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 TRDR0700

September 2007

RTX-11615
RTX-11715
RTX-12515
RTX-14615
RTX-14715
RTX-15615
RTX-15715
RTXF-11615
RTXF-11715
RTXF-12515
RTXF-14615
RTXF-14715
RTXF-15615
RTXF-15715

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SUPPORT

Introduction

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 lever 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, set the parking brakes, and block the wheels.

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.

If your vehicle is equipped with a remote throttle, before operation, the transmission must be in neutral.

TOWING: To avoid damage to the transmission during towing, disconnect the driveline.

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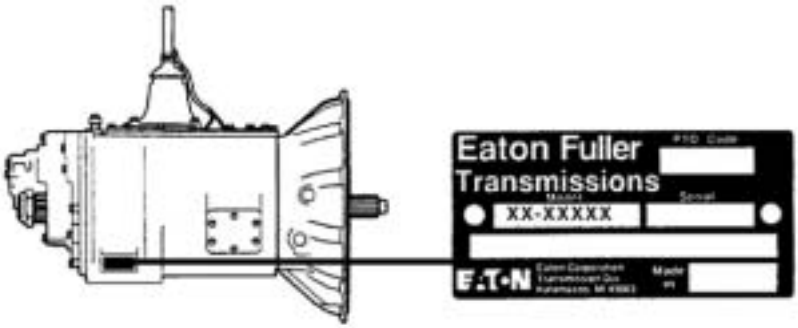
Overview

Identification Tag

Transmission Tag and Location



DO NOT REMOVE OR DESTROY THE TRANSMISSION IDENTIFICATION TAG.

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 (example: RTLO-14610B).

Record transmission identification data. Have these reference numbers handy when ordering replacement parts or requesting service information.

Model Designation

R T X F - 11 9 15

- R — Roadranger
- T — Twin Countershaft
- X — O- Overdrive / X - Direct
- F — Forward Shift Bar Housing
- 11 — This (x) 100 = Nominal Torque Capacity
- 9 — *9- Improved Seal System
- 15 — Forward Speeds
  - 6-"Multi-Mesh Gearing
  - 7- Helical Auxiliary Gearing & "Multi-Mesh" Front Gearing

General Information

Introduction
Driver instructions are divided into two sections: Transmission Operation and Service and Maintenance. Transmission Operation contains information on driving techniques along with shift patterns. Service and Maintenance contains information items that deal with basic service and maintenance; such as, identification tags and lubrication information.

Models in the 15-speed series have fifteen forward speeds and three reverse, consisting of a five-speed front section and a three-speed auxiliary section.

For highway operation, the five speeds in the front section are used once in LO Range and once again in HI Range.

You use the easy, one shift lever, Roadranger® repeat shift pattern. LO Range and HI Range are selected with the Range Control Knob/Range Preselection Lever. It is used once during the upshift sequence and once during the downshift sequence.

Always preselect the range shift as shown in the detailed instructions. After preselection, the transmission automatically makes the synchronized range shift as the shift lever passes through neutral.

The Deep Reduction ratios are selected by the Deep Reduction Lever of the dash-mounted valve or the Deep Reduction Button of the Master Control Valve on the shift lever. The "IN"/FORWARD position selects the Deep Reduction ratios; the "OUT"/REARWARD position is used for all other shifting. The Deep Reduction ratios overlap some of the ratios in LO Range. However, the transmission can be shifted progressively from Deep Reduction, to LO Range and to HI Range to give twelve progressive speeds.

Shifting

Introduction to 15 Speed "X" and "F" Model Transmissions

Overdrive models with the letter "X" instead of an "O" in the model designations, such as in RTX-11615, have their full complement of forward and reverse speeds arranged within a direct shift pattern instead of in a standard overdrive pattern.

On the other hand, the letter "F" appearing in the model designations, such as in RTOF-11615, indicates a forward-mounted position of the gear shift lever housing on the transmission and does not affect the shift pattern.

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:

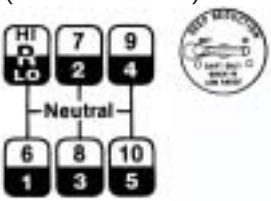
Eaton Corporation
Truck Components
Global Marketing Services
P.O. Box 4013
Kalamazoo, MI 49003
www.roadranger.com

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

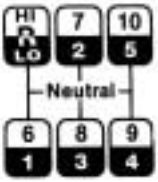
Shift Lever Patterns

With the Deep Reduction Lever/Button in the "OUT"/REARWARD position... Shift 1-2-3-4-5 in LO RANGE. Range Shift... And shift 6-7-8-9-10 in HI RANGE.

RT (Direct Models)
RTX (Overdrive Models)

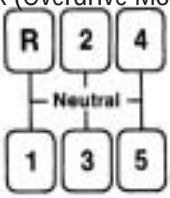


RTO (Overdrive) Models

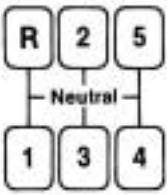


While in LO Range ONLY and the Deep Reduction Lever/Button in the “IN”/ FORWARD position...Shift 1-2-3-4-5 in DEEP REDUCTION.

RT (Direct Models)
RTX (Overdrive Models)



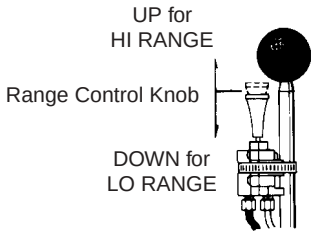
RTO (Overdrive) Models



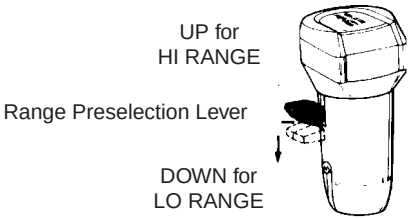
Shifting

Shift Controls

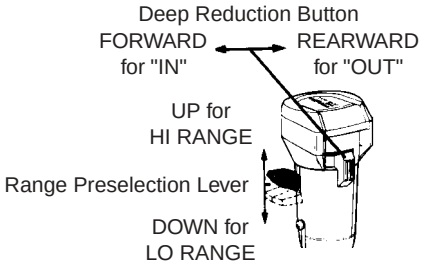
Range Control Valve (A-3546)



Master Control Valve (A-5010)



Master Control Valve (A-5015)



Driving Tips

- Always select an initial starting gear that provides sufficient reduction for the load and terrain.
- Always use normal double-clutching procedures when making lever shifts.
- Never slam or jerk the shift lever to complete gear engagements.
- Never coast with the shift lever in the neutral position.
- 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.
- Never downshift at too high of a road speed.
- 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 top gear.
- For models equipped with the dash-mounted Deep Reduction Valve, never move the Lever to the "IN" position when operating in HI Range.
- Never move the Deep Reduction Lever/Button or the Range Control Knob/Range Preselection Lever with the gear shift lever in neutral while vehicle is moving.

Double-Clutching Procedure

Special Instructions

Purpose:

a. To break torque to allow the transmission to come out of gear, and...
b. To disengage the engine from the transmission when shifting into gear.

Procedure

1. Release accelerator.
2. Depress clutch pedal slightly to break torque enough to move the shift lever to neutral.

Note: Avoid depressing the clutch pedal too far and contacting the clutch brake.

3. When the shift lever is in neutral, let up on clutch pedal.

Note: Engaging the clutch with the shift lever in the neutral position connects the transmission input gearing to the engine. This allows the operator to speed up or slow down the transmission input gearing to properly match the desired gear speed to the current road speed.

a. For upshifts - allow engine RPM to decrease to match road speed.

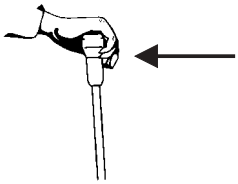
b. For downshifts - increase engine RPM to match road speed.

4. At the correct engine RPM, depress the clutch pedal slightly and **at the same time**, move the shift lever into the desired gear.
5. Let up on 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.

1. Move the gear shift lever into neutral.
2. Start engine and wait for the vehicle's air system to reach normal line pressure.
3. Make sure the Range Preselection Lever is DOWN in the LO Range position.



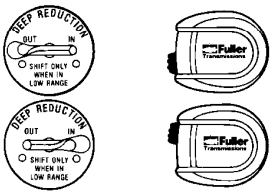
Range Preselection Lever MUST be in the LO RANGE position for LO RANGE and/or DEEP REDUCTION operation.

4. Lever in "OUT" or Button in REARWARD position for LO RANGE operation.
5. Lever in "IN" or Button in FORWARD position for DEEP REDUCTION ONLY.

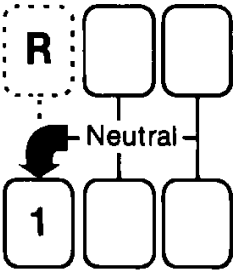
CAUTION: Never move the Deep Reduction Lever/Button to the "IN"/FORWARD position with the Range Preselection Lever UP in the HI Range position OR at any time while the transmission is operating in HI Range.

Lever in "OUT" or Button in REARWARD position for LO RANGE operation.

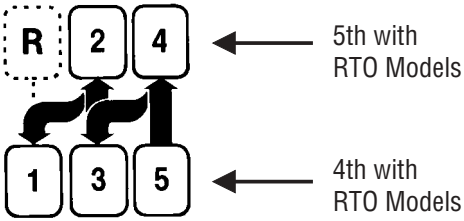
Lever in "IN" or Button in FORWARD position for DEEP REDUCTION ONLY



6. With the clutch disengaged, move the shift lever to the 1st speed gear position. Release the clutch pedal to start vehicle moving. If Deep Reduction was selected, the transmission will be in Deep Reduction 1st.



7. Upshift, double-clutching, from 1st through 2nd, 3rd and 4th to 5th. If the transmission has been operating in LO Range, proceed to the "Range shift from LO to HI Range" step.

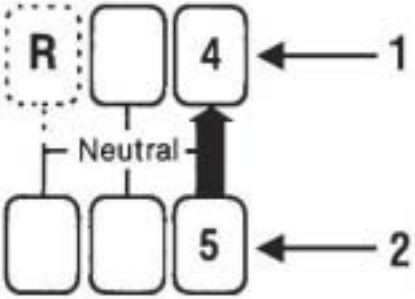


Note: Only when operating conditions permit can the transmission be shifted from Deep Reduction 1st to LO Range 1st in the same gear shift lever position. Since this is a 42% step upshift, the vehicle must have enough speed to make the shift. Move the Deep Reduction Lever/Button to the "OUT/REARWARD position and IMMEDIATELY release accelerator, depress clutch pedal once to break torque and re-engage the clutch. The transmission shifts from Deep Reduction to LO Range when synchronous is reached. Then accelerate.

Release Accelerator . . . Single-Clutch . . . and Accererate.

Upshifting from Deep Reduction 5th to Low Range 4th

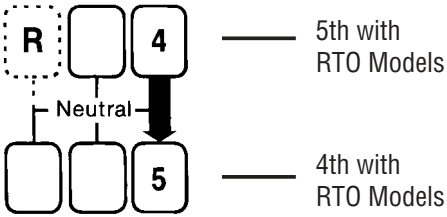
8. While in Deep Reduction 5th and ready for the next upshift, move the Deep Reduction Lever/Button to the "OUT"/REARWARD position. And IMMEDIATELY move the shift lever, double-clutching, to the 4th speed gear position. The transmission shifts from Deep Reduction to LO Range when synchronous is reached.



1. DEEP REDUCTION/LO RANGE 5th with RTO Models
2. DEEP REDUCTION/LO RANGE 4th with RTO Models

Note: An upshift from Deep Reduction 2nd, 3rd or 4th to the next lower ratio in LO Range can be done in the same manner. For instance, Deep Reduction 3rd to LO Range 2nd.

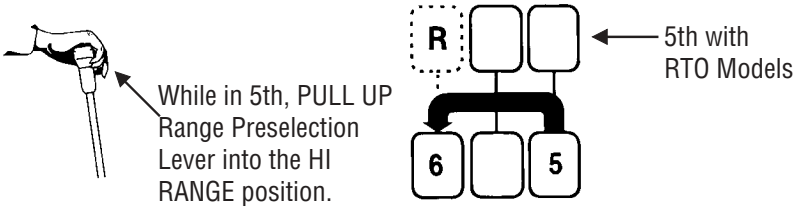
9. Upshift, double-clutching, from 4th to 5th in the LO Range shift pattern.



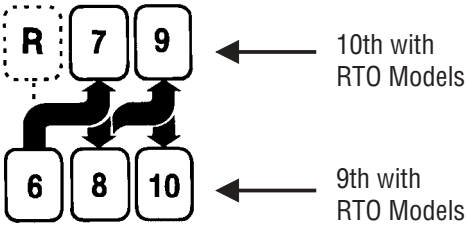
Range shift from LO to HI Range

10. While in LO Range 5th and ready for the next upshift, PULL UP the Range Preselection lever and move the shift lever, double-clutching, to the 6th speed gear position. As the shift lever passes through neutral, the transmission automatically shifts from LO Range to HI Range.

CAUTION: Never move the Range Preselection Lever with the shift lever in neutral while vehicle is moving. Always preselect when making a range shift BEFORE moving the shift lever out of gear.



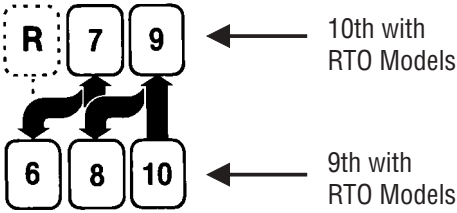
11. Continue upshifting, double-clutching, from 6th through 7th, 8th and 9th to 10th while in HI Range.



Downshift 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.

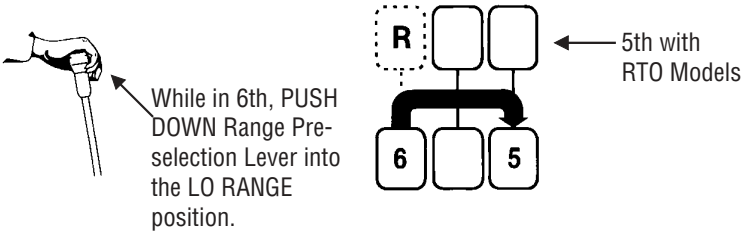
1. Move the gear shift lever, double-clutching, from 10th through 9th, 8th, and 7th to 6th while in HI Range.



Range shift from HI to LO Range

2. While in 6th and ready for the next downshift, PUSH DOWN the Range Preselection Lever and move the shift lever, double-clutching, to the 5th-speed gear position. As the shift lever passes through neutral, the transmission automatically shifts from HI Range to LO Range.

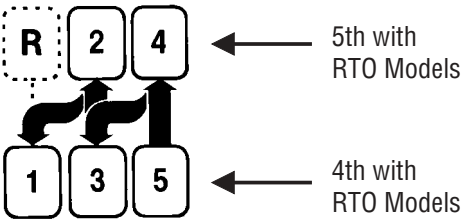
CAUTION: Never move the Deep Reduction Lever/Button to the "IN"/ FORWARD position with the Range Preselection Lever UP in the HI Range position OR at any time while the transmission is operating in HI Range.



3. Continue downshifting, double-clutching, from 5th through 4th, 3rd and 2nd to 1st while in LO Range.
4. You need not downshift into Deep Reduction as the LO Range ratios provide sufficient reduction under normal operating conditions. However, under adverse conditions, the shift to Deep Reduction may be necessary. To make this shift, move the Deep Reduction Lever/ Button to the "IN"/FORWARD position. And IMMEDIATELY release the accelerator, depress the clutch pedal once to break torque, release the pedal to re-engage clutch and accelerate. The transmission shifts from LO Range 1st to Deep Reduction 1st when synchronous is reached.

CAUTION: Never move the Deep Reduction Lever/Button to the "IN"/ FORWARD position with the Range Preselection Lever UP in the HI Range position OR at any time while the transmission is operating in HI Range.

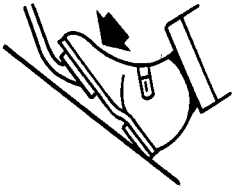
Note: Since this is more than a 42% step downshift, a sufficient change in engine RPM is needed to make the shift.



Skip-Shifting

After becoming proficient in shifting, you may want to skip some of the ratios. This may be done ONLY when operating conditions permit, depending on the load, terrain, and road speed.

Clutch Brake



For easier and faster gear engagement, some Eaton® Fuller® transmissions may be equipped with a Clutch Brake. This brake is used to make initial gear engagement into 1st or reverse while the vehicle is standing still. It can also be used while upshifting to help complete the upshift under adverse conditions where vehicle road speed rapidly slows down. For instance, when accelerating up a hill from a standing start.

The brake is applied by fully depressing the clutch pedal to the floor board. When applied the brake slows down the transmission gearing. It is a disc-type brake incorporated into the clutch and transmission drive gear assemblies.

Never use the Clutch Brake when downshifting, or as a brake to slow the vehicle.

Lubrication Procedures

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.

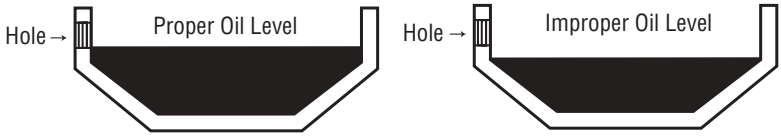
All parts will be properly lubricated if these procedures are closely followed:

a. Maintain oil level. Inspect regularly.
b. Follow maintenance interval chart.
c. Use the correct grade and type of oil.
d. 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.)**

When adding oil, never mix engine oils and gear oils in the same transmission.



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).

Buy from a reputable dealer

For a complete list of approved and reputable dealers see TCMT-0020 or write to:

Eaton Corporation
Truck Components
Global Marketing Services
P.O. Box 4013
Kalamazoo, MI 49003
www.roadranger.com

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.

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

Transmission Oil Coolers are:
Recommended
• With engines of 350 H.P. and above.
Required
• With engines 399 H.P. and above and GCW's over 90,000 lbs.
• With engines 399 H.P. and above and 1400 lbs. ft. or greater torque.
• With engines 450 H.P. and above.

Glossary

Definitions/Glossary of Terms for Transmission Operation

The following terms are used in describing the transmission operating procedures.

Break Torque	Releasing engine power or load from the transmission and drivetrain by releasing throttle or depressing clutch pedal.
Double-Clutch	The shifting technique used when moving the shift lever to the next lever position. Procedures: Depress clutch pedal, move lever to neutral, let up clutch pedal, accelerate or decelerate engine to obtain synchronous, depress clutch pedal again, and move lever into gear.
Preselect	Moving the shift button just prior to starting the shift. The shift button should not be moved while the shift lever is in neutral.
Ratio Step	Amount of change between two gear ratios expressed as a percentage. Example: The ratio step from 1st gear to 2nd gear is 35%.
Shift Button	The button on the side of the shift knob used to change gears.
Synchronous	The point at which the input gearing speed (engine speed) matches the output gearing speed (road speed) and a shift can occur without grinding.

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For spec'ing or service assistance, call 1-800-826-HELP (4357) or visit www.eaton.com/roadranger. In Mexico, call 001-800-826-4357.

Roadranger: Eaton and trusted partners providing the best products and services in the industry, ensuring more time on the road.

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