




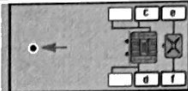






WABCO START-UP LOG

System	Trailer EBS-E	WABCO part number	480 102 063 0
Production date	2022-01-10	Serial number	896046203800C
Serial number (modulator)	000000658202		
Fingerprint Customer EOL / Customer Development / Flash Program	W041899 / 2022-03-23 ; 00000000 / 0000-00-00 ; 00000000 / 0000-00-00		

WABCO

TRAILER EBS-E

GGVS/ADR TUEH TB 2007 - 019.00

HERSTELLER MANUFACTURER CONSTRUCTEUR		KAESSBOHRER								GIO		Pin1		Pin3		Pin4	
TYP TYPE TYPE		LB3E								1		---		---		---	
VEHICLE IDENT. NUMBER CHASSIS NUMBER NUMERO DE CHASSIS		WKVDAS00300116227								2		ILS1		---		---	
BREMSBERECHNUNGS-NR. BRAKE CALCULATION NO. CALCUL. DE FREINAGE NO.		51638S								3		---		---		---	
POLRADZÄHREZAHL c-d e-f POLE WHEEL TEETH c-d e-f DENTS ROUE DENTEE c-d e-f		80		80		ABS-System ABS-System Système ABS		4S/3M		4		---		---		---	
RSS RSS RSS		Einfachbereifung Single Tire Monte simple				Leertachse Steering axle Essieu vivot				5		---		---		---	
		Zwillingsbereifung Twin Tire Monte jumelle		X		Kuppeltrachse Fahrzeug Critical Trailer Vehicule critique				6		---		---		---	
Subsystems		---		I/O						7		---		---		---	
												---					
ACHSE AXLE ESSIEU		pm (bar)		6.5		pm (bar)		0.7		2.0		---		6.5		 (bar)	
												pz				TR (daN)	
1		3000		1.0		2.9		10000		4.2		0.4		1.5		610	
2		3000		1.0		2.9		10000		4.2		0.4		1.5		4417	
3		3000		1.0		2.9		10000		4.2		0.4		1.5		4417	
4		0		---		---		0		---		---		---		---	
5		0		---		---		0		---		---		---		---	



START-UP LOG

Vehicle ident. no

WKVDAS00300116227

Configuration of the lifting axle valves

Lifting axle 1

LACV

Lifting axle 2

LACV

Braking pressures

Predominance CAN

0.0

Predominance pm

0.0

Distance Axles / Track width

Track width

1.95

Coupling head - First axle

9.1

First axle - Second axle

2.2

Second axle - Additional axle

1.3

Additional axle - Fourth axle

Fourth axle - Fifth axle

Diverse

- X Warning lamp goes out after 2 seconds (ECE-R13)
- Warning lamp goes out at $v > 7$ km/h

Tire circumference

Tire circumference Axle c-d

2400

Tire circumference Axle e-f

2400

CAN messages

- X EBS23 Standard
 - EBS23 group bit
 - EBS22 no output of total axle load
 - RGE22 no output for single axle loads
 - Support 12 V CAN Bus
- Indicate service moment via lamp
- Service interval (km) 0

TEBS function selection

Standard functions

- Speed switch1 (ISS1)
- Speed switch2 (ISS2)
- X Lifting axle control1 (ILS1)
- Lifting axle control2 (ILS2)
- External axle load sensor e-f (ALS2)
- X Traction help (TH)
- Lifting axle forced lowering (FL)
- Wear final value (LWI)
- Diagnosis / Telematic system GIO5 (DIAG)
- Road finisher brake/ Trailer extending control (FB)
- Stop light supply (24N)
- Unloading level (D-SW)
- Normal level 4 (FN4-SW)

Special functions

- Traction help with res. press. maint. (TH+)
- OptiTurn / OptiLoad (MH)
- OptiTurn / OptiLoad plus (MH+)
- External axle load sensor c-d (ALS1)
- Second ext. axle load sensor c-d (S-ALS1)
- External demand pressure sensor (DPS)
- ABS active signal (RSS-O)
- RSS active signal (RSS-O)
- Speed signal (V-S)
- Steady positive voltage 1 (24 V-O1)
- Steady positive voltage 2 (24 V-O2)
- Tilt alert (Tilt warning) (TW)
- Steering axle lock (SAC)

- X Demand pressure sensor on R/R (DPS-RR)
- Output emergency brake light (EBA)
- Trailer Safety Brake (TSB)
- Generic Operating Hour Counter (GOHC)
- ELM (ELM)
- External ECAS (eECAS)
- Bounce Control (relaxation function) (TR-SW)
- Brake release function (BR-SW)
- Lifting/Lowering button (LF-SW/LW-SW)
- Normal level button (NL-SW)
- Shut-off switch Level control (LC-SW)
- Freely configurable digital function (FKD-I)
 - with output (FKD-O)
- Freely configurable analogue function (FKA-I)
 - with output (FKA-O)
- Freely configurable function 1 (FCF1)
- Freely configurable function 2 (FCF2)
- Immobilizer (IM)
 - Output for buzzer (IM-SU)
- Forklift operation (FLC)

Subsystems

- IVTM (IVTM)
- Remote control unit (RCU)
- Control box (RCB)
- SmartBoard (SB)
- Telematic system (TS)
- Electronic Extension Module (ELEX)

WABCO

START-UP LOG

Vehicle ident. no.

WKVDAS00300116227

ISS	On (km/h)	Off (km/h)	Level inverted	RTR Pulse	Cable break detection	Light	Valve
ISS 1	15	10	-	X	-	-	X
ISS 2	15	10	-	X	-	-	X

Automatic lifting axle control

	Lift (Bar)	Lower (Bar)	Lift (km/h)	Lifting axle function (OptiTurn/OptiLoad) interrupted with parking brake engaged	
Lifting axle 1	2.5	4.2	7	Lower with ignition off	-
Lifting axle 2	0.0			Tag axle residual pressure regulation	0.5
				Residual pressure Tag axle (bar)	

Lifting axle control with OptiLoad or Forklift recognition

Raise lifting axle 1 (bar)	0.0	Raise lifting axle 2 (bar)	0.0	X	Mechanical switch
Lower lifting axle 1 (bar)	0.0	Lower lifting axle 2 (bar)	0.0	-	Proximity switch

Forced lowering lifting axle

X	Button	-	Switch	-	Activation via SmartBoard	-	Only 2nd lifting axle
				X	All lifting axles		

Automatic wheelbase control Switch level detection

- +24 V only	-	Ground only	X	Ground and +24 V
- Continuous actuation				

Traction help

Traction help	-	Traction help automatically with curve detection		-	Only partial/full load
	-	Traction help with ignition on			
		Terminate at (km/h)	Pressure limitation (bar)		Duration (s)
Traction help		30	5.4		0
- Off-road traction help		0	0.0		0
Activation	-	Button	X	Button and brake	- Only brake

OptiTurn

- Underspeed	-	Curve detection with partial/full load	Terminate at (km/h)	30
- Curve detection	-	Via SmartBoard	Pressure limitation (bar)	0.0

OptiLoad

Start (km/h)	0	Activate with	Automatic at speed
Pressure limitation (bar)	0.0		- Only at partial/full load
2nd lifting axle characteristic	-		- Manually with button

Level control

Level control		20	-	Dead-man switch (continuous button actuation)		
Speed at which adjustment to normal level is triggered automatically (RTR)						
	-	Normal level 2	-	Normal level 3	Normal level 4/unloading level	
Front axle	0		0		0	
Rear axle	0		0		0	
Speed on (km/h)			60			
Speed off (km/h)			40		10	
Activation via	-	Smartboard	-	Remote control unit	-	Smartboard
- Separate lifting/lowering left/right via remote control unit						
- Level control shut-off via SmartBoard						
Unloading level switch	X	Mechanical	-	Proximity switch	-	Proximity switch with separate switch

Vehicle ident. no.

WKVDAS00300116227

ECAS special parameter

Control delay

Control delay when stationary (s)

Control delay when driving (s)

Control delay at stand-by (s)

Stop time for normal level control with lift/lower button (s)

1

60

15

2.0

Tolerances

Tolerance front axle (mm)

Tolerance rear axle (mm)

Permissible right/left deviation rear axle (mm)

Maximum deviation right/left or front/rear outside the levels during the lifting/lowering process (s)

10

10

10

50

Lowering

Lower onto buffer

Lower to lower calibrated level

X

-

Lifting axle offset

Lifting axle offset

Reference of normal level

To the lowest normal level

To the currently selected normal level

Normal level height increase when lifting axle is raised (mm)

Normal level height increase with traction help/OptiTurn/OptiLoad (mm)

-

X

0

0

Stand-by operation

Trailer battery installed

Activation of stand-by mode

X By pressing Stop button

- Automatically with ignition off

Tolerance in Stand-by (mm)

Stand-by time (h/min)

20

0/01

ECAS with eTASC / Rotary slide valve

After ignition, actual level is the same as nominal level

No level control when stationary

Manual lifting / lowering (eTASC)

-

-

-

Plausibility

Limit plausibility check during the lowering process at the front axle (mm)

Limit plausibility check during the lowering process at the rear axle (mm)

Period plausibility check (s)

20

20

30

Other functions

Pre-deflection compensation (25 mm when fully laden)

X

Green ECAS warning lamp

Installed - as LED

Behaviour upon faults

Flashes 4 times after ignition on

Flashes permanently

-

-

X

Front (mm)

Rear (mm)

Normal level control with reduction in bellows pressure differences (only ECAS 2-point control)

Permissible bellows pressure

Vehicle speed up to which manual height changes are permitted (km/h)

15

15

-

12.0

10

Immobilizer

Buzzer output

Connected Components

Emergency release function

Unlock only with engaged parking brake

X permanent

X Valve (buzzer)

- periodic

- Light

-

X

Proximity switch

Switching threshold (uA)

600

Steering axle lock

as of speed

Level inverted

with raised lifting axle

30

-

X

After reverse driving, disable up to speed (km/h)

Activation via switch

Reverse detection via Electronic Extension Module

10

-

X



START-UP LOG

Vehicle ident. no.

WKVDAS00300116227

Road finisher brake / Trailer Extending Control

- | | | |
|---|------------------------------|-----|
| - Without automatic load-dependent braking pressure (LSV) | Pressure test pm (bar) | 1.5 |
| - Pressure adjustment with hand brake lever | Function active until (km/h) | 10 |
| - Actuation only via SmartBoard (no switch required) | | |

Switch

- X Mechanical switch
- Proximity switch
- Proximity switch and separate switch

Level recognition

- X Ground only
- +24 V only (with resistance cable)

- Road finisher brake, Deactivation unloading level during road finisher operation
- Trailer Extending Control, only brake rear aggregate

Trailer Safety Brake

- | | | | |
|------------------------------|------------------|-------------------------------------|---|
| - Tank truck/Container truck | X Tipper | - User-defined | - Function can be deactivated with SmartBoard or Trailer Remote Control |
| Input signal | Proximity switch | Pressure threshold | 3.0 |
| Warning brake from | 18 | Braking from | 28 |
| | | - Display via separate warning lamp | |

Emergency brake light output

- | | | |
|-----------------------|---|--------------------|
| - Actuation permanent | X | Actuation periodic |
| - LED installed | 3 | Frequency (Hz) |

Bounce Control

- Activation only via SmartBoard (no push-button required)

Brake release function

- Activation only via SmartBoard
- For wood hauling trailers up to 5 km/h

Freely configurable digital function (GIO-FKD)

- Function name
- Input
- If switch
- | | | |
|----------|----|--------------|
| - opens | X | greater than |
| X closes | - | less than |
| | 15 | km/h |
- Function after (s)
- 180
- Switch output
 - Invert output
 - Save event
- Connected component
- | | | |
|---------|---|-------|
| X Valve | - | Light |
|---------|---|-------|
- Duration of function for (s)
- 180
- or until speed
- | | | |
|----|------|---------------|
| 30 | km/h | X exceeds |
| | | - drops below |

Freely configurable analogue function (GIO-FKA)

- Function name
- Input
- When input voltage
- | | | | |
|---------------|-----|------|--------------|
| Voltage | 3.5 | X | greater than |
| X exceeds | - | - | less than |
| - drops below | 15 | km/h | |
- Function after (s)
- 180
- Switch output
 - Invert output
 - Save event
- Connected component
- | | | |
|---------|---|-------|
| X Valve | - | Light |
|---------|---|-------|
- Duration of function for (s)
- 180
- or until speed
- | | | |
|----|------|---------------|
| 30 | km/h | X exceeds |
| | | - drops below |

Connected component

- | | | | | |
|---------------------------|-------|-------|-----------------------|------------------|
| | Valve | Light | Cable break detection | No stand-by mode |
| ABS active signal | X | - | X | |
| RSS active signal | X | - | X | |
| Steady positive voltage 1 | | | X | - |
| Steady positive voltage 2 | | | X | - |
| Speed signal | | | X | |



START-UP LOG

Vehicle ident. no.

WKVDAS00300116227

Operating Hour Counter

Service name

Service interval

Input signal

Signal name

Conditions

0

Internal signal

Active

- Display with ABS light

- Display via external signal light

X Service interval can be reset

- Changeable service interval

Threshold value (V)

3.5

Tilt alert (Tilt warning)

Maximum permissible tilt
angle (degree)

2

Connected component

X Valve

- Display only via SmartBoard (no output required!)

- Light

distribution: KÄSSBOHRER
3 AXLE

please note!

This brake calculation is made under consideration of
-the legal prescriptions mentioned above in the version valid
at the time of making the program (V6.14.04.20).
-the functional characteristics of our products
as well as the data of the brake out of the test
approvals of the axle manufacturers, and
-the other vehicle data included in the brake calculation.
Please check whether these data correspond to the actual vehicle data.
Our conditions of delivery apply (particularly section 9.0).
In any case we commend to do a braking harmonisation!
WABCO Brake V6.14.04.20 db 26.03.2019

vehicle manufacturer: KÄSSBOHRER
trailer model : 3 AXLE
trailer type : 3-axle-semi-trailer
remarks : air / hydraulic / VA suspension
WABCO TRAILER - EBS
TRISTOP 1+2: 30/30
245/70 R 17,5

axle 1 + 2 + 3 : BPW, SN3020, 361-081-12 ECE,

		<u>unladen</u>		<u>laden</u>	
total mass	P in kg	9680	- 13000	45000	- 48000
king-pin	PS kg	680	- 4000	15000	- 18000
axle 1	P1 in kg		3000		10000
axle 2	P2 in kg		3000		10000
axle 3	P3 in kg		3000		10000
total axle mass	PR in kg		9000		30000
wheel base	E in mm	7500	- 15000		
centre of gravity height	h in mm		1200		1800
K-factor		Kv min	1,7648	Kc min	1,0991
K-factor		Kv max	1,8601	Kc max	1,2284

		<u>axle 1</u>	<u>axle 2</u>	<u>axle 3</u>
no. of combined axles		1	1	1
no. of brake chambers per axle line	KDZ	2	2	2
The power output corresponds to		BC 0038.0	BC 0038.0	BC 0030.0
brake chamber manufacturer		WABCO	WABCO	WABCO
chamber size		30/30	30/30	30
lever length	lBh in mm	150	150	150
brake factor	[-]	6,90	6,90	6,90
dyn. rolling radius	rdyn min in mm	383	383	383
dyn. rolling radius	rdyn max in mm	383	383	383
threshold torque	Co Nm	45,0	45,0	45,0

calculation:				
chamber pressure(rdyn min)pH at z=22,5%bar		2,3	2,3	2,3
chamber pressure(rdyn max)pH at z=22,5%bar		2,3	2,3	2,3
chamber press.(servo)pcha at pm6,5bar bar		5,6	5,6	5,6
piston force ThA at pm6,5bar N		10580	10580	10580
brake force(rdyn min)T lad. at pm6,5bar N		56541	56541	56541
brake force(rdyn max)T lad. at pm6,5bar N		56541	56541	56541
brake force within 1 % rolling friction	%	33,3	33,3	33,3
proportion				

braking rate z laden 0,576 for rdyn min
z = sum (TR)/PRmax 0,576 for rdyn max

Trailer may only be operated in combination with trucks/tractors with
ISO 7638 supply (5 or 7 polar).

brake diagram : 841 701 101 0

maximum pressure: 8,5 bar

axle 1:

valve 1: 971 002 ... 0 WABCO
EBS emergency valve

valve 2: 480 102 ... 0 WABCO
EBS trailer modulator

brake cylinder: WABCO 925 492 208 0 / 925 492 96x 0

axle 2:

valve 1: 971 002 ... 0 WABCO
EBS emergency valve

valve 2: 480 102 ... 0 WABCO
EBS trailer modulator

brake cylinder: WABCO 925 492 208 0 / 925 492 96x 0

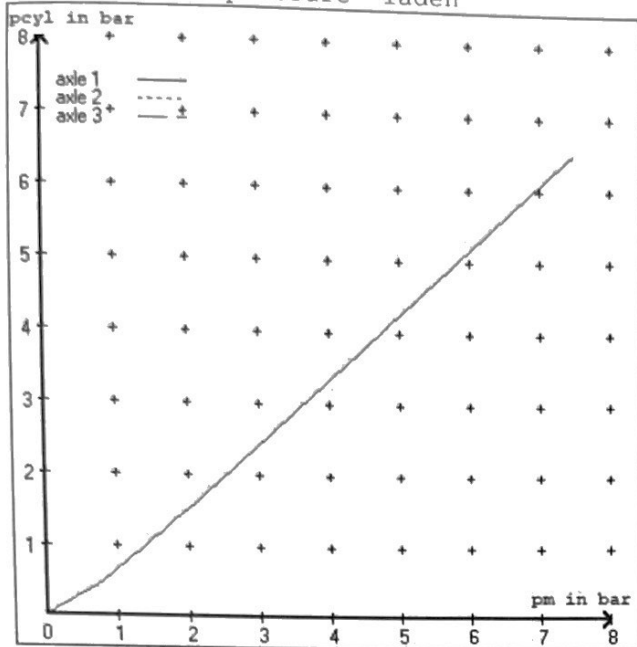
axle 3:

valve 1: 971 002 ... 0 WABCO
EBS emergency valve

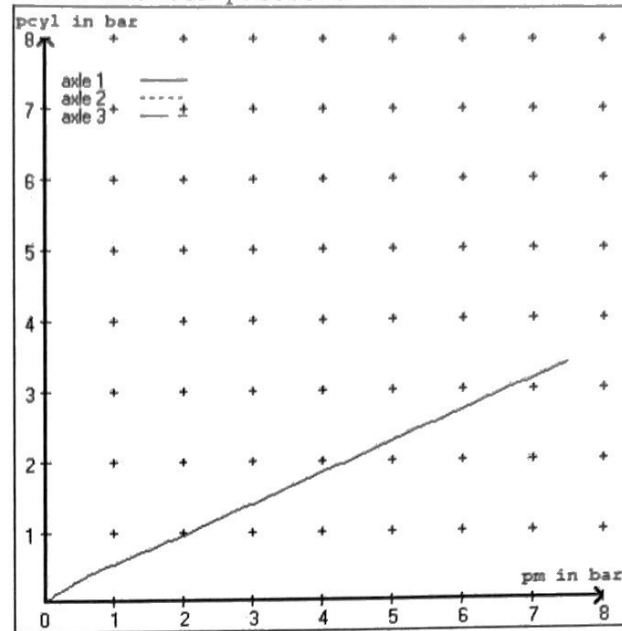
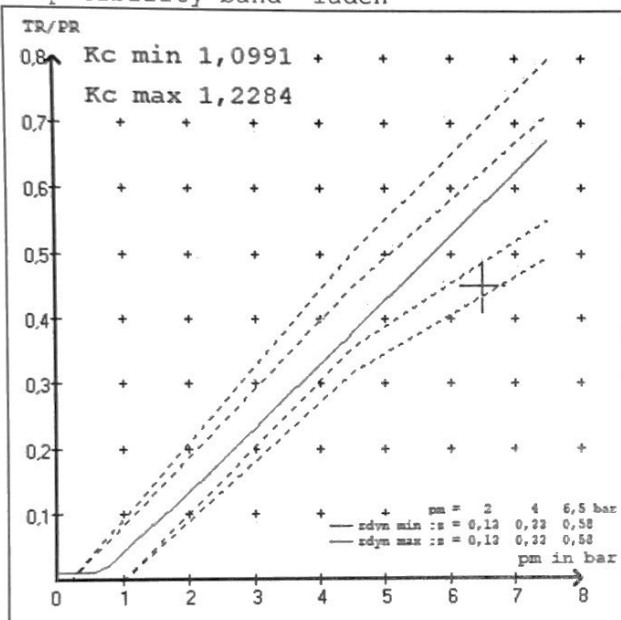
valve 2: 480 102 ... 0 () WABCO or 480 207 0.. 0 / 2.. 0
EBS trailer modulator

brake cylinder: WABCO 423 107 90. 0 / 423 107 96x 0

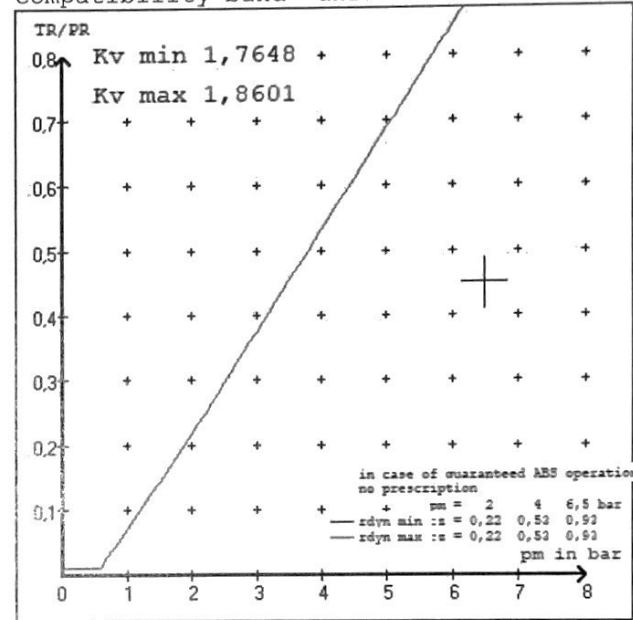
test type III (zIII = 0,30) for rdyn min : axle1 axle2 axle3
at pm 3,7 bar => pcha in bar : 3,0 3,0 3,0
test type III (zIII = 0,06) for rdyn min : axle1 axle2 axle3
at pm 1,2 bar => pcha in bar : 0,8 0,8 0,8



compatibility band laden



compatibility band unladen



vehicle manufacturer: KÄSSBOHRER
 trailer model : 3 AXLE
 trailer type : 3-axle-semi-trailer

brake chamber and lever length :

axle 1 : 2 x type/diameter 30/30 (WABCO) lever length 150 mm
 axle 2 : 2 x type/diameter 30/30 (WABCO) lever length 150 mm
 axle 3 : 2 x type/diameter 30 (WABCO) lever length 150 mm

brake diagram : 841 701 101 0

valve :

971 002 ... 0 WABCO EBS emergency valve
 480 102 ... 0 WABCO EBS trailer modulator
 480 102 ... 0 WABCO EBS trailer modulator or 480 207 0.. 0 / 2.. 0

EBS input data

=====

vehicle manufacturer: KÄSSBOHRER
 trailer model : 3 AXLE
 trailer type : 3-axle-semi-trailer
 brake calculation no. : T_S 51638S

tire circumference main axle : 2400 for rdyn max
 tire circumference auxiliary axle : 2400 for rdyn max

assignment pm / deceleration z: pm 0,7 bar z = 0,010
 (laden condition) 2,0 bar z = 0,137
 6,5 bar z = 0,575

control pressure pm			6,5	control pressure pm			0,7	2,0	6,5
axle	axle load unladen	bellow pr. unladen	brake pr. unladen	axle load laden	bellow pr. laden	brake pr. laden			
1	3000	to be	2,9	10000	to be		0,4	1,5	5,6
2	3000	entered by	2,9	10000	entered by		0,4	1,5	5,6
3	3000	the vehicle	2,9	10000	the vehicle		0,4	1,5	5,6
4	0	manufact.	0,0	0	manufact.		0,0	0,0	0,0
5	0		0,0	0			0,0	0,0	0,0

The unladen values indicated in the above table are values for the basic parameter set. Higher unladen axle loads and liftaxles are automatically recognized and do not require separate adjustment. The above unladen axle loads must not be fallen below.

=====

axle 1	axle 2	axle 3
axle load pcyl	axle load pcyl	axle load pcyl
3000 2,9	3000 2,9	3000 2,9
3500 3,1	3500 3,1	3500 3,1
4000 3,3	4000 3,3	4000 3,3
4500 3,5	4500 3,5	4500 3,5
5000 3,7	5000 3,7	5000 3,7
5500 3,9	5500 3,9	5500 3,9
6000 4,1	6000 4,1	6000 4,1
6500 4,3	6500 4,3	6500 4,3
10000 5,6	10000 5,6	10000 5,6

data sheet to ECE vehicle type-approval certificate concerning braking
equipment: according to ECE R13 annex 11

axle 1 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA170712
axle 2 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA170712
axle 3 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA170712

calc. verif. of residual (hot) braking force type III
(item 4.2.1 of appendix 2 to annex 11)

axle 1	(rdyn 383 mm)	T = 23,1 % Fe
axle 2	(rdyn 383 mm)	T = 23,1 % Fe
axle 3	(rdyn 383 mm)	T = 23,1 % Fe

calculated actuator stroke in mm
(item 4.3.1.1 of appendix 2 to annex 11)

axle 1	(sp = 59 mm)	s = 50 mm
axle 2	(sp = 59 mm)	s = 50 mm
axle 3	(sp = 65 mm)	s = 50 mm

average thrust output in N at pm = 6,5 bar (however max. pcha = 7,0 bar)

axle1	ThA = 10580 N
axle2	ThA = 10580 N
axle3	ThA = 10580 N

calc. residual (hot) braking force in N
(item 4.3.1.4 of appendix 2 to annex 11)

axle 1	(rdyn 383 mm)	T = 41876 N
axle 2	(rdyn 383 mm)	T = 41876 N
axle 3	(rdyn 383 mm)	T = 41876 N

	basic test	type III
	of subject	(calculated)
	trailer (E)	residual
braking rate of the vehicle		(hot)braking
(item 4.3.2 to appendix 2 to annex 11)	0,58	0,43

required braking rate	>= 0,4 and
(items 1.5.3 and 1.7.2 to annex 11)	>= 0,6*E (0,35)

axle 1	(rdyn 383 mm)	T = 41876 N
axle 2	(rdyn 383 mm)	T = 41876 N
axle 3	(rdyn 383 mm)	T = 41876 N

	basic test	type III
	of subject	(calculated)
	trailer (E)	residual
braking rate of the vehicle		(hot)braking
(item 4.3.2 to appendix 2 to annex 11)	0,58	0,43

required braking rate	>= 0,4 and
(items 1.5.3 and 1.7.2 to annex 11)	>= 0,6*E (0,35)

data sheet to ECE vehicle type-approval certificate concerning braking equipment: according to ECE R13 annex 11

axle 1 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA120412
axle 2 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA120412
axle 3 : reference axle: BPW	N130	brake lining: TEXTAR T090
test report :	361-081-12 ECE	date : GA120412

calc. verif. of residual (hot) braking force type III
(item 4.2.1 of appendix 2 to annex 11)

axle 1	(rdyn 383 mm)	T = 23,1 % Fe
axle 2	(rdyn 383 mm)	T = 23,1 % Fe
axle 3	(rdyn 383 mm)	T = 23,1 % Fe

calculated actuator stroke in mm
(item 4.3.1.1 of appendix 2 to annex 11)

axle 1	(sp = 59 mm)	s = 53 mm
axle 2	(sp = 59 mm)	s = 53 mm
axle 3	(sp = 65 mm)	s = 53 mm

average thrust output in N at pm = 6,5 bar (however max. pcha = 7,0 bar)

axle1	ThA = 10580 N
axle2	ThA = 10580 N
axle3	ThA = 10580 N

calc. residual (hot) braking force in N
(item 4.3.1.4 of appendix 2 to annex 11)

axle 1	(rdyn 383 mm)	T = 39809 N
axle 2	(rdyn 383 mm)	T = 39809 N
axle 3	(rdyn 383 mm)	T = 39809 N

basic test	type III
of subject	(calculated)
trailer (E)	residual
	(hot)braking
	0,41

braking rate of the vehicle
(item 4.3.2 to appendix 2 to annex 11)

0,58

required braking rate
(items 1.5.3 and 1.7.2 to annex 11)

>= 0,4 and
>= 0,6*E (0,35)

axle 1	(rdyn 383 mm)	T = 39809 N
axle 2	(rdyn 383 mm)	T = 39809 N
axle 3	(rdyn 383 mm)	T = 39809 N

basic test	type III
of subject	(calculated)
trailer (E)	residual
	(hot)braking
	0,41

braking rate of the vehicle
(item 4.3.2 to appendix 2 to annex 11)

0,58

required braking rate
(items 1.5.3 and 1.7.2 to annex 11)

>= 0,4 and
>= 0,6*E (0,35)

	axle 1	axle 2
no of TRISTOP-actuators per axle line KDZ	2	2
TRISTOP-actuator type	30/30	30/30
lever length		
stat. tyre radius	150	150
	367	367
at a stroke of		
min. force of spring brake	30	30
sp.brake chamber no 925 ...	10431	10431
sp.brake chamber no 925 ...	492 208 0492 208 0	492 208 0492 208 0
release pressure	492 96x 0492 96x 0	492 96x 0492 96x 0
	5,1	5,1

calculation:

ratio until road	2,8202	2,8202
$iFb = lBh \cdot \eta \cdot C \cdot rBt / (2 \cdot rBn \cdot rstat)$		
for rstat in mm	367	367
brake force of spring br. Tf in N	57142	57142
$Tf = (TFZ \cdot KDZ - 2 \cdot Co / lBh) \cdot iFb$		
braking rate	0,253	
$zf = \sum (Tf) / P + 0,01$		

Test of the frictional connection required by the parking brake

minimum wheelbase/minimum supporting width min Ef necessary
to fulfil the regulations

$$\min Ef = E \cdot (1 - PR/P + zferf \cdot h/E) / (1 - zferf / (fzul \cdot nf/ng))$$

min Ef = 4734 mm for E = 7500 mm
=====

min Ef = 8980 mm for E = 15000 mm
=====

min Ef = minimum distance between front axle(s) (trailer) or support (semitrailer)
and the rear axle(s) (resultant of the bogie)

E = wheel base

fzul = 0,80 maximum permissible frictional connection required

zferf = 0,18 maximum required braking ratio of the parking brake

h = 1800 mm height of center of gravity - laden

PR = 30000 kg maximum bogie mass - laden

P = 48000 kg maximum total mass - laden

nf = 2 no. of axle(s) with TRISTOP spring brake actuators

ng = 3 no. of bogie axle(s)

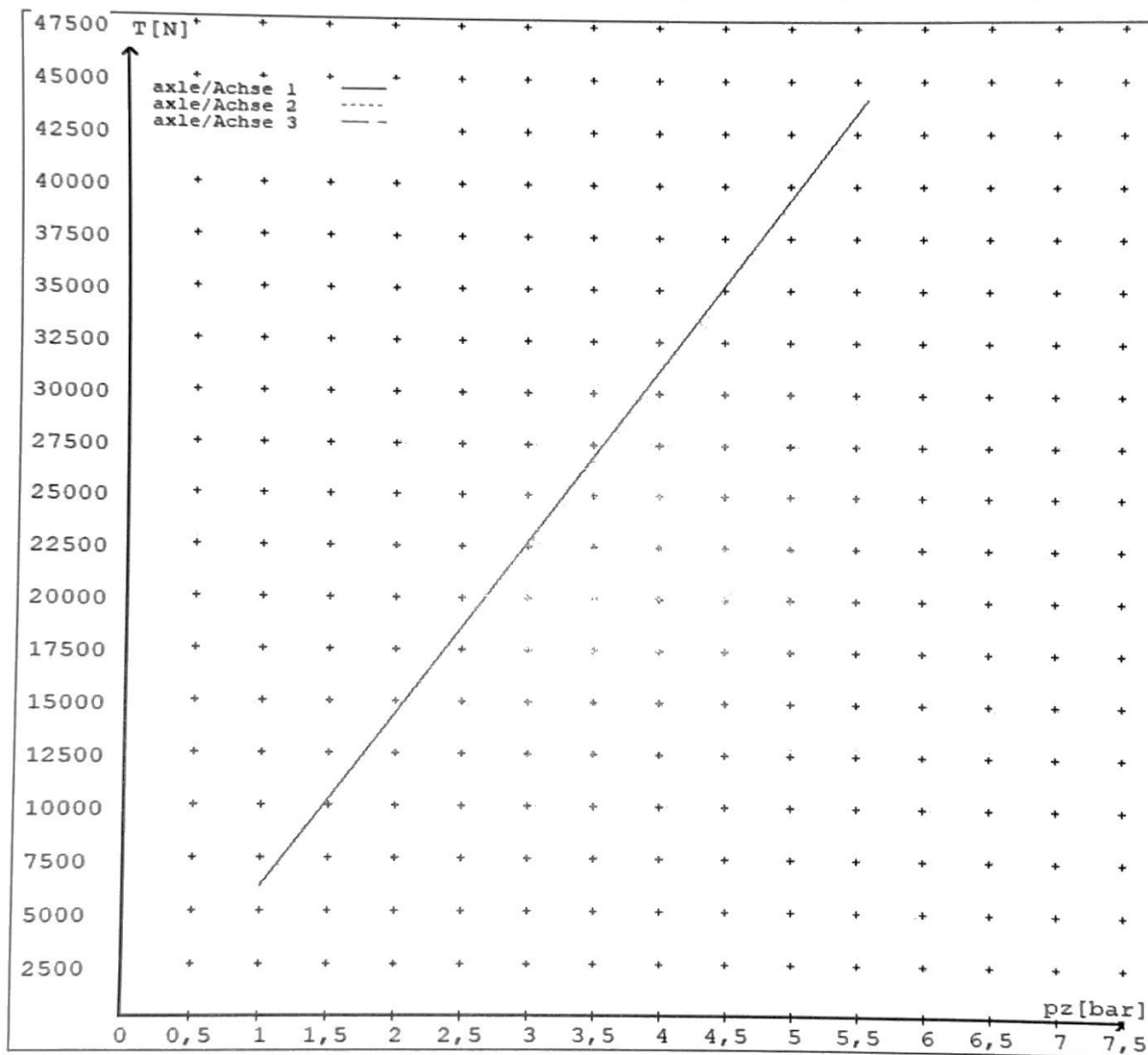
reference values

reference values for z = 45% for max rdyn: 383 mm

	pz [bar]	T [N]	T [N]
axle 1	1,0 5,6		6104 44173
axle 2	1,0 5,6		6104 44173
axle 3	1,0 5,6		6104 44173

VIN - no.:

	Axle(s) / Achse(n)				
brake cylinder type (service / parking) Bremszylinder Typ (Betrieb / Fest)	30/30	30/30	30/	/	/
Maximum stroke smax = ...mm maximaler Hub smax =mm	67	67	76		
Lever length =mm Hebellänge =mm	150	150	150		



reference values for $z = 0,45$

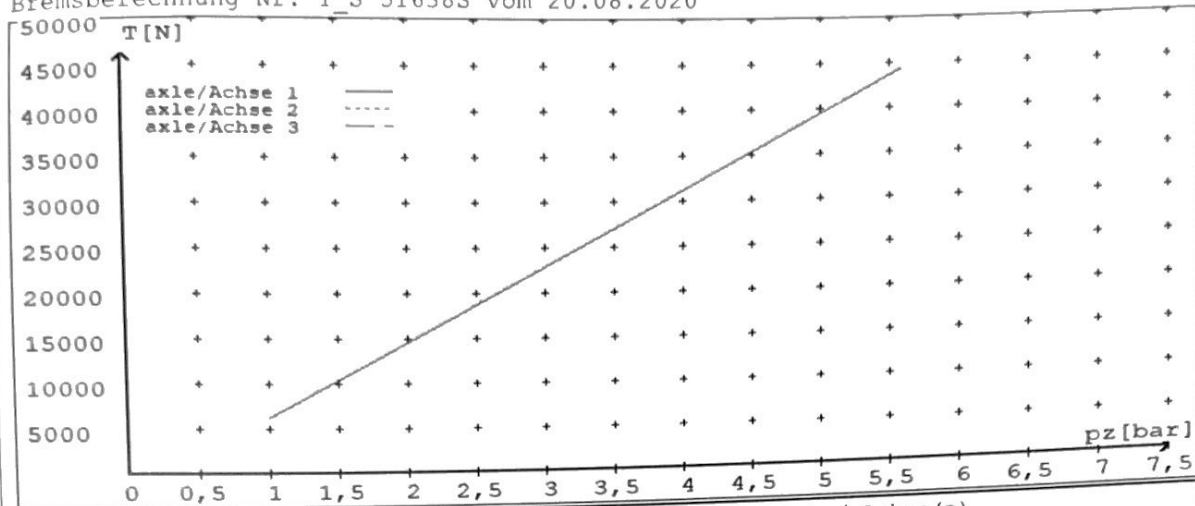
Angabe der Referenzwerte für $z = 0,45$

for max r_{dyn}: 383 mm

für max r_{dyn}: 383 mm

brake calculation no: T_S 51638S date 20.08.2020

Bremsberechnung Nr: T_S 51638S vom 20.08.2020



	Axle(s) / Achse(n)				
brake cylinder type (service / parking)	30/30	30/30	30/	/	/
Bremszylinder Typ (Betrieb / Fest)					
Maximum stroke s _{max} =mm	67	67	76		
maximaler Hub s _{max} =mm					
Lever length =mm	150	150	150		
Hebellänge =mm					