# 4 Technical data

## 4.1 Testing and setting data

| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| General engine data | | | | | | | |
| P00 01 | Length of engine | about all data | TCD 2015 | | V06 | 1200 | mm |
| | Length of engine with connection housing | | TCD 2015 (Railway) | | V06 | 1107 | mm |
| | | | TCD 2015 (Railway) | | V08 | 1454 | mm |
| P00 02 | Width of engine | about all data | TCD 2015 | | V06 | 1200 | mm |
| | Width of engine with connection housing | | TCD 2015 (Railway) | | V06 | 1125 | mm |
| | | | TCD 2015 (Railway) | | V08 | 1120 | mm |
| P00 03 | Height of engine | about all data | TCD 2015 | | V06 | 1300 | mm |
| | Height of engine with connection housing | | TCD 2015 (Railway) | | V06 | 835 | mm |
| | | | TCD 2015 (Railway) | | V08 | 837 | mm |
| P00 04 | Engine weight according to DIN 70020-A | without operating media | TCD 2015 | | V06 | approx. 1020-1200 | kg |
| | | | TCD 2015 | | V08 | 1244 | kg |
| | | | TCD 2015 (Railway) | | V06 | 920 | kg |
| | | | TCD 2015 (Railway) | | V08 | 1160 | kg |
| P00 10 | Working principle | | TCD 2015 | | | 4 stroke | - |
| P00 20 | Combustion process | | TCD 2015 | | | Direct injection | - |
| P00 30 | Total volume | | TCD 2015 | | V06 | 11906 | $cm^3$ |
| | | | TCD 2015 | | V08 | 15874 | $cm^3$ |
| P00 31 | Bore | | TCD 2015 | | | 132 | mm |

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| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P00 32 | Stroke | | TCD 2015 | | | 145 | mm |
| P00 40 | Compression ratio | | TCD 2015 | | | 17.5:1 | - |
| | | | TCD 2015 (Railway) | | | 16.5:1 | - |
| P00 50 | Direction of rotation | looking onto the flywheel | TCD 2015 | | | counter-clockwise | - |
| P00 51 | Compression pressure | | TCD 2015 | | | 3200-3400 (32-34) | kPa (bar) |
| P00 70 | Spark gap | | TCD 2015 | | V06 | 120 | ° |
| P00 71 | Ignition sequence | | TCD 2015 | | V06 | A1-B3-A3-B2-A2-B1 | - |
| | | | TCD 2015 | | V08 | A1-B4-A4-B1-B3-A3-B2-A2 | - |
| P00 81 | Cylinder and side view | | TCD 2015 | | | T00 81 | - |
| Cylinder head | | | | | | | |
| P01 01 | Valve seat insert, bore (inlet) | Standard fit H6 | TCD 2015 | | | 47.500 $\overset{+0.0}{0}$ | mm |
| P01 02 | Valve seat insert, bore (outlet) | Standard | TCD 2015 | | | 44.500 $\overset{+0.0}{0}$ | mm |
| P01 03 | Valve seat insert, bore (inlet) | 1. oversize level | TCD 2015 | | | 47.800 $\overset{+0.0}{0}$ | mm |
| P01 04 | Valve seat insert, bore (outlet) | 1. oversize level | TCD 2015 | | | 44.300 $\overset{+0.0}{0}$ | mm |
| P01 05 | Valve guide, bore in cylinder head | Standard | TCD 2015 | | | 15.000 $\overset{+0.0}{0}$ | mm |
| P01 06 | Valve guide, bore in cylinder head | 1. oversize level | TCD 2015 | | | 15.100 $\overset{+0.0}{0}$ | mm |
| P01 07 | Valve guide, bore in cylinder head | 2. oversize level | TCD 2015 | | | 15.200 $\overset{+0.0}{0}$ | mm |
| P01 08 | Cylinder head, height | Standard | TCD 2015 | | | 120 | mm |
| P01 09 | Cylinder head, height | Undersize | TCD 2015 | | | 119.70 | mm |
| Valve guide | | | | | | | |
| P01 11 | Valve guide, external diameter | Standard | TCD 2015 | | | 15.0 | mm |

| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P01 12 | Valve guide, external diameter | 1. oversize level | TCD 2015 | | | 15.1 | mm |
| P01 13 | Valve guide, external diameter | 2. oversize level | TCD 2015 | | | 15.2 | mm |
| P01 14 | Valve guide, inside diameter (inlet) | Standard | TCD 2015 | | | 8.030 $^{+0.0}_{0}$ | mm |
| P01 15 | Valve guide, inside diameter (outlet) | Standard | TCD 2015 | | | 8.030 $^{+0.0}_{0}$ | mm |
| Valve seat insert | | | | | | | |
| P01 21 | Valve seat insert, outside diameter (inlet) | Standard | TCD 2015 | | | 47.5 $^{+0.0}_{+0.0}$ | mm |
| P01 22 | Valve seat insert, outside diameter (outlet) | Standard | TCD 2015 | | | 44.0 $^{+0.0}_{+0.0}$ | mm |
| P01 23 | Valve seat insert, outside diameter (inlet) | 1. oversize level | TCD 2015 | | | 47.800 $^{+0.0}_{+0.0}$ | mm |
| P01 24 | Valve seat insert, outside diameter (outlet) | 1. oversize level | TCD 2015 | | | 44.300 $^{+0.0}_{+0.0}$ | mm |
| Valve | | | | | | | |
| P01 31 | Valve shaft diameter (inlet) | Standard | TCD 2015 | | | 7.97 $^{+0.0}_{-0.0}$ | mm |
| P01 32 | Valve shaft diameter (outlet) | Standard | TCD 2015 | | | 7.96 $^{+0.0}_{-0.0}$ | mm |
| P01 33 | Valve shaft clearance (inlet) | Wear limit | TCD 2015 | | | 0.12 | mm |
| P01 34 | Valve shaft clearance (outlet) | Wear limit | TCD 2015 | | | 0.14 | mm |
| P01 35 | Valve edge thickness, valve head (inlet) | Standard | TCD 2015 | | | 1.9 $^{+0.}_{-0.}$ | mm |
| P01 36 | Valve edge thickness, valve head (outlet) | Standard | TCD 2015 | | | 1.5 $^{+0.}_{-0.}$ | mm |
| P01 37 | Valve head diameter (inlet) | Standard | TCD 2015 | | | 46.0 $^{+0.}_{-0.}$ | mm |
| P01 38 | Valve head diameter (outlet) | Standard | TCD 2015 | | | 42.0 $^{+0.}_{-0.}$ | mm |
| Valve seat | | | | | | | |
| P01 45 | Valve stand back dimension (inlet) | Standard<br>(from the center of the valve head to the cylinder head sealing surface) | TCD 2015 | | | 2.5 | mm |
| | | Wear limit<br>(from the center of the valve head to the cylinder head sealing surface) | TCD 2015 | | | 1.20 - 1.60 | mm |

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| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P01 46 | Valve stand back dimension (outlet) | Standard (from the center of the valve head to the cylinder head sealing surface) | TCD 2015 | | | 2.4 | mm |
| | | Wear limit (from the center of the valve head to the cylinder head sealing surface) | TCD 2015 | | | 1.25 - 1.65 | mm |
| Valve spring | | | | | | | |
| P01 51 | Valve spring length | untensioned, normal | TCD 2015 | | | 58.7 | mm |
| | Valve spring wire diameter | | | | | 4.25 | |
| Valve clearance | | | | | | | |
| P01 61 | Valve clearance (inlet) | with rotation angle disc | TCD 2015 | | | 90 +1 | ° |
| | | with cold engine with feeler gauge | | | | 0.25 ±0.05 | mm |
| P01 62 | Valve clearance (outlet) | with rotation angle disc | TCD 2015 | | | 108 +1 | ° |
| | | with cold engine with feeler gauge | | | | 0.30 ±0.05 | mm |
| P01 63 | Valve clearance setting | Valve overlap according to adjustment schematic | TCD 2015 | | | T01 63 | - |
| Rocker arm/bracket | | | | | | | |
| P01 72 | Rocker arm, bore, diameter (outlet) | | TCD 2015 | | | 28 +0.05 | mm |
| P01 73 | Rocker arm, bore, diameter (inlet) | | TCD 2015 | | | 28 +0.05 | mm |
| P01 74 | Rocker arm shaft (diameter) | | TCD 2015 | | | 28 -0.04 -0.06 | mm |
| P01 75 | Axial clearance of the toggle levers | Axial bearing clearance with cold engine | TCD 2015 | | | 0.2 - 0.4 | mm |

| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P01 93 | Roughness | Surface for cylinder head gasket | TCD 2015 | | | 10 | Rz |
| | | | | | | 20 | [Rmax] |
| | | Surface for cylinder head cover | TCD 2015 | | | 16 | Rz |
| | | | | | | 20 | [Rmax] |
| Main running gear | | | | | | | |
| Crankshaft | | | | | | | |
| Main journal | | | | | | | |
| P02 03 | Main journal, diameter | Standard | TCD 2015 | | | 108 -0.03 -0.05 | mm |
| P02 04 | Main journal, diameter | Undersize stage<br>3 stages | TCD 2015 | | | 0.25 each | mm |
| P02 06 | Main journal, unroundness | Wear limit | TCD 2015 | | | 0.010 | mm |
| P02 07 | Main journal, hardness | Standard | TCD 2015 | | | 50 +4 0 | HRC |
| Fit journal | | | | | | | |
| P02 11 | Fit bearing, width | Standard | TCD 2015 | | | 38 +0.0 | mm |
| P02 12 | Fit bearing, width | Oversize stage | TCD 2015 | | | 38.25 +0.0 | mm |
| P02 13 | Fit bearing, width | Limit value for oversize stage | TCD 2015 | | | 38.50 +0.0 | mm |
| Lifting journal | | | | | | | |
| P02 22 | Lifting journal, diameter | | TCD 2015 | | | 91 -0.03 -0.05 | mm |
| P02 23 | Lifting journal, diameter | Undersize stage<br>3 stages | TCD 2015 | | | 0.25 each | mm |
| P02 25 | Lifting journal, unroundness | Wear limit | TCD 2015 | | | 0.010 | mm |
| P02 26 | Radial run-out, crankshaft | maximum permissible deviation | TCD 2015 | | | 0.15 | mm |
| Main bearing | | | | | | | |
| P02 34 | Axial clearance of crankshaft | permissible | TCD 2015 | | | 0.205 - 0.392 | mm |

| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P02 35 | Thrust ring half, thickness | Standard<br>(upper and lower half) | TCD 2015 | | | 3.36 +0.0 | mm |
| P02 36 | Thrust ring half, thickness | 1. oversize stage=0.125 mm<br>(upper and lower half) | TCD 2015 | | | 3.485 +0.0 | mm |
| P02 37 | Thrust ring half, thickness | 2. oversize stage=0.125 mm<br>(upper and lower half) | TCD 2015 | | | 3.610 +0.0 | mm |
| Connecting rod | | | | | | | |
| P02 41 | Parallelism of the connecting rod | Permissible deviation (a) | TCD 2015 | | | max. 0.06 | mm |
| | | at a distance of (x) | | | | 100 | mm |
| P02 42 | Taper on periphery of the connecting rod | Permissible deviation (A) to (B) | TCD 2015 | | | max. 0.10 | mm |
| | | at a distance of (x) | | | | 100 | mm |
| P02 43 | Small end bush, inside diameter | installed, unmachined | TCD 2015 | | | 52.040 0 +0.0 | mm |
| P02 45 | Small end bush clearance between piston pin and small end bush | | TCD 2015 | | | 0.04 - 0.063 | mm |
| P02 46 | Assembly temperature of the small end bush | cooled in coolant to | TCD 2015 | | | approx. -40 | °C |
| P02 47 | Assembly temperature of the connecting rod | heated up in hot-air oven to | TCD 2015 | | | max. 220 | °C |
| Big end bearing | | | | | | | |
| P02 52 | Big end bearing shells, inside diameter | installed<br>identification (n) / top<br>lining spattered | TCD 2015 | | | 91.048 0 +0.0 | mm |
| P02 54 | Big end bearing | Undersize stage<br>3 stages | TCD 2015 | | | 0.25 each | mm |
| P02 55 | Big end bearing, bore in connecting rod | after separation and re-assembly of rod and cover | TCD 2015 | | | 95 +0.0 -0.0 | mm |
| P02 56 | Theoretical clearance between the big end bearing / lifting journal | | TCD 2015 | | | 0.060 - 0.136 | mm |
| P02 57 | Big end bearing clearance | Wear limit | TCD 2015 | | | 0.17 | mm |

| ID no. | Name | Information | Series | | Value | Unit |
|---|---|---|---|---|---|---|
| Piston pin | | | | | | |
| P02 61 | Piston pin, diameter | | TCD 2015 | | 51.992 - 52.000 | mm |
| P02 62 | Piston pin clearance | Wear limit | TCD 2015 | | 0.09 | mm |
| Piston | | | | | | |
| P02 71 | Piston, diameter | Measuring point 1 at height 22.5 mm (Identification of the installation position on the piston head) | TCD 2015 | | 132 -0.05 | mm |
| P02 72 | Piston, diameter | Measuring point 2 at height 87.5 mm (Identification of the installation position on the piston head) | TCD 2015 | | 132 -0.05 | mm |
| P02 73 | Piston, diameter | Measuring point 3 at height 122.7 mm (Identification of the installation position on the piston head) | TCD 2015 | | 132 -0.05 | mm |
| P02 75 | Piston projection | 1.4 = 1 hole (cylinder head gasket) | TCD 2015 | | -0.05 to 0.10 | mm |
| P02 76 | Piston projection | 1.6 = 2 holes (cylinder head gasket) | TCD 2015 | | 0.10 to 0.30 | mm |
| P02 77 | Piston projection | 1.8 = 3 holes (cylinder head gasket) | TCD 2015 | | 0.30 to 0.51 | mm |
| P02 78 | Piston pin, bore | | TCD 2015 | | 52 +0.01 | mm |
| Piston rings | | | | | | |
| P02 84 | Closed gap, piston ring 1 | Standard | TCD 2015 | | 0.35 - 0.45 | mm |
| | | Wear limit (identification TOP in direction of piston head) | | | 0.9 | mm |
| P02 85 | Closed gap, piston ring 2 | Standard | TCD 2015 | | 1.1 - 1.3 | mm |
| | | Wear limit (identification TOP in direction of piston head) | | | 1.4 | mm |

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| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P02 86 | Closed gap, piston ring 3 | Standard | TCD 2015 | | | 0.4 - 0.7 | mm |
| | | Wear limit (identification TOP in direction of piston head) | | | | 1.2 | mm |
| P02 87 | Axial clearance, 1st piston ring | Wear limit | TCD 2015 | | | Measure with trapezoidal groove wear gauge | - |
| P02 88 | Axial clearance, 2nd piston ring | Wear limit | TCD 2015 | | | 0.25 | mm |
| P02 89 | Axial clearance, 3rd piston ring | Wear limit | TCD 2015 | | | 0.15 | mm |
| Crankcase | | | | | | | |
| Camshaft bearing | | | | | | | |
| P03 11 | Bore diameter for camshaft bearing liner in the crankcase | | TCD 2015 | | | 75.000 $^{+0.0}_{0}$ | mm |
| P03 12 | Camshaft bearing liner, outside diameter | | TCD 2015 | | | 75.090 $^{+0.0}_{0}$ | mm |
| P03 13 | Camshaft bearing liner, inside diameter | | TCD 2015 | | | 69.990 $^{+0.0}_{0}$ | mm |
| | Camshaft bearing liner, wall thickness | | | | | 2.0493 $^{+0.0}_{0}$ | mm |
| P03 14 | Camshaft bearing liner, inside diameter | Wear limit | TCD 2015 | | | 70.100 | mm |
| P03 23 | Tappet bores, diameter | | TCD 2015 | | | 25.000 $^{+0.0}_{0}$ | mm |
| P03 24 | Tappet bores, diameter | Wear limit | TCD 2015 | | | 25.050 | mm |
| P03 25 | Installation depth of the crankshaft sealing ring (rear cover) | First assembly | TCD 2015 | | | 0.5 $^{+0.2}_{-0.2}$ | mm |
| | | Repairs | | | | 3.5 $^{+0.2}_{-0.2}$ | mm |
| P03 26 | Installation depth of the crankshaft sealing ring (genset support) | First assembly | TCD 2015 | | | 3 $^{+0.1}_{-0.1}$ | mm |
| | | Repairs | | | | 7 $^{+0.1}_{-0.1}$ | mm |
| Cylinder liners | | | | | | | |
| P03 31 | Cylinder bore | Standard | TCD 2015 | | | 132 $^{+0.1}_{-0.0}$ | mm |
| P03 35 | Fitting depth for cylinder liner | | TCD 2015 | | | 9.87 $^{+0.1}_{-0.0}$ | mm |

| ID no. | Name | Information | Series | | | Value | Unit |
|---|---|---|---|---|---|---|---|
| P03 36 | Collar height of cylinder liner | | TCD 2015 | | | 9.02 $^{0}_{-0.0}$ | mm |
| P03 37 | Thickness of shim | Standard | TCD 2015 | | | 1.0 $^{+0.1}_{-0.0}$ | mm |
| P03 39 | Overhang of cylinder liner | | TCD 2015 | | | 0.09 | mm |
| Control system | | | | | | | |
| Camshaft | | | | | | | |
| P04 31 | Camshaft bearing pin diameter | Standard | TCD 2015 | | | 70 $^{-0.05}_{-0.07}$ | mm |
| P04 35 | Axial clearance of the camshaft | | TCD 2015 | | | 0.25 - 0.75 | mm |
| P04 37 | Thickness of the gasket for axial clearance setting | | TCD 2015 | | | 0.3 | mm |
| P04 39 | Overhang of the parallel pin on the camshaft gear wheel | | TCD 2015 | | | 5.000 | mm |
| P04 43 | Axial clearance of the camshaft for injection pumps | | TCD 2015 | | | 0.2 - 0.45 | mm |
| P04 44 | Tooth edge clearance of the idler gear - idler gear to camshaft gear wheel | | TCD 2015 | | | 0.04 - 0.3 | mm |
| Speed governing system | | | | | | | |
| P05 91 | Clearance between speed governor (crankshaft) and flywheel | | TCD 2015 | | | 1.0 $^{+0.}$ | mm |
| P05 92 | Clearance between speed governor (camshaft) and camshaft gear wheel | | TCD 2015 | | | 0.3 - 0.9 | mm |
| Fuel system | | | | | | | |
| P07 19 | Plunger lift of the camshaft for injection pumps | see name plate | TCD 2015 | | | 4.00 | mm |
| P07 20 | Tooth edge clearance between gear wheel of the camshaft for injection pumps and camshaft gear wheel | | TCD 2015 | | | 0.04 - 0.3 | mm |
| Injection valve | | | | | | | |
| P07 52 | Nozzle opening pressure of the fuel injector | | TCD 2015 | | | 280 - 288 | bar |

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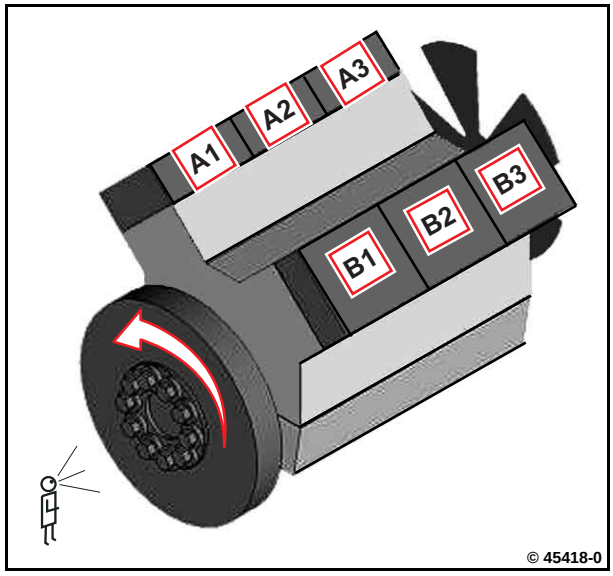
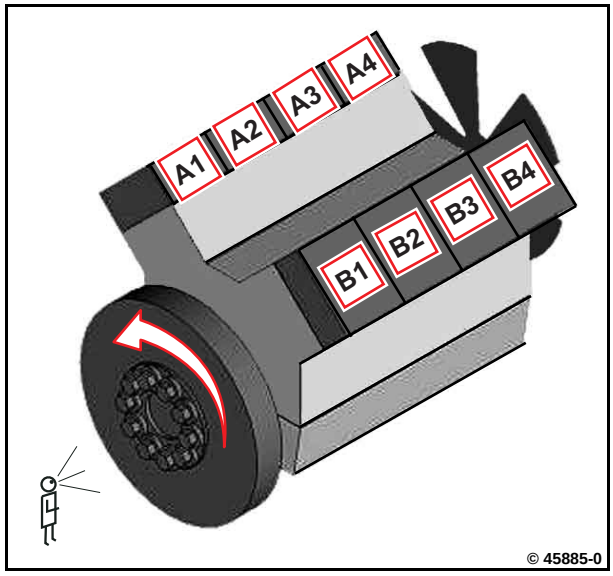
| ID no. | Name | Information | Series | | Value | Unit |
|---|---|---|---|---|---|---|
| P07 91 | Installation dimensions of the fuel shut-off valve | dimension X | TCD 2015 | | approx. 25 | mm |
| P07 92 | Installation angle of the fuel pipe | dimension X | TCD 2015 | | approx. 30 | ° |
| Lubricating oil system | | | | | | |
| Lube oil pressure | | | | | | |
| P08 63 | Basic setting of the pressurestat when using new parts | for 3.00 bar | TCD 2015 | | 35 | mm |
| | | for 3.50 bar | | | 32 | |
| | | for 4.00 bar | | | 29.1 | |
| Cooling system | | | | | | |
| P09 11 | Thermostat, start opening (A-bank) | Coloured marking black venting notch top | TCD 2015 | | 79 | °C |
| P09 12 | Thermostat, start opening (B-bank) | Venting notch top | TCD 2015 | | 87 | °C |
| P09 13 | Thermostat, stroke distance | | TCD 2015 | | at least 8 | mm |
| Other components | | | | | | |
| P12 11 | Tension of the single V-belt (first assembly, generator, 120 Ampere) | with V-belt tension measuring device 8115 | TCD 2015 | | 500 | N |
| | Tension of the single V-belt (first assembly, generator, 55 Ampere) | with V-belt tension measuring device 8115 | | | 550 +50 -50 | N |
| P12 21 | Tension of the single V-belt (generator, 120 Ampere) | Check after 15 minutes running under load | TCD 2015 | | 350 +50 -50 | N |
| | Tension of the single V-belt (generator, 55 Ampere) | Check after 15 minutes running under load | | | 300 +50 -50 | N |
| P13 66 | Screw-in height of the flame glow plug in connecting line | dimension X | TCD 2015 | | 60 +3 -3 | mm |

**T00 81**
Cylinder and side view
engine TCD 2015 V06




**T00 81**
Cylinder and side view
engine TCD 2015 V08




**T01 63**
Setting valve clearance
engine TCD 2015 V06
Ignition sequence: A1-B3-A3-B2-A2-B1

| Valve overlap on cylinder | Setting on cylinder |
|---|---|
| A1 | B2 |
| B3 | A2 |
| A3 | B1 |
| B2 | A1 |
| A2 | B3 |
| B1 | A3 |

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**T01 63**

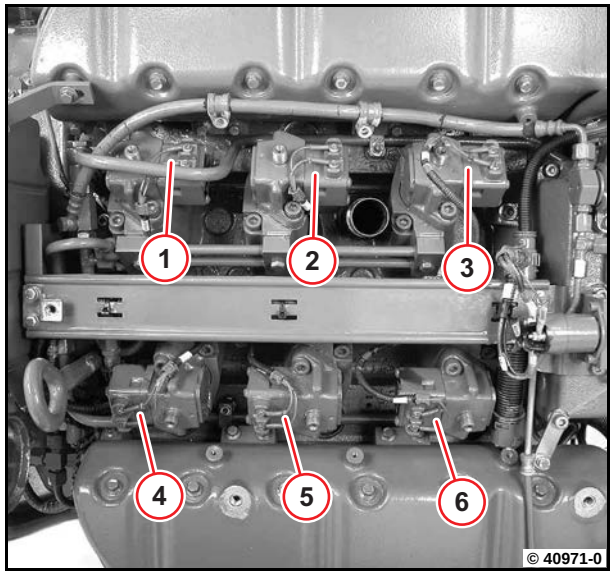
Setting valve clearance
engine TCD 2015 V08
Ignition sequence: A1-B4-A4-B1-B3-A3-B2-A2

| Valve overlap on cylinder | Setting on cylinder |
|---|---|
| A1 | B3 |
| B4 | A3 |
| A4 | B2 |
| B1 | A2 |
| B3 | A1 |
| A3 | B4 |
| B2 | A4 |
| A2 | B1 |

**T13 054**

Connection plan of the injection pumps
engine TCD 2015 V06

| Item | Component | Cylinder assignment |
|---|---|---|
| 1 | Y15.1 | A1 |
| 2 | Y15.5 | A2 |
| 3 | Y15.3 | A3 |
| 4 | Y15.6 | B1 |
| 5 | Y15.4 | B2 |
| 6 | Y15.2 | B3 |




**T13 054**

Connection plan of the injection pumps
engine TCD 2015 V08

| Item | Component | Cylinder assignment |
|---|---|---|
| | Y15.1 | A1 |
| | Y15.8 | A2 |
| | Y15.6 | A3 |
| | Y15.3 | A4 |
| | Y15.4 | B1 |
| | Y15.7 | B2 |
| | Y15.5 | B3 |
| | Y15.2 | B4 |

## 4.2 Tightening specifications

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A00 001 | Clamping bracket on crankcase | | Mounting feet/engine mounting on crankcase, elastic | TCD 2015 | | | 106 Nm | |
| | | | Mounting feet/engine mounting on crankcase, rigid<br>oil lightly | TCD 2015 | | | 30 Nm | +45° |
| A00 002 | Clamping bracket on adapter for assembly block | | | TCD 2015 | | | 90 Nm | |
| A00 003 | Mounting feet/engine mounting on crankcase | | elastic | TCD 2015 | | | 106 Nm | |
| | | | rigid<br>oil lightly | TCD 2015 | | | 30 Nm | +45° |
| A01 001 | Cylinder head on crankcase | | Screw can be used a max. 3 times, otherwise renew every time they are loosened.<br>Oil lightly | TCD 2015 | | | 50 Nm | +120°<br>+120°<br>+60° |
| A01 002 | Rocker arm bracket on cylinder head | | | TCD 2015 | | | 61 Nm | |
| A01 003 | Lock nut valve clearance setting screw | | | TCD 2015 | | | 20 Nm | |
| A01 004 | Cylinder head cover on cylinder head | | oil lightly | TCD 2015 | | | 22 Nm | |
| A01 005 | Cylinder head cover on cylinder head hood | M8x30 | oil lightly<br>hexagonal socket | TCD 2015 | | | 22 Nm | |
| A02 001 | Counterweight on crankshaft | | oil lightly | TCD 2015 | | | 50 Nm | +30°<br>+60°<br>+60° |
| A02 010 | Main bearing cover, vertical screws | Screws with washers | Screws can be used a max. 3 times, otherwise renew every time they are loosened.<br>Oil lightly | TCD 2015 | | | 50 Nm | +60°<br>+60°<br>+120° |

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| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A02 011 | Main bearing cover, horizontal screws | | Screws can be used a max. 3 times, otherwise renew every time they are loosened. | TCD 2015 | | | 80 Nm | +30°<br>+30° |
| A02 020 | Big end bearing cover on connecting rod | | Renew screws every time they are loosened. | TCD 2015 | | | 50 - 60 Nm | +60°<br>+60° |
| A03 010 | Rear cover on crankcase | | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 21 Nm | |
| A03 020 | Genset support on crankcase | M10 | | TCD 2015 | | | 55 Nm | |
| A03 030 | Lubricating oil pan on crankcase | | Gasket steel beading<br>Observe tightening order | TCD 2015 | | | 28 Nm | |
| | | | | TCD 2015 (Railway) | | | 24 Nm | |
| A03 031 | Oil drain plug on lubricating oil pan | | oil lightly | TCD 2015 | | | 120 Nm | |
| | | | | TCD 2015 (Railway) | | | 120 Nm | |
| A03 034 | Half-flange on connecting flange | M8x30-10.9 | | TCD 2015 (Railway) | | | 30 Nm | |
| A03 035 | Connecting flange on lubricating oil pan | M10x20-10.9 | | TCD 2015 (Railway) | | | 30 Nm | |
| A03 051 | Valve housing (pressurestat) on crankcase | | oil lightly | TCD 2015 | | | 50 Nm | 210 Nm |
| A03 060 | Crankcase breather | | Pipe clamp | TCD 2015 | | | 8 Nm | |
| A03 064 | Breather pipe on intake elbow/oil separator | | Hose clip | TCD 2015 | | | 6.5 Nm | |
| A03 069 | Breather pipe (holder) on cable harness rail | | | TCD 2015 | | | 20 Nm | |
| | Pipe (crankcase breather) on cable harness rail | | | TCD 2015 (Railway) | | | 20 Nm | |

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A03 070 | Pipe (crankcase breather) | | Hose clip | TCD 2015 (Railway) | | | 6.5 Nm | |
| A03 080 | Connection housing on lubricating oil pan | | | TCD 2015 | | | 70 Nm | |
| A03 081 | Connection housing to crankcase | M12x1.5x35 | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 30 Nm | +30°<br>+30° |
| A03 082 | Connection housing to crankcase | M12x1.5x90 | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 30 Nm | +60°<br>+60° |
| A03 085 | Cover on connection housing | M8x16 | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 21 Nm | |
| A03 088 | Connection housing to crankcase | M12x190 | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 30 Nm | +60°<br>+60°<br>+60° |
| A03 089 | Connection housing to crankcase | M12x175 | Insert with locking agent DEUTZ DW 59 | TCD 2015 | | | 30 Nm | +60°<br>+90° |
| A04 001 | Central screw for camshaft gear wheel on camshaft | | oil lightly | TCD 2015 | | | 50 Nm | +150° |
| A04 002 | Stop cover (camshaft) on crankcase | | Insert with locking agent DEUTZ DW 72 | TCD 2015 | | | 22 Nm | |
| A04 003 | Camshaft gear wheel on idler gear | | oil lightly | TCD 2015 | | | 30 Nm | |
| A04 004 | Gear wheel on camshaft for injection pumps | | | TCD 2015 | | | 30 Nm | +30° |
| A04 005 | Plug of injection pump camshaft on crankcase | | Fastening screw for diverter stopper | TCD 2015 | | | 8.5 Nm | |
| A04 011 | Fastening screw for idler gear on genset support | | | TCD 2015 | | | 80 Nm | |
| A04 012 | Screw plug for bolt idler gear | | oil lightly | TCD 2015 | | | 79 Nm | |
| A04 013 | Screw for bolt idler gear | M12x100 | oil lightly | TCD 2015 | | | 70 Nm | |
| A04 015 | Pad thrust bearing on crankcase | | oil lightly | TCD 2015 | | | 30 Nm | |

| ID no. | Name | Screw type | Notes / Remarks | Series | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|
| A04 020 | Gear case cover on crankcase | | | TCD 2015 | 21 Nm | |
| | | M8x35<br>M8x45 | | TCD 2015 (Railway) | 21 Nm | |
| A04 022 | Cover (stop cover) on crankcase | | Insert with locking agent DEUTZ DW 72 | TCD 2015 | 20 Nm | |
| A05 011 | Speed governor on connection housing (cranks-haft) | | | TCD 2015 | 8 Nm | |
| A05 012 | Speed governor on cover (camshaft) | | | TCD 2015 | 8 Nm | |
| A06 001 | Exhaust pipe at cylinder head | | Insert with fitting compound DEUTZ S1 | TCD 2015 | 60 Nm | |
| A06 002 | Exhaust pipe on exhaust manifold | | Insert with fitting compound DEUTZ S1 | TCD 2015 | 22 Nm | |
| A06 003 | Exhaust pipe on exhaust line | Nut | Insert with fitting compound DEUTZ S1 | TCD 2015 | 18 Nm | |
| A06 010 | Exhaust manifold to connection housing | | | TCD 2015 | 28 Nm | |
| | Exhaust manifold to exhaust line | | Insert with fitting compound DEUTZ S1 | TCD 2015 (Railway) | 35 Nm | |
| A06 020 | Exhaust turbocharger to exhaust manifold | | | TCD 2015 | 35 Nm | |
| | | Nut | Insert with fitting compound DEUTZ S1 | TCD 2015 (Railway) | 10 Nm | 35 Nm |
| A06 021 | Intake elbow to exhaust turbocharger | | Hose clip<br>housing position of the hose clip top<br>screw head rear | TCD 2015 | 5 Nm | |
| A06 024 | Tubing connection to turbocharger | | Hose clip | TCD 2015 (Railway) | 5 Nm | |

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A06 030 | Charge air pipe to cylinder head | | | TCD 2015 | | | 20 Nm | |
| | Charge air pipe to air intake pipe | M10 x 85<br>M10 x 65 | | TCD 2015 | | | 60 Nm | |
| A06 033 | Connection pipe to air intake pipe | | | TCD 2015 | | | 20 Nm | |
| | | Nut | | TCD 2015 (Railway) | | | 20 Nm | |
| A06 034 | Joint plate on connecting pipe | | | TCD 2015 | | | 57 Nm | |
| | Holder on exhaust manifold | | | TCD 2015 (Railway) | | | 20 Nm | |
| A06 038 | Screw plug on charge air pipe | | | TCD 2015 | | | 34 Nm | |
| A06 046 | Connecting elbow to charge air pipe | Nut | | TCD 2015 | | | 20 Nm | |
| | | Stud | | | | | 4.5 Nm | |
| A06 056 | Connecting pipe to holder | | | TCD 2015 | | | 20 Nm | |
| | | | | TCD 2015 (Railway) | | | 20 Nm | |
| A06 058 | Retaining plate on genset support | | | TCD 2015 | | | 20 Nm | |
| A07 001 | Fuel injector on cylinder head | Union screw | without leak oil<br>Insert with fitting compound DEUTZ S1 | TCD 2015 | | | 70 Nm | |
| A07 002 | Injection nozzle on fuel injector | Nozzle cap nut | | TCD 2015 | | | 40 - 50 Nm | |
| A07 003 | Injection line on fuel injector/injection pump | Union nut | | TCD 2015 | | | 25 Nm | |
| A07 006 | Pipe clamp for injection pipe | M6x12 | | TCD 2015 | | | 10 Nm | |
| A07 009 | Injection pump housing on crankcase | | oil lightly | TCD 2015 | | | 60 Nm | |
| A07 012 | Injection pump on injection pump housing | | oil lightly | TCD 2015 | | | 60 Nm | |

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| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A07 015 | Fuel pipe to injection pump housing | | | TCD 2015 | | | 25 Nm | |
| | | | | TCD 2015 (Railway) | | | 25 Nm | |
| A07 018 | Fuel pipe to fuel shut-off valve (flame flow plugs) | Union nut | | TCD 2015 | | | 20 Nm | |
| A07 023 | Temperature transmitter on connector | | | TCD 2015 | | | 22 Nm | |
| A07 024 | Bearing housing (fuel supply pump) to genset support | | | TCD 2015 | | | 42 Nm | |
| A07 034 | Fuel line on fuel supply pump | Hollow screw | | TCD 2015 | | | max.35 Nm | |
| A07 044 | Fuel pipe fastening | | Pipe clamp/holder oil thread and head contact surface. | TCD 2015 | | | 8.5 Nm | |
| | Fuel pipe fastening | | Pipe clamp | TCD 2015 (Railway) | | | 8.5 Nm | |
| A07 057 | Adapter (flame glow plug) on charge air pipe | M45x1.5 | SW50 | TCD 2015 (Railway) | | | 50 Nm | |
| A07 058 | Ground cable on lock nut (flame glow plug) | | | TCD 2015 (Railway) | | | 7.5 Nm | |
| A07 059 | Flame glow plug to connecting pipe | Lock nut | | TCD 2015 | | | 25 Nm | |
| A07 066 | Connector (fuel pressure holding valve) to fuel pipe | Union nut | | TCD 2015 | | | 42 Nm | |
| | | | | TCD 2015 (Railway) | | | 42 Nm | |
| A07 067 | Overflow valve on connector | | | TCD 2015 | | | 39 Nm | |
| | | | | TCD 2015 (Railway) | | | 39 Nm | |
| A07 068 | Screw-in nipple on fuel shut-off valve | | | TCD 2015 | | | 18 Nm | |

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A07 069 | Screw-in nipple on overflow valve | M16x1.5 | | TCD 2015 (Railway) | | | 42 Nm | |
| A07 093 | Fuel shut-off valve (flame glow plug) on crankcase (thermostat housing) | | Pipe clamp | TCD 2015 | | | 20 Nm | |
| A08 002 | Adapter on oil filter nozzle (genset support | | | TCD 2015 | | | 50 Nm | |
| A08 010 | Oil pressure pump on genset support | | Oil thread and head contact surface. | TCD 2015 | | | 40.5 Nm | |
| A08 011 | Plug on oil pump | | Oil thread and head contact surface. | TCD 2015 | | | 21 Nm | |
| A08 013 | Lubricating oil pipe to genset support | Hollow screw | | TCD 2015 | | | 18 Nm | |
| A08 014 | Lubricating oil pipe to fuel supply pump | Union nut | | TCD 2015 | | | 20 Nm | |
| A08 015 | Oil suction intake pipe on oil pump | M8x16 | | TCD 2015 | | | 22 Nm | |
| | | M8x20 | | TCD 2015 (Railway) | | | 22 Nm | |
| A08 016 | Holder oil suction pipe on retaining plate (main bearing cover) | M8x25 | | TCD 2015 | | | 22 Nm | |
| | | | | TCD 2015 (Railway) | | | 22 Nm | |
| | Holder on oil suction pipe | | | TCD 2015 | | | 22 Nm | |
| | | M8x16 | | TCD 2015 (Railway) | | | 22 Nm | |
| A08 035 | Guide tube on screw-in nipple (lubricating oil pan | Union nut | | TCD 2015 | | | 30 Nm | |
| A08 038 | Screw-in nipple (guide tube) on lubricating oil pan | | | TCD 2015 | | | 45 Nm | |
| A08 040 | Lubricating oil pipe on exhaust turbocharger | Union nut M14 x 1.5 | | TCD 2015 | | | 39 Nm | |

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| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A08 044 | Oil return pipe to turbocharger/crankcase | | | TCD 2015 | | | 20 Nm | |
| | | | | TCD 2015 (Railway) | | | 20 Nm | |
| A08 045 | Oil pressure pipe on gear case cover | | Pipe clamps | TCD 2015 | | | 8.5 Nm | |
| | Oil pressure pipe on genset support | | Pipe clamp | TCD 2015 (Railway) | | | 20 Nm | |
| A08 050 | Oil cooler housing cover on genset support | | | TCD 2015 | | | 20 Nm | |
| A08 051 | Oil cooler on genset support | | | TCD 2015 | | | 20 Nm | |
| A08 071 | Screw plug on valve housing (pressurestat) | | Hexagon socket head | TCD 2015 | | | 180 Nm | |
| A08 079 | Holder (lubricating oil pipe) on genset support/ gear case cover | | | TCD 2015 | | | 20 Nm | |
| A08 081 | Relief valve of piston cooling nozzle on crankcase | | | TCD 2015 | | | 28 Nm | |
| A08 091 | Oil pressure pick-up on oil cooler housing | M14 x 1.5 | | TCD 2015 | | | 20 Nm | |
| A09 001 | Thermostat housing on crankcase | | | TCD 2015 | | | 20 Nm | |
| | Holder on thermostat housing | | Holder of pipe clamp (fuel pipe) | | | | 20 Nm | |
| A09 002 | Outlet branch on thermostat housing | | | TCD 2015 | | | 20 Nm | |
| A09 010 | Coolant pump on genset support | | oil lightly | TCD 2015 | | | 21 Nm | |
| A09 011 | Inlet adapter on coolant pump | | oil lightly | TCD 2015 | | | 20 Nm | |
| A09 031 | Temperature transmitter on thermostat housing | | | TCD 2015 | | | 22 nm | |
| A12 001 | Flywheel on crankshaft | M16x70 | Renew screws after every loosening. Oil lightly | TCD 2015 | | | 50 Nm | +30° +60° +60° |
| A12 030 | Flanged hub (torsional vibration damper) on crankshaft | | oil lightly | TCD 2015 | | | 30 Nm | +120° |

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A12 031 | V-belt pulley/torsional vibration damper on flanged hub | | oil lightly | TCD 2015 | | | 30 Nm | |
| A12 057 | Bearing housing (hydraulic pump drive) on crankcase | M10x55 | oil lightly | TCD 2015 | | | 30 Nm | +60° |
| A12 058 | Flange housing on bearing housing (hydraulic pump drive) | M10x110 | oil lightly | TCD 2015 | | | 30 Nm | +120° |
| A12 059 | Flange housing on bearing housing (hydraulic pump drive) | M10x210 | oil lightly | TCD 2015 | | | 30 Nm | +180° |
| A12 071 | Holder on gear case cover | M8x16-8.8 | | TCD 2015 | | | 18 Nm | |
| | | | | TCD 2015 (Railway) | | | 20 Nm | |
| | Heat shield on holder (gear case cover) | M8x16-10.9 | | TCD 2015 | | | 20 Nm | |
| A12 080 | Fuel pipe on flame glow plug | Union nut | | TCD 2015 | | | 20 Nm | |
| A12 082 | Oil pressure pipe | Union nut | | TCD 2015 | | | 39 Nm | |
| | | | | TCD 2015 (Railway) | | | 45 Nm | |
| A12 090 | Fuel hose to connector (overflow valve/fuel shut-off valve) | Hollow screw M10x1 | | TCD 2015 | | | 13 Nm | |
| | | | Pipe union with ring piece, pipe 6 mm | TCD 2015 (Railway) | | | 18 Nm | |
| A12 092 | Hollow screw pipe union with ring piece | Hollow screw M14x1.5 | Breather pipe on oil cooler cover | TCD 2015 | | | 39 Nm | |
| A12 093 | Hollow screw pipe union | M16x1.5 | Fule pipe on fuel pressure holding valve | TCD 2015 | | | 40 Nm | |
| A12 095 | Pipe clamps, fuel pipe to connecting pipe | M6 | | TCD 2015 | | | 8.5 Nm | |
| | Fuel hose to air intake pipe | | Pipe clamp | | | | 8.5 Nm | |
| | Clip (cable) on holder (central plug) | M8 | | | | | 18 Nm | |

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| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A12 096 | Breather pipe on holder | | Pipe clamp | TCD 2015 (Railway) | | | 30 Nm | |
| A12 098 | Screw-in nipple (lubricating oil pipe) on exhaust turbocharger | | | TCD 2015 (Railway) | | | 45 Nm | |
| A13 001 | Starter on crankcase | Nut | | TCD 2015 | | | 30 Nm | +60° +60° |
| A13 006 | Heat shield (starter) on crankcase | M12x22 M12x28 | | TCD 2015 | | | 70 Nm | |
| A13 012 | Generator on plate (console) | | | TCD 2015 | | | hand tight | 20 Nm |
| A13 015 | Generator on console | | | TCD 2015 | | | hand tight | 20 Nm |
| A13 017 | Lock nut (V-belt) on generator holder | Screw lock nut | | TCD 2015 | | | hand tight | 42 Nm |
| A13 018 | Generator holder on genset support | | | TCD 2015 | | | 42 Nm | |
| A13 035 | Cable to flame glow plug | Nut M5 | | TCD 2015 | | | max. 5 Nm | |
| | | | | TCD 2015 (Railway) | | | 5 Nm | |
| A13 037 | Cable to pre-heating relay | Nut M4 | | TCD 2015 | | | 2 Nm | |
| A13 038 | Cable to pre-heating relay | Nut M6 | | TCD 2015 | | | 7.5 Nm | |
| A13 046 | Pressure sensor/temperature transmitter on connecting pipe | | | TCD 2015 | | | 9 Nm | |
| A13 054 | Cable to injection pump | | | TCD 2015 | | | 1.0 Nm | |
| | | | | TCD 2015 (Railway) | | | 5 Nm | |

| ID no. | Name | Screw type | Notes / Remarks | Series | | | Pre-clamping value | Post-clamping value |
|---|---|---|---|---|---|---|---|---|
| A13 090 | Cable harness holder to connecting pipe | M8 x 20<br>M8 x 16 | | TCD 2015 | | | 18 Nm | |
| | | M8 | | TCD 2015 (Railway) | | | 20 Nm | |
| A13 094 | Cable harness rail on holder | M6 | | TCD 2015 | | | 7.5 Nm | |
| | | M6x12<br>M6x16 | | TCD 2015 (Railway) | | | 8 Nm | |
| A13 098 | Holder (cable harness) on connection housing | | | TCD 2015 (Railway) | | | 70 Nm | |