

Chassis Systems Control Vacuum brake booster Tie Rod 4 (TR4)



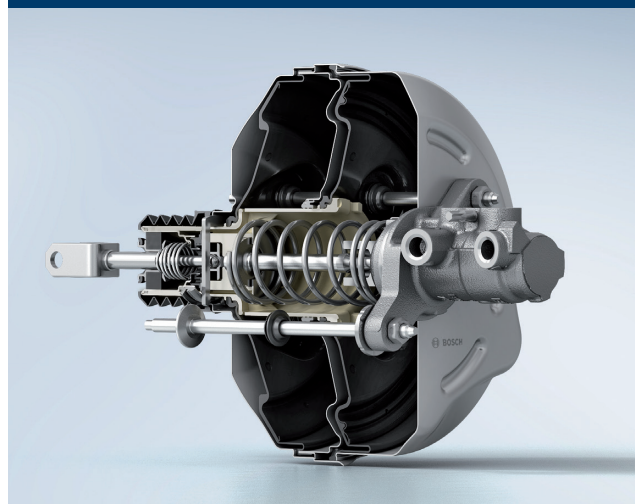
底盘控制系统 真空助力器 贯穿式真空助力器 (TR4)



Tie Rod 4 Single



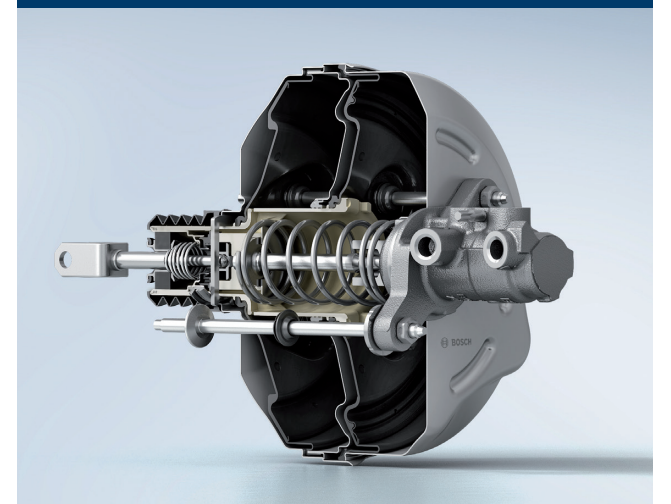
Tie Rod 4 Tandem Aluminum with TMC 8



贯穿式单膜片真空助力器



贯穿式双膜片铝壳真空助力器制动主缸总成



Customer benefits

- ▶ The Tie Rod 4 is produced worldwide using standardized processes and can be adapted to a wide range of requirements
- ▶ Optimized weight
- ▶ Small packaging
- ▶ Improved pedal feel and reduced pedal travel
- ▶ Available as a single (scalable from 9 to 11") or as a tandem (scalable from 7 + 8" to 10 + 10") version
- ▶ Steel design 10 % lighter than conventional brake power boosters
- ▶ Aluminum variant yields to further weight saving of 20 – 25%
- ▶ Through Bolt version available for easier assembly

Characteristics

The new vacuum brake booster Tie Rod 4 with innovative Tie Rod technology stands out by virtue of its low weight (10% lighter than conventional brake power boosters) and optimized braking performance. Our global presence enables us to produce worldwide using standardized processes, which we adapt to OEM requirements. This reduces complexity for global vehicle platforms. The high rigidity of the Tie Rod 4 shortens the brake pedal travel in maximum braking situations, thereby enhancing safety and comfort.

The Tie Rod 4 brake booster is available as a single (scalable from 9" to 11") or as a tandem version (scalable from 7 + 8" to 10 + 10"). In the Through Bolt version (with hollow Tie Rod) the brake power booster can be fastened with bolts from the engine compartment side on the vehicle fire wall. This simplifies assembly in the vehicle, saving time and money.

客户获益

- ▶ 贯穿式真空助力器采用标准工艺流程全球化生产，能适应多种要求。
- ▶ 重量优化
- ▶ 安装空间小
- ▶ 减少踏板行程，改善了踏板感
- ▶ 我们提供尺寸完备的贯穿式真空助力器，单膜片系列（尺寸从9"到11"）和双膜片系列（尺寸从7+8"到10+10"）
- ▶ 贯穿式钢壳真空助力器与传统真空助力器相比，重量减轻了10%
- ▶ 贯穿式铝壳真空助力器还能进一步减轻20-25%的重量
- ▶ 螺栓拧紧贯穿式真空助力器的前拧紧式设计更有助于简化整车厂的装配过程

特点

凭借创新贯穿杆技术脱颖而出的贯穿式真空助力器，重量轻（与传统真空助力器相比，重量减轻了10%），制动性能更好。博世集团的全球化网络，使我们能在世界范围内按符合主机厂要求的标准化工艺流程生产，这降低了全球汽车平台操作的复杂性。创新的贯穿杆技术使真空助力器壳体的刚度大大增加，在高强度制动时可减少行程损失，从而提供更安全及舒适的制动效果。

我们提供尺寸完备的贯穿式真空助力器，单膜片系列（尺寸从9"到11"）和双膜片系列（尺寸从7+8"到10+10"）。螺栓拧紧贯穿式真空助力器设计方案便于主机厂在发动机舱安装真空助力器在汽车防火板上。这种设计有助于简化整车厂的装配工序，节省了时间和资金。

贯穿式铝壳真空助力器还能进一步减轻20-25%的重量，可大大节省油耗及有效降低二氧化碳排放量。

重量规格

9寸贯穿式单膜片真空助力器	1,600 g
10寸贯穿式单膜片真空助力器	2,050 g
10寸贯穿式单膜片铝壳真空助力器	1,500 g
11寸贯穿式单膜片真空助力器	2,450 g
11寸贯穿式单膜片铝壳真空助力器	1,700 g
7+8寸贯穿式双膜片真空助力器	2,500 g
8+8寸贯穿式双膜片真空助力器	2,650 g
8+8寸贯穿式双膜片铝壳真空助力器	1,900 g
8+9寸贯穿式双膜片真空助力器	2,950 g
8+9寸贯穿式双膜片铝壳真空助力器	2,300 g
10+10寸贯穿式双膜片真空助力器	3,900 g

组合选项

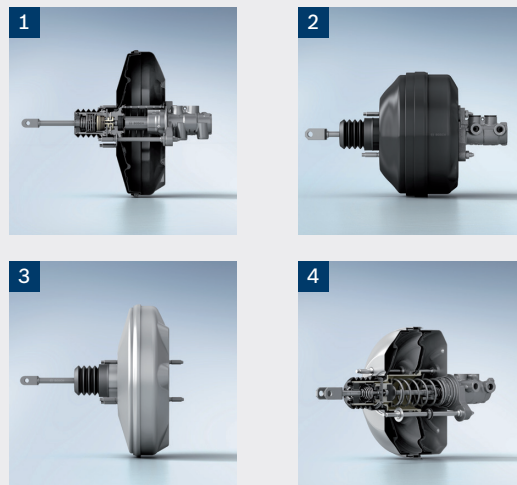
通过提供系统化服务和网络化的专业知识，以及全面的产品范围和技术，我们的客户获得了进一步的优势。根据客户的需要，贯穿式真空助力器能够和制动主缸(TMC 8)，机械紧急制动辅助装置 (EVA)，或双助力比弹簧装置 (SPR)组合使用。

在需要紧急制动时，机械紧急制动辅助装置 (EVA) 可以帮助驾驶员尽快达到启动ABS所需的制动压力，在最短的时间里使车辆达到最大减速度。最理想情况是最多可缩短60%的制动距离。EVA可大大提升驾驶的安全性和增强对行人的保护。

双助力比弹簧装置 (SPR) 能够根据驾驶者做出刹车反应时间长短的不同，可最多减小60%左右的踩踏力。伴随着舒适性较大提升的同时，制动距离也可缩短最多达30%。

博世最新一代的制动主缸(TMC 8)，比常规制动主缸长度减少约30%，重量减轻约20%，这样不仅节省了在发动机舱的安装空间，也有助于降低油耗。TMC8是一个模块化系统产品，尺寸有从19到33mm，因此可针对客户的不同需求提供相应的解决方案。

贯穿式真空助力器 衍生



- 1 贯穿式单膜片钢壳真空助力器制动主缸总成
- 2 贯穿式双膜片钢壳真空助力器制动主缸总成
- 3 贯穿式单膜片铝壳真空助力器制动主缸总成
- 4 贯穿式双膜片铝壳真空助力器制动主缸总成

可与贯穿式真空助力器组合的选项



- 1 机械紧急制动辅助装置 (EVA)
- 2 双助力比弹簧装置 (SPR)
- 3 制动主缸 (TMC 8)

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印刷于中国

Weight specifications

TR4 Single 9"	1,600 g
TR4 Single 10"	2,050 g
TR4 Single Aluminum 10"	1,500 g
TR4 Single 11"	2,450 g
TR4 Single Aluminum 11"	1,700 g
TR4 Tandem 7 + 8"	2,500 g
TR4 Tandem 8 + 8"	2,650 g
TR4 Tandem Aluminum 8 + 8"	1,900 g
TR4 Tandem 8 + 9"	2,950 g
TR4 Tandem Aluminum 8 + 9"	2,300 g
TR4 Tandem 10 + 10"	3,900 g

Combination options

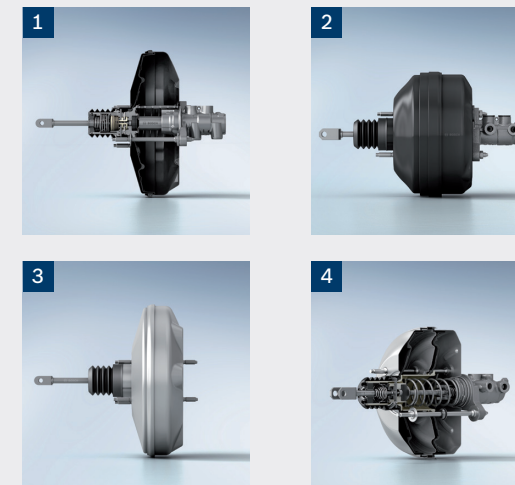
Our customers gain further advantages through our system and networking expertise combined with our comprehensive product range and know-how. The Tie Rod 4 can be combined with the EVA (Emergency Valve Assist) brake-assist and SPR (Spring Reaction), and with the brake master cylinder TMC 8.

In emergency braking situations the mechanical brakeassist EVA helps the driver to reach the ABS pressure required for maximum deceleration in the shortest possible time. This enhances comfort and shortens the braking distance by up to 60%.

The Dual Rate function SPR can reduce the required pedal force – depending on driver reaction – by up to 60%. Added to this improvement in comfort, SPR can shorten braking distances by up to 30%.

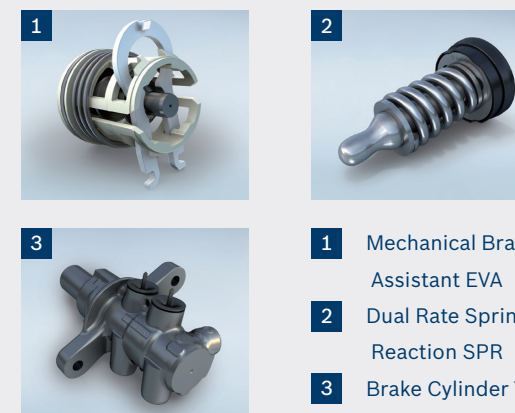
The tandem brake master cylinder TMC 8 not only needs less space for installation than a conventional brake master cylinder thanks to reduction in length (30%) but also helps to reduce fuel consumption by a weight reduction (20%). The TMC 8 is a scalable modular system (from 19 to 33 mm) that can deliver the right solution for any customer requirement.

Variants of the TR4



- 1 Tie Rod 4 Single Steel with TMC 8
- 2 Tie Rod 4 Tandem Steel mit TMC 8
- 3 Tie Rod 4 Single Aluminum
- 4 Tie Rod 4 Tandem Aluminum with TMC 8

Combination options for the TR4



- 1 Mechanical Brake Assistant EVA
- 2 Dual Rate Spring Reaction SPR
- 3 Brake Cylinder TMC 8

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