Driver Instructions

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 Automated Transmissions TRDR0060

September 2007

RTAO-14710B-AS
RTAO-14710C-AS
RTAO-16710B-AS
RTAO-16710C-AS
RTLO-14918B-AS
RTLO-16918B-AS
RTLO-18918B-AS
RTLO-20918B-AS

EATON
Powering Business Worldwide

BACKED BY
Roadranger
SUPPORT

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.

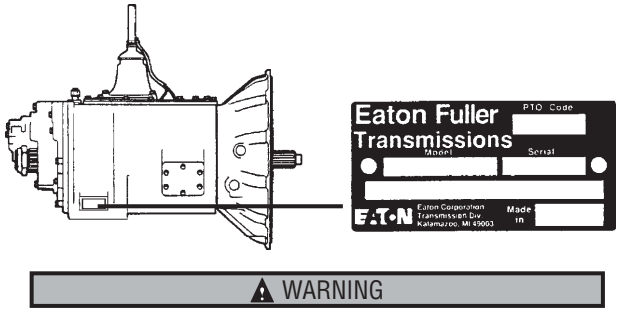
If your vehicle is equipped with a remote throttle, before operation, the transmission must be in neutral.

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

Table of Contents

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.



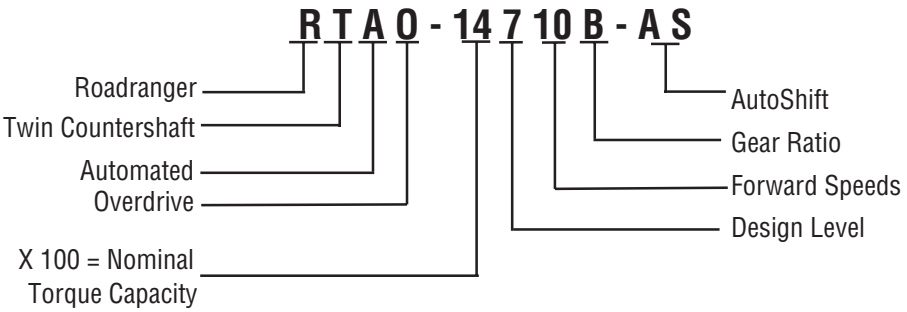
Do not remove or destroy the transmission identification tag.
The blank spaces provided below are for recording transmission identification data and part numbers of maintenance items. Have these reference numbers handy when ordering replacement parts or requesting service information:

Transmission Model	
Transmission Serial Number	
Transmission Controller	
Software Number	
Shift Control	
Software Number	

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

Model Designations

Nomenclature

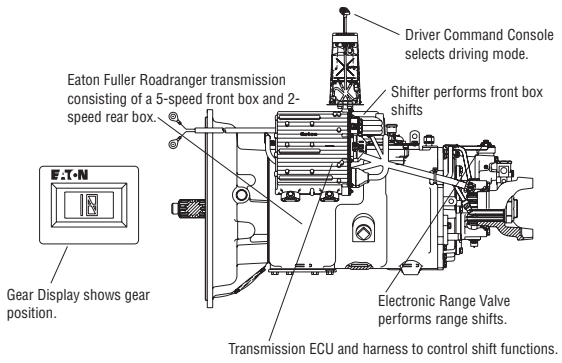


AutoShift™

The AutoShift™ is a partially automated Eaton® Fuller® transmission that automatically selects and engages the transmission's gears. The driver must use the clutch to start and stop the vehicle. A shift begins when the AutoShift™ computer detects that conditions are right for a shift. The transmission signals the engine controller to break driveline torque and provides engine RPM for synchronizing the next gear. When synchronous is met the transmission engages the next gear and signals the engine to resume operation. The clutch is only used for starting and stopping.

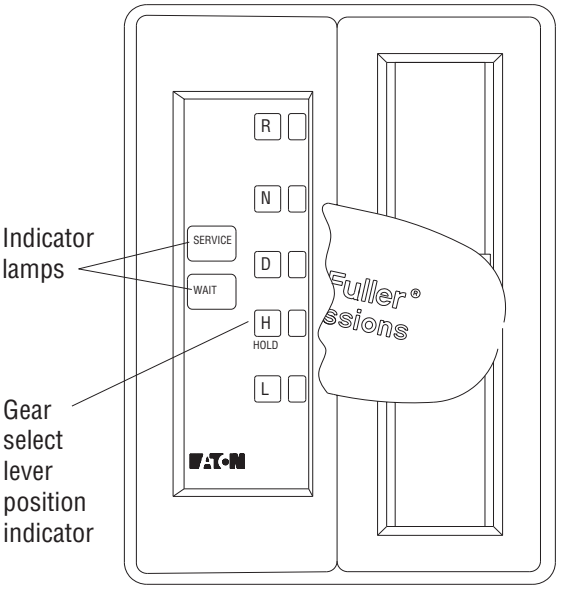
The AutoShift™ automated transmission is a mechanical transmission with several components added to make shifting automatic.

Gear Display	Shows gear position
Driver Command Console	Used instead of shift lever. Controls the transmission gear selection.
Shifter	Shifts the transmission into proper gear. Used by transmission controller for front box shifts.
Electronic Control Unit	There are two controllers: Transmission ECU and System ECU. The transmission ECU controls all transmission shift functions. The system ECU manages all vehicle interfaces for transmission shift functions.
Electronic Range Valve	Used by the transmission ECU to perform range shifts.



Introduction

Driver Command Console



Top View of Console

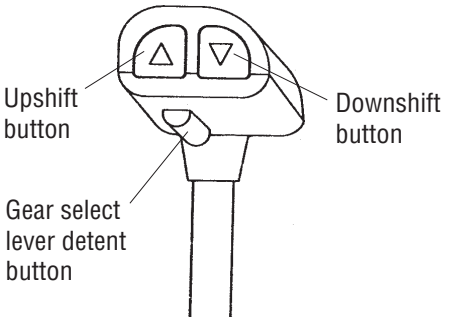
R Reverse

N Neutral

D Drive

H Hold

L LO



Side View of Shift Handle

Driver Command Console Positions Defined

R Reverse gear is selected. The vehicle does not have to be stopped to shift into reverse; however, the shift into gear does not occur until the vehicle road speed is under 2 mph and the clutch has been depressed.

N Neutral is selected. Neutral is for starting, parking, or any stationary operation. No gear is selected. The gear select lever must be in neutral before engine can be started.

D The transmission selects the starting gear and automatically selects gears between the starting gear and top gear.

H Allows driver to hold current gear and manually select appropriate gear for road conditions using the up/down buttons. The system will not respond to shift requests that would overspeed or excessively lug the engine.

L LO gear is selected vehicle is at a stop. If the vehicle is moving, transmission downshifts at earliest opportunity for maximum engine braking. No upshifts occur in this mode.

Light/Switch Elements Defined:

Service	The service light alerts the driver of potential transmission problems and service needs, and assists the mechanic in problem diagnosis.
Wait	The wait light alerts the driver that the vehicle is not ready to operate yet.
Upshift/ Downshift Buttons	Used in the “H” mode to select upshifts and downshifts.

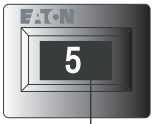
⚠ WARNING

Autoshift™ allows upshift from “L” and “H” for engine overspeed protection.

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



SOLID

Out of gear waiting for engine/trans rpm to reach synchronous

FLASHING

Satisfactory engagement in 6th gear

SOLID

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.

Driving Tips

- The clutch is used for starting and stopping only. The clutch must be used to move the shift lever from "N" to any gear. Once rolling, the clutch is not needed for shifting.
- Always select an initial starting gear that provides sufficient reduction for the load and terrain.
- Never coast with the transmission in the neutral position.
- To inhibit upshifts during downhill driving and for optimal engine braking while operating in the desired gear, move the shift lever to HOLD or “L”. There will be no further upshifts, except to protect engine from overspeeding. The gear select lever can be moved at any speed.
- There is a speed limit on reverse engagements, yet the driver can effectively rock the vehicle by moving the gear select lever from reverse to drive and drive to reverse.
- When parking the vehicle, select "N." Set the parking brakes and if you stop on an incline, for safety reasons, block the wheels.
- For manual control, move the gear select lever to “H” and use up/down buttons. Use this mode when driving in the docking yard, over railroad tracks and while on steep grades. To return to normal driving simply select “D” and the best gear will be automatically selected.
- When Cruise Control is engaged the transmission shifts automatically. No driver intervention is necessary.

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, and depress the clutch.

1. Make sure the transmission is in neutral and parking brake is set, depress the clutch.

Note: If key switch is turned "on," in any gear other than neutral, the AutoShift™ defaults to neutral and the truck will not start. To resume transmission function you must, 1) Select neutral, 2) Depress the clutch, 3) Try to engage starter.

2. Turn on the key switch, start the engine.

Note: The shift lever should light up and go through a process of showing each of its light elements: service trans, gear positions.

3. Release the clutch to register proper input shaft speed.
4. Allow vehicle air pressure to build to 90 PSI.
5. Apply the service brakes.
6. Depress the clutch, allow about 2 seconds for input shaft to stop.
7. Move the shift lever to desired gear position.
8. Select proper starting gear using the shift buttons, if equipped.
9. Release the parking brakes. Remove your foot from the service brakes.
10. Slowly release the clutch to allow for gear engagement.

If gear shown on gear display is flashing, indicating gear not yet engaged, depress clutch to floor momentarily, and gradually release.

⚠ CAUTION

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

Driving in "D" Mode

Drive mode is used for normal driving conditions.

1. Fully depress clutch.
2. Select “D”.

Note: Clutch must be fully depressed in order to shift from N to Drive.

3. Upshifting and downshifting are performed automatically. The clutch must be used for starting and stopping.

Driving in "R" (Reverse) Mode

1. Depress the clutch.
2. Select “R”.
3. Use arrow buttons on shift lever to choose LO reverse or HI reverse (if equipped).
4. Release the clutch.

Note: 18-Speed transmissions have 4 reverse gears: low range, low split “1R”; low range, high split “R”; high range low split “1R”; high range, high split “H”.

Vehicle Parking

1. With clutch pedal depressed, move lever to “N”.
2. Verify solid N on gear display.
3. Set parking brakes.
4. Slowly release clutch pedal.

Setting Start Gear (if equipped with Push Buttons)

The driver can change the default starting gear. This change is only active while the truck is running (resets on shut-off), or until you change it. The starting gear may be any gear 1st through 5th depending on model with is applicable for the load being carried.

1. While the vehicle is stopped, select "D" or "H" to set the starting gear.
2. Use downshift or upshift buttons on gear select lever to choose the starting gear.

Driving in "H" (Hold) Mode (if equipped)

When driving in the "H" mode the driver must control shifts with the push buttons on the shift handle.

1. Depress clutch.
2. Select "H".
3. Select starting gear using the downshift or upshift buttons.
4. Release clutch.

Upshifting

You, as the driver, decide when to upshift and downshift.

1. Accelerate.
2. Press upshift on the shift console (skip shift by pressing twice).
3. Transmission automatically selects and shifts to next gear.

Downshifting

1. Decelerate.
2. Press downshift button on the shift console (skip shift by pressing twice).
3. Transmission automatically selects and shifts to the next gear.

PTO Operations

The AutoShift™ transmission models have been engineered for both 6 bolt and 8 bolt transmission countershaft PTOs.

Stationary PTO Operation (Transmission in Neutral)
The 6 and 8 bolt transmission countershaft PTOs are normally used in this application.

1. Place the transmission gear select lever in “N” with the engine at idle.
2. Depress clutch (this stops the countershaft rotation to allow PTO engagement).
3. Select transmission PTO switch.
4. Release clutch.

Mobile PTO Operation
The 6 and 8 bolt *transmission countershaft* PTO provides limited mobile operation in the starting gears.

1. Place gear select lever in “H” or “L” with the engine at idle.
2. Depress clutch (this stops the countershaft rotation to allow PTO engagement).
3. Select starting gear.
4. Select transmission PTO switch.

Note: While PTO is engaged, you can shuttle shift between reverse/neutral/drive if the vehicle speed is under 2 mph.

Lubrication

Proper Lubrication

The Key to Long Transmission Life
Proper lubrication procedures are the key to a good all-around maintenance program. If the oil is not doing its job or if the oil 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 that 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 oil level. Inspect regularly.
2. Follow maintenance interval chart.
3. Use the correct grade and type of oil.
4. Buy oil from a reputable dealer.

Note: Additives and friction modifiers are NOT recommended for use in Eaton Fuller Transmissions.

For additional lubrication information, see TCMT-0021.

When adding oil, types and brands of oil should not be mixed because of possible incompatibility.

Mixing of Oil Types

⚠ CAUTION

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

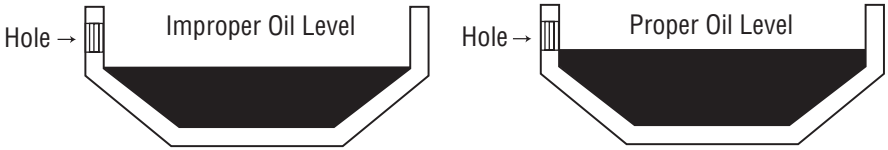
Note: Additives and friction modifiers must not be introduced.

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.

Note: For a list of Eaton approved synthetic lubricants, see TCMT-0020 or call 1-800-826-HELP (4357).

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.

Lubrication

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.

Operating Temperatures

Transmissions must not be operated at temperatures above 250°F [120°C]. Operation 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. If the elevated temperature is associated with an unusual operating condition that will recur, a cooler should be added, or the capacity of the existing cooling system increased.

The following conditions in any combination can cause operating temperatures over 250°F [121°C].

- Operating consistently at slower speeds
- High ambient temperatures
- Restricted air flow around transmission
- High horsepower
- Use of engine retarder
- Exhaust system too close to transmission

Transmission coolers must be used to reduce operating temperatures when the above conditions are encountered.

Lubrication Change

Draining Oil
Drain transmission while oil is warm. To drain oil, remove the drain plug at the case bottom and oil pan. Clean the drain plugs and re-install.

Refilling
The operational level should always be within the appropriate temperature bands on the dipstick. The exact amount of oil depends on the transmission inclination and model. Insufficient oil damages the pump and other components, and can affect the function and reduce the life of the transmission.

DO NOT OVERFILL! This causes overheating and loss of fuel economy.

When adding oil, types and brands of oil should not be mixed because of possible incompatibility.

Use clean oil and clean containers when filling transmission. Containers that have been used for anti-freeze or water should not be used for transmission oil.

1. Remove the dipstick and slowly add of the prescribed oil through the fill tube.
2. Place the transmission in neutral position and apply the parking brakes. Start the engine and let it idle for five (5) minutes, (this allows oil to fill the converter, main case, and cooling system). Add oil as needed to obtain a level at the proper temperature range. Total oil quantity varies depending on the cooling system.
3. Increase the engine idle slowly to 1500 RPM for five (5) minutes. Now recheck the oil level at normal idle speed in neutral, again adding oil to obtain a level at the proper temperature range.
4. Replace the dipstick and tighten securely.

For additional lubrication information, see TCMT-0021.

Lubrication

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 Cooler

The transmission must not be operated consistently at temperatures above 250°F. However, intermittent operating temperatures to 300°F do not harm the transmission. Operating temperatures above 250°F increases the lubricant's oxidation rate and shortens its effective life. When the average operating temperature is above 250°F, the transmission can require more frequent oil changes or external cooling.

The following conditions in any combination can cause operating temperatures of over 250°F: (1) operating consistently at slow speeds, (2) high ambient temperatures, (3) restricted air flow around transmission, (4) exhaust system too close to transmission, (5) high horsepower operation.

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

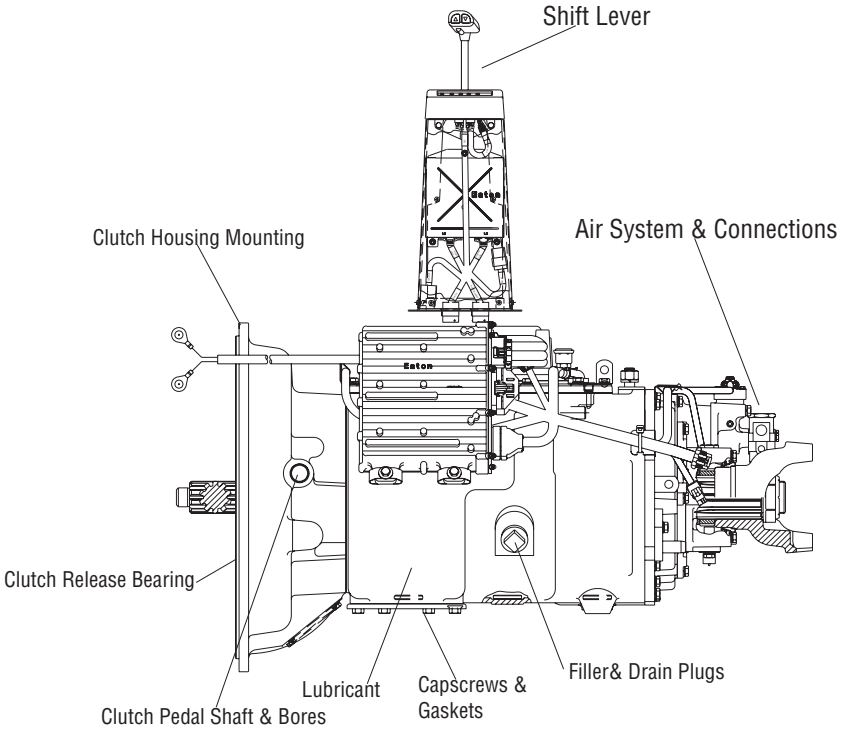
Oil Cooler Chart

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 Lbf·ft or greater torque
  - With engines 450 H.P. and above.

Maintenance Checks

Note: Item numbers refer to the illustration.



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.

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 l'evel 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

- Keep foreign objects and liquids out of the DCC. When dirty wipe with a clean cloth.

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 _____
Address _____
City _____ **State/Prov.** _____
Postal Code _____
Phone _____
Email: _____

DEALER _____
Address _____
City _____ **State/Prov.** _____
Postal Code _____
Phone _____
Email: _____

Vehicle & Component Information

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

Chassis VIN (17 characters): _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Vehicle Vocation: (Check one)
City Delivery **Construction** **Heavy Haul** **Line Haul**
Logging **Mining** **Oil Field** **Refuse**
Other _____

OEM: _____ **Current Mileage:** _____ **Truck In-Service Date:** _____

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
Eaton Corporation
Attn: Warranty Registration
P.O. Box 93531
Chicago, IL 60673-3531

Canada
Eaton Corporation
Attn: Warranty Registration
P.O. Box 2473, Station A
Toronto, Ontario, M5W2K6

Check #: _____
Check Date: _____
Check Amt.: _____ **USD/ CAN Funds**

Before signing below, please read this section carefully !

I/we understand the terms of this warranty and acknowledge the following:
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 adjustment, 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

TCWY-0750
08/05

Note: Features and specifications listed in this document are subject to change without notice and represent the maximum capabilities of the software and products with all options installed. Although every attempt has been made to ensure the accuracy of information contained within, Eaton makes no representation about the completeness, correctness or accuracy and assumes no responsibility for any errors or omissions. Features and functionality may vary depending on selected options.

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.

Eaton Corporation
Vehicle Group
P.O. Box 4013
Kalamazoo, MI 49003 USA
800-826-HELP (4357)
www.eaton.com/roadranger

Printed in USA

EATON
Powering Business Worldwide

BACKED BY
Roadranger
SUPPORT