Hudson

WITH

Hydra-Matic Drive

NEW CAR INSPECTIONS AND ADJUSTMENTS

GENERAL TECHNICAL POLICIES AND INFORMATION BULLETIN

Number

9

Date

1-8-51

Subject

TO ALL DEALERS:

TRANSMISSION CASE THREADS STRIPPE

Some reports have been received from the Field indicating that the band adjusting screw threads in the cases of Hydra-Matic transmissions were stripped when making band adjustments, necessitating expensive repairs and replacement of the case.

ADJUTMENT INSTRUCTIONS CHANGED

Investigation shows that this difficulty is caused by the band adjusting screws being completely backed out of the case when performing band adjustments. To preclude the possibility of this occuring, we are changing the instructions covering band adjustment on pages 20 and 21 of the Hydra-Matic Drive New Car Inspection and Adjustment Book, on page 39, section 11 of the Hydra-Matic Service Manual and on page 39, section 11 of the 1951 Mechanical Procedure Manual. These instructions, which call for backing out the band adjusting screws until the engine speed increases from the 700 R.P.M. idle setting to 900-1000 R.P.M., are being changed to show a speed increase to 800-900 R.P.M.

INSURE PROPER SCREW INSTALLATION

This reduction in engine speed increase makes it unnecessary to turn the adjusting screws all the way out; however, if this should be done, the selector lever should be placed in the "N" position before installing the screws. To eliminate the danger of cross threading, the screws should be started and given at least three full turns by hand before using band adjusting tool J-2681-A.

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E. J. BLUM

TECHNICAL SERVICE MANAGER

(THIS BULLETIN AS WRITTEN IS BEING MAILED TO SERVICE STATION AGREEMENT HOLDERS AS BULLETIN NO. 26.)

HUDSON SALES CORPORATION
6506 NORTH BROADWAY
ST LOUIS 15. MO.

April 21, 1952 STL-52-89

TO ALL HUDSON DEALERS,

ST. LOUIS ZONE.

Gentlemen:

We have had a number of calls in the past two weeks, where the Service Manager has spent money calling us for information, with reference to the Hydra-Matic Transmission refusing to shift into third speed from high gear on the kick down or passing gear.

This is caused by the Spring Retainer, shown on Page 11 -84; Figure 178, in the Procedure Manual, not being in position, or the L. to 3 valve shown in Figure 179 being stuck in the seat, or turned crossways in the front Servo.

To make a correction in twenty minutes, first drain oil from bottom pan only, remove an from case, and you will see the front Servo in full view.

Remove the pipe plug as in Figure 178 and remove 4 to 3 valve as in Figure 179 and assemble, as in Figure 181.

Replace the bottom pan and add the oil and in each case, so far, we have corrected the 4 to 3 down shift with this operation.

Be very careful to check for cleanliness when lower pan is removed, so that no dust gets into the control valve or Servos, to keep them from functioning freely.

Yours very truly,

HUDSON SALES CORPORATION

C. G. Monken
Parts & Service Manager.

CGM:nvj.

THE 1951 HUDSON

IS AVAILABLE WITH

A

FULLY AUTOMATIC TRANSMISSION

HYDRAULICALLY OPERATED

HAVING

4 SPEEDS FORWARD

AND ONE REVERSE

NEW CAR INSPECTIONS

AND ADJUSTMENTS

PRE-DELIVERY INSPECTION

1000 MILE INSPECTION

2000 MILE INSPECTION

LINKAGE ADJUSTMENTS

EXTERNAL BAND ADJUSTMENT

ROAD TESTING AND DIAGNOSIS

DRIVING INSTRUCTION

N E W C A R

P R E - D E L I V E R Y

I N S P E C T I O N

1. FLUID LEVEL.
2. BAND ADJUSTING SCREW LOCK NUTS.
3. NEUTRAL SAFETY SWITCH.
4. ENGINE PERFORMANCE.
5. MANUAL CONTROL LINKAGE.
6. THROTTLE CONTROL LINKAGE.
7. OIL LEAKS.
8. ROAD TEST.

CHECKING FLUID LEVEL

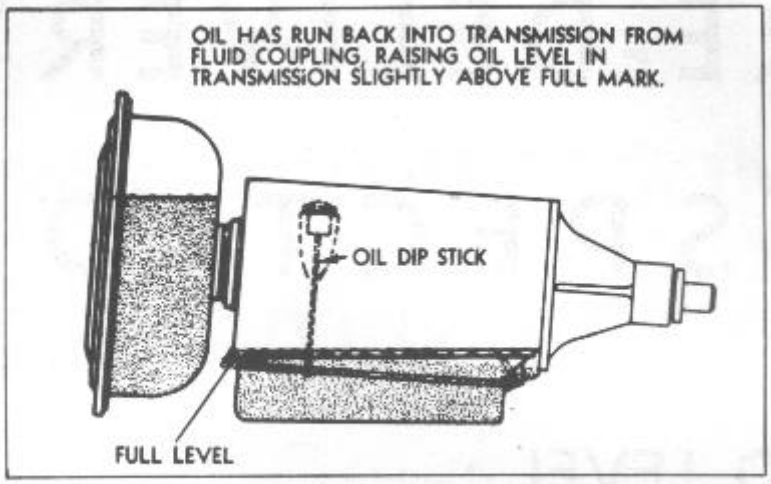


Fig. 1– Oil Level, Engine not Running

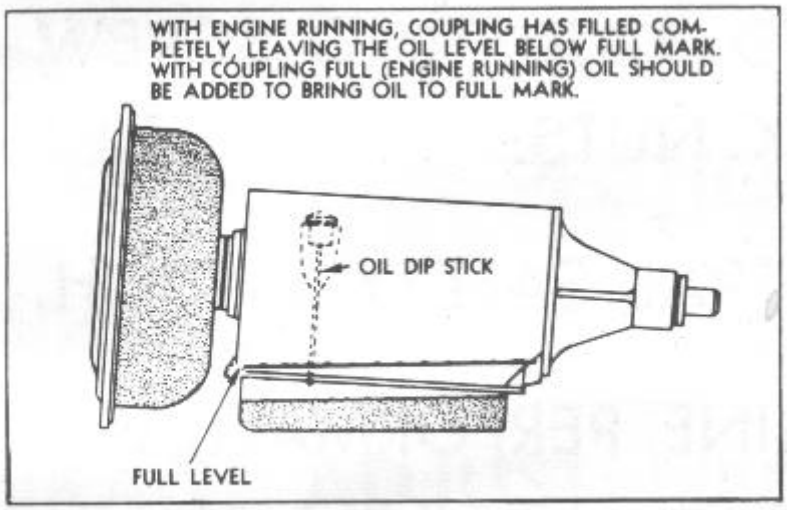


Fig. 2—Oil Level, Engine Running

CHECK WITH . . .

Engine running at normal operating temperature—manual control lever in "N" position—hand brake on—allow engine to run several minutes before checking. Oil level must be just to the full mark on the dip stick.

DO NOT OVERFILL

CHECK BAND ADJUSTING SCREW LOCK NUTS FOR TIGHTNESS

1. **Remove floor hole cover.**
2. **Check the lock nuts on the front and rear band adjusting screws for tightness. To do this, hold the screws so that there will be no change in their position while tightening the lock nuts. Torque should be 40-50 ft. lbs.**
3. **Replace hole cover.**

Fig-3 Band Adjusting Screws

NEUTRAL SAFETY SWITCH

1. **With hand brake applied, ignition switch on and manual lever in "N" position, starting motor should operate when starter button on instrument panel is pushed in.**

2. **Moving manual lever to "Dr" position, starting motor should not operate.**

NOTE: If starting motor does not operate with manual lever in the "N" position, but does operate in the "Dr" position, refer to page 149 covering adjustment.

ENGINE PERFORMANCE

(Engine at operating temperature)

1. **Timing**
2. **Idle Mixture**
3. **With manual lever in "N" position, idle speed should be 490-510 RPM, consistent with best idle performance.**

MANUAL CONTROL LINKAGE

1. Check tightness of clamp bolt (E) Figure 4 in transmission outer shift lever to 10-13 ft. lbs. torque.

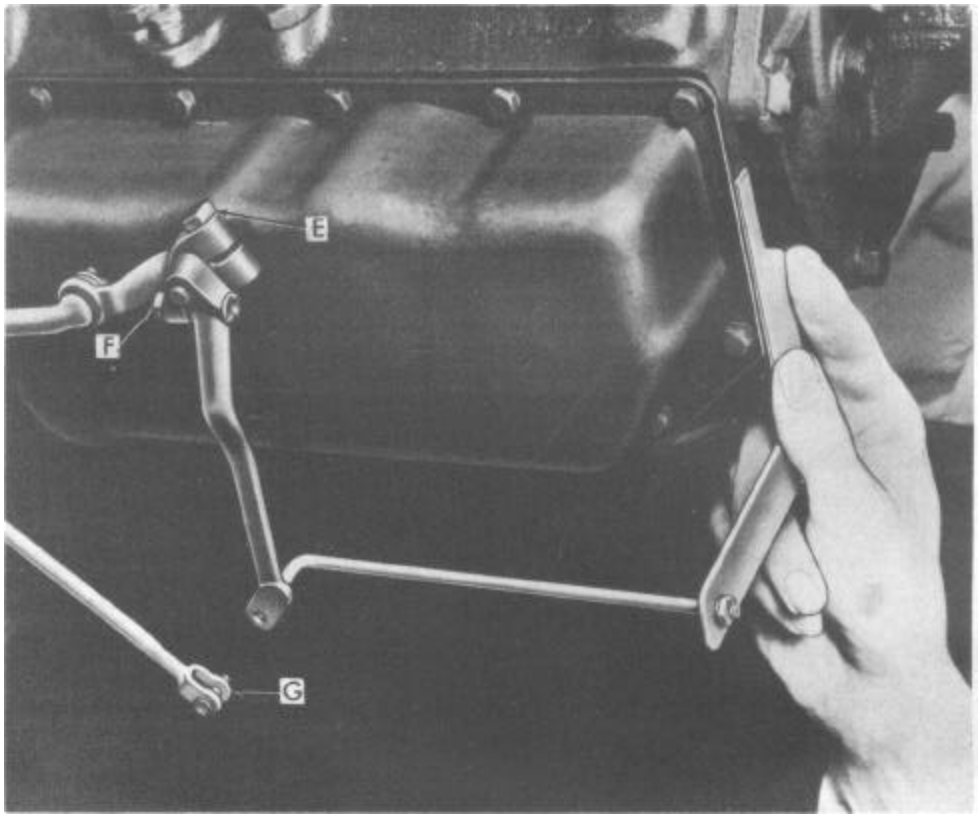


Figure 4

THROTTLE CONTROL LINKAGE

1. Tighten the clamp bolt (F) Figure 4 in the throttle control lever at the transmission to 12-15 ft. lbs. torque.
2. With the carburetor throttle in the "Full Open" position, the accelerator pedal must be 1/16" from its stop. See "Adjustments" Page 145.

CHECK FOR OIL LEAKS

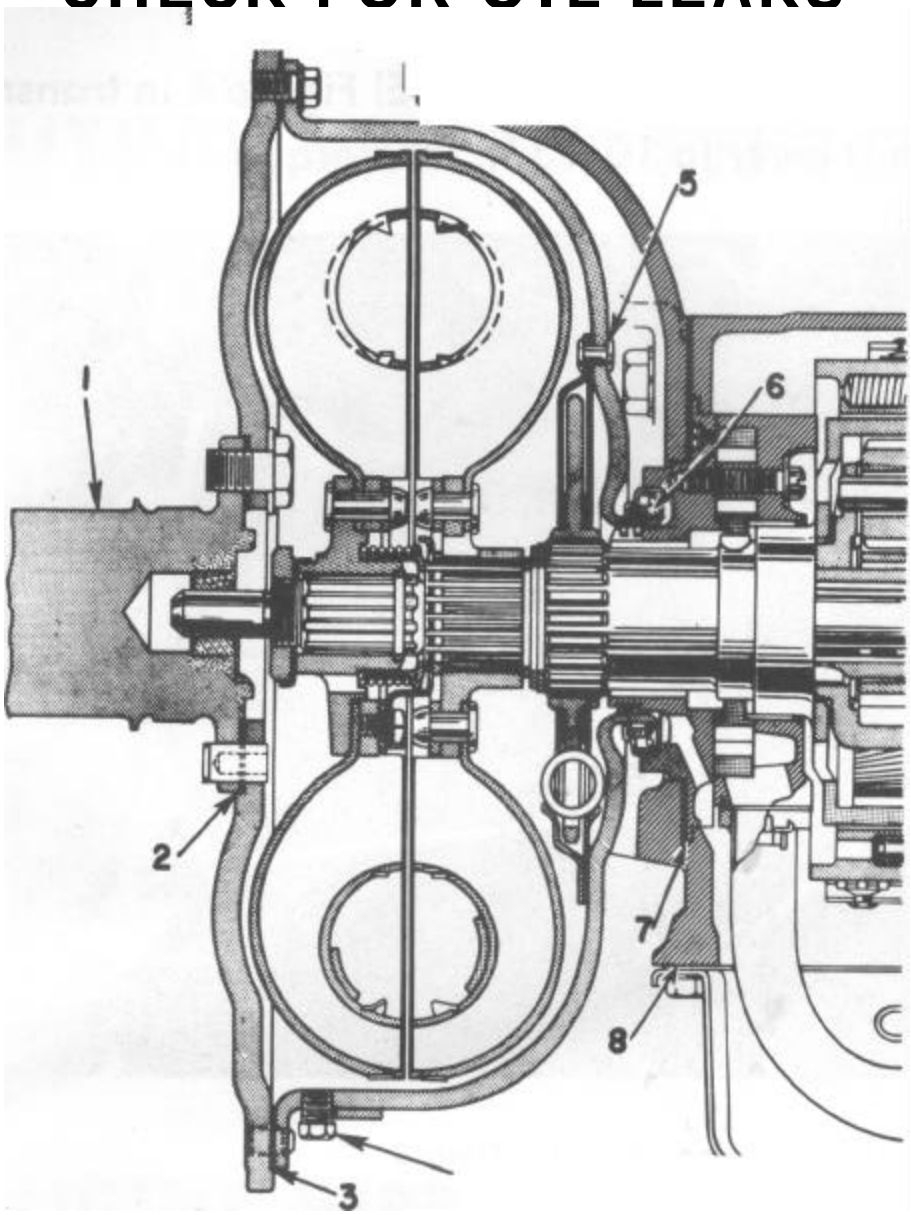


Figure 5

1. At crankshaft rear main bearing oil seal.
2. Between crankshaft and flywheel.
3. Torus cover and flywheel.
4. At torus cover oil drain plug.
5. At dampener rivets.
6. Front cover oil seal.
7. Front cover gasket or pump cover attaching screws.
8. Oil pan to case gasket.
   Side cover cap screws.
   Side cover and manual shaft seal.
   Rear bearing retainer seal.
9. Transmission oil pan drain pipe.

ROAD TEST

The car should be given a road test to thoroughly check all phases of the Hydra-Matic operation.

During the road test, the shift pattern should be checked to see that shifts occur at the proper speeds. See "Diagnosis Chart," page 156.

DO NOT run car at speeds above 50 MPH during this test.

The road test will disclose any malfunction of the Hydra-Matic Transmission and necessity for adjustments.

Refer to Page 149—For Neutral Safety Switch Adjustment
Refer to Page 147—Manual Control Linkage Adjustment
Refer to Page 142—Throttle Control Linkage Adjustment
Refer to Page 150—External Band Adjustment
Refer to Page 153—Diagnosis Guide

1000 MILE INSPECTION

1. With engine at normal operating temperature, check Hydra-Matic transmission fluid level, with engine running and manual selector lever in "N" position—hand brake on—allow engine to run several minutes before checking. Oil level must be just to the full mark on the dip stick. DO NOT OVERFILL.

2. Check neutral safety switch operation.

3. Check manual selector lever positions. (Pointer should be directly over range letter when detent is engaged.) If an adjustment is necessary refer to "Adjustment of Manual Control Lever." Pages 147 and 148.

4. Set engine idle speed to 490-510 RPM, consistent with best idle performance.

5. Check throttle adjustment. Pages 142 thru 146.

6. Check for fluid leaks. Page 138.

7. Road test, using the Hydra-Matic Diagnosis. Guide pages 152 thru 157.

2000 MILE INSPECTION

Perform operations 1 through 7 under the "1000 Mile Inspection," plus a band adjustment.

The band adjustment at the 2000 mile inspection can be made internally after removing the transmission oil pan, or externally after removing the inspection cover at the transmission floor cover.

NOTE: Do not attempt an external adjustment at any time unless special tools for the purpose and instructions for their use are available.

For "External Band Adjustment" refer to page 150.

LINKAGE ADJUSTMENTS

THROTTLE CONTROL LINKAGE ADJUSTMENT

1. Adjust engine idle speed at 490-510 RPM, with engine at normal operating temperature, transmission warm and manual control lever in neutral.

2. With the carburetor throttle idle screw (A) Figure 1 against its stop and carburetor off fast idle, adjust the accelerator cross shaft operating rod trunnion nuts (B) Figures 1 and 2, until gauge pin J-2544 enters freely into the accelerator pedal bell crank lever (C) and the hole in the boss of the cylinder block at (D) Figure 2.

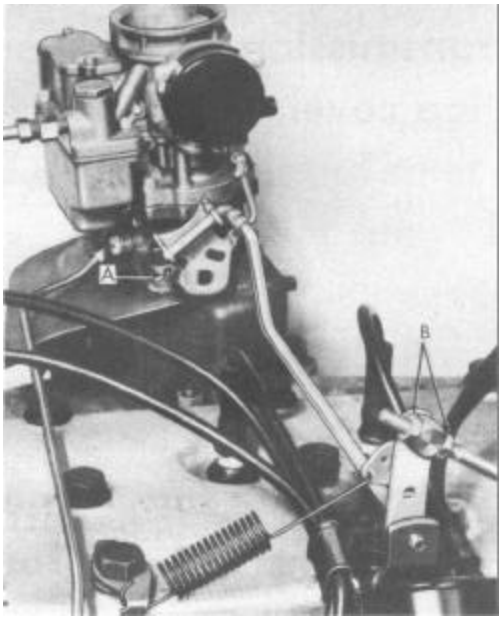


Figure 1

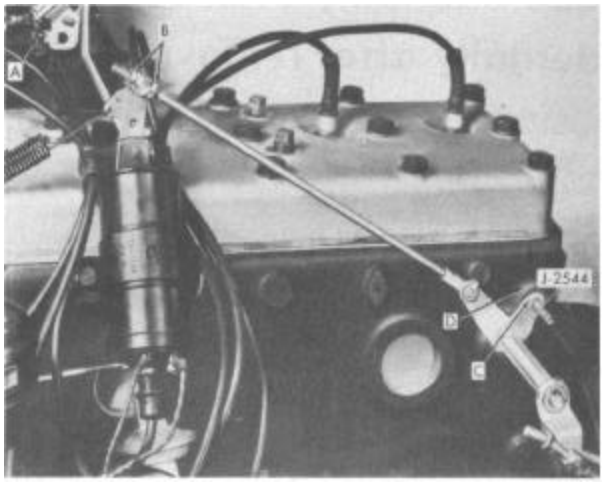


Figure 2

When the gauge pin enters both holes freely, remove the gauge pin and tighten the trunnion lock nuts (B) securely. Recheck this adjustment by again entering pin into the bell crank lever and boss hole. Pin should again enter both holes freely. After rechecking remove gauge pin.

3. Raise car, disconnect the transmission throttle rod (G) Figure 3 at the transmission outer lever (H). Tighten outer throttle lever clamp bolt (F) if necessary.

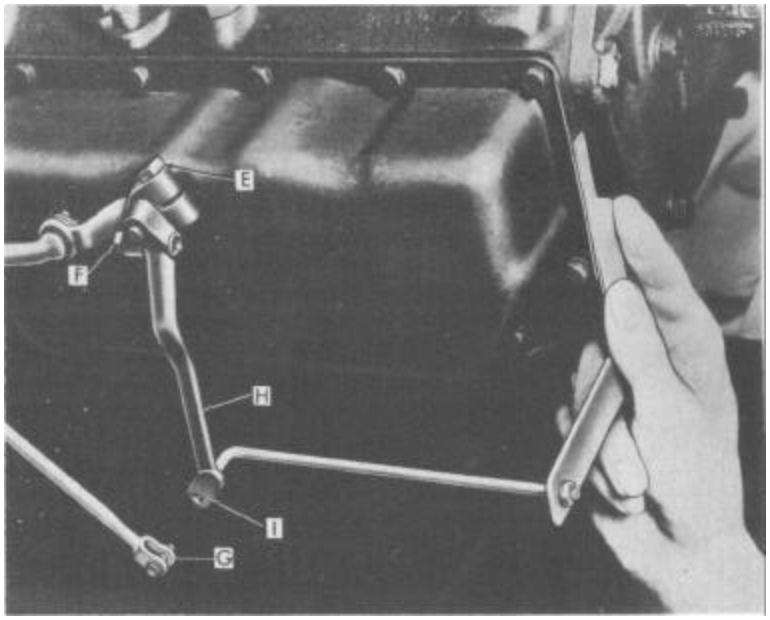


Figure 3

4. Check position of the outer throttle lever as follows:

(a) Clean the machined surface at back of transmission case and place the throttle lever checking Fixture J-2195 flat against the back surface of the transmission case with the edge of the checking gauge against the transmission side cover Figure 3.

(b) With the transmission outer throttle lever held against its stop (toward rear of transmission), the throttle outer lever hole should enter freely over the small diameter of the gauge pin (I) and the inside face of the throttle control lever should just touch the larger diameter of the gauge rod. Do Not Force the outer lever against its stop and Do Not try to bend this lever unless you have the proper bending tool.

NOTE: If the outer throttle lever lower hole will not enter over the checking fixture pin as outlined in paragraph (b) use the Throttle Lever Bending Tool J-3310 and bend the throttle lever to secure proper alignment, employing the bending tool as illustrated in Figure 4 to bend the lever rearward.

To bend the lever forward, reverse the bending tool (bending tool pins will now face towards transmission).

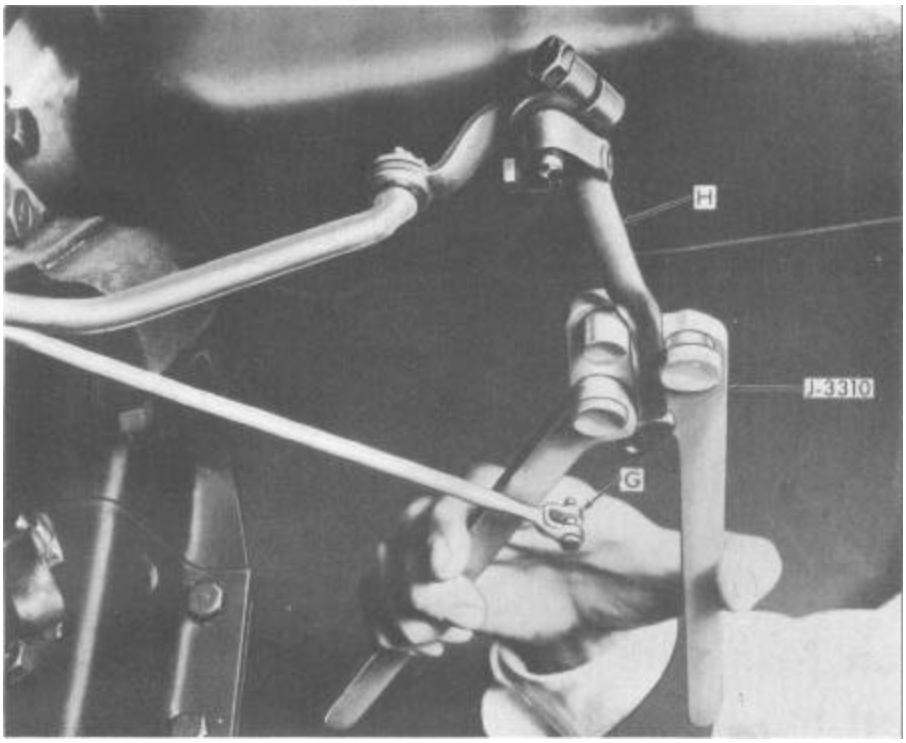


Figure 4

(c) After making the proper alignment of the throttle outer lever to the throttle checking fixture, install the transmission throttle rod (G), clevis pin and cotter pin to the outer throttle lever (H), secure cotter pin. Lower car.

5. Disconnect the transmission throttle rod trunnion (J) from the accelerator pedal link bell crank lever by removing the cotter pin and flat washer from the trunnion pin, Figure 5. Gauge Pin J-2544 should enter freely into accelerator bell crank lever (c) and hole in boss.

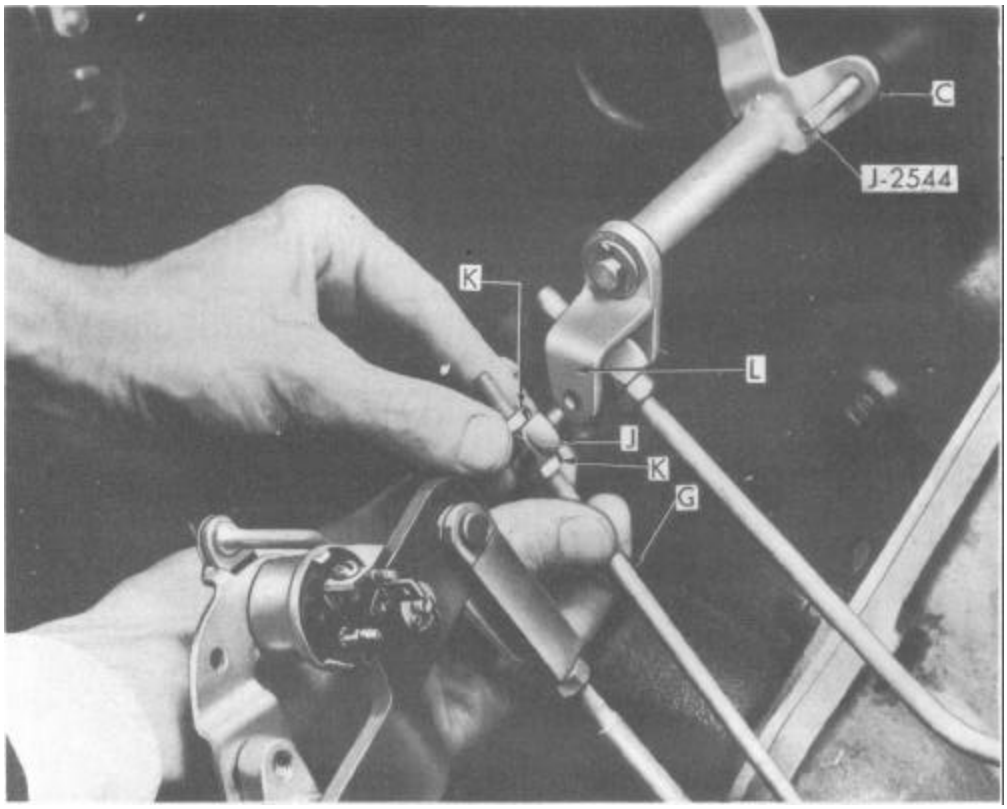


Figure 5

6. Holding the transmission throttle lever (H) against its stop in the transmission by pushing the transmission throttle rod rearward lightly, Figure 5, adjust the transmission throttle rod so trunnion pin will slide freely into the accelerator pedal link bell crank lever M.

7. Install trunnion pin, flat washer and cotter pin. With the trunnion pin (M) in position, shorten the throttle rod (G) by backing off the rear lock nut (K) 11/2 turns and tighten the upper lock nut securely, Figure 6. Remove the J-2544 Gauge Pin.

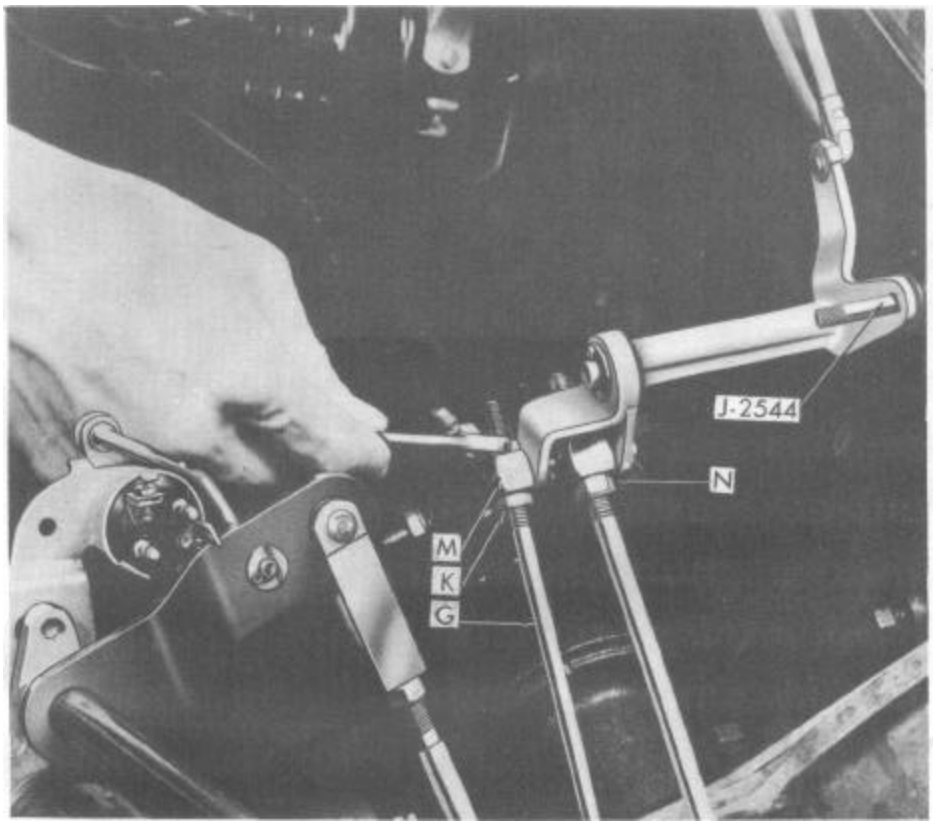


Figure 6

8. Adjust the accelerator pedal rod (N) so that the accelerator pedal is 1/16" from its stop at the floor panel(driver's compartment), when the carburetor throttle is wide open.

MANUAL CONTROL LINKAGE ADJUSTMENT

1. **Disconnect the transmission shift rod (O) at the manual control lower lever (P) Figure 7.**

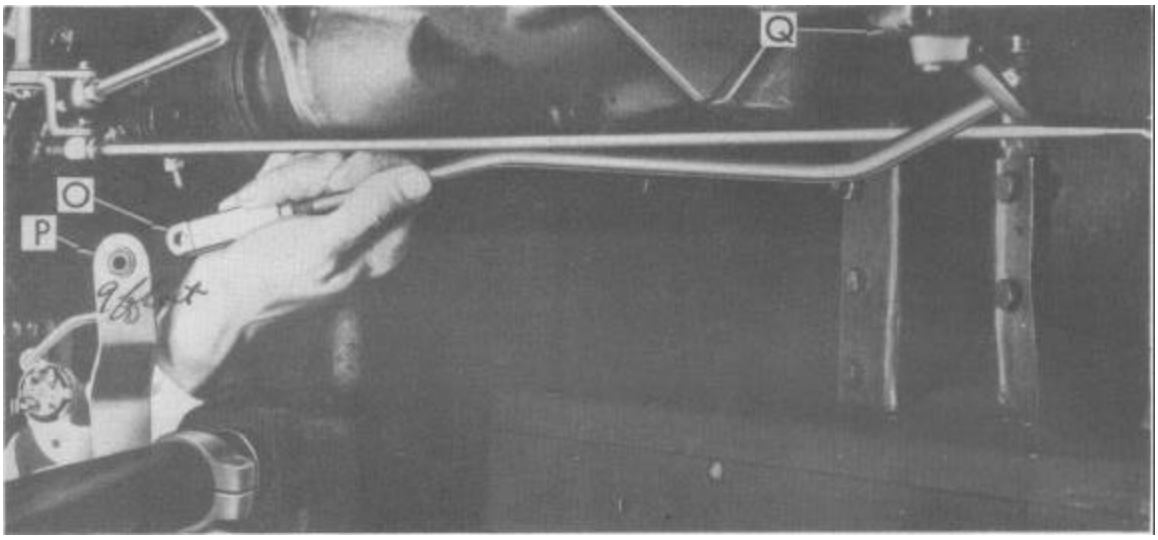


Figure 7

2. **With the transmission shift rod (O) disconnected, place transmission shift lever (Q) (at transmission) in the reverse position by pushing the transmission shift rod (0) rearward as far as it will go (reverse position), Figure 7. Next pull shift lever rod (O) forward one detent, placing transmission shift lever (O) in "LO" position.**
   CAUTION: Move the transmission shift rod (O) slowly so that shift lever (Q) is moved only one detent (to "LO" position).

3. **Place the manual control lever (at steering wheel) in the "LO" position and pull the manual control lever as far as it will go toward reverse with out lifting the manual lever.**

4. Adjust the length of the transmission shift rod (O) until the clevis pin holes in clevis align with the hole in the manual control tube lower lever (P), Figure 8. Do Not, move either the transmission shift lever (O) or the manual control lever (P) when making the rod adjustment. After determining that the pin enters freely, increase the length of shift rod (O) by turning the clevis one full turn. Install clevis pin, flat washer and cotter pin. Tighten clevis lock nut.

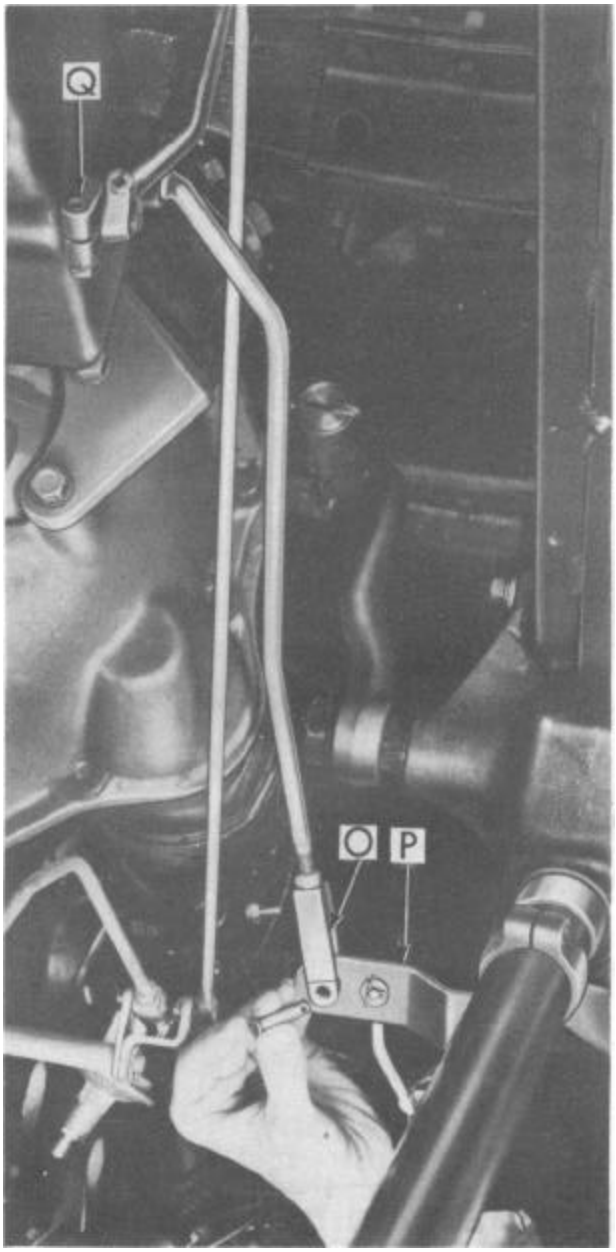
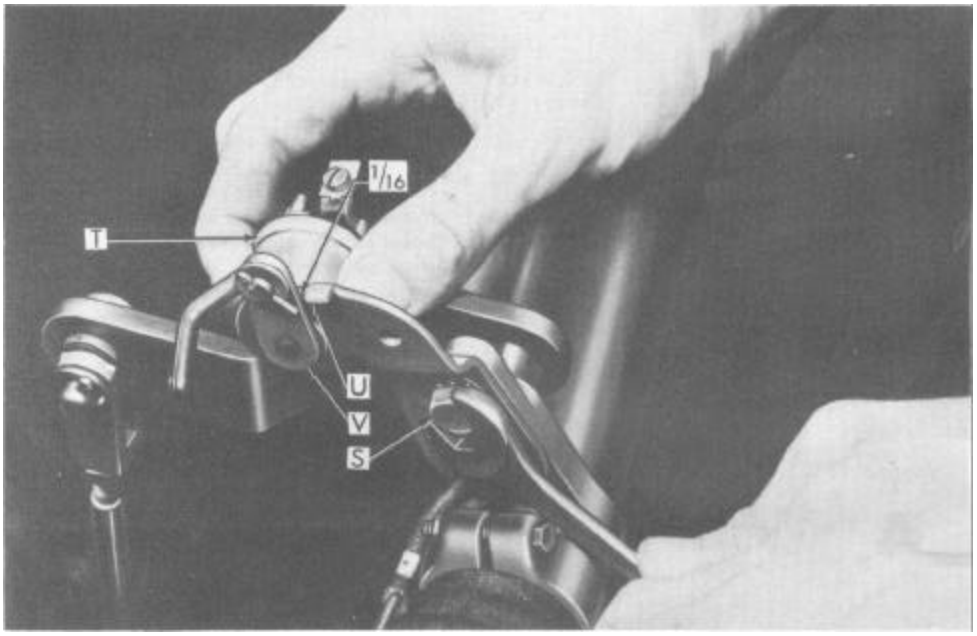


Figure 8.

NEUTRAL SAFETY SWITCH ADJUSTMENT

1. Place the manual control lever in the "N" (Neutral) position.

2. Loosen the safety switch adjusting screw (S), Figure 9 and rotate the transmission safety switch and bracket (T) until there is 1/16" clearance between the stop (U) and switch lever (V).



3. With the manual control lever in the "N" (Neutral position) the starter should operate when the ignition switch is on and starter button on instrument panel is pressed. With manual control lever in the "DR" position, the starter should not operate, when the starter button is pressed and ignition switch is on.

ADJUSTING HYDRA-MATIC TRANSMISSION BANDS

EXTERNAL ADJUSTMENT:

1. Set hand brake firmly and block front wheels with wheel chocks to prevent car running forward during adjustment.
2. Remove accelerator pedal, floor mat and adjusting hole cover.
3. Connect an Electrical Tachometer to distributor and ground. Set dwell-meter to either 6 or 8 cylinder reading.
4. Start engine and allow engine to run until normal operating temperature is reached. (Choke and fast idle off).
5. Position control lever in "DR" range.

Figure 10

6. Adjust carburetor idle speed screw to give 700 RPM.

FRONT BAND

7. Using Band Adjusting Tool No. J-2681 loosen the front band adjusting screw lock nut (Fig. 10).
8. Loosen the front band adjusting screw (by turning top handle while holding lower handle of Tool J-2681) until the engine speed increases to 900-1000 RPM (front drum is now spinning freely).
9. Tighten the front band adjusting screw slowly until engine returns to 700 RPM (front drum has now stopped turning).
10. Once more loosen the front band adjusting screw until engine speed increases and tighten the screw again (slowly) until engine speed returns to 700 RPM.

NOTE: The object in loosening and re-tightening the screw is to locate the exact point at which the band stops the drum from spinning. At this point wait 30 seconds. If engine speed again increases, tighten screw 1/10 of a turn more. Repeat this procedure until engine speed remains at 700 RPM for at least 30 seconds.

11. Set counter on tool to 00.

12. While holding lock nut stationary with long handle of tool, tighten adjusting screw exactly 5½ turns with short handle (counter will read 5.5).

13. Hold the front band adjusting screw stationary with the short handle of Tool J-2681 and tighten the adjusting screw lock nut by turning the outer body of the tool with the long (outer) handle.

NOTE: Adjusting screw must not move during this tightening operation.

REAR BAND

14. With control lever in "DR" range, loosen the rear band adjusting screw lock nut Figure 10.

15. Loosen the rear band adjusting screw until the engine speed increases to 900-1000 RPM (rear drum now spinning freely).

16. Tighten the rear band adjusting screw slowly until engine returns to 700 RPM (rear drum now stopped).

17. Loosen the rear hand adjusting screw until engine speed increases and tighten again slowly until engine speed returns to 700 RPM.

NOTE: At this point wait 30 seconds. If engine speed increases, tighten adjusting screw 1/10 of a turn. Wait another 30 seconds and if engine speed again increases, tighten screw 1/10 of a turn more. Repeat this procedure until engine speed remains at 700 RPM for at least 30 seconds.

18. Set counter on tool to 00.

19. Position manual control lever in the "N" position.

20. While holding the lock nut stationary with the long handle of Adjusting Tool, tighten band adjusting screw exactly 2 turns using top short handle (counter will read 20).

21. Position control lever in "DR" range.

22. Hold adjusting screw stationary with the top handle and tighten the lock nut with the long handle.

23. Reset engine idle at 490-510 RPM (Control lever in "N" position).

24. Turn off ignition.

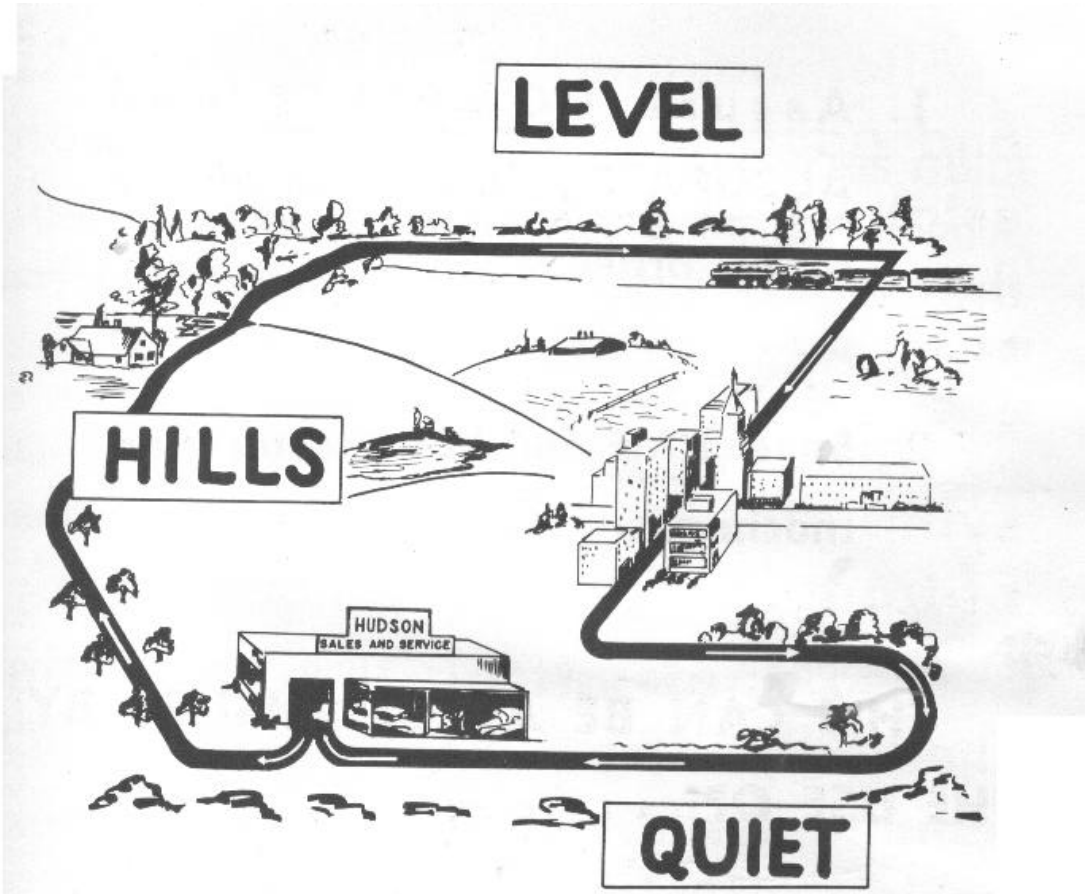
25. Install floor hole cover, floor mat and accelerator pedal.

ROAD TESTING AND DIAGNOSIS

After making pre-delivery checks and adjustments, road test over an established test route which will thoroughly test all phases of Hydra-Matic operation.

This will uncover any hidden symptoms and determine causes of trouble that must be corrected.

Also, the shift pattern must be checked during the road test to determine if shifts occur at the proper vehicle speeds.



Suggested Test Route

UNIFORM TESTING WILL

1. **Assure COMPLETE and ACCURATE information on the repair order.**

2. **Save TIME for both tester and mechanic.**

THIS CAN BE ACCOMPLISHED BY THE USE OF . . .

The Hudson HYDRA-MATIC DIAGNOSIS GUIDE which provides a means of making a thoroughly uniform, accurate and systematic trouble diagnosis.

This guide is designed for use while the car is being road tested. A simple check mark inthe proper space on the guide will indicate any malfunctions which are discovered.

The guide lists possible causes of troubles, indicating the units which may be responsible for the conditions checked.

HYDRA-MATIC DIAGNOSIS GUIDE FOR HUDSON CARS

COVERING

1. Shifting 2. Noise 3. Oil Leaks

IMPORTANT—BEFORE TESTING, ALWAYS——1. CHECK OIL LEVEL——2. CHECK ENGINE IDLE

Date_____ Trans. No._____

Owner_____ R. O. No._____

Mileage_____ Tester_____

SHIFT CONDITIONS

SHIFT CONDITIONS	√	Possible Causes	OTHER CONDITIONS	√	Possible Causes
Too High		C-G-H	Excessive Creeping		B-O-P
Too Low		C-G-H	Slipping		A-C-D-E-F-G-I J-M-O-P-R-U-V
Varies		C-F-G-H	Jumps out of Reverse		C-N
Hunting		C-G	No Drive Forward		A-C-D-F-E-I-M-K
Misses one or more shifts		G-H-O	Locks up on reverse coast		D-F-G-J-K
Improper Throttle downshift		C-D-G-H-K	Moves forward when in reverse		P
Engine speeds up, Band apply rough		C-F	Noisy		See Noise Section
Rough downshift to 1st		G-J	Clashes when shifted to reverse		B-C-G-J-N-S
Violent Shifting		C-G	No drive in reverse		E-N-S
Shifts above 2nd in low range		G-H	Drives in reverse only		C-N-T
No shifts—Stays in same gear		C-G-H			

ALWAYS CHECK CAUSES IN SEQUENCE GIVEN

LEGEND

A	Oil Level	I	Front Servo	R	Oil Delivery Sleeve
B	Engine Idle Speed	J	Rear Servo	S	Rev Shifter Bracket
C	Linkage	K	Front Oil Pump	T	Manual Detent Lever
D	Oil Pressure	L	Rear Oil Pump	U	Restriction in Oil Circuit
E	Servo Bands	M	Fluid Coupling	V	Excessive Oil Leak in Circuit
F	Pressure Regulator	N	Reverse Unit	W	
G	Control Valve Assembly	O	Front Unit	X	
H	Governor	P	Rear Unit	Y	

OIL LEAKS

WHERE NOTICED	POSSIBLE CAUSE	√
Between Flywheel & Crankshaft Flange	Loose Flywheel to Crankshaft Bolts or Gasket	
Fluid Coupling & Flywheel or Fluid Coupling Proper	Flywheel to Torus Cover Gasket—Flywheel Sealing Area, Drain plug or Dampener Rivets	
Front of Transmission	Front Cover, Gasket, Front Oil Seal or Oil Seal Rings	
Bottom Oil Pan	Oil Pan Gasket—Drain Plug Gasket	
Side Cover Pan—or left rear corner of transmission	Side Cover Pan Gasket—Throttle and Manual Shaft seals Pressure line plug	
Rear of Transmission	Rear Oil Seal—Rear Bearing Retainer Gasket	

NOISE

OCCURS UNDER FOLLOWING CONDITIONS	POSSIBLE CAUSE	√
Neutral and all Gears whenever engine is running	Front Oil Pump	
Neutral, 1st and 2nd Gears only	Rear Unit Planetary Gears	
Neutral, 1st, 3rd and Reverse Gears only	Front Unit Planetary Gears	
Reverse Gear, Acceleration only	Reverse Unit Planetary Gears	
Reverse Gear, Deceleration only	Rear Unit Planetary Gears	
Metallic scraping at front of transmission	Excessive Backlash—Torus Members	

HYDRA-MATIC SHIFT POINTS IN M. P. H. FOR HUDSON CARS

UPSHIFTS

	DRIVE RANGE		L RANGE	
SHIFT	MINIMUM THROTTLE	FULL THROTTLE	MINIMUM THROTTLE	FULL THROTTLE
1-2	4-8	10-15		22-27
2-3	10-14	27-35		
3-4	15-20	58-66		

DOWNSHIFTS

	DRIVE RANGE			L RANGE		
SHIFT	CLOSED THROTTLE	FULL THROTTLE	FORCED	CLOSED THROTTLE	FULL THROTTLE	LOCKOUT
4-3	15-11	19-16	60-15			
3-2	8-5	14-10				
2-1	5-3	10-5		9-5	14-10	
4-2						48-39

STALL TEST

TEST CONDITIONS	1450 TO 1650 ENG. R. P. M.	UNDER 1450 ENG. R. P. M.	OVER 1650 ENG. R. P. M.
With the engine at operating temperature, set control lever in D position. Fully apply hand and foot brake, and accelerate engine to wide open throttle.	NORMAL	Poor engine performance such as need of tune up, etc.	Transmission slippage or excessive torus coupling slippage. (Do not hold throttle open.)

Finally -

Use of the Diagnosis Guide by ServiceSalesmen, Testers and others who must relay to the Mechanic what corrective work is necessary, will result in the ordering of specific operations rather than a repair order reading "Overhaul Transmission".

Also, the guide, when properly handled, provides complete factual information on the Hydra-Matic Transmission for car history records.

DRIVING INSTRUCTIONS

"Drive" the automobile with the owner when he takes delivery of his new Hydra-Matic equipped HUDSON.

The following items must be fully explained:

1. STARTING

2. DRIVING

STARTING

1. Apply hand brake.
2. Place selector lever in "N" (neutral) position.
3. Depress accelerator pedal halfway and release.
<u>Never pump accelerator or race the engine.</u>
4. Turn ignition switch on and press starter button.

DRIVING

SELECTOR LEVER POSITIONS

N — Neutral

Dr — Normal Forward Driving

Lo — Max. Power Forward or Braking on Steep Grades

R — Reverse

NORMAL FORWARD DRIVING —

Move selector lever to "Dr". Depress accelerator to attain desired speed.

TRAVELING UP OR DESCENDING GRADES—

Move selector lever to "Lo". Lever can be moved from "Dr" to "Lo" at any speed below 48 MPH. Shifting into "Lo" above 48 MPH will not be effective until the car speed is reduced below 48 MPH.

The change from "Dr" to "Lo" can be made at any speed below 48 MPH when road is dry and traction is good. This shift is not recommended on slippery pavement, since skidding may result.

REVERSE—

Come to a full stop before shifting. Apply service brakes, move selector lever to "Lo", hesitate, then lift lever slightly and move to "R".

FORCED DOWNSHIFT FROM FOURTH TO THIRD

For increased power when climbing hills or passing at speeds below 60 MPH, depress accelerator to the floor:

A shift back to fourth speed will occur automatically when accelerator is released or when car has reached approximately 65 MPH.

NOTES

NOTES