

SERVICE MANUAL

Boomer™ 20 / Boomer™ 25 Compact Tractor

Part number 48017684

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SERVICE MANUAL

Boomer™ 20
Boomer™ 25

Link Product / Engine

Product	Market Product	Engine
Boomer™ 20	Europe	S3L2
Boomer™ 25	Europe	S3L2

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INTRODUCTION

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Foreword

This repair manual provides the technical information needed to properly service the NEW HOLLAND models Boomer 20 and 25 tractors. Use this manual in conjunction with the operator's manual for complete operation, adjustment, and maintenance information

On NEW HOLLAND equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

Foreword - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your NEW HOLLAND Sales and Service Networks.

Safety rules

Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules - Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may 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 you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- The air-conditioning system contains gases that should not be released into the atmosphere. Consult an air-conditioning specialist or use a special extractor to recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. NEW HOLLAND strongly recommends that you return all used batteries to a NEW HOLLAND dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



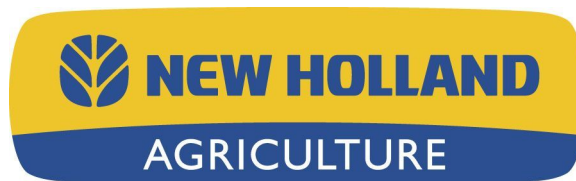
Mandatory battery recycling

NOTE: The following requirements are mandatory in Brazil.

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling



SERVICE MANUAL

Engine

Boomer™ 20

Boomer™ 25

Engine - General specification

Engine Model	S3L , S3L2
Type	Water cooled, 4-stroke cycle diesel
No. of cylinders	3
Combustion type	Swirl chamber
Valve mechanism	Overhead valve type
Cylinder bore x stroke	78 mm x 92 mm (3.07 in x 3.62 in)
Total displacement	1.3 l (79 in³)
Compression ratio	22:1
Fuel used	JIS K2204, Diesel fuel or its equivalent (ASTM diesel fuel oil No. 2-D)
Firing order	1 - 3 - 2
Direction of rotation	Counterclockwise as viewed from flywheel side
Length	512 mm (20.2 in)
Width	453 mm (17.8 in)
Height	563 mm (22.2 in)
Dry weight	Approximately 140 kg (309 lb)

Inspection point	Nominal	Standard	Limit	Remark
Maximum rotation speed (rated rotation speed used as reference)	Varies depending on specification of destination			
Minimum rotation speed	Varies depending on specification of destination			
Compression ratio @ 290 RPM		29 bar (421 psi) or above	26 bar (377 psi) or less	When oil and water temperatures at 20 - 30 °C (68 - 86 °F)
Valve timing Intake - Open - Close Exhaust - Open - Close		BTDC 15 ° ABDC 41 ° BBDC 54 ° ATDC 10 °		With 2 mm (0.079 in) clearance on valve side, when cold. Values are only for checking valve timing and are different from the actual ones.
Rocker arm Rocker arm inside diameter Rocker shaft outside diameter Clearance between rocker arm and rocker shaft (oil clearance)	18.9 mm (0.744 in) 18.9 mm (0.744 in)	18.910 - 18.930 mm (0.7445 - 0.7453 in) 18.880 - 18.930 mm (0.7433 - 0.7453 in) 0.012 - 0.050 mm (0.0005 - 0.0020 in)	0.200 mm (0.0079 in)	Replace rocker arm
Valve Valve stem outside diameter - Intake - Exhaust Valve guide inside diameter - Intake - Exhaust Clearance between valve guide and valve stem	6.6 mm (0.260 in) 6.6 mm (0.260 in) 6.6 mm (0.260 in) 6.6 mm (0.260 in)	6.565 - 6.580 mm (0.2585 - 0.2591 in) 6.530 - 6.550 mm (0.2571 - 0.2579 in) 6.600 - 6.615 mm (0.2598 - 0.2604 in) 6.600 - 6.615 mm (0.2598 - 0.2604 in)	6.500 mm (0.2559 in) 6.500 mm (0.2559 in)	

Inspection point	Nominal	Standard	Limit	Remark
- Intake		0.020 - 0.050 mm (0.0008 - 0.0020 in)	0.100 mm (0.0039 in)	Replace valve and valve guide
- Exhaust		0.050 - 0.085 mm (0.0020 - 0.0033 in)	0.150 mm (0.0059 in)	
Valve seat angle	45 °			
Valve sinkage	0 mm (0.00 in)	0.25 - 0.75 mm (0.0098 - 0.0295 in)	1.50 mm (0.0591 in)	
Valve head width	1.6 mm (0.063 in)	1.30 - 1.80 mm (0.0512 - 0.0709 in)	2.50 mm (0.0984 in)	
Valve margin	1.5 mm (0.059 in)	1.35 - 1.65 mm (0.0531 - 0.0650 in)	0.50 mm (0.0197 in)	
Valve guide mounting length	10 mm (0.39 in)	9.5 - 10.5 mm (0.374 - 0.413 in)		
Valve spring				
Free length		47 mm (1.85 in)	46 mm (1.81 in)	
Length @ 131 - 145 N (29 - 33 lb)		39.0 mm (1.535 in)	-15 %	
Length @ 279 - 309 N (63 - 69 lb)		30.1 mm (1.185 in)	-15 %	
Push rod runout		0.3 mm (0.012 in)		Replace
Cylinder head distortion		0.05 mm (0.0020 in)	0.10 mm (0.0039 in)	
Cylinder				
Cylinder block distortion (Deck)		0.05 mm (0.0020 in) or less	0.10 mm (0.0039 in)	Repair
Inside diameter	78 mm (3.071 in)	78 mm (3.071 in)	78.2 mm (3.079 in)	Repair to oversize or replace
Cylindricity		0.01 mm (0.0004 in) or less		
Piston				
Outside diameter				
- STD	78.00 mm (3.0709 in)	77.93 - 77.95 mm (3.0681 - 3.0689 in)	77.80 mm (3.0630 in)	
- 0.25 mm (0.010 in) OS	78.25 mm (3.0807 in)	78.18 - 78.20 mm (3.0780 - 3.0787 in)	78.05 mm (3.0728 in)	
- 0.50 mm (0.020 in) OS	78.50 mm (3.0906 in)	78.43 - 78.45 mm (3.0878 - 3.0886 in)	78.30 mm (3.0827 in)	
Weight difference within an engine		+ / - 5 g (0.18 oz) or less		
Piston pin outside diameter	23 mm (0.91 in)	22.994 - 23.000 mm (0.9053 - 0.9055 in)		
Clearance between piston pin bore and piston pin		0.006 - 0.018 mm (0.0002 - 0.0007 in)	0.050 mm (0.0020 in)	
Clearance between piston and cylinder		0.035 - 0.086 mm (0.0014 - 0.0034 in)	0.300 mm (0.0118 in)	Repair to oversize or replace

Inspection point	Nominal	Standard	Limit	Remark
Piston ring Clearance between the piston ring and ring groove - Top compression ring - Intermediate ring - Oil ring Piston ring end gap - Top compression ring - Intermediate ring - Oil ring		0.09 - 0.11 mm (0.0035 - 0.0043 in) 0.07 - 0.11 mm (0.0028 - 0.0043 in) 0.03 - 0.07 mm (0.0012 - 0.0028 in) 0.15 - 0.30 mm (0.0059 - 0.0118 in) 0.15 - 0.30 mm (0.0059 - 0.0118 in) 0.20 - 0.40 mm (0.0079 - 0.0157 in)	0.30 mm (0.0118 in) 0.20 mm (0.0079 in) 0.20 mm (0.0079 in) 1.50 mm (0.0591 in) 1.50 mm (0.0591 in) 1.50 mm (0.0591 in)	Replace the rings until the limits are reached, then replace the piston. Replace the rings until the limits are reached, then replace the piston. Replace the rings until the limits are reached, then replace the piston. Replace Replace Replace
Connecting rod Bend and torsion (over a 100 mm (3.9 in) span) End play		0.05 mm (0.0020 in) or less 0.10 - 0.35 mm (0.0039 - 0.0138 in)	0.15 mm (0.0059 in) 0.50 mm (0.0197 in)	 Replace the connecting rod
Crankshaft Crank journal outside diameter Crank pin outside diameter Crankshaft runout Main bearing oil clearance Connecting rod bearings oil clearance End play	52 mm (2.05 in) 48 mm (1.89 in)	51.985 - 52.000 mm (2.0467 - 2.0472 in) 47.950 - 47.965 mm (1.8878 - 1.8884 in) 0.025 mm (0.0010 in) or less 0.030 - 0.077 mm (0.0012 - 0.0030 in) 0.025 - 0.072 mm (0.0010 - 0.0028 in) 0.050 - 0.175 mm (0.0020 - 0.0069 in)	 0.050 mm (0.0020 in) 0.100 mm (0.0039 in) 0.150 mm (0.0059 in) 0.500 mm (0.0197 in)	 Repair or replace Replace main bearing Replace connecting rod bearings Replace flanged No. 3 main bearing
Timing gear backlash Between crankshaft gear and idler gear Between idler gear and valve camshaft gear Between idler gear and pump camshaft gear		0.04 - 0.12 mm (0.0016 - 0.0047 in) 0.04 - 0.12 mm (0.0016 - 0.0047 in) 0.04 - 0.12 mm (0.0016 - 0.0047 in)	0.30 mm (0.0118 in) 0.30 mm (0.0118 in) 0.30 mm (0.0118 in)	Replace Replace Replace



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Inspection point	Nominal	Standard	Limit	Remark
Between valve camshaft gear and PTO gear		0.08 - 0.19 mm (0.0031 - 0.0075 in)	0.30 mm (0.0118 in)	Replace
Between pump camshaft gear and oil pump gear		0.07 - 0.20 mm (0.0028 - 0.0079 in)	0.30 mm (0.0118 in)	Replace
Cam height		35.62 - 35.82 mm (1.4024 - 1.4102 in)	34.72 mm (1.3669 in)	Replace
Flywheel flatness		0.15 mm (0.0059 in) or less	0.50 mm (0.0197 in)	Repair
Clearance between tappet and cylinder block bore			0.15 mm (0.0059 in)	Replace tappet
Clearance between camshaft journal and bushing		0.05 - 0.125 mm (0.0020 - 0.0049 in)	0.15 mm (0.0059 in)	Replace
Clearance between idler gear bushing and idler shaft		0.02 - 0.07 mm (0.0008 - 0.0028 in)	0.20 mm (0.0079 in)	Replace idler gear or idler shaft

Engine - Torque

Description	Threads Diameter x pitch	Torque
Cylinder head bolt	M10 x 1.75	83 - 93 N·m (61 - 69 lb ft)
Rocker cover bolt	M8 x 1.25	10 - 13 N·m (7 - 10 lb ft)
Rocker shaft bracket bolt	M8 x 1.25	10 - 20 N·m (7 - 15 lb ft)
Rocker arm adjusting nut	M8 x 1.25	18 - 22 N·m (13 - 16 lb ft)
Tachometer L joint union nut	M22 x 1.5	17 - 23 N·m (13 - 17 lb ft)
Band type hose cramp	-	3 - 4 N·m (2 - 3 lb ft)
Thrust plate	M8 x 1.25	10 - 12 N·m (7 - 9 lb ft)
Main bearing cap bolt	M10 x 1.25	49 - 54 N·m (36 - 40 lb ft)
Connecting rod cap nut	M9 x 1.0	32 - 37 N·m (24 - 27 lb ft)
Flywheel bolt	M12 x 1.25	127 - 137 N·m (94 - 101 lb ft)
Crankshaft pulley nut	M18 x 1.5	147 - 196 N·m (108 - 145 lb ft)
Rear plate use mounting bolt		
- For general use	M12 x 1.25	54 - 74 N·m (40 - 55 lb ft)
- For tractor	M12 x 1.25	83 - 103 N·m (61 - 76 lb ft)

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