

# 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

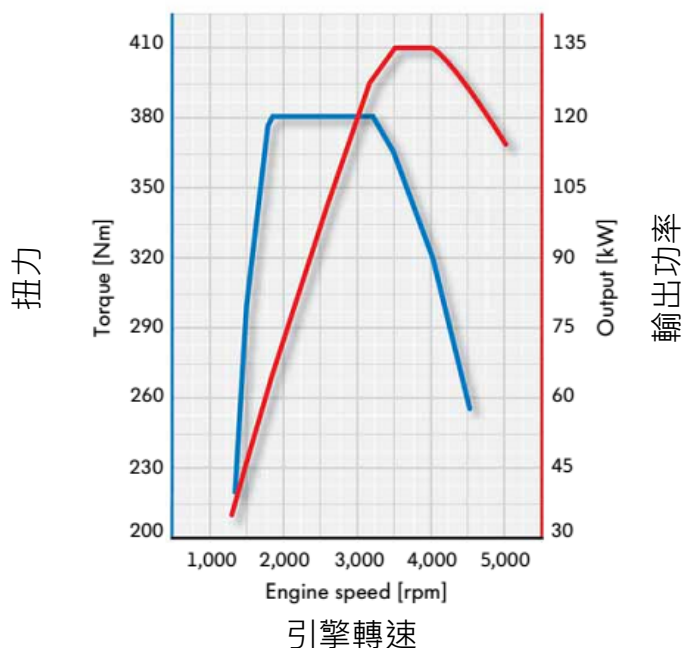
Engine Family ≠ Engine Code  
(引擎系列 ≠ 引擎代碼)



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## 典型TDI引擎表現

2.0L 135kW TDI 引擎  
扭力和馬力特性



典型TDI引擎  
最大扭力轉速範圍：  
1,500 ~ 3,000 rpm



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# Engine Management System 引擎管理系統

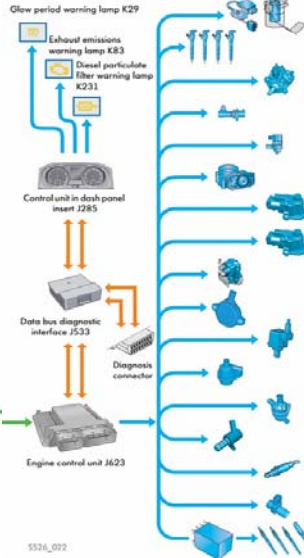
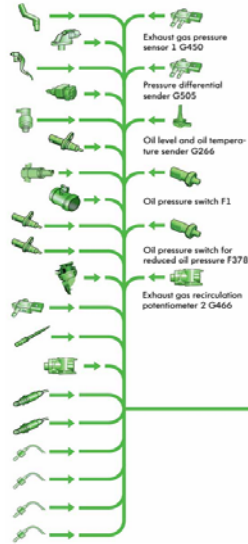
>26 sensors 傳感器

>26 actuators 驅動器

## 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 G677
- 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



### Actuators

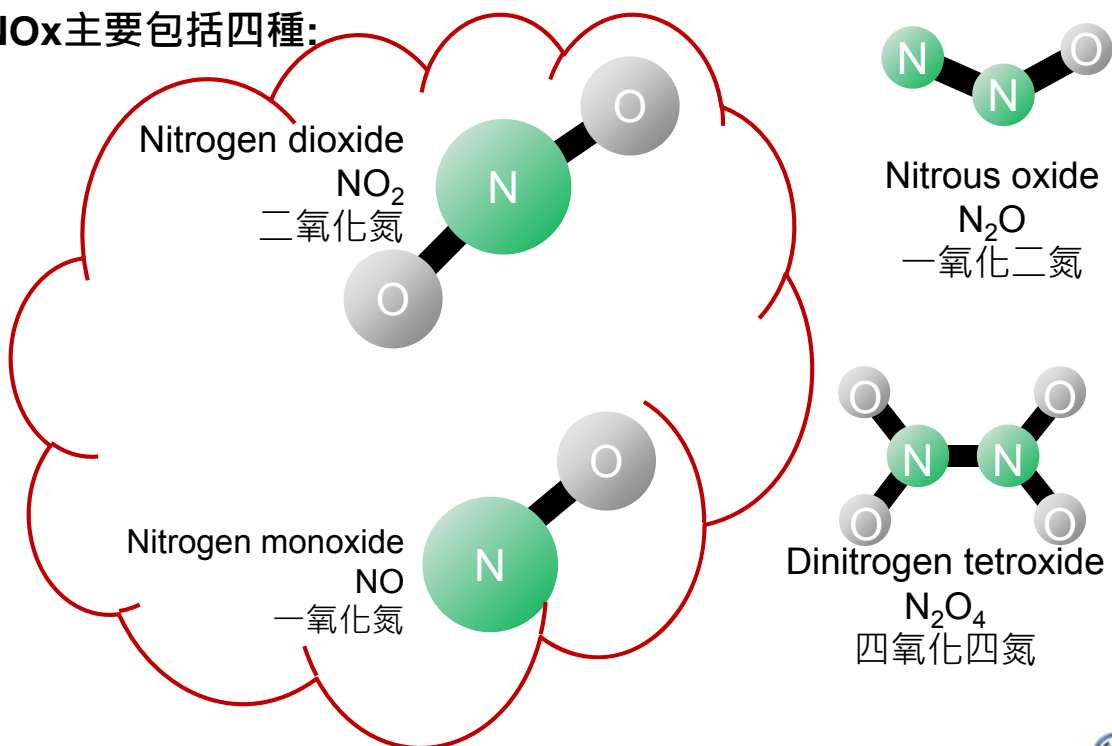
- Fuel pump control unit J538
- Fuel system pressurisation pump G6
- Injectors for cylinders 1-4 N30, N31, N32, N33
- Fuel metering valve N290
- Fuel pressure regulating valve N276
- Charge pressure control solenoid valve N75
- Throttle valve module J338
- Exhaust gas recirculation control motor V338
- 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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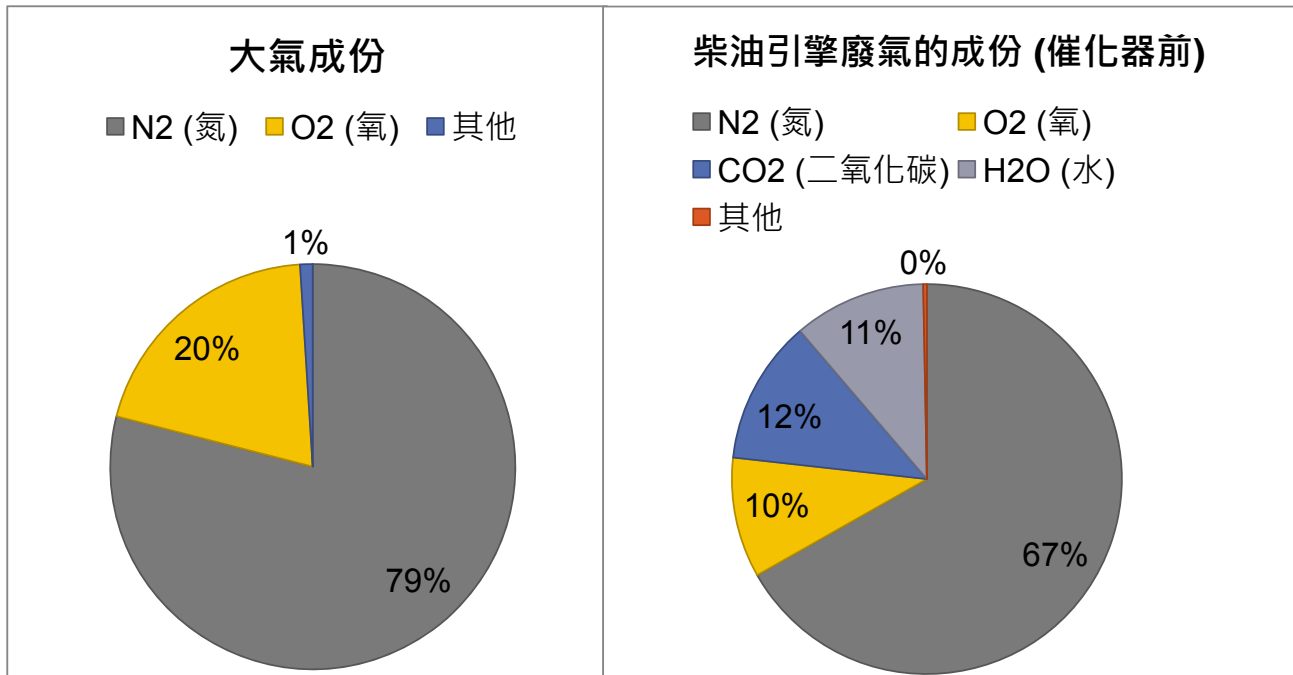
# Nitrogen oxides (NO<sub>x</sub>) 氮氧化物

NO<sub>x</sub>主要包括四種:

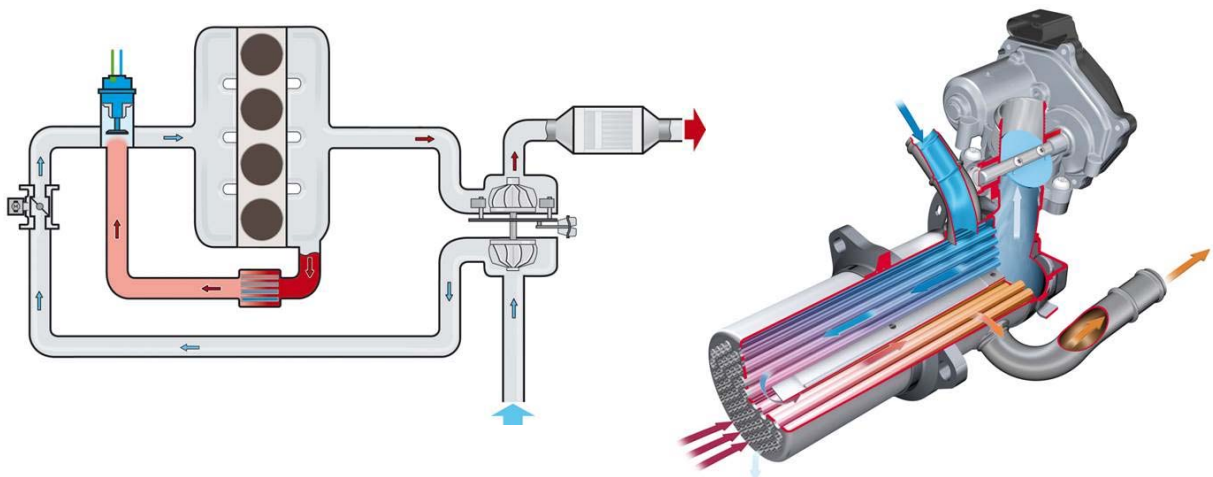


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# 燃燒前後氣體成份變化



# Exhaust Gas Recirculation (EGR) 廢氣再循環

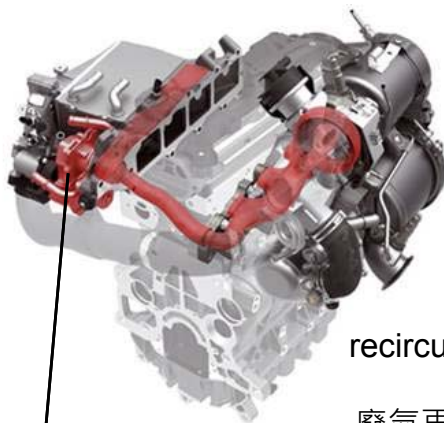


## EGR 減低 NO<sub>x</sub> 原理

- 與大氣相比，廢氣含更高的CO<sub>2</sub>和更低的O<sub>2</sub>
- 將一部分廢氣再循環到引擎生氣入口，使隨後燃燒室內的O<sub>2</sub>減少，CO<sub>2</sub>增加，以降低隨後爆炸的溫度
- 因此可以減少NO<sub>x</sub>
- EGR 於歐四及後柴油引擎極普遍

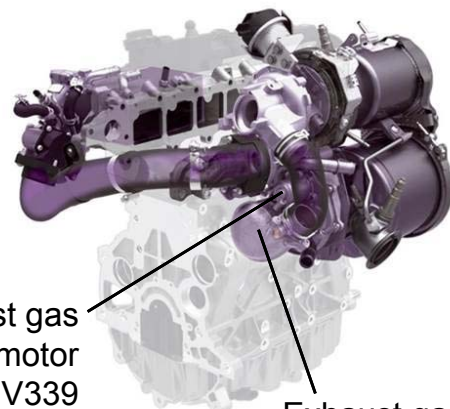
## 雙迴路EGR：概述

High-pressure EGR  
高壓EGR



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

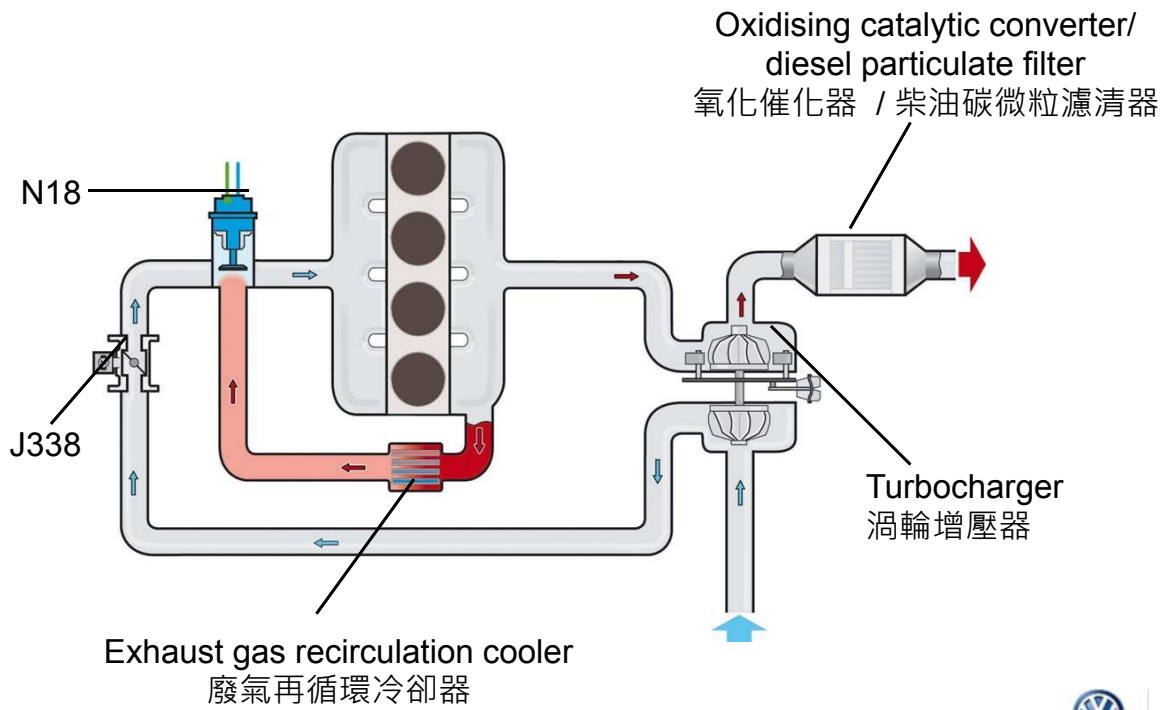
Low-pressure EGR  
低壓EGR



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

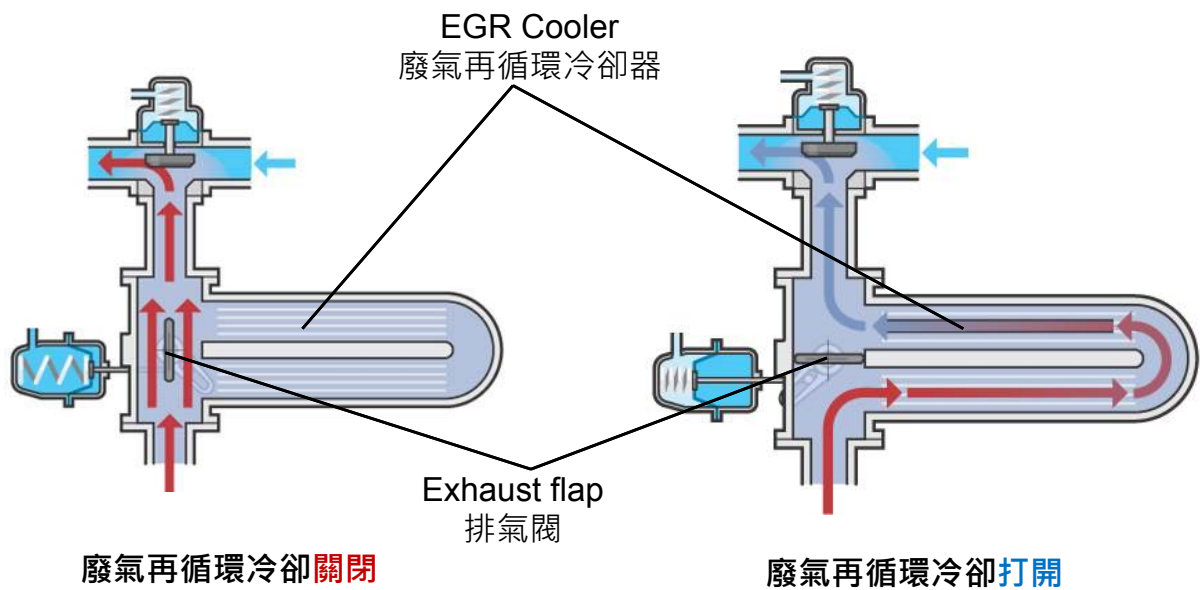
Exhaust gas  
recirculation cooler  
再循環冷卻器

# 高壓 EGR



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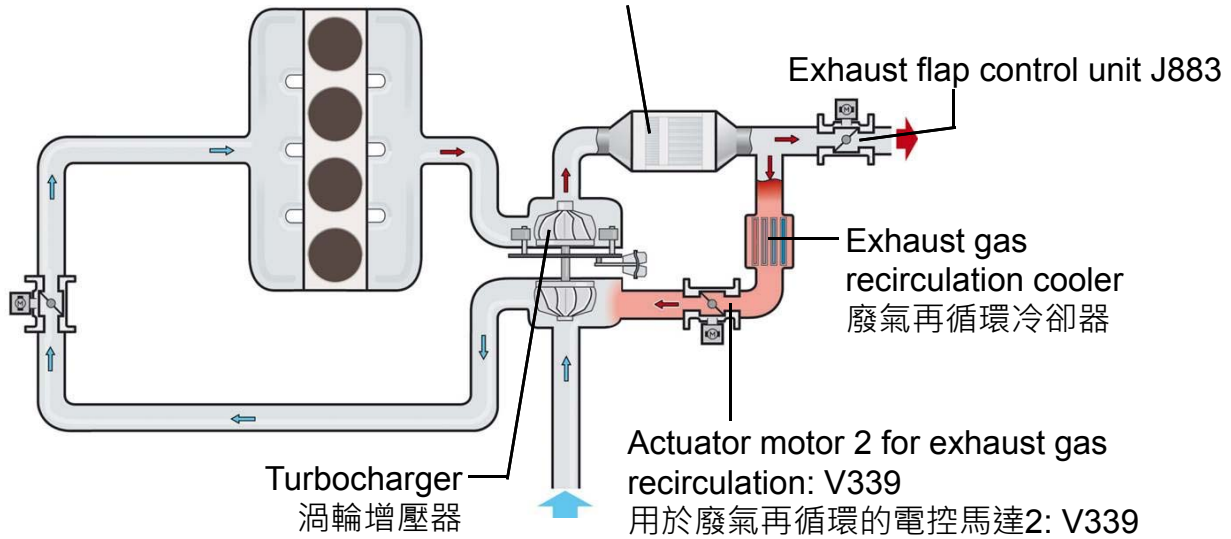
# 高壓 EGR



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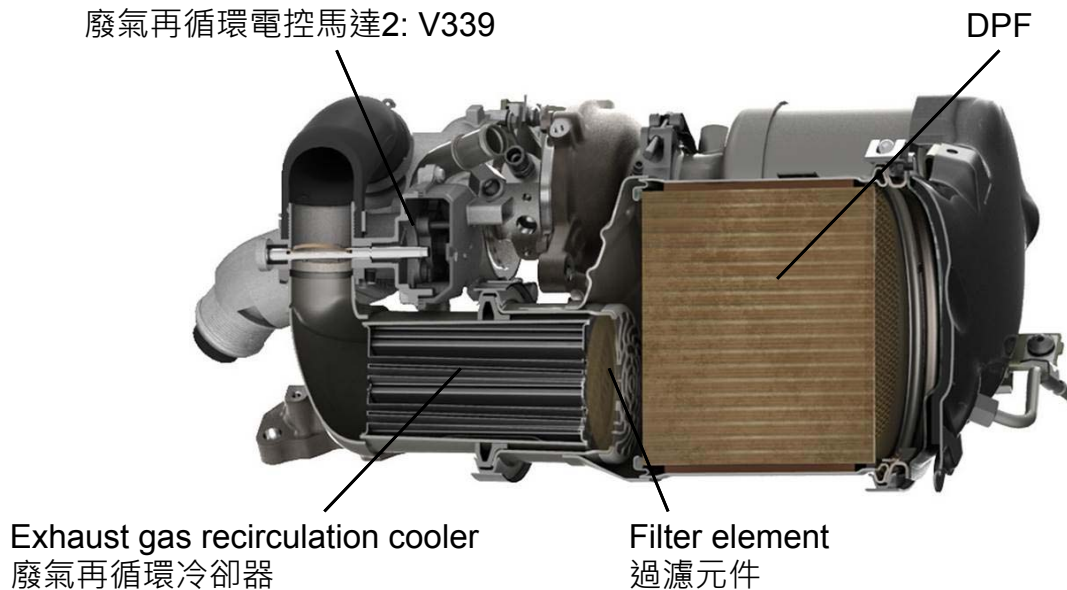
# 低壓 EGR

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



# 低壓 EGR

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

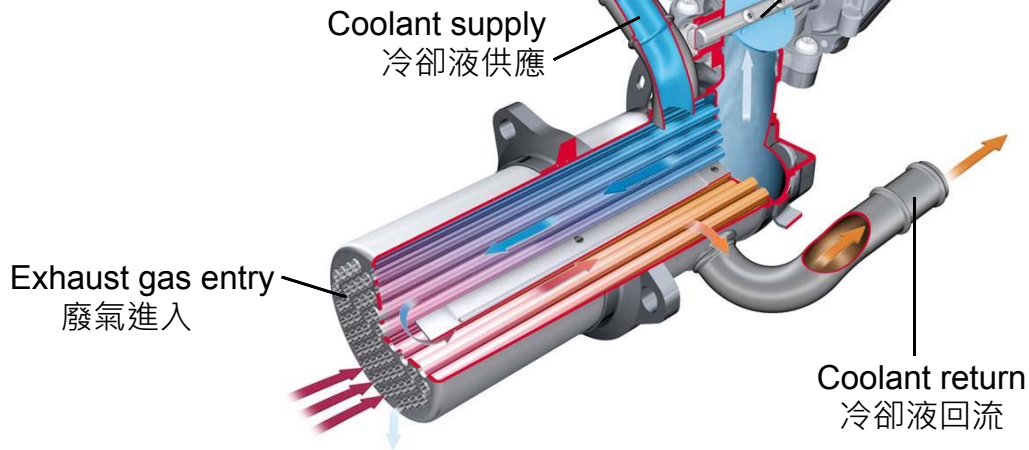




# 低壓EGR

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



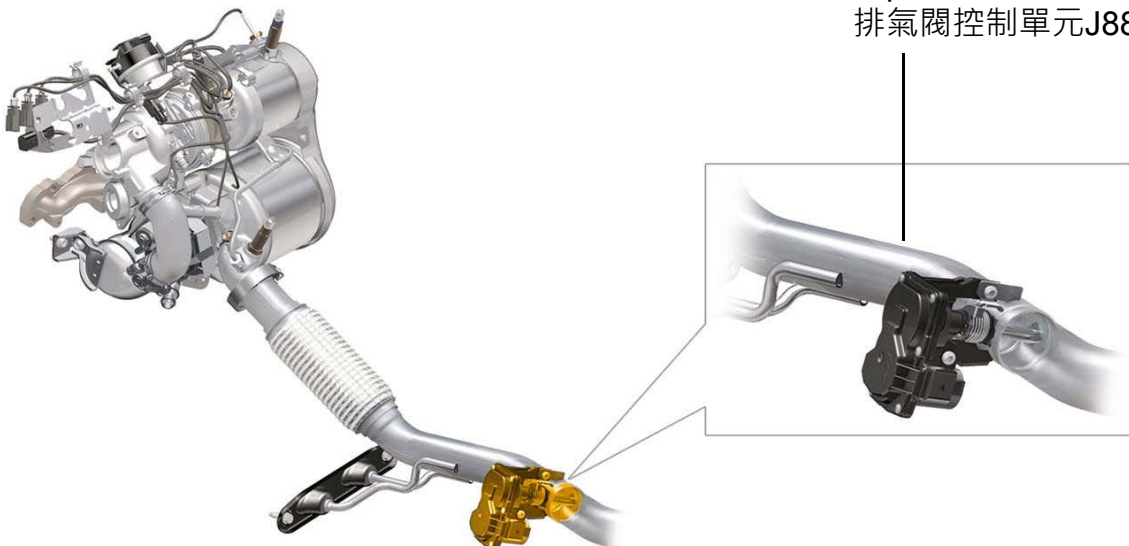
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# 低壓EGR

Exhaust flap control unit J883

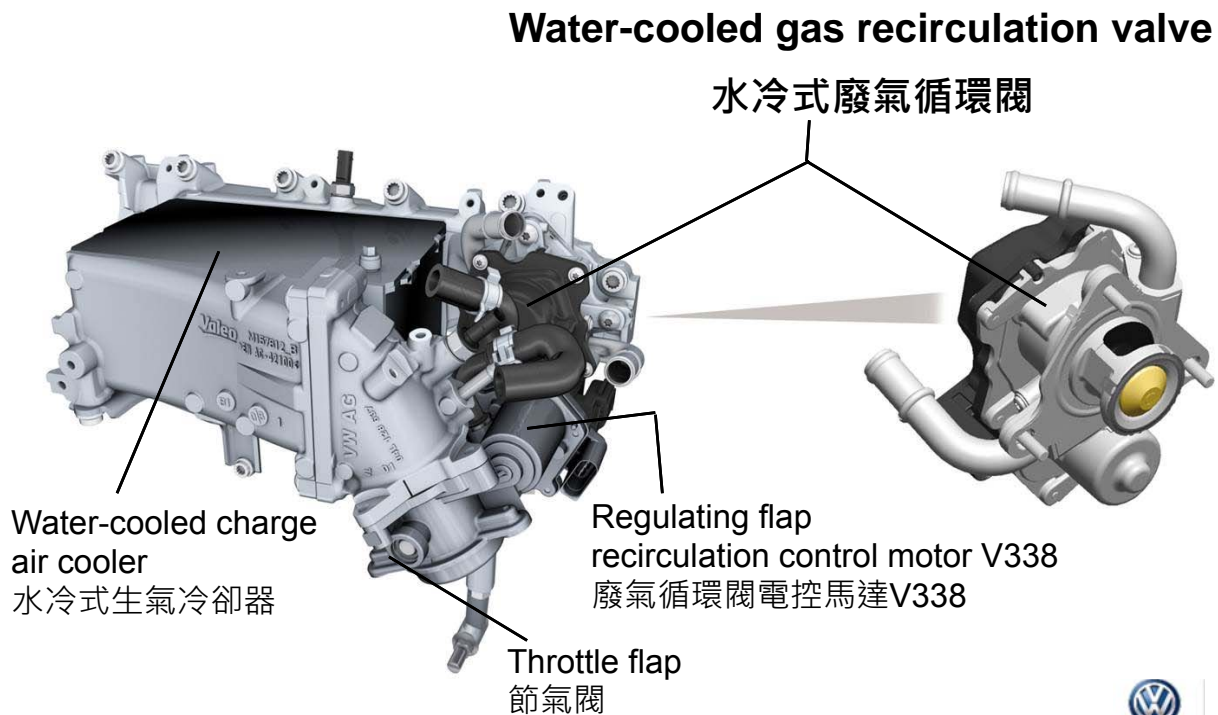
排氣閥控制單元J883

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



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# 低壓 EGR



## Oxidizing Catalytic Converter (Diesel) 氧化催化器 (柴油)

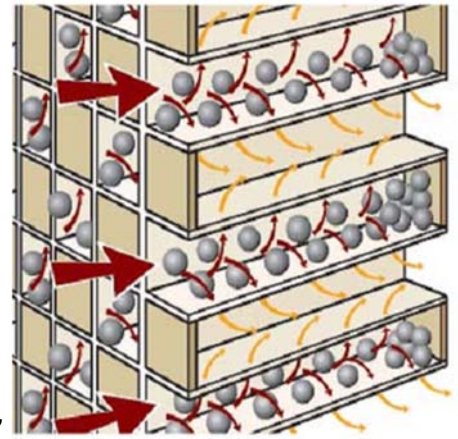
- 由金屬氧化物製成的基板，用於更快的加熱
- 塗有鉑(Platinum)和鈀(Palladium)
- 將HC和CO氧化成蒸氣及CO<sub>2</sub>



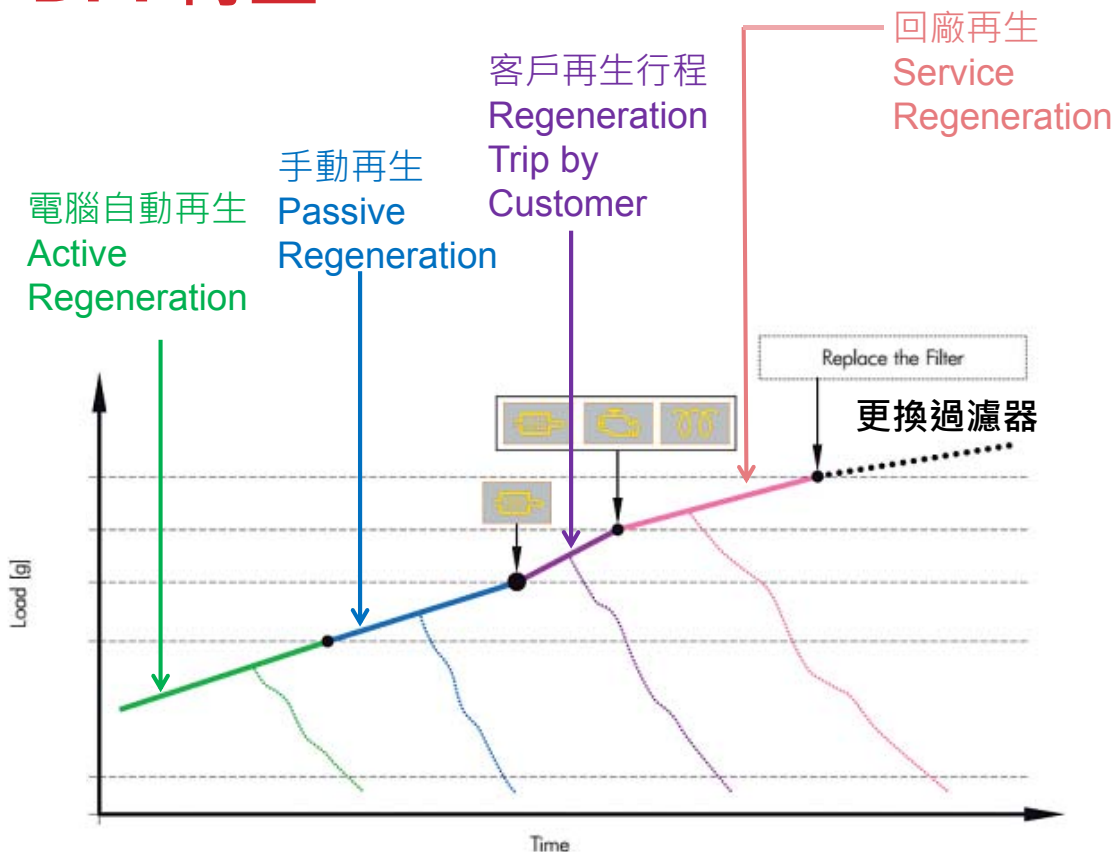
# Diesel Particulate Filter (DPF)

## 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



## DPF再生



# 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

