THE MASTER TECHNICIAN'S

SERVICE REFERENCE BOOK

SESSION NO. 63-11

1963 MODEL SERVICE DIGEST

MASTER TECHNICIANS SERVICE CONFERENCE
PREPARED BY CHRYSLER CORPORATION
PLYMOUTH · DODGE · CHRYSLER · IMPERIAL

Owner satisfaction-Everyone's job!

In the long run, the customer who pays the bills pays our wages. And it's a cold, hard fact that *satisfied* owners are mighty good job insurance.

According to sales figures, our salesmen are doing a fine job of putting customers into '63 model Chrysler-built cars. But now, the Sales Department has just about wrapped up this model year. Soon they'll be giving their full attention to the 1964 line.

For Service Technicians, it's a different story. You can't write off the 1963 model year until the last '63 car rolls out of your Service Department for the last time! It's mighty good business to *keep* those owners of '63 models satisfied until they're ready to trade again. So count on it being a long time before you can stop thinking about servicing the current model cars.

This 1963 Model Service Digest is a collection of the most important and helpful things we've learned about servicing these models. It's the kind of information that will come in handy as long as you have a '63 to service. Many of the points discussed in this issue are covered in more detail in previous issues. To make it easier to locate information in past issues of the reference books for this model year, you'll find a cumulative table of contents on the back cover of this issue. So hang on to *all* your reference books—*and use 'em!*

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ENGINES

REPORTED EXCESSIVE OIL CONSUMPTION

Many variables affect oil consumption. The types of operation, the driving habits of the owner, the quality and viscosity of the oil used and, of course, the condition of the engine all have a bearing on the amount of engine oil consumed. Because of these variables, it's difficult to establish a set figure beyond which oil consumption can be considered excessive. As a rule of thumb, however, oil consumption of up to one quart for every 500 miles may be considered acceptable. In fact, slight oil consumption is normal—it indicates that the top piston rings are being lubricated properly.

NEW ENGINES

New engines usually use more oil until the rings are seated. This is a fact that many new-car owners don't realize. It simply means that a little extra oil is being used to lubricate the upper areas of the cylinders. Oil mileage will improve when the rings seat themselves. The same condition exists with a re-ringed engine.

OIL LEAKS

When an owner complains that his car is using oil, don't just take his word for it. There may be some simple, easily corrected cause. For example, an oil leak of only a few drops per mile can quickly account for a quart of oil in a couple of hundred miles. So be sure that all oil seals and gaskets are doing their jobs before you get into any major repair work.

CHECK DIPSTICK CALIBRATION

A dipstick that reads wrong may cause the owner to add oil before it's needed. When the crankcase is overfilled, the excess oil will be used up in a hurry, leading the owner to think he has an "oil burner" on his hands. If the dipstick error is in the other direction, the oil level may get dangerously low before the owner adds oil.

Read Dipstick: To check the accuracy of the dipstick, drain the crankcase and refill it with the right amount of MS oil. Then read the dipstick. If you change the filter at this time, *don't* add the extra quart for the new filter or start the engine until *after you've checked the dipstick*. Otherwise, you'll get a false reading because of the filter capacity.

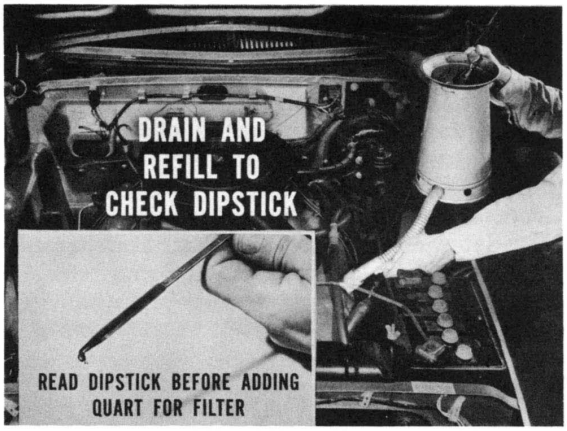


Fig. 1—Check dipstick calibration

Re-mark Dipstick: If the dipstick doesn't read "Full" when the engine is filled with the correct amount of oil, re-mark it to indicate the correct level. A fine file or an etching tool can be used for this purpose. Also change the location of the "Add one quart" mark a corresponding distance. And be sure to remove or obliterate the old marks to avoid confusing the owner or service personnel.

Replacing the dipstick won't necessarily correct the problem, because you can't always be sure it's the dipstick's fault. The trouble might be due to the dipstick tube, or other conditions. If so, a new dipstick would give you the same faulty indications as the previous one!

OIL CONSUMPTION TEST

After you've made sure there's no oil leak, and have filled the crankcase with fresh oil and checked the dipstick, test the actual oil consumption. Here's how. Ask the owner to drive a thousand miles or so on the fresh fill of oil. Then see how much oil he's actually used. Insist that the owner bring the car back to you if it needs any oil added during the test. That way, you can tell if it *really needs* oil, and if so, you can be sure that only MS oil of the proper viscosity is added.

ADVANTAGES OF MS OIL

Why is the exclusive use of MS oil stressed? The reasons are many, but they can be summed up in one sentence: only MS oils have sufficient chemical additives to protect the engine against scuffing, premature wear, corrosion and harmful varnish and sludge deposits. Any engine oil must do five jobs—lubricate, control rust and corrosion, cool, seal piston rings against blow-by, and keep the engine clean. MS oil does all five of these jobs—*best!* Non-detergent or straight mineral oils simply *do not* provide adequate protection.

Fig. 2—Reasons for using MS oil

APPROVED OIL ADDITIVES

For most types of service, it's not necessary to add anything to MS engine oil. However, when the car is used infrequently or for short trips, additional rust protection may be required. MoPar or Chryco Engine Oil Supplement can be used with MS oil to provide this protection. This product also has anti-scuff properties, and should be used during the break-in period after a major engine overhaul. No oil additives other than MoPar or Chryco products should ever be used.

WHY CHANGE OIL?

MS oil, because of its high-quality base and essential additives, does the best all-around job of protecting an engine. But in doing this job, the additives are gradually used up. Engine oil must be changed before the additives are used up and before the oil becomes too highly contaminated.

WHEN TO CHANGE OIL

How often should the oil be changed? This depends on temperature, type of operation and engine condition. Cold weather and short trip driving accelerates oil contamination. A poorly tuned or worn engine will also increase oil contamination.

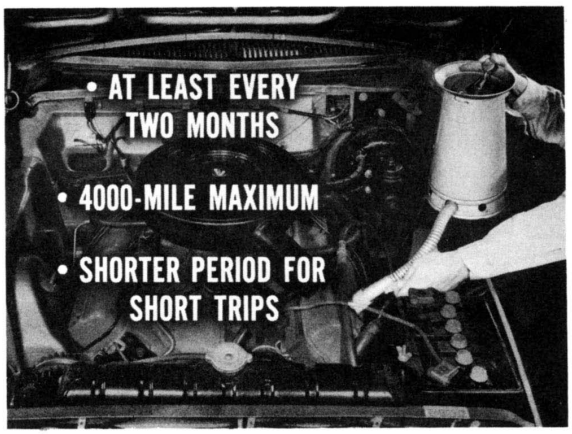


Fig. 3—Oil change intervals

First — and most important — oil should be changed *at least every two months.* On cars that are driven a lot, mileage between oil changes must be considered. If a car is driven 2,000 miles a month, a maximum of 4,000 miles between oil changes is permitted if the car is used mostly for highway driving. Oil should be changed more frequently than every two months if the car is used only for short trips in cold weather, or for other severe conditions like extreme high speeds or driving in dusty or sandy areas.

FILTER CHANGE INTERVALS

If engine oil is changed on the recommended schedule, the oil filter should be changed twice a year, to coincide with an oil change. When the car is operated in unusually dusty areas, the filter should be changed more frequently.

REPLACEMENT FILTERS

MoPar and Chryco oil filters are engineered to protect our Chrysler-built engines. They are superior in *capacity* and *ability to remove small particles* of foreign material. Some other filters may have less capacity or less ability to remove small particles from the oil.

So-called "super-filters" cannot eliminate the need for regular oil changes. When MS oil additives are used up, the oil must be changed even though it *looks* clean. So play it safe and stick to MoPar or Chryco filters, MS oil and recommended oil change intervals.

ENGINE BREAK-IN TIPS

On a new or re-ringed engine, the owner can help to seat the rings by using the right break-in procedure. He should stick to MS oil for maximum protection. After the first fifty miles, speeds up to 60 m.p.h. are desirable. Brief full-throttle acceleration in high gear is also desirable. The increased cylinder pressures promote ring seating and break-in.

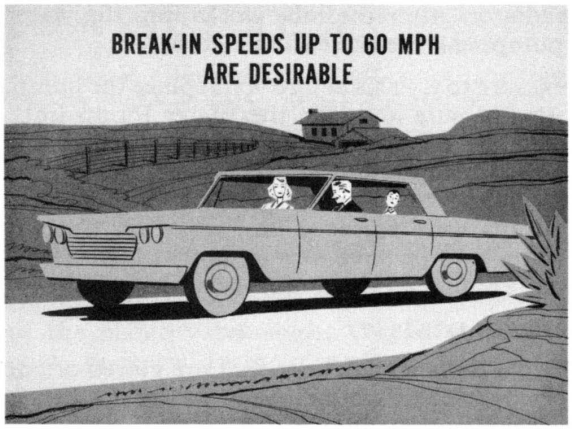


Fig. 4—Proper break-in helps seat rings

ENGINE OVERHEATING

When an owner complains that his engine is overheating, begin by checking the radiator for obstructions to air flow. Sometimes a clogged bug screen or air-conditioning condenser cuts down the cooling air to the radiator core. The condenser of a field-installed air conditioner might create an overheating problem if the standard radiator and fan are used. As you've probably noticed, a heavy-duty radiator and a fan shroud are included with the factory-installed air-conditioning unit to insure sufficient engine cooling capacity in hot weather.

HOSE CONDITION

Inspect all hoses in the cooling system and replace any that are deteriorated or damaged. Make sure that the reinforcing spiral wire in the lower radiator hose hasn't shifted out of position toward one end of the hose. If this happens, the other end of the hose will collapse and restrict coolant flow.

COOLANT CONDITION

The appearance of the coolant can tell you a lot. Here are some examples. Air leaking into the cooling system at the suction side of the water pump will create foam or bubbles when the engine's running. An internal leak which allows combustion gases to enter the cooling system may also cause foam or bubbles. An oily appearance of the coolant could mean a leak in the automatic transmission oil cooler or into the engine lubrication system. Rust indicates that the cooling system's been neglected.

PRESSURE TESTS

Cooling System: If the coolant level is low, or if the owner mentions that he's had to add water to the radiator periodically, pressure-test the cooling system and radiator cap.

Fig. 5—Pressure-test the cooling system

Pressure-Test Cooling System: Add water to bring the coolant level up to about one-half inch below the filler neck. Then attach the C-3499 Tester to the filler neck and apply a maximum pressure of 15 pounds per square inch to the system. Some leaks show up only when the engine is cold; others, only when the engine is hot. So test the system under both conditions to be sure.

Pressure Drop Means Coolant Leak: If the pressure drops, check first for external coolant

leaks. Don't overlook the possibility of a leak at a core hole expansion plug in the block. If there are no external leaks, check the system for evidence of combustion gas and internal leaks. A neglected internal leak into the lubrication system can cause serious engine trouble.

Radiator Pressure Cap: Using the adapter and seal with the C-3499 Tester, test the pressure cap. If it fails to hold 12 to 15 pounds of pressure, replace the cap. On cars with air conditioning, the cap should hold 15 to 16 pounds.

COMBUSTION GAS LEAK INTO COOLANT

An internal coolant leak into a cylinder is a two-way street! Coolant may get into the lubricating oil and combustion fumes and oil may get into the coolant. The C-3685 Bloc-Chek Kit will tell you if there's any trace of combustion fumes in the vapors at the radiator filler neck.

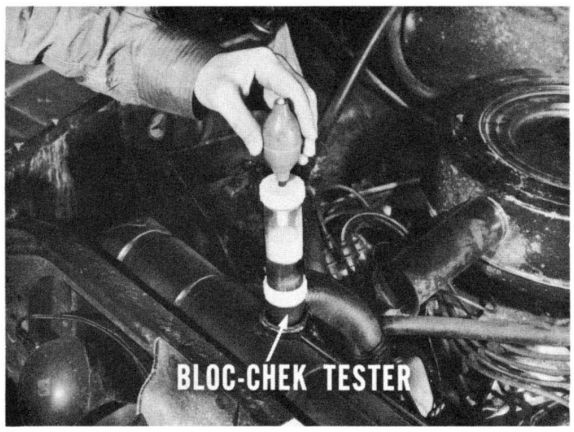


Fig. 6—Bloc-Chek detects combustion fumes

Coolant Plus Oil Equals Sludge: When coolant gets into engine oil, sludge forms. Soon, the sludge accumulation prevents the proper operation of many engine parts. If you detect and correct this condition in time, it can be kept from developing into much more serious trouble—a ring or bearing job, for instance.

V-8 Engines: To find out which bank of cylinders is leaking on a V-8 engine, drain and refill the system with fresh water to remove all traces of combustion fumes from the system. Then remove the spark plugs from one bank and repeat the test, running the engine on four cylinders. If the fumes are still present, the leak is at the side having the plugs installed. If not, the leak is at the side where the plugs were removed.

Don't try to make this test by just pulling one bank of spark plug wires—the plugs must be removed to relieve compression in the cylinders. Otherwise, the compression would force the unburned gasoline vapors into the cooling system, giving the same Bloc-Chek indication as combustion fumes.

NOISY WATER PUMP

Some cooling system problems are less serious, but still annoying, like a noisy water pump, for example. If you find a chattering or squeaking water pump, chances are the noise can be corrected by pouring a bottle of Water Pump Lube, Part No. 2298997, into the coolant in the radiator. After the lube works into the water pump seal, the noise should stop.

Be sure to try this before you replace the pump. Also be sure and give the Water Pump Lube time to correct the noise—don't expect the noise to stop immediately! At one time, it was estimated that about four out of five noisy pumps were replaced unnecessarily. Current water pumps have new seals that have virtually eliminated this source of noise.

RELATED NOISES

Drive Belts: Drive belts that are glazed or out of adjustment will be noisy. To see if a belt is causing a noise, put water on it. If this temporarily stops the noise, either the belt is at fault or there's paint in the pulley grooves. Belt dressing, incidentally, sometimes causes belt glaze, so its use is not recommended.

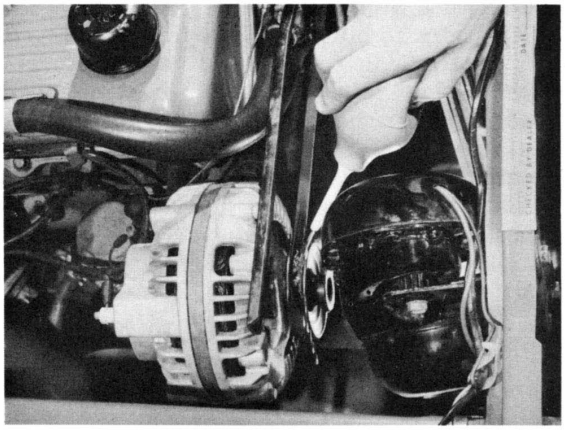


Fig. 7—Apply water to check for belt noise

Pulleys: Any slight trace of paint in the pulley grooves will cause noise, so be sure they're clean. The grooves should be uniformly wide, all around, to prevent the belt from "bouncing". And a pulley that's not lined up, or a wobbly pulley, can glaze a belt in a hurry.

Remove Belts To Test: To see if the noise is coming from the water pump or some other belt-driven accessory, remove all drive belts and run the engine. Then reinstall one belt at a time and run the engine. Repeat this test until you find where the noise is coming from. You can also use this test on other stubborn noise problems—even those seemingly not related to belt-driven accessories. For example, a noisy alternator can sometimes sound suspiciously like a rear axle that's going bad!

CARBURETION AND FUEL SYSTEM

Automatic Choke: To avoid choke sticking due to the formation of gum deposits in the choke piston chamber and choke shaft bearing areas, frequent treatment with MoPar or Chryco Carburetor Cleaner, Part No. 1643273, is recommended. With the engine warmed up and idling, squirt the cleaner through the piston link opening into the vacuum piston chamber. Also put a few drops on both ends of the choke valve shaft. Wiggle the choke valve back and forth to work the solvent in. This should be done at least every 8000 miles, and preferably more frequently—at every oil change.

On cars with higher mileage, the only effective way to eliminate gum from the choke system is to remove the choke piston and clean it. Soak the piston in carburetor cleaner and scrub all traces of gum from the choke piston cylinder with carburetor cleaner. Use a new plug when you re-install the piston and make sure it doesn't leak. The piston should be removed and cleaned on every carburetor cleaning or repair job.

Manifold Heat Control Valve: For good performance during warm-up, you have to keep the exhaust manifold heat control valve operating freely. Use Manifold Heat Control Valve Solvent, Part No. 1879318, on every tune-up and lube job. To get results, you've got to apply the solvent to *both ends* of the valve shaft. To prevent the solvent from boiling off, apply it when the valve is cool.

Here's a suggestion. Keep a can of heat control valve solvent and a can of carburetor cleaner in your service bay. Use them both at every opportunity—the choke piston and heat valve are essential to good performance.

HOT-START PROBLEMS

Fuel Filter: Early '63s and past models have the fuel filter located in a horizontal position. In extremely hot weather, fuel in the filter and lines expands and forces liquid gasoline through the carburetor and into the intake manifold. This can cause flooding of the manifold with raw gasoline after stopping a hot engine.

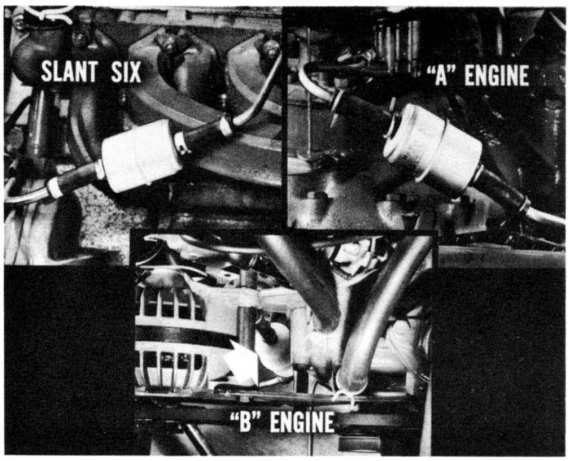


Fig. 8—Correct filter position improves hot starting

Current fuel filters are mounted vertically or tilted upward to prevent this problem. In this position, expanding fuel pushes vapor rather than solid fuel into the carburetor. Repositioning horizontal filters will eliminate some hot starting problems. Pre-formed fuel lines are being released by MoPar to make the job easy. These service lines are for 361- and 383-cubic-inch engines equipped with 2-barrel carburetors. Check with your parts man if you need these pre-formed lines.

RESTRICTED FUEL FILTERS

A restricted fuel filter can affect performance by starving the engine. Under certain conditions, it's necessary to change the filter sooner than the maximum interval of 16,000 miles recommended in the Certified Car Care schedule.

CARBURETOR AIR CLEANER

A restricted carburetor air filter acts like a partially closed choke. It causes a rich mixture with resulting poor performance and lowered economy. At least every 8,000 miles, the carburetor air filter should be removed and cleaned. To remove dirt, blow compressed air through the filter *from the inside* out—never into the filter from the outside. And don't bang the filter on a bench to loosen the dirt. This could distort the filter and cause a leak.

Fig. 9—Improper filter cleaning techniques

FUEL TANK VENT

A restricted fuel tank vent can affect performance, particularly at high speeds. And if the vent is closed off, fuel pump suction can actually collapse the tank! So take a moment to be sure the tank vent isn't obstructed. Be sure cars without a vented tank have a vented cap.

IGNITION TIMING ERROR—SLANT SIX ENGINES

In a few isolated cases, the outer section of the vibration damper has rotated on its rubber hub. If this happens, the vibration damper timing marks cannot be used to adjust ignition timing. Of course this timing mark error will not show up until you attempt to set ignition timing.

As we said before, this is not a common condition and it has occurred *only* on vibration dampers having a *machine-turned front face.* Chances are you may never run into this condition. However, if you do, it could be mighty frustrating to complete a tune-up job only to find that the engine wouldn't start or wouldn't perform right when timing is set correctly according to the timing marks.

The accompanying illustration gives you all the information you need to make a template for checking the accuracy of the timing marks. To use your template, align the keyway notch of the template with the damper keyway. The "D C" marks on the template and damper should line up within 1/4" of each other. If they do not, install a new damper.

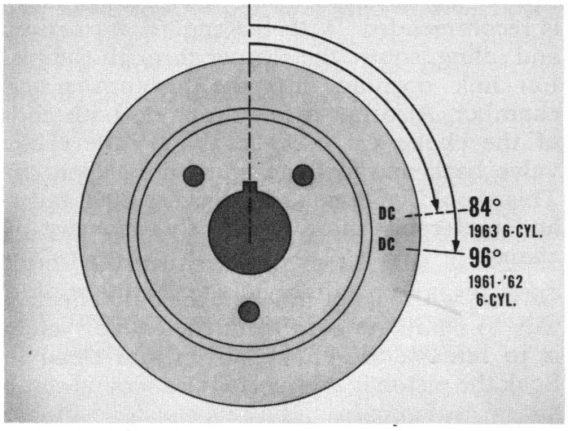


Fig. 10—Timing mark locations

ELECTRICAL

BATTERY CONDITION

On every electrical trouble-shooting job, it's a good idea to begin by testing battery condition and state of charge. If the battery isn't up to par, test the charging system to be sure it's capable of keeping the battery charged. If the battery's only partially charged or sulphated, install a battery that's fully charged before making charging system tests.

ELECTRICAL CONNECTIONS

Be sure the battery connections are clean and tight, and apply a coating of petrolatum or light grease to the battery terminals to retard corrosion. Loose or corroded electrical connections anywhere in the system can cause high resistance and starting, charging or performance problems. In fact, poor connections are the most common cause of electrical troubles.

ALTERNATOR AND CHARGING CIRCUIT

When testing the charging circuit, perform the circuit resistance tests, field current draw and alternator output test, and voltage regulator tests in that order. Before attempting any alternator bench repairs, be sure the trouble isn't due to something simple, like a loose field circuit connection or a voltage regulator that needs adjustment.

Alternator Brush "Hanging Up": Occasionally you may find an alternator brush "hanging up" because of a burr on the brush holder. To fix this, remove the burr with a fine file. Don't just replace the brush or the trouble will return!

V-8 BATTERY CABLE ROUTING

On all V-8's, be sure the battery cable doesn't rub against the body side shield. Eventually, the insulation could wear through and short out the cable. Sometimes it's necessary to bend the cable retaining clip up to give a quarter-inch clearance between the cable and the side shield. The clip can be bent easily by hand.

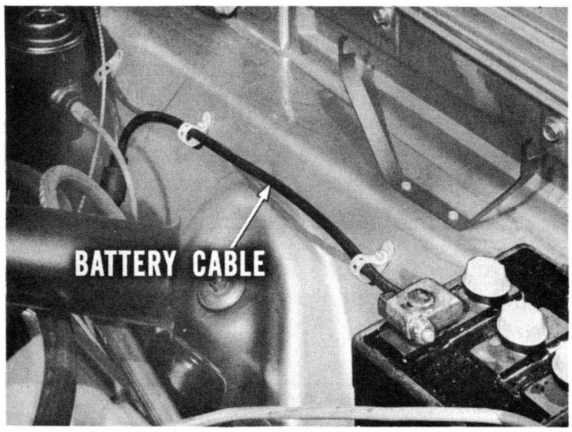


Fig. 11—Clearance at clip prevents shorted cable

NEUTRAL SAFETY SWITCH WIRE ROUTING

When you're working on a Valiant or Dart with TorqueFlite transmission, take a moment to be sure the neutral safety switch wire is routed and clipped properly. The wire should come down the side of the transmission housing and be held in place by a clip at the transmission oil cooler line bracket. If the neutral safety switch wire gets against the exhaust pipe, the heat could melt the insulation and ground the starting circuit. Then the engine could be started with the transmission in gear.

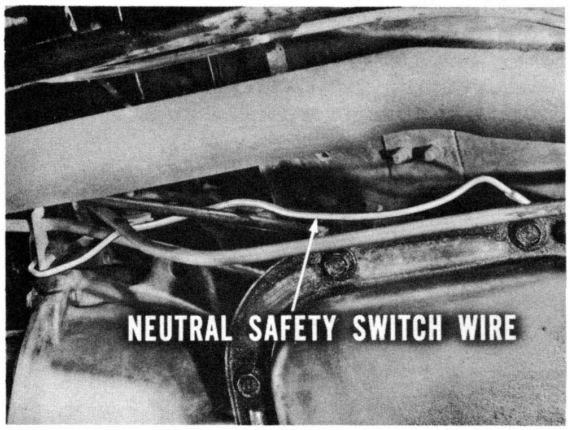


Fig. 12—Neutral safety switch wire routing

IGNITION SECONDARY CIRCUIT

Distributor Cap: Hard starting and misfiring could be caused by a high-voltage leak at the distributor cap. On every tune-up job remove the cap and scrub it, inside and out, with a diluted solution of a non-volatile household detergent to remove every trace of dirt and grease. Rinse the cap in hot water and dry it with a clean cloth. Don't use compressed air for drying—it might be contaminated with moisture or oil.

6-Cylinder Replacement Cap: For particularly stubborn cases of hard starting and misfiring on any U.S.-built Slant Six engine and distributor, try this. Install the improved distributor cap and rotor and the new coil high-tension cable available in the MoPar Distributor Cap Service Package, Part No. 2448273.

The new coil high-tension cable with improved nipples for better sealing is also available separately as a service package for both U.S. and Canadian Slant Sixes. These parts are

available from Chryco and MoPar, Part No. 2095773.

IGNITION COIL PROBLEMS

When servicing the ignition system, clean the coil tower thoroughly to prevent arcing and carbon tracking. Also be sure the primary ignition wire terminals on the coil are positioned properly, turned *away* from the tower to keep the secondary current from arcing down the tower and through the primary wire to ground.

Broken Circuit Inside Coil: Here's an unusual ignition problem that's not very common, but you should be aware of it. This condition has all the symptoms of coil trouble, and the symptoms are more pronounced in cold weather. Yet the coil may test okay.

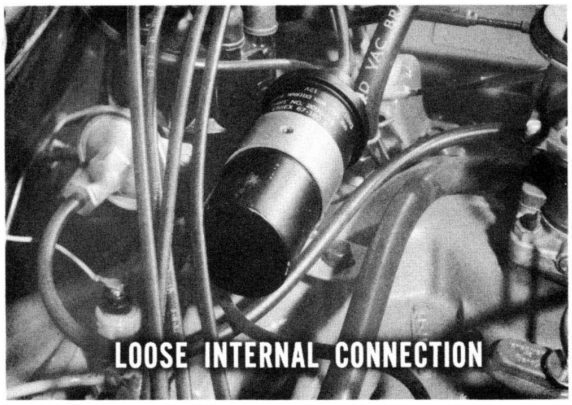


Fig. 13—Poor internal connection causes coil trouble

This unusual condition is caused by high resistance in the primary circuit because of a loose connection *inside the coil*. The loose connection closes up and reduces resistance when the coil gets warm, so you can't always find it with a coil tester. To correct the problem, replace the coil.

Only certain coils are vulnerable to this problem. They are coils stamped with Part No. 2095223 and *a date code between 08-3 to 18-3, inclusive*. The date code stamping is the key. Coils dated 19-3 and later are not vulnerable, and should be used to replace the earlier coils if this trouble occurs. Replacement coils with *no date code stamping* are also okay.

SPARK PLUGS

Spark plugs with attached gaskets for V-8 engines can be removed and installed several times without destroying the sealing ability of the gaskets. On 1963 Slant Six engines, both 170-cubic-inch and 225-cubic-inch models, *built in the United States only,* gaskets should *not* be used under the spark plugs. On earlier Slant Sixes and all Canadian Sixes, gaskets should be used. And on any Slant Six, always replace the spark plug tube rubber seal whenever a plug is serviced.

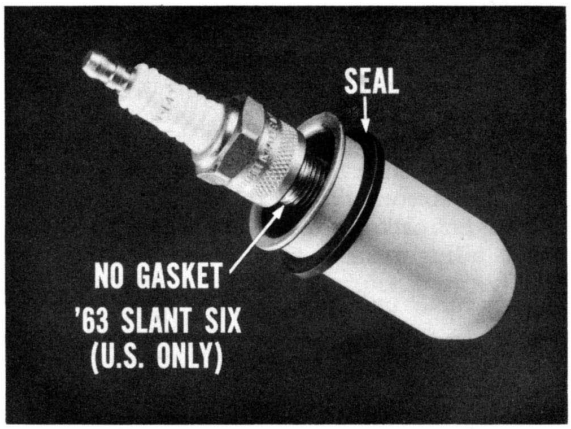


Fig. 14—Replace seal when servicing plugs

Spark Plug Applications: The following chart will help you be sure the correct plugs are used on every '63 engine. The spark plug gap is .035″ for all plugs except the J 7 Y used on the 426-cubic-inch Maximum Performance V-8. The gap for these plugs is .025″.

	U.S.	CANADA
Slant Six, 170 & 225 cu. in.	N 14 Y	AG 52
V-8's, 313 cu. in. (Canada); 318 cu. in. (U.S.); 361 cu. in. (Std. or Power Pack): 383 & 413 cu. in. with 2-bbl. carb.	J 12 Y	A 42
V-8's, 383 & 413 cu. in. with 4-bbl. carb. (incl. 300J with 2 4-bbl. carb.)	J 9 Y	A 42
V-8, 426 cu. in.	J 9 Y (Normal Usage) J 7 Y (Max. Performance)	

TORQUEFLITE TRANSMISSION PROBLEMS

Most TorqueFlite troubles start with neglected service adjustments or failure to maintain the correct fluid level. If minor shift problems are corrected early enough, most mechanical failures can be avoided. These problems develop because one of the bands or clutches is not doing what it's supposed to do when it's supposed to do it! Road-test the car to figure out which band or clutch isn't doing its job.

BAND AND CLUTCH APPLICATION CHART

LOW (Breakaway)	LOW (No. 1 Button)	SECOND	DIRECT	REVERSE
REAR CLUTCH	REAR CLUTCH	REAR CLUTCH	REAR CLUTCH	FRONT CLUTCH
OVERRUNNING CLUTCH	LOW AND REVERSE BAND	KICKDOWN BAND	FRONT CLUTCH	LOW AND REVERSE BAND

Fig. 15—TorqueFlite band and clutch application

TRANSMISSION ROAD TEST

On the road test, try every push button. Refer to the Band And Clutch Application Chart and use the process of elimination to determine which component isn't functioning properly. Think mainly about band and clutch operation, and don't worry about valves and hydraulic circuits on the road test. Whenever possible, take the owner along on the road test so he can point out exactly what he's complaining about. Session No. 176, TorqueFlite Diagnosis, was developed for past model cars. However, it is very much applicable to the current models.

FLUID LEVEL AND SERVICE ADJUSTMENT

Always check the level of the fluid before you do anything else. If the fluid has a strong burned odor, a band or clutch has been slipping and overheating the friction material. If fluid level is okay, check out the service adjustments.

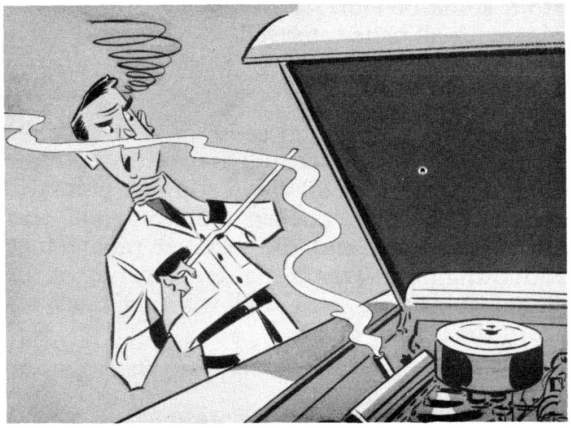


Fig. 16—Burned odor means trouble!

There are four important service adjustments in the TorqueFlite transmission: the push-button cable and transmission throttle linkage adjustments, and kickdown band and low and reverse band adjustments. Check these adjustments before you even think about overhauling the transmission. Quite often, one of these checks will uncover an easily corrected cause of trouble.

FRICTION MATERIAL

If an adjustment seems to correct the trouble, be sure to check a sample of the transmission fluid for loose particles of band-facing material before returning the car to its owner. An accumulation of friction material means that a complete overhaul is needed, so don't turn your customer loose with a potential troublemaker!

VALVE BODY SERVICE

The most common cause of valve body troubles is simply dirt—*not worn or damaged parts*. Normally, all that's required is extremely thorough cleaning and careful, gentle handling.

For reassembly, follow the manual instructions and illustrations.

REAR AXLE NOISE

Sometimes a noise that sounds like rear axle trouble can come from other unrelated sources —an underinflated tire or a noisy alternator bearing, for example. Of course, if the noise comes in with the car standing still, the rear axle's not at fault. To see if the noise is coming from some belt-driven accessory, run the engine with all belts removed.

EXHAUST RESONANCE

Exhaust resonance can sometimes sound like the rear axle, too. You'll have to align the exhaust system at all three support points to reduce this noise. Loosen the front and rear support clamps and the exhaust pipe flange mounting nuts. Then retighten, starting at the flange mounting nuts and working back toward the rear of the car.

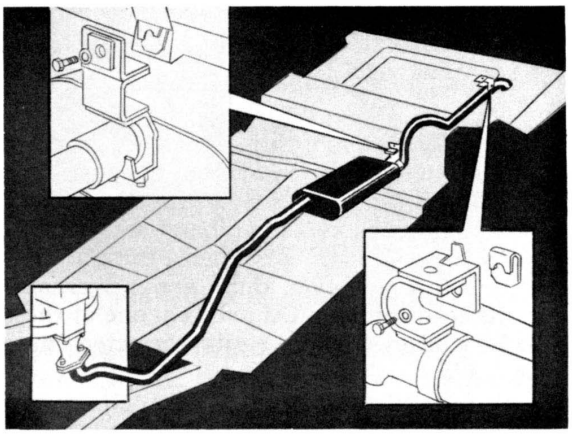


Fig. 17—Align exhaust system to reduce resonance

REAR AXLE LUBE LEVEL

If a rear axle has lost most of its lubricant, check carefully for a leak, particularly around the cover flange and at the pinion oil seal. Also make sure the rear axle vent is clean and open. A plugged vent can cause leakage. Add lube to fill the differential to the specified level and road-test. If the axle is still noisy, damage has occurred and repairs are needed.

When you check differential lube level, be sure the vehicle is in a level position and is supported by the rear axle housing or wheels.

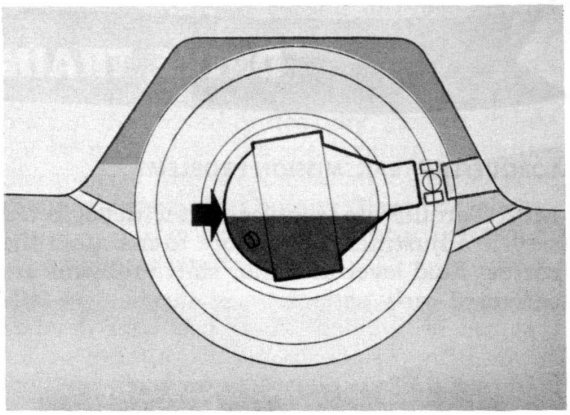


Fig. 18—Lube level wrong on frame hoist

Don't use a frame contact hoist! If you do, the rear axle will hang low and you'll get a wrong indication of lube level. And on a Valiant or a Dart with a properly filled rear axle, you might even drain out some of the lube when you remove the plug.

U-BOLT TIGHTENING PRECAUTIONS

It's important to tighten U-bolts correctly when you install a rear axle or spring. For one thing, if the U-bolts are over-torqued, the axle housing will be distorted and cause premature wheel bearing failure. Also, the rear axle insulators will be compressed too much and they'll transmit noise.

PROP SHAFT VIBRATION

Vibration will occur if the prop shaft balance is disturbed. See if the vibration is caused by

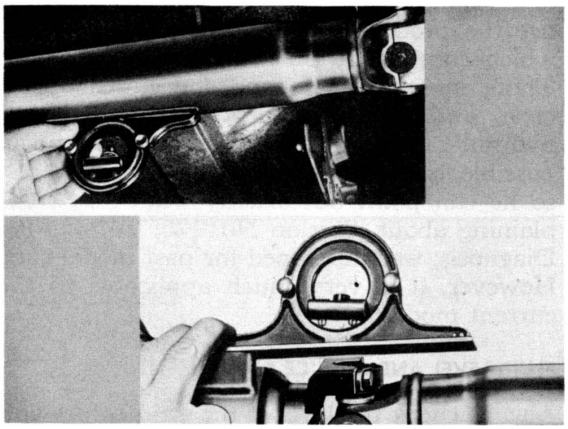


Fig. 19—Measure prop shaft and axle carrier angles

something simple, like undercoating overspray deposits on the shaft.

Noise and vibration can also be caused by an excessive working angle of the rear universal joint. If you think the working angle might be too great, measure the prop shaft angle and the tilt of the axle carrier with a spirit level protractor. Be sure the car has a full fuel tank and no extra weight other than standard equipment.

The angle between the carrier and the prop shaft should be between one degree and three degrees. If the trouble can't be corrected by properly tightening the U-bolt nuts, you'll have to bring the working angle within limits by installing tapered shims under the spring pads.

STEERING, SUSPENSION, BRAKES

LOWER BALL JOINT FREE PLAY

The Lower Ball Joint Wear Gauge, C-3911, will tell you if the unloaded free play is within limits or if the ball joint should be replaced. Up to .050″ of axial free play is acceptable. That dimension is equal to five graduations on the gauge scale. If your customer's interested, show him how this factory-authorized gauge checks out the lower ball joints *on his car*. It's a real eye-opener for anyone who's been exposed to the sales arguments for the unauthorized parts.

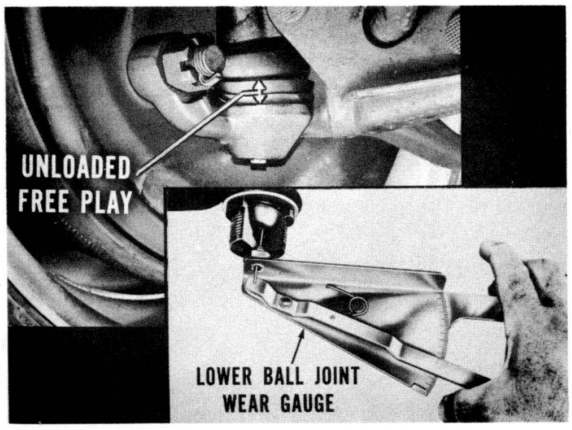


Fig. 20—Don't replace good lower ball joints

This tool eliminates confusion among independent service station operators and automotive inspection agencies. Unless the ball joints are checked with this tool, some perfectly good lower ball joints will be replaced unnecessarily. In many instances, unauthorized replacement parts that increase steering effort and have other adverse effects have been used.

STEERING SERVICE DIAGNOSIS TIP

On any steering complaint, it pays to look first for damaged parts in the steering linkage. Measure steering axis inclination and toe-out on turns if you suspect damage to the steering linkage or front suspension that's not uncovered by visual inspection.

BRAKE DRUM OR LINING CONTAMINATION

Lining contamination is the most likely cause of brake pull. Since contamination changes the friction characteristics of the lining and drum, it results in unequal braking and pull. Don't just get rid of the brake contamination —*find and correct the cause of it, too!* For example, a wheel cylinder might be leaking brake fluid onto the drum. In fact, any time the level of the brake fluid in the master cylinder is low, it's a good idea to inspect the entire brake hydraulic system for fluid leaks.

POWER BRAKE TEST

To test the operation of the power brake booster, apply the brakes six to eight times

Fig. 21—Test power brake operation

before you start the engine. This will equalize pressures in the booster. Push lightly but firmly on the brake pedal to hold the brakes in the applied position as you start the engine. If the booster is okay, you will feel the booster power cut in as the engine starts. If there's no power assist from the booster, you'll save time by checking first for vacuum leaks at the power brake hose connections.

BRAKE ADJUSTMENT

Brakes with automatic adjusters seldom need service, so it's easy to forget how to adjust them manually. Tighten the adjuster until you feel a slight drag, as you would when adjusting any brake. But then, it's essential to disengage the adjuster lever with a thin-bladed screwdriver or similar tool, *and back off the star wheel a full twelve notches.* This provides the added shoe-to-drum clearance required by this design. After backing off the adjustment, be sure there's no trace of brake shoe drag.

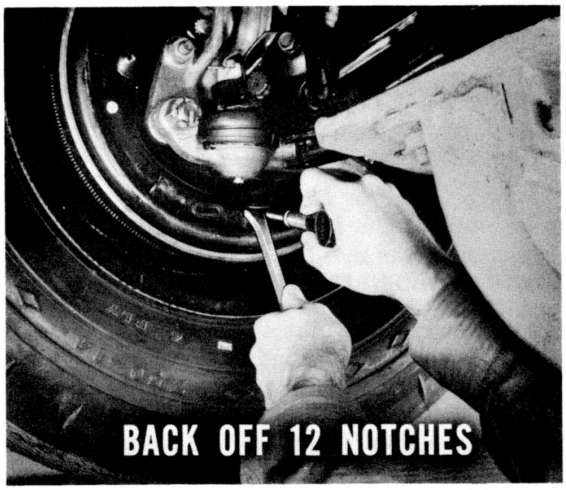


Fig. 22—Manual adjustment of brakes with automatic adjusters

MISCELLANEOUS TIPS

RADIO SERVICE

Before you remove any radio for service, make a few simple checks. First, make sure it's getting power. Check the power cable and fuse. Try to operate the radio with a test antenna connected in place of the regular antenna. This will tell you if you've got antenna troubles, like a grounded antenna or damaged antenna lead. Finally, check the antenna trimmer adjustment and push-button adjustment. These adjustments are more sensitive with today's transistor radios than they were with the older sets.

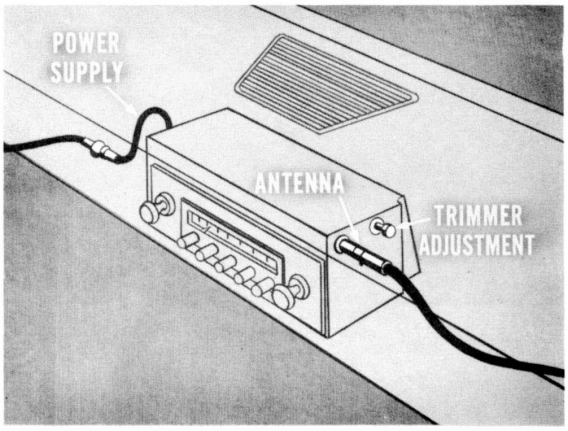


Fig. 23—Check radio before removing for service

RADIO IDENTIFICATION

When you send a radio out for repairs, be sure to identify the make of radio and send it to the correct repair shop. This is particularly important when the radio is under warranty. Here's how to identify each make:

Motorola: Model No. 216, 217, 344 and 345 radios are Motorola units used on Plymouth and standard Dodge cars. Vent holes in the case of these units are triangular or diamond-shaped. Motorola units sold by MoPar are stamped with the letters, "VH".

Bendix: Model No. 214, 215, 315, 343, 411 and 413 radios are Bendix units used on Valiant, Dodge Dart and Custom 880, Chrysler and Imperial. They can be identified by rectangular-shaped vent holes in the case. Bendix units sold by MoPar are stamped with the letters, "AAPJ".

Delco: The new combination AM-FM radio is manufactured by Delco.

THERMAL-ELECTRIC GAUGES

Diagnosis Before Removal: You might save a lot of unnecessary work by isolating the faulty gauge circuit component *before* you remove the instrument cluster. Consider the entire gauge circuit—the voltage limiter, the gauge and the sending unit—as you look for the trouble. Use a good voltmeter and the C-3826 Gauge Tester to determine where the trouble is.

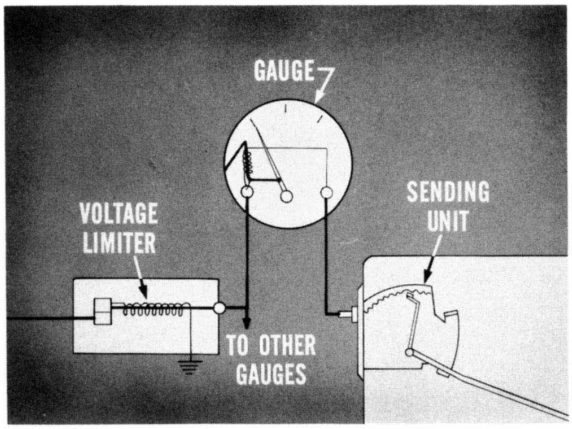


Fig. 24—Typical thermal-electric gauge circuit

Servicing Precautions: Never apply full battery voltage to the voltage limiter, either in the car or on the bench, without first making sure the instrument cluster is grounded. Otherwise, the voltage limiter won't control the voltage and you'll burn out the gauges. And before you remove the instrument cluster, disconnect the battery ground cable so you won't short out a gauge or a circuit and do considerable damage.

SELF-ADJUSTING CLOCK

The optional self-adjusting clock has a feature that regulates its speed whenever the hands are reset.

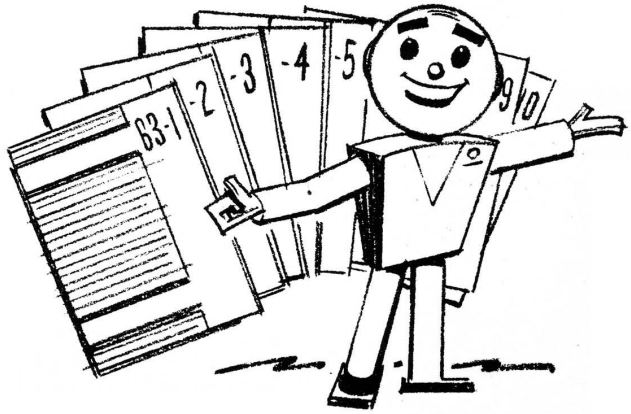
If the hands are set back, the clock will run slower; if they are set ahead, the clock will run faster. If the clock's running fast or slow, the owner should be advised to reset it every day at about the same time. After three or four days, the clock should be keeping good time. However, it's important that the adjusting knob be turned *only* in the direction of the desired adjustment. Otherwise, two speed-regulating adjustments—one in each direction—will be made, nullifying each other.

CONVERTIBLE TOP BOOTS

It's easy to confuse the convertible top boot for the Valiant with the boot for the Dart. To tell the difference, count the snaps. The Valiant boot has 21 snaps; the Dart boot has 23.

LAST BUT NOT LEAST

Don't forget that much of the information in past issues of the reference book applies to the current model cars. The cumulative table of contents on the back cover of this issue will help you locate information contained in all the reference books published since the beginning of the 1963 model year.



SERVICE REFERENCE BOOK

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