

| PROJECT | CUSTOMER | VEHICLE |
|-----------------|----------|---------------|
| Xtrapolis-PRASA | PRASA | 298- M1 - VFT |

RTR Vehicle Functional Static Testing TS298 M1 Report
 GIB0000008436



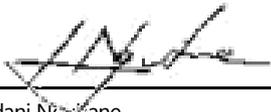
| | CREATED | VERIFIED | APPROVED | DISTRIBUTION |
|------------------|---------------|-----------------|-----------------|---|
| Name | Vusumuzi ZULU | Lindani Ngubane | Kgomotso NKOANA | Confidentiality Category <i>Restricted</i> <i>Project</i> <i>Normal</i> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Date | 1/9/2025 | 1/9/2025 | 1/9/2025 | Control Category <i>Controlled</i> <i>Not Controlled</i> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Signature | | | | Language EN |

This report has been automatically generated from TES version 1

Table of modifications

| Rev | Date | Modifications Content | Writer |
|-----|----------|-----------------------|---------------|
| A0 | 1/9/2025 | Creation | Vusumuzi ZULU |

Internal validations

| | Name | Function | Date | Signature |
|-----------------|-----------------|---------------------|----------|---|
| Creator | Vusumuzi ZULU | EPU Manager | 1/9/2025 | X  Vusumuzi ZULU EPU Manager |
| Verifier | Lindani Ngubane | Serial Test Manager | 1/9/2025 | X  Lindani Ngubane Serial Test Manager |
| Approver | Kgomotso NKOANA | Test Expert | 1/9/2025 | X  Kgomotso NKOANA Test Expert |

Execution Plan

| | |
|-------------------|-----------|
| Start Date | 21/8/2025 |
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Section 1 – Purpose / Objectives

1. Energy Distribution

Ensure the distribution of 110Vdc and 400Vac through the vehicle from the battery and Auxiliary converter

2. TCMS Network

Verify the working of the TCMS network and its core elements, i.e TRS, CRS.

3. Cabin Control

Verify the cabin control functions in both normal and backup modes, their commanding of the train lines, and the TCMS response to each function.

4. Internal Lighting

Verify the working of all internal lighting functions.

5. PACIS System

Verify power supply to all PACIS network equipment.

6. Train-Ground Communication

Setup the Train-to-ground systems, and verify correct installation of the antennas by VSWR test.

7. Pantograph

The objective of this procedure is to ensure the correct control and operation of the pantograph.

8. Rescue Mode and Emergency Disconnection

The objective of this procedure is to verify the correct operation of the emergency disconnection function, as well as the correct activation of the Back-Up mode.

10. Emergency Brake

The objective of this procedure is to verify all electrical components of the Emergency braking system.

11. Service Brake

The objective of this procedure is to verify all electrical components of the Service brake system.

12. Holding and Parking Brake

The objective of this procedure is to verify all electrical components of the Parking/holding brake system.

13. Passenger Doors

The objective of this procedure is to ensure the proper operation of the train doors.

14. Air Conditioning

Verify the voltage distribution to and correct operation of the HVAC system

15. Fire protection

The objective of this procedure is to verify the configuration of the fire detection units, as well as the presence of the safety resistor in the auxiliary converter.

16. Traction and Electric Brake

Verify all the train lines associated with the traction and electric brake systems of the train

18. Vehicle Normalization

The objective of this procedure is to ensure that all connectors, panels and covers are normalized.



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TS298 – M1 – VFT
RTR Vehicle Functional Static Testing Report

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1/9/2025

Section 3 – Energy Distribution

3.1 Instructions list

3.1.1 015_NRG-Energy Distribution

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--------------------------------------|---------|
| 10001 | I | Energy Distribution (SPP=015) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10003 | I | All the Circuit Breakers should be OPEN | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10004 | I | Test bench should be connected with no active output voltage | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10005 | I | NO 400Vac should be connected to the car | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10006 | I | 110Vdc Circuit Breaker | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10007 | A | Close Circuit Breaker 15Q3 (Normal Line) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10008 | I | 230Vac and 400Vac Circuit breakers | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10009 | A | Close Circuit Breaker 13Q1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10010 | I | Normal and Permanent Power Supply | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10011 | I | 110Vdc Permanent Train Line Dev1/40 = END1 90XP24 pin 29 Dev5/40 = END2 90XP34 pin 29 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10012 | A | Force [NI] Dev1/40 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10013 | R | Read Defined Variable [NI] Dev5/40 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10014 | A | Apply 110Vdc on the Normal Line using the external power supply | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10015 | A | Measure 110Vdc between 90XR50.X1/1 (+) and 90XR50.X2/1 (-) (intercar connector). [Normal line] | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10016 | I | Permanent Line Circuit Breakers | | OK | | Sicelo Mtolo 525130 | M1 |

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| | | | | | | 21.08.2025 | |
| 10017 | A | Check for battery voltage (above 80Vdc) on Circuit Breaker 15Q4 and close it (permanent Line) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10018 | I | 230Vac Circuit Breakers | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10019 | A | Close Circuit Breaker 13Q2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10020 | A | Close Circuit Breaker 13Q3 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10021 | I | 230Vac and 400Vac Voltage Supply | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10022 | A | Apply 400Vac to the Vehicle on End 1 or End 2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10023 | A | Perform a phase rotation measurement on Connector 90XR62 between phases U(X3),V(X2),W(X1) and ensure the rotation is in the correct direction | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10024 | R | Phase rotation between U,V,W is correct | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10025 | A | Perform a phase rotation measurement on Connector 90XR52_1 between phases U(X1),V(X2),W(X3) and ensure the rotation is in the correct direction | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10026 | R | Phase rotation between U,V,W is correct | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10027 | A | Check 230Vac between points L and N of socket -13XT1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10028 | R | 230Vac present | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10029 | A | Check 230Vac between points L and N of socket -13XT2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10030 | R | 230Vac present | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10031 | A | Remove the connector 57XP1_10 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10032 | A | Remove the connector 93XP150 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10033 | A | Close the circuit breaker 34Q1 and 57Q1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |

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| 10034 | A | Check 400Vac +-5% tolerance between Phases (W,V,U) on connector 57XP1_10 (10b1,10a2,10a1) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10035 | R | 400Vac +- 5% tolerance is measured between all three phases on connector 93XP150 (E2,E3,E1) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10036 | A | Check 400Vac +-5% tolerance between Phases (W,V,U) on connector 93XP150 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10037 | R | 400Vac +- 5% tolerance is measured between all three phases on circuit breaker 57Q1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10038 | A | Put back the connector 57XP1_10 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10039 | A | Put back the connector 93XP150 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10040 | I | Auxiliary Converters Command | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10041 | I | Battery Connection Train Lines Dev1/79 = END 1 90XR24 pin 30 Dev5/79 = END 2 90XP34 pin 30 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10042 | A | Force [NI] Dev1/79 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10043 | R | Read Defined Variable [NI] Dev5/79 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10044 | A | Force [NI] Dev1/79 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10045 | R | Read Defined Variable [NI] Dev5/79 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10046 | I | Battery Disconnection Train Lines Dev1/75 = END 1 90XR24 pin 31 Dev5/75 = END 2 90XP34 pin 31 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10047 | A | Force [NI] Dev1/75 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10048 | R | Read Defined Variable [NI] Dev5/75 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10049 | A | Force [NI] Dev1/75 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10050 | R | Read Defined Variable [NI] Dev5/75 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10051 | I | IES StatusTrain Lines Dev1/86 = END 1 90XR25 pin 61 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |

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| | | Dev2/87 = END 1 90XR25 pin 62 | | | | | |
| 10052 | A | Force [NI] Dev1/86 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10053 | R | Read Defined Variable [NI] Dev2/87 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10054 | A | Force [NI] Dev1/86 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10055 | R | Read Defined Variable [NI] Dev2/87 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10056 | I | Switch off the 400Vac power supply at the socket | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |



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Section 4 – TCMS Network

4.1 Instructions list

4.1.1 025_NET-TCMS Network

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--|---------|
| 10001 | I | TCMS Network IO (SPP=25) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10002 | I | Initial conditions | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10003 | I | Vehicle test bench should be configured as TC1: 1. TC1 Dataplugs 2. MCE switch set to TC1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10004 | R | On DDU TCMS screen the TC1 cab is in BLUE colour | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10005 | I | Power Supply to the Router Switches | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10006 | I | Power supply to the 25A10 SWITCH ETHERNET (CRS1) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10007 | A | Close Circuit Breaker 25Q10 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10008 | R | CRS1 25A10 is ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10009 | I | Power supply to the 25A11 SWITCH ETHERNET (CRS2) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10010 | A | Close Circuit Breaker 25Q11 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10011 | R | CRS2 25A11 is ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10012 | I | Power supply to the 25A14 ETHERNET REPEATER (TBR) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10013 | A | Close Circuit Breaker 25Q14 | | OK | | Alleta Sekgololo 417407 | M1 |

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| | | | | | | 21.08.2025 | |
| 10014 | R | TBR 25A14 is ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10015 | A | Close Circuit Breaker 25Q6 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10016 | A | Close Circuit Breaker 25Q7 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10017 | I | Ethernet Loop | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10018 | A | For each CRS, check that the Ethernet Loop LEDs are flashing | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10019 | R | CRS1 has LEDs on ports X3 and X4 flashing | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10020 | R | CRS2 has ONLY LED on port X4 flashing | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10021 | R | Check on the Test Bench DDU that all Router Switches are available on the network | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10022 | I | Power Supply to the BRIOMS | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10023 | I | Power supply to the 25A6 BRIOM 40/10 ETH 6 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10024 | R | BRIOM 25A6 is ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10025 | A | Check visually that ground braid is connected to BRIOM | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10026 | I | Power supply to the 25A7 BRIOM 40/10 ETH 7 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10027 | R | BRIOM 25A7 is ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |

Section 5 – Cabin Control

5.1 Instructions list

5.1.1 020_CAB-Cabin Control

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|--|---------|
| 10001 | I | Cabin Control (SPP=020) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10002 | I | Train Lines | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10003 | I | Cab Selected on Train Lines Dev1/1 = END1 90XR24 pin 3 Dev5/1 = END2 90XP34 pin 3 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10004 | A | Force [NI] Dev1/1 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10005 | R | Read Defined Variable [NI] Dev5/1 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10006 | A | Force [NI] Dev1/1 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10007 | R | Read Defined Variable [NI] Dev5/1 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10008 | I | Cab Active TC1 Train Lines Dev1/2 = END1 90XR24 pin 4 Dev5/2 = END2 90XP34 pin 4 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10009 | A | Force [NI] Dev1/2 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10010 | R | Read Defined Variable [NI] Dev5/2 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10011 | A | Force [NI] Dev1/2 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10012 | R | Read Defined Variable [NI] Dev5/2 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10013 | I | Master Key TC1 Train Lines Dev1/73 = END1 90XR24 pin 17 Dev5/73 = END2 90XP34 pin 14 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |



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| 10014 | A | Force [NI] Dev1/73 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10015 | R | Read Defined Variable [NI] Dev5/73 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10016 | A | Force [NI] Dev1/73 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10017 | R | Read Defined Variable [NI] Dev5/73 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |



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Section 6 – Internal Lighting

6.1 Instructions list

6.1.1 052_LGT-Internal Lighting

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--------------------------------------|---------|
| 10001 | I | Internal Lighting (SPP=052) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10003 | I | The 110Vdc Normal line is ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10004 | I | Cleaning Lighting Command | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10005 | I | 110Vdc Permanent Train Line Dev1/40 = END1 90XR24 pin 29 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10006 | A | Force [NI] Dev1/40 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10007 | A | Close Circuit Breaker 52Q5 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10008 | A | Close Circuit Breaker 52Q3 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10009 | A | Close Circuit Breaker 52Q4 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10010 | I | Lighting 33% Train Line Dev1/8 = END1 90XR25 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10011 | A | Force [NI] Dev1/8 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10012 | R | The saloon RIGHT side emergency lights (low intensity) are ON on all light modules | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10013 | R | The saloon LEFT side emergency lights (low intensity) are ON on all light modules | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10014 | I | Lighting 33% Train Line Dev5/8 = END2 90XP35 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10015 | R | Read Defined Variable [NI] Dev5/8 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10016 | I | Lighting 33% Train Line Dev1/8 = END1 90XR25 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |

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| 10017 | A | Force [NI] Dev1/8 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10018 | I | Lighting 33% Train Line Dev5/8 = END2 90XP35 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10019 | R | Read Defined Variable [NI] Dev5/8 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10020 | R | All saloon emergency lights (low intensity) are OFF on all light modules (Left+Right) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10021 | A | Turn Cleaning Staff Lights Switch 52S6 to ON position | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10022 | I | Lighting 33% Train Line Dev5/8 = END2 90XP35 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10023 | R | Read Defined Variable [NI] Dev5/8 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10024 | R | All saloon emergency lights (low intensity) are ON on all light modules (Left+Right) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10025 | A | Reset Circuit Breaker 52Q5 (Open and Close) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10026 | R | Read Defined Variable [NI] Dev5/8 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10027 | I | Main Lighting Command | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10028 | A | Close Circuit Breaker 52Q1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10029 | A | Close Circuit Breaker 52Q2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10030 | R | All saloon emergency lights (low intensity) are ON on all light modules (Left+Right) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10031 | I | Lighting 33% Train Line Dev5/8 = END2 90XP25 pin 27 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10032 | R | Read Defined Variable [NI] Dev5/8 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10033 | I | Main Lighting Command Train Line Dev1/32 = END1 90XR25 pin 26 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10034 | A | Force [NI] Dev1/32 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10035 | I | Main Lighting Command Train Line Dev5/24 = END2 90XP35 pin 26 | | OK | | Sicelo Mtolo 525130 | M1 |

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|-------|---|--|--|----|---|--|----|
| | | | | | | 21.08.2025 | |
| 10036 | R | Read Defined Variable [NI] Dev5/24 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10037 | R | The saloon LEFT side main lighting (high intensity) is ON on all light modules | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10038 | R | The saloon RIGHT side main lighting (high intensity) is ON on all light modules | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10039 | I | Main Lighting Command Train Line Dev1/32 = END1 90XR25 pin 26 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10040 | A | Force [NI] Dev1/32 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10041 | R | All saloon emergency lights (low intensity) are ON on all light modules (Left+Right) | | OK | | Alleta Sekgololo 417407 01.09.2025 | M1 |



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Emission date
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Section 7 – PACIS Network

7.1 Instructions list

7.1.1 054_PIS-PACIS Network

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|---|---------|
| 10001 | I | PACIS System (SPP=054) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10002 | I | Initial conditions | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10003 | I | 110Vdc Normal line is connected and ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10004 | I | Circuit Breakers | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10005 | A | Close Circuit Breaker 54Q1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10006 | A | Close Circuit Breaker 54Q2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10007 | A | Close Circuit Breaker 54Q10 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10008 | A | Close Circuit Breaker 54Q11 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10009 | A | Close Circuit Breaker 55Q2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10010 | A | Close Circuit Breaker 55Q3 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10011 | R | All 'Pacis System' circuit breakers are closed | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10012 | I | Power Supply of Router Switches | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10013 | I | Ethernet Switch CRS1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10014 | R | CRS1 is ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10015 | I | Ethernet Switch CRS2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10016 | R | CRS2 is ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|--|--|----|------|---|----|
| 10017 | I | DPAI-1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10018 | R | DPAI-1 is ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10019 | I | DPAI-2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10020 | R | DPAI-2 is ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10021 | I | Lateral Display 'LAT1' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10022 | R | The PWR (power) LED is ON on the Lateral Display 'LAT1' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10023 | I | Lateral Display 'LAT2' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10024 | R | The PWR (power) LED is ON on the Lateral Display 'LAT2' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10025 | I | Interior Display 'INT1' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10026 | R | The PWR (power) LED is ON on the Interior Display 'INT1' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10027 | I | Interior Display 'INT2' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10028 | R | The PWR (power) LED is ON on the Interior Display 'INT2' | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10029 | I | Impedance of Loudspeaker | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10030 | I | Saloon Speakers Commanded by DPAI-1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10031 | A | Measure the impedance connector '54XP1_X4' between pins:z32(+) and z30 (-) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10032 | R | ImpedanceResult Max : x <= 32 (Ohm) | | OK | 30.5 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10033 | I | Saloon Speakers Commanded by DPAI-2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10034 | A | Measure the impedance connector '54XP2_X4' between pins:z32(+) and z30 (-) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10035 | R | ImpedanceResult Max : x <= 32 (Ohm) | | OK | 30.2 | Mlungisi Madela 529927 | M1 |



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| | | | | | | 21.08.2025 | |
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Section 8 – Train-Ground Communication

8.1 Instructions list

8.1.1 064_COM-Train-Ground Communication

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|--|---------|
| 10001 | I | Train-Ground Communication (SPP=064) | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10002 | A | Using the tool list on the side of your screen, note the serial number of the antenna cable tester used in this procedure | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10003 | I | Antenna cable tester Calibration | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10004 | I | PERFORM THIS CALIBRATION BEFORE TESTING EACH CABLE | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10005 | A | Select "preset", then Set the test frequency by selecting "FREQ/DIST" then setting the start and stop frequency, select "calibrate", then "Full 1-port" then Calibrate the Antenna cable tester using the 0.5m extension cable and the T-calibration unit. | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10006 | I | GSM Cable | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10007 | A | Ensure the frequency range is 876MHz - 961.34MHz; Connect the GSM cable of the Netbox to the measuring cable and note the resulting waveform | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10008 | R | The maximum peak of the waveform isResult Max : x <= 2.13 () | | OK | 2 | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10009 | A | Save the waveform result with the following name: TS#(#-Train number)_NBX_GSM1 | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10010 | A | Recalibrate the tester. Ensure the frequency range is 1.71GHz - 1.88Ghz; Connect the GSM cable of the Netbox to the measuring cable and note the resulting waveform | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10011 | R | The maximum peak of the waveform isResult Max : x <= 2.13 () | | OK | 1.87 | Tshembhani Khosa 446920 | M1 |

| | | | | | | | |
|-------|---|---|---|----|------|--|----|
| | | | | | | 27.08.2025 | |
| 10012 | A | Save the waveform result with the following name: TS#(#-Train number)_NBX_GSM2 | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10013 | I | GPS Cable | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10014 | A | Recalibrate the tester. Ensure the frequency range is 1200MHz - 1600MHz; Connect the GPS cable of the Netbox to the measuring cable and note the resulting waveform | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10015 | A | On the cable tester, select "MEAS" and select F1 "Distance to Fault" | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10016 | I | Ensure that the resulting waveform is such as in the picture on the right. The peak of the graph should be at a point >8m; before that, the graph should be flat. Maximum value before the peak should be 1.2 |  | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10017 | R | The maximum peak of the waveform isResult Max : x <= 1.2 () | | OK | 1 | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10018 | A | Save the waveform result with the following name: TS#(#-Train number)_NBX_GPS | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10019 | I | Wifi Cable | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10020 | A | Recalibrate the tester. Ensure the frequency range is 1710MHz - 2700MHz; Connect the WiFi cable of the Netbox to the measuring cable and note the resulting waveform | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10021 | R | The maximum peak of the waveform isResult Max : x <= 2.45 () | | OK | 1.12 | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10022 | A | Save the waveform result with the following name: TS#(#-Train number)_NBX_WiFi1 | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10023 | A | Recalibrate the tester. Ensure the frequency range is 4.9GHz - 5.935GHz; | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10024 | R | The maximum peak of the waveform isResult Max : x <= 2.45 () | | OK | 1.9 | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10025 | A | Save the waveform result with the following name: TS#(#-Train number)_NBX_WiFi2 | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10026 | A | Close Circuit Breaker 64Q1 | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |
| 10027 | R | Check that the Netbox turns ON | | OK | | Tshembhani Khosa 446920 27.08.2025 | M1 |

8.1.2 062_ETS-ERTMS

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--|---------|
| 10001 | I | ERTMS (SPP=062) | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10002 | I | ERTMS Bypass Train Lines Dev1/33 = END1 90XR24 pin 11 Dev5/37 = END2 90XP34 pin 11 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10003 | A | Force [NI] Dev1/33 = 1.0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10004 | R | Read Defined Variable [NI] Dev5/37 = 1.0 | | OK | 1 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10005 | A | Force [NI] Dev1/33 = 0.0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10006 | R | Read Defined Variable [NI] Dev5/37 = 0.0 | | OK | 0 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10007 | I | Emergency Brake ERTMS 1 Train Lines Dev1/88 = END1 90XR24 pin 18 Dev5/88 = END2 90XP34 pin 18 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10008 | A | Force [NI] Dev1/88 = 1.0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10009 | R | Read Defined Variable [NI] Dev5/88 = 1.0 | | OK | 1 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10010 | A | Force [NI] Dev1/88 = 0.0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10011 | R | Read Defined Variable [NI] Dev5/88 = 0.0 | | OK | 0 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10012 | I | Emergency Brake ERTMS 2 Train Lines Dev1/80 = END1 90XR24 pin 20 Dev5/80 = END2 90XP34 pin 20 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10013 | A | Force [NI] Dev1/80 = 1.0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10014 | R | Read Defined Variable [NI] Dev5/80 = 1.0 | | OK | 1 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10015 | A | Force [NI] Dev1/80 = 0 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |

| | | | | | | | |
|-------|---|--|---|----|---|--|----|
| 10016 | R | Read Defined Variable [NI] Dev5/80 = 0 | | OK | 0 | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10017 | I | Wheel Sensor Continuity Test | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10018 | I | Use the multimeter to test the continuity | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10019 | A | Check continuity between [62B1 WHEEL SENSOR (Local:+MB2; Connector 62XP1_1) and Intercar(Local:+END2; connector 90XP33.c)] | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10020 | R | There is a continuity between: pin B & pin 2, pin A & pin 1, pin C & pin 7, pin D & pin 8 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10021 | R | There is a continuity between: pin F & pin 4, pin E & pin 3, pin G & pin 9, pin H & pin 10 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10022 | R | There is a continuity between: pin L & pin 6, pin K & pin 5, pin M & pin 11, pin N & pin 12 | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10023 | I | Eurobalise Antenna Cable | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10024 | A | Check continuity between [Intercar(LOCAL: +END1; Connector - 90XR20) and Intercar (LOCAL:+END2; connector -90XP30)] according to the image below |  | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |
| 10025 | R | Eurobalise Antenna cable is correctly configured | | OK | | Sthabile Dlamini 418538 21.08.2025 | M1 |



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Section 9 – Pantograph

9.1 Instructions list

9.1.1 021_PNT-Pantograph

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|---|---------|
| 10001 | I | Pantograph (SPP = 021) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10002 | I | There should be no air in the main pipe | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10003 | R | Measure 0 Bar at point K2.8 using the pressure gauge | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10004 | A | Ensure that the pantograph isolation valve K2.5 is normalised (not isolated) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10005 | I | Initial Conditions | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10006 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1drainingcocker1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10007 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1drainingcocker2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10008 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10009 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10010 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxpressswitchr1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10011 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxpressswitchr2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10012 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10013 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10014 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10015 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10016 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |

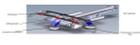
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|-------|---|--|----|---|---|----|
| 10017 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr2 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10018 | I | Auxiliary Compressor | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10019 | A | Close Circuit Breaker 21Q1 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10020 | A | Close Circuit Breaker 21Q2 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10021 | A | Close Circuit Breaker 21Q3 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10022 | R | The Auxiliary compressor 21M1 turns ON | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10023 | R | Read Defined Variable [TT] (MPU1)lo_pnt_m1startauxiliarcompr1 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10024 | R | Read Defined Variable [TT] (MPU1)lo_pnt_m1startauxiliarcompr2 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10025 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr1 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10026 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr2 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10027 | A | Force [TT] (MPU1)lo_pnt_m1raisepantor1 = 1.0 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10028 | A | Allow the pressure to rise. Using the pressure gauge, check that the pressure at point K2.8 > 3.8Bar. (VERIFY BEFORE MOVING TO THE NEXT STEP) | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10029 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr1 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10030 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr2 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10031 | R | The pantograph is raised | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10032 | A | Allow the pressure to rise. Using the pressure gauge, check that the pressure at point K2.8 is between 6 - 7Bar. (VERIFY BEFORE MOVING TO THE NEXT STEP) | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10033 | R | The Auxiliary compressor 21M1 turns OFF | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10034 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr1 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|--|---|----|---|---|----|
| 10035 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1auxcpcontactorr2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10036 | A | Turn the pantograph isolation valve K2.5 to isolated position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10037 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1drainingcockr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10038 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1drainingcockr2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10039 | A | Force [TT] (MPU1)lo_pnt_m1startauxiliarcompr1 = 0.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10040 | A | Force [TT] (MPU1)lo_pnt_m1startauxiliarcompr2 = 0.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10041 | A | Drain the air by putting the isolation valve K2.5 in half way position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10042 | R | Using the pressure gauge, check that the Pantograph drops at 3.3 Bar. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10043 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10044 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10045 | A | Turn the pantograph isolation valve K2.5 to normal position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10046 | A | Release [TT] (MPU1)lo_pnt_m1startauxiliarcompr1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10047 | A | Release [TT] (MPU1)lo_pnt_m1startauxiliarcompr2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10048 | R | The Auxiliary compressor 21M1 turns ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10049 | A | Allow the pressure to rise. Using the pressure gauge, check that the pressure at point K2.8 is between 6 - 7Bar. (VERIFY BEFORE MOVING TO THE NEXT STEP) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10050 | R | The Auxiliary compressor 21M1 turns OFF | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10051 | I | Isolation and Earthing | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10052 | A | In the HV Box , check that all the Green Keys are present. |  | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|---|--|----|---|---|----|
| 10053 | A | In the HV Box , set the HVB1 valve to Isolated position - to isolate the pantograph | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10054 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10055 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10056 | A | Turn the Earthing Switch to grounded position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10057 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10058 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10059 | A | Turn the Earthing Switch to back to Normal position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10060 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10061 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1earthpantor2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10062 | A | Set the HVB1 valve to Normal position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10063 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr1 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10064 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantoisolatedr2 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10065 | A | Normalize the HV box and remove all spare/duplicate keys (green/yellow/blue) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10066 | I | Pantograph Mechanical Test | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10067 | I | Housed Height Measurement, Pantograph Over-Height Measurement, Automatic Drop Device and Control Force Test | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10068 | I | Initial Conditions | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10069 | I | There should be no air in the main pipe | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10070 | R | Measure 0 Bar at point K2.8 using the pressure gauge | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10071 | A | Ensure that the pantograph isolation valve K2.5 is normalised (not isolated) | | OK | | Mlungisi Madela 529927 | M1 |

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|-------|---|---|---|----|-----|---|----|
| | | | | | | 21.08.2025 | |
| 10072 | I | Housed Height Measurement | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10073 | I | The purpose of this test is to ensure that the housed height of the pantograph complies with the specified dimensions The train must be positioned on a levelled track without any overhead catenary | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10074 | A | Measure the perpendicular height (using a measuring tape and ruler extended from points A, B and C of the pantohead) of the pantograph on natural housed position (between the roof of the train and the pantograph collector head at points A, B, C) |  | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10075 | A | Ensure that no part of the pantograph is higher than 486mm above the roof | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10076 | R | AResult Max : $x \leq 486$ (mm) | | OK | 485 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10077 | R | BResult Max : $x \leq 486$ (mm) | | OK | 486 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10078 | R | CResult Max : $x \leq 486$ (mm) | | OK | 485 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10079 | A | Check that the centre of the pantograph head corresponds with the track centreline in the housed position (Use marked ruler to compare) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10080 | R | Pantograph aligned with the track centreline in housed position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10081 | I | Automatic Drop Device | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10082 | I | The purpose of this test is to verify the correct operation of the automatic drop device (ADD) and will be performed by simulating the activation of the ADD pressure switch. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10083 | A | Tie a cable on pantograph head collector | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10084 | A | Close Circuit Breaker 21Q3 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10085 | A | Close Circuit Breaker 21Q1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10086 | A | Close Circuit Breaker 21Q2 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|---|---|----|--|---|----|
| 10087 | R | The Auxiliary compressor 21M1 turns ON | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10088 | A | Force [TT] (MPU1)lo_pnt_m1raiseantor1 = 1.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10089 | I | Allow the pressure to rise, and the pantograph to raise | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10090 | R | The pantograph is raised | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10091 | A | Activate the ADD manually on the roof by operating the bleeding screw (PT3) on the pan head to simulate a loss of air supply |  | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10092 | R | The pressure of the test point PT12 drops to 0 bar | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10093 | A | On the roof, close the bleeding screw (PT3) to reset the ADD | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10094 | R | Fault reset and equipment normalized | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10095 | A | Release [TT] (MPU1)lo_pnt_m1raiseantor1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10096 | R | Pantograph is lowered | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10097 | I | Pantograph Over-Height Measurement | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10098 | I | The purpose of the next test is to verify that the pantograph over-height detection and auto dropping functions are calibrated and work correctly. This test simulates the condition when a pantograph is incorrectly raised in an area without any overhead line | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10099 | I | You will be required to time the rising and dropping of the pantograph using a stopwatch. measure the time from the moment the pantograph starts to rise until the pantograph reaches maximum raised position; then time from the moment the pantograph starts dropping at overheight detection till it reaches housed position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10100 | A | Use the rope to hook the pantograph and place the marked ruler perpendicular to the roof of the car. See the picture attached. |  | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10101 | A | Force [TT] (MPU1)lo_pnt_m1raiseantor1 = 1.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10102 | A | Whilst holding the end of the rope, allow the pressure to rise, and the pantograph | | OK | | Mlungisi Madela 529927 | M1 |

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|-------|---|--|--|----|-----|---|----|
| | | to rise until it reaches the maximum height marked on the ruler. | | | | 21.08.2025 | |
| 10103 | R | Rising timeResult Max : $x \leq 10$ (S) | | OK | 7.6 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10104 | A | By adjusting the rope, ensure that the Pantograph Panhead is aligned with the marking on the ruler. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10105 | A | Adjust the Over-height valve such that when the panto goes above the marking on the ruler, the overheight must be detected. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10106 | R | The over-height valve is adjusted correctly. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10107 | A | Release [TT] (MPU1)lo_pnt_m1raisepantor1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10108 | R | Pantograph is lowered | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10109 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10110 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10111 | A | Force [TT] (MPU1)lo_pnt_m1raisepantor1 = 1.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10112 | A | Allow the pantograph to rise freely until it reaches overheight. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10113 | R | Overheight is detected immediately after passing the marked area on the ruler and pantograph begins to drop | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10114 | R | Lowering timeResult Max : $x \leq 7$ (S) | | OK | 6.3 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10115 | A | Release [TT] (MPU1)lo_pnt_m1raisepantor1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10116 | A | Reset over-height valve (PT2) on the roof | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10117 | R | Equipment normalized. (Only after resetting the PT2 valve, can the pantograph be raised) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10118 | I | Control Force Test | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10119 | I | The purpose of this test is to ensure that the pantograph maintains an acceptable force against the catenary wire over all operating heights | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|--|--|----|---|---|----|
| 10120 | A | Attach the dynamometer to the pantograph's head collector | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10121 | A | Raise the pantograph and measure the static force when the pantograph begins to rise after pulling the dynamometer up (lifting force on housed position) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10122 | A | Force [TT] (MPU1)lo_pnt_m1raiseantor1 = 1.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10123 | I | Allow the pressure to rise, and the pantograph to raise | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10124 | R | The pantograph is raised | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10125 | R | F>150N | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10126 | A | Attach the 8.5kg (one 7.5kg and one 1kg) dead weight to the pantohead to apply a 85N force whilst the panto is in the raised position. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10127 | R | The pantographs should remain in the neutral position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10128 | A | Check that the centre of the pantograph head corresponds with the track centreline on maximum raised position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10129 | R | Pantograph aligned with the track centreline in maximum raised position (Use marked ruler to compare) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10130 | A | Remove 1kg dead weight | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10131 | R | Pantograph continues to rise to over height condition | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10132 | A | Remove the dynamometer and dead weights from the pantograph's head-collector | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10133 | A | Release [TT] (MPU1)lo_pnt_m1raiseantor1 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10134 | R | Pantograph is lowered | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10135 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr1 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10136 | R | Read Defined Variable [TT] (MPU1)li_pnt_m1pantorisedr2 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |



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Emission date
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Section 10 – Rescue Mode and Emergency Disconnection

10.1 Instructions list

10.1.1 027_ERM-Rescue Mode and Emergency Disconnection

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|--|---------|
| 10001 | I | Rescue Mode and Emergency Disconnection (SPP=027) | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10003 | I | 110Vdc Normal power supply is connected to the vehicle, and switched ON | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10004 | I | Backup Mode Train Lines Dev1/29 = END1 90XR15 pin23 Dev5/33 = END2 90XP25 pin 23 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10005 | A | Force [NI] Dev1/29 = 1.0 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10006 | R | Read Defined Variable [NI] Dev5/33 = 1.0 | | OK | 1 | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10007 | R | Relay 27K1 is Energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10008 | R | Relay 27K2 is De-energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10009 | A | Timer 30.0 S | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10010 | R | Relay 27K2 is De-energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |

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|-------|---|--|--|----|---|--|----|
| 10011 | A | Timer 30.0 S | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10012 | R | Relay 27K2 is energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10013 | I | Backup Mode Train Lines Dev1/29 = END1 90XR25 pin23 Dev5/33 = END2 90XP35 pin 23 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10014 | A | Force [NI] Dev1/29 = 0.0 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10015 | R | Read Defined Variable [NI] Dev5/33 = 0.0 | | OK | 0 | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10016 | R | Relay 27K1 is De-energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10017 | R | Relay 27K2 is De-energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10018 | I | Emergency Disconnection | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10019 | I | Emergency Disconnection Train Lines Dev1/30 = END1 90XR25 pin24 Dev5/34 = END2 90XP35 pin 24 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10020 | A | Force [NI] Dev1/30 = 1.0 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10021 | R | Read Defined Variable [NI] Dev5/34 = 1.0 | | OK | 1 | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10022 | R | Relay 27K5 is Energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10023 | I | Emergency Disconnection Train Lines Dev1/30 = END1 90XR25 pin24 Dev5/34 = END2 90XP35 pin 24 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10024 | A | Force [NI] Dev1/30 = 0.0 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |



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|-------|---|--|--|----|---|--|----|
| 10025 | R | Read Defined Variable [NI] Dev5/34 = 0.0 | | OK | 0 | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10026 | R | Relay 27K5 is De-energised | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |



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Section 11 – Emergency Brake

11.1 Instructions list

11.1.1 044_UBK-Emergency Brake

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|--|---------------|--------------|--|---------|
| 10001 | I | Emergency Brake (SPP=044) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10003 | I | No PEAs are activated | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10004 | I | 110Vdc Normal power supply should be connected to the vehicle and ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10005 | I | Visual Inspection | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10006 | A | Physically and visually inspect all the Disk Break Units (DBU) and brake pads, to ensure they are securely fitted |  | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10007 | R | All the brake DBUs are correctly installed and all the brake pads are correctly installed and locked | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10008 | A | Check the piping installation | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10009 | R | All the pipes are installed on the vehicle | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10010 | A | Check all the Passenger Emergency Alarm handles, and ensure they are connected to their respective connectors | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10011 | R | All the PEAs are installed and connected | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10012 | I | Train Lines | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10013 | I | Emergency Brake Loop Train Lines Dev1/5 = END1 90XR24 pin 8 Dev5/5 = END2 90XP34 pin 8 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10014 | A | Force [NI] Dev1/5 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10015 | R | Read Defined Variable [NI] Dev5/5 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10016 | A | Force [NI] Dev1/5 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |

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|-------|---|--|--|----|---|--|----|
| 10017 | R | Read Defined Variable [NI] Dev5/5 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10018 | I | Emergency Brake Loop Override Train Lines Dev1/6 = END1 90XR24 pin 9 Dev5/6 = END2 90XP34 pin 9 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10019 | A | Force [NI] Dev1/6 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10020 | R | Read Defined Variable [NI] Dev5/6 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10021 | A | Force [NI] Dev1/6 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10022 | R | Read Defined Variable [NI] Dev5/6 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10023 | I | Emergency Brake Train Line Train Lines Dev1/50 = END1 90XR25 pin 67 Dev5/61 = END2 90XP35 pin 67 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10024 | A | Force [NI] Dev1/50 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10025 | R | Read Defined Variable [NI] Dev5/61 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10026 | A | Force [NI] Dev1/50 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10027 | R | Read Defined Variable [NI] Dev5/61 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10028 | I | PEA Loop OTDR Train Lines Dev1/7 = END1 90XR24 pin 10 Dev5/7 = END2 90XP34 pin 10 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10029 | A | Force [NI] Dev1/7 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10030 | R | Read Defined Variable [NI] Dev5/7 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10031 | A | Force [NI] Dev1/7 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10032 | R | Read Defined Variable [NI] Dev5/7 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10033 | I | PEA Reset | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10034 | A | Check continuity on Timer Relay 44D1 between points A1 and B1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10035 | R | The points are continuous | | OK | | Alleta Sekgololo | M1 |

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| | | | | | | 417407 21.08.2025 | |
| 10036 | A | Check continuity on Timer Relay 44D1 between points A4, B3 and C4 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10037 | R | All three points are continuous | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10038 | A | Close Circuit Breaker 44Q1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10039 | I | PEA Loop Train Lines Dev1/58 = END1 90XR25 pin 95 Dev5/62 = END2 90XP35 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10040 | A | Force [NI] Dev1/58 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10041 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10042 | A | Force [NI] Dev1/58 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10043 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10044 | A | Force [NI] Dev1/58 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10045 | A | Activate the PEA on door 5 (44S15) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10046 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10047 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10048 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10049 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10050 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10051 | A | Activate the PEA on door 3 (44S13) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10052 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10053 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |

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|-------|---|--|--|----|---|--|----|
| 10054 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10055 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10056 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10057 | A | Activate the PEA on door 1 (44S11) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10058 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10059 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10060 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10061 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10062 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10063 | A | Activate the PEA on door 2 (44S12) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10064 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10065 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10066 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10067 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10068 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10069 | A | Activate the PEA on door 4 (44S14) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10070 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10071 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10072 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo | M1 |

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|-------|---|--|--|----|---|--|----|
| | | | | | | 417407 21.08.2025 | |
| 10073 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10074 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10075 | A | Activate the PEA on door 6 (44S16) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10076 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10077 | R | Read Defined Variable [NI] Dev5/62 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10078 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10079 | I | PEA Loop Train Lines Dev5/62 = END2 90XP25 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10080 | R | Read Defined Variable [NI] Dev5/62 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10081 | I | PEA Loop Train Lines Dev1/58 = END1 90XR15 pin 95 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10082 | A | Force [NI] Dev1/58 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |



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Version: A0

Emission date
1/9/2025

Section 12 – Service Brake

12.1 Instructions list

12.1.1 040_SBK-Service Brake

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|--|---------------|--------------|--|---------|
| 10001 | I | Service Brake (SPP=040) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10003 | I | No air supply to the vehicle | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10004 | I | All BPM cocks are in normal position (not isolated) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10005 | I | 110Vdc Normal power supply should be connected to the vehicle and ON | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10006 | I | Follow the procedure in the document below to upload software onto the TBCU electronic [11-40-49-281074_TBCU Software Upload.pdf] |  | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10007 | I | Power Supply | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10008 | A | Remove the connector 10XR12_XCB2 from the propulsion box | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10009 | A | Close Circuit Breaker 33Q1, 33Q3 and 33Q5 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10010 | A | Check the voltage on connector 10XR12_XCB2 between pins 4 (+) and 69 (-) ; 4(+) and 67(-); and 5(+) and 68(-) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10011 | R | Battery voltage (above 80Vdc) is measured on connector 10XR12_XCB2 between pins 4 (+) and 69 (-) ; 4(+) and 67(-); and 5(+) and 68(-) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10012 | A | Open Circuit Breaker 33Q1 and 33Q3, Replace connector 10XR12_XCB2 on the propulsion box, and Close Circuit breaker 33Q1 and 33Q3 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10013 | A | Remove the connector -40XP2_C2_16 from pneumatic BPM | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10014 | A | Close Circuit Breaker 40Q1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10015 | A | Check the voltage on connector 40XP2_C2_16 between pins 13 (+) and 31 (-) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |

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|-------|---|---|----|---|--|----|
| 10016 | R | Battery voltage (above 80Vdc) is measured on connector 40XP2_C2_16 between pins 13 (+) and 31 (-) | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10017 | A | Open Circuit Breaker 40Q1, Replace connector -40XP2_C2_16 on the pneumatic BPM, and Close Circuit breaker -40Q1 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10018 | R | The pneumatic BPM 40A2 is ON | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10019 | I | Brake Air Supply and Brake Application | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10020 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XP35 pin 60 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10021 | R | Read Defined Variable [NI] Dev2/85 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10022 | R | Read Defined Variable [NI] Dev5/51 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10023 | I | Brake Applied Train Lines Dev2/83 = END1 90XR25 pin 50 Dev5/49 = END2 90XP35 pin 50 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10024 | R | Read Defined Variable [NI] Dev2/83 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10025 | R | Read Defined Variable [NI] Dev5/49 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10026 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1brakeairsuppokr1 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10027 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1brakeairsuppokr2 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10028 | R | Read Defined Variable [TT] (TBCU1)LI_BRPS_NOK = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10029 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_NOT_APPLIED = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10030 | A | Close/Isolate the Isolation cock F2.1/3 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10031 | A | Open the Isolation cock F2.2/3 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10032 | A | Connect the air supply to the vehicle main pipe coupling flexible hose F3/5, and switch the supply ON | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10033 | I | Take note of any air leaks in the pipes or valves | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |

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|-------|---|--|--|----|---|--|----|
| 10034 | A | Allow the pressure to go above 6 bar. The pressure can be checked at the BRTP test point | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10035 | R | BRTP pressure is measured >=6 Bar | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10036 | I | Brake Applied Train Lines Dev2/83 = END1 90XR25 pin 50 Dev5/49 = END2 90XP35 pin 50 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10037 | R | Read Defined Variable [NI] Dev2/83 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10038 | R | Read Defined Variable [NI] Dev5/49 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10039 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1brakeairsuppokr1 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10040 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1brakeairsuppokr2 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10041 | R | Read Defined Variable [TT] (TBCU1)LI_BRPS_NOK = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10042 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_NOT_APPLIED = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10043 | I | Remote Isolation | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10044 | I | Remote Isolation Train Lines Dev1/84 = END1 90XR25 pin 59 Dev5/50 = END2 90XP35 pin 59 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10045 | A | Force [NI] Dev1/84 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10046 | R | Read Defined Variable [NI] Dev5/50 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10047 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_ISO = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10048 | A | Force [TT] (MPU1)lo_sbk_m1isobrake = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10049 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_ISO = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10050 | I | Remote Isolation Train Lines Dev5/50 = END2 90XP35 pin 59 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10051 | R | Read Defined Variable [NI] Dev5/50 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10052 | A | Release [TT] (MPU1)lo_sbk_m1isobrake | | OK | | Alleta Sekgololo 417407 | M1 |

| | | | | | | 21.08.2025 | |
|-------|---|--|--|----|---|--|----|
| 10053 | R | Read Defined Variable [NI] Dev5/50 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10054 | R | Read Defined Variable [TT] (TBCU1)Li_BRAKE_ISO = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10055 | I | Remote Isolation Train Lines Dev1/84 = END1 90XR25 pin 59 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10056 | A | Force [NI] Dev1/84 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10057 | I | Manual Isolation | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10058 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XP35 pin 60 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10059 | R | Read Defined Variable [NI] Dev2/85 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10060 | R | Read Defined Variable [NI] Dev5/51 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10061 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1servicebrakedc = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10062 | R | Read Defined Variable [TT] (TBCU1)Li_ServiceBrakeDC = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10063 | A | Close the Isolation cock C2.3.1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10064 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XP35 pin 60 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10065 | R | Read Defined Variable [NI] Dev2/85 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10066 | R | Read Defined Variable [NI] Dev5/51 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10067 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1servicebrakedc = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10068 | R | Read Defined Variable [TT] (TBCU1)Li_ServiceBrakeDC = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10069 | A | Re-open the Isolation cock C2.3.1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10070 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1servicebrakedc = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |

| | | | | | | | |
|-------|---|---|--|----|---|--|----|
| 10071 | I | Switch OFF 400V before reading the bcufault variable | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10072 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1bcufault = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10073 | A | Force [TT] (TBCU1)LO_BRK_FLT = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10074 | R | Read Defined Variable [TT] (MPU1)li_sbk_m1bcufault = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10075 | A | Release [TT] (TBCU1)LO_BRK_FLT | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |



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Section 13 – Holding and Parking Brake

13.1 Instructions list

13.1.1 045_PBK-Holding and Parking Brake

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|------|---------------|--------------|---|---------|
| 10001 | I | Holding and Parking Brake (SPP_045) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10002 | I | Initial Conditions | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10003 | I | Using the tools list on the side of your screen, record the serial number of the manometer that will be used in this test | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10004 | I | Check that the pressure on Test point C2.11/1 is >5bar | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10005 | I | Visual Inspection | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10006 | A | Check the installation of the manual parking brake release components (lever + cable) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10007 | R | The lever is securely fixed (tight) and the cable is correctly attached to the bogie (there is no excess cable and all clamps are installed) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10008 | I | Circuit Breakers | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10009 | I | Circuit Breaker 33Q3 and 33Q5 should be closed | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10010 | I | Parking Brake Pressure Switch | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10011 | R | Read Defined Variable [TT] (TBCU1)LI_PARK_BR_RELEASE = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10012 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_STAT = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10013 | R | Read Defined Variable [TT] (MPU1)TBCU1_parkbrakerelease = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10014 | R | Read Defined Variable [TT] (MPU1)tbcu1_li_pbrake_stat = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10015 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP35 pin 77 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10016 | R | Read Defined Variable [NI] Dev2/52 = 0.0 | | OK | 0 | Mlungisi Madela 529927 | M1 |

| | | | | | | | |
|-------|---|---|--|----|---|---|----|
| | | | | | | 21.08.2025 | |
| 10017 | R | Read Defined Variable [NI] Dev5/58 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10018 | I | Parking Brake Applied | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10019 | I | For this section of the test, ensure that the pressure on test point C2.11/1 is ALWAYS BELOW 4.8 Bar. if it goes above, turn the Isolation cock C2.3.2 to CLOSE position to drain the air | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10020 | A | Position the Isolation cock C2.3.2 in CLOSE position. Allow the parking brake air pressure to drain to below 4.5 Bar. Use the test point C2.11/1 to verify the air pressure <4.5 Bar | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10021 | R | Pressure at test point C2.11/1 <4.5 Bar | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10022 | R | Read Defined Variable [TT] (TBCU1)LI_PARK_BR_RELEASE = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10023 | R | Read Defined Variable [TT] (MPU1)TBCU1_parkbrakerelease = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10024 | A | Return the Isolation cock C2.3.2 to OPEN position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10025 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_STAT = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10026 | R | Read Defined Variable [TT] (MPU1)tbcu1_li_pbrake_stat = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10027 | R | Read Defined Variable [TT] (TBCU1)LI_PARK_BR_DC = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10028 | R | Read Defined Variable [TT] (MPU1)TBCU1_parkbrakeisoldc = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10029 | R | Read Defined Variable [TT] (MPU1)li_pbk_m1parkbrakeisol = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10030 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP35 pin 77 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10031 | R | Read Defined Variable [NI] Dev2/52 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10032 | R | Read Defined Variable [NI] Dev5/58 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10033 | A | Position the Isolation cock C2.3.2 in CLOSE position | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |

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|-------|---|--|----|---|---|----|
| 10034 | R | Read Defined Variable [TT] (MPU1)li_pbk_m1parkbrakeisol = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10035 | R | Read Defined Variable [TT] (TBCU1)LI_BRAKE_STAT = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10036 | R | Read Defined Variable [TT] (MPU1)tbcu1_li_pbrake_stat = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10037 | R | Read Defined Variable [TT] (TBCU1)LI_PARK_BR_DC = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10038 | R | Read Defined Variable [TT] (MPU1)TBCU1_parkbrakeisol = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10039 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP35 pin 77 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10040 | R | Read Defined Variable [NI] Dev2/52 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10041 | R | Read Defined Variable [NI] Dev5/58 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10042 | A | Return the Isolation cock C2.3.2 to OPEN position | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10043 | I | Remote Parking Brake Command | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10044 | I | Remote Parking Brake Command Train Lines Dev1/51 = END1 90XR25 pin 68 Dev5/57 = END2 90XP35 pin 68 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10045 | A | Force [NI] Dev1/51 = 1.0 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10046 | R | Read Defined Variable [NI] Dev5/57 = 1.0 | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10047 | R | Confirm that the parking brake is applied, and air is released from electro valve C2.5 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10048 | I | Remote Parking Brake Command Train Lines Dev1/51 = END1 90XR25 pin 68 Dev5/57 = END2 90XP35 pin 68 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10049 | A | Force [NI] Dev1/51 = 0.0 | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10050 | R | Read Defined Variable [NI] Dev5/57 = 0.0 | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10051 | R | Confirm that electro valve C2.5 has stopped emitting air | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |



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|---|--|---------------------------|



Serial Tests Report
TS298 – M1 – VFT
RTR Vehicle Functional Static Testing Report

Document Reference
GIB0000008436
Version: A0

Emission date
1/9/2025

Section 14 – Passenger Doors

14.1 Instructions list

14.1.1 050_DOR-Passenger Doors

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--------------------------------------|---------|
| 10001 | I | Passenger Doors (SPP=050) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10002 | I | Initial conditions | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10003 | I | 110Vdc Normal power supply is connected to the vehicle and ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10004 | I | Ensure that the TCMS network is functional | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10005 | I | Circuit Breakers | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10006 | A | Close Circuit Breaker 50Q1 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10007 | R | DCU 1 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10008 | R | Check on the DDU that DCU1 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10009 | A | Close Circuit Breaker 50Q2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10010 | R | DCU 2 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10011 | R | Check on the DDU that DCU2 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10012 | A | Close Circuit Breaker 50Q3 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10013 | R | DCU 3 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10014 | R | Check on the DDU that DCU3 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10015 | A | Close Circuit Breaker 50Q4 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10016 | R | DCU 4 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |

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|-------|---|---|---|----|---|--------------------------------------|----|
| 10017 | R | Check on the DDU that DCU4 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10018 | A | Close Circuit Breaker 50Q5 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10019 | R | DCU 5 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10020 | R | Check on the DDU that DCU5 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10021 | A | Close Circuit Breaker 50Q6 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10022 | R | DCU 6 is powered ON | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10023 | R | Check on the DDU that DCU6 is online | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10024 | A | Close Circuit Breaker 50Q7 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10025 | I | Car ID Code | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10026 | A | Using the DDU on the test bench, check that all the doors on M1 are available - as in the picture attached. |  | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10027 | R | All doors are available | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10028 | I | Door Open and Close - Safety Loop | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10029 | I | ERTMS Auth Left Train Lines Dev1/81 = END1 90XR25 pin 44 Dev5/86 = END2 90XP35 pin 44 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10030 | A | Force [NI] Dev1/81 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10031 | R | Read Defined Variable [NI] Dev5/86 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10032 | A | Force [NI] Dev1/81 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10033 | R | Read Defined Variable [NI] Dev5/86 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10034 | I | ERTMS Auth RightTrain Lines Dev1/82 = END1 90XR25 pin 47 Dev5/87 = END2 90XP35 pin 47 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10035 | A | Force [NI] Dev1/82 = 1.0 | | OK | | Sicelo Mtolo 525130 | M1 |

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|-------|---|--|--|----|---|--------------------------------------|----|
| | | | | | | 21.08.2025 | |
| 10036 | R | Read Defined Variable [NI] Dev5/87 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10037 | A | Force [NI] Dev1/82 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10038 | R | Read Defined Variable [NI] Dev5/87 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10039 | I | Doors Open Train Lines Dev1/49 = END1 90XR25 pin 66 Dev5/55 = END2 90XP35 pin 66 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10040 | A | Force [NI] Dev1/49 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10041 | R | Read Defined Variable [NI] Dev5/55 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10042 | A | Force [NI] Dev1/49 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10043 | R | Read Defined Variable [NI] Dev5/55 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10044 | I | Door Close Right Train Lines Dev1/53 = END1 90XR25 pin 78 Dev5/59 = END2 90XP35 pin 78 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10045 | A | Force [NI] Dev1/53 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10046 | R | Read Defined Variable [NI] Dev5/59 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10047 | A | Force [NI] Dev1/53 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10048 | R | Read Defined Variable [NI] Dev5/59 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10049 | I | Door Close Left Train Lines Dev1/54 = END1 90XR25 pin 79 Dev5/60 = END2 90XP35 pin 79 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10050 | A | Force [NI] Dev1/54 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10051 | R | Read Defined Variable [NI] Dev5/60 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10052 | A | Force [NI] Dev1/54 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10053 | R | Read Defined Variable [NI] Dev5/60 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |

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|-------|---|---|----|---|--|--------------------------------------|----|
| 10054 | I | Door Auth Left Train Lines Dev1/56 = END1 90XR25 pin 85 Dev5/64 = END2 90XP35 pin 85 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10055 | A | Force [NI] Dev1/56 = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10056 | R | Read Defined Variable [NI] Dev5/64 = 1.0 | OK | 1 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10057 | I | Door Auth Right Train Lines Dev1/55 = END1 90XR25 pin 84 Dev5/61 = END2 90XP35 pin 84 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10058 | A | Force [NI] Dev1/64 = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10059 | R | Read Defined Variable [NI] Dev5/56 = 1.0 | OK | 1 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10060 | I | V<3km/h Train Lines Dev1/35 = END1 90XR25 pin 29 Dev5/39 = END2 90XP35 pin 29 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10061 | A | Force [NI] Dev1/35 = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10062 | R | Read Defined Variable [NI] Dev5/39 = 1.0 | OK | 1 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10063 | A | Force [TT] (MPU1)lo_dor_m1opendoorleft = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10064 | A | Force [TT] (MPU1)lo_dor_m1opendoorright = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10065 | R | Check that ALL doors are OPEN | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10066 | I | Door Auth Left Train Lines Dev1/56 = END1 90XR25 pin 85 Dev5/64 = END2 90XP35 pin 85 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10067 | A | Force [NI] Dev1/56 = 0.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10068 | R | Read Defined Variable [NI] Dev5/64 = 0.0 | OK | 0 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10069 | I | Door Auth Right Train Lines Dev1/64 = END1 90XR25 pin 84 Dev5/56 = END2 90XP35 pin 84 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10070 | A | Force [NI] Dev1/64 = 0.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10071 | R | Read Defined Variable [NI] Dev5/56 = 0.0 | OK | 0 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10072 | R | Check that ALL doors are CLOSED | OK | | | Sicelo Mtolo 525130 | M1 |

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|-------|---|--|----|------|--|--------------------------------------|----|
| | | | | | | 21.08.2025 | |
| 10073 | I | Safety Doors Loop Train Lines Dev1/59 = END1 90XR25 pin 96 Dev5/89 = END2 90XP35 pin 96 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10074 | A | Force [NI] Dev1/59 = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10075 | R | Read Defined Variable [NI] Dev5/89 = 1.0 | OK | 1 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10076 | I | Left Side Doors | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10077 | I | Door 1 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10078 | I | Door Auth Left Train Lines Dev1/56 = END1 90XR25 pin 85 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10079 | A | Force [NI] Dev1/56 = 1.0 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10080 | R | Check if ALL Left doors opens in 3 sec (+1/-0) | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10081 | R | Check that the GREEN leds on both sides of the door blink while the door opens [Safety Request: Prasa8-05] | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10082 | I | Door Opening Gap | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10083 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10084 | R | Door 1 gapResult Min/Max : 1390<= x <= 1410 (mm) | OK | 1396 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10085 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10086 | R | Door 1 gapResult Min/Max : 1390<= x <= 1410 (mm) | OK | 1408 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10087 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10088 | R | Door 1 gapResult Min/Max : 1390<= x <= 1410 (mm) | OK | 1402 | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10089 | I | Door 3 | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10090 | I | Door Opening Gap | OK | | | Sicelo Mtolo 525130 21.08.2025 | M1 |

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|-------|---|---|--|----|------|--------------------------------------|----|
| 10091 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10092 | R | Door 3 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10093 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10094 | R | Door 3 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1407 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10095 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10096 | R | Door 3 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1404 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10097 | I | Door 5 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10098 | I | Door Opening Gap | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10099 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10100 | R | Door 5 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1399 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10101 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10102 | R | Door 5 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1408 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10103 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door). | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10104 | R | Door 5 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1405 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10105 | I | Door Auth Left Train Lines Dev1/56 = END1 90XR15 pin 85 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10106 | A | Force [NI] Dev1/56 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10107 | R | Check if ALL Left doors closes in 3 sec (+1/-0) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10108 | R | Check that the RED leds on both sides of the door blink while the door closes [Safety Request: Prasa8-05] | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10109 | I | Safety Doors Loop Train Lines Dev5/89 = END2 90XP35 pin 96 | | OK | | Sicelo Mtolo 525130 | M1 |

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|-------|---|--|--|----|------|--------------------------------------|----|
| | | | | | | 21.08.2025 | |
| 10110 | R | Read Defined Variable [NI] Dev5/89 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10111 | I | Right Side Doors | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10112 | I | Door 2 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10113 | I | Door Auth Right Train Lines Dev1/64 = END1 90XR25 pin 84 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10114 | A | Force [NI] Dev1/64 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10115 | R | Check if ALL Left doors opens in 3 sec (+1/-0) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10116 | R | Check that the GREEN leds on both sides of the door blink while the door opens [Safety Request: Prasa8-05] | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10117 | I | Door Opening Gap | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10118 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10119 | R | Door 2 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1401 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10120 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10121 | R | Door 2 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1410 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10122 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10123 | R | Door 2 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1406 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10124 | I | Door 4 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10125 | I | Door Opening Gap | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10126 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10127 | R | Door 4 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1399 | Sicelo Mtolo 525130 21.08.2025 | M1 |

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|-------|---|--|--|----|------|--------------------------------------|----|
| 10128 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10129 | R | Door 4 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1407 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10130 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10131 | R | Door 4 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1403 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10132 | I | Door 6 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10133 | I | Door Opening Gap | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10134 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10135 | R | Door 6 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1401 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10136 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10137 | R | Door 6 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1409 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10138 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10139 | R | Door 6 gapResult Min/Max : 1390<= x <= 1410 (mm) | | OK | 1406 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10140 | I | Obstacle Detection | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10141 | I | Door Auth Left Train Lines Dev1/56 = END1 90XR25 pin 85 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10142 | A | Force [NI] Dev1/56 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10143 | R | Check if ALL Left doors opens in 3 sec (+1/-0) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10144 | R | Position an obstacle on the floor in the centre of each and every door closing line | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10145 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10146 | A | Force [NI] Dev1/64 = 0.0 | | OK | | Sicelo Mtolo 525130 | M1 |

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|-------|---|---|--|----|---|--------------------------------------|----|
| | | | | | | 21.08.2025 | |
| 10147 | A | Force [NI] Dev1/56 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10148 | R | All doors will hit the obstacles, reopen and try to close again 3 times. On the third attempt ALL doors will stop and stand adjar - free to be opened manually | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10149 | I | Safety Doors Loop Train Lines Dev5/89 = END2 90XP35 pin 96 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10150 | R | Read Defined Variable [NI] Dev5/89 = 0.0 | | OK | 0 | Sicelo Mtolo 525130 27.08.2025 | M1 |
| 10151 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10152 | A | Force [NI] Dev1/64 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10153 | A | Force [NI] Dev1/56 = 1.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10154 | R | ALL doors opens fully | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10155 | A | Remove the obstacles | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10156 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10157 | A | Force [NI] Dev1/64 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10158 | A | Force [NI] Dev1/56 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10159 | R | Check that ALL doors closes in 3 sec (+1/-0) | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10160 | R | Check that the RED leds on both sides of the door blink while the door closes [Safety Request: Prasa8-05] | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10161 | I | Safety Doors Loop Train Lines Dev5/89 = END2 90XP35 pin 96 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10162 | R | Read Defined Variable [NI] Dev5/89 = 1.0 | | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10163 | I | Speed Detection | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |

| | | | | | | |
|-------|---|--|----|---|--------------------------------------|----|
| 10164 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10165 | A | Force [NI] Dev1/64 = 1.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10166 | A | Force [NI] Dev1/56 = 1.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10167 | R | All doors open | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10168 | I | V>5km/h Train Lines Dev1/34 = END1 90XR25 pin 28 Dev5/38 = END2 90XP35 pin 28 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10169 | A | Force [NI] Dev1/34 = 1.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10170 | R | Read Defined Variable [NI] Dev5/38 = 1.0 | OK | 1 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10171 | R | All doors close due to the invalid state of the DCU | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10172 | A | Release [TT] (MPU1)lo_dor_m1opendoorleft | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10173 | A | Release [TT] (MPU1)lo_dor_m1opendoorright | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10174 | I | V>5km/h Train Lines Dev1/34 = END1 90XR25 pin 28 Dev5/38 = END2 90XP35 pin 28 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10175 | A | Force [NI] Dev1/34 = 0.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10176 | R | Read Defined Variable [NI] Dev5/38 = 0.0 | OK | 0 | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10177 | I | V<3km/h Train Lines Dev1/35 = END1 90XR25 pin 29 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10178 | A | Force [NI] Dev1/35 = 0.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10179 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10180 | A | Force [NI] Dev1/64 = 0.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10181 | A | Force [NI] Dev1/56 = 0.0 | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |
| 10182 | I | Safety Doors Loop Train Lines Dev1/59 = END1 90XR25 pin 96 | OK | | Sicelo Mtolo 525130 | M1 |



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| | | | | | | 21.08.2025 | |
| 10183 | A | Force [N] Dev1/59 = 0.0 | | OK | | Sicelo Mtolo 525130 21.08.2025 | M1 |



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Section 15 – HVAC Air Conditioning

15.1 Instructions list

15.1.1 057_HVA-HVAC_TK

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|--|---|---------------|--------------|----------|---------|
| 10001 | I | Air Conditioning (SPP=057) | | NE | | | M1 |
| 10002 | I | Initial conditions | | NE | | | M1 |
| 10003 | A | Car Should be Prepared | | NE | | | M1 |
| 10004 | I | Power Supply | | NE | | | M1 |
| 10005 | A | Close Circuit Breaker 57Q1 | | NE | | | M1 |
| 10006 | A | Close Circuit Breaker 57Q2 | | NE | | | M1 |
| 10007 | I | HVAC Electronic Power Supply | | NE | | | M1 |
| 10008 | A | Close Circuit Breaker F1 on the HVAC Panel | | NE | | | M1 |
| 10009 | I | The HVAC electronic is ON | | NE | | | M1 |
| 10010 | A | Turn the control switch to AUTO position on the HVAC Panel | | NE | | | M1 |
| 10011 | I | Software Upload | | NE | | | M1 |
| 10012 | I | Follow the procedure in the document below to upload software onto the HVAC electronic | | NE | | | M1 |
| 10013 | A | |  | NE | | | M1 |
| 10014 | I | Checking 400Vac | | NE | | | M1 |
| 10015 | A | Ensure that the 400Vac Shore Supply is connected to the vehicle, else connect it | | NE | | | M1 |

| | | | | | | |
|-------|---|--|---|----|--|----|
| 10016 | A | Disconnect connector 57XP4_X5 and use a multimeter to measure 400Vac between phases a1, a2 and b1 | | NE | | M1 |
| 10017 | R | 400Vac (+-5%) measured | | NE | | M1 |
| 10018 | A | On the same connector, with a phasemeter, check the correct Phase Rotation between points L1- Phase a1, L2- Phase a2 and L3- Phase b1. | | NE | | M1 |
| 10019 | R | The phase rotation is correct between all three phases | | NE | | M1 |
| 10020 | A | Normalize connector 57XP4_X5 | | NE | | M1 |
| 10021 | I | HVAC 50% restriction | | NE | | M1 |
| 10022 | A | Force [TT] NRG_HvacM150Cmd = 0 | | NE | | M1 |
| 10023 | I | HVAC inhib | | NE | | M1 |
| 10024 | A | Force [TT] (MPU1)lo_hva_m1hvacinhibr1__1 = 1 | | NE | | M1 |
| 10025 | A | Force [TT] (MPU1)lo_hva_m1hvacinhibr2__1 = 1 | | NE | | M1 |
| 10026 | R | HVAC unit turns ON and starts to work | | NE | | M1 |
| 10027 | I | Emergency Ventilation | | NE | | M1 |
| 10028 | A | Force [TT] (MPU1)lo_hva_m1emergventil__1 = 1 | | NE | | M1 |
| 10029 | I | All saloon HVAC units work in Ventilation mode. Not heating/cooling | | NE | | M1 |
| 10030 | A | Connect the laptop to the HVAC maintenance software using HCU Finder and check the actual working mode of HVAC |  | NE | | M1 |
| 10031 | R | Release [TT] (MPU1)lo_hva_m1emergventil__1 | | NE | | M1 |
| 10032 | I | Forced Mode (Saloon HVAC) | | NE | | M1 |
| 10033 | I | In the maintenance software, select the 'Forced' tab, and use the "Required | | NE | | M1 |

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|-------|---|---|---|----|--|----|
| | | working mode" drop down box to force the following modes: | | | | |
| 10034 | I | For the next sections, walk through the whole car and physically check (feel) that the HVAC is functioning as desired | | NE | | M1 |
| 10035 | A | Force Ventilation mode on the Saloon HVAC | | NE | | M1 |
| 10036 | I | Ventilation Mode |  | NE | | M1 |
| 10037 | R | All saloon HVAC units work in Ventilation mode. Not heating/cooling | | NE | | M1 |
| 10038 | I | Cooling Mode | | NE | | M1 |
| 10039 | A | Force Cooling mode on the Saloon HVAC | | NE | | M1 |
| 10040 | R | All saloon HVAC units work in Cooling mode | | NE | | M1 |
| 10041 | I | Heating Mode | | NE | | M1 |
| 10042 | A | Force Heating mode on the Saloon HVAC | | NE | | M1 |
| 10043 | R | All saloon HVAC units work in Heating mode | | NE | | M1 |
| 10044 | I | Self-Test | | NE | | M1 |
| 10045 | A | Force Self-Test on the Saloon HVAC | | NE | | M1 |
| 10046 | R | All saloon HVAC units work according to the mode described in the "Actual working mode" | | NE | | M1 |
| 10047 | R | The Exhaust fans are Turned OFF | | NE | | M1 |
| 10048 | I | HVAC Faults | | NE | | M1 |
| 10049 | A | In the maintenance software, select the "Alarms / Warnings" tab |  | NE | | M1 |
| 10050 | A | Ensure there are no active faults on the HVAC | | NE | | M1 |



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|-------|---|---|--|----|--|--|----|
| 10051 | R | No active faults identified on the HVAC unit | | NE | | | M1 |
| 10052 | A | Release [TT] (MPU1)lo_hva_m1hvacinhibr1__1 | | NE | | | M1 |
| 10053 | A | Release [TT] (MPU1)lo_hva_m1hvacinhibr2__1 | | NE | | | M1 |
| 10054 | A | Release [TT] NRG_HvacM150Cmd | | NE | | | M1 |
| 10055 | I | End of Test | | NE | | | M1 |

15.1.2 057_HVA_SME-HVAC_SME

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--|---------|
| 10001 | I | HVA_057 Air Conditioning | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10002 | I | Initial conditions | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10003 | A | Car Should be Prepared with CVS running and 400V ac available in the car | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10004 | I | HVAC AC Power Supply | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10005 | A | Close Circuit Breaker 13Q1 and 13Q5 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10006 | A | Check on the DDU if the HVAC is offline | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10007 | I | Checking 400Vac | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10008 | A | Close Circuit Breaker 57Q1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10009 | A | Disconnect connector 57XP4_X5 and use a multimeter to check 400Vac between each phases a1, a2 and b1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10010 | R | 400Vac measured between all phases | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10011 | A | On the same connector 57XP4_X5, with a phasemeter, check the phase rotation of all 3 phases which are a1- phase L1, a2- Phase L2 and b1- phase L3 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10012 | R | The phase rotation is correct between all three phases | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |

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|-------|---|--|---|----|--|--|----|
| 10013 | A | Normalize connector 57XP4_X5. | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10014 | I | HVAC controller power supply | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10015 | A | Close Circuit Breaker 57Q2 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10016 | A | Allow the HVAC to initialize and check on the DDU if the HVAC is online | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10017 | R | HVAC unit turns ON and starts to work | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10018 | I | HVAC inhib | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10019 | A | Force [TT] (MPU1)lo_hva_m1hvacinhibr1__1 = 1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10020 | A | Force [TT] (MPU1)lo_hva_m1hvacinhibr2__1 = 1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10021 | I | 50% HVAC restriction | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10022 | A | Force [TT] NRG_HvacM150Cmd = 0 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10023 | I | saloon HVAC | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10024 | I | HVAC web portal | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10025 | I | The attached document is a procedure on how to navigate around the maintenance software |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10026 | I | Connect the laptop to the HVAC maintenance software using web browser. Enter the following IP address on the web browser 10.136.xxx30 xxx represents the train number | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |

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|-------|---|---|---|----|--|--|----|
| | | Login: maint Password: maint | | | | | |
| 10027 | I | Full "Self test" saloon | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10028 | R | On status tab, Active mode is off for both cab and saloon |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10029 | A | Go to Alarms tab and clear all the alarms for saloon and cabin | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10030 | I | For the following tests make sure on the webHMI tab you change controller to be controlled by webHMI and not MPU |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10031 | A | Before running the full test, please click on reset test to reset the previous results. | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10032 | A | Select Full-Test on the Saloon HVAC |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10033 | R | All saloon HVAC units work according to the mode described in the "ACTIVE MODE" on the status tab | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10034 | R | When the test is complete, please check if the status is showing as "TEST PASS" and the test took 3 mins +/- 2 seconds for each mode. | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10035 | I | Forced Mode (Saloon HVAC) | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10036 | I | During all tests Walk through the whole car and physically check (feel) that the HVAC is functioning as desired | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10037 | I | Go to maintenance tab to force the following modes |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10038 | I | Cooling Mode | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10039 | A | Select forced Cooling mode on the Saloon HVAC and let it run for 5 mins | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10040 | R | All HVAC units are cooling | | OK | | Mbavhalelo Funyufunyu 484649 | M1 |

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|-------|---|---|--|----|--|--|----|
| | | | | | | 21.08.2025 | |
| 10041 | I | Heating Mode | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10042 | A | Select forced Heating mode on the Saloon HVAC and let it run for 5 mins | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10043 | R | All HVAC units are heating | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10044 | I | HVAC Faults | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10045 | A | In the maintenance software, select the "Alarms" tab | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10046 | A | Ensure there are no active faults on the HVAC for Cabin and Saloon. Use the highlighted drop down to navigate between saloon and cabin. |  | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10047 | R | No active faults identified on the HVAC unit | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10048 | A | Release [TT] (MPU1)lo_hva_m1hvacinhibr1__1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10049 | A | Release [TT] (MPU1)lo_hva_m1hvacinhibr2__1 | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10050 | A | Release [TT] NRG_HvacM150Cmd | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10051 | R | Cabin HVAC turned OFF | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |
| 10052 | I | End of test | | OK | | Mbavhalelo Funyufunyu 484649 21.08.2025 | M1 |



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Section 16 – Fire Protection

16.1 Instructions list

16.1.1 067_FSD-Fire Protection

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|---|---------|
| 10001 | I | Fire Protection System (SPP=067) | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10002 | I | Fire Detection Train Lines | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10003 | I | Fire Detection Train Lines Dev1/76 = END1 90XR24 pin 21 Dev5/76 = END2 90XP34 pin 21 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10004 | A | Force [NI] Dev1/76 = 1.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10005 | R | Read Defined Variable [NI] Dev5/76 = 1.0 | | OK | 1 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10006 | A | Force [NI] Dev1/76 = 0.0 | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10007 | R | Read Defined Variable [NI] Dev5/76 = 0.0 | | OK | 0 | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10008 | I | Continuity Test | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10009 | I | The following steps are continuity tests between the two points described in each step. Use a multimeter for this test. | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10010 | A | From : [(local: +END1 -90XR23.B (pin 4))] to : [-Inter-connector (local: +END2 -90XP33.a pin 7)] | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10011 | A | From : [(local: +END1 -90XR23.B (pin 5))] to : [-Inter-connector (local: +END2 -90XP33.a pin 8)] | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |
| 10012 | A | From : [(local: +END1 -90XR23.A (pin 7))] to : [-Inter-connector (local: +END2 - | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |



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|-------|---|--|--|----|--|---|----|
| | | 90XP33.b pin 4)] | | | | | |
| 10013 | A | From : [(local: +END1 -90XR23.A (pin 8))] to: [-Inter-connector (local: +END2 -90XP33.b pin 5)] | | OK | | Mlungisi Madela 529927 21.08.2025 | M1 |



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Section 17 – Traction and Electric Brake

17.1 Instructions list

17.1.1 033_TRC-Traction and Electric Brake

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|------|---------------|--------------|--|---------|
| 10001 | I | Traction and Electric Brake (SPP=033) | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10002 | I | Circuit Breakers and Configuration | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10003 | A | Close Circuit Breaker 33Q1 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10004 | A | Close Circuit Breaker 33Q2 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10005 | A | Close Circuit Breaker 33Q3 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10006 | A | Close Circuit Breaker 33Q4 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10007 | A | Close Circuit Breaker 33Q5 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10008 | R | Read Defined Variable [TT] (TBCU1)LI_CAR_ID1 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10009 | I | Train Lines | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10010 | I | 110Vdc Normal Traction EL Train Lines Dev 1/66 = END1 90XP25 pin 49 Dev 2/65 = END1 90XP35 pin 42 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10011 | A | Force [NI] Dev1/66 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10012 | R | Read Defined Variable [NI] Dev2/65 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10013 | A | Force [NI] Dev1/66 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10014 | R | Read Defined Variable [NI] Dev2/65 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10015 | I | Forward Train Lines: Dev1/31 : END1 90XR25 pin 25 Dev5/78 : END2 90XP35 pin 30 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10016 | A | Force [NI] Dev1/31 = 1.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |

| | | | | | | |
|-------|---|---|----|---|--|----|
| 10017 | R | Read Defined Variable [TT] (TBCU1)LI_FORWARD = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10018 | R | Read Defined Variable [NI] Dev5/78 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10019 | I | Forward Train Lines: Dev1/31 : END1 90XR25 pin 25 Dev5/78 : END2 90XP35 pin 30 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10020 | A | Force [NI] Dev1/31 = 0.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10021 | R | Read Defined Variable [TT] (TBCU1)LI_FORWARD = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10022 | R | Read Defined Variable [NI] Dev5/78 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10023 | I | Reverse Train Lines: Dev1/36 : END1 90XR25 pin 30 Dev5/35 : END2 90XP35 pin 25 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10024 | A | Force [NI] Dev1/36 = 1.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10025 | R | Read Defined Variable [TT] (TBCU1)LI_REVERSE = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10026 | R | Read Defined Variable [NI] Dev5/35 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10027 | I | Reverse Train Lines: Dev1/36 : END1 90XR25 pin 30 Dev5/35 : END2 90XP35 pin 25 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10028 | A | Force [NI] Dev1/36 = 0.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10029 | R | Read Defined Variable [TT] (TBCU1)LI_REVERSE = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10030 | R | Read Defined Variable [NI] Dev5/35 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10031 | I | Traction Train Lines: Dev1/37 : END1 90XR25 pin 31 Dev5/81 : END2 90XP35 pin 31 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10032 | A | Force [NI] Dev1/37 = 1.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10033 | R | Read Defined Variable [TT] (TBCU1)LI_TRACTION = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10034 | R | Read Defined Variable [NI] Dev5/81 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |

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|-------|---|---|----|---|--|----|
| 10035 | I | Traction Train Lines: Dev1/37 : END1 90XR25 pin 31 Dev5/81 : END2 90XP35 pin 31 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10036 | A | Force [NI] Dev1/37 = 0.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10037 | R | Read Defined Variable [TT] (TBCU1)LI_TRACTION = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10038 | R | Read Defined Variable [NI] Dev5/81 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10039 | I | No Brake Train Lines: Dev1/38 : END1 90XR25 pin 32 Dev5/82 : END2 90XP35 pin 32 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10040 | A | Force [NI] Dev1/38 = 1.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10041 | R | Read Defined Variable [TT] (TBCU1)LI_NOBRAKE = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10042 | R | Read Defined Variable [NI] Dev5/82 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10043 | I | No Brake Train Lines: Dev1/38 : END1 90XR25 pin 32 Dev5/82 : END2 90XP35 pin 32 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10044 | A | Force [NI] Dev1/38 = 0.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10045 | R | Read Defined Variable [TT] (TBCU1)LI_NOBRAKE = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10046 | R | Read Defined Variable [NI] Dev5/82 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10047 | I | Traction Interlock Bypass Train Lines Dev1/4 : END1 90XR24 pin 6 Dev5/4 : END2 90XP34 pin 6 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10048 | A | Force [NI] Dev1/4 = 1.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10049 | R | Read Defined Variable [NI] Dev5/4 = 1.0 | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10050 | A | Force [NI] Dev1/4 = 0.0 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10051 | R | Read Defined Variable [NI] Dev5/4 = 0.0 | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10052 | I | Traction Interlock Train Lines Dev1/39 : END1 90XR25 pin 41 Dev5/83 : END2 90XP35 pin 41 | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10053 | A | Force [NI] Dev1/39 = 1.0 | OK | | Alleta Sekgololo 417407 | M1 |

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| | | | | | | 21.08.2025 | |
| 10054 | R | Read Defined Variable [TT] (TBCU1)LI_NOT_INHIB = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10055 | R | Read Defined Variable [NI] Dev5/83 = 1.0 | | OK | 1 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10056 | I | Traction Interlock Train Lines Dev1/39 : END1 90XR25 pin 41 Dev5/83 : END2 90XP35 pin 41 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10057 | A | Force [NI] Dev1/39 = 0.0 | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10058 | R | Read Defined Variable [TT] (TBCU1)LI_NOT_INHIB = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10059 | R | Read Defined Variable [NI] Dev5/83 = 0.0 | | OK | 0 | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10060 | I | Coolant Liquid | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10061 | A | Check that the coolant level is atleast 1/2 of the sight glass level indicator [9-30-44- 281075_Coolant Level Check.pdf] |  | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10062 | R | Coolant Liquid Level is OK | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |
| 10063 | I | End of Test | | OK | | Alleta Sekgololo 417407 21.08.2025 | M1 |



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Section 18 – Vehicle Normalization

18.1 Instructions list

18.1.1 NORM-Vehicle Normalization

I - Information A - Action R - Result NE - Not Executed

| N° | Type | Instruction | File | Result status | Result value | Operator | Vehicle |
|-------|------|---|---|---------------|--------------|--|---------|
| 10001 | I | Initial Conditions | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10002 | I | The VFT procedures are all completed | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10003 | I | Vehicle Normalization Check | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10004 | R | On LV3 all Circuit Breakers are installed and secured | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10005 | R | On LV3 all Dataplugs are installed, tightened and earth braids are fastened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10006 | R | On LV3 all Connectors are tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10007 | R | On LV3 there are no missing components, device, wiring or connectors. | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10008 | A | ON LV3, make sure that both bolts on 93XT300 terminal 4 are tightened and torque marked. |  | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10009 | R | On LV6 all Dataplugs are installed, tightened and earth braids are fastened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10010 | R | On LV6 all Connectors are tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10011 | R | On LV6 there are no missing components, device, wiring or connectors. | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10012 | R | On HC Cubicle the Controller is installed and properly tightened and its connectors are tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10013 | R | All DCUs are properly installed and secured | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |

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| 10014 | R | All Internal Displays are properly installed and secured | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10015 | R | All Light Covers are properly installed | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10016 | R | All Saloon Fire Detectors are properly installed and secured | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10017 | R | All covers are normalised inside the car | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10018 | R | On the Underframe, TBCU Agate is installed and properly tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10019 | R | On the Underframe, Auxiliary Compressor cover is normalized | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10020 | R | On the Underframe, Panto panel cover is normalized | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10021 | R | On the Underframe, Speed Sensors are installed and properly tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10022 | R | On the LVB, all Circuit Breakers are installed and properly tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10023 | R | On the LVB, all Relays and Timers are installed and properly tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10024 | R | On the LVB, BRIOMs are installed and properly tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10025 | R | On the LVB there are no missing components, device, wiring or connectors. | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10026 | R | On the Underframe, all Connectors are tightened | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10027 | R | All underframe covers are normalised | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10028 | R | On END1 the Octopus cables are disconnected from the car and properly stored. | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10029 | R | On END2 the Octopus cables are disconnected from the car and properly stored. | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10030 | R | On the roof, there is no Strap connected to the Pantograph | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10031 | R | The Test Bench is switched OFF and the Octopus cables are disconnected and properly stored | | OK | | Celiwe Sokhela 491462 21.08.2025 | M1 |
| 10032 | R | ALL P.Os of this car are closed | | OK | | Alleta Seggololo 417407 | M1 |



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Section 17 – Report summaries

17.2 Results status

| Test Instruction Sheet | Compliant | Incomplete | Non-compliant |
|---|-----------|------------|---------------|
| Energy Distribution | X | | |
| TCMS Network | X | | |
| Cabin Control | X | | |
| Internal Lighting | X | | |
| Train-Ground Communication | X | | |
| Pantograph | X | | |
| Rescue Mode and Emergency Disconnection | X | | |
| Emergency Brake | X | | |
| Service Brake | X | | |
| Holding and Parking Brake | X | | |
| Passenger Doors | X | | |
| HVAC Air Conditioning | X | | |
| Fire Protection | X | | |
| Traction and Electric Brake | X | | |
| Vehicle Normalization | X | | |
| PACIS Network | X | | |

17.1 Tools used

| Function | Tool name | Tool number | Next Calibration date |
|----------|------------|-------------|-----------------------|
| 015_NRG | Phasemeter | Phasemeter | 9/30/2025 |
| 021_PNT | Manometer | Manometer | 8/31/2026 |
| 040_SBK | Manometer | Manometer | 8/31/2026 |
| 045_PBK | Manometer | Manometer | 8/31/2026 |



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|-------------|----------------|----------------|------------|
| 057_HVA_SME | Phasemeter | Phasemeter | 9/30/2025 |
| 062_ETS | Multimeter | Multimeter 2 | 9/30/2025 |
| 064_COM | GSM-R - tester | Radio Analyser | 11/10/2025 |
| 067_FSD | Multimeter | Meter 1 | 8/31/2025 |