



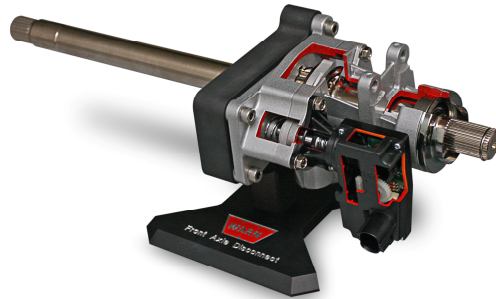
WARN INDUSTRIES, INC.

Electric Center Disconnect Actuator (ECDA)

Warn Industries is an ISO 9001, ISO/TS 16949 and ISO 14001 certified supplier to the automotive industry.

Standard Specifications

Max Torque Capacity, N-m:	vehicle specific
Overall Width, mm:	90
Overall Height, mm:	108
Overall Thickness, mm:	33
Actuator Weight, g:	280
Max Axle Velocity, rpm:	vehicle specific
Operating Temp:	-40°C to 120°C
Peak operating current:	5.0A max
Durability:	240,000 km
Required Service:	NONE



OEM Applications

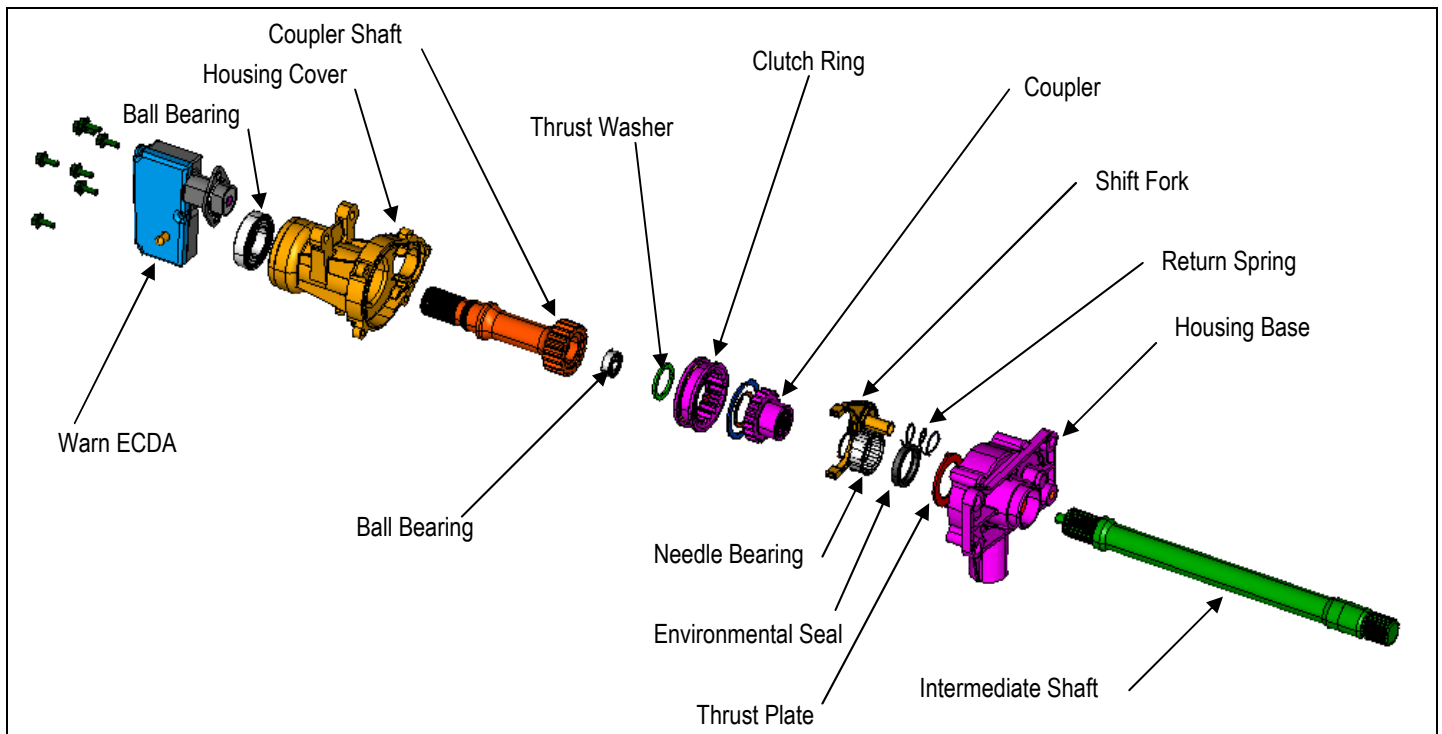
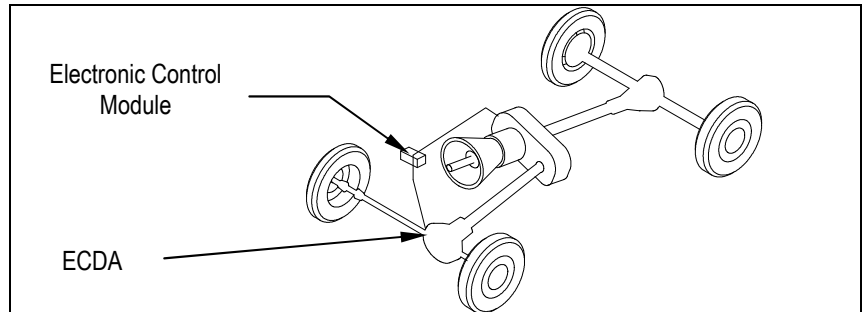
Mid-sized Passenger car

Electric Center Disconnect Benefits and Operation:

- A full sized pickup, in 2WD mode, equipped with an ECDA system saves up to 0.25 mpg (0.75 hp) over the same vehicle with no axle disconnect.
- The axle engages automatically when the driver shifts the transfer case (T/C) to 4WD operation (shift on the fly capable.)
- An electric engage shift signal from the transfer case triggers the WARN patented electric center disconnect actuator to move to the engage position. A spring provides the necessary force to engage the axle shafts if a blocked shift condition occurs.
- The axle disengages automatically when the driver shifts the T/C to 2WD operation; only the axle shafts rotate in 2WD.
- The electric disengage shift signal from the transfer case triggers the ECDA to move to the disengage position. The actuator moves to the disengaged position and a return spring provides the force necessary to disengage the axle shafts.
- The ECDA system is compatible with automatic 4WD systems.

Vehicle 4x4 System Requirements:

- Electric signal from ECM to ECDA
- Electric signal from the transfer case to the 4X4 light.





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Warn's Standard Bench Tests

ECDA test samples must function after each of the following tests:

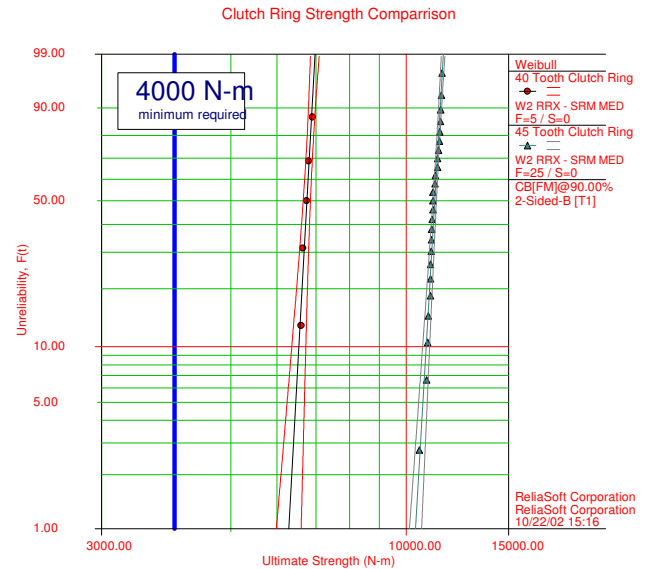
1. Static Strength: Apply specified torque load through the intermediate shaft/clutch ring/coupler shaft with the sample in the locked mode.
2. Ratcheting Durability: Rotate the sample at a specified speed. Attempt engagement by energizing actuator. Allow the coupler shaft and clutch ring splines to grind together (ratchet) for a specified amount of time.
3. Free Running (2WD Mode) Durability: Rotate the sample in the 2WD mode at a specified speed for a specified amount of time.
4. Sealing Requirements: No environmental contamination after a specified amount of time.
5. Low Temperature Operation: Soak the sample for a specified amount of time at extreme temperature (-40°C).

Typical Vehicle Tests:

ECDA test samples must function after each of the following tests:

1. Rapid Start: Axle torsional strength under maximum engine power.
2. Water Sealing: No water leaks when engaging the actuator under water.
3. Off Road Durability: Axle torsional strength under frame twist conditions.
4. High and Low Temperature Operation: Actuator operation at extreme temperature conditions (-40°C to 120°C).
5. High Speed Durability: Axle durability under high speed 2WD driving conditions.
6. Shift-on-the-Fly Operation: Engage (4WD mode) while traveling at freeway speeds.

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- **Warn's Powertrain Products:** Integrated Wheel End Disconnect Systems • Continuous Vacuum Locking Hubs • Manual Locking Hubs • Wheel Bearing Retention Systems • Pulse Type Vacuum Locking Hubs • Cam Type Automatic Locking Hubs
- Warn's Products are patent protected in the United States and overseas countries.



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