

# Eaton 9-Speed Synchronized Transmissions Double "H" Shift Control Configuration TRDR0070

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SUPPORT

# Warnings and Cautions

## Warnings and Cautions

### WARNING

Read the entire driver instruction before operating this transmission.

Set the park brakes before starting the 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 (where a safety start circuit is fitted).

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.

### CAUTION

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

**TOWING:** To avoid damage to the transmission during towing, place the transmission in neutral and lift the drive wheels off the ground or disconnect the driveline.

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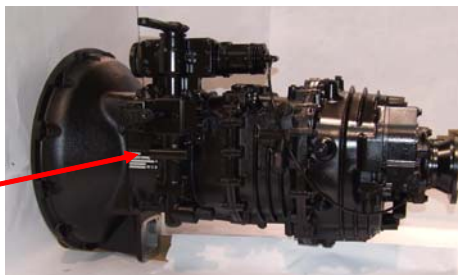
# *Introduction*

## 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.

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

Transmission Tag



Record the Transmission Model and Serial Number below. Have these reference numbers handy when ordering replacement parts or requesting service information:

Transmission Model:

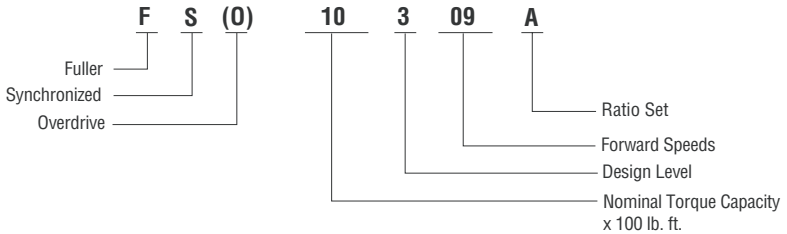
Transmission Serial Number:

Every effort has been made to ensure the accuracy of all information in this manual. However, Eaton Truck Components Operations makes no expressed or implied warranty or representation based on the enclosed information.

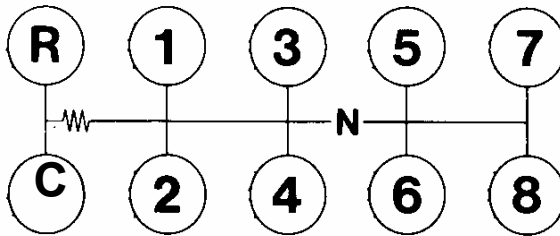
Any errors or omissions may be reported to Eaton Corporation, Truck Components, Global Marketing Services, P.O.Box 4013, Kalamazoo, Michigan, 49003.

# Operation

## Nomenclature



## Shift Pattern



**Note:** The shift lever is cross gate biased and will rest naturally in 3rd / 4th gate position when in LOW and in 5th / 6th gate position when in HIGH.

The cross gate bias could vary or may be omitted depending on the vehicle manufacturer. Ensure you are familiar with this before driving the vehicle

# Operation

## General Information

### 9-Speed Double “H”

Models in this series provide nine forward speeds and one reverse speed, consisting of a five-speed front section and a two-speed auxiliary range section.

Crawler gear (C) in the front section is used only as a starting gear. The other four ratios are used once in LOW range and once again in HIGH range.

After shifting out of Crawler gear, shift the remaining gears in LOW range and HIGH range as you would shift any synchronized transmission.

Shift range from LOW to HIGH and HIGH to LOW by moving the shift lever fully to the right or fully to the left as described in the Operation section. The transmission will automatically make the synchronized range shift as the shift lever is moved fully left or right.



### High to Low Range Shifting

Never attempt to shift down at too high a vehicle speed as this will result in major damage to the driveline.

**Note:** Some vehicles are fitted with a range shift over-speed protection device in conjunction with the vehicle manufacturer. **Never assume a range over-speed device is fitted.**

As a guide never shift from HIGH range to LOW range above 30 kph - not even if the vehicle is in neutral and the clutch pedal is depressed.

**Note:** This speed will vary based on the overall driveline configuration.

## **Shift Pattern Diagrams**

A shift pattern diagram / etched shift knob should be in your vehicle (depending on vehicle manufacture).

## **Driving Tips**

- Always use the clutch when making up shifts or down shifts. Premature synchronizer failure can result from not using the clutch.
- Always select an initial starting gear that provides sufficient reduction for load and terrain.
- Never slam or jerk the shift lever to complete gear engagement.
- Never coast with the shift lever in the neutral position.
- Never downshift at too high of a road speed.
- Never shift to crawler gear (C) while the vehicle is moving.
- Never select reverse gear while the vehicle is moving.

# Operation

## Initial Start-Up

### WARNING

Before starting the vehicle, always be seated in the drivers seat, move the shift lever to neutral, and depress the master clutch fully.

### CAUTION

Before moving a vehicle, make sure you understand your shift pattern configuration.

1. Make sure the shift lever is in neutral, the range section is in LOW, and the parking brakes are set.
2. Turn on the key switch. Start the engine.
3. Build up the air pressure to cut off.
4. Apply the service brakes.
5. Depress the clutch pedal to the floor.
6. Move the shift lever to the desired initial gear.
7. Release the parking brakes.
8. Slowly release the clutch pedal and apply accelerator.

In the following instructions it is assumed that the driver is familiar with operating a commercial vehicle and can coordinate the shift lever movement and clutch pedal to make a smooth gear engagement while upshifting and downshifting.

## Upshift

1. Fully depress the clutch pedal. Move the shift lever to the next desired speed.
2. Release the clutch pedal.
3. Accelerate the vehicle.
4. Continue upshifting to 4th speed.



## Range Shift Low to High (4th to 5th)

1. When in the last LOW range gear position (4th) and ready for the next upshift, with the engine / vehicle speed at a point that will allow the vehicle to accelerate.
2. Release the accelerator.
3. Fully depress the clutch pedal. Move the shift lever to neutral.
4. Move the shift lever fully RIGHT for a short period - doing this will trigger the range valve to automatically shift the transmission to HIGH range.
5. Allow the shift lever to return to its natural cross gate position.
6. With the clutch still depressed shift to 5th speed.
7. Release the clutch and apply the accelerator.
8. Continue upshifting to 8th speed.

## Downshift

1. Fully depress the clutch pedal, move the shift lever to the next desired speed.
2. Release the clutch pedal.
3. Continue downshifting to 5th speed.

## Range Shift High to Low (5th to 4th)

1. When in the last HIGH range gear position (5th) release the accelerator.
2. Fully depress the clutch pedal. Move the shift lever to neutral.
3. Move the shift lever fully LEFT for a short period - doing this will trigger the range valve to automatically shift the transmission to LOW range.
4. Allow the shift lever to return to its natural cross gate position.
5. With the clutch still depressed shift to 4th speed.
6. Release the clutch.
7. Slow the vehicle and continue downshifting.

**Note:** Never shift to crawler gear (C) while the vehicle is moving.

# Service & Maintenance

## Proper Lubrication

Proper lubrication procedures are key to a good all-around maintenance program. 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 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 lubricated if these procedures are closely followed:

- Maintain oil level and inspect regularly.
- Follow maintenance plan.
- Use correct grade and type of oil. Prolonged oil change will cause internal damage.
- Do not overfill as this causes overheating and effects fuel economy.
- Buy from a reputable dealer.

## Mixing Oil Types

 CAUTION

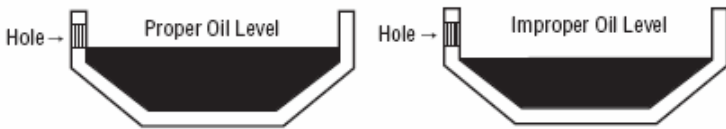
Never mix engine oils and gear oils in the same transmission.

**Note:** Additives and friction modifiers must not be introduced. 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.

## **Proper Transmission Lubrication Levels**

- Make sure the transmission lubricant is level with the bottom of the fill opening.
- Always check the oil on level ground

### **Oil Level**



# Service & Maintenance

## Lubricant Change Intervals

- Lubricant change intervals will be included in the vehicle operating handbook and will be defined based on the type of oil used and the operating conditions.
- **As a base rule the following should be followed:**

### Mineral Oils

#### \* On Highway Use

- |                                |  |
|--------------------------------|--|
| Initial oil change             | - At the operator's discretion.          |
| Every 20,000 km                | - Inspect oil level and check for leaks. |
| Every 100,000 km (or annually) | - Change oil (see Note below)            |

**Note:** Whichever comes first.

#### \* Off Highway Use

- |                    |  |
|--------------------|--|
| Initial oil change | - At the operator's discretion.          |
| Every 40 hours     | - Inspect oil level and check for leaks. |
| Every 500 hours    | - Change oil (see Note 1 below)          |
| Every 1000 hours   | - Change oil (see Note 2 below)          |

**Note 1:** Oil change - where severe dirt conditions exist.

**Note 2:** Oil change - where normal conditions exist.

## Synthetic / Semi-Synthetic Oils

### \* On Highway Use

- Every 20,000 km - Inspect oil level and check for leaks.
- Every 300,000 km to 500,000 km - Change oil (see Note below)
- OR -
- Every 3 years - Change oil.

**Note:** Mileage will depend on type of oil used.

### \* Off Highway Use

- Every 40 hours - Inspect oil level and check for leaks.
- Every 500 hours - Change oil (see Note below)
- Every 1000 hours - Change oil (Normal operation)

**Note:** Change oil where severe dirt conditions exist.

## Operating Temperatures

Transmissions must not be allowed to operate at temperatures above 120°C (250°F). Operating above this temperature causes loaded gear tooth temperatures to exceed 177°C (350°F), which will ultimately destroy the heat treatment of the gears. If the elevated temperature is associated with an unusual operating condition that will recur seek advice from your vehicle manufacturer.

# ***Service & Maintenance***

## **Lubricant Change**

### **Draining Oil**



Hot oil may be present during this activity.

- Drain the transmission when the oil is warm.
- Remove the two drain plugs from the transmission.
- Clean the oil strainer before replacing it.
- Replace copper washer / o-ring as required.

### **Re-filling**

- Fill transmission to the level of the filler opening.
- Do not inter mix different types of brands of oil.
- Do not use additives i.e. friction modifiers.
- Do not overfill the transmission, as this will cause overheating and may cause oil leaks through the input and output shaft oil seals.

## **Maintenance Checks**

Conduct regular maintenance checks where possible regarding:

- Clutch mechanism
- Lubricant
- Filler and drain plug
- Cap screws and gaskets
- LRC / Shift tower
- General operation
- Correct level
- Correct tightness / damage to washers
- Loose / oil leaks
- Secure / free play / wear

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