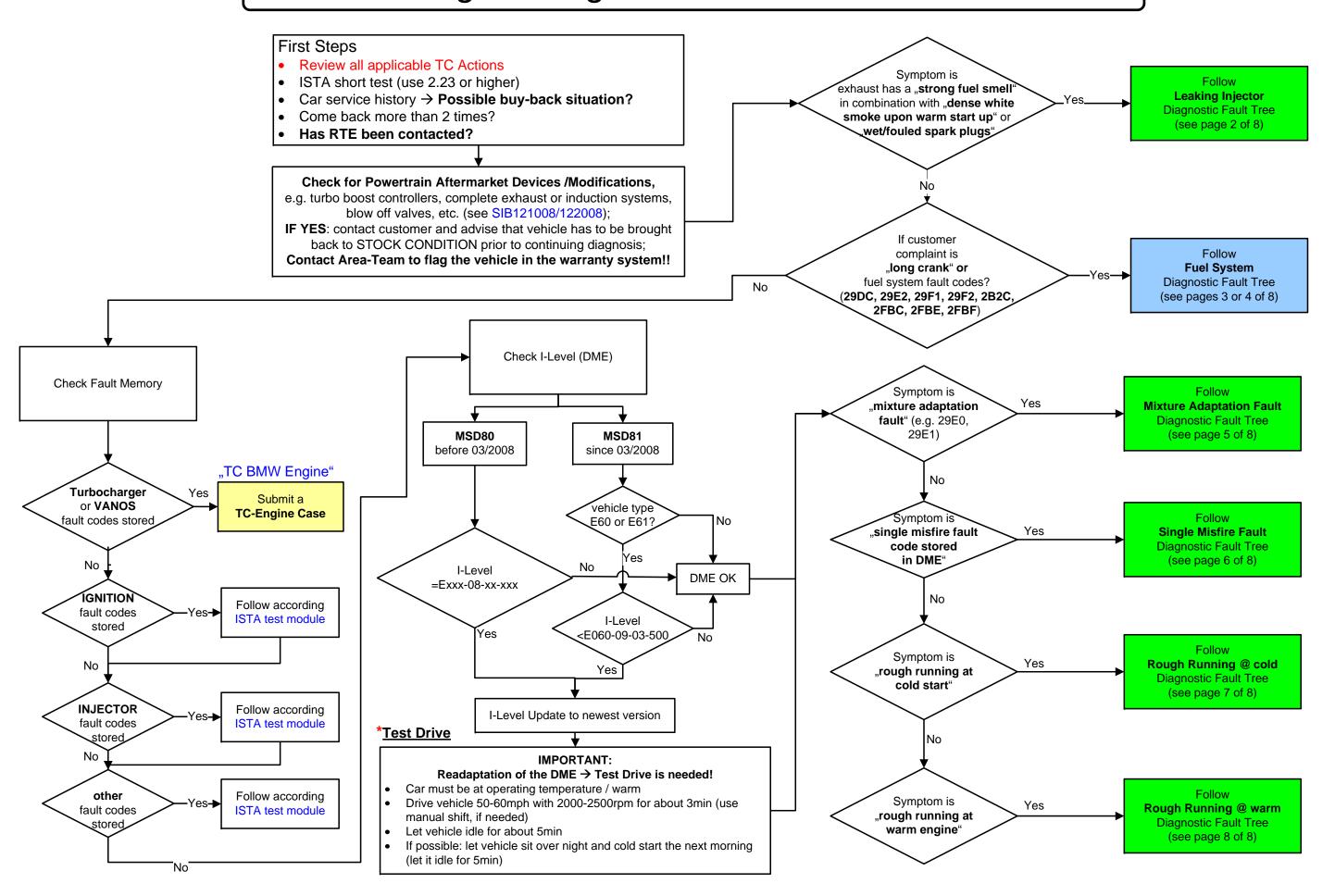
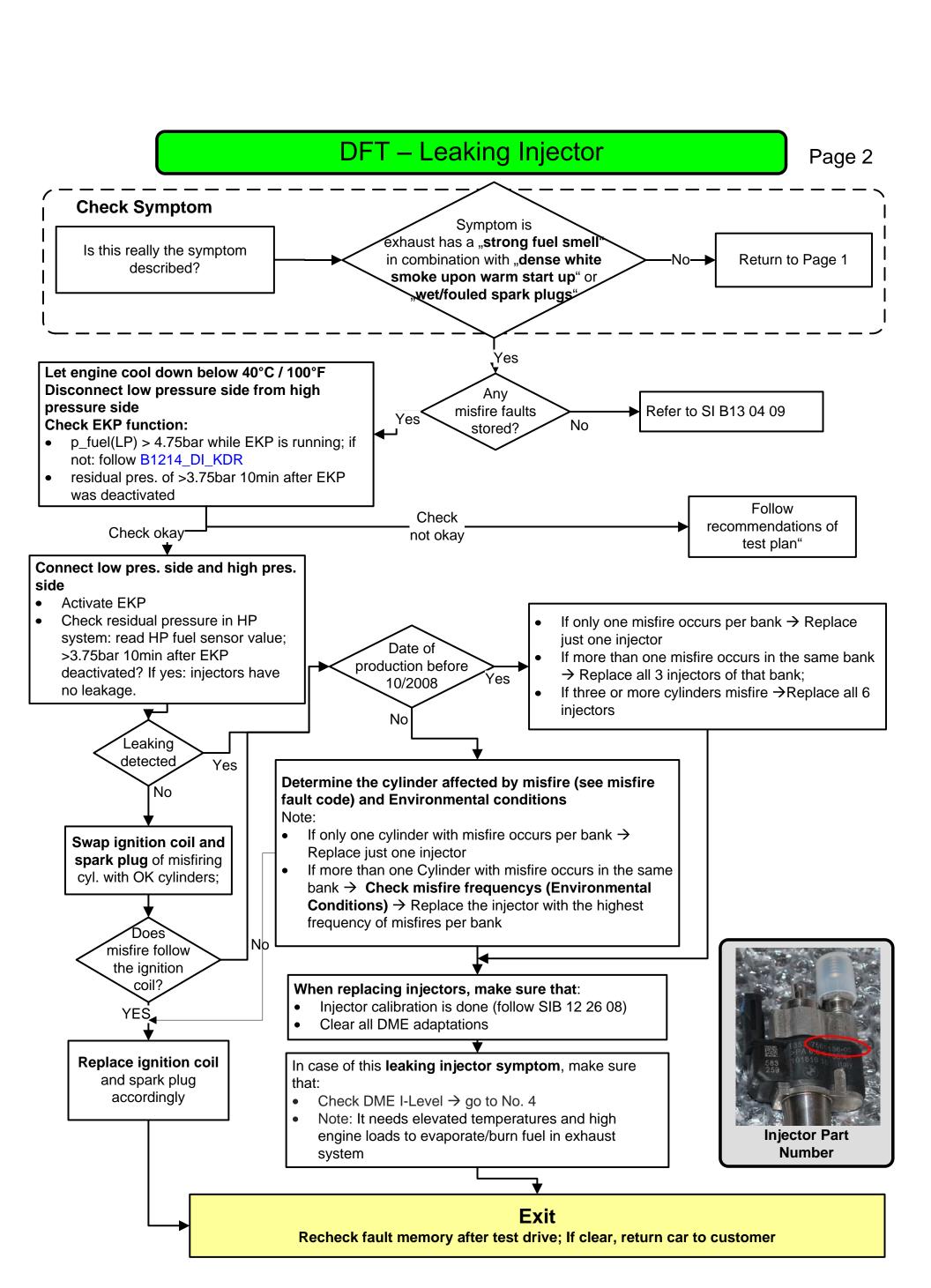
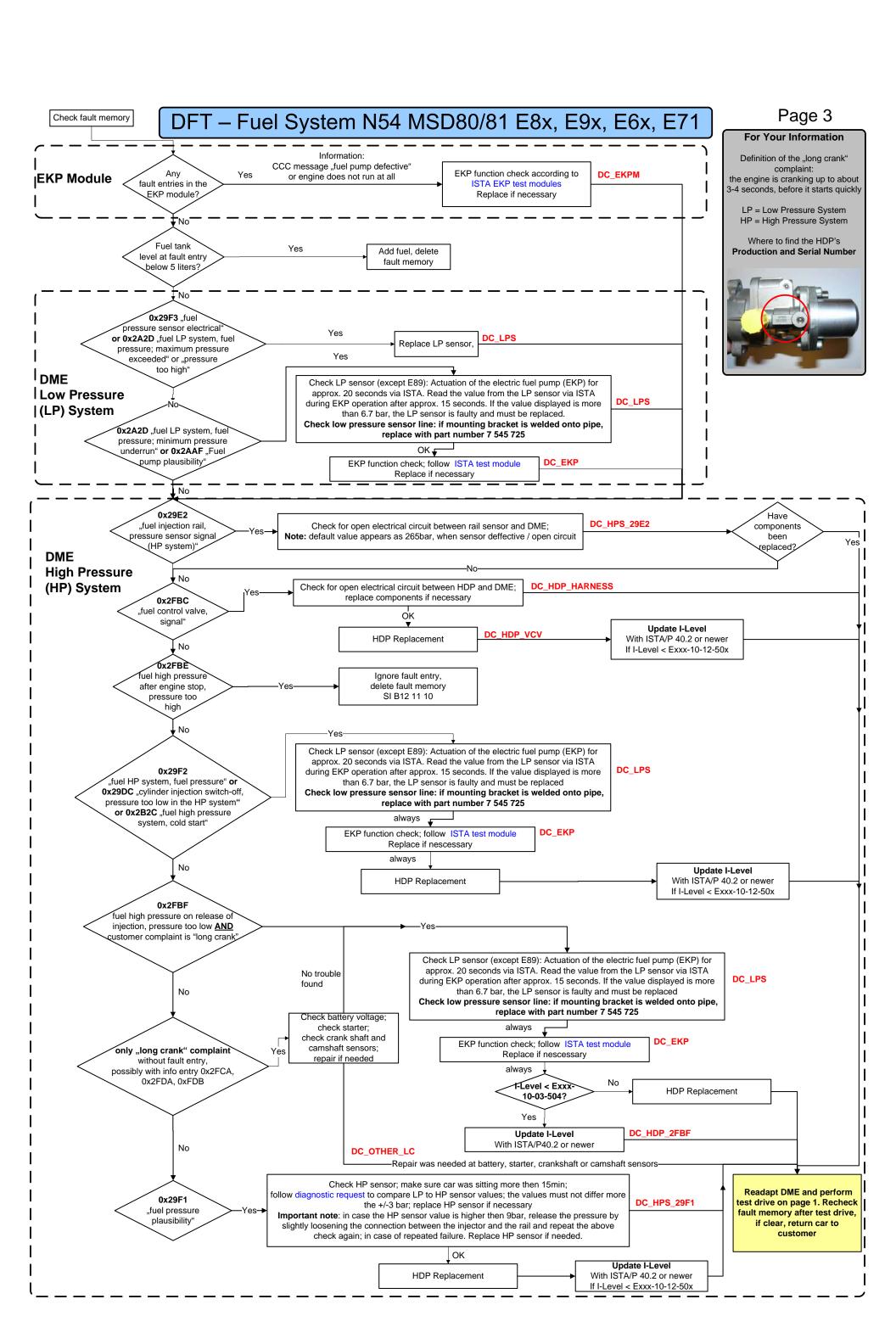
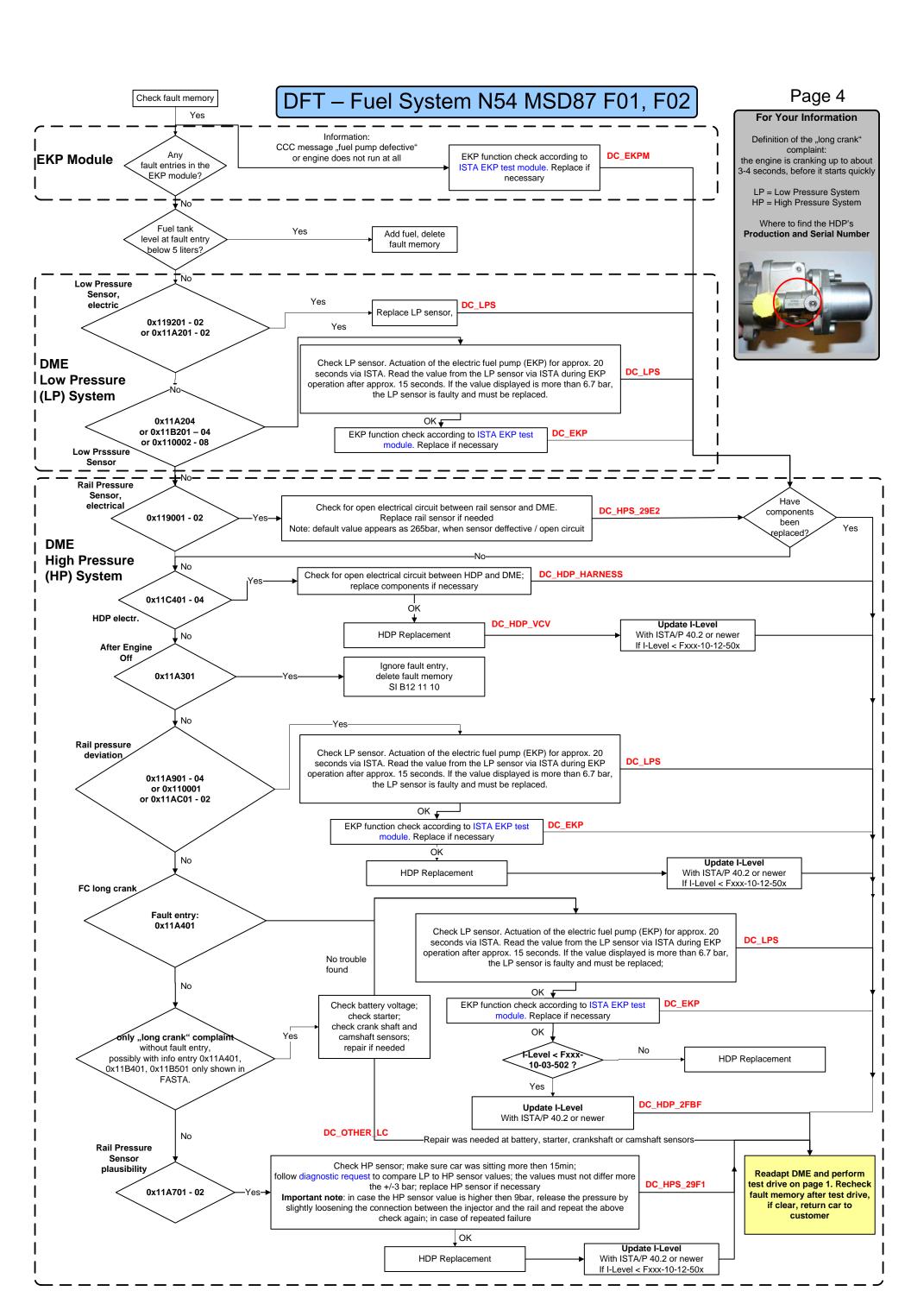
N54 Engine Diagnostic Fault Tree Version 01_06_11







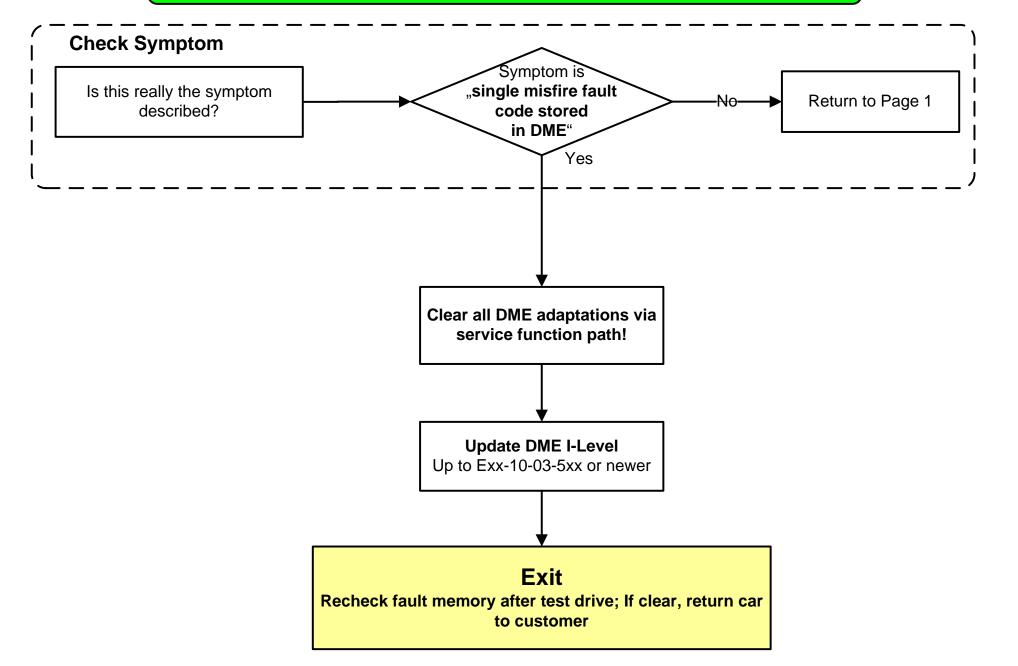


DFT – Mixture Adaptation Fault Page 5 **Check Symptom** Is **29E0**, **29E1** Is this really the symptom Return to Page 1 described? fault code stored? Yes Check environmental -Too Richconditions of fault code: -Too Lean Is it too Rich or too Lean? Check for possible rich conditions Visually check monoliths (borescope Check exhaust side on that bank if available), whether they are Smoke the exhaust system; search mechanically deteriorated; check for cracks/leakages and replace part fault memory for 29F4, 29F5 if needed "catalyst conversion" Are O2 sensors torqued correctly; Continue following DFT - Leaking *Submit TC case for replacement, if Injector on Page 2 needed DC_MIX_RICH DC_MIX_EXH **Check Fuel Quality** Check alcohol content following SIB 13 04 06; In case >15% → check fuel lines and connections for corrosion Refuel the car with known good gas Clear DME adaptations (doublecheck Readaptation of the DME with short test GT1) DC_MIX_FUEL → Test Drive is needed! Car must be at operating temperature / warm Drive vehicle 50-60mph with 2000-2500rpm for at least 3min (use manual shift, if needed) Perform at least 2-3 drive cycles if possible Let vehicle idle for about 5min Recheck mixture adaptation values (short test GT1) **Check Fuel Supply** Check crankcase ventilation pressure Check fault memory (history) for any indications of lean conditions, 29F2. Problem fixed? 29DC, 29F1, etc. Check FASTA Inspect the fuel tank for contamination data! like sand, grit, cloudy fuel, etc.; if yes Yes drain the fuel system and repair as needed DC_MIX_SUP

ExitRecheck fault memory after test drive; If clear, return car to customer

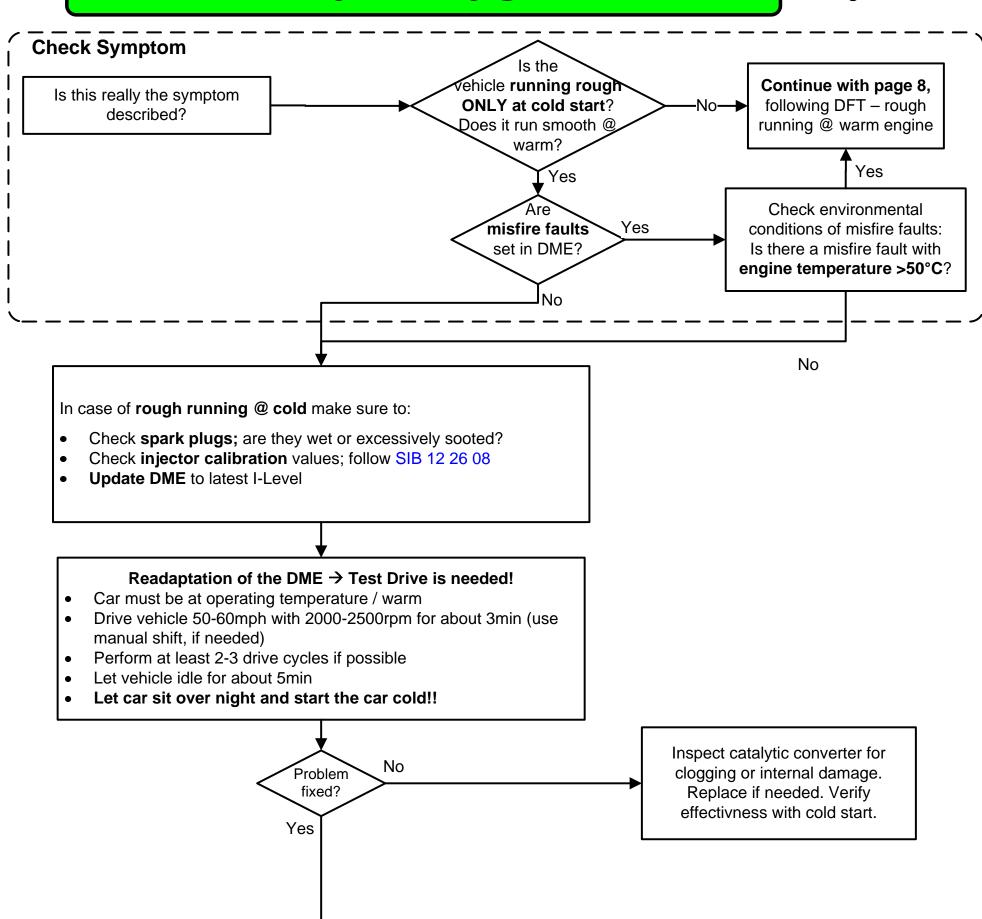
DFT – Single Misfire Fault

Page 6



DFT – Rough Running @ Cold Start

Page 7



Exit

Recheck Fault Memory after cold start;

If clear, return car to customer

DFT – Rough Running @ Warm Engine Page 8 **Check Symptom** Check environmental conditions Are Yes vehicle running ault codes 29E0 Is this really the symptom Yes of misfire faults: No misfire faults set or 29E1 set in described? rough with warm Are engine temperature <50°C in DME? DME? engine? for ALL misfire faults? Swap ignition coil and Yes No Yes No spark plug of misfiring cyl. with OK cylinders; Injector Part Continue with page 5, Continue with page 7, No Yes Is the visually check the coils Return to Page 1 following DFT - mixture following DFT - rough running @ Number SES light on? and plugs for burn marks adaptation fault cold start **IMPORTANT:** Test Drive is needed! Clear fault memory and Engine must be warm check if the misfiring Drive vehicle at different reoccurs loads and speeds! First Check: Recheck DME fault code; are there any other fault codes; if yes follow ISTA Swap injector from Does Clear fault memory and Replace ignition coil No misfire follow misfiring cylinder with Recheck DME I-Level (look at page1), update if needed check if the misfiring and spark plug the ignition injector from okay accordingly Check crankcase ventilation pressure following SIB 11 03 08; crankcase reoccurs cylinder ventilation pressure should be 9mbar (+/- 1mbar) Check cylinder compression / cylinder leak down at engine operating temperature with open throttle; follow RA 11 00 039 and SIB 11 13 06; Does nominal values 14...16 bar, deviation between cylinders not more than 2bar No Yes misfire follow (29psi); leak down exceeding 8% indicates problem; further determine ne injector whether it's caused by the intake, exhaust valves or piston rings If only one misfire occurs per bank → Replace Check spark plugs just one injector Date of Check vacuum lines, waste-gate solenoid valves of the turbochargers, etc. If more than one misfire occurs in the same bank production before → Replace all 3 injectors of that bank: 10/2008 If three or more cylinders misfire →Replace all 6 Check wirering harness between DME and injector / ingnition coil: injectors Electrical connection Corrosion open electrical circuit Determine the cylinder affected by misfire (see misfire higher electrical resistance fault code) and Environmental conditions When replacing injectors, make sure Check cylinder compression / cylinder leak down at engine operating temperature with open throttle; follow RA 11 00 039 and SIB 11 13 06; If only one cylinder with misfire occurs per bank \rightarrow Injector calibration is done (follow nominal values 14...16 bar, deviation between cylinders not more than 2bar Replace just one injector SIB 12 26 08) (29psi); leak down exceeding 8% indicates problem; further determine If more than one Cylinder with misfire occurs in the same Record injector part number in whether it's caused by the intake, exhaust valves or piston rings bank → Check misfire frequencys (Environmental PUMA case Check spark plugs Clear all DME adaptations **Conditions**) → Replace the injector with the highest frequency of misfires per bank Replace defective part if necessary Readaptation of the DME → Test Drive is needed! Car must be at operating temperature / warm Drive vehicle 50-60mph with 2000-2500rpm for about 3min (use manual shift, if needed) Exit Perform at least 2-3 drive cycles if possible Recheck Fault Memory after test drive; Let vehicle idle for about 5min If clear, return car to customer