MANUFACTURER	**ALSTOM TRANSPORT - Unit of LE CREUSOT** 105 Allée Albert Einstein – BP 90042 – 71202 LE CREUSOT Cedex – FRANCE
CUSTOMER	**PRASA**
CONTRACT	411G026
PROJECT	**PRASA**

MANUFACTURER'S DELIVERY DOCUMENT

PRODUCT TYPE	**MOTOR BOGIE type MB1** **AR00000174809-AR** **DTR0009706804**
SERIAL NUMBER	**MB1 - 134**

CONTENTS

COMPLIANCE CERTIFICATE

We hereby declare, barring exceptions, reservations, or exemptions listed in this statement of conformity, that the listed supplies comply with the contract requirements and that, after completions of testing and verification, they completely satisfy all specified requirements and applicable standards and regulations.

CONSTRUCTOR APPROVAL	
DATE	22 March 2018
NAME	Khanchai SUTTHAKAN
VISA	

I - Deviation / Derogation

II - Missing parts or repairs to be performed before the PAC

III - Bogie configuration

A Bogie index

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PRODUCTS TRACEABILITY

Project : **PRASA**
Supplier : **Alstom Le creusot**
MB1
Date : **22 March 2018**

Grey cells are not to be filled

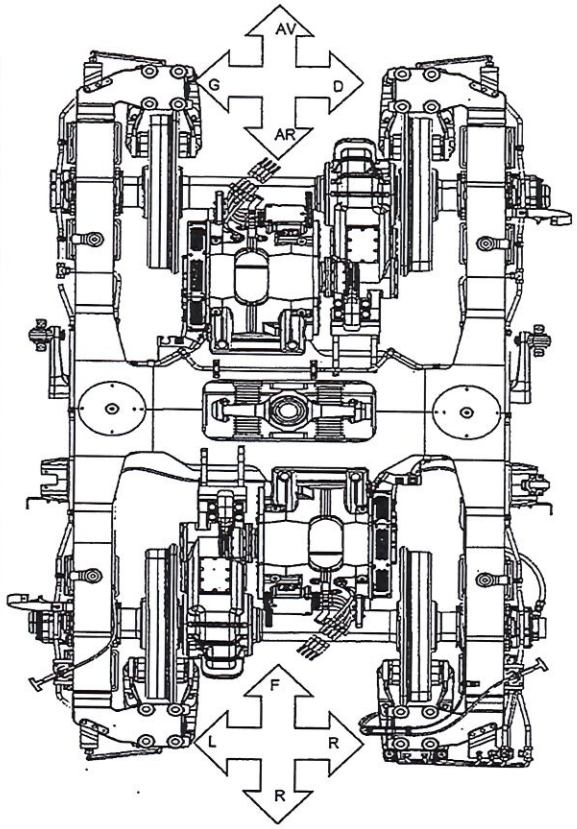
Niveau		Product Designation (Alstom reference)	Product reference	Serial n°	Batch or Date Manufacturing	Supplier
1		**MOTOR BOGIE BM1**	AR00000176086	0134		ALSTOM LE CREUSOT
2		**MOTOR BOGIE FRAME**	AR00000176080	0181		ALSTOM LE CREUSOT
2		**WHEELSET** (Front)	AR00000178600	M10281		ALSTOM LE CREUSOT
2		**AXLE WITH FITTED GEARBOX**	AR00000177072	K21	2017/05	JINXI
2		**WHEEL** (Right)	AR00000174670	069	35676	BONATRANS
2		**WHEEL** (Left)	AR00000174670	052	35676	BONATRANS
2		**WHEELSET** (Rear)	AR00000178600	M10282		ALSTOM LE CREUSOT
2		**AXLE WITH FITTED GEARBOX**	AR00000177072	K25	2017/05	JINXI
2		**WHEEL** (Right)	AR00000174670	128	36120	BONATRANS
2		**WHEEL** (Left)	AR00000174670	122	36120	BONATRANS
2		**MOTOR** (Front)	DTR0000340039	401	2018	ORNANS
2		**MOTOR** (Rear)	DTR0000340039	400	2018	ORNANS
2		**PNEUMATIC SUSPENSION** (Right)	AR00000176127	1704007		TMT
2		**PNEUMATIC SUSPENSION** (Left)	AR00000176127	1704013		TMT
2		**BRAKE UNIT WITH PB** (Right rear)	AR00000174544	282	02.2017	WABTEC
2		**BRAKE UNIT WITHOUT PB** (Right front)	AR00000175185	809	02.2017	WABTEC
2		**BRAKE UNIT WITHOUT PB** (Left front)	AR00000175185	810	02.2017	WABTEC
2		**BRAKE UNIT WITHOUT PB** (Left rear)	AR00000175185	811	02.2017	WABTEC

ALSTOM
Etablissement du Creusot

PRASA MOTOR BOGIE

N° de protocole *Protocol number*	Variante *Type*	PRASA BM1
201800223	N° de série *Serial N°*	134

	Valeur mesurée *Measured value*	Unité *Unit*	Cible *Target*	Mini	Maxi
Charge appliquée coté droit Applied load on right side	7,384	t	7,379	/	/
Charge appliquée coté gauche Applied load on left side	7,385	t	7,379	/	/
Charge de roue avant gauche Load on front left wheel	5,55	t	/	/	/
Charge de roue arrière gauche Load on rear left wheel	5,589	t	/	/	/
Charge de roue avant droite Load on front right wheel	5,596	t	/	/	/
Charge de roue arrière droite Load on rear right wheel	5,557	t	/	/	/
Ecart charges aux roues arrière Load difference on Rear wheels	0,29%	%	0	-2%	2%
Ecart charges aux roues avant Load difference on front wheels	-0,41%	%	0	-2%	2%
Ecart charges aux roues diagonale Load difference on Diagonal wheels	-0,35%	%	0	-2%	2%
Ecart fils de rails Wheels lenght of rail difference load	-0,06%	%	0	-2%	2%
Ecart charges aux roues entre essieu avant et essieu arrière Wheel load difference between front axle and rear axle	0,00%	%	0	-2%	2%
Jeu suspension primaire arrière gauche Rear left primary suspension gap	42,2	mm	41	38	44
Jeu suspension primaire avant gauche Front left primary suspension gap	42,32	mm	41	38	44
Jeu suspension primaire arrière droit Rear right primary suspension gap	42,3	mm	41	38	44
Jeu suspension primaire avant droit Front right primary suspension gap	42,74	mm	41	38	44
Hauteur suspension secondaire gauche mesurée Left secondary suspension height measured	590,87	mm	591	590	592
Hauteur suspension secondaire droite mesurée Right secondary suspension height measured	589,79	mm	591	590	592
Epaisseur de cale suspension secondaire gauche Shim thickness of left secondary suspension	0	mm	/	/	/
Epaisseur de cale suspension secondaire droite Shim thickness of right secondary suspension	1	mm	/	/	/
Hauteur suspension secondaire gauche corrigée Left secondary suspension height corrected	590,87	mm	591	590	592
Hauteur suspension secondaire droite corrigée Right secondary suspension height corrected	590,79	mm	591	590	592
Différence suspension secondaire droite / gauche corrigée Height difference between right and left secondary suspension corrected	-0,08	mm	0	-1	1



* Charge appliquée sur outillage + Masse outillage
* Load on tool + tool weight

Masse outillage = 65 kg / côté
Tool weight = 65 Kg / side

Nom opérateur : **Operator name**	JOUBERT BARTHELEMY
Date :	03/09/2018 03:07
Niveau de la lunette de mesure correcte **Tool of measurment calibration is OK**	C1N 175
Visa :	C1N 175

ALSTOM

DOSSIER LIVRAISON CONSTRUCTEUR

DELIVERY LOG BOOK

Inspection certificate according EN 10204-3.1

Produit / Product :	Traction Motors 6 ECA 3022 A	
N° de série / Serial number	17271 C	N° 400
Client / Customer :		
Objet / Purpose	PRASA	
Marché n° / Contrad number		
Situation / Situation	**None**	
Dérogations / Concessions	**None**	
Modifications client / Customer modification	**None**	
Pièces manquantes / Missing parts	**None**	

Nous déclarons que la fourniture citée est conforme aux exigences du contrat et que, après vérifications et essais, elle répond en tout point, aux exigences spécifiées, aux normes et règlements applicables, sauf exceptions, réserves ou dérogations énumérées dans la présente déclaration de conformité.

We hereby declare, barring exceptions, reservations or exemptions listed in this statement of conformity, that the listed supplies comply with the contract requirements and that, after completion of testing and verification, they completely satisfy all specified requirements , and applicable standards and regulazions.

Date / Date : 18/01/2018

Fonction / Function Inspection finale / Final inspection

Etabli et signé par / written and signed by ADAM JOEL

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B.P 49 – 25290 Ornans (France)
Tél : + 33 3 81 62 44 00
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Alstom Transport S.A
Société Anonyme au capital de 40 540 000 €
Siège Social : 48 Rue Albert Dhalenne
93482 SAINT OUEN Cedex (France)
RCS Nanterre 389 191 982
Siret 389 191 982 00278
APE 741.J – TVA FR 53 389 191 982

ALSTOM

MECHANICAL TESTS REPORT

PRASA

ORDER : **17271 C**
TYPE : **6 ECA 3022 A**
Configuration N° TROS 917 195 000 Rev A

MOTOR N° : **400**
STATOR N° : **413**
ROTOR N° **397**

The machine is delivered equipped with | Grease : **MOBILITH** | Quality : **SHC 100**

		Specified mm	Record mm
CERAMIC INSULATED bearingsS :	Drive opposite side : 6214 M P6 J20AB H257A C4 Supplier **FAG** Radial play after monting	Mini 0,021 Maxi 0,067	**0,055**
	Drive side NU 214 EM1 P6 F1 H257A J20AB C4 Supplier **FAG** Radial play after monting	Mini 0,042 Maxi 0,114	**0,075**
SHAFT	shaft end deviation Drive side :	Maxi 0,050	**0,010**

Remarks **None**

Written and signed ADAM JOEL

Date : 18/01/2018

PRASA

MOTOR TYPE 6 ECA 3022 A

ALSTOM

ROUTINE TESTS REPORT according to tests program N° TROS - 905-890 (Rev. B)

Motor N° **400**

GO	NoGo
☑	☐

FMO.Q.E / 006 -01 - B

Test Method: SINUSOIDAL SUPPLY - 50 Hz (± 1 Hz)

1 - Initial cold stator winding resistances. θ amb : 18 °C

Phases	U (V)	I (A)	R (mΩ)	R at 20° C (mΩ)	Toler. R at 20° C mini/maxi (mΩ)	Passed	Failed
U - V	2,566	10,00	256,60	258,63	243.66 / 269.31	☑	☐
V - W	2,563	10,00	256,30	258,33	Max déviation (%)		
U - W	2,572	10,02	256,69	258,72	0,151 % ≤ 1.0%	☑	☐

2- Verify direction of rotation

Supply : 1 2 3

Wiring connexions → Motor : U V W ☑ ☐

Clockwise direction of rotation, when viewed from drive end.

3 - No-load test. Rotation with reduced line voltage between 400 and 600 V - 10 min

U Line. (V)	Iu (A)	Iv (A)	Iw (A)	Tolérance -/+ (A)	Power factor	P o (kW)	P o Max (kW)		
1044 ± 2	51,7	51,3	51,3	45.4 / 55.5	0,048	4,430		☑	☐

4 - Speed probe.

Speed = 1000 ± 5 rev/min - Clockwise direction of rotation, when viewed from end

Verify signals timing : S2 (Yellow Core) → S1 (Green Core) ☑ ☐

Duty cycle - Active time on :	150 µs ≤	S1 :	540	µs ≤	750 µs	☑	☐
	150 µs ≤	S2 :	540	µs ≤	750 µs	☑	☐
Phase shift rising edges S2/S1 :			190	µs ≥	20 µs	☑	☐
Overlap - Rise (S1) / Fall (S2) time :			300	µs ≥	20 µs	☑	☐

5 - Locked rotor test at 50 Hz.

U Line (V)	I phase (A)	Tolér. -/+ (A)	Power Factor	P (kW)		
284.1	100,5	95 / 105	0,190	9,44	☑	☐

ALSTOM - B.P. 49 - 25290 Ornans (France)	Performed by **C. CLERVAUX**	Date : **17/01/2018**

ALSTOM

PRASA

MOTOR TYPE 6 ECA 3022 A

ROUTINE TESTS REPORT according to tests program N° TROS - 905-890 (Rev. B)

Motor N° 400

				Passed	Failed
6 - Max speed test.					
Run the motor at 4217 rev/min (f= 210.85 Hz) , 2 minutes. - No rotor damage				☑	☐
7 - Vibrations measurement : (Machine installed on elastic supports)					
Bearing	D.E	N.D.E			
4217 rev/min (210.85 Hz)	0,7	0,7	mm/s RMS ≤ 4.2 mm/s	☑	☐
3600 rev/min (180 Hz)	0,5	0,5	mm/s RMS ≤ 2.8 mm/s	☑	☐
1500 rev/min (75 Hz)	0,3	0,3	mm/s RMS ≤ 2.8 mm/s	☑	☐
8 - Dielectirc test :					
8-1 : Stator winding					
9000 V ac , 25-100 Hz , between stator winding and earth, 1 minute.				☑	☐
9 - Insulation resistances measurement :					
9-1 : Stator winding	2500 d.c V; R > 1 G Ω			☑	☐
9-2 : Bearings	100 V d.c ; 1 minute ; R	25 880	kΩ > 50 kΩ	☑	☐

Routines tests performed on tests bench **Operator approval** ☑

ALSTOM

DOSSIER LIVRAISON CONSTRUCTEUR

DELIVERY LOG BOOK

Inspection certificate according EN 10204-3.1

Produit / Product :	Traction Motors 6 ECA 3022 A	
N° de série / Serial number	17271 C	N° 401
Client / Customer :		
Objet / Purpose	PRASA	
Marché n° / Contrad number		
Situation / Situation	**None**	
Dérogations / Concessions	**None**	
Modifications client / Customer modification	**None**	
Pièces manquantes / Missing parts	**None**	

Nous déclarons que la fourniture citée est conforme aux exigences du contrat et que, après vérifications et essais, elle répond en tout point, aux exigences spécifiées, aux normes et règlements applicables, sauf exceptions, réserves ou dérogations énumérées dans la présente déclaration de conformité.

We hereby declare, barring exceptions, reservations or exemptions listed in this statement of conformity, that the listed supplies comply with the contract requirements and that, after completion of testing and verification, they completely satisfy all specified requirements , and applicable standards and regulazions.

Date / Date : 23/01/2018

Fonction / Function Inspection finale / Final inspection

Etabli et signé par / written and signed by ADAM JOEL

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PRASA

MOTOR TYPE 6 ECA 3022 A

ALSTOM

ROUTINE TESTS REPORT according to tests program N° TROS - 905-890 (Rev. B)

Motor N° **401**

GO	NoGo
☑	☐

FMO.Q.E / 006 -01 - B

Test Method: SINUSOIDAL SUPPLY - 50 Hz (± 1 Hz)

1 - Initial cold stator winding resistances. θ amb : 17 °C

Phases	U (V)	I (A)	R (mΩ)	R at 20° C (mΩ)	Toler. R at 20° C mini/maxi (mΩ)	Passed	Failed
U - V	2,522	10,00	252,20	255,21	243.66 / 269.31	☑	☐
V - W	2,522	10,00	252,20	255,21	Max déviation (%)		
U - W	2,526	10,00	252,60	255,61	0,157 % ≤ 1.0%	☑	☐

2- Verify direction of rotation

Wiring connexions → Supply : 1 2 3 / Motor : U V W ☑ ☐

Clockwise direction of rotation, when viewed from drive end.

3 - No-load test. Rotation with reduced line voltage between 400 and 600 V - 10 min

U Line. (V)	Iu (A)	Iv (A)	Iw (A)	Tolérance -/+ (A)	Power factor	P o (kW)	P o Max (kW)		
1044 ± 2	52,1	51,6	51,7	45.4 / 55.5	0,048	4,470		☑	☐

4 - Speed probe.

Speed = 1000 ± 5 rev/min - Clockwise direction of rotation, when viewed from end

Verify signals timing : S2 (Yellow Core) → S1 (Green Core) ☑ ☐

Duty cycle - Active time on : 150 µs ≤ S1 : 500 µs ≤ 750 µs ☑ ☐

150 µs ≤ S2 : 540 µs ≤ 750 µs ☑ ☐

Phase shift rising edges S2/S1 : 260 µs ≥ 20 µs ☑ ☐

Overlap - Rise (S1) / Fall (S2) time : 280 µs ≥ 20 µs ☑ ☐

5 - Locked rotor test at 50 Hz.

U Line (V)	I phase (A)	Tolér. -/+ (A)	Power Factor	P (kW)		
284.1	101,0	95 / 105	0,186	9,28	☑	☐

ALSTOM

PRASA
MOTOR TYPE 6 ECA 3022 A

ROUTINE TESTS REPORT according to tests program N° TROS - 905-890 (Rev. B)

Motor N° 401

				Passed	Failed
6 - Max speed test.					
Run the motor at 4217 rev/min (f= 210.85 Hz) , 2 minutes. - No rotor damage				☑	☐
7 - Vibrations measurement : (Machine installed on elastic supports)					
Bearing	D.E	N.D.E			
4217 rev/min (210.85 Hz)	0,7	0,5	mm/s RMS ≤ 4.2 mm/s	☑	☐
3600 rev/min (180 Hz)	0,7	0,7	mm/s RMS ≤ 2.8 mm/s	☑	☐
1500 rev/min (75 Hz)	0,5	0,5	mm/s RMS ≤ 2.8 mm/s	☑	☐
8 - Dielectirc test :					
8-1 : Stator winding					
9000 V ac , 25-100 Hz , between stator winding and earth, 1 minute.				☑	☐
9 - Insulation resistances measurement :					
9-1 : Stator winding	2500 d.c V; R > 1 G Ω			☑	☐
9-2 : Bearings	100 V d.c ; 1 minute ; R	9 090 000 kΩ	> 50 k Ω	☑	☐

Routines tests performed on tests bench **Operator approval** ☑

ALSTOM Transport S.A. - B.P. 49 - 25290 Ornans	Performed by **C. CLERVAUX**	Date : **22/01/2018**