NEW HOLLAND

LB90.B
LB95.B
LB110.B
LB115.B

Workshop
Manual

NEW HOLLAND

PROVEN PERFORMANCE

TO READER

This manual has been printed for a skilful engineer to supply necessary technical information to carry out service operations on this machine.

Read carefully this manual to collect correct information relevant to repair procedures.

For any question or remark, or in case of any error relevant the contents of this manual, please contact:

NEW HOLLAND KOBELCO CONSTRUCTION MACHINERY S.p.A.
Strada di Settimo, 323 - 10099
S. Mauro Torinese (TO) - Italia

REFERENCE

Beyond this Service Manual, also refer to documents hereunder listed:

- Operator's Manual
- Parts Catalogue

COMPLETE HANDBOOK FOR INSTRUCTIONS AND REPAIRS

The complete Service Manual consists of two volumes:

- LB90.B - LB95.B - LB110.B - LB115.B Service Manual "LOADER BACKHOE"
- LB90.B - LB95.B - LB110.B - LB115.B Service Manual "Engine"

The Service Manuals for "Loader backhoe" and "Engine" contain the necessary technical information to carry out service and repair on machine and on engine, necessary tools to carry out those operations and information on service standard, on procedures for connection, disconnection, disassembly and assembly of parts.

The complete Service Manual which covers the loader backhoe models LB90.B - LB95.B - LB110.B - LB115.B consists of the following volumes, which can be identified through their print number as stated below:

VOLUME	MACHINE TYPE	PRINT NUMBER
Service Manual - "Loader backhoe"	LB90.B - LB95.B - LB110.B - LB115.B	604.13.547
Service Manual - "Engine"	LB90.B - LB95.B - LB110.B - LB115.B	604.13.612

INDEX

SECTION 00 - SAFETY PRECAUTIONS

SECTION 01 - MAINTENANCE

SECTION 02 - TECHNICAL SPECIFICATIONS

SECTION 17 - TORQUE CONVERTERS

SECTION 21 - TRANSMISSION

SECTION 25 - FRONT AXLES

SECTION 27 - REAR AXLE

SECTION 33 - BRAKES SYSTEM

SECTION 35 - HYDRAULIC SYSTEM

SECTION 39 - CHASSIS

SECTION 41 - STEERING SYSTEM

SECTION 50 - CAB HEATING AND AIR CONDITIONING

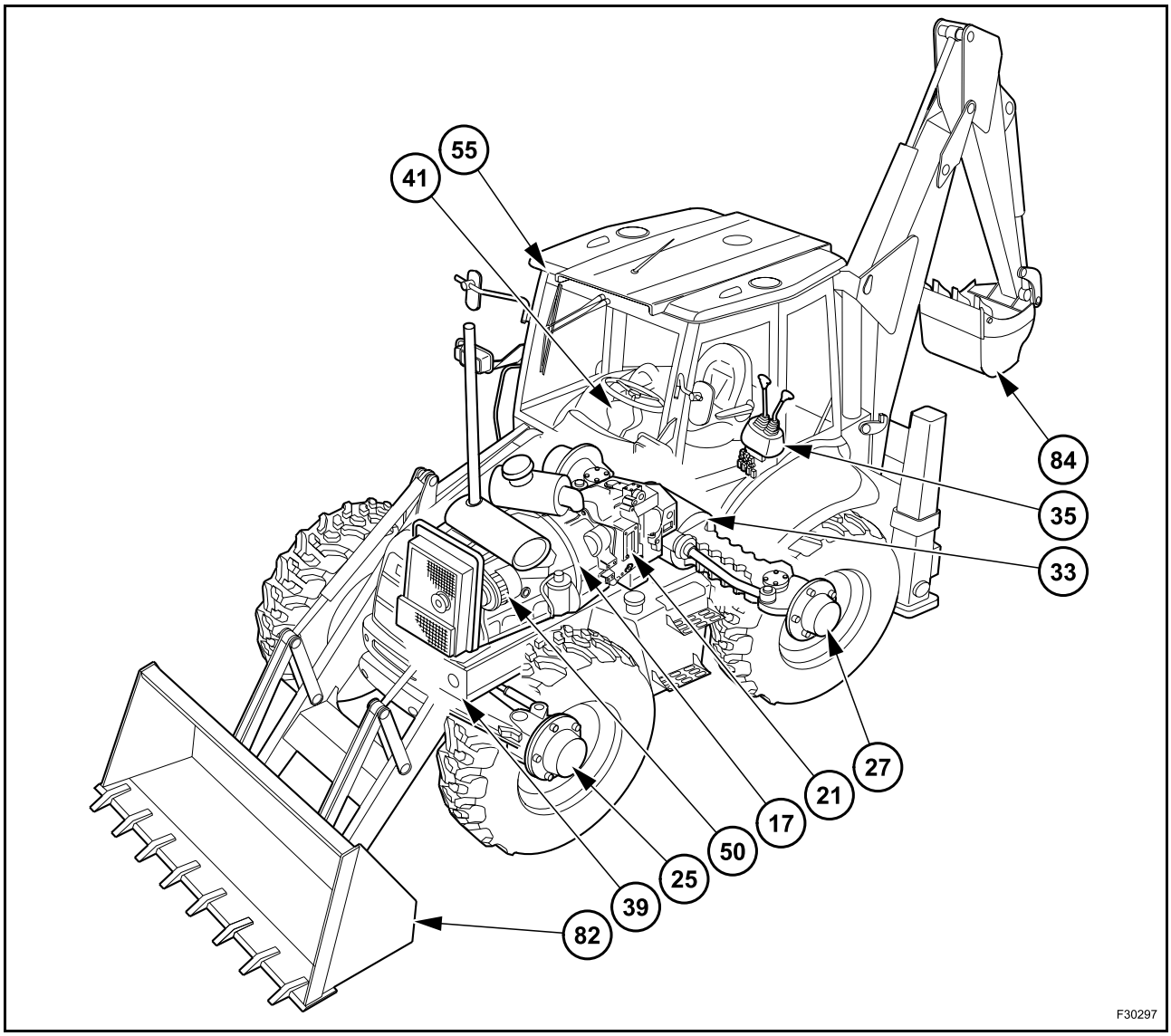
SECTION 55 - ELECTRICAL SYSTEM

SECTION 82 - LOADER

SECTION 84 - BACKHOE

SECTIONS INDEX

Where disassembly of a specific component is required refer to the relevant repair manual section.



SECTION 17: TORQUE CONVERTER

SECTION 21: TRANSMISSION

SECTION 25: FRONT AXLE

SECTION 27: REAR AXLE

SECTION 33: BRAKES SYSTEM

SECTION 35: HYDRAULIC SYSTEM

SECTION 39: CHASSIS

SECTION 41: STEERING SYSTEM

SECTION 50: CAB HEATING AND AIR CONDITIONING

SECTION 55: ELECTRICAL SYSTEM

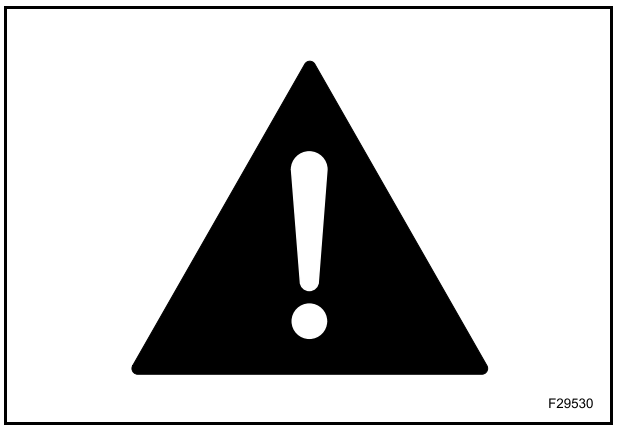
SECTION 82: LOADER

SECTION 84: BACKHOE

LB90.B
LB95.B
LB110.B
LB115.B

SECTION 00 - SAFETY PRECAUTIONS

This warning symbol points out important messages involving personal safety.
Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and safeguard your safety and personal integrity.
In this manual you will find this symbol together with the following key-words:
WARNING - it gives warning about improper repair operations and deriving potential consequences affecting the service technician's personal safety.
DANGER - it gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved.



TO PREVENT ACCIDENTS

Most accidents and personal injuries that occur in the work site or on the road, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions.

For this reason, MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and taking the necessary precautions, before the accident occurs.

Regardless of the care used in design and construction of any type of equipment, there may be conditions that cannot be completely safeguarded against, without interfering with reasonable accessibility and efficient operation.

A careful operator or technician is the best precaution against accidents. The complete observance of one simple rule would prevent many thousands of serious injuries each year.

This rule is: Never attempt to clean, lubricate or adjust a machine while it is in motion.

SAFETY RULES

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get hold into moving parts.
  We advise to use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
- Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are certified operators to assist in the operation to be carried out.
- Never operate the machine or use attachments from a place other than sitting at the operator's seat.
- Never carry out any operation on the machine when the engine is running, except when specifically indicated.
- Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- All repair and maintenance operations should be carried out with the greatest care and attention.
- Service stairs 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 warn that the Machine is being serviced. Block the machine and all equipment which should be raised.
- Never check or fill fuel tanks and accumulator batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- Brakes are inoperative when they are manually released for maintenance purposes. In such cases, the machine should be kept constantly under control using blocks or similar devices.
- The fuel filling gun should remain always in contact with the filler neck.
  Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity buildup.
- Use exclusively specified towing points for towing the machine. Connect parts carefully.
  Ensure that foreseen pins and/or locks are steadily fixed before applying traction.
  Do not stop near towing bars, cables or chains working under load.
- To transfer a failed machine, use a trailer or a low loading platform trolley if available.
- To load and unload the machine from the transportation mean, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the forwarder.
- For electrical heaters, battery-chargers and similar equipment use exclusive auxiliary power supplies with a efficient ground to avoid electrical shock hazard.
- Always use lifting equipment and similar of appropriate capacity to lift or move heavy components.
- Pay special attention to bystanders.
- Never pour gasoline or diesel oil into open, wide and low containers.
- Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.
- Wear protection goggles with side guards when cleaning parts using compressed air.
- Do not exceed a pressure of 2.1 bar, in accordance with local regulations.
- Do not run the engine in a closed building without proper ventilation.
- Do not smoke, use open flames, cause sparks in the nearby area when filling fuel or handling highly flammable liquids.
- Do not use flames as light sources when working on a machine or checking for leaks.
- Move with caution when working under a Machine, and also on or near a Machine. Wear proper safety accessories:
  helmets, goggles and special footwear.
- During checks which should be carried out with the engine running, ask an assistant to sit at the operator's seat and keep the service technician under visual control at any moment.
  In case of operations outside the workshop, drive the machine to a flat area and block it. If working on an incline cannot be avoided, first block the Machine carefully. Move it to a flat area as soon as possible with a certain extent of safety.
- Ruined or plied cables and chains are unreliable. Do not use them for lifting or trailing. Always handle them wearing gloves of proper thickness.
- Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stop near the fastening point, trailing chains or cables.
- The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.
- Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container. Before starting the Machine or its attachments, check, adjust and block the operator's seat. Also ensure that there are no persons within the Machine or attachment operating range.
- Do not keep in your pockets any object which might fall unobserved into the Machine's inner compartments.

- Whenever there is the possibility of being reached by ejected metal parts or similar, use protection eye mask or goggles with side guards, helmets, special footwear and heavy gloves. Wear suitable protection such as tinted eye protection, helmets, special clothing, gloves and footwear whenever it is necessary to carry out welding procedures. All persons standing in the vicinity of the welding process should wear tinted eye protection. NEVER LOOK AT THE WELDING ARC IF YOUR EYES ARE NOT SUITABLY PROTECTED.
- Metal cables with the use get frayed. Always wear adequate protections (heavy gloves, eye protection, etc.).
- Handle all parts with the greatest caution. Keep your hands and fingers far from gaps, moving gears and similar. Always use approved protective equipment, such as eye protection, heavy gloves and protective footwear.

START UP

- Never run the engine in confined spaces which 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 very slowly before removing it to allow pressure in the system to dissipate. Coolant should be topped up only when the engine is stopped or idle if hot.
- Do not fill up fuel tank when the engine is running, mainly if it is hot, to avoid ignition of fires in case of fuel spilling.
- Never check or adjust the fan belt tension when the engine is running. Never adjust the fuel injection pump when the machine is moving.
- Never lubricate the machine when the engine is running.

ELECTRICAL SYSTEMS

- If it is necessary to use auxiliary batteries, cables must be connected at both sides as follows: (+) to (+) and (-) to (-). Avoid short-circuiting the terminals. GAS RELEASED FROM BATTERIES IS HIGHLY FLAMMABLE. During charging, leave the battery compartment uncovered to improve ventilation. Avoid checking the battery charge by means of “jumpers” made by placing metallic objects across the terminals. Avoid sparks or flames near the battery area. Do not smoke to prevent explosion hazards.
- Prior to any service, check for fuel or coolant leaks. Remove these leaks before going on with the work. Do not charge batteries in confined spaces. Ensure that ventilation is appropriate to prevent accidental explosion hazard due to build-up of gasses relieved during charging.
- Always disconnect the batteries before performing any type of service on the electrical system.

HYDRAULIC SYSTEMS

- Some fluid slowly coming out from a very small port can be almost invisible and be strong enough to penetrate the skin. For this reason, NEVER USE YOUR HANDS TO CHECK FOR LEAKS, but use a piece of cardboard or a piece of wood for this purpose. If any fluid is injected into the skin, seek medical aid immediately. Lack of immediate medical attention, serious infections or dermatitis may result.
- Always take system pressure readings using the appropriate gauges.

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.
- Keep off and stay at the tyre side when correcting the inflation pressure.
- Check the pressure only when the machine is unloaded and tyres are cold to avoid wrong readings due to 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, nor weld a rim with the inflated tyre assembled.
- To remove the wheels, block both front and rear Machine wheels. Raise the Machine and install safe and stable supports under the Machine in accordance with regulations in force.
- Deflate the tyre before removing any object caught into the tyre tread.
- Never inflate tyres using flammable gases as they may originate explosions and cause injuries to bystanders.

REMOVAL AND INSTALLATION

- Lift and handle all heavy components using lifting equipment of adequate capacity. Ensure that parts are supported by appropriate slings and hooks. Use lifting eyes provided to this purpose. Take care of the persons near the loads to be lifted.
- Handle all parts with great care. Do not place your hands or fingers between two parts. Wear approved protective clothing such as safety goggles, gloves and footwear.
- Do not twist chains or metal cables. Always wear protection gloves to handle cables or chains.

IMPORTANT ECOLOGICAL CONSIDERATIONS

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances.

Helpful hints

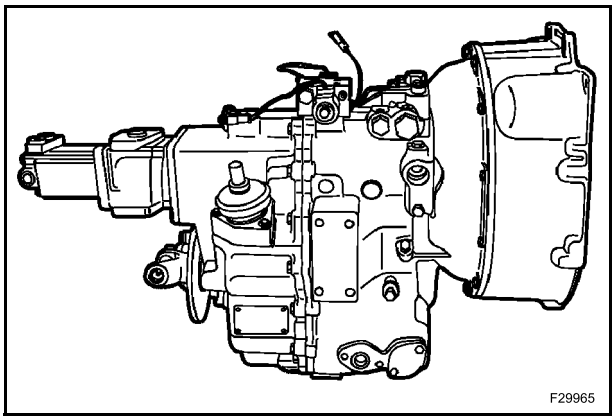
- Avoid filling tanks using jerry cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc.
  Most of them contain substances which can be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in ordinary heating systems.
- Avoid spillage when draining off used engine coolant mixtures, engine, transmission and hydraulic oils, brake fluids, etc.
  Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
- Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
- Do not open the Air-Conditioning system yourself. It may contain gases which should not be released into the atmosphere. Your air conditioning specialist has special equipment for discharging and charging the system.
- Repair any leaks or defects in the engine cooling or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a catastrophic failure of the system components.
- Protect hoses during welding as penetrating weld chips may burn a hole or weaken them, causing the loss of oils, coolant, etc.

LB90.B
LB95.B
LB110.B
LB115.B

SECTION 21 - TRANSMISSION

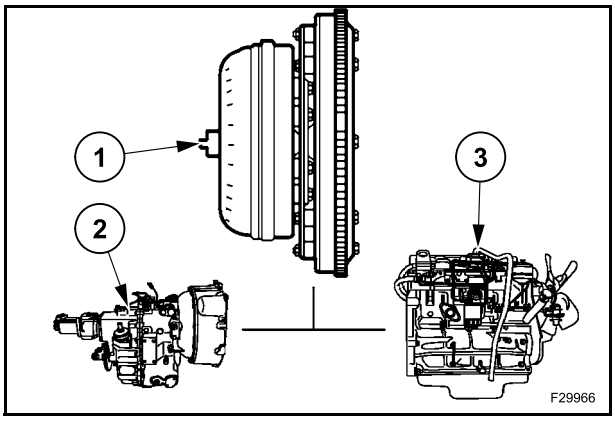
1. POWERSHUTTLE TRANSMISSION “TURNER MODEL COM-T4-2025”

This transmission is used on Powershuttle loader backhoes models LB90.B - LB95.B - LB100.B.
The transmission consists of a torque converter, an internal rotor-type hydraulic pump, an oil distributor, a solenoid control valve assembly, two hydraulically operated clutches, a 4-speed synchromesh geartrain, transmission case and oil cooler tubes.



NOTE: a conventional clutch is not used with this transmission.

The transmission case serves as an oil tank for the torque converter and hydraulic clutch assemblies. The transmission receives power from the engine (1) by a fluid coupling in the torque converter (2) and hydraulic clutch assemblies in the transmission (3).



1.1 TECHNICAL SPECIFICATIONS

GEAR RATIO

Forward				Reverse			
1	2	3	4	1	2	3	4
4.824	2.998	1.408	0.792	4.020	2.496	1.173	0.660

COLD START BY-PASS VALVE SPRING

Free length ..... 53.4 mm ± 0.96 mm

FORWARD CLUTCH SPRING

Free length ..... 76.6 mm

CLUTCH PISTON SPRING

Free length ..... 75.9 mm

DETENT SPRING

Free length (Approximately) ..... 42.06 mm

END FLOAT

Input forward Primary Shaft	0.0508-0.41 mm
Input reverse Primary Shaft	0.0508-0.41 mm
Output shaft	1st Gear - 0.33-0.508 mm
	2nd Gear - 0.35-0.558 mm
	3rd Gear - 0.38-0.838 mm
	4th Gear - 0.20-0.558 mm
Four Wheel Drive Shaft	0.050-0.28 mm
Bearing End Floats	0.025-0.076 mm
Bearing End Float Shims available	0.050/0.076/0.127/0.177/0.381/0.508 mm

HYDRAULIC TESTS

Tachometer setting	2000 revs/min
Test temperature, oil	80-85 °C
Cold Start Valve (For reference only)	26 bar
System Pressure Test	13.7-15.2 bar
Torque Converter	7-11 bar
Reverse Clutch	13.7-15.2 bar
Forward Clutch	13.7-15.2 bar
Four Wheel Drive Supply	13.7-15.2 bar

COOLER FLOW TEST

Oil temperature 80-85 °C	Revs/min	Oil Flow Litres/min
	700	12.5 litres
	1000	18.2 litres
	1500	22.1 litres
	2000	24.0 litres
	2200	24.5 litres
	2500	25.0 litres

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1.2 TIGHTENING TORQUES

Strainer bolts	18 to 31 Nm
Pump retaining bolts	18 to 31 Nm
Output Yoke bolts	68 to 88 Nm
Pressure test plugs	41 to 54 Nm
Main transmission case bolts	45 to 64 Nm
Shift detent plug	41 to 54 Nm
Shift fork screws	18 to 25 Nm
Shift lever assembly screws	16 to 24 Nm
Drain plugs	34 to 54 Nm
Relief valve	23 to 30 Nm
Pressure regulator valve	46 to 60 Nm
Cold start valve	46 to 60 Nm
4WD solenoid valve spool	20 to 27 Nm
4WD Solenoid coil retaining nut	5.4 Nm
Control valve retaining screws	6.8 to 8.5 Nm
4WD hydraulic pipe connections	6.8 to 10.2 Nm
Filter housing bolts	45 to 64 Nm
Oil filter	7 to 10 Nm
Temperature sender	20 to 27 Nm

RECOMMENDED SEALANTS

Transmission case joint	Loctite 5203
4WD Output gear	Loctite 649
4WD gear (Permanent 4WD assy)	Loctite 649
4WD clutch supply pipe	Loctite 542
Gear lever housing	Loctite 5900 RTV
Shimming access plug	Loctite 649