PROJECT	CUSTOMER	VEHICLE
Xtrapolis-PRASA	**PRASA**	**233 – M4 – VPT**

RTR Vehicle Pre-Testing TS233 M4 Report
GIB0000006928

	CREATED	VERIFIED	APPROVED	DISTRIBUTION		
Name	Kealeboga MOCWAGOLE	Sifiso LUKHELE	Kgomotso NKOANA	Confidentiality Category *Restricted* ☐	*Project* ☐	*Normal* ☑
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Table of modifications

Rev	Date	Modifications Content	Writer
A0	11/07/2024	Creation	Kealeboga MOCWAGOLE

Internal validations

	Name	Function	Date	Signature
Creator	Kealeboga MOCWAGOLE	EPU Manager	11/07/2024	X _____ Kealeboga MOCWAGOLE EPU Manager
Verifier	Sifiso LUKHELE	Serial Test Manager	11/07/2024	X _____ Sifiso LUKELELE Serial Test Manager
Approver	Kgomotso NKOANA	Test Expert	11/07/2024	X _____ Kgomotso NKOANA Test Expert

Execution Plan

Start Date	01/07/2024
End Date	01/07/2024

Contents

Section 1 – Purpose / Objectives

1. Protective Bonding

The objective of this procedure is to verify the return path of the current to the ground.

2. Reflectometry

The objective of this procedure is to verify the integrity of the ethernet cables.

3. Config

The objective of this procedure is to set up car ID for specific systems such as fire and to verify wiring to the speed sensors and OTDR.

4. Traction motors

The objective of this procedure is to verify the wiring configuration of the motors. This is to ensure that all the motors are wired the same and shall rotate in the same direction in operation

Serial Tests Report TS233 – M4 – VPT RTR Vehicle Pre-Testing Report	Document Reference GIB0000006928 Version: A0	Emission date 11/07/2024

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Section 2 – Protective Bonding and Return Current

2.2 Instructions list

2.2.1 012__PB-Protective Bonding and Return Current

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

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Return Circuit: Car Body to Ground		OK		Nqobile Chirwa - 484648	M4
10002	I	The purpose of this test is to confirm that the car body of each car in the train is connected to ground via the earthing brush which will ensure that current from the overhead wire is returned to the substation without damage to equipment or risk of electric shock		OK		Nqobile Chirwa - 484648	M4
10003	A	Use the Tool List to record the serial number of the Ohmmeter that will be used in this test		OK		Nqobile Chirwa - 484648	M4
10004	A	Ensure that the current setpoint is 50A and voltage <50V (applicable for all impedance measurement) on the ohmmeter device to be used for the test.		OK		Nqobile Chirwa - 484648	M4
10005	I	For all impedance measurements of the car body to ground the positive terminal shall be connected to the car body and the negative terminal to the rail		OK		Nqobile Chirwa - 484648	M4
10006	I	For all other impedance measurements, the positive terminal shall be connected to the tested subject and the negative terminal to the car body shell.		OK		Nqobile Chirwa - 484648	M4
10007	A	Visually identify and inspect that the earthing cables of the 1st and 2nd axle of the 1st and 2nd Bogie Frame are properly connected to the axle brushes		OK		Nqobile Chirwa - 484648	M4
10008	A	Disconnect from the axle box the earthing cable of the 1st and 2nd axle of the 1st and 2nd Bogie Frame of the M4 car		OK		Nqobile Chirwa - 484648	M4
10009	R	All the earthing cables of the M4 car are disconnected		OK		Nqobile Chirwa - 484648	M4
10010	A	Connect the earthing cable of the 1st axle in the 1st Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10011	R	Only the earthing cable of the 1st axle of the 1st Bogie Frame is connected		OK		Nqobile Chirwa - 484648	M4

10012	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Nqobile Chirwa - 484648	M4
10013	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000673	Nqobile Chirwa - 484648	M4
10014	A	Disconnect the earthing cable of the 1st axle of the 1st bogie frame		OK		Nqobile Chirwa - 484648	M4
10015	R	Earthing cable disconnected		OK		Nqobile Chirwa - 484648	M4
10016	A	Connect the earthing cable of the 2nd axle in the 1st Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10017	R	Only the earthing cable of the 2nd axle of the 1st Bogie Frame is connected		OK		Nqobile Chirwa - 484648	M4
10018	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Nqobile Chirwa - 484648	M4
10019	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000531	Nqobile Chirwa - 484648	M4
10020	R	Earthing cable disconnected		OK		Nqobile Chirwa - 484648	M4
10021	A	Disconnect the earthing cable of the 2nd axle of the 1st bogie frame		OK		Nqobile Chirwa - 484648	M4
10022	I	Earthing of Equipment on the Underframe		OK		Nqobile Chirwa - 484648	M4
10023	A	Connect the earthing cable of the 1st axle in the 2nd Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10024	R	Only the earthing cable of the 1st axle of the 2nd Bogie Frame is connected		OK		Nqobile Chirwa - 484648	M4
10025	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Nqobile Chirwa - 484648	M4
10026	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000646	Nqobile Chirwa - 484648	M4
10027	A	Disconnect the earthing cable of the 1st axle of the 2nd bogie frame		OK		Nqobile Chirwa - 484648	M4
10028	R	Earthing cable disconnected		OK		Nqobile Chirwa - 484648	M4
10029	A	Connect the earthing cable of the 2nd axle in the 2nd Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10030	R	Only the earthing cable of the 1st axle of the 2nd Bogie Frame is connected		OK		Nqobile Chirwa - 484648	M4
10031	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Nqobile Chirwa - 484648	M4

10032	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000687	Nqobile Chirwa - 484648	M4
10033	A	Reconnect all earthing cables of the 1st and 2nd axle of the 1st and 2nd Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10034	R	All earthing cables connected on the 1st and 2nd Bogie Frame		OK		Nqobile Chirwa - 484648	M4
10035	A	Visually inspect that the earthing cable connecting the Traction Inverter Case to M4 car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10036	R	Traction Inverter Case visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10037	A	Using an ohmmeter measure the impedance between the Traction Inverter Case and the car body		OK		Nqobile Chirwa - 484648	M4
10038	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000696	Nqobile Chirwa - 484648	M4
10039	A	Visually inspect that the earthing cable connecting the Line Inductor Case to M4 car body is properly connected and related bolts are correctly torqued.		OK		Nqobile Chirwa - 484648	M4
10040	R	Line Inductor Case visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10041	A	Using an ohmmeter measure the impedance between the Line Inductor Case and the car body		OK		Nqobile Chirwa - 484648	M4
10042	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000631	Nqobile Chirwa - 484648	M4
10043	A	Visually inspect that the earthing cable connecting the Traction Motors of the 1st and 2nd axle of the 1st Bogie Frame to the car body is properly connected and related bolts are correctly torqued.		OK		Nqobile Chirwa - 484648	M4
10044	R	Traction Motors visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10045	A	Using an ohmmeter measure the impedance between the Traction Motor of the 1st and 2nd axle of the 1st Bogie Frame and the car body		OK		Nqobile Chirwa - 484648	M4
10046	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000542	Nqobile Chirwa - 484648	M4
10047	A	Visually inspect that the earthing cable connecting the Traction Motors of the 1st and 2nd axle of the 2nd Bogie Frame to		OK		Nqobile Chirwa - 484648	M4

		the car body is properly connected and related bolts are correctly torqued.					
10048	R	Traction Motors visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10049	A	Using an ohmmeter measure the impedance between the Traction Motor of the 1st and 2nd axle of the 2nd Bogie Frame and the car body		OK		Nqobile Chirwa - 484648	M4
10050	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000693	Nqobile Chirwa - 484648	M4
10051	I	Earthing of Interior Equipment		OK		Nqobile Chirwa - 484648	M4
10052	A	Visually inspect that the earthing cable connecting the LV3 cubicle, and the car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10053	R	LV3 cubicle visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10054	A	Using an ohmmeter measure the impedance between the LV3 cubicle and the car body		OK		Nqobile Chirwa - 484648	M4
10055	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000743	Nqobile Chirwa - 484648	M4
10056	A	Visually inspect that the earthing cable connecting the LV6 cubicle, and the car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10057	R	LV6 cubicle visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10058	A	Using an ohmmeter measure the impedance between the LV6 cubicle and the car body		OK		Nqobile Chirwa - 484648	M4
10059	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000702	Nqobile Chirwa - 484648	M4
10060	I	Earthing of Equipment on the Roof		OK		Nqobile Chirwa - 484648	M4
10061	A	Visually inspect that the earthing cable connecting the 1st Braking Resistor Box to M4 car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10062	R	1st Braking Resistor Box visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10063	A	Using an ohmmeter measure the impedance between the 1st Braking		OK		Nqobile Chirwa - 484648	M4

		Resistor Box and the car body					
10064	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000718	Nqobile Chirwa - 484648	M4
10065	A	Visually inspect that the earthing cable connecting the Saloon HVAC to M4 car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10066	R	Saloon HVAC visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10067	A	Using an ohmmeter measure the impedance between the Saloon HVAC and the car body		OK		Nqobile Chirwa - 484648	M4
10068	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000675	Nqobile Chirwa - 484648	M4
10069	A	Visually inspect that the earthing cable connecting the 2nd Braking Resistor Box to M4 car body is properly connected and related bolts are correctly torqued		OK		Nqobile Chirwa - 484648	M4
10070	R	2nd Braking Resistor Box visually grounded and torque is correctly marked		OK		Nqobile Chirwa - 484648	M4
10071	A	Using an ohmmeter measure the impedance between the 1st Braking Resistor Box and the car body		OK		Nqobile Chirwa - 484648	M4
10072	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.000854	Nqobile Chirwa - 484648	M4

Section 3 – Reflectometry

3.2 Instructions list

3.2.1 025_NET_054_PIS-Network Cabling Integrity

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

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Network Cabling Integrity Test		OK		Mphato Mphahlele - 480716	M4
10002	I	It is necessary to check the network cables to ensure that they have been installed correctly to improve the overall operation of the system.		OK		Mphato Mphahlele - 480716	M4
10003	I	The Cable Analyzer Module DSX-5000 will be used to validate cabling		OK		Mphato Mphahlele - 480716	M4
10004	I	Register as a new Operator on the DSX-5000. Check on the manual below on how to register as a new Operator		OK		Mphato Mphahlele - 480716	M4
10005	I	When saving the tests results for each line, it should be named by its trainset number (X) and the test code (Indicated in the test step). i.e. TS021_P01 for PACIS and TS021_T01 for TCMS.		OK		Mphato Mphahlele - 480716	M4
10006	I	TCMS cabling		OK		Mphato Mphahlele - 480716	M4
10007	A	From: [25A10 CRS1 (Local: +LV3; Connector: 25XP10_X3)] to: [25A11 CRS2 (Local: +LV3; Connector: 25XP11_X4)] NOTE: Cable is crossed TSX_M4_T01		OK		Mphato Mphahlele - 480716	M4
10008	A	From: [25A10 CRS1 (Local: +LV3; Connector: 25XP10_X4)] to: [(Local: +END1; Connector: 90XP12.All)] NOTE: Cable is straight TSX_M4_T02		OK		Mphato Mphahlele - 480716	M4
10009	A	From: [25A14 TBR (Local: +LV3; Connector: 25XP14_ETH0)] to: [(Local:		OK		Mphato Mphahlele - 480716	M4

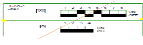|						
		+END1; Connector: 90XR11.All)] NOTE: Cable is crossed TSX_M4_T03				
10010	A	From: [25A11 CRS2 (Local: +LV3; Connector: 25XP11_X3)] to: [Inter-car (Local: +END2; Connector: 90XP22.all)] NOTE: Cable is crossed TSX_M4_T04		OK		Mphato Mphahlele - 480716	M4
10011	A	From: [25A14 TBR (Local: +LV3; Connector: 25XP14_ETH1)] to: [Inter-car (Local: +END2; Connector: 90XP22.al)] NOTE: Cable is straight TSX_M4_T05		OK		Mphato Mphahlele - 480716	M4
10012	A	From: [(Local: +END1; Connector: 90XR12.Al)] to: [Inter-car (Local: +END2; Connector: 90XP21.al)] NOTE: Cable is straight TSX_M4_T06		OK		Mphato Mphahlele - 480716	M4
10013	A	From: [(Local: +END1; Connector: 90XR11.Al)] to: [Inter-car (Local: +END2; Connector: 90XP21.all)] NOTE: Cable is straight TSX_M4_T07		OK		Mphato Mphahlele - 480716	M4
10014	I	Pacis cabling		OK		Mphato Mphahlele - 480716	M4
10015	A	From: [(Local: +END1; Connector: -90XR11.Ell] to: [Inter-car (Local: +END2; Connector: -90XP21.ell)] NOTE: Cable is straight TSX_M4_P01		OK		Mphato Mphahlele - 480716	M4
10016	A	From: [54A10 SWITCH ETHERNET (CRS1) (Local: +LV6; Connector: 54XP10_X7)] to: [(Local: +END1; Connector: -90XR12.Ell)] NOTE: Cable is crossed TSX_M4_P02		OK		Mphato Mphahlele - 480716	M4
10017	A	From: [54A11 SWITCH ETHERNET (CRS2) (Local: +LV6; Connector: 54XP11_X8)] to: [(Local: +END2; Connector: -90XP22.ell)] NOTE: Cable is straight TSX_M4_P03		OK		Mphato Mphahlele - 480716	M4

10018	A	From: [54A11 SWITCH ETHERNET (CRS2) (Local: +LV6; Connector: 54XP11_X7)] to: [54A10 SWITCH ETHERNET (CRS1) (Local: +LV6; Connector: 54XP10_X8)] NOTE: Cable is crossed TSX_M4_P04		OK		Mphato Mphahlele - 480716	M4
10019	A	All cables have been validated on M4		OK		Mphato Mphahlele - 480716	M4
10020	R	Download all the results from Fluke and save them on PC with folder name "M4_TSxx"		OK		Ntobeko Ndlovu - 421595	M4
10021	R			OK		Ntobeko Ndlovu - 421595	M4

Section 4 – Config

4.2 Instructions list

4.2.1 CONFIG-Vehicle Configuration

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

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Configuration Checks		OK		Nqobile Chirwa - 484648	M4
10002	A	Check continuity on all pins of End 1 connector 90XP15 & 90XP14 to ground		OK		Nqobile Chirwa - 484648	M4
10003	R	There is no continuity		OK		Nqobile Chirwa - 484648	M4
10004	A	Check continuity on all pins of End 2 connector 90XP15 & 90XP14 to ground		OK		Nqobile Chirwa - 484648	M4
10005	R	There is no continuity		OK		Nqobile Chirwa - 484648	M4
10006	I	Fire Detection_67		OK		Nqobile Chirwa - 484648	M4
10007	I	Smoke Detector Address Configuration		OK		Nqobile Chirwa - 484648	M4
10008	A	Remove and configure the Smoke Detector 67A2 (+PA1) according to the figure below		OK		Nqobile Chirwa - 484648	M4
10009	A	Reconnect Smoke Detector 67A2		OK		Nqobile Chirwa - 484648	M4
10010	A	Remove and configure the Smoke Detector 67A3 (+PA3) according to the figure below		OK		Nqobile Chirwa - 484648	M4
10011	I	Line Heat Detection		OK		Nqobile Chirwa - 484648	M4
10012	R	Measure the resistance between point 1 and point 4 of the connector 67XP3_11 Result Min/Max : 550<= x<= 700 (Ohms)		OK	551	Nqobile Chirwa - 484648	M4
10013	A	Reconnect Smoke Detector 67A3		OK		Nqobile Chirwa - 484648	M4
10014	I	OTDR LOOP		OK		Nqobile Chirwa - 484648	M4

10015	I	Check the continuity between the following points:		OK		Nqobile Chirwa - 484648	M4
10016	A	From: [+IV1 (local: +END1 Connector -90XR13.B (pin1))] to: [local: +END2 Connector -90XP23.b(pin1)]		OK		Nqobile Chirwa - 484648	M4
10017	A	From: [-IV1 (local: +END1 Connector -90XR13.B (pin2))] to: [local: +END2 Connector -90XP23.b (pin2)]		OK		Nqobile Chirwa - 484648	M4

Section 5 – Traction Motors

5.2 Instructions list

5.2.1 011_TRM-Traction Motors

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

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Traction Motors (SPP = 11)		OK		Mphato Mphahlele - 480716	M4
10002	I	Ensure all the CONNECTORS are fully ASSEMBLED before running a continuity test.		OK		Mphato Mphahlele - 480716	M4
10003	I	The following test is used to confirm the wiring of the traction motors.		OK		Mphato Mphahlele - 480716	M4
10004	I	SAFETY NOTICE: It is important to ensure that there is no 400Vac power supply on the vehicle.		OK		Mphato Mphahlele - 480716	M4
10005	A	Switch OFF the 400Vac power supply at the source and disconnect the supply cables from the vehicle		OK		Mphato Mphahlele - 480716	M4
10006	R	There is no 400Vac available on the vehicle		OK		Mphato Mphahlele - 480716	M4
10007	I	Bogie 1 (MB1)		OK		Mphato Mphahlele - 480716	M4
10008	I	Visual Inspection		OK		Mphato Mphahlele - 480716	M4
10009	A	For motor 1 and motor 2 connect 11XR1 and 11XR2 and visually inspect that the following cables are connected from -11XR1 connector to -11M1 motor and -11XR2 connector to -11M2 motor respectively. NOTE: the cable configuration should be straight, none should cross the other		OK		Mphato Mphahlele - 480716	M4
10010	I	Motor 2		OK		Mphato Mphahlele - 480716	M4
10011	R	[-11XR2 connector (local: UND - 11XP2_2.X1 pin 1)] connected to: [-11XT2 motor terminals (U) -11M2].		OK		Mphato Mphahlele - 480716	M4
10012	R	[-11XR2 connector (local: UND - 11XP2_2.X2 pin 1)] connected to: [-11XT2 motor terminals (V) -11M2].		OK		Mphato Mphahlele - 480716	M4
10013	R	[-11XR2 connector (local: UND - 11XP2_2.X3 pin 1)] connected to: [-11XT2 motor terminals (W) -11M2].		OK		Mphato Mphahlele - 480716	M4

10014	R	-11M2 Motor terminals PE connected to -11GND2.		OK		Mphato Mphahlele - 480716	M4
10015	I	Motor 1		OK		Mphato Mphahlele - 480716	M4
10016	R	[-11XR1 connector (local: UND - 11XP1_2.X1 pin 1)] connected to: [-11XT1 motor terminals (U) -11M1].		OK		Mphato Mphahlele - 480716	M4
10017	R	[-11XR1 connector (local: UND - 11XP1_2.X2 pin 1)] connected to: [-11XT1 motor terminals (V) -11M1].		OK		Mphato Mphahlele - 480716	M4
10018	R	[-11XR1 connector (local: UND - 11XP1_2.X3 pin 1)] connected to: [-11XT1 motor terminals (W) -11M1].		OK		Mphato Mphahlele - 480716	M4
10019	R	-11M1 Motor terminals PE connected to -11GND.		OK		Mphato Mphahlele - 480716	M4
10020	I	Bogie 2 (MB2)		OK		Mphato Mphahlele - 480716	M4
10021	I	Visual Inspection		OK		Mphato Mphahlele - 480716	M4
10022	A	For motor 3 and motor 4 visually inspect that the following cables are connected from -11XR3 connector to -11M3 motor and -11XR4 connector to -11M4 motor respectively. NOTE: the cable configuration should be straight, none should cross the other		OK		Mphato Mphahlele - 480716	M4
10023	I	Motor 3		OK		Mphato Mphahlele - 480716	M4
10024	R	[-11XR3 connector (local: UND - 11XP3_2.X1 pin 1)] connected to: [-11XT3 motor terminals (U) -11M3].		OK		Mphato Mphahlele - 480716	M4
10025	R	[-11XR3 connector (local: UND - 11XP3_2.X2 pin 1)] connected to: [-11XT3 motor terminals (V) -11M3].		OK		Mphato Mphahlele - 480716	M4
10026	R	[-11XR3 connector (local: UND - 11XP3_2.X3 pin 1)] connected to: [-11XT3 motor terminals (W) -11M3].		OK		Mphato Mphahlele - 480716	M4
10027	R	-11M3 Motor terminals PE connected to -11GND3.		OK		Mphato Mphahlele - 480716	M4
10028	I	Motor 4		OK		Mphato Mphahlele - 480716	M4
10029	R	[-11XR4 connector (local: UND - 11XP4_2.X1 pin 1)] connected to: [-11XT4 motor terminals (U) -11M4].		OK		Mphato Mphahlele - 480716	M4

10030	R	[-11XR4 connector (local: UND - 11XP4_2.X2 pin 1)] connected to: [-11XT4 motor terminals (V) -11M4].		OK		Mphato Mphahlele - 480716	M4
10031	R	[-11XR4 connector (local: UND - 11XP4_2.X3 pin 1)] connected to: [-11XT4 motor terminals (W) -11M4].		OK		Mphato Mphahlele - 480716	M4
10032	R	-11M4 Motor terminals PE connected to -11GND.		OK		Mphato Mphahlele - 480716	M4

Section 6 – Report summaries

6.1 Results status

Test Instruction Sheet	Compliant	Incomplete	Non-compliant
Traction Motors	X		
Reflectometry	X		
Protective Bonding and Return Current	X		
Config	X		

6.2 Tools used

Function	Tool name	Tool number	Next Calibration date
012_PB	Megger	Megger	8/25/2025
025_NET_054_PIS	Cable Analyser DSX5000	Fluke machine_Gibela	7/31/2024
CONFIG	Multimeter	Meter 1	8/25/2024

Vehicle	Equipment	Expected version	Version loaded
M4			