Car Number: ____

FSAEBR 2024 Electrical Inspection Form

ELECTRICAL TRACTION SYSTEM INSPECION WILL HAPPEN JUST AFTER ACCUMULATOR AND MECHANICAL INSPECTION
TEAM MUST BE ABLE TO PRESENT ANY COMPONENT DOCUMENTATION WHEN REQUIRED
IF THERE IS A CONFLICT BETWEEN THIS FORM AND THE RULES, THE RULES PREVAIL

TEAM INFORMATION (ESO must be present e cannot be a driver even if are more than one, add a seal to ESO bracelet)		
ESO	Name:	Phone:
ESA	Name:	Phone

ACCUMULATOR INSPECTION (accumulator on the charging cart / members wearing PPE)				
Start date: / /	**Conclusion date:** / /		**Check a box for each reinspection visit:** ☐☐☐☐☐☐☐☐	
Judge #1	Name:		Phone:	
Judge #2	Name:		Phone:	
Judge #3	Name:		Phone:	
ESF Check			ESF Accumulator items clear?	☐
Accumulator/charging Design (while accumulator is open, maintenance plugs must be disconnected)				
Inspection Items	EV.8.6	IMD (Insulation Monitoring Device) present.		☐
	EV.8.3	AMS (Accumulator Management System) present.		☐
	EV.5.10	Charger(s) for the Accumulator(s).		☐
	IN.4.1	Accumulator Container Hand Cart.		☐
	IN.4.1	All accumulators on the inspection including spare ones.		☐
	IN.4.1	Data sheets and copies of any submitted Rules Questions with the received answer.		☐
	IN.4.1	Insulated cable shears, screw drivers and other tools used in TS.		☐
	IN.4.1	Multimeter with ***protected probe tips***.		☐
	IN.4.1	Face Shield.		☐
	IN.4.1	HV insulating gloves which are less than the test date.		☐
	IN.4.1	Two HV insulating blankets of minimum 0.83 [m²] each.		☐
	IN.4.1	Safety glasses with side shields for all team members that might work on the Tractive System or Accumulator.		☐
Labels and symbols	EV.5.3.7.a	"Always energized" text must be present and clear visible on the accumulator.		☐
	EV.5.3.7.b	ISO-7010-W012 symbol, a triangle with a black lightning on a yellow background, must be present and clear visible on the accumulator.		☐
	EV.5.3.7.c	"High Voltage" text must be present and clear visible on the accumulator, if accumulator voltage is greater than 60 [VDC].		☐
Package	F.10.4.4	Accumulator may have holes with maximum diameter of 10 [mm], only round is allowed. The holes cannot have a line of sight to the driver, with the firewall installed or not.		☐
HV connections	EV.6.10	Every TS connector outside the accumulator that can be disconnected without tools must include an interlock.		☐
	EV.7.4.3	Bolted connections in the HV path must have a positive locking mechanism. Nylon, lock washers and thread locking compound are NOT allowed.		☐
	EV.6.2.4	Soldering is not allowed in the high current path.		☐
	EV.6.3.2.d	Maintenance plugs must have a positive locking feature which prevents the plug from unintentionally becoming loose.		☐
Maintenance plugs	EV.6.3.2.a EV.6.3.2.b	Maintenance plugs shall separate the stacks and cannot be incorrectly installed. The separation must affect both poles of the stack.		☐
	EV.6.3.2.c EV.6.3.2.d	Maintenance plugs shall be removed without tools and its surfaces must be non-conductive except as required to make the electrical connection.		☐
Temperature monitoring	EV.8.5.5	AMS must monitor the temperature of at least 30 [%] of the cells (Lithium based). Number of cells: ____. Number of sensors: ____.		☐
	EV.8.5.4	Temperature sensor must be in direct contact with negative terminal or < 10 [mm] away on the bus bar		☐

Stack energy	EV.6.1.2	Stacks voltage shall be less than 120 [VDC] and a maximum energy of 6 [MJ]. E = V*C[A.h]*3600. Max. stack voltage: [ ] [V]. Max. stack energy: [ ] [MJ].	☐
Accumulator voltage	EV.4.1.2	Accumulator voltage shall be less than 600 [V]. Voltage: [ ] [V].	☐
Charger Tractive System Measuring Points	EV.6.8	Two TSMP connected to positive and negative output lines of the charger shall be present. *4 [mm] shrouded red banana jack marked with “HV+” and “HV-” label, that does not allow conductive parts to be touched by bare fingers.	☒
	EV.5.4	One TSMP connected to the GLV system shall be present. *4 [mm] shrouded black banana jack marked with “GLV” label.	☐
	EV.6.8.4	TSMP body protection resistor value shall be: **05k[Ohm]**, if 000[V] < TS Voltage <= 200[V]. **10k[Ohm]**, if 200[V] < TS Voltage <= 400[V]. **15k[Ohm]**, if 400[V] < TS Voltage <= 600[V]. With the charger disconnected from electrical source and from vehicle, measure the value of the body protection resistor between the TSMP HV+/HV- and the charger poles connector. Measured charger TSMP body protection resistor: [ ] [Ohm].	☐
Insulations		Each stack shall be separated using an electrically insulating and fire-resistant materials (UL94-V0, FAR25 or equivalent) towards other stacks in the container and on top of the stack. Air is not a suitable insulation material in this case.	☐
		Poles of the accumulator stack(s) and cells must be insulated against the inner wall of the accumulator container, if the container is made of electrically conductive material.	☐
		Fuse and AIRs must be separated from the rest of the enclosure by an electrically insulating fireproof material.	☐
Protections		Every accumulator container must contain at least two AIRs, one AIR on each pole of it for the high current path.	☐
		No always energized TS wires leaving accumulator container (All TS wires, high voltage, leaving accumulator disconnected by an AIR).	☐
		Every accumulator container must contain at least one fuse in the high current path.	☐
		All wiring/connectors (wirings, AIRs, connectors) shall be protected by overcurrent protection fuse with current rating <= ampacity of wire.	☐
		Fuses in TS must have DC voltage rating >= max TS voltage. For parallel fusible links on the accumulator, with low voltage or non-voltage: must have a fuse connected in series with 1/3 the sum of the parallel fuse links and the suitable data from the of the current rating shall be provided.	☐
		All branch circuits are fused within 150mm of source (includes cell sense to BMS).	☐
		Every parallel configuration on TS must implement a fuse in the string. The fuse must be calculated to avoid the string amperage to go beyond the maximum current of the most sensitive component on that string.	☐
Charger		Charger connector must incorporate an interlock such that the connectors only become live if is correctly connected.	☐
		TS+ and TS- shrouded red banana jack available when charging.	☐
		The charger must be galvanically isolated (AC) input to (DC) output.	☐
		If the charger housing is conductive, it must be connected to the earth ground of the AC input.	☐
		All connections of the charger(s) must be isolated and covered.	☐
Wiring harness color		Any TS wiring that runs outside accumulator must be an orange shielded cable or run enclosed in a separated orange nonconductive conduit.	☐
		TS wiring orange shielded cable or orange nonconductive conduit must be attached at each end and shall withstand a force of 200 [N].	☐
		Any other circuit that is no part of the HV system could not be orange.	☐
Spare accumulators		Any other spare accumulator shall have the same size, weight and type.	☐

<table>
<tr><td>PCBs containing high and low voltage</td><td>EV.7.5.7</td><td>Every PCBs, on the accumulator or charger system, with GLV and TS, shall have at least the spacing below clearly defined and marked on it. *Bring PCBs when visual check is not possible.
<table>
<tr><th>TS Voltage</th><th>Over surface</th><th>Thru cut in board</th><th>Under Coating*</th></tr>
<tr><td>000[V] < V <= 050[V]</td><td>1.6 [mm]</td><td>1.6 [mm]</td><td>1 [mm]</td></tr>
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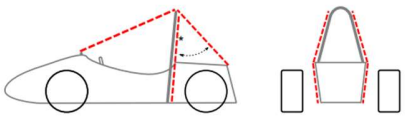
<tr><td>300[V] < V <= 600[V]</td><td>12.7 [mm]</td><td>9.5 [mm]</td><td>4 [mm]</td></tr>
</table></td><td>☐</td></tr>
<tr><td rowspan="3">Hand Cart</td><td></td><td>Able to carry the load of the Accumulator Container(s) without tipping over.</td><td>☐</td></tr>
<tr><td></td><td>Contain a minimum of two wheels.</td><td>☐</td></tr>
<tr><td></td><td>Have a dead man brake that be able to stop the hand cart with the accumulator loaded on it.</td><td>☐</td></tr>
<tr><td rowspan="3">Shutdown Circuit</td><td></td><td>IMD and AMS have independent relays or transistors to open the shutdown circuit.</td><td>☐</td></tr>
<tr><td></td><td>All relays and transistors in the shutdown circuit shall be normally open.</td><td>☐</td></tr>
<tr><td></td><td>A push-pull or push-rotate emergency switch having at least 25 [mm] diameter. Labelled with an international electrical symbol (a red spark on a white edged blue triangle). Must open the circuit when activated.</td><td>☐</td></tr>
<tr><td colspan="4">Charging (accumulator must be closed)
Every test that turns off the AIRs, shall decrease TS voltage outside accumulator below 60 [VDC] in 5[s].</td></tr>
<tr><td rowspan="4">Accumulator Voltage Indicator</td><td></td><td>The voltage being present at the connectors must directly control the Voltage Indicator using hard wired electronics with no software control.</td><td>☐</td></tr>
<tr><td></td><td>The control signal which closes the AIRs must not control the Voltage Indicator.</td><td>☐</td></tr>
<tr><td></td><td>Indicator must be labeled “High Voltage Present”.</td><td>☐</td></tr>
<tr><td></td><td>Indicates in a prominent way when voltage above 60 [VDC] is present outside of the container. Check indicator with a charging demonstration.</td><td>☐</td></tr>
<tr><td rowspan="2">AMS</td><td></td><td>Start changing the accumulator, AMS shall be live and present each cell voltage and all installed temperature sensors.</td><td>☐</td></tr>
<tr><td></td><td>With accumulator in valid charge condition, AMS shall be live and able to turn off the charger and open AIRs if a fault is detected. (A way to generate a failure must be provide, e.g., change cell limits to force a fault.</td><td>☐</td></tr>
<tr><td>Shutdown Switches</td><td></td><td>With accumulator in valid charge condition, an activation of the emergency button shall turn off the charger and open AIRs.</td><td>☐</td></tr>
<tr><td>IMD</td><td></td><td>With accumulator in valid charge condition, IMD turn off the charger and open AIRs in 30 seconds when an isolation fault is present. Procedure:
1 – ☐ Accumulator in valid charge condition.
2 – ☐ Connect TSMP (-) and GLVS ground using the IMD test resistor.
3 – ☐ IMD shall detect an insulation fault, turn off the charger and open AIRs in 30 [s].
4 – ☐ Repeat the test using the TSMP (+).</td><td>☐</td></tr>
<tr><td>Seals</td><td></td><td>Add a sell at accumulator openings. And one next to the main connector.</td><td>☐</td></tr>
<tr><td colspan="4">TRACTION SYSTEM (complete vehicle / members wearing PPE / vehicle jacked up / driven wheels removed)</td></tr>
<tr><td colspan="2">Start date: / /</td><td colspan="2">Conclusion date: / /</td></tr>
<tr><td colspan="4">Check a box for each reinspection visit: ☐☐☐☐☐☐☐☐</td></tr>
<tr><td>Inspector #1</td><td colspan="2">Name:</td><td>Phone:</td></tr>
<tr><td>Inspector #2</td><td colspan="2">Name:</td><td>Phone:</td></tr>
<tr><td>Inspector #3</td><td colspan="2">Name:</td><td>Phone:</td></tr>
<tr><td>ESF Check</td><td colspan="2"></td><td>ESF Traction System items clear? ☐</td></tr>
<tr><td colspan="4">TS design and components (Accumulator connector and HVD must be disconnected)</td></tr>
<tr><td rowspan="7">HVD High Voltage Disconnect</td><td>EV.6.5</td><td>Shall open the circuit of at least one pole between accumulator and motor controller.</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>Easily visible when stand behind the vehicle and clear/visible marked with “HVD” label.</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>Be above 350 [mm] from the ground and inside vehicle envelope.</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>Must be a direct accessible element, could not have obstruction/bodywork to access it.</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>Shall be operable by hands directly on it and without the need of tools.</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>An untrained person should be able to activate in less than 10 [s].</td><td>☐</td></tr>
<tr><td>EV.6.5</td><td>Shall implement an interlock connected to shutdown circuit when HVD is active.</td><td>☐</td></tr>
</table>

	EV.6.5	If HVD element is a removable part and has exposed touchable contacts in this situation, a dummy connector shall be available to restore isolation when HVD is out.	☐
Discharge circuit location		Team shall demonstrate that the TS discharge circuit is placed on the motor controller side of the HVD. Discharge resistor value: _____ [Ohm].	☐
Inertia switch	T.9.4.2.b	Mechanically and rigidly attached to the vehicle to receive the vehicle deceleration. Attach to a flexible body work or no fixed tightly do structure is not allowed.	☐
	T.9.4.3.b	Must be NC type and open the circuit when activated.	☐
	T.9.4.3.a	Must be triggered due to impact that decelerates vehicle on 8 [g]~11 [g].	☐
	T.9.4.3.c	After triggered must latch until manually reset and may be reset by driver from cockpit.	☐
Shutdown switches		Team needs to show that IMD, BSPD and AMS parts of shutdown has independent circuits. * Documentation/PCBs could be used.	☐
		Team needs to show that shutdown components directly carry current that goes to AIRs.	☐
Master switches	EV.8.9.2	One LV master switch that opens all power to GLV system, in the center of a 50 [mm]+ diameter red circular area with the label “LV”.	☐
	EV.8.9.3	One TS master switch that opens LV part of TS shutdown circuit, in the center of a 50mm+ diameter orange circular area with the label “TS” and an ISO-7010-W012 symbol, a triangle with a black lightning on a yellow background.	☐
	EV.8.9.3.e EV.10.1	TS master switch must have a lockout/tagout capability in OFF position. Only ESO should be able to open the lockout and it shall be locked in OFF position when any work is done on car.	☐
	T.9.3.1	LV/TS master switches must be on the right side of the driver and easily actuated from outside.	☐
	T.9.3.1	LV/TS master switches must be rigidly mounted next to main hoop at driver’s shoulder height.	☐
	T.9.3.2	LV/TS master switches must be a rotary mechanical type, with the ON position in the horizontal and the OFF position in the vertical.	☐
	T.9.3.2.f	The master’s switches key must be removable and only in OFF position it shall be possible.	☐
Charger Tractive System Measuring Points	EV.6.8	Two TSMP connected to positive and negative motor controller lines shall be present. *4 [mm] red banana jack marked with “HV+” and “HV-”, that does not allow conductive parts to be touched by bare fingers and next to the Master Switches.	☐
	EV.5.4	One TSMP connected to the GLV system shall be present. *4 [mm] shrouded black banana jack marked with “GLV” label.	☐
	EV.6.8.4	TSMP body protection resistor value shall be: **05k[Ohm]**, if 000[V] < TS Voltage <= 200[V]. **10k[Ohm]**, if 200[V] < TS Voltage <= 400[V]. **15k[Ohm]**, if 400[V] < TS Voltage <= 600[V]. With the master switches in **OFF position, accumulator and HVD disconnected** measure the resistance between TSMP HV+ and HV-. Measured value shall be 2 * (body protection resistor) + (controller discharge resistor). Measured value: _____ [Ohm].	☐
Mechanical protection of TS components	F.11.1	No TS components or wiring below the frame or outside rollover protection envelope. *Outboard wheels and their connections are an exception to this. *TS elements in the side impact will be checked below. 	☐
	F.11.2.1	TS components on the side of the car must be protected from side impact by an equivalent side impact structure. If below 350 [mm] from the ground must be a triangulated structure.	☐
	F.11.2.2	TS components on the rear of the car must be protected from a rear impact by an equivalent side impact structure. When below 350 [mm] from the ground must be a triangulated structure. *Differential mounts may be used as rear impact protection, upper/lower tubes of mounts must be 25 [mm] or larger.	☐
		All TS wiring must be protected from damage, look inside structure for abrasive conditions. (e.g.: mobile parts and transmission chain/belts).	☐
Protections		All wiring/connectors (wirings and connectors) shall be protected by overcurrent protection fuse with current rating <= ampacity of wire.	☐
		All branch circuits are fused within 150 [mm] of source.	☐
		Fuses in TS must have DC voltage rating >= max TS voltage.	☐

<table>
<tr><td></td><td></td><td>Check low voltage battery over current protection.</td><td>☐</td></tr>
<tr><td rowspan="2">Vehicle grounding</td><td></td><td>Every conductive surface on the vehicle (e.g.: firewall, suspension, tubers, screws, accumulator enclosure, any other TS enclosure, seat parts, mounting points, etc.) that is less than 100 [mm] from a TS component (e.g.: motors, connectors, motor controllers, TSMPs, etc.) must have a resistance less than 300 [mOhm] from GLV TSMP.</td><td>☐</td></tr>
<tr><td></td><td>Parts which may become electrically conductive (e.g.: carbon fiber) that is less than 100 [mm] from a TS component, must have a resistance less than 5 [ohm].</td><td>☐</td></tr>
<tr><td>PCBs containing high and low voltage</td><td>EV.7.5.7</td><td>Every PCBs, on the accumulator or charger system, with GLV and TS, shall have at least the spacing below clearly defined and marked on it. *Bring PCBs when visual check is not possible.
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<tr><td rowspan="3">TS insulation</td><td>EV.7.2</td><td>No conductive parts of the TS system shall be exposed to touched by bare hands finger proof by a model with 100 [mm] long / 6 [mm] diameter.</td><td>☐</td></tr>
<tr><td>EV.7.2</td><td>Insulation for conductive parts shall be rated for a temperature of 90 [ºC] and its voltage.</td><td>☐</td></tr>
<tr><td>EV.7.2</td><td>Tape can be part of the insulation but not the only one.</td><td>☐</td></tr>
<tr><td rowspan="4">HV connections</td><td>EV.6.10</td><td>Every TS connector outside the accumulator that can be disconnected without tools must include an interlock.</td><td>☐</td></tr>
<tr><td>EV.7.4.3</td><td>Bolted connections in the HV path must have a positive locking mechanism. Nylon, lock washers and thread locking compound are NOT allowed.</td><td>☐</td></tr>
<tr><td>EV.6.2.4</td><td>Soldering is not allowed in the high current path.</td><td>☐</td></tr>
<tr><td></td><td>Every connection shall be designed in a way that should be physically impossible to connect it electrically/mechanically in a different manner. (e.g.: accumulator connector).</td><td>☐</td></tr>
<tr><td rowspan="4">Accumulator</td><td>F.11.1.1</td><td>All Accumulator Containers must lie inside the Primary Structure.</td><td>☐</td></tr>
<tr><td>F.11.2.1.b</td><td>When accumulator is placed on side an accumulator side impact protection must protect it.</td><td>☐</td></tr>
<tr><td>F.11.2.1.c</td><td>Accumulator must not be part of the equivalent structure.</td><td>☐</td></tr>
<tr><td>F.11.2.3</td><td>All non-Crushable Items should have a minimum 25 [mm] clearance to the surface of the Accumulator Container.</td><td>☐</td></tr>
<tr><td>Insulation measurement test</td><td></td><td>Measure isolation between TSMP HV+/HV- and TSMP GLV.
Ref. Voltage is the next voltage above the maximum TS voltage (options 250 and 500).
Measured value shall be greater than 500 * (Ref. voltage) + (TSMP body protection resistors).
HV+ to GLV: ____ [Ohm]. HV+ to GLV: ____ [Ohm].</td><td>☐</td></tr>
<tr><td rowspan="4">Wiring harness</td><td></td><td>Any TS wiring that runs outside accumulator must be an orange shielded cable or run enclosed in a separated orange nonconductive conduit.</td><td>☐</td></tr>
<tr><td></td><td>TS wiring orange shielded cable or orange nonconductive conduit must be attached at each end and shall withstand a force of 200 [N].</td><td>☐</td></tr>
<tr><td></td><td>Any other circuit that is no part of the HV system could not be orange.</td><td>☐</td></tr>
<tr><td></td><td>TS wiring shall not be able to reach the cockpit opening or the driver regardless of where it breaks.</td><td>☐</td></tr>
<tr><td>High voltage label</td><td></td><td>Each enclosure containing HV parts (except motor housings) must be labeled with "High Voltage" sticker.</td><td>☐</td></tr>
<tr><td rowspan="5">Firewall</td><td>T.1.8.1.b</td><td>Separate the driver compartment from all tractive system components.</td><td>☐</td></tr>
<tr><td>T.1.8.3</td><td>Firewalls must protect a line of sight from any tractive system component to 100 [mm] above the bottom of the helmet of the tallest driver, except outboard wheel motors and components.</td><td>☐</td></tr>
<tr><td></td><td>Accumulator must not be part of the firewall.</td><td>☐</td></tr>
<tr><td>T.1.9</td><td>TS side must be made of aluminum and grounded.</td><td>☐</td></tr>
<tr><td>T.1.9</td><td>Driver side must be made of insulated nonflammable material layer that cannot be penetrated with a 4 [mm] screwdriver applied with a force of 250 [N].</td><td>☐</td></tr>
<tr><td rowspan="3">APPS</td><td></td><td>Must have at least two sensors not sharing supply or signal lines.</td><td>☐</td></tr>
<tr><td></td><td>The transfer functions of the APPs sensors shall have positive slope with different gradients and/or offset (OEM parts are exception, present documentation).</td><td>☐</td></tr>
<tr><td></td><td>Has an over travel protection to avoid the sensor to be damaged.</td><td>☐</td></tr>
<tr><td>Tractive System Active Light</td><td></td><td>Near main hoop, inside the rollover protection envelope and no lower than 150 [mm] from the highest point of the vehicle.</td><td>☐</td></tr>
</table>

		Not allow contact with driver's helmet.	☐
Dynamic Traction Validation (Connect accumulator and HVD on the vehicle) *Every test that turns off the AIRs, shall decrease TS voltage outside accumulator below 60 [VDC] in 5[s].*			
⚠ Pre-charge discharge		The TSAL must be red and clearly visible even in bright sunlight, every horizontal direction, except small angles blocked by main hoop.	☐
		When turning off TS, checks with a multimeter on TSMP, if the controller voltage goes below 60 [V] in 5 [s].	☐
⚠ Tractive System Active Light		The TSAL must be solid green when GLV turned on and the voltage outside of accumulator container is less than 60 [VDC].	☐
		The TSAL must be flashing red when GLV turned on and the voltage outside of accumulator container exceeds 60 [VDC].	☐
		The TSAL must be red and clearly visible even in bright sunlight, every horizontal direction, except small angles blocked by main hoop.	☐
⚠ Shutdown Switches		Turn ON TS and then turn off GLV master switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then turn off TS master switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then turn off cockpit shutdown switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then turn off left shutdown switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then turn off right shutdown switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then turn off brake shutdown switch, TS shall be off in 5 [s].	☐
		Turn ON TS and then activate inertia switch shaking it, TS shall be off in 5 [s].	☐
		Turn ON TS and then open HVD interlock, TS shall be off in 5 [s].	☐
		Turn ON TS and then test opening all vehicle interlocks, TS shall be off in 5 [s].	☐
⚠ IMD		The IMD test resistor shall be below 50 [%] of 250 [ohm] per accumulator max voltage. Procedure: 1 - ☐ Measure the test resistor. Value: _____ [ohms]. 2 - ☐ Activate tractive system. 3 - ☐ Connect TSMP (-) and GLVS ground using the IMD test resistor. 4 - ☐ IMD shall detect an insulation failure, turn off TS opening AIRs in 30 [s]. 5 - ☐ Check if IMD indicator light inside the cockpit has turned on. It must be marked as "IMD", must be red and must be visible in a bright sunlight. 6 - ☐ Remove the IMD test resistor, the TS cannot be on again, IMD indicator must remain on and cannot be reset by the driver, just by a person outside the car. 7 - ☐ Restore the system and repeat the test using the TSMP (+).	☐
⚠ AMS		AMS shall monitor cells and shutdown TS, opening AIRs, if a fault is detected. (A way to generate a failure must be provide, e.g., change cell limits to force a fault.) Procedure: 1 - ☐ Activate tractive system. 2 - ☐ Show cells information and temperature. 3 - ☐ Force a fault to the system. 4 - ☐ AMS shall detect a failure, turn off TS opening AIRs immediately. 5 - ☐ Check if AMS indicator light inside the cockpit has turned on. It must be marked as "AMS", must be red and must be visible in a bright sunlight. 6 - ☐ Remove the fault, the TS cannot be on again, AMS indicator must remain on and cannot be reset by the driver, just by a person outside the car.	☐
⚠ Ready to drive		Vehicle shall not be in ready to drive mode just closing the shutdown circuit. Team must demonstrate the additional action to set it (**pressing brake pedal on procedure is mandatory**). 1 - ☐ Enable TS. 2 - ☐ Press accelerator pedal, motors **should not SPIN**. 3 - ☐ Press brake and team's additional action to drive to ready. 4 - ☐ Car must make a characteristic easily recognizable sound, between 1 and 3 [s], with a minimum sound of 80 [dBA] (can be measured) in a radius of 2 [m] around it, to indicates the car is in ready to drive mode. 5 - ☐ Press accelerator, motors **should SPIN**. 6 - ☐ Press cockpit shutdown button to disable TS. 7 - ☐ Release shutdown button and enable TS.	☒

		8 - ☐ Press Accelerator, motors **should not SPIN**. 9 - ☐ Press brake and team's additional action to drive to ready. 10 - ☐ Car must make a characteristic easily recognizable sound, between 1 and 3 [s], with a minimum sound of 80 [dBA] (can be measured) in a radius of 2 [m] around it, to indicates the car is in ready to drive mode. 11 - ☐ Press accelerator, motors **should SPIN**.	
⚠ Brake System Plausibility Device		The team's nonprogrammable circuit BSPD shall shutdown TS upon an acceleration/braking implausibility. Team must provide a test including the sensor on it. Procedure: 1 - ☐ Activate tractive system. 2 - ☐ Apply a hard braking condition. 3 - ☐ Simulates a current equivalent to 5 [kW] at the nominal accumulator voltage. 4 - ☐ When BSPD has hard braking signal and [5kW] on power signal at the same time for more than 500ms, the shutdown circuit must detect an implausibility failure, turn off TS opening AIRs immediately. 5 - ☐ Check if BSPD indicator light inside the cockpit has turned on. It must be marked as "BSPD", must be red and must be visible in a bright sunlight. 6 - ☐ Remove the fault conditions, the TS cannot be on again, BSPD indicator must remain on and cannot be reset by the driver, just by a person outside the car.	☐
		The team's nonprogrammable circuit BSPD shall shutdown TS upon a failure on wire harnesses. Procedure: 1 - ☐ Activate tractive system. 2 - ☐ Disconnect the sensors and simulate an open circuit, short circuit to ground and short circuit to + supply, to check if the circuit can handle those failures. 3 - ☐ When each one of the above conditions is applied, the shutdown circuit must detect the failure and turn off TS opening AIRs immediately. 4 - ☐ Check if BSPD indicator light inside the cockpit has turned on. It must be marked as "BSPD", must be red and must be visible in a bright sunlight. 5 - ☐ Remove the fault condition, the TS cannot be on again, BSPD indicator must remain on and cannot be reset by the driver, just by a person outside the car.	☐
⚠ Acceleration/brake plausibility check		Motor torque must be zero when accelerator and brake pedal are pressed simultaneously. 1 - ☐ Enable TS. 2 - ☐ Press accelerator pedal, motors **should SPIN**. 3 - ☐ With accelerator pedal > 25 [%] press brake pedal. Motors **should STOP** to spin. 4 - ☐ Keep accelerator > 25 [%] and release brake pedal. Motors **must remain STOPPED**. 5 - ☐ Slowly release accelerator, motors **may SPIN** again once accelerator pedal < 5[%].	☐
⚠ APPs implausibility		Motor torque must be zero if APPs are implausible. 1 - ☐ Enable TS. 2 - ☐ Press accelerator pedal, motors **should SPIN**. 3 - ☐ Keep 1 APP connected and unplug the other ones. 4 - ☐ Press accelerator pedal, motors **should SPIN**. 5 - ☐ Repeat the process to the others APP sensors.	☐
Energy Meter		Lend an energy meter to the team. EM code:	☐

RAIN TEST (complete vehicle / members wearing PPE / vehicle jacked up / no members inside vehicle)

Start date: / /	**Conclusion date:** / /	**Check a box for each reinspection visit:** ☐☐☐☐☐☐☐☐

Inspector #1	Name:	Phone:
Inspector #2	Name:	Phone:

VEHICLE MUST NOT BE IN READY TO DRIVE MODE AND MUST BE WITHOUT THE DRIVEN WHEELS

⚠	EV.6.5	Motor torque must be zero if APPs are implausible.	☐

Rain Test		1 - ☐ Enable TS, wait the TSAL to be on. 2 - ☐ Check IMD fault detection system, connecting the IMD test resistor between HV+ and GLV TSMPs and verifying if it is working properly. 3 - ☐ Reset IMD failure and enable TS again to start the rain test. 4 - ☐ With vehicle jacked up, without driven wheels and no person inside it, it will be sprayed with water for 120 [s]. 5 - ☐ Stop the water and observe the vehicle for more 120 [s]. 6 - ☐ Vehicle is approved if IMD does not detect a failure during the 240 [s].	

Notes about the team inspection and rechecks

Judge feedback about the inspection sheet (tips, issues, etc…)

Teste do imd nas provas dinamicas

Checar tensão de entrada do carregador

Pulseira para ESO

Informativo carregamento energemeter

Energymeter USA e GE

Adesivos de triangulo nos botão

Pegar interface e método de ligação do gerador

Sinal do TSAL não sair alta tensão do acc