

# Power Booster System PBS



## Applications

- Truck
- Bus
- Mobile and stationary Construction Machines
- Off-road Vehicles
- Diesel Locomotives

# Pneumatic Booster System

PBS eliminates turbo lag on diesel engines, improves performance and saves valuable energy.

## POWERTRAIN

For decades, engineers have been working to reduce the problem of turbo lag on turbo-charged diesel engines – the performance lag which typically occurs when accelerating from rest or changing gear. With its Pneumatic Booster System (PBS), Knorr-Bremse has developed an intelligent system which brings a huge improvement in throttle response and acceleration performance in trucks and buses. PBS will go into production in early 2013.

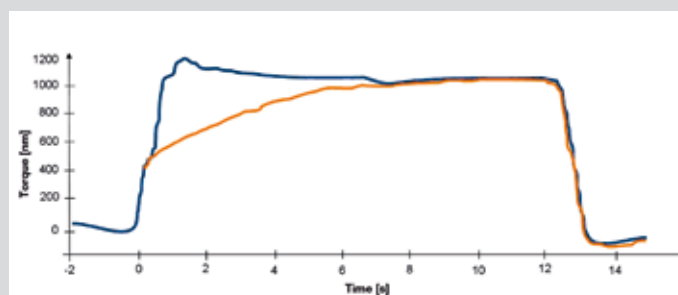
## THE CONCEPT

During acceleration, PBS briefly injects air from the vehicle's compressed air system into the engine's injection manifold. This allows a correspondingly larger amount of fuel to be injected, so that full-load torque is available almost immediately. PBS is a mechatronic product which has its own ECU and functionality software, and can interface directly with the engine management system.

## THE ADVANTAGES

Initially, the development objective was simply to enhance performance and acceleration, where PBS can bring improvements of up to 150%. As work continued however, customers became increasingly interested in the energy efficiency aspect. Here too, PBS opens up new possibilities, since in the context of efficiency the significant improvement in accelerating power can also be used to support downsizing or downspeeding.

**Downsizing:** This approach offers particularly promising potential for buses and delivery trucks – vehicles that are frequently fitted with larger engines than strictly necessary, in the interests of livelier performance. Using PBS it is possible to develop the same accelerating power from a 25-30% smaller displacement. The customer sees the benefits in weight savings, which also lead to reduced fuel consumption and costs.



With PBS (blue), a turbodiesel engine develops boost pressure and torque much faster than without (orange).



The test vehicle: a 430 hp MAN TGA semitrailer rig with automated transmission.

**Downspeeding:** There are two possible approaches to downspeeding, which can be used either separately or together. Firstly, particularly in the case of vehicles with automated manual transmission, the transmission shift logic can be optimized so that the entire improvement in accelerating power translates into lower-rpm shifting. The transmission then shifts up significantly sooner, and shifts down less frequently, but with no loss of accelerating power and with an improvement in fuel consumption. The second possibility is to opt for a longer final drive ratio, but only to the point where the resultant drop in the rate of acceleration can still just be offset by PBS. This solution has the advantage of reducing engine speeds even when driving at a constant road speed, thereby saving fuel.

In conjunction with modified engine operating parameters, PBS can also reduce particulate and nitrogen oxide emissions.



*For questions and further information,  
please contact Dr. Guang Rao:  
e-Mail: [guang.rao@knorr-bremse.com](mailto:guang.rao@knorr-bremse.com)*

Head Office

**Knorr-Bremse Systeme für  
Nutzfahrzeuge GmbH**

Moosacher Strasse 80  
80809 Munich  
Germany  
Tel: +49 89 3547-0  
Fax: +49 89 3547-2767  
www.knorr-bremseCVS.com

## Europe – Africa

Austria  
**Knorr-Bremse GmbH  
Systeme für Nutzfahrzeuge**  
Mödling  
Tel: +43 2236 409-2436  
Fax: +43 2236 409-2434

Belgium  
**Knorr-Bremse Benelux B.V.B.A.**  
Heist-op-den-Berg  
Tel: +32 1525 7900  
Fax: +32 1524 9240

Czech Republic  
**Knorr-Bremse Systémy pro  
uzitkovú vozidla, CR, s.r.o.**  
Liberec  
Tel: +420 482 363-611  
Fax: +420 482 363-711

France  
**Knorr-Bremse  
Systèmes pour Véhicules  
Utilitaires France**  
Lisieux Cedex  
Tel: +33 2 3132 1200  
Fax: +33 2 3132 1303

Germany  
**Hasse & Wrede GmbH**  
Berlin  
Tel: +49 30 9392-3101  
Fax: +49 30 7009-0811

Germany  
**Knorr-Bremse Systeme für  
Nutzfahrzeuge GmbH**  
Berlin  
Tel: +49 180 223-7637  
Fax: +49 30 9392-3426

Hungary  
**Knorr-Bremse  
Fékkendzszerek Kft.**  
Kecskemét  
Tel: +36 76 511 100  
Fax: +36 76 481 100

Italy  
**Knorr-Bremse  
Sistemi per Autoveicoli  
Commerciali S.p.A.**  
Arcore  
Tel: +39 039 6075-1  
Fax: +39 039 6075-435

Netherlands  
**Knorr-Bremse Benelux B.V.B.A.**  
Mydrecht  
Tel: +31 297 239-330  
Fax: +31 297 239-339

Poland  
**Knorr-Bremse Polska Sfn Sp. z o.o.**  
Warsaw  
Tel: +48 22 887-3870  
Fax: +48 22 531-4170

Russia  
**Knorr-Bremse RUS**  
Nizhniy Novgorod  
Tel: +7 831 220-5687  
Fax: +7 831 220-5688

Russia  
**Knorr-Bremse  
Systeme für Nutzfahrzeuge GmbH**  
Moscow  
Tel: +7 495 234-4995  
Fax: +7 495 234-4996

South Africa  
**Knorr-Bremse S.A. Pty. Ltd.**  
Kempton Park  
Tel: +27 11 961-7800  
Fax: +27 11 975-8249

Spain  
**Bost Ibérica, S.L.**  
Irun (Guipuzcoa)  
Tel: +34 902 100-569  
Fax: +34 943 614-063

Sweden  
**Knorr-Bremse  
System for Tunga Fordon AB**  
Lund  
Tel: +46 46 440 0105  
Fax: +46 46 148971

Switzerland  
**Knorr-Bremse  
Systeme für Nutzfahrzeuge GmbH**  
Bassersdorf  
Tel: +41 44 888 77-55  
Fax: +41 44 888 77-50

Turkey  
**Knorr-Bremse  
Ticari Araç Fren Sistemleri Tic. Ltd. Sti.**  
Findikli - Istanbul  
Tel: +90 212 293-4742  
Fax: +90 212 293-4743

United Kingdom  
**Knorr-Bremse  
Systems for Commercial Vehicles Ltd.**  
Bristol  
Tel: +44 117 9846-100  
Fax: +44 117 9846-101

## America

Brazil  
**Knorr-Bremse  
Sistemas para Veículos  
Comerciais Brasil Ltda.**  
São Paulo  
Tel: +55 11 5681 1104  
Fax: +55 11 5686 3905

USA  
**Bendix Commercial Vehicle  
Systems LLC**  
Elyria, OH  
Tel: +1 440 329-9100  
Fax: +1 440 329-9105

## Asia – Australia

Australia  
**Knorr-Bremse  
Australia Pty. Ltd.**  
Granville NSW  
Tel: +61 2 8863-6500  
Fax: +61 2 8863-6510

China  
**Knorr-Bremse  
Brake Equipment (Shanghai) Co. Ltd.**  
Shanghai  
Tel: +86 21 3858-5800  
Fax: +86 21 3858-5900

China  
**Knorr-Bremse  
Asia Pacific (Holding) Limited  
Commercial Vehicle Systems Division**  
Hong Kong  
Tel: +852 3657-9800  
Fax: +852 3657-9901

India  
**Knorr-Bremse  
Systems for Commercial Vehicles  
India Private Ltd.**  
Pune  
Tel: +91 20 6674-6800  
Fax: +91 20 6674-6899

Japan  
**Knorr-Bremse  
Commercial Vehicle Systems  
Japan Ltd.**  
Saitama  
Tel: +81 49 273-9155  
Fax: +81 49 282-8601

Korea  
**Knorr-Bremse  
Korea Ltd. Truck Brake Division**  
Seoul  
Tel: +82 2 2273-1182  
Fax: +82 2 2273-1184

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Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Moosacher Strasse 80, 80809 Munich, Germany. Tel: +49 89 3547-0, Fax: +49 89 3547-2767 [www.knorr-bremse.com](http://www.knorr-bremse.com) [www.knorr-bremseCVS.com](http://www.knorr-bremseCVS.com).

