



Product

Custom E220 Clutch

Application

Locomotive Hybrid Transmission

Highlights

- Customized E220 bearing-mounted electromagnetic clutch
- Max. torque rating of 3685 lb.ft. (5000 Nm)
- Max. speed rating of 3000 rpm
- Compact design
- 50,000 hour operating life without maintenance
- Specialized friction face material
- Sealed bearings
- -40°C to 100°C operating temperature range

A major European manufacturer of power transmission systems for locomotives approached Warner Electric engineers with a request for a customized clutch to integrate with its new hybrid transmission. The clutch is positioned between the electric drive system and the diesel engine on the hybrid drive. The clutch allows the diesel engine drive to engage when the electric drive's battery power is low.

A special clutch design was necessary because of a very tight set of application parameters, including high speeds (up to 3,000 rpm) and high torque (up to 5,000 Nm). An operating life of over 50,000 hours without maintenance was required since the clutch would be enclosed in a housing as part of the transmission, making access nearly impossible. The housing also meant that the clutch would be exposed to extreme operating temperatures and required to operate reliably in ambient temperatures ranging from -40°C to 100°C.

The engineers at Warner Electric worked closely with the customer to develop a customized E220 electromagnetic clutch to meet the challenging locomotive application requirements. The E220 range of power-activated, zero-backlash clutches is designed for embedded applications and is particularly suited to hybrid transmissions where no residual torque can be transmitted when the clutch is disengaged.

A tolerance of +/-30% on the pilot voltage of the clutch was included and a stabilizing system was implemented to avoid any unforeseen engagement. Sealed bearings and a specialized friction face material were added for longevity without maintenance.

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