VM- Motor R754 EU6
VM- Engine R754 EU6

VM- Motor R754 EU6
VM- Engine R754 EU6

You will find further information about the VM- engine in the sections:

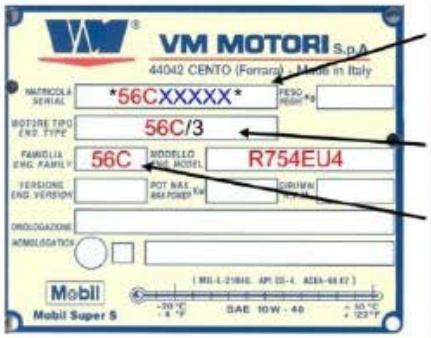
09.01 VM- Engine maintenance
09.0.3 Fehlerliste VM- Motor R754EU6
09.0.4 Error codes ECU- VM- engine
09.0.5 Error codes ACU (SCR- Sytem, DEF-AdBlue)
09.0.6 OP- Manual VM- Motor R754EU6, EN, FR, IT
09.0.7 Tightening torques VM- Engine
09.0.8 Tensioning or replacing the radiator V- belt
09.0.9 VM- Engine training with detailed discription of components

And the folder VM- Engine - Diagnosis

Note: It is imperative that the VM diagnosis software and the VM documentation for the VM R754EU6 engine are available when carrying out diagnosis and repair work at the VM- engine!

VM- Motor R754 EU6
VM- Engine R754 EU6

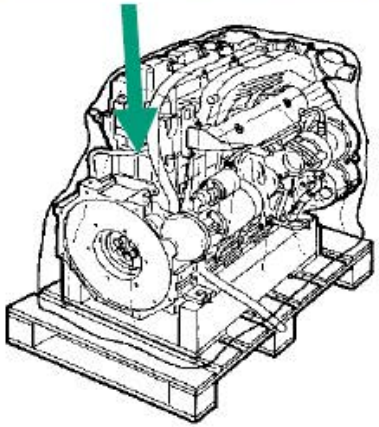
Engine- Number



SERIENNUMMER
56C**XXXXX** 5-stellige Seriennummer

SONDEREINSTELLUNGEN
56C/3 Bsp. ../3" = 2'600 min-1

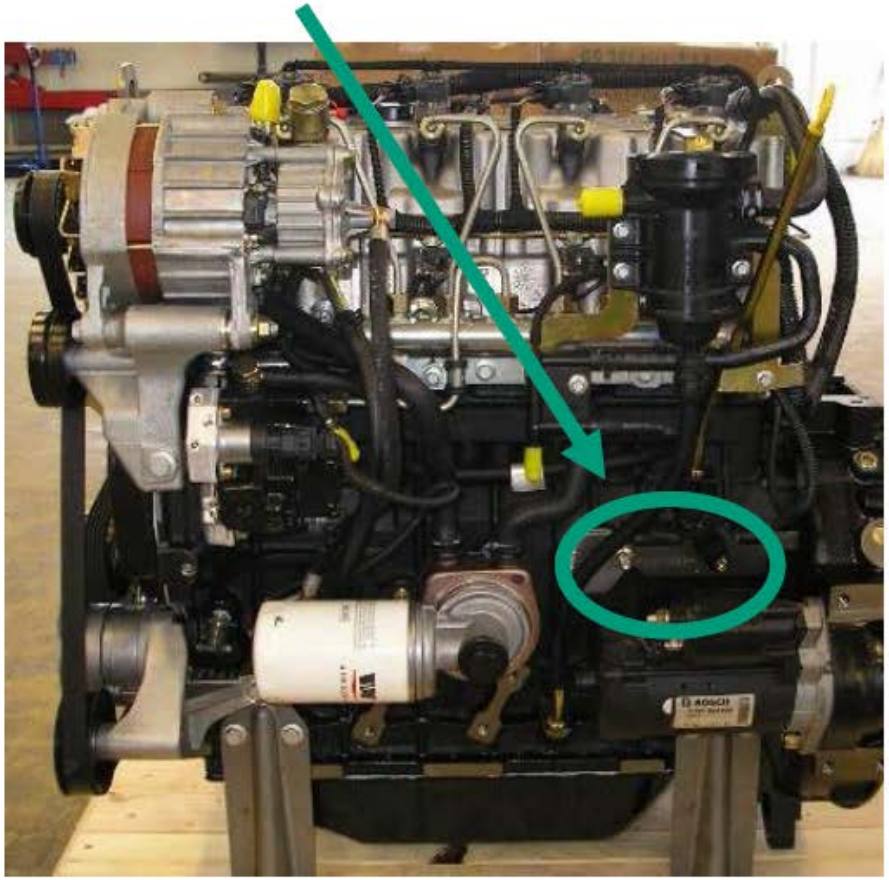
MOTORENFAMILIE
56C Motorenfamilie



R754EU4 = 56C 00000

R754EU6 = 60D 00000

56C XXXXX oder *60D XXXXX*



VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Control Unit A1 (ECU)

ECU-Teilenummer

Software-Kalibration

Software Calibration

ECU Part Number

IMA-Code

Motor-Serienummer

Engine- Number

IMA- Code Injektors

Bosch-Etikette

Bosch Code

VM- Motor R754 EU6
VM- Engine R754 EU6

Technical data and equipment

VM R754EU6, 4 cylinder, 3.0 litre displacement

Salient characteristics

- Common rail injection (C.R.)
- Through cylinder head
- Turbocharger and charge air cooler
- Poly-V belt drive
- 2 valves per cylinder
- Cooled external exhaust gas recirculation
- Particulate filter with upstream oxidation catalytic converter
- SCR technology
- Euro 6 homologation

VM- Motor R754 EU6
VM- Engine R754 EU6

Technical data and equipment

Engine manufactor		VM
Type of engine		R754 EU6
Number of cylinders		4
Displacement	ccm	2970
Power	KW bei 1/Min	80 KW bei 2600
Engine rpm	1/ Min	max. 2700
Torque	Nm	420 Nm bei 1100 1/min
Engine oil fill capacity with oil filter	Littre	9.5L (8.7kg) **ACEA E6/ E9 oder API CJ-4**
Coolant fill capacity	Litre	10
Compression ratio		17.5 +/- 0.5 : 1
Valves per cylinder		2
Ignition sequence		1-3-4-2 **(clinder 1 at the timing side)**

VM- Motor R754 EU6
VM- Engine R754 EU6

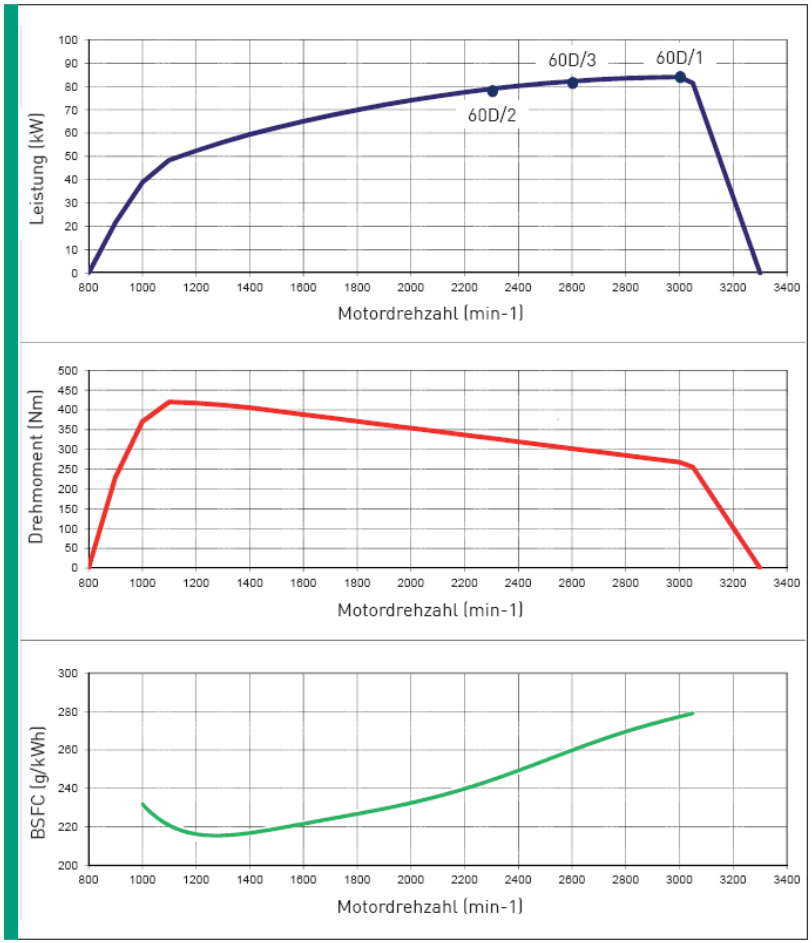
Technical data and equipment

Motoröldruck	At 800 rpm and an oil temperature of 80°C	Minimum of 1 bar
Compression	bar	25- 30
Compression	bar	19 **(wear limit)**
Compression Permissible difference between all cylinders	bar	5 Permissible difference between all cylinders
Exhaust gas limits according to Euro standard		EU 6
DOC + Partikelfilter (DPF)		Yes
SCR- System		Yes
Exhaust gas recirculation		Yes
Charging (Turbocharger)		Yes
Charge air cooling		Yes

VM- Motor R754 EU6
VM- Engine R754 EU6

Power and Torque Curves

LEISTUNGSKURVE



Leistung nach 50 Stunden Einlaufzeit, Nutzleistung gemäss ECE R120/R24, Toleranz +/- 5 %, Version 14.02.2014.00, Änderungen vorbehalten

HOMOLOGATION

EC 595/2009 EURO 6

LEISTUNG

80 kW (109 PS) bei 2600 min-1

MAX. DREHMOMENT

420 Nm bei 1100 min-1

Homologation
EC 595/2009 Euro 6

Power

80 kW (109 hp) with 2600 min- 1

Max. Torque
420 Nm with 1100 min-1

VM- Motor R754 EU6
VM- Engine R754 EU6

Explanation of technical abbreviations

ECU = Engine Control Unit (A1)	Motorsteuergerät A1 (ECU)
ACU = After Treatment Control Unit	Abgasnachbehandlung- Kontrolleinheit Steuergerät
ATS = After Treatment System	Abgas Nachbehandlungssystem
DCU = Dosing Control Unit (Adblue)	Dosier- Kontrolleinheit (Steuergerät Adblue)
DEF = Diesel Exhaust Fluid (Adblue)	Diesel Abgas Flüssigkeit (z.B. Adblue)
DOC = Diesel Oxidation Catalyst (before DPF)	Diesel- Oxidationskatalysator (vor dem DPF)
DPF = Diesel Particulate Filter	Diesel- Partikelfilter
DWS = Driver Warning System	Fahrer Warnsystem
FDS = Fluid Delivery System for DEF	Fördersystem DEF (AdBlue)
NOX = Oxides of Nitrogen	Stickoxide
SCR = Selective Catalyst Reduction	Selektive katalytische Reduktion

VM- Motor R754 EU6
VM- Engine R754 EU6

VM- Motor- Diagnose- Kopie der Fehlereinträge abspeichern

Before each engine maintenance:

Be means of the VM- Diagnosis read out the error memeory of the engine control unit. Stop existing errors.)

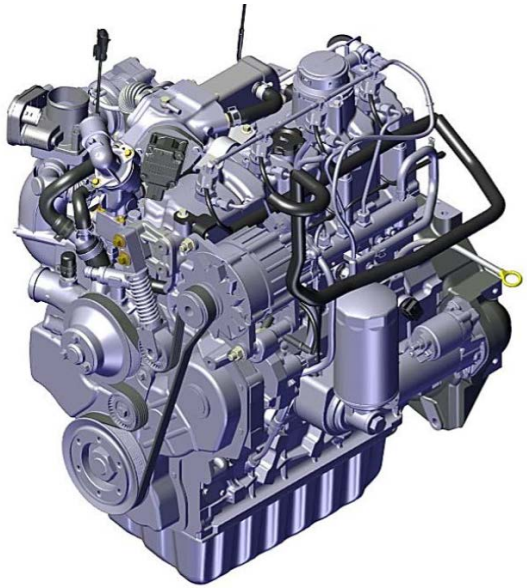
If error codes are existing save a copy (log file). Create a new file (VW diagnosis) on the hard disc C. You need a copy with the
error codes for warranty claims before and after the repair. You have to enclose these copies to the guarantee claim. If you send
guarantee claims via E-Mail, enclose these copies as log files.

Check the load condition of the particulate filter. If the load limit is reached, a service regeneration of the particulate filter
(DPF) has to be done.

Execute the service regeneration before maintenance and before the motor oil change, because at every regeneration
of the particulate filter diesel gets into the motor oil and dilutes the motor oil.

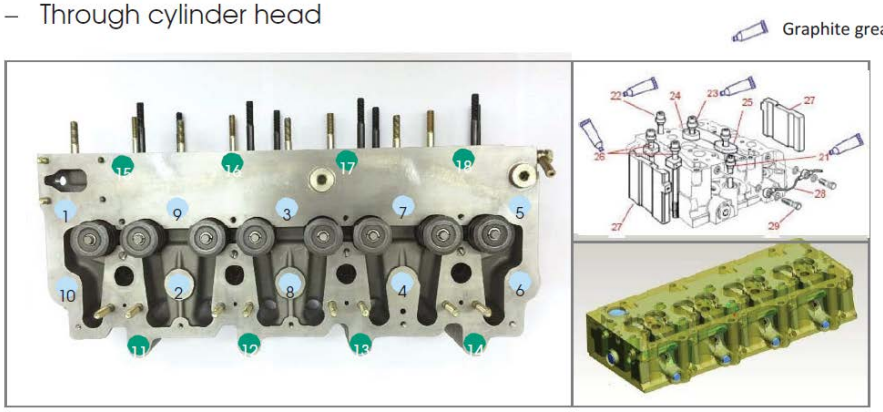
VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components- Cylinder Head- Hydraulic Tappets (Valve)

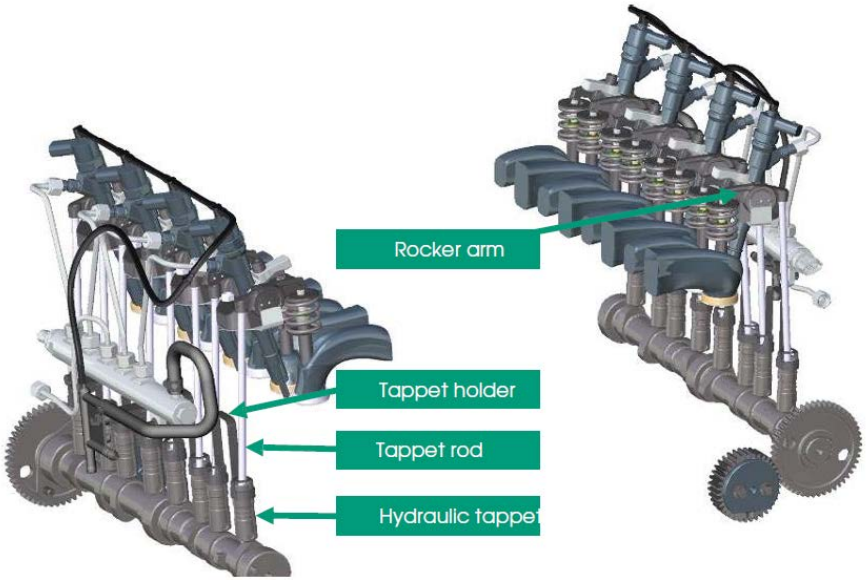


R750EU6

- Two valves per cylinder
- Through cylinder head

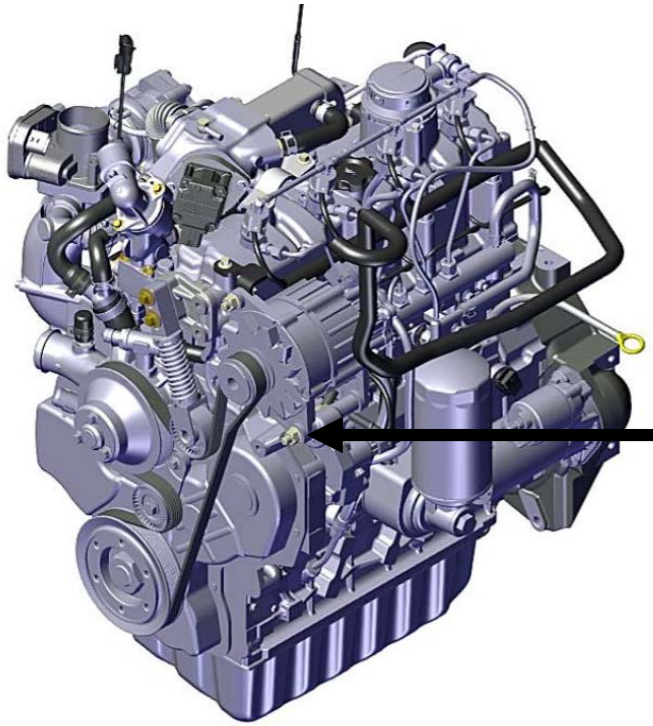


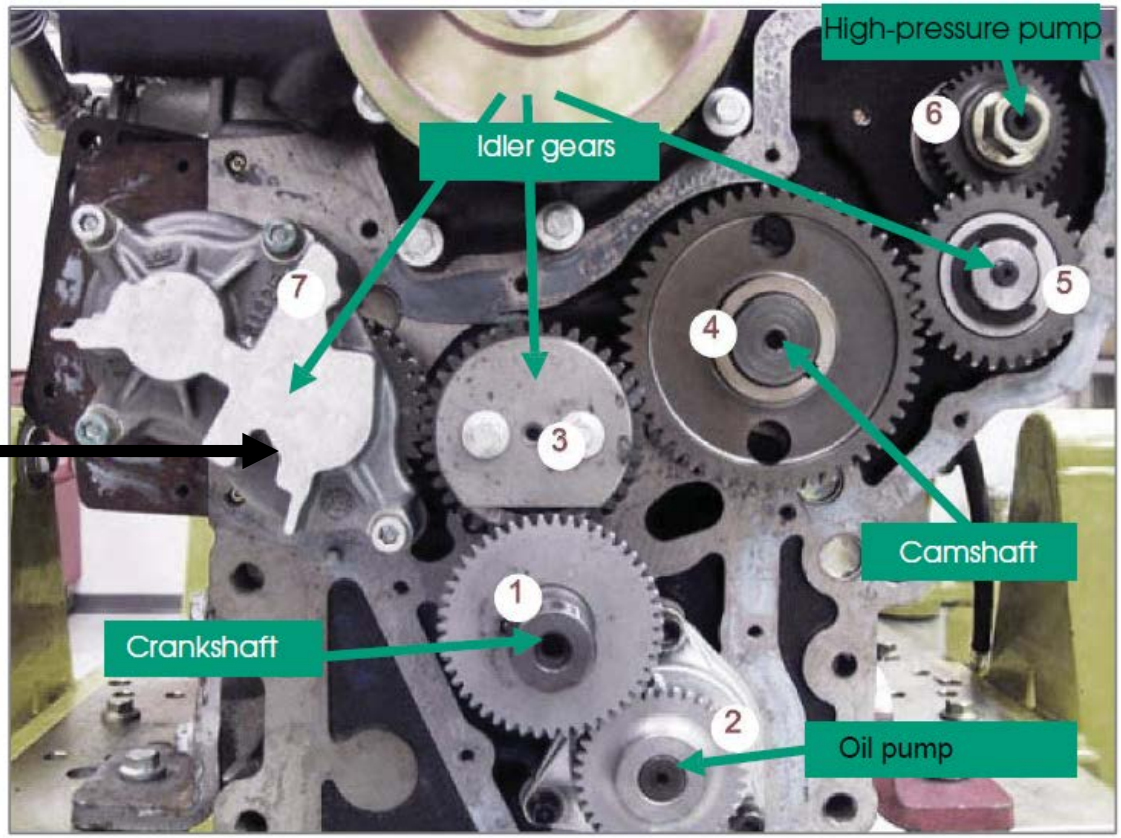
Pulling procedure according to instructions in the workshop manual.



VM- Motor R754 EU6
VM- Engine R754 EU6

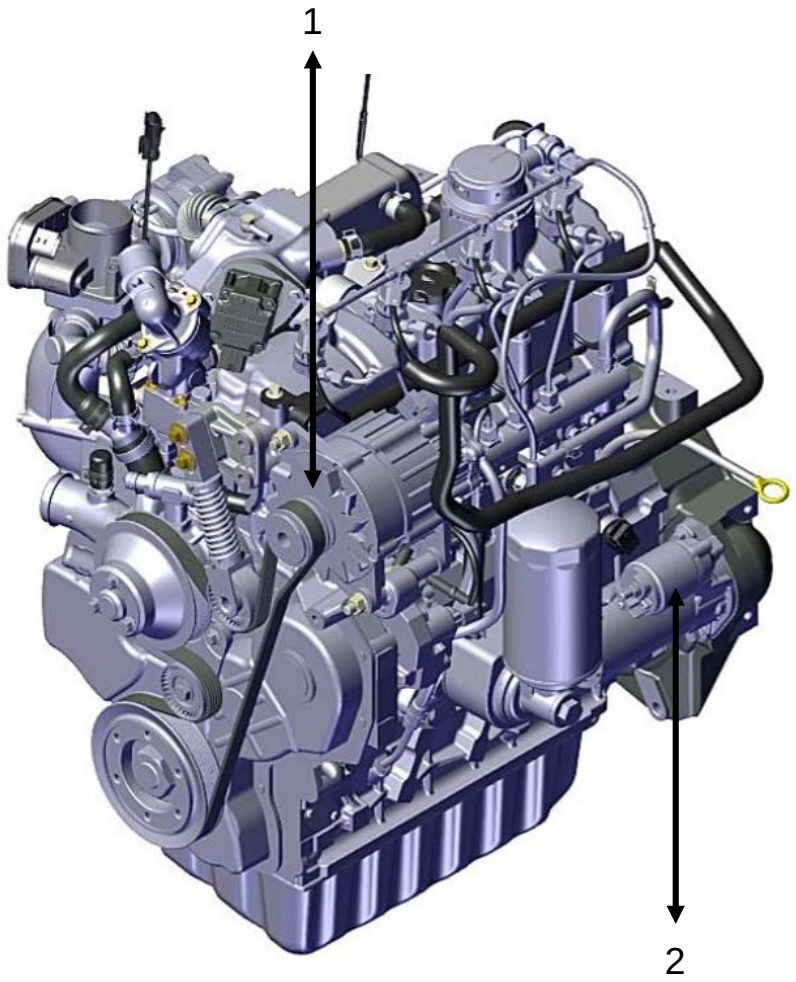
Engine Main Components- Timing





VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components



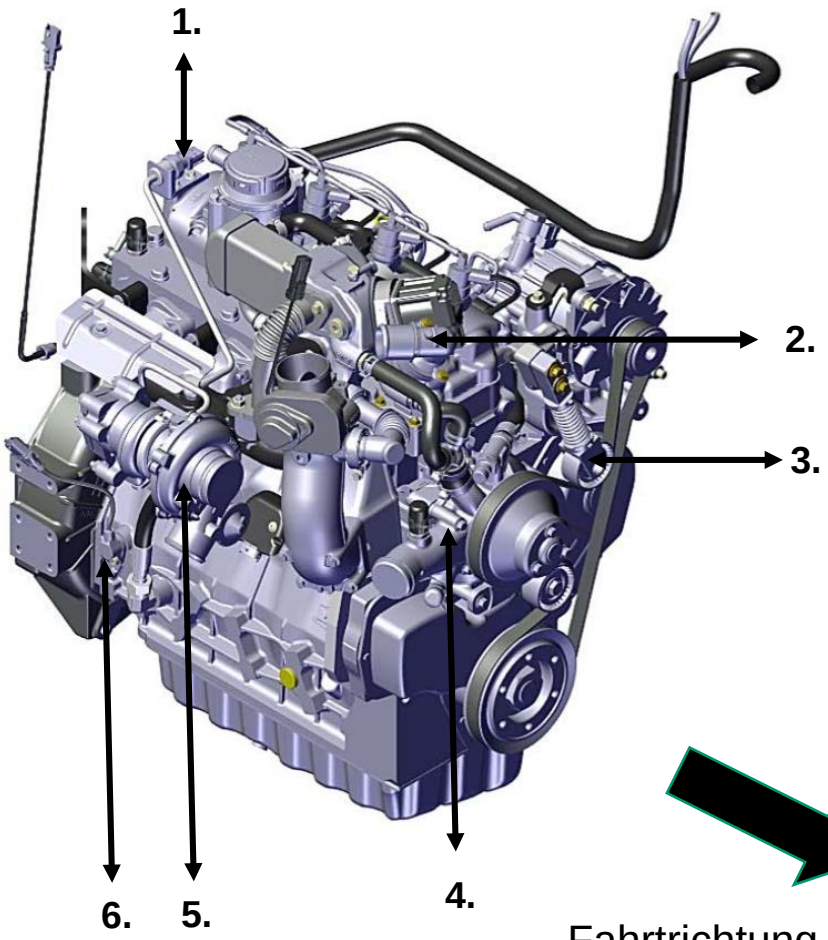
1. Alternator (Generator) G1

2. Starter Motor M1

Fahrtrichtung- Driving Direction

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components

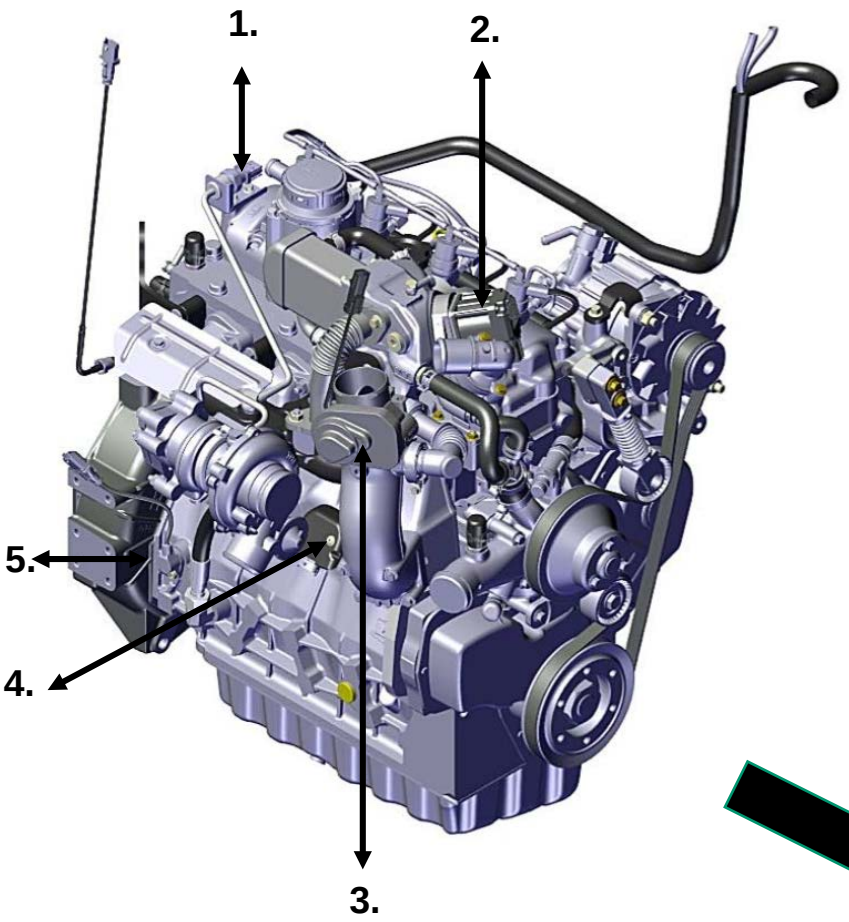


1. Exhaust pressure sensor P3, B66, X128
2. Thermostat (head)
3. Belt Tensioner (Compact)
4. Water Pump
5. Turbocharger
6. Crankshaft sensor B2, X606

Fahrtrichtung- Driving Direction

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components



1. Exhaust- Gas- Pressure- Sensor P3, B66, X128

2. EGR-Valve (Exhaust- Gas- Recirculation), Y41, X612

3. Throttle Valve, Y42, X613

Note: Dismantle the throttle valve Y42, every 500 operating hours, and clean the throttle valve Y42 with brake cleaner!

4. Charge air pressure + charge air temperature sensor B4, X608

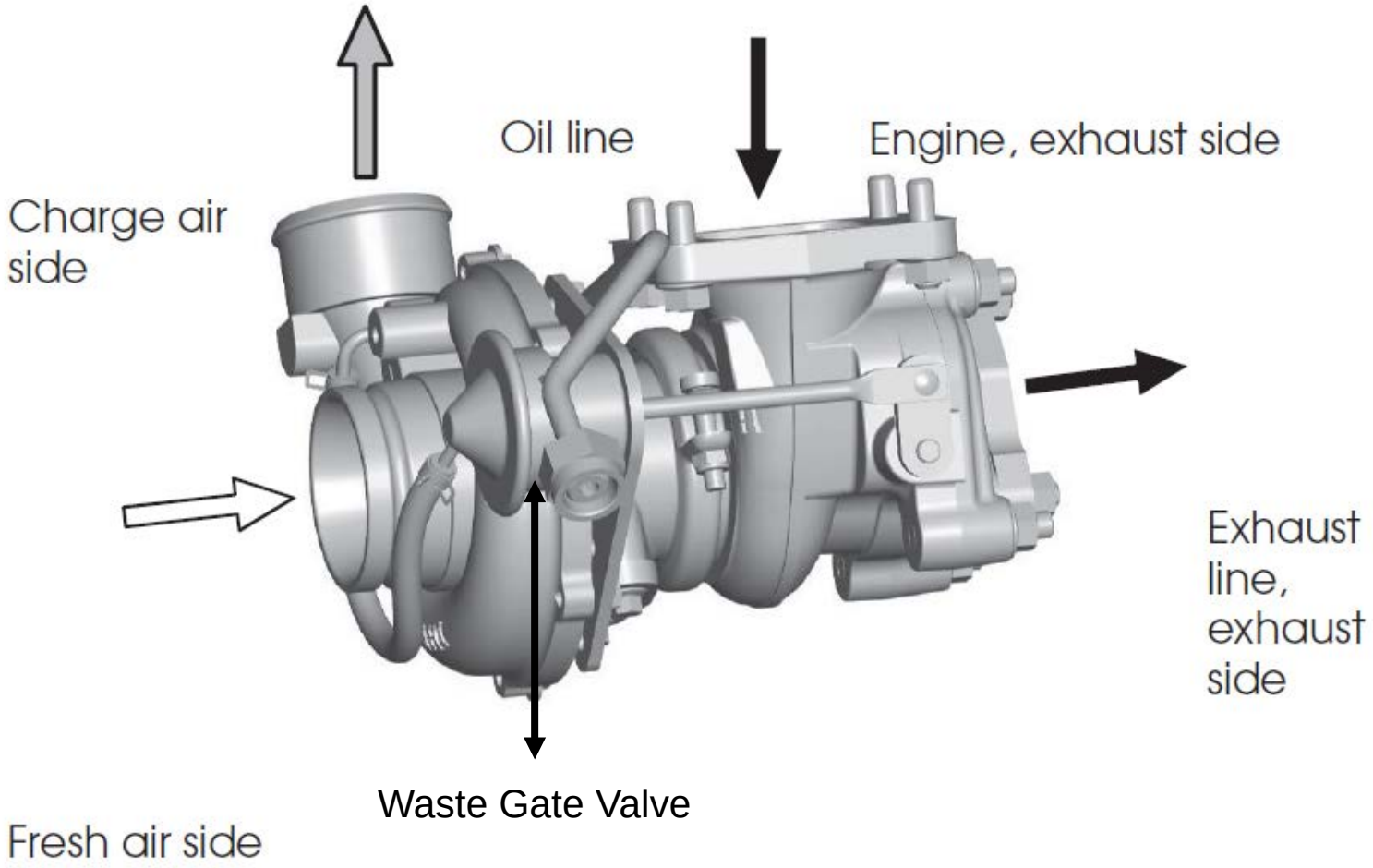
Note: Dismantle Sensor B4, every 500 operating hours, and clean the sensor B4 with brake cleaner!

5. Crankshaft- Sensor, B2, X606

Fahrtrichtung- Driving Direction

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components- Turbocharger



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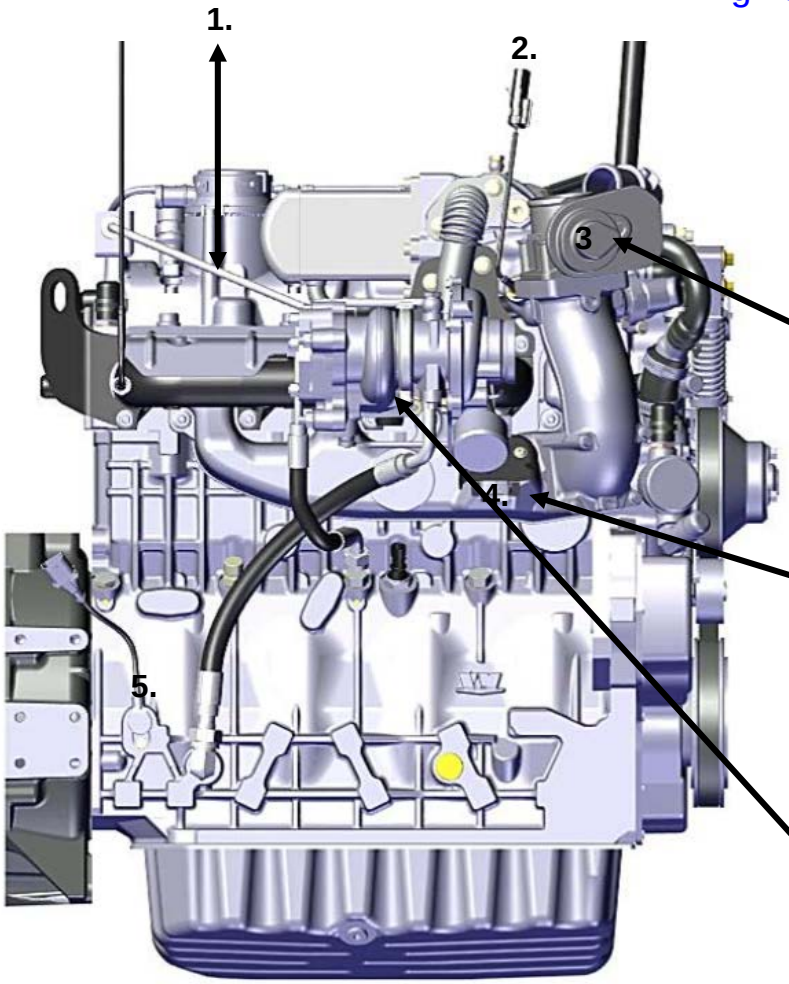
Engine Main Components



1. Pipe from Exhaust- Gas- Pressure- Sensor P3, B66, X128

2. Temperature sensor turbocharger OUT X65, X123

3. Throttle Valve, Y42, X613

Note: Dismantle the throttle valve Y42, every 500 operating hours, and clean the throttle valve Y42 with brake cleaner!

4. Charge air pressure + charge air temperature sensor B4, X608

Note: Dismantle Sensor B4, every 500 operating hours, and clean the sensor B4 with brake cleaner!

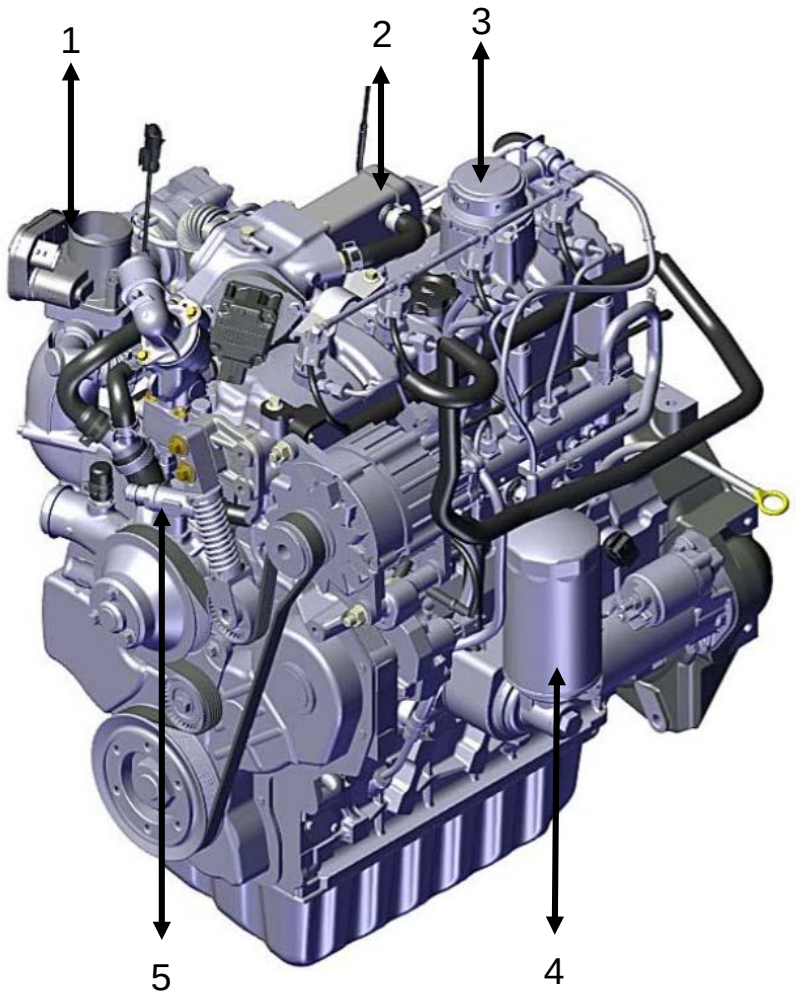
5. Crankshaft- Sensor, B2, X606

6. Temperature sensor B65 at turbocharger

Fahrtrichtung- Driving Direction

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components

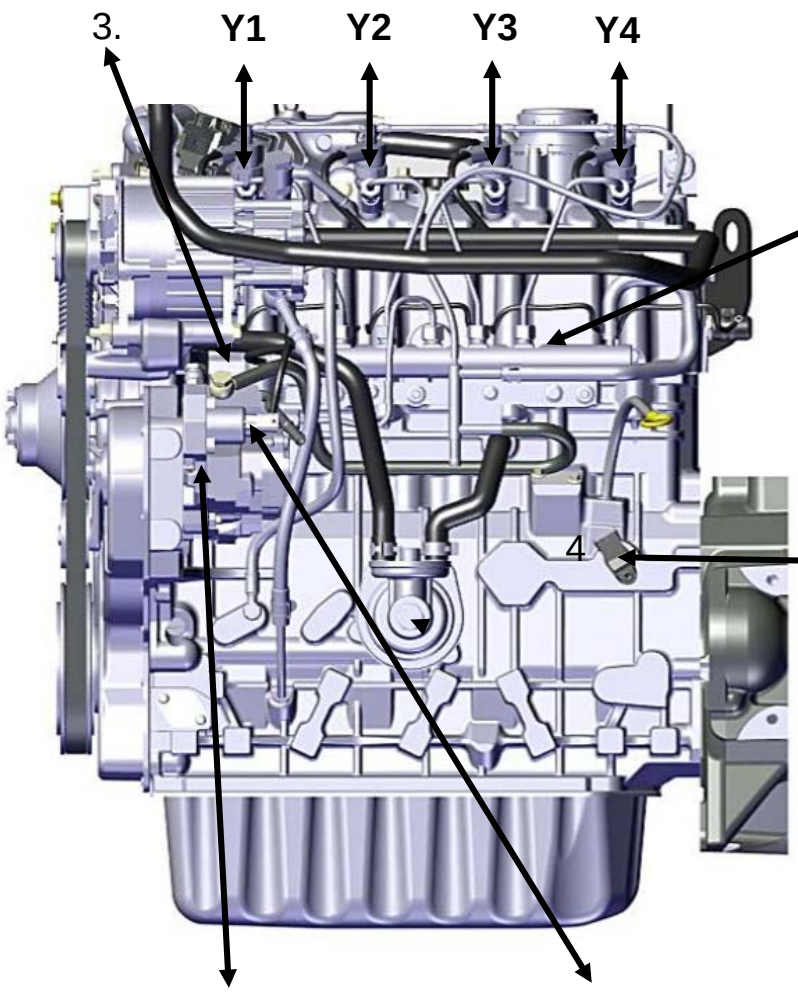


1. Throttle Valve, Y42, X613
2. EGR- Cooler (Exhaust- Gas- Recirculation Cooler)
3. Oilseparator (integratet)
4. Engine- Oil- Filter
5. Water temperature sensor (Coolant), B5, X609

Fahrtrichtung- Driving Direction

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components



Y1 Injector Zyl. 1
Y2 Injector Zyl. 2
Y3 Injector Zyl. 3
Y4 Injector Zyl. 4

2. Rail Pipe

3. Rail pressure sensor B3, X607 at rail pipe

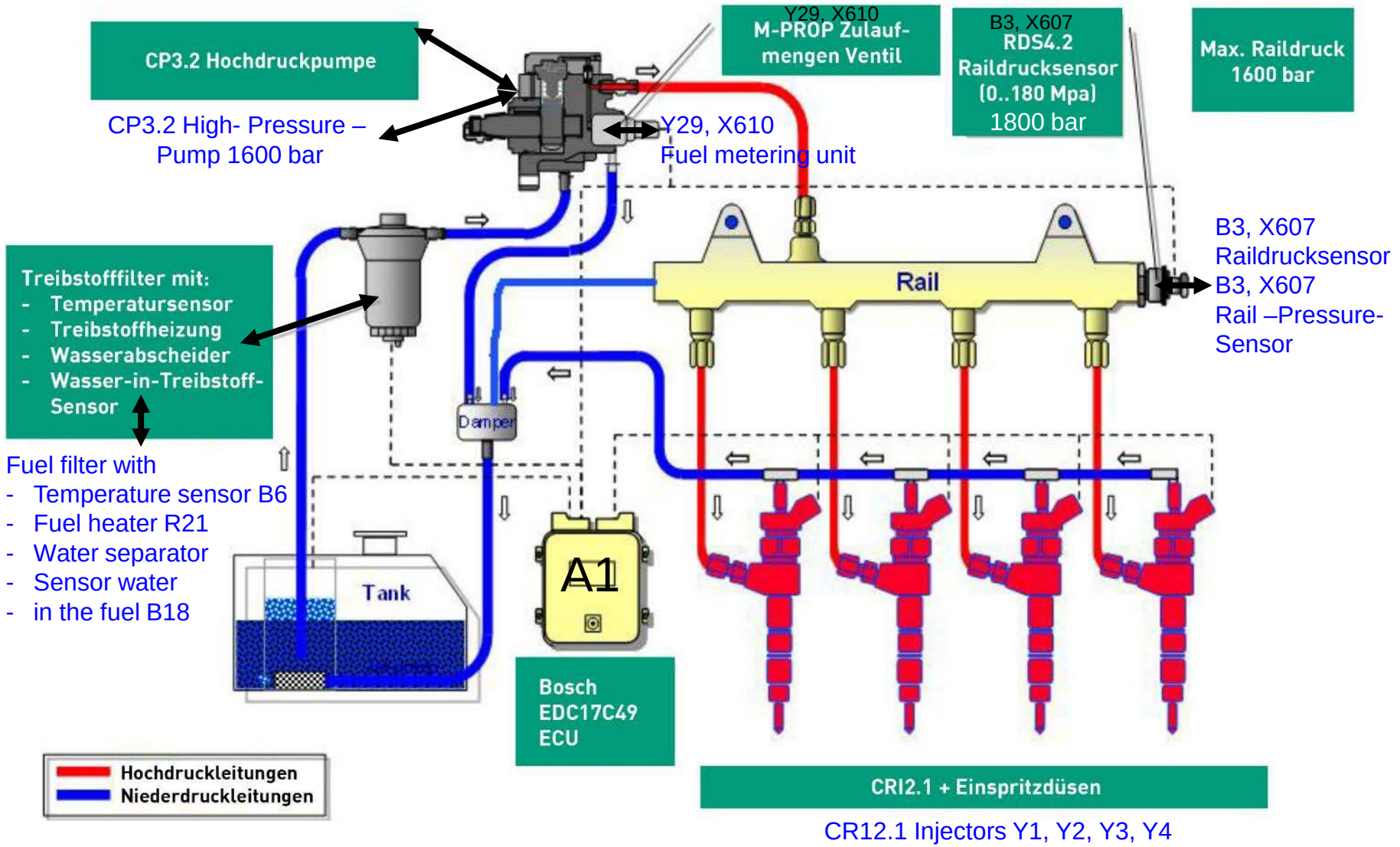
4. Camshaft speed sensor B1, X605

CR- High pressure pump

6. Fuel metering unit (valve) Y29, X610 at high pressure pump

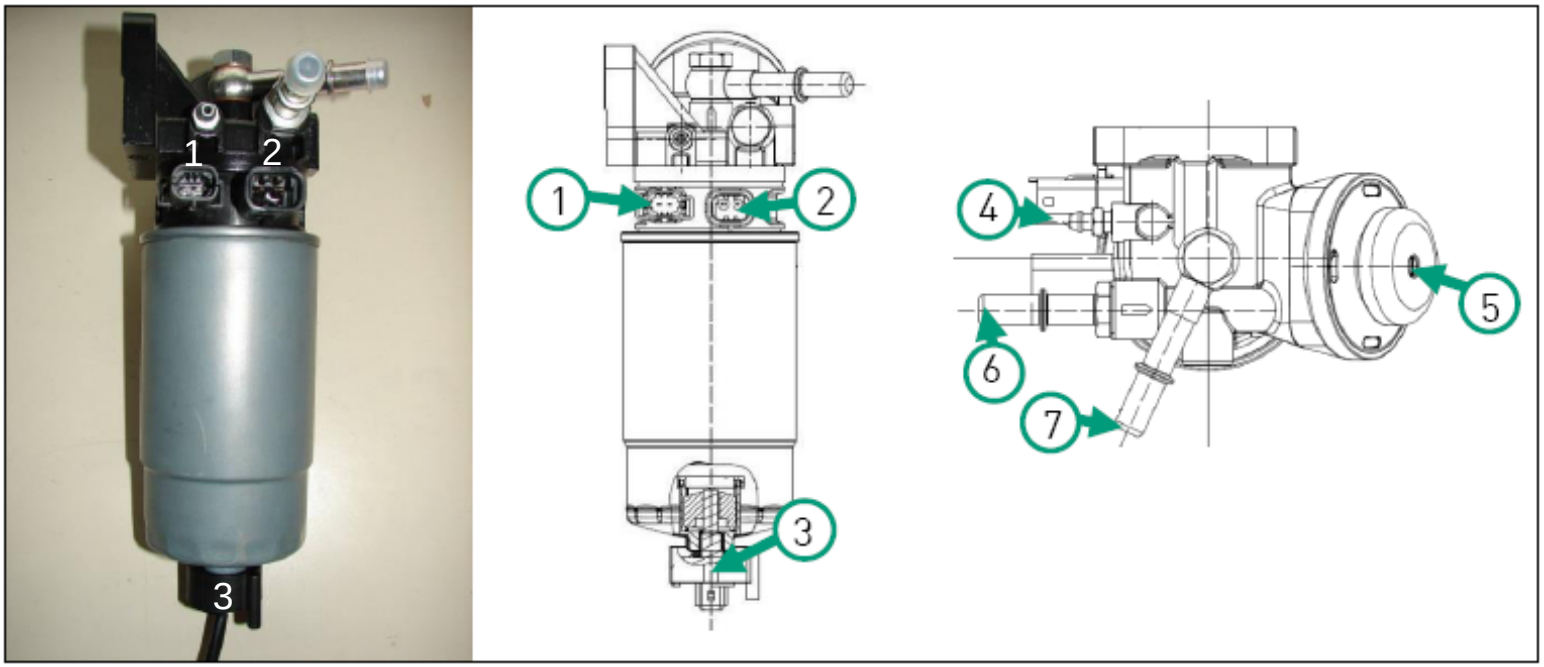
VM- Motor R754 EU6
VM- Engine R754 EU6

Common- Rail- Injection- System



VM- Motor R754 EU6
VM- Engine R754 EU6

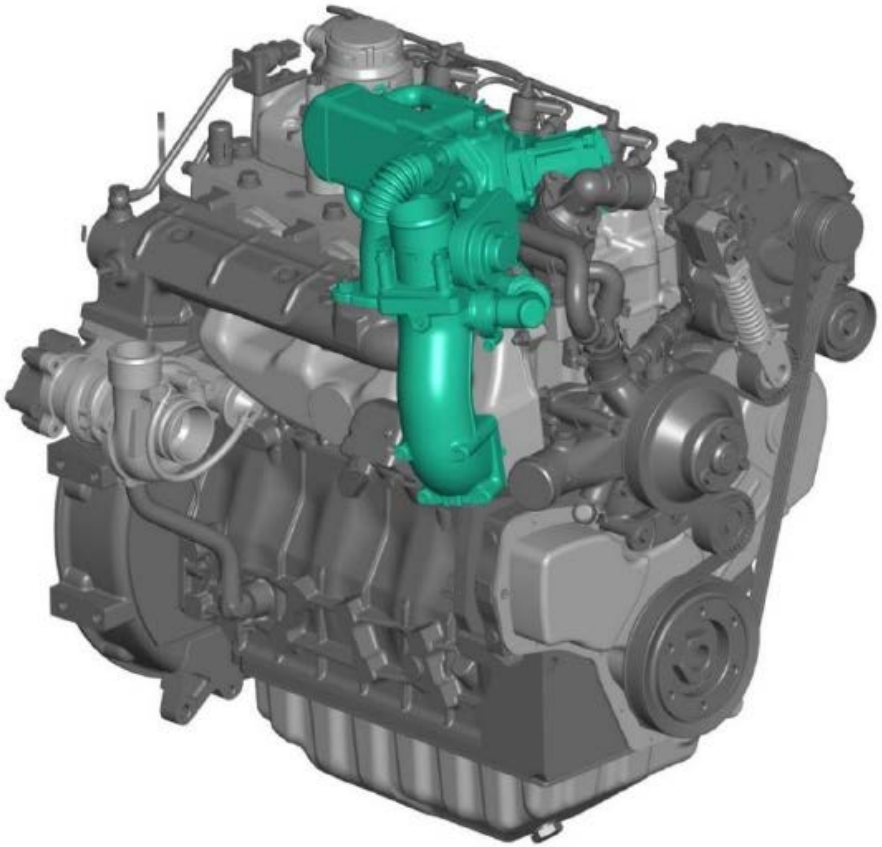
Engine Main Components- Fuel Filter



1. Conector Fuel –Temperature- Sensor B6, X143
2. Connector Fuel Heater R21, X144
3. Conector Sensor Water in the Fuel B18, X145

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components- EGR- System



R754EU6
externe gekühlte Abgasrückführung

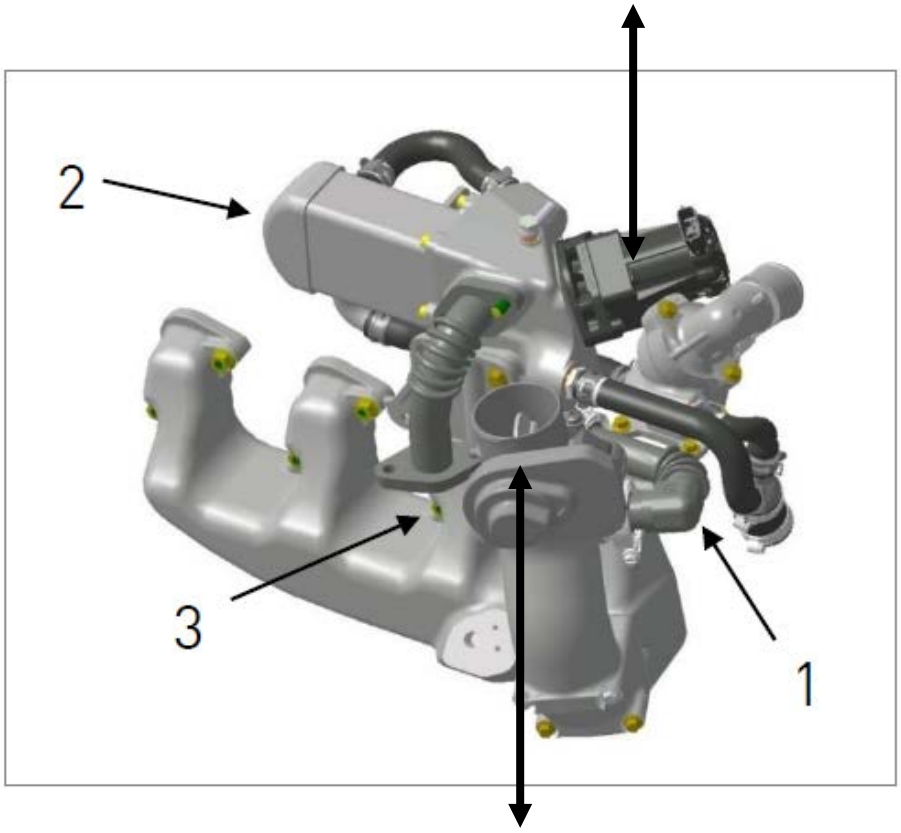
The EGR system consisting of the EGR valve and EGR cooler routes a part of the exhaust gases back into the intake pipe after cooling.

Via the exhaust gas recirculation (EGR), under partial load operation, a part of the fresh air drawn in is enriched by the cooled exhaust gases and so, the excess oxygen in the cylinders is lowered. This causes a lowering of the combustion temperatures and thus, a lowering of the nitrogen oxide values (NOx) in the exhaust gases.

VM- Motor R754 EU6
VM- Engine R754 EU6

Engine Main Components- EGR- System

EGR- Valve Y41, X612



Throttle valve Y42; X613

1. Exhaust gas from the exhaust manifold into the exhaust gas recirculation.
2. Cooling of the exhaust gase thought the exhaust recirculation cooler.
3. Mixing of cooled exhaust gases with the intake air.

VM- Motor R754 EU6
VM- Engine R754 EU6

Main Components Exhaust System

Based on engine operation relevant sensor data, the quantity of the reducing agent is adjusted exactly to the engine operating point and to the catalyst-specific properties for maximum nitric oxide conversion. Since AdBlue freezes below -11 °C the pressure lines and the AdBlue tank are electrically heated using engine coolant.

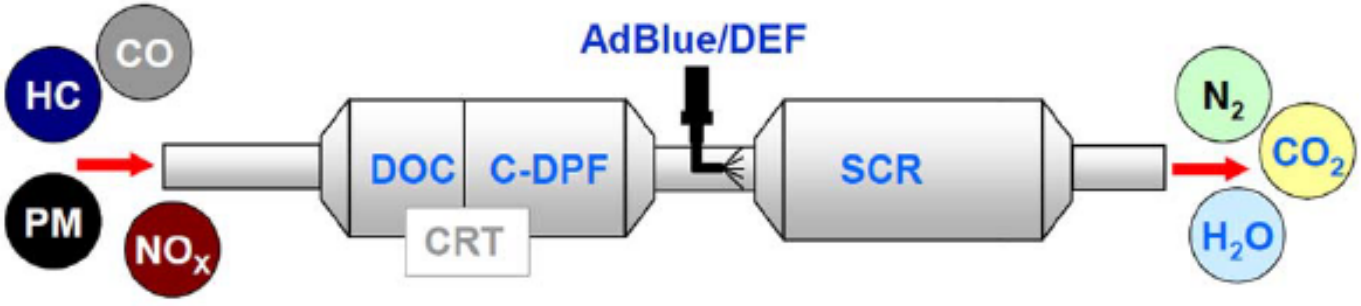
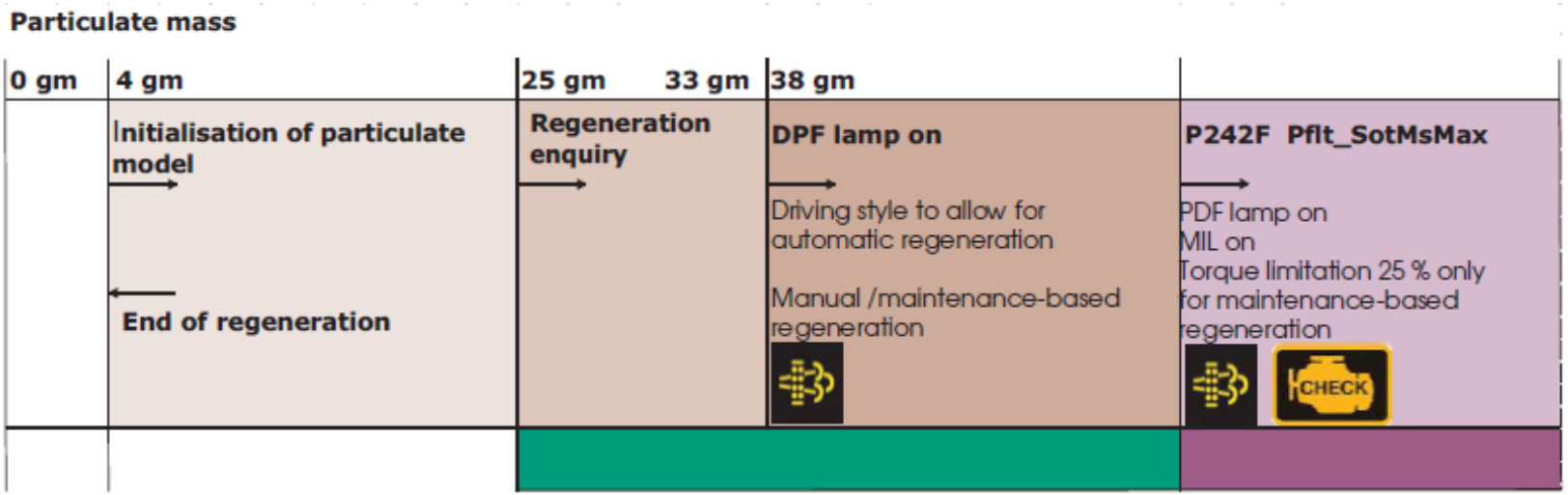


Fig. 172:

DOC	Diesel Oxidation Catalyst	SCR	Selective Catalytic Reduction
DPF	Diesel Particulate Filter	SCRT	Selective Catalytic Reduction Technology
CRT	Continuously Regenerating Trap	DEF	Diesel Exhaust Fluid

DPF load limit values



VM- Motor R754 EU6
VM- Engine R754 EU6

DWS- System- Warning Lights

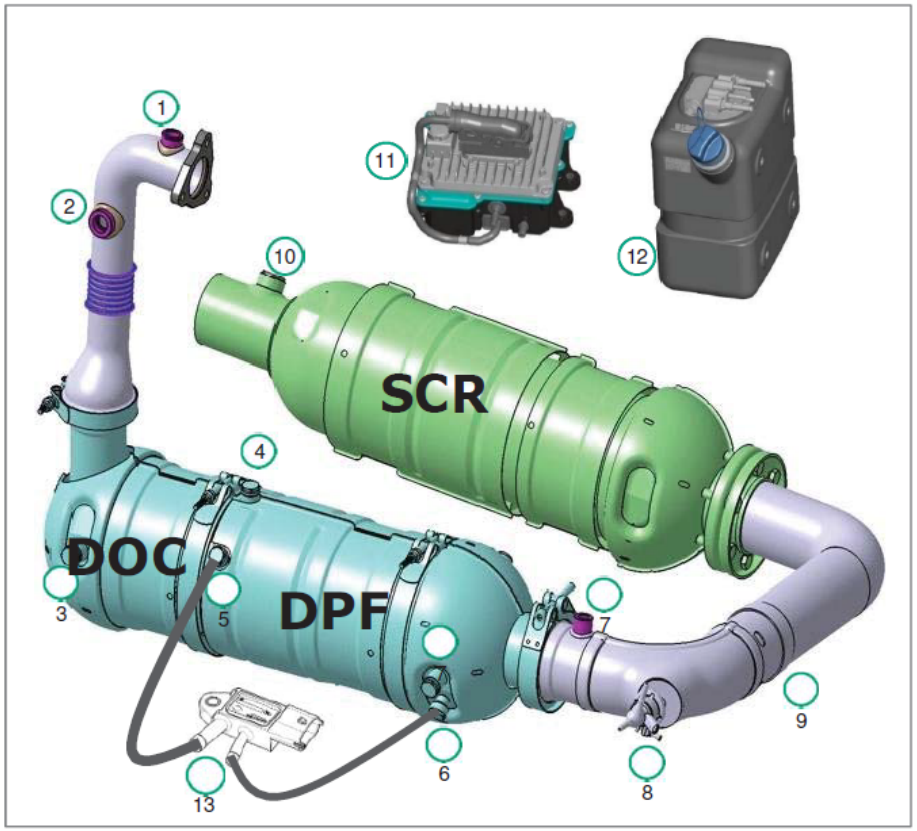
Item	Symbol	Colour	Function
130		Yellow	**SCR warning light** The SCR warning light and the EOBD/MIL light may light up at the same time and indicate whether malfunctions have occurred at the exhaust emission control system that have a direct influence on exhaust gas emissions. For more information – see section *"Exhaust gas purification system"* on page 3-89.
131		Yellow	**Telltale – diesel particle filter** If the diesel particle filter telltale lights up in the indicating device, the diesel particle filter has reached a critical load condition and must be regenerated. For more information – see section *"Exhaust gas purification system"* on page 3-89.
132		Yellow	**Warning light – EOBD/MIL (European On-Board Diagnosis)** The SCR warning light and the EOBD/MIL light may light up at the same time and indicate whether malfunctions have occurred at the exhaust emission control system that have a direct influence on exhaust gas emissions. For more information – see section *"Exhaust gas purification system"* on page 3-89.

VM- Motor R754 EU6
VM- Engine R754 EU6

The SCR- System precisely injects a required amount of urea (DEF- AdBlue) into the exhaust system. The injection takes place between the particulate filter and the SCR filter.

After being injected, the urea vaporisis and is converted to ammonia and carbon dioxide. The ammonia (NH3) together with the Nox is convertet into nitrogen (N2) and water (H2O) in the catalytic converter. Both resulting chemicals are harmless and are reduced to almost zero.

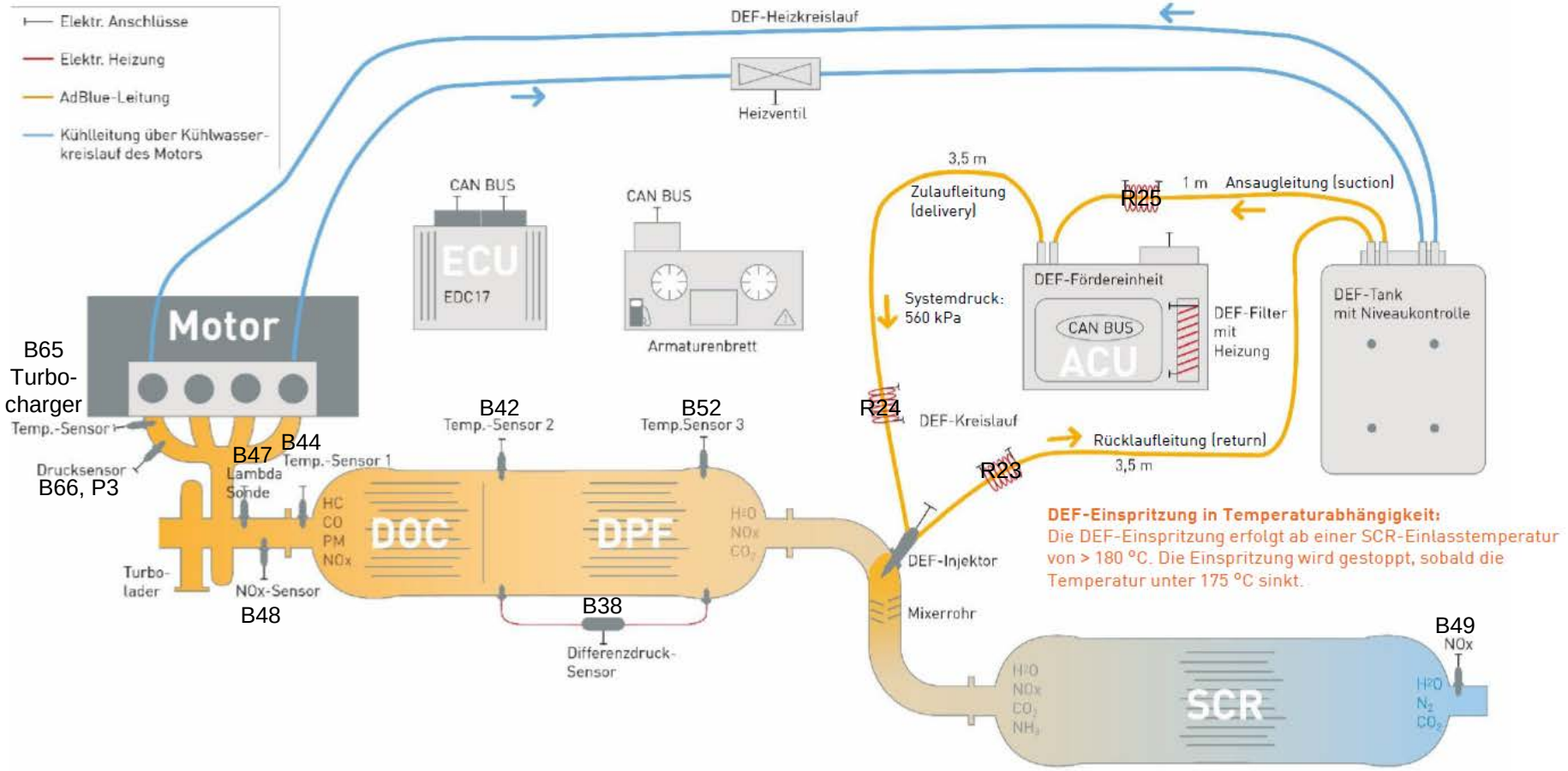
Mainly, the system consist of: urea tank, tank level sensor and temperature sensor, pump unit, filter, DEF- lines, dosing unit, heater, injection valve, Nox- sensors, control unit and wiring harness.



1	Oxygen sensor
2	NOx sensor (in)
3	Temperature sensor DOC in
4	Temperature sensor DPF in
5	Pressure connection DPF in
6	Pressure connection DPF out
7	Temperature sensor SCR in
8	DEF injector
9	Mixing pipe
10	NOx sensor (out)
11	ACU box
12	DEF tank
13	Differential pressure sensor

VM- Motor R754 EU6
VM- Engine R754 EU6

Main Components Exhaust- System, DOC, DPF, SCR



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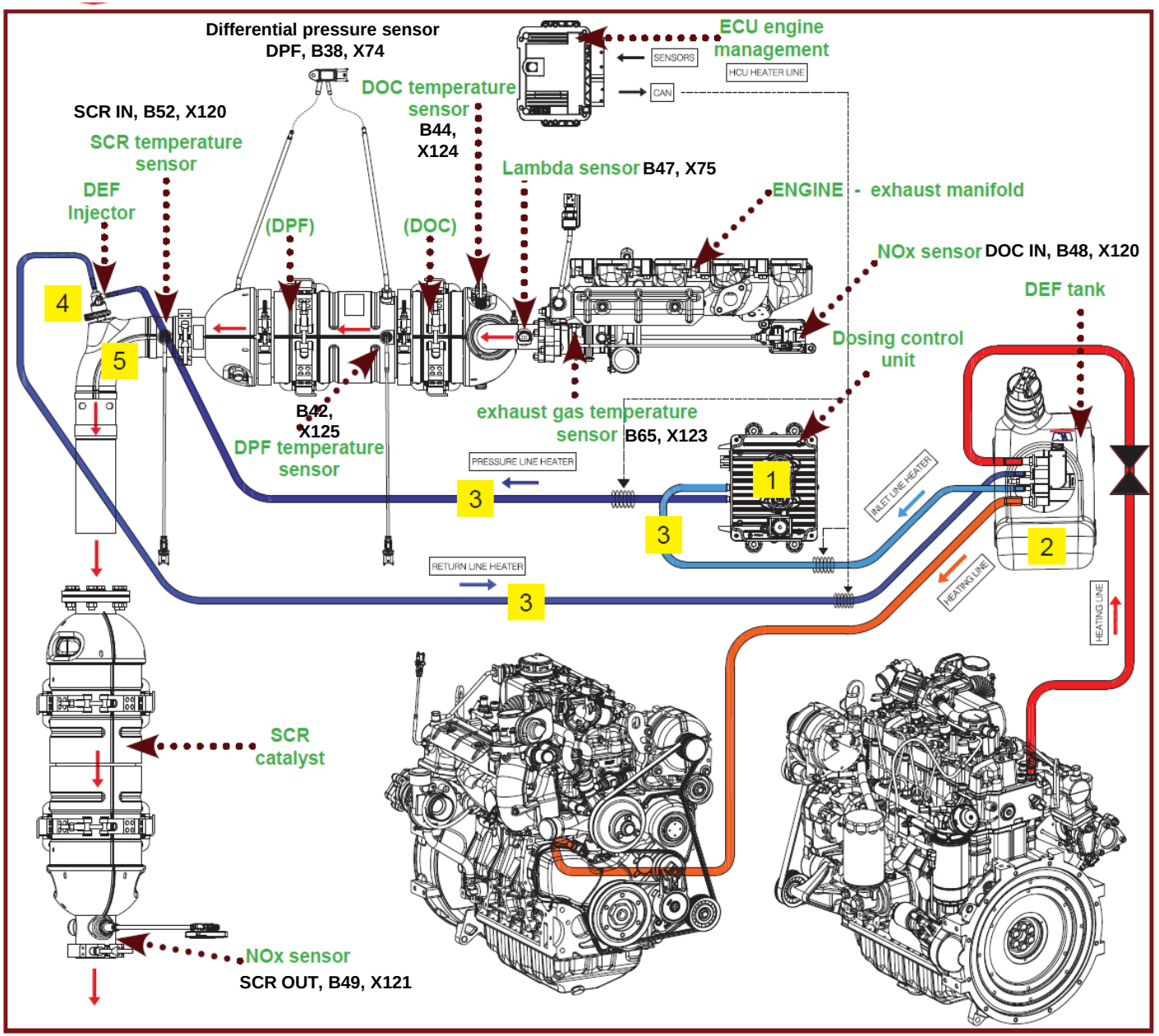
VM- Engine R754 EU6



VM- Motor R754 EU6
VM- Engine R754 EU6

DEF and DWS

What is diesel exhaust fluid (DEF- AdBlue)

DEF is the reactant required for the functioning of the SCR- system. Is is a homogeneous urea water solution 32.5% urea and 67.5% de- mineralised water)

Why must a 32.5% urea solution be used?

The highest reduction rate of Noxis archieved with a 32.5 urea solution, therefore the SCR- sytem is calibrated for that.

The following parameters are checked:
DEF- AdBlue tank level
DEF- AdBlue quality
DEF- AdBlue injection
DEF- Adblue consumption
Manipulation at SCR- components

AdBlue-Anzeige

159 DEF- Adblue tank level
160 Warning light DEF- AdBlue filling level (to low), approx 6.5L DEF. Refill DEF!
SCR- warning light. The SCR and EOBD- Mil warning light may light up at the same time
And indicate whether malfunctions have occured at the exhaust emission control system that have direct influence on exhaust gas emission.

VM- Motor R754 EU6
VM- Engine R754 EU6

Driver warning and request system

Level of the request	Effect	Error detection	Cause	Warning symbol		Measure
				SCR warning light  yellow	EOBD/MIL  yellow	
Low reagent level						
Without	None		Reagent level >8.8 %	off	off	
Driver warning	None		Reagent level < 8.8 %	on	off	Top up approx. 12 l
Strong request	Max. driving speed 20 km/h		Reagent level 0 %	Flashing 2 Hz	on	Top up approx. 15 l
Insufficient reagent quality						
Without	None	No error	Reagent concentration OK	off	off	
Driver warning	None	Error acknowledged and active	Insufficient reagent concentration	on	on	Seek assistance from an authorised work-shop.
Weak request	25 % Engine torque reduction	Error was not eliminated within 10 h (Activation during engine operation and gradual reduction)		Flashing 1 Hz	on	
Strong request	Max. driving speed 20 km/h	Error was not eliminated within 20 h (active after ignition off + approx. 60 s)		Flashing 2 Hz	on	
Reagent consumption too low						
Without	None	No error	Dosage OK	off	off	
Driver warning	None	Error acknowledged and active	Interruption of reagent supply	on	on	Seek assistance from an authorised work-shop.
Weak request	25 % Engine torque reduction	Error was not eliminated within 10 h (Activation during engine operation and gradual reduction)		Flashing 1 Hz	on	
Strong request	Max. driving speed 20 km/h	Error was not eliminated within 20 h (active after ignition off + approx. 60 s)		Flashing 2 Hz	on	
Malfunction of the exhaust gas after-treatment system, possibly due to unauthorised intervention (manipulation)						
Without	None	No error	Exhaust gas after-treatment OK	off	off	
Driver warning	None	Error acknowledged and active	Electrical fault (component – especially sensor monitoring, possibly due to unauthorised intervention) Fault of the AGR system function	on	on	Seek assistance from an authorised work-shop.
Weak request	25 % Engine torque reduction	Error was not eliminated within 36 h (Activation during engine operation and gradual reduction)		Flashing 1 Hz	on	
Strong request	Max. driving speed 20 km/h	Error was not eliminated within 100 h (active after ignition off + approx. 60 s)		Flashing 2 Hz	on	

VM- Motor R754 EU6
VM- Engine R754 EU6

Faults in the DEF- Adblue system by filling with incorrect operating fluids:

When the DEF Adblue tank has been filled with water, the system can be cleaned and refilled with DEF- AdBlue
As soon as the DEF- AdBlue concentration is normal again, the system will work again without problems.

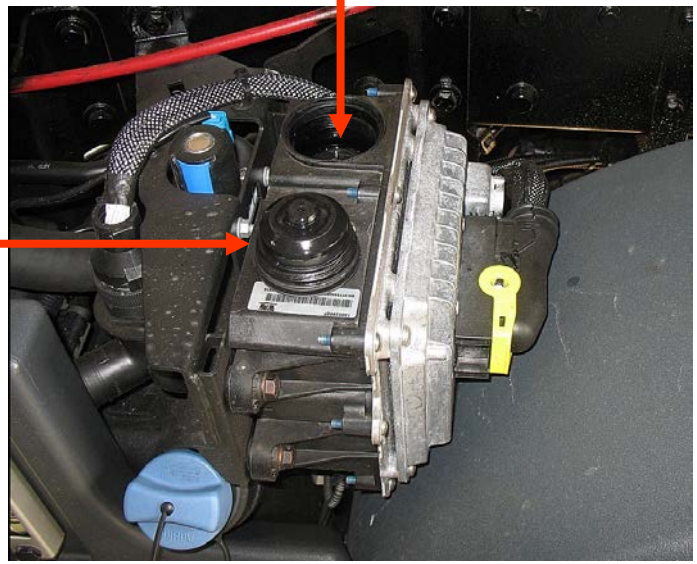
If other fluids are filled in the DEF-Tank, replace all component of the SCR- system! (diesel, biodiesel, engine oil, hydraulic oil, engine coolant, windscreen cleaner)

Fluid	Injection nozzle	FDS box	DEF tank Assembly	DEF lines
Water	No exchange	No exchange	Empty and fill with DEF	No exchange
Diesel	Replace components	Replace components	Empty tank and rinse, replace DEF box	Replace components
Biodiesel (B20)	Replace components	Replace components	Empty tank and rinse, replace DEF box	Replace components
Engine oil	Replace components	Replace components	Empty tank and rinse, replace DEF box	Replace components
Hydraulic oil	Replace components	Replace components	Empty tank and rinse, replace DEF box	Replace components
Ethylene glycol	Replace components	Replace components	Empty system and rinse	Replace components
Windscreen water	Empty and rinse	Replace components	Empty system and rinse	Replace components

VM- Motor R754 EU6
VM- Engine R754 EU6

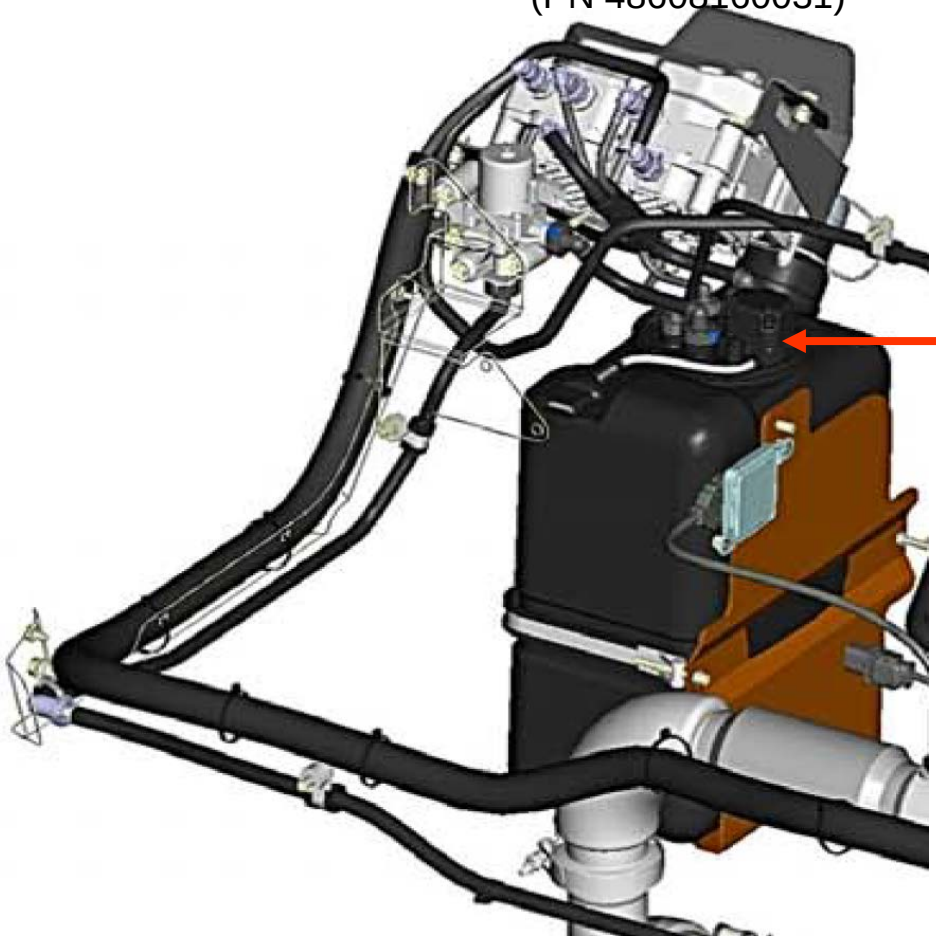
DEF(AdBlue)Supply- Unit with control unit A18, Emmission Stage Euro 6A
(PN 48601620025E)

Replace AdBluefilter (SCR- Filter) every 1000 Bh operating hours
(PN 48608160003)



VM- Motor R754 EU6
VM- Engine R754 EU6

New DEF- Supply- Unit(AdBlue) with control unit A18, Emisssion Stage Euro 6C
(PN 48601620042E, Supplier Bosch)
Replace AdBluefilter (SCR- Filter) every 1000 Bh operating hours
(PN 48608160031)



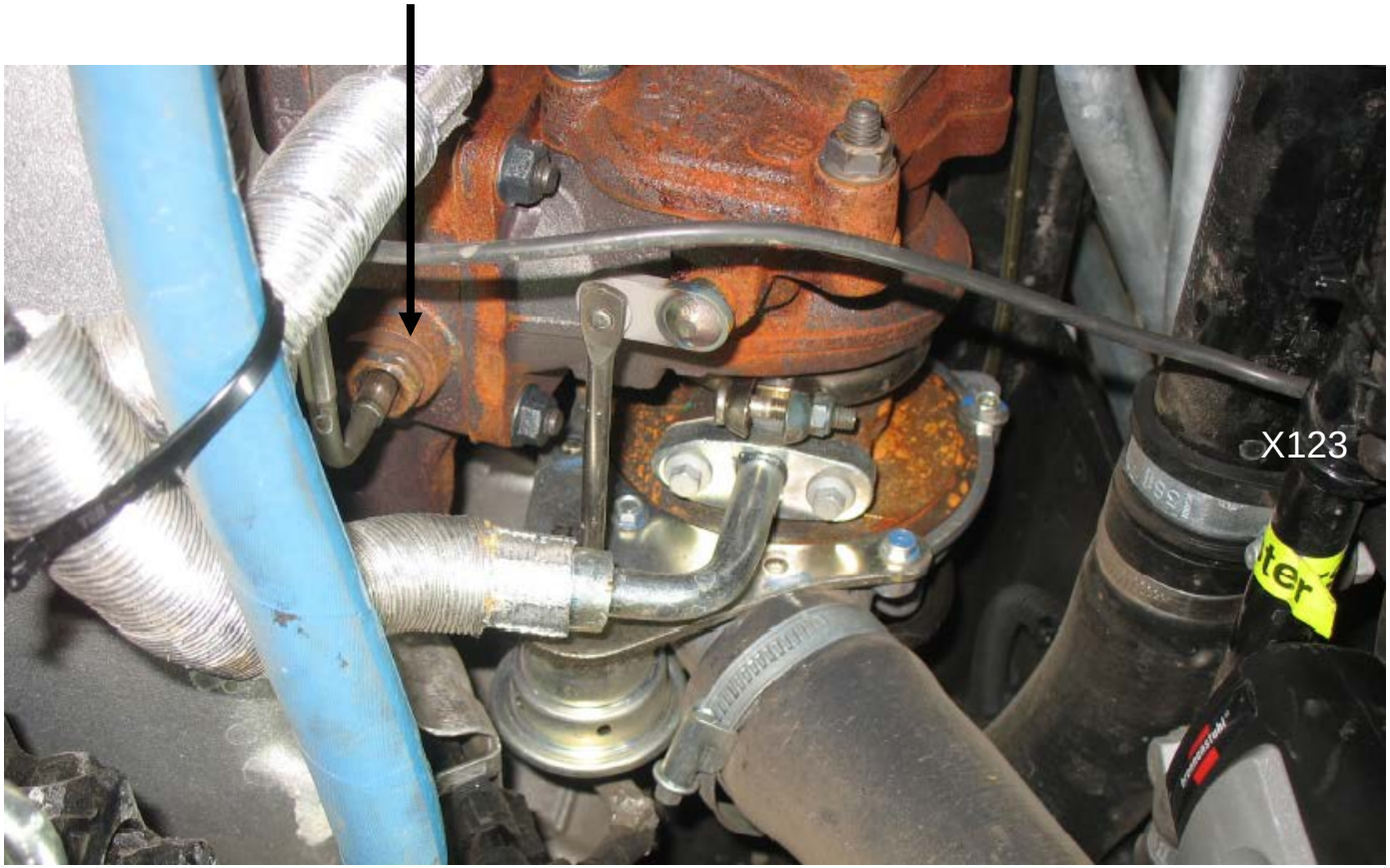
AdBlue Sensor B62, X316
für
Adblue Füllstand,
AdBlue Temperatur
und
AdBlue Qualität

AdBlue- Sensor B62, X316
For AdBlue Level
AdBlue Tempeture
and
AdBlue (DEF) Quality

VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system

Temperatursensor am Abgasturbolader, B65, X123
Sicht von unten:
Exhaust pressure sensor at turbo charger, B65, X123
View from down side:



VM- Motor R754 EU6
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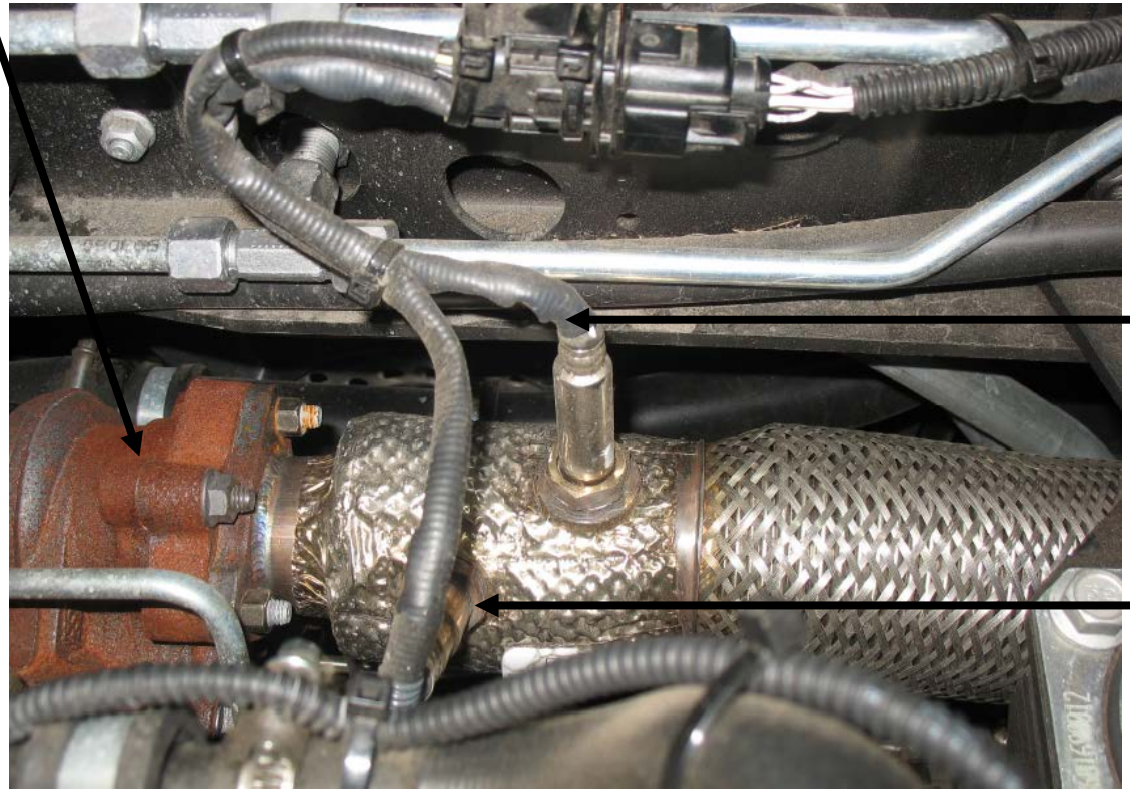
Elektrische Bauteile Abgassystem- Electrical components exhaust system

Turbolader
Turbocharger

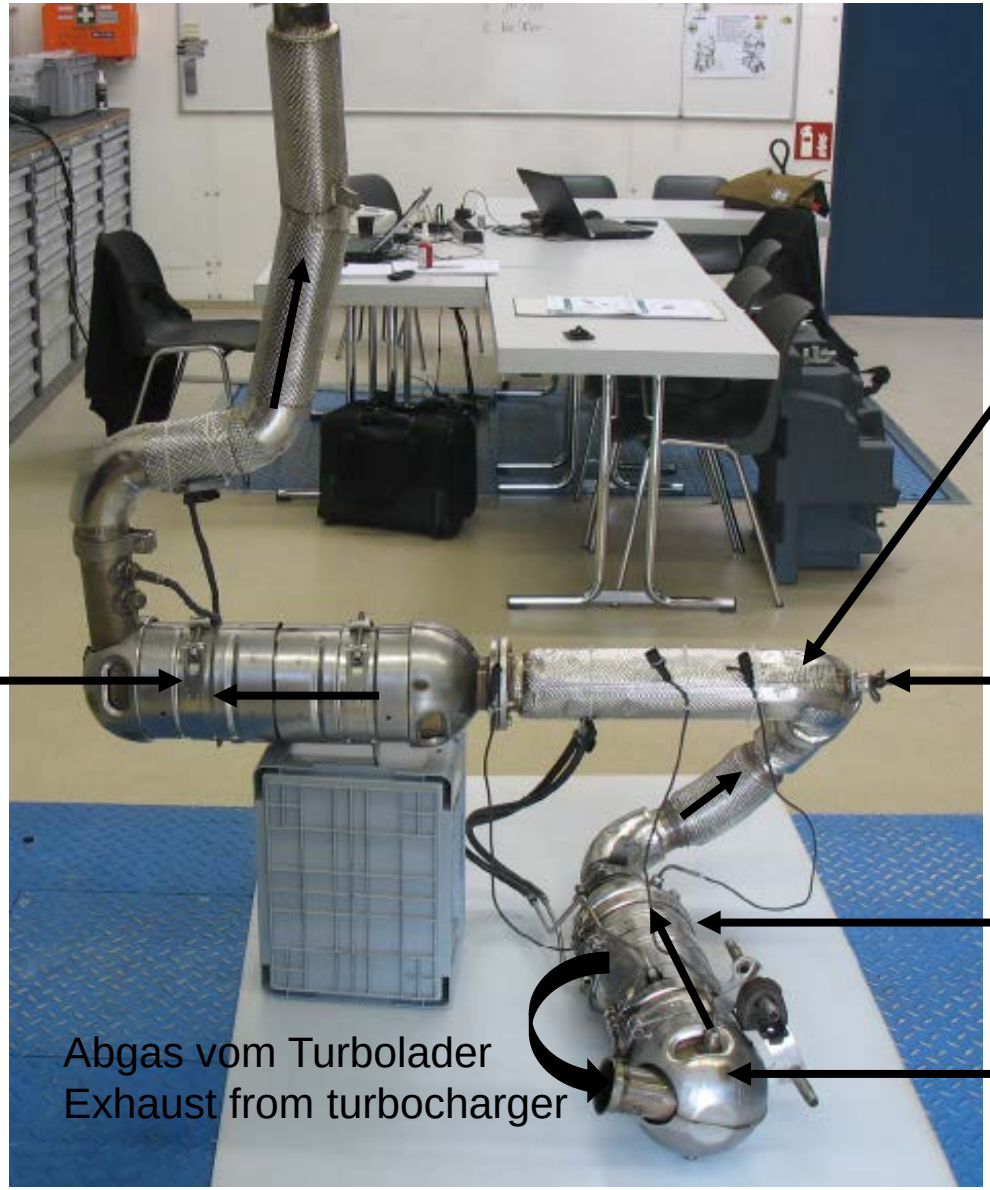


NOx Sensor
DOC IN
B48, X120
Nox – sensor
DOC IN

Lambdasonde
Lambda – Sensor,
B47, X75

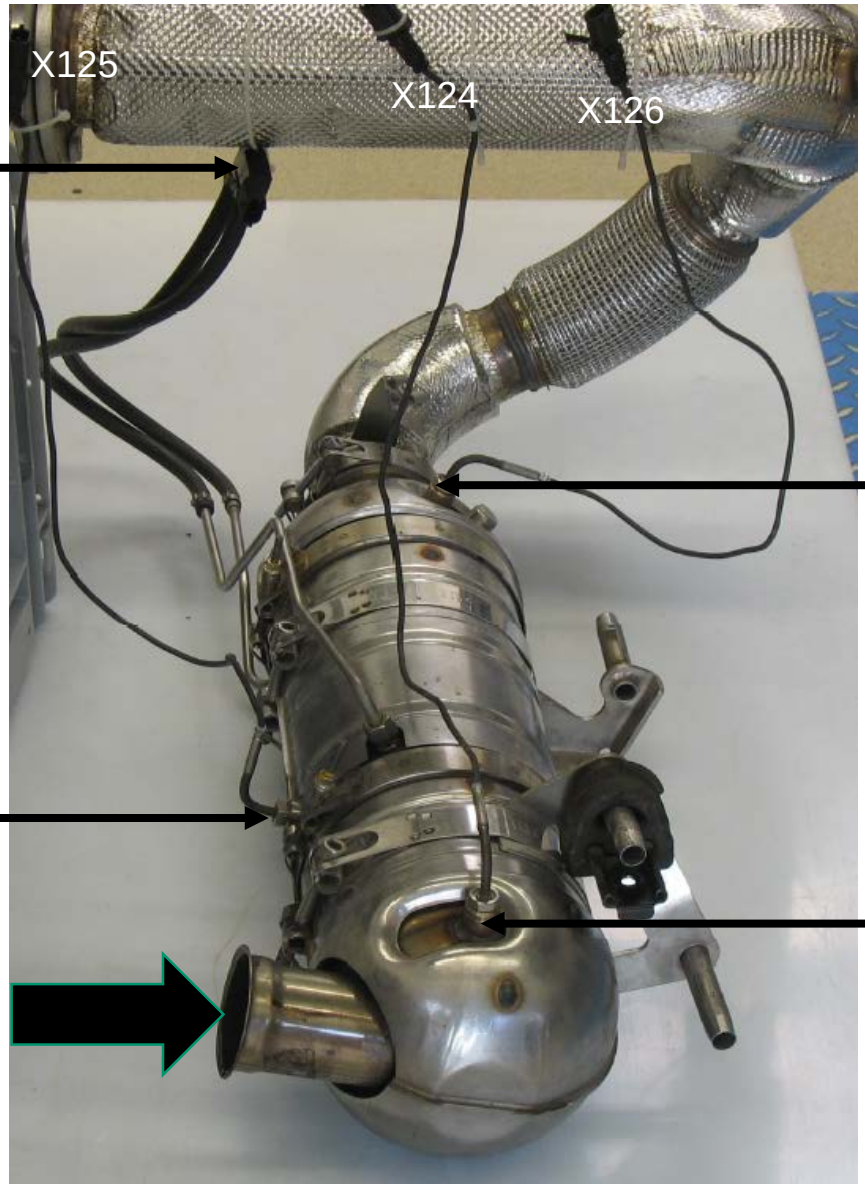
VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system



VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system



Differenzdruckgeber
DPF B38, X74
Differential pressure
sensor DPF B38, X74

Temperatursensor,
SCR- Kat IN B52, X126
Temperature sensor
SCR- CAT IN B52, X126

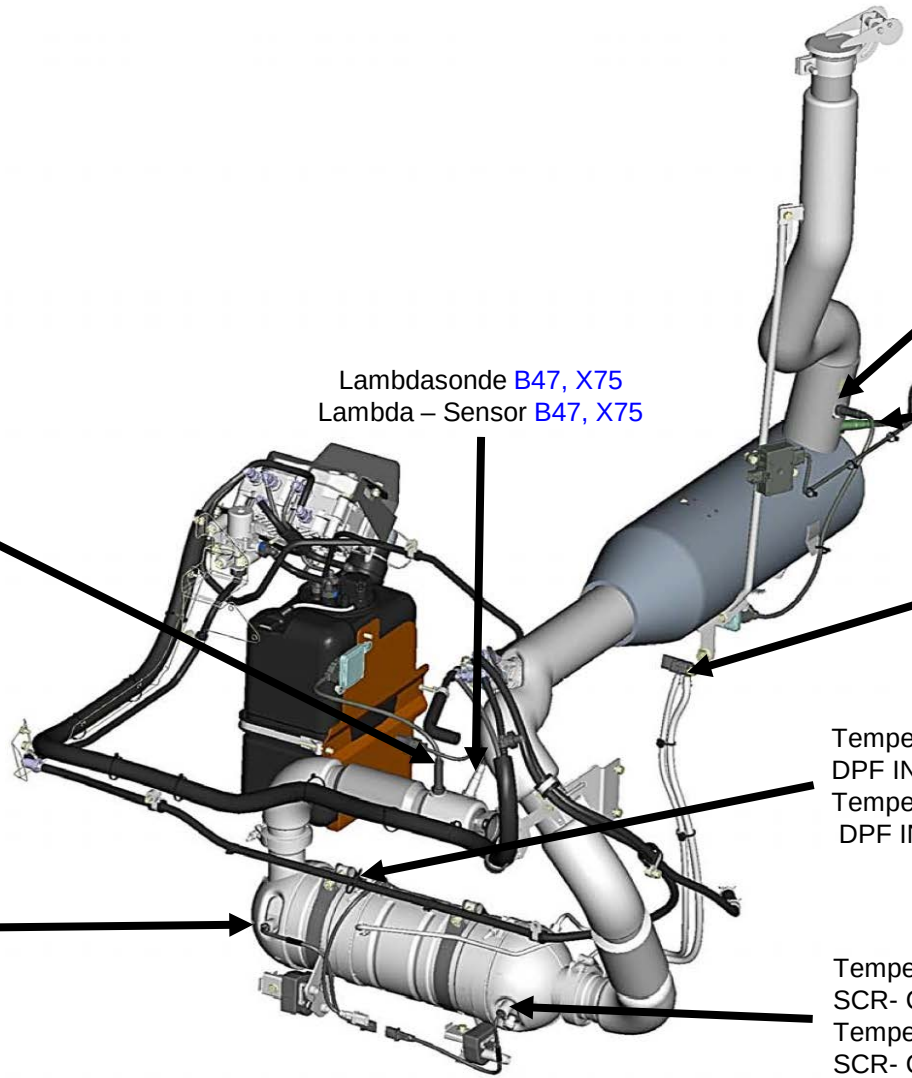
Temperatursensor,
DPF IN
Temperature sensor,
DPF IN, B42 X125

Temperatursensor,
DOC IN, B44, X124
Temperature sensor,
DOC IN, B44, X124

Abgas vom Turbolader
Exhaust from Turbocharger

VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system



NOx- Sensor nach
SCR- OUT, B49, X121
NOx – Sensor after
SCR- OUT, B49, X121

Neu mit Euro 6C
PM- Sensor B59, X315
(Partikelmasse- Sensor)
New with Euro 6C
PM- Sensor B59, X315
(Particle rate sensor)

Lambdasonde B47, X75
Lambda – Sensor B47, X75

NOx Sensor
DOC IN, B48, X120
NOx – sensor
DOCIN, B48, X120

Differenzdruckgeber
DPF B38, X74
Differential pressure
sensor DPF B38, X74

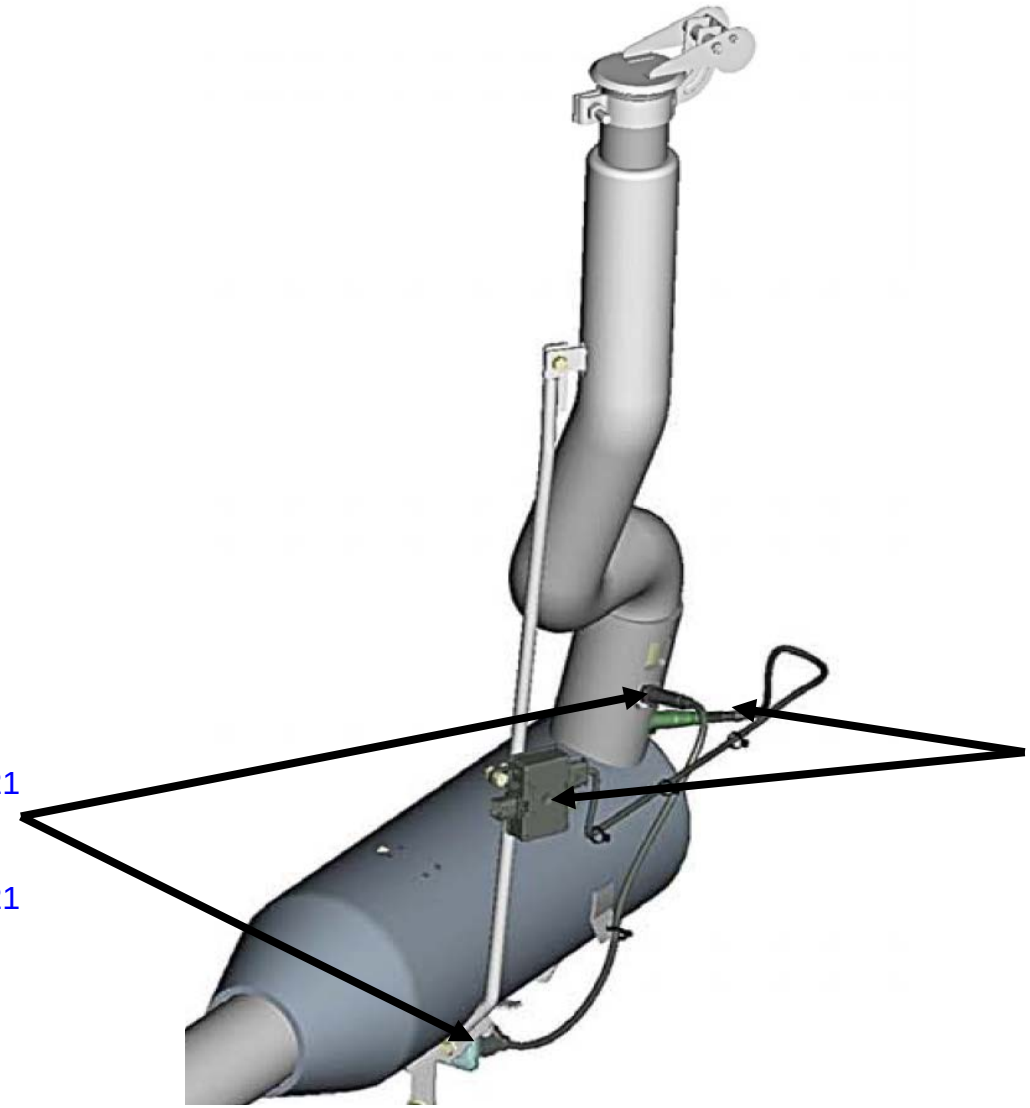
Temperatursensor,
DPF IN, B42, X126
Temperature sensor,
DPF IN, B42 X125

Temperatursensor,
DOC IN, B44, X124
Temperature sensor
DOC IN, B44, X124

Temperatursensor,
SCR- Cat IN B52, X126
Temperature sensor
SCR- CAT IN B52, X126

VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system



NOx- Sensor nach
SCR- OUT, B49, X121

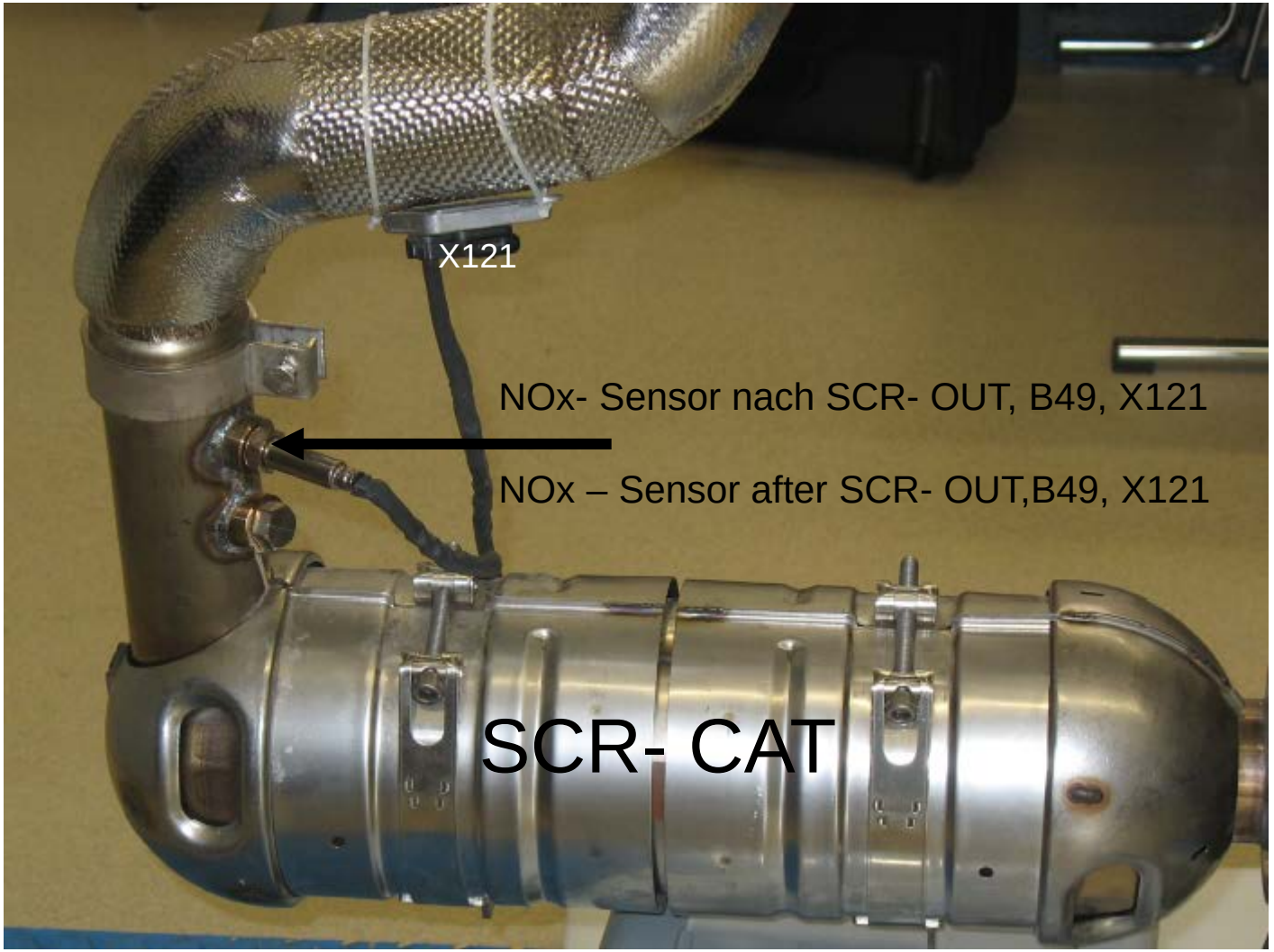
NOx – Sensor after
SCR- OUT, B49, X121

Neu mit Euro 6C
PM- Sensor B59, X315
(Partikelmasse- Sensor)

New with Euro 6C
PM- Sensor B59, X315
(Particle rate sensor)

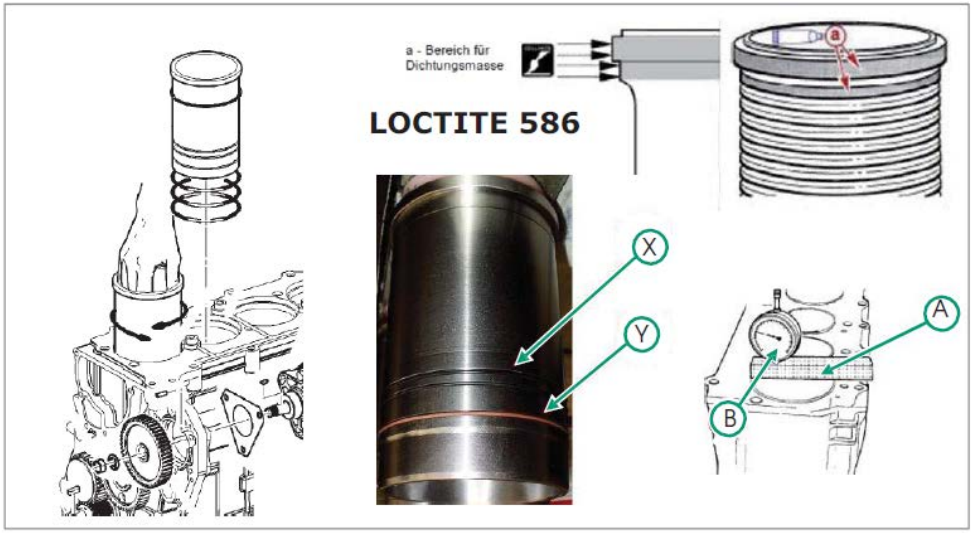
VM- Motor R754 EU6
VM- Engine R754 EU6

Electrical components exhaust system



VM- Motor R754 EU6
VM- Engine R754 EU6

Loctice fluid gaskets



Loctite 586 cylinder gasket
Loctite 510 srews and crankshaft sealing
Loctite 601 Loctite 601 cures when confines in the absense of air between close fitting metal surfaces
Loctite 5399 engine oil pan

VM- Motor R754 EU6
VM- Engine R754 EU6

Please observe: A systematic procedure for troubleshooting is absolutely necessary! Despite the electronics and increasing complexity, never forget the basic principle of a diesel engine!

Please observe the following basics of troubleshooting and fault removal:

Prior to commencing work, make sure all engine/vehicle fluids have been refuelled (diesel, engine oil, engine coolant, DEF AdBlue). If necessary, top up the engine/vehicle fluids. If the engine/vehicle fluids are contaminated, take a sample and send it in for examination.

Check the fuel filter and the air filter for contamination and damage.

In case of error messages from the engine control unit, check whether fuses are defective, need to be replaced or are missing.

Check the battery voltage in case of error messages from the engine control unit that occur when starting the engine (errors in the power supply of the control units, CAN bus error). The battery is discharged or defective.

Note: If the battery voltage is too low (battery discharged), other control units (e.g. control unit work hydraulics, control unit hydrostat) also often register CAN bus errors or errors in the power supply of the control units.

If the battery is charged and the voltage does not drop at the battery during start-up, check the earth connections (earthing points at the battery and on the vehicle frame) for poor contact and loose cable connections.
Check the battery / plus supply (B+) for the engine control unit (fuses, relays, cable connections, contacts, plugs).

Note: In case of errors in the ground supply, other control units (e.g. control unit work hydraulics, control unit hydrostat) also often register CAN bus errors or errors in the power supply of the control units.

VM- Motor R754 EU6
VM- Engine R754 EU6

To provide you with further support, we require the following information from you via e-mail:

1. Vehicle identification number (vehicle chassis number)
2. Engine number
3. Operating hours/km of the vehicle
4. Error description of the engine fault (vehicle does not start, sputtering, no power, white smoke, black smoke, blue smoke).
5. Do telltales light up that indicate an engine fault?
6. Which telltales light up (EOBD/MIL, DPF, SCR system)?
7. Has the engine error memory been read out using the VM diagnostics program?
8. If yes, which error numbers (P code, DTC error) were displayed? Please save the error log and send it to the Hako customer service at cbuesing@hako.com or kschudlik@hako.com. Please do not send any screenshots of the laptop but the complete log (log file).
9. Which components have already been checked?
10. Which components have already been replaced?