Component Procedures: Clutch

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Component Procedures: Clutch

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Pressure Plate	24255748	Pressure Plate	725.79	Includes: Clutch Disc.

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Aisin Ay6	B	6.3	4.4
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Aisin Ay6 >?		0.2	
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Aisin Ay6 >?		0.2	0.2
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Tremec	B	4.9	3.3
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Tremec > NO?		0.2	
Remove & Replace	Clutch & Flywheel > Clutch, R&R > Tremec > NO?		0.2	0.2
Remove & Replace	Clutch & Flywheel > Release Bearing, R&R > Ai?	B	6.1	0.0
Remove & Replace	Clutch & Flywheel > Release Bearing, R&R > Tr?	B	4.7	0.0
Remove & Replace	Hydraulic System > Master Cylinder, R&R	B	3.3	0.0
Remove & Replace	Hydraulic System > Slave Cylinder, R&R > See ?			0.0
Bleed	Hydraulic System > System, Bleed	B	0.4	0.0

Specifications Quick Reference (itype_439)

Quick Specifications
- item

Clutch System (Article 14015)

Figure 1: Clutch System Components
The following components are the main parts of the clutch system:
- The driving members – attached to the engine and turning with the engine
- The driven member – attached to the driveline and transmission and turning with the driveline and transmission
- The operating members – including the spring, the clutch hydraulic system , and the clutch pedal linkages, required to apply and release the pressure, which holds the driving and driven members in contact with each other

Clutch Driving Members

The clutch driving members consist of 2 flat surfaced iron plates, machined to a smooth finish. 1 of these surfaces is the rear face of the engine flywheel and the other is a comparatively heavy flat ring, with 1 side machined, known as the clutch pressure plate .

Clutch Driven Members

The driven member, clutch disc , has a splined hub that freely slides lengthwise along the splines of the input shaft, which also drives the shaft through these same splines. Suitable friction facings are attached to each side of the plate by rivets.

In order to make the clutch engagement as smooth as possible and eliminate chatter, the steel segments driving the splined hub are slightly waved, which causes the contact pressure on the facings to rise gradually as the waved springs flatten out.

Clutch Operating Members

The driving member and the driven member are held in contact by spring pressure. This pressure is exerted by a 1-piece conical or diaphragm spring.

A diaphragm spring is a conical piece of spring steel that has been specially stamped to give it greater flexibility. The diaphragm is positioned between the cover and the pressure plate so that the diaphragm spring is nearly flat when the clutch is in the engaged position. The action of this type of spring is similar to that of an ordinary oil can.

The pressure of the inner rim of the spring on the pressure plate decreases as the flat position is passed. The inner rim of the diaphragm bears on the pressure plate and is pivoted on a ring on the outer edge of the pressure plate. The application of a pulling load on the inner section of the pressure plate will cause the inner rim to move away from the flywheel and allow the pressure plate to move away from the clutch disc, thereby releasing or disengaging the clutch. When the pressure is released from the inner section, the OIL CAN

action of the diaphragm causes the inner section to move in, and the movement of the inner rim forces the pressure plate against the clutch disc, thus engaging the clutch.
The clutch release bearing is moved by the actuator assembly to move the release levers which move the pressure plate to the rear, thus separating the clutch disc from the flywheel when the clutch pedal is depressed by the driver. As the clutch disc wears, the diaphragm spring fingers move forward forcing the release bearing to move. This movement forces the actuator cylinder piston to move forward in its bore, consuming hydraulic fluid from the master cylinder reservoir, thereby providing the SELF-ADJUSTING feature of the hydraulic clutch linkage system.

Hydraulic Clutch Description

The clutch hydraulic system consists of a master cylinder and an actuator cylinder. When pressure is applied to the clutch pedal, pedal depressed, the pushrod contacts the plunger and pushes it down the bore of the master cylinder. In the first 0.8 mm (0.031 in) of movement, the compensation port seal closes the port to the fluid reservoir tank, and as the plunger continues to move down the bore of the cylinder, the fluid is forced through the outlet line to the actuator cylinder mounted to the driveline support assembly. As fluid is pushed down the pipe from the master cylinder, this in turn forces the piston in the actuator cylinder outward. As the actuator cylinder piston moves forward, it forces the release bearing to disengage the clutch pressure plate from the clutch disc. On the return stroke, pedal released, the plunger moves back as a result of the return pressure of the clutch. Fluid returns to the master cylinder and the final movement of the plunger opens the port to the fluid reservoir, allowing an unrestricted flow of fluid between system and reservoir.
Some systems may have a clutch pedal over-center spring. The clutch pedal over-center spring provides load at the top of stroke and reduces clutch effort at the bottom of stroke. This reduces driver fatigue during stop and go traffic.

Clutch - Fastener Tightening Specifications (Article 14043)

Application Specification
Metric English
Clutch Actuator Cylinder Bolt – Tremec 13 Nm 115 lb in
Clutch Actuator Cylinder Pipe Fitting – Tremec 10 Nm 88 lb in
Clutch Pedal Assembly to Brake Pedal Assembly Nuts 20 Nm 15 lb ft
Clutch Pedal Assembly to Cowl Nut 9 Nm 80 lb in
Clutch Pedal Assembly Bolt 20 Nm 15 lb ft
Clutch Pedal Position Switch Bolt 2.5 Nm 22 lb in
Clutch Pressure Plate Bolt – V6 Engine[1]
First Pass 15 Nm 11 lb ft
- First Pass
Second Pass 30 Nm 22 lb ft
- Second Pass
Third Pass (1, 2, 3) 30 Nm plus 20 degrees 22 lb ft plus 20 degrees
- Third Pass (1, 2, 3)
Final Pass (4, 5, 6) 30 Nm plus 20 degrees 22 lb ft plus 20 degrees
- Final Pass (4, 5, 6)
Clutch Pressure Plate Bolt – V8 Engine[1]
Second Pass 35 Nm 26 lb ft
Final Pass 70 Nm 52 lb ft
- Final Pass
Concentric Actuator Cylinder Bolt – Aisin 20 Nm 15 lb ft
Concentric Actuator Cylinder Quick Connector Bolt – Aisin 10 Nm 89 lb in
[1]Clutch pressure plate bolts must be tightened in sequence and in even increments over the specified passes. Reference the repair procedure for specified instruction and thread locker specifications.

All Technical Service Bulletins (itype_100)

Tsbs
- Intermittent Clutch Pedal Low or Pedal Does Not Fully Return After Being Depressed (PI0486C, 2016/05/06)

Symptoms - Clutch (Article 14026)

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to Clutch System Description and Operation .

Visual/Physical Inspection

- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Visually inspect the clutch master cylinder reservoir for the correct fluid level. Do not open.
- Inspect the hydraulic clutch line s for dents, kinks or other obvious damage that may affect the clutch system operations.
- Inspect the hydraulic lines for proper installation.
- Inspect the clutch system for contamination of dirt, oil, or other substances that may affect the clutch system operations.
- Inspect for aftermarket parts.
- Inspect the clutch pedal for binding, over-center spring in use or operation.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:
- Clutch Drag Hard Shifting
- Clutch Slipping
- Clutch Grabbing
- Clutch Rattle
- Clutch Noisy
- Clutch Pedal Spongy, Low Pedal Effort, Hesitates on Return
- Clutch Pedal Hard to Push
- Clutch Frequent Adjustments
- Clutch Vibration
- Clutch - No Load

Clutch Drag Hard Shifting (Article 14017)

Cause Action

DEFINITION: The clutch does not disengage completely to allow smooth shift operations. It may cause gear clashing while the vehicle is not moving, at idle, and shifting out of neutral, or hard shifting in and out of gears while driving the vehicle. Review the Symptoms - Clutch and perform the necessary inspections.

Pedal blocked from full travel Inspect for obstacles that will prevent the pedal from going to the floor. Clear any obstacles from under the pedal area, such as floor mats or interior panels.
- Inspect for obstacles that will prevent the pedal from going to the floor.
- Clear any obstacles from under the pedal area, such as floor mats or interior panels.

Too much travel between pedal and clutch master cylinder Inspect the pedal for worn bushings. Replace the pedal bushings if worn. Refer to Clutch Pedal Replacement .
- Inspect the pedal for worn bushings.
- Replace the pedal bushings if worn. Refer to Clutch Pedal Replacement .

Clutch pedal mounting loose Inspect the clutch pedal mounting bracket for loose or missing fasteners. Replace or repair the fasteners. Refer to Clutch Pedal Replacement .
- Inspect the clutch pedal mounting bracket for loose or missing fasteners.
- Replace or repair the fasteners. Refer to Clutch Pedal Replacement .

Linkage at pedal worn or damaged Inspect the linkage at the pedal for excessive wear. Repair or replace the linkage as required. Refer to Clutch Pedal Replacement .
- Inspect the linkage at the pedal for excessive wear.
- Repair or replace the linkage as required. Refer to Clutch Pedal Replacement .

Clutch master cylinder seized or binding Inspect the master cylinder for the piston being able to move freely and full range of travel. Repair or replace the clutch master cylinder as required. Refer to Clutch Master Cylinder Replacement .
- Inspect the master cylinder for the piston being able to move freely and full range of travel.
- Repair or replace the clutch master cylinder as required. Refer to Clutch Master Cylinder Replacement .

Air in the clutch hydraulic system Bleed the clutch hydraulic system. Refer to Hydraulic Clutch System Bleeding .

Clutch actuator cylinder seized or binding Inspect the clutch actuator piston for moving freely. Replace the clutch actuator cylinder if the piston is binding. Refer to Clutch Concentric Actuator Cylinder Replacement .
- Inspect the clutch actuator piston for moving freely.
- Replace the clutch actuator cylinder if the piston is binding. Refer to Clutch Concentric Actuator Cylinder Replacement .

Clutch master cylinder leaking internally Inspect for proper pedal reserve. Let up halfway on pedal. Apply the

pedal a few times. Inspect to ensure there is still the proper pedal reserve. Replace the clutch master cylinder if it will not hold pedal reserve. Refer to Clutch Master Cylinder Replacement .
- Inspect for proper pedal reserve.
- Let up halfway on pedal.
- Apply the pedal a few times.
- Inspect to ensure there is still the proper pedal reserve.
- Replace the clutch master cylinder if it will not hold pedal reserve. Refer to Clutch Master Cylinder Replacement .

Damaged clutch assembly components Remove the clutch assembly. Inspect the following clutch assembly components for damage: Damaged clutch disc hub splines Bent clutch disc Bent drive straps Broken or warped pressure plate Replace the clutch assembly if any of the above damage is found. Refer to Clutch Assembly Replacement .
- Remove the clutch assembly.
- Inspect the following clutch assembly components for damage:
- Damaged clutch disc hub splines
- Bent clutch disc
- Bent drive straps
- Broken or warped pressure plate
- Replace the clutch assembly if any of the above damage is found. Refer to Clutch Assembly Replacement .

Excessive side loading on the release bearing Inspect the following clutch system components: Worn or damaged pilot bearing Excessive flywheel runout Excessive engine to transmission misalignment Repair or replace any faulty components.
- Inspect the following clutch system components:
- Worn or damaged pilot bearing
- Excessive flywheel runout
- Excessive engine to transmission misalignment
- Repair or replace any faulty components.

Faulty pilot bearing Replace the pilot bearing. Refer to Clutch Pilot Bearing Replacement .

Transmission input shaft splines worn or damaged Replace the transmission input shaft. Refer to Transmission Disassemble .

Tight or contaminated clutch disc splines Clean the clutch disc and input shaft splines. If the clutch disc will not clean, replace the clutch assembly. Refer to Clutch Assembly Replacement .
- Clean the clutch disc and input shaft splines.
- If the clutch disc will not clean, replace the clutch assembly. Refer to Clutch Assembly Replacement .

Flywheel housing, engine block to clutch housing, or transmission front case excessively misaligned Inspect the clutch housing or the transmission front case for being faulty. Replace the clutch housing if it is faulty. Refer to Transmission Replacement . Replace the transmission front case half. Refer to Transmission Disassemble .
- Inspect the clutch housing or the transmission front case for being faulty.
- Replace the clutch housing if it is faulty. Refer to Transmission Replacement .
- Replace the transmission front case half. Refer to Transmission Disassemble .

Grease or oil contamination on the clutch discs facing Repair the oil leak. Repair the grease leak. Clean the clutch disc facing and the other clutch assembly components. Replace the clutch assembly if it will not clean. Refer to Clutch Assembly Replacement .
- Repair the oil leak.
- Repair the grease leak.
- Clean the clutch disc facing and the other clutch assembly components.
- Replace the clutch assembly if it will not clean. Refer to Clutch Assembly Replacement .

Clutch Slipping (Article 14024)

Cause Action

DEFINITION: The clutch does not engage completely after the pedal is released, after shifting gears, or the clutch slips during maximum engine loads, such as climbing hills or high vehicle speeds. Clutch slipping is identified by increase in engine RPM without increase in vehicle speed. Review the Symptoms - Clutch and perform the necessary inspections.

Incorrect clutch pedal height, not allowing the clutch master cylinder to return Adjust the clutch pedal position switch . Refer to Clutch Pedal Position Sensor Replacement .

The clutch pedal return spring is broken or missing Replace the clutch pedal return spring, if equipped. Refer to Clutch Pedal Replacement .

The clutch pedal is binding or sticking Clear away any items that may be contacting the pedal. Inspect the

pedal bushings for ease of movement. Replace the clutch pedal if it is faulty. Refer to Clutch Pedal Replacement .
- Clear away any items that may be contacting the pedal.
- Inspect the pedal bushings for ease of movement.
- Replace the clutch pedal if it is faulty. Refer to Clutch Pedal Replacement .
Clutch master cylinder binding or seized Replace the clutch master cylinder. Refer to Clutch Master Cylinder Replacement .
Clutch actuator cylinder binding or seized Replace the clutch actuator cylinder. Refer to Clutch Concentric Actuator Cylinder Replacement .
Kinked or damaged clutch hydraulic hose Inspect for the correct routing of the clutch hydraulic hose. Route the hose properly. Inspect for loose or faulty engine mounts that may allow the hydraulic hose to be kinked or pinched. Repair or replace faulty engine mounts. Refer to Engine Mount Replacement - Left Side and Engine Mount Replacement - Right Side . Repair or replace the clutch hydraulic hose if it is damaged. Refer to Hydraulic Clutch Hose/Pipe Replacement .
- Inspect for the correct routing of the clutch hydraulic hose.
- Route the hose properly.
- Inspect for loose or faulty engine mounts that may allow the hydraulic hose to be kinked or pinched.
- Repair or replace faulty engine mounts. Refer to Engine Mount Replacement - Left Side and Engine Mount Replacement - Right Side .
- Repair or replace the clutch hydraulic hose if it is damaged. Refer to Hydraulic Clutch Hose/Pipe Replacement .
Grease or oil contamination of the clutch disc Repair the source of the oil leak. Repair the source of the grease leak. Clean the contamination from the clutch components. If contaminates cannot be removed, replace the clutch assembly. Refer to Clutch Assembly Replacement .
- Repair the source of the oil leak.
- Repair the source of the grease leak.
- Clean the contamination from the clutch components.
- If contaminates cannot be removed, replace the clutch assembly. Refer to Clutch Assembly Replacement .
Worn or damaged flywheel Replace the engine flywheel. Refer to Flywheel Replacement .
Worn clutch disc facing Replace the clutch assembly. Refer to Clutch Assembly Replacement .
Burnt or glazed clutch discs Replace the clutch assembly. Refer to Clutch Assembly Replacement .
Input shaft splines worn Replace the input shaft. Refer to Transmission Disassemble .
Improper resurfacing of the flywheel Replace the flywheel if it has been improperly resurfaced, allowing contact of the clutch disc hub or insufficient clamping load of the pressure plate . Refer to Flywheel Replacement .

Clutch Grabbing (Article 14019)

Cause Action
DEFINITION: The clutch grabs, or chatters, or the clutch is unable to release without the vehicle jerking. An abrupt engagement of the clutch. Review the Symptoms - Clutch and perform the necessary inspections.
Grease or oil contamination on the clutch facings Repair the cause of the oil leak or grease contamination. Clean the clutch facings. Replace the clutch components if they will not clean. Refer to Clutch Assembly Replacement .
- Repair the cause of the oil leak or grease contamination.
- Clean the clutch facings.
- Replace the clutch components if they will not clean. Refer to Clutch Assembly Replacement .
Loose or faulty engine mounts Inspect the engine mounts for being loose or faulty. Repair or replace the engine mounts as required. Refer to Engine Mount Replacement - Left Side and Engine Mount Replacement - Right Side .
- Inspect the engine mounts for being loose or faulty.
- Repair or replace the engine mounts as required. Refer to Engine Mount Replacement - Left Side and Engine Mount Replacement - Right Side .
Clutch pedal sticking Inspect the clutch pedal for correct operation. Replace the clutch pedal if it is faulty. Refer to Clutch Pedal Replacement .
- Inspect the clutch pedal for correct operation.
- Replace the clutch pedal if it is faulty. Refer to Clutch Pedal Replacement .
Clutch actuator binding Inspect the clutch actuator for the piston seals binding or sticking on the hub . Replace the clutch actuator if it is binding. Refer to Clutch Concentric Actuator Cylinder Replacement .
- Inspect the clutch actuator for the piston seals binding or sticking on the hub .
- Replace the clutch actuator if it is binding. Refer to Clutch Concentric Actuator Cylinder Replacement .

Clutch master cylinder binding Inspect the clutch master cylinder for the piston binding or sticking in the cylinder. Replace the master cylinder if it is faulty. Refer to Clutch Master Cylinder Replacement .
- Inspect the clutch master cylinder for the piston binding or sticking in the cylinder.
- Replace the master cylinder if it is faulty. Refer to Clutch Master Cylinder Replacement .
Warped Clutch Cover Inspect the clutch cover for distortion caused by improperly tightening the clutch cover bolts. Replace the clutch cover if it is distorted. Refer to Clutch Assembly Replacement .
- Inspect the clutch cover for distortion caused by improperly tightening the clutch cover bolts.
- Replace the clutch cover if it is distorted. Refer to Clutch Assembly Replacement .
Improper clutch installation Inspect the pressure plate for distortion caused by improperly tightening the pressure plate bolts. Inspect the clutch disc for a bent hub caused by forcing the installation of the transmission. Inspect for the correct clutch disc. Inspect the clutch disc for being installed backwards. Replace the clutch assembly if it is damaged or the wrong components were installed. Refer to Clutch Assembly Replacement .
- Inspect the pressure plate for distortion caused by improperly tightening the pressure plate bolts.
- Inspect the clutch disc for a bent hub caused by forcing the installation of the transmission.
- Inspect for the correct clutch disc.
- Inspect the clutch disc for being installed backwards.
- Replace the clutch assembly if it is damaged or the wrong components were installed. Refer to Clutch Assembly Replacement .
Clutch disc binding on the input shaft Inspect the input shaft for rust dirt or debris. Clean and lubricate the input shaft. Inspect the clutch disc for a bent hub. Replace the clutch assembly if the clutch disc is faulty. Refer to Clutch Assembly Replacement . Inspect the input shaft for excessive wear on the splines, causing the clutch disc to bind. Replace the transmission input shaft if it is worn. Refer to Transmission Disassemble .
- Inspect the input shaft for rust dirt or debris.
- Clean and lubricate the input shaft.
- Inspect the clutch disc for a bent hub.
- Replace the clutch assembly if the clutch disc is faulty. Refer to Clutch Assembly Replacement .
- Inspect the input shaft for excessive wear on the splines, causing the clutch disc to bind.
- Replace the transmission input shaft if it is worn. Refer to Transmission Disassemble .
Clutch pressure plate damaged Inspect the pressure plate for bent drive straps caused by improper vehicle use. Replace the clutch assembly if the clutch pressure plate is damaged. Inform the customer. Refer to Clutch Assembly Replacement .
- Inspect the pressure plate for bent drive straps caused by improper vehicle use.
- Replace the clutch assembly if the clutch pressure plate is damaged. Inform the customer. Refer to Clutch Assembly Replacement .
Flywheel improperly machined Inspect the flywheel for being machined, and causing interference with the clutch disc. Replace the flywheel if it has been machined. Refer to Flywheel Replacement .
- Inspect the flywheel for being machined, and causing interference with the clutch disc.
- Replace the flywheel if it has been machined. Refer to Flywheel Replacement .
Flywheel uneven Inspect the flywheel surface for being warped or uneven. Replace the flywheel if it is faulty. Refer to Flywheel Replacement .
- Inspect the flywheel surface for being warped or uneven.
- Replace the flywheel if it is faulty. Refer to Flywheel Replacement .

Clutch Rattle (Article 14023)

Cause Action
DEFINITION: A rattle noise coming from the clutch components with the clutch disengaged or engaged. Review the Symptoms - Clutch and perform the necessary inspections.
Idle rattle clutch engaged Replace the clutch disc , due to faulty damper springs. Refer to Clutch Assembly Replacement .
Clutch is improperly installed Remove the clutch and install it correctly. Refer to Clutch Assembly Replacement .
Clutch disc damper worn or damaged Inspect the clutch disc for a broken or worn damper. Replace the clutch assembly. Refer to Clutch Assembly Replacement .
- Inspect the clutch disc for a broken or worn damper.
- Replace the clutch assembly. Refer to Clutch Assembly Replacement .
Clutch disc splines and input shaft splines worn Inspect the clutch disc hub to input shaft splines for excessive clearance. Replace the clutch assembly if the clutch splines are worn. Refer to Clutch Assembly Replacement . Replace the input shaft. Refer to Transmission Disassemble .

- Inspect the clutch disc hub to input shaft splines for excessive clearance.
- Replace the clutch assembly if the clutch splines are worn. Refer to Clutch Assembly Replacement .
- Replace the input shaft. Refer to Transmission Disassemble .

Clutch Noisy (Article 14020)

Cause Action
DEFINITION: A growl or whine noise is coming from the clutch when engaged or disengaged. Review the Symptoms - Clutch and perform the necessary inspections.
Pilot bearing is worn or damaged Replace the pilot bearing. Refer to Clutch Pilot Bearing Replacement .
Release bearing damaged or worn Replace the release bearing. Refer to Clutch Concentric Actuator Cylinder Replacement .

Clutch Pedal Spongy, Low Pedal Effort, Hesitates on Return (Article 14022)

Cause Action
DEFINITION: The clutch pedal may feel spongy, or it requires very little effort to operate. The clutch pedal may temporarily hang up at the bottom of travel. Review Symptoms - Clutch and perform the necessary inspections. Warning: For vehicles equipped with push button start in which a clutch malfunction is suspected, always sit in the driver's seat and firmly apply the brake before starting the vehicle. Do not press the "start" button for any reason from outside the vehicle. A vehicle with a malfunctioning clutch could immediately move when started, which could cause personal injury or property damage.
Air in the hydraulic system Bleed the clutch hydraulic system . Refer to Hydraulic Clutch System Bleeding .
Contaminated hydraulic fluid Inspect the clutch hydraulic fluid for contamination of water. Inspect the reservoir cap for being faulty if water is present. Inspect the clutch hydraulic fluid for dirt or debris. Flush and bleed the clutch hydraulic system if the above conditions are found. Refer to Hydraulic Clutch System Bleeding .
- Inspect the clutch hydraulic fluid for contamination of water.
- Inspect the reservoir cap for being faulty if water is present.
- Inspect the clutch hydraulic fluid for dirt or debris.
- Flush and bleed the clutch hydraulic system if the above conditions are found. Refer to Hydraulic Clutch System Bleeding .

Master cylinder fluid level low Inspect for leakage in the clutch master cylinder , hose connections, and the clutch actuator. Repair or replace any faulty components.
- Inspect for leakage in the clutch master cylinder , hose connections, and the clutch actuator.
- Repair or replace any faulty components.

Incomplete pedal return Inspect the pedal for full return. Clear any obstacles that may interfere with the pedal operation. Replace the clutch pedal return spring, if equipped. Refer to Clutch Pedal Replacement . Adjust the clutch pedal position switch . Refer to Clutch Pedal Position Sensor Replacement .
- Inspect the pedal for full return.
- Clear any obstacles that may interfere with the pedal operation.
- Replace the clutch pedal return spring, if equipped. Refer to Clutch Pedal Replacement .
- Adjust the clutch pedal position switch . Refer to Clutch Pedal Position Sensor Replacement .

Clutch incorrectly installed Remove the clutch and install it correctly. Refer to Clutch Assembly Replacement .
Clutch mounting bolts loose or broken Remove the broken bolts. Replace the broken or loose bolts, and tighten. Refer to Clutch Assembly Replacement .
- Remove the broken bolts.
- Replace the broken or loose bolts, and tighten. Refer to Clutch Assembly Replacement .

Release bearing worn or damaged Replace the release bearing. Refer to Clutch Concentric Actuator Cylinder Replacement .

Clutch Pedal Hard to Push (Article 14021)

Cause Action
DEFINITION: The clutch pedal requires high effort to operate. Review the Symptoms - Clutch and perform the necessary inspections. Warning: For vehicles equipped with push button start in which a clutch malfunction is suspected, always sit in the driver's seat and firmly apply the brake before starting the vehicle. Do not press the "start" button for any reason from outside the vehicle. A vehicle with a malfunctioning clutch could immediately move when started, which could cause personal injury or property damage.
Incorrect hydraulic fluid Inspect for the correct fluid in the master cylinder. Refer to Adhesives, Fluids, Lubricants, and Sealers . Flush the hydraulic system and fill with the correct fluid.

- Inspect for the correct fluid in the master cylinder. Refer to Adhesives, Fluids, Lubricants, and Sealers .
- Flush the hydraulic system and fill with the correct fluid.
Contaminated hydraulic fluid Inspect the hydraulic fluid for water. Inspect the hydraulic fluid for dirt or debris. Flush the hydraulic system and fill with the correct fluid. Refer to Adhesives, Fluids, Lubricants, and Sealers .
- Inspect the hydraulic fluid for water.
- Inspect the hydraulic fluid for dirt or debris.
- Flush the hydraulic system and fill with the correct fluid. Refer to Adhesives, Fluids, Lubricants, and Sealers .
Clutch pedal binding Inspect the pedal for binding. Repair or replace the pedal. Refer to Clutch Pedal Replacement .
- Inspect the pedal for binding.
- Repair or replace the pedal. Refer to Clutch Pedal Replacement .
Clutch pedal spring worn Replace the clutch pedal spring. Refer to Clutch Pedal Replacement .
Kinked or damaged clutch hydraulic pipe Inspect for a kinked or damaged hydraulic hose . Repair or replace the clutch hydraulic hose. Refer to Hydraulic Clutch Hose/Pipe Replacement .
- Inspect for a kinked or damaged hydraulic hose .
- Repair or replace the clutch hydraulic hose. Refer to Hydraulic Clutch Hose/Pipe Replacement .
Clutch disc worn too thin Replace the clutch assembly. Refer to Clutch Assembly Replacement .
Clutch adjusts prematurely Replace the clutch kit. Refer to Clutch Assembly Replacement .

Clutch Frequent Adjustments (Article 14018)

Cause Action
DEFINITION: The self-adjusting clutch is constantly adjusting. Review the Symptoms - Clutch and perform the necessary inspections.
Excessive clutch slippage Refer to Clutch Slipping .
Clutch wearing excessively Review the vehicle application. Review the driver practices.
- Review the vehicle application.
- Review the driver practices.

Clutch Vibration (Article 14025)

Cause Action
DEFINITION: Vibration from the clutch components during disengagement or engagement. Review the Symptoms - Clutch and perform the necessary inspections.
Excessive driveline torsional activity Review the Vibration Analysis - Driveline .
Clutch incorrectly installed Remove the clutch and install it correctly. Refer to Clutch Assembly Replacement .
Pilot bearing worn or damaged Replace the pilot bearing. Refer to Clutch Pilot Bearing Replacement . Inspect the input shaft pilot bearing journal for wear or damage. Replace the input shaft if it is damaged or worn. Refer to Transmission Disassemble .
- Replace the pilot bearing. Refer to Clutch Pilot Bearing Replacement .
- Inspect the input shaft pilot bearing journal for wear or damage.
- Replace the input shaft if it is damaged or worn. Refer to Transmission Disassemble .
Transmission input splines worn or damaged Inspect the clutch disc to input splines for wear or damage. Replace the input shaft if the splines are excessively worn. Refer to Transmission Disassemble .
- Inspect the clutch disc to input splines for wear or damage.
- Replace the input shaft if the splines are excessively worn. Refer to Transmission Disassemble .
Clutch disc facings damaged Replace the clutch assembly. Refer to Clutch Assembly Replacement .
Flywheel housing to clutch housing excessively misaligned Replace the faulty clutch housing or transmission front case. Refer to Transmission Disassemble .
Clutch out of balance Replace the clutch assembly. Refer to Clutch Assembly Replacement .

Clutch - No Load (Article 14016)

Cause Action
DEFINITION: Regardless of ambient temperature and vehicle on/off operational status, the clutch pedal effort is zero/light in both up-stroke and down-stroke and the clutch will not disengage. Review Symptoms - Clutch and perform the necessary inspections. Warning: For vehicles equipped with push button start in which a clutch malfunction is suspected, always sit in the driver’s seat and firmly apply the brake before starting the vehicle. Do not press the “start” button for any reason from outside the vehicle. A vehicle with a

malfunctioning clutch could immediately move when started, which could cause personal injury or property damage.
Internal damage to the clutch master cylinder and the hydraulic system Inspect for fluid leaks. Replace the clutch hydraulic system . Refer to Clutch Master Cylinder Replacement and Hydraulic Clutch Hose/Pipe Replacement . Replace the clutch master cylinder and the clutch actuator cylinder (CSC). Refer to Clutch Master Cylinder Replacement and Clutch Concentric Actuator Cylinder Replacement . Re-bleed the clutch hydraulic system. Refer to Hydraulic Clutch System Bleeding .
- Inspect for fluid leaks.
- Replace the clutch hydraulic system . Refer to Clutch Master Cylinder Replacement and Hydraulic Clutch Hose/Pipe Replacement .
- Replace the clutch master cylinder and the clutch actuator cylinder (CSC). Refer to Clutch Master Cylinder Replacement and Clutch Concentric Actuator Cylinder Replacement .
- Re-bleed the clutch hydraulic system. Refer to Hydraulic Clutch System Bleeding .

Clutch - Special Tools (Article 14040)

Illustration Tool Number / Description
Click for full-size image DT-49267 Dual Clutch Alignment Tool (V8)
Click for full-size image DT-50194 Clutch Disc Alignment Tool (V6)
Click for full-size image J-38836 Bushing Installer and Clutch Arbor
Click for full-size image J-43276 Clutch Pilot Bearing Remover

Low Pedal (itype_151)

Tsbs
- Intermittent Clutch Pedal Low or Pedal Does Not Fully Return After Being Depressed (PI0486C, 2016/05/06)

Out of specification (itype_158)

Tsbs
- Intermittent Clutch Pedal Low or Pedal Does Not Fully Return After Being Depressed (PI0486C, 2016/05/06)

Won't Release (itype_180)

Tsbs
- Intermittent Clutch Pedal Low or Pedal Does Not Fully Return After Being Depressed (PI0486C, 2016/05/06)