

Testing & Adjusting

D3C, D4C, and D5C Series III Power Shift Transmission

D3C**6SL1-UP
7XL1-UP
9TS1-UP****D4C****6YL1-UP
7SL1-UP
1FW1-UP****D5C****6ZL1-UP
9DL1-UP
8ZS1-IP****Transmission****2RE
9AE
1DX**

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "WARNING" as shown below.



The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning, explaining the hazard, can be either written or pictorially presented.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. Caterpillar dealers have the most current information available. For a list of the most current publication form numbers available, see the Service Manual Contents Microfiche, REG1139F.

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Operation And Maintenance

NOTE: For complete operation and maintenance instructions, refer to Operation And Maintenance Manual, D3C, D4C, and D5C Series III Track-Type Tractor, Form No. SEBU6731.

Systems Operation

NOTE: For Systems Operation and Troubleshooting, make reference to Systems Operation, D3C, D4C, and D5C Series III Tractor Power Train, SENR5335.

Specifications

NOTE: For specifications with illustrations, make reference to Specifications, D3C, D4C, D5C Series III Tractor Power Train, SENR5334. If the specifications given in SENR5334 are not the same as given in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications given in the book with the latest date.

WARNING

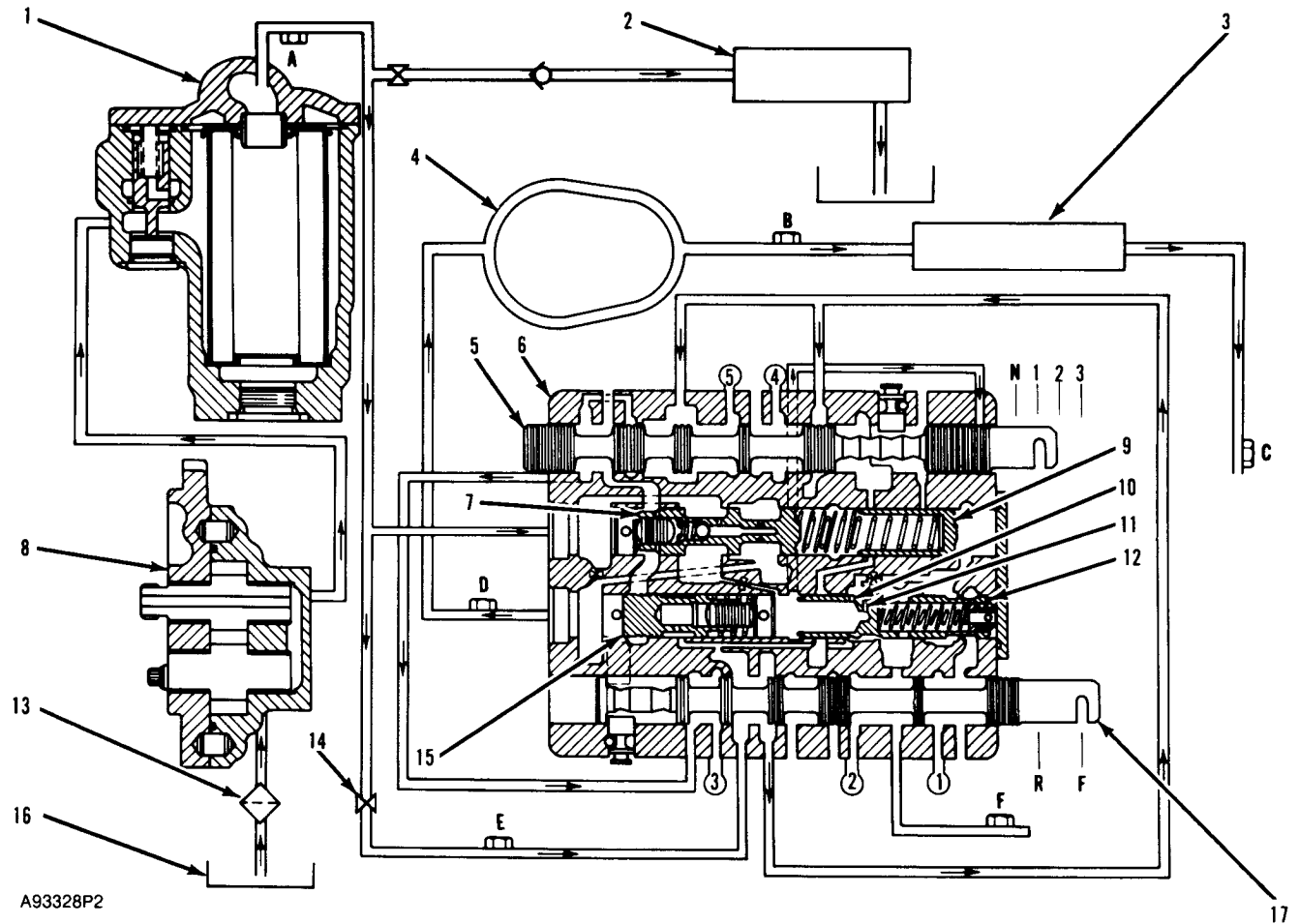
When tests and adjustments are made to the transmission or the torque converter, the parking brake must be OFF. To prevent movement of the machine and personal injury do the procedure that follows.

1. Lower the blade and ripper (if equipped) to the ground.
2. Put blocks in front of and behind the tracks.
3. Let only approved personnel on the machine and keep all other personnel off the machine and in clear view of the operator.
4. When testing must be done in a closed area and whenever possible, activate the service brakes if the parking brake can not be used.

NOTE: All tests and adjustments must be made with the oil in the hydraulic control system at normal temperature of operation. Be sure the linkage adjustments are correct before tests are made.

Testing And Adjusting

Power Train Hydraulic System Schematic

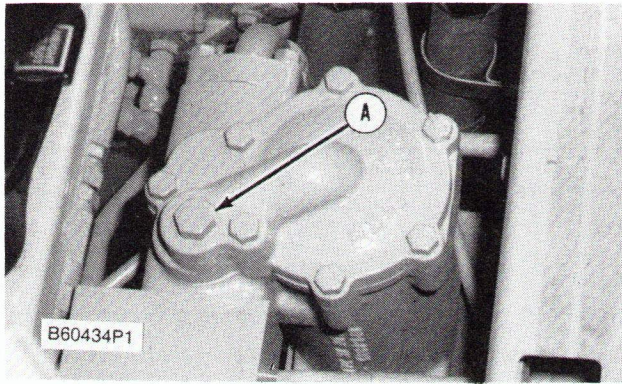


Transmission Hydraulic Controls

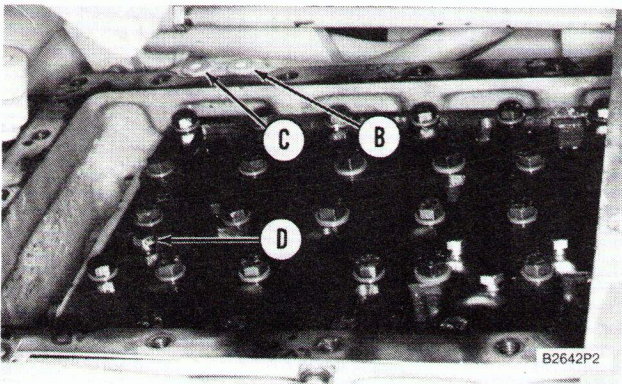
(Engine Running, First Speed FORWARD)

(1) Oil filter. (2) Steering controls. (3) Oil cooler. (4) Torque converter. (5) Speed selector spool. (6) Body of selector and pressure control valve. (7) Modulation relief valve. (8) Oil pump. (9) Load piston. (10) Orifice. (11) Orifice. (12) Pressure differential valve. (13) Magnetic screen. (14) Flow control orifice. (15) Ratio valve for torque converter. (16) Reservoir in bottom of transmission case. (17) Direction selector spool. (A) Pressure tap for transmission oil pump. (B) Pressure tap for converter outlet. (C) Pressure tap for transmission lubrication. (D) Pressure tap for converter inlet (P3). (E) Pressure tap for speed clutch (P1). (F) Pressure tap for direction clutch (P2).

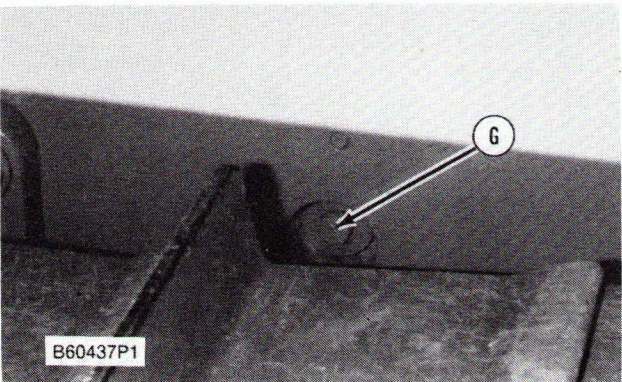
Location Of Pressure Taps



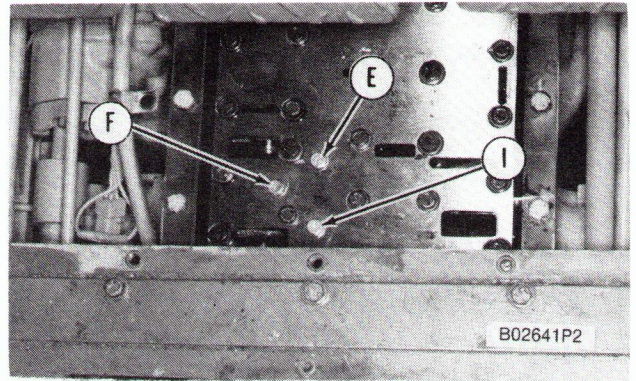
(A) Oil pump.



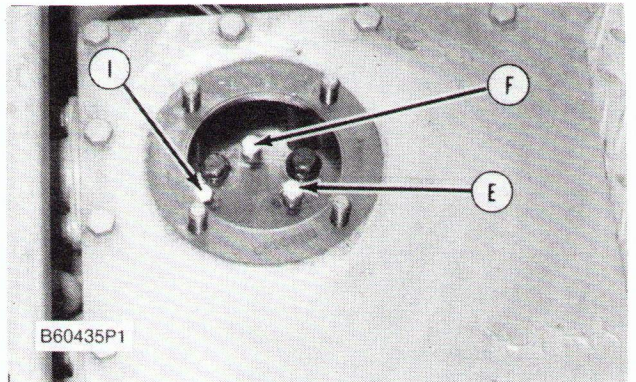
(B) Torque converter outlet. (C) Lubrication. (D) Torque converter inlet (P3).



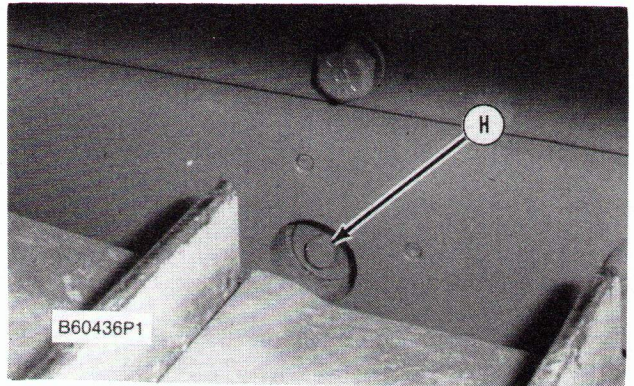
(G) Left steering clutch.



(6V0184 Transmission Test Cover Installed)
(E) Speed clutch (P1). (F) Direction clutch (P2). (I) Plug for load piston (LP).



Cover Not Removed
(E) Speed clutch (P1). (F) Direction clutch (P2). (I) Plug for load piston (LP).



(H) Right steering clutch.

Transmission Pressure Chart

D3C

TRANSMISSION PRESSURE CHART				
Pressure	Pressure Tap	Low Idle	High Idle	Adjustment
Oil Pump	(A)	More than speed clutch pressure (P1).	More than speed clutch pressure (P1).	NONE
Speed Clutch (P1) (Initial Pressure)	(E)	530 ± 35 kPa (77 ± 5 psi) with transmission selector lever in NEUTRAL. Load piston plug (I) removed.		Add or remove spacers (18). See Spacer Chart.
Speed Clutch (P1)	(E)	1910 kPa (277 psi) minimum, with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	2517 ± 138 kPa (365 ± 20 psi) with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Final pressure is controlled by the Initial Pressure Setting.
Direction Clutch (P2)	(F)	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Direction clutch pressure is controlled by the spring for the pressure differential valve.
Transmission Lubrication Oil	(C)	39 kPa (6 psi) Minimum.	90 ± 20 kPa (13 ± 3 psi)	NONE
Converter Inlet Pressure (P3)	(D)		896 ± 55 kPa (130 ± 8 psi) Maximum*	NONE
Converter Outlet Pressure	(B)		415 to 520 ± 14 kPa (60 to 75 psi) with brakes activated, selector lever in THIRD SPEED FORWARD, and converter in a stall condition.	NONE.

* With cold oil.

STEERING CLUTCH PRESSURE			
Pressure	Pressure Tap		Adjustment
Steering Clutches	(G) and (H)	Steering clutch pressure is controlled by speed clutch (P1) pressure. 1900 kPa (275 psi) is the minimum pressure required to release the steering clutches.	None

Pressure Differential Valve Test

1. With the engine stopped, move the transmission selector lever to any position except NEUTRAL.
2. Engage the brakes and hold them.
3. Start the engine and run it at HIGH IDLE (2400 RPM).
4. The direction clutch pressure (P2) must be 0.0 kPa (0.0 psi).
5. The speed clutch pressure (P1) must be 2600 ± 105 kPa (377 ± 15 psi).
6. The direction clutch pressure (P2) must remain at 0.0 kPa (0.0 psi).
7. Move the transmission selector lever to NEUTRAL and then to THIRD SPEED FORWARD or REVERSE.
8. The direction clutch pressure (P2) must now be 380 ± 55 kPa (55 ± 8 psi) less than speed clutch pressure (P1).

D4C

TRANSMISSION PRESSURE CHART				
Pressure	Pressure Tap	Low Idle	High Idle	Adjustment
Oil Pump	(A)	More than speed clutch pressure (P1).	More than speed clutch pressure (P1).	NONE
Speed Clutch (P1) (Initial Pressure)	(E)	530 ± 35 kPa (77 ± 5 psi) with transmission selector lever in NEUTRAL. Load piston plug (I) removed.		Add or remove spacers (18). See Spacer Chart.
Speed Clutch (P1)	(E)	2550 kPa (370 psi) minimum, with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	2897 ± 105 kPa (420 ± 15 psi) with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Final pressure is controlled by the Initial Pressure Setting.
Direction Clutch (P2)	(F)	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Direction clutch pressure is controlled by the spring for the pressure differential valve.
Transmission Lubrication Oil	(C)	4 kPa (.6 psi) Minimum.	90 ± 20 kPa (13 ± 3 psi)	NONE
Converter Inlet Pressure (P3)	(D)		1000 ± 55 kPa (145 ± 8 psi) Maximum*	NONE
Converter Outlet Pressure	(B)		415 to 520 kPa (60 to 75 psi) with brakes activated, selector lever in THIRD SPEED FORWARD, and converter in a stall condition.	NONE.

* With cold oil.

STEERING CLUTCH PRESSURE			
Pressure	Pressure Tap		Adjustment
Steering Clutches	(G) and (H)	Steering clutch pressure is controlled by speed clutch (P1) pressure. 1900 kPa (275 psi) is the minimum pressure required to release the steering clutches.	None

Pressure Differential Valve Test

1. With the engine stopped, move the transmission selector lever to any position except NEUTRAL.
2. Engage the brakes and hold them.
3. Start the engine and run it at HIGH IDLE (2400 RPM).
4. The direction clutch pressure (P2) must be 0.0 kPa (0.0 psi).
5. The speed clutch pressure (P1) must be 2897 ± 105 kPa (415 ± 15 psi).
6. The direction clutch pressure (P2) must remain at 0.0 kPa (0.0 psi).
7. Move the transmission selector lever to NEUTRAL and then to THIRD SPEED FORWARD or REVERSE.
8. The direction clutch pressure (P2) must now be 380 ± 55 kPa (55 ± 8 psi) less than speed clutch pressure (P1).

D5C

TRANSMISSION PRESSURE CHART				
Pressure	Pressure Tap	Low Idle	High Idle	Adjustment
Oil Pump	(A)	More than speed clutch pressure (P1).	More than speed clutch pressure (P1).	NONE
Speed Clutch (P1) (Initial Pressure)	(E)	530 ± 35 kPa (77 ± 5 psi) with transmission selector lever in NEUTRAL. Load piston plug (I) removed.		Add or remove spacers (18). See Spacer Chart.
Speed Clutch (P1)	(E)	2206 kPa (320 psi) minimum, with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	2517 ± 138 kPa (365 ± 20 psi) with selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Final pressure is controlled by the Initial Pressure Setting.
Direction Clutch (P2)	(F)	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	380 ± 55 kPa (55 ± 8 psi) less than the speed clutch pressure at tap (E). Selector lever in any FORWARD or REVERSE speed. Load piston plug (I) installed.	NONE. Direction clutch pressure is controlled by the spring for the pressure differential valve.
Transmission Lubrication Oil	(C)	39 kPa (6 psi) Minimum.	76.5 ± 11.0 kPa (11 ± 2 psi)	NONE
Converter Inlet Pressure (P3)	(D)		918 ± 55 kPa (133 ± 8 psi) Maximum*	NONE
Converter Outlet Pressure	(B)		415 to 520 ± 14 kPa (60 to 75 psi) with brakes activated, selector lever in Third Speed FORWARD, and converter in a stall condition.	NONE.

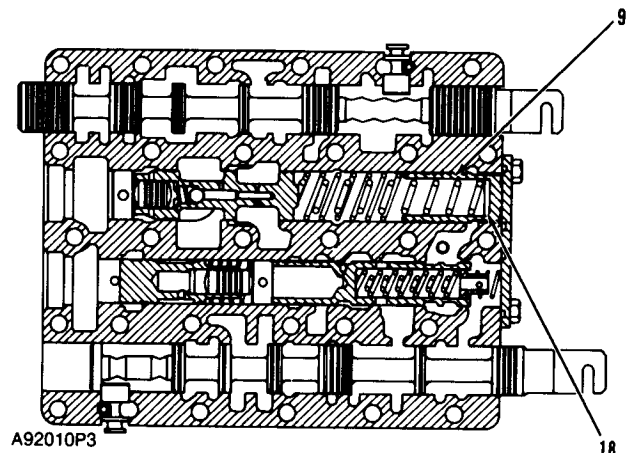
* With cold oil.

STEERING CLUTCH PRESSURE			
Pressure	Pressure Tap		Adjustment
Steering Clutches	(G) and (H)	Steering clutch pressure is controlled by speed clutch (P1) pressure. 2200 kPa (320 psi) is the minimum pressure required to release the steering clutches.	NONE

Pressure Differential Valve Test

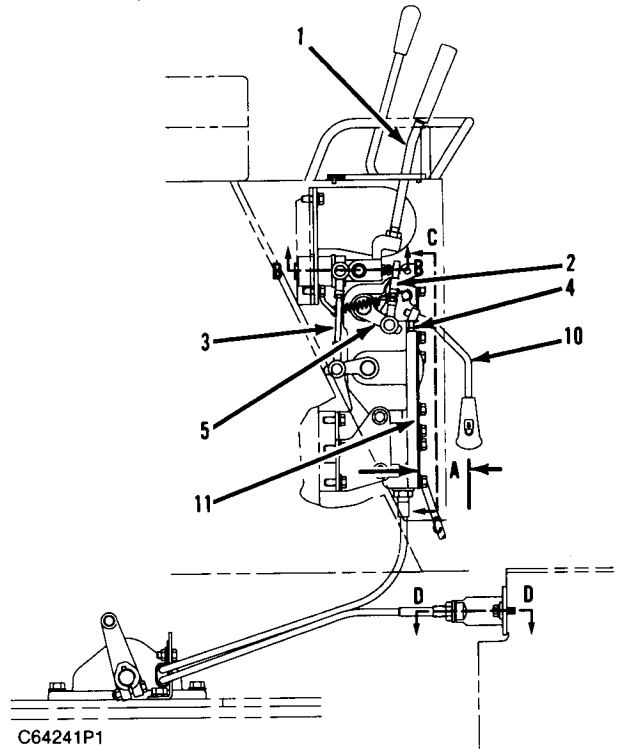
1. With the engine stopped, move the transmission selector lever to any position except NEUTRAL.
2. Engage the brakes and hold them.
3. Start the engine and run it at HIGH IDLE (2400 RPM).
4. The direction clutch pressure (P2) must be 0.0 kPa (0.0 psi).
5. The speed clutch pressure (P1) must be 2517 ± 138 kPa (365 ± 20 psi).
6. The direction clutch pressure (P2) must remain at 0.0 kPa (0.0 psi).
7. Move the transmission selector lever to NEUTRAL and then to THIRD SPEED FORWARD or REVERSE.
8. The direction clutch pressure (P2) must now be 380 ± 55 kPa (55 ± 8 psi) less than speed clutch pressure (P1).

SPACER CHART PRESSURE CHANGE TO THE VALVES BY REMOVAL OR ADDITION OF ONE SPACER			
Part No. For Spacer	Thickness	Change in:	Where Used
(18)			
5M9622	1.60 mm (.063 in)	98 kPa (14.2 psi)	Load Piston (9)
5M9623	0.90 mm (.035 in)	57 kPa (8.3 psi)	
5M9624	0.25 mm (.010 in)	16 kPa (2.3 psi)	



Selector And Pressure Control
(9) Load piston. (18) Spacers.

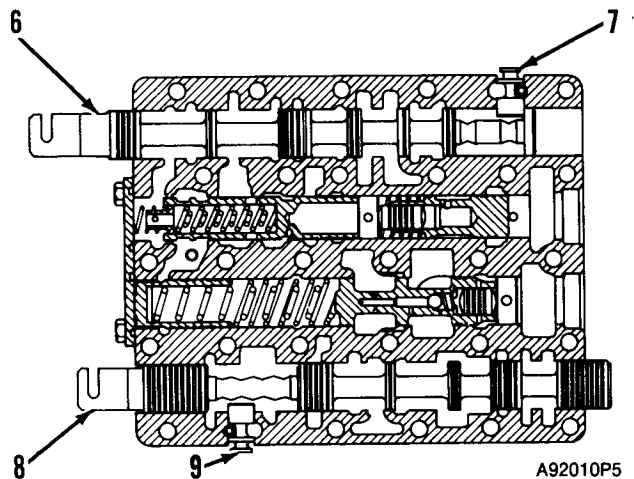
Transmission Control Linkage

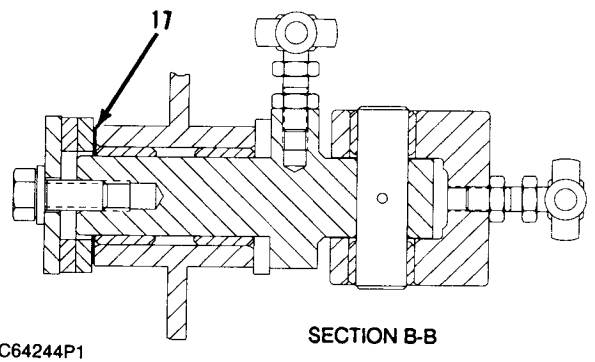
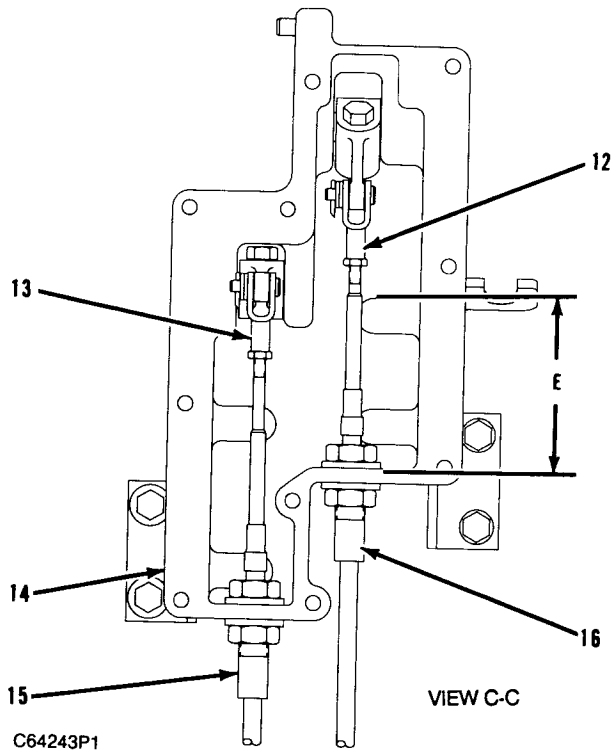


Transmission Oil Pump Bench Test Specifications

Type Gear
 Number of sections One
 Rotation (seen from drive end) Clockwise
 Output [with SAE No. 10W oil at 49°C (120°F)]
 (minimum) 52.5 liter/min (13.65 U.S. gpm)
 At a pump speed of 1800 rpm
 At a pressure of 2070 kPa (300 psi)

Transmission Selection	Clutches Engaged In Transmission
NEUTRAL	3
First Speed FORWARD	2 and 5
Second Speed FORWARD	2 and 4
Third Speed FORWARD	2 and 3
First Speed REVERSE	1 and 5
Second Speed REVERSE	1 and 4
Third Speed REVERSE	1 and 3





(17) Use shims as required to obtain end play of 0.025 to 0.10 mm (.0010 to .004 in)

⚠ WARNING

Do not make any adjustments to the transmission control linkage while the engine running.

Torque for all (1/4 in) locknuts (jam nuts) that hold the rod ends on the cables $8 \pm 3 \text{ N}\cdot\text{m}$ ($6 \pm 2 \text{ lb ft}$)

Torque for all (5/8 in) jam nuts $38 \pm 7 \text{ N}\cdot\text{m}$ ($28 \pm 5 \text{ lb ft}$)

(A) Neutral lock position 77.0 mm (3.00 in)

(E) Dimension 95.0 mm (3.75 in)

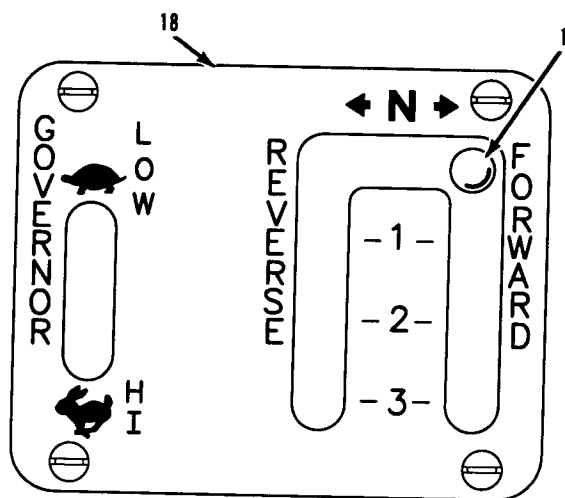
(3) Assembled length of rod assembly 146.0 mm (5.75 in)

(11) Apply 7M7260 Liquid Gasket between cover and housing.

Adjustment of Transmission Control Linkage

1. Disconnect yoke (13) on cable assembly (15) from lever.
2. Disconnect yoke (12) on cable assembly (16) from lever.
3. Check length of cable assemblies (15) and (16) inside housing (14). Make adjustments as needed to dimension (E).
4. Move direction control spool (6) to the FORWARD position against stop (7) by pulling out on cable assembly (15).
5. Move speed selector spool (8) to the NEUTRAL position against stop (9) by pushing in on cable assembly (16).
6. Adjust set screw (4) for neutral lock lever (10) to dimension (A).
7. Move speed control lever (5) until it contacts neutral lock lever (10).

8. Make adjustments, as needed, to the length of rod assembly (2) and/or yoke (12) on cable assembly (16) until the pin can be installed in the lever.
9. Adjust the length of rod assembly (3) to 146.0 mm (5.70 in) from center to center of rod end ball.
10. Install yoke (13) on cable assembly (15) with pin.
11. Move transmission neutral lock lever (10) to the OPERATING position (pulled up).



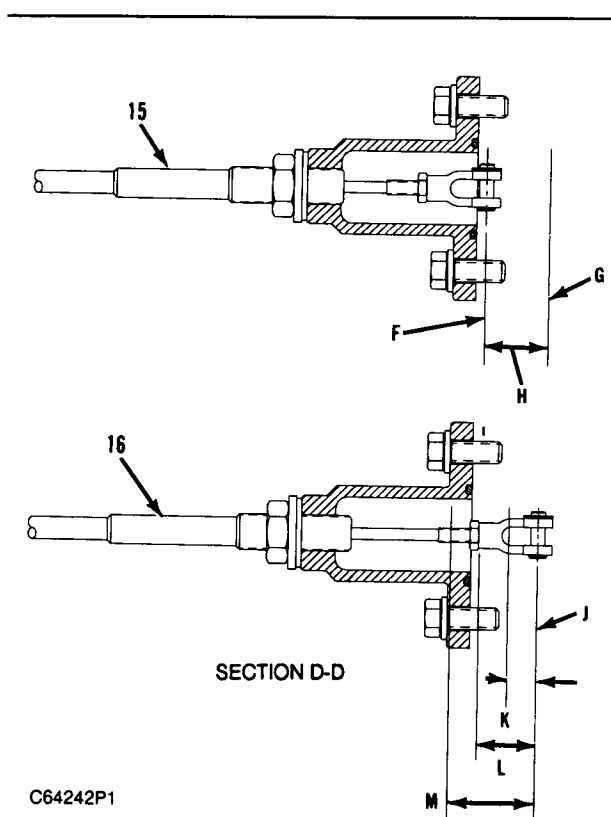
C60734P1

Transmission Selector Lever on the Forward Side of the Neutral Opening. (1) Transmission selector lever. (18) Shift guide.

12. With the cover removed from housing (14), move transmission selector lever (1) to all positions indicated on shift shift guide (18). A detent must be felt in each position. Also check to make sure that the jam nuts on the cables do not make contact with the shields on the cables.

NOTE: Final adjustment, if needed, may be obtained by doing one of the following:

- a. Loosen the cable that needs adjusting at the housing on the fuel tank console and move the cable in or out to obtain the desired adjustment.
- b. Loosen the housing at the transmission (shown in View D-D) and thread the housing in or out to obtain the desired adjustment.



C64242P1

(15) Direction cable. (16) Speed cable.

- (F) Forward
- (G) Reverse
- (H) 25.4 mm (1.00 in)
- (J) Neutral Position
- (K) First Speed Position 12.7 mm (.50 in)
- (L) Second Speed Position 25.4 mm (1.00 in)
- (M) Third Speed Position 38.1 mm (1.50 in)

