Video Instruction Available
Instructional videos are available for download at no charge at roadranger.com

Videos are also available for purchase. To order, call 1-888-386-4636. Ask for item # RRSD0002

Fuller Heavy Duty Transmissions
TRDR0310
September 2007
Warnings and Cautions

⚠️ WARNING

Read the entire driver instructions before operating this transmission.

Set the parking brakes before starting a vehicle, always be seated in the driver’s seat, move the shift level to neutral, and depress the master clutch.

If engine cranks in any gear other than neutral or without the master clutch depressed, service your vehicle neutral safety start circuit immediately.

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

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

When parking the vehicle or leaving the cab, always place the shift lever in neutral and set the parking brakes.

TOWING: To avoid damage to the transmission during towing, disconnect the driveline.
## Table of Contents

**Reference Numbers**  
Tag Information ............................................................................................................ 1  

**Model Designations**  
Nomenclature............................................................................................................. 2  

**Shift Lever Positions**  
Shift Positions........................................................................................................... 3  

**General Information**  
General Information ................................................................................................. 5  

**Operation**  
Driving Operation ...................................................................................................... 8  

**Lubrication**  
Proper Lubrication ...................................................................................................... 11  

**Preventive Maintenance**  
Maintenance Checks ................................................................................................. 14
Reference Numbers

Tag Information

Transmission model designation and other transmission identification information are stamped on the transmission tag. To identify the transmission model designation and serial number, locate the tag on the transmission and then locate the numbers as shown.

WARNING: Do not remove or destroy the transmission identification tag.

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

Transmission Model: ______________________________________

Transmission Serial Number: _________________________________

Every effort has been made to ensure the accuracy of all information in this brochure. However, Eaton Corporation makes no expressed or implied warranty or representation based on the enclosed information. Any errors or omissions may be reported to Technical Service, Eaton Corporation, P.O. Box 4013, Kalamazoo, Michigan 49003-4013.
Model Designations

Nomenclature

RTF-14608

Roadranger
Twin Countershaft
Forward Shift Bar Housing

Forward Speeds
6 = "Multi-Mesh" Gearing
This (x) 100 = Nominal Torque Capacity
Shift Lever Positions

Shift Positions

RT & RTF

Fuller Roadranger  8-SPEED (RT)

TO UP-SHIFT
• START WITH SELECTOR IN DOWN POSITION
• SHIFT LO 1 2 3 4
• SHIFT 5 6 7 8

TO DOWN-SHIFT
• SHIFT 8 7 6 5
• DEPRESS SELECTOR
• SHIFT 4 3 2 1

DO NOT CHANGE RANGE WHILE MOVING IN REVERSE

RT & RTF

Eaton Fuller Roadranger Transmissions

8 SPEED (RT)

PRE SELECT
UPSHIFTING
START WITH RANGE SELECTOR DOWN
SHIFT LO 1-2-3-4 RANGE SELECTOR
SHIFT 5-6-7-8

DOWNSHIFTING
SHIFT 8-7-6-5 RANGE SELECTOR DOWN
SHIFT 4-3-2-1-LO

DO NOT CHANGE WHILE MOVING IN REVERSE

WARNING
PUT TRANSMISSION IN NEUTRAL BEFORE STARTING ENGINE
Shift Lever Positions

Range Valve (A-3546)

- Range Lever
  - Up for HI Range
  - Down for LO Range

Roadranger Valve—A-5010

- Range Lever
  - Up for HI Range
  - Down for LO Range
General Information

Models in this series provide eight forward speeds and two reverse, consisting of a four-speed front section and a two-speed auxiliary section. The auxiliary section contains LO and HI range ratios, plus an overdrive splitter gear.

The four gear sets in the front section are used twice—once in LO range and once again in HI range.

Shifting is simple and easy with the Roadranger repeat "H" shift pattern. The gear shift lever position for 5th is the same as 1st, 6th the same as 2nd, 7th the same as 3rd, and 8th the same as 4th.

One shift lever and the range control knob/range preselection lever are used to select all ratios in LO or HI range. The range control knob/range preselection lever is used once during an upshift sequence and once during a downshift sequence.

Always preselect the range shift. After preselection, the transmission will automatically make the synchronizer range shift as the shift lever passes through neutral.

Shift Pattern Diagram
A shift pattern diagram should be in your vehicle. If it has been lost, a replacement may be obtained by writing to:

Eaton Corporation  
Transmission Division  
Marketing Communications  
P.O. Box 4013  
Kalamazoo, Michigan 49003  
www.roadranger.com

Please specify shifting controls used and transmission model number when making request.
Transmission Features

Range Shift

The range lever selects LO or HI range. It is used once during an upshift sequence and once during a downshift sequence.

Preselect

IMPORTANT: Always preselect all range shifts when upshifting or downshifting. Preselection requires that the range lever is moved to the needed position before starting the shift.
Preselected range shifts are completed automatically as the lever is moved through neutral and into the next gear. Preselecting all range shifts prevents damage to the transmission and provides for smoother shifts.
For easier and faster gear engagement while the vehicle is standing still, some Eaton® Fuller® transmissions may be equipped with either a Countershaft Brake or a Clutch Brake.

**Countershaft Brake** (Used with push-type clutches)
The control button is mounted on the shift lever just below the shift knob. To operate, disengage the clutch, press down the control button, and shift into LO or reverse. This is an air-operated mechanical brake which slows down the transmission gearing by forcing a piston against the countershaft PTO gear. Never use the Countershaft Brake when upshifting or downshifting. Use only for initial gear engagement when the vehicle is standing still.

**Clutch Brake** (Used with pull-type clutches)
The clutch brake is applied by fully depressing the clutch pedal to the floor board. When applied, the brake slows down and can stop the transmission front box gearing. It is a disc-type brake incorporated into the clutch and transmission drive gear assemblies. Never use the Clutch Brake when upshifting or downshifting. Use only for initial gear engagement when the vehicle is standing still.
Driving Operation

Driving Tips

- Always use normal double-clutching procedures when making lever shifts.
- Always select an initial starting gear that provides sufficient reduction for the load and terrain.
- Never slam or jerk the shift lever to complete gear engagements.
- Never coast with the shift lever in the neutral position.
- Never downshift at too high of a road speed.
- Never move the range lever with the shift lever in neutral while the vehicle is moving.
- Never make a range shift while moving in reverse.
- In most cases, depending on the engine and axle ratios, you can save valuable fuel by operating the vehicle at less than governed RPM while cruising in 8th.

Double-Clutching Procedure

When ready to make a shift:
1. Depress pedal to disengage clutch.
2. Move the shift lever to neutral.
3. Release pedal to engage clutch.*
   a. Upshifts—decelerate engine until engine RPM and road speed match.
   b. Downshifts—accelerate engine until engine RPM and road speed match.
4. Quickly depress pedal to disengage clutch and move shift lever to next gear speed position.
5. Release pedal to engage clutch.

Note: * By engaging the clutch with the shift lever in the neutral position, the operator is able to control the mainshaft gear RPM since it is regulated by engine RPM. This procedure helps the operator match the mainshaft with the driveline.
Operation

Initial Start-Up

**WARNING:** Before starting a vehicle always be seated in the driver’s seat, move the shift lever to neutral, set the parking brakes.

1. Make sure the shift lever is in neutral and the parking brakes are set.
2. Turn on the key switch to start the engine.
3. Allow the vehicle air pressure to build to the correct level. Refer to your “Operator and Service Manual” supplied with the truck.
4. Apply the service brakes.
5. Make sure the range lever is down in the LO range position.

![Range Lever MUST be in the LO Range position for LO Range.](image)

6. Depress the clutch pedal to the floor.
7. Move the shift lever to desired initial gear.
8. Release the parking brakes on the vehicle.
9. Slowly release the clutch pedal and apply accelerator.
Upshift Procedure

In the following instructions, it is assumed that the driver is familiar with operating heavy-duty trucks and tractors, and can coordinate the movement of the shift lever and clutch pedal to make smooth gear engagements while upshifting or downshifting. Always double-clutch when making lever shifts.

**CAUTION:** Never move the range lever with the shift lever in neutral while the vehicle is moving.

1. Move the shift lever, double-clutching, to the next desired gear position in LO range.

Range shift—LO to HI Range (4th to 5th)...

2. When in last gear position for LO range and ready for the next upshift, pull up the Range Lever and move the shift lever, double-clutching, to the next higher speed position according to your shift pattern. As the shift lever passes through neutral, the transmission will automatically shift from LO to HI range.

**CAUTION:** Never move the shift lever after HI range preselection, or at anytime the transmission is in HI range.

Downshift Procedure

1. Move the shift lever, double-clutching, to the next desired gear position in HI range.

Range shift from HI Range to LO Range (5th to 4th)...

2. While in 5th and ready for the next downshift, preselect LO range, push the range preselection lever down.

3. Move the shift lever, double-clutching, to the next desired gear position in LO range. As the shift lever passes through neutral, the transmission automatically shifts from HI range to LO range.

4. Continue downshifting, double-clutching, to the next desired gear position in LO range.
Proper Lubrication

The Key to Long Transmission Life
Proper lubrication procedures are the key to a good all-around maintenance program.

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

All parts will be properly lubricated if these procedures are closely followed:

- Maintain oil level. Inspect regularly.
- Follow maintenance interval chart.
- Use the correct grade and type of oil.
- Buy from a reputable dealer.

Maintain Proper Oil Level

Make sure oil is level with the filler opening. Being able to reach oil with your finger does not mean oil is at proper level. (One inch of oil level is about one gallon of oil.)

For additional lubrication information, see TCMT-0021.

If your vehicle has a transmission oil filter, you must change the filter when fluid or lubricant is changed. Additive and friction modifiers must not be introduced. Never mix engine oils and gear oils in the same transmission.

The use of lubricants not meeting these requirements will affect warranty coverage.

For a list of Eaton Approved Synthetic Lubricants see TCMT-0020 or call 1-800-826-HELP (4357).
Transmission Operating Angles

If the transmission operating angle is more than 12 degrees, improper lubrication will occur. The operating angle is the transmission mounting angle in the chassis plus the percent of upgrade (expressed in degrees).

For operating angles over 12 degrees, the transmission must be equipped with an oil pump or cooler kit to insure proper lubrication.
Lubrication

Operating Temperatures with Oil Coolers

Operating at temperatures above 250°F (120°C) causes loaded gear tooth temperatures to exceed 350°F (177°C) which will ultimately destroy the heat treatment of the gears. Temperatures above 250°F (120°C) should be regarded as a warning of inadequate cooling. If the elevated temperature is associated with unusual operating conditions that will reoccur, a cooler should be added, or the capacity of the existing cooling system increased.

The following conditions in any combination can cause operating temperatures of over 250°F:
   • Operating consistently at slow speed.
   • High ambient temperatures.
   • Restricted air flow around transmission.
   • Exhaust system too close to transmission.
   • High horsepower operation.

External oil coolers are available to reduce operating temperatures when the above conditions are encountered.

Oil Cooler Chart

<table>
<thead>
<tr>
<th>Transmission Oil Coolers are:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong></td>
</tr>
<tr>
<td>• With engines of 350 H.P. and above.</td>
</tr>
<tr>
<td><strong>Required</strong></td>
</tr>
<tr>
<td>• With engines 399 H.P. and above and GCW's over 90,000 lbs.</td>
</tr>
<tr>
<td>• With engines 399 H.P. and above and 1400 lbs. ft. or greater torque.</td>
</tr>
<tr>
<td>• With engines 450 H.P. and above.</td>
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</tbody>
</table>
Preventative Maintenance

Maintenance Checks

Air System and Connections
- Check for leaks, worn air lines, loose connections and capscrews.

Clutch Housing Mounting
- Check all capscrews of the clutch housing flange for looseness.

Clutch Release Bearing (Not Shown)
- Remove hand hole cover and check radial and axial clearance in release bearing.
- Check relative positive of thrust surface of release bearing with thrust sleeve on push-type clutches.
Preventative Maintenance

Clutch Pedal Shaft and Bores

- Pry upward on shafts to check wear.
- If excessive movement is found, remove clutch release mechanism and check bushing on bores and wear on shafts.

Lubricant

- Change at specified service intervals.
- Use only the types and grades recommended.

Filler and Drain Plugs

- Remove filler plugs and check level of lubricant at specified intervals. Tighten filler and drain plugs securely.

Capscrews and Gaskets

- Check all capscrews, especially those on P.T.O. covers and rear bearing covers for looseness which would cause oil leakage.
- Check P.T.O. opening and rear bearing covers for oil leakage due to faulty gasket.

Shift lever

- Check for looseness and free play in housing. If lever is loose in housing, proceed with Shift Lever Housing Assembly.

Shift Lever Housing Assembly

- Remove air lines at slave valve and remove the shift lever housing assembly from transmission.
- Check tension spring and washer for set and wear.
- Check the shift lever spade pin and slot for wear.
- Check bottom end of shift lever for wear and check slot of yokes and blocks in shift bar housing for wear at contact points with shift lever.