



Installation Instructions

ET-2 ELECTRONIC THROTTLE SPRING KITS AND MAJOR REBUILD KITS



**IMPORTANT! PLEASE READ AND FOLLOW
THESE INSTRUCTIONS TO AVOID
PERSONAL INJURY OR DEATH:**

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels.
2. Stop the engine when working around the vehicle.
3. If the vehicle is equipped with air brakes, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle.
4. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in manner that removes all electrical power from the vehicle.
5. When working in the engine compartment the engine should be shut off. 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.
6. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
7. Never exceed recommended pressures and always wear safety glasses.
8. 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.
9. Use only genuine Bendix replacement parts, components, and kits. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, and strength as original equipment and be designed specifically for such applications and systems.
10. Components with stripped threads or damaged parts should be replaced rather than repaired. Repairs requiring machining or welding should not be attempted unless specifically approved and stated by the vehicle or component manufacturer.
11. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.

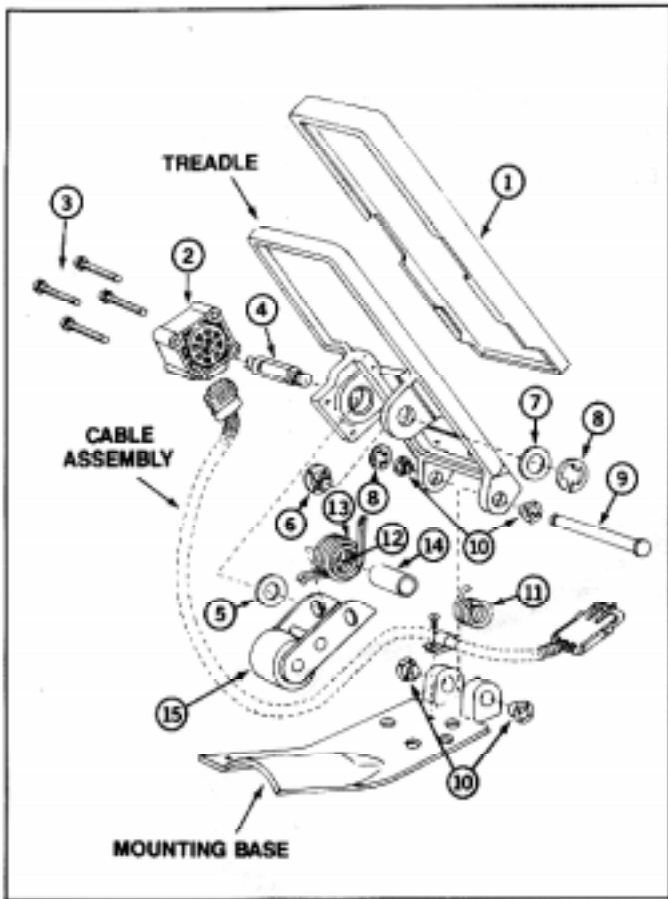


FIGURE 2 - Exploded Line Drawing

ET-2 REMOVAL

1. Park the 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 end opposite the potentiometer. Disconnect by lifting the lock tab and pulling the connectors until they disengage.
4. Remove the ET-2 from the vehicle.

DISASSEMBLY

The following instructions present a major disassembly of the ET-2. Follow each step if installing a major rebuild kit. Follow steps 1-3 if using the pivot spring kit, and follow steps 4-7 if using the lever shaft spring kit.

1. Remove the pivot pin's snap ring (8).
2. Remove the pivot pin (9) and the two nylon bearings (10) from the treadle's exterior. Also remove the two nylon bearings (10) from the mounting base. Separate the treadle from the mounting base.
3. Remove the pivot spring (11). NOTE: IF USING THE PIVOT SPRING KIT, DISASSEMBLY IS COMPLETE. DISCARD THE COMPONENTS THAT HAVE REPLACEMENTS IN THE KIT AND PROCEED TO "CLEANING AND INSPECTION."
4. Remove the screws (3) that secure the potentiometer (2) to the treadle. Remove the potentiometer.
5. Remove the lever shaft's snap ring (8) and washer (7).
6. Remove the lever shaft (4). Then remove the roller assembly (15), the inner washer (5), and the nylon bearing (6) from the treadle.

7. The roller assembly consists of the lever, roller, two springs (12 & 13), and a spring support (14). Remove the springs and the spring support from the lever.

NOTE: IF USING THE LEVER SHAFT SPRING KIT, THE FOLLOWING PARTS WILL BE REUSED: POTENTIOMETER, LEVER SHAFT, ROLLER, PIVOT PIN, TREADLE, MOUNTING BASE, AND TREADLE COVER. DO NOT DISCARD THESE PARTS.

IF USING THE MAJOR REBUILD KIT, THE ONLY PARTS NOT IN THE KIT ARE THE TREADLE, MOUNTING BASE AND POTENTIOMETER. DISCARD THE OTHER COMPONENTS.

CLEANING & INSPECTION

1. Use mineral spirits or an equivalent solvent to clean all metal parts that will be reused. Be sure to thoroughly dry the parts.
2. Remove the treadle cover (1). Inspect the treadle and mounting base 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. Check end-to-end electrical continuity at terminals. Replace as necessary.

ASSEMBLY

Refer to Figure 2 throughout the assembly procedure.

1. Install the four nylon bearings (10) on the mounting base and treadle.
2. Place the treadle "ears" outside the mounting base "ears" so that the holes line up.
3. Install the pivot spring (11) into the base and treadle. The curved end of the spring fits into a small hole in the treadle, and the straight end fits into a small hole in the mounting base.
4. The pivot pin (9) should slide through the holes in the "ears" of the treadle and base assembly, and through the center of the spring. Secure the pin with its snap ring (8). Make sure the pivot spring is straight and is seated in its holes.

IF INSTALLING THE PIVOT PIN SPRING KIT, ASSEMBLY IS COMPLETE. PROCEED TO "OPERATIONAL TEST."

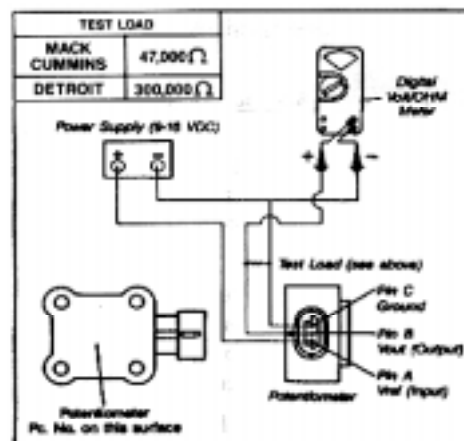


FIGURE 3 - Electrical Schematic

5. The installation of the remaining components is much easier if the inner and outer springs (12 & 13) are compressed and caged. This can be done with a short piece of wire, or even a paper clip. The springs should be compressed so that their ends are approximately one inch apart.
6. Place the spring support (14) inside the caged spring assembly. Then insert the springs into the roller assembly (15). The curved ends of the springs fit over the small bar directly behind the roller.
7. Install the nylon bearing (6) in the treadle.
8. In order to install the lever shaft (4), the roller assembly, with its springs and spring support, and the washers (5 & 7) must be aligned. This can be done by resting the ET -2 on its side, with the smaller ear of the treadle facing up. Insert the washers as shown in Figure 2. [Washer (5) has the larger inside diameter (.520").] And while holding the roller assembly in place, push the lever shaft through the treadle ears.
9. With the ET-2 on its side, as mentioned above, the lever shaft should protrude from the treadle with its snap ring groove visible. Secure the lever shaft with its snap ring (8).
10. Turn the ET-2 upright. Place the potentiometer (2) in the position shown in Figure 2, with its connector facing the rear of ET-2. Secure the potentiometer with its screws (3). Torque to 20 inch pounds (± 5).
11. Install the treadle cover (1) and cable assembly as shown in Figure 2. If the inner and outer springs were compressed and caged with a wire, clip the wire from the spring assembly so that the straight end of the springs rest against the underside of the treadle.
12. Make sure the ET-2 has smooth, even treadle movement. Also, perform Operational Test before installing the ET-2.

OPERATIONAL TEST

1. Unplug the cable assembly from the potentiometer's integral connector by lifting the lock tab and pulling the connectors until they disengage. Inspect cable assembly for loose terminals, frayed wires, corrosion, wear, or physical damage. Check end-to-end electrical continuity at terminals.
2. Secure the ET-2 to a smooth, flat surface in such a way that does not twist the unit.
3. Connect the potentiometer to the volt meter and power supply as shown in Figure 3.
4. Verify that the closed throttle (idle) output voltage, as a percentage of supply voltage, is within the limits listed in the table below.

	Cummins	Detroit Diesel	Mack
Closed Throttle (idle)	6-20%	6-14%	10-20%
Open Throttle (full)	66-80%	83-94%	70-85%

FIGURE 4 - ET-2 Output Voltage, as a Percentage of Supply Voltage

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 the table above. (i.e. Testing a Detroit Diesel ET-2 Potentiometer: Battery = 10 VDC. Full throttle = 9 VDC. $9/10 \times 100 = 90\%$.)
6. Make several full applications and record idle position voltage each time. Verify that idle position voltage does not vary by more than .4% (.04 volts).

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

INSTALLATION

1. Install the assembled ET-2 on the vehicle.
2. Reconnect the cable connector by plugging it into the potentiometer's integral connector and pushing until the lock tab snaps into place.

