ı	N٨	Р	Δ	C	Γ4.	U.	7	Q.	2
ı	IVI	г.	М	C	14.	v	1.	O.	_

Service

Chassis ID Path

284/Diagnostics//Engine control module (ECM), diagnostic trouble codes

Model Identity

140225418

Publish date ID/Operation

12/12/2017

Engine control module (ECM), diagnostic trouble codes

Note: More information about diagnostic trouble codes is available in Tech Tool.

Diagnostic	DTC Name	Failure Type	Pin on	Failure Description	Additional Information
Trouble			ECU		
Code					
P001676	Crankshaft	Wrong	A14.	Event:	Root Cause:
	Position -	Mounting	EA:45	Phase error due to incorrect angle	- Flywheel not
	Camshaft	Position	A14.	between cam and flywheel	correctly mounted
	Position		EA:46		
	Correlation			Behavior:	Workshop action:
				No information available	Check:
					– Flywheel
	Turbocharger	No Sub-type	N/A	Event:	Root Cause:
	/Supercharger	Information		Self calibration failure detected by	Calibration of
	Boost Control			Turbocharger/Supercharger A	Turbocharger
	"A" Position				/Supercharger A failed
	Exceeded			Behavior:	
	Learning Limit			No information available	Workshop action:
					Check:
					Calibration of
					Turbocharger
					/Supercharger A
P004607	Turbocharger	Mechanical	N/A	Event:	Root Cause:
	/Supercharger	Failures		Failure detected by Turbocharger	- Turbocharger
	Boost Control			/Supercharger A	/Supercharger A is
	"A" Circuit				not following
	Range			Behavior:	command
	/Performance			Low power	
					Workshop action:
					Check:
					- Turbocharger
					/Supercharger A
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P006964		Signal		Event:	Root Cause:
	Absolute	Plausibility	EA:22	Boost pressure compared to reference	- Sensor failure
	Pressure -	Failure		pressure below -15kPa	
	Barometric			OR	Workshop action:
	Pressure			Boost pressure compared to reference	Check:
	Correlation			pressure above 15kPa	– Sensor
				L	If fault is not detected:
				Behavior:	Fault trace according
D000	<u> </u>			No information available	to Tech Tool fault tree
	Turbocharger	No Sub-type	N/A	Event:	Root Cause:
	/Supercharger	Information		Low voltage detected by Turbocharger	Low voltage
	Boost Control			/Supercharger A	detected by
	A Supply			L	Turbocharger
	Voltage Circuit			Behavior:	/Supercharger A
				Low power	

P007015	Ambient Air Temperature Sensor A	Circuit short to battery or open	N/A	Event: Sensor voltage above 4.5V Behavior: No information available	Workshop action: Check: - Low voltage detected by Turbocharger /Supercharger A Root Cause: - Faulty sensor - Wiring harness - Ambient temperature below -30 degC (-22degF) Workshop action: Check:
P007164	Ambient Air	Signal	N/A	Event:	SensorWiring harnessAmbient temperatureRoot Cause:
	Temperature Sensor Range /Performance	Plausibility Failure		Difference during Precrank between mean value of (Engine Exhaust Temperature, HC Heat Temperature, DPF Temperature) and Ambient Air Temperature above 40°C Behavior: No information available	 Malfunctioning Ambient Air Temperature Sensor Workshop action: Check: Ambient Air Temperature Sensor If fault is not detected: Fault trace according to Tech Tool fault tree
	Ambient Air Temperature Circuit Low	No Sub-type Information	N/A	Event: Sensor voltage below 0.5 V Behavior: No information available	Root Cause: - Current above normal - Short circuit to ground Workshop action: Check: - Short circuit to ground If fault is not detected: Fault trace according to Tech Tool fault tree
P008700	Fuel Rail /System Pressure - Too Low Bank 1	No Sub-type Information	N/A	Event: The rail pressure below 260 bar above conditions must remain valid for 4s Behavior: Engine cranks but does not start	Root Cause: - Injector leakage - High pressure pipe leakage - Inlet metering valve with damaged connector/wiring harness - Bad fuel quality - Air leak in low

IMPACT 4.07.82 11/19/2020 pressure system Empty fuel tank High pressure pump damaged Low fuel pressure circuit Workshop action: Check: Any type of leak Inlet metering valve with connector /harness ⊢ Fuel quality and level High pressure pump - Low fuel pressure circuit If fault is not detected: Fault trace according to Tech Tool fault tree Event: P008A00 Low Pressure No Sub-type N/A Root Cause: Fuel System Information Aftertreatment 1 Fuel Pressure 1 below Fuel tank ventilation Pressure - Too (200kPa + Offset dependent on fuel clogged or stuck Low value and Engine Speed) closed OR Fuel leak, e.g. Aftertreatment 1 Fuel Pressure 1 below leaking fuel lines (100kPa + Offset dependent on fuel Air ingress in lowvalue and Engine Speed) pressure circuit AHI fuel pressure Behavior: sensor malfunction No information available Clogged fuel filter, if the pressure sensor is placed between the fuel pump and the fuel filter Fuel pump malfunction Overflow valve stuck open Workshop action: Check: Fuel tank ventilation Fuel leak, e.g. leaking fuel lines - Air ingress in lowpressure circuit AHI fuel pressure sensor - Fuel filter

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

P008B00 Low Pressure

No Sub-type

N/A

Event:

- Fuel pump - Overflow valve

Root Cause:

		Fuel System Pressure - Too High	Information		Aftertreatment 1 Fuel Pressure 1 above (700kPa + Offset dependent on fuel value and Engine Speed) Behavior: No information available	stuck closed - Low Pressure - Fuel System Pressure Sensor malfunction (if this sensor is used) - Exhaust Aftertreatment Fuel Pressure Sensor malfunction (if this	
						workshop action: Check: - Overflow valve - Low Pressure - Fuel System Pressure Sensor (if this sensor is used) - Exhaust Aftertreatment Fuel Pressure Sensor (if this sensor is used) If fault is not detected: Fault trace according	
						to Tech Tool fault tree	
	P009400	Fuel System Leak Detected - Small Leak	No Sub-type Information		Event: During engine shutdown, an abnormal fuel pressure drop in the rail is observed during evaluation period Behavior: No information available	Root Cause: - Leaking fuel pressure release valve - Leaking high pressure fuel system - Rail fuel pressure sensor	
						Workshop action: Check: - Fuel pressure release valve - High pressure fuel system - Rail fuel pressure sensor If fault is not detected: Fault trace according to Tech Tool fault tree	
	P009513	Intake Air	Circuit Open	A14.	Event:	Root Cause:	
		Temperature			Voltage on A:47 above 4.91V	- Wiring harness fault	
		Sensor 2 Bank			OR	– Sensor fault	
		1			Voltage on A:47 above 0.15V	– ECU fault	
					and Voltage on A:47 below 0.29V	Workshop action: Check:	
С	ppyright to this d	ocumentation belongs t	b the Volvo Group. I	No reprodu	 ction, copying, change, amendment or other similar dispo		c

				Behavior:	- Wiring harness
				No information available	– Sensor
					– ECU
P009664	Intake Air	Signal	A14.	Event:	Root Cause:
	Temperature	Plausibility		Difference during Precrank between	Malfunctioning
	Sensor 2	Failure		Boost Temperature and mean value of	Intake Manifold Air
	Circuit Range			(EGR Temperature, Compressor	Temperature Sensor
	/Performance			Temperature, Engine Coolant	Tomporator o consor
	(Bank 1)			Temperature) above 40°C	Workshop action:
					Check:
				Behavior:	- Intake Manifold Air
				No information available	Temperature Sensor
P009700	Intake Air	No Sub-type	Λ14	Event:	Root Cause:
F009700	Temperature	Information		Voltage on A:47 below 0.15V	Wiring harness fau
	Sensor 2	IIIIOIIIIalioii	LA.47	Voltage of A.47 below 0.13V	- Sensor fault
				Behavior:	- ECU fault
	Circuit Low				- ECO fault
	(Bank 1)			No information available	Mandada a a attana
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P009A00	Engine Air	No Sub-type		Event:	Root Cause:
	Intake	Information	EA:47	Difference between Sensed Boost	- Temperature sense
	Temperature -			Temperature and Modeled Boost	drifting
	Correlation			Temperature below -45°C	- Temperature sense
				OR	biased high or low
				Difference between sensed boost	- Temperature sense
				temperature and modeled boost	broken
				temperature above 45°C	
					Workshop action:
				Behavior:	Check:
				No information available	- Temperature sense
					If fault is not detected
					Fault trace according
					to Tech Tool fault tre
P009B13	Fuel Pressure	Circuit Open	A14.	Event:	Root Cause:
	Relief Control		EA:17	Either short circuit to battery, or open	- Open circuit in
			1	circuit is detected	wiring harness,
			EA:18		actuator or connecto
				Behavior:	- Short circuit to
				Engine derate	battery wiring
					harness, actuator or
					connector
					3333(0)
					Workshop action:
					Check:
					- Wiring harness
					- Actuator
7000000	E I D	N- C I I	A 4 4	F	- Connector
	Fuel Pressure	No Sub-type		Event:	Root Cause:
	Relief Control	Information	1	Short circuit to ground is detected	Wiring harness,
	Circuit Low		A14.		actuator or connecto

I	I		□ Λ.40	Behavior:	is short circuited to
			EA. 10	Engine derate	ground voltage
				Engine derate	ground voitage
					Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
POOODOO	Fuel Pressure	No Sub-type	Λ11	Event:	Root Cause:
Puusbuu	Relief Control	Information			– Wiring harness,
		IIIIOIIIIalioii	A14.	Short circuit to battery is detected	actuator or connector
	Circuit High			Behavior:	is short circuited to
			EA. 10		
				Engine derate	battery voltage.
					Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
D000E70	Fuel Pressure	Actuator	N/A	Event:	Root Cause:
F009E/3	Relief Control	Stuck Closed		Fuel Pressure Relief Valve is	- Fuel Pressure Relief
	Performance /	Stuck Closed			Valve stuck closed
				considered stuck closed when the fuel	
	Stuck Off			rail pressure deviates from the	- Fuel Pressure Relief
				expected after a requested opening of	Valve wiring harness
				the valve	or connector
				D. L. C.	- Injection Pump Fuel
				Behavior:	Valve stuck open
				Engine derate	- Injection Pump Fuel
					Valve wiring harness
					or connector
					– Rail Pressure
					Sensor faulty
					Workshop action:
					Check:
					– Fuel Pressure Relief
					Valve
					- Injection Pump Fuel
					' '
					Valve
					- Rail pressure sensor
					– Wiring harness and
					connector
					If fault is not detected:
					Fault trace according
DOOAFOO	Turbasharra	No Cub #	N1/A	Events	to Tech Tool fault tree
PUUAFU0	Turbocharger	No Sub-type	N/A	Event:	Root Cause:
	/Supercharger	Information		Internal failure detected by	- Internal actuator
	Boost Control			Turbocharger/Supercharger A	fault in Turbocharger
	"A" Module			Daharian.	/Supercharger A
	Performance			Behavior:	AA/a-da-la-
				Low power	Workshop action:
					Check:
haveight to this s		 		lction, copying, change, amendment or other similar dispo	– Turbocharger

					/Supercharger A If fault is not detected: Fault trace according to Tech Tool fault tree
P00C600	Fuel Rail Pressure Too Low - Engine Cranking	No Sub-type Information	N/A	Event: The rail pressure during cranking phase below 285 bar above conditions must remain valid for 15s Behavior:	Root Cause: - Injector leakage - High pressure pipe leakage - Inlet metering valve with damaged
				Engine cranks but does not start	connector/wiring harness - Bad fuel quality - Air leak in low pressure system - Empty fuel tank - High pressure pump damaged - Low fuel pressure circuit
					Workshop action: Check: - Injector - High pressure pipe - Inlet metering valve with connector/wiring
					- Bad fuel quality - Air leak in low pressure system - Empty fuel tank - High pressure pump - Low fuel pressure circuit
P010513	Manifold Absolute Pressure /Barometric Pressure Sensor	Short Circuit to Battery		Event: Voltage on A:22 above 4.70V and Voltage on A:22 below 4.85V OR Voltage on A:22 below 0.29V	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action:
				Behavior: No information available	Check: - Wiring harness - Sensor - ECU
P010800	Manifold Absolute Pressure /Barometric Pressure Sensor Circuit	No Sub-type Information		Event: Voltage on A:22 above 4.85V Behavior: No information available	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action:
opyright to this o	High	to the Volvo Group	No reprodu	ction, copying, change, amendment or other similar dispos	Check: - Wiring harness

					– Sensor – ECU
P011013	Intake Air	Circuit Open	A14.	Event:	Root Cause:
1011010	Temperature	Ondan Open	1	Voltage on B:43 above 0.75V	Wiring harness fault
	Sensor 1 Bank			OR	- Sensor fault
	1			Voltage on B:43 above 0.06V and	ECU fault
				voltage on B:43 below 0.17V	L
				L	Workshop action:
				Behavior:	Check:
				No information available	- Wiring harness - Sensor
					- ECU
P011164	Intake Air	Signal	1	Event:	Root Cause:
	Temperature	Plausibility	EB:43	Difference during Precrank between	- Malfunctioning
	Sensor 1	Failure		Compressor Temperature and mean	Compressor
	Circuit Range			value of (EGR Temperature, Engine	Discharge
	/Performance Bank 1			Coolant Temperature, Boost Temperature) above 40°C	Temperature Sensor
					Workshop action:
				Behavior:	Check:
				No information available	- Compressor
					Discharge
					Temperature Sensor
					If fault is not detected
					Fault trace according
					to Tech Tool fault tree
P011200	Intake Air	No Sub-type	A14.	Event:	Root Cause:
	Temperature	Information		Voltage on B:43 below 0.06V	- Wiring harness faul
	Sensor 1				- Sensor fault
	Circuit Low Bank 1			Behavior: No information available	– ECU fault
	Dank i				Workshop action:
					Check:
					- Wiring harness
					- Sensor
					– ECU
D011513	Engine Coolant	Circuit Open	A14.	Event:	Root Cause:
1 011010	Temperature	Circuit Open		Voltage on B:27 above 4.91V	- Wiring harness faul
	Sensor 1		LD.21	OR	- Sensor fault
	Derisor 1			Voltage on B:27 above 0.15V and	– ECU fault
				voltage on B:27 above 0.13V and voltage on B:27 below 0.23V	- LOO lault
				Voltage on b.27 below 0.23V	Workshop action:
				Behavior:	Check:
				No information available	- Wiring harness
				available	- Sensor
					– ECU
D01162A	Engine Coolert	Signal Study	A14.	Event:	Root Cause:
CUTIOZA	Engine Coolant	-	1		
	Temperature	In Range	CD.21	Difference during Precrank between	– Malfunctioning
	Circuit Range /Performance			Engine Coolant Temperature and mean	•
	yrenomiance			value of (EGR Temperature, Compressor Temperature, Boost	temperature sensor
				Temperature) above 40°C	Workshop action:
				, , , , , , , , , , , , ,	Check:
	1	I	I		1

	I	l		Behavior:	Engine coolant
				Engine cooling fan does not shut off	temperature sensor
				Engine does not reach normal	If fault is not detected:
				operating temperature	Fault trace according
					to Tech Tool fault tree
				Engine cooling fan inoperative Engine overheating	to recir roomault free
P011700	Engine Coolant	No Sub-type	A14.	Event:	Root Cause:
	Temperature Circuit Low	Information	EB:27	Voltage on B:27 below 0.15V	Wiring harness faultSensor fault
				Behavior:	– ECU fault
				No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P012200	Throttle/Pedal	No Sub-type	N/A	Event:	Root Cause:
	Position Sensor	1		Sensor voltage below 0.38 V	- Throttle/Pedal
	/Switch "A"	Imormation		Consol voltage solow c.co v	Position Sensor
	Circuit Low			Behavior:	/Switch "A" input is
	on our Low			Poor accelerator pedal response	short to ground
				l cor accelerator pedar response	- Throttle/Pedal
					Position Sensor
					/Switch "A" input is
					open circuit
					– Pedal is broken
					- r edaris brokeri
					Workshop action:
					Check:
					- Throttle/Pedal
					Position Sensor
					/Switch "A"
					– Pedal
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P012300	Throttle/Pedal	No Sub-type	N/A	Event:	Root Cause:
1 0 12000	Position Sensor	1	'\\/\	Sensor voltage above 4.25 V	- Throttle/Pedal
	/Switch "A"	Imormation		Consol voltage above 4.25 v	Position Sensor
	Circuit High			Behavior:	/Switch "A" input is
	Olicult Flight			Poor accelerator pedal response	short to battery
				l doi accelerator pedar response	- Pedal is broken
					- i edal is blokeli
					Workshop action:
					Check:
					- Throttle/Pedal
					Position Sensor
					/Switch "A"
					– Pedal
					If fault is not detected:
					Fault trace according to Tech Tool fault tree
D040000	Caplant	Na Colle Co	NI/A	Frank.	
P012800	Coolant	No Sub-type	N/A	Event:	Root Cause:

P012800 | Coolant | No Sub-type | IN/A | Everit. |
Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

		Thermostat (Coolant Temp Below Thermostat Regulating Temperature)	Information		Engine Coolant Temperature below Table derived value dependent on Average Engine Torque (typically 71 C) Behavior: Engine does not reach normal operating temperature	 Coolant thermostat leaking or blocked open Coolant temperature sensor offset Workshop action: Check: Coolant thermostat Coolant temperature sensor
						If fault is not detected: Fault trace according
						to Tech Tool fault tree
f	P016E00	Closed Loop	No Sub-type	N/A	Event:	Root Cause:
		Fuel Pressure	Information	,, .	Average rail pressure deviation above	- Rotated cam profile
		Control At Limit			140 bar above conditions must remain	- Leaking fuel
		- Pressure Too			valid for 5s.	pressure release valve
		High				- Fuel pressure
						regulator
					Behavior:	Low fuel pressure
					Engine derate	system
						Bad fuel quality
						- Pressure release
						valve stuck closed
						Workshop action: Check:
						Rotated cam profile
						Fuel pressure
						release valve
						– Fuel pressure
						regulator
						Low fuel pressure
						system
						- Fuel quality
						If fault is not detected:
						Fault trace according
						to Tech Tool fault tree
	P016F00	Closed Loop	No Sub-type	N/A	Event:	Root Cause:
		Fuel Pressure	Information		Average rail pressure deviation below	Inlet metering valve
		Control At Limit			-140 bar above conditions must remain	with damaged
		- Pressure Too			valid for 5s.	connector/wiring
		Low				harness
					Behavior:	- Leaking fuel
					Engine derate	pressure release valve
						- Leaking high
						pressure fuel system
						High fuel pressure
						pump
						– Fuel pressure
						regulator
	maniminate to the state of the		h the \/-! C	Na z== '		Low fuel pressure
r	invright to this d	ncumentation helongs t	n the Volvo Group	NO reprodu	lction, copying, change, amendment or other similar dispo-	ear is entitled without prior written A

					system, fuel supply Workshop action: Check: - Inlet metering valve - Fuel pressure
					release valve - High pressure fuel system - High fuel pressure pump - Fuel pressure regulator - Low fuel pressure
D040042	Fred Dell	Circuit On a	044		system, fuel supply If fault is not detected: Fault trace according to Tech Tool fault tree
P019013	Pressure Sensor Bank 1	Circuit Open		Event: Voltage on A:19 above 4.88V OR Voltage on A:19 above 0.15V and Voltage on A:19 below 0.37V	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action:
				Behavior: Engine derate	Check: - Wiring harness - Sensor - ECU
P019164	Fuel Rail Pressure Sensor Circuit Range /Performance Bank 1	Signal Plausibility Failure		and Time since engine was running) OR Rail pressure below -100bar OR Evaluation performed while engine running: rail pressure fluctuation less than expected	Root Cause: - Fuel Rail Pressure Sensor Bank 1: Connector and/or pins corroded - Fuel Rail Pressure Sensor Bank 1: Damaged insulation on the sensor wiring harness - Fuel Rail Pressure Sensor Bank 1: Broken
				Engine derate	Workshop action: Check: - Fuel rail pressure sensor bank 1 - Connector and wiring harness If fault is not detected: Fault trace according to Tech Tool fault tree
P019200	Fuel Rail Pressure	No Sub-type Information	l .	Event: Voltage on A:19 below 0.15V	Root Cause: – Wiring harness fault

I	la	I	ı	I	l .
	Sensor Circuit				- Sensor fault
	Low Bank 1			Behavior:	– ECU fault
				Engine derate	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					– ECU
P019400	Fuel Rail	No Sub-type	A14.	Event:	Root Cause:
	Pressure	Information	EA:19	Significant rail pressure signal transition	- Fuel Rail Pressure
	Sensor Circuit			when none or minor expected	Sensor Bank 1:
	Intermittent			'	Connector and/or pins
	/Erratic Bank 1			Behavior:	corroded
	Ziradio Barik i			Engine derate	- Fuel Rail Pressure
				Engine derate	Sensor Bank 1:
					Damaged insulation
					-
					on the sensor wiring
					harness
					- Fuel Rail Pressure
					Sensor Bank 1:
					Broken
					Workshop action:
					Check:
					Fuel rail pressure
					sensor bank 1
					Connector and
					wiring harness
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P019513	Engine Oil	Circuit Open	A14.	Event:	Root Cause:
1	Temperature	'	l	Voltage on A:31 above 4.93V	Wiring harness fault
	Sensor "A"				- Sensor fault
	0011001 71			Behavior:	– ECU fault
				No information available	Looraan
					 Workshop action:
					Check:
					- Wiring harness
					- Sensor
D040004	F : 0"	0: 1			- ECU
P019664	Engine Oil	Signal		Event:	Root Cause:
	Temperature	Plausibility	EA:31	Difference during Precrank between Oil	– Oil temperature
1	Sensor Range	Failure			sensor failure
	/Performance			Temperature, Boost Temperature,	
				Compressor Temperature, Engine	Workshop action:
				Coolant Temperature) above 40°C	Check:
					Oil temperature
				Behavior:	sensor
				No information available	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P019700	Engine Oil	No Sub-type	A14.	Event:	Root Cause:
1	-	1	l		

P019700 Engine Oil No Sub-type A14. Event: Root Cause:

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

	Temperature Sensor Circuit Low	Information	EA:31	Voltage on A:31 below 0.10V Behavior: No information available	 Wiring harness fault Sensor fault ECU fault Workshop action: Check: Wiring harness Sensor
P01991F	Engine Oil Temperature Sensor Circuit Intermittent /Erratic	Circuit Intermittent		Event: Abnormally high rate of change of the oil temperature sensor signal. Intermittent fault.	- ECU Root Cause: - Sensor fault - Wiring fault - ECU fault
	7 = 1 (4.10			Behavior: No information available	Workshop action: Check: - Replace the combined oil level and temperature sensor in the oil pan.
1	Cylinder 1 Injector "A"	Circuit Open	EA:62	Event: Current driving the injector rises too slowly Behavior: Engine derate	Root Cause: - Wiring harness issue - Actuator broken - Connector detached Workshop action: Check: - Wiring harness
P020213	Cylinder 2	Circuit Open	A14.	Event:	- Actuator - Connector Root Cause:
	Injector "A"		EA:62 A14. EA:12	Current driving the injector rises too slowly Behavior: Engine derate	 Wiring harness Actuator broken Connector detached Workshop action: Check: Wiring harness Actuator Connector
1	Cylinder 3 Injector "A"	Circuit Open	EA:62	Event: Current driving the injector rises too slowly Behavior: Engine derate	Root Cause: - Wiring harness - Actuator broken - Connector detached Workshop action: Check: - Wiring harness - Actuator - Connector
	Cylinder 4 Injector "A"	Circuit Open	EA:61 A14.	Event: Current driving the injector rises too slowly	Root Cause: - Wiring harness - Actuator broken

			EA:52		Connector detached
				Behavior:	
				Engine derate	Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
P020513	Cylinder 5	Circuit Open	A14.	Event:	Root Cause:
1 020010	Injector "A"	Circuit Open		Current driving the injector rises too	- Wiring harness
	Injector A		l .		- Actuator broken
				slowly	
			EA:44	Dallar Jana	- Connector detached
				Behavior:	
				Engine derate	Workshop action:
					Check:
					- Wiring harness
					- Actuator
					Connector
P020613	Cylinder 6	Circuit Open	A14.	Event:	Root Cause:
	Injector "A"		EA:61	Current driving the injector rises too	- Wiring harness
			A14.	slowly	 Actuator broken
			EA:36		Connector detached
				Behavior:	
				Engine derate	Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
P021700	Engine Coolant	No Sub-type	N/A	Event:	Root Cause:
1 021700	_	Information	''''	Engine Coolant Temperature high	- Extreme driving
	Temperature			Engine declarit remperature mgm	conditions, resulting in
	Condition			Behavior:	too high temperature
	Condition			Engine derate	- The coolant
				Lingine derate	thermostat is broken
					- Problems with the
					fan
					- The radiator is
					blocked
					Workshop action:
					Check:
					- Extreme driving
					conditions
					- The coolant
					thermostat
					- The fan
					- The radiator
P021800		No Sub-type	N/A	Event:	Root Cause:
	Fluid Over	Information		Sensor - Gearbox Oil Temperature high	- Transmission cooler
	Temperature				failure
	Condition			Behavior:	 Cooling system
				Engine derate	problem
anuright to this -	houmontation hales set	the Makes Craws	No rozza d	ation conving change amondment or other size the start and the size that the start and the start are start as a start and the start are start as a start a	Workshop action:

					Check: - Transmission cooler - Cooling system problem
P021900	-	No Sub-type Information	N/A	Event: Too high engine speed detected Behavior: Engine shuts off unexpectedly - Only at low speed	Root Cause: - Too high engine speed Workshop action: Check: - Engine speed
P023400	_	No Sub-type Information	N/A	Event: Difference between sensed boost pressure and estimated boost pressure above 45kPa.	Root Cause: - Blocked wastegate - Boost pressure sensor biased high
				Behavior: No information available	Workshop action: Check: - Wastegate - Boost pressure sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P025614	Fuel Metering	Short Circuit to Ground or Open	EA:59	Event: Current driving the injector rises too slowly Behavior: Low power	Root Cause: - Wiring harness issue - Actuator broken - Connector detached Workshop action: Check:
					Wiring harness and connectorActuator
P025700	' '	No Sub-type Information	N/A	Event: Loss of high fuel pressure pumping capacity Behavior:	Root Cause: - High fuel pressure pump - Rotated cam profile
	(Cam/Rotor /Injector)			Engine derate	Workshop action: Check: - High fuel pressure pump - Cam profile
P025900		No Sub-type Information	EA:59	Event: Current driving the injector rises too quickly Behavior: Low power	Root Cause: - Wiring harness issue - Short circuit to battery - Actuator broken
apyright to this o	Incumentation belongs to	a the Volva Group	No reprodu	ction, copying, change, amendment or other similar dispo	Workshop action: Check: - Wiring harness and

					connector
					– Actuator
2026200	Cylinder 1	No Sub-type	A14.	Event:	Root Cause:
	Injector Circuit	Information	EA:62	Current driving the injector rises too	Wiring harness issue
	High		A14.	quickly	- Short circuit to
			EA:20		battery
				Behavior:	– Actuator broken
				Engine derate	
					Workshop action:
					Check:
					Wiring harness and
					connector
					– Actuator
P026500	Cylinder 2	No Sub-type	A14.	Event:	Root Cause:
	Injector Circuit	Information	EA:62	Current driving the injector rises too	Wiring harness issue
	High		A14.	quickly	Short circuit to
			EA:12		battery
				Behavior:	Actuator broken
				Engine derate	
					Workshop action:
					Check:
					Wiring harness and
					connector
					– Actuator
2026800	Cylinder 3	No Sub-type	A14.	Event:	Root Cause:
	Injector Circuit	Information	EA:62	Current driving the injector rises too	Wiring harness issue
	High		1	quickly	- Short circuit to
			EA:28		battery
				Behavior:	– Actuator broken
				Engine derate	
					Workshop action:
					Check:
					Wiring harness and
					connector
					– Actuator
P026A00	Charge Air	No Sub-type	N/A	Event:	Root Cause:
	Cooler	Information		Ratio between Modeled CaC Temp and	- Deteriorated charge
	Efficiency			difference between Modeled	air cooler
	Below			Deteriorated and Modeled Nominal	
	Threshold			CaC Temp below 0.001ratio.	Workshop action:
					Check:
				Behavior:	Charge air cooler
				No information available	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P026C00	Fuel Injection	No Sub-type	N/A	Event:	Root Cause:
	Quantity Lower	Information			– Bad quality or
	Than Expected			and requested fuel quantity above 85%.	1
				1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	being used
				Behavior:	– Air in fuel
				Low power	- EGR Valve stuck
					closed
					Leak in the exhaust
vright to this o	ocumentation belongs	to the Volvo Group	lo roprodu	action, copying, change, amendment or other similar dispos	1

IMPACT 4.07.82 11/19/2020 system Coolant leak into the air path Coolant leak into the combustion chamber Combustion gases leak into the low pressure system Combustion gases leak into the coolant Low base engine compression Fuel injectors injecting low quantity Workshop action: Check: – Fuel Air in fuel - EGR valve Leak in the exhaust system - Coolant leak - Combustion gases leak - Low base engine compression Fuel injectors If fault is not detected: Fault trace according to Tech Tool fault tree N/A P026D00 Fuel Injection No Sub-type Event: Root Cause: Quantity Higher Information 128% above Average of the ratio Leakage from the

Than Expected between estimated and requested fuel aftertreatment quantity. hydrocarbon injector (AHI) Behavior: - Oil leakage from the High fuel consumption turbocharger - EGR Valve stuck open - Bad quality or incorrect type of fuel being used Combustion gases leak into the coolant system Combustion gases leak into the low pressure fuel system Low base engine compression Fuel injectors

Cbpyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

injecting high quantity

ı	ı	ı	ı	I	1
					Morkoban astismi
					Workshop action:
					Check:
					– Leakage from the
					aftertreatment
					hydrocarbon injector
					(AHI)
					Oil leakage from the
					turbocharger
					– EGR valve
					– Fuel
					 Combustion gases
					leak
					Low base engine
					compression
					– Fuel injectors
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P027100	Cylinder 4	No Sub-type	A14.	Event:	Root Cause:
1	Injector Circuit	Information	1	Current driving the injector rises too	- Wiring harness issue
	High		1	quickly	- Short circuit to
			EA:52		battery
				Behavior:	- Actuator broken
				Engine derate	
					Workshop action:
					Check:
					- Wiring harness
					- Short circuit to
					battery
					– Actuator
P027400	Cylinder 5	No Sub-type	A14.	Event:	Root Cause:
	Injector Circuit	Information	EA:61	Current driving the injector rises too	- Wiring harness issue
	High		A14.	quickly	- Short circuit to
			EA:44		battery
				Behavior:	 Actuator broken
				Engine derate	
					Workshop action:
					Check:
					- Wiring harness
					- Short circuit to
					battery
					– Actuator
P027700	Cylinder 6	No Sub-type	A14.	Event:	Root Cause:
	Injector Circuit	Information	EA:61	Current driving the injector rises too	- Wiring harness issue
	High		A14.	quickly	- Short circuit to
			EA:36		battery
				Behavior:	 Actuator broken
				Engine derate	
					Workshop action:
					Check:
					- Wiring harness
					- Short circuit to
Convright to this o	ocumentation belongs	th the Volvo Group	No reprodu	Liction, copying, change, amendment or other similar disp	osal is entitled without prior written

					battery
					- Actuator
P027E00	Cold Start Fuel	No Sub-type	N/A	Event:	Root Cause:
	Injection	Information		Average of the ratio between estimated	Bad quality or
	Quantity Lower			and requested fuel quantity above 85%.	incorrect type of fuel
	Than Expected				being used
				Behavior:	– Air in fuel – EGR
				Low power	Valve stuck closed
					Leak in the exhaust
					system
					Coolant leak into the
					air path
					Coolant leak into the
					combustion chamber
					- Combustion gases
					leak into the low
					pressure system
					- Combustion gases
					leak into the coolant
					Low base engine
					compression
					- Fuel injectors
					injecting low quantity
					Workshop action:
					Check:
					– Fuel
					– Air in fuel
					- EGR valve
					Leak in the exhaust
					system
					- Coolant leak
					- Combustion gases
					leak
					Low base engine
					compression
					- Fuel injectors
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P027F00		No Sub-type	N/A	Event:	Root Cause:
	Injection	Information		128% above Average of the ratio	Leakage from the
	Quantity Higher			between estimated and requested fuel	aftertreatment
	Than Expected			quantity.	hydrocarbon injector
					(AHI)
				Behavior:	- Oil leakage from the
				High fuel consumption	turbocharger
					EGR Valve stuck
					open
					– Bad quality or
					incorrect type of fuel
					being used
					Combustion gases

					leak into the coolant system - Combustion gases leak into the low pressure fuel system - Low base engine compression - Fuel injectors injecting high quantity Workshop action: Check: - Leakage from the aftertreatment hydrocarbon injector (AHI) - Oil leakage from the turbocharger - EGR valve - Fuel - Combustion gases leak - Low base engine compression - Fuel injectors If fault is not detected: Fault trace according to Tech Tool fault tree
P029800	Engine Oil Over Temperature	No Sub-type Information	N/A	Event: Engine Oil Temperature (EOT) over temperature Behavior:	Root Cause: – Extreme driving conditions Workshop action:
				Engine derate	Check:
P029900	Turbocharger	No Sub-type	N/A	Event:	Driving conditions Root Cause:
	Turbocharger /Supercharger Underboost Cylinder 1 Fuel	Information		Difference between sensed boost	- Significant leakage in intake air system - Boost pressure sensor biased low Workshop action: Check: - Leakage in intake air system - Boost pressure sensor If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause:
	Injector Offset Learning at Min	Information		-100 Percentage below Cylinder balancing fueling offset ratios in ction, copying, change, amendment or other similar dispose	 Losses via PTO or other power

	Limit			percentage of the fault code limit for each injector. Behavior: Uneven torque	consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - Losses via PTO or other power consuming equipment - Injector - Injector tip - Spray holes in the injector
P02CD00	Cylinder 1 Fuel Injector Offset Learning at Max Limit	No Sub-type Information	N/A	Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - VCB valve malfunction - Worn injector cam lobe - Unadjusted tappet clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO - VCB valve - Injector cam lobe - Valves and unit injectors
P02CE00	Cylinder 2 Fuel Injector Offset Learning at Min Limit	No Sub-type Information	N/A	Event: -100 Percentage below Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector.	- Piston/cylinder Root Cause: - Losses via PTO or other power consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector

	I	I	I	1	1
				Behavior:	Workshop action:
				Uneven torque	Check:
				Sherren terque	– PTO
					- Injector
POSCEDO	Cylinder 2 Fuel	No Sub-type	N/A	Event:	Root Cause:
F 02C1 00	"	Information	13/7	100% above Cylinder balancing fueling	- Losses via PTO or
	*	Iniomation			
	Learning at Max Limit			offset ratios in percentage of the fault	other power
	IVIAX LITIIL			code limit for each injector.	consuming equipment VCB valve
				Daharian.	
				Behavior:	malfunction
				Uneven torque	– Worn injector cam
					lobe
					- Unadjusted tappet
					clearance for valves
					or unit injectors
					 Misaligned or
					broken valve springs
					or guides
					Cracked valves
					- Piston/cylinder worn
					/damaged
					Worn injector
					 Cracked injector tip
					 Damaged spray
					holes in the injector
					Workshop action:
					Check:
					PTO or other power
					consuming equipment
					– VCB valve
					- Injector
					- Clearance for valves
					or unit injectors
					– Valve
					- Piston/cylinder
P02D000	Cylinder 2 Fuel	No Cub tupo	NI/A	Events	
FUZDUUU	Cylinder 3 Fuel	1	N/A	Event:	Root Cause: Losses via PTO or
	1	Information		-100% below Cylinder balancing fueling	
	Learning at Min			offset ratios in percentage of the fault	other power
	Limit			code limit for each injector	consuming equipment
				L	- Worn injector
				Behavior:	- Cracked injector tip
				Uneven torque	 Damaged spray
					holes in the injector
					Workshop action:
					Check:
					– PTO or other power
					consuming equipment
					- Injector
P02D100	Cylinder 3 Fuel	No Sub-type	N/A	Event:	Root Cause:
	Injector Offset	Information		100% above Cylinder balancing fueling	- Losses via PTO or
onvright to this d	ocumentation belongs t	th the Volvo Group	No reprodu	l ction, copying, change, amendment or other similar dispo	al is entitled without prior written

P02D200	Cylinder 4 Fuel Injector Offset Learning at Min Limit	No Sub-type Information	Event: -100% below Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector	other power consuming equipment VCB valve malfunction Worn injector cam lobe Unadjusted tappet clearance for valves or unit injectors Misaligned or broken valve springs or guides Cracked valves Piston/cylinder worn /damaged Worn injector Cracked injector tip Damaged spray holes in the injector Workshop action: Check: PTO or other power consuming equipment VCB valve Injector Clearance for valves or unit injectors Valve Piston/cylinder Root Cause: Losses via PTO or other power consuming equipment Worn injector
			Behavior: Uneven torque	 Cracked injector tip Damaged spray holes in the injector Workshop action: Check:
				– PTO or other power consuming equipment – Injector
P02D300	Cylinder 4 Fuel Injector Offset Learning at Max Limit	No Sub-type Information	Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - VCB valve malfunction - Worn injector cam lobe - Unadjusted tappet

P02D400	O Cylinder 5 Fuel Injector Offset	No Sub-type Information	N/A	Event: -100% below Cylinder balancing fueling	clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO or other power consuming equipment - VCB valve - Injector - Clearance for valves or unit injectors - Valve - Piston/cylinder Root Cause: - Losses via PTO or
	Learning at Min Limit			offset ratios in percentage of the fault code limit for each injector	other power consuming equipment
					Worn injector
				Behavior:	Cracked injector tip
				Uneven torque	- Damaged spray
				·	holes in the injector
					 Workshop action:
					Check:
					– PTO or other power
					consuming equipment
					• • •
DOODEO	Cylinder E Fred	No Sub time	NI/A	Event:	– Injector Root Cause:
FUZD3U(1 *	No Sub-type	N/A		
	Injector Offset	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Learning at			offset ratios in percentage of the fault	other power
	Max Limit			code limit for each injector	consuming equipment
				Data and an	- VCB valve
				Behavior:	malfunction
				Uneven torque	– Worn injector cam
					lobe
					 Unadjusted tappet
					clearance for valves
					or unit injectors
					– Misaligned or
					broken valve springs
					or guides
	1		l		One also de la
					Cracked valvesPiston/cylinder worn

					/damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO or other power consuming equipment - VCB valve - Injector - Clearance for valves or unit injectors - Valve - Piston/cylinder
P02D600	Cylinder 6 Fuel Injector Offset Learning at Min Limit	No Sub-type Information		Event: -100% below Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action:
P02D700	Cylinder 6 Fuel	No Sub-type	N/A	Event:	Check: – PTO or other power consuming equipment – Injector Root Cause:
	Injector Offset Learning at Max Limit	Information		100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector Behavior: Uneven torque	- Losses via PTO or other power consuming equipment - VCB valve malfunction - Worn injector cam lobe - Unadjusted tappet clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector

					Check: – PTO or other power consuming equipment – VCB valve – Injector – Clearance for valves or unit injectors – Valve – Piston/cylinder
	Diesel Intake Air Flow Control	Circuit Open	EB:5 A14.	Event: Open circuit fault is detected Behavior: No information available	Root Cause: - Wiring harness - Actuator - Connector - Open circuit Workshop action: Check: - Wiring harness - Actuator - Connector - Open circuit
1		No Sub-type Information	EB:5 A14.	Event: Short circuit to ground is detected Behavior: No information available	Root Cause: - Wiring harness - Actuator - Connector - Short circuit to ground voltage Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit
	Air Flow Control Circuit High	No Sub-type Information	EB:5 A14. EB:1	Event: Short circuit to battery is detected Behavior: No information available	Root Cause: - Wiring harness - Actuator - Connector - Short circuit to battery voltage Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit
	Air Flow Position Sensor	Circuit Open	EB:24	Event: Voltage on B:24 above 4.76V and voltage on B:24 below 4.85V OR Voltage on B:24 below 0.25V	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action:

	l		I	Behavior:	Check:
				No information available	- Wiring harness
				Information available	- Sensor
					- ECU
DOOFOOO	Dia a al Intalia	No Code to a	0.4.4	Property.	+
1		No Sub-type		Event:	Root Cause:
1		Information	EB:24	Voltage on B:24 above 4.85V	Wiring harness fault
1	Position			L	- Sensor fault
1	Sensor Circuit			Behavior:	- ECU fault
	High			No information available	L
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- ECU
		No Sub-type	N/A	Event:	Root Cause:
1 1	l	Information		Throttle position - demanded throttle	 Malfunctioning
	Control System			position above 10%	intake throttle valve
	- High Air Flow				
	Detected			Behavior:	Workshop action:
				No information available	Check:
					 Intake throttle valve
P02ED00	Diesel Intake	No Sub-type	N/A	Event:	Root Cause:
	Air Flow	Information		Demanded throttle position - throttle	 Malfunctioning
	Control System			position above 10%	intake throttle valve
	- Low Air Flow				
	Detected			Behavior:	Workshop action:
				No information available	Check:
					 Intake throttle valve
P02FA97	Diesel Intake	Component	N/A	Event:	Root Cause:
	Air Flow	or System		not Maximum Opened Throttle Position	 Malfunctioning
	Position	Operation		between 78.3deg and 84.7deg and not	intake throttle valve
	Sensor	Obstructed		Minimum Closed Throttle Position	
	Minimum	or Blocked		between -2.8deg and 2.8deg	Workshop action:
	/Maximum Stop				Check:
	Performance			Behavior:	Intake throttle valve
				No information available	
P030000	Random	No Sub-type	N/A	Event:	Root Cause:
	Misfire Detected	Information		Total misfire rate above 5%.	- Power consuming
					equipment - such as
				Behavior:	power take-off, idler
				Uneven torque	wheels, air
					compressor, power
					steering pump, air
					condition pump - are
					connected in an
					unsupported way
					– Air in fuel system
					- Fuel quality
					– Cylinder
					compression
					Valve mechanism
					tappet clearance
					Valve mechanismUnadjusted injector

P030100	Cylinder 1 Misfire Detected	No Sub-type Information	N/A	Event: Misfire rate for cylinder 1 above 80%. Behavior: The engine misfires	- Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber Workshop action: Check: - Power consuming equipment - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Injector - Fuel injectors - Volvo Engine Brake - EGR - Coolant in a combustion chamber If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - are connected in an unsupported way - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Unadjusted injector tappet clearance - Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber Workshop action: Check: - Power consuming
Convright to this	documentation belongs t	a the Value Croup	No roprodu	Jetion, copying, change, amendment or other similar disp	equipment

P030200	Cylinder 2 Misfire Detected	No Sub-type Information	N/A	Event: Misfire rate for cylinder 2 above 80%. Behavior: The engine misfires	- Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Injector - Fuel injectors - Volvo Engine Brake - EGR - Coolant in a combustion chamber Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - are connected in an unsupported way - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Unadjusted injector tappet clearance - Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber
					Workshop action: Check: - Power consuming equipment - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Injector - Fuel injectors - Volvo Engine Brake - EGR
P030300		No Sub-type	N/A	Event:	Coolant in a combustion chamber Root Cause:
Copyright to this o	Misfire Detected		No reprodi	Misfire rate for cylinder 3 above 80%. ction, copying, change, amendment or other similar dispo	Power consuming equipment - such as is entitled without prior written.

				Behavior:	power take-off, idler
				The engine misfires	wheels, air
					compressor, power
					steering pump, air
					condition pump - are
					connected in an
					unsupported way
					– Air in fuel system
					- Fuel quality
					- Cylinder
					compression
					- Valve mechanism
					- Unadjusted injector
					tappet clearance
					- Fuel injectors
					Volvo Engine BrakeEGR
					- Presence of coolant
					in a combustion
					chamber
					Workshop action:
					Check:
					Power consuming
					equipment
					– Air in fuel system
					- Fuel quality
					- Cylinder
					compression
					- Valve mechanism
					- Injector
					- Fuel injectors
					- Volvo Engine Brake
					- EGR
					– Coolant in a
7000100					combustion chamber
P030400	Cylinder 4	No Sub-type	N/A	Event:	Root Cause:
	Misfire Detected	Information		Misfire rate for cylinder 4 above 80%.	– Power consuming
					equipment - such as
				Behavior:	power take-off, idler
				The engine misfires	wheels, air
					compressor, power
					steering pump, air
					condition pump - are
					connected in an
					unsupported way
					– Air in fuel system
					Fuel quality
					– Cylinder
					compression
					- Valve mechanism
					Unadjusted injector
					tappet clearance
povright to this o	l documentation belongs	to the Volvo Group	l No reprodi	ction, copying, change, amendment or other similar disp	· ·

P030500	Cylinder 5 Misfire Detected	No Sub-type Information	N/A	Event: Misfire rate for cylinder 5 above 80%. Behavior: The engine misfires	- Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber Workshop action: Check: - Power consuming equipment - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Injector - Fuel injectors - Volvo Engine Brake - EGR - Coolant in a combustion chamber Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - are connected in an unsupported way - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Unadjusted injector tappet clearance - Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber
					tappet clearance – Fuel injectors – Volvo Engine Brake – EGR
					in a combustion
					Workshop action: Check: - Power consuming equipment - Air in fuel system - Fuel quality

1 1	Cylinder 6 Misfire Detected	No Sub-type Information		Event: Misfire rate for cylinder 6 above 80%. Behavior: The engine misfires	Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - are connected in an unsupported way - Air in fuel system - Fuel quality - Cylinder compression - Valve mechanism - Unadjusted injector tappet clearance - Fuel injectors - Volvo Engine Brake - EGR - Presence of coolant in a combustion chamber
					Unadjusted injectortappet clearanceFuel injectors
					EGRPresence of coolant in a combustion
					Workshop action: Check:
					Power consuming equipment
					Air in fuel systemFuel qualityCylindercompression
					Valve mechanismInjectorFuel injectors
					Volvo Engine BrakeEGRCoolant in a
Poccessi i	0 1	N. O.	A 4 4		combustion chamber
P033531		No Signal		Event:	combustion chamber Root Cause:
F	Position	No Signal	EA:38	No crank teeth detected between cam	combustion chamber Root Cause: - Sensor broken
F		No Signal	EA:38 A14.		combustion chamber Root Cause: - Sensor broken - Connector detached
F	Position	No Signal	EA:38	No crank teeth detected between cam	combustion chamber Root Cause: - Sensor broken

	I	I	I	Behavior:	I
					Modern ortion.
				High fuel consumption	Workshop action:
				Uneven torque	Check:
					- Sensor
					- Connector
P033638	Crankshaft	Signal	A14.	Event:	Root Cause:
	Position	Frequency	EA:38	More crank teeth than expected	- Noisy signal due to
	Sensor A	Incorrect	A14.	detected between cam teeth by the	wiring harness
	Circuit Range		EA:37	control unit	 Sensor broken
	/Performance				Connector detached
				Behavior:	
				High fuel consumption	Workshop action:
				Uneven torque	Check:
				'	- Wiring harness
					- Sensor
					- Connector
D033000	Crankshaft	No Sub-type	A14.	Event:	Root Cause:
F033900		1			
	Position	Information	1	Intermittent crank speed signal	- Noisy signal due to
	Sensor A		A14.	L	wiring harness
	Circuit		EA:37	Behavior:	– Sensor broken
	Intermittent			High fuel consumption	Connector detached
				Uneven torque	
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- Connector
P034031	Camshaft	No Signal	A14.	Event:	Root Cause:
	Position		EA:45	No signal is detected on the cam wheel	Connector detached
	Sensor "A"		A14.	li ciginario actorica cir uno cami unico.	- Sensor broken
	Bank 1 or			Behavior:	- Sensor incorrectly
	Single Sensor			No information available	mounted (e.g. far
	Olligic Oction			I TO I HOTHIAGOT A VAIIABLE	away from the wheel)
					away iroin the wheel)
					M/aulualaan aatian.
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- Connector
P034138	Camshaft	Signal		Event:	Root Cause:
	Position	Frequency	EA:45	Noisy signal detected	Noisy signal due to
	Sensor A	Incorrect	A14.		wiring harness
	Circuit Range		EA:46	Behavior:	 Sensor broken
	/Performance			No information available	Connector detached
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- Connector
D040400	Fnais -	No Code from	N1/A	Events	
P040100	"	No Sub-type	N/A	Event:	Root Cause:
	Exhaust Gas	Information		Percentage of Ratio between EGR	EGR system blocked
	Recirculation 1	1	l	Mass Flow and Demanded EGR Mass	/restricted

	Valve Position			Flow below (70% + Offset dependent on Ambient air pressure).	- Malfunctioning EGR valve
	Insufficient Detected			Behavior: No information available	Workshop action: Check: - EGR system - EGR valve If fault is not detected: Fault trace according
					to Tech Tool fault tree
P04020	Engine Exhaust Gas Recirculation 1 Valve Position Flow Excessive	No Sub-type Information	N/A	Event: Percentage of Ratio between EGR Mass Flow and Demanded EGR Mass Flow above (130% + Offset dependent	Root Cause: - Malfunctioning EGR valve - Malfunctioning VGT
	Detected			on Ambient air pressure).	Workshop action:
	D GLOSION			Behavior: No information available	Check: - EGR valve - VGT If fault is not detected: Fault trace according to Tech Tool fault tree
P04031	3 EGR "A"	Circuit Open	A14.	Event:	Root Cause:
	Control		EB:13 A14.	Open circuit fault is detected. Behavior: No information available	- Open circuit in wiring harness, actuator or connector.
					Workshop action: Check: - Wiring harness, actuator and connector If fault is not detected: Fault trace according to Tech Tool fault tree
P04060	Exhaust Gas Recirculation Sensor "A" Circuit High	No Sub-type Information		Event: Voltage on A:21 above 4.83V Behavior: No information available	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check:
P04091	3 EGR	Circuit Open	A14.	Event:	- Wiring harness - Sensor - ECU Root Cause:
, 0,001	differential pressure sensor			Voltage on A:21 below 0.21V Behavior: No information available	- Wiring harness fault - Sensor fault - ECU fault Workshop action:
		h the Velor Or		etion, conving, change, amondment or other similar disperse	Check: - Wiring harness

					– Sensor – ECU
P040A13 Exhaust Gas Recirculation Temperature Sensor "A"	Circuit Open	1	Event: Voltage on B:48 above 0.75V OR Voltage on B:48 above 0.06V and Voltage on B:48 below 0.17V	Root Cause: - Wiring harness faul - Sensor fault - ECU fault	
			Behavior: No information available	Workshop action: Check: - Wiring harness - Sensor - ECU	
P040B64	Exhaust Gas Recirculation Temperature Sensor "A" Circuit Range /Performance	Signal Plausibility Failure	EB:48	Event: (Exhaust Gas Recirculation Temperature (EGRT) - Engine Coolant Temperature) below -45°C OR (Exhaust Gas Recirculation Temperature (EGRT) - Engine Coolant Temperature) above 50°C Behavior: No information available	Root Cause: - Temperature sense drifting - Temperature sense biased high or low - Temperature sense broken Workshop action: Check: - Temperature sense
P040C00	Exhaust Gas Recirculation Temperature Sensor "A" Circuit Low	No Sub-type Information	EB:48	Event: Voltage on B:48 below 0.06V Behavior: No information available	Root Cause: - Wiring harness fau - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU
P042000	Catalyst System Efficiency Below Threshold	No Sub-type Information		Event: Catalyst System Monitor Failure Event and Ratio of diesel that slipped through the catalyst and oxidized in the Particulate Filter above 1.555 ratio and SCR conversion efficiency below (80% + Offset dependent on Average SCR NOx Catalyst Temperature) OR Empty Can Monitor Failure Event and (The number of quick temperature changes before the catalyst / The number of quick temperature changes after catalyst) below 2.5 ratio. Behavior: No information available	Root Cause: - Exhaust Aftertreatment Fuel Injector "A" does not deliver as expected - Exhaust Aftertreatment Fuel Injector "A" nozzle is clogged - Catalyst has lost its conversion capability - Catalyst is removed or severely damaged Workshop action: Check: - Exhaust Aftertreatment Fuel Injector "A" - Catalyst

					If fault is not detected: Fault trace according to Tech Tool fault tree
P042200	Catalyst 2 Efficiency Below Threshold	No Sub-type Information	N/A	Event: SCR conversion efficiency below (80% + Offset dependent on Average SCR NOx Catalyst Temperature)	Root Cause: - DPF has lost its conversion capability - DPF is removed or
	(Bank 1)			and Ratio of diesel that slipped through the catalyst and oxidized in the Particulate	severely damaged Workshop action:
				Filter below 0.60 ratio.	Check: - DPF
				Behavior: No information available	If fault is not detected: Fault trace according to Tech Tool fault tree
P046C64	EGR	Signal	A14.	Event:	Root Cause:
	Differential Pressure	Plausibility Failure	EA:21	Difference between estimated and real EGR differential pressure below -7	- Sensor
	Sensor Circuit			OR	Workshop action:
	Range			Difference between estimated and real	Check:
	/Performance			EGR differential pressure above 18 OR	- Sensor
				Engine Exhaust Gas Recirculation 1	
				Differential Pressure above 2.18kPa	
				Behavior: No information available	
P048013	Fan 1 Control	Circuit Open	A14.	Event:	Root Cause:
	Circuit		EB:49	Open circuit fault is detected	Open circuit in:
					- Wiring harness
				Behavior:	– Actuator
				No information available	- Connector
					Workshop action: Check:
					- Wiring harness
					– Actuator
					- Connector
P048900	EGR "A"	No Sub-type	A14.	Event:	Root Cause:
	Control Circuit	Information		Short circuit to ground is detected.	– Wiring harness,
	Low		A14.	3 11 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	actuator or connector
				Behavior:	is short circuited to
				No information available	ground voltage
					Workshop action:
					Check:
					– Wiring harness,
					actuator and
					connector
					If fault is not detected:
					Fault trace according
	<u>.</u>				to Tech Tool fault tree
P04D800	Excessive	No Sub-type	N/A	Event:	Root Cause:

P04D800 Excessive No Sub-type N/A Event: Root Cause:

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

	Time To Enter Closed Loop EGR Control	Information	Behavior: No information available	- Engine coolant temperature sensor stuck below EGR closed loop enable range Workshop action: Check: - Engine coolant temperature sensor If fault is not detected: Fault trace according to Tech Tool fault tree
	EGR Control At Limit - Flow Too Low		MAP value dependent on engine speed and engine torque Behavior: No information available	Root Cause: - EGR valve stuck open - VGT control saturated low Workshop action: Check: - EGR valve - VGT control If fault is not detected: Fault trace according to Tech Tool fault tree
	Closed Loop EGR Control At Limit - Flow Too High	No Sub-type Information	MAP value dependent on engine speed and engine torque Behavior: No information available	Root Cause: - EGR valve stuck closed - EGR system restricted - VGT control saturated high Workshop action: Check: - EGR valve - EGR system - VGT control If fault is not detected: Fault trace according to Tech Tool fault tree
	Crankcase Ventilation System Disconnected	No Sub-type Information	Event: Crankcase pressure difference between operation window with high oil pressure and operation window with low pressure below 0.25kPa Behavior:	Root Cause:

P04DD00	Cold Start EGR "A" Flow Insufficient Detected	No Sub-type Information	N/A	Event: Percentage of Ratio between EGR Mass Flow and Demanded EGR Mass Flow below (70% + Offset dependent on Ambient air pressure) Behavior: No information available	- Crankcase ventilation pipe If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - EGR system blocked /restricted - Malfunctioning EGR valve Workshop action: Check: - EGR system - EGR valve If fault is not detected: Fault trace according to Tech Tool fault tree
P050013	Vehicle Speed Sensor A	Circuit Open	N/A	Event: Sensor current below 0.1 mA Behavior: No information available	Root Cause: - Wiring harness issue - Connector issue - Sensor detached - Sensor issue - VECU issue Workshop action: Check: - Wiring harness - Connector - Sensor - VECU If fault is not detected: Fault trace according
P050200	Vehicle Speed Sensor "A" Circuit Low	No Sub-type Information	N/A	Event: Sensor voltage below 2.5 V Behavior: No information available	to Tech Tool fault tree Root Cause: - Sensor detached - Sensor issue - VECU issue Workshop action: Check: - Sensor - VECU If fault is not detected: Fault trace according to Tech Tool fault tree
P050600	Idle Control System - RPM Lower Than Expected	No Sub-type Information	N/A	Event: Average engine speed during the evaluation period below 450rpm Behavior: Uneven engine speed during idle	Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air

	No Sub-type Information	N/A	Event: Average engine speed during the evaluation period above 800rpm Behavior: Uneven engine speed during idle	condition pump - active - Blocked exhaust system, including turbo - Blocked inlet system - Bad fuel quality - Air in fuel system - Broken valve spring - Rocker arms - Bad injector trim codes - Unadjusted valves or unit injectors - Bad fuel injectors - Workshop action: Check: - Power consuming equipment - Exhaust system, including turbo - Inlet system - Fuel quality - Fuel system - Valve spring - Rocker arms - Injector trim codes - Valves or unit injectors If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Oil residue in the inlet system - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - active - Fuel quality - Air in fuel system - Broken valve spring - Rocker arms - Bad injector trim codes
acumentation belongs to	the Valva Graun I	No reprodu	ction, copying, change, amendment or other similar d	codes – Unadjusted tappet clearance for valves

					or unit injectors – Bad fuel injectors
					Workshop action:
					Check:
					Inlet system
					Power consuming
					equipment
					Fuel quality
					- Fuel system
					⊢ Valve spring
					Rocker arms
					Injector trim codes
					├ Valves or unit
					injectors
					Fuel injectors
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P051A13	Crankcase	Circuit Open		Event:	Root Cause:
	Pressure		EB:28	Voltage on B:28 above 4.76V	Wiring harness fault
	Sensor			and	- Sensor fault
				Voltage on B:28 below 4.85V OR	– ECU fault
				Voltage on B:28 below 0.31V	Workshop action:
					Check:
				Behavior:	- Wiring harness
				No information available	– Sensor
D054D04	0	0:	A 4 4	- 4	- ECU
P051B64	_	Signal		Event:	Root Cause:
	Pressure Sensor Circuit	Plausibility Failure	EB:28	Crankcase pressure compared to	Sensor failure
	1	railule		reference pressure below -15kPa OR	Markahan aatian:
	Range /Performance			Crankcase pressure compared to	Workshop action: Check:
	renomance			reference pressure above 15kPa	- Sensor failure
				leterence pressure above 15ki a	If fault is not detected:
				Behavior:	Fault trace according
				No information available	to Tech Tool fault tree
P051D00	Crankcase	No Sub-type	A14.		Root Cause:
	Pressure	Information	l .	Voltage on B:28 above 4.85V	- Wiring harness fault
	Sensor Circuit			Stange on Executive most	- Sensor fault
	High			Behavior:	– ECU fault
	1.9.			No information available	
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- ECU
P052013	Engine oil	Circuit Open	A14.	Event:	Root Cause:
	pressure sensor		EB:11	Voltage on B:11 above 4.79V	Wiring harness fault
	/switch "A"			and	- Sensor fault
				Voltage on B:11 below 4.85V	ECU fault
]	OR	

				Voltage on B:11 below 0.21V Behavior: No information available	Workshop action: Check: - Wiring harness - Sensor - ECU
	Engine Oil Pressure Sensor/Switch Range	Signal Plausibility Failure		Event: Engine oil pressure above 100kPa OR Engine oil pressure above 600kPa	Root Cause: - Oil pressure sensor failure
	/Performance			OR Engine oil pressure below 230kPa Behavior:	Workshop action: Check: - Oil pressure sensor If fault is not detected:
				No information available	Fault trace according to Tech Tool fault tree
P052300	Engine Oil	No Sub-type	A14.	Event:	Root Cause:
	Pressure Sensor/Switch	Information	EB:11	Voltage on B:11 above 4.85V	Wiring harness faultSensor fault
	Circuit High			Behavior:	ECU fault
				No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P052400	Engine Oil	Engine Oil	N/A	Event:	Root Cause:
	Pressure Too	Pressure		Engine oil pressure below output from a	- Oil leakage
	Low	Too Low		look-up table with input engine RPM -	- The oil pump is
				TECU	broken
					- The oil system is
				Behavior:	clogged
				Engine shuts off unexpectedly – Only at	
				low speed	Workshop action:
					Check:
					- Oil leakage
					- The oil pump
					- The oil system
P052712	Fan Speed	Short Circuit	A14.	Event:	Root Cause:
1	Sensor Circuit	to Battery	l .	Current engine cooling fan speed	- Fan speed sensor
	Range /Performance	lo battery	LA.55	sensed equals to 0 rpm	malfunctioning
	, chomance			Behavior:	Workshop action:
				Engine cooling fan does not shut off	Check:
				Linguis occurry fair does flot strut oil	– Fan speed sensor
P053E00	Crankcase	No Sub-type	N/A	Event:	Root Cause:
	Pressure Too	Information	13//7	Difference between ambient air	- The pressure
	1				difference between
	High			pressure and crank case pressure too	
				high.	crankcase pressure
				Bahavian	and ambient air
				Behavior:	pressure is/was
				Engine derate	above limit
		to the Velve Craws			Workshop action:

P05407E	Intake Air Heater "A" Control	Actuator Stuck On	A14. EB:7	Event: The preheat element is active when there is no preheat activation request. Behavior: No information available	Check: - Pressure difference between crankcase pressure and ambient air pressure is/was above limit Root Cause: - Preheat relay problem - Wiring harness defect Workshop action: Check: - Preheat relay - Wiring harness
P054100	Intake Air Heater A Circuit Low	No Sub-type Information	A14. EB:7	Event: Voltage on B:7 above (0.72V * (Battery Voltage / 24.0V)) and Voltage on B:7 below (2.86V * (Battery Voltage / 24.0V)) Behavior: Engine is difficult to start - Only cold conditions	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU
P054300	Intake Air Heater A Circuit Open	No Sub-type Information	A14. EB:7	Event: Voltage on B:7 above (25.14V * (Battery Voltage / 24.0V)) OR Voltage on B:7 above (2.86V * (Battery Voltage / 24.0V)) and Voltage on B:7 below (20.56V * (Battery Voltage / 24.0V)) Behavior: Engine is difficult to start - Only cold conditions	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU
	Idle Control System - Fuel Quantity Lower Than Expected	No Sub-type Information	N/A	Event: Average fuel quantity in each injection for the evaluation period below 5mg Behavior: Uneven engine speed during idle	Root Cause: - Power consuming equipment - such as power take-off, idler wheels, air compressor, power steering pump, air condition pump - active - Blocked exhaust system, including turbo - Blocked inlet system - Bad fuel quality

	I	I			equipment
					- Fuel quality
					– Fuel system
					- Valve spring
					- Rocker arms
					- Injector trim codes
					- Valves or unit
					injectors
					- Fuel injectors
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
D055412	Engine Oil	Circuit Open	Λ14	Event:	Root Cause:
FUSSATS	Pressure	Circuit Open	l	Voltage on B:19 above 4.79V	- Wiring harness fault
	Sensor/Switch		LD. 19	and	- Sensor fault
	"B"			Voltage on B:19 below 4.85V	- ECU fault
				OR	- ECO lault
				Voltage on B:19 below 0.21V	Workshop action:
				Voltage on B. 19 below 0.21V	Check:
				Behavior:	- Wiring harness
				No information available	- Sensor
					- ECU
D055B64	Piston Cooling	Signal	Λ14	Event:	Root Cause:
F 000004	Oil Pressure	Plausibility		Difference between demanded piston	– Piston cooling
	Sensor Range	Failure	LD. 19	cooling pressure and measured piston	pressure sensor failure
	/Performance	anure		cooling pressure between -30kPa and	pressure serisor failure
	// crioimance			30kPa	Workshop action:
				OR .	Check:
				Piston Cooling Oil Pressure above	– Piston cooling
			l	30kPa	pressure sensor
					If fault is not detected:
				Behavior:	Fault trace according
			l	No information available	to Tech Tool fault tree
P055D00	Piston Cooling	No Sub-type		Event:	Root Cause:
	Oil Pressure	Information	l	Voltage on B:19 above 4.85V	- Wiring harness fault
	Sensor Circuit				- Sensor fault
	High			Behavior:	– ECU fault
			l	No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P055F00	Engine Oil	No Sub-type	N/A	Event:	Root Cause:
	Pressure Out	Information		Difference between estimated oil	Low oil pressure
	of Range			pressure and real oil pressure below	
				-100kPa	Workshop action:
					Check:
				Behavior:	Low oil pressure
				No information available	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P056E92	Cold Start	Performance	N/A	Event:	Root Cause:

P056E92 Cold Start Performance N/A Event: Root Cause:

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

	Turbocharger /Supercharger Boost Control "A" Performance	or incorrect operation		Any Fault reported from VGT to ECM during Cold Start Mode Behavior: No information available	 VGT Malfunctioning Workshop action: Check: VGT If fault is not detected: Fault trace according to Tech Tool fault tree
P05E400	Park Brake Sensor/Switch Circuit Low	No Sub-type Information	N/A	Event: Sensor voltage below 0.1 V Behavior: No information available	Root Cause: - Current above normal or short circuit Workshop action: Check: - Current above normal or short circuit If fault is not detected: Fault trace according to Tech Tool fault tree
P05EB00	Cold Start SCR NOx Catalyst Inlet Temperature Too Low	No Sub-type Information	N/A	Event: EATS heating efficiency below 30% Behavior: No information available	Root Cause: - Exhaust Aftertreatment Fuel Injector "A" does not deliver fuel as expected - Exhaust Aftertreatment Fuel Injector "A" nozzle is clogged - Diesel Oxygen Catalyst has lost its conversion capability - Diesel Oxygen Catalyst is removed or damaged Workshop action: Check: - Exhaust Aftertreatment Fuel Injector "A" - Diesel Oxygen Catalyst If fault is not detected: Fault trace according to Tech Tool fault tree
P05FD00	Turbocharger /Supercharger Boost Control "A" Temperature Too High	No Sub-type Information	N/A	Event: High temperature failure detected by Turbocharger/Supercharger A. Behavior: No information available	Root Cause: - High temperature in Turbocharger /Supercharger A Workshop action: Check:

					- Turbocharger /Supercharger A If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P060100	Internal Control	No Sub-type	N/A	Event:	Root Cause:
	Module	Information		Internal Control Module Memory Check	 Corrupted dataset
	Memory Check Sum Error			Sum Error	or software
				Behavior:	Workshop action:
				Engine derate	Check:
					- Dataset or software
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P061700	Starter Relay	No Sub-type	A14.	Event:	Root Cause:
1 001700	Circuit High	Information		Short circuit to battery is detected.	– Wiring harness,
	Ollouit Flight		LD.20	Chort direct to buttery is detected.	actuator or connector
				Behavior:	is short circuited to
				Starter motor does not run	battery voltage
					Workshop action:
					Check:
					Wiring harness,
					actuator and
					connector
					- Short circuit to
					battery voltage
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P063051	VIN Not	Not	N/A	Event:	Root Cause:
	Programmed or	Programmed		The Vehicle Identification Number is	- The Vehicle
	Incompatible -			missing or incorrectly written	Identification Number
	ECM/PCM				is missing or is
				Behavior:	incorrectly written
				No information available	
					Workshop action:
					Check:
					– Vehicle
					Identification Number
P064200	Sensor	No Sub-type	N/A	Event:	Root Cause:
	Reference	Information	'\'/\	Sensor voltage below 4 V	- Throttle/Pedal
	Voltage "A"			Consol voltage below + v	Position Sensor
	Circuit Low			Behavior:	/Switch "A"/"B"
	Circuit LOW			Poor accelerator pedal response	- Sensor reference
				i ooi accelerator pedarresponse	
					voltage "A" from VECU is shorted to
					ground
					Hardware error in VECU
		l]	etion, copying, change, amondment or other similar dispo	Workshop action:

P064300	Sensor Reference Voltage "A" Circuit High	No Sub-type Information	N/A	Event: Sensor voltage above 4.5V Behavior: Poor accelerator pedal response	Check: - Throttle/Pedal Position Sensor /Switch "A"/"B" - Sensor Reference Voltage "A" from VECU - Short circuit to ground - Hardware error in VECU If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Throttle/Pedal Position Sensor /Switch "A"/"B" - Sensor reference voltage "A" from VECU is shorted to battery - Hardware error in VECU Workshop action: Check: - Throttle/Pedal Position Sensor /Switch "A"/"B" - Sensor Reference Voltage ""A"" from VECU - Short circuit to battery - Hardware error in VECU - Short circuit to battery - Hardware error in VECU - Short circuit to battery - Hardware error in VECU - Short circuit to battery - Hardware error in VECU If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause:
P065200	Sensor Reference Voltage "B" Circuit Low	No Sub-type Information	N/A	Event: Sensor voltage below 0.1 V Behavior: Poor accelerator pedal response	Root Cause: - VECU input Sensor Reference Voltage "B" is short to ground - VECU hardware error Workshop action: Check: - VECU input Sensor Reference Voltage

					"B" is short to ground – VECU hardware
					error
P066613	Control Module	Circuit Open	N/A	Event:	Root Cause:
	Internal			Voltage on ECU internal above 0.15V	Wiring harness faul
	Temperature			and	 Sensor fault
	Sensor "A"			Voltage on ECU internal below 1.12V	– ECU fault
				Behavior:	Workshop action:
				No information available	Check:
					- Wiring harness
					– Sensor
					- ECU
P066800	PCM/ECM	No Sub-type	N/A	Event:	Root Cause:
	/TCM Internal	Information		Voltage on ECU internal below 0.15V	- Wiring harness fau
	Temperature				Sensor fault
	Sensor Circuit			Behavior:	– ECU fault
	Low			No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P069100	Fan 1 Control	No Sub-type	A14.	Event:	Root Cause:
	Circuit Low	Information		Short circuit to ground is detected.	– Wiring harness,
				3	actuator or connector
				Behavior:	is short circuited to
				No information available	ground voltage
					Workshop action:
					Check:
					– Wiring harness,
					actuator and
					connector
					- Short circuit to
					ground voltage
P069200	Fan 1 Control	No Sub-type	Δ14	Event:	Root Cause:
	Circuit High	Information	1	Short circuit to battery is detected.	– Wiring harness,
	Onoun riigir			briore direction battery is detected.	actuator or connector
				Behavior:	is short circuited to
				No information available	battery voltage
				I to information available	battery voltage
					Workshop action:
					Check:
					Wiring harness,
					actuator and
					connector
					Short circuit to
					battery voltage
P06B100	Sensor Power	No Sub-type	A14.	Event:	Root Cause:
	Supply A	Information	EA:7	Voltage on A:7 below 4.5V	- Wiring harness fau
	Circuit Low				 Sensor fault
	I	1	1		– ECU fault

I	I	I	I	I	1
				Behavior:	Workshop action:
				Engine derate	Check:
					- Wiring harness
					- Sensor
					– ECU
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P06B200	Sensor Power	No Sub-type	A14.	Event:	Root Cause:
	Supply A	Information	EA:7	Voltage on A:7 above 5.5V	 Wiring harness fault
	Circuit High				Sensor fault
				Behavior:	– ECU fault
				Engine derate	
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					– ECU
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P06B400	Sensor Power	No Sub-type		Event:	Root Cause:
	Supply B	Information	EB:17	Voltage on B:17 below 4.5V	 Wiring harness fault
	Circuit Low				 Sensor fault
				Behavior:	– ECU fault
				No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					– ECU
					If fault is not detected:
					Fault trace according
DOCDEOO	C	No Codo toros	0.4.4	Property.	to Tech Tool fault tree
P06B500	Sensor Power	No Sub-type		Event:	Root Cause:
	Supply B	Information	EB:17	Voltage on B:17 above 5.5V	Wiring harness faultSensor fault
	Circuit High			Behavior:	- ECU fault
				No information available	- ECO lault
				available	Workshop action:
					Check:
					- Wiring harness
					- Sensor
					– ECU
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P06DD00	Engine Oil	No Sub-type	N/A	Event:	Root Cause:
. 332230	Pressure	Information	',''	Difference in Oil Pressure (Piston	- Oil pump regulation
	Control Circuit			Cooling Valve forced open)	valve failure
	Performance			and	
	/Stuck Off			Oil Pressure (Piston Cooling Valve	Workshop action:
Lauriaht to this o	hourmontation halange	the Make Croup	la reprodu	Letion conving change amondment or other similar dian	and in antitled without prior written

				forced closed) above 180kPa	Check:
					 Oil pump regulation
				Behavior:	valve
				No information available	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P06F700	Sensor Power	No Sub-type	A14.	Event:	Root Cause:
	Supply "C"	Information	EA:1	Voltage on A:1 below 4.5V	- Wiring harness fault
	Circuit Low			l stage on the bolow has	- Sensor fault
	on our Low			Behavior:	- ECU fault
				Engine cooling fan inoperative	Loordan
				Engine dealing fair inoperative	Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- ECU
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
DOSESOO	Sensor Power	No Sub-type	A14.	Event:	Root Cause:
P00E000	Supply "C"	Information	EA:1		Wiring harness fault
	Circuit High	IIIIOIIIIalioii	EA. 1	Voltage on A:1 above 5.5V	- Sensor fault
	Circuit riigii			Behavior:	- ECU fault
					- ECO lault
				Engine cooling fan inoperative	Markahan aatian:
					Workshop action:
					Check:
					Wiring harnessSensor
					- ECU
					If fault is not detected:
					Fault trace according to Tech Tool fault tree
DOSEEDO	Cold Ctowt	No Culo turo	NI/A	Franti	
PUOFEUU	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	Diesel Intake	Information		Throttle position - demanded throttle	– Malfunctioning
	Air Flow			position above 10% OR	intake throttle valve
	Control				Morkoban action.
	Performance			Demanded throttle position - throttle	Workshop action:
				position above 10%	Check:
				Robovion	 Intake throttle valve
				Behavior: No information available	
D400440	Facility and an	Cinavit On an	0440		Doot Course
P100113	Engine stop	Circuit Open	1		Root Cause:
	switch		27	Voltage on A:27 above (24.42V *	Wiring harness faultSensor fault
				(Battery Voltage / 24.0V))	
				OR	– ECU fault
				Voltage on A:27 above (20.30V *	Montoh an a at!
				(Battery Voltage / 24.0V))	Workshop action:
				and	Check:
				Voltage on A:27 below (23.56V *	- Wiring harness
				(Battery Voltage / 24.0V))	– Sensor
				OR	- ECU
				Voltage on A:27 above (2.86V *	
	<u></u>	1 11 2	ļ	(Battery Voltage / 24.0V))	
nyriaht to this a	nocumentation helongs	th the Volvo Group	No reprod	uction, copying, change, amendment or other similar disp	agal is entitled without prior written in

P101100	Cold Start Cylinder 1 Fuel Injector Offset Learning at Max Limit	No Sub-type Information	N/A	and Voltage on A:27 below (18.14V * (Battery Voltage / 24.0V)) Behavior: No information available Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior:	Root Cause: - Losses via PTO or other power consuming equipment - VCB valve malfunction
				Uneven torque	- Worn injector cam lobe - Unadjusted tappet clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector
					Workshop action: Check: - PTO and other power consuming equipment - VCB valve - Injector - Valves and unit injectors - Valve springs or guides - Valves - Piston/cylinder - Injector
P101200	Cold Start Cylinder 1 Fuel Injector Offset Learning at Min Limit	No Sub-type Information	N/A	Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check:

I	I	I	I	I	DTO 4:141
					– PTO and other
					power consuming
					equipment
					– Injector
P101300	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	Cylinder 2 Fuel	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Injector Offset			offset ratios in percentage of the fault	other power
	Learning at			code limit for each injector.	consuming equipment
	Max Limit				- VCB valve
				Behavior:	malfunction
				Uneven torque	Worn injector cam
					lobe
					Unadjusted tappet
					clearance for valves
					or unit injectors
					Misaligned or
					broken valve springs
					or guides
					- Cracked valves
					- Piston/cylinder worn
					/damaged
					- Worn injector
					- Cracked injector tip
					- Damaged spray
					holes in the injector
					lioles in the injector
					Workshop action:
					Check:
					– PTO and other
					power consuming
					equipment
					– VCB valve
					InjectorValves and unit
					injectors
					Valve springs or
					guides
					– Valves
					– Piston/cylinder
					– Injector
P101400	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	1	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Injector Offset			offset ratios in percentage of the fault	other power
	Learning at Min			code limit for each injector.	consuming equipment
	Limit			L	– Worn injector
				Behavior:	- Cracked injector tip
				Uneven torque	 Damaged spray
					holes in the injector
					Workshop action:
					Check:
					PTO and other
					power consuming
Copyright to this o	ocumentation belongs t	the Volvo Group.	No reprodu	ction, copying, change, amendment or other similar dispos	sal is entitled without prior written

					equipment
					– Injector
P101D00		No Sub-type	N/A	Event:	Root Cause:
	Cylinder 3 Fuel	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Injector Offset			offset ratios in percentage of the fault	other power
	Learning at Max Limit			code limit for each injector.	consuming equipment - VCB valve
	IVIAX LITTIC			Behavior:	malfunction
				Uneven torque	- Worn injector cam
				Oneventorque	lobe
					- Unadjusted tappet
					clearance for valves
					or unit injectors
					- Misaligned or
					broken valve springs
					or guides
					- Cracked valves
					- Piston/cylinder wor
					/damaged
					- Worn injector
					- Cracked injector tip
					- Damaged spray
					holes in the injector
					noise in the ingester
					Workshop action:
					Check:
					– PTO and other
					power consuming
					equipment
					– VCB valve
					– Injector
					– Valves and unit
					injectors
					– Valve springs or
					guides – Valves
					Piston/cylinderInjector
P102111	Volvo	Short Circuit	A14.	Event:	Root Cause:
F 102111	Compression	to Ground		Short circuit to ground is detected	– Wiring harness,
	Brake (VCB)	lo Ground	A14.	Short circuit to ground is detected	actuator or connecto
	Control Circuit		1	Behavior:	is short circuited to
	Control Circuit			Engine starts but does not continue to	ground voltage
				run	ground ronago
					Workshop action:
					Check:
					- Wiring harness
					– Actuator
					- Connector
					- Short circuit to
					ground voltage
P102112		Short Circuit	1		Root Cause:
	Compression	to Battery to the Volvo Group.	EB:37	Short circuit to battery is detected	Wiring harness,

	Brake (VCB) Control Circuit		A14. EB:30	Behavior: Auxiliary brakes, low performance	actuator or connector is short circuited to battery voltage
				(reduced engine braking)	Workshop action: Check: - Wiring harness - Actuator - Connector
					- Short circuit to
7400440		0: "0			battery voltage
P102113		Circuit Open		Event:	Root Cause:
	Compression			Open circuit fault is detected	Open circuit in
	Brake (VCB)		A14.	L	wiring harness,
	Control Circuit		EB:30	Behavior:	actuator or connector
				Auxiliary brakes, low performance	[
				(reduced engine braking)	Workshop action:
					Check:
					- Wiring harness
					– Actuator
					– Connector
					- Open circuit
P102300	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	1 *	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Injector Offset			offset ratios in percentage of the fault	other power
	Learning at Min Limit			code limit for each injector.	consuming equipment - Worn injector
				Behavior:	Cracked injector tip
				Uneven torque	– Damaged spray
					holes in the injector
					Workshop action:
					Check:
					– PTO and other
					power consuming
					equipment
					– Injector
P102400	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	Cylinder 4 Fuel	Information		100% above Cylinder balancing fueling	Losses via PTO or
	Injector Offset			offset ratios in percentage of the fault	other power
	Learning at			code limit for each injector.	consuming equipment
	Max Limit				– VCB valve
				Behavior:	malfunction
				Uneven torque	– Worn injector cam
					lobe
					 Unadjusted tappet
					clearance for valves
					or unit injectors
					– Misaligned or
					broken valve springs
			I		or guides
		1			or guides
					- Cracked valves
					_

P102500	Cold Start	No Sub-type	N/A	Event:	/damaged - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO and other power consuming equipment - VCB valve - Injector - Valves and unit injectors - Valve springs or guides - Valves - Piston/cylinder - Injector Root Cause:
P102500	Cold Start Cylinder 4 Fuel Injector Offset Learning at Min Limit	No Sub-type Information	N/A	Levent: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Losses via PTO or other power consuming equipment Worn injector Cracked injector tip Damaged spray holes in the injector Workshop action: Check: PTO and other power consuming equipment Injector
	Cold Start Cylinder 5 Fuel Injector Offset Learning at Max Limit	No Sub-type Information	N/A	Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - VCB valve malfunction - Worn injector cam lobe - Unadjusted tappet clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector

P102700	Cold Start Cylinder 5 Fuel	No Sub-type Information	N/A	Event: 100% above Cylinder balancing fueling	- Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO and other power consuming equipment - VCB valve - Injector - Valves and unit injectors - Valve springs or guides - Valves - Piston/cylinder - Injector Root Cause: - Losses via PTO or
	Injector Offset Learning at Min Limit	information		offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	other power consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO and other power consuming equipment - Injector
	Cold Start Cylinder 6 Fuel Injector Offset Learning at Max Limit	No Sub-type Information		Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - VCB valve malfunction - Worn injector cam lobe - Unadjusted tappet clearance for valves or unit injectors - Misaligned or broken valve springs or guides - Cracked valves - Piston/cylinder worn /damaged - Worn injector - Cracked injector tip - Damaged spray

					holes in the injector Workshop action: Check: – PTO and other power consuming equipment – VCB valve – Injector – Valves and unit injectors – Valve springs or guides – Valves – Piston/cylinder – Injector
	Cold Start Cylinder 6 Fuel Injector Offset Learning at Min Limit	No Sub-type Information	N/A	Event: 100% above Cylinder balancing fueling offset ratios in percentage of the fault code limit for each injector. Behavior: Uneven torque	Root Cause: - Losses via PTO or other power consuming equipment - Worn injector - Cracked injector tip - Damaged spray holes in the injector Workshop action: Check: - PTO and other power consuming equipment - Injector
1	Particulate Matter Sensor Clogged Tip	No Sub-type Information	N/A	Event: Particulate Matter Sensor Tip Clogged Fault Behavior: No information available	Root Cause: - Debris on sensor exhaust intake Workshop action: Check: - Sensor exhaust intake
	Particulate Matter Sensor Removed from Exhaust	No Sub-type Information	N/A	Event: Particulate Matter Sensor Removed From Exhaust Fault Behavior: No information available	Root Cause: - Particulate Matter Sensor removed from exhaust stream Workshop action: Check: - Particulate Matter Sensor
P103400	Particulate Matter Sensor System Voltage Too High	No Sub-type Information	N/A	Event: Particulate Matter Sensor Module System Voltage Too High	Root Cause: – Bad battery or generator or wiring harness

					Workshop action:
				Behavior:	Check:
				No information available	Battery, generator
					and wiring harness
P103600	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	Closed Loop	Information		Average rail pressure deviation below	- Inlet metering valve
	Fuel Pressure			-140bar above conditions must remain	with damaged
	Control At Limit			valid for 5s	connector/wiring
	- Pressure Too				harness
	Low			Behavior:	- Leaking fuel
				Engine derate	pressure release valve
					Leaking high
					pressure fuel system
					High fuel pressure
					pump
					Fuel pressure
					regulator
					– Low fuel pressure
					system, fuel supply
					Workshop action:
					Check:
					- Inlet metering valve
					with connector/wiring
					harness
					- Pressure Release
					Valve
					High pressure fuel
					system
					High fuel pressure
					pump
					- Fuel pressure
					regulator
					Low fuel pressure
					system, fuel supply
P103700	Cold Start	No Sub-type	N/A	Event:	Root Cause:
	Closed Loop	Information		Average rail pressure deviation above	- Rotated cam profile
	Fuel Pressure			140 bar above conditions must remain	- Leaking fuel
	Control At Limit			valid for 5s	pressure release valve
	- Pressure Too				- Fuel pressure
	High			Behavior:	regulator
				Engine derate	Low fuel pressure
					system
					- Bad fuel quality
					- Pressure release
					valve stuck closed
					Workshop action:
					Check:
					– Cam profile
					– Fuel pressure
					release valve
Damumic Lata 11:	de auma ent-ti l	to the 1/-!: 0		Line continue shapes assessment at the continue shapes assessment at the continue shapes are shapes at the continue shapes at the continue shapes are shapes at the continue shapes at	- Fuel pressure
opyright to this	documentation belongs	to the Volvo Group.	No reprod	uction, copying, change, amendment or other similar dispo	sal is entitled without prior written b

P103B00	Dosing Valve Inducement	No Sub-type Information	N/A	a difference smaller than: 3.5 and It can take up to 60 minutes before reporting fail on the monitor Behavior: Engine derate	regulator - Low fuel pressure system - Fuel quality - Pressure release valve Root Cause: - Reductant dosing valve blocked or clogged Workshop action: Check: - Reductant dosing valve
1	NOx Catalyst Efficiency Inducement, Selective Catalytic Reduction (SCR) Unit	No Sub-type Information	N/A	Event: Filtered urea efficiency below 75% and The evaluation of urea efficiency used for dilution detection may be required to be repeated a few times to set the fault. Time required depends on engine load and the NOx flow. With all enable conditions fulfilled, it normally takes no more than a few minutes. Behavior: Engine derate	Root Cause: - Reductant quality and concentration - Exhaust leakage - Sulfur poisoning - Reductant delivery - SCR catalyst - Upstream NOx sensor - Downstream NOx sensor Workshop action: Check: - Reductant quality and concentration - Exhaust leakage - SCR catalyst - Upstream NOx sensor - Downstream NOx sensor - Downstream NOx sensor - Downstream NOx sensor - Downstream NOx sensor
	Moderately Low	No Sub-type Information	N/A	Event: If calculated value for oil level below 4% and Engine must be in prerunning during a specific time, defined by output from map with input Engine Oil Temperature (EOT) Behavior: Engine shuts off unexpectedly – Only at low speed Event:	– Oil leakage
	Filter Differential Pressure Critically High	Information		Compensated Diesel Particulate Filter Differential Pressure high	- Chunk of ice is influencing measure values of the sensor - Muck soot in the

I	ı	1	ı	I	1
					particle filter
				Behavior:	- The filter is broken
				Engine derate	
					Workshop action:
					Check:
					- Chunk of ice is
					influencing measure
					values of the sensor
					- Muck soot in the
					particle filter
					The filter
P10E200	Particulate	No Sub-type	N/A	Event:	Root Cause:
	Filter	Information	,,	Compensated Diesel Particulate Filter	- Chunk of ice is
	Differential			Differential Pressure high	influencing measure
	Pressure			Differential Fredsale High	values of the sensor
	Moderately			Behavior:	- Muck soot in the
	1			Engine derate	particle filter
	High			Engine derate	- The filter is broken
					- The flitter is broken
					Workshop action:
					Check:
					- Chunk of ice is
					influencing measure
					values of the sensor
					– Muck soot in the
					particle filter
P10EB00	ECB	No Sub two	N/A	Event:	- The filter Root Cause:
PIUEDUU	Differential	No Sub-type Information	IN/A		
		Information		Engine Exhaust Gas Recirculation 1 Differential Pressure below -1.6kPa	- Sensor
	Pressure			Differential Pressure below - 1.6kPa	Market en estien.
	Sensor "A"				Workshop action:
	Circuit Below			Behavior:	Check:
	Range			No information available	- Sensor
P10EC00		No Sub-type	N/A	Event:	Root Cause:
	Differential	Information		Engine Exhaust Gas Recirculation 1	- Sensor
	Pressure			Differential Pressure above 1.6kPa	
	Sensor "A"				Workshop action:
	Circuit Above			Behavior:	Check:
	Range			No information available	– Sensor
P10FE00	Particulate	No Sub-type	N/A	Event:	Root Cause:
	Filter	Information		High soot load in aftertreatment diesel	High soot load in
	Restriction -			particulate filter	aftertreatment diesel
	Soot				particulate filter
	Accumulation			Behavior:	– High ash load in
	Moderately			Engine derate	aftertreatment diesel
	High Bank 1				particulate filter
					- Clogging of
					aftertreatment diesel
					particulate filter
					l'
					- Faulty
					aftertreatment diesel
					particulate filter
					differential pressure

					sensor - Faulty boost pressure sensor - Faulty exhaust gas recirculation differential pressure sensor
					Workshop action: Check: - High soot load in aftertreatment diesel particulate filter - High ash load in aftertreatment diesel particulate filter
					 Aftertreatment diesel particulate filter Aftertreatment diesel particulate filter differential pressure sensor Boost pressure sensor Exhaust gas
P110D00	Engine Stop	No Sub-type	A14.		recirculation differential pressure sensor Root Cause:
1 110000	Switch Circuit High	Information		Voltage on A:27 above (23.56V * (Battery Voltage / 24.0V)) and Voltage on A:27 below (24.42V * (Battery Voltage / 24.0V))	- Wiring harness fault - Sensor fault - ECU fault Workshop action: Check:
				Behavior: No information available	- Wiring harness - Sensor - ECU
P110E00	Engine Stop Switch Circuit Low	No Sub-type Information		Event: Voltage on A:27 above (1.33V * (Battery Voltage / 24.0V)) and Voltage on A:27 below (2.86V * (Battery	Root Cause: - Wiring harness fault - Sensor fault - ECU fault
				Voltage / 24.0V)) Behavior: No information available	Workshop action: Check: - Wiring harness - Sensor - ECU
P110F9E	Engine Stop Switch Stuck	Stuck On	N/A	Stop button is active during start-up OR Stop button becomes active when	Root Cause: - Problems with plausibility check of the stop button, stop
Copyright to this o	locumentation belongs	to the Volvo Group.	No reprodu	vehicle speed > 0 action, copying, change, amendment or other similar dispose	button stuck

I	I		I	I	
				Behavior:	Workshop action:
				No information available	Check:
					- Problems with
					plausibility check of
					the stop button, stop
					button stuck
D111400	Intake Manifold	No Sub-type	N/A	Event:	Root Cause:
FILIAGO		Information	IN/A	Inlet Manifold Air Temperature (IMAT)	– Poor cooling
	Too High	IIIIOIIIIalioii			- Extreme running
	Too right			high	conditions
				Behavior:	Conditions
					Modsehen estion.
				Engine derate	Workshop action: Check:
					- Cooling
					- Running conditions
					If fault is not detected:
					Fault trace according
	_				to Tech Tool fault tree
P111C00	· ·	No Sub-type	N/A	Event:	Root Cause:
		Information		Estimated air temperature out from	- Extreme driving
	Temperature			compressor high	conditions
	Too High				
				Behavior:	Workshop action:
				Engine derate	Check:
					 Extreme driving
					conditions
P111D00	Engine Coolant	1	N/A	Event:	Root Cause:
	1	Information		Engine Coolant Level low	Sensor out of range
	Moderately Low				
				Behavior:	Workshop action:
				No information available	Check:
					 Sensor out of range
P111E00	Engine Coolant	No Sub-type	N/A	Event:	Root Cause:
	Temperature	Information		Engine Coolant Temperature high	 Extreme driving
	Moderately				conditions, resulting in
	High			Behavior:	too high temperature
				No information available	- The coolant
					thermostat is broken
					- Problems with the
					fan
					- The radiator is
					blocked
					Workshop action:
					Check:
					 Extreme driving
					conditions, resulting in
					too high temperature
					- Coolant thermostat
					– Fan
					– Radiator
P112100	EGR	No Sub-type	N/A	Event:	Root Cause:
houright to this	logumentation belongs t	the Velve Croup	lo roprod	lation conving change amondment or other similar dispo	and in antitled without prior written

I	Temperature	Information		Exhaust Gas Recirculation	_ Extreme driving
	Too High	IIIIOIIIIalioii			conditions
	100 High			Temperature (EGRT) high	- EGR cooler
				Behavior:	problems
					problems
				Engine derate	Madrahan artism.
					Workshop action:
					Check:
					- Extreme driving
					conditions
D440400	505				– EGR cooler
P112198		Component	N/A	Event:	Root Cause:
	Temperature	or System		Exhaust Gas Recirculation	- Extreme driving
	Too High	Overheating		Temperature (EGRT) high	conditions
					– EGR cooler
				Behavior:	problems
				Engine derate	
					Workshop action:
					Check:
					 Extreme driving
					conditions
					– EGR cooler
P112200	EGR	No Sub-type	N/A	Event:	Root Cause:
	Temperature	Information		Exhaust Gas Recirculation	 Extreme driving
	Moderately			Temperature (EGRT) high	conditions
	High				– EGR cooler
				Behavior:	problems
				Engine derate	
					Workshop action:
					Check:
					 Extreme driving
					conditions
					– EGR cooler
P112500	Engine Oil	No Sub-type	N/A	Event:	Root Cause:
	Temperature	Information		Engine Oil Temperature (EOT) high	 Extreme driving
	Moderately				conditions
	High			Behavior:	
				Engine derate	Workshop action:
					Check:
					- Driving conditions
P112900	Transmission	No Sub-type	N/A	Event:	Root Cause:
	Fluid	Information		Sensor Gearbox Oil Temperature high	- Transmission cooler
	Temperature				failure
	Moderately			Behavior:	- Cooling system
	High			Engine derate	problem
					ŗ
					Workshop action:
					Check:
					- Transmission cooler
					- Cooling system
P113500	Crankcase	No Sub-type	N/A	Event:	Root Cause:
1 110000	Pressure	Information	14/7	Difference between ambient air	- Too high difference
	Relative to				between ambient air
				pressure and crank case pressure too	
houright to this	Ambient	to the Vehic Craim	lo roprod	high.	pressure and crank

Ambient high. pressure and crank Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by

	Pressure Too				case pressure.
	High			Behavior:	
				Engine derate	Workshop action:
					Check:
					- Difference between
					ambient air pressure
					and crank case
					pressure
P113600	NOx Sensor 1	No Sub-type	N/A	Event:	Root Cause:
	/2 Correlation	Information		not Upstream NOx Sensor available in	Wrong configuration
	Calibration			ECM	in ECM
	Error Bank 1			or	- Upstream
				not Downstream NOx Sensor available	/Downstream NOx
				in ECM	Sensors configuration
					in (control part) do not
				Behavior:	match setup in
				No information available	(diagnostic part)
					Workshop action:
					Check:
					- Configuration in
					ECM
					- Upstream
					/Downstream NOx
					sensor configurations
P113711	Oil Thermostat	Short Circuit	Λ14 D:	Event	Root Cause:
F113/11	Oii Themostat	to Ground	53		– Wiring harness,
		lo Ground	55	Short circuit to ground is detected.	1
				Behavior:	actuator or connector
				No information available	is short circuited to
				No information available	ground voltage.
					Workshop action:
					Check:
					Wiring harness,
					actuator and
					connector
					- Short circuit to
					ground voltage
P113712	Oil Thermostat	Short Circuit	A14.B:	Event:	Root Cause:
107 12	- Inomostat	to Battery	53	Short circuit to battery is detected.	- Wiring harness,
		Dationy		distributed battery is detected.	actuator or connector
				Behavior:	is short circuited to
				No information available	battery voltage.
				TO THOTHAGOT AVAILABLE	battery voitage.
					Workshop action:
					Check:
					– Wiring harness,
					actuator and
					connector
					- Short circuit to
D440740	Oil The second of	Oiner it O	A 4 4 5	F	battery voltage
P113/13	Oil Thermostat	Circuit Open	1		Root Cause:
l	l		53	Open circuit fault is detected.	Open circuit in

				Behavior: No information available	wiring harness, actuator or connector Workshop action: Check: - Open circuit - Wiring harness, actuator and connector
P113F11	Buffered Idle Validation Switch Wire - VECU Side	Short Circuit to Ground	N/A	Event: VECU input IVS1 is high (close to battery voltage) and VECU output BUFFIVS is low (close to ground) Behavior: No information available	Root Cause: - Wiring harness issue on the buffered idle validation switch - Short circuit to ground on VECU connector Workshop action: Check: - Wiring harness on the buffered idle validation switch - Short circuit to ground
P113F12	Buffered Idle Validation Switch Wire - VECU Side	Short Circuit to Battery	N/A	Event: VECU input IVS1 is low (close to ground) and VECU output BUFFIVS is high (close to battery voltage) Behavior: No information available	Root Cause: - Wiring harness issue on the buffered idle validation switch - Short circuit to battery on VECU connector Workshop action: Check: - Wiring harness on the buffered idle validation switch - Short circuit to battery
P114000	Volvo Compression Brake (VCB) Control Oil Temperature Too Low	No Sub-type Information	N/A	Event: Engine oil temperature is too low when engine brake is demanded Behavior: Auxiliary brakes, low performance (reduced engine braking)	Root Cause: No fault, only for driver information:. – Low engine oil temperature when engine brake is requested Workshop action: No fault, only for driver information: – Low engine oil

					temperature when engine brake is requested
P114113	Buffered Idle	Circuit Open	A14.	Event:	Root Cause:
	 Validation			Voltage on B:15 above (7.64V *	Wiring harness fault
	Switch Wire,			(Battery Voltage / 24.0V))	- Sensor fault
	Engine Control			and	- ECU fault
	Module (ECM)			Voltage on B:15 below (18.30V *	
	Side			(Battery Voltage / 24.0V))	Workshop action:
					Check:
				Behavior:	- Wiring harness
				No information available	- Sensor
					- ECU
D11/1123	Buffered Idle	Signal Stuck	A14.	Event:	Root Cause:
F 1 14 123	Validation	Low		Calculated pedal position percentage	Signal stuck high/low
	Switch Wire -	LOW	EB. 13	above 50% and Buffered IVS Switch	- Signal Stuck High/low
					Madahan adian
	ECM Side			Status equal to 0	Workshop action:
				L	Check:
				Behavior:	Signal stuck high/low
				No information available	
P114124	Buffered Idle	Signal Stuck		Event:	Root Cause:
	Validation	High	EB:15	Calculated pedal position percentage	Signal stuck high/low
	Switch Wire -			below 1% and Buffered IVS Switch	
	ECM Side			Status equal to 1	Workshop action:
					Check:
				Behavior:	Signal stuck high/low
				No information available	
P114212	Fan Thermal	Short Circuit	A14.	Event:	Root Cause:
	Switch	to Battery	EA:5	Voltage on A:5 above 3.99V and	Wiring harness fault
				Voltage on A:5 below 4.20V	 Sensor fault
					– ECU fault
				Behavior:	
				No information available	Workshop action:
					Check:
					- Wiring harness
					- Sensor
					– ECU
D11/212	Fan Thermal	Circuit Open	A14.	Event:	Root Cause:
F 14213	Switch	Oncor Open		Voltage on A:5 above 0.82V and	- Wiring harness fault
	SWILCH		EA.5	_	- Sensor fault
				Voltage on A:5 below 3.99V	
				Paharian.	– ECU fault
				Behavior:	Manufacture "
				No information available	Workshop action:
					Check:
					- Wiring harness
					– Sensor
					– ECU
P114500	Reductant	No Sub-type	N/A	Event:	Root Cause:
	Level	Information		Reductant level below 12% must	– Reductant level low
	Moderately Low			remain valid for 45s	
				Behavior:	Workshop action:
				Engine derate	Check:
bovright to this o	ocumentation belongs t	the Volvo Group.	No reprodu	ction, copying, change, amendment or other similar disp	osal is entitled without prior written

					 Reductant level If fault is not detected: Fault trace according Tech Tool fault tree
P114800	Communication With ECM According To	No Sub-type Information	N/A	Event: Communication failure detected by Turbocharger/Supercharger A.	Root Cause: – Disturbance on CAN
	Turbocharger /Supercharger Control Module "A"			Behavior: Low power	Workshop action: Check: - Disturbance on CAN If fault is not detected: Fault trace according to Tech Tool fault tree
P115000	Throttle/Pedal Position Sensor /Switch "A"/"D" Voltage Correlation	No Sub-type Information	N/A	Event: 2 different occasions can set this code: (VECU input IVS1 is low AND VECU input IVS2 is high AND accelerator sensor voltage below 0.65V) OR (VECU input IVS1 is high AND VECU input IVS2 is low AND accelerator pedal sensor voltage above 1.2V)	Root Cause: - VECU input Throttle /Pedal Position Sensor /Switch "D" is short to battery - VECU input Throttle /Pedal Position Sensor /Switch "D" is short to ground
				Behavior: No information available	Workshop action: Check: - VECU input Throttle /Pedal Position Sensor /Switch "D"
P115100		No Sub-type Information	N/A	Event: Temperature in the aftertreatment system high Behavior: Engine derate	Root Cause: - Extreme driving conditions may result in high temperatures - High soot load in aftertreatment diesel particulate filter may result in high temperatures - Exhaust gas temperature sensor bank 1 sensor 1 may be faulty - Exhaust gas temperature sensor bank 1 sensor 2 may be faulty - Exhaust gas temperature sensor bank 1 sensor 2 may be faulty - Exhaust gas temperature sensor bank 1 sensor 3 may be faulty
payright to this		a tha Valua Craun	No repred	uction, copying, change, amendment or other similar dispo	Workshop action: Check:

					- Driving conditions
					High soot load in
					aftertreatment diesel
					particulate filter
					Exhaust gas
					temperature sensor
					bank 1 sensor 1
					Exhaust gas
					temperature sensor
					bank 1 sensor 2 may
					– Exhaust gas
					temperature sensor
					bank 1 sensor 3
P115300	Diesel Intake	No Sub-type	N/A	Event:	Root Cause:
1 110000	Air Flow	Information	14// (Calibration requested and no calibration	- Intake throttle valve
	Position	Iniomation		performed	calibration not
	Sensor			periorined	performed
	Exceeded			Behavior:	perioritied
	Learning Limit				 Workshop action:
	Learning Limit				Check:
					- Intake Throttle
					Valve calibration
D445400	D. J. O. Mari	N. O. I. I	N1/A	P	
P115400	Body Control	No Sub-type	N/A		Root Cause:
	Module "A"	Information		Lost communication between IPC and	- IPC not powered
	Lost			BCM on medium speed CAN	
	Communication			communication bus	Workshop action:
	With				Check:
	Instrument			Behavior:	- IPC
	Panel Cluster				If fault is not detected:
	(IPC) Control				Fault trace according
	Module				to Tech Tool fault tree
P115500	Lost	No Sub-type	N/A	Event:	Root Cause:
	Communication	Information		Lost communication with IPC on	- IPC not powered
	with			medium speed CAN communication bus	- Software
	Aftertreatment				incompatibility with
	Diesel			Behavior:	IPC
	Particulate			No information available	
	Filter				Workshop action:
	Regeneration				Check:
	Inhibit Switch				- IPC not powered
					– Software
P117600	Starter Motor	No Sub-type	N/A	Event:	Root Cause:
	Deactivated -	Information		Starter motor is overheated when start	Starter motor is
	Over			is requested	overheated
	Temperature				
				Behavior:	Workshop action:
				Starter motor does not run	Check:
					- Starter motor
P117700	Starter Motor	No Sub-type	N/A	Event:	Root Cause:
	Deactivated -	Information	. 4// 1	Gear box is not in neutral position when	
	Transmission			· ·	neutral position
	Not in Neutral				
					Workshop action:
onvright to this	logumentation belongs	the the Velve Croup	la rantadi	ection, conving change amondment or other similar dispos	

				Behavior	Check:
				Behavior:	– Gear box
				Starter motor does not run	
P117900	Starter Motor	No Sub-type	N/A	Event:	Root Cause:
	Deactivated -	Information		The starter motor is stopped due to PTC	
	PTO Active				starter motor
				Behavior:	
				Starter motor does not run	Workshop action:
					Check:
					- PTO
P200200	Diesel	No Sub-type	N/A	Event:	Root Cause:
	Particulate	Information		Number of Particulate Matter Sensor	 Damaged Diesel
	Filter Efficiency			evaluations exceeding 380s divided by	Particulate Filter
	Below			total number of Particulate Matter	
	Threshold			Sensor evaluations below	Workshop action:
	(Bank 1)			0.100000001490116 ratio.	Check:
					 Diesel Particulate
				Behavior:	Filter
				No information available	
P203B00	Aftertreatment	No Sub-type	N/A	Event:	Root Cause:
	Reagent Level	Information		Deviation between highest and lowest	Reductant level
	Warning			urea tank level measurements during	sensor stuck
				diagnosis below 10mm	- Clogged reductant
				3	delivery system
				Behavior:	- Incompatible
				No information available	reductant tank
				The information available	installed
					Workshop action:
					Check:
					- Reductant level
					sensor
					- Reductant delivery
					1
					system
					- Incompatible
					reductant tank
DOOGEOO	D 1 1 1	N 0 1 1			installed
P203F00	Reductant	No Sub-type	N/A	Event:	Root Cause:
	Level Low	Information		Reductant level below 0.1% must	- Reductant tank
				remain valid for 30s.	empty
				Behavior:	Workshop action:
				Engine derate	Check:
					- Reductant tank
					If fault is not detected:
					Fault trace according
		1			to Tech Tool fault tree
P205B64	Reductant	Signal	N/A	Event:	Root Cause:
	Tank	Plausibility		Absolute difference between urea tank	– Malfunctioning DEF
	Temperature	Failure		temperature and urea quality	Tank Temperature
	Sensor Circuit			temperature above 9s	Sensor
	Range				
	/Performance				Workshop action:
ovright to this o	hourmontation bolongs	th the Velve Croup	la rancad	Uction, copying, change, amendment or other similar dispo	· ·

P206B64	Reductant Quality Sensor Range /Performance	Signal Plausibility Failure	N/A	Behavior: No information available Event: If a DTC in the "Inhibited by the following DTCs"-list is failed or not evaluated, it might inhibit this DTC and Reductant concentration below 18% and Difference between the filtered NOx conversion and the expected NOx conversion, based on reductant concentration, above 5% and Catalyst Efficiency above -1% OR Reductant concentration above fault	Check: - Tank Temperature Sensor If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Reductant quality sensor Workshop action: Check: - Reductant quality sensor If fault is not detected: Fault trace according to Tech Tool fault tree
				limit for plausibility high Behavior: No information available	
P207F00	Reductant Quality	No Sub-type Information	N/A	Event: Increased reductant flow has not improved conversion efficiency and the flow cannot be increased further and Reductant concentration below 18% and Conversion efficiency has decreased rapidly Behavior: Engine derate	Root Cause: - Reductant quality and concentration - Exhaust leakage - Sulfur poisoning - Reductant delivery - SCR catalyst - Upstream NOx sensor - Downstream NOx sensor
					Workshop action: Check: - Reductant quality and concentration - Exhaust leakage - Sulfur poisoning - Reductant delivery - SCR catalyst - Upstream NOx sensor
1	Exhaust Gas	Signal	N/A	Event:	- Downstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause:

	Temperature Sensor Circuit Range /Performance Bank 1 Sensor 1	Plausibility Failure		Evaluation performed before engine start: Difference between Exhaust Gas Temperature Sensor 1 and Sensor 2 and 3 above 40°C OR Exhaust gas temperature sensor 1 above 70°C OR Evaluation between the sensors performed while engine running: Difference between Exhaust Gas Temperature Sensor 1 and Sensor 2 above 70°C and Difference between Exhaust Gas Temperature Sensor 1 and Sensor 3 above 70°C OR Exhaust gas temperature sensor 1 below 100°C	- Exhaust Gas Temperature Sensor Sensor 1 Not Mounted Exhaust Gas Temperature Sensor Sensor 1 Broken - All three exhaust gas temperature sensors not mounted correctly, tampering with distances Workshop action: Check: - Exhaust Gas Temperature Sensor Sensor If fault is not detected: Fault trace according to Tech Tool fault tree
				Behavior: Manual regeneration not possible	
P208464	Exhaust Gas Temperature Sensor Circuit Range /Performance (Bank 1 Sensor 2)	Signal Plausibility Failure	N/A	Event: Evaluation performed before engine start: Difference between exhaust gas temperature sensor 2 and sensor 1 and 3 above 40°C OR Exhaust Gas Temperature Sensor 2 above 70°C OR Evaluation between the sensors performed while engine running: Difference between Exhaust Gas Temperature Sensor 1 and Sensor 2 above 70°C and Difference between Exhaust Gas Temperature Sensor 2 and Sensor 3 above 70°C OR Exhaust Gas Temperature Sensor 2 and Sensor 3 above 70°C OR Exhaust Gas Temperature Sensor 2 below 100°C Behavior:	Root Cause: - Exhaust gas temperature sensor 2 not mounted - Exhaust gas temperature sensor 2 broken - All three exhaust gas temperature sensors not mounted correctly, tampering with distances Workshop action: Check: - Exhaust gas temperature sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P208E00	Aftertreatment Reagent Dosing Valve	No Sub-type Information	N/A	No information available Event: Stored reagent pump duty-cycle during high dosing	Root Cause: - Reductant dosing valve blocked or

		Fluid Leak or Seal Failure	EB:62 A14.	Stored reagent pump duty-cycle during low dosing shall have a difference smaller than: 18.5 Behavior: No information available Event: Aftertreatment 1 Fuel Pressure 1 below fuel pressure limit used for the fuel leakage (FL) evaluation. Behavior: Manual regeneration not possible	Workshop action: Check: - Reductant dosing valve If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Exhaust Aftertreatment Fuel Injector Stuck Closed Workshop action: Check: - Exhaust Aftertreatment Fuel Injector
					If fault is not detected: Fault trace according to Tech Tool fault tree
P20D000	Exhaust Aftertreatment Fuel Injector "A" Stuck Closed	No Sub-type Information	EB:62 A14.	Event: Aftertreatment 1 Fuel Pressure 1 above 140kPa and not Aftertreatment 1 Fuel Pressure 1 below 25kPa and Aftertreatment 1 Fuel Pressure 1 below 300kPa OR Aftertreatment 1 Fuel Pressure 1 above 200kPa and Aftertreatment 1 Fuel Pressure 1 above 200kPa Behavior: Manual regeneration not possible	Root Cause: - Exhaust Aftertreatment Fuel Injector Stuck Closed Workshop action: Check: - Exhaust Aftertreatment Fuel Injector If fault is not detected: Fault trace according to Tech Tool fault tree
1	Exhaust Aftertreatment Fuel Supply Control	Circuit Open		Event: Open circuit fault is detected Behavior: Manual regeneration not possible	Root Cause: - Wiring harness - Actuator - Connector Workshop action: Check: - Wiring harness - Actuator - Connector
	Aftertreatment	No Sub-type Information	EB:2	Event: Short circuit to ground is detected.	Root Cause: - Wiring harness, actuator or connector is short circuited to

Fuel Supply Control Circuit Low			Behavior: Manual regeneration not possible	ground voltage Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit to
Aftertreatment Fuel Supply Control Circuit High	No Sub-type Information	EB:2	Event: Short circuit to battery is detected. Behavior: Manual regeneration not possible	ground voltage Root Cause: - Wiring harness, actuator or connector is short circuited to battery voltage. Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit to battery voltage
Exhaust Aftertreatment Fuel Supply Control Stuck Closed	No Sub-type Information	N/A	Event: Monitor A Failure Event IDTC_ATI1_FP_PL and Aftertreatment 1 Fuel Pressure 1 below 100kPa and not Aftertreatment 1 Fuel Pressure 1 below 25kPa and Aftertreatment 1 Fuel Pressure 1 below 300kPa OR Aftertreatment 1 Fuel Pressure 1 above 200kPa and Aftertreatment 1 Fuel Pressure 1 above 200kPa OR Monitor B Failure Event IDTC_ATI1_FP_PL and Fuel Pressure In The Exhaust Aftertreatment Fuel Injector below 0kPa must remain valid for 60s Behavior: Manual regeneration not possible	Root Cause: - Exhaust aftertreatment fuel supply control valve stuck closed Workshop action: Check: - Exhaust aftertreatment fuel supply control valve If fault is not detected: Fault trace according to Tech Tool fault tree
Exhaust aftertreatment fuel pressure	Circuit Open	l .	Event: Voltage on A:50 above 4.79V and	Root Cause: - Wiring harness fault - Sensor fault

	sensor			Voltage on A:50 below 4.85V OR	ECU fault
				Voltage on A:50 below 0.21V	Workshop action: Check:
				Behavior:	- Wiring harness
				Manual regeneration not possible	- Sensor
				Warida regeneration not possible	– ECU
P20DE00	Exhaust	No Sub-type	A14.	Event:	Root Cause:
	Aftertreatment Fuel Pressure Sensor Circuit	Information	EA:50	Aftertreatment 1 Fuel Pressure 1 below 25kPa and	– Sensor Stuck Or Out Of Range
	Range			Aftertreatment 1 Fuel Pressure 1 below	Workshop action:
	/Performance			300kPa	Check:
				OR	– Sensor S
				Aftertreatment 1 Fuel Pressure 1 above 200kPa	
				and	
				Aftertreatment 1 Fuel Pressure 1 above 200kPa	
				Behavior:	
				Manual regeneration not possible	
P20E000	Exhaust	No Sub-type	A14.	Event:	Root Cause:
	Aftertreatment	Information	EA:50	Voltage on A:50 above 4.85V	Wiring harness fault
	Fuel Pressure				Sensor fault
	Sensor Circuit High			Behavior: Manual regeneration not possible	– ECU fault
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					- ECU
P20EE00	SCR NOx	No Sub-type	N/A	Event:	Root Cause:
	Catalyst	Information		If a DTC in the "Inhibited by the	- Reductant quality
	Efficiency Below			following DTCs"-list is failed or not	and concentration
	Threshold			evaluated, it might inhibit this DTC and	Exhaust leakageSulfur poisoning
	(Bank 1)			Reductant concentration above 30%	- Reductant delivery
	(Same 1)			and	- SCR catalyst
				Filtered NOx conversion below 79.5%.	- Upstream NOx
					sensor
				Behavior:	– Downstream NOx
				Engine derate	sensor
					Workshop action:
					Check:
					- Reductant quality
					and concentration
					Exhaust leakageSulfur poisoning
					- Reductant delivery
					- SCR catalyst
					- Upstream NOx
 povright to this c	l documentation belongs	to the Volvo Group	No reprodu	 action, copying, change, amendment or other similar dispos	l '

ı		I	I	I	I	l
						sensor
						– Downstream NOx
						sensor
						If fault is not detected:
						Fault trace according
-						to Tech Tool fault tree
		DEF (Diesel	No Sub-type	N/A	Event:	Root Cause:
		Exhaust Fluid)	Information		Calculated reductant consumption	- Reductant level
		Consumption			below -101%	sensor stuck
		Too Low				 Clogged reductant
					Behavior:	delivery system
					No information available	 Incompatible
						reductant tank
						installed
						Modrobon actions
						Workshop action:
						Check:
						– Reductant level
						sensor
						- Reductant delivery
						system
						- Incompatible
						reductant tank
						installed
						If fault is not detected:
						Fault trace according
+	D005504	Dedicted	0	N1/A	F 4-	to Tech Tool fault tree
		Reductant	Component	N/A	Event:	Root Cause:
		Metering Unit Performance	or System Operating		If a DTC in the "Inhibited by the following DTCs"-list is failed or not	Reductant quality and concentration
		Performance	Conditions		_	
			Conditions		evaluated, it might inhibit this DTC and	- Reductant quality
					Reductant concentration below 18%	sensor Exhaust lackage
					and	Exhaust leakageSulfur poisoning
					Filtered NOx conversion below 71%	- Reductant delivery
					OR	- SCR catalyst
					Reductant concentration above fault	- Upstream NOx
					limit for high concentration.	sensor
					limit for high concentration.	- Downstream NOx
					Behavior:	sensor
					No information available	Crisci
					Tro mornation available	Workshop action:
						Check:
						– Quality sensor
						– Exhaust leakage
						- Sulfur poisoning
						– Delivery SCR
						catalyst
						- Upstream NOx
						sensor
						– Downstream NOx
						sensor
-	P210900	Throttle/Pedal	No Sub-type	N/A	Event:	Root Cause:
					T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

D040000	Position Sensor "A" Minimum Stop Performance	Information	NVA	Sensor voltage between 0.38V and 0.65 V Behavior: Poor accelerator pedal response	Position Sensor /Switch "A"/"B" - Sensor is broken - VECU input Throttle /Pedal Position Sensor /Switch "C" is short to battery - VECU hardware error (sensor supply) Workshop action: Check: - Throttle/Pedal Position Sensor /Switch "A"/"B" - Sensor - VECU input Throttle /Pedal Position Sensor /Switch "C" - VECU hardware error (sensor supply) If fault is not detected: Fault trace according to Tech Tool fault tree
P213600	Throttle/Pedal position sensor /switch "A"/"C" Voltage Correlation	No Sub-type Information	N/A	Event: Sensor voltage above 6 V Behavior: No information available	Root Cause: - VECU input Throttle /Pedal Position Sensor /Switch "C" is short to battery - VECU input Throttle /Pedal Position Sensor /Switch "C" is short to ground Workshop action: Check: - VECU input Throttle /Pedal Position Sensor /Switch "C"
P215A64	Vehicle Speed - Wheel Speed Correlation	Signal Plausibility Failure	N/A	Event: Difference between vehicle speed and ABS above 12 km/h Behavior: No information available	Root Cause: - Sensor broken Workshop action: Check: - Sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P216300	Throttle/Pedal Position	No Sub-type Information	N/A	Event: Sensor voltage between 1.2 V and 4.25 V	Root Cause: - Throttle/Pedal Position Sensor /Switch "A"/"B"

	Sensor "A"			Behavior:	Sensor is broken
	Maximum Stop			Poor accelerator pedal response	- VECU input Throttle
	Performance			l l l l l l l l l l l l l l l l l l l	/Pedal Position Sensor
					/Switch "C" is short to
					ground
					- VECU hardware
					error (sensor supply)
					Workshop action:
					Check:
					- Throttle/Pedal
					Position Sensor
					/Switch "A"/"B"
					- Sensor
					VECU input Throttle
					/Pedal Position Sensor
					/Switch "C"
					– VECU hardware
					error (sensor supply) If fault is not detected:
					Fault trace according to Tech Tool fault tree
D220012	NOx Sensor	Circuit Open	N/A	Event:	Root Cause:
	Bank 1 Sensor	Circuit Open	11/74	Internal open circuit signal containing	- Upstream NOx
	1			status and error byte received from	sensor
				upstream NOx sensor evaluated as	- Open circuit
				NOT_RELIABLE	(internal sensor fault)
				. 10 1_1121111322	(internal concernation
				Behavior:	Workshop action:
				No information available	Check:
					- Upstream NOx
					sensor
					- Open circuit
					(internal sensor fault)
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P220164	NOx Sensor	Signal	N/A	Event:	Root Cause:
	Bank 1 Sensor	Plausibility		The Upstream NOx Difference	- Upstream NOx
	1	Failure		(upstream NOx sensor measured NOx	sensor
				flow – modeled NOx flow) is compared	
				to a low and high fault threshold map	Workshop action:
				(NOx flow threshold as a function of	Check:
				modeled NOx flow).	- Upstream NOx
				The difference must be below low limit	sensor
				or above high limit repeatedly 4 times.	If fault is not detected:
				Evaluation time for each repeated evaluation is 4.5s.	Fault trace according
				evaluation is 4.5s.	to Tech Tool fault tree
				Behavior:	
				No information available	
P220300	NOx Sensor	No Sub-type	N/A	Event:	Root Cause:
	Circuit High	Information		Internal short circuit signal containing	- Upstream NOx
ovright to this d	houmantation balance	th the Velve Croup	la roprodi	ction, copying, change, amendment or other similar dispo	del in antitlad without prior written

	Bank 1 Sensor 1			Behavior: No information available	Sensor Short Circuit (Internal sensor fault) Workshop action: Check: - Upstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
	NOx Sensor Gas Outlet Open Circuit	Circuit Open	N/A	Temperature Of Heater Element in NOx Sensor Upstream not reached and Internal Open Circuit signal from Upstream NOx sensor is equal to "Open Wire Detected" Behavior: No information available	Sensor Heater Element Open Circuit (Internal sensor fault) Workshop action: Check: - Upstream NOx Sensor Heater Element
	NOx Sensor Heater Control Circuit Low, Bank 1 Sensor 1	No Sub-type Information	N/A	Temperature Of Heater Element in NOx Sensor Upstream not reached and Internal Short Circuit Low signal from Upstream NOx sensor is equal to "Short Wire Detected"	Root Cause: - Upstream NOx Sensor Heater Element Short Circuit Low (Internal sensor fault) Workshop action: Check: - NOx Sensor Heater Element
1	NOx Sensor Heater Sense Circuit, Bank 1 Sensor 1	No Sub-type Information	N/A	Temperature Of Heater Element in NOx Sensor Upstream not reached Behavior: No information available	Root Cause: - Temperature of Heater (NOx Sensor In Heater Element) - Upstream not reached - Internal sensor fault Workshop action: Check: - Temperature of Heater (NOx Sensor In Heater Element) - Sensor
	1	Circuit Voltage Out of Range	N/A	Event: Internal supply voltage signal containing status and error byte received from upstream NOx sensor evaluated as NOT_RELIABLE	Root Cause: - Faulty Upstream NOx Sensor Supply. (Internal sensor fault) Workshop action: Check:

1	NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	Circuit Voltage Out of Range	N/A	Behavior: No information available Event: Internal supply voltage signal containing status and error byte received from downstream NOx sensor evaluated as NOT_RELIABLE Behavior: No information available	- Upstream NOx Sensor Supply. If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Faulty downstream NOx sensor supply (internal sensor fault) Workshop action: Check: - Downstream NOx Sensor If fault is not detected:
					Fault trace according to Tech Tool fault tree
1	NOx Sensor Heater Control Circuit Range /Performance (Bank 1 Sensor 1)	No Operation	N/A	Event: Internal status and error byte received from Upstream NOx sensor not evaluated as GOOD within a reasonable time. Behavior:	Root Cause: - Faulty upstream NOx sensor - Incorrect start-up behavior Workshop action:
				No information available	Check: - Upstream NOx sensor - Start-up behavior If fault is not detected: Fault trace according to Tech Tool fault tree
1	NOx Sensor Heater Control Circuit Range /Performance Bank 1 Sensor 2	No Operation	N/A	Event: Internal status and error byte received from downstream NOx sensor not evaluated as GOOD within a reasonable time. Behavior: No information available	Root Cause: - Faulty downstream NOx sensor - Incorrect start-up behavior Workshop action: Check: - Downstream NOx sensor
					Start-up behavior If fault is not detected: Fault trace according to Tech Tool fault tree
	NOx Sensor 1 /2 Correlation Bank 1	No Sub-type Information	N/A	Event: Difference between Upstream and Downstream NOx sensor lambda above 1 lambda and Lambda difference must be greater than Limit repeatedly this number of times: 11 During this time each: 0.6s	Root Cause: - Upstream NOx sensor - Downstream NOx sensor Workshop action: Check:

P222613	Barometric Pressure Circuit	Circuit Open	N/A	Behavior: No information available Event: Voltage on ECU internal below 0.12V Behavior: No information available	- Upstream NOx sensor - Downstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU
P222764	Barometric Pressure Sensor "A" Circuit Range /Performance	Signal Plausibility Failure	N/A	Event: Ambient air pressure below 44kPa OR Ambient air pressure above 114kPa OR Ambient air pressure compared to reference pressure below -15kPa OR Ambient air pressure compared to reference pressure above 15kPa Behavior: No information available	Root Cause: - Sensor failure Workshop action: Check: - Sensor If fault is not detected: Fault trace according to Tech Tool fault tree
	Barometric Pressure Circuit High	No Sub-type Information	N/A	Event: Voltage on ECU internal above 4.96V Behavior: No information available Event:	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU Root Cause:
	Performance - Signal Stuck High Bank 1 Sensor 1	Information		Upstream NOx level above 50 ppm and A filter is applied to the NOx level that may require the evaluation to be repeated a few times to set the fault. Behavior: No information available	 Upstream NOx sensor Workshop action: Check: Upstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P225D00		No Sub-type Information	N/A	Event: The upstream NOx Sensor considered	Root Cause: - Upstream NOx

	Signal Stuck			removed from the exhaust system	sensor has been
	Low Bank 1			when the sensor measure too high	removed from
	Sensor 1			Lambda value or too low NOx value	exhaust flow
				during high engine speed and high load.	
				The fault evaluation need to be	Workshop action:
				repeated for a number of times to take	Check:
				a decision, and report the IDTC	Upstream NOx
					sensor
				Behavior:	If fault is not detected:
				No information available	Fault trace according
					to Tech Tool fault tree
P225E00	NOx Sensor	No Sub-type	N/A	Event:	Root Cause:
	Performance -	Information		Downstream NOx level above 50ppm	– Downstream NOx
	Signal Stuck			and a filter is applied to the NOx level	sensor
	High Bank 1			that may require the evaluation to be	- Excessive reductant
	Sensor 2			repeated a few times to set the fault	delivery causing NH3
	0011001 2			ropodica a row times to cot the radic	slip
				Behavior:	
				No information available	Workshop action:
				I valiable	Check:
					– Downstream NOx
					sensor
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
DOOFFOO	NOx Sensor	No Cub time	NI/A	Event:	Root Cause:
P225F00	Performance -	No Sub-type Information	N/A	The downstream NOx sensor is	– Downstream NOx
		IIIIOIIIIalioii		considered removed from the exhaust	sensor has been
	Signal Stuck Low Bank 1				removed from
				system when the sensor measure too	
	Sensor 2			high Lambda value or too low NOx	exhaust flow
				value during high engine speed and	M/autrahan aatian.
				high load. The fault evaluation need to	Workshop action:
				be repeated for a number of times to	Check:
				take a decision, and report the IDTC	– Downstream NOx
				Dala a da m	sensor
				Behavior:	If fault is not detected:
				No information available	Fault trace according
Doccess	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	N. O. I. i		<u> </u>	to Tech Tool fault tree
P226600	Water In Fuel	No Sub-type	l .	Event:	Root Cause:
	Indicator Circuit	intormation	EB:8	Voltage on B:8 below 0.21V	Wiring harness fault
	Low			L	- Sensor fault
				Behavior:	- ECU fault
				No information available	
					Workshop action:
					Check:
					- Wiring harness
					– Sensor
					– ECU
P226C00	Turbocharger	No Sub-type	N/A	Event:	Root Cause:
	Boost Control	Information		Sensed Boost Pressure too low after	- Boost Pressure
	"A" Slow			the engine has been operated in a low	Sensor signal stuck in
	Response			boost operating window followed by a	operating range
				high boost operating window below a	
houriabt to this c	houmantation balance	the the Malue Creum I	la roprodi	lotion conving change amondment or other similar diana	ablic antitlad without prior written

				fault limit dependent on Ambient air pressure. Behavior:	Workshop action: Check: - Boost pressure sensor
				Low power	If fault is not detected: Fault trace according
					to Tech Tool fault tree
P228E00	Fuel Pressure Regulator 1 Exceeded Learning Limits - Too Low	No Sub-type Information	N/A	Event: Fuel pressure controller adjustment value saturated low Behavior: Engine derate	Root Cause: - Leaking fuel pressure release valve - High fuel pressure pump - Fuel pressure regulator - Low fuel pressure system - Rotated cam profile Workshop action: Check: - Fuel pressure release valve - High fuel pressure pump - Fuel pressure regulator - Low fuel pressure system - Rotated cam profile If fault is not detected: Fault trace according to Tech Tool fault tree
	Fuel Pressure Regulator 1 Exceeded Learning Limits - Too High	No Sub-type Information	N/A	Event: Fuel pressure controller adjustment value saturated high Behavior: Engine derate	Root Cause: - Leaking fuel pressure release valve - High fuel pressure pump - Fuel pressure regulator - Low fuel pressure system, fuel supply - Rotated cam profile Workshop action: Check: - Fuel pressure release valve - High fuel pressure pump - Fuel pressure regulator - Low fuel pressure system, fuel supply

P229E13	NOx Sensor Bank 1 Sensor 2	Circuit Open	N/A	Event: Internal open circuit signal containing status and error byte received from downstream NOx sensor evaluated as NOT_RELIABLE Behavior: No information available	- Rotated cam profile If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Downstream NOx sensor open circuit (internal sensor fault) Workshop action: Check: - Downstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P229F64	NOx Sensor Gas Outlet Removed	Signal Plausibility Failure	N/A	The sensor will respond to tip-in events (sudden power increase). Maximum and minimum NOx levels are saved during evaluation events. When 5 events have passed, the sensor is considered stuck low if the difference between the highest and lowest value is lower than 5.	Root Cause: - Downstream NOx sensor Workshop action: Check: - Downstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P22A100	NOx Sensor Circuit High Bank 1 Sensor 2	No Sub-type Information	N/A	Internal short circuit signal containing status and error byte received from downstream NOx sensor evaluated as NOT_RELIABLE Behavior: No information available	Root Cause: - Downstream NOx sensor - Short circuit (internal sensor fault) Workshop action: Check: - Downstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P22A313	NOx Sensor Heater Control Bank 1 Sensor 2	Circuit Open	N/A	Temperature Of Heater Element in NOx Sensor Downstream not reached and Internal Open Circuit signal from Downstream NOx sensor is equal to "Open Wire Detected"	Root Cause: - Downstream NOx Sensor Heater Element - Open circuit (internal sensor fault) Workshop action: Check: - Downstream NOx Sensor Heater Element

		No Sub-type Information	N/A	Temperature Of Heater Element in NOx Sensor Downstream not reached and Internal Short Circuit Low signal from Downstream NOx sensor is equal to "Short Wire Detected"	Root Cause: - Downstream NOx Sensor Heater Element - Short Circuit Low (Internal sensor fault) Workshop action: Check: - Downstream NOx Sensor Heater Element
	Heater Sense Circuit, Bank 1 Sensor 2	No Sub-type Information		Temperature Of Heater Element in NOx Sensor Downstream not reached Behavior: No information available	Heater (NOx Sensor In Heater Element) – Downstream not reached – Internal sensor fault Workshop action: Check: – Temperature of Heater (NOx Sensor In Heater Element) – Sensor
	Performance -	Performance or incorrect operation	N/A	Internal status and error byte received from upstream NOx sensor evaluated as bad sensor quality Behavior: No information available	Root Cause: - Faulty upstream NOx sensor (internal sensor fault) Workshop action: Check: - Upstream NOx sensor If fault is not detected: Fault trace according to Tech Tool fault tree
	Performance - Sensing Element Bank 1 Sensor 2	No Sub-type Information	N/A	No information available	Root Cause: - Faulty downstream NOx sensor (internal sensor fault) Workshop action: Check: - Downstream NOx sensor. (internal sensor fault) If fault is not detected: Fault trace according to Tech Tool fault tree
	EGR Slow Response	No Sub-type Information	N/A	Event: EGR valve fails to follow command.	Root Cause: – EGR valve stuck

I					
				Behavior:	Workshop action:
				No information available	Check:
					EGR valve
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
	Exhaust Gas	No Sub-type	N/A	Event:	Root Cause:
	Temperature	Information		Engine Exhaust Gas Temperature high	High exhaust back
	Too High				pressure.
				Behavior:	Extreme driving
				Engine derate	conditions.
					Workshop action:
					Check:
					Exhaust back
					pressure
					- Driving conditions
P242B64	Exhaust Gas	Signal	N/A	Event:	Root Cause:
	Temperature	Plausibility		Evaluation performed before engine	- Exhaust gas
	Sensor Circuit	Failure		start:	temperature sensor 3
	Range			Difference between exhaust gas	not mounted
	/Performance			temperature sensor 3 and sensor 1 and	– Exhaust gas
	(Bank 1 Sensor			2 above 40°C	temperature sensor 3
	3)			OR	broken
				Exhaust Gas Temperature Sensor 3	All three exhaust
				above 70°C	gas temperature
				OR	sensors not mounted
				Evaluation between the sensors	correctly, tampering
				performed while engine running:	with distances
				Difference between Exhaust Gas	
				Temperature Sensor 1 and Sensor 3	Workshop action:
				above 70°C	Check:
				and	– Exhaust gas
				Difference between Exhaust Gas	temperature sensor
				Temperature Sensor 2 and Sensor 3	If fault is not detected:
				above 70°C	Fault trace according
				OR	to Tech Tool fault tree
				Exhaust Gas Temperature Sensor 3 below 100°C	
				below 100 C	
				Behavior:	
				No information available	
P244B00	Aftertreatment	No Sub-type	N/A	Event:	Root Cause:
	1 Diesel	Information		Measured differential pressure as	– DPF melted
	Particulate			percentage of modeled differential	DPF filled with soot
	Filter			pressure above 350 %.	Hose to differential
	Differential				pressure sensor not
	Pressure Too			Behavior:	mounted
	High (Bank 1)			No information available	
					Workshop action:
					Check:
				Jetion, copying, change, amendment or other similar dispos	- DPF

P245364	Diesel Particulate Filter Pressure Sensor "A" Circuit Range /Performance	Signal Plausibility Failure	N/A	Event: Failure event for diagnosis in After Run and Compensated Diesel Particulate Filter Differential Pressure above 1.75kPa OR Failure event for diagnosis during high load and Compensated Diesel Particulate Filter Differential Pressure below 1.25kPa Behavior: No information available	- Hose to differential pressure sensor not mounted If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: Sensor broken Workshop action: Check: - Sensor If fault is not detected: Fault trace according to Tech Tool fault tree
P245700	Exhaust Gas Recirculation Cooler Efficiency Below Threshold	No Sub-type Information	N/A	Event: Ratio (modeled exhaust manifold temp - EGR temp) / (modeled exhaust manifold temp - engine coolant temp) below 0.82 ratio Behavior: No information available	Root Cause: - Deteriorated EGR cooler Workshop action: Check: - EGR cooler If fault is not detected: Fault trace according to Tech Tool fault tree
P245900	Diesel Particulate Filter Regeneration Frequency (Bank 1)	No Sub-type Information	N/A	Event: Difference between pressure based and Kalman filter based soot models above 0.6 ratio and Time since last regeneration above 16400s and Number of too frequent regenerations in a row above 2 Behavior: No information available	Root Cause: - Faulty aftertreatment diesel particulate filter differential pressure sensor. Workshop action: Check: - Aftertreatment diesel particulate filter If fault is not detected: Fault trace according to Tech Tool fault tree
P246300	Particulate Filter Restriction - Soot Accumulation Bank 1	No Sub-type Information	N/A	Event: Moderately high soot load in aftertreatment diesel particulate filter Behavior: Engine derate	Root Cause: - High soot load in aftertreatment diesel particulate filter - High ash load in aftertreatment diesel particulate filter - Clogging of aftertreatment diesel

				particulate filter – Faulty aftertreatment diesel particulate filter differential pressure sensor – Faulty boost pressure sensor – Faulty exhaust gas recirculation differential pressure sensor
				Workshop action: Check: - Aftertreatment diesel particulate filter - Aftertreatment diesel particulate filter differential pressure sensor - Boost pressure sensor - Exhaust gas recirculation differential pressure
				differential pressure sensor
Excessive Time To Enter Closed Loop Reductant Injection Control	No Sub-type Information	N/A	Event: Average SCR NOx Catalyst Temperature below 215°C Behavior: No information available	Root Cause: - Exhaust leakage between Engine and Exhaust Aftertreatment System - Exhaust Gas Temperature Sensor 3 stuck low
				Workshop action: Check: - Exhaust leakage between Engine and Exhaust Aftertreatment System - Exhaust gas temperature sensor 3 If fault is not detected: Fault trace according
		N/A	Event:	to Tech Tool fault tree Root Cause:
	Time To Enter Closed Loop Reductant Injection Control	Time To Enter Information Closed Loop	Time To Enter Closed Loop Reductant Injection Control	Time To Enter Closed Loop Reductant Injection Control Behavior: No information Average SCR NOx Catalyst Temperature below 215°C Behavior: No information available

P2/4000	Closed Loop	No Sub-type	N/A	Behavior: No information available Event:	Injection Quantity Wrong. Workshop action: Check: Regeneration target temperature Exhaust Aftertreatment Fuel Injection Quantity If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause:
1	Closed Loop DPF Regeneration Control at Limit - Temperature Too Low	No Sub-type Information	N/A	Closed loop exhaust aftertreatment fuel injection control at maximum limit 0.7 ratio of the time. Regeneration temperature too low. Behavior: No information available	Root Cause: Regeneration target temperature cannot be reached Exhaust Aftertreatment Fuel Injector Too Low Workshop action: Check: Regeneration target temperature Exhaust Aftertreatment Fuel Injector If fault is not detected: Fault trace according to Tech Tool fault tree
	Closed Loop DPF Regeneration Control At Limit - Temperature Too High	No Sub-type Information	N/A	Event: Closed loop exhaust aftertreatment fuel injection control at minimum limit 0.7 ratio of the time. Regeneration temperature too low. Behavior: No information available	Root Cause: - Temperature too high during particulate filter regeneration - Exhaust Aftertreatment Fuel Injector Too High Workshop action: Check: - Temperature too high during particulate filter regeneration - Exhaust Aftertreatment Fuel Injector If fault is not detected: Fault trace according to Tech Tool fault tree
	Particulate Filter	No Sub-type Information	N/A	Event: Too small reduction of actual diesel particulate filter soot loading ction, copying, change, amendment or other similar dispose.	Root Cause: – Exhaust aftertreatment system

	Regeneration Incomplete (Bank 1)			OR Differential pressure percent after parked diesel particulate filter regeneration above 150%. Behavior: No information available	needs cleaning – High ash load in aftertreatment diesel particulate filter – Clogging of aftertreatment diesel particulate filter
					Workshop action: Check: - Exhaust aftertreatment system - High ash load in aftertreatment diesel particulate filter - Clogging of aftertreatment diesel particulate filter If fault is not detected:
					Fault trace according to Tech Tool fault tree
P24A400	1	No Sub-type Information	N/A	Event: The aftertreatment diesel particulate filter load is considered critically high Behavior: High fuel consumption	Root Cause: - Critically high soot load in aftertreatment diesel particulate filter - High ash load in aftertreatment diesel particulate filter - Clogging of aftertreatment diesel particulate filter - Clogging of aftertreatment diesel particulate filter - Faulty aftertreatment diesel particulate filter differential pressure sensor - Faulty boost pressure sensor - Faulty engine exhaust gas recirculation differential pressure
appright to this s	Secumentation belongs	n the Volvo Group	No renvod	uction, copying, change, amendment or other similar dis	Workshop action: Check: - Aftertreatment diesel particulate filter - Aftertreatment diesel particulate filter differential pressure sensor - Boost pressure

1	Particulate Matter Sensor	Circuit Open	N/A	Event: Particulate Matter Sensor Electrodes Open Circuit Fault Behavior: No information available	sensor - Engine exhaust gas recirculation differential pressure sensor Root Cause: - Particulate Matter Sensor Heater Open Circuit Workshop action: Check: - Particulate Matter Sensor Heater
1	Particulate Matter Sensor Circuit Range /Performance	No Sub-type Information	N/A	Event: Particulate Matter Sensor Module Boost Voltage Out of Range OR Particulate Matter Sensor Heater Current Leakage Fault OR Particulate Matter Sensor Module Voltage Reference Out of Range OR Particulate Matter Sensor Gain Too High Fault. Behavior: No information available	Root Cause:
P24B100	Particulate Matter Sensor Circuit Low Particulate Matter Sensor Circuit High	No Sub-type Information No Sub-type Information	N/A	Event: Particulate Matter Sensor Electrodes Short to Ground Fault Behavior: No information available Event: Particulate Matter Sensor Electrodes Short to Supply Voltage Fault OR Particulate Matter Sensor Internal Short	Root Cause: - Particulate Matter Sensor short circuit. Workshop action: Check: - Particulate Matter Sensor - Replace Sensor Root Cause: - Particulate Matter Sensor shortcut internal circuit.
P24B492	Particulate Matter Sensor Heater Control Circuit Range /Performance	Performance or incorrect operation	N/A	Circuit Fault Behavior: No information available Event: Particulate Matter Sensor Controller Current Out of Range	Workshop action: Check: - Particulate Matter Sensor - Replace Sensor Root Cause: - Particulate Matter Sensor Heater Out Of Range Fault

P24R500	Particulate	No Sub-type	N/A	Behavior: No information available Event:	Workshop action: Check: - Particulate Matter Sensor Heater Out Of Range Fault Root Cause:
	Matter Sensor Heater Control Circuit Low	Information	TW/V	Particulate Matter Sensor Regeneration Supply Voltage Fault Behavior: No information available	- Particulate Matter Sensor Regeneration Supply Voltage Too Low
					Workshop action: Check: – Particulate Matter Sensor
	Particulate Matter Sensor Heater Resistance	No Sub-type Information	N/A	Event: Particulate Matter Sensor Fixed Resistance Fault. Behavior: No information available	Root Cause: - Particulate Matter Sensor bypassed by resistor or debris Workshop action: Check: - Particulate Matter Sensor - Replace Sensor
	Particulate Matter Sensor Supply Voltage Circuit Low	No Sub-type Information	N/A	Event: Particulate Matter Sensor Module System Voltage Too Low Behavior: No information available	Root Cause: - Bad battery - Generator - Wiring harness Workshop action: Check: - Battery - Generator - Wiring harness
	Particulate Matter Sensor Regeneration Incomplete	No Sub-type Information	N/A	Event: Particulate Matter Sensor Regeneration Timeout Fault Behavior: No information available	Root Cause: - Debris on Particulate Matter Sensor element Workshop action: Check: - Particulate Matter Sensor
	Particulate Matter Sensor Exhaust Sample Error Bank 1	No Sub-type Information	N/A	Event: Particulate Matter Sensor Tip Clogged Fault OR Particulate Matter Sensor Removed From Exhaust Fault. Behavior: No information available	Root Cause: - Particulate Matter Sensor Not Able To Measure Soot - Particulate Matter Sensor Not In Exhaust Stream - Particulate Matter Sensor Tip Clogged

					Workshop action:
					Check:
					- Particulate Matter
					Sensor
P24F600	Evhauet	No Cub tupo	A14.	Event:	Root Cause:
F24F000	Aftertreatment	No Sub-type Information		Aftertreatment 1 Fuel Pressure 1 above	- Exhaust
	1	Information		40kPa	aftertreatment fuel
	Fuel Air Purge				I
	Valve Stuck		EB:40		injection air purge
	Open				valve stuck open
				25kPa	– Exhaust
				and	aftertreatment fuel
					supply control valve
				300kPa	stuck open
				OR	– Exhaust
				Aftertreatment 1 Fuel Pressure 1 above	
				200kPa	Injector Nozzle
				and	Clogged
				Aftertreatment 1 Fuel Pressure 1 above	
				200kPa	Workshop action:
					Check:
				Behavior:	– Exhaust
				Manual regeneration not possible	Aftertreatment Fuel
					Injection
					If fault is not detected
					Fault trace according
					to Tech Tool fault tree
P24F700	Exhaust	No Sub-type	A14.	Event:	Root Cause:
	Aftertreatment	Information		Aftertreatment 1 Fuel Pressure 1 below	No air supply to the
	Fuel Air Purge		A14.	33kPa	exhaust
	Valve Stuck		EB:40	and not	aftertreatment fuel
	Closed			Aftertreatment 1 Fuel Pressure 1 below	injection system
				25kPa	Pipe to the Exhaust
				and	Aftertreatment Fuel
				Aftertreatment 1 Fuel Pressure 1 below	Injection Nozzle not
				300kPa	Connected or Leakag
				OR	– Exhaust
				Aftertreatment 1 Fuel Pressure 1 above	Aftertreatment Fuel
				200kPa	Injection Air Purge
				and	Valve is not Opening
				Aftertreatment 1 Fuel Pressure 1 above	
				200kPa	Workshop action:
					Check:
				Behavior:	– Exhaust
				Manual regeneration not possible	Aftertreatment Fuel
				,	Injection System
					If fault is not detected
					Fault trace according
					to Tech Tool fault tree
P24F813	Exhaust	Circuit Open	A14	Event:	Root Cause:
	Aftertreatment	J. Gait Open		Open circuit fault is detected.	- Open circuit in
	, atoracamient		A14.	open offert fault is detected.	wiring harness,
			EB:40		actuator or connector
nuriabt to this o	locumentation belongs	to the Volvo Group		ction, copying, change, amendment or other similar dispos	

	Fuel Air Purge				- Short circuit to
	Valve Control			Behavior:	battery in wiring
	Circuit			Manual regeneration not possible	harness, actuator or
					connector
					Workshop action:
					Check:
					Open circuit in
					wiring harness,
					actuator or connector
					- Short circuit to
					battery in wiring
					harness, actuator or
					connector
P24FA00	Exhaust	No Sub-type	A14.	Event:	Root Cause:
- 117100	Aftertreatment	Information	l	Short circuit to ground is detected.	– Wiring harness,
	Fuel Air Purge	Internation	A14.	Chort choult to ground to dotoctou.	actuator or connector
	Valve Control			Behavior:	is short circuited to
	Circuit Low		LD.40	Manual regeneration not possible	ground voltage.
	Circuit Low			inariuar regeneration not possible	ground voltage.
					Workshop action:
					Check:
					- Wiring harness
					Actuator
					Connector
					 Short circuit to
					ground voltage
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P24FB00	Exhaust	No Sub-type	A14.	Event:	Root Cause:
	Aftertreatment	Information	EB:42	Short circuit to battery is detected	Wiring harness,
	Fuel Air Purge		A14.		actuator or connector
	Valve Control		EB:40	Behavior:	is short circuited to
	Circuit High			Manual regeneration not possible	battery voltage
					Workshop action:
					Check:
					- Wiring harness
					- winng namess - Actuator
					- Connector
					- Short circuit to
DO 4ECCC	D. C. 1.	N. C. I. I	h:/*	F4	battery voltage
P24FC00	Particulate	No Sub-type	N/A	Event:	Root Cause:
	Matter Sensor	Information		Particulate Matter Sensor Module	– Particulate Matter
	Heater Control			Heater Over Temperature	Sensor Heater Over
	Circuit Driver			L	temperature
	Current			Behavior:	
	/Temperature			No information available	Workshop action:
	Too High				Check:
					 Particulate Matter
					Sensor Heater
P250A13	Engine Oil	Circuit Open	A14.	Event:	Root Cause:

P250A13 Engine Oil Circuit Open A14. Event: Root Cause:

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

1	Level Sensor Engine Oil Level Circuit Low	No Sub-type Information	A14. EB:4 A14. EB:3 A14.	Voltage on B:4 above 4.85V Behavior: No information available Event: Voltage on B:4 below 0.05V Behavior:	- Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU Root Cause: - Wiring harness fault - Sensor fault
				No information available	Workshop action: Check: - Wiring harness - Sensor - ECU
P250F00	*	No Sub-type Information		Event: If calculated value for oil level below -5% and Engine must be in prerunning during a specific time, defined by output from map with input Engine Oil Temperature (EOT) Behavior: Engine shuts off unexpectedly – Only at low speed	Root Cause: - Critically low oil level - Oil leakage Workshop action: Check: - Oil level - Oil leakage
	Engine Coolant Level Sensor /Switch		EB:23	Event: Voltage on B:23 above (24.42V * (Battery Voltage / 24.0V)) OR Voltage on B:23 above (15.95V * (Battery Voltage / 24.0V)) and Voltage on B:23 below (23.56V * (Battery Voltage / 24.0V)) OR Voltage on B:23 above (11.09V * (Battery Voltage / 24.0V)) and Voltage on B:23 below (13.58V * (Battery Voltage / 24.0V)) OR Voltage on B:23 above (6.57V * (Battery Voltage / 24.0V)) OR Voltage on B:23 above (6.57V * (Battery Voltage / 24.0V)) and Voltage on B:23 below (8.72V * (Battery Voltage / 24.0V)) OR Voltage on B:23 above (2.86V * (Battery Voltage / 24.0V)) Coltage on B:23 above (2.86V * (Battery Voltage / 24.0V))	Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness - Sensor - ECU

ı	I	ı	ı	Ι .	1
				and	
				Voltage on B:23 below (4.47V * (Battery	
				Voltage / 24.0V))	
				Behavior:	
				No information available	
P255800	Engine Coolant	No Sub-type	A14.	Event:	Root Cause:
1	Level Circuit	Information	1	Voltage on B:23 below (2.86V * (Battery	
	Low			Voltage / 24.0V))	- Sensor fault
	LOW			Voltage / 24.0 V))	- ECU fault
				Behavior:	Loo lauit
				No information available	Markahan aatian:
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					– ECU
P255900	Engine Coolant	1	1	Event:	Root Cause:
	Level Circuit	Information	EB:23	Voltage on B:23 above (23.56V *	Wiring harness fault
	High			(Battery Voltage / 24.0V))	- Sensor fault
				and	– ECU fault
				Voltage on B:23 below (24.42V *	
				(Battery Voltage / 24.0V))	Workshop action:
					Check:
				Behavior:	- Wiring harness
				No information available	– Sensor
					- ECU
P256000	Engine Coolant	No Sub-type	N/A	Event:	Root Cause:
	Level Low	Information		Engine Coolant Level low	- Coolant level below
				3	range
				Behavior:	
				No information available	Workshop action:
				Tto information available	Check:
					- Coolant level below
D057004	T	No Cianal	NI/A	Frant	range
P257831	Turbocharger	No Signal	N/A	Event:	Root Cause:
	Speed Sensor			Turbo Speed below 0rpm	Malfunctioning VGT
				L	actuator
				Behavior:	[
				No information available	Workshop action:
					Check:
					– VGT actuator
1	Turbocharger	Signal Has	N/A	Event:	Root Cause:
	Speed Sensor	Too Many		Ratio between Fault Timer	– Malfunction in VGT
	"A" Circuit	Pulses		(incremented when Turbo Overspeed	Control
	Range			Flag is TRUE)	
	/Performance			and Evaluation Timer above 0.9 ratio	Workshop action:
					Check:
				Behavior:	- VGT control
				No information available	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
P25A913	Piston Cooling	Circuit Open	A14.	Event:	Root Cause:
20/10/10	Oil Control	Sirodic Open		Open circuit fault is detected.	- Open circuit in
Sparright to this a	On Control	the Velve Craus	LD.41	Open circuit fault is detected.	

1	Piston Cooling Oil Control Circuit Low	No Sub-type Information		Behavior: No information available Event: Short circuit to ground is detected. Behavior: No information available	wiring harness, actuator or connector Workshop action: Check: - Open circuit - Wiring harness - Actuator - Connector Root Cause: - Wiring harness, actuator or connector is short circuited to ground voltage Workshop action: Check: - Wiring harness - Actuator
P25AB00	Piston Cooling Oil Control Circuit High	No Sub-type Information		Event: Short circuit to battery is detected. Behavior: No information available	- Connector - Short circuit to ground voltage Root Cause: - Wiring harness, actuator or connector is short circuited to battery voltage.
					Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit to
	Piston Cooling Oil Control Circuit Performance /Stuck Off	No Sub-type Information	N/A	Event: When piston cooling valve is forced open and closed the oil pressure change below 30kPa Behavior: No information available	Root Cause: Piston cooling valve failure Workshop action: Check: Piston cooling valve If fault is not detected: Fault trace according to Tech Tool fault tree
P25AE00	Piston Cooling Oil Pressure Too Low	No Sub-type Information	N/A	Event: The signal Piston Cooling Oil Pressure is above a critical limit	Root Cause: - Low oil level Workshop action:
P260013	Coolant Pump "A" Control	Circuit Open	A14. EA:4	Behavior: Engine derate Event: Open circuit fault is detected.	Check: - Low oil level Root Cause: - Open circuit in

"A" Control EA:4 Open circuit fault is detected. — Open circuit in Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

P260200	Coolant Pump "A" Control Circuit Low	No Sub-type Information		Behavior: No information available Event: Short circuit to ground is detected. Behavior: No information available	wiring harness, actuator or connector. Workshop action: Check: - Open circuit - Wiring harness - Actuator - Connector Root Cause: - Wiring harness, actuator or connector is short circuited to ground voltage Workshop action: Check: - Wiring harness - Actuator
P260300	Coolant Pump "A" Control Circuit High	No Sub-type Information		Event: Short circuit to battery is detected. Behavior: No information available	 Connector Short circuit to ground voltage Root Cause: Wiring harness, actuator or connector is short circuited to battery voltage
					Workshop action: Check: - Wiring harness - Actuator - Connector - Short circuit to battery voltage
P26047F	Intake Air Heater "A" Circuit Range /Performance	Actuator Stuck Off	A14. EB:7	Event: The preheat element is inactive when there is a preheat activation request Behavior: Engine is difficult to start - Only cold conditions	Root Cause: - Preheat relay problem - Wiring harness defect Workshop action: Check:
P260513	Intake Air Heater "B" Control	Circuit Open	A14. EB:14	Event: Voltage on B:14 above (25.14V * (Battery Voltage / 24.0V)) OR Voltage on B:14 above (2.86V * (Battery Voltage / 24.0V)) and Voltage on B:14 below (20.58V *	- Preheat relay - Wiring harness Root Cause: - Wiring harness fault - Sensor fault - ECU fault Workshop action: Check: - Wiring harness

				(Battery Voltage / 24.0V))	– Sensor
					- ECU
				Behavior:	
				Engine is difficult to start - Only cold conditions	
P26067F	Intake Air	Actuator	A14.	Event:	Root Cause:
	Heater B	Stuck Off	EB:14	The preheat element is inactive when	- Preheat relay
	Circuit Range			there is a preheat activation request	problem
	/Performance			Only for 12 volt systems	- Wiring harness
				Behavior:	defect
				Engine is difficult to start - Only cold	Workshop action:
				conditions	Check:
				Conditions	- Preheat relay
					- Wiring harness
P26087E	Intaka Air	Actuator	A14.	Event:	Root Cause:
	Heater "B"	Stuck On		The preheat element is active when	- Preheat relay
		Oluck OII	LD. 14	1	problem
	Circuit High			there is no preheat activation request.	ľ
				Only for 12 volt systems	– Wiring harness
				Behavior:	defect
				No information available	Markahan astian.
				No information available	Workshop action:
					Check:
					- Preheat relay
Doggoog	l (l A:		11/0	<u> </u>	- Wiring harness
P260900	1	No Sub-type	N/A	Event:	Root Cause:
1	,	Information		If the drop voltage involved by the	– Intake air heater
	Performance			consumption of the intake air heater	device deficient:
				device, measured through the battery	At least one of both
				voltage, after activation is lower than 1	devices is not heating
				volt, the IDTC is reported.	correctly (Current
				Dahardan.	consumed by the one
				Behavior:	is not enough)
				No information available	Markahan astian.
					Workshop action: Check:
					– Intake air heater
D000440	Engine October	Circuit C	N 4 4	Event	device
1	Engine Coolant	Oircuit Open	1	Event:	Root Cause:
	Bypass Valve "A" Control		ED.38	Open circuit fault is detected	Open circuit in
	A CONTROL			Behavior:	wiring harness,
				No information available	actuator or connector
				ino miormation available	Morkshop action:
					Workshop action: Check:
					- Open circuit
					- Wiring harness - Actuator
					- Actuator - Connector
Daesono	Engine Costest	No Cub ton-	Λ 4 4	Event	
1	Engine Coolant	1	1	Event:	Root Cause:
	Bypass Valve	Information	ED:38	Short circuit to ground is detected.	– Wiring harness,
	Control Circuit				actuator or connector
	Low	# - V-h - 0	ļ	etion, copying change amondment or other similar dispo	is short circuited to

				Behavior:	ground voltage
				No information available	Workshop action: Check:
					- Wiring harness
					- Actuator
					- Connector
					- Short circuit to
					ground voltage
P268300	Engine Coolant	No Sub type	A14.	Event:	Root Cause:
-200300	Bypass Valve	Information		Short circuit to battery is detected	– Wiring harness,
	Control Circuit	Inionnation	EB.36	Short circuit to battery is detected	actuator or connecto
				Behavior:	is short circuited to
	High			No information available	
				Information available	battery voltage
					Workshop action:
					Check:
					- Wiring harness
					– Actuator
					Connector
					- Short circuit to
					battery voltage
268C00	Cylinder 1	No Sub-type	N/A	Event:	Root Cause:
	Injector Data	Information		Trim Code checksum of Injector 1 is	- Entered wrong trim
	Incompatible			incorrect	code
				Behavior:	Workshop action:
				Uneven torque	Check:
				and the state of t	- Trim code
268D00	Cylinder 2	No Sub-type	N/A	Event:	Root Cause:
200200	Injector Data	Information	' ',' '	Trim Code checksum of Injector 2 is	- Entered wrong trim
	Incompatible	Inionnation		incorrect	code
	, , , , , , , , , , , , , , , , , , ,				
				Behavior:	Workshop action:
				Uneven torque	Check:
					- Trim code
P268E00	Cylinder 3	No Sub-type	N/A	Event:	Root Cause:
	Injector Data	Information		Trim Code checksum of Injector 3 is	 Entered wrong trim
	Incompatible			incorrect	code
				Behavior:	Workshop action:
				Uneven torque	Check:
					- Trim code
P268F00	Cylinder 4	No Sub-type	N/A	Event:	Root Cause:
	Injector Data	Information	''''	Trim Code checksum of Injector 4 is	Entered wrong trim
	Incompatible			incorrect	code
				Daharian.	MA/anlashasa a g
				Behavior:	Workshop action:
				Uneven torque	Check:
					– Trim code
P269000	Cylinder 5	No Sub-type	N/A	Event:	Root Cause:
	Injector Data	Information		Trim Code checksum of Injector 5 is	Entered wrong trim
	Incompatible			incorrect	code

				Behavior: Uneven torque	Workshop action: Check: - Trim code
	Cylinder 6 Injector Data Incompatible	No Sub-type Information	N/A	Event: Trim Code checksum of Injector 6 is incorrect	Root Cause: – Entered wrong trim code
				Behavior: Uneven torque	Workshop action: Check: - Trim code
	Exhaust aftertreatment fuel injector "A"	Circuit Open	EB:62	Event: Either short circuit to battery, or open circuit is detected Behavior: Manual regeneration not possible	Root Cause: - Open circuit in wiring harness, actuator or connector - Short circuit to battery wiring harness, actuator or connector
					Workshop action: Check: - Open circuit in wiring harness, actuator or connector actuator or connector battery wiring harness, actuator or
2000000	F 1	N. O. I. I.	0.4.4	F 4	connector
		No Sub-type Information	EB:62	Event: Exhaust Aftertreatment Fuel Injector "A" loss of injection above 0.75 ratio Behavior: No information available	Root Cause: - Exhaust Aftertreatment Fuel Injector "A" clogged - Exhaust Aftertreatment Fuel Injector "A" does not deliver as expected
					Workshop action: Check: - Exhaust Aftertreatment Fuel Injector "A" If fault is not detected Fault trace according to Tech Tool fault tre
	Exhaust Aftertreatment Fuel Injector "A" Circuit Low	No Sub-type Information	EB:62 A14.	Event: Short circuit to ground is detected Behavior:	Root Cause: - Wiring harness, actuator or connecto is short circuited to
	A Circuit Low		LD.40	Deliaviol.	is short circuited to

					Check:
					- Wiring harness
					– Actuator
					- Connector
					Short circuit to
					ground voltage
P269A00	Exhaust	No Sub-type	Δ14	Event:	Root Cause:
1 200/100	Aftertreatment	Information		Short circuit to battery is detected.	Wiring harness issue
	Fuel Injector	Intormation	A14.	Chort circuit to battery is detected.	- Actuator broken
	"A" Circuit High			Behavior:	- Connector
	Circuit riigir		65.43	Manual regeneration not possible	- Short circuit to
					battery
					Dattery
					Workshop action:
					Check:
					Wiring harnessShort circuit to
					battery
					– Actuator
					– Connector
P2A1614	Injection Pump	Short Circuit		Event:	Root Cause:
	Fuel Metering	to Ground or	1	Current driving the injector rises too	 Wiring harness issue
	Control "D"	Open	1	slowly	 Actuator broken
	(Cam/Rotor		EB:56		- Connector detached
	/Injector)			Behavior:	
				Engine derate	Workshop action:
					Check:
					- Wiring harness
					Actuator
					Connector
P2A1700	Injection Pump	No Sub-type	N/A	Event:	Root Cause:
	Fuel Metering	Information		Loss of high fuel pressure pumping	 High Fuel Pressure
	Control "D"			capacity	- Pump Rotated Cam
	Range				profile
	/Performance			Behavior:	
	(Cam/Rotor			Engine derate	Workshop action:
	/Injector)				Check:
					High fuel pressure
					pump
					Rotated cam profile
P2A1900	Injection Pump	No Sub-type	A14.	Event:	Root Cause:
	Fuel Metering	Information		Current driving the injector rises too	Wiring harness issue
	Control "D"		1	quickly	Actuator broken
	High (Cam		EB:56	1.	- Short circuit to
	/Rotor/Injector)			Behavior:	battery
				Engine derate	Jamory
					Workshop action:
					Check:
					- Wiring harness
					- Short circuit to
					battery
D044544	Injustice D	Chart Circ. II	N 4 4	Promis	– Actuator
P2A1E14	Injection Pump	Snort Circuit] A14.	Event:	Root Cause:

P2A1E14 Injection Pump | Short Circuit | A14. | Event: | Root Cause: | Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

	Fuel Metering Control "F" (Cam/Rotor /Injector)	to Ground or Open	1	Current driving the injector rises too slowly Behavior: Engine derate	 Wiring harness issue Actuator broken Connector detached Workshop action: Check: Wiring harness Actuator Connector
P2A1F00	Injection Pump Fuel Metering Control "F" Range /Performance (Cam/Rotor /Injector)	No Sub-type Information	N/A	Event: Loss of high fuel pressure pumping capacity Behavior: Engine derate	- Connector Root Cause: - High fuel pressure pump - Rotated cam profile Workshop action: Check: - High fuel pressure pump - Rotated cam profile
P2A2100	Injection Pump Fuel Metering Control "F" High (Cam /Rotor/Injector)	No Sub-type Information	EB:60	Event: Current driving the injector rises too quickly Behavior: Engine derate	Root Cause: - Wiring harness issue - Short circuit to battery - Actuator broken Workshop action: Check: - Wiring harness - Short circuit to battery - Actuator
P2AB047	Particulate Matter Sensor Processor	Watchdog / Safety μC Failure	N/A	Event: Particulate Matter Sensor Processor Performance Behavior: No information available	Root Cause: - Particulate Matter Sensor CPU Internal Fault Workshop action: Check: - Particulate Matter Sensor
P2CE113	Heater "C" Circuit/Open	Circuit Open	EB:25	Event: Open circuit fault is detected Behavior: Engine is difficult to start - Only cold conditions Event:	Root Cause: - Open circuit in wiring harness, actuator or connector Workshop action: Check: - Open circuit in wiring harness - Actuator - Connector Root Cause:
P2GE311	Intake Air Heater "C"	to Ground		Short circuit to ground is detected.	Root Gause: - Wiring harness,

Heater "C" to Ground | EB:25 | Short circuit to ground is detected. — Wiring harness,
Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

I	Circuit Low	I	I	I	actuator or connector
	Circuit Low			Behavior:	is short circuited to
				No information available	battery voltage
					Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
					- Short circuit to
P2CE412	Intoleo Air	Short Circuit	Λ11	Event:	ground voltage Root Cause:
P20E412	1				
	Heater "C"	to Battery	EB:25	Short circuit to battery is detected	– Wiring harness,
	Circuit High			L	actuator or connector
				Behavior:	is short circuited to
				Engine is difficult to start - Only cold conditions	battery voltage
					Workshop action:
					Check:
					- Wiring harness
					- Actuator
					- Connector
					Short circuit to
					battery voltage
U000188	CAN	Bus off	A14.	Event:	Root Cause:
	Communication			It has not been possible to send frames	Lost communication
	Backbone 2 Net			on high speed CAN communication	on high speed CAN
	Backson's 2 Not			bus, and it has not been possible to	communication bus
				receive frames on high speed CAN	
				communication bus	Workshop action:
					Check:
				Behavior:	- High speed CAN
				Starter motor does not run	communication bus
				Clarter motor does not run	If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
11004000	CANI	D #	044	Frant	
U001088	1	Bus off		Event:	Root Cause:
	Communication			It has not been possible to send frames	Lost communication
	Backbone 1 Net			on medium speed CAN communication	on medium speed
			EB:55	bus, and it has not been possible to	CAN communication
				receive frames on medium speed CAN communication bus	bus
					Workshop action:
				Behavior:	Check:
				Starter motor does not run	Medium speed CAN
					communication bus
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
U008088	Vehicle	Bus off	N/A	Event:	Root Cause:
	Communication			It has not been possible to send frames	Lost communication
	Engine Subnet			on vehicle communication engine	on vehicle
				subnet, and it has not been possible to	communication
hovright to this o	laarimantatian halanaa t	L the Velve Craus	الم تمسيميا	etion, conving, change, amondment or other similar dispos	Lie entitled without noise written

				receive frames on vehicle	engine subnet
				communication engine subnet	
				_	Workshop action:
				Behavior:	Check:
				Engine derate	Vehicle
					communication
					engine subnet
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
U010100	Lost	No Sub-type	N/A	Event:	Root Cause:
	Communication		,, .	Lost communication with TCM on	- TCM not powered
	with TECU			medium speed CAN communication bus	-
				The diam open of the communication and	incompatibility with
				Behavior:	TCM
				No information available	
				The information divaliable	 Workshop action:
					Check:
					– TCM
					- Software
					incompatibility with
					TCM
U010C00	Lost	No Sub-type	N/A	Event:	Root Cause:
1	Communication	1	11/7	Lost communication with VGTM on	VGTM not powered
	with	IIIIOIIIIalioii		vehicle communication engine subnet	- Software
	Turbocharger			Verilcie communication engine submet	incompatibility with
	/Supercharger			Behavior:	VGTM
	Control Module			Engine derate	VGTW
	"A			Lingine derate	Workshop action:
	^				Check:
					– VGTM
					- Software
					incompatibility with
					VGTM
U010E00	Lost	No Sub-type	N/A	Event:	Root Cause:
0010200	Communication		IN/A	Lost communication with EACM on	
	With Reductant	IIIIOIIIIalioii		Medium Speed CAN Communication	EACM not poweredSoftware
	Control Module			Bus	incompatibility with
	Control Module			Dus	EACM
				Behavior:	EACIVI
				Engine derate	Workshop action:
				Lingine derate	Check:
					– EACM
					– Software
					If fault is not detected:
					Fault trace according to Tech Tool fault tree
U012100	Lost	No Sub time	N/A	Event:	
		No Sub-type	IN/A		Root Cause:
	Communication	Innomiation		Lost communication with ABS on	- ABS not powered
	With Anti-Lock			medium speed CAN communication bus	
	Brake System			Rehavior	incompatibility with
	(ABS) Control			Behavior:	ABS
houright to this s	Module	h the Velve Grave	lo roprod	No information available	al in antitled without prior written

U012900	Lost	No Sub-type	N/A		Workshop action: Check: - ABS - Software incompatibility with ABS Root Cause:
	Communication With Brake System Control Module	Information		Behavior: Auxiliary brakes, low performance (reduced retarder braking)	 BSCM not powered Software incompatibility with BSCM Workshop action: Check: BSCM Software incompatibility with BSCM
U014100	Lost Communication with VMCU	No Sub-type Information	N/A	Lost communication with BCM on medium speed CAN communication bus OR Lost communication with BCM on medium speed CAN communication bus Behavior: Starter motor does not run	Root Cause: - BCM not powered - Software incompatibility with BCM Workshop action: Check: - BCM - Software incompatibility with BCM If fault is not detected: Fault trace according to Tech Tool fault tree
U014200	Lost Communication With Body Control Module "B"	No Sub-type Information	N/A	Lost communication with body control module "B" on medium speed CAN communication bus Behavior: Activation failure, engine mounted power take off	Root Cause: - Body control module "B" not powered - Software incompatibility with body control module "B" Workshop action: Check: - Body control module "B" - Software
U015500	Lost Communication with Instrument Panel Cluster (IPC) Control Module	No Sub-type Information	N/A	Lost communication with IPC on medium speed CAN communication bus Behavior: No information available	Root Cause: – IPC not powered

U016700	Communication With Vehicle Immobilizer Control Module		N/A	Event: Signal response time out Behavior: Starter motor does not run Engine cranks but does not start	Check: - IPC - Software incompatibility with IPC If fault is not detected: Fault trace according to Tech Tool fault tree Root Cause: - Response time out Workshop action: Check: - Response time out
U029D00	Communication With NOx Sensor "A"		N/A	Event: Lost communication with NOX1 on vehicle communication engine subnet Behavior: No information available	Root Cause: - NOX1 not powered - Software incompatibility with NOX1 Workshop action: Check: - NOX1 - Software incompatibility with NOX1 If fault is not detected: Fault trace according to Tech Tool fault tree
U029E00	Lost Communication With NOx Sensor "B"	No Sub-type Information	N/A	Event: Lost communication with NOX2 on vehicle communication engine subnet Behavior: No information available	Root Cause: - NOX2 not powered - Software incompatibility with NOX2 Workshop action: Check: - NOX2 - Software incompatibility with NOX2 If fault is not detected: Fault trace according to Tech Tool fault tree
U02A300	Lost Communication With Particulate Matter (PM) Sensor	No Sub-type Information	N/A	Event: Lost communication with Particulate Matter (PM) Sensor 11 on Vehicle Communication Engine Subnet Behavior: No information available	Root Cause: - Particulate Matter (PM) Sensor 11 not powered - Software incompatibility with Particulate Matter (PM) Sensor 11

					Workshop action:
					Check:
					- Particulate Matter
					(PM) Sensor
					– Software
U032300	Software	No Sub-type	N/A	Event:	Root Cause:
	Incompatibility	Information	,	Lost communication with IPC on	- IPC not powered
	with Instrument	Innormation		medium speed CAN communication bus	
	Panel Control			Intediam speed CAN communication bus	
	1			Daharian.	incompatibility with
	Module			Behavior:	IPC
				No information available	L
					Workshop action:
					Check:
					- IPC
					– Software
					incompatibility with
					IPC
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
U033100	Software	No Sub-type	N/A	Event:	Root Cause:
	1	Information	13/7	Lost communication with BCM on	BCM not powered
	Incompatibility	IIIIOIIIIalioii			· ·
	with Body			medium speed CAN communication bus	
	Control Module				incompatibility with
	"A"			Behavior:	ВСМ
				Starter motor does not run	
					Workshop action:
					Check:
					- BCM
					– Software
					incompatibility with
					ВСМ
					 If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
11044500	Invalid Data	No Sub-type	N/A	Event:	Root Cause:
		1	IN/A		
	Received from	Information		Invalid Data Received from Anti-Lock	– Invalid Data
	Anti-Lock			Brake System (ABS) Control Module	Received from Anti-
	Brake System				Lock Brake System
	(ABS) Control			Behavior:	
	Module			No information available	Workshop action:
					Check:
					– Invalid Data
					Received from Anti-
					Lock Brake System
U042600	Invalid Data	No Sub-type	N/A	Event:	Root Cause:
	1	Information		ECM and immobilizer unit security	- Faulty immobilizer
	Vehicle			codes do not match	code
	Immobilizer			COUGS UD HOL HIGHER	- Coue
	1			Bahayian	Moulsahan asti
	Control Module			Behavior:	Workshop action:
				Starter motor does not run	Check:
				Engine cranks but does not start	 Immobilizer code
U116C00	Lost	No Sub-type	N/A	Event:	Root Cause:

U116C00 Lost No Sub-type N/A Event: Root Cause:

Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

ı	ı	ı		I	I
	Communication	Information		Lost communication with TCM on	- TCM
	with TCM on			vehicle communication powertrain CAN	- Software
	Powertrain CAN				incompatibility with
				Behavior:	TCM
				No information available	
					Workshop action:
					Check:
					- TCM
					- Software
U116F00	Loot	No Cub tupo	N/A	Event:	Root Cause:
011000		No Sub-type	IN/A		
	Communication	Information		Lost communication with EACM on	EACM not powered
	with Reductant			vehicle communication engine subnet	- Software
	Control Module				incompatibility with
	on Engine			Behavior:	EACM
	Subnet			Engine derate	
					Workshop action:
					Check:
					- EACM
					– Software
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree
U117888	Vehicle	Bus off	A14.	Event:	Root Cause:
0117000	1	Dus on			
	Communication		1	It has not been possible to send frames	Lost communication
	Powertrain CAN			on vehicle communication powertrain	on Vehicle
			EB:56	CAN, and it has not been possible to	communication
				receive frames on vehicle	powertrain CAN
				communication powertrain CAN	
					Workshop action:
				Behavior:	Check:
				No information available	– Vehicle
					communication
					powertrain CAN
U1FFF68	Factory Mode	Event	N/A	Event:	Root Cause:
	Active	Information		The factory mode is active through	- Factory Mode was
				P1HCF	not turned off by
					P1HCF
				Behavior:	11101
					Morkoben estissi
				No information available	Workshop action:
					Check:
					– Factory mode
U300001	Electronic	General	· ·	Event:	Root Cause:
	control unit	Electrical	1	Voltage on ECU internal below 0.15V	Wiring harness fault
		Failure	internal	I .	- Sensor fault
				Behavior:	– ECU fault
				Starter motor does not run	
					Workshop action:
					Check:
					- Wiring harness
					- Sensor
					- ECU
11200044	Electronic	Concret	NI/A	Event	
U300041	Electronic	General	N/A	Event:	Root Cause:
	control unit	Checksum		Program memory corruption	Download issue

control unit Checksum Program memory corruption Download issue
Copyright to this documentation belongs to the Volvo Group. No reproduction, copying, change, amendment or other similar disposal is entitled without prior written consent by the Volvo Group

		Failure			
				Behavior:	Workshop action:
				Starter motor does not run	Check:
					– Download
	Electronic	Data	N/A	Event:	Root Cause:
	control unit	Memory Failure		RAM corruption	– Download issue
				Behavior:	Workshop action:
				Starter motor does not run	Check:
					– Download
U300045	Electronic	Program	N/A	Event:	Root Cause:
	control unit	Memory		Program memory corruption	 Download issue
		Failure		Software memory checksum error	
					Workshop action:
				Behavior:	Check:
				Starter motor does not run	– Download
U300049	Electronic	Internal	N/A	Event:	Root Cause:
	control unit	Electronic Failure		ECU internal error	– ECU hardware issue
				Behavior:	Workshop action:
				Starter motor does not run	Check:
					 ECU hardware
	Control Module	No Sub-type	N/A	Event:	Root Cause:
	Timer/Clock	Information		Engine running monitor Failure	 Real time clock
	Performance				failure
				Behavior:	
				No information available	Workshop action:
					Check:
					 Real time clock
					If fault is not detected:
					Fault trace according
					to Tech Tool fault tree

For more information, please see:

Engine Control Module (ECM), Signal Description