Tesla Model S/X Advanced Battery Report

Source File: TMSfix-battery

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SOC: 0.0% | V-Max: 3.42V (M11-B3) | V-Min: 2.71V (M4-B1) | Delta: 0.71V

Section 1: Voltage Map (96 Bricks)

Module 1	Module 2	Module 3	Module 4
Brick 1: 3.4042 V	Brick 7: 3.3966 V	Brick 13: 3.4088 V	Brick 19: 2.71 V
Brick 2: 3.4055 V	Brick 8: 3.4033 V	Brick 14: 3.4088 V	Brick 20: 3.2831 V
Brick 3: 3.4048 V	Brick 9: 3.4052 V	Brick 15: 3.4109 V	Brick 21: 3.2266 V
Brick 4: 3.4091 V	Brick 10: 3.4039 V	Brick 16: 3.4113 V	Brick 22: 3.3179 V
Brick 5: 3.4055 V	Brick 11: 3.4033 V	Brick 17: 3.4097 V	Brick 23: 2.7954 V
Brick 6: 3.4103 V	Brick 12: 3.4027 V	Brick 18: 3.4082 V	Brick 24: 3.2443 V
Module 5	**Module 6**	**Module 7**	**Module 8**
Brick 25: 3.4 V	Brick 31: 3.4061 V	Brick 37: 3.4134 V	Brick 43: 3.396 V
Brick 26: 3.4103 V	Brick 32: 3.4082 V	Brick 38: 3.4171 V	Brick 44: 3.2541 V
Brick 27: 3.4073 V	Brick 33: 3.4024 V	Brick 39: 3.4161 V	Brick 45: 3.4085 V
Brick 28: 3.4021 V	Brick 34: 3.4091 V	Brick 40: 3.4171 V	Brick 46: 3.3954 V
Brick 29: 3.4048 V	Brick 35: 3.4048 V	Brick 41: 3.4119 V	Brick 47: 3.4009 V
Brick 30: 3.4015 V	Brick 36: 3.4058 V	Brick 42: 3.4134 V	Brick 48: 3.4036 V
Module 9	**Module 10**	**Module 11**	**Module 12**
Brick 49: 3.3865 V	Brick 55: 3.4036 V	Brick 61: 3.418 V	Brick 67: 3.4113 V
Brick 50: 3.382 V	Brick 56: 3.407 V	Brick 62: 3.4192 V	Brick 68: 3.4109 V
Brick 51: 3.3813 V	Brick 57: 3.3823 V	Brick 63: 3.4201 V	Brick 69: 3.4119 V
Brick 52: 3.3786 V	Brick 58: 3.3948 V	Brick 64: 3.4201 V	Brick 70: 3.4143 V
Brick 53: 3.3881 V	Brick 59: 3.3981 V	Brick 65: 3.4186 V	Brick 71: 3.41 V
Brick 54: 3.3859 V	Brick 60: 3.4009 V	Brick 66: 3.4174 V	Brick 72: 3.4134 V
Module 13	**Module 14**	**Module 15**	**Module 16**
Brick 73: 3.3853 V	Brick 79: 3.4027 V	Brick 85: 3.3911 V	Brick 91: 3.4064 V
Brick 74: 3.338 V	Brick 80: 3.4039 V	Brick 86: 3.4021 V	Brick 92: 3.4073 V
Brick 75: 3.3926 V	Brick 81: 3.4048 V	Brick 87: 3.4067 V	Brick 93: 3.4113 V
Brick 76: 3.3984 V	Brick 82: 3.407 V	Brick 88: 3.4061 V	Brick 94: 3.4125 V
Brick 77: 3.3936 V	Brick 83: 3.4024 V	Brick 89: 3.3966 V	Brick 95: 3.4073 V
Brick 78: 3.3832 V	Brick 84: 3.3981 V	Brick 90: 3.3911 V	Brick 96: 3.4082 V

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ACTIVE BMS DIAGNOSTIC PARAMETERS

ENERGY & SOC:

Battery Health (State of Energy): 100.3937 %

Usable Battery Capacity (kWh): 0.0 %

Nominal Battery Capacity (kWh): 57.6 KWh

Remaining Battery Energy: 0.0 KWh

State of Charge (SOC): N/A

Minimum Allowed SOC: 0.0 %

Total Energy Charged (Lifetime): 56156.984 kWh

Total Energy Discharged (Lifetime): 52648.523 kWh

VOLTAGE, TEMP & ISOLATION:

Maximum Cell Voltage: 3.42 V

Minimum Cell Voltage: 2.71 V

Cell Voltage Imbalance: 0

Maximum Battery Temperature: 15.0 DegC

Minimum Battery Temperature: 14.0 DegC

Battery Pack Temperature: 13 C

Internal Battery Isolation Status: 0

External HV Isolation Status: 0

HV Interlock Loop Voltage (HVIL): 0.0 V

High Cell Internal Resistance Warning: 0

Module / Cell Mismatch Warning: 0

Section 2: Battery Thermal Analysis

MAX MODULE TEMP

15.0 C

Location: Module #16

MIN MODULE TEMP

14.0 C

Location: Module #8

Section 4: System Telemetry

BMS_1HzDebug_Id:	28	BMS_alertID:	30
BMS_alertType:	1	BMS_battTempPct:	32 %
BMS_bmbVBrickDeltaID:	2	BMS_brickNumVoltageMax:	63
BMS_brickNumVoltageMin:	19	BMS_chgLineCurrentAvail:	102.35 A
BMS_chgPowerAvailable:	255.875 kW	BMS_chgTimeToFull:	68.25 Hours
BMS_chgVLimitMode:	1	BMS_componentHardwareId:	41

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BMS_componentMajorVersion:	254	BMS_componentSpecificData:	3
BMS_cpldVersion:	4	BMS_currentUnfiltered:	0.1 A
BMS_dragStripStatus:	1	BMS_energyCounter:	5
BMS_highestFaultCategory:	4	BMS_hvChainLimitingCurrent:	2040 A
BMS_hvChainLimitingTemperature:	1000 DegC	BMS_hvilStatus:	1
BMS_iSensorMajorVersion:	1	BMS_iSensorMinorVersion:	2
BMS_iSensorProtocolNumber:	3	BMS_iSensorReleaseVersion:	9
BMS_iSensorSerialNumber:	1777700	BMS_infoIndex:	10
BMS_inletActiveCoolTargetT:	52 DegC	BMS_inletActiveHeatTargetT:	22 DegC
BMS_inletPassiveTargetT:	30 DegC	BMS_isolationResistance:	5100 kOhm
BMS_kwhChargeTotal:	56156.984 kWh	BMS_kwhDischargeTotal:	52648.523 kWh
BMS_maxBusVoltage:	399.24 V	BMS_maxDischargePower:	4.7 kW
BMS_maxRegenPower:	26.57 kW	BMS_minBusVoltage:	364.57 V
BMS_modelTMax:	12.0 DegC	BMS_modelTMin:	11.0 DegC
BMS_moduleNumTMax:	16	BMS_moduleNumTMin:	8
BMS_moduleTMax:	15.0 DegC	BMS_moduleTMin:	14.0 DegC
BMS_negativeBusBarT:	17.0 C	BMS_nominalFullPackEnergy:	57.6 KWh
BMS_odometer:	88325.856 mi	BMS_okToShipByAir:	1
BMS_okToShipByLand:	1	BMS_packCurrent:	-0.1 A
BMS_packCurrent10Hz:	-0.1 A	BMS_packCurrent_toFC:	-0.0183 A
BMS_packSerialNumberByte01:	84	BMS_packSerialNumberByte02:	49
BMS_packSerialNumberByte03:	52	BMS_packSerialNumberByte04:	65
BMS_packSerialNumberByte05:	48	BMS_packSerialNumberByte06:	48
BMS_packSerialNumberByte07:	50	BMS_packSerialNumberByte08:	57
BMS_packSerialNumberByte09:	52	BMS_packSerialNumberByte10:	49
BMS_packSerialNumberByte11:	49	BMS_packTemperature:	13 C
BMS_packVoltage:	0.14 V	BMS_packVoltage_toFC:	0.0732 V
BMS_platformType:	1	BMS_protocolVersion:	7
BMS_sensorNumTMax:	2	BMS_sensorNumTMin:	1
BMS_soe:	100.3937 %	BMS_state:	7
BMS_u008_limpMode:	1	BMS_voltageTarget:	403.1982 V
CHG_FCContactorState_toFC:	2		

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Section 5: AI Analysis & Repair Recommendations

Battery Condition Summary:

Overall Condition: Poor

Battery State Conclusion:

Cell voltage spread 710.0 mV — significant imbalance. Lowest cell in Module 4. Replace Module 4. Also check Module(s) 8 — low cells may need attention.

Expert Conclusion (MASCorp AI Core):

Executive Verdict: The overall system status of the battery pack is classified as "Action Required." The significant voltage spread observed among the cells indicates critical instability within the battery modules, necessitating immediate attention to prevent potential failure and ensure operational safety.

Detailed Electrochemical Analysis: The analysis of the battery pack reveals a pack voltage of 324.73 V, with a concerning cell voltage spread of 710.0 mV. This spread is well beyond the critical threshold of 90 mV, indicating severe imbalances among the cells. The minimum cell voltage recorded is 2.71 V, which is alarmingly low and suggests that some cells are approaching deep discharge conditions. Conversely, the maximum cell voltage is 3.42 V, which, while above the critical threshold, still reflects a significant disparity in cell performance. The temperature range of 14.0–15.0°C is within acceptable limits; however, the electrochemical stability of the cells is compromised due to the excessive voltage spread.

BMS Logic & Integrity: In the context of the bench test, the Battery Management System (BMS) is expected to isolate data effectively. However, the current findings indicate a failure in maintaining cell voltage balance, which is critical for optimal battery performance. The BMS must be evaluated for its ability to manage cell balancing and to ensure that it can respond appropriately to the detected imbalances. The presence of such a high voltage spread suggests that the BMS may not be functioning as intended, which could lead to further degradation of the battery pack if not addressed promptly.

Maintenance Roadmap: Immediate actions are recommended to rectify the identified issues. It is imperative to replace Module 4, which contains the lowest cell, to restore balance within the pack. Additionally, Module 8 should be closely inspected, as it has been flagged for low cells that require attention. Regular monitoring and maintenance of the battery pack should be instituted, with a focus on cell balancing and voltage management to prevent future discrepancies. A follow-up service visit is advised to reassess the battery's health post-repair and to ensure that the BMS is functioning correctly.

Verified by MASCorp AI Core. Hardware Revision: CAN-Gateway v4.

Battery Parameter Interpretation (AI):

- Pack Voltage 324.73 V — normal range for Tesla pack
- Cell voltage spread 710.0 mV — significant imbalance, consider module replacement
- Temperature 14.0–15.0°C — normal operating range

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Repair Recommendations:

1. Replace Module 4 (lowest cell).

2. Check Module 8 — low cells need attention.

Repair Priority:

High

Note: This analysis is generated by AI based on diagnostic data.

For accurate diagnosis and repair, consult with a certified Tesla service center.

Note: All detailed parameters required for repair can be found in the generated JSON file.