

# **SERVICE REPAIR**

# **MANUAL**

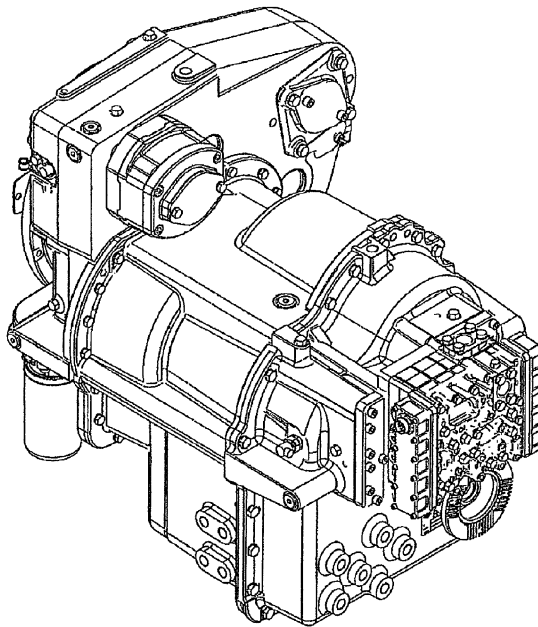
Hyster A236 (H400HD, H400HDS, H450HD,  
H450HDS) Forklift Service Repair Manual

# ***HYSTER***

# **TRANSMISSION REPAIR**

## **(TE13 AND TE17)**

**H16.00-18.00XM/XMS-12  
(H400-450HD/HDS) [A236]; H16.00-22.00XM-12EC  
(H400-500HD/HDS-EC) [B214]; H16XM-12, H18XM-12,  
H20XM-12, H22XM-12 (H400HD, H450HD, H500HD,  
H550HD) [B236]; H16XM-12EC, H18XM-12EC,  
H22XM-12EC (H400HD-EC, H450HD-EC, H500HD-EC) [C214]**



# ***HYSTER***

# SAFETY PRECAUTIONS

## MAINTENANCE AND REPAIR

- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **HYSTER APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

**NOTE:** The following symbols and words indicate safety information in this manual:



### **WARNING**

**Indicates a hazardous situation which, if not avoided, could result in death or serious injury.**



### **CAUTION**

**Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.**

**On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.**

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This section is for the following models:

H16.00-18.00XM/XMS-12 (H400-450HD/HDS) [A236];  
H16.00-22.00XM-12EC (H400-500HD/HDS-EC) [B214];  
H16XM-12, H18XM-12, H20XM-12, H22XM-12 (H400HD, H450HD,  
H500HD, H550HD) [B236];  
H16XM-12EC, H18XM-12EC, H22XM-12EC (H400HD-EC,  
H450HD-EC, H500HD-EC) [C214]

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**Have any questions please write to me:  
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## General

This manual provides information on the repair and diagnostics of the TE-13 and TE-17 transmission as equipped on the B214 and A236 series lift trucks. The difference between models TE-13 and TE-17 is in the torque converter and the number of discs in the clutches. Model TE-13 is fitted on trucks with

the 142 kW engine option, Model TE-17 is fitted on trucks with the 164 kW engine option.

Electrical system diagrams are shown in **Diagrams** 8000 SRM 1312 for A236 and **Diagrams** 8000 SRM 1281 for B214.

## Transmission Repair

### REMOVE

**NOTE:** The transmission can be removed by lifting it out of the lift truck.

1. Place the lift truck on a solid, level surface.
2. Lower the mast completely.
3. Turn the key to **OFF** position to shut down the engine.
4. Apply the parking brake.

**NOTE:** When removing battery cables, always disconnect the ground cable first and then the positive cable.

5. Disconnect the cables at the battery.
6. Unlock the two front covers.
7. Remove the two front covers.
8. Disconnect the air intake tube from the air cleaner assembly.
9. Remove the nuts holding the two gas springs.
10. Remove the hood including the air cleaner assembly.
11. Disconnect the drive shaft at the differential. Remove the drive shaft between the transmission and the differential.
12. Disconnect the wiring harnesses from the transmission.
13. Disconnect the wires at the pressure and temperature sending unit on the transmission. Put identification tags on the wires so they can be correctly connected again.

14. Place a suitable container under the transmission sump and remove the transmission sump drain plug and drain the transmission oil.
15. Disconnect the oil lines to the oil cooler at the transmission. Drain the oil into a drain pan. Put plugs and caps on open lines/fittings.
16. Disconnect the oil hoses at the hydraulic pumps. Put plugs and caps on open lines/fittings.

**NOTE:** The hydraulic pump is connected to the transmission cover with four capscrews each. The drive shaft of the hydraulic pump is engaged in the splines of the drive gear. The drive shaft of the hydraulic pump will slide out of the drive gear when the hydraulic pump is removed.

17. Remove the hydraulic pump.
18. Disconnect and remove the dipstick assembly from the transmission.
19. Install blocks and a jack under the flywheel end of the engine as a support. If the support is under the engine oil sump, make sure that the support is across the width of the oil sump so the weight of the engine does not damage the oil sump.



### WARNING

**Make sure that the lifting device has a minimum capacity of 1000 kg (2205 lb).**

20. Connect a lifting device to the transmission.
21. Remove the transmission mounts to the frame.

**CAUTION**

**Do not drop the capscrews into the converter housing. They will be difficult to retrieve.**

**NOTE:** You must turn the flywheel to gain access to each capscrew.

**22.** Remove the eight capscrews retaining the drive plate to the flywheel.

**23.** Raise the lifting device to hold the weight of the transmission only. Remove all fasteners between the torque converter housing to the flywheel housing.

**24.** Make sure that all connections have been removed.

**WARNING**

**The transmission is heavy. Make sure that the lifting devices are properly positioned.**

**CAUTION**

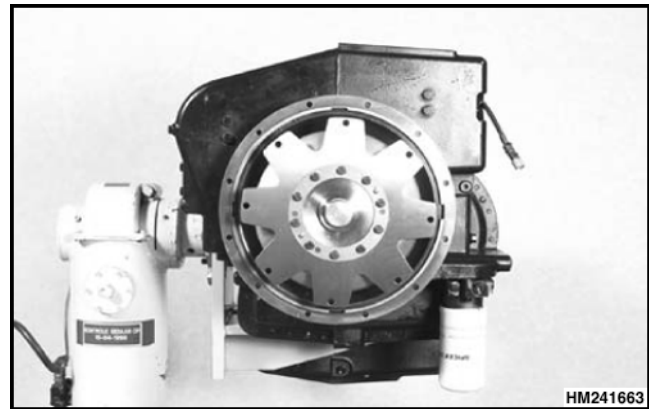
**Keep the transmission level when the transmission is separated from the engine so the drive plate is not damaged.**

**25.** To avoid damage to the drive plate, carefully lift the transmission assembly past the crossmember support.

**26.** Carefully lower the transmission on the ground.

**DISASSEMBLE**

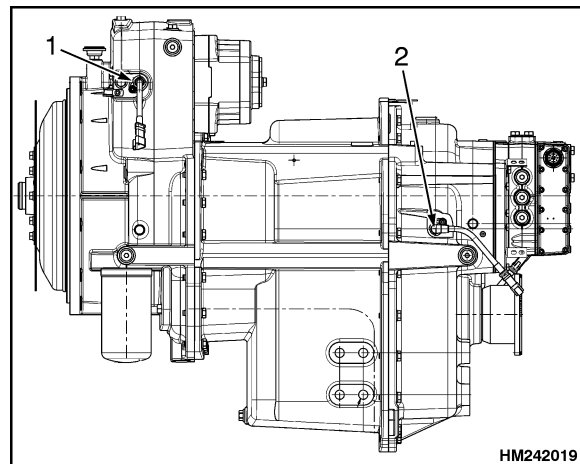
Figure 1 shows the front view of the TE17 transmission.



*Figure 1. TE17 Transmission*

**Transmission Case****STEP 1.**

Remove the engine speed and temperature sensor and the drum speed sensor from the transmission case.

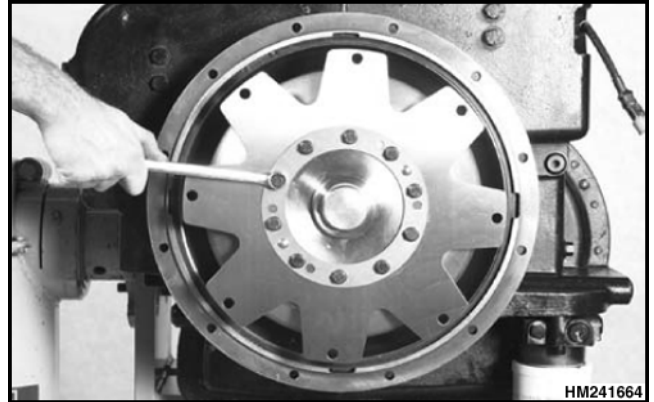


1. ENGINE SPEED AND TEMPERATURE SENSOR
2. DRUM SPEED SENSOR

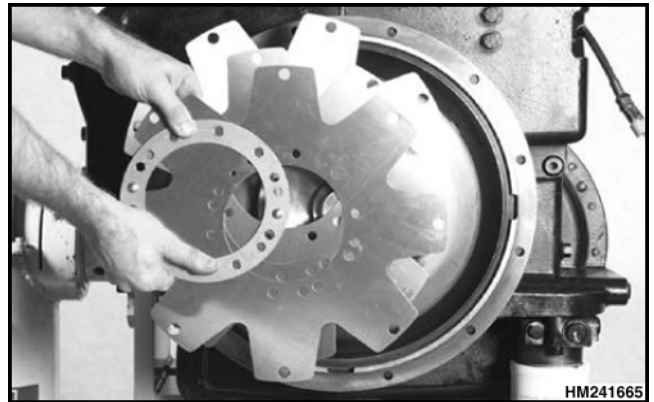


**STEP 2.**

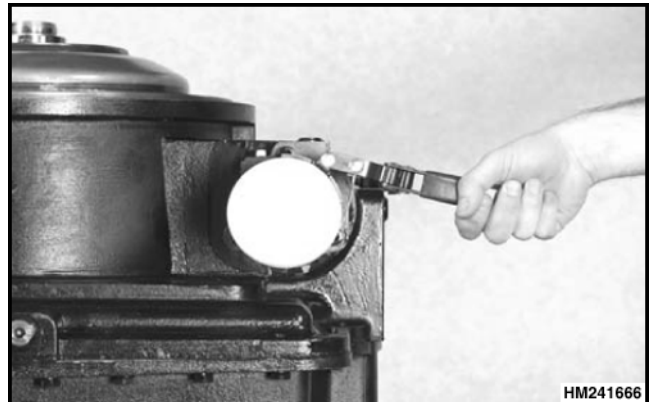
Remove the drive plate mounting bolts and washers.

**STEP 3.**

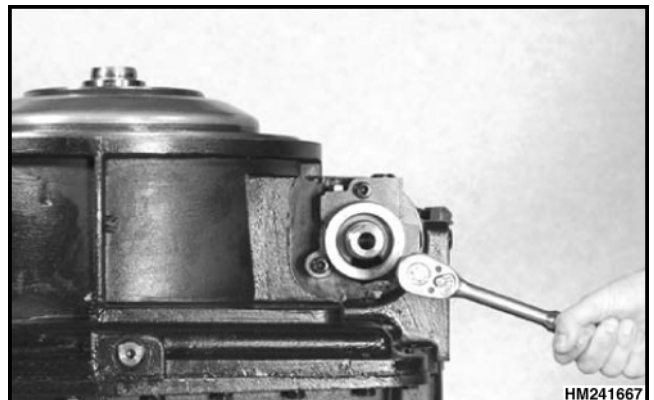
Remove the drive plates and backing ring.

**STEP 4.**

Remove the filter element.

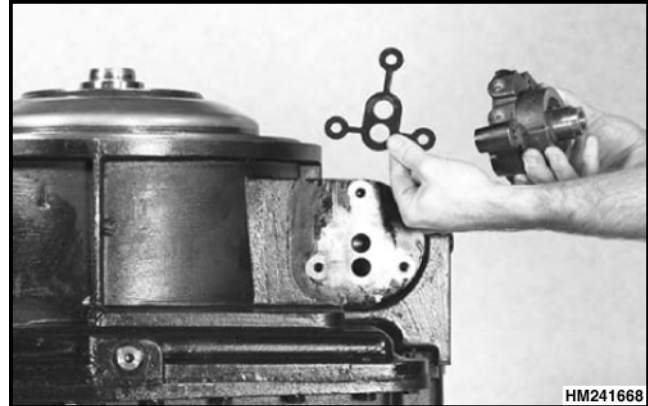
**STEP 5.**

Remove the filter adapter bolts and lockwashers.



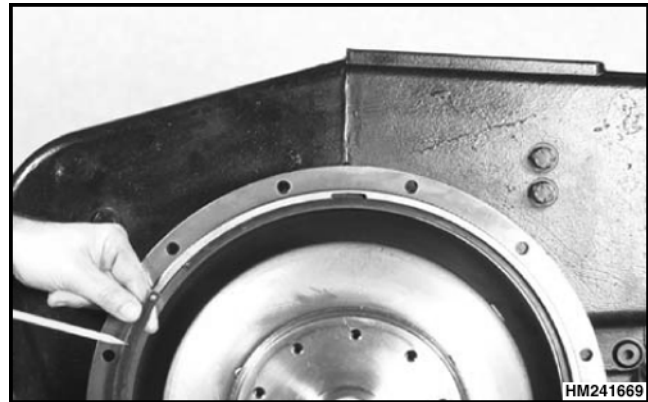
**STEP 6.**

Remove the filter adapter and gasket.



**STEP 7.**

Remove the oil baffle retaining ring.



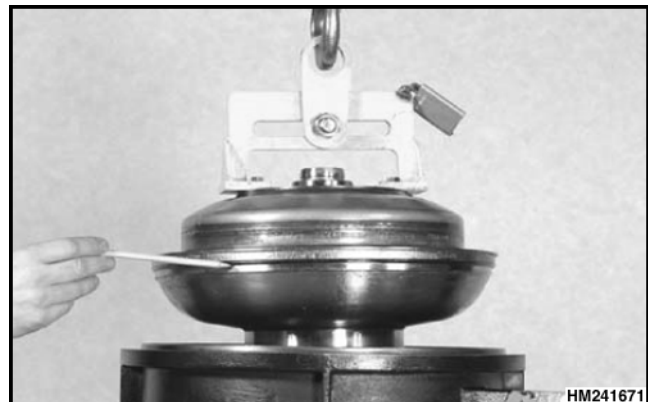
**STEP 8.**

Attach a special tool or two lifting eyes to the mounting surface of the drive plates to lift the converter and oil baffle from the converter housing as an assembly.



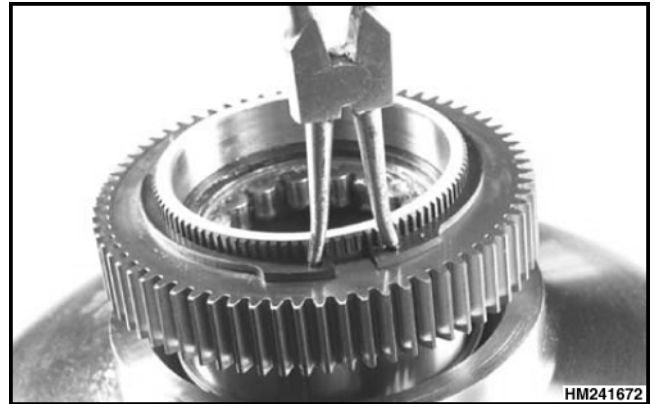
**STEP 9.**

Remove the converter housing, oil baffle, and sealing ring.

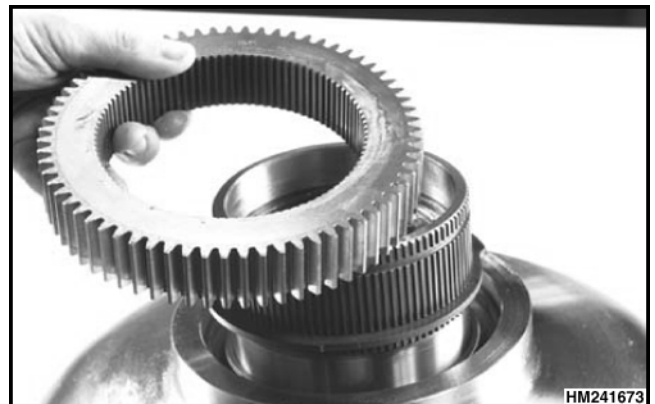


**STEP 10.**

Remove the torque converter gear snap ring.

**STEP 11.**

Remove the torque converter gear.

**STEP 12.**

Remove the torque converter gear lower snap ring.

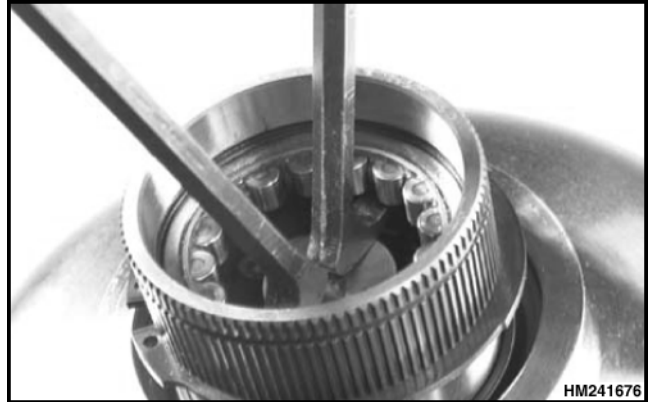
**STEP 13.**

Remove the stator support bearing retaining snap ring.

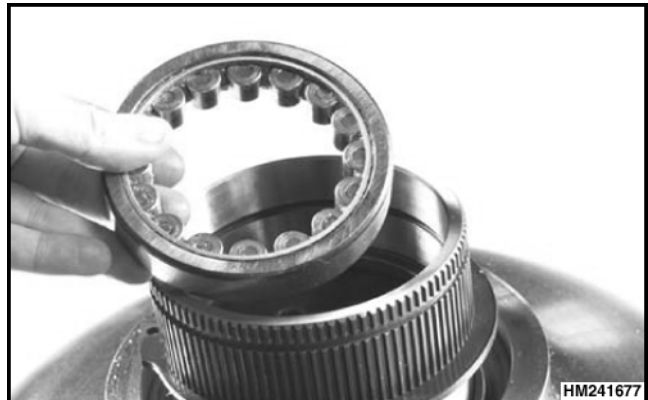


**STEP 14.**

Pry the stator support bearing from the converter assembly as shown.

**STEP 15.**

Remove the stator support bearing.

**STEP 16.**

Remove the stator support capscrews and lockwashers.

**STEP 17.**

Remove the torque converter sleeve and gasket.

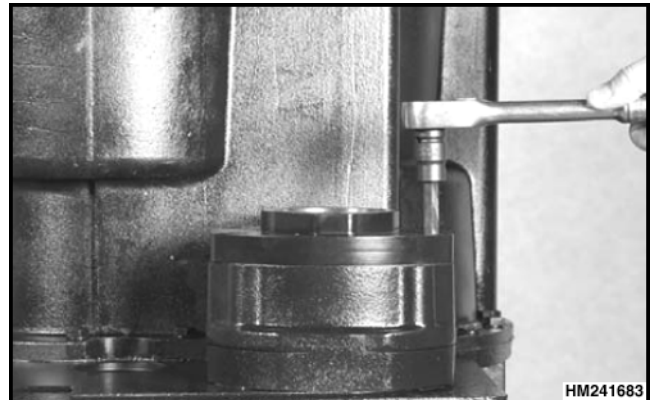


**STEP 18.**

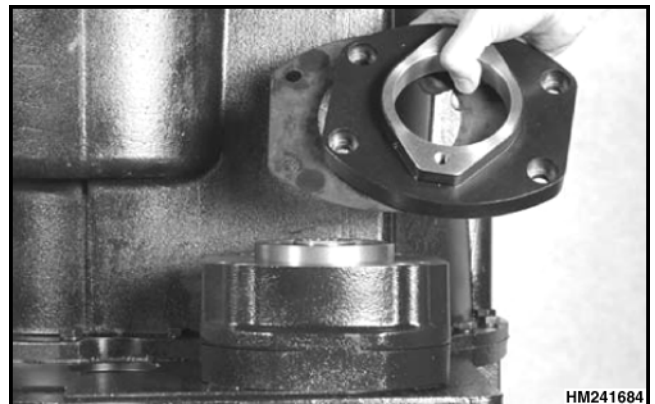
Remove the oil baffle and sealing ring.

**STEP 19.**

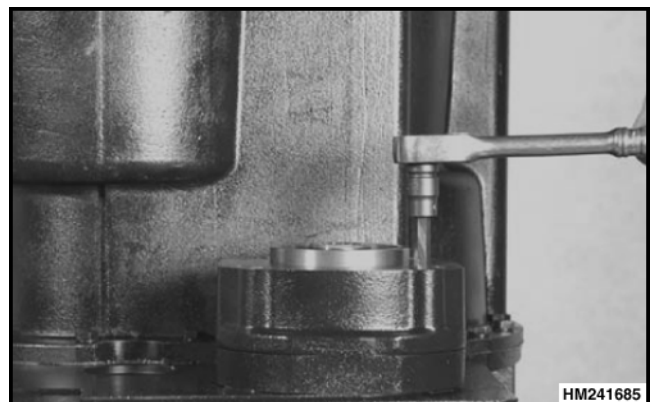
Remove the charging pump adapter plate capscrews and lockwashers.

**STEP 20.**

Remove the charging pump adapter plate and gasket.

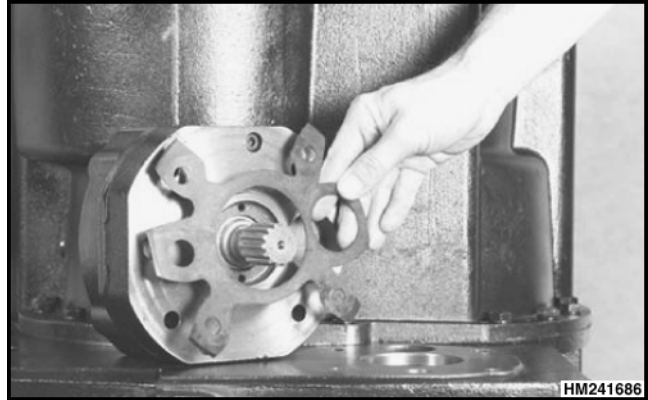
**STEP 21.**

Remove the charging pump capscrews and lockwashers.

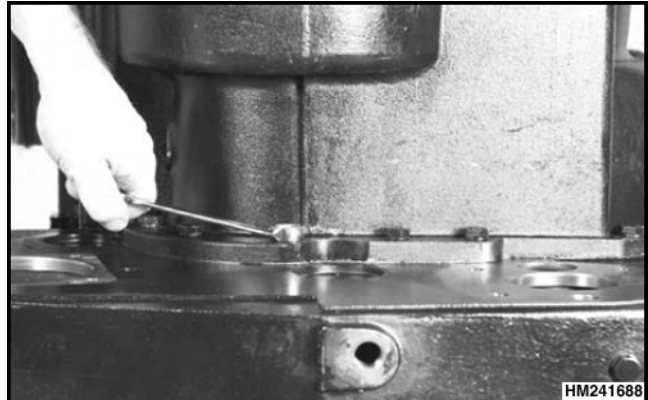


**STEP 22.**

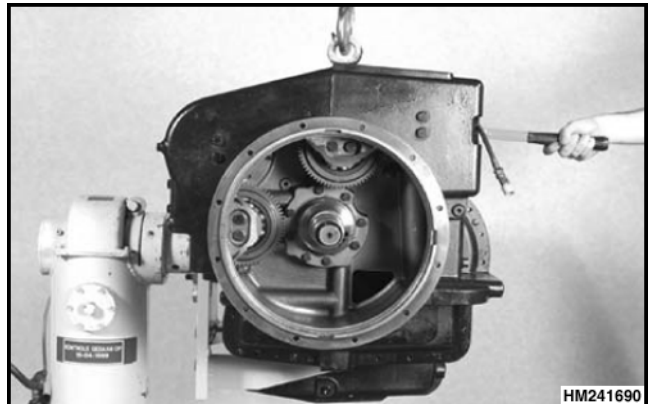
Remove the charging pump assembly and gasket.

**STEP 23.**

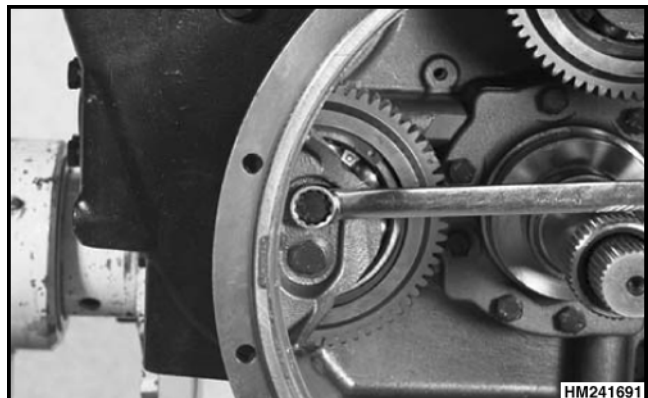
Remove the torque converter housing to transmission case bolts and lockwashers.

**STEP 24.**

Support the torque converter housing with a chain hoist and using a soft hammer, tap the torque converter housing away from the transmission case.

**STEP 25.**

Remove the first pump drive idler gear bolts and lockwashers.

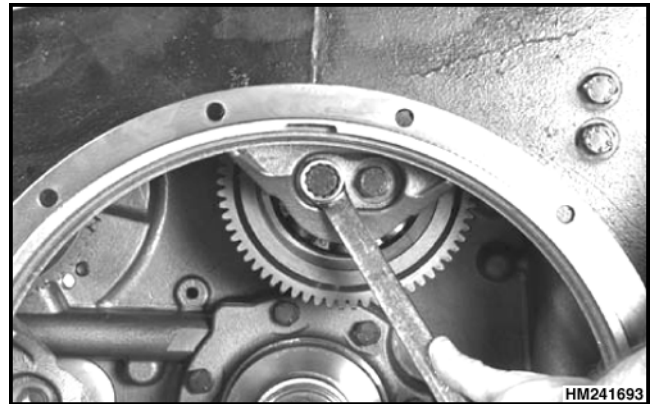


**STEP 26.**

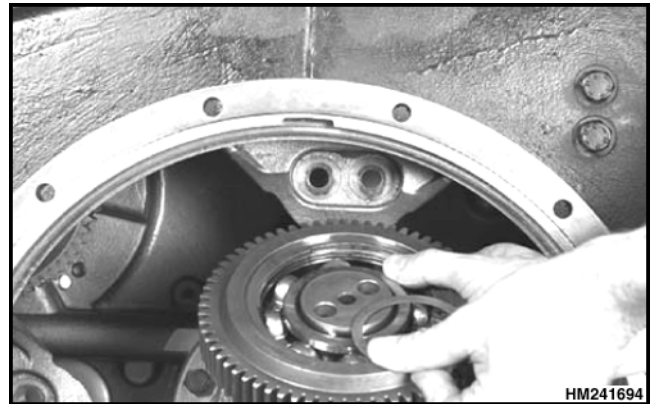
Remove the first pump drive idler gear, washer, and bearing as an assembly.

**STEP 27.**

Remove the second pump drive idler gear bolts and lockwashers.

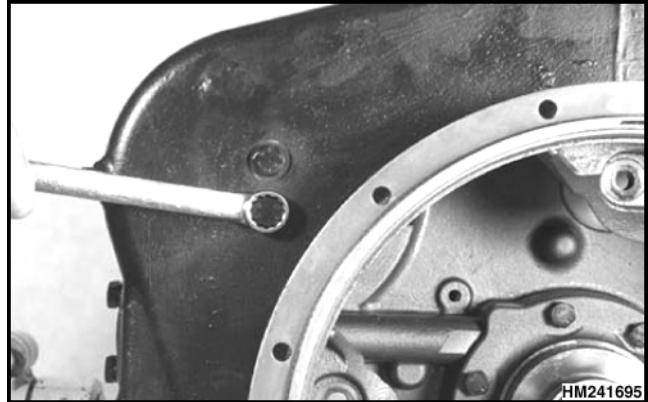
**STEP 28.**

Remove the second pump drive idler gear, washer, and bearing as an assembly.



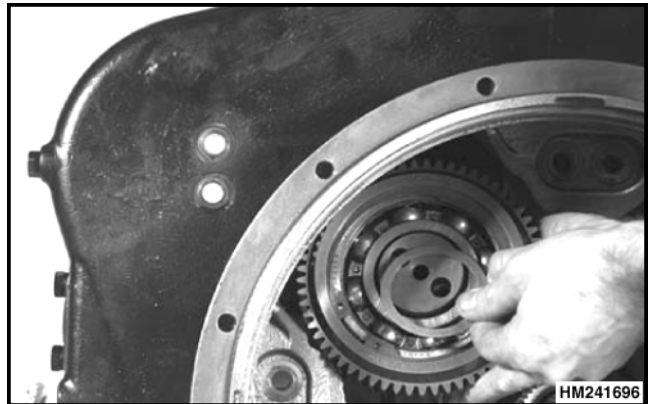
**STEP 29.**

Remove the first pump drive gear bolts and lockwashers.



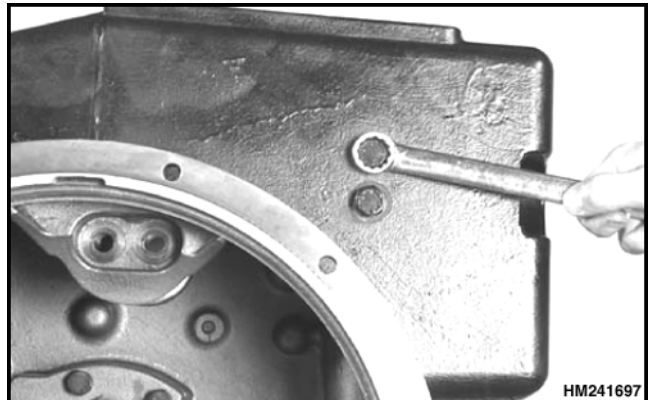
**STEP 30.**

Remove the first pump drive gear, washer, and bearing as an assembly.



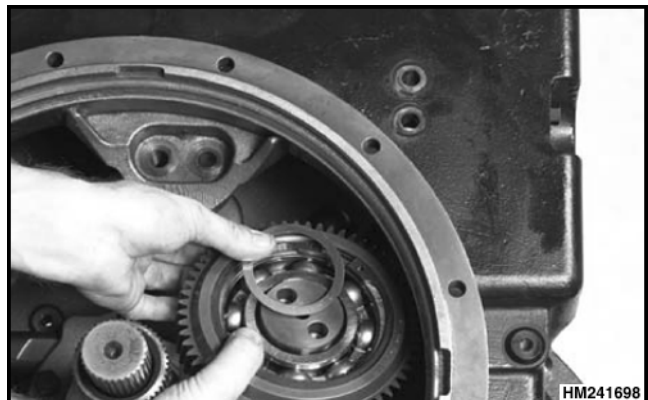
**STEP 31.**

Remove the second pump drive gear bolts and lockwashers.



**STEP 32.**

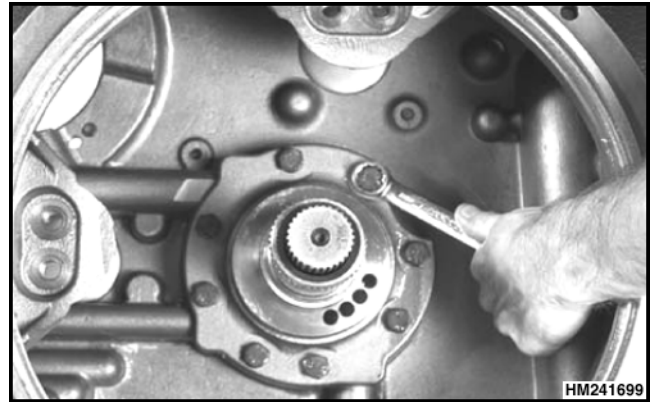
Remove the second pump drive gear, washer, and bearing as an assembly.



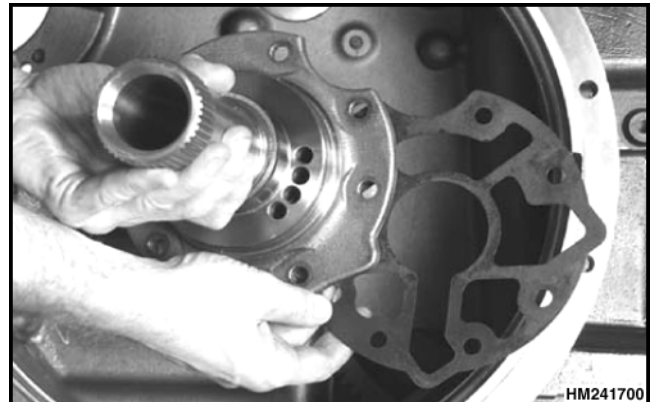


**STEP 33.**

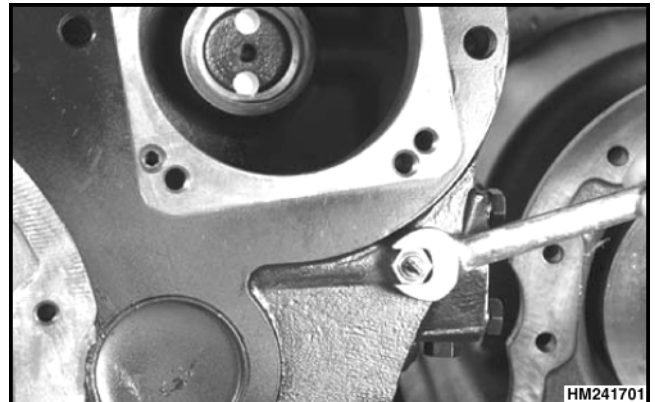
Remove the stator support bolts and lockwashers.

**STEP 34.**

Remove the stator support and gasket.

**STEP 35.**

Remove the temperature sensor from housing.

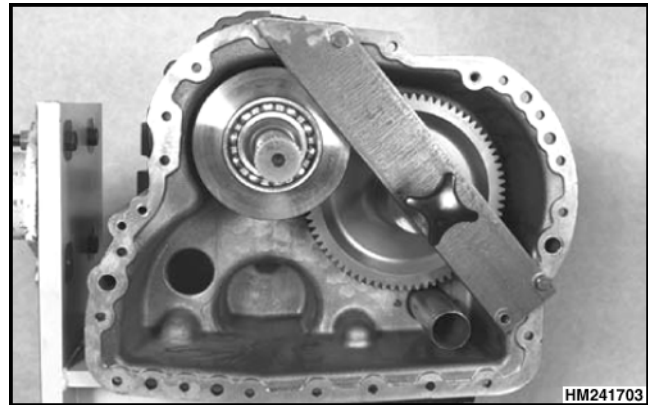
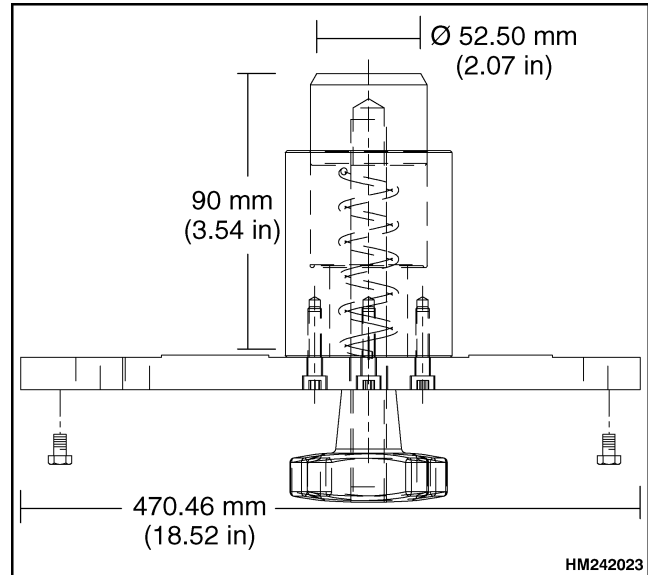
**STEP 36.**

Remove the lock nut from the FWD/3RD shaft assembly.

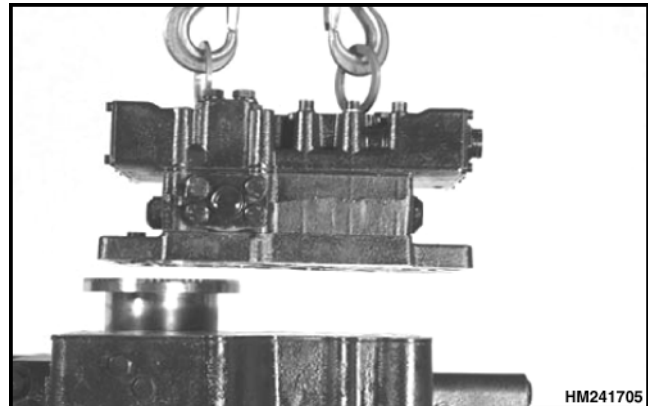


**STEP 37.**

Install a special tool with the dimensions shown onto the FWD/3rd shaft assembly. Use two bolts to attach the special tool to the transmission housing to prevent the gear from dropping when the transmission is turned. Turn the transmission.

**STEP 38.**

Use a chain hoist to lift the transmission control valve assembly from the transmission.



**STEP 39.**

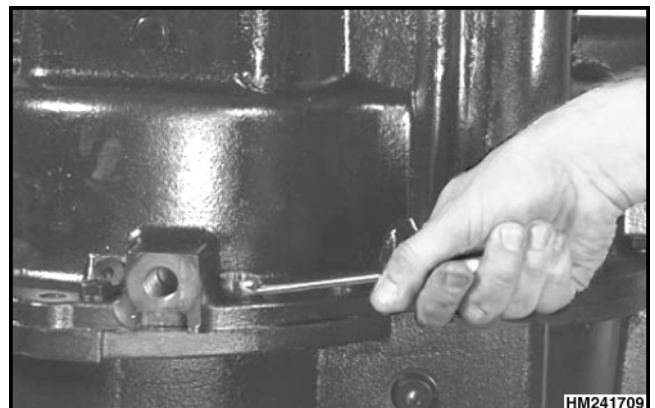
Remove the adapter plate and upper and lower gas-kets.

**STEP 40.**

Remove the rear output flange, lock nut, O-ring, and washer.

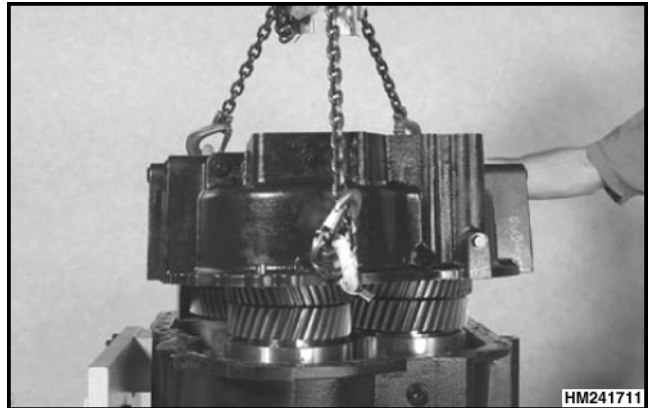
**STEP 41.**

Remove bolts and lockwashers from the rear cover.

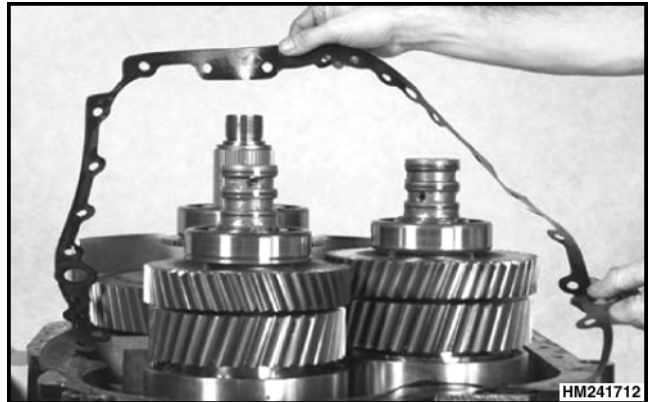


**STEP 42.**

Use external snap ring pliers to open the snap ring on the 2ND/REV shaft and use a hoist to remove the rear cover while holding the snap ring open.

**STEP 43.**

Remove the rear cover gasket.

**STEP 44.**

Remove the clutch shaft sealing rings from the FWD/3RD shaft.

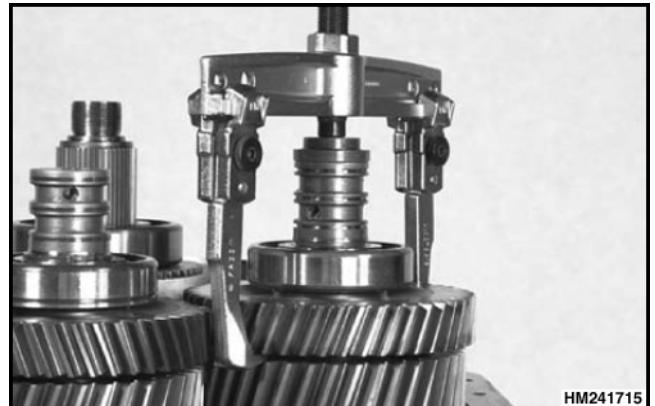


**STEP 45.**

Remove the bearing retaining snap ring.

**STEP 46.**

Use a bearing puller to remove the bearing, gear, and spacer from the FWD/3RD shaft.

**STEP 47.**

Remove the clutch shaft sealing rings from the 2ND/REV shaft.

