Troubleshooting

Pull Type Clutches - Poor Release

Complaint	Possible Causes	Corrective Action
Poor Release	Intermediate plate sticking on drive lugs due to cocked drive pins (AS and EP 1402 only) (see Figures 18 - 19)	Drive pins must be 90° square to the flywheel surface with .006 minimum clearance between drive pins and intermediate plate slots.
	Pressure plate not fully retracting	Check pressure plate return springs to see if bent, stretched, or broken. These springs can be replaced through the inspection opening. Transmission removal is not necessary. Verify that the release bearing travel is 1/2"—9/16". Determine if the lever nose is out of the groove in the release sleeve retainer. If it is, be sure to reinstall.
	Excessive release bearing travel, causing lever to contact pressure plate (in excess of 5/8")	Adjust to 1/2"—9/16" release bearing travel.
	Incorrect pedal height	Set the pedal height so you can obtain: —1/2" to 9/16" release bearing travel —1/8" free travel at the release yoke and —1/2" to 1" clutch brake squeeze Consult the truck service manual or Eaton's Installation Instructions.
	No clutch brake squeeze	1/2"—1" required.
	Damaged bushing in the release bearing sleeve assembly	Replace cover.
	Cover assembly not properly seated into pilot of flywheel	Reseat into flywheel. Use crisscross pattern when tightening mounting bolts.
	The spacer ring & intermediate plate assembly (Solos and SAS 1402 only) was bolted up backwards onto the flywheel (see Figures 34 - 37)	If the clutch cover has already been bolted to the flywheel, it is imperative that it be replaced with a new intermediate plate assembly because permanent damage may have occurred to the drive straps and spacer ring. Also, thoroughly inspect the cover for any damage and replace if damaged.
	The intermediate and/or pressure plate is either cracked or broken (see Figures 13 - 14 and 25)	Replace any damaged parts. This failure is caused by driver abuse or excessive heat as indicated by the following: —Holding vehicle on hill with the clutch —Overload —Starting off in the wrong gear —Wrong cover assembly installed allowing clutch to slip (misapplication) —Intermediate plate hanging up, allowing clutch to slip

Troubleshooting

Poor Release

Complaint	Possible Causes	Corrective Action
Poor Release (Continued)	Release sleeve bushing is contacting the transmission input shaft due to a side loading condition. This condition can be the result of one or more of the following items: —Cross shafts protruding through the release yoke —Finger(s) of release yoke are bent —Clutch cover is not mounted concentric and/ or not properly seated into the flywheel pilot —Misalignment between the transmission bell housing and engine housing —Loose transmission mounting bolts —Improper setup of linkage	—Check for protruding cross shafts. —Install a new release yoke. —When mounting clutch cover to the flywheel, always tighten the mounting bolts to their proper torque using the crisscross pattern. —Refer to Eaton's Installation Instructions on the proper techniques for checking misalignment. —Tighten bolts to proper torque. —Thoroughly examine the linkage to determine if it can be contributing to a side loading condition.
	Driven disc distorted or warped (see Figure 47)	Damage to driven discs can be caused by poor installation methods. Do not force transmission drive gear into disc hubs. This will distort or bend driven disc causing poor release. Also, do not allow transmission to hang unsupported. Replace any distorted or warped discs.
	Disc(s) installed backwards (see Figures 49 & 50) or front and rear discs were switched with each other	Install new discs. Also, investigate the clutch cover for any damage. Replace if damaged.
	Spline worn on main drive gear of transmission. (see Figure 77)	Replace drive gear and check driven disc hubs for excessive wear. If worn, replace disc. Check flywheel housing alignment of engine and transmission. Make sure driven discs slide freely on drive gear splines.
	Flywheel pilot bearing fits either too tight or too loose in the flywheel and/or end of input shaft	Check pilot bearing for proper fit.
	Damaged or dry (rough) pilot bearing (see Figure 76)	Replace with new bearing.
	Failure to use the anti-rattle springs packaged with all 14" AS and EP Super Duty clutches (see Figures 20 - 22)	Always use new anti-rattle springs.
	(3) Anti-rattle springs were installed backwards (see Figures 23 - 24)	Install them so the rounded sections are pointing toward the flywheel/engine.
	Failure to set the positive separator pins during clutch installation	It is important to note that the procedure for setting the positive separator pins (model 1552, Solo & SAS 1402 clutches) can be performed while the transmission is installed. The steps are as follows: 1. Remove the transmission inspection hole cover. 2. Rotate the clutch cover until one of the holes (for setting the pins) is at the 6 o'clock position. 3. Using the appropriate tool, lightly tap the separator pin to verify that it is seated against the flywheel. 4. Repeat steps 2 and 3 for the remaining three separator pins. 5. Reinstall the transmission inspection hole cover For additional information, refer to Eaton's Installation Instructions.

Troubleshooting

Poor Release

Complaint	Possible Causes	Corrective Action
Poor Release (Continued)	Bent/damaged positive separator pin(s) (see Figures 31 - 33)	1. Be sure to use the proper tool when setting the pins. 2. Take great care when handling the intermediate plate.
	The release yoke bridge is contacting the cover assembly at the full release position (clutch pedal to floor) (see Figures 1 - 2)	It is highly recommended that the (6) six items listed next to Figures 1 and 2 be thoroughly investigated before installing a new clutch.
	Damaged or non-functioning clutch brake (see Figures 73 - 74)	Install new clutch brake when installing a new clutch and/or replace existing brake with 2 piece (Kwik-Konnect type).
	Rust preventative, i.e. never seize, grease, etc. on transmission input drive gear (see Figures 43 - 45)	Drive gear should be clean and dry before installing discs.
	Incorrect use of clutch brake when shifting into 1st gear. Sometimes when applying the clutch brake with the vehicle on a grade, the transmission gears can become locked together due to the applied torque, making it difficult to shift into and out of gear.	Let up on the clutch pedal a few inches in order to disengage the clutch brake. Doing so will allow the input shaft to roll-over slightly, eliminating the locking condition of the transmission gears and allow for effortless shifting.
	Facing of driven disc assemblies are coated with oil or grease (see Figures 41, 43 - 44)	Replace the driven disc assemblies. Cleaning of old discs is not recommended.
	Foreign material on the internal workings of the clutch cover (dirt, chaff, salt, etc.)	Remove foreign material. Ensure that the transmission inspection hole cover is reinstalled to minimize future problems.

Troubleshooting

Noisy/Rattling

Complaint	Possible Cause	Corrective Action
Noisy/Rattling	Excessive flywheel runout	Consult Eaton's Installation Instructions.
	Corrosion of disc hubs to transmission input shaft	Clean the mating parts to ensure that the discs slide freely over input shaft.
	Engine idling too fast	Readjust engine to proper idling speed.
	Clutch release bearing is dry or damaged (see Figures 28 - 29)	Lubricate the bearing. If the noise persists, install a new clutch cover (the release bearing will be included with the cover).
	Flywheel pilot bearing is dry or damaged (see Figure 76)	Replace flywheel pilot bearing.
	Bridge of the yoke hitting clutch cover	Refer to the section titled: "Failure - yoke bridge rubbing into clutch cover," Figures 1 - 2.
	Fingers of release yoke hitting clutch cover	Refer to the section titled: "Failure - yoke fingers rubbing into clutch cover," Figures 4 - 5.
	Failure to use the transmission inspection hole cover	Re-install the cover.
	Failure to use anti-rattle springs (AS and EP 1402 Super-Duty only) (see Figures 20 - 22)	Always install the new anti-rattle springs packaged with each 14" Super-Duty clutch.
	Worn sleeve bushing	Investigate for any side loading conditions on the release bearing housing. Determine the cause, being sure to correct before installing the new clutch.
	Linkage system is frozen, improperly lubricated, worn excessively, has missing parts (washers, etc.), or the linkage itself is rattling excessively	Clean, lubricate and reassemble or replace missing/worn parts.
	Idle gear rattle coming from the transmission	—Specify driven disc assemblies which feature Free-Travel design. —Check the engine for the correct idle speed. Consult the OEM engine manual.
	Dampener spring cover of the driven disc assembly interfering with the flywheel (Figures 48 - 52)	Install correct clutch assembly.
	Rivets of the rear disc are interfering with the retainer assembly (see Figures 25 and 57)	Adjust the clutch internally (via the adjusting ring), not externally (via the linkage system).
	Clutch is loose on flywheel (see Figures 8 - 10)	Install a new clutch assembly and eight new mounting bolts.

Troubleshooting

Vibrating Clutch

Complaint	Possible Cause	Corrective Action
Vibrating Clutch	Loose flywheel	Retighten flywheel mounting bolts to the proper specifications.
	Worn universal joints	Replace worn parts.
	Improper phasing of driveshaft	Investigate for correct yoke phasing.
	Driveshaft is not balanced	Balance and straighten driveshaft. Also, ensure that no balance weights have come off the driveshaft.
	Incorrect driveline angles	Shim drivetrain components to equalize u-joint angles.
	Flywheel is not balanced	Balance the flywheel.
	Pilot area of the clutch is not completely seated into flywheel	Ensure that no dirt, burrs, etc. are preventing the cover from completely seating into the flywheel mounting surface.
	Failure to tighten the clutch cover mounting bolts, using a criss cross sequence, can cause an out-of-balance condition. Loose mounting bolts can also induce this condition (Figures 8 - 10)	Consult Eaton Clutch Service Manual.
	Damaged, loose, or worn out engine mounts	Replace any damaged/worn parts. Retighten all loose bolts to proper specifications. Refer to the OEM engine manufacturer's service manual.
	Misfiring of engine	Refer to OEM engine manufacturer's service manual.
	Excessive flywheel runout	Refer to Eaton's Installation Instructions.
	Rivets of the rear disc are interfering with the retainer assembly (see Figures 25 and 57)	Adjust the clutch internally instead of externally.
	Clutch is loose on flywheel (see Figures 8 - 10)	Install a new clutch assembly and eight new mounting bolts.
	Insufficient amount of free travel. When the clutch was initially installed, the linkage was not adjusted to obtain a full 1/8" free travel	After first adjusting the clutch for l/2"-9/16"release bearing travel, adjust the linkage to obtain an 1/8" free travel (distance between the release yoke fingers and the release bearing wear pads) travel.
	Misapplication of clutch, causing premature wear	If a service clutch, determine whether the clutch is properly specified for the vehicle's particular application.
	Starting out in too high a gear may lead to premature clutch wear	Start the vehicle in the proper gear. Refer to item 1 of "Factors That Effect Clutch Performance".
	Worn cross shafts and/or linkage system	Investigate entire linkage system to determine if it is binding or operating sporadically and/or worn excessively.
	Clutch discs wore down to rivets	Install new clutch.
	Riding of clutch pedal, causing premature wear	Refrain from using the clutch pedal as a foot rest.

Troubleshooting

Vibrating Clutch

Complaint	Possible Cause	Corrective Action
	Holding the vehicle on an incline by using the slipping clutch as a brake. Doing this can cause premature wear.	Refrain from using the clutch pedal as a brake.
	Sporadic changes in the amount of free play/free travel due to excessive crankshaft end play	Consult the engine OEM Service Manual.

Too much Free Play on Solo Clutch

Complaint	Possible Cause	Corrective Action
Too much Free Play on Solo Clutch	Failure to install a clutch brake when one is required. This condition will cause the Solo's release bearing to adjust closer than normal to the transmission's bearing retainer cap and will also cause the wear tab to move toward the half worn position.	Reset the wear tab to the new position. Install a 2-piece Eaton Fuller Clutch Brake. Readjust the Solo using the normal adjusting procedures.
	Solo Clutch has over adjusted (release bearing is less than .500" {standard stroke Solo} or .430" {short stroke} from the transmission)	Reset the wear tab to the new position. Readjust the Solo using the normal adjusting procedures.
	Failure to properly set-up the clutch linkage	Reset the linkage to obtain a free travel (at the yoke) range of 1/16" -1/8".
	Nothing is wrong. It is normal for the free play to increase during the Solo's "Breaking in" period.	None is required, but if the additional free play is objectionable, you may readjust the linkage until you have 1/16" -1/8" of free travel at the release yoke.

Clutch Slippage

Complaint	Possible Cause	Corrective Action
Clutch Slippage	No free pedal	Readjust clutch. Refer to adjustment instructions found in Eaton's Installation Instructions.
	Release mechanism binding	Free up mechanism and linkage, check clutch adjustment. Refer to adjustment instructions found in Eaton's Installation Instructions.
	Failure to remove shipping/resetting bolts (Solo HD & MD)	Remove shipping/resetting bolts.
	Grease or oil on facings (see Figures 41, 43 - 44)	Replace driven disc assembly.
	Driver riding clutch pedal	Refrain from riding clutch pedal.
	Overloaded clutch	Verify that the proper clutch has been specified for the vehicle's application.

Troubleshooting

Chattering, Erratic Engagement, Clutch Grabs, truck is difficult to launch

Complaint	Possible Cause	Corrective Action
Chaffering, Erratic Engagement, Clutch Grabs	Input shaft spline wear (see Figure 77)	Replace input shaft.
	Clutch is worn out - the driven disc assembly(s) have worn down to the facing rivets (see Figure 70)	Replace all worn components.
	The linkage system is not operating freely, it is binding and/or worn excessively (see fig. 75)	Replace all worn parts, being sure to lubricate according to the OEM Service Manual.
	Grease/oil on the disc(s) facing material (see Figure 41, 43 - 44)	Replace disc(s).
	Loose engine mounts	Retighten to OEM specs.
	The fingers of the release yoke and/or the wear pads on the release bearing are worn excessively (see Figures 29 and 79)	Replace all worn parts.
	The electronic engine is not programmed properly regarding clutch engagement torque.	Consult with OEM engine manufacturer.

Push - Type Clutches

Poor Release

Complaint	Possible Cause	Corrective Action
Poor Release	Insufficient amount of clutch pedal height may prevent the throw out bearing from traveling far enough to disengage the clutch	Consult the OEM Service Manual and/or Eaton's Installation Instructions.
	Incorrect throw out bearing was installed. A throw out bearing assembly that is too short cannot travel far enough to enable full disengagement of the clutch	Install the correct throw out bearing.
	Excessive free pedal in the cab - the clutch cannot fully disengage	Consult the OEM Service Manual.
	Throw out bearing is hanging up on the quill (stem) of transmission	Consult the OEM Service Manual.
	Missing and/or improper torquing of clutch cover mounting bolts	Consult Eaton's Installation Instructions.
	Incorrect driven assembly installed - it is too thick	Install the correct disc.

Noisy/Rattling

Complaint	Possible Cause	Corrective Action
Noise/Rattling	Throw out bearing is worn/seized	Replace the throw out bearing. If reusing the clutch, ensure that the release levers are not damaged (see Figure 38).
	Incorrect driven disc has been installed	Install correct driven disc assembly.

Troubleshooting

Pedal Operation

CONDITION	POSSIBLE CAUSE	CORRECTION
Binds	1. Clutch linkage not lubricated.	1. Lubricate linkage at specified intervals with correct lubricant.
	2. Damaged clutch linkage.	2. Repair linkage.
	3. Clutch out-of-adjustment.	3. Adjust release bearing clearance and clutch linkage.
	4. Damaged input shaft.	4. Replace input shaft. Make sure correct installation and driver operating procedures are used.
	5. Linkage touches other components.	5. Route or repair linkage as required.
No Free Travel	1. Damaged clutch linkage.	1. Repair linkage.
	2. Clutch and/or linkage out-of-adjustment.	2. Adjust release bearing clearance and clutch linkage.
	3. Clutch not installed correctly.	3. Install clutch correctly.
Scrape	1. Clutch linkage not lubricated.	1. Lubricate linkage at specified intervals with correct lubricant.
	2. Damaged linkage.	2. Repair linkage.
	3. Linkage touches other components.	3. Route or repair linkage as required.
Squeak	1. Clutch linkage not lubricated.	1. Lubricate linkage at specified intervals with correct lubricant.
	2. Damaged linkage.	2. Repair linkage.
	3. Linkage touches other components.	3. Route or repair linkage as required.

Specifications

Pressure Plate Specifications

Description	14-Inch Clutches	15-1/2-Inch Clutches
Pressure Plate Parallelism (New)	0.000-0.005 inch (0.000-0.127 mm)	0.000-0.005 inch (0.000-0.127 mm)
Pressure Plate Flatness (New)	0.000-0.005 inch (0.000-0.127 mm)	0.000-0.005 inch (0.000-0.127 mm)
Maximum Allowable Wear	0.060 inch (1.52 mm)	0.060 inch (1.52 mm)

Center Plate Specifications

Description	14-Inch Clutches	15-1/2-Inch Clutches
Center Plate Parallelism (New)	0.000-0.005 inch (0.00-0.127 mm)	0.000-0.005 inch (0.00-0.127 mm)
Center Plate Flatness (New)	0.000-0.005 inch (0.00-0.127 mm)	0.000-0.005 inch (0.00-0.127 mm)
Center Plate Minimum Thickness	0.728 inch (18.5 mm) Ceramic Linings	0.681 inch (17.3 mm)
	0.610 inch (15.5 mm) Organic Linings	
Center Plate Driving Method	Drive Pin in Flywheel	Tabs on Center Plate Mate in Clutch Cover Slots
Drive Pin-to-Center Plate Clearance	0.006 inch (0.152 mm) MIN.	———
Center Plate Tab-to-Cover Slot Clearance	———	0.006 inch (0.152 mm) MIN.

Clutch Brake Specifications

Description	Specification
Free Play	10°
Spline Diameter	1.75 Inch 2.00 Inch
Torque Limited	15-30 lb-ft (2.1-4.0 kg-m)

Specifications

Clutch Disc Specifications

Description	14 Inch Clutches	15-1/2 Inch Clutches	15-1/2 Inch LTD Clutches
Number of Splines	10	10	10
Spline Diameter	1.75 Inch 2.00 Inch	2.00 Inch	2.00 Inch
Hub Type	Dampened	Dampened	Dampened
Number of Co-Axial Spring Sets	8	8	7
Ceramic Pad Material	Asbestos-Free, Ceramic and Metallic Material	Asbestos-Free, Ceramic and Metallic Material	Asbestos-Free, Ceramic and Metallic Material
Organic Pad Material	Asbestos-Free, Organic Material	Asbestos-Free, Organic Material	----------
Minimum Disc Thickness-Riveted Ceramic	To Top of Rivet	To Top of Rivet	To Top of Rivet
Minimum Disc Thickness-Molded Organic	0.283 inch (7.2 mm)	0.283 inch (7.2 mm)	---------

Torque Specifications

Description	Lb-Ft	N·m
Adjusting Ring Lock Capscrew	25-30	34-40
Strap-to-Cover Capscrew	29-43	40-58
Cover Assembly-to-Flywheel Capscrew - 14 Inch Clutches	25-35	34-47
Cover Assembly-to-Flywheel Capscrew - 15-1/2 Inch Clutches	40-50	54-68

Specifications

Clutch Adjustment Specifications

Description	Specification
Clearance Between Release Bearing and Clutch Brake - Non-Synchronized Transmission	0.500 Inch (12.7 mm) MINIMUM 0.562 Inch (14.2 mm) MAXIMUM 0.531 Inch (13.5 mm) TARGET
Clearance Between Release Bearing and Cover - Synchronized Transmission	0.687 Inch (17.5 mm)
Clearance Between Tips of Release Fork and Pads on Release Bearing	0.125 Inch (3.17 mm) MINIMUM 0.150 Inch (3.81 mm) MAXIMUM 0.125 Inch (3.17 mm) TARGET
Clutch Pedal Free Travel - Varies ❶	1.125 - 2.375 Inch (28.5 - 60.3 mm)
Clutch Brake Contact ❷	0.500-1.00 inch (12.7-25.4mm) from floor

NOTES:

❶ See the specifications of the manufacturer of the vehicle. Free travel specifications vary with the vehicle manufacturer.

❷ A 0.010 inch (0.254 mm) feeler gauge must fit snugly between the release bearing and the clutch brake when the clutch pedal is fully depressed.

Lubricant Specifications

Component	Lubricant	Interval
Release Bearing	High Temperature Multi-Purpose Wheel Bearing Grease (Meritor Specification O-661), Lithium Complex Grease, NLGI Grade #3	Use the interval specified by manufacturer of the vehicle or the fleet, but make sure the release bearing is lubricated once per month.
Cross Shaft Bushings In Clutch Housing	Use the lubricant specified by the manufacturer of the vehicle.	Use the interval specified by manufacturer of the vehicle or the fleet.
Clutch Linkage	Use the lubricant specified by the manufacturer of the vehicle.	Use the interval specified by manufacturer of the vehicle or the fleet.

Specifications

Clutch Inspection Check List

Transmission and Bell Housing	OK	OK
Bell housing is not worn or damaged.		
Unused cross shaft bores in bell housing are plugged.		
Inspection cover is installed.		
Input bearing retainer is not worn or damaged.		
Distance between top of input shaft and top of input bearing retainer is 0.00- 8.72 inches (000.00 221.48 mm).		
Release fork is straight.		
Fork tips are not worn or damaged.		
Cross shaft moves freely.		
Radial or side-to-side movement of the cross shaft is not excessive.		
The cross shaft and bushings (if used) are not worn or damaged.		
Input shaft splines are not worn or damaged.		
Clutch brake contact area (non-synchronized transmission only) on input bearing retainer is not worn or damaged.		
Pressure Plate and Cover Assembly	OK	OK
Cover is not broken.		
Diaphragm spring is not damaged.		
Pressure plate is not cracked.		
Heat marks can be removed with emery cloth. Replace plate if marks cannot be removed.		
Scratches are less than 0.060 inch (1.52 mm) deep.		
Pressure plate flatness is 0.000-0.005 inch (0.000 - 0.127 mm). Measured Flatness_____		
Pressure plate runout is 0.002 inch (0.05 mm) or less. Measured Runout_____		
Clutch Discs	OK	OK
Hub is not damaged.		
Coaxial springs (dampened discs only) do not have any axial movement.		
Oil or grease is not on discs.		
Facings are not damaged or loose.		

Clutch Discs (Cont'd)	OK	OK
Ceramic Facing: Facing wear is even or above the top of the rivet.		
Molded Organic Facing: Facing thickness is 0.283 inch (7.2 mm) or less.		
Center Plate	OK	OK
14 Inch Clutches: Slots in plate are not damaged. If every other slot is damaged, install good slots over drive pins. If all slots are damaged, replace plate.		
15-1/2 Inch Clutches: Tab to slot clearance is at least 0.006 inch (0.152 mm). If not, index to get correct clearance or replace plate. Tabs on plate are not damaged. Thickness: Plates are at or above specified thickness. 14 Inch Clutches with Ceramic Facings: 0.728 Inch (18.5 mm) 14 Inch Clutches with Organic Facings: 0.610 Inch (15.5 mm) 15-1/2 Inch Clutches- All: 0.681 Inch (17.3 mm) Measured Thickness_____		
Center Plate Flatness is 0.005 inch (0.127 mm) or less - new. If flatness is more than 0.005 inch (0.0127 mm), grind a new surface on the plate. With new surface, plate must be at or above minimum thickness. Measured Flatness_____		
Center Plate Runout is 0.005 inch (0.127 mm) or less. If runout is more than 0.005 inch (0.127 mm), grind a new surface on the plate. With new surface, plate must be at or above minimum thickness. Measured Runout_____		
Pilot Bearing	OK	OK
Pilot bearing is not worn or damaged. **Replace pilot bearing every time clutch is removed with a bearing that uses a high temperature rubber seal and grease.**		

Specifications

Clutch Inspection Check List (Cont'd)

Drive Pins (14 Inch Clutches Only)	OK	OK
Drive pins are not worn or damaged.		
Flat sides of pins are at a 90° angle to top of flywheel housing. If not, reinstall or replace pin.		
Center plate to drive pin clearance is at least 0.006 inch (0.152 mm). If not, reinstall or replace pin.		
Flywheel and Flywheel Housing	OK	OK
NOTE: **For flywheel service information, see the procedure of the manufacturer of the vehicle or the engine.**		
Runout of the outer surface of the flywheel is: 14 Inch Clutches: 0.007 Inch (0.177 mm) or less. 15-1/2 Inch Clutches: 0.008 Inch (0.196 mm) or less. Measured Runout_____		
Runout of the bore of the pilot bearing is 0.005 inch (0.127 mm) or less. Measured Runout_____		
Crankshaft end play- See OEM or Vehicle Manufacturer Specifications		
Runout of the outer surface of the flywheel housing is 0.008 inch (0.203 mm) or less. Measured Runout_____		
Runout of the bore of the flywheel Housing is 0.008 inch (0.203 mm) or less. Measured Runout_____		
Release Bearing Clearance	OK	OK
Non-Synchronized Transmissions: 0.50 inch (12.7 mm) - Minimum. Measure between release bearing housing and clutch brake. Snychronized Transmissions: between 0.687 inch (17.44 mm). Measure release bearing housing and clutch cover.		

Release Bearing Clearance (Cont'd)	OK	OK
If not at specified dimension, adjust release bearing clearance. Measured Clearance_____		
Release Fork-to-Release Bearing Clearance	OK	OK
Release fork-to-release bearing clearance is 0.125 inch (3.17 mm). If not at specified dimension, adjust linkage. See the procedure of the manufacturer of the vehicle. Measured Clearance_____		
Clutch Linkage	OK	OK
Pedal Height Specifications: See vehicle manufacturer specifications. To adjust, see the procedure of the manufacturer of the vehicle. Measured Pedal Height _____		
Total Pedal Travel Specifications: See the specifications of the manufacturer of the vehicle. To adjust, see the procedure of the manufacturer of the vehicle. Measured Total Pedal Travel _____		
Clutch Brake Squeeze (Non-Synchronized Transmission): Release bearing housing must touch clutch brake when clutch pedal is typically 1.0 inch (25 mm) from end of pedal travel. For specifications, see the specifications of the manufacturer of the vehicle. To adjust, see the procedure of the manufacturer of the vehicle. Measured Clutch Brake Squeeze _____		
Free travel varies from 1.125 to 2.375 inches (28-60 mm). To adjust, see the procedure and specifications of the manufacturer of the vehicle. Measured Free Travel _____		

Specifications

INSTALLATION AND LUBRICATION INSTRUCTIONS

Spicer Pull-Type Clutches

INSTALLATION INSTRUCTIONS

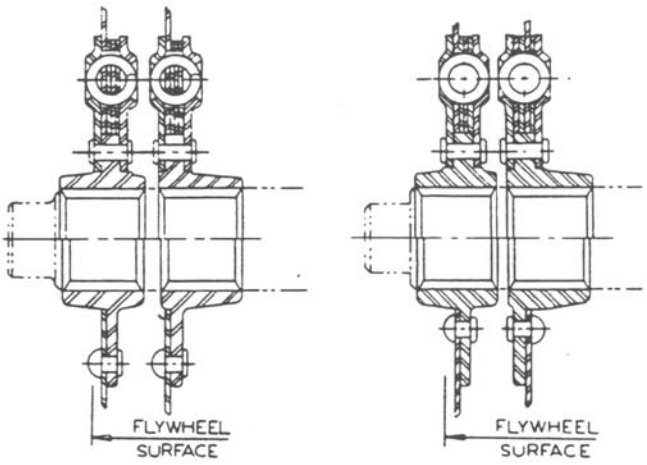
1. A new pilot bearing should be used when replacing a clutch. If the old bearing is reused, clean and check the bearing thoroughly. Repack with lubricant.
2. Check condition of the flywheel. If it is cracked or warped, refer to the manufacturers' recommendations concerning replacement or regrinding.
3. Check condition of transmission drive gear spline. Use hand stone if necessary to dull the sharp edges of splines. If splines are worn excessively or notched, Driven Discs will not slide and drive gear should be replaced.
4. Make sure Drive Pin heads are square with flywheel friction face. Most vehicles use one or two set-screws per Drive Pin to lock the Drive Pin in position. **These set-screws must be loosened or removed to turn or to replace Drive Pins.**
5. New drive pins should be installed anytime the clutch is replaced. Worn or damaged drive pins can cause faulty clutch operation. Use 6 drive pins, with minimum of .006 clearance between Drive Pin and Intermediate Plate Slot at each location. (Some units use 4 drive pins only.)
6. Install Front Driven Disc, Intermediate Plate and Rear Driven Disc. See illustration for proper positioning of driven discs.
7. Place cover assembly in position on flywheel and start cap screws. Note: Lockstrap must be aligned with access hole in bell housing.
8. Insert spline aligning tool through Clutch Assembly and into pilot or pocket bearing.
9. Progressively tighten cap screws which hold Cover Assembly to flywheel. 35 to 40 lbs. ft. of torque is recommended.

Bolt Tightening Sequence (35-40 Ft. Lbs.)

10. Remove the two wooden blocks from between the Release Bearing Housing and Flywheel Housing. Remove spline aligning tool.
11. If Clutch Brake is to be used, place brake parts on the main drive gear of the transmission and shift transmission into gear.
12. Rotate Clutch Release Bearing Housing so that flat section is on top. (If Cross Shaft is below center, rotate Bearing Housing (180°).
13. Rotate Clutch Release Yoke so that release yoke fingers clear the pads on the Release Bearing Housing.
14. Use a sling or transmission jack to support and maintain the engine-to-transmission alignment while installing the transmission. Use care to avoid hanging the weight of the transmission on the clutch or forcing the transmission into the clutch or flywheel housing. Either of these abuses can cause bent or "sprung" Driven Discs and prevent the clutch from releasing. Rotate Clutch Release Yoke into proper position as transmission is moved into place.
15. Start all transmission bell housing cap screws and tighten progressively around the housing to torque recommended by vehicle manufacturer.
16. Connect clutch release linkage and check release bearing travel, clutch brake squeeze and proper free pedal. Adjust as necessary.

PROPER POSITION OF FRONT AND REAR DRIVEN DISCS IN INSTALLATION (See below)

DAMPER CONSTRUCTION SHOWN ABOVE CENTER LINE



RIGID CONSTRUCTION SHOWN BELOW CENTER LINE

LUBRICATION INSTRUCTIONS

WARNING

1. The release bearing housing **has been pre-packed with grease!**
2. Only **high temperature greases** should be used. Chassis lube or all purpose lubricants are not recommended.
3. Add lubricant at each chassis lubrication period or more often if service is extreme.
4. To assure adequate distribution of the grease throughout the bearing, engine should be running while grease is being added.

Specifications

ADJUSTING PROCEDURE

Spicer Angle-Spring Clutches

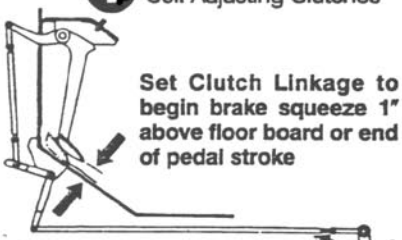
Before adjusting anything, suppose we review the conditions required for proper clutch action.

A pull-type clutch permits use of a simple clutch brake. The brake "squeeze" should begin about 1 inch from the floor board or the end of pedal stroke.

Any clutch will slip and burn up if there is no free pedal.

To release properly, the clutch release bearing must move about 1/2 inch. This occurs between the end of free pedal travel and the brake actuation point.

STEP 1 For **Both** Manual & Self Adjusting Clutches



Set Clutch Linkage to begin brake squeeze 1" above floor board or end of pedal stroke

Proper adjustment of clutch brake is achieved by shortening or lengthening the external linkage rod.

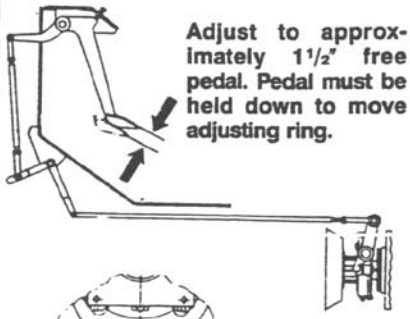
NOTE:

Hydraulic linkage–Refer to manufacturer's specifications for proper adjustment of system.

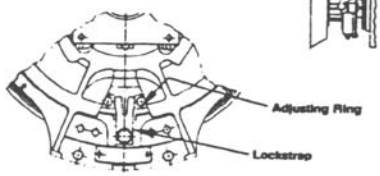
Synchronized Transmissions – (No Brake) Adjust external linkage so release bearing almost contacts transmission bearing cap when pedal is fully depressed.

Verify 1/2" release travel

STEP 2 For Manual Adjusting Clutches **Only**



Adjust to approximately 1 1/2" free pedal. Pedal must be held down to move adjusting ring.

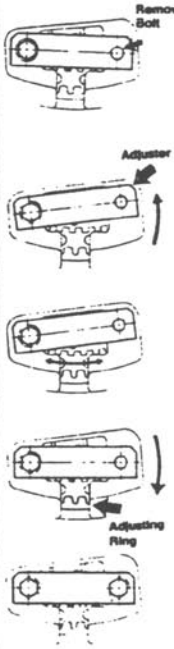


Remove adjusting lockstrap

Turning the adjusting ring clockwise moves the release bearing toward the transmission (Increases Free Pedal)

Turning adjusting ring counter-clockwise moves the release bearing toward the engine. (Decreases Free Pedal)

STEP 2 For Self-Adjusting Clutches **Only**



A. Remove right bolt. Loosen left bolt one turn.

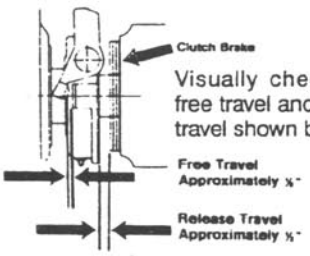
B. Rotate adjuster upward. This will disengage worm gear from the adjusting ring to allow manual adjustment. Hold adjuster disengaged and tighten left bolt.

C. Rotate adjusting ring until approximately 1 1/2" of free pedal is acquired – pedal must be down. Rotate clockwise to increase free pedal, counter clockwise to decrease.

D. Loosen left hand bolt, rotate adjuster assembly downward to engage worm with adjusting ring teeth. Adjusting ring may have to be rotated slightly to allow worm to mesh.

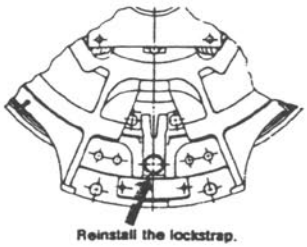
E. Install right bolt and tighten both bolts (30-35 lbs. ft. torque).

STEP 3 For **Both** Manual & Self Adjusting Clutches



Visually check both free travel and release travel shown below.

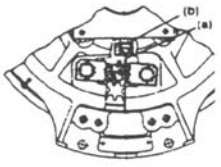
STEP 4 For Manual Adjusting Clutches **Only**



Reinstall the lockstrap.

STEP 4 For Self Adjusting Clutches **Only**

Visually check to see if actuator arm (a) is inserted into release sleeve retainer (b). If adjusting assembly is installed properly, the adjuster assembly spring will move back and forth as pedal is stroked.



NOTE: The clutch will not self-adjust if the actuator arm is not inserted into the release sleeve retainer, or release bearing travel is less than 1/2".

Flywheel Depth

14" Diameter:
Single Plate – 1.873" ± .010"
Double Plate – 2.938" ± .010"

15 1/2" Diameter:
Double Plate – .150"–.180"

Specifications

ADJUSTING PROCEDURE

Spicer Type Angle-Spring Pull-Type Clutches

UNDERSTANDING SPICER CLUTCH ADJUSTMENT

To assure optimum performance of Spicer Clutches:
a. 1/2" to 9/16" release travel is required
b. 1/8" free travel (clearance between release bearing and release yoke)

TERMINOLOGY:

1. RELEASE TRAVEL: 1/2" to 9/16"
Proper release travel assures that the release bearing is capable of traveling far enough, allowing the driven disc(s) to spin freely, avoiding clutch drag.

2. CLUTCH FREE PEDAL:
Pedal free play is an indication of clutch adjustment interval. When free pedal is no longer present, begin adjustment procedures as outlined below.

3. CLUTCH FREE TRAVEL: 1/8"
Free travel is the clearance between the release yoke and clutch release bearing wear pads. This dimension regulates how much free pedal is obtained in the cab.

EXPLANATION of ADJUSTMENT:

1. INTERNAL CLUTCH ADJUSTMENT: (NORMAL SERVICE ADJUSTMENTS).
Clutch component wear is adjusted internally in the clutch through clockwise rotation of the adjusting ring. This adjustment moves the release bearing toward the transmission and re-establishes the 1/2" release travel and 1/8" free travel.

2. LINKAGE ADJUSTMENT:
Linkage adjustment should only be performed in the following cases:
A. Initial dealer preparation to set total pedal stroke and yoke throw
B. To compensate for linkage wear or replacement of related clutch or linkage components.

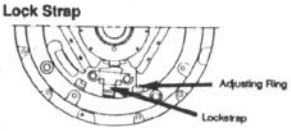
STEP 1

NOTE: Adjustments are performed with pedal depressed (clutch released)

There are three versions of adjustment mechanisms for the Stamped Angle-Spring Clutches. They are shown as follows:

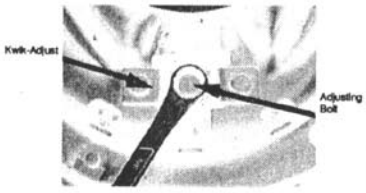
Manual Adjust

Lock Strap



Remove Lockstrap to Adjust.

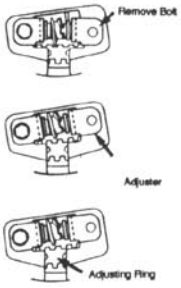
Kwik-Adjust



Depress Adjusting Bolt & Rotate

NOTE: OPEN-END WRENCHS ARE NOT RECOMMENDED.

Wear Compensator

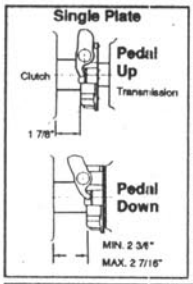


A. Remove right bolt. Loosen left bolt one turn.
B. Rotate wear compensator upward. This will disengage worm gear from the adjusting ring to allow manual adjustment. Hold adjuster disengaged and tighten left bolt.

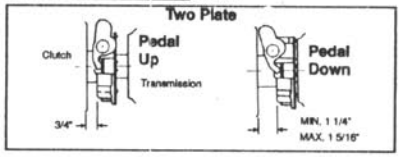
STEP 2

A. CLUTCH ADJUSTMENT WITHOUT CLUTCH BRAKE FOR BOTH MANUAL AND SELF-ADJUSTING CLUTCHES

FOR SYNCHRONIZED TRANSMISSION ONLY

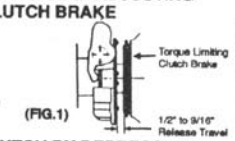


To set 1 7/8" dimension for single plate, or set 3/4" dimension for two plate: With pedal depressed, turn adjusting ring to obtain approximately 1 7/8" for single plate or 3/4" for two plate with pedal up as shown in both illustrations. Turning the adjusting ring clockwise moves the release bearing toward the transmission. Turning the adjusting ring counter-clockwise moves the release bearing toward the engine. Check Release Travel dimensions with Release Yoke rotated toward Release Bearing, eliminating excess play in system.
Having set this, depress pedal down fully releasing clutch and check release travel to settings shown:



B. FOR BOTH MANUAL & SELF-ADJUSTING CLUTCHES WITH CLUTCH BRAKE

Measure clearance between release bearing housing and clutch brake. See Figure 1. If clearance is less than 1/2" or greater than 9/16", adjust clutch as outlined in following steps:



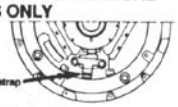
(FIG.1)

1. RELEASE THE CLUTCH BY DEPRESSING THE CLUTCH PEDAL TO THE END OF PEDAL TRAVEL.

2. ADJUST THE CLUTCH INTERNALLY TO GET 1/2" TO 9/16" RELEASE. THIS IS DONE BY TURNING THE ADJUSTING RING.
1. If clearance between release bearing housing and clutch brake is **less than 1/2"**, rotate the adjusting ring **counterclockwise** which moves the release bearing toward the engine.
2. If clearance between the release bearing housing and clutch brake is **greater than 9/16"**, rotate the adjusting ring **clockwise** which moves the release bearing toward the transmission.

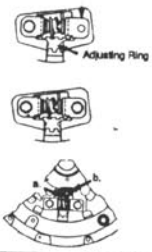
3. REINSTALL LOCKSTRAP FOR MANUAL ADJUSTED CLUTCHES ONLY

NOTE: Tighten both bolts. (35-40 lbs. ft. torque).



KWIK-ADJUST
Assure Kwik-Adjust is rotated to its locked position with the bolt flats aligned with bracket.

REPOSITION WEAR COMPENSATOR ASSEMBLY FOR WEAR COMPENSATOR CLUTCHES ONLY

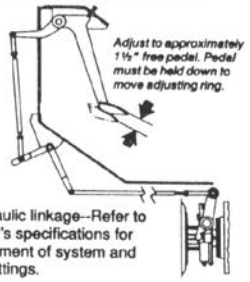


A. Loosen left hand bolt, rotate assembly downward to engage worm with adjusting ring teeth. Adjusting ring may have to be rotated slightly to allow worm to mesh.
B. Install right bolt and tighten both bolts. (35-40 lbs. ft. torque).
Visually check to see if actuator arm (a) is inserted into release sleeve retainer (b). If adjusting assembly is installed properly, the wear compensator assembly spring will move back and forth as pedal is fully stroked.
NOTE: The clutch will not compensate for wear if the actuator arm is not inserted into the release sleeve retainer, or release bearing travel is less than 1/2".

STEP 3

LINKAGE ADJUSTMENT FOR FREE-PEDAL

To set 1/8" dimension:
Adjust external linkage by shortening or lengthening to obtain 1/8" between the release yoke fingers and the wear pads on the release bearing housing. To eliminate potential housing movement check the 1/8" dimension on both sides of housing simultaneously. This 1/8" will provide approximately 1 1/2" free travel at the pedal. Be sure to tighten all locknuts.



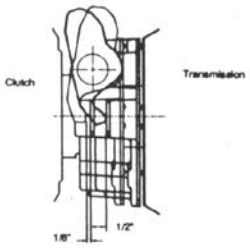
NOTE: Hydraulic linkage--Refer to manufacturer's specifications for proper adjustment of system and free pedal settings.

STEP 4

Verify dimensions or clutch brake settings Fig. 2 and 3. For vehicles with synchronized transmissions (vehicles without clutch brake).

Release bearing must move between 1/2" and 9/16" full pedal stroke, to avoid clutch drag.

(FIG.2)

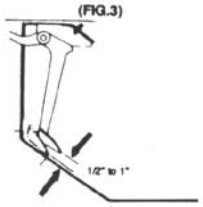


If 1/2"-9/16" release travel is not obtained refer to O.E. service manuals for pedal height and linkage settings.

For vehicles with non-synchronized transmissions. Verify clutch brake setting.

1. Depress clutch pedal. With correct release travel and free travel settings, clutch brake "squeeze" should occur approximately 1" from the end of pedal stroke.
Depress the clutch pedal. The pedal should be 1/2" to 1" from the end of stroke at the beginning of the clutch brake squeeze. See Fig. 3.
A. To check this, insert a .010" feeler gauge or business card between the release bearing and clutch brake (refer to Fig. 1). Depress the clutch pedal and squeeze the card. Let the pedal up slowly. Stop when the card can be pulled out. The pedal should be 1/2" to 1" from the end of stroke.

(FIG.3)



Section 5