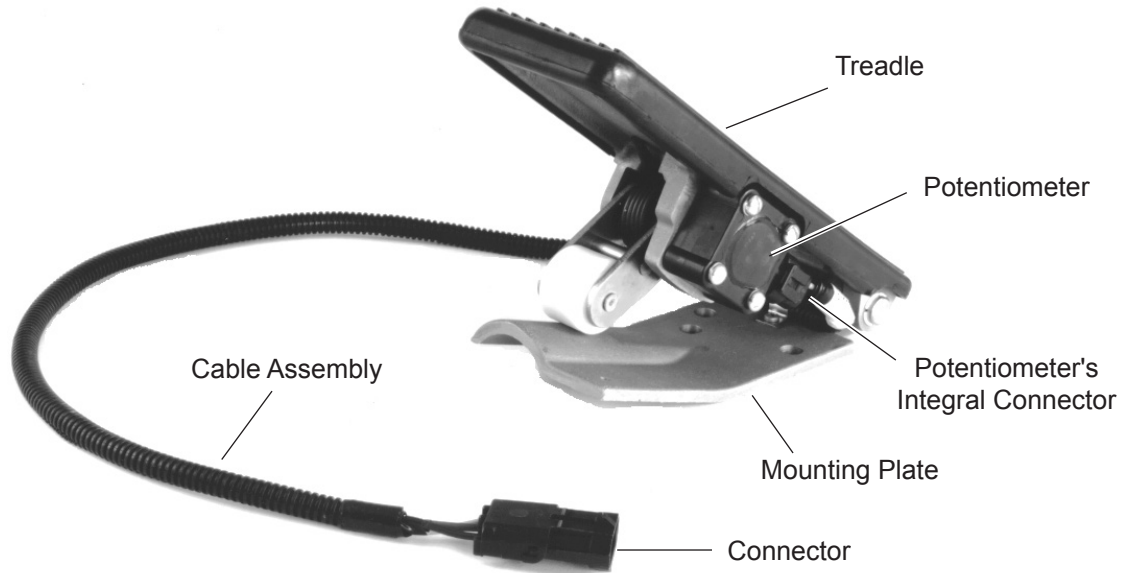




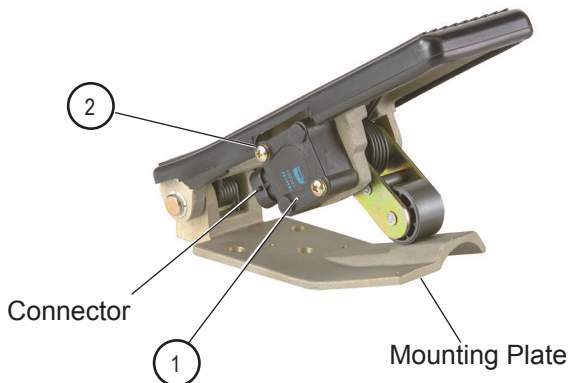
Installation Instructions

BENDIX® ET-2™ ELECTRONIC TREADLE POTENTIOMETER KIT

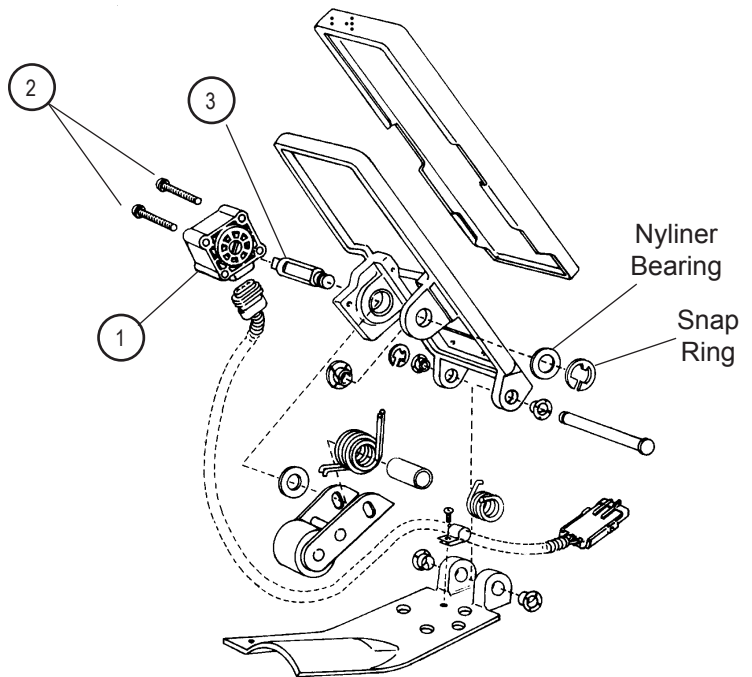


The Bendix® ET-2™ Potentiometer Kit Consists of the Following:

Key No.	Description	Qty.
1	Potentiometer	1
2	#10 Screw	2
3	Shaft	1



Bendix ET-2 Electronic Treadle



Bendix ET-2 Treadle Exploded View

Figure 1 – Typical Bendix ET-2 Electronic Throttle

GENERAL SAFETY GUIDELINES



WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS

TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following guidelines should be observed AT ALL TIMES:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si® air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

DESCRIPTION

This kit contains all the components needed to replace the potentiometer on a Bendix® ET-2™ treadle.

REMOVAL

1. Park vehicle on a level surface and block the wheels and/or hold the vehicle by means other than the air brakes.
2. Drain the air pressure from all vehicle reservoirs.
3. Unplug the cable assembly at the end opposite the potentiometer (1). Disconnect by lifting the lock-tab and pulling the connectors until they disengage.
4. Remove the ET-2 treadle from the vehicle. Remove the electronic treadle from the vehicle and set aside the mounting hardware for reassembly. Clamp the mounting plate (see *Figure 1*) in a vise.

IMPORTANT

Do not clamp the assembly by the treadle actuator body or base since over-clamping may cause distortion to the casting.

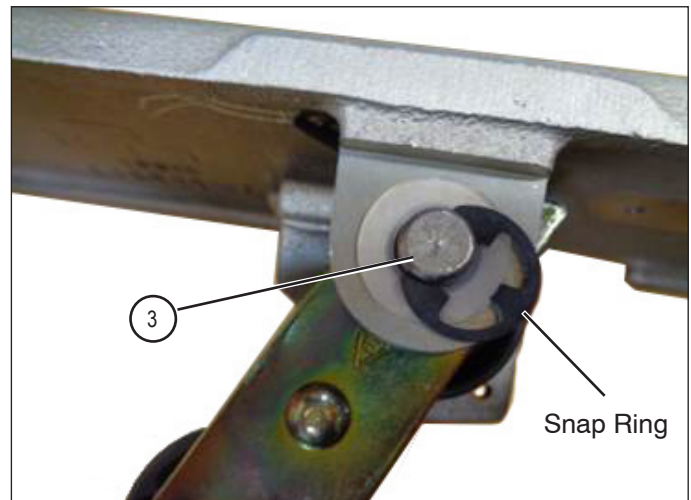


Figure 2 – Snap Ring Removal

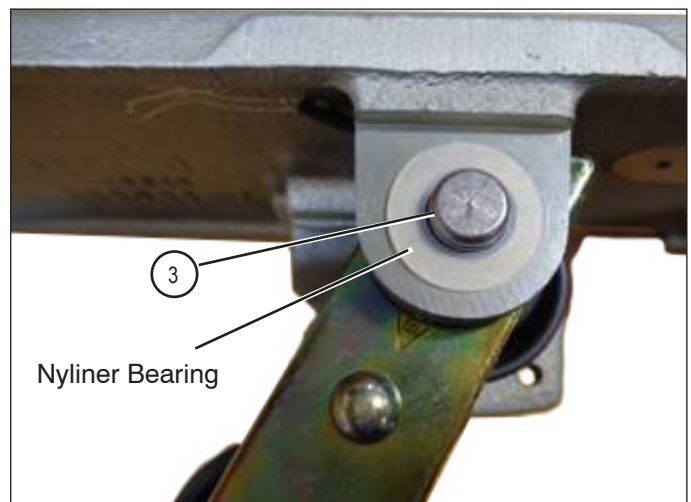


Figure 3 – Nyliner Bearing Removal



Figure 4 – Shaft Removal

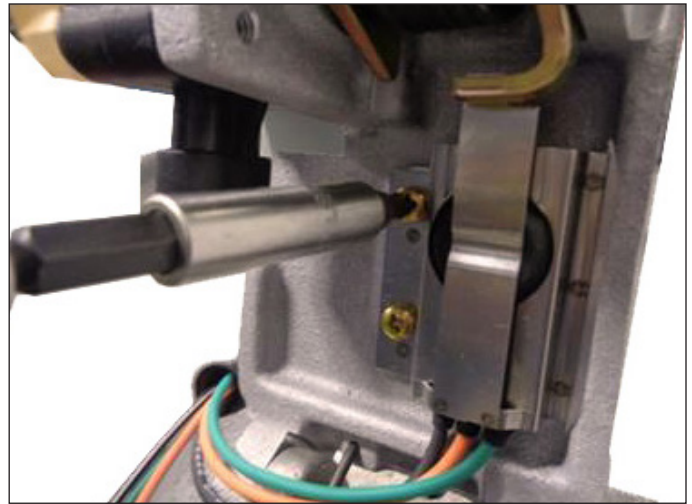


Figure 6 – Idle Validation Switch Removal



Figure 5 – Holding The Assembly In Position

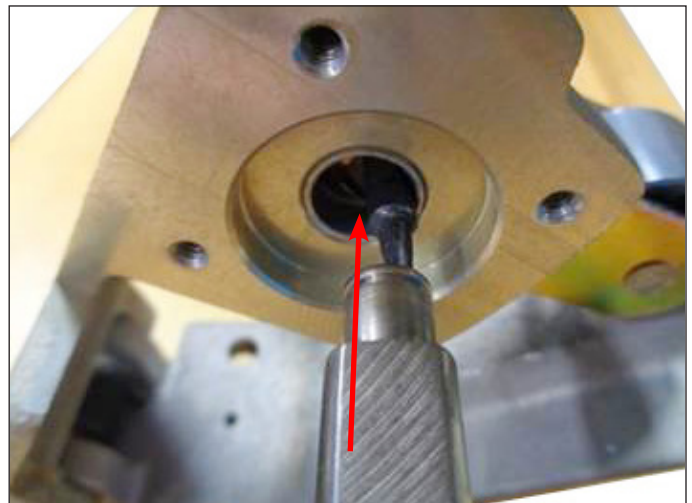


Figure 7 – Shaft Installation

DISASSEMBLY

1. Remove the screws (2) that secure the potentiometer to the treadle.
2. Disengage the potentiometer's integral connector from the cable assembly. Lift the lock-tab and pull the connector until it disengages.
3. Remove the potentiometer (1).
4. Remove snap ring from the shaft (3) as shown in Figure 2.
5. Remove the Nyliner bearing shown in Figure 3.
6. Using a cylindrical object such as a punch or a pen, push the shaft (3) through the treadle. Hold the cylindrical object in the assembly to prevent the parts from misaligning as shown in Figure 5.
7. For models with an idle validation switch, remove the switch and complete the wiring harness. *Refer to Figure 6.*

CLEANING & INSPECTION

1. Clean all metal parts with mineral spirits or an equivalent solvent. Be sure to thoroughly dry the parts.
2. Inspect reusable parts for severe corrosion, pitting or cracks. Replace as necessary. Superficial corrosion and/or pitting is acceptable.
3. Inspect the cable assembly for loose or frayed wires, physical damage, or any contaminants on the connectors.

ASSEMBLY

1. While holding the treadle assembly in position, insert the new shaft (3) using the cylindrical object that was used in the disassembly as a guide. *Refer to Figure 7.*
2. Install the Nyliner bearing and snap ring as shown in Figures 1 and 2.
3. Install the wiring harness, ensuring the safety lock from connector is seated properly.
4. Place the potentiometer (1) on the treadle, in the position shown in Figure 1. The potentiometer's connector must face the rear of the Bendix® ET-2™ treadle valve. Secure the potentiometer with its screws (2). Torque to 20 (±5) in-lbs.



Figure 8 – Idle Validation Switch Installation

5. For models with an idle validation switch, install the wiring harness included in the kit and ensure the connectors are seated properly.
6. Install the idle validation switch as shown in Figure 8.
7. Perform the OPERATIONAL TEST before placing the Bendix® ET-2™ treadle valve back in the vehicle.

OPERATIONAL TEST

1. Check end-to-end electrical continuity at the cable assembly terminals. Note: The cable assembly connector pin out may vary from engine to engine.
2. Secure the ET-2 treadle to a smooth, flat surface in such a way that does not twist the unit.
3. Connect the potentiometer to a volt meter and power supply as shown in Figure 9. Power supply can be a 12 VDC battery in good condition with a known voltage output.
4. Verify that the closed throttle (idle) output voltage, as a percent of supply voltage, is within the limits listed in Figure 10.
5. Depress the treadle to its full throttle position. The output voltage, as a percentage of supply voltage, should be within the limits listed in Figure 10. (i.e., Testing a Detroit Diesel Potentiometer: Battery = 10 VDC. Full throttle = 9 VDC $9/10 \times 100 = 90\%$).
6. Make several full applications and record the idle position voltage each time. Verify that the idle position voltage does not vary by more than .4% (.04 volts).

If the ET-2 treadle fails to operate within its specified ranges, service the unit or replace it with a new ET-2 treadle, available at your nearest Bendix parts outlet.

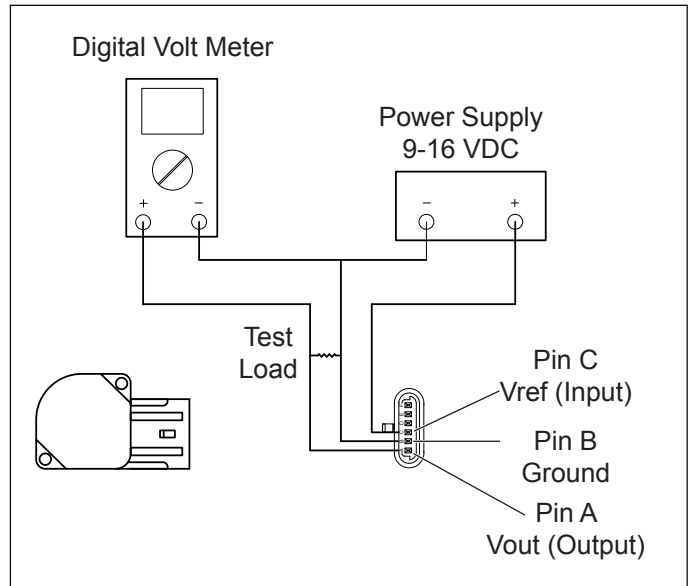


Figure 9 – Electrical Schematic

	Cummins®	Detroit Diesel® (DDEC II)	Detroit Diesel (DDEC II) & Mack®
Closed Throttle (Idle)	6–20%	6-14%	10-20%
Open Throttle (Full)	66-80%	83-94%	70-85%

Figure 10 – Output Voltage, as a Percentage of Supply Voltage

INSTALLATION

1. Install the ET-2 treadle on the vehicle and reconnect the cable assembly.
2. Make sure the ET-2 treadle moves smoothly and evenly, and make sure the treadle has its full range-of-motion before placing the vehicle back into service.

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