 2 Serial Data Bus

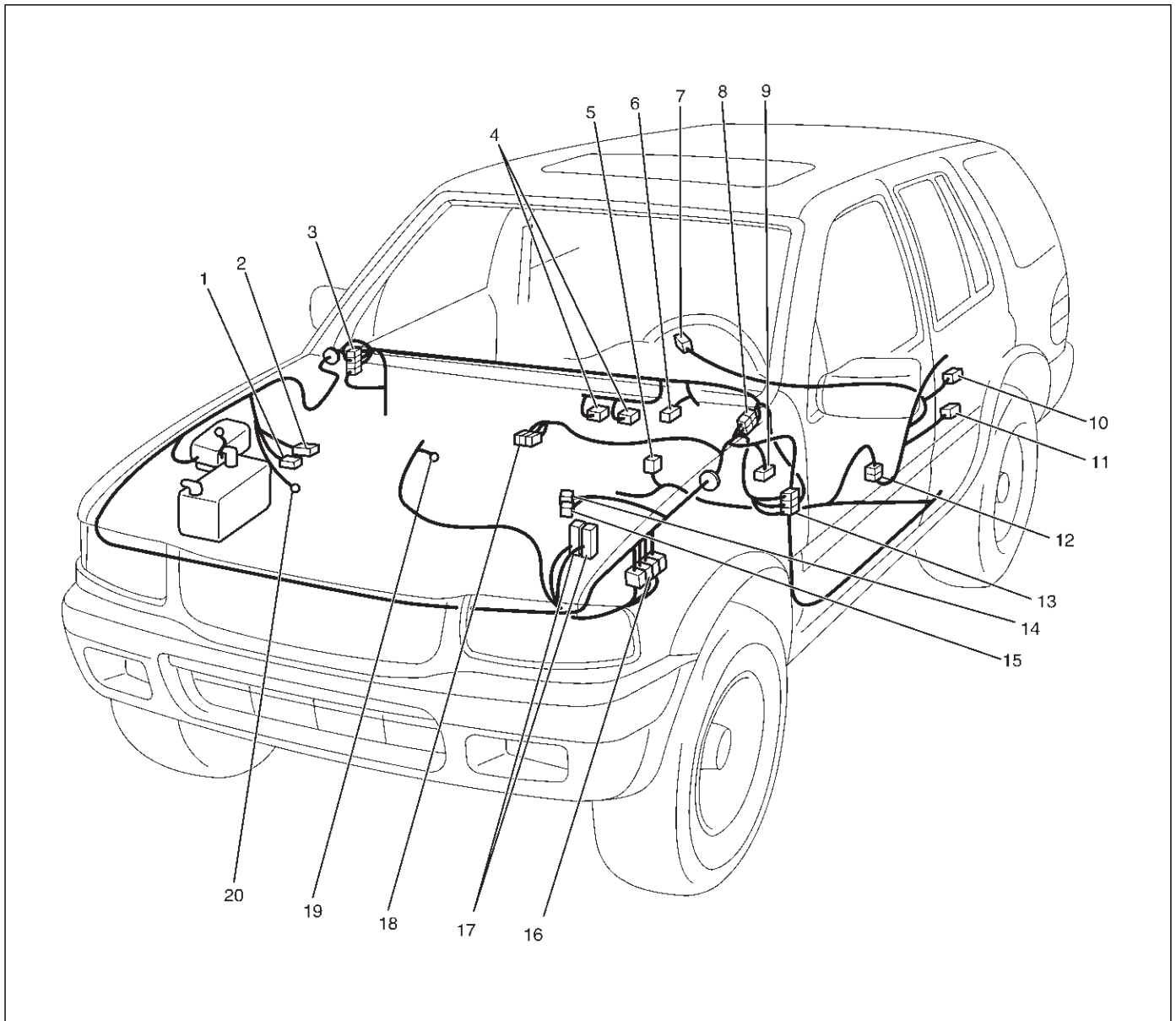
OBD II technology requires a much more sophisticated PCM than does OBD I technology. The OBD II PCM diagnostic management system not only monitors systems and components that can impact emissions, but they also run active tests on these systems and components. The decision making functions of OBD II PCM have also greatly increased. To accommodate this expansion in diagnostic complexity, Isuzu engineers have designed the Class 2 serial data bus, which meets SAE J1850 recommended practice for serial data.

“Serial Data” refers to information which is transferred in a linear fashion – over a single line, one bit at a time. A “Data Bus” is an electronic pathway through which serial data travels.

RODEO previously used a 5 volt data bus called UART, which is an acronym for “Universal Asynchronous Receive and Transmit”. When neither the vehicle’s control module nor the diagnostic tool, such as a Tech 2, are “talking,” the voltage level of the bus at rest is 5 volts. The two computers talk to each other at a rate of 8,192 bits per second, by toggling or switching the voltage on the data bus from 5 volts to ground.

Class 2 data, which is used on OBD II vehicles, is quite different. Data is transferred at a rate of 10.4 kilobits per second, and the voltage is toggled between zero and 7 volts.

Parts Location



D08RY00304

Legend

- | | |
|----------------------------|-----------------------|
| (1) C-44 | (11) F-5 |
| (2) C-43 | (12) H-35 |
| (3) H-12, H-13, H-14, H-18 | (13) H-15, H-16, H-17 |
| (4) I-1, I-2 | (14) C-46 |
| (5) B-25 | (15) C-45 |
| (6) I-18 | (16) H-5, H-6, H-7 |
| (7) F-6 | (17) E-21, E-22 |
| (8) H-31, H-32 | (18) C-50, C-51, C-52 |
| (9) C-34 | (19) E-30 |
| (10) F-7 | (20) C-36 |