

SAF INTRADISC *plus* INTEGRAL



rigid axle

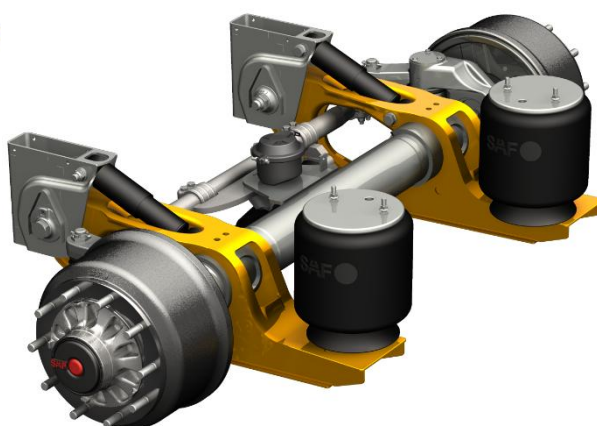


self-steering axle

SAF INTRADRUM



rigid axle



self-steering axle

Realized updates of this version to INTRA 2024-09

Page 28,98	Introduction INTRA Smart Steering Control
Page 30, 96-97	Introduction TRAKr
Page 67	welding instructions aluminum hanger bracket standard updated

Realized updates version INTRA 2024-09 to INTRA 2020-01

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Page 9-14, 17, 21, 42, 43	Introduction of suspensions with SAF 2626V, SAF 2927VK
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Page 92	Important Info 119: SAF TIRE PILOT I.Q.

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Designation on type plate and serialnumber

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.

In the SAF-HOLLAND app you will find a QR-code scanner installed for a quick and failure free ordering. The SAF-HOLLAND app can be downloaded from the Apple Store or Google Play Store.



Example type plate

With Identifiers:

SAF-HOLLAND GMBH D-63856 BESENBAACH · GERMANY			
Version	S9-4218	ID1-SNK4218-11S	
Serial No.	11 12 194 0155	ID2-SNK420X180	
Ident No.	247 90 66 2 59 3	ID3-10791	
Stat.9000kg Vmax105km/h		ID4-TDB0381	
Made in Germany	E	 SN 11121940155	

The serial number appears as follows:

XX JJ TTT NNNN

XX..... - Place of manufacture:

JJ..... - Year of manufacturing

TTT..... - Day of manufacturing

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

Example serial number: **11 12 194 0155**

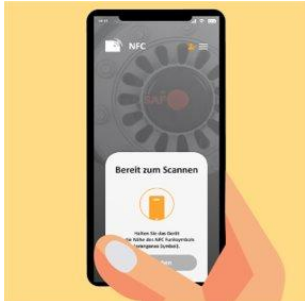
This is about the **155**th product of the **194**th manufacturing day at the manufacturing year **2012** from the **manufacturing plant 11**.

Identify spare parts securely via NFC

Your smartphone as a workshop assistant.

Hold it up. Scan. Identify spare parts.

Here you will find the video with the corresponding instructions



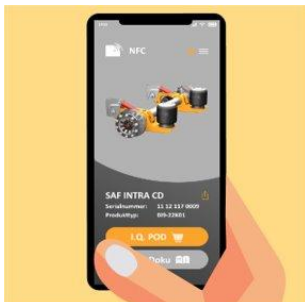
1

Open the „SH-Connect“- app on your smartphone.



2

Scan the hubcap to identify the trailer axle.



3

You will now see the details of the trailer axle, allowing you to easily order your spare parts in the POD or Knowledge Portal.



Simple and quick identification of the trailer axle (no need to crawl under the trailer to identify the nameplate anymore)



The parameters of the identified product (product image, product category, serial number, product type, etc.) can be shared via a **“Share” function from the app through various channels** (email, WhatsApp, SMS, etc.)



The search for suitable literature is significantly simplified, as the information is customized to the specific product.



The more efficient search for literature and spare parts allows workshops to **save time, resulting in cost savings for the end customer or fleet.**



The search for the right spare part is made easier as it is based on the serial number level (similar to the existing QR code on the nameplate)

Type identification for suspension: INTRADISC *plus* INTEGRAL and INTRADRUM

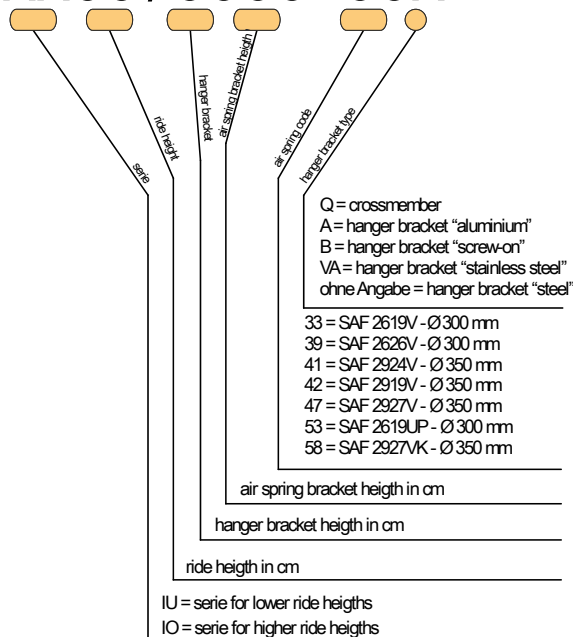
Letters are marked with "X", numbers with "0"

Example:

IU28/2005 33Q

IO44/3000 41

XX00/0000 00X



Type identification for axle generation 06

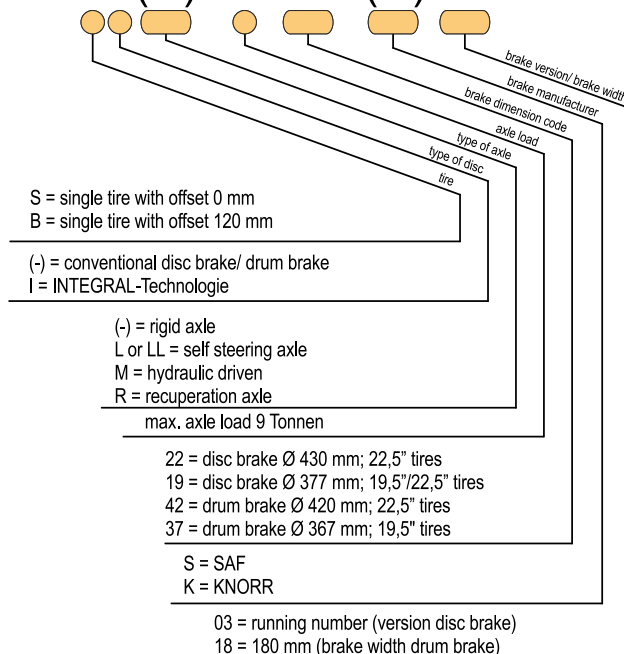
Letters are with "X", numbers with "0"

Example:

S 9-42 18

BI L 9-22 S 01

XX(X) 9-00 (X)00



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 spring centre, distance air spring centre line between left- and right side
ET	Offset, distance wheel attachment face to centre tire
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 spring bracket height
H₂	Air spring bracket height at lift air spring
HM	Hanger bracket centre, distance hanger bracket centre line between left- and right side
Hmax	Air spring height maximum
Hmin	Air spring 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 spring (L2, standard 385 mm)
LM	Spring centre, centre distance spring between left- and rightside
Lmax	Shock absorber length maximum
Lmin	Shock absorber length minimum
P	Air pressure in the air spring (Mpa)
p	Air pressure in the air spring (Mpa/kg)
Pt	Air pressure in the air spring 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 tires between left- and right side
V	Air spring offset, distance centre air spring to centre spring
X	Overall height, distance centre axle to under side of chassis beam when air springs are without air
Y	Installation height of liftarm, when raised.

All measurements are given in mm if not specified otherwise.

Overview of ride heights and weights for INTRA suspension rigid axles

air spring type 2619 V (code: **33**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU25/2000 33	230-270	200	0	389	379	410	393
IU28/2005 33	260-300	200	50	394	384	415	398
IU30/2505 33	280-320	250	50	398	388	419	402
IU33/2510 33	310-350	250	100	400	390	421	404
IU35/3010 33	330-370	300	100	404	394	425	408
IO35/2000 33	335-375	200	0	391	381	412	395
IO37/2500 33	355-395	250	0	394	384	415	398
IO40/2505 33	385-425	250	50	399	389	420	403
IO42/3005 33	405-445	300	50	403	393	424	407
IO45/3010 33	435-475	300	100	405	395	426	409
IO47/3510 33	455-495	350	100	408	398	429	412
IO50/3515 33	485-525	350	150	411	404	432	418

air spring type 2626 V (code: **39**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU29/2000 39	270-310	200	0	390	380	411	394
IU31/2500 39	290-330	250	0	394	384	415	398
IU34/2505 39	320-360	250	50	399	389	420	403
IU36/3005 39	340-380	300	50	403	393	424	407
IO41/2500 39	395-435	250	0	396	386	417	400
IO43/3000 39	415-455	300	0	399	389	420	403
IO46/3005 39	445-485	300	50	404	394	425	408
IO48/3505 39	465-505	350	50	408	398	429	412
IO51/3510 39	495-535	350	100	410	400	431	414

air spring type 2919 V (code: **42**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU25/2000 42	225-265	200	0	393	383	414	397
IU28/2005 42	255-295	200	50	398	388	419	402
IU30/2505 42	275-315	250	50	402	392	423	406
IU33/2510 42	305-345	250	100	404	394	425	408
IU35/3010 42	325-365	300	100	408	398	429	412
IO35/2000 42	330-370	200	0	395	385	416	399
IO37/2500 42	350-390	250	0	398	388	419	402
IO40/2505 42	380-420	250	50	403	393	424	407
IO42/3005 42	400-440	300	50	407	397	428	411
IO45/3010 42	430-470	300	100	409	399	430	413
IO47/3510 42	450-490	350	100	412	402	433	416
IO50/3515 42	480-520	350	150	415	405	436	419

air spring type 2927 VK (code: **58**), total axle travel **180 mm**

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU29/2000 58	270-310	200	0	396	386	417	400
IU31/2500 58	290-330	250	0	400	390	421	404
IU34/2505 58	320-360	250	50	405	395	426	409
IU36/3005 58	340-380	300	50	409	399	430	413
IO41/2500 58	395-435	250	0	402	392	423	406
IO43/3000 58	415-455	300	0	405	395	426	409
IO46/3005 58	445-485	300	50	410	400	431	414
IO48/3505 58	465-505	350	50	414	404	435	418
IO51/3510 58	495-535	350	100	416	406	437	420

air spring type 2924 V (code: **41**), total axle travel **200 mm**

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU29/2000 41	250-310	200	0	394	384	415	398
IU31/2500 41	270-330	250	0	398	388	419	402
IU34/2505 41	310-360	250	50	403	393	424	407
IU36/3005 41	320-380	300	50	407	397	428	411
IU39/3010 41	350-410	300	100	409	399	430	413
IU42/3015 41	375-435	300	150	411	401	432	415
IO41/2500 41	375-435	250	0	400	390	421	404
IO44/3000 41	395-455	300	0	404	394	425	408
IO46/3005 41	425-485	300	50	408	398	429	412
IO49/3505 41	445-505	350	50	412	402	433	416

air spring type 2927 V (code:47), total axle travel **260** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU30/2000 47	270-350	200	0	402	392	423	406
IU32/2500 47	290-370	250	0	405	395	426	409
IU35/2505 47	320-400	250	50	410	400	431	414
IU37/3005 47	340-420	300	50	414	404	435	418
IU40/3010 47	370-450	300	100	416	406	437	420
IU42/3510 47	390-470	350	100	402	392	423	406
IO44/3000 47	415-495	300	0	410	400	431	414
IO50/3505 47	465-545	350	50	418	408	439	422

INTRA „MEGA“, air spring type 2927 V (code:47), total axle travel **260** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ¹⁾ [kg]			
				BI9-22S ²⁾	BI9-19S ³⁾	S9-4218	S9-3718
IU27/2000 47V90	240-320	200	0	397	387	418	401

- 1) Weight deviations lie within the permitted DIN tolerances for the respective manufacturing process. Weight when track/spring centre 2040/1300 with steel hanger brackets, without wheel nuts. For drum brakes, weight without slack adjuster.
- 2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220 K0) an additional weight of 5 kg per axle needs to be accounted for.
- 3) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SB6...ST6) an additional weight of 5 kg per axle needs to be accounted for.

Further variants on request.

Overview of ride heights and weights for INTRA suspensions self-steering axles (BILL9-...)

Important:

The ride height range for self-steering axles is depending on the resulting caster. Because of this caster, not every ride height range as with the rigid axle can be covered. See also page 80, [Caster](#).

air spring type 2619 V (code: **33**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU25/2000 33	255-270	200	0	525	515	570
IU28/2005 33	260-295	200	50	530	520	575
IU30/2505 33	305-320	250	50	534	524	579
IU33/2510 33	310-345	250	100	536	526	581
IU35/3010 33	355-370	300	100	540	530	585
IO35/2000 33	335-350	200	0	527	517	572
IO37/2500 33	365-395	250	0	530	520	575
IO40/2505 33	385-400	250	50	535	525	580
IO42/3005 33	415-445	300	50	539	529	584
IO45/3010 33	435-450	300	100	541	531	586
IO47/3510 33	465-495	350	100	544	534	589
IO50/3515 33	485-500	350	150	547	537	592

air spring type 2626 V (code: **39**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU29/2000 39	270-295	200	0	526	516	571
IU31/2500 39	305-330	250	0	530	520	575
IU34/2505 39	320-345	250	50	535	525	580
IU36/3005 39	355-380	300	50	539	529	584
IO41/2500 39	395-405	250	0	532	522	577
IO43/3000 39	415-455	300	0	535	525	580
IO46/3005 39	445-455	300	50	540	530	585
IO48/3505 39	465-500	350	50	544	534	589
IO51/3510 39	485-505	350	100	546	536	591

air spring type 2919 V (code: **42**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU25/2000 42	255-265	200	0	529	519	574
IU28/2005 42	255-295	200	50	534	524	579
IU30/2505 42	305-315	250	50	538	528	583
IU33/2510 42	305-345	250	100	540	530	585
IU35/3010 42	355-365	300	100	544	534	589
IO35/2000 42	330-350	200	0	531	521	576
IO37/2500 42	365-390	250	0	534	524	579
IO40/2505 42	380-400	250	50	539	529	584
IO42/3005 42	415-440	300	50	543	533	588
IO45/3010 42	430-450	300	100	545	535	590
IO47/3510 42	465-490	350	100	548	538	593
IO50/3515 42	480-500	350	150	551	541	596

air spring type 2927 VK (code: **58**), total axle travel **180** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU29/2000 58	270-295	200	0	532	522	577
IU31/2500 58	305-330	250	0	536	526	581
IU34/2505 58	320-345	250	50	541	531	586
IU36/3005 58	355-380	300	50	545	535	590
IO41/2500 58	495-405	250	0	538	528	583
IO43/3000 58	415-455	300	0	541	531	586
IO46/3005 58	445-455	300	50	546	536	591
IO48/3505 58	465-505	350	50	550	540	595

air spring type 2924 V (code: **41**), total axle travel **200** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU29/2000 41	255-295	200	0	530	520	575
IU31/2500 41	305-330	250	0	534	524	579
IU34/2505 41	305-345	250	50	539	529	584
IU36/3005 41	355-380	300	50	543	533	588
IU39/3010 41	355-395	300	100	545	535	590
IU41/3510 41	405-430	350	100	549	539	594
IO44/3000 41	415-450	300	0	540	530	585
IO49/3505 41	465-500	350	50	548	538	593

air spring type 2927 V (code:47), total axle travel **260** mm

air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU30/2000 47	270-295	200	0	537	527	582
IU32/2500 47	305-345	250	0	541	531	586
IU35/2505 47	320-345	250	50	545	535	590
IU37/3005 47	355-395	300	50	549	539	594
IU40/3010 47	370-395	300	100	551	541	596
IU42/3510 47	405-445	350	100	555	545	600
IO45/3000 47	415-450	300	0	546	536	591
IO50/3505 47	465-500	350	50	554	544	599

INTRA „MEGA“, air spring type 2927 V (code:47), total axle travel **260** mm

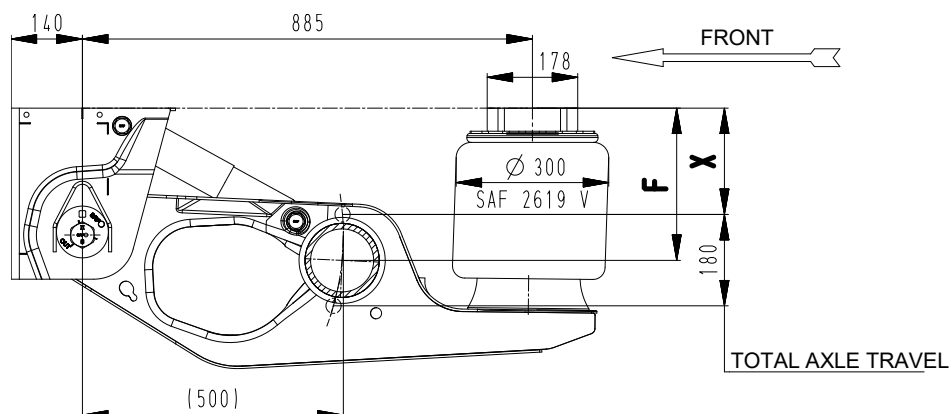
air suspension type	ride height range [mm]	hanger bracket [mm]	air spring bracket [mm]	weight ^{1) 4)} [kg]		
				BILL9-22S ²⁾	BILL9-19S ³⁾	SL9-4218
IU27/2000 47V90	255-295	200	0	533	523	578

- 1) Weight deviations lie within the permitted DIN tolerances for the respective manufacturing process. Weight when track/spring centre 2040/1300 with steel hanger brackets, without wheel nuts. For drum brakes, weight without slack adjuster.
- 2) Axle version with SAF-HOLLAND brake calliper (SBS2220); with SAF-HOLLAND brake calliper (SBS2220 K0) an additional weight of 5 kg per axle needs to be accounted for.
- 3) Axle version with SAF-HOLLAND brake calliper (SBS1918); with KNORR brake calliper (SB6...ST6) an additional weight of 5 kg per axle needs to be accounted for.
- 4) The extra weight for the axle version with B(I)L in stead of B(I)LL is about 24 kg.

Further variants on request.

Air suspension type IU with air spring 2619V (33)

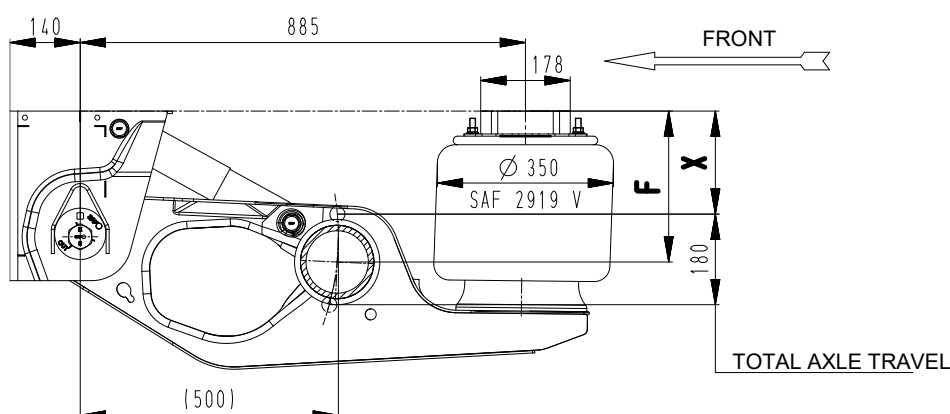
nominal ride heights 250 – 350 mm

IU../.... 33


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU25/2000 33	250	230-270	160	145
IU28/2005 33	280	260-300	190	175
IU30/2505 33	300	280-320	210	195
IU33/2510 33	330	310-350	240	225
IU35/3010 33	350	330-370	260	245

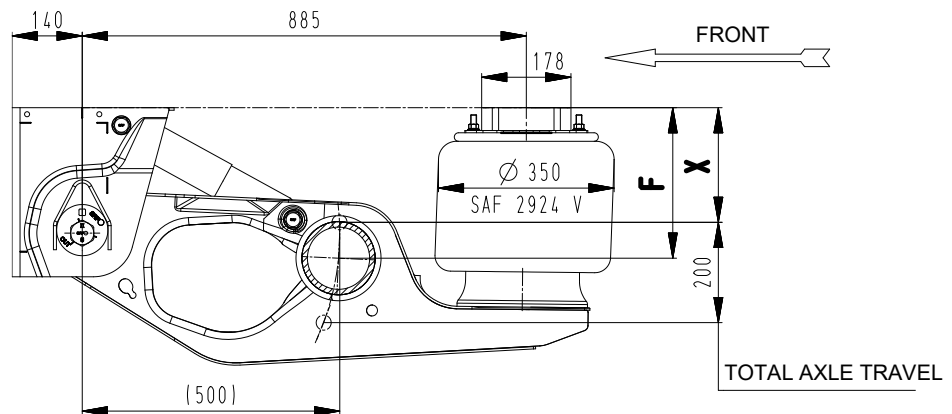
Air suspension type IU with air spring 2919V (42)

nominal ride heights 250 – 350 mm

IU../.... 42


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU25/2000 42	250	225-265	155	140
IU28/2005 42	280	255-295	185	170
IU30/2505 42	300	275-315	205	190
IU33/2510 42	330	305-345	235	220
IU35/3010 42	350	325-365	255	240

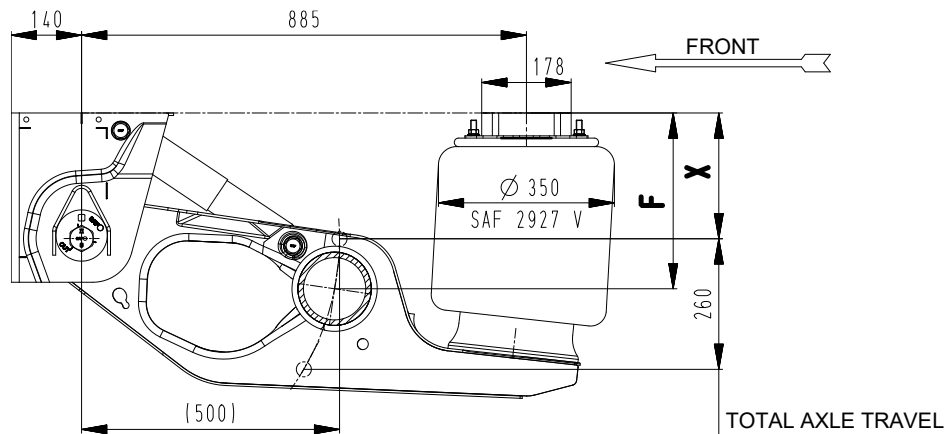
Air suspension type IU with air spring 2924V (41)

 nominal ride heights **290– 420 mm**
IU../.... 41


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU29/2000 41	290	250-310	180	165
IU31/2500 41	310	270-330	200	185
IU34/2505 41	340	300-360	230	215
IU36/3005 41	360	320-380	250	235
IU39/3010 41	390	350-410	280	265
IU42/3015 41 ¹⁾	420	375-435	305	290

1) in combination with self-steering axles the air suspension type IU41/3510 41 is used

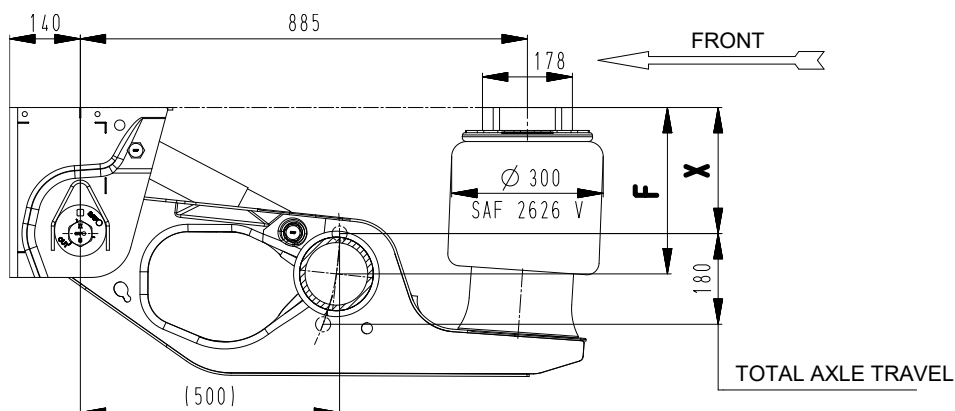
Air suspension type IU with air spring 2927V (47)

 nominal ride heights **300 – 420 mm**
IU../.... 47


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU30/2000 47	300	270-350	200	185
IU32/2500 47	320	290-370	220	205
IU35/2505 47	350	320-400	250	235
IU37/3005 47	370	340-420	270	255
IU40/3010 47	400	370-450	300	285
IU42/3510 47	420	390-470	320	305

Air suspension type IU with air spring 2626V (39)

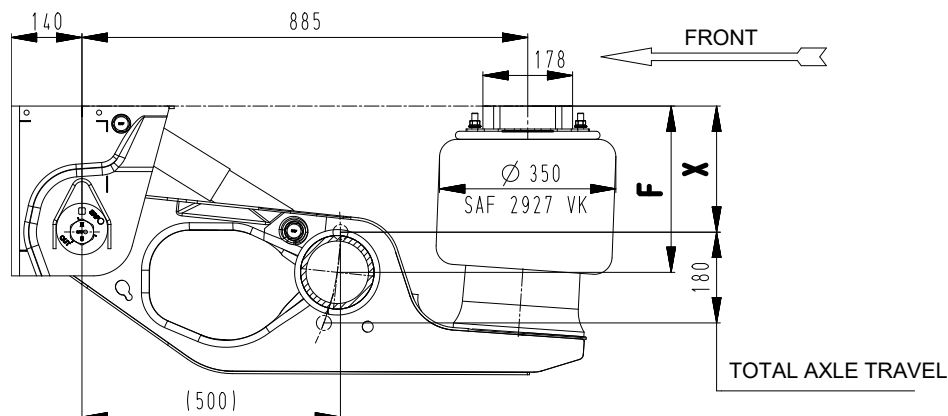
nominal ride heights 290 – 360 mm

IU../.... 39


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU29/2000 39	290	270-310	200	185
IU31/2500 39	310	290-330	220	205
IU34/2505 39	340	320-360	250	235
IU36/3005 39	360	340-380	270	255

Air suspension type IU with air spring 2927VK (58)

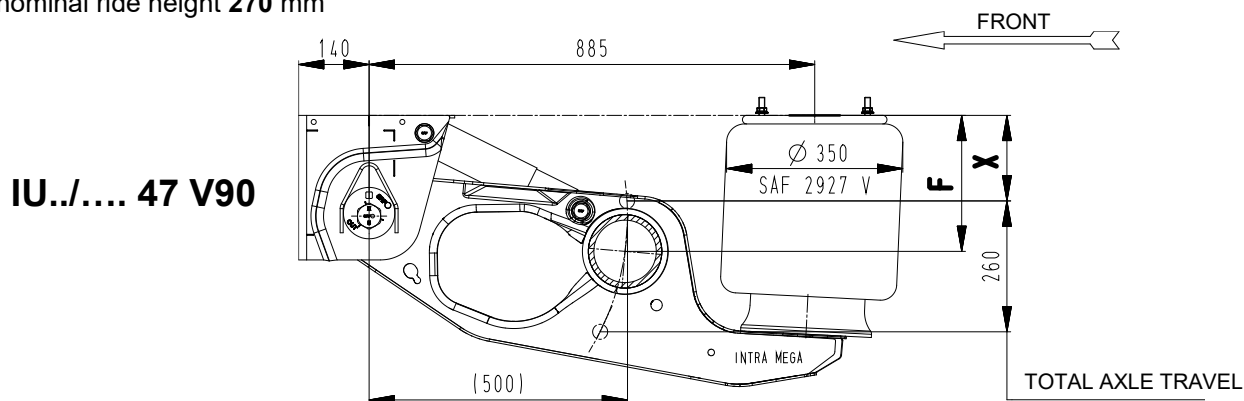
nominal ride heights 290 – 360 mm

IU../.... 58


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU29/2000 58	290	270-310	200	185
IU31/2500 58	310	290-330	220	205
IU34/2505 58	340	320-360	250	235
IU36/3005 58	360	340-380	270	255

Air suspension type INTRA „MEGA“ with air spring 2927V (47)

nominal ride height 270 mm



air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IU27/2000 47 V90	270	240-320	170	155

The INTRA „MEGA“ version contains:



✓ Lower mounting position of the air spring



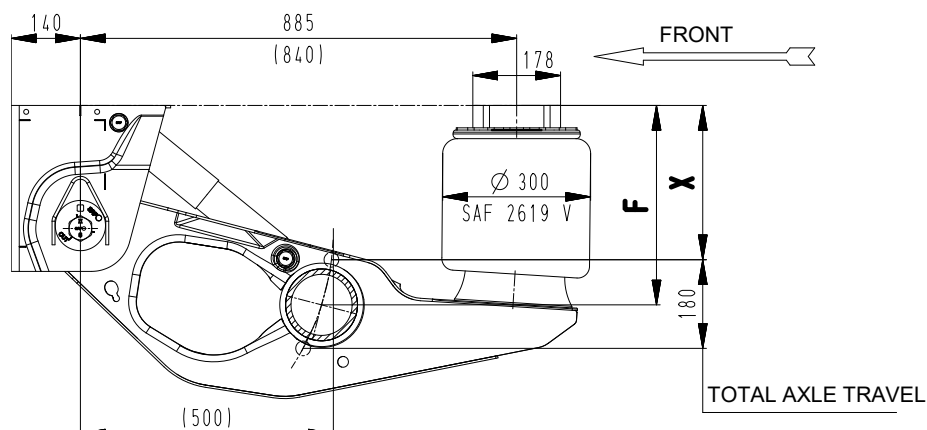
✓ Lateral displacement inwards of the air spring with offset (V) 30, 60 or 90 mm

Other track/ spring centre possibilities on request.

Air suspension type IO with air spring 2619V (33)

nominal ride heights 355 – 505 mm

IO../.... 33

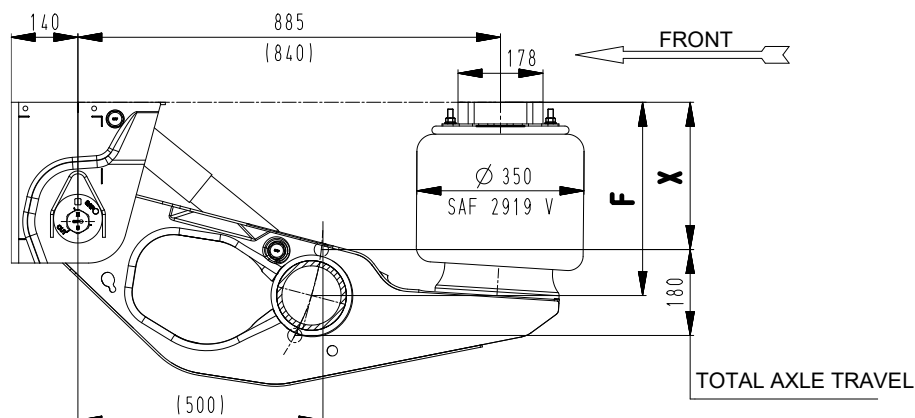


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO35/2000 33	355	335-375	265	250
IO37/2500 33	375	355-395	285	270
IO40/2505 33	405	385-425	315	300
IO42/3005 33	425	405-445	335	320
IO45/3010 33	455	435-475	365	350
IO47/3510 33	475	455-495	385	370
IO50/3515 33	505	485-525	415	400

Air suspension type IO with air spring 2919V (42)

nominal ride heights 355 – 505 mm

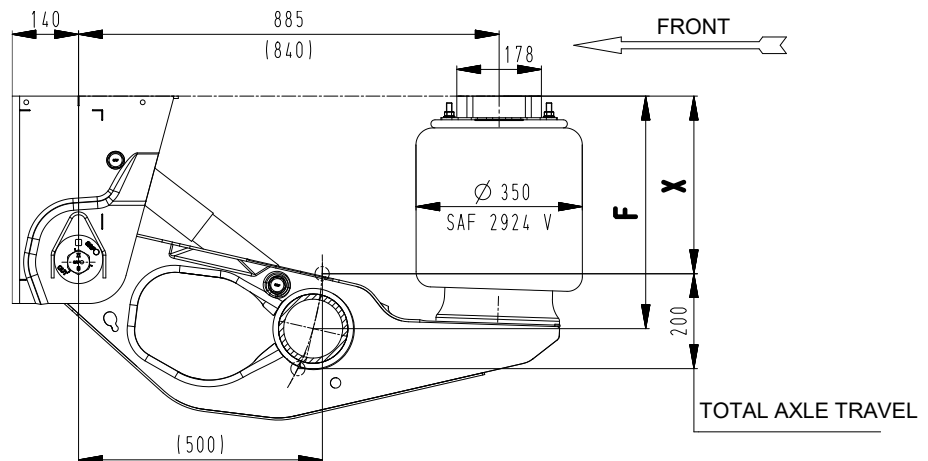
IO../.... 42



air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO35/2000 42	355	330-370	260	245
IO37/2500 42	375	350-390	280	265
IO40/2505 42	405	380-420	310	295
IO42/3005 42	425	400-440	330	315
IO45/3010 42	455	430-470	360	345
IO47/3510 42	475	450-490	380	365
IO50/3515 42	505	480-520	410	395

Air suspension type IO with air spring 2924V (41)

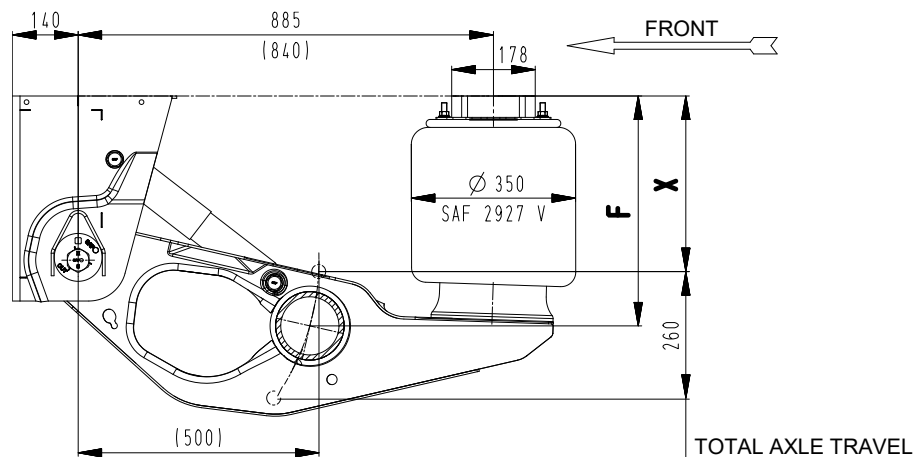
nominal ride heights 410 - 490 mm

IO../.... 41


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO41/2500 41	410	375-435	305	290
IO44/3000 41	440	395-455	325	310
IO46/3005 41	460	425-485	355	340
IO49/3505 41	490	445-505	375	360

Air suspension type IO with air spring 2927V (47) ¹⁾

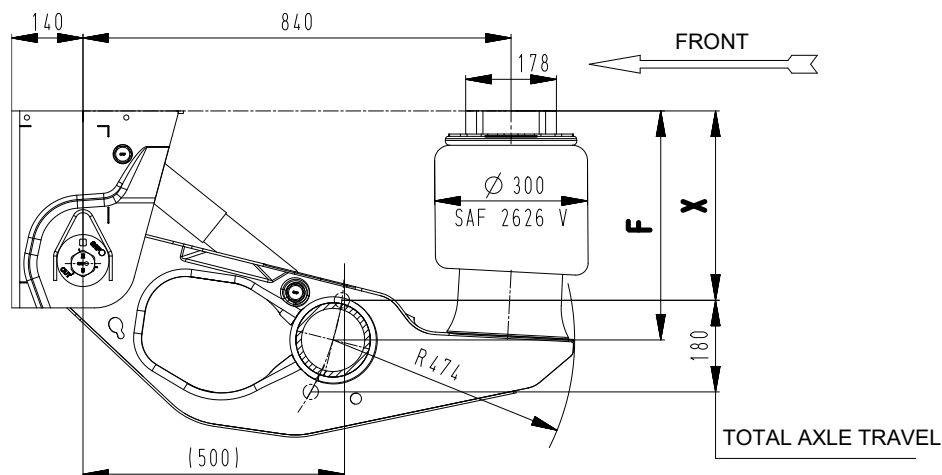
nominal ride heights 450 - 500 mm

IO../.... 47


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO45/3000 47	450	415-495	345	330
IO50/3505 47	500	465-545	395	380

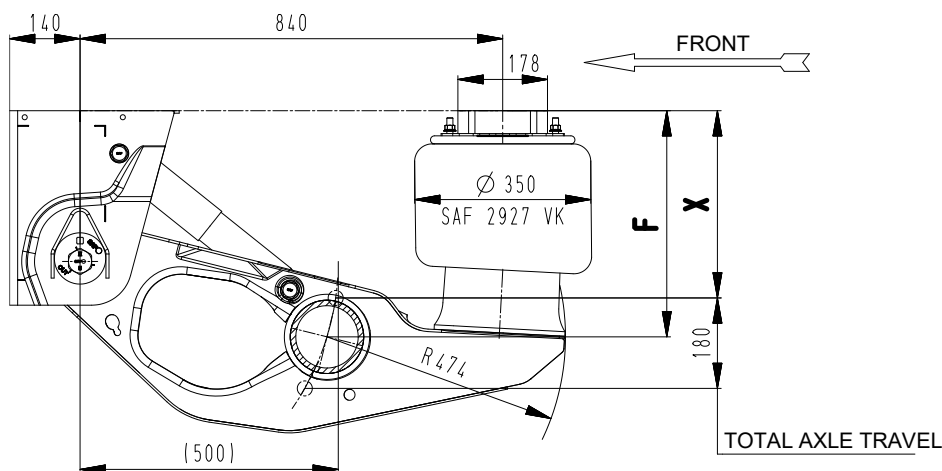
1) Cross member not possible

Trailing arm in pavers serie IO; only CD-Version
with air spring 2626V (39)

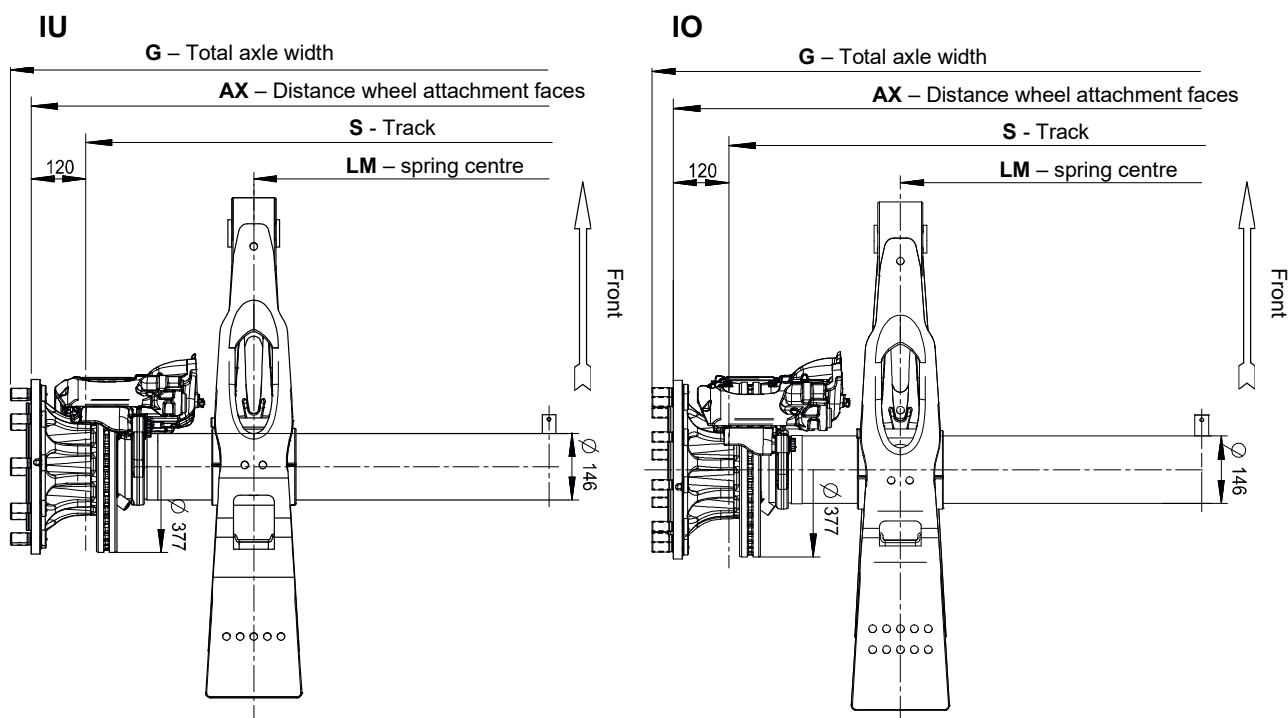
 nominal ride heights **415 - 515 mm**
IO../.... 39


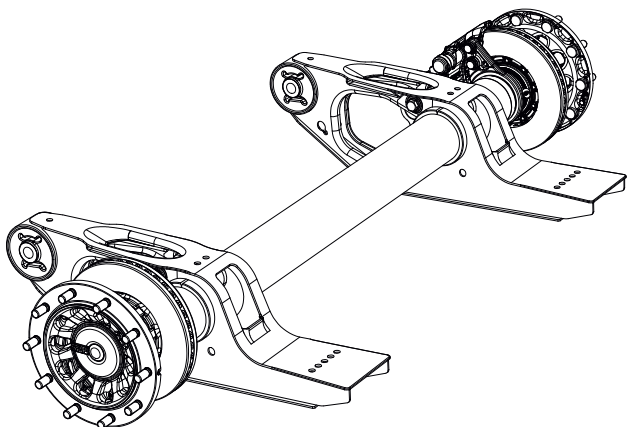
air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO41/2500 39	415	395-435	325	310
IO43/3000 39	435	405-445	345	330
IO46/3005 39	465	440-480	370	355
IO48/3505 39	480	455-495	385	370
IO51/3510 39	515	490-530	420	405

with air spring 2927VK (58)

 nominal ride heights **415 – 515 mm**
IO../.... 58


air suspension type	F; nominal ride height [mm]	ride height range [mm]	X; overall height	
			unladen without air [mm]	laden without air [mm]
IO41/2500 58	415	395-435	325	310
IO43/3000 58	435	410-450	340	325
IO46/3005 58	460	445-485	375	350
IO48/3505 58	495	460-500	390	375
IO51/3510 58	515	495-535	425	410

Axle version BI9-19.:Axle load maximum: **9.000 kg**Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

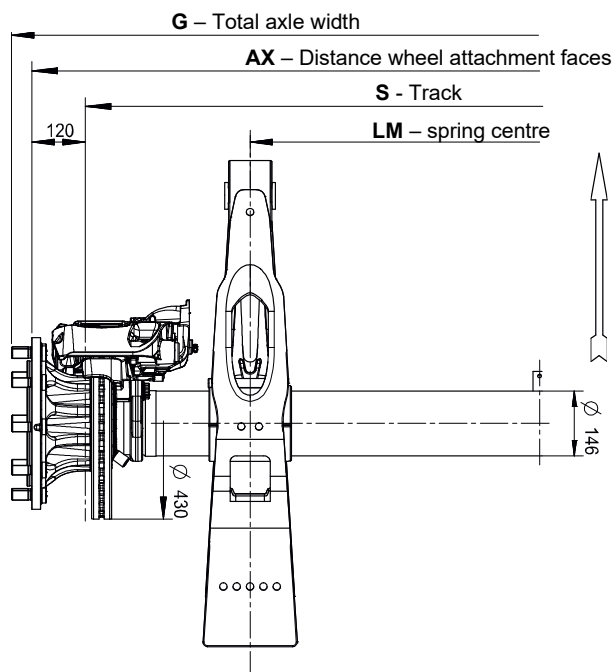
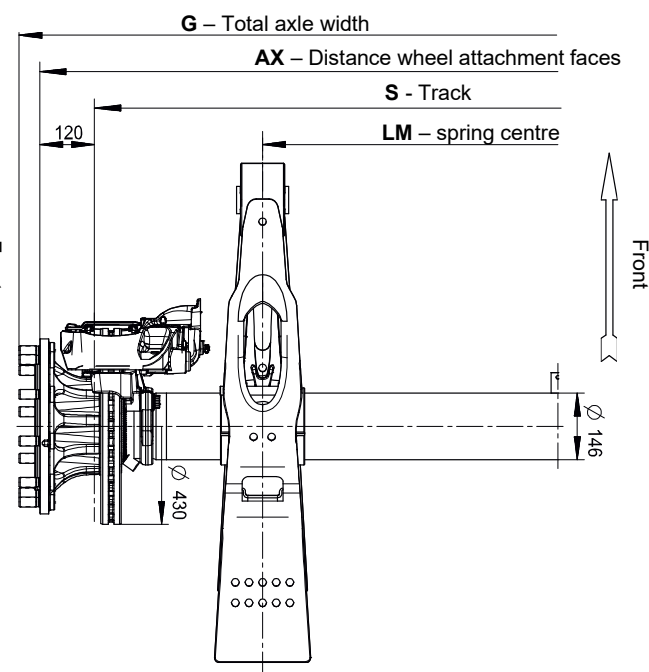
axle version / axle type/ brake/ test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾
	tire (example): 445/45R19,5"		[mm]
 illustration IU BI9-19S / SBS1937 / SAF, SBS1918 / TDB 0870 BI9-19K / SBK1937 / KNORR, SBK1937 / TDB 0605	2210/1200	1970/1200	2302
	2250/1200	2010/1200	2342
	2250/1300	2010/1300	2342
	2280/1200	2040/1200	2372
	2280/1300	2040/1300	2372
	2330/1300	2090/1300	2422
	2380/1300	2140/1300	2472
	238/1400	2140/1400	2472

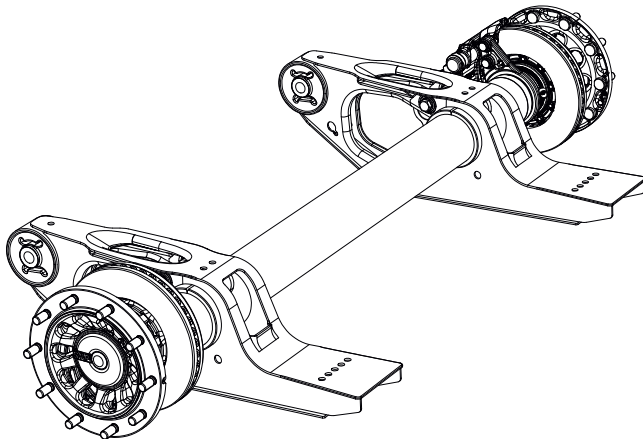
1) **S = AX - 2 * ET (120 mm)**2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

Axle version BI9-22...:Axle load maximum: **9.000 kg**Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm****IU****IO**

axle version / axle type/ brake/ test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾ [mm]
	tire (example): 385/65R22,5"		
 illustration IU BI9-22S / SBS2243 / SAF, SBS2220 / TDB 0843 BI9-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214	2210/1200	1970/1200	2302
	2250/1200	2010/1200	2342
	2250/1300	2010/1300	2342
	2280/1200	2040/1200	2372
	2280/1300	2040/1300	2372
	2330/1300	2090/1300	2372
	2380/1300	2140/1300	2472
	2380/1400	2140/1400	2472

1) **S = AX - 2 * ET** (120 mm)2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

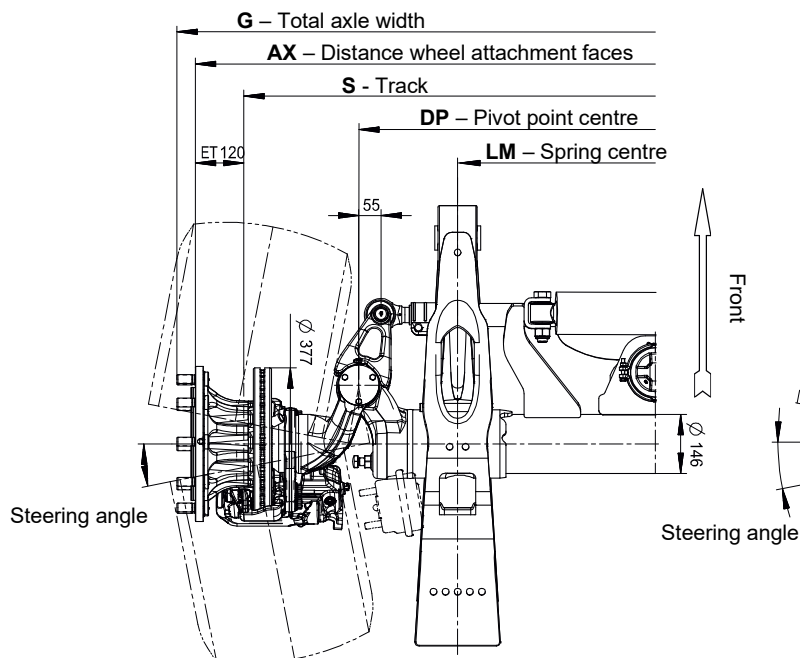
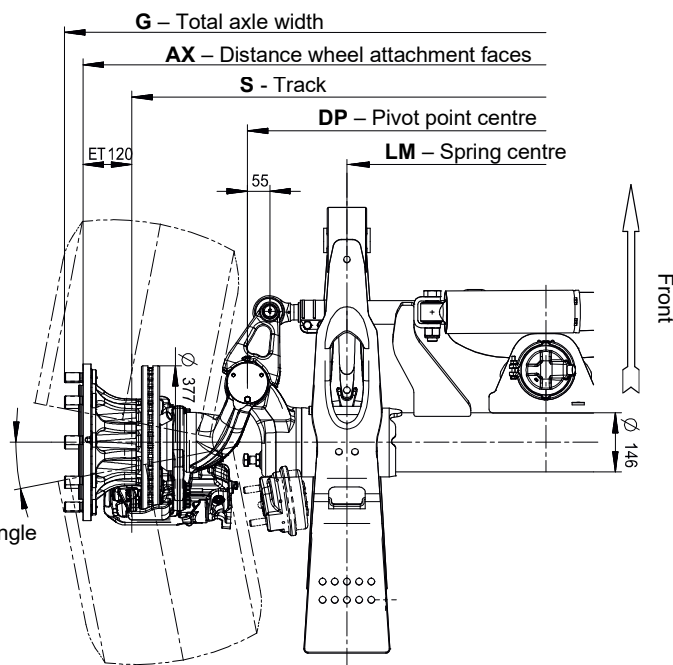
Axle version BILL9-19. with Intra Standard:

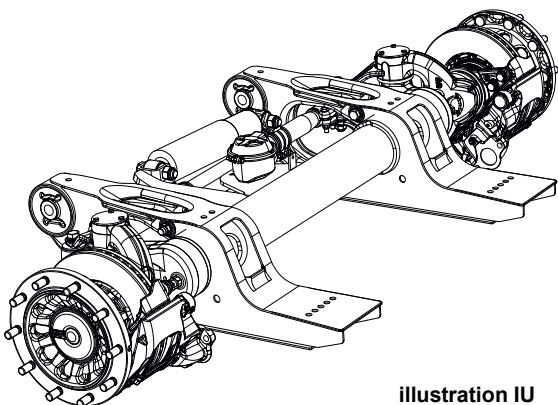
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 For air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

IU

IO


axle version / axle type/ brake/ test report	AX / LM [mm]	S ^{1)/} LM [mm]	G ²⁾	DP
	tire (example):445/45R19,5“		[mm]	[mm]
 illustration IU BILL9-19S / SBS1937 / SAF, SBS1918 / TDB 0870 BILL9-19K / SBK1937 / KNORR, SBK1937 / TDB 0605	2250/950	2010/950	2342	1440
	2280/980	2040/980	2372	1470
	2330/1030	2090/1030	2422	1520
	2330/1080	2090/1080	2422	1520
	2380/1080	2140/1080	2472	1570

 1) **S = AX - 2 * ET (120 mm)**

 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

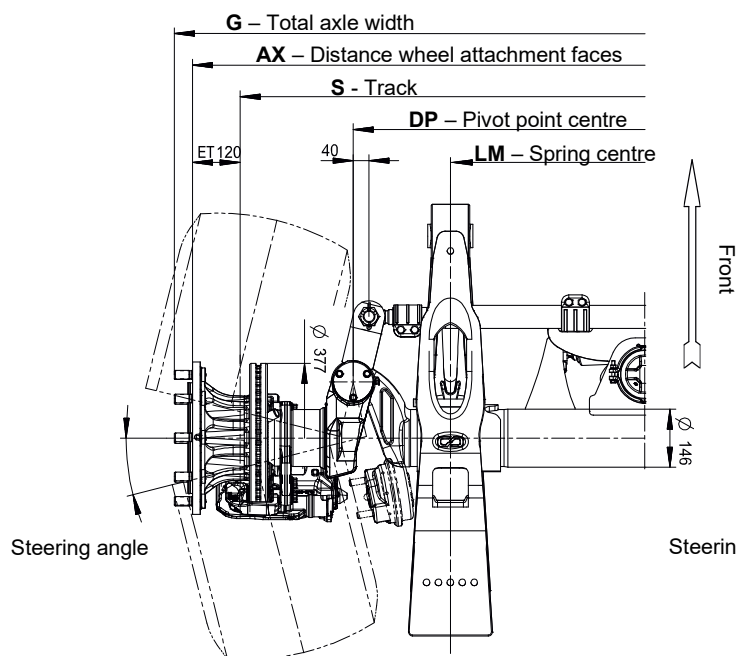
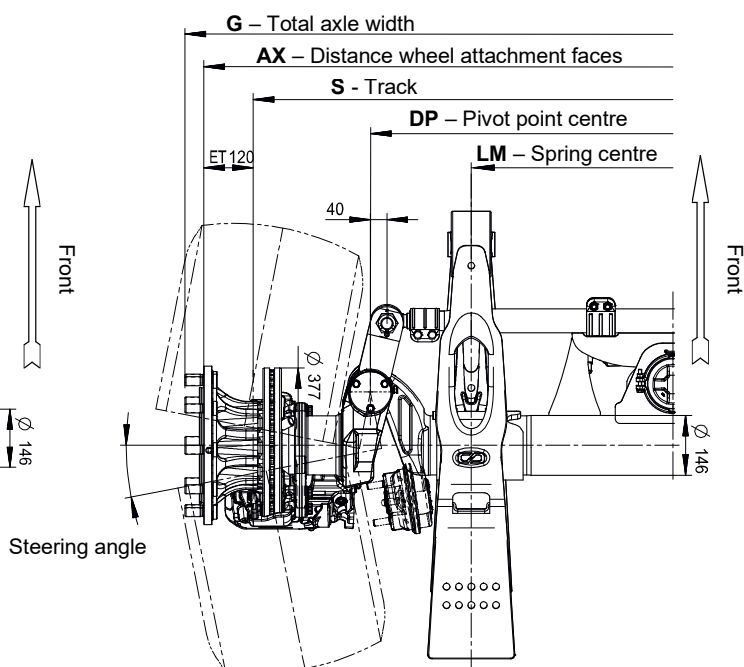
Axle version BIL9-19. with Intra CD

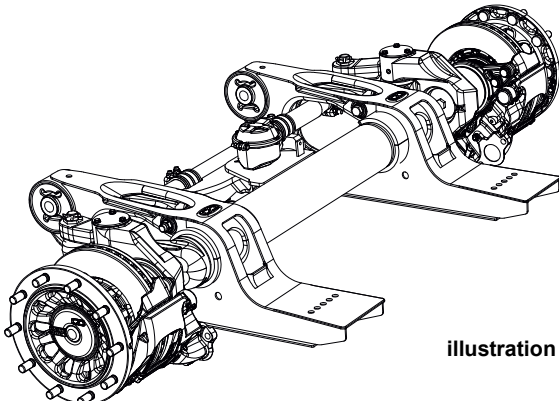
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

IU

IO


axle version / axle type/ brake/ test report	AX / LM [mm]	S ^{1)/ LM} [mm]	G ²⁾	DP
	tire (example):445/45R19,5“		[mm]	[mm]
 illustration IU	2250/950	2010/950	2342	1440
	2280/980	2040/980	2372	1470
	2330/1030	2090/1030	2422	1520
	2330/1080	2090/1080	2422	1520
	2380/1080	2140/1080	2472	1570

 1) $S = AX - 2 * ET$ (120 mm)

 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

 If needed, special version with brake caliper rotated upwards ([see page 34](#))

Further variants on request.

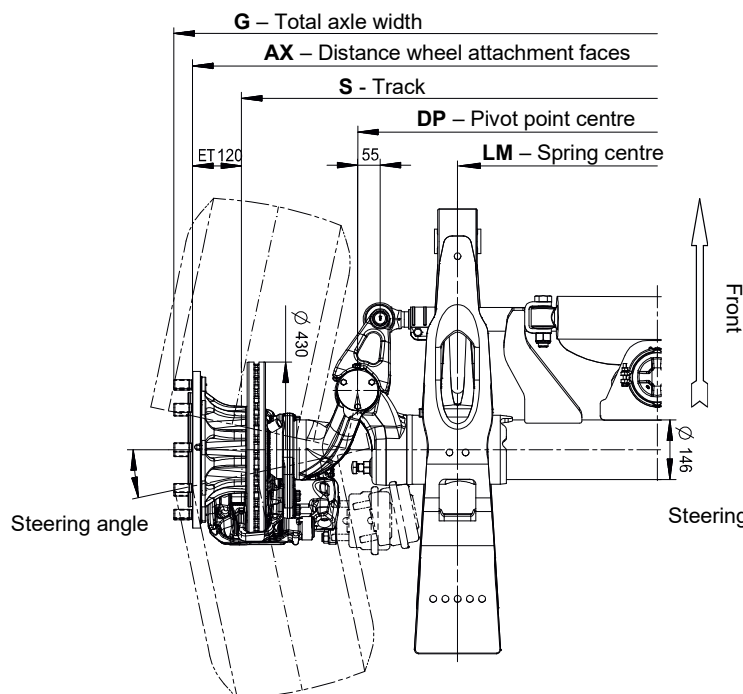
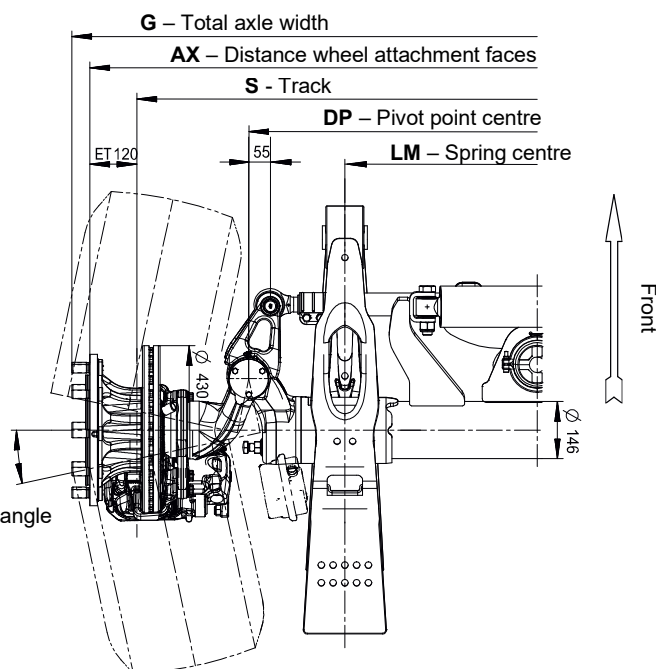
Axle version BILL9-22...with Intra Standard

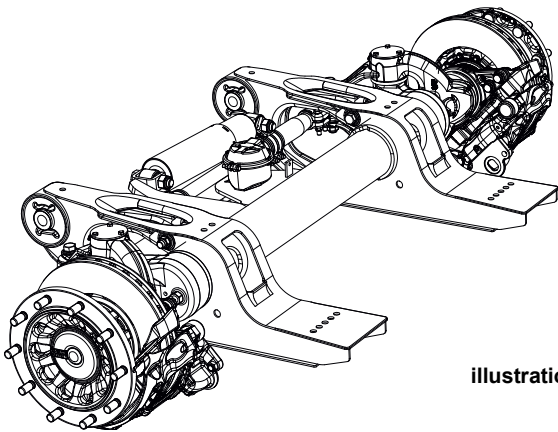
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

IU

IO


axle version / axle type/ brake/ test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾	DP
	tire (example):385/65R22,5“		[mm]	[mm]
 illustration IU	2250/950	2010/950	2342	1440
	2280/980	2040/980	2372	1470
	2330/1030	2090/1030	2422	1520
	2330/1080	2090/1080	2422	1520
	2380/1080	2140/1080	2472	1570

 1) **S = AX - 2 * ET (120 mm)**

 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

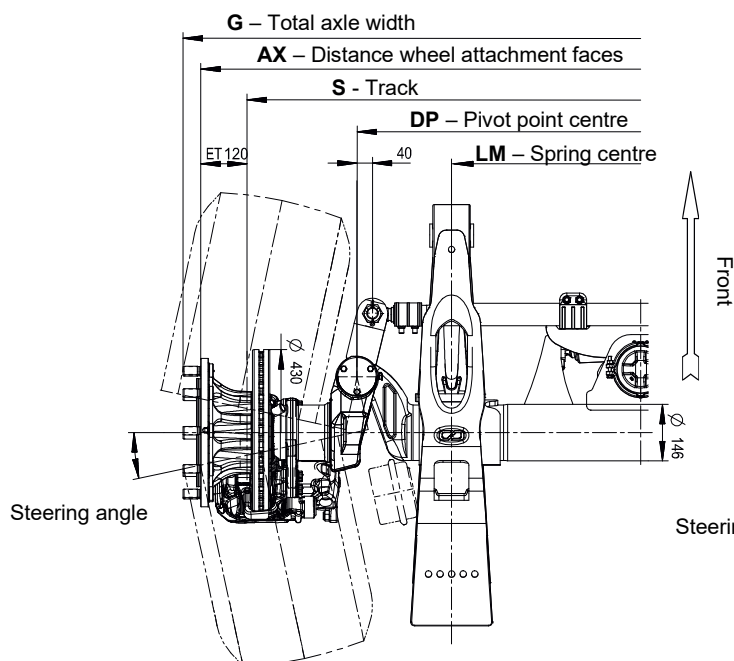
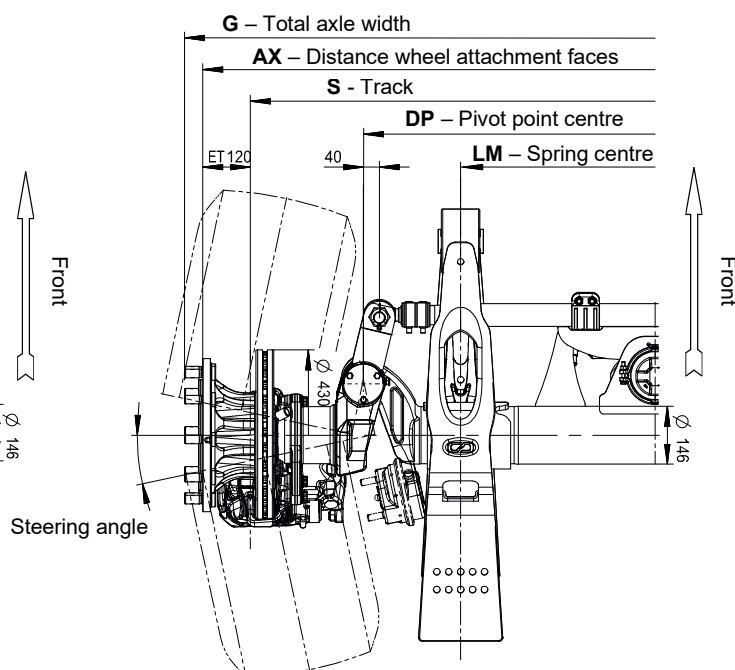
Axle version BIL9-22...with Intra CD

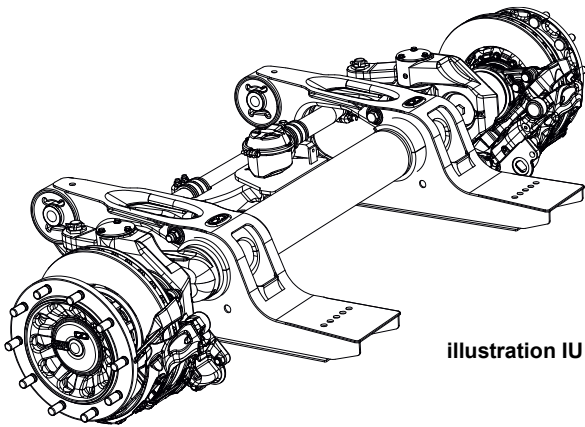
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

IU

IO


axle version / axle type/ brake/ test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾	DP
	tire (example):385/65R22,5“		[mm]	[mm]
 illustration IU	2250/950	2010/950	2342	1440
	2280/980	2040/980	2372	1470
	2330/1030	2090/1030	2422	1520
	2330/1080	2090/1080	2422	1520
	2380/1080	2140/1080	2472	1570
BIL9-22S / SBS2243 / SAF, SBS2220 / TDB0843 BIL9-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214				

 1) **S = AX - 2 * ET (120 mm)**

 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

 If needed, special version with brake caliper rotated upwards ([see page 34](#))

Further variants on request.

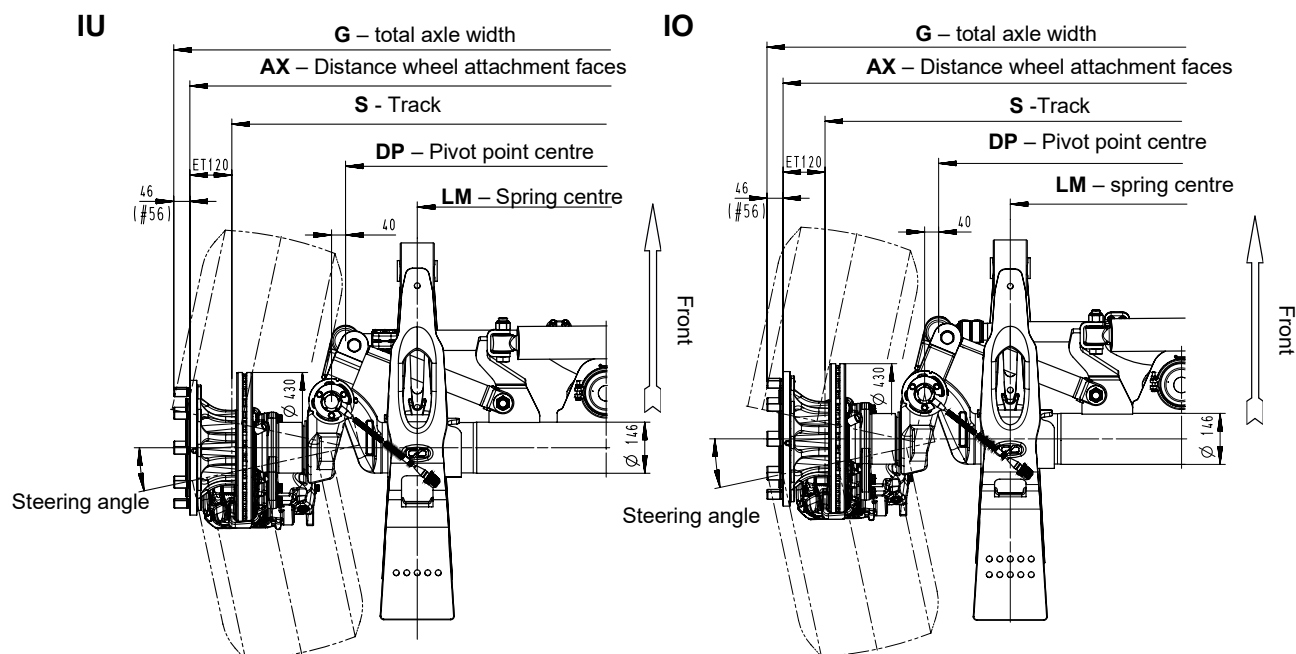
Axle version BIL9-22 with Smart Steering Control:

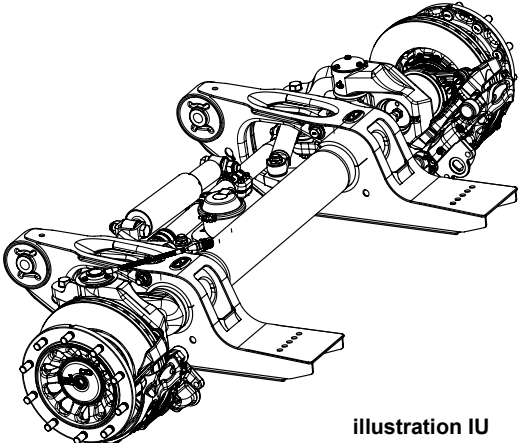
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.



axle version / axle type / Brake / test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾ [mm]	DP [mm]
	tire (example): 385/65R22,5"			
 illustration IU BIL9-19S / SBS1937 / SAF, SBS1918 / TDB 0870 BIL9-19K / SBK1937 / KNORR, SBK1937 / TDB 0605 BIL9-22S / SBS2243 / SAF, SBS2220 / TDB 0843 BIL9-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214	2250/950	2010/950	2342	1440
	2280/980	2040/980	2372	1470
	2330/1030	2090/1030	2422	1520
	2330/1080	2090/1080	2422	1520
	2380/1080	2140/1080	2472	1570

 1) **S = AX - 2 * ET (120 mm)**

 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

 If needed, special version with brake caliper rotated upwards ([see page 34](#))

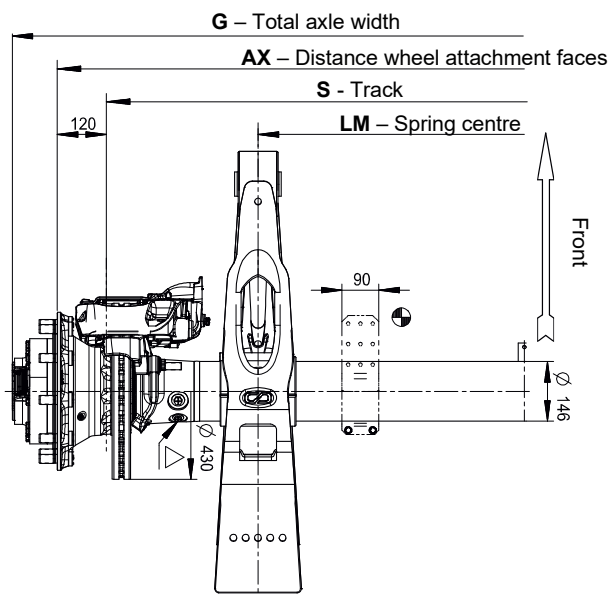
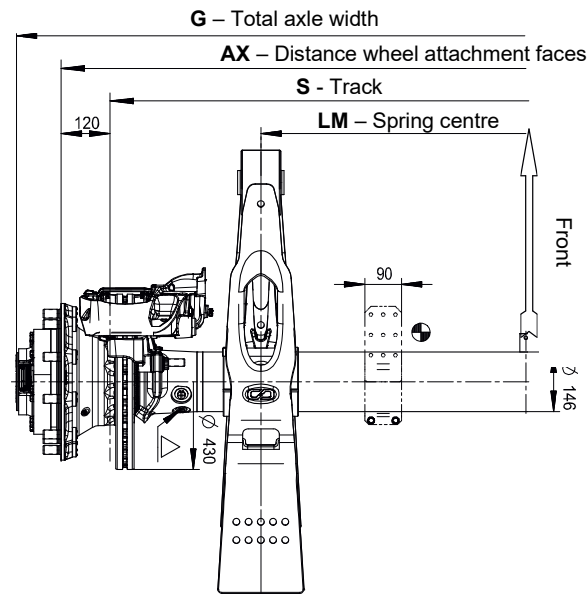
 System guide [see page 98](#)

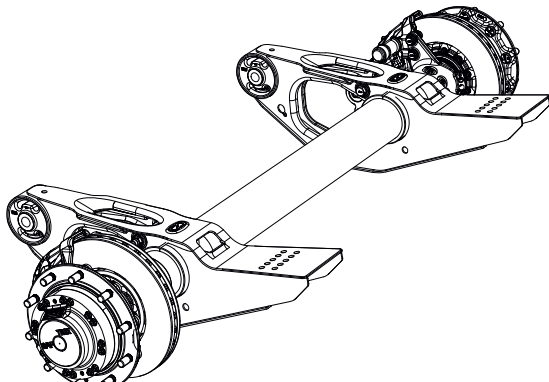
Further variants on request.

Achsversion BIM9:

 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**
IU

IO

 - Tube support is available as an option

axle version / axle type/ brake/ test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G [mm]
	tire (example): 385/65R22,5"		
 Illustration IO BIM9-19S / SBS1937 / SAF, SBS1918 / TDB 0870 BIM9-19K / SBK1937 / KNORR, SBK1937 / TDB 0605 BIM9-22S / SBS2243 / SAF, SBS2220 / TDB 0843 BIM9-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214	2280/1200	2040/1200	2500
	2280/1300	2040/1300	2500
	2330/1300	2090/1300	2550
	2330/1350	2090/1350	2550

 1) $S = AX - 2 * ET$ (120 mm)

Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire 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 INTRA CD TRAK axle](#)

Further variants on request.

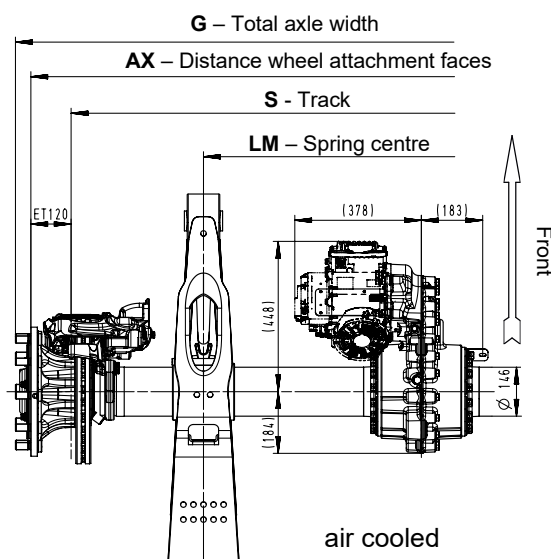
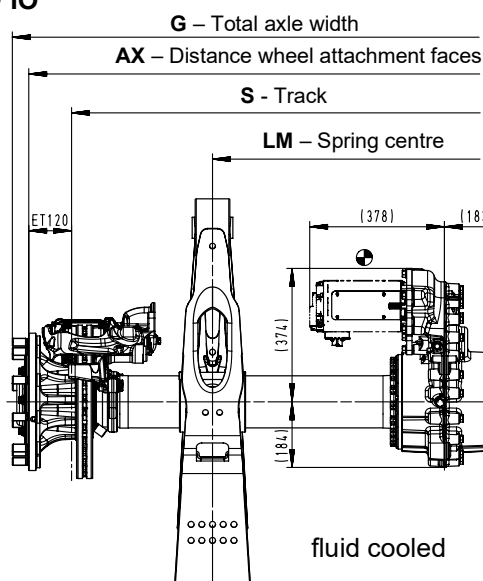
Axle version BIR9:

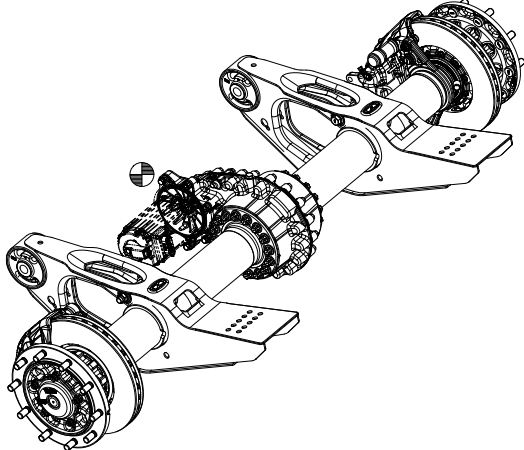
 Axle load maximum: **9.000 kg**

 Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**

 Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

IU / IO



axle version / axle type / brake / test report	AX / LM [mm]	S ¹⁾ / LM [mm]	G ²⁾ [mm]
	tire (example): 385/65R22,5"		
 illustration IO, fluid cooled BIR9-19S / SBS1937 / SAF, SBS1918 / TDB 0870 BIR9-19K / SBK1937 / KNORR, SBK1937 / TDB 0605 BIR9-22S / SBS2243 / SAF, SBS2220 / TDB 0843 BIR9-22S01 / SBS2243 / SAF, SBS2220K0 / 36102214	2280/1200	2040/1200	2372
	2280/1300	2040/1300	2372
	2330/1300	2090/1300	2422
	2380/1300	2140/1300	2472
	2380/1400	2140/1400	2472

 1) $S = AX - 2 \cdot ET$ (120 mm)

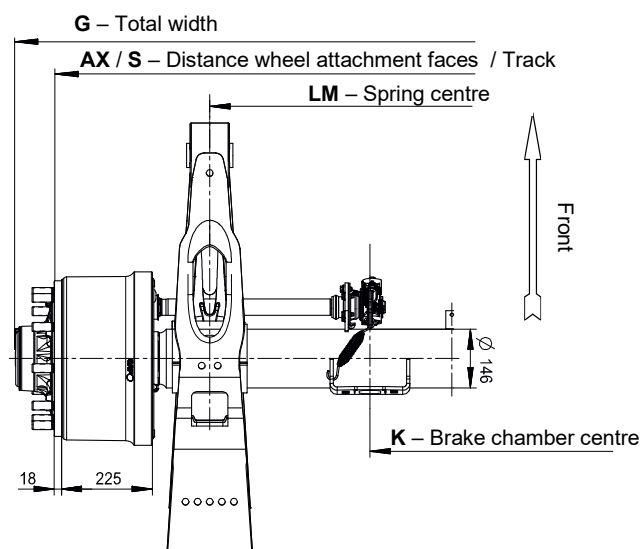
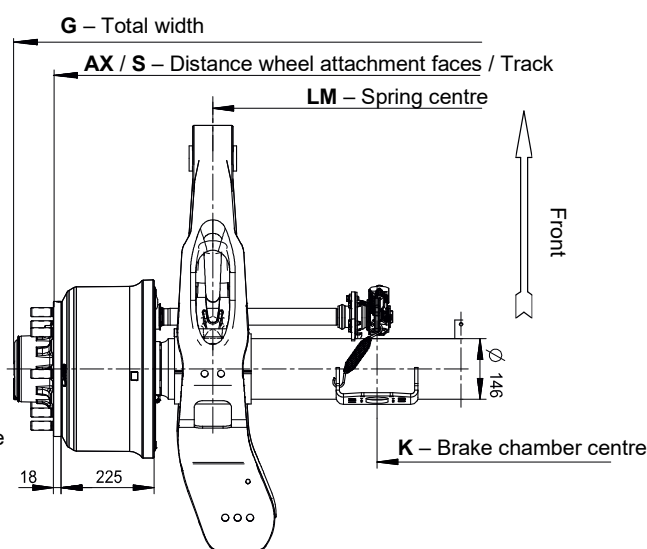
 2) **G** is increased by 20 mm when wheel studs are used for mounting aluminium rims

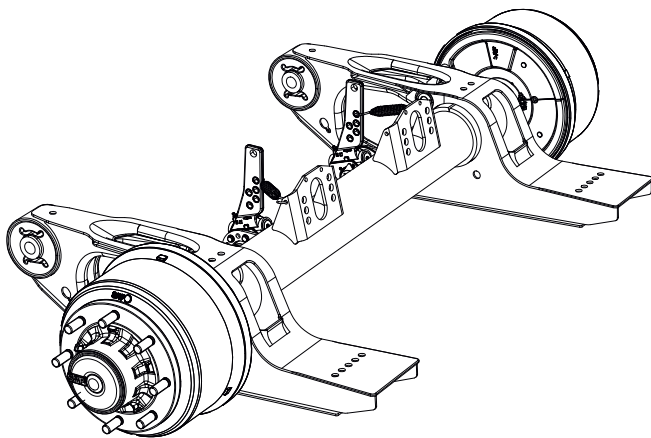
Note:

 The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

 See the recommendation for [SAF TRAKr Achse](#)

Further variants on request.

Axle version S9-3718:Axle load maximum: **9.000 kg**Wheel fixing: **8 / 220 / 275 / 22x1,5 mm** or **10 / 280 / 335 / 22x1,5 mm**Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm****IU****IU (Intra MEGA)**

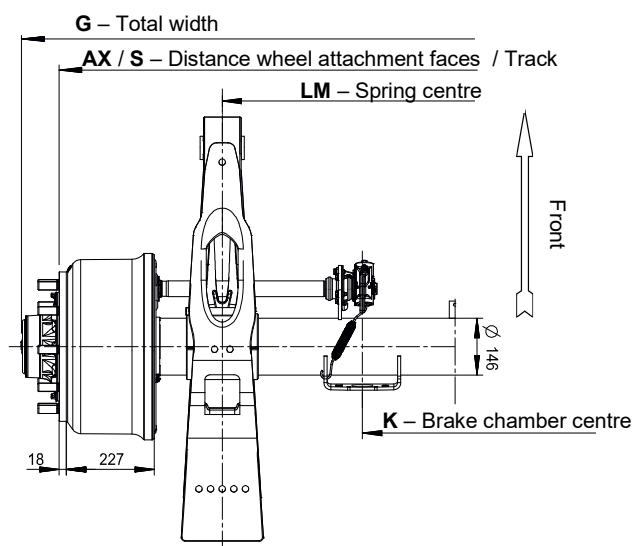
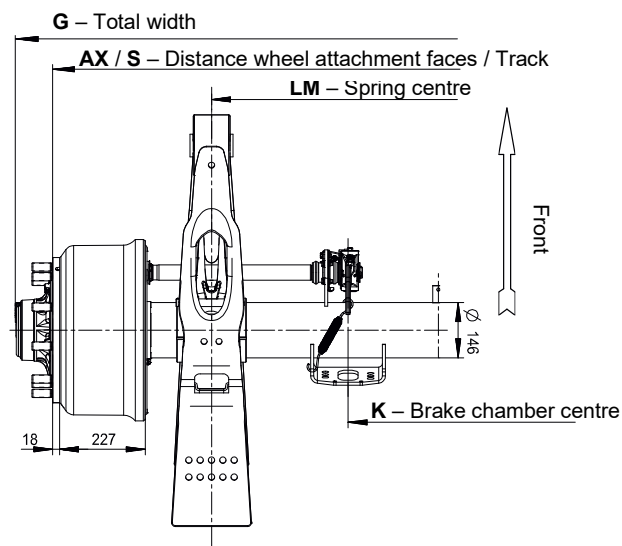
axle version / axle type/ brake/ test report	AX ¹⁾ / LM [mm]	G [mm]	K
	tire (example): 445/45R19,5"		[mm]
 illustration IU S9-3718 / SNK3718 / SNK367x180 / TDB 0459	1970/1160	2168	406
	1970/1200	2168	406
	2010/1200	2208	446
	2040/1200	2238	476
	2040/1300	2238	476
	2090/1300	2288	526

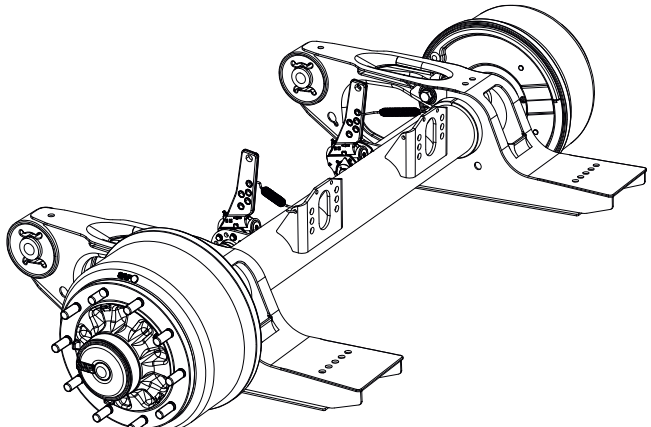
1) **AX = S**

Note:

The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

Axle version S9-4218:Axle load maximum: **9.000 kg**Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm****IU****IO**

axle version / axle type/ brake/ test report	AX ¹⁾ / LM [mm]	G [mm]	K [mm]
	tire (example): 385/65R22,5"		
 illustration IU S9-4218 / SNK4218 / SNK420x180 / TDB 0381	2040/1200	2238	478
	2040/1300	2238	536
	2090/1300	2288	586
	2140/1300	2338	578
	2140/1400	2338	636

1) **AX = S**

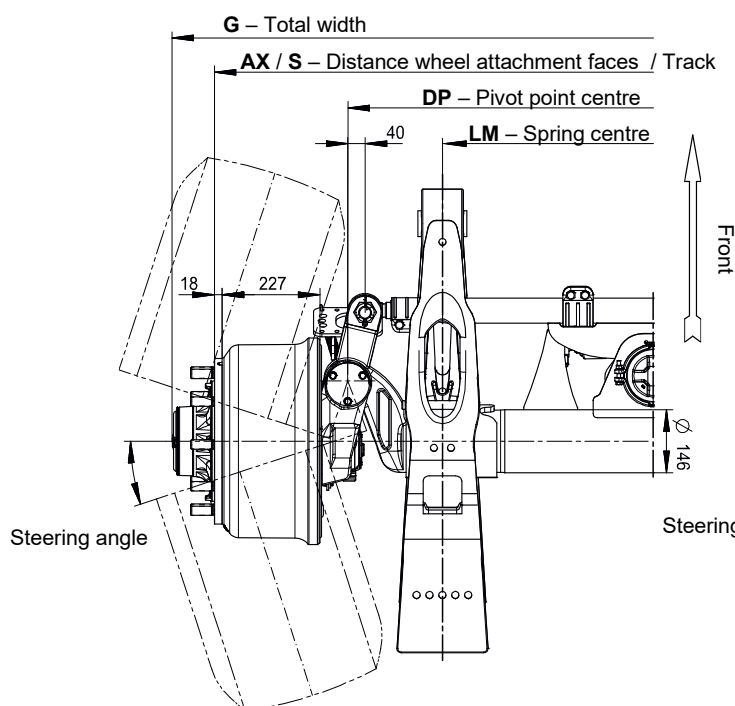
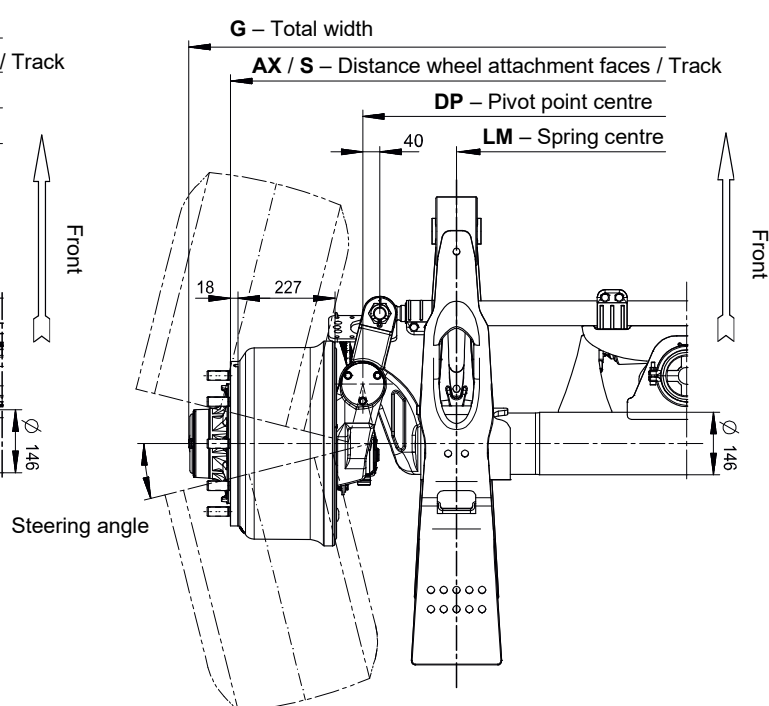
Note:

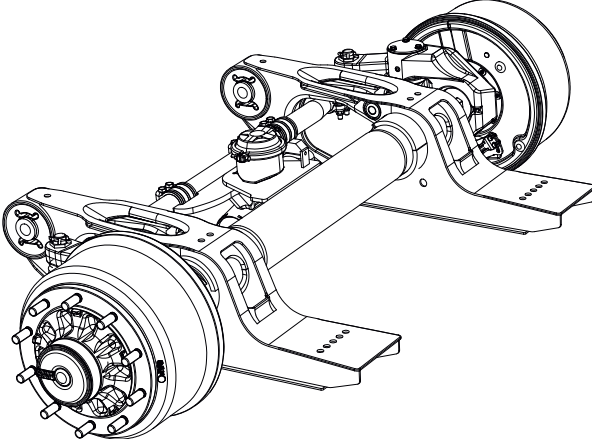
The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request

Axle version SL9-4218:Axle load maximum: **9.000 kg**Wheel fixing: **10 / 280 / 335 / 22x1,5 mm**Suitable for air springs with diameter **Ø 300 mm** and **Ø 350 mm**

Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

IU**IO**

axle version/ axle type/ brake/ test report	AX ¹⁾ / LM [mm]	G [mm]	DP
	tire (example): 385/65R22,5"		[mm]
 illustration IU SL9-4218 / SNK4218 / SNK420x180 / TDB 0381	2040/980	2238	1420
	2090/980	2288	1470
	2090/1030	2288	1470
	2140/1080	2338	1520

1) **AX = S**

Note:

The following air spring offsets are possible **V = 0 / 30 / 60 mm**. The clearance between air spring (max. diameter) and chosen tire should be at least **25 mm**.

Further variants on request.

Examples of axle versions with brake caliper rotated upwards:

Special version optimized for tipper application and increased ground clearance.

Suitable for: IO series, air springs with diameter of $\varnothing$ 300 mm and $\varnothing$ 350 mm

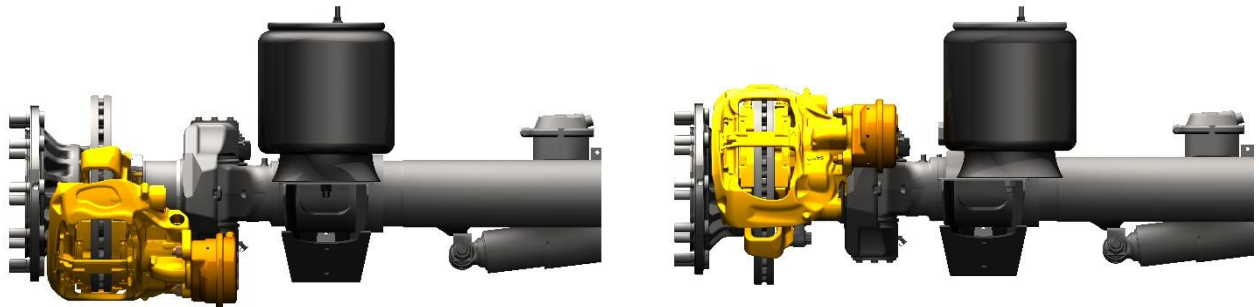
Steering angles up to max. 20°, depending on track, spring centre, tire size and other components.

Standard welding position:

brake caliper below axle center

Special welding position (BO):

brake caliper above axle center



axle version	AX / LM [mm]	S ¹⁾ / LM [mm]	Steering angle Standard [°] tire (example): 385/65R22,5"/445/45R19,5"	steering angle BO ²⁾ [°] with airbag spring $\varnothing$ 300 depending on LA dimension and V				
				LA				
				385		340		
				V=0	V=30	V=60	V=30	V=60
BIL9-19S	2280/980	2040/980	11	12	12	12	10	12
	2330/1030	2090/1030						
	2380/1080	2140/1080						
BIL9-19K	2280/980	2040/980	14	14	14	14	12	14
	2330/1030	2090/1030						
	2380/1080	2140/1080						
BIL9-22S	2280/980	2040/980	12	10	16	16	8	14
	2330/1030	2090/1030						
	2380/1080	2140/1080						
BIL9-22S01	2280/980	2040/980	13	13	17	17	10	17
	2330/1030	2090/1030						
	2380/1080	2140/1080						

1) $S = AX - 2 * ET$ (120 mm)

2) When using MB cylinder 20'', max. $\varnothing$ 175, e.g. SAF 3 454 1082 60 ([see site 77](#))

Note:

Illustration is for example purposes only!

The clearance between the air spring (maximum diameter) and the selected tire should be at least **25mm**.

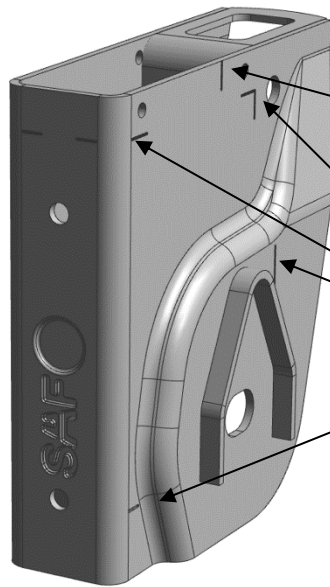
Further variants on request.

Geometry hanger bracket „steel“

Frame connection width of
90 mm

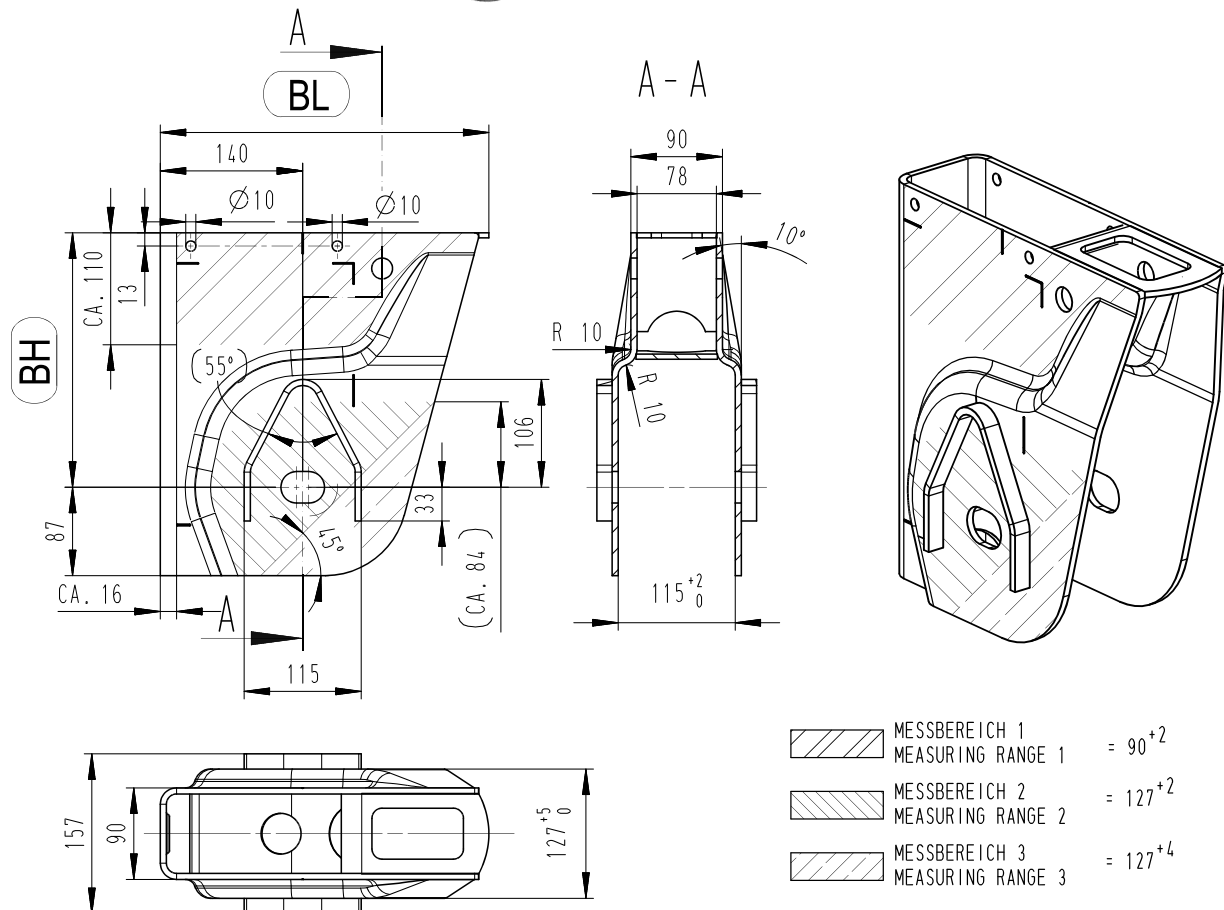
Illustration 2 183 0826 02

3 - Engraved SAF lettering



1 - Marking for the position of
hanger bracket pivot bolt
mounting.

2 - Marked up zone, see
[Definition welding zone](#)



Dimension		Hanger bracket number		
BH [mm]	BL [mm]	in steel		in stainless steel
		primed	non-primed	non-primed
200	310	2 183 0825 02	2 183 0825 92	2 183 0843 00
250	323	2 183 0826 02	2 183 0826 92	2 183 0849 00
300	337	2 183 0827 02	2 183 0827 92	2 183 0850 00
350	350	2 183 0828 02	2 183 0828 92	-

Geometry hanger bracket „steel“ – „screw-on“

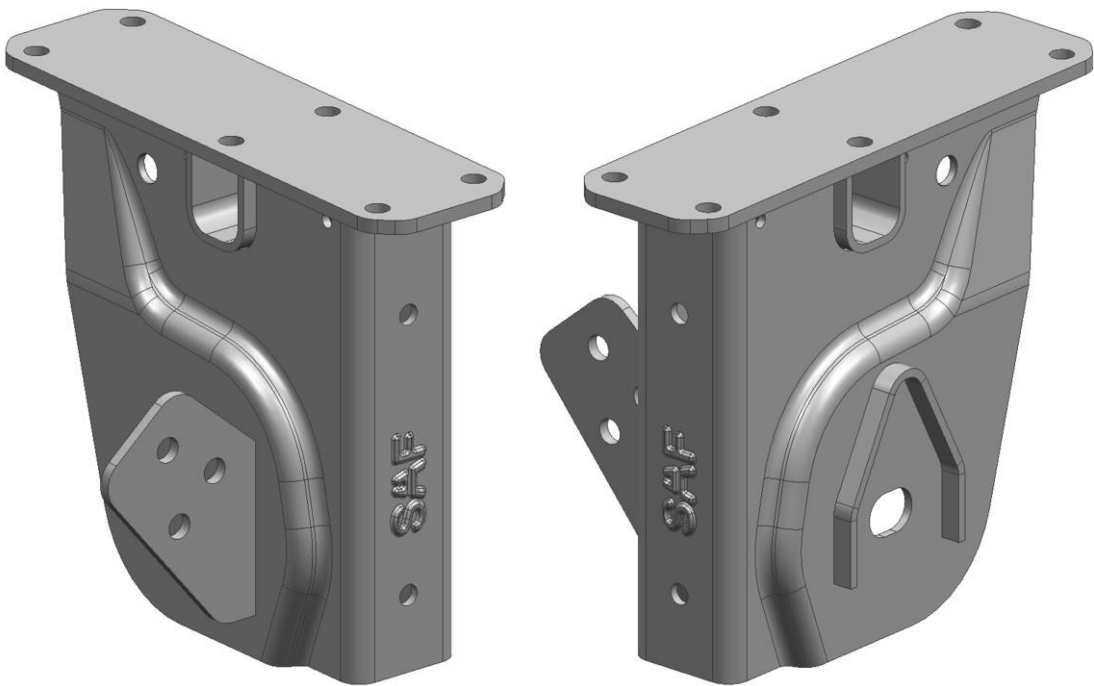
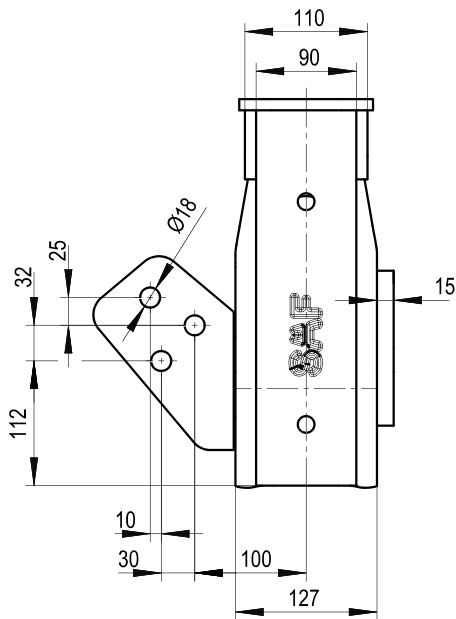
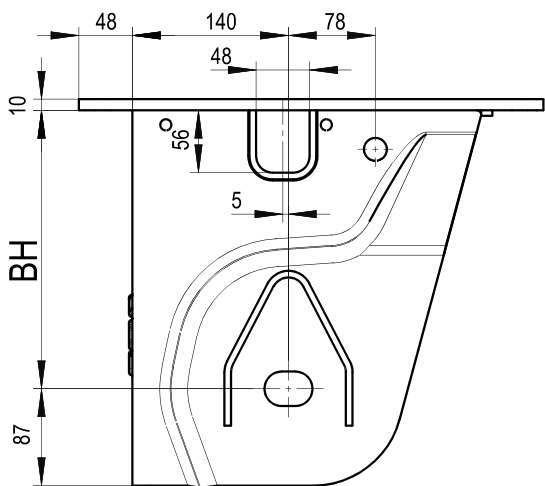
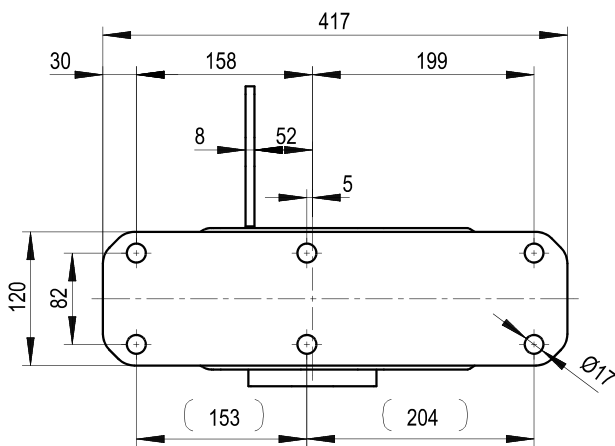


illustration 2 183 0877 00, „inside“ – „outside“



Installation instruction [see page 70](#)



Dimension BH [mm]	Hanger bracket number	
	left	right
200	2 183 0875 00	2 183 0876 00
250	2 183 0877 00	2 183 0878 00

Geometry cross member, rigid axle

LM = HM

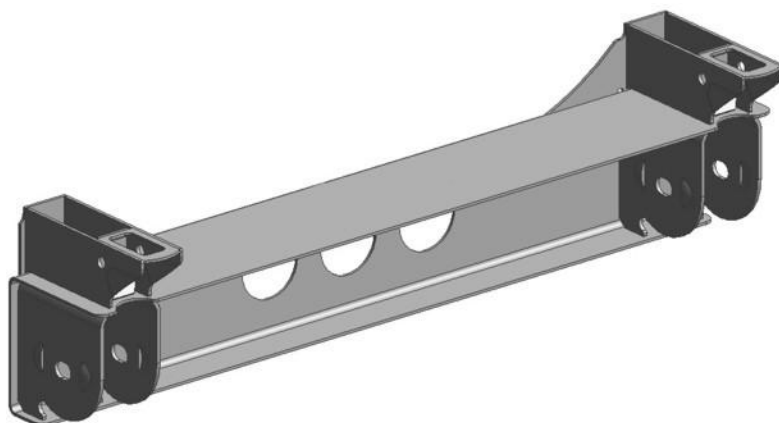
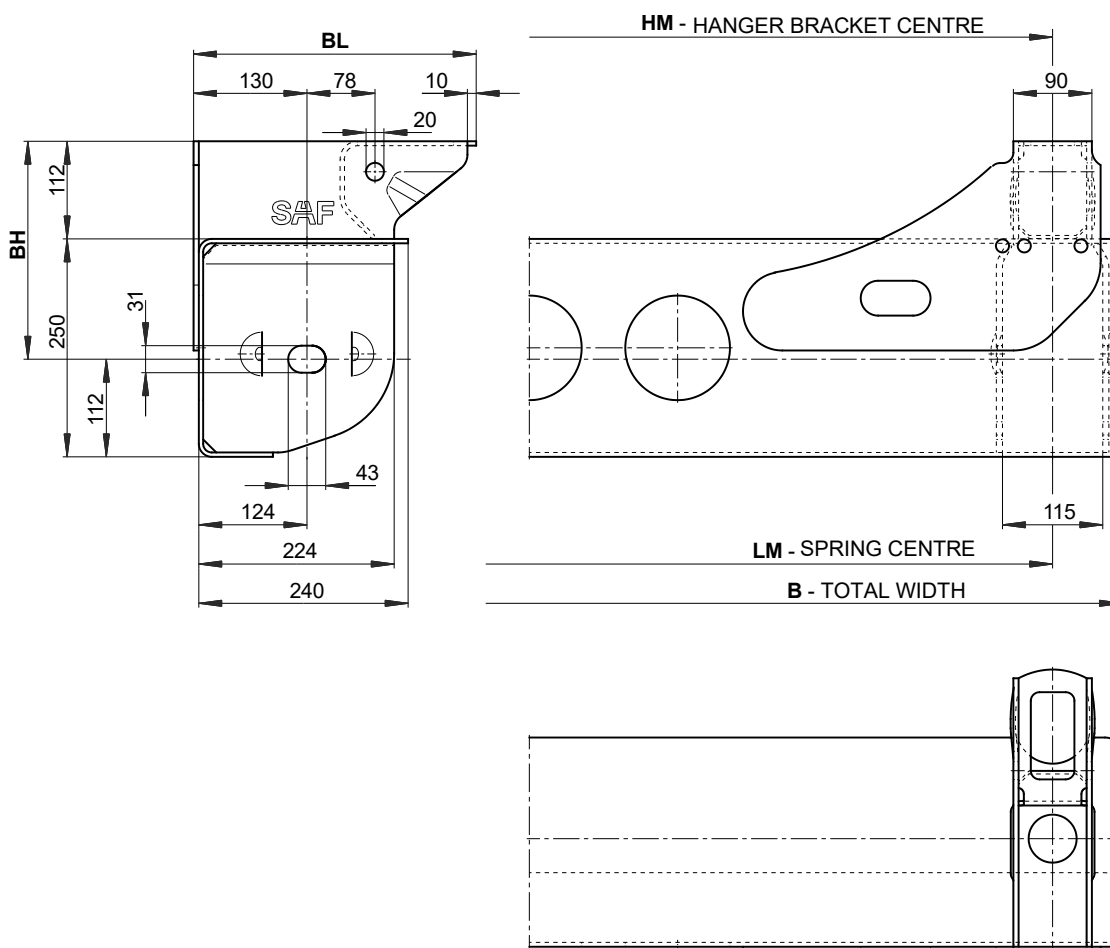


illustration 2 291 0401 00



LM [mm]	B [mm]	BH = 200 mm	BH = 250 mm	BH = 300 mm	BH = 350 mm
		BL = 324 mm		BL = 335 mm	
1200	1360	2 291 0426 00	2 291 0423 00	2 291 0428 00	2 291 0465 00
1300	1460	2 291 0400 00	2 291 0401 00	2 291 0402 00	2 291 0404 00
1400	1560	2 291 0427 00	2 291 0424 00	2 291 0421 00	2 291 0464 00

Geometry cross member, steering axle

LM < HM

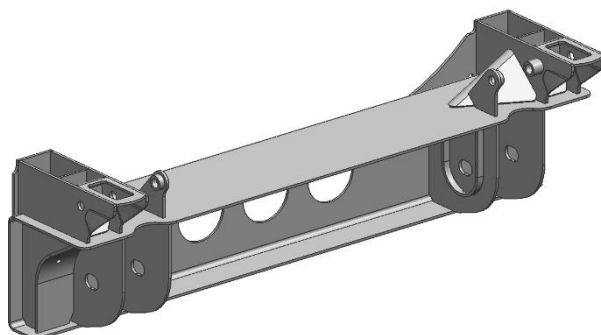


illustration 2 291 0435 00

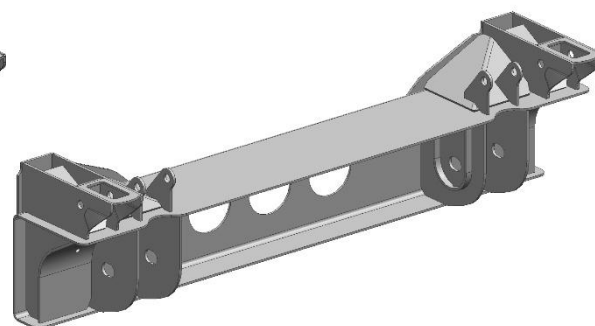
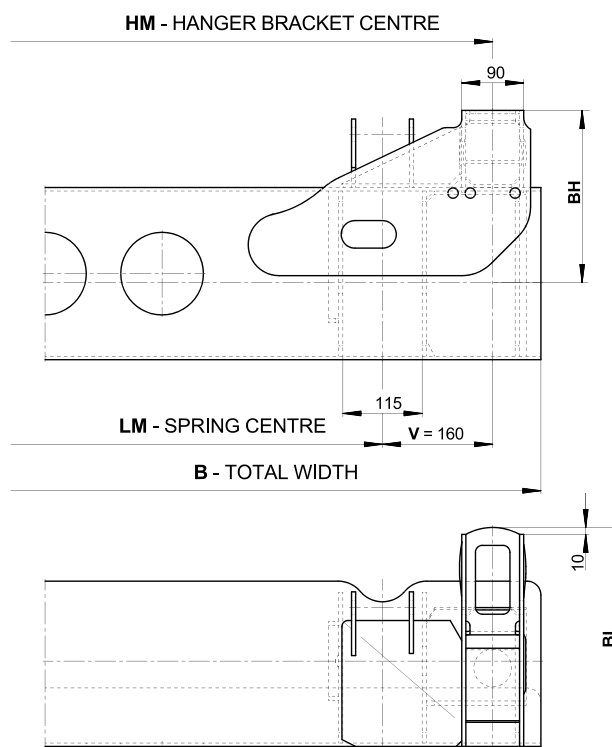
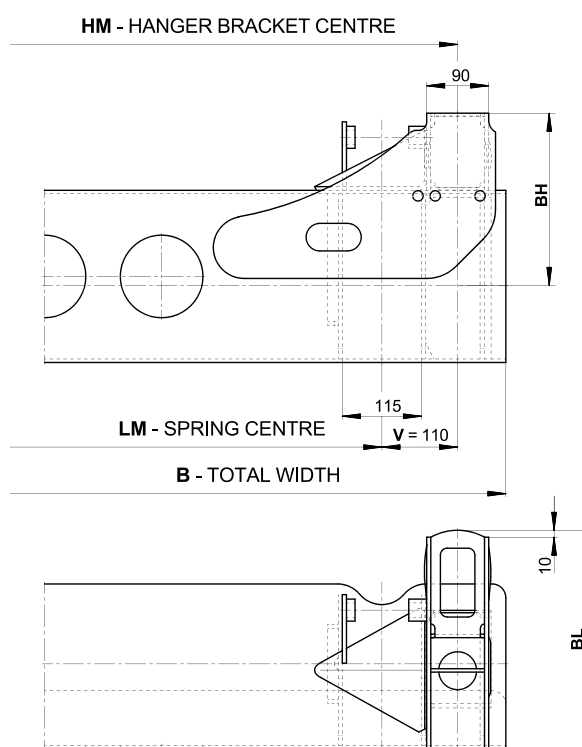
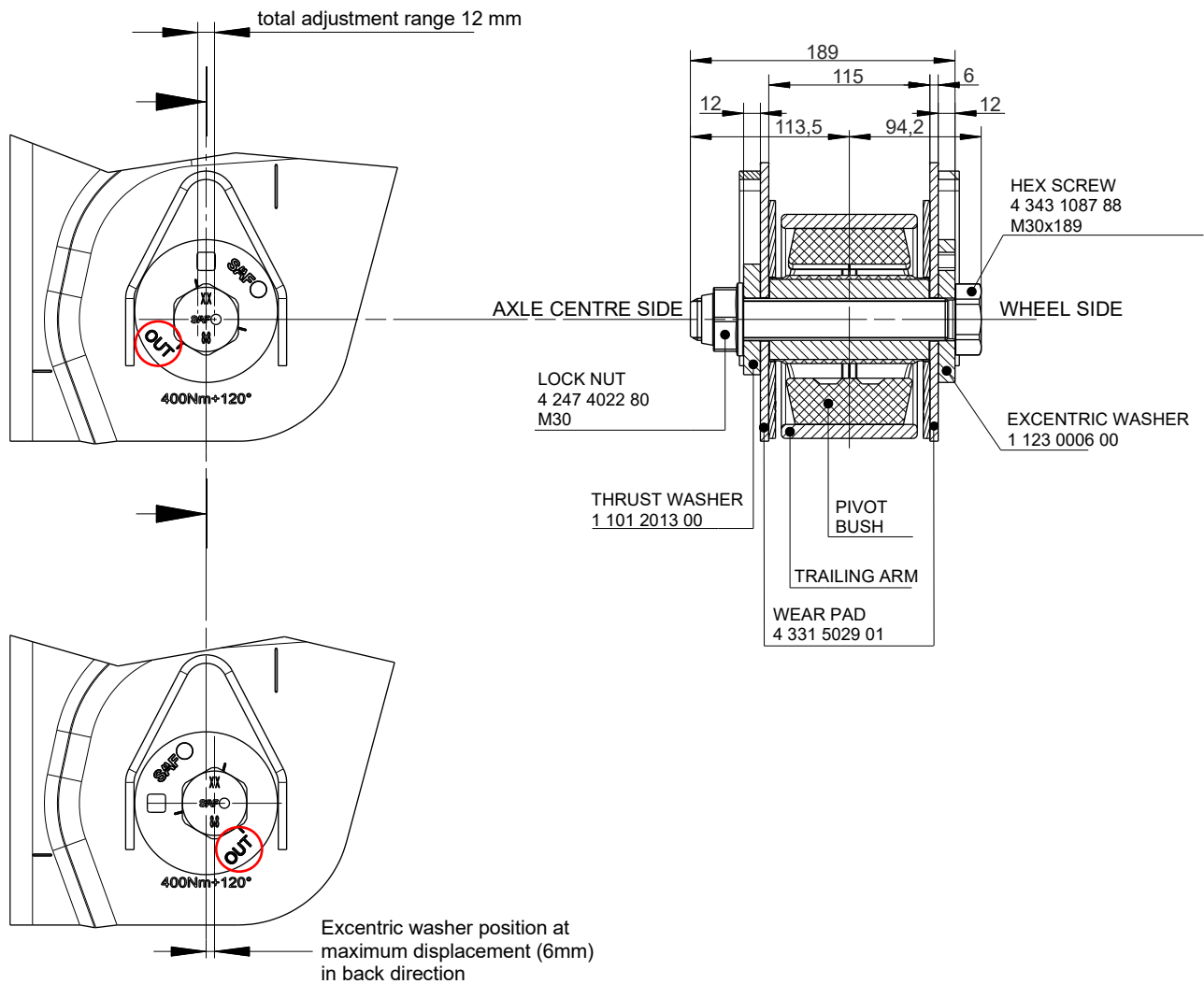


illustration 2 291 0449 00



LM [mm]	HM [mm]	V [mm]	B [mm]	BH = 200 mm;		BH = 250 mm;		BH = 300 mm;		BH = 350 mm;	
				BL = 324 mm		BL = 335 mm					
980	1200	110	1340	2 291 0434 00	2 291 0435 00	2 291 0436 00	2 291 0442 00				
980	1300	160	1440	2 291 0448 00	2 291 0449 00	2 291 0450 00	2 291 0467 00				
1080	1300	110	1440	2 291 0438 00	2 291 0439 00	2 291 0440 00	2 291 0443 00				
1080	1400	160	1540	2 291 0458 00	2 291 0459 00	2 291 0460 00	2 291 0468 00				

Adjustable pivot bolt for hanger bracket „steel“ and „cross member“



Ref.: 3 143 1018 00

Tightening torque ; 400 Nm + 120° ; tightening procedure page 72

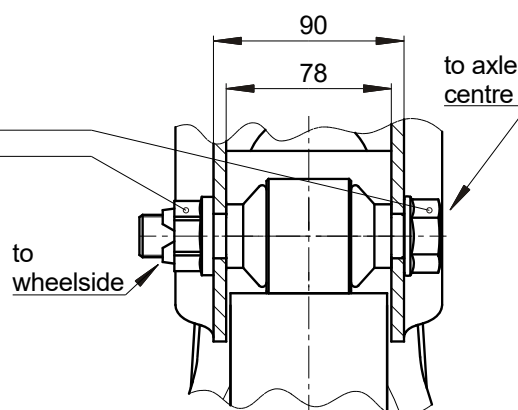
Achtung:

- Threads are not to be oiled or greased!
- Pivot bolt mounting for hanger bracket "steel" is maintenance free.
- 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-alignment of the axles / opening the pivot bolt connection, the pivot bolt connection needs to be exchanged.
- The pressure and excentric washer must be installed with the **"OUT"** label facing outwards.
- Two-side 3 027 1292 00 ([see page 56](#)) required.

Shock absorber assembly: hanger bracket „steel“ / cross member / cross member V=160 / cross member V=110 and trailing arm

BOLT KIT	
3 341 2803 10	
HEXAGON BOLT M20x1,5x125	4 343 2803 10
LOCK NUT M20x1,5	4 247 4044 10

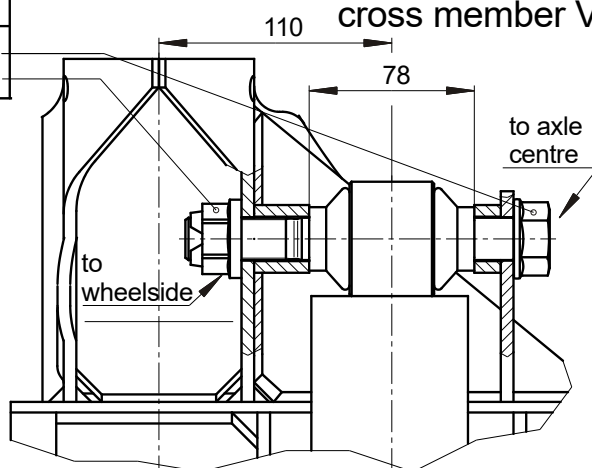
TIGHTENING TORQUE: 600 Nm



view hanger bracket / cross member /
cross member V=160

BOLT KIT	
3 341 2802 10	
HEXAGON BOLT M20x1,5x155	4 343 2802 10
LOCK NUT M20x1,5	4 247 4044 10

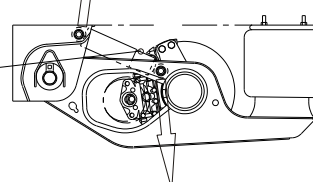
TIGHTENING TORQUE: 600 Nm



view cross member V=110

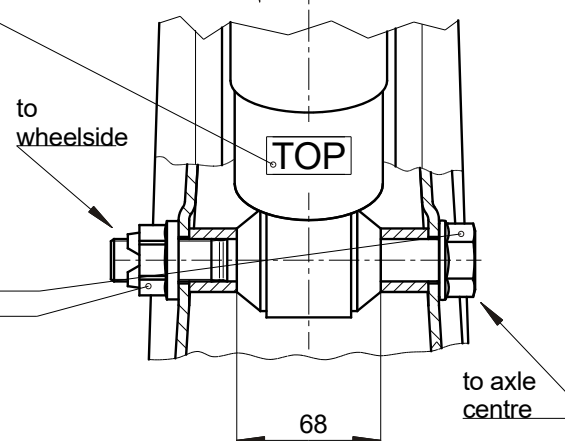
Attention: Mark **TOP** facing
upwards in working position!

Position TOP



BOLT KIT	
3 341 2802 10	
HEXAGON BOLT M20x1,5x155	4 343 2802 10
LOCK NUT M20x1,5	4 247 4044 10

TIGHTENING TORQUE: 600 Nm



view trailing arm

Ref.: 0 378 0028 00, 0 378 0030 00, 0 378 0031 00

Geometry hanger bracket „aluminium“

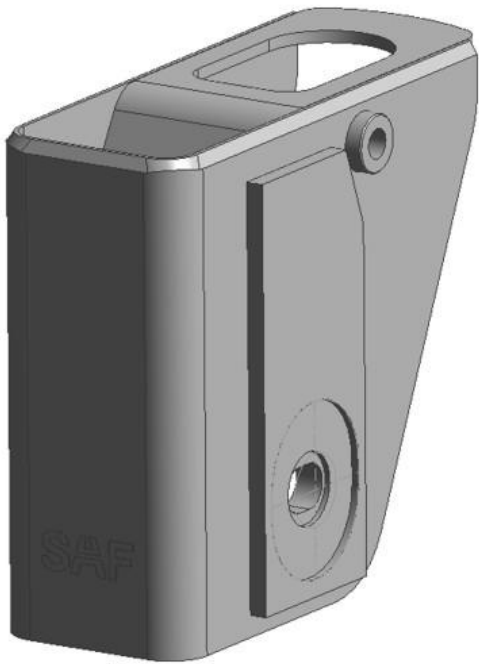
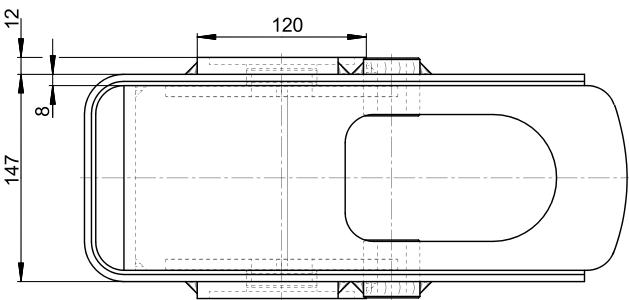
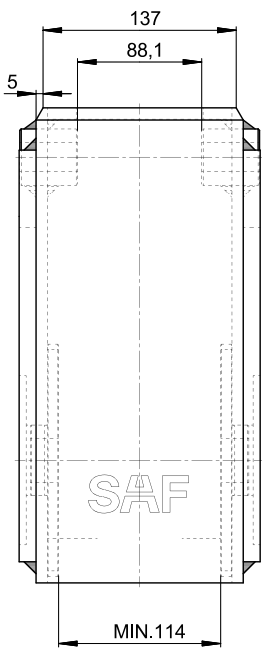
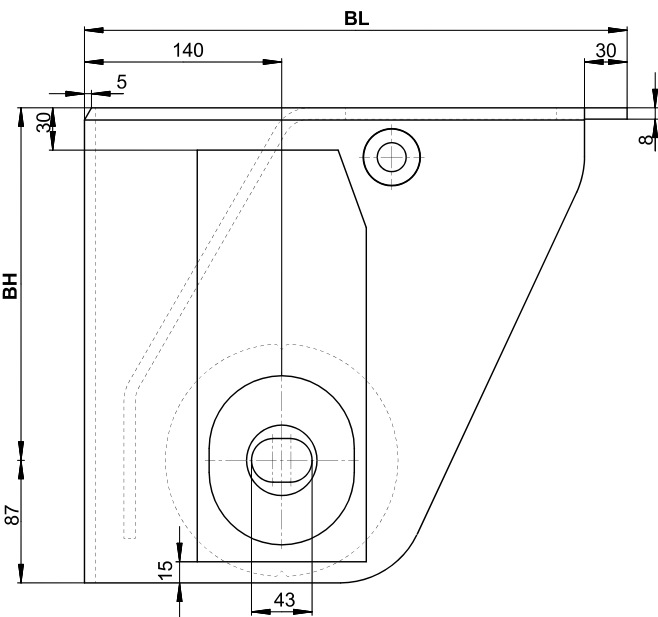


Illustration 2 183 0830 00

Symmetrical hanger brackets
Welding instruciton [see page 67](#)



Dimension		Hanger bracket number
BH [mm]	BL [mm]	
200	360	2 183 0829 00
250	385	2 183 0830 00
300	405	2 183 0831 00
350	430	2 183 0832 00

A-A

240
114
8
8
7
20
140
119
20
20

AXLE CENTRE SIDE

WHEEL SIDE

LOCK NUT M30
4 247 4022 80

THRUST WASHER
1 101 2001 00

HEX-SCREW M30x240
4 343 1053 88

ECCENTRIC WASHER
1 123 0001 01

PIVOT BUSH

TRAILING ARM

WEAR PAD
4 331 5029 00

A

Total adjustment range 12 mm

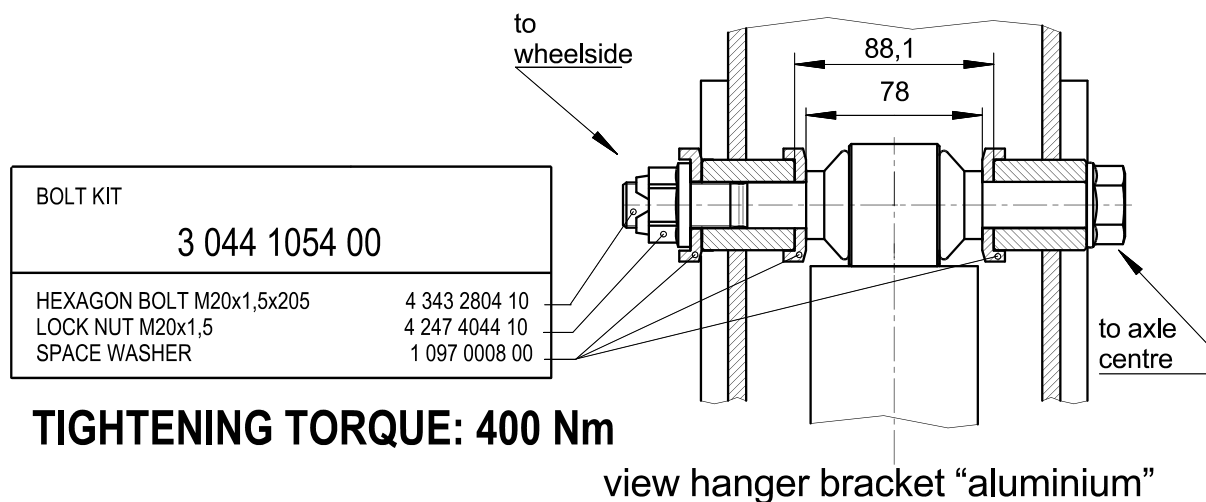
Eccentric washer position at maximum displacement (6 mm) in back direction

SAF

Tightening torque: 400 Nm + 120°; tightening procedure Page 72

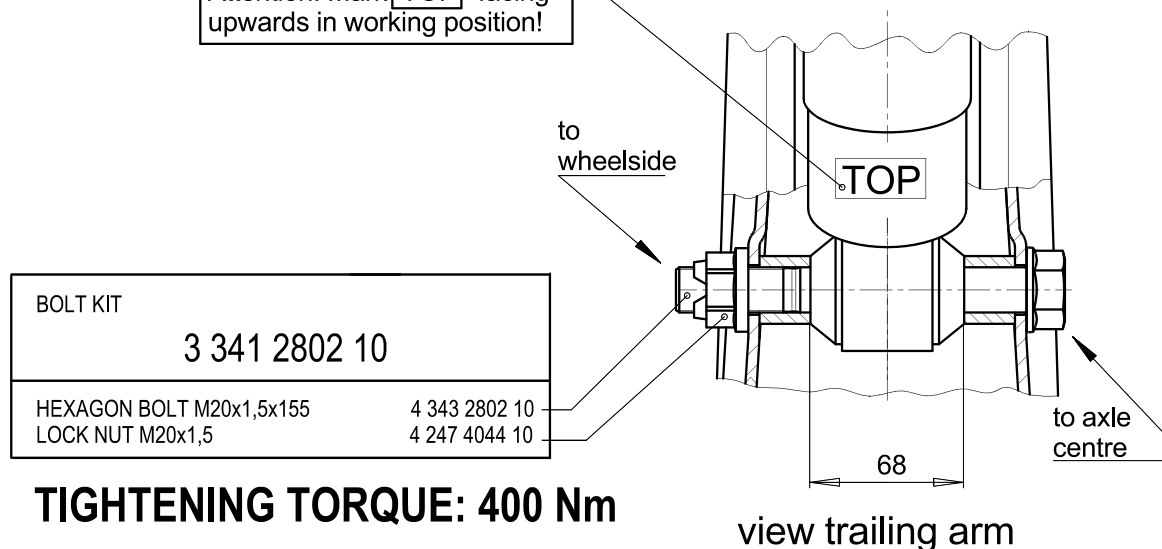
- Threads are not to be oiled or greased!
- Connections on hanger bracket „aluminum“ or stainless steel are not maintenance free! This needs to be checked after 1 month or 10.000 km, further checks every 12 months or 120.000 km. Inspection torque 1200 Nm.
- After taking the trailer into service and re-alignment of the axles / opening the pivot bolt connection, the pivot bolt connection needs to be exchanged.

Shock absorber assembly: hanger bracket „aluminium“



Attention:
Screw connections at aluminium or stainless steel hanger brackets are not maintenance free! Service intervals see SAF – Operating and Servicemanuals.

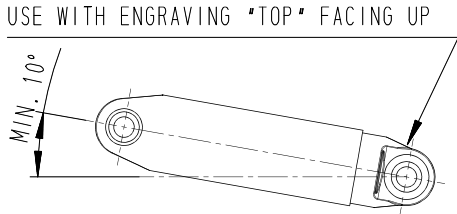
Attention: Mark **TOP** facing upwards in working position!



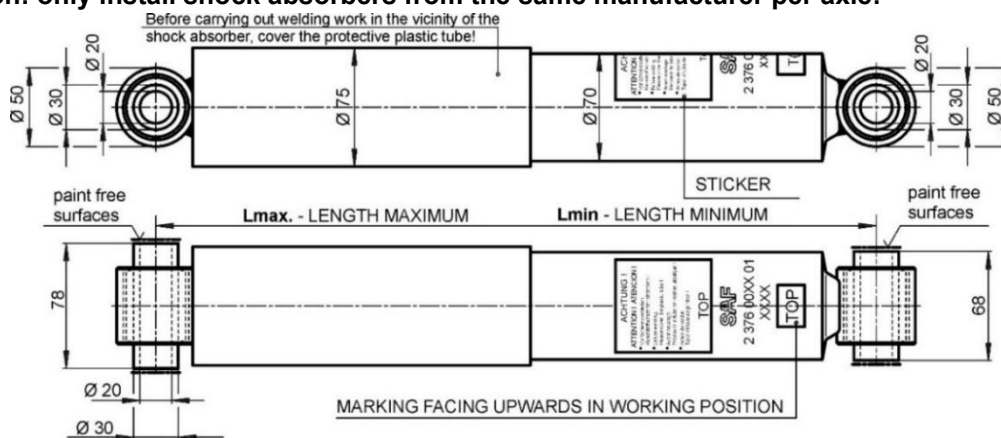
Ref: 0 378 0029 00

Shock absorber overview

Technical details:

Shock absorber number		Lmax [mm]	Lmin. [mm]	Stroke [mm]	 USE WITH ENGRAVING "TOP" FACING UP
for Intra Standard	for Intra CD / UP				
2 376 0070 02	2 376 0084 00	410	281	129	
2 376 0071 02	2 376 0085 00	484	318	166	
2 376 0072 02	2 376 0086 00	532	342	190	
2 376 0073 02	2 376 0087 00	457	304,5	152,5	
	2 376 0088 00	447	297	150	
	2 376 0089 00	430	290	140	
	2 376 0090 00	385	270	115	
	2 376 0078 02	395	275	120	

Attention: only install shock absorbers from the same manufacturer per axle!



Overview table with classification to air suspension type:

Air suspension type	Shock absorber	
	Standard	CD
IU25/2000 33/42	2 376 0070 02	2 376 0084 00
IU28/2005 33/42	2 376 0070 02	2 376 0084 00
IU30/2505 33/42	2 376 0071 02	2 376 0085 00
IU33/2510 33/42	2 376 0071 02	2 376 0085 00
IU35/3010 33/42	2 376 0071 02	2 376 0085 00
IO35/2000 33/42	2 376 0071 02	2 376 0085 00
IO37/2500 33/42	2 376 0071 02	2 376 0085 00
IO40/2505 33/42	2 376 0072 02	2 376 0086 00
IO42/3005 33/42	2 376 0071 02	2 376 0085 00
IO45/3010 33/42	2 376 0072 02	2 376 0086 00
IO47/3510 33/42	2 376 0071 02	2 376 0085 00
IO50/3515 33/42	2 376 0072 02	2 376 0086 00

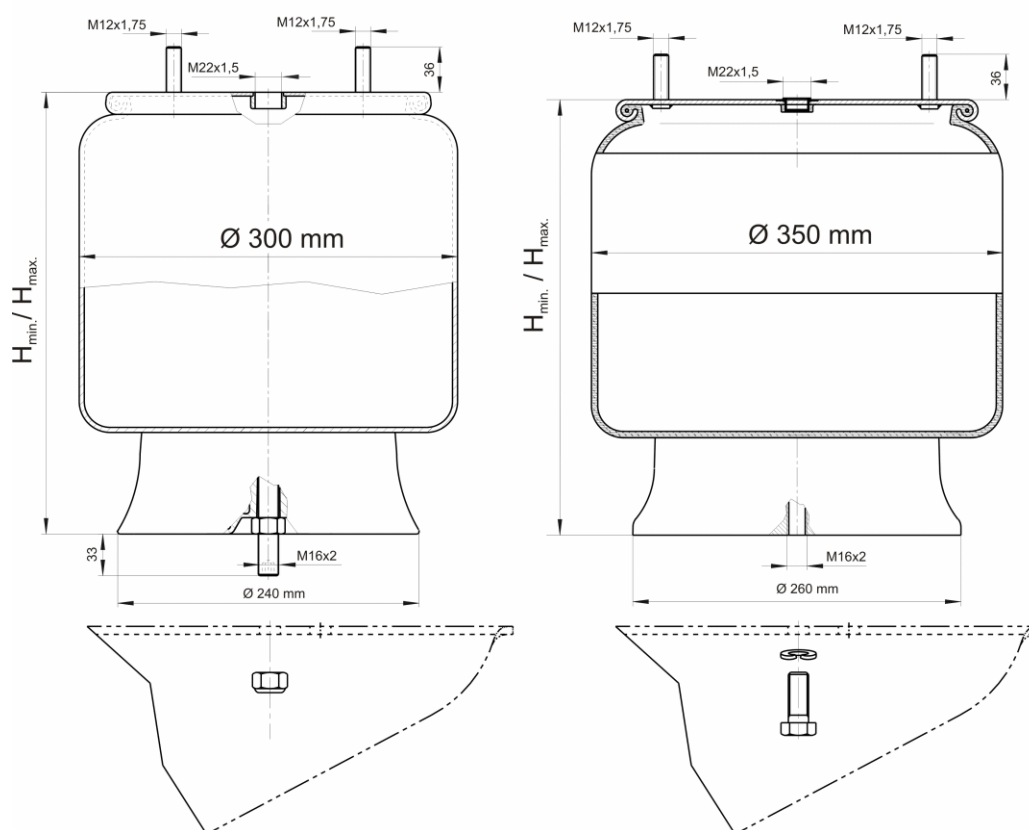
Air suspension type	Shock absorber	
	Standard	CD
IU29/2000 39/58	2 376 0070 02	2 376 0084 00
IU31/2500 39/58	2 376 0071 02	2 376 0085 00
IU34/2505 39/58	2 376 0071 02	2 376 0085 00
IU36/3005 39/58	2 376 0071 02	2 376 0085 00
IO41/2500 39/58	2 376 0072 02	2 376 0086 00
IO43/3000 39/58	2 376 0071 02	2 376 0085 00
IO46/3005 39/58	2 376 0072 02	2 376 0086 00
IO48/3505 39/58	2 376 0071 02	2 376 0085 00
IO51/3510 39/58	2 376 0072 02	2 376 0086 00

IU29/2000 41	2 376 0070 02	2 376 0084 00
IU31/2500 41	2 376 0071 02	2 376 0085 00
IU34/2505 41	2 376 0071 02	2 376 0085 00
IU36/3005 41	2 376 0071 02	2 376 0085 00
IU39/3010 41	2 376 0071 02	2 376 0085 00
IU42/3015 41	2 376 0072 02	2 376 0086 00
IO41/2500 41	2 376 0072 02	2 376 0086 00
IO44/3000 41	2 376 0072 02	2 376 0086 00
IO46/3005 41	2 376 0072 02	2 376 0086 00
IO49/3505 41	2 376 0072 02	2 376 0086 00

IU30/2000 47	2 376 0073 02	2 376 0087 00
IU32/2500 47	2 376 0072 02	2 376 0086 00
IU35/2505 47	2 376 0072 02	2 376 0086 00
IU37/3005 47	2 376 0072 02	2 376 0086 00
IU40/3010 47	2 376 0072 02	2 376 0086 00
IU42/3510 47	2 376 0072 02	2 376 0086 00
IO45/3000 47	2 376 0072 02	2 376 0086 00
IO50/3505 47	2 376 0072 02	2 376 0086 00

IU27/2000 47V90	2 376 0073 02	2 376 0087 00
-----------------	---------------	---------------

Air spring overview



Description	Article number - code:	Top view	Bottom view
2619V H _{min} = 190 mm H _{max} = 560 mm Ø 300 mm Plastic piston	3 228 1033 00 - 33		
2626V H _{min} = 260 mm H _{max} = 630 mm Ø 300 mm Plastic piston	3 228 1039 00 - 39		
2919V H _{min} = 190 mm H _{max} = 560 mm Ø 350 mm Plastic piston	3 228 1042 00 - 42		
2927VK H _{min} = 270 mm H _{max} = 630 mm Ø 350 mm Plastic piston	3 228 1058 00 - 58		
2924V H _{min} = 230 mm H _{max} = 675 mm Ø 350 mm Plastic piston	3 228 1041 00 - 41		
2927V H _{min} = 250 mm H _{max} = 795 mm Ø 350 mm Plastic piston	3 228 1047 00 - 47		

All air springs with a maximum diameter of Ø 350 mm are also available with a steel piston, except for the 2927VK (58) air spring.

Air spring for train loading

With the SAF UP train loading system (air spring type 2619 UP) we offer the opportunity to operate the air suspension system for train loading without any extra parts.

Trailer operation:

driving condition

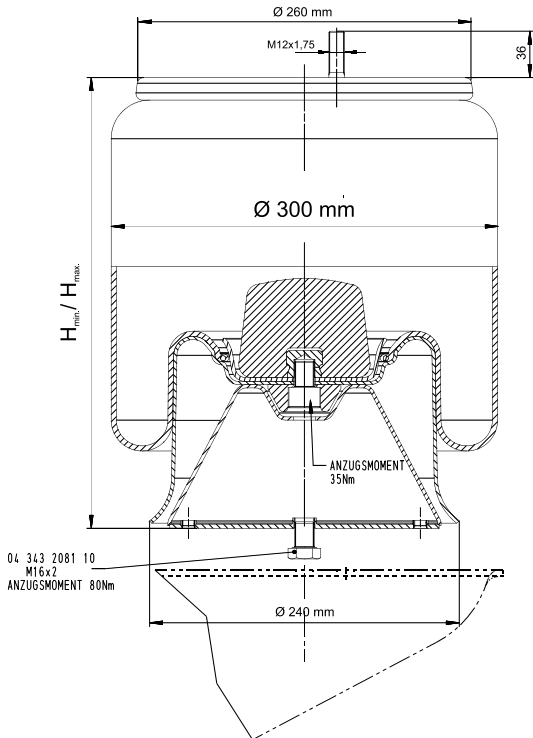


rail loading



In driving condition, an optimal load transmission occurs between the air spring and the trailing arm through the specially-designed support brackets at the interface points

When rail loading, the axle sinks down and is held by the shock absorber with bump stop. When the trailer is set down, the bellows and support brackets are joined again automatically and without creases.



Description	Article number - code:	Top view	Bottom view
2619UP Hmin = 190 mm Hmax = 560 mm Ø 300 mm Piston and support bracket	3 228 1053 00 53		

The use of the SAF 2619 UP air spring can only be in combination with the right shock absorber length to the used air suspension type. For air suspension types with air spring 2619 UP instead of 2619V, an additional weight of 6 kg per axle needs to be accounted for.

Overview table with classification to air suspension type with air SAF 2619 UP, code 53:

Air suspension type	Shock absorber [02 376]	Ride height range [mm]	X; overall height	
			Unladen without air [mm]	Laden without air [mm]
IU25/2000 53	0078 02	230-270	160	145
IU28/2005 53	0078 02	260-300	190	165
IU30/2505 53	0088 00	280-320	210	195
IU33/2510 53	0088 00	310-350	240	225
IU35/3010 53	0088 00	330-370	260	245

Air suspension type	Shock absorber [02 376]	Ride height range [mm]	X; overall height	
			Unladen without air [mm]	Laden without air [mm]
IO35/2000 53	0089 00	335-375	265	250
IO37/2500 53	0085 00	355-395	285	270
IO40/2505 53	0085 00	385-425	315	300
IO42/3005 53	0085 00	405-445	335	320
IO45/3010 53	0085 00	435-475	365	350
IO47/3510 53	0085 00	455-495	385	370
IO50/3515 53	0085 00	485-525	415	400

Further variants on request.

Calculation of clearance between tire and air spring

The calculated clearance is the distance between tire and air spring. This must be at least **25 mm**.

Calculation formula: 

$$\text{Clearance} = \frac{AX - LM - \text{air bag diameter} - \text{tyre width}}{2} + V - ET$$

Example 1:

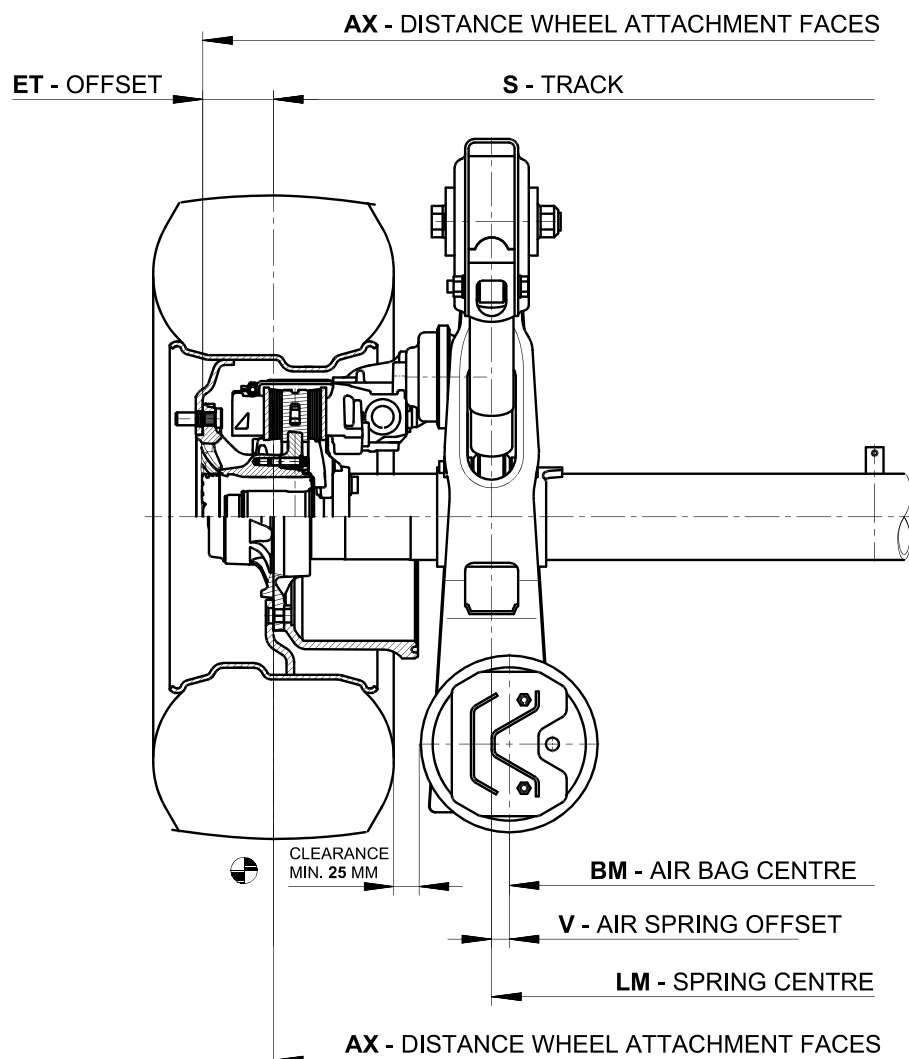
IO35/2000 33 S9-4218
distance wheel attachment faces: 2040 mm
spring centre 1300 mm
air spring diameter 300 mm
mounted tire 385/65R22,5"
(E.T.R.T.O Norm 405 mm)
air spring offset 30 mm
offset 0 mm

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

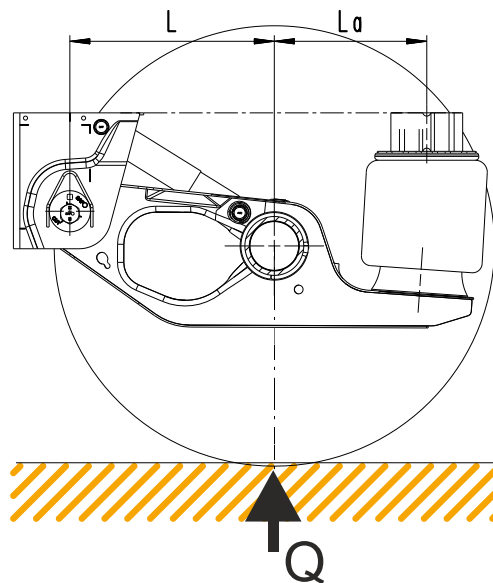
Example 2:

IU34/2505 41 BI9-19S
distance wheel attachment faces: 2330 mm
spring center 1300 mm
air spring diameter 350 mm
mounted tire 445/45R19,5"
(E.T.R.T.O Norm 453 mm)
air spring offset 30 mm
offset 120 mm

$$\frac{2330 - 1300 - 350 - 453}{2} + 60 - 120 = 53,5 \text{ mm}$$



Calculation of the air spring pressure



Formula to calculate the air pressure when fully laden:

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

P = air pressure in the air spring [Pa]

Q = permissible axle load on the ground [kg]

A = unsprung mass [kg]

i = ratio

$$i = \frac{L}{L + La}$$

p = air pressure in the air spring per kg load

air spring Ø 300mm (SAF 2619V / SAF 2626V)

air spring Ø 350mm (SAF 2919V / 2927VK / 2924V / 2927V)

$$p = 0,00244 \cdot 10^5 \text{ Pa/kg}$$

$$p = 0,00187 \cdot 10^5 \text{ Pa/kg}$$

Example with air suspension type IU30/2505 33 (air spring SAF 2619V)

Q = 9000 kg,

A = 750 kg

L = 500 mm , La = 385 mm

$$i = \frac{500}{500 + 385} = 0,565$$

$$p = 0,00244 \cdot 10^5 \text{ Pa/kg}$$

$$P = \frac{(9000 - 750) \cdot 0,565 \cdot 0,00244}{2} \cdot 10^5 \text{ Pa}$$

$$\underline{\underline{P = 5,69 \cdot 10^5 \text{ Pa}}}$$

Formula to calculate the air pressure when partially loaded:

$$P_t = \frac{(Q_t - A) \cdot i \cdot p}{2} \cdot 10^5 \text{ Pa}$$

Q_t = axle load on the ground when partially loaded

Example with air suspension type IU30/2505 33 (air spring SAF 2619V)

Q_t = 2100 kg,

A = 750 kg

L = 500 mm , La = 385 mm

$$i = \frac{500}{500 + 385} = 0,565$$

$$p = 0,00244 \cdot 10^5 \text{ Pa/kg}$$

$$P_t = \frac{(2100 - 750) \cdot 0,565 \cdot 0,00244}{2} \cdot 10^5 \text{ Pa}$$

$$\underline{\underline{P_t = 0,93 \cdot 10^5 \text{ Pa}}}$$

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, when adjusting the EBS – installation (e.g. HALDEX EBS), an inspection to compare both values (theoretically and measured) to achieve an optimized utilization of suspension- and brake-characteristics.

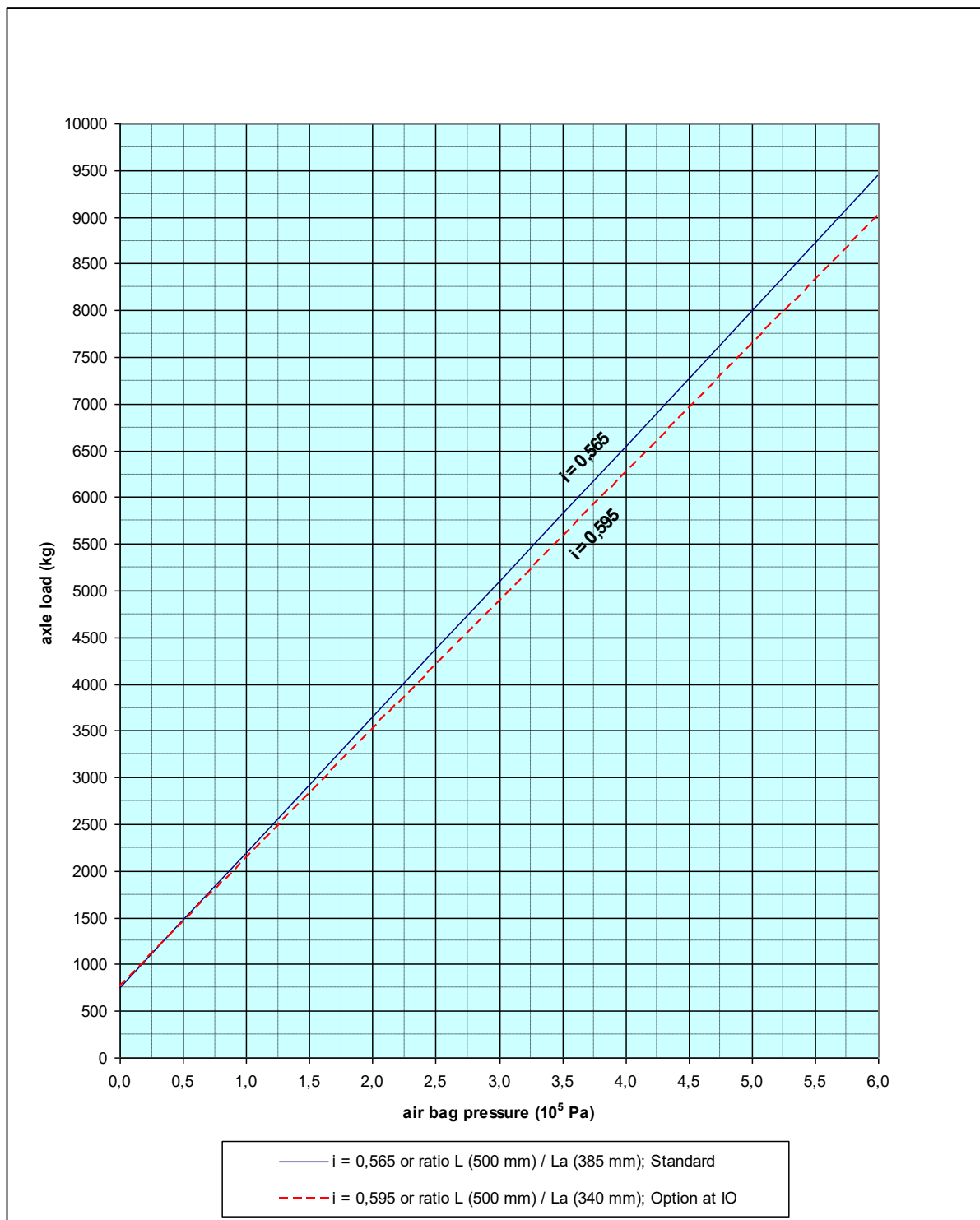
Possible inspection method:

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. measure 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

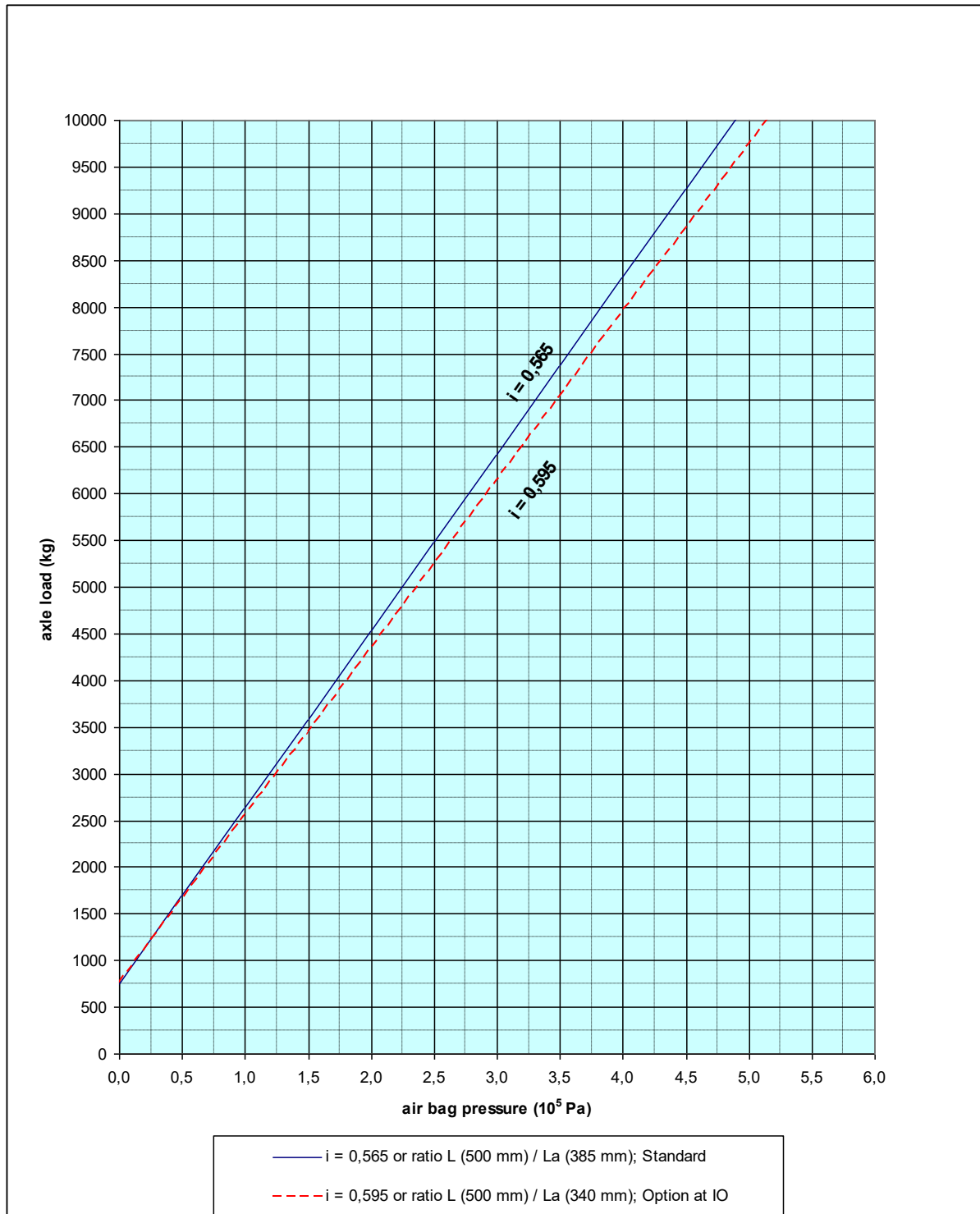
Force-pressure-diagram for air spring with diameter 300 mm

**Air spring: SAF 2619V (33)
SAF 2626V (39)
SAF 2619UP (53)**



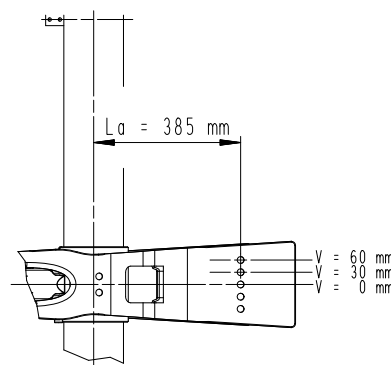
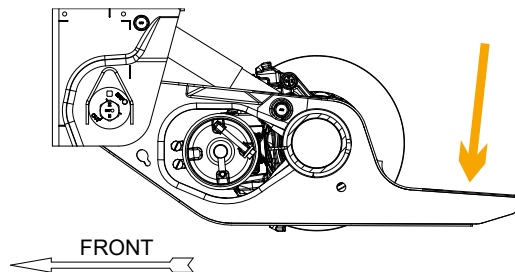
Force-pressure-diagram for air spring with diameter 350 mm

Air springs: **SAF 2919V (42)**
 SAF 2927VK (58)
 SAF 2924V (41)
 SAF 2927V (47)

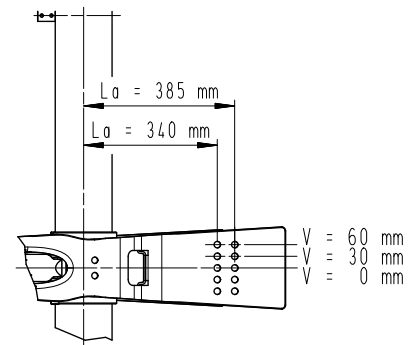
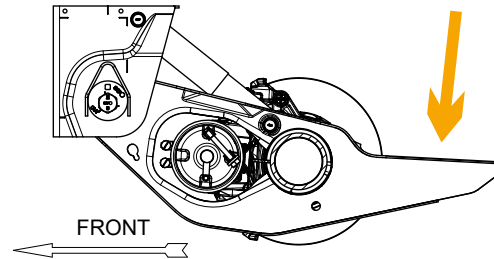


Air spring fixing / trailing arm – air spring

trailing arm IU



trailing arm IO

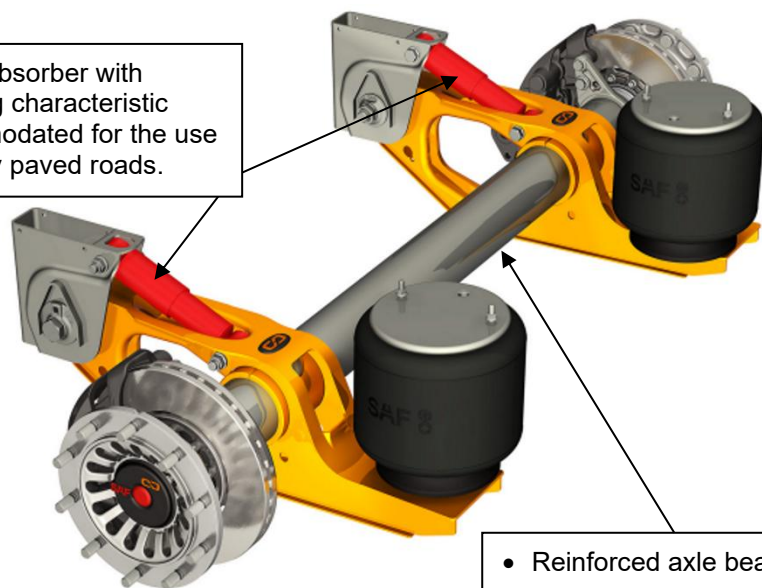


Custom Design Version

The INTRADISC *plus INTEGRAL* or INTRADRUM air suspension are also available as reinforced version named CD version. This version is preferably used for heavy application, for example off-road, and for trailers with torsionally stiff bodies as in tippers, pavers, tipping silo- and moving floor trailers, furthermore for trailers, which come to be used out of the "geographical" areas as named in our Guaranty of Competence.

The CD version contains:

- Shock absorber with damping characteristic accommodated for the use on badly paved roads.



- Reinforced axle beam.

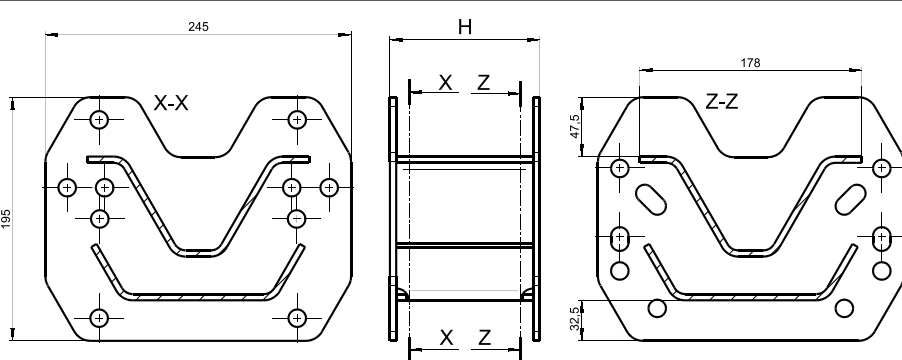
The additional weight to the standard version is about 10 kg for rigid axles and for self-steering axles (B(I)L9..) about 24 kg

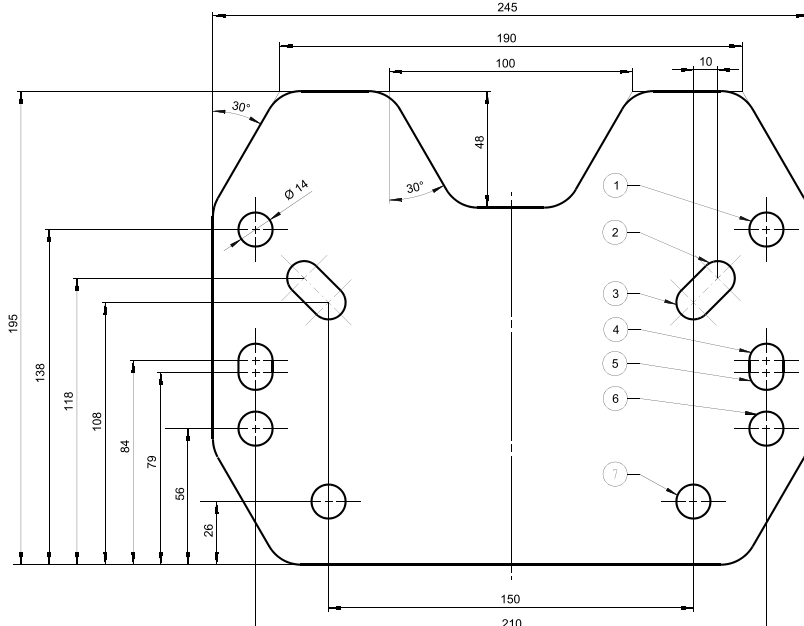
Overview air spring brackets

Standard air spring bracket „steel“

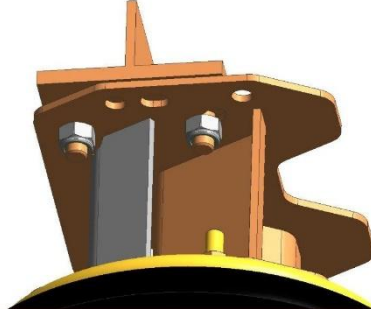
article number:		H [mm]	
primed	non-primed		
2 237 0081 01	2 237 0081 91	50	
2 237 0080 01	2 237 0080 91	100	
2 237 0082 01	2 237 0082 91	150	

air spring bracket „steel“ – screw-on

article number:	H [mm]		
2 237 1081 01	55		
2 237 1080 01	105		
2 237 1082 01	155		

	
at V:	at position .. and / or ..
0	1 / 6
30	3 / 7
60	5 / 2

example V = 30, pos. 3 and 7.



Corrosion protection of SAF-HOLLAND products:

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

Cathodic dip coating (KTL)	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 topcoats	
- Coat thickness is max. 45µm - Min. 504 h salt spray test according to DIN EN ISO 9227	- Coat thickness is max. 20µm - Min. 200 h salt spray test according to DIN EN ISO 9227
Application example:	
trailing arm, axle beam	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-strength 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.

Premium Coated:

Features:

- Additional powder coating for extended corrosion protection.
- Ideal mechanical properties and excellent chemical resistance.
- 10-year warranty against perforation corrosion.
- The ability to recoat remain unaffected.
- Color code of the Premium Coated axles is **DB703** (iron glimmer metallic)
- Coating thickness max. **350µm**.
- Min. **2000 h** salt spray test according to **DIN EN ISO 9227**.

Application example: rigid axles INTRADISC, INTRADRUM, self-steering axles INTRADISC

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.
- Existing ventilation openings, such as those in brake actuators or hub caps, must not be sealed airtight with paint, wax or other coatings, as this can lead to malfunctions and safety related damage.

Two sided axle lift

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

- Not suitable for 19,5" tires due to insufficient ground clearance.
- Applications with "UP-airsprings" (53) available on request

Calculation of clearance between lift air spring and tire

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

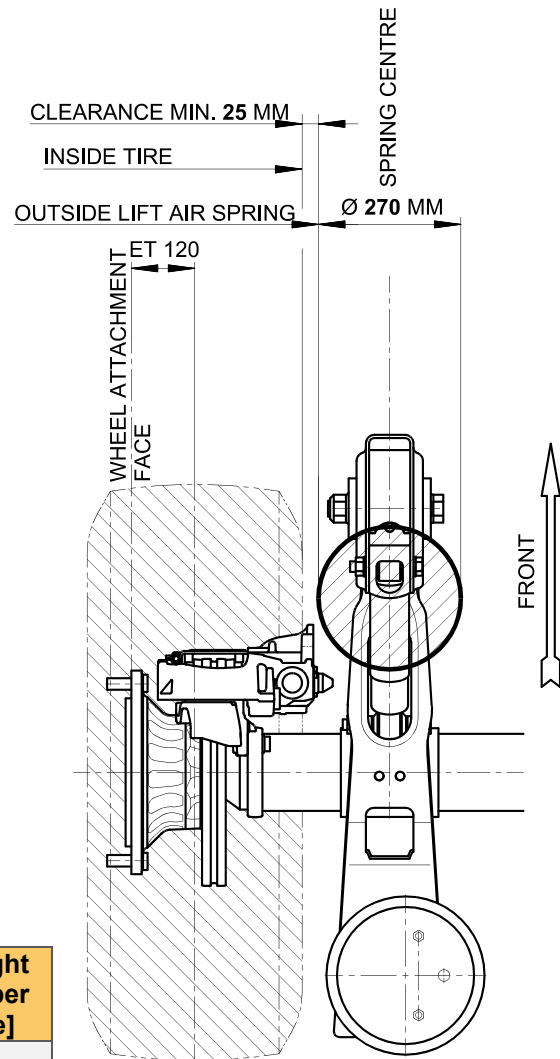
Formula:

$$\frac{AX - LM - \text{max. tire width} - 270}{2} - ET = \text{clearance}$$

Example with: IU25/2000 33 BI9-22S

- distance wheel attachment faces: 2280 mm
- spring centre: 1300 mm
- tire width (max.): 405 mm
(E.T.R.TO. Norm for tire size 385/65R22,5")
- lift air spring diameter max. 270 mm
- offset 120 mm

$$\frac{2280 - 1300 - 405 - 270}{2} - 120 = \text{clearance} = 32,5 > 25$$



Versions for hanger bracket

Kitnumber:	application	Weight [kg per axle]
3 027 1292 00	for hanger bracket „steel“	20
3 027 1280 01	for hanger bracket „aluminum“	22

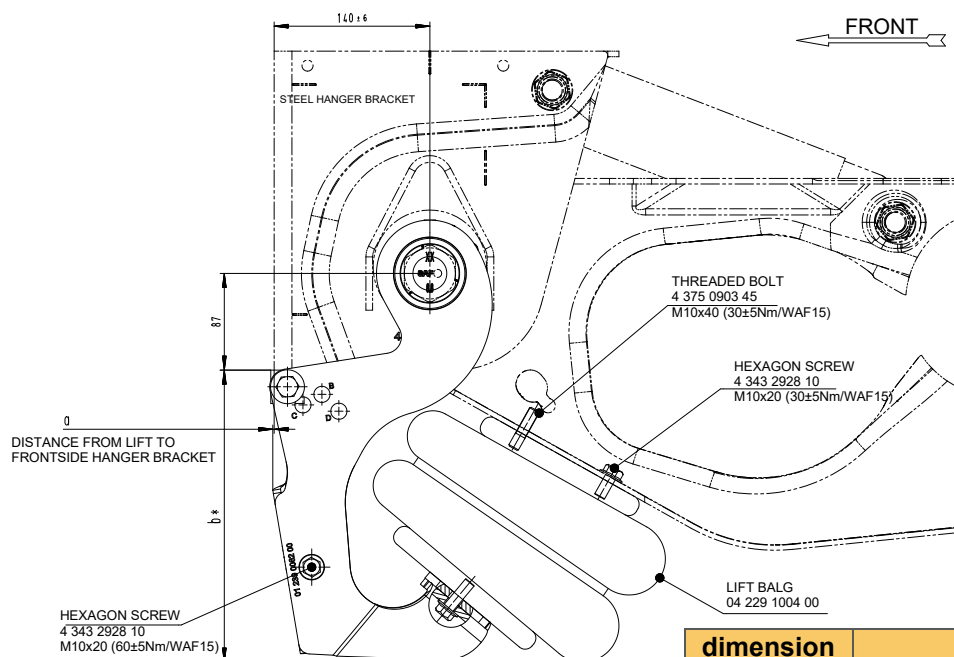


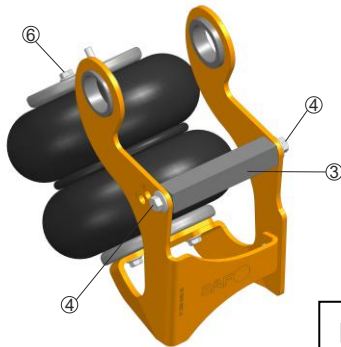
Illustration for hanger bracket "steel" – 3 027 1292 00

dimension [mm]	Position			
	A	B	C	D
a (±6mm)	5	15	30	55
b	270	280	285	290

Installation instruction

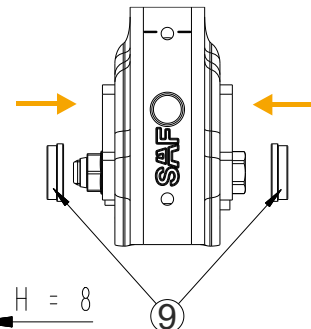
Installation of the lift:

1. Demount support bar (3) with hexagon screws (4), and demount hexagon screw (6) on lift air bag .

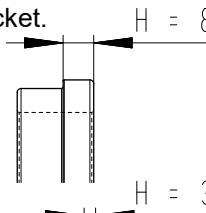


2. Remove cable straps. Slide one washer (9), over the nut against the thrust washer and one over the bolt head of the pivot bolt mounting against the eccentric washer.

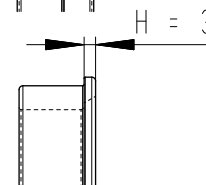
Attention! The shoulder of the washer is towards the sides of the hanger bracket.



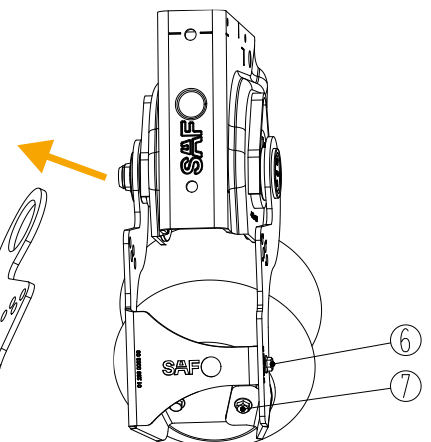
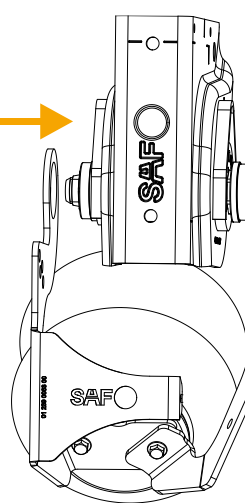
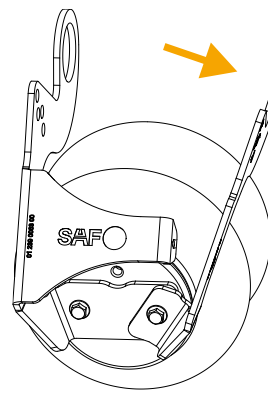
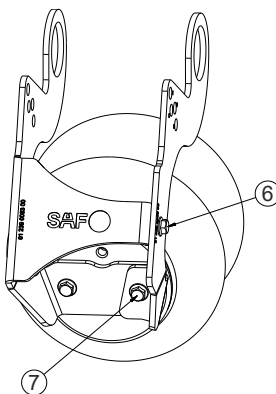
pivot bolt connection for **steel** hanger bracket only in combination with washer (9) **H=8**



pivot bolt connection for **aluminium** hanger bracket only in combination with washer (9) **H=3**



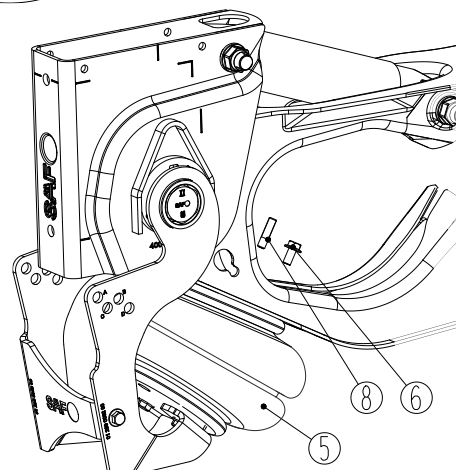
3. Demount hexagon screws (6), loosen up the hexagon screw (7), push the lift arm outwards and slide them over the washers (9).



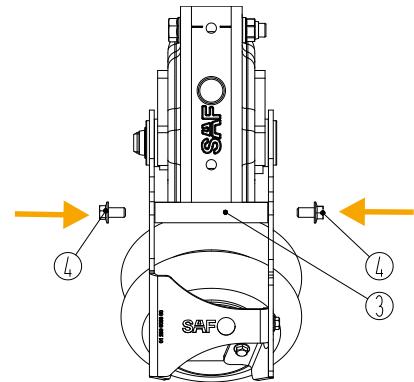
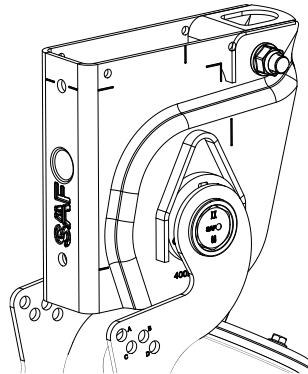
4. Tighten hexagon screw (6), **Tightening torque 60 Nm/ WAF15** and tighten hexagon screw (7), **Tightening torque 30 Nm/ WAF15**
5. Position the lift air bag (5) at the trailing arm by threaded bolt (8). And fixate by the hexagon screw (6) from the inside of the trailing arm. **Tightening torque 30 Nm/ WAF15**

Attention!

For better access to screw (6), remove the brake chamber if necessary.

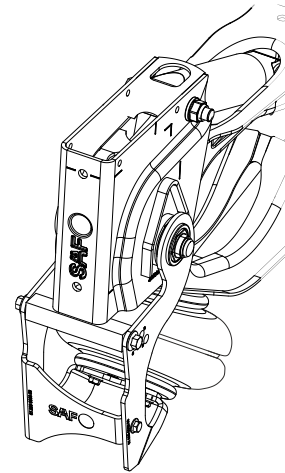


6. Take the required position (**Pos.**) as described from the [Table](#). Mount the support bar (**3**) in a horizontal position against the bottom of the hanger bracket with the hexagon screws(**4**).
Tightening torque 120 Nm/ WAF18



Installation instruction

- Positioning (Pos.)**
The lift needs to be adjusted to every air suspension type (combination of trailing arm, hanger bracket, air spring and air spring bracket). The adjustment is done by positioning the support bar between the lift arms. This position (**pos.**) can be taken out of the table below.
- Installation required space in front of the hanger bracket (a)**
Depending on the **pos.**, you'll find different sizes for the required space in front of the hanger bracket. These can be taken from the Table below (**a**). The +/- 6 (mm) need to be taken in consideration because of the adjusting of the pivot bearing (axle alignment).
- Ground clearance (b)**
Depending on the **pos.**, you'll find different sizes for the ground clearance. These values can be taken from the Table below (**b**).



Air suspension type	Pos.	a [mm]	b [mm]
IU25/2000 33/42	A	5 ±6	270
IU28/2005 33/42	B	15 ±6	280
IU30/2505 33/42	A	5 ±6	270
IU33/2510 33/42	B	15 ±6	280
IU35/3010 33/42	A	5 ±6	270
IO35/2000 33/42	D	55 ±6	290
IO37/2500 33/42	C	30 ±6	285
IO40/2505 33/42	D	55 ±6	290
IO42/3005 33/42	C	30 ±6	285
IO45/3010 33/42	D	55 ±6	290
IO47/3510 33/42	C	30 ±6	285
IO50/3515 33/42	D	55 ±6	290

Air suspension type	Pos.	a [mm]	b [mm]
IU29/2000 39/58	A	5 ±6	270
IU31/2500 39/58	A	5 ±6	270
IU34/2505 39/58	A	5 ±6	270
IU36/3005 39/58	A	5 ±6	270
IO41/2500 39/58	C	30 ±6	290
IO43/3000 39/58	C	30 ±6	285
IO46/3005 39/58	C	30 ±6	285
IO48/3505 39/58	C	30 ±6	285
IO51/3510 39/58	C	30 ±6	285

IU29/2000 41	B	15 ±6	280
IU31/2500 41	A	5 ±6	270
IU34/2505 41	B	15 ±6	280
IU36/3005 41	A	5 ±6	270
IU39/3010 41	B	15 ±6	280
IU42/3015 41	C	30 ±6	285
IO41/2500 41	D	55 ±6	290
IO44/3000 41	C	30 ±6	285
IO46/3005 41	D	55 ±6	290
IO49/3505 41	C	30 ±6	285

IU30/2000 47	C	30 ±6	285
IU32/2500 47	B	15 ±6	280
IU35/2505 47	C	30 ±6	285
IU37/3005 47	B	15 ±6	280
IU40/3010 47	C	30 ±6	285
IU42/3510 47	B	15 ±6	280
IO45/3000 47	D	55 ±6	290
IO50/3505 47	D	55 ±6	290
IU27/2000 47V90	B	15 ±6	280

Further variants on request!

Part list for two sided lift mounted at hanger bracket:

Per axle are two kits needed.

	Kit number:	Hanger bracket „steel“	Hanger bracket „aluminum“	pos.	per kit
liftarm left		1 239 0063 00	1 239 0053 00	(1)	1x
liftarm right		1 239 0062 00	1 239 0052 00	(2)	1x
support bar		1 095 0106 00	1 095 0099 00	(3)	1x
hexagon screw with flange M14 + ESLOCK		4 343 2930 10		(4)	2x
lift air spring		4 229 1004 00		(5)	1x
hexagon screw with flange M10x1,5x20		4 343 2928 10		(6)	3x
hexagon screw with flange M10x1,5x30		4 343 2929 10		(7)	1x
threaded bolt		4 375 0903 45		(8)	1x
washer		1 097 0017 00	1 097 0014 00	(9)	2x

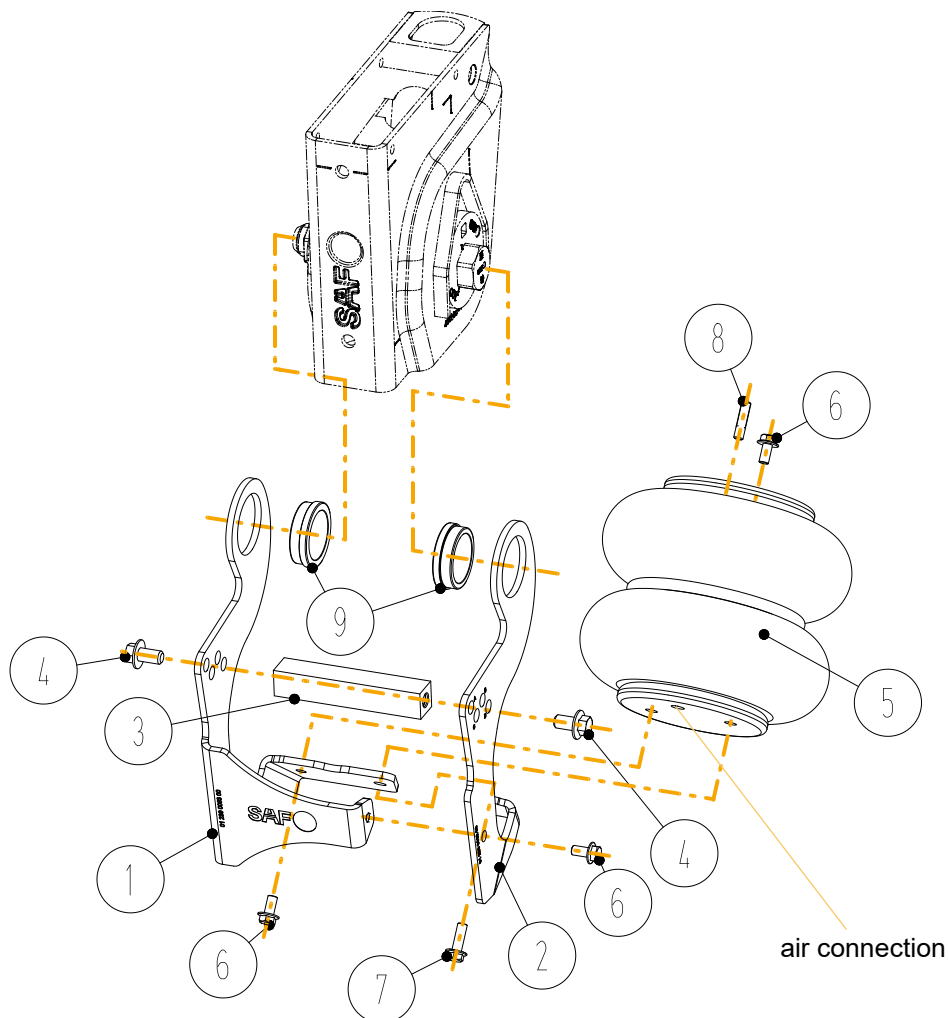


Illustration for mounting at hanger bracket – 3 027 1292 00

Version for cross member

Following version is obtainable:

Kitnumber:	application	weight [kg per axle]
3 027 1243 01	for crossmember	25

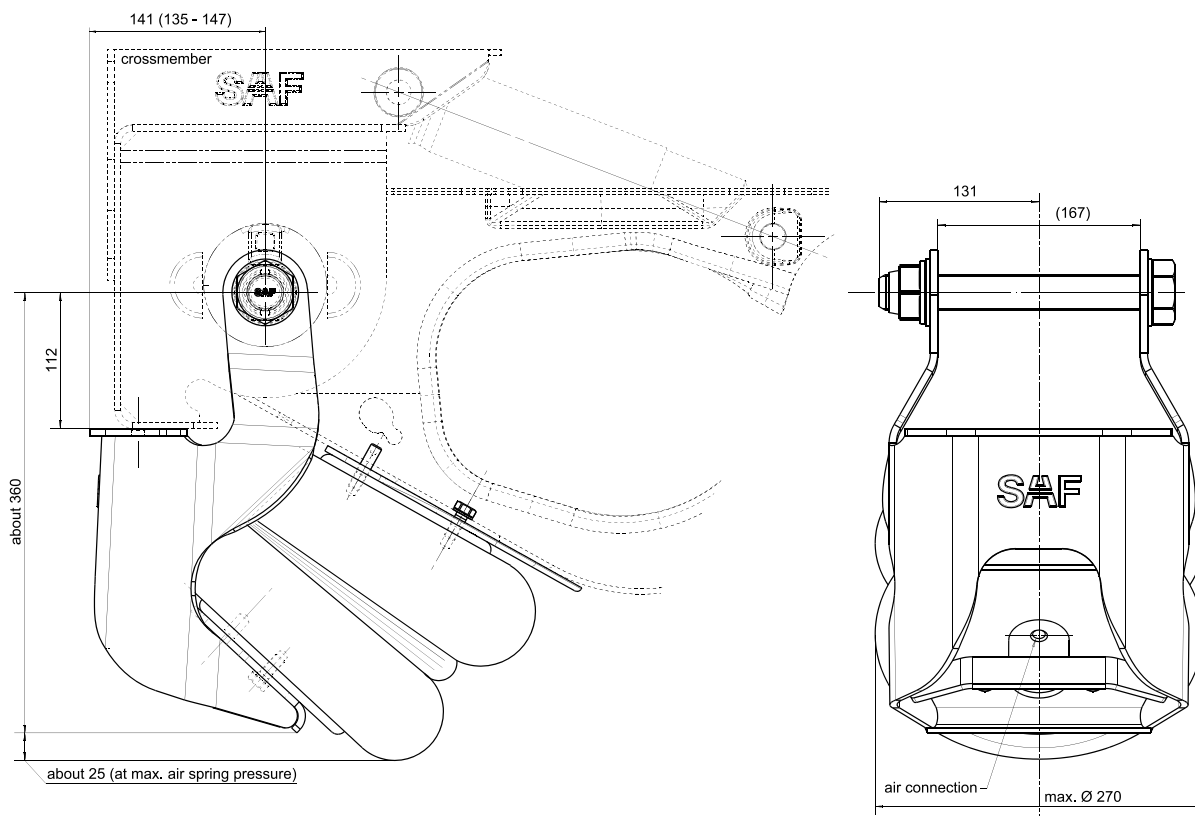
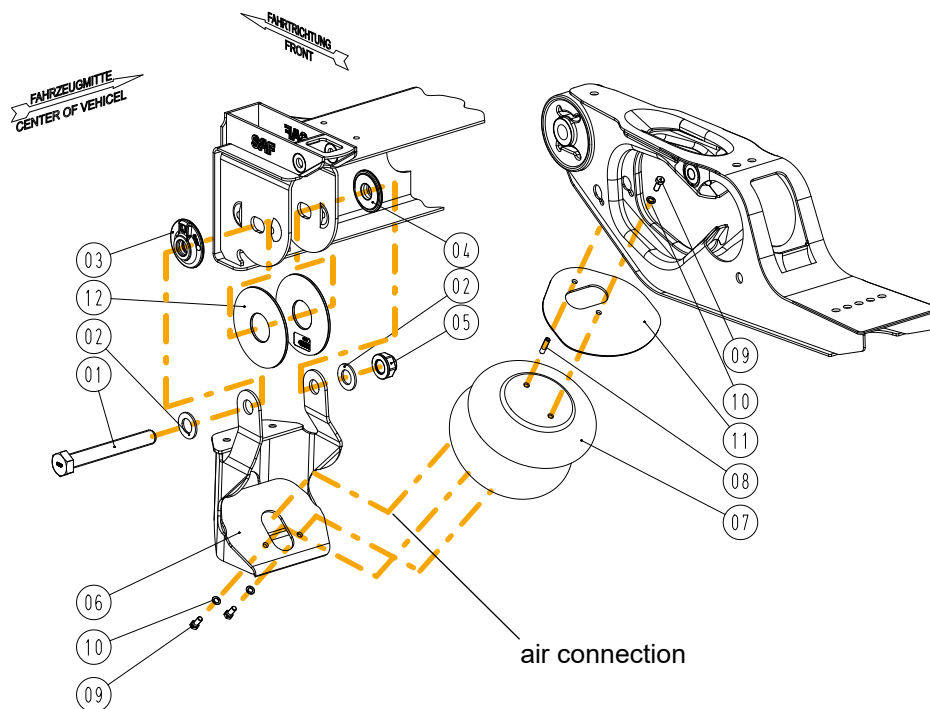


Illustration for „crossmember“ – 3 027 1243 01

Part list for two sided lift mounted at crossmember

Per axle are two kits needed.

	Crossmember		
kit number:	3 027 1243 01	Pos.	per kit
liftarm	2 239 0040 00	(6)	1x
hexagon screw	4 343 1085 88	(1)	1x
lock nut	4 247 4022 80	(5)	1x
lift air spring	4 229 1005 01	(7)	1x
protection plate	1 336 0003 00	(11)	1x
washer	1 331 0117 00	(2)	2x
hexagon screw	4 343 1006 88	(9)	3x
spring washer	4 141 0002 00	(10)	3x
threaded bolt	4 375 0903 45	(8)	1x
Washer	4 331 5029 01	(12)	2x
Thrust washer	1 101 2001 00	(4)	1x
Eccentric washer	1 123 0001 01	(3)	1x



Installation instruction

Installation of the lift arm:

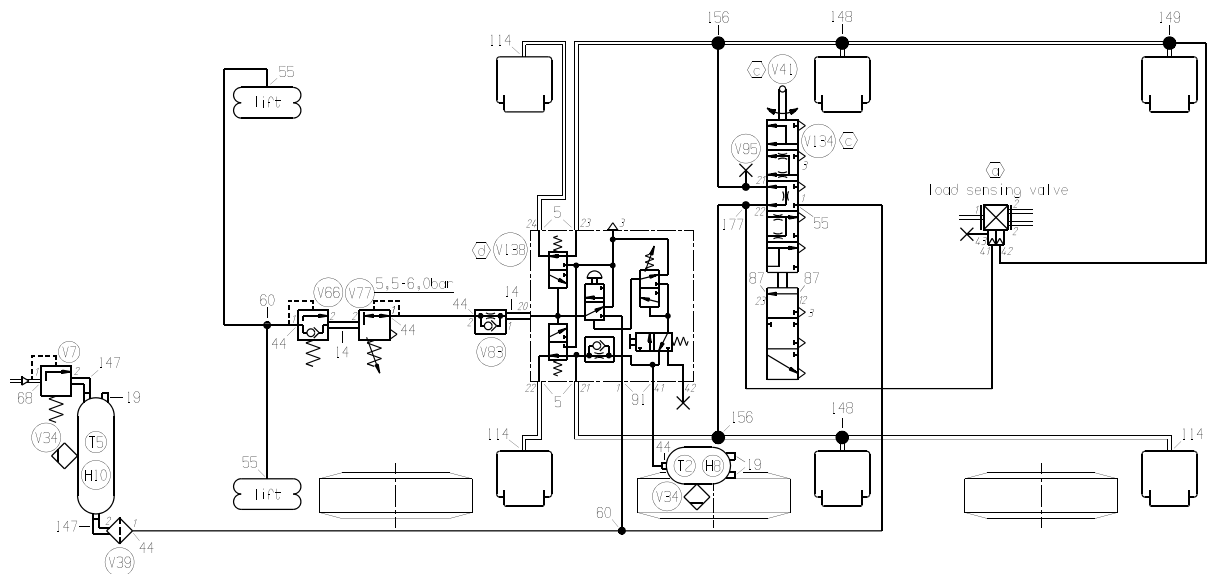
- ✓ Remove the existing pivot bolt mounting. Eccentric washer (3) and thrust washer (4) re-use.
- ✓ Position the lift arm (6) over the hanger bracket or cross member.
- ✓ Mount the pivot bolt according to the illustration. Use the hexagon screw (1), washers (2) and lock nut (5) new from the kit. Washers (3), (4) and (12) 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 72)**

Installation of the lift air spring:

- ✓ Fix the lift air spring (7) from underneath with two bolts enclosed (9) and washers (10) to the lift arm. **Tightening torque 50 Nm**
- ✓ The air connection of the lift air spring **must**, point downwards to the lift arm (6), as illustrated.
- ✓ Screw the threaded bolt (8) to the upper spring plate as illustrated (positioning nearest to the pivot bolt). **Tightening torque 25-30 Nm**
- ✓ Lift air spring (7) and protection plate (11) are locked by the threaded bolt (8) to the trailing arm. And fixed with bolt (9) as well as the washer (10) from the inner side of the trailing arm. **Tightening torque 50 Nm**

Circuit diagram

Triaxle with two-sided lift with lift axle control valve (pneumatically operated)



remarks to index no.	explanations
① not our delivery volume (. 99) ② mounted to middle axle ③ adjustment according to air bag pressure diagram	— tube 8x1 — tube 12x1,5 connection designation at valve: valve fitting 4 424 0068 00
SAF-HOLLAND	according to DIN 34 all rights reserved ! circuit no. 00 53 34 4 01 4 2004 designed 2011 checked name Part

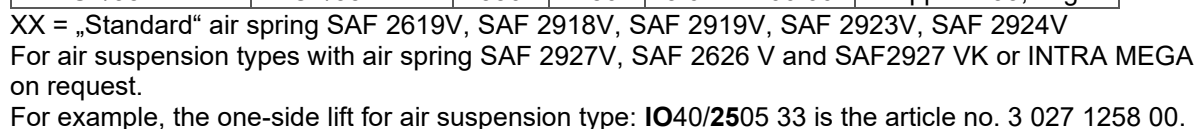
Part list of
 00 53 34 4 01 4
 contains:

03 424 0019 00
 03 424 0021 00
 03 424 0010 00
 03 424 0011 00

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

Partnumber	Quantity	Description	Dimensionen
4.424.0005.40	4	STRAIGHT MALE STUD COUPLING	M16x1,5/D12
4.424.0014.40	2	DOUBLE CONNECTOR WITH LOCK NUT	M22x1,5
4.424.0019.40	1	MALE PLUG	M22x1,5
4.424.0044.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D8
4.424.0055.40	1	MALE STUD ELBOW COUPLING	M12x1,5/D8
4.424.0060.40	1	EQUAL TEE COUPLING	D8/8/8
4.424.0068.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D12
4.424.0087.40	2	MALE PLUG	M16x1,5
4.424.0091.40	2	STRAIGHT MALE STUD COUPLING	M16x1,5/D8
4.424.0114.40	3	MALE STUD ELBOW COUPLING	M22x1,5/D12
4.424.0147.40	2	ELBOW WITH LOCK NUT	M22x1,5
4.424.0148.40	2	MALE STUD TEE COUPLING	M22x1,5/D12/D12
4.424.0149.40	1	MALE STUD TEE COUPLING	M22x1,5/D12/D8
4.424.0156.40	2	EQUAL TEE COUPLING	D12/8/12
4.424.0177.40	1	MALE STUD TEE COUPLING	M12x1,5/D8
V 4.425.0007.00	1	CHARGING VALVE WITHOUT RETURN FLOW	M22x1,5
V 4.425.0034.40	1	DRAIN VALVE	M22x1,5
V 4.425.0039.00	1	LINE FILTER	M22x1,5
V 4.425.0041.00	1	LINK CONNECTION FOR LEVELLING VALVE	M8/D6
V 4.425.0066.00	1	CHARGING VALVE WITH RETURN FLOW 0	M22x1,5
V 4.425.0077.00	1	PRESSURE LIMITING VALVE 1,8 BAR	M22x1,5
V 4.425.0083.00	1	CHECK VALVE CONSTANT THROTTLING D1	M22x1,5
V 4.425.0095.00	1	STRAIGHT MALE STUD COUPLING WITH T	M12x1,5/D8
V 4.425.0134.00	1	LEVELLING VALVE	M12x1,5/M16x1,5
V 4.425.0138.00	1	LIFT AXLE CONTROL VALVE	M16x1,5/M22x1,5
T 4.105.0002.00	1	AIR RESERVOIR 10 LTR	D206x355
T 4.105.0008.00	1	AIR RESERVOIR 60 LTR	D310x880
H 4.405.0008.00	2	HOLDER (AIR RESERVOIR) 10/20 LTR	D206
H 4.405.0010.00	2	HOLDER (AIR RESERVOIR) 40/60 LTR	D310

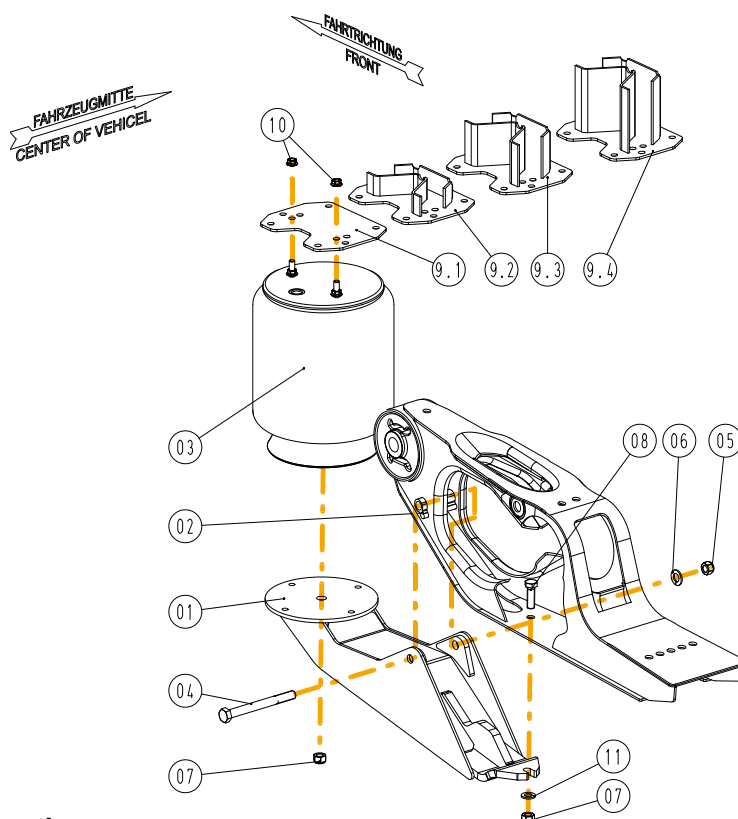
Axle lift can be mounted on the left or right hand side. Lift air spring offset is not permissible.



Part list of mounting kit:

Per axle is one mounting kit needed.

	BH 200	BH 250	BH 300	BH 350		
kitnummer:	3 027 1257 00	3 027 1258 00	3 027 1259 00	3 027 1260 00	Pos.	pro kit
air spring bracket (H ₂)	1 043 0261 01	2 237 0081 01	2 237 0080 01	2 237 0082 01	(9)	1x
lift arm		2 239 0042 00			(1)	1x
guide		1 148 0010 00			(2)	1x
lift air spring		3 229 0033 00			(3)	1x
hexagon bolt		4 343 0151 10			(4)	1x
loch nut		4 247 4026 10			(5)	1x
washer		4 348 1021 00			(6)	1x
lock nut		4 247 4007 80			(7)	2x
hexagon bolt		4 343 1010 88			(8)	1x
hexagon nut		4 247 4047 10			(10)	2x
washer		4 331 1004 00			(11)	1x



Installation instruction

Installation of the lift arm:

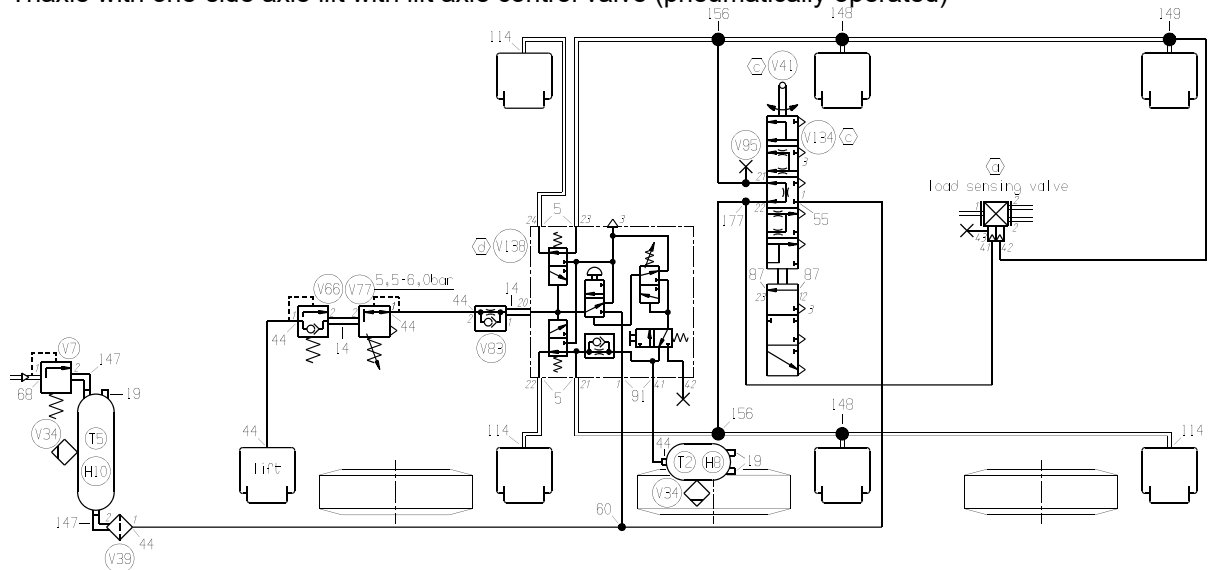
- ✓ Position the guide (2) in the gap in the trailing arm
- ✓ Place lift arm (1) in the guide (2) using bolt (4), nut (5), and washer (6) as in the illustration
- ✓ Fix the lift arm (1) to the under side of the trailing arm with bolt (8), washer (11) and nut (7). **Tightening torque 210Nm.**
- ✓ Tighten the assembly with bolt (4), **Tightening torque 400Nm.**

Installation of the lift air spring:

- ✓ Fix the lift air spring bracket (9.1...9.4) to the chassis, see [Page 69](#)
- ✓ Screw lift air spring (3) with nut (7) to lift arm (1) **Tightening torque 80Nm**
- ✓ Screw the dowel pins of the air spring plate to the air spring bracket (9.1...9.4) using nut (10) **Tightening torque 40Nm**
- ✓ The air supply of the lift air spring (3) **must** lie in the cut out position of the lift air spring bracket (9.1...9.4) see illustration.

Circuit diagram

Triaxle with one-side axle lift with lift axle control valve (pneumatically operated)



remarks to index no.	explanations
①: spot our delivery volume (. 99) ②: mounted to middle axle ③: adjustment according to air bag pressure diagram	— tube 6x1 — tube 12x1,5 connection designation of valve: valve V 4 425 0007 00 fitting 4 424 0068 00
	according to DIN 34 all rights reserved
	circuit no. 00 53 34 4 01 5 2004 designed 26.11. name Roth

Part list of
00 53 34 4 01 5
contains:

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

Partnumber	Quantity	Description	Dimensionen
4.424.0005.40	4	STRAIGHT MALE STUD COUPLING	M16x1,5/D12
4.424.0014.40	2	DOUBLE CONNECTOR WITH LOCK NUT	M22x1,5
4.424.0019.40	1	MALE PLUG	M22x1,5
4.424.0044.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D8
4.424.0055.40	1	MALE STUD ELBOW COUPLING	M12x1,5/D8
4.424.0060.40	2	EQUAL TEE COUPLING	D8/8/8
4.424.0068.40	1	STRAIGHT MALE STUD COUPLING	M22x1,5/D12
4.424.0087.40	2	MALE PLUG	M16x1,5
4.424.0091.40	2	STRAIGHT MALE STUD COUPLING	M16x1,5/D8
4.424.0114.40	3	MALE STUD ELBOW COUPLING	M22x1,5/D12
4.424.0147.40	2	ELBOW WITH LOCK NUT	M22x1,5
4.424.0148.40	2	MALE STUD TEE COUPLING	M22x1,5/D12/D12
4.424.0149.40	1	MALE STUD TEE COUPLING	M22x1,5/D12/D8
4.424.0156.40	2	EQUAL TEE COUPLING	D12/8/12
4.424.0177.40	1	MALE STUD TEE COUPLING	M12x1,5/D8
V 4.425.0007.00	1	CHARGING VALVE WITHOUT RETURN FLOW	M22x1,5
V 4.425.0034.40	1	DRAIN VALVE	M22x1,5
V 4.425.0039.00	1	LINE FILTER	M22x1,5
V 4.425.0041.00	1	LINK CONNECTION FOR LEVELLING VALVE	M8/D6
V 4.425.0066.00	1	CHARGING VALVE WITH RETURN FLOW 0,5 bar	M22x1,5
V 4.425.0077.00	1	PRESSURE LIMITING VALVE 1,8 BAR	M22x1,5
V 4.425.0083.00	1	CHECK VALVE CONSTANT THROTTLING D1	M22x1,5
V 4.425.0095.00	1	STRAIGHT MALE STUD COUPLING WITH T	M12x1,5/D8
V 4.425.0134.00	1	LEVELLING VALVE	M12x1,5/M16x1,5
V 4.425.0138.00	1	LIFT AXLE CONTROL VALVE	M16x1,5/M22x1,5
T 4.105.0002.00	1	AIR RESERVOIR 10 LTR	D206x355
T 4.105.0008.00	1	AIR RESERVOIR 60 LTR	D310x880
H 4.405.0008.00	2	HOLDER (AIR RESERVOIR) 10/20 LTR	D206
H 4.405.0010.00	2	HOLDER (AIR RESERVOIR) 40/60 LTR	D310

Welding instruction for hanger bracket „steel“

Note

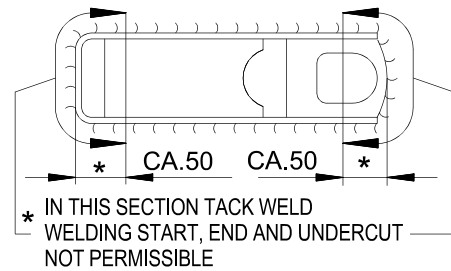
Cover the trailing arm to protect it from flying sparks. Welding and connecting the welding equipment ground cable to the trailing arm is not permissible. In order to avoid bearing damage, the welding equipment ground cable must also not be connected either to the wheel, wheelhub or wheelflange.

Welding recommendation

The high tensile steel (in accordance with DIN EN 10025 (class 3) used for the hanger brackets with a carbon content C 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 ISO 14341, shielding gas in accordance with DIN EN ISO 14175, welding seams to DIN EN ISO 5817 "quality levels for imperfections" to "group C".

WELDING SEAM 5 



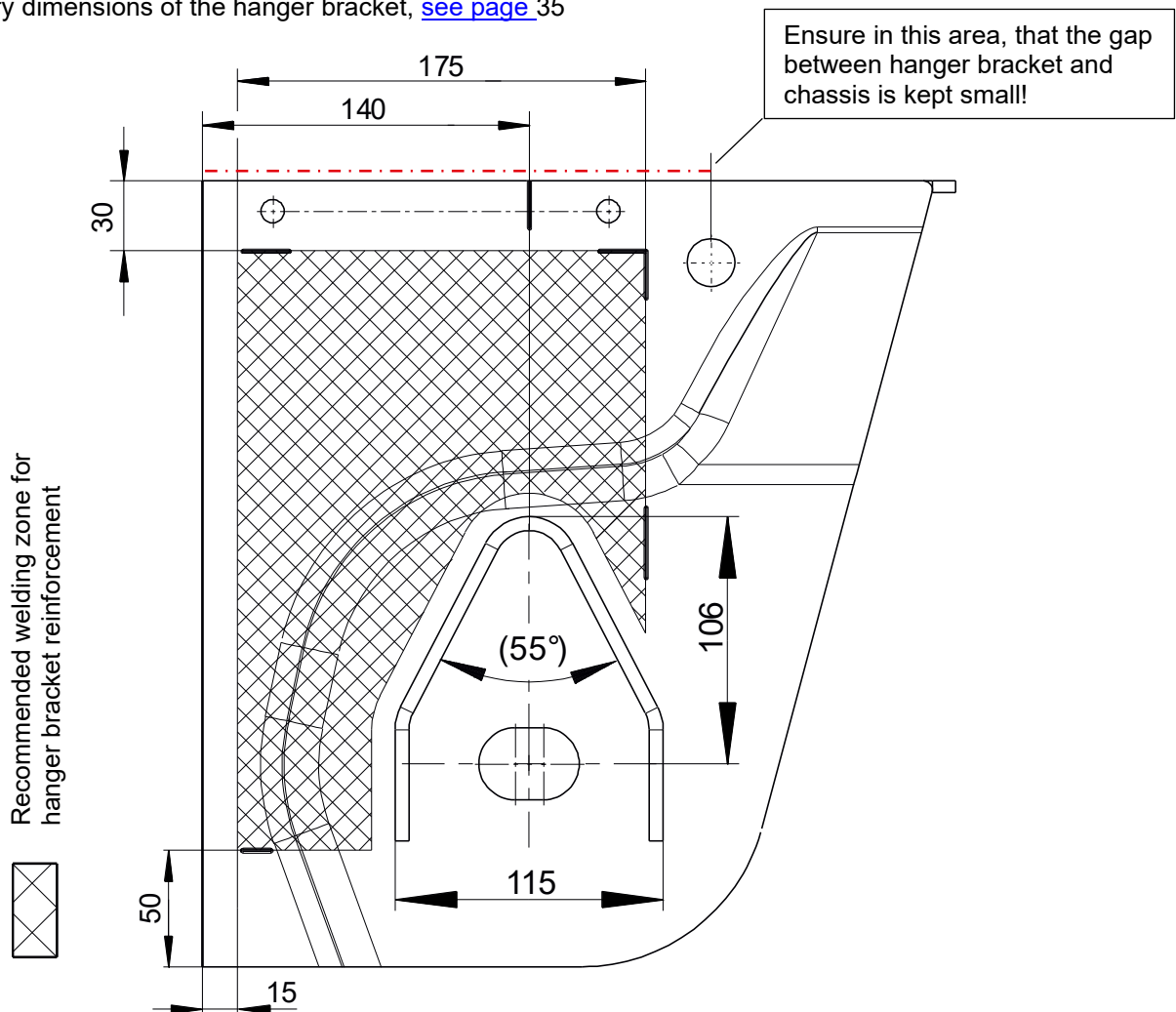
Design information

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 35](#)



Welding instruction for hanger bracket „aluminium“

Note

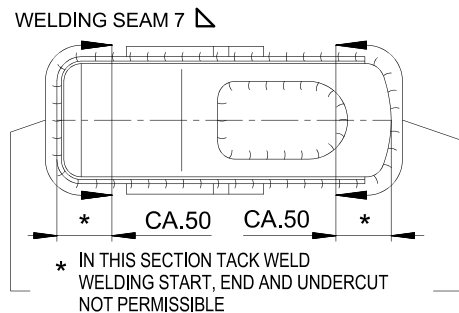
Cover the trailing arm to protect it from flying sparks. Welding and connecting the welding equipment ground cable to the trailing arm is not permissible. In order to avoid bearing damage, the welding equipment ground cable must also not be connected either to the wheel, wheelhub or wheelflange.

Material

Al Mg 4,5 Mn W 28 according to EN AW 5083-H111 (EN 485-2)

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-HOLLAND recommends $a = 7 \text{ mm}$, chamfer $5 \times 30^\circ$), to minimise the heat-induced distortion and tension. SAF-HOLLAND is using the gas metal arc welding procedure with the additional material according to DIN EN ISO 18273 S Al 5183 (AlMg4.5Mn0.7(A)) according to DIN EN ISO 14175. Welding seams to DIN EN ISO 10042 "quality levels for imperfections" to "group C".



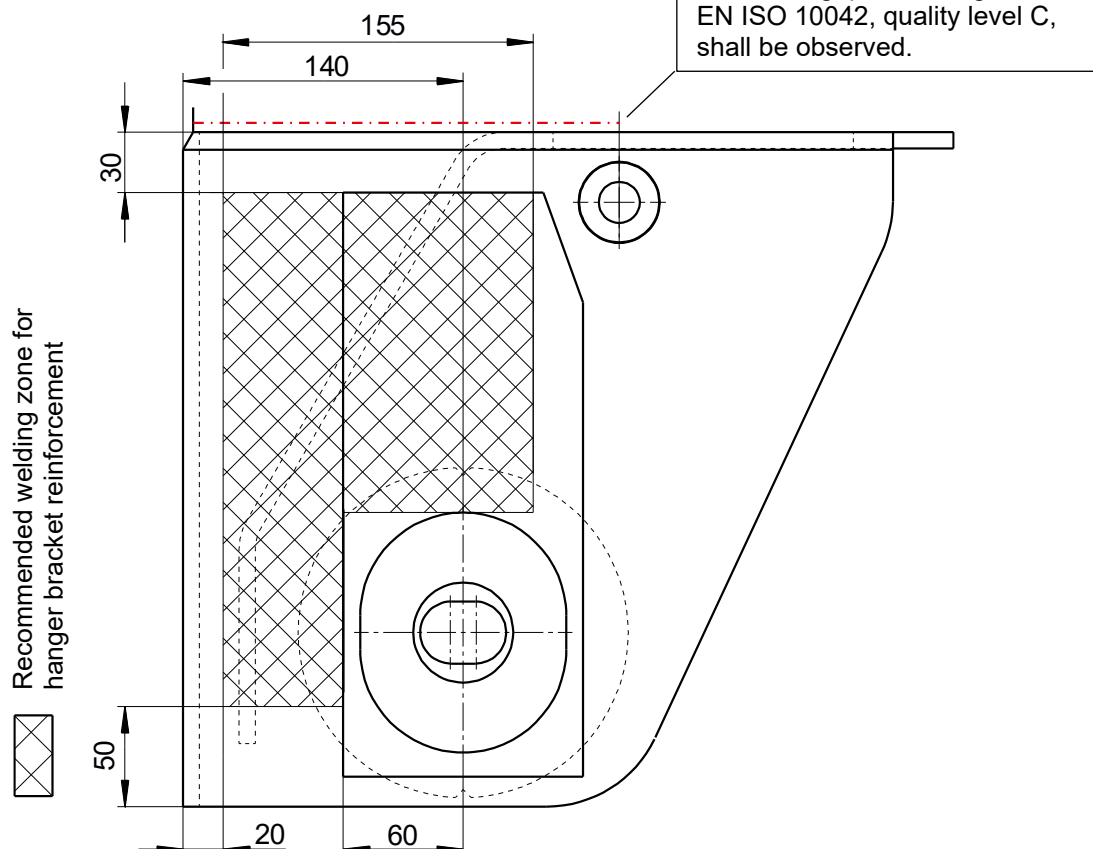
Design information

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

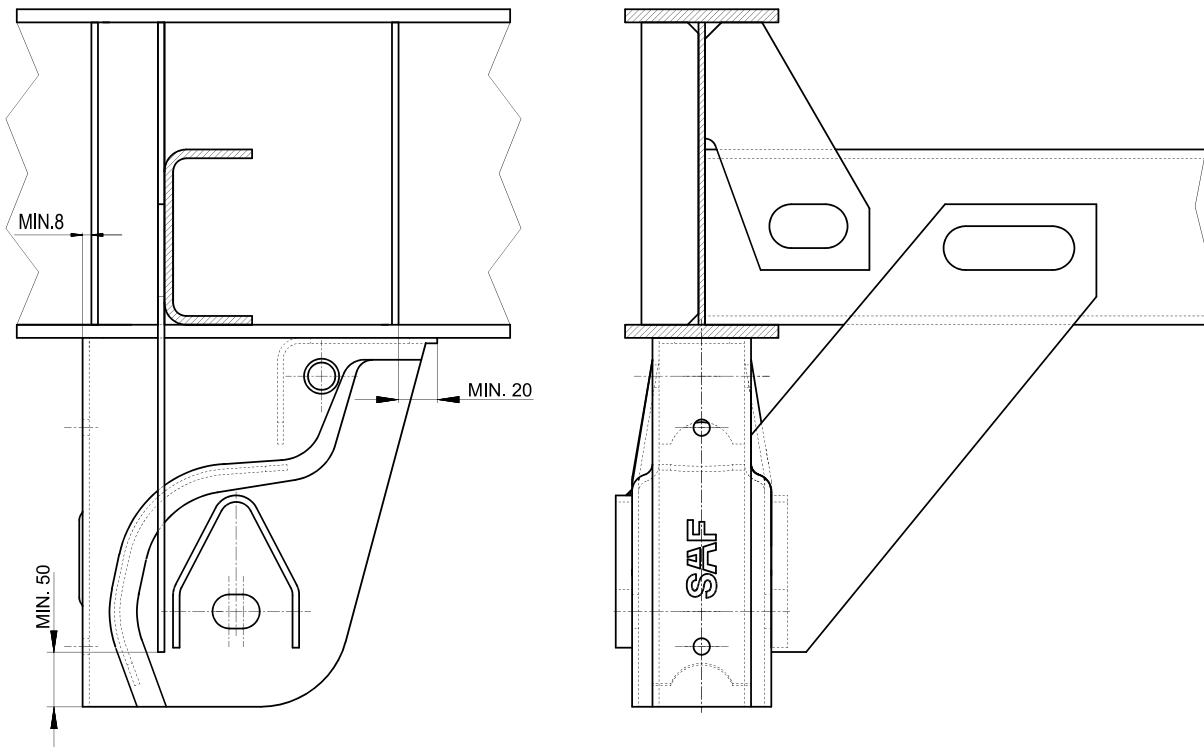
Overlapping of the lateral brace (gusset plate) and inner brace plate of the hanger bracket is necessary to avoid any diaphragm effect.

Geometry dimensions of the hanger bracket, [see page 41](#).

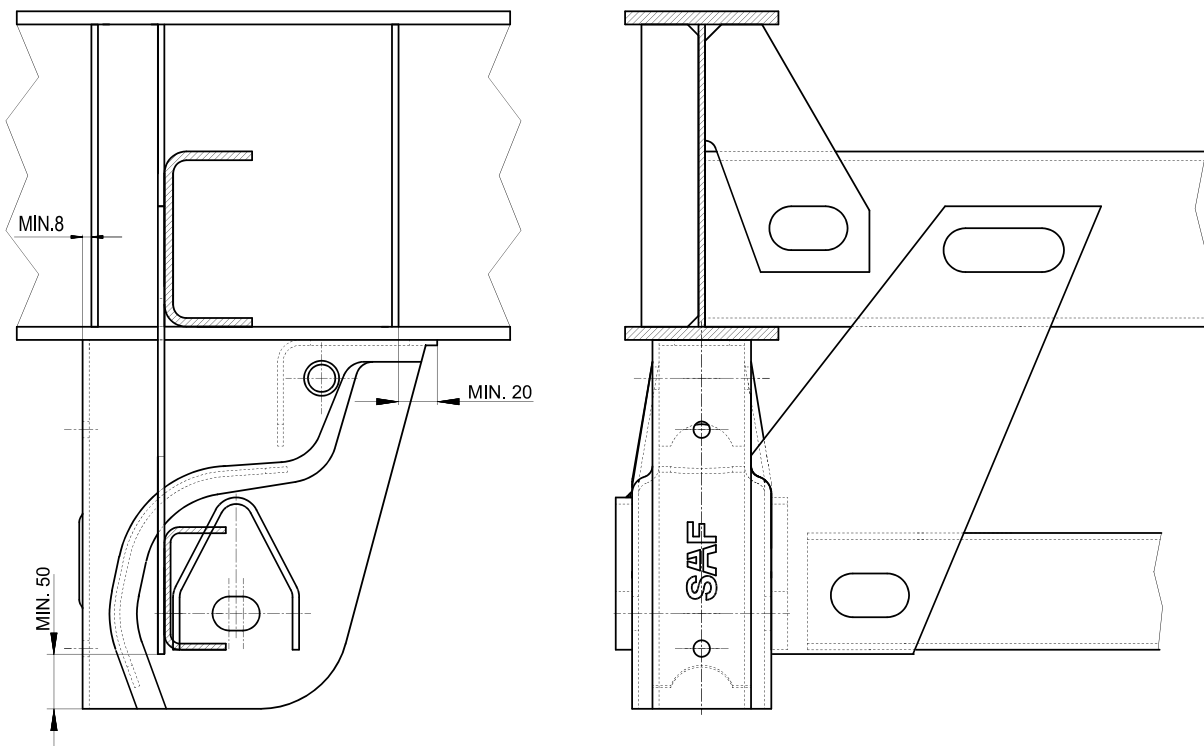


Recommendation for lateral reinforcement of hanger bracket „steel“

for torsionally flexibel chassis



for torsionally stiff chassis

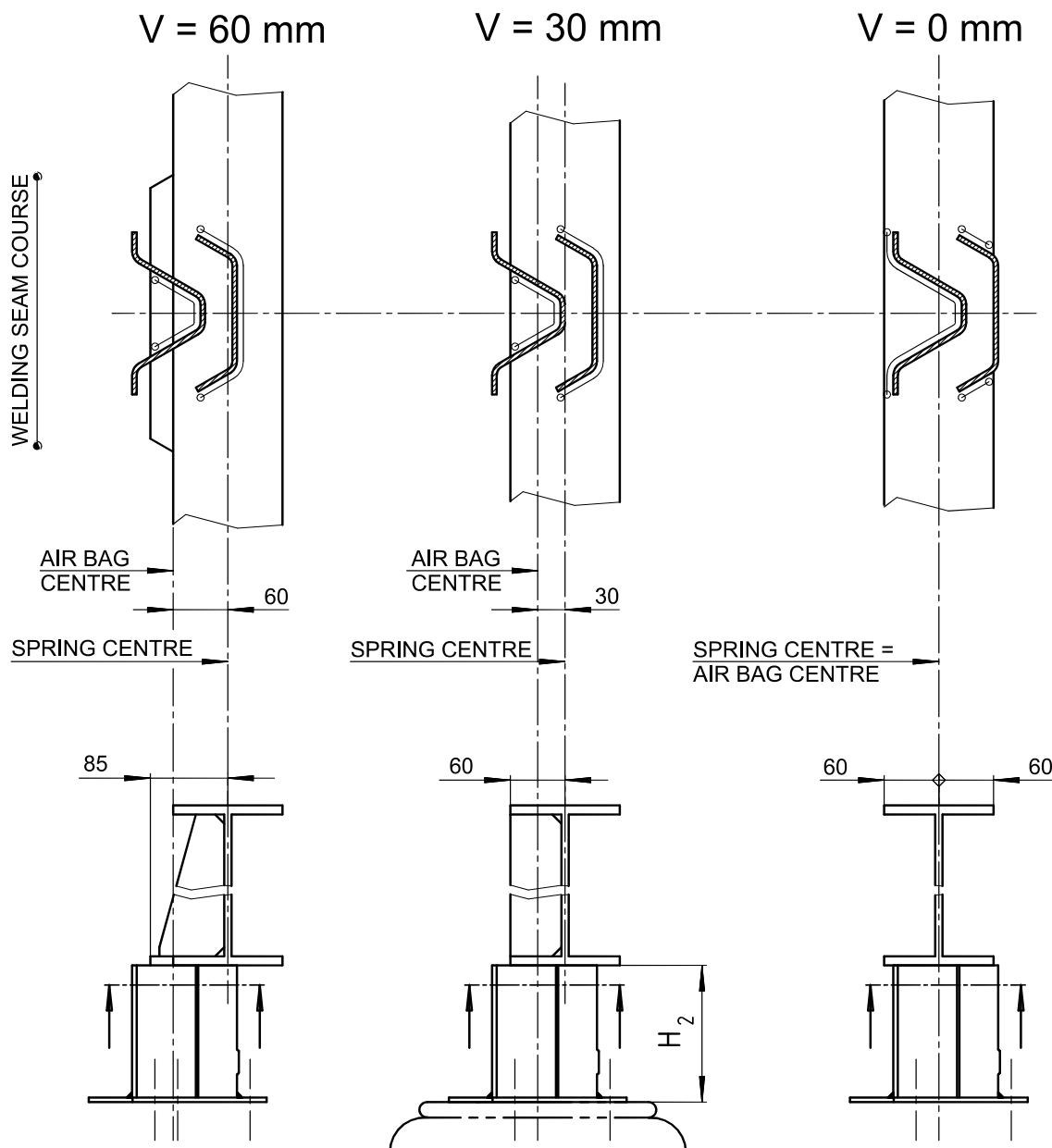
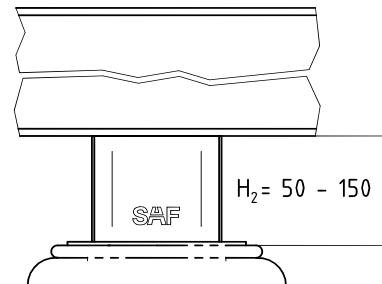


[Hanger bracket welding instruction see page 66.](#)

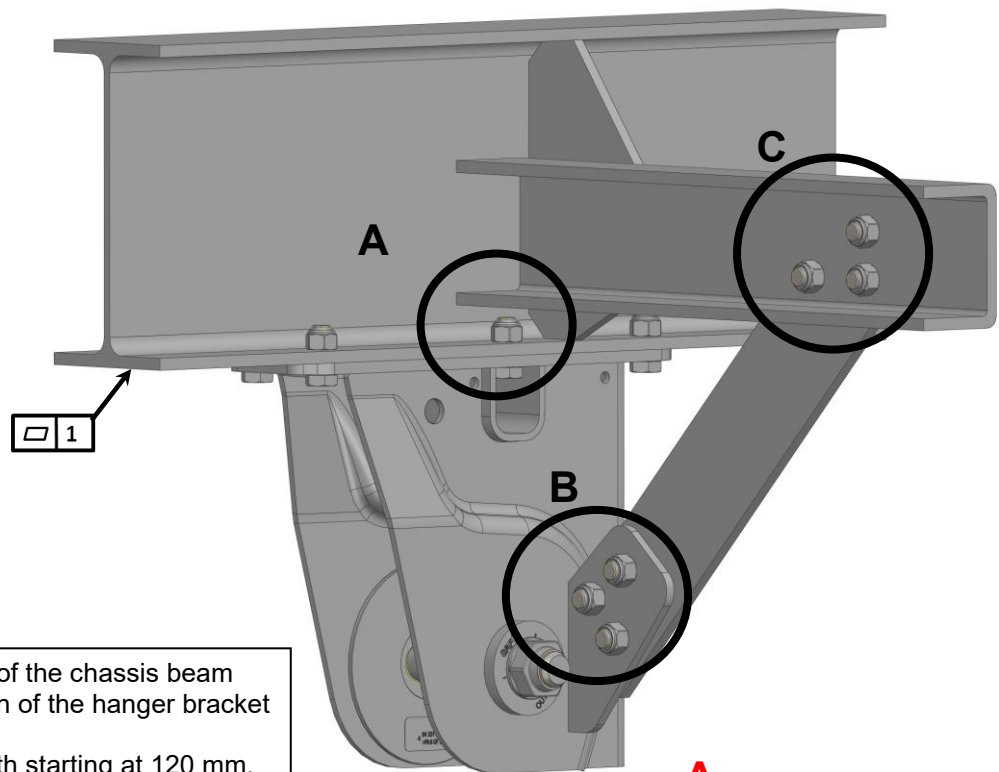
The design and dimensioning of the hanger bracket reinforcement is the responsibility of the trailer manufacturer, this depends on the type and operating conditions of the trailer.

Welding recommendation for air spring bracket

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



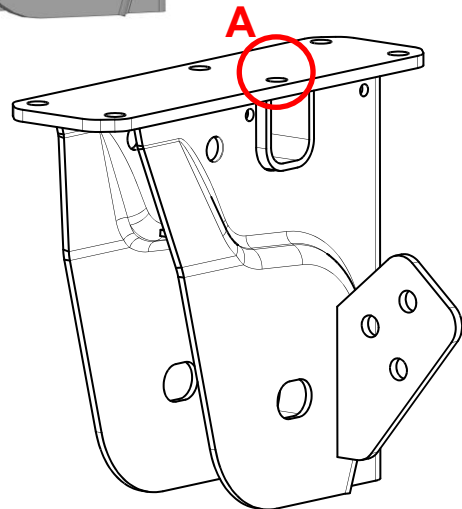
Installation of hanger brackets „screw-on“



Max. unevenness 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 $\varnothing$ 16mm
 hole in brace $\varnothing$ 18mm
- 3) [Adjustment of track](#) and mounting the pivot bolt according to SAF-HOLLAND installation recommendation, [see page 72](#).
- 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-HOLLAND delivery volume.

Attachment faces for bolting connection parts:

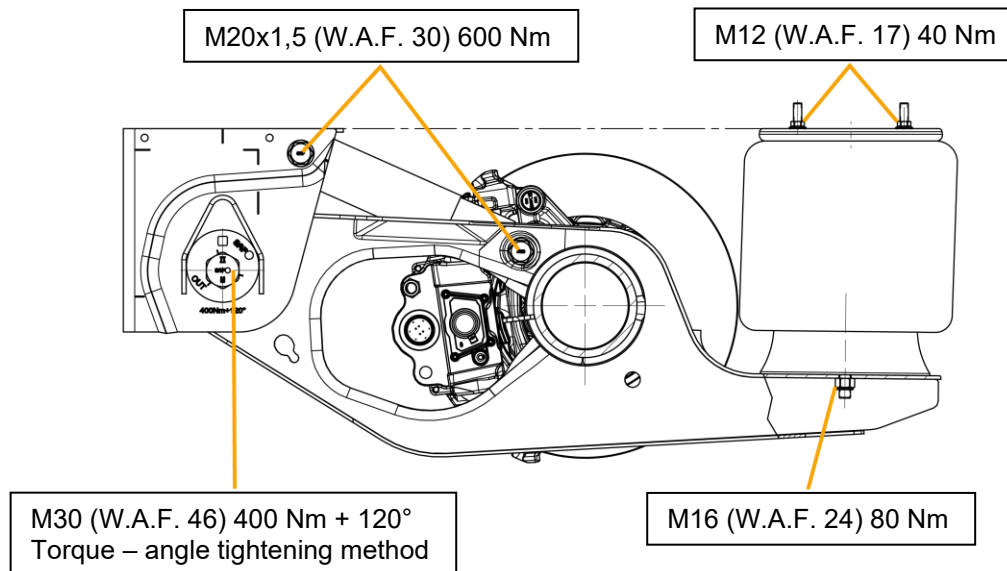
- coat thickness when painting max. **30** μ m
- coat thickness when galvanizing max. **100** μ m

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](#).

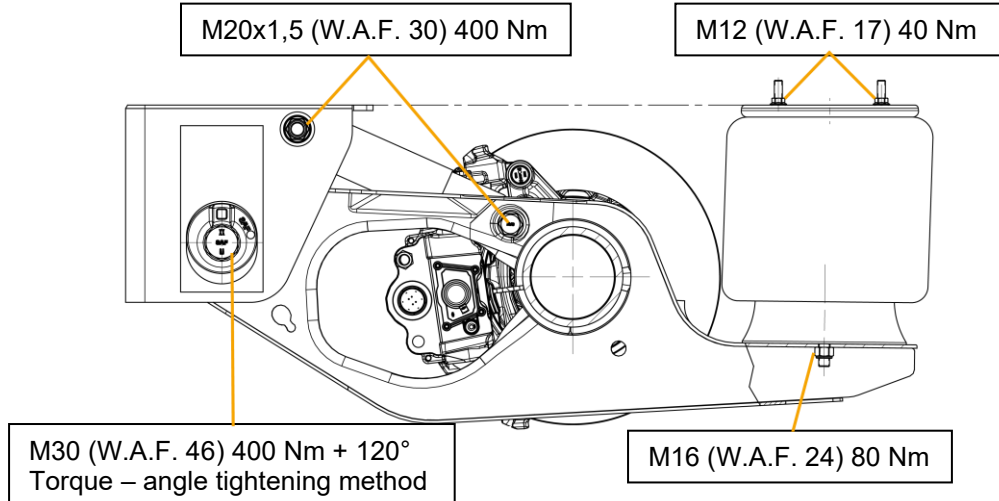
Tightening torques

The max. coating thickness on the contact surfaces (interfaces) of the trailing arm and shock absorber bolts must not surpass **45 µm**!

Hangar bracket „steel/ stainless steel“ – trailing arm – shock absorber – air spring



Hangar bracket „aluminium“ – trailing arm – shock absorber – air spring

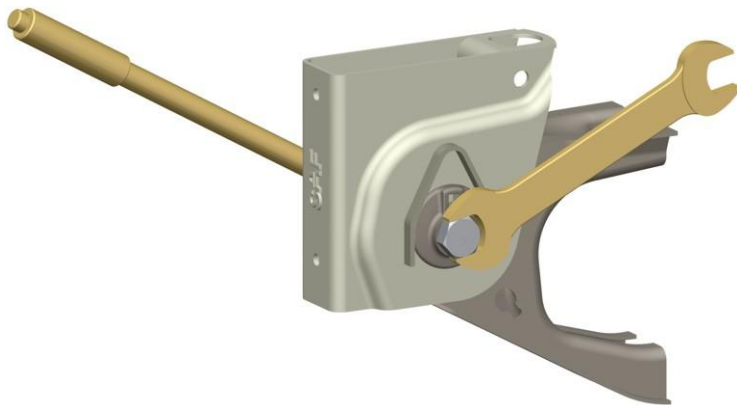


Attention:

- Threads are not to be oiled or greased!
- Pivot bolt mounting for hangar bracket „steel“ maintenance free.
- Connections on hangar bracket „aluminium“ or stainless steel are not maintenance free! This needs to be checked after 1 month or 10.000 km, further checks every 12 months or 120.000 km. Inspection torque:
 - of 1200 Nm for the pivot bolt connection
 - of 400 Nm for the shock absorber connection.
- Pivot bolt mounting on galvanized hangar brackets are up to a coating thickness of **120 µm** maintenance free.
- After taking the trailer into service and re-alignment of the axles / opening the pivot bolt connection, the pivot bolt connection needs to be exchanged.

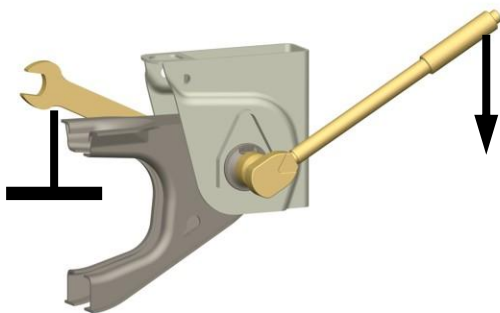
Tightening instructions for adjustable pivot bolt

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

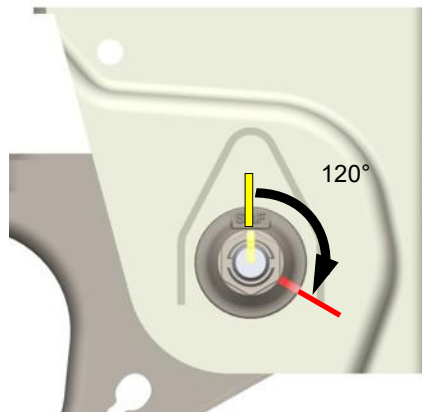


Bolt head always on the eccentric washer side

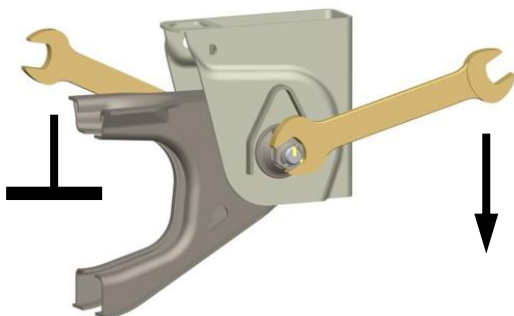
Pre tightening **400 Nm**
Use torque wrench



Marking for angle tightening



Angle tightening **120°**
eventual extend lever to 2,5 meter



Visual inspection

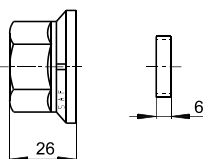


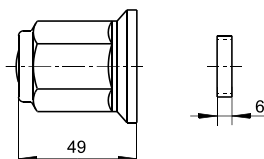
Wheel fixing – standard, wheel size 19,5"/22,5", disc brake (code 48)

Axle versions: BI(L/LL)9-22. / BI(L/LL)9-19.

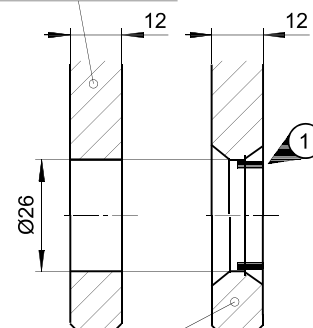
Single tire with ET 120 mm,

Studs 1 303 1118 11 with length 68 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 10) + 4x centring rings (01 095 1040 01)

WHEEL HUB-CENTRING


 WHEEL - DOUBLE CENTRING
 SPHERICAL COUNTERSINK

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

Illustration:

Standard stud with steel wheel

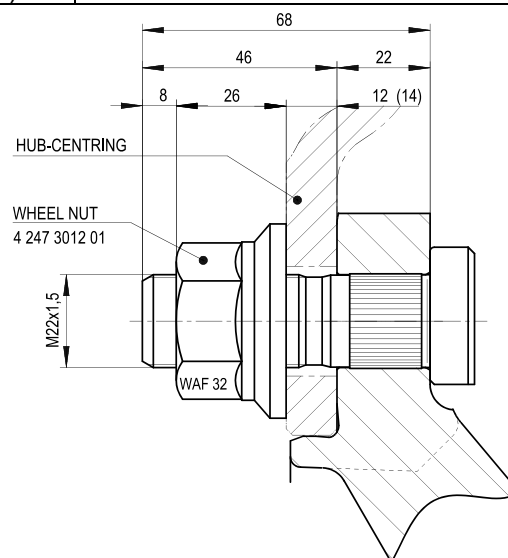
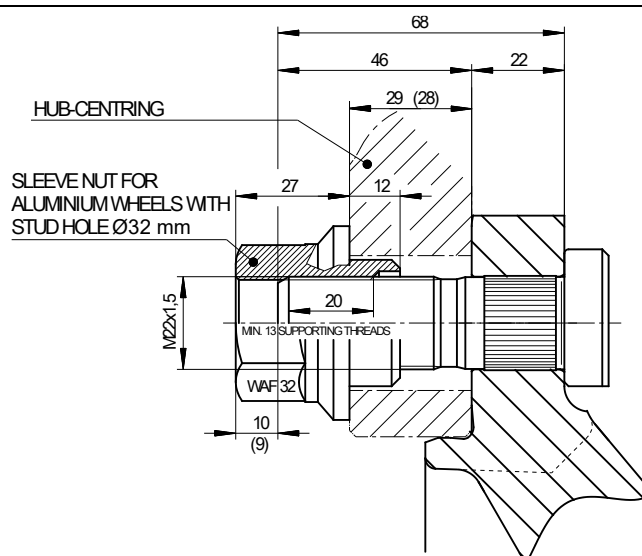
Tightening torque: 600 Nm!


Illustration:

Standard stud with aluminium wheel



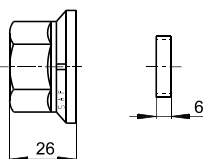
Wheel fixing – aluminium, wheel size 19,5"/22,5", disc brake (code 49)

Axle versions: BI(L/LL)9-22. / BI(L/LL)9-19.

Single tire with ET 120 mm

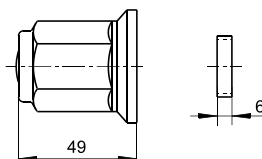
Studs 1 303 1120 10 with length 78 mm

Open wheel nut
M22x1,5 mm
Wrench size 32 mm



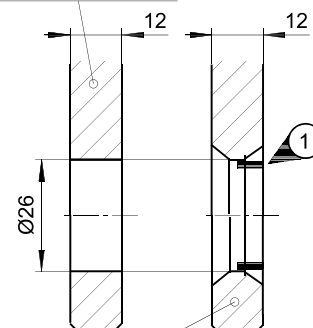
Wheel nut set (Standard): per axle one set:
VPE Red – **03 247 0401 10** contains, 20x wheel nuts
(04 247 3012 01) + 4x centring rings (01 095 1040 01)

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 10) + 4x centring rings (01 095 1040 01)

WHEEL HUB-CENTRING



WHEEL - DOUBLE CENTRING
SPHERICAL COUNTERSINK

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

Illustration:

Long stud with
aluminium wheel/ steel wheel

Tightening torque: 600 Nm!

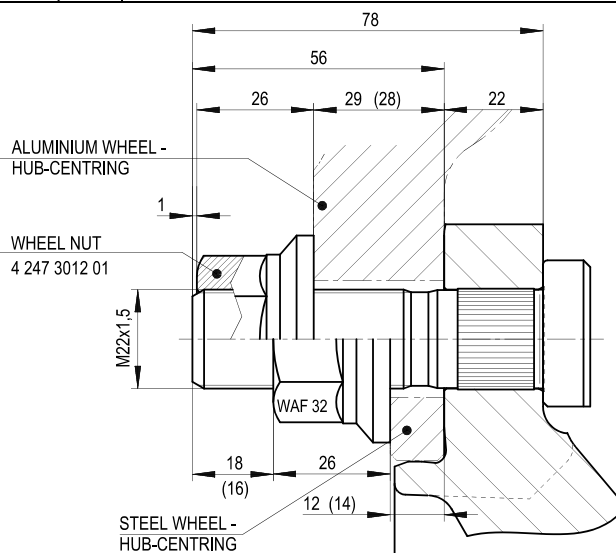
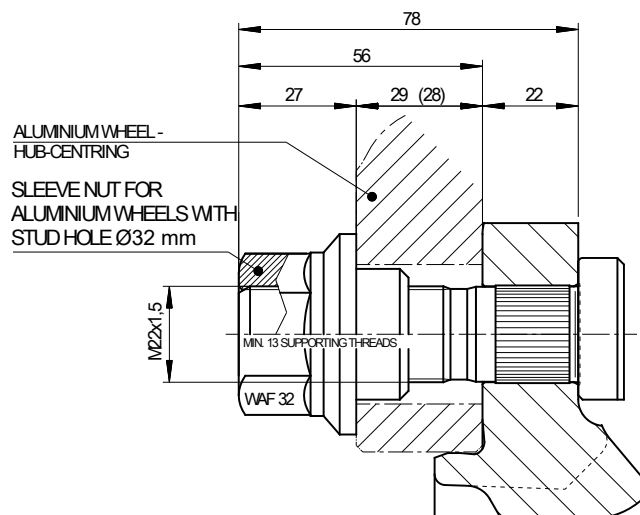


Illustration:

Long stud with aluminium wheel

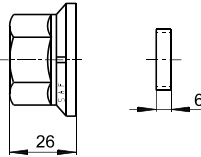


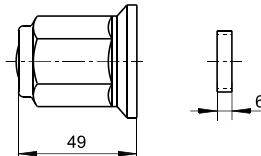
Wheel fixing – standard, wheel size 22,5“, drum brake (code 58)

Axle version: S9-4218

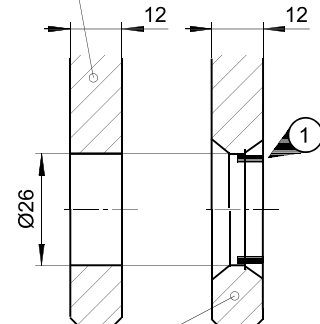
Single tire with ET 0 mm

Wheelstud 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 10) + 4x centring rings (01 095 1040 01)

WHEEL HUB-CENTRING


 WHEEL - DOUBLE CENTRING
 SPHERICAL COUNTERSINK

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

Illustration:

Standard stud with steel wheel

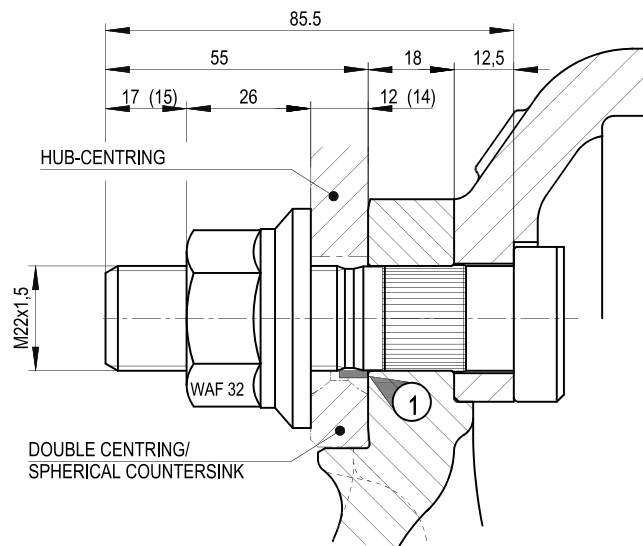
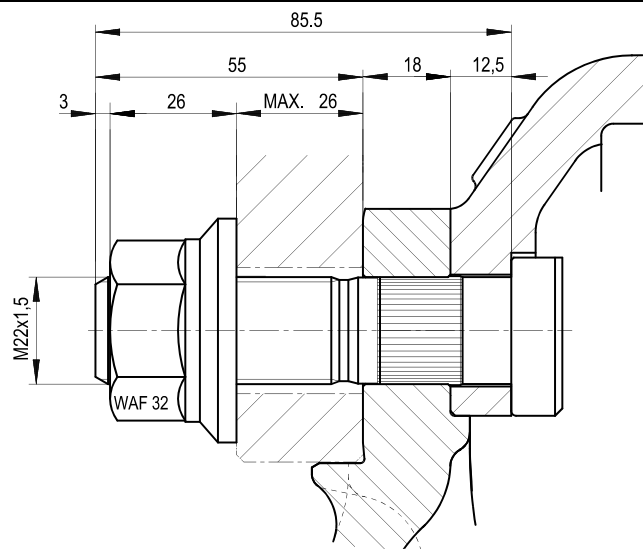
Tightening torque: 600 Nm!


Illustration:

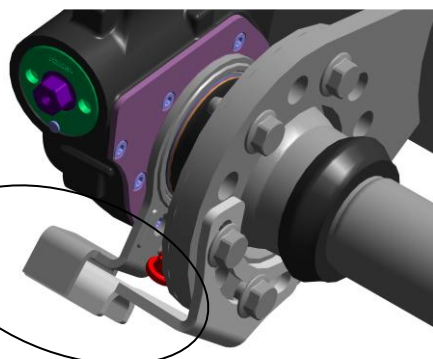
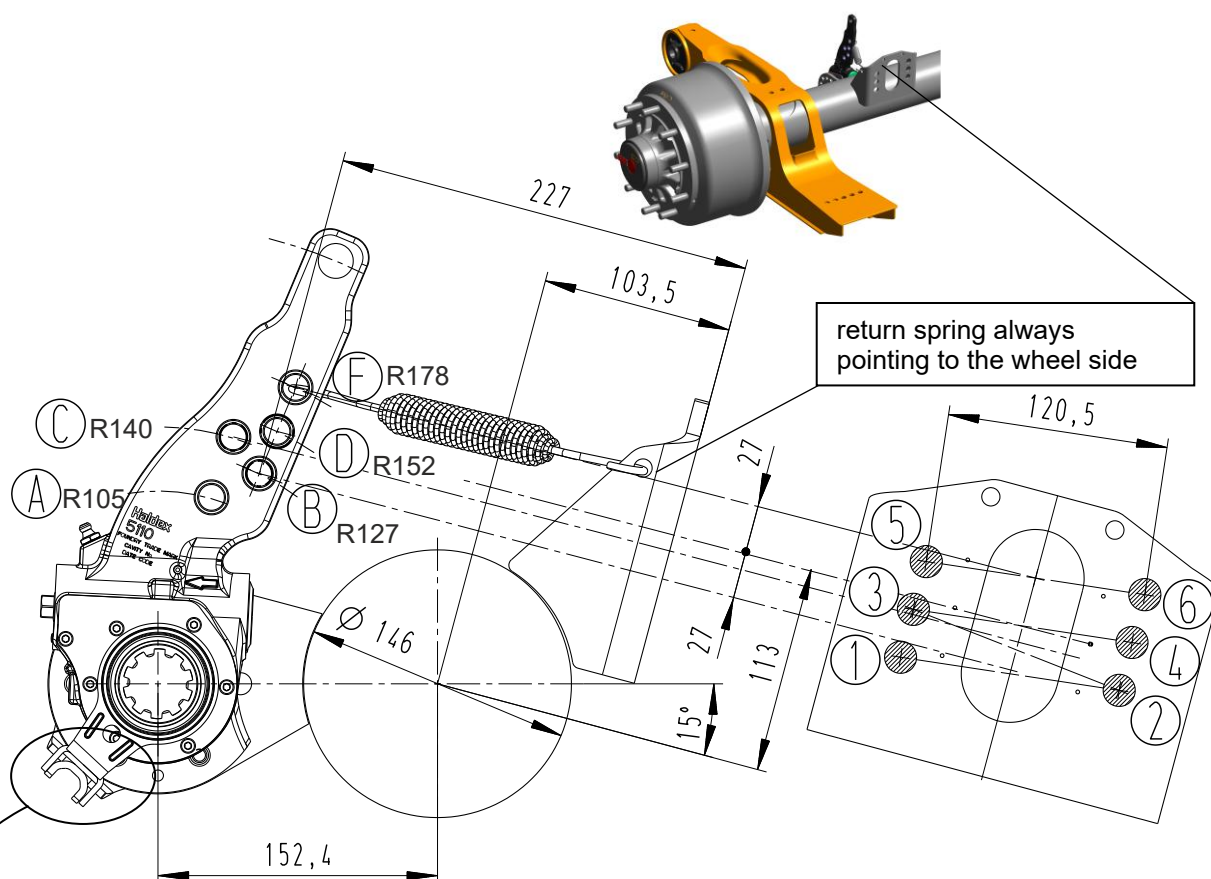
Standard stud with aluminium wheel



Brake chamber bracket

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

Design with SNK 420, INTRADRUM – rigid axles



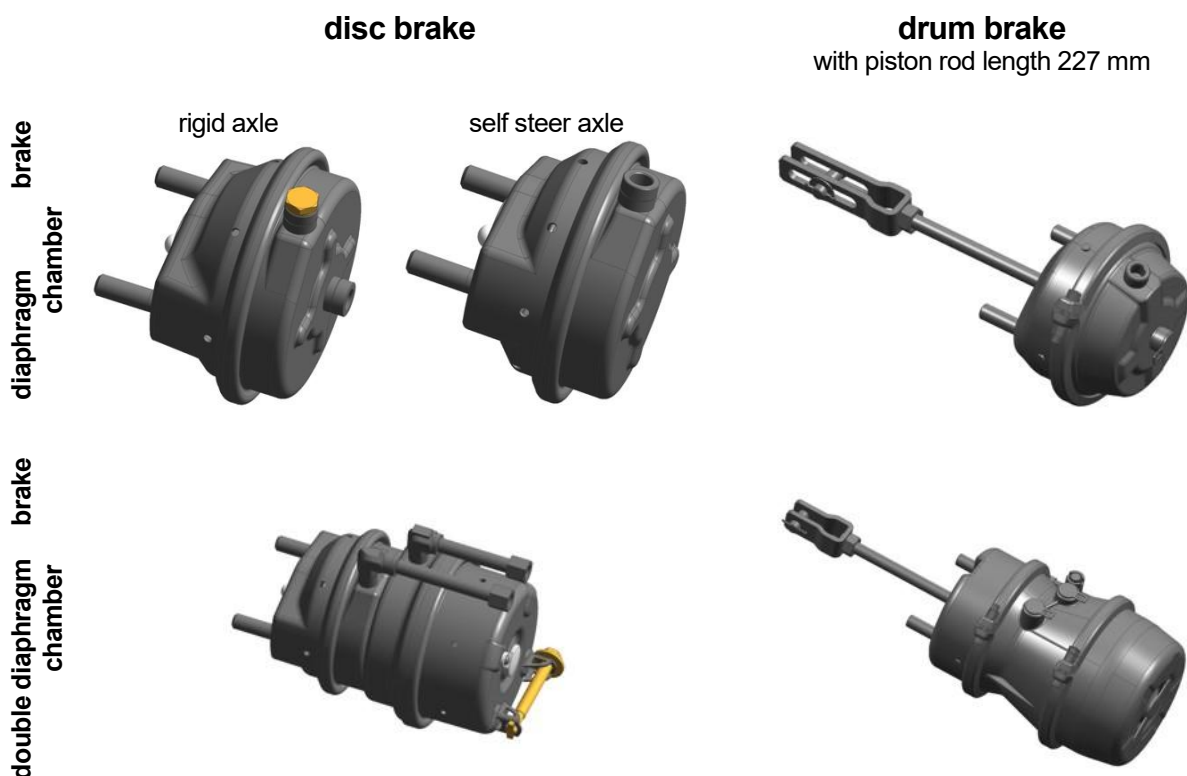
lever length of slack adjuster	Kennung	Brake chamber mounting position on the bracket
178 mm	E	5 – 6
152 mm	D	3 – 4
140 mm	C	2 – 3
127 mm	B	1 – 2
105 mm	A	

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

Overview SAF-HOLLAND brake chambers

The brake chambers can be combined with all axle versions produced by SAF-HOLLAND. The maximum permissible brake input torques according to the ECE R 13 test reports shall be considered.

The brake chambers in overview:



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	partnumber ¹⁾ brake chamber INTRADISC plus INTEGRAL	
		rigid axle	self steer axle
Diaphragm brake chamber	16"	3 454 1065 60	3 454 1081 60
	18"	3 454 1066 60	-
	20"	3 454 1067 60	3 454 1082 60
	22"	3 454 1068 60	-
	24"	3 454 1069 60	-
Double diaphragm brake chamber	16"/24"	3 454 1077 64	-
	18"/24"	3 454 1074 64	-
	20"/24"	3 454 1079 64	-

¹⁾ partnumbers include the 2 fixing nuts

For axles with drum brake and piston rod length 227 mm

The versions in the table are available in both OEM and spare parts:

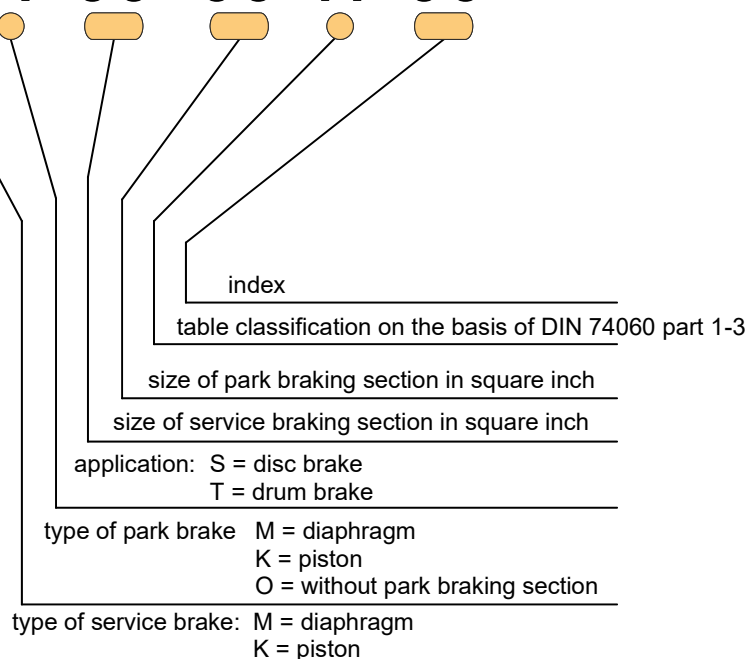
model	size	partnumber ¹⁾ brake chamber INTRADRUM	
		rigid axle	self steer axle
Diaphragm brake chamber	20"	3 454 1089 20	-
	24"	3 454 1090 20	-
Double diaphragm brake chamber	24"/30"	3 454 1092 20	-

¹⁾ partnumbers include the 2 fixing nuts

Typ identification for SAF-HOLLAND brake chambers

Letters are marked with "X", numbers with "0"
 example:

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
	18"/24"	MMS1824C60	BC 0045	68	6960	5911
	20"/24"	MMS2024A60	BC 0046	67	7564	6160

For axles with drum brake and piston rod length 227 mm

model	size	type	test report	max. stroke s _{max}	piston rod length	service brake:	parking brake:
				[mm]		force [N] at 6,5 bar	force [N] at 30 mm stroke
diaphragm brake chamber	20"	MOT2000B20	BC 0177	77	227	7659	-
	24"	MOT2400B20	BC 0178	77	227	9234	-
double diaphragm brake chamber	24"/30"	MMT2430B20	BC 0172	74	227	9175	6440

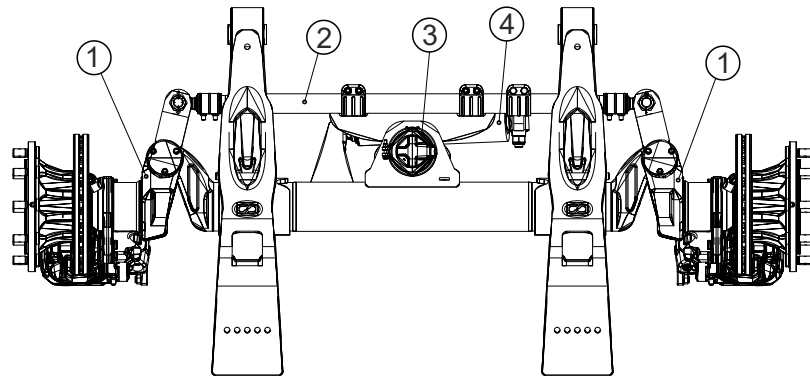
Further technical data can be found on the referenced test reports or can be provided by SAF-HOLLAND ([Download-Center: SAF-HOLLAND Deutschland \(safholland.com\)](https://www.safholland.com)). For these brake chambers, the required [brake calculations](#) can be provided by SAF-HOLLAND.

Self-steering axle with stabilising damper

Steering mechanism

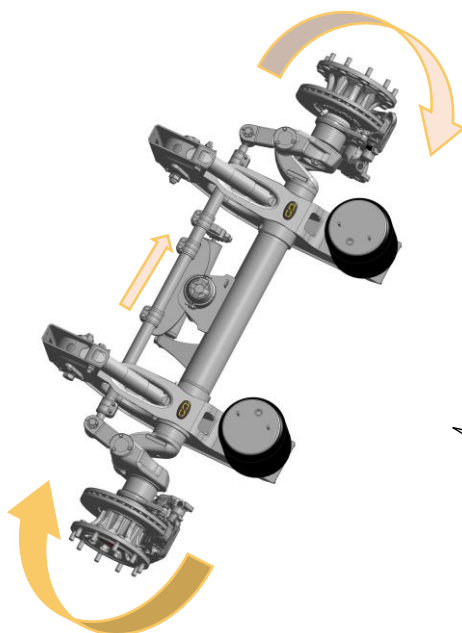
In the case of self-steering axle with stabilising damper, the steering mechanism comprises:

- 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 center of 140mm, 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 righthand turn

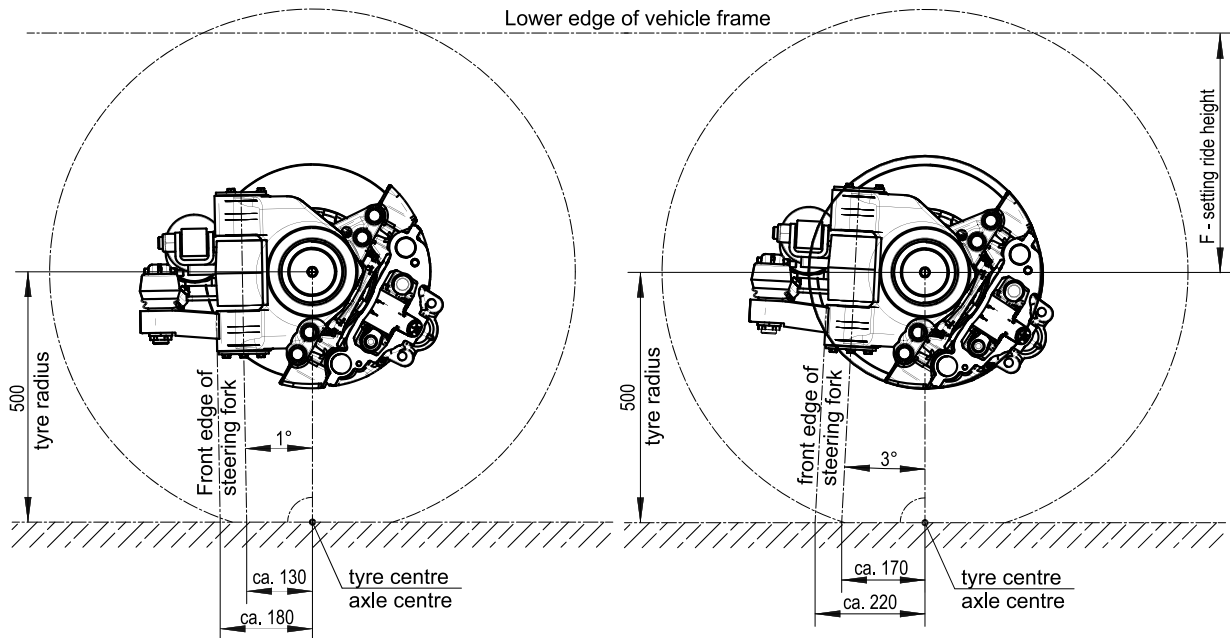
The stabilisation damper is suspended on the axle body on one side and on the steering tie rod on the other. This is either pressed (shortened) or pulled (lengthened) depending on the angle of rotation of the steering knuckles. The special design of this SAF stabilisation dampers means that its internal 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 tire 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. ([see page 12](#))



Steering angle

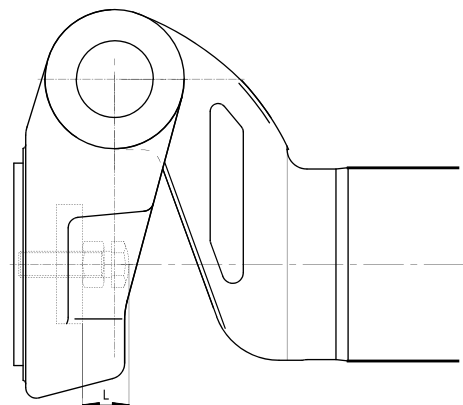
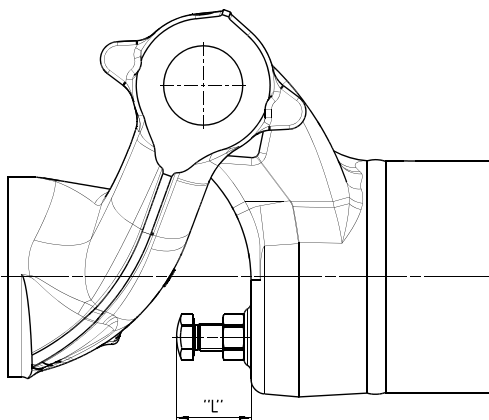
With SAF-HOLLAND self-steering axles, the steering angle is limited to 20° on account of the design. This can be reduced if required, depending on the track width and spring centre ratio. For this purpose, the adjusting screw on the steering knuckle should be screwed out according to the values in the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

For self-steering axle version(s):
B(I)LL9...

α [°]	L [mm]	α [°]	L [mm]
20	31	12	56
18	37	10	63
16	43	8	69
14	50		

B(I)L9... und SL9...

α [°]	L [mm]	α [°]	L [mm]
20	35	12	54
18	40	10	59
16	45	8	64
14	49		



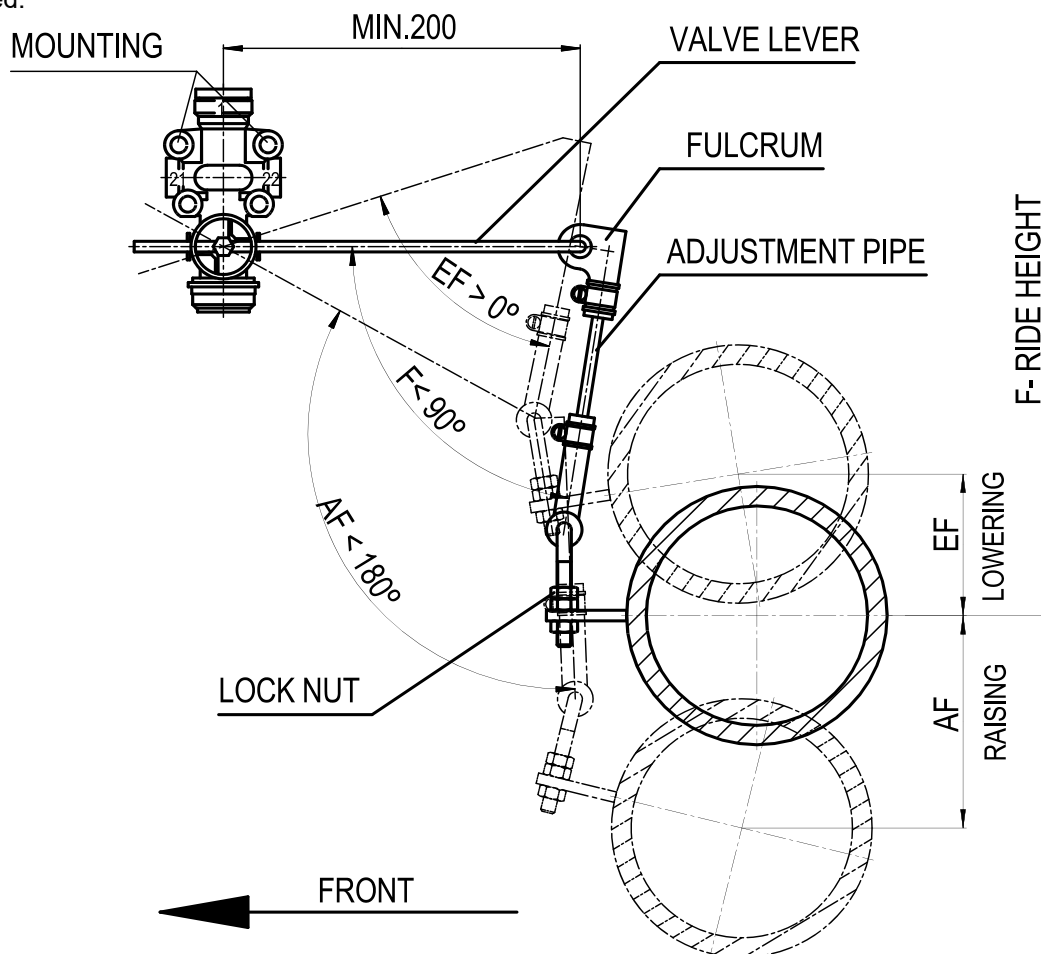
Adjustment of the air suspension ride height

Air suspension valve

As standard, SAF-HOLLAND air suspension system require only one air suspension valve. The air suspension valve controls the air spring 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 springs 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 spring 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.

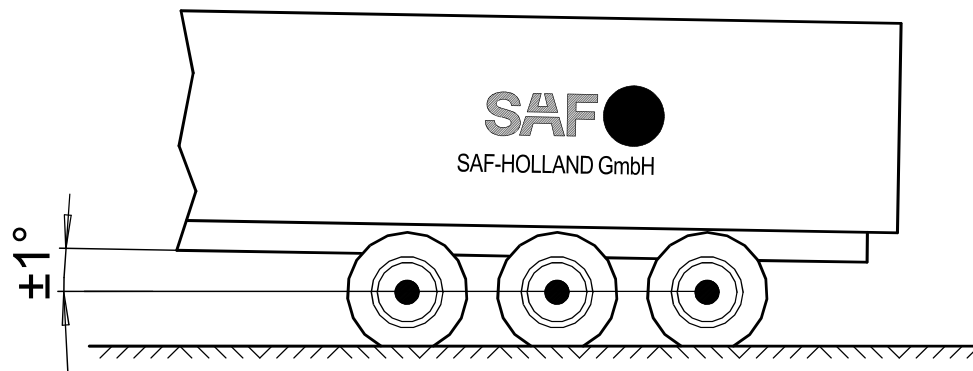
Ride heights

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 $\pm 1^\circ$ or 20 mm/m.

Axle alignment

General

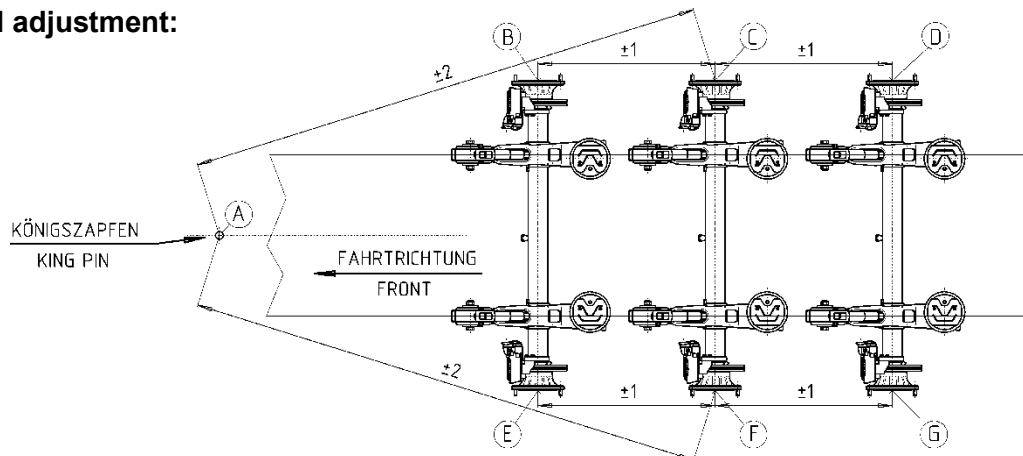
In order to compensate the production tolerances, an axle alignment and, if necessary, an adjustment should be carried out.

The maximum possible wheelbase correction per axle is ± 6 mm, [see page 39](#)

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:

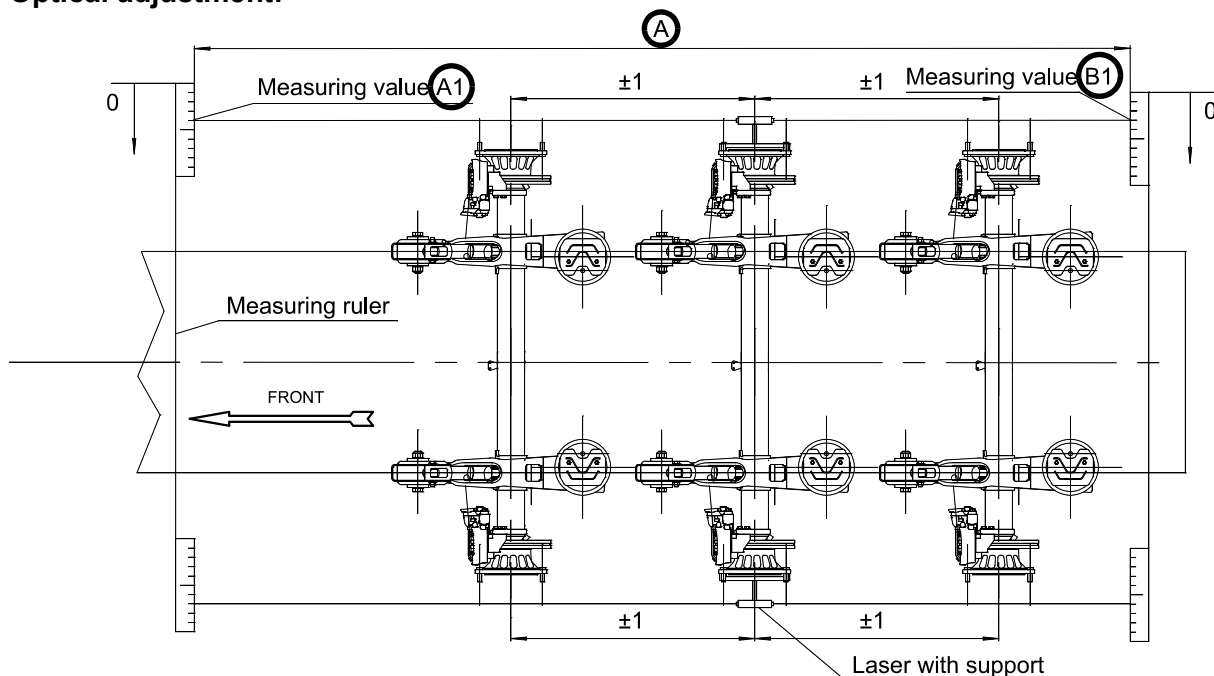


Procedure:

Determine the lengths of the diagonals **A - C** and **A - F** for the middle axle (reference axle) by comparison measurements, permitted deviation maximum 4 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, permitted deviation maximum 2 mm.

Optical adjustment:

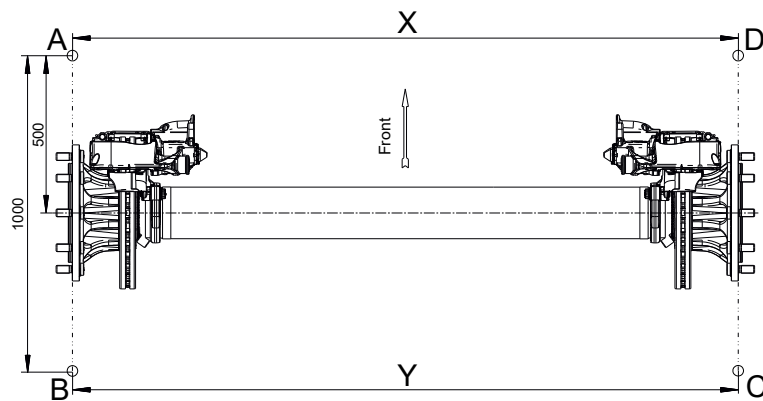


Calculation of the toe-in and toe-out values:

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

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

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

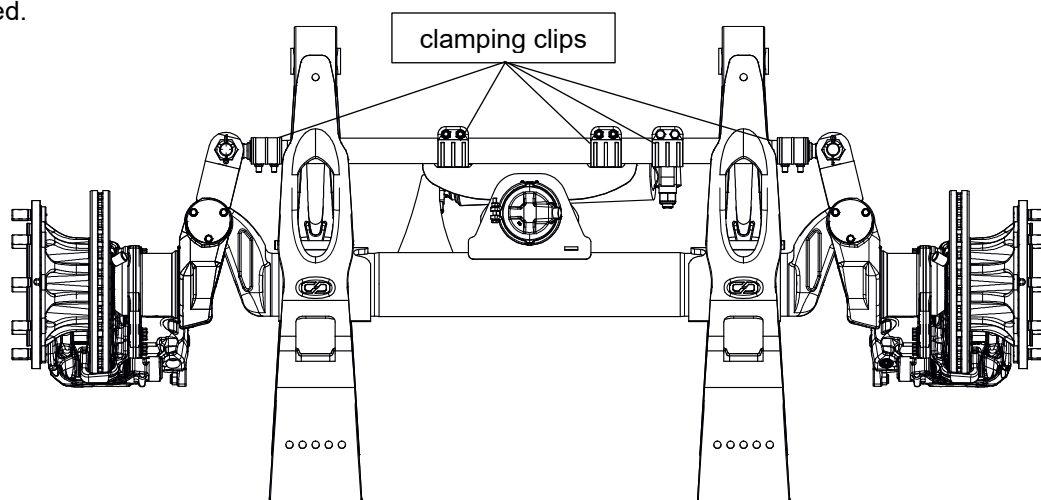
Positive toe-in/ toe-out:

Rigid axle:

Toe-in: -2 mm/m (-6,75') to +3,5 mm/m (12'), or $(-2 < (Y - X) < 3,5 \text{ [mm/m]})$

Self-steering axle:

Toe-in: +4 mm/m (14') to +7 mm/m (24'), or $(4 < (Y - X) < 7 \text{ [mm/m]})$

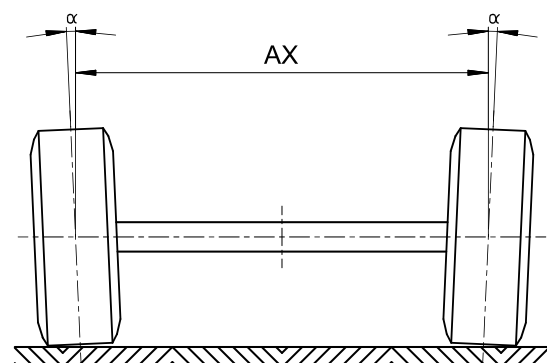
The setting is carried out by lengthening or shortening the steering tie rod. After all the clamping clips have been loosened, the required dimension is set by turning steering tie rod. The tie-rod ends are not affected.



Measuring the "straight ahead" position of the axle and if needed re-adjusting **AC – BD**, deviation max. 3 mm

Camber:

The wheel camber (α) is determined by design and cannot be adjusted. For the unloaded axle, the value is between 3,5 mm/m (12') and 0 mm/m (0').



In order to avoid tire 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:

- ✓ Wear of the pivot bush
- ✓ Deformation of the axle assembly components due to improper use.

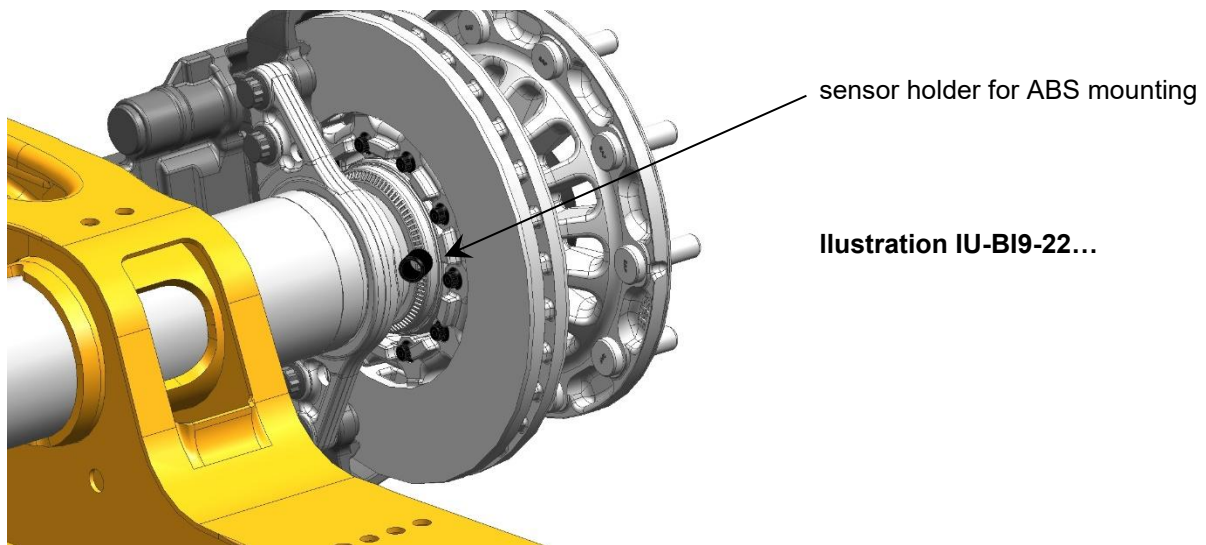
Overview of exciter ring to the different axle versions

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

Wheel fixing			Tire size	Axle version	No. of teeth
bolt pitch circle	centre bore	no. of bolts			
275	220	8	19,5"/ 22,5"	S9-3718	90
335	280	10		BI(L)9-19	
			22,5"	BI(L)9-22	
				S(L)9-4218	

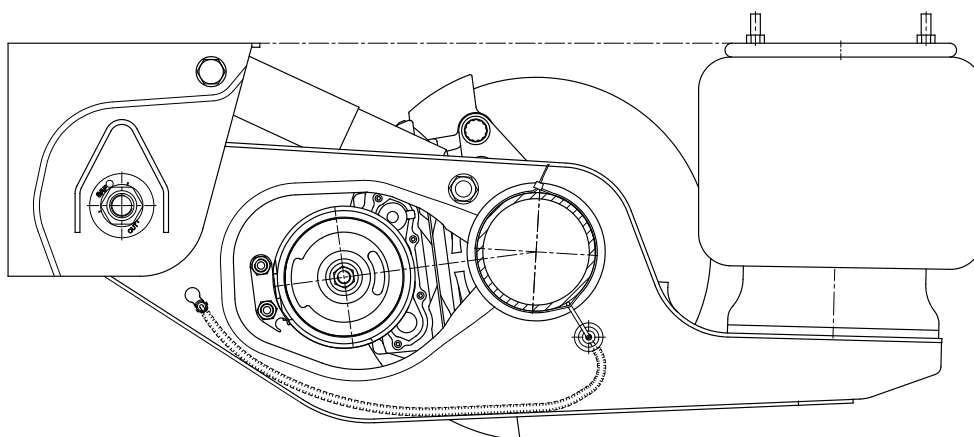
Note:

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



Installation instruction, ABS cable SAF INTRADISC *plus* *INTEGRAL*

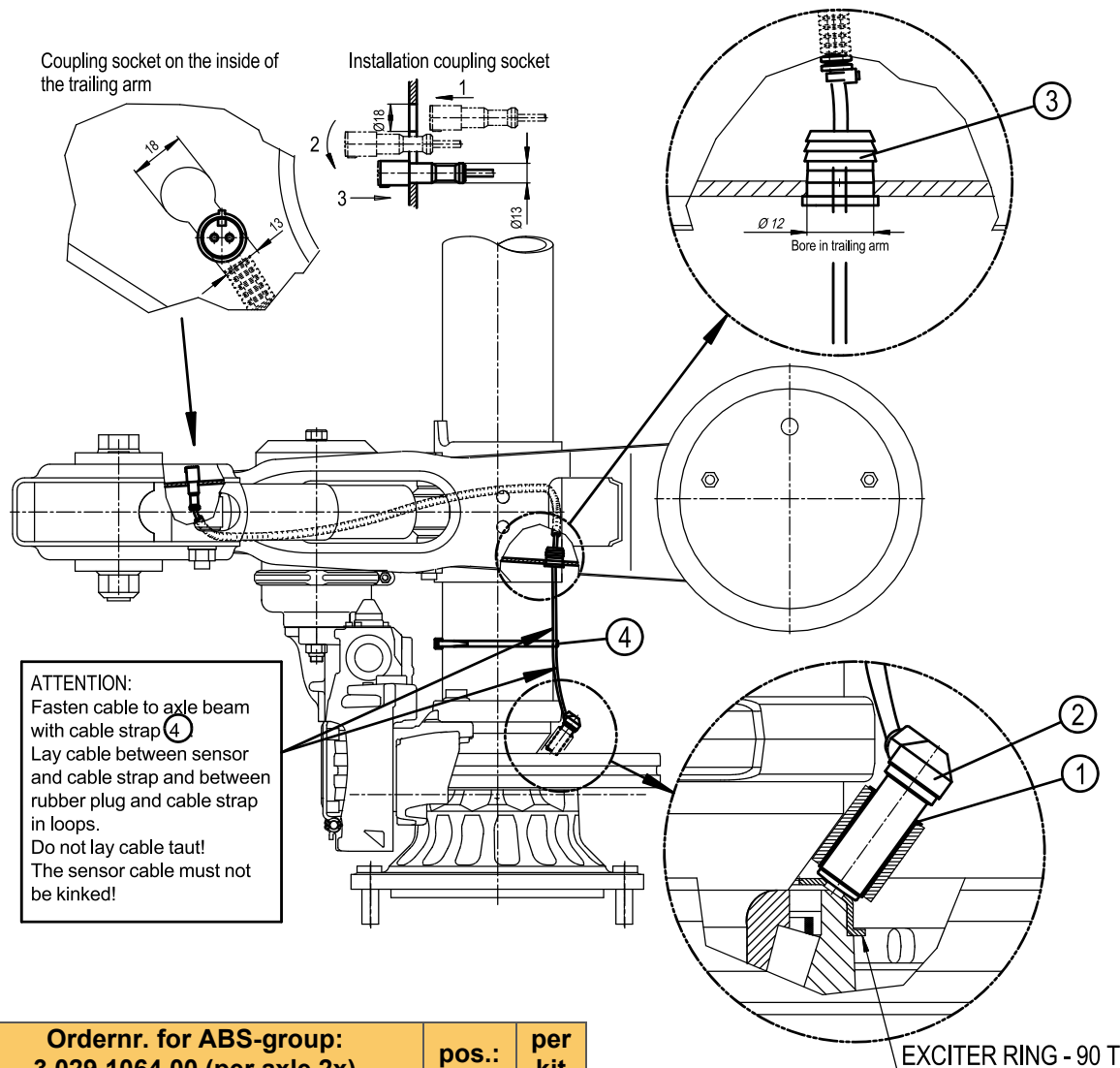
rigid axle



Plug pressed completely into Ø 22 diameter bore in trailing arm

Coupling socket on the inside of the trailing arm

Installation coupling socket



ATTENTION:
 Fasten cable to axle beam with cable strap (4)
 Lay cable between sensor and cable strap and between rubber plug and cable strap in loops.
 Do not lay cable taut!
 The sensor cable must not be kinked!

Ordernr. for ABS-group: 3 029 1064 00 (per axle 2x)		pos.:	per kit
clamping bush	4 029 1013 00	1	1x
rod sensor	4 029 1064 00	2	1x
plug	4 337 2028 00	3	1x
cable strap	4 194 2030 01	4	1x

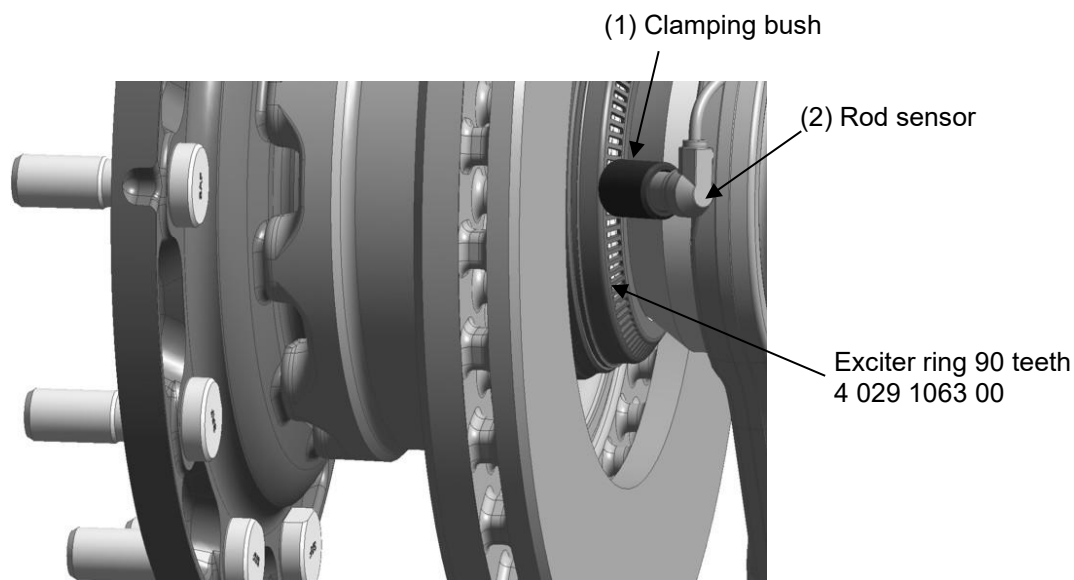
Clamping bush -part ①- pressed in completely
 Rod sensor -part ②- pressed in completely

EXCITER RING - 90 T

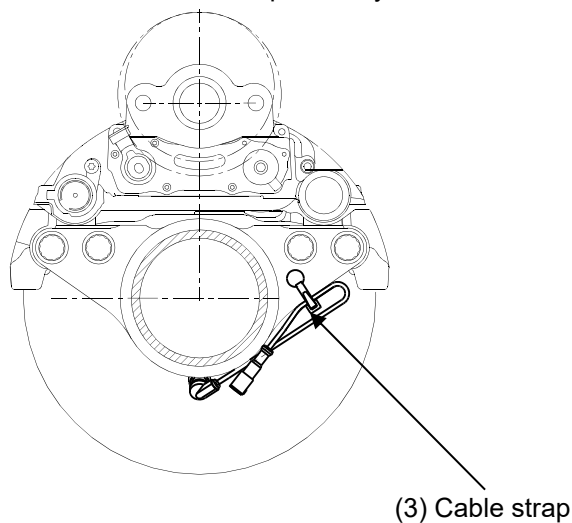
Ref.: 3 029 1064 00

Installation instruction, ABS cable SAF INTRADISC plus INTEGRAL self-steering axle

Clamping bush (1) and rod sensor (2) pressed in completely.



Position the cable with cable strap (3) on the side in the recess of the brake spider. Lay the cable between rod sensor and cable strap in loops.

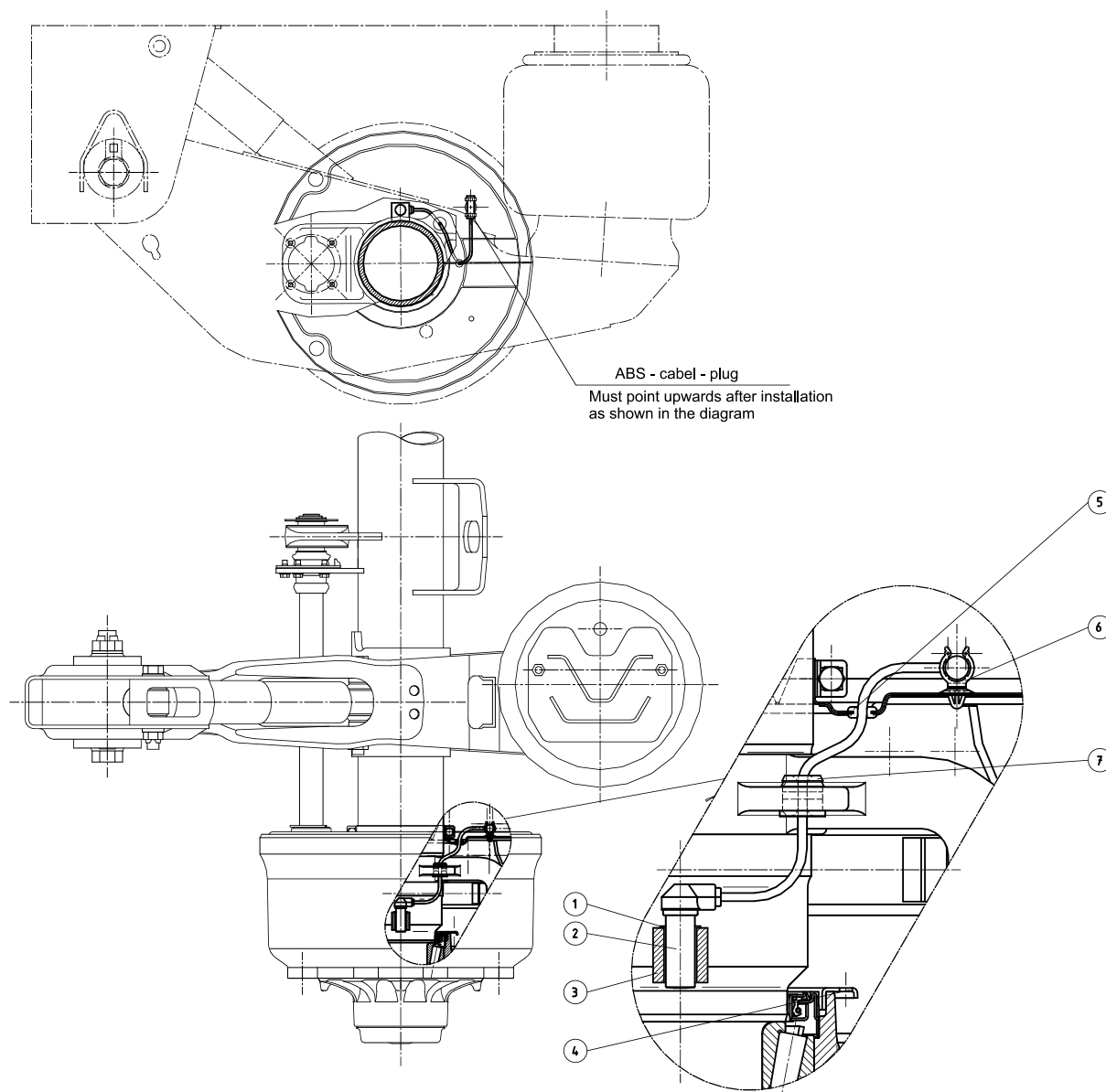


The sensor cable must not be laid taut or kinked!

Ordernr. for ABS-group: 3 029 1002 00 (per axle 2x)		pos.:	per kit
clamping bush	4 029 1013 00	1	1x
rod sensor	4 029 1002 00	2	1x
cable strap	4 194 2031 01	3	1x

Ref.: 3 029 1002 00

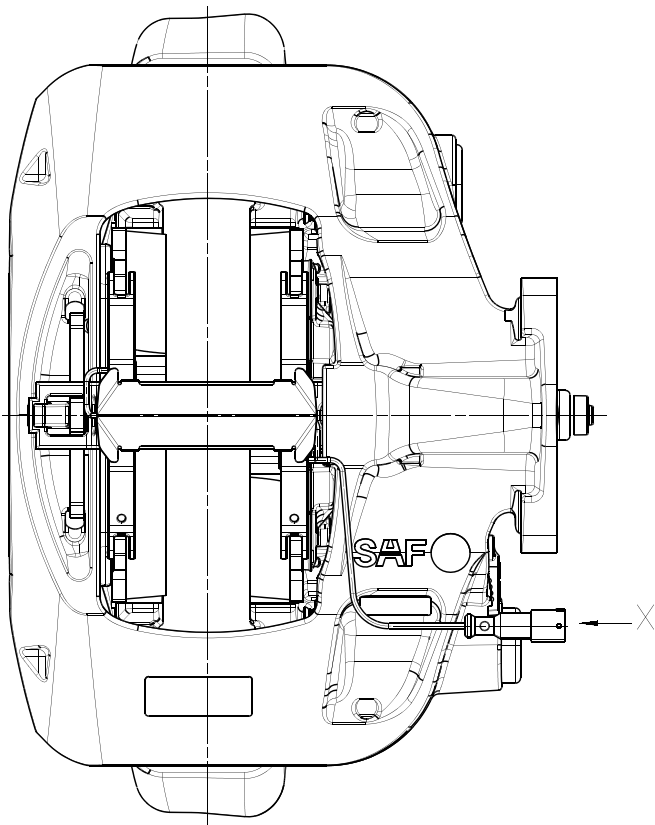
Installation instruction, ABS cable INTRADRUM



Ordernr. for ABS group: 3 029 0234 05 (per axle 2x)		po s.:	per kit
clamping bush	4 029 1013 00	1	1x
rod sensor	4 029 1002 00	2	1x
sensor adapter	-	3	-
exciter ring – 90 teeth	-	4	-
rubber grommet	4 177 3018 00	5	1x
cable clamp	4 189 0044 00	6	1x
plug	4 337 2028 00	7	1x

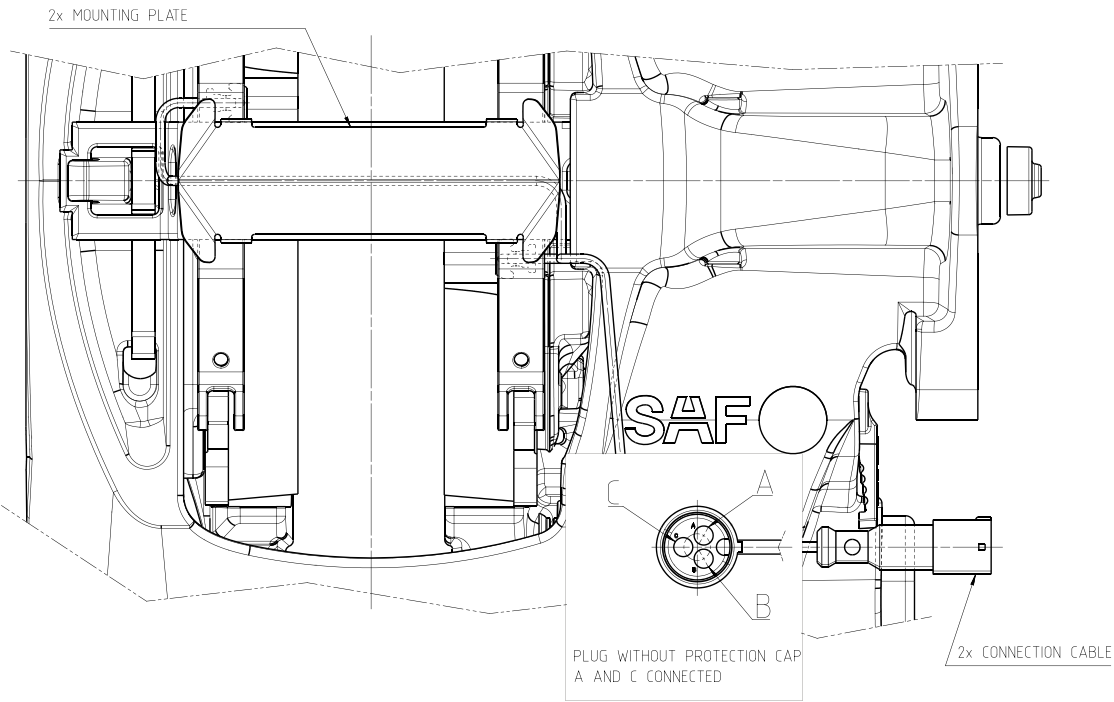
Ref.: 3 029 0002 00

Installation instruction, connecting cable kit for pad wear sensing
on SAF calliper

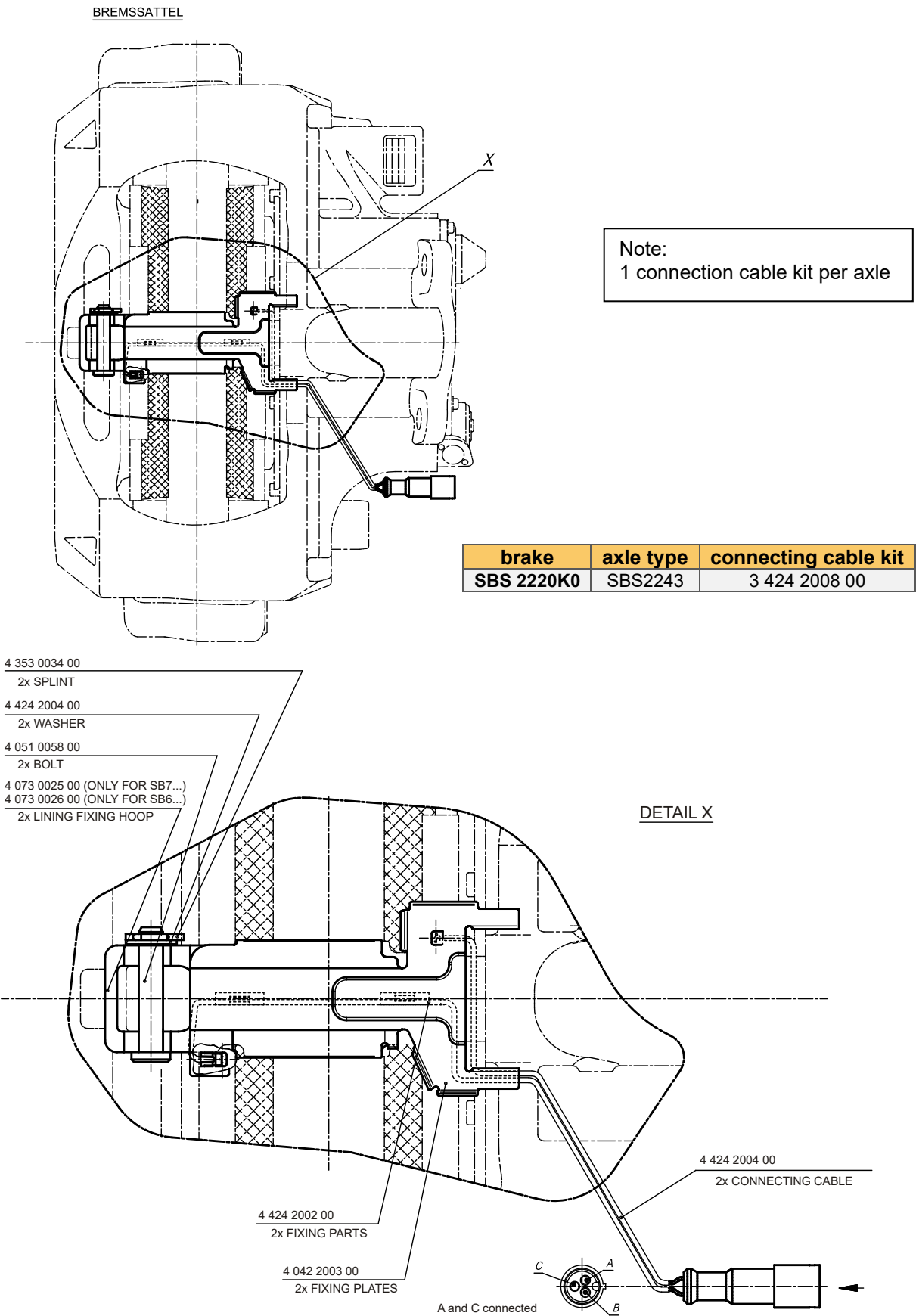


Note:
1 connection cable kit per axle

brake	axle type	connecting cable kit
SBS2220	SBS2243	3 424 2033 01
SBS1918	SBS1937	



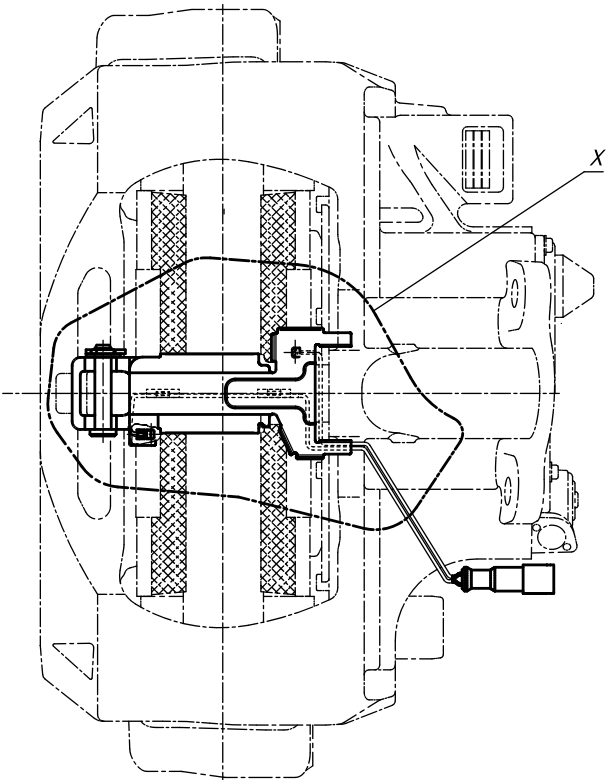
Installation instruction, connecting cable kit for pad wear sensing
on SAF calliper



Amendments and errors excepted. XL-AS10002DM-en-DE Rev I © SAF-HOLLAND

Installation instruction, connecting cable kit for pad wear sensing
on KNORR calliper

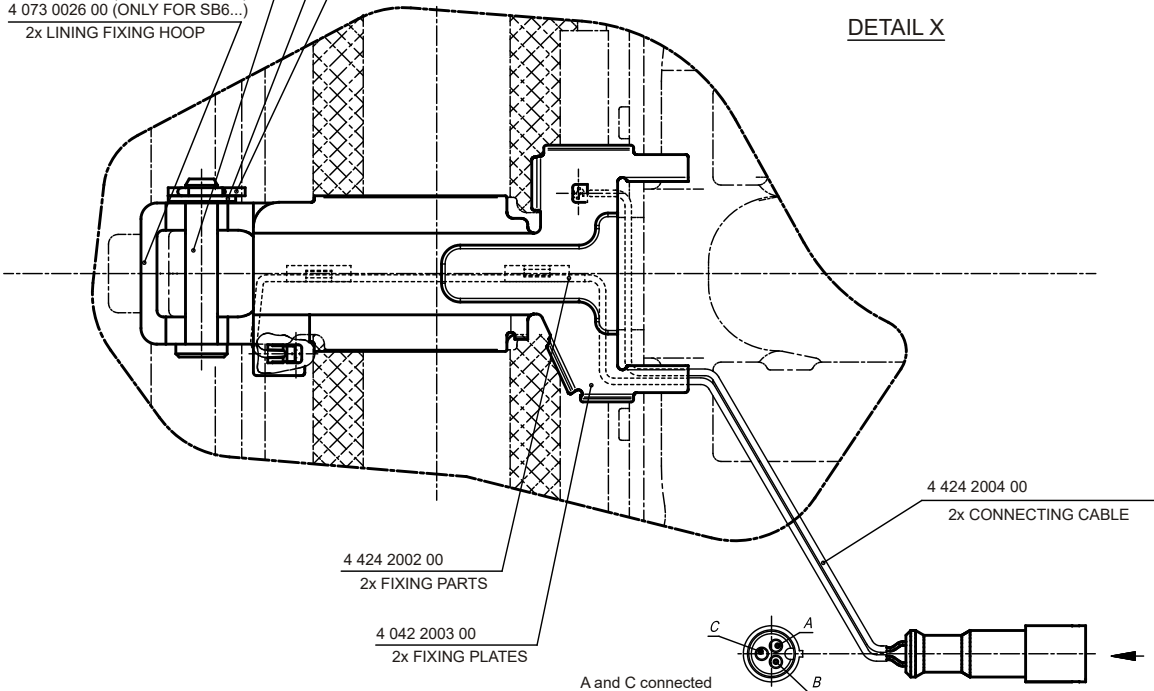
BRAKE CALIPER



Note:
1 connecting cable kit per axle

brake	axle type	connecting cable kit
SBK1937	SBK1937	3 424 2008 00

- 4 353 0034 00
2x SPLINT
- 4 424 2004 00
2x WASHER
- 4 051 0058 00
2x BOLT
- 4 073 0025 00 (ONLY FOR SB7...)
- 4 073 0026 00 (ONLY FOR SB6...)
- 2x LINING FIXING HOOP



Amendments and errors excepted. XL-AS10002DM-en-DE Rev I © SAF-HOLLAND

SAF-O-Meter

Designation:

Rolling circumference range:	SAF-O-meter orderno.:	Tire 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	275/70R22,5"
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:

Tire: 385/65R22,5" with rolling circumference (E.T.R.T.O Norm): 3248 mm

This rolling circumference fits best to the range 3185 - 3315 mm so:

- SAF-O-Meter 4 388 0325 01
- Hub cap 4 304 0103 02.

Installation

Please check before fitting whether you have received the right SAF-O-meter suitable to your tire size



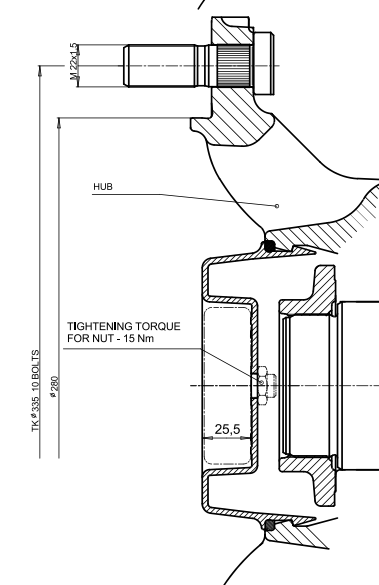
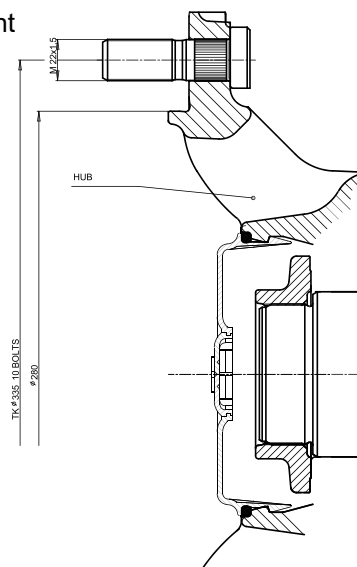
standard hub cap
4 304 0152 00



hub cap for SAF-O-meter
4 304 0103 02

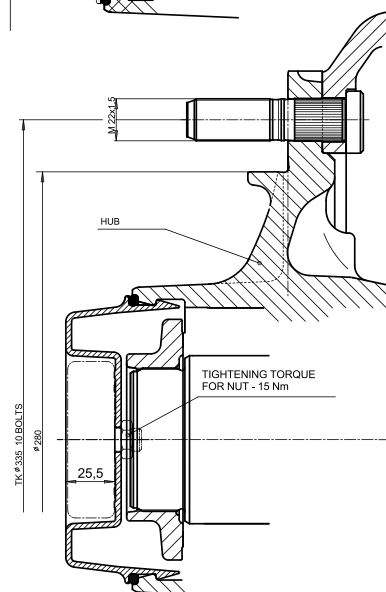
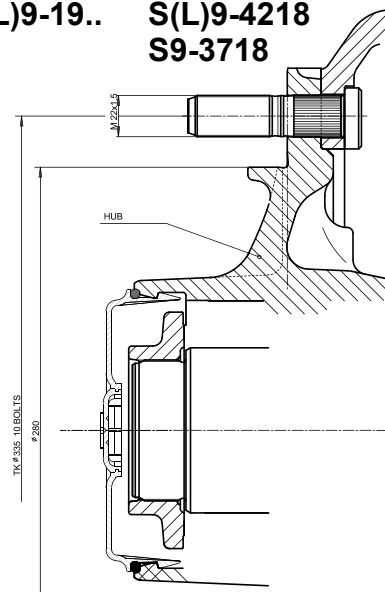
axle versions:

B(I)(L/LL)9-22.. and B(I)(L/LL)9-19..



axle versions:

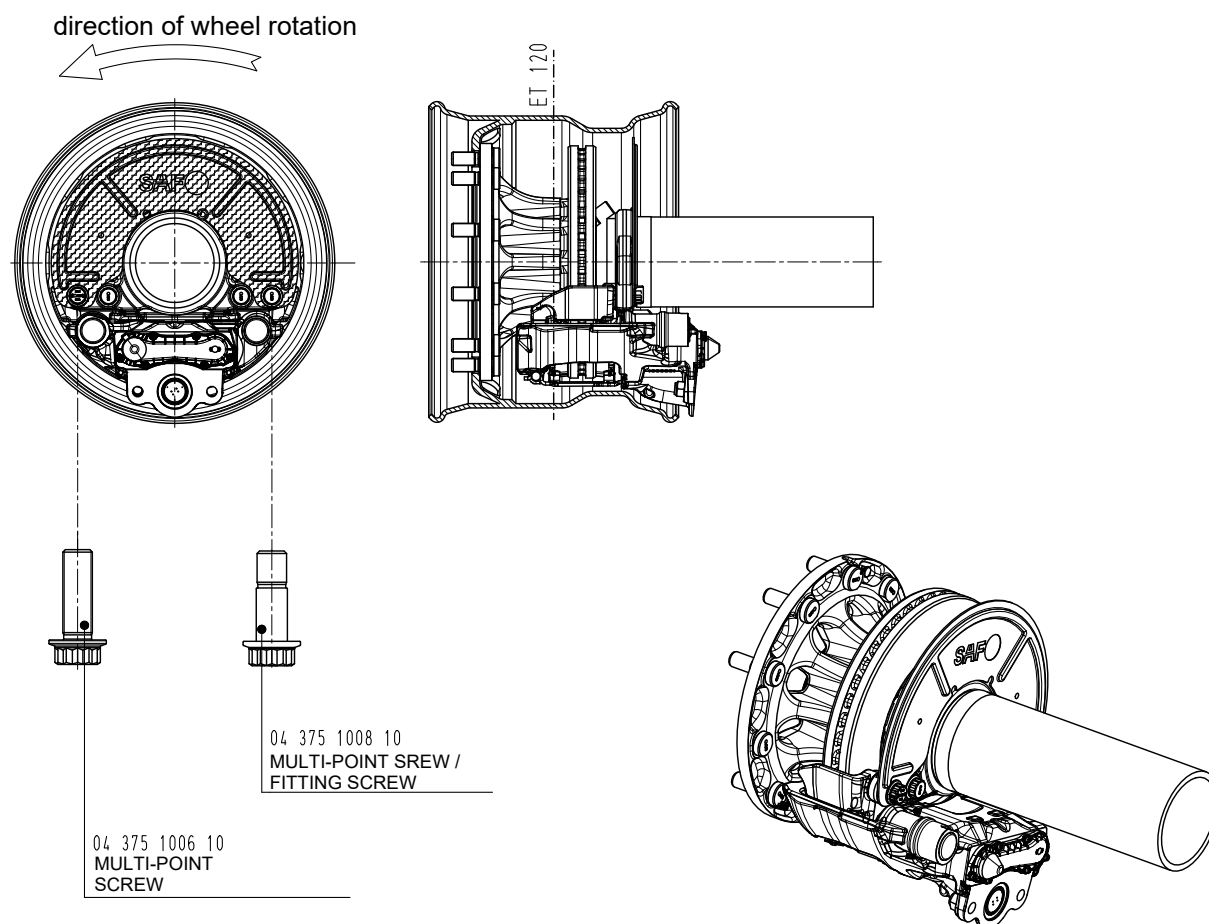
**S(L)9-4218
S9-3718**



The sketches show, irrelevant of the axle versions, 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

Installation instruction cover Plate

Axle version	Cover plate assembly
B(I)9-19	3 005 0283 00
B(I)9-22	3 005 0284 00



Torque:

1. Pre-tightening
 $M_A = 120 \text{ Nm}$ (Thread free of oil and grease)
2. Final tightening
 $M_A = 450 \pm 30 \text{ Nm}$
 bzw.
 $M_A = 120 \text{ Nm} + 60^\circ$

SAF TIRE PILOT I.Q.:

The SAF TIRE PILOT I.Q. continuously monitors the tire pressure of all tires mounted on the trailer. If necessary, the system automatically inflates the tires to the preset pressure.

The SAF TIRE PILOT I.Q. communicates with the towing vehicle via CAN and TEBS. In the event of a malfunction, a warning message can be sent to the driver on the dashboard.

Basic Kits:

kit-numbers	naming
3 001 0271 02	Trailer Basic Kit - HALDEX
3 001 0301 02*	Trailer Basic Kit – ZF-Wabco
3 001 0302 02*	Trailer Basic Kit - KNORR



Complies with the requirements of EU Regulation 2019/2144 and ECE R 141

*in trailer basic kit for Wabco or Knorr, an adapter cable is in scope of delivery.

Attention: For the connection between EBS and TIRE PILOT I.Q. Box an EBS-connection cable must be acquired from the EBS-manufacturer.

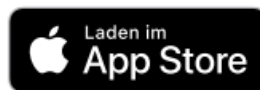
[See operating manual](#)

axle kits for the specific axle type:

kit-numbers	Axle type
3 001 0300 00	B/BI (ET120)
3 001 0308 00	B/BI (ET120) - CD
3 001 0259 00	S (ET0)
3 001 0310 00	S (ET0) - CD
3 001 0306 00	BLL/BILL (ET120)
3 001 0305 00	BL/BIL (ET120)
3 001 0309 00	BL/BIL (ET120) - CD



In addition to the warning message on the dashboard in the driver's cabin, the SAF TIRE PILOT I.Q.



Note:

The illustration is for example purposes only!

Refere to the document for installation and assembly instructions.

Recommendation for the technical requirement on the SAF INTRA CD TRAK

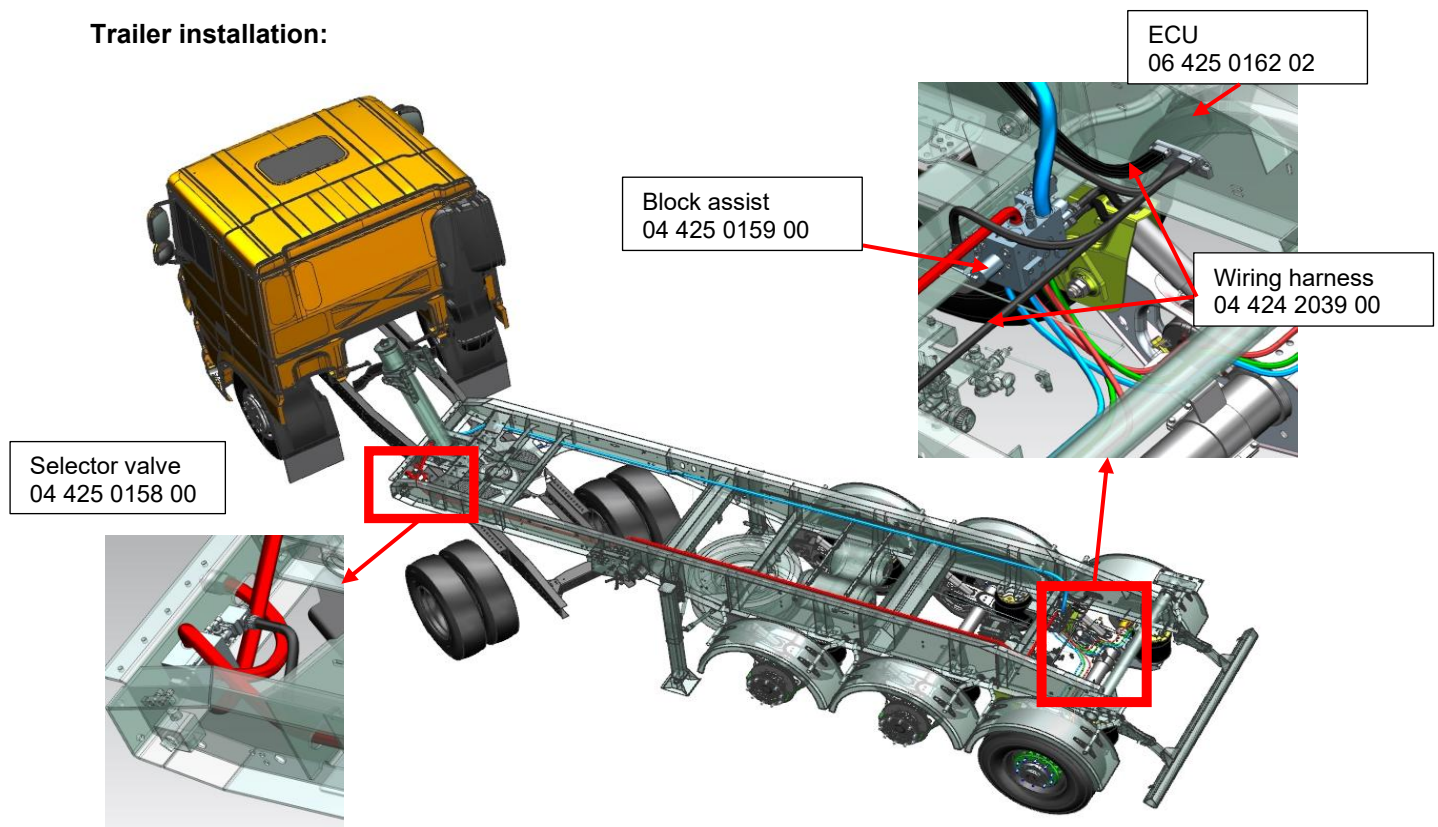
The driven axle [SAF INTRA CD TRAK](#) is optimised for trailers in the 9t standard range – both on-road and off-road. Specially developed for tippers operating in the area of construction sites or landfills, the drive axle supports the tractor unit on inclines and difficult terrain with its integrated additional drive. The additional drive is gained from the hydraulic installation which is used for the tipping cylinder or walking floor at the trailer.

The SAF TRAK control is designed for the use of the SAF INTRA CD 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 equipped 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 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

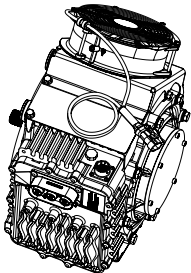
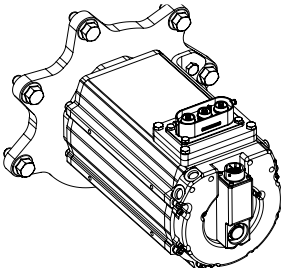
The axle is supplied including mounted and checked hydraulic pumps. The integration of the Intra suspension in the trailer is the same as current standard.

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 cylinder of the walking floor unit, the block assist should be installed close to the driven axle.

Be aware of the installation guide: [XL-PS40050BM-de-DE Rev C.pdf \(safholland.com\)](#)

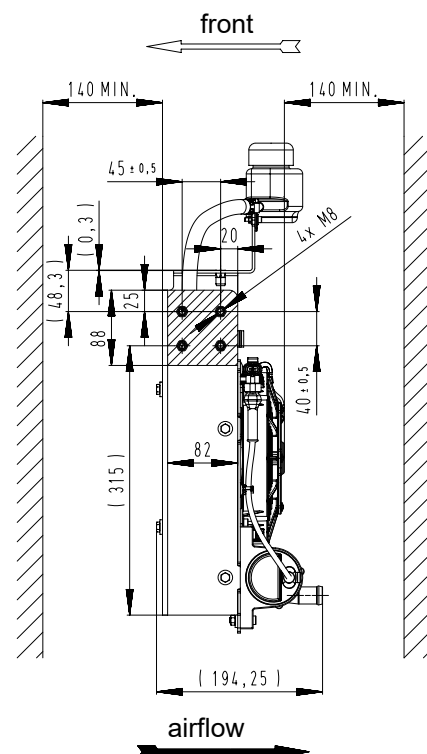
The additional weight of the SAF INTRA CD TRAK axle is about 118 kg. The weight for the controls (wiring harness, block assist, selector valve) is about 31 kg.

During braking, or overrun phases, the central mounted high-voltage generator unit of the [SAF TRAKr](#) converts the vehicle's kinetic energy into electrical energy. This energy is either stored in a lithium-ion battery in conjunction with the electric CARRIER/ADDVOLT system or used directly while driving to power auxiliary consumers on the trailer, such as cooler, silo, moving floor, lifting platform or transportable e-forklift. The preferred application for the SAF TRAKr is in the cooler trailers, where the cooler unit can be operated electrically.

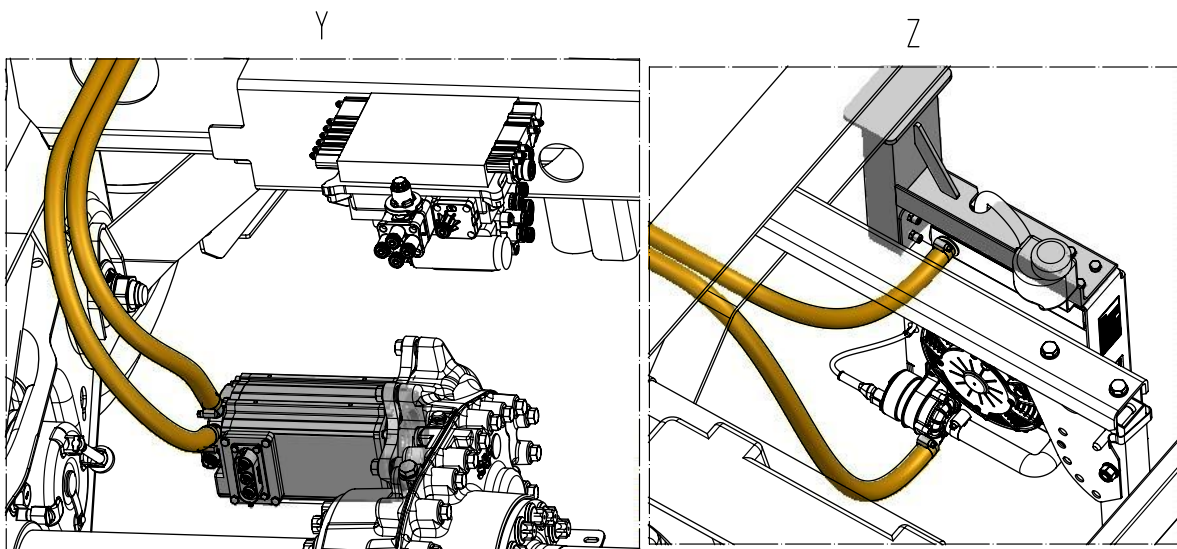
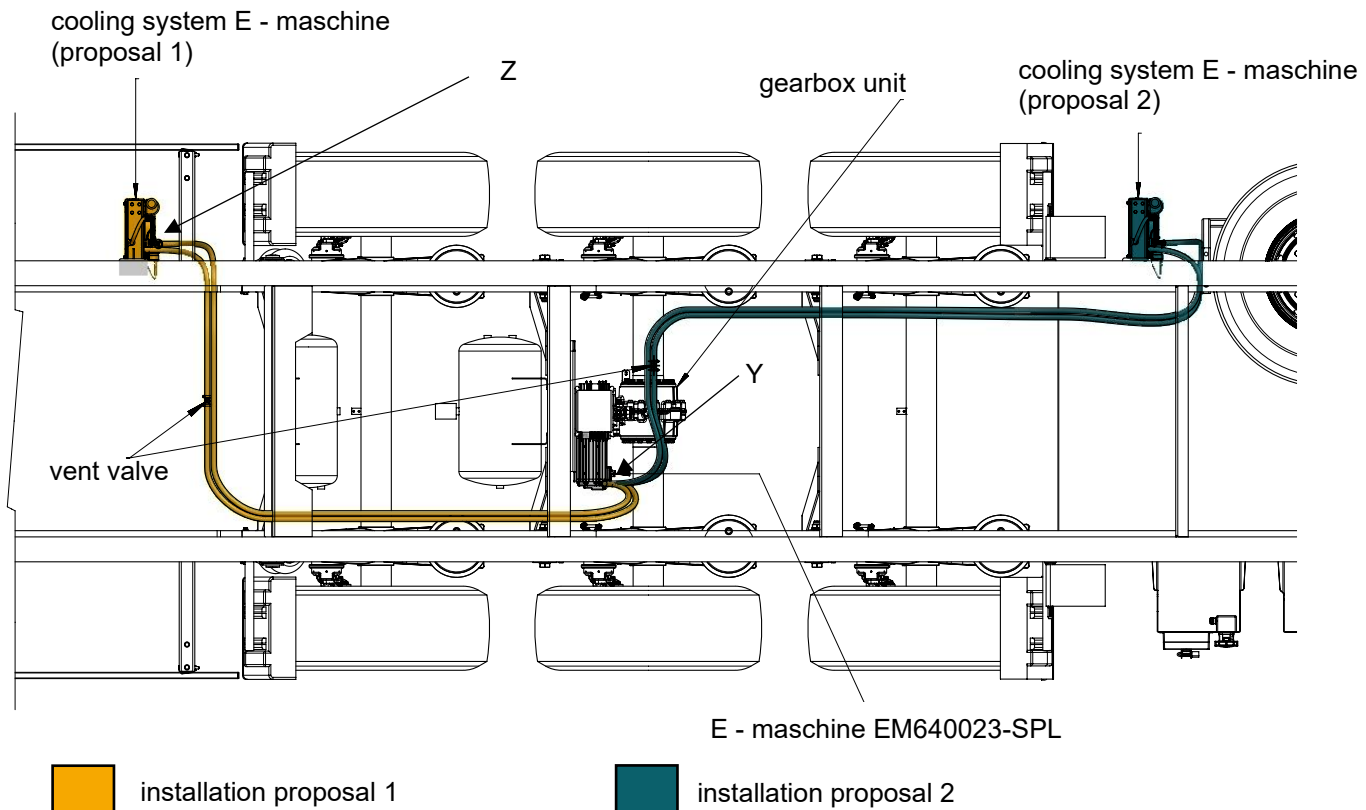
technical data	
gearbox	1 – speed with differential gear ratio $i=1:14$
E-machine	
air-cooled 	liquid-cooled 
air-cooled reluctance machine	liquid-cooled permanent magnet machine
motor power (technical): 17,0 kW continuous power 32,0 kW peak power	motor power (technical): 23,8 kW continuous power 33,1 kW peak power
usable system power: 16,0 kW continuous power* 20,0 kW peak power*	usable system power: 16,0 kW continuous power 20,0 kW peak power
*at 20°C ambient temperature	

Installation proposal for the liquid-cooled cooling unit of the SAF TRAKr system

- The brackets for the cooling unit are **not included in the scope of delivery** and must be provided by the vehicle manufacturer.
- The installation orientation relative to the direction of travel must be observed.
- Installation space shown on the right must be maintained.
- The max. hose length is 2 x 4 m.
- If the hoses or the electric machine protrude the upper edge of the cooling unit, the vent valve must be positioned at the highest point of the return hose.
- The cooling unit must be mounted to a bracket on the vehicle frame using all eight mounting points. The use of all mounting points is mandatory.
- Required hole diameter in the bracket: $\varnothing 9\text{mm} \pm 0,5\text{ mm}$.
- All bolted connections must be secured using Loctite 243 or an equivalent thread-lock product.
- Recommended screw M8x1,25
- **Tightening torque 16 Nm** (when using Loctite 243)
- The contact area of the cooling unit on each side (88 mm x 80 mm) must have full surface contact with the mounting bracket.



The solutions shown are for reference purposes only. Adequate accessibility for maintenance and service work must be ensured. The vehicle manufacturer is free to choose the installation location, provided that all technical requirements specified in the installation instructions are met.



If hose* or the E – machine extend above the top edge of the cooling system, the vent valve* must be installed at the highest point of the return hose.

*included in the scope of delivery

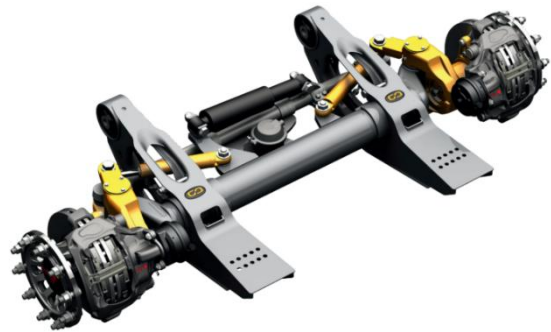
see the installation guide on: [SAF TRAKr mit E-Maschine EM640023-SPL](#)

The total additional weight of the SAF INTRA TRAKr axle, including the generator, is +160 kg.

Self-steering axle with Smart Steering Control

The functionality of a self-steering axle, which reduces tire wear and decreases the turning radius compared to rigid axles, is significantly enhanced by the Smart Steering Control system.

The axle is for the most part pre-prepared at the factory for the additional steering system. This system provides active steering assistance at low speeds (up to 25 km/h), both when driving forward and in reverse.



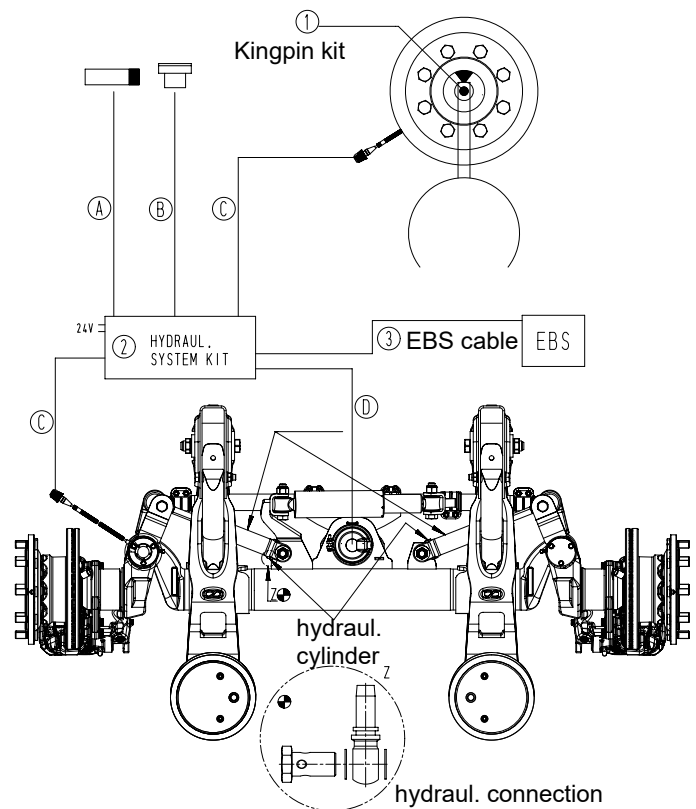
Steering system

The self-steering SAF INTRA Smart Steering Control axle basically operates like a conventional self-steering axle. At low vehicle speeds, the additional steering system determines the required wheel steering angle based on the articulation angle between the tractor unit and the trailer. This ensures optimum vehicle maneuverability during both forward and reverse driving.

The direction of travel is detected via the reverse light signal. In the event of a malfunction or inactivity of the steering system, the self-steering axle is automatically locked while reversing.

Components of the steering system

- Pre-assembled sensor kingpin.
Available for various trailer skidplate thicknesses.
- | skidplate thickness | Kingpin |
|---------------------|------------------|
| t = 8 mm | 1030 30 000079 0 |
| t = 10 mm | 1030 30 000080 0 |
| t = 12 mm | 1030 30 000081 0 |
- systemkit
 - Connection cable to the EBS system. An EBS connection cable must be obtained from the EBS manufacturer for the connection between the EBS and the system box. For Haldex EBS, cable 844521010 is available.
 - Wiring kit
 - A – cable for reverse light
 - B – cable for indicator light
 - C – connection cable sensor
 - D – connection cable for reversing lock



The system also includes an axle-mounted angle sensor and two hydraulic cylinders.

Hydraulic hoses

Hydraulic hoses and fittings must be provided by the vehicle manufacturer according to the specific installation position of the system box within the vehicle frame. Compact fittings are required for the connection of the hoses to the steering cylinder. An example is shown in detail Z.

Commissioning

The complete system, including all hoses and hydraulic lines, must be filled and bled. The use of a vacuum filling kit is recommended. Always use LHM Plus oil.