Air suspension units GL70 | GL70HD | GL70L

Identifiable on the air suspension bracket with a slot for track adjustment.

The axle set consists of the axle with mounted air spring bars – with brake cylinders on request.

For pre-assembled air suspension units (air spring bars with air suspension bracket), due to the high number of installation options and versions, the air suspension brackets are not adjusted to driving height at the factory and the spring bolts factory not tightened to the required torques at the factory. The factory-installed spring bolt and- absorber screw fitting must be loosened and the prescribed tightening torque must be taken from the table and observed.

Do not overstretch the air bellows when working on a raised chassis. The air suspension unit must be secured accordingly before the maximum ride height is reached.

1. Design description

GIGANT air suspension units can be used as single or as multi-axle units.

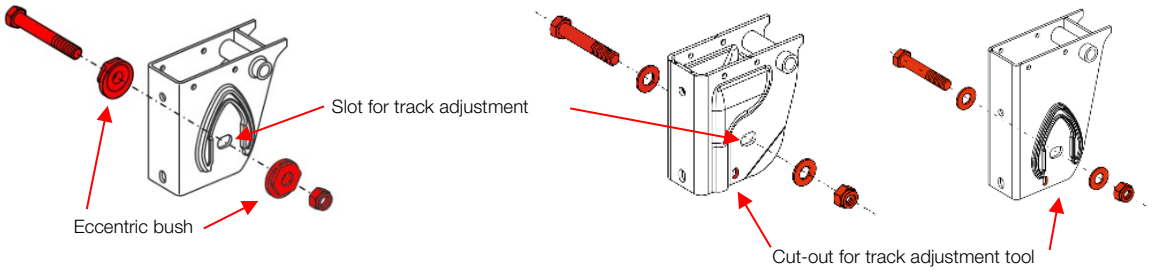
We make a distinction between two versions of the air suspension brackets. Air suspension brackets with an eccentric bushing in the spring bolt kit and without eccentric bushing with two slots for the track adjustment directly under the spring bolt using a tracking tool.

Generation 1 until 2022 with eccentric bushing

Generation 2 starts in the 1st quarter of 2022 without eccentric bushing

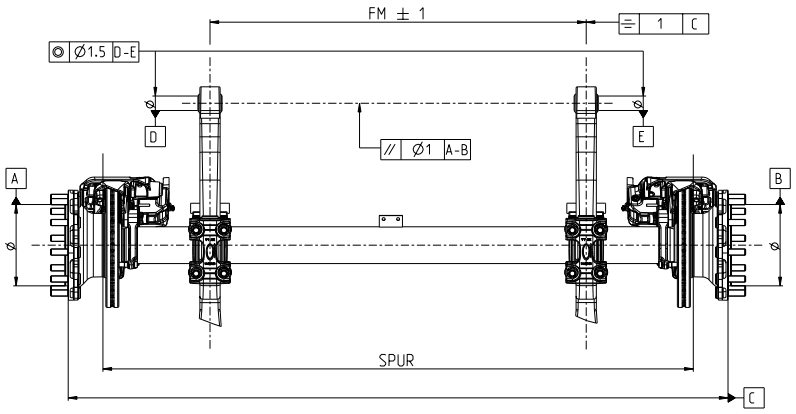
T-bracket

M-bracket / O-bracket



The guide bars are used to apply the guide forces of the axle. The U-shaped arrangement of the guide bars the U-shaped arrangement of the guide bars and axle stabilises the vehicle and, when there is lateral acceleration, counteracts the rolling torque.
The guide forces which are absorbed by the guides are transferred in the horizontal plane to the air suspension brackets to the vehicle chassis. air suspension brackets to the vehicle chassis. Vertical forces are also absorbed by the air bellows and the air suspension bracket. The frame beams must be provided with suitable bracing to absorb the forces arising in the vehicle chassis. If there is insufficient support provided, no guarantee claims can be accepted in the event of any damage be accepted in the event of damage

Recommendation!
With a separate delivery of a GL70L suspension, the axle set should be assembled using an assembly jig to ensure that the dimensional tolerances are complied with.

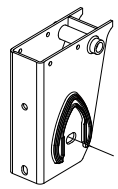


Shape and positional tolerances for the axle set

2. Positional tolerances

To ensure a smooth installation of the axle with the fitted springs, the position of the air suspension bracket must be within certain tolerances.

Example illustration

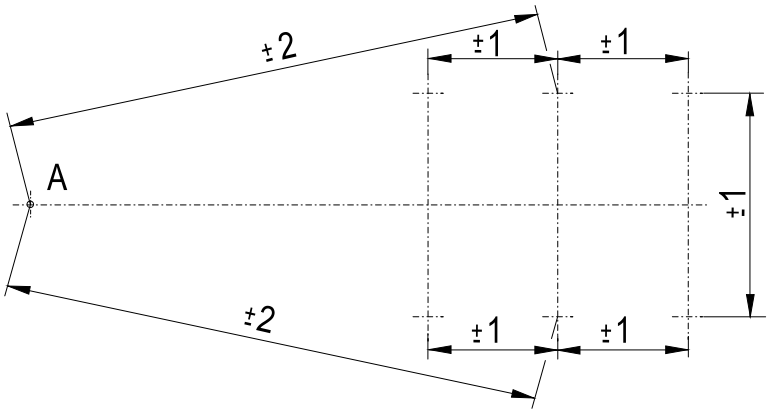


Alignment in the longitudinal direction of the vehicle

The four centres of the slots in the air suspension brackets form the base line of an equilateral triangle. The intersection of the two sides should lie on the pulling point of the vehicle. These sides have a tolerance range of ±2 mm to form an equilateral triangle. The centre lines through the slots of the air suspension brackets on the other axles should be parallel to one another with a tolerance of ±1 mm. If these tolerances are not observed, the track will not be able to be adjusted properly.

Alignment in the transverse direction of the vehicle

The separation of the air suspension brackets and the centre lines through the air suspension brackets on the other axles have a tolerance of ±1 mm.



Adjustment tolerances for the track and the distance between axles

3. Fitting the air suspension bracket

GIGANT has the welded and the screwed version for attaching the air suspension bracket onto the chassis.

3.1. Welded version of the air suspension bracket

The GL70 | GL70HD | GL70L air suspension brackets are suitable for welding to the narrow bottom plates found in modern vehicle designs thanks to their small width.

Important!

- Bearing damage can be prevented by ensuring that the clamping contact (earthing) of the welding equipment is not attached to the components of the axle.
- Welding and attaching the clamping contact (earthing) to the guide bars is not permitted.
- The guide bars and air bellows must be protected against welding beads, electrodes and welding tongs during welding work.

3.1.1. Welding process

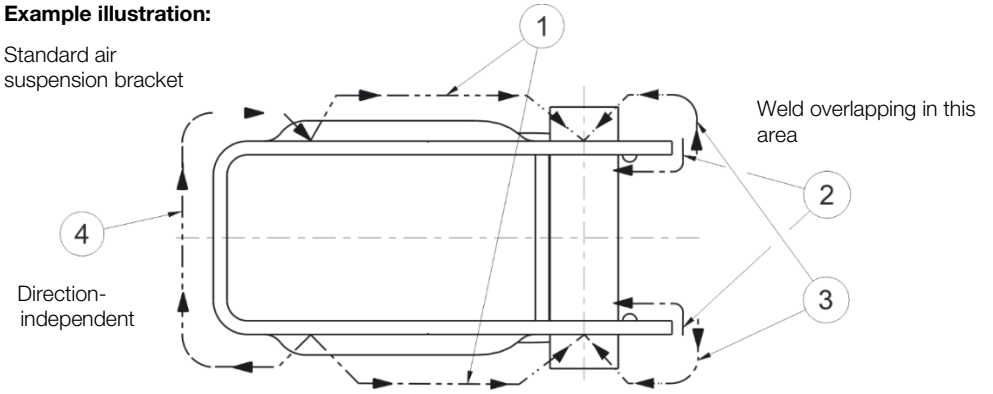
For welding on the air suspension bracket and any necessary side supports, the welder must meet the requirements and qualifications according to DIN EN ISO 15614-1.

- After fixing the air suspension bracket on the chassis, it is mandatory to follow the welding sequence 1-4
- No tack welds or weld seams may be applied within 30 mm or 50 mm from the corner edges of the air suspension bracket (see figure below).
- Undercuts and end craters are not permitted
- Weld seams a5 ◺ must be produced in accordance with quality level C of DIN EN ISO 5817 (except for the numbers 2017, 5012, since these are assessed according to quality level B).

Important!

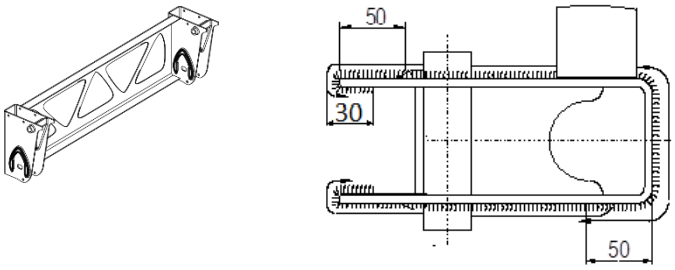
- GIGANT air suspension brackets are manufactured from the high-quality material 1.0980 (S420MC).
- Weld starts, ends and sequences are laid out for manual welding.
- GIGANT does not accept liability for consequential damage resulting from and deviating welds/welding methods.

Example illustration:



5.5 / 7 tonne air suspension bracket with C-profile

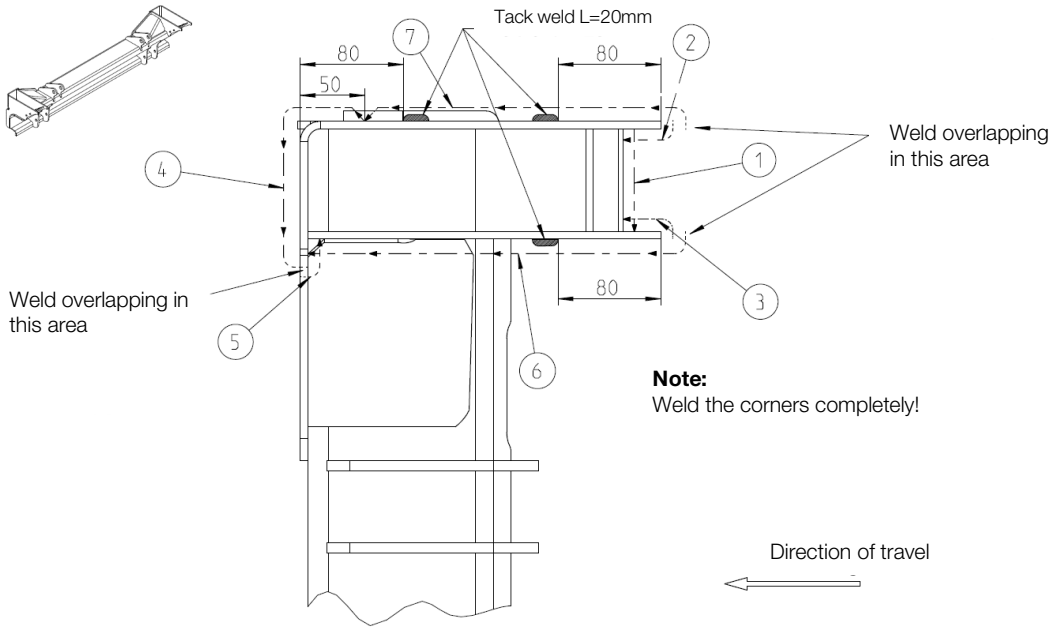
Example illustration:



9 tonne air suspension bracket with C-profile

Example illustration:

Manual welding (tack weld: L=20mm / a3◺)



Note:
Weld the corners completely!

Direction of travel

3.2. Screw-on air suspension bracket with cover

The screwed-on air suspension bracket is equipped with a cover with welded stud bolts. The screwed version of the air suspension unit may not be used on construction sites and off-road.

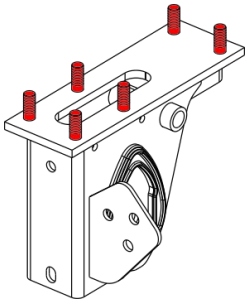
Important!

- For the use of screwed air suspension brackets, the lower belt must be at least 120 mm wide and the minimum distance from the outer edge of the lower belt must be observed for the through hole (e.g. DIN 997 Tracing Dimensions for Bars and Rolled Steel Sections). The distance for the stud bolts or through holes can be found in the set drawing.
- The threaded connections of the air suspension brackets must be maintained after the first laden trip and every 3 months; if applicable, maintenance must be performed more frequently depending on the use of the vehicle (e.g. city traffic). gigant has no control over this and it must be noted in the vehicle documentation by the vehicle manufacturer.

3.2.1. Screw-on cover with stud bolts

Important!

- Cover with welded countersunk screws M16 x 60 (10.9 / black / DIN 9771)
- Locknuts are not included in the scope of delivery
- Ø 17 through hole in the lower belt in accordance with DIN EN 20273
- The contact area of the locknut M16 (DIN EN ISO 7040) must be parallel to the cover, equalise if necessary (e.g. wedge plates DIN 434 for U-profile)
- Use washers if necessary for higher surface pressure
- Evenness of the mounting surface of the lower belt <1 mm
- Prevent contact corrosion between the cover and lower belt
- The tightening torque can be found in the table.



4. Lateral support

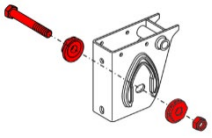
To be able to withstand the lateral forces, air suspension brackets must be braced laterally. The lateral braces should be supported on a cross-member on the chassis so that the forces can be evenly distributed to the vehicle chassis.
When using a C-profile, no additional lateral support is required.

With **torsionally soft vehicle chassis**, care should be taken to ensure that the torsional softness is maintained but that the air spring brackets are prevented from bending (e.g. on flatbed vehicles).

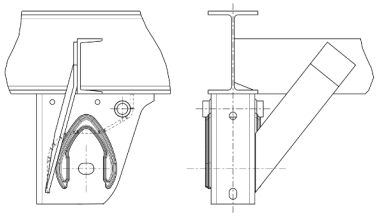
With **rigid vehicle chassis**, the bracing of the air suspension brackets can be carried out in a rigid manner (e.g., tanker, silo or box-body vehicles). gigant recommends open profiles, such as U-profiles. Torsionally rigid, closed profiles are to be avoided as cross beams (risk of cracking at the weld joints).

4.1. Welded lateral support

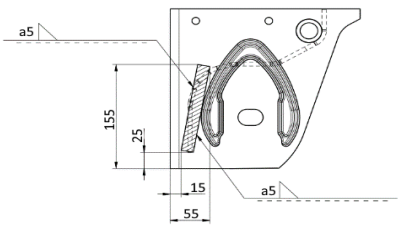
Suggestion for air suspension bracket:



Generation 1 until 2022 <u>with</u> eccentric bushing:

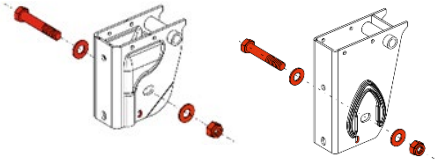


Suggested lateral support

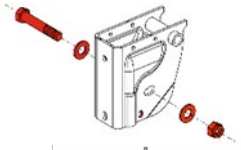


Area of lateral support including the weld

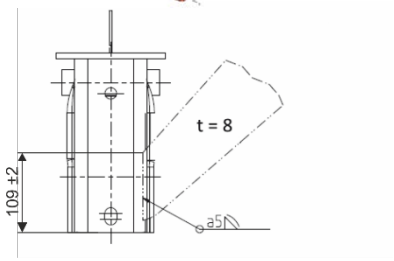
So that the subsequent function of additional attachments is not restricted, transverse support may only be applied in the specified area.



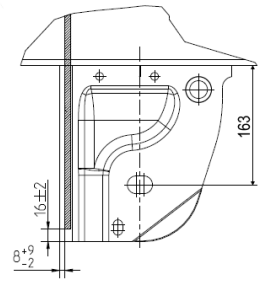
Generation 2 started in the 1st quarter of 2022
<u>without</u> eccentric bushing:



Front bracket-chassis brace

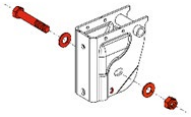


Suggested lateral support

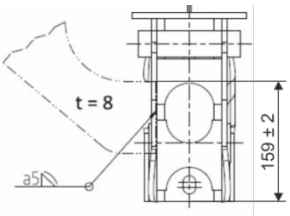


Area of lateral support including the weld

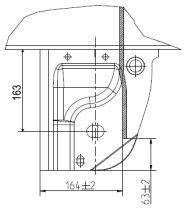
So that the subsequent function of additional attachments is not restricted, he cross supports may only be applied in the specified area



Rear bracket-chassis brace

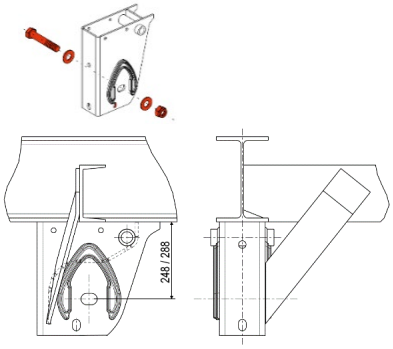


Suggested lateral support

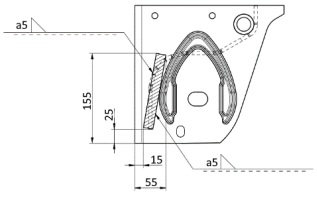


Area of lateral support including the weld

So that the subsequent function of additional attachments is not restricted, transverse support may only be applied in the specified area.



Suggested lateral support



Area of lateral support including the weld

So that the subsequent function of additional attachments is not restricted, transverse support may only be applied in the specified area.

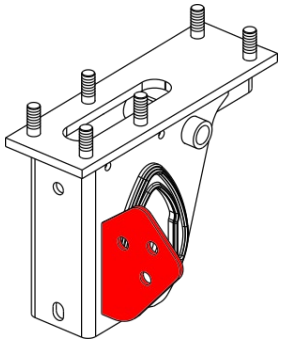
The data and instructions shown here are to be considered as a suggestion. The bracing and dimensioning depend on the type of the vehicle and its conditions of use. These data are only known to the vehicle manufacturer, and are taken into account in the design.

4.2. Screwed lateral support

For air suspension brackets with a screwed cover, GIGANT also provides the version with screwed lateral support.

Important!

- Through hole for lateral support Ø 17mm
- The screws are not included in the scope of delivery
- The contact surface of the locknut must be parallel to the lateral support.
- Use washers if necessary for higher surface pressure
- Evenness of the mounting surface <1 mm
- Prevent contact corrosion between the mounting surface and lateral support
- GIGANT recommends using hexagonal screws as per DIN EN ISO 4014 and locknuts as per DIN EN ISO 7042.
  ! When using other threaded connections, all responsibility is of the vehicle manufacturer.
- The tightening torque can be found in the table



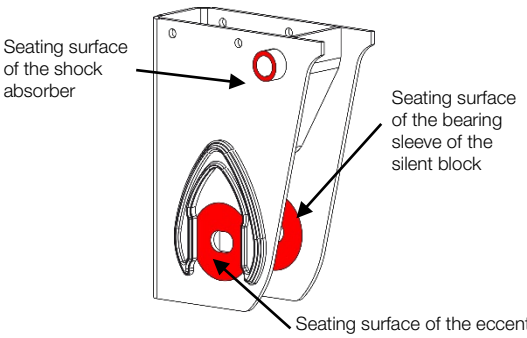
The data and instructions shown here are to be considered as a suggestion. The bracing and dimensioning depend on the type of the vehicle and its conditions of use. These data are only known to the vehicle manufacturer and are taken into account during the design.

5. Surface protection

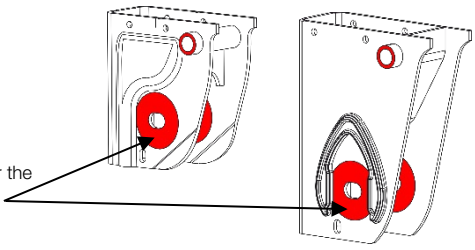
The welded or screwed air suspension bracket can be provided with or without CDP coating as requested. It is necessary to apply a surface coating.

For the screwed air suspension bracket, it is necessary that the seating surfaces on the chassis have the same layer thickness, as described for the air suspension bracket in the following. Since the stud bolts for fastening the chassis are firmly on the screwed air suspension bracket, only galvanisation in a screwed-on state is permitted here. The corrosion protection between the chassis and air suspension bracket must be coordinated beforehand with the galvanising plant.

Example illustrations:



Observe!
The coating thickness of the surfaces on which components (seating surfaces of the eccentric bushing or washer, bearing sleeve of the silent block and shock absorber) are supported may not exceed 30µm.



Important!
Galvanising of the air suspension brackets is the responsibility of the vehicle manufacturer, and cannot be influenced by GIGANT. The following parameters are prescribed for proper function of the components:

- The seating surfaces must be free of welding residues, scale, zinc runs or other unevenness
- It must be ensured that there is sufficient adhesion between the zinc layer and the seating surface (peeling of the zinc layer from the surface is not permitted!)
- Coat thickness 85µm ± 5µm

Note!
When galvanising beside the seating surfaces of the shock absorber, conical bushings and spacers, GIGANT recommends coating the thread of the shock absorber screw fitting with “anti-zinc paste” according to the manufacturer specifications, and to remove it again after galvanising. This prevents difficulties when installing the locknut (re-cut the thread if necessary) for the shock absorber and ensures a secure spring bolt fitting (setting behaviour).

6. Assembly

6.1. Mounting the air bellows to the vehicle frame

Important!

- Air bellows must be protected against weld splatter and the effects of excessive heat!
- During assembly without air, the bellows contract under the load. When lowering the vehicle, proper rolling of the bellows over the piston must then be ensured.
- Overexpansion of the air bellows under operating pressure is not permitted. A limitation to DL_{max} must be accomplished according to Point 6.10.

6.1.1. Mounting to the vehicle frame

- Dimensions for attachment of the air bellow can be found in the installation drawing of the air suspension set
- Holes: according to DIN ISO 273
- Separation of the holes: according to DIN ISO 2768m

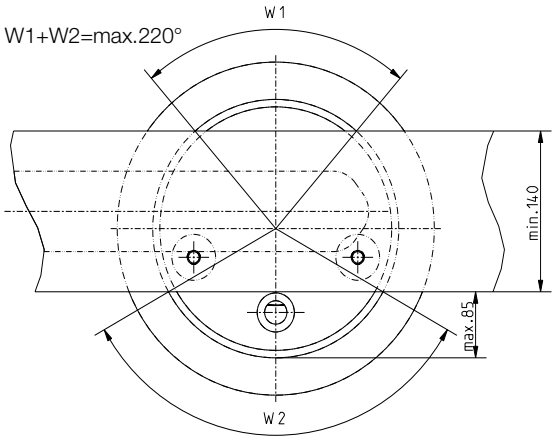
The load-bearing capacity of the frame beam must be taken into account when designing the U-shaped plate.

The U-shaped plate may protrude 85 mm over the edge of the abutment. Overall, 40% of the length of the U-shaped plate edge must be supported directly on the thrust bearing.

A load bearing frame width of at least 140 mm is required for the U-shaped plate with a maximum offset of 20 mm. With narrow frames, a bellows plate or a bellows attachment must be used. With an offset of more than 20 mm, the bearing surface must be widened accordingly, e.g., with VS45 to 165 mm.

Recommendation

- Air bellows Ø 300 mm: Bellows plate/attachment of at least 200 x 245 x 6 mm
- Air bellows Ø 360 mm: Bellows plate/attachment of at least 200 x 305 x 6 mm

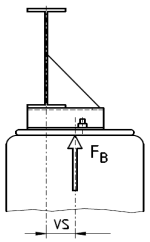


Alignment of the air bellows and the protrusion

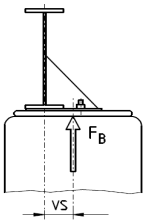
For air bellows without offset (VS), there are no bending forces, and with small bellows offset (VS) of 20 mm, only minimal bending forces may occur. With a bellow offset larger than 20 mm, greater bending forces occur, which must be structurally compensated with lateral support.

Depending on the air suspension unit, a bellows plate or bellows attachment is required for structural reasons and must be bolted or welded onto the vehicle chassis and supported if necessary. The dimensions can be found in the technical documents.

Suggestion for creating a bellows support.



Bellows with bellows attachment



Bellows with bellows plate

- Welds (suggested: GIGANT a5 ◺ according to DIN 1912) are to be made in accordance with quality level B of DIN EN ISO 5817.
- The clearance between the air bellows and the tyres or brake cylinder must be at least 30 mm.
- The maximum permitted lateral offset between the lower and upper bellows mount may not exceed 10 mm.
- The lower and upper bellows mount may not be aligned twisted towards each other.

If the air bellow is not supported properly, no guarantee claims can be accepted in the event of damage to the air bellows.

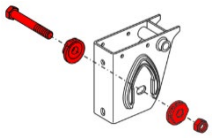
6.1.2. Compressed air

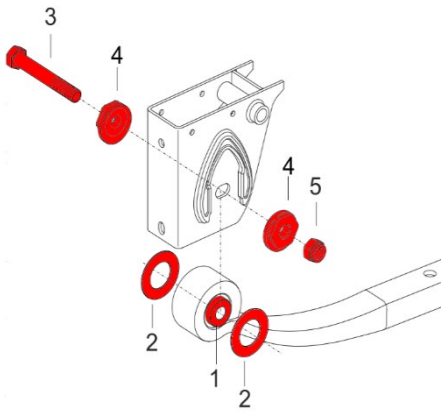
Pressurise the air bellow with compressed air which is free from foreign matter.

Guarantee claims can only be made if the vehicle is fitted with in-line filters in its compressed air supply and signal lines.

Minor tolerances are produced due to the manufacturing processes. The air bellows may lose air. Tolerance value: Loss of 0.5 bar (within 24 hours with a starting pressure of 2 bar).

6.2.Air suspension bracket

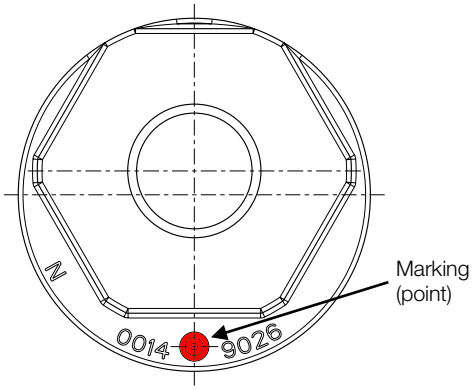
6.2.1  Axle set with Generation 1 air suspension brackets <u>with</u> eccentric bushing:



Before inserting the spring eye in the air suspension bracket, the protruding ends of the inner bushing (1) of the silent block must be pushed onto the thrust washers (2). The thrust washers should fit tightly.

Important!
The threaded connection and the seating surfaces must be free of grease!

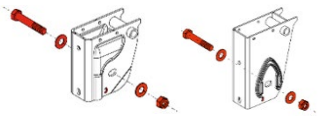
Position the axle in the air suspension brackets. Push the spring bolt (3) with an eccentric nut (4) from the outside through the bracket and the silent block. Place the second eccentric nut (4) on the opposite side and fix with the locknut (5).



Observe!
The circular mark (point) on the eccentric bushing must point to the ground with the vehicle upright before the track adjustment. Pre-tighten the spring fitting to a torque of 200 Nm and after adjusting the track, tighten to the end torque (refer to the “Tightening torques” table).

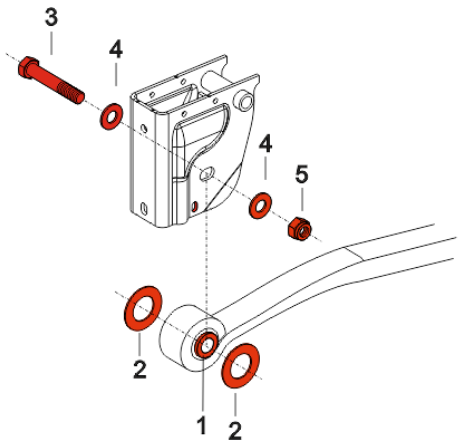
Deviation in the angular positions on both eccentric bushings on a bracket after screwing together of up to 10° relative to each other is permitted.

6.2.2. brackets



Axle set with Generation 2 air suspension

<u>without</u> eccentric bushings:



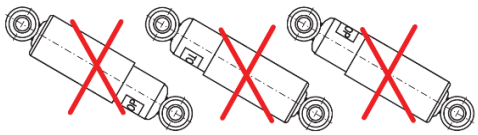
Before inserting the spring eye in the air suspension bracket, the protruding ends of the inner bushing (1) of the silent block must be pushed onto the thrust washers (2). The thrust washers should fit tightly.

Important!
The threaded connection and the seating surfaces must be free of grease!

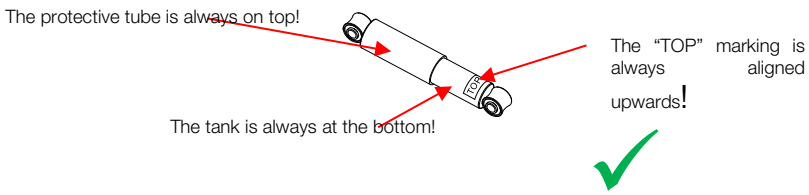
Position the axle in the air suspension brackets. Push the spring bolt (3) with a washer (4) from the outside through the bracket and the silent block. On the opposite side, place the washer (4) and locknut (5) and tighten until the spring bolt fitting can still be moved by hand.

6.3. Shock absorber

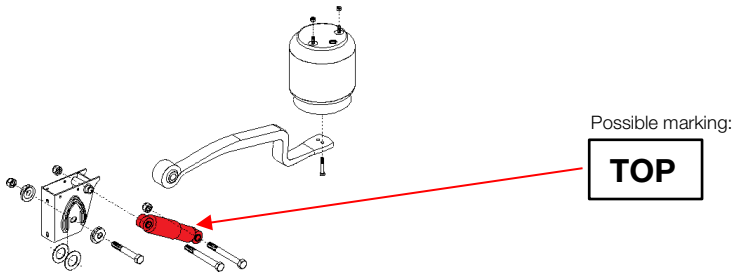
Shock absorbers that must be fitted with a specific orientation are labelled with a “TOP” marking on the lower shock absorber attachment. The “TOP” marking is aligned towards the top to ensure proper function of the shock absorbers.



The shock absorber is always fitted with the protective tube on the upper shock absorber attachment.



Example illustration:

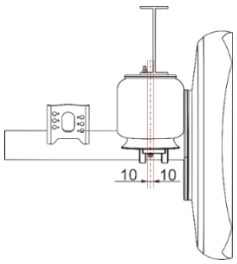


Important!

For air suspension units, the position of the shock absorber may not be less than 20° relative to the horizontal plane to ensure proper function of the shock absorber.

6.4. Fitting the bellows to the steering unit

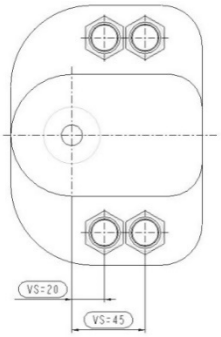
- The maximum permitted lateral offset of the upper and lower fastening of the air bellow relative to each other may not exceed 10 mm.



- The lower and upper bellows mount may not be aligned twisted towards each other.
- Fitting the air bellow in a twisted position is not permitted.
- The gap between the air bellow (max. diameter) and the tyres must be at least 30 mm!
- The torques can be found in the table in the document.

6.5. Fitting the bellows with an adapter plate

Example illustration:



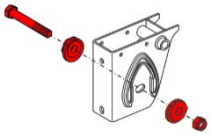
Air bellows with Ø 360 mm are pre-fitted with adapter plates giving an offset VS=45.
Air bellows with Ø 300 mm and plastic pistons are sometimes supplied with pre-assembled adapter plates and should be fitted in accordance with the offset dimension from the axle set drawing.

Observe!
Position the adapter plate to the upper air connection of the air bellows.

The bars of the air bellow piston should be supported on the adapter plate if possible. When screwing it on, align the bars of the air bellow with adapter plate such that there is no collision with the screws.

6.6. Manual track adjustment

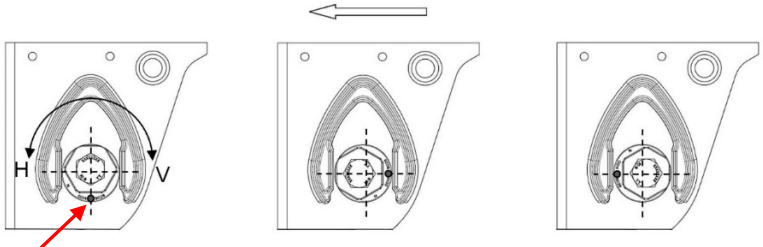
6.6.1. Version 1 air suspension bracket with eccentric nut <u>with</u> eccentric bushing:



The axles can be moved in the longitudinal direction using the eccentric bushings and the track can be adjusted.

Note:

- Pre-tighten the spring bolt to 200 Nm
- Both eccentric bushings on a bracket must have the same angular position
- The marking points must be precisely opposite
- Use a centring tool 700311130, or an open-end spanner, SW 60
- After the track adjustment, tighten the locknut of the spring bolt to the prescribed torque (see “Tightening torques” table), and do not turn the eccentric bushings any more in the process.



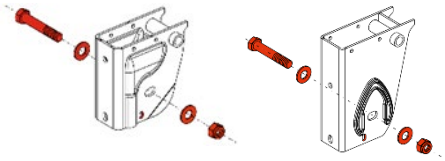
Observe marking (point)

Maximum axle shift of 5 mm to the front

Maximum axle shift of 5 mm to the rear

Important!
The track may be set using an automatic tracking device if the conditions specified in the "Manual track adjustment" section are met.

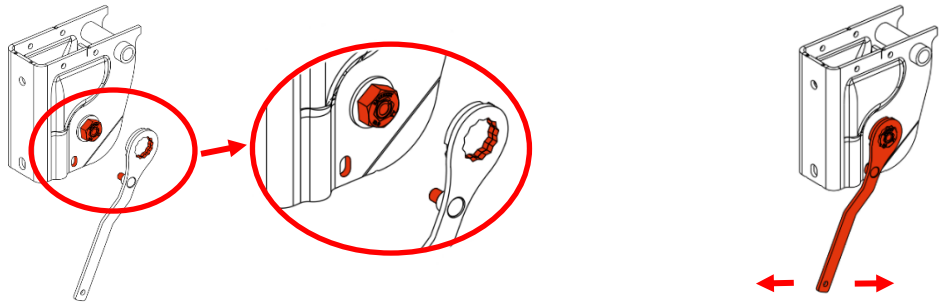
6.6.2. Generation 2 air suspension bracket without eccentric bushing:



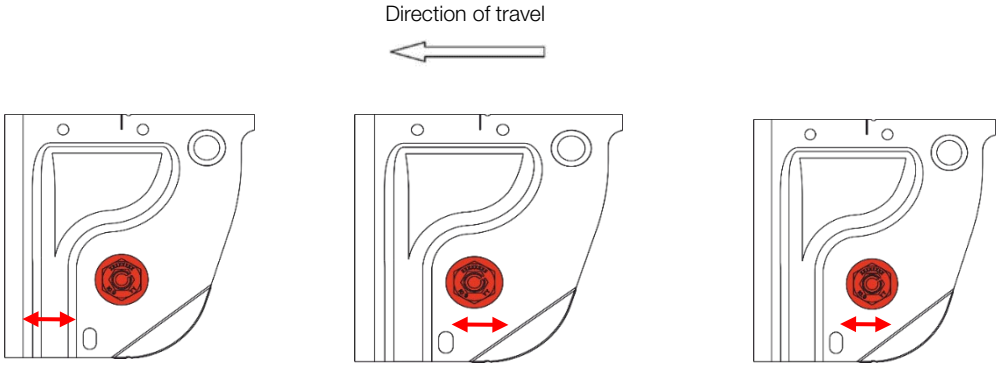
By sliding the spring bolt fitting in the slot of the air suspension bracket, the axle can be moved longitudinally and the track can be adjusted.

Note:

- Tighten the spring bolt fitting until the spring bolt fitting can still be moved by hand.
- Using the lever tool 703026395, whose pin is supported in the cut-out of the air suspension bracket, the spring bolt fitting is moved back and forth and the track is adjusted.



- After the track adjustment, tighten the locknut of the spring bolt to the prescribed torque (see “Tightening torques” table in the annex), without moving the spring bolt fitting.



Neutral position in the centre of the slot

Maximum axle shift of 5 mm to the front

Maximum axle shift of 5 mm to the rear

6.7. Connection of the air suspension

General aspects:

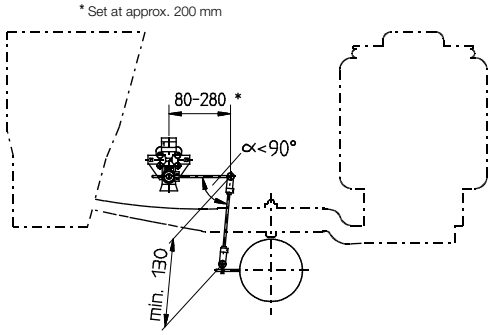
GIGANT air suspension units need an air spring valve as a standard. This valve regulates the pressure depending on the load and maintains the ride height at the same level in any load state.

The ride height adjustment (FH) can be found in the installation drawing for the GIGANT air suspension unit.

The control provided by the control unit must guarantee that, at the maximum lift height of the air suspension unit, the air supply to the air bellows is closed off. The dimension for the maximum lifting height (DLmax) can be found in the installation drawing.

For vehicles that will be equipped with lifting and lowering function, the stop valve must be adjusted such that the air supply is closed at the max. permitted damper length (DLmax) specified in the installation drawing.

If possible, the air spring valve should be installed on the centre axle for triple-axle units and on the rear axle for double-axle units. For axles with axle-lifting devices, the selection of the connection for the air spring valve depends on the axle to be lifted.



The valve lever should be set at approx. 200 mm and is horizontal at ride height. The steering rod must have an angle of < 90° with the connection of the axle. To check for proper function, the lever is moved slightly down. In doing so, air must flow out through the venting chamber.

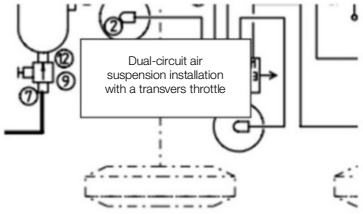
To prevent the valve lever from swivelling out, the air suspension must be compressed up to the air bellows stop and also be de-compressed up to the stop (DLmax in the installation drawing) for checking purposes. In doing so, the angle between the two valve gear levers must be approx. α_{EF} > 15° during compression and approx. α_{AF} < 165° during de-compression.

Recommendation!

For the greatest possible functionality and safety while driving, gigant recommends a dual-circuit air suspension installation with a transverse throttle.

Observe!

Manufacturer's documentation for the air suspension system.



Air suspension system

When using a single-circuit air suspension system, higher loads on the axle and unit components can occur, which can damage the vehicle chassis. For this reason, gigant cannot accept any guarantee claims in these circumstances.

6.8. Fixing the ride height control unit

To fit the ride height control units, a perforated plate is found in the centre of the axle to which the control units' linkage can be fastened.

Observe!

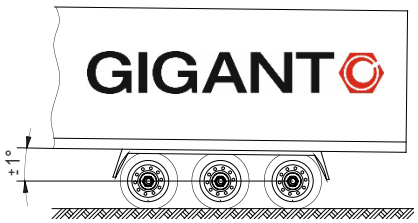
The control units manufacturer's documentation.

The control provided by the control unit must guarantee that, at the maximum lift height of the air suspension unit, the air supply to the air bellows is closed off. The dimension for the maximum lifting height can be found in the unit drawing.

6.9. Setting the drive heights

The ride height of the air suspension axles is to be adjusted in the permitted range specified by GIGANT. In doing so, the following minimum deflection must be observed:

- Single axles: 60 mm
- Multiple axles: 70 mm
- **Exception** – multiple axles with axle lift: 100 mm

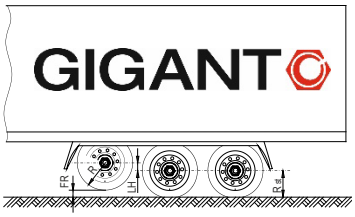


The maximum attachment tilt of the semitrailer must not exceed ±1° or 20 mm/m!

Important!

Consult GIGANT when retrofitting an axle lift.

The lift of the axle lift corresponds to the deflection of the axle. The free space (FS) under the tyres is reduced by the deflection of the tyres.



$FR = LH - (T - T_{st})$

- FR = Free space
- LH = Lift stroke; $LH_{min.}$ 100 mm
- T_{st} = free tyre radius, statically loaded
- T = free tyre radius, unloaded

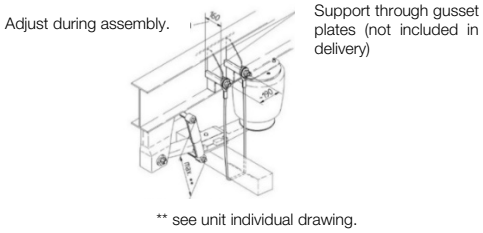
6.10. Ride height restriction

For GIGANT air suspension units, arresting cables are generally not required.

Important!

When using tipper or container chassis and on vehicles which are frequently loaded or lifted using a crane, catch ropes are required. When unloading the vehicle, they prevent a rapid release of the air suspension units and protect the chassis from mechanical damage. Under certain conditions – only with GIGANT's approval – the use of quick bleed valves with a bleed controller is possible.

Example illustration:



To determine the fixing points for the square pin, the vehicle must be raised to the maximum lifting height.

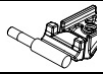
The rope must be pulled as tightly to the axle body as possible and the square pins welded to the longitudinal beam.

6.11. Unit assembly with trailing axles

Observe!

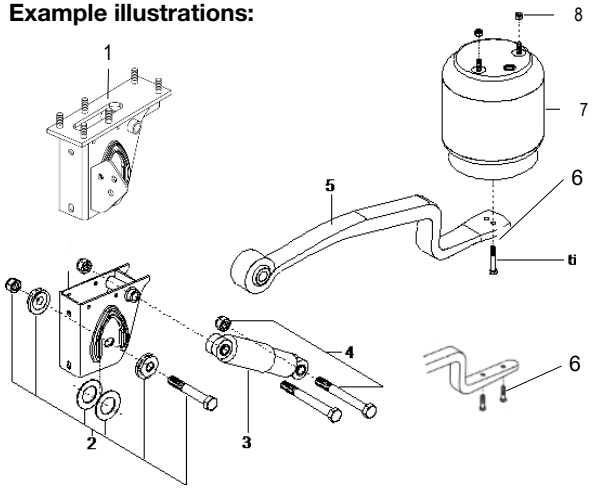
Installation guidelines GN0045 Self-steering axles K2, K3 and GH7 12010 and TM 01/2012 (download at: http://www.gigant.com/de/download.html)

7. Prescribed tightening torques

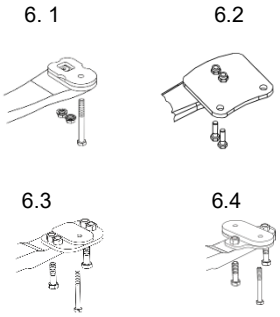
Description	Thread	Tightening torque
Air suspension unit		
1. Stud bolts / lateral support of the screwed air suspension bracket	M16	280 ± 10 Nm
2. Spring bolt with eccentric bushing	M24	340 ± 20 Nm + 90°± 3°
4. Shock absorber screw fitting to the air suspension bracket	M24	125 ± 10 Nm + 120°± 3°
4. Shock absorber screw fitting (axle plate with tube) 	M24	125 ±0 Nm + 120°±3°
4. Shock absorber screw fitting (axle plate with pegs) 	M24	400 ±20 Nm
6. Pistons (rolled bellows) - Spring	M12 (screw) M16 (screw)	55 ± 5 Nm 280 ±10 Nm
6.1 Pistons (rolled bellows) – Spring with adapter plate	M12 (nut/stud bolt 10.9) M12 (screw)	110 ± 10 Nm 55 ± 5 Nm
6.2 Pistons (rolled bellows) – Spring with adapter plate	M12 (screw 10.9)	110 ±10 Nm
6.3 Pistons (rolled bellows) – Spring with adapter plate	M12 (screw) M16 (screw)	55 ± 5 Nm 280 ±10 Nm
6.4 Pistons (rolled bellows) – Spring with adapter plate	M12 (screw) M16 (screw)	55 ± 5 Nm 280 ±10 Nm

Description	Thread	Tightening torque
8. Threaded pegs (rolled bellows)	M12 (nut)	55 ± 5 Nm

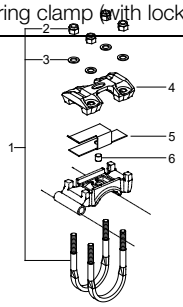
Example illustrations:



Adapter plates:



Connection		
Spring clamp (with lock nut) / GL70	M22 x 1.5	700 ±25 Nm
Spring clamp (with lock nut) / GL70L	M20 x 1.5	550 ±25 Nm



For 2:

- Per steering, gradually tighten up the nuts on the spring clamp to half the specified torque using a criss-cross pattern.
- Evenly tighten up the nuts cross-wise to the specified torque value.

Important!

The spring clamps must not be tilted!

The threads must protrude equally above the nuts!

Important!

The lock nuts used must be replaced with new ones after each disassembly!

These installation instructions are a part of our terms and conditions of sale and delivery. Failing to observe them means that we will not be able to accept any claims in the event of damage.

The prescribed axle loads may not be exceeded. Observe changes to the centre of gravity heights and instructions on the installation drawings. When dimensioning, it should be considered that, with a semitrailer, the coupling load must be stabilised via the saddle coupling of the tractor. Ensure that there is sufficient space for the tyres and the axle components, especially when the vehicle is lowered.

Change number	Index	Change description	Date	Signature
A391HU	6	Supplement for welding instructions C-Pril in Point 3.1 Supplement for note, Point 5 Supplement General aspects, Point 6.7 Supplement for tightening torque (M16 screw), Point 7 under 6. Pistons (rolled bellows) - Spring	2023.11.20	HU
AP596603414	5	Change to the contour of the air suspension bracket (150), change to the tightening torque for the shock absorber (P153)	2021.12.14	HU
AP594287717	4	Figures/descriptions updated	2019.12.06	HU
-	3	Specification of the evenness changed from <0.1 to <1mm	2018.12.18	HU
VAS 3008	2	Screwed air suspension bracket, air bellow adapter plates supplemented	2018.10.16	HU
AP592985721	1	Torque for threaded pin (rolled bellows), shock absorber information	2017.01.13	HU
Project 106	0	Document created	2015.03.12	GL

Created/reviewed:		Approved:	
2023.11.23	HU	2023.11.24	AK
Date	Signature	Date	Signature