



08/2017

# VDO CR Diesel Injectors Training Presentation

# Product overview

# CR Diesel Injectors - Overview

## VDO EU3/4 CR Injectors



DW10TD  
DV4  
DW10B  
DW10U  
Lion V6  
Lion V6 Upgrade  
Lion V8  
Ford Lynx  
K9K EU4  
MWM IESA

**Test & Repair possible**

## VDO EU5 CR Injectors



VW EA189  
Puma  
Ford / PSA DV6C  
Renault K9K EU5  
Renault K9KGen6  
MWM Sprint  
Ford Ranger  
Renault M9T

**Test planned for Q2/2018 / Repair not possible**

## VDO EU6 CR Injectors



Ford Panther

**Test tbd.**

# VDO Diesel – Overview

# Common Rail Diesel Injectors

System	Continental OEM Number		IAM Article Number	Replacement Part	Test	Repair
DW10TD	5WS40000	A2C00012054	5WS40000-Z	✓	⊗	⊗
DV4TED	EU3: 5WS40148 EU4: 5WS40516	EU3: A2C20009398 EU4: A2C53194835	EU3: 5WS40148-Z EU4: A2C59511612	✓	✓	✓
DW10B Class 4 DW10B Class 5 DW10B MFMA Class 6 DW10U MFMA DW10B MFMA Class M DW10B MFMA Class 7	5WS40156-4 5WS40156 5WS40156-6 5WS40200 5WS40441 5WS40322-7	A2C33349200 A2C20009324 A2C34821900 A2C53122017 A2C33359000 A2C62508505	5WS40156-4Z 5WS40156-Z A2C59511601 A2C59511602 A2C59511603 A2C59513552	✓	✓	✓
Lion V6/DT17	5WS40057 5WS40103 5WS40249	A2C53181820, A2C89916300 A2C20010654, A2C35064400 A2C34821700	EU3: A2C59511315 EU4: A2C59511316 EU4: A2C59511364	✓	✓	Q1/2018
Lion V6 Upgrade	5WS40252	A2C53107585	A2C59513553	✓	✓	Q1/2018
Lion V8	5WS40253 5WS40387	A2C89916439 A2C53110641	K100: A2C59513596 K174: A2C59513597	✓	✓	Q1/2018
MWM NGD 3.0	5WS40080	A2C20009347	A2C59515264	✓	✓	Q1/2018
MWM Sprint 3.2	5WS40932	A2C39997000	A2C3999700080	✓	2018	⊗
K9K EU4	5WS40087	A2C20009366	A2C59511606	✓	✓	✓
K9K EU5	5WS40536	A2C53216006	A2C59513484	✓	2018	⊗
K9K Gen6		A2C53381618	A2C59507596	✓	2018	⊗
Puma	5WS40775	A2C34967300, A2C33352600	A2C59517051	✓	2018	⊗
Puma JLR – Land Rover Defender	5WS40925	A2C53421318, A2C33349400	2910000177400	✓	2018	⊗
Ford Ranger >09/2015		A2C81394900	A2C8139490080	✓	2018	⊗
Ford Lynx	5WS40086	A2C20009355	A2C59511610	currently ⊗	✓	✓
Ford Lynx V227	5WS40250	A2C53100318	A2C59511611	currently ⊗	✓	✓
VW EA189 (03L130277S)		A2C96260400	A2C9626040080	✓	2018	⊗
DV6C Ford/PSA	5WS40677	A2C53252642	A2C59513556	✓	2018	⊗
Renault M9T EU6		A2C33351900	A2C3335190080	Q4/2017	⊗	⊗
Ford Panther EU6		A2C93035000	A2C9303500080	Q4/2017	⊗	⊗

VDO / IAM

Confidential



# Approved test benches

## CR Diesel Injectors

- Project to support EU5 CR Injectors - ongoing
- Hardware update for CRi-PC required - BlackBox
- Approved test plans for EU3 and EU4 CR Injectors are available



Hartridge Cri-PC



### EU3 / EU4 CR Injectors

5WS40148-Z	DV4 EU3
5WS40156-4Z	DW10BTED
5WS40156-Z	DW10BTED
A2C59515264	IESA NGD 3.0
A2C59511315	LION V6
A2C59511316	LION V6
A2C59511364	LION V6
A2C59511601	DW10BTED
A2C59511602	DW10UTED
A2C59511603	DW10BTED
A2C59513552	DW10BTED
A2C59513484	K9K EU4
A2C59511610	LYNX K10.01
A2C59511611	LYNX K10-03
A2C59511612	DV4 EU4
A2C59513553	LION V6-UG
A2C59513596	LION V8
A2C59513597	LION V8

## EU3, EU4 and EU5 CR Diesel Injectors on Bosch test benches

- Authorized test plans for VDO CR Injectors planned for Q2/2018
- Hardware update for test benches required - BlackBox
- Detailed planning concerning the authorization concept and availability of test plans will be provided once details are available

**Planned for 2018**



Testing of Continental CR Injectors on Bosch test benches EPS 708 and EPS 815

# VDO Diesel Injectors - Repair process



# VDO Diesel – CR Injectors repair process

Information concerning the repair process, repair parts and the required tools are provided in the VDO CR Injector Repair Manual; current version 1.21

- Please also see Service Information SI 18/17 which includes important updates to the manual!
- Available on the VDO Extranet

Update: SI 18/17



# VDO Diesel Injectors - Repair parts

# CR Injectors repair parts - overview

## Availability of CR Injector repair parts

Repair Part		Availability
Nozzle repair kits		✓
High Pressure connectors		Q1/2018
Solenoids (actor)		⊗
Inner parts such as washers, discs, throttle modules, etc.		⊗

# Repair parts – Nozzle Repair Kits

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## CR Injectors Repair – Repair Kits

Injector repair of EU3 and EU4 CR Injectors means to replace the nozzle and the nozzle retaining nut. No other original repair parts are available on the market. Everything else which is offered are fake parts which can lead to unexpected results.



Repair kit = Nozzle and retaining nut



Example: Packaging of 1 nozzle and retaining nut

Packaging unit = 4 pcs.

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# Repair parts

**Please note:** There are no other authorized repair parts available than the nozzle repair kits!  
Continental does neither offer solenoids nor any other parts built-in the CR Injectors

Unauthorized repair parts offered in the market: e.g. Solenoids



Fake packaging



No laser marking



Bears traces of a screw-wrench



# Repair parts

## VDO EU3/4 CR Injectors



Test & Repair possible



System	Variant	IAM article#	Piezo actuator	Nozzle Repair Kit
DW10TD		5WS40000-Z	n/a	n/a
DV4	DV4 EU3	5WS40148-Z	n/a	A2C59513997
	DV4 EU4	A2C59511612	n/a	A2C59513998
DW10B	DW10B Class 4	5WS40156-4Z	n/a	A2C59514909
	DW10B Class 5	5WS40156-Z	n/a	A2C59514909
	DW10B MFMA Class 6	A2C59511601	n/a	A2C59514909
	DW10B MFMA Class M	A2C59511603	n/a	A2C59514909
	DW10B MFMA Class 7	A2C59513552	n/a	A2C59514909
	DW10U MFMA	A2C59511602	n/a	A2C59514910
Ford Lynx	Lynx	A2C59511610	n/a	A2C59514911
	Lynx V227	A2C59511611	n/a	A2C59514912
K9K	K9K EU4	A2C59511606	n/a	A2C59506606
MWM	IESA NGD 3.0	A2C59515264	n/a	<b>A2C2000961680</b>
Lion	Lion V6 Base EU3	A2C59511315	n/a	<b>A2C2001018980</b>
	Lion V6 Base EU4	A2C59511316	n/a	<b>A2C2001064080</b>
	Lion V6 Base /DT17 EU4	A2C59511364	n/a	<b>A2C5311306980</b>
	Lion V6 Upgrade	A2C59513553	n/a	<b>A2C5311291780</b>
	Lion V8 K100	A2C59513596	n/a	<b>A2C5311896380</b>
	Lion V8 K174	A2C59513596	n/a	<b>A2C5311896380</b>

Items marked in red: Availability planned for end of Q1/2018

# Repair parts

## VDO EU5 CR Injectors



Test only!



Special equipment required → 2018

CR Injector Type	Variant	Piezo actuator	Nozzle Repair Kit
M9T	M9TEU5	n/a	n/a
K9K	K9K EU5 K9K Gen6	n/a n/a	n/a n/a
Ford	Puma EU5 Ranger EU5 JLR EU5	n/a n/a n/a	n/a n/a n/a
VW	EA189 EU5	n/a	n/a
DV6C	Ford / PSA	n/a	n/a
MWM	Sprint 3.2	n/a	n/a

# Repair parts

## VDO EU6 CR Injectors



Test procedure  
- under investigation -



CR Injector Type	Variant	Piezo actuator	Nozzle Repair Kit
Ford	Panther	n/a	n/a



# CR Diesel Injectors - Tools

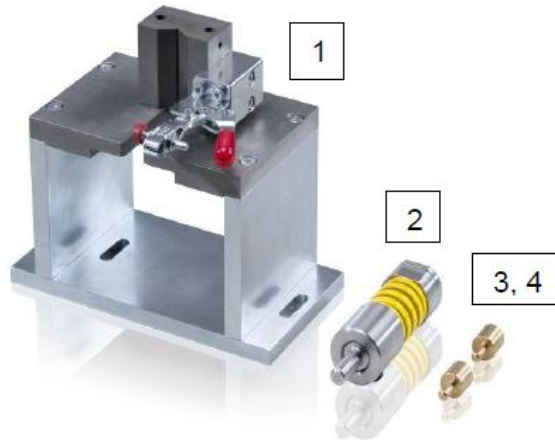
# CR Injectors repair - Tools



Toggle press - A2C59514000



Torque wrenches



CR Injector Repair Tool Kit "version A"

Order number:

**A2C59514886**

Package contents:

- 1) Injector holder
- 2) Pre-load device
- 3) Pressure transfer adapter DV4 EU3, marked with the letter "E"
- 4) Pressure transfer adapter DV4 EU4, marked with the letter "D"



CR Injector Repair Tool Kit "version B"

Order number:

**A2C59514001**

Scope of delivery:

- 1) Injector holder
- 2) Injector holder pad

# VDO Diesel Injectors – Test & Repair Overview

# CR Diesel Injectors – Functionality

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## Functionality

- Common Rail Diesel injectors are connected to the rail and deliver the necessary amount of fuel into the combustion chamber for all engine operating conditions. The injected amount per stroke consists of a pre-injection, a main-injection and a post-injection amount.
- The injection in three phases leads to a "soft" combustion operation.
- Piezo actuators allow extremely short response times. This means that the injected fuel amount can be extremely accurately controlled. Furthermore, excellent repeatability is ensured.
- The injectors are controlled by the engine control unit (ECU). Through the energy recovery facility with Piezo injectors, a substantially smaller triggering energy is required in comparison to previous systems.



# CR Diesel Injectors - Overview

## VDO EU3/4 CR Injectors



DW10TD  
DV4  
DW10B  
DW10U  
Lion V6  
Lion V6 Upgrade  
Lion V8  
Ford Lynx  
K9K EU4  
MWM IESA

**Test & Repair possible**

## VDO EU5 CR Injectors



VW EA189  
Puma  
Ford / PSA DV6C  
Renault K9K EU5  
Renault K9KGen6  
MWM Sprint  
Ford Ranger  
Renault M9T

**Test planned for Q2/2018 / Repair not possible**

## VDO EU6 CR Injectors



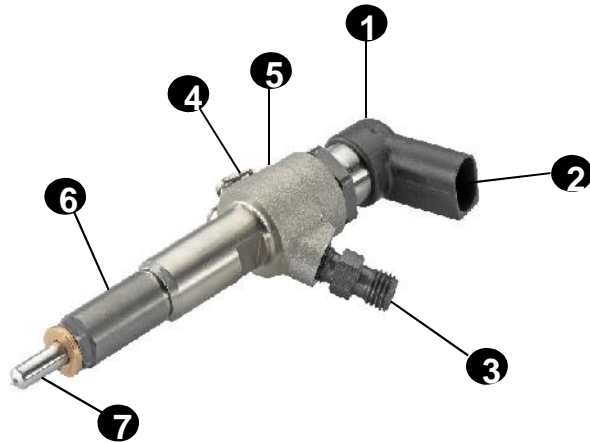
Ford Panther

**Test tbd.**

# CR Diesel Injectors – Overview

## EU4 / EU5 CR Injectors - Design

➤ Typically a EU4/EU5 CR Injector looks like shown in the example.



- ❶ Piezo-actuator
- ❷ Electrical connection
- ❸ High pressure connection
- ❹ Fuel return
- ❺ Injector head
- ❻ Nozzle retaining nut
- ❼ Injector nozzle

### Warning

- The mechanical design of the EU4 and EU5 CR Injectors is close to each other.
- The electrical design of the EU4 and EU5 CR Injectors is totally different
- Never connect an EU5 CR Injector to any non authorized Diesel test bench or flushing equipment.  
This can pre-damage the piezo stack
- Currently there is no authorized procedure available to replace any part (neither nozzle nor piezo actor) of the EU5 CR Injectors

# CR Diesel Injectors – Overview

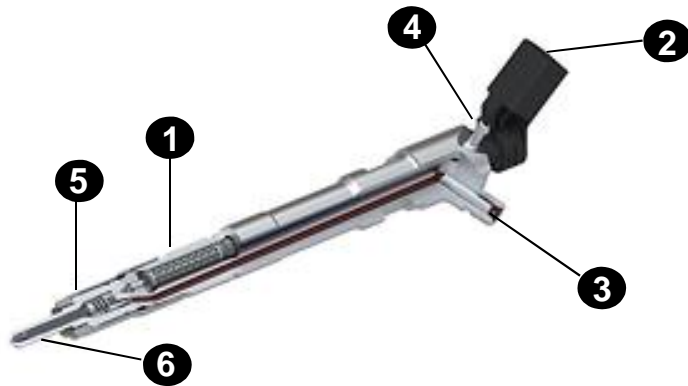
## EU4 / EU5 CR Injectors – Relevant Sales & Service Information

SI number / date	Description
<b>2016</b>	
24.02.2016	Replacement Parts: Availability of CR Injector DW10TD
03.03.2016	Replacement Parts: Classification of CR Diesel Injectors
09.03.2016	Repair: Repair of CR Injectors - marking
14.03.2016	Repair: Repair of CR Injectors - requirements
16.03.2016	Repair: Repair of CR Injectors - requirements
12.09.2016	Replacement Parts: O-Ring gasket for CR Injector DV6C
23.09.2016	Repair: Information on the CR Injector Repair Manual
19.10.2016	Replacement Parts: CR Injector DW10B MFMA Class7 - Successor
03.11.2016	Repair: CR Injectors - Repair Box
02.11.2016	Replacement Parts: Availability of new CR Injectors
18.11.2016	Replacement Parts: Overview about copper rings for CR Injectors
24.11.2016	Repair: CR Injectors - Sealing plugs
<b>2017</b>	
SI 03/17	Replacement Parts: VW CR Diesel Injector - replacement
SI 05/17	Repair: Requirements - CR Diesel Injectors
SI 08/17	Replacement Parts: Availability of CR Injectors Ford Ranger and Sprint

# CR Diesel Injectors – Overview

## EU6 CR Injector - Design

➤ Typically a EU6 CR Injector looks like shown in the example.



- ❶ Piezo-actuator
- ❷ Electrical connection
- ❸ High pressure connection
- ❹ Fuel return
- ❺ Nozzle retaining nut
- ❻ Injector nozzle

### Warning

- The EU6 CR Injector design (*mechanically as well as electrically*) is totally different compared to the basic design of the EU4/EU5 variants
- Never connect a EU6 CR Injector to a Diesel test bench or any flushing equipment
- Never loosen the nozzle retaining nut. The adjustment and therefore the basic functionality of the EU6 CR Injector is depending on the correct torque of the nozzle retaining nut! The adjustment can only be done in the factory.



# **VDO Diesel Injectors Repair procedure**

# CR Diesel Injectors – Repair

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## Important note

- Information provided on the following slides are mainly based on the CR Injector Repair Manual 1.21
- Some statements written in the manual have been modified especially for this presentation (08/2017)
- **Service information 18/17** contains updated information - available on the VDO Extranet
  
- *The information provided in this chapter do not supersede the content of the repair manual completely but are additional information*

# **VDO Diesel Injectors Visual check**

# CR Diesel Injector Repair – Visual check

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- Please perform visual check in order to get the injectors separated



*Inappropriate storage can lead to irreparable damages*



*CR Injectors with broken connector housings cannot be repaired*

# CR Diesel Injector Repair – Visual check

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- Please perform visual check in order to get the injectors separated



CR Injectors which show signs of being overheated or burned on the surface cannot be tested as inner parts have been damaged.



If only the nozzle has been damaged the test & repair process should solve the problem.

# **VDO Diesel Injectors Electrical test**

Available for EU3, EU and EU5 CR Injectors

# CR Diesel Injectors – Repair

## Electrical tests

➤ **If a CR Injector fails one of the electrical tests, the injectors piezo actor is defect. In this case the CR Injector cannot be repaired**

➤ Condition for all electrical tests

➤ Storage and measuring temperature → 23°C +/- 5°C

➤ Storage time before testing → min 3 hours

➤ Insulating resistance test

➤ High voltage insulation tester or digital multimeter

This can be measured using insulation resistance tester.  
In order to check for an open or short circuit:

- 1) Connect plug supplying high voltage (approx. 300 V) to both actor pins.
- 2) Connect the ground pole to the injector body.
- 3) Measure the insulation resistance for at least 4 seconds. The measured value must be greater than 100 MOhm.

The insulation resistance should be tested under "Clean Room" conditions thus temperature and moisture have very strong influence on the measured value.



# CR Diesel Injectors – Repair

## Electrical tests

- Condition for all electrical tests
  - Storage and measuring temperature → 23°C +/- 5°C
  - Storage time before testing → min 3 hours
- Piezo actor resistance test
  - High voltage insulation tester or digital multimeter

The piezo resistance can be measured using a multimeter / multimeter. In order to check for open or short circuit:

- 1) Keep the temperature of the injector between 0–80°C
- 2) Set the multimeter to measure resistance (Ohms).
- 3) Place the probes, one to the left pin and the other to the right pin of the connector in turn.
- 4) Wait for at least 5 seconds for the measurement to stabilize before reading. The resistance value must be between 160 kOhm – 240 kOhm





# CR Diesel Injectors – Repair

## Electrical tests

- Condition for all electrical tests
  - Storage and measuring temperature → 23°C +/- 5°C
  - Storage time before testing → min 3 hours
- Piezo capacity test
  - Handheld LCR meter

The piezo capacitance can be measured using a handheld LCR meter (e.g. Agilent U1730C Series). In order to perform the test, please keep following requirements:

- 1) Temperature of the injector 0 – 25°C
- 2) Voltage <2V and Frequency <5KHz
- 3) Stabilization time 15s

Injector type	The measured capacitance value mustn't be lower than
DV4 EU3	2,8µF
DV4 EU4	2,5µF
DW10B	2,8µF
DW10U	2,8µF
Lynx	2,8µF
Lynx V227	2,8µF
K9K EU4	2,8µF
IESA NGD 3.0	2,8µF
Lion V6 Base	2,8µF
Lion V6 Upgrade	2,8µF
Lion V8	2,8µF
K9K EU5	2,5µF
VW CR	2,5µF
Puma	2,8µF
DV6C	2,5µF

# **VDO Diesel Injectors Nozzle replacement**

# **VDO Diesel Injectors Cleaning process**

# CR Diesel Injectors – Cleaning

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- Clean the CR Injector in an ultrasonic cleaner
- Do only plunge the lower part into the fluid as shown in the picture

If the cleaning process is not carried out correctly, this might lead to corrosion in the nozzle and to function changes (e. g. injection quantity, spray conditioning) or malfunction (nozzle crack).

A mechanical cleaning process also damages the nozzle. Therefore, a cleaning process in the ultrasonic bath according to below mentioned description is recommended.

Mechanical means and cloths shall not be used!

Ultrasonic bath with resolution (deionized water and cleaning agent e. g. Tickopur RW77)

- solution ratio: water – Tickopur: 10:1
- temperature: 60°C
- duration: min. 10min; max. 2h
- power: 300W eff.

Renew the cleaning bath depending on degree of pollution (Recommendation: after max. 4 normal contaminated injectors per 1000ml cleaning fluid).



This surface can be cleaned in ultrasonic bath

# CR Diesel Injectors – Cleaning

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- Continental recommends the following cleaning process

Put the injector perpendicularly with the nozzle below in a special retainer in the ultrasonic bath. This retainer should avoid that the injector upsets and that the nozzle gets in contact with the bottom of the cleaning device. It is only allowed that the injector dips until one half of the nozzle retaining nut into the cleaning resolution. Take care that no cleaning fluid comes into the actuator. Therefore carry out an appropriate preventive action (protection connector) during the cleaning. A contact of the nozzle to wall or bottom of the ultrasonic cleaning device is not allowed, because this may lead to a mechanical damaging of the nozzle. Flash the nozzles after ultrasonic bath with brake cleaner (e.g. from CAR1 material number: 5997) and blow them carefully dry with dry compressed air. Avoid contact between nozzle and compressed-air gun. Operate the injector with a corrosion protective medium.



This surface can be cleaned in ultrasonic bath

# **VDO Diesel Injectors High Pressure Connection check**

# CR Diesel Injector – Repair

## VDO EU3/4 CR Injectors



Repair possible

Items will be available in Q1/2018

System	Variant	High Pressure connector
DW10TD	DW10TD	
DV4	DV4 EU3	A2C59507594
	DV4 EU4	A2C59507594
DW10B	DW10B Class 4	A2C59507595
	DW10B Class 5	A2C59507595
	DW10B MFMA Class 6	A2C59507595
	DW10B MFMA Class M	A2C59507595
	DW10B MFMA Class 7	A2C59507595
	DW10U MFMA	A2C59507595
Ford Lynx	Lynx	A2C59507594
	Lynx V227	A2C59507594
K9K	K9K EU4	A2C59507594
MWM	IESA NGD 3.0	A2C59507594
Lion	Lion V6 Base EU3	A2C59507594
	Lion V6 Base EU4	A2C59507594
	Lion V6 Base /DT17 EU4	A2C59507594
	Lion V6 Upgrade	A2C59507594
	Lion V8 K100	A2C5311416280
	Lion V8 K174	A2C5311416280

# CR Diesel Injectors – Repair

- High pressure connection – tightness check
- If the high pressure connector has been loosened it must be replaced

## VDO EU3/4 CR Injectors



CR Injector type	Initial torque	Rotation angle	Final torque
DV4 EU3 and EU4	n/a	n/a	35 + 5
DW10 B / DW10U	10	70° +/- 20°	55 +/- 15
Lynx	10	70° +20/-35°	55 +/-15Nm
Lynx V227	10	70° +20/-35°	55 +/-15Nm
K9K EU4	10	70° +20/-35°	55 +/-15Nm
Lion V6 (Jaguar) EU3			35 +5Nm
Lion V6 EU4 / DT17	10	70° +/-20°	55 +/-15Nm
Lion V6 (Land Rover)	10		35 +5Nm
Lion V6 Upgrade	10	70° +20/-35°	55 +/-15Nm
Lion V8	10	70° +20/-35°	55 +/-15Nm



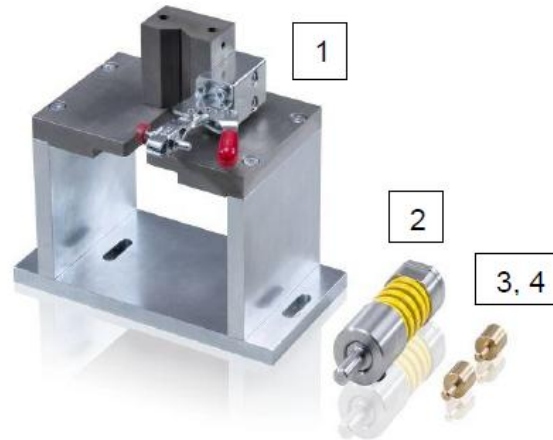
# VDO Diesel Injectors Repair Tools



Toggle press - A2C59514000



Torque wrenches



CR Injector Repair Tool Kit "version A"

Order number:

**A2C59514886**

Package contents:

- 1) Injector holder
- 2) Pre-load device
- 3) Pressure transfer adapter DV4 EU3, marked with the letter "E"
- 4) Pressure transfer adapter DV4 EU4, marked with the letter "D"



CR Injector Repair Tool Kit "version B"

Order number:

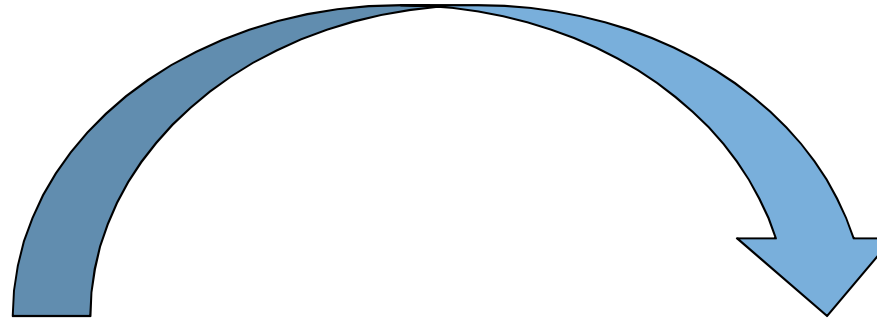
**A2C59514001**

Scope of delivery:

- 1) Injector holder
- 2) Injector holder pad

# CR Diesel Injector Repair – Tooling

The pressure transfer adapter is available as spare part (always a kit of 2 pieces) and must be replaced once a quarter.



*Letter D – A2C59513999*  
*Letter E – A2C59514913*  
*Letter F – A2C59506472*

# **VDO Diesel Injectors Nozzle replacement process**

# CR Diesel Injector repair – Step 1

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- Check the CR Injector condition according to previous slides.

If the CR Injector passed all tests and was cleaned accordingly so that there are no particles or dirt on the surface, identify the correct "Repair Kit".

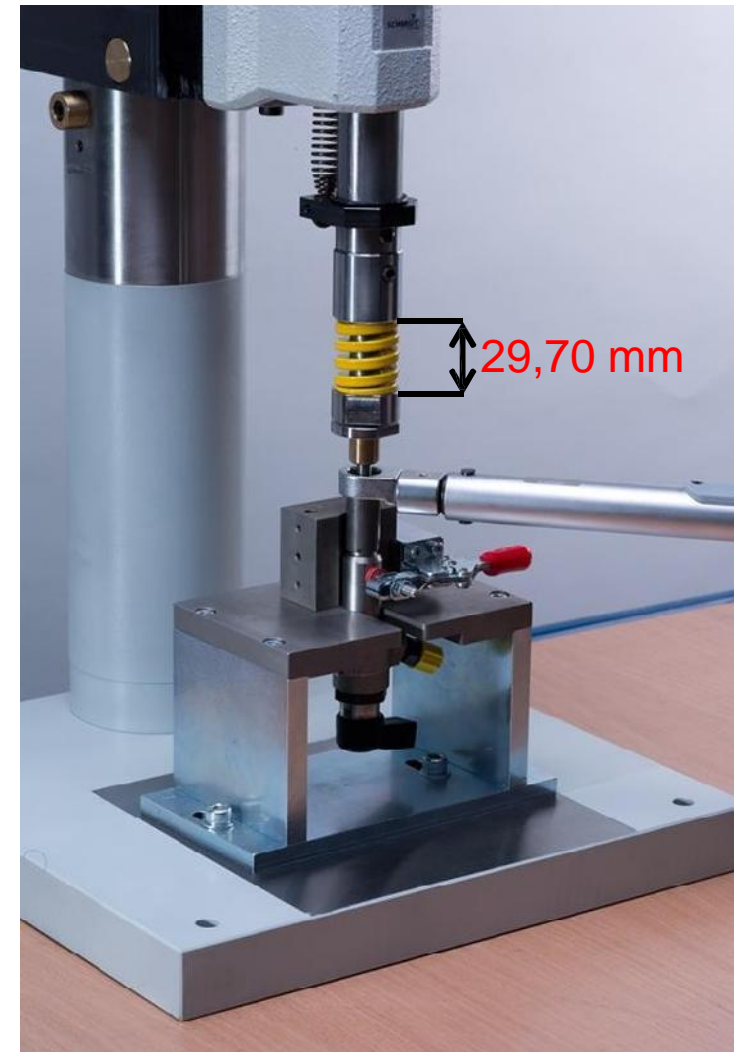


## CR Diesel Injector repair – Step 2

- Mount the appropriate CR Injector holder and the Preload Device and select the suitable Pressure Transfer Adapter.
- Put the CR Injector into the holder and fix it with the clamp.
- Put the torque wrench on the nozzle retaining nut ( $\varnothing 15$ ) and close the toggle press clamp.
- Once closed the nozzle retaining nut can be released.

**ATTENTION!**

**Please use appropriate Pressure Transfer Adapter for each injector type!**



## CR Diesel Injector repair – Step 3

- After the nozzle retaining nut has been released the CR Injector can be taken out of the holder and carefully be opened.

### ATTENTION!

Once injector has been disassembled, both nozzle and nozzle retaining nut need to be replaced.



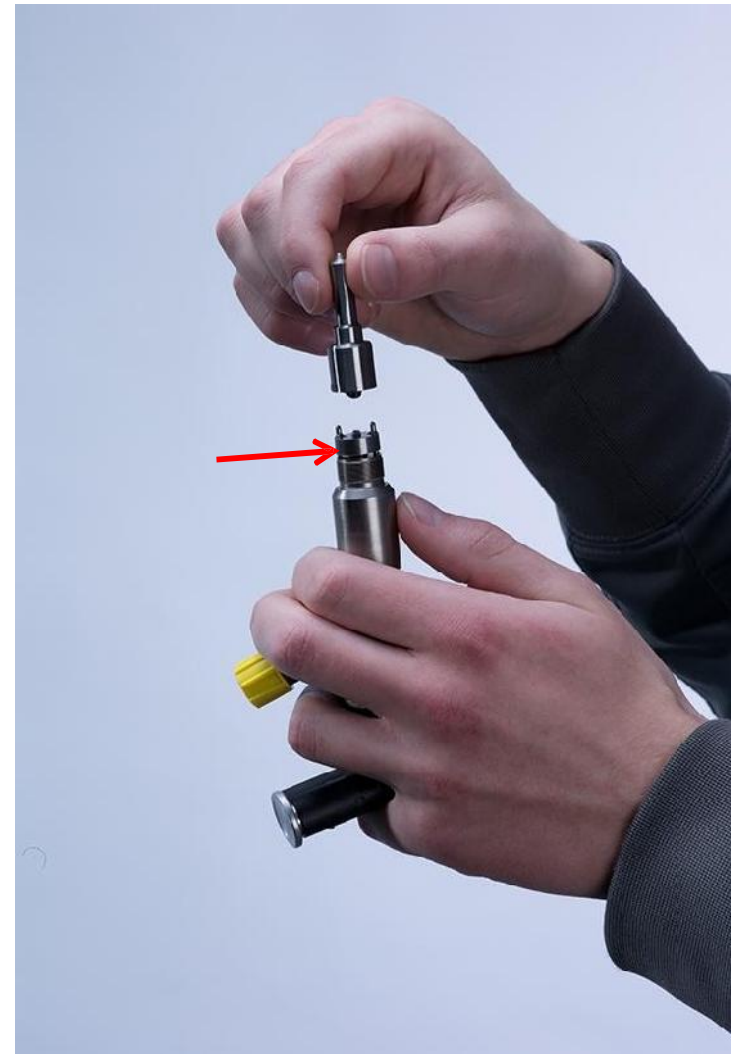


## CR Diesel Injector repair – Step 4

- Carefully dismantle the nozzle from injector.
- The injector's stop disk must not be disassembled therefore please hold it together with injector's body.

**ATTENTION!**

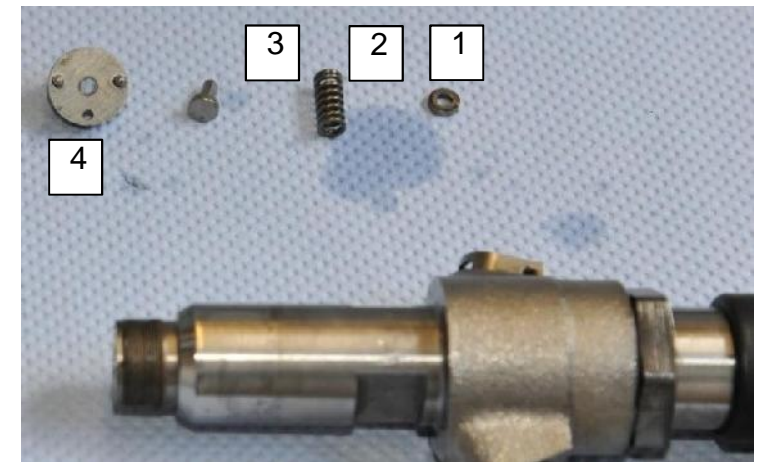
**Do NOT touch the nozzle's head!**





## CR Diesel Injector repair – Step 5

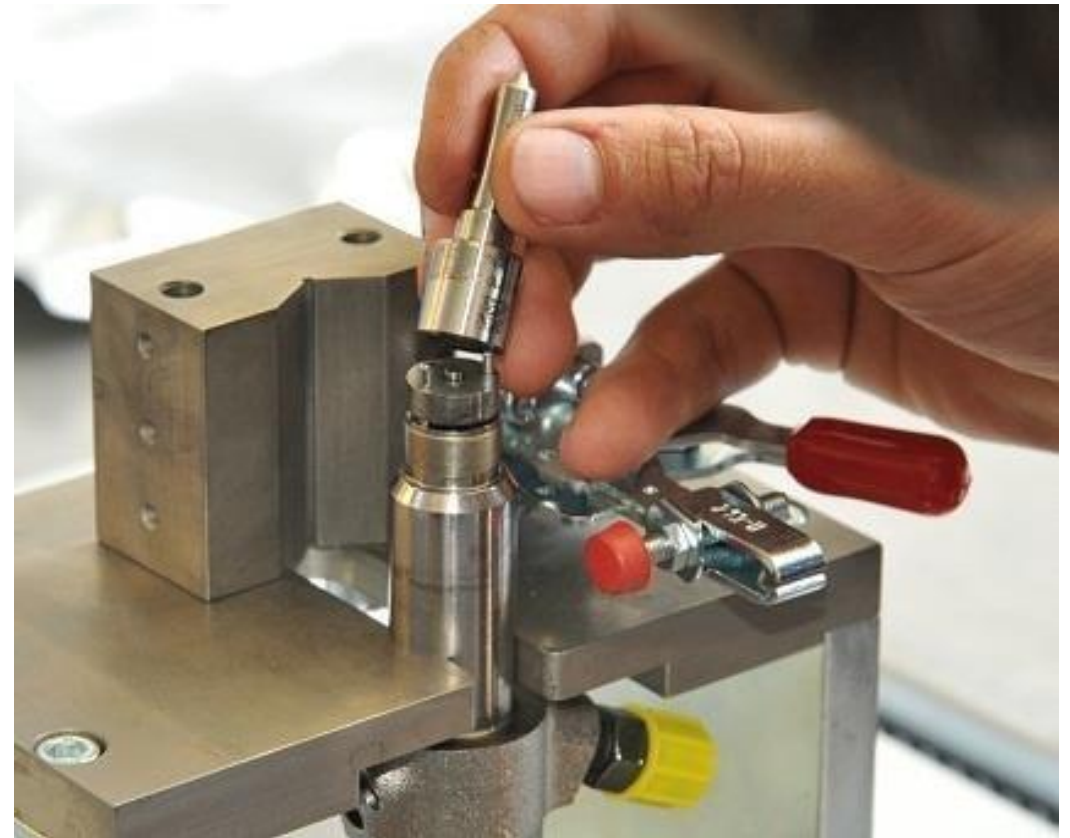
- Clean the repair parts (nozzle and nozzle retaining nut) in brake-cleaning fluid.
  - Use compressed air to remove excess brake-cleaning fluid residues.
- 
- In case the parts like spacer bolt (3), spiral spring (2), spacer washer (1) or stop disk with parallel pins (4), are fallen out of the injector, please proceed with brake-cleaning fluid and compressed air.
  - The numbers shown on the picture show you the proper sequence for assembly.



## CR Diesel Injector repair – Step 6

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- Carefully put the nozzle on the stop disk.



## CR Diesel Injector repair – Step 7

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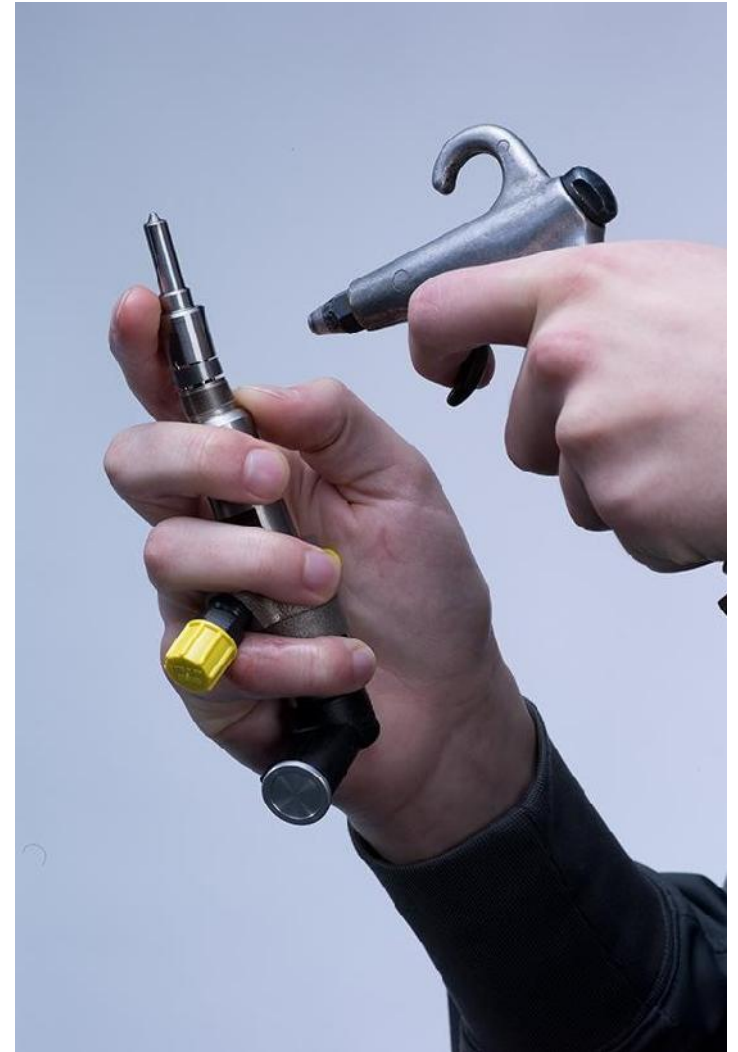
- Clean the injector's thread with brake-cleaning fluid.



## CR Diesel Injector repair – Step 8

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- Use compressed air to remove dust and brake-cleaning fluid residues.



## CR Diesel Injector repair – Step 9

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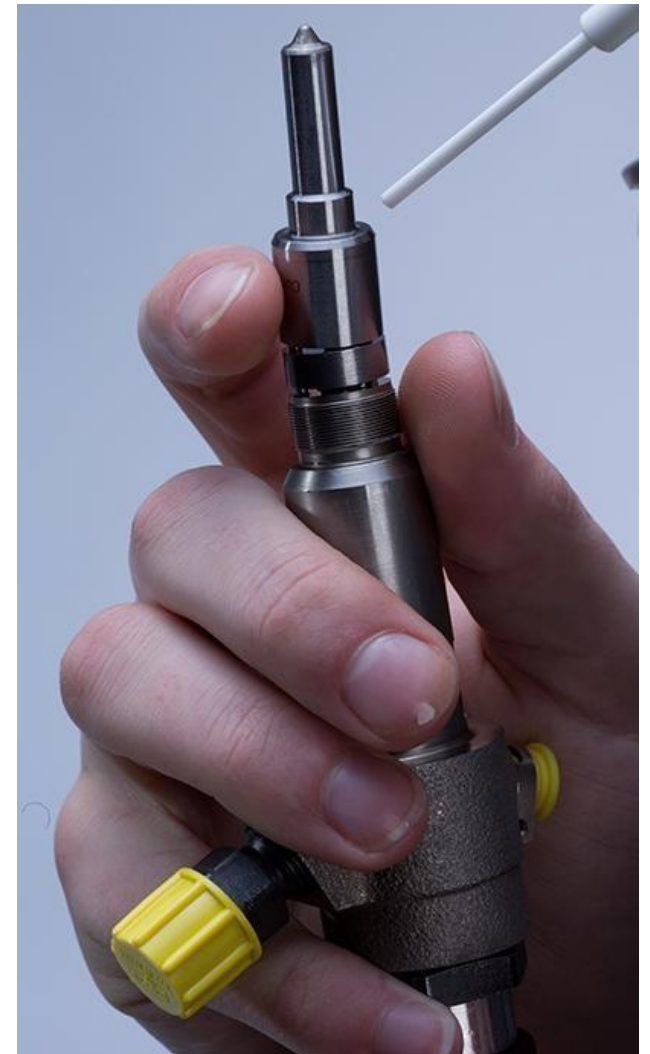
- Slightly lubricate both nozzle nut's thread and the contact surface between nozzle and nozzle nut before re-fitting and tighten of the nozzle nut.

**ATTENTION!**

**Do NOT use GREASE instead of OIL!**

**HINT!**

**Oil with parameters like Molykote L-1346FG should be used.**



## CR Diesel Injector repair – Step 10

- Carefully put the nozzle nut on the nozzle.
- Put the CR Injector into the holder and fix it with the clamp.
- Gently tighten the nozzle's nut with a hand.

**ATTENTION!**

**Do not rotate the injector's nozzle!**

**Never touch the nozzle's head during assembling the injector !**



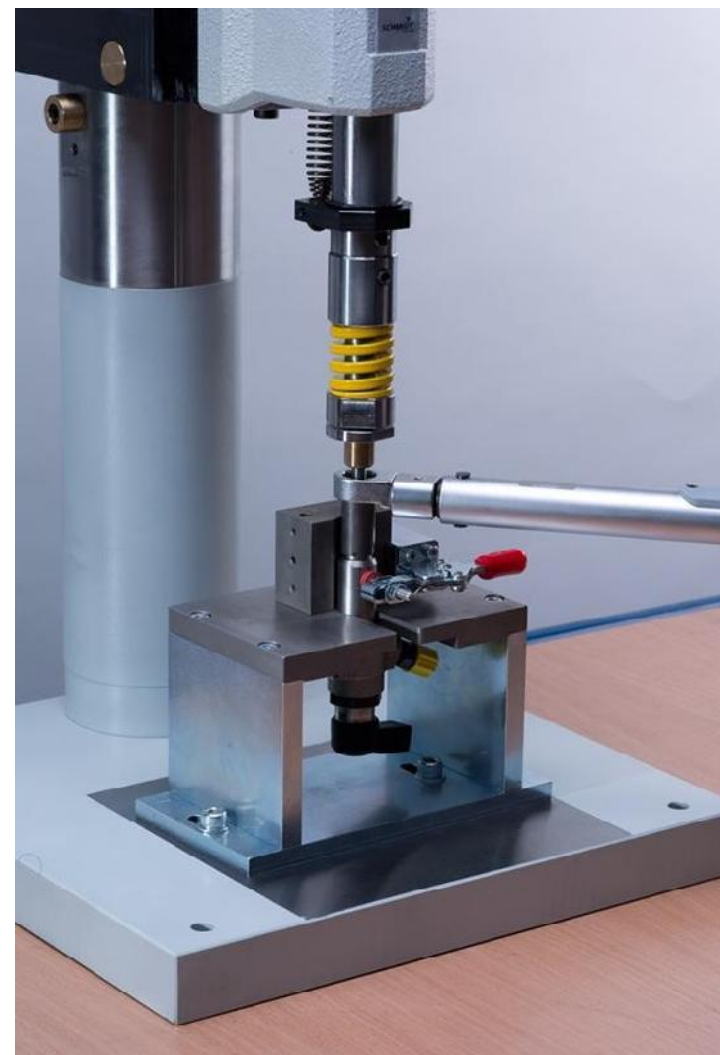


# CR Diesel Injector repair – Step 11

- Place the torque wrench on the nozzle retaining nut and close the toggle press clamp.
- Tighten the nut according to the specification shown below.

## Nozzle retaining nut

CR Injector type	Initial torque	Rotation angle	Final torque
DV4 EU3 and EU4	10	104°+/-5°	60 +/-20Nm
DW10 B / DW10U	10	104°+/-5°	60 +/-20Nm
Lynx	10	104°+/-5°	60 +/-20Nm
Lynx V227	10	104°+/-5°	60 +/-20Nm
K9K EU4	10	107+/-5°	70 +/-15Nm
Lion V6 (Jaguar) EU3	10	72°+/-5°	70 +/-15Nm
Lion V6 EU4 / DT17	10	70°+/-3°	70 +/-20Nm
Lion V6 (Land Rover)	10	72°+/-5°	70 +/-15Nm
Lion V6 Upgrade	10	67°+/-3°	70 +/-20Nm
Lion V8	10	67°+/-3°	70 +/-20Nm



# **VDO Diesel Injectors Marking & Packaging**



# CR Diesel Injectors repair – Type Plate

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- Attach new DRS ID Plate as showed in picture



# CR Diesel Injectors repair –

## Packaging

Storage for a long period of time:

- Special VCI bags with water vapour permeability 0,01 g/m<sup>2</sup>•d (measured at 23°C / 85% ambient air humidity according to DIN 53122).
- Vacuum-sealed bags have a maximum storage period of one year. After this time we recommend retest and repackage as necessary.

Order number for a coated bag **X11-800-100-101**

Original VDO Injector Box (order number **A2C59507770**)

The QR-Code includes following data:

*[Part Number]*

*Refurbished[Date of Repair]*

*UseBefore[Use Before Date]*

*[DRS Number]*

For example:

A2C59511601

Refurbished28.07.2012

UseBefore27.07.2013

DRS 001/08

# A2C59511601

Injector repaired according to the VDO requirements

CR System Type : DW10B

DRS Partner : Schmitz & Krieger

Class or Code : Class 6

DRS Number : D 001/08

Refurbished : 28.07.2012

Use Before: 27.07.2013

VDO original repair  
parts used



# CR Diesel Injector repair – Repair parts Packaging



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# Thank you!