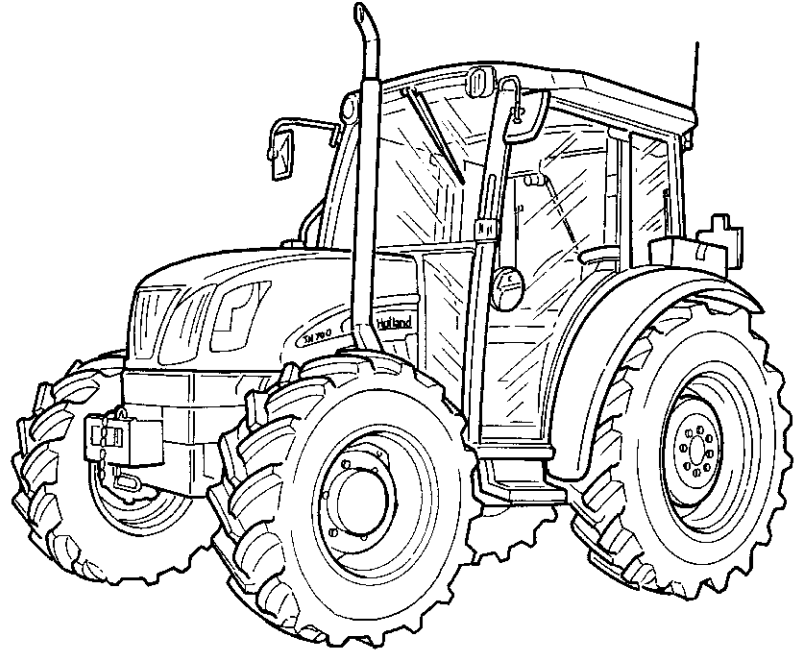




NEW HOLLAND



MDF0730A

TN60DA – TN60SA – TN70DA – TN70SA – TN75DA – TN75SA TRACTORS SERVICE MANUAL

SECTIONS

GENERAL GUIDELINES	00
ENGINE	10
CLUTCH	18
TRANSMISSIONS	21
DRIVE LINES	23
FRONT MECHANICAL TRANSMISSION	25
REAR MECHANICAL TRANSMISSION	27
POWER TAKE-OFF	31
BRAKES	33
HYDRAULIC SYSTEMS	35
STEERING	41
AXLE AND WHEELS	44
CAB AIR CONDITIONING SYSTEM	50
ELECTRICAL SYSTEM	55
PLATFORM, CAB, BODYWORK	90

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 603.54.431.01; 2nd Update 603.54.431.02; 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 As NEW HOLLAND constantly improves its product range, some information may be out of date subsequent to modifications implemented for technical or commercial reasons, or to meet legal requirements in different countries.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.*

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.*

TEXT AND ILLUSTRATIONS ARE THE PROPERTY OF
CNH ITALIA S.p.A.



No part of the text or illustrations
may be reproduced

PRINTED IN ITALY

CNH ITALIA S.p.A. – Viale delle Nazioni, 55 – 41100 MODENA – Italy

TECHNICAL SUPPORT – Technical Information

Print No. **603.54.431.00** – 10 – 2003 – 200

CONTENTS VOLUME 1

	Page	Date		Page	Date
00 – GENERAL GUIDELINES					
General instructions	1–2	10–03	Checks and measurements – cylinder block and liners	51–52	10–03
Safety regulations	3–4–5	10–03	Checks and measurements – crankshaft, bearings and flywheel	53–54–55–56	10–03
Consumables	6	10–03			
10 – ENGINE					
Summary	1	10–03	Checks and measurements – connecting rods	57	10–03
General specifications	2–3–4	10–03	Checks and measurements – pistons	58–59–60	10–03
Fuel system data	5–12	10–03	Checks and measurements – camshaft, tappets and valves	61–62–63	10–03
Injection pump calibration and engine performance data	6–7–8–9–10–11	10–03	Checks and measurements – cylinder head	64	10–03
Engine block data	12	10–03	Re-facing valve seats	65	10–03
Crankshaft data	13–14	10–03	Checks and measurements – lubrication system	66	10–03
Connecting rod data	14	10–03	Checks and measurements – lubrication system	67	10–03
Piston data	15	10–03	Checks and measurements – cooling system	68	10–03
Timing gear data	16–17	10–03	Replacing valve guides	69–70–71	10–03
Cylinder head data	18	10–03	Replacing injector sleeves and support	72–73	10–03
Lubrication and cooling system data	19	10–03	Removal–Installation – crankshaft front seal	74–75	10–03
Tightening torques	20	10–03	Valve Clearance Adjustment	76–77	10–03
Tools	21–22	10–03	Removal–Installation – injectors	78–79	10–03
Cross-sectional views of engine	23–24	10–03	Removal – Installation Bosch injection pump	80–81–82	10–03
Lubrication diagrams	25	10–03	Bosch injection pump – timing	83–84	10–03
Engine cooling system diagram	26	10–03	Bosch injection pump – air bleeding	85	10–03
Fault diagnosis	27–28–29–30	10–03	Exhaust pipe. Removal–Installation	86	10–03
Engine Removal – Installation	31–32	10–03	Removal–Installation – coolant pump	87	10–03
Compression Test	33	10–03	Coolant pump overhaul	88	10–03
Engine Disassembly – Assembly	34–35–36–37–38–39–40–41–42–43–44–45–46–47–48–49–50	10–03	Removal–Installation – thermostat valve	89–90	10–03

	Page	Date		Page	Date
Removal–Installation – radiator	91–92–93–94	10–03	Removal–Installation – Rear transmission – gearbox casing	14–15–16–17–18–19–20	10–03
18 – CLUTCH			Disassembly–Assembly – transmission–gearbox casing	21–22–23–24–25–26–27–28	10–03
Data	1–2	10–03	Gearbox driving and driven shafts end float adjustment.	29	10–03
Tightening Torques	2	10–03	Sealing compound application diagram	30	10–03
Tools	2–3	10–03	Gearbox control lever. Removal – Installation	31	10–03
Cross–sectional views ...	3–4	10–03	Range gear control lever. Removal – Installation	32	10–03
Fault diagnosis	5	10–03	Shuttle control lever. Removal – Installation	33	10–03
Removal–Installation – clutch	6–7–8–9–10–11–12–13–14–15	10–03	Fuel tank. Removal – Installation	34–35	10–03
Clutch Overhaul	16–17–18–19–20	10–03	CHAPTER 2 – Mechanical transmission and splitter		
Checks and measurements – clutch	21–22	10–03	Data	1–2	10–03
Adjustments – clutch disengagement levers	22–23	10–03	Tightening Torques	2	10–03
Adjustments – clutch pedal	24	10–03	Tools	2	10–03
PTO control adjustment ..	25	10–03	Cross–sectional views ...	3–4–5	10–03
Sectional view of PTO clutch servo control	26	10–03	Description and Operation	6	10–03
Description and operation of PTO servo control	27–28	10–03	Fault diagnosis	7	10–03
PTO servo control adjustment	29	10–03	Splitter device and creeper unit casing, shafts and bearings disassembly	8–9–10	10–03
PTO engaged switch adjustment	30	10–03	CHAPTER 3 – Power Shuttle transmission with dual command (2 Speed Power Shift) function		
21 – TRANSMISSIONS			Data	1–2	10–03
CHAPTER 1 – Transmission and range gear (16x16)			Tightening Torques	3	10–03
Data	1–2	10–03	Tools	4–5–6	10–03
Tightening Torques	2–3	10–03	Cross–sectional views ...	7–8–9–10–11	J10–03
Tools	4–5–6–7	10–03	Clutch control pressure test	10	10–03
Cross–sectional views ...	8–9–10–11	10–03	Description and Operation	12	10–03
Description and Operation	12	10–03	Fault diagnosis	12	10–03
Fault diagnosis	12–13	10–03			

	Page	Date		Page	Date
Disassembly–Assembly – transmission–gearbox casing	13–14	10–03	23 – DRIVE LINES		
Disassembly–Reassembly – Power Shuttle control valve	15–16–17	10–03	Data	1	10–03
Disassembly–Assembly – accumulator	18	10–03	Tightening Torques	2	10–03
Gearbox control valve sole- noid valve. Removal – In- stallation	19–20	10–03	Tools	3–4	10–03
Disassembly–Assembly – clutch casing	21–22–23– 24–25	10–03	Cross–sectional views ...	5–6–7	10–03
Fault code decoding	26	10–03	Description and Operation	8–9	10–03
Calibrations	27–28–29– 30–31–32– 33–34–35– 36–37–38– 39–40–41– 42–43–44– 45	10–03	Fault diagnosis	9	10–03
First start–up procedure ..	46	10–03	Drive shafts and guard. Disassembly – Assembly .	10–11–12	10–03
Diagnostics	47 to 148	10–03	Removal–Installation – drive gear casing	13–14	10–03
Power Shuttle control unit input/output wiring diagram	150–151– 152–153	10–03	Disassembly–Assembly – drive gear casing	15–16–17– 18	10–03
Description and operation of the control unit	154–155– 156–157– 158	10–03	Fault code decoding	19	10–03
CHAPTER 4 – Mechanical transmission (8 + 8 North American version)			Calibrations	20–21–22– 23–24–25– 26–27	10–03
Data	1	10–03	First start–up procedure ..	28	10–03
Tightening Torques	1	10–03	Diagnostics	29 to 66	10–03
Tools	1	10–03	PTO control unit input/out- put wiring diagram	68–69	10–03
Cross–sectional views ...	2–3–4	10–03	25 – FRONT MECHANICAL TRANSMISSION		
CHAPTER 4 – Power Shuttle transmission (16 + 16 and 8 + 8 versions)			CHAPTER 1 – Front mechanical transmission (super steer axle)		
Data	1	10–03	Data	1–2	10–03
Tightening Torques	2	10–03	Data	3	10–03
Cross–sectional views ...	3–4–5–6	10–03	Tightening Torques	4–5–6	10–03
Clutch control pressure test	6	10–03	Tools	7–8–9	10–03
			Cross–sectional views ...	10–11–12– 13	10–03
			Description and Operation	13–14	10–03
			Fault diagnosis	15	10–03
			Removal–Installation – front axle	16–17–18– 19	10–03
			Removal–Installation – front axle bevel drive sup- port and differential	20–21–22– 23	10–03

	Page	Date		Page	Date
Overhaul – front axle bevel drive	24–25	10–03	Overhaul – front differential	36	10–03
Adjustments – bevel drive	26–27–28– 29–30–31	10–03	LIM–SLIP self–locking differential	37–38	10–03
Overhaul – front differential	32	10–03	Checking leading wheels alignment	39	10–03
Overhaul – differential lock unit	33–34–35	10–03	Disassembly–Assembly – front epicyclic final drive ..	40–41	10–03
Disassembly–Assembly – front epicyclic final drive with brake	36–37–38– 39	10–03	Disassembly–Assembly – front epicyclic final drive with brake	42–43–44	10–03
Disassembly–Assembly – front epicyclic final drive ..	40–43	10–03	27 – REAR MECHANICAL TRANSMISSION		
Disassembly–Assembly – front epicyclic final drive ..	41–42	10–03	Data	1–2	10–03
Wheel hub seal. Replacement	43–44	10–03	Tightening Torques	3–4	10–03
Adjustments – steering knuckle bearings	45	10–03	Tools	5–6–7–8	10–03
Replacing steering knuckle pins and bearings	46	10–03	Cross–sectional views ...	9–10	10–03
Lead–drive wheel position check	47	10–03	Description and Operation	11–12	10–03
CHAPTER 2 – Front mechanical transmission			Fault diagnosis	12–13	10–03
Data	1–2–7	10–03	Disassembly–Assembly – transmission–gearbox casing	14–15–16– 17–18–19	10–03
Tightening Torques	3–4	10–03	Adjustment – differential lock engagement sleeve position	20	10–03
Tools	5–6	10–03	Adjustments – bevel drive	21–22–23– 24–25	10–03
Cross–sectional views ...	7–8	10–03	Removal–Installation– side gear casing	26–27–28– 29	10–03
Description and Operation	8–9	10–03	Disassembly–Assembly – drive wheel shaft	29–30–31	10–03
Fault diagnosis	10	10–03	Disassembly–Assembly – epicyclic final drive	31	10–03
Removal–Installation – front axle	11–12–13– 14	10–03	31 – POWER TAKE–OFF		
Front axle. Disassembly – Assembly	15–16–17– 18–19–20– 21–22–23	10–03	CHAPTER 1 – Mechanical power take–off		
Overhaul – differential lock unit	24–25	10–03	Data	1–2–3	10–03
Replacing steering knuckle pins and bearings	26	10–03	Tools	4	10–03
Adjustments – steering knuckle bearings	27–28	10–03	Tightening Torques	5–6	10–03
Adjustments – bevel drive	29–30–31– 32–33–34– 35	10–03	Cross–sectional views ...	7–8	10–03
			Description and Operation	9–10–11	10–03
			Fault diagnosis	11	10–03

	Page	Date		Page	Date
Disassembly – Assembly – power take-off	12–13–14– 15	10–03	Removal–Installation – ser- vice brake	9–10	10–03
33 – BRAKES			Removal–Installation – ser- vice brake pump	11–12–13– 14	10–03
Data	1–2	10–03	Adjustments – service brake pedals travel	15–16	10–03
Tightening Torques	2	10–03	Service brake circuit air bleeding	16–17–18	10–03
Cross-sectional views ...	3–4	10–03	Removal–Installation – parking brake	19–20	10–03
Cross-sectional views ...	5	10–03	Adjustments – parking handbrake travel	21	10–03
Tools	5–6	10–03			
Description and Operation	6	10–03			
Fault diagnosis	7–8	10–03			

GENERAL INSTRUCTIONS

IMPORTANT NOTICE

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.

BATTERY

Before carrying out any kind of service operation disconnect and isolate the battery negative lead, unless otherwise requested for specific operations (e.g., operations requiring the engine to be running), after which it is necessary to disconnect the above-mentioned lead to complete the work.

SHIMMING

For each adjustment operation, select adjusting shims and measure individually using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value indicated for each 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 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, RHO-DORSIL 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 176 to 194 °F (80 to 90 °C) before fitting on the shafts;
- allow the bearings to cool before installing them from the outside.

SPRING PINS

When fitting split socket spring 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

Use genuine parts only.

Only genuine spare parts guarantee the same quality, duration and safety as they are the same parts that are assembled during production.

Only **genuine parts** can offer this guarantee.

When ordering spare parts, always provide the following information:

- tractor 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.

IMPORTANT NOTES

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, windshield wipers, 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

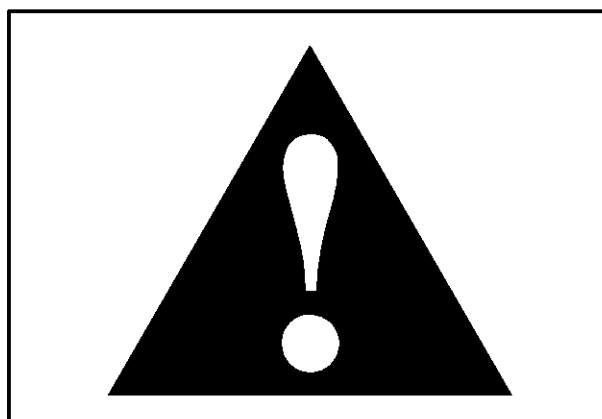
PAY ATTENTION TO THIS SYMBOL

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.



1

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 vehicle, 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 a workshop or in the field should be built in compliance with the safety rules in force.
- 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 place them into a metal container. Before starting the tractor or its attachments, check, adjust and block the operator's seat. Also check that there are no persons within the tractor or implement range of action.
- Do not keep into your pockets any object which might fall unobserved into the tractor's inner compartments.
- 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 bring your head, body, arms, legs, feet, hands, 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 no 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

- Check that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check possible damages to the rims and tyres.
- 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 reuse parts of recovered wheels as improper welding, brazing or heating may weaken the wheel and make it fail.
- 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 object caught in the tyre tread.
- Never inflate tyres using inflammable gases; as this may result in explosions and injury to bystanders.

REMOVAL AND INSTALLATION

- Lift and handle all heavy parts using suitable hoisting equipment. Ensure that parts are supported by appropriate slings and hooks. Use lifting eyes provided to this purpose. 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
Cooling system: without cab	2.64 (10.0)	Water and AMBRA AGRIFLU liquid 50% + 50%	NH 900 A	–
with cab	3.17 (12.0)			
Windscreen washer reservoir	0.52 (2.0)	Water and liquid	–	–
Fuel tank:	19.81 (75)	Decanted and filtered diesel fuel	–	–
Engine sump: without filter:	1.76 (6.7)	AMBRA SUPER GOLD oil	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)			
Brake circuit	0.18 (0.7)	AMBRA BRAKE LHM fluid	NH 610 A	ISO 7308
With front brakes	0.13 (0.5)			
Front axle: axle housing	1.18 (4.5)	AMBRA MULTI G oil	NH 410 B	API GL4 ISO 32/46 SAE 10W–30
final drives without brakes (each)	0.26 (1.0)			
final drives with brakes (each)	0.39 (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	0.03 (0.15)			

SECTION 10 – ENGINE**Chapter 1 – Engine****CONTENTS**

Section	Description	Page
10 000	General specifications	2
	Main data	5
	Torque settings	20
	Tools	21
	Sections	23
	Lubrication and cooling system diagrams	25
	Troubleshooting	27
10 001 10	Engine. Removal – Installation	31
10 001 30	Compression test	33
10 001 54	Engine. Disassembly–Assembly	34
10 101 53	Valve guides. Replacement	69
10 101 60	Injector sleeve. Replacement	72
10 102 70	Front engine oil seal. Removal–Installation	74
10 106 12	Valve/rocker arm clearance adjustment	76
10 218 30	Engine injector. Removal–Installation	78
10 246 14	Bosch injection pump. Removal–Installation timing and air bleeding check	80
10 254 44	Exhaust pipe. Removal–Installation	86
10 402 11	Coolant pump. Removal–Installation with radiator removed	87
10 402 28	Coolant pump. Overhaul	88
10 402 30	Thermostat valve. Removal–Installation	89
10 406 10	Radiator. Removal–Installation	91

GENERAL SPECIFICATIONS	
Engine, technical type:	
– Models TN 60DA and TN 60SA – type 8035.05C.615/619/919 (BOSCH pump)	See data on page 6–7
– Models TN 70DA and TN 70SA – type 8035.25R.615/619/919 (BOSCH pump)	See data on page 8–9
– Models TN 75DA and TN 75SA – type 8035.25.615/619/919 (BOSCH pump)	See data on page 10–11
Cycle	diesel, 4–stroke
Fuel injection	direct
Number of cylinders in line	3
Cylinder liners	in cylinder block
Piston diameter	
– Models TN 60DA and TN 55SA	4.0944 in. (104 mm)
– Models TN 70DA and TN 70SA	4.0944 in. (104 mm)
– Models TN 75DA and TN 75SA	4.0944 in. (104 mm)
Piston stroke	4.5275 in. (115 mm)
Total displacement:	
– Models TN 60DA and TN 60SA	178.8496 in. ³ (2931 cm ³)
– Models TN 70DA and TN 70SA	178.8496 in. ³ (2931 cm ³)
– Models TN 75DA and TN 75SA	178.8496 in. ³ (2931 cm ³)
Compression ratio for models TN 60DA, TN 60SA	17:1 normally aspirated
Compression ratio for models TN70DA, TN70SA, TN 75DA and TN 75SA ...	16.5:1 turbocharged
Maximum power:	
– Models TN 60DA and TN 60SA	44 kW (60 HP)
– Models TN 70DA and TN 70SA	48 kW (65 HP)
– Models TN 75DA and TN 75SA	53 kW (72 HP)
Maximum power speed	2300 rpm
Maximum torque speed for Models TN 60DA and TN 60SA	1400 rpm
Maximum torque speed for Models TN 70DA and TN 70SA	1400 rpm
Maximum torque speed for Models TN 75DA and TN 75SA	1400 rpm
Number of main bearings	4
Sump pan	structural, cast iron

(continued)

(cont)

GENERAL SPECIFICATIONS	
Lubrication	forced, with gear pump
Pump drive	camshaft
Engine speed/oil pump speed ratio	2:1
Oil cleaning	mesh filter on oil intake and filtering cartridge on delivery line
Normal oil pressure with motor warmed-up and running at maximum speed:	
For models TN 60DA and TN 60SA	42.05 to 56.55 psi (2.9 to 3.9 bar)
For models TN70DA, TN70SA; TN 75DA and TN 75SA (start of action)	≥ 29 psi (≥ 2 bar)
Pressure relief valve	incorporated in oil pump housing
Valve initial opening pressure	50.75 psi (3.5 bar)
For further lubrication technical data	See page 19
Cooling system	coolant circulation
Radiator on models TN 60DA/SA	3 lines of vertical pipes with copper fins
Radiator on model TN 70DA/SA and TN 75DA/SA	4 lines of vertical copper pipes
Fan, attached to coolant pump pulley	intake, 6-blade in sheet-metal
Coolant pump	centrifugal vane-type
Engine speed/coolant pump speed ratio	1:1.25
Temperature control	thermostat
Coolant thermometer	coloured scale divided into 3 sections
Temperature ranges corresponding to each section:	
– initial white section	86° to 149 °F (30° to 65 °C)
– middle green section (normal working conditions)	149° to 221 °F (65° to 105 °C)
– final red section	221° to 239 °F (105° to 115 °C)
For further cooling system technical data	See page 19
Rev counter/hourmeter	incorporated in control panel
Operating system	from gear on camshaft
Hour counter calibrated for engine speed of	1800 rpm

(continued)

(cont)

GENERAL SPECIFICATIONS	
<p>Timing system</p> <p>Intake:</p> <ul style="list-style-type: none"> – start: before T.D.C. 12° – end: after B.D.C. 31° <p>Exhaust:</p> <ul style="list-style-type: none"> – start: before B.D.C. 50° – end: after T.D.C. 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 0.0118 ± 0.0019 in. (0.30 ± 0.05 mm) – exhaust 0.0118 ± 0.0019 in. (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>Fuel pump with 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 via 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> <p>– 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</p>	

FUEL SYSTEM DATA

Turbocharger (models TN 70DA/SA and TN 75DA/SA):	
– GARRETT type	T 25
Injection pump	rotating distributor with speed governor and advance regulator incorporated
BOSCH pump:	
– Models TN 60DA and TN 60SA	VE 3/11 F 1150 L 767 – 504041420
– Models TN 70DA and TN 70SA	VE 3/11 F 1150 L 764–2 – 504054475
– Models TN 75DA and TN 75SA	VE 3/11 F 1150 L 764 – 504042213
Direction of rotation	anti-clockwise
Injection order	1–2–3

Fuel injectors:	
BOSCH type:	
TN 60DA and TN 60SA	504054021
TN 70DA, TN 70SA, DT 75DA and TN 75SA	500307714
– Nozzle holder type	4791124
– Nozzle type:	
TN 60DA and TN 60SA	DLA 132 SV3 143 221 – 504051747
TN 70DA, TN 70SA, DT 75DA and TN 75SA	DLA 132S 1320 – 99469341
Number of nozzle holes:	
TN 60DA and TN 60SA	6
TN 70DA, TN 70SA, DT 75DA and TN 75SA	5
Nozzle hole diameter:	
TN 60DA and TN 60SA	0.0074 in. (0.19 mm)
TN 70DA, TN 70SA, DT 75DA and TN 75SA	0.0090 in. (0.23 mm)
Pressure setting	3770 to 3944 psi (260 to 272 bar)
Delivery lines for BOSCH pump	
– type	99441952
– Pipe dimensions	87 x 25.37 x 7830 in. (6 x 1.75 x 540 mm)

**MODELS TN 60DA AND TN 60SA – BOSCH INJECTION PUMP CALIBRATION DATA
TYPE VE 3/11 F 1150 L 766 – VE 3/11 F 1150 L 766-1 – 504041420**

ASSEMBLY DATA

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

Plunger pre-lift for timing on engine: 0.0393 in. (1 mm) from BDC (with tools **380000228** – **380000229**).

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

ASSEMBLY DIMENSIONS

SYMBOL	K	MS	ya	yb
in. (mm)	–	–	1.437 to 1.5157 (36.5 to 38.5)	1.6299 to 1.8346 (41.4 to 46.6)

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 3625 to 3668 psi (250 to 253 bar)

Fuel supply pressure:

5.075 \pm 0.725 psi (0.35 \pm 0.05 bar).

Delivery pipes (conforming to ISO 4093.2):

0.2362 x 0.0787 x 17.71 in. (6 x 2 x 450 mm)

Graduate drain time : 30".

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

1. START OF DELIVERY

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

2. ADVANCE REGULATOR STROKE

rpm: 1240	Advance stroke: 0.0157 to 0.0551 in. (0.4 to 1.4 mm)
-----------	--

3. FUEL SUPPLY PUMP PRESSURE

rpm: 1200	Internal pressure: 111.65 to 129.05 psi (7.7 to 8.9 bar)
-----------	--

4. FULL LOAD DELIVERY

rpm: 700	Delivery per 1000 shots: cm^3 64.1 to 69.1	Spread: $\text{cm}^3 \leq 3.5$
----------	---	--------------------------------

5. SPREAD GOVERNOR AT IDLE SPEED

rpm: 325	Delivery per 1000 shots: cm^3 15.9 to 23.9	Spread: $\text{cm}^3 \leq 4.0$
----------	---	--------------------------------

6. SPREAD GOVERNOR AT MAXIMUM SPEED

rpm: 1200	Delivery per 1000 shots: cm^3 43.5 to 54.5	Spread:–
-----------	---	----------

7. DELIVERY AT STARTING SPEED

rpm: 100	Delivery per 1000 shots: cm^3 55 to 95
----------	---

8. INJECTION ADVANCE PROGRESSION

Rev/min		1240	1280
Advance stroke	in (mm)	0.0157 to 0.0551 (0.4 to 1.4)	0.0511 to 0.0748 (1.3 to 1.9)

9. TRANSFER PRESSURE PROGRESSION

Rev/min		1200	400	
Internal pressure	psi (bar)	111.65 to 129.05 (7.7 to 8.9)	50.75 to 68.15 (3.5 to 4.7)	

10. BACKFLOW

Rev/min		400	1100
Backflow	l/h	14 to 22	22 to 42

(continued)

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

