

柴油商業車輛技術講座系列

大眾汽車集團香港有限公司

Volkswagen Group Hong Kong Limited



Commercial
Vehicles

24/2/2017



大綱

- **VW型號**
- **EA288引擎系列概述**
- **EGR system (廢氣再循環系統)**
- **DPF Regeneration (柴油碳微粒濾清器概述)**
- **VW Maintenance Tips (大眾維修的提示)**



Volkswagen 歐四及後柴油商業車輛型號

- **Transporter**

- Engine Code:
 - CXFA: 1.968L, Euro 6b
 - CAAC: 1.968L, Euro 5b
 - CCHA: 1.968L, Euro 5b
 - BNZ: 2.461L, Euro 4

- **Caddy**

- Engine Code:
 - DFSD: 1.968L, Euro 6b
 - CAYD: 1.598L, Euro 5b
 - BLS: 1.896L, Euro 4

- **Amarok**

- Engine Code:
 - CNFB: 1.968L, Euro 5b
 - CSHA: 1.968L, Euro 5b



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EA288 引擎系列 (合乎歐六標準)



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EA288 引擎系列

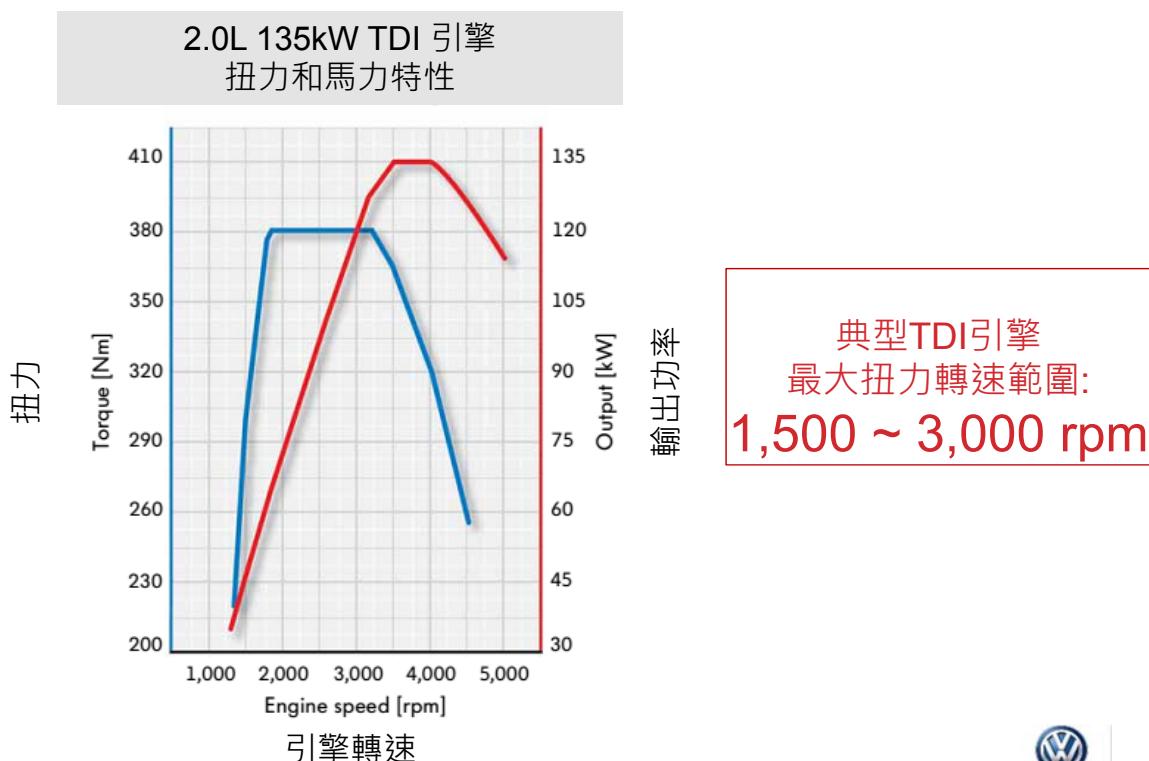
Engine Description 引擎描述	Engine Code 引擎代碼	Max Power 最大馬力	Max Torque 最大扭力
1.6L 66kW TDI	CRKA	66kW @ 2,750 - 4,600rpm	230Nm @ 1,400 - 2,600rpm
1.6L 81kW TDI	CRKB	81kW @ 3,200 - 4,000rpm	250Nm @ 1,500 - 3,000rpm
2.0L 110kW TDI	CRLB	110kW @ 3,500 - 4,000rpm	340Nm @ 1,750 - 3,000rpm
2.0L 135kW TDI	CUNA	135kW @ 3,500 - 4,000rpm	380Nm @ 1,750 - 3,250rpm

Engine Family ≠ Engine Code
(引擎系列 ≠ 引擎代碼)



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典型TDI引擎表現



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Engine Management System

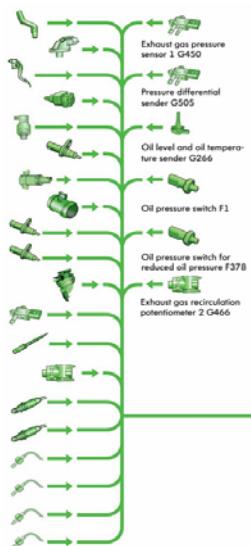
引擎管理系統

>26 sensors 傳感器

System overview

Sensors

Engine speed sender G28
 Hall sender G40
 Accelerator pedal sender with accelerator position senders G79 and G185
 Brake light switch F
 Brake pedal switch F63
 Fuel pressure sender G247
 Fuel temperature sender G81
 Coolant temperature sender G62
 Air mass meter G70
 Intake air temperature sender G42
 Charge air temperature sender after charge air cooler G811
 Position sender for charge pressure positioner G581
 Charge pressure sender G31
 Cylinder 3 combustion chamber pressure sender G679
 Exhaust gas recirculation potentiometer G212
 Lambda probe G39
 Lambda probe after catalytic converter G130
 Exhaust gas temperature sender 1 G235
 Exhaust gas temperature sender 2 G448
 Exhaust gas temperature sender 3 G495
 Exhaust gas temperature sender 4 G648



Glow period warning lamp K29

Exhaust emissions warning lamp K83

Diesel particulate filter warning lamp K231

Control unit in dash panel insert J285

Data bus diagnostic interface J533

Diagnosis connector

Engine control unit J623

5521_022

>26 actuators 驅動器

Actuators

Fuel pump control unit J538

Fuel system pressurisation pump G6

Injectors for cylinders 1-4 N30, N31, N32, N33

Fuel metering valve N290

Fuel pressure regulating valve N276

Charge pressure control solenoid valve N75

Throttle valve module J338

Exhaust gas recirculation control motor V338

Exhaust gas recirculation control motor 2 V339

Exhaust flap control unit J883

Camshaft control valve 1 N205

Coolant valve for cylinder head N489

Charge air cooling pump V188

Auxiliary pump for heating V488

Valve for oil pressure control N428

Lambda probe heater Z19

Heater element for crankcase breather N79

Automatic glow period control unit J179

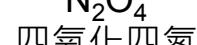
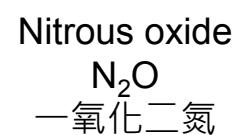
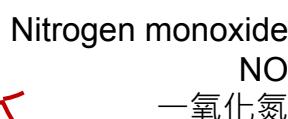
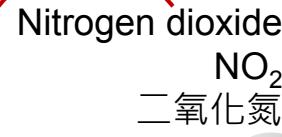
Glow plugs 1-4 Q10, Q11, Q12, Q13



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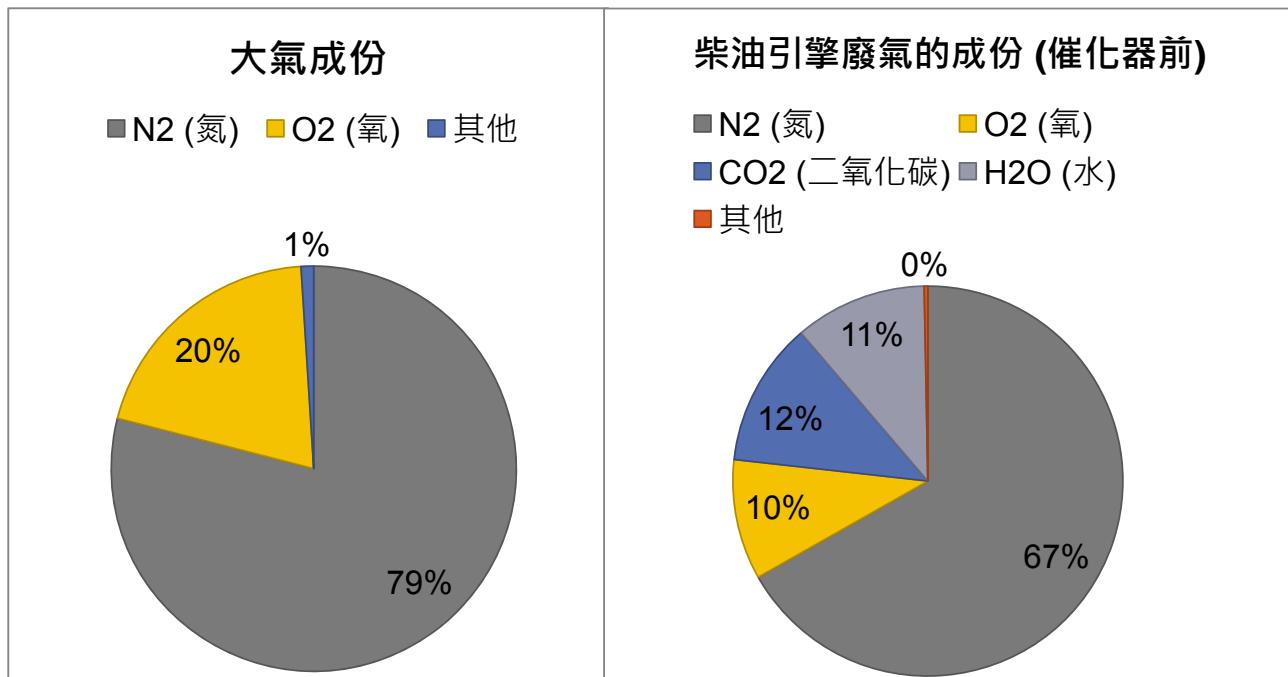
Nitrogen oxides(NO_x) 氮氧化物

NO_x 主要包括四種：



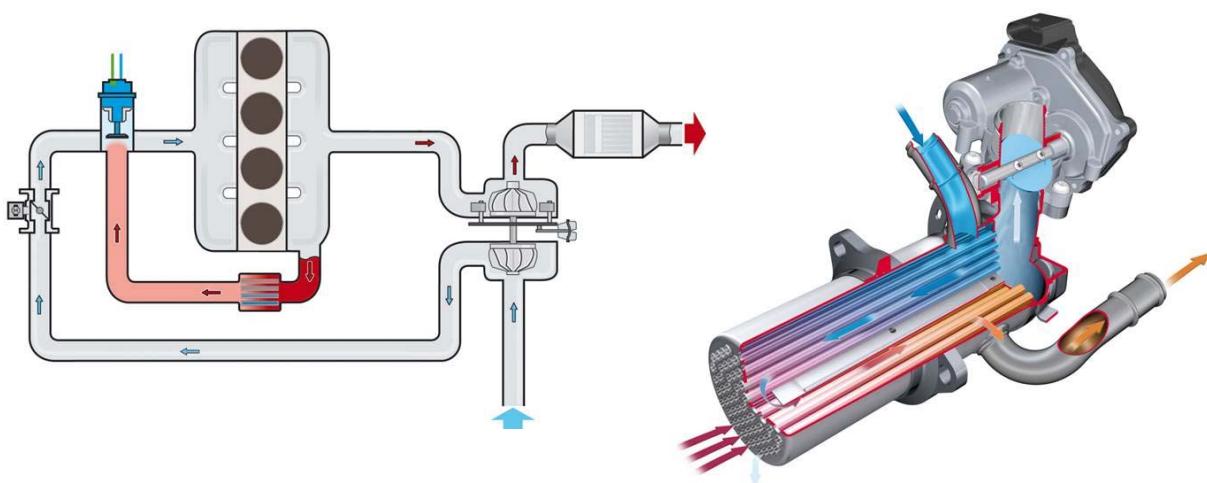
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燃燒前後氣體成份變化



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Exhaust Gas Recirculation (EGR) 廢氣再循環



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EGR 減低 NO_x 原理

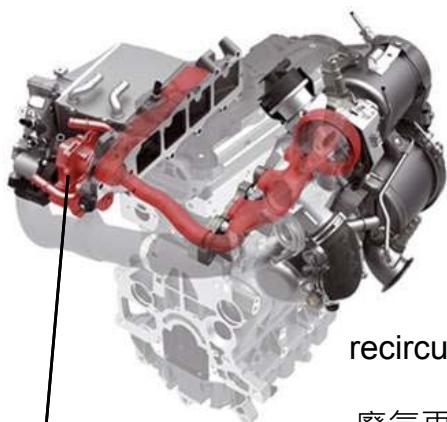
- 與大氣相比，廢氣含更高的CO₂和更低的O₂
- 將一部分廢氣再循環到引擎生氣入口，使隨後燃燒室內的O₂減少，CO₂增加，以降低隨後爆炸的溫度
- 因此可以減少NO_x
- EGR 於歐四及後柴油引擎極普遍



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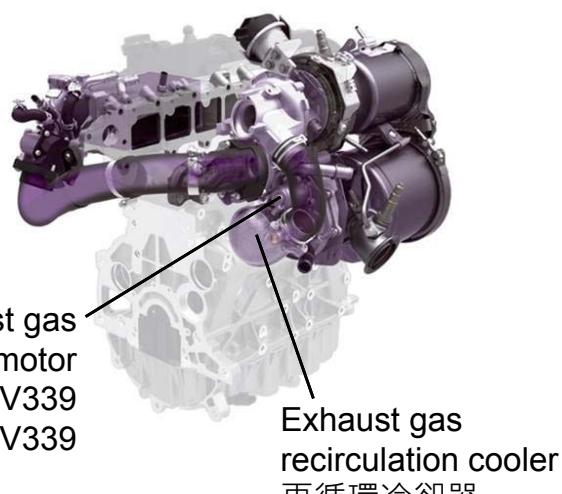
雙迴路EGR：概述

High-pressure EGR
高壓EGR



Exhaust gas
recirculation control motor
V338
廢氣再循環電控馬達V338

Low-pressure EGR
低壓EGR



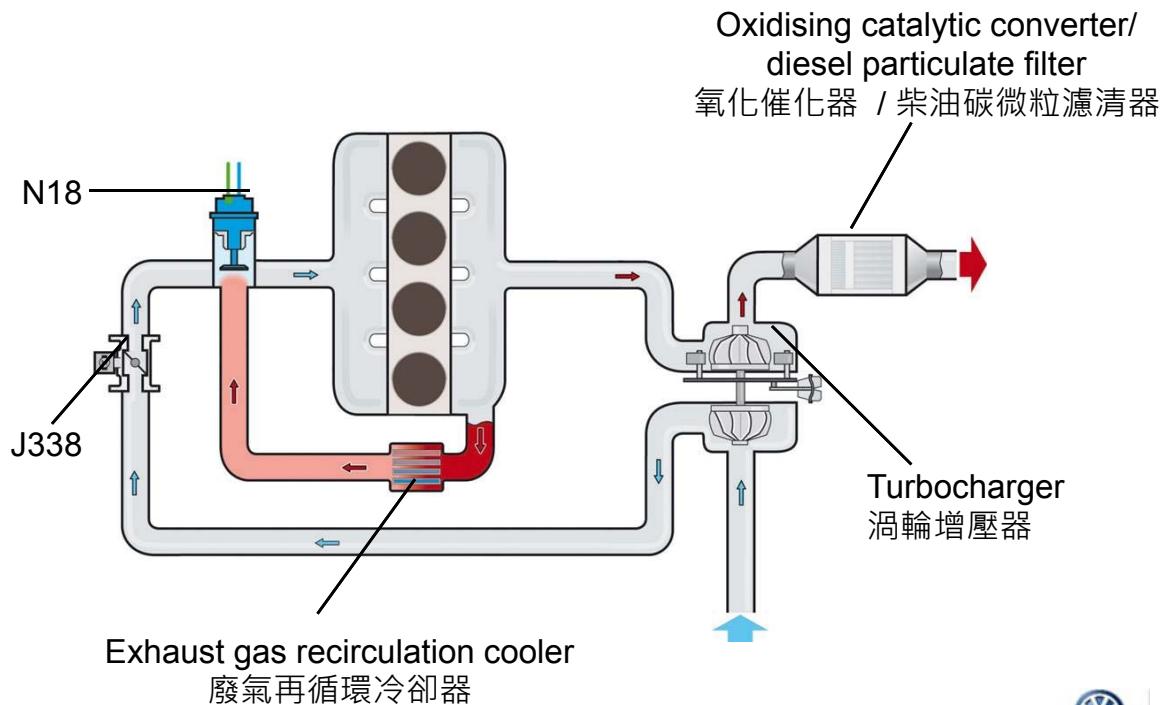
Exhaust gas
recirculation control motor
V339
廢氣再循環電控馬達V339

Exhaust gas
recirculation cooler
再循環冷卻器



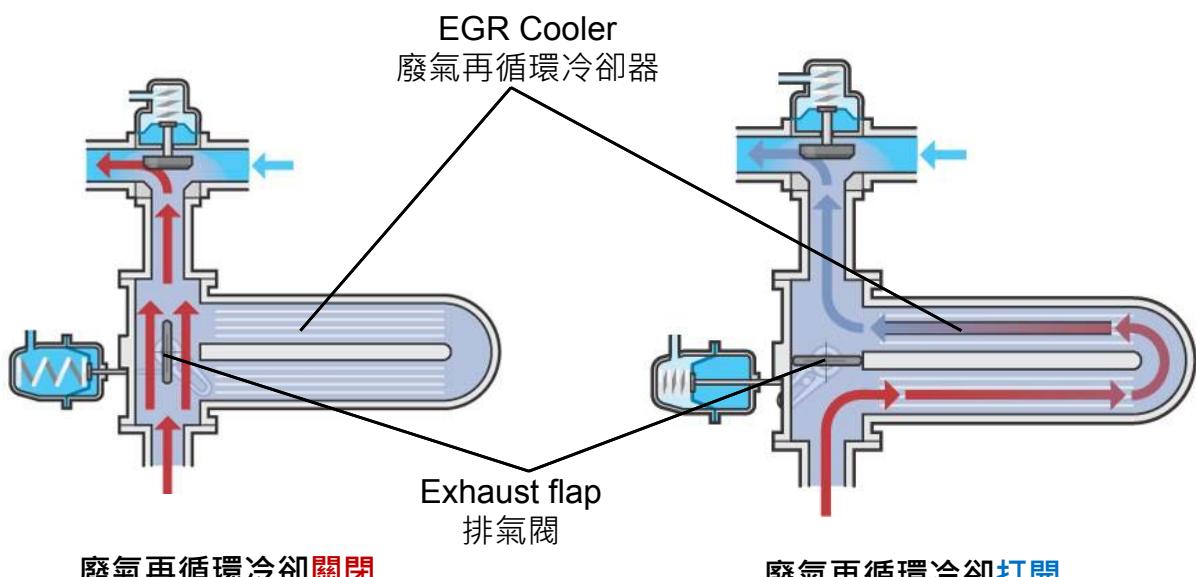
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高壓 EGR



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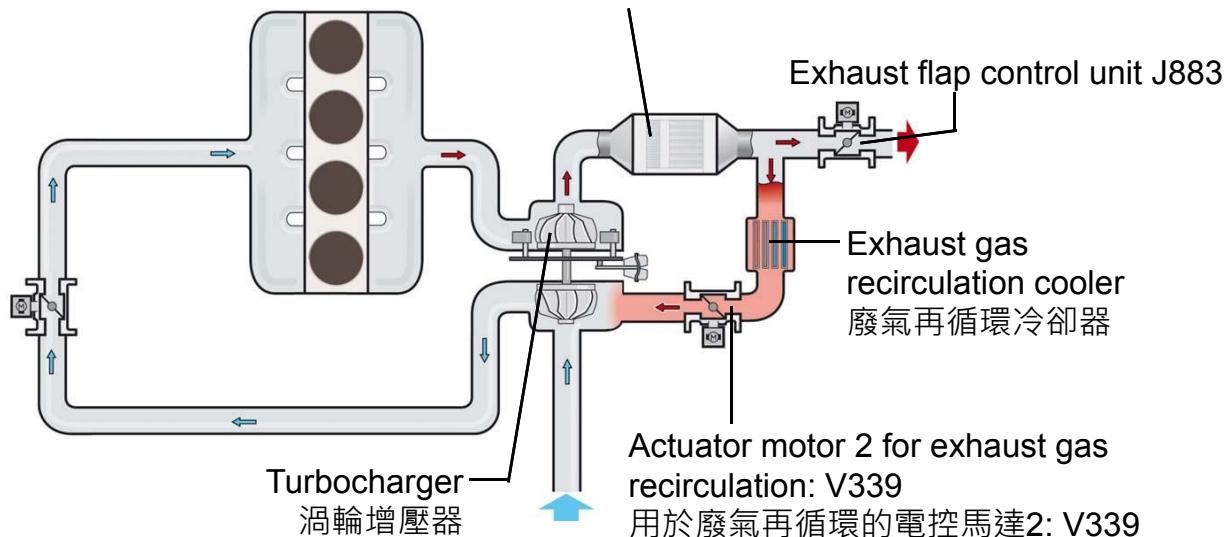
高壓 EGR



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低壓 EGR

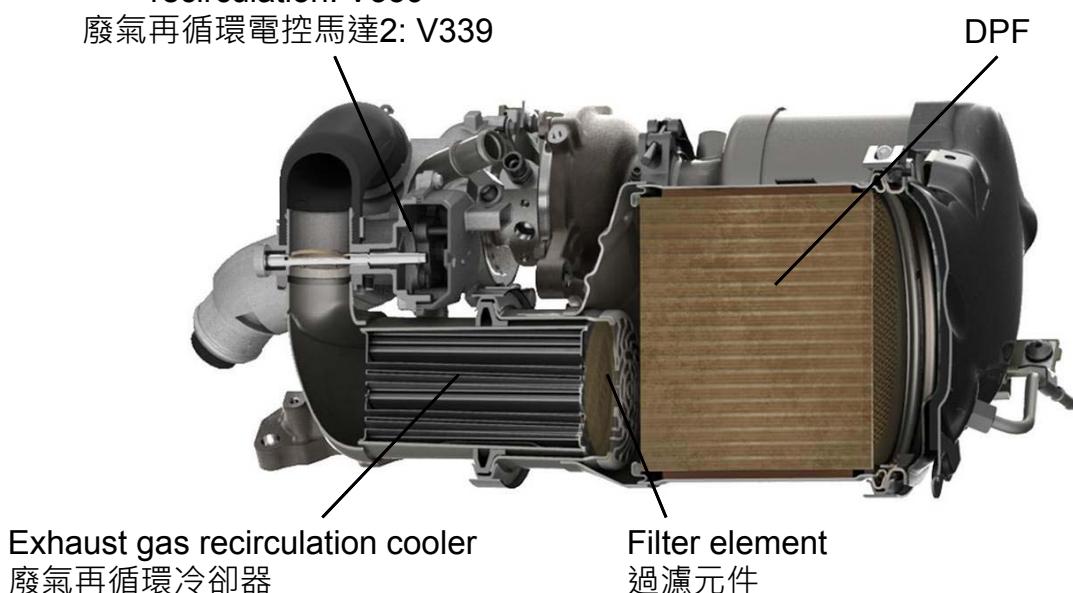
Oxidising catalytic converter/diesel particulate filter
氧化催化器 / 柴油碳微粒濾清器



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低壓 EGR

Actuator motor 2 for exhaust gas recirculation: V339
廢氣再循環電控馬達2: V339

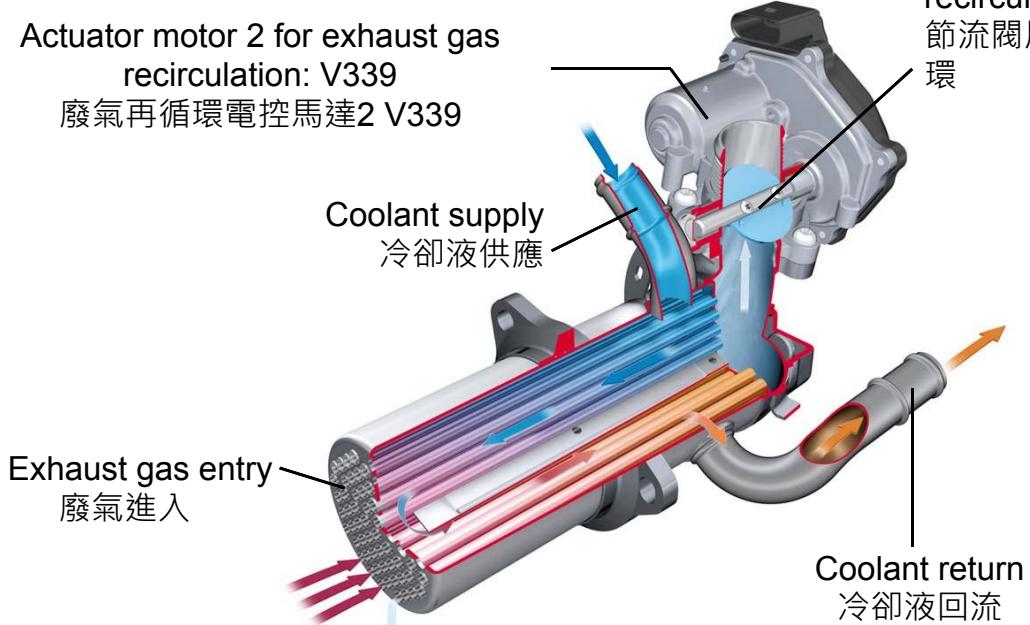


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低壓EGR

Actuator motor 2 for exhaust gas recirculation: V339
廢氣再循環電控馬達2 V339

Throttle valve for the exhaust gas recirculation
節流閥用於廢氣再循環



圖示廢氣再循環模式進行中



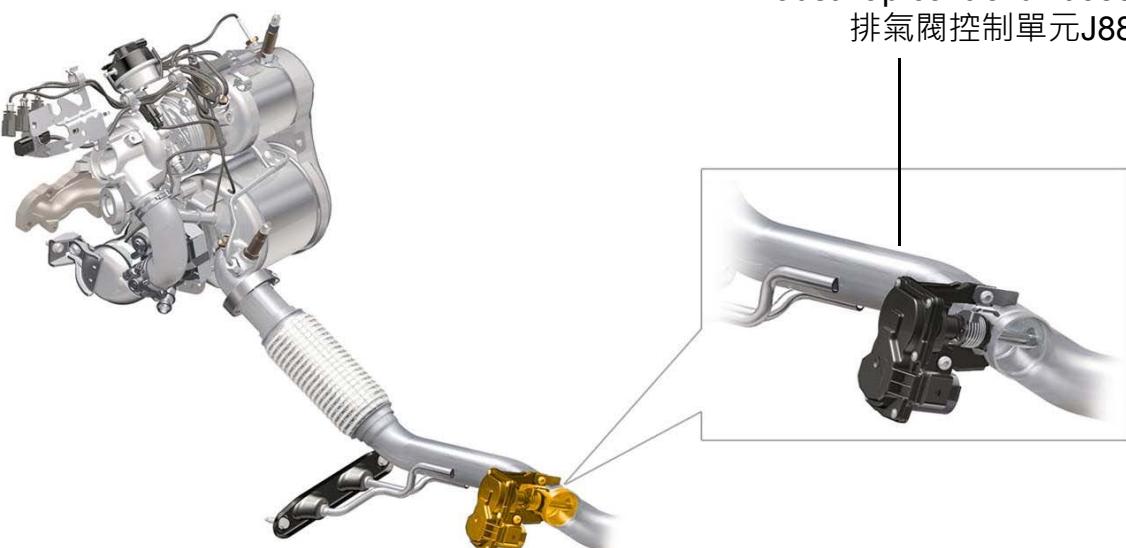
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低壓EGR

Exhaust flap control unit J883

排氣閥控制單元J883

Exhaust flap control unit J883
排氣閥控制單元J883

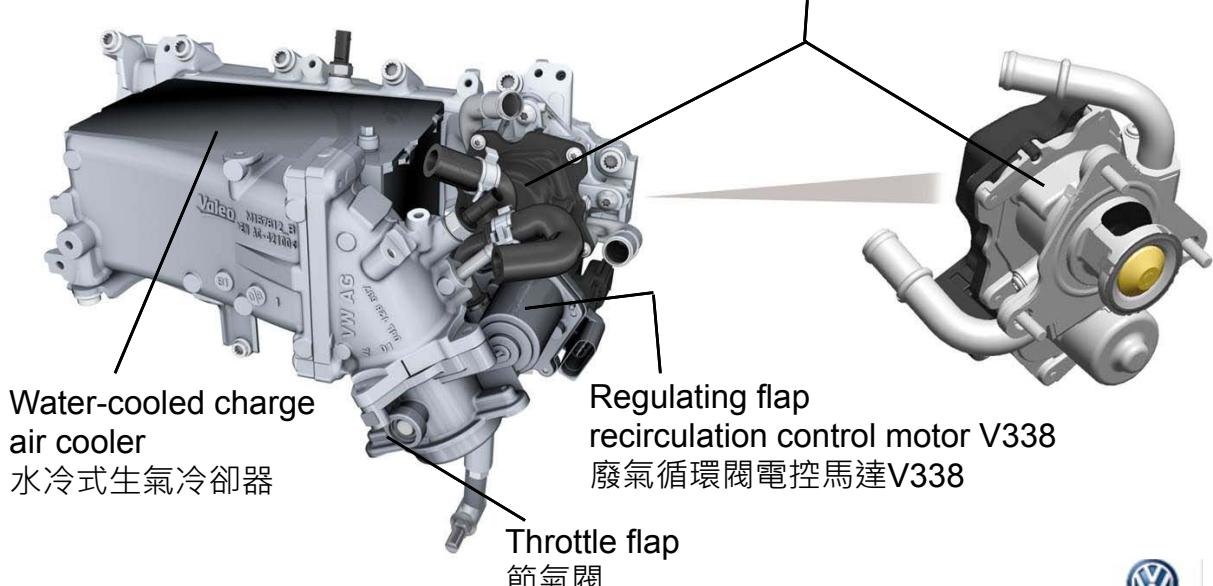


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低壓 EGR

Water-cooled gas recirculation valve

水冷式廢氣循環閥



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Oxidizing Catalytic Converter (Diesel)

氧化催化器 (柴油)

- 由金屬氧化物製成的基板，用於更快的加熱
- 塗有鉑(Platinum)和鈀(Palladium)
- 將HC和CO氧化成蒸氣及CO2

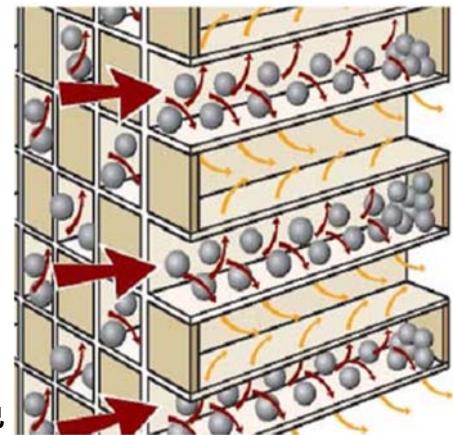


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Diesel Particulate Filter (DPF)

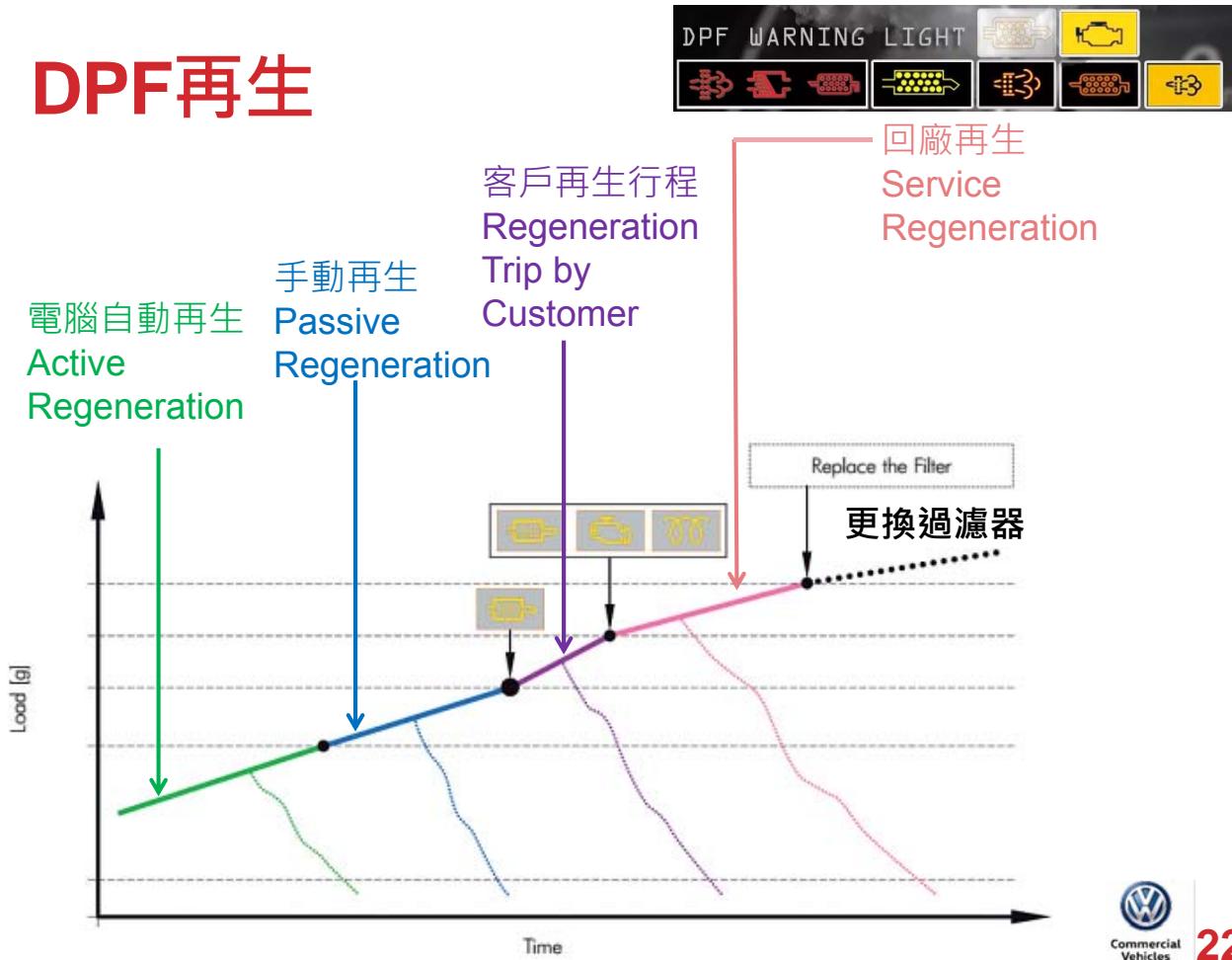
柴油碳微粒濾清器

- 蜂窩狀陶瓷體
- 塗有鈦酸鋁(aluminum titanate)或碳化矽(silicon carbide)
- 小通道交替關閉和打開
- 過濾器壁是多孔的，塗有基材(substrate)
- 該基材(substrate)具有鉑(Platinum)和鈀(Palladium)作為催化器
- 碳微粒 (PM) 留在多孔過濾器壁中
- 碳微粒必須以再生(Regeneration) 燃燒，避免堵塞過濾器壁



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DPF再生



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Volkswagen 引擎冷卻液

- 電控柴油引擎冷卻系統複雜， 零部件多
- EGR系統必須配合冷卻系統， 才正常運作
- **用不正確的引擎冷卻液會腐蝕EGR冷卻器**
- 當EGR系統堵塞時， 引擎效能會減弱， 排放亦增加
- 在EGR組件故障之前， 通過清潔進行預防性維修， 比更換壞的組件更便宜。



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Volkswagen 引擎冷卻液

- 所有VW歐四及後柴油商業車輛， 只可使用**適當稀釋的VW G13 引擎冷卻液**：
- **2份G13冷卻液：3份蒸餾水**
- **本頁資料更新日期：2017年2月**



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Volkswagen引擎機油

- 燃燒室中必然會燃燒小部分引擎機油，機油被燃燒後會留下微粒，俗稱「灰」(ash)，部份灰在任何DPF再生過程中都不會被燃燒，永留在DPF中
- 灰的量及成份取決於機油質量
- 嚴重堵塞的DPF增加了引擎背壓，因此降低了引擎功率，並增加了燃料消耗。 NOx也將增加
- 為了延長DPF的壽命，只可使用VW指定的引擎機油



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Volkswagen 指定的引擎機油

- VW Standard: 504.00 or 507.00
- 適用於在香港所有VW柴油及汽油車輛

VW引擎機油產品名稱：

- LongLife III – High Performance Engine Oil
- LongLife III FE – High Performance Engine Oil
- 標準包裝: 1L, 5L, 60L

- 本頁資料更新日期：2017年2月



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Volkswagen 柴油商業車輛

Engine Coolant

2份VW G13冷卻液：3份蒸餾水

Engine Oil

VW Standard: 504.00 or 507.00

LongLife III

LongLife III FE

本頁資料更新日期：2017年2月

