

## Driver Instructions

### Video Instruction Available

Instructional videos are available for download at no charge at [roadranger.com](http://roadranger.com)

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

# Fuller Heavy Duty Transmissions TRDR0631 September 2007

RTLO-14613B  
RTLOF-14613B



*Powering Business Worldwide*

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SUPPORT

# *Precautions*

## Cautions & Warnings



Read the entire driver instructions before operating this transmission.

Before starting a vehicle always be seated in the driver's seat, move the shift lever to neutral, and set the parking brakes.

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.

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

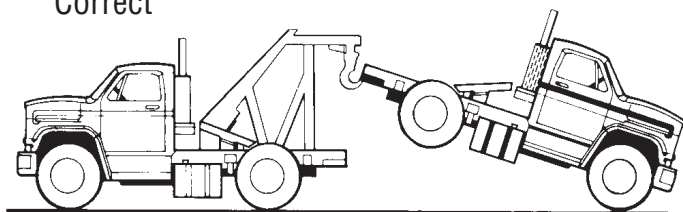


When towing the vehicle, the output shaft of the transmission must not be allowed to spin or turn. If the vehicle is towed with the drive wheels still in contact with the road surface, the vehicle axle shafts or driveline must be removed or disconnected.



**WARNING:** Serious internal transmission damage can result from improper vehicle towing.

Correct



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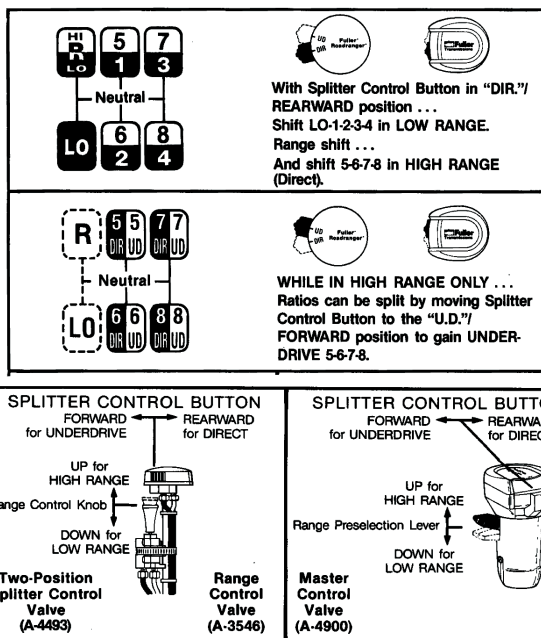
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# Introduction

## Shift Lever Pattern and Shifting Controls



## Model Designations

- R = Roadranger®
- T = Twin countershaft transmission
- F = Forward position of gear shift lever (Does not affect the shift pattern)
- 9,11,12,14 or 15 X 100 = Nominal torque capacity (lbs. ft.)
- 5 = Denotes model with conventional gearing
- 6 = Denotes New Generation model with "multi-mesh" gearing
- 13 = Thirteen forward speeds

## **General Information**

The letter “F” appearing in the model designations, such as in RTF-11613, simply indicates forward-mounted position of the gear shift lever housing on the transmission and does not affect the shift pattern.

Splitter models in the 13-speed underdrive series have thirteen forward speeds and two reverse, consisting of a five-speed front section and a three-speed auxiliary section. The auxiliary section contains Low and High Range ratios, plus an underdrive splitter gear.

One ratio in the front section (LO) is used only as a starting ratio; it is never used when the transmission is in High Range.

The other four ratios in the front section are used once in Low Range and once again in High Range. However, each of the four ratios when use in High Range can be split with the underdrive splitter gear. Low Range ratios cannot be split.

The Range Control Knob/Range Preselection Lever selects Low or High Range. It is used once during an upshift sequence and once during a downshift sequence.

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

When in High Range, the ratios can be split by using the Splitter Control Button. The “DIR”/REARWARD position gives the 5th, 6th, 7th and 8th speed ratios; the “U.D.”/FORWARD position splits each of the High Range ratios. Thus, eight progressive High Range ratios can be obtained.

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, Service Parts Department, North American Headquarters, P.O. Box 4013, Kalamazoo, MI 49003-4013. Please specify shifting controls used and transmission model number when making a request.

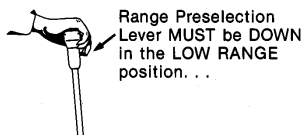
# Operation

## Detailed Shifting Instructions

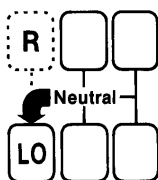
In the following instructions, it is assumed that the driver is familiar with operating heavy-duty trucks and tractors, and can coordinate the movement of the shift lever and clutch pedal to make smooth gear engagements while upshifting or downshifting. Always double-clutch when making lever shifts (See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

### Upshifting

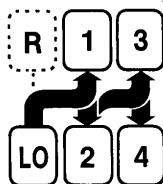
1. Move the gear shift lever into neutral.
2. Start engine and wait for the vehicle's air system to reach normal line pressure.
3. Make sure the Range Preselection Lever is DOWN in the Low Range position and the Splitter Control Button is in the REARWARD (DIRECT) position.



4. With the clutch disengaged, move the shift lever to the LO speed gear position. Release the clutch pedal to start vehicle moving.



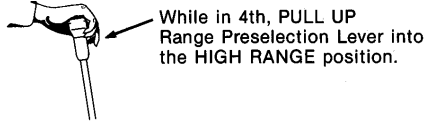
5. Upshift, double-clutching, from LO through 1st, 2nd and 3rd to 4th while in Low Range.



**Range Shift from Low Range (4th) to (5th) Underdrive in High Range...**

# Operation

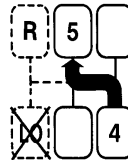
6. While in 4th and ready for the next upshift, preselect HIGH Range by pulling UP the Range Preselection Lever.



7. Start normal shift by moving the shift lever to the 5th speed gear position, double-clutching. Do not make final clutch engagement. As the shift lever passes through neutral, the transmission will automatically make the shift to High Range.



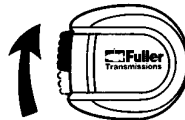
**CAUTION:** Never move the shift lever to the LO speed gear position after preselecting High Range, or at any time transmission is in High Range.



8. Just prior to completing final clutch engagement after shift lever has reached the 5th speed gear position, move the Splitter Control Button into the FORWARD (UNDERDRIVE) position.



**CAUTION:** Never move the Splitter Control Button or the Range Preselection Lever with the shift lever in neutral while the vehicle is moving.

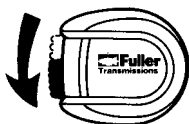


9. Complete final clutch engagement and accelerate with transmission in 5th Underdrive. If splitter selection to Underdrive is not made, the transmission will be in 5th Direct once final clutch engagement is completed.

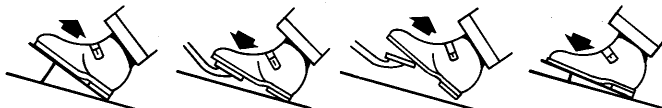
# Operation

## Upshift from (5th) Underdrive to (5th) Direct in the same gear shift lever position...

10. Move the Splitter Control Button into the REARWARD (DIRECT) position.



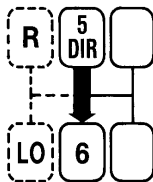
11. Then, IMMEDIATELY release accelerator, depress clutch pedal once to break torque, release pedal to re-engage clutch, and accelerate engine. Transmission will shift from Underdrive to Direct when synchronous is reached.



Release accelerator . . . Single-clutch . . . and accelerate.

## Upshift from (5th) Direct to (6th) Underdrive...

12. Start normal shift by moving the shift lever, double-clutching, to the 6th speed gear position.



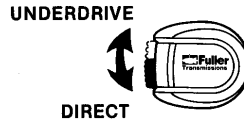
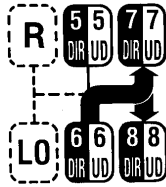
13. Just prior to completing final clutch engagement after shift lever has reached the 6th speed gear position, move the Splitter Control Button into the Forward (UNDERDRIVE) position.





## Operation

14. Complete final clutch engagement and accelerate engine with transmission in 6th Underdrive. If the splitter selection to Underdrive is not made, the transmission will be in 6th Direct.
15. Continue upshifting through the shift pattern. Double-clutch during lever shifts; single-clutch during split shifts with the shift lever in the same position.

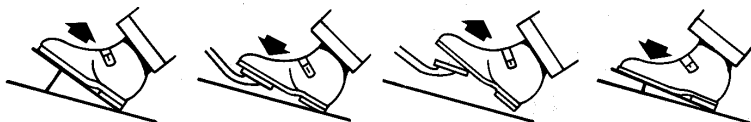


# Operation

## Downshifting

### Downshifting from (8th) Direct to (8th) Underdrive in the same shift lever position...

1. Move the Splitter Control Button into the FORWARD (UNDERDRIVE) position.
2. Then, IMMEDIATELY release accelerator, depress clutch pedal once to break torque, release pedal to re-engage clutch, and accelerate. The transmission will shift from Direct to Underdrive when synchronous is reached



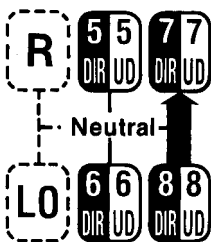
Release accelerator. . .Single-clutch. . .and accelerate.

### Downshift from (8th) Underdrive to (7th) Direct...

3. Move the Splitter Control Button into the REARWARD (DIRECT) position.



4. Then, IMMEDIATELY move the shift lever from 8th, double clutching, to the 7th speed gear position. If the Splitter Control Button is not moved REARWARD, the transmission will be in 7th Underdrive once the lever shift and final clutch engagement has been made.

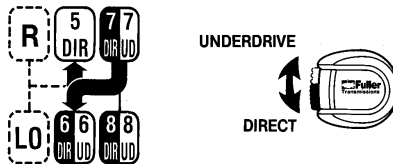


# Operation

- Continue downshifting from 7th Direct to 5th Direct while in High Range. Double clutch when making lever shifts; single clutch when split-shifting in the same gear shift lever position.



**CAUTION:** DO NOT downshift to 5th Underdrive when anticipating a downshift into Low Range. Use 5th Underdrive only when you intend to stay in HIGH RANGE. (See CAUTION, Downshifting Step 6).



## Range Shift from (5th) Direct to Low Range (4th)...

- While in 5th Direct and ready for the next downshift, preselect Low Range by pushing the Range Preselection Lever DOWN.



**CAUTION:** When downshifting from High Range to Low Range, the Splitter Control Button **MUST** be in the REARWARD (DIRECT) position and shift to direct completed, before making the range selection. The shift to Low Range cannot be made with the Splitter Control Button in the FORWARD (UNDERDRIVE) position.

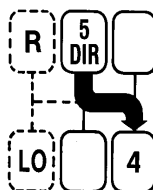


While in 5th DIRECT, PUSH DOWN Range Preselection Lever into the LOW RANGE position.

Splitter Control Button **MUST** be REARWARD.

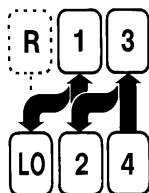


- Complete downshift from 5th Direct by moving the shift lever double clutching, to the 4th speed gear position. As the shift lever passes through neutral, the transmission will automatically shift from High Range to Low Range



## *Operation*

8. Continue downshifting, double clutching, from 4th through 3rd, 2nd and 1st to LO while in Low Range.



## **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.

## Optional Equipment - The Clutch Brake

For easier and faster gear engagement, some Fuller transmissions may be equipped with a Clutch Brake. This brake is used to make initial gear engagement into LO 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. Use **ONLY** for initial gear engagement when vehicle is standing still.

## Double-Clutching Procedure

### When ready to make a shift:

1. Depress pedal to disengage clutch.
2. Move gear 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 gear shift lever to next gear speed position.
5. Release pedal to engage clutch.

\*By engaging the clutch with the gear shift lever in the neutral position, the operator is able to control the RPM of the mainshaft gears since they are regulated by engine RPM. This procedure enables the operator to match the RPM of the mainshaft gears with those of the mainshaft driven by the vehicle's rear wheels.

# ***Operation***

## **Driving Tips**

- For a smooth start, always select an initial starting gear that will provide sufficient reduction for the load and terrain.
- Always use normal double-clutching procedures when making lever shifts. (See “Double-Clutching Procedure” Section).
- Never slam or jerk the shift lever to complete gear engagement.
- Never coast with the gear shift lever in neutral position.
- Never move the shift lever to the LO speed gear position while transmission is in High Range.
- Never move the Range Control Knob/Range Preselection Lever or the Splitter Control Button with the gear shift lever in neutral while vehicle is moving.
- Never make a range shift when in reverse.
- When making a splitter shift, move the Splitter Control Button and IMMEDIATELY complete the shift as this control is not a preselect valve.
- 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 8th Direct.

## **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.

Eaton® 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.

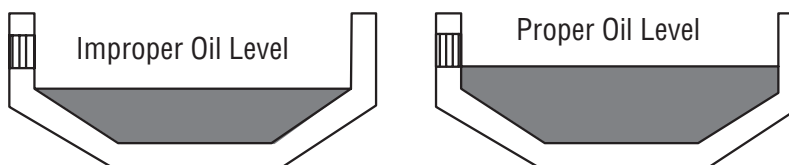
**Note:** For a list of Eaton Approved Synthetic Lubricants, see TCMT-0021 or call 1-800-826-HELP (4357).

**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.)



If the transmission operating angle is more than 12 degrees, improper lubrication can occur. The operating angle is the transmission mounting angle in the chassis plus the grade (expressed in degrees).

Any time the transmission operating angle of 12 degrees is exceeded for an extended period of time, the transmission must be equipped with an oil pump or cooler kit to insure proper lubrication.

## Lube Change Intervals

Lubricant changes should be based on a combination of the intervals shown in TCMT-0021 Lubrication Specification 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.





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