

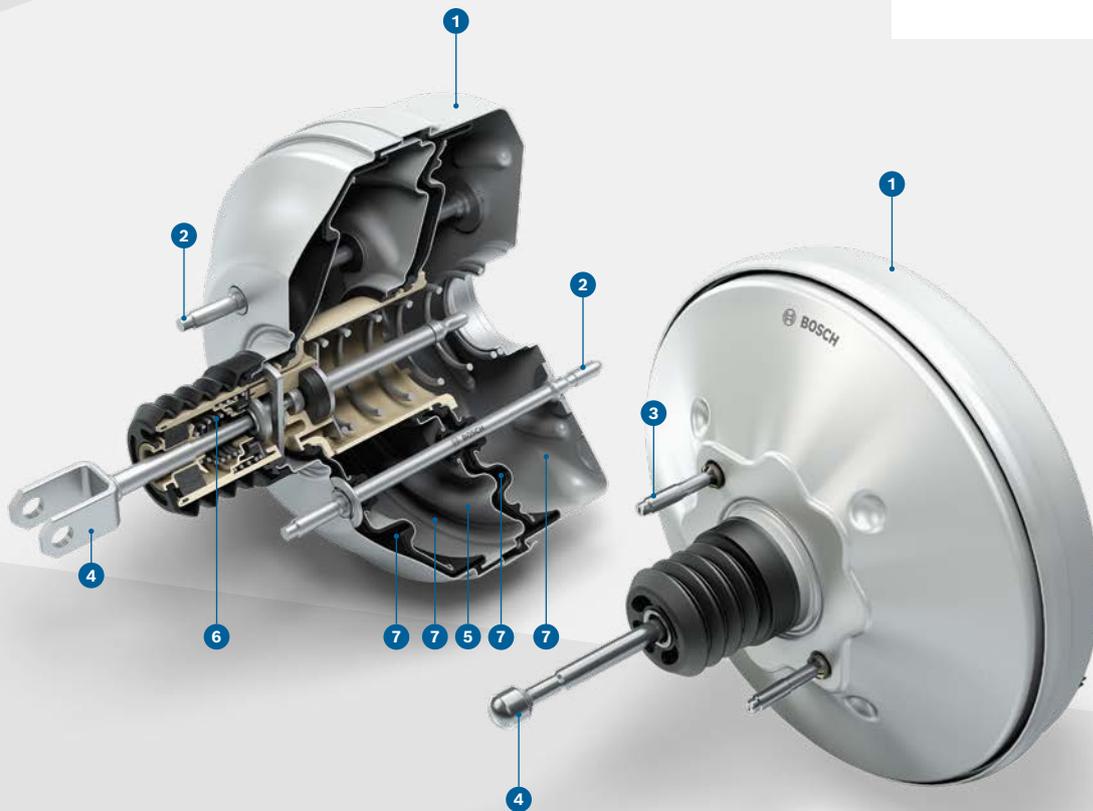
Vacuum brake booster

Tie Rod 4 and Through Bolt 4



BOSCH

Invented for life



PRODUCT BENEFITS

- ▶ Optimized weight
 - Steel design up to 20 % lighter than conventional brake boosters
 - Aluminum variant allows a further weight saving of 20 - 25 %
- ▶ Improved pedal feel and reduced pedal travel
- ▶ Through Bolt version available for easier assembly
- ▶ Standardized manufacturing processes worldwide

- 1 Aluminum shell
- 2 Tie Rod
- 3 Through Bolt
- 4 Input rod
- 5 Diaphragm / diaphragm plate
- 6 Valve
- 7 Chambers



up to

45 %

less weight which contributes to lower fuel consumption and CO₂ emissions.

TASK

Brake boosters allow for a reduction in the pedal force that the driver must apply in order to achieve a desired braking effect. The new vacuum brake booster Tie Rod 4 and Through Bolt 4 with innovative Tie Rod technology stands out by virtue of its low weight and optimized braking power (steel variant up to 20% lighter than conventional vacuum brake boosters). The aluminum variant reduces weight by an additional 20 – 25%. The aluminum brake booster thus contributes to lower fuel consumption and CO₂ emissions. The high rigidity of the vacuum brake boosters shortens the brake pedal travel in maximum braking situations, thereby enhancing safety and comfort. Tie Rod 4 and Through Bolt 4 are available as a single (scalable from 9" to 11") or as a tandem version (scalable from 8+8" to 10+10"). The Tie Rod 4 and Through Bolt 4 vacuum brake boosters are therefore suitable for use in different vehicle types – from small cars to light commercial vehicles.

FUNCTION

A brake booster has two chambers which are separated by a moving membrane. To amplify the driver's pedal force, a pressure difference is created between both chambers of the brake booster. To do this, the brake booster is evacuated in a non-activated state. When the driver actuates the brake pedal, ambient air flows into the rear chamber, creating higher pressure in front of the membrane. Such a pressure difference is created between both of the chambers that the diaphragm plate presses in the direction of the tandem master cylinder and thus supports the force of the driver's foot. For larger vehicles, tandem vacuum brake boosters with four chambers are used.

easier
assembly

of the Through Bolt version due to sleeve

VALUE-ADDED FUNCTIONS

In the Through Bolt version (with tube), the brake booster can be fastened to the fire wall of the vehicle with screws from the engine compartment side. This simplifies the assembly significantly and saves time and cost. Tie Rod 4 and Through Bolt 4 can be combined with the Dual Rate function as well as the tandem master cylinder TMC8. The Dual Rate function can reduce the required pedal force – depending on driver reaction – by up to 60%. In addition to this improvement in comfort, it can shorten braking distances by up to 30%. The tandem master cylinder TMC8 not only needs less space for installation than a conventional brake master cylinder thanks to reduction in length (30%), but also helps to reduce fuel consumption by a weight reduction (20%). The TMC8 is a scalable modular system (from 19 to 33 mm) that can deliver the right solution for any customer requirement.

TIE ROD WEIGHT SPECIFICATIONS

Value	Steel	Aluminum	Full aluminum
Single 10"	2.10 kg	1.70 kg	1.50 kg
Single 11"	2.50 kg	1.90 kg	1.70 kg
Tandem 8+8"	2.60 kg	2.15 kg	1.85 kg
Tandem 8+9"	3.00 kg	2.35 kg	2.10 kg