

# Remove and refit inter car coupler mounting bolts - Bombardier 09 Stock London Underground Trains



**Overview:** Northumberland Park Depot is the maintenance depot for the London Underground Victoria Line, operating Bombardier 09 Stock trains.

**Application:** to remove and refit the inter car coupler mounting bolts to a torque of 1,050 N.m. The challenge comes from position of the coupler underneath the train. It is surrounded by other hardware making access difficult but particularly the position of the Absolute Position Reader (APR) which is a large boss in the centre of the four-bolt flange.



This application is performed at a scheduled service interval and when the coupler is damaged.

**Current Method:** two operators pull on a high-capacity torque wrench. This is made extremely difficult given the restricted access in the 'pit road' under the train. Additionally, the top bolts allow very little angular movement of the torque wrench.

**Objectives:** to eliminate the risk of injury and to provide a reliable method of accurate torque application.

**Solution:** Pneutorque® PTS-72-2000 driving an offset gearbox. The offset is so arranged that by using a combination of reaction plates and by changing the driven end of the offset, all four bolts can be reached with the one tool.

The ratio of the offset alters from either 1:1.33 to 1:0.78 depending on which end is driven. To compensate for this, the kit includes a Twin Regulator Lubro Control Unit (16075) meaning that a simple switching operation ensures that the correct torque is delivered, regardless of which end (and consequently which ratio) is in operation.

As part of the quotation process, a 3D printed model of the offset was created to ensure that the final product would reach all of the bolts intended for it. The value of this was proven when it was discovered that the first printed model did not in fact fit all couplers. Modifications were subsequently made to the design prior to manufacture.



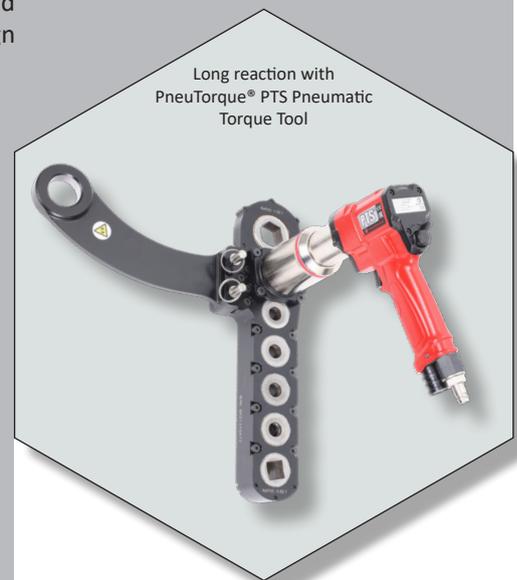
Short reaction with PneuTorque® PTS Pneumatic Torque Tool



Upper bolt using one of the short reaction orientations



Lower bolt using long reaction



Long reaction with PneuTorque® PTS Pneumatic Torque Tool