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| **Information for replacing the functional units** |
| **KDI 3404 TM Workshop Manual (Rev. 08.4)** |



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**Translated from the original manual in Italian language**

Data reported in this issue can be modified at any time by KOHLER.

Sommario

[1. TITOLO 1 2](#_Toc495648770)

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# Information for replacing the functional units

## Injector and injection pump replacement

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| Z_importante.jpg **Important**         * Before proceeding with operation, carefully read [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=814&parent=1545) . * Replace the high pressure pipes after two disassemblies. * Seal all injection component unions as illustrated in [**Par. 2.9.7**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=786&parent=1545) during disassembly. * Always replace the gaskets after each disassembly. * Handle the components as described in [**Par. 2.18**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=815&parent=1545) . * Refer to [**Par. 1.3**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=401&parent=1545) for **operating references** when assembling and disassembling. * When repaired, **RSN-A** injectors must be certified by a Stanadyne centre to check their correct operation - check the type of engine mounted injectors on the spare parts list ( **RSN-A** is specified in the description). | 6.1.jpg **Fig 6.1** |
| **6.1.1 Injection fuel pipes disassembly (injection pump/injectors)**   1. Undo the screw **s A** . 2. Undo the screws **B** . 3. Remove quick fitting **C** . 4. Undo the screws **D** and remove the manifold **E** . | 6.2.jpg **Fig 6.2** |
| 1. Undo the screw **H1** and remove the clamp **H2** and remove rubber. 2. Undo the nuts **F** . 3. Undo the nuts **G** . 4. Remove the tube **H** . | 6.3.jpg **Fig 6.3** |
| **6.1.2 Rocker arms cover disassembly**   1. Undo the screw **L** . 2. Undo the screw **M.** 3. Undo the screws **N** and remove the rocker arm cap **P** . | 6.4.jpg **Fig 6.4** |
| **6.1.3 Fuel return pipes disassembly**   1. Undo the screws **Q** and remove hose **R** . | 6.5.jpg **Fig 6.5** |
| **6.1.4 Injectors disassembly**   1. Undo the screw **J** and remove washer **K** and then bracket **X** . 2. Remove the injector **Z** .   **NOTE:** Should you be unable to remove the electronic injector (acting only on point BC), use an open-ended spanner (Ø 11 mm), by applying small rotations to unblock the component.   1. Seal all injection component unions as illustrated in [**Par. 2.9.7**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=786&parent=1545) .                  1. Ensure that gasket **S** has remained in the correct position ( **Fig. 6.7** ). Otherwise, recover the gasket from inside the electronic injector **V** manifold. | 6.6.jpg **Fig 6.6**  6.7.jpg **Fig 6.7** |
| **NOTE:** Click on the right to play the procedure. | <https://www.youtube.com/embed/mt-Dsw4A81A?rel=0> |
| **6.1.5 Injection pump disassembly**    Z_importante.jpg **Importante**       * Before proceeding with the disassembly, identify the pump code from its identifying name plate ( [**Pos. 12 - Tab. 2.12**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=786&parent=1545) ) and remove the cylinder injector 1 ( [**Par. 1.4**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=725&parent=1545) - [**6.1.1 - 6.1.2 - 6.1.3 - 6.1.4**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=746&parent=1545) ). * Alternatively, you can identify the pump from the online spare parts catalogue ( [**https://partners.lombardini.it/App/SparepartCatalogue/Default/Catalogue.aspx**](https://partners.lombardini.it/App/SparepartCatalogue/Default/Catalogue.aspx) )  1. Insert the tool [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) into the injector **N°1** and fix it with the fixing brace **X** , capscrew **J** and washer **K** .   **NOTE** : Do not tighten the capscrew **J** . | 6.8.jpg **Fig 6.8** |
| 1. Disassemble the starter motor. 2. Mount the tool [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) in the seat of the starter motor **Y** and fit it with the two starter motor fixing screws. 3. Rotate the crankshaft clockwise (Rif. A [**Par. 1.4**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=725&parent=1545) ) through the [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) tool bringing reference **X** upwards.   **NOTE** : When positioning reference **X** , make sure cylinder **N° 1** is in compression phase (the valves on piston **N° 1** must all be closed). | 6.1_34TM.jpg **Fig 6.9** |

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| 1. With reference X pointed upwards, find the TDC through tool [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) , then bring the dial gauge indicator to 0. | 6.1_34TM_2.jpg  **Fig 6.10** |
| 1. By means of the identified pump code, refer to **Tab. 6.** **1** to know the advance degrees and the corresponding value to lower the piston. 2. Having identified the value to lower the piston, rotate the crankshaft anti-clockwise by going beyond the value described in **Tab. 6.1** , once again, rotate the crankshaft clockwise, stopping at the correct advance value by using tool [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) ( **Rif. A** [**Par. 1.4**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=725&parent=1545) ).   **NOTE:** The value indicated in **Tab. 6.1** must be reached by rotating the shaft with the piston in compression phase. Use the [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) tool to totate the crankshaft. | |  |  |  | | --- | --- | --- | | **Pump code** | **Piston**  **lowering (mm)** | **Advance** | | ED0065905290-S | 0,733 (0.562 - 0.927) | 8° (± 1°) | | ED0065905430-S | 0,562 (0.413 - 0.733) | 7° (± 1°) | | ED0065905440-S | 1,033 (0.828 - 1.261) | 9,5° (± 1°) | | ED0065905690-S | 0,645 (0.485 - 0.828) | 7.5° (± 1°) |   **Tab. 6.1** |
| 1. Lock the [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) tool through **J** screws and ensure that the crankshaft does not rotate, which would alter the correct advance value. If this happens, repeat the instructions described in points **4** , **5** , **6** , **7** and **8** . 2. Undo the screws **A1** , remove the plate **B1** . | 6.11.jpg  **Fig 6.11** |
| 1. Undo and remove the nut **C1** fixing the injection pump control gear **D1** .     Z_importante.jpg **Important**       * After removing the nut **C1** , ensure that the correct advance value has remained unchanged on [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) . * Be careful that the nut **C1** does not fall into the timing cover. | 6.12.jpg  **Fig 6.12** |
| 1. Undo the capscrew **E1** and shift the slotted plate **F1** in the direction of arrow **G1** . 2. Tighten screw **E1** to block the pump (tightening torque to **12 Nm** ). 3. Screw the tool [**ST\_13**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) on the gear **D1** . | 6.13.jpg  **Fig 6.13** |
| 1. Perform the operations of **point 1** of [**Par. 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=745&parent=1545) . 2. Remove quick fitting **N1** . 3. Undo the screws **K1** and **K2** and remove the Oil Cooler group **L1** from the crankcase **M1** . 4. Loosen the screws **J2** . | 6.14.jpg  **Fig 6.14** |
| 1. Undo the screw **P1** . 2. Tighten the screw of tool [**ST\_13**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) to disconnect the injection pump **J1** from the high pressure pump control gear **D1** . 3. Svitare le viti **J2** ed estrarre la pompa iniezione **J1** . 4. **DO NOT** remove the tool [**ST\_13**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) . | 6.15.jpg  **Fig 6.15** |
| **NOTE:** Click on the right to play the procedure. | <https://www.youtube.com/embed/lll9hIO0pXM?rel=0> |
| **6.1.6 Injection pump assembly**    Z_importante.jpg **Important**       * Before assembling the new pump **J1** , make sure that plate **F1** can move freely and that fastening capscrews **E1** are not loose (the pump sold as a spare part is, **upplied with the cylinder injection timing blocked   N° 1** ). * **Ensure that the coupling surfaces on shaft Q1 and gear D1 are free from impurities and lubrication residues.** * Remove the guard cap only when the pipes are reconnected. * Do not remove the tool [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) .  1. Mount the injection pump **J1** , inserting the shaft **Q1** in the gear  **D1** .     Z_importante.jpg **Important**       * Always change screws **J2** with new ones or apply **Loctite 2701** to the threads.   1. Clamp the screws **J2** on the crankcase **M1** (tightening torque at **25 Nm** ).   2. Remove the tool [**ST\_13**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) .   3. Ensure that the correct advance value has remained unchanged, tighten nut **C1** on shaft **Q1** (as shown in Fig. 6.17, you are allowed to use a screwdriver to guide nut **C1** onto shaft **Q1** in order to prevent it from accidentally falling inside carter **S1** - tightening torque at **see service letter 710018** ). | 6.16.jpg  **Fig 6.16**  6.17.jpg  **Fig 6.17** |
| * 1. Undo the capscrew **E1** and shift the slotted plate **F1** in the direction of arrow **G2** .   2. Tighten screw **E1** (tightening torque to **5.5 Nm** ). The injection pump is unlocked.   3. Remove the tool [**ST\_30**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) and [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) . | 6.18.jpg  **Fig 6.18** |
| 1. Assemble Oil Cooler **L1** onto crankcase **M1** by means of capscrews **K1** and **K2** .   **NOTE:** Always replace the gasket **R1** , **R2** at each assembly. | 6.19.jpg  **Fig 6.19** |
| 1. Secure tube **U1** by means of capscrew **P1** , inserting gasket **T1** . 2. Fit quick coupling **N1** onto pump **J1** . | 6.20.jpg  **Fig 6.20** |
| 1. Secure plate **B1** by means of capscrews **A1** , inserting gasket **V1** onto carter **S1** (tightening torque at **10** **Nm** ). | 6.21.jpg  **Fig 6.21** |
| **NOTE:** Click on the right to play the procedure. | <https://www.youtube.com/embed/xAUa9IQBmpU?rel=0> |
| **6.1.7 Injector assembly**    Z_importante.jpg **Important**       * To prevent damaging the injection system, the protection caps ( [**Par. 2.9.7**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=786&parent=1545) )  must be removed during assembly.  1. Lubricate the gaskets **U, T, S** , and fit them on the injector  **Z** . | 6.22.jpg  **Fig 6.22** |
| 1. Fit the injector **Z** in the sleeve **V** . | 6.23.jpg  **Fig 6.23** |
| 1. Assemble the parts **P, Q, R** . and fit the parts so assembled on the injector **Z** . | 6.24.jpg  **Fig 6.24** |
| 1. Insert tool [**ST\_52**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=573&parent=1273) on the injectors junctions **Z** (detail **X2** ). 2. Tighten the screw J (tightening torque to **20 Nm** - **Fig. 6.24** ). | fig._6.25_3404_TM.jpg  **Fig 6.25** |
| **6.1.8 Assembly of the injector return pipes**   1. Position the tube **N** on the injectors **Z** and tighten screws **M** (tightening torque to **14 Nm** ). | 6.26.jpg  **Fig 6.26** |
| **6.1.9 Assembly Rocker arm cover**    Z_importante.jpg **Important**       * The gasket **Z1** between the rocker arm cover and the cylinder head must always be replaced every time it is disassembled.  1. Position tool [**ST\_17**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) onto the head in correspondence with the two fastening holes **9** and **10** . 2. Position gasket **Z1** and cap **P** on cylinder head **A2** matching the holes of fastening capscrews **N** with the aid of the gudgeon guides [**ST\_17**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=812&parent=1545) . 3. Attach the rocker arm cover **P** on the head **A2** with the screw N adhering to the tightening sequence shown in **Fig. 6.28** (tightening torque to **10 Nm** ). 4. Secure the hose **M2** with the screw  **L**  (tightening torque to **10 Nm** ). 5. Clamp the fitting **M3** with the screw **M**  (tightening torque to **25 Nm** ) inserting the gasket **B2** . | 6.27.jpg  **Fig 6.27**  6.28.jpg  **Fig 6.28** |
| **6.1.10 Installation of the fuel injector pipes (pump injector/injectors)**     1. Position pipes **D** on the injectors and on the injector pump.     Z_importante.jpg  **Important**       * Tighten the nuts **F** and **G** manually, without clamping them.  1. Tighten the nuts **F** and **G** (tightening torque at **25 Nm** ). 2. Secure tubes **H** by means of clamps **H2** , assembling:  * **H3** rubber element; * clamp **H2** on element **H3** ; * secure clamp **H2** by means of capscrew **H4** and nut **H5** (tightening torque at **10** **Nm** ).      1. Secure manifold **E** onto cylinder head **A2** by means of capscrews **D** , inserting gasket **C2** . 2. Secure suction line **E2** onto manifold **E** by means of capscrews **A** , inserting gasket **D2** . 3. Fit quick coupling **C** onto manifold **E** . 4. Fasten the pipe **H6** on the manifold **E** with the screws **B.** | 6.29.jpg  **Fig 6.29** |
| 6.30.png  **Fig. 6.30/6.31** | |

## Coolant pump replacement

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| **6.2.1 Disassembly  NOTE:** Perform the operations described in [**Par. 5.1**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=744&parent=1545) .    Z_importante.jpg **Important**         * Before proceeding with operation, read [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=814&parent=1545) . * The coolant pump is not repairable.  1. Loosen the screws **A** and **B** . 2. Loosen capscrew **C** and disconnect voltage from belt **D** and remove belt **D** . 3. Undo the screws **E** and remove the pulley **F** . | 6.32.jpg **Fig 6.32**6.33.jpg **Fig 6.33** |
| 1. Undo the screws **G** and remove the pump **H** with the relevant gasket. | 6.34.jpg **Fig 6.34** |
| **NOTE:** Click by side to play the procedure. | <https://www.youtube.com/embed/FdI56hBo_R0?rel=0> |
| **6.2.2 Assembly**    Z_importante.jpg **Important**         * Always replace the gaskets **J** , after each disassembly. * Always replace the belt **D** after each assembly. * To handling components refer to [**Par. 2.17**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=739&parent=1545) * Always replace the gaskets (where are provided) after each disassembly  1. Fit the coolant pump **G** with the screws **H** interposing the new gasket **J** (tightening torque at **25 Nm** ). | 6.35.jpg **Fig 6.35** |
| 1. By means of capscrews **E** , secure pulley **F** to crankcase **K (** tightening torque at **25 Nm).** | 6.36.jpg **Fig 6.36** |
| 1. Insert the belt **D** on the pulleys **M** . 2. Tighten screw **C** and bring block **L** at **10 mm** from bracket **N** (value **C1** ). 3. Fit the screw **A** (tightening torque at **25** **Nm** ). 4. Fit the screw **B (Fig. 6.32 -** tightening torque at **see service letter 710007** ). 5. Start the engine and run it for some minutes, then turn off it, and let it cool down at ambient temperature. Check by the appropriate tool that at point **P** the tension value is between **135** and **178 Hz.**   **NOTE:** If the poly-v belt tension results out of the above mentioned values, proceed with the replacement. | 6.37.jpg  Alternator_Belt_tension_10mm.png  **Fig 6.37** |
| **NOTE:** Click by side to play the procedure. | <https://www.youtube.com/embed/edCJrMN0G5M?rel=0> |

## Oil vapour separator replacement

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| **6.7.1 Disassembly**    Z_importante.jpg  **Important**       * Before proceeding with operation, read [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=814&parent=1545) .  1. Remove quick fitting **A** .      1. Release the clamps **B** and **C** .      1. Remove hose **D** from breather body **E** . | 6.38.jpg **Fig 6.38** |
| 1. Remove capscrews **F** and remove breather body **E** . | 6.39.jpg **Fig 6.39** |
| **6.7.2 Assembly**   1. Secure breather body **E** by means of capscrews **F** (tightening torque at **22 Nm** ). 2. Fit hose **D** onto breather body **E (Fig. 6.38)** .        1. Secure the clamps **B** and **C (Fig. 6.38).** | 6.40.jpg **Fig 6.40** |

## Oil cooler unit and oil filter replacement

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| **6.4.1 Oil Cooler unit disassembly**    Z_importante.jpg **Important**       * Before proceeding with operation, read [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=814&parent=1545) . * Perform the operations described in [**Par 5.1**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=744&parent=1545) and [**Par 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=745&parent=1545) **.** * Oil Cooler unit **E** is not repairable.  1. Release the clamps **A** . 2. Remove the manifolds **B** out of the Oil Cooler unit **E** . | 6.41.jpg **Fig 6.41** |
| Z_Avvertenza.jpg **Warning**       * Electric/pneumatic screwdrivers are forbidden. * Use a suitable container to recover any residue oil.  1. Unscrew cartridge holder cover **H** by performing three complete turns and wait 1 minute.   **NOTE** : this operation allows to oil contained in the support **E** to flow into the oil sump in the correct way.   1. Unscrew cartridge holder cover **H** and check that the oil in the lub. oil filter support **E** has flowed towards the oil sump. 2. Remove quick fitting **N1** . | 6.42.jpg **Fig 6.42** |
| 1. Undo the screws **C** and **D** and remove the Oil Cooler unit **E** . 2. Remove the gaskets **F** and **G** from the Oil Cooler unit **E** . | 6.43.jpg **Fig 6.43** |
| **6.4.2** **Oil filter cartridge replacement**   1. Remove gaskets **L, M** and **N** from element holder cover **H** . 2. Remove cartridge **P** from element holder cover **H** . | 6.44.jpg **Fig 6.44** |
| 1. Lubricate and insert gaskets **L, M** and **N** in the **L1, M1** and **N1** seats of element holder cover **H** . 2. Insert element **P** into element holder cover  **H** . | 6.45.jpg **Fig 6.45** |
| **6.4.3 Oil Cooler unit assembly**    Z_importante.jpg **Important**       * In the event of assembly of union **U** on crankcase **S** , manual tightening torque with **Loctite 2701** on the thread).      1. Check that the surface **Q** on the support **E** and on the crankcase **S** are free from impurities. 2. Lubricate and insert the gasket **T** on the fitting **U** . 3. Lubricate and insert the gaskets on the support **E** : **F** in seat **F1** ; **G** in seat **G1** . 4. Fit the support **R** with the screws **C** and **D** (tightening torque at **10** **Nm** ). 5. Insert and tighten the cartridge support **H** on the filter support **E** (tightening torque at **25** **Nm** ). 6. Fit the hoses **B** on the support **E** and secure the hoses **B** with the clamps **A** . 7. Fit quick coupling **N1** onto pump **J1** . | 6.46.jpg **Fig 6.46**6.47.jpg **Fig 6.47** |

## Fuel filter replacement

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| **6.5.1 Disassembly**    Z_importante.jpg  **Important**       * Before proceeding with operation, read [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=814&parent=1545) .     Z_Avvertenza.jpg **Warning**       * The fuel filter is not always mounted in the engine. * When disassembling, use a suitable container to recover the fuel contained in the cartridge **F** .  1. Remove quick fitting **N1** . 2. Release the clamps **A** and pull the pipes **B** out of the support **H** . 3. Unscrew the cartridge **F** from the support **H** . 4. Undo the screws **C** and remove the support **H** . | 6.48.jpg **Fig 6.48**6.49.jpg **Fig 6.49** |
| Z_Avvertenza.jpg **Warning**       * Check that the fuel supply pump filter is present, and replace if necessary.  1. Release the clamp **D** . 2. Demount the hose **E** . 3. Unscrew the filter **G** from the pump **Q** . | CAP_6_Prefiltro_FACET_01.png |
| 1. Screw the new filter **G** onto the pump **Q** (tightening torque **20 Nm** ). 2. Connect the hose **E** to the filter **G** and fasten with the clamp **D** . | CAP_6_Prefiltro_FACET_02.png |
| **6.5.2 Assembly**   1. Secure fuel filter bracket H with capscrews **C** onto crankcase **M** , inserting spacer **L** between **M** and **H** and washer **P** between **H** and **C** (tightening torque at **25 Nm** ). 2. Fit the pipes **B** on the support **H** . 3. Secure the pipes **B** with the clamps **A** . | 6.50.jpg **Fig 6.50** |
| 1. Lubricate the gasket **N** with fuel. 2. Tighten the cartridge **F** on the support **H** (tightening torque at **17 Nm** ). 3. Fit quick coupling **N1** onto support **H** . | 6.51.jpg **Fig 6.51** |

