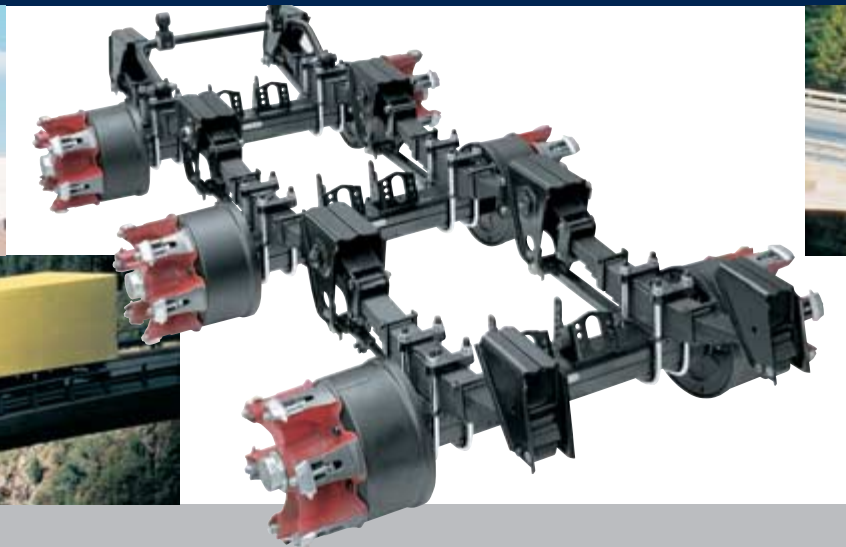


**BPW axle units
with mechanical suspension
for drawbar trailers and semi-trailers
VB and W-series**



Standard range

Technical data, order specification

Dimensions

The track widths, spring centres, support centres and wheel bases are standard dimensions and correspond to general practice in the commercial vehicle industry. Versions with larger spring centres are to be particularly recommended due to their higher roll stability.

The axles do not have any toe-in or toe-out.

The axle camber is 0.5% (H-series).

Axle loads

The specified axle loads are maximum values on the ground up to 105 km/h (65 mph). In vehicles with a slower permitted maximum speed, the following axle load increases are possible:

V max. 40 km/h + 10%

V max. 25 km/h + 25%

V max. 10 km/h + 40%

Reinforced leaf springs must be used if the axle load is increased by more than 10%.

Wheel brakes

S-cam brakes correspond to the generally applicable national and international regulations. A compilation of international certificates can be viewed in Technical Information BPW-TI-Bremsg-00/d and on the Internet at www.bpw.de (brake certificates).

Wheel connections

The axles are supplied with the following options:

With hubs and wheel studs

- for disc wheels with stud centring according to DIN 74361 part 1
- for disc wheels with hub centring according to DIN 74361 part 3
- for alloy wheels (specify configuration and stud hole diameter when ordering)
- for ..F... axle types, wheel nuts are delivered separately for either stud or hub centring (please specify when ordering)

with spider wheels

- for TRILEX rims

Steering axles

BPW ..LL.. series self-steering axles are used for axle loads up to 14 t in conjunction with VB axle suspension systems; the steering axles must be equipped with a steering damper if the axle load ratio (rigid axle to steering axle) is 1:1.

Standard version

- Slack adjusters and air cylinder brackets, suitable for pneumatic diaphragm and spring-type cylinders. Please contact BPW before using spring-type cylinders in W-suspension units.
- Axles equipped with proven, longlife BPW bearing systems.

Additional equipment

- ECO-Master automatic slack adjuster for axles up to 14,000 kg axle load.
- Installed sensors and pole wheels for anti-lock brake system (ABS).

Order information

• Axle, suspension version:

- Single axle, tandem axle suspension, tri-axle suspension
- Suspension type (e.g. HSFVB 3/10010 ME ECO)
- Design index

• Axle load (e.g. 3 x 10,000 kg)

• SN ... brake

• With steering axle, type ...

• Track (SP) ...

• Spring centre (FM) ...

• Support centre (AM) ...

• High mounting bracket

• Wheel base (RS) ...

• Ride height (FH) ...

• Brake application:

- Diaphragm cylinder
- Spring-type cylinder
- GSK manual slack adjuster
- ECO-Master automatic slack adjuster

• Wheel connection:

- Stud centring
- Hub centring
- For alloy wheels (stud hole Ø)
- Offset, tyre size

• ECO hub system

• Vehicle type:

- Drawbar trailer, semi-trailer, tipper, etc.
- Special operational conditions

• Design acc. to

- Code number
- Drawing number
- Offer ...



Key to types

| Example: | | | | | | | | | | | Trailer axle | | |
|----------|----|---|-----|---|----|----|---------------|------|-----|-----|---|--------|-------------------|
| H | S | F | VB | U | LL | 3/ | 10010 | /12° | M | ECO | Series | Brake | Tyres |
| H | | | | | | | | | | | H □ | SN 420 | 20" / 22.5" / 24" |
| | S | | | | | | | | | | For single wheels, wheels without offset (ET=0) | | |
| | Z | | | | | | | | | | For twin wheels | | |
| | IZ | | | | | | | | | | Wheel spiders for TRILEX rims, twin wheels | | |
| | | F | | | | | | | | | M22 x 1.5 wheel studs without wheel nuts; order wheel nuts for stud or hub centring separately | | |
| | | M | | | | | | | | | For hub centring with wheel nuts installed M22 x 1.5 | | |
| | | | VB | | | | | | | | Suspension series | | |
| | | | VBT | | | | | | | | VB spring suspension, leaf springs over the axle | | |
| | | | W | | | | | | | | VBT as above, however with leaf springs under the axle | | |
| | | | | U | | | | | | | W W-tandem axle suspension, with two leaf springs and trunnion axle, mounting brackets between the leaf springs | | |
| | | | | | LL | | | | | | With U-stabiliser (VB-series only) | | |
| | | | | | | — | | | | | Self-steering axle, LL-series | | |
| | | | | | | 2/ | | | | | Single axle | | |
| | | | | | | 3 | | | | | Tandem axle suspension | | |
| | | | | | | | 9010 to 20010 | | | | Tri-axle suspension | | |
| | | | | | | | | 12° | | | Axle load in kg + number of wheel studs per wheel | | |
| | | | | | | | | | HD | | Steering angle of the steering axle | | |
| | | | | | | | | | HDE | | Equaliser bearing with rubber/steel bushes up to 14 t | | |
| | | | | | | | | | M | | Equaliser bearing with bronze bushes 14 to 20 t | | |
| | | | | | | | | | ME | | Equaliser bearing with rubber bushes 9 to 12 t | | |
| | | | | | | | | | ECO | | Equaliser bearing with bronze bushes 9 to 12 t | | |
| | | | | | | | | | | ECO | ECO hub system | | |

BPW axle suspension systems, VB-series

Axle loads 9,000 - 12,000 kg

Recommended applications:

For transporting less sensitive goods.

For semi-trailers and drawbar trailers used for local or long-distance haulage.

On- and off-road.

VB suspension systems are equipped with multi-leaf and parabolic springs (up to 12 t) and are available as suspension systems with 1 to 3 axles (up to 4 axles in exceptional cases). They can be used with either disc or TRILEX wheels. The standard axle load equalisation is performed using equalising beams. These beams are mounted in maintenance-free rubber/steel bushes (M-series) or in high-quality bronze bushes (ME-series). Replaceable spring slides with optimised wear properties are located in the suspension supports and at the ends of the equalising beams.

Precise axle control is achieved thanks to horizontal swinging arms (torque arms) which are mounted in rubber/steel bushes and do not require maintenance. The swinging arms are located between the axles and the front and centre suspension

supports. They are fixed on one wheel side and adjustable on the other, thereby allowing the axles to be aligned in relation to one another and to the centre of the vehicle. Equalising beam studs and bolts are equipped with anti-rotation locks as standard.

Delivery: In modules (axles, supports, springs)

Can be combined with BPW LL self-steering axle

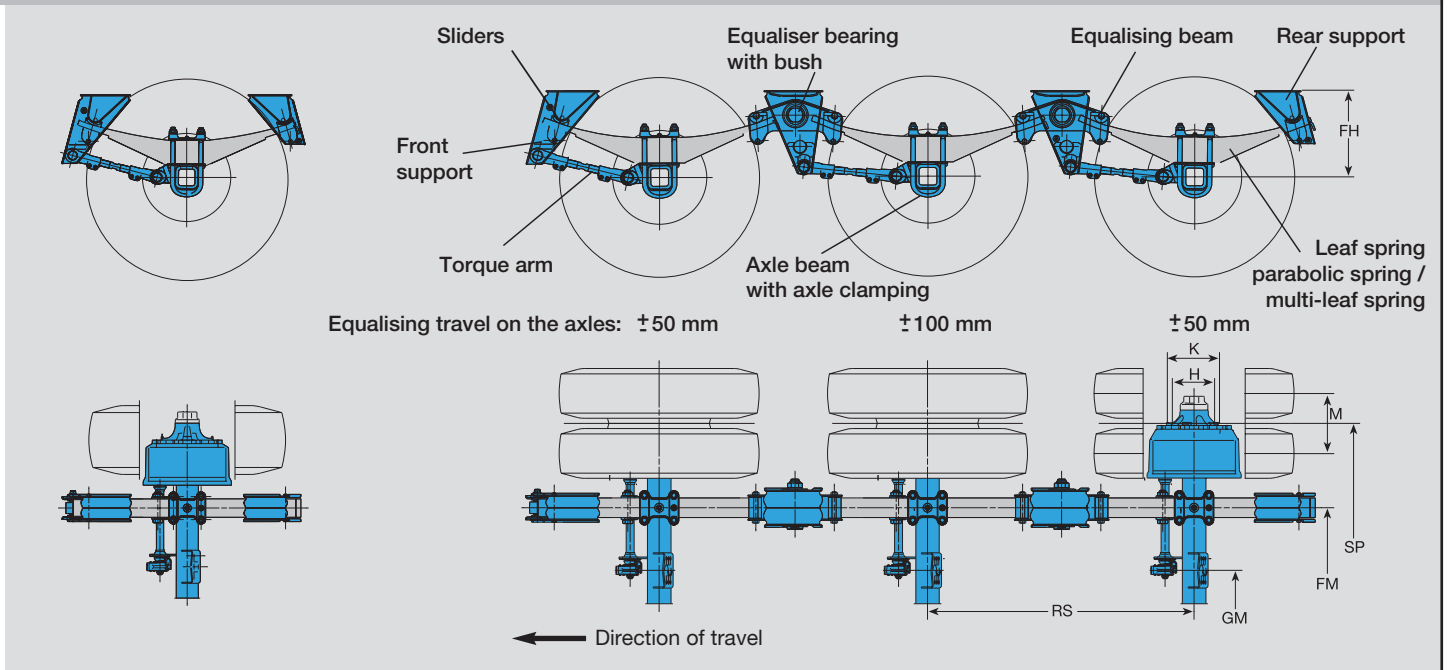
- Tandem and tri-axle suspension systems with a self-steering axle
- Four-axle suspension systems are available with one or two self-steering axles and valve installation for steering lock

With drawbar connection for trailer front axles

Special versions are available on request for aircraft refuelling tankers

Stabilisers must be fitted on vehicles with a high centre of gravity

| Type ¹⁾ | Single axle | Tandem axle suspension | Tri-axle suspension | Version ²⁾ | Axle beam | S-cam brake Ø x width | Track SP | Spring centre FM mm | GM mm | Wheel base RS mm | Tyre ³⁾ example |
|--------------------|-------------|------------------------|---------------------|-----------------------|-----------|--------------------------|----------|---------------------|-------|------------------|------------------------------|
| HSFVB | 9010 | 2/9010 | 3/9010 | M ME | vkt.120 | SN 420x180 | 2010 | 1200 | 385 | 1360 | 385/55 R22.5 385/65 R22.5 |
| | | | | | | | 2040 | 1200 | 415 | | |
| | | | | | | | 2040 | 1300 | 415 | | |
| | | | | | | | 2095 | 1400 | 470 | | |
| HZFVB | 9010 | 2/9010 | 3/9010 | M ME | vkt.120 | SN 420x180 | 1820 | 980 | 341 | 1360 | 275/70 R22.5 |
| | | | | | | | 1820 | 900 | 341 | | |
| | | | | | | | 1880 | 980 | 325 | | |
| HSFVB | 10010 | 2/10010 | 3/10010 | M ME | vkt.150 | SN 420x200 | 2040 | 1300 | 365 | 1360 | 425/65 R22.5 |
| | | | | | | | 2000 | 1200 | 325 | | |
| HZFVB | 10010 | 2/10010 | 3/10010 | M ME | vkt.150 | SN 420x200 | 1820 | 900 | 261 | 1360 | 275/70 R22.5 |
| | | | | | | | 1820 | 980 | 261 | | |
| | | | | | | | 1850 | 980 | 241 | | |
| HZFVB | | 2/10010 | | M ME | vkt.150 | SN 420x200 | 1820 | 900 | 261 | 1820 | 275/70 R22.5 |
| | | | | | | | 1820 | 980 | 261 | | |
| | | | | | | | 1850 | 980 | 241 | | |
| HSFVB | 12010 | 2/12010 | 3/12010 | M ME | vkt.150 | SN 420x200 | 2040 | 1300 | 365 | 1360 | 445/65 R22.5 |
| | | | | | | | 2000 | 1200 | 325 | | |
| HZFVB | 12010 | 2/12010 | 3/12010 | M ME | vkt.150 | SN 420x200 | 1820 | 900 | 261 | 1360 | 295/80 R22.5 |
| | | | | | | | 1820 | 980 | 261 | | |
| | | | | | | | 1850 | 980 | 241 | | |
| HZFVB | | 2/12010 | | M ME | vkt.150 | SN 420x200 | 1820 | 900 | 261 | 1820 | 295/80 R22.5 |
| | | | | | | | 1820 | 980 | 365 | | |
| | | | | | | | 1850 | 980 | 241 | | |



| M=Centre-to-centre distance ET=Offset | Overall width across the tyres mm | Wheel connection | | Ride height FH with multi-leaf springs / with parabolic springs | | | | Suspension weights kg (Version M with parabolic springs) | | |
|--|-----------------------------------|------------------|--------------|---|---------|---------------------|---------|--|------------------------|---------------------|
| | | Wheel stud | Ø H / K (mm) | laden ¹⁾ | unladen | laden ¹⁾ | unladen | Single axle | Tandem axle suspension | Tri-axle suspension |
| ET=0 | 2405 | 10 x M22x1.5 | 280.8 / 335 | 382 | 424 | 378 | 413 | 496 kg | 1035 kg | 1545 kg |
| | 2435 | | | | | | | 497 kg | 1037 kg | 1548 kg |
| | 2435 | | | | | | | 497 kg | 1037 kg | 1548 kg |
| | 2490 | | | | | | | 499 kg | 1041 kg | 1554 kg |
| M=320 | 2432 | 10 x M22x1.5 | 280.8 / 335 | 382 | 424 | 378 | 413 | 505 kg | 1053 kg | 1572 kg |
| | 2432 | | | | | | | 505 kg | 1053 kg | 1572 kg |
| | 2492 | | | | | | | 508 kg | 1059 kg | 1581 kg |
| ET=0 | 2475 | 10 x M22x1.5 | 280.8 / 335 | 397 | 439 | 406 | 429 | 545 kg | 1114 kg | 1693 kg |
| | 2435 | | | | | | | 543 kg | 1110 kg | 1687 kg |
| M=320 | 2432 | 10 x M22x1.5 | 280.8 / 335 | 397 | 439 | 406 | 429 | 545 kg | 1114 kg | 1693 kg |
| | 2432 | | | | | | | 545 kg | 1114 kg | 1693 kg |
| | 2462 | | | | | | | 547 kg | 1118 kg | 1699 kg |
| M=320 | 2432 | 10 x M22x1.5 | 280.8 / 335 | 397 | 439 | 406 | 429 | | 1148 kg | |
| | 2432 | | | | | | | | 1148 kg | |
| | 2462 | | | | | | | | 1152 kg | |
| ET=0 | 2505 | 10 x M22x1.5 | 280.8 / 335 | 394 | 436 | 417 | 444 | 540 kg | 1097 kg | 1660 kg |
| | 2465 | | | | | | | 538 kg | 1093 kg | 1654 kg |
| M=330 | 2465 | 10 x M22x1.5 | 280.8 / 335 | 394 | 436 | 417 | 444 | 540 kg | 1097 kg | 1660 kg |
| | 2465 | | | | | | | 540 kg | 1097 kg | 1660 kg |
| | 2495 | | | | | | | 542 kg | 1101 kg | 1666 kg |
| M=330 | 2465 | 10 x M22x1.5 | 280.8 / 335 | 394 | 436 | 417 | 444 | | 1136 kg | |
| | 2465 | | | | | | | | 1136 kg | |
| | 2495 | | | | | | | | 1140 kg | |

¹⁾ TRILEX versions: Type designation HIZVB ... The track widths vary depending on the tyre size and spacer ring; ²⁾ M: Equaliser bearing in rubber/steel bushes / ME: Equaliser bearing in bronze bushes / 40 mm lower versions ..MN / ..MNE with shortened supports on request; ³⁾ Note the tyre manufacturer's information regarding load index and dimensions; ⁴⁾ Take account of the clearance for dynamic upward travel and equalising distance on suspension axles; ⁵⁾ Weight without wheels and tyres; weight deviations are within the permitted DIN tolerances for the corresponding production processes

BPW axle suspension systems, VB-series

Axle loads 14,000 - 20,000 kg

Recommended applications:

For transporting less sensitive goods.
For semi-trailers and drawbar trailers used for local or long-distance haulage.
On- and off-road.

HD/HDE versions of VB suspension systems are equipped with multi-leaf springs and are available as suspension systems with 1 to 3 axles (up to 4 axles in exceptional cases). They can be used with either disc or TRILEX wheels.

The suspension supports are produced using high-quality, fine-grained steel with excellent welding properties. The standard axle load equalisation is performed using equalising beams. These beams are mounted in maintenance-free, high volume rubber/steel bushes (HD-series) or in longlife, generously sized bronze bushes (HDE-series). Replaceable, thick-walled spring slides made from a wear-resistant steel alloy are located in the suspension supports and at the ends of the equalising beams.

Precise axle control is achieved thanks to horizontal swinging arms (torque arms) which are mounted between the axles and the front and centre suspension supports. They are equipped with zero-maintenance bearings in rubber/steel bushes.

The swinging arms are fixed on one wheel side and adjustable on the other, thereby allowing the axles to be aligned in relation to one another and to the centre of the vehicle's longitudinal axis.

Equalising beam bearing studs and bolts are equipped with anti-rotation locks as standard.

Delivery: In modules (axles, supports, springs).

Can be combined with BPW LL self-steering axle

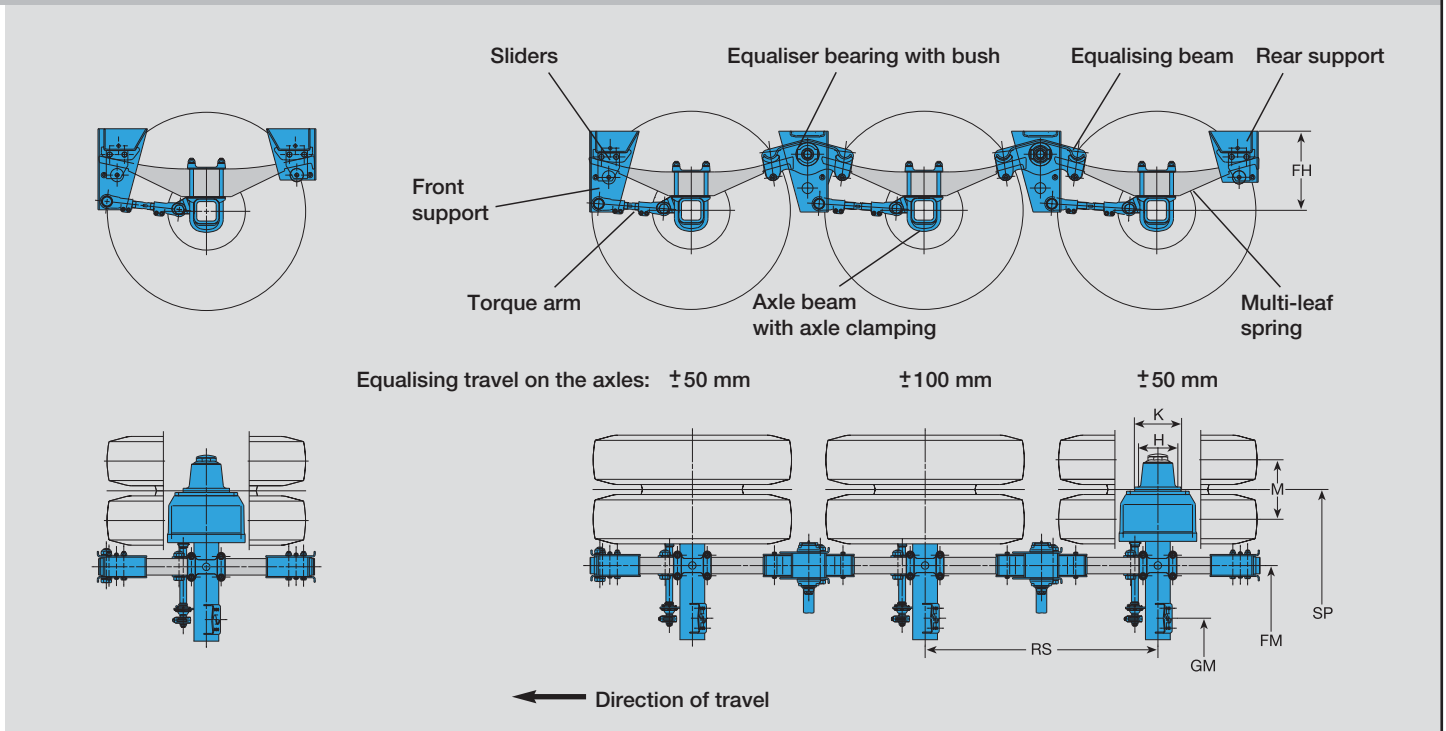
- Tandem and tri-axle suspension systems with a self-steering axle
- Four-axle suspension systems are available with one or two self-steering axles, complete with valve installation for steering lock

With drawbar connection for trailer front axles

Special versions are available on request for aircraft refuelling tankers

Stabilisers must be fitted on vehicles with a high centre of gravity

| Type ¹⁾ | Single axle | Tandem axle suspension | Tri-axle suspension | Version ²⁾ | S-cam brake Ø x width | Track SP mm | Spring centre FM mm | GM mm | Wheel ³⁾ base RS mm | Tyre ⁴⁾ example |
|--------------------|-------------|------------------------|---------------------|-----------------------|-----------------------|-------------|---------------------|-------|--------------------------------|----------------------------|
| HZFVB | | 2/14010 | 3/14010 | HD/HDE | SN 420 x 200 | 1820 | 900 | 266 | 1360 | 12.00 R 20 |
| | | | | | | | | 1410 | 12.00 R 24 | |
| | 14010 | | | | | 1820 | 900 | 266 | 1500 | |
| HZMVB | | 2/16010 | 3/16010 | HDE | SN 420 x 200 | 1820 | 900 | 261 | 1360 | 12.00 R 20 |
| | | | | | | 1950 | 900 | 281 | 1410 | 12.00 R 24 |
| | | | | | | 2250 | 1200 | 505 | 1500 | |
| | | | | | | 1820 | 900 | 261 | | |
| | 16010 | | | | | | | | | |
| HZMVB | 18010 | 2/18010 | 3/18010 | HDE | SN 420 x 200 | 1820 | 900 | 261 | 1500 | 12.00 R 24 |
| | | | | | | 1950 | 900 | 281 | | 14.00 R 20 |
| | | | | | | 2320 | 1200 | 407 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| HZMVB | 20010 | 2/20010 | 3/20010 | HDE | SN 420 x 200 | 1950 | 900 | 278 | 1500 | 14.00 R 20 |
| | | | | | | 2200 | 1100 | 354 | | |
| | | | | | | 2400 | 1300 | 554 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |



| M=Centre-to-centre distance | Overall width across the tyres mm | Wheel connection | | Ride height FH | | Suspension weights ^{§)} | | |
|-----------------------------|-----------------------------------|------------------|--------------|---------------------------|---------------|----------------------------------|---------------------------------|------------------------------|
| | | Wheel stud | Ø H / K (mm) | laden ^{§)} mm | unladen mm | Single axle kg | Tandem axle suspension kg | Tri-axle suspension kg |
| M=350 | 2496 | 10 x M22x1.5 | 280.8 / 335 | 430 | 475 | | 1527 kg | 2300 kg |
| M=360 | 2509 | | | 435 | 480 | | 1548 kg | 2331 kg |
| | 2509 | | | 455 | 500 | 814 kg | 1592 kg | 2432 kg |
| M=350 | 2496 | 10 x M22x1.5 | 280.8 / 335 | 475 | 500 | | 1640 kg | 2469 kg |
| M=360 | 2639 | | | 460 | 495 | | 1678 kg | 2525 kg |
| | 2939 | | | 490 | 530 | | 1767 kg | 2659 kg |
| | 2509 | | | | | 864 kg | 1715 kg | 2581 kg |
| M=360 | 2496 | 10 x M22x1.5 | 280.8 / 335 | 460 | 480 | | 1735 kg | 2612 kg |
| M=428 | 2776 | | | | | | 1757 kg | 2645 kg |
| | 3146 | | | | | 940 kg | 1817 kg | 2735 kg |
| M=428 | 2776 | 10 x M24x1.5 | 280.8 / 335 | 455 | 480 | | 1885 kg | 2837 kg |
| | 3026 | | | | | | 1931 kg | 2906 kg |
| | 3226 | | | | | 1015 kg | 1967 kg | 2960 kg |

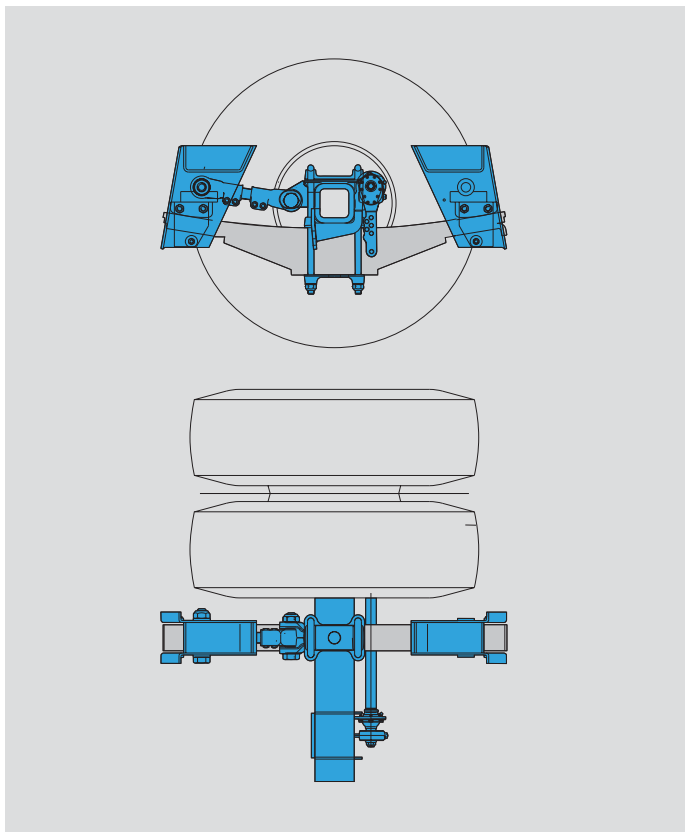
Also available as TRILEX version

¹⁾ TRILEX versions: Type designation HIZVB ... The track widths vary depending on the tyre size and spacer ring; ²⁾ HD: Equaliser bearing in rubber/steel bushes / HDE: Equaliser bearing in bronze bushes; ³⁾ Wheel base 2050 on request; ⁴⁾ Note the tyre manufacturer's information regarding load index and dimensions; ⁵⁾ Take account of the clearance for dynamic upward travel and equalising distance on suspension axles; ⁶⁾ Weight without wheels and tyres; weight deviations are within the permitted DIN tolerances for the corresponding production processes

BPW axle suspension systems, VB-series

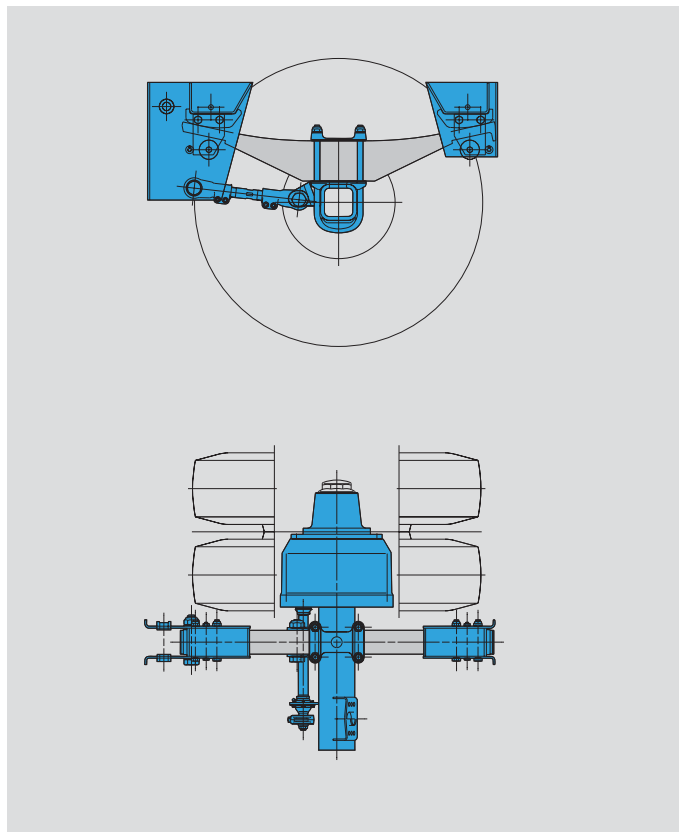
Special versions

Axle suspension systems for low vehicles



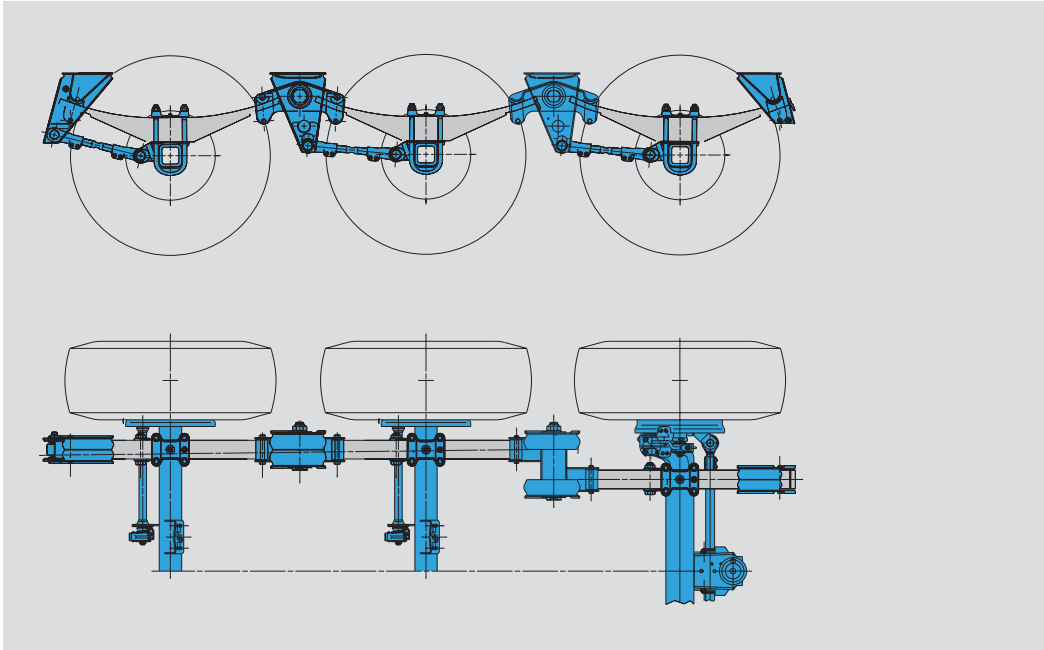
BPW suspension series ...VBT with underslung springs

Axle suspension systems for trailer front axles



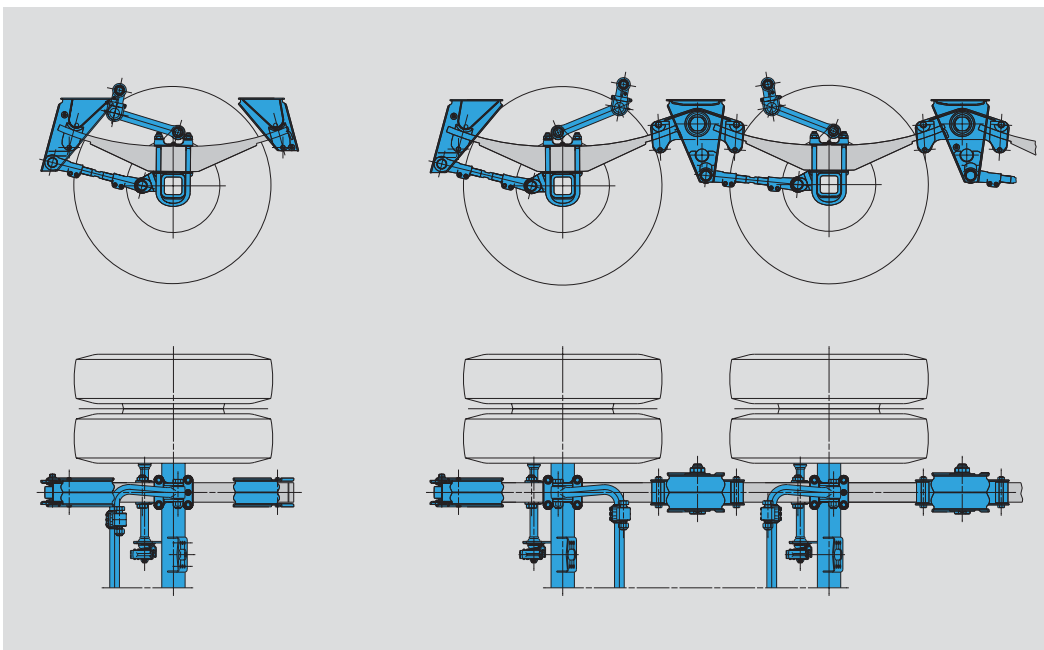
BPW suspension with drawbar connection for trailer front axles

Suspension combinations with BPW LL self-steering axle



In suspension combinations with an LL self-steering axle (max. 14 t axle load), the spring centre difference is equalised using equalising beams offset to the side.

Axle units for vehicles with a high centre of gravity



For vehicles with a high centre of gravity, the U-stabiliser version is required

BPW axle suspension systems, W-series suspension load 20,000 to 40,000 kg

Recommended applications:

Tandem axle suspension systems for transporting robust goods under harsh conditions on-road, off-road and on construction sites. For off-road application in the tropics and the arctic.

Available as ready-to-install, completely pre-assembled suspension for either disc or TRILEX wheels. W-series axle units are equipped with robust and longlife multi-leaf springs. The main spring layers are angled at both ends to control the track of the axles. They are clamped onto the axle beams using spring housings with rubber elements.

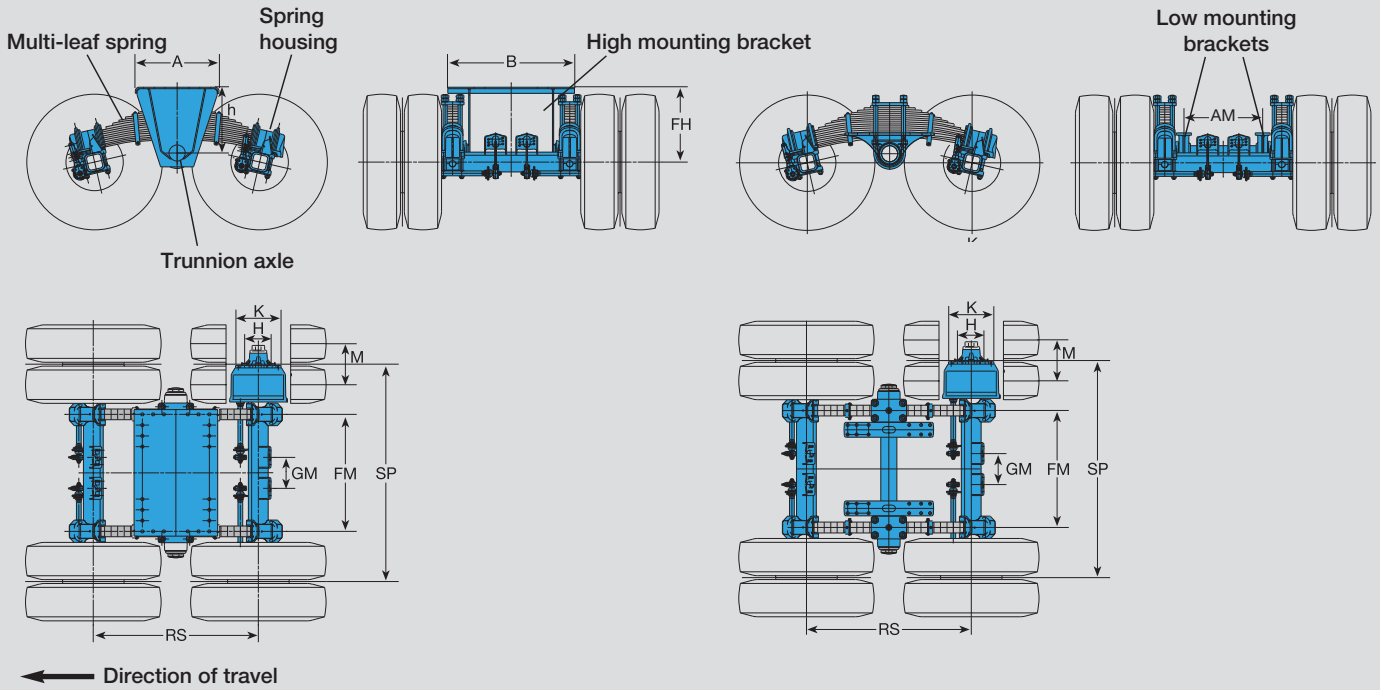
Longlife bronze bushes are used for mounting the spring packs on the shared central trunnion axle.

It is possible to select between one high mounting bracket or two low mounting brackets for directly attaching the suspension onto the vehicle frame.

The design is characterised by high lateral stability and very long axle load equalisation distances. It is unaffected by semi-trailer tilt.

W-suspension systems have proved their worth over decades in demanding off-road and tipper applications.

| Type | Suspension load up to 105 km/h kg | S-cam brake Ø x width | Track SP mm | Spring centre mm | GM mm | Support centre AM mm | High mounting bracket AxBxh mm | Wheel base RS mm | |
|------------------------------|-----------------------------------|-----------------------|-------------|------------------|-------|----------------------|--------------------------------|------------------|------|
| HZFW 2/10010 | 20000 | SN 420x200 | 1820 | 980 | 261 | 660 | | 1400 | |
| | | | 1820 | 980 | 261 | | 700x1060x550 | | |
| HZFW 2/12010 B ¹⁾ | 24000 | SN 420x200 | 1820 | 980 | 261 | 660 | | 1400 | |
| | | | 1820 | 980 | 261 | | 700x1060x600 | | |
| HZFW 2/12010 C ²⁾ | 24000 | SN 420x200 | 1820 | 980 | 261 | 660 | | 1500 | |
| | | | 1820 | 980 | 261 | | 700x1060x600 | | |
| HZ(M)W 2/14010-1 | 28000 | SN 420x200 | 1820 | 900 | 266 | 520 | | 1500 | |
| | | | 1820 | 900 | 266 | | 800x980x600 | | |
| | | | 1920 | 900 | 290 | 520 | | | 1650 |
| | | | 1920 | 900 | 290 | | 800x980x600 | | |
| HZMW 2/16010 | 32000 | SN 420x200 | 1800 | 900 | 241 | 520 | | 1550 | |
| | | | 1800 | 900 | 241 | | 800x980x600 | | |
| | | | 2150 | 1150 | 367 | 770 | | | |
| | | | 2150 | 1150 | 367 | | 800x1230x600 | | |
| HZMW 2/18010 | 36000 | SN 420x200 | 1800 | 900 | 241 | 520 | | 1550 | |
| | | | 1800 | 900 | 241 | | 800x980x600 | | |
| | | | 2150 | 1150 | 367 | 770 | | | |
| | | | 2150 | 1150 | 367 | | 800x1230x600 | | |
| HZMW 2/20010 | 40000 | SN 420x200 | 1900 | 900 | 278 | | 800x980x700 | 1550 | |
| | | | 2100 | 1150 | 254 | 770 | | | |



| Ride height | | Wheel connection | | Tyre ³⁾ example | Centre-to-centre distance M | Overall width across the tyres mm | Weight of suspension ⁴⁾ kg |
|----------------|------------------|------------------|-----------------|-------------------------------|--------------------------------|--|---|
| laden FH mm | unladen FH mm | Wheel stud | Ø H / K (mm) | | | | |
| 253 | 213 | 10 x M22x1.5 | 280.8 / 335 | 11.00 R 20 | M = 348 | 2482 | 1650 |
| 628 | 588 | | | | | | 1840 |
| 253 | 213 | 10 x M22x1.5 | 280.8 / 335 | 12.00 R 20 | M = 350 | 2496 | 1710 |
| 678 | 638 | | | | | | 1862 |
| 253 | 207 | 10 x M22x1.5 | 280.8 / 335 | 12.00 R 24 | M = 360 | 2509 | 1650 |
| 675 | 630 | | | | | | 1820 |
| 191 | 262 | 10 x M22x1.5 | 280.8 / 335 | 12.00 R 20 | M = 350 | 2496 | 2073 |
| 605 | 661 | | | | | | 2262 |
| 262 | 191 | | | 14.00 R 20 | M = 428 | 2746 | 2203 |
| 591 | 662 | | | | | | 2385 |
| 212 | 259 | 10 x M22x1.5 | 280.8 / 335 | 12.00 R 24 | M = 350 | 2489 | 2385 |
| 610 | 657 | | | | | | 2575 |
| 210 | 257 | | | 14.00 R 20 | M = 428 | 2976 | 2839 |
| 610 | 660 | | | | | | 2457 |
| 212 | 259 | 10 x M22x1.5 | 280.8 / 335 | 12.00 R 24 | M = 350 | 2489 | 2422 |
| 612 | 659 | | | | | | 2545 |
| 212 | 259 | | | 14.00 R 20 | M = 428 | 2976 | 2507 |
| 612 | 659 | | | | | | 2619 |
| 712 | 759 | 10 x M24x1.5 | 280.8 / 335 | 14.00 R 20 | M = 428 | 2726 | 2737 |
| 212 | 259 | | | | | 2926 | 2577 |

Also available as TRILEX version

¹⁾ Version for heavy-duty application; ²⁾ Version for on-road use; ³⁾ Note the tyre manufacturer's information regarding load index and dimensions; ⁴⁾ Weight without wheels and tyres; weight deviations are within the permitted DIN tolerances for the corresponding production processes



corporate-art.de BPW-VB/W-04/1e

