

| PROJECT | CUSTOMER | VEHICLE |
|-----------------|----------|----------------|
| Xtrapolis-PRASA | PRASA | 215 – M2 – VFT |

RTR Vehicle Functional Static Testing TS215 M2 Report
GIB0000006296






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Internal validations

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Execution Plan

| | |
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Section 1 – Purpose / Objectives

Section 3 – Cabin Control

3.3 Instructions list

3.3.1 020_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 | M2 |
| 10002 | I | Train Lines | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10003 | I | Cab Selected on Train, Train Lines Dev2/1 = END1 90XR24 pin 3 Dev4/1 = END2 90XR34 pin 3 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10004 | A | Force [NI] Dev4/1 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10005 | R | Read Defined Variable [NI] Dev2/1 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10006 | A | Force [NI] Dev4/1 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10007 | R | Read Defined Variable [NI] Dev2/1 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10008 | I | Cab Active TC1 Train Lines Dev2/3 = END1 90XR24 pin 5 Dev4/2 = END2 90XR34 pin 4 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10009 | A | Force [NI] Dev4/2 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10010 | R | Read Defined Variable [NI] Dev2/3 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10011 | A | Force [NI] Dev4/2 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10012 | R | Read Defined Variable [NI] Dev2/3 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |

Section 4 – Train-Ground Communication


4.3 Instructions list







4.3.1 062_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 | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Ensure that ALL the circuit breaker in the ERTMS cubicle are in OFF position | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | ELECTRICAL CHECK |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | R | All the ERTMS Circuit Breakers were checked | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | A | Close Circuit Breaker 62Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | A | Close Circuit Breaker 62Q3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | A | Close Circuit Breaker 62Q4 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | R | Check that the ERTMS module is OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | I | ERTMS Bypass Train Line Dev4/37 = END2 90XP34 pin 11 Dev2/33 = END1 90XP24 pin 11 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | A | Force [NI] Dev4/37 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | R | Read Defined Variable [NI] Dev2/33 = 1.0 | | OK | 1 | Walter Sigudla - 486333 | M2 |
| 10012 | R | Using the dc voltage detector, check that the relay 62K3 is energized. | | OK | | Walter Sigudla - 486333 | M2 |
| 10013 | A | Force [NI] Dev4/37 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | R | Read Defined Variable [NI] Dev2/33 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10015 | R | Using the dc voltage detector, check that the relay 62K3 is de-energized. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | I | Emergency Brake ERTMS 1 Train Line Dev4/88 = END2 90XP34 pin 18 Dev2/88 = END1 90XP24 pin 18 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10017 | A | Force [NI] Dev4/88 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|---|--------------------------|----|
| 10018 | R | Read Defined Variable [NI] Dev2/88 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10019 | A | Force [NI] Dev4/88 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | R | Read Defined Variable [NI] Dev2/88 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10021 | I | Emergency Brake ERTMS 2 Train Line Dev4/80 = END2 90XP34 pin 20 Dev2/80 = END1 90XP24 pin 20 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | A | Force [NI] Dev4/80 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10023 | R | Read Defined Variable [NI] Dev2/80 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10024 | A | Force [NI] Dev4/80 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | R | Read Defined Variable [NI] Dev2/80 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10026 | I | Master Key TC2 Train Line Dev1/73 = END1 90XP24 pin 17 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10027 | A | Force [NI] Dev1/73 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10028 | R | Using the dc voltage detector, check that the relay 62K5 is energized. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | A | Force [NI] Dev1/73 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10030 | R | Using the dc voltage detector, check that the relay 62K5 is de-energized. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | I | Master Key TC1 Train Line Dev4/73 = END2 90XP34 pin 14 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | A | Force [NI] Dev4/73 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | R | Using the dc voltage detector, check that the relay 62K4 is energized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10034 | A | Force [NI] Dev4/73 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10035 | R | Using the dc voltage detector, check that the relay 62K4 is de-energized. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10036 | I | Direction | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10037 | I | Forward Train Line Dev4/35 = END2 90XP35 pin 25 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10038 | A | Force [NI] Dev4/35 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|--|--------------------------|----|
| 10039 | R | Using the dc voltage detector, check that the relay 62K9 is energized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10040 | A | Force [NI] Dev4/35 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10041 | R | Using the dc voltage detector, check that the relay 62K9 is de-energized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10042 | I | Reverse Train Line Dev4/78 = END2 90XP35 pin 30 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10043 | A | Force [NI] Dev4/78 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10044 | R | Using the dc voltage detector, check that the relay 62K8 is energized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10045 | A | Force [NI] Dev4/78 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10046 | R | Using the dc voltage detector, check that the relay 62K8 is de-energized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10047 | I | Wheel Sensor Continuity Test |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10048 | R | Wheel sensor mechanical check completed. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10049 | I | Use the multimeter to test the continuity | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10050 | A | Check continuity between [62B2 WHEEL SENSOR (Local:+MB2; Connector 62XP2_1) and 62A1 ERTMS (Local:+LV4; connector 62XP1_X02.c)] | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10051 | R | There is a continuity between: pin B & pin 12, pin A & pin 6, pin C & pin 11, pin D & pin 5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10052 | R | There is a continuity between: pin F & pin 10, pin E & pin 4, pin G & pin 9, pin H & pin 3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10053 | R | There is a continuity between: pin L & pin 8, pin K & pin 2, pin M & pin 7, pin N & pin 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10054 | R | Cable shield is continuous | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10055 | A | Check continuity between [InterCar (Local: +END2; Connector 90XR33.C) and 62A1 ERTMS (Local:+LV4; connector 62XP1_X02.d)] | | OK | | Nokuzola Mdluli - 491469 | M2 |


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|-------|---|---|---|----|--|--------------------------|----|
| 10056 | R | There is a continuity between: pin 2 & pin 12, pin 1 & pin 6, pin 7 & pin 11, pin 8 & pin 5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10057 | R | There is a continuity between: pin 4 & pin 10, pin 3 & pin 4, pin 9 & pin 9, pin 10 & pin 3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10058 | R | There is a continuity between: pin 6 & pin 8, pin 5 & pin 2, pin 11 & pin 7, pin 12 & pin 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10059 | R | Wheel Sensor cable bending radius is at least 10 times its diameter. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10060 | I | Radar Continuity Test |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10061 | R | Radar mechanical check completed. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10062 | A | Check continuity between [62A4 RADAR (Local:+UND; Connector 62XP4_1) and 62A1 ERTMS (Local:+LV4; Connector 62XP1_X02.b)] |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10063 | R | There is good continuity between Radar and the ERTMS connector. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10064 | I | Eurobalise Antenna Cable | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10065 | A | Check continuity between [62A1(LOCAL:+LV4; Connector - 62XP1_X01) and Intercar (LOCAL:+END2; connector -90XR30)] according to the image below |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10066 | R | Eurobalise Antenna cable is correctly configured from END2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10067 | A | Check continuity between [62A1(LOCAL:+LV4; Connector - 62XP1_X07) and Intercar (LOCAL:+END1; connector -90XR20)] according to the image below |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10068 | R | Eurobalise Antenna cable is correctly configured from END1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10069 | I | EVC Mechanical Check + Software Upload |  | OK | | Walter Sigudla - 486333 | M2 |
| 10070 | I | Upload the ODE software using the following procedure: |  | OK | | Walter Sigudla - 486333 | M2 |

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|-------|---|--|---|----|--|-------------------------|----|
| 10071 | I | Upload the COMET software using the following procedure: |  | OK | | Walter Sigudla - 486333 | M2 |
| 10072 | A | Insert the Sim Cards inside the GSM-R modules MT1 and MT2: |  | OK | | Walter Sigudla - 486333 | M2 |
| 10073 | I | END OF TEST | | OK | | Walter Sigudla - 486333 | M2 |

4.3.2 064_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 | | Nokuzola Mdluli - 491469 | M2 |
| 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 | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | Antenna cable tester Calibration | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | A | Connect the Validation Antenna(from Warehouse) to connector 64XR3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | I | PERFORM THIS CALIBRATION BEFORE TESTING EACH CABLE | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | 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 | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | I | GSM Cable (64XP2_X12) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | A | Ensure the frequency range is 876MHz - 961.34MHz; Connect the GSM cable(64XP2_X12) of the maintenance box to the measuring cable and note the resulting waveform | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | R | The maximum peak of the waveform is Result Max : x <= 2.13 () | | OK | 1.99 | Nokuzola Mdluli - 491469 | M2 |
| 10010 | A | Save the waveform result with the following name: TS#(#-Train number)_MBX_ GSM1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | A | Recalibrate the tester. Ensure the frequency range is 1.71GHz - 1.88Ghz; Connect the GSM cable of the maintenance box to the measuring cable and note the resulting waveform | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | R | The maximum peak of the waveform is Result Max : x <= 2.13 () | | OK | 2.09 | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|---|----|------|------------------------------------|----|
| 10013 | A | Save the waveform result with the following name: TS#(#-Train number)_MBX_ GSM2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | I | GPS Cable (64XP2_X13) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10015 | A | Recalibrate the tester. Ensure the frequency range is 1200MHz - 1600MHz; Connect the GPS cable (64XP2_X13) of the maintenance box to the measuring cable and note the resulting waveform | | OK | | Sicelo Mtolo - 525130 | M2 |
| 10016 | A | On the cable tester, select "MEAS" and select F1 "Distance to Fault" | | OK | | Sicelo Mtolo - 525130 | M2 |
| 10017 | I | Ensure that the resulting waveform is such as in the picture below. 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 | | Sicelo Mtolo - 525130 | M2 |
| 10018 | R | The maximum peak of the waveform is Result Max : x <= 1.2 () | | OK | 1.16 | Sicelo Mtolo - 525130 | M2 |
| 10019 | A | Save the waveform result with the following name: TS#(#-Train number)_MBX_ GPS | | OK | | Sicelo Mtolo - 525130 | M2 |
| 10020 | I | Wifi Cable(64XP2_X14) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | A | Recalibrate the tester. Ensure the frequency range is 1710MHz - 2700MHz; Connect the WiFi cable (64XP2_X14) of the maintenance box to the measuring cable and note the resulting waveform | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | R | The maximum peak of the waveform is Result Max : x <= 2.45 () | | OK | 2.05 | Nokuzola Mdluli - 491469 | M2 |
| 10023 | A | Save the waveform result with the following name: TS#(#-Train number)_MBX_ WiFi1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | A | Recalibrate the tester. Ensure the frequency range is 4.9GHz - 5.935GHz; | | OK | | Goitsemodimo Kgatitswe - 526511 | M2 |
| 10025 | R | The maximum peak of the waveform is Result Max : x <= 2.45 () | | OK | 2.08 | Goitsemodimo Kgatitswe - 526511 | M2 |
| 10026 | A | Save the waveform result with the following name: TS#(#-Train number)_MBX_ WiFi2 | | OK | | Goitsemodimo Kgatitswe - 526511 | M2 |
| 10027 | A | Close Circuit Breaker 64Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|------|---------------------------------|----|
| 10028 | A | Check the voltage on connector 64XP2_X4 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | R | +110V between pin 1(+) and 3(-) +110V between pin 2(+) and 4(-) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10030 | A | Open Circuit Breaker 64Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | I | ERTMS | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | A | Recalibrate the tester. Ensure the frequency range is 876MHz - 960MHz; Connect the GSM-R Cable 62XP1_A1X1_1 cable of the ERTMS to the measuring cable and note the resulting waveform | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | R | The maximum peak of the waveform is Result Max : x <= 2.13 () | | OK | 2.07 | Nokuzola Mdluli - 491469 | M2 |
| 10034 | A | Save the waveform result with the following name: TS#(#-Train number)_ERTMS_ 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10035 | A | Ensure the frequency range is 876MHz - 960MHz; Connect the GSM-R Cable 62XP1_A1X2_1 cable of the ERTMS to the measuring cable and note the resulting waveform | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10036 | R | The maximum peak of the waveform is Result Max : x <= 2.13 () | | OK | 1.68 | Nokuzola Mdluli - 491469 | M2 |
| 10037 | A | Save the waveform result with the following name: TS#(#-Train number)_ERTMS_ 2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10038 | I | END OF TEST | | OK | | Goitsemodimo Kgatitswe - 526511 | M2 |



Serial Tests Report
TS215 – M2 – VFT
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Section 5 – Energy Distribution

5.3 Instructions list

5.3.1 015_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 | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Initial Conditions | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | All the Circuit Breakers should be OPEN | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | I | Test bench should be connected but with no power supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | I | NO 400Vac should be connected to the car | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | I | Voltage Isolation 230Vac and 400Vac | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | A | Close Circuit breaker 14Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | I | 230Vac and 400Vac Circuit breakers | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | A | Close Circuit Breaker 13Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | I | Normal and Permanent Power Supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | I | 110Vdc Permanent Train Line Dev2/78 = END1 90XR24 pin 29 Dev4/78 = END2 90XR34 pin 29 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | A | Force [NI] Dev4/40 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10013 | R | Read Defined Variable [NI] Dev2/40 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10014 | A | Apply 110Vdc on the Normal Line using the external power supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10015 | A | Close Circuit Breaker 15Q3 (Normal Line) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | A | Measure 110Vdc between 90XR50_2.X2 (+) and 90XR50_2.X1 (-) (inter-car connector). [Normal line]. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10017 | I | Permanent Line Circuit Breakers | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|--|--------------------------|----|
| 10018 | A | Check Circuit Breaker 15Q4 for battery voltage (above 80V dc) and close it (permanent Line) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10019 | I | 230Vac Circuit Breakers | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | A | Close Circuit Breaker 13Q3 and 13Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | I | 230Vac and 400Vac Voltage Supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | A | Apply 400Vac to the Vehicle, either on End1 or End 2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 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 | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | R | Phase rotation between U, V, W is correct. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | A | Perform a phase rotation measurement on Connector 90XR52_2 between phases U(X3), V(X2), W(X1) and ensure the rotation is in the correct direction. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10026 | R | Phase rotation between U,V,W is correct | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10027 | A | Check 230Vac between points L and N of socket -13XT1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10028 | R | 230Vac present | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | A | Check 230Vac between points L and N of socket -13XT2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10030 | R | 230Vac present | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | A | Remove connector 93XP150 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | A | Remove connector 57XP1-10 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | A | Close Circuit Breaker 34Q1 and 57Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10034 | A | Check 400Vac +-5% tolerance between Phases (W, V, U) on connector 57XP1_10 (10.b1, 10.a2, 10.a1). | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10035 | R | 400Vac +- 5% tolerance is measured between all three phases on connector | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|--|----|---|--------------------------|----|
| | | 57XP1_10 | | | | | |
| 10036 | A | Check 400Vac +-5% tolerance between Phases (W, V, U) on connector 93XP150 (pin E3, E2 and E1). | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10037 | R | 400Vac +- 5% tolerance is measured between all three phases on connector 93XP150 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10038 | A | Open Circuit Breaker 34Q1 and 57Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10039 | A | Put back connector 57XP1-10 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10040 | A | Put back connector 93XP150 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10041 | I | Auxiliary Converter Command | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10042 | I | Battery Connection Train Lines Dev2/79 = END 1 90XR24 pin 30 Dev4/79 = END 2 90XR34 pin 30 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10043 | A | Force [NI] Dev4/79 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10044 | R | Read Defined Variable [NI] Dev2/79 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10045 | A | Force [NI] Dev4/79 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10046 | R | Read Defined Variable [NI] Dev2/79 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10047 | I | Battery Disconnection Train Lines Dev2/75 = END 1 90XR24 pin 31 Dev4/75 = END 2 90XR34 pin 31 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10048 | A | Force [NI] Dev4/75 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10049 | R | Read Defined Variable [NI] Dev2/75 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10050 | A | Force [NI] Dev4/75 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10051 | R | Read Defined Variable [NI] Dev2/75 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10052 | I | IES Status Train Lines Dev1/86 = END 1 90XR25 pin 61 Dev2/87 = END 1 90XR25 pin 62 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10053 | A | Force [NI] Dev1/86 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|---|--------------------------|----|
| 10054 | R | Read Defined Variable [NI] Dev2/87 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10055 | A | Force [NI] Dev1/86 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10056 | R | Read Defined Variable [NI] Dev2/87 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10057 | I | Switch off the 400Vac power supply at the socket | | OK | | Nokuzola Mdluli - 491469 | M2 |



Serial Tests Report
TS215 – M2 – VFT
RTR Vehicle Functional Static Testing Report

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Section 6 – Pantograph

6.3 Instructions list

6.3.1 021_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 | | Thandanani Makhanya - 463827 | M2 |
| 10002 | I | There should be no air in the main pipe | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10003 | R | Measure 0 Bar at point K2.8 using the pressure gauge | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10004 | A | Ensure that the pantograph isolation valve K2.5 is normalized (not isolated) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10005 | I | Initial Conditions | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10006 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2drainingcockr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10007 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2drainingcockr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10008 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10009 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10010 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxpressswitchr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10011 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxpressswitchr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10012 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10013 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10014 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10015 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |


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|-------|---|--|--|----|---|---------------------------------|----|
| 10016 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10017 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10018 | I | Auxiliary Compressor | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10019 | A | Close Circuit Breaker 21Q3 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10020 | A | Close Circuit Breaker 21Q1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10021 | A | Close Circuit Breaker 21Q2 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10022 | R | The Auxiliary compressor 21M1 turns ON | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10023 | R | Read Defined Variable [TT] (MPU1)lo_pnt_m2startauxiliarcompr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10024 | R | Read Defined Variable [TT] (MPU1)lo_pnt_m2startauxiliarcompr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10025 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10026 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10027 | A | Force [TT] (MPU1)lo_pnt_m2raisepantor1 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10028 | I | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10029 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10030 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10031 | R | The pantograph is raised | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10032 | I | 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 | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|--|----|---|---------------------------------|----|
| 10033 | R | The Auxiliary compressor 21M1 turns OFF | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10034 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10035 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2auxcpcontactorr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10036 | A | Turn the pantograph isolation valve K2.5 to isolated position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10037 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2drainingcockr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10038 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2drainingcockr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10039 | A | Force [TT] (MPU1)lo_pnt_m2startauxiliarcompr1 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10040 | A | Force [TT] (MPU1)lo_pnt_m2startauxiliarcompr2 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10041 | A | Drain the air by putting the isolation valve K2.5 in half way position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10042 | R | Using the pressure gauge, check that the Pantograph drops at 3.3 Bar | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10043 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10044 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10045 | A | Turn the pantograph isolation valve K2.5 to normal position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10046 | A | Release [TT] (MPU1)lo_pnt_m2startauxiliarcompr1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10047 | A | Release [TT] (MPU1)lo_pnt_m2startauxiliarcompr2 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10048 | R | The Auxiliary compressor 21M1 turns ON | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10049 | I | 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 | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|---|--|----|---|---------------------------------|----|
| 10050 | R | The Auxiliary compressor 21M1 turns OFF | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10051 | I | Isolation and Earthing | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10052 | A | In the HV Box , set the HVB1 valve to Isolated position - to isolate the pantograph | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10053 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10054 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10055 | A | Turn the Earthing Switch to grounded position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10056 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10057 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10058 | A | Turn the Earthing Switch to back to Normal position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10059 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10060 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2earthpantor2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10061 | A | Set the HVB1 valve to Normal position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10062 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr1 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10063 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantoisolatedr2 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10064 | A | Normalize the HV box and remove all spare/duplicate keys (green/yellow/blue) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10065 | I | Pantograph Mechanical test | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10066 | I | Housed Height Measurement, Pantograph Over-Height Measurement, Automatic Drop Device and Control Force Test | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10067 | I | Initial Conditions | | OK | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|---|---|----|-----|---------------------------------|----|
| 10068 | I | There should be no air in the main pipe | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10069 | R | Measure 0 Bar at point K2.8 using the pressure gauge | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10070 | A | Ensure that the pantograph isolation valve K2.5 is normalized (not isolated) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10071 | I | Circuit Breakers | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10072 | A | Close Circuit Breaker 21Q3 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10073 | A | Close Circuit Breaker 21Q1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10074 | A | Close Circuit Breaker 21Q2 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10075 | I | Housed Height Measurement | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10076 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10077 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10078 | A | Ensure that no part of the pantograph is higher than 486mm above the roof | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10079 | R | A Result Max : $x \leq 486$ (mm) | | OK | 483 | Thandanani Makhanya - 463827 | M2 |
| 10080 | R | B Result Max : $x \leq 486$ (mm) | | OK | 484 | Thandanani Makhanya - 463827 | M2 |
| 10081 | R | C Result Max : $x \leq 486$ (mm) | | OK | 483 | Thandanani Makhanya - 463827 | M2 |
| 10082 | A | Check that the center of the pantograph head corresponds with the track center line in the housed position (Use marked ruler to compare) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10083 | R | Pantograph aligned with the track center line in housed position. | | OK | | Thandanani Makhanya - 463827 | M2 |

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| 10084 | I | Automatic Drop Device | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10085 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10086 | A | Tie a cable on the pantograph head collector | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10087 | A | Close Circuit Breaker 21Q3 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10088 | A | Close Circuit Breaker 21Q1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10089 | A | Close Circuit Breaker 21Q2 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10090 | R | The Auxiliary compressor 21M1 turns ON | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10091 | A | Force [TT] (MPU1)lo_pnt_m2raiseantor1 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10092 | I | Allow the pressure to rise, and the pantograph to raise | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10093 | R | The pantograph is raised | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10094 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10095 | R | The pressure of the test point PT12 drops to 0 bar | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10096 | A | On the roof, close the bleeding screw (PT3) to reset the ADD | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10097 | R | Fault reset and equipment normalized | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10098 | A | Release [TT] (MPU1)lo_pnt_m2raiseantor1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10099 | R | Pantograph is lowered | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10100 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10101 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|---|----|-----|---------------------------------|----|
| 10102 | I | Pantograph Over-Height Measurement | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10103 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10104 | 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 over height detection till it reaches housed position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10105 | A | Use the rope to hook the Pantograph and place the marked ruler perpendicular to the roof of the car. |  | OK | | Thandanani Makhanya - 463827 | M2 |
| 10106 | A | Force [TT] (MPU1)lo_pnt_m2raise pantor1 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10107 | A | Whilst holding the end of the rope, allow the pressure to rise, and the pantograph to rise until it reaches the maximum height marked on the ruler. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10108 | R | Rising time Result Max : x <= 10 (s) | | OK | 5.3 | Thandanani Makhanya - 463827 | M2 |
| 10109 | A | By adjusting the rope, ensure that the Pantograph Panhead is aligned with the marking on the ruler. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10110 | A | Adjust the Over-height valve such that when the Pantograph goes above the marking on the ruler, the over height must be detected. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10111 | R | The over-height valve is adjusted correctly. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10112 | A | Release [TT] (MPU1)lo_pnt_m2raise pantor1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10113 | R | Pantograph is lowered | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10114 | A | Force [TT] (MPU1)lo_pnt_m2raise pantor1 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|--|----|---|---------------------------------|----|
| 10115 | A | Allow the Pantograph to rise freely until it reaches Over-height | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10116 | R | Over-height is detected immediately after passing the marked area on the ruler and Pantograph begins to drop | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10117 | R | Lowering time Result Max : $x \leq 7$ (s) | | OK | 6 | Thandanani Makhanya - 463827 | M2 |
| 10118 | A | Release [TT] (MPU1)lo_pnt_m2raiseantor1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10119 | A | Reset over-height valve (PT2) on the roof | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10120 | R | Equipment normalized. (Only after resetting the PT2 valve, can the pantograph be raised) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10121 | I | Control Force Test | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10122 | I | The purpose of this test is to ensure that the pantograph maintains an acceptable force against the catenary wire overall operating heights | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10123 | A | Attach the dynamometer to the pantograph's head collector | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10124 | 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 | | Thandanani Makhanya - 463827 | M2 |
| 10125 | A | Force [TT] (MPU1)lo_pnt_m2raiseantor1 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10126 | I | Allow the pressure to rise, and the pantograph to raise | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10127 | R | The pantograph is raised | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10128 | R | $F > 150N$ | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10129 | A | Attach the 8.5kg (one 7.5kg and one 1kg) dead weight to the Panto head to apply an 85N force whilst the Panto is in the raised position. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10130 | R | The pantographs should remain in the neutral position | | OK | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|---|--|----|---|---------------------------------|----|
| 10131 | A | Check that the center of the pantograph head corresponds with the track center line on maximum raised position. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10132 | R | Pantograph aligned with the track centreline in maximum raised position (Use marked ruler to compare) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10133 | A | Remove 1kg dead weight | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10134 | R | Pantograph continues to rise to over height condition | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10135 | A | Remove the dynamometer and dead weights from the pantograph's head-collector | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10136 | A | Release [TT] (MPU1)lo_pnt_m2raiseantor1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10137 | R | Pantograph is lowered | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10138 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr1 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10139 | R | Read Defined Variable [TT] (MPU1)li_pnt_m2pantorisedr2 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |



Serial Tests Report
TS215 – M2 – VFT
RTR Vehicle Functional Static Testing Report

Document Reference
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Version: A0

Emission date
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Section 7 – Internal Lighting

7.3 Instructions list

7.3.1 052_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 | | Thandanani Makhanya - 463827 | M2 |
| 10002 | I | Initial Conditions | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10003 | I | 110Vdc Normal line is ON | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10004 | I | Cleaning Light Command | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10005 | I | 110Vdc Permanent Train Line Dev4/40 = END2 90XR24 pin 29 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10006 | A | Force [NI] Dev4/40 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10007 | A | Close Circuit Breaker 52Q5 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10008 | A | Close Circuit Breaker 52Q3 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10009 | A | Close Circuit Breaker 52Q4 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10010 | I | Light 33% Train Line Dev4/8 = END2 90XP25 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10011 | A | Force [NI] Dev4/8 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10012 | R | The saloon RIGHT side emergency lights (low intensity) are "ON" on all light modules | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10013 | R | The saloon LEFT side emergency lights (low intensity) are "ON" on all light modules | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10014 | I | Light 33% Train Line Dev2/8 = END1 90XR25 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10015 | R | Read Defined Variable [NI] Dev2/8 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10016 | I | Light 33% Train Line Dev4/8 = END2 90XP35 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10017 | A | Force [NI] Dev4/8 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|--|----|---|---------------------------------|----|
| 10018 | I | Light 33% Train Line Dev2/8 = END1 90XR25 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10019 | R | Read Defined Variable [NI] Dev2/8 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10020 | R | All saloon emergency lights (low intensity) are OFF on all light modules (Left + Right) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10021 | A | Turn Cleaning Staff Lights Switch 52S6 to ON position | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10022 | I | Light 33% Train Line Dev2/8 = END1 90XR15 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10023 | R | Read Defined Variable [NI] Dev2/8 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10024 | R | All saloon emergency lights (low intensity) are "ON" on all light modules (Left + Right) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10025 | A | Reset Circuit Breaker 52Q5 (Open and Close) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10026 | R | Read Defined Variable [NI] Dev2/8 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10027 | I | Main Light Command | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10028 | A | Close Circuit Breaker 52Q1 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10029 | A | Close Circuit Breaker 52Q2 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10030 | R | All saloon emergency lights (low intensity) are "ON" on all light modules (Left + Right) | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10031 | I | Light 33% Train Line Dev2/8 = END1 90XR25 pin 27 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10032 | R | Read Defined Variable [NI] Dev2/8 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10033 | I | Main Light Command Train Line Dev4/24 = END2 90XP35 pin 26 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10034 | A | Force [NI] Dev4/24 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10035 | I | Main Light Command Train Line Dev2/32 = END1 90XR25 pin 26 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10036 | R | Read Defined Variable [NI] Dev2/32 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|--|----|--|---------------------------------|----|
| 10037 | R | The saloon RIGHT side main lighting (high intensity) is "ON" on all light modules | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10038 | R | The saloon LEFT side main lighting (high intensity) is "ON" on all light modules | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10039 | I | Main Light Command Train Line Dev4/24 = END2 90XP35 pin 26 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10040 | A | Force [NI] Dev4/24 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10041 | R | All saloon emergency lights (low intensity) are "ON" on all light modules (Left + Right) | | OK | | Thandanani Makhanya - 463827 | M2 |



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Section 8 – TCMS Network

8.3 Instructions list

8.3.1 025_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 (SPP=25) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Initial conditions | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | Vehicle test bench should be configured as TC1: 1. TC1 Data plugs 2. MCE switch set to TC1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | A | 110Vdc supply to the Normal Train line is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | I | Power Supply to the Router Switches | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | I | Power supply to the 25A10 SWITCH ETHERNET (CRS1) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | A | Close Circuit Breaker 25Q10 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | R | CRS1 25A10 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | I | Power supply to the 25A11 SWITCH ETHERNET (CRS2) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | A | Close Circuit Breaker 25Q11 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | R | CRS2 25A11 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | I | Power supply to the 25A14 ETHERNET REPEATER (TBR) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10013 | A | Close Circuit Breaker 25Q14 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | R | TBR 25A14 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10015 | A | Close Circuit Breaker 25Q6 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | A | Close Circuit Breaker 25Q7 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10017 | I | Ethernet Loop | | OK | | Nokuzola Mdluli - 491469 | M2 |

| | | | | | | | |
|-------|---|---|--|----|--|--------------------------|----|
| 10018 | A | For each CRS, check that the Ethernet Loop LEDs are flashing | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10019 | R | CRS1 has LEDs on ports X3 and X4 flashing | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | R | CRS2 has LEDs on ports X3 and X4 flashing | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | R | Check on the Test Bench DDU that all Router Switches are available on the network | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | I | Power Supply to the BRIOMS | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10023 | R | BRIOM 25A6 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | A | Check visually that ground braid is connected to BRIOM | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | R | BRIOM 25A7 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10026 | A | Check visually that ground braid is connected to BRIOM | | OK | | Nokuzola Mdluli - 491469 | M2 |

Section 9 – Rescue Mode and Emergency Disconnection

9.3 Instructions list

9.3.1 027_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 | | Thandanani Makhanya - 463827 | M2 |
| 10002 | I | Initial Conditions | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10003 | I | 110Vdc Normal power supply is connected to the vehicle, and switched ON | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10004 | I | Backup Mode | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10005 | I | Backup Mode Train Lines Dev2/29 = END1 90XR25 pin23 Dev4/33 = END2 90XP35 pin 23 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10006 | A | Force [NI] Dev4/33 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10007 | R | Read Defined Variable [NI] Dev2/29 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10008 | R | Relay 27K1 is energized. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10009 | R | Relay 27K2 is de-energized. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10010 | A | Timer 30.0 S | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10011 | R | Relay 27K2 is de-energized. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10012 | A | Timer 30.0 S | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10013 | R | Relay 27K2 is energized. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10014 | I | Backup Mode Train Lines Dev2/29 = END1 90XR25 pin23 Dev4/33 = END2 90XP35 pin 23 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10015 | A | Force [NI] Dev4/33 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10016 | R | Read Defined Variable [NI] Dev2/29 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10017 | R | Relay 27K1 is de-energized. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10018 | R | Relay 27K2 is de-energized. | | OK | | Thandanani Makhanya - 463827 | M2 |

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|-------|---|--|--|----|---|---------------------------------|----|
| 10019 | I | Emergency Disconnection | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10020 | I | Emergency Disconnection Train Lines Dev2/30 = END1 90XR25 pin24 Dev4/34 = END2 90XP35 pin 24 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10021 | A | Force [NI] Dev4/34 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10022 | R | Read Defined Variable [NI] Dev2/30 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10023 | R | Relay 27K5 is energized | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10024 | I | Emergency Disconnection Train Lines Dev2/30 = END1 90XR25 pin24 Dev4/34 = END2 90XP35 pin 24 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10025 | A | Force [NI] Dev4/34 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10026 | R | Read Defined Variable [NI] Dev2/30 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10027 | R | Relay 27K5 is de-energized. | | OK | | Thandanani Makhanya - 463827 | M2 |

Section 10 – Service Brake

10.3 Instructions list

10.3.1 040_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 | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Initial Conditions | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | No air supply to the vehicle | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | I | All brake panel cocks are in normal position (not isolated) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | I | 110Vdc Normal power supply should be connected to the vehicle and ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | I | Follow the procedure in the document below to upload software onto the TBCU electronic |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | I | Power Supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | A | Remove the connector 10XR12_XCB2 from the propulsion box | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | A | Close Circuit Breaker 33Q1, 33Q3 and 33Q5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | A | Check the voltage on connector 10XR12_XCB2 between pins 4 (+) and 69 (-) ; 4(+) and 67(-); and 5(+) and 68(-) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 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 | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | A | Open Circuit Breaker 33Q1 and 33Q3, Replace connector 10XR12_XCB2 on the propulsion box, and Close Circuit breaker 33Q1 and 33Q3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10013 | A | Remove the connector -40XP2_C2_16 from pneumatic brake panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | A | Close Circuit Breaker 40Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|--|----|---|--------------------------|----|
| 10015 | A | Check the voltage on connector 40XP2_C2_16 between pins 13 (+) and 31 (-) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | R | Battery voltage (above 80Vdc) is measured on connector 40XP2_C2_16 between pins 13 (+) and 31 (-) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10017 | A | Open Circuit Breaker 40Q1, Replace connector -40XP2_C2_16 on the pneumatic brake panel, and Close Circuit breaker -40Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10018 | R | The pneumatic brake panel 40A2 is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10019 | I | Brake Air Supply and Brake Application | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XR35 pin 60 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | R | Read Defined Variable [NI] Dev2/85 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10022 | R | Read Defined Variable [NI] Dev5/51 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10023 | I | Brake Applied Train Lines Dev2/83 = END1 90XR25 pin 50 Dev5/49 = END2 90XR35 pin 50 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | R | Read Defined Variable [NI] Dev2/83 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10025 | R | Read Defined Variable [NI] Dev5/49 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10026 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2brakeairsuppokr1 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10027 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2brakeairsuppokr2 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10028 | R | Read Defined Variable [TT] (TBCU2)LI_BRPS_NOK = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10029 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_NOT_APPLIED = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10030 | A | Close/Isolate the Isolation cock F2.1/3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | A | Open the Isolation cock F2.2/3 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|--|----|---|--------------------------|----|
| 10032 | A | Connect the air supply to the vehicle main pipe coupling flexible hose F3/5, and switch the supply ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | I | Take note of any air leaks in the pipes or valves | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10034 | A | Allow the pressure to go above 6 bar. The pressure can be checked at the BRTP test point | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10035 | R | BRTP pressure is measured ≥ 6 Bar | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10036 | I | Brake Applied Train Lines Dev2/83 = END1 90XR25 pin 50 Dev5/49 = END2 90XR35 pin 50 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10037 | R | Read Defined Variable [NI] Dev2/83 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10038 | R | Read Defined Variable [NI] Dev5/49 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10039 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2brakeairsupokr1 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10040 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2brakeairsupokr2 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10041 | R | Read Defined Variable [TT] (TBCU2)LI_BRPS_NOK = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10042 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_NOT_APPLIED = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10043 | I | Remote Isolation | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10044 | I | Remote Isolation Train Lines Dev2/84 = END1 90XR25 pin 59 Dev4/50 = END2 90XR35 pin 59 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10045 | A | Force [NI] Dev4/50 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10046 | R | Read Defined Variable [NI] Dev2/84 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10047 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_ISO = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10048 | A | Force [TT] (MPU1)lo_sbk_m2isobrake = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|---|-----------------------------|----|
| 10049 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_ISO = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10050 | I | Remote Isolation Train Lines Dev2/84 = END1 90XR25 pin 59 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10051 | R | Read Defined Variable [NI] Dev2/84 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10052 | A | Release [TT] (MPU1)lo_sbk_m2isobrake | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10053 | I | Remote Isolation Train Lines Dev2/84 = END1 90XR25 pin 59 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10054 | R | Read Defined Variable [NI] Dev2/84 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10055 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_ISO = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10056 | I | Remote Isolation Train Lines Dev4/50 = END2 90XR35 pin 59 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10057 | A | Force [NI] Dev4/50 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10058 | I | Manual Isolation | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10059 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10060 | R | Read Defined Variable [NI] Dev2/85 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10061 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XR35 pin 60 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10062 | R | Read Defined Variable [NI] Dev5/51 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10063 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2servicebrakedc = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10064 | R | Read Defined Variable [TT] (TBCU2)Li_ServiceBrakeDC = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10065 | A | Close the Isolation cock C2.3.1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10066 | I | EB Reduced Train Lines Dev2/85 = END1 90XR25 pin 60 Dev5/51 = END2 90XR35 pin 60 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10067 | R | Read Defined Variable [NI] Dev2/85 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |

| | | | | | | | |
|-------|---|--|--|----|---|--------------------------|----|
| 10068 | R | Read Defined Variable [NI] Dev5/51 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10069 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2servicebrakedc = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10070 | R | Read Defined Variable [TT] (TBCU2)Li_ServiceBrakeDC = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10071 | A | Re-open the Isolation cock C2.3.1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10072 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2servicebrakedc = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10073 | I | Switch OFF 400V before reading the bcufault variable | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10074 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2bcufault = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10075 | A | Force [TT] (TBCU2)LO_BRK_FLT = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10076 | R | Read Defined Variable [TT] (MPU1)li_sbk_m2bcufault = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10077 | A | Release [TT] (TBCU2)LO_BRK_FLT | | OK | | Nokuzola Mdluli - 491469 | M2 |



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Section 11 – Emergency Brake

11.3 Instructions list

11.3.1 044_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 | M2 |
| 10002 | I | Initial Conditions | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10003 | I | No PEAs are activated | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10004 | I | 110Vdc Normal power supply should be connected to the vehicle and ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10005 | I | Visual Inspection | | OK | | Alleta Sekgololo - 417407 | M2 |
| 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 | M2 |
| 10007 | R | All the brake DBUs are correctly installed, and all the brake pads are correctly installed and locked | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10008 | A | Check the pipe installation. | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10009 | R | All the pipes are installed on the vehicle | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10010 | A | Check all the Passenger Emergency Alarm handles, and ensure they are connected to their respective connectors | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10011 | R | All the PEAs are installed and connected | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10012 | I | Train Lines | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10013 | I | Emergency Brake Loop Train Lines Dev2/5 = END1 90XR24 pin 8 Dev4/5 = END2 90XP34 pin 8 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10014 | A | Force [NI] Dev4/5 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10015 | R | Read Defined Variable [NI] Dev2/5 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10016 | A | Force [NI] Dev4/5 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10017 | R | Read Defined Variable [NI] Dev2/5 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|---|---------------------------|----|
| 10018 | I | Emergency Brake Loop Override Train Lines Dev2/6 = END1 90XR24 pin 9 Dev4/6 = END2 90XP34 pin 9 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10019 | A | Force [NI] Dev4/6 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10020 | R | Read Defined Variable [NI] Dev2/6 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10021 | A | Force [NI] Dev4/6 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10022 | R | Read Defined Variable [NI] Dev2/6 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10023 | I | Emergency Brake Train Line Train Lines Dev2/50 = END1 90XR25 pin 67 Dev4/61 = END2 90XP35 pin 67 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10024 | A | Force [NI] Dev4/61 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10025 | R | Read Defined Variable [NI] Dev2/50 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10026 | A | Force [NI] Dev4/61 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10027 | R | Read Defined Variable [NI] Dev2/50 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10028 | I | PEA Loop OTDR Train Lines Dev2/7 = END1 90XR24 pin 10 Dev4/7 = END2 90XP34 pin 10 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10029 | A | Force [NI] Dev4/7 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10030 | R | Read Defined Variable [NI] Dev2/7 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10031 | A | Force [NI] Dev4/7 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10032 | R | Read Defined Variable [NI] Dev2/7 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10033 | I | PEA Reset | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10034 | A | Close Circuit Breaker 44Q1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10035 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 Dev4/62 = END2 90XP35 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10036 | A | Force [NI] Dev4/62 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10037 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10038 | A | Activate the PEA on door 5 (44S15) | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|---|------------------------------|----|
| 10039 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10040 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10041 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10042 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10043 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10044 | A | Activate the PEA on door 3 (44S13) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10045 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10046 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10047 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10048 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10049 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10050 | A | Activate the PEA on door 1 (44S11) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10051 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10052 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10053 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10054 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10055 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10056 | A | Activate the PEA on door 2 (44S12) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10057 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |

| | | | | | | | |
|-------|---|--|--|----|---|---------------------------|----|
| | | | | | | | |
| 10058 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10059 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10060 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10061 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10062 | A | Activate the PEA on door 4 (44S14) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10063 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10064 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10065 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10066 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10067 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10068 | A | Activate the PEA on door 6 (44S16) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10069 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10070 | R | Read Defined Variable [NI] Dev2/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10071 | A | Reset the PEA using square key | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10072 | I | PEA Loop Train Lines Dev2/58 = END1 90XR25 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10073 | R | Read Defined Variable [NI] Dev2/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10074 | I | PEA Loop Train Lines Dev4/64 = END2 90XP35 pin 95 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10075 | A | Force [NI] Dev4/62 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |



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Section 12 – HVAC Air Conditioning


12.3 Instructions list




12.3.1 057_HVA-Air Conditioning


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) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Initial conditions | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | A | Car Should be Prepared | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | I | Power Supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | A | Remove Connector 57XP1_5 from HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | A | Close Circuit Breaker 57Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | A | Force [TT] (MPU1)lo_hva_m2hvacinhibr1__1 = 0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | A | Force [TT] (MPU1)lo_hva_m2hvacinhibr2__1 = 0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | R | Check battery voltage (above 80Vdc) between points 11 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | A | Force [TT] (MPU1)lo_hva_m2hvacinhibr2__1 = 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | R | Check 0Vdc between points 11 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | A | Force [TT] (MPU1)lo_hva_m2hvacinhibr1__1 = 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10013 | R | Check 0Vdc between points 11 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | R | Check 0Vdc between points 10 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10015 | A | Force [TT] (MPU1)lo_hva_m2hvacinhibr2__1 = 0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | A | Force [TT] (MPU1)lo_hva_m2emergventil__1 = 1 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|---|----|--|--------------------------|----|
| 10017 | R | Check 0Vdc between points 11 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10018 | R | Check battery voltage (above 80Vdc) between points 10 and 9 of the connector 57XP1_5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10019 | A | Release [TT] (MPU1)lo_hva_m2emergventil__1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | A | Release [TT] (MPU1)lo_hva_m2hvacinhibr1__1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | A | Release [TT] (MPU1)lo_hva_m2hvacinhibr2__1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | A | Return back the connector 57XP1_5 on the HVAC panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10023 | I | HVAC Electronic Power Supply | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | A | Close Circuit Breaker F1 on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | A | Turn the control switch to AUTO position on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10026 | R | The HVAC electronic is ON | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10027 | A | Open Circuit Breaker F1 on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10028 | R | The HVAC electronic is OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | A | Close Circuit Breaker F1 on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10030 | I | Software Upload | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | I | Follow the procedure in the document below to upload software onto the HVAC electronic |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | A | |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | I | Sensor Grade | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10034 | I | Each temperature sensor has calibrated grade information. The sensor must be setup with this information. | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|---|----|----|--------------------------|----|
| 10035 | A | The label with sensor grade information is found inside the HVAC frame, near the filter. Inside the train, open the ceiling filter access, rotate a damper, and read the label. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10036 | R | Sensor grade for HVAC Return Air (RAS) is : | | OK | 3l | Nokuzola Mdluli - 491469 | M2 |
| 10037 | R | Sensor grade for HVAC Duct Air (DAS) is : | | OK | 6l | Nokuzola Mdluli - 491469 | M2 |
| 10038 | R | Sensor grade for HVAC Fresh Air (FAS) is : | | OK | 6l | Nokuzola Mdluli - 491469 | M2 |
| 10039 | R | Sensor grade for HVAC Duct Air 2 (DAS2) is : | | OK | 3 | Nokuzola Mdluli - 491469 | M2 |
| 10040 | A | In the maintenance software, select the "Application settings" page and click the "Sensors" tab | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10041 | A | Enter the data found on the label for each grade. Then, click "Save settings" |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10042 | A | Open Circuit Breaker F1 on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10043 | I | Checking 400Vac | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10044 | A | Ensure that the 400Vac Shore Supply is connected to the vehicle, else connect it | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10045 | A | Close Circuit Breaker 57Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10046 | A | Measure 400Vac (+/-5%) in the Terminal Block next to the connector '57XP1_10.A / '57XP1_10.B' on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10047 | R | 400Vac (+/-5%) measured | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10048 | A | On the HVAC Panel check 400Vac (+/-5%) between points L1- Phase R, L2- Phase S, L3- Phase T | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10049 | A | On the HVAC Panel, with a phasemeter, check the correct Phase Rotation between points L1- Phase R, L2- Phase S and L3- Phase T. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10050 | R | 400Vac (+/-5%) is measured between each of the phases | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|---|----|--|--------------------------|----|
| 10051 | R | The phase rotation is correct between all three phases | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10052 | I | Using the tools list on the side of your screen, log the details of the phasemeter used | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10053 | I | Saloon HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10054 | I | To force any mode on HVAC, please follow the manual below to open the communication channel with the HVAC. Connection should be through the HVAC Electronic Device in the HC cubicle |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10055 | A | Close Circuit Breaker F1 on the HVAC Panel | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10056 | R | HVAC unit turns ON and starts to work | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10057 | I | Reconnect the laptop to the HVAC maintenance software using HCU Finder | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10058 | R | The Exhaust fans are Turned Off (Confirm on Forced tab that Actual exhauster speed is OFF) |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10059 | I | Forced Mode (Saloon HVAC) | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10060 | I | For the next sections, walk through the whole car and physically check (feel) that the HVAC is functioning as desired | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10061 | I | In the maintenance software, select the 'Forced' tab, and use the "Required working mode" drop down box to force the following modes: | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10062 | I | Ventilation Mode |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10063 | A | Force Ventilation mode on the Saloon HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10064 | R | All saloon HVAC units work in Ventilation mode. Not heating/cooling | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10065 | R | The Exhaust fans are Turned OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10066 | I | Cooling Mode | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10067 | A | Force Cooling mode on the Saloon HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|---|----|--|--------------------------|----|
| 10068 | R | All saloon HVAC units work in Cooling mode | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10069 | R | The Exhaust fans are Turned OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10070 | I | Heating Mode | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10071 | A | Force Heating mode on the Saloon HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10072 | R | All saloon HVAC units work in Heating mode | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10073 | R | The Exhaust fans are Turned OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10074 | I | Self-Test | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10075 | A | Force Self-Test on the Saloon HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10076 | R | All saloon HVAC units work according to the mode described in the "Actual working mode" | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10077 | R | The Exhaust fans are Turned OFF | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10078 | I | HVAC Faults | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10079 | A | Open Circuit Breaker 57Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10080 | R | All saloon HVAC units STOP working | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10081 | A | Close Circuit Breaker 57Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10082 | R | All saloon HVAC units START working | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10083 | A | In the maintenance software, select the "Alarms / Warnings" tab |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10084 | A | Ensure there are no active faults on the HVAC | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10085 | R | No active faults identified on the HVAC unit | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10086 | A | Reconnect HVAC ethernet cable and check on the DDU if HVAC is online. | | OK | | Nokuzola Mdluli - 491469 | M2 |



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Section 13 – Holding and Parking Brake

13.3 Instructions list

13.3.1 045_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 | | Alleta Sekgololo - 417407 | M2 |
| 10002 | I | Initial Conditions | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10003 | I | Using the tools list on the side of your screen, record the serial number of the manometer used during this test | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10004 | I | Check that the pressure on Test point C2.11/1 is >5bar | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10005 | I | Visual Inspection | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10006 | A | Check the installation of the manual parking brake release components (lever + cable) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 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 | | Alleta Sekgololo - 417407 | M2 |
| 10008 | I | Circuit Breaker | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10009 | I | Ensure that the Circuit Breaker 33Q3 is closed | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10010 | A | Close Circuit Breaker 33Q5 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10011 | I | Parking Brake Pressure Switch | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10012 | R | Read Defined Variable [TT] (TBCU2)LI_PARK_BR_RELEASE = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10013 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_STAT = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10014 | R | Read Defined Variable [TT] (MPU1)tbcu2_parkbrakerelease = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10015 | R | Read Defined Variable [TT] (MPU1)tbcu2_li_pbrake_stat = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|--|----|---|------------------------------|----|
| 10016 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP35 pin 77 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10017 | R | Read Defined Variable [NI] Dev2/52 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10018 | R | Read Defined Variable [NI] Dev5/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10019 | I | Parking Brake Applied | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10020 | 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 | | Alleta Sekgololo - 417407 | M2 |
| 10021 | 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 | | Alleta Sekgololo - 417407 | M2 |
| 10022 | R | Pressure at test point C2.11/1 <4.5 Bar | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10023 | R | Read Defined Variable [TT] (TBCU2)LI_PARK_BR_RELEASE = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10024 | R | Read Defined Variable [TT] (MPU1)tbcu2_parkbrakeisoldc = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10025 | A | Return the Isolation cock C2.3.2 to OPEN position | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10026 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_STAT = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10027 | R | Read Defined Variable [TT] (MPU1)tbcu2_li_pbrake_stat = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10028 | R | Read Defined Variable [TT] (TBCU2)LI_PARK_BR_DC = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10029 | R | Read Defined Variable [TT] (MPU1)tbcu2_parkbrakeisoldc = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10030 | R | Read Defined Variable [TT] (MPU1)li_pbk_m2parkbrakeisol = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10031 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP35 pin 77 | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|---|---------------------------|----|
| 10032 | R | Read Defined Variable [NI] Dev2/52 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10033 | R | Read Defined Variable [NI] Dev5/58 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10034 | A | Position the Isolation cock C2.3.2 in CLOSE position | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10035 | R | Read Defined Variable [TT] (TBCU2)LI_BRAKE_STAT = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10036 | R | Read Defined Variable [TT] (MPU1)tbcu2_li_pbrake_stat = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10037 | R | Read Defined Variable [TT] (TBCU2)LI_PARK_BR_DC = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10038 | R | Read Defined Variable [TT] (MPU1)tbcu2_parkbrakeisoldc = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10039 | R | Read Defined Variable [TT] (MPU1)li_pbk_m2parkbrakeisol = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10040 | I | Parking Brake Applied Train Lines Dev2/52 = END1 90XR25 pin 77 Dev5/58 = END2 90XP25 pin 77 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10041 | R | Read Defined Variable [NI] Dev2/52 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10042 | R | Read Defined Variable [NI] Dev5/58 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10043 | A | Return the Isolation cock C2.3.2 to OPEN position | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10044 | I | Remote Parking Brake Command | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10045 | I | Remote Parking Brake Command Train Lines Dev2/51 = END1 90XR25 pin 68 Dev4/57 = END2 90XR35 pin 68 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10046 | A | Force [NI] Dev4/57 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10047 | R | Read Defined Variable [NI] Dev2/51 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10048 | R | Confirm that the parking brake is applied, and air is released from electro valve C2.5 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10049 | I | Remote Parking Brake Command Train Lines Dev2/51 = END1 90XR25 pin 68 Dev4/57 = END2 90XR35 pin 68 | | OK | | Alleta Sekgololo - 417407 | M2 |



Serial Tests Report
TS215 – M2 – VFT
RTR Vehicle Functional Static Testing Report

Document Reference
GIB0000006296
Version: A0

Emission date
09/04/2024

| | | | | | | | |
|-------|---|--|--|----|---|---------------------------|----|
| 10050 | A | Force [NI] Dev4/57 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10051 | R | Read Defined Variable [NI] Dev2/51 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10052 | R | Confirm that electro valve C2.5 has stopped emitting air | | OK | | Alleta Sekgololo - 417407 | M2 |



Serial Tests Report
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Section 14 – Passenger Doors

14.3 Instructions list

14.3.1 050_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 | | Alleta Sekgololo - 417407 | M2 |
| 10002 | I | Initial conditions | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10003 | I | 110Vdc Normal power supply is connected to the vehicle and ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10004 | I | Ensure that the TCMS network is functional | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10005 | I | Circuit Breaker | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10006 | A | Close Circuit Breaker 50Q1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10007 | R | DCU 1 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10008 | R | Check on the DDU that DCU1 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10009 | A | Close Circuit Breaker 50Q2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10010 | R | DCU 2 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10011 | R | Check on the DDU that DCU2 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10012 | A | Close Circuit Breaker 50Q3 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10013 | R | DCU 3 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10014 | R | Check on the DDU that DCU3 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10015 | A | Close Circuit Breaker 50Q4 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10016 | R | DCU 4 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10017 | R | Check on the DDU that DCU4 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10018 | A | Close Circuit Breaker 50Q5 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10019 | R | DCU 5 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|---|----|---|---------------------------|----|
| 10020 | R | Check on the DDU that DCU5 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10021 | A | Close Circuit Breaker 50Q6 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10022 | R | DCU 6 is powered ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10023 | R | Check on the DDU that DCU6 is online | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10024 | A | Close Circuit Breaker 50Q7 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10025 | I | Car ID Code | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10026 | A | Using the DDU on the test bench, check that all the doors on M2 are available - as in the picture |  | OK | | Alleta Sekgololo - 417407 | M2 |
| 10027 | R | All doors are available | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10028 | I | Door Open and Close - Safety Loop | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10029 | I | ERTMS Auth Left Train Lines Dev4/87 = END2 90XR35 pin 47 Dev2/81 = END1 90XR25 pin 44 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10030 | A | Force [NI] Dev4/87 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10031 | R | Read Defined Variable [NI] Dev2/81 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10032 | A | Force [NI] Dev4/87 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10033 | R | Read Defined Variable [NI] Dev2/81 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10034 | I | ERTMS Auth Right Train Lines Dev2/82 = END1 90XR15 pin 47 Dev4/86 = END2 90XP25 pin 44 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10035 | A | Force [NI] Dev4/86 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10036 | R | Read Defined Variable [NI] Dev2/82 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10037 | A | Force [NI] Dev4/86 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10038 | R | Read Defined Variable [NI] Dev2/82 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10039 | I | Doors Open Train Lines Dev2/49 = END1 90XR15 pin 66 Dev4/55 = END2 90XP25 pin 66 | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|---|---------------------------|----|
| 10040 | A | Force [NI] Dev4/55 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10041 | R | Read Defined Variable [NI] Dev2/49 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10042 | A | Force [NI] Dev4/55 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10043 | R | Read Defined Variable [NI] Dev2/49 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10044 | I | Door Close Right Train Lines Dev2/53 = END1 90XR15 pin 78 Dev4/60 = END2 90XP25 pin 79 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10045 | A | Force [NI] Dev4/60 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10046 | R | Read Defined Variable [NI] Dev2/53 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10047 | A | Force [NI] Dev4/60 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10048 | R | Read Defined Variable [NI] Dev2/53 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10049 | I | Door Close Left Train Lines Dev2/54 = END1 90XR15 pin 79 Dev4/59 = END2 90XP25 pin 78 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10050 | A | Force [NI] Dev4/59 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10051 | R | Read Defined Variable [NI] Dev2/54 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10052 | A | Force [NI] Dev4/59 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10053 | R | Read Defined Variable [NI] Dev2/54 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10054 | I | V<3km/h Train Lines Dev2/35 = END1 90XR15 pin 29 Dev4/39 = END2 90XP25 pin 29 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10055 | A | Force [NI] Dev4/39 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10056 | R | Read Defined Variable [NI] Dev2/35 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10057 | I | Door Auth Right Train Lines Dev2/64 = END1 90XR15 pin 85 Dev4/64 = END2 90XP25 pin 84 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10058 | A | Force [NI] Dev4/64 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10059 | R | Read Defined Variable [NI] Dev2/64 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10060 | I | Door Auth Left Train Lines Dev2/56 = END1 90XR15 pin 84 | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|--|----|---|---------------------------|----|
| | | Dev4/56 = END2 90XP25 pin 85 | | | | | |
| 10061 | A | Force [NI] Dev4/56 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10062 | R | Read Defined Variable [NI] Dev2/56 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10063 | A | Force [TT] (MPU1)lo_dor_m2opendoorleft = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10064 | A | Force [TT] (MPU1)lo_dor_m2opendoorright = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10065 | R | Check that doors 1, 3 and 5 (LEFT SIDE) open | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10066 | R | Check that doors 2, 4 and 6 (RIGHT SIDE) open | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10067 | I | Door Auth Right Train Lines Dev2/64 = END1 90XR15 pin 85 Dev4/64 = END2 90XP25 pin 84 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10068 | A | Force [NI] Dev4/64 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10069 | R | Read Defined Variable [NI] Dev2/64 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10070 | I | Door Auth Left Train Lines Dev2/56 = END1 90XR15 pin 84 Dev4/56 = END2 90XP25 pin 85 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10071 | A | Force [NI] Dev4/56 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10072 | R | Read Defined Variable [NI] Dev2/56 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10073 | R | Check that doors 1, 3 and 5 (LEFT SIDE) close | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10074 | R | Check that doors 2, 4 and 6 (RIGHT SIDE) close | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10075 | I | Safety Doors Loop Train Lines Dev2/59 = END1 90XR15 pin 96 Dev4/89 = END2 90XP25 pin 96 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10076 | A | Force [NI] Dev4/89 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10077 | R | Read Defined Variable [NI] Dev2/59 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10078 | I | Left Side Doors | | OK | | Alleta Sekgololo - 417407 | M2 |

| | | | | | | | |
|-------|---|--|--|----|------|---------------------------|----|
| 10079 | I | Door 1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10080 | I | Door Auth Right Train Lines Dev4/64 = END2 90XP25 pin 85 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10081 | A | Force [NI] Dev4/64 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10082 | R | Check if ALL Left doors opens in 3 sec (+1/-0) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10083 | R | Check that the GREEN leds on both sides of the door blink while the door opens [Safety Request: Prasa8-05] | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10084 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10085 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10086 | R | Door 1 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10087 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10088 | R | Door 1 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1402 | Alleta Sekgololo - 417407 | M2 |
| 10089 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10090 | R | Door 1 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10091 | I | Door 3 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10092 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10093 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10094 | R | Door 3 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1408 | Alleta Sekgololo - 417407 | M2 |
| 10095 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|------|---------------------------|----|
| 10096 | R | Door 3 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1406 | Alleta Sekgololo - 417407 | M2 |
| 10097 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10098 | R | Door 3 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10099 | I | Door 5 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10100 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10101 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10102 | R | Door 5 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1398 | Alleta Sekgololo - 417407 | M2 |
| 10103 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10104 | R | Door 5 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10105 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10106 | R | Door 5 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1398 | Alleta Sekgololo - 417407 | M2 |
| 10107 | I | Door Auth Right Train Lines Dev4/64 = END2 90XP25 pin 85 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10108 | A | Force [NI] Dev4/64 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10109 | R | Check that ALL Left door closes in 3 sec (+1/-0) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10110 | R | Check that the RED leds on both sides of the door blink while the door closes [Safety Request: Prasa8-05] | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10111 | I | Safety Doors Loop Train Lines Dev2/59 = END1 90XR15 pin 96 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10112 | R | Read Defined Variable [NI] Dev2/59 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |

| | | | | | | | |
|-------|---|---|--|----|------|---------------------------|----|
| 10113 | I | Right Side Doors | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10114 | I | Door 2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10115 | I | Door Auth Left Train Lines Dev4/56 = END2 90XP25 pin 84 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10116 | A | Force [NI] Dev4/56 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10117 | R | Check that the door opens in 3 sec (+1/-0) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10118 | R | Check that the GREEN leds on both sides of the door blink while the door opens [Safety Request: Prasa8-05] | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10119 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10120 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10121 | R | Door 2 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10122 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10123 | R | Door 2 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1403 | Alleta Sekgololo - 417407 | M2 |
| 10124 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10125 | R | Door 2 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10126 | I | Door 4 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10127 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10128 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10129 | R | Door 4 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1396 | Alleta Sekgololo - 417407 | M2 |
| 10130 | A | Measure the opening gap of the door. (This measurement must be done at the | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|------|------------------------------|----|
| | | top of the door) | | | | | |
| 10131 | R | Door 4 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10132 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10133 | R | Door 4 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1398 | Alleta Sekgololo - 417407 | M2 |
| 10134 | I | Door 6 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10135 | I | Door Opening Gap | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10136 | A | Measure the opening gap of the door. (This measurement must be done at the BOTTOM of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10137 | R | Door 6 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1400 | Alleta Sekgololo - 417407 | M2 |
| 10138 | A | Measure the opening gap of the door. (This measurement must be done at the top of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10139 | R | Door 6 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1404 | Alleta Sekgololo - 417407 | M2 |
| 10140 | A | Measure the opening gap of the door. (This measurement must be done in the middle of the door) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10141 | R | Door 6 gap Result Min/Max : 1390<= x <= 1410 (mm) | | OK | 1402 | Alleta Sekgololo - 417407 | M2 |
| 10142 | I | Obstacle Detection | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10143 | I | Door Auth Right Train Lines Dev4/64 = END2 90XP25 pin 85 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10144 | A | Force [N] Dev4/64 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10145 | R | Check if ALL Left doors opens in 3 sec (+1/-0) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10146 | A | Position an obstacle on the floor in the centre of each and every door closing line | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10147 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|--|----|---|---------------------------|----|
| | | Dev1/56 = END1 90XR25 pin 85 (Left) | | | | | |
| 10148 | A | Force [NI] Dev4/56 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10149 | A | Force [NI] Dev4/64 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10150 | 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 ajar - free to be opened manually | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10151 | I | Safety Doors Loop Train Lines Dev2/59 = END1 90XR15 pin 96 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10152 | R | Read Defined Variable [NI] Dev2/59 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10153 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10154 | A | Force [NI] Dev4/56 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10155 | A | Force [NI] Dev4/64 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10156 | R | ALL doors opens fully | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10157 | A | Remove the obstacle | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10158 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10159 | A | Force [NI] Dev4/56 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10160 | A | Force [NI] Dev4/64 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10161 | R | Check if ALL door closes in 3 sec (+1/-0) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10162 | R | Check that the RED leds on both sides of the door blink while the door closes [Safety Request: Prasa8-05] | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10163 | I | Safety Doors Loop Train Lines Dev2/59 = END1 90XR15 pin 96 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10164 | R | Read Defined Variable [NI] Dev2/59 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |

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|-------|---|--|--|----|---|---------------------------|----|
| 10165 | I | Speed Detection | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10166 | I | Door Auth Left Train Lines Dev4/56 = END2 90XP25 pin 84 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10167 | A | Force [NI] Dev4/56 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10168 | I | Door Auth Right Train Lines Dev4/64 = END2 90XP25 pin 85 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10169 | A | Force [NI] Dev4/64 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10170 | R | All doors open | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10171 | I | V>5km/h Train Lines Dev2/34 = END1 90XR15 pin 28 Dev4/38 = END2 90XP25 pin 28 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10172 | A | Force [NI] Dev4/38 = 1.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10173 | R | Read Defined Variable [NI] Dev2/34 = 1.0 | | OK | 1 | Alleta Sekgololo - 417407 | M2 |
| 10174 | R | All doors close due to the invalid state of the DCU | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10175 | A | Release [TT] (MPU1)lo_dor_m2opendoorleft | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10176 | A | Release [TT] (MPU1)lo_dor_m2opendoorright | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10177 | I | V>5km/h Train Lines Dev2/34 = END1 90XR15 pin 28 Dev4/38 = END2 90XP25 pin 28 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10178 | A | Force [NI] Dev4/38 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10179 | R | Read Defined Variable [NI] Dev2/34 = 0.0 | | OK | 0 | Alleta Sekgololo - 417407 | M2 |
| 10180 | I | V<3km/h Train Lines Dev4/39 = END2 90XP25 pin 29 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10181 | A | Force [NI] Dev4/39 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10182 | I | Door Auth Train Lines Dev1/64 = END1 90XR25 pin 84 (Right) Dev1/56 = END1 90XR25 pin 85 (Left) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10183 | A | Force [NI] Dev4/64 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|--|----|--|------------------------------|----|
| 10184 | A | Force [NI] Dev4/56 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10185 | I | Safety Doors Loop Train Lines Dev4/89 = END2 90XP25 pin 96 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10186 | A | Force [NI] Dev4/89 = 0.0 | | OK | | Alleta Sekgololo - 417407 | M2 |



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Section 15 – Fire protection

15.3 Instructions list

15.3.1 067_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 | | Thandanani Makhanya - 463827 | M2 |
| 10002 | I | Fire Detection Train Lines | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10003 | I | Fire Detection Train Lines Dev2/76 = END1 90XR24 pin 21 Dev4/76 = END2 90XP34 pin 21 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10004 | A | Force [NI] Dev4/76 = 1.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10005 | R | Read Defined Variable [NI] Dev2/76 = 1.0 | | OK | 1 | Thandanani Makhanya - 463827 | M2 |
| 10006 | A | Force [NI] Dev4/76 = 0.0 | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10007 | R | Read Defined Variable [NI] Dev2/76 = 0.0 | | OK | 0 | Thandanani Makhanya - 463827 | M2 |
| 10008 | I | Continuity Test | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10009 | A | The following steps are continuity tests between the two points described in each step. Use a multimeter for this test. | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10010 | A | From : [(local: +END1 -90XR23.B (pin 4))] to: [(local: +END2 -90XP33.B pin 4)] | | OK | | Thandanani Makhanya - 463827 | M2 |
| 10011 | A | From : [(local: +END1 -90XR23.B (pin 5))] to: [(local: +END2 -90XP33.B pin 5)] | | OK | | Thandanani Makhanya - 463827 | M2 |

Section 16 – Traction and Electric Brake

16.3 Instructions list


16.3.1 033_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 | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | Circuit Breakers and Configuration | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | A | Close Circuit Breaker 33Q1 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | A | Close Circuit Breaker 33Q2 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | A | Close Circuit Breaker 33Q3 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | A | Close Circuit Breaker 33Q4 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | A | Close Circuit Breaker 33Q5 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | R | Read Defined Variable [TT] (TBCU2)LI_CAR_ID2 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10009 | I | Train Lines | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | I | 110Vdc Normal Traction EL Train Line Dev1/65 = END1 90XP25 pin 42 Dev2/74 = END1 90XP35 pin 14 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | A | Force [NI] Dev1/65 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | R | Read Defined Variable [NI] Dev2/28 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10013 | A | Force [NI] Dev1/65 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | R | Read Defined Variable [NI] Dev2/28 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10015 | I | Forward Train Lines: Dev2/31 : END1 90XR25 pin 25 Dev4/35 : END2 90XP35 pin 25 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | A | Force [NI] Dev4/35 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10017 | R | Read Defined Variable [TT] (TBCU2)LI_FORWARD = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10018 | R | Read Defined Variable [NI] Dev2/31 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|--|----|---|-----------------------------|----|
| 10019 | I | Forward Train Lines: Dev2/31 : END1 90XR25 pin 25 Dev4/35 : END2 90XP35 pin 25 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | A | Force [NI] Dev4/35 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | R | Read Defined Variable [TT] (TBCU2)LI_FORWARD = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10022 | R | Read Defined Variable [NI] Dev2/31 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10023 | I | Reverse Train Lines: Dev2/36 : END1 90XR25 pin 30 Dev4/78 : END2 90XP35 pin 30 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | A | Force [NI] Dev4/78 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | R | Read Defined Variable [TT] (TBCU2)LI_REVERSE = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10026 | R | Read Defined Variable [NI] Dev2/36 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10027 | I | Reverse Train Lines: Dev2/36 : END1 90XR25 pin 30 Dev4/78 : END2 90XP35 pin 30 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10028 | A | Force [NI] Dev4/78 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | R | Read Defined Variable [TT] (TBCU2)LI_REVERSE = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10030 | R | Read Defined Variable [NI] Dev2/36 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10031 | I | Traction Train Lines: Dev2/37 : END1 90XR25 pin 31 Dev4/81 : END2 90XP35 pin 31 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | A | Force [NI] Dev4/81 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10033 | R | Read Defined Variable [TT] (TBCU2)LI_TRACTION = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10034 | R | Read Defined Variable [NI] Dev2/37 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10035 | I | Traction Train Lines: Dev2/37 : END1 90XR25 pin 31 Dev4/81 : END2 90XP35 pin 31 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10036 | A | Force [NI] Dev4/81 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|--|----|---|-----------------------------|----|
| 10037 | R | Read Defined Variable [TT] (TBCU2)LI_TRACTION = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10038 | R | Read Defined Variable [NI] Dev2/37 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10039 | I | No Brake Train Lines: Dev2/38 : END1 90XR25 pin 32 Dev4/82 : END2 90XP35 pin 32 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10040 | A | Force [NI] Dev4/82 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10041 | R | Read Defined Variable [TT] (TBCU2)LI_NOBRAKE = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10042 | R | Read Defined Variable [NI] Dev2/38 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10043 | I | No Brake Train Lines: Dev2/38 : END1 90XR25 pin 32 Dev4/82 : END2 90XP35 pin 32 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10044 | A | Force [NI] Dev4/82 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10045 | R | Read Defined Variable [TT] (TBCU2)LI_NOBRAKE = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10046 | R | Read Defined Variable [NI] Dev2/38 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10047 | I | Traction Interlock Bypass Train Lines Dev2/4 : END1 90XR24 pin 6 Dev4/4 : END2 90XP34 pin 6 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10048 | A | Force [NI] Dev4/4 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10049 | R | Read Defined Variable [NI] Dev2/4 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10050 | A | Force [NI] Dev4/4 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10051 | R | Read Defined Variable [NI] Dev2/4 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10052 | I | Traction Interlock Train Lines Dev2/39 : END1 90XR25 pin 41 Dev4/83 : END2 90XP35 pin 41 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10053 | A | Force [NI] Dev4/83 = 1.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10054 | R | Read Defined Variable [TT] (TBCU2)LI_NOT_INHIB = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10055 | R | Read Defined Variable [NI] Dev2/39 = 1.0 | | OK | 1 | Nokuzola Mdluli - 491469 | M2 |
| 10056 | I | Traction Interlock Train Lines Dev2/39 : END1 90XR25 pin 41 | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|---|---|----|---|--------------------------|----|
| | | Dev4/83 : END2 90XP35 pin 41 | | | | | |
| 10057 | A | Force [NI] Dev4/83 = 0.0 | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10058 | R | Read Defined Variable [TT] (TBCU2)LI_NOT_INHIB = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10059 | R | Read Defined Variable [NI] Dev2/39 = 0.0 | | OK | 0 | Nokuzola Mdluli - 491469 | M2 |
| 10060 | I | Coolant Liquid | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10061 | A | Check that the coolant level is at least 1/2 of the sight glass level indicator |  | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10062 | R | Coolant Liquid Level is OK | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10063 | I | End of Test | | OK | | Nokuzola Mdluli - 491469 | M2 |



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Section 17 – Vehicle Normalization

17.3 Instructions list

17.3.1 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 | | Nokuzola Mdluli - 491469 | M2 |
| 10002 | I | This inspection must be performed by the EPU/Acting EPU Manager on shift | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10003 | I | The VFT procedures are all completed | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10004 | I | Vehicle Normalization Check | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10005 | R | On LV3 all Circuit Breakers are installed and secured | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10006 | R | On LV3 all Dataplugs are installed, tightened and earth braids are fastened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10007 | R | On LV3 all Connectors are tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10008 | R | On LV3 there are no missing components, device, wiring or connectors. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10009 | R | On LV6 all Dataplugs are installed, tightened and earth braids are fastened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10010 | R | On LV6 all Connectors are tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10011 | R | On LV6 there are no missing components, device, wiring or connectors. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10012 | R | On HC Cubicle the Controller is installed and properly tightened and its connectors are tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10013 | R | All DCUs are properly installed and secured | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10014 | R | All Internal Displays are properly installed and secured | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10015 | R | All Light Covers are properly installed | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10016 | R | All Saloon Fire Detectors are properly installed and secured | | OK | | Nokuzola Mdluli - 491469 | M2 |

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|-------|---|--|--|----|--|---------------------------------|----|
| 10017 | R | All covers are normalised inside the car | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10018 | R | On the Underframe, TBCU Agate is installed and properly tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10019 | R | On the Underframe, Auxiliary Compressor cover is normalized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10020 | R | On the Underframe, Panto panel cover is normalized | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10021 | R | On the Underframe, Speed Sensors are installed and properly tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10022 | R | On the LVB, all Circuit Breakers are installed and properly tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10023 | R | On the LVB, all Relays and Timers are installed and properly tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10024 | R | On the LVB, BRIOMs are installed and properly tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10025 | R | On the LVB there are no missing components, device, wiring or connectors. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10026 | R | On the Underframe, all Connectors are tightened | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10027 | R | All underframe covers are normalised | | OK | | Goitsemodimo Kgatitswe - 526511 | M2 |
| 10028 | R | On END1 the Octopus cables are disconnected from the car and properly stored. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10029 | R | On END2 the Octopus cables are disconnected from the car and properly stored. | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10030 | R | On the roof, there is no Strap connected to the Pantograph | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10031 | R | The Test Bench is switched OFF and the Octopus cables are disconnected and properly stored | | OK | | Nokuzola Mdluli - 491469 | M2 |
| 10032 | R | ALL P.Os of this car are closed | | OK | | Goitsemodimo Kgatitswe - 526511 | M2 |



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Section 18 – PACIS Network

18.3 Instructions list

18.3.1 054_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 | | Alleta Sekgololo - 417407 | M2 |
| 10002 | I | Initial conditions | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10003 | I | 110Vdc Normal line is connected and ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10004 | I | Circuit Breaker | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10005 | A | Close Circuit Breaker 54Q1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10006 | A | Close Circuit Breaker 54Q2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10007 | A | Close Circuit Breaker 54Q10 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10008 | A | Close Circuit Breaker 54Q11 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10009 | A | Close Circuit Breaker 55Q2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10010 | A | Close Circuit Breaker 55Q3 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10011 | R | All 'Pacis System' circuit breakers are closed | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10012 | I | Power Supply of Router Switches | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10013 | I | Ethernet Switch CRS1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10014 | R | CRS1 is ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10015 | I | Ethernet Switch CRS2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10016 | R | CRS2 is ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10017 | I | DPAI-1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10018 | R | DPAI-1 is ON | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10019 | I | DPAI-2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10020 | R | DPAI-2 is ON | | OK | | Alleta Sekgololo - 417407 | M2 |

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|-------|---|---|--|----|------|---------------------------|----|
| 10021 | I | Lateral Display 'LAT1' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10022 | R | The PWR (power) LED is "ON" on the Lateral Display 'LAT1' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10023 | I | Lateral Display 'LAT2' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10024 | R | The PWR (power) LED is "ON" on the Lateral Display 'LAT2' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10025 | I | Interior Display 'INT1' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10026 | R | The PWR (power) LED is "ON" on the Interior Display 'INT1' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10027 | I | Interior Display 'INT2' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10028 | R | The PWR (power) LED is "ON" on the Interior Display 'INT2' | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10029 | I | Impedance of Loudspeaker | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10030 | I | Saloon Speakers Commanded by DPAI-1 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10031 | A | Measure the impedance connector '54XP1_X4' between pins: z32(+) and z30 (-) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10032 | R | Impedance Result Max : x <= 32 (Ohms) | | OK | 30.1 | Alleta Sekgololo - 417407 | M2 |
| 10033 | I | Saloon Speakers Commanded by DPAI-2 | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10034 | A | Measure the impedance connector '54XP2_X4' between pins: z32(+) and z30 (-) | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10035 | R | Impedance Result Max : x <= 32 (Ohms) | | OK | 31 | Alleta Sekgololo - 417407 | M2 |
| 10036 | I | Data plugs | | OK | | Alleta Sekgololo - 417407 | M2 |
| 10037 | A | Insert and secure data plugs in the CRS | | OK | | Alleta Sekgololo - 417407 | M2 |



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| Serial Tests Report TS215 – M2 – VFT RTR Vehicle Functional Static Testing Report | Document Reference GIB0000006296 Version: A0 | Emission date 09/04/2024 |
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Serial Tests Report
TS215 – M2 – VFT
RTR Vehicle Functional Static Testing Report

Document Reference
GIB0000006296
Version: A0

Emission date
09/04/2024

Section 17 – Report summaries

17.2 Results status

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

| Vehicle | Equipment | Expected version | Version loaded |
|---------|-----------|------------------|----------------|
| M2 | | | |