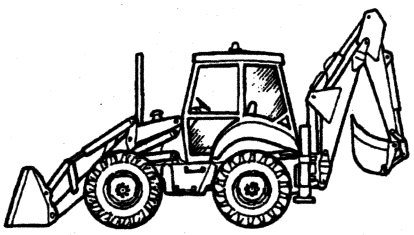
Please cut where indicated and insert the label into the plastic pocket on the spine of the binder.

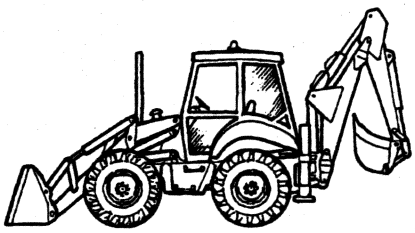


LOADER BACKHOE REPAIR

LB115

Vol. 1

86584406



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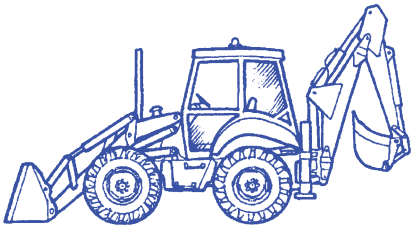


NEW HOLLAND

LB115

Section 1 – Engine and Fuel System

REPAIR MANUAL

NEW HOLLAND

SERVICE

86584407 3/99

LB115 REPAIR MANUAL CONTENTS

SECTION 1 - ENGINE AND FUEL SYSTEM

Chapter 1 - General Instructions

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by NEW HOLLAND authorized workshops. All instructions detailed should be carefully observed and special equipment indicated should be used if necessary.
Everyone who carries out service operations described without carefully observing these prescriptions will be directly responsible of deriving damages.

SHIMMING

At each adjustment, select adjusting shims, measure them individually using a micrometer and then sum up recorded values. Do not rely on measuring the whole shimming set, which may be incorrect, or on rated value indicated for each shim.

ROTATING SHAFT SEALS

To correctly install rotating shaft seals, observe the following instructions:

- Let the seal soak into the same oil as it will seal for at least half an hour before mounting;
- Thoroughly clean the shaft and ensure that the shaft working surface is not damaged;
- Place the sealing lip towards the fluid. In case of a hydrodynamic lip, consider the shaft rotation direction and orient grooves in order that they deviate the fluid towards the inner side of the seal;
- Coat the sealing lip with a thin layer of lubricant (oil rather than grease) and fill with grease the gap between the sealing lip and the dust lip of double lip seals;
- Insert the seal into its seat and press it down using a suitable tool. Do not tap the seal with a hammer or a drift;
- Take care to insert the seal perpendicularly to its seat while you are pressing it. Once the seal is settled, ensure that it contacts the thrust element if required;
- To prevent damaging the sealing lip against the shaft, place a suitable protection during installation.

O RINGS

Lubricate the O rings before inserting them into their seats. This will prevent the O rings from rolling over during mounting which will jeopardize sealing.

SEALERS

Apply Loctite Gasket Eliminator 510 or a suitable equivalent, over the mating surfaces marked with an X.
Before applying the sealer, prepare the surface as follows:

- remove possible scales using a metal brush;
- thoroughly degrease the surfaces using NEW HOLLAND DEGREASER, or a suitable equivalent.

BEARINGS

It is advisable to heat the bearings to 80 - 90°C before mounting them on their shafts and cool them down before inserting them into their seats with external tapping.

SPRING PINS

When mounting split socket spring pins, ensure that the pin notch is oriented in the direction of the effort to stress the pin.
Spiral spring pins should not be oriented during installation.

NOTES FOR SPARE PARTS

Use exclusively **genuine NEW HOLLAND spare parts**, the only ones bearing this logo.

Only genuine parts guarantee same quality, life, safety as original components as they are the same as mounted in production.
Only the **NEW HOLLAND genuine spare parts** can offer this guarantee.
All spare parts orders should be complete with the following data:

- Machine model (commercial name) and frame number;
- engine type and number;
- part number of the ordered part, which can be found on the "Microfiches" or the "Spare Parts Catalogue", which is the base for order processing.

NOTES FOR EQUIPMENT

Equipment which NEW HOLLAND proposes and shows in this manual are as follows:

- studied and designed expressly for use on NEW HOLLAND Machines;
- necessary to make a reliable repair;
- accurately built and strictly tested to offer efficient and long-lasting working means.

We also remind the Repair Personnel that having these equipment means:

- work in optimal technical conditions;
- obtain best results;
- save time and effort;
- work more safely.

NOTICES

Wear limits indicated for some details should be intended as advised, but not binding values. The words "front", "rear", "right hand", and "left hand" referred to the different parts should be intended as seen from the operator's seat oriented to the normal sense of movement of the Machine.

HOW TO MOVE THE MACHINE WITH THE BATTERY REMOVED

Cables from the external power supply should be connected exclusively to the respective terminals of the Machine positive and negative cables using pliers in good condition which allow proper and steady contact.
Disconnect all services (lights, windshield wipers, etc.) before starting the Machine.
If it is necessary to check the Machine electrical system, check it only with the power supply connected. At check end, disconnect all services and switch the power supply off before disconnecting the cables.

SAFETY RULES

PAY ATTENTION TO THIS SYMBOL

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 (ATTENTION)** - it gives warning about improper repair operations and deriving potential consequences affecting the service technician's personal safety.*

***DANGER:** The word "Danger" denotes a forbidden practice in connection with a serious hazard.*

TO PREVENT ACCIDENTS

Most accidents and personal injuries taking place in workshops are due from non-observance of some simple and essential prudential rule and safety precautions. For this reason, IN MOST CASES THEY CAN BE AVOIDED. It suffices to foresee possible causes and act consequently with necessary caution and care.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precaution against accidents.

Careful observance of this only basic precaution would be enough to avoid many severe accidents.

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

SAFETY RULES

GENERALITIES

◊ 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 into 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.

◊ Do not charge batteries in confined spaces. Ensure that ventilation is appropriate to prevent accidental explosion hazard due to build-up of gases releaved during charging.

◊ Always disconnect the batteries before performing any type of service on the electrical system.

◊ Prior to any service, check for fuel or coolant leaks. Remove these leaks before going on with the work.

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 to this purpose. If any fluid is injected into the skin, seek medical aid immediately. Lack of immediate medical attention, serious infections or dermatosis may result.

◊ Always take system pressure readings using the appropriate gauges.

WHEELS AND TIRES

◊ Check that the tires are correctly inflated at the pressure specified by the manufacturer. Periodically check possible damages to the rims and tires.

◊ Keep off and stay at the tire side when correcting the inflation pressure.

◊ Check the pressure only when the Machine is unloaded and tires 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 tire 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 tire before removing any object caught into the tire tread.

◊ Never inflate tires 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 twine chains or metal cables. Always wear protection gloves to handle cables or chains.

PRODUCT IDENTIFICATION

Your Backhoe Loader and its major components are identified by various numbers and letters for recognition in After Sales Service. The following information provides the locations of these identification plates, stamped numbers and examples of what can be found on your machine.

VEHICLE SERIAL NUMBER (1), Figure 1.

The Serial Number is stamped on the top of the right hand main frame, in front of the right hand loader post, in position (1). . . . . *Example: *031005017**

NOTE: *The Serial Number and identification numbers of components may be required by your dealer when requesting parts or service. These numbers will also be required as an aid to identifying the machine if it is ever stolen; keep them safe.*

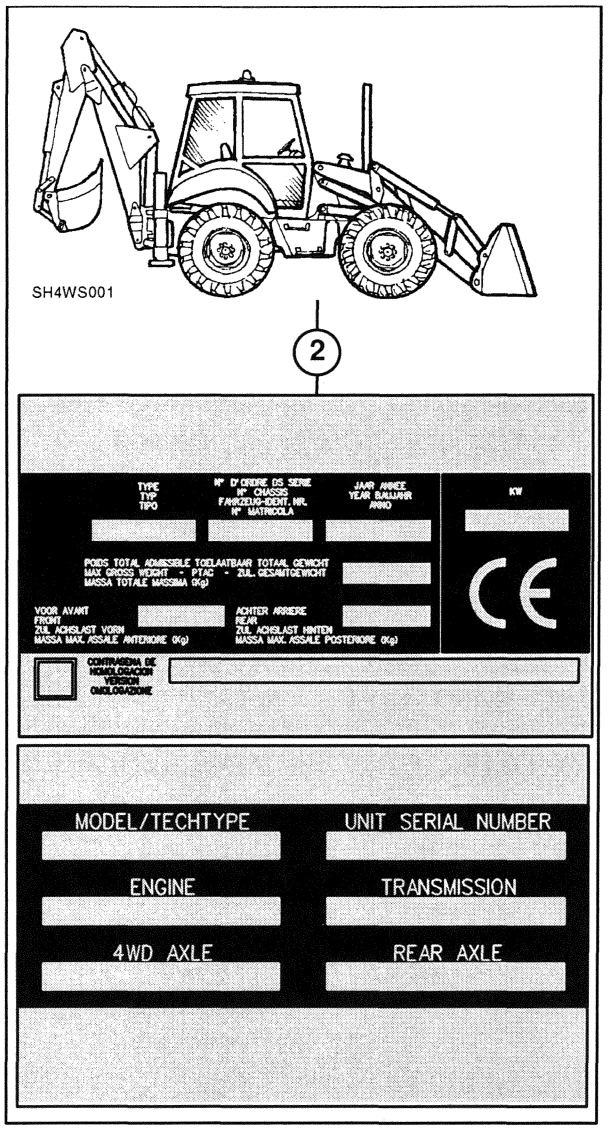
VEHICLE IDENTIFICATION PLATES (2), Figure 1.

The machine identification plates are located on the right-hand loader post, as shown at position (2). Record the data of your machine below.

MODEL/TECHNICAL TYPE _____
*Example: *699.510.700**

UNIT SERIAL NO. _____
*Example: *031005017**

YEAR _____
*Example: *1998**



1

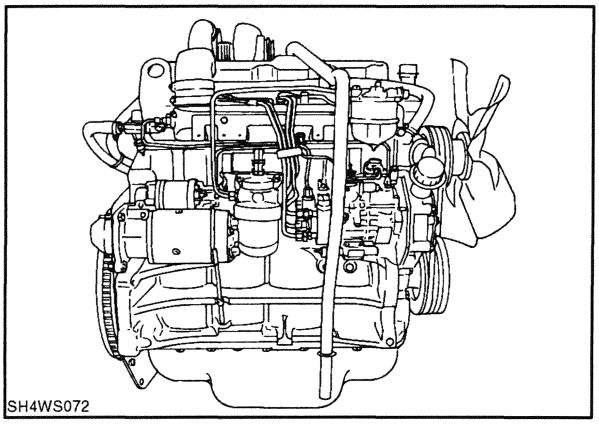
ENGINE IDENTIFICATION, Figure 2.

The engine identification information is located on the right hand engine sump rail. Record the information below for quick reference.

MODEL NO._____
*Example: *EA5**

SERIAL NO._____
*Example: *57018**

DATE CODE._____
*Example:*8J25*=8(1998),J(SEPTEMBER),25(DAY)*



2

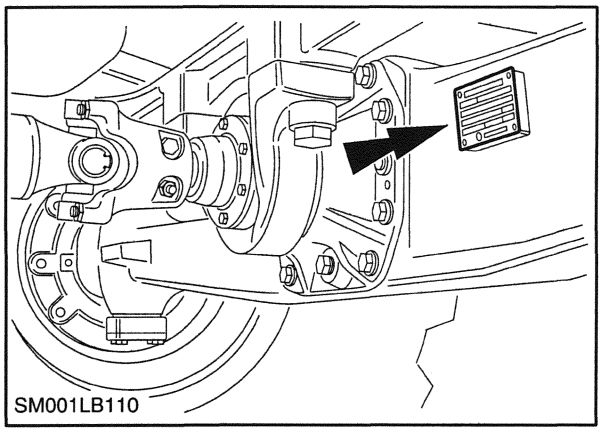
FRONT AXLE IDENTIFICATION, Figure 3

The serial number and axle type is printed on the plate (1), located on the front axle housing. Record the information below for quick reference.

AXLE TYPE _____
*Example: *26 - 25**

SERIAL NO. _____
*Example: *000102**

RATIO _____
Example: 18.46:1



3

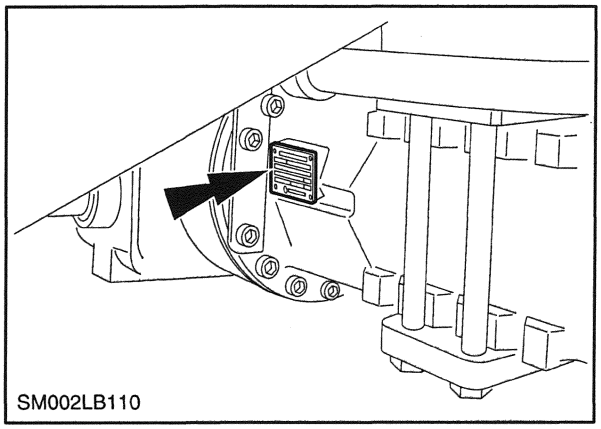
REAR AXLE IDENTIFICATION, Figure 4

The serial number and axle type is printed on the plate (1), located on the rear axle housing. Record the information below for quick reference.

AXLE TYPE _____
*Example: *26 - 25**

SERIAL NO. _____
*Example: *000102**

RATIO _____
Example: 18.46:1



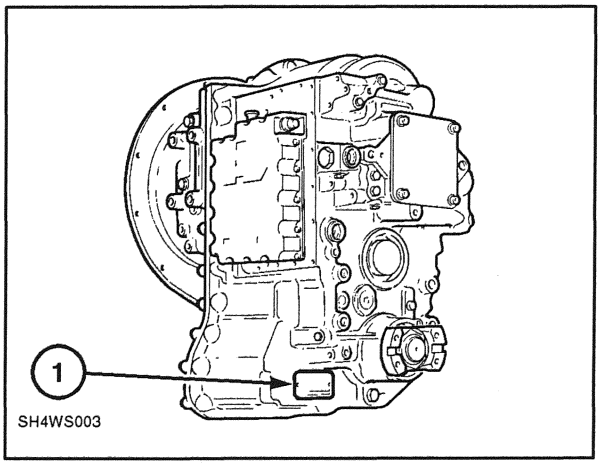
4

TRANSMISSION IDENTIFICATION 4x2 POWER SHIFT, Figure 5

The serial number and type is printed on the plate (1), on the lower part of the rear of the transmission. Record the information below for quick reference.

MODEL NO. _____
*Example: *11.11 - FT16000-1**

SERIAL NO. _____
*Example: *PBEA 000201* P=96, BE= Belgium*



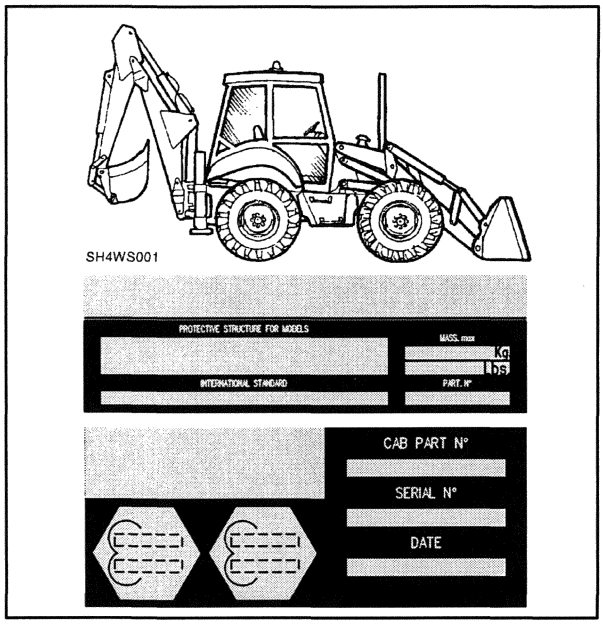
5

CAB IDENTIFICATION PLATES, Figure 6

The cab serial number and details are printed on the certification plates (1) on the rear left hand window. Record the serial number below for quick reference.

Serial No. _____

Date Code _____



6

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

1. Avoid filling tanks using Jerry cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.

2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which can be harmful to your health.

3. Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in ordinary heating systems.

4. Avoid spillage when draining off used engine coolant mixtures, engine, gearbox 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.

5. 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.

6. 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 a special equipment for discharging and charging the system.

7. Repair any leaks or defects in the engine cooling or hydraulic system immediately.

8. Do not increase the pressure in a pressurized circuit as this may lead to a catastrophic failure of the system components.

9. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, causing the loss of oils, coolant, etc.

SERVICE TECHNIQUES

GENERAL

Clean the exterior of all components before carrying out any form of repair. Dirt and abrasive dust can reduce the efficient working life of a component and lead to costly replacement.

Time spent on the preparation and cleanliness of working surfaces will pay dividends in making the job easier and safer and will result in overhauled components being more reliable and efficient in operation.

Use cleaning fluids which are known to be safe. Certain types of fluid can cause damage to O rings and cause skin irritation. Solvents should be checked that they are suitable for the cleaning of components and also that they do not risk the personal safety of the user.

Replace O rings, seals or gaskets whenever they are disturbed. Never mix new and old seals or O rings, regardless of condition. Always lubricate new seals and O rings with hydraulic oil before installation.

When replacing component parts, use the correct tool for the job.

HOSES AND TUBES

Always replace hoses and tubes if the cone end or the end connections on the hose are damaged.

When installing a new hose, loosely connect each end and make sure the hose takes up the designed position before tightening the connection. Clamps should be tightened sufficiently to hold the hose without crushing and to prevent chafing.

After hose replacement to a moving component, check that the hose does not foul by moving the component through the complete range of travel.

Be sure any hose which has been installed is not kinked or twisted.

Hose connections which are damaged, dented, crushed or leaking, restrict oil flow and the productivity of the components being served. Connectors which show signs of movement from the original swaged position have failed and will ultimately separate completely.

A hose with a chafed outer cover will allow water entry. Concealed corrosion of the wire reinforcement will subsequently occur along the hose length with resultant hose failure.

Ballooning of the hose indicates an internal leakage due to structural failure. This condition rapidly deteriorates and total hose failure soon occurs.

Kinked, crushed, stretched or deformed hoses generally suffer internal structural damage which can result in oil restriction, a reduction in the speed of operation and ultimate hose failure.

Free-moving, unsupported hoses must never be allowed to touch each other or related working surfaces. This causes chafing which reduces hose life.

O RING FLAT FACE SEAL FITTINGS

When repairing O ring face seal connectors, the following procedures should be observed.

WARNING: NEVER DISCONNECT OR TIGHTEN A HOSE OR TUBE THAT IS UNDER PRESSURE. IF IN DOUBT, ACTUATE THE OPERATING LEVERS SEVERAL TIMES WITH THE ENGINE SWITCHED OFF PRIOR TO DISCONNECTING A HOSE OR TUBE.

1. Release the fittings and separate the hose or tube assembly, then remove and discard the O ring seal from the fitting.
2. Dip a new O ring seal into clean hydraulic oil prior to installation. Install a new O ring into the fitting and, if necessary, retain in position using petroleum jelly.
3. Assemble the new hose or tube assembly and tighten the fitting finger tight, while holding the tube or hose assembly to prevent it from turning.
4. Use two suitable wrenches and tighten the fitting to the specified torque according to the size of the fitting. Refer to the following torque chart.

   NOTE: To ensure a leak-free joint is obtained, it is important that the fittings are not over or under torqued.

O RING FLAT FACE SEAL FITTING TORQUE VALUES

Nominal O.D (in.)	Tube (mm)	Dash Size	Thread Size In.	Swivel Nut Torque ft. lb.	N·m
0.250	6.35	-4	9/16-18	12	16
0.375	9.52	-6	11/16-16	18	24
0.500	12.70	-8	13/16-16	37	50
0.625	15.88	-10	1-14	51	69
0.750	19.05	-12	1 3/16-12	75	102
0.875	22.22	-14	1 3/16-12	75	102
1.000	25.40	-16	1 7/16-12	105	142
1.250	31.75	-20	1 11/16-12	140	190
1.500	38.10	-24	2-12	160	217

SEALER SPECIFICATIONS

The following sealers should be used as directed in the manual:

SEALERS	PART NUMBER	TRADE DESCRIPTION
Anaerobic sealer	82995770/1	LOCTITE GASKET ELIMINATOR 518
RTV silicone sealer	82995775/6	LOCTITE SUPERFLEX 593, 595 or 596 LOCTITE ULTRA BLUE 587 DOW CORNING SILASTIC 732 GENERAL ELECTRIC RTV 103 OR 108
Pipe sealant	82995768	PST 592 PIPE SEALANT WITH TEFLON
Thread-locking compound	82995773	LOCTITE 271 THREADLOCKER/SEALANT (red)

HARDWARE TORQUE VALUES

Check the tightness of hardware periodically.

Use the following charts to determine the correct torque when checking, adjusting or replacing hardware on the Backhoe Loader.

IMPORTANT: DO NOT use the values listed in the charts if a different torque value or tightening procedure is specified in this manual for a specific application. Torque values listed are for general use only.

Make sure fastener threads are clean and not damaged.

NOTE: *A torque wrench is necessary to properly torque hardware.*

MINIMUM HARDWARE TIGHTENING TORQUES

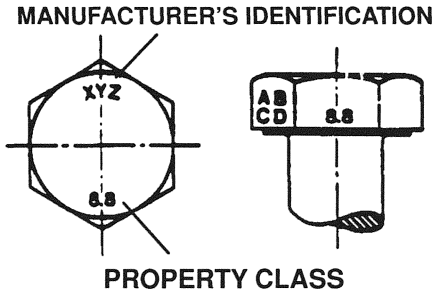
IN NEWTON-METERS - N·m (FOOT POUNDS - FT. LB.) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC HARDWARE AND LOCKNUTS

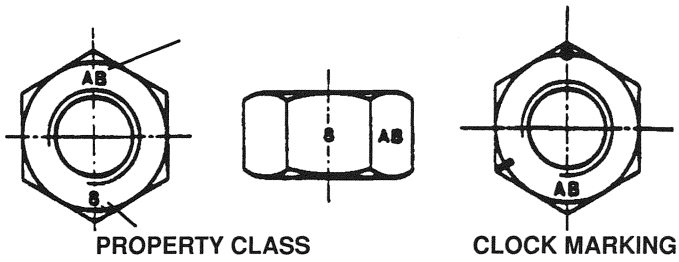
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	1.7 (15*)	2.2 (19*)	2.6 (23*)	3.4 (30*)	3.7 (33*)	4.8 (42*)	1.8 (16*)
M6	5.8 (51*)	7.6 (67*)	8.9 (79*)	12 (102*)	13 (115*)	17 (150*)	6.3 (56*)
M8	14 (124*)	18 (159*)	22 (195*)	28 (248*)	31 (274*)	40 (354*)	15 (133*)
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	30 (22)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	53 (39)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	131 (97)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	265 (195)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	458 (338)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



MINIMUM HARDWARE TIGHTENING TORQUES

IN NEWTON-METERS - N·m (FOOT POUNDS - FT. LB.) FOR NORMAL ASSEMBLY APPLICATIONS

INCH HARDWARE AND LOCKNUTS

NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	6.2 (55*)	8.1 (72*)	9.7 (86*)	13 (112*)	14 (121*)	18 (157*)	6.9 (61*)	9.8 (86*)	1/4
5/16	13 (115*)	17 (149*)	20 (178*)	26 (229*)	28 (250*)	37 (324*)	14 (125*)	20 (176*)	5/16
3/8	23 (17)	30 (22)	35 (26)	46 (34)	50 (37)	65 (48)	26 (19)	35 (26)	3/8
7/16	37 (27)	47 (35)	57 (42)	73 (54)	80 (59)	104 (77)	41 (30)	57 (42)	7/16
1/2	57 (42)	73 (54)	87 (64)	113 (83)	123 (91)	159 (117)	61 (45)	88 (64)	1/2
9/16	81 (60)	104 (77)	125 (92)	163 (120)	176 (130)	229 (169)	88 (65)	125 (92)	9/16
5/8	112 (83)	145 (107)	174 (128)	224 (165)	244 (180)	316 (233)	122 (90)	172 (127)	5/8
3/4	198 (146)	256 (189)	306 (226)	397 (293)	432 (319)	560 (413)	217 (160)	306 (226)	3/4
7/8	193 (142)	248 (183)	495 (365)	641 (473)	698 (515)	904 (667)	350 (258)	494 (364)	7/8
1	289 (213)	373 (275)	742 (547)	960 (708)	1048 (773)	1356 (1000)	523 (386)	739 (545)	1

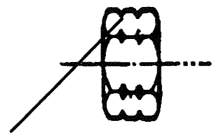
NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
CAP SCREWS AND CARRIAGE BOLTS

SAE GRADE 2 | SAE GRADE 5 | SAE GRADE 8

REGULAR NUTS | SAE GRADE 5 HEX NUTS | SAE GRADE 8 HEX NUTS

LOCKNUTS



GRADE IDENTIFICATION

GRADE A NO NOTCHES

GRADE B ONE CIRCUMFERENTIAL NOTCH

GRADE C TWO CIRCUMFERENTIAL NOTCHES

GRADE IDENTIFICATION

GRADE A NO MARKS

GRADE B THREE MARKS

GRADE C SIX MARKS

MARKS NEED NOT BE LOCATED AT CORNERS

GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C

GRADE IDENTIFICATION

Chapter 2 - Data and Tooling

The following data is for general guidance. Where specific data or dimensions are required and not quoted in this section, refer to the section in the Repair Manual relating to the component under repair.

ENGINE DATA

Type Diesel		New Holland Model 450T/PD
Output		108 hp / 80.5 kw (ISO TR 14936) 106.2 hp / 79.2 kw (ECE80/1269)
No. of cylinders		4
Bore	in.	4.4
	(mm)	(111.8)
Stroke	in.	5.0
	(mm)	(127.0)
Displacement	in^3	304
	(cm^3)	(4987)
Compression Ratio		17.5:1
Firing Order		1.3.4.2
Idle Speed	rev/min	600 - 805
Maximum 'No-Load' Speed	rev/min	2350 - 2400
Engine Speed at Maximum Torque	rev/min	1400
Rated Speed	rev/min	2100
Tappet Clearance (cold) Intake		0.36 - 0.46 mm (0.014 - 0.018 in)
Exhaust		0.43 - 0.53 mm (0.017 - 0.021 in)

COOLING SYSTEM

Type		Pressurized Full Flow By-pass with Expansion Chamber
System capacity		24 Liters (Coolant 12 L Water 12 L)
Fan Belt Deflection:		10 - 16 mm (0.38 - 0.62 in)
Drive Belt Deflection Air Con Compressor		10 mm
Thermostat: Start to	Open at	82°C (180°F)
	Fully Open at	95°C (203°F)
Radiator Cap		0.90 bar (13 lb in^2)

FUEL SYSTEM

Fuel	Diesel
Fuel Tank capacity	106 Liters
Injection Pump Type	Rotary
Cold Start Device	Thermostart
Excess Fuel Device	Automatic Governor
Fuel Shut Off	Solenoid
Lift Pump	Electric

TRANSMISSION

Make/Model	Clark-Hurth-T16000
Power Shift	4X2= 4 Forward and 2 Reverse Gears
Transmission Oil Capacity	18 Liters
Direction of output	Clockwise
Torque Convertor Ratio	2.31:1

ELECTRICAL SYSTEM

Alternator	70 amp (Magneti, Marelli A127-70)
Battery Type	12 volt Negative Ground 95 amp hr (12v/960 CCA) SAE
Battery Disconnect via the Isolator Switch	on Negative / chassis cable
Regulator	Transistorized
Ground (Earth)	Negative
Starting Motor	Positive Engagement, Solenoid Operated (3.1 kw)
Headlight Bulb	55/60W H4 Halogen
Stop/Tail Light Bulb	5/21W Bayonet Cap
Interior Light Bulb	10W Festoon and 10W Bayonet Cap
Flasher Light Bulb	21W Bayonet Cap
Work Light Bulbs	55W H3 Halogen
Instrument/Warning Light Bulbs	1.2W Capless
Rocker Switch Bulbs	1.2W Capless

BRAKES

Type	Wet Multi-Discs 3+3 per Axle
Brake Disc Diameter	223 mm (8.7 in) 6 off
Parking Type	Single Disc on Driveline
Parking Brake Disc Diameter	230 mm (9.0 in)

STEERING

Make/Model	Danfoss/OSP 160LS	
Power Steering Type	Hydrostatic	
Turns Lock to Lock		
FWD Left	3.5	
Right	3.45	
Pump Type	Gear	
System Pressure	175 bar (2537.5 lb in^2)	
Front Wheel Toe-in	0 - 6 mm (0 - 0.24 in)	
Turning Circle Measured outside of wheel	2 Wheel Steer = 12m	All Wheel Steer = 8m
Turning Circle Measured corner of loader bucket	2 Wheel Steer = 17.2m	All Wheel Steer = 10.5m

AXLE TYPE

Make	Carraro
Front Axle	Type 26.25 - Ratio 18.46:1
Front Axle Hub Reduction Ration	6.923:1
Front Axle Static Loading	25000 kg
Rear Axle	Type 26.25 - Ratio 18.46:1
Rear Axle Hub Reduction Ration	6.923:1
Rear Axle Static Loading	15210 kg

HYDRAULIC SYSTEM

Pump, Make/Model	Ultra 2PT037-033
Hydraulic Tank Capacity	106 Liters (28 gals)
Hydraulic System Capacity	137 Liters (36 gals)
Hydraulic System Open Center	Pressure 210 bar (3049 lbs/in^2)
Hydraulic Pump Capacity	147 Liters/min

TORQUES

		N·m	ft. lb.
Front and Rear Wheel Nuts		800	590
Backhoe Attaching Bolts		970	715
Cab/ROPS Attaching Bolts		380	280
Turbocharger - Oil Inlet Pipe		20	15
- Oil Outlet Pipe		34	25
Hydraulic Hoses/Tubes/ ORS Connections			
Thread Size:	$^{9}/_{16}$ - 18	13.5 - 16.5	10 - 12
	$^{11}/_{16}$ - 16	23 - 28	17 - 20
	$^{13}/_{16}$ - 16	45 - 53	32 - 39
	1 - 14	62 - 77	46 - 57
	$1^{3}/_{16}$ - 12	86 - 107	63 - 79
	$1^{7}/_{16}$ - 12	125 - 142	93 - 105
	$1^{11}/_{16}$ - 12	169 - 190	125 - 140
	2 - 12	203 - 246	150 - 182

FOUR WHEEL DRIVE TIRE COMBINATIONS

The tires fitted to your machine with four wheel drive have been carefully selected to match the gearing of the transmission and axles. When renewing worn or damaged tires, always install tires of the same make, model and size as those removed. The installation of other tire combinations may result in excessive tire wear, loss of usable power or severe damage to drive line components. If in doubt, consult your Dealer.

WHEEL PRESSURES AND PERMISSIBLE LOADS

The following charts give the carry capacity of the axle at the tire pressures indicated.

These charts are for guidance only. For exact information regarding inflation pressures and loads for your particular tires.

Tire size	Inflation Pressures in bar														
	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6
	Permissible Load Capacity Per Axle (kg)														
16.9 - 24-R4	1650	1775	2020	2130	2240	2445	2550	2650	2735	2820	2905	2990	3080	3165	3250
16.9 - 28-R4	1760	1895	2155	2775	2390	2610	2720	2830	2920	3005	3095	3190	3280	3370	3465

Tire size	Inflation Pressures in ft. lb./in2														
	14.5	16.0	18.9	20.3	21.8	24.7	26.1	27.6	29.0	30.5	31.9	33.4	34.8	36.3	37.7
	Permissible Load Capacity Per Axle (lbs)														
16.9 - 24-R4	3630	3905	4444	4686	4849	5379	5610	5830	6017	6204	6391	6578	6776	6963	7150
16.9 - 28-R4	3872	4169	4741	6105	5258	5742	5984	6226	6424	6611	6809	7018	7216	7414	7623

FRONT WEIGHTS

Chin Weight	180 kg.	396 lb.

RADIATOR COOLANTS

Coolant should be changed every 1200 hours or 24 months.

NOTE: *In order to reduce deposits and corrosion, water in the cooling system should not exceed the following limits:*

Total hardness	*Chloride*	*Sulphates*
300 parts per million	*100 parts per million*	*100 parts per million*

ROAD SPEEDS

The following table shows the approximate ground speeds in km/h and miles/h at rated engine speed (2070 rev/min). The ground speed at any other engine speed may be derived from the tables by using a simple calculation.

Example:

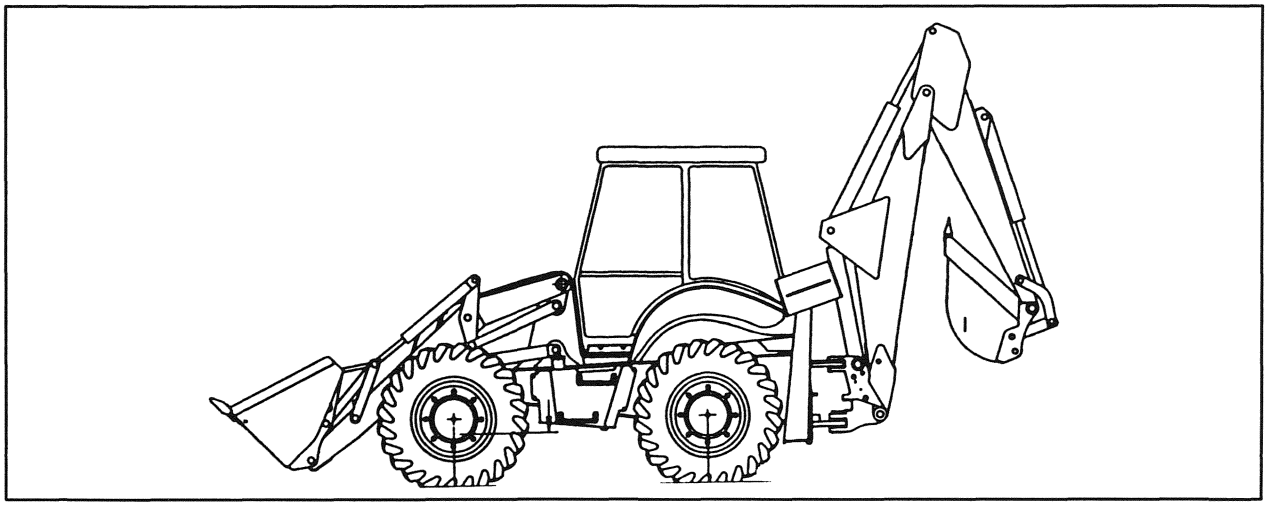
Ground speed required at 1500 rev/min. in 3rd gear ratio, forward travel, on a machine equipped with 16.9 - 24 Industrial Sure Grip tires.

From the appropriate table the ground speed at 2200 rev/min. is found to be 35.2 km/h (22 miles/h).

Engine speed 1500 rev/min $35.2 \div 2200 \times 1500 = 24$ km/h (15 miles/h).

Gear Selection		Tire size 16.9 x 24		Tire size 16.9 x 28	
		Km/h	m/hr	Km/h	m/hr
1st	Forward	5.7	3.6	6.2	3.9
2nd	Forward	10.6	6.625	11.6	7.25
3rd	Forward	20.7	12.94	22.6	14.1
4th	Forward	35.2	22	38.9	24.3
1st	Reverse	6.7	4.18	7.3	4.56
2nd	Reverse	12.6	7.87	13.7	8.56

WEIGHT OF MACHINES AND ATTACHMENTS



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IMPORTANT: *The information shown is for general guidance when estimating machine weight. To determine an accurate weight of your machine it will be necessary to place your machine onto an official scale.*

Operating Weight (Per SAE J49)

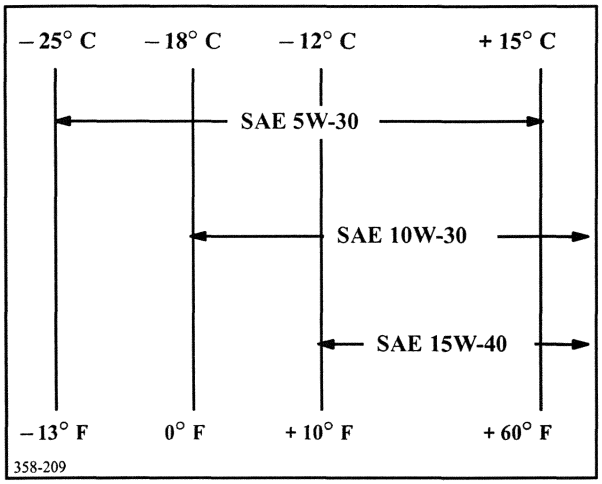
Model LB115: Base weight = 7600 kg (16755 lbs.)

Base unit includes 1.49 cu. yd. loader bucket, 24″ HD Hi Capacity backhoe bucket, cab, power shift transmission, long dipstick, 175 lb. Operator, full fuel tank, 16.9 x 24 front and rear tires.

Options/Attachments	Weight	Add/Subtract
Multi-purpose 4 x 1 bucket	630 kg (1389 lbs)	+204 kg (449.7 lbs)
Multi-purpose 6 x 1 bucket	786 kg (1733 lbs)	+360 kg (793.8 lbs)
1.49 cu yd bucket w/forks	600 kg (1314 lbs)	+174 kg (383.6 lbs)
HED (long)	417 kg (919.3 lbs)	+246 kg (542 lbs)
Front tires 16.9 x 28	150 kg (330 lbs)	+35 kg (77 lbs)
Rear tires 16.9 x 28	150 kg (330 lbs)	+35 kg (77 lbs)
12″ Hi Cap HD Bucket	132 kg (290 lbs)	–55 kg (121 lbs)
18″ Hi Cap HD Bucket	168 kg (371 lbs)	–19 kg (42 lbs)
24″ Hi Cap HD Bucket	187 kg (412 lbs)	- 0 -
30″ Hi Cap HD Bucket	217 kg (478 lbs)	+30 kg (66 lbs)
36″ Hi Cap HD Bucket	243 kg (537 lbs)	+56 kg (123 lbs)
18″ Severe Duty Bucket	179 kg (395 lbs)	–8 kg (18 lbs)
24″ Severe Duty Bucket	198 kg (438 lbs)	+11 kg (24 lbs)
Front chin weight	170 kg (375 lbs)	170 kg (375 lbs)

FUEL, LUBRICANTS AND COOLANTS

ENGINE



Engine oil must at minimum meet A.P.I. (American Petroleum Institute) engine service classifications SH/SJ.

NOTE: *In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable, such as the use of SAE 5W in extreme cold temperatures or the use of SAE 50 in extreme high temperatures.*

The engine oil change period is shown in Section 4. Locally available fuel may have a high sulphur content, in which case the oil change period should be adjusted as follows:

Sulphur Content %	**Oil Change Period**
Below 0.5	Normal
0.5 - 1.0	Half the Normal
1.0 - 1.3	One-quarter Normal

The use of fuel with a sulphur content above 1.3% is not recommended.

APPLICATION AND RECOMMENDED FLUIDS	SPECIFICATION	QUANTITY
Engine -		
NH Super Premium 15W-40	API CG-4/SH/SJ	17 liters (4.5 gals)
NH Super Premium 10W-30	API CG-4/SH/SJ	(including filter)
Fuel -		
Diesel Fuel	–6°C (20°F) and above - No. 2 Diesel Fuel Cetane - 45 (min.) –6°C (20°F) and below - No. 1 Diesel Fuel Cetane - 50 (min.)	106 liters (28 gals)
Transmission Power Shuttle -		
2WD -		
NH 134D Hydraulic Oil	Use of NH F200 recommended in extreme cold temperatures, below –18°C (0°F).	17 liters (4.5 gals)
NH F200 Hydraulic Oil		
4WD -		18 liters (4.75 gals)
NH 134D Hydraulic Oil		
NH F200 Hydraulic Oil		
Transmission Power Shift -		18 liters (4.75 gals)
Automatic Transmission Fluid	Ford Mercon GM Dextron II	

APPLICATION AND RECOMMENDED FLUIDS	SPECIFICATION	QUANTITY
Front/Rear Drive Axles - Axle, NH 134D Hydraulic Oil Per Hub, NH 134D Hydraulic Oil		5.5 liters (5.8 qts) 6.5 liters (1.7 gals) 0.9 liters (1 qt.)
Backhoe/Loader Hydraulic - NH 134D Hydraulic Oil NH F200 Hydraulic Oil	Use of NH F200 recommended in extreme cold temperatures, below –18°C (0°F).	106 liters (28 gals) Tank 137 liters (36 gals) System
Engine Coolant - Water/Antifreeze	SCA Conditioner - 5% Water 45% Ethylene Glycol - 50%	24 liters (6.3 gals)
Brakes - Brake Fluid - DOT4	NHTSA116 - DOT4	0.9 liters (1 qt.)
Grease Fittings/Bearings - NH Super Premium M.P. Lithium NH High Temp M.P. Lithium	NLGI 2 NLGI 2	As Required
Extendible Dipper Stick - Dry Lubricant	Dow-Corning Moly Coat	As Required
AC Compressor - NH SP20DS Oil	PAG Oil	As Required

TOOL LISTING AND APPLICATIONS

GENERAL Tools (*= New Tool)	**Application**
1. Multi Meter (Fig. 8)	General Electrics
2. Internal Micrometer (Fig. 9)	Engine Bores, General
3. Dial Indicator Eccentricity checking (Fig. 10)	Valve Seats, General
4. Pressure Tester (Fig. 11)	Fuel Injectors
5. Dial Indicator Concentricity, End Floats (Fig. 12)	Crankshaft Seals, General
6. Internal Bore Gauge (Fig. 13)	Valve Guides, General
7. Bearing Heater (Fig. 14)	Bearing Fitting, General
8. Pressure Test Hand Pump * (Fig. 15)	Hydraulics General 206 bar (3000 lbs in^2) capability
9. 3 Legged Puller (Fig. 16)	General
10. Spring Compressor (Fig. 17)	Valve Springs
11. Square (Fig. 18)	Valve Springs
12. Bearing Puller (Fig. 19)	General
13. Piston Ring Remover (Fig. 20)	Pistons
14. Puller (Fig. 21)	General
15. Splitting Kit (Fig. 22)	Machine Disassembly

ENGINE

AVAILABLE Tools (*= New Tools)	**Number**	**Application**
16. Bush Installer (Fig. 23)	FNH 01255	Camshaft Bush Removal / Installation
17. Step Plates, Seal Installation (Fig. 24) (old) (new)	 FT 630S T.B.A	 Front Cover Seal Installer, General
18. Lifting Bracket * (Fig. 25)	NH 10 001	Engine with Transmission Attached
19. Seal Installer (Fig. 26)	NH 01301	Engine Rear Cover Seal
20. Timing tool (Fig. 27)	OTC-NH01341 OTC-NH01342	C.A.V Injection Pump Timing

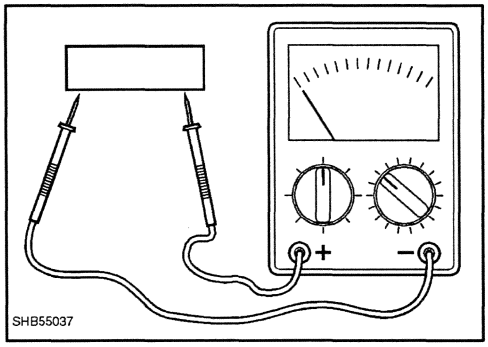
HYDRAULICS

21. Pressure Test Gauge (Fig. 28)		x2 - 250 bar (3626lb/in^2) Hydraulic System / Steering x2 - 20 bar (290lb/in^2) Transmission / Four Wheel Drive
22. Quick Release Fitting * (Fig. 29)	FNH 00535	Steering and Hydraulic Relief Valve Testing
23. Peg Wrench (Fig. 30)	FNH 02605	Lift and Crowd Cylinders Disassembly Bucket and Swing Cylinders Disassembly Stabilizers (Center Pivot)
24. 'C' Wrench (Fig. 31)	FT 8554 FT 8554 FT 8553	Hydraulic Extendible Dipperstick Stabilizers (Sideshift) Bucket Cylinder

TRANSMISSION

AVAILABLE Tools (*= New Tool)	**Number**	**Application**
25. Locking Tool * (Fig. 32)	NH 01259	Holds output couplings solid to remove attaching nut
26. 60 mm Thin wall socket * (Fig. 33)	OTC 1902	Remove output couplings attaching nut
27. Compression Tool * (Fig. 34)	NH 01251	Transmission Clutch Packs
28. Pressure Gauge Adapter*(Fig. 35)	NH 01272	Torque Convertor Pressure Test
29. Pressure Gauge Adapter*(Fig. 36)	NH 01271	General Gauge Testing
30. Pressure Gauge (Fig. 37)		20 bar (290 lbs/in^2) general

General Tools



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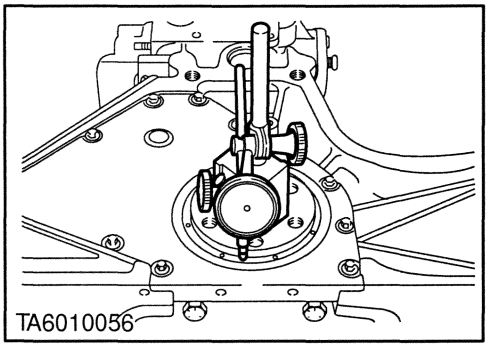

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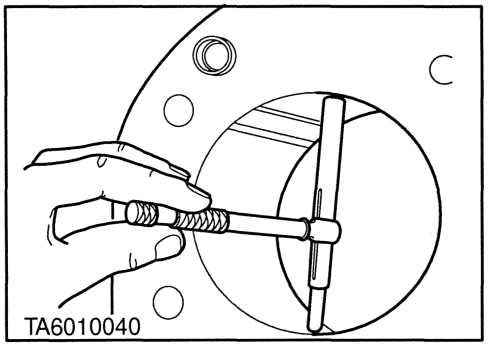

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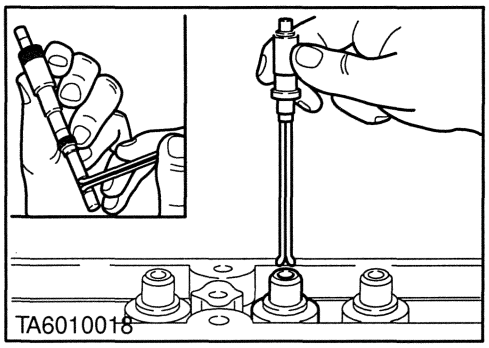

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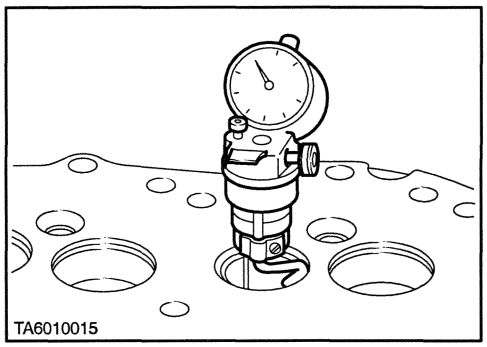

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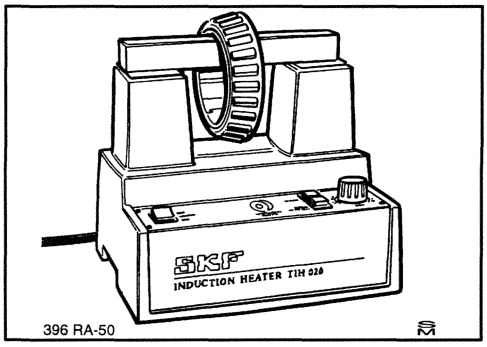

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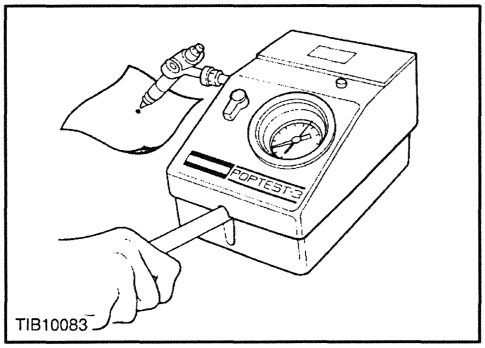

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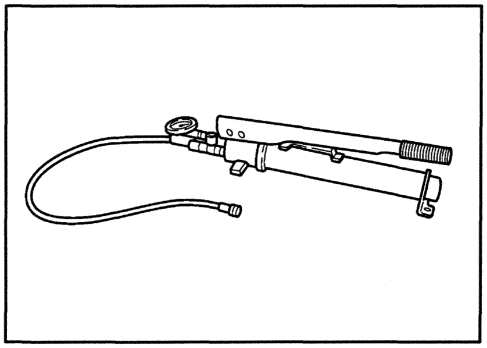

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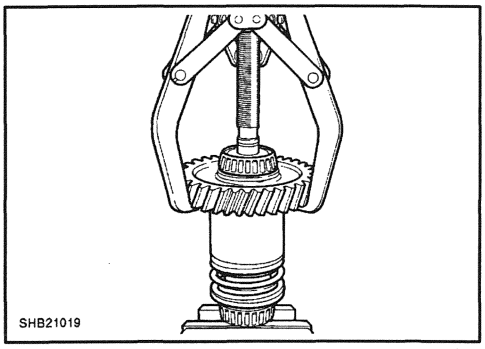
General Tools



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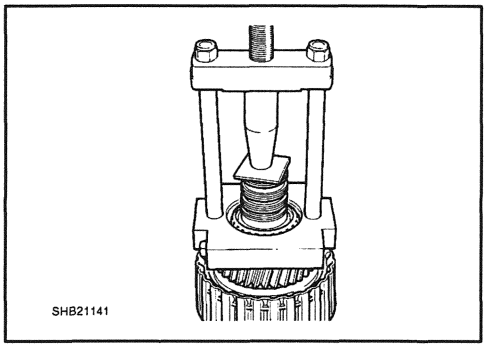

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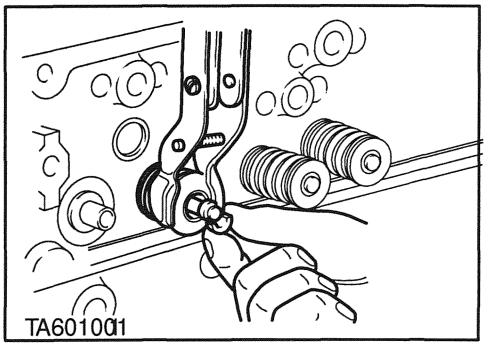

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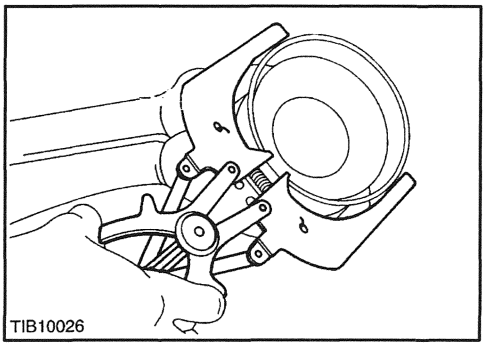

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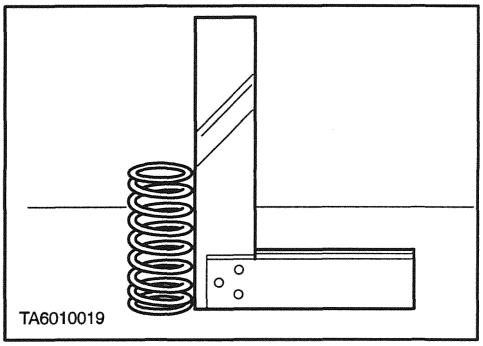

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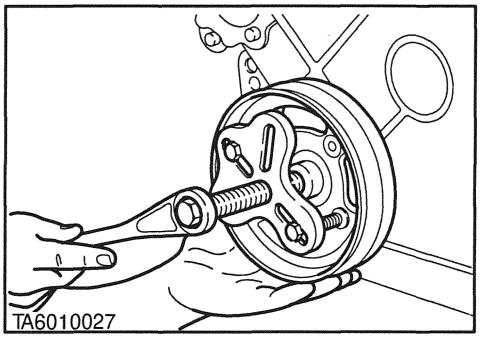

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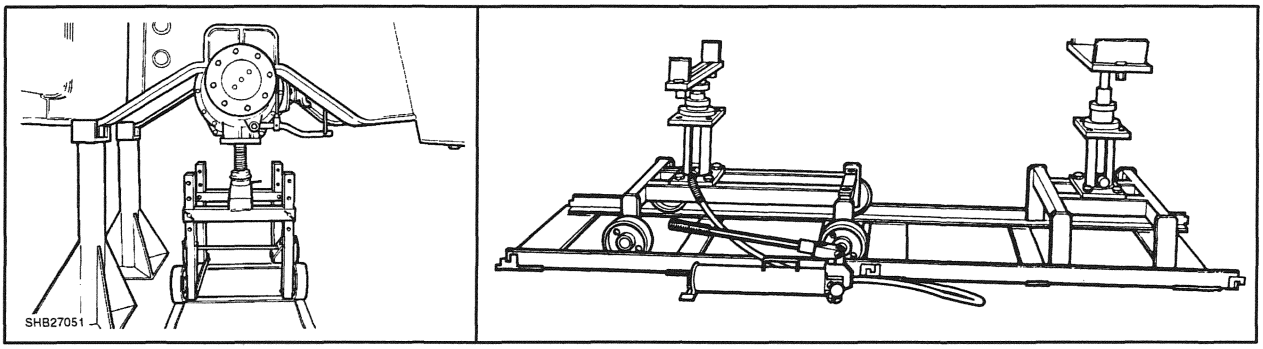

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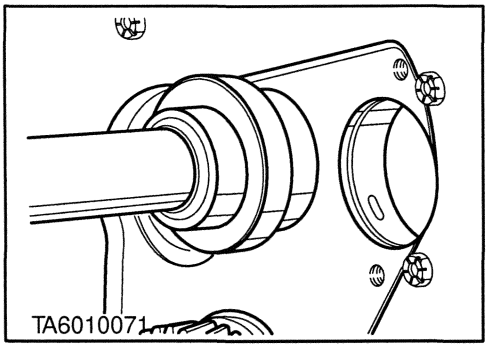
Available Tools



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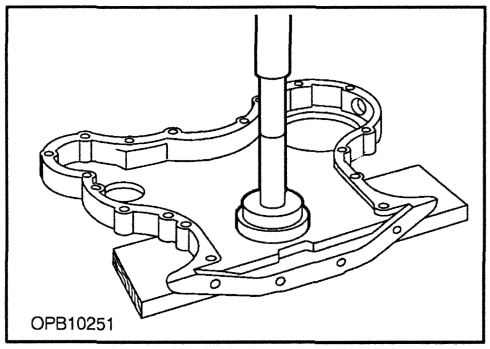
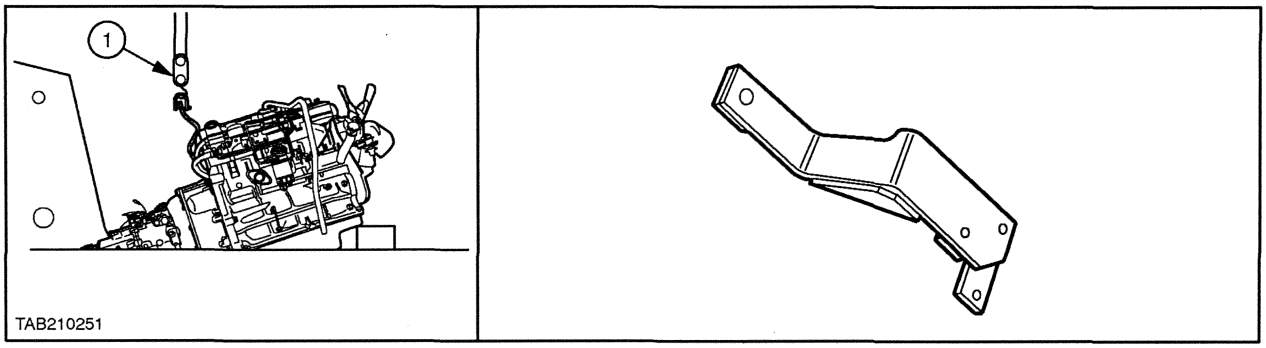
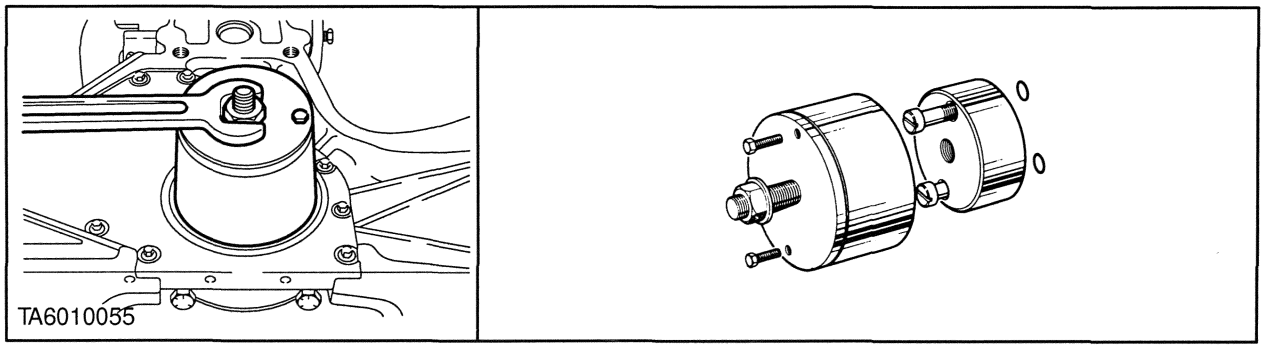


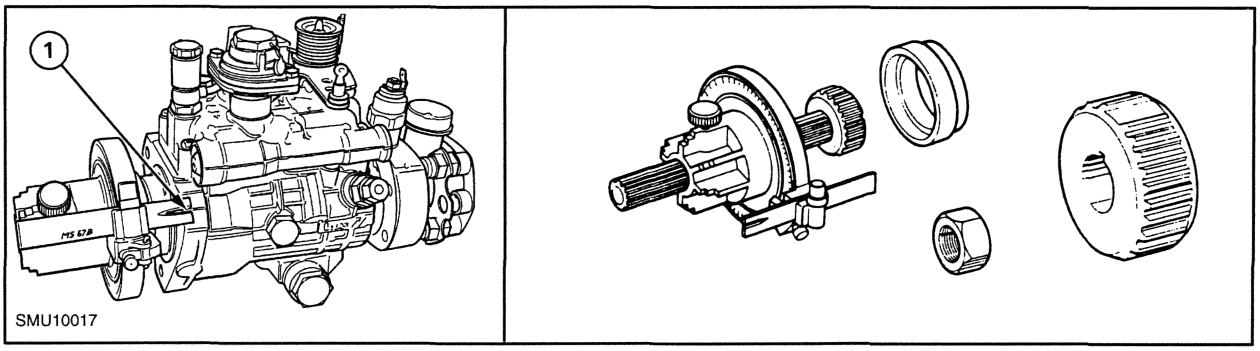
Tool No - FT 630S V.L Churchill 24



Tool No - NH 01250 25

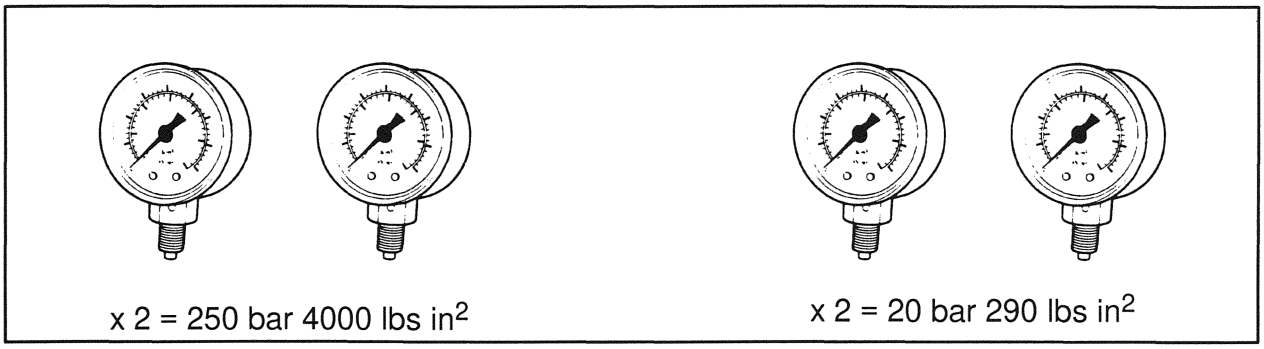


Tool No - NH 01301 26



Tool No - NH 01341, NH 01342 27

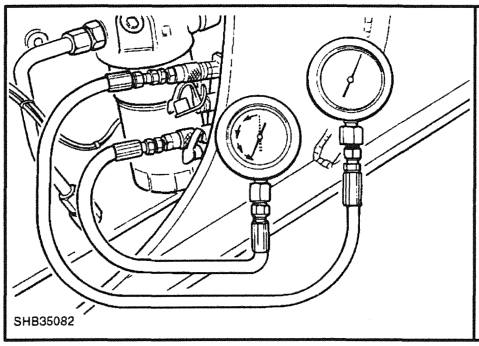
Available Tools

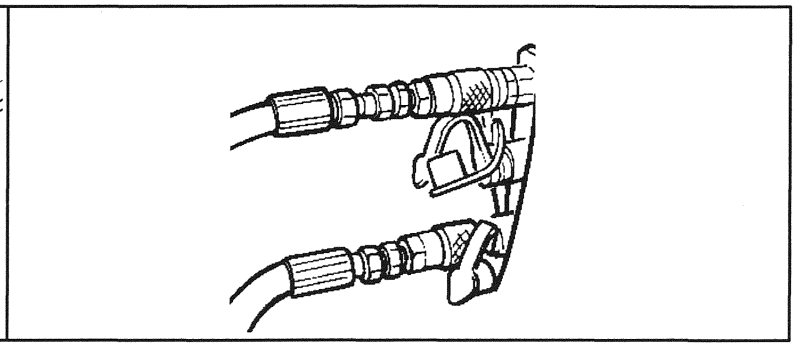


x 2 = 250 bar 4000 lbs in^2

x 2 = 20 bar 290 lbs in^2

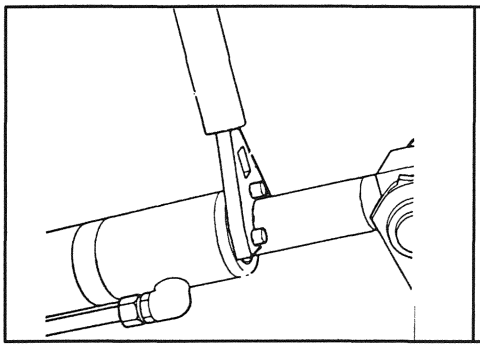
28

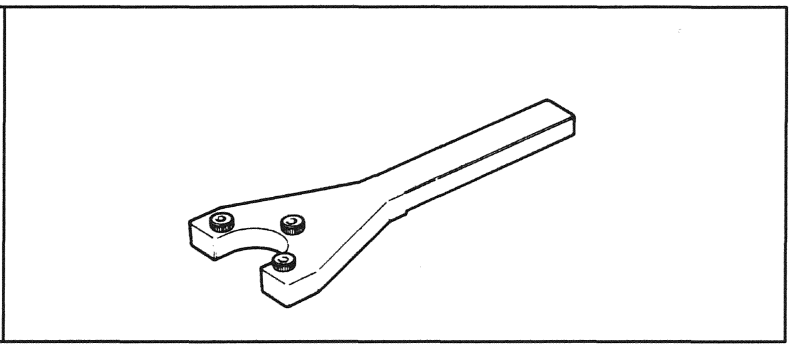




Tool No - FNH - 00535

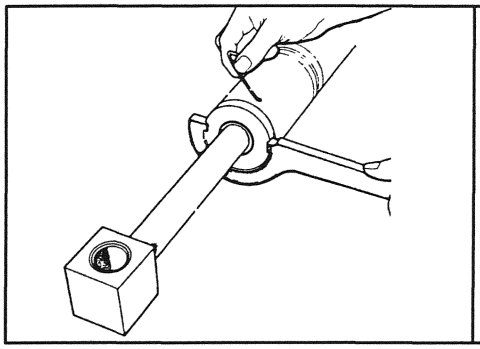
29

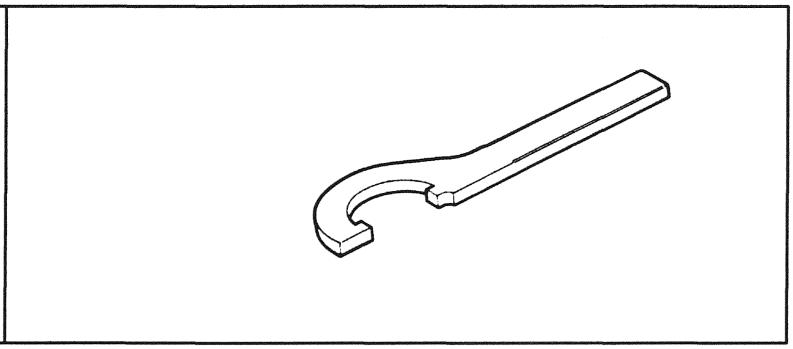




Tool No - FNH 02605

30

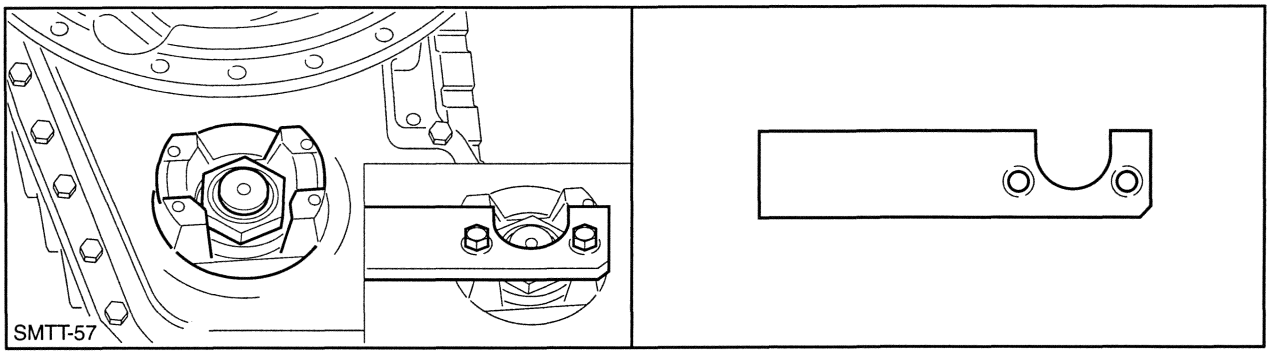




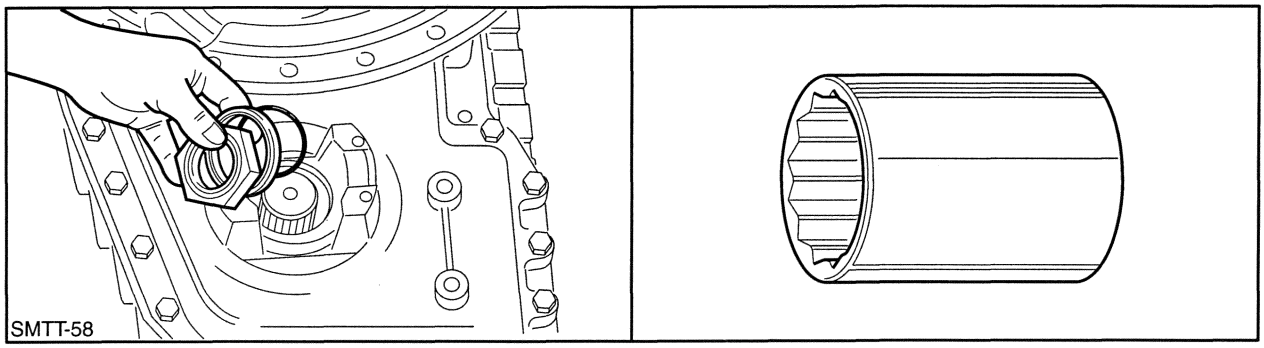
Tool No - FT8554, FT8553

31

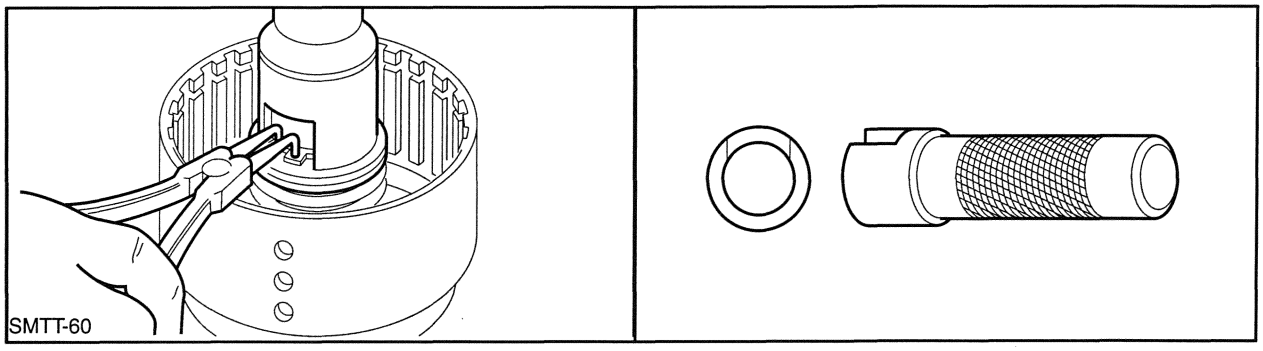
Available Tools



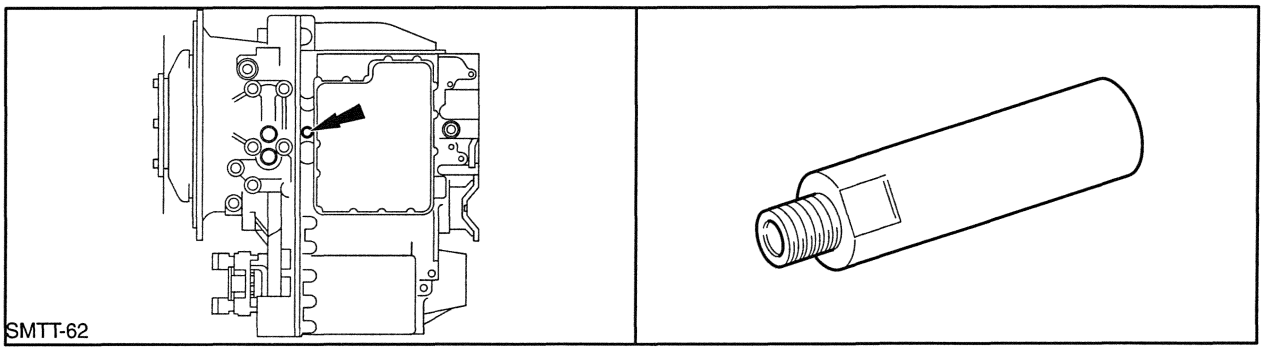
Tool No - NH 01259 32



Tool No - OTC 1902 33



Tool No - NH 01251 34



Tool No - NH 01272 (90°) 35