

FRONT AND REAR

AIR SUSPENSIONS

THAT MAXIMIZE

RIDE QUALITY

AND

HANDLING

# **BUS AIR RIDE SUSPENSIONS**



*For The Road Ahead*

 **HENDRICKSON**

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**PARASTEER AND HAS DELIVER PREMIUM  
PERFORMANCE IN ALL KINDS OF BUS APPLICATIONS.**

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For more than three-quarters of a century, Hendrickson has been providing long-lasting suspensions for trucks, tractors, and trailers. Drivers know Hendrickson for our ability to smooth out the bumps in the road, and fleet owners know Hendrickson for our ability to reduce their maintenance and operating costs.

Now Hendrickson, after thoroughly investigating the special needs of bus fleets and customers, has developed a brand new bus suspension—ParaSteer—to complement our proven HAS Single-Axle Air Suspension. From now on, bus manufacturers and customers will not have to compromise ride to achieve great handling with no maintenance.

Hendrickson's ParaSteer Front-Axle Air Suspension utilizes a unique four-bar linkage design to position the air springs directly under the load, improving ride quality and bus body and chassis protection. And the HAS Series is already well-known in the medium-duty and heavy-duty markets for its premium ride and outstanding stability.

ParaSteer and HAS are the ideal combination to improve driver and passenger comfort, while lowering operating costs and increasing driver confidence.

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**PARASTEER FRONT AIR. FOUR-BAR LINKAGE DESIGN FOR EXCEPTIONAL HANDLING. SUPERIOR RIDE FOR PASSENGER COMFORT AND BUS CHASSIS AND BODY PROTECTION.**

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**PARASTEER**

**FOUR-BAR LINKAGE DESIGN.**

Maintains correct steering geometry under all conditions, minimizing steering error caused by rough road, hard cornering, and braking. Results in more precise and accurate control for driver.

**HEAVY-DUTY BUSHINGS.**

Eliminate lubrication requirements and provide exceptional durability.

**HEAVY-DUTY AIR SPRINGS.**

Design positions load directly over springs for increased equipment protection, as well as premium passenger and driver comfort.

**HEIGHT CONTROL VALVE.**

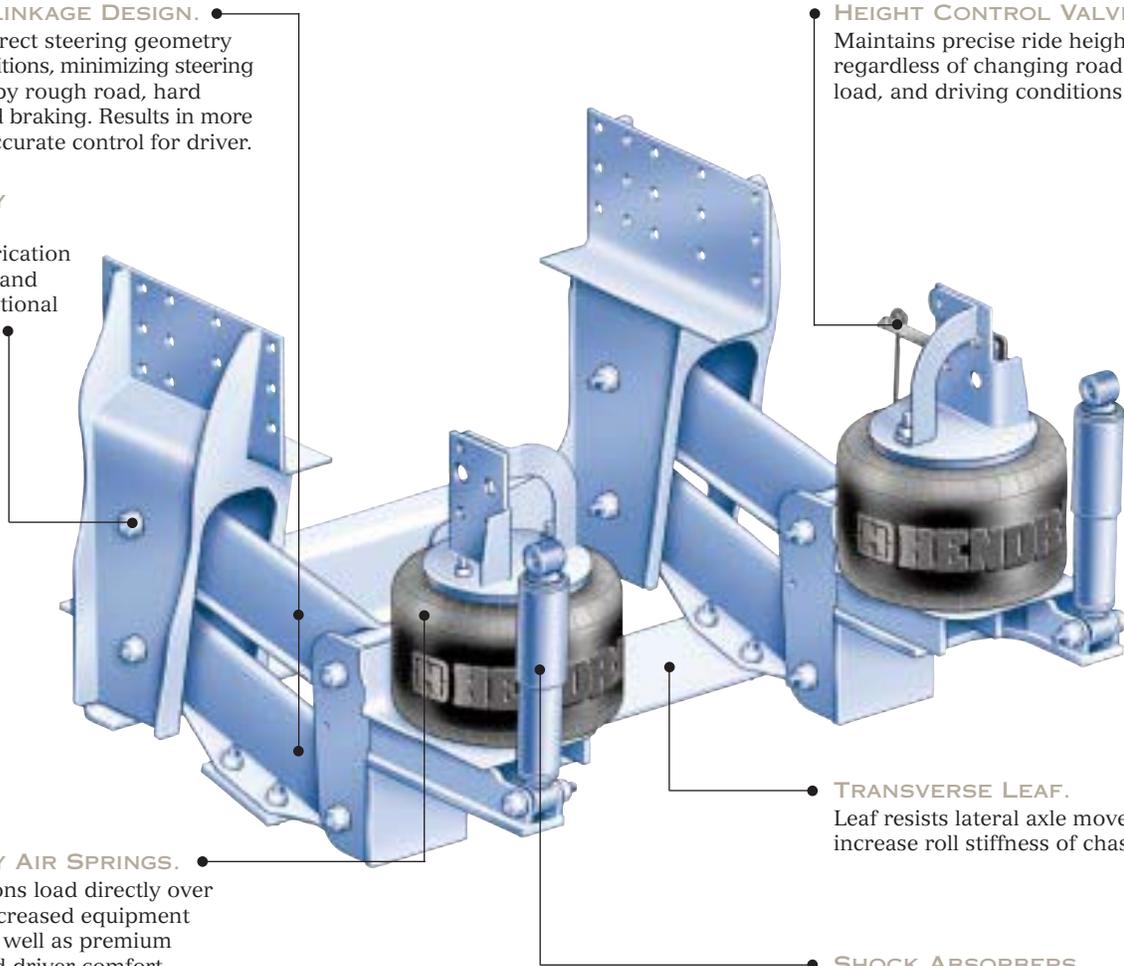
Maintains precise ride height control regardless of changing road surfaces, load, and driving conditions.

**TRANSVERSE LEAF.**

Leaf resists lateral axle movement to increase roll stiffness of chassis.

**SHOCK ABSORBERS.**

Tuned for optimum damping to further enhance ride quality.



Based on Hendrickson's proven ParaLift™ Ultra steerable lift axle system, ParaSteer solves the adverse effects common to front air suspensions. Its durable design and transverse leaf improve roll stiffness, while providing a degree of ride comfort unmatched by previous air suspensions. ParaSteer is also completely maintenance-free.

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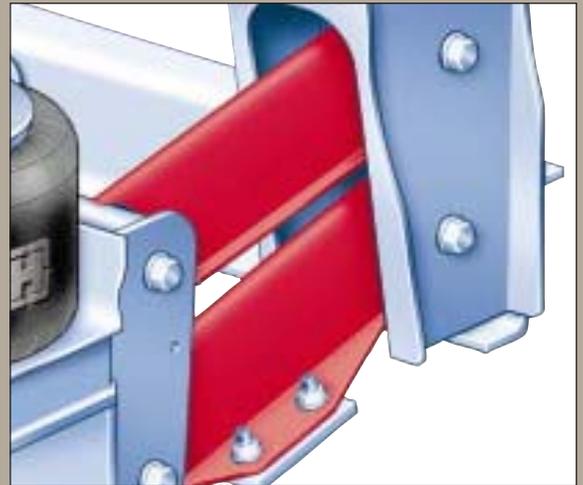
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PARASTEER AND HAS AIR SUSPENSIONS. FROM FRONT TO REAR, HENDRICKSON TECHNOLOGY KEEPS YOU MORE COMFORTABLE AND CONFIDENT.

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Hendrickson front and rear air suspensions provide a total system to protect your bus. ParaSteer's unique four-bar linkage design is the key to its ride quality, handling, great stability and durability.

Because the upper and lower control arms remain at a constant angle to each other at all times, ParaSteer maintains constant wheel caster regardless of the road surface or steering event. This gives the driver better control during bumps, hard cornering, and braking.



ParaSteer's unique four-bar linkage improves handling.

Both ParaSteer and HAS suspensions position 100% of

the vertical load directly on top of the heavy-duty air springs, so the bus is literally riding on a cushion of air at all times. Drivers will feel fresher and more alert, and passengers will experience a



Hendrickson's high volume air springs cushion drivers and passengers.

more comfortable journey. Hendrickson's high volume, low pressure air springs have a very low natural frequency, which is the rate at which energy from road shock is sent through the chassis to driver and passengers. This means that much of the energy is absorbed, not passed on. For this reason, ParaSteer and HAS provide excellent

protection for other chassis components.

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HAS REAR SINGLE-AXLE AIR. RUGGED DURABILITY FOR LONG LIFE AND NO MAINTENANCE. DESIGNED FOR EXCEPTIONAL STABILITY AND RIDE QUALITY.

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## HAS

### EASY ALIGNMENT.

Drop-in shims make axle alignment fast and easy for increased tire life.

### FRAME HANGERS.

Lightweight, durable hangers with integral slipper pads provide low-friction surface for quiet main support member travel. Enlarged rebound roller limits vertical travel of main support member for enhanced control during braking.

### TRANSVERSE ROD.

Ensures maximum lateral stability.

### TORQUE RODS.

Engineered to optimize stability during acceleration and braking.

### SHOCK ABSORBERS.

Shocks are tuned for optimum damping, enhancing ride quality.

### CROSS CHANNEL.

Enhances lateral load distribution for greater stability and reduces maintenance requirements.

### HEAVY-DUTY AIR SPRINGS.

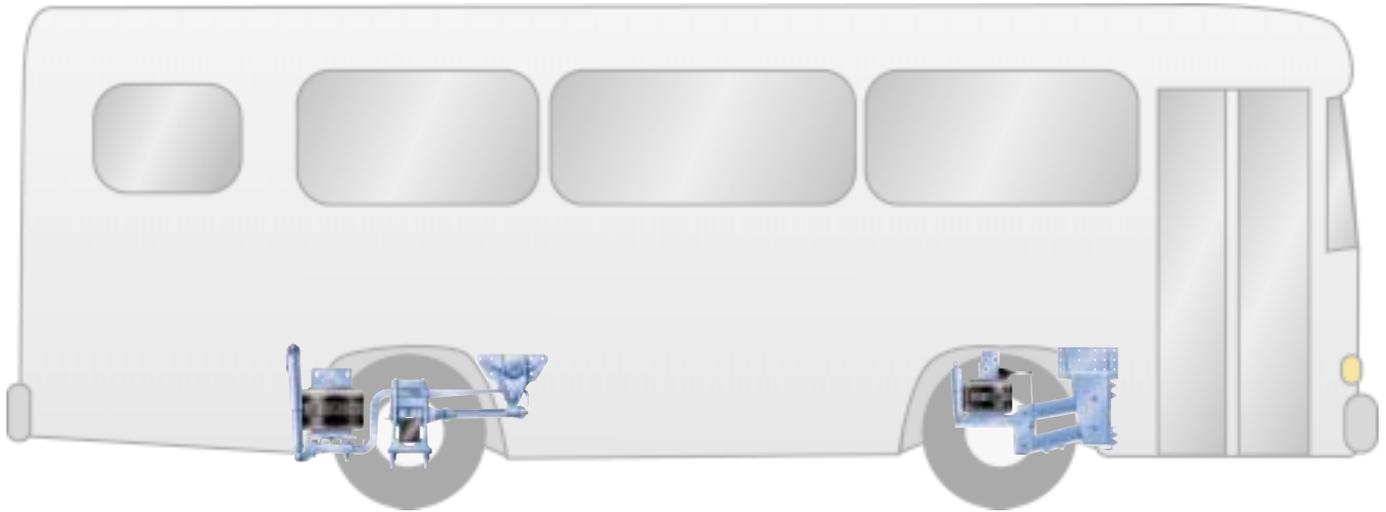
Large volume air springs with rolling lobe design constantly adjust to changing road conditions to deliver superior ride quality.

### HEIGHT CONTROL VALVE.

Maintains precise ride height control regardless of changing road surfaces, load, and driving conditions.

The rugged design and robust construction of Hendrickson's HAS Series not only improve handling characteristics, but significantly reduce maintenance costs. Large volume air springs and heavy-duty shock absorbers provide exceptional ride quality, while protecting equipment from the effects of road shock.

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**HAS AND PARASTEER**

The best air ride system available in the bus market today. ParaSteer in the front and HAS on the rear accommodate either a front or rear engine configuration. Great for drivers, great for riders, ParaSteer and HAS from Hendrickson, the world leader in suspension technology.

SPECIFICATIONS	HAS 150	HAS 180	HAS 210	HAS 230
Installed Weight <sup>1</sup>	396 lbs.	423 lbs.	454 lbs.	470 lbs.
Capacity	15,000 lbs.	18,000 lbs.	21,000 lbs.	23,000 lbs.

<sup>1</sup> NOTE—Includes complete suspension, torque rods, axle and frame brackets, and all hardware.

SPECIFICATIONS	PARASTEER
Installed Weight <sup>1</sup>	597 lbs.
Capacity	14,600 lbs.

<sup>1</sup> NOTE—Includes complete suspension, transverse leaf, axle and frame brackets, and all hardware.



A Boler Company