

Clutch: Symptom Related Diagnostic Procedures

Symptom Chart - Clutch and Transmission Operation

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Condition	Possible Sources	Action
<ul style="list-style-type: none"> Clutch slippage 	<ul style="list-style-type: none"> Clutch pedal binding. Clutch pressure plate diaphragm spring weakened/damaged. Clutch pressure plate worn/damaged. Clutch disc facing worn excessively/damaged. Clutch disc facing surface hardened or oil coated. Clutch release hub and bearing binding. Flywheel glazed/damaged. 	<ul style="list-style-type: none"> CARRY OUT the Clutch Slippage Inspection and Verification procedure
<ul style="list-style-type: none"> Clutch chatter or shudder 	<ul style="list-style-type: none"> Engine/transmission mount loose/damaged. Bolts retaining clutch pressure plate to flywheel loose. Clutch pressure plate worn/damaged. Clutch disc facing oil coated. Clutch disc facing hardened/damaged. Clutch disc runout excessive. Flywheel surface glazed/damaged. Flywheel runout excessive. Transmission input shaft eccentric/not perpendicular. 	<ul style="list-style-type: none"> CARRY OUT the Clutch Chatter or Shudder Inspection and Verification procedure

Symptom Chart - Clutch and Transmission Operation (Part 1)

Symptom Chart — Clutch and Transmission Operation (Continued)

Condition	Possible Sources	Action
<ul style="list-style-type: none"> Clutch drag 	<ul style="list-style-type: none"> Insufficient clutch hydraulic system fluid. Clutch hydraulic system fluid leakage. Air in clutch hydraulic system. Clutch pressure plate worn/damaged. Clutch disc damaged. Clutch disc splines rusted/worn. Clutch disc runout excessive. 	<ul style="list-style-type: none"> CARRY OUT the Clutch Drag Inspection and Verification procedure
<ul style="list-style-type: none"> Clutch pedal pulsation 	<ul style="list-style-type: none"> Clutch pressure plate worn/damaged. Clutch disc damaged. Clutch disc runout excessive. Flywheel runout excessive. 	<ul style="list-style-type: none"> REMOVE the clutch disc and pressure plate. INSPECT the clutch disc and pressure plate for wear and damage, and CHECK the clutch disc runout. CHECK the flywheel runout. REPAIR all components as necessary. TEST the system for normal operation.
<ul style="list-style-type: none"> Clutch related vibrations 	<ul style="list-style-type: none"> Engine component grounding against frame. Accessory drive belt loose/damaged. Clutch release bearing worn/damaged. Bolts retaining clutch pressure plate to flywheel loose. Bolts retaining flywheel to engine loose. Flywheel runout excessive. Clutch pressure plate imbalance. 	<ul style="list-style-type: none"> CARRY OUT the Clutch Chatter or Shudder Inspection and Verification procedure
<ul style="list-style-type: none"> Hard shifting 	<ul style="list-style-type: none"> Insufficient clutch hydraulic system fluid. Clutch hydraulic system fluid leakage. Air in clutch hydraulic system. Clutch not releasing. Transmission concern. 	<ul style="list-style-type: none"> CARRY OUT the Hard Shifting Inspection and Verification procedure

Symptom Chart - Clutch and Transmission Operation (Part 2)

Symptom Chart — Clutch and Transmission Operation (Continued)

Condition	Possible Sources	Action
<ul style="list-style-type: none">Excessive noise	<ul style="list-style-type: none">Clutch disc damper damaged.Transmission input shaft pilot bearing worn/damaged.Crankshaft end play excessive.Release bearing worn/damaged.	<ul style="list-style-type: none">REMOVE the clutch disc and pressure plate. INSPECT the clutch disc for damage. INSPECT the transmission input shaft pilot bearing for wear and damage. REFER to Pilot Bearing CheckCHECK the crankshaft end play. Refer to Engine for the procedure. CHECK the clutch release hub and bearing, and guide tube for wear and damage. REPAIR all components as necessary. TEST the system for normal operation.

Symptom Chart - Clutch and Transmission Operation (Part 3)

Symptom Chart — Clutch and Transmission Operation (Continued)

Condition	Possible Sources	Action
<ul style="list-style-type: none"> Transmission jumps out of gear 	<ul style="list-style-type: none"> Gearshift lever boot installed incorrectly. Bolts retaining transmission to engine loose. Transmission input shaft pilot bearing. Axial clearance incorrect. Internal components damaged. Gear teeth worn/damaged. 	<ul style="list-style-type: none"> CHECK gearshift lever boot installation. TIGHTEN the bolts to specification. INSTALL a new transmission input shaft pilot bearing. CHECK axial clearance. INSPECT the synchronizer sleeves for free movement on their hubs. INSPECT the synchronizer blocking rings for widened index slots, rounded clutch teeth and smooth internal surface. CHECK the countershaft cluster gear for excessive end play. INSPECT the shift forks for wear. CHECK for loose shift forks on the shift rails. INSPECT the synchronizer sliding sleeve and the gear clutch teeth for wear and damage. REPAIR as necessary. INSPECT and REPAIR as necessary.
<ul style="list-style-type: none"> Transmission will not shift into one gear — all others OK 	<ul style="list-style-type: none"> Internal components. 	<ul style="list-style-type: none"> For the gear in question, INSPECT the shift rail and fork, the synchronizer and the gear clutch teeth for restricted travel. REPAIR as necessary.
<ul style="list-style-type: none"> Transmission is locked in one gear and will not shift out of that gear 	<ul style="list-style-type: none"> Internal components. 	<ul style="list-style-type: none"> INSPECT the gears, the shift rails, and the forks and the synchronizer for wear and damage. REPAIR as necessary.

Symptom Chart - Clutch and Transmission Operation (Part 5)

Symptom Chart — Clutch and Transmission Operation (Continued)

Condition	Possible Sources	Action
<ul style="list-style-type: none"> • Fluid leaks 	<ul style="list-style-type: none"> • Engine, power steering, transmission, clutch. • Input shaft bearing retainer seal. • Shift rail detent plug. • Top cover gasket. • Power take-off (PTO) cover. • Sand holes/cracks in case. • Fill and drain plugs. 	<ul style="list-style-type: none"> • REMOVE all traces of lubricant on the exposed transmission surfaces. VERIFY that the transmission vent is clear of foreign material. OPERATE the transmission. INSPECT for new leakage. REFER to the appropriate repair procedures. • INSPECT and REPAIR as necessary. • INSPECT and REPAIR as necessary. • INSPECT and REPAIR as necessary. • INSPECT and REPAIR as necessary. INSTALL a new gasket. TIGHTEN to specification. • INSPECT and INSTALL a new case as necessary. • INSPECT the plug, the O-ring and the threads in the case. REPAIR as necessary. TIGHTEN the plug to specification.
<ul style="list-style-type: none"> • Noise occurs during transfer case operation 	<ul style="list-style-type: none"> • 4x4 system. 	<ul style="list-style-type: none"> • REFER to Manual Transmission for diagnosis and testing procedures.
<ul style="list-style-type: none"> • Transfer case jumps out of gear 	<ul style="list-style-type: none"> • 4x4 system. 	<ul style="list-style-type: none"> • REFER to Manual Transmission for diagnosis and testing procedures.

Symptom Chart - Clutch and Transmission Operation (Part 6)