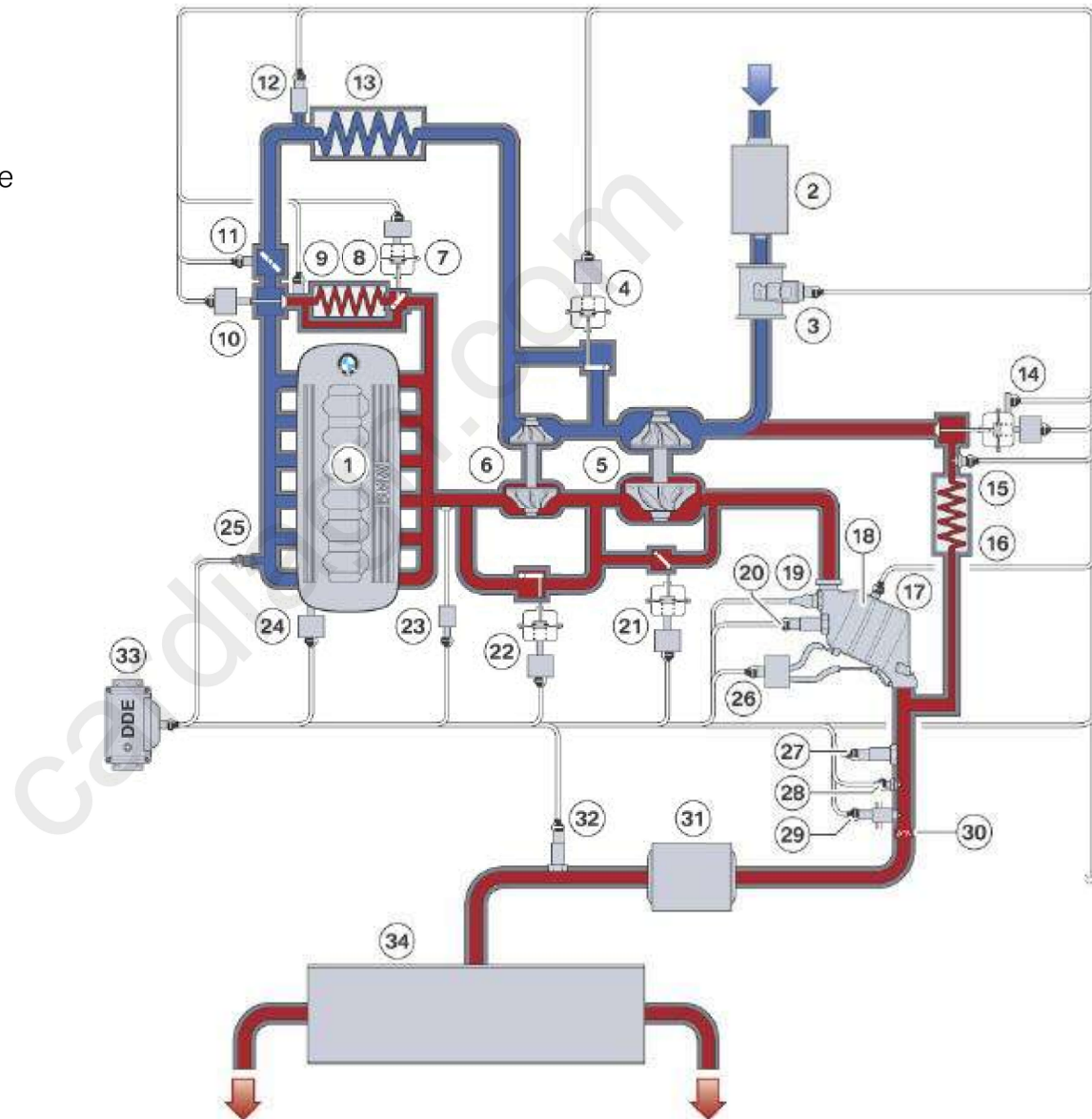


Air Intake and Exhaust Systems

The M57D30T2 US engine exhibits the following special features in the air intake and exhaust system:

- Electric swirl flaps
- Electric exhaust gas recirculation valve (High pressure EGR valve)
- Low pressure EGR (E70 only)
- Turbo assembly adapted for low pressure EGR. (E70 only)



Index	Explanation	Index	Explanation
1	Diesel engine - M57D30T2	18	Oxidation catalyst and Diesel particle filter (DOC/DPF)
2	Intake silencer (air filter)	19	Exhaust gas temperature sensor - pre catalyst (DOC)
3	HFM	20	Oxygen sensor
4	Compressor bypass valve	21	Wastegate valve
5	Turbocharger - low pressure stage	22	Turbine control valve
6	Turbocharger - high pressure stage	23	Exhaust pressure sensor (after exhaust manifold)
7	Bypass valve for High Pressure EGR cooler	24	Swirl port actuator
8	High-pressure EGR cooler	25	Boost pressure sensor
9	Temperature sensor for high-pressure EGR	26	Exhaust differential pressure sensor
10	High-pressure EGR valve	27	NO _x sensor - pre SCR catalyst
11	Throttle valve	28	Temperature sensor - post DPF
12	Charge air temperature sensor	29	Dosing (metering) module (for SCR system)
13	Intercooler	30	Mixer (for SCR system)
14	Low pressure EGR valve with position sensor	31	SCR Catalyst
15	Temperature sensor for low pressure EGR	32	NO _x sensor - post SCR catalyst
16	Low pressure EGR cooler	33	DDE 7.3
17	Exhaust gas temperature sensor - post catalyst (DOC)	34	Muffler (silencer)

Air Intake Systems

The intake air ductwork differs between the E70 and E90. Both vehicles will draw air from behind the kidney grill. On the E70, the air filter housing and silencer is located on top of the engine. On the other hand, the E90 has a filter housing on the passenger side inner fender.



Index	Explanation	Index	Explanation
A	Air intake system - E70	3	Air filter housing
B	Air intake system - E90	4	HFM
1	Intake air point of entry	5	Fresh (filtered) air intake pipe
2	Unfiltered air intake	6	Blow-by tube

Swirl Flaps

The US version of the M57 engine utilizes the previously known swirl flaps which are located in the intake manifold. The primary difference is that the swirl flaps are now controlled electrically, rather than with vacuum. This method of actuation also provides a means of position feedback with the DDE system to comply with OBD requirements. An additional benefit of this method of control is a more precise positioning of the swirl flaps as needed. The flaps are map controlled using engine speed, engine load and coolant temperature.

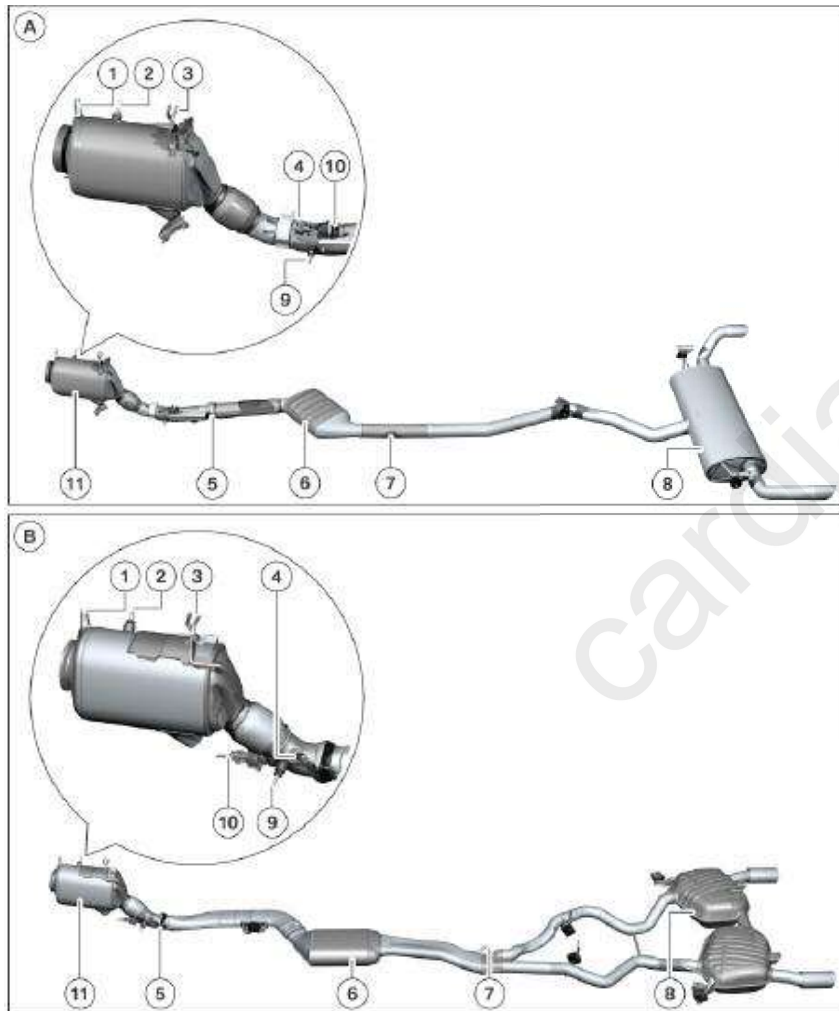


Index	Explanation	Index	Explanation
1	Control rod for swirl flaps	5	Swirl ports
2	Throttle plate mounting	6	Tangential ports
3	Intake manifold	7	Swirl flaps
4	Electric motor (for swirl flaps)		

Exhaust System

The exhaust systems for both the E90 and E70 have been adapted for the US market. There are special provisions for the SCR system as well as for the US specific OBD monitoring of the DOC.

Each system is unique to the vehicle with different muffler and tailpipe features.



Index	Explanation	Index	Explanation
A	Exhaust system E70	6	SCR catalyst
B	Exhaust system E90	7	NO _x sensor after SCR catalyst
1	Oxygen sensor Exhaust gas temperature sensor before DOC (concealed)	8	Rear silencer (muffler)
2	Exhaust gas temperature sensor after DOC	9	Exhaust gas temperature sensor after DPF
3	Differential pressure sensor	10	Metering module
4	NO _x sensor before SCR catalyst	11	Diesel particulate filter (DPF)
5	Mixer		

EGR System

For more information on EGR systems, refer to the section on "Emission Controls".

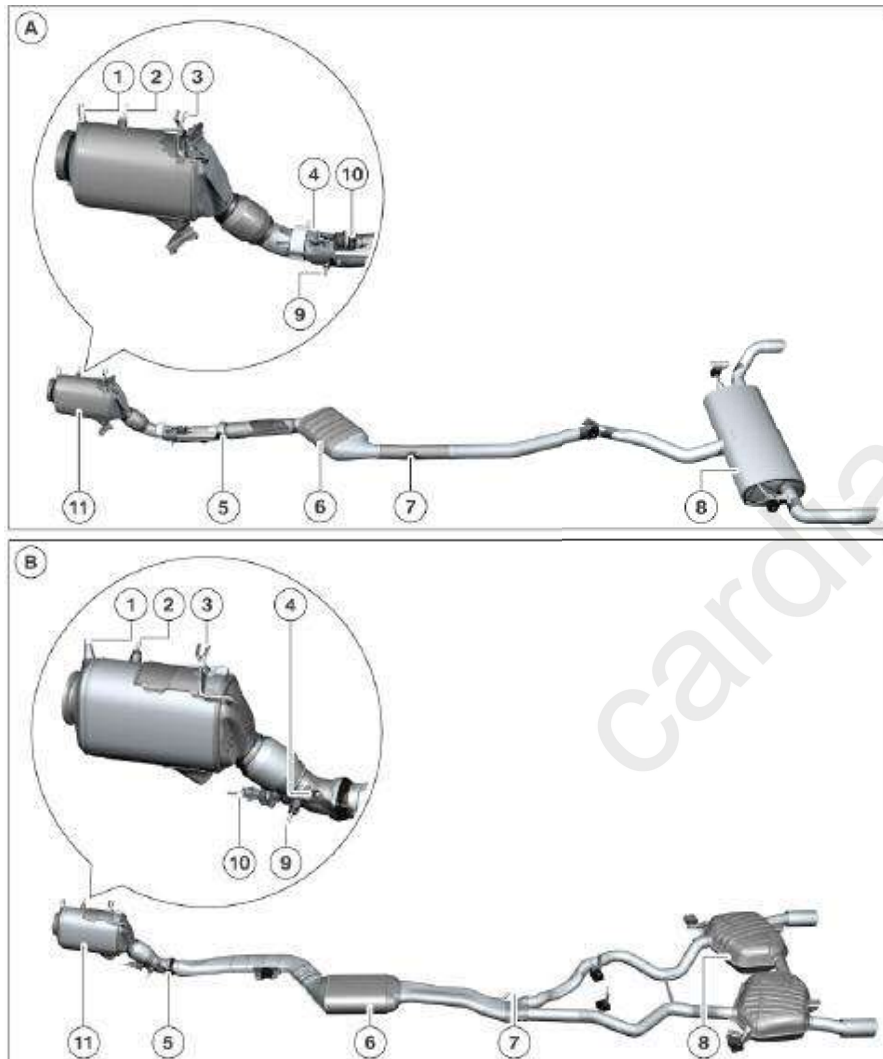
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Workshop Exercise - Exhaust System Components

- Complete exercise by filling in the “function/purpose” of the exhaust system components. Then, locate and identify the exhaust system components on the vehicle:



Index	Explanation	Function/Purpose
A	Exhaust system E70	E70
B	Exhaust system E90	E90
1	Oxygen sensor Exhaust gas temperature sensor before DOC (concealed)	
2	Exhaust gas temperature sensor after DOC	
3	Differential pressure sensor	
4	NO _x sensor before SCR catalyst	
5	Mixer	
6	SCR catalyst	
7	NO _x sensor after SCR catalyst	
8	Rear silencer (muffler)	
9	Exhaust gas temperature sensor after DPF	
10	Metering module	
11	Diesel particulate filter (DPF)	



Workshop Exercise - Exhaust System Components

Using the diagnostic equipment, access the “Service Functions” menu and go to DPF. (Do not start vehicle at this time)

What are the two selections in the DPF menu?

According to the test module, what is the replacement interval of the DPF?

When should the “DPF Regeneration” test module be carried out?

How is the “DPF Regeneration” test module carried out? (i.e. Can it be completed in the shop?)

Go to “Status Requests” under the DPF section and highlight all values. Read out with the engine running. Fill in chart below with the values:

Status request	Value	Status request	Value
Differential pressure sensor		Consumption per 100km	
Regeneration enabled		Distance remaining on DPF	
Regeneration released		Distance traveled since regeneration	



Classroom Exercise - Review Questions

1. What changes were made to the piston on the US version of the M57D30T2 engine? (circle one)
The piston pin is larger in diameter
The piston pin is offset in the piston
The piston pin is made from a stronger material
The piston pin is lighter
2. Which of the following statements are **TRUE** regarding the driveline changes on the diesel vehicles?
(circle the true statements, cross out the false statements)
On the diesel vehicles, the gear ratio in the differential is the same as the gasoline powered vehicles.
The transmission gear ratios are the same
The transmission on the diesel vehicles is also used on the 8-cylinder, gasoline powered vehicles
The torque converter is the same between gasoline and diesel powered vehicles
3. Why is it important to be sure that the air intake system is "oil-free" before starting the engine?
4. Which of the following engine management components are "electrically actuated" (directly connected) by the DDE?
(circle those that apply)
Compressor bypass valve SCR metering valve
Bypass valve for HP-EGR cooler Wastegate
Throttle valve Swirl flaps
High pressure EGR valve Low pressure EGR valve
Turbine control valve
5. Which of the following engine management components are "vacuum controlled" (via EPDW) by the DDE?
(circle those that apply)
Compressor bypass valve SCR metering valve
Bypass valve for HP-EGR cooler Wastegate
Throttle valve Swirl flaps
High pressure EGR valve Low pressure EGR valve
Turbine control valve

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