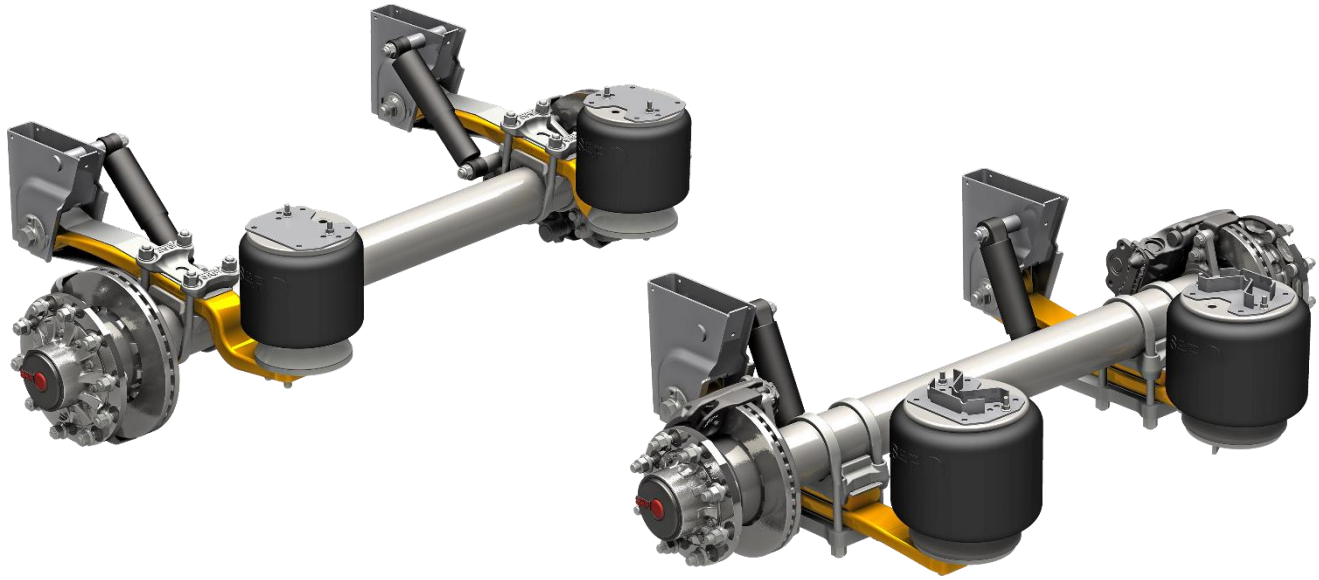
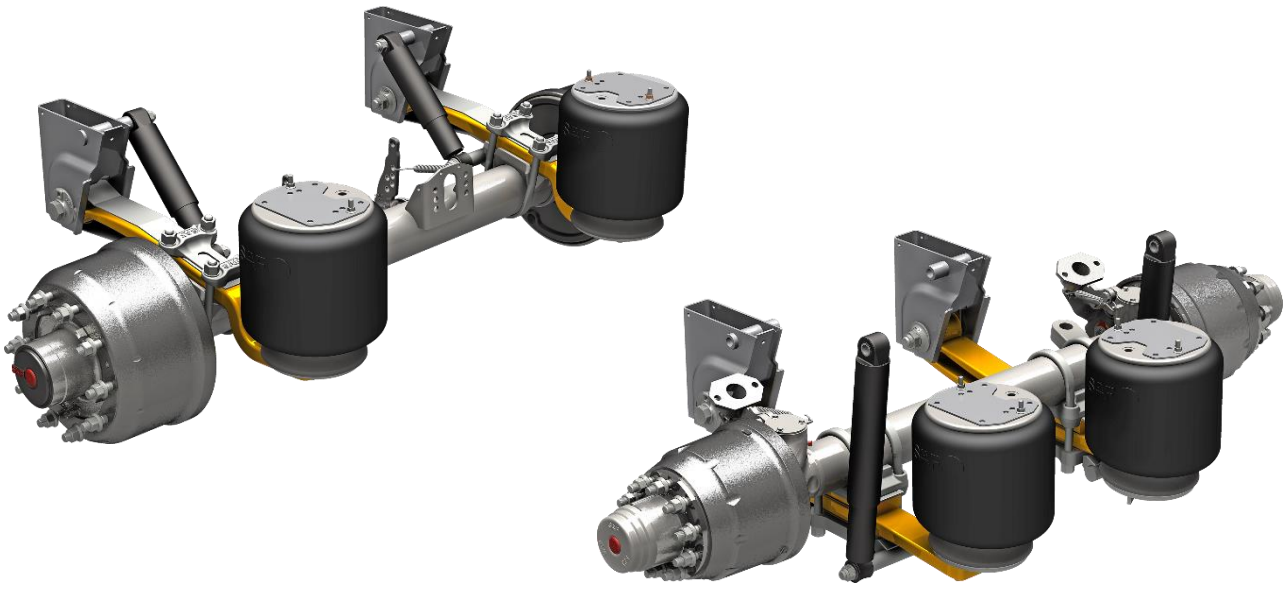
Design manual

SAF MODUL



disc brake



drum brake

Edition 2023-02
XL-AS10004DM-en-DE Rev C

Realized updates of this version to Modul 2010-09

General information

Air suspension types for axles with disc brake

Rigid axles with disc brake

Self-steering axles with disc brake

Steered axles with disc brake

Hydraulic driven axle

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Axles with drum brake

Self-steering axles with drum brake

Steered axles with drum brake

Assembly components

Axle lifts

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Brake chamber

Self-steering axles

Axle, suspension settings

Miscellaneous

This manual is over the internet available. The newest version is always to be found with: http://designmanual.safholland.de.

Designation on type plate and serial number

The data on the type plate is confirm the regulation for checking and homologating the brake systems (by ECE R 13). The identification of the test equivalent and the applicability areas of the test report is now described with the following four identifiers:

- ID 1 identifies the axle
- ID 2 identifies the brake
- ID 3 identifies the test axle load
- ID 4 identifies the test report number

The QR code
With a QR Code Reader and an internet access on a smart phone, tablet PC or with the (free of charge) SAF-HOLLAND app, you can scan the data on the type plate. The QR Code will guide you to the spare parts list of the scanned axle. The needed parts can than directly being ordered of the spare parts list free of failure.

Example type plate

With Identifiers:

The serial number appears as follows:

XX JJ TTT NNNN

XX..... - code, Place of manufacture:

JJ..... - code, Year of manufacturing

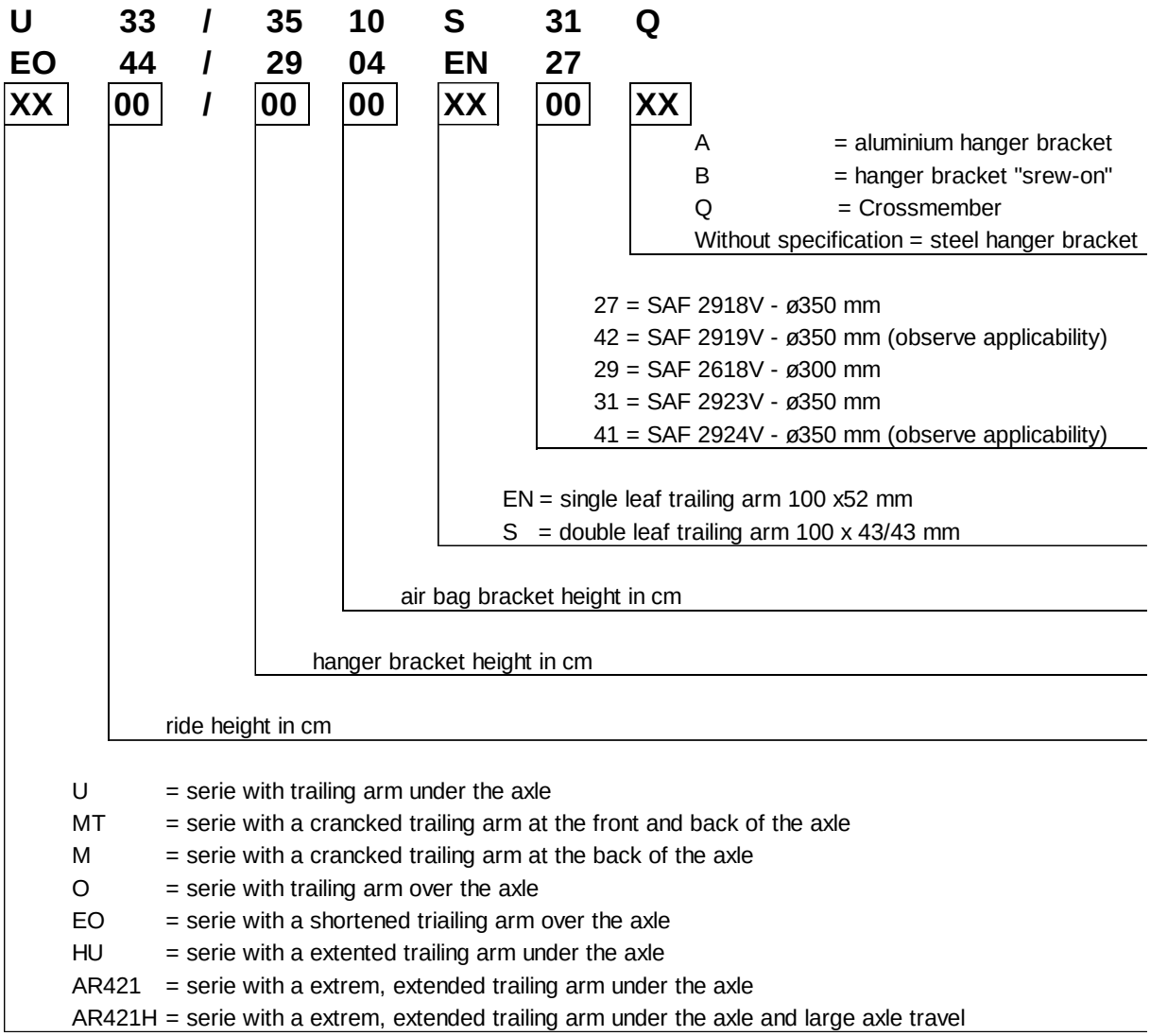
TTT..... - code, Day of manufacturing

NNNN.... - code, Running number per day, year and place

Example serial number: **11 12 194 0155**
This is about the **155**th product of the **194**th manufacturing day at the manufacturing year 20**12** from the **manufacturing plant 11**.

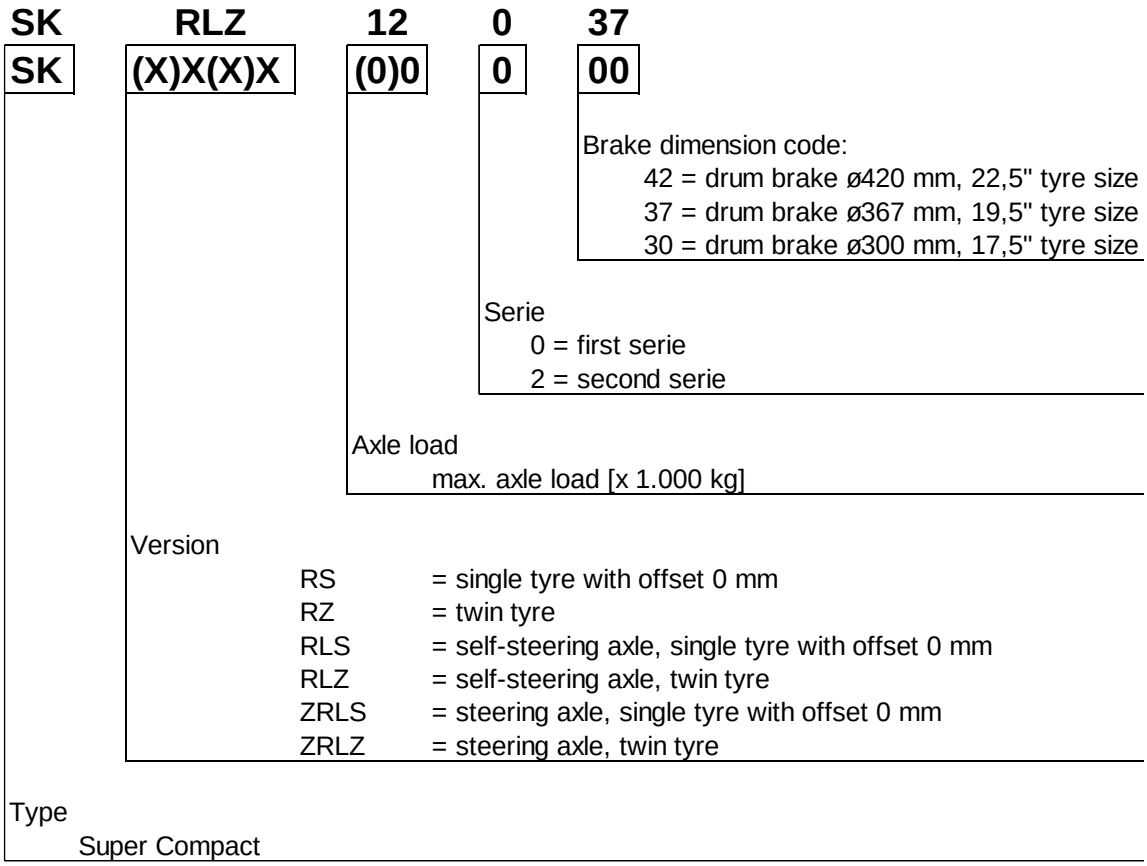
Type identification for modul suspension

Letters are marked with “X”, numbers with “0”
Example:

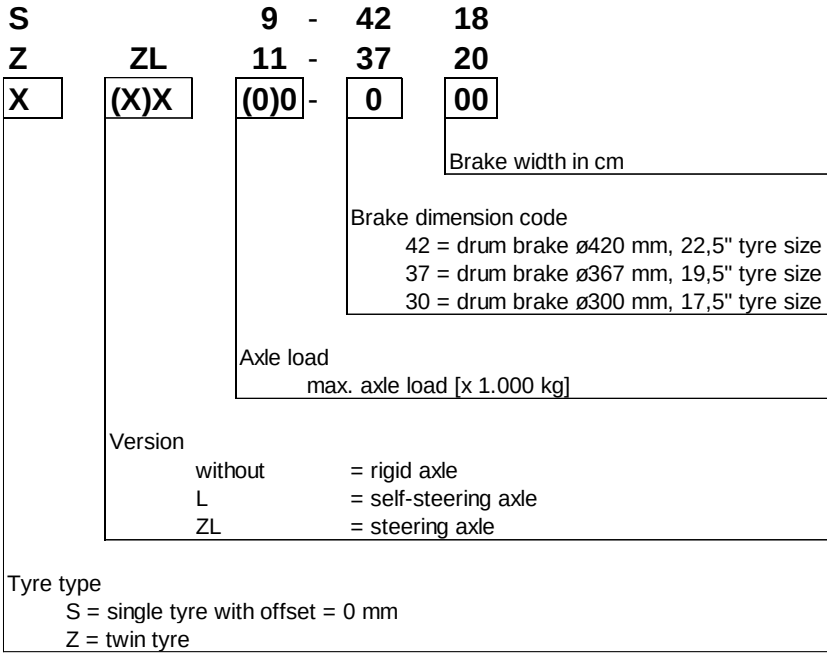


Type identification for axle generation SK

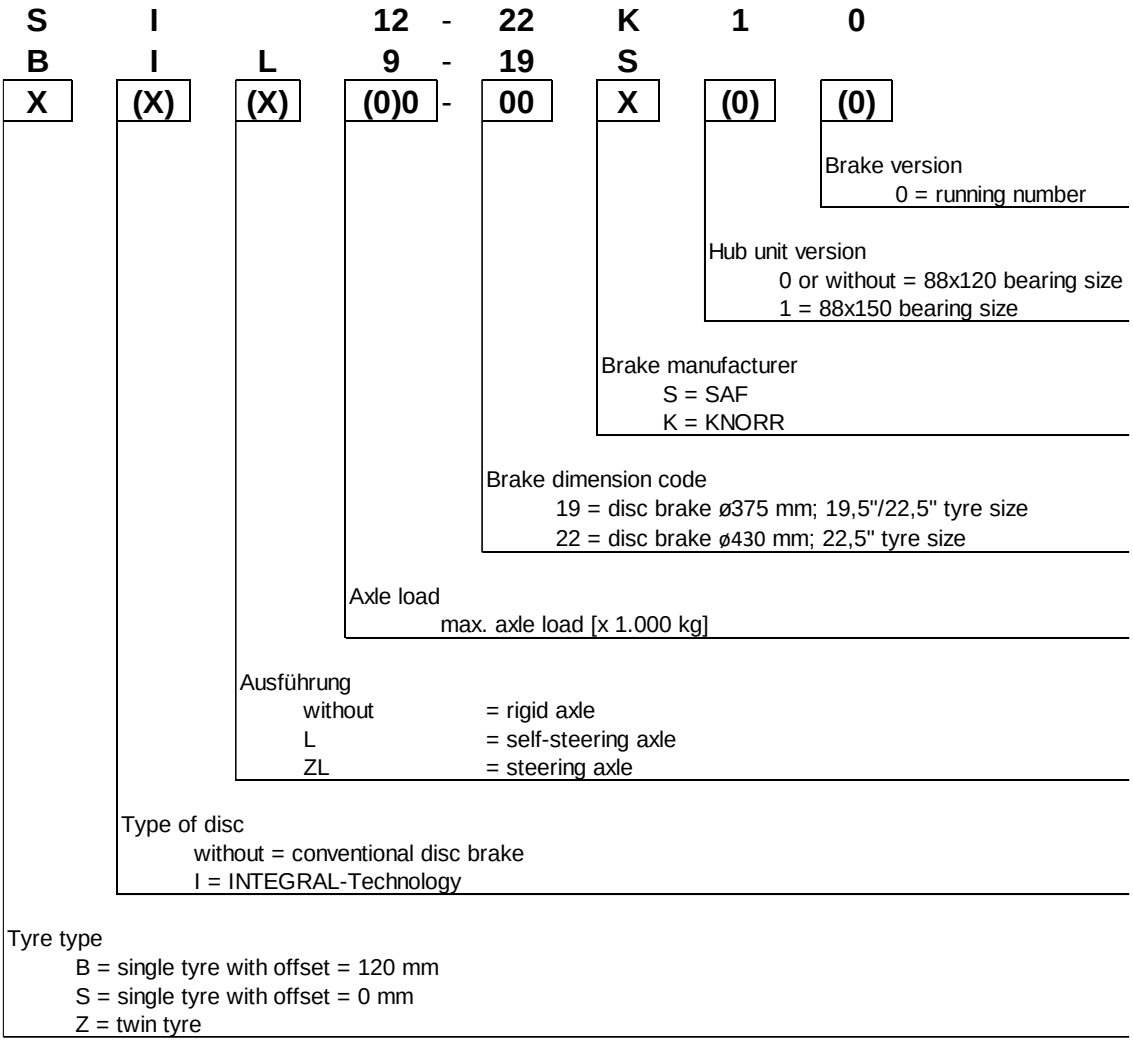
with drum brake



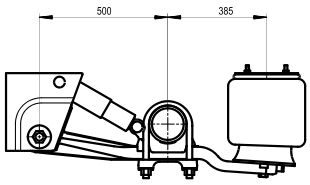
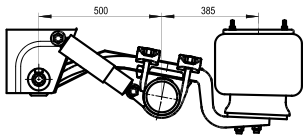
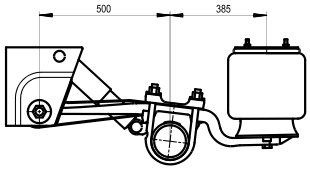
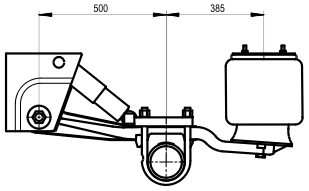
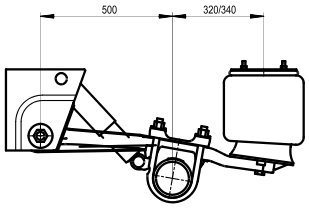
Type identification for axle generation 06
with drum brake



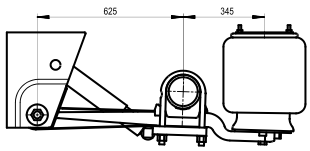
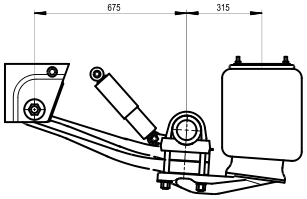
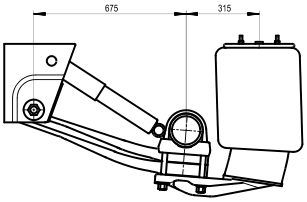
with disc brake



Overview standard series at a glance

	Serie	Feature(s)	Trailing arm variations [mm]			F [mm]	Total axle travel with air bag: [mm]			
			EN (100 x 51)	**EN** (100 x 52)	**S** (100 x 43/43)		2618V **29** Ø300	2918V **27** Ø350	2923V **31** Ø350	2926V **30** Ø350
	**U**	trailing arm under the axle		●	●	**180** till **410**	180	180	200	260
	**MT**	crancked trailing arm over the axle	●			**250** till **410**	180	180	200	260
	**M**	crancked trailing arm over the axle		●	●	**340** till **535**	180	180	200	260
	**O**	trailing arm over the axle		●	●	**400** till **600**	180	180	200	260
	**EO**	trailing arm over the axle, short La-proportion		●	●	**400** till **585**	190	190	220	

Overview special series at a glance

	Serie	Feature(s)	Trailing arm variations [mm]		F [mm]	Total axle travel with air bag: [mm]		
			E (100 x 61)	**S** (100 x 54/54)		2923V **31** Ø350	2926V **30** Ø350	3138 nv. Ø390
	**HU**	trailing arm under the axle, extended L1-proportion		●	**220** till **315**	260	300	
	**AR421**	trailing arm under the axle, extended L1-proportion		●	**250** till **500**		310	
	**AR421H**	trailing arm under the axle, extended L1-proportion		●	**380** till **480**			420 at 9 t; 400 at 10 t

Deployment recommendations and classification of component criteria

Application	Axle load up to 105 km/h	Axle beam	Serie	Trailing arm (width x thickness)	Spring centre (◙ = no limitations)	Spring seat	Air bag (Ø)	Notes
	[t]			[mm]	[mm]		[mm]	
standard western Europe resp. on-road use	9	standard	MT	51	◙	standard	300/ 350	for container- and coil-trailers: quick release valve or arresting cable
			U/M/EO	52	◙	standard	300/ 350	
	10		MT	51	> 1050	heavy duty	350	
	11		U/M/EO	52	> 1050	standard	350	
				52	≤ 1050	heavy duty	350	
	12			52	> 1050	heavy duty	350	
				43/43	◙	heavy duty	350	
mega-trailer	10	standard	HU	60	◙	standard	350	long stroke
	11			54/54	◙	heavy duty	350	
eastern Europe or comparable conditions	9	reinforced	MT	51	> 1050	standard	350	for container- and coil-trailers: quick release valve or arresting cable
			U/M/EO	52	> 1050	standard	350	
				52	≤1050	heavy duty	350	
	11			52	> 1050	heavy duty	350	
				43/43	◙	heavy duty	350	
	12			43/43	◙	heavy duty	350	
tipper western Europe	9	reinforced	M/EO	52	◙	standard	350	quick release valve or arresting cable
tipper heavy use/ logging	9	reinforced	M/EO	52	> 1050	standard	350	quick release valve or arresting cable
				52	≤ 1050	heavy duty	350	
	12			43/43	◙	heavy duty	350	

Axle travel limitations at SAF air suspensions

Basically it is in the design of SAF air suspension that there is no need for axle travel limitations. However there are some to operational conditions required exceptions:

Operating condition	Sling	Height limiting valve
Raise- and lowering device (e.g. adapting trailer to bank heights/ demountable body systems	⇨ **REQUIRED** (alternative height limiting valve)	**NOT REQUIRED** when raise/ lower valve with **DEADMAN HANDLE** is fitted
Roll on/ Roll off applications		
⇨ with air pressure in the air bags	⇨ **REQUIRED**	
⇨ without air pressure in the air bags (wit SAF standard air bags and use of anti-vacuum-valve)	⇨ **REQUIRED** (rubber part of the air bag has to stay rolled on over the piston at maximum axle travel)	
Quick discharging for example coil-trailers		
⇨ with raise and lowering device (discharging in „raised“ position)	⇨ **REQUIRED**	
Ferry operation		
⇨ with air pressure in the air bags	⇨ **REQUIRED**	
⇨ without air pressure in the air bags (wit SAF standard air bags and use of anti-vacuum-valve)	⇨ **REQUIRED** (rubber part of the air bag has to stay rolled on over the piston at maximum axle travel)	

Key

Summary	Explanation
A	Unsprung mass
AX	Distance wheel attachment faces left to right
B	Total width
BH	Hanger bracket height, distance centre pivot bolt to top side hanger bracket
BL	Hanger bracket length, distance top hanger bracket from front- to backside
BM	Air bag centre, distance air bag centre line between left- and right side
ET	Offset, distance wheel attachment face to centre tyre
DP	Pivot point centre (steering axle), distance pivot bolts centre line between left- and right side
F	Nominal ride height, distance centre axle to bottom chassis in driving condition
G	Total axle width
H	Air bag bracket height
H_2	Air bag bracket height at lift air bag
HM	Hanger bracket centre, distance hanger bracket centre line between left- and right side
Hmax	Air bag height maximum
Hmin	Air bag height minimum
i	Ratio
K	Brake chamber centre (with drum brake), centre distance brake chamber bracket between left- and right side
KTL	Cathodic dip coating
L	Trailing arm length (L1), distance centre pivot bolt to centre axle (standard 500 mm)
La	Distance centre axle to centre air bag (L2, standard 385 mm)
LM	Spring centre, centre distance spring between left- and right side
Lmax	Shock absorber length maximum
Lmin	Shock absorber length minimum
P	Air pressure in the air bag (Mpa)
p	Air pressure in the air bag (Mpa/kg)
Pt	Air pressure in the air bag at partial load (Mpa)
Q	Axle load on the ground (kg)
Qt	Axle load on the ground at partial load (kg)
S	Track, centre distance tyres between left- and right side
V	Air bag offset, distance centre air bag to centre spring
X	Overall height, distance centre axle to under side of chassis beam when air bags are without air
Y	Installation height of liftarm, when raised.

All measurements are given in mm if not specified otherwise.

To choose a suspension assembly

For example an assembly with the following data:

Air suspension: Overall height (**X**), unladen without air: 280 mm
lowering travel: 90 mm
adjusted ride height (**F**): 370 mm
standard air bag Ø 300 mm
spring centre: 1300 mm

Axle: axle with disc brake 22,5“, axle load maximum 9.000 kg
tyre size: 385/65R22,5“ on a wheel with offset 0 mm
total width (distance outside tyres left to right) maximum: 2490 mm

With this data:

Suspension as on page 19, air suspension for axles with disc brake.
Air suspension type: M36/2500EN29.

Axle as on page 31, axle with disc brake 22,5“. Axle version: SI9-22S
Tyre 385/65R22,5“ has a width of 405 mm (E.T.R.T.O. Norm).
With a maximum total width of 2490 mm you can calculate the maximum distance wheel attachment faces (2490 – 405 + 2 x 0 =) 2085 mm.

For this, the suspension assembly is described as:
M36/2500EN29 SI9-22S
Distance wheel attachment faces: 2040 mm
Spring centre: 1300 mm

With an air bag offset of 30 mm, you'll get a free space between tyre and air bag of:
Calculation:

$$\frac{AX - LM - air\ bag\ diameter - tyre\ width}{2} + V - ET \geq 25\ mm$$

$$\frac{2040 - 1300 - 300 - 405}{2} + 30 - 0 = 47{,}5 \geq 25\text{mm}$$

see also page 89

Calculation of suspension assembly weight

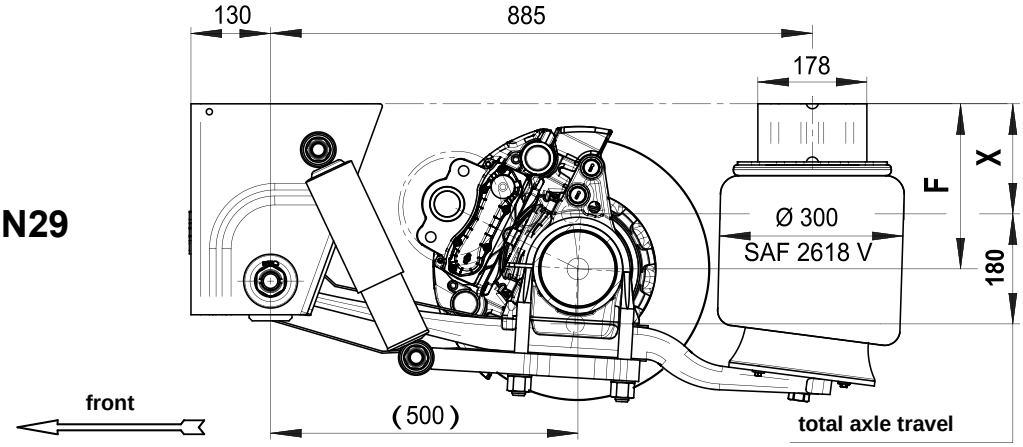
The total weight of this assembly is the sum of the weights of air suspension type and axle.

M36/2500EN29		weight air suspension type (page 19)	176 kg
SI9-22S,	distance wheel attachment faces 2040 mm	weight axle (page 31)	292 kg
		total weight suspension assembly:	468 kg

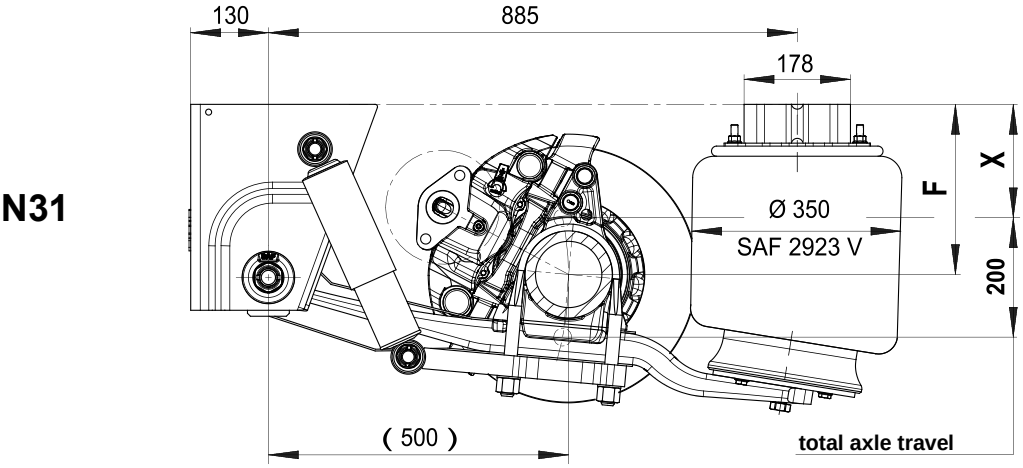
Weights are without slack adjusters (axles with drum brake), brake chambers and wheel nuts. Weight deviations lie within the permitted DIN tolerances for the respective manufacturing process.

Air suspension serie U;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)
Nominal ride heights **240** – **365** mm

U../….EN29



U../….EN31



air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height 1) unladen without air [mm]	**X**; overall height 1) laden without air [mm]	weight approx.2) [kg]
U24/2904EN29 3)	240	220-260	150	135	189
U25/2907EN29 3)	255	235-275	165	150	190
U27/2910EN29	270	250-290	180	165	191
U30/3510EN29 3)	300	280-320	210	195	196
U31/3513EN29 3)	315	295-335	225	210	197
U33/3516EN29	335	315-355	245	230	198
U27/2904EN31 3)	270	240-300	170	155	204
U28/2907EN31	290	260-320	190	175	205
U30/2910EN31	305	275-335	205	190	206
U33/3510EN31	335	305-365	235	220	211
U35/3513EN31	350	320-380	250	235	212
U36/3516EN31	365	335-395	265	250	213

1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) Only possible in combination for axle versions with 19,5” disc brake

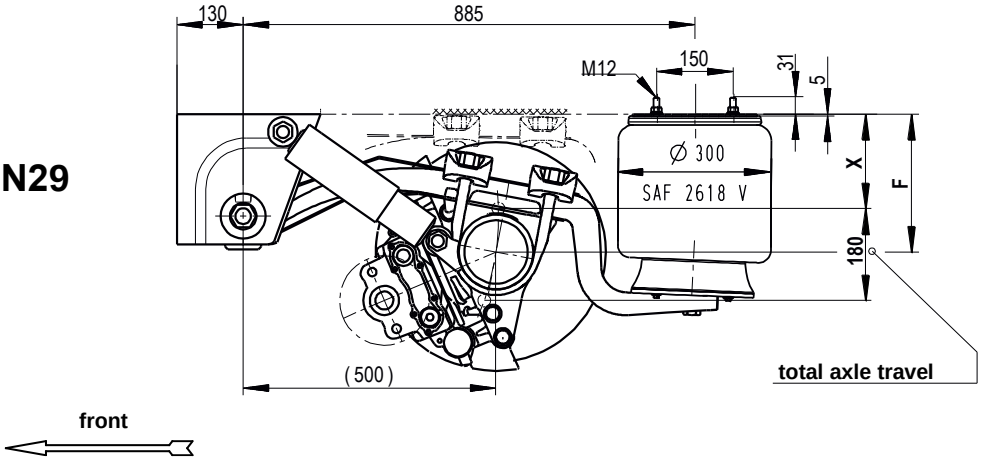
Use of cross member and aluminium hanger bracket is not applicable.

Further variants on request

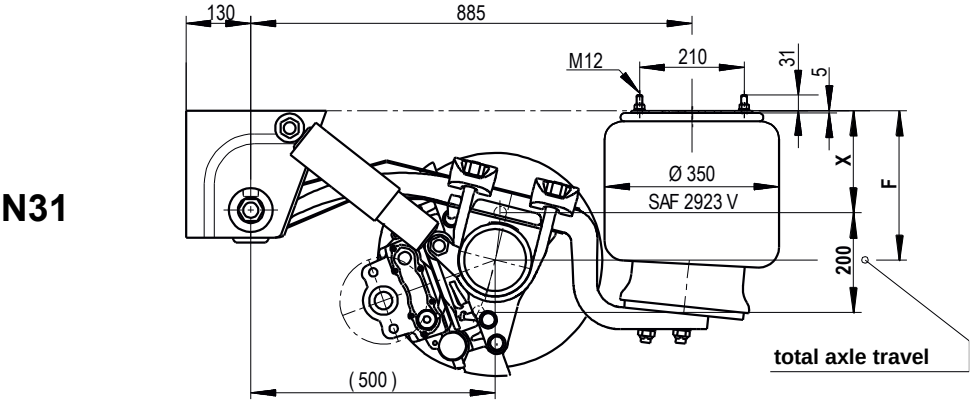
Air suspension serie MT;
Single leaf trailing arm (EN) 51 mm with air bag 2618V (29) or 2923V (31)

Nominal ride heights **270** – **380** mm

MT../….EN29



MT../….EN31



air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx.[2] [kg]
MT27/2000EN29 [3]	270	250-290	180	180	177
MT30/2005EN29	300	280-320	210	195	182
MT32/2505EN29	320	300-340	230	215	185
MT35/2510EN29	350	330-370	260	245	187
MT30/2000EN31	305	275-335	205	190	190
MT33/2005EN31	330	300-360	230	215	195
MT35/2505EN31	355	325-385	255	240	198
MT38/2510EN31	380	350-410	280	265	200

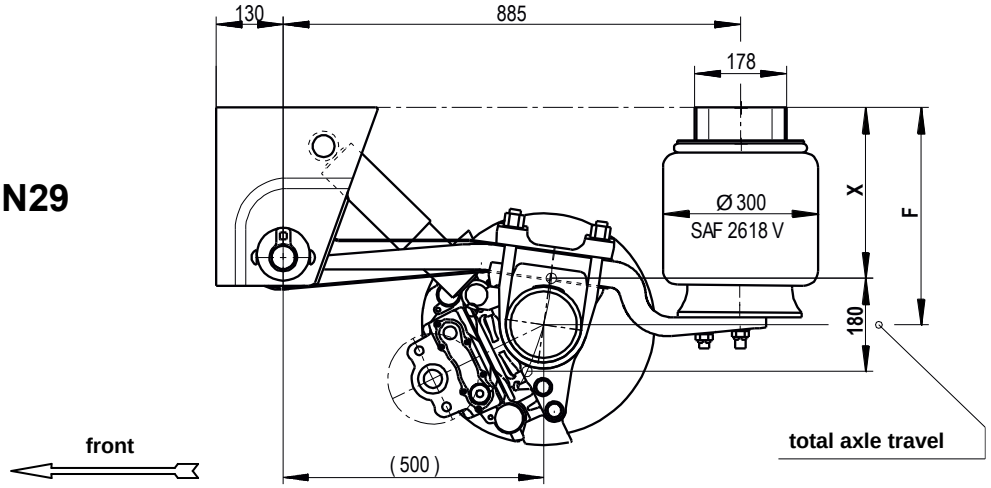
1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) Air suspension types MT27/2000EN29, contact at the axle clamping to chassis beam in position without air (unladen without air = laden without air)

Use of aluminium hanger bracket is not applicable.

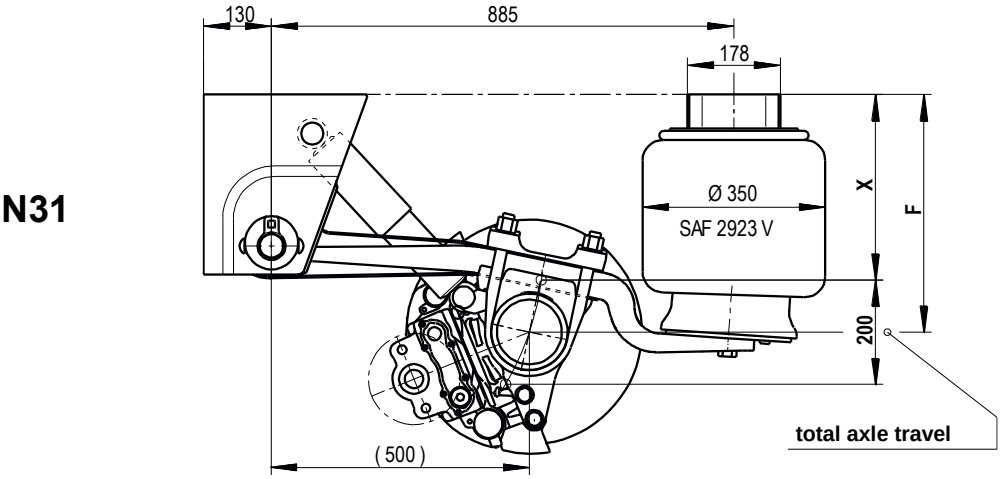
Further variants on request.

Air suspension serie M;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)
Nominal ride heights **370** – **505** mm

M../….EN29



M../….EN31



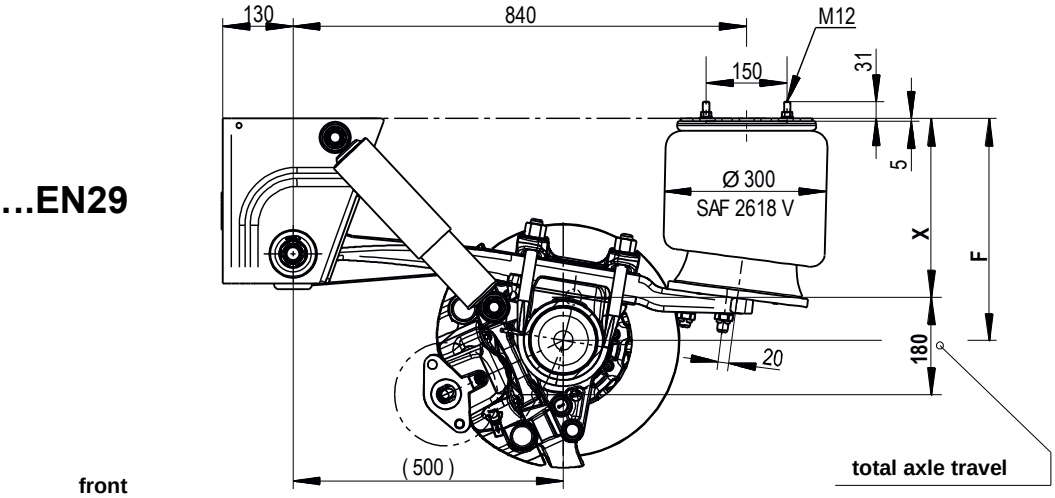
air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx. [2] [kg]
M36/2500EN29	370	350-390	280	265	176
M38/2504EN29	390	370-410	300	285	177
M40/2904EN29	410	390-430	320	305	180
M42/2907EN29	425	405-445	335	320	181
M43/2910EN29	445	425-465	355	340	182
M46/3510EN29	470	450-490	380	365	187
M40/2500EN31	405	375-435	305	290	191
M42/2504EN31	425	395-455	325	310	192
M43/2904EN31	445	415-475	345	330	195
M45/2907EN31	460	430-490	360	345	196
M47/2910EN31	480	450-510	380	365	197
M50/3510EN31	505	475-535	405	390	202

1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

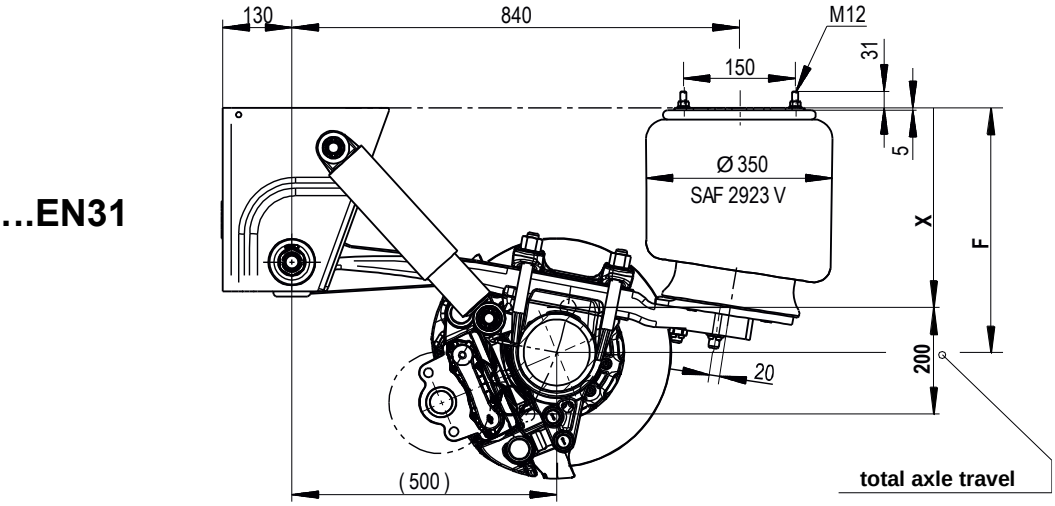
Air suspension serie EO;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)
Nominal ride heights **420** – **555** mm

EO../….EN29



front

EO../….EN31



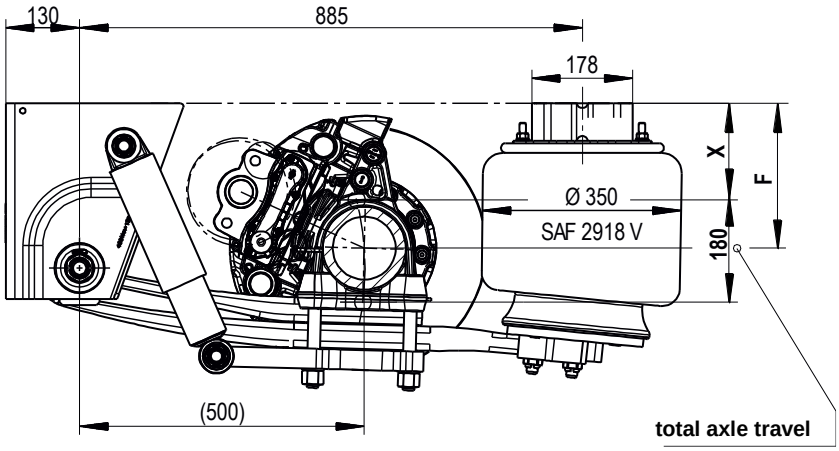
air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx. [2] [kg]
EO41/2500EN29	420	400-440	330	315	173
EO42/2900EN29	435	415-455	345	330	176
EO44/2904EN29	455	435-475	365	350	177
EO47/3504EN29	480	460-500	390	375	182
EO49/3507EN29	500	480-520	410	395	183
EO50/3510EN29	520	500-540	430	415	184
EO44/2500EN31	455	425-485	355	340	188
EO46/2900EN31	470	440-500	370	355	191
EO48/2904EN31	495	465-525	395	380	192
EO50/3504EN31	515	485-545	415	400	197
EO52/3507EN31	535	505-565	435	420	198
EO54/3510EN31	555	525-585	455	440	199

1) The data in the table corresponds with an air bag offset (**V**) of **0, 30, 55** or **70** mm.
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

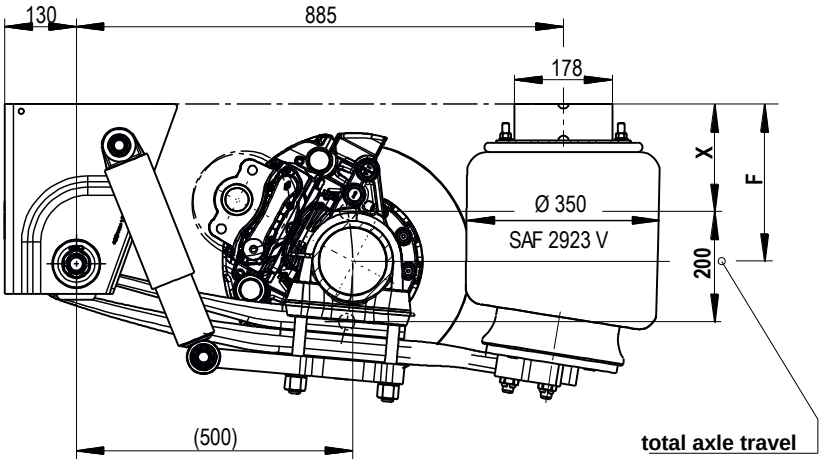
Air suspension serie U;
Double leaf trailing arm (S) 43/43 mm with air bag 2918V (27) or 2923V (31)
Nominal ride heights **240** – **370** mm

U../….S27



front

U../….S31



air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx.[2] [kg]
U24/2904S27 [3]	240	220-260	150	140	219
U25/2907S27 [3]	255	235-275	165	155	220
U27/2910S27	270	250-290	180	170	221
U30/3510S27 [3]	300	280-320	210	200	226
U31/3513S27 [3]	315	300-340	230	220	227
U33/3516S27	330	315-355	245	235	228
U27/2904S31 [3]	270	245-305	175	165	221
U28/2907S31	285	260-320	190	180	222
U30/2910S31	300	275-335	205	195	223
U33/3510S31	330	305-365	235	225	228
U35/3513S31	350	320-380	250	240	229
U36/3516S31	370	340-400	270	260	230

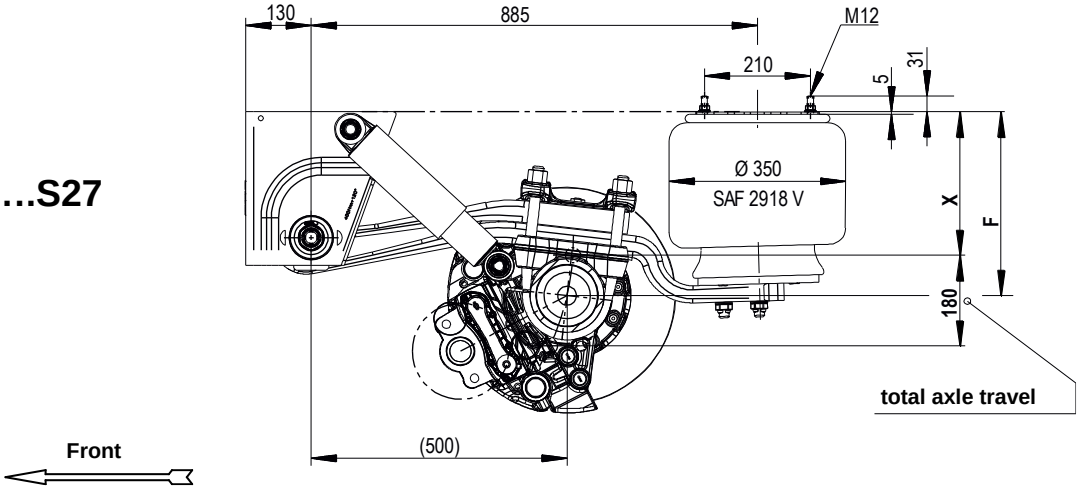
1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) Only possible in combination for axle versions with 19,5” disc brake

Use of cross member and hanger bracket „aluminium“ is not applicable.

Further variants on request.

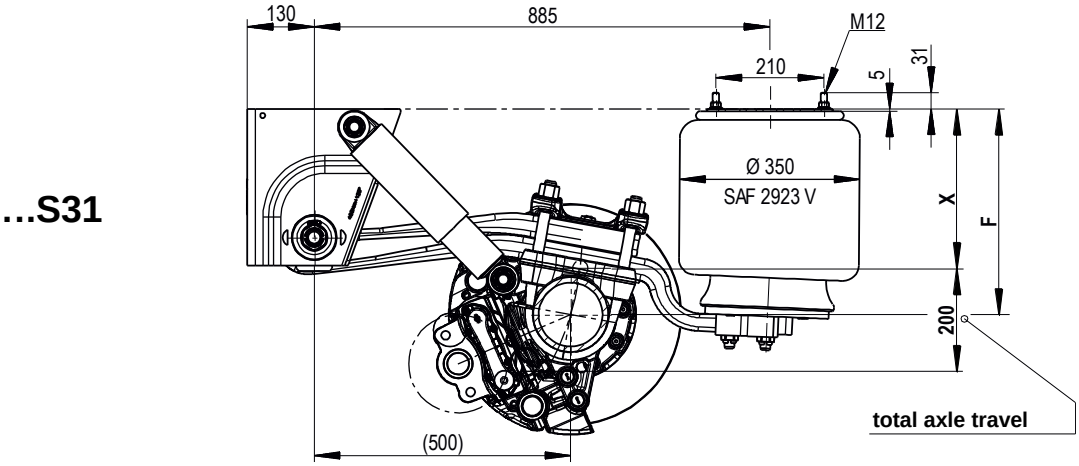
Air suspension serie M;
Double leaf trailing arm (S) 43/43 mm with air bag 2918V (27) or 2923V (31)
Nominal ride heights **370** – **505** mm

M../….S27



Front

M../….S31



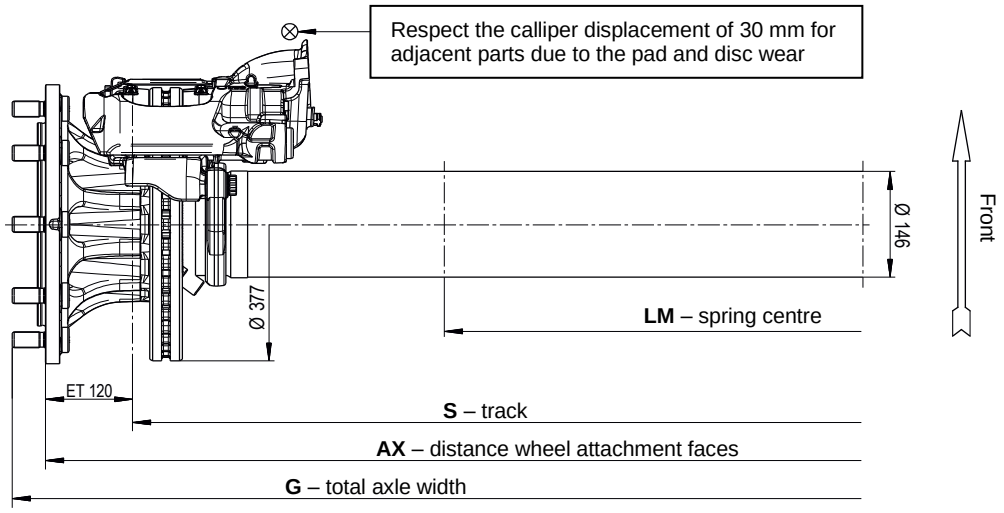
air suspension type	**F**; nominal ride height [mm]	ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx.[2] [kg]
M36/2500S27	370	350-390	280	270	209
M38/2504S27	390	370-410	300	290	210
M40/2904S27	410	390-430	320	310	213
M42/2907S27	425	405-445	335	325	214
M43/2910S27	445	425-465	355	345	215
M46/3510S27	470	450-490	380	370	220
M40/2500S31	405	375-435	305	295	211
M42/2504S31	425	395-455	325	315	212
M43/2904S31	440	410-470	340	330	215
M45/2907S31	460	430-490	360	350	216
M47/2910S31	475	445-505	375	365	217
M50/3510S31	505	475-535	405	395	222

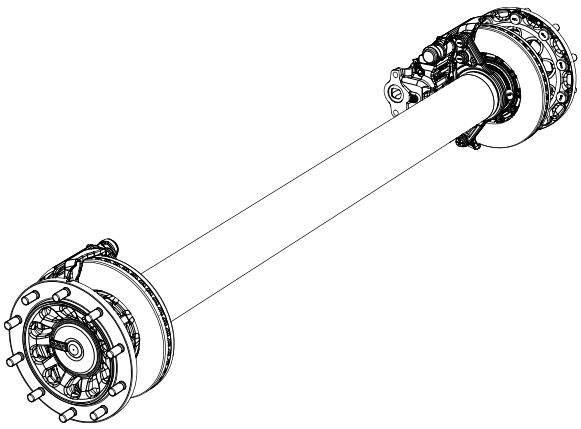
1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

Axle version BI9-19…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version/ axle / brake/ test report	AX / LM [mm]	S [1] / LM [mm]	G [2] [mm]	weight approx.[3] [kg]
	tyre (example): 425/55R19,5“			
	2210/1100	1970/1100	2302	276
	2210/1200 [4]	1970/1200 [4]	2302	276
	2250/1200	2010/1200	2342	277
	2280/1200	2040/1200	2372	278
	2280/1300 [4]	2040/1300 [4]	2372	278
BI9-19S / SBS1937 / SAF, SBS1918 / TDB0870 **BI9-19K /** SBK1937- / KNORR, SBK1937 / TDB0605	2330/1300	2090/1300	2422	280

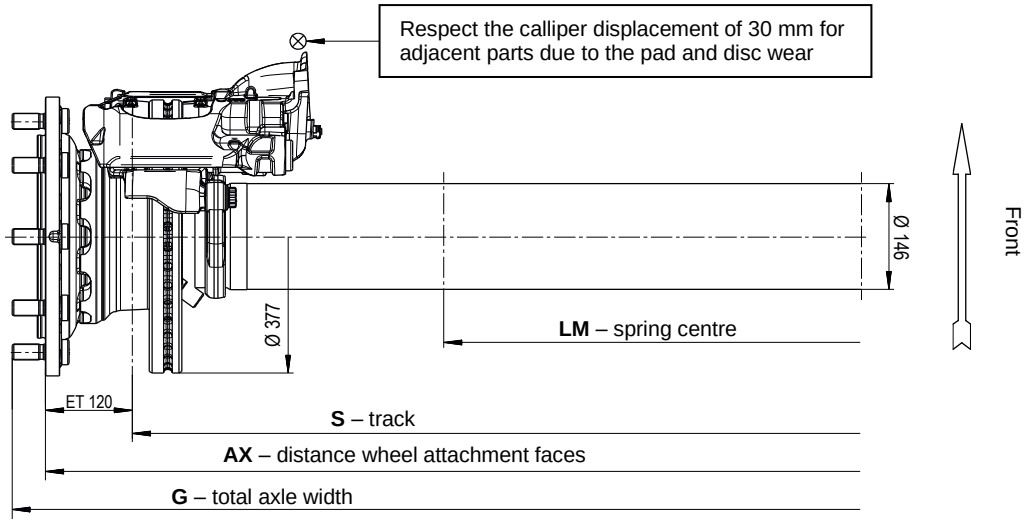
1) **S** = **AX** – 2 x **ET** (**120** mm)
2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims.
3) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SBK1937) an additional weight of 5 kg per axle needs to be accounted for.
Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **425/55R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

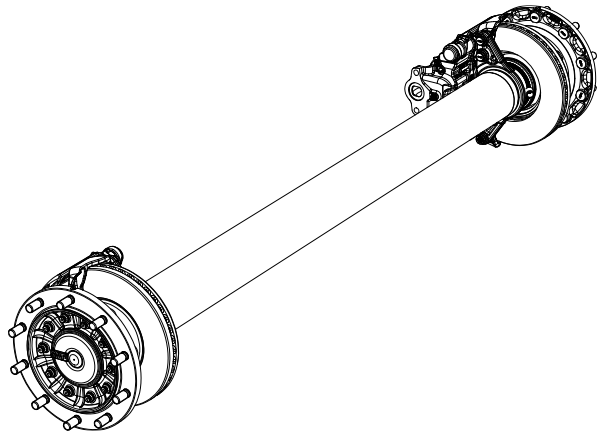
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version B9-19…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [2] [mm]	weight approx.[3] [kg]
	tyre (example): 425/55R19,5“			
	2210/1100	1970/1100	2302	282
	2210/1200 [4]	1970/1200 [4]	2302	282
	2250/1200	2010/1200	2342	283
	2280/1200	2040/1200	2372	284
	2280/1300 [4]	2040/1300 [4]	2372	284
B9-19S / SBS1937 / SAF, SBS1918 / TDB0870 **B9-19K /** SBK1937- / KNORR, SBK1937 / TDB0605	2330/1300	2090/1300	2422	286

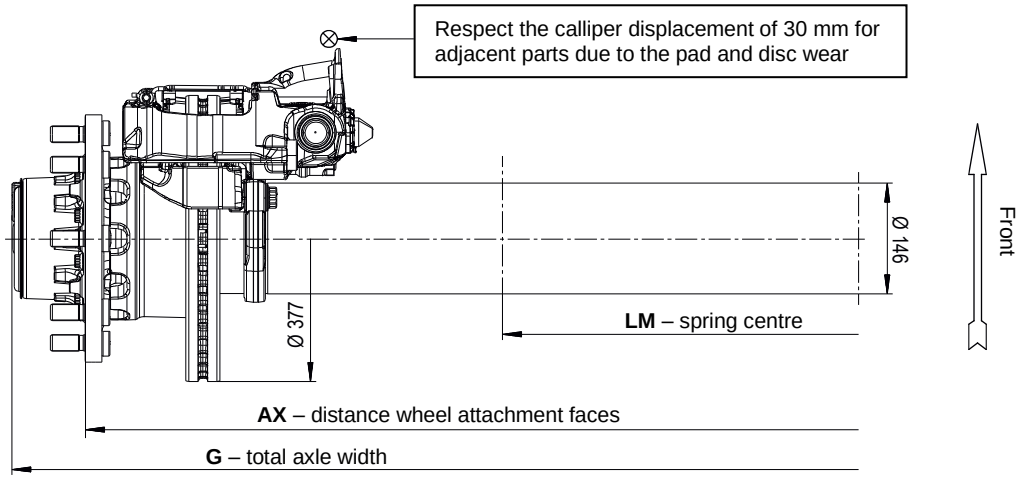
1) **S** = **AX** – 2 x **ET** (**120** mm)
2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims.
3) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SBK1937) an additional weight of 5 kg per axle needs to be accounted for.
Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **425/55R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

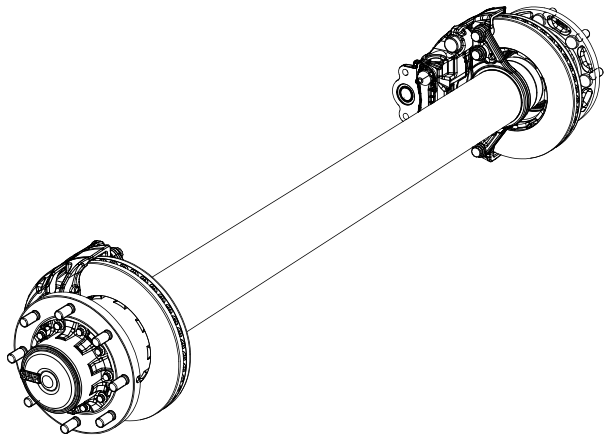
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI9-19.:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/55R19,5“	G [mm]	weight approx.[2] [kg]
	1970/1100	2168	271
	1970/1200 [3,4]	2168	271
	2010/1180	2208	272
	2040/1200	2238	273
	2040/1300 [3,4]	2238	273
SI9-19S / SBS1937 / SAF, SBS1918 / TDB0870 **SI9-19K** / SBK1937 / KNORR, SBK1937 / TDB0605	2090/1300 [4]	2288	275

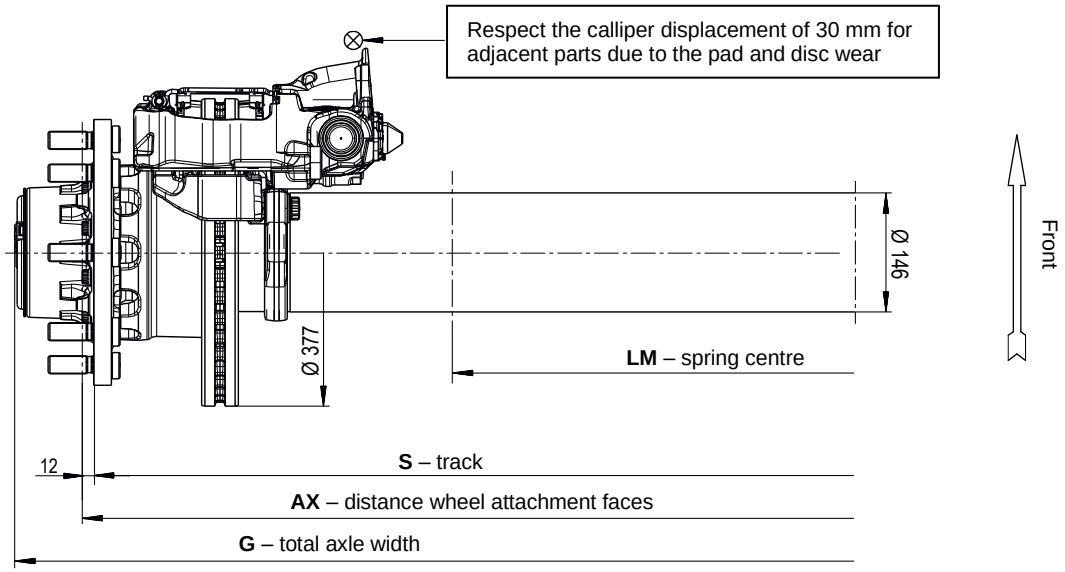
1) **AX** = **S**
2) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SBK1937) an additional weight of 5 kg per axle needs to be accounted for.
Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **425/55R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm
4) to be combined with air suspension types starting at a nominal ride height of **330** mm.

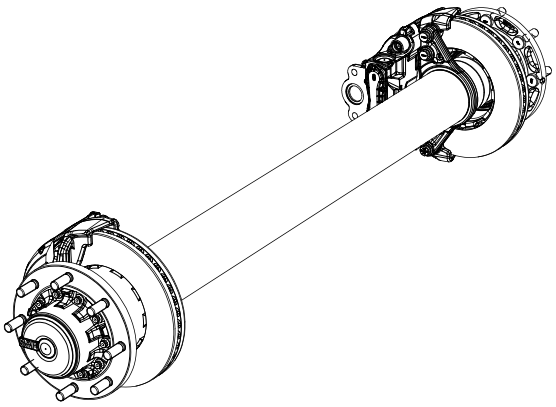
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI9-19.:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	weight approx. [2] [kg]
	tyre (example): 245/70R19,5“			
	1806/900	1834/900	2004	275
	1806/980 [3]	1834/980 [3]	2004	275
	1860/950	1888/950	2058	277
	1860/1020 [3]	1888/1020 [3]	2058	277
	1926/1020	1926/1020	2124	280
	1926/1050	1954/1050	2124	280
ZI9-19S / SBS1937 / SAF SBS1918 / TDB0878 **ZI9-19K** / SBK1937 / KNORR, SBK1937 / TDB0606	1926/1100 [3]	1954/1100 [5]	2124	280

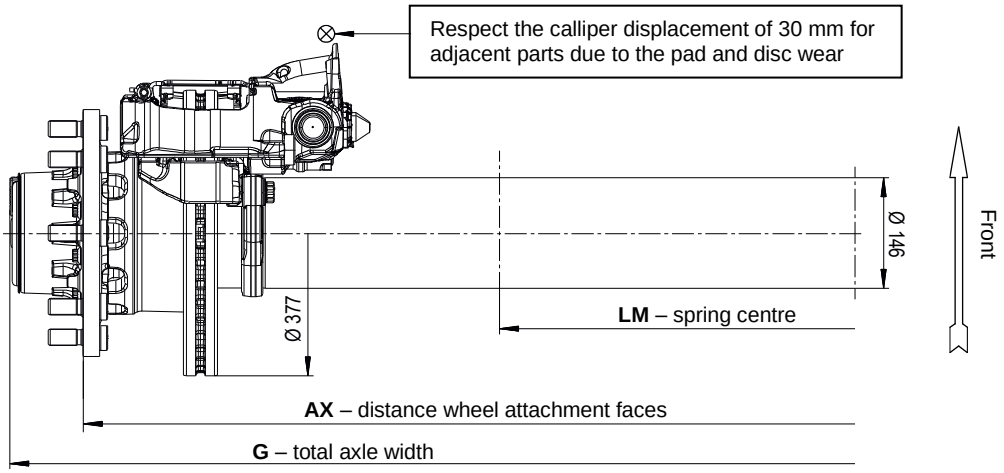
1) **S** = **AX** + 2 x wheel disc thickness (standard 14 mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SBK1937) an additional weight of 5 kg per axle needs to be accounted for.
Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **245/70R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

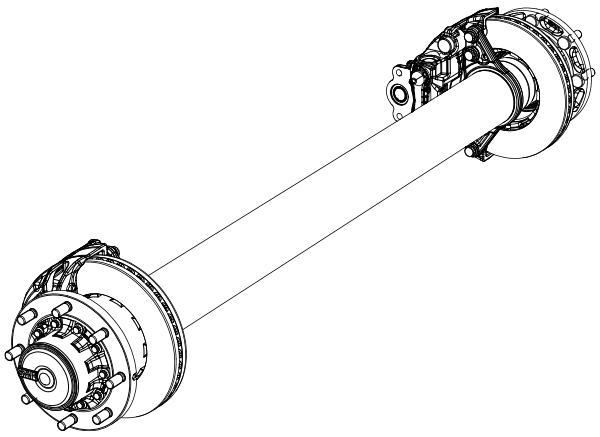
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI11-19K:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bag with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 435/50R19,5“	G [mm]	weight approx.[2] [kg]
 **SI11-19K** / SBK1937 / KNORR SBK1937 / TDB0605	1970/1100	2168	286
	1970/1200 [4,6]	2168	286
	2010/1180 [3]	2208	288
	2040/1200 [3]	2238	289
	2040/1300 [5,6]	2238	289
	2090/1300 [4,6]	2288	291

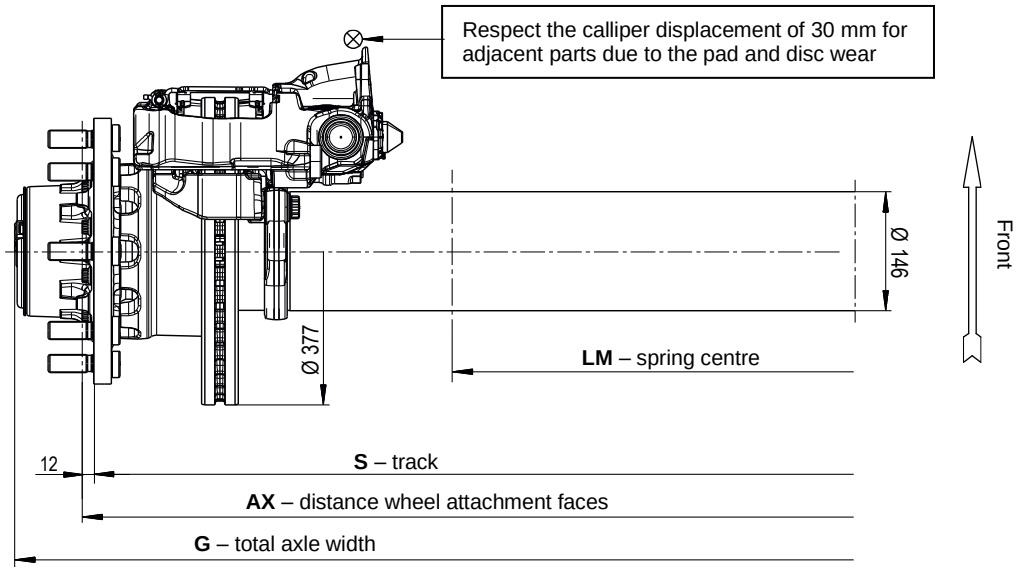
1) **AX** = **S**
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **435/50R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **435/50R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) with tyres **435/50R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **70** mm
6) to be combined with air suspension types starting at a nominal ride height of **330** mm.

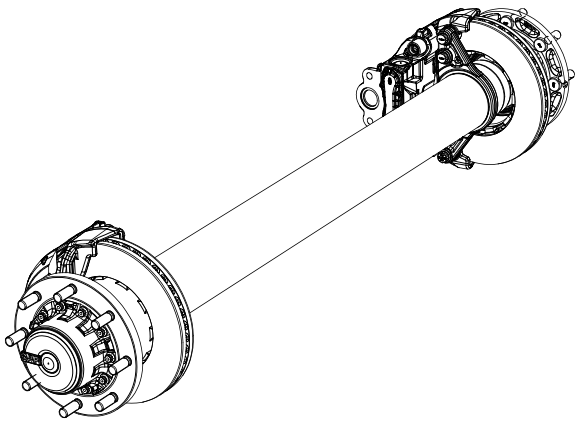
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI11-19K:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	weight approx. [2] [kg]
	tyre (example): 265/70R19,5“			
 **ZI11-19K /** SBK1937- / KNORR, SBK1937 / TDB0606	1806/900 [3]	1834/900 [3]	2004	280
	1806/980 [5]	1834/980 [5]	2004	280
	1860/950 [3]	1888/950 [3]	2058	282
	1860/1020 [4]	1888/1020 [4]	2058	282
	1926/1020 [3]	1954/1020 [3]	2124	285
	1926/1050 [4]	1954/1050 [4]	2124	285
	1926/1100 [5]	1954/1100 [5]	2124	285

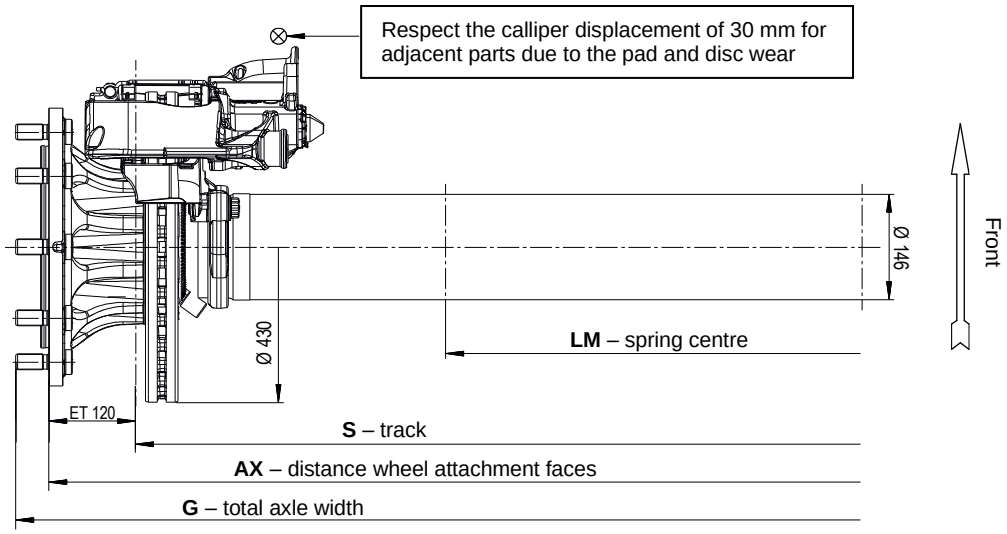
1) **S** = **AX** + 2 x wheel disc thickness (standard 14 mm)
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **265/70R19,5“**and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **265/70R19,5“**and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) with tyres **265/70R19,5“**and air bag diameter **Ø 350** mm only with **V** = **70** mm

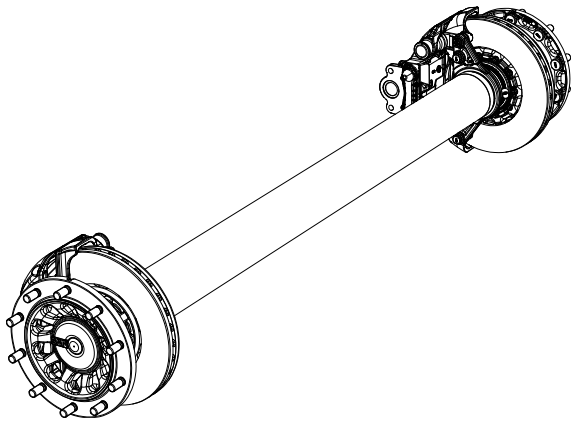
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version BI9-22…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [2] [mm]	weight approx.[3] [mm]
	tyre (example): 385/65R22,5“			
 **BI9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **BI9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2210/1100	1970/1100	2302	286
	2210/1200	1970/1200	2302	286
	2280/1200	2040/1200	2372	288
	2280/1300 [4]	2040/1300 [4]	2372	288
	2330/1300	2090/1300	2422	290
	2380/1300	2140/1300	2472	291
	2380/1400 [4]	2140/1400 [4]	2472	291

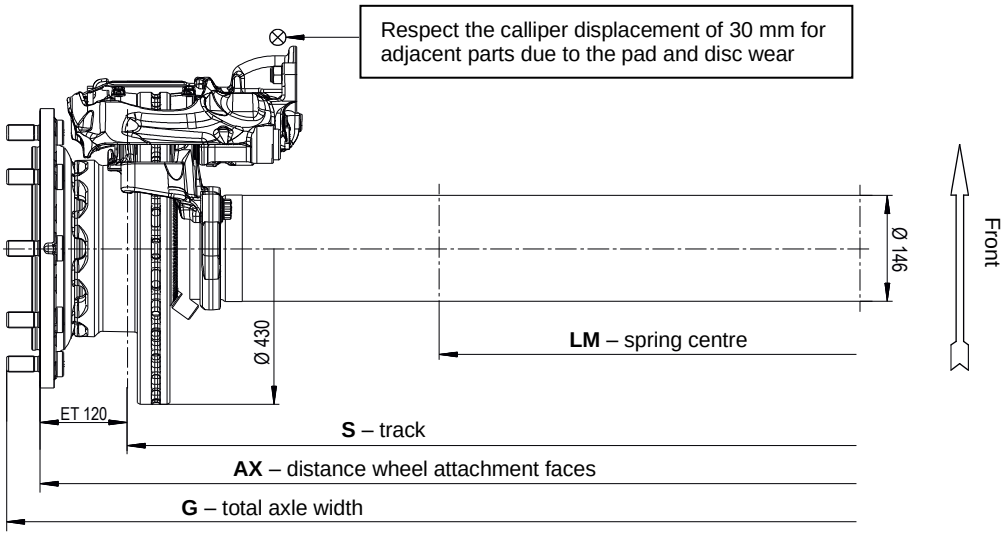
1) **S** = **AX** – 2 x **ET** (**120** mm)
2) **G** is increased by **20** mm when wheel studs are used for mounting aluminium-rims.
3) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for.
Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **385/65R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

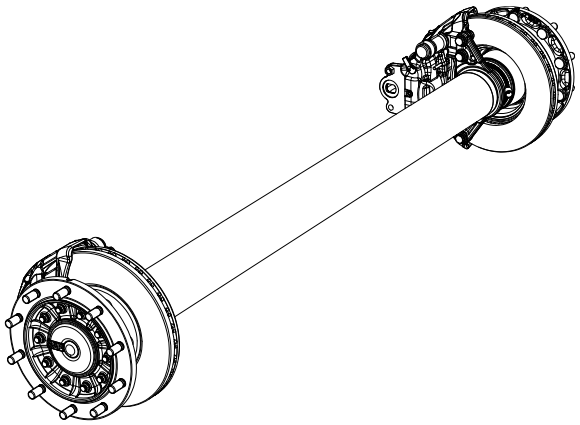
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version B9-22…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [2] [mm]	weight approx.[3] [kg]
	tyre (example): 385/65R22,5“			
 **B9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **B9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2210/1100	1970/1100	2302	294
	2210/1200	1970/1200	2302	294
	2280/1200	2040/1200	2372	296
	2280/1300 [4]	2040/1300 [4]	2372	296
	2330/1300	2090/1300	2422	300
	2380/1300	2140/1300	2472	301
	2380/1400 [4]	2140/1400 [4]	2472	301

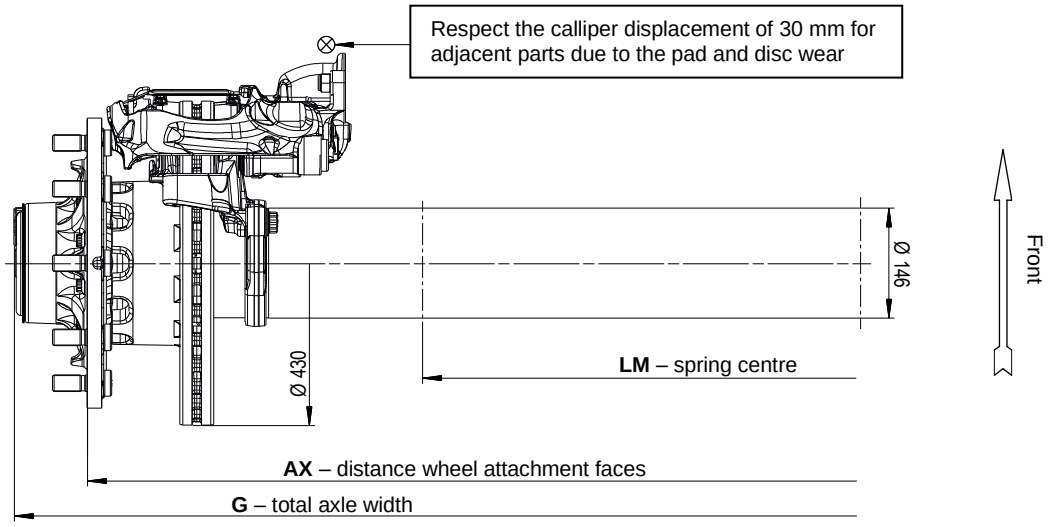
1) **S** = **AX** – 2 x **ET** (**120** mm)
2) **G** is increased by **20** mm when wheel studs are used for mounting aluminium-rims.
3) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **385/65R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

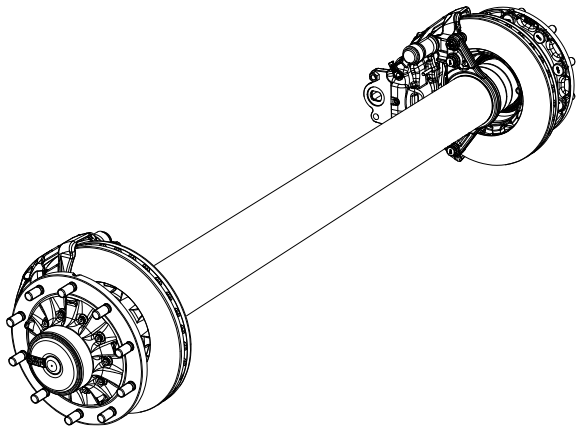
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI9-22…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	weight approx.[2] [kg]
 **SI9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **SI9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	1970/1100	2168	290
	1970/1200	2168	290
	2040/1200	2238	292
	2040/1300 [3,4]	2238	292
	2090/1300	2288	294
	2140/1300	2338	295
	2140/1400 [3,4]	2338	295

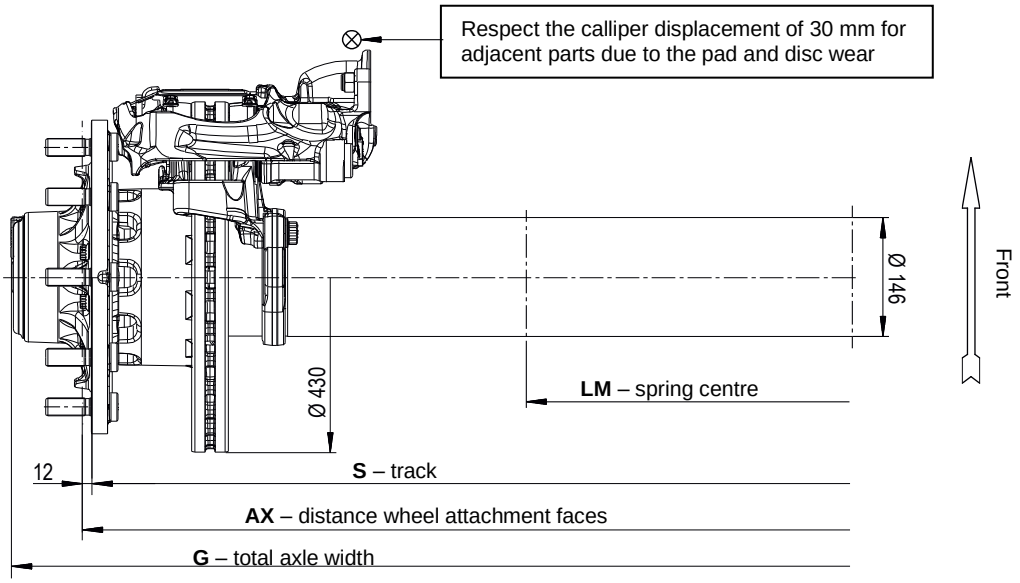
1) **AX** = **S**
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **385/65R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm
4) to be combined with air suspension types starting at a nominal ride height of **330** mm.

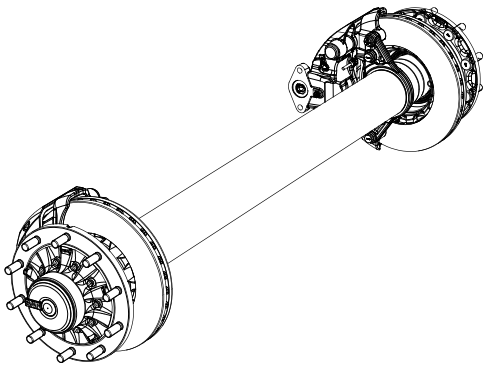
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI9-22…:

Axle load maximum **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	weight approx.[2] [kg]
	tyre (example): 255/70R22,5“			
 **ZI9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **ZI9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	1820/900	1844/900	2018	298
	1820/940	1844/940	2018	298
	1860/980	1884/980	2058	299
	1896/1020	1920/1020	2094	300
	1920/1060 [3]	1944/1060 [3]	2118	302

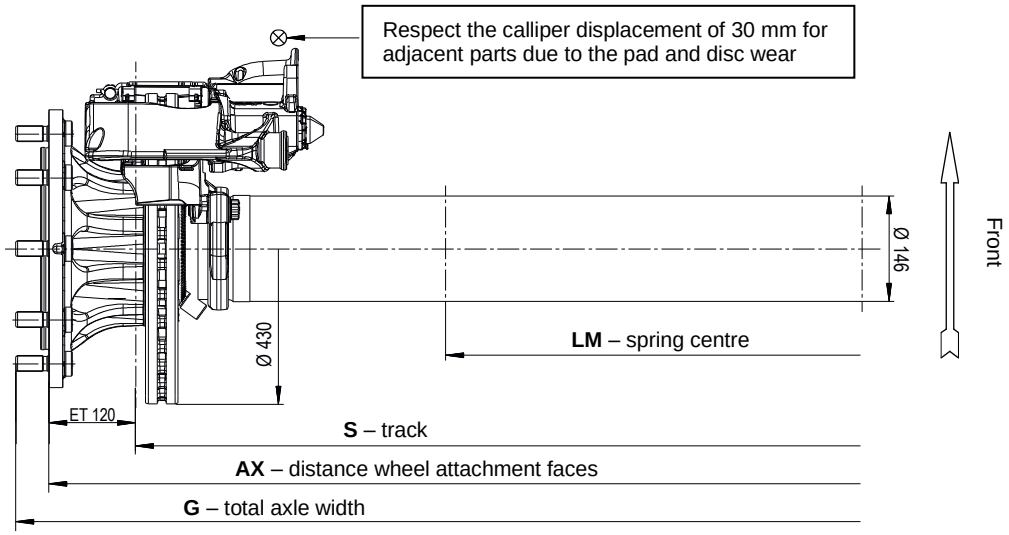
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **255/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm

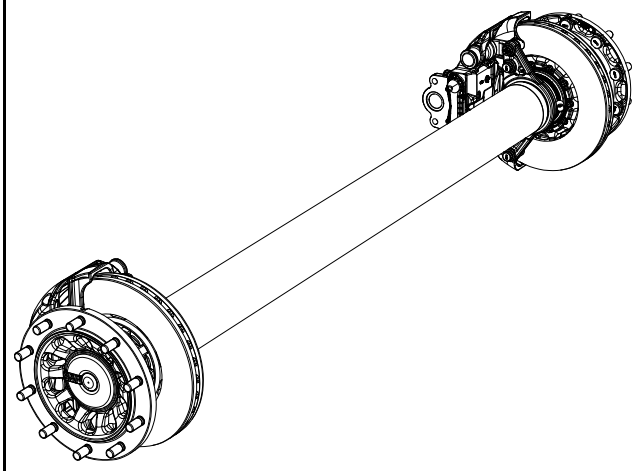
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version BI10-22…:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [2] [mm]	weight approx. [3] [kg]
	tyre (example): 385/65R22,5“			
	2210/1100	1970/1100	2302	297
	2210/1200 [4]	1970/1200 [4]	2302	297
	2280/1200	2040/1200	2372	300
	2280/1300 [4]	2040/1300 [4]	2372	300
	2330/1300 [4]	2090/1300 [4]	2422	302
	2380/1300	2140/1300	2472	304
BI10-22S / SBS2243 / SAF, SBS2220 / TDB0843 **BI10-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2380/1400 [5]	2140/1400 [5]	2472	304

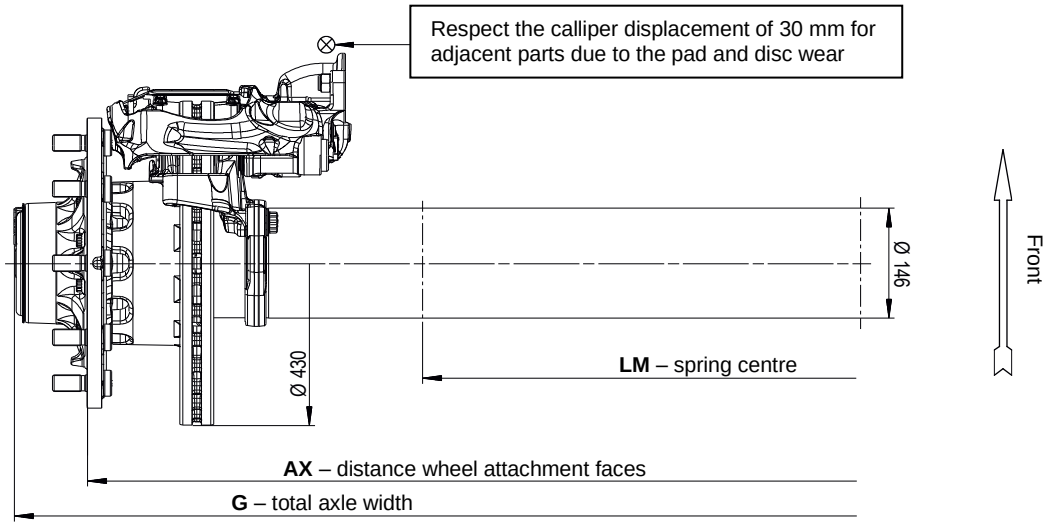
1) **S** = **AX** – 2 x **ET** (**120** mm)
2) **G** is increased by **20** mm when wheel studs are used for mounting aluminium-rims.
3) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
5) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

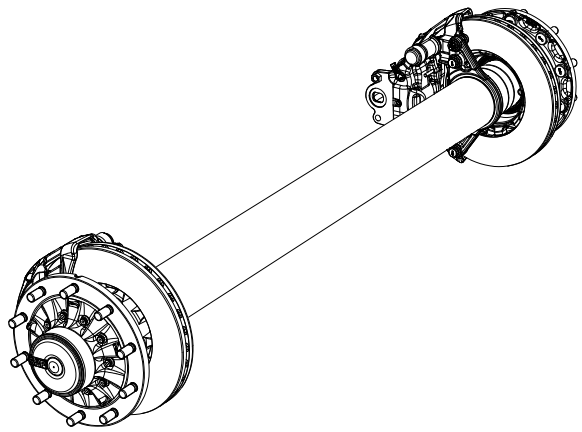
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI10-22…:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	weight approx.[2] [kg]
	1970/1100	2168	301
	1970/1200 [3,5]	2168	301
	2040/1200	2238	304
	2040/1300 [4,5]	2238	304
	2090/1300 [3,5]	2288	306
	2140/1300	2338	308
SI10-22S / SBS2243 / SAF, SBS2220 / TDB0843 **SI10-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2140/1400 [4,5]	2338	308

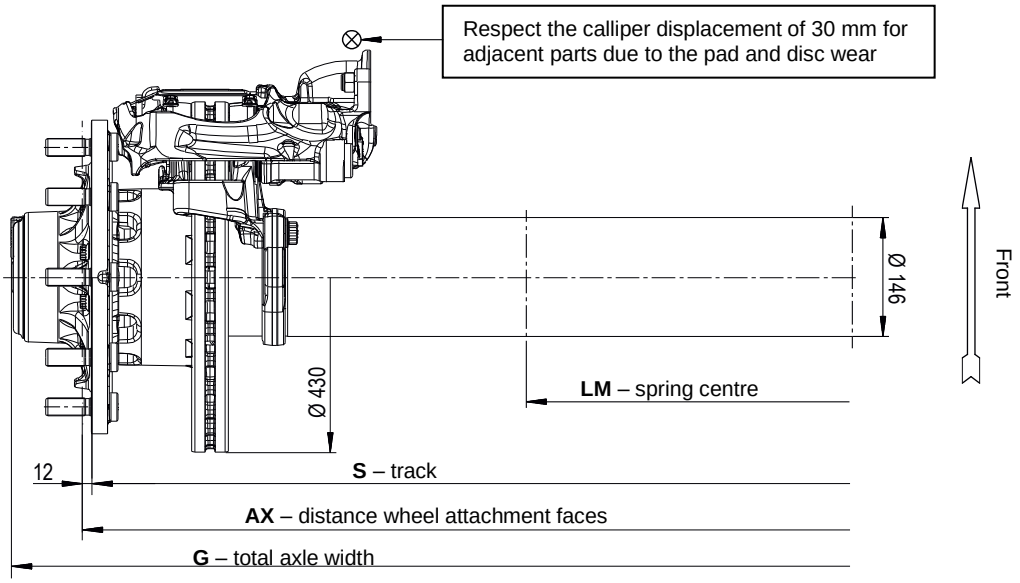
1) **AX** = **S**
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) to be combined with air suspension types starting at a nominal ride height of **330** mm.

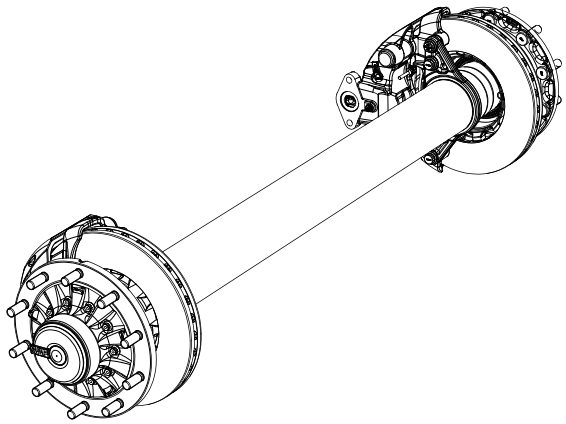
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI10-22…:

Axle load maximum **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm] tyre (example): 275/70R22,5“	S [1] / LM [mm]	G [mm]	weight approx.[2] [kg]
 **ZI10-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **ZI10-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	1786/900 [3]	1810/900 [3]	1982	299
	1820/900 [3]	1844/900 [3]	2018	300
	1820/940 [4]	1844/940 [4]	2018	300
	1860/980 [4]	1884/980 [4]	2058	301
	1896/1020 [4]	1920/1020 [4]	2094	302
	1920/1060 [4]	1944/1060 [4]	2118	304

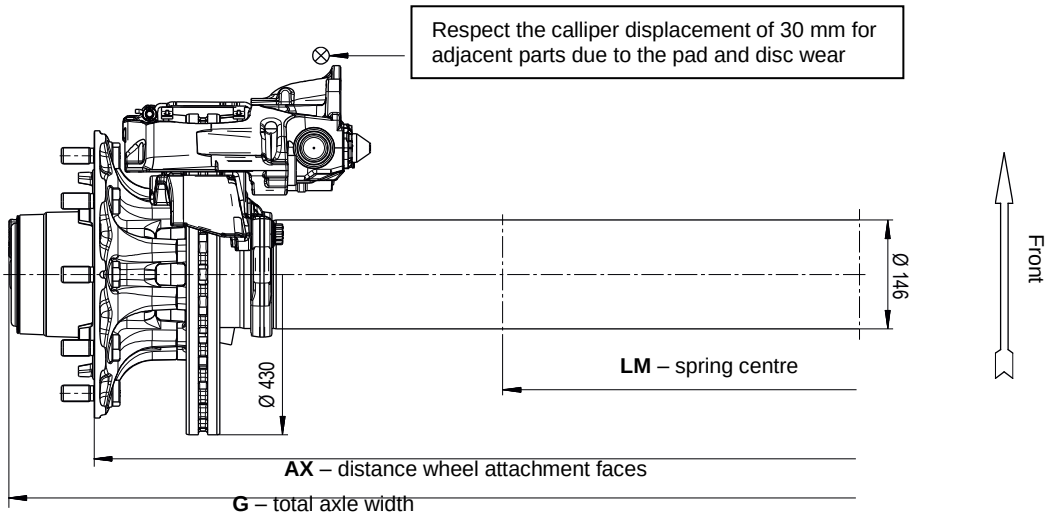
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **70** mm

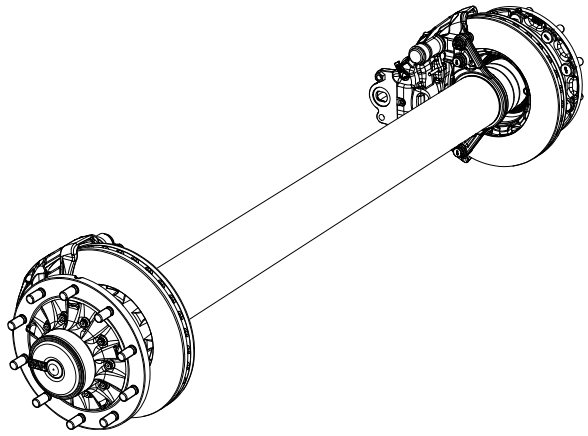
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI11-22K11:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/65R22,5“	G [mm]	weight approx.[2] [kg]
 **SI11-22K11** / SBK2243 / KNORR, SBK2243K01 / 36101814	1970/1100	2198	336
	1970/1200 [4,5]	2198	336
	2040/1200 [3]	2268	340
	2040/1300 [4,5]	2268	340
	2090/1300 [3,5]	2318	343

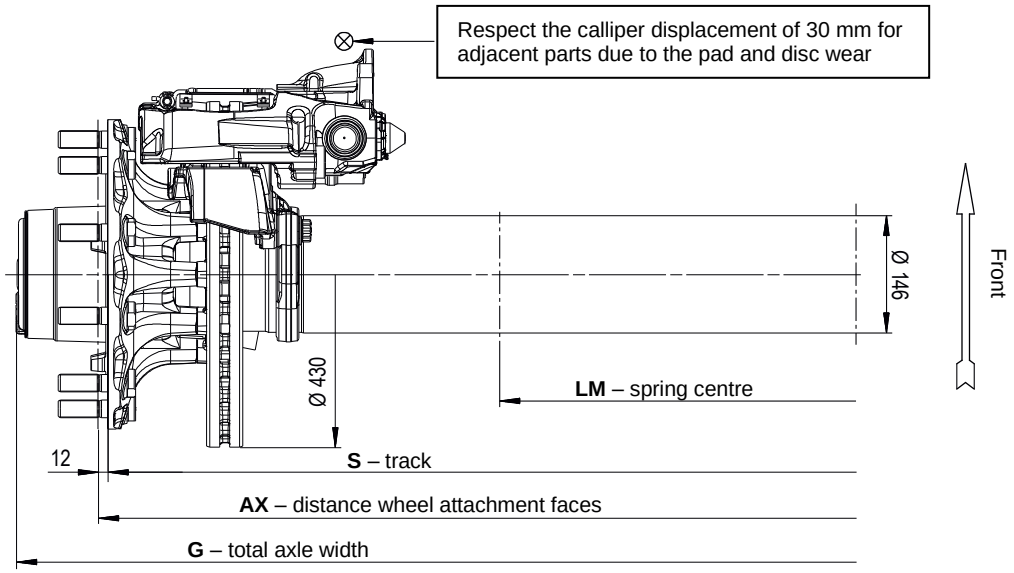
1) **AX** = **S**
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) to be combined with air suspension types starting at a nominal ride height of **330** mm.

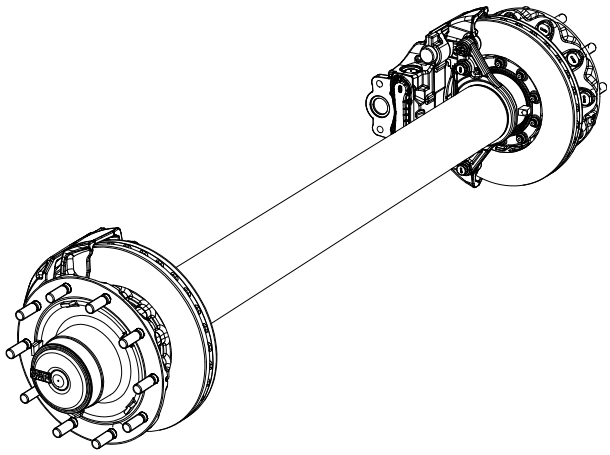
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI11-22K11:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	weight approx.[2] [kg]
	tyre (example): 275/70R22,5“			
 **ZI11-22K11 /** SBK2243 / KNORR SBK2243K01 / 36101814	1786/900 [4]	1810/900 [4]	1982	333
	1820/900 [3]	1844/900 [3]	2018	335
	1820/940 [4]	1844/940 [4]	2018	335
	1860/980 [4]	1884/980 [4]	2058	337
	1896/1020 [4]	1920/1020 [4]	2094	339
	1920/1060 [4]	1944/1060 [4]	2118	342

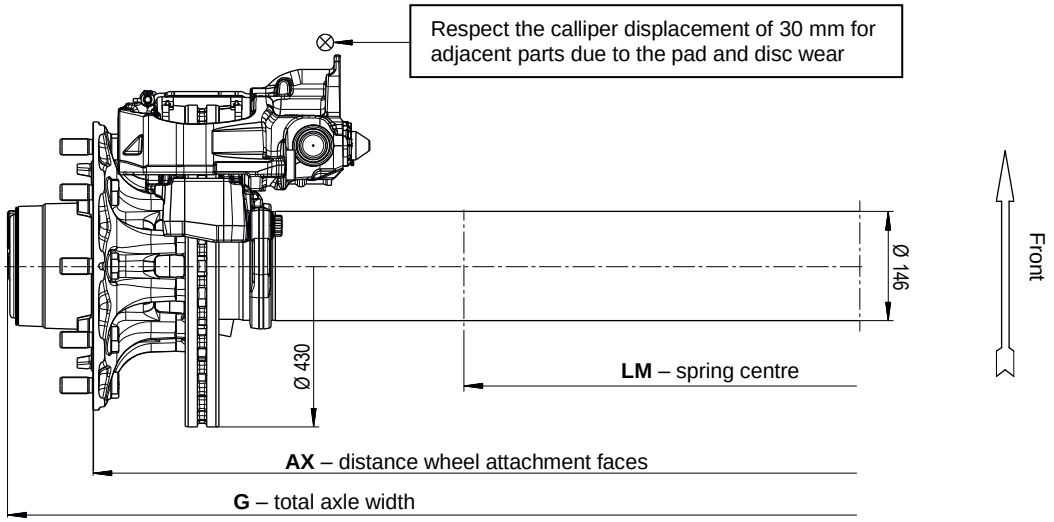
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

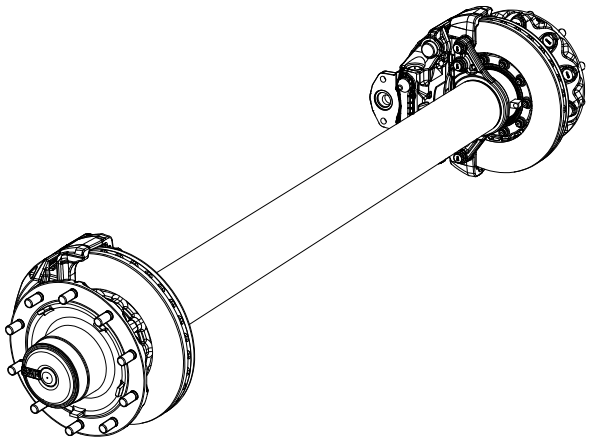
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SI12-22K10:

Axle load maximum: **12.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 445/65R22,5“	G [mm]	weight approx.[2] [kg]
 **SI12-22K10** / SBK2243 / KNORR, SBK2243 / TDB0590	1970/1100	2198	354
	1970/1200 [4,5]	2198	354
	2040/1200 [3]	2268	358
	2040/1280 [4,5]	2268	358

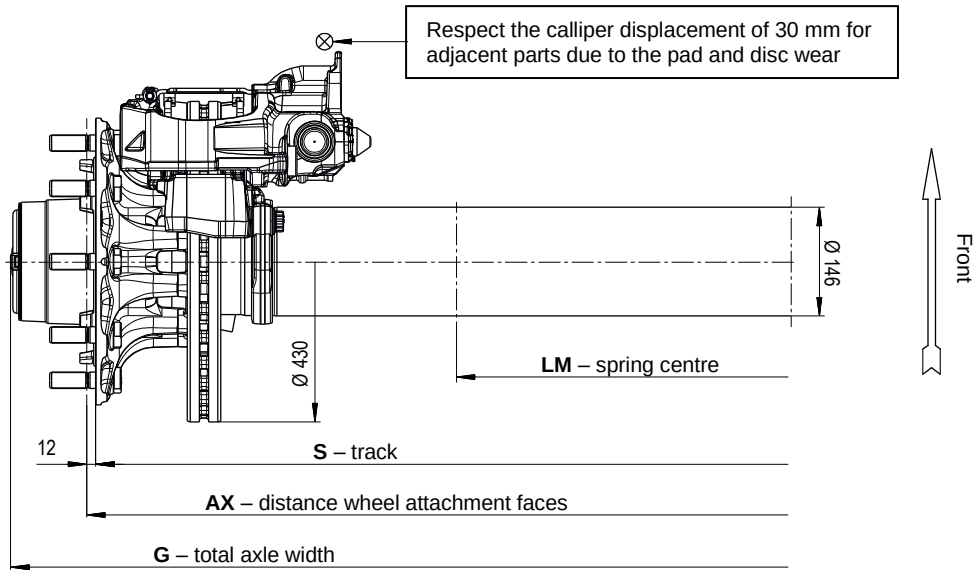
1) **AX** = **S**
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **445/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **445/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) to be combined with air suspension types starting at a nominal ride height of **330** mm.

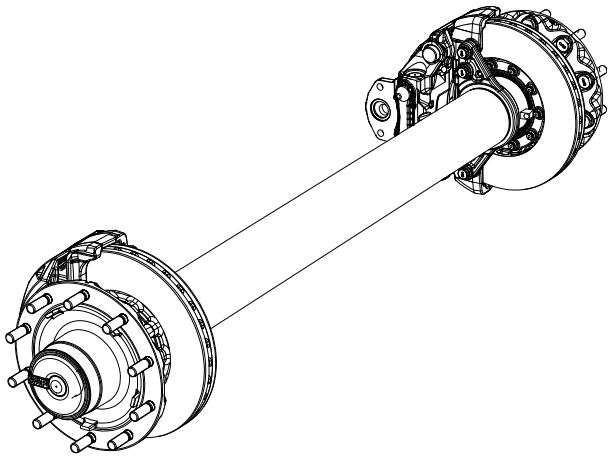
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version ZI12-22K10:

Axle load maximum: **12.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	weight approx.[2] [kg]
	tyre (example): 295/80R22,5“			
 **ZI12-22K10 /** SBK2243 / KNORR, SBK2243 / TDB0590	1786/900 [4]	1810/900 [4]	2014	343
	1820/900 [3]	1844/900 [3]	2048	345
	1820/940 [4]	1844/940 [4]	2048	345
	1860/980 [4]	1884/980 [4]	2088	347
	1896/1020 [4]	1920/1020 [4]	2124	349

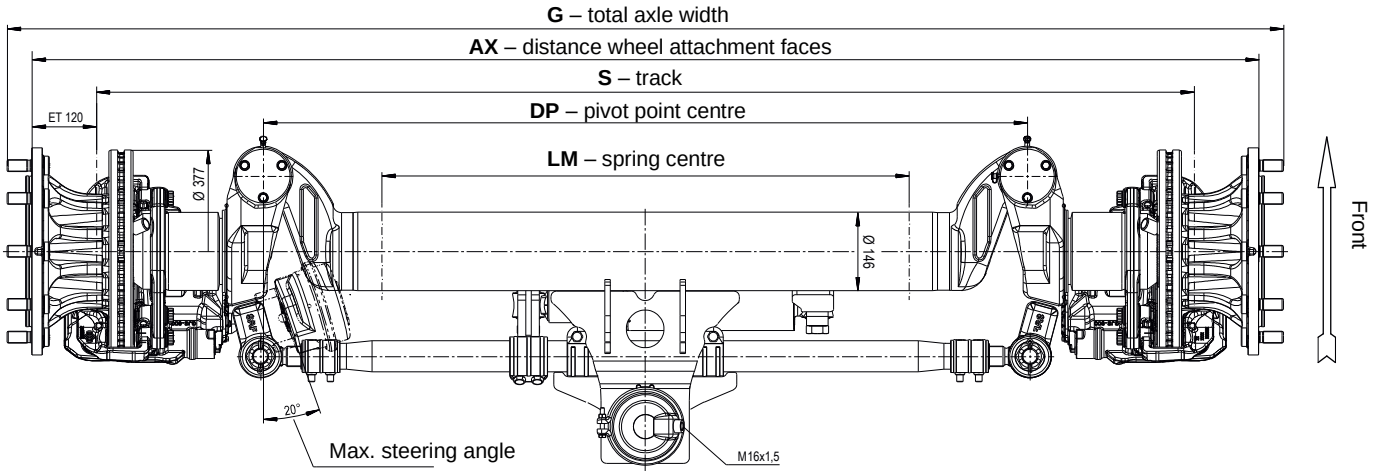
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **295/80R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **295/80R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

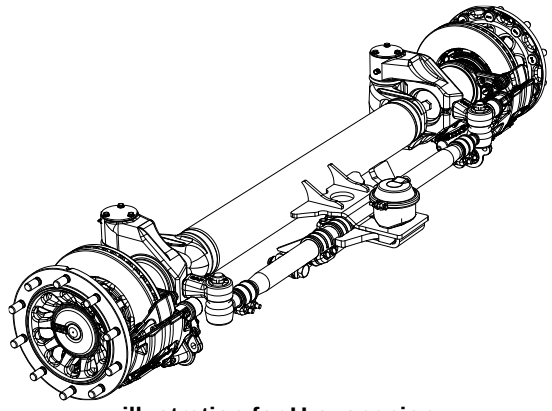
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version BIL9-19.:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	S [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	DP [mm]	weight approx. [2] [kg]
 **illustration for U-suspenion**	1970/840	2302	1350	430
	2040/900	2372	1420	434
	2040/980	2372	1420	434
	2090/950	2422	1470	437
	2090/1020	2422	1470	437
BIL9-19S / SBS1937 / SAF, SBS1918 / TDB0878 **BIL9-19K /** SBK1937 / KNORR, SBK1937 / TDB0605	2140/1000	2472	1520	440

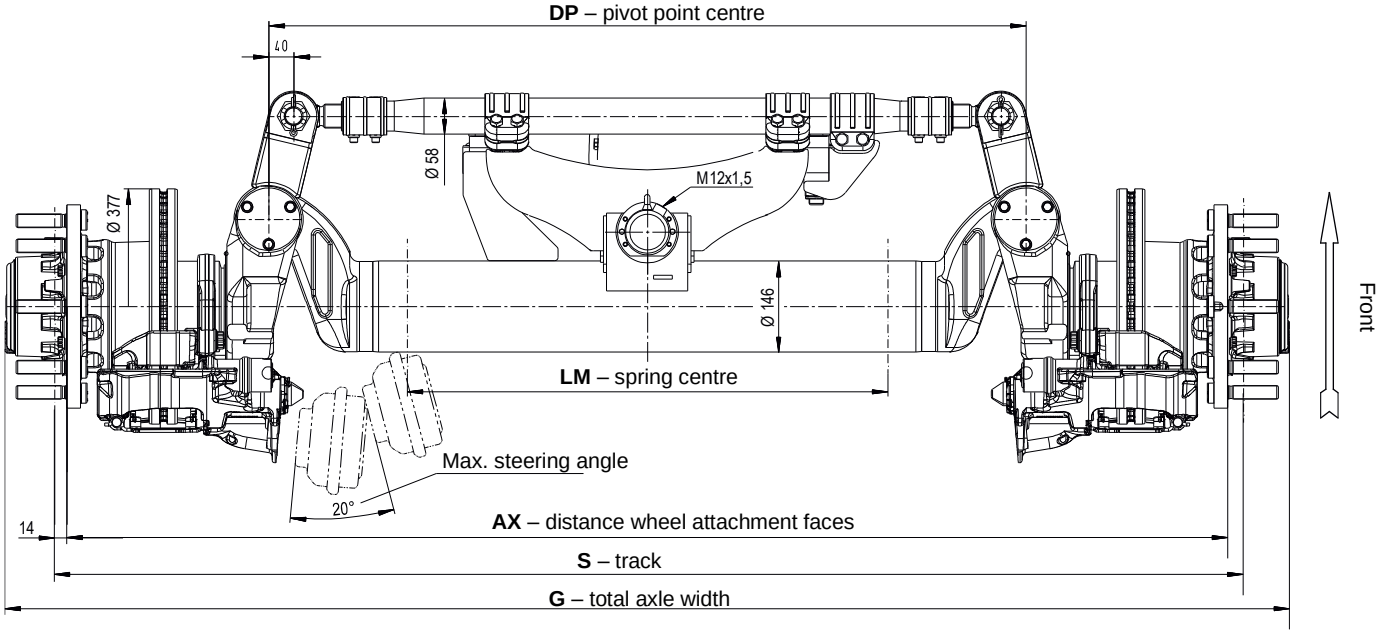
1) **S** = **AX** – 2x **ET** (**120** mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SBK1937) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

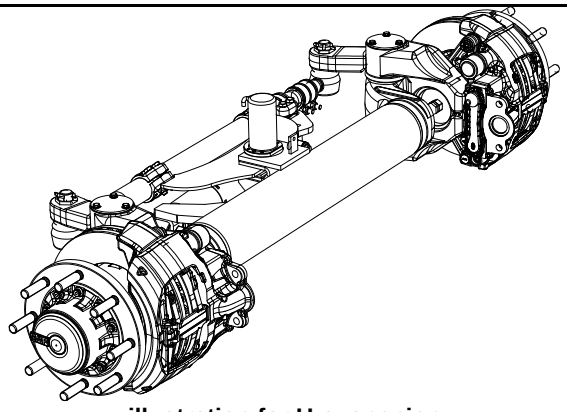
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

All variants on request.

Axle version ZIL11-19K:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 265/70R19,5“	G [mm]	DP [mm]	weight approx.[2] [kg]
 **illustration for U-suspenion** **ZIL11-19K /** SBK1937 / KNORR, SB7…SK7 / 36110303	1860/700	2058	1213	427
	1926/700	2124	1279	431
	1926/700	2124	1279	431

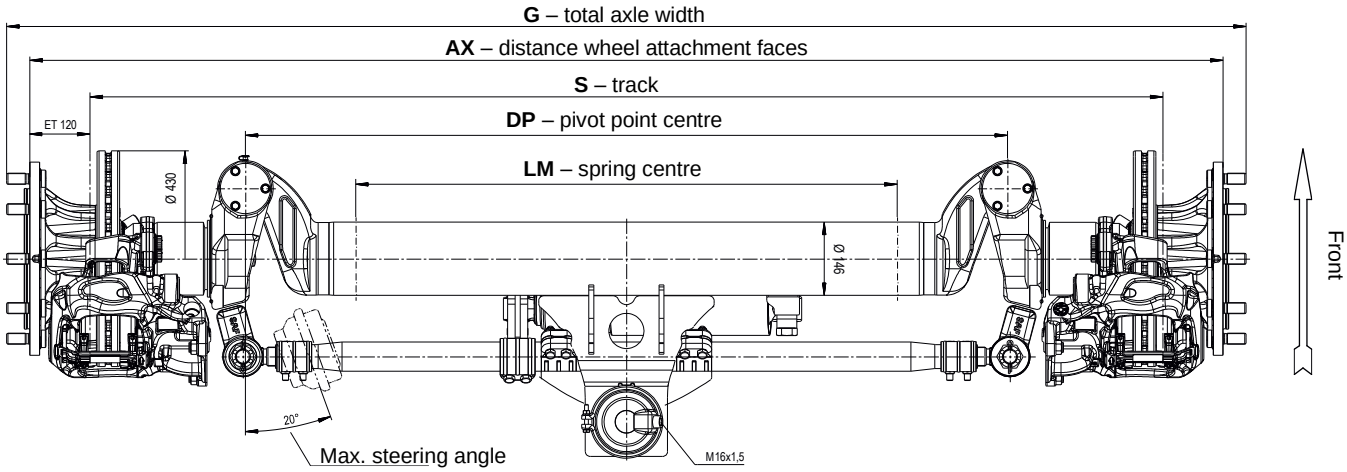
1) **AX** = **S**
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

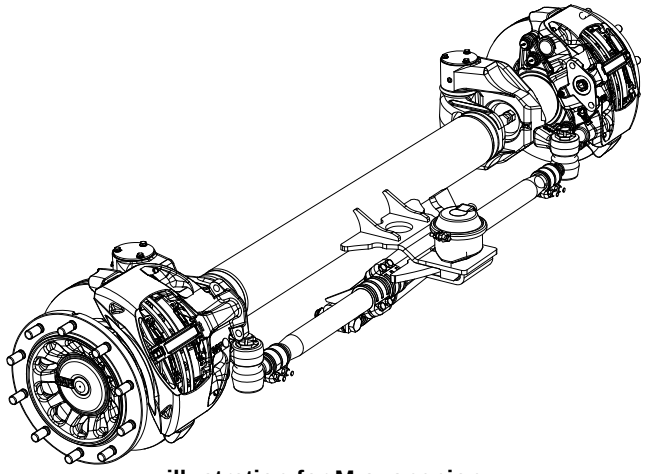
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

All variants on request.

Axle version BIL9-22…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	S [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	DP [mm]	weight approx.[2] [kg]
 **illustration for M-suspenion** **BIL9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **BIL9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	1970/840	2192	1350	446
	2040/900	2262	1420	450
	2090/960	2312	1470	453
	2140/1000	2362	1520	456

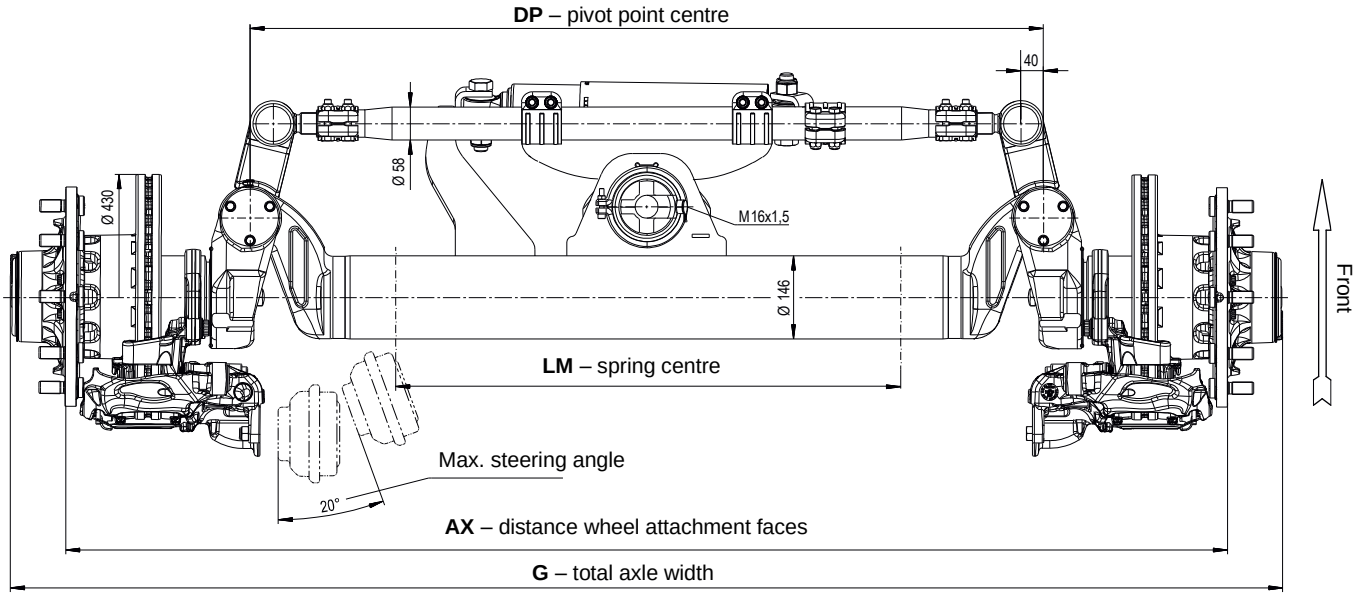
1) **S** = **AX** – 2x **ET** (**120** mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

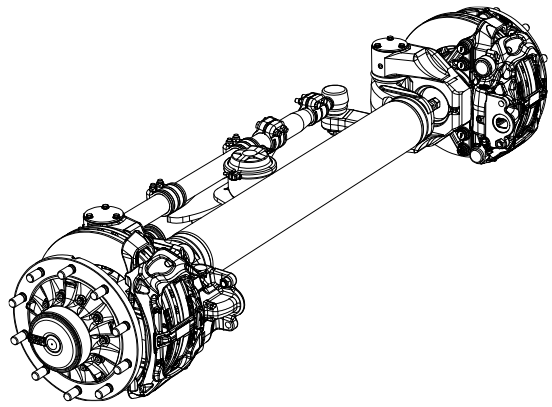
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

All variants on request.

Axle version SIL9-22…:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	DP [mm]	weight approx.[2] [kg]
 **illustration for M-suspenion**	1970/800	2168	1323	448
	2040/900	2238	1393	452
	2040/980	2238	1393	452
	2090/900	2288	1443	455
	2090/980	2288	1443	455
SIL9-22S / SBS2243 / SAF, SBS2220 / TDB0843 **SIL9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2140/980	2338	1493	458

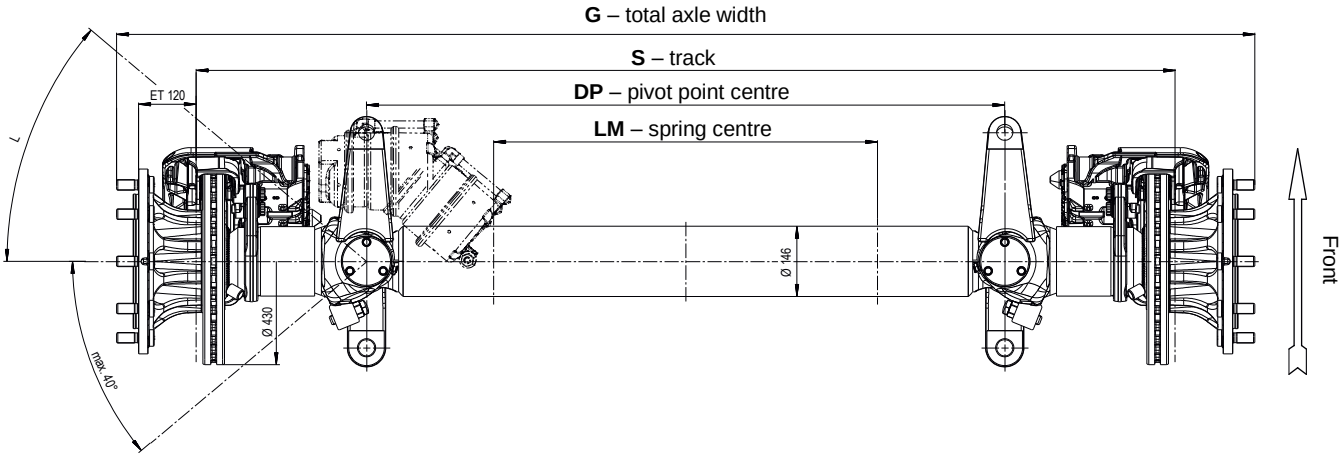
1) **AX** = **S**
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

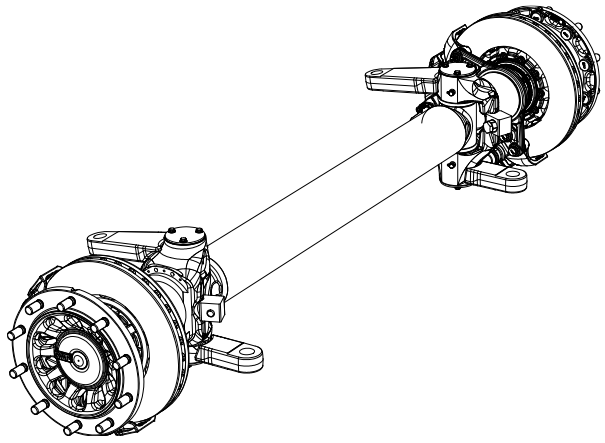
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

All variants on request.

Axle version BIZL10-22…:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	S [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	DP [mm]	L [°]	weight approx.[2] [kg]
	2040/800	2372	1330	35	465
	2040/850	2372	1330	32	448
	2040/900	2372	1330	29	448
	2090/850	2422	1380	35	451
	2090/900	2422	1380	32	451
	2090/950	2422	1380	29	451
	2140/900	2472	1430	35	454
	2140/950	2472	1430	32	454
	2140/1000	2472	1430	29	454

BIZL10-22S / SBS2243 / SAF, SBS2220 / TDB0843
BIZL10-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214

1) **S** = **AX** – 2x **ET** (**120** mm)
2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220K0) an additional weight of 5 kg per axle needs to be accounted for. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

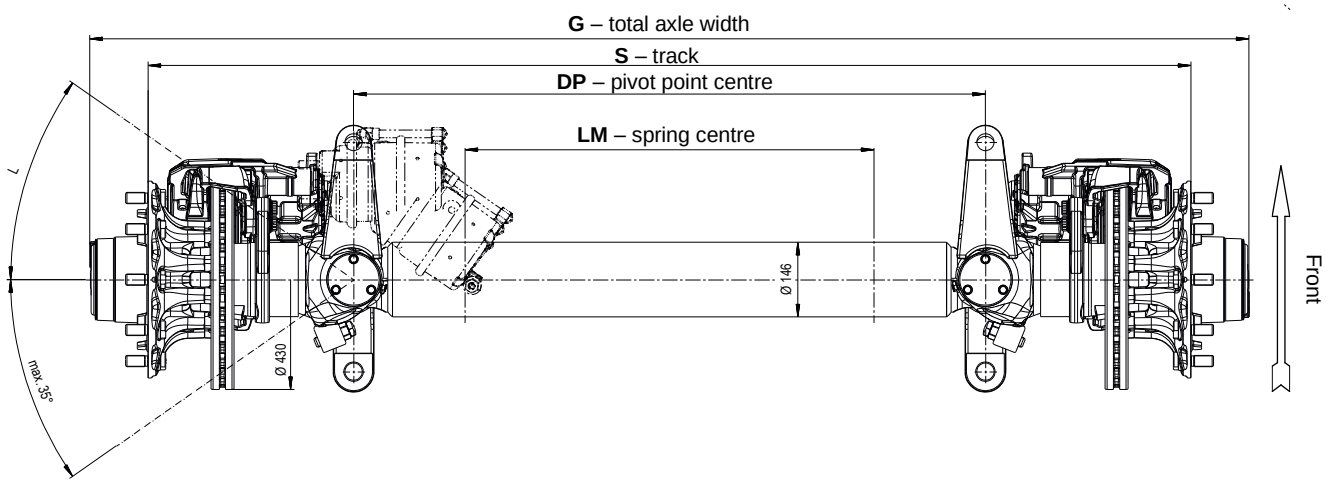
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

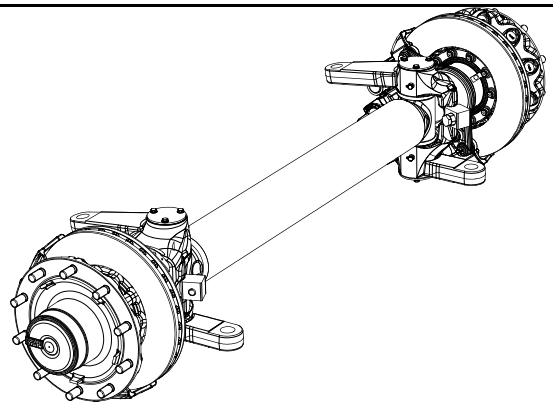
The axles prepared for an electric steering system are extra equipped with a tie-rod at the front and steering limiter. Also, the pivot pin is prepared for the installation of an angle sensor.

All variants on request.

Axle version SIZL11-22K11:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/65R22,5“	G [mm]	DP [mm]	L [°]	weight approx.[2] [kg]
 **SIZL11-22K11 /** SBK2243 / KNORR, SBK2243K01 / 36101814	2040/800	2238	1236	30	500
	2040/850	2238	1236	23	500
	2090/850	2288	1286	30	504
	2090/900	2288	1286	23	504

1) **AX** = **S**
2) without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

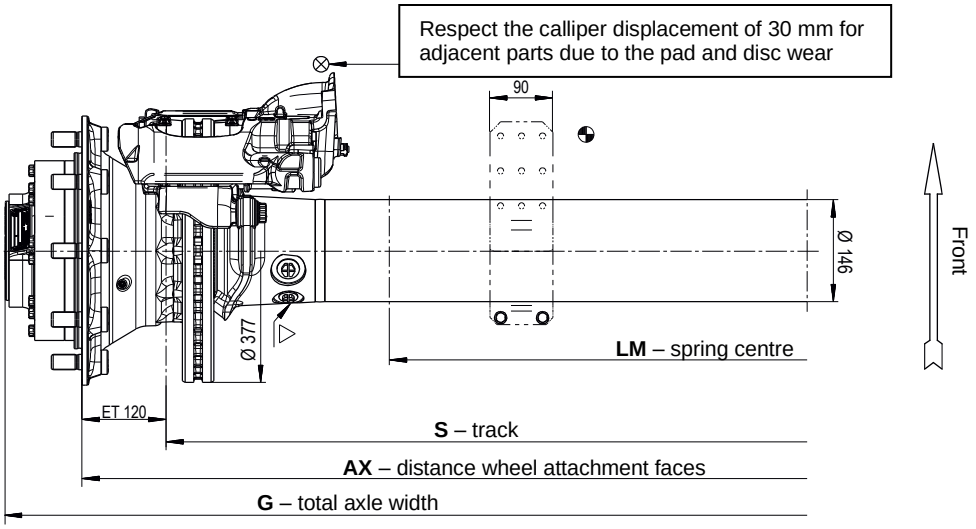
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, especially for the motion of the tires during steering. This should be at least **25** mm.

The axles prepared for an electric steering system are extra equipped with a tie-rod at the front and steering limiter. Also, the pivot pin is prepared for the installation of an angle sensor.

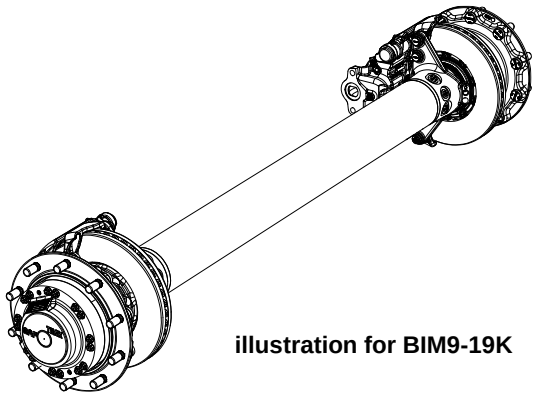
All variants on request.

Axle version BIM9-.....:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **MT**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



- Support bracket for hydraulic hoses as an option available

axle version/ axle type / brake/ test report	AX / LM [mm] tyre (example): 385/65R22,5“	S [1] / LM [mm]	G [2] [mm]	Additional weight approx.[3] [kg]
 **illustration for BIM9-19K**	2210/1100	1970/1100	2430	149
	2210/1200	1970/1200	2430	149
	2280/1200	2040/1200	2500	149
	2280/1300 [3]	2040/1300 [3]	2500	149
BIM9-19S / SBS1937 / SAF, SBS1918 / TDB0870 **BIM9-19K /** SBK1937- / KNORR, SBK1937 / TDB0605 **BIM9-22S /** SBS2243 / SAF, SBS2220 / TDB0843 **BIM9-22S01 /** SBS2243 / SAF, SBS2220K0 / 36102214	2330/1300	2090/1300	2550	149

1) **S** = **AX** – 2 x **ET** (**120** mm)
2) Additional weight to the respective non-driven axle. Without spring seats, brake chambers and wheel nuts (spring seats are enclosed in the air suspension).
Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
4) with tyres **385/65R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

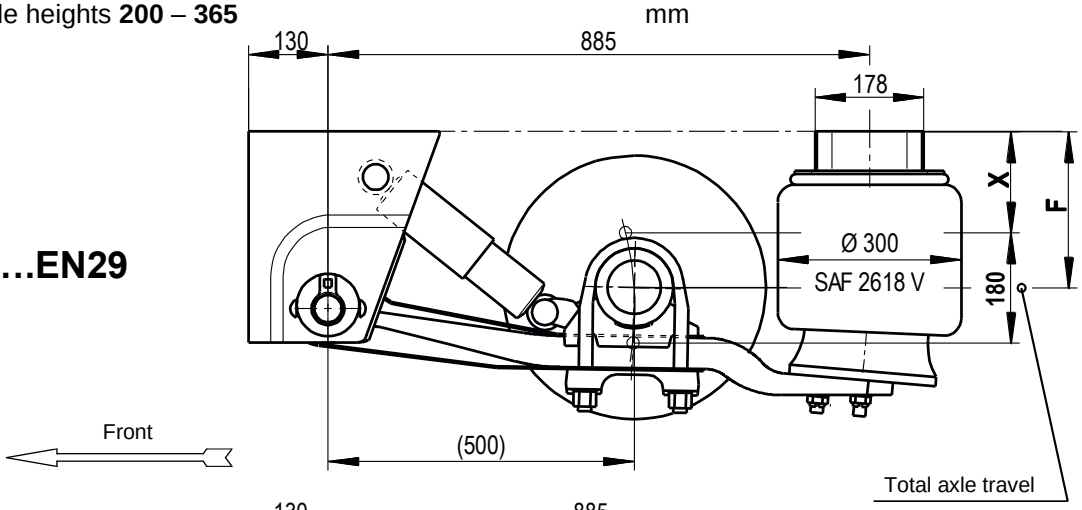
Δ – see the installation guide on: http://saf-intra-cd-trak.safholland.de
And also the recommendations for the technical requirements on the SAF TRAK axle

Further variants on request.

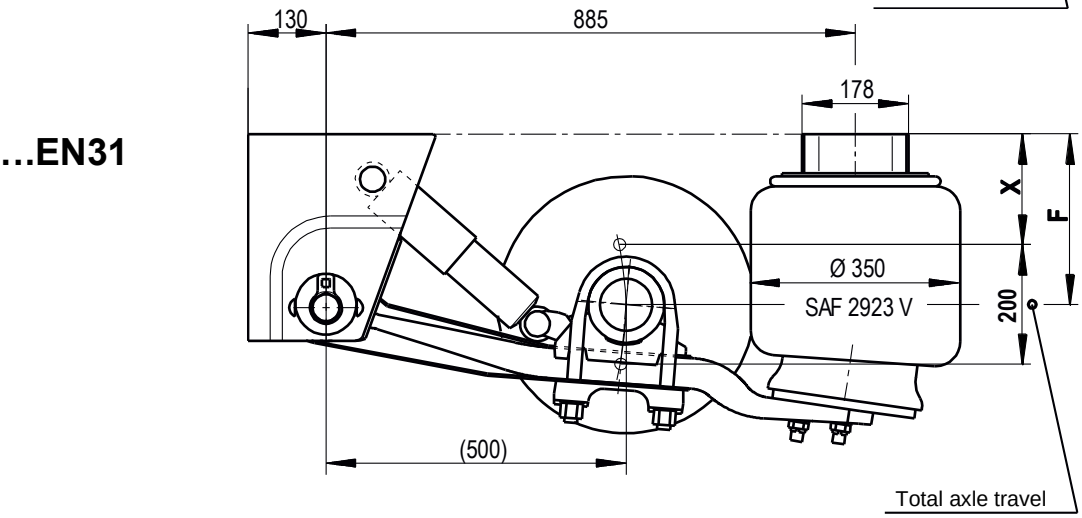
Air suspension serie U;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)

Nominal ride heights **200** – **365** mm

U../….EN29



U../….EN31



air suspension type	**F**; nominal ride height	for axles with an axle beam **146 mm**				for axles with an axle beam **127 mm**			
		ride height range	**X**; overall height [1] unladen without air	**X**; overall height [1] laden without air	weight approx.[2]	ride height range	**X**; overall height [1] unladen without air	**X**; overall height [1] laden without air	weight approx.[2]
	[mm]	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[kg]
U20/2500EN29	200	180-220	110	95	173	185-225	115	100	172
U22/2504EN29	220	200-240	130	115	174	210-250	140	125	173
U24/2904EN29	240	220-260	150	135	177	225-265	155	140	176
U25/2907EN29	255	235-275	165	150	178	240-280	170	155	177
U27/2910EN29	270	250-290	180	165	179	260-300	190	175	178
U30/3510EN29	300	280-320	210	195	184	290-330	220	205	183
U31/3513EN29	315	295-335	225	210	185	305-345	235	220	184
U33/3516EN29	335	315-355	245	230	186	320-360	250	235	185
U23/2500EN31	235	205-265	135	120	188	210-270	140	125	187
U25/2504EN31	255	225-285	155	140	189	230-290	160	145	188
U27/2904EN31	270	240-300	170	155	192	250-310	180	165	191
U28/2907EN31	290	260-320	190	175	193	265-325	195	180	192
U30/2910EN31	305	275-335	205	190	194	285-345	215	200	193
U33/3510EN31	335	305-365	235	220	199	310-370	240	225	198
U35/3513EN31	350	320-380	250	235	200	330-390	260	245	199
U36/3516EN31	365	335-395	265	250	201	345-405	275	260	200

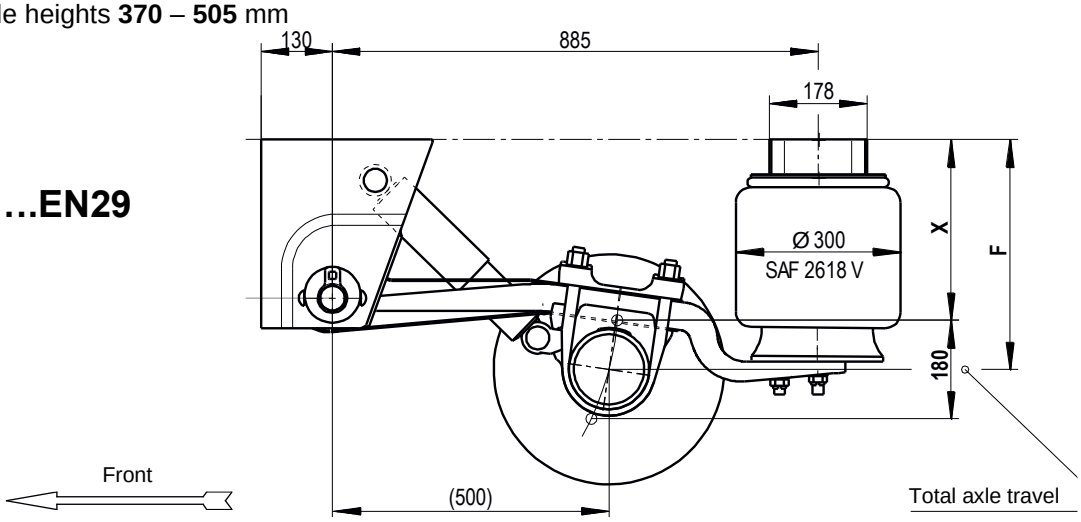
1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

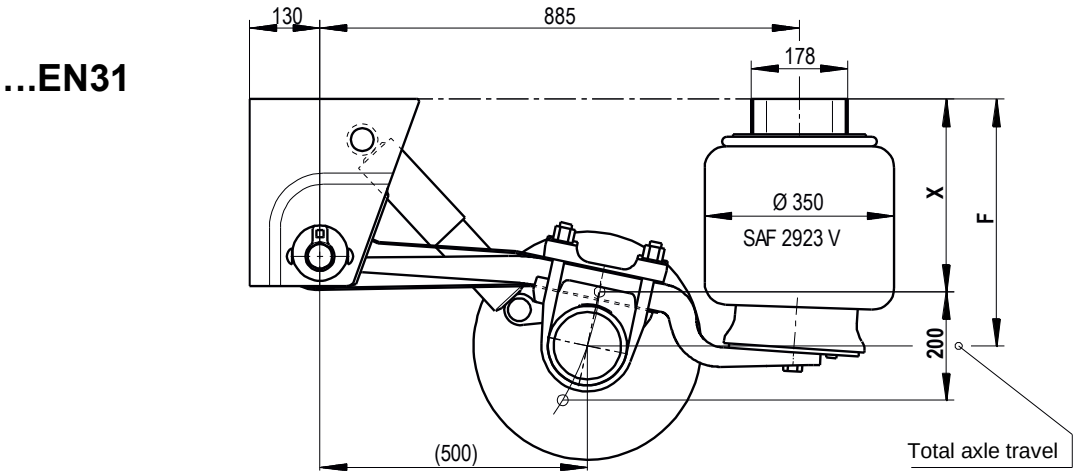
Air suspension serie M;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)

Nominal ride heights **370** – **505** mm

M../….EN29



M../….EN31



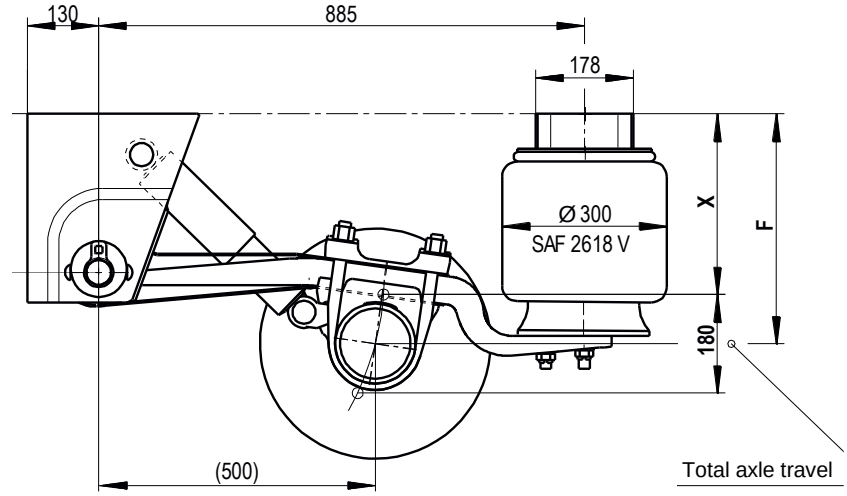
air suspension type	**F**; nominal ride height [mm]	for axles with an axle beam **146 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	laden without air [mm]	weight approx.[2] [kg]	for axles with an axle beam **127 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	laden without air [mm]	weight approx.[2] [kg]
M36/2500EN29	370	350-390	280	265	176	345-385	275	260	175
M38/2504EN29	390	370-410	300	285	177	365-405	295	280	176
M40/2904EN29	410	390-430	320	305	180	380-420	310	295	179
M42/2907EN29	425	405-445	335	320	181	395-435	325	310	180
M43/2910EN29	445	425-465	355	340	182	415-455	345	330	181
M46/3510EN29	470	450-490	380	365	187	440-480	370	355	186
M40/2500EN31	405	375-435	305	290	191	370-430	300	285	190
M42/2504EN31	425	395-455	325	310	192	390-450	320	305	191
M43/2904EN31	445	415-475	345	330	195	405-465	335	320	194
M45/2907EN31	460	430-490	360	345	196	420-480	350	335	195
M47/2910EN31	480	450-510	380	365	197	440-500	370	355	196
M50/3510EN31	505	475-535	405	390	202	465-525	395	380	201

1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

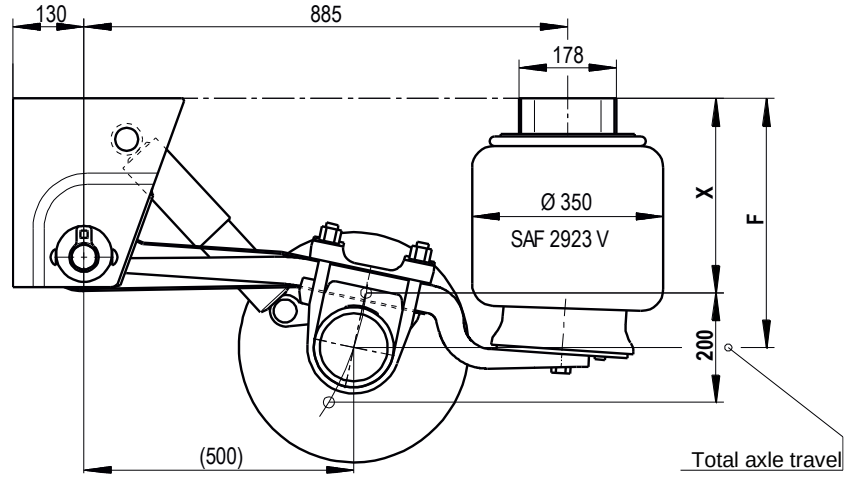
Air suspension serie EO;
Single leaf trailing arm (EN) 52 mm with air bag 2618V (29) or 2923V (31)
Nominal ride heights **420** – **555** mm

EO../….EN29



Front

EO../….EN31



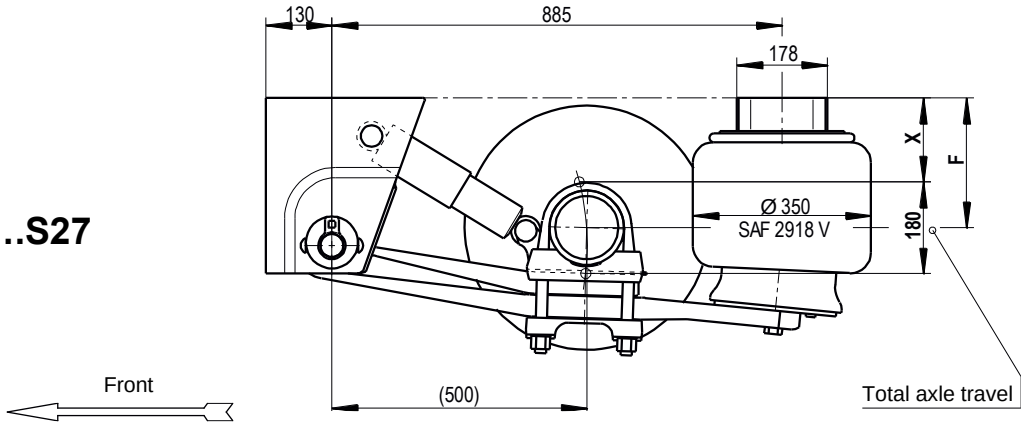
air suspension type	**F**; nominal ride height [mm]	for axles with axle beam **146 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	laden without air [mm]	weight approx.[2] [kg]
EO41/2500EN29	420	400-440	330	315	174
EO42/2900EN29	435	415-455	345	330	177
EO44/2904EN29	455	435-475	365	350	178
EO47/3504EN29	480	460-500	390	375	183
EO49/3507EN29	500	480-520	410	395	184
EO50/3510EN29	520	500-540	430	415	185
EO44/2500EN31	455	425-485	355	340	189
EO46/2900EN31	470	440-500	370	355	192
EO48/2904EN31	495	465-525	395	380	193
EO50/3504EN31	515	485-545	415	400	198
EO52/3507EN31	535	505-565	435	420	199
EO54/3510EN31	555	525-585	455	440	200

1) The data in the table corresponds with an air bag offset (**V**) of **0, 30, 55** or **70** mm.
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

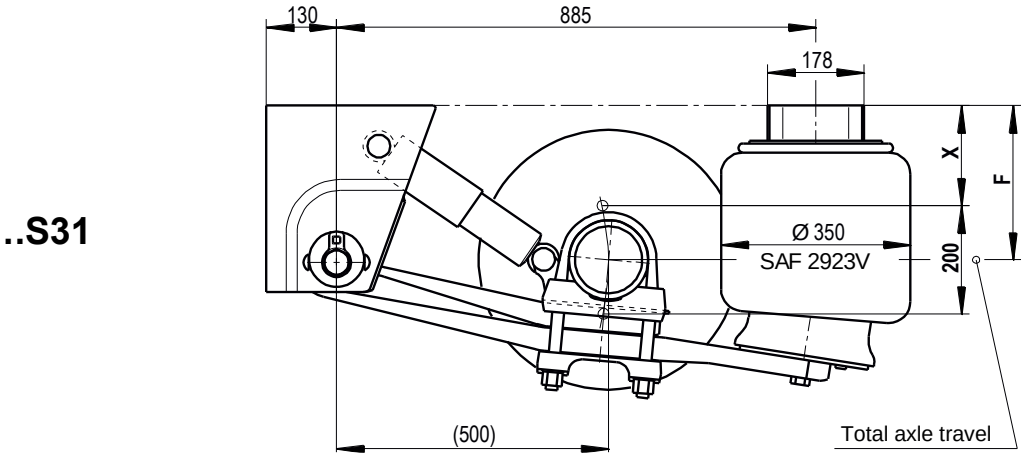
Further variants on request.

Air suspension serie U;
Double leaf trailing arm (S) 43/43 mm with air bag 2918V (27) or 2923V (31)
Nominal ride heights **205** – **365** mm

U../….S27



U../….S31



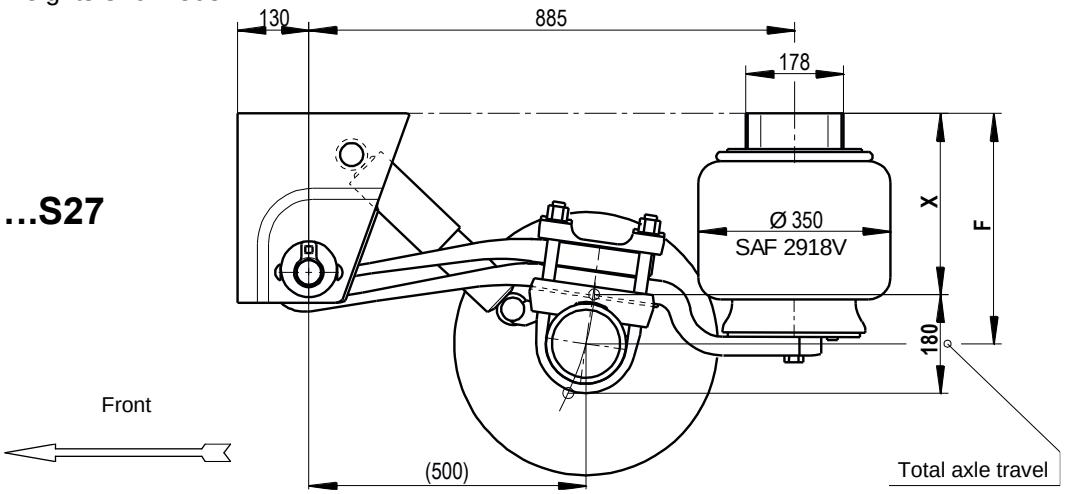
air suspension type	**F**; nominal ride height [mm]	for axles with axle beam **146 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx.[2] [kg]	for axles with axle beam **127 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	**X**; overall height [1] laden without air [mm]	weight approx.[2] [kg]
U20/2500S27	205	185-225	115	105	203	190-230	120	110	202
U22/2504S27	220	200-240	130	120	204	210-250	140	130	203
U24/2904S27	240	220-260	150	140	207	230-270	160	150	206
U25/2907S27	255	235-275	165	155	208	245-285	175	165	207
U27/2910S27	275	255-295	185	175	209	265-305	195	185	208
U30/3510S27	300	280-320	210	200	214	290-330	220	210	213
U31/3513S27	320	300-340	230	220	215	310-350	240	230	214
U33/3516S27	335	315-355	245	235	216	325-365	255	245	215
U23/2500S31	235	205-265	135	125	205	215-275	145	135	204
U25/2504S31	255	225-285	155	145	206	235-295	165	155	205
U27/2904S31	275	245-305	175	165	209	250-310	180	170	208
U28/2907S31	290	260-320	190	180	210	270-330	200	190	209
U30/2910S31	305	275-335	205	195	211	285-345	215	205	210
U33/3510S31	335	305-365	235	225	216	315-375	245	235	215
U35/3513S31	350	320-380	250	240	217	330-390	260	250	216
U36/3516S31	365	340-400	270	260	218	350-410	280	270	217

1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

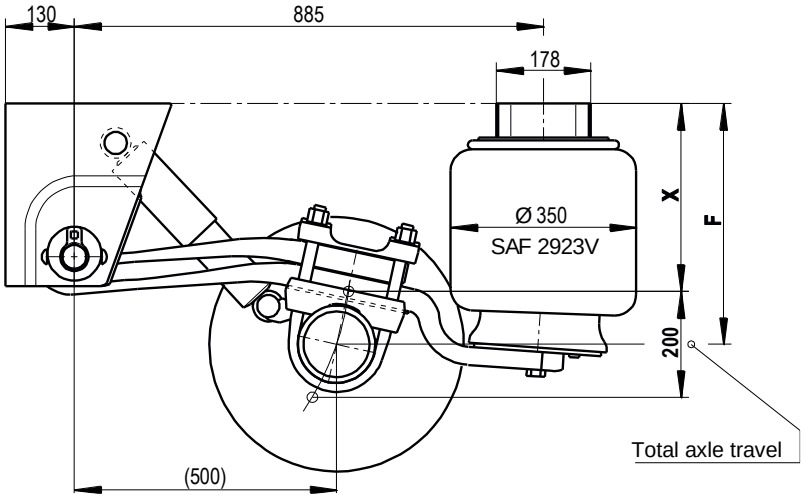
Further variants on request.

Air suspension serie M;
Double leaf trailing arm (S) 43/43 mm with air bag 2918V (27) or 2923V (31)
Nominal ride heights **370** – **505** mm

M../….S27



M../….S31



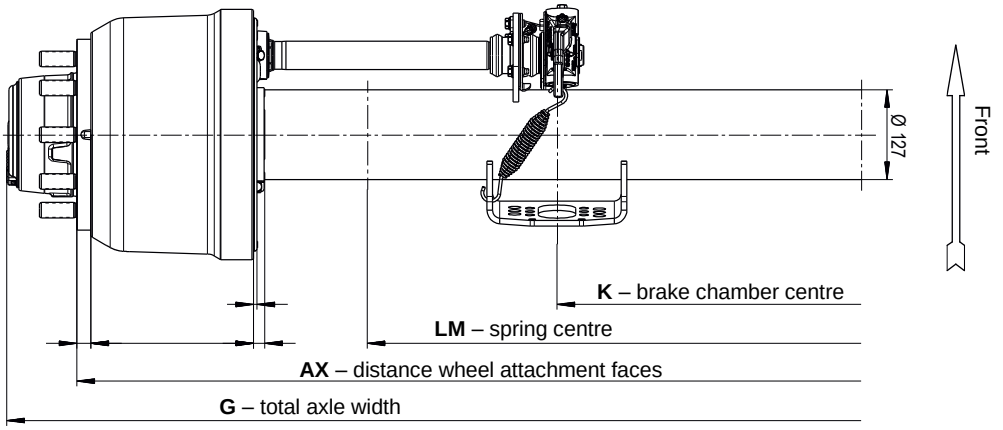
air suspension type	**F**; nominal ride height [mm]	for axles with axle beam **146 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	laden without air [mm]	weight approx.[2] [kg]	for axles with axle beam **127 mm** ride height range [mm]	**X**; overall height [1] unladen without air [mm]	laden without air [mm]	weight approx.[2] [kg]
M36/2500S27	370	350-390	280	270	209	340-380	270	260	208
M38/2504S27	390	370-410	300	290	210	360-400	290	280	209
M40/2904S27	410	390-430	320	310	213	380-420	310	300	212
M42/2907S27	425	405-445	335	325	214	395-435	325	315	213
M43/2910S27	445	425-465	355	345	215	415-455	345	335	214
M46/3510S27	470	450-490	380	370	220	440-480	370	360	219
M40/2500S31	405	375-435	305	295	211	365-425	295	285	210
M42/2504S31	425	395-455	325	315	212	385-445	315	305	211
M43/2904S31	440	410-470	340	330	215	400-460	330	320	214
M45/2907S31	460	430-490	360	350	216	420-480	350	340	215
M47/2910S31	475	445-505	375	365	217	435-495	365	355	216
M50/3510S31	505	475-535	405	395	222	465-525	395	385	221

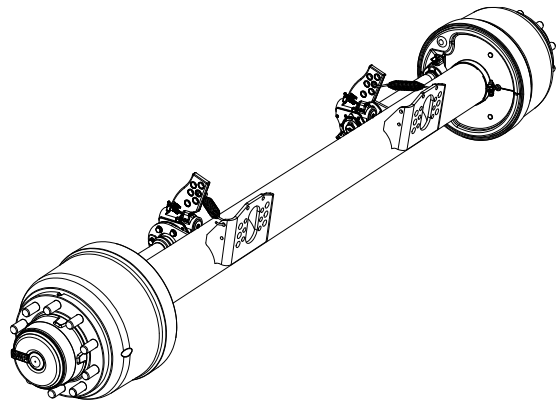
1) The data in the table corresponds with an air bag offset (**V**) of **0** or **30** mm, with **V** = **55** mm or **V** = **70** mm the overall height **X** is increased by **5** mm (so changes the ride height range accordantly)
2) Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Further variants on request.

Axle version S7-3015:

Axle load maximum: **7.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example) 285/70R19,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S7-3015 /** SNK3015 / SNK300x150 / TDB0622	1970/1200	2168	611	267
	2040/1200	2238	681	269
	2040/1300	2238	681	269
	2090/1300	2288	731	271
	2140/1300	2338	781	273
	2140/1400	2338	781	273
	2200/1460	2398	841	275

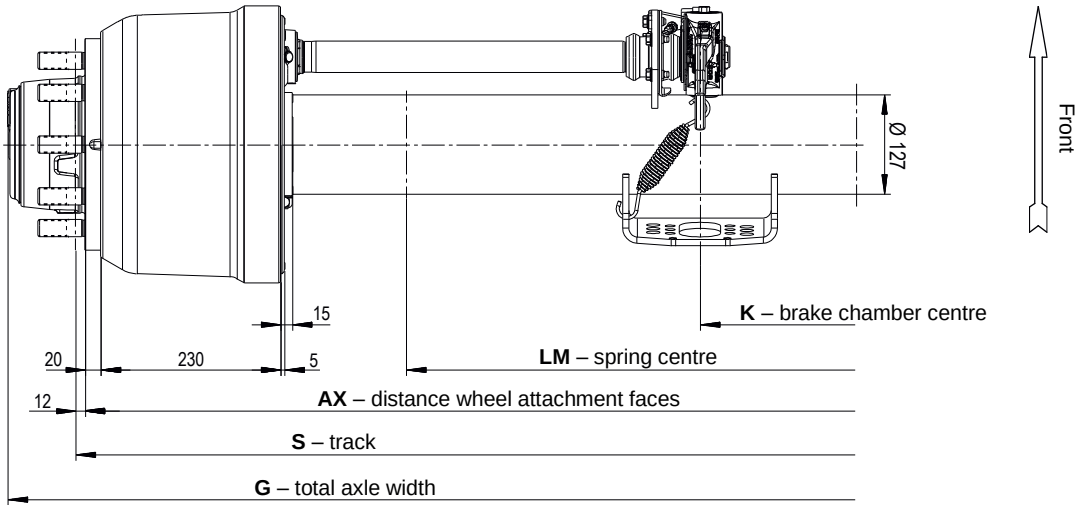
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

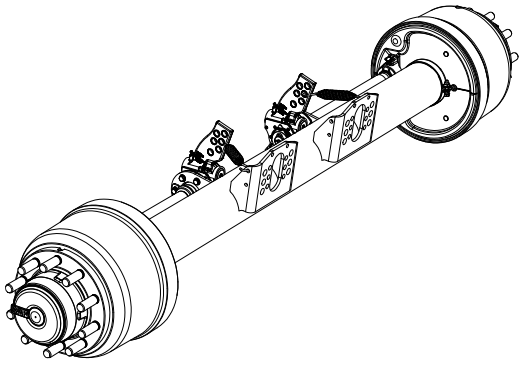
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z7-3015:

Axle load maximum: **7.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm



axle version / axle type / brake / test report	AX / LM [mm]	S 1) / LM [mm]	G [mm]	K [mm]	Weight approx.2) [kg]
	tyre (example): 205/65R17,5“				
 **Z7-3015** / SNK3015 / SNK 300x150 / TDB0623	1806/900	1830/900	2004	232	260
	1806/980	1830/980	2004	232	260
	1860/980	1884/980	2058	286	262
	1860/1050	1884/1050	2058	286	262
	1926/1050	1950/1050	2124	352	264
	1926/1100	1950/1100	2124	352	264
	1970/1100	1994/1100	2168	396	266
	1970/1150	1994/1150	2168	396	266

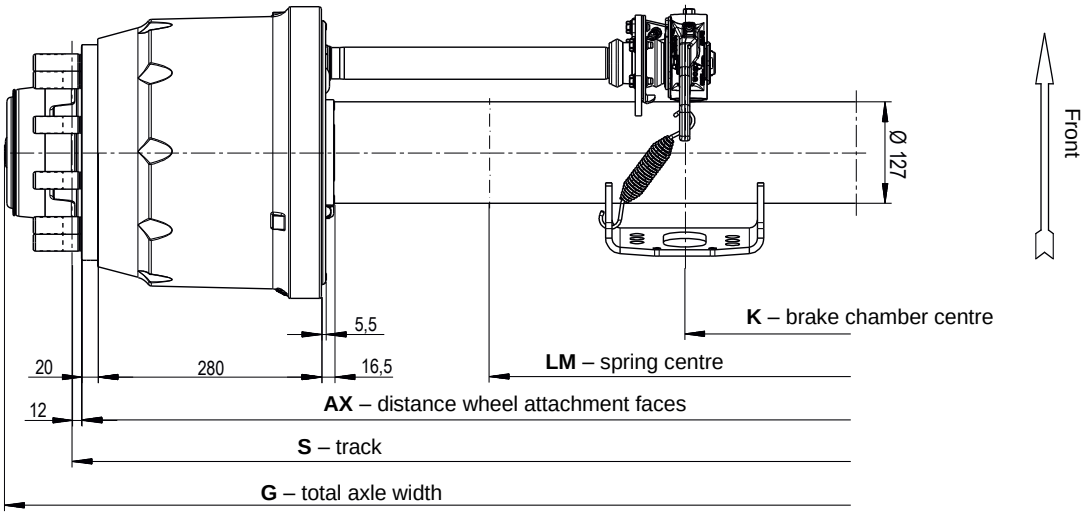
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

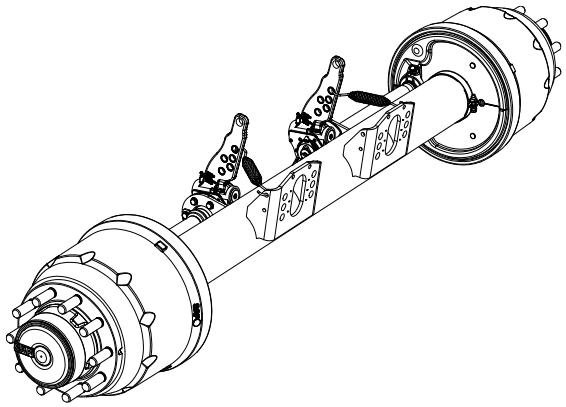
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z9-3020:

Axle load maximum: **9.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	K [mm]	weight approx.[2] [kg]
	tyre (example): 235/75R17,5“				
 **Z9-3020 /** SNK3020 / SNK300x200 / TDB0487	1806/900	1830/900	2004	220	284
	1806/980 [3]	1830/980 [3]	2004	220	284
	1860/980	1884/980	2058	274	286
	1860/1050 [3]	1884/1050 [3]	2058	274	286
	1926/1050	1950/1050	2124	340	288
	1926/1100 [3]	1950/1100 [3]	2124	340	288
	1971/1100	1995/1100	2179	385	291
	1971/1150 [3]	1995/1150 [3]	2179	385	291

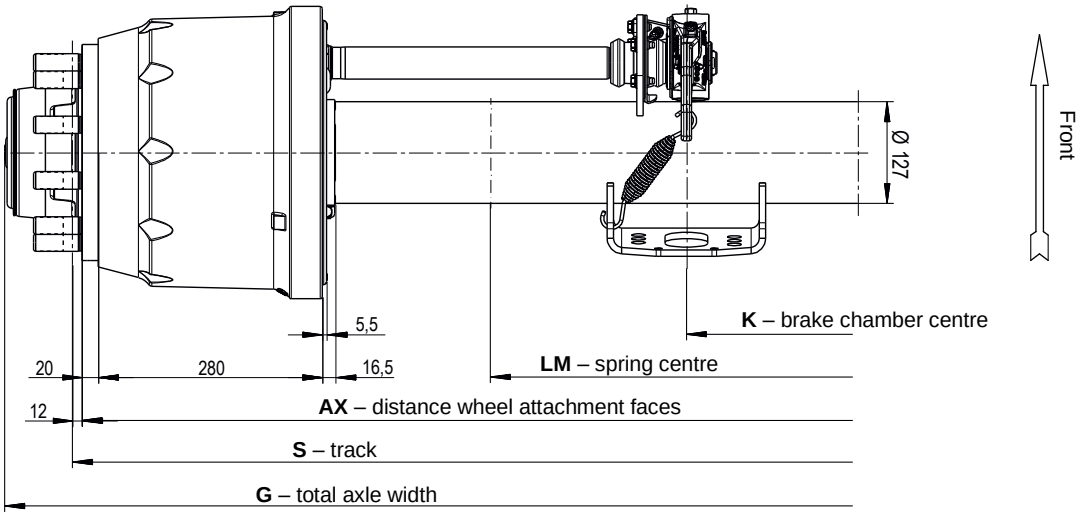
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **235/75R17,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

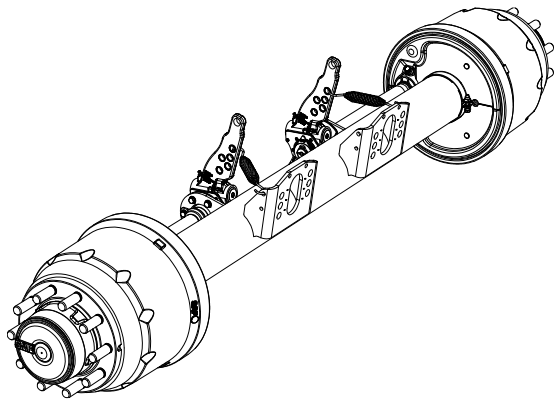
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z11-3020:

Axle load maximum: **11.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	K [mm]	weight approx.[2] [kg]
	tyre (example): 235/75R17,5“				
 **Z11-3020 /** SNK3020 / SNK300x200 / TDB0487	1806/900 [3]	1830/900 [3]	2004	220	305
	1806/980 [4]	1830/980 [4]	2004	220	305
	1860/980 [3]	1884/980 [3]	2058	220	307,5
	1860/1050 [4]	1884/1050 [4]	2058	220	307,5
	1926/1050 [3]	1950/1050 [3]	2124	286	311
	1926/1100 [4]	1950/1100 [4]	2124	286	311
	1971/1100 [3]	1995/1100 [3]	2179	331	314
	1971/1150 [4]	1995/1150 [4]	2179	331	314

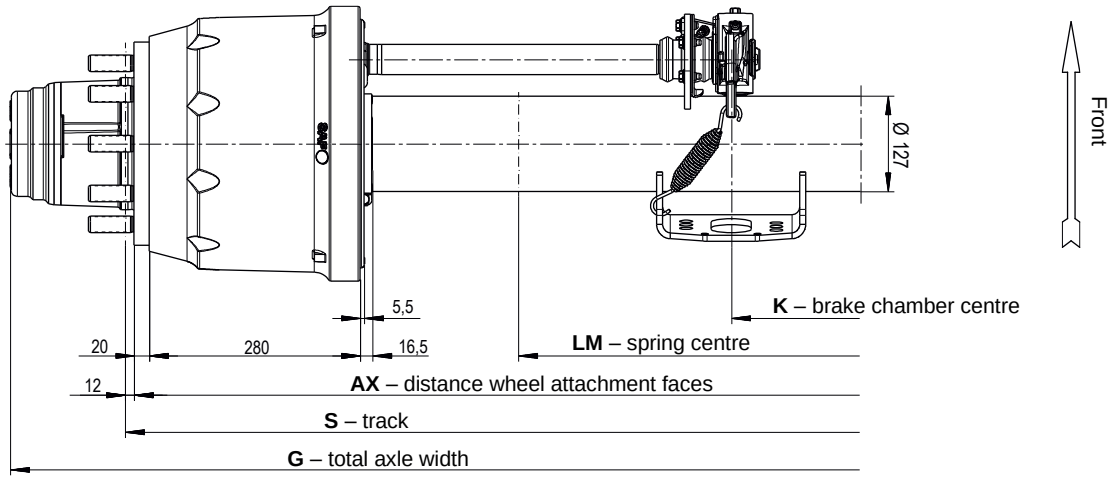
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **235/75R17,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **235/75R17,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

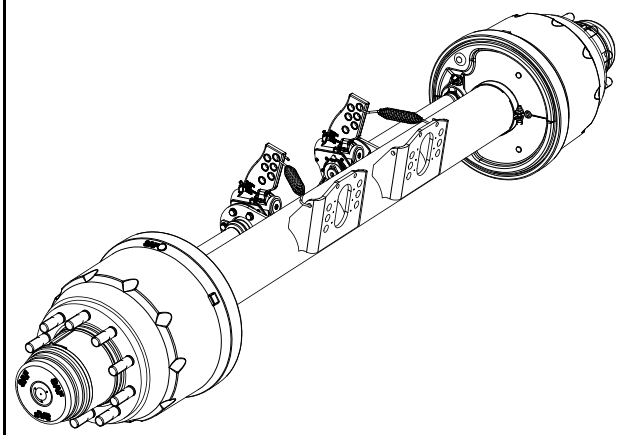
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SKRZ12030S:

Axle load maximum: **12.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	K [mm]	weight approx.[2] [kg]
	tyre (example): 245/70R17,5“				
 **SKRZ12030S /** SNK3020 / SNK300x200S / TDB0882	1806/900 [3]	1830/900 [3]	2135	220	320
	1806/980 [4]	1830/980 [4]	2135	220	320
	1860/980 [3]	1884/980 [3]	2189	220	322,5
	1860/1050 [4]	1884/1050 [4]	2189	220	322,5
	1926/1050 [3]	1950/1050 [3]	2255	286	326
	1926/1100 [4]	1950/1100 [4]	2255	286	326
	1971/1100 [3]	1995/1100 [3]	2300	331	329
	1971/1150 [4]	1995/1150 [4]	2300	331	329

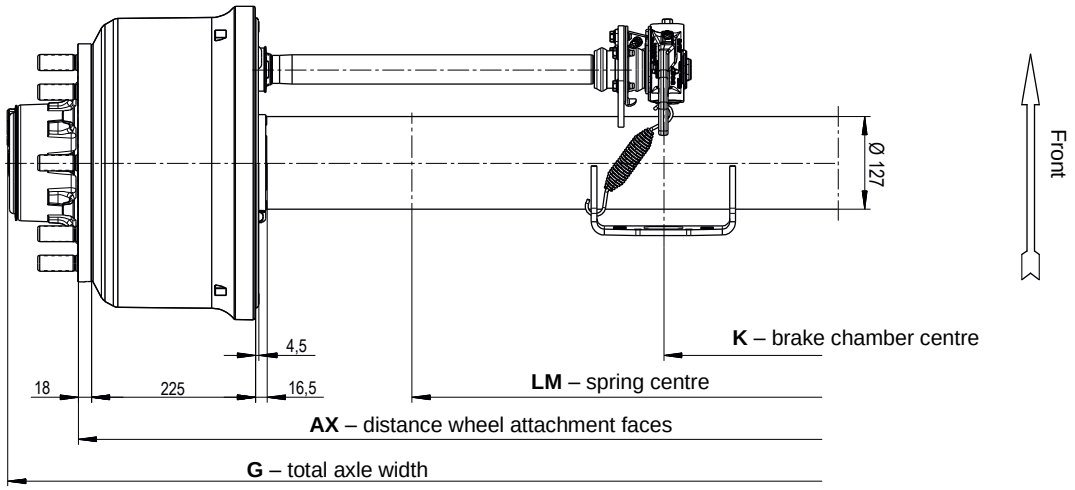
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **245/70R17,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **245/70R17,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

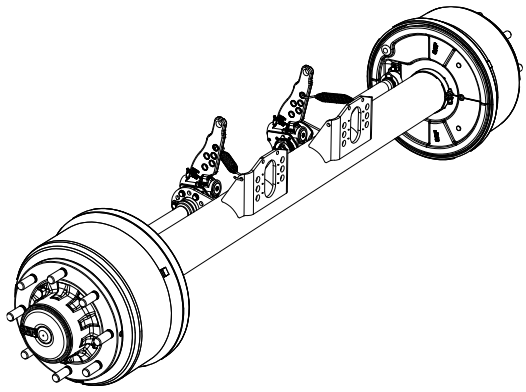
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S9-3718:

Axle load maximum: **9.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm or **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/55R19,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S9-3718** / SNK3718 / SNK367x180 / TDB0459	1970/1100	2168	364	279
	1970/1200 [3]	2168	364	279
	2040/1200	2238	434	281
	2040/1300 [3]	2238	434	281
	2090/1300	2288	484	282

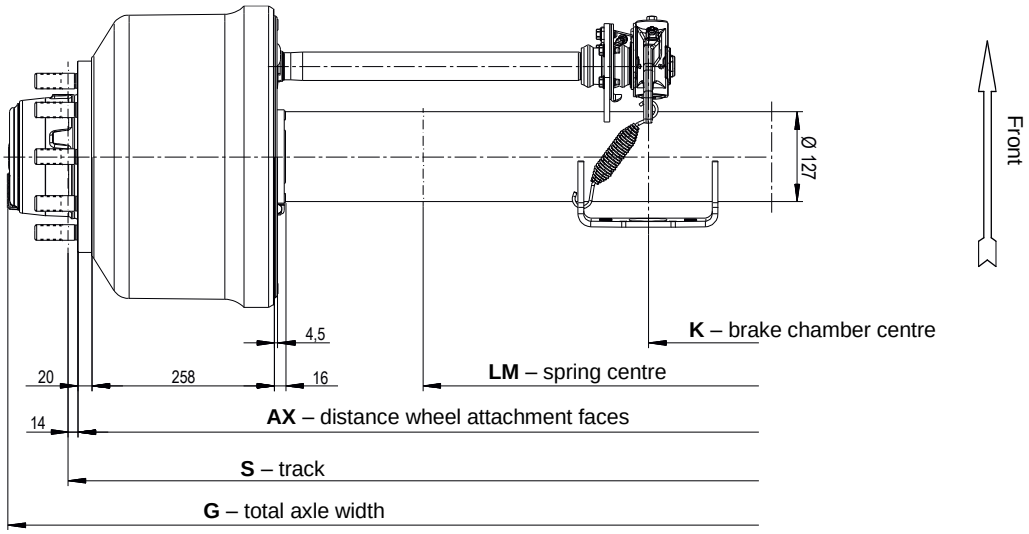
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **425/55R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

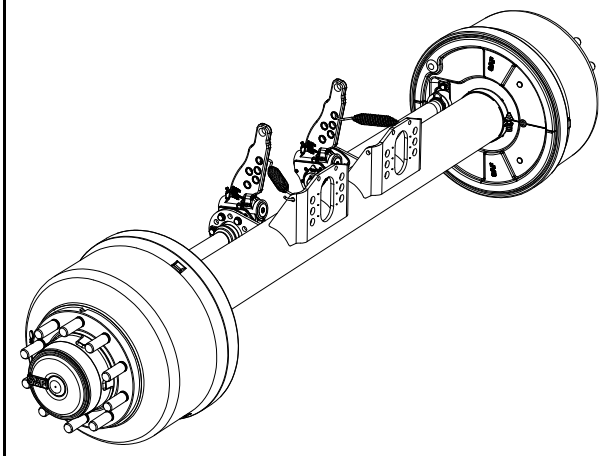
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z9-3720:

Axle load maximum: **9.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm or **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx.[2] [kg]
	tyre (example): 245/70R19,5“				
 **Z9-3720 /** SNK3720 / SNK367x200 / TDB0460	1806/900	1834/900	2004	250	296
	1806/980 [3]	1834/980 [3]	2004	250	296
	1860/950	1888/950	2058	246	298
	1860/1020 [3]	1888/1020 [3]	2058	246	298
	1926/1020	1954/1020	2124	312	302
	1926/1050	1954/1050	2124	312	302
	1926/1100 [3]	1954/1100 [3]	2124	312	302

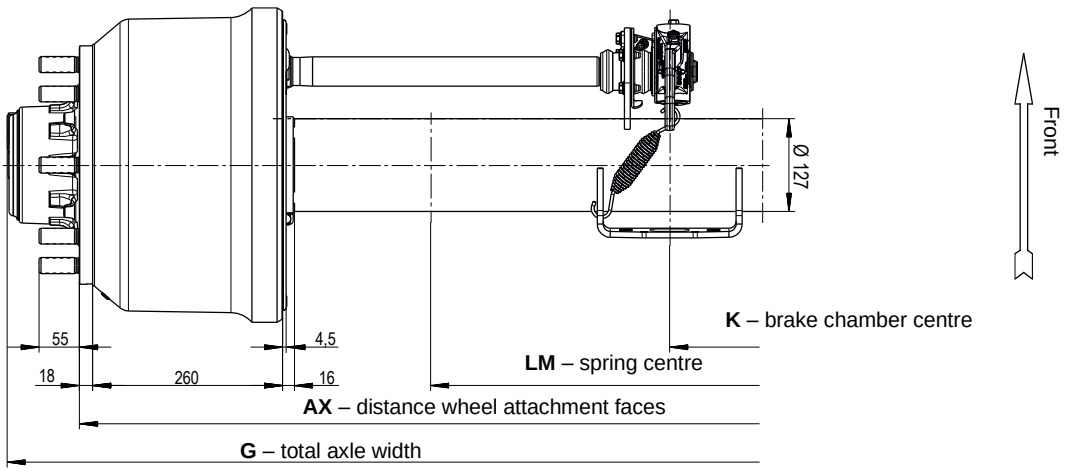
1) **S** = **AX** + 2 x wheel disc thickness (standard 14 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **245/70R19,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

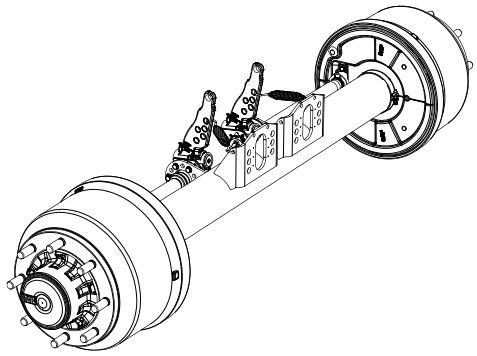
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S11-3720:

Axle load maximum: **11.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 445/65R19,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S11-3720 /** SNK3720 / SNK367x200 / TDB0460	1970/1100 [3]	2168	414	329
	1970/1200 [4]	2168	414	329
	2040/1200 [3]	2238	484	332
	2040/1260 [4]	2238	484	332

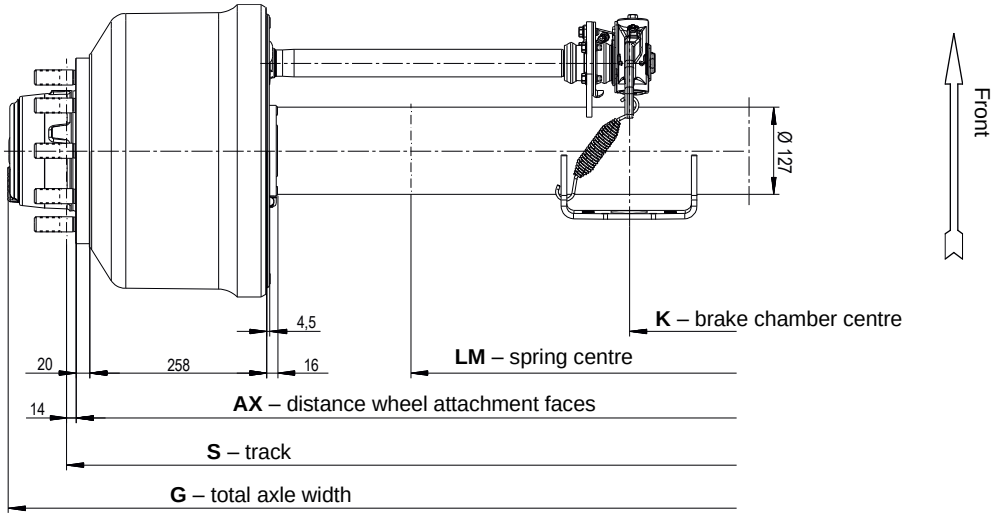
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **445/65R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **445/65R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

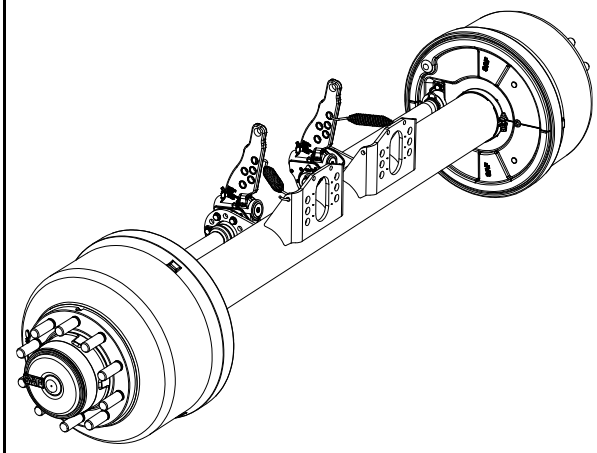
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z11-3720:

Axle load maximum: **11.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm or **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 265/70R19,5“				
 **Z11-3720 /** SNK3720 / SNK367x200 / TDB0460	1806/900	1834/900	2004	250	320
	1806/980 [4]	1834/980 [4]	2004	250	320
	1860/950	1888/950	2058	246	323
	1860/1020 [3]	1888/1020 [3]	2058	246	323
	1926/1020	1954/1050	2124	312	328
	1926/1050 [3]	1954/1050 [3]	2124	312	328
	1926/1100 [4]	1954/1100 [4]	2124	312	328

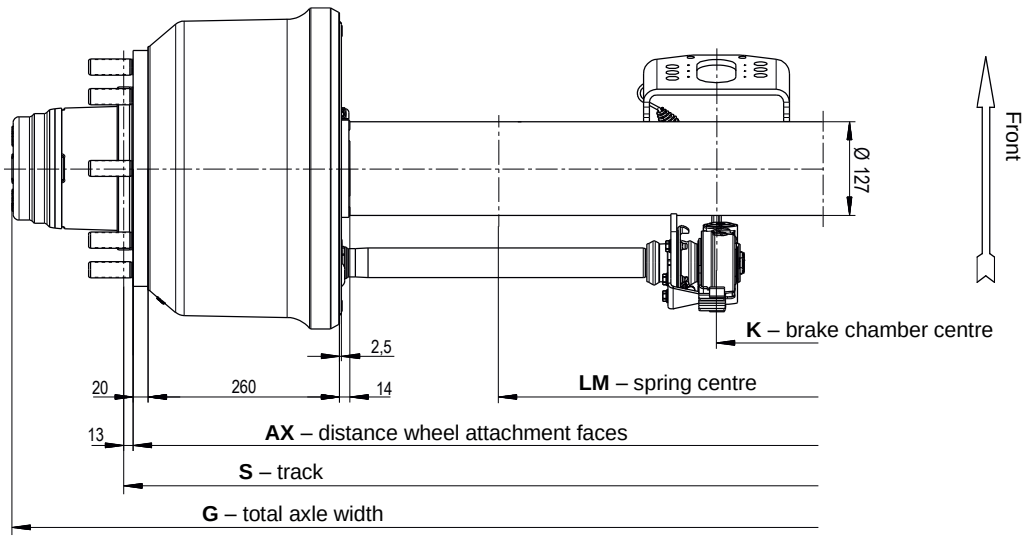
1) **S** = **AX** + 2 x wheel disc thickness (standard 14 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **265/70R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **265/70R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

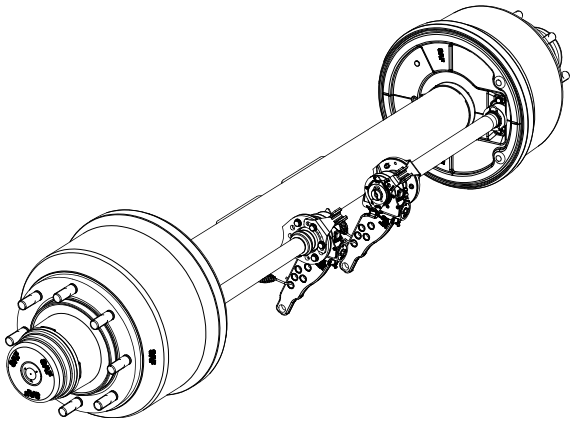
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SKRZ12037:

Axle load: **12.000** kg
Axle beam **Ø 127** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 285/70R19,5“				
 **SKRZ12037 /** SNK3720 / SNK367x200 / TDB0460	1806/900 [3]	1832/900 [3]	2135	250	335
	1806/980 [5]	1832/980 [5]	2135	250	335
	1860/950 [3]	1886/950 [3]	2189	246	338
	1860/1020 [5]	1886/1020 [5]	2189	246	338
	1926/1020 [3]	1952/1020 [3]	2255	312	343
	1926/1050 [4]	1952/1050 [4]	2255	312	343
	1926/1100 [5]	1952/1100 [5]	2255	312	343

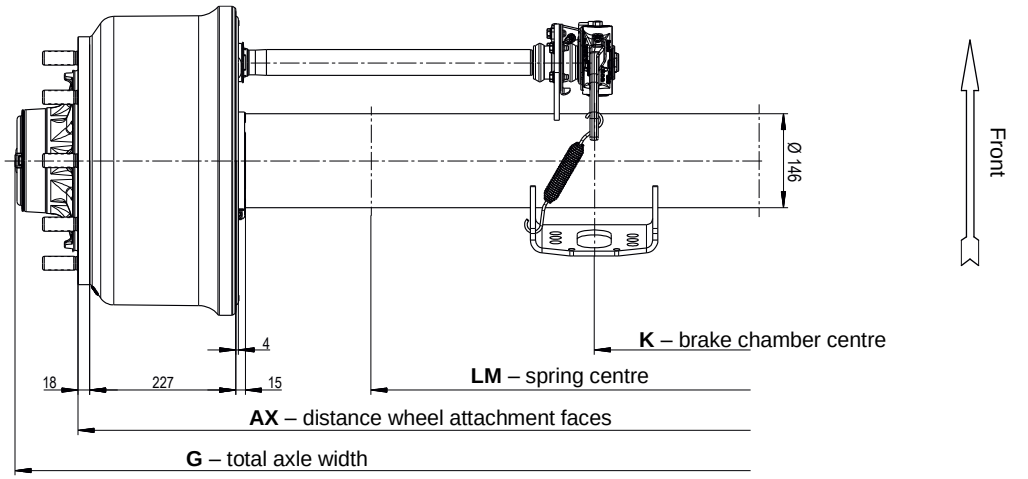
1) **S** = **AX** + 2 x wheel disc thickness (standard 13 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **285/70R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **285/70R19,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) with tyres **285/70R19,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

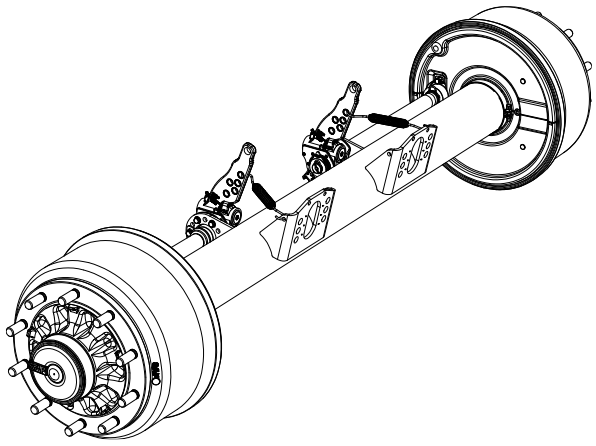
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S9-4218:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S9-4218** / SNK4218 / SNK420x180 / TDB0381	1970/1100	2168	366	291
	1970/1200	2168	366	291
	2040/1200	2238	436	293
	2040/1300 [3]	2238	436	293
	2090/1300	2288	486	295
	2140/1300	2338	536	297
	2140/1400 [3]	2338	536	297

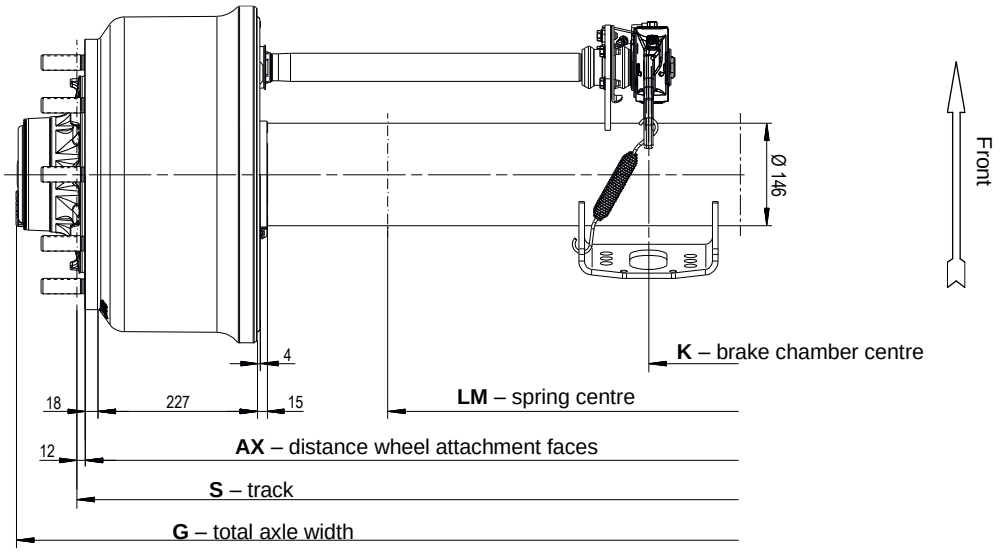
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **385/65R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

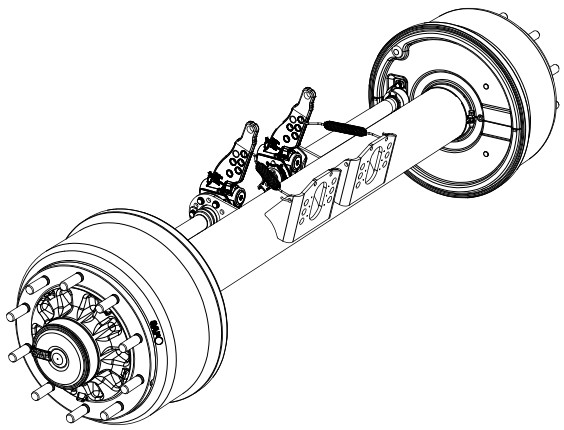
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z9-4218:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 255/70R22,5“				
 **Z9-4218** / SNK4218 / SNK420x180 / TDB0483	1820/900	1844/900	2018	216	310
	1820/940	1844/940	2018	216	310
	1860/980	1884/980	2058	256	312
	1896/1020	1920/1020	2094	292	314
	1920/1060 [3]	1944/1060 [3]	2118	316	316

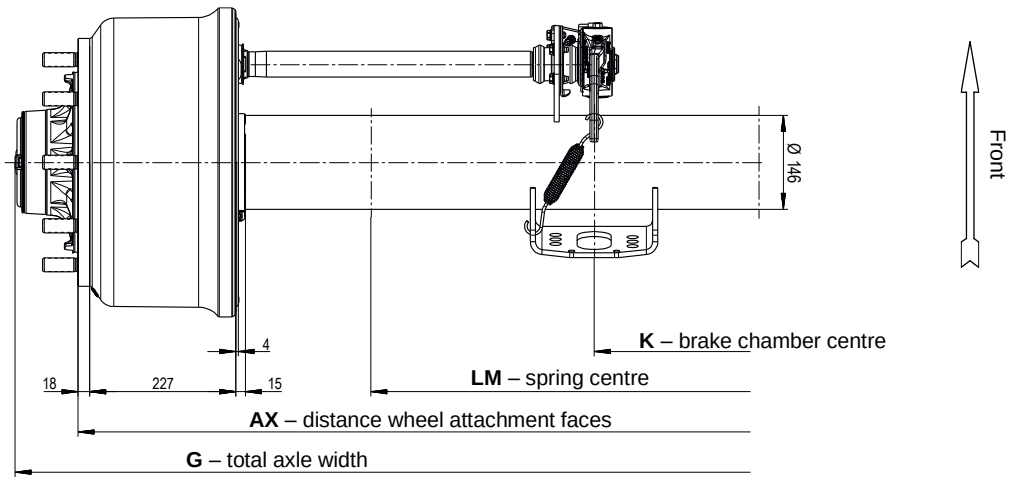
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **255/70R22,5“** and air bag diameter **Ø 300** mm starting at **V** = **30** mm

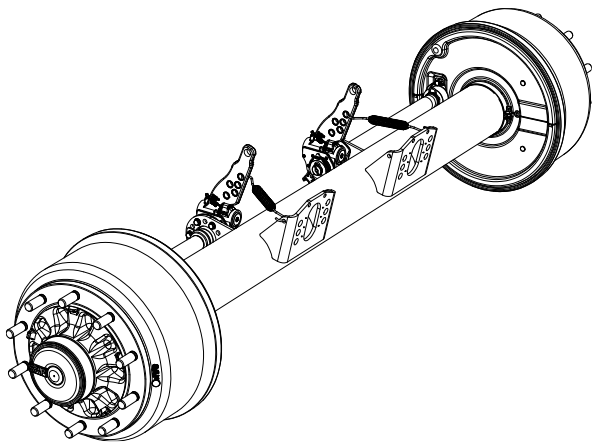
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S10-4218:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S10-4218** / SNK4218 / SNK420x180 / TDB0381	1970/1100	2168	366	302
	1970/1200 [3]	2168	366	302
	2040/1200	2238	436	305
	2040/1300 [4]	2238	436	305
	2090/1300 [3]	2288	486	307
	2140/1300	2338	536	309
	2140/1400 [4]	2338	536	309

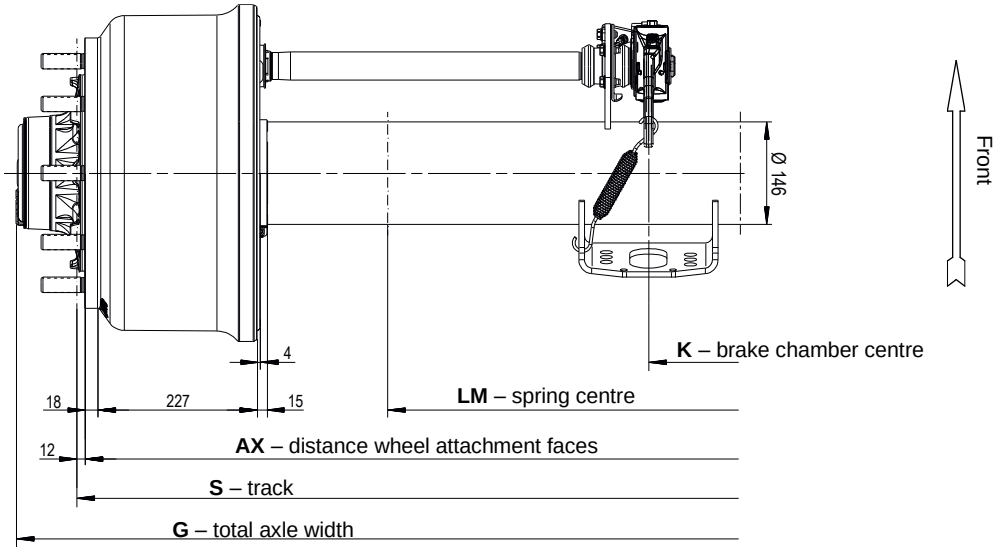
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **385/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

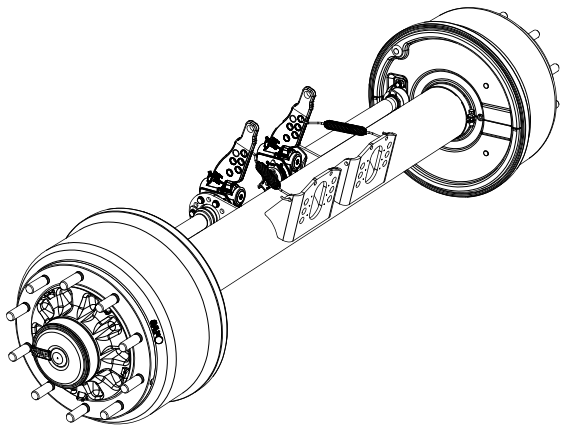
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z10-4218:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 275/70R22,5“				
 **Z10-4218** / SNK4218 / SNK420x180 / TDB0381	1786/900 [3]	1810/900 [3]	1984	224	295
	1820/900 [3]	1844/900 [3]	2018	258	297
	1820/940 [4]	1844/940 [4]	2018	258	297
	1860/980 [4]	1884/980 [4]	2058	256	298
	1896/1020 [4]	1920/1020 [4]	2094	292	299
	1920/1060 [4]	1944/1060 [4]	2118	316	301

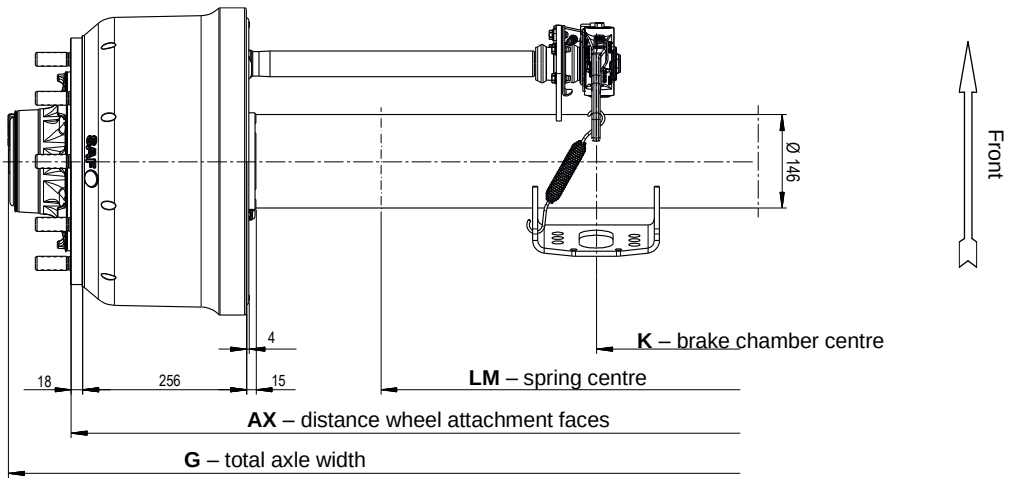
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

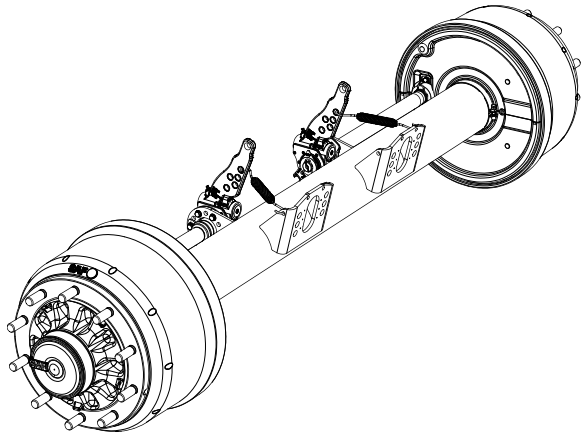
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S10-4220:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/65R22,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S10-4220** / SNK4220 / SNK420x200 / TDB0455	1970/1100	2168	329	317
	1970/1200 [4]	2168	329	317
	2040/1200 [3]	2238	399	320
	2040/1300 [4]	2238	399	320
	2090/1300 [3]	2288	449	322

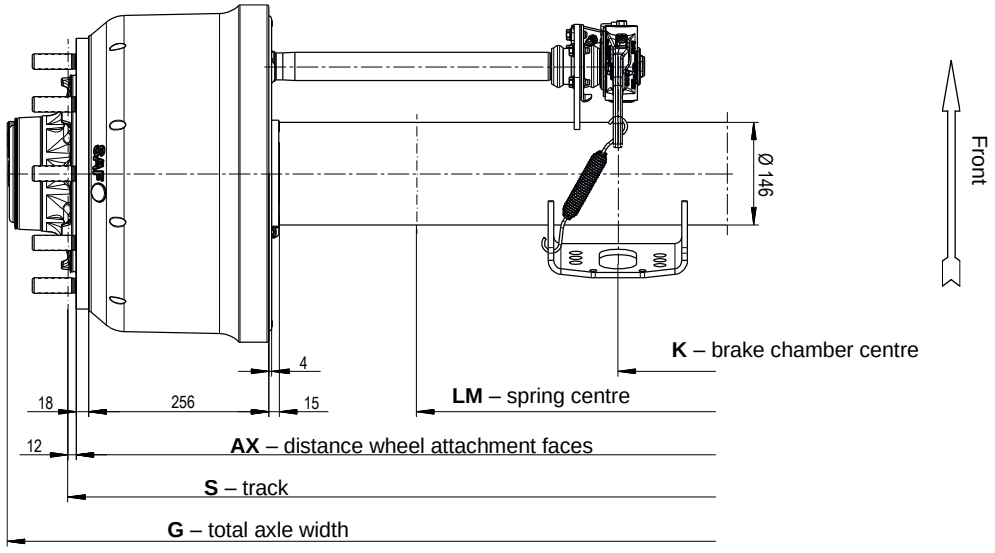
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

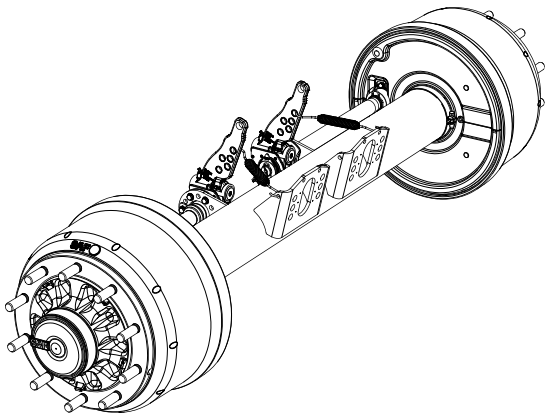
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z10-4220:

Axle load maximum: **10.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M, EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 275/70R22,5“				
 **Z10-4220** / SNK4220 / SNK420x200 / TDB0455	1786/900 [3]	1810/900 [3]	1984	224	310
	1820/900 [3]	1844/900 [3]	2018	258	312
	1820/940 [4]	1844/940 [4]	2018	258	312
	1860/980 [4]	1884/980 [4]	2058	256	313
	1896/1020 [4]	1920/1020 [4]	2094	292	315
	1920/1060 [4]	1944/1060 [4]	2118	316	316

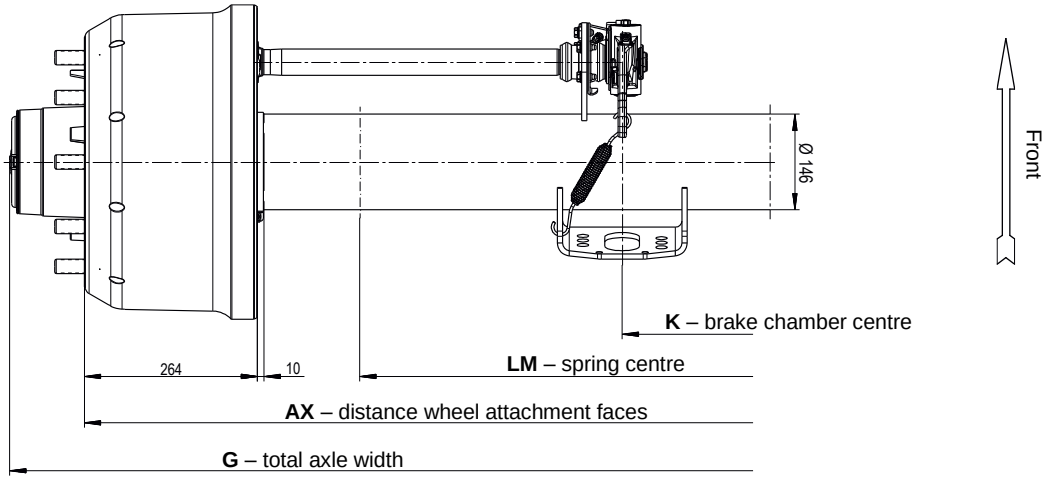
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

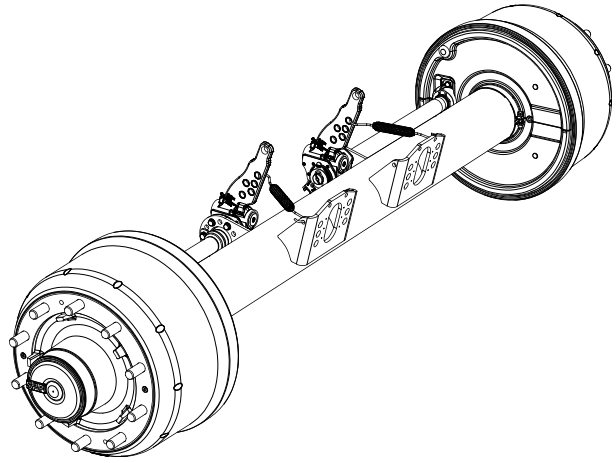
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S11-4220S10:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 425/65R22,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S11-4220S10** / SNK4220 / SNK420x200 / TDB0455	1970/1100	2198	350	330
	1970/1200 [4]	2198	350	330
	2040/1200 [3]	2268	420	334
	2040/1300 [4]	2268	420	334
	2090/1300 [3]	2318	470	337

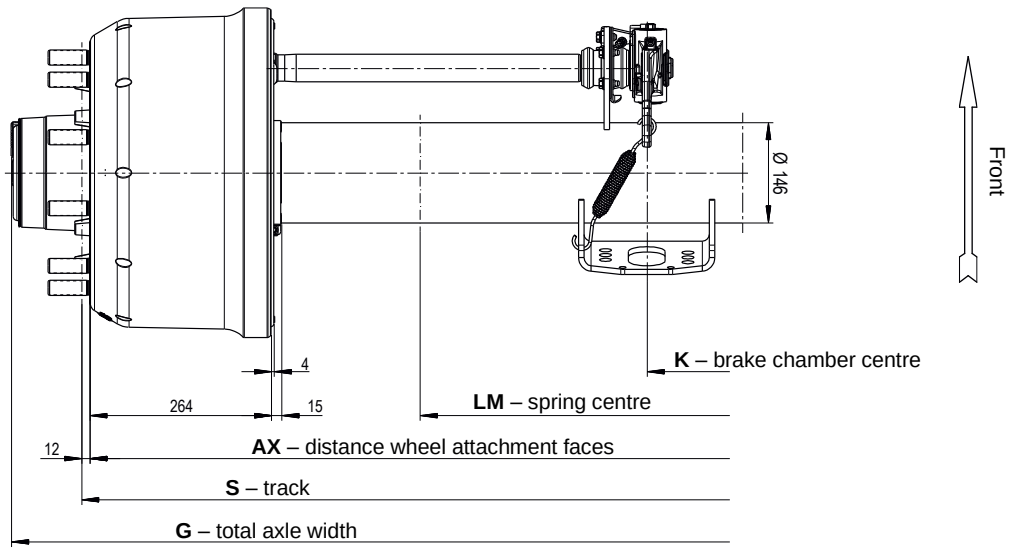
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **425/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

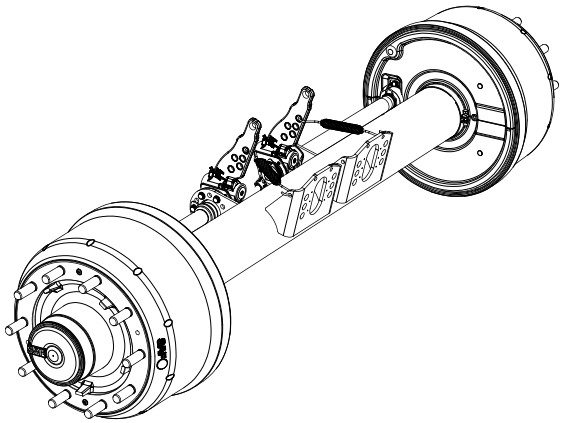
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z11-4220S10:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S 1) / LM [mm]	G [mm]	K [mm]	weight approx.2) [kg]
	tyre (example): 275/70R22,5“				
 **Z11-4220S10** / SNK4220 / SNK420x200 / TDB0455	1820/900 3)	1844/900 3)	2048	300	325
	1820/940 4)	1844/940 4)	2048	300	325
	1860/980 4)	1884/980 4)	2088	240	327
	1896/1020 4)	1920/1020 4)	2124	276	329
	1920/1060 4)	1944/1060 4)	2148	300	331

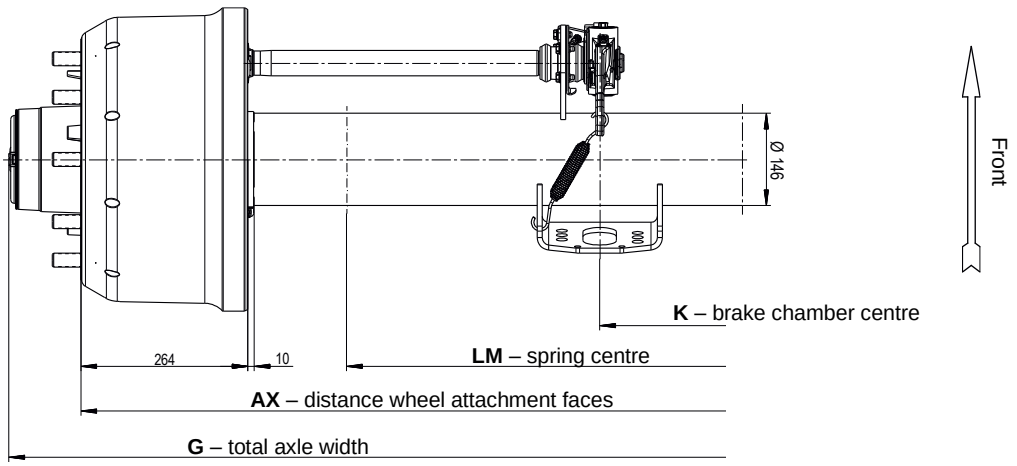
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
5) with tyres **275/70R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

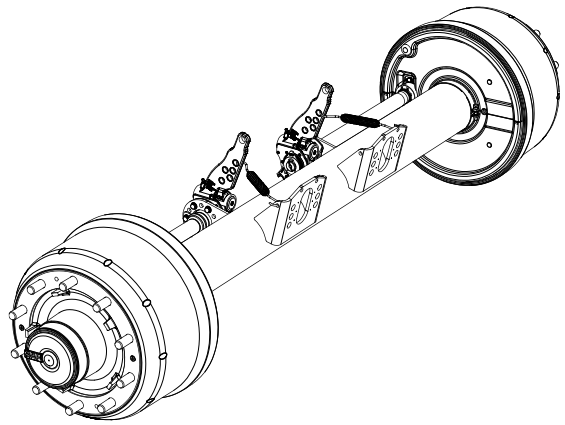
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version S12-4220S10:

Axle load maximum: **12.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 445/65R22,5“	G [mm]	K [mm]	weight approx.[2] [kg]
 **S12-4220S10** / SNK4220 / SNK420x200 / TDB0455	1970/1100	2198	325	332
	1970/1200 [4]	2198	325	332
	2040/1200 [3]	2268	395	336
	2040/1280 [4]	2268	395	336

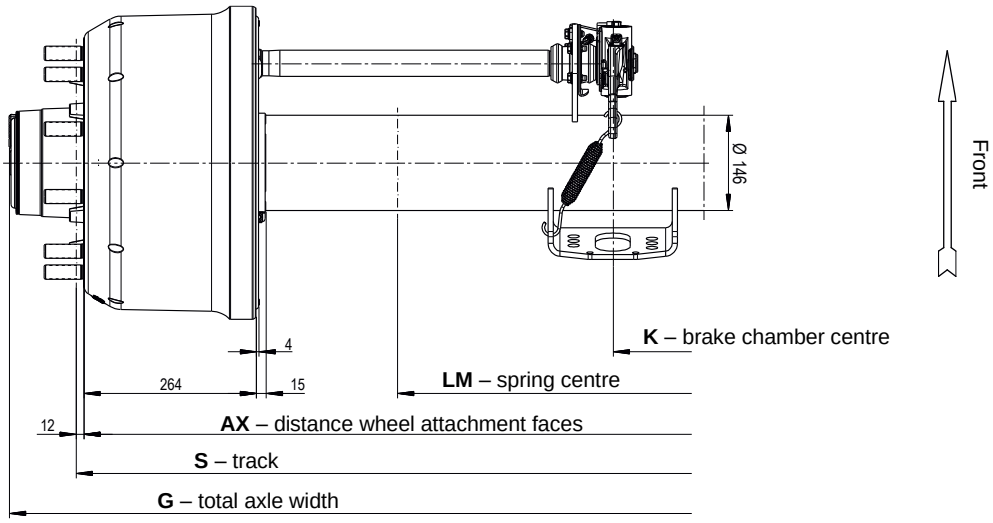
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **445/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **30** mm
4) with tyres **445/65R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm

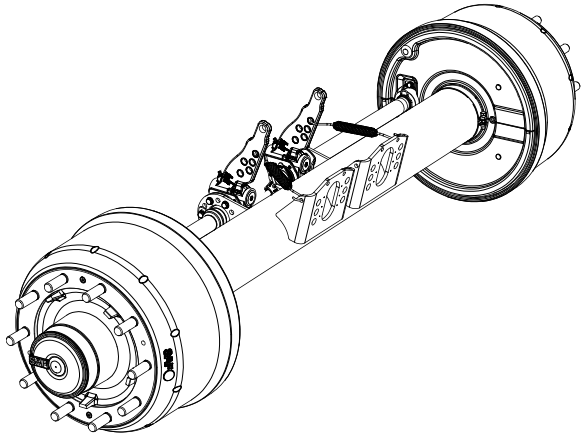
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version Z12-4220S10:

Axle load maximum: **12.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX / LM [mm]	S [1] / LM [mm]	G [mm]	K [mm]	weight approx. [2] [kg]
	tyre (example): 295/80R22,5“				
 **Z12-4220S10 /** SNK4220 / SNK420x200 / TDB0455	1820/900 [3]	1844/900 [3]	2048	240	327
	1820/940 [4]	1844/940 [4]	2048	240	327
	1860/980 [4]	1884/980 [4]	2088	276	329
	1896/1020 [4]	1920/1020 [4]	2148	300	331

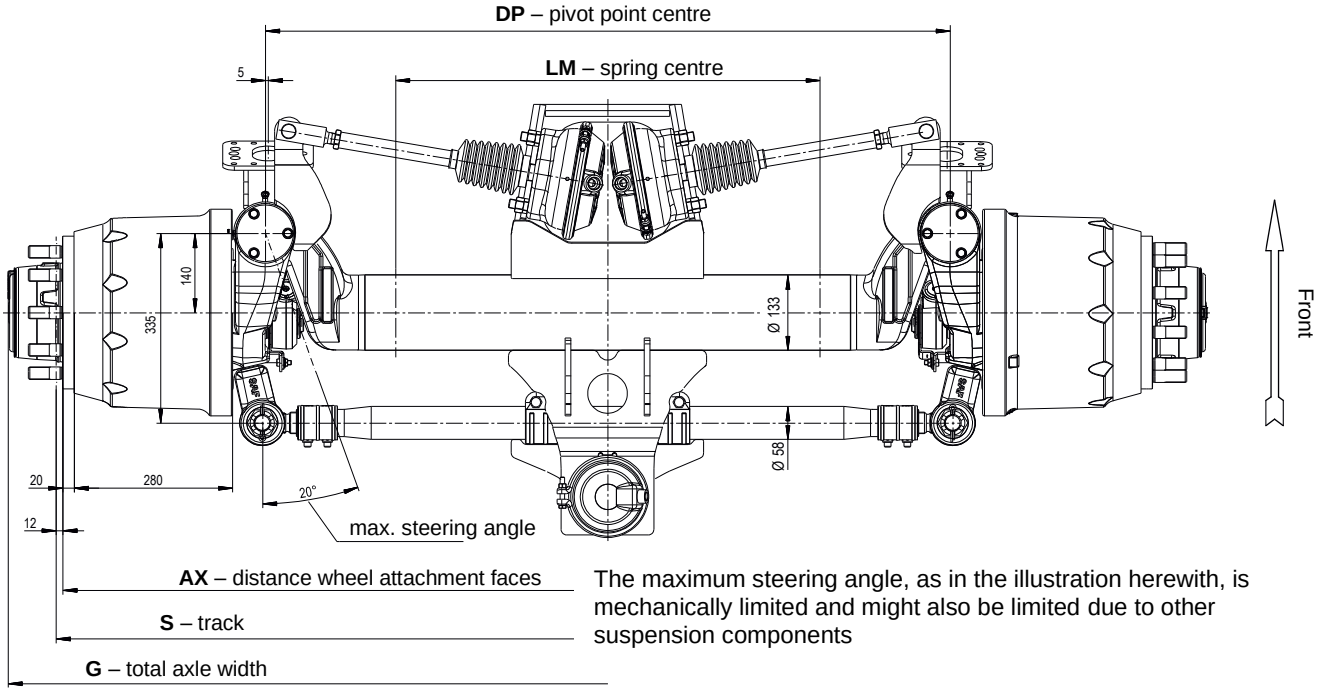
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.
3) with tyres **295/80R22,5“** and air bag diameter **Ø 350** mm starting at **V** = **55** mm
4) with tyres **295/80R22,5“** and air bag diameter **Ø 350** mm only with **V** = **70** mm

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

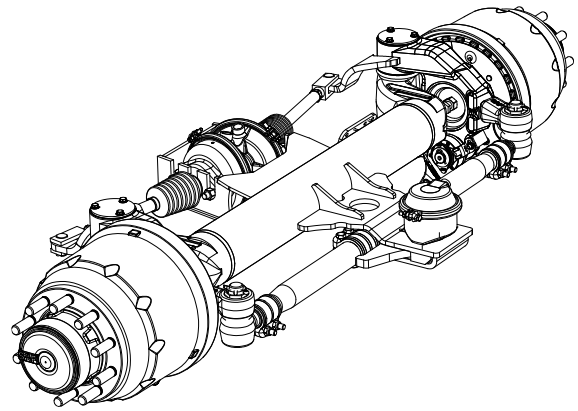
Further variants on request.

Axle version ZL11-3020:

Axle load maximum: **10.000** kg
Axle beam **Ø 133** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



The maximum steering angle, as in the illustration herewith, is mechanically limited and might also be limited due to other suspension components

axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	DP [mm]	weight approx.[2] [kg]
	tyre (example): 235/75R17,5“				
 **ZL11-3020 /** SNK3020 / SNK300x200 / TDB0487	1806/660	1830/660	2004	1090	505
	1860/700	1884/700	2058	1144	507,5
	1926/750	1950/750	2124	1210	511
	1971/800	1995/800	2179	1255	514

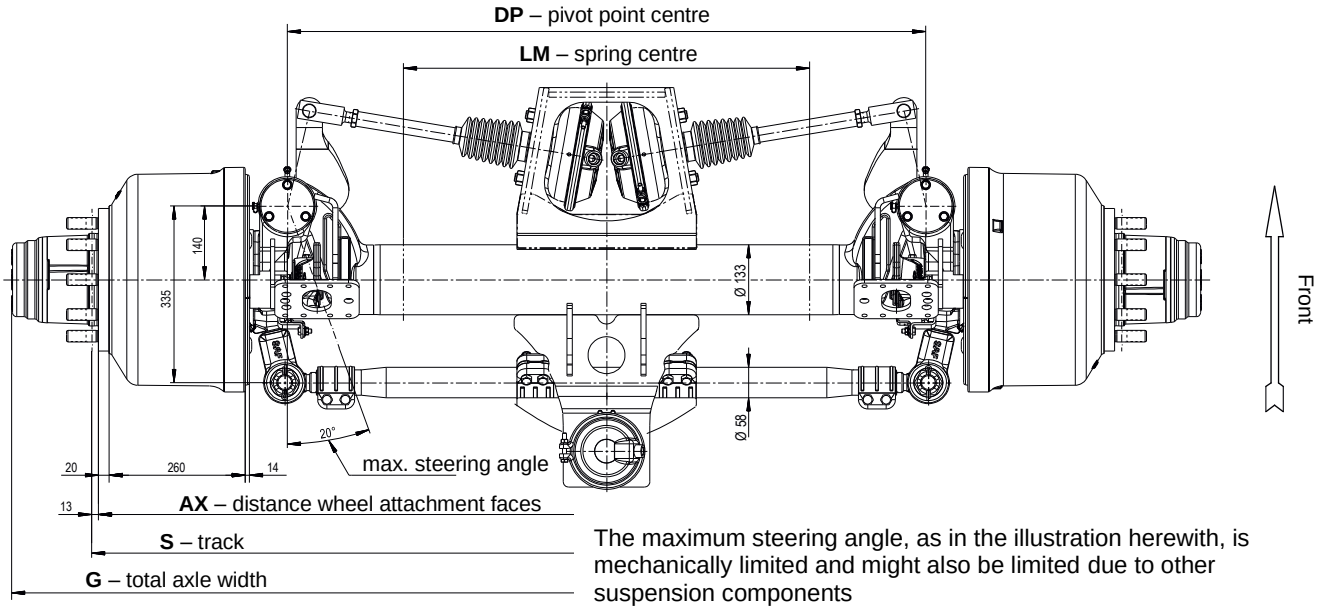
1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

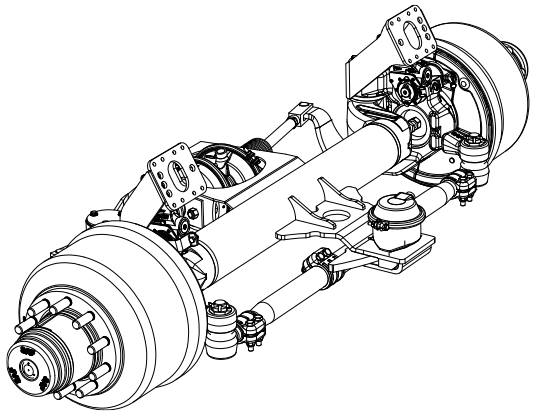
All variants on request

Axle version SKRLZ12037:

Axle load maximum: **12.000** kg
Axle beam **Ø 133** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm oder **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



The maximum steering angle, as in the illustration herewith, is mechanically limited and might also be limited due to other suspension components

axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	DP [mm]	weight approx.[2] [kg]
	tyre (example): 285/70R19,5“				
 **SKRLZ12037 /** SNK3720 / SNK367x200 / TDB0460	1820/600	1846/600	2159	1104	535
	1860/700	1884/700	2189	1144	538
	1926/750	1952/750	2255	1210	543

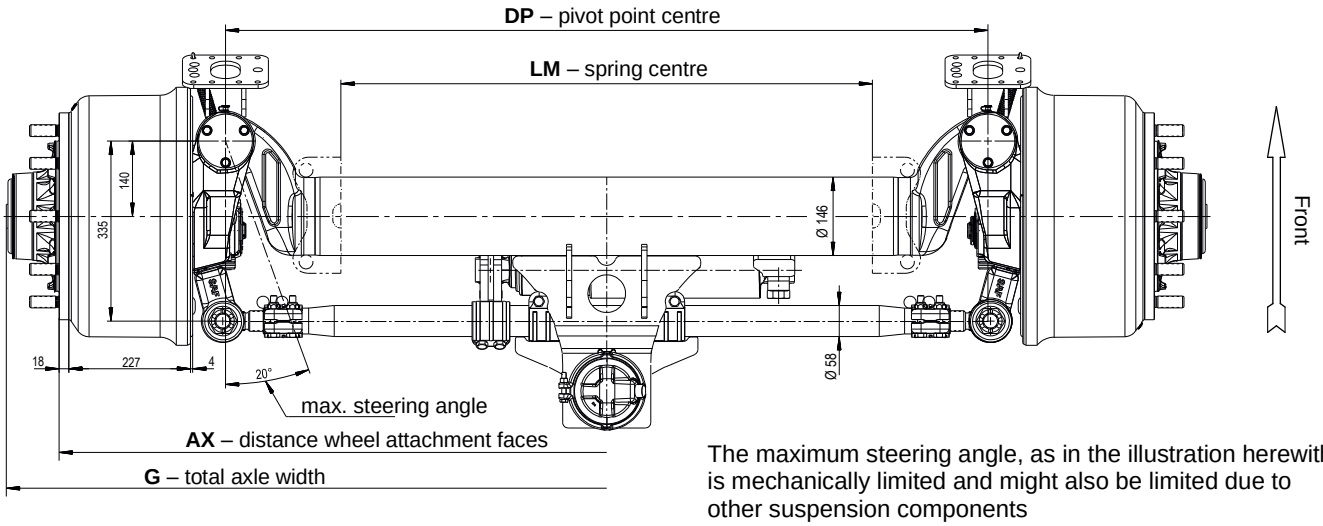
1) **S** = **AX** + 2 x wheel disc thickness (standard 13 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

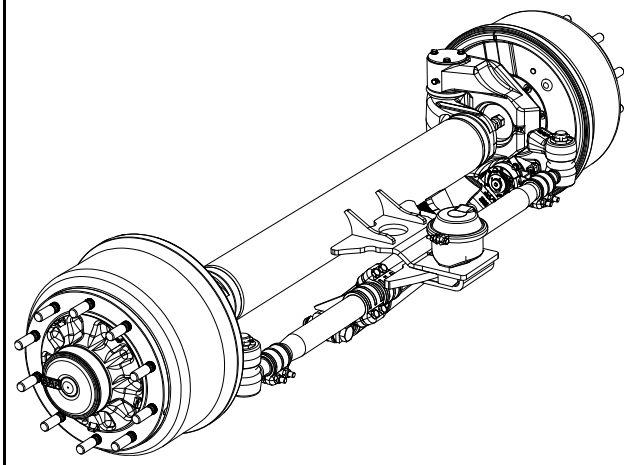
All variants on request

Axle version SL9-4218:

Axle load maximum: **9.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M**, **EO** with single leaf trailing arm (**EN**) and
Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



The maximum steering angle, as in the illustration herewith, is mechanically limited and might also be limited due to other suspension components

axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 385/65R22,5“	G [mm]	DP [mm]	weight approx.[2] [kg]
 **SL9-4218 /** SNK4218 / SNK420x180 / TDB0381	2040/900	2238	1420	453
	2040/980	2238	1420	453
	2090/980	2288	1470	456
	2090/1030	2288	1470	456
	2140/980	2338	1520	459
	2140/1080	2338	1520	459

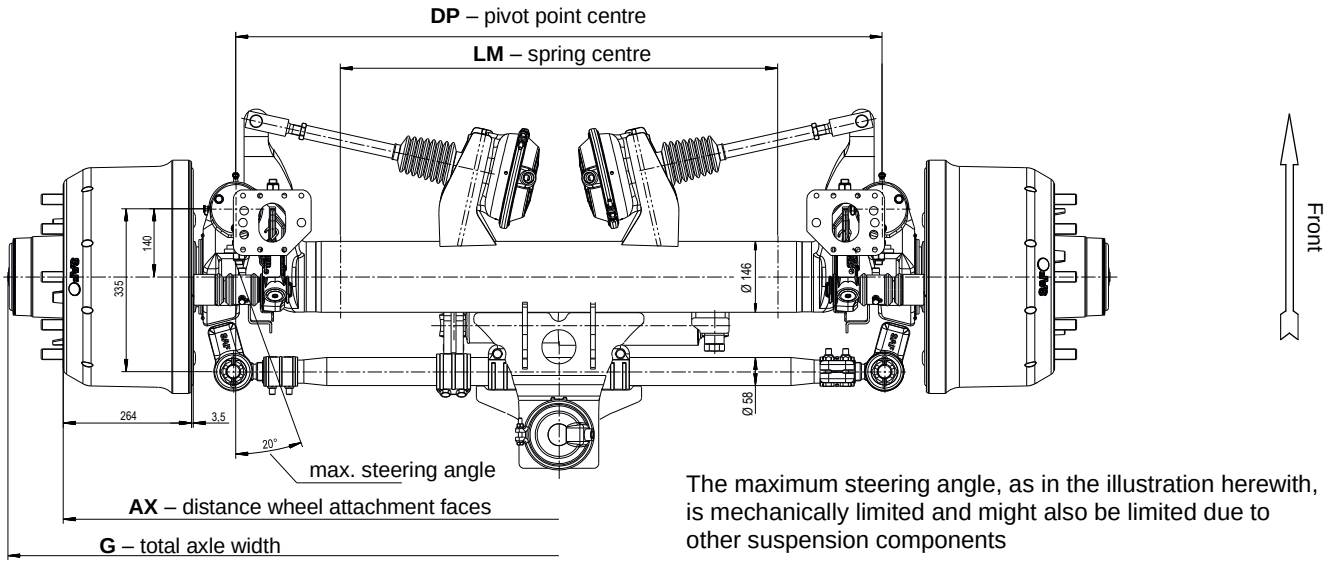
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

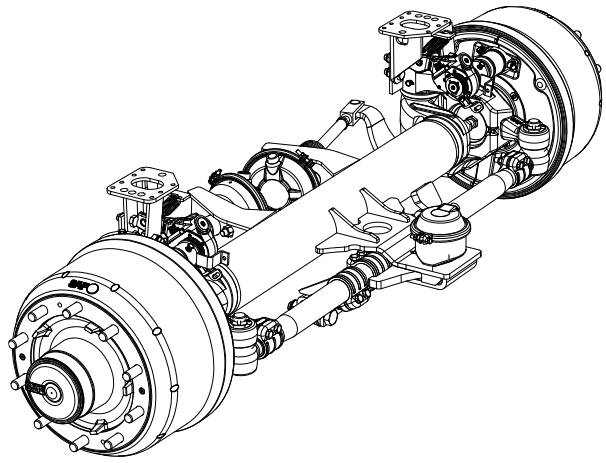
Further variants on request.

Axle version SL12-4220S10:

Axle load maximum: **12.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 300** mm and **Ø 350** mm



The maximum steering angle, as in the illustration herewith, is mechanically limited and might also be limited due to other suspension components

axle version / axle type / brake / test report	AX [1] / LM [mm] tyre (example): 445/65R22,5“	G [mm]	DP [mm]	weight approx.[2] [kg]
 **SL12-4220S10 /** SNK4218 / SNK420x200 / TDB0455	1970/780	2198	1260	546
	1970/830	2198	1260	546
	2040/850	2268	1330	551
	2040/900	2268	1330	551

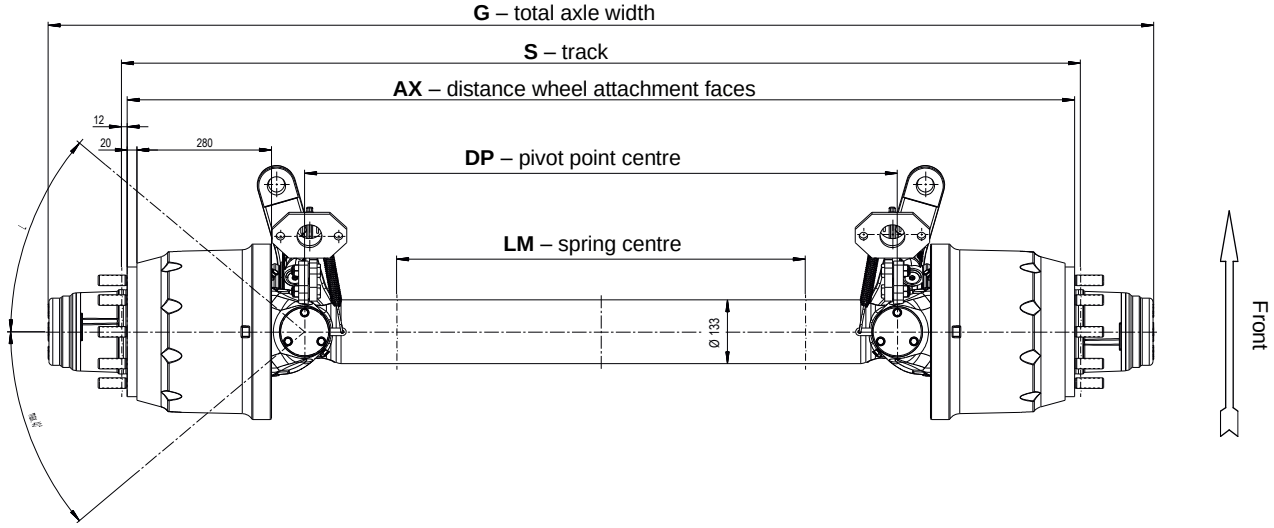
1) **AX** = **S**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

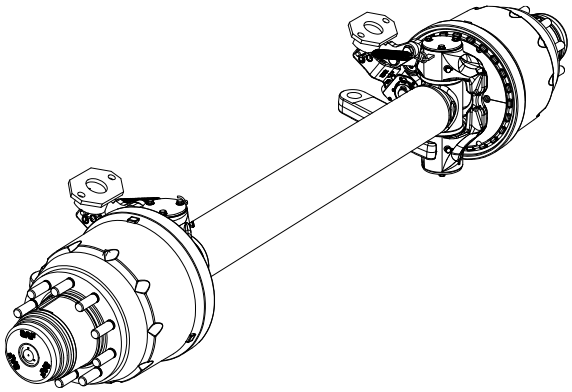
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

Further variants on request.

Axle version SKZRLZ12030S:

Axle load maximum: **12.000** kg
Axle beam **Ø 133** mm
Wheel fixing: **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	DP [mm]	weight approx.[2] [kg]
	tyre (example): 245/75R17,5“				
 **SKZRLZ12030S /** SNK3020 / SNK300x200 / TDB0882	1860/700	1884/700	2082	1122	469,5
	1926/750	1950/750	2148	1188	471
	1971/800	1995/800	2193	1233	474

1) **S** = **AX** + 2 x wheel disc thickness (standard 12 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

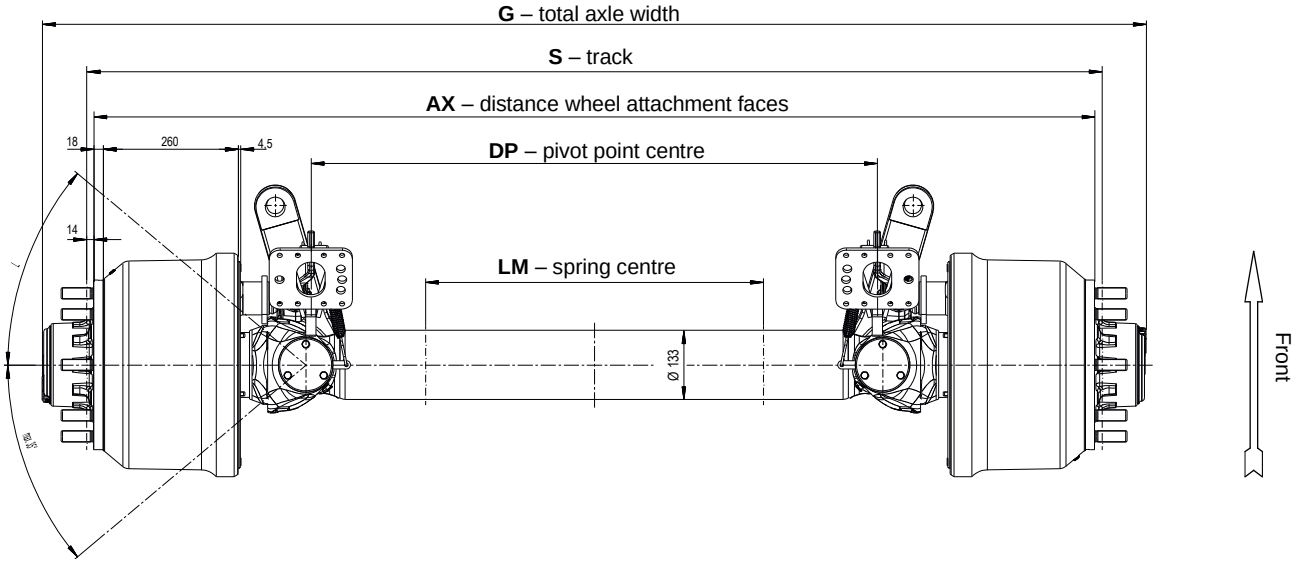
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

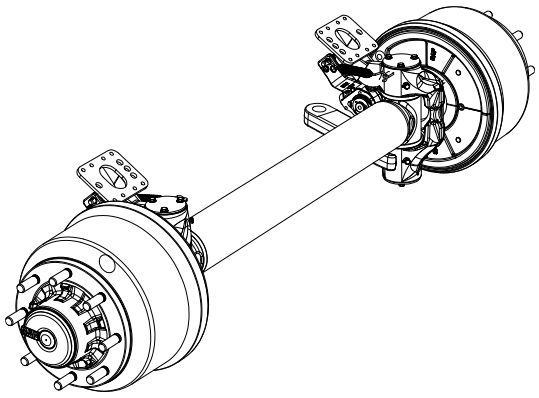
The axles prepared for an electric steering system are extra equipped with a tie-rod at the front and steering limiter. Also, the pivot pin is prepared for the installation of an angle sensor.

All variants on request

Axle version ZZL11-3720:

Axle load maximum: **11.000** kg
Axle beam **Ø 133** mm
Wheel fixing: **8** / **220** / **275** / **22x1,5** mm or **10** / **175** / **225** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm]	S / LM [mm]	G [mm]	DP [mm]	weight approx.[2] [kg]
	tyre (example): 265/70R19,5“				
 **ZZL11-3720 /** SNK3720 / SNK367x200 / TDB0460	1860/600	1884/600	2058	1044	468
	1860/700	1884/700	2058	1044	468
	1926/660	1954/660	2124	1110	473
	1926/770	1954/770	2124	1110	473
	1946/680	1974/680	2144	1130	475
	1946/780	1974/780	2144	1130	475

1) **S** = **AX** + 2 x wheel disc thickness (standard 14 mm)
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

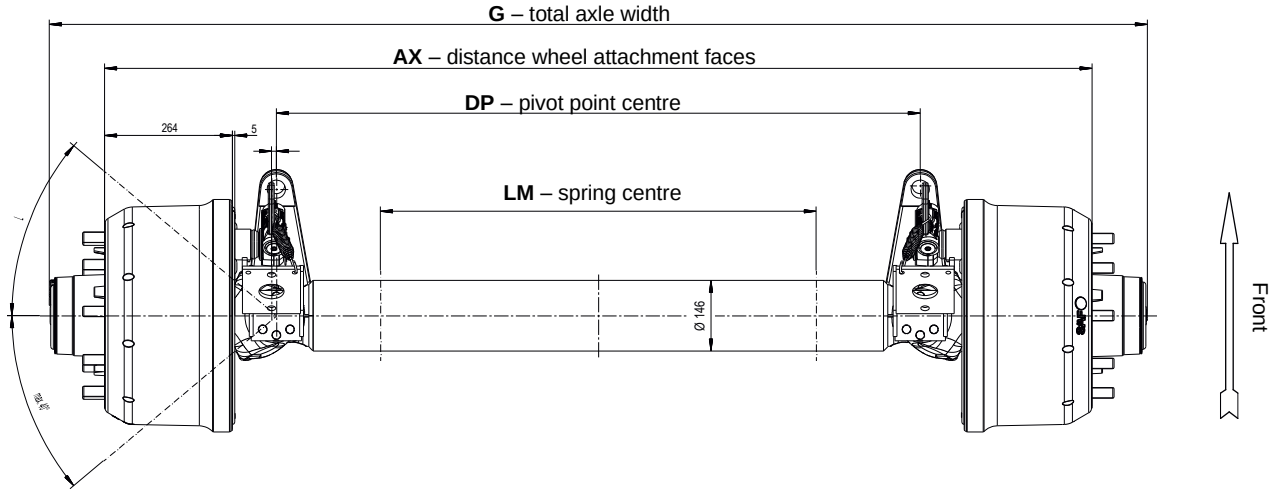
Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

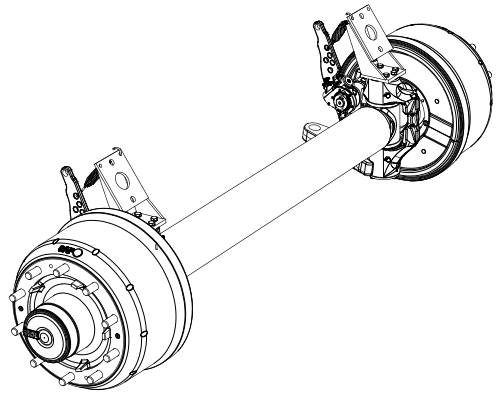
The axles prepared for an electric steering system are extra equipped with a tie-rod at the front and steering limiter. Also, the pivot pin is prepared for the installation of an angle sensor.

All variants on request

Axle version SZL11-4220S10:

Axle load maximum: **11.000** kg
Axle beam **Ø 146** mm
Wheel fixing: **10** / **280** / **335** / **22x1,5** mm
Suitable for: Air suspension series **U**, **M** with double leaf trailing arm (**S**)
Air bags with air bag diameter **Ø 350** mm



axle version / axle type / brake / test report	AX [1] / LM [mm] Tyre (example): 425/65R22,5"	G [mm]	DP [mm]	weight approx.[2] [kg]
 **SZL11-4220S10 /** SNK4220 / SNK420x200 / TDB0455	2040/800	2268	1330	494
	2040/900	2268	1330	494
	2090/850	2318	1380	498
	2090/950	2318	1380	498

1) **S** = **AX**
2) without spring seats, slack adjuster and wheel nuts (spring seats are enclosed in the air suspension). Weight deviations lie within the permitted DIN Tolerances for the respective manufacturing process.

Note:
When choosing the suspension assembly, the clearance between air bag (max. diameter) and chosen tyre must be checked, this should be at least **25** mm.

The axles prepared for an electric steering system are extra equipped with a tie-rod at the front and steering limiter. Also, the pivot pin is prepared for the installation of an angle sensor.

All variants on request

Geometry steel hanger bracket, shock absorber attachment over a fixed bolt

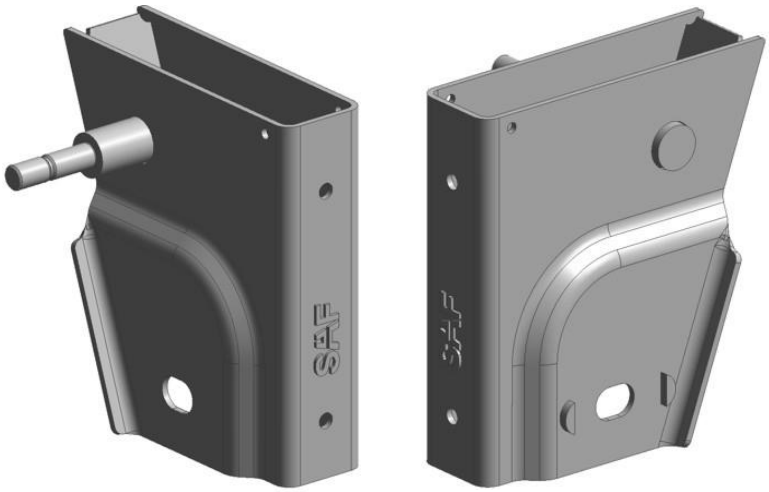
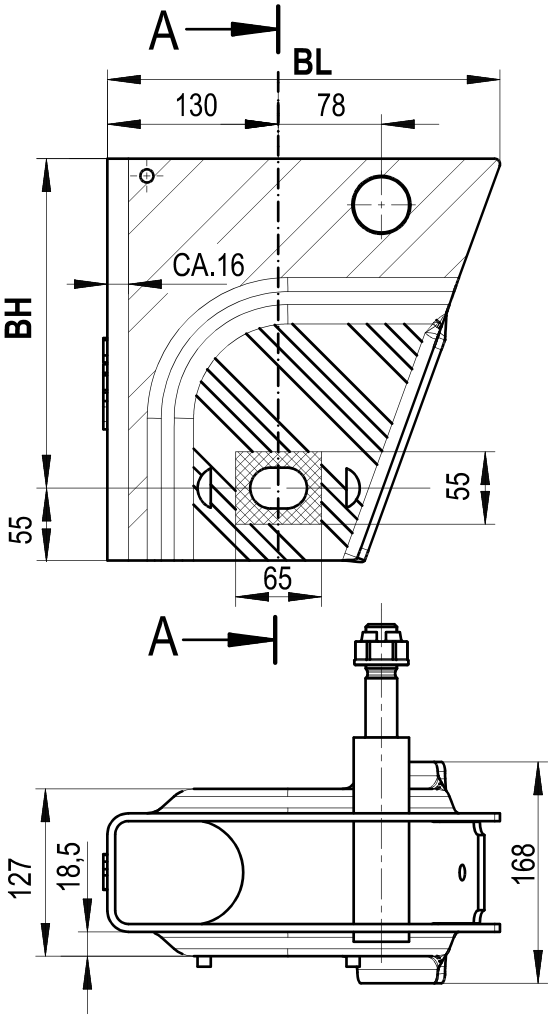
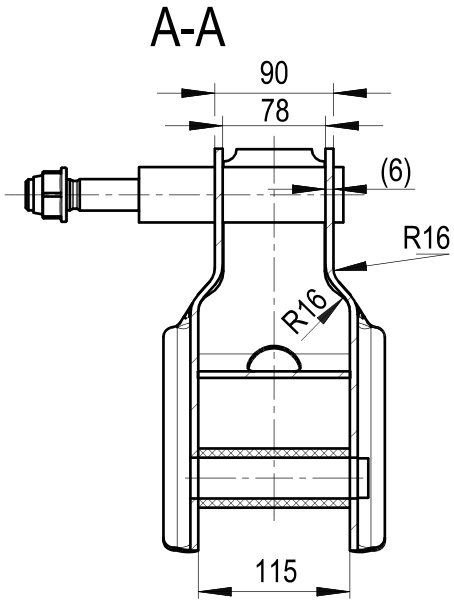
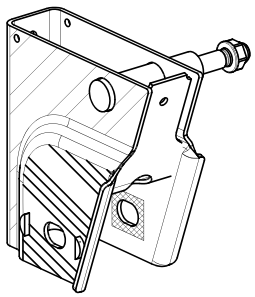


illustration 2 183 0747 01, „inside“ – „outside“







Measuring range 1 = 90 +2

Measuring range 2 = 127 ±2

Measuring range 3 = 115 +2

Dimension [mm]		Hanger bracket number:	Version
BH	BL		
250	298	02 183 0745 01	Left
250	298	02 183 0746 01	Right
290	313	02 183 0747 01	Left
290	313	02 183 0748 01	Right
355	337	02 183 0749 01	Left
355	337	02 183 0750 01	Right

With hanger bracket non-primed, the end number changes from von 01 in 91, example: 02 183 0747 91

Geometry steel hanger bracket, shock absorber attachment over a screw

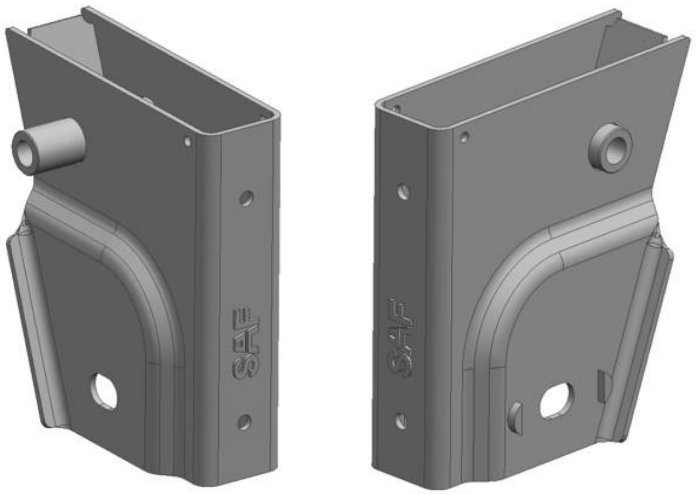
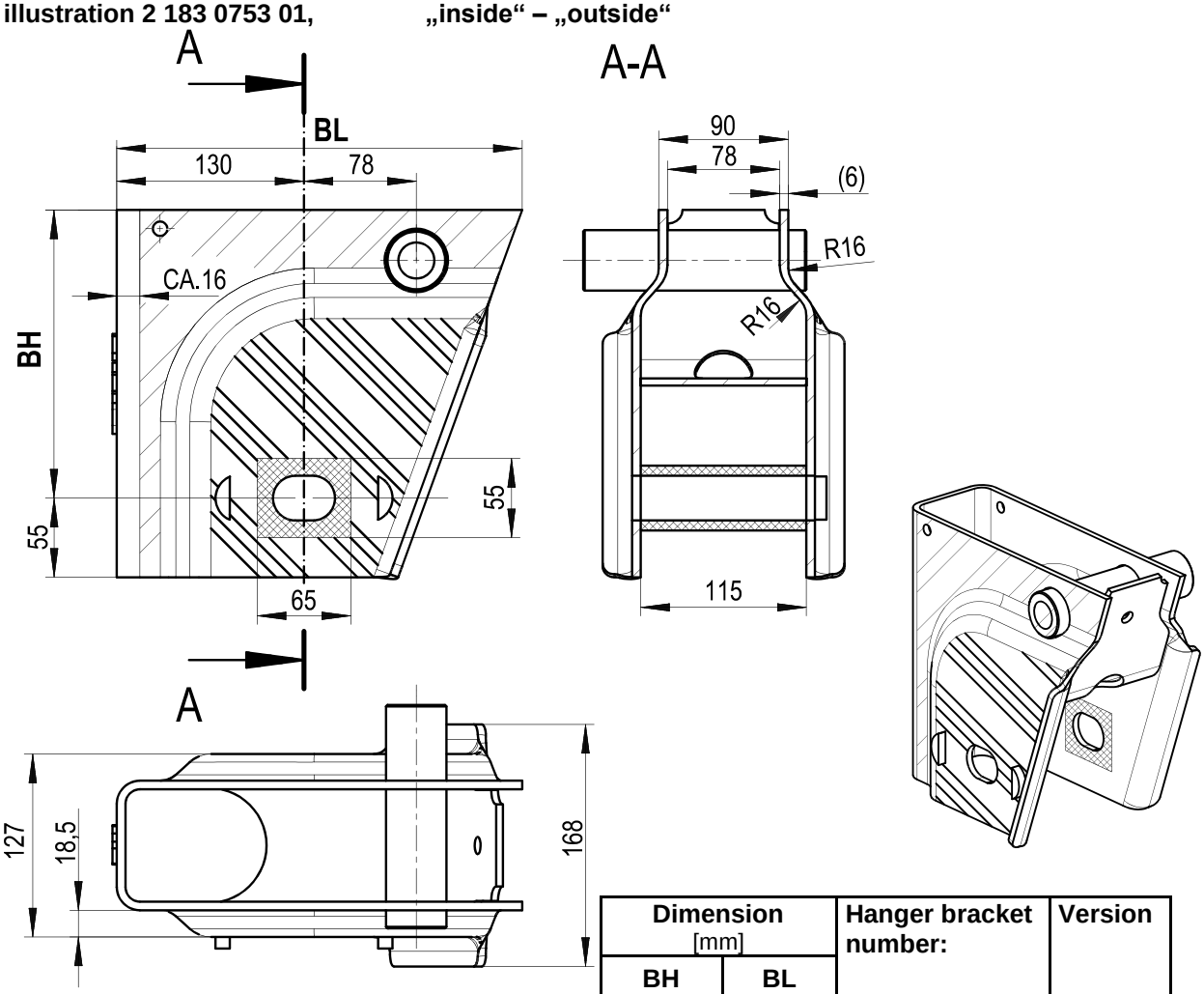


illustration 2 183 0753 01, „inside“ – „outside“



Measuring range 1 = 90 +2

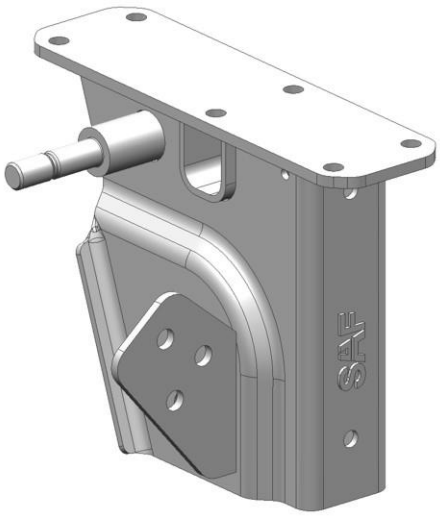
Measuring range 2 = 127 ±2

Measuring range 3 = 115 +2

Dimension [mm]		Hanger bracket number:	Version
BH	BL		
200	282	02 183 0779 01	Left
200	282	02 183 0780 01	Right
250	298	02 183 0751 01	Left
250	298	02 183 0752 01	Right
290	313	02 183 0753 01	Left
290	313	02 183 0754 01	Right
355	337	02 183 0755 01	Left
355	337	02 183 0756 01	Right

With hanger bracket non-primed, the end number changes from von 01 in 91, example: 02 183 0753 91

Geometry hanger bracket „screw-on“



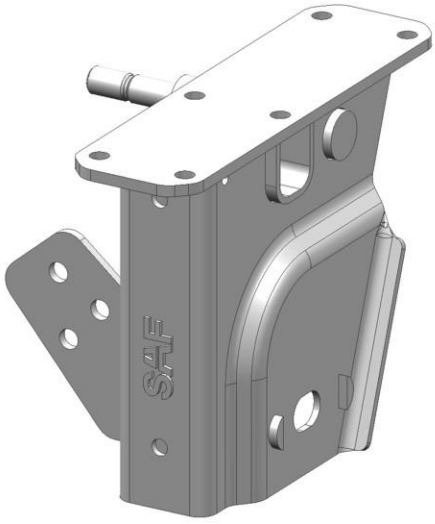
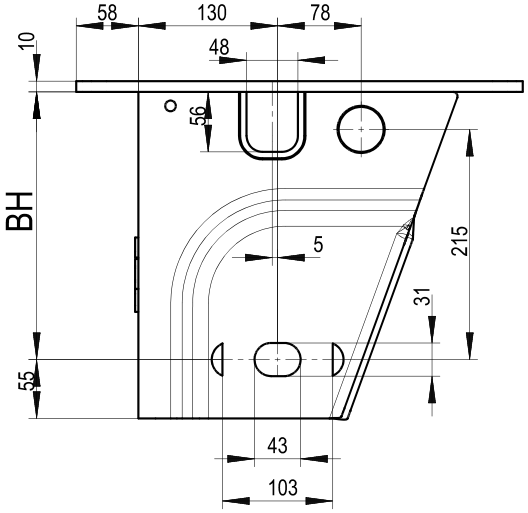
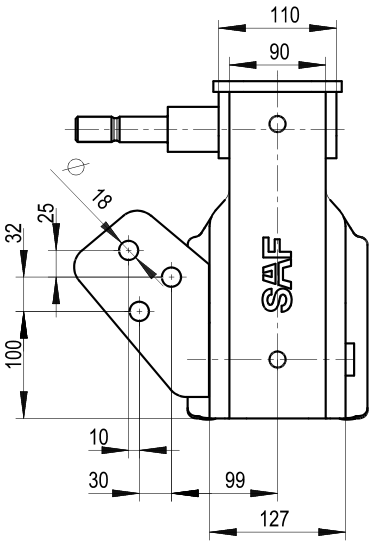
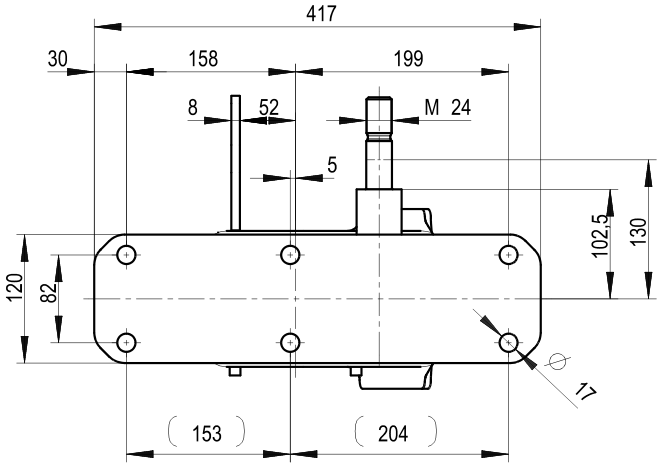
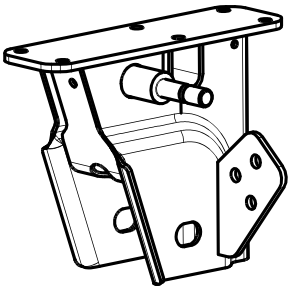


illustration 2 183 0879 00, „inside“ – „outside“









BH [mm]	Hanger bracket number	Version
250	02 183 0879 00	Left
250	02 183 0880 00	Right
290	02 183 0881 00	Left
290	02 183 0882 00	Right

With hanger bracket non-primed, the end number changes from 00 in 90, example: 02 183 0879 90

For maximum axle load **10** Ton with single tyre.

Installation see Page 111

Geometry cross member, rigid axle

LM = HM

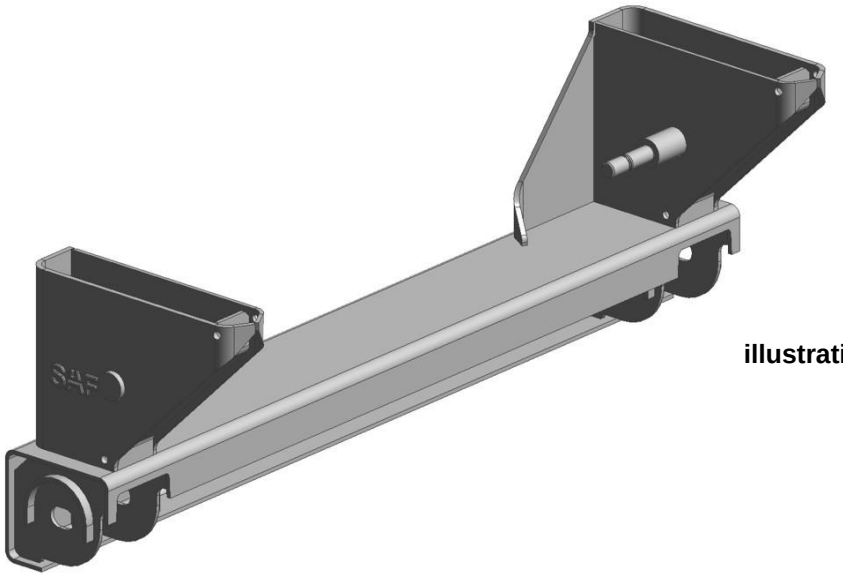
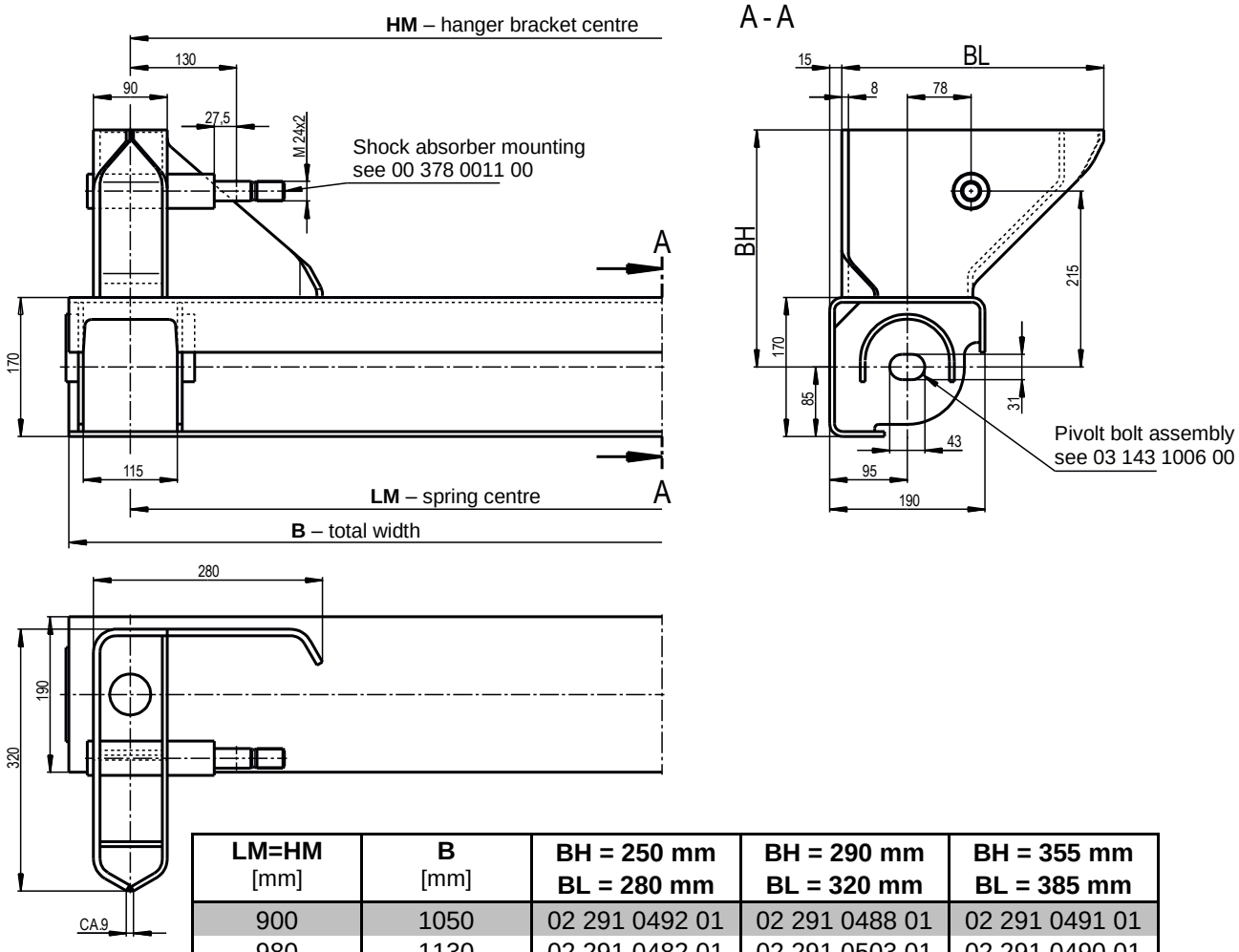


illustration 2 291 0497 01

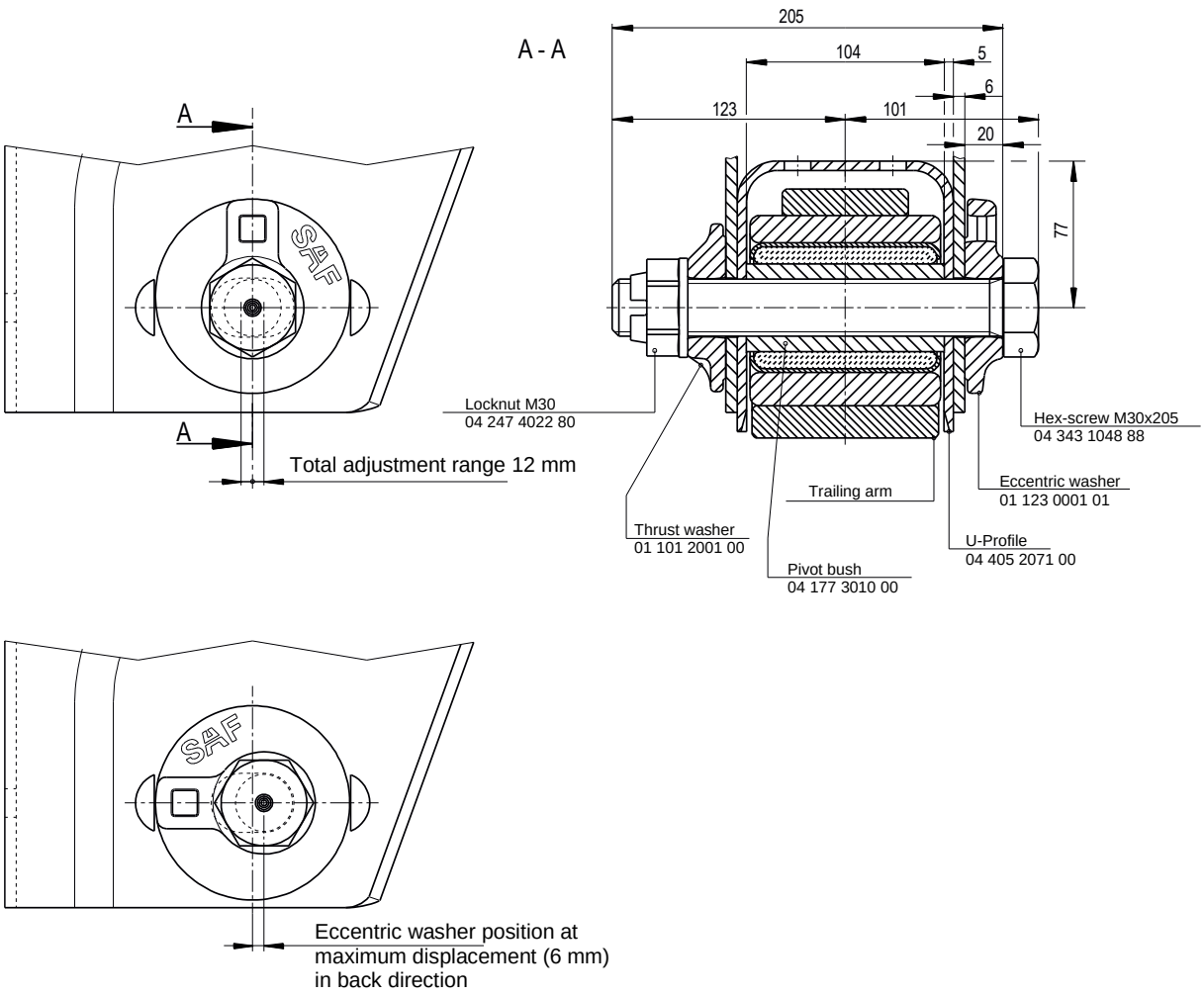


LM=HM [mm]	B [mm]	BH = 250 mm BL = 280 mm	BH = 290 mm BL = 320 mm	BH = 355 mm BL = 385 mm
900	1050	02 291 0492 01	02 291 0488 01	02 291 0491 01
980	1130	02 291 0482 01	02 291 0503 01	02 291 0490 01
1100	1250	02 291 0462 01	02 291 0501 01	02 291 0489 01
1200	1350	02 291 0473 01	02 291 0496 01	02 291 0497 01
1300	1450	02 291 0463 01	02 291 0349 01	02 291 0370 01

other versions on request

With non-primed cross members the end number is changing from 01 in 91, example: 02 291 0497 91.
Not applicable when combined, air suspension serie „U“ and axles with disc brake.

Pivot bolt connection for steel hanger bracket and cross member

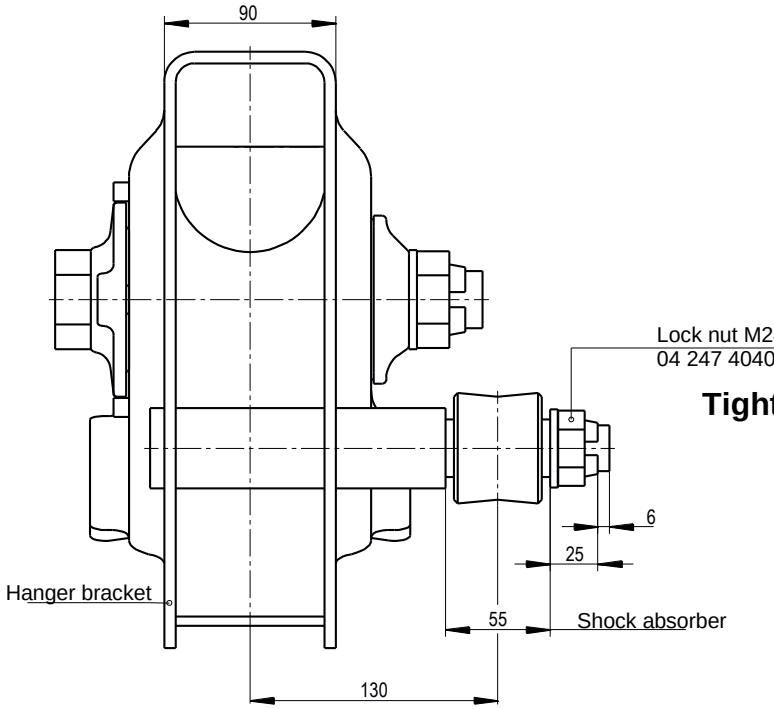


Tightening torque: 400 Nm + 120°; tightening procedure see page 113

Ref.nr.: 03 143 1006 00

Shock absorber assembly: steel hanger bracket

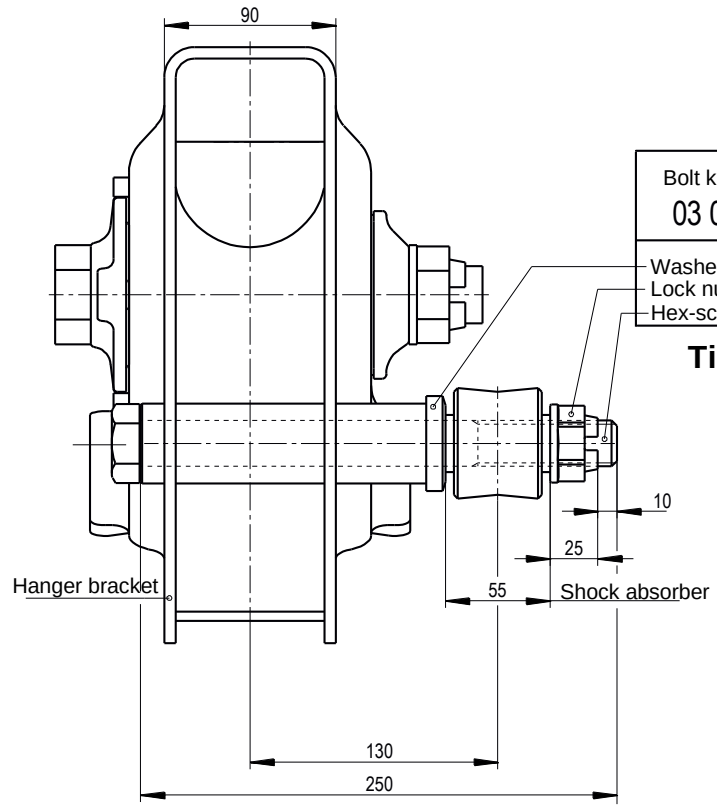
bolted (standard)



Tightening torque 400 Nm

Ref.nr.: 0 378 0011 00

with hex-screw



Bolt kit 03 044 1046 00	
Washer	01 097 0011 00
Lock nut M24x2	04 247 4040 88
Hex-screw M24x2x250	04 343 2034 88

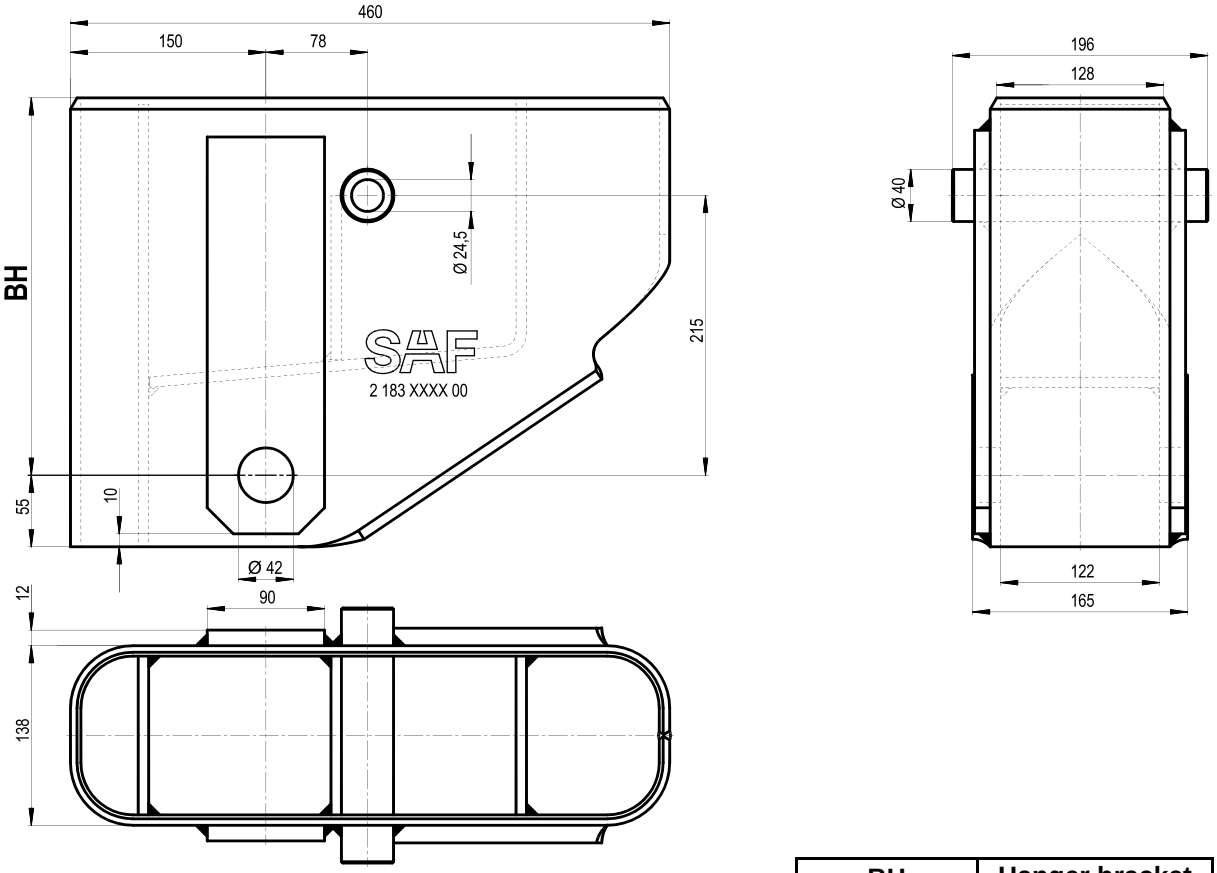
Tightening torque 400 Nm

Ref.nr.: 0 378 0012 00

Geometry aluminium hanger bracket

illustration 2 183 0730 00

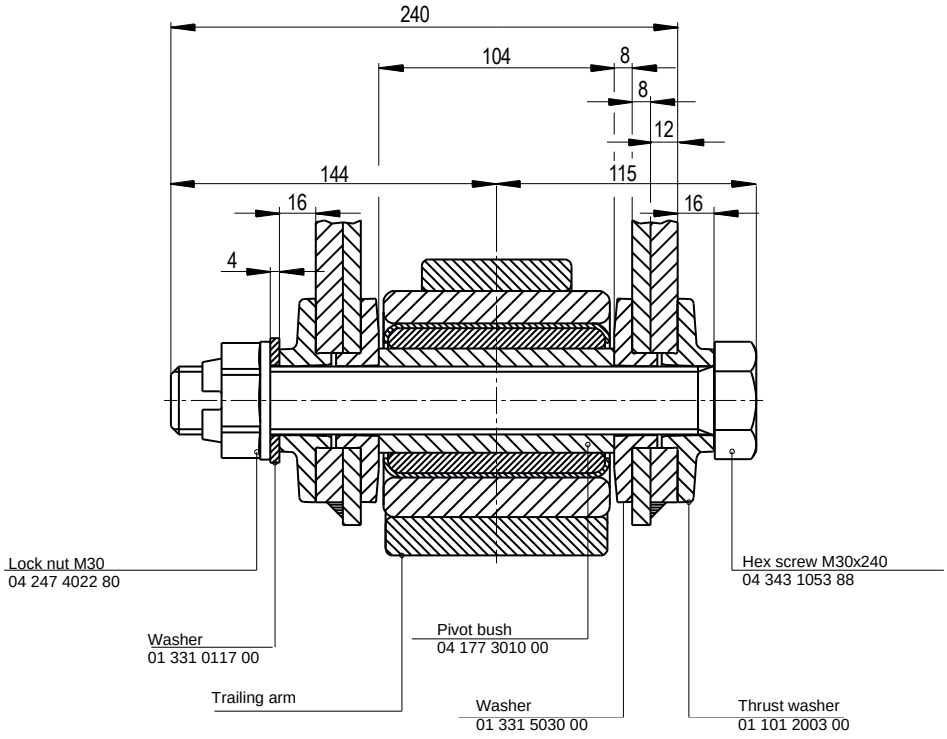
Symmetrical hanger brackets



BH [mm]	Hanger bracket number
250	02 183 0679 00
290	02 183 0730 00
355	02 183 0731 00

Not applicable when combined, air suspension serie „U“ and axles with disc brake.

Pivot bolt for aluminium hanger bracket

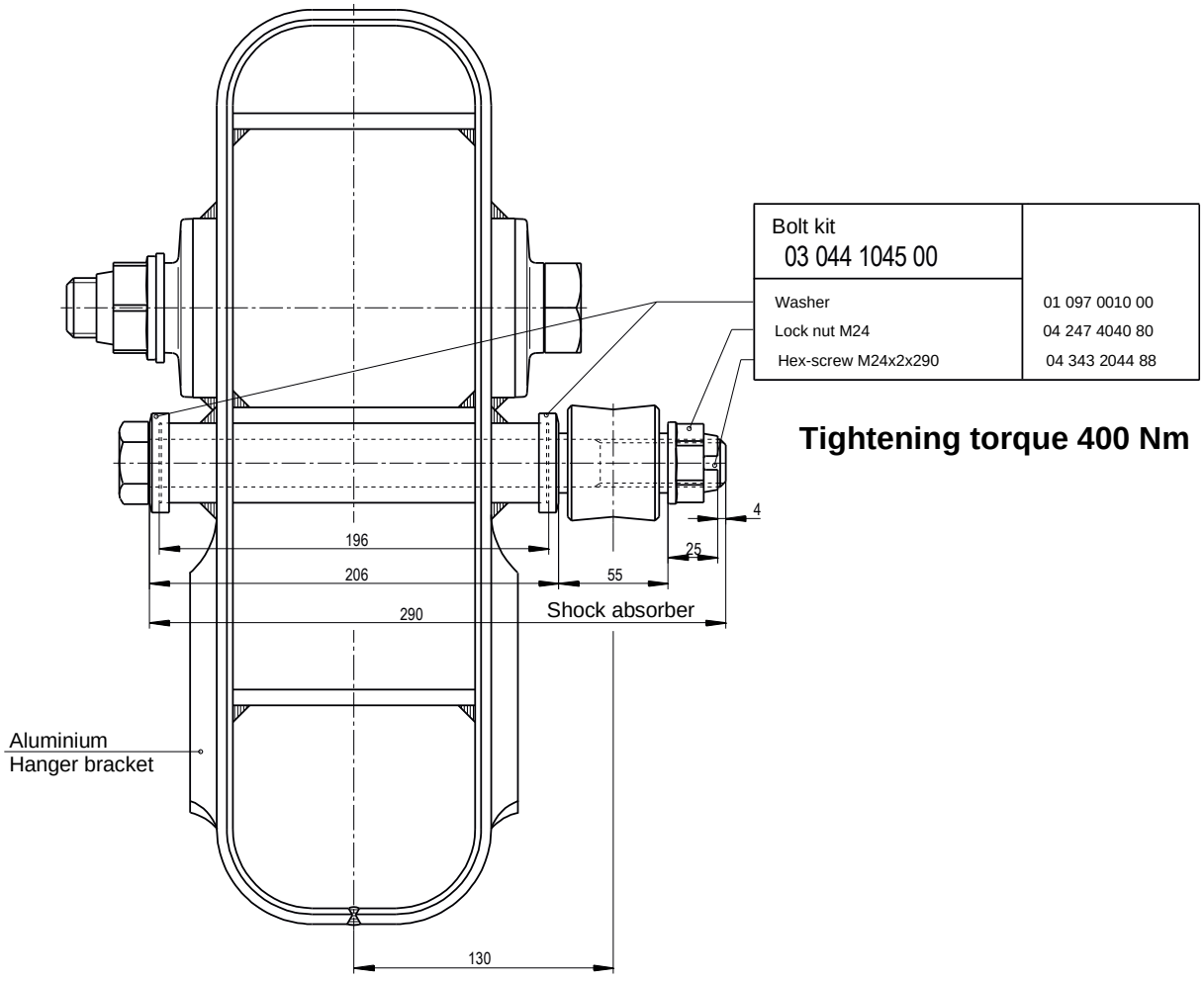


Attention:
Screw connections at aluminium hanger brackets are not maintenance free!
Service intervals see SAF-HOLLAND – Operating and service manuals.
Inspection torque 1200 Nm!

Tightening moment: 400 Nm + 120°; tightening procedure see page 113

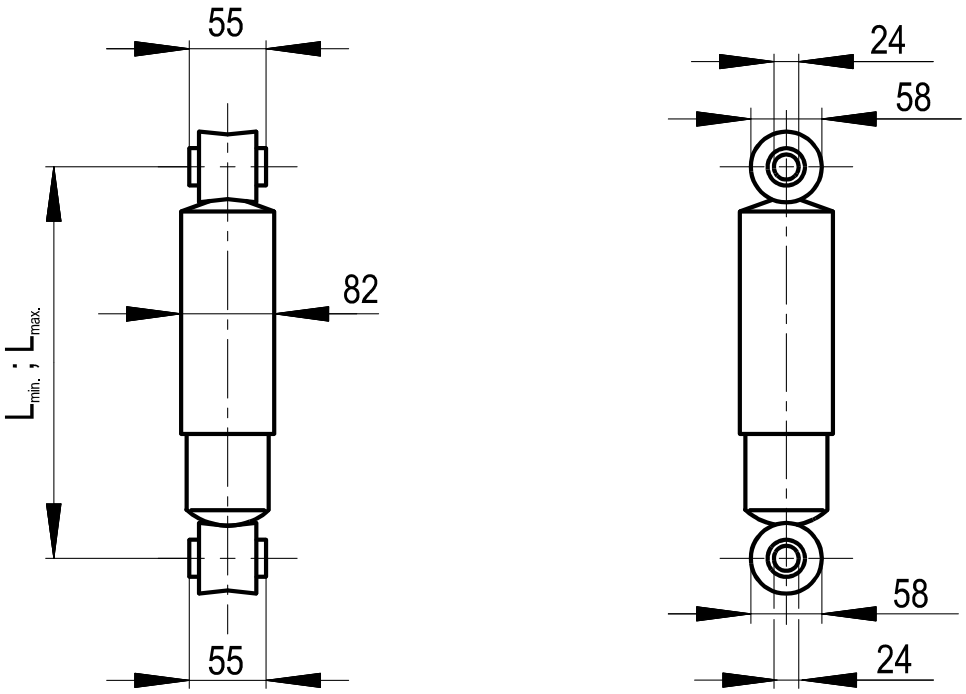
Ref.nr.: 03 143 1007 00

Shock absorber assembly: aluminium hanger bracket



Ref.nr.: 0 378 0010 00

Shock absorber overview



Order number:	Stroke [mm]	$L_{min.}$ [mm]	$L_{max.}$ [mm]	Characteristics tension/ compression [N] at 0,52 m/s
02 376 0026 00	170	325	495	18500 / 4000
02 376 4026 00 (heavy duty version)	170	325	495	24000 / 3200
02 376 0027 00	140	292	424	18500 / 4000
02 376 4027 00 (heavy duty version)	140	292	424	24000 / 3200
02 376 0030 00	160	315	475	19000 / 4300
02 376 0031 00	190	350	540	19800 / 5100
02 376 0032 00	270	426	696	18500 / 5000
02 376 0036 00	320	475	795	17000 / 6500

Calculation of free space between tyre and air bag.

The calculated clearance ist he distance between tyre and air bag. This must be at least **25** mm.

Calculation formula: $\frac{AX - LM - \text{air bag diameter} - \text{tyre width}}{2} + V - ET \geq 25\ mm$

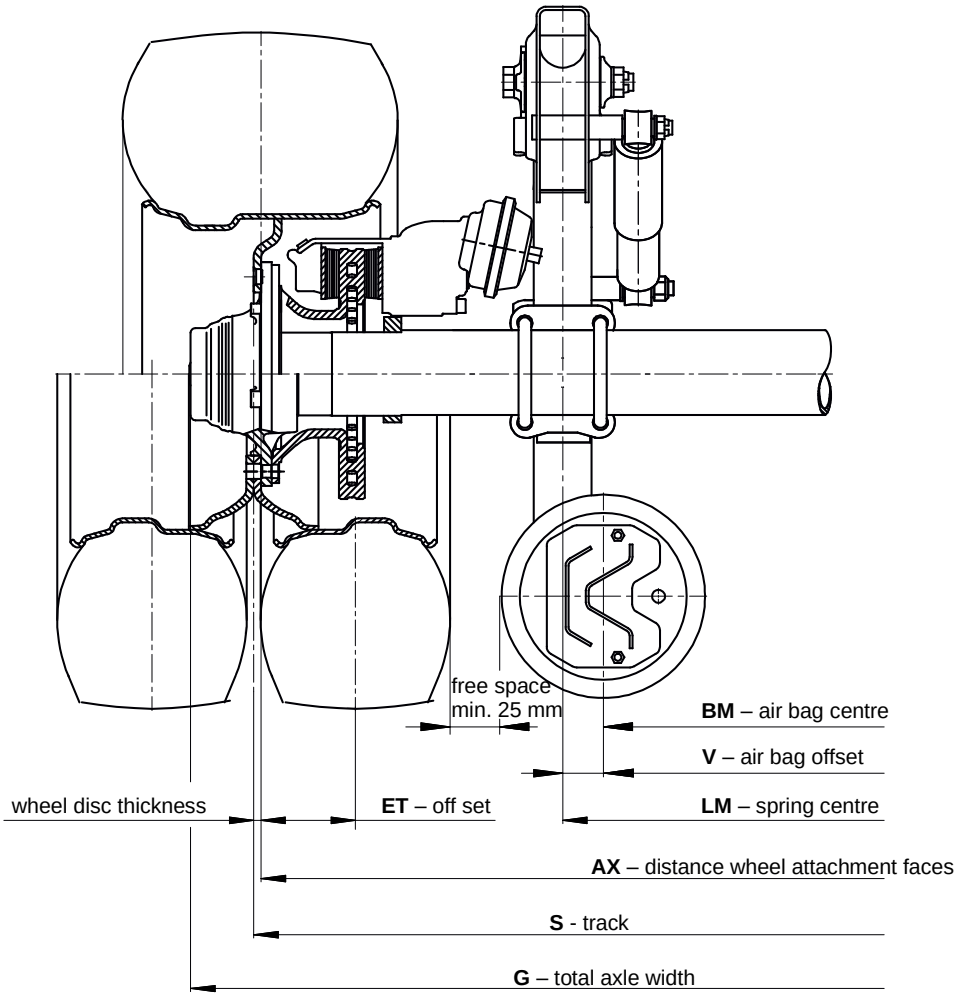
As example the suspension:

M36/2500S27 S11-4220S10
distance wheel attachment faces: 2040 mm
spring centre: 1200 mm
air bag diameter 350 mm
mounted tyre 425/65R22,5“
(E.T.R.T.O. Norm 447 mm)
air bag offset 30 mm

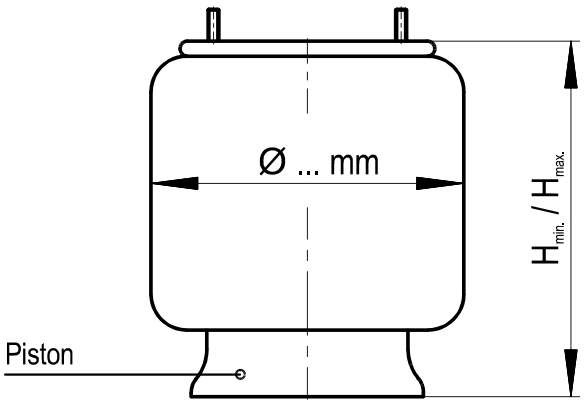
$$\frac{2040 - 1200 - 350 - 447}{2} + 30 - 0 = 51{,}5\ mm$$

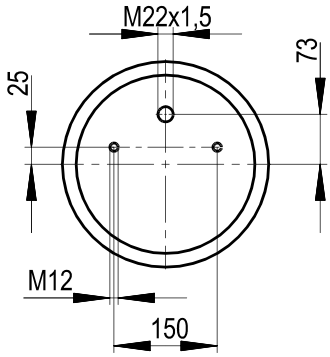
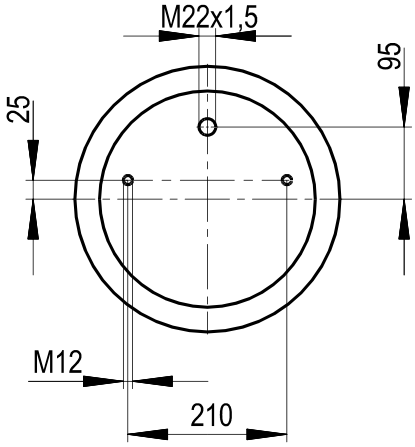
U27/2910EN29 ZI9-19K
distance wheel attachment faces: 1860 mm
spring centre 980 mm
air bag diameter 300 mm
mounted tyre 265/70R19,5“
(E.T.R.T.O. Norm 272 mm)
air bag offset 30 mm
used wheel 19,5 x 7,50 (example ET 138,5 mm)

$$\frac{1860 - 980 - 300 - 272}{2} + 30 - 138{,}5 = 45{,}5\ mm$$

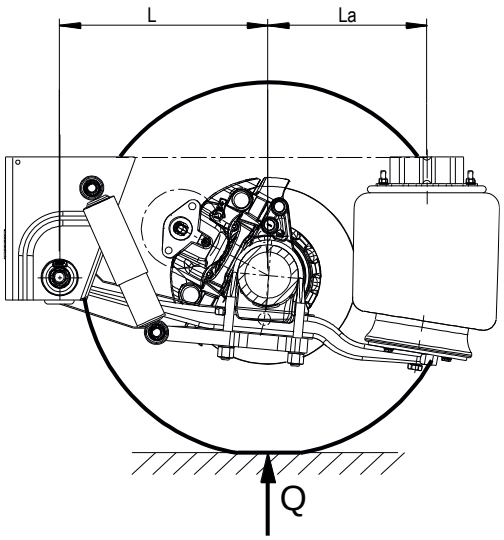


Air bag overview



Description	Article number. - code:	Top view
2618V H_{min} = 180 mm H_{max} = 550 mm Ø 300 mm plastic piston	3 228 0029 00 - **29**	
2918V H_{min} = 180 mm H_{max} = 520 mm Ø 350 mm steel piston	3 228 0027 00 - **27**	
2919V H_{min} = 180 mm H_{max} = 520 mm Ø 350 mm plastic piston	on request, depending on air bag offset (**V**) - **42**	
2923V H_{min} = 225 mm H_{max} = 625 mm Ø 350 mm steel piston	3 228 0031 00 - **31**	
2924V H_{min} = 225 mm H_{max} = 625 mm Ø 350 mm plastic piston	on request, depending on air bag offset (**V**) - **41**	

Calculation of the air bag pressure



Formula to calculate the air pressure when fully loaden:

$$P = \frac{(Q - A) \times i \times p}{2} \times 10^5\ Pa$$ (1 bar = 10^5 N/m² = 10^5 Pa = 0,1 MPa)

P = air pressure in the air bag [Pa]
Q = permissible axle load on the ground [kg]
A = unsprung mass [kg] mean value for A = Q x 0,1
i = ratio $i = \frac{L}{L + La}$
p = air pressure in the air bag per kg load
where: air bag Ø 300mm (SAF 2618V) p = 0,00244 x10^5 Pa/kg
air bag Ø 350mm (SAF 2918V / 2923V / 2926V) p = 0,00187 x10^5 Pa/kg

Example:
Air suspension type: M36/2500EN29 (air bag SAF 2618V)
Q = 9000 kg A = Q × 0,1 = 900 kg
L = 500 mm, La = 385 mm $i = \frac{500}{500 + 385} = 0{,}565$
p = 0,00244 x10^5 Pa/kg $P = \frac{(9000 - 900) \times 0{,}565 \times 0{,}00244}{2} \times 10^5\ Pa$

P = 5,58 *10^5 Pa

Formula to calculate the air pressure when partially loaden:

$$Pt = \frac{(Qt - A) \times i \times p}{2} \times 10^5\ Pa$$

Q_t = axle load on the ground when partially loaden
Example:
Air suspension type: M36/2500EN29 (air bag SAF 2618V)
Q_t = 2100 kg A = Q × 0,1 = 900 kg
L = 500 mm, La = 385 mm $i = \frac{500}{500 + 385} = 0{,}565$
p = 0,00244 x10^5 Pa/kg $P = \frac{(2100 - 900) \times 0{,}565 \times 0{,}00244}{2} \times 10^5\ Pa$

Pt =0,83 *10^5 Pa

Force-pressure-diagram

The shown air pressure line in the diagramm (force-pressure-diagramm) shows the force-pressure-values of an ideal adjusted air suspension.

This can be influenced as follow:

- Utilization of the total ride height range, thereby changing the ratio **i** and the air spring length
- Anomaly of the real unsprung mass caused by different suspension types, wheels and tires
- Anomaly of the effective area of the air spring caused by the angled position (depending on the air suspension type)

Therefore we recommend, for adjusting the EBS, to check the theoreticall, calculated pressure values with the realistic values at the trailer. If needed these values need to be be re-adjusted. Only with this check an optimized brake perfomance can be achieved. This is also valid for installations of axle load measurements.

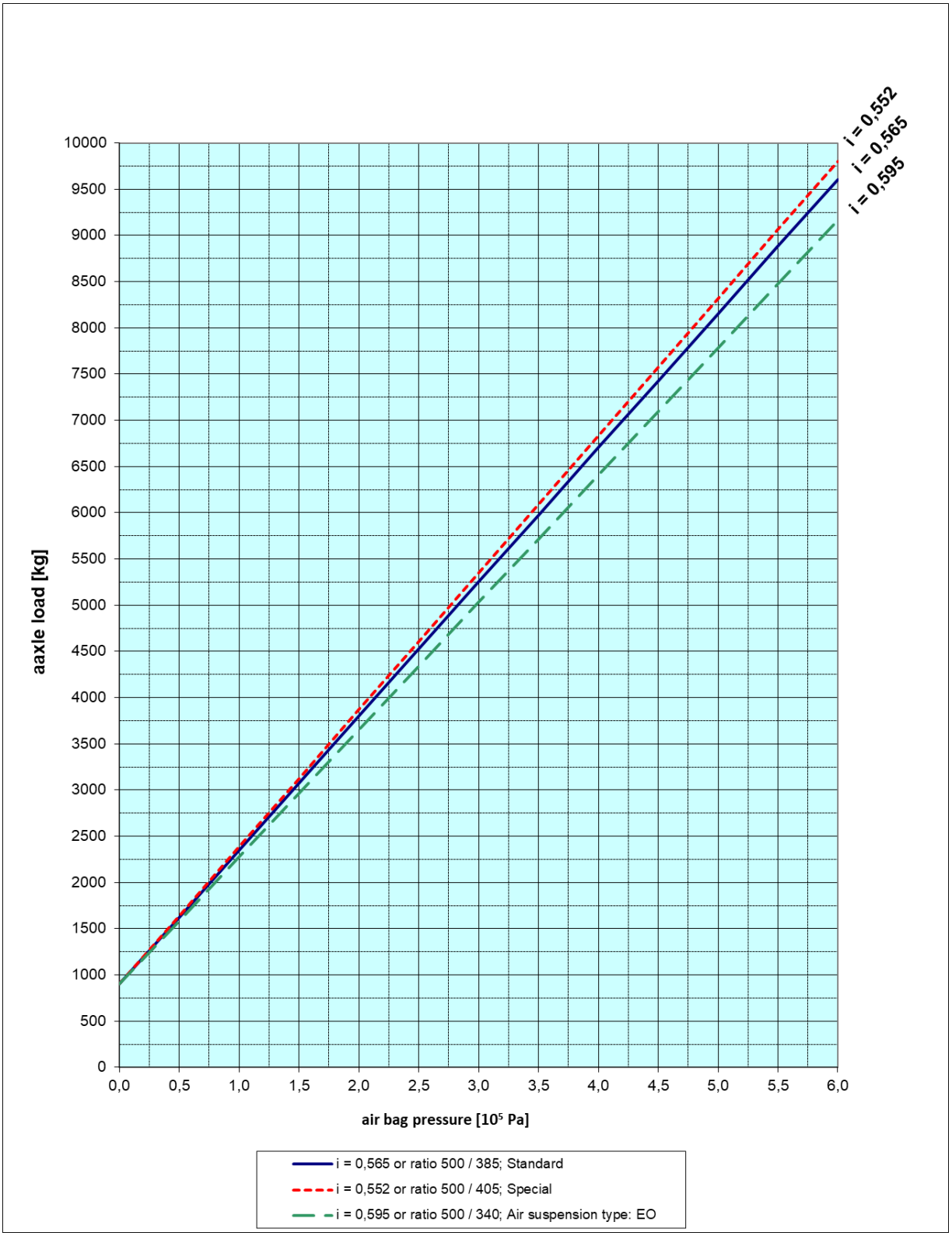
Possible inspection method:

1. position trailer on even ground
2. connect the air pressure gauge to the test-outlet of the carrying air spring
3. measurement to be done with unladen trailer
4. put the, to be measured axle, on a scale
5. meausure the weight of the axle
6. read out of the air pressure in the air spring
7. compare the measured values with the values at the force-pressure diagram
8. if necessary EBS values needs re-adjusting to the measured values
9. conduct measurement with a partial- and full-load
10. repeat steps 4 – 8 for all carrying air springs

It is assumed that all measuring instruments are calibrated

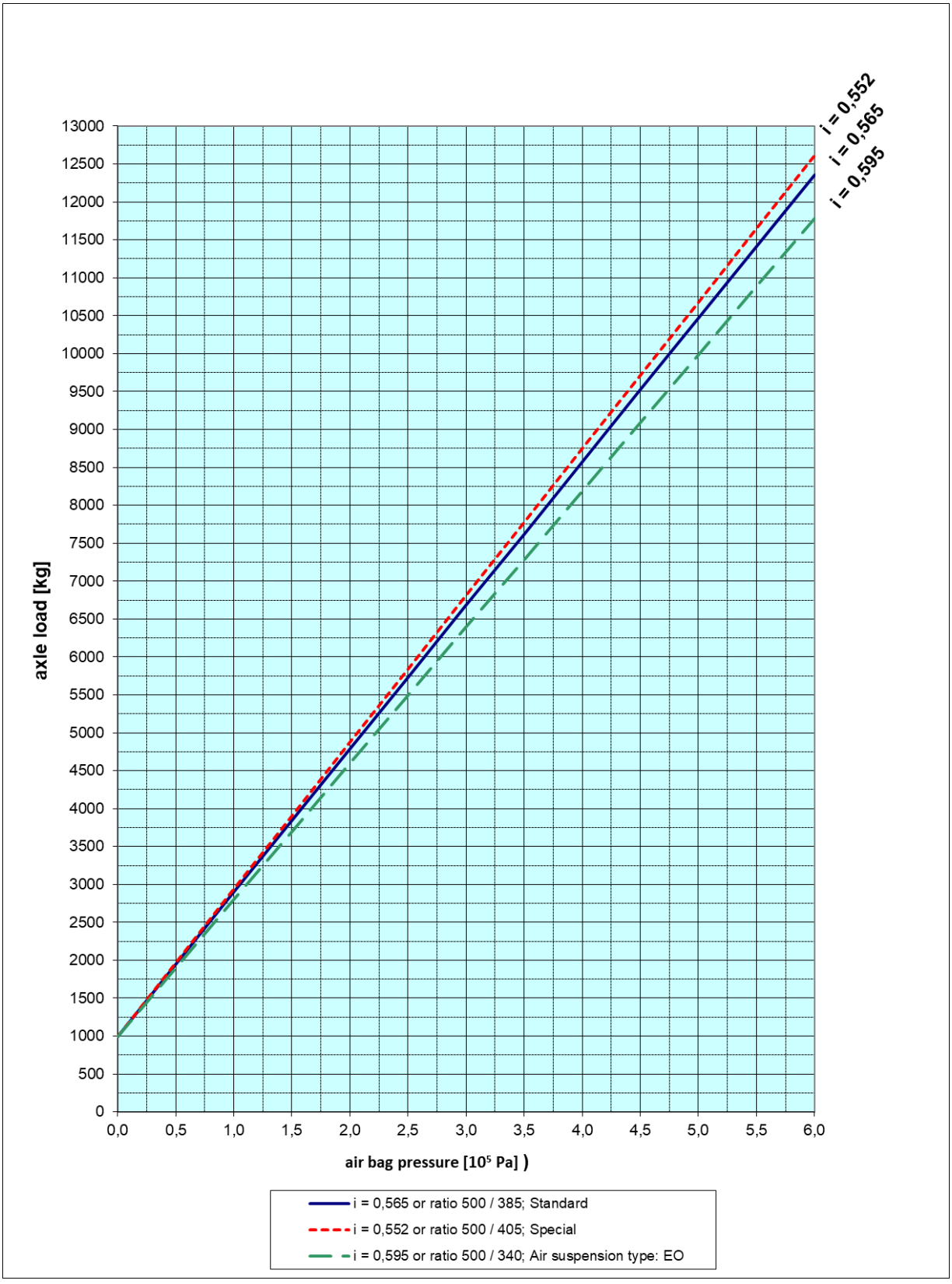
Force-pressure diagram for air bag with diameter 300 mm

Air bag: SAF 2618V (29)

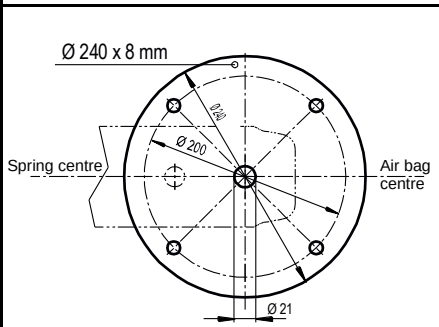
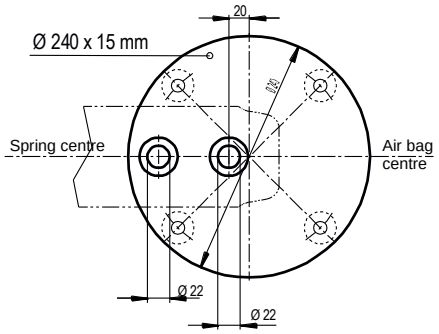
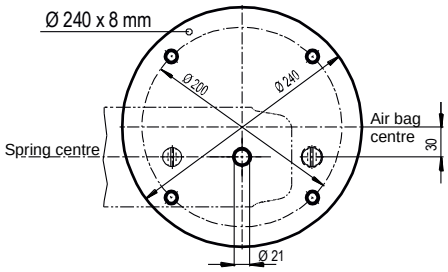
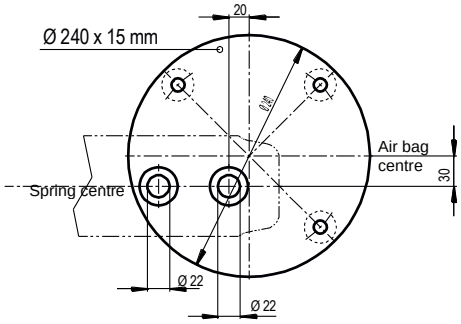
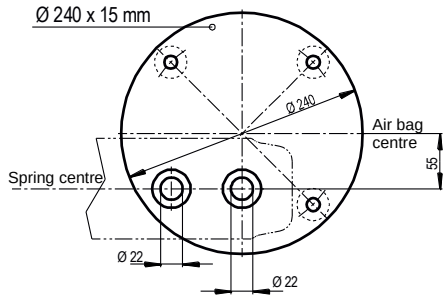
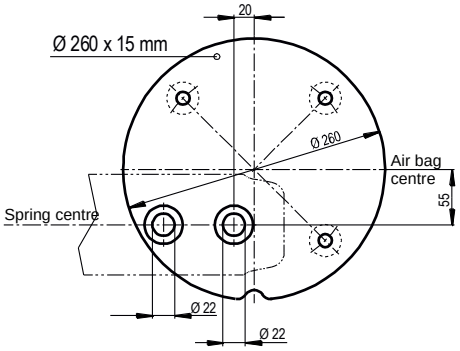
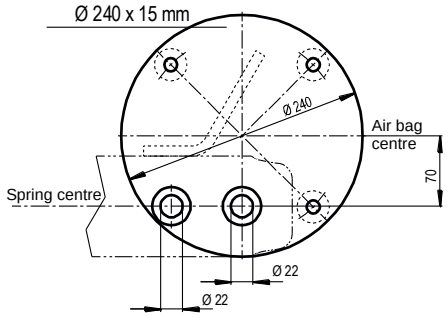
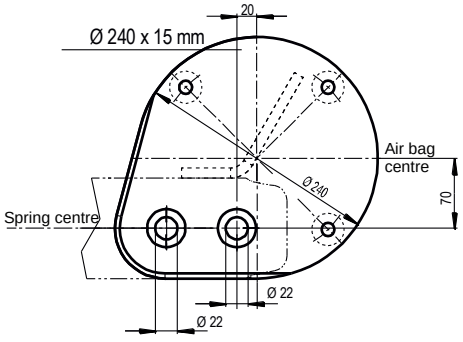


Force-pressure diagram for air bag with diameter 350 mm

Air bags: **SAF 2918V (27)**
SAF 2923V (31)
SAF 2924V (41)
SAF 2919V (42)



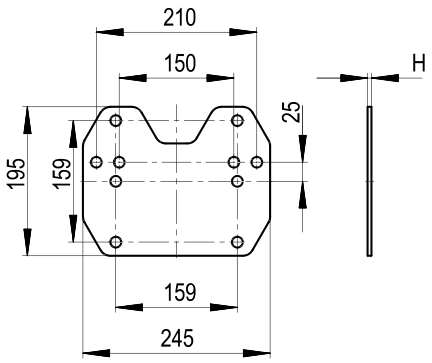
Mounting plates for air bag offset (V) overview

air bag offset (V)	standard	La +20 mm
0 mm		
	03 043 0291 00	03 043 0345 00
30 mm		
	03 043 0292 01	left – 03 043 0307 00 (shown) right – 03 043 0308 00 (mirrored)
55 mm		
	left – 03 043 0328 00 (shown) right – 03 043 0327 00 (mirrored)	left – 03 043 0369 00 (shown) right – 03 043 0370 00 (mirrored)
70 mm		
	left – 03 043 0289 00 (shown) right – 03 043 0290 00 (mirrored)	left – 03 043 0401 00 (shown) right – 03 043 0402 00 (mirrored)

Article numbers contain the mounting parts for installation on the trailing arm

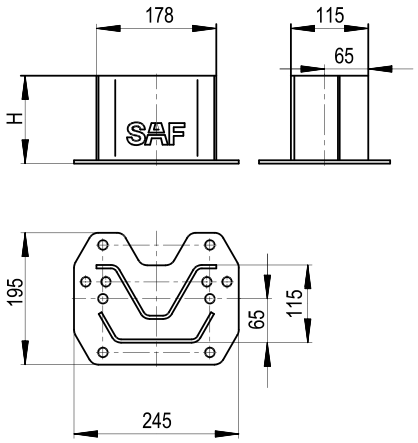
Overview air bag brackets

Plates

article number:	H [mm]	
01 043 0261 01	5	
01 043 0262 01 (aluminium)	8	

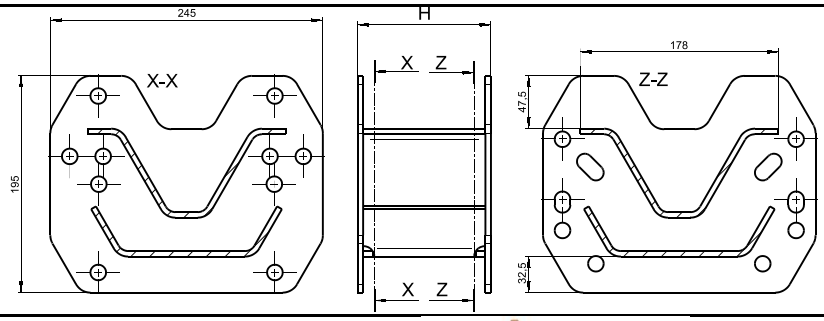
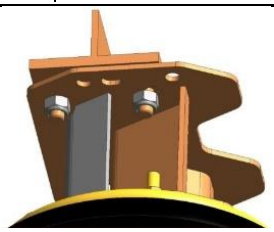
With non-primed plates, the last digits of the article number changes from 01 to 91,
see for example: 01 043 0261 91

Air bag brackets - standard

Article number	H [mm]	description
02 237 0070 01	40	
02 237 0081 01	50	
02 237 0071 01	70	
02 237 0080 01	100	
02 237 0072 01	130	
02 237 0073 01	160	

With non-primed air bag brackets, the last digits of the article number changes from 01 to 91,
see for example: 02 237 0070 91

Air bag brackets – “screw-on”

Article number:	H (mm)	
02 237 1081 01	55	
02 237 1071 01	75	
02 237 1080 01	105	example V = 30 
02 237 1082 01	155	

With non-primed air bag brackets, the last digits of the article number changes from 01 to 91,
see for example: 02 237 0070 91

Surface coating of SAF components

Corrosion protection of SAF-HOLLAND products:

To achieve an ideal corrosion protection on SAF-HOLLAND products, we use the following different coating methodes:

Cathodic dip coating (KTL):

Features:

- Complete corrosion protection in all areas of the component.
- High surface hardness with uniform coat thickness.
- Recoatable with all single-component or 2-component top coats.
- Coat thickness is max. **45** µm.
- Min. **504 h**. salt spray test according to DIN EN ISO 9227.

Application example: trailing arm, axle beam.

Cathodic dip coating (KTL) thin layer:

Features:

- Complete corrosion protection in all areas of the component.
- High surface hardness with uniform coat thickness.
- Recoatable with all single-component or 2-component top coats.
- Coat thickness is max. **20** µm.
- Min. **200 h**. salt spray test according to DIN EN ISO 9227.

Application example: wheelhub

Dip coating:

Features:

- Complete corrosion protection in all areas of the component.
- Recoatable with all single-component or 2-component top coats.
- Coat thickness is max. **30** µm.
- Min. **100 h**. salt spray test according to DIN EN ISO 9227.

Application example: hanger bracket

Zinc-flake coating (Cr(VI)-free types):

Features:

- High quality corrosion protection for threaded fastening elements.
- Suitable for high-strenght bolting elements.
- Adjustable friction coefficient for a reliable screwing process.
- Min. **480 h**. salt spray test according to DIN EN ISO 9227.

Application example: pivot bolt mounting, disc brake mounting.

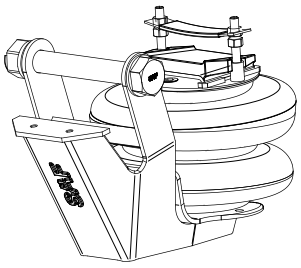
Recommendation for users:

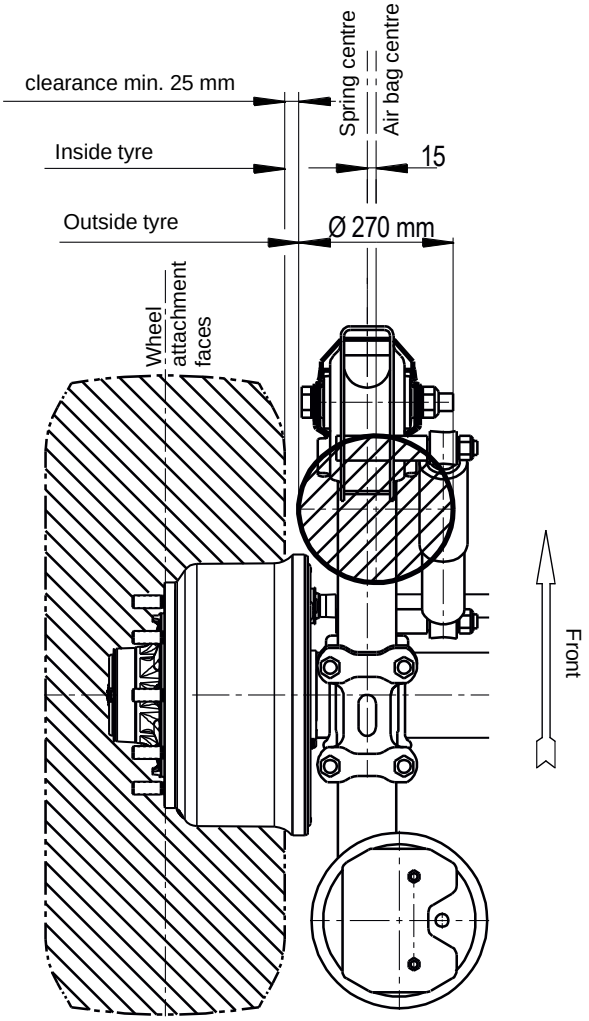
- In principle, dip coating can be welded over. SAF-HOLLAND recommends, however, that these coats needs to be removed in the area of weld seams.
- All contact surfaces of the pivot bolts and shock absorbers bolts are not allowed to have additional primer or paint coatings.
- Wheel attachment faces are not allowed to be painted. The wheel attachment face must be clean and free of grease. In general the remarks of the wheel manufactures needs to be followed.

Two side axle lift for axles with drum brake

We recommend a minimum of **100** mm lift travel when setting the ride height. The use of 19,5” tyres is possible in combination with two sided axle lift if the clearance to the ground is taken into account. With installation of a two sided axle lift a minimum distance of **15** mm between lift air bag and brake drum are to be considered.

For axles with disc brake on request.





Calculation of clearance between lift air bag and tyre

The clearance must be at least **25** mm.

Formula:

$$\frac{AX - LM - \text{max. tyre width} - 270}{2} + 15 \geq 25\text{mm}$$

Example with: M36/2500EN29 S9-4218

- distance wheel attachment faces: 2040 mm
- spring centre: 1300 mm
- tyre width (max.): 405 mm
  (E.T.R.TO. Norm for tyre 385/65R22,5“)
- lift air bag diameter 270 mm
- lift air bag offset 15 mm

$$\frac{2040 - 1300 - 405 - 270}{2} + 15 = 47{,}5 \geq 25\text{ mm}$$

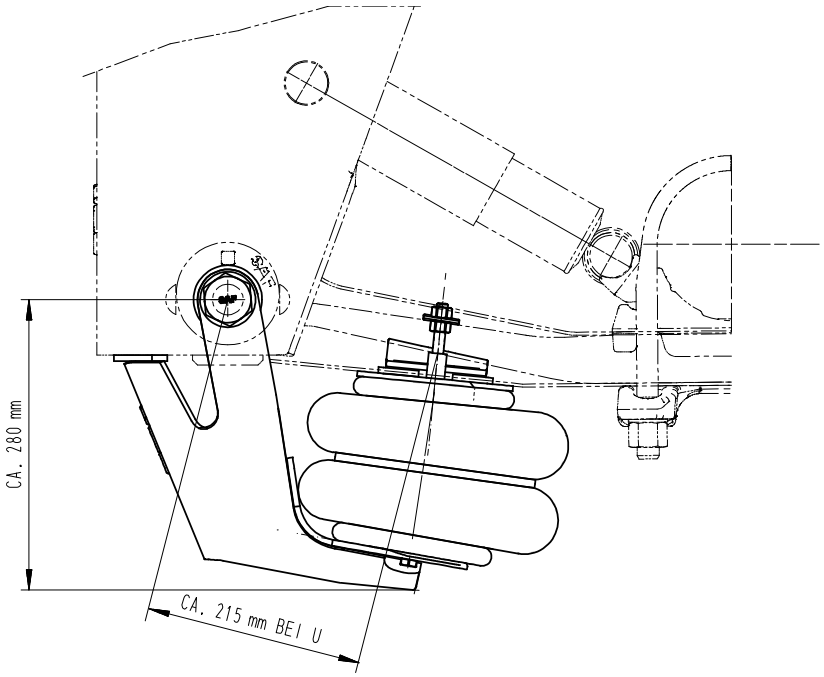
Installation combination of the two side axle lift for modul series with single leaf trailing arm.

Single tyre 22,5“				
AX [mm]	**LM** [mm]	**lift air bag centre** [mm]	**tyre size (example)**	
			385/65R22,5"	425/65R22,5"
1970	1200	1170	applicable	applicable
2040	1200	1170	applicable	applicable
2040	1300	1270	applicable	applicable
2090	1300	1270	applicable	applicable
2090	1400	1370	applicable	not applicable
2140	1400	1370	applicable	applicable

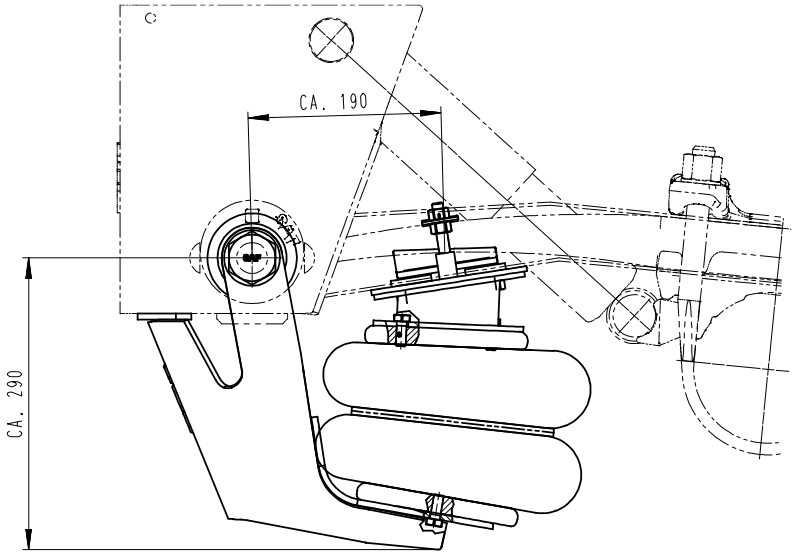
Other axle combinations must be checked.

Two side axle lift types

For axles with drum brake SNK 420, single tyre and single leaf trailing arm



air suspension serie „U../….EN..“



air suspension serie „M../….EN..“

Following types are obtainable:

kit number:	air suspension serie	application
03 027 1205 01	U../….EN..	for steel hanger bracket
03 027 1216 01	U../….EN..	for cross member
03 027 1236 00	M../….EN..	for steel hanger bracket
03 027 1237 00	M../….EN..	for cross member

Further variants on request

Weight per axle approx. 30 kg (2 kits).

Kit content - two side axle lift

Per axle are two kits needed.

	U../….EN..		M../….EN..			
	steel hanger bracket	cross member	steel hanger bracket	cross member		
kit number:	**3 027 1205 01**	**3 027 1216 01**	**3 027 1236 00**	**3 027 1237 00**	pos.	per kit
lift arm	2 239 0015 01	2 239 0016 01	2 239 0015 01	2 239 0016 01	(**6**)	1x
hexagon screw	4 343 1085 88				(**1**)	1x
disc	1 331 0117 00				(**2**)	2x
lift air bag	4 229 1004 00				(**7**)	1x
plate	4 284 6046 02				(**9**)	1x
counter sunk screw	4 343 5010 88				(**10**)	2x
distance piece	4 095 0065 00				(**13**)	1x
threaded bolt	4 178 2004 88				(**16**)	2x
clamping plate	4 350 0101 00				(**15**)	1x
hexagon nut	4 342 0004 60				(**14**)	4x
hexagon screw	4 343 1006 88				(**8**)	2x

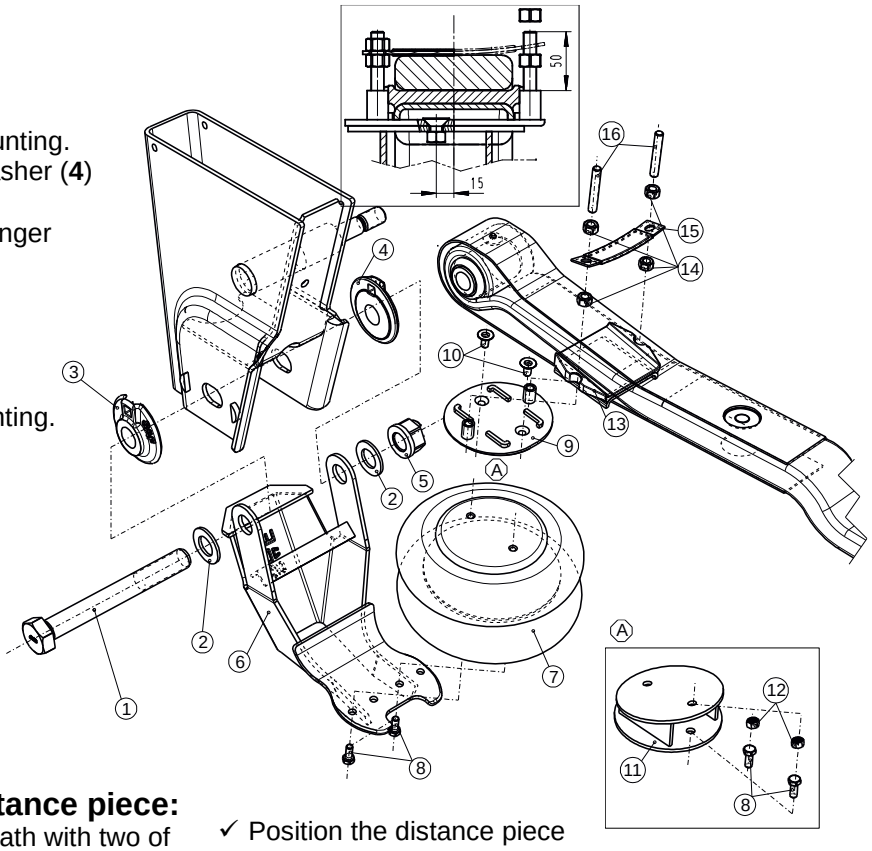
Ⓐ

hexagon screw	4 343 1006 88	(**8**)	2x
distance piece	2 095 0074 00	(**11**)	1x
hexagon nut	4 342 0041 10	(**12**)	2x

Installation instruction

Installation of the lift arm:

- ✓ Remove the existing pivot bolt mounting. Eccentric washer (**3**) and thrust washer (**4**) re-use.
- ✓ Position the lift arm (**6**) over the hanger bracket or cross member.
- ✓ Mount the pivot bolt according to the illustration. Use the hexagon screw (**1**), discs (**2**) and lock nut (**5**) new from the kit. Washers (**3**) and (**4**) of the demounting.
- ✓ **Important: the pivot bolt must be tightened according to the SAF-HOLLAND torque regulations in the ride height. (400Nm + 120°, see Page 113)**



Installation of lift air bag/ distance piece:

- ✓ Fix the lift air bag (**7**) from underneath with two of the enclosed screws (**8**) to the lift arm (**6**). **Tightening torque 50 Nm**. The air intake of the lift air bag **must,** as illustrated**,** point downwards to the lift arm (**6**).
- ✓ Mount the plate (**9**) with screws (**10**) to the lift air bag upside. **Tightening torque 50 Nm**

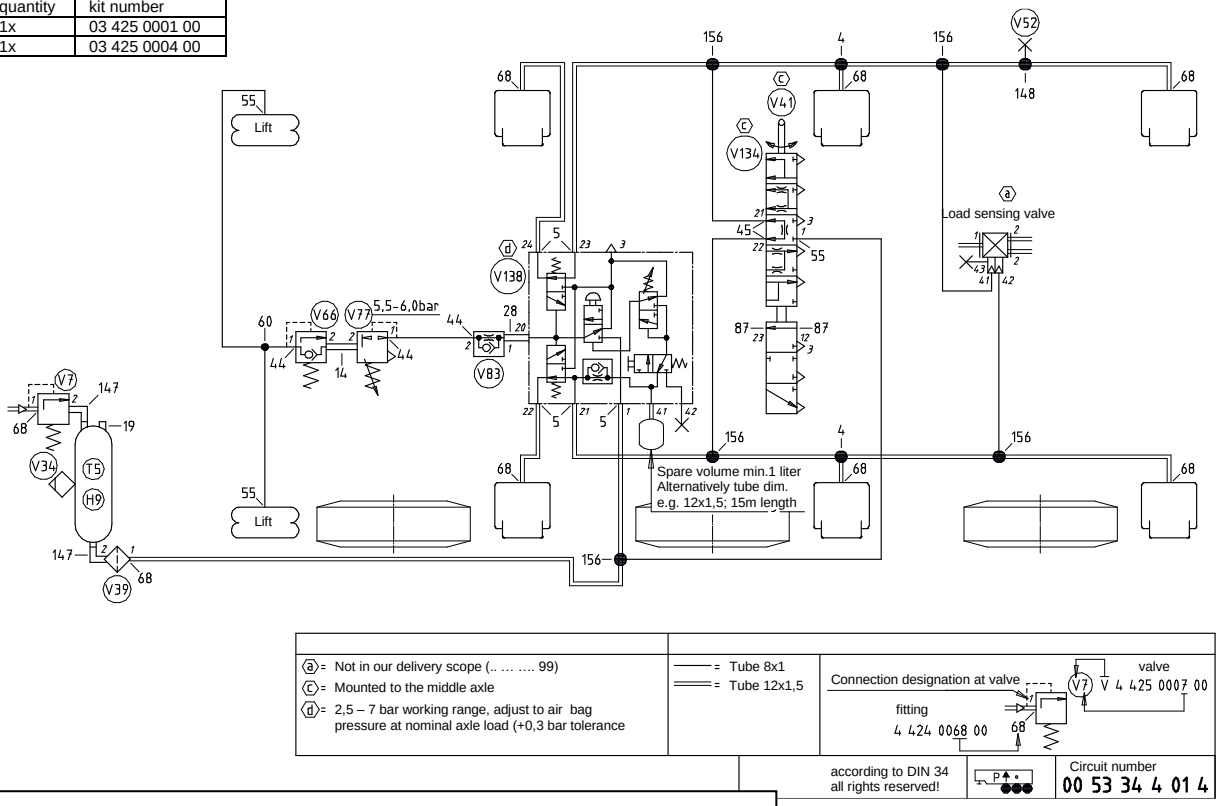
Ⓐ For air suspension serie M is an extra distance piece (**11**) needed between lift air bag upper plate and plate (**9**), to be mounted with screws (**8**) and nuts (**12**). **Tightening torque 50 Nm**

- ✓ Position the distance piece (**13**) between protection plate and trailing arm according to the type drawing (Page 99).
- ✓ Screw the threaded bolts (**16**) to the plate (**9**) as illustrated. **Tightening torque 25-30 Nm**
- ✓ Lift air bag (**7**), plate (**9**) and distance piece ((**11**), **13** und **15**) are locked in position by the threaded bolts (**16**) and fixed with the nuts (**14**). **Tightening torque 50 Nm**

Circuit diagram, two side axle lift

Triaxle with two side axle lift with lift axle control valve (pneumatically controlled)

00 53 34 4 01 4 composed of:	
quantity	kit number
1x	03 425 0001 00
1x	03 425 0004 00



ⓐ = Not in our delivery scope (.. … …. 99)
ⓒ = Mounted to the middle axle
ⓓ = 2,5 – 7 bar working range, adjust to air bag pressure at nominal axle load (+0,3 bar tolerance

= Tube 8x1
= Tube 12x1,5

Connection designation at valve
fitting
4 424 0068 00
valve
V 4 425 0007 00

Circuit number
00 53 34 4 01 4

Max. lift air bag pressure 6,0 bar; residual pressure 0,5 bar!

reference no. ⇨ **00 53 34 4 01 4** ⇨ **composed of:**

SAF KIT Basic		SAF KIT 2SL	
3 425 0001 00	1x	3 425 0004 00	1x

SAF reference	quantity	SAF reference	quantity	description	dimensions	WABCO ref.
4.424.0004.40	2	4.424.0004.40	1	EQUAL TEE COUPLING	D12/12/12	893 861 450 0
		4.424.0005.40	5	STRAIGHT MALE STUD COUPLING	M16x1,5/D12	893 803 430 0
		4.424.0014.40	1	DOUBLE CONNECTOR WITH LOCK NUT	M22x1,5	893 890 440 0
4.424.0019.40	1			MALE PLUG	M22x1,5	893 022 009 4
		4.424.0028.40	1	DOUBLE CONNECTOR	M22x1,5	893 890 440 0
4.424.0044.40	1	4.424.0044.40	3	STRAIGHT MALE STUD COUPLING	M22x1,5/D8	893 803 400 0
4.424.0045.40	2			STRAIGHT MALE STUD COUPLING	M12x1,5/D8	893 803 490 0
4.424.0055.40	1	4.424.0055.40	2	MALE STUD ELBOW COUPLING	M12x1,5/D8	893 831 240 0
		4.424.0060.40	1	EQUAL TEE COUPLING	D8/8/8	893 862 010 0
4.424.0068.40	7	4.424.0068.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D12	893 803 440 0
4.424.0087.40	2			MALE PLUG	M16x1,5	893 022 008 4
4.424.0147.40	2			ELBOW WITH LOCK NUT	M22x1,5	893 890 641 0
4.424.0148.40	1			MALE STUD TEE COUPLING	M22x1,5/D12/D12	893 850 970 0
4.424.0156.40	4	4.424.0156.40	1	EQUAL TEE COUPLING	D12/8/12	
V 4.425.0007.00	1			CHARGING VALVE WITHOUT RETURN FLOW 6,0 BAR	M22x1,5	434 100 125 0
V 4.425.0034.40	1			DRAIN VALVE	M22x1,5	934 300 001 0
V 4.425.0039.00	1			LINE FILTER	M22x1,5	432 500 020 0
V 4.425.0041.00	1			LINK CONNECTION FOR LEVELLING VALVE	M8/D6	433 401 003 0
V 4.425.0052.00	1			TEST COUPLING	M22x1,5	463 703 117 0
		V 4.425.0066.00	1	CHARGING VALVE WITH RETURN FLOW 0,5 BAR	M22x1,5	434 100 027 0
		V 4.425.0077.00	1	PRESSURE LIMITING VALVE 1,8 BAR	M22x1,5	475 010 307 0
		V 4.425.0083.00	1	CHECK VALVE CONSTANT THROTTING D1	M22x1,5	434 014 001 0
V 4.425.0134.00	1			LEVELLING VALVE	M12x1,5/M16x1,5	464 006 100 0
		V 4.425.0138.00	1	LIFT AXLE CONTROL VALVE	M16x1,5/M22x1,5	463 084 000 0
T 4.105.0005.00	1 △			AIR RESERVOIR 60 LTR	D276x1100	950 760 002 0
H 4.405.0009.00	2 △			HOLDER (AIR RESERVOIR) 40/60 LTR	D276	451 999 276 2

△ = do not belong to a SAF-KIT.

Pendulum lift

For suspension serie „U“, „M“ and „EO“ with single- and double leaf trailing arm.

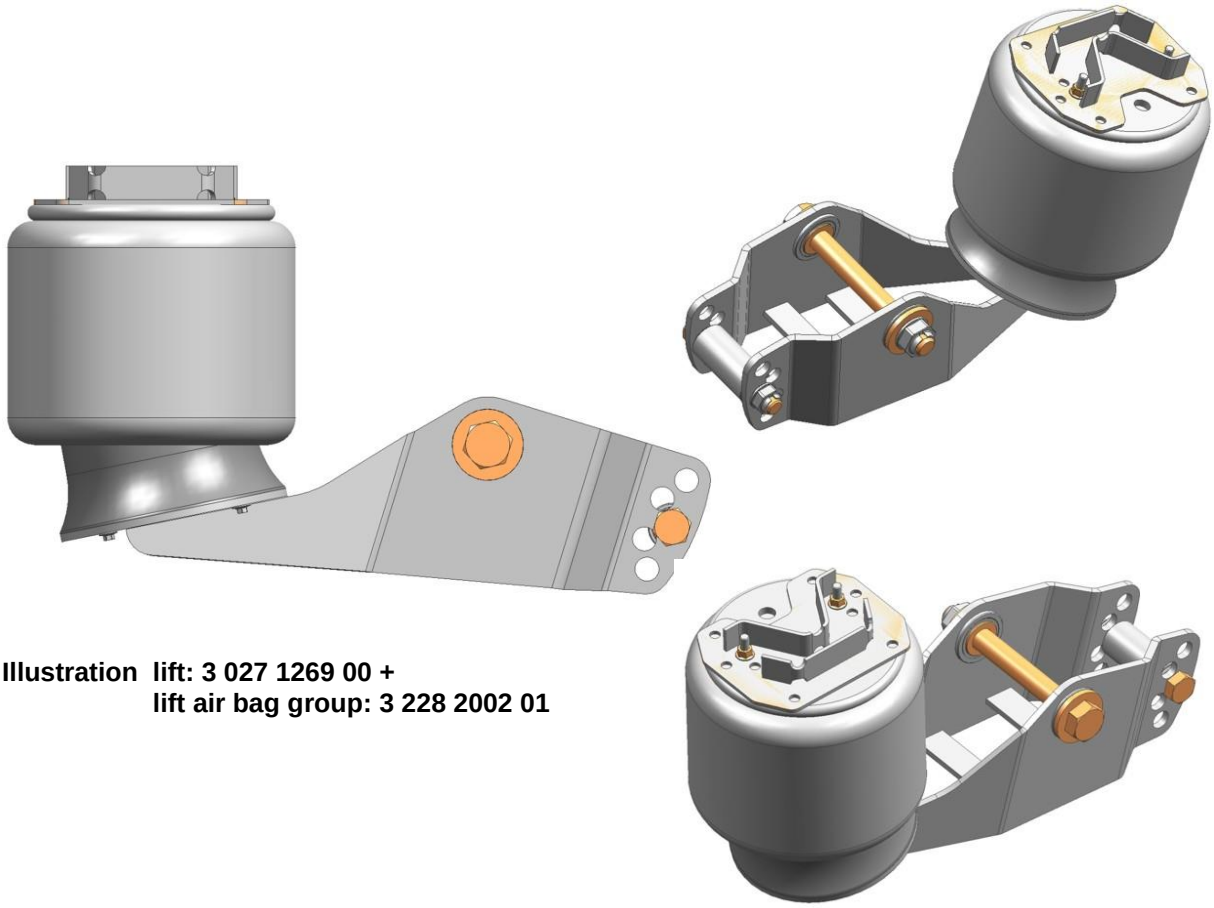
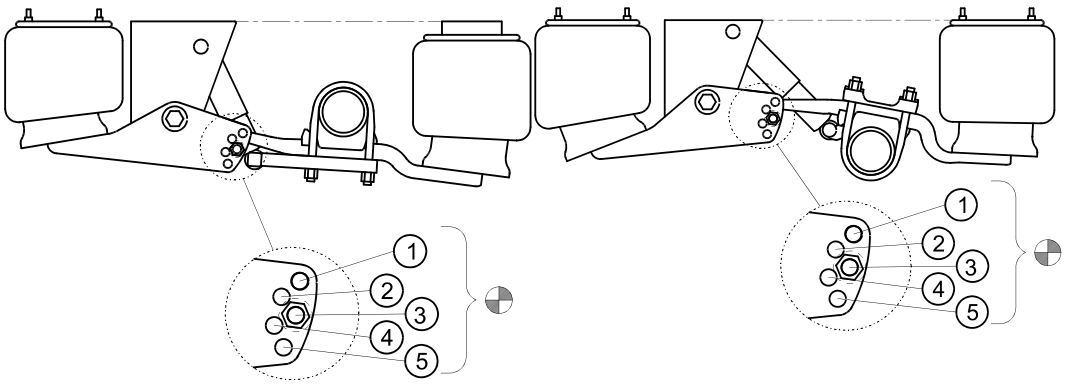


Illustration lift: 3 027 1269 00 +
lift air bag group: 3 228 2002 01



The mounting position (⊕) for the supporting roll is to be taken from the respective suspension drawing.

Weight starts at 27 kg.

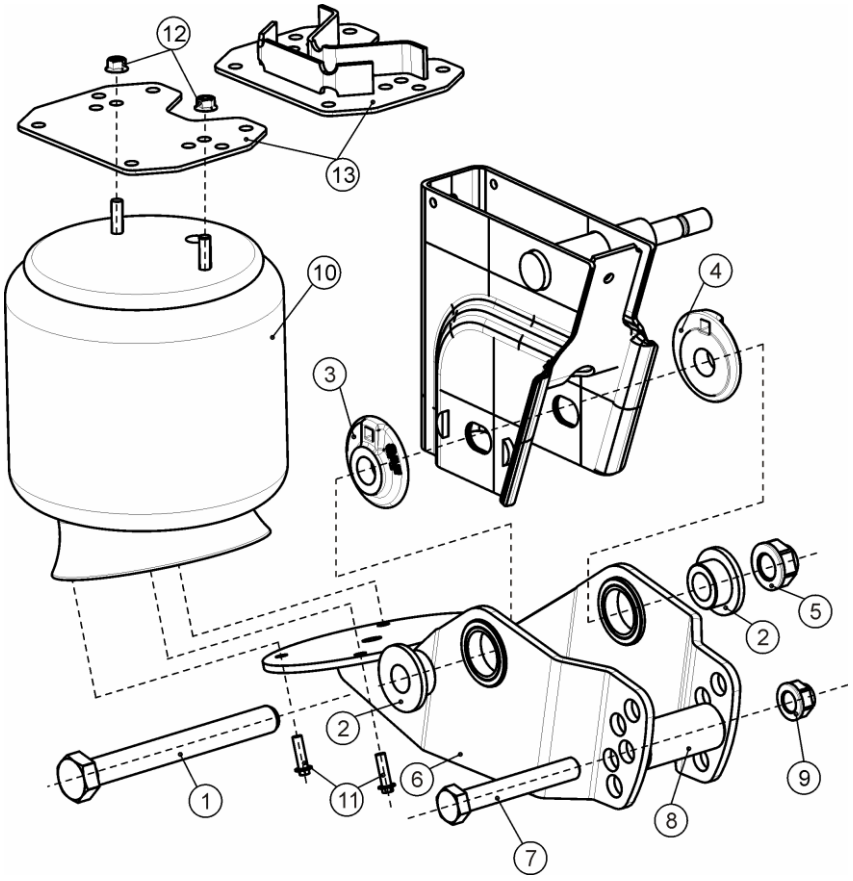
Note:
We recommend a minimum of **100** mm lift travel when setting the ride height.

Not applicable with use of cross member or aluminium hanger bracket.
Avoid any collision of the lift arm to the hanger bracket lateral reinforcement.

Kit content pendulum lift

A lift kit contains 1 kit + 1 lift air bag combination group**.**

kitnumber:	**3 027 1269 00**	pos.	pro kit
lift arm	2 239 0043 00	(**6**)	1x
hexagon screw M30x260	4 343 1049 88	(**1**)	1x
hexagon nut M30	4 247 4022 80	(**5**)	1x
pilot bush	1 148 1005 00	(**2**)	2x
hexagon screw M24x160	4 343 2058 88	(**7**)	1x
supporting roll	2 309 3032 00	(**8**)	1x
hexagon nut M24	4 247 4040 80	(**9**)	1x
+ lift air bag combination group:	**3 228 200... 01**		
lift air bag	3 229 0033 00	(**10**)	1x
self cutting screw K100x40	4 343 2037 00	(**11**)	3x
hexagon screw M12	4 247 4047 10	(**12**)	2x
air bag bracket or mounting plate	depending on air suspension type	(**13**)	1x



Installation instruction

Installation of the supporting roll (8):

Choose the right position. (on request) Mount the supporting roll (**8**) with screw (**7**) and lock nut (**9**).
Tightening torque 420 Nm.

Installation of the lift arm (6):

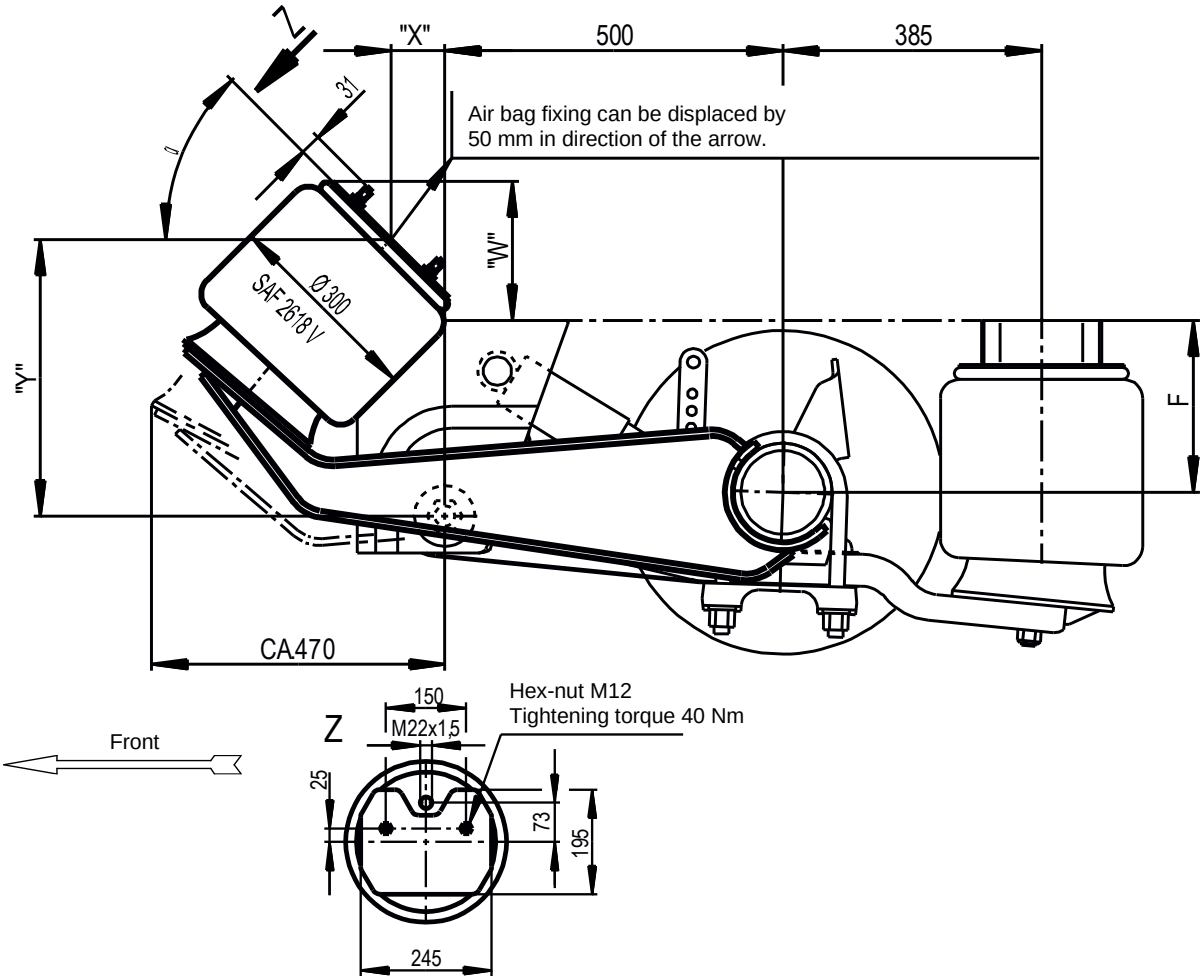
- ✓ Remove the existing pivot bolt mounting. Eccentric washer (**3**) and thrust washer (**4**) re-use.
- ✓ Position the lift arm (**6**) over the hanger bracket and place the supporting roll to the trailing arm. (without picture).
- ✓ Fasten the pivot bolt according to the illustration. Use het hexagon screw (**1**)**,** pilot bushes (**2**) and lock nut (**5**) new from the kit. Washers (**3**) and (**4**) of the demounting.
- ✓ **Important: the pivot bolt must be tightened according to the SAF-HOLLAND torque regulations in the ride height. (400 Nm + 120°, see Page 113)**

Installation of the lift air bag (10):

- ✓ Apply the mounting plate respectively air bag bracket (**13**) to the trailer. (see Page 110 resp. suspension drawing)
- ✓ Fasten the lift air bag (**10**) with the screws (**11**) to the lift arm (**6**). **Tightening torque 20 Nm.**
- ✓ Fasten the lift air bag (**10**) to the mounting plate resp. air bag bracket (**13**) by the top bolts with the hexagon screws (**12**). **Tightening torque 40 Nm.** Take hereby note to the position of the air intake port.
- ✓ Circuit diagram see Page 106

Centre axle lift

For suspension series U with single- and double leaf trailing arm



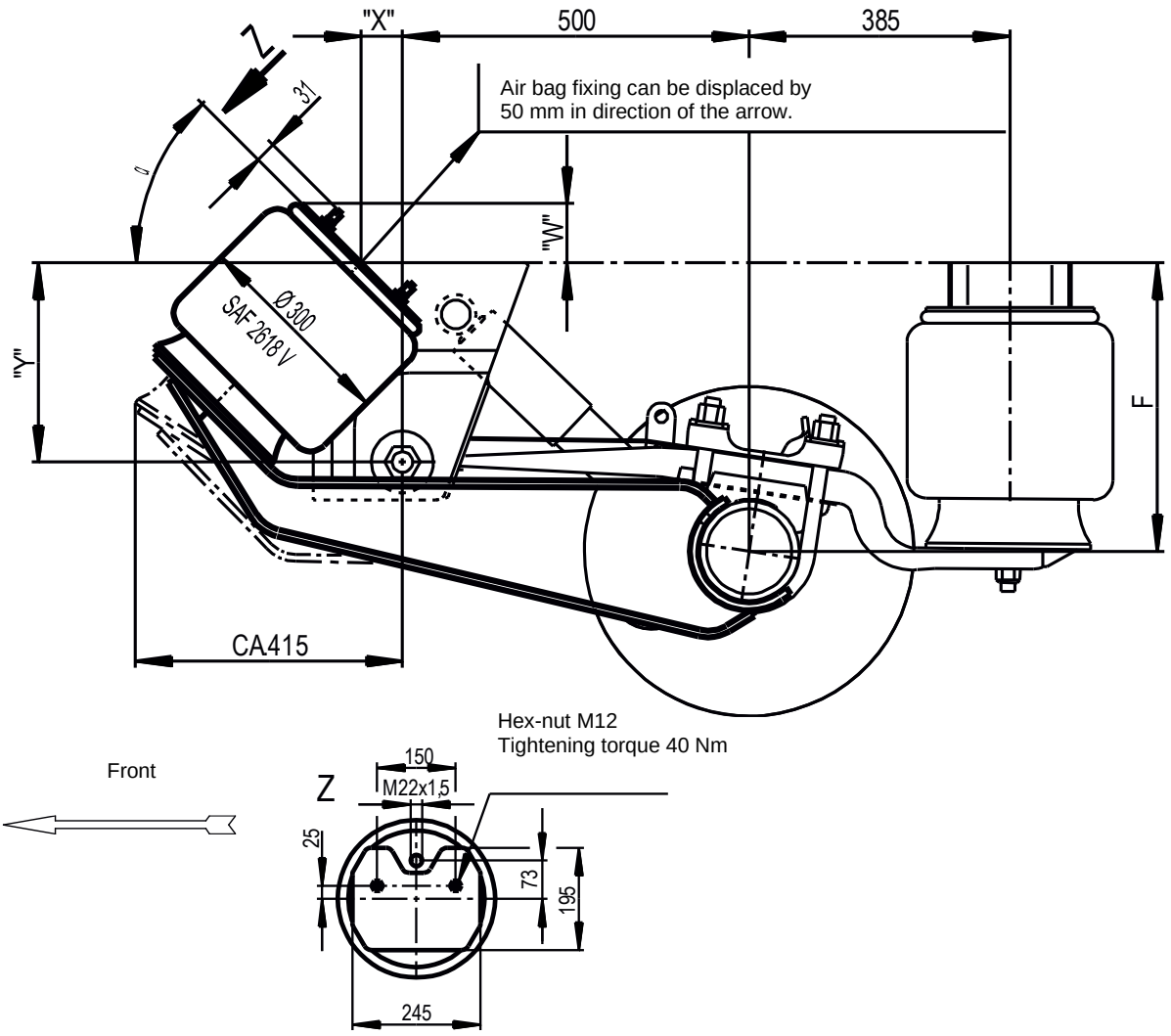
Weight starts at approx. 32 kg

We recommend a minimum of **100** mm lift travel when setting the ride height.
Option: lift air bag Ø 350 mm (SAF 2918V) on request.

air suspension type	dimension "X" [mm]	"Y" [mm]	"α" [mm]	"W" approx. [mm]	with mounting plate "steel" axle beam Ø 146 mm	with mounting plate "steel" axle beam Ø 127 mm	with mounting plate "aluminium" axle beam Ø 146 mm	with mounting plate "aluminium" axle beam Ø 127 mm
					3 027 …. 00			
U20/2500_29	90	400	45°	240	1193	1192	1219	1218
U22/2504_29	80	410	45°	250				
U24/2904_29	90	400	45°	200				
U25/2907_29	80	410	45°	210				
U27/2910_29	70	420	45°	220				
U30/3510_29	90	400	45°	135				
U31/3513_29	80	410	45°	145				
U33/3516_29	70	420	45°	155				
U23/2500_31	50	415	50°	260	1193	1192	1219	1218
U25/2504_31	40	420	50°	265				
U27/2904_31	50	415	50°	220				
U28/2907_31	40	420	50°	225				
U30/2910_31	35	430	50°	235				
U33/3510_31	50	415	50°	155				
U35/3513_31	40	420	50°	160				
U36/3516_31	35	430	50°	170				

Centre axle lift

For suspension serie M with single- and double leaf trailing arm.



Weight starts at approx. 32 kg

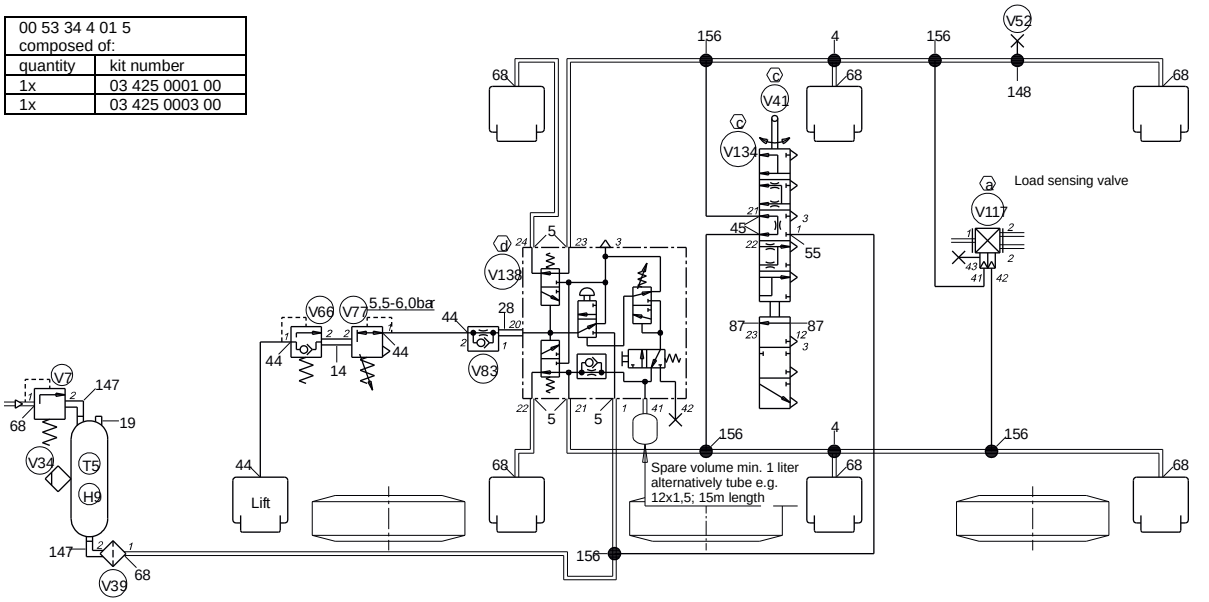
We recommend a minimum of **100** mm lift travel when setting the ride height.
Option: lift air bag Ø 350 mm (SAF 2918V) on request.

air suspension type	dimension "X" [mm]	"Y" [mm]	"α" [mm]	"W" approx. [mm]	with mounting plate "steel" axle beam Ø 146 mm	with mounting plate "steel" axle beam Ø 127 mm	with mounting plate "aluminium" axle beam Ø 146 mm	with mounting plate "aluminium" axle beam Ø 127 mm
					0 027 …. 00			
M36/2500_29	65	285	45°	125	1193	1192	1219	1218
M38/2504_29	60	290	45°	130				
M40/2904_29	65	285	45°	85				
M42/2907_29	60	290	45°	90				
M43/2910_29	55	295	45°	95				
M46/3510_29	65	285	45°	20				
M40/2500_31	45	305	45°	145	1193	1192	1219	1218
M42/2504_31	40	310	45°	150				
M43/2904_31	45	305	45°	105				
M45/2907_31	40	310	45°	110				
M47/2910_31	35	315	45°	115				
M50/3510_31	45	305	45°	40				

Circuit diagram, one sided or pendulum lift

Triaxle with lift (one sided or pendulum lift) and lift axle control valve (pneumatically controlled)

00 53 34 4 01 5 composed of:	
quantity	kit number
1x	03 425 0001 00
1x	03 425 0003 00



ⓐ Not in our delivery scope (.. … …. 99)
ⓒ Mounted to the middle axle
ⓓ 2,5 – 7 bar working range, adjust to air bag pressure at nominal axle load (+0,3 bar tolerance

Tube 8x1
Tube 12x1,5

Connection designation at valve
valve
V7 V 4 425 0007 00
fitting
4 424 0068 00
68

Circuit number
00 53 34 4 01 5

max. lift air bag pressure 6,0 bar; residual pressure 0,5 bar!

Reference no. ⇨ **00 53 34 4 01 5** ⇨ **composed of**

SAF KIT Basic		SAF KIT 1SL	
3 425 0001 00	1x	3 425 0003 00	1x

SAF reference	quantity	SAF reference	quantity	description	dimensions	WABCO ref.
4.424.0004.40	2	4.424.0004.40	1	EQUAL TEE COUPLING	D12/12/12	893 861 450 0
		4.424.0005.40	5	STRAIGHT MALE STUD COUPLING	M16x1,5/D12	893 803 430 0
		4.424.0014.40	1	DOUBLE CONNECTOR WITH LOCK NUT	M22x1,5	893 890 440 0
4.424.0019.40	1			MALE PLUG	M22x1,5	893 022 009 4
		4.424.0028.40	1	DOUBLE CONNECTOR	M22x1,5	893 890 440 0
4.424.0044.40	1	4.424.0044.40	4	STRAIGHT MALE STUD COUPLING	M22x1,5/D8	893 803 400 0
4.424.0045.40	2			STRAIGHT MALE STUD COUPLING	M12x1,5/D8	893 803 490 0
4.424.0055.40	1			MALE STUD ELBOW COUPLING	M12x1,5/D8	893 831 240 0
4.424.0068.40	7	4.424.0068.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D12	893 803 440 0
4.424.0087.40	2			MALE PLUG	M16x1,5	893 022 008 4
4.424.0147.40	2			ELBOW WITH LOCK NUT	M22x1,5	893 890 641 0
4.424.0148.40	1			MALE STUD TEE COUPLING	M22x1,5/D12/D12	893 850 970 0
4.424.0156.40	4	4.424.0156.40	1	EQUAL TEE COUPLING	D12/8/12	
V 4.425.0007.00	1			CHARGING VALVE WITHOUT RETURN FLOW 6,0 BAR	M22x1,5	434 100 125 0
V 4.425.0034.40	1			DRAIN VALVE	M22x1,5	934 300 001 0
V 4.425.0039.00	1			LINE FILTER	M22x1,5	432 500 020 0
V 4.425.0041.00	1			LINK CONNECTION FOR LEVELLING VALVE	M8/D6	433 401 003 0
V 4.425.0052.00	1			TEST COUPLING	M22x1,5	463 703 117 0
		V 4.425.0066.00	1	CHARGING VALVE WITH RETURN FLOW 0,5 BAR	M22x1,5	434 100 027 0
		V 4.425.0077.00	1	PRESSURE LIMITING VALVE 1,8 BAR	M22x1,5	475 010 307 0
		V 4.425.0083.00	1	CHECK VALVE CONSTANT THROTTING D1	M22x1,5	434 014 001 0
V 4.425.0117.99	(1)□			LOAD SENSING VALVE		475 714 500 0
V 4.425.0134.00	1			LEVELLING VALVE	M12x1,5/M16x1,5	464 006 100 0
		V 4.425.0138.00	1	LIFT AXLE CONTROL VALVE	M16x1,5/M22x1,5	463 084 000 0
T 4.105.0005.00	1△			AIR RESERVOIR 60 LTR	D276x1100	950 760 002 0
H 4.405.0009.00	2△			HOLDER (AIR RESERVOIR) 40/60 LTR	D276	451 999 276 2

□ = not SAF delivery volume.
△ = do not belong to a SAF-KIT.

Welding instruction for steel hanger bracket

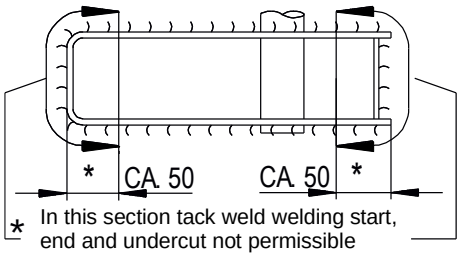
Note

Cover the trailing arm, to protect it from flying sparks. Welding and connecting the welding equipment ground cable to the trailing arm is not permissible. In order to avoid bearing damage, the welding equipment ground cable must also not be connected either to the wheel, wheelhub or wheelflange.

Welding recommendation

The high tensile steel used for the hanger brackets with a carbon content of max. 0,2 % can easily be welded. SAF-HOLLAND is using the gas metal arc welding procedure with the additional material G4 Si 1 (previous designation SG 3) in accordance with DIN EN 440, for steel S 235 to S 335, weldable fine-grained structural steel to S 460.
Shielding gas in accordance with DIN EN 439, welding seams to DIN EN 5817 ”quality levels for imperfections” to “group C”.

Welding seam 5 ◺

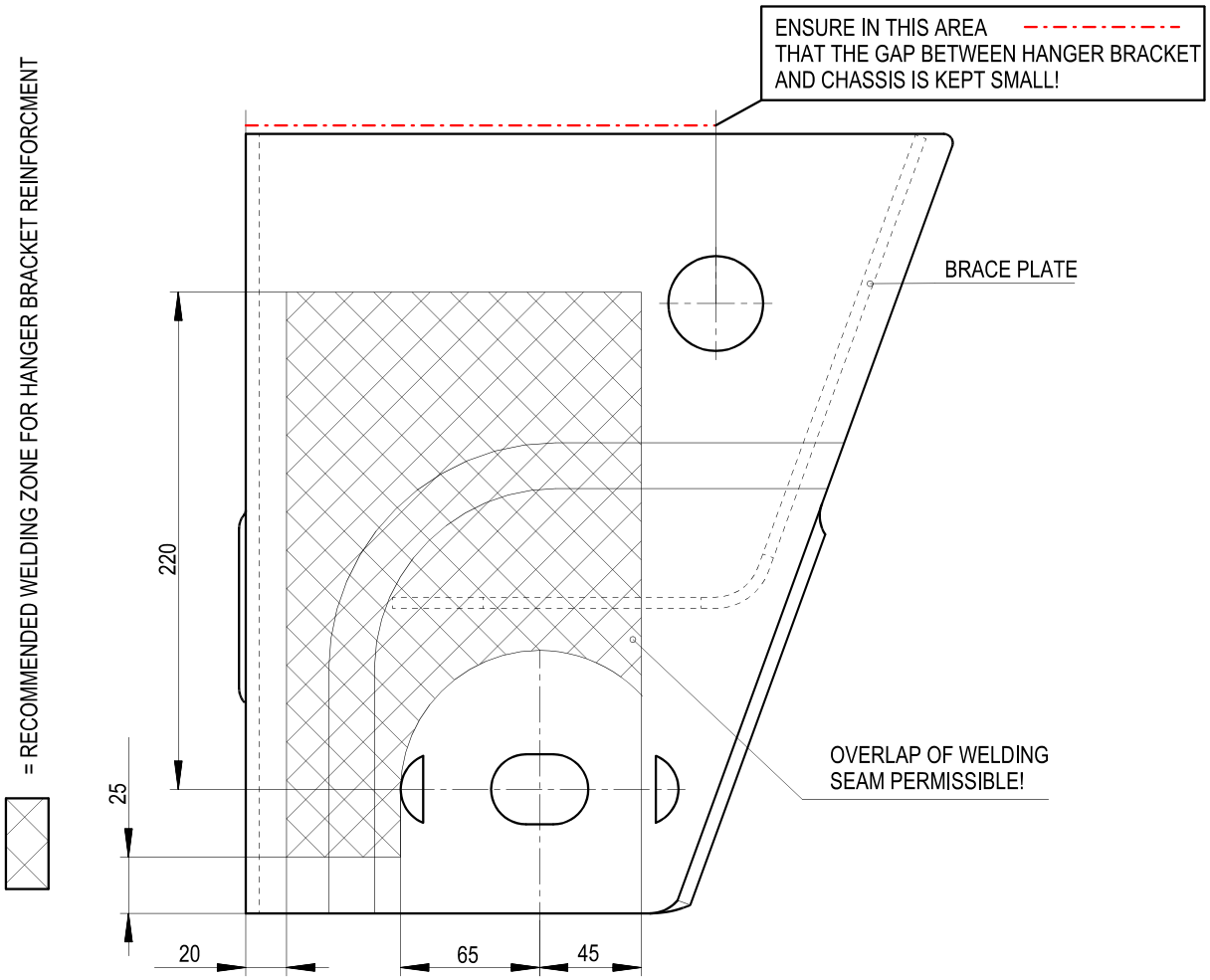


Design information

The chassis must be reinforced so that it can absorb the forces to which it is exposed. The hanger brackets need an additional reinforcement.

Recommendation for lateral reinforcement of the hanger brackets

Overlapping of the lateral brace (gusset plate) and inner brace plate of the hanger bracket is necessary to avoid any diaphragm effect. The use of a cross member can replace the lateral brace, but this doesn’t replace a crossmember in the chassis.
Geometry dimensions of the hanger bracket, see page 79.



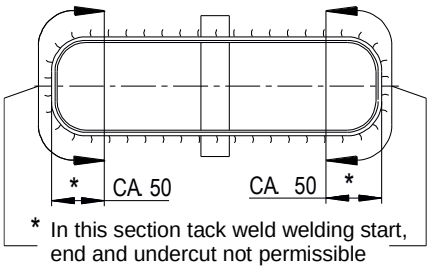
Welding instruction for aluminium hanger bracket

Note
Cover the trailing arm to protect it from flying sparks. Welding and connecting the welding equipment ground cable to the trailing arm is not permissible. In order to avoid bearing damage, the welding equipment ground cable must also not be connected either to the wheel, wheelhub or wheelflange.

Material
Al Mg 4,5 Mn W 28 (W=soft; 28=tensile strength Rm min. 275 N/mm max. 350 N/mm)

Welding recommendation
Pre-treat welding edges with steel brush (brushes with CrNi-steel). They should not be polished (misguides the arc). The welding seam should be kept as narrow as possible (SAF recommends a = 7 mm, chamfer 5 x 30°), to minimise the heat-induced distortion and tension.
SAF is using the gas metal arc welding procedure with the additional material SG – Al Mg 4,5 in accordance with DIN EN ISO 18273.
Shielding gas “Argon” in accordance with DIN EN ISO 14175, welding seams to DIN EN 25817 ”quality levels for imperfections” to “group C”.

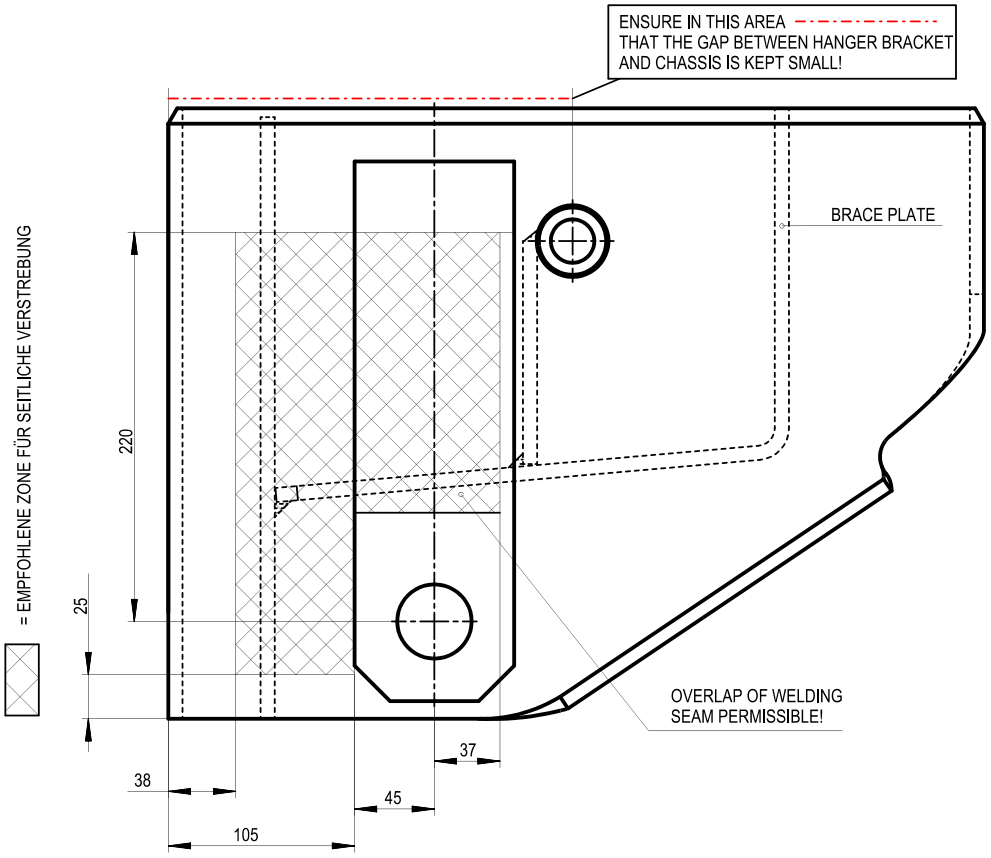
Welding seam 7 ◺



Design information
The chassis must be reinforced so that it can absorb the forces to which it is exposed. The hanger brackets need an additional reinforcement.

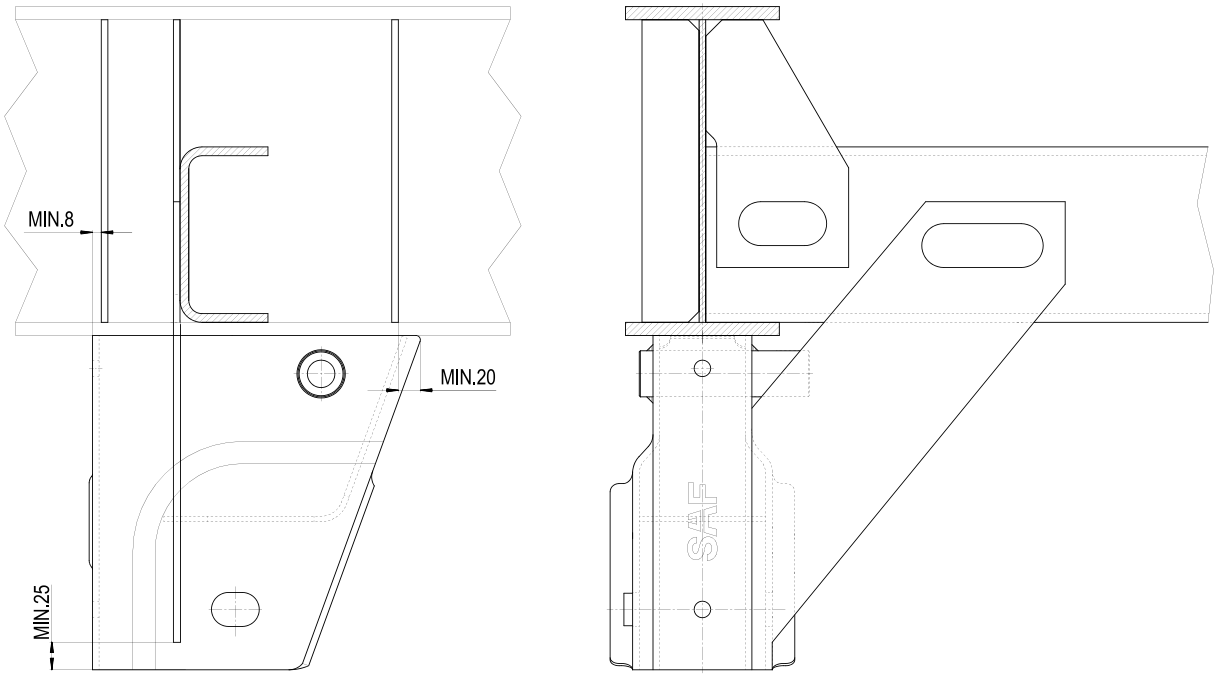
Recommendation for lateral reinforcement of the hanger brackets

Overlapping of the lateral brace (gusset plate) and inner brace plate of the hanger bracket is necessary to avoid any diaphragm effect.
Geometry dimensions of the hanger bracket, see page 85



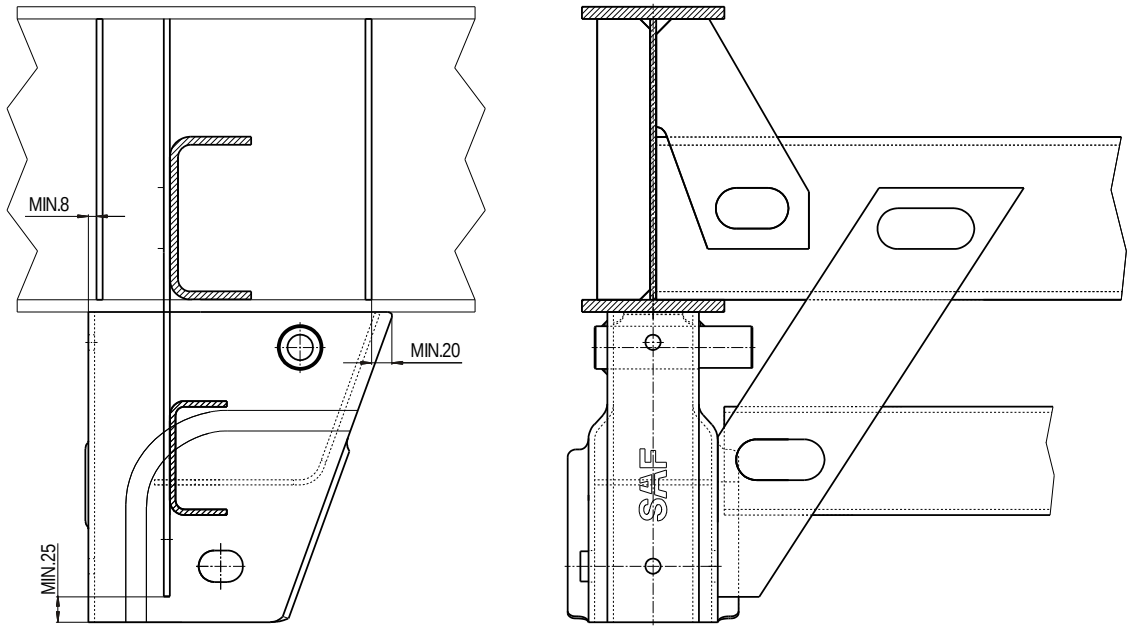
Recommendation for lateral reinforcement of steel hanger bracket

for torsionally flexibel chassis



Ref. Nr.: Verstrebung_Modul01

for torsionally stiff chassis

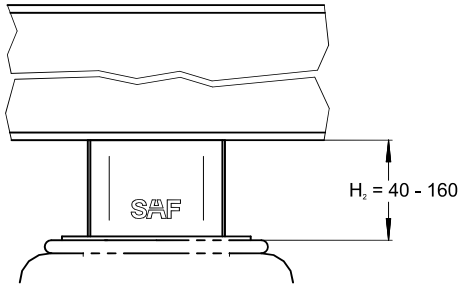


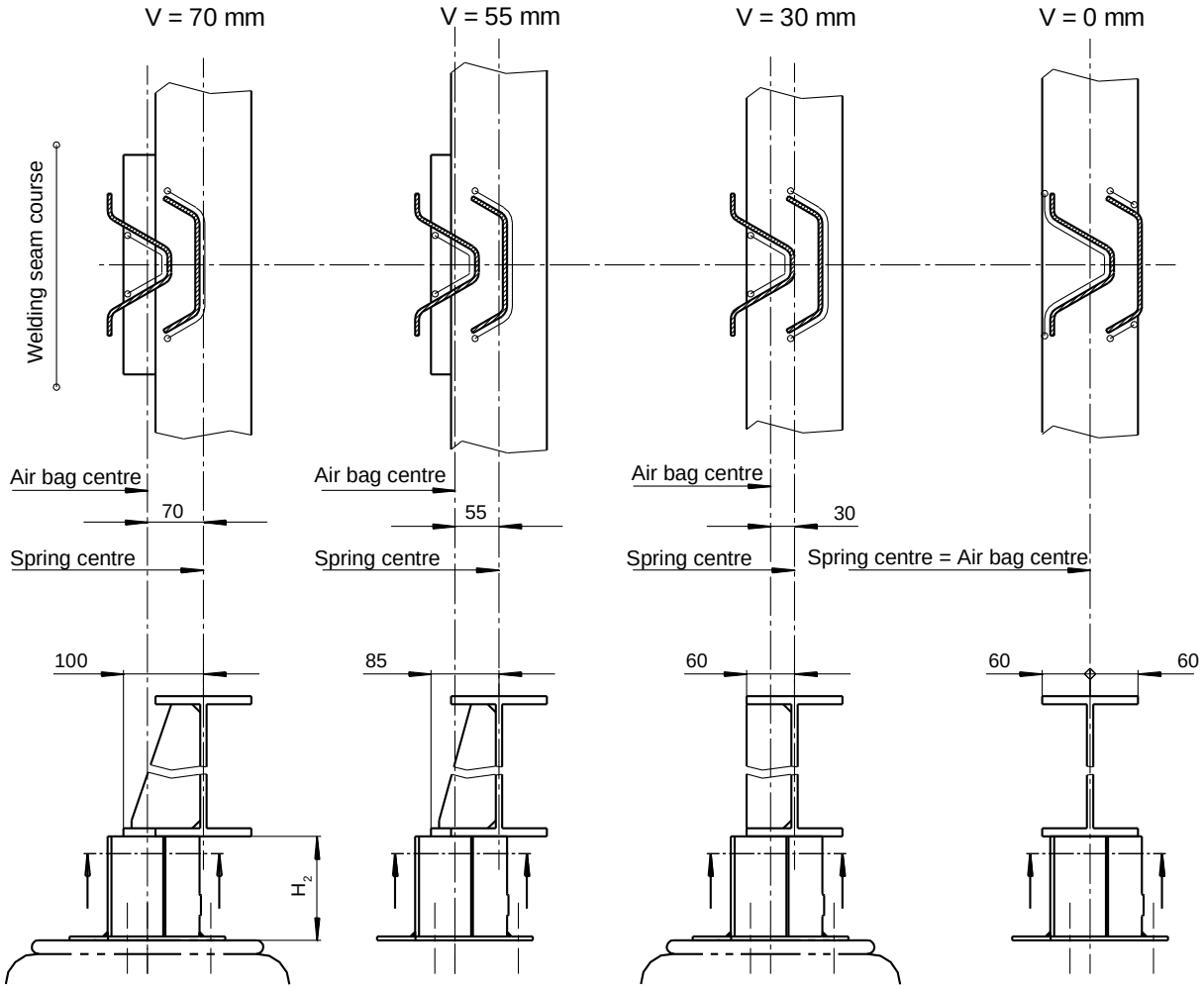
Ref. Nr.: Verstrebung_Modul02

Hanger bracket welding instruction see page 107.
The design and dimensioning of the hanger bracket reinforcement is the responsibility of the trailer manufacturer, this depends on the type and operating conditions of the trailer.

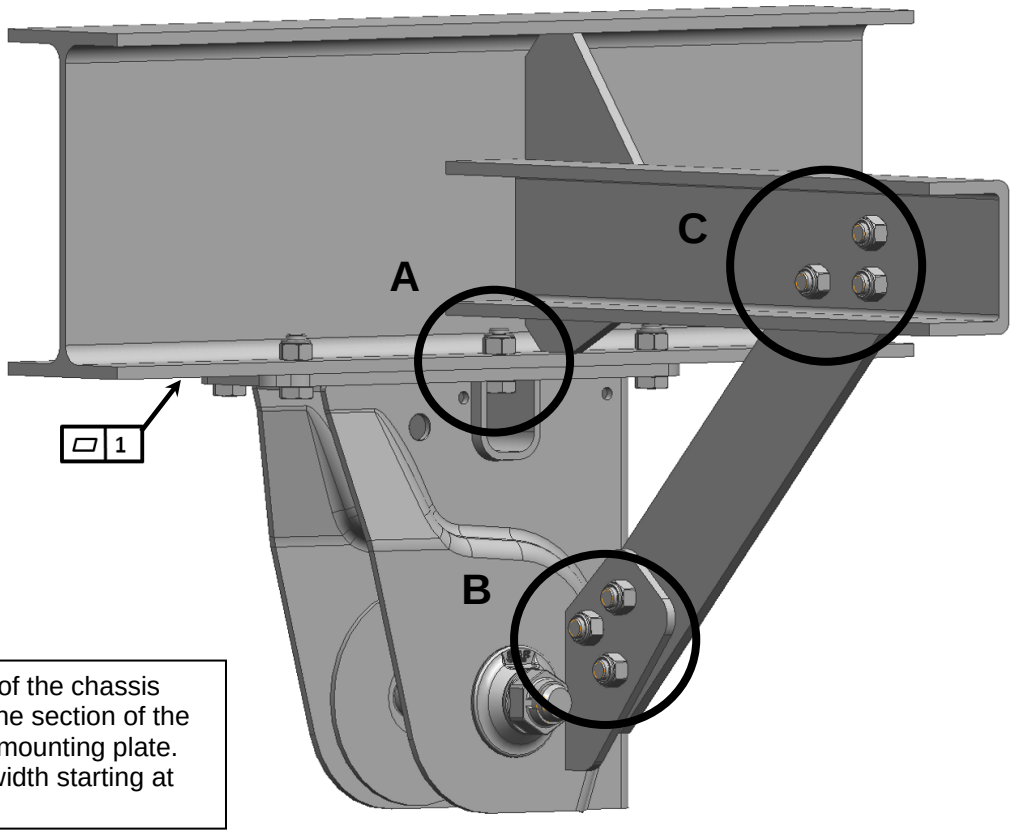
Welding instruction for air bag bracket

Welding seam course and bracing are SAF-recommendations. Dimensions, design and implementation are under responsibility of the trailer manufacturer.

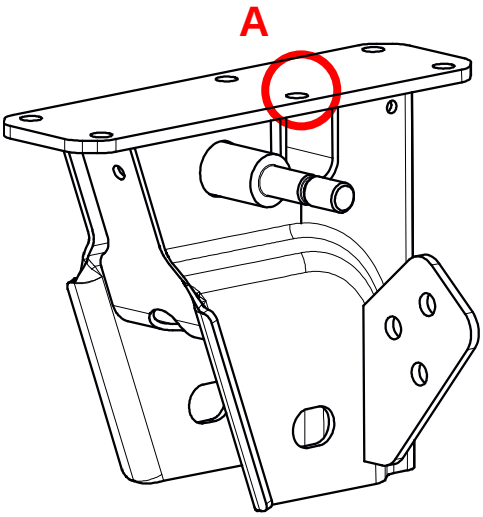




Installation of „screw-on“ hanger brackets



Max. evenness of the chassis beam 1 mm in the section of the hanger bracket mounting plate. Chassis beam width starting at 120 mm.



Installation:

1) Install the hanger bracket with at least 5 screws M16, 10.9, **230** – **250** Nm on the chassis. Only the middle screw towards axle centre can fail (Pos. A).

2) Pre-assemble the lateral brace as appropriate with 3 screws M16, 10.9 on the hanger bracket (Pos. B) and chassis (Pos. C) – do not tight these yet.
   hole in cross member ø 16mm
   hole in brace ø 18mm

3) Adjustment of track and mounting the pivot bolt according to SAF installation recommendation, see page 113.

4) Tighten the lateral brace connections (Pos. B und C) on the hanger bracket and chassis with maximum allowed torque.

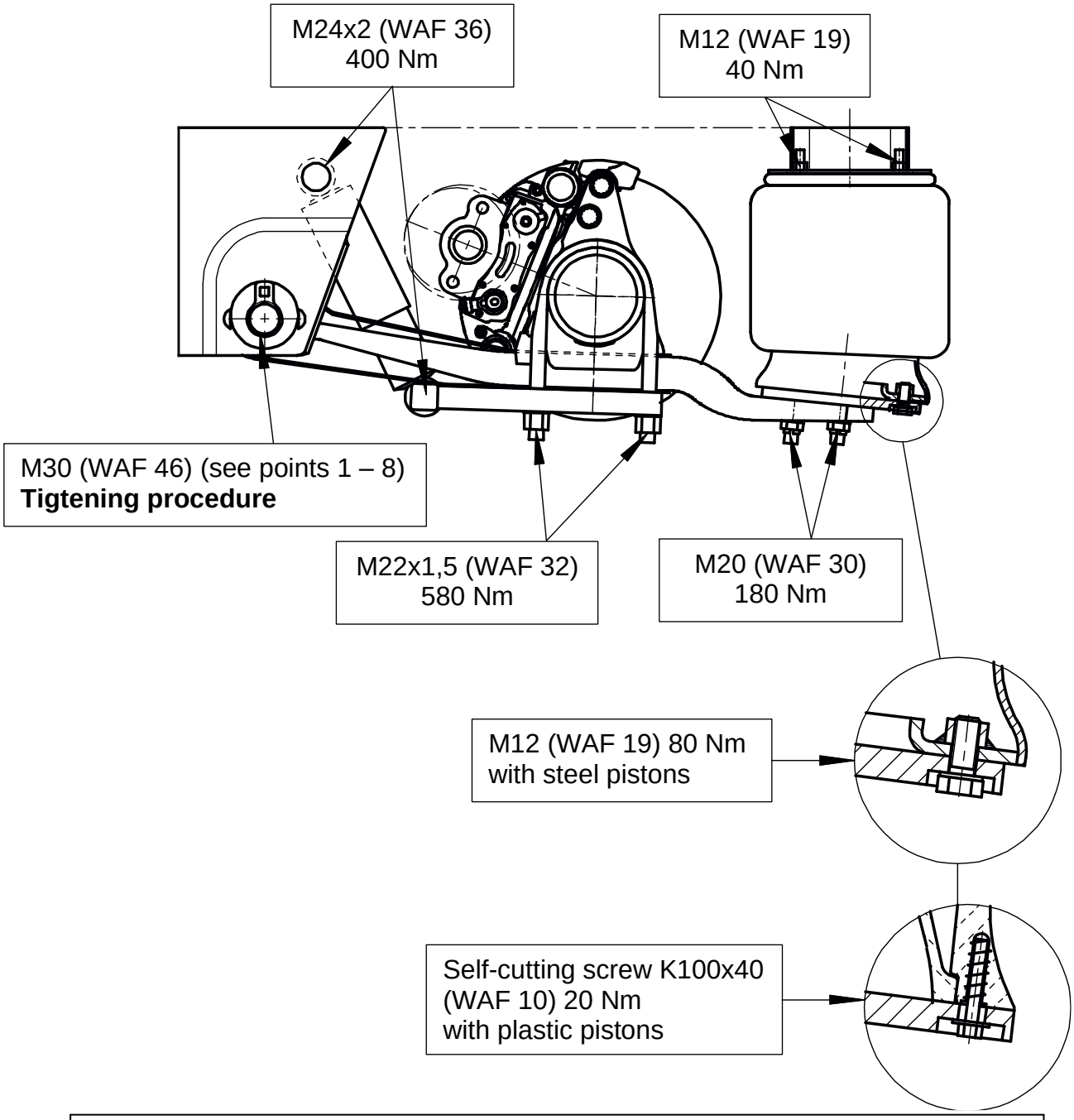
Lateral brace and bolted connections are not SAF delivery volume.

Attachment faces for bolting connection parts:
- coat thickness when painting max. **30** µm
- coat thickness when galvanizing max. **100** µm

The top plate with the verified hole pattern as the lateral position and hole pattern of the lateral brace are the same for all mentioned hanger brackets.

Tightening torques for trailing arm – shock absorber - air bag

The maximum coat thickness of any primer or paint must not exceed **45** µm on any contact surface of the suspension arm and shock absorber fixing!

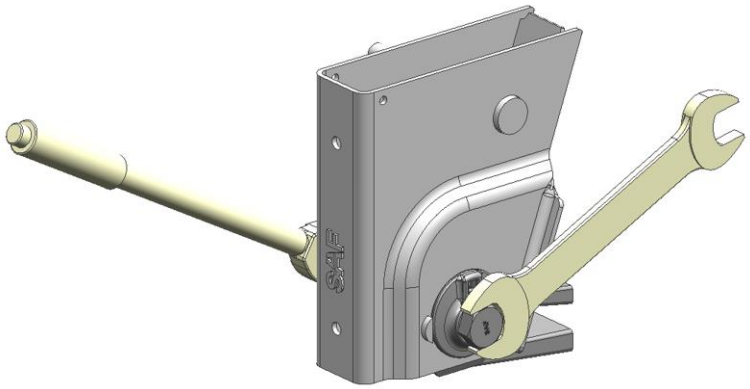


Attention:

- Threads are not to be oiled or greased!
- Pivot bolt mounting for hanger bracket „steel“ maintenance free.
- Connections on hanger bracket „aluminum“ or stainless steel are not maintenance free! This needs to be checked after first 5 weeks or 10.000 km, further checks every 12 months or 100.000 km. Inspection torque:
  - of 1200 Nm for the pivot bolt connection
  - of 400 Nm for the shock absorber connection.
- Pivot bolt mounting on galvanized hanger brackets are up to a coating thickness of **120** µm maintenance free.
- After taking the trailer into service and re-allignment of the axles / opening the pivot bolt connection, the pivot bolt connection needs to be exchanged.

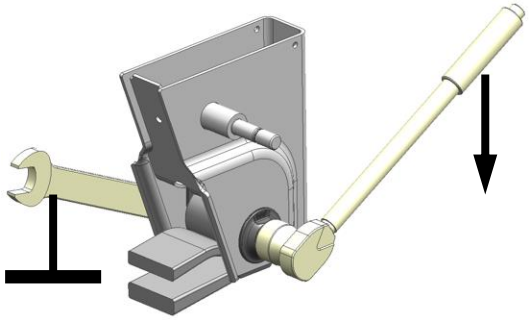
Tightening instructions for adjustable pivot bolt

Attention: always within the specified ride height range!
No paint residues between eccentric washer and hanger bracket!

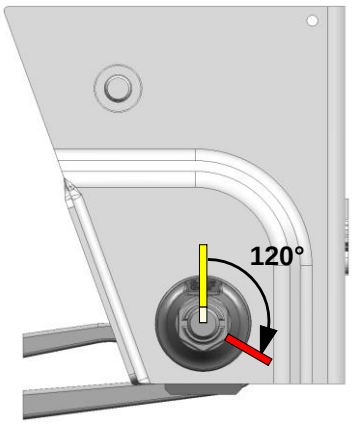


Bolt head always on the eccentric washer side

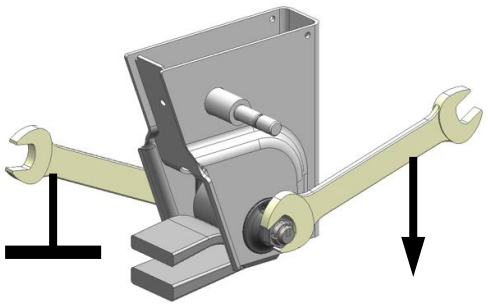
Pre tightening **400** Nm
Use torque wrench



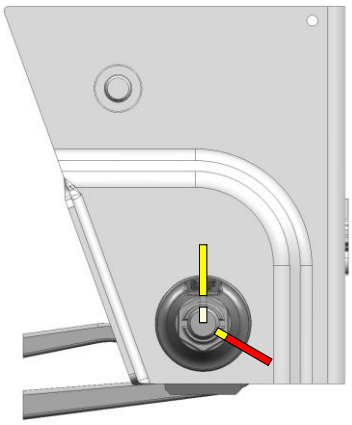
Marking for angle tightening



Angle tightening **120°**
Use impact wrench or extend lever to 2,5 m.



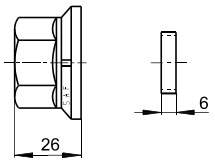
Visual inspection



Wheel fixing – Single 22,5“, drum brake (code 58)

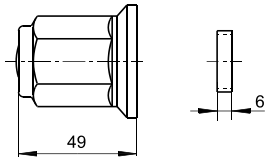
For example with axle version: S9-4218
Single tyre with offset 0 mm
Wheel stud 1 303 1074 14 with stud length 85,5 mm

Open wheel nut
M22x1,5 mm
Wrench size 32 mm

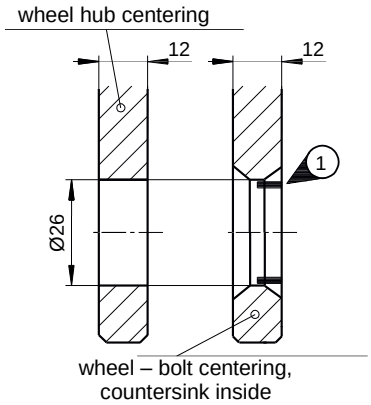


Wheel nut set (Standard): per axle one set:
VPE Red – **03 247 0401 10** contains, 20x wheel nuts (04 247 3012 01) + 4x centring rings (01 095 1040 01)

Closed wheel nut
M22x1,5 mm
Wrench size 32 mm



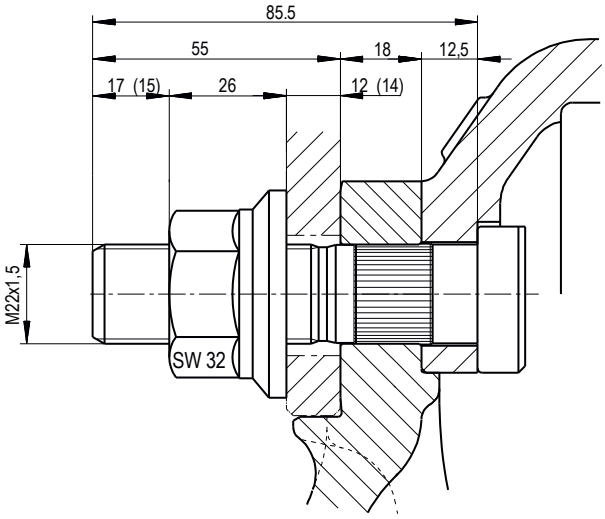
Wheel nut set per axle one set:
VPE Orange – **03 247 0410 10** contains, 20x wheel nuts (04 247 3039 01) + 4x centring rings (01 095 1040 01)



For wheels with double centring/ spherical countersink there are per hub
2 counter fitted centring rings needed (1)

Illustration:

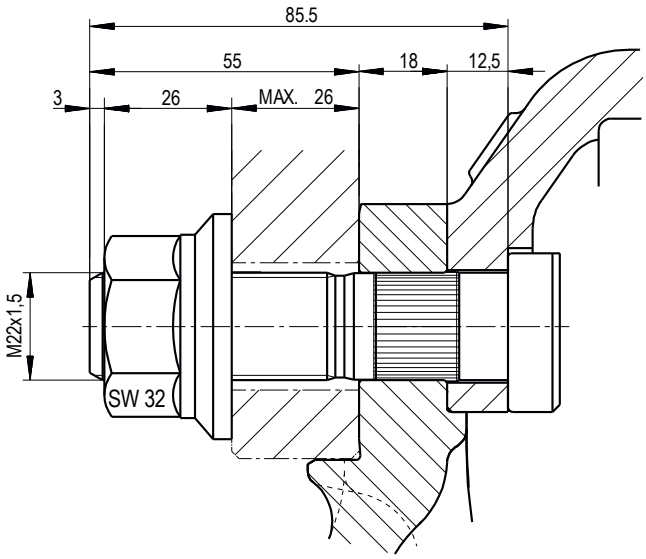
Standard stud with steel wheel



Tightening torque: 600 Nm!

Illustration:

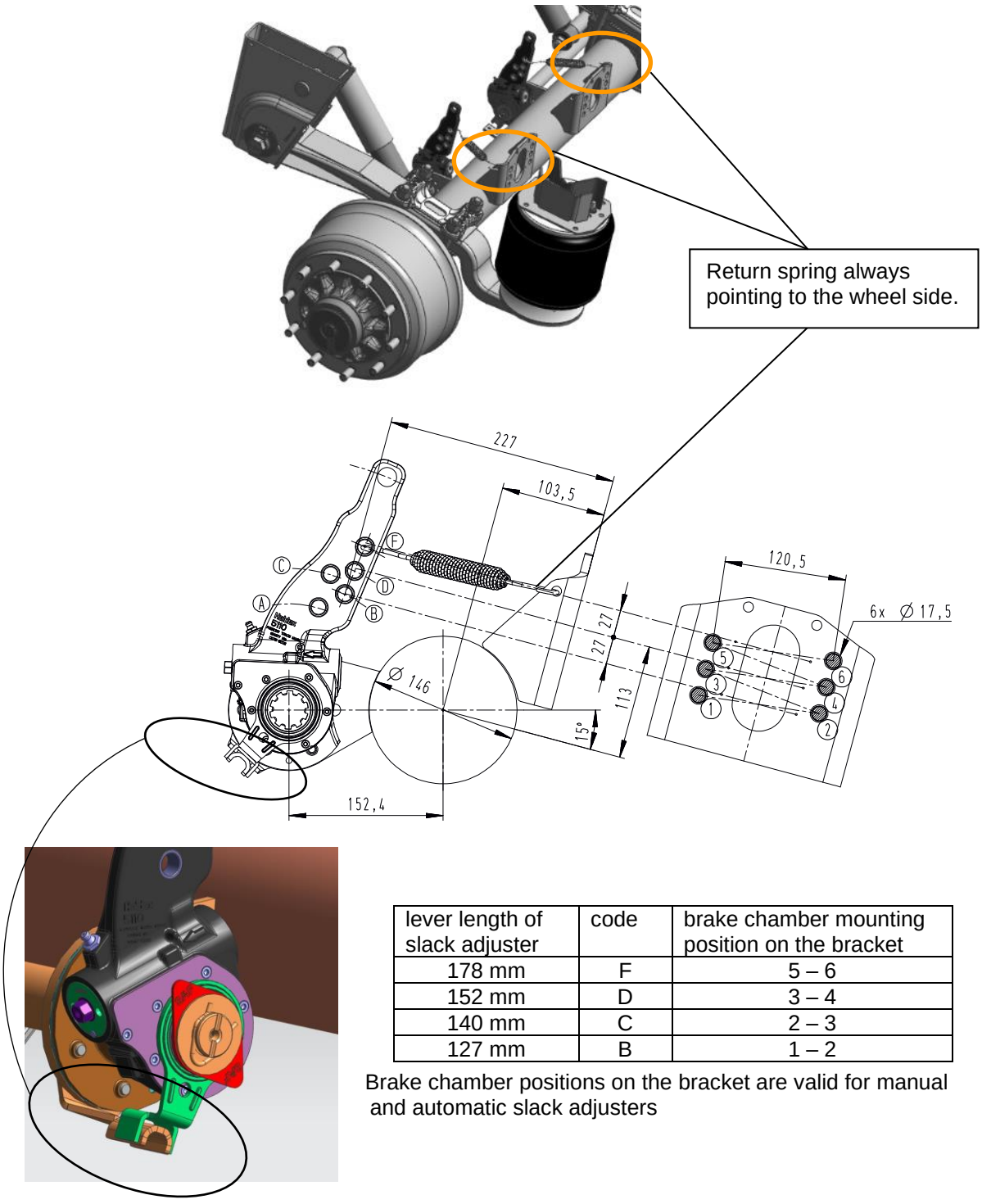
Standard stud with aluminium wheel



Brake chamber bracket

Observe the installation instructions of the brake chamber manufacturer! A major factor for the functionality is the compliance with the specified tightening torque and its regular checking.

Example design with SNK 420



lever length of slack adjuster	code	brake chamber mounting position on the bracket
178 mm	F	5 – 6
152 mm	D	3 – 4
140 mm	C	2 – 3
127 mm	B	1 – 2

Brake chamber positions on the bracket are valid for manual and automatic slack adjusters

Overview SAF-HOLLAND brake chamber for axles with disc brake

The brake chambers can be combined with all SAF-HOLLAND axle versions with disc brake.

The brake chambers in overview:

disc brake

rigid axle | self steering axle

diaphragm brake chamber

double diaphragm brake chamber

For axles with disc brake 22,5“ and 19,5“
The versions in the table are available in both OEM and spare parts:

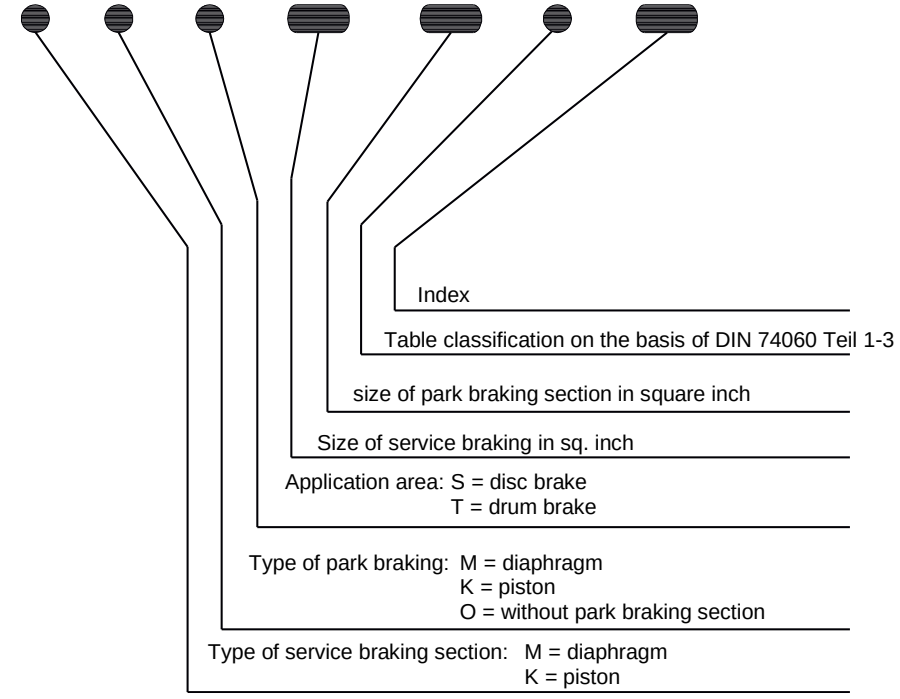
model	size	article number[1] brake chamber	
		MODUL	
		rigid axle	self steering axle
diaphragm brake chamber	16“	04 454 1065 60	04 454 1081 60
	18“	04 454 1066 60	-
	20“	04 454 1067 60	04 454 1082 60
	22“	04 454 1068 60	-
	24“	04 454 1069 60	-
double diaphragm brake chamber	16“/24“	04 454 1077 64	-
	16“/30“	04 454 1096 64	
	18“/24“	04 454 1074 64	
	20“/24“	04 454 1079 64	
	20“/30“	04 454 1097 64	

[1] **article numbers with 03 043 … include the 2 fixing nuts**

Brake chambers for axles with drum brake on request.

Type identification for SAF-HOLLAND brake chambers

M O S 16 00 A 60
M M T 24 30 B 20
X X X 00 00 X 00



Technical data

For axles with disc brake 22,5“ and 19,5“

Model	size	type	test report	max. stroke s_{max} [mm]	service brake: force [N] at 6,5 bar	parking brake: force [N] at 30 mm stroke
diaphragm brake chamber	16“	MOS1600A60	BC 0060	64	6590	-
	18“	MOS1800C60	BC 0061	64	6960	-
	20“	MOS2000A60	BC 0062	65	7564	-
	22“	MOS2200C60	BC 0063	65	8055	-
	24“	MOS2400A60	BC 0064	65	9374	-
double diaphragm brake chamber	16“/24“	MMS1624A60	BC 0044	63	6452	6160
	16“/30“	MMS1630A60	BC 0092	64	6590	7605
	18“/24“	MMS1824C60	BC 0045	68	6960	5911
	20“/24“	MMS2024A60	BC 0046	67	7564	6160
	20“/30“	MMS2030A60	BC 0093	65	7564	7605

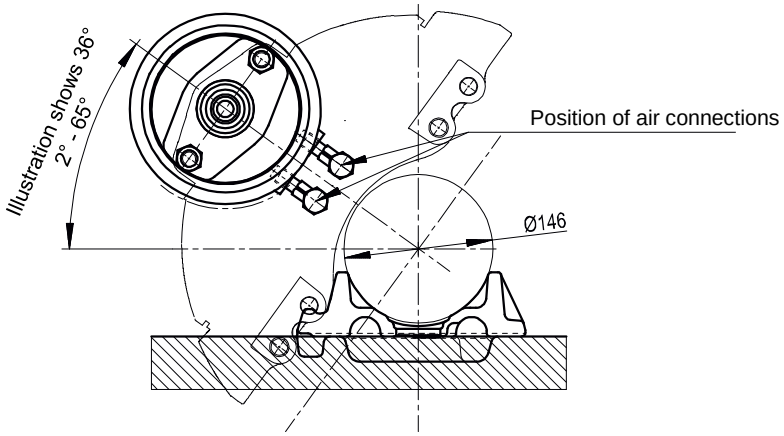
Further technical data can be found on the referenced test reports or can be provided by SAF-HOLLAND (http://testreport.safholland.de). Brake calculations with these brake chambers can be provided by the brake system manufactures WABCO, KNORR and HALDEX.

www.safholland.org/testreports
GUTACHTEN / TEST REPORTS

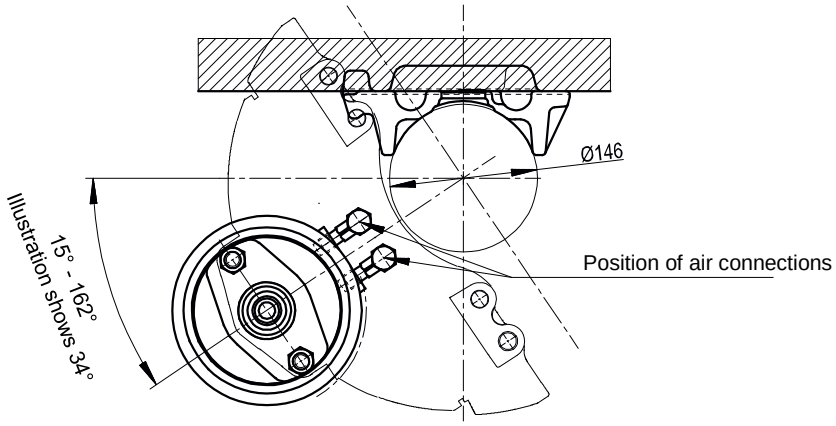
Installation instruction for brake chambers at axles with disc brake

For axles with disc brake 19,5“ and 22,5“

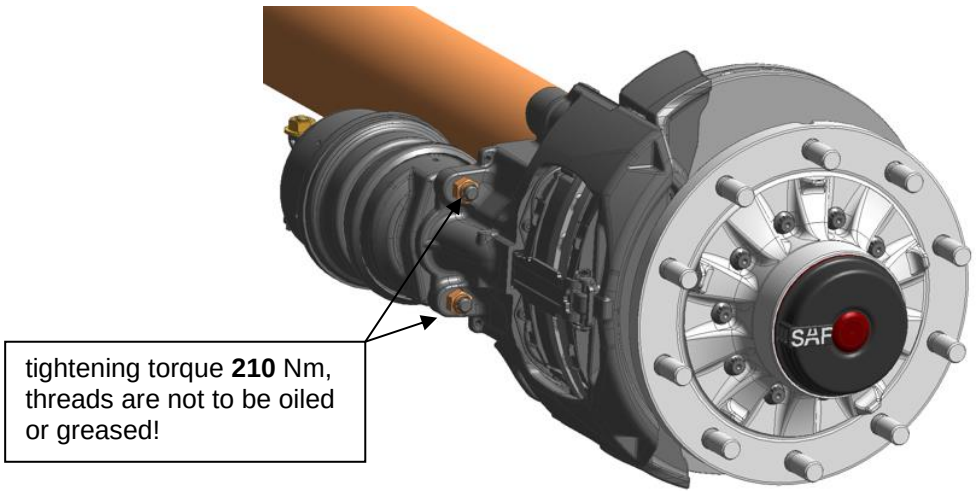
U – serie



M – serie



Tightening torque for brake chamber fixing to brake calliper: **210** Nm

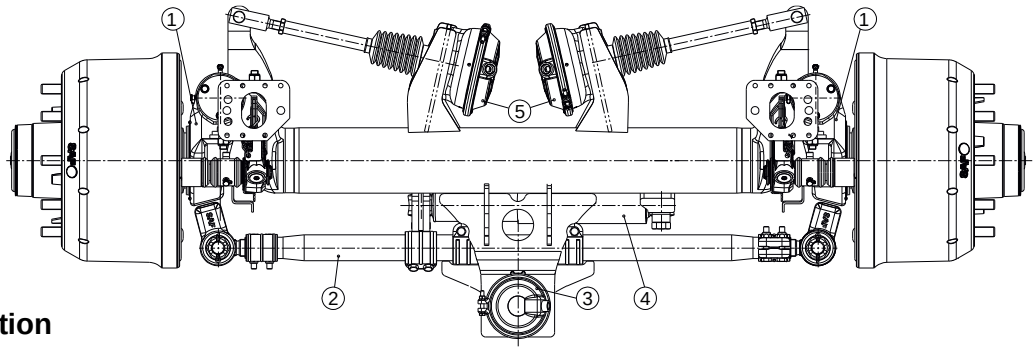


Self-steering axle with pneumatic steering stabilising

Steering mechanism

In the case of self-steering axle with pneumatic steering stabilising, the steering mechanism comprises:

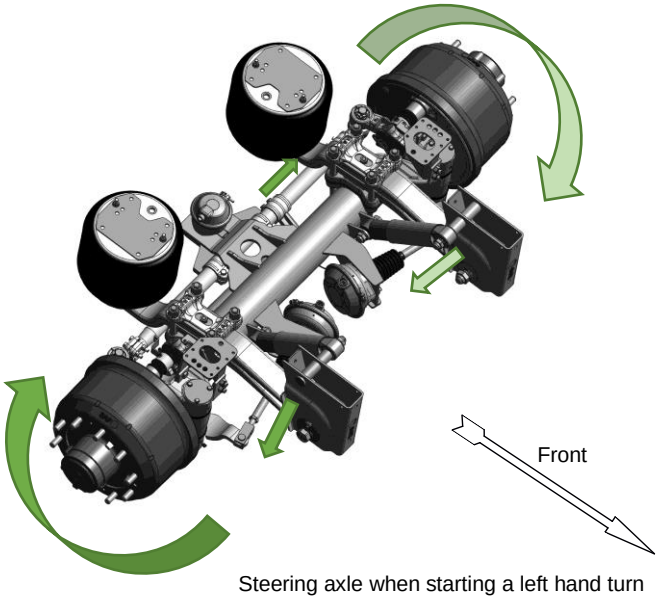
- two pivot mounted steering knuckles (1)
- a steering tie rod (2)
- a reverse lock (3)
- a steering damper (4)
- two stabilising pneumatic cylinders with push rods (5)



Functional description

Side forces occur in the tyre contact areas when vehicles drive round bends or overtake other vehicles. On account of the offset between the steering knuckle bearings to the axle centre of 140 mm, these side forces (left and right) produce a steering torque that acts on the steering knuckles and forces them into an angled position. This angled position is the so-called axle steering angle. The steering tie rod is responsible for the synchronous turning movement between the left and right steering knuckles.

The stabilising cylinders are connected on one side with the axle beam and on the other side over a steering rod with the steering knuckle. The stabilising cylinders are under normal straight forward driving, fully extended and are under load depending pressure (by the connection with the air bag) without force on the steering arms.



Steering axle when starting a left hand turn

When cornering (side force) the push rod of the stabilising chamber nearest to the inside tyre is pressed to the inside against the cylinder force. The telescopic push rod of the other stabilising cylinder is pulled out pressure less.

As the side forces decrease, the force in the stabilising cylinder will dominate the side forces and forces the tyres and also the steering knuckles back into the straight position. The steering damper supports a sturdy and flutter-free drive.

When adjusting, the stabilising pressure needs to be minimum 2,0 bar.

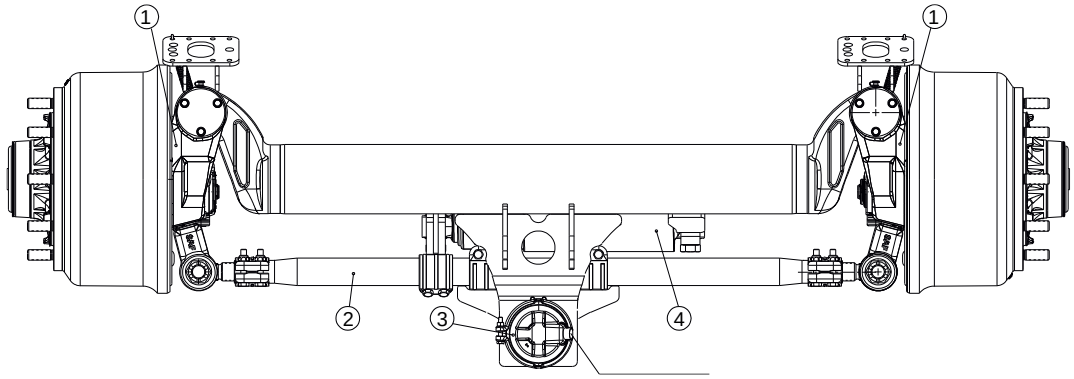
To make reversing possible with a self-steering axle, it has to be set rigid. This is done electro-pneumatically through the reversing lock, the task of which is to prevent the steering tie rod moving and to block it in the central position (driving straight on) by the spring-type cylinder.

Self-steering axle with stabilising damper

Steering mechanism

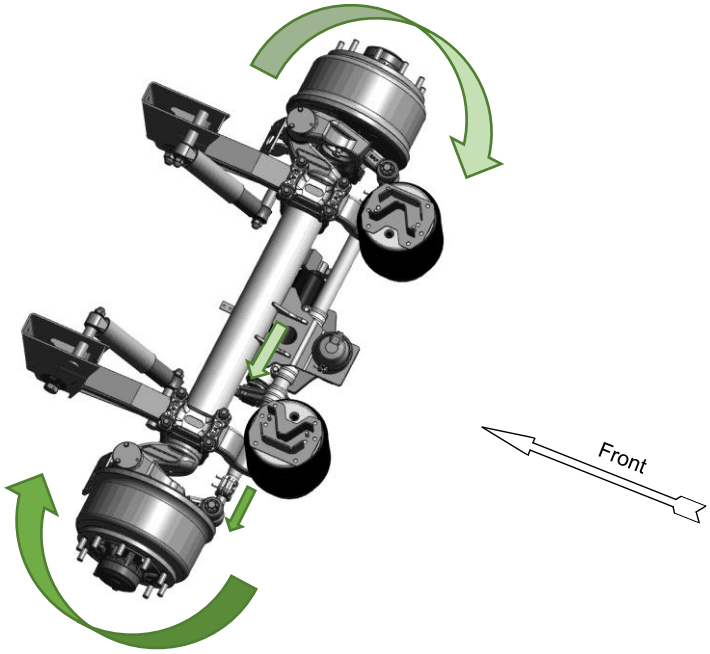
In the case of self-steering axle with stabilising damper, the steering mechanism comprises:

- two pivot-mounted steering knuckles (1)
- a steering tie rod (2)
- a reversing lock (3)
- a stabilising damper (4)



Functional description

Side forces occur in the tyre contact areas when vehicles drive round bends or overtake other vehicles. On account of the offset between the steering knuckle bearings to the axle centre of 140 mm, these side forces (left and right) produce a steering torque that acts on the steering knuckles and forces them into an angled position. This angled position is the so-called axle steering angle. The steering tie rod is responsible for the synchronous turning movement between the left and right steering knuckles.



Steering axle when turning into a left hand turn

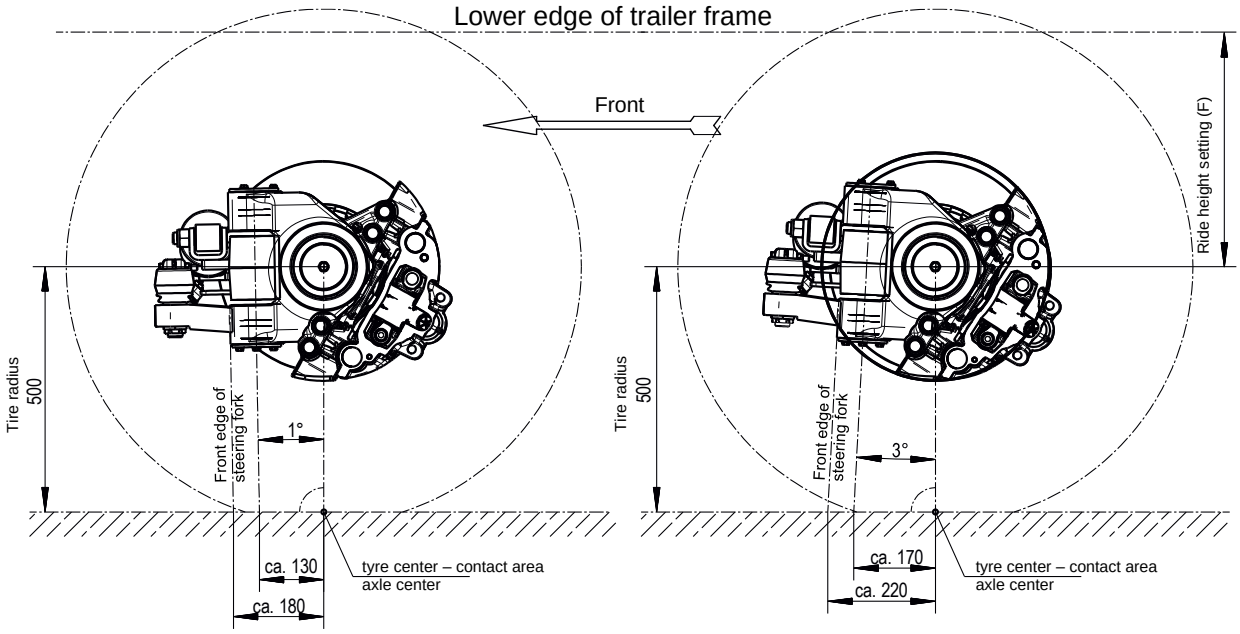
The stabilisation damper is suspended on the axle body on one side and on the steering tie rod on the other. This is either pressed (shortened) or pulled (lengthened) depending on the angle of rotation of the steering knuckles. The special design of this SAF stabilisation dampers means that its internal spiral spring is always compressed during both movements.

As the side forces decrease, the spring force dominates the side forces, and forces the tyres and also steering knuckles back into the straight position. The spiral spring, supported by the damper properties, is also the reason for a sturdy and flutter-free straight drive.

To make reversing possible with a self-steering axle, it has to be set rigid. This is done electro-pneumatically through the reversing lock, the task of which is to prevent the steering tie rod moving and to block it in the central position (driving straight on) by the spring-type cylinder.

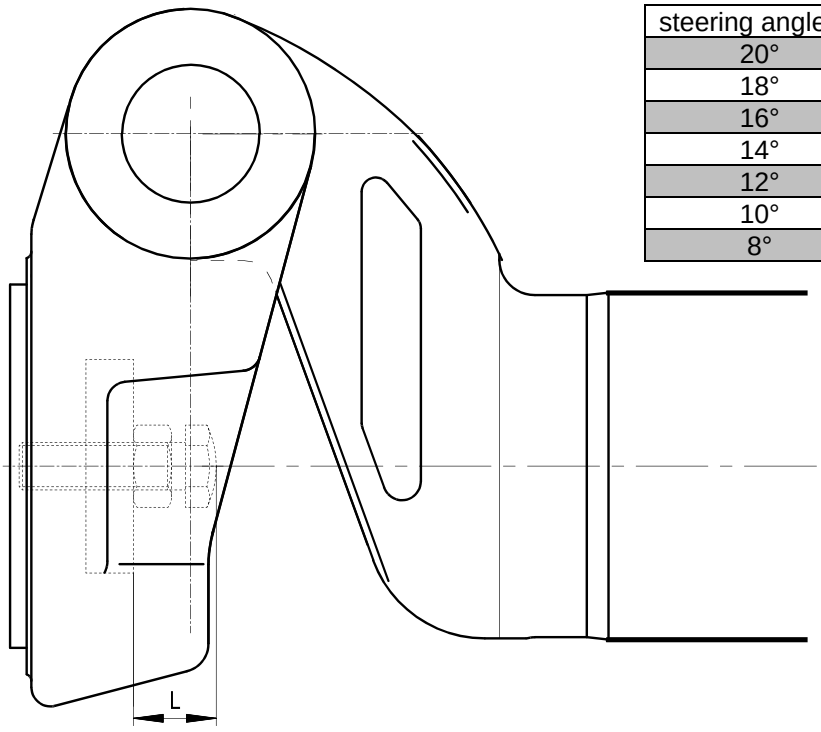
Caster

Installed in a suspension system, the caster (distance steering bolt centre lengthened to the ground to the centre of the tyre contact area) may vary in vehicle setting between 130 mm (steering pin tilted forwards) and 170 mm (steering pin tilted backwards). In contrast to leaf spring suspension, the caster can be influenced in the case of air suspension by the ride height setting.



Steering angle

With SAF self-steering axles, the steering angle is limited to 20° on account of the design. This can be reduced if required, depending on the track width and spring centre ratio. For this purpose, the adjusting screw on the steering knuckle should be screwed out according to the values in the following table and then countered by a locknut.



steering angle	bolt overhang „L“
20°	35 mm
18°	40 mm
16°	45 mm
14°	49 mm
12°	54 mm
10°	59 mm
8°	64 mm

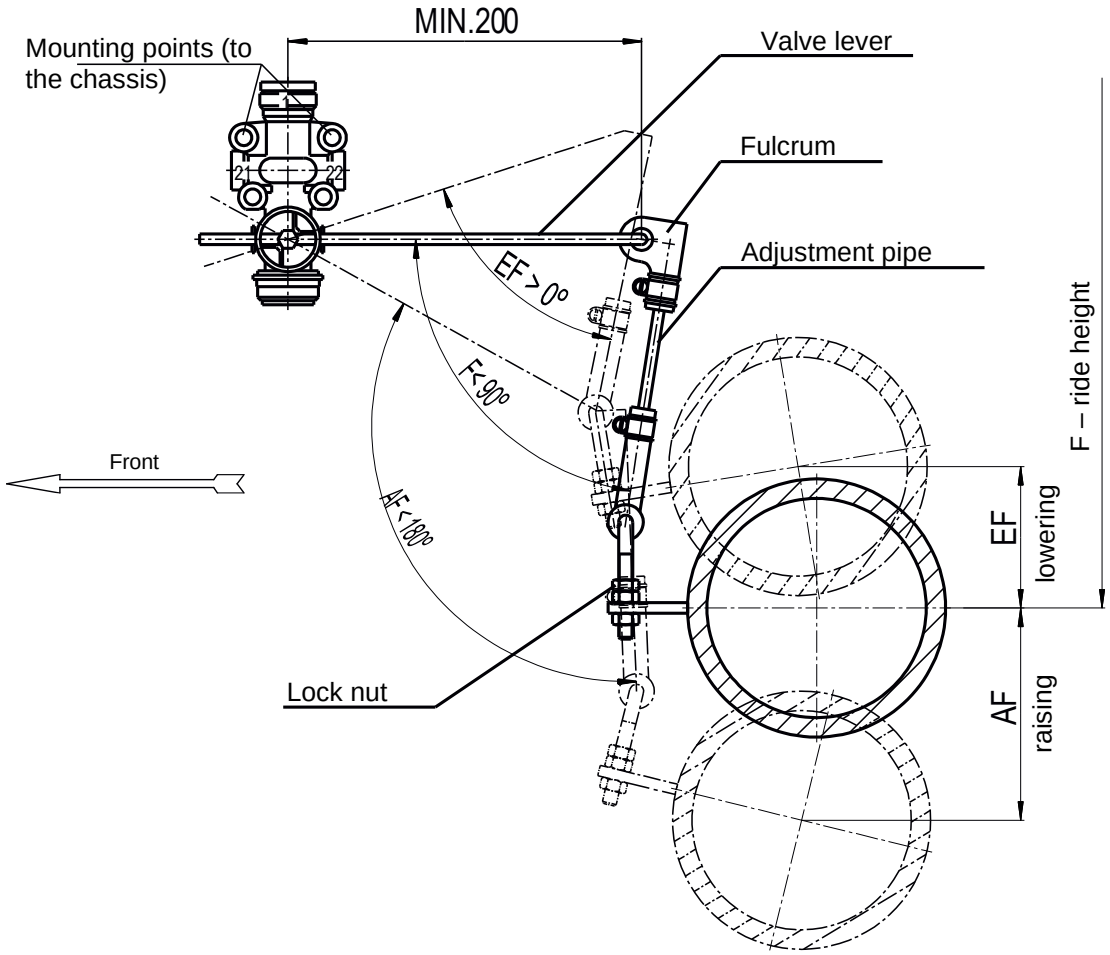
Adjustment of the air suspension ride height

Air suspension valve

As standard, SAF-HOLLAND air suspension system require only one air suspension valve. The air suspension valve controls the air bag pressure in relation to the trailer load in order to maintain a constant ride height (F) in every load condition.

The air suspension valve is fastened to the trailer frame with screws and connected to the axle via the pivot joint (valve lever and adjustment pipe). On tri-axle trailers, the system is generally connected to the middle axle (normally in the middle of the axle), and on twin-axle trailers to the rear axle. In special cases (e.g. large trailer tilt angle), the air suspension valve can be installed on the rear axle.

For trailers with axle lifting system, the axle to which the system is connected depends on the axle to be lifted.



Installation

The valve lever should be at least 200 mm long and is horizontal when the trailer is in the driving position. As a function check, move the lever down slightly. Air must now escape via the venting cap into the atmosphere. If air flows into the air bags when the lever is pushed down, the valve lever has to be turned through 180°. For this the valve lever has to be disconnected. The ride height is set by adjusting the adjustment pipe in the fulcrums and by turning the lock nuts. The adjustment must be carried out with the trailer standing on level ground. It can be carried out with the trailer either empty or loaded.

Note

For a final check, the air suspension system should be lowered to the suspension stop or raised to the limit (shock absorbers, stop ropes, air bag length). During this process, the specified angle between valve lever and adjustment pipe must not be exceeded in order that the valve lever does not move in the wrong direction.

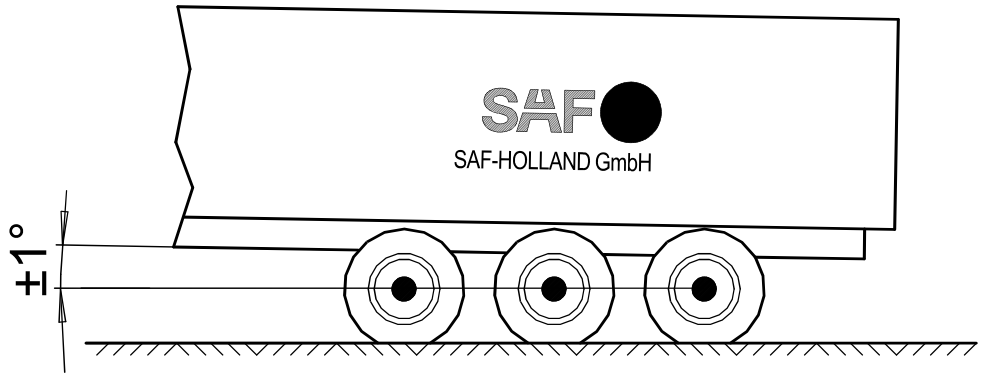
Ride heights

Adjust the ride height of the air suspension to the permissible range indicated in the corresponding SAF-HOLLAND documents

With single axles, a minimum lowering of **60** mm is allowed.
With multiple axles, a minimum lowering of **70** mm is allowed.

Exception:
For multi-axle trailers with lift axles, the minimum lowering at the lift axle should not be less than **100** mm in order to ensure an adequate ground clearance

Semi-trailer tilt angle



The maximum tilt angle of the semi-trailer can not be more than ±1° or 20 mm/m.

Axle alignment

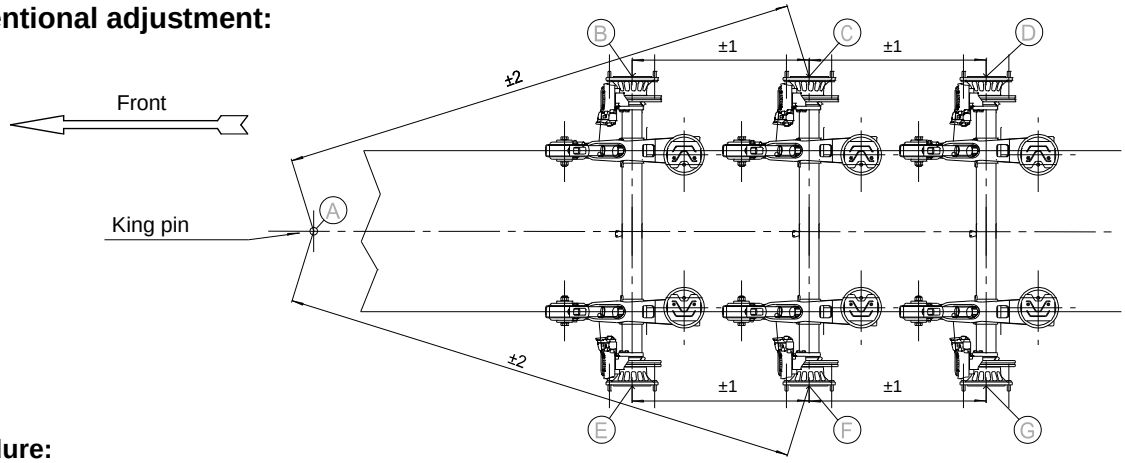
General

In order to compensate the production tolerances, an axle alignment and, if necessary, an adjustment should be carried out. The maximum permissible deviations (tolerances) of the alignment values are specified by the tyre manufacturer.
The maximum possible wheelbase correction per axle is ± 6 mm, see page 83

Basic condition

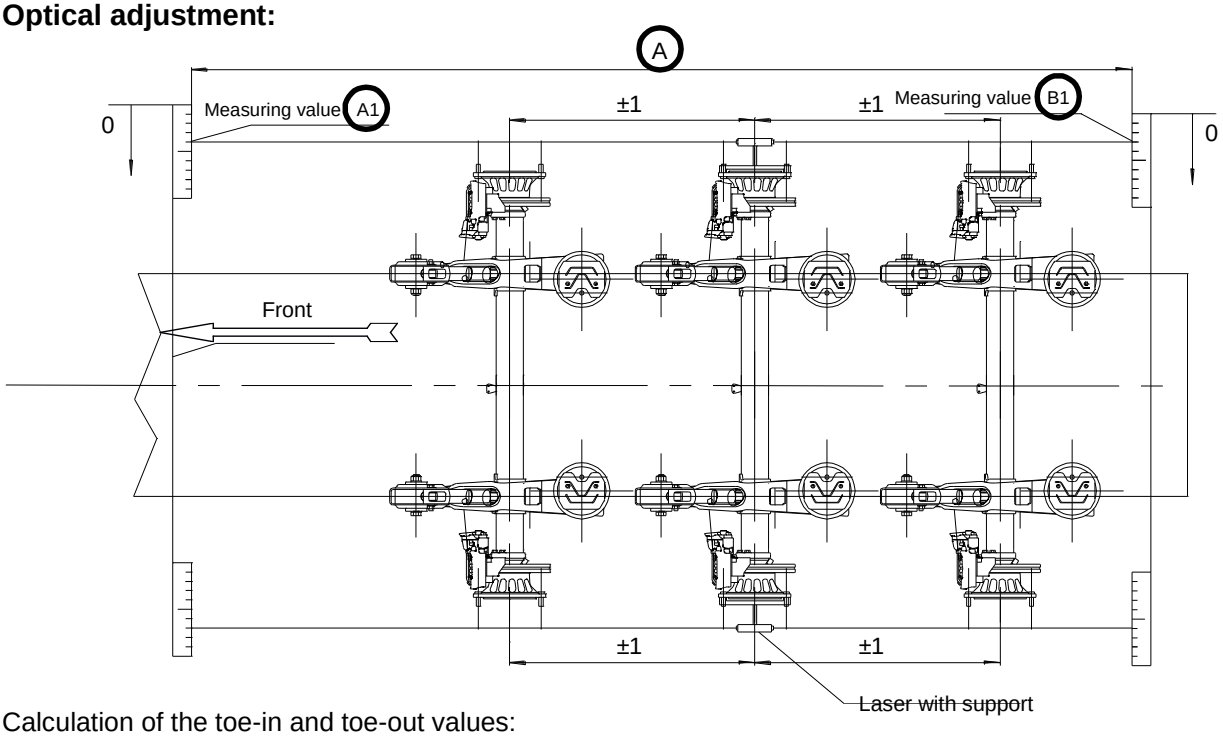
The axle alignment must be done in unladen situation. With air suspension the trailer has to be adjusted in the right ride height.

Conventional adjustment:



Procedure:
Determine the lengths of the diagonals **A** - **C** and **A** - **F** for the middle axle (reference axle) by comparison measurements, observing the tolerances (± **2,0** mm).
Check the wheelbases **B** – **C** and **E** – **F** for the front axle and **C** – **D** and **F** – **G** for the rear axle and correct, if necessary, observing the tolerances (± **1,0** mm).

Optical adjustment:



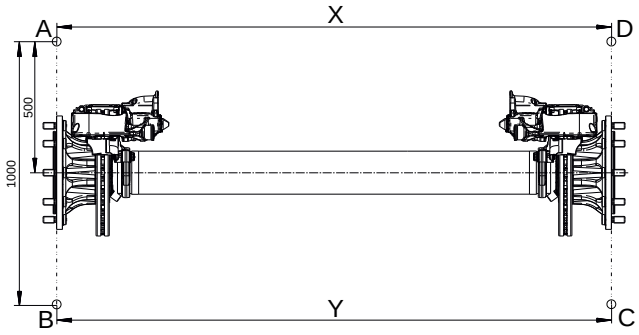
Calculation of the toe-in and toe-out values:

$$\frac{A1(mm) - B1(mm)}{A(m)} = C$$

C (positive value) = toe-in
C (negative value) = toe-out

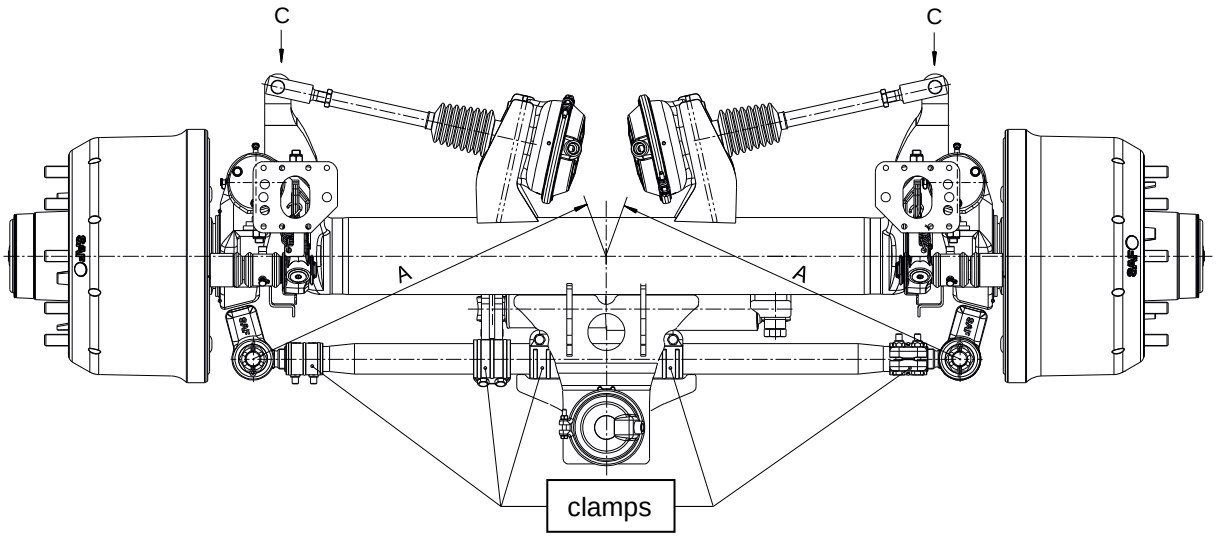
Observe the operating and setting instructions of the measuring system manufacturer.

Positive toe / toe-in :



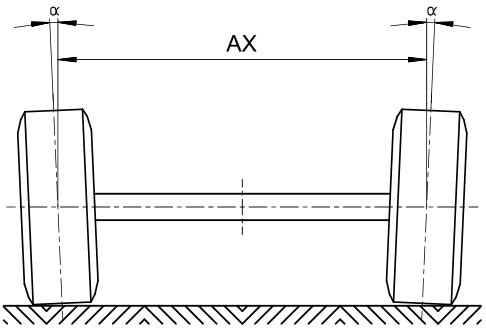
Rigid axle:
Toe-in: -2 mm/m (-6,75') bis + 3,5 mm/m (12'), (-2 < (Y – X) < 3,5 [mm/m])

Self-steering axle:
Toe-in: +4 mm/m (14') to + 7 mm/m (24'), (+4 < (Y – X) > 7 [mm/m])
The setting is carried out by lengthening or shortening the steering tie rod. After all the clamps have been loosened, the required dimension is set by turning the steering tie rod. The tie-rod ends are not affected.



Distance „A" must be the same, in consideration of the toe-in.

In case of a self-steering axle with pneumatic stabilising, the push rods of the stabilising cylinder must be free of play („C") to be adjusted if needed. For this the pressure in the stabilising cylinder must be at a min. of 2 bar.
When adjusting the toe-in/ toe-out, the correct setting of the ride height needs to be observed.



Camber:

The wheel camber (α) has been designed fixed and cannot be adjusted. For the unloaded axle, the value is between 3,5 mm/m (12´) and 0 mm/m.

In order to avoid tyre wear, we recommend that an axle alignment is performed at regular intervals. We recommend the use of an optical measuring system for carrying out the axle alignment. For alignment, only the centres of the middle of the wheel cap or the middle of the axle stub end are of interest as reference points.
Possible causes of deviations in the axle alignment are:
- ✓ Loose U-bolt connection
- ✓ Wear of the pivot bush
- ✓ Deformation of the axle assembly components due to improper use

Classification of exciter ring teeth

SAF-HOLLAND standard supplies the exciter ring and sensor bracket preinstalled. The number of teeth is now dependent on the wheel mounting, tyre size installed and their dynamic rolling circumference have been taken into consideration.

Bolt pitch circle [mm]	Center bore [mm]	No. of bolts	Tyre size	Axle version	No. of teeth
225	175	10	17,5"	S/Z7-3015	80
				Z9-3020	
				Z11-3020	
				SK RZ 12030S	
			19,5"	S/Z9-3718/20	
				S/Z11-3720	
				SK RZ 12037	
275	220	8		S/Z11-3720	90
				S/Z9-3718/20	
				S/ZI9-19	
				S/ZI11-19	
335	280	10	19,5"/ 22,5"	BI9-19	
			22,5"	BI9-22	
				S/ZI9-22	
				S/ZI10-22	
				S/Z9-4218	
				S/Z10-4218	
				S/Z10-4220	
				S/Z11-4220S10	100
				S/Z12-4220S10	
				S/ZI11-22K11	
				S/ZI12-22K10	

The exciter ring of steered axles (self-steering and power steered) has the same number of teeth as with the rigid axles.

Note:
The position of the exciter ring is on the inside of the wheel hub, irrespective of the type of brake (disc or drum).

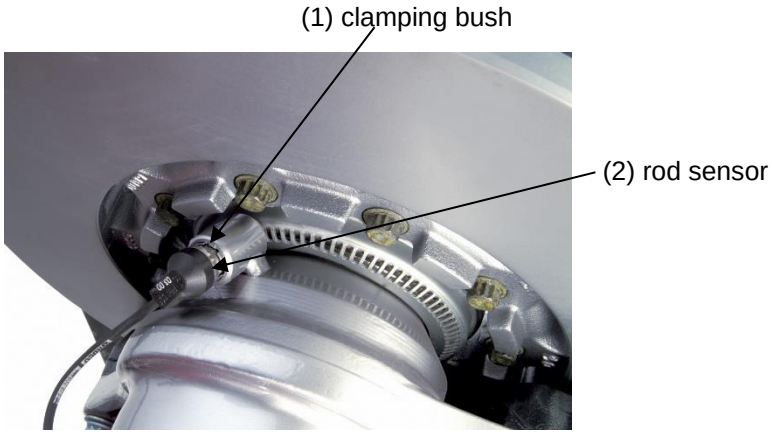
disc brake

drum brake

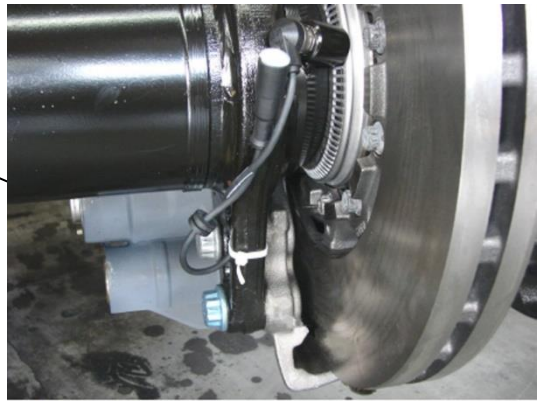
Installation instruction ABS cable

Axle with disc brake

Rod sensor (2) with clamping bush (1) pressed in completely (till exciter ring) by hand.



The fixation of the ABS cable on the supplied axle serves the transport security. The cable can not touch any adjacent, moving parts.



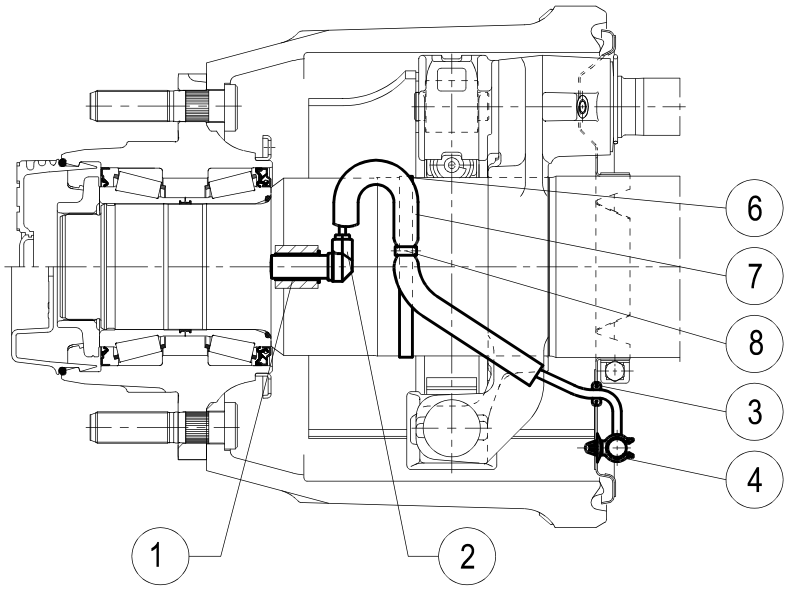
The sensor cable must not be laid taut or kinked!
The correct installation is a responsibility of the trailer builder.

	Article number for ABS group: (per axle 2x)			Pos
	with single tyre (ET0) and twin tyre:		**with single tyre (ET120):**	
At max. axle load:	9T / 10T 03 029 0238 05	11T / 12T 03 029 1071 00	03 029 1002 00	
Clamping bush	04 029 1071 00	04 029 1071 00	04 029 1002 00	(**1**)
Rod sensor	04 029 1072 00	04 029 1072 00	04 029 1013 00	(**2**)
Cable strap	04 194 2030 01			(**3**)
Cable strap	04 194 2031 01	04 194 2031 01	04 194 2031 01	(**3**)
Protecting tube	04 338 0010 00			
Rubber gromet			04 177 3018 00	

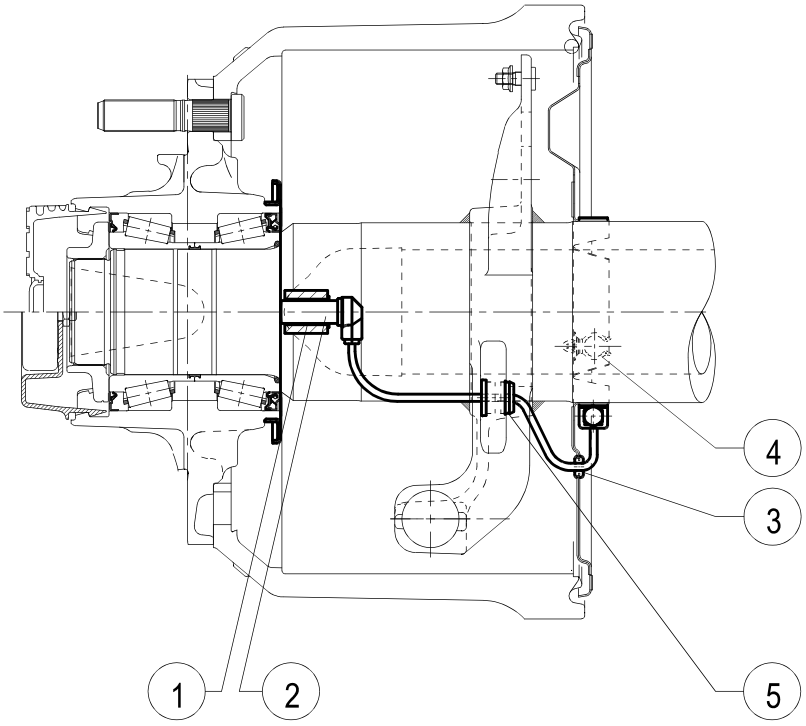
Installation instruction ABS cable

Axle with drum brake, rigid axles

at SNK 300

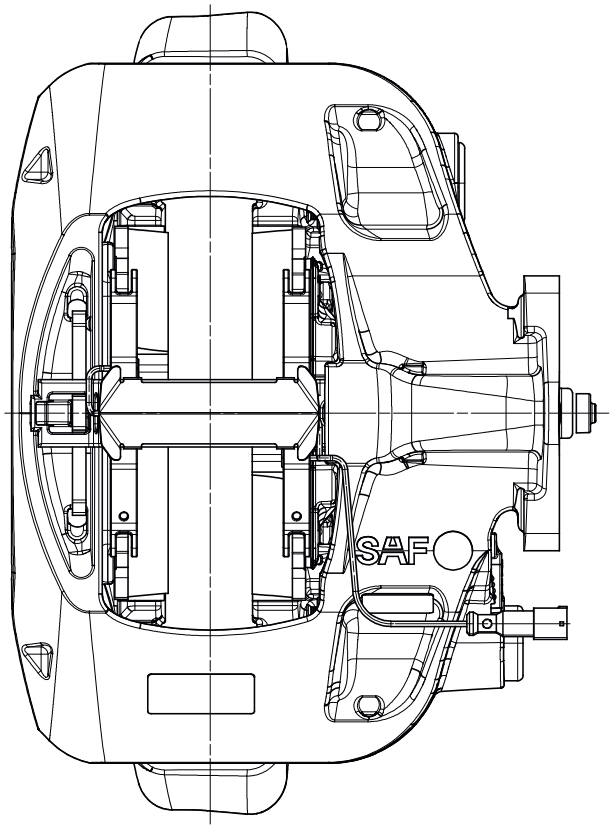


at SNK 420 and SNK 367



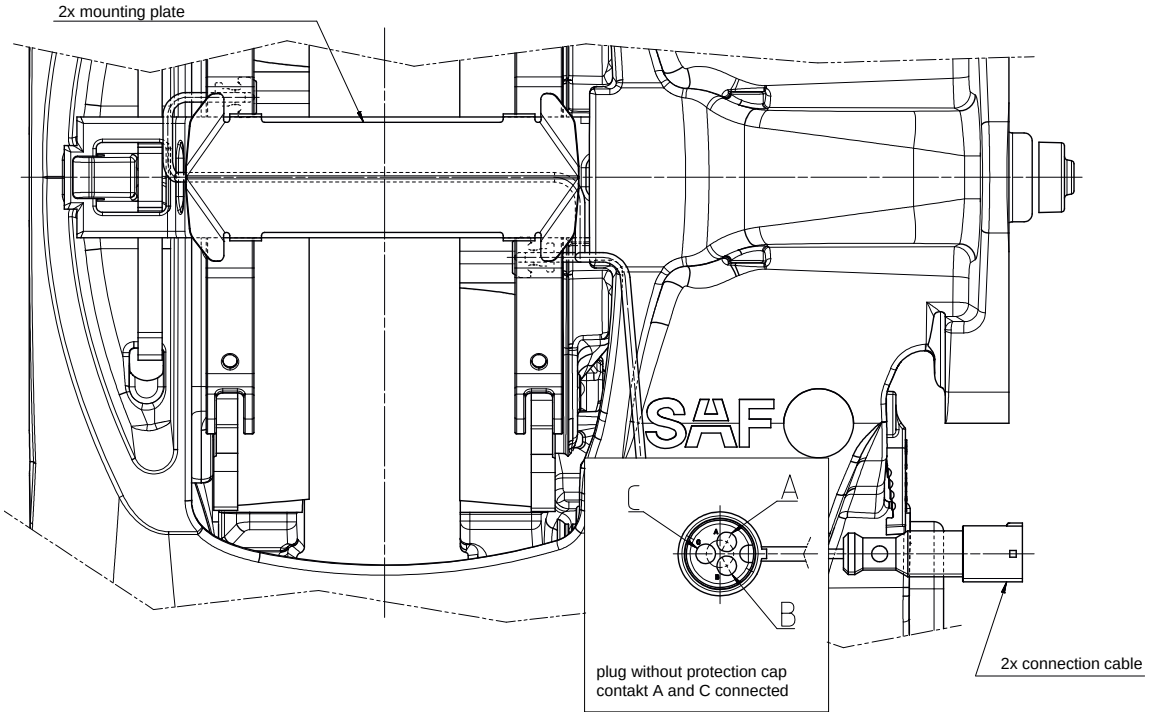
Article number 03 029 …. .. for ABS group: (per axle 2x)							Pos.	Pro Kit
	SNK 300		**SNK 367**		**SNK 420**			
At max. axle load:	9T / 11T	12T	12T	9T / 11T	9T / 10T	11 T / 12T		
	0236 05	0051 05		0234 05		0256 00		
Clamping bush	04 029 1013 00						(**1**)	1x
Rod sensor	04 029 1002 00						(**2**)	1x
Rubber grommet	04 177 3018 00						(**3**)	1x
Cable clamp	04 189 0044 00						(**4**)	1x
Plug	-			04 337 2028 00			(**5**)	1x
Clamping clip	04 194 2018 00			-			(**6**)	1x
Protecting tube	04 338 0010 00			-			(**7**)	1x
Clamping ring	01 194 4001 00			-			(**8**)	1x

Connecting cable kit for pad wear sensing on SAF calliper

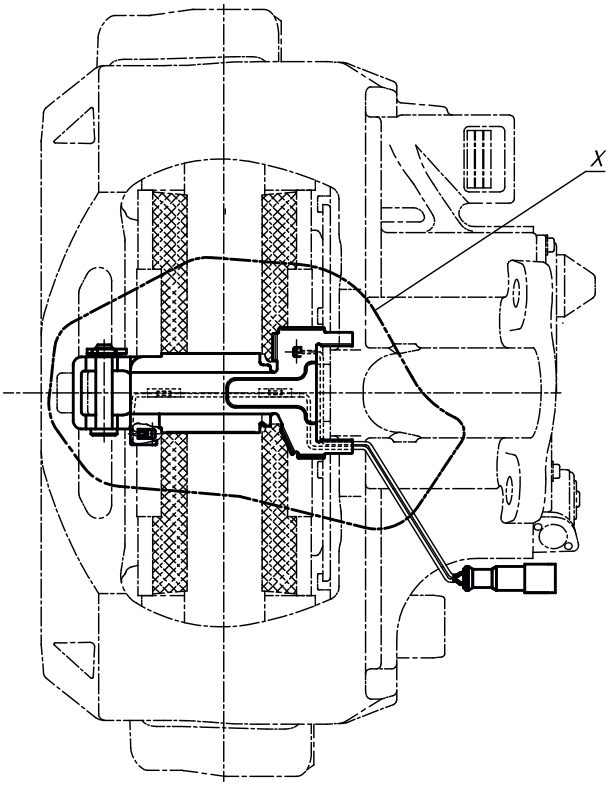


Note:
1 connection cable kit per axle

Brake	Axle type	connecting cable kit
SBS2220	SBS2243	03 424 2033 01
SBS1918	SBS1937	

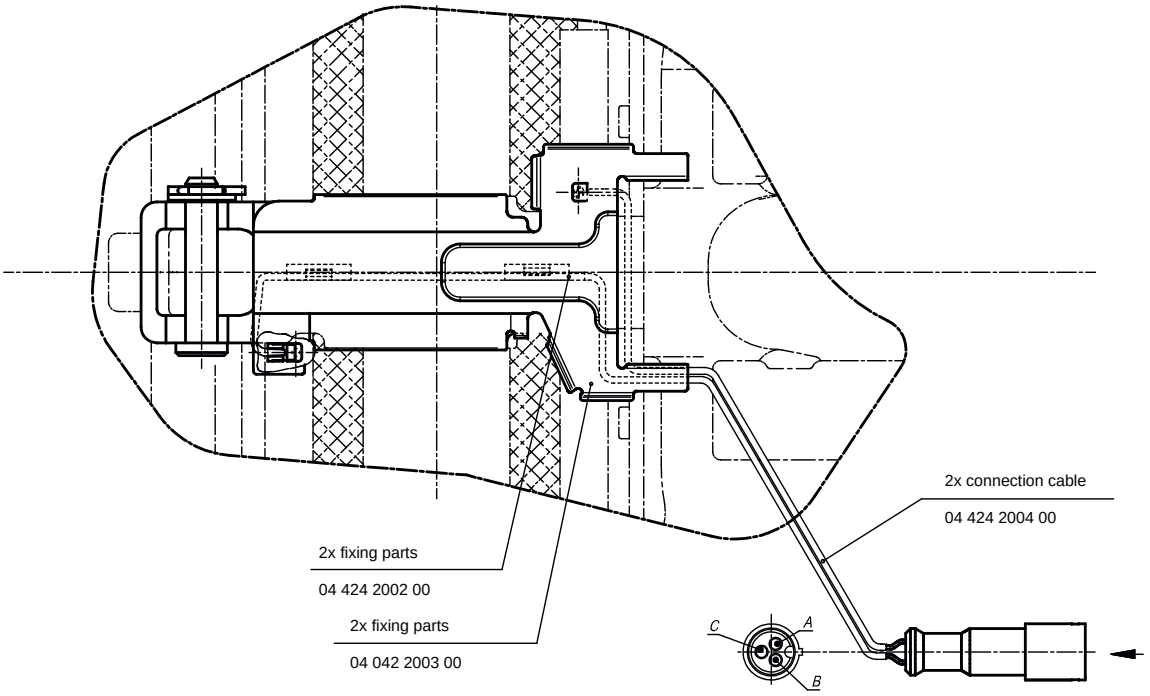


Connecting cable kit for pad wear sensing on SAF calliper

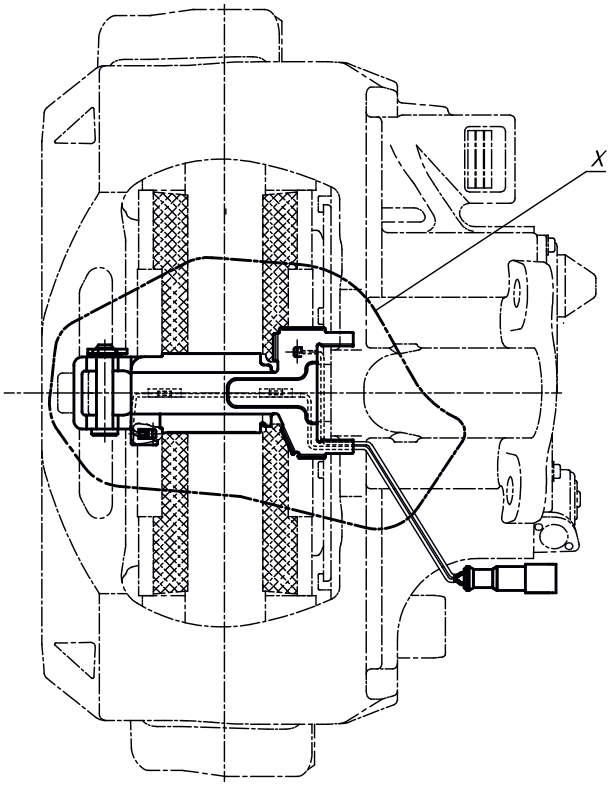


Note:
1 connection cable kit per axle

Brake	Axle type	connecting cable kit
SBS2220K0	SBS2243	03 424 2008 00

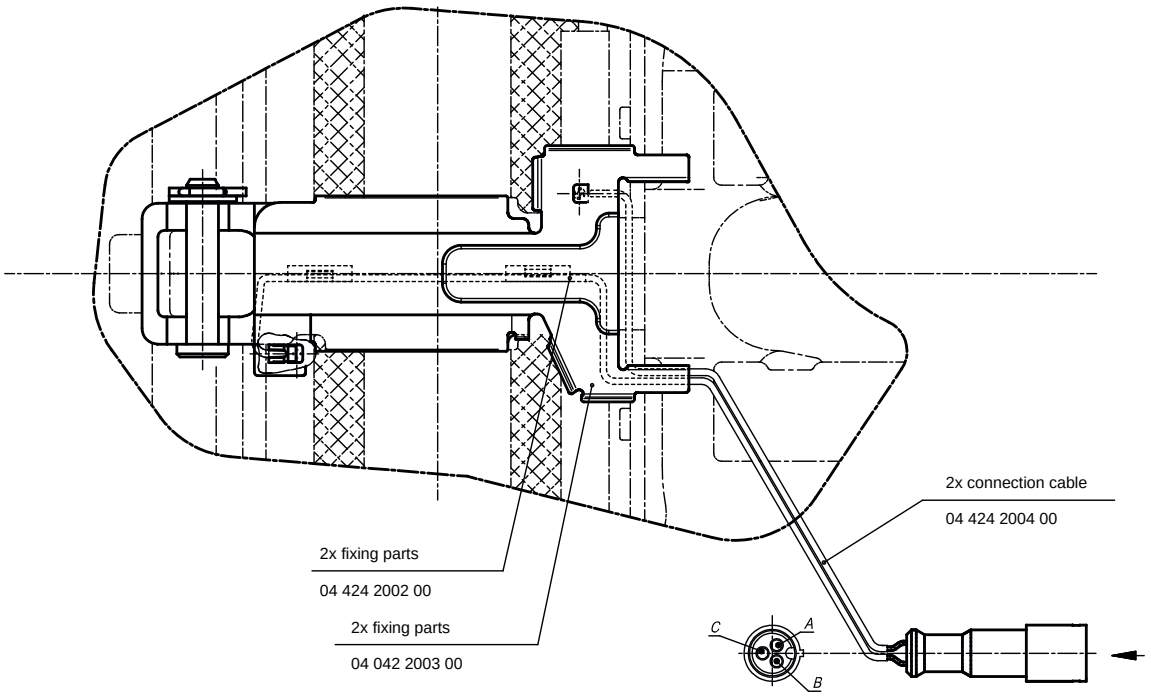


Connecting cable kit for pad wear sensing
on KNORR calliper



Note:
1 connecting cable kit per axle

Brake	Axle Typ	connecting cable kit
SBK1937	SBK1937	03 424 2008 00
SBK2243	SBK2243	



SAF-O-Meter

Designation:

Rolling circumference range:	SAF-O-Meter order no.:	Tyre example:
2360 – 2455 mm	4 388 0241 01	245/70R17,5“ or 235/75R17,5“
2590 – 2690 mm	4 388 0264 01	265/70R19,5“
2655 – 2765 mm	4 388 0271 01	445/45R19,5“
2850 – 2970 mm	4 388 0291 01	425/55R19,5“
2980 – 3100 mm	4 388 0304 01	385/55R22,5“
3125 – 3250 mm	4 388 0319 01	11R22,5“ or 295/80R22,5“
3185 – 3315 mm	4 388 0325 01	385/65R22,5“
3420 – 3560 mm	4 388 0349 01	425/65R22,5“

For example:

axle version: S9-4218
Tyre size: 385/65R22,5“
with rolling circumference
(E.T.R.T.O Norm): 3248 mm
- SAF-O-Meter 04 388 0325 00
- Hub cap 03 304 0103 02.

axle version: SK RZ 12037
tyre size: 285/70R19,5“
with rolling circumference
(E.T.R.T.O Norm): 2730 mm
- SAF-O-Meter 04 388 0271 00
- Cap group 03 337 0041 01

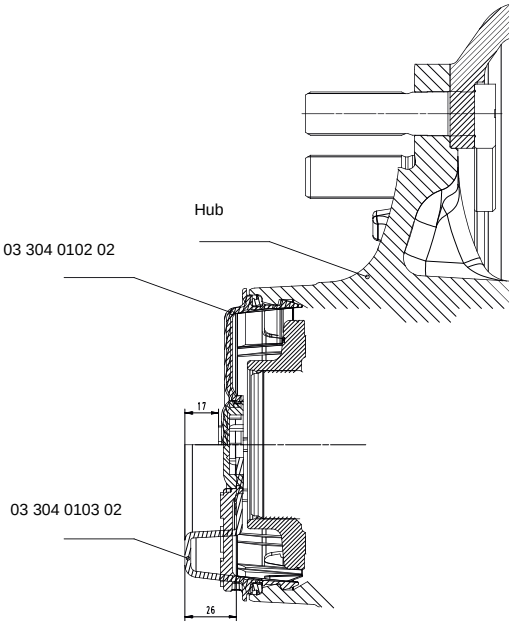
Installation

Please check before fitting whether you have received the right SAF-O-Meter suitable to your tyre size!

axle generation 06, example:
axle version S9-4218

standard hubcap
03 304 0102 02

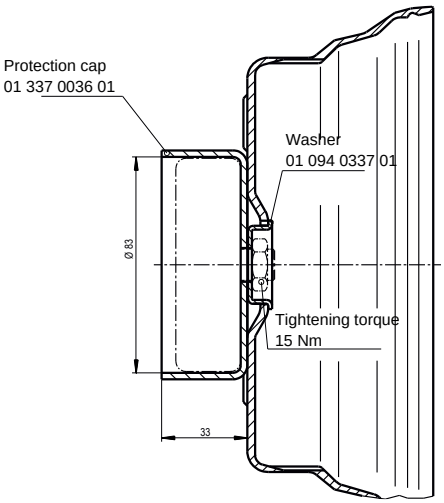
hubcap for SAF-O-Meter
03 304 0103 02



axle generation SK,example:
axle version
SK RZ 12037

hubcap

hubcap with protection cap group.
03 337 0041 01 for SAF-O-Meter



The sketches show, irrelevant of the axle types, how the SAF-O-Meter is fitted in the hub caps. It is not important on which side of the vehicle it is fitted, as the counter functions are independent of the direction of rotation.

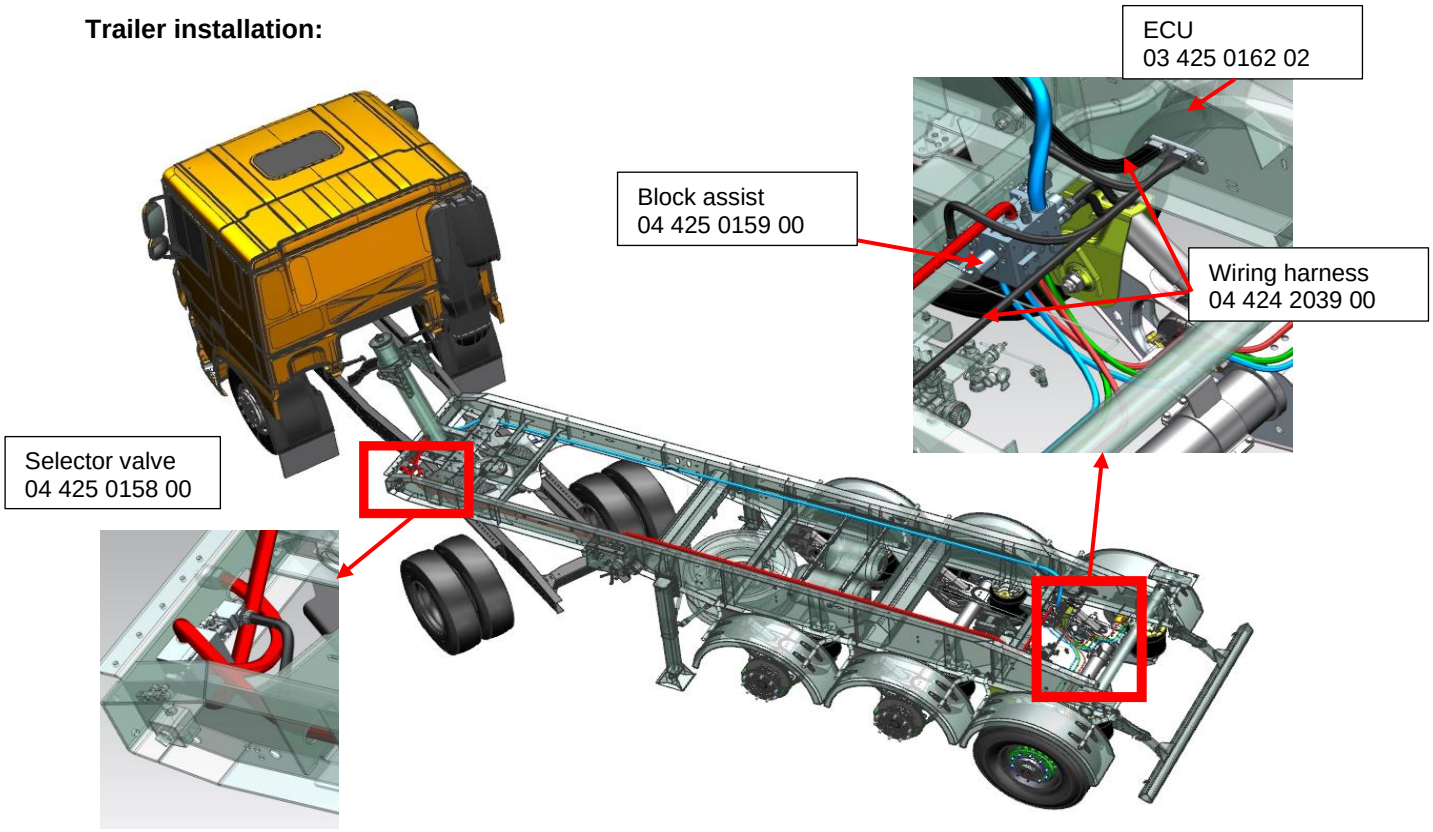
Recommendation for the technical requirement on the SAF TRAK

The driven axle SAF TRAK is optimised for trailers in the 9t standard range – both on-road and off-road. Specially developed for tippers operating in the area of construction sites or landfills, the drive axle supports the tractor unit on inclines and difficult terrain with its integrated additional drive. The additional drive is gained from the hydraulic installation which is used for the tipping cilinder or walking floor at the trailer.
The SAF TRAK control is designed for the use of the SAF TRAK axle combined with the hydraulic equipment of the tractor unit. The tractor unit needs to have the relevant setup to do so.

Recommended technical equipment for the tractor unit

The tractor unit will have to be equipt with control switches / lights, CAN Bus signals, hydraulic pump and a 2-line hydraulic system with tipping valve. This is described in the installation instructions.

Trailer installation:



Optional is a cable (04 425 2041 00) from the ECU-unit to the tractor unit with 13 pin connector and also a cable (04 425 2040 00) from the wiring harness to the selector valve. Both cables have a length of about 12 meter.

Trailer integration

The axle is supplied including mounted and checked hydraulic pumps. The integration of the Intra suspension in the trailer is the same as current standard.
The controls for the use in a tipping trailer, walking floor,… covers the complete wiring harness, the ECU-unit as the selector valve to switch between trailer hydraulic and drive, plus the block assist for the driving direction. The selector valve is installed close to the tipping cilinder of the walking floor unit, the block assist should be installed close to the driven axle.
Be aware of the installation guide: http://saf-intra-de-trak.safholland.de

The additional weight of the SAF TRAK axle is about 118 kg. The weight for the controls (wiring harness, block assist, selector valve) is about 31 kg.