SERVICE MANUAL

WHEEL LOADER

V70S

YANMAR

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Service Manual

V70S

SERIAL-NO.: from **TL07040103** to **TL0704XXXX**

Issue Date: 01/24/2019
Language: English (en)
Issue Number: 02
Original Instructions

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02.37.31 Technical data

ENGINE Tier 4

Engine type	Unit	Description
Manufacturer:		Deutz
Type:		TCD 2.9 L4
Operation		4-stroke diesel engine
Displacement		Turbocharger with charge-air cooling
Cooling type		Water cooling
Number of cylinders		4
Cylinder arrangement		In line
Bore / stroke	Mm	92 / 110
Total displacement	cm^3	2925
Combustion		Direct injection
Injection system		Common rail
Exhaust gas recirculation		Cooled externally
Exhaust gas after-treatment	interim	Diesel oxidation catalyst
Exhaust gas after-treatment	Final	Diesel particle filter
Valves per cylinder		2
Firing sequence of the engine *Direction of rotation viewed on flywheel*		1-3-4-2
Engine power to ISO 3046	kW/HP	45 / 61
Speed (nominal speed)	Rpm	2200
High idle:	Rpm	2150^{+50}
Low idle:	rpm	950^{+50}
Engine oil pressure: Low idle (warm)	bar	1.3
Engine oil pressure: High idle (warm)	bar	2.3
Spec. fuel consumption at full load:	g/kWh	215
Valve lash control no longer necessary		Hydraulic tappet
V-belt tension V-belt AVX 13 (width: 13 mm)	N	Pre-load / re-load $650^{\pm 50}$ / $400^{\pm 50}$
V-ribbed belt tension		Automatically tensioning spring-loaded idler pulley

For further data: see the engine operating instructions

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02.37.41 Drift values

Drift values in mm / minute

Lift cylinder	Tilt cylinder
3,0	5,5

Notice
Drift values measured without load-retaining valves.
(Load-retaining valves are not connected during the measurement).

Test conditions

1. Hydraulic oil temperature approx. 50 - 60° C.
2. Attach measuring connection to the cylinder with manometer
3. Extend and retract the cylinder several times and change the working equipment reach until the manometer shows a load pressure of 100 bar (where applicable, load with weight).
4. Measure the piston rod length of the cylinder.
5. Measure the piston rod length again after 5 minutes.
6. The difference to the nearest minute is the drift of the cylinder.
7. The values stated apply only for hydraulic oil 10 W 40
   (Viscosity at 50°C approx. 35 mm^2/s (cST).

When using hydraulic oil with other specifications, deviations are possible.

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Notes

Notes

- This engine is defined exclusively for purpose according to the scope of delivery and built by the equipment manufacturer (use for the intended purpose). Any other use above and beyond this will be considered as misuse. The manufacturer will not accept any liability for damages resulting from this. The user bears the sole risk.
- Use for the intended purpose also includes observance of the operating, maintenance and repair instructions specified by the manufacturer. The engine may only be used, maintained and serviced by persons who are familiar with it and are aware of the hazards.

  The relevant rules for the prevention of accidents and other generally recognised safety and occupational medicine rules must be observed.
- Unauthorised modifications to the engine will exclude the manufacturer from all liability for resulting damage.
- Equally, manipulations to the injection and control system can affect the engine's performance and the exhaust characteristics. In this case, compliance with environmental regulations will no longer be guaranteed.
- Do not change the cooling air feed area to the blower or fan. An unobstructed cooling air supply must be guaranteed.

  The manufacturer will accept no liability for damages resulting from this.
- As a general rule, only DEUTZ original parts may be used when carrying out maintenance/repair work on the engine. These have been designed especially for your engine and ensure fault-free operation.

  Maintenance/cleaning work on the engine may only be carried out when the engine is not running and has cooled down. When performing such works, make sure that the electrical system is switched off (remove ignition key).

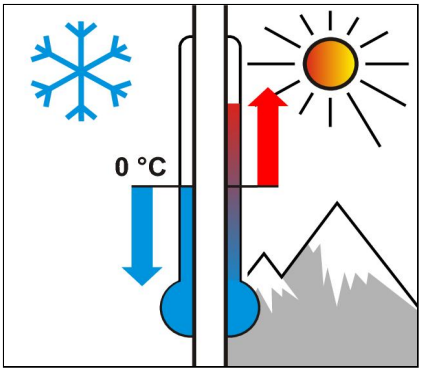
  The rules for the prevention of accidents on electrical systems (e.g. -VDE-0100/-0101/-0104/-0105 Electrical Protection Measures against Dangerous Live Voltages) must be observed.

  Cover all electrical components tightly when cleaning with liquids.

Failure to observe the following safety instructions may result in damage to property, environmental damage and serious injury to persons, including death!

- Read the operating instructions before use. If you have any trouble understanding these, please contact DEUTZ Support info@deutz.com or your local service partner.
- Make sure that the operating instructions are available to everyone who operates, maintains or repairs the engine and that the contents have been understood.
- Before use, have a qualified person instruct you in the operation of the device or the engine.
- Wear suitable personal protective equipment (e.g. ear protection, safety gloves, safety glasses, protective clothing, safety helmet, safety shoes).
- Only let the engine run when the bonnet / engine compartment is closed. **Caution Risk of injury!**
- Do not approach a running engine if the bonnet / engine compartment is not closed. **Attention Risk of injury!**
- It is generally not permitted to enter the engine and/or engine and exhaust after-treatment parts. Access is only permitted on specially designated and marked areas (treads). **Attention Risk of injury! Risk of property damage!**
- Do not reach into the engine compartment (only permitted in case of service or maintenance using suitable personal protective equipment and trained personnel). **Caution Risk of injury!**
- The engine, engine parts and exhaust system can be very hot — even after a long period of downtime. **Caution Risk of fire and injury!**
- Regardless of the operating condition of the engine, the exhaust gas can be very hot and suddenly change its temperature. This applies in particular to regeneration mode. **Caution Risk of fire and injury!**
- Engine parts and exhaust system may be sharp-edged. **Caution Risk of injury!**
- Before working on the engine, take suitable measures to ensure that the engine cannot be started unintentionally. **Caution Risk of injury!**
- Pay attention to unusual noises and switch off the engine in case of doubt! **Risk of property damage!**

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Low ambient temperature

The operation of engines under cold or even Arctic climatic conditions requires modifications to the engine during installation, engine operation and maintenance. If these modifications are not taken into account, this can have an impact on the engine starting properties, performance, reliability and the operation of the corresponding exhaust aftertreatment system.

Operating an engine under cold or Arctic climatic conditions without suitable modifications can affect the warranty.

Use of engines in low load operation (engine does not reach the operating temperature) over a long time period under cold climatic conditions results in fuel waste, increased wear and potentially to engine damage. These low temperature conditions result in incomplete combustion and therefore to a build-up of deposits on components within the engine. In addition, operating an engine with low exhaust temperatures and low exhaust gas mass flow can cause premature faults such as engine or the exhaust aftertreatment system failure.

The following measures can be taken by the operator:

Lubricating oil

- Select the lubricating oil viscosity according to the ambient temperature.
- Halve the oil change times in case of frequent cold starts.

Fuel

- Use winter fuel below 0 °C 56.

Battery

- The battery must be well-charged before the engine is started 77.
- Warming the battery to about 20°C improves the engine starting behaviour. (Remove and store the battery in a warm room).

Cold start aid

- The engines in these operating instructions are equipped with glow plugs 37.

Coolant

- Observe the mixing ratio of anti-freeze/cooling water 57.

The following possibilities can be considered by the device manufacturer or retrofitted by authorised specialist personnel:

- Warming the cooling circuit and/or the oil circuit when the engine is not running.
- Maintaining the desired engine operation temperature, particularly in low-load operation, requires:
  - Superimposition of additional load through the application.
  - Use of a device cooler hood or housing.
  - Housing the oil pan and the underside of the engine in order to protect against cold air through the engine fan.
  - If possible, use of a temperature-dependent fan coupling.
- Insulation of fuel lines, filters, pumps or even tanks.
- Warming of the intake air through intake air preheating or diverting the warm engine compartment air.
- Warming the crankcase ventilation.

If you have any additional questions, please contact your equipment supplier or DEUTZ partner.

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09.37.11 Keypad operation



1 Function button with symbol for function
2 LED (status indicator)
3 Number block (number input - *e.g. for immobilizer PIN code*)
4 ENTER (Confirm program - *Save*)
5 Point (Clear number input - *Clear entered numbers*)

	Working floodlight front		Working floodlight, rear (optional)		Rotating beacon (optional)
	Front wiper		Front windshield washer		Transmission control (optional)
	Rear wiper		Rear windshield washer		Heater fan
	Activation working hydraulics		Additional control circuit 1		Float position continuous operation

The machine is operated primarily via the keypad.
Depending on the function, the corresponding button must be operated once or several times.
The functions which are initiated using the keypad are also shown in parallel on the menu "Machine functions" of the TFT display

(Description: see also the operating instructions).

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contents: TL80-100 CRT_103

Schematic circuit diagram

Sheet 10 Power supply, Starting System, Glow Plugs, Fuel pump
Sheet 11 Diesel Engine Control, Clearance to start, Throttle Pedal, Fixed Speed, Override Switch
Sheet 12 Diesel Engine Control, pressure sensors, Cooling water temperature
Sheet 13 Diesel Engine Control, Injectors, Inlet temperature
Sheet 14 Diesel Engine Control, Exhaust Gas Recirculation, Rotational speed sensor
Sheet 15 Diesel Engine Control, (Only TL120)
Sheet 16 Diesel Engine Control, Throttle Flap, Exhaust Gas Mass Flow Sensor, Diesel particle filter (CRT)
Sheet 17 CAN2, Diagnostic plug, Isolation Point Telematics, Keypad
Sheet 18 CAN1, Diagnostic plug, Immobilizer, Telematics
Sheet 19 Power supply MCU
Sheet 20 Power supply MCU
Sheet 21 Drive, Transmission control, sensors brake, Driving Speed
Sheet 22 Working hydraulics, Optional Hydraulic Circuit 1+2, Save Valve Additional Control Circuit, Quick-attach system
Sheet 23 Bucket return positioner, overload warn system
Sheet 24 Ride control, Fuel Level
Sheet 25 Lighting system StvZO, Reverse Alarm, Horn
Sheet 26 Work Light, Additional LED working floodligh, Beacon
Sheet 27 Water nozzle, Broom, Trailer socket at tail, Electrical socket for attachments at loader installation
Sheet 28 Windshield Wiper, Washer Pump
Sheet 29 Interior light, Radio preparation, Air Suspension Seat, Buckle, Filling pump
Sheet 30 Heater fan, Air conditioning, Supplementary heating
Sheet 31 Heating mirrors, Fuel filter heating, Engine block heater, Central Lubrication
Sheet 32 Spare Options and Fuses
Sheet 33 Swivel (Only TL70s)

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Rev. Index	Revision	Revision No.	Name	Date
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d				
c				
b				
a				

	Date	Name
Designed	04.10.2016	Lenkner
Checked	20.10.2016	Lenkner
Approved		

YANMAR Compact Germany GmbH

Description: Inhaltverzeichnis
Stromlaufpläne

Type TL80 CRT
M.-Nr.: 0100-

Origin Project

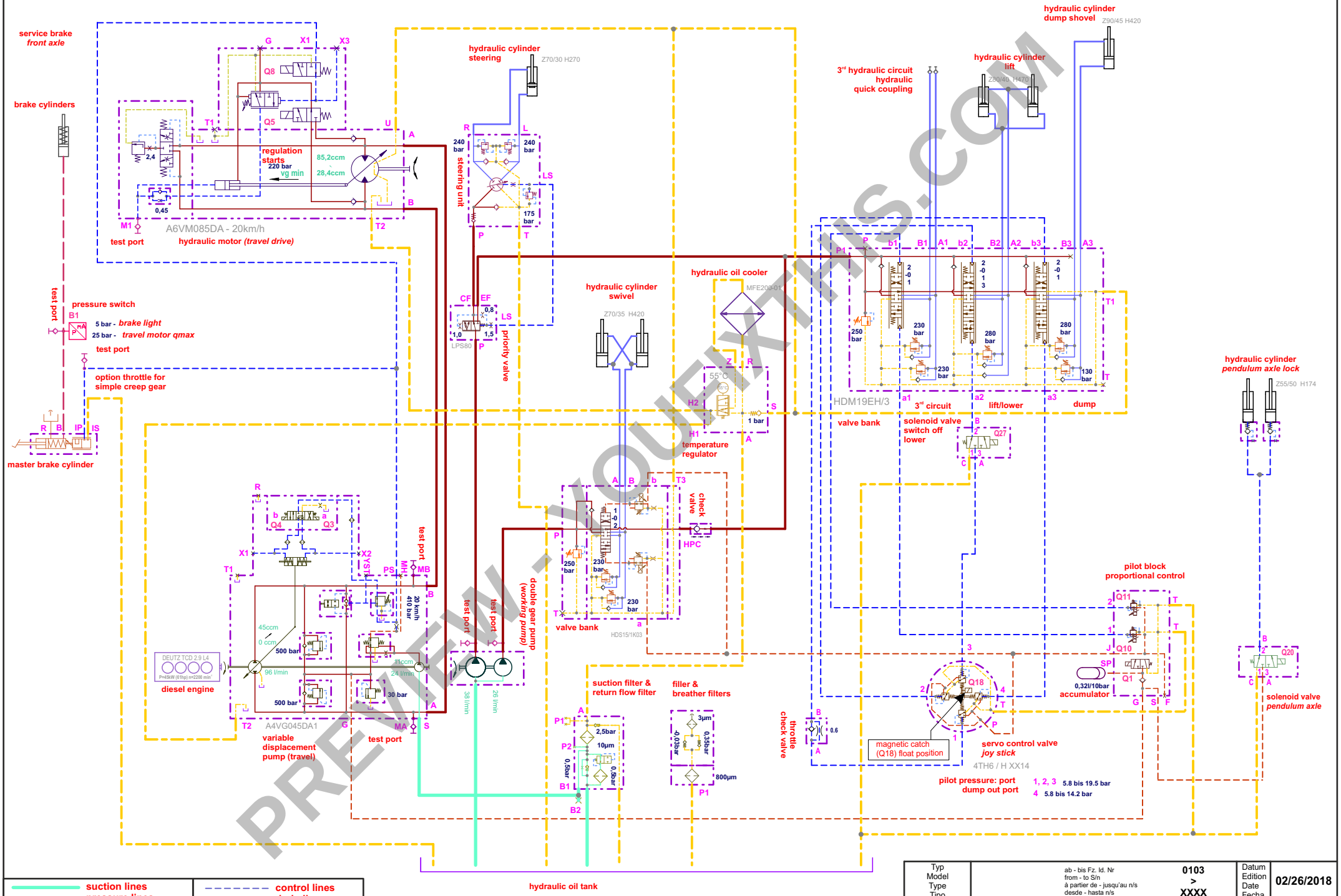
Drawing number
6436040501

Assignment

Location

Sheet 1
No. 66 Sh.

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suction lines
pressure lines
return lines
hydraulic lines
pressure control line

control lines
drain lines
brake lines
system boundary

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Typ Model Type Tipo	ab - bis Fz. Id. Nr from - to S/n à partier de - jusqu'au n/s desde - hasta n/s	0103 > XXXX	Datum Edition Date Fecha	02/26/2018
Benennung Description Dénomination Denominación	Hydraulikschaltplan - Standard Hydraulic circuit diagram - Standard Schéma hydraulique - Standard Esquema hidráulico - Estándar		Blatt Page Feuille Página	04.37.01

Removing and installing the lubricating oil pan

Conventional tools

Special tools:

– Separating tool 02992301

– Sealing compound DEUTZ DW 75

– Safety information / User information

– Operating manual

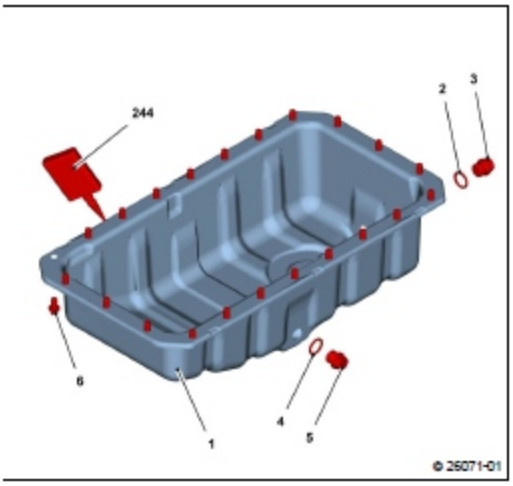
ATTENTION
Make sure that no sealing residues fall into the crankcase!
Seal all openings.

Collect leaking operating materials in suitable vessels and dispose of according to regulations.
Emptying and filling the engine with operating materials must be carried out according to the operating manual and the appropriate documentation of the vehicle/equipment manufacturer.

For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing lubricating oil pan

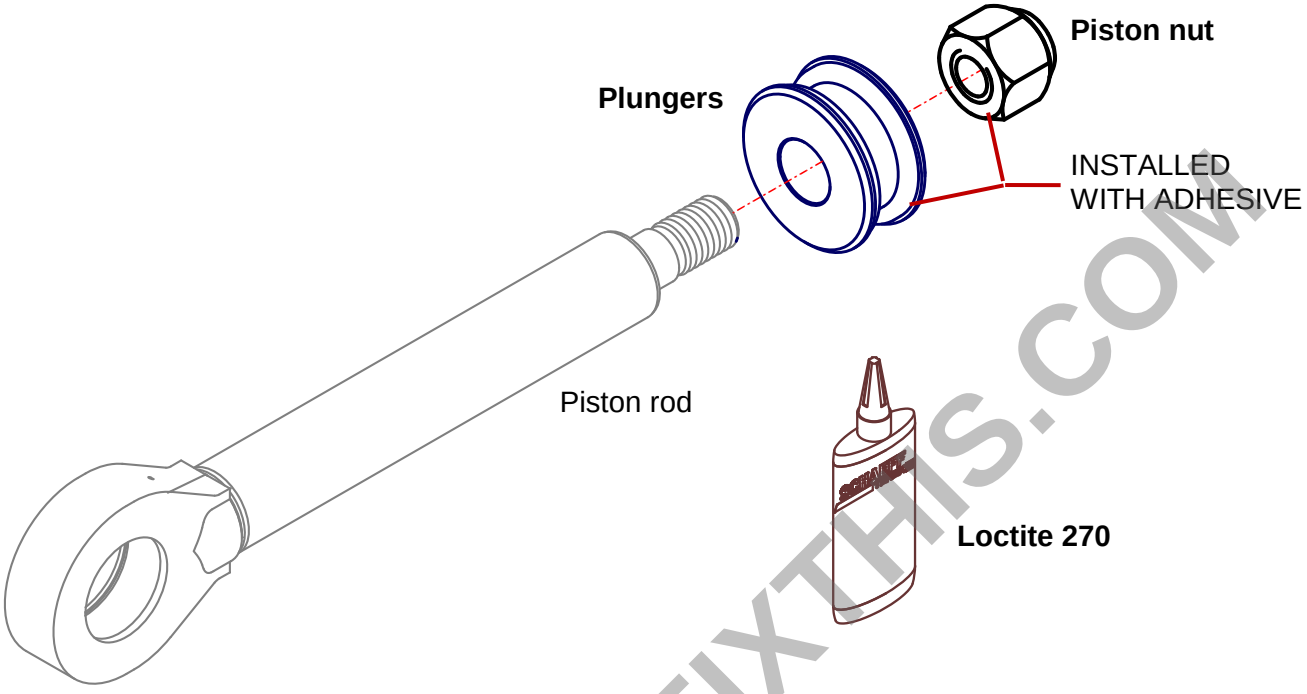
1 Lubricating oil pan
2 Sealing ring
3 Locking screw
4 Sealing ring
5 Locking screw
6 Torx screw
244 Packing compound



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1.500.01 Tightening torques for pistons or piston nuts



Piston nut/piston thread	Tightening torque Nm	Type of mounting
M 18x2	200	**Piston nut**
M 22x2	410	**Piston nut**
M 24x2	450	**Piston nut**
M 27x2	810	**Piston nut**
M 27x2	530	**Plungers**
M 30x2	1050	**Piston nut**
M 33x2	1100	**Piston nut**
M 35x1.5	730	**Plungers**
M 36x2	1075	**Plungers**
M 36x3	1550	**Piston nut**
M 39x3	1700	**Piston nut**
M 40x1.5	730	**Plungers**
M 42x2	1400	**Plungers**
M 42x3	1750	**Piston nut**
M 48x3	2050	**Piston nut**
M 50x2	1300	**Plungers**
M 56x2	1600	**Plungers**
M 60x2	1800	**Plungers**
M 64x2	2000	**Plungers**
M 70x3	2700	**Plungers**
M 80x2	2900	**Plungers**
M 90x2	3200	**Plungers**
M 100x3	3500	**Plungers**

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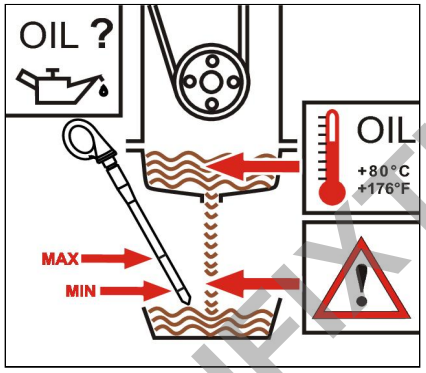
DTC Code (Hex)	DTC Type	SPN-Value	Failure type	Function/Module	Number	Description
622A01	C (communication)	207361	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	HMI	1	No communication to the HMI (Display or dashboard)
732A01	C (communication)	207361	FMI=19—RECEIVED NETWORK DATA IN ERROR	HMI	1	IO-failure on HMI (Display or dashboard)
623201	C (communication)	209409	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	Keypad	1	No communication to the keypad
733201	C (communication)	209409	FMI=19—RECEIVED NETWORK DATA IN ERROR	Keypad	1	IO-failure on keypad
621D01	C (communication)	204033	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	ECU	1	No communication to the ECU (engine control unit)
731D01	C (communication)	204033	FMI=19—RECEIVED NETWORK DATA IN ERROR	ECU	1	IO-failure on the ECU (engine control unit)
620201	C (communication)	197121	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	ACU	1	No communication to the ACU (Air condition and climate control unit)
730201	C (communication)	197121	FMI=19—RECEIVED NETWORK DATA IN ERROR	ACU	1	IO-failure on the ACU (Air condition and climate control unit)
625801	C (communication)	219137	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	TCU	1	No communication to the TCU (transmission control unit)
735801	C (communication)	219137	FMI=19—RECEIVED NETWORK DATA IN ERROR	TCU	1	IO-failure on the TCU (transmission control unit)
622B01	C (communication)	207617	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	HPCU	1	No communication to the HPCU (Hydraulic pump control unit)
732B01	C (communication)	207617	FMI=19—RECEIVED NETWORK DATA IN ERROR	HPCU	1	IO-failure on the HPCU (Hydraulic pump control unit)
443A01	P (Power supply)	145921	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	1	VBATF1 below normal
443A02	P (Power supply)	145922	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	2	VBATF2 below normal
443A03	P (Power supply)	145923	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	3	VBATF3 below normal
443A04	P (Power supply)	145924	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	4	VBATF4 below normal
443A05	P (Power supply)	145925	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	5	VBATD1 below normal
443A06	P (Power supply)	145926	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	6	VBATD2 below normal
443A07	P (Power supply)	145927	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	7	VBATD3 below normal
443A08	P (Power supply)	145928	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	8	VBATD4 below normal
443A09	P (Power supply)	145929	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	9	VBATD5 below normal
443A0A	P (Power supply)	145930	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	10	VBATD6 below normal
443A0B	P (Power supply)	145931	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	11	VBATD7 below normal
443A0C	P (Power supply)	145932	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	12	RTC-Battery-voltage below normal range
203A01	I (Input)	80385	FMI=0—DATA VALID BUT ABOVE NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	1	UN01
213A01	I (Input)	80385	FMI=1—DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	1	UN01
223A01	I (Input)	80385	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	MCU	1	UN01
233A01	I (Input)	80385	FMI=3—VOLTAGE ABOVE NORMAL, OR SHORTED TO HIGH SOURCE	MCU	1	UN01
243A01	I (Input)	80385	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	1	UN01
203A02	I (Input)	80386	FMI=0—DATA VALID BUT ABOVE NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	2	UN02
213A02	I (Input)	80386	FMI=1—DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	2	UN02
223A02	I (Input)	80386	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	MCU	2	UN02
233A02	I (Input)	80386	FMI=3—VOLTAGE ABOVE NORMAL, OR SHORTED TO HIGH SOURCE	MCU	2	UN02
243A02	I (Input)	80386	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	2	UN02
203A03	I (Input)	80387	FMI=0—DATA VALID BUT ABOVE NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	3	UN03
213A03	I (Input)	80387	FMI=1—DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	3	UN03
223A03	I (Input)	80387	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	MCU	3	UN03
233A03	I (Input)	80387	FMI=3—VOLTAGE ABOVE NORMAL, OR SHORTED TO HIGH SOURCE	MCU	3	UN03
243A03	I (Input)	80387	FMI=4—VOLTAGE BELOW NORMAL, OR SHORTED TO LOW SOURCE	MCU	3	UN03
203A04	I (Input)	80388	FMI=0—DATA VALID BUT ABOVE NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	4	UN04
213A04	I (Input)	80388	FMI=1—DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MOST SEVERE LEVEL	MCU	4	UN04
223A04	I (Input)	80388	FMI=2—DATA ERRATIC, INTERMITTENT OR INCORRECT	MCU	4	UN04

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Regulations for working on the lubricating oil system

Do not work on the running engine!
Smoking and naked lights are prohibited!
Be careful with hot lubricating oil. Danger of scalding!

Ensure the highest degree of cleanliness when working on the lubricating oil system. Carefully clean the area around the components concerned. Blow wet parts dry with compressed air.
Observe safety regulations and national regulations when working with lube oils! Dispose of leaking lube oil and filter elements according to regulations. Do not allow used lube oil to seep into the ground. Do a trial run after all work. Pay attention to leakage and lube oil pressure and then check the engine lube oil level.



Checking the lubricating oil level.

Lack of lube oil or overfilling lead to engine damage.
The lubricating oil level may only be checked when the engine is horizontal and switched off.
Only check lubricating oil level whilst warm, 5 minutes after shutting down.

Be careful with hot lubricating oil. Danger of scalding!
Do not pull out the dipstick while the engine is running. Danger of injury!

- Pull out the lubricating oil dipstick and wipe off with a lint-free, clean cloth.
- Insert the lubricating oil dipstick as far as it goes.
- Remove the lubricating oil dipstick and read the lubricating oil level.
- The lubricating oil level must always be between MIN- and MAX-1 markings! If necessary, fill up to MAX-marking.

Changing the lubricating oil

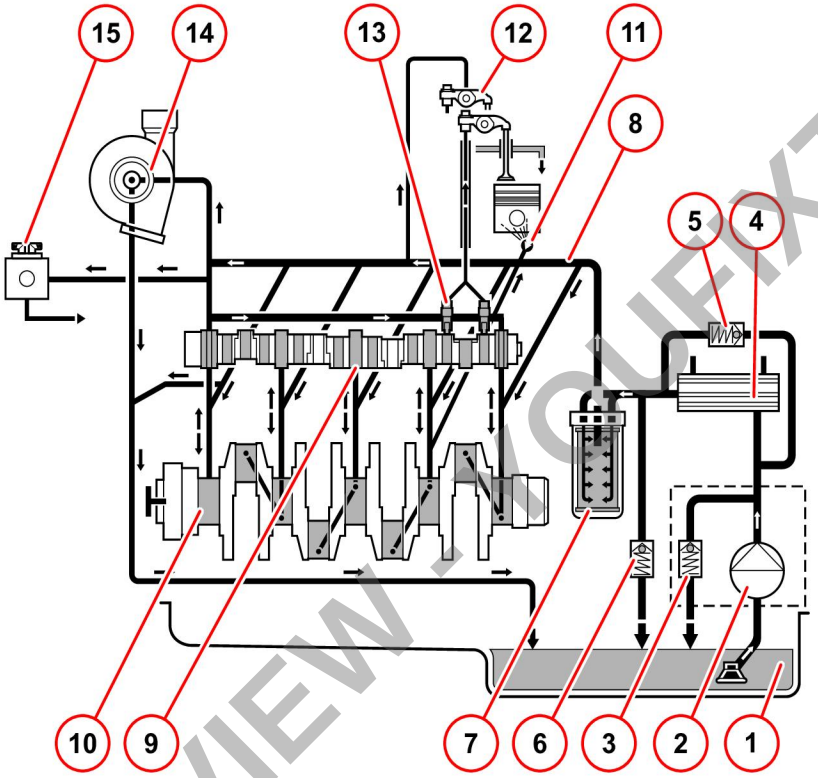
550 operating hours after the last standstill regeneration, the control unit automatically requests a new standstill regeneration to reset the soot load of the diesel particulate filter or to refresh the SCR system. The counter is then reset automatically.
It is therefore recommended to have a standstill regeneration done by an authorised DEUTZ partner each time before changing the lubricating oil. This avoids any premature fuel ingress into the lubricating oil.

- Run the engine warm (lubricating oil temperature > 80 °C).
- Position the engine or vehicle / device so as to be level.
- Shut down engine
- Position a collecting vessel under the lubricating oil drain plug .
- Unscrew the lubricating oil drain plug, drain the lubricating oil.
  - In the case of agricultural technology engines with a separate oil pan, both oil drain plugs must be unscrewed.
- Turn in and tighten lubricating oil drain plug fitted with new sealing ring.

  Tightening torque:

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Lubricating oil system

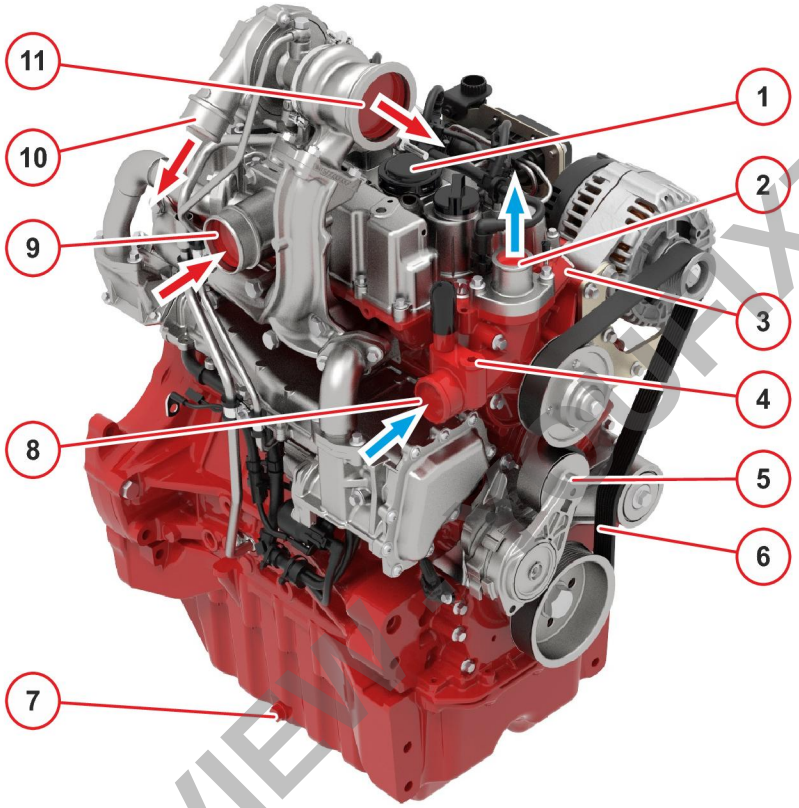
(example)

1 Lubricating oil pan
2 Lubricating oil pump
3 Pressure control valve
4 Lubricating oil cooler
5 Bypass valve
6 Pressure control valve
7 Lubricating oil filter
8 Main lube oil channel
9 Camshaft bearing
10 Crankshaft bearings
11 Piston cooling nozzle
12 Rocker arm
13 Hydraulic tappets
14 Exhaust gas turbocharger
15 Hydraulic pump
Optional

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TCD 2.9 L4

Agricultural engineering

View from right (example)

1 Crankcase ventilation
2 Coolant outlet
3 Coolant supply flow to the cab heating
4 Coolant return flow from the cab heating
5 Tension pulley
6 V-rib belts
7 Lubricating oil drain plug
8 Coolant inlet
9 Charge air inlet
10 Charge air outlet
11 Exhaust outlet

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05.37.41 Travel hydraulics – setting instructions

Note
Always observe the generally applicable accident prevention regulations when performing all measurement and adjustment work.
See Chapter 1 – Safety and accident prevention

Note
For a better understanding of the description, refer to the following chapters:
05.37.21 Rexroth A4VG065DA1 displacement pump and
05.37.31 Displacement motor – Rexroth A6VMDA3 series 71.

1. Measuring and adjusting the supply pressure

- ***60 bar*** – connect manometer to high-pressure measuring point M_A or M_B of the travel pump.

Caution: Do not switch on direction of travel!

- Read off the measured value from the manometer. ***Set point:*** *See Chapter 2. Technical data*

Note
If the set point has not been reached:
Unscrew blind fittings for supply pressure valve 02 and correct the pressure by attaching or removing adjusting shims.

	Dimension	Spare part number	Adjusting
Shims	10 x 16 x 0.3	1.309.412.107	approx.0.9 bar
Shims	10 x 16 x 0.5	1.309.412.217	approx. 1.5 bar
Shims	10 x 16 x 1.0	1.309.412.117	approx. 3.0 bar

2. Measuring and adjusting the travel pump neutral position

- ***60 bar*** – connect manometer to high-pressure measuring point M_A or M_B of the travel pump

Caution: Do not switch on direction of travel!

- Engine; apply full throttle.
- Observe the manometer. **Both measured values for the supply pressure must be the same**.

Note
If the two measured values are different, the neutral position can be corrected using the adjusting screw 06 on the travel pump.

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LUBRICANTS

Name	Unit	Description
Engine		See engine operating instructions
Hydraulic oil		Refer to operating instructions
Transmission oil		MIL-L 2105 B or API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease		according to DIN 51825. Drop point above 170° C, Lithium set.
Brake medium		ATF type A suffix A or Dexron II D

SERVICE PARTS Refer to operating instructions

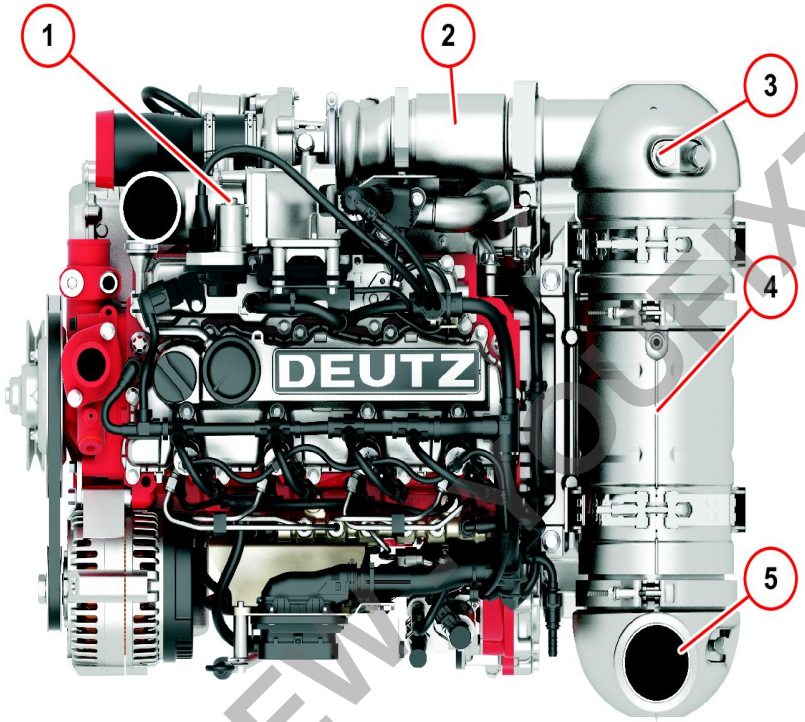
FLUID CAPACITIES

Name	Liters approx.	Description
Engine oil with oil filter - change quantity	8.0	Engine oil
Hydraulic oil (tank and system) - first filling	55	Hydraulic oil
Hydraulic oil tank - change quantity	46	Hydraulic oil
Fuel tank	75	Diesel
Front axle - center housing	8.0	Transmission oil
Rear axle - wheel hub	0.8	Transmission oil
Rear axle – center housing	8	Transmission oil
Rear axle - standard reduction gears	1.3	Transmission oil
Rear axle - fast-drive version reduction gears	4	Transmission oil
Rear axle - wheel hub	0.8	Transmission oil
Service brake	0.25	ATF MINERAL OIL
Coolant	15	Water with anti-corrosion agent and antifreeze
OPTION – air conditioning system: Refrigerant	800g	TETRAFLUORETR 134A

Note
All values stated are approximate.
The filling level indication is always the decisive factor.

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Exhaust gas aftertreatment system

Diesel particle filter

1 Throttle valve
2 Decoupling line
3 Diesel oxidation catalytic converter
4 Diesel particle filter
5 Exhaust outlet

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General

Modern diesel engines place very high demands on the lubricating oil used. The specific engine performances increased constantly in recent years lead to increased thermal stress of the lubricating oil. In addition, the lubricating oil is subject to heavier contamination due to reduced lubricating oil consumption volumes and increased lubricating oil change intervals. For this reason it is necessary to observe the requirements and recommendations described in this operating manual in order not to shorten the life of the engine.

Lubricating oils always consist of a base lubricating oil and an additive package. The additives perform the most important tasks of a lubricating oil (e.g. wear protection, corrosion protection, neutralisation of acids from combustion products, prevention of coke and soot deposits on the engine components). The properties of the base lubricating oil are also decisive for the quality of the product, e.g. with regard to the thermal load.

In principle, all engine lubricating oils of the same specification can be mixed. Mixtures of engine lubricating oils should however be avoided because the worst properties of the mixture always dominate.

The lubricating oils approved by DEUTZ AG have been thoroughly tested for all engine applications. The active ingredients they contain are compatible with each other. Therefore, the use of additives for lubricating oils is not permitted in DEUTZ engines.

The **lubricating oil quality** has a considerable influence on the life, efficiency and thus the economy of the engine. As a general principle, the better the lubricating oil quality, the better these properties.

The **lubricating oil viscosity** describes the way the lubricating oil flows, depending on the temperature. The lubricating oil viscosity only has a small influence and effect on the quality of the oil.

Synthetic lubricating oils are used increasingly and offer advantages. These lubricating oils have better temperature and oxidation stability, as well as relatively low cold viscosity. Since some processes which are relevant for determining the lubricating oil change times are largely dependent on the oil quality (e.g. the infiltration of soot and other contamination), the oil change time for synthetic lubricating oils may not be increased in relation to the specifications on lubricating oil change intervals.

Biodegradable lubricating oils may be used in DEUTZ engines if they meet the requirements of this operating manual.

Quality

Lubricating oils are classified by DEUTZ according to their efficiency and quality class (DQC: DEUTZ Quality Class). the higher the quality class (DQC I, II, III, IV), the more effective/the better quality the lubricating oil is.

The DQC quality classes are still to be extended by the DQC-LA quality classes which include the modern, low-ash lubricating oils (LA = Low Ash).

The choice of lubricating oil essentially depends on the exhaust aftertreatment system.

The following lubricating oils are permissible for the engines in this operating manual:

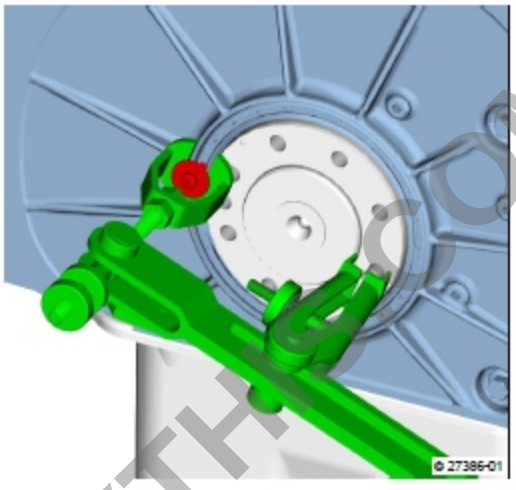
Permissible quality class	
DEUTZ	**Other**
Engines with exhaust aftertreatment system	
DQC III **LA** *	Please contact your DEUTZ partner or visit www.deutz.com
DQC IV **LA** *	
Engines without exhaust aftertreatment system	
DQC III	Please contact your DEUTZ partner or visit www.deutz.com
DQC III **LA** *	
DQC IV	
DQC IV **LA** *	
* Sulphur content in the fuel < 15 mg/kg	

For low-ash engine oils released according to the DQC system, an appropriate reference is made in the oil release list.

DEUTZ lubricating oils DQC II TLS - 15W40 D	
Not for engines with exhaust gas aftertreatment	
Container	**Ordering number:**
5 litre canister	0101 6331
20 litre canister	0101 6332
209 litre barrel	0101 6333

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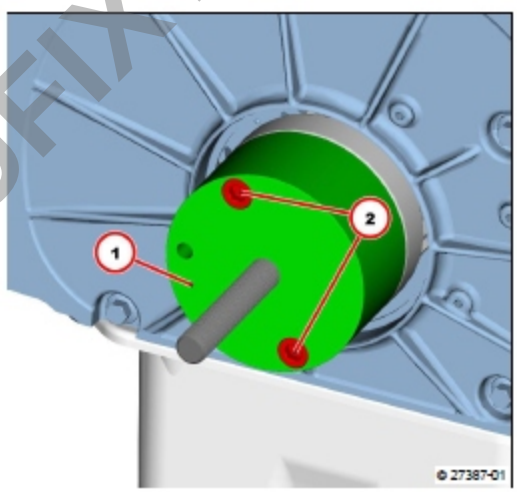
- Pull out crankshaft sealing ring with assembly lever.
- Visually inspect the running surface of the crankshaft sealing ring.
- Visually inspect all contact surfaces.



Installing the crankshaft sealing ring

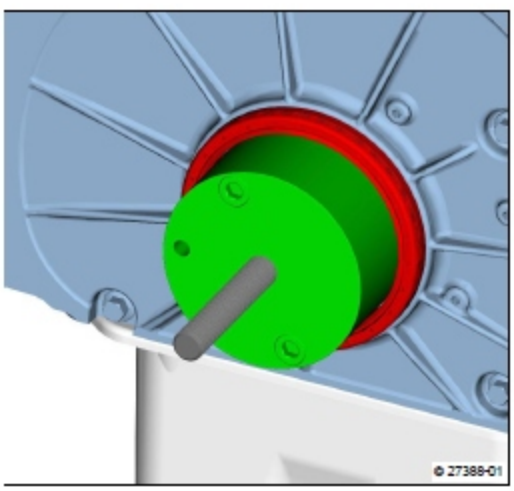
- Mount guide sleeve (1).
- Tighten screws (2).

The bores in the guide sleeve must be aligned with the threaded holes in the crankshaft flange.



- Place the crankshaft sealing ring carefully on the contact surface.

Do not oil waxed crankshaft sealing rings. The sealing lip faces the crankcase.



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Generator

Conventional tools

Special tools:

– Multi-tooth socket wrench optional	01899069
Serrated screwdriver bit	01899098

– Safety information / User information

For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Disassembly / Assembly

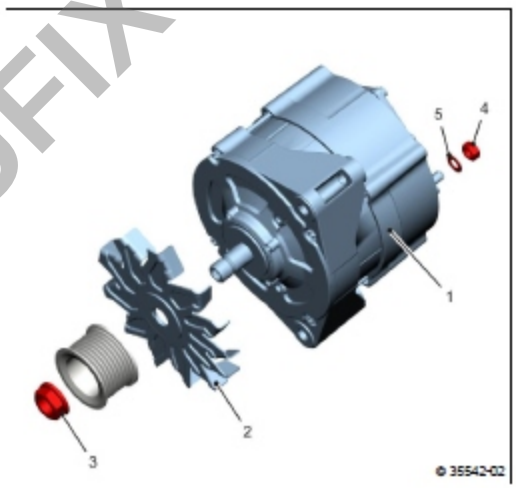
1 Generator
Terminal D+ (L)
2.7 – 3.8 Nm

2 Fan

3 Hexagon nut
Variant without clamping cone.
90 Nm
Hexagonal nut in conjunction with clamping cone and V-rib belt pulley
75 Nm

4 Hexagonal nut
Terminal B+
7.5 – 8 Nm

5 Spring washer



ATTENTION
Position 3. Observe the spare parts documentation.

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Die Segementlängen sind laut Toleranzbereich einzuhalten und verstehen sich Mitte Pin zu Mitte Pin zu Pin, Pin zu Anschlagtel.

● Punkt
200 mm Segmentlänge

Der Kabelbaum ist mit einem Label/ Klebestreifen zu versehen mit folgenden Informationen:
1. Lieferant
2. Artikelnummer/A-Index
3. Lieferant Artikelnummer
4. Lieferung-Identifizierung

/5 /C5

Alle Adern sind durchgehend mit der Adernzahl-nummer und dem Signalnamen zu bedrucken.
Beispiel: -W1 · PV1 F1 Klemme 30
Alle Stecker und Kabelschuhe sind öl-, wasser- und witterungsbeständig mit dem Bestellbestimmenen zu Kennzeichnen.

Beispiel: -BS37:X1
Leitungen die verdrillt werden müssen, sind mit 20-25 Schläge pro Meter zu verdrillen.

Toleranzbereich (in mm)

0 bis 300	+10 / -5
301 bis 500	+15 / -10
501 bis 1000	+20 / -10
1001 bis 2500	+25 / -15
2501 bis 10000	+30 / -20

Die Summe der Einzeltoleranzen dürfen die angegebenen Toleranzangaben nicht über / unterschritten

Nicht beteiligte Anschlüsse mit Blindstopfen verschliessen

Der Ultraschall geschweißte Spüce wird nach dem schweißen mit einem Schrumpfschlauch mit Kleber eingeschrumpft und so wasserdicht verschlossen

= PVC Adhesive Band, 105°C
= PET Vlies Adhesive Band, 125°C
= PET Gewebe Adhesive Band, 150°C

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-A10:X1A#2

01					
02					
03	Sh_Ref_Sv	-fa18/z2,4	-W474	YE	0,75 mm²
04	Kühlwasserfarmig	-KNA81/4C	-W205	GN	0,75 mm²
05	DIO	-KDN22c2,4	-W437	BN	1,00 mm²
06	DIO	-KDN22c2,2	-W438	BN	1,00 mm²
07	Scheinwerferübrg	-KNA81/4C	-W204	GN	0,75 mm²
08	Kühlwasserübrg	-KNA81/5C	-W204	GN	0,75 mm²
09	Out				
10	RS3_Prog	-A12:z1,6	-W149	GN	0,75 mm²
11	Zusatz_Fahren_vorwärts	-A12:z11,3	-W132	GN	0,75 mm²
12	DIO	-KDN22c2,3	-W439	BN	1,00 mm²
13	MI32_A2-F7_2A	-A270xf	-W491	RD	1,00 mm²
14	Hupkzg	-S3:x1:6	-W83	BK	0,75 mm²
15	Zusatz_Fahren_neutral	-A12:z1,10	-W153	GN	0,75 mm²
16	RS5_Prog	-A12:zX1:11	-W150	GN	0,75 mm²
17	Out	-S3:X1:3	-W207	GN	0,50 mm²
18	SIG_NC	-XOPT1:5	-W555	GN	0,75 mm²
19	KW13_A1-F14_A10	-A114/xd	-W206	BK	1,00 mm²
20	MI32_A2-F7_2A	-A270xf	-W462	RD	1,00 mm²
21	Zusätz_Fahren_rückwärts	-A12:z11,4	-W134	GN	0,75 mm²
22	Kraftstoffpumpe	-A60/1.1/AD	-W142	WH	1,00 mm²
23	Raumlicht/Uhr	-A61/4c/B	-W74	GN	0,75 mm²
24	RA_Scheinwer_links	-A10/xd,4D	-W581	GN	1,00 mm²
25	CAN1_L_Diag	-A10:z1,2	-W201	YE	1,00 mm²
26	KW15_A1-F13_A10	-A113/xd	-W334	BK	1,00 mm²

-A10:X1B#2

01	Rundumleuchte	-A5/c5,6b	-W274	GN	0,75 mm²
02	Arbeitslicht	-A5/4d,6b	-W275	GN	0,75 mm²
03	Arbeitslicht	-A5/c5,6b	-W276	GN	0,75 mm²
04	Sterlfreigabe	-A2:f5	-W264	GN	0,75 mm²
05	DIO	-KDN22c2,4	-W440	BN	1,00 mm²
06	Schwenkü	-KNA84:2B	-W433	WH	1,00 mm²
07					
08	Fahrer Lenksaen	-KNA81/4C	-W140	WH	1,00 mm²
09	Schwenkfkt	-KNA84:2B	-W434	WH	1,00 mm²
10		-S3:X1:8	-W85	GN	0,75 mm²
11	KL30				
12					
13					
14	Handlenmse	-S7:X:4	-W236	GN	0,75 mm²
15	Verbuchertastaufhaltung	-S3:X1:10	-W84	BK	0,75 mm²
16	CAN1_Term	-A10:X1B:17	-W209	WH	1,00 mm²
17	CAN1_Term	-A10:X1B:18	-W209	WH	1,00 mm²
18	KW15_A1-F13_A10	-A113/xd	-W335	BK	1,00 mm²
19	DpS_NO	-A10:X1A:11	-W332	GN	0,75 mm²
20	Sensorsw	-A10:X1A:10	-W333	GN	0,75 mm²
21	NS_Hubgerüst_abschalten	-XOPT1:7	-W154	GN	0,75 mm²
22	Menge 4 Sig	-XOPT1:7	-W154	GN	0,75 mm²
23					
24	RA_Scheinwer_links	-A10:X1A:4D	-W581	GN	1,00 mm²
25	CAN1_L_Diag	-A10:z1,2	-W201	YE	1,00 mm²
26	KW15_A1-F13_A10	-A113/xd	-W334	BK	1,00 mm²

-A10:X2A#2

01					
02					
03					
04	Sterlfreigabe	-KNA84:4B	-W435	WH	1,00 mm²
05	Lifterichtcakt	-KNA81/4A	-W202	WH	1,00 mm²
06	Lifterumfahrt	-KNA81:B6D	-W201	WH	1,00 mm²
07	KL15_A10	-A10/xd	-W202	BN	1,00 mm²
08	KL87_A10	-A370xf	-W324	BK	1,00 mm²
09		-A370xf	-W324	BK	1,00 mm²
10	Gehäuseschalter	-KNA83:5D	-W546	GN	0,75 mm²
11	Schwenkfkt	-KNA84:2B	-W434	WH	1,00 mm²
12	KL31b	-S3:X1:8	-W223	WH	1,00 mm²
13	Gehäuseschalter	-KNA83:5A	-W145	GN	0,75 mm²
14	KL49_A10	-A250xf	-W321	BK	1,00 mm²
15	KL87_A10	-A370xf	-W325	BK	1,00 mm²
16					
17					
18	NS_Schwenken_rechts	-KNA84:5A	-W582	GN	1,00 mm²
19	Signal_Fahrdrehschalter	-XOPT1:21	-W541	GN	0,75 mm²
20					
21					
22	Fernbedienen	-KNA84:5B	-W436	WH	1,00 mm²
23					
24	GND	-KDN22c2,1	-W441	BN	1,00 mm²
25	Sprtbewasserpr1	-XB:11	-W228	BN	1,00 mm²
26	Schwenkleuchtung 4. Stkr	-S8:X:10	-W345	GN	0,75 mm²

-A10:X2B#2

01	DIAG_H_J1939	-fa151/z2,3	-W263	WH	1,00 mm²
02	KW15_A2-F8_A10	-A115/xd	-W338	BK	1,00 mm²
03					
04					
05	4.Sitzarbeitslicht	-KNA84:8B	-W160	WH	1,00 mm²
06	4.Sitzarbeitslicht	-KNA84:7B	-W161	WH	1,00 mm²
07	Option 2 A	-KNA84:2C	-W403	WH	1,00 mm²
08	KL49_A10	-A180xf	-W327	BK	1,00 mm²
09	GND	-KDN22c4,4	-W127	BN	1,00 mm²
10					
11	SRF	-XOPT1:6	-W547	GN	0,75 mm²
12					
13	KW15_A2-F12_A10	-A113/xd	-W333	BK	1,00 mm²
14	Option2 B	-KNA84:2D	-W464	WH	1,00 mm²
15	GND	-KDN22c2,5	-W128	BN	1,00 mm²
16					
17	Lastwarn_ein	-XOPT1:4	-W370	GN	0,75 mm²
18					
19					
20	Scheinwerf_links	-KNA84:5D	-W564	WH	1,00 mm²
21	Hydrantgrat_abschalten	-KNA84:5C	-W582	WH	1,00 mm²
22	Klima_ein	-S9:X:3	-W315	WH	0,75 mm²
23	GND	-KDN22c2,7	-W443	BN	1,00 mm²
24					
25	Scheinwerf_rechts	-KNA84:6A	-W565	WH	1,00 mm²
26					

-A10:X3A#2

01	KL31b_A10	-A180xf	-W328	BK	1,00 mm²
02	Steuerblock A	-KNA81:B3A	-W158	WH	1,00 mm²
03	Steuerblock B	-KNA81:B3A	-W159	WH	1,00 mm²
04					
05					
06					
07	KW15_A1-F12_A10	-A113/xd	-W332	BK	1,00 mm²
08	KL49_A10	-A180xf	-W327	BK	1,00 mm²
09	GND	-KDN22c4,4	-W127	BN	1,00 mm²
10					
11	SRF	-XOPT1:6	-W547	GN	0,75 mm²
12					
13	KW15_A1-F12_A10	-A113/xd	-W333	BK	1,00 mm²
14	Option2 B	-KNA84:2D	-W464	WH	1,00 mm²
15	GND	-KDN22c2,5	-W128	BN	1,00 mm²
16					
17	Lastwarn_ein	-XOPT1:4	-W370	GN	0,75 mm²
18					
19					
20	Scheinwerf_links	-KNA84:5D	-W564	WH	1,00 mm²
21	Hydrantgrat_abschalten	-KNA84:5C	-W582	WH	1,00 mm²
22	Klima_ein	-S9:X:3	-W315	WH	0,75 mm²
23	GND	-KDN22c2,7	-W443	BN	1,00 mm²
24	Fzug2Abkoppelanlagen	-KNA84:7A	-W431	GN	0,75 mm²
25	Scheinwerf_rechts	-KNA84:6A	-W565	WH	1,00 mm²
26					

-A10:X3B#2

01	KW15_A2-F8_A10	-A118/xd	-W340	BK	1,00 mm²
02	KW15_A2-F8_A10	-A118/xd	-W341	BK	1,00 mm²
03					
04	Schaltstufe2	-KNA81:5A	-W144	WH	1,00 mm²
05	Schnellwechsler	-KNA81:A2D	-W182	WH	1,00 mm²
06	Schaltstufe1	-KNA81:4A	-W143	WH	1,00 mm²
07	KL49_A10	-A180xf	-W328	BK	1,00 mm²
08	KL49_A10	-A180xf	-W329	BK	1,00 mm²
09	Out	-fa5:3	-W224	WH	1,00 mm²
10					
11					
12					
13	Nähung_Schaufel_ausgerichtet	-KNA84:2A	-W428	GN	0,75 mm²
14	Nähung_Hubgerüst_oben	-KNA84:5A	-W427	GN	0,75 mm²
15	Nähung_Hubgerüst_unten	-KNA84:4A	-W428	GN	0,75 mm²
16					
17	KL49_A10	-A180xf	-W322	BK	1,00 mm²
18	DIAG_J_J1939	-fa81/z1,3	-W263	BN	1,00 mm²
19					
20	KL31	-S11:X:3	-W198	GN	0,75 mm²
21	Dämeschutz Distrikt	-KNA81:B6C	-W120	GN	0,75 mm²
22					
23	Anemdruck	-B1:X1:2	-B1:X:W1	2_WH	0,50 mm²
24	Lastwarnung	-KNA84:8B	-W469	GN	0,75 mm²
25	Fzug beheizen	-KDA2:9B	-W45	WH	1,00 mm²
26	Blocherr/Park	-A7/A2:6E	-W216	GN	0,75 mm²
27	Wischer2 Stufe	-A7/X1:6E	-W215	GN	0,75 mm²
28	Fahrer vorwärts	-KNA81:A6C	-W144	WH	1,00 mm²
29	Anemdicht	-KNA81:A1C	-W73	BK/RT	1,00 mm²
30	GND	-KDN22c2,6	-W442	BN	1,00 mm²
31					
32					
33	Zeitrcelt	-KNA81:B6B	-W121	GN	0,75 mm²
34					

-T1:B#1

1					
2					
3	Sitzsteller/R	-X8:13	-W480	RD	0,75 mm²
4	Sitzsteller/K	-X8:14	-W482	BK	0,75 mm²
5	Sitzsteller/L	-X8:15	-W481	RD	0,75 mm²
6	Sitzsteller/G	-X8:16	-W483	BK	0,75 mm²
7					
8					

-T1:A#2

1					
2					
3					
4	KW15_A2-F10_10A	-A2:100xf	-W380	BK	1,00 mm²
5					
6					
7	BMS2_A2-F10_10A	-A2:160xf	-W45	RD	1,00 mm²
8	GND	-KDN22c2,4	-W280	BN	1,00 mm²

-S1:X#1

*10/10

1					
2	Sh_Ref_Sv	-fa18/z2,4	-W474	YE	0,75 mm²
3	Kühlwasserfarmig	-KNA81/4C	-W205	GN	0,75 mm²
4	DIO	-KDN22c2,1	-W437	BN	1,00 mm²
5	DIO	-KDN22c2,2	-W438	BN	1,00 mm²
6	Scheinwerferübrg	-KNA81/4C	-W204	GN	0,75 mm²
7	Kühlwasserübrg	-KNA81/5C	-W204	GN	0,75 mm²
8	Out				
9	Out				
10	RS3_Prog	-A12:z1,6	-W149	GN	0,75 mm²

-S2:X#1

1	Zusatz_Fahren_vorwärts	-A12:z11,3	-W132	GN	0,75 mm²
2	DIO	-KDN22c2,3	-W439	BN	1,00 mm²
3	MI32_A2-F7_2A	-A270xf	-W491	RD	1,00 mm²
4	Hupkzg	-S3:X1:6	-W83	BK	0,75 mm²
5	Zusatz_Fahren_neutral	-A12:z11,10	-W153	GN	0,75 mm²
6	RS5_Prog	-A12:zX1:11	-W150	GN	0,75 mm²
7	Out	-S3:X1:3	-W207	GN	0,50 mm²
8	SIG_NC	-XOPT1:5	-W555	GN	0,75 mm²
9	KW13_A1-F14_A10	-A114/xd	-W206	BK	1,00 mm²
10	MI32_A2-F7_2A	-A270xf	-W462	RD	1,00 mm²

-S3:X#1

*6/6

1	Hupe_Schlüsselbe	-A10:X2B:15	-W135	GN	0,75 mm²
2	KW15_A1-F5_2A	-A170xf	-W294	BK	0,75 mm²
3	Zusatz_Fahren_vorwärts	-A10:X1A:11	-W132	GN	0,75 mm²
4	Zusatz_Fahren_rückwärts	-A10:X1A:21	-W134	GN	0,75 mm²
5	KW15_A1-F5_2A	-A150xf	-W393	BK	1,00 mm²
6	Zusatz_Fahren_neutral	-A10:X1A:15	-W133	GN	0,75 mm²
7	LV_Ref_5V	-fa15/z1,1	-W147	YE	0,75 mm²
8	RS3_Prog	-A10:X1A:16	-W150	GN	0,75 mm²
9	GND	-XGND2:a1	-W148	BN	0,75 mm²
10	LV_Ref_5V	-fa15/z1,2	-W475	YE	0,75 mm²
11	RS6_Prog	-A10:X1A:16	-W150	GN	0,75 mm²
12	GND	-XGND2:b5	-W478	BN	0,75 mm²

-S4:X#1

*10/10

1	KW30_A2-F2_25A	-A2:110xf	-W43	RD	2,50 mm²
2	KW15_A1-F7-10A	-A170xf	-W307	BK	1,50 mm²
3	Horn	-KNA81:A7B	-W341	WH	1,00 mm²
4	Sitzheizt_KI.58	-A4:1fc, /F1:X2:3E	-W54, -W53	GY/BK, GY/BK	1,00 mm² / 1,00 mm²
5	Fernlicht_KI.56a	-A4:5fc, /F1:X2:3T	-W67, -W66	WH, WH	1,50 mm² / 1,00 mm²
6	Abblendlicht_KI.56b	-A4:4fc, /F1:X2:3E	-W68, -W69	WH/YE, WH/YE	1,50 mm² / 1,00 mm²
7	Kfa_Blink_re/rü	-S3:X:1T, -A4:6fc	-W250, -W249	BK/GN, BK/GN	0,75 mm² / 1,00 mm²
8	Blinker_Links	-A4:7fc, -S5:X:5	-W243, -W244	BK/WH, BK/WH	1,00 mm² / 1,00 mm²
9	Kfa_Blink_fg	-S5:X:1E, -A10:X1A:3	-W254, -W255	BK/BU, BK/BU	1,00 mm² / 1,00 mm²
10					

-S5:X#1

*10/10

1	Blinker_rechts	-S4:X:8, /F1:X2:5A	-W244, -W245	BK/WH, BK/WH	1,00 mm² / 1,00 mm²
2	Kfa_Blink_re/rü	-P1:X2:5S, -S4:X:7	-W251, -W250	BK/GN, BK/GN	1,00 mm² / 1,00 mm²
3	GND	-S4:X:5, -A10:X1A:4D	-W581	GN	1,00 mm²
4					
5					
6					
7	GND	-S4:X:6, /F1:X2:5A	-W574, -W361	BN, BN	0,75 mm² / 0,75 mm²
8	Schalterbeleuchtung	-S3:X:9, -S8:X:8	-W544, -W542	BK, BK	0,75 mm² / 0,75 mm²
9					
10					

-S8:X#1

*10/10

VC2 Carling 10 Position socket housing

Switch Pre-Selection Optional Hydraulic Circuit II

-S11:X#1

*10/10

VC2 Carling 10 Position socket housing

Switch Rück-control

-S35:X#1

*10/10

VC2 Carling 10 Position socket housing

Switch Regeneration particulate filter

-S10:X#1

*10/10



VC2 Carling 10 Position socket housing

Switch Bak-up-warning

-S9:X#1

*10/10

VC2 Carling 10 Position socket housing

Switch Air conditioning

-S3:X1#2

10	Verbuchertastaufhaltung	-A10:X1B:15, -A4:3h	-W84, -W81	BK, BK	0,75 mm² / 0,75 mm²
6	KL30	-A10:X1B:11	-W85	GN	0,75 mm²
9	KL30	-X2:2	-W86	GN	0,75 mm²
4					
5	53.15/4	-A52:X1:8E	-W37	BK	1,00 mm²
8	Relais1a	-A10:X1A:14, -KNA81:B3D	-W83, -W398	BK, BK	0,75 mm² / 0,75 mm²

-S3:X2#1

1	KW30_A2-F1_A7.5	-A2:10xt	-W82	RD	1,00 mm²

-S3:X2#2

1					
2	31/ Schalter	-S14:X:2, -S13:X:2	-W188, -W113	BK, BK	0,75 mm² / 0,75 mm²
3	Sprecherin	-P1:X1:10, -S23:X:10	-W56, -W91	GN, GN	0,75 mm² / 0,75 mm²
4					
5					
6					
7	GND	-S23:X:9, -S13:X:7	-W93, -W175	BN, BN	0,75 mm² / 0,75 mm²
8	Schalterbeleuchtung	-S13:X:8, -S8:X:8	-W173, -W89	BK, BK	0,75 mm² / 0,75 mm²
9	GND	-S23:X:7, -S8:X:10	-W93, -W198	BN, BN	0,75 mm² / 0,75 mm²
10	Sprecherin	-S23:X:3	-W91	GN	0,75 mm²

-S13:X#2

1					
2	31/ Schalter	-A1:6Out, -S23:X:2	-W114, -W113	BK, BK	0,75 mm² / 0,75 mm²
3	Schnellwechsler	-P1:X1:02	-W190	GN	0,75 mm²
4					
5					
6					
7	GND	-S23:X:7, -XGND2:a3	-W175, -W355	BN, BN	0,75 mm² / 0,75 mm²
8	Schalterbeleuchtung	-S23:X:8, -fa111:Z:X	-W173, -W166	BK, BK	0,75 mm² / 0,75 mm²
9					
10	Schnellwechsler				

-S23:X#1

*10/10



VC2 Carling 10 Position socket housing

Switch Save Valve Additional Control Circuit

-S13:X#1

*10/10



VC2 Carling 10 Position socket housing

Switch Quick-attach system

-S26:X#1

*6/6



Delphi 6 pole Sealed Socket housing

Throttle Pedal

-S26:X#2

B	GND_Sollwertgeber	-fa11/z1,3	-W375	BN	0,75 mm²
C	LV2_Sollwertgeber	-fa14/z1,3	-W374	BK	0,75 mm²
F	GND_Sollwertgeber	-fa11/z1,1	-W378	BN	0,75 mm²
A	Signal_Sollwertgeber	-fa14/z1,1	-W373	GN	0,75 mm²
D	5V5	-fa14/z1,5Z2	-W379	GN	0,75 mm²
E					

-S3:X1#1

*6/6



Start Switch

-S3:X2#1

*6/6



Start Switch

-S7:X#1



Handrake

-S7:X#2

1	KombiausSchl/einen	-A10:X1A:4	-W47	BK	0,75 mm²
2					
3					
4	Handlenmse	-A10:X1B:14	-W236	GN	0,75 mm²

4pol Sumsesse Socket housing

Handrake

-S14:X#1

*10/10



VC2 Carling 10 Position socket housing

Engine cooler reversing fan changeover switch

-S5:X#1

*10/10



JC2 Packard 56, 10 pole Socket housing

Hazard warning switch

-P1:X1#2

01					
02	Schnellwechsler	-S13:X:3	-W190	GN	0,75 mm²
03	Löfeumatik_aus	-S14:X:3	-W195	GN	0,75 mm²
04	Man_Löfeumatik	-S14:X:4	-W194	GN	0,75 mm²
05					
06					
07					
08					
09	CAN_Intern_Term	-P1:X1:25	-W258	WH	1,00 mm²
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21	CAN1_H_Diag	-fa13/z2,3	-W350	YE	1,00 mm²
22	CAN1_L_Diag	-fa14/z2,3	-W200	GN	1,00 mm²
23	Lastwarnblinkleuchte	-A60/1.B4C	-W281	BU	1,00 mm²
24	Speichern	-S23:X:3	-W90	GN	0,75 mm²
25					
26					

-P1:X2#1

01	Kfa_Blink_Sig	-S4:X:9	-W255	BK/BU	1,00 mm²
02	C2_Zusatz_Blinkleuchte_AHK	-A9:5D	-W256	BK/BU	1,00 mm²
03	Kfa_Blink_re/rü	-S23:X:11	-W251	BK/GN	1,00 mm²
04	Blinker_Links	-S5:X:5	-W245	BK/WH	1,00 mm²
05	Standlicht_KI.58	-S4:X:4	-W53	GY/BK	1,00 mm²
06	Abblendlicht_KI.56b	-S4:X:6	-W69	WH/YE	1,00 mm²
07	Fernlicht_KI.56a	-S4:X:5	-W66	WH	1,00 mm²
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21	CAN_Intern_Term	-P1:X2:22	-W257	WH	1,00 mm²
22	CAN_Intern_Term	-P1:X2:21	-W257	WH	1,00 mm²
23					
24	CAN2_H_J1939	-X11:6	-W254	WH	1,00 mm²
25	CAN2_L_J1939	-X11:5	-W254	BN	1,00 mm²
26					

-S4:X#2

1	KW30_A2-F2_25A	-A2:110xf	-W43	RD	2,50 mm²
2	KW15_A1-F7-10A	-A170xf	-W307	BK	1,50 mm²
3	Horn	-KNA81:A7B	-W341	WH	1,00 mm²
4	Sitzheizt_KI.58	-A4:1fc, /F1:X2:3E	-W54, -W53	GY/BK, GY/BK	1,00 mm² / 1,00 mm²
5	Fernlicht_KI.56a	-A4:5fc, /F1:X2:3T	-W67, -W66	WH, WH	1,50 mm² / 1,00 mm²
6	Abblendlicht_KI.56b	-A4:4fc, /F1:X2:3E	-W68, -W69	WH/YE, WH/YE	1,50 mm² / 1,00 mm²
7	Kfa_Blink_re/rü	-S5:X:1T, -A4:6fc	-W250, -W249	BK/GN, BK/GN	0,75 mm² / 1,00 mm²
8	Blinker_Links	-A4:7fc, -S5:X:5	-W243, -W244	BK/WH, BK/WH	1,00 mm² / 1,00 mm²
9	Kfa_Blink_fg	-S5:X:1E, -A10:X1A:3	-W254, -W255	BK/BU, BK/BU	1,00 mm² / 1,00 mm²
10					

-M4:X#1

*6/6



6-pin plug sleeve housing 6.3 mm FASTIN-FASTON

Wiper motor Front

-M4:X#2

1	KL31b	-A7/A2:67a	-W220	WH	1,50 mm²
2	Stufe_1	-A7/A2:30	-W217	WH	1,50 mm²
3	MI05_A3-F13_15A	-A3:103xf	-W387	RD	1,50 mm²
4	Stufe2	-A7/A1:87	-W219	WH	1,50 mm²
5					
6	GND	-XGND2:b 2	-W221	BN	1,50 mm²

-B1:X1#1

*6/6



Actuation/sicher Connection M12 socket connector 5pol. 5m IN/IT 5-220/5M

-B1:X:1#2

1	KW15_A1-F5_2A	-A1:100xf	-B1:X:W1	1_BN	0,50 mm²
2	Bremsdruck	-A10:X2B:23	-B1:X:W1	2_WH	0,50 mm²
3					
4					
5					

-A12:X#1



DT Series,2pole Socket housing

-A12:X#2

1	Schwenkleuchtung	-A10:X1A:27	-W141	WH	1,50 mm²
2	GND	-XGND2:a2	-W146	BN	1,00 mm²

-A12:X1#1

*12/12



-A12:X1#2

1	Hupe_Schlüsselbe	-A10:X2B:15	-W135	GN	0,75 mm²
2	KW15_A1-F5_2A	-A170xf	-W294	BK	0,75 mm²
3	Zusatz_Fahren_vorwärts	-A10:X1A:11	-W132	GN	0,75 mm²
4	Zusatz_Fahren_rückwärts	-A10:X1A:21	-W134	GN	0,75 mm²
5	KW15_A1-F5_2A	-A150xf	-W393	BK	1,00 mm²
6	Zusatz_Fahren_neutral	-A10:X1A:15	-W133	GN	0,75 mm²
7	LV_Ref_5V	-fa15/z1,1	-W147	YE	0,75 mm²
8	RS3_Prog	-A10:X1A:16	-W150	GN	0,75 mm²
9	GND	-XGND2:a1	-W148	BN	0,75 mm²
10	LV_Ref_5V	-fa15/z1,2	-W475	YE	0,75 mm²
11	RS6_Prog	-A10:X1A:16	-W150	GN	0,75 mm²
12	GND	-XGND2:b 6	-W478	BN	0,75 mm²

-X12:1#1



2-pin plug housing 6.3 mm FASTIN-FASTON

Isolation Point Backup Alarm

-X12:1#2

1	Rückfahrscheinwerfer	-S10:X:2	-W266	GY/BU	1,00 mm²
2	Rückfahrwarner	-S10:X:1	-W267	WH	1,00 mm²

-X12:#1



2-pin plug sleeve housing 6.3 mm FASTIN-FASTON

Isolation Point Backup Alarm

-X12:#2

1	Rückfahrscheinwerfer	-XKAB3:5B, -A8:X2:4F	-W41, -W150	GY/BU, GY/BU	1,00 mm² / 1,50 mm²
2	Rückfahrwarner	-XKAB1:A5C	-W270	WH	1,00 mm²

-X14#1



6-pin plug sleeve housing 6.3 mm FASTIN-FASTON

Central Lubrication

-X14#2

1	KombiausSchl/einen	-XOPT2:11	-W363	GN	0,75 mm²
2	Schmieren	-XOPT2:12	-W364	WH	0,75 mm²
3	GND	-XGND2:b7	-W365	BN	0,50 mm²
4	Aef-F10_20A	-A4:100xf	-W545	BK	2,50 mm²
5					
6					

-X7:1

Relay carrier with assignment

Relay assignment plan

A5	
Relay 1–6	
Relay no.	**Function**
A5-K1	Ride control system, option
A5-K2	Relief of reverse headlights
A5-K3	Front working floodlights
A5-K4	Working floodlight rear, option
A5-K5	Rotating beacon, option
A5-K6	Fuel pump relay

A6	
Relay 1–6	
Relay no.	**Function**
A6-K1	Relay fan level 1
A6-K2	Relay fan level 2
A6-K3	Relay fan level 3
A6-K4	Optional brake light attachment socket
A6-K5	Optional water nozzle
A6-K6	Fuel filter heating

A7	
Relay 1–6	
Relay no.	**Function**
A7-K1	Front wiper motor, 2nd level
A7-K2	Front wiper motor, 1st level
A7-K3	
A7-K4	
A7-K5	
A7-K6	

A8	
Relay 1–6	
Relay no.	**Function**
A8-K1	
A8-K2	Spare
A8-K3	Spare
A8-K4	Spare
A8-K5	Spare
A8-K6	Spare

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