Daimler Trucks North America LLC

Recall Campaign

May 2021
FL865A-T
NHTSA #20V-642
Transport Canada #2020-488

Subject: Eaton Clutch Replacement

Models Affected: Specific Model Year 2018-2019 Freightliner 108SD, 114SD, 122SD, Argosy, Business class M2, Cascadia, and Columbia vehicles, and Western Star 4700, 4900, and 5700 vehicles manufactured April 10, 2017, through July 2, 2018, and equipped with an Eaton clutch.

General Information

Daimler Trucks North America LLC (DTNA), behalf of its Freightliner Trucks Division and wholly owned subsidiary, Western Star Trucks Sales, Inc., has decided that a defect that relates to motor vehicle safety exists on the vehicles mentioned above.

On certain vehicles, an internal clutch component may be outside specification and fail, which in special circumstances could cause this clutch component to inhibit clutch departure. In the rare event of such a failure, transmission of enough driveline torque to overcome the parking brakes while the vehicle is idling in neutral may occur and cause unintended vehicle motion, increasing the risk of property damage, personal injury or crash.

The Eaton clutch will be inspected and replaced as needed.

There are approximately 6,516 vehicles involved in this campaign.

Additional Repairs

Dealers must complete all outstanding Recall and Field Service campaigns prior to the sale or delivery of a vehicle. A Dealer will be liable for any progressive damage that results from its failure to complete campaigns before sale or delivery of a vehicle.

Owners may be liable for any progressive damage that results from failure to complete campaigns within a reasonable time after receiving notification.

Work Instructions

Please refer to the attached work instructions. Prior to performing the campaign, check the vehicle for a completion sticker (Form WAR260).

Replacement Parts

Replacement parts are now available and can be obtained by ordering the part number(s) listed below from your facing Parts Distribution Center.

If our records show your dealership has ordered any vehicle(s) involved in campaign number FL865, a list of the customers and vehicle identification numbers will be available on DTNAConnect. Please refer to this list when ordering parts for this recall.

Table 1 - Replacement Parts for FL865

Campaign Number	Part Description	Part Number	Qty.
FL865A, C, D, F, S	CLUTCH	SP 122002 35EX	1 ea
FL865B, E, G, H, T	CLUTCH	SP 122003 42A	1 ea
FL865I	CLUTCH	SP 122002 35EX	1 ea
	CLAMP-4" AXIAL SLIP	TCX AMS014AM	1 ea
	CLAMP-5" SPHERICAL MARMON	CUM A029E742	1 ea
	GASKET-5" SPHERICAL MARMON	CUM A029E744	1 ea

Table 1, cont. on page 2

Campaign Number	Part Description	Part Number	Qty.
FL865J	CLUTCH	SP 122003 42A	1 ea
	CLAMP-5" SPHERICAL	TCX T130158342AC2	1 ea
	GASKET-5” SPHERICAL	TCX AMS013	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
FL865K	CLUTCH	SP 122002 35EX	1 ea
	CLAMP-4" AXIAL SLIP	TCX AMS014AM	2 ea
FL865L	CLUTCH	SP 122002 35EX	1 ea
	CLAMP-5" SPHERICAL	TCX T130158342AC2	1 ea
	GASKET-5” SPHERICAL	TCX AMS013	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
FL865M	CLUTCH	SP 122003 42A	1 ea
	CLAMP-5" SPHERICAL	TCX T130158342AC2	1 ea
	GASKET-5” SPHERICAL	TCX AMS013	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
FL865N	CLUTCH	SP 122003 42A	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
	CLAMP-V BAND, TURBO, 5.92"	01-14596-008	1 ea
FL865O	CLUTCH	SP 122002 35EX	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
	CLAMP-5" SPHERICAL	TCX T130158342AC2	1 ea
	GASKET-5” SPHERICAL	TCX AMS013	1 ea
FL865P	CLUTCH	SP 122002 35EX	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
	PIPE-CLAMP-5” V-BAND	CUM A029T535	1 ea
	PIPE GASKET-5 IN.	CUM Q312516	1 ea
FL865Q	CLUTCH	SP 122003 42A	1 ea
	CLAMP-5" AXIAL SLIP	TCX AMS015AM	1 ea
	CLAMP-5" SPHERICAL	TCX T130158342AB2	1 ea
	GASKET-5” SPHERICAL	TCX AMS013	1 ea
FL865R	CLUTCH	SP 122003 42A	1 ea
	CLAMP-4" AXIAL SLIP	TCX AMS014AM	1 ea
	CLAMP-5” SPHERICAL MARMON	CUM A029E742	1 ea
	PIPE-GASKET-5” SPHERICAL	CUM A029E744	1 ea

Table 1, cont. from page 1

Removed Parts

Removed clutches will be returned. U.S. and Canadian Dealers, please follow Warranty Failed Parts Tracking shipping instructions for the disposition of all removed parts. Export distributors, please destroy removed parts unless otherwise advised.

Labor Allowance

Table 2 - Labor Allowance

Campaign Number	Procedure	Time Allowed (hours)	SRT Code	Corrective Action
FL865A-T	Inspect clutch serial number	0.5	996-R017A	06-Inspect
FL865A & B	Inspect, remove & replace clutch	8.9 (FTL) 9.1 (WST)	996-R017B	12-Repair Recall/Campaign

Table 2, cont. on page 3

Campaign Number	Procedure	Time Allowed (hours)	SRT Code	Corrective Action
FL865C	Inspect, remove & replace clutch with O/S cross member	9.9	996-R017C	12-Repair Recall/Campaign
FL865D, E, S, T	Inspect, remove & replace clutch w/ nodal mounts	9.2 (FTL) 10.1 (WST)	996-R017D	12-Repair Recall/Campaign
FL856F & G	Inspect, remove & replace clutch w/ twin-steer	10.6	996-R017E	12-Repair Recall/Campaign
FL865H	Inspect, remove & replace clutch w/ cab support, C/M removal	8.9	996-R017F	12-Repair Recall/Campaign
FL865I & J	Inspect, remove & replace clutch w/ down-pipe removal	9.4	996-R017G	12-Repair Recall/Campaign
FL865K	Inspect, remove & replace clutch with O/S cross member & down-pipe removal	10.9	996-R017H	12-Repair Recall/Campaign
FL865L, M, N, Q, R	Inspect, remove & replace clutch w/ nodal mounts & down-pipe removal	10.2 (FTL) 11.1 (WST)	996-R017J	12-Repair Recall/Campaign
FL865O & P	Inspect, remove & replace clutch w/ down-pipe removal & ATD removal	9.9	996-R017K	12-Repair Recall/Campaign

Table 2, cont. from page 2

IMPORTANT: When the Recall has been completed, locate the base completion label in the appropriate location on the vehicle, and attach the red completion sticker provided in the recall kit (Form WAR260). If the vehicle does not have a base completion label, clean a spot on the appropriate location of the vehicle and first attach the base completion label (Form WAR259). If a recall kit is not required or there is no completion sticker in the kit, write the recall number on a blank sticker and attach it to the base completion label.

Claims for Credit

You will be reimbursed for your parts, labor, and handling (landed cost for Export Distributors) by submitting your claim through the Warranty system within 30 days of completing this campaign. Please reference the following information in OWL:

- Claim type is **Recall Campaign**.
- In the Campaign field, enter the campaign number and appropriate condition code (e.g. **FL865-A, FL865-B, etc.**).
- In the Primary Failed Part Number field, enter **25-FL865-000**.
- In the Parts field, enter the appropriate part number(s) as shown in the Replacement Parts Table.
  IMPORTANT: Removed clutches will be returned. U.S. and Canadian Dealers, please follow Warranty Failed Parts Tracking shipping instructions for the disposition of all removed parts.
- In the Labor field, first enter the appropriate SRT from the Labor Allowance Table. Administrative time will be included automatically as SRT 939-6010A for 0.3 hours.
- The VMRS Component Code is **F99-999-005** and the Cause Code is **A1 - Campaign**.
- **U.S. and Canada -- Reimbursement for Prior Repairs.** When a customer asks about reimbursement, please do the following:
  - Accept the documentation of the previous repair.
  - Make a brief check of the customer's paperwork to see if the repair may be eligible for reimbursement. (See the "Copy of Owner Letter" section of this bulletin for reimbursement guidelines.)
  - Submit an OWL Recall Pre-Approval Request for a decision.
  - Include the approved amount on your claim in the Other Charges section.
  - Attach the documentation to the pre-approval request.
  - If approved, submit a based on claim for the pre-approval.
  - Reimburse the customer the appropriate amount.

May 2021
FL865A-T
NHTSA #20V-642
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IMPORTANT: OWL must be viewed prior to performing the recall to ensure the vehicle is involved and the campaign has not been previously completed. Also, check for a completion sticker prior to beginning work.

U.S. and Canadian dealers, contact the Warranty Campaigns Department via Web inquiry at DTNAConnect.com / WSC, if you have any questions or need additional information. Export distributors, submit a Web inquiry or contact your International Service Manager.

U.S. and Canadian Dealers: To return excess kit inventory related to this campaign, U.S. dealers must submit a Parts Authorization Return (PAR) to the Memphis PDC. Canadian dealers must submit a PAR to their facing PDC. All kits must be in resalable condition. PAR requests must include the original purchase invoice number. Export Distributors: Excess inventory is not returnable.

The letter notifying U.S. and Canadian vehicle owners is included for your reference.

Please note that the National Traffic and Motor Vehicle Safety Act, as amended (Title 49, United States Code, Chapter 301), requires the owner's vehicle(s) be corrected within a reasonable time after parts are available to you. The Act states that failure to repair a vehicle within 60 days after tender for repair shall be prima facie evidence of an unreasonable time. However, circumstances of a particular situation may reduce the 60 day period. Failure to repair a vehicle within a reasonable time can result in either the obligation to (a) replace the vehicle with an identical or reasonably equivalent vehicle, without charge, or (b) refund the purchase price in full, less a reasonable allowance for depreciation. The Act further prohibits dealers from selling a vehicle unless all outstanding recalls are performed. Any lessor is required to send a copy of the recall notification to the lessee within 10 days. Any subsequent stage manufacturer is required to forward this notice to its distributors and retail outlets within five working days.

May 2021
FL865A-T
NHTSA #20V-642
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Copy of Notice to Owners

Subject: Eaton Clutch Replacement

For the Notice to U.S. Customers: This notice is sent to you in accordance with the National Traffic and Motor Vehicle Safety Act. **For the Notice to Canadian Customers:** This notice is sent to you in accordance with the requirements of the Motor Vehicle Safety Act. This is to inform you that your vehicle may contain a defect that could affect the safety of a person.

Daimler Trucks North America LLC (DTNA), on behalf of its Freightliner Trucks Division and wholly owned subsidiary, Western Star Trucks Sales, Inc., has decided that a defect that relates to motor vehicle safety exists on specific Model Year 2018-2019 Freightliner 108SD, 114SD, 122SD, Argosy, Business Class M2, Cascadia, and Columbia vehicles, and Western Star 4700, 4900, and 5700 vehicles manufactured April 10, 2017, through July 2, 2018, and equipped with an Eaton clutch.

On certain vehicles, an internal clutch component may be outside specification and fail, which in special circumstances could cause this clutch component to inhibit clutch departure. In the rare event of such a failure, transmission of enough driveline torque to overcome the parking brakes while the vehicle is idling in neutral may occur and cause unintended vehicle motion, increasing the risk of property damage, personal injury or crash.

The Eaton clutch will be inspected and replaced as needed.

Please contact an authorized Daimler Trucks North America dealer to arrange to have the Recall performed and to ensure that parts are available at the dealership. To locate an authorized dealer, search on line at www.Daimler-TrucksNorthAmerica.com. On the menu tab, select “Contact,” scroll down to “Find a Dealer,” and select the appropriate brand. The Recall will take approximately eight to ten hours and will be performed at no charge to you. You may also confirm your vehicle’s involvement in this recall at this URL: https://dtna-dlrinfo.prd.freightliner.com:48518/VinLookup/vin-module/getVinLookupPage.

You may be liable for any progressive damage that results from your failure to complete the Recall within a reasonable time after receiving notification.

If you do not own the vehicle that corresponds to the identification number(s) which appears on the Recall Notification, please return the notification to the Warranty Campaigns Department with any information you can furnish that will assist us in locating the present owner. If you have leased this vehicle, Federal law requires that you forward this notice to the lessee within 10 days. If you are a subsequent stage manufacturer, Federal law requires that you forward this notice to your distributors and retail outlets within five working days. If you have paid to have this recall condition corrected prior to this notice, you may be eligible to receive reimbursement. Please see the reverse side of this notice for details.

If you have questions about this Recall, please contact the Warranty Campaigns Department at (800) 547-0712, 7:00 a.m. to 4:00 p.m. Pacific Time, Monday through Friday, e-mail address DTNA.Warranty.Campaigns@Daimler.com. **For the Notice to U.S. Customers:** If you are not able to have the defect remedied without charge and within a reasonable time, you may wish to submit a complaint to the Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590; or call the Vehicle Safety Hotline at (888) 327-4236 (TTY: 800-424-9153); or to http://www.safercar.gov. **For the Notice to Canadian Customers:** If you wish to submit a complaint about this recall, you can contact Transport Canada road safety, 80 rue Noel, Gatineau, Quebec J8Z 0A1 or call (800) 333-0510.

We regret any inconvenience this action may cause but feel certain you understand our interest in motor vehicle safety.

WARRANTY CAMPAIGNS DEPARTMENT

Enclosure

Reimbursement to Customers for Repairs Performed Prior to Recall

If you have already **paid** to have this recall condition corrected you may be eligible to receive reimbursement.

Requests for reimbursement may include parts and labor. Reimbursement may be limited to the amount the repair would have cost if completed by an authorized Daimler Trucks North America LLC dealer. The following documentation must be presented to your dealer for consideration for reimbursement.

Please provide original or clear copies of all receipts, invoices, and repair orders that show:

- The name and address of the person who paid for the repair
- The Vehicle Identification Number (VIN) of the vehicle that was repaired
- What problem occurred, what repair was done, when the repair was done
- Who repaired the vehicle
- The total cost of the repair expense that is being claimed
- Proof of payment for the repair (such as the front and back of a cancelled check or a credit card receipt)

Reimbursement will be made by check from your Daimler Trucks North America LLC dealer.

Please speak with your Daimler Trucks North America LLC authorized dealer concerning this matter.

Work Instructions

Subject: Eaton Clutch Replacement

Models Affected: Specific Model Year 2018-2019 Freightliner 108SD, 114SD, 122SD, Argosy, Business Class M2, Cascadia, and Columbia vehicles, and Western Star 4700, 4900, and 5700 vehicles manufactured April 10, 2017, through July 2, 2018, and equipped with an Eaton clutch.

IMPORTANT: Removed clutches will be returned. U.S. and Canadian Dealers, please follow Warranty Failed Parts Tracking shipping instructions for the disposition of all removed parts.

Population, Group and Work Instruction page number.See **Table 3.**

Population / Group	Work Instruction Page #
FL865A, B, C	7
FL865D, E, F, G	12
FL865H	18
FL865I, J	22
FL865L, M, N	27
FL865Q, R	33
FL865S, T	44
FL865K, O, P	52

Table 3, Work Instruction page numbers

Population FL865A, B, C - Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 4**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 4, Clutch Serial Number and Date Range

5.1 If the serial number is within the affected range, complete the inspection steps, then continue with the **Transmission Removal** procedure.

5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Drain the air system.
3. Remove the ground wire connections between the battery bank(s) and the chassis.
4. Remove the tail pipe from the ATD, if necessary for transmission removal.
5. Remove any electrical or fluid routing brackets from the bottom of the transmission.
6. If needed, remove the cooler lines from the transmission and cap the lines and ports.
7. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
8. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
9. If required, remove the over-slung crossmember.
10. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
11. Remove any electrical or fluid routing brackets from the top of the transmission.
12. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie loca-tions for reassembly.
13. Remove air line connections from the transmission, and mark for reassembly.
14. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Ad-just the support plate to the same angle as the bottom of the transmission.
15. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
16. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

17. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 1**.

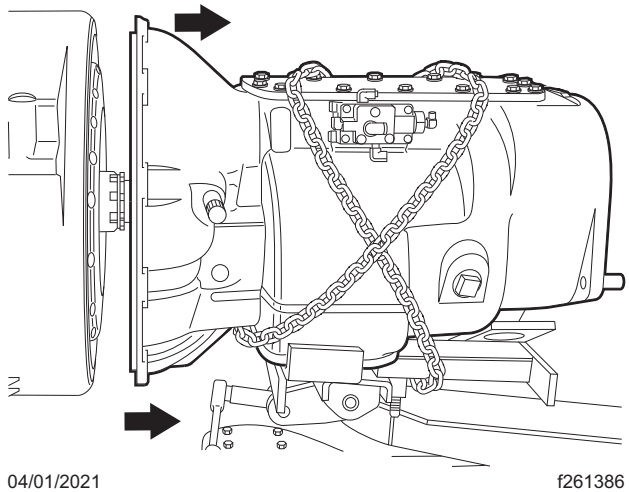


Fig. 1, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tighten then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns Department* using the **Warranty Support Center (WSC) Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 2**.

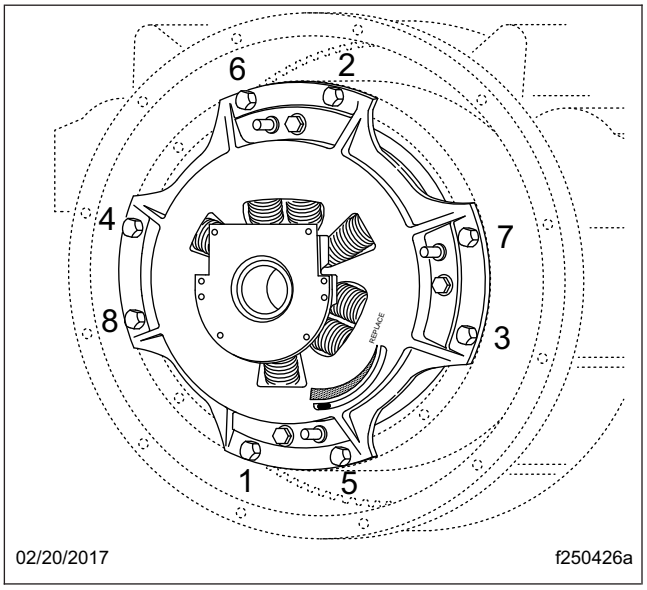


Fig. 2, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.
3. Feed the release bearing grease tube through the hole in the bell housing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

4. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
5. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
6. Remove the transmission from the jack.
7. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
8. If removed, install the over slung crossmemeber torque 128 lbf·ft (174 N·m).
9. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
10. Attach the wire and fluid routing brackets to the top of the transmission.
11. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
12. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
13. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
14. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
15. Connect the batteries.

Cummins X15 Software Update

1. Verify the **ServiceRanger** tool has data release 1901-01-SCB-2682 or greater applied, and update the transmission ECU to 5569997 or greater. Details on this process can be found in the **Eaton Service Bulletin Document CLIB-0033**, steps A-D.
2. Locate the engine serial number (ESN).
   - 2.1 If the ESN is equal to or greater than 80012737, go to the **Clutch Adjustment** procedure on page 11.
   - 2.2 If the ESN is less than 80012737, continue to step 3.

3. Connect Cummins INSITE™ and record the current engine ECM code (calibration revision) installed in the ECM.

   3.1 If the engine ECM code revision is equal to or greater than the code revision indicated below, continue with the clutch adjustment procedure.

   3.2 If the engine ECM code revision is less than the code revision indicated below, update to the latest available engine ECM code revision, then continue with the clutch adjustment procedure.

Cummins X15 Engine ECM Codes

HD10001.11	HD10050.07	HD10089.07	HD10147.07	HD10181.05	HD10201.04
HD10002.10	HD10054.07	HD10091.06	HD10148.07	HD10182.05	HD10202.04
HD10005.10	HD10055.07	HD10094.06	HD10149.07	HD10183.05	HD10203.04
HD10008.09	HD10056.07	HD10097.06	HD10150.07	HD10184.05	HD10204.04
HD10009.09	HD10057.07	HD10100.06	HD10151.07	HD10185.04	HD10205.04
HD10011.08	HD10058.07	HD10103.06	HD10152.07	HD10186.04	HD10206.04
HD10012.08	HD10059.07	HD10114.06	HD10162.07	HD10187.04	HD10207.04
HD10014.08	HD10060.07	HD10115.06	HD10164.07	HD10188.04	HD10208.04
HD10024.07	HD10061.07	HD10126.07	HD10169.05	HD10189.04	HD10209.05
HD10025.07	HD10062.07	HD10127.07	HD10170.05	HD10190.04	HD10210.05
HD10030.08	HD10072.07	HD10128.07	HD10171.05	HD10191.04	HD10211.05
HD10031.08	HD10073.07	HD10129.07	HD10172.05	HD10192.04	HD10212.05
HD10032.08	HD10074.07	HD10130.07	HD10173.05	HD10193.04	HD10213.05
HD10036.08	HD10075.07	HD10131.07	HD10174.05	HD10194.04	HD10214.05
HD10037.08	HD10076.07	HD10132.07	HD10175.05	HD10195.04	HD10215.05
HD10038.08	HD10077.07	HD10133.07	HD10176.05	HD10196.04	HD10216.05
HD10043.07	HD10078.07	HD10134.07	HD10177.05	HD10197.04	HD10217.04
HD10044.07	HD10079.07	HD10144.07	HD10178.05	HD10198.04	HD10218.04
HD10045.07	HD10080.07	HD10145.07	HD10179.05	HD10199.04	HD10219.04
HD10048.07	HD10087.07	HD10146.07	HD10180.05	HD10200.04	HD10220.04

Table 5, Cummins X15 Engine ECM Codes

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

Population FL865D, E, F, G -
Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 6**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 6, Clutch Serial Number and Date Range

   5.1 If the serial number is within the affected range, complete the inspection steps, then continue with the **Transmission Removal** procedure.

   5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Drain the air system.
3. Remove the ground wire connections between the battery bank(s) and the chassis.
4. Remove the tail pipe from the ATD, if necessary for transmission removal.
5. If required for transmission removal on vehicles tandem-steer suspension, remove the suspension cross-member.
6. Remove any electrical or fluid routing brackets from the bottom of the transmission.
7. If needed, remove the cooler lines from the transmission and cap the lines and ports.
8. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
9. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
10. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.

11. Remove any electrical or fluid routing brackets from the top of the transmission.
12. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie locations for reassembly.
13. Remove air line connections from the transmission, and mark for reassembly.
14. Remove the nodal rear engine mount isolator bolts, and raise and support the back of the engine.
15. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Adjust the support plate to the same angle as the bottom of the transmission.
16. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
17. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

18. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 3**.

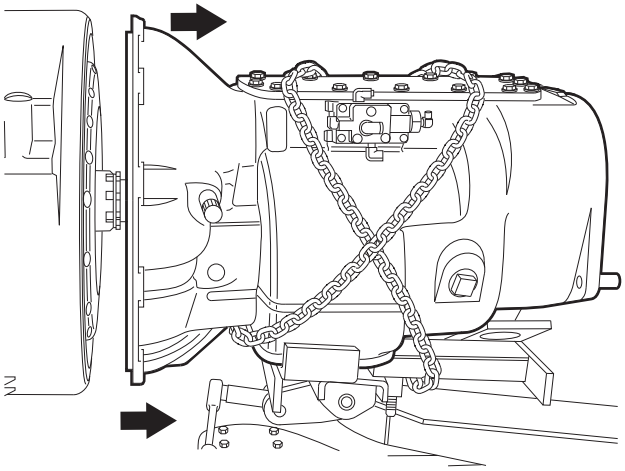


Fig. 3, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns Department* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 4**.

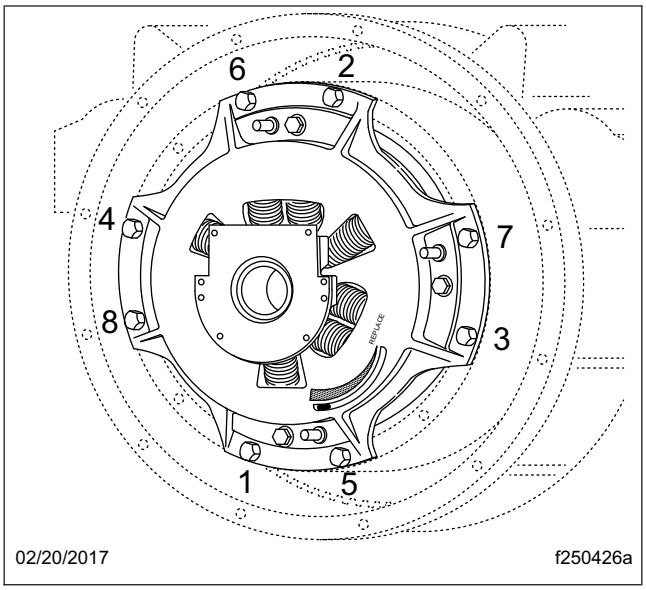


Fig. 4, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

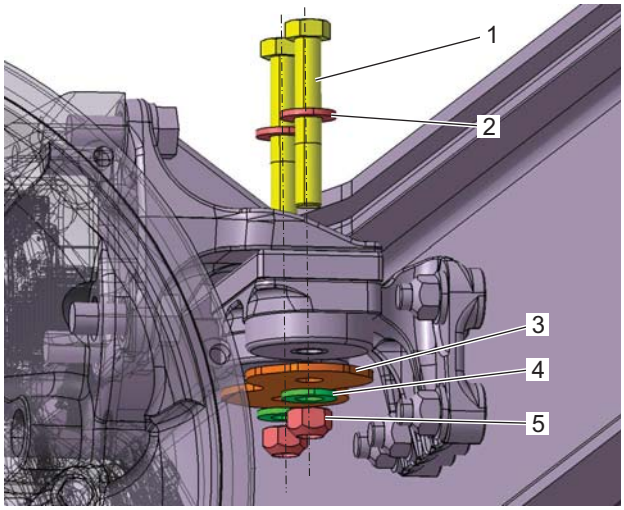
2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
5. Lower the back of the engine and install the isolator bolts. Torque to 203 lbf·ft (275 N·m), alternating between the front and rear bolts, to prevent binding. See **Fig. 5**.



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1. Screw-Cap, HEX
2. Washer
3. Plate
4. Washer
5. Nut

Fig. 5, Nodal Rear Engine Supports

6. Remove the transmission from the jack.
7. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
8. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
9. Attach the wire and fluid routing brackets to the top of the transmission.

10. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
11. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
12. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
13. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.

NOTE: For installations where 7/8" grade 8 fasteners are torqued to 500 lft·ft (678 N·m), the fasteners are one-time use and must be replaced when removed.

14. If removed, install the tandem-steer suspension crossmember.
    - For tubular assemblies with 3/4" grade 8 fasteners torque to 200 lbf·ft (271 N·m).
    - For tubular assemblies with 7/8" grade 8 fasteners, and welded spring-end frame hangers (set forward axle position), torque to 323 lbf·ft (438 N·m).
    - For tubular assemblies with 7/8" grade 8 fasteners, and cast spring-end frame hangers (set back axle position), torque to 500 lbf·ft (678 N·m).
15. Connect the batteries.

Cummins X15 Software Update

1. Verify the **ServiceRanger** tool has data release 1901-01-SCB-2682 or greater is applied, and update the transmission ECU to 5569997 or greater. Details on this process can be found in the **Eaton Service Bulletin Document CLIB-0033**, steps A-D.
2. Locate the engine serial number (ESN).
    2.1 If the ESN is equal to or greater than 80012737, go to the **Clutch Adjustment** procedure.
    2.2 If the ESN is less than 80012737, continue to step 3.
3. Connect Cummins INSITE™ and record the current engine ECM code (calibration revision) installed in the ECM.
    3.1 If the engine ECM code revision is equal to or greater than the code revision indicated below, continue with the clutch adjustment steps.
    3.2 If the engine ECM code revision is less than the code revision indicated below, update to the latest available engine ECM code revision, then continue with the clutch adjustment procedure.

Cummins X15 Engine ECM Codes

HD10001.11	HD10050.07	HD10089.07	HD10147.07	HD10181.05	HD10201.04
HD10002.10	HD10054.07	HD10091.06	HD10148.07	HD10182.05	HD10202.04
HD10005.10	HD10055.07	HD10094.06	HD10149.07	HD10183.05	HD10203.04
HD10008.09	HD10056.07	HD10097.06	HD10150.07	HD10184.05	HD10204.04
HD10009.09	HD10057.07	HD10100.06	HD10151.07	HD10185.04	HD10205.04
HD10011.08	HD10058.07	HD10103.06	HD10152.07	HD10186.04	HD10206.04
HD10012.08	HD10059.07	HD10114.06	HD10162.07	HD10187.04	HD10207.04
HD10014.08	HD10060.07	HD10115.06	HD10164.07	HD10188.04	HD10208.04

Table 7, Cummins X15 Engine ECM Codes, continued on page 17

HD10024.07	HD10061.07	HD10126.07	HD10169.05	HD10189.04	HD10209.05
HD10025.07	HD10062.07	HD10127.07	HD10170.05	HD10190.04	HD10210.05
HD10030.08	HD10072.07	HD10128.07	HD10171.05	HD10191.04	HD10211.05
HD10031.08	HD10073.07	HD10129.07	HD10172.05	HD10192.04	HD10212.05
HD10032.08	HD10074.07	HD10130.07	HD10173.05	HD10193.04	HD10213.05
HD10036.08	HD10075.07	HD10131.07	HD10174.05	HD10194.04	HD10214.05
HD10037.08	HD10076.07	HD10132.07	HD10175.05	HD10195.04	HD10215.05
HD10038.08	HD10077.07	HD10133.07	HD10176.05	HD10196.04	HD10216.05
HD10043.07	HD10078.07	HD10134.07	HD10177.05	HD10197.04	HD10217.04
HD10044.07	HD10079.07	HD10144.07	HD10178.05	HD10198.04	HD10218.04
HD10045.07	HD10080.07	HD10145.07	HD10179.05	HD10199.04	HD10219.04
HD10048.07	HD10087.07	HD10146.07	HD10180.05	HD10200.04	HD10220.04

Table 7, Cummins X15 Engine ECM Codes, continued from page 16

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

May 2021
FL865A-T
NHTSA #20V-642
Transport Canada #2020-488

Population FL865H - Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 8**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 8, Clutch Serial Number and Date Range

   5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

   5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Remove the cab height control valve link and use the valve to raise the cab and support it with blocks.
3. Drain the air system.
4. Remove the ground wire connections between the battery bank(s) and the chassis.
5. Deflate the cab support springs.
6. Remove the cab support crossmember.
7. Remove the tail pipe from the ATD, if necessary for transmission removal.
8. Remove any electrical or fluid routing brackets from the bottom of the transmission.
9. If needed, remove the cooler lines from the transmission and cap the lines and ports.
10. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
11. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
12. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.

13. Remove any electrical or fluid routing brackets from the top of the transmission.
14. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie locations for reassembly.
15. Remove air line connections from the transmission, and mark for reassembly.
16. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Adjust the support plate to the same angle as the bottom of the transmission.
17. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
18. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

19. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 6**.

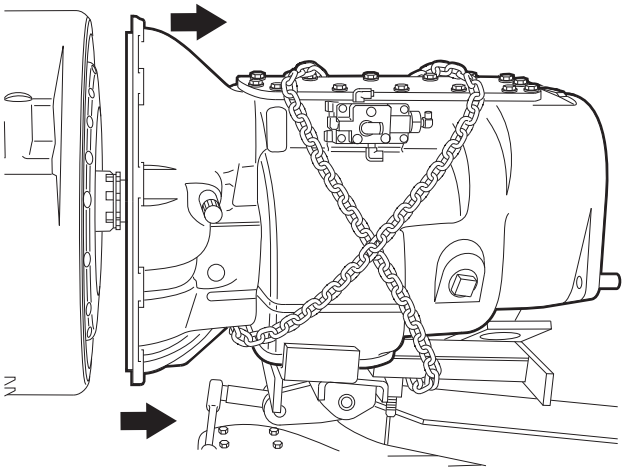


Fig. 6, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns Department* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 7**.

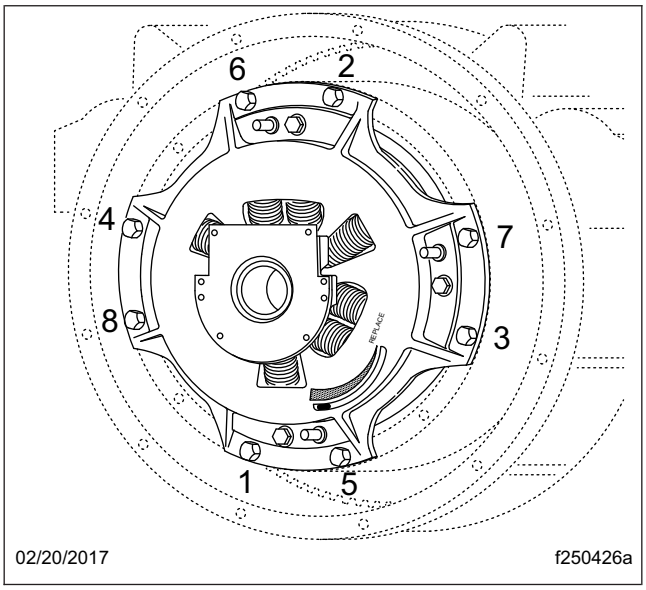


Fig. 7, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
5. Remove the transmission from the jack.
6. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
7. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
8. Attach the wire and fluid routing brackets to the top of the transmission.
9. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
10. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
11. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
12. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
13. Install the cab support crossmember. Torque the bolts to 128 lbf·ft (174 N·m).
14. Remove the cab support blocks.
15. Install the height control valve link.
16. Connect the batteries.

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

Population FL865I, J - Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 9**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 9, Clutch Serial Number and Date Range

5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

May 2021
FL865A-T
NHTSA #20V-642
Transport Canada #2020-488

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Drain the air system.
3. Remove the ground wire connections between the battery bank(s) and the chassis.
4. Remove the tail pipe from the ATD, if necessary for transmission removal.
5. Remove the exhaust pipe between the bellows outlet and the ATD inlet.
6. Remove any electrical or fluid routing brackets from the bottom of the transmission.
7. If needed, remove the cooler lines from the transmission and cap the lines and ports.
8. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
9. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
10. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
11. Remove any electrical or fluid routing brackets from the top of the transmission.
12. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie loca-tions for reassembly.
13. Remove air line connections from the transmission, and mark for reassembly.
14. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Ad-just the support plate to the same angle as the bottom of the transmission.
15. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
16. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

17. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 8**.

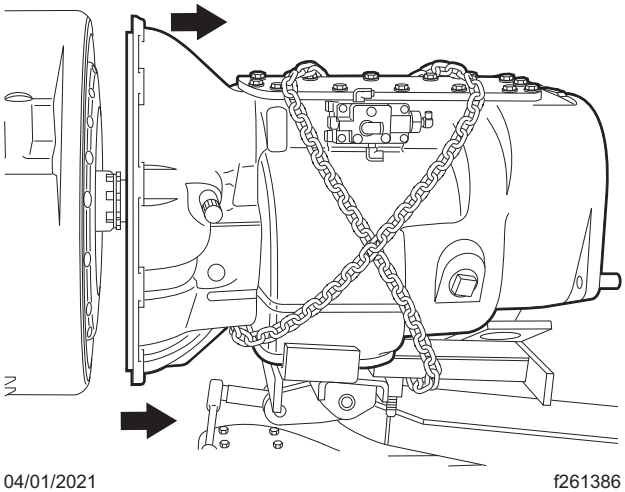


Fig. 8, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns De-partment* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 9**.

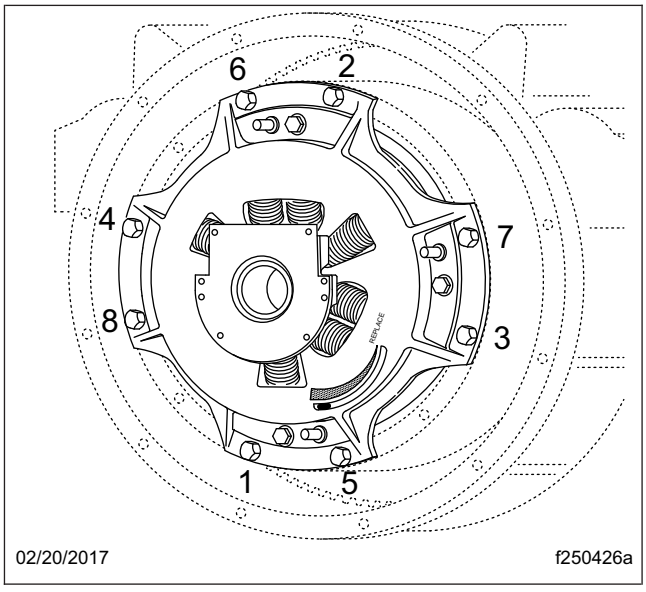


Fig. 9, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.

10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

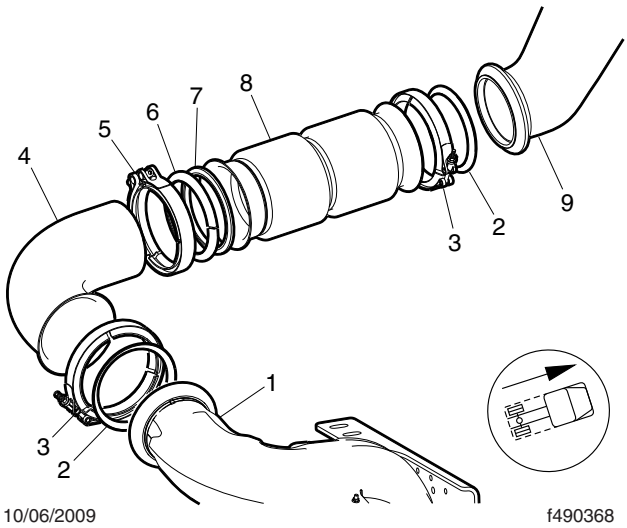
Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
5. Remove the transmission from the jack.
6. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
7. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
8. Attach the wire and fluid routing brackets to the top of the transmission.
9. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
10. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
11. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
12. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
13. If removed, attach the tail pipe to the ATD outlet.
14. Clean the gasket material from all the exhaust connection surfaces, being sure not to drop any material in the pipe or ATD.

IMPORTANT: Exhaust V-band clamps and gaskets are one-time use, and must be replaced each time they are removed from a system that has been heat cycled.

15. Install the gasket on the ATD inlet.
16. Remove the nut from the new clamp and hang it out of the way on the ATD inlet port.

17. Assemble the slip joint clamp/gasket as follows:
    17.1 Clean any remaining gasket material or soot from the clamp areas.
    17.2 Fit the slip-joint clamp (5), flare (6), and compression gasket (7) onto the ATD inlet pipe in the order shown in the **fig. 10**.
    17.3 Slide the ATD inlet pipe into the bellows.
    17.4 Fit the slip-joint clamp over the slip flare, compression gasket, and bellows, and loosely install the nut.



1. ATD
2. Spherical Clamp Gasket
3. Spherical Clamp
4. ATD Inlet Pipe
5. Slip-Joint Clamp
6. Slip Flare
7. Conical Gasket
8. Bellows
9. Turbocharger Outlet Pipe

Fig. 10, Exhaust Pipe Installation

18. Fit the pipe assembly to the ATD inlet, position the clamp, and loosely install the nut.
19. If removed, install the ATD inlet pipe support bracket on the frame rail, and torque to 64 lbf·ft (87 N·m).
20. If applicable, fit the ATD-inlet-pipe support bracket clamp.
21. Stabilize the assembly by applying minimal torque to all the clamps in the following order:
    - Slip-Joint
    - ATD Inlet
    - Support Clamp
22. Use the following procedure to torque V-band style exhaust clamps
    22.1 Align the pipe ends to be as centered on the port as possible.
    22.2 Tighten the clamp to the specified torque value.
    22.3 Use a plastic or rubber mallet, tap around the outside of the clamp to seat it against the pipe.
    22.4 Re-tighten the clamp to the specified torque value.
23. Using the V-band torque procedure, tighten the clamp at the ATD inlet to 15 lbf·ft (20 N·m).
24. Using the V-band torque procedure, tighten the slip-joint clamp at the bellows to 15 lbf·ft (20 N·m).
25. If applicable, tighten the ATD-inlet-pipe support bracket clamp to 24 lbf·ft (30 N·m).
26. Connect the batteries.

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

Population FL865L, M, N -

Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 10**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 10, Clutch Serial Number and Date Range

5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Drain the air system.
3. Remove the ground wire connections between the battery bank(s) and the chassis.
4. Remove the tail pipe from the ATD, if necessary for transmission removal.
5. Remove the inlet pipe clamp, support the ATD and remove the strap fasteners.
6. Remove the inlet pipe clamp and electrical harness connections between the chassis and ATD.
7. Remove the exhaust pipe between the bellows outlet and the ATD inlet.
8. Remove any electrical or fluid routing brackets from the bottom of the transmission.
9. If needed, remove the cooler lines from the transmission and cap the lines and ports.
10. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
11. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
12. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
13. Remove any electrical or fluid routing brackets from the top of the transmission.
14. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie loca-tions for reassembly.
15. Remove air line connections from the transmission, and mark for reassembly.
16. Remove the nodal rear engine mount isolator bolts, and raise and support the back of the engine.
17. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Ad-just the support plate to the same angle as the bottom of the transmission.
18. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
19. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

20. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 11**.

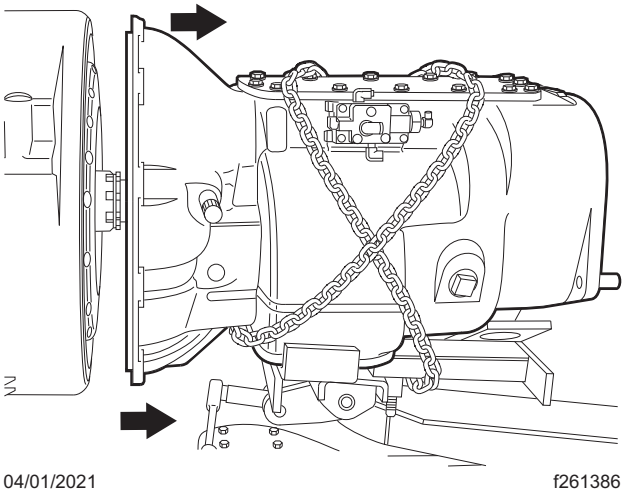


Fig. 11, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns De-partment* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the uide studsgand install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 12**.

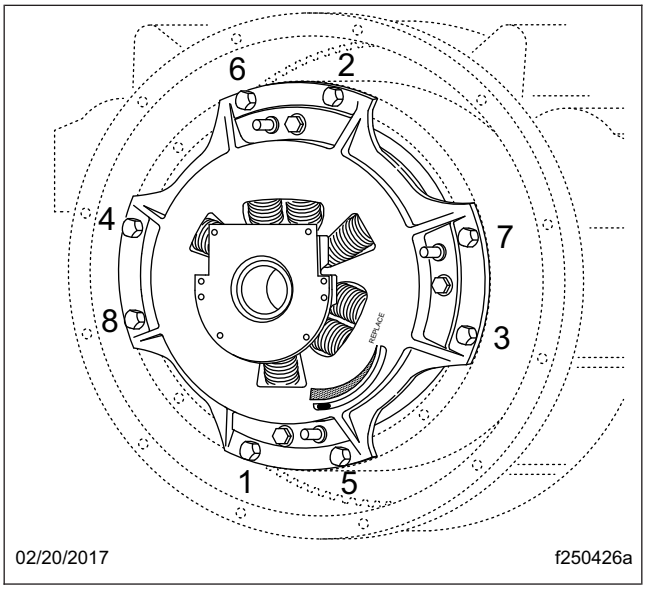


Fig. 12, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

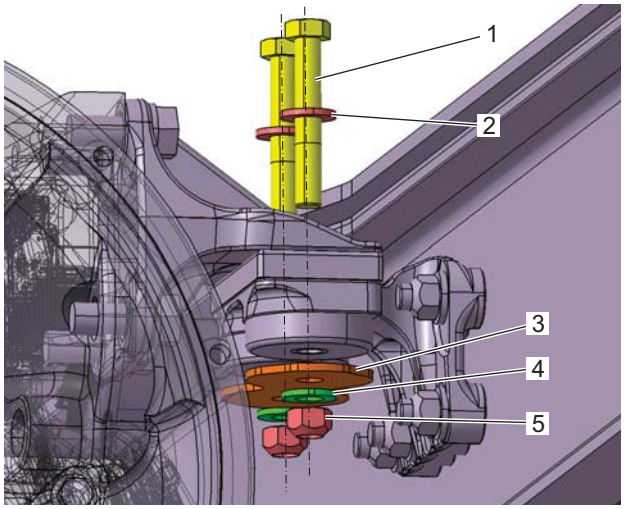
NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.

5. Lower the back of the engine and install the isolator bolts. Torque to 203 lbf·ft (275 N·m), alternating between the front and rear bolts, to prevent binding. See **Fig. 13**.



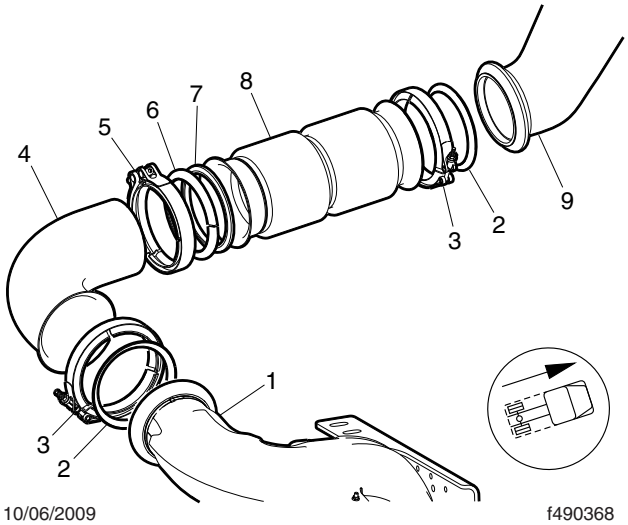
1. Screw-Cap, HEX
2. Washer
3. Plate
4. Washer
5. Nut

Fig. 13, Nodal Rear Engine Supports

6. Remove the transmission from the jack.
7. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
8. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
9. Attach the wire and fluid routing brackets to the top of the transmission.
10. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
11. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
12. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
13. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
14. Install the ATD, torque strap fasteners to 30 lbf·ft (41 N·m).
15. If removed, attach the tail pipe to the ATD outlet.
16. Clean the gasket material from all the exhaust connection surfaces, being sure not to drop any material in the pipe or ATD.

IMPORTANT: Exhaust V-band clamps and gaskets are one-time use, and must be replaced each time they are removed from a system that has been heat cycled.

17. Install the gasket on the ATD inlet.
18. Remove the nut from the new clamp and hang it out of the way on the ATD inlet port.
19. Assemble the slip joint clamp/gasket as follows:
    - 19.1 Clean any remaining gasket material or soot from the clamp areas.
    - 19.2 Fit the slip-joint clamp (5), flare (6), and compression gasket (7) onto the ATD inlet pipe in the order shown in the **fig. 14**.
    - 19.3 Slide the ATD inlet pipe into the bellows.
    - 19.4 Fit the slip-joint clamp over the slip flare, compression gasket, and bellows, and loosely install the nut.



1. ATD
2. Spherical Clamp Gasket
3. Spherical Clamp
4. ATD Inlet Pipe
5. Slip-Joint Clamp
6. Slip Flare
7. Conical Gasket
8. Bellows
9. Turbocharger Outlet Pipe

Fig. 14, Exhaust Pipe Installation

20. Fit the pipe assembly to the ATD inlet, position the clamp, and loosely install the nut.
21. If removed, install the ATD inlet pipe support bracket on the frame rail, and torque to 64 lbf·ft (87 N·m).
22. If applicable, fit the ATD-inlet-pipe support bracket clamp.
23. Stabilize the assembly by applying minimal torque to all the clamps in the following order:
    - Slip-Joint
    - ATD Inlet
    - Support Clamp
24. Use the following procedure to torque V-band style exhaust clamps
    - 24.1 Align the pipe ends to be as centered on the port as possible.
    - 24.2 Tighten the clamp to the specified torque value.
    - 24.3 Use a plastic or rubber mallet, tap around the outside of the clamp to seat it against the pipe.
    - 24.4 Re-tighten the clamp to the specified torque value.

25. Using the V-band torque procedure, tighten the clamp at the ATD inlet to 15 lbf·ft (20 N·m).
26. Using the V-band torque procedure, tighten the slip-joint clamp at the bellows to 15 lbf·ft (20 N·m).
27. If applicable, tighten the ATD-inlet-pipe support bracket clamp to 24 lbf·ft (30 N·m).

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

Population FL865Q, R -
Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 11**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 11, Clutch Serial Number and Date Range

5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.

⚠ WARNING

Before tilting the cab, make sure there is adequate clearance in front of the vehicle and that the area is free of people and objects.

The hydraulic tilt system is a cab-tilting, not a cab-holding device. Do not leave the vehicle unattended unless the cab is fully tilted or resting against the safety stop. Holding the cab in place with the hydraulic tilt system may result in personal injury or death and/or property damage.

Objects falling in the cab or a door flying open could damage the vehicle or cause personal injury.

NOTICE

Do not use either the telescoping tube assembly or the hydraulic tilt cylinder as a step or hand-hold; you could damage the transmission, telescoping tube assembly, or the tilt cylinder.

Before tilting the cab, make sure the vehicle is parked on level ground, both side-to-side and fore-to-aft. Tilting the cab while the vehicle is parked on a slope may damage the cab mounts and prevent you from returning the cab to the operating position.

IMPORTANT: Before tilting or lowering the cab, read the warning label on the tilt pump and the tilt instructions label on the exhaust stack.

2. Secure all loose articles in the cab and bunk, then activate the tilt system power switch on the dash. See **Fig. 15**.

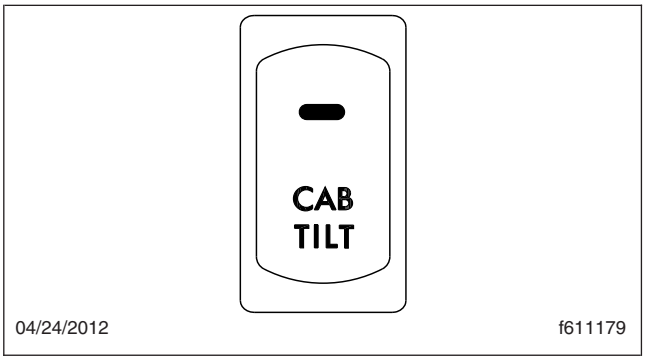


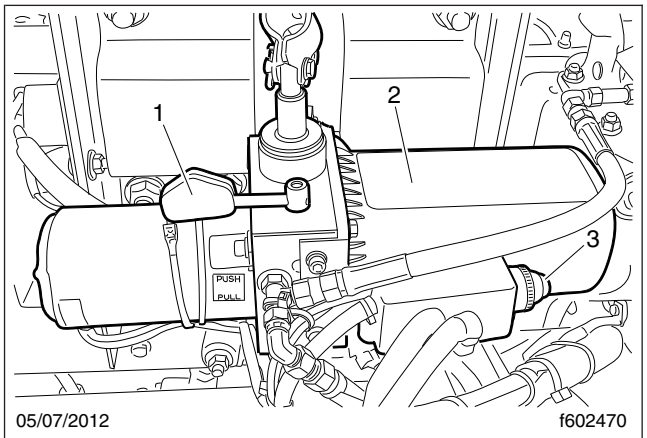
Fig. 15, Cab Tilt Switch

3. Exit the cab and make sure the doors are fully latched.

NOTICE

Make sure the grille is open before tilting the cab. Leaving the grille closed while tilting the vehicle will cause damage to the grille.

4. Fully open the grille.
5. Check the cab travel path for obstructions.
6. Move the pump control lever to the TILT position. See **fig. 16**.



1. Pump Control Lever
2. Hydraulic Tilt Pump
3. Pump Activation Button

Fig. 16, Cab Tilt Pump

7. Press and hold the button on the pump to disengage the hold-down latches and begin tilting the cab.

IMPORTANT: Check the indicator pin on each cab latch. The latches have disengaged if the pins are out. See **Fig. 17**.

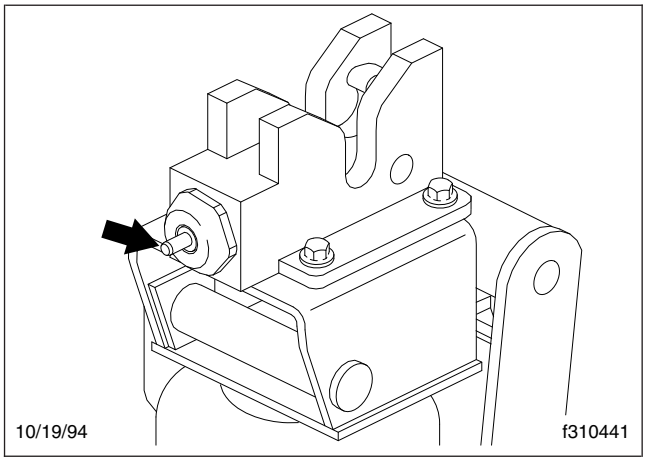
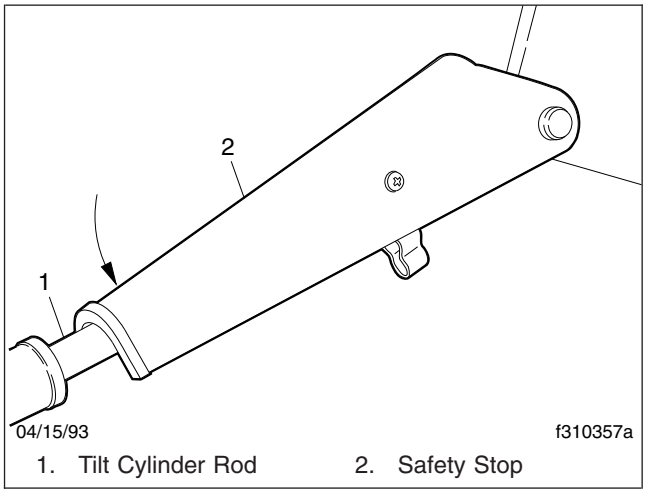


Fig. 17, Indicator Pin

⚠ DANGER

Make sure the safety stop is engaged on the right tilt cylinder rod. If the safety stop isn't engaged, and the cab should drop, the result could be serious injury or death.

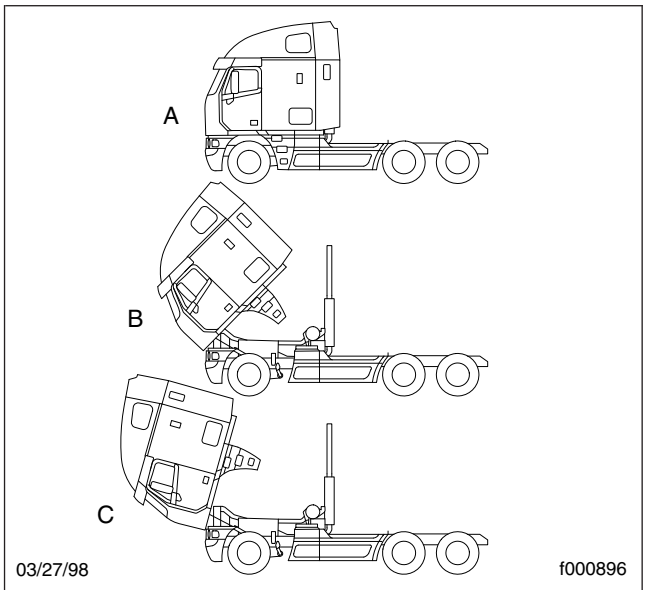
8. When the cab reaches a 30-degree angle, stop tilting the cab by letting go of the pump button. Engage the safety stop on the right tilt cylinder rod. See **Fig. 18** . The safety stop prevents the cab from accidentally dropping below this position.



1. Tilt Cylinder Rod
2. Safety Stop

Fig. 18, Safety Stop Engaged

9. To tilt the cab all the way, press and hold the button on the pump until the cab nears a 45-degree angle (the balance point). See **Fig. 19**. Once the cab goes beyond 45 degrees, release the button on the pump and move the tilt pump lever to the RETURN position in order to slow the cab descent.



A. Upright or Operating Position
B. 45° Tilted Position (balance position)
C. Full-Tilt Position

Fig. 19, Cab Tilt Positions

IMPORTANT: If the cab stops after it has gone beyond the 45-degree angle (balance point), don't force it down with the tilt pump. The velocity fuses have locked the tilt cylinders. To unlock them, see **Chapter 2, Cab Tilt System** for **Hydraulic Lockup** in the *Argosy Driver's manual*.

10. Drain the air system.
11. Remove the ground wire connections between the battery bank(s) and the chassis.
12. Remove the tail pipe from the ATD, if necessary for transmission removal.
13. Remove the exhaust pipe between the bellows outlet and the ATD inlet.
14. Remove any electrical or fluid routing brackets from the bottom of the transmission.
15. If needed, remove the cooler lines from the transmission and cap the lines and ports.
16. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
17. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
18. Remove the over-slung crossmember.
19. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
20. Remove any electrical or fluid routing brackets from the top of the transmission.
21. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie loca-tions for reassembly.
22. Remove air line connections from the transmission, and mark for reassembly.
23. Remove the nodal rear engine mount isolator bolts, and raise and support the back of the engine.
24. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Ad-just the support plate to the same angle as the bottom of the transmission.
25. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
26. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

27. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 20**.

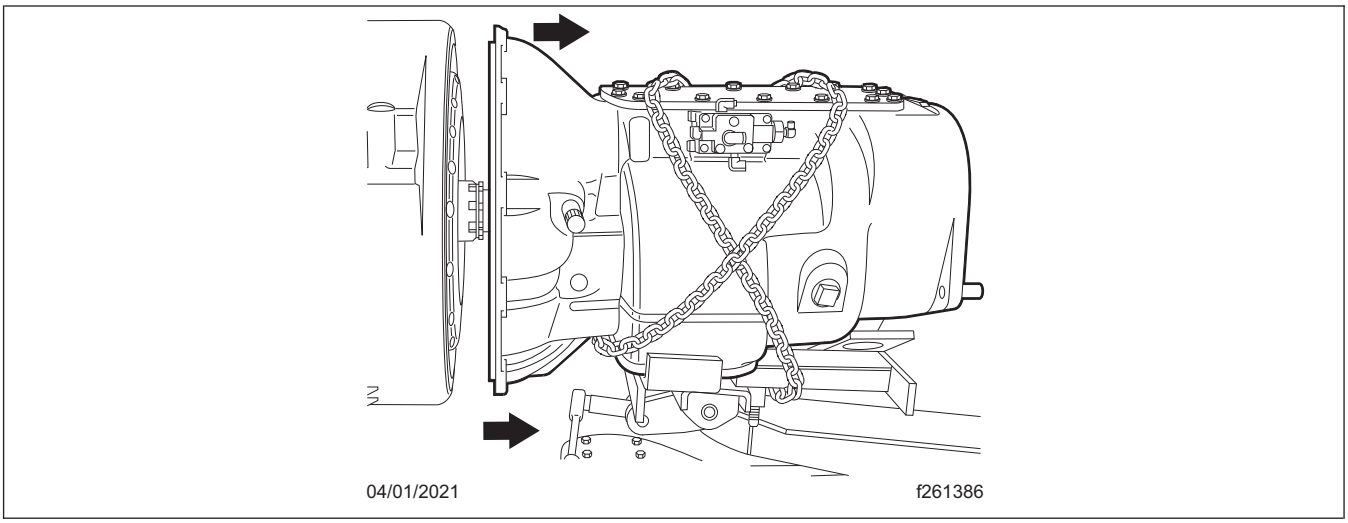


Fig. 20, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns Department* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 21**.

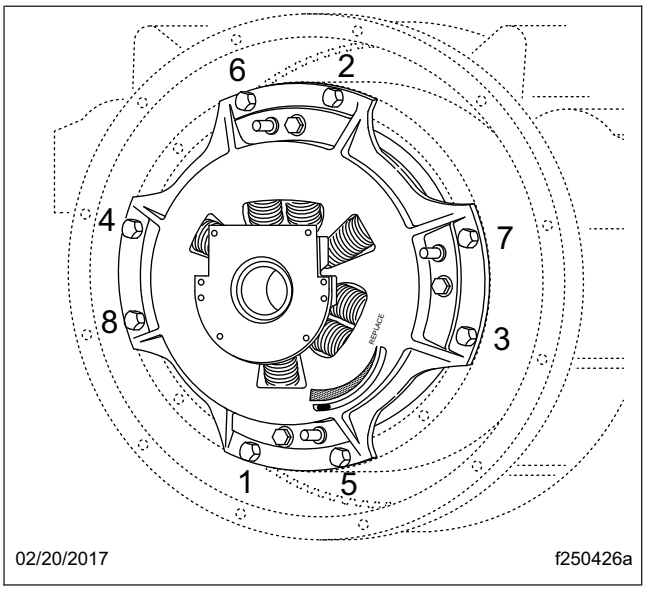


Fig. 21, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

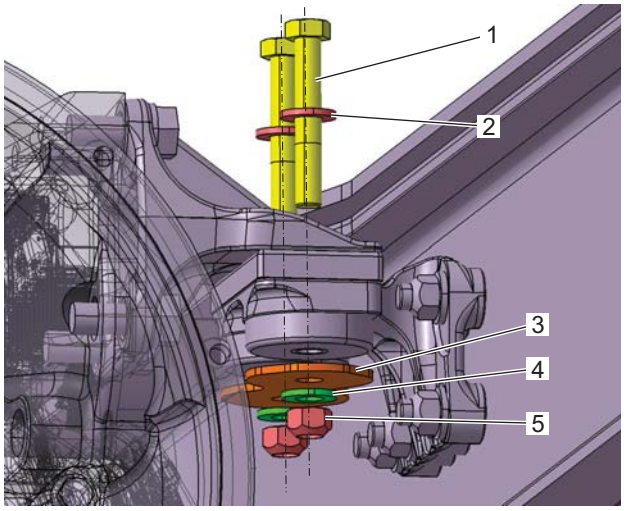
2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.
3. Feed the release bearing grease tube through the hole in the bell housing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

4. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
5. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
6. Lower the back of the engine and install the isolator bolts. Torque to 203 lbf·ft (275 N·m), alternating between the front and rear bolts, to prevent binding. See **Fig. 22**.



1. Screw-Cap, HEX
2. Washer
3. Plate
4. Washer
5. Nut

Fig. 22, Nodal Rear Engine Supports

7. Remove the transmission from the jack.
8. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
9. Install the over slung crossmemeber torque 128 lbf·ft (174 N·m).
10. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
11. Attach the wire and fluid routing brackets to the top of the transmission.
12. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
13. If required for transmission removal on vehicles tandem-steer suspension, remove the suspension cross-member.
14. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
15. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
16. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
17. If removed, attach the tail pipe to the ATD outlet.
18. Clean the gasket material from all the exhaust connection surfaces, being sure not to drop any material in the pipe or ATD.

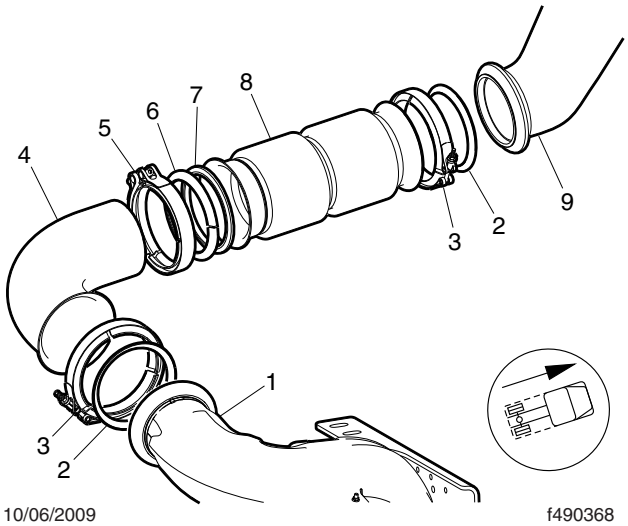
IMPORTANT: Exhaust V-band clamps and gaskets are one-time use, and must be replaced each time they are removed from a system that has been heat cycled.

19. Install the gasket on the ATD inlet.
20. Remove the nut from the new clamp and hang it out of the way on the ATD inlet port.
21. Assemble the slip joint clamp/gasket as follows:
    21.1 Clean any remaining gasket material or soot from the clamp areas.

21.2 Fit the slip-joint clamp (5), flare (6), and compression gasket (7) onto the ATD inlet pipe in the order shown in the **fig. 23**.

21.3 Slide the ATD inlet pipe into the bellows.

21.4 Fit the slip-joint clamp over the slip flare, compression gasket, and bellows, and loosely install the nut.



1. ATD
2. Spherical Clamp Gasket
3. Spherical Clamp
4. ATD Inlet Pipe
5. Slip-Joint Clamp
6. Slip Flare
7. Conical Gasket
8. Bellows
9. Turbocharger Outlet Pipe

Fig. 23, Exhaust Pipe Installation

22. Fit the pipe assembly to the ATD inlet, position the clamp, and loosely install the nut.
23. If removed, install the ATD inlet pipe support bracket on the frame rail, and torque to 64 lbf·ft (87 N·m).
24. If applicable, fit the ATD-inlet-pipe support bracket clamp.
25. Stabilize the assembly by applying minimal torque to all the clamps in the following order:
    - Slip-Joint
    - ATD Inlet
    - Support Clamp
26. Use the following procedure to torque V-band style exhaust clamps
    26.1 Align the pipe ends to be as centered on the port as possible.
    26.2 Tighten the clamp to the specified torque value.
    26.3 Use a plastic or rubber mallet, tap around the outside of the clamp to seat it against the pipe.
    26.4 Re-tighten the clamp to the specified torque value.
27. Using the V-band torque procedure, tighten the clamp at the ATD inlet to 15 lbf·ft (20 N·m).
28. Using the V-band torque procedure, tighten the slip-joint clamp at the bellows to 15 lbf·ft (20 N·m).
29. If applicable, tighten the ATD-inlet-pipe support bracket clamp to 24 lbf·ft (30 N·m).

NOTE: For installations where 7/8" grade 8 fasteners are torqued to 500 lft·ft (678 N·m), the fasteners are one-time use and must be replaced when removed.

30. If removed, install the tandem-steer suspension crossmember.
    - For tubular assemblies with 3/4" grade 8 fasteners torque to 200 lbf·ft (271 N·m).
    - For tubular assemblies with 7/8" grade 8 fasteners, and welded spring-end frame hangers (set forward axle position), torque to 323 lbf·ft (438 N·m).
    - For tubular assemblies with 7/8" grade 8 fasteners, and cast spring-end frame hangers (set back axle position), torque to 500 lbf·ft (678 N·m).
31. Connect the batteries.

⚠ DANGER

Stay completely clear of the cab's travel path at all times. Once the safety stop has been released, don't lean over the frame rails, the engine, or the transmission for any reason. To do so could result in serious injury or death.

32. Move the pump lever to the RETURN position.
33. Check the cab travel path for obstructions.
34. Press and hold the button on the pump to begin moving the cab to the operating position.

NOTE: To slow the cab descent, reverse the tilt pump lever after the cab passes the balance point.

35. Allow the cab to lower to the safety stop, then move the safety stop away from the right tilt cylinder rod. See **Fig. 24**.

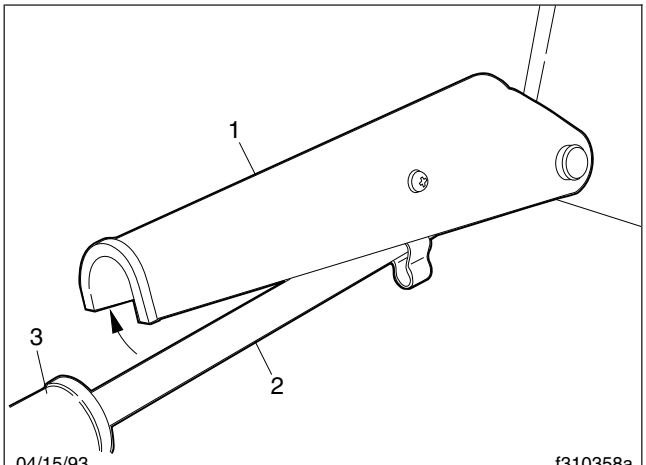


Fig. 24, Safety Stop Disengaged

36. Press and hold the button on the pump until the cab nears a 45-degree angle (the balance point). See **Fig. 25** . Once the cab goes beyond 45 degrees, release the button on the pump and move the tilt pump lever to the TILT position in order to slow cab descent.

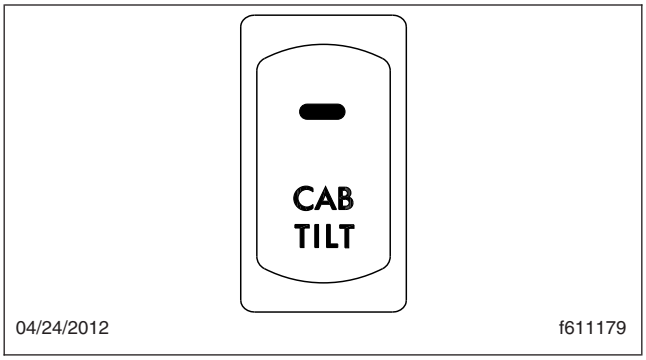


Fig. 25, Cab Tilt Switch

IMPORTANT: If the cab stops after it has gone beyond 45 degrees, don't force it down with the tilt pump. The safety stop is in the locked position or, the velocity fuses have locked the tilt cylinders. Release the safety stop or, to unlock the fuses, see **Hydraulic Lockup** in the *Argosy Driver's manual*.

37. Move the pump lever to the RETURN position.
38. Check the indicator pin on each cab latch. The latches are locked when the pins have moved back into the piston and cylinder spring assembly.
39. Close the grille.
40. Turn OFF the tilt system dash switch.

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on "ServiceRanger" icon to launch the program.
4. Open and expand the "Advanced Product Functions" tree.
5. Click on "Transmission", and then Advanced Product Functions appear.
6. Click on "ECA Clutch Service".

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on "Request Clutch Adjustment".
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

May 2021
FL865A-T
NHTSA #20V-642
Transport Canada #2020-488

Population FL865S, T -

Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 12**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 12, Clutch Serial Number and Date Range

   5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

   5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.

⚠ WARNING

Before tilting the cab, make sure there is adequate clearance in front of the vehicle and that the area is free of people and objects.

The hydraulic tilt system is a cab-tilting, not a cab-holding device. Do not leave the vehicle unattended unless the cab is fully tilted or resting against the safety stop. Holding the cab in place with the hydraulic tilt system may result in personal injury or death and/or property damage.

Objects falling in the cab or a door flying open could damage the vehicle or cause personal injury.

NOTICE

Do not use either the telescoping tube assembly or the hydraulic tilt cylinder as a step or hand-hold; you could damage the transmission, telescoping tube assembly, or the tilt cylinder.

Before tilting the cab, make sure the vehicle is parked on level ground, both side-to-side and fore-to-aft. Tilting the cab while the vehicle is parked on a slope may damage the cab mounts and prevent you from returning the cab to the operating position.

IMPORTANT: Before tilting or lowering the cab, read the warning label on the tilt pump and the tilt instructions label on the exhaust stack.

2. Secure all loose articles in the cab and bunk, then activate the tilt system power switch on the dash. See **Fig. 26**.
3. Exit the cab and make sure the doors are fully latched.

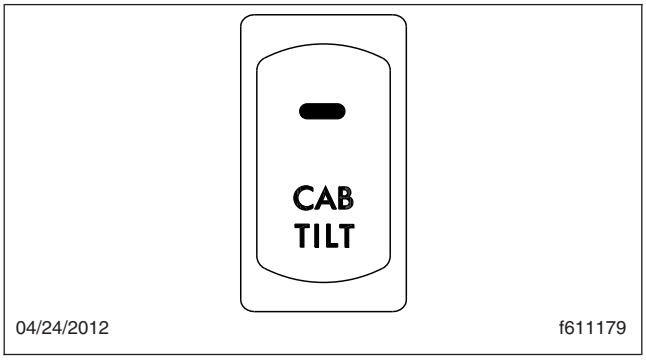
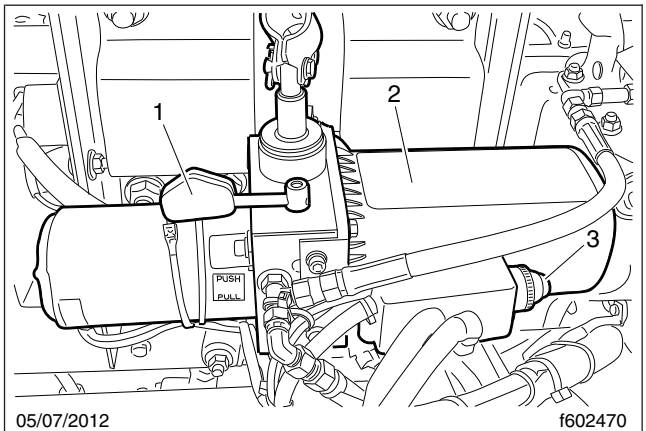


Fig. 26, Cab Tilt Switch

NOTICE

Make sure the grille is open before tilting the cab. Leaving the grille closed while tilting the vehicle will cause damage to the grille.

4. Fully open the grille.
5. Check the cab travel path for obstructions.
6. Move the pump control lever to the TILT position. See **fig. 27**.



1. Pump Control Lever
2. Hydraulic Tilt Pump
3. Pump Activation Button

Fig. 27, Cab Tilt Pump

7. Press and hold the button on the pump to disengage the hold-down latches and begin tilting the cab.

IMPORTANT: Check the indicator pin on each cab latch. The latches have disengaged if the pins are out. See **Fig. 28**.

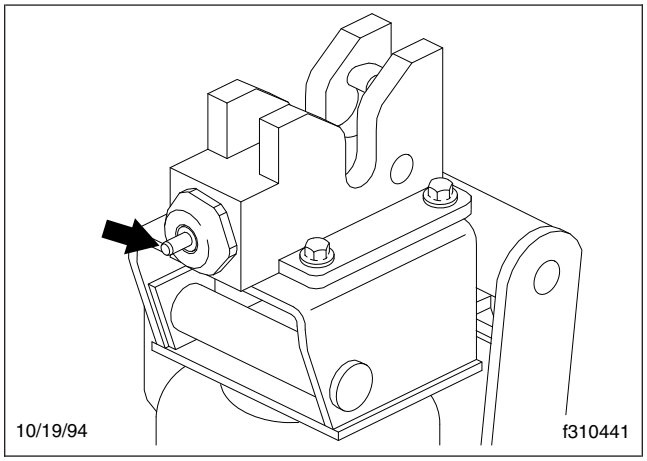
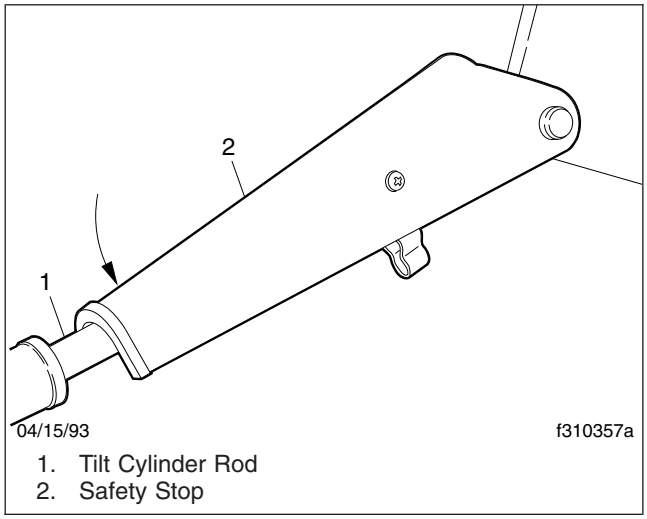


Fig. 28, Indicator Pin

8. When the cab reaches a 30-degree angle, stop tilting the cab by letting go of the pump button. Engage the safety stop on the right tilt cylinder rod. See **Fig. 29** . The safety stop prevents the cab from accidentally dropping below this position.

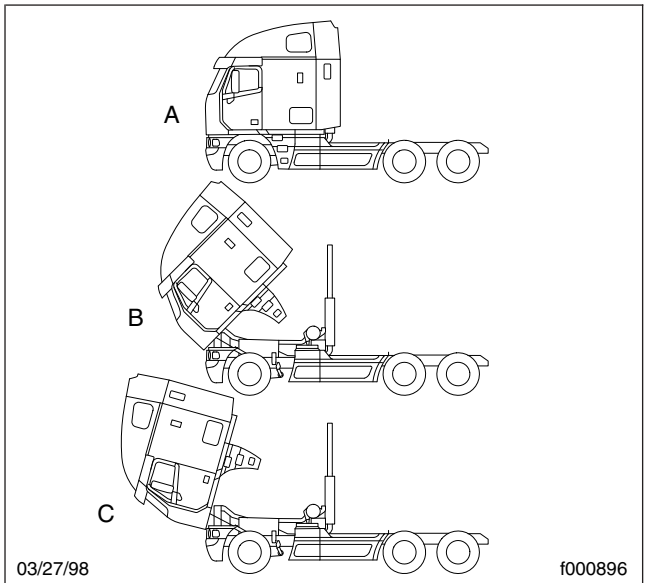


1. Tilt Cylinder Rod
2. Safety Stop

Fig. 29, Safety Stop Engaged

9. To tilt the cab all the way, press and hold the button on the pump until the cab nears a 45-degree angle (the balance point). See **Fig. 30**. Once the cab goes beyond 45 degrees, release the button on the pump and move the tilt pump lever to the RETURN position in order to slow the cab descent.

IMPORTANT: If the cab stops after it has gone beyond the 45-degree angle (balance point), don't force it down with the tilt pump. The velocity fuses have locked the tilt cylinders. To unlock them, see **Chapter 2, Cab Tilt System** for **Hydraulic Lockup** in the *Argosy Driver's manual*.



A. Upright or Operating Position
B. 45° Tilted Position (balance position)
C. Full-Tilt Position

Fig. 30, Cab Tilt Positions

10. Drain the air system.
11. Remove the ground wire connections between the battery bank(s) and the chassis.
12. Remove the tail pipe from the ATD, if necessary for transmission removal.
13. Remove any electrical or fluid routing brackets from the bottom of the transmission.
14. If needed, remove the cooler lines from the transmission and cap the lines and ports.
15. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
16. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
17. Remove the over-slung crossmember.
18. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
19. Remove any electrical or fluid routing brackets from the top of the transmission.
20. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie locations for reassembly.
21. Remove air line connections from the transmission, and mark for reassembly.
22. Remove the nodal rear engine mount isolator bolts, and raise and support the back of the engine.

23. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Adjust the support plate to the same angle as the bottom of the transmission.
24. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
25. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

26. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 31**.

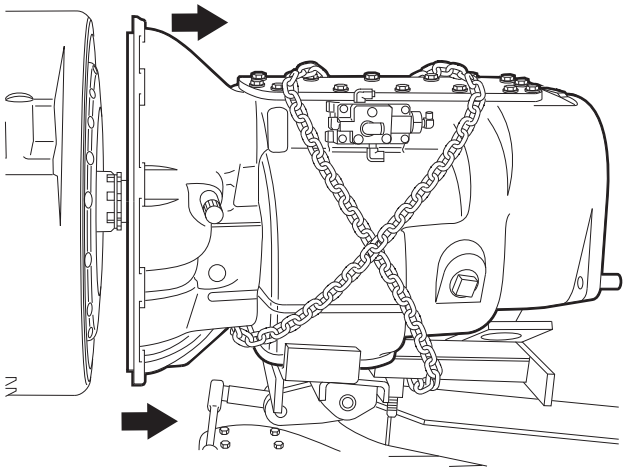


Fig. 31, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns Department* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16"x14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 32**.

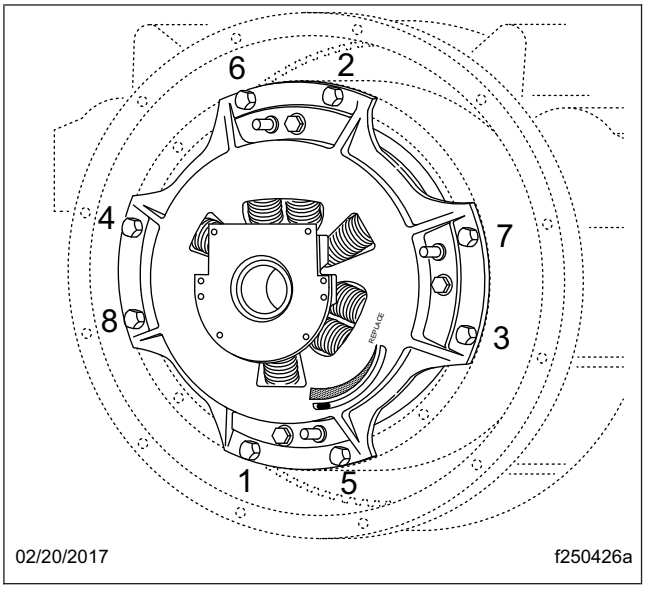


Fig. 32, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

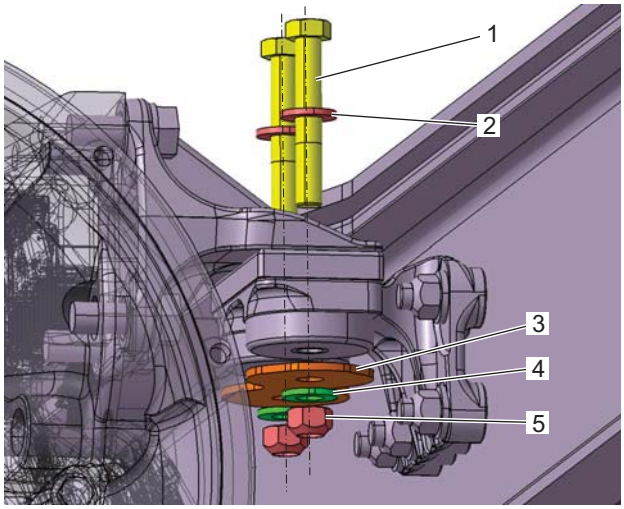
2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.
5. Lower the back of the engine and install the isolator bolts. Torque to 203 lbf·ft (275 N·m), alternating between the front and rear bolts, to prevent binding. See **Fig. 33**.



03/25/2021 f250745

1. Screw-Cap, HEX
2. Washer
3. Plate
4. Washer
5. Nut

Fig. 33, Nodal Rear Engine Supports

6. Remove the transmission from the jack.
7. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
8. Install the over slung crossmember torque 128 lbf·ft (174 N·m).
9. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
10. Attach the wire and fluid routing brackets to the top of the transmission.
11. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
12. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
13. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.

14. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
15. Connect the batteries.

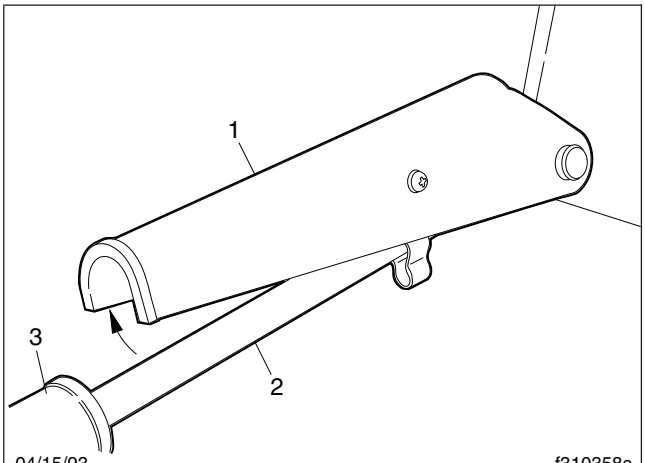
⚠ DANGER

Stay completely clear of the cab's travel path at all times. Once the safety stop has been released, don't lean over the frame rails, the engine, or the transmission for any reason. To do so could result in serious injury or death.

16. Move the pump lever to the RETURN position.
17. Check the cab travel path for obstructions.
18. Press and hold the button on the pump to begin moving the cab to the operating position.

NOTE: To slow the cab descent, reverse the tilt pump lever after the cab passes the balance point.

19. Allow the cab to lower to the safety stop, then move the safety stop away from the right tilt cylinder rod. See **Fig. 34**.



1. Safety Stop
2. Tilt Cylinder Rod
3. Tilt Cylinder

Fig. 34, Safety Stop Disengaged

20. Press and hold the button on the pump until the cab nears a 45-degree angle (the balance point). See **Fig. 35** . Once the cab goes beyond 45 degrees, release the button on the pump and move the tilt pump lever to the TILT position in order to slow cab descent.

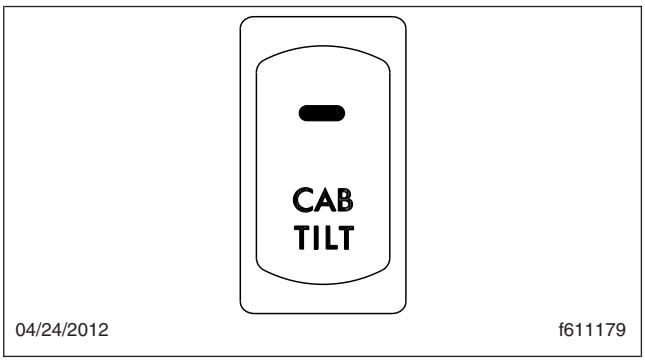


Fig. 35, Cab Tilt Switch

IMPORTANT: If the cab stops after it has gone beyond 45 degrees, don't force it down with the tilt pump. The safety stop is in the locked position or, the velocity fuses have locked the tilt cylinders. Release the safety stop or, to unlock the fuses, see **Hydraulic Lockup** in the *Argosy Driver's manual*.

21. Move the pump lever to the RETURN position.
22. Check the indicator pin on each cab latch. The latches are locked when the pins have moved back into the piston and cylinder spring assembly.
23. Close the grille.
24. Turn OFF the tilt system dash switch.

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on "ServiceRanger" icon to launch the program.
4. Open and expand the "Advanced Product Functions" tree.
5. Click on "Transmission", and then Advanced Product Functions appear.
6. Click on "ECA Clutch Service".

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on "Request Clutch Adjustment".
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.

Population FL865K, O, P
Clutch Serial Number Inspection

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.
2. Check the base label (Form WAR259) for a completion sticker for FL865 (Form WAR260), indicating this work has been done. The base label is usually located on the passenger side door, about 12 inches (30cm) below the door latch. If a sticker is present, no work is needed. If there is no sticker, proceed with the next step.
3. Remove the inspection cover from the bell housing.
4. If needed, use a baring tool designed for the engine to bring the clutch date code into view.
5. Inspect the installed clutch serial number, and compare the serial numbers in **Table 13**.

Ranges	Clutch Serial Number	Year	Month	Day
Start	AU1704010001	2017	04	01
End	AU1806139999	2018	06	13
		OR		
Start	SL1704010001	2017	04	01
End	SL1806209999	2018	06	13

Table 13, Clutch Serial Number and Date Range

5.1 If the serial number is within the affected range, complete the inspection steps then continue with the **Transmission Removal** procedure.

5.2 If the serial number is outside the affected range, the clutch does not need to be replaced. Complete the inspection procedure and the **Completion Sticker step**.

6. Remove the barring tool.
7. Install the inspection cover.
8. Clean a spot on the base label (Form WAR259). Write the recall number, FL865, on a blank red completion sticker (Form WAR260), and attach it to the base label to indicate this campaign has been performed.

Transmission Removal

1. Use the **ServiceRanger** tool to move the electric clutch actuator (ECA) into the service position. For more detailed instructions, see the *Heavy Duty Clutch Service Manual*, in the **Literature center** of **www.RoadRanger.com**.
2. Drain the air system.
3. Remove the ground wire connections between the battery bank(s) and the chassis.
4. Remove the tail pipe from the ATD, if necessary for transmission removal.
5. Support the ATD and remove the strap fasteners.
6. Remove the inlet pipe clamp and electrical harness connections between the chassis and ATD.
7. Remove the exhaust pipe between the bellows outlet and the ATD inlet.
8. Remove any electrical or fluid routing brackets from the bottom of the transmission.
9. If needed, remove the cooler lines from the transmission and cap the lines and ports.
10. Mark the transmission yoke and driveline for reassembly and remove the driveline from the transmission output. For more information refer to the vehicle specific workshop manual.
11. Support the driveline and remove the bearing at the first midship bracket, save any shims, and hang the driveline out of the way.
12. If required, remove the over-slung crossmember.
13. Remove the remote release bearing grease tube from the push-to-connect fitting on the bell housing.
14. Remove any electrical or fluid routing brackets from the top of the transmission.
15. Remove and mark the chassis wire harness connections from the transmission, and note the cable tie loca-tions for reassembly.
16. Remove air line connections from the transmission, and mark for reassembly.
17. Position a transmission jack under the transmission, and raise it against the bottom of the transmission. Ad-just the support plate to the same angle as the bottom of the transmission.
18. Fit the jack against the bottom of the transmission, then secure the transmission to the jack.
19. Remove the flywheel-housing to clutch-housing bolts.

NOTICE

Do not let the rear of the transmission drop, and do not let the transmission hang unsupported in the splined hubs of the clutch discs. Taking these precautions will prevent damage to the clutch discs.

20. Pull the transmission back, until the transmission input shaft is clear of the clutch and the engine flywheel housing. Lower the transmission. See **Fig. 36**.

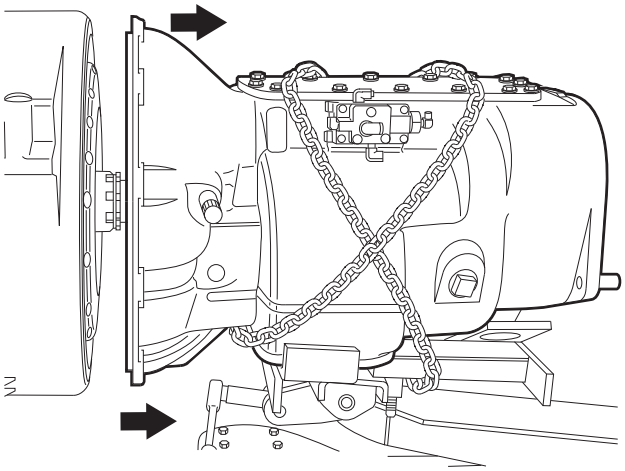


Fig. 36, Transmission Removal

Clutch Replacement

IMPORTANT: Failure to install the four shipping bolts prior to the removal of the clutch will result in clutch damage and void the clutch warranty.

1. Locate the four shipping bolts (7/16" x 14 x 1 3/4" UNC, hex head). Install them in the four cover holes, hand tight it then turn one full turn.
2. Remove two of the top mounting bolts and install two 7/16" x 14 UNC x 5" studs. Then remove the remaining six mounting bolts.
3. Support the clutch assembly with a clutch jack and remove the assembly from the vehicle.

NOTE: The clutch assembly is being replaced prior to wear-out, so no significant wear is expected for the related components associated with normal clutch replacement process. If there is evidence of flywheel, pilot bearing, or housing wear, or the clutch is at the end of its expected life, contact the *Warranty Campaigns De-partment* using the **WSC Ticket** system and provide details of the specific issues.

4. Load the cover assembly onto the clutch jack.

⚠ WARNING

Do not unbolt the intermediate plate from the cover assembly.

5. Install the engine-side disc on the aligning tool. Follow the orientation instructions on the disc.
6. Slide the clutch assembly over the guide studs and install six lock washers and mounting bolts (7/16" x 14 UNC x 2 1/4" grade 5) finger tight. Replace the studs with the remaining two lock washers and bolts.

⚠ CAUTION

Failure to follow the tightening sequence could result in improper piloting of the clutch to the flywheel and can result in a vibration, or worse, the clutch coming loose from the flywheel.

7. Progressively tighten the mounting bolts in a crisscross pattern starting with the lower left bolt. Torque to 45 lbf·ft (61 N·m). See **Fig. 37**.

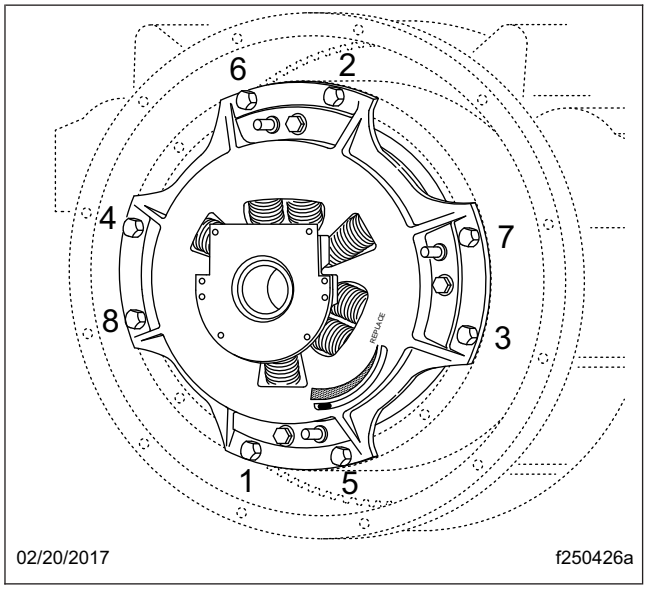


Fig. 37, Tightening Sequence

8. Remove the four yellow shipping bolts in an even ¼ turn crisscross pattern.
9. Remove the aligning tool.
10. Position the release bearing so the orientation of the lube fitting is in the 4 o'clock position.

Transmission Installation

1. Position the transmission behind the engine and adjust the support plate until the flange of the clutch housing is parallel to the flange of the flywheel housing.

NOTE: If necessary, wipe the input shaft with a clean, dry cloth. It is not necessary to lubricate the input shaft.

2. Roll the transmission forward, raising the transmission as needed to maintain alignment in the center of the release bearing.

NOTICE

Use care to avoid springing the drive discs when the transmission is being installed. Do not force the transmission into the clutch or flywheel housing if it does not enter freely.

Do not let the transmission drop or hang unsupported in the driven discs. These practices can damage the clutch assembly.

3. Push the transmission forward until the clutch housing pilot flange enters the flywheel housing pilot bore.
4. Install the flywheel-housing-to-clutch-housing fasteners, tighten them finger-tight. Then, using a crisscross pattern, tighten the capscrews either 48 lbf·ft (65 N·m) for Patch-Lok capscrews, or 42 lbf·ft (57 N·m) for non-locking capscrews with lockwashers.

5. Remove the transmission from the jack.
6. Connect the air lines and wiring to the transmission and secure with ties and clamps as original.
7. If removed, install the over slung crossmemeber torque 128 lbf·ft (174 N·m).
8. Attach the release bearing grease line to the push-to-connect fitting on the bell housing.
9. Attach the wire and fluid routing brackets to the top of the transmission.
10. Align the marks made during removal, between the transmission yoke and driveline, and connect the driveline to the yoke, and torque. Use vehicle specific transmission and driveline build information from PartsPro and the driveline section of the workshop manual to determine the correct torque specification. The information in PartsPro identifies the specific type of driveline, and the workshop manual provides the type/torque table.
11. Assemble the midship bearing using the original shims. Confirm the isolator is centered in the frame, and the fore/aft retaining tabs are not touching the isolator.
12. Torque the midship carrier frame using the vehicle specific driveline build info from PartsPro to determine the correct torque.
13. If applicable, connect the oil cooler lines to the transmission, using the appropriate torque method for the fitting type and size. As an example, -6 JIC fittings hose ends using the flats from wrench resistance (F.F.W.R) method is ½ to ¾ flats after wrench resistance is achieved.
14. Install the ATD, torque strap fasteners to 30 lbf·ft (41 N·m)
15. If removed, attach the tail pipe to the ATD outlet.
16. Clean the gasket material from all the exhaust connection surfaces, being sure not to drop any material in the pipe or ATD.

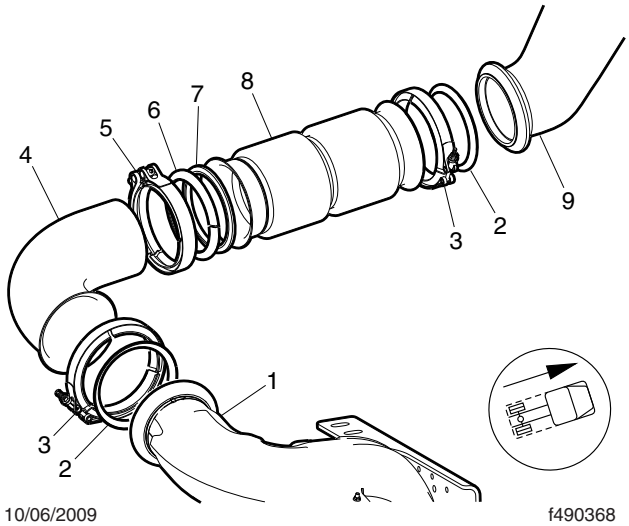
IMPORTANT: Exhaust V-band clamps and gaskets are one-time use, and must be replaced each time they are removed from a system that has been heat cycled.

17. Install the gasket on the ATD inlet.
18. Remove the nut from the new clamp and hang it out of the way on the ATD inlet port.
19. Assemble the slip joint clamp/gasket as follows:
    19.1 Clean any remaining gasket material or soot from the clamp areas.

19.2 Fit the slip-joint clamp (5), flare (6), and compression gasket (7) onto the ATD inlet pipe in the order shown in the **fig. 38**.

19.3 Slide the ATD inlet pipe into the bellows.

19.4 Fit the slip-joint clamp over the slip flare, compression gasket, and bellows, and loosely install the nut.



1. ATD
2. Spherical Clamp Gasket
3. Spherical Clamp
4. ATD Inlet Pipe
5. Slip-Joint Clamp
6. Slip Flare
7. Conical Gasket
8. Bellows
9. Turbocharger Outlet Pipe

Fig. 38, Exhaust Pipe Installation

20. Fit the pipe assembly to the ATD inlet, position the clamp, and loosely install the nut.
21. If removed, install the ATD inlet pipe support bracket on the frame rail, and torque to 64 lbf·ft (87 N·m).
22. If applicable, fit the ATD-inlet-pipe support bracket clamp.
23. Stabilize the assembly by applying minimal torque to all the clamps in the following order:
    - Slip-Joint
    - ATD Inlet
    - Support Clamp
24. Use the following procedure to torque V-band style exhaust clamps
    24.1 Align the pipe ends to be as centered on the port as possible.
    24.2 Tighten the clamp to the specified torque value.
    24.3 Use a plastic or rubber mallet, tap around the outside of the clamp to seat it against the pipe.
    24.4 Re-tighten the clamp to the specified torque value.
25. Using the V-band torque procedure, tighten the clamp at the ATD inlet to 15 lbf·ft (20 N·m).
26. Using the V-band torque procedure, tighten the slip-joint clamp at the bellows to 15 lbf·ft (20 N·m).
27. If applicable, tighten the ATD-inlet-pipe support bracket clamp to 24 lbf·ft (30 N·m).
28. Connect the batteries.

Clutch Adjustment

NOTE: A clutch adjustment should always be performed after a clutch replacement. This command signals the ECA to actuate the clutch in order to reset to the default clutch position in the transmission ECU.

1. Turn the ignition switch to the ON position.
2. Plug the 9-pin connector into the dash port.
3. Click on “ServiceRanger” icon to launch the program.
4. Open and expand the “Advanced Product Functions” tree.
5. Click on “Transmission”, and then Advanced Product Functions appear.
6. Click on “ECA Clutch Service”.

⚠ CAUTION

Ensure that hands are not inside the clutch housing while opening or closing the clutch.

7. Select the "Clutch Position" tab.
8. Click on “Request Clutch Adjustment”.
9. Start the engine and run it until the air system pressurizes to at least 80 psi (550 kPa).
10. Clean a spot on the base label (Form WAR259) and attach a recall completion sticker for FL865, indicating this work has been completed.