Roadranger®

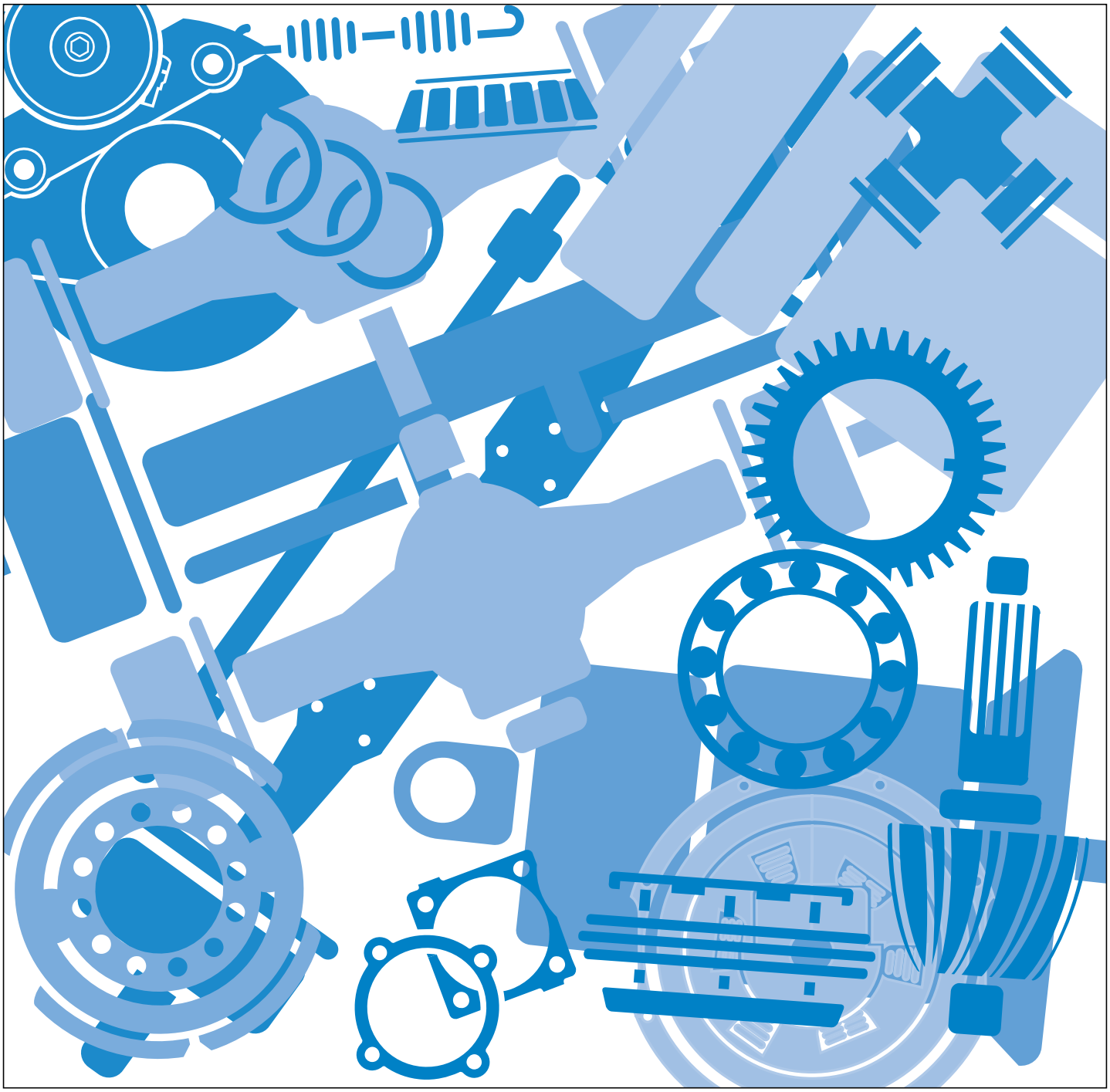
Eaton® Fuller ® Automated Transmissions

RTAO-1X710-AS
RTAO-1X710-AC
RTLO-1X918-AS

DANA | EATON

One Great Drivetrain from Two Great Companies

Troubleshooting Guide TRTS-0050 January 2006



For the most current information, visit the Roadranger web site at www.roadranger.com

Warnings and Cautions

⚠ WARNING

Follow the specified procedures in the indicated order to avoid personal injury.

⚠ CAUTION

Follow the specified procedures in the indicated order to avoid equipment malfunction or damage.

Note: Additional relevant information not covered in the service procedure.

⚠ WARNING

Before starting a vehicle:

1. **Sit in the driver's seat**
2. **Place shift lever in neutral**
3. **Set the parking brake**

Before working on a vehicle or leaving the cab with engine running:

4. **Place shift lever in neutral**
5. **Set the parking brake**
6. **Block the wheels**

When parking the vehicle or leaving the cab:

7. **Place shift lever in neutral**
8. **Set the parking brake**

⚠ CAUTION

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

To avoid damage to the transmission during towing:

9. **Place shift lever in neutral**
10. **Lift the drive wheels off of the ground or disconnect the driveling**

Do not operate vehicle if alternator lamp is lit or if gauges indicate low voltage.

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Suggested Tools

Air Gauges

- 2 (0-100) PSI Air Gauges

Volt/Ohm Meter

- SPX / Kent-Moore 1 (800) 328-6657
- P/N 5505027

PC-based Service Tool “ServiceRanger”

- Contact your OEM

Data Link Tester

- Eaton Service Parts 1 (800) 826-HELP (826-4357)
- P/N K-3378

Download Harness Kit

- Eaton Service Parts 1 (800) 826-HELP (826-4357)
- K-3481

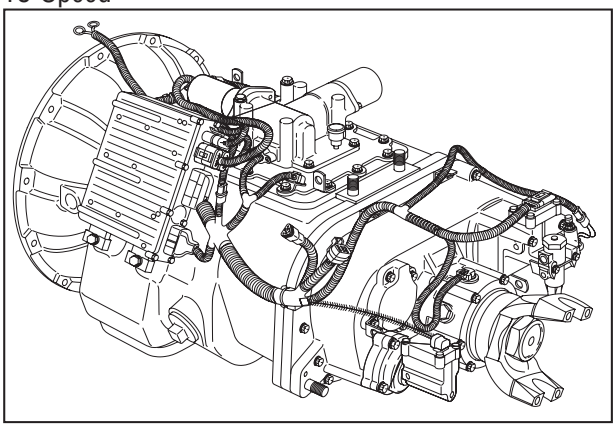
Test Adapter Kit

- SPX / Kent-Moore 1 (800) 328-6657
- Eaton Test Adapter Kit P/N J-43318
- Serial Link Adapter Kit P/N J-38351-B

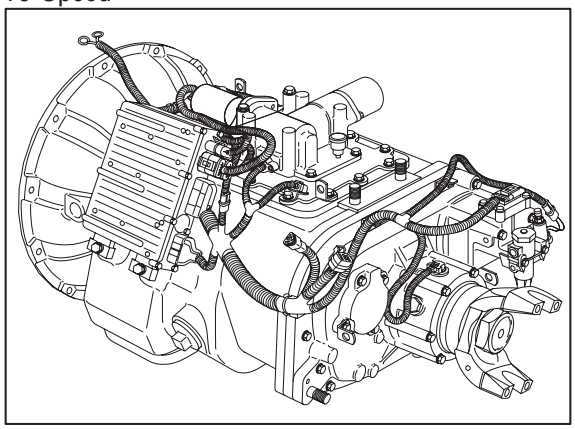
For more information call 1-800-826-HELP (826-4357)

Transmission Models Included

18-Speed

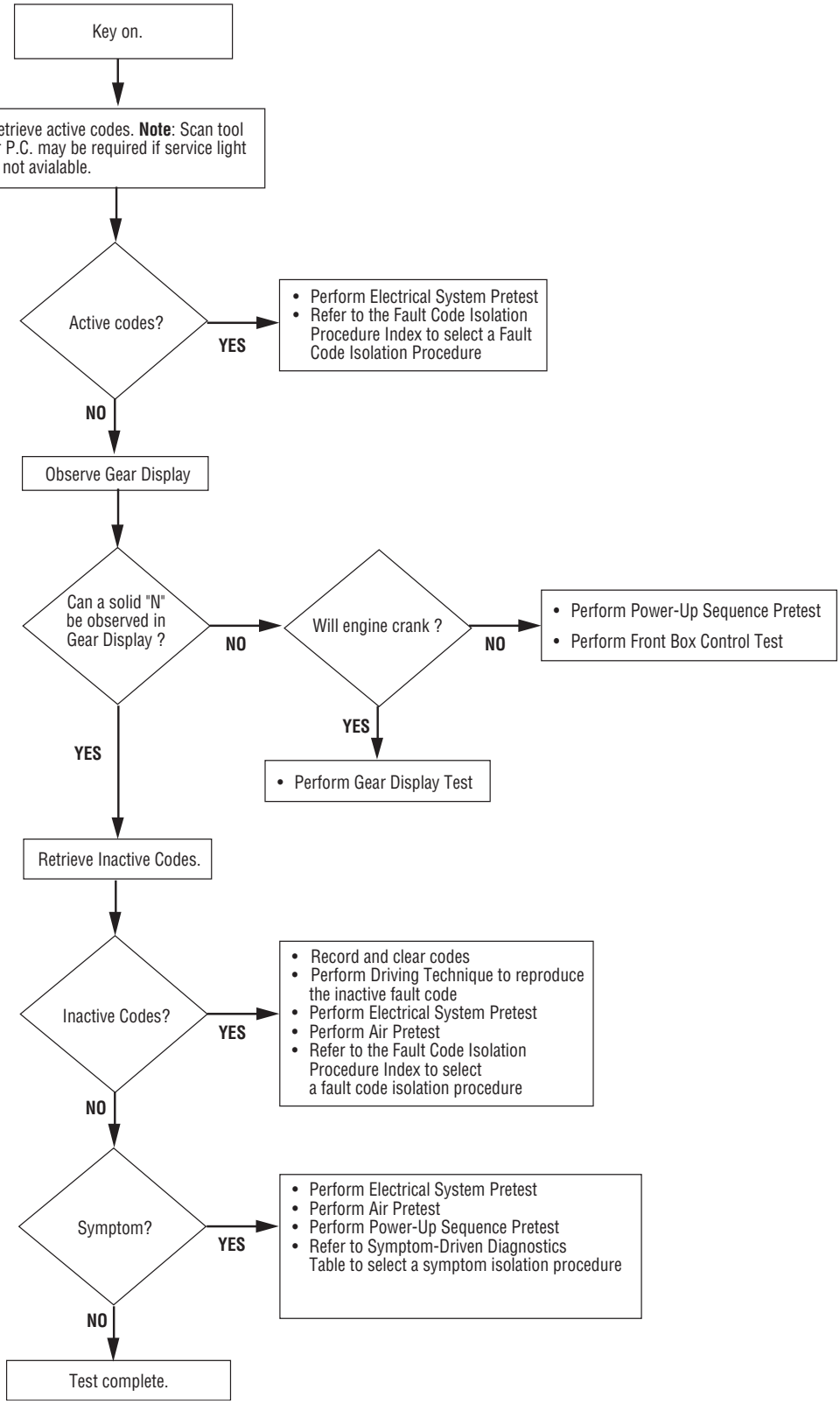


10-Speed



Diagnostic Procedure

Follow the flow cart below for all AutoSelect/AutoShift failures. Perform tests and procedures as directed by the flowchart.



Fault Code Retrieval/Clearing

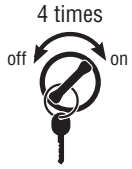
Retrieving Fault Codes

Retrieve fault codes by enabling the system's self-diagnostic mode.

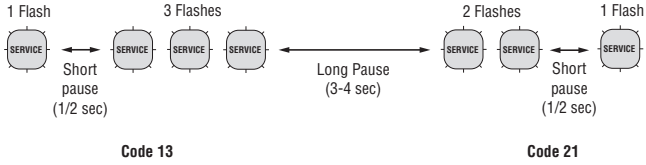
Note: You can also use a PC- based service tool, such as the ServiceRanger to retrieve fault codes.

1. Place the shift lever in neutral.
2. Set the parking brake.
3. Turn the ignition key on but do not start the engine. If the engine already running, you may still retrieve codes, however, do not engage the starter if the engine stalls.
4. To Retrieve Active Codes: Start with the key in the on position. Turn the key off and on two times within five seconds ending with the key in the on position. After five seconds, the service lamp begins flashing two-digit fault codes. If no faults are active, the service light will not flash.

5. To Retrieve Inactive Codes: Start with the key in the on position. Turn the key off and on four times within five seconds ending with the key in the on position. After five seconds, the service lamp begins flashing two-digit fault codes. If there are no inactive faults, the service light will not flash.



6. Observe the sequence of flashes on the indicator lamp and record the codes. A one to two second pause separates each stored code, and the sequence automatically repeats after all codes have been flashed.



Clearing Fault Codes

The following procedure clears all inactive fault codes from the ECU's memory. Active fault codes are automatically cleared when the fault has been corrected.

Note: You may use a PC-based Service Tool, such as ServiceRanger, to clear fault codes.

1. Place the shift lever in neutral.
2. Set the parking brake.
3. Turn the ignition key on but do not start the engine.
4. Start with the key in the on position. Turn the key off and on six times within five seconds ending with the key in the on position.

Note: If the codes have been successfully cleared, the service lamp will come on and stay on for five seconds.

5. Turn key off and allow the system to power down.

Driving Techniques

Fault Codes	PID	SID	FMI	Description	Type of Code	Driving Technique
11		254	2,12	System Controller	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
12		233	12	Transmission Controller	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
13		236	4,5	Power Connect Relay Coil	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
14		18	12	Shift Lever	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat, vibration and selecting different shift lever positions.
15		57	2	Shift Lever Data Link	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
16		248	2	Eaton Proprietary Link (EPL)	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
17		237	4	Start Enable Relay Coil	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.

Fault Codes	PID	SID	FMI	Description	Type of Code	Driving Technique
31	62		3,4	Engine Brake Relay Coil	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
33	168		4	Battery Voltage Supply	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
35		231	2,7	Engine Control Failure	System	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat, vibration and varying levels of throttle demand.
41		56	7	Range Failed to Engage	System	Operate the vehicle and perform several range upshifts and downshifts. The failure is detected after 5 consecutive attempts to complete the same type of range shift. Several shifts (ten or more) may be necessary before the ECU confirms the failure.
42		61	7	Splitter Failed to Engage	System	Operate the vehicle and perform several range upshifts and downshifts. The failure is detected after 5 consecutive attempts to complete the same type of range shift. Several shifts (ten or more) may be necessary before the ECU confirms the failure.
43		35 or 36	3,4,5	Range Solenoid Valve	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
44	54		3,4,5	Interia Brake Solenoid Coil	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
46		37 or 38	4,5	Splitter Solenoid Valve	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.

Fault Codes	PID	SID	FMI	Description	Type of Code	Driving Technique
51	60		2	Rail Select Sensor	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
52	59		2	Gear Select Sensor	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
53		34	2	Reverse Ball Switch	Component	Select a reverse gear (repeatedly).
56	161		2	Input Shaft Speed Sensor	Component	Select a forward gear and drive at a steady speed no slower than 10 m.p.h. It may be necessary to operate the vehicle for a prolonged period of time if the cause of failure is related to heat and vibration.
57	160		2	Main Shaft Speed Sensor	Component	Select a forward gear and drive at a steady speed no slower than 10 m.p.h. It may be necessary to operate the vehicle for a prolonged period of time if the cause of failure is related to heat and vibration.
58	191		2	Output Shaft Speed Sensor	Component	Select a forward gear and drive at a steady speed no slower than 10 m.p.h. It may be necessary to operate the vehicle for a prolonged period of time if the cause of failure is related to heat and vibration.
61		39	5,6	Rail Select Motor	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
63		40	5,6	Gear Select Motor	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.

Fault Codes	PID	SID	FMI	Description	Type of Code	Driving Technique
65		251	4	Low Motor Voltage	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.
71		60	7	Stuck Engaged	System	Engage LO gear and allow the vehicle to slowly move forward. While the vehicle is in motion, move the shift lever to Reverse LO and slowly bring the vehicle to a stop. The vehicle will shift into Reverse LO. Several shifts (ten or more) may be necessary before the ECU confirms the failure.
72		59	7	Failed to Select Rail	System	Complete several shifts while the vehicle is in motion, including selections from neutral. Allow the transmission to complete several automatic shifts.
73		58	7	Failed to Engage Gear	System	Complete several shifts while the vehicle is in motion, including selections from neutral. Allow the transmission to complete several automatic shifts.
74		54	7	Failed to Syn Initial Engagement	System	With vehicle stopped, select a drive gear and fully depress the clutch pedal. Return transmission to neutral. Repeat several times.
83		18	14	Shift Lever Missing	Component	Key on. If the fault is present, the system should automatically detect the problem and set the code. If the fault is not present at key on, operate the vehicle and attempt to duplicate the driving conditions that triggered the fault code. Possible triggers include heat and vibration.

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Electrical System Pretest

Overview

The test does not relate to any specific fault code, but must be completed before performing Fault Code Isolation Table procedures. The pretest verifies the batteries are fully charged.

Detection

There is no detection process specifically for the basic electrical supply. However, failures of this type are generally detected by the transmission or driver as some other type of fault code or symptom.

Fallback

There is no fallback for the electrical pretest, however, it may effect other systems.

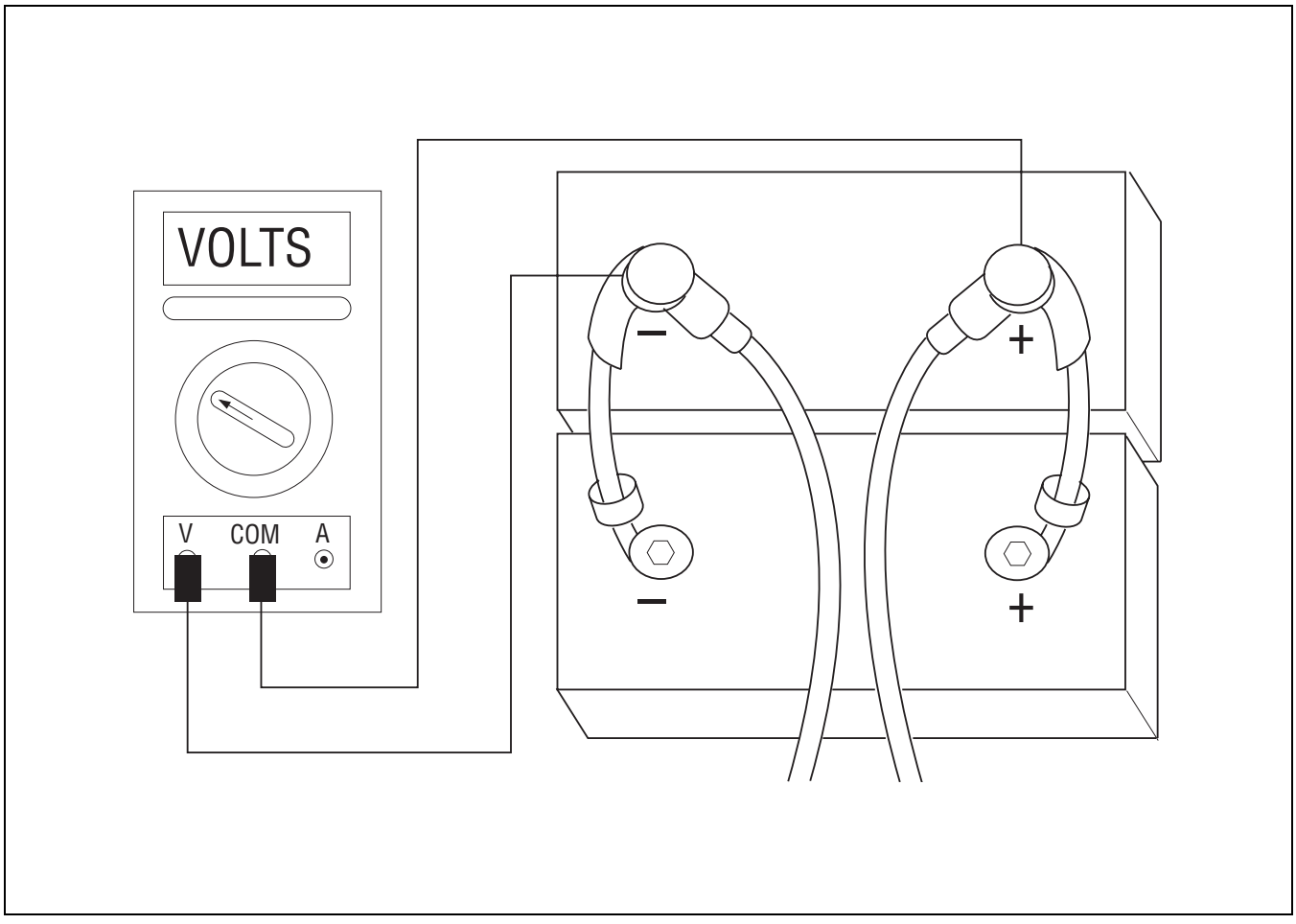
Required Tools

- Basic Hand Tools
- Eaton Test Adapter Kit
- Digital Volt/Ohm Meter
- Troubleshooting Guide
- Battery Load Tester

Possible Causes

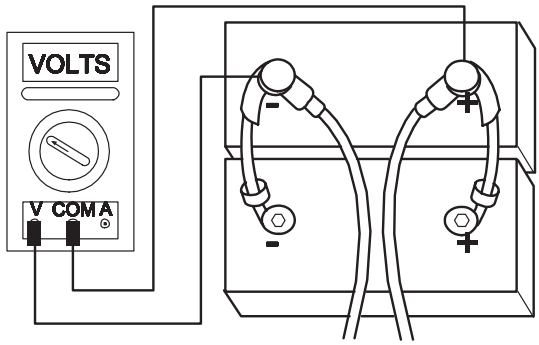
This pretest can be used for any of the following:

- Low Batteries
- Starter/Battery connections



Electrical System Pretest

Step A	Procedure	Condition	Action
	1. Key off.		
	2. Inspect starter/battery connections for integrity.		
	3. Measure voltage across battery. →	If voltage is 11 to 13 volts on a 12 volt system or	
		22 to 26 on a 24 volt system →	Go to **Step V.**
		If voltage is outside of range →	Repair or replace battery/s and charging system as required. Repeat this step.



Step V	Procedure	Condition	Action
	1. Key off.		
	2. Load Test the Battery/s. →	If the battery/s maintain the specified load →	Test Complete.
		If the battery/s fail the load test →	Replace the damaged battery/s and repeat this step.

Power-Up Sequence Pretest

Overview

A failure during the self-check indicates a failure of the Shift Control.

Detection

The power-up self-check is performed automatically each time the key is turned on. Turn the key on and watch the service lamp. If power-up stops with the service lamp constantly on, or it never comes on, self-check has failed.

Fallback

If self-check fails, the product cannot perform any operations.

Required Tools

- Basic Hand Tools
- Eaton Test Adapter Kit
- Digital Volt/Ohm Meter
- Troubleshooting Guide

Possible Causes

This test can be used for the following:

- Shift Control
- Vehicle Harness