

## Stiffness in Brose drives

### 1 Introduction – stiffness / friction torque

Customers have reported of stiffness in drives. They frequently also talk of resistance at specific points. This “perceived” stiffness is determined by turning the crank (including the chain drive) by hand. However, this method is not effective because only the feeling in the legs counts when riding. The hand is much more sensitive in detecting disturbance torque, which in reality has no negative impact on the riding experience (pedaling). In direct comparison, it is possible for drives to have different levels of friction torque for production reasons. This is due to the use of highly abrasive seals in the ball bearings to satisfy the tightness requirements as well as the interplay of the different manufacturing tolerances in the system.

Brose inspects every motor prior to delivery to ensure that it is 100% compliant in terms of friction torque.

The following explains a procedure that dealers can use to determine if a drive is not compliant with the Brose factory standards and whether a complaint or exchange is justified.

### 2 Procedure for stiff drives

#### 2.1 Check the tension of the drive in the bike frame

The drive may be mounted too tightly in the frame, which has been shown to have a negative impact on how smooth it runs. In this case the drive must first be removed from the bike. If the drive is no longer stiff immediately after this, then the complaint should be directed to the bicycle manufacturer. If the disassembly has no positive effect on the pedaling resistance, proceed according to 2.2.

#### 2.2 Determine friction torque



1.  
What you'll need:

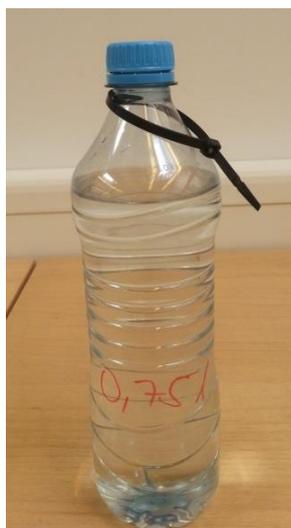
- An empty PET bottle (0.75l)
- Crank (without pedals) with 175mm hole spacing and a weight of 250g ± 50g
- 2 cable ties



2.  
Fill the bottle until its total weight is 700g  $\pm$  10g.



3.  
Place the drive that has been removed from the bike frame on the edge of a table as shown.



4.  
Wrap the first cable tie around the bottle neck.  
Use the second cable tie to attach the crank to the first cable tie.  
Firmly tighten both cable ties and cut off the excess.



5.  
Push/attach the crank with the bottle onto the drive and hold it still. Align the crank horizontally (parallel to the tabletop) as shown. Continue to hold the motor in place; let go of the crank/bottle. Make sure that the bottle hangs freely.

If the crank moves downwards from the horizontal position, the friction torque in this position is within the specified tolerance range.  
If the crank with the bottle attached to it stays in the horizontal position, the friction torque is too high and does not comply with the specifications. A complaint is justified in this case.

6.  
Repeat step 5. for different positions of the bottom bracket spindle. If the crank remains in a horizontal position, the drive is not compliant and a complaint is justified.