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| **Information about optional components** |
| **KDI 1903 M Workshop manual (Rev\_09.5)** |



Sommario

[1. TITOLO 1 2](#_Toc495648770)

[1.1. Asdfsdfsdf 2](#_Toc495648771)

[1.2. Asdfsdfsdfggg 2](#_Toc495648772)

# Information about optional components

## Oil dipstick in cylinder head

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.1.1 Check**   1. Pull out the dipstick **B** in the direction of the arrow **A** . 2. Check that the mark left by the oil on the dipstick is between the **MIN** . and **MAX** . notches. | Fig._11.1.jpg **Fig 11.1** |
| **11.1.2 Replacement**  **11.1.2.1 Disassembly**   1. Undo the screw **D** . 2. Pull out the oil dipstick hose **E** in the direction of the arrow **F** . | Fig._11.2.jpg **Fig 11.2** |
| **11.1.2.2 Assembly**    Z_importante.jpg **Important**       * Always replace the gasket **G** every time it is disassembled.  1. Insert the gasket **G** in the seat **K** of the hose **E** . 2. Insert the hose **E** in the crankcase **H** . | Fig._11.3.jpg **Fig 11.3** |
| 1. Tighten the oil dipstick hose **E** using the screw **D** on the manifold **L** (Tightening torque of **10 Nm** ). | Fig._11.4.jpg  **Fig 11.4** |
| **NOTE:** Check the integrity of the gaskets **J.**   1. Insert the dipstick **B** inside the hose **E** . | Fig._11.5.jpg **Fig 11.5** |

## Heater (replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.2.1 Disassembly**   1. Undo the screws **A** and the relevant washers and remove the earth cable **B** . 2. Remove the flange **C** and the manifold **D** . 3. Remove the heater **E** and the relevant gaskets **F** . | Fig._11.6.jpg **Fig 11.6** |
| **11.2.2 Assembly**    Z_importante.jpg **Important**       * Always replace gaskets **F** , with each assembly.      1. In sequence, fit the manifold **G** with the gasket **F** , the new heater **E** , the second gasket **F** , the flange **C,** the washers **H** , the screws **A** and the cable **B** . 2. Secure the flange **H** with the screws **A** (tightening torque at **22 Nm** ). 3. Secure the earth cable **B** with the nut **J** and the relevant washer on the heater  **E** . | Fig._11.7_M.jpg **Fig 11.7** |

## Poly-V alternator belt (replacement and adjustment)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=198&parent=1000) . |  |
| 1. Loosen the nut **B** and manually tighten the screw **C** until it just touches the pulley pin **D (Fig. 11.9)** . | CAP_11_POLY-V_prot_galoppino_01.png   **Fig 11.8** |
| 1. Untighten the screw **E** by around **32mm (A)** . 2. Untighten the screw **C** .     **NOTE:** The belt tensioner pulley **F** should move towards the arrow **G** . If it does not, please move it manually. | CAP_11_POLY-V_prot_galoppino_02.png  CAP_11_POLY-V_prot_galoppino_03.png **Fig 11.9** |
| 1. Remove the V-Belt **H** and install the new one.     **NOTE:** Ensure that the internal profile of belt **H** is properly inserted into the grooves of the pulley **A** (as illustrated in **D1 e D2** ). | CAP_11_POLY-V_prot_galoppino_04.png   **Fig 11.10** |
| 1. Tighten capscrew **C** , to shift gudgeon **D** fully to the bottom of the grooved guide. 2. Tighten capscrew **E** (tightening torque at **45Nm** ). 3. Hold the screw **C** still with a key, and tighten the screw **B** on the plate **L** to secure the screw **C** (tightening torque at **45Nm** ). 4. Check, in point **P (Fig. 11.8)** ,the tension of the belt. Check by the appropriate tool that at point **p** the tension value is between **149 and 196 Hz** .     **NOTE:** After the engine has been in operation for around 15 minutes, repeat point **8** . | CAP_11_POLY-V_prot_galoppino_05.png   **Fig 11.11** |

## Tightening pulley and alternator for Poly-V belt

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=198&parent=1000) . |  |
| **11.4.1 Disassembly**   1. Perform the operations from [**point 1 to 3 of**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=178&parent=1000) [**Par. 11.3**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=178&parent=1000) *.* 2. Remove the belt **H (** [**Fig. 11.10**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=178&parent=1000) **)** . 3. Undo and remove the screw **A** . 4. Fully undo the screw **B** and remove the tightening pulley **C** . | CAP_11_POLY-V_prot_galoppino_06.png   **Fig 11.12** |
| 1. Undo the screws **D** and remove the plate **E** and the pin **F** . | imm11.13.jpg **Fig 11.13** |
| 1. Undo the screws **G and H** remove the alternator **L** . | imm11.14.jpg **Fig 11.14** |
| 1. Undo the screws **M** and remove the bracket **N** . | imm11.15.jpg **Fig 11.15** |
| **11.4.2** **Assembly**   1. Secure the bracket **N** using the screws **M** on the cylinder head **P** (tightening torque at **25 Nm** ). | imm11.16.jpg **Fig 11.16** |
| 1. Insert the screw **H** into the fixing hole on the alternator **L** . 2. Insert the spacer **R** on the screw **H** (between the alternator and crankcase). 3. Tighten the screw manually **H** onto the crankcase **Q** . 4. Orientate the second fixing hole of the alternator **L** with the hole of the bracket **N** , secure the alternator **L** using the screw **G** (tightening torque at **25 Nm** ) onto the bracket **N** and then the screw **H** (tightening torque at **25 Nm** ). | imm11.17.jpg **Fig 11.17** |
| 1. Insert the pin **F** in the plate slot **E** . 2. Orientate the pin **F** with the surface **S** (support for screw **A** ) upwards. 3. Secure the plate **E** using the screws **D** on the bracket **N** (tightening torque at **25 Nm** ). | imm11.18.jpg **Fig 11.18** |
| 1. Insert the screw **B** in the plate **C1** and pulley **C** . 2. Manually tighten the screw **B** onto the pin **F** up to the stop; Undo the screw **B** again by one turn.     **NOTE:** The screw **B** must protrude by about 32 mm **(A)** from the surface of the tightening pulley **C** (see detail **X** ).     1. Install the new belt **H** **(Fig. 11.10)** . 2. Tighten the screw **A** onto the plate **E** up to the stop on the pin **F** . 3. Perform the operations from point **6 to 8** **of *Par. 11.3*** . | CAP_11_POLY-V_prot_galoppino_07.png   **Fig 11.19** |

## Idler gear (for 3rd / 4th PTO)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.3.1 Disassembly**   1. Undo the screw **A** and remove the gear unit **B** . | imm11.20.jpg **Fig 11.8** |
| 2.   Remove the retainer ring **C** from the seat of the pin **D** . 3.   Remove the shoulder washer **E** , the gear **B** , the shoulder ring **F** and the bushing **G** from the pin **D** . | imm11.21.jpg  **Fig 11.9** |
| **11.3.2 Assembly**   1. Fit into the pin **D** : - The shoulder ring **F** (of least thickness) - The gear **B** - The shoulder ring **E** - The retainer ring **C** . 2. Insert the bushing **G** on the crankcase **L** . | imm11.22.jpg   **Fig 11.10** |
| Z_importante.jpg **Important**       * Always replace the washer **H** every time it is disassembled. **Modified component, see service letter 700019 -** **700021 .** * Check that the perforated screw **A** is free from impurities inside it.      1. Position the gear unit **B** on the hole **J** using the bushing **G** to centre. 2. Secure the gear **B** using the screw **A** inserting the washer **H** (tightening torque at **see service letter 700019 -** **700021** ). | Fig._11.11.jpg  **Fig 11.11** |

## 3rd PTO (replacement)

 **Fig 11.12**

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.4.1 Disassembly**   1. Undo the screws **A** and remove the pump **B** . | 11.13.jpg **Fig 11.13** |
| 1. Remove the centring ring **C** and the relative gaskets 2. Undo the screws **N** . | 11.14.jpg **Fig 11.14** |
| 1. Remove the flange **F** with the components **D,** **E** , **G** and **H** in the direction of the arrow **P** . 2. Remove the gasket **J** . | 11.15.jpg **Fig 11.15** |
| 1. Remove the retainer ring **D** and the shoulder washer **E** . 2. Remove the gear **H** and the shoulder ring **G** from the flange **F** in the direction of the arrow **Q** . | imm11.28.jpg **Fig 11.16** |
| **11.4.2 Assembly**    Z_importante.jpg **Important**       * Always replace the gasket **J** after each assembly. * Lubricate the gear H with oil. * It is mandatory to replace the screws **N** or apply a few beads of **Loctite 2701** .  1. Insert the gear H in the flange **F** in the direction of the arrow **R** inserting the shoulder ring **G** . 2. Insert the shoulder ring **E** on the flange **F** and clamp the gear **H** using the retainer ring **D** . 3. Position the flange **F** on the crankcase **K** inserting the gasket **J** , and inserting the gear **H** up to the stop on the bearing **L** ( **Fig. 11.31** ). | imm11.29.jpg **Fig 11.17**Fig._11.18.jpg **Fig 11.18** |
| 1. Secure the flange **F** using the screws **N** (tightening torque at **25 Nm** ).     Z_importante.jpg **Important**       * Always replace the gaskets **P** and **Q** at each assembly.  1. Insert the centring ring **C** in the flange **F** up to the stop. | Fig._11.19.jpg **Fig 11.19** |
| 1. Insert the pump **B** on the flange **F** engaging the gear **H** . 2. Secure the pump **B** using the screws **A** on the flange **F** (tightening torque at **25 Nm** ). | Fig._11.20.jpg **Fig 11.20** |

## 4th PTO (replacement)

 **Fig 11.21**

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.5.1 Disassembly**   1. Undo the screws **A** and remove the pump **B** . | imm11.34.jpg **Fig 11.22** |
| 1. Undo the screws **C** and remove the flange **D** . | Fig._11.23.jpg **Fig 11.23** |
| 1. Undo the screws **E** and remove the cover **F** . | Fig._11.24.jpg **Fig 11.24** |
| 1. Undo the screws **G** and remove the flange **K** with the components **H** , **J** , **M** and **N** . | Fig._11.25.jpg **Fig 11.25** |
| 1. Remove the retainer ring **H** and the shoulder ring **J** from the flange **K** . 2. Remove the gear **N** and the shoulder ring **M** from the flange **K** . | imm11.38.jpg **Fig 11.26** |
| **11.5.2 Assembly**    Z_importante.jpg **Important**       * Always replace the shoulder ring **J** after each assembly. * Lubricate the gear **N** with oil. * It is mandatory to replace the screws **G** or apply a few beads of **Loctite 2701** .  1. Insert the gear **N** in the flange **K** in the direction of the arrow **W** inserting the shoulder ring **M** . 2. Insert the shoulder ring **J** on the flange **K** and clamp the gear **N** using the retainer ring **H** . | imm11.39.jpg **Fig 11.27** |
| 1. Position the flange **K** on the crankcase **Q** inserting the gasket **P** , and inserting the gear **N** up to the stop on the bearing **R** ( [**Fig. 11.41**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=348&parent=1136) ). 2. Secure the flange **K** using the screws **N** (tightening torque at **25 Nm** ). | Fig._11.28.jpg **Fig 11.28** |
| Z_importante.jpg **Important**       * Always replace the gasket **V** after each assembly.  1. Insert the gasket **V** on the cover **F** , insert and position the cover **F** on the flange **K** . 2. Secure the cover **F** using the screws **E** on the flange **K** (tightening torque at **25 Nm** ) | Fig._11.29.jpg **Fig 11.29** |
| Z_importante.jpg **Important**       * Always replace the gasket **T** after each assembly.  1. Position and secure the flange **D** using the screws **C** on the crankcase **S** (tightening torque at **10 Nm** ). | Fig._11.30.jpg **Fig 11.30** |
| Z_importante.jpg **Important**       * Always replace the gasket **U** after each assembly.  1. Position the gasket **U** on the flange  **D** . 2. Secure the pump B using the screws A on the flange D (tightening torque at **25 Nm** ). | Fig._11.31.jpg **Fig 11.31** |

## 3rd + 4th PTO (configurations)



**Fig. 11.32**

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| **11.6.1 Information**  Hydraulic pumps on the 3rd and 4th PTO can be installed at the same time. In some configurations, there is also the centering ring **C** on the 4th PTO.    Z_importante.jpg **Important**       * For disassembly or installation, refer to [**Par. 11.5**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=344&parent=1136) **,** [**Par. 11.6**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=345&parent=1136) **and** [**Par. 11.7**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=346&parent=1136) **.** * Always replace the gasket of the rings **B** and **C** and flanges **D** and **K** at each assembly. * Lubricate the gear **H** with oil. | Fig._11.33.jpg  **Fig. 11.33** |

## Balancer device (replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.7.1 Disassembly**   1. Perform the operations described in [**Par. 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=290&parent=1136) . 2. Undo the screws **A** and remove the oil sump **B** . | Fig._11.34.jpg **Fig 11.34** |
| 1. Undo the screws **C** and remove the hose **D** . | Fig._11.35.jpg **Fig 11.35** |
| 1. Undo the screws **E** and remove the shaft support box **F** . | Fig._11.36.jpg **Fig 11.36** |
| 1. Undo the screws **G** and remove the plate **H** . | imm11.48.jpg **Fig 11.37** |
| 1. Remove the shafts **J** and **K** in the direction of the arrow **L** from box **F** . | imm11.49.jpg **Fig 11.38** |
| **11.7.2 Assembly**   1. Lubricate the bushings **V** with **Molikote** grease. 2. Insert the shafts **J** and **K** inside the box **F** in the direction of the arrow **M** . | imm11.50.jpg **Fig 11.39** |
| 1. Make sure that the shafts **J** and **K** inside the box **F** observe the marks **N** and that the shaft **J** with the gear indicated by letter " **S** " stamped on it is on the left with respect to the box **F** . | imm11.51.jpg **Fig 11.40** |
| 1. Secure the plate **H** using the screws **G** on the box **F** (tightening torque at **8 Nm** ). | imm11.52.jpg **Fig 11.41** |
| 1. Manually tighten the retainer screw [**ST\_15**](https://iservice.lombardini.it/jsp/Template2//jsp/Template2/manuale.jsp?id=339&parent=1136.jsp?id=191&parent=1000) on the box **F** by slightly rotating the shaft **K** , centring the hole on it using the [**ST\_15**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=339&parent=1136) , to lock the device. | imm11.53.jpg **Fig 11.42** |
| 1. Rotate the crankshaft and clamp it on the TDC ( **Ref. P** upwards) using the tool [**ST\_34**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=191&parent=1000) secured in place of the starter motor (detail **Q** ). | 11.7.jpg **Fig 11.43** |
| 1. Position the box **F** on the surface **R** of the crankcase observing the reference bushings. 2. Secure the box **F** using the screws **E** and **Loctite 242** inserting the washers **U** (tightening torque at **50 Nm** ). 3. Remove the retainer screw [**ST\_15**](https://iservice.lombardini.it/jsp/Template2//jsp/Template2/manuale.jsp?id=339&parent=1136.jsp?id=191&parent=1000x) from the box **F** . | Fig._11.44.jpg **Fig 11.44** |
| Z_importante.jpg **Important**       * Check that the retainer screw [**ST\_15**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=339&parent=1136) is not present on the box **F** ( **Fig. 11.42** ). * Always replace the gasket **W** after each assembly. * Lubricate the gasket **W** with oil before assembling it.  1. Insert the gasket **W** in the seat on the flange of the oil hose **D** . 2. Secure the oil intake hose **D** using the screws **C** . 3. Perform all operations described in [**Par. 9.4.3**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=321&parent=1136) to assemble the oil sump. | Fig._11.45_M.jpg **Fig 11.45** |

## Air filter (cartridge replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| 1. Release the two hooks **A** and remove the cover **B** from the body **C** . 2. Remove the cartridges **D** . | Fig._11.46.jpg **Fig 11.46** |
| 1. Insert the new cartridge **D** and both of them inside the filter body **C** . 2. Secure the cover **B** via the hooks **A** . | Fig._11.47.jpg  **Fig. 11.47** |

## Remote oil filter (disassembly and assembly)

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| Z_importante.jpg **Important**       * **Modified component, see service letter 700018** **.**   **11.9.1 Disassembly**   1. Perform the operations described in [**Par. 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=290&parent=1136) **.**     Z_importante.jpg **Important**       * + Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) .   + For the replace the cartridge, please refer to operation number **6 (Par. 11.9.1) and 2 (Par. 11.9.2)** .   + For the disassembly of the pipes **B** **and** **C,** lock with a tool the fittings **K, H (Fig. 11.49) and L (Fig. 11.50)** in order to prevent their lose together with the nuts A , with the consequent of oil leakage.  1. Undo the nuts A and remove the hoses **B** **and C** . | Fig._11.48.jpg **Fig 11.48** |
| 1. Unscrew and remove the fitting **H** with its copper gasket from the head **J** . 2. Unscrew the fittings **K** and remove the copper gaskets from the head **J** . | Fig._11.49.jpg **Fig 11.49** |
| 1. Unscrew the fittings **L** and remove the copper gaskets from the support **M** . 2. Unscrew the cartridge **N** with gasket from the support **M** . | Fig._11.50.jpg  **Fig 11.50** |
| **11.9.2 Assembly**      Z_importante.jpg **Important**       * Always replace the gaskets **V** after each assembly.  1. Clamp the fittings **H** on the support **M** inserting the gasket **V** (tightening torque at **65 Nm** ). 2. Lubricate the gasket **W** and clamp the cartridge **N** on the support **M** (tightening torque at **20 Nm** ).       Z_importante.jpg **Important**       * Always replace the gaskets **P, Q, and U** at each assembly. * Lubricate the gaskets **P, Q** with oil before assembling them.  1. Insert the gasket **P** on the seat of the fitting **K** . 2. Insert the head **J** on the fitting **K** and the gasket **Q** in the seat of the head **J** . 3. Clamp the fitting **K** (tightening torque at **45 Nm + Loctite 2701** ). 4. Clamp the fitting **H** on the flange **J** inserting the gasket **U** (tightening torque at **65 Nm** ). | Fig._11.51.jpg  **Fig 11.51** |
| 1. Connect the hose **B** to the central fitting of support **M** and of flange **J** . 2. Connect the hose **C** to the side fitting of the support **M** and of head **J** . 3. Clamp the nuts **A** on the head **J** (tightening torque at **48 Nm** ). 4. Clamp the nuts **A** on the support **M** (tightening torque at **48 Nm** ).     Z_importante.jpg **Important**       * Check the tightening of the fittings **H (Fig. 11.51) and L (Fig. 11.52)** (tightening torque at **65 Nm** ). | Fig._11.52.jpg **Fig 11.52** |

## Intake circuit (replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.10.1 Air filter disassembly**   1. Release the clamp **B** . 2. Untighten the screws **A** and remove the filter **C** . | Fig._11.53.jpg  **Fig. 11.53** |
| **11.10.2 Manifold air filter disassembly**   1. Release the clamp **D** . 2. Remove the manifold **E** . 3. Loosen capscrews **G** and remove plate **H** . | Fig._11.54.jpg  **Fig. 11.54** |
| **11.10.3 Air filter manifold assembly**   1. Insert the fitting **G** on the flange **H** . 2. Tighten the clamps **D** . 3. Fasten plate **G** by means of capscrews **F** (tightening torque at **25 Nm** ). | Fig._11.55.jpg  **Fig. 11.55** |
| **11.10.4 Air filter assembly**   1. Insert the filter **C** into the manifold **E** . 2. Tighten the clamps **B** . 3. Tighten the screws **A** (tightening torque at  **25 Nm** ) | Fig._11.56.jpg  **Fig. 11.56** |

## Muffler (replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.11.1 Disassembly**   1. Undo the screw **A** . 2. Undo the nuts **B** . 3. Remove the muffler **C** . | Fig._11.57.jpg  **Fig. 11.57** |
| **11.11.2 Assembly**   1. Position the gasket **D** and the muffler **C** on the intake manifold **E** . 2. Position the muffler **C** on the bracket **F** and tighten the screws **A** (tightening torque at **25 Nm** ). 3. Tighten the nuts **B** (tightening torque at **25** **Nm** ). | Fig._11.58.jpg  **Fig. 11.58** |

## Cooling circuit (replacement)

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| Z_importante.jpg  **Important**       * Before proceeding with operation, read  [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . |  |
| **11.12.1 Radiator disassembly**   1. Release the clamp **A** . 2. Remove the sleeve **B** . | Fig._11.59.jpg  **Fig. 11.59** |
| 1. Loosen the 4 capscrews **C** and capscrew **E** . | Fig._11.60.jpg  **Fig. 11.60** |
| 1. Remove guard **D** . | Fig._11.61.jpg  **Fig. 11.61** |
| 1. Release the clamp **H** . 2. Release the pipe **L** from the radiator **M** . | Fig._11.62.jpg  **Fig. 11.62** |
| 1. Undo nuts **N** and remove the radiator **M** . | Fig._11.63.jpg  **Fig. 11.63** |
| **11.12.2 Fan disassembly**   1. Undo the screws **P** and remove the plate **Q** from the fan **R** . | Fig._11.64.jpg  **Fig. 11.64** |
| **11.12.3 Fan assembly**   1. Assemble the fan **R** on the pulley **U** . 2. Position the plate **Q** on the fan **R** . 3. Fasten the fan **R** by using the screws **P** and interposin washers **S** (tightening torque at **10 Nm** ). | Fig._11.65.jpg  **Fig. 11.65** |
| **11.12.4 Radiator assembly**   1. Position the radiator on the support **V.** 2. Fasten radiator **M** on support **V** by means of nut **N** inserting washer **W** (tightening torque at **20 Nm** ). | Fig._11.66.jpg  **Fig. 11.66** |
| 1. Fit the sleeve **L** on the fitting of the radiator **M** . 2. Tighten the clamp **H** . | Fig._11.67.jpg  **Fig. 11.67** |
| 1. Position bulkhead **D** onto shroud **F** . | Fig._11.68.jpg  **Fig. 11.68** |
| 1. Fasten brace **G** by means of capscrews **E** (tightening torque at **25 Nm** ). 2. Fasten guard **D** by means of capscrews **C** (tightening torque **10 Nm** ). | Fig._11.69.jpg  **Fig. 11.69** |
| 1. Fit the sleeve **B** on the fitting of the radiator **M** and of the thermostat cover **Y** . 2. Tighten the clamps **A** . | Fig._11.70.jpg  **Fig. 11.70** |

## Engine feet (information)

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| **NOTE** : Component not necessarily supplied by **KOHLER** . The representation of the engine is purely indicative.  Important   * The motor supports **A** can be installed on the bell **B** or on the crankcase **C** by using the screws **D** (tightening torque at **50 Nm** ). | Fig._11.71.jpg  **Fig. 11.71** |

## Oil sump with supporting structure

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| **11.14.1 Flywheel (J) disassembly**   1. Execute the operations described in [**Par. 7.10.1**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=306&parent=1136) .   **11.14.2 Plate/flange housing (L) disassembly**   1. Loosen supplementary capscrews **A** and **B** . 2. Execute the operations described in [**Par. 7.10.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=306&parent=1136) . 3. Remove housing or plate **L** . | 11_72.jpg  **Fig. 11.72** |

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| **11.14.3 Oil sump disassembly**   1. Execute the operations described in [**Par. 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=290&parent=1136) . 2. Loosen capscrews **C** and remove bypass tube **D** . 3. Loosen capscrews **E** and remove oil sump **F** . | 11_73.jpg  **Fig. 11.73** |

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| **11.14.4 Oil sump assembly**   1. Make sure contact surfaces **G** of oil sump **F** and crankcase **H** have no impurities. 2. Apply a sealing bead of approximately **2.5 mm** ( **Loctite 5660** ) onto surface **G** of crankcase **H** . 3. Place oil sump **F** onto crankcase **H** in correspondence with the fastening holes (use tool [**ST\_18**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=339&parent=1136) ). | 11_74.jpg  **Fig. 11.74** |

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| 11_75.jpg  **Fig. 11.75** | |

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| 1. Apply capscrews **E** into the fastening holes and use torque at **10 Nm** . 2. Loosen capscrews **E** , leaving approximately 1 mm leeway ( **position A** ) between the neck surface of capscrews **E** and oil sump **F** . 3. Place flange housing or plate **L** onto crankcase **H** , complying with centring tap pins **M** . 4. Using 2 capscrews **A** , fasten housing or plate **L** onto crankcase **H** (tightening torque at  **20 Nm** ). 5. Using 2 capscrews **A** , fasten housing or plate L onto oil sump **F** (tightening torque at **20 Nm** ). | 11_76.jpg  **Fig. 11.76** |

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| 11_77.jpg    **Fig. 11.77** | |

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| 1. Fasten oil sump **F** by tightening capscrews **E** and strictly following the order shown in **Fig. 11.77** (tightening torque at  **20 Nm** ). 2. Loosen capscrews **A** and remove housing or plate **L** ( **Fig. 11.76** ). 3. Fasten oil sump **F** by tightening capscrews **E** and strictly following the order shown in **Fig. 11.77** (tightening torque at  **47 Nm** ). Loosen the screw **1** again and tighten it to **47 Nm** . | 11_78.jpg  **Fig. 11.78** |

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| 1. Insert gaskets **N** into seats **P** of bypass tube **D** . 2. Fasten bypass tube **D** onto oil sump **F** using capscrews **C** (tightening torque at **10 Nm** ). | 11_79.jpg  **Fig. 11.79** |

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| **11.14.5 Flange plate / housing assembly**   1. Execute the operations described in **point 6** of **Par. 11.14.4** . 2. Fasten housing or plate **L** by using capscrews **A** and strictly following the order shown in **Fig. 11.79** (tightening torque at **85 Nm** ). 3. Fasten housing or plate **L** by using capscrews **B** (tightening torque at **270 Nm** ).   **11.14.6 Flywheel assembly**   1. Execute the operations described in [**Par. 9.5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=322&parent=1136) **.** | 11_80.jpg  **Fig. 11.80** |

## Oil sump 15L

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| **11.15.1** **Disassembly**   1. Perform the operations indicated in [**Par. 5.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=121&parent=1000) . 2. Loosen the screws **A** and remove the oil sump **B** . 3. Loosen the screws **A1** and remove the oil sump **B1** flange. | 11_xx_coppa_Liebherr_01.png  11_xx_coppa_Liebherr_02.png  **Fig. 11.81** |
| **11.15.2** **Assembly**   1. Apply a bead of approx. **2.5 mm** of sealant ( **Loctite 5660** ) inside the channel **B2** of the oil sump **B1** flange. 2. Position the oil sump **B1** on the crankcase **H** at the fixing holes (use the tool [**ST\_18**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=822&parent=1000) ). 3. Screw the screws **A1** in the fixing holes. | 11_xx_coppa_Liebherr_03.png  11_xx_coppa_Liebherr_04.png  11_xx_coppa_Liebherr_05.png  **Fig. 11.82** |
| 1. To fix the sump **B1** , tighten the screws **A1** by strictly following the order indicated in the **Fig. 11.83** (tightening torque of **25 Nm** ). 2. Loosen the screw **1** again and tighten it to **25 Nm** . | 11_xx_coppa_Liebherr_06.png  **Fig. 11.83** |
| 1. Apply a bead of approx. **2.5 mm** of sealant ( **Loctite 5660** ) inside the channel **B3** of the oil sump **B** . 2. Position the oil sump **B** on the oil sump **B1** flange at the fixing holes (use the tool [**ST\_18**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=822&parent=1000) ). 3. Screw the screws **A** in the fixing holes. | 11_xx_coppa_Liebherr_08.png  11_xx_coppa_Liebherr_09.png  **Fig. 11.84** |
| 1. To fix the sump **B** , tighten the screws **A** by strictly following the order indicated in the **Fig. 11.85** (tightening torque of **25 Nm** ). 2. Loosen the screw **1** again and tighten it to **25 Nm** . | 11_xx_coppa_Liebherr_10.png  **Fig. 11.85** |

## Crankcase oil filter - Lengthwise assembly

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| **11.16.1** **Disassembly**   1. Perform the operations indicated in **Par. 5.2.**     Z_importante.jpg **Important**       * Before performing the operation, check [**Par. 3.3.2**](https://iservice.lombardini.it/jsp/Template2/manuale.jsp?id=283&parent=1136) . * To replace only the cartridge, refer to operations **2** ( **Par. 11.16.1** ) and **6** ( **Par. 11.16.2** ).  1. Unscrew the cartridge **A** . | 11_xx_Filtro_olio_Liebherr_01.png  **Fig 11.86** |
| 1. Unscrew and remove the oil pressure switch **B** together with its copper gasket from the support **E** . 2. Unscrew the union **C** together with its copper gasket. 3. Loosen the screws **D** and remove the support **E** . | 11_xx_Filtro_olio_Liebherr_02.png **Fig 11.87** |
| **11.16.2** **Assembly**      Z_importante.jpg **Important**       * Replace the gaskets **E1** , **C1** , **C2** and **B1** at every assembly. * Lubricate the gaskets **E1** , **C1** with oil before performing the assembly.  1. Fit the support **E** on the crankcase **F** using the screws **D** and placing the gasket **E1** in-between; do not tighten the screws **D** . 2. Insert the gasket **C2** and **C1** on the union **C** . 3. Apply **Loctite 2701** on the thread of the union **C** , fix the union **C** to the crankcase **F** (tightening torque of **25 Nm** ). 4. Tighten the screws **D** (tightening torque of **10 Nm** ). | 11_xx_Filtro_olio_Liebherr_03.png  11_xx_Filtro_olio_Liebherr_04.png **Fig 11.88** |
| 1. Fix the oil pressure switch **B** to the support **E** placing the gasket **B1** in-between (tightening torque of **25 Nm** ). | 11_xx_Filtro_olio_Liebherr_05.png  **Fig 11.89** |
| 1. Lubricate the gasket of the cartridge **A** and secure the cartridge **A** to the support **E** (tightening torque of **20 Nm** ). | 11_xx_Filtro_olio_Liebherr_06.png  **Fig 11.90** |

