Reading out the parameters Engine control unit A1 M29-CM2200- CMAR

The parameters which are important for our vehicle are read and evaluated in this description.
The comparison values which are specified for the parameters are displayed in the following modes and speed ranges.

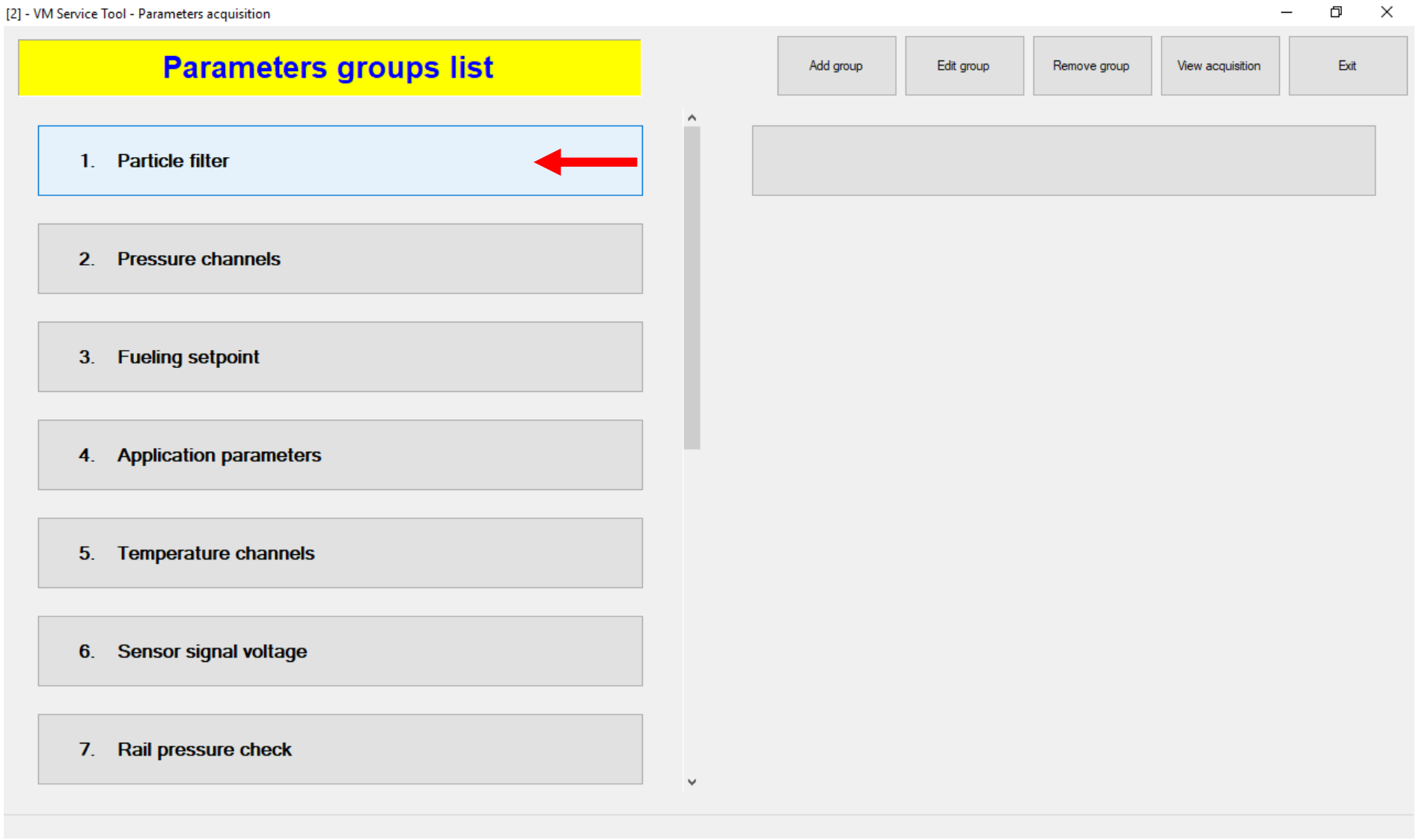
1. Idle speed 900 rpm without load in transport mode
2. CM 2200 – sweeping mode ECO mode 1400 rpm
3. CM 2200 – sweeping mode standard mode 1700 rpm
   Turbine speed with potentiometer set to 100 % in position 10
4. CM 2200 – sweeping mode max. mode 2000 rpm
   Turbine speed with potentiometer set to 100 % in position 10
5. M29 – engine speed with ADR set to 2800 rpm (nominal speed) under load

VM Service Tool - E.C.U. Diagnosis

1. Diagnostic codes
2. Parameters acquisition
3. Trip Recorder
4. Diagnostic tests
5. Engine Collect Data
6. ECU Information
7. Exit

[Ethernet USB] Connected

- Selection and opening of parameter group 1. Particle filter



Explanation of particle filter parameter group (DPF)

The differential pressure may not exceed 0.3 bar at the maximum engine speed.
A differential pressure that is too high is an indication of a blocked diesel particle filter.
The maximum particle weight of the diesel particle filter is 38 grammes.
With a particle weight of 38 grammes, error P242F is stored as active in the engine control unit, and the engine power is reduced by 25 %.
Automatic regeneration of the particle filter is not possible in this condition, and particle filter regeneration can only be initiated by means of a service generation.
From a particle weight of 33 grammes and above, the DPF regeneration request indicator lamp (H50) illuminates. From a particle weight of 38 grammes, the DPF regeneration request indicator lamp (H50) and also the EOBD/MIL warning light (H49) illuminate.

If the vehicle is operated for a long period with a blocked diesel particle filter, consequential damage to the EGR valve and the turbocharger may occur, since the exhaust gas is unable to escape via the particle filter.

If the particle filter is blocked, problems may also occur when starting the engine.

It is also essential to check the load condition of the diesel particle filter in the event of error messages due to low charge pressure (lack of engine power). Because of the blocked particle filter, the turbocharger no longer reaches the required engine speed and the charge pressure is no longer achieved.

2. Particle filter DPF

1. Idle speed 900 rpm without load in transport mode

[2-1] - VM Service Tool - Parameters acquisition - Particle filter

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	849.00	rpm	
Ratio between the maximum torque and the torque current - (...	1.88	%	
Differential pressure particulate filter - (Exh_pPFltDiff) Pressure sensor DPF B38	0.008	bar	
Simulated soot mass in particulate filter - (PFltLd_mSotSim)	23.08	g	
Flow resistance of the particulate filter - (PFltLd_resFlw)	0.00	bar/(m^3/h)	
Engine operating point - (PFltPOp_stEngPOp)	1.00	-	

Acquisition | Graph | Log file | Print | Exit

Request 2/6

2. Particle filter DPF

2. CM 2200 – sweeping in ECO mode 1400 rpm

[2-1] - VM Service Tool - Parameters acquisition - Particle filter

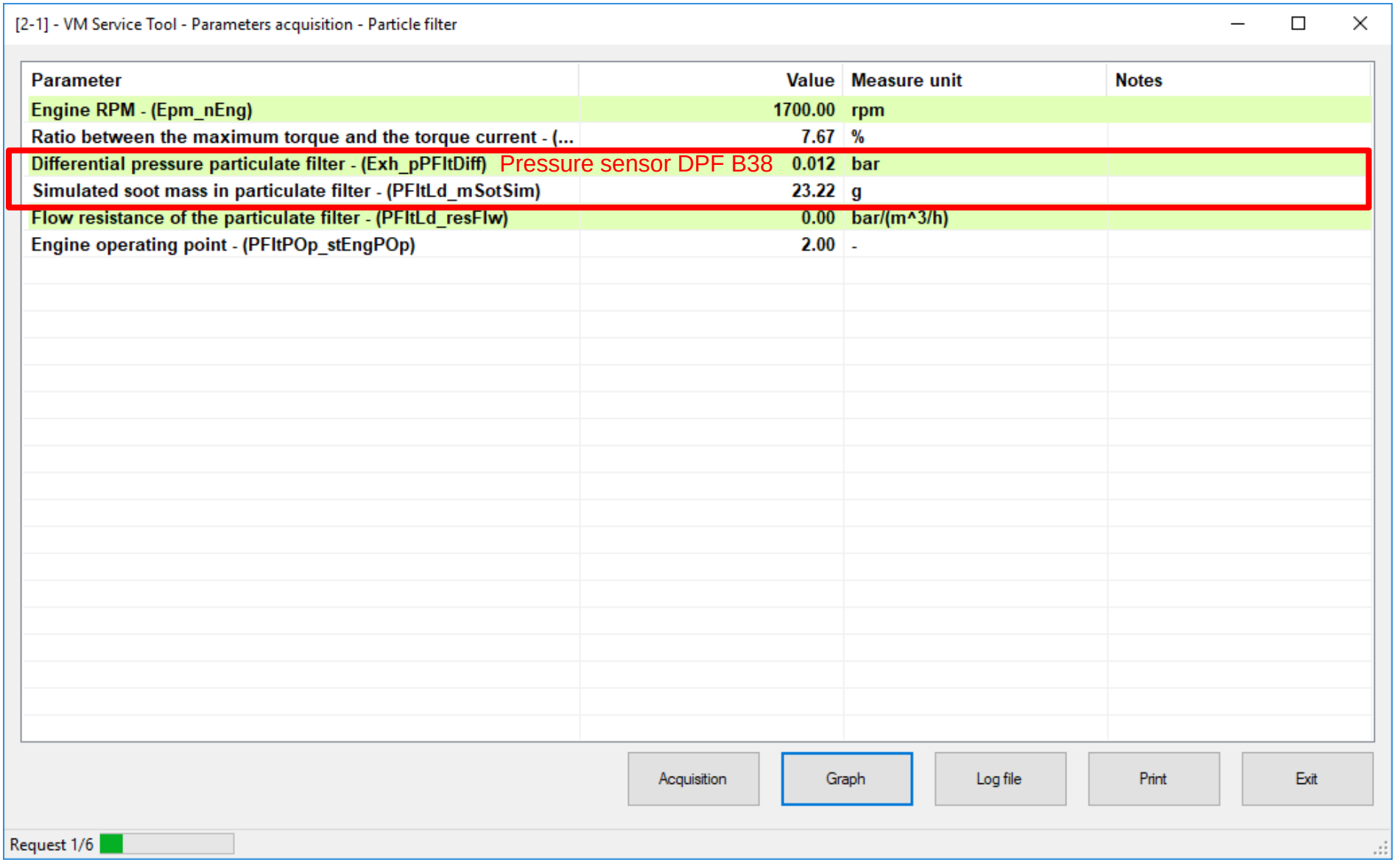
Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	849.00	rpm	
Ratio between the maximum torque and the torque current - (...	1.88	%	
Differential pressure particulate filter - (Exh_pPFltDiff) Pressure sensor DPF B38	0.008	bar	
Simulated soot mass in particulate filter - (PFltLd_mSotSim)	23.08	g	
Flow resistance of the particulate filter - (PFltLd_resFlw)	0.00	bar/(m^3/h)	
Engine operating point - (PFltPOp_stEngPOp)	1.00	-	

Acquisition | Graph | Log file | Print | Exit

Request 2/6

2. Particle filter DPF

3. CM 2200 – sweeping in standard mode 1700 rpm
Turbine speed with the potentiometer set to 100 % in position 10.



2. Particle filter DPF

4. CM 2200 – sweeping in max mode 2000 rpm
Turbine speed with the potentiometer set to 100 % in position 10.

[2-1] - VM Service Tool - Parameters acquisition - Particle filter

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2004.00	rpm	
Ratio between the maximum torque and the torque current - (...	10.03	%	
Differential pressure particulate filter - (Exh_pPFltDiff) Pressure sensor DPF B38	0.023	bar	
Simulated soot mass in particulate filter - (PFltLd_mSotSim)	23.26	g	
Flow resistance of the particulate filter - (PFltLd_resFlw)	0.00	bar/(m^3/h)	
Engine operating point - (PFltPOp_stEngPOp)	2.00	-	

Acquisition | Graph | Log file | Print | Exit

Request 6/6

2. Pressure channels

5. M29 – engine speed with ADR set to 2800 rpm (nominal speed) under load

[2-1] - VM Service Tool - Parameters acquisition - Particle filter

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2814.00	rpm	
Ratio between the maximum torque and the torque current - (...	8.28	%	
Differential pressure particulate filter - (Exh_pPFltDiff)	0.060	bar	
Simulated soot mass in particulate filter - (PFltLd_mSotSim)	23.32	g	
Flow resistance of the particulate filter - (PFltLd_resFlw)	0.00	bar/(m^3/h)	
Engine operating point - (PFltPOp_stEngPOp)	2.00	-	

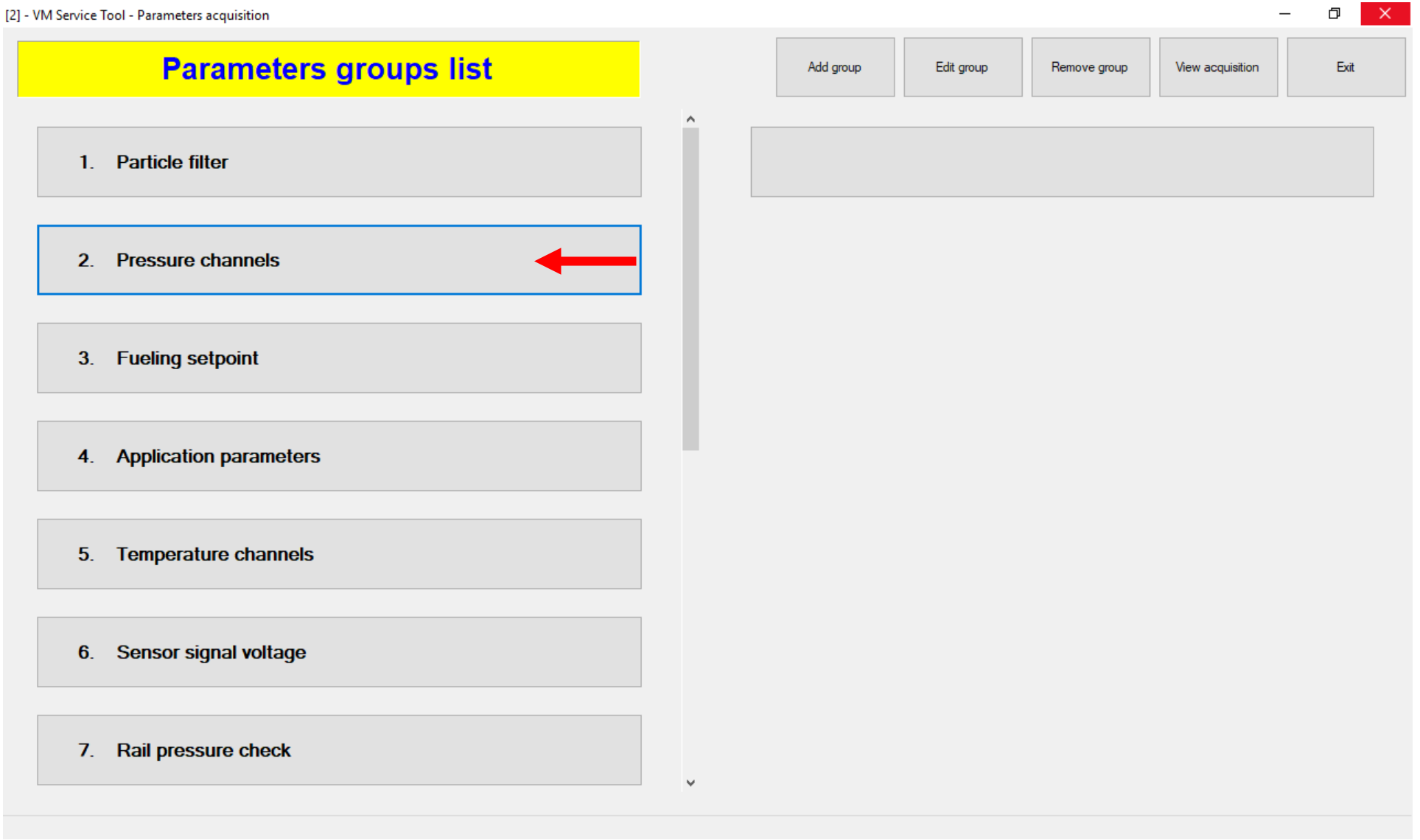
Pressure sensor DPF B38

The differential pressure may not exceed 0.3 bar at the maximum engine speed.

Acquisition | Graph | Log file | Print | Exit

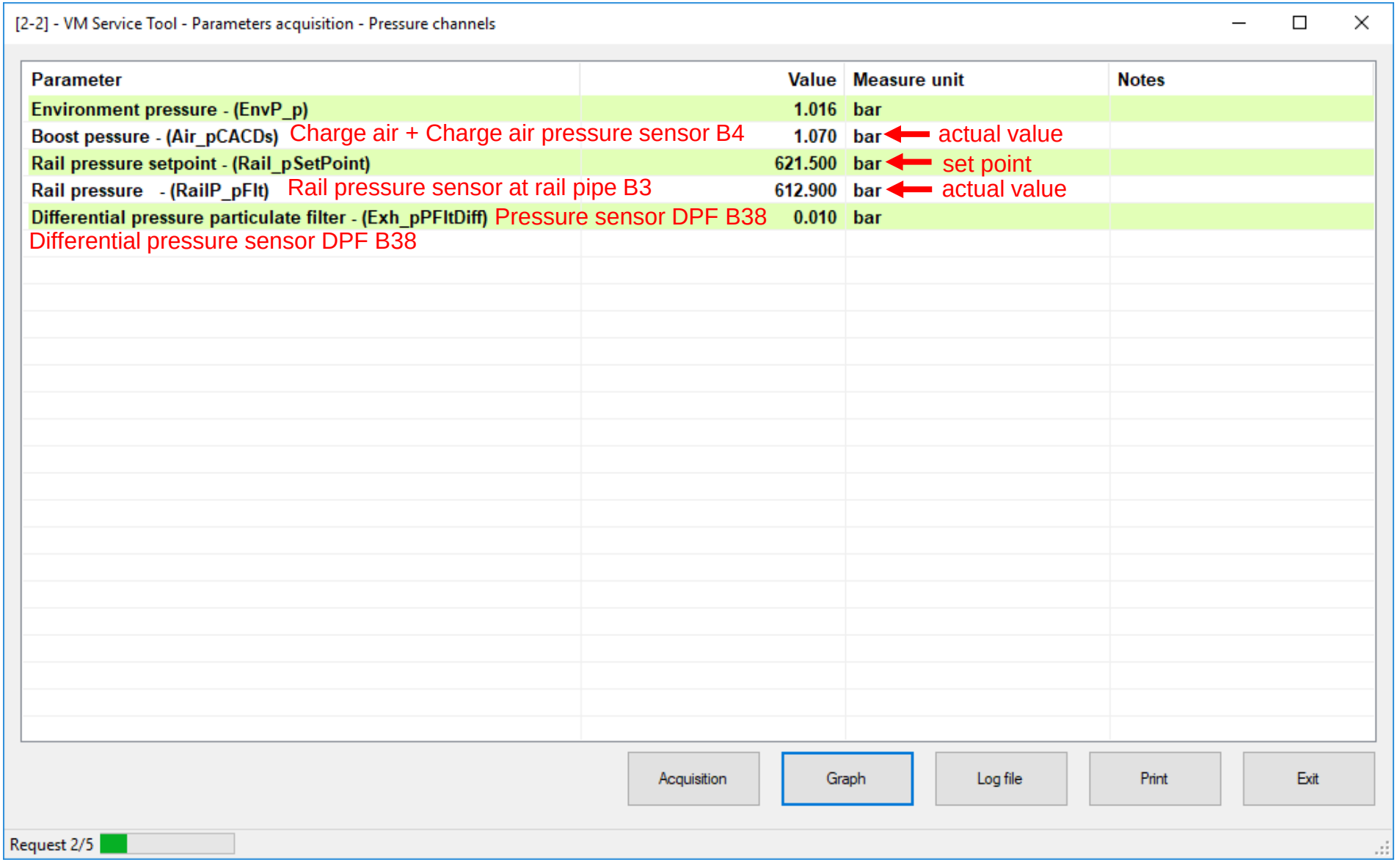
Request 2/6

- Selection and opening of parameter group 2. Pressure channels



2. Pressure channels

1. M29- CM 2200 idle speed 900 rpm without load in transport mode



2. Pressure channels

2. CM 2200 sweeping in ECO mode 1400 rpm

[2-2] - VM Service Tool - Parameters acquisition - Pressure channels

Parameter	Value	Measure unit	Notes
Environment pressure - (EnvP_p)	1.016	bar	
Boost pessure - (Air_pCACDs)	1.104	bar	
Rail pressure setpoint - (Rail_pSetPoint)	855.300	bar	
Rail pressure - (RailP_pFlt)	857.000	bar	
Differential pressure particulate filter - (Exh_pPFltDiff)	0.010	bar	

Charge air + Charge air pressure sensor B4

actual value

set point

Rail pressure sensor at rail pipe B3

actual value

Pressure sensor DPF B38

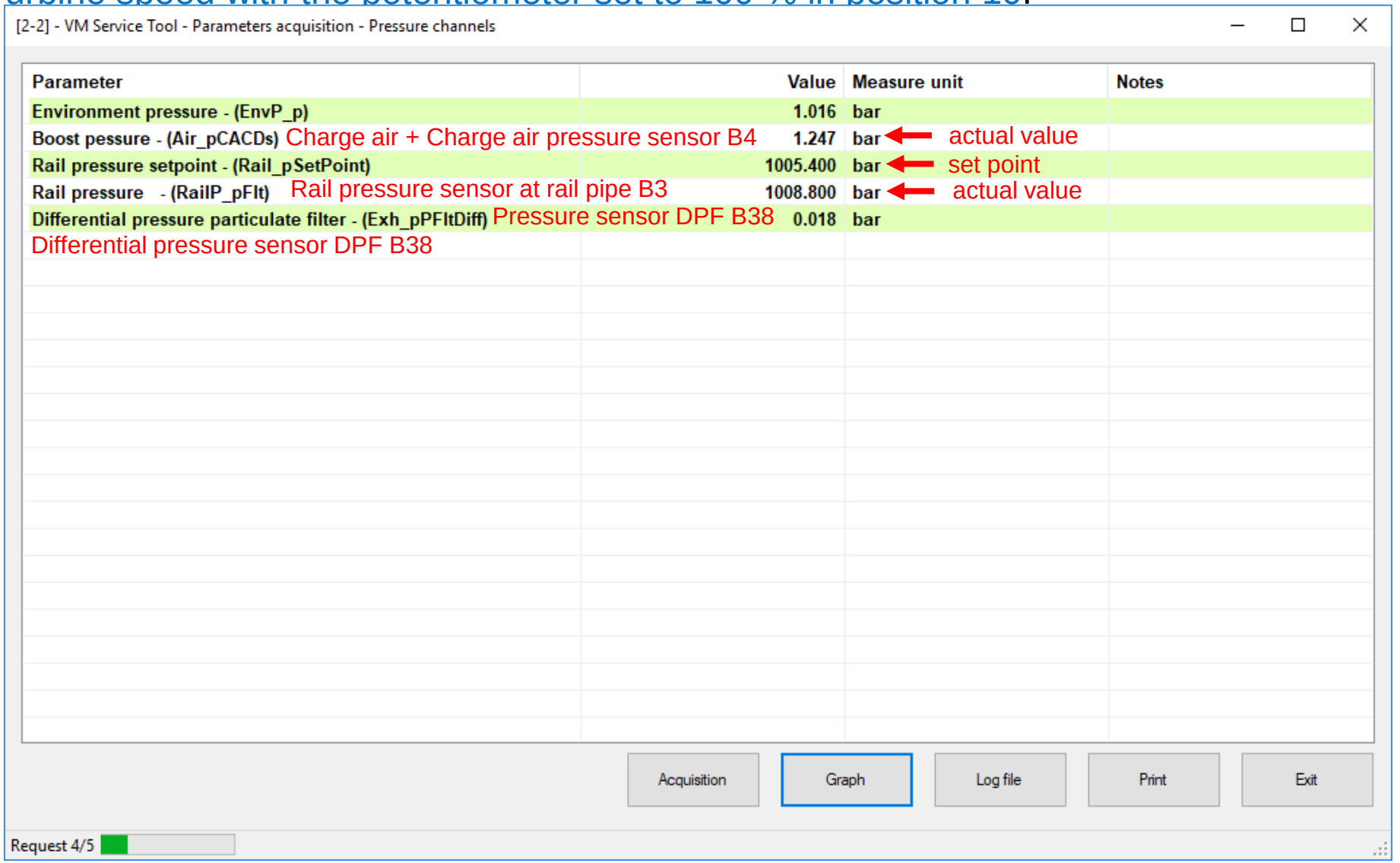
Differential pressure sensor DPF B38

Acquisition | Graph | Log file | Print | Exit

Request 3/5

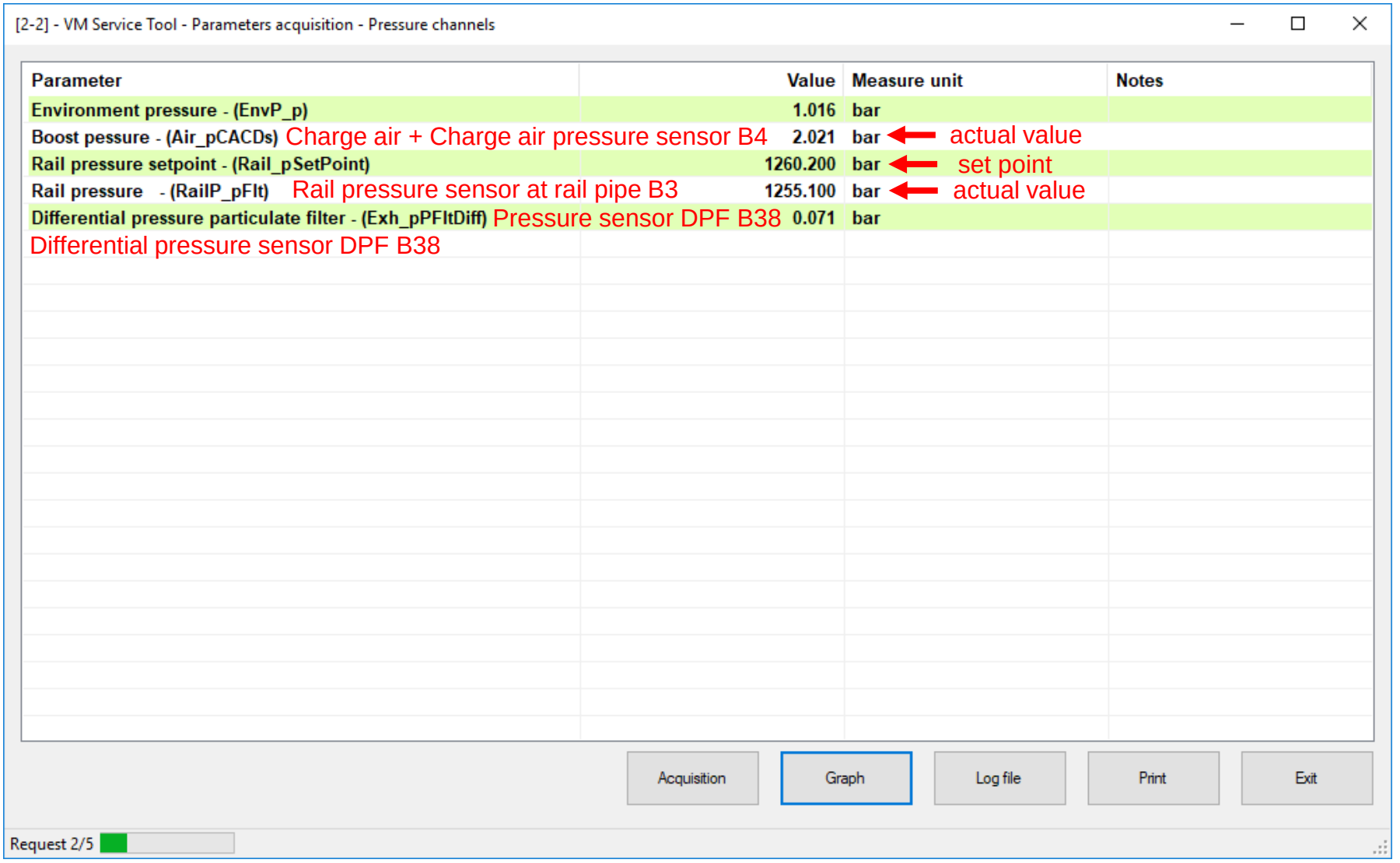
2. Pressure channels

3. CM 2200 sweeping in standard mode 1700 rpm
Turbine speed with the potentiometer set to 100 % in position 10.



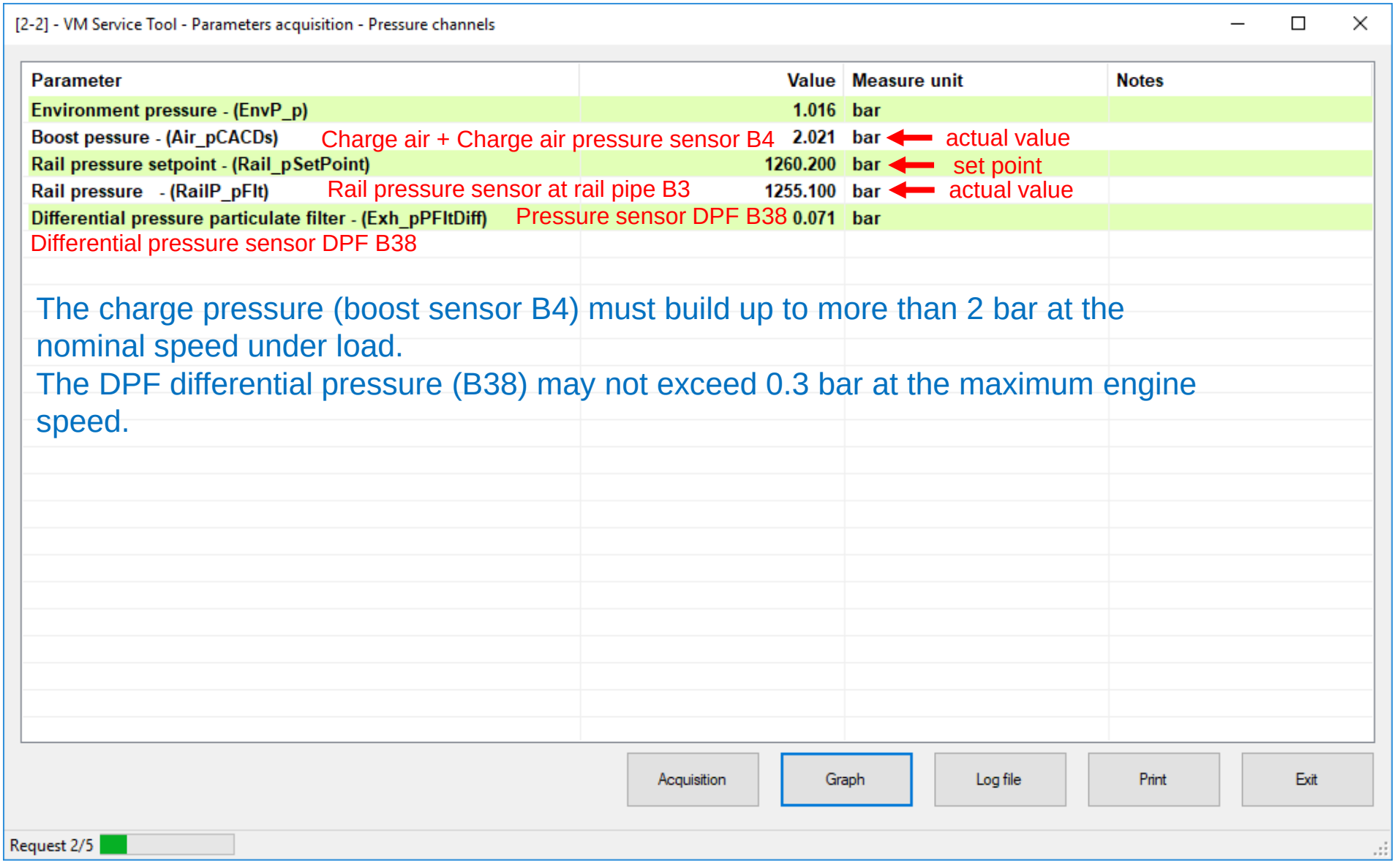
2. Pressure channels

4. CM 2200 sweeping in max mode 2000 rpm
Turbine speed with the potentiometer set to 100 % in position 10.



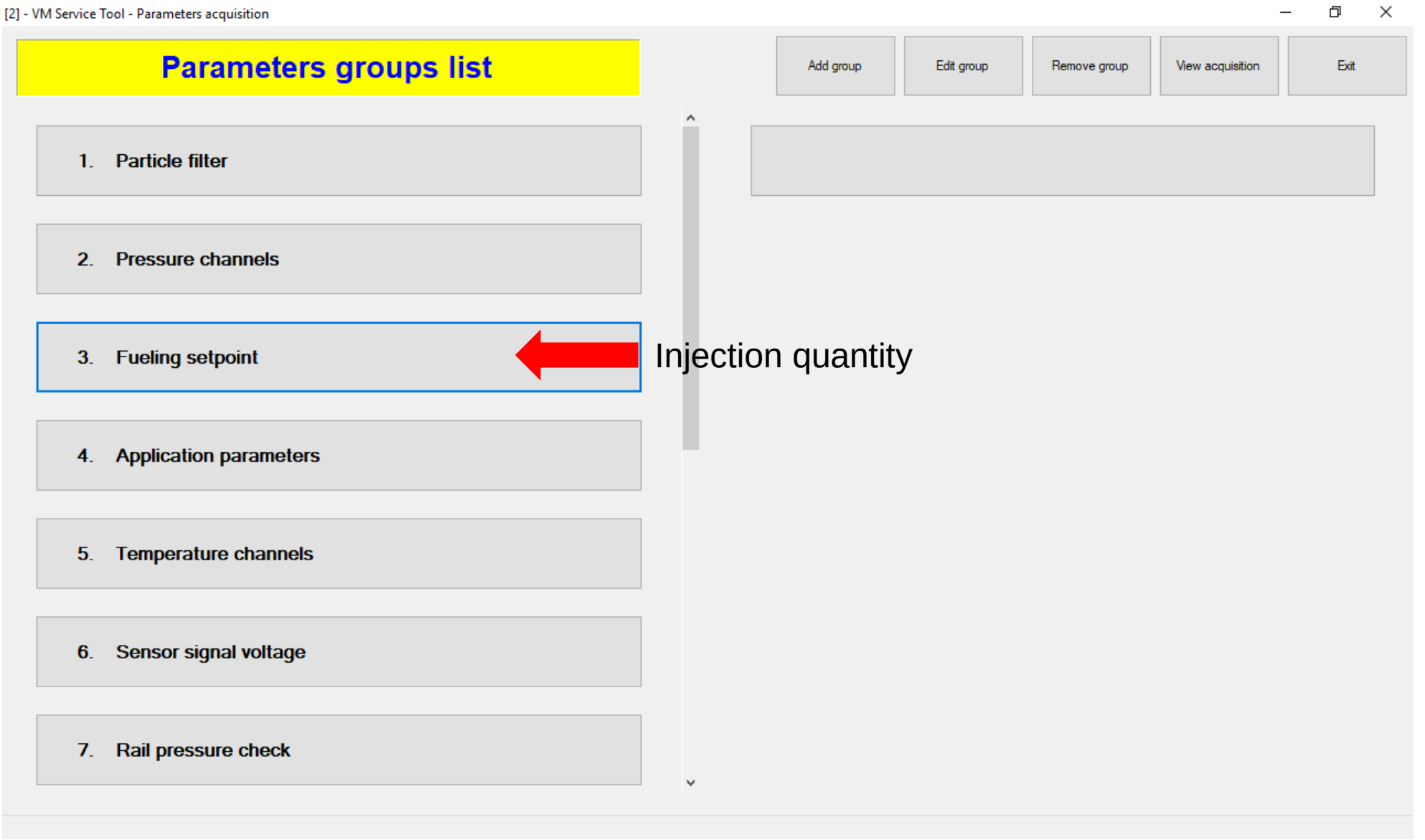
2. Pressure channels

5. M29 – engine speed with work speed control (ADR) set to 2800 rpm (nominal speed) under load.



The charge pressure (boost sensor B4) must build up to more than 2 bar at the nominal speed under load.
The DPF differential pressure (B38) may not exceed 0.3 bar at the maximum engine speed.

- Selection and opening of parameter group 3. Injection setpoint



Explanation concerning injection setpoint parameter group

With Common Rail diesel systems, the injection is subdivided into 3 groups.

1. Pre-injection for smooth engine running
2. Main injection for a good torque characteristic
3. Post-injection for a good Nox value

In this injection setpoint parameter group, the “Quantity introduced by main injection” measurements are evaluated depending on the engine speed.
The “Quantity introduced by main injection” should be 75 mm^3/ stroke (cubic millimetres per stroke) in the full load range.
All other values in this parameter group are not relevant for the M29- CM 2200.

3. Injection quantity

1. Idle speed 900 rpm without load in transport mode

[2-3] - VM Service Tool - Parameters acquisition - Fueling setpoint

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	849.50	rpm	
Ratio between the maximum torque and the torque current - (...	1.83	%	
Desired MI1 injection quantity - (InjCrv_qMI1Des)	12.02	mm^3/hub	
Desired PiI1 injection quantity - (InjCrv_qPiI1Des)	1.31	mm^3/hub	
Post injection 1 setpoint quantity - (InjCrv_qPoI1Des_mp)	0.00	mm^3/hub	
Post injection 2 setpoint quantity - (InjCrv_qPoI2Des_mp)	0.00	mm^3/hub	
advance angle main injection - (InjCrv_phiMI1Des)	0.31	deg CrS	
Advance angle pilot injection 1 - (InjCrv_phiPiI1Des)	6.00	deg CrS	
Advance angle pilot injection 2 - (InjCrv_phiPiI2Des)	0.00	deg CrS	
Main injection duration - (InjCrv_tiMI1ET)	543.60	µs	
Excitation time current Pilot 1 - (InjVlv_tiPiI1ET)	275.60	µs	
Excitation time current Pilot 2 - (InjVlv_tiPiI2ET)	0.00	µs	

Acquisition | Graph | Log file | Print | Exit

Request 4/12

3. Injection quantity

2. Sweeping in ECO mode 1400 rpm

[2-3] - VM Service Tool - Parameters acquisition - Fueling setpoint

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	1416.00	rpm	
Ratio between the maximum torque and the torque current - (...	5.16	%	
Desired MI1 injection quantity - (InjCrv_qMI1Des)	13.61	mm^3/hub	
Desired PiI1 injection quantity - (InjCrv_qPiI1Des)	1.76	mm^3/hub	
Post injection 1 setpoint quantity - (InjCrv_qPoI1Des_mp)	0.00	mm^3/hub	
Post injection 2 setpoint quantity - (InjCrv_qPoI2Des_mp)	1.51	mm^3/hub	
advance angle main injection - (InjCrv_phiMI1Des)	-0.66	deg CrS	
Advance angle pilot injection 1 - (InjCrv_phiPiI1Des)	13.58	deg CrS	
Advance angle pilot injection 2 - (InjCrv_phiPiI2Des)	0.00	deg CrS	
Main injection duration - (InjCrv_tiMI1ET)	492.80	µs	
Excitation time current Pilot 1 - (InjVlv_tiPiI1ET)	254.00	µs	
Excitation time current Pilot 2 - (InjVlv_tiPiI2ET)	0.00	µs	

Acquisition | Graph | Log file | Print | Exit

Request 8/12

3. Injection quantity

3. Sweeping in standard mode 1700 rpm
Turbine speed with the potentiometer set to 100 % in position 10.

[2-3] - VM Service Tool - Parameters acquisition - Fueling setpoint

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	1708.00	rpm	
Ratio between the maximum torque and the torque current - (...	8.84	%	
Desired MI1 injection quantity - (InjCrv_qMI1Des)	21.69	mm^3/hub	
Desired PiI1 injection quantity - (InjCrv_qPiI1Des)	2.00	mm^3/hub	
Post injection 1 setpoint quantity - (InjCrv_qPoI1Des_mp)	0.00	mm^3/hub	
Post injection 2 setpoint quantity - (InjCrv_qPoI2Des_mp)	1.83	mm^3/hub	
advance angle main injection - (InjCrv_phiMI1Des)	-1.87	deg CrS	
Advance angle pilot injection 1 - (InjCrv_phiPiI1Des)	11.80	deg CrS	
Advance angle pilot injection 2 - (InjCrv_phiPiI2Des)	0.00	deg CrS	
Main injection duration - (InjCrv_tiMI1ET)	574.40	µs	
Excitation time current Pilot 1 - (InjVlv_tiPiI1ET)	242.00	µs	
Excitation time current Pilot 2 - (InjVlv_tiPiI2ET)	0.00	µs	

Acquisition | Graph | Log file | Print | Exit

Request 10/12

3. Injection quantity

4. Sweeping in max mode 2000 rpm
   Turbine speed with the potentiometer set to 100 % in position 10.

[2-3] - VM Service Tool - Parameters acquisition - Fueling setpoint

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2000.50	rpm	
Ratio between the maximum torque and the torque current - (...	11.40	%	
Desired MI1 injection quantity - (InjCrv_qMI1Des)	24.15	mm^3/hub	
Desired Pil1 injection quantity - (InjCrv_qPil1Des)	2.00	mm^3/hub	
Post injection 1 setpoint quantity - (InjCrv_qPoI1Des_mp)	0.00	mm^3/hub	
Post injection 2 setpoint quantity - (InjCrv_qPoI2Des_mp)	1.33	mm^3/hub	
advance angle main injection - (InjCrv_phiMI1Des)	-1.01	deg CrS	
Advance angle pilot injection 1 - (InjCrv_phiPil1Des)	11.67	deg CrS	
Advance angle pilot injection 2 - (InjCrv_phiPil2Des)	0.00	deg CrS	
Main injection duration - (InjCrv_tiMI1ET)	575.20	µs	
Excitation time current Pilot 1 - (InjVlv_tiPil1ET)	244.00	µs	
Excitation time current Pilot 2 - (InjVlv_tiPil2ET)	0.00	µs	

Acquisition | Graph | Log file | Print | Exit

Request 11/12

3. Injection quantity

5. M29 - engine speed with ADR set to 2800 rpm (nominal speed) under load.

[2-3] - VM Service Tool - Parameters acquisition - Fueling setpoint

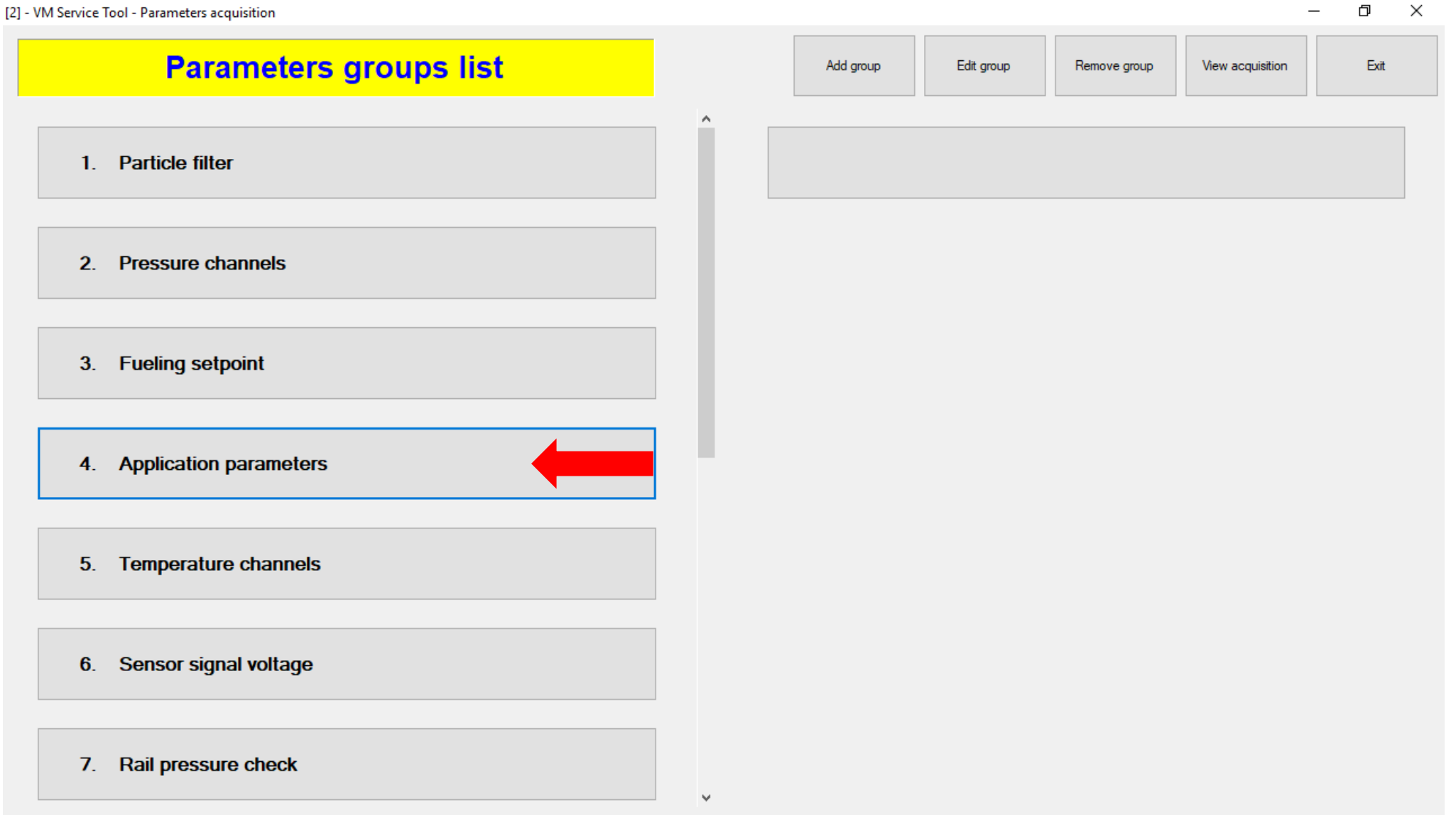
Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2808.00	rpm	
Ratio between the maximum torque and the torque current - (...	10.68	%	
Desired MI1 injection quantity - (InjCrv_qMI1Des)	31.80	mm^3/hub	
Desired Pil1 injection quantity - (InjCrv_qPil1Des)	2.00	mm^3/hub	
Post injection 1 setpoint quantity - (InjCrv_qPol1Des_mp)	0.00	mm^3/hub	
Post injection 2 setpoint quantity - (InjCrv_qPol2Des_mp)	0.00	mm^3/hub	
advance angle main injection - (InjCrv_phiMI1Des)	2.53	deg CrS	
Advance angle pilot injection 1 - (InjCrv_phiPil1Des)	18.17	deg CrS	
Advance angle pilot injection 2 - (InjCrv_phiPil2Des)	0.00	deg CrS	
Main injection duration - (InjCrv_tiMI1ET)	631.60	µs	
Excitation time current Pilot 1 - (InjVlv_tiPil1ET)			
Excitation time current Pilot 2 - (InjVlv_tiPil2ET)	0.00	µs	

The “Quantity introduced by main injection” should be a maximum of 75 mm^3 / stroke (cubic millimetres per stroke) in the full load range.
All of the other values in this parameter group are not relevant for our vehicle.

Acquisition | Graph | Log file | Print | Exit

Request 11/12

- Selection and opening of parameter group 4. Application parameters



4. Application parameters

[2-4] - VM Service Tool - Parameters acquisition - Application parameters

Parameter	Value	Measure unit	Notes
Basic low idle setpoint speed (rpm) - (HLSDem_nSetPLoBas)	800.00	rpm	
Engine RPM - (Epm_nEng)	849.50	rpm	
Vehicle speed - (VehV_v)	0.00	km/h	
theoretical Fuel consumption - (Com_dvolFICons)	1.37	l/h	
Total time engine running - (EngDa_tiEngOn)	57265.00	s	
ECU ON time for the current driving cycle - (EngReq_tiECUOn	3478.00	s	
diluted oil mass - (Lub_mOilDilEng)	59.90	g	
Fuel-oil ratio in the engine - (Lub_rFIOil)	0.84	%	

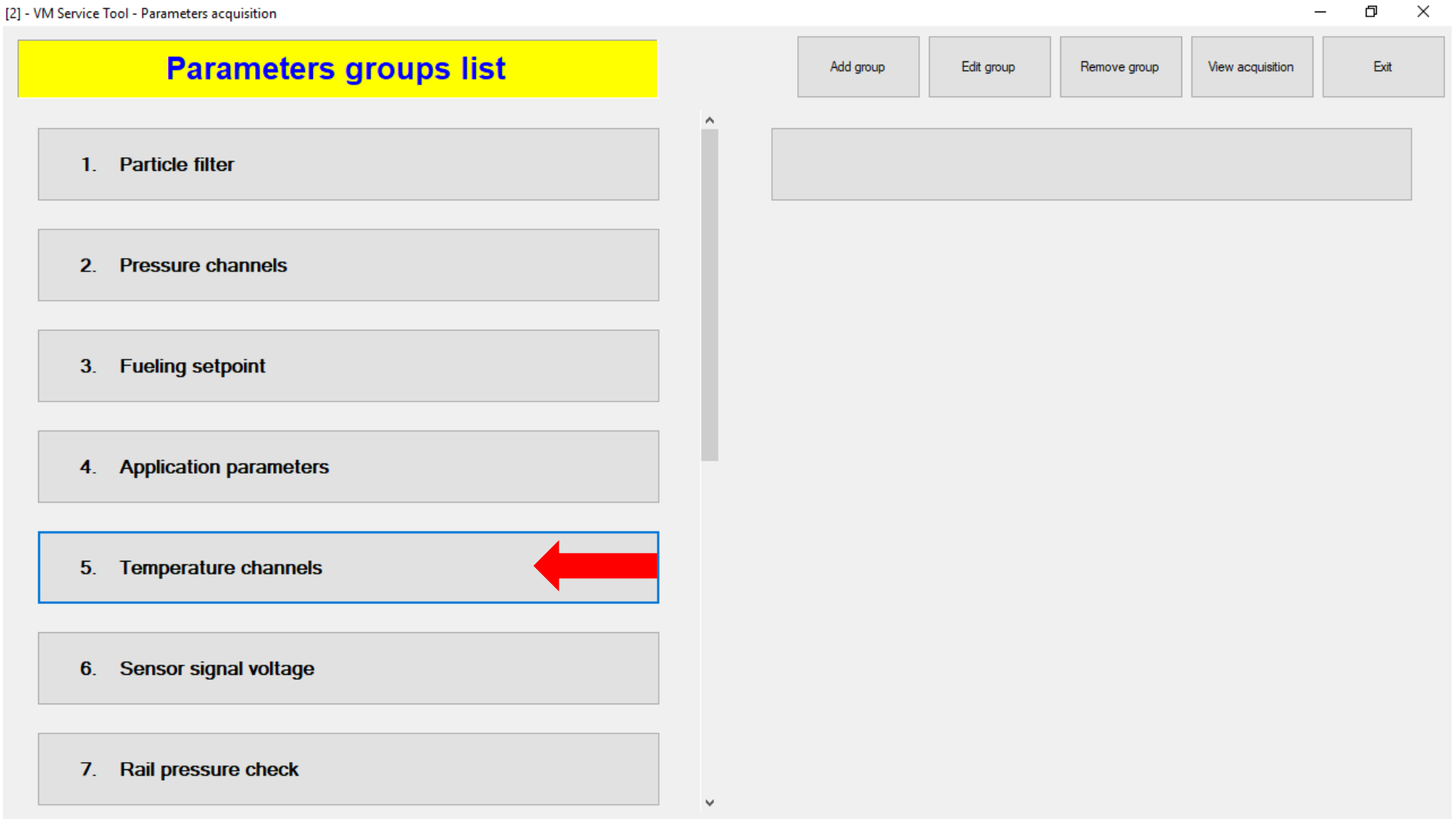
Not relevant for M29- CM 2200

The quality of the engine oil with regard to oil dilution is evaluated in this parameter group. There are no reference values for our vehicles which are an indication of excessive oil dilution.
Excessive oil dilution is indicated with an error message, warning light EOBD/MIL H49 comes on and is stored in the engine control unit with fault code P252F.

Acquisition | Graph | Log file | Print | Exit

Request 4/8

- Selection and opening of parameter group 5. Temperature channels



5. Temperature channels

[2-5] - VM Service Tool - Parameters acquisition - Temperature channels

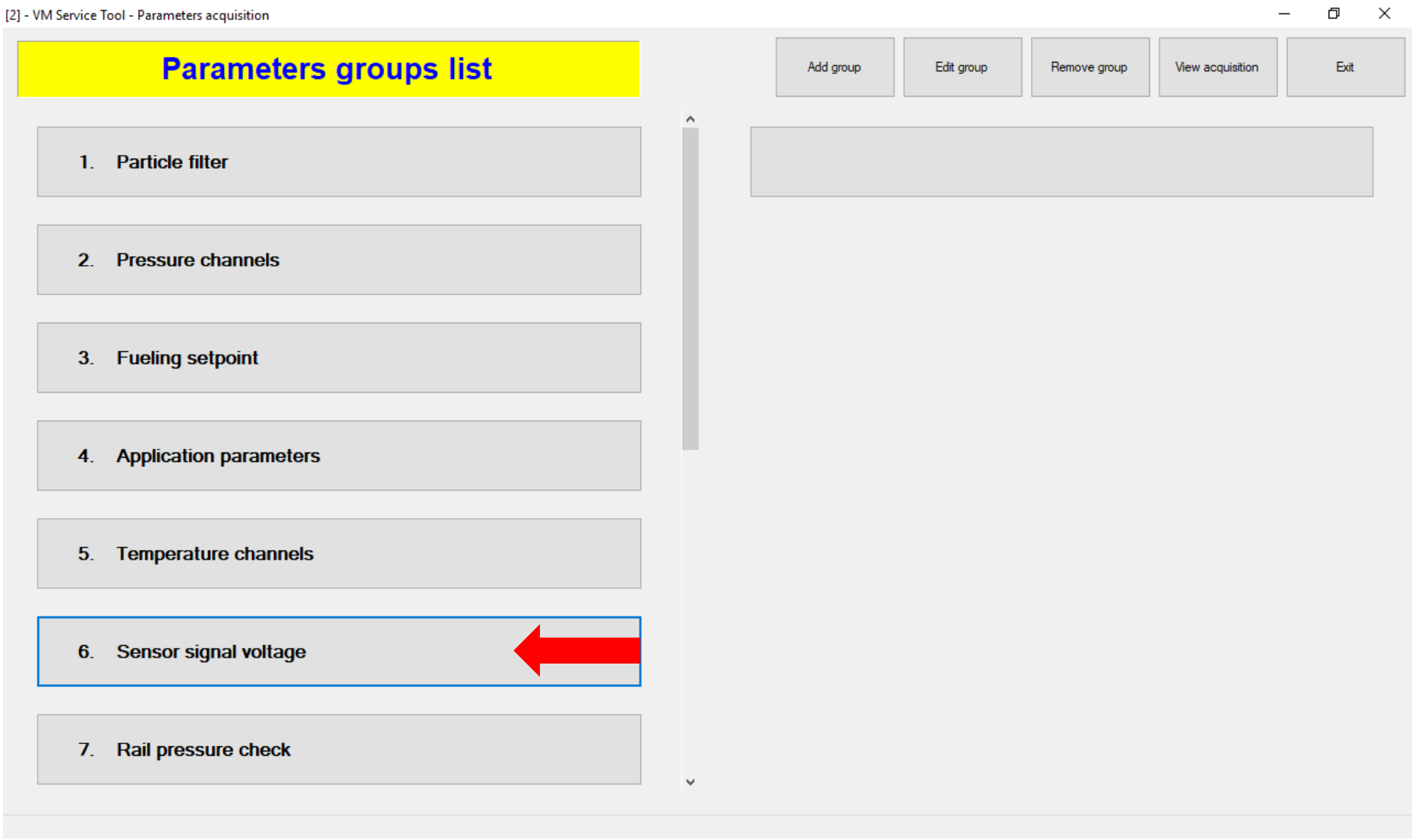
Parameter		Value	Measure unit	Notes
Engine coolant temperature - (CEngDsT_t_mp)	Coolant temperature sensor B5	85.96	°C	
temperature air inside the inlet manifold - (Air_tCACDs)		49.26	°C	
Fuel temperature - (FuelT_t)	Fuel temperature sensor B6	27.96	°C ←	max. fuel temperature 75 °C
DOC in Temperature - (Exh_tOxiCatUs)	Temperature sensor DOC-IN B 44	173.36		
DPF in Temperature - (Exh_tPFltUs)	Temperature sensor DPF-IN B 42	185.16	°C ←	max. temperature DPF- In 700 °C

At a fuel temperature of more than 75 °C, the power of the engine is reduced and fault code P0168 is stored in engine control unit A1.
Regeneration of the diesel particle filter is aborted at a DPF inlet temperature of more than 700 °C.

Acquisition | Graph | Log file | Print | Exit

Request 4/5

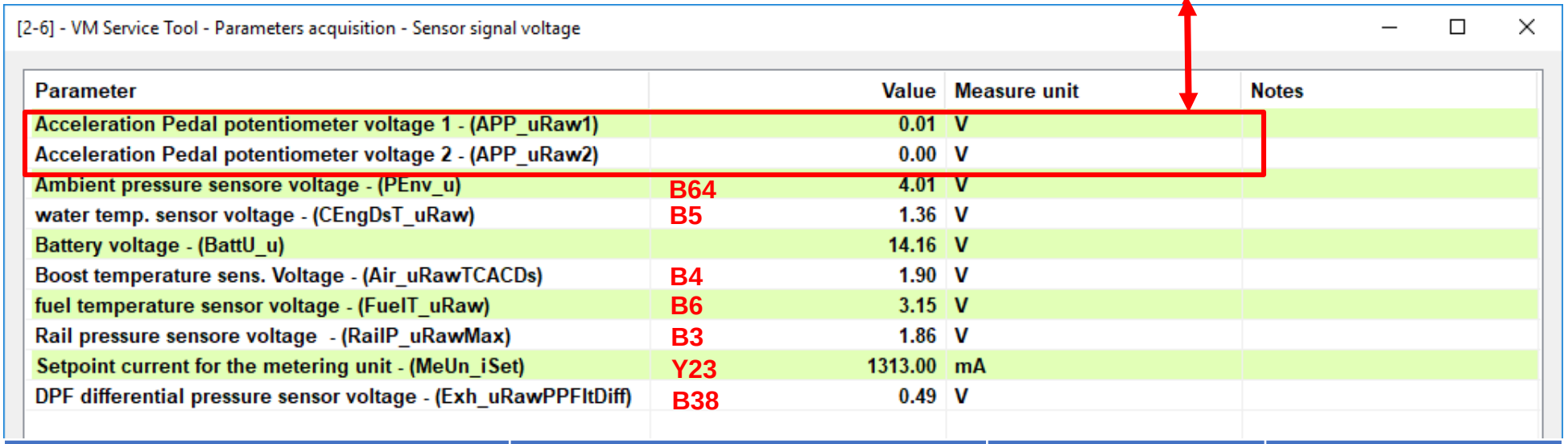
- Selection and opening of parameter group 6. Sensor signal voltage



6. Sensor signal voltage

Pedal value transmitter B40 (accelerator) is evaluated by the Hydrostat control unit A12. Evaluation via Bodas/ process parameters/ group 13.3 +13.4

1. Idle speed 900 rpm without load in transport mode



Parameter		Value	Measure unit	Notes
Acceleration Pedal potentiometer voltage 1 - (APP_uRaw1)		0.01	V	
Acceleration Pedal potentiometer voltage 2 - (APP_uRaw2)		0.00	V	
Ambient pressure sensore voltage - (PEnv_u)	B64	4.01	V	
water temp. sensor voltage - (CEngDsT_uRaw)	B5	1.36	V	
Battery voltage - (BattU_u)		14.16	V	
Boost temperature sens. Voltage - (Air_uRawTCACDs)	B4	1.90	V	
fuel temperature sensor voltage - (FuelT_uRaw)	B6	3.15	V	
Rail pressure sensore voltage - (RailP_uRawMax)	B3	1.86	V	
Setpoint current for the metering unit - (MeUn_iSet)	Y23	1313.00	mA	
DPF differential pressure sensor voltage - (Exh_uRawPPFltDiff)	B38	0.49	V	

Parameter	Sensor	Values (V+ mA)	Resitance
Ambient sensor voltage	Ambient-Sensor B64	5 Volt	No value
Water temp. sensor voltage	Water (Coolant) temprature sensor B5	5 Volt	2500 Ohm at 25° C coolant temperture
BOOST temperature sens. voltage	Charge air + charge air pressure sensor B4	5 Volt	No value
Fuel temperature sensor voltage	Fuel temperature sensor (integrated in the fuel filter) B6	5 Volt	2050 Ohm at 25 ° C fuel temperature
Rail pressure sensor voltage	Rail pressure sensor at the rail pipe B3	5 Volt	No value
Setpoint current for meetering unit	Fuel metering unit Y25 (at HP- pump))	1800 mA	2 Ohm
DPF differential pressure voltage	Differential pressure sensor DPF B38	5 Volt	No value

6. Sensor signal voltage

2. Sweeping in ECO mode rpm

[2-6] - VM Service Tool - Parameters acquisition - Sensor signal voltage

Parameter		Value	Measure unit	Notes
Acceleration Pedal potentiometer voltage 1 - (APP_uRaw1)		0.01	V	
Acceleration Pedal potentiometer voltage 2 - (APP_uRaw2)		0.00	V	
Ambient pressure sensore voltage - (PEnv_u)	B64	4.01	V	
water temp. sensor voltage - (CEngDsT_uRaw)	B5	1.31	V	
Battery voltage - (BattU_u)		14.12	V	
Boost temperature sens. Voltage - (Air_uRawTCACDs)	B4	1.35	V	
fuel temperature sensor voltage - (FuelT_uRaw)	B6	3.15	V	
Rail pressure sensore voltage - (RailP_uRawMax)	B3	2.64	V	
Setpoint current for the metering unit - (MeUn_iSet)	Y25	1228.00	mA	
DPF differential pressure sensor voltage - (Exh_uRawPPFltDiff)	B38	0.53	V	

Parameter	Sensor	Values (V+ mA)	Resitance
Ambient sensor voltage	Ambient-Sensor B64	5 Volt	No value
Water temp. sensor voltage	Water (Coolant) temprature sensor B5	5 Volt	2500 Ohm at 25° C coolant temperture
BOOST temperature sens. voltage	Charge air + charge air pressure sensor B 4	5 Volt	No value
Fuel temperature sensor voltage	Fuel temperature sensor (integrated in the fuel filter) B6	5 Volt	2050 Ohm at 25 ° C fuel temperature
Rail pressure sensor voltage	Rail pressure sensor at the rail pipe B3	5 Volt	No value
Setpoint current for meetering unit	Fuel metering unit Y25 (at HP- pump))	1800 mA	2 Ohm
DPF differential pressure voltage	Differential pressure sensor DPF B38	5 Volt	No value

6. Sensor signal voltage

3. Sweeping in standard mode 1700 rpm
Turbine speed with the potentiometer set to 100 % in position 10.

[2-6] - VM Service Tool - Parameters acquisition - Sensor signal voltage

Parameter		Value	Measure unit	Notes
Acceleration Pedal potentiometer voltage 1 - (APP_uRaw1)		0.01	V	
Acceleration Pedal potentiometer voltage 2 - (APP_uRaw2)		0.00	V	
Ambient pressure sensore voltage - (PEnv_u)	B64	4.01	V	
water temp. sensor voltage - (CEngDsT_uRaw)	B5	1.30	V	
Battery voltage - (BattU_u)		14.14	V	
Boost temperature sens. Voltage - (Air_uRawTCACDs)	B4	1.22	V	
fuel temperature sensor voltage - (FuelT_uRaw)	B6	3.16	V	
Rail pressure sensore voltage - (RailP_uRawMax)	B3	2.99	V	
Setpoint current for the metering unit - (MeUn_iSet)	Y25	1189.00	mA	
DPF differential pressure sensor voltage - (Exh_uRawPPFltDiff)	B38	0.47	V	

Parameter	Sensor	Values (V+ mA)	Resitance
Ambient sensor voltage	Ambient-Sensor B64	5 Volt	No value
Water temp. sensor voltage	Water (Coolant) temprature sensor B5	5 Volt	2500 Ohm at 25° C coolant temperture
BOOST temperature sens. voltage	Charge air + charge air pressure sensor B 4	5 Volt	No value
Fuel temperature sensor voltage	Fuel temperature sensor (integrated in the fuel filter) B6	5 Volt	2050 Ohm at 25 ° C fuel temperature
Rail pressure sensor voltage	Rail pressure sensor at the rail pipe B3	5 Volt	No value
Setpoint current for meetering unit	Fuel metering unit Y25 (at HP- pump))	1800 mA	2 Ohm
DPF differential pressure voltage	Differential pressure sensor DPF B38	5 Volt	No value

6. Sensor signal voltage

4. Sweeping in max mode 2000 rpm
Turbine speed with the potentiometer set to 100 % in position 10.

[2-6] - VM Service Tool - Parameters acquisition - Sensor signal voltage

Parameter		Value	Measure unit	Notes
Acceleration Pedal potentiometer voltage 1 - (APP_uRaw1)		0.01	V	
Acceleration Pedal potentiometer voltage 2 - (APP_uRaw2)		0.00	V	
Ambient pressure sensore voltage - (PEnv_u)	B64	4.01	V	
water temp. sensor voltage - (CEngDsT_uRaw)	B5	1.30	V	
Battery voltage - (BattU_u)		14.14	V	
Boost temperature sens. Voltage - (Air_uRawTCACDs)	B4	1.22	V	
fuel temperature sensor voltage - (FuelT_uRaw)	B6	3.16	V	
Rail pressure sensore voltage - (RailP_uRawMax)	B3	2.99	V	
Setpoint current for the metering unit - (MeUn_iSet)	Y25	1189.00	mA	
DPF differential pressure sensor voltage - (Exh_uRawPPFltDiff)	B38	0.47	V	

Parameter	Sensor	Values (V+ mA)	Resitance
Ambient sensor voltage	Ambient-Sensor B64	5 Volt	No value
Water temp. sensor voltage	Water (Coolant) temprature sensor B5	5 Volt	2500 Ohm at 25° C coolant temperture
BOOST temperature sens. voltage	Charge air + charge air pressure sensor B 4	5 Volt	No value
Fuel temperature sensor voltage	Fuel temperature sensor (integrated in the fuel filter) B6	5 Volt	2050 Ohm at 25 ° C fuel temperature
Rail pressure sensor voltage	Rail pressure sensor at the rail pipe B3	5 Volt	No value
Setpoint current for meetering unit	Fuel metering unit Y25 (at HP-pump))	1800 mA	2 Ohm
DPF differential pressure voltage	Differential pressure sensor DPF B38	5 Volt	No value

6. Sensor signal voltage

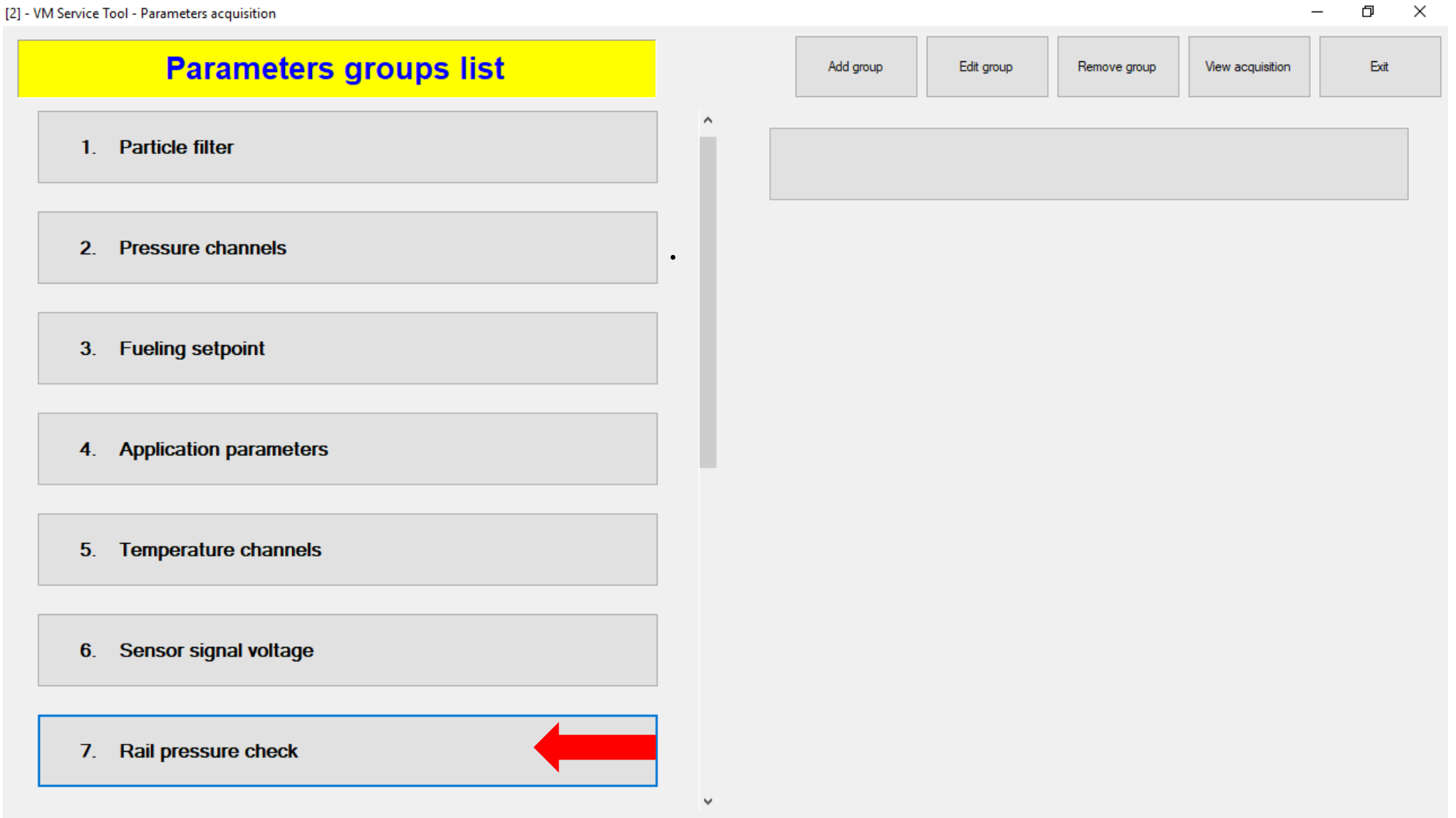
5. M29 – engine speed with ADR set to 2800 rpm (nominal speed) under load.

[2-6] - VM Service Tool - Parameters acquisition - Sensor signal voltage

Parameter		Value	Measure unit	Notes
Acceleration Pedal potentiometer voltage 1 - (APP_uRaw1)		0.01	V	
Acceleration Pedal potentiometer voltage 2 - (APP_uRaw2)		0.00	V	
Ambient pressure sensore voltage - (PEnv_u)	B64	4.01	V	
water temp. sensor voltage - (CEngDsT_uRaw)	B5	1.31	V	
Battery voltage - (BattU_u)		14.16	V	
Boost temperature sens. Voltage - (Air_uRawTCACDs)	B4	1.25	V	
fuel temperature sensor voltage - (FuelT_uRaw)	B6	3.15	V	
Rail pressure sensore voltage - (RailP_uRawMax)	B3	3.13	V	
Setpoint current for the metering unit - (MeUn_iSet)	Y25	1166.00	mA	
DPF differential pressure sensor voltage - (Exh_uRawPPFltDiff)	B38	0.67	V	

Parameter	Sensor	Values (V+ mA)	Resitance
Ambient sensor voltage	Ambient-Sensor B64	5 Volt	No value
Water temp. sensor voltage	Water (Coolant) temprature sensor B5	5 Volt	2500 Ohm at 25° C coolant temperture
BOOST temperature sens. voltage	Charge air + charge air pressure sensor B 4	5 Volt	No value
Fuel temperature sensor voltage	Fuel temperature sensor (integrated in the fuel filter) B6	5 Volt	2050 Ohm at 25 ° C fuel temperature
Rail pressure sensor voltage	Rail pressure sensor at the rail pipe B3	5 Volt	No value
Setpoint current for meetering unit	Fuel metering unit Y25 (at HP- pump))	1800 mA	2 Ohm
DPF differential pressure voltage	Differential pressure sensor DPF B38	5 Volt	No value

- Selection and opening of parameter group 7. Rail pressure check



7. Rail pressure check

- M29- CM 2200 ignition switched on; engine is off.

[2-7] - VM Service Tool - Parameters acquisition - Rail pressure check

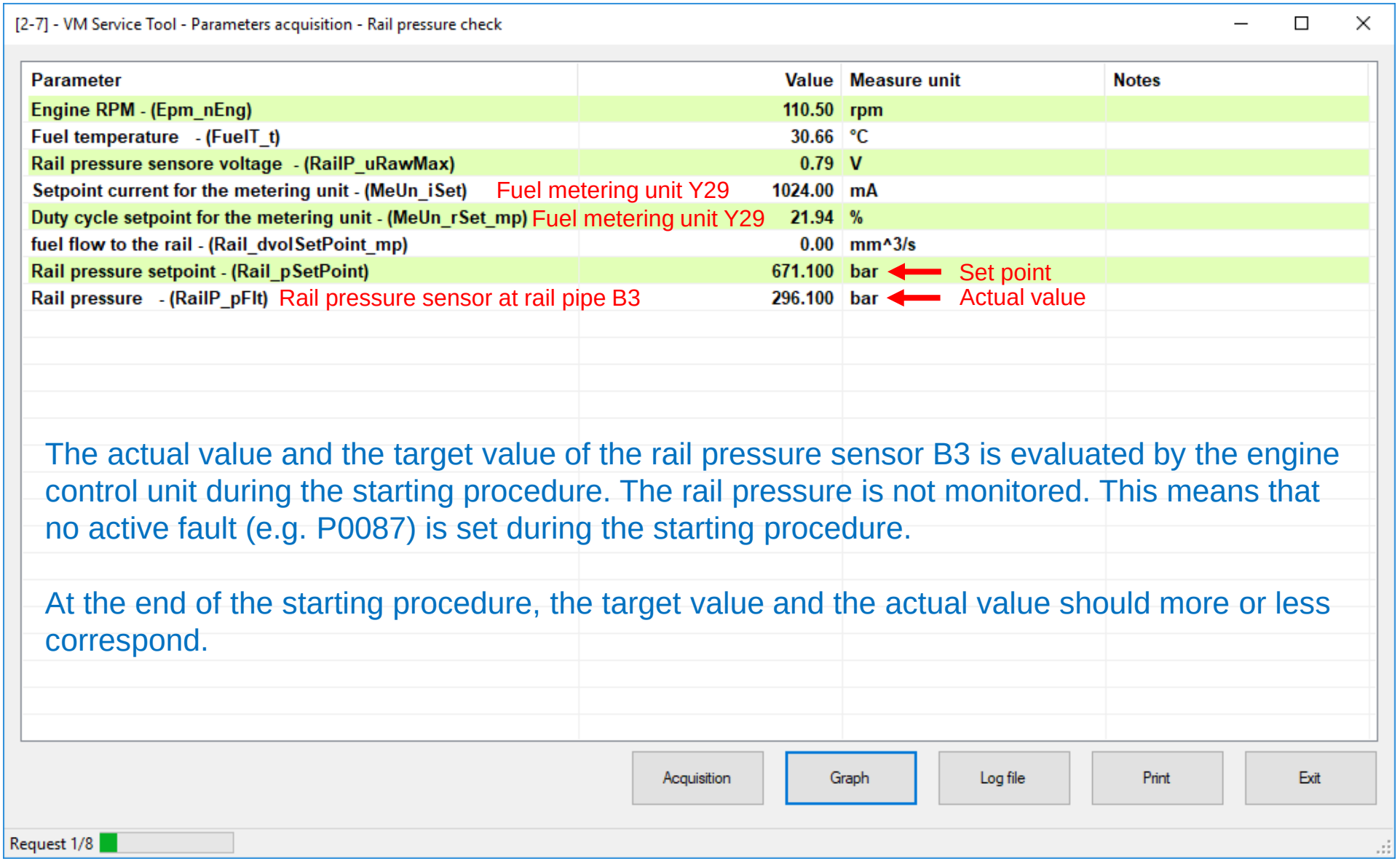
Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	0.00	rpm	
Fuel temperature - (FuelT_t)	29.86	°C	
Rail pressure sensore voltage - (RailP_uRawMax)	0.51	V	
Setpoint current for the metering unit - (MeUn_iSet)	1007.00	mA	
Duty cycle setpoint for the metering unit - (MeUn_rSet_mp)	21.57	%	
fuel flow to the rail - (Rail_dvolSetPoint_mp)	0.00	mm^3/s	
Rail pressure setpoint - (Rail_pSetPoint)	415.400	bar	
Rail pressure - (RailP_pFlt) Rail pressure sensor at rail pipe B3	3.600	bar	

Acquisition | Graph | Log file | Print | Exit

Request 2/8

7. Rail pressure check

- M29- CM 2200 ignition switched on; engine starts.



7. Rail pressure check

2. CM 2200 sweeping in ECO mode 1400 rpm

[2-7] - VM Service Tool - Parameters acquisition - Rail pressure check

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	1402.50	rpm	
Fuel temperature - (FuelT_t)	29.96	°C	
Rail pressure sensore voltage - (RailP_uRawMax)	2.61	V	
Setpoint current for the metering unit - (MeUn_iSet) Fuel metering unit Y29	1230.00	mA	
Duty cycle setpoint for the metering unit - (MeUn_rSet_mp) Fuel metering unit Y29	26.20	%	
fuel flow to the rail - (Rail_dvolSetPoint_mp)	0.00	mm^3/s	
Rail pressure setpoint - (Rail_pSetPoint)	947.900	bar ← Set point	
Rail pressure - (RailP_pFlt) Rail pressure sensor at rail pipe B3	945.000	bar ← Actual value	

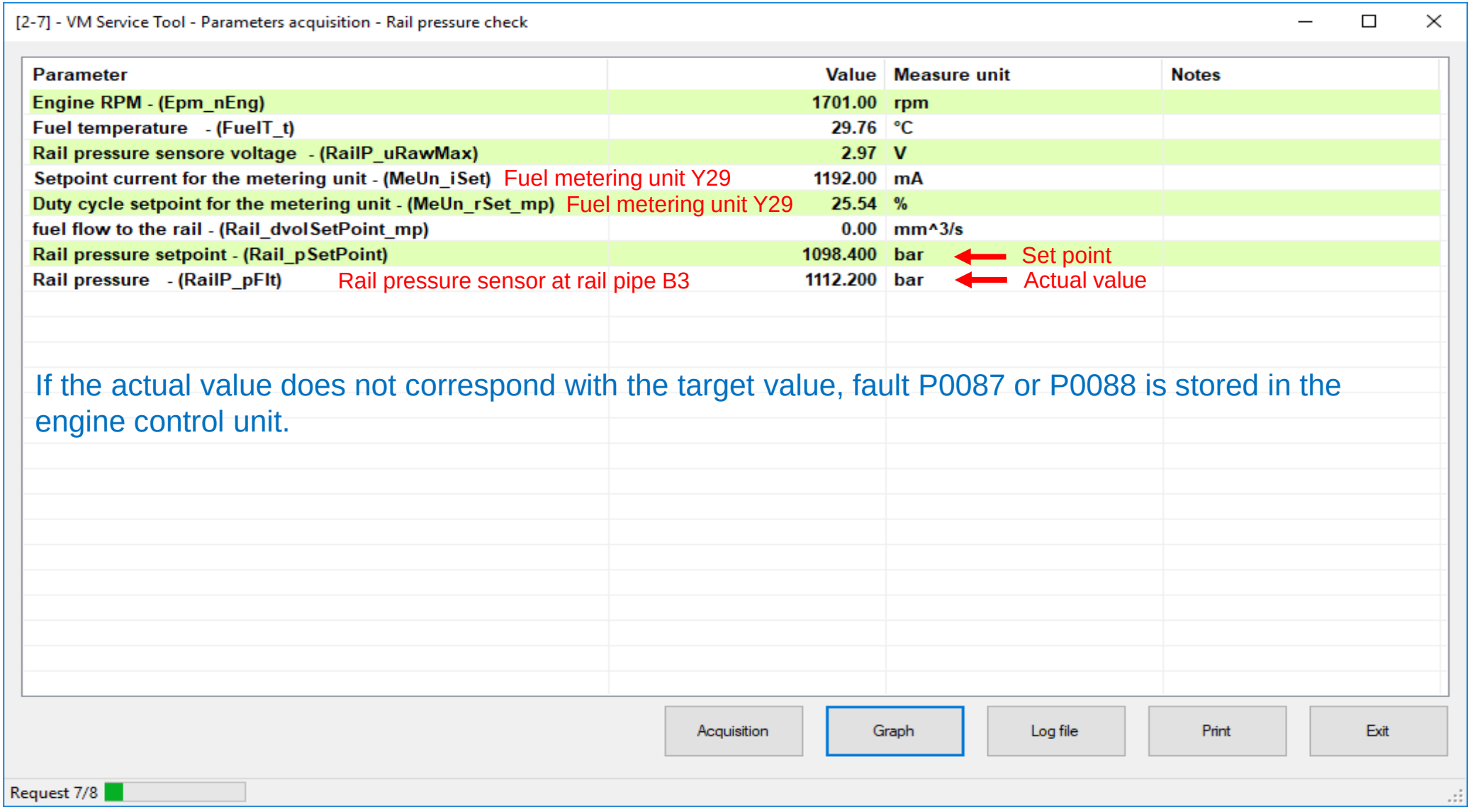
If the actual value does not correspond with the target value, fault P0087 or P0088 is stored in the engine control unit.

Acquisition | Graph | Log file | Print | Exit

Request 7/8

7. Rail pressure check

3. CM 2200 sweeping in standard mode 1700 rpm
   Turbine speed with the potentiometer set to 100 % in position 10.



7. Rail pressure check

4. CM 2200 sweeping in max mode 2000 rpm
   Turbine speed with the potentiometer set to 100 % in position 10.

[2-7] - VM Service Tool - Parameters acquisition - Rail pressure check

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2001.50	rpm	
Fuel temperature - (FuelT_t)	29.76	°C	
Rail pressure sensore voltage - (RailP_uRawMax)	3.13	V	
Setpoint current for the metering unit - (MeUn_iSet) Fuel metering unit Y29	1169.00	mA	
Duty cycle setpoint for the metering unit - (MeUn_rSet_mp) Fuel metering unit Y29	25.02	%	
fuel flow to the rail - (Rail_dvolSetPoint_mp)	0.00	mm^3/s	
Rail pressure setpoint - (Rail_pSetPoint)	1176.600	bar ← Set point	
Rail pressure - (RailP_pFlt) Rail pressure sensor at rail pipe B3	1167.100	bar ← Actual value	

If the actual value does not correspond with the target value, fault P0087 or P0088 is set in the engine control unit.

Acquisition | Graph | Log file | Print | Exit

Request 8/8

7. Rail pressure check

4. CM 2200 sweeping in max mode 2000 rpm
   Turbine speed with the potentiometer set to 100 % in position 10.

[2-7] - VM Service Tool - Parameters acquisition - Rail pressure check

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2001.50	rpm	
Fuel temperature - (FuelT_t)	29.76	°C	
Rail pressure sensore voltage - (RailP_uRawMax)	3.13	V	
Setpoint current for the metering unit - (MeUn_iSet)	1169.00	mA	
Duty cycle setpoint for the metering unit - (MeUn_rSet_mp)	25.02	%	
fuel flow to the rail - (Rail_dvolSetPoint_mp)	0.00	mm^3/s	
Rail pressure setpoint - (Rail_pSetPoint)	1176.600	bar	
Rail pressure - (RailP_pFlt)	1167.100	bar	

Fuel metering unit Y29

Fuel metering unit Y29

Set point

Actual value

Rail pressure sensor at rail pipe B3

Acquisition | Graph | Log file | Print | Exit

Request 8/8

7. Rail pressure check

5. M29 – engine speed with ADR set to 2800 rpm (nominal speed) under load.

[2-7] - VM Service Tool - Parameters acquisition - Rail pressure check

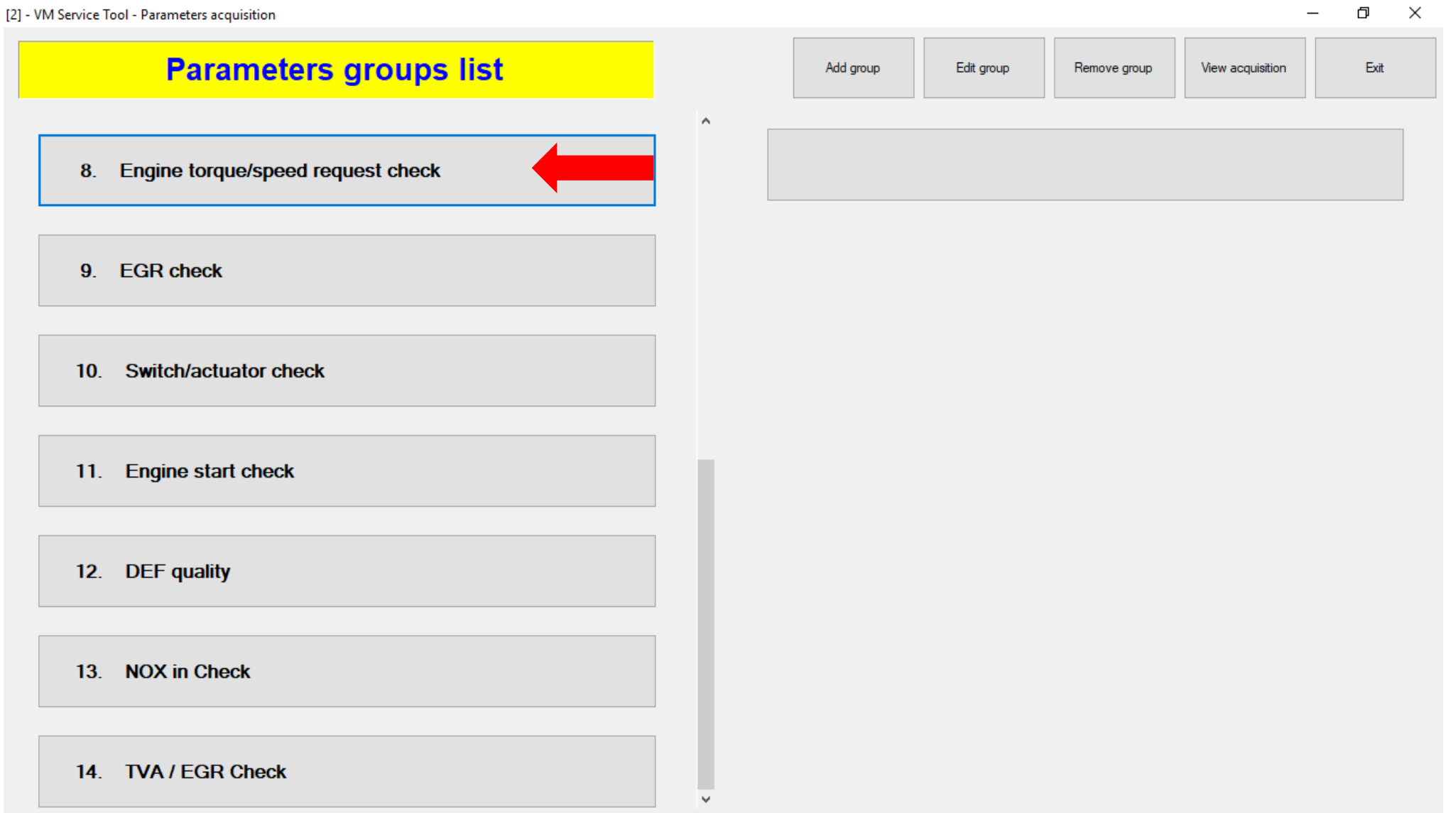
Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	2802.50	rpm	
Fuel temperature - (FuelT_t)	30.06	°C	
Rail pressure sensore voltage - (RailP_uRawMax)	3.28	V	
Setpoint current for the metering unit - (MeUn_iSet) Fuel metering unit Y29	1080.00	mA max. 1800 mA	
Duty cycle setpoint for the metering unit - (MeUn_rSet_mp) Fuel metering unit Y29	23.16	%	
fuel flow to the rail - (Rail_dvolSetPoint_mp)	0.00	mm^3/s	
Rail pressure setpoint - (Rail_pSetPoint) ← Set point	1261.100	bar	
Rail pressure - (RailP_pFlt) Rail pressure sensor at rail pipe B3 ← Actual value	1272.600	bar	

If the actual value does not correspond with the target value, fault P0087 or P0088 is set in the engine control unit.

Acquisition | Graph | Log file | Print | Exit

Request 5/8

- Selection and opening of parameter group 8. Engine torque/speed request check



8. Engine torque/ speed request check

1. Idle speed 900 rpm without load in transport mode.

[2-8] - VM Service Tool - Parameters acquisition - Engine torque/speed request check

Parameter	Value	Measure unit	Notes
Engine RPM - (Epm_nEng)	848.50	rpm	
Basic low idle setpoint speed (rpm) - (HLSDem_nSetPLoBas)	800.00	rpm	
engine set-point speed required by the ECU - (EISGov_nSetPLo)	850.00	rpm	
Lower limit of the speed interval (setpoint speed) of the EISGo...	850.00	rpm	
Request rpm via CAN - (CoETS_nTSEASpdReq_mp)	850.00	rpm	
Torque delivered in case of limitations - (EngPrt_trqLim)	412.30	Nm	
Limiting torque smoke limit - (EngReq_trqInrLimSmk)	290.70	Nm	
Torque reduction for the gearbox - (Gbx_trqTSCIntv)	0.00	Nm	

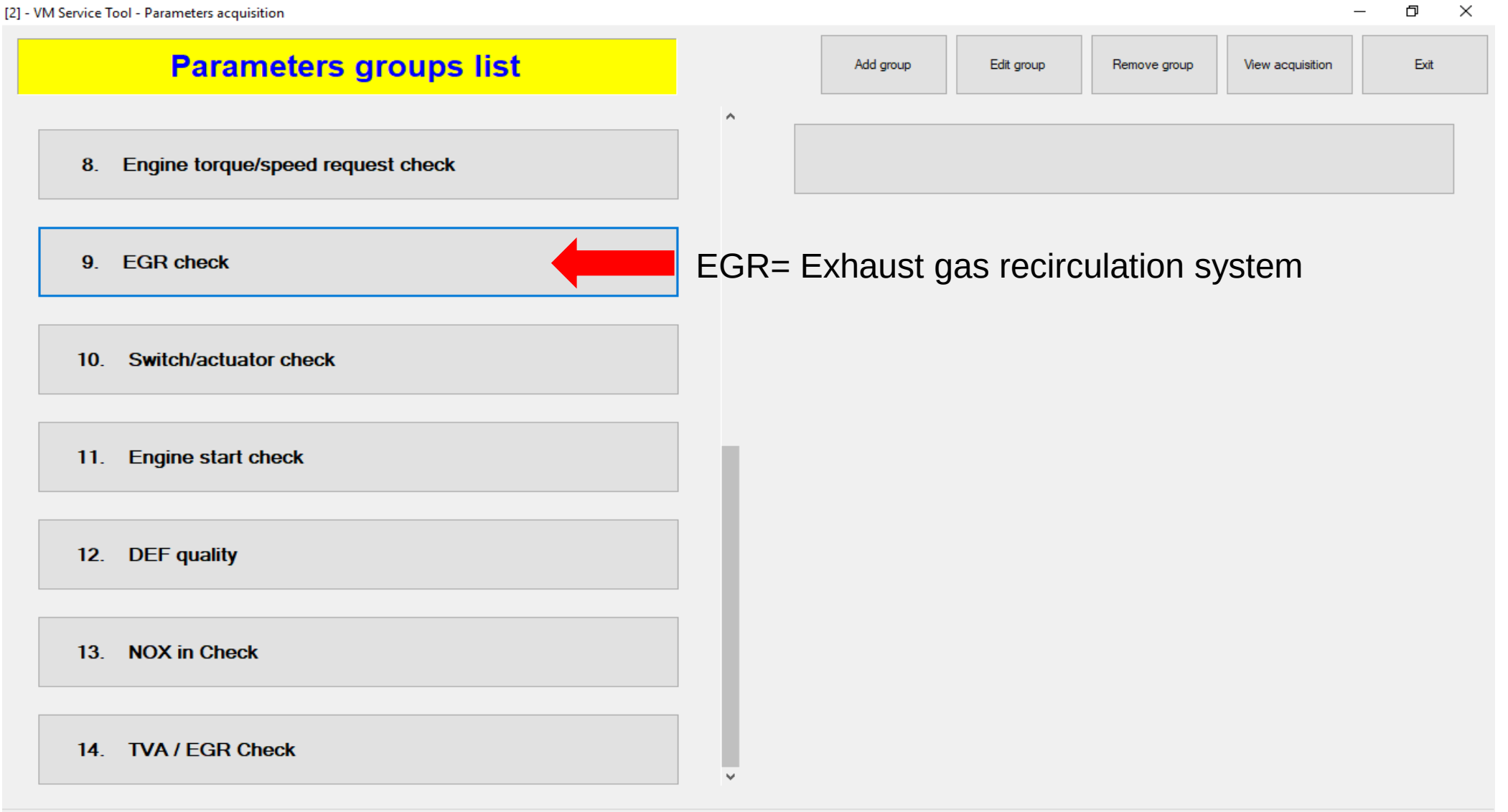
Evaluation of speed between the Hydrostat control unit A12 and the engine control unit A1 in the no-load condition, e.g. idle speed 900 rpm without load.

The “Engine RPM” must correspond with “Request rpm via CAN”.

Acquisition | Graph | Log file | Print | Exit

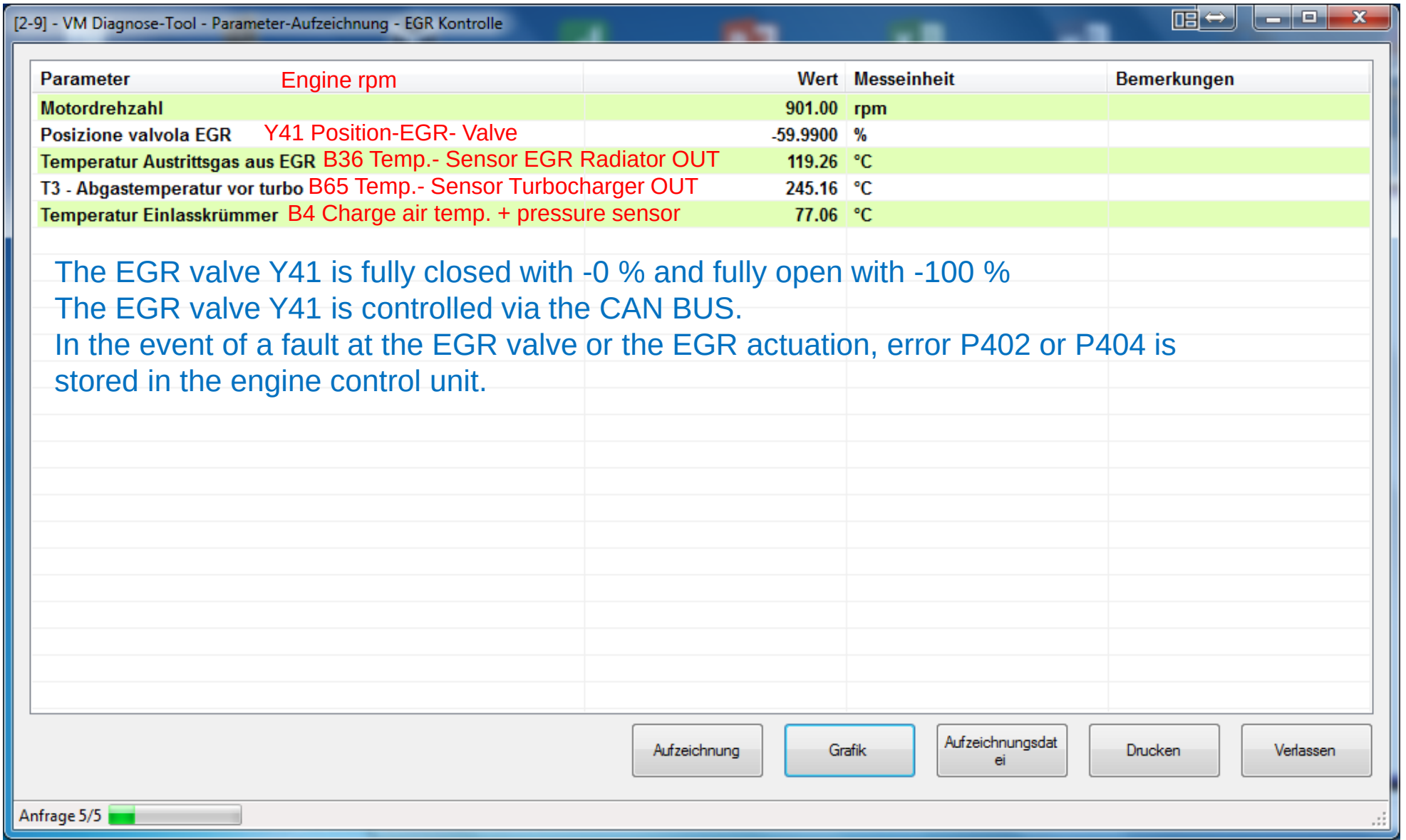
Request 8/8

- Selection and opening of parameter group 9. EGR check



9. EGR check (EGR= Exhaust gas recirculation system)

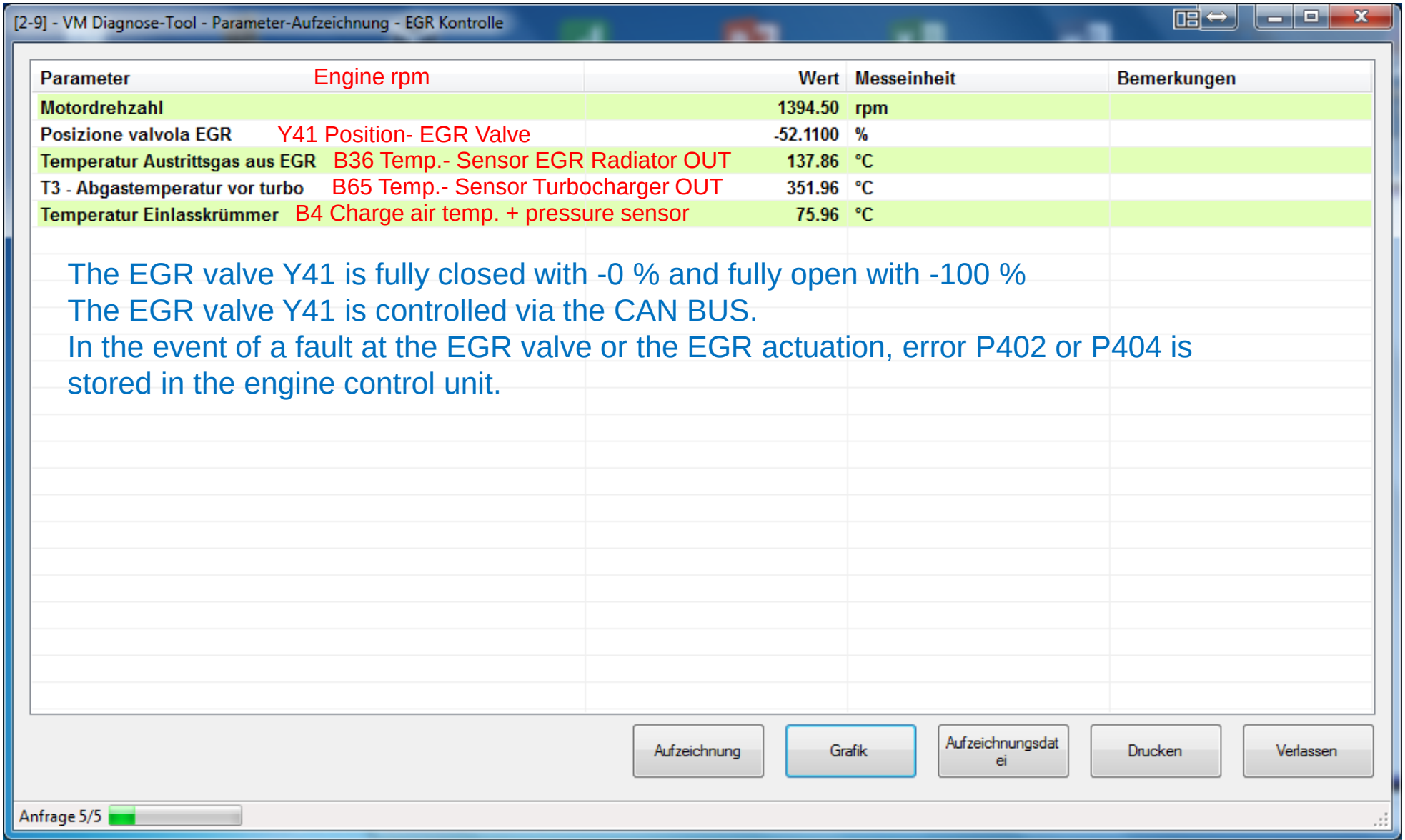
1. Idle speed 900 rpm without load in transport mode.



The EGR valve Y41 is fully closed with -0 % and fully open with -100 %
The EGR valve Y41 is controlled via the CAN BUS.
In the event of a fault at the EGR valve or the EGR actuation, error P402 or P404 is stored in the engine control unit.

9. EGR check (EGR= Exhaust gas recirculation system)

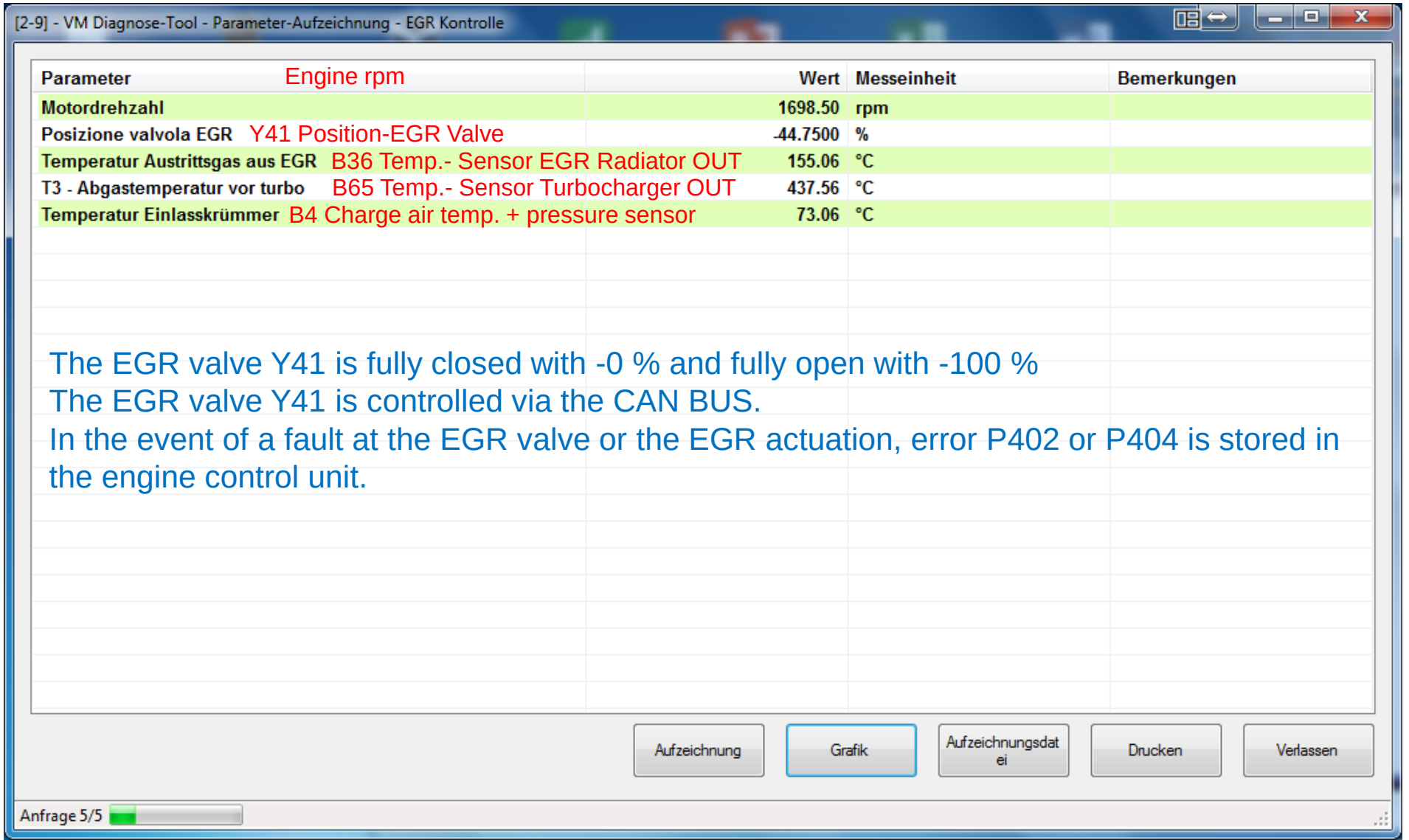
2. Sweeping in ECO mode 1400 rpm.



The EGR valve Y41 is fully closed with -0 % and fully open with -100 %
The EGR valve Y41 is controlled via the CAN BUS.
In the event of a fault at the EGR valve or the EGR actuation, error P402 or P404 is stored in the engine control unit.

9. EGR check (EGR= Exhaust gas recirculation system)

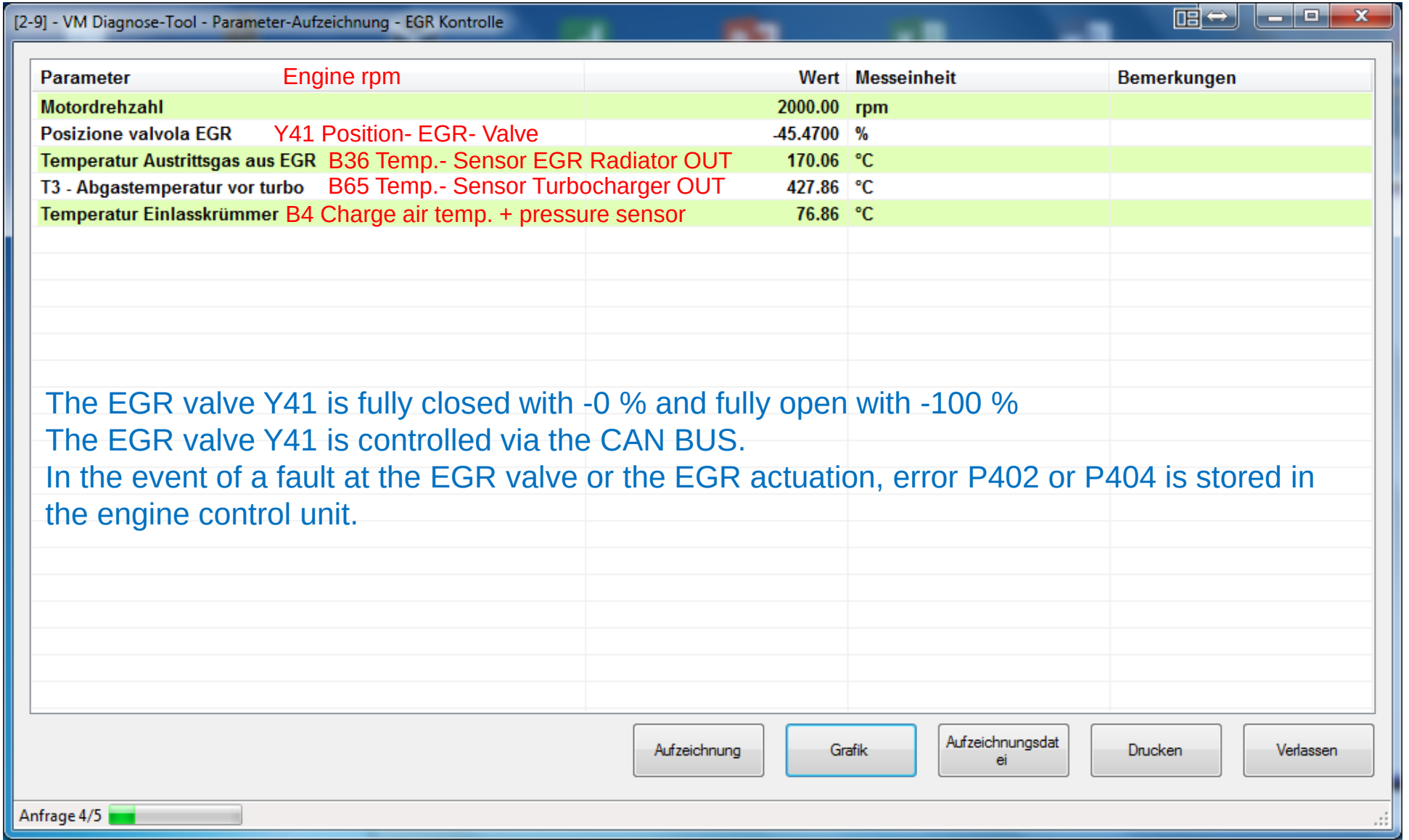
3. Sweeping in standard mode 1700 rpm
Turbine speed with the potentiometer set to 100 % in position 10.



The EGR valve Y41 is fully closed with -0 % and fully open with -100 %
The EGR valve Y41 is controlled via the CAN BUS.
In the event of a fault at the EGR valve or the EGR actuation, error P402 or P404 is stored in the engine control unit.

9. EGR check (EGR= Exhaust gas recirculation system)

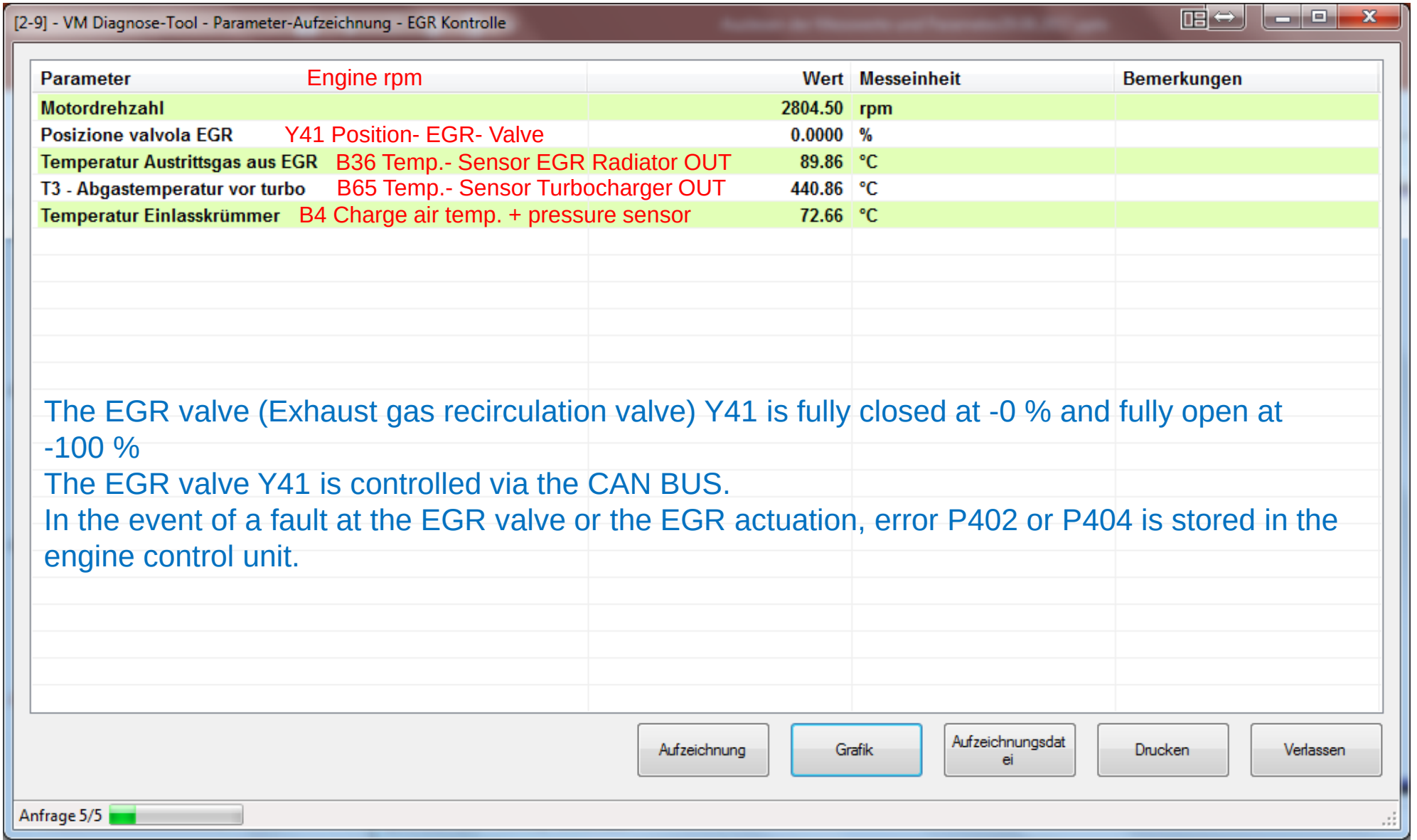
4. Sweeping in max mode 2000 rpm
Turbine speed with the potentiometer set to 100 % in position 10.



The EGR valve Y41 is fully closed with -0 % and fully open with -100 %
The EGR valve Y41 is controlled via the CAN BUS.
In the event of a fault at the EGR valve or the EGR actuation, error P402 or P404 is stored in the engine control unit.

9. EGR check (EGR= Exhaust gas recirculation system)

5. M29 – engine speed with ADR set to 2800 rpm (nominal speed) under load.

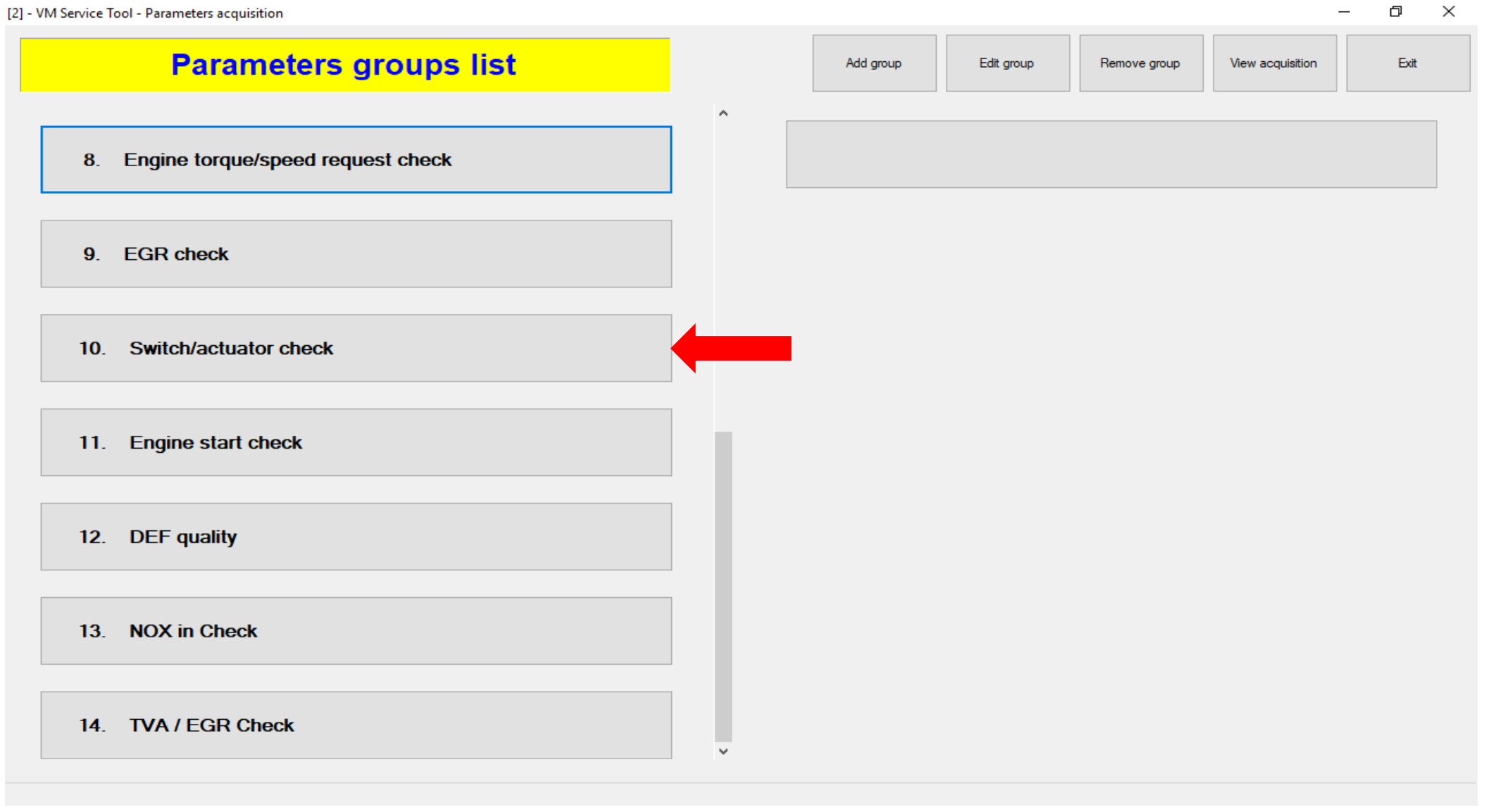


The EGR valve (Exhaust gas recirculation valve) Y41 is fully closed at -0 % and fully open at -100 %

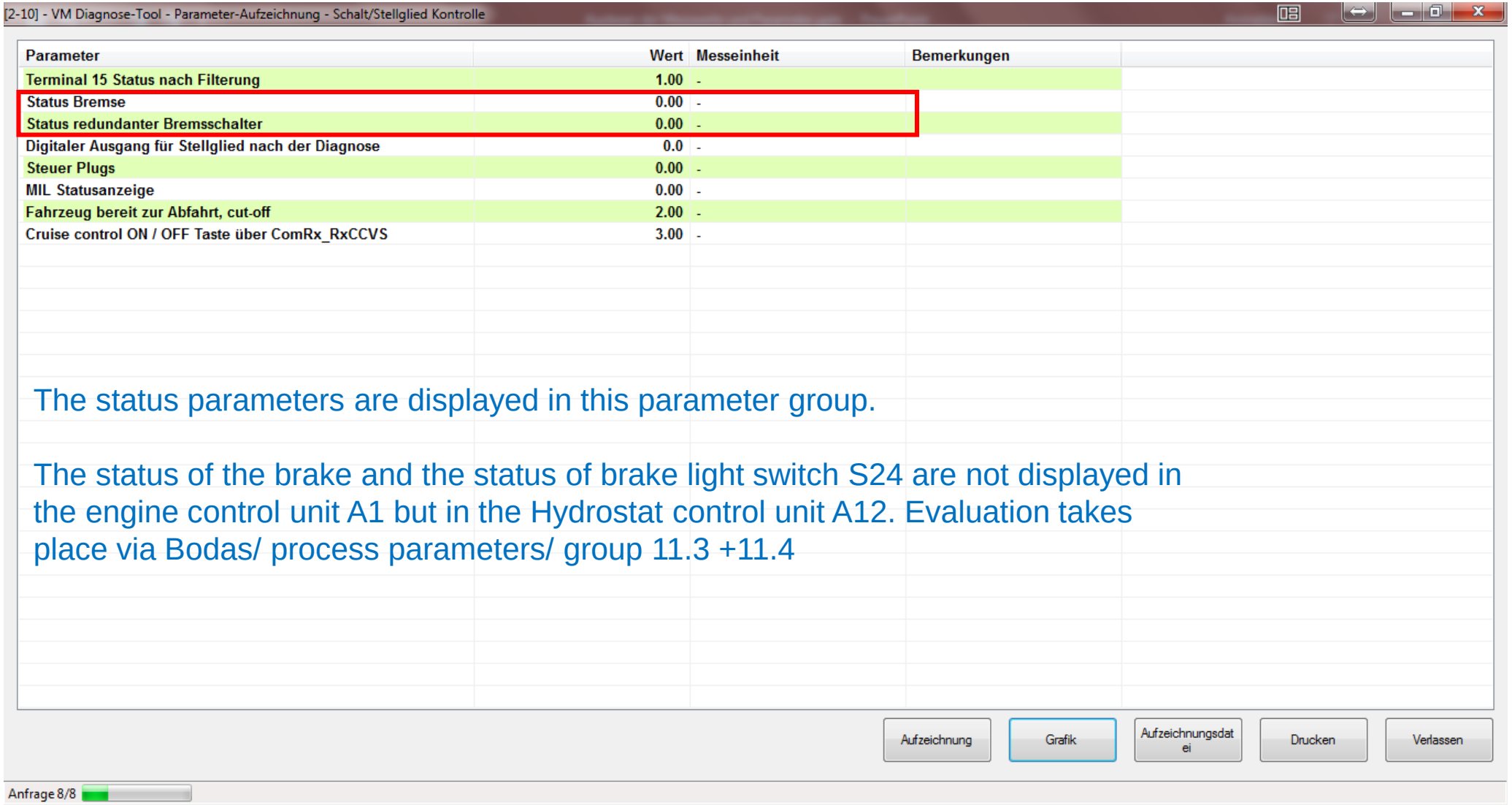
The EGR valve Y41 is controlled via the CAN BUS.

In the event of a fault at the EGR valve or the EGR actuation, error P402 or P404 is stored in the engine control unit.

- Selection and opening of parameter group 10. Switch/actuator check



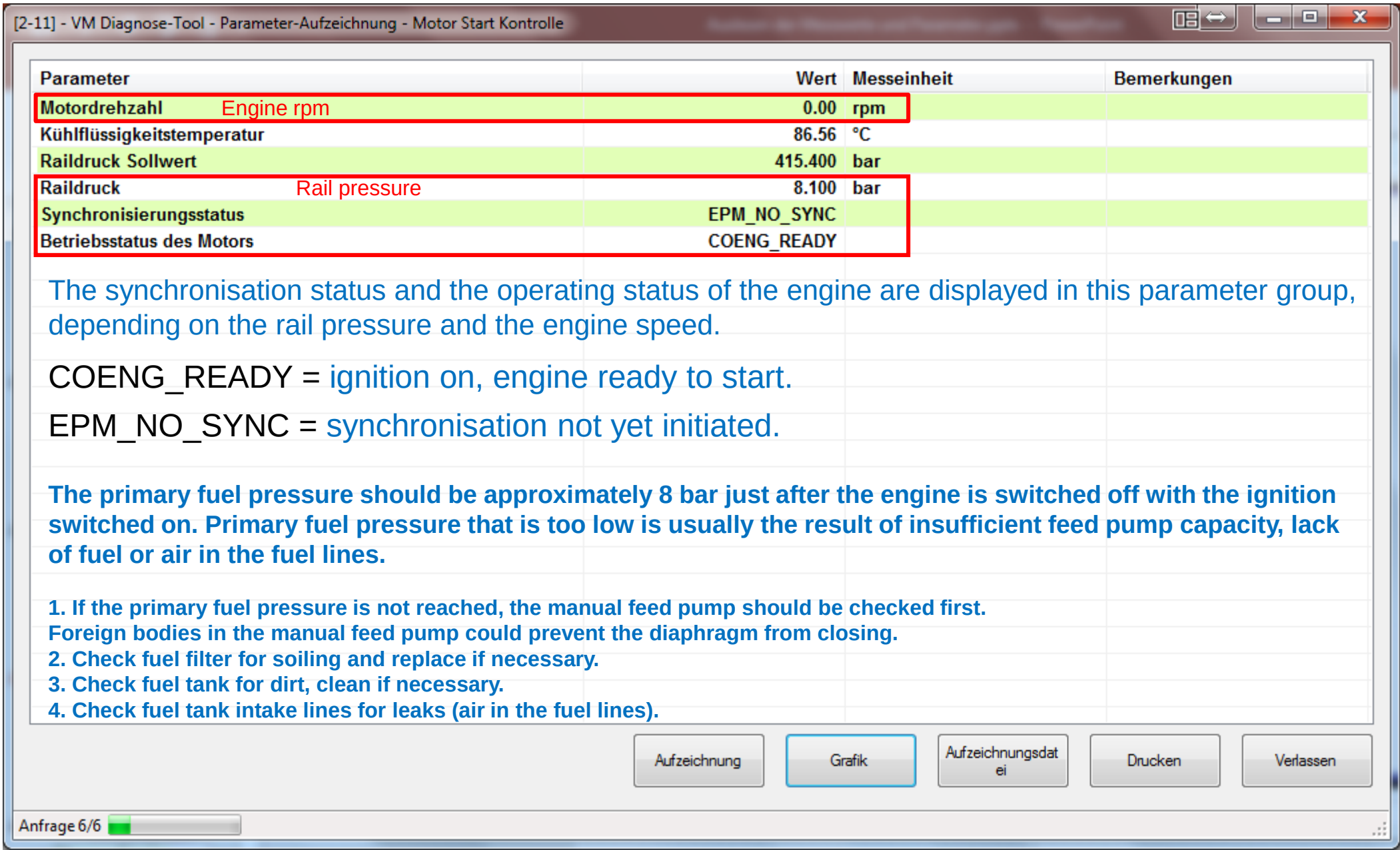
10. Switch/ actuator check



- Selection and opening of parameter group 11. Engine start check

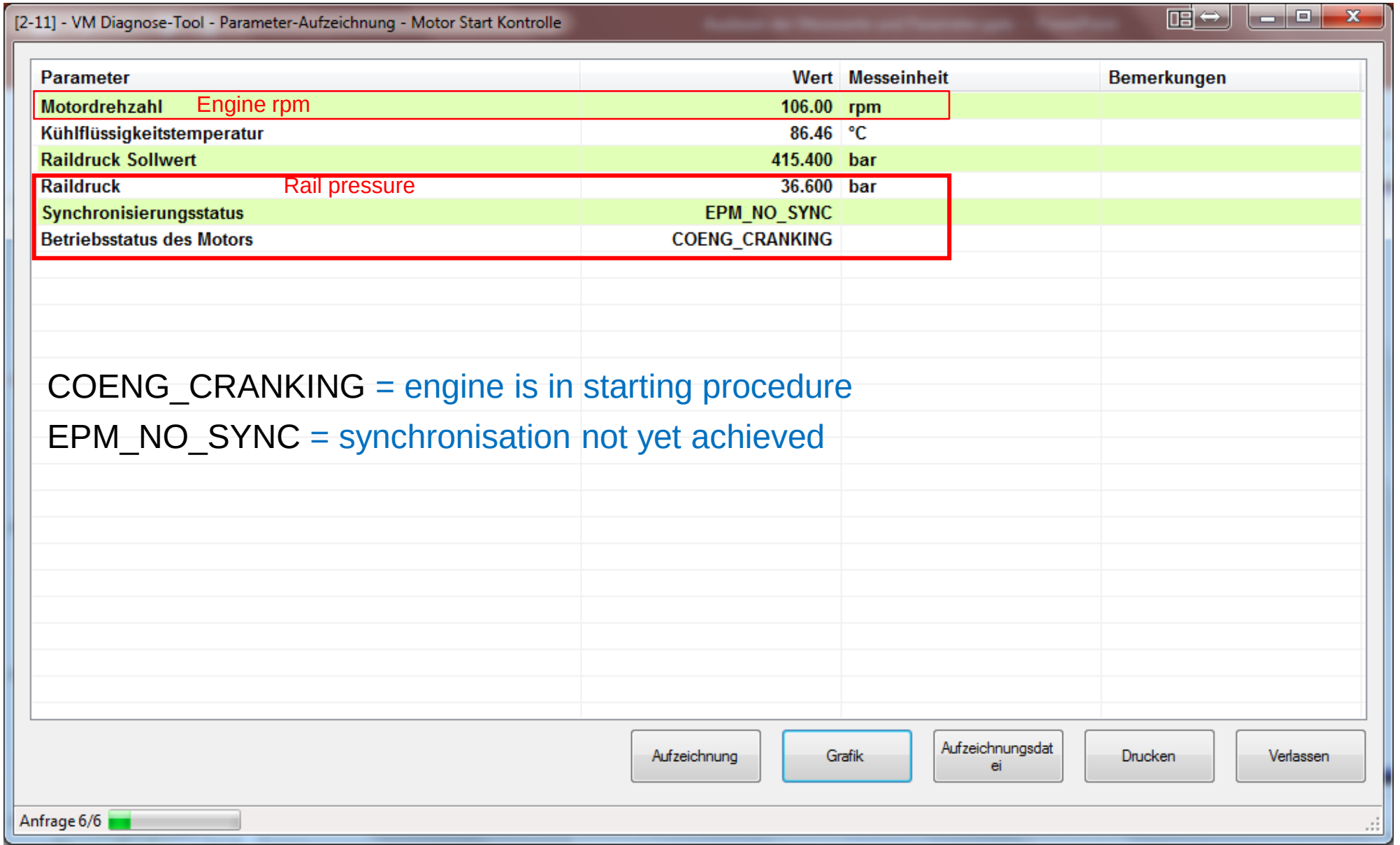
11. Engine start check

- Ignition switched on, engine is off.

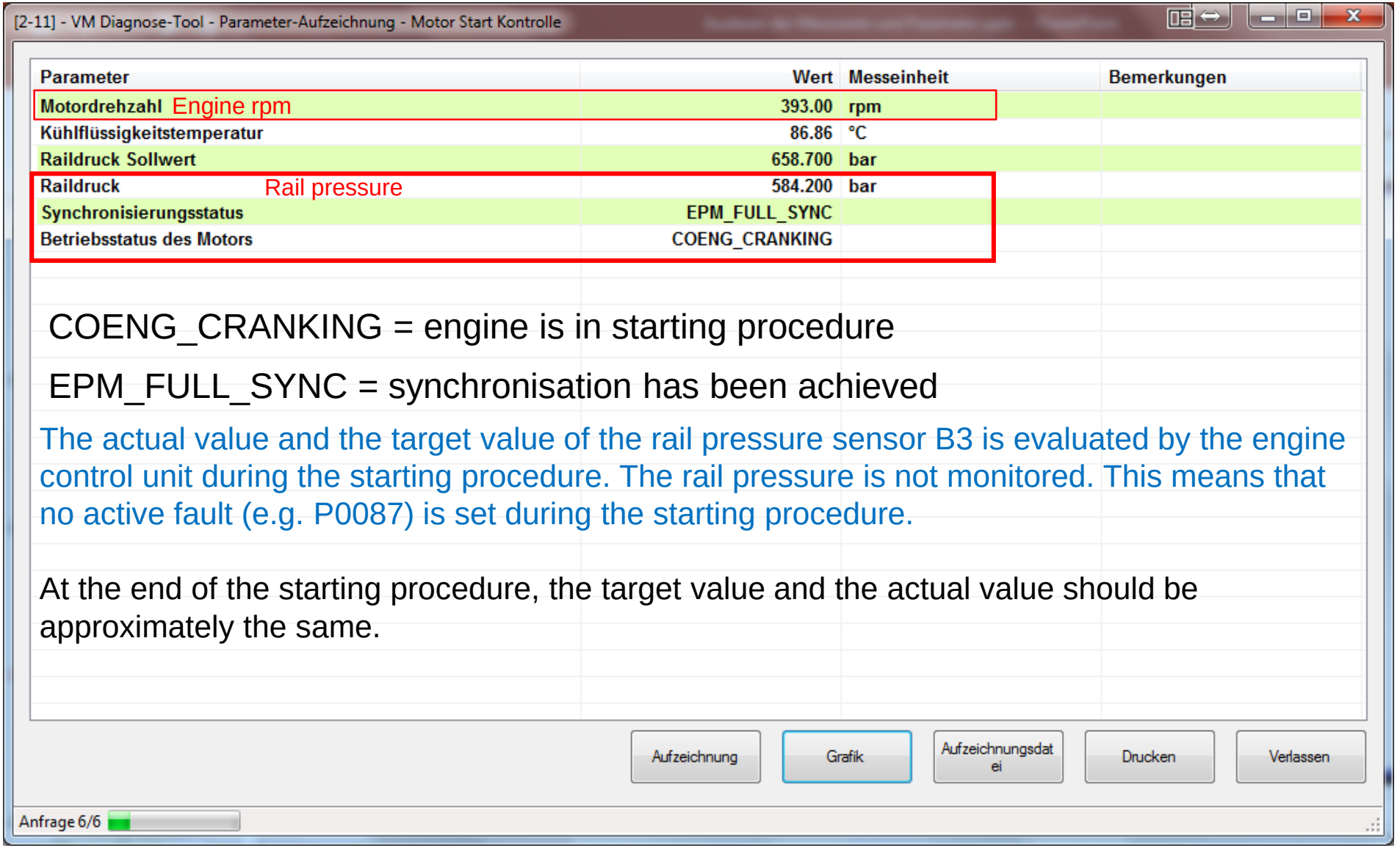


11. Engine start check

- Engine during starting procedure

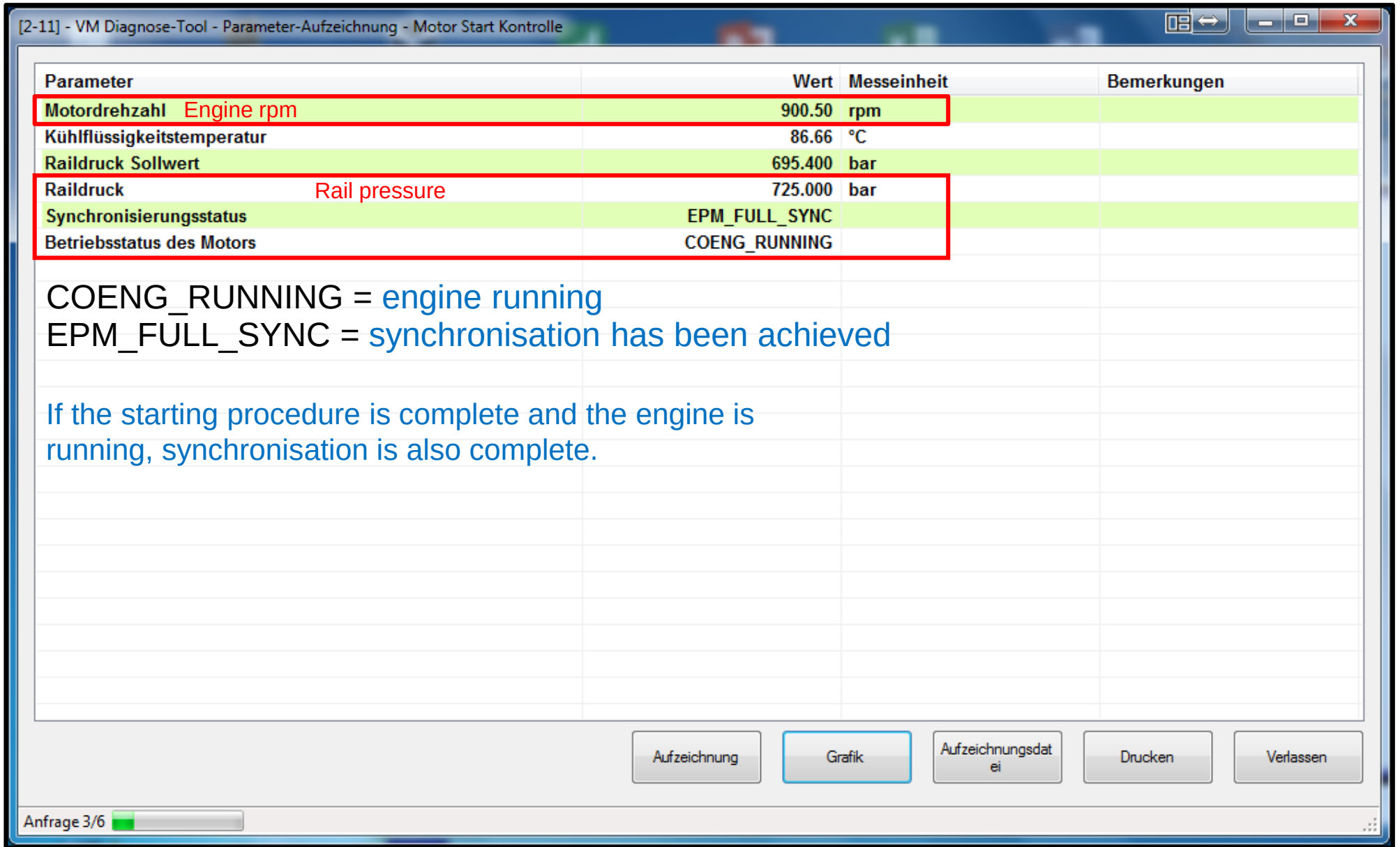


11. Engine start check



11. Engine start check

- Starting procedure complete, engine is running

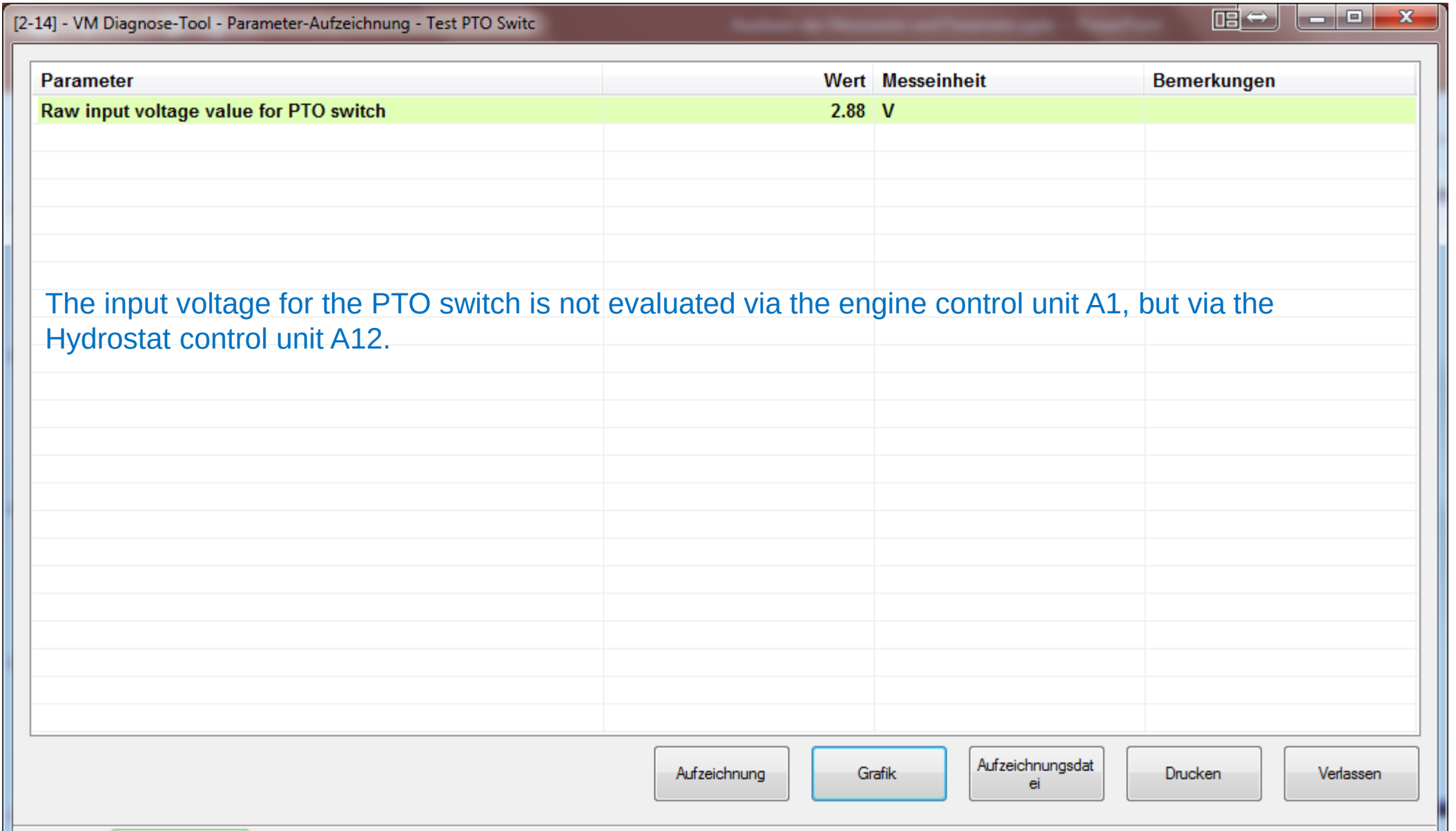


This page is not relevant for the M29-CM 2200.

This page is not relevant for the M29- CM 2200.

- Selection and opening of parameter group 14. Test PTO Switch

14. Test PTO Switc



The input voltage for the PTO switch is not evaluated via the engine control unit A1, but via the Hydrostat control unit A12.