PARTS • ACCESSORIES • PRODUCT

SERVICE Counselor

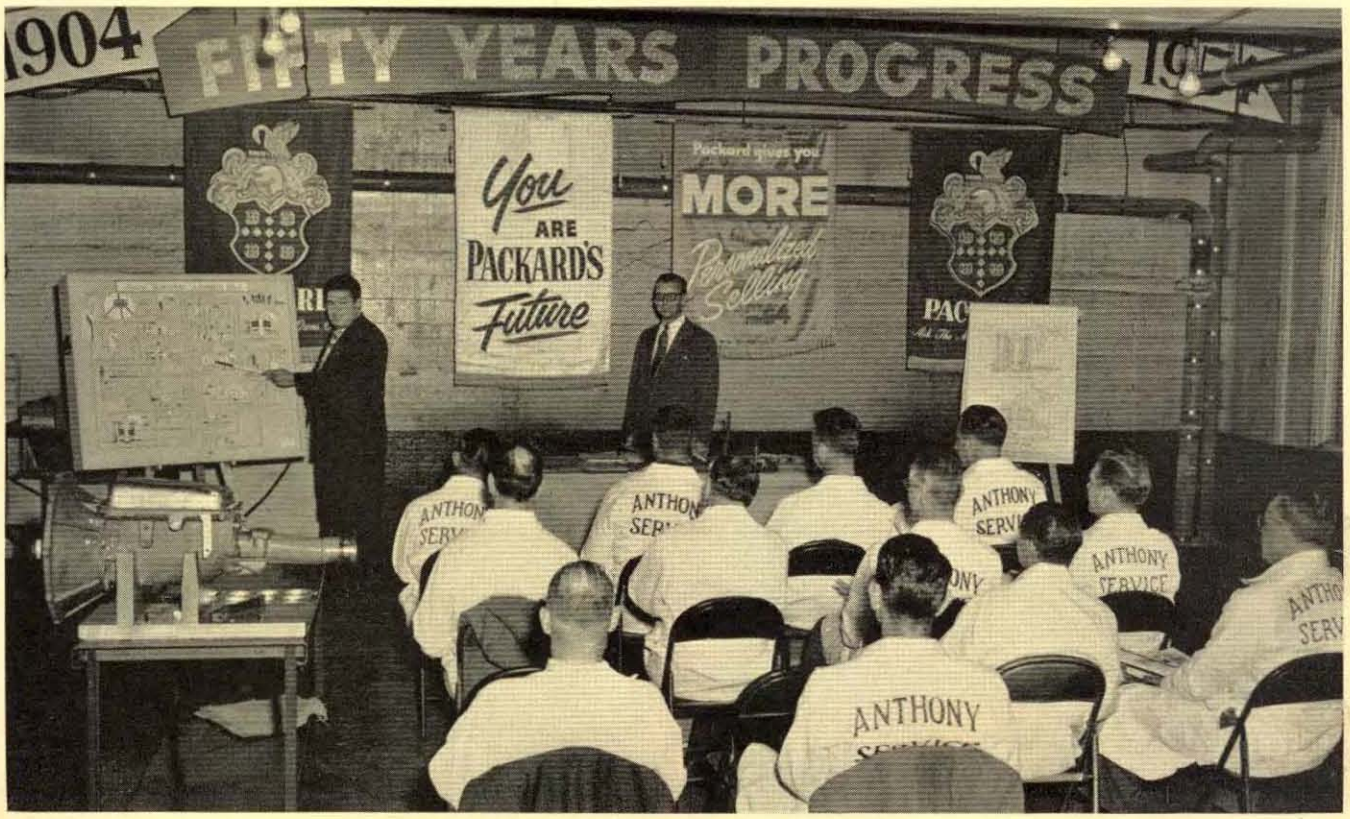
PACKARD MOTOR CAR COMPANY

VOL. 28, NO. 11 NOVEMBER, 1954

Twin Ultramatic Transmission

The official name for the Gear-Start Transmission is "TWIN ULTRAMATIC TRANSMISSION" and will be referred to as such in all future service publications.

Most all of the zones have completed the Twin Ultramatic Transmission schools with their dealers and according to reports, the service training panel covering the hydraulic system was highly received by the mechanics.



This type of service training aid is planned for future schools wherever it can be applied. We feel that a better understanding of any and all units of the car will result in a more accurate diagnosing of complaints and better workmanship which means quicker and better repair jobs for the Packard owners.

Pictured are schools held recently by the Los Angeles Zone.

Twin Ultramatic Transmission

HYDRAULIC TESTS

Hydraulic pressure tests are a most important factor when diagnosing automatic transmission complaints.

If a complaint or trouble is not definitely located or established, do not disassemble the unit until the oil level is checked, the car road tested and a hydraulic unit pressure test is made. Too many times a unit is disassembled, and when the inspection is made the cause of the complaint cannot be found, because the clue or evidence of the cause has been lost or destroyed.

In many instances, "come backs" could be avoided if a hydraulic pressure test was made after the work was completed. For example: a certain part was replaced, but the cause of the failure was not determined. Make a pressure test, it may give you the cause which should be corrected thus avoiding a repetition of the trouble.

FLUID LEVEL

The fluid level should always be checked and brought up to the full mark before any diagnosis is made. Low fluid level can be the cause of many complaints ranging from excessive noise to a noticeable slip in any or all of the operating ranges.

ROAD TEST

After the oil level is brought up to the full mark, road test the car to determine if correcting the oil level has corrected the complaint. The road test will also warm up the engine and transmission to operating temperature necessary to make an accurate pressure test.

Drive the car with frequent stops and starts, at low speed, accelerating, and at medium speeds, similar to the conditions that would exist in driving in heavy traffic and highway driving. After the engine and transmission are thoroughly warmed up, and the non-standard operation noted, make a hydraulic pressure test as outlined below:

HYDRAULIC PRESSURE TEST

To diagnose and isolate the cause of the faulty operation a pressure test should be made of the following hydraulic units:

(1) Front pump pressure.
(2) High range clutch pressure.
(3) Low brake top pressure.
(4) Converter in pressure.
(5) Converter out pressure.
(6) Direct drive clutch pressure.
(7) Governor pressure.
(8) Throttle pressure.

GEAR-START ULTRAMATIC TRANSMISSION PRESSURE TEST FORMS

A Report on Gear-Start Ultramatic Unit #..... Date.....

Owner.....

Engine.....Vehicle No.....

Mileage.....Del. Date.....

The results of the Pressure Test are as follows:

Front Pump (1)—400 RPM—All Selector Positions
Readings 80-95 80-95 80-95 80-95 80-95

'D Position—15 to 20 MPH—Full throttle before Direct Drive engages—Max. Pressure —Reading 150-160

D' Position — Full throttle before Direct Drive engages—Max. Pressure —Reading 140-150

High Range Clutch (2)—Pressure should be the same or not more than 10 lbs. under pump pressure.

	P.P	H.R.C.P
'D Position—400 RPM—Reading	80-95	75-90
'D Position — 15 to 20 MPH Converter Drive —Reading	150-160	145-155
D' Position—400 RPM—Reading	80-95	0
D' Position—20 MPH—Direct Drive Steady throttle —Reading		55-65

Low Brake Top (3)—Pressure should be the same or not more than 10 lbs. under pump pressure

	P.P	L.B.T.P
'D Position—400 RPM—Reading	80-95	75-90
D' Position—400 RPM—Reading	80-95	0
D' Position Immediately After Upshift —Reading	50-70	40-65

Converter In (4)—400 RPM D' Position —Reading 60-70

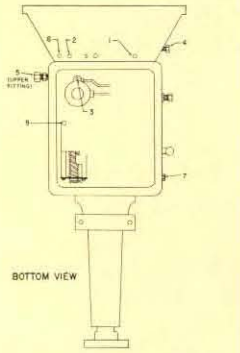
15 MPH "Before Direct Drive"—Reading 70-80

Direct Drive Engaged —Reading 15-25

Kickdown —Reading 70-80

Converter Out (5)—D' Position 15 to 18 MPH
Converter Drive —Reading 30-40

Direct Drive —Reading 10-20



Direct Drive (6) Pressure should be the same or not more than 10 lbs. under pump pressure.

D' Position 15 to 18 MPH	P.P	D.D.P
Before Engagement —Reading	80-95	0
After Engagement —Reading		55-65
Kickdown —Reading	140-160	0

Governor (7)—13 MPH —Reading 15-20

28 MPH —Reading 30-35

56 MPH —Reading 55-65

Throttle (8)—400 RPM —Reading 20-25

Full Throttle —Reading 65-72

Kickdown —Reading 80-95

Note: Red figures indicate correct pressures.
'D Position—Not Gear Start.
D' Position—Gear Start.
All pressures taken at normal operating temperature.

(File with owner's repair order)

Fig. 1

NOTE: When making pressure tests, use the pressure test forms shown in Fig. 1. The figures below the lines on the form indicates correct pressures.

TOOLS

The necessary special tools required to make a complete hydraulic pressure test on the Twin Ultramatic Transmission are:

PK-23 Special Test Pan Adapter, Throttle Pressure Adjusting Wrenches and Gauge Hose Extensions.

PU-300 Three Gang Pressure Test Gauge.

PREPARATION

As most of the pressure tests are taken with the car in motion at various speeds, the gauge should be in the driver's compartment where it can be seen while driving.

Remove the flexible tubing from the left fresh air duct, thread the gauge hoses through the left fresh air grille, out of the air duct and down to the transmission. "See Fig. 2 for location of the pressure test take-off points."

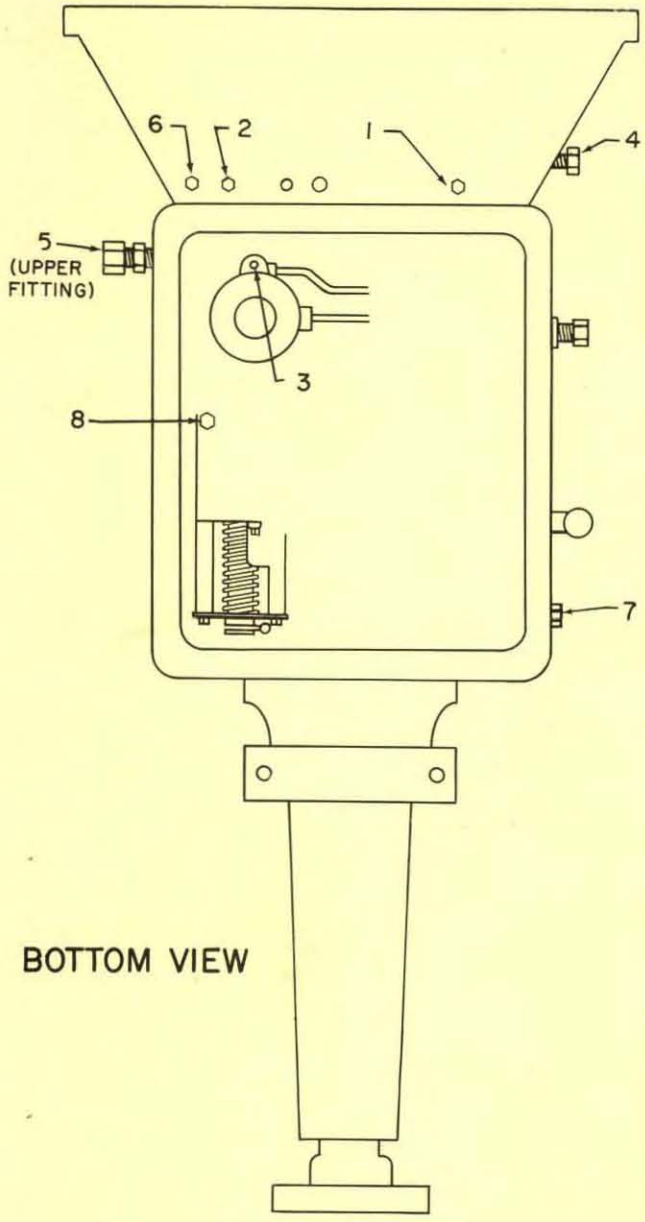


Fig. 2

Three pressures can be taken at one time; therefore; study the nature of the trouble to determine the combination of pressures that may be at fault.

Suggested list of pressure test combinations without removing the transmission oil pan:

1. Front Pump—High Range Clutch—Converter In.
2. Front Pump—Direct Drive Clutch—Converter In.
3. Front Pump—Converter In—Converter Out.
4. Direct Drive Clutch—Converter In—Converter Out.
5. Direct Drive Clutch—Governor—Converter In.

CONVERTER OUT PRESSURE

To take the converter out pressure, a special tee connection will be required. Install and braze a 1/8" male nipple into one end of a 1/8" tee.

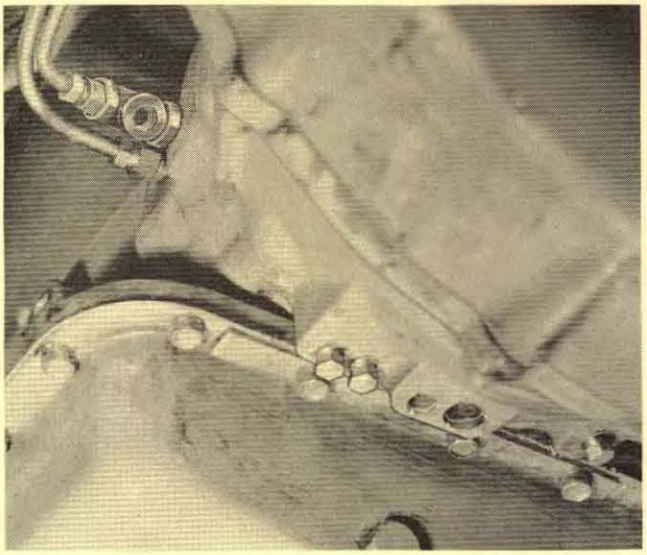


Fig. 3

Remove the upper oil cooler tube adapter from the side of the bell housing and install the special tee connection in the bell housing. Install the oil cooler tube adapter in the tee and reconnect the cooler tube. "See Fig. 3." Connect a gauge hose to the tee connection.

THROTTLE PRESSURE AND LOW BRAKE TOP PRESSURE

The throttle pressure and low brake top pressure test take-off points are located on the control assembly. "See Fig. 4." To make these tests, follow the procedure outlined:

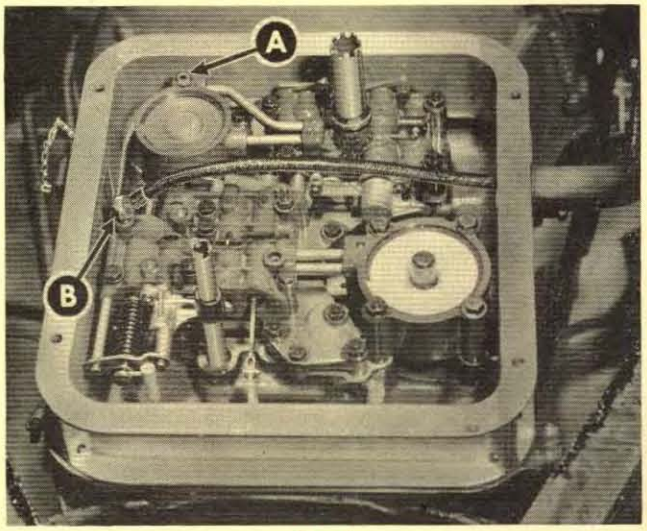


Fig. 4

(a) Drain the oil, remove the transmission oil pan and screen.

(b) Install the test pan adapter and gasket with the adapter elbow tube on the left side and toward the front of the car.

Thread two of the gauge hoses through the elbow tube on the adapter.

(c) Remove the 1/8" pipe plug "A" from the bottom of the low brake and install a 1/8" elbow in this opening. Connect one of the gauge hoses to the elbow.

Remove the 1/8" pipe plug "B" from the throttle valve body and install a 1/8" elbow in this opening. Connect the other gauge hose to this elbow.

(d) Install the two oil suction tube extensions as shown in Fig. 4 and install the oil pan and gasket. Reinstall the oil that was drained out or the same amount of new oil.

NOTE: The throttle pressure is a very important pressure as it controls most other pressures in the system, controls upshift, clutch engagements and disengagements. Therefore, it is important that throttle pressure be accurate.

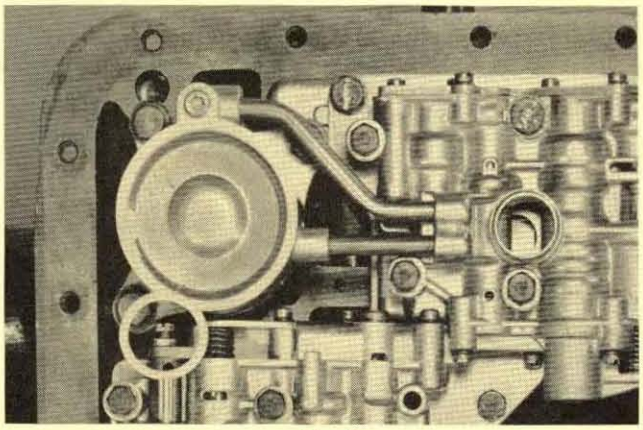


Fig. 5

THROTTLE PRESSURE ADJUSTMENT

Before attempting to adjust the throttle pressure, check all of the throttle linkage adjustments as described in the "Maintenance Section" of your Gear-Start Ultramatic Transmission Training Booklet.

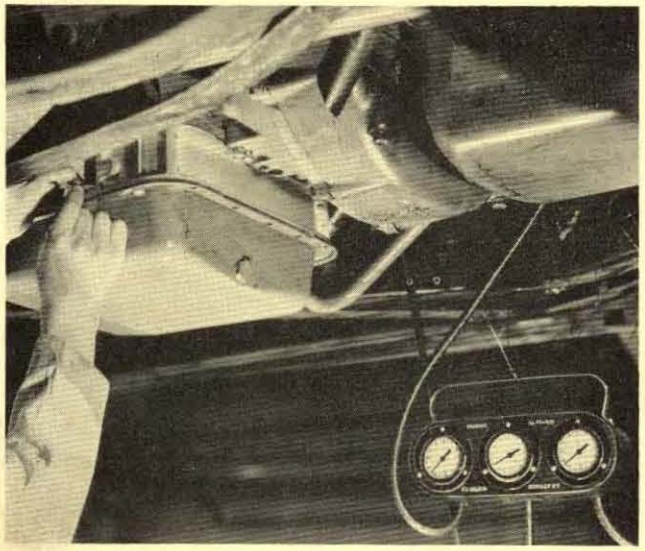


Fig. 6

The throttle pressure should be 23 lbs. at 400 RPM with the oil at operating temperature. The throttle pressure adjusting screw is shown in Fig. 5. It can be adjusted by removing the rubber plug in the adapter and using the two small wrenches through the opening as shown in Fig. 6. Be sure to recheck the pressure after the adjusting screw lock nut is tightened.

Suggested list of pressure test combinations with gauges connected to the control body:

1. Throttle—Low Brake Top—High Range Clutch.
2. Throttle—Low Brake Top—Direct Drive.
3. Throttle—Low Brake Top—Governor.
4. Throttle—Low Brake Top—Front Pump.
5. Throttle—Low Brake Top—Converter In.

After the pressure tests have been completed and the readings posted on the pressure test form, compare your pressures with those on the test form. Careful study of the pressures in conjunction with the hydraulic charts will greatly aid you in diagnosing troubles.

Voltage Regulator Testing Procedure

DELCO-MODEL 1118829

5402-06-11-13-26-31

Field reports indicate that the importance of checking the voltage setting of Model 1118829 type regulators *with a battery in the circuit* is not fully appreciated by all concerned.

The Model 1118829 type regulators do not include a accelerator or "kicker" coil on the voltage regulator unit. As a result, the rate of armature vibration is slower than that of earlier types and *the voltage setting can be checked accurately only when a battery is connected in the charging circuit.* For this reason, it is specified that voltage regulator checks on these regulators be made with a fixed 1/4-ohm resistor of not less than 25 watts capacity connected in series with the battery.

If Model 1118829 type regulators are checked by using a 3/4-ohm resistor in place of the battery (as was previously recommended on earlier models), the *indicated voltage setting* will tend to be erratic and *always will be considerably lower than that obtained with a battery in the circuit.*

The use of a fixed 1/4-ohm resistor connected in series with the battery is entirely satisfactory for checking the voltage regulator setting *on both old and new* type regulators in either 6- or 12-volt models.

Headlight Aiming

The AMA specifications on headlamp aiming has been changed in respect to the height of the light beam.

Please make this change on page 22 "Electrical Section" of your Service Manual. In the 2nd paragraph under "Headlight Aiming", change 3" dimension to 2".

PRINTED IN U.S.A.