



# AGRICULTURE & OFF HIGHWAY FUEL INJECTION OVERVIEW 2024



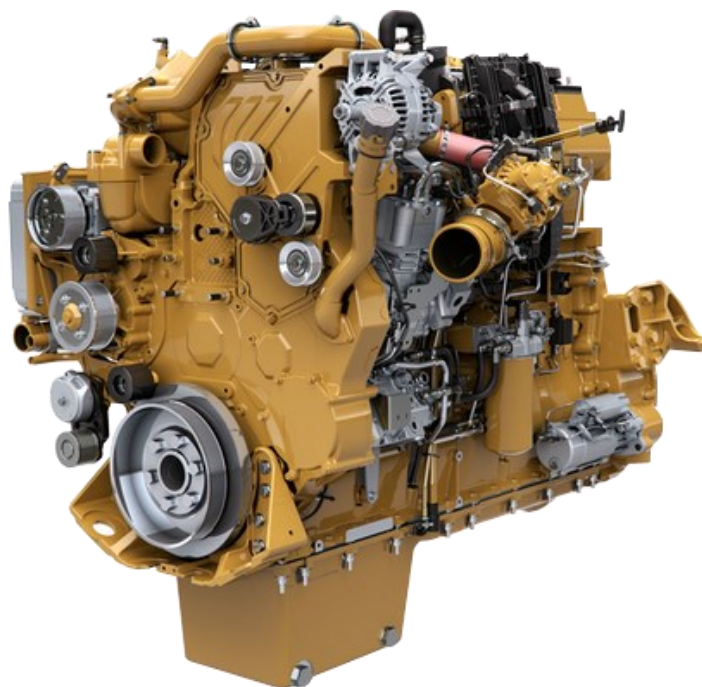


## AGRICULTURAL AND OFF-HIGHWAY PRODUCT OVERVIEW

The unique diversity of the agriculture and the off-highway sector has led to significant developments in fuel injection technology. These development have filtered across the whole heavy duty and industrial engine landscape improving emissions and vehicle performance.

Initially, this sector mirrored the fuel injection systems of commercial vehicles at the time, utilising conventional inline and latterly rotary systems. In the 1990s, a new technology, the electronic unit injector (EUI) came to dominate the sector due to its robust and efficient qualities. Over time, common rail has taken over from the earlier systems but does not make them less relevant in todays market.

From the humble tractor to high-tech forestry equipment, Merlin Diesel have the solutions to keep these vehicles operational.

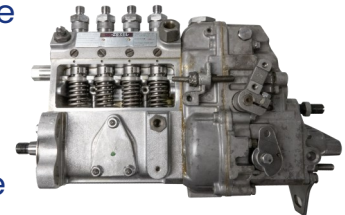


## INLINE AND ROTARY SYSTEM



Bosch VP30

Diesel fuel injection systems in agricultural and off-highway vehicles, specifically inline and rotary units, are closely tied to the development of the diesel engine. From the early 20th century, these systems have been utilised in applications, many of which are still used today.



Zexel 4 Cylinder

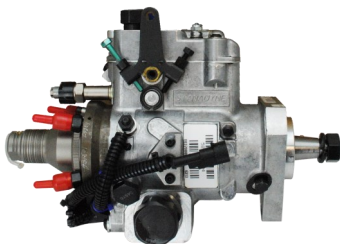


Delphi DPA

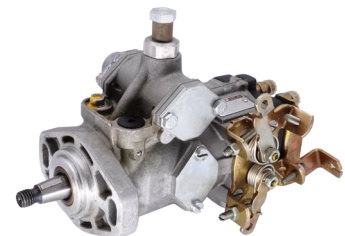
Merlin Diesel understands the longevity of agricultural and off-highway vehicles and keeping them maintained for the harsh environments in which they operate. We hold injectors, pumps, engine management, filtration and repair parts in stock and have the remanufacturing facilities to recondition the earliest inline, rotary pumps and conventional (mechanical) injectors.



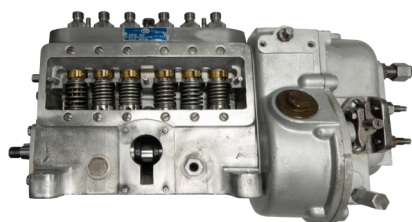
Yanmar Rotary



Stanadyne DB4



Bosch A Type



C.A.V 6 Cylinder



Conventional Injector



Delphi DP210

## EUI, HEUI AND SMART SYSTEM



Delphi F2P



Delphi F2P



Delphi Smart



Bosch Atego



Bosch Actros



Bosch DAF

EUI systems emerged as a significant advancement in fuel injection technology. Developed by company's like Caterpillar, EUI systems use electronic controls to precisely meter and deliver fuel to the engine cylinders. This technology allowed for better fuel efficiency, reduced emissions, and improved engine performance. EUI systems were widely adopted in various agricultural and off-highway applications due to their reliability and effectiveness.

Merlin Diesel have invested heavily in developing a repair program for EUI using authorised solutions. Our exchange range is extensive and has several hundred references. We have also developed trim coding for Caterpillar 3500 and C series EUI.



Delphi E1



Bosch A Series



Bosch Scania



Delphi F2E



Delphi F2E



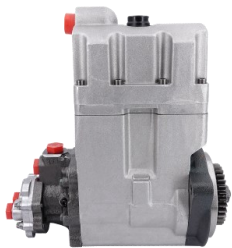
Delphi F2R



Delphi Smart



## HEUI, EUI AND SMART SYSTEM



CAT HEUI OIL



Bosch Iveco



Bosch Case/Iveco



Cummins PT



Cummins Select



Cummins HPI

HEUI systems, pioneered by Caterpillar, introduced a hydraulic element to the electronic fuel injection process. In HEUI systems, engine oil is used as the catalyst to actuate the fuel injector. This innovation provided finer control over fuel delivery and improved performance, especially in heavy-duty applications where high torque and power are required. HEUI systems became particularly popular in large agricultural and off-highway machinery such as bulldozers and combines.

Merlin Diesel are leading the market with aftermarket platforms for the remanufacture of HEUI. Using OE quality components and our specially developed MDS7000 test stand, we are continually expanding our reference database to cover more of this unique technology.



Bosch Volvo



Delphi E3



CAT/Ford Powerstroke



CAT C7/C9



CAT 3165B



CAT C15

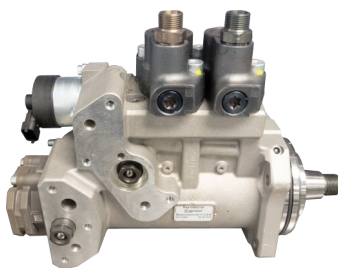


CAT 3500

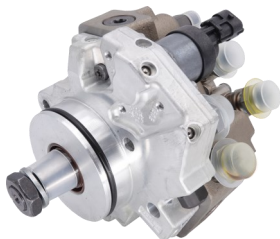
## COMMON RAIL SYSTEM



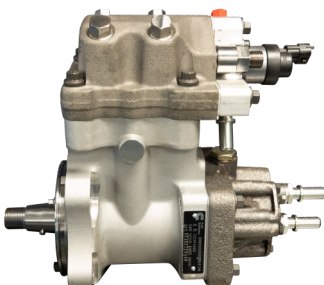
CAT C4.4/C6.6 Pump



Bosch CP5



Bosch CP3



Cummins QSK Pump

Common rail fuel injection has revolutionised diesel engine technology in the agriculture and off-highway sectors. Its adoption has been driven by regulatory requirements and the demand for better performance and efficiency.

As technology continues to advance, common rail systems will remain a critical component in the quest for cleaner, more efficient, and more powerful engines in these demanding applications.

With the introduction of hybrid engines that utilise this technology and the forthcoming Euro 7/Tier 5 regulations, common rail advancement will only continue.

Merlin Diesel are ideally placed to follow this progression into the future. We will continually invest to bring OE and aftermarket repair and supply solutions to the market.



Denso Perkins



CAT C4.4/C6.6 Injector



Denso John Deere



Bosch 2/4 Pin



Delphi JCB

## ENGINE MANAGEMENT

Merlin Diesel are a leading provider of engine management components for diesel agricultural, off-highway vehicles.

We have all the relevant sensors for vehicles in this sector, from Nox to temp, pump to rail, we hold the stock for next UK delivery.



## FILTRATION

Merlin Diesel specialises in providing filtration solutions for CV and PSV vehicles, serving as a distributor for renowned manufacturers such as Bosch, Delphi, Perkins, Mann, Fleetguard, Donaldson, Sure, HiFi, and Parker.



## REPAIR PARTS

Merlin Diesel takes pride in its extensive repair parts stock, sourced exclusively from the OE manufacturers such as Bosch, Delphi, Denso, Continental, Perkins, Stanadyne, and Yanmar.

We have the agriculture and off-highway sector covered.







- Diesel Pump / Injector / Test and Repair
- Suppliers of New and Remanufactured Pumps / Injectors
- Technical Support
- Test Equipment
- Parts Sales
- Injector Software Coding Solutions
- Conference and Training Facilities

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**Perkins**



**DENSO**

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**Stanadyne**

**YANMAR**

**Continental**  
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**vitesco**  
TECHNOLOGIES