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Motor, hybrid & fuel cell powertrains
FEV INDIA PVT LTD

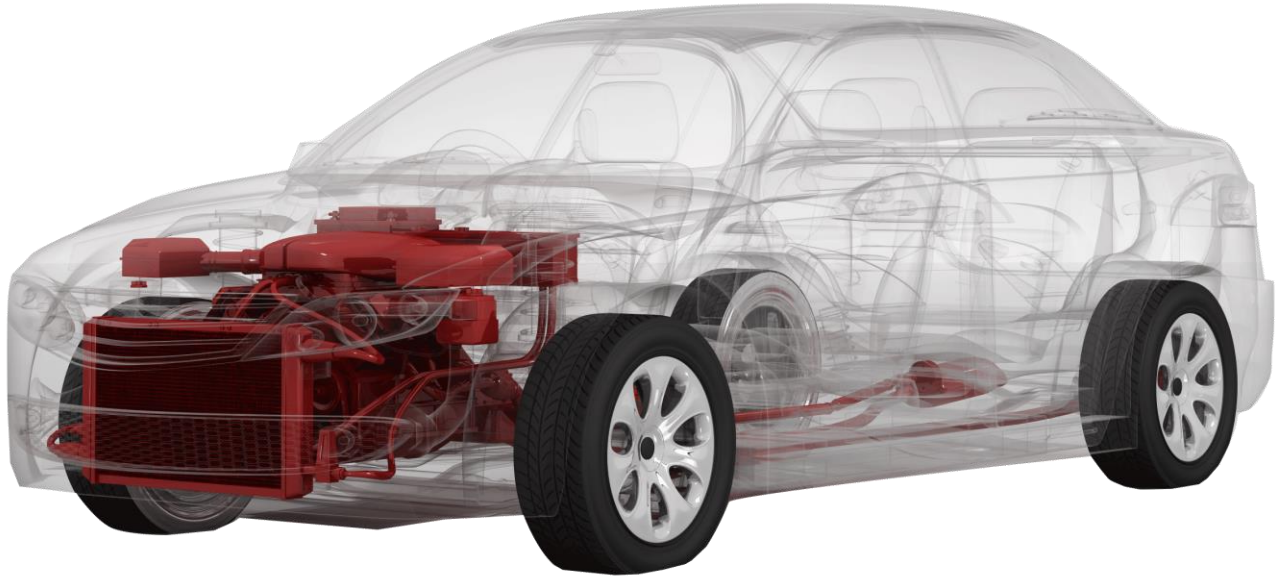
Prepared for

Stellantis India

RAHUL SINGH H
ANANDRAJ BACKIARAJ

EB2LTEM_AT6_CC21N4S001_IND_OBD

OBD ROLLING ANALYSIS



EB2LTEM_AT6_CC21N4S001_IND_OBD

Details

- Vehicle : **CC21_MZZCCHPT9SV027569**
- Platform: **EB2LTEM_AT6_CC21N4S001_IND_OBD (BS6.2, full OBD implementation)**
- Software:
  - ECM : **MG1CS051_H440_2F.a2l**
  - TCU : **96D9488280_8129700U_FV84_nc.a2l**
- Datasets :
  - ECM : **C_H440_2F_43CCC-3B2A4A7BN0000_25250F.hex (MDL Dataset)**
  - TCU **:** **96D9488280_8129700U_FV84_nc.hex**
- Test Mass:
  - Vide (+200kg) = 1255 kg

EB2LTEM_AT6_CC21N4S001_IND_OBD

DIAGNOSTIC ROBUSTNESS EVALUATION

Introduction
This report evaluates the reliability of selected On-Board Diagnostic (OBD) monitors using fleet data. The focus is on:

False Detection Margin (FDM): Safety margin between healthy signal behavior and the fault threshold.

Signal Stability: How consistently the diagnostic behaves under real conditions.

Overall Robustness: Ability of the diagnostic to detect real faults without false triggers.

Key Metric

FDM (False Detection Margin): The statistical distance between the healthy operating mean and the calibrated fault threshold.

A higher FDM = more robust monitor.

Evaluation Criteria

Strong robustness (≥ 6σ) – Large margin, highly reliable

Adequate robustness (3–6σ) – Acceptable margin, reliable under most conditions

Borderline robustness (1–3σ) – Limited margin, requires further validation

At Risk (< 1σ) – Very low margin, potential for false detection

EB2LTEM_AT6_CC21N4S001_IND_OBD

DIAGNOSTIC ROBUSTNESS EVALUATION

Analysis Deliverables

For each Diagnostic Fault Code (DFC):

Purpose – What the diagnostic monitors and the fault it is designed to detect**.**

Signal Evaluation – Statistical measures (mean, spread) compared against fault thresholds.

Robustness (FDM) – Quantifies the margin of safety against false detections.

Verdict – Robustness classification: Strong, Adequate, Borderline, or At Risk.

Interpretation Guidance

High FDM (≥ 6σ): Diagnostic is well-insulated from false triggers.

Medium FDM (3–6σ): Generally robust, but should be validated in extreme or high-load conditions.

Low FDM (1–3σ): Diagnostic may trigger in borderline cases; review calibration and test further.

Very Low FDM (< 1σ): High chance of false detection, requires corrective action.

Data Split/Gaps-

Merged MDF logs may show timestamp gaps due to session-based recordings. These gaps were preserved to reflect actual logging conditions and may appear as flat plateaus in time-series plots.

EB2LTEM_AT6_CC21N4S001_IND_OBD

GENERAL CONDITIONS

DESCRIPTION

- The rolling is done in **Chennai,** India.
- **Signal Evalutaion**
- **PRESSION_ATMO (hPa)-** atmospheric pressure
- Max: 1000
- Mean: 981.351497
- Min : 685
- **TEMP_AIR_EXT (deg. C) -** external temperature
- Max: 86
- Mean: 34.658249
- Min : 24.5
- **KILOMETRAGE (Km)–** 0-15000

EB2LTEM_AT6_CC21N4S001_IND_OBD

BATTERY SOC

DESCRIPTION

- **Diagnostic Purpose:**

To monitor the battery's state-of-charge over driving cycles and check if any undervoltage or overcharge condition is detected.

- **Signal Evaluation:**

Ext_rBattSoc_RTE (%)- realtime battery SOC
- Max: 100
- Mean: 88.94
- Min : 0

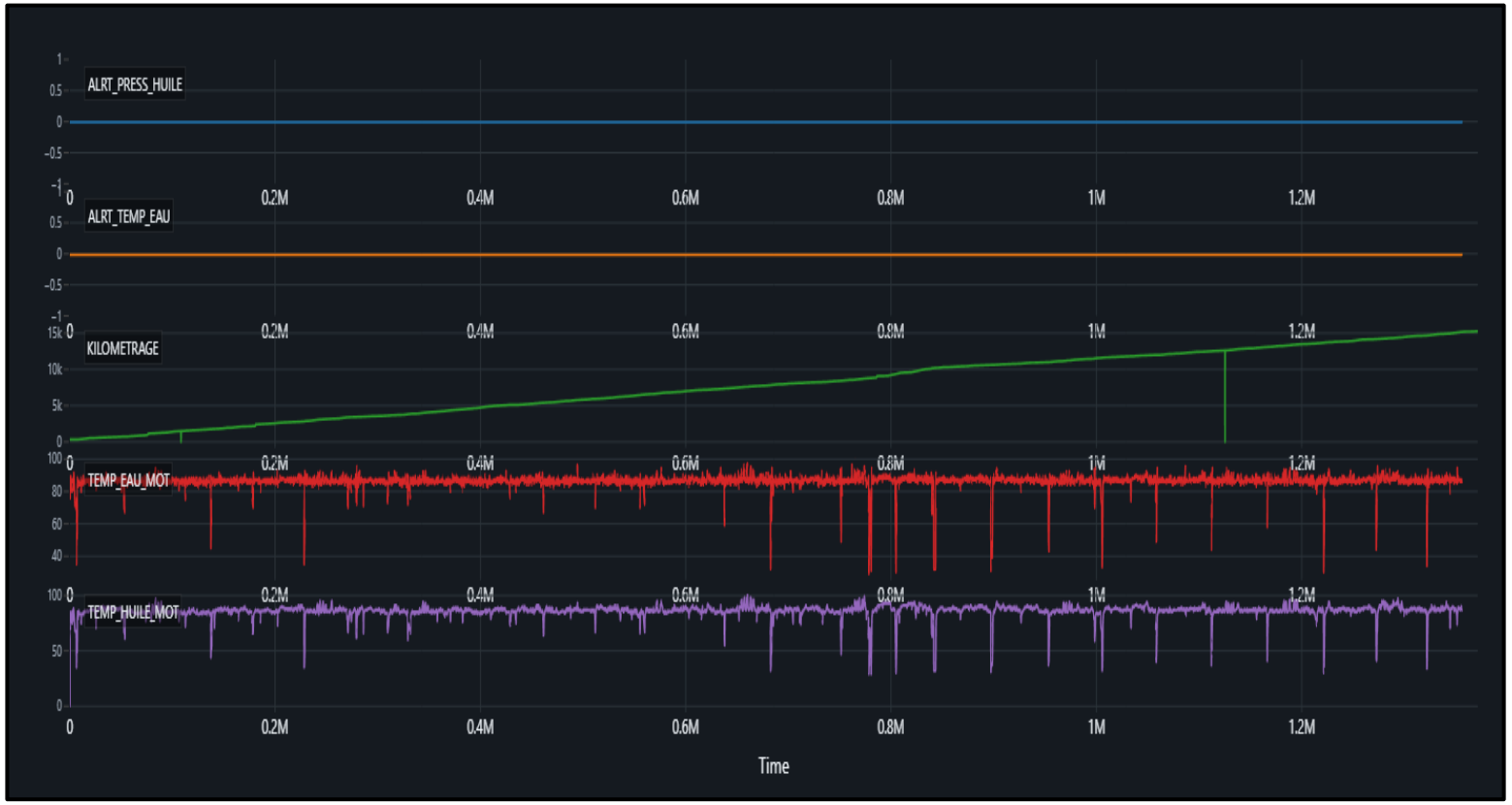
ETAT_CHARGE _BATTERE(%)- battery charge
- Max: 100
- Mean: 88.6
- Min : 0

TEMP_BATT (deg. C) - battery temperature
- Max: 97
- Mean: 51
- Min : 28

Robustness:
Robust – No diagnostic fault observed. SOC trends indicate stable battery operation.

EB2LTEM_AT6_CC21N4S001_IND_OBD

OIL & COOLANT CHECK



DESCRIPTION

- **Diagnostic Purpose:**

To monitor oil and coolant temperature across the fleet run.

- **Signal Evaluation:**

Coolant Temperature: Mostly stable around 126–128 °C, with a few dips, but stays under the 130 °C threshold.
TEMP_EAU_MOT (deg. C) -Engine-Coolant Temperature

- Max: 99
- Mean: 86.72
- Min : 0

ALRT_TEMP_EAU- Coolant Temperature Alert -0
Oil Temperature: Tracks similarly but with slightly larger fluctuations; still generally below 130 °C except for brief peaks.
TEMP_HUILE_MOT (deg. C) - Engine Oil Temperature

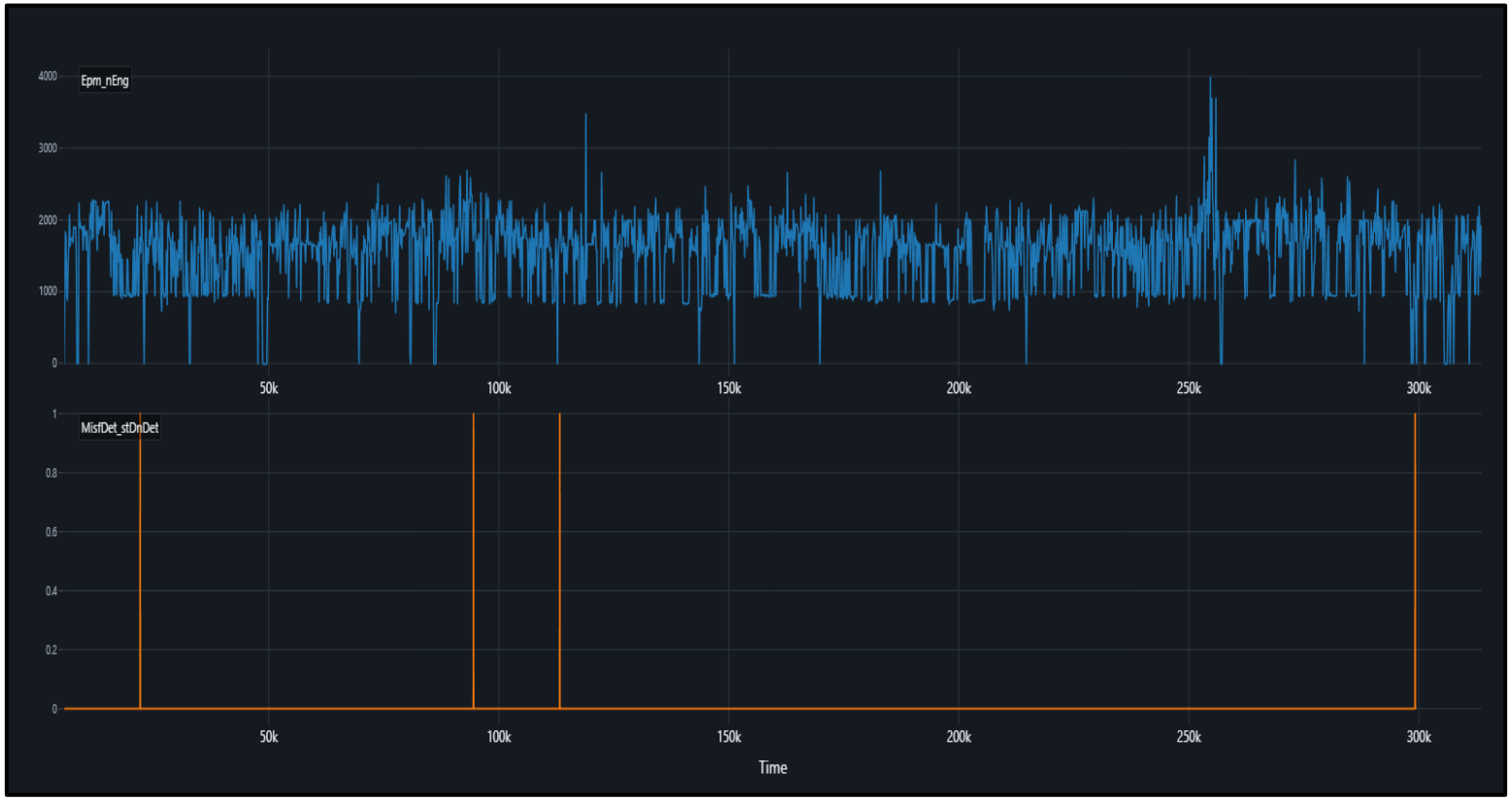
- Max: 101
- Mean: 86.75
- Min : 0

ALRT_PRESS_HUILE- Oil Pressure Alert -0

Robustness:
Both systems didn't trigger the alert flag

EB2LTEM_AT6_CC21N4S001_IND_OBD

MISFIRE



DESCRIPTION

- **Diagnostic Purpose:**

Detect combustion failure events in individual cylinders to prevent catalyst damage, ensure emissions compliance, and protect engine durability.

- **Signal Evaluation:**

MisfDet_stDnDet: Misfire detection state flag from ECU.

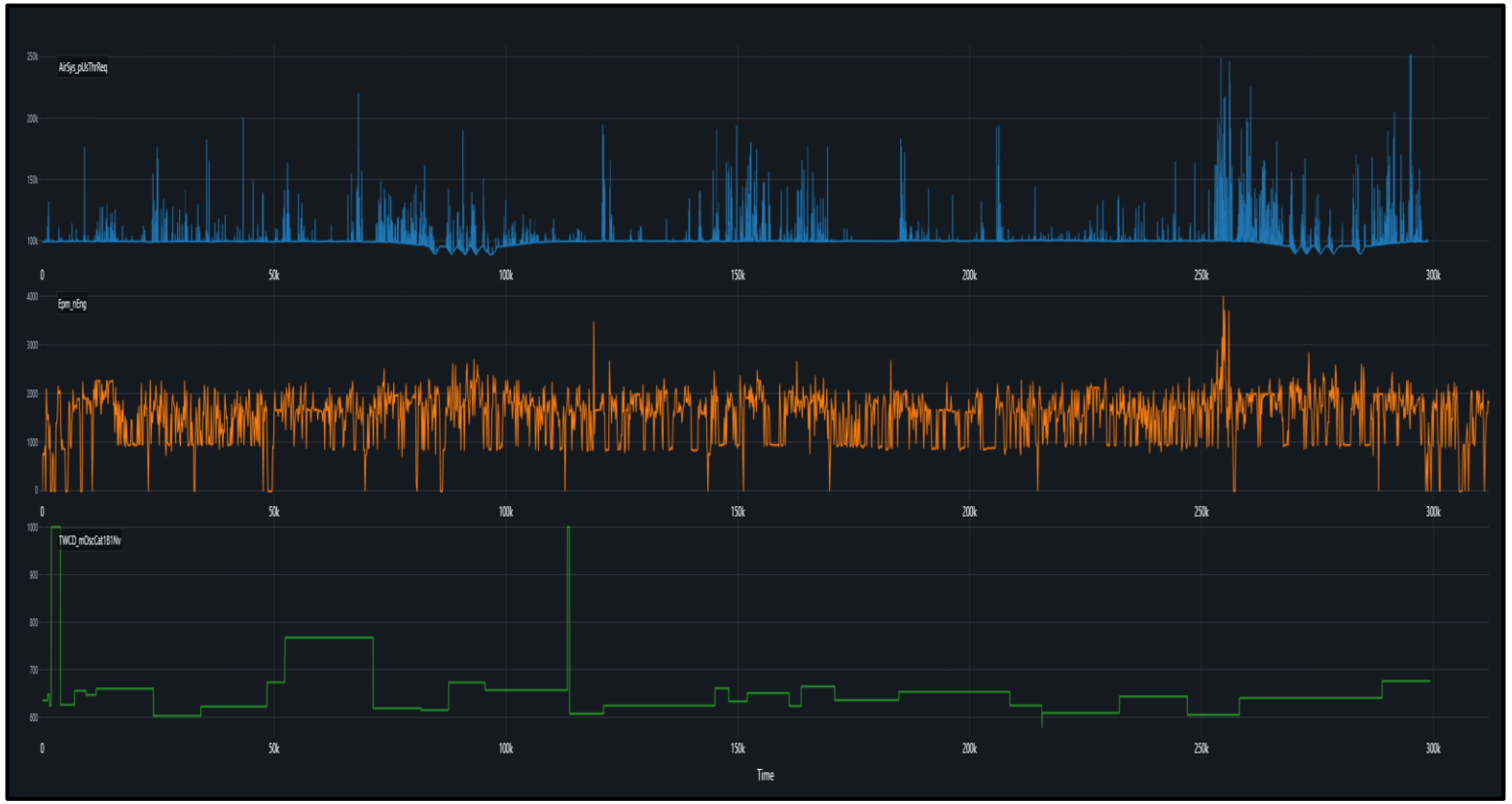
Flag activated- 4 times

Epm_nEng (rpm): Engine speed for operating condition correlation.
Misfire events are identified when the detection state flag is active.

Robustness:
Accuracy maintained under varying ignition loads, fuel quality, and environmental conditions.

EB2LTEM_AT6_CC21N4S001_IND_OBD

OXYGEN STORAGE CAPACITY



DESCRIPTION

- **Diagnostic Purpose:**
  Assess the three-way catalyst's ability to store and release oxygen, which is critical for efficient conversion of HC, CO, and NOx. This parameter is used to detect catalyst degradation.

- **Signal Evaluation:**

TWCD_mOssCatB1Nv (mg): Calculated oxygen storage capacity of the catalyst (Bank 1).
- Max: 1000
- Mean: 649.02
- Min : 579.2

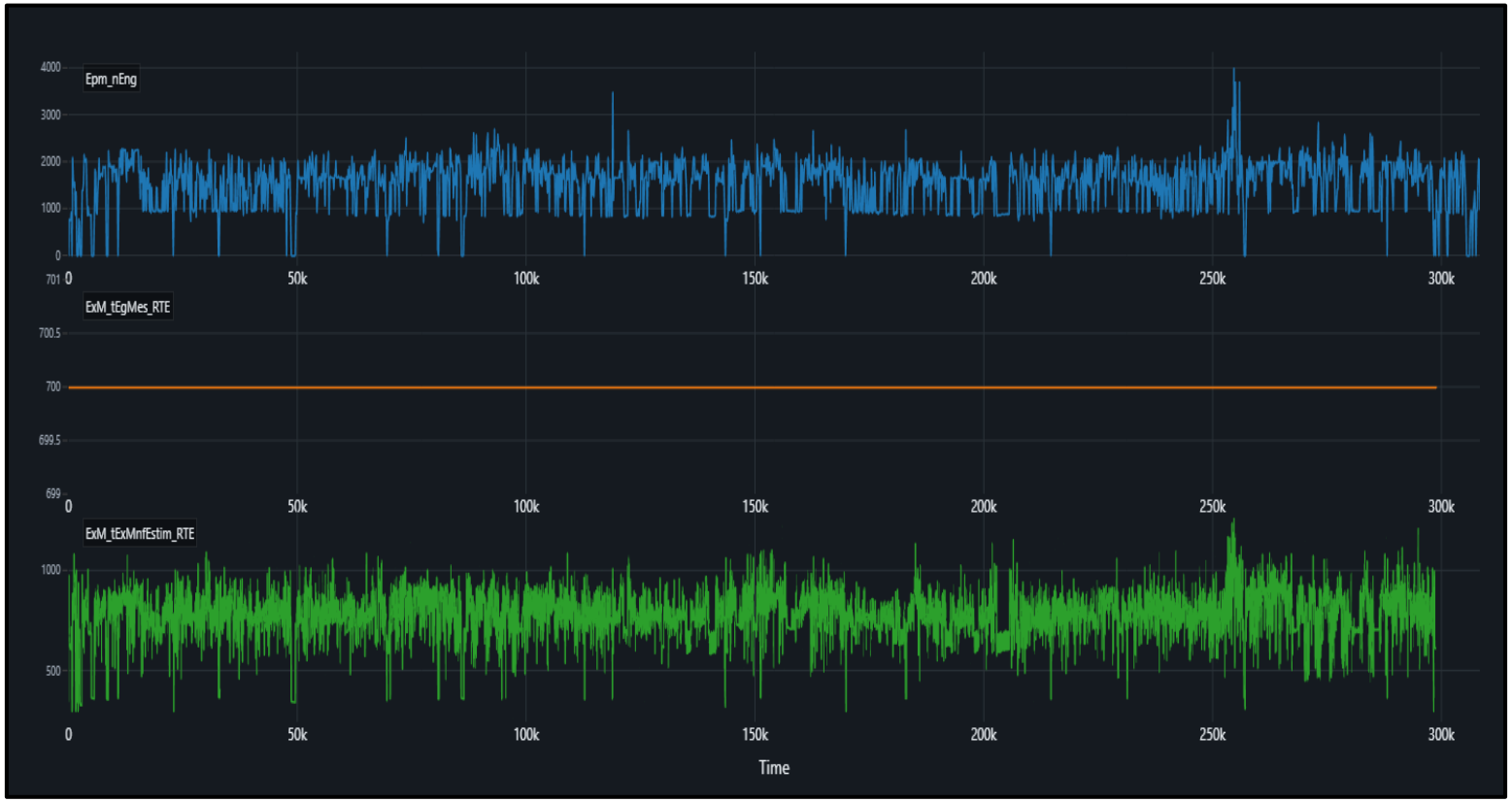
AirSys_pUsThrReq (Pa): Upstream pressure request, providing exhaust flow/load context.
- Max: 267288
- Mean: 101656.11
- Min : 89256

Epm_nEng (rpm): Engine speed reference.
A significant reduction over time or under similar load conditions indicates potential catalyst aging.

Robustness:
Measurement stable across varying load and AFR oscillations.

EB2LTEM_AT6_CC21N4S001_IND_OBD

EXHAUST MANIFOLD



DESCRIPTION

- **Diagnostic Purpose:**
  To monitor and control exhaust manifold thermal conditions, safeguarding turbocharger and catalyst components while ensuring compliance with emissions and durability requirements.

- **Signal Evaluation:**

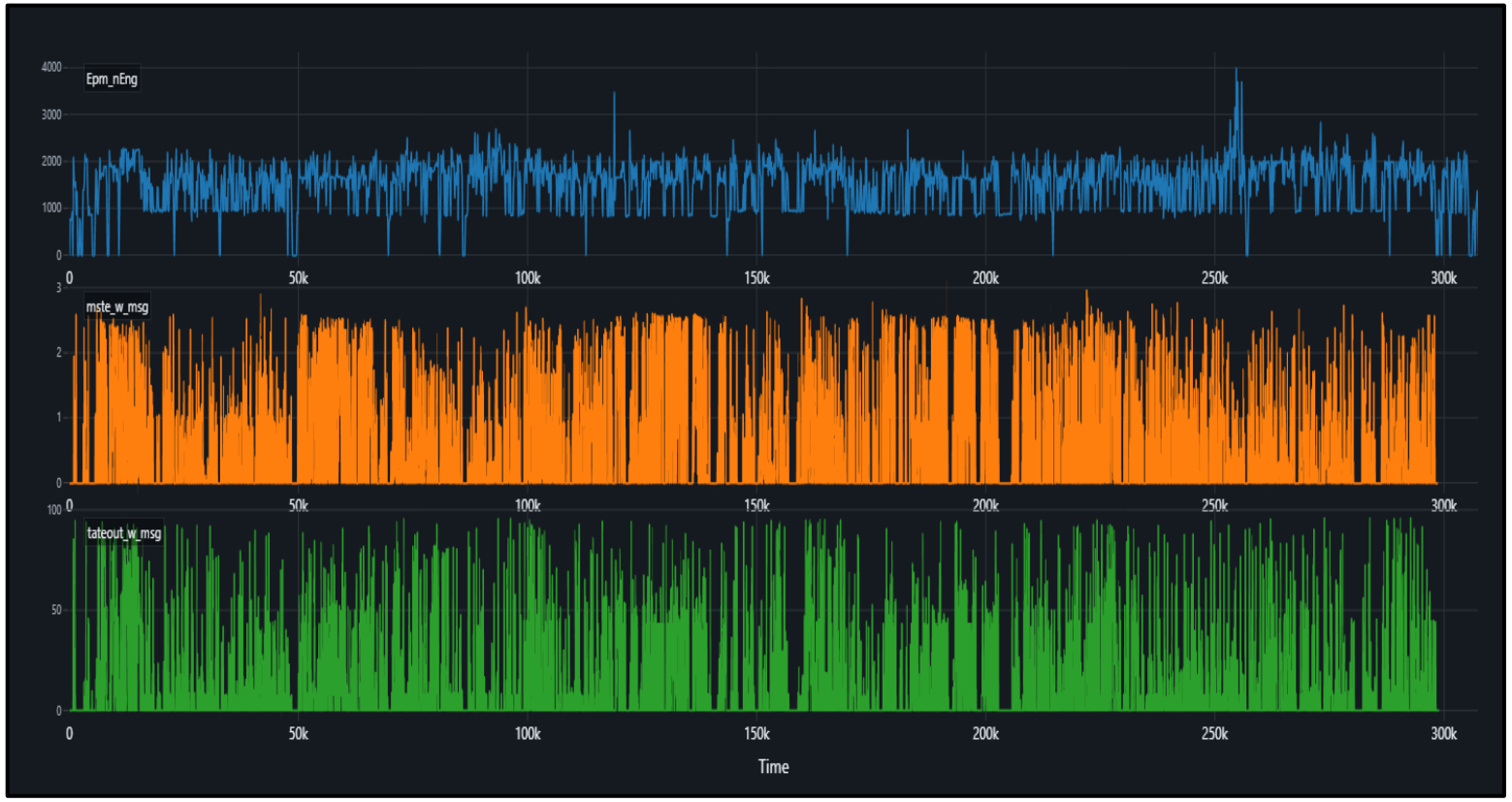
ExM_tExMnEstim_RTE (K): Modeled temperature of exhaust gases in the exhaust manifold

- Max: 1293.622
- Mean: 779.42
- Min : 273

Epm_nEng (rpm): Engine speed for operational reference.
Temperature should rise predictably with load, stabilize in steady-state, and fall during low load. Any abrupt spikes may indicate abnormal combustion or fueling.
Robustness:
Stable under steady-state .Maintains accuracy across ambient and fuel variations. Avoids saturation at high values to preserve over-temperature detection.

EB2LTEM_AT6_CC21N4S001_IND_OBD

CANISTER PURGE DUTY CYCLE



DESCRIPTION

- **Diagnostic Purpose:**
  To verify correct EVAP purge valve operation, ensuring fuel vapor is purged from the charcoal canister under calibrated engine conditions without inducing drivability or emissions deviations.

- **Signal Evaluation:**

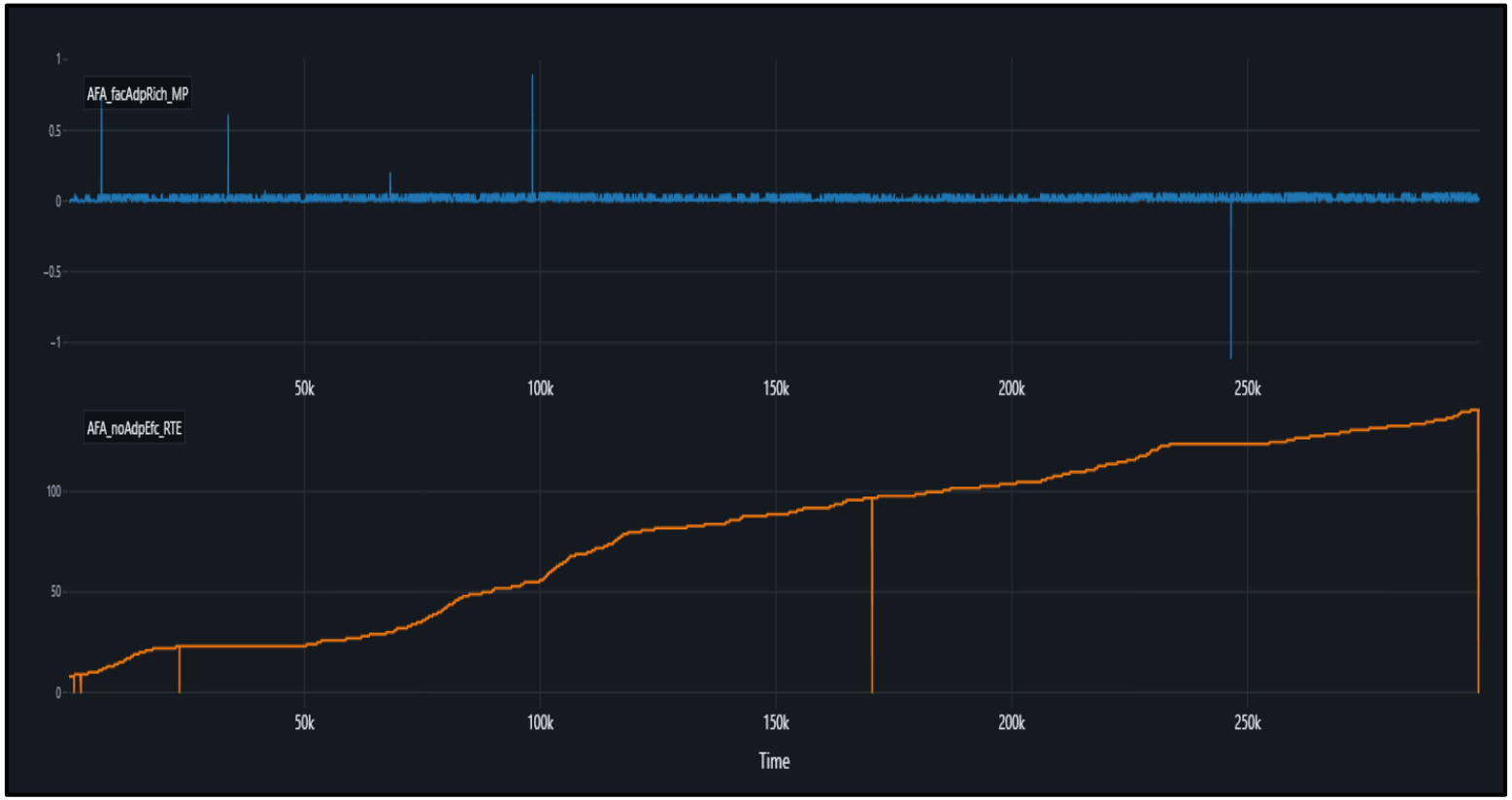
mste_w_msg (kg/h): Actual purge mass flow rate.
- Max: 3.32
- Mean: 0.52
- Min : 0

tateout_w_msg (%): ECU-commanded purge valve duty cycle.
- Max: 96.64
- Mean: 11.99
- Min : 0

Epm_nEng (rpm): Engine speed for load context.
Duty cycle should increase progressively in closed-loop after warm-up, with flow rate correlating proportionally. Purge should be disabled during cold start, idle stabilization, and WOT.
Robustness:
Smooth, noise-free modulation with flow values within limits.

EB2LTEM_AT6_CC21N4S001_IND_OBD

AIR FUEL ADAPTATION



DESCRIPTION

- **Diagnostic Purpose:**

Maintain stoichiometric combustion by applying adaptive corrections to the air–fuel ratio (AFR). conditions.

- **Signal Evaluation:**

AFA_FacAdpRibc_MP: Equivalence ratio correction factor after applying all adaptors. Represents the cumulative adjustment needed to maintain target AFR.

- Max: 896.02
- Mean: 0.02
- Min : -7.85

AFA_noAdpEr_RTE: Number of adaptation applications since last reset. Indicates the adaptation activity level over time.

- Max: 141
- Mean: 79.94
- Min : 0

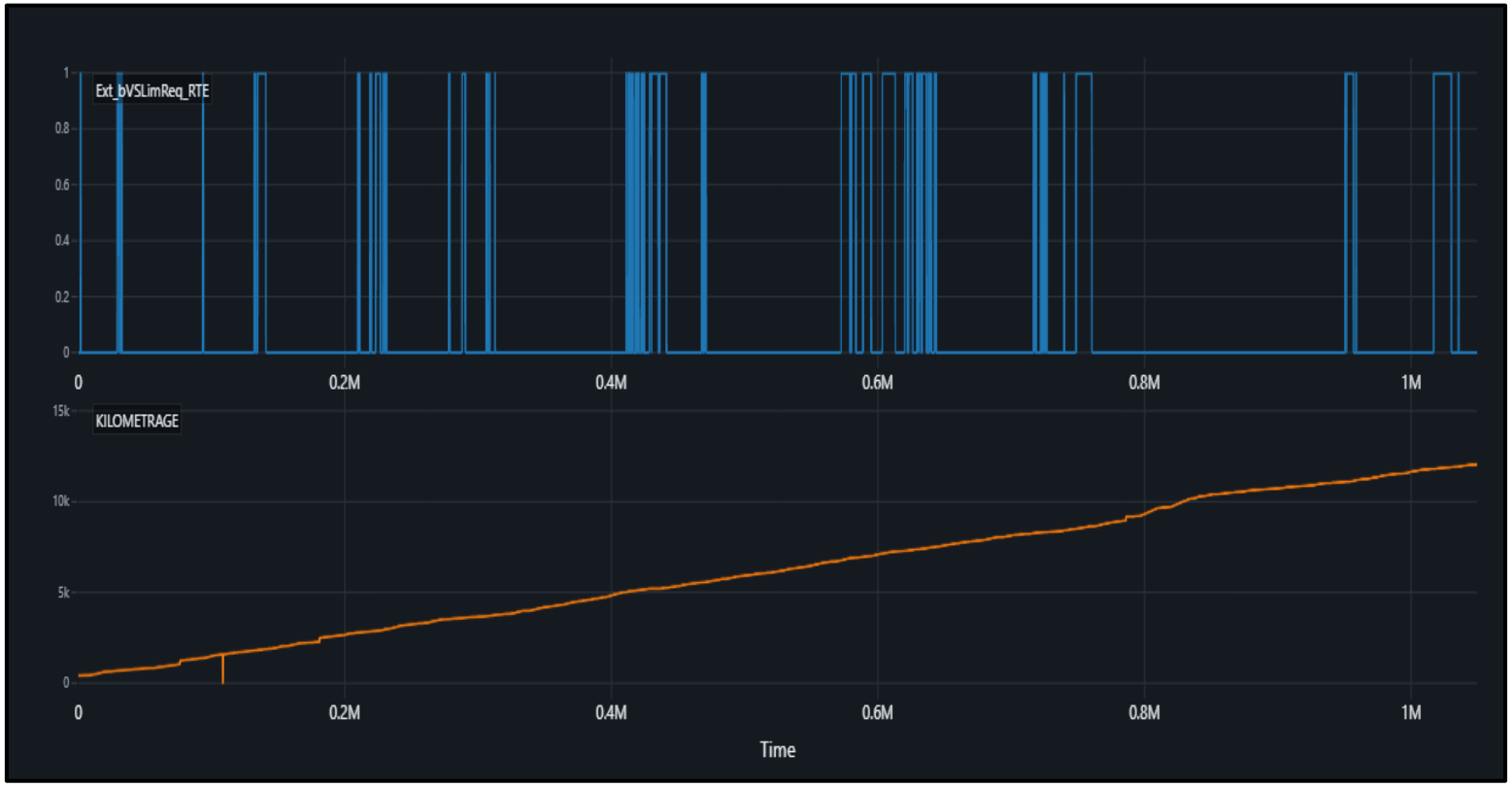
Epm_nEng (rpm): Engine speed reference to correlate adaptation behavior with load conditions.

Robustness:

Stable performance under transient load and purge conditions, with minimal long-term drift. Adaptation logic remains effective across environmental conditions, and component tolerances.

EB2LTEM_AT6_CC21N4S001_IND_OBD

SPEED LIMITER VALIDATION



DESCRIPTION

- **Diagnostic Purpose:**

This diagnostic validates the correct functioning of the **Speed Limiter (LVV)** system.
It ensures that limiter activation requests are correctly registered under varying driving conditions.

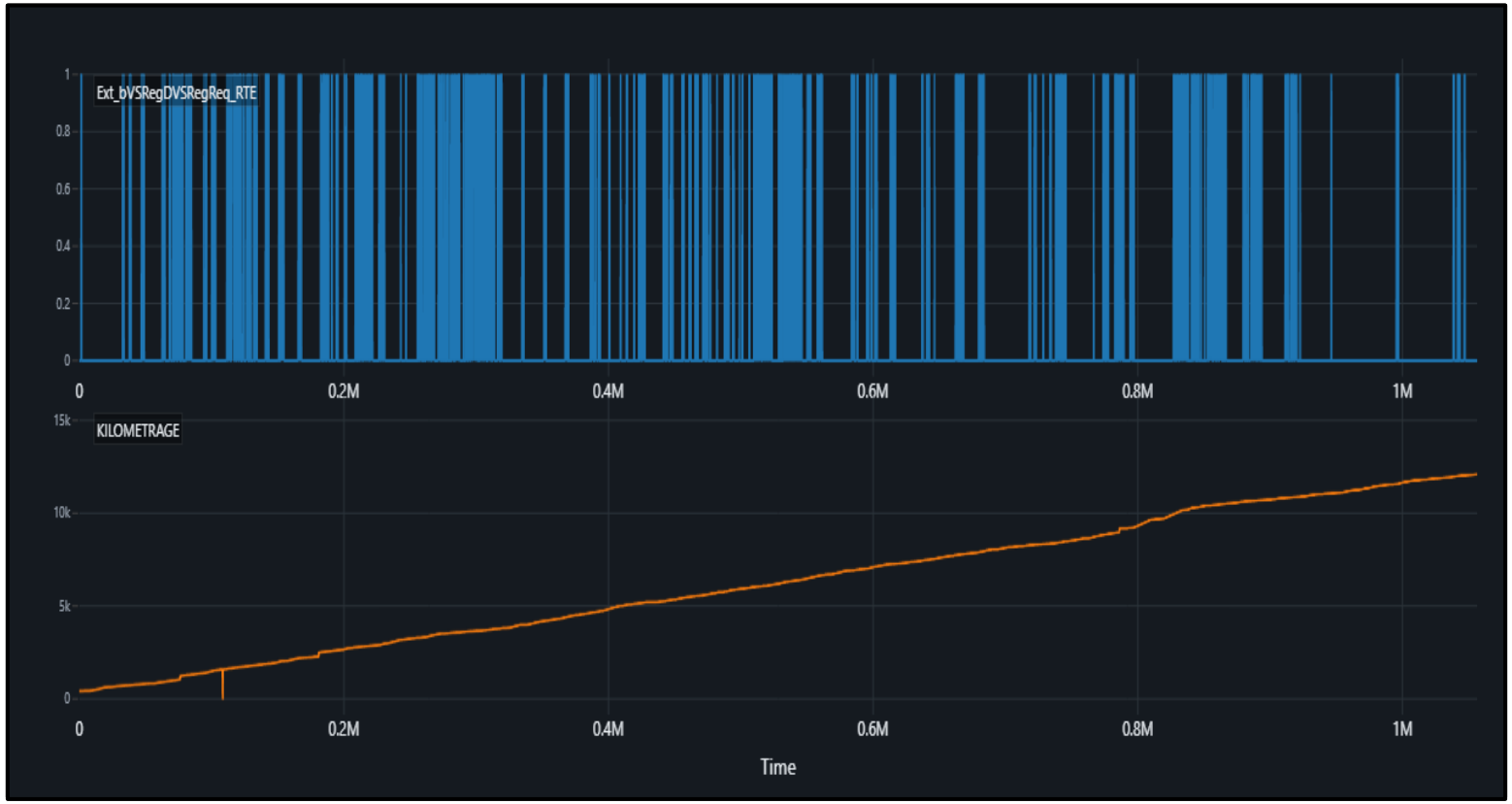
- **Signal Evaluation:**

Ext_bVSLimReq_RTE: Indicator for speed limiter activation request:
1 → Limiter request active (effective, non-effective, or override)
0 → Limiter off

Robustness:
The speed limiter demonstrates stable engagement across transient load and gradient conditions.

EB2LTEM_AT6_CC21N4S001_IND_OBD

CRUISE CONTROL VALIDATION



DESCRIPTION

- **Diagnostic Purpose:**

This diagnostic validates the functionality of the **Cruise Control (RVV)** system.
It ensures that activation requests are correctly interpreted by the ECU across varying operating conditions.

- **Signal Evaluation:**

Ext_bVSRegDVSRegReq_RTE-Indicator for cruise control activation request:
1 → Cruise control active (effective, non-effective, or override)
0 → Cruise control off

Robustness:
Cruise control exhibits accurate speed regulation under varying road loads and slopes..

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC OBSERVED

DFC_NAME	P_CODE	SHORT_DESC
DFC_CoPTSt_stDgoEngStall	P17ED-94	Detection of engine stall for all application types
DFC_Com329hAbsent	U1149-87	Missing frame STT_BV_329
DFC_Ext_stDgoMiss_CONTEXTE_1_5B2	U0140-87	Missing frame CONTEXTE_1_5B2
DFC_Ext_stDgoMiss_DYN_ESC_0ED	U1153-87	Missing frame DYN_ESC_0ED
DFC_Ext_stDgoMiss_V2_BVA_349	U1109-87	Missing frame V2_BVA_349
DFC_Ext_stDgoMiss_V2_BV_3C9	U1109-87	Missing frame V2_BV_3C9
DFC_Ext_stDgoMiss_V2_BV_489	U1109-87	Missing frame V2_BV_489
DFC_Ext_stDgoMiss_VDS_BSI_492	U1158-87	Missing frame VDS_BSI_492
DFC_Ext_stDgoMiss_VIS_BSI_4B2	U1158-87	Missing frame VIS_BSI_4B2
DFC_Ext_stDgoMiss_WMI_BSI_4D2	U1158-87	Missing frame WMI_BSI_4D2
DFC_UCE_stDgoMainWkuDisrd	U2000-06	Diagnosis of main wake up anomaly
DFC_DSKVRmin	P0191-16	Fuel-rail high-pressure sensor: range check (min) error
DFC_HEGOS2B1ElecSig	P0140-13	HEGO sensor 2 (Bank 1): electrical signal fault
DFC_TANKLnpl	P0313-7B	Not plausible error of fuel tank level (OBDII error link)
DFC_UEGOSnsrMntdS1B1	P0130-64	UEGO sensor (S1B1) physical-plausibility fault

EB2LTEM_AT6_CC21N4S001_IND_OBD

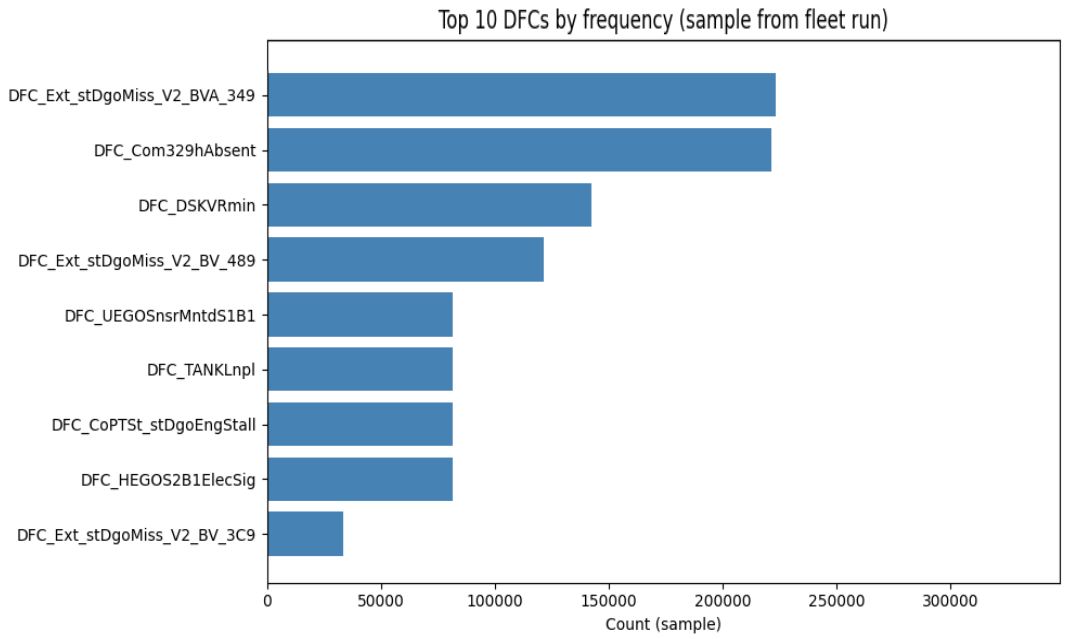
DFC OBSERVED

DFC_NAME	NUM_DFC CODE	EVENT_COUNT	ROW_COUNT	RUNTIME_COUNT
DFC_CoPTSt_stDgoEngStall	196	202	4435306	891418.8
DFC_Com329hAbsent	248	150	2986460	598311.6
DFC_Ext_stDgoMiss_CONTEXTE_1_5B2	650	32	557522	111763.2
DFC_Ext_stDgoMiss_DYN_ESC_0ED	670	32	557522	111763.2
DFC_Ext_stDgoMiss_V2_BVA_349	704	330	6527322	1307762.8
DFC_Ext_stDgoMiss_V2_BV_3C9	705	150	2986460	598311.6
DFC_Ext_stDgoMiss_V2_BV_489	706	150	2986460	598311.6
DFC_Ext_stDgoMiss_VDS_BSI_492	707	32	557522	111763.2
DFC_Ext_stDgoMiss_VIS_BSI_4B2	708	32	557522	111763.2
DFC_Ext_stDgoMiss_WMI_BSI_4D2	715	32	557522	111763.2
DFC_UCE_stDgoMainWkuDisrd	1204	32	557522	111763.2
DFC_DSKVRmin	1440	202	4435306	891418.8
DFC_HEGOS2B1ElecSig	1538	202	4435306	891418.8
DFC_TANKLnpl	1748	202	4435306	891418.8
DFC_UEGOSnsrMntdS1B1	1762	202	4435306	891418.8

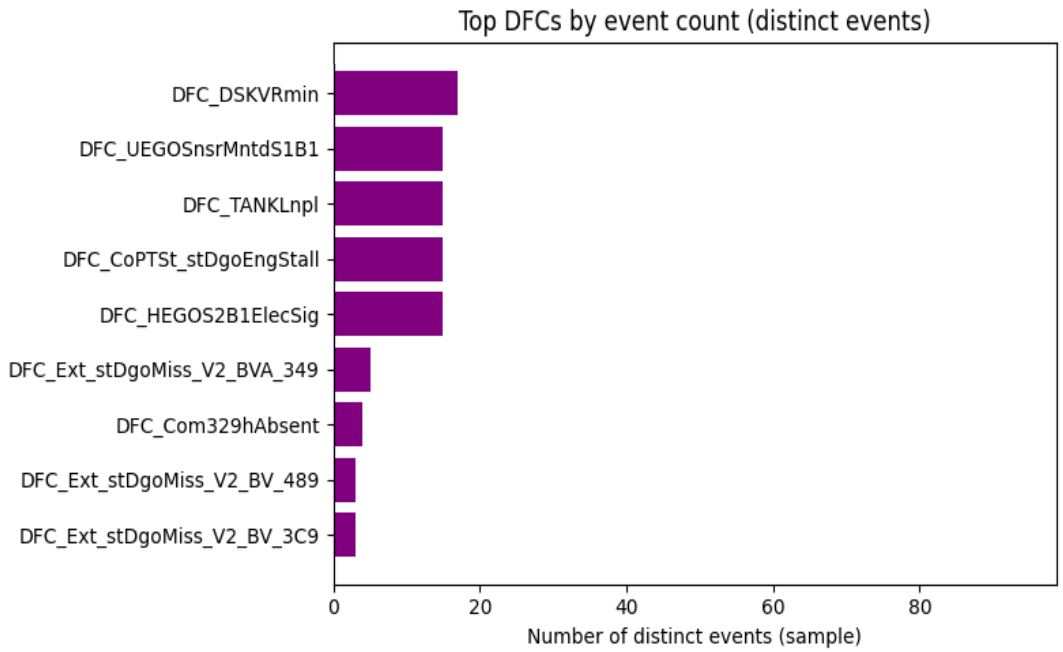
EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC FROM FLEET RUN- NUMDFC

- **Row-based frequency** – counts how many rows (i.e., time points) each DFC is active. This view reflects how much time vehicles spend in each fault state.

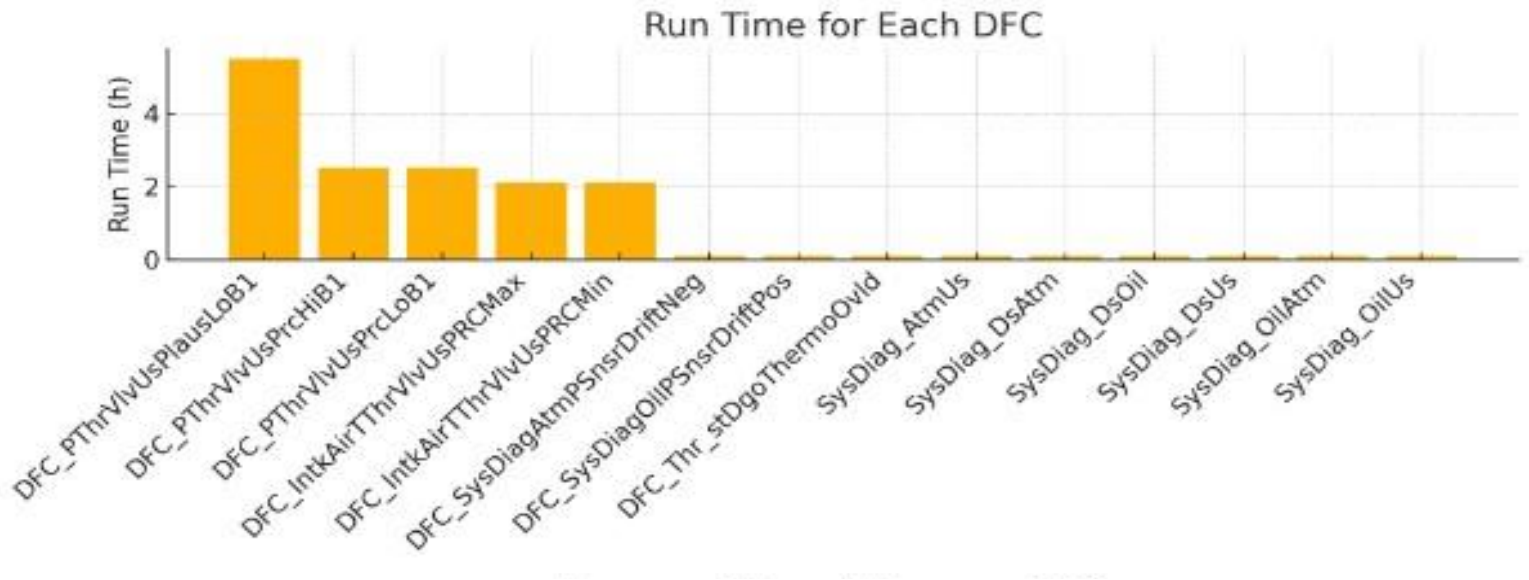


- **Event-based frequency** – counts distinct occurrences of a fault regardless of its duration. Consecutive rows with the same numdfc value are treated as a single event. This view reflects how often faults are triggered.



EB2LTEM_AT6_CC21N4S001_IND_OBD

FREEZE FRAME



DESCRIPTION

- **Diagnostic Purpose:**
To monitor DFC occurrence.

- **Run Time for Each DFC:**

- Top 3 faults run for 2–5 hours each, far exceeding all others.

- The remaining diagnostics clear quickly (< 0.5 h), indicating only a few persistent issues.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DIAGNOSTIC ROBUSTNESS EVALUATION

Diagnostic Purpose
Each diagnostic plot includes a signal distribution curve and calibrated reference limits.
The legend provides the key markers to interpret system performance:

- **Synthetic PDF (Blue Curve)**
- Statistical probability distribution of the signal under healthy operation. It shows how frequently different values occur across the dataset.

- **Expected Min (Green Dashed Line)**
- Lower boundary of the acceptable signal range. Values below this may indicate abnormal or faulty behavior.

- **Measured Mean (Orange Dashed Line)**
- Average value of the signal observed during fleet testing. Indicates the typical operating point in real-world conditions.

- **Expected Max (Red Dashed Line)**

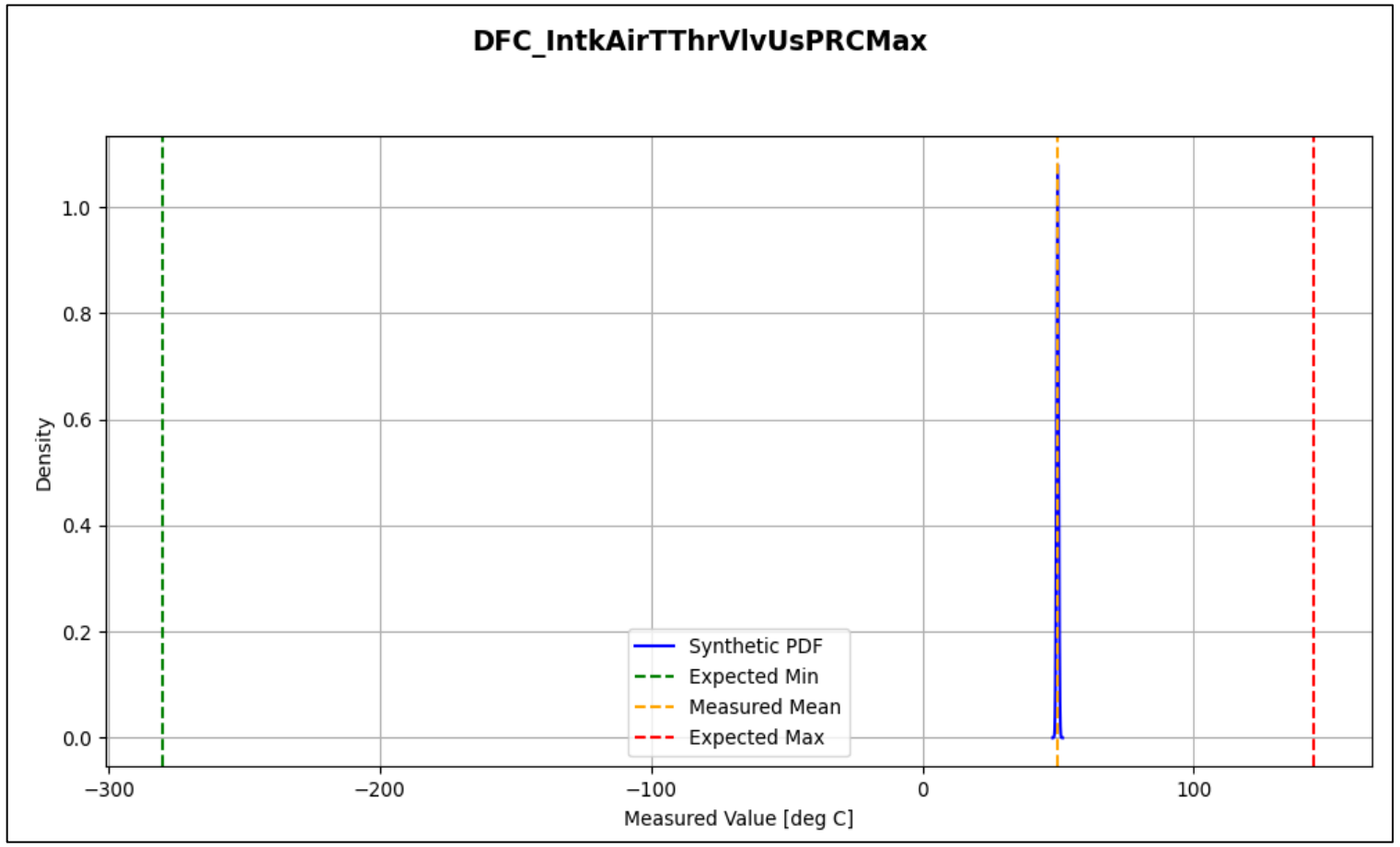
Upper boundary of the acceptable signal range. Values above this may suggest out-of-spec conditions or potential fault activation.

Interpretation Guidance

- If the blue curve (PDF) lies well within green/red boundaries → signal is robust.
- If the curve approaches or crosses a boundary → reduced margin → higher risk of false or missed detections.
- The orange line (mean) shows whether the real-world fleet operation is centered or biased toward a threshold.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_INTKAIRTTHRVLVUSPRCMAX



DESCRIPTION

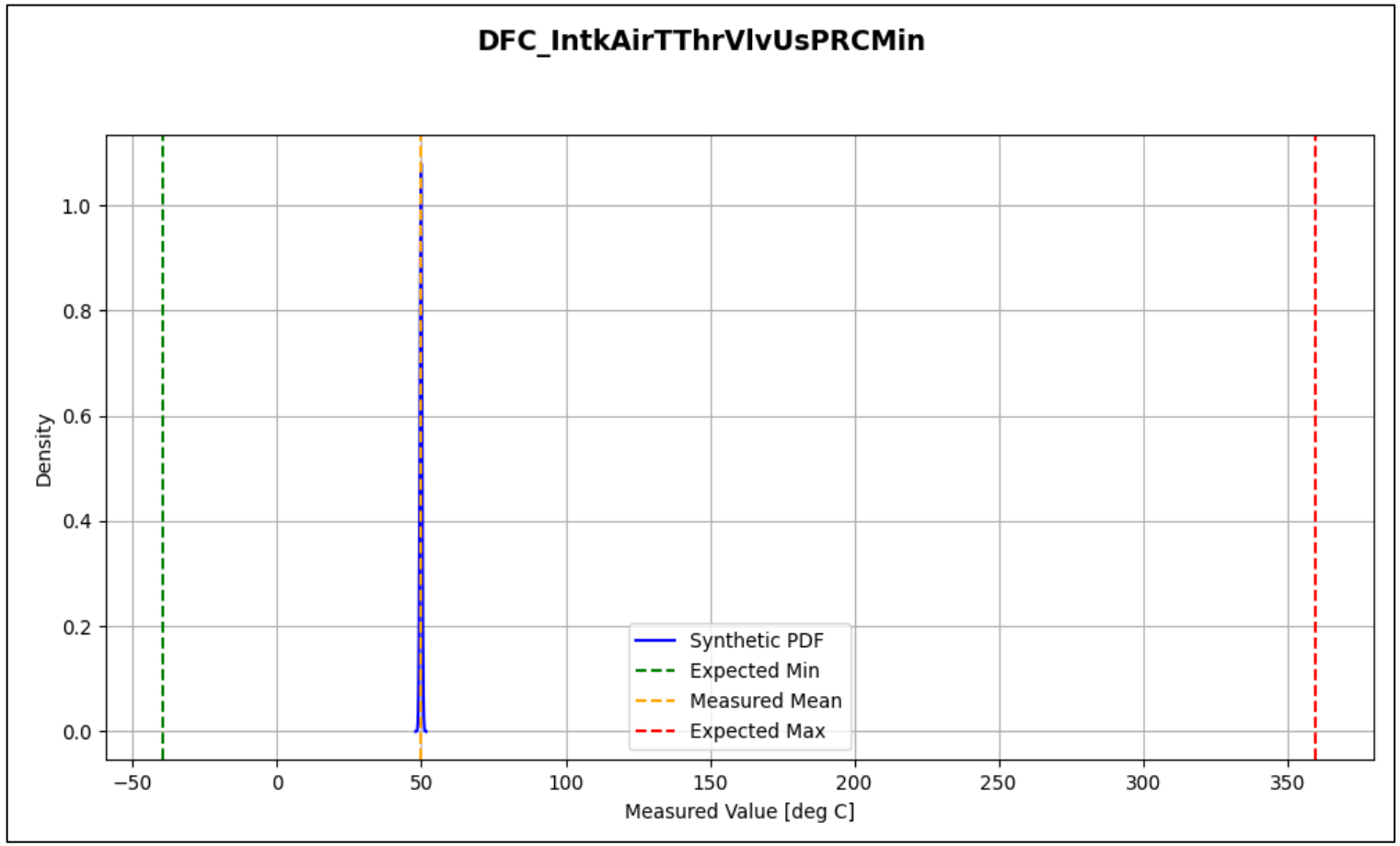
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_IntkAirTThrVlvUsPRCMax` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 49.84 with a standard deviation of 0.37. Expected operational range is from -280.0 to 144.46. Observed values range between -280.0 and 144.46, indicating the signal's behavior under real conditions.
Threshold Value : IAT_upstream > 144°C

3. Robustness
Signal remains well below the upper threshold in healthy conditions with tight standard deviation (σ = 0.37). Strong margin ensures resilience against sensor drift and thermal excursions.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_INTKAIRTTHRVLVUSPRCMIN



DESCRIPTION

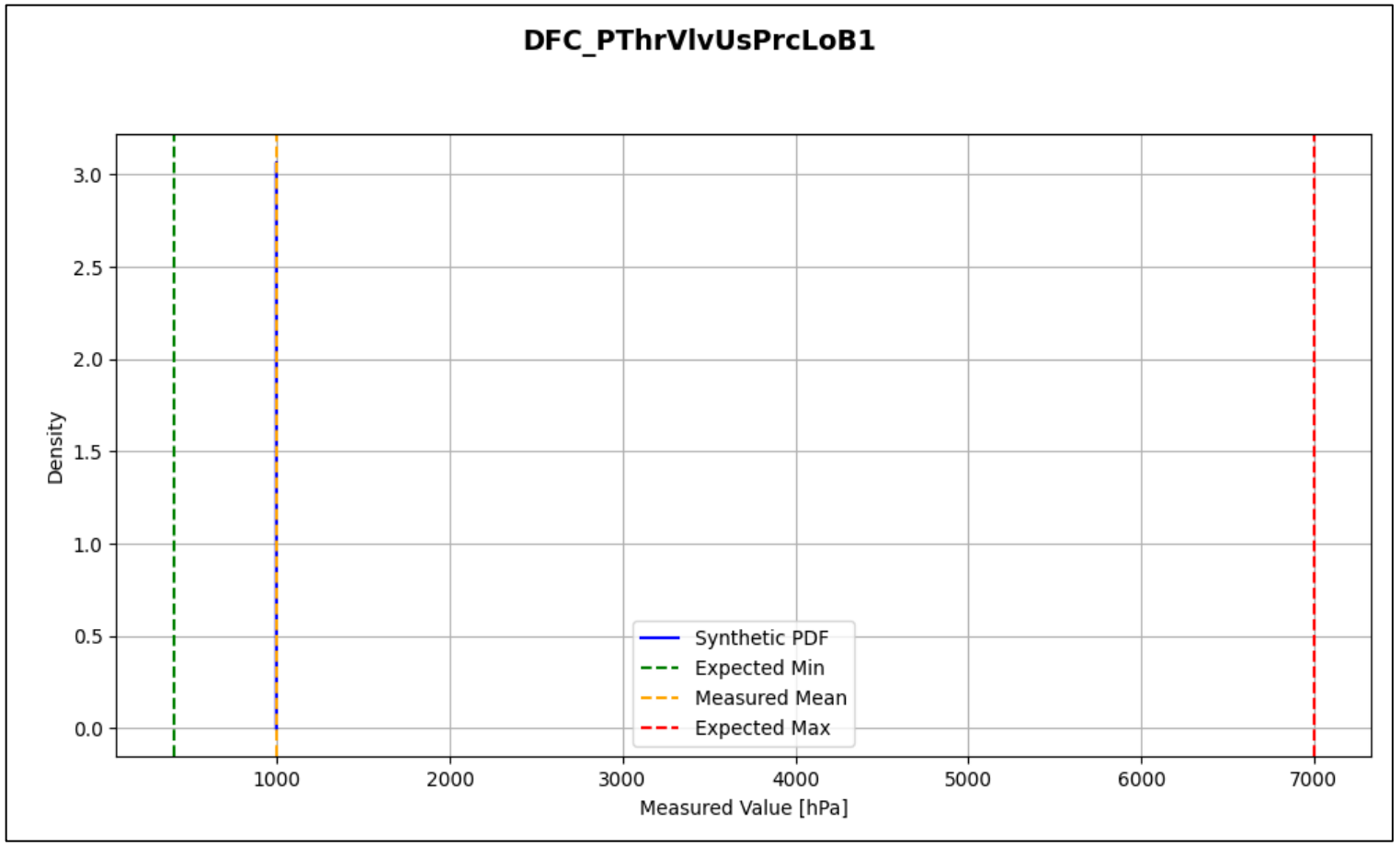
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_IntkAirTThrVlvUsPRCMin` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 49.84 with a standard deviation of 0.37. Expected operational range is from -39.54 to 360.0. Observed values range between -39.54 and 360.0, indicating the signal's behavior under real conditions.
Threshold Value: IAT_upstream < -39.54°C

3. Robustness
Signal distribution is centered far above the minimum threshold, leaving strong statistical margin. Fault unlikely unless genuine low-temperature condition occurs.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_PTHRVLVUSPRCLOB1



DESCRIPTION

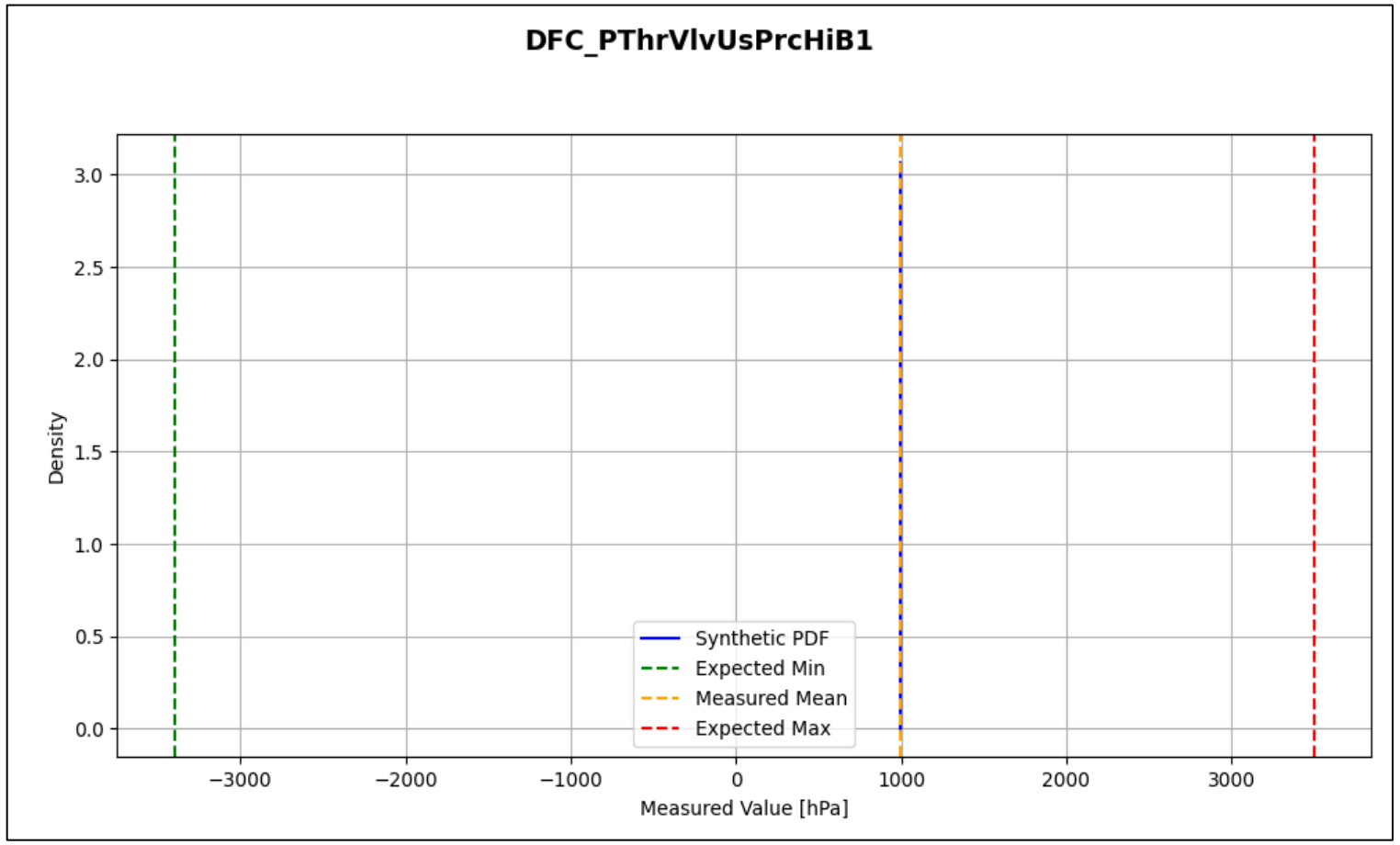
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_PThrVlvUsPrcLoB1` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 995.92 with a standard deviation of 0.13. Expected operational range is from 400.0 to 7000.0. Observed values range between 400.0 and 7000.0, indicating the signal's behavior under real conditions.
Threshold Value: P_upstream < 400 hPa

3. Robustness
Borderline case with limited margin (≈1.5σ). Monitor may be sensitive under transient load drops or pressure dips. Needs further validation under low ambient pressure scenarios.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_PTHRVLVUSPRCHIB1



DESCRIPTION

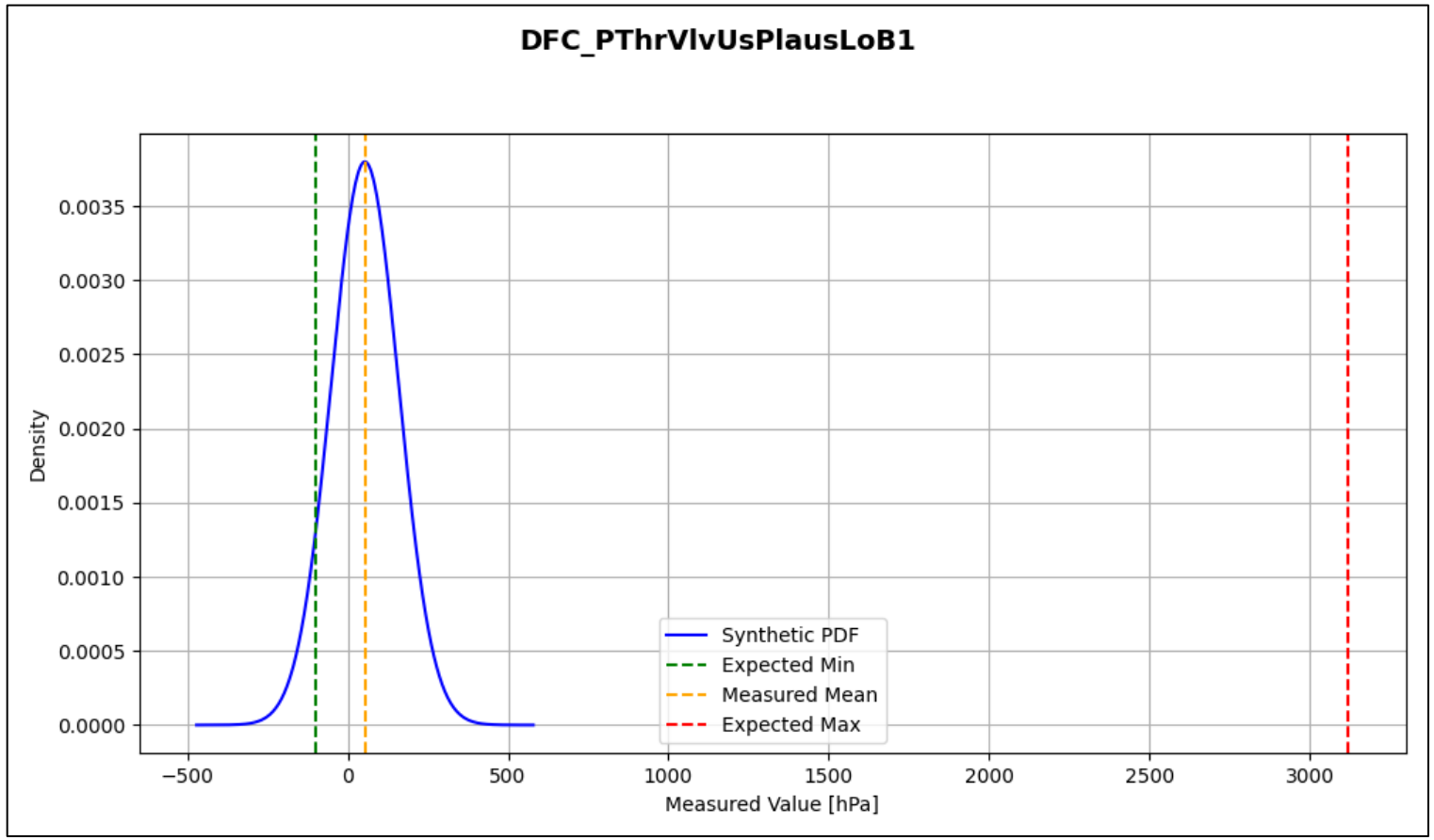
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_PThrVlvUsPrcHiB1` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 995.92 with a standard deviation of 0.13. Expected operational range is from -3400.0 to 3500.0. Observed values range between -3400.0 and 3500.0, indicating the signal's behavior under real conditions.
Threshold Value: IAT_upstream > 3500 hpa

3. Robustness
Very strong margin; actual pressure variation is narrow compared to threshold. Diagnostic is highly insulated against false positives.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_PTHRVLVUSPLAULOB1



DESCRIPTION

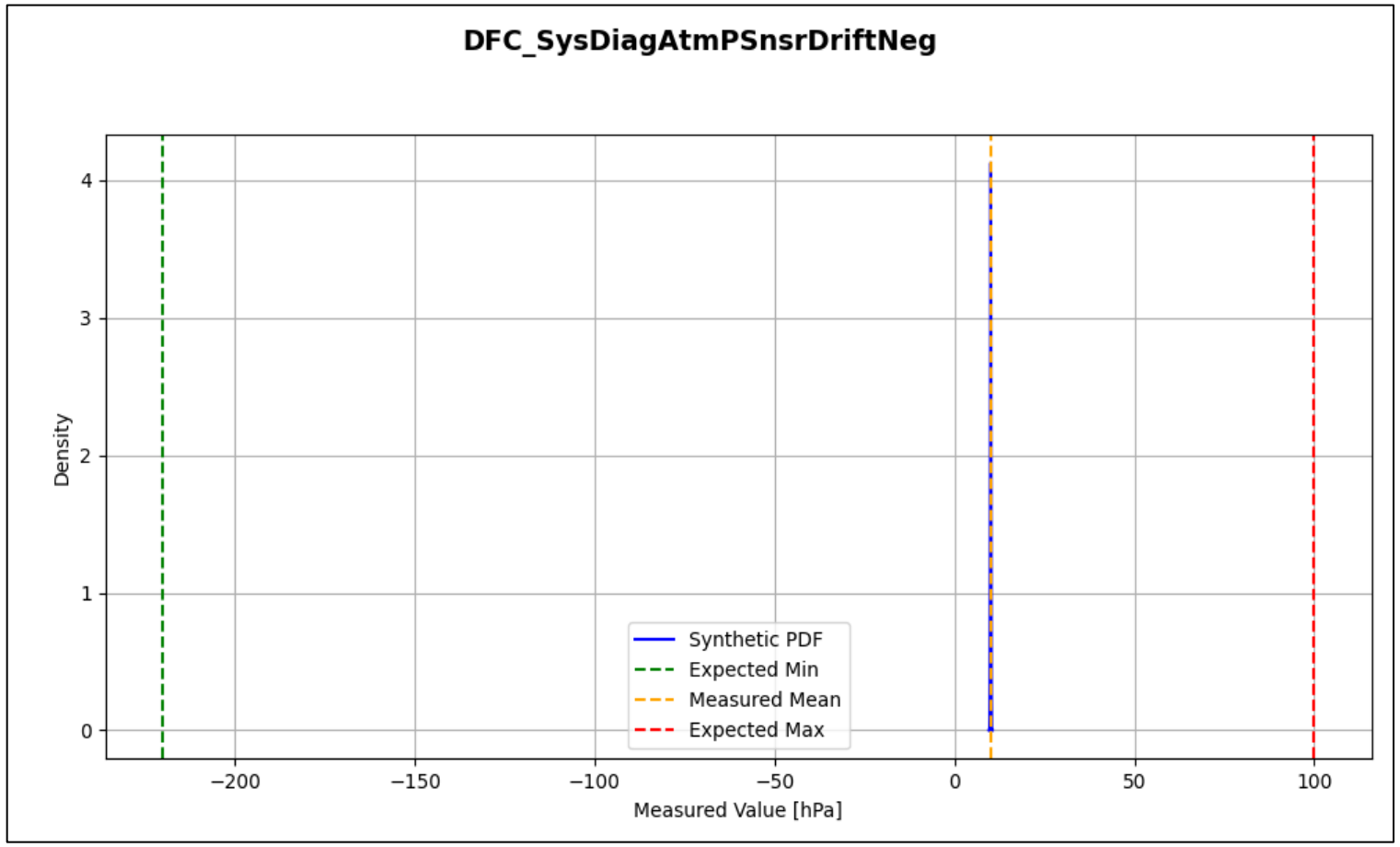
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_PThrVlvUsPlausLoB1` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 53.78 with a standard deviation of 104.99. Expected operational range is from -100.0 to 3120.0. Observed values range between -100.0 and 3120.0, indicating the signal's behavior under real conditions.
Threshold Value: P_upstream < 400 hPa

3. Robustness
High variance in the signal ($\sigma \approx 105$) reduces robustness margin. Monitor susceptible to noise and requires further refinement or filtering strategy

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_SYSDIAGATMPSNSRDRIFTNEG



DESCRIPTION

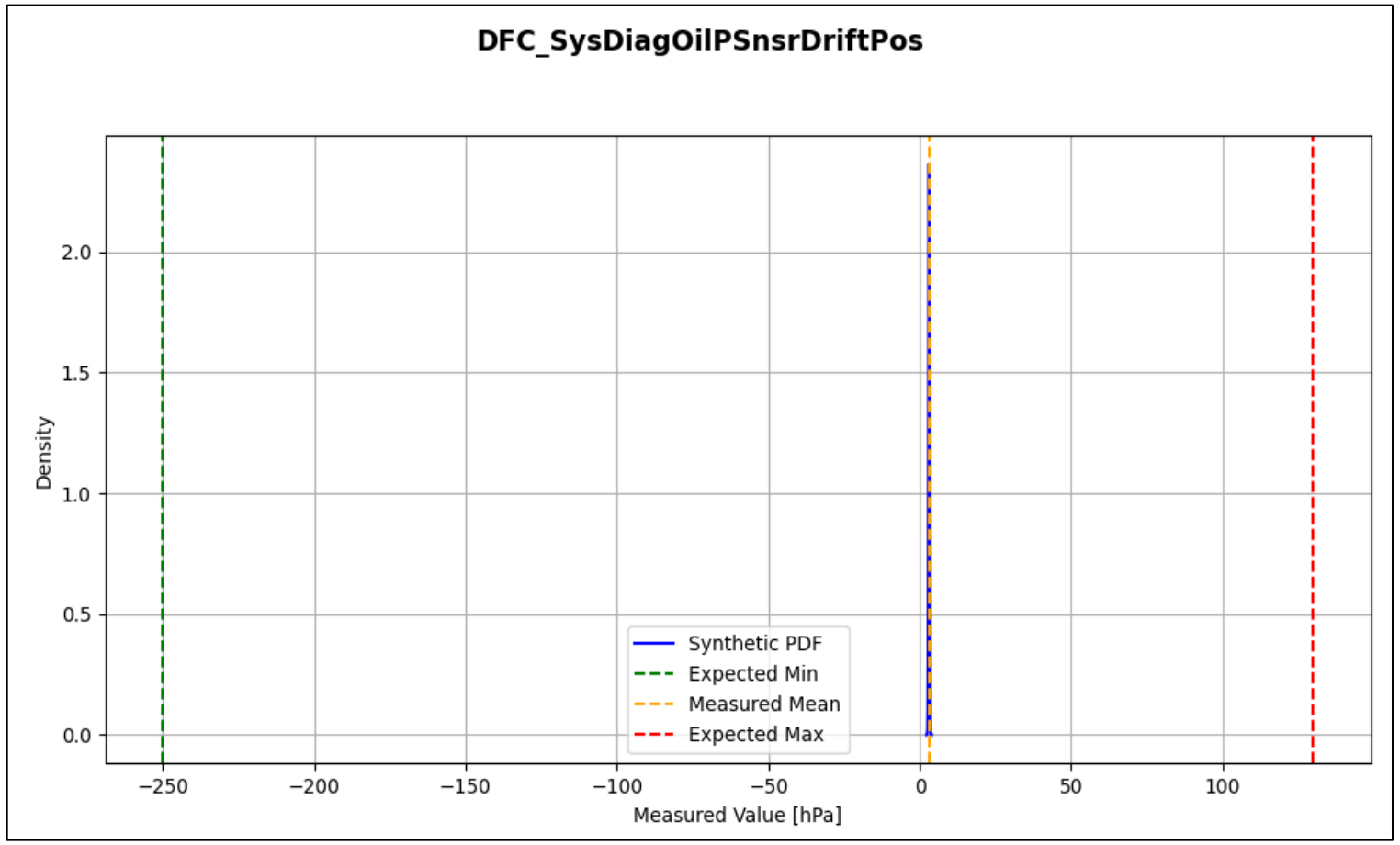
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_SysDiagAtmPSnsrDriftNeg` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 10.07 with a standard deviation of 0.10. Expected operational range is from -220.0 to 100.0. Observed values range between -220.0 and 100.0, indicating the signal's behavior under real conditions.
Threshold Value: P_atm ≤ P_ref – 220 hPa

3. Robustness
Mean pressure remains far from drift threshold. Strong margin confirms immunity to atmospheric variations and sensor noise.

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_SYSDIAGOILPSNSRDRIFTPOS



DESCRIPTION

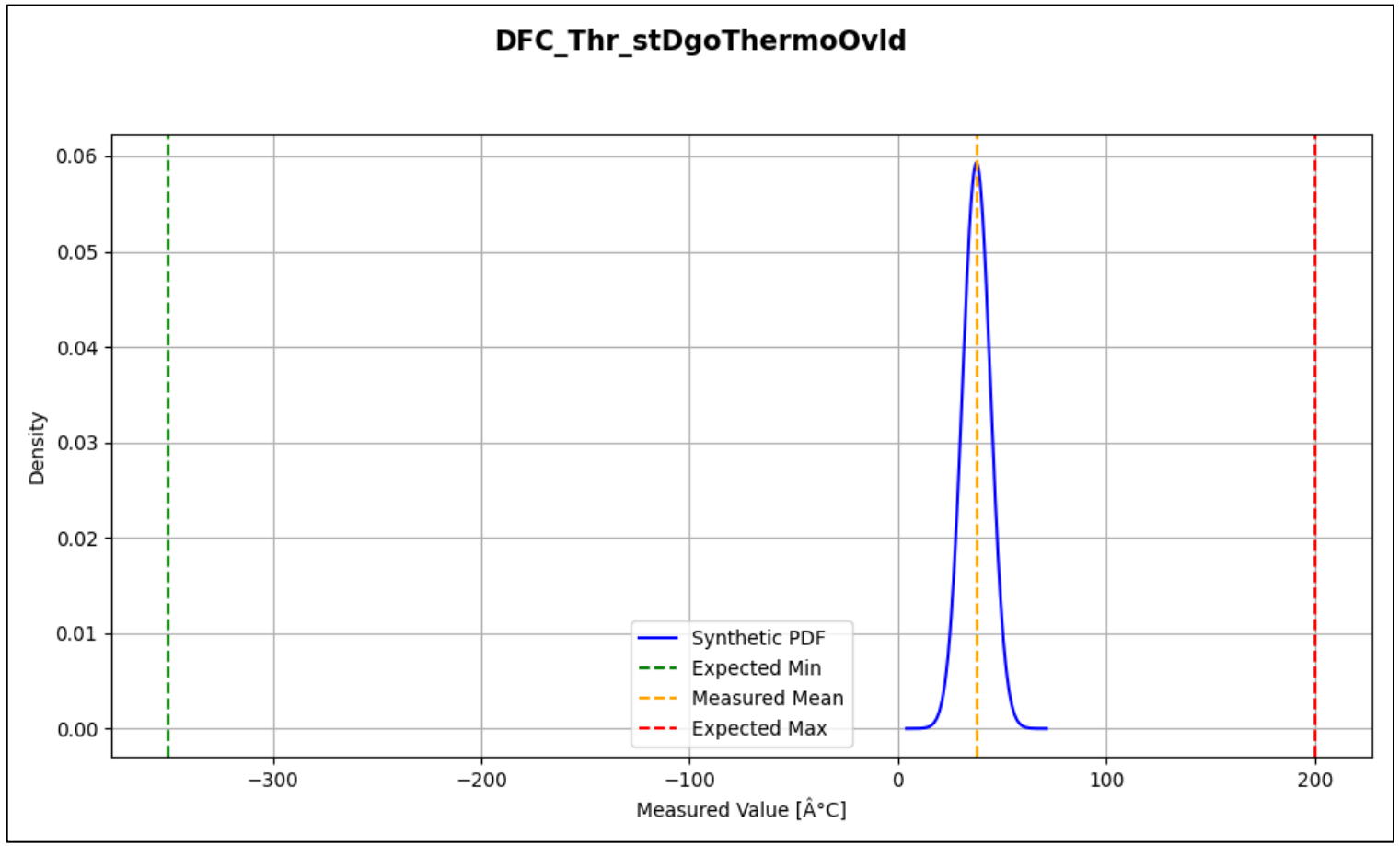
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_SysDiagOilPSnsrDriftPos` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 3.06 with a standard deviation of 0.17. Expected operational range is from -250.0 to 130.0. Observed values range between -250.0 and 130.0, indicating the signal's behavior under real conditions.
Threshold Value: P_oil > P_ref + 130 hPa

3. Robustness
Pressure readings stay well within expected bounds. Large margin confirms reliable discrimination between normal and drifted states..

EB2LTEM_AT6_CC21N4S001_IND_OBD

DFC_THR_STDGOTHERMOOVLD



DESCRIPTION

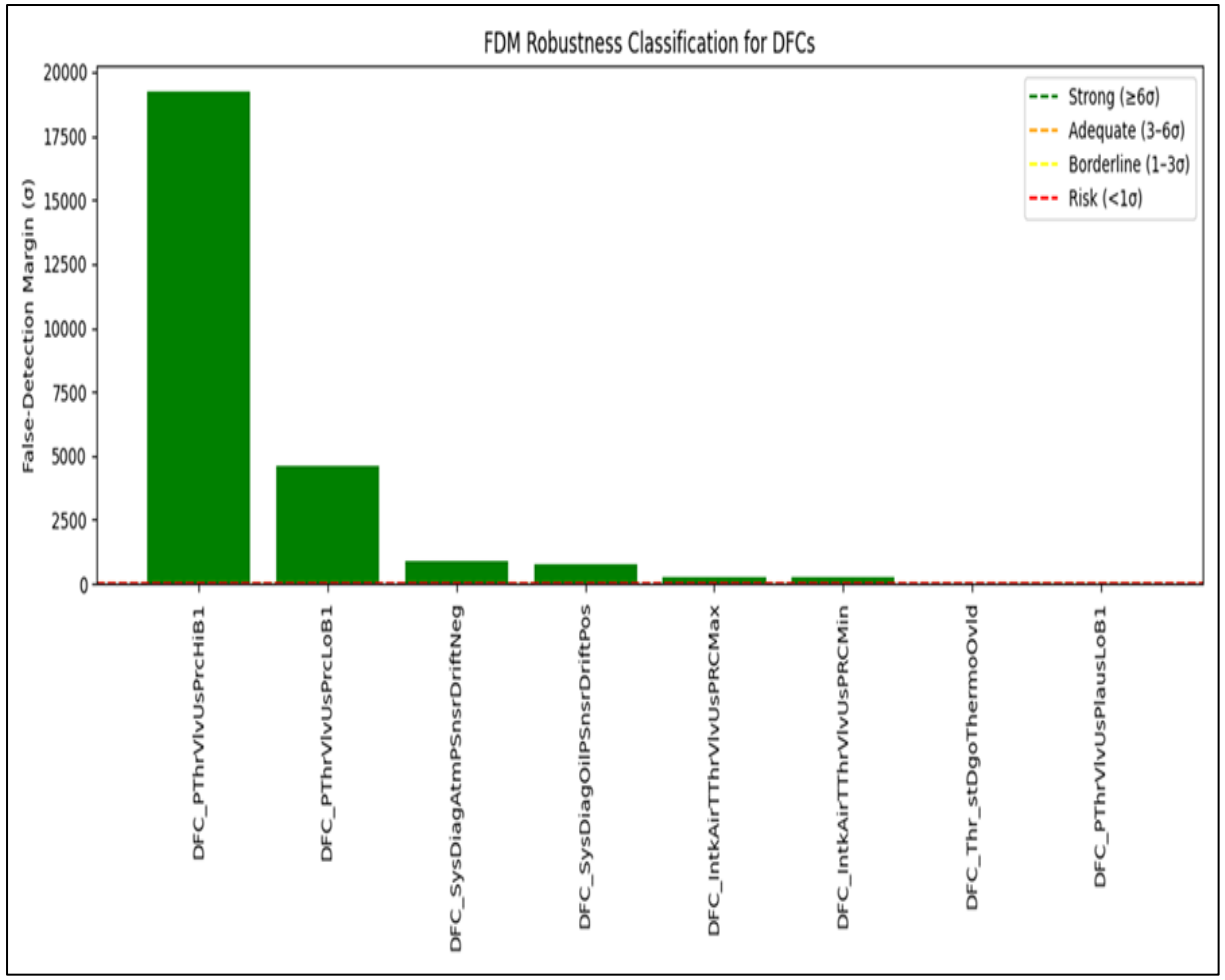
1. Diagnostic Purpose
This diagnostic monitors the signal `DFC_Thr_stDgoThermoOvld` to ensure it operates within expected thermal or pressure boundaries, aiding in fault detection and system reliability.

2. Signal Evaluation
The signal exhibits a mean of 37.73 with a standard deviation of 6.73. Expected operational range is from -350.0 to 200.0. Observed values range between -350.0 and 200.0, indicating the signal's behavior under real conditions.
Threshold Value: Throttle temp > 200°C

3. Robustness
Healthy operating range is far below over-temperature threshold. Statistical insulation ensures robustness across load and environmental cycles

EB2LTEM_AT6_CC21N4S001_IND_OBD

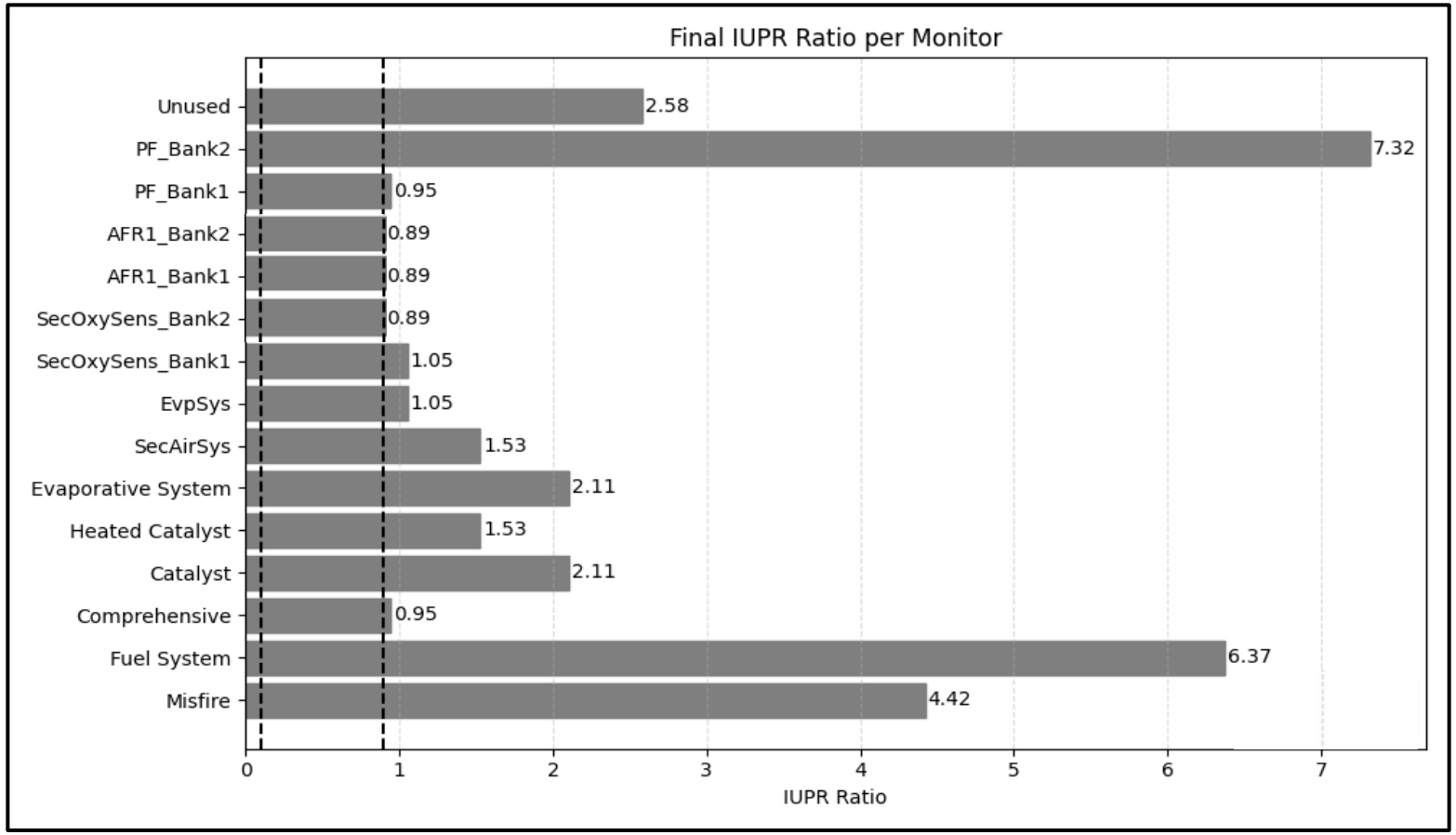
FDM ROBUSTNESS CLASSIFICATION



DFC	FDM	Robustness
DFC_IntkAirTThrVlvUsPRCMax	256.274	Strong
DFC_IntkAirTThrVlvUsPRCMin	242.067	Strong
DFC_PThrVlvUsPlausLoB1	1.4647	Borderline
DFC_PThrVlvUsPrcHiB1	19247.5	Strong
DFC_PThrVlvUsPrcLoB1	4580.5	Strong
DFC_SysDiagAtmPSnsrDriftNeg	930.056	Strong
DFC_SysDiagOilPSnsrDriftPos	752.201	Strong
DFC_Thr_stDgoThermoOvld	24.1141	Strong

EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR MONITORING SYSTEM



DESCRIPTION

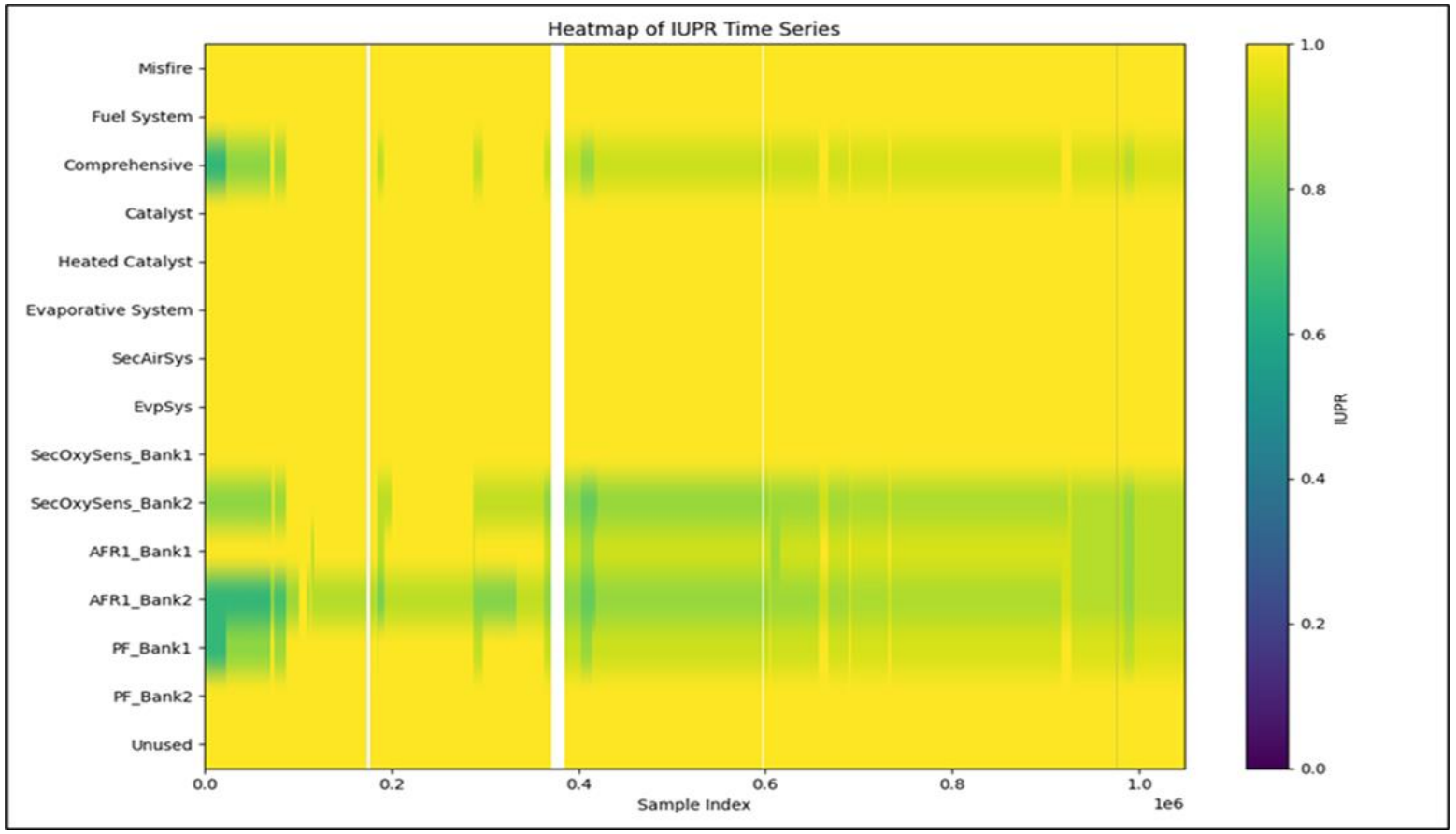
IUPR:

The In-Use Performance Ratio (IUPR) quantifies how many diagnostic tests a given OBD monitor has executed (ctNum) relative to its enable-condition opportunities (ctDenom).

$$\text{IUMPR} = \frac{Number\ of\ Monitoring\ Events}{Number\ of\ Driving\ Events}$$

EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR HEATMAP



DESCRIPTION

Heatmap – IUPR Progression vs Time

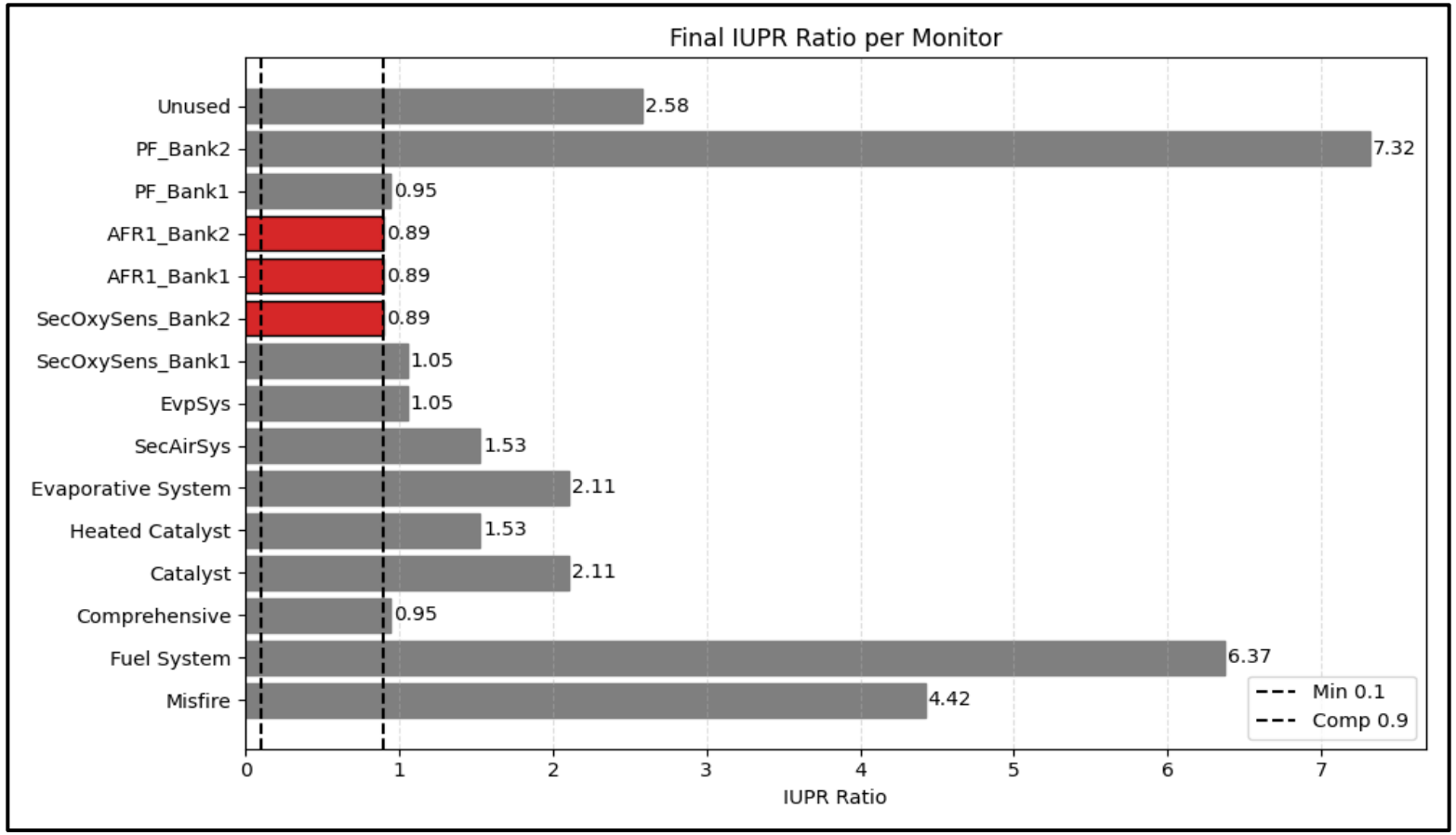
This heatmap visualizes the evolution of IUPR values across all monitored systems over the drive period.

- **Yellow bands** indicate monitors that achieved and maintained full readiness (IUPR ≥ 1.0), e.g., **Misfire**, **Fuel System**, **Evap System**.
- **Green zones** show delayed or gradual execution, notably in **AFR1_Bank2** and **SecOxySens_Bank2**.
- **Dark zones** represent extended inactivity or untriggered conditions.

Conclusion: Most monitors reached readiness early;

EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR HEATMAP



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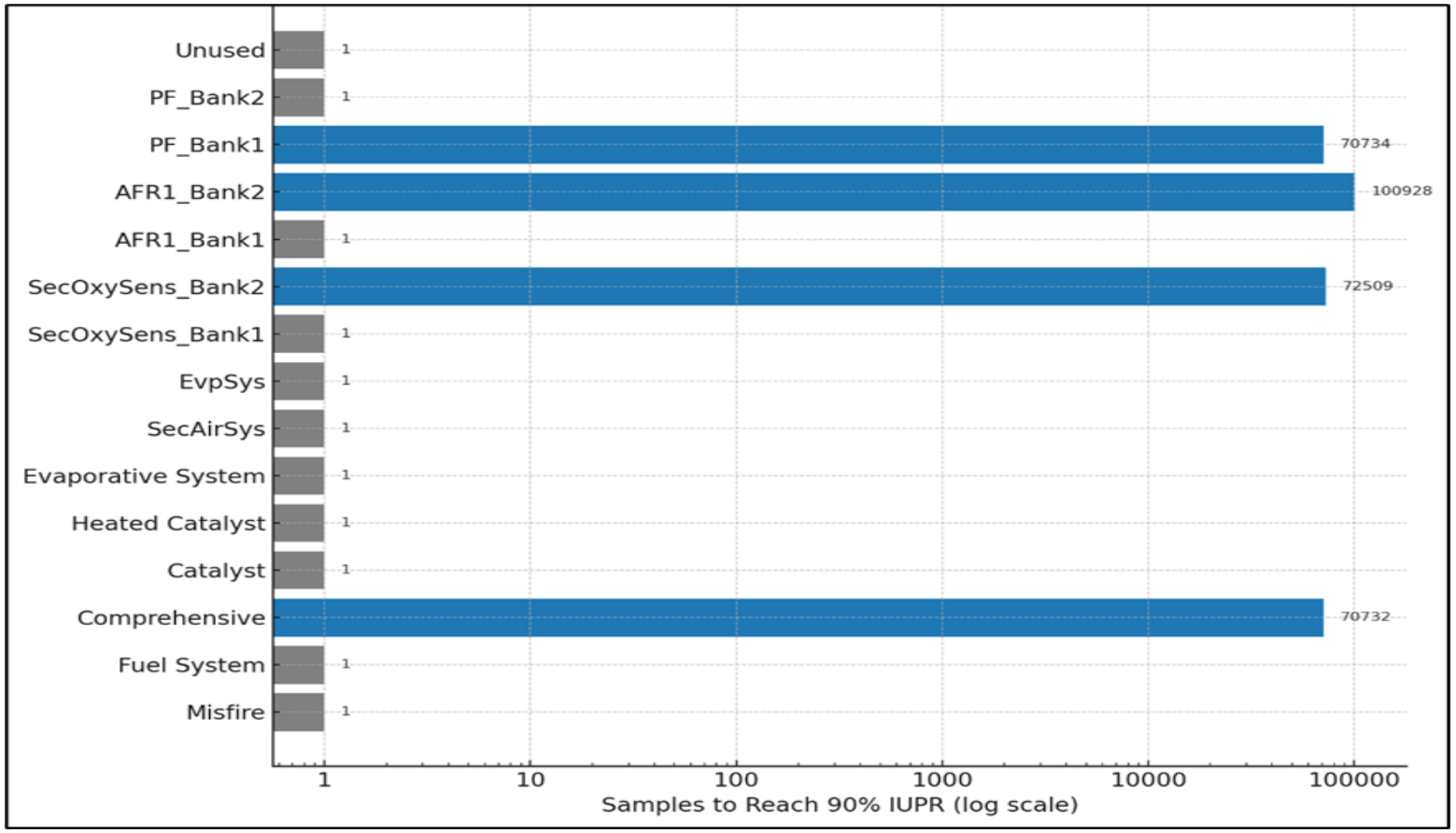
EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR SAMPLE TO 90%



DESCRIPTION

Samples to Reach 90% IUPR

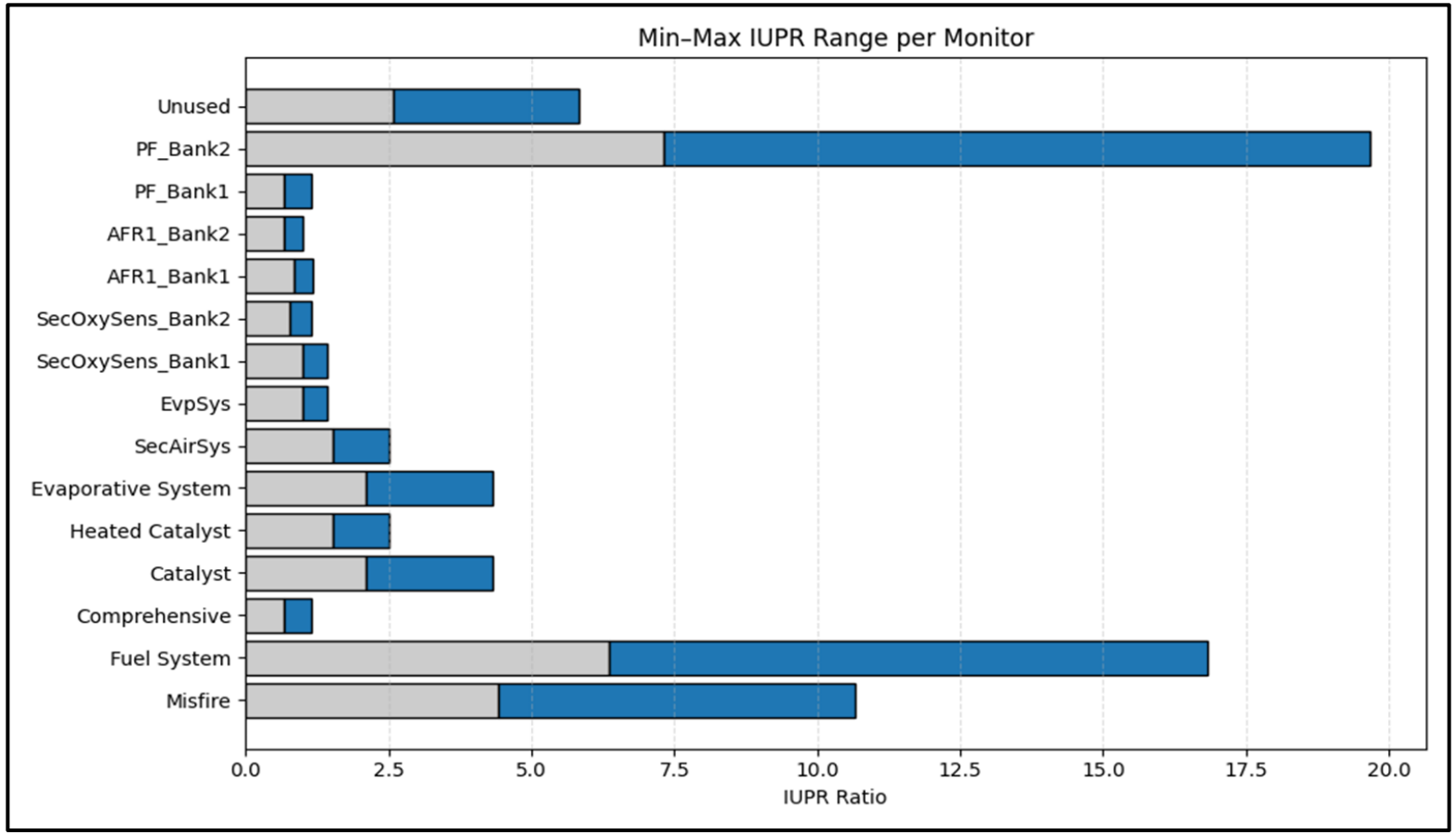
This log-scaled bar chart shows the number of samples required for each monitor to reach IUPR ≥ 0.90.

- **1 sample** implies immediate readiness.
- **Comprehensive**, **AFR1_Bank2**, and **SecOxySens_Bank2** required >70,000 samples — reflecting restrictive enablement conditions.

Conclusion: Most monitors are compliant early, to meet readiness.

EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR MIN MAX



DESCRIPTION

Min–Max IUPR Range per Monitor

This bar plot highlights the execution intensity per monitor.

- **Fuel System** and **Misfire** showed repeated runs (IUPR > 15), confirming frequent enablement.
- Monitors like **SecAirSys** and **Catalyst** also showed consistent coverage.
- **AFR and secondary O2 sensors** demonstrated lower IUPR growth, indicating limited triggering windows.

Conclusion: Diagnostic execution is robust for most monitors; specific monitors may benefit from drive cycle tuning for early readiness.

EB2LTEM_AT6_CC21N4S001_IND_OBD

IUPR MONITORING SYSTEM

Index	Label	Final IUPR	Pass/Fail
0	Misfire	4.42	Pass
1	Fuel System	6.37	Pass
2	Comprehensive	0.95	Pass
3	Catalyst	2.11	Pass
4	Heated Catalyst	1.53	Pass
5	Evaporative System	2.11	Pass
6	SecAirSys	1.53	Pass
7	EvpSys	1.05	Pass
8	SecOxySens_Bank1	1.05	Pass
9	SecOxySens_Bank2	0.89	Pass
10	AFR1_Bank1	0.89	Pass
11	AFR1_Bank2	0.89	Pass
12	PF_Bank1	0.95	Pass
13	PF_Bank2	7.32	Pass
14	Unused	2.58	Pass

DESCRIPTION

Pass/Fail Criterion

14 of 14 monitors met the threshold.

- **0.260** — Secondary air system monitors & other cold start related monitors
- **0.520** — Evaporative emission purge control monitors
- **0.336** — All other monitors

Ref AIS 175_D1, Appendix C7