Eaton Fuller® AutoShift®
Transmissions
TRDR0930 EN-US
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RTLO-14918A-AS3
RTLO-16918A-AS3
RTLO-18918A-AS3
RTLO-20918A-AS3
RTLO-22918A-AS3
RTO-10910B-AS3
RTO-12910B-AS3
RTO-14910B-AS3
RTO-14910C-AS3
RTO-16910B-AS3
RTO-16910C-AS3
RTO-18910B-AS3
Warnings & Cautions

Read the entire driver instructions before operating this transmission.

Before starting a vehicle always be seated in the driver's seat, select “N” on the shift control, and set the parking brakes.

If engine cranks in any gear other than neutral, service your vehicle immediately!

Before working on a vehicle, parking the vehicle, or leaving the cab with the engine running, place the transmission in neutral, set the parking brakes, and block the wheels.

For safety reasons, always engage the service brakes prior to selecting gear positions from "N".

Do not release the parking brake or attempt to select a gear until the air pressure is at the correct level.

Before operating the PTO, refer to “Transmission Power Take Off Operation”.

Battery (+) and (-) must be disconnected prior to any type of welding on any AutoShift™ equipped vehicle.

It is a requirement that the driver of a commercial vehicle specified under paragraph A sections 1-6 of FMCSA regulation 392.10 need only cross railroad grade crossings in a gear that permits the vehicle to complete the crossing without a change of gears.

This can only be achieved by utilizing the Manual “M” mode. Please refer to pages 2 and 9 for correct manual mode operation.
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Operation

Shift Console Positions

R - Reverse
N - Neutral
D - Drive
MANUAL
LOW

R  Selects Reverse gear once vehicle speed is less than 2 mph.
N  Selects Neutral
D  Selects the default starting gear and automatically selects gears between the starting gear and top gear.
Manual  Allows the driver to hold current gear and manually select the appropriate gear for road conditions using the up/down buttons. MANUAL mode should be used whenever the driver wants to select the shifts instead of letting AutoShift select them automatically. For example, when the driver is moving around the yard, over railroad tracks, or on steep grades. (See the “Manual Mode” section for more details.)
Low  Transmission downshifts at the earliest opportunity for maximum engine braking.

Up / Down Buttons  Used in the MANUAL mode to select upshifts and downshifts and to change start gear, if available.
PTO  Power Take Off is activated and transmission is ready for PTO operation. (See “Transmission Countershaft Power Take Off” section for more details.)

WARNING

AutoShift™ initiates upshifts from “MANUAL” and “LOW” for engine overspeed protection. Some engines do not use the Eaton engine overspeed protection.
**Operation**

**Gear Display**

The Gear Display shows the current gear position of the transmission. The Gear Display will flash the target gear position of the transmission when in neutral during a shift.

- **Satisfactory engagement in 5th gear**
- **Out of gear waiting for engine/trans rpm to reach synchronous**
- **Satisfactory engagement in 6th gear**

Down arrows on the Gear Display indicate the transmission is waiting to verify decreased input shaft speed, before a gear engagement from Neutral can be completed.

The “DASH” indicates the transmission may be torque locked in gear (see “Service and Maintenance Locked in Gear” section for more details).
Start-up and Power Down

Start-up

1. Turn the ignition key to “ON” and allow the AutoShift to power-up.
2. Depress the clutch pedal.
   
   • Engine cranking is delayed until the transmission power-up is complete and the gear display shows a solid “N”.
3. Start the engine.
4. Apply service brake.
5. Release the clutch pedal to register proper input shaft speed.
6. Depress clutch pedal.
7. Select the desired mode and starting gear, on the shift console.
8. Release the vehicle parking brakes.
10. Release the clutch pedal to begin vehicle movement.

Power Down

1. Select Neutral on the shift control.
   
   • If gear display does not show solid “N”, neutral has not yet been obtained.
2. Set the vehicle parking brakes.
3. Turn off the ignition key and allow the engine to shut down.
Driving Tips

Proper Starting Gear
Choose a starting gear appropriate for the load and grade conditions while at a stop in Drive and MANUAL modes by using the up/down buttons. Refer to Drive Mode for detailed information.

Skip Shifting
Automatic skip shifting may occur in Drive mode if conditions are appropriate or the driver may command them in MANUAL by pressing the shift button more than once. Refer to MANUAL mode section for detailed information.

Optimal Engine Braking
The LOW mode can be selected while moving. This initiates downshifts as soon as possible. Refer to Low mode section for detailed information.

Skid Conditions
If a skid or Antilock brake condition occurs, disengage the clutch. The AutoShift senses the vehicle speed dropping rapidly and will limit downshift gear selections until the skid condition is complete.

Cruise Control
The AutoShift is totally compatible with cruise control. If a shift is required while cruise control is active, cruise is temporarily interrupted while the shift is performed and then automatically resumed after the shift.

Load Based Shifting
In Drive, the AutoShift will adapt to the changing conditions of the vehicle. Right after power-up or after changing loads, AutoShift needs to learn the new conditions. While learning, it may hold a gear instead of upshifting. Simply push the Up button to start the upshift. It may take three or four shifts for the AutoShift to learn the new conditions. After that it will handle upshifts and downshift automatically.

Coast Mode
When coasting to a stop in lower gears, AutoShift may not finish downshifting until the driver gets back on the throttle. This is normal for the AutoShift.
Reverse Mode
The vehicle speed must be less than 2 mph before Reverse is permitted. If the driver requests Reverse above 2 mph, the shift is not performed until the speed has dropped below 2 mph.

Each time Reverse is selected from Neutral, the default reverse gear is engaged.

While the vehicle is stopped in Reverse, the up/down buttons are used to change the reverse gear. This selection is only maintained until another mode is selected.

There is a speed limit on the reverse engagements, yet the driver can effectively rock the vehicle by selecting from reverse to drive and drive to reverse.

18-Speed

10-Speed
Operation

Drive Mode

Depending on the transmission model and Transmission ECU configuration, there may be alternate forward starting gears available. While the vehicle is stopped in Drive, the up/down buttons are used to change the starting gear. This selection is used until it is changed again, or the AutoShift is powered down.

In Drive mode, all upshifts and downshifts are performed automatically based on vehicle and transmission conditions.

The driver can advance a shift (by about 75 rpm) by pressing the proper up/down button (up for upshifts, down for downshifts) when the transmission is within 75 rpm of the load based shift point.

The Gear Display shows the status of the shift:

- The current gear is displayed solid.
- At the start of the shift, the current gear is displayed solid until the transmission is pulled to the neutral position.
- While the transmission is in neutral and synchronizing for the target gear, the target gear is flashed.
- When the shift is complete, the new current gear is displayed solid.
**Operation**

**MANUAL Mode**

Manual mode should be used whenever you want to select the shifts instead of letting AutoShift select them for you. For example, when you are moving around the yard and on some grade conditions.

**Selecting from Neutral:**

- As described above for Drive Mode, the starting gear can be changed in exactly the same way in Manual mode.
- If Manual mode is selected from a stop, the starting gear is maintained - no automatic shifts are performed, except for condition noted below.
- The driver can request shifts using the proper shift button (up for upshifts, down for downshifts). The upshift or downshift is performed by the AutoShift provided the result in engine speed is not outside of defined limits. For upshifts, the resulting engine speed must be greater than 800 RPM; for downshifts, the resulting engine speed must be less than engine rated speed. By pressing the button twice, the driver can request a skip shift.

**Selecting Manual from Drive or Low while Moving:**

- If Manual mode is selected while moving, the current gear is maintained - no shifts are performed, except for conditions noted below.
- As described above, the driver can request shifts using the proper shift button (up for upshifts, down for downshifts) within the same limits described.

**Note:** For optimal vehicle performance, it is recommended the vehicle be operated in “D” Drive mode.
Some engines do not use the Eaton engine overspeed protection.

Transmission Manual Override:

- If the vehicle is being back driven (vehicle coasting and being pushed by the trailer) and the engine is approaching a higher than normal level (approximately 300 RPM above rated speed), the AutoShift overrides the Manual position and performs an upshift to prevent engine damage.
- If the gear being maintained is higher than starting gear, and the vehicle comes to a stop, the AutoShift overrides the Manual mode and performs a shift into starting gear.
Operation

LOW Mode

LOW mode should be used any time you want to maximize engine braking and minimize the use of the brake pedal. For example, when driving down long grades or when coming to a stop.

Selecting LOW from Neutral:

- If LOW mode is selected from Neutral while stopped, the starting gear is always the lowest available gear. The starting gear cannot be changed in LOW mode.
- If LOW mode is selected from Neutral while stopped, the lowest available gear is maintained - no shifts are performed, except for conditions noted below.

Selecting LOW from Drive or MANUAL while moving:

- If LOW mode is selected while moving, no upshifts are performed, except for override conditions noted below.
- Downshifts are performed at higher rpm’s than normal to enhance engine braking. The downshift point is chosen so engine speed after the shift is about 50 rpm below engine rated speed.

Some engines do not use the Eaton engine overspeed protection.

Transmission LOW Override:

- If the vehicle is being back driven (vehicle coasting and being pushed by the trailer) and the engine is approaching a higher than normal level (approximately 300 rpm above rated speed), the AutoShift overrides the LOW position and performs an upshift to prevent engine damage.

WARNING
Operation

Transmission Power Take Off

Stationary PTO Operation
The transmission countershaft PTO is used in this application.

To engage the PTO for stationary operation perform the following steps:

1. Depress clutch.
2. Select “D” on the Shift Control (this stops countershaft rotation for PTO engagement).
3. Engage Transmission PTO.
4. Select Neutral mode.
5. Release clutch.
6. Apply the parking brake.
7. Raise engine speed to desired rpm.

Mobile PTO operation
The Transmission countershaft PTO is used in this application and provides limited mobile operation in the start gears.

To engage the PTO for mobile operation perform the following steps:

1. Depress clutch.
2. Select “MANUAL” on the Shift Control (this stops countershaft rotation for PTO engagement).
3. Engage Transmission PTO.
4. Select “MANUAL”, “Neutral” or, “Reverse”, as required for vehicle movement.
5. Release clutch.
6. Raise engine speed to move vehicle / operate PTO.

Split shaft PTO Operation (stationary only)

To engage the transmission for split shaft operation perform the following steps:

1. Select “D” on the Shift Control.
2. Select PTO switch.
Service & Maintenance

General Model Information

Nomenclature

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Roadranger
Twin Countershaft
Overdrive
Torque x 100
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```
Roadranger
Twin Countershaft
Low-Inertia
Overdrive
Torque x 100
```

Tag Location

The blank spaces provided below are for recording transmission identification data and part numbers of maintenance items. All Fuller® Transmissions are identified by the model and serial number. This information is stamped on the transmission identification tag and affixed to the case.

**DO NOT REMOVE OR DESTROY THE TRANSMISSION IDENTIFICATION TAG.**

The blank spaces provided below are for recording transmission identification data. Have these reference numbers handy when ordering replacement parts or requesting service information:

Transmission Model ________________________________
Transmission Serial Number ________________________________
Troubleshooting

Diagnostics
In the event there is a problem with the AutoShift, there are three primary tasks the driver should perform:

1. Note the driving condition under which the problem occurred.
2. Note the condition of the AutoShift under which the problem occurred (i.e. operation mode (Drive, MANUAL, LOW), current gear, engine speed, etc.).
3. Reset the system following the sequence below.

Transmission Reset Procedure
In some cases, proper transmission operation can be restored by “resetting” the transmission Electronic Control Unit (ECU). Use the following procedure to reset the ECU:

1. When it is safe to do so, stop the vehicle.
2. Place the transmission shift lever in Neutral and turn the ignition key to the “off” position.
3. Wait at least 2 minutes.
4. Restart the engine.

Product Diagnostic Mode “PD”
In the event the transmission is put in Product Diagnostic Mode, a “PD” will be displayed on the gear display, and the truck will not start. Use the following procedure to exit Product Diagnostic Mode:

1. Select Neutral “N” and turn the key off.
2. Wait at least 2 minutes.
3. Turn the key on and power the system up.
4. Verify there is an “N” on the gear display.
5. Start the engine.
Service & Maintenance

Locked In Gear

If the truck is shut down in gear, the AutoShift may become locked in gear. The transmission will attempt to get to Neutral during the next power up if the shifter is in Neutral. If Neutral is achieved, a solid “N” appears on the Gear Display. If Neutral cannot be achieved, a “DASH” will appear on the display and the engine will not start. If a dash appears during power up and the lever is in Neutral try the following:

1. Select Neutral, “N.” Turn the key OFF and let the transmission power down for at least 2 minutes.
2. Depress the brake pedal.
3. Release the parking brake.
4. Depress the clutch, but do not push in all the way to the floor or you will make contact with the clutch brake.
5. Select Neutral.
6. Turn the key to the ON position.
7. AutoShift will attempt to shift into Neutral once you turn the key ON, but you may have to slightly release the brake pedal to help let the torque off the driveline.
8. Once it reaches Neutral a solid “N” will appear on the Gear Display and the truck will start. If a dash still appears after this procedure, get the vehicle to a service center.
Proper Lubrication

Proper lubrication procedures are key to a good all-around maintenance program. If the lubricant is not doing its job or if the lubricant level is ignored, all the maintenance procedures in the world are not going to keep the transmission running or assure long transmission life.

Fuller® Transmissions are designed so the internal parts operate in an oil bath circulated by the motion of the gears and shafts.

Thus, all parts are amply lubricated if these procedures are closely followed:

1. Maintain lubricant level and inspect regularly.
2. Follow maintenance interval chart.
3. Use the correct grade and type of lubricant.
4. Buy lubricant from an approved dealer.

Mixing of Oil Types

CAUTION

Never mix engine oils & gear oils in the same transmission.

Engine oils and gear oils may not be compatible; mixing can cause breakdown of the lubricant and affect component performance. When switching between types of lubricants, all areas of each affected component must be thoroughly flushed.

Note: For a list of Eaton approved synthetic lubricants, see TCMT-0021 or call 1-800-826-HELP (4357).

Note: Additives and friction modifiers must not be introduced.
Service & Maintenance

Proper Transmission Lubrication Level

Make sure the transmission lubricant is level with the bottom of the fill opening. Being able to reach the lubricant with your finger does not mean the lubricant is at the proper level. (On heavy duty transmissions, one inch of lubricant level equals about one gallon of lubricant.)

Lube Change Intervals

Lubricant changes should be based on a combination of the intervals shown in TCMT-0021, the Roadranger Products Lubrication Manual, and user judgement based on the application and operating environment. Extending drain intervals beyond those shown in the tables is not recommended and will put warranties at risk.

Note: The first lube change for a Line-Haul vehicle may be extended to 500,000 miles (800,000 km) when a new transmission has been factory filled with a lube that is Eaton approved for 500,000 miles (800,000 km) (E-500, PS-164).

Note: Vocational service applications are those which require components to be consistently operated at heavy loads, in contaminated environments or on steep grades. For these applications, the Vocational Service section should be used.
Vehicle Towing

When towing the vehicle, the output shaft of the transmission must not be allowed to spin or turn. If the vehicle is towed with the drive wheels still in contact with the road surface, the vehicle axle shafts or driveline must be removed or disconnected.

**CAUTION**

Serious internal transmission damage can result from improper vehicle towing.

Correct

INCORRECT
Warranty

Extended Warranty Form

Purchased Warranty Registration Form

For extended warranty pricing and coverages, please visit our website at www.Roadranger.com or reference these warranty documents:
See TCWY-0900 for purchased warranty requirements, limitations, exclusions, and pricing.
See TCWY-0600 for general warranty information, claim processing procedures, and part requirements.
- Vehicles registered from the 13th month through the 24th month of service require payment of a $100.00 USD/$120 CAN fee plus the extended warranty coverage price.
- Vehicles registered from the 25th month through the 36th month of service require payment of a $300.00 USD/$350 CAN fee plus the extended warranty coverage price.

Required Registration Information

IMPORTANT: To ensure this warranty registration can be processed, please provide complete and accurate answers to ALL information requested below. Failure to do so will cause delays in registering the vehicle.

OWNER __________________________________ DEALER _________________________________
Address _________________________________ Address _________________________________
City ____________________ State/Prov. _____ City ____________________ State/Prov. _____
Postal Code __________________ Postal Code __________________
Phone __________________________ Phone ___________________________
Email: __________________________________ Email: __________________________________

Vehicle & Component Information

NOTE: Not all Vocations are eligible for Extended Warranty Coverage.

Chassis VIN (17 characters): __  __  __  __  __  __  __  __  __  __  __  __  __  __  __  __  __
Vehicle Vocation: City Delivery    Heavy Haul      Line Haul
(Log check one)   Logging       Oil Field       Refuse
Other ____________________________________________

OEM: ___________________   Current Mileage: ________________
Transmission Model: _________________________ Trans Serial No _______________
Clutch Mfg. : Model _______________

Remittance Instructions

Checks should be made in U.S. or CAN funds and made payable to Eaton Corporation. Checks may be written by the dealer or the owner. Checks and registration forms should be mailed to the appropriate address listed below:

United States    Canada
Eaton Corporation    Eaton Corporation
Attn: Warranty Registration    Attn: Warranty Registration
P.O. Box 93531        P.O. Box 2473, Station A
Chicago, IL 60673-3531    Toronto, Ontario, M8W3X6
Check #:                Check Date: _______________________________
USD/Check Amt.: _______________________________ USD/$350 CAN Funds

Before signing below, please read this section carefully!

This warranty is only valid if the vehicle is used in the vocation/application selected.
This warranty is only valid if the clutch and/or transmission are properly maintained. This includes maintaining proper adjustments, the use of required lubricants, adhering to prescribed lubricant change schedules and keeping lubricant at prescribed levels at all times.
I may be required to provide proof that lubricants have been changed at the required intervals.
This warranty is only valid for verifiable defects in material or workmanship.
This warranty does not cover failures due to operator error or abuse, improper maintenance or adjustments, driveline vibration or torsional activity, improper driveline angles, unauthorized alterations to the warranted product or failures caused by other components.
This warranty might be subject to other requirements, limits and exclusions.

DEALER Contact Signature: ________________________________  OWNER Signature: ________________________________
DEALER (Printed): ____________________  Date: __________________
DEALER Contact Phone: ________________________________

www.Roadranger.com