



NEW HOLLAND

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IMPORTANT NOTES

These pages replace the corresponding pages in the Manual of models TN55D/S, TN65D/S, TN75D/S

- preface pages 1 and 2.
- contents, pages 3, 4, 5, 6, 7, 8, 9 and 10.
- Section 00, pages 5 and 6.
- Section 10, Chapter 1, pages 1, 2, 3, 4, 5, 6, 15, 16, 19, 20, 21, 22, 65, 66, 81, 82, 83 and 84.
- Section 18, Chapter 1, pages 1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 15 and 16.
- Section 21, Chapter 1, pages 29 and 30.
- Section 21, Chapter 3, pages 1, 2, 9, 10, 25, 26, 27, 28, 29, 30, 31, 32, 33 and 34.
- Section 23, Chapter 1, pages 1, 2, 3, 4, 19 and 20.
- Section 25, Chapter 1, pages 1, 2, 7, 8, 13, 14, 41 and 42.
- Section 25, Chapter 2, pages 1, 2, 5, 6, 7, 8, 29, 30, 39 and 40.
- Section 27, Chapter 1, pages 1, 2, 3, 4, 21 and 22.
- Section 31, Chapter 1, pages 1, 2, 3 and 4.
- Section 33, Chapter 1, pages 3 and 4.
- Section 35, Chapter 1, pages 17, 18, 19, 20, 21, 22, 31, 32, 30 and 40.
- Section 35, Chapter 2, pages 1 and 2.
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- Section 41, Chapter 2, pages 5 and 6.
- Section 44, Chapter 1, pages 1 and 2.
- Section 55, Chapter 1, pages 11 and 12.

IMPORTANT NOTES

The following pages are newly issued:

- pages 11 and 12, index.
- pages 95 and 96, Chapter 1, Section 10.
- pages 25, 26, 27, 28, 29 and 30, Chapter 1, Section 18.
- pages 35 to 158, Chapter 3, Section 21.
- pages 21 to 70, Chapter 1, Section 23.
- pages 41, 42, 43 and 44, Chapter 2, Section 25.
- pages 61 to 148, Chapter 4, Section 35.
- pages 1 to 132, Chapter 6, Section 35.
- pages 17 to 26, Chapter 1, Section 55.
- pages 19 to 34, Chapter 2, Section 55.
- pages 13 and 14, Chapter 3, Section 55.
- pages 111 to 276, Chapter 6, Section 55.

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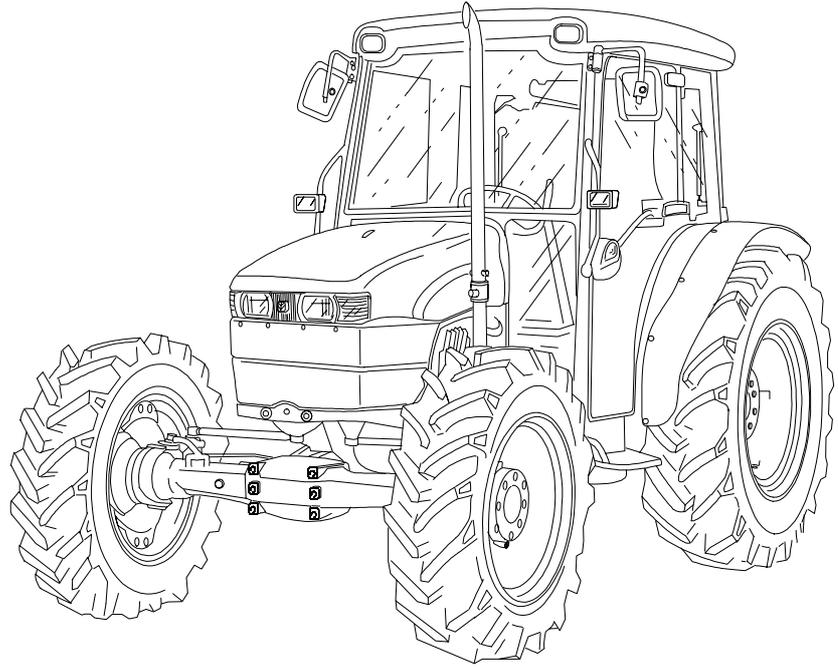
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NEW HOLLAND



27594

TN55D - TN55S - TN65D - TN65S - TN70D - TN70S - TN75D - TN75S TRACTORS SERVICE MANUAL

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S E R V I C E

INTRODUCTION

- *This manual is divided into sections identified by two-figure numbers and each section has independent page numbering.
For easy reference, these sections have the same numbers and names as the Repairs Rate Book sections.*
- *The different sections can easily be found by consulting the table of contents on the following pages.*
- *The document number of the manual and the edition/update dates are given at the bottom of each page.*
- *Pages updated in the future will be identified by the same document number followed by a two-figure update number (e.g.: 1st Update 603.54.350.01; 2nd Update 603.54.350.02; etc.) and by the corresponding issue date.
These pages will be supplemented by a reprint of the updated contents page.*
- *The information contained in this manual was current on the date printed on each section. As NEW HOLLAND constantly improves its product range, some information may be out of date subsequent to modifications implemented for technical or commercial reasons, or to meet legal requirements in different countries. In the event of conflicting information, consult the NEW HOLLAND Sales and Service Departments.*

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- *All maintenance and repair work described in this manual must be performed exclusively by NEW HOLLAND service technicians, in strict accordance with the instructions given and using any specific tools necessary.*
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90 - PLATFORM, CAB, BODYWORK

CHAPTER 1 - Cab

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START UP

- Never run the engine in confined spaces that are not equipped with adequate ventilation for exhaust gas extraction.
- Never place the head, body, limbs, feet, hands or fingers near fans or rotating belts.

ENGINE

- Always loosen the radiator cap slowly before removing it to allow any remaining pressure in the system to be discharged. Filling up with coolant should only be carried out with the engine stopped or idling (if hot).
- Never fill up with fuel when the engine is running, especially if hot, in order to prevent the outbreak of fire as a result of fuel spillage.
- Never check or adjust fan belt tension when the engine is running.
Never adjust the fuel injection pump when the vehicle is moving.
- Never lubricate the vehicle when the engine is running.

ELECTRICAL SYSTEMS

- If it is necessary to use auxiliary batteries, remember that both ends of the cables must be connected as follows: (+) with (+) and (-) with (-). Avoid short-circuiting the terminals. GAS RELEASED FROM BATTERIES IS HIGHLY INFLAMMABLE. During charging, leave the battery compartment uncovered to improve ventilation. Never check the battery charge using "jumpers" (metal objects placed on the terminals). Avoid sparks or flames near the battery zone. Do not smoke to prevent explosion hazards.
- Before servicing operations, check for fuel or current leaks. Eliminate any eventual leaks before proceeding with work.
- Never charge batteries in confined spaces. Make sure that there is adequate ventilation in order to prevent accidental explosion hazards as a result of the accumulation of gases released during charging operations.
- Always disconnect the batteries before performing any kind of servicing on the electrical system.

HYDRAULIC SYSTEMS

- A liquid leaking from a tiny hole may be almost invisible but, at the same time, be powerful

enough to penetrate the skin; Therefore, NEVER USE HANDS TO CHECK FOR LEAKS. Use a piece of cardboard or wood for this purpose. If any liquid penetrates skin tissue, call for medical aid immediately. Failure to treat this condition with correct medical procedure may result in serious infection or dermatosis.

- In order to check the pressure in the system use suitable instruments.

WHEELS AND TYRES

- Make sure that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check the rims and tyres for damage.
- Stand away from (at the side of) the tyre when checking inflation pressure.
- Only check pressure when the tractor is unloaded and the tyres are cold, to avoid incorrect readings as a result of over-pressure. Do not use parts of recovered wheels as incorrect welding brazing or heating may weaken and eventually cause damage to the wheel.
- Never cut or weld a rim mounted with an inflated tyre.
- To remove the wheels, lock both the front and rear vehicle wheels. After having raised the vehicle, position supports underneath, according to regulations in force.
- Deflate the tyre before removing any objects that may be jammed in the tyre tread.
- Never inflate tyres using inflammable gases; as this may result in explosions and injury to bystanders.

REMOVAL AND RE-FITTING

- Lift and handle all heavy parts using suitable hoisting equipment. Make sure that parts are sustained by appropriate hooks and slings. Use the hoisting eyebolts for lifting operations. Extra care should be taken if persons are present near the load to be lifted.
- Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.
- Avoid twisting chains or metal cables. Always wear safety gloves when handling cables or chains.

CONSUMABLES

COMPONENT TO BE FILLED OR TOPPED UP	QUANTITY dm ³ gall. (litres)	RECOMMENDED NEW HOLLAND PRODUCTS	NEW HOLLAND SPECIFICATIONS	INTERNATIONAL SPECIFICATIONS
Cooling system: without cab with cab	2.64 (10.0) 3.17 (12.0)	Water and AMBRA AGRIFLU liquid 50% + 50%	NH 900 A	-
Windscreen washer bottle	0.52 (2.0)	Water and AREXONS DP1* liquid*	-	-
Fuel tank:	19.81 (75)	Decanted and filtered diesel fuel	-	-
Engine sump: without filter:	1.77 (6.7)	AMBRA SUPER GOLD	NH 324G (SAE 10W-30) NH 330G (SAE 15W-40)	API CF-4/SG CCMC D4 MIL-L-2104E
with filter:	1.98 (7.5)	AMBRA SUPER Oil	NH 301C (SAE 10W) NH 302C (SAE 10W) NH 303C (SAE 10W) NH 304C (SAE 10W)	API CCMC D4 MIL-L-2104C
Brake circuit	0.18 (0.7)	AMBRA BRAKE LHM oil	NH 610 A	ISO 7308
With front brakes	0.13 (0.5)			
Front axle: axle casing	1.18 (4.5)	AMBRA MULTI G oil	NH 410 B	API GL4 ISO 32/46 SAE 10W-30
final drives without brakes TN55D/S (each)	0.21 (0.8)			
final drives with brakes TN55D/S (each)	0.34 (1.3)			
final drives without brakes TN65, TN70D/S TN75D/S (each)	0.26 (1.0)			
final drives with brakes TN65, TN70D/S TN75D/S (each)	0.40 (1.5)			
Rear transmission (bevel drive, final drives and brakes), gearbox, hydraulic lift, PTO and hydraulic steering:	11.09 (42)			
Grease fittings	-	AMBRA GR9 grease	NH 710 A	NLGI 2
Air conditioning system - coolant	- 0.21 (0.80)	-	-	R-134a SPA
- oil	0.04 (0.15)			

(* Detergent and anti-freeze to -10 °C with 50% of AREXONS DP1 **liquid**. For temperatures below -10 °C) fill only with AREXONS DP1 **liquid**.

SECTION 10 - ENGINE

Chapter 1 - Engine

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GENERAL SPECIFICATIONS	
Engine, technical type:	
- Models TN 55D and TN 55S - type 8035.05B.231/229/529 (BOSCH pump)	See data on page 6-7
- Models TN 65D and TN 65S - type 8035.05R.241/239/539 (BOSCH pump)	See data on page 8-9
- Models TN 70D and TN 70S - type 8035.25R.220/520 (BOSCH pump) . .	See data on page 95-96
- Models TN 75D and TN 75S - type 8035.25.231/229/529 (BOSCH pump)	See data on page 10-11
Cycle	diesel, 4-stroke
Injection	direct
Number of on-line cylinders	3
Cylinder liners	dry force-fitted in cylinder block
Piston diameter	
- Models TN 55D and TN 55S	4.094 in. (104 mm)
- Models TN 65D and TN 65S	4.094 in. (104 mm)
- Models TN 70D and TN 70S	4.094 in. (104 mm)
- Models TN 75D and TN 75S	4.094 in. (104 mm)
Piston stroke	4.527 in. (115 mm)
Total displacement:	
- Models TN 55D and TN 55S	2931 cm ³
- Models TN 65D and TN 65S	2931 cm ³
- Models TN 70D and TN 70S	2931 cm ³
- Models TN 75D and TN 75S	2931 cm ³
Compression ratio for Models TN 55D, TN 55S, TN 65D and TN 65S	17:1 normally aspirated
Compression ratio for Models TN 70D, TN 70S, TN 75D and TN 75S	16.5:1 turbocharged
Maximum power:	
- Models TN 55D and TN 55S	37 kW (50 Hp)
- Models TN 65D and TN 65S	44 kW (60 Hp)
- Models TN 70D and TN 70S	51 kW (70 Hp)
- Models TN 75D and TN 75S	53 kW (72 Hp)
Maximum power speed	2300 rpm
Maximum torque speed for Models TN 55D and TN 55S	1400 rpm
Maximum torque speed for Models TN 65D and TN 65S	1400 rpm
Maximum torque speed for Models TN 70D and TN 70S	1400 rpm
Maximum torque speed for Models TN 75D and TN 75S	1400 rpm
Number of main bearings	4
Sump pan	structural, cast iron

(continued)

(cont)

GENERAL SPECIFICATIONS	
Lubrication Pump drive Engine speed/oil pump speed ratio Oil cleaning Normal oil pressure with motor warmed-up and running at maximum speed 203° to 221 °F (95° to 105 °C): For Models TN 55D/S and TN 65D/S For Models TN 70D/S and TN 75D/S (start operation) Pressure relief valve Valve initial opening pressure For further lubrication technical data	forced, with gear pump camshaft 2:1 mesh filter on oil intake and filtering cartridge on delivery line 42.06 to 56.56 psi (2.9 to 3.9 bar) ≥ 29 psi (≥ 2 bar) incorporated in oil pump housing 50.76 psi (3.5 bar) see page 19
Cooling system Radiator on Models TN 55D/S and TN 65D/S Radiator on model. TN 70D/S and TN 75D/S Fan, attached to coolant pump pulley Coolant pump Engine speed/coolant pump speed ratio Temperature control Coolant thermometer Temperature ranges corresponding to each section: - initial white section - middle green section (normal working conditions) - final red section For further cooling system technical data	coolant circulation 3 lines of vertical pipes with copper fins 4 lines of vertical copper pipes intake, 6-blade in sheet-metal centrifugal vane-type 1:1.25 thermostat coloured scale divided into 3 sections 86° to 149 °F (30° to 65 °C) 149° to 221 °F (65° to 105 °C) 221° to 239 °F (105° to 115 °C) see page 19
Speedometer/tachometer Operating system Hour counter calibrated for engine speed of	incorporated in control panel from gear on camshaft 1800 rpm

(continued)

(cont)

GENERAL SPECIFICATIONS	
<p>Timing system</p> <p>Intake:</p> <ul style="list-style-type: none"> - start: before TDC. 12° - end: after BDC. 31° <p>Drain:</p> <ul style="list-style-type: none"> - start: before BDC. 50° - end: after TDC. 16° <p>Valve-rocker arm clearance for timing check 0.0177 in. (0.45 mm)</p> <p>Valve-rocker arm clearance (with engine cold):</p> <ul style="list-style-type: none"> - intake 0.011 ± 0.0019 mm (0.30 ± 0.05 mm) - exhaust 0.011 ± 0.0019 mm (0.30 ± 0.05 mm) <p>For further timing system technical data see page 16</p>	<p>overhead valves operated by tappets, rods and rocker arms via the camshaft located in the engine block; the camshaft is driven by the crankshaft using helical gears</p>
<p>Fuel system</p> <p>Air cleaning dual cartridge dry air filter, with clogged filter indicator with centrifugal pre-filter and automatic dust ejector</p> <p>Charge Pump double diaphragm</p> <p>Fuel filtering through wire filter in fuel supply pump, and replaceable cartridge on delivery line to injection pump</p> <p>Minimum fuel flow rate with pump shaft rotating at 1600 rpm . 100 litres/hour</p> <p>Cam operated engine timing</p> <p>BOSCH injection pump rotating distributor type</p> <p>All-speed governor, incorporated in pump:</p> <p>BOSCH centrifugal counterweights</p> <p>Automatic advance regulator, incorporated in pump:</p> <p>BOSCH hydraulic</p> <p>For further fuel system technical data:</p> <p>Fixed advance (pump setting for start of delivery before TDC)</p> <ul style="list-style-type: none"> - Pressure setting - Injection order, and other information regarding the BOSCH pump refer to the data for the relevant engine type in the table on page 2 	

FUEL SYSTEM DATA

Turbocharger (Models TN 70D/S and TN 75D/S):	
- GARRETT type	T 25
Injection pump	rotating distributor with speed governor and advance variator incorporated
BOSCH pump:	
- Models TN 55D/S	VE 3/11 F 1150 L 767 - 99441584
- Models TN 65D/S	VE 3/11 F 1150 L 766 - 99441586
- Models TN 70D/S	VE 3/11 F 1150 L 764-2 - 500389114 - 500389115
- Models TN 75D/S	VE 3/11 F 1150 L 764 - 99441587
Direction of rotation	counter-clockwise
Injection order	1-2-3

Fuel injectors:	
BOSCH type	500307714
- Nozzle holder type	4791124
- Nozzle type	DLLA 132S 1320 - 99469341
Number of nozzle holes	5
Nozzle hole diameter	0.23
Pressure setting	3771.18 to 3945.23 psi (260 to 272 bar)
Delivery lines for BOSCH pump	
- type	99441952
- Pipe dimensions	6 x 1.75 x 540

**MODELS TN 55D AND TN 55S - CALIBRATION DATA FOR BOSCH INJECTION PUMP
TYPE VE 3/11 F 1150 L 767 - VE 3/11 F 1150 L 767-1 - 99441584 - 500324953**

ASSEMBLY DATA

Pump timing on engine: delivery start $9^{\circ} \pm 0.5^{\circ}$ before TDC. of cylinder 1 compression stroke.

Plunger pre-lift for timing on engine: 0.0393 in. (1 mm) from BDC. (with tools **291754** - **291755**).

Cylinder No. 1 delivery line union on pump: marked with letter A.

ASSEMBLY DIMENSIONS

SYMBOL	K	MS	ya	yb
in. (mm)	-	-	1.515 to 1.594 (38.5 to 40.5)	1.685 to 1.889 (42.8 to 48.0)

CALIBRATION TEST CONDITIONS

Test bench conforming to ISO 4008/1 .../2

Injectors conforming to ISO 7440-A61 - (1.688.901.027 with pad \varnothing 0.0196 in. (0.5 mm)).

Injector pressure setting 3626.13 to 5120.10 psi (250 to 353 bar).

Fuel supply pressure:

..... 5.076 \pm 0.0725 psi (0.35 \pm 0.05 bar).

Delivery pipes (conforming to ISO 4093.2):

..... 0.236 x 0.078 x 17.71 in. (mm 6 x 2 x 450).

Graduate drain time: 30".

Test liquid: ISO 4113 at a temperature of $113^{\circ} \pm 33.8^{\circ}$ F ($45^{\circ} \pm 1^{\circ}$ C).

1. START OF DELIVERY

Plunger pre-lift from TDC.: mm -	Pump rotation (viewed from drive side): counter-clockwise	Injection order: 1-2-3
-------------------------------------	--	------------------------

2. ADVANCE REGULATOR STROKE

rpm: 1200	Advance stroke: in. 0.0275 to 0.0433 (mm 0.7 to 1.1)
-----------	--

3. FUEL SUPPLY PUMP PRESSURE

rpm: 1200	Internal pressure: 117.41 to 126.18 psi (bar 8.1 to 8.7)
-----------	--

4. FULL LOAD DELIVERY

rpm: 700	Delivery per 1000 shots: cm ³ 59.5 to 60.5	Spread: cm ³ - 3.5
----------	---	-------------------------------

5. SPREAD GOVERNOR AT IDLE SPEED

rpm: 325	Delivery per 1000 shots: cm ³ 8.4 to 12.4	Spread: cm ³
----------	--	-------------------------

6. SPREAD GOVERNOR AT MAXIMUM SPEED

rpm: 1220	Delivery per 1000 shots: cm ³ 27 to 33	Spread: -
-----------	---	-----------

7. DELIVERY AT STARTING SPEED

rpm: 100	Delivery per 1000 shots: cm ³ 60 to 100
----------	--

8. INJECTION ADVANCE PROGRESSION

rpm	1200	1250
Advance stroke	in. (mm) 0.0275 to 0.0433 (0.7 to 1.1)	0.055 to 0.0708 (1.4 to 1.8)

9. TRANSFER PRESSURE PROGRESSION

rpm	1200	400	700
Internal pressure	psi (bar) 117.41 to 126.18 (8.1 to 8.7)	46.414 to 55.117 (3.2 to 3.8)	68.171 to 88.477 (4.7 to 6.1)

10. BACKFLOW

rpm	400	1150
Backflow	l/h 13 to 33	25 to 37

(continued)

Note: the values shown above in brackets must be used for checking purposes only.

PISTON DATA	in. (mm)
Pistons	light alloy with three compression rings, including two seal rings and one scraper ring
Standard piston diameter, measured at 2.244 in. (57 mm) from skirt base and perpendicularly to the gudgeon pin axis	4.0870 to 4.0876 (103.812 to 103.826)
Piston clearance in cylinder liner	0.0068 to 0.0083 (0.174 to 0.212)
Maximum permitted wear clearance	0.0118 (0.30)
Piston oversizes	0.0157 - 0.0314 (0.4 - 0.8)
Piston protrusion at TDC. from cylinder block face	0.0139 to 0.0299 (0.355 to 0.761)
Gudgeon pin diameter	1.4953 to 1.4956 (37.983 to 37.990)
Diameter of gudgeon pin seat in piston	1.4957 to 1.4960 (37.993 to 38.000)
Gudgeon pin to seat clearance	0.0001 to 0.0006 (0.003 to 0.017)
Gudgeon pin to small end bearing clearance	0.0005 to 0.0012 (0.014 to 0.031)
Maximum permitted wear clearance	0.0023 (0.06)
Maximum weight difference between pistons in same engine ...	20 grams
Piston ring groove clearance (measured vertically):	
- 1 st ring	0.0035 to 0.0048 (0.090 to 0.122)
- 2 nd ring	0.0023 to 0.0036 (0.060 to 0.092)
- 3 rd ring	0.0015 to 0.0029 (0.040 to 0.075)
Maximum permitted wear clearance:	
- 1 st ring	0.0019 (0.50)
- 2 nd and 3 rd ring	0.0007 (0.20)
Assembly clearance between piston ring ends in cylinder sleeves:	
- 1 st ring	0.0015 to 0.0025 (0.40 to 0.65)
- 2 nd ring	0.0011 to 0.0021 (0.30 to 0.55)
- 3 rd ring	0.0011 to 0.0023 (0.30 to 0.60)
Maximum permissible gap (wear limit)	0.0472 (1.20)

VALVE TIMING GEAR DATA	in. (mm)
Timing gear tooth backlash	0.0062 (0.160)
Inside diameter of intermediate gear bushings (fitted and reamed)	1.4586 to 1.4596 (37.050 to 37.075)
Diameter of intermediate gear journal	1.4557 to 1.4566 (36.975 to 37.000)
Clearance between pin and relative bushings	0.0019 to 0.0039 (0.050 to 0.100)
Maximum permitted wear clearance	0.0059 (0.15)
Bushing interference fit in seat in intermediate gear	0.0024 to 0.0055 (0.063 to 0.140)
Outside diameter of camshaft bearings:	
- front	2.1604 to 2.1625 (54.875 to 54.930)
- intermediate	2.1407 to 2.1429 (54.375 to 54.430)
- drive	2.1210 to 2.1232 (53.875 to 53.930)
Interference between bearings and seats in cylinder block	0.0027 to 0.0059 (0.070 to 0.150)
Inside diameter of camshaft bearings (fitted and reamed):	
- front	2.0110 to 2.0129 (51.080 to 51.130)
- intermediate	1.9913 to 1.9933 (50.580 to 50.630)
- drive	1.9716 to 1.9736 (50.080 to 50.130)
Diameter of camshaft journals:	
- front	2.0066 to 2.0078 (50.970 to 51.000)
- intermediate	1.9870 to 1.9881 (50.470 to 50.500)
- drive	1.9673 to 1.9685 (49.970 to 50.000)
Clearance between camshaft journals and bushings	0.0031 to 0.0062 (0.080 to 0.160)
Maximum permitted wear clearance	0.0078 (0.20)
Camshaft endfloat between thrust plate and seat on camshaft ..	0.0027 to 0.0086 (0.070 to 0.220)
For further timing system technical data	see page 4

TAPPET DATA	in. (mm)
Tappet bore in crankcase	0.5905 to 0.5912 (15.000 to 15.018)
Outside diameter of standard tappet	0.5885 to 0.5893 (14.950 to 14.970)
Tappet running clearance	0.0011 to 0.0026 (0.030 to 0.068)
Maximum permitted wear clearance	0.0059 (0.15)
Tappet oversizes	0.0039 - 0.0078 - 0.118 (0.1 - 0.2 - 0.3)

LUBRICATION SYSTEM DATA	in. (mm)	
	TN 55D/S TN 65D/S	TN 70D/S TN 75D/S
Assembly clearance between oil pump drive shaft and bushing .	0.0006 to 0.0021 (0.016 to 0.055)	-
Clearance between shaft and driven gear	0.0012 to 0.0025 (0.033 to 0.066)	-
Tooth backlash between drive and driven gears	0.0039 (0.100)	-
Radial clearance between drive and driven gears and housing ..	0.0023 to 0.0066 (0.060 to 0.170)	-
Thickness of drive and driven gears	1.6126 to 1.6141 (40.961 to 41.000)	-
Height of gear seat in pump	1.6151 to 1.6175 (41.025 to 41.087)	-
Endfloat between gears and gear housing in pump	0.0009 to 0.0049 (0.025 to 0.126)	-
Pressure relief valve spring		-
- spring free length	1.7716 (45)	1.4133 (35.9)
- length under load of 45 to 49 N (10.14 to 11.02 lbs.) (4.6 to 5 kg)	1.4763 (37.5)	-
- length under load of 88 to 94 N (19.84 to 21.16 lbs.) (9 to 9.6 kg)	1.2007 (30.5)	-
- spring length (2. fig. 149) under load of 127.8 to 141.2 N (286.60 to 317.46 lbs.) (130 to 144 kg).	-	1.1417 (29)
- spring length (2. fig. 149) under load of 233.4 to 258 N (524.70 to 579.81 lbs.) (238 to 263 kg)	-	0.9133 (23.2)
For further lubrication technical data	see page 3	-

COOLING SYSTEM DATA	in. (mm)
Interference fit between pump impeller and shaft	0.0006 to 0.0023 (0.017 to 0.059)
Interference fit between fan hub and shaft	0.0009 to 0.0022 (0.024 to 0.058)
Interference fit between front seal bushing and impeller	0.0004 to 0.0022 (0.012 to 0.058)
For further cooling system technical data	see page 3

TORQUE SETTINGS WITH ANGLE

PARTS TO TIGHTEN	Thread	Tightening torque		Angle
		Nm	kgm	
Cylinder head bolts (2, page 23)	M 12 x 1.25	70	7.1	90° + 90°
Main bearing cap bolts (4)	M 14 x 1.5	80	8.2	90°
Big-end cap bolts (5)	M 11 x 1.5	40	4.1	60°
Flywheel mounting bolts (3)	M 12 x 1.25	40	4.1	60°

TORQUE SETTINGS

PARTS TO TIGHTEN	Thread	Tightening torque	
		Nm	kgm
Rocker shaft pedestal bolts (1, page 23)	M 8	25	2.5
Crankshaft hub retaining nut (7)	M 30 x 1.5	294	30
Fan and alternator pulley bolts (6)	M 10 x 1.25	55	5,6
Additional counterweight retaining bolts (1, page 24)	M 12 x 1.25	110	11.2
Inlet manifold retaining bolts	M 8	25	2,6
Alternator and belt tension adjustment nut	M 10 x 1.25	55	5,6
Coolant pump retaining bolts	M 10 x 1.25	55	5.6
Tappet cover nuts (1. fig. 48)	M 8	15	1.5
Rocker shaft pedestal bolts (2. fig. 49)	M 8	25	2.5
Oil pump and pump cover retaining bolts (1. fig. 57)	M 8	25	2.6
Timing gear case and cover bolts (1, fig. 61)	M 8	25	2.6
Intermediate flanged journal bolts (1, fig. 64)	M 10 x 1.25	55	5.6
Camshaft thrust plate retaining bolts (2, fig. 65)	M 8	35	3.6
Rear crankcase cover bolts (2, fig. 85)	M 8	25	2.6
Tappet adjuster locknuts (1, fig. 104)	M 8	22	2.2
Nuts for injector mounting studs (1, fig. 105)	M 8	25 (*)	2.6 (*)
Exhaust manifold retaining bolts	M 8	25	2.6
Injection pump mounting bolts	M 8	25	2.6
Sump pan retaining bolts	M 10 x 1.25	69	7
- Timing gear rear seal, cover and casing	M 10 x 1.25	39 to 49	4 to 5
- flywheel housing crankcase and casing:			
models. TN 55D/S and TN 65D/S	M 10 x 1.25	49 to 59	5 to 6
models TN 70D/S and TN 75D/S	M 10 x 1.25	49 to 69	5 to 7

(*) Tighten the nuts in two stages - see operations described in fig. 105.

TOOLS

Warning - The operations described in this section can only be carried out with **ESSENTIAL** tools indicated by an **(X)**.

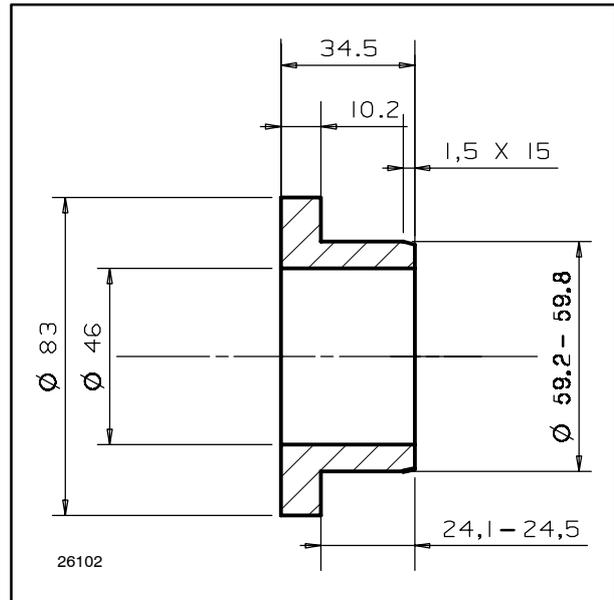
To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools, which are to be made according to the drawings included in this manual.

List of specific tools required for the various operations described in this section.

290740	Engine lifting hook.	X 294027	Twist bit for enlarging valve guide bore.
290090	Revolving engine service stand.	X 294028	Tapered grinder 8° for swaging exhaust valve guides.
293860	Engine mounting brackets for rotating stand 290090 .	X 293231	Bush for valve guide installation (with 291046).
X 291309	Compression test kit (complete with dummy injector 293862).	X 291177	Engine valve guide reamer.
292870	Engine oil pressure test kit.	X 291050	Engine valve spring disassembly-assembly compressor.
293240	Check set, turbo charger, for models TN 70D/S and TN 75D/S).	X 293270	Set of grinding tools for regrinding injector seat.
X 291160	Piston ring pliers.	X 291182	Puller for coolant pump impeller.
X 291048	Clamp for fitting pistons in cylinders.	X 293280	Drift for installation of coolant pump impeller seal.
X 292248	Protractor for angular torque measurement.	293814	Charger impeller reaction block (for models TN 70D/S and TN 75D/S).
X 291504	Puller for crankshaft pulley hub.	293786	Wrench for injection pump delivery line unions.
X 291883	Wrench for valve clearance adjustment.	293671	Injector cleaning kit.
X 291046	Drift for valve guide extraction / installation.	X 293761	Wrench set for injector dismantling (with 295008).
		290284	Hand pump for injector calibration test.
		Injection pump bench test	
		291754	Dial gauge (0.0393/3.937 in.) (1/100 mm, stroke 0.1968 in. (5 mm), Ø 1.5748 in. (40 mm) with 291755).
		291755	Device for BOSCH injection pump timing on engine (with 291754).
		X 295042	Puller for injection pump drive gear.

Splining tool to be manufactured for assembling the crankshaft front seal (print No. 50138 on the tool - Values in mm).

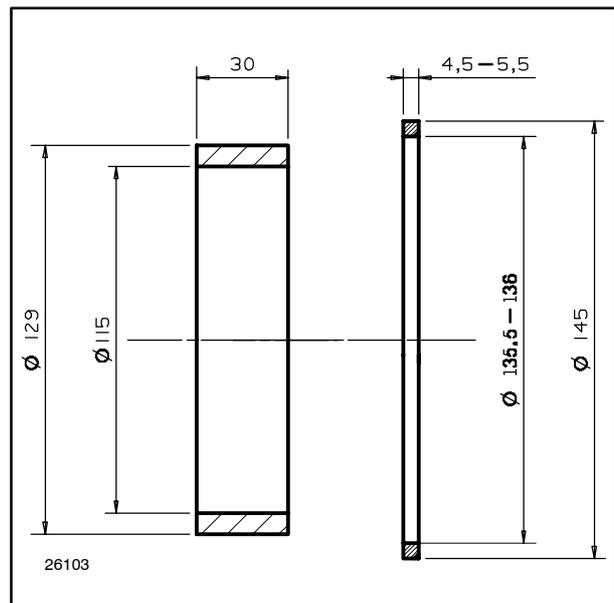
Make in UNI C40 material.



1

Splining tool to be manufactured for assembling the crankshaft rear seal (print No. 50139 on the tool - Values in mm).

Make in UNI C40 material.



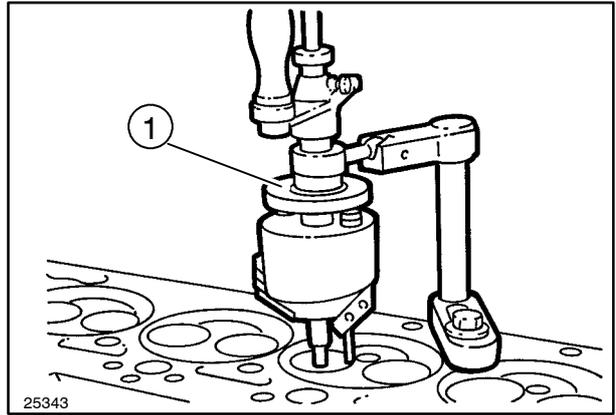
2

**VALVE SEATS IN CYLINDER HEAD -
Re-facing**



Handle all parts carefully.
Do not put your hands or fingers between parts.
Wear suitable safety clothing - safety goggles,
gloves and shoes.

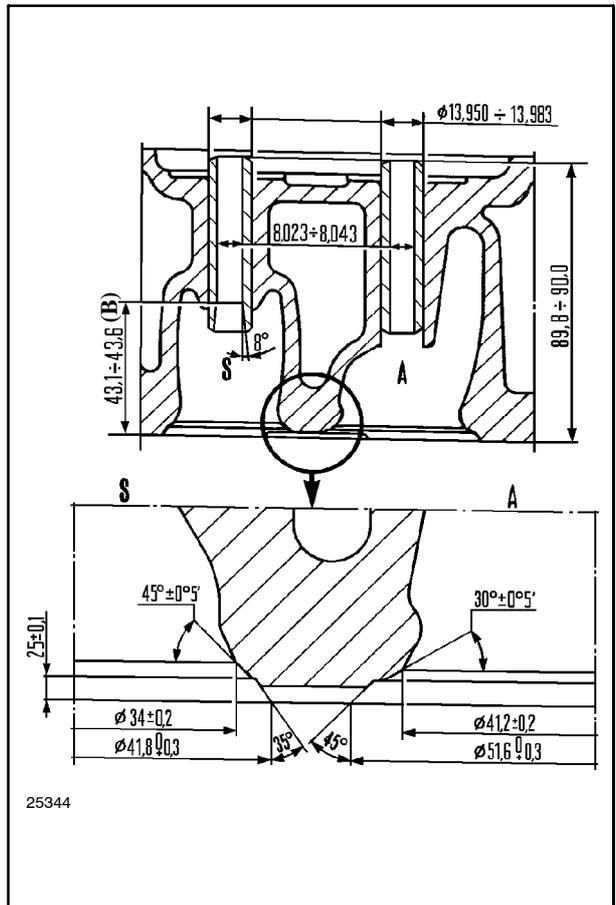
1. If the valve seats need refacing to improve valve sealing, use the universal valve grinder (1) and remove as little material as possible.



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Dimensions (mm) of valve seats and valve guides.

- A. Intake.
- B. Depth of taper.
- S. Drain.



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CHECKS, DIMENSIONS AND REPAIRS - LUBRICATION SYSTEM



Handle all parts carefully.
Do not put your hands or fingers between parts.
Wear suitable safety clothing - safety goggles, gloves and shoes.

Clean all parts carefully before proceeding with the operations described below.

OIL PUMP - Overhaul

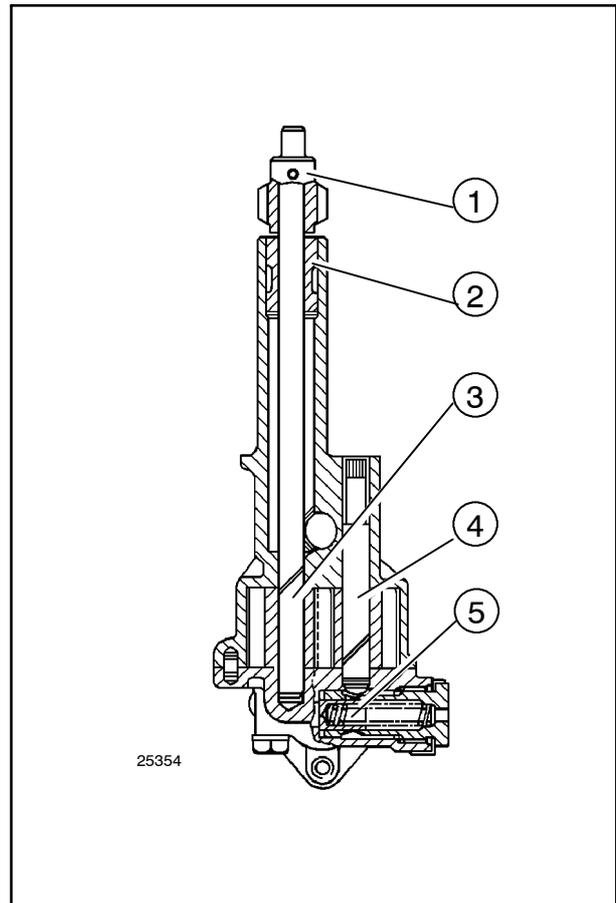
To access the oil pump, remove the sump pan.

When servicing the pump, check component wear against the dimensions specified in the table on page 19.

In case of replacement, note that the drive shaft (3) and drive gear are supplied ready assembled, with the gear hot force-filled on the shaft.

Cross-sectional view of engine lubricating oil pump - Models. TN 55D, TN 55S, TN 65D and TN 65S

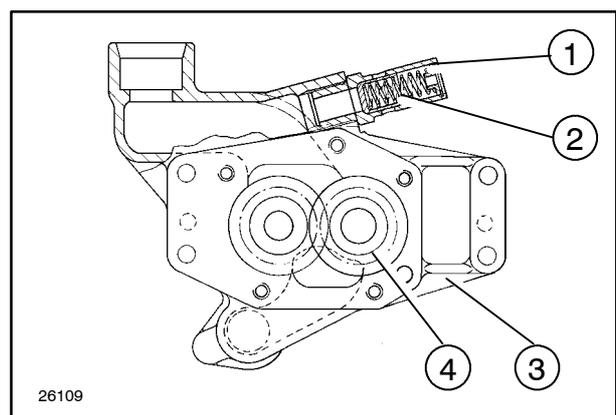
1. External drive gear.
2. Bush.
3. Drive shaft and gear.
4. Driven shaft and gear.
5. Pressure relief valve.



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Cross-sectional view of engine lubricating oil pump - Models. TN 70D, TN 70S, TN 75D and TN 75S

1. Pressure relief valve.
2. Spring.
3. Pump body.
4. Internal gears.



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