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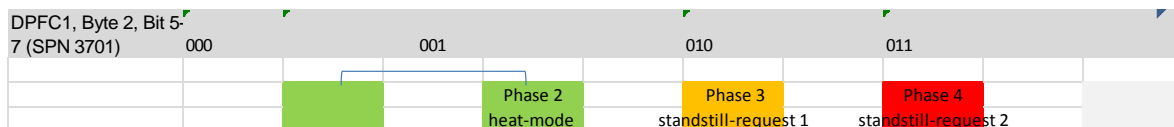**Betreff: HMI DPF Regeneration AP (S120P/ S220P, ST4)**

- **Historie:**

  17.07.2017: erstellt
  19.07.2017: Motor muss DPFC1 SPN 3702 = 00 senden wenn alle Fahrzeugbedingungen erfüllt sind.

- **Beladungsanzeige**

  Im Heat Mode werden die ersten beiden grünen Balken gleichzeitig angezeigt (Phase 2), bei einer mittleren Filterbeladung wird zusätzlich der orange Balken angezeigt (Phase 3), und bei voller Filterbeladung wird zusätzlich noch der erste rote Balken angezeigt (Phase 4). Den zweiten roten Balken zeigen wir bei AP/ MAN nicht an, da das Auslösen der Regeneration immer erlaubt wird, und nicht wie bei Deutz ab einer def. Beladung nur noch durch das Service Tool.

DPFC1, Byte 2, Bit 5-7 (SPN 3701)	000		001		010		011	
				Phase 2 heat-mode		Phase 3 standstill-request 1		Phase 4 standstill-request 2

- **Aktivierungsschalter**

  Der Schalter soll bei keiner oder geringer Beladung (Phase 2) deaktiviert werden, damit der Fahrer nicht beliebig oft regenerieren kann.
  Durch Fendias soll der Schalter durch das senden einer CAN Botschaft wieder aktiviert werden. Der Schalter soll dann bis zum nächsten Zündungswechsel eingeblendet werden. Abstimmung bzgl. CAN Botschaft mit Kundendienst erforderlich.
  (Zur Erprobung soll der Schalter immer eingeblendet werden, zur Serie aber nicht)

  ES/ FSS

- **Restdaueranzeige**

  AP sendet die Restdauer in Minuten in Byte 2 der proprietären Botschaft ATHOURS2. Die Restdauer soll in der Main Phase und der Cool Down Phase, analog zur Anzeige bei Deutz, angezeigt werden.

- **Erforderliche Inhibitet Status**

Description	SPN	linked with point..
Diesel Particulate Filter Active Regeneration Inhibited Due to Accelerator Pedal Off Idle	3707	01 Engine operating condition reached and low idle 🟨

Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature	3711	01 Engine operating condition reached and low idle 🟧 **AND** 02 Min coolant temperature is reached and SCR system is ready for operation 🟩
Diesel Particulate Filter Active Regeneration Inhibited Due to System Fault Active	3712	01 Engine operating condition reached and low idle 🟧
Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout	3713	01 Engine operating condition reached and low idle 🟧
Diesel Particulate Filter Active Regeneration Inhibited Due to Temporary System Lockout	3714	01 Engine operating condition reached and low idle 🟧
Diesel Particulate Filter Active Regeneration Inhibited Due to Permanent System Lockout	3715	01 Engine operating condition reached and low idle 🟧
Diesel Particulate Filter Active Regeneration Inhibited Due to Engine Not Warmed Up	3716	01 Engine operating condition reached and low idle 🟧 **AND** 02 Min coolant temperature is reached and SCR system is ready for operation 🟩

- **CAN Kommunikation/Ablauf**

  Gesamtübersicht
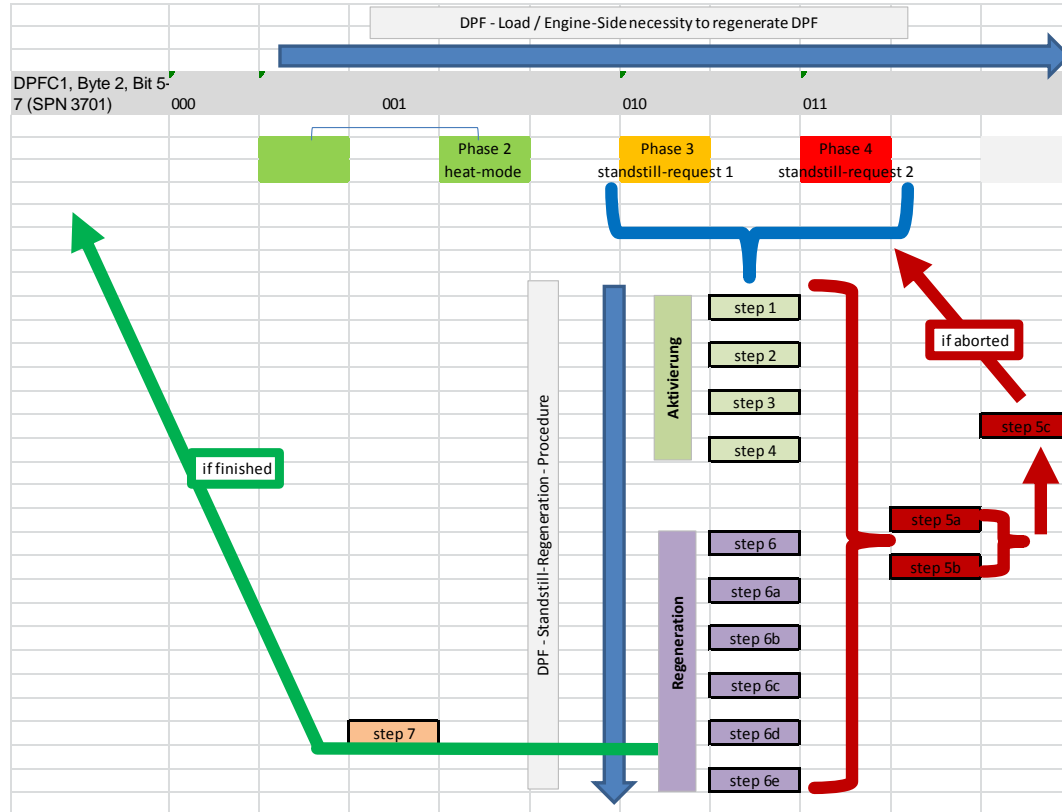
Ablauf Regeneration

Die CAN Kommunikation von EDC zu EXT unterscheidet sich zwischen Deutz, MAN und AP. Die CAN Kommunikation von der EXT zur EDC kann bei Deutz, MAN und AP gleich sein.

		from engine					to engine	
		Deutz		**MAN**		**AP**		
step 1		DPFC1, Byte 1, Bit 1-3	DPFC1, Byte 2, Bit 5-7	DPFC1,Byte 2, Bit 5-7 SPN 3701		DPFC1,Byte 2, Bit 5-7 SPN 3701		
	standstill-request 1	101 AND	don't care	010		010		
	standstill-request 2	101 AND	011	011		011		
step 2	vehicle checks boundary conditions for standstill on engine side	DPFC1		DPFC1		DPFC1		
	all inhibit status must be =00	SPN 3702-3717 inhibit status	=00: not activated	SPN 3706, SPN 3711, SPN3712, SPN 3716 inhibit status	=00: not activated	SPN 3707, SPN 3711, SPN3712, SPN 3713, SPN 3714, SPN 3715, SPN 3716 inhibit status	=00: not activated	
step 3	vehicle checks boundary conditions for standstill on vehicle side (parking brake, vehicle standing, ...)					DPFC1 SPN 3702 inhibit status	=00: not activated send always, NOT only 5 Sec	
	inhibit- condition from vehicle					CM1 SPN 3695 DPF Regeneration Inhibit Switch	00 is sent to engine if standstill allowed send always, NOT only 5 Sec	
step 4	status: all step2 and step3 preconditions met					CM1		
	go -information to engine					SPN 3696 DPF Regeneration Force Switch/ activated by user	01 is sent to engine if user pushes "regeneration start" button on terminal send always, NOT only 5 Sec	

Step	Description	DPF Test Monitor / DPFC1	Value	EDC8 prop. / DPFC1	Value	ATHOURS2 / DPFC1	Value	CM1
step 5a	abort of standstill regeneration by vehicle							
step 5b	abort of standstill regeneration by engine. vehicle checks boundary conditions for standstill on engine side.	DPFC1		DPFC1		DPFC1 SPN 3707, SPN 3711, SPN3712, SPN 3713, SPN 3714, SPN 3715, SPN 3716		
	If at least one inhibit signal =01 --> regeneration abort	SPN 3702-3717 inhibit status	=01: activated	SPN 3706, SPN 3711, SPN3712, SPN 3716 inhibit status	=01: activated	inhibit status	=01: activated	
step 5c	standstill abort by step 5a/ step 5b. vehicle checks boundary conditions for standstill on engine side.							CM1 SPN 3695 DPF Regeneration Inhibit Switch — 01 is sent to engine if standstill not allowed/ abort by user. SPN 3696 DPF Regeneration Force Switch/ activated by user — 00 is sent to engine if regeneration is abort/ finished
				Info to driver "regeneration abort"		Info to driver "regeneration abort"	Info to driver "regeneration abort"	
step 6	standstill-regeneration enabled							
step 6a	engine pre-conditioning / launch phase	DPF Test Monitor. Byte 7, Bit 1-4 Standstill regeneration state	=0001: Launch Phase	EDC8 prop. Byte 2 Bit 0-3 Standstill regeneration state	=2: HeadUp Mode)	ATHOURS2 Byte 4 Bit 1-5 Indicates the specific state of diesel particulate filter active regeneration.	=00001: standstill regeneration, DOC heat up	
		DPFC1 Diesel Particulate Filter Lamp Command	!= 0					
		Info to driver "engine is being prepared"			Info to driver "engine is being prepared"		Info to driver "engine is being prepared"	
step 6b	standstill regeneration - main regeneration phase	DPF Test Monitor. Byte 7, Bit 1-4 Standstill regeneration state	=0010: Regeneration Phase	EDC8 prop. Byte 2 Bit 0-3 Standstill regeneration state	= 3 Regeneration Mode	ATHOURS2 Byte 4 Bit 1-5 Indicates the specific state of diesel particulate filter active regeneration.	=00010: standstill regeneration, regeneration active	
				Info: start of remaining-time-counter				
		DPF Test Monitor. Byte 5	if 255: no reactino by vehicle 1min/bit	EDC7 prop. Byte 3, Bit 4-7 Standstill regeneration duration time	100 % .... 0% fix time --> EXT is calculating time: (100% = 20 min) + 5 min Afterrun	ATHOURS2 Byte 2 Regeneration progress, minutes left	1 min/bit	
		Info to driver "remaining time: xx min"		Info to driver "remaining time: xx min"		Info to driver "remaining time: xx min"		
step 6c	standstill regeneration - afterrun	DPF Test Monitor. Byte 7, Bit 1-4 Standstill regeneration state	=0100: Afterrun	EDC8 prop. Byte 2 Bit 0-3 Standstill regeneration state	= 4 CoolDown Mode	ATHOURS2 Byte 4 Bit 1-5 Indicates the specific state of diesel particulate filter active regeneration.	=00011: standstill regeneration, cooldown	
		DPF Test Monitor. Byte 5	if 255: no reactino by vehicle	EDC7 prop. Byte 3, Bit 4-7 Standstill regeneration duration time	100 % .... 0% fix time --> EXT is calculating time: (100% = 5 min)	ATHOURS2 Byte 2 Regeneration progress, minutes left	1 min/bit	
		Info to driver "remaining time: xx min"		Info to driver "remaining time: xx min"		Info to driver "remaining time: xx min"		
step 6d	communication to driver: successful/not successfull	DPF Test Monitor. Byte 7, Bit 1-4 Standstill regeneration state	= 0000: no standstill regeneration active	EDC8 prop. Byte 2 Bit 0-3 Standstill regeneration state	= 0 No Regeneration necessary	ATHOURS2 Byte 4 Bit 1-5 Indicates the specific state of diesel particulate filter active regeneration.	=00000: regeneration not active OR =00100: standstill regeneration complete	

step 6e	regeneration successfull			Info to driver "regeneration successful"		Info to driver "regeneration successful"		Info to driver "regeneration successful"		CM1 SPN 3696 DPF Regeneration Force Switch/ activated by user	00 is sent to engine if regeneration is abort/ finished
step 7	time since last regeneration	AT1S			AT1S			AT1S			
		Byte 3-6	1sec/bit		Byte 3-6	1sec/bit		Byte 3-6	1sec/bit		
		Time since last Regeneration is set back after regeneration successful			Time since last Regeneration is set back after regeneration successful			Time since last Regeneration is set back after regeneration successful			

- ## CAN Spec

Botschaftsname	Bez.	CAN-ID [hex]	Rate [ms]	DLC	Sender EDC	Empfänger EDC	J1939	Startpos[bit]	Length[bit]	SPN	CAN / SAE -Signalname	Wertebeschreibung / Kommentar	Scale	Unit	Offset	Range
Cab Message 1	CM1	0x18E00003	1000			x	x	0	8	986	Requested Percent Fan Speed	Requested Percent Fan Speed	0.125 rpm/bit		0 rpm	0..8031.875
								8	16	1691	Cab Interior Temperature Command	not used FFFF hex: don't care	0.03125 °C/bit		-273°C	-273..+1735 °C
								24	2	1684	Auxiliary Heater Coolant Pump Request	not used 11bin: don't care	1/bit		0	0..3
								26	2	1682	Battery Main Switch Hold Request	not used 11bin: don't care	1/bit		0	0..3
								28	2	1714	Operator Seat Direction Switch	not used 11bin: don't care	1/bit		0	0..3
								30	2	1856	Seat Belt Switch	not used 11bin: don't care	1/bit		0	0..3
								32	2	5630	Park Brake Command	not used 11bin: don't care	1/bit		0	0..3
								34	2	1655	Veh. Limiting Speed Governor Dec. Switch	not used 11bin: don't care	1/bit		0	0..3
								36	2	1654	Veh. Limiting Speed Governor Inc. Switch	not used 11bin: don't care	1/bit		0	0..3
								38	2	1653	Veh. Limiting Speed Governor Enable Switch	not used 11bin: don't care	1/bit		0	0..3
								40	2	3695	DPF Regeneration Inhibit Switch	00 - not activated 01 - activated 11 - not available	1/bit		0	0..3
								42	2	3696	DPF Regeneration Force Switch	00 - not activated 01 - activated 11 - not available	1/bit		0	0..3
								44	2	1666	Automatic Gear Shifting Enable Switch	not used 11bin: don't care	1/bit		0	0..3
								46	2	1656	Engine Automatic Start Enable Switch	not used 11bin: don't care	1/bit		0	0..3
								48	4	1683	Auxiliary Heater Mode Request	not used 11bin: don't care	1/bit		0	0..15
								52	2	1685	Request Engine Zone Heating	not used 11bin: don't care	1/bit		0	0..3
								54	2	1686	Request Cab Zone Heating	not used 11bin: don't care	1/bit		0	0..3
								56	8	2596	Selected Maximum Vehicle Speed Limit	not used FF hex: don't care	1/bit		0	0..250
Diesel Particulate Filter Control	DPFC1	0x18FD7C03	1000	8		x	x	1.1	3 bit	3697	Diesel Particulate Filter Lamp Command	0b000 - Off 0b001 - On 0b100 - fast blink (3 Hz) Servicetool required 0b101 - slow blink (0.5 Hz) Standstill required 0b111 - not used				
								1.4	5 bit	N/A	not used	11111				
								2.1	2 bit	3699	Diesel Particulate Filter Passive Regeneration Status	00 not active 01 active 11 not available (passive regeneration with DPF CRT)				
								2.3	2 bit	3700	Diesel Particulate Filter Active Regeneration Status	00 - Not Active 01 - Active: only if standstill regeneration is ongoing. 10 - Regeneration needed –automatically initiated active regeneration imminent. Whenever a standstill regeneration is requested 0b11- not used				
								2.5	3 bit	3701	Diesel Particulate Filter Status	000 - Regeneration not needed 001 Regeneration needed – lowest level (heat mode 1 or 2 requested) 010 Regeneration needed – moderate level (standstill regeneration required, no inducement active) 011 Regeneration needed – highest level (standstill regeneration required, inducement active) Always Highest Level is shown 0b111 - not used				
								2.8	1 bit	N/A	not used	1				
								3.1	2 bit	3702	Diesel Particulate Filter Active Regeneration Inhibited Status	00 not active 01 active 11 not available				
								3.3	2 bit	3703	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch	00 - No Inhibit 01 - Inhibit 11 - Not Available				
								3.5	2 bit	3704	Diesel Particulate Filter Active Regeneration Inhibited Due to Clutch Disengaged	11 not available				
								3.7	2 bit	3705	Diesel Particulate Filter Active Regeneration Inhibited Due to Service Brake Active	11 not available				
								4.1	2 bit	3706	Diesel Particulate Filter Active Regeneration Inhibited Due to PTO Active	00 - Not Active 01 - Active, engine not in low idle 11 - Not Available				
								4.3	2 bit	3707	Diesel Particulate Filter Active Regeneration Inhibited Due to Accelerator Pedal Off Idle	00 - Not Active 01 - Active, engine not in low idle 11 - Not Available				
								4.5	2 bit	3708	Diesel Particulate Filter Active Regeneration Inhibited Due to Out of Neutral	00 - Not Active 01 - Active 11 - Not Available				
								4.7	2 bit	3709	Diesel Particulate Filter Active Regeneration Inhibited Due toVehicle Speed Above Allowed Speed	00 - Not Active 01 - Active 11 - Not Available				
								5.1	2 bit	3710	Diesel Particulate Filter Active Regeneration Inhibited Due to Parking Brake Not Set	00 not active 01 active 11 not available				
								5.3	2 bit	3711	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature	00 not active 01 active 11 not available				
								5.5	2 bit	3712	Diesel Particulate Filter Active Regeneration Inhibited Due to System Fault Active	00 not active 01 active 11 not available				
								5.7	2 bit	3713	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout	00 not active 01 active 11 not available				

Pos	Size	SPN	Description	Value	Units	Default	Range
6.1	2 bit	3714	Diesel Particulate Filter Active Regeneration Inhibited Due to Temporary System Lockout (Filter load too low for regeneration)	00 - Not Enabled 01 Enabled, Filter soot load below minimum level 11 - Not Available			
6.3	2 bit	3715	Diesel Particulate Filter Active Regeneration Inhibited Due to Permanent System Lockout (Filter fully loaded)	00 not enabled 01 enabled 11 not available			
6.5	2 bit	3716	Diesel Particulate Filter Active Regeneration Inhibited Due to Engine Not Warmed Up	00 - Not Enabled 01 Enabled (coolant temperature too low or SCR system not ready (DEF tank frozen) 11 - Not Available			
6.7	2 bit	3717	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Below Allowed Speed	00 not enabled 01 enabled 11 not available			
7.1	2 bit	3718	Diesel Particulate Filter Automatic Active Regeneration Initiation Configuration	11 not available			
7.3	3 bit	3698	Exhaust System High Temperature Lamp Command	000 - Off 001 - On: Activated when exhaust gas temperature downstream DPF exceeds EMR 4/ TIER4f CAN BUS Specification Page 34 of 61 File: EMR4-TIER4f_CAN_BUS_Specification_ver02_00.docx © Deutz AG threshold. Optional: connected with standstill regeneration 0b111 - not used			
7.6	3 bit	4175	Diesel Particulate Filter Active Regeneration Forced Status	000 - Not Active 001 - Active, Forced by Switch (Acknowledgement for Release Button 010 – Active, Forced by Service Tool 111 - Not Available			
8.1	2 bit	5504	Hydrocarbon Doser Purging Enable	11 - Not Available			
8.3	2 bit	5629	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Pressure	11 - Not Available			
8.5	2 bit	3750	Diesel Particulate Filter1 Conditions Not Met for Active Regeneration	Examples: Engine Speed/Load conditions not met or Soot Load Percent not high enough 00 - Active DPF Regeneration not inhibited 01 - Active DPF Regeneration inhibited 11 - Not Available			
8.7	2 bit	N/A	not used	11			
AT1S Aftertreatment 1 Service	AT1S	0x18FD7B00	1000	8	x		x
1	1 byte	3719	DPF Soot Load Percent	(100% soot load: fully loaded filter >100% soot load: over loaded filter)	1%/bit	0	0..250%
2	2 bit	3720	DPF Ash Load Percent		1%/bit	0	0..100%
3-6	4 byte	3721	Time since last active regeneration		1s/bit	0	0..4294967295 s
7-8	2 byte	N/A	not used	0xFFFF			

Diesel Particulate Filter Control 1	DPFC1	0x18FD7C00	1000	8	x		x			
1.1	3 bit	3697	Diesel Particulate Filter Lamp Command	0b000 - Off 0b001 - On 0b100 - fast blink (3 Hz) Servicetool required 0b101 - slow blink (0.5 Hz) Standstill required				
1.4	5 bit	N/A	not used	11111				
2.1	2 bit	3699	Diesel Particulate Filter Passive Regeneration Status	00 not active 01 active 11 not available (passive regeneration with DPF CRT)				
2.3	2 bit	3700	Diesel Particulate Filter Active Regeneration Status	00 - Not Active 01 - Active: only if standstill regeneration is ongoing. 10 - Regeneration needed –automatically initiated active regeneration imminent. Whenever a standstill regeneration is requested				
2.5	3 bit	3701	Diesel Particulate Filter Status	000 - Regeneration not needed 001 Regeneration needed – lowest level (heat mode 1 or 2 requested) 010 Regeneration needed – moderate level (standstill regeneration required, no inducement active) 011 Regeneration needed – highest level (standstill regeneration required, inducement active) Always Highest Level is shown				
2.8	1 bit	N/A	not used	1				
3.1	2 bit	3702	Diesel Particulate Filter Active Regeneration Inhibited Status	00 not active 01 active 11 not available				
3.3	2 bit	3703	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch	00 - No Inhibit 01 - Inhibit 11 - Not Available				
3.5	2 bit	3704	Diesel Particulate Filter Active Regeneration Inhibited Due to Clutch Disengaged	11 not available				
3.7	2 bit	3705	Diesel Particulate Filter Active Regeneration Inhibited Due to Service Brake Active	11 not available				
4.1	2 bit	3706	Diesel Particulate Filter Active Regeneration Inhibited Due to PTO Active	00 - Not Active 01 - Active, engine not in low idle 11 - Not Available				
4.3	2 bit	3707	Diesel Particulate Filter Active Regeneration Inhibited Due to Accelerator Pedal Off Idle	00 - Not Active 01 - Active, engine not in low idle 11 - Not Available				
4.5	2 bit	3708	Diesel Particulate Filter Active Regeneration Inhibited Due to Out of Neutral	00 - Not Active 01 - Active 11 - Not Available				
4.7	2 bit	3709	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Above Allowed Speed	00 - Not Active 01 - Active 11 - Not Available				
5.1	2 bit	3710	Diesel Particulate Filter Active Regeneration Inhibited Due to Parking Brake Not Set	00 not active 01 active 11 not available				
5.3	2 bit	3711	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Temperature	00 not active 01 active 11 not available				
5.5	2 bit	3712	Diesel Particulate Filter Active Regeneration Inhibited Due to System Fault Active	00 not active 01 active 11 not available				
5.7	2 bit	3713	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout	00 not active 01 active 11 not available				
6.1	2 bit	3714	Diesel Particulate Filter Active Regeneration Inhibited Due to Temporary System Lockout (Filter load too low for regeneration)	00 - Not Enabled 01 Enabled, Filter soot load below minimum level 11 - Not Available				
6.3	2 bit	3715	Diesel Particulate Filter Active Regeneration Inhibited Due to Permanent System Lockout (Filter fully loaded)	00 not enabled 01 enabled 11 not available				
6.5	2 bit	3716	Diesel Particulate Filter Active Regeneration Inhibited Due to Engine Not Warmed Up	00 - Not Enabled 01 Enabled (coolant temperature too low or SCR system not ready (DEF tank frozen) 11 - Not Available				
6.7	2 bit	3717	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Below Allowed Speed	00 not enabled 01 enabled 11 not available				
7.1	2 bit	3718	Diesel Particulate Filter Automatic Active Regeneration Initiation Configuration	11 not available				
7.3	3 bit	3698	Exhaust System High Temperature Lamp Command	000 - Off 001 - On: Activated when exhaust gas temperature downstream DPF exceeds EMR 4/ TIER4f CAN BUS Specification Page 34 of 61 File: EMR4-TIER4f_CAN _BUS_Specification_ver02_00.docx © Deutz AG threshold. Optional: connected with standstill regeneration				
7.6	3 bit	4175	Diesel Particulate Filter Active Regeneration Forced Status	000 - Not Active 001 - Active, Forced by Switch (Acknowledgement for Release Button 010 – Active, Forced by Service Tool 111 - Not Available				
8.1	2 bit	5504	Hydrocarbon Doser Purging Enable	11 - Not Available				
8.3	2 bit	5629	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Gas Pressure	11 - Not Available				
8.5	2 bit	3750	Diesel Particulate Filter1 Conditions Not Met for Active Regeneration	Examples: Engine Speed/Load conditions not met or Soot Load Percent not high enough 00 - Active DPF Regeneration not inhibited 01 - Active DPF Regeneration inhibited 11 - Not Available				
8.7	2 bit	N/A	not used	11				

Aftertreatment Hours and Status 2	ATHOURS2	0x18FF9900	500	8	x					
0	2			EST (high exhaust system temperature) lamp	00: HEST lamp OFF 01: HEST lamp ON 10, 11: reserved for future AP assignment			1	0	
2	3			DPF lamp	000: DPF lamp OFF 001: DPF lamp ON 010: DPF lamp slow blink 100: DPF lamp fast blink 011, 110, 101, 111 - Reserved for future AP assignment			1	0	
5	2			audible warning	00: audible warning OFF 01: audible warning ON: 10, 11: reserved for future AP assignment			1	0	
8	8			Regeneration progress, minutes left		min		1min	0	
16	8			Reasons for inhibiting active regeneration. 1 = inhibited, 0 = allowed	Bit 1: inhibited by inhibit switch Bit 2: inhibited by low exhaust gas temperature Bit 3: inhibited by system fault. Certain system faults prevent regeneration Bit 4: inhibited by system timeout. If the regeneration process fails to complete in a certain time window. Bit 5: inhibited by low engine coolant temperature. The engine has to be warmed up for active regeneration. Bit 6: inhibited by accelerator pedal off idle Bit 7: inhibited by low DPF level. If the soot loading in DPF is low, regeneration is not allowed to prevent unnecessary oil dilution. Bit 8: inhibited by high DPF level. If the soot loading in DPF is too high, regeneration is inhibited to prevent uncontrolled regeneration.			1	0	
24	5			Indicates the specific state of diesel particulate filter active regeneration.	00000: regeneration not active 00001: standstill regeneration, DOC heat-up 00010: standstill regeneration, regeneration active 00011: standstill regeneration, cooldown 00100: standstill regeneration complete 00101: standstill regeneration aborted			1	0	
29	3			Indicates the state of the diesel particulate filter regeneration need and urgency.	000 Regeneration not needed 001 Regeneration needed - lowest level 010 Regeneration needed - moderate level 011 Regeneration needed - highest level 100 reserved for SAE assignment 101 reserved for SAE assignment 110 reserved for SAE assignment 111 not available			1	0	
32	8			DPF soot loading level		%		1%/b	0	
40	8			DPF ash loading level		%		1%/b	0	
48	16			Time since last regeneration		h		1h/b	0	