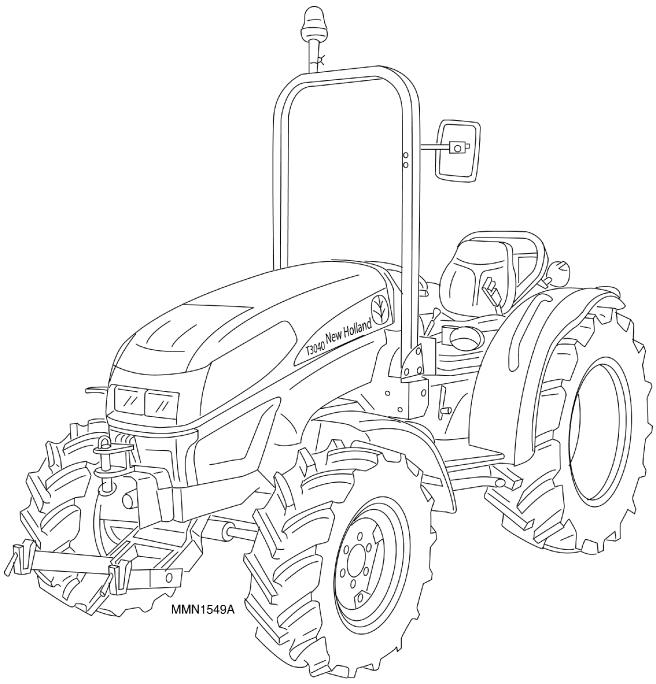
# SERVICE MANUAL

## T3010 / T3020 / T3030  T3040

Tractors

Print No. 84183229B

NEW HOLLAND




# T3010 – T3020 – T3030 – T3040

# SERVICE MANUAL

SECTIONS



T E C H N I C A L  S U P P O R T

## INTRODUCTORY NOTES

- *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.*
- *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 As NEW HOLLAND constantly improves its product range, some information may be out of date subsequent to modifications implemented for technical or commercial reasons, or to meet legal requirements in different countries.*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.*

## IMPORTANT WARNINGS

- *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.*
- *Anyone performing the operations described herein without strictly following the instructions is personally responsible for any eventual injury or damage to property.*
- *The Manufacturer and all organisations belonging to the Manufacturer's distribution network, including but not restricted to national, regional or local distributors, will accept no responsibility for personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer, including those used for maintenance and/or repair of the product manufactured or marketed by the Manufacturer.*
  *In any case, the product manufactured or marketed by the Manufacturer is covered by no guarantee of any kind against personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer.*



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## CONTENTS

# GENERAL INSTRUCTIONS

## IMPORTANT NOTICE

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Anyone performing the operations described herein without strictly following the instructions is personally responsible for any eventual injury or damage to property.

## BATTERY

Before carrying out any kind of service operations, disconnect and isolate the battery negative lead, unless otherwise requested for specific operations (e.g.: operations that require the engine running). Once the specific operation has been completed, disconnect the lead in order to complete the operation.

## SHIMMING

For each adjustment operation, select adjusting shims and measure individually using a micrometer, then add up the recorder values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value indicated for each on shim.

## ROTATING SHAFT SEALS

For correct rotating shaft seal installation, proceed as follows:
- before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes;
- thoroughly clean the shaft and check that the working surface on the shaft is not damaged;
- position the sealing lip facing the fluid; with hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will deviate the fluid towards the inner side of the seal;
- coat the sealing lip with a thin layer of lubricant (use oil rather than grease) and fill the gap between the sealing lip and the dust lip on double lip seals with grease;
- insert the seal in its seat and press down using a flat punch; do not tap the seal with a hammer or mallet;
- whilst inserting the seal, check that the it is perpendicular to the seat; once settled, make sure that it makes contact with the thrust element, if required;
- to prevent damaging the seal lip on the shaft, position a protective guard during installation operations.

## O-RING “SEALS”

Lubricate the O-RING seals before inserting them in the seats, this will prevent them from overturning and twisting, which would jeopardise sealing efficiency.

## SEALING COMPOUNDS

Apply one of the following sealing compounds on the mating surfaces marked with an X: RTV SILMATE, RHODORSIL CAF 1 or LOCTITE PLASTIC GASKET.
Before applying the sealing compound, prepare the surfaces as follows:
- remove any incrustations using a wire brush;
- thoroughly de-grease the surfaces using one of the following cleaning agents: trichlorethylene, petrol or a water and soda solution.

## BEARINGS

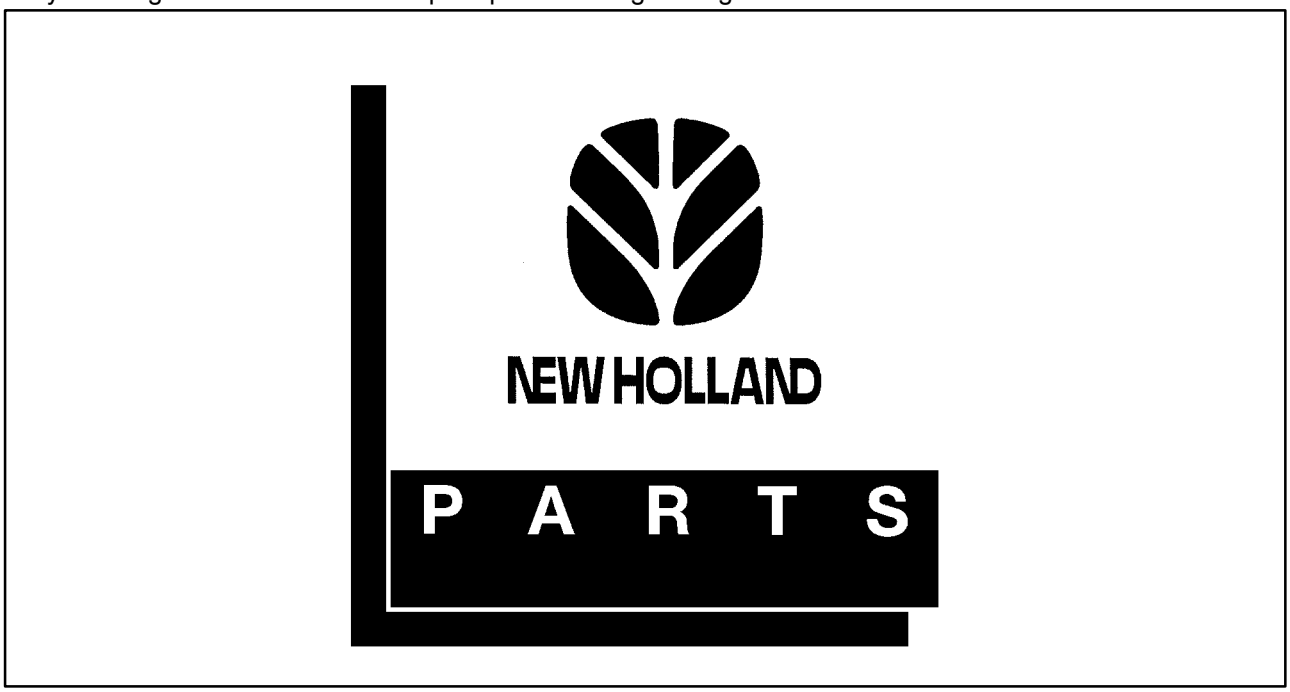
When installing bearings it is advised to:
- heat the bearings to 80 ÷ 90 °C before fitting on the shafts;
- allow the bearings to cool before installing them from the outside.

## SPRING PINS

When fitting split socket elastic pins, ensure that the pin notch is positioned in the direction of the force required to stress the pin.
Spiral spring pins do not require special positioning.

## SPARE PARTS

Only use original NEW HOLLAND spare parts bearing the logo shown below.

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Only original spare parts guarantee the same quality, duration and safety as they are the same parts that are assembled during production.
Only **original NEW HOLLAND spare parts** can offer this guarantee.
When ordering spare parts, always provide the following information:

- vehicle model (commercial name) and frame number;
- engine type and number;
- part number of the ordered part, which can be found in the “Microfiches” or the “Spare Parts Catalogue”, used for order processing.

## TOOLS

The tools that NEW HOLLAND propose and illustrate in this manual are:

- specifically researched and designed for use with NEW HOLLAND vehicles;
- essential for reliable repair operations;
- accurately built and rigorously tested so as to offer efficient and long-lasting operation.

By using these tools, repair personnel will benefit from:

- operating in optimal technical conditions;
- obtaining the best results;
- saving time and effort;
- working in safe conditions.

## CAUTION

Wear limit values indicated for certain parts are recommended, but not binding. The terms “front”, “rear”, “right-hand” and “left-hand” (when referred to different parts) are intended as seen from the driving position with the vehicle in the normal direction of movement.

## MOVING THE TRACTOR WITH THE BATTERY REMOVED

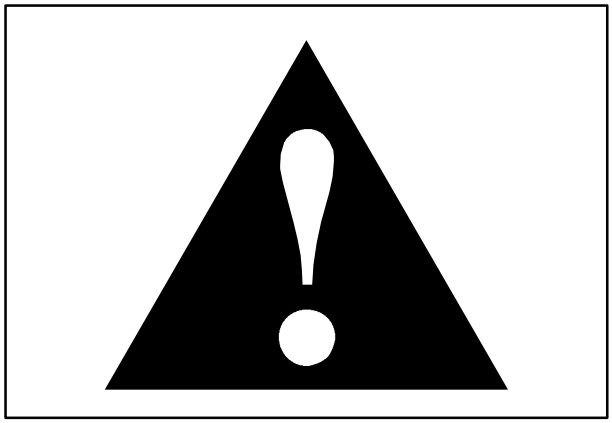
External power supply cables should only be connected to the respective positive and negative cable terminals, using efficient clamps that guarantee adequate and secure contact.
Disconnect all services (lights, work lights, etc.) before starting the vehicle.
If the vehicle electrical system requires checking, carry out operations with the power supply connected; once checking is completed, disconnect all services and switch off the power supply before disconnecting the cables.

## SAFETY REGULATIONS

### *WARNING AND DANGER SYMBOL*

*This warning symbol points out important messages concerning your safety.*
*Carefully read the following safety regulations and observe advised precautions in order to avoid potential hazards and safeguard your health and safety.*
*In this manual the symbol is accompanied by the following key-words:*

***CAUTION** - Warnings concerning unsuitable repair operations that may jeopardise the safety of Service personnel.*
***DANGER**- Specific warnings concerning potential hazards for operator safety or for other persons directly or indirectly involved.*



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### ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of non-observance of simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of vehicles, regardless of how well it was designed and built.

A careful and judicious service technician is the best guarantee against accidents.

Precise observance of the most basic safety rule is normally sufficient to avoid many serious accidents.

**DANGER.** Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

### SAFETY REGULATIONS

### GENERAL GUIDELINES

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewellery, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips that may remain entangled in moving parts. It is advised to wear approved safety clothing, e.g.: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Do not operate the vehicle or use any of the implements from different positions, other than the driver's seat.
- Do not carry out operations on the vehicle with the engine running, unless specifically indicated.
- Stop the engine and check that the hydraulic circuits are pressure-free before removing caps, covers, valves, etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in the workshop or elsewhere should be built according to standard accident prevention regulations.
- Disconnect the batteries and label all controls to indicate that the vehicle is being serviced. Any parts that are to be raised must be locked in position.
- Do not check or fill fuel tanks, accumulator batteries, nor use starting liquid when smoking or near naked flames, as these fluids are inflammable.
- Brakes are inoperative when manually released for repair or maintenance purposes. Use blocks or similar devices to control the machine in these conditions.
- The fuel nozzle should always be in contact with the filling aperture. Maintain this position until filling operations are completed in order to avoid possible sparks caused by the accumulation of static electricity.

- Only use specified towing points for towing the tractor. Connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction. Never remain near the towing bars, cables or chains that are operating under load.
- Transport vehicles that cannot be driven using a trailer or a low-loading platform trolley, if available.
- When loading or unloading the vehicle from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels. Firmly secure the tractor to the truck or trailer and lock the wheels in the position used by the carrier.
- Electric heaters, battery-chargers and similar equipment must only be powered by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never pour gasoline or diesel oil into open, wide or low containers.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-inflammable, non toxic commercially available solvents.
- Wear safety goggles with side guards when cleaning parts with compressed air.
- Limit the air pressure to a maximum of 30.45 psi (2.1 bar), according to local regulations.
- Do not run the engine in confined spaces without suitable ventilation.
- Do not smoke, use naked flames, or cause sparks in the area when fuel filling or handling highly inflammable liquids.
- Never use naked flames for lighting when working on the machine or checking for “leaks”.
- All movements must be carried out carefully when working under, on or near the vehicle. Wear protective equipment: helmets, goggles and special footwear.
- When carrying out checks with the engine running, request the assistance of an operator in the driver’s seat. The operator must maintain visual contact with the service technician at all times.
- If operating outside the workshop, position the vehicle on a flat surface and lock in position. If working on a slope, lock the vehicle in position. Move to a flat area as soon as is safely possible.
- Damaged or bent chains or cables are unreliable. Do not use them for lifting or towing. Always use suitable protective gloves when handling chains or cables.
- Chains should always be safely secured. Make sure that the hitch-up point is capable of sustaining the load in question. Keep the area near the hitch-up point, chains or cables free of all bystanders.
- Maintenance and repair operations must be carried out in a CLEAN and DRY area. Eliminate any water or oil spillage immediately.
- Do not create piles of oil or grease-soaked rags as they represent a serious fire hazard. Always store rags in a closed metal container.
  Before starting the vehicle or implements, make sure that the driver’s seat is locked in position. Also check that there are no persons within the tractor or implement range of action.
- Empty pockets of all objects that may fall unobserved into the vehicle parts.
- In the presence of protruding metal parts, use protective goggles or goggles with side guards, helmets, special footwear and gloves.
- When welding, use protective safety devices: tinted safety goggles, helmets, special overalls, gloves and footwear. All persons present in the area where welding is taking place must wear tinted goggles. NEVER LOOK DIRECTLY AT THE WELDING ARC WITHOUT SUITABLE EYE PROTECTION.
- Metal cables tend to fray with repeated use. Always use suitable protective devices (gloves, goggles, etc.) when handling cables.
- Handle all parts carefully. Do not put your hands or fingers between moving parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

## 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 US gal. (litres) | | RECOMMENDED NEW HOLLAND PRODUCTS | NEW HOLLAND SPECIFICATIONS | INTERNATIONAL SPECIFICATIONS |
|---|---|---|---|---|---|
| | T3010 | T3020-T3030-T3040 | | | |
| Cooling system:<br>- with cab .....<br>- less cab ..... | 0.79 (3.0)<br>0.52 (2.0) | 0.97 (3.7)<br>0.71 (2.7) | Water and **AMBRA AGRIFLU** liquid 50% + 50% | NH 900 A | - |
| Engine with filter: .. | 1.76 (6.7) | 1.95 (7.4) | Oil **AMBRA SUPER GOLD** | NH 330G | API CF-4/SG<br>CCMC D4<br>SAE 15W-40 |
| Rear transmission, gears, hydraulic lift, power steering: ... | 6.34 (24) | | Oil **AMBRA MULTI F** | NH 420 A | API GL 4<br>SAE 20W-30<br>U.T.T.O. |
| Front axle and front reduction units: .... | 0.92 (3.5) | | Oil **AMBRA HYPOIDE 90** | NH 520 A | API GL5<br>MIL-L-2105D<br>SAE 80W-90 |
| Fuel tank ..... | 10.56 (40) | | Decanted and filtered diesel fuel | - | - |
| Windscreen washer reservoir ..... | 0.52 (2) | | Water and liquid detergent | - | - |
| Front Power Take Off ..... | 0.09 (0.35) | | Oil **AMBRA MULTI F** | NH 420 A | API GL 4<br>SAE 20W-30<br>U.T.T.O. |
| Grease fittings | - | | Grease **AMBRA GR9** | NH 710 A | NLGI 2 |

# SECTION 10 - ENGINE

## Chapter 1 - Engine (TIER 3)

**CONTENT**

| GENERAL SPECIFICATIONS | T3010 |
|---|---|
| **Engine** | |
| - Initial | 3TNV88-KLAN |
| - Manufacturer | Yanmar |
| Cycle | Diesel, 4-stroke |
| Direct | Injection |
| Number of cylinders | 3 |
| Fuel system | Natural |
| Cylinder liners | In cylinder block |
| Bore (mm) | 88 |
| Stroke (mm) | 90 |
| Total displacement ($cm^3$) | 1642 |
| Firing order | 1 - 3 - 2 |
| Compression ratio | 19.1:1 |
| ISO power output (Kw/CV) | 26(35.5) |
| Maximum power speed (rpm) | 2800 |
| Maximum no-load speed (rpm) | 3000 to 3050 |
| Maximum torque (Nm) | 108.5 |
| Maximum torque speed (rpm) | 1200 |
| Slow idle speed (rpm) | 1000 |
| Direction of rotation | Anticlockwise (as seen from flywheel) |
| Number of main bearings | 4 |
| Recommended diesel fuel | ISO 8217 DMA,<br>BS 2869 A1 or A2<br>(cetane No.: 45 min) |
| Lubrication system | Forced lubrication with trochoid pump |
| Lubrication oil tank capacity (l) | 6.7 |
| Recommended lubrication oil | AMBRA SUPER GOLD |
| Cooling System | Coolant/Radiator |
| Coolant tank capacity (l) | 2.0 |
| Cooling fan | 6-blade fan, ∅ 335 mm |
| Regulator | Mechanical centrifuge-type<br>(all speeds) |
| Ignition system | Electric |

*(continued)*

| GENERAL SPECIFICATIONS | T3020 |
|---|---|
| **Engine** | |
| - Initial | 4TNV84/KLAN |
| - Manufacturer | Yanmar |
| Cycle | Diesel, 4-stroke |
| Direct | Injection |
| Number of cylinders | 4 |
| Fuel system | Natural |
| Cylinder liners | In cylinder block |
| Bore (mm) | 84 |
| Stroke (mm) | 90 |
| Total displacement ($cm^3$) | 1995 |
| Firing order | 1 - 3 - 4 - 2 |
| Compression ratio | 19.1:1 |
| ISO power output (Kw/CV) | 32(44) |
| Maximum power speed (rpm) | 2800 |
| Maximum no-load speed (rpm) | 3000 to 3050 |
| Maximum torque (Nm) | 129 |
| Maximum torque speed (rpm) | 1400 |
| Slow idle speed (rpm) | 1000 |
| Direction of rotation | Anticlockwise (as seen from flywheel) |
| Number of main bearings | 5 |
| Recommended diesel fuel | ISO 8217 DMA,<br>BS 2869 A1 or A2<br>(cetane No.: 45 min) |
| Lubrication system | Forced lubrication with trochoid pump |
| Lubrication oil tank capacity (l) | 7.4 |
| Recommended lubrication oil | AMBRA SUPER GOLD |
| Cooling System | Coolant/Radiator |
| Coolant tank capacity (l) | 2.7 |
| Cooling fan | 6-blade fan, ∅ 370 mm |
| Regulator | Mechanical centrifuge-type<br>(all speeds) |
| Ignition system | Electric |

*(continued)*

| GENERAL SPECIFICATIONS | T3040 |
|---|---|
| **Engine** | |
| - Initial | 4TNV88/KLAN |
| - Manufacturer | Yanmar |
| Cycle | Diesel, 4-stroke |
| Direct | Injection |
| Number of cylinders | 4 |
| Fuel system | Natural |
| Cylinder liners | In cylinder block |
| Bore (mm) | 88 |
| Stroke (mm) | 90 |
| Total displacement ($cm^3$) | 2189 |
| Firing order | 1 - 3 - 4 - 2 |
| Compression ratio | 19.1:1 |
| ISO power output (Kw/CV) | 35(47.5) |
| Maximum power speed (rpm) | 2800 |
| Maximum no-load speed (rpm) | 3000 to 3050 |
| Maximum torque (Nm) | 141 |
| Maximum torque speed (rpm) | 1200 |
| Slow idle speed (rpm) | 1000 |
| Direction of rotation | Anticlockwise (as seen from flywheel) |
| Number of main bearings | 5 |
| Recommended diesel fuel | ISO 8217 DMA,<br>BS 2869 A1 or A2<br>(cetane No.: 45 min) |
| Lubrication system | Forced lubrication with trochoid pump |
| Lubrication oil tank capacity (l) | 7.4 |
| Recommended lubrication oil | AMBRA SUPER GOLD |
| Cooling System | Coolant/Radiator |
| Coolant tank capacity (l) | 2.7 |
| Cooling fan | 6-blade fan, ∅ 370 mm |
| Regulator | Mechanical centrifuge-type<br>(all speeds) |
| Ignition system | Electric |

*(continued)*

| GENERAL SPECIFICATIONS | T3040 |
|---|---|
| **Engine** | |
| - Initial | 4TNV84T-ZXLAN |
| - Manufacturer | Yanmar |
| Cycle | Diesel, 4-stroke |
| Direct | Injection |
| Number of cylinders in line | 4 |
| Fuel system | Turbo |
| Cylinder liners | In cylinder block |
| Bore (mm) | 84 |
| Stroke (mm) | 90 |
| Total displacement ($cm^3$) | 1995 |
| Firing order | 1 - 3 - 4 - 2 |
| Compression ratio | 18.9:1 |
| ISO power output (Kw/CV) | 39.9(54.3) |
| Maximum power speed (rpm) | 2800 |
| Maximum no-load speed (rpm) | 3125 to 3175 |
| Maximum torque (Nm) | 159.5 |
| Maximum torque speed (rpm) | 2000 |
| Slow idle speed (rpm) | 1000 |
| Direction of rotation | Anticlockwise (as seen from flywheel) |
| Number of main bearings | 5 |
| Recommended diesel fuel | ISO 8217 DMA,<br>BS 2869 A1 or A2<br>(cetane No.: 45 min) |
| Lubrication system | Forced lubrication with trochoid pump |
| Lubrication oil tank (l) | (Dipstick max) 7.4 - (Dipstick min) 4.0 |
| Recommended lubrication oil | AMBRA SUPER GOLD |
| Cooling System | Coolant/Radiator |
| Coolant tank capacity (l) | 2.7 |
| Cooling fan | 6-blade fan, ∅ 370 mm |
| Regulator | Mechanical centrifuge-type<br>(all speeds) |
| Ignition system | Electric |

*(continued)*

*(cont)*

| GENERAL SPECIFICATIONS | T3010 | T3020-T3030-T3040 |
|---|---|---|
| **Valve Timing** | | |
| Type | Overhead valves operated by rocker arms | |
| Valve clearance, engine cold: | | |
| - intake | 0.15 to 0.25 mm | |
| - exhaust | 0.15 to 0.25 mm | |
| **Fuel system** | | |
| Type (T3010-T3020-T3030) | Aspirated | |
| Type (T3040) | Turbo | |
| Air filtering | 5" dry filter, with two removable elements for maintenance | |
| Fuel pump | Yanmar | |
| Fuel filtering | Paper filter on injection pump delivery | |
| Actuation | via cam | |
| Injection Pump | Yanmar | |
| All-speed governor, incorporated in pump | Yanmar | |
| Automatic advance regulator, incorporated in pump | Yanmar | |
| Cold start device | Grid heater | |
| For further fuel system technical data: | | |
| - Fixed advance | 25° (T3010-T3020-T3030)<br>25° (T3040) | |
| - Injection order | 1 - 3 - 2 | 1 - 3 - 4 - 2 |
| Fuel injectors | Yanmar | |
| - Calibration pressure (bar) | 216 to 226 | |

*(continued)*

*(cont)*

| GENERAL SPECIFICATIONS | T3010 | T3020-T3030-T3040 |
|---|---|---|
| **Lubrication** | | |
| Type | Forced, by pump | |
| Oil cleaning | Mesh filter (on pump inlet)<br>cartridge filter (on engine delivery) | |
| Oil pressure with engine at maximum power | 3 to 4 bar | |
| Recommended oil | AMBRA SUPER GOLD | |
| **Cooling** | | |
| Type | Water, pressurised circulation by centrifugal pump driven by timing gears | |
| Coolant tank capacity (l) | 2.0 | 2.7 / 3.2 (T3040) |
| Cooling fan | Fan with blades | |
| Fan diameter and No. of blades (mm) | 335 x 6 | 373 x 6 |
| Recommended fluid | AMBRA AGRIFLU | |
| **Injection Pump** | | |
| Model | YPD-4MP2 | |
| Plunger diameter | 9 mm | |
| Cam height | 8.1 mm | |
| Regulator | Mechanical | |
| Fuel pump | Trochoid pump with forced lubrication | |
| Lubrication | From the engine lubrication system | |
| Injection regulator | Hydraulic system | |
| **Turbocharger T3040** | | |
| Model | RHB31 | |
| Type | Standard centrifugal | |
| Lubrication | External | |
| Continuous peak speed (rpm) | 250.000 | |
| Exhaust gas maximum temperature | 750° | |

| ENGINE LUBRICATION CIRCUIT DATA | | Nominal value |
|---|---|---|
| Lubrication oil pump delivery volume | | |
| - High speed (at 3600 rpm) | litres/min | 25.0 (at 3600 rpm) |
| - Low speed (at 800 rpm) | litres/min | 8.0 (at 800 rpm) |
| Pressure check valve opening pressure | bar | 3.0 to 4.0 |
| Lubrication oil pressure switch working pressure | bar | 0.4 to 0.6 |

| ENGINE COOLANT CIRCUIT DATA | | Nominal value |
|---|---|---|
| Coolant pump delivery volume (at 3220 to 3280 rpm) | litres/min | 70 |
| Thermostat valve opening temperature | | |
| - Opening temperature | °C | 69.5 to 72.5 |
| - Cam lift | mm | ≥ 8.0 (≥ 85 °C) |
| Thermo switch activation temperature | | |
| - ON | °C | 107 to 113 |

## TORQUE WRENCH SETTINGS

| PARTS TO BE TIGHTENED | Thread | Tightening torque | |
|---|---|---|---|
| | | Nm | kgm |
| Cylinder head bolts (1) | M10 X 1.25 | 85.3 to 91.2 | 8.7 to 9.3 |
| Connecting rod cap retaining bolts (1) | M9 x 1.0 | 44.1 to 54.0 | 4.5 to 5.5 |
| Flywheel retaining bolts (1) | M10 X 1.25 | 83.4 to 88.3 | 8.5 to 9.0 |
| Main bearing cap retaining bolts (1) | M12 x 1.5 | 96.1 to 100.1 | 9.8 to 10.2 |
| Crankshaft V pulley retaining bolts (1) | M 14 x 1.5 | 112.8 to 122.6 | 11.5 to 12.5 |
| Injector nuts (2) | M6 x 1.0 | 6.9 to 8.8 | 0.7 to 0.9 |
| Automatic advance retaining nuts (2) | M12 x 1.75 | 58.9 to 68.7 | 6.0 to 7.0 |
| Regulator centrifuge weights support nut (2) | M12 x 1.25 | 44.1 to 49.1 | 4.5 to 5.0 |
| Fuel high pressure pipe sleeve retaining nut (2) | M12 x 1.5 | 29.4 to 34.3 | 3.0 to 3.5 |
| Hex bolt (4T) and nut (2) (3) | M6 x 1 | 9.8 to 11.8 | 1.0 to 1.2 |
| | M 8 x 1.25 | 22.6 to 28.4 | 2.3 to 2.9 |
| | M10 x 1.5 | 44.1 to 54.0 | 4.5 to 5.5 |
| | M12 x 1.75 | 78.5 to 98.1 | 8.0 to 10.0 |
| PT caps (2) | 1/8” | 9.8 | 1.0 |
| | 1/4” | 19.6 | 2.0 |
| | 3/8” | 29.4 | 3.0 |
| | 1/2” | 58.9 | 6.0 |
| Pipe union bolts (2) | M8 | 12.8 to 16.7 | 1.3 to 1.7 |
| | M12 | 24.5 to 34.3 | 2.5 to 3.5 |
| | M14 | 39.2 to 49.1 | 4.0 to 5.0 |
| | M16 | 49.1 to 54.0 | 5.0 to 5.5 |

(1) Parts smeared with lubrication oil.

(2) Parts not smeared with lubrication oil.

(3) a. When fitting aluminium parts, tighten the bolts to 80% of the torque indicated in the table.

b. 4T bolts and locknuts must be tightened to 60% of the torque indicated in the table.

## SPECIAL 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 chapter.

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

**X 380000301** Revolving engine service stand.

**X 380000216** Engine lifting hook.

**X 380000220** Clamp for fitting pistons in cylinders.

**X 380000303** Compression test kit (use with **380000179**).

**X 380000221** Piston ring pliers.

**X 380000178** Rotating stand connection bracket (**380000301**).

**X 380000179** Dummy injector (use with **380000303**).

**X 380000180** Drift for fitting camshaft bushings.

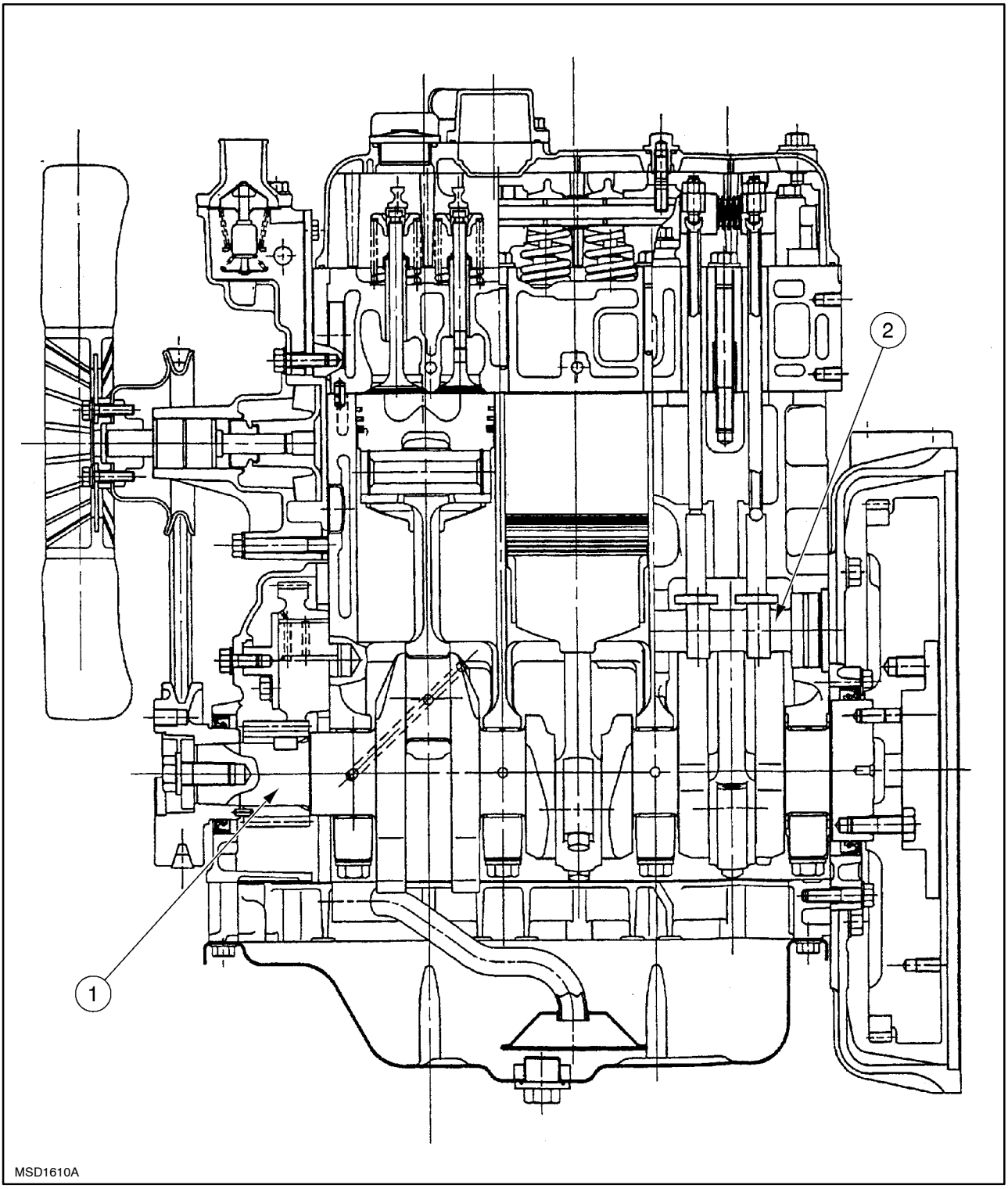
**X 380000181** Drift for extracting valve guides.

**X 380000182** Drift for fitting valve guides.

**X 380000183** Engine valve guide reamer.

**X 380000184** Engine valve spring disassembly-assembly compressor.

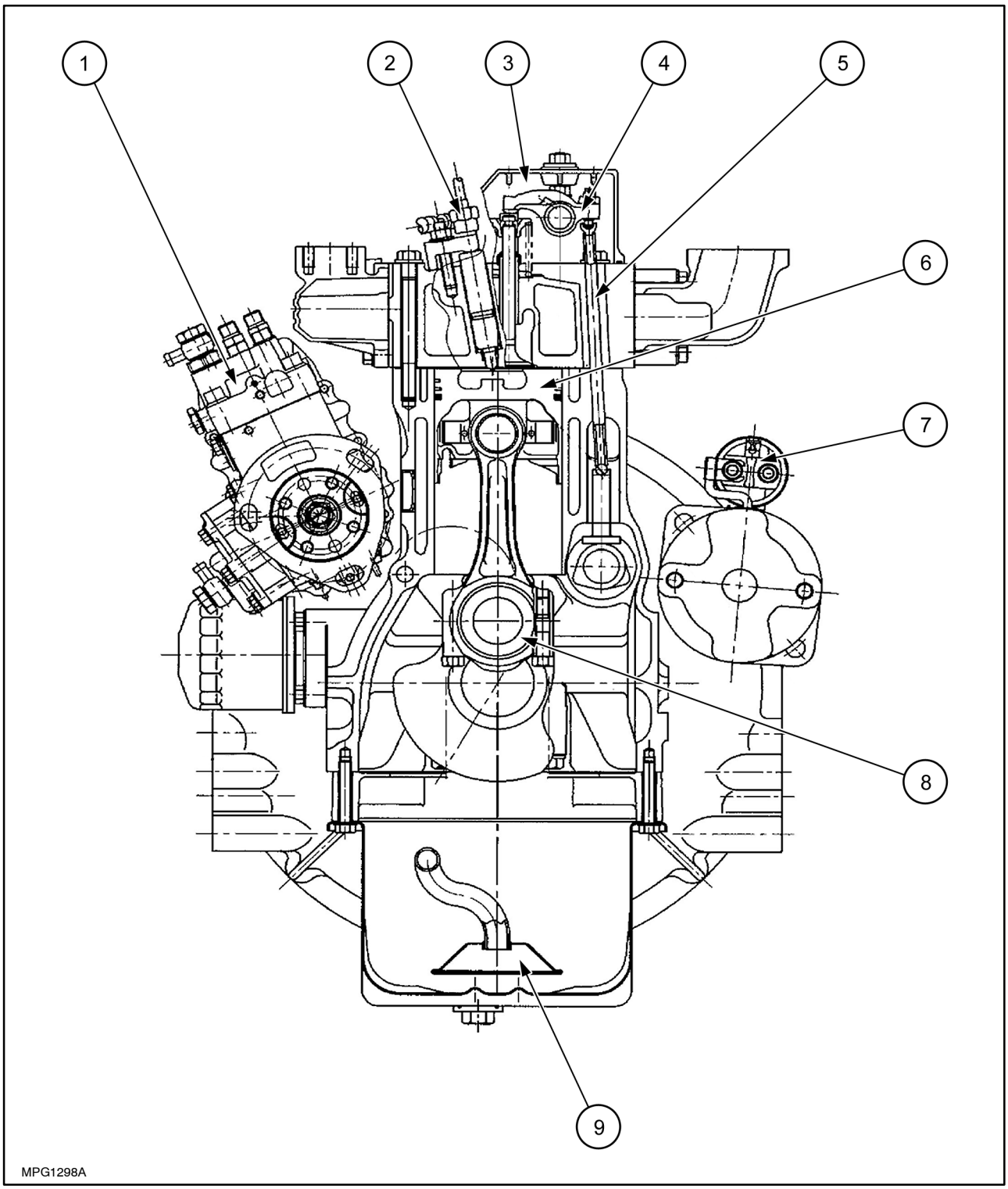
## SECTIONS




1

**Longitudinal section of engine (mod. T3010).**

**1.** Crankshaft
**2.** Camshaft




2

**Cross-section of engine (mod. T3010).**

1. Fuel injection pump
2. Injection nozzle
3. Tappet cover
4. Rocker arm
5. Cylinder head
6. Piston
7. Starter motor
8. Connecting rod
9. Lubrication oil inlet pipe