AECD information RTDXC.660JET

AECD	Purpose	Sensed parameters (see footnote 2)			Actuators (see footnote 3)		Emission impact (NMOG, NOx, CO, PM)	Justification (choose at least one from footnote 1)	Comments to justification
		Sensed Parameter	Entry condition (when the AECD is operational)	Exit condition (when the AECD is not operational)	Actuator	Action			
Cold start/hot restart strategy	Fuel enrichment at cold start and hot restarts to prevent lean misfire and high Nox (see figure 5a.)Ignition is also used to aid warm up(Figure 5b).	Engine coolant temperature	< 83 °C	≥ 83 °C	Fuel injector	Increase quantity of fuel injected	None	A	This AECD is completely included in FTP test cycle, and it is only activated at cold-start (< 83 °C) and during hot restarts. Once engine is warmed up or is running after a hot restart, the AECD is deactivated. Additonal fuel is needed for cold start and also after hot restart due to fuel condensation when cold and evaporation when hot.
Stoichiometric Control	Delayed operation: Operates outside stoichiometric control to allow engine stabilisation for accuracy of O2 sensor feedback and emission control. Disabled off cycle to protect the engine from excessive heat.	Coolant temperature, throttle position, engine speed and time	Temperature: <20°C stoichiometric control is disabled but is restored once coolant temperature exceeds this threshold. At temperatures >20°C, the following delays are activated; delayed for 20 seconds after engine start, 0.1 seconds after an acceleration, 0.4 seconds after fuel cut. These delays do not operate at all at temperatures below 20 °C. Engine speed and throttle position: See table 1 below for operation area outside stoichiometric control.		Oxygen sensor	Relinquishes stoichiometric control	None	A,B	This AECD is substantially included in FTP test cycle for the various delays of operation described. Under harder accelerations where throttle openings are far higher than on the FTP test cycle, and at throttle angles above 50° which are typically only encountered during hard accelerations, we gradually move to richer AFR ratios. This is for thermal protection of the catalyst and other key components such as valves and valve seats. Our maximum exhaust gas temperature in the combustion chamber is 850 °C and our maximum catalyst temperature is 950 °C. If we were to maintain stoichiometric air fuel ratios then these temperatures would exceed the maximum levels whereby engine durability would be compromised to the point of damage, catalyst temperatures would rise to the point of damage and we would increase CO2 and fuel consumption due to also having to retard ignition timing to avoid knock, which would cause higher emissions again. It is not possible to accurately determine the effect on emissions but we would expect there to be an insignificant rise in all three pollutants. However, we respectfully submit that deviations from stoichiometric are always minimised to preserve consumer driven fuel consumption demands which are best served at 14.5:1.
Purge Control	Stops or modulates purging to maintain emissions and to prevent excessive catalyst temperature.	Engine Speed	See table 2 below		Evap Canister Purge valve	On/off or modulated	None	A, B	This AECD is substantially included in all parts of the FTP test cycle. Modulation of the purge rate is necessary to prevent excessively rich emissions when the engine is cold and during light throttle/low speed riding areas. There is also modulation to prevent step changes once the canister is empty and is no longer adding HC vapour to the engine.
		Throttle angle							
		Air temperature	≤ -10 °C and ≥ 80 °C	Between the temperatures specified left.					
		Engine coolant temperature	≤ 30 °C and ≥ 115 °C	Between the temperatures specified left.					

Secondary air injection strategy	Catalyst protection and NOx emissions control	Throttle angle	See Figure 5c below	SAI solenoid valve	Open/close	Prevention of excess NOx	A, B	SAI is fitted to control emissions during cold start and in low airflow conditions only. It is turned off at lower and higher throttle angles and engine speeds, all encountered during the test cycle to prevent catalyst temperatures exceeding 950 °C. It is also turned off as an emission control/reduction measure to prevent excessive NOx, as excess oxygen in these conditions will inhibit NOx conversion in the catalyst. Turning SAI off has no effect on CO and HC levels in these operational areas. SAI is operational for approximately 100% of the cycle.

Table 1 - stoichiometric control area (throttle angle vs RPM)

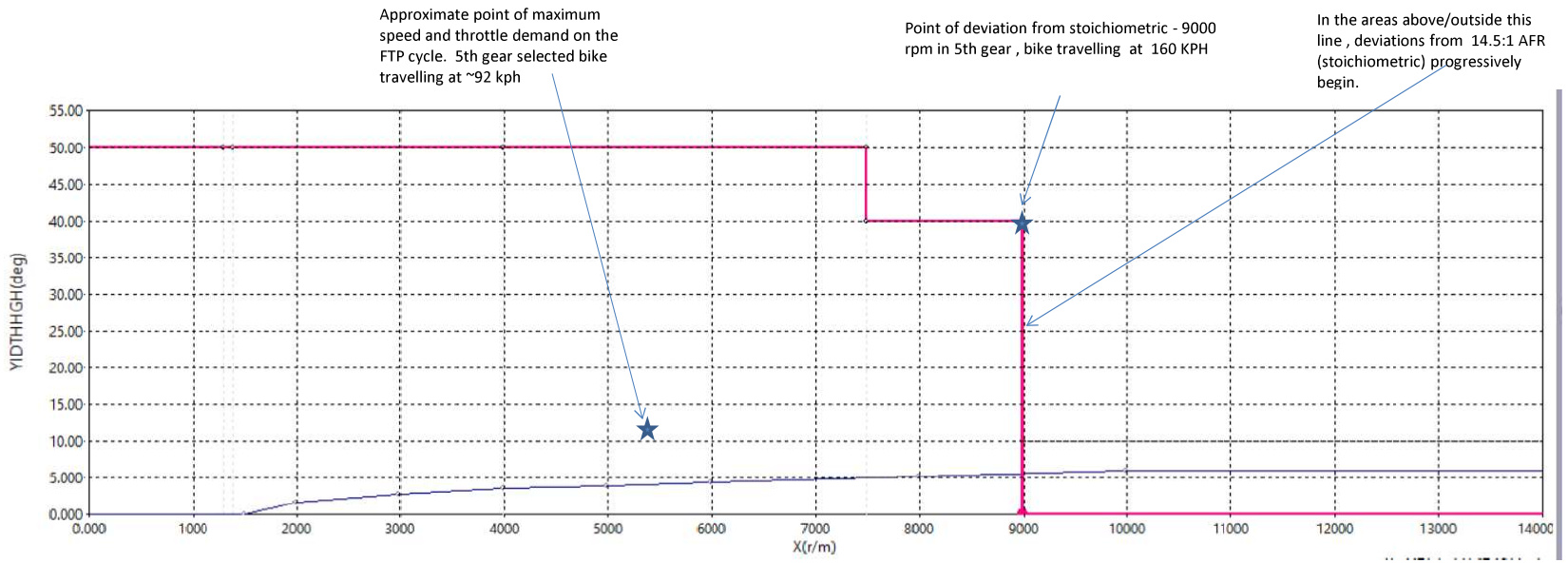

Table 2 - Purge Control

Throttle position (%)	Target PCV duty	Engine speed											
		800	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	10250
	0%	3.52	3.516	5.078	7.031	7.03	7.031	7.03	7.03	7.03	7.03	7.031	7.031
	6%	12.9	12.89	16.02	26.95	34.4	53.52	63.7	68	71.5	71.9	71.88	71.88
	13%	22.7	22.66	28.91	46.88	56.3	79.3	93.4	98.4	99.6	99.6	99.61	99.61
	31%	61.7	62.11	68.36	87.89	99.6	99.61	99.6	99.6	99.6	99.6	99.61	99.61
	63%	99.6	99.61	99.61	99.61	99.6	99.61	99.6	99.6	99.6	99.6	99.61	99.61
	75%	99.6	99.61	99.61	99.61	99.6	99.61	99.6	99.6	99.6	99.6	99.61	99.61
	88%	99.6	99.61	99.61	99.61	99.6	99.61	99.6	99.6	99.6	99.6	99.61	99.61
	100%	99.6	99.61	99.61	99.61	99.6	99.61	99.6	99.6	99.6	99.6	99.61	99.61

[1]. A.Substantially included in Federal emission testing (FTP test cycle) B. Protect vehicle/engine C. Doesn't go beyond engine start.

[2]. Enter all sensors that trigger activation of this AECD

[3]. Enter all actuators impacted by this AECD. Note that there is no significance to a sensor and an actuator being on the same line

Figure 5a

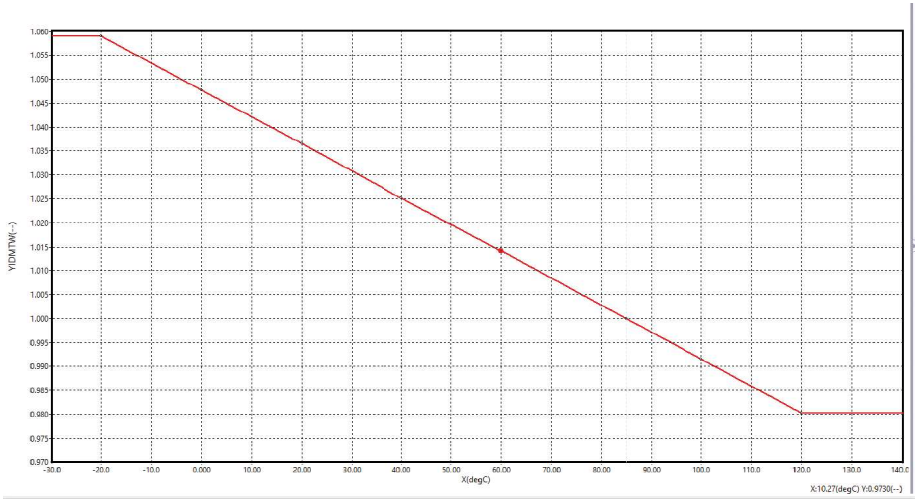

Figure 5b

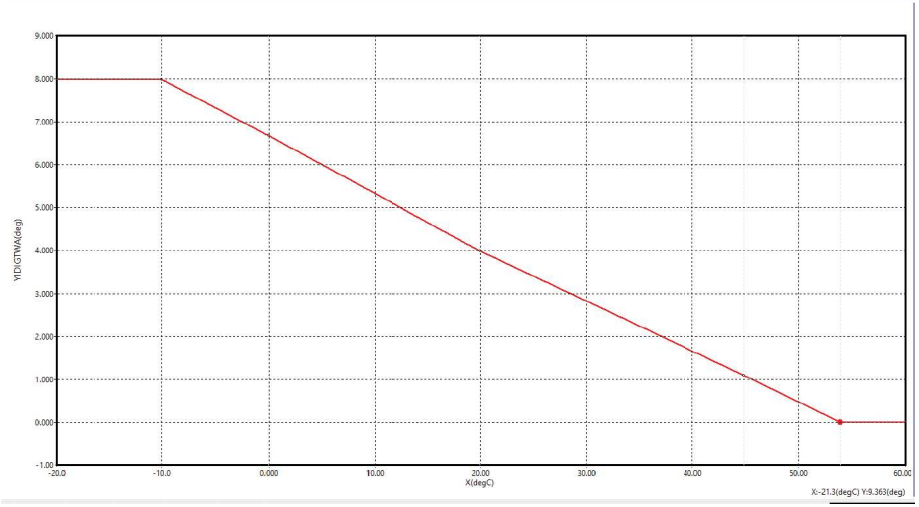

Figure 5c - Secondary air operational area (operational between red lines)