

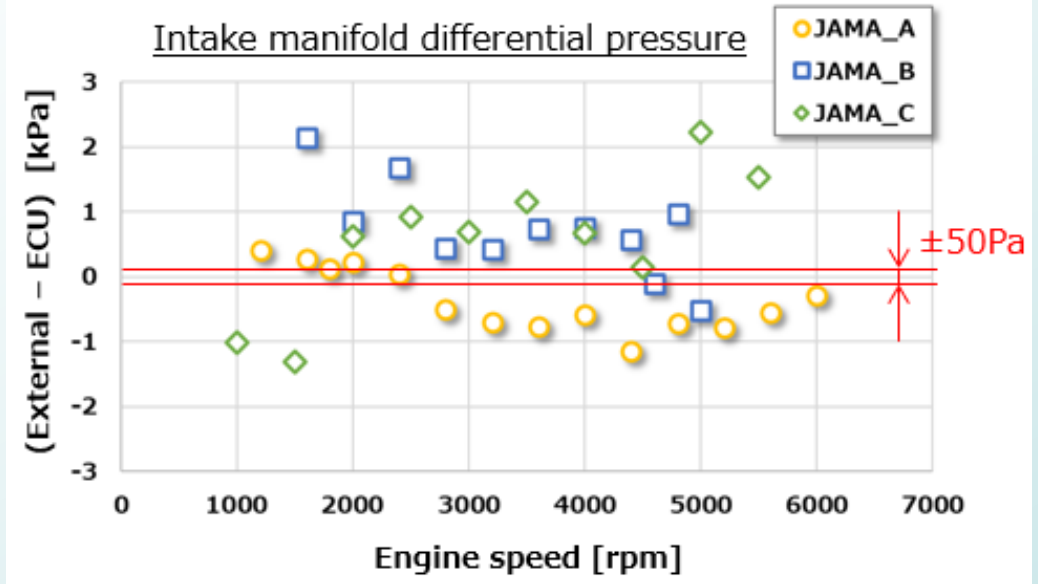
OICA comments on GTR 21
EVE-IWG #61
25.-26.04.2023

■ Revision proposal summary

- Current requirement : Measured using an external measuring instrument, accuracy requirement is $\pm 50\text{Pa}$
- Reason for Proposal : Processing is necessary for measurement, and considering the possibility of COP in the future, a method without processing is preferable.
- Proposal content : If $\pm 2\%$ accuracy guarantee compared to external measuring instruments is obtained, $\pm 50\text{ Pa}$ can be removed and replaced with ECU signal.

■ Accuracy verification result

This is the result of JAMA3 companies, verifying the difference between the external measurement device and the on-board data.



<Test conditions>

- Engine: Turbo-charged
- Injector: Flow central product for approval
- External sensor: Certified product for approval

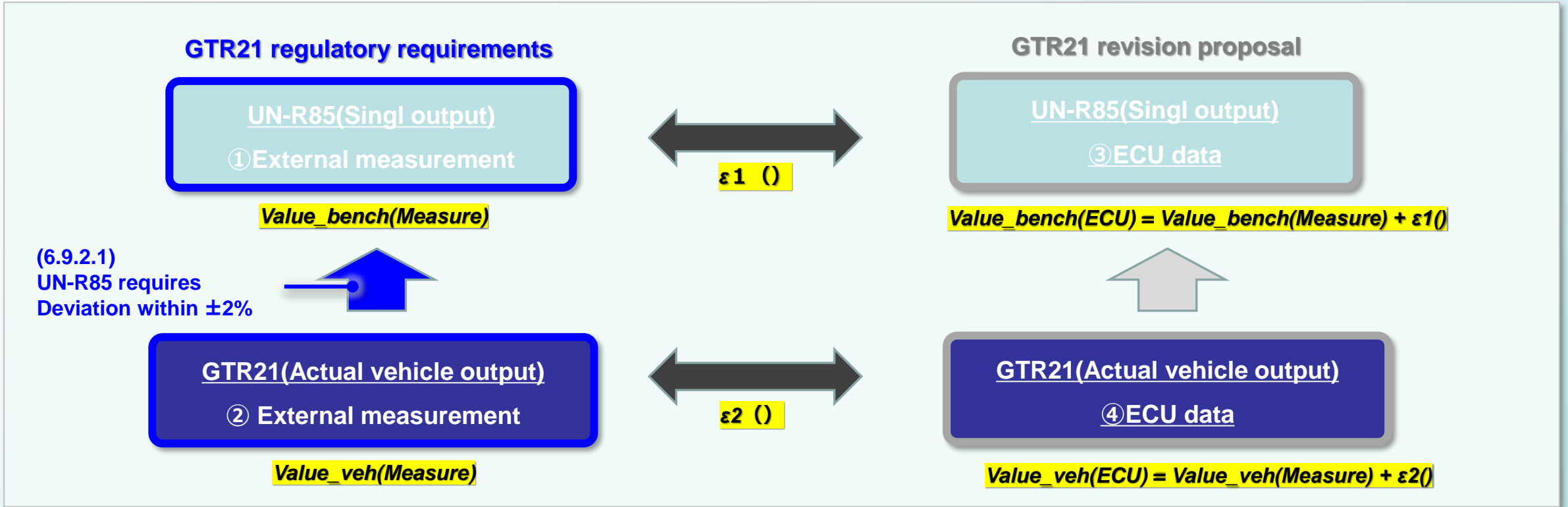
<Measurement point>

Stable flow rate with WOT for each rotation

The difference between the controlled external sensor and the ECU signal greatly exceeds the sensor accuracy requirement of $\pm 50\text{Pa}$.

■ ECU signal replacement logic proposal

Variation is defined by defining the difference between external measurement and ECU as ϵ



$$\text{Value_bench(Measure)} - \text{Value_veh(Measure)} = \text{Value_bench(ECU)} - \text{Value_veh(ECU)} + \underline{\underline{(\epsilon_1 - \epsilon_2)}}$$

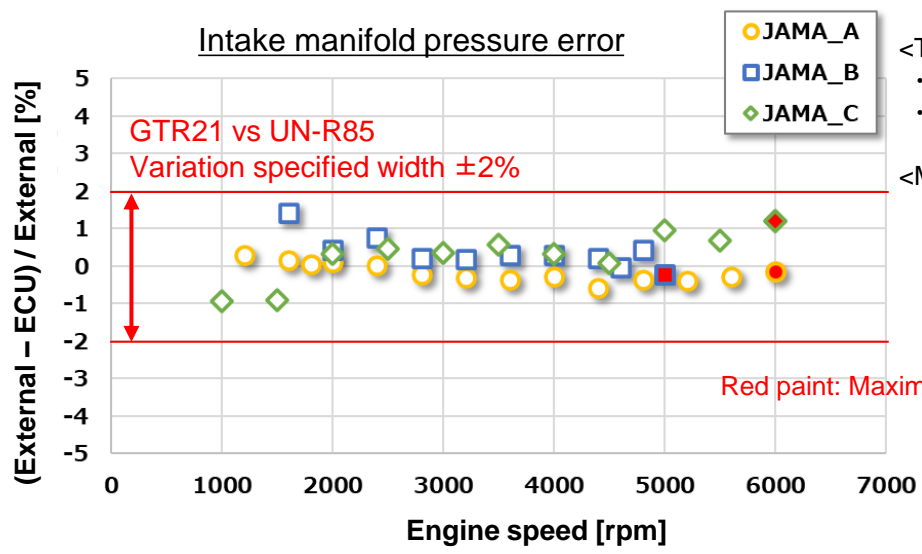
If $(\epsilon_1 - \epsilon_2) \approx 0$ then external measurements can be replaced with ECU signal values



Investigate the variation ϵ between the external measurement value and the ECU value

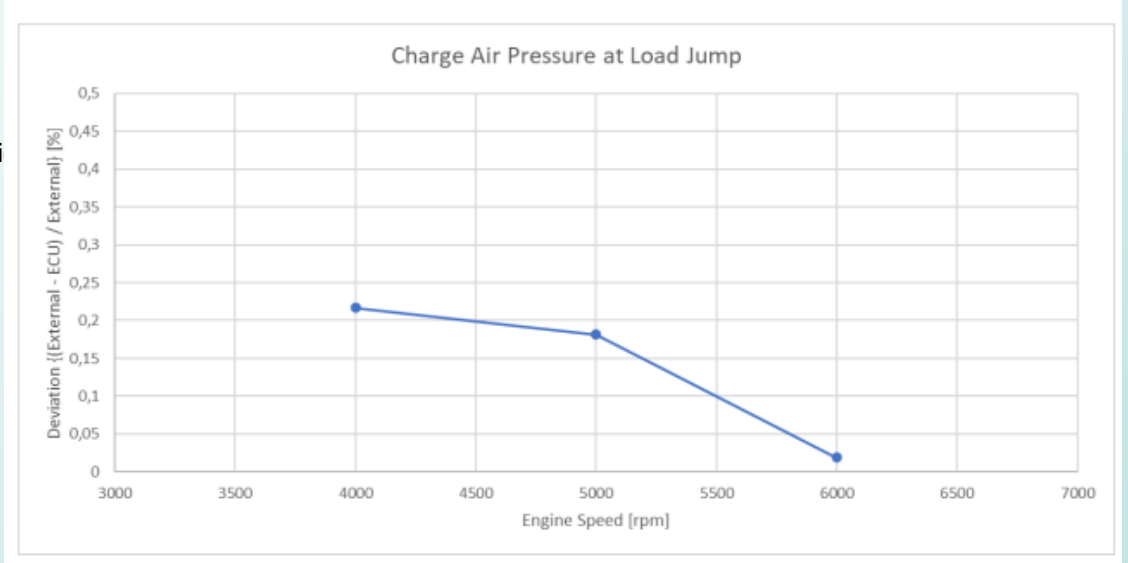
Pressure error between external measuring instrument and ECU signal value

■ UN-R85 variation result JAMA 3 company results



<Test conditions>
 • Engine: Turbo-charged
 • External sensor: Certified product for certification
 <Measurement point>
 Stable flow rate with WOT for each rotation

■ GTR21 variation result ACEA company result



Both UN-R85 and GTR21 results are within $\pm 2\%$ of variation between external measuring instrument and ECU value

Proposal

- The required accuracy of ± 50 Pa for intake manifold pressure does not need to be met if the variation is within $\pm 2\%$ by comparing the external sensor and ECU values, and the results can be used for those with the same on-board sensor system.
- The same on-board sensor system can be used for the comparison of variation between GTR21 and UN-R85 using ECU values that meet the above requirements.