

Delphi Brake Apply

Delphi knows vehicles inside and out. By leveraging decades of its automotive experience and expertise, Delphi continues to design, develop, test, and manufacture automotive vehicle innovations that meet or exceed customer expectations. This vast knowledge of the total vehicle, combined with Delphi's resources and global locations, contributes to the production of more than 6 million brake apply systems each year. Delphi supplies a full range of braking components, modules, and systems that can be tailored to manufacturers' specific requirements. With technical centers and manufacturing sites located throughout the world, Delphi provides personalized customer service and on-time, cost-effective deliveries to vehicle manufacturers and other Tier 1 suppliers.

► Description

Delphi brake apply primarily consists of a vacuum booster and master cylinder that are designed to meet the specific characteristics of a wide variety of vehicle size classifications and programs. State-of-the-art packaging and mounting specifications contribute to a quiet, efficient, and lightweight system. The vacuum booster and master cylinder can also be supplied as a complete powerbrake assembly.



Vacuum booster: The vacuum booster design is available in two lightweight configurations—conventional and tie rod. Both provide a smaller packaging envelope for decreased mass with the tie rod design providing the additional benefit of less pedal travel. Also, the tie rod construction minimizes the stamped shell thickness, achieving a lighter part.

Delphi uses the building block approach to manufacture vacuum boosters that are cost-effective. Common internal components are used for each booster—only the outside housing dimensions vary from size to size.

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Master cylinder: Delphi’s versatile master cylinder design is ideal for either an inboard or outboard brake pipe connection port. Multiple thread and seat styles, such as ISO, JASO, and inverted flare, accommodate vehicle manufacturer specifications around the globe. For improved durability and to reduce initial travel loss, Delphi’s patented Super Peen process is used to make a smooth bypass hole in the master cylinder.

With one of the largest selections of bore diameters, Delphi’s family of master cylinders allows vehicle manufacturers to offer a diverse range of pedal feel responses to their customers.

Delphi’s three leading-edge designs help control the fluid flow rate. The standard design has a single bypass hole and is used in vehicles with anti-lock brake systems. The TCS1 and TCS2 designs, with their double bypass holes and higher strength lip seals, are compatible with anti-lock braking, traction control, and vehicle stability control systems. Single bypass holes and activated lip seals distinguish the TCS2 design. Delphi also has centerpoint compensating (CPC1 and CPC2) designs available.

Reservoir: The reservoir shapes and sizes are custom designed for a unique fit. They are also equipped with a fluid level sensor to help alert drivers (via a dashboard light) when brake fluid should be added. The sensor can be located inboard, outboard, or in the reservoir cap for greater vehicle program flexibility.

▶ Vacuum Booster

Features	Benefits
Custom calibration capability	Superior pedal feel
Clevis, eyelet, and two-piece pushrods	Flexibility
Optimized design	Maximum output Consistent driver interface Proven reliability and durability
Best-in-class response time	Enhanced brake modulation Shorter stopping distance
Conventional and tie rod configurations	Flexibility
Complete range of booster diameters— Single: 6 to 11 in. Tandem: 7 in/8 in. to 10 in/10.5 in, 220 mm, 240 mm, and 260 mm	Flexibility Cost-effective

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► Master Cylinder

Features	Benefits
Optimized design	Improved packaging and cost-effectiveness
Aluminum body and pistons	Less mass Improved durability Enhanced corrosion resistance
Reservoir, outlet, and fluid level sensor flexibility	Accommodates various vehicle packaging needs
STD, TCS1, TCS2, CPC1, and CPC2 designs	Compatible with ABS, TCS, and stability control systems
Patented Super Peen technology	Improved durability ABS and TCS compatible Cost-effectiveness
Complete range of bore diameters from 19 mm to 40 mm	Flexibility Cost-effectiveness
State-of-the-art validation testing (Multi-Environment Over Stress Tests)	Proven durability and reliability

► Typical Applications

Delphi's numerous bore sizes and vacuum booster calibration capability enable each vehicle manufacturer to provide a smooth, distinct pedal feel for a wide range of vehicle classifications—from compact car to light-duty truck.

► Performance Advantages

With an optimized design, brake apply provides consistent output, fast response, and long-term reliability with a validated performance of 150,000 miles. Delphi's stringent noise, vibration, and harshness testing process has led to optimized internal airflow paths and to one of the quietest brake apply systems in the industry. In addition, an immediate braking response when the driver touches the pedal, also known as low initial travel loss, helps to enhance the driver's sense of control and security.