



CONFIDENTIAL INFORMATION

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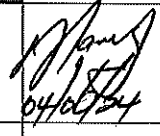
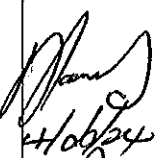

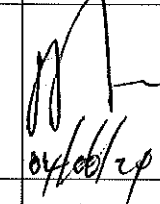

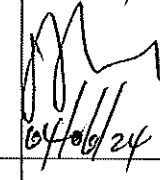



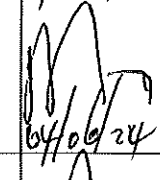

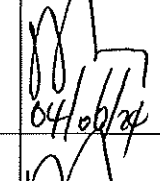

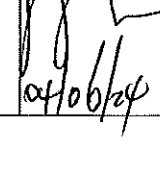
APPLICATION REFERENCE



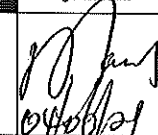
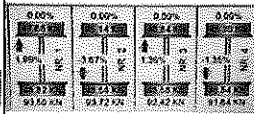

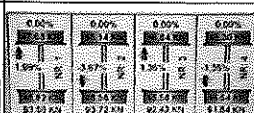
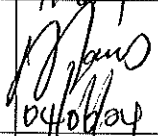

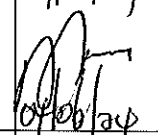
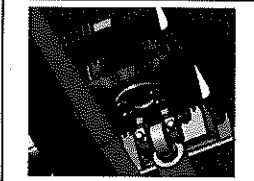
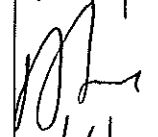
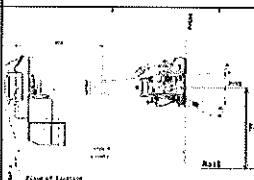
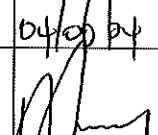
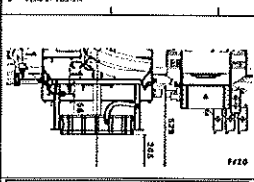
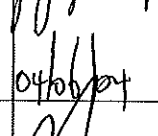
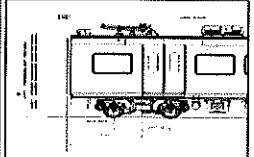
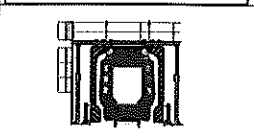
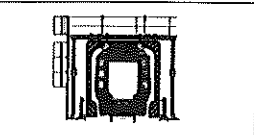
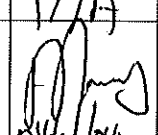
MOUNTING	DESCRIPTION	STATION	CAR TYPE						WORK INSTRUCTION	SAFETY ? 
			TC1	M4	M1	M2	M3	TC2		
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	1	1	1	1		PRA.FT1140.04	YES
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1				X	PRA.FT1140.05	YES
<input type="checkbox"/>	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
<input type="checkbox"/>	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
<input type="checkbox"/>										
<input type="checkbox"/>										
<input type="checkbox"/>										

REV	DATE	MODIFICATION CONTENT	RESPONSIBLE	NAME	DATE
7	2/11/2020	UPDATE OF AIR TIGHTNESS TEST TIME FROM 4 MIN TO 5 MIN. ADD PANTOGRAPH AIR TIGHTNESS.	APPROVER	GIVEN SILOWA	2/11/2020
			CHECKER	SIMON MOKOENA	2/11/2020
			COMPILER	COMFORT MALATJI	2/11/2020
8	9/13/2021	ADDING GAUGE MEASUREMENT CHECK ON THE SI.	APPROVER	MAKOFANE LUCY	9/13/2021
			CHECKER	RATAU EDISON	9/13/2021
			COMPILER	TSAKANI KHOSA	9/13/2021
9	5/31/2022	pressure valve (APV) Isolation	APPROVER	MAKHURUPETJI THABANG	5/31/2022
			CHECKER	HAZEL MGIBA	5/31/2022
			COMPILER	RATAU EDISON	5/31/2021

TUE	CAR	OPERATOR NAME	DATE	SELF INSPECTION NUMBER	PAGES
16221	TC2	<i>[Signature]</i>	04/06/24	SI.FT1140.52	01/08

	SELF INSPECTION INDUSTRIAL QUALITY		Rev:09 Date: 5/31/2022	Project: PRASA	SI.FT1140.52						
	Car:	INCR:	Work Station: FT1140								
<div style="display: flex; align-items: center; justify-content: center;"> Safety Related </div>											
I - Document and Instrument Control											
I.1 - Documents control											
Document	TC1	M1	M2	M3	M4	TC2	Revision	Remark	OK	NOK	Signature/Date
PRA.FT1140.04						V			✓		<i>M4</i> 04/06/24
PRA.FT1140.05											
PRA.FT1140.05											
I.2 - Instruments Control - Monitoring and Measuring Instrument Control (Used for all Instrument with calibration needed)											
Instruments description	Serial number					Calibration or Verification Validation Date			OK	NOK	Signature/Date
<i>Measuring Tape</i>	<i>GIBTA 0276</i>					<i>26/10/23-26/10/24</i>			✓		<i>Mary</i> 04/06/2024
<i>Vernier Caliper</i>	<i>GIBVR 6056</i>					<i>06/06/23-06/06/24</i>			✓		
<i>Torque wrench 35MM</i>	<i>D2S11023</i>					<i>19/12/23-19/12/24</i>			✓		
<i>Torque wrench 160MM</i>	<i>D28622069</i>					<i>19/12/23-19/12/24</i>			✓		
<i>Torque wrench 320MM</i>	<i>A9636633</i>					<i>21/12/23-21/12/24</i>			✓		
<i>Torque wrench 530MM</i>	<i>A9630033</i>					<i>21/12/23-21/12/24</i>			✓		
<i>Torque wrench 17MM</i>	<i>D2861617</i>					<i>19/12/23-19/12/24</i>			✓		

	<h1 style="text-align: center;">SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09	Projet: PRASA	SI.FT1140.52									
			Date:											
			5/31/2022											
II - Self Inspection - Items to Check														
II.1 - Items to Check														
Item	Picture/Sketch	Description	Criteria/Record	OK	FAIL	Signature/Date								
01		Ensure that the average pressure valve (APV) is isolated by capping the two input pipes at the fittings installing the blanking fitting on the pipes highlighted		✓		 04/06/24								
02		Check underframe pipe system Air tightness. Test performance according to WI PRA.FT1130.15.	The test was performed and no leak was observed. Initial pressure (IP) <u>9.99</u> bar Final pressure (FP) <u>9.90</u> bar FP - IP = <u>0.09</u> bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0.2 bar	✓		 04/06/24								
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓		 04/06/24								
04		Measurement inspection was done with car on condition AWO and the rail levelled. (The load cells system must be levelled and calibrated)	Calibration Validation Date <u>17/12/23</u>	✓		 04/06/24								
05		In case of the equipments not installed, equivalent weight of the item should be added in the same place to simulate the equipment. (Any simulated weight, add on pending list)	<table border="1" style="width: 100%;"> <tr> <th>EQUIPMENT DESCRIPTION</th> <th>WEIGHT (kg)</th> </tr> <tr> <td>DRIVER desk</td> <td>100</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	DRIVER desk	100					✓		 04/06/24
EQUIPMENT DESCRIPTION	WEIGHT (kg)													
DRIVER desk	100													
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0.3 bar.		✓		 04/06/24								
07		Measuremet recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓		 04/06/24								
08		All leveling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓		 04/06/24								

		<h1>SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09	Projeto: PRASA		SI.FT1140.52
		Date:	5/31/2022				
Item	Picture/Sketch	Description	Criteria/Record	OK	NG	Process	Signature/Date
09		Check that the leveling rods are torqued and have torque marker.		<input checked="" type="checkbox"/>			 04/06/24
10		The difference of weight between the left and right wheels of each axis, must be $\leq 4\%$. (Verify on the T&C equipment if all arrows are in green).		<input checked="" type="checkbox"/>			 04/06/24
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$.		<input checked="" type="checkbox"/>			 04/06/24
12		1 - Record shims thickness used on rod 2 - All screws were torqued and have torque marker.	THICKNESS (mm) I <u>0</u> II <u>0</u> III <u>0</u> IV <u>0</u>	<input checked="" type="checkbox"/>			 04/06/24
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	<input checked="" type="checkbox"/>			 04/06/24
14		FOR TC CARS F= Height of the center of Automatic coupler F = 895mm (+5 / -10mm) (Using levelled rail)	TC CAB # <u>898</u> mm	<input checked="" type="checkbox"/>			 04/06/24
15		FOR TC CARS Height of Eurobrake Antenna = 205mm (+/-10mm) (Using levelled rail)	TC CAB #1= <u>196</u> mm	<input checked="" type="checkbox"/>			 04/06/24
16		Check pantograph piping air tightness. Test performance according to WI PRA.FT1140.17.	The test was performed and no leak was observed. -Roof piping connection fittings. -Room piping connection fittings (Roof arch and door trimming)				N/A
17		Pantograph does not come in contact with the higher height gauge when passing through.	No Contact with Pantograph and Gauge -GO Contact with Pantograph and Gauge - NO GO				N/A
18		Car does not come into contact with the gauge.	No Contact with Car and Gauge -GO Contact with Car and Gauge - NO GO	<input checked="" type="checkbox"/>			 04/06/24



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SLFT1140.52

DRAFT TO MEASUREMENTS DURING LEVELLING (ALL UNITS MUST BE IN mm/bar/kg)

DESCRIPTION	TOLERANCE	END#1												END#2											
		LEFT SIDE						RIGHT SIDE						LEFT SIDE						RIGHT SIDE					
AIR SPRING HEIGHT (EMPTY)	N/A	A ^{II}												A ^{IV}											A ^{IV}
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ^{II}					257 258	258 256						A ^{III}						255 258					A ^{III}
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{II}												E ^{III}											E ^{III}
AIR SPRING PRESSURE	≤ 0.3 (C _{II} - C _I)	C ^{II}					3.46	3.77						C ^{II}											C ^{II}
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₃												D ₅											D ₅
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₄												D ₆											D ₆
PIVOT VERTICAL GAP	min 25 max 32	K ^{II}												K ^{III}											K ^{III}
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J _I - J _{II})	J ^{II}												J ^{III}											J ^{III}
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{II}												X ^{III}											X ^{III}
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{II}												Y ^{III}											Y ^{III}
AIR SPRING HEIGHT (EMPTY)	N/A	A ^{III}												A ^{IV}											A ^{IV}
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ^{III}					256 267	255 258						A ^{III}											A ^{III}
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{III}												E ^{IV}											E ^{IV}
AIR SPRING PRESSURE	≤ 0.3 (C _{IV} - C _{III})	C ^{III}					3.05	2.67						C ^{IV}											C ^{IV}
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₅												D ₇											D ₇
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₆												D ₈											D ₈
PIVOT VERTICAL GAP	min 25 max 32	K ^{III}												K ^{IV}											K ^{IV}
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J _{IV} - J _{III})	J ^{III}												J ^{IV}											J ^{IV}
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{III}												X ^{IV}											X ^{IV}
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{III}												Y ^{IV}											Y ^{IV}

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW

GOOD LOWER HIGHER

✓ ↓ ↑

WEIGHT COMPENSATION

EQUIPMENT

WEIGHT

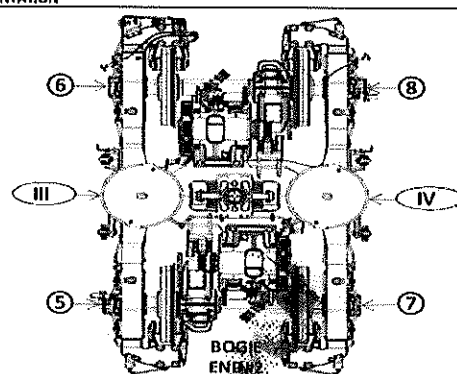
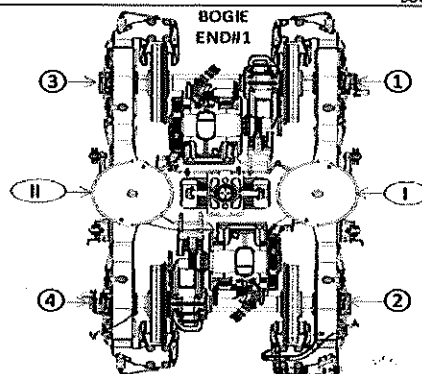
EQUIPMENT

WEIGHT

SECONDARY MEASUREMENTS (ONLY TC CARS)

AUTOMATIC COUPLER HEIGHT

ANTENNA HEIGHT





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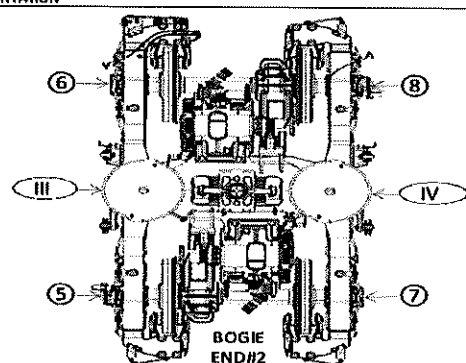
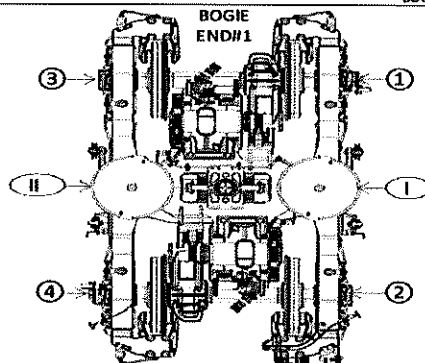
SI.FT1140.52

DRAFT TO MEASUREMENTS DURING LEVELLING (ALL UNITS MUST BE IN mm/bar/kg)

DESCRIPTION	TOLERANCE	END#1												END#2					
		LEFT SIDE						RIGHT SIDE						RIGHT SIDE					
AIR SPRING HEIGHT (EMPTY)	N/A	A'II																	A'I
AIR SPRING HEIGHT (FULL)	mh 254 max 261	AII																	AI
FLOOR COVERING HEIGHT	mh 1096 max 1116	EII																	EI
AIR SPRING PRESSURE	± 0.3 (OI - CI)	CII																	CI
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	Ds																	D1
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	Da																	D2
PIVOT VERTICAL GAP	mh 25 max 32	KII																	KI
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (AI - A)	JII																	JI
QTY OF TURNS OF LEVELLING ROD	N/A	XII																	XI
SHIMS OF ANTI-ROLL BAR	N/A	YII																	YI
AIR SPRING HEIGHT (EMPTY)	N/A	A'III																	A'IV
AIR SPRING HEIGHT (FULL)	mh 254 max 261	AIII																	AIV
FLOOR COVERING HEIGHT	mh 1096 max 1116	EIII																	EIV
AIR SPRING PRESSURE	± 0.3 (OIV - CIV)	CIII																	CIV
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	Ds																	D7
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	Da																	D8
PIVOT VERTICAL GAP	mh 25 max 32	KIII																	KIV
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (AIV - AI)	JIII																	JIV
QTY OF TURNS OF LEVELLING ROD	N/A	XIII																	XIV
SHIMS OF ANTI-ROLL BAR	N/A	YIII																	YIV

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW

GOOD	LOWER	HIGHER
✓	↓	↑
WEIGHT COMPENSATION		
EQUIPMENT		
WEIGHT		
EQUIPMENT		
WEIGHT		
SECONDARY MEASUREMENTS (ONLY TC CARS)		
AUTOMATIC COUPLER HEIGHT		
ANTENNA HEIGHT		





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5/31/2022

Projeto:
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Table 1 - Reference Values and Measurement Tolerances for the Car Levelling.

ITEM		THEORETICAL VALUES											
		TCL CAR		M4 CAR		M1 CAR		M2 CAR		M3 CAR		M5 CAR	
		TBext	TBint	MB1	MB1	MB1	MB1	MB2	MB2	MB1	MB1	MB1	TBext
Pivot Internal stop gap difference [mm]	Fig. 4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Air Spring height [mm]	Fig. 5	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁	255 ⁺⁴ ₋₁
Air spring pressure at AMO [Bar]	Fig. 5	3,76 (Ref.)	2,82 (Ref.)	2,87 (Ref.)	2,83 (Ref.)	3,02 (Ref.)	2,91 (Ref.)	3,07 (Ref.)	2,85 (Ref.)	2,83 (Ref.)	2,87 (Ref.)	2,83 (Ref.)	3,76 (Ref.)
		0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.	0,3 Max.
Primary Suspension gap [mm]	Fig. 6	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁	35 ⁺² ₋₁
		D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄
		D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄
		D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄	D ₃ ; D ₄
Carbody Floor height [mm]	Fig. 7	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀	1106 ⁺¹⁰ ₋₁₀
Booster height [mm]	Fig. 7	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃	850 ⁺³ ₋₃
Coupling End height [mm]	Fig. 8	895 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	895 (Ref.)
	Fig. 9	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)
Pivot Vertical gap [mm]	Fig. 10	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃	30 ⁺³ ₋₃

	<h1 style="text-align: center;">SELF INSPECTION INDUSTRIAL QUALITY</h1>	Rev:09	Project: PRASA	SI.FT1140.52
		Date:		
		5/31/2022		

Leveling report from Production (Final measurements after Levelling and Weighting fine)

References for secondary suspension empty
A'n Air spring height empty

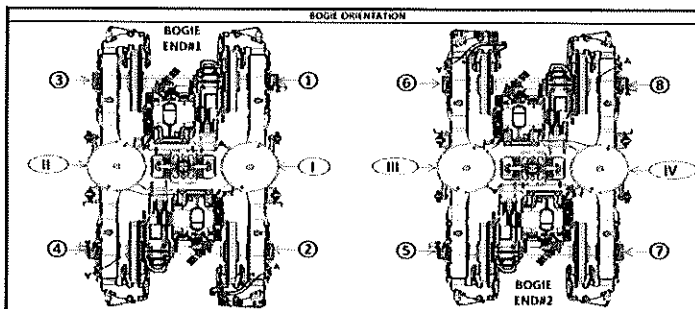
References for secondary suspension full
An Air spring height
Bn Difference between measurement A'n and An
En Floor covering height
Cn Air spring pressure
Dn Primary suspension
Kn Pivot Vertical gap
Jn Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 233	A'ii 235	A'is 234	A'iv 243
An	254 to 261	Au 256	Aii 257	Ais 256	Aiv 258
Bn = An - A'n	N/A	Bi 23	Bii 22	Bis 22	Biv 15
En	1106 ±10 mm	Ei 1107	Eii 1110	Eis 1109	Eiv 1113
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	Ci 3,56	Cii 3,56	Cis 2,89	Civ 2,81
Cn - Cn+1	Difference ≤ 0,3	Ci - Cii 0		Cis - Civ 0,08	
Gauge serial number	N/A	G1B05873	G1B05873	G1B05873	G1B05873
Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Dn	Table 01 (*)	D1 42,64	D3 43,67	D6 46,82	D8 44,48
		D2 43,45	D4 42,46	D5 43,80	D7 46,91
Kn	25 to 45	Ki 34,42		Kii 33,77	
Jn	Difference ≤ 4	Ji 25,11	Jii 25,69	Jis 25,85	Jiv 25,67

(*) Reference, only include values, Isn't approval criteria.

Table 01 D Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbox	TBin	Mb1	Mb1	Mb1	Mb2	Mb2	Mb1	Mb1	Mb1	Tbin	Tbox
D=	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅	35 ⁺¹² ₋₅

Table 02 C Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbox	TBin	Mb1	Mb1	Mb1	Mb2	Mb2	Mb1	Mb1	Mb1	Tbin	Tbox
C=	3.76	2.82	2.87	2.83	3.02	2.91	3.07	2.85	2.83	2.87	2.83	3.76



Weighting report from Test and Commissioning (Final measurements after Levelling and Weighting fine)


[illegible]



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TRAIN SET 227	REF: GIB000001672 JO PRASA WEIGHT BALANCE EN
	PCOB WEIGHING REPORT

TC2	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance (%)	Criteria Longitudinal Imbalance $\pm 10\%$
	Weight Measured vs Predicted	18.46	15.60	8.40%	PASS
		Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference (%)	Criteria MinDiff/Max
		34.06	34.42	1.06%	Tolerance (%) 1.62% PASS

Test Participants			
Name	Company	Department	Signature
Thabo MUSA	Gibela	EOC	

Date: 04/06/2024