

# SERVICE MANUAL

## **B90B / B95B / B95BLR / B95BTC / B110B / B115B** Backhoe Loaders

Print No. 84428670B



**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:

**CNH AMERICA LLC**  
245 E North Avenue  
Carol Stream, IL 60188 U.S.A.

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**REFERENCES**

Beyond this Service Manual, also refer to the documents listed below:

- Operator's Manual
- Service Parts Catalogue

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**SERVICE MANUAL**

The Service Manual consists of two volumes:

- B90B - B95B - B95BLR - B95BTC - B110B - B115B  
Service Manual for "Loader backhoe"
- B90B - B95B - B95BLR - B95BTC - B110B - B115B  
Service Manual for "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 Service Manual which covers the loader backhoe models B90B - B95B - B95BLR - B95BTC - B110B - B115B consists of the following volumes, which can be identified by their print number as stated below:

VOLUME	MACHINE TYPE	PRINT NUMBER
Service Manual for "Loader backhoe"	B90B - B95B - B95BLR - B95BTC - B110B - B115B	84428670A1
Service Manual - "Engine"	B90B - B95B - B95BLR - B95BTC - B110B - B115B	87659057A

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## **PREVENT ACCIDENTS**

The majority of accidents and injuries which occur in the workshop, at the worksite 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 and / or technician is the best insurance against accidents.  
The careful observance of this single safety rule would be sufficient to prevent serious injuries:

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

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### **WARNING**

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Before carrying out any maintenance operation, adjustment and or repair on machines equipped with attachments, controlled hydraulically or mechanically, make sure that the attachment is lowered and safely set on the ground. If it is necessary to have the equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and /or mechanical device used for controlling the equipment.

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**CNH AMERICA LLC**  
245 E North Avenue  
Carol Stream, IL 60188 U.S.A.

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## LOADER BACKHOE MODELS

The complete range of Loader Backhoe models described in this manual are identified below:

	B90B	B95B B95BLR	B95BTC	B110B	B115B
Powershift	/	/	/	●	●
Powershuttle	●	●	●	●	/
Cab	●	●	●	●	●
Rops	●	●	●	/	/
2WD	●	●	/	/	/
4WD	●	●	●	●	●
4WS	/	/	/	/	●
“Pilot” backhoe attachment controls	●	●	●	●	●
Backhoe attachment mechanical controls	●	●	●	●	●
Engine Iveco 72 kW - 97 HP model F4GE9424C*601 (mechanical)	●	/	/	/	/
Engine Iveco 72 kW - 97 HP model F4HE0484G*J102 (electronic)	/	●	●	/	/
Engine Iveco 82 kW - 110 HP model F4HE9484C*J102 (electronic)	/	/	/	●	/
Engine Iveco 82 kW - 110 HP (4WS) model F4HE9484C*J103 (electronic)	/	/	/	/	●
Short dipper backhoe	●	●	●	/	/
Long dipper backhoe	/	●	●	●	●

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**B90B**

**B95B - B95BLR - B95BTC**

**B110B**

**B115B**



**SECTION 00 - SAFETY RULES**



## SAFETY INSTRUCTIONS

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### **WARNING**

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This warning symbol points out important messages involving your safety.

Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and to safeguard your safety and personal integrity.

In this manual you will find this symbol together with the following keywords:

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### **WARNING**

---

This symbol warns about the possibility of potential damages to the machine that can involve the operator's safety.

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### **WARNING**

---

With specific warnings about potential dangers for the operator's or other persons integrity directly or indirectly involved.

---

The non-compliance with the warnings preceded by the above-mentioned keywords (WARNING and DANGER) can cause serious accidents or even the death of the persons involved.

Moreover, in the present Manual, some instructions are given with text in italics, preceded by the words **NOTE** and **CAUTION**.

**NOTA:** *it emphasizes and underlines to the operator the correct technique or correct procedure to follow.*

---

### **WARNING**

---

This symbol warns about the possibility of potential damages to the machine that can involve the operator's safety.

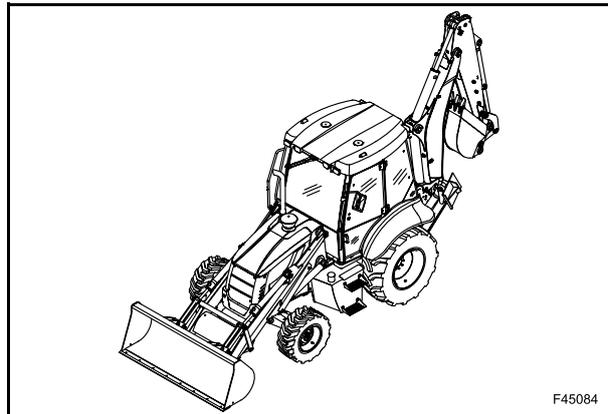
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## FOREWORD

Loader backhoes B90B - B95B - B95BLR - B95BTC - B110B - B115B have been designed to perform most earth-moving operations.

If you use this machine for duties involving the use of attachments, accessories, or special tools, consult your Dealer to make sure that the adaptations or modifications carried out are in conformity with the machine's technical specifications and with current regulations on safety.

Any modifications or adaptations which are not approved by the manufacturer may invalidate the machine's original conformity with safety requirements.



1

The machine must be used according to its intended use, respecting the safety and precautionary rules and strictly following the operating instructions. Any functional disorders, especially those affecting the safety of the machine, should therefore be rectified immediately.

———— **⚠ DANGER ⚠** ————

A different use of the excavator or of its working equipment:

- for lifting or transporting persons;
- as a working platform;
- for lifting loads without the attachment being approved for this purpose;
- for pulling loads;

is considered unintended use.

Unintended use may cause injury or life-threatening risks for the operator and for other persons.

The manufacturer/supplier cannot be held responsible for any damage resulting from unintended use. The risk involved in such misuse lies entirely with the user.

———— **⚠ DANGER ⚠** ————

It is absolutely forbidden to tamper with and/or change the setting of any of the hydraulic system valves to avoid damaging machine components, with a consequent risk for personal safety.

The current Operator's Manual is the user's guide for correct run-in, use and maintenance of the machine.

Carefully read this Operator's Manual and store it in the cab for quick location and reference.

Instructions concerning safety, operation and maintenance have been developed to permit safe service and operation of this machine.

In the event of queries or suggestions relevant to your machine do not hesitate to address to your Dealer. Dealers have qualified and trained personnel at disposal as well as Original Spares, means and equipment suitable to carry out all necessary maintenance.

Do not use this machine for any applications or purposes other than those described in this manual. If you use this machine for duties involving the use of attachments, accessories, or special tools, consult your Dealer to make sure that the adaptations or modifications carried out are in conformity with the machine's technical specifications and with current regulations on safety.

Any modifications or adaptations which are not approved by the manufacturer may invalidate the machine's original conformity with safety requirements.

**IMPORTANT:** *the engine and fuel system on your machine are designed and built to government emissions standards. Tampering by dealers, customers, operators and users is strictly prohibited by law. Failure to comply with this prohibition could result in government fines, rework charges, invalid warranty, legal action and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be carried out by a certified technician only.*

**NOTA:** *each machine is supplied complete with a copy of this Manual. Descriptions and illustrations provided herein are not binding. The Manufacturer, provided that the basic characteristics of machine types described and shown in this Manual remain the same, reserves the right to change components, parts and accessories supplied without any commitment to timely update this publication; and this any time it deems it convenient for improvement purposes or due to commercial or manufacturing requirements. For exact information, please consult your Dealer or contact the Manufacturer's Branch Offices, who remain at your disposal for further help.*

## SPARE PARTS

The "non-genuine" spare parts have not been checked and authorized by the Manufacturer. The assembly and/or use of such products may have negative effects on the machine design features and could impair its operation safety. The Manufacturer is not liable for any damage caused by "non-genuine" spare parts or accessories.

## WARRANTY

This machine is under warranty according to the regulations in force in Your Country and in compliance with the sales agreement drawn up with the Dealer. The warranty, however, expires if the operation and maintenance instruction for this machine and contained in this manual, have not been followed.

## SAFETY INSTRUCTIONS

Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and to safeguard your safety and personal integrity.

Your safety and that of the people around you depends on you.

It is essential that you understand this manual for a correct inspection, lubrication and repair of this machine.

Read this manual carefully and check that:

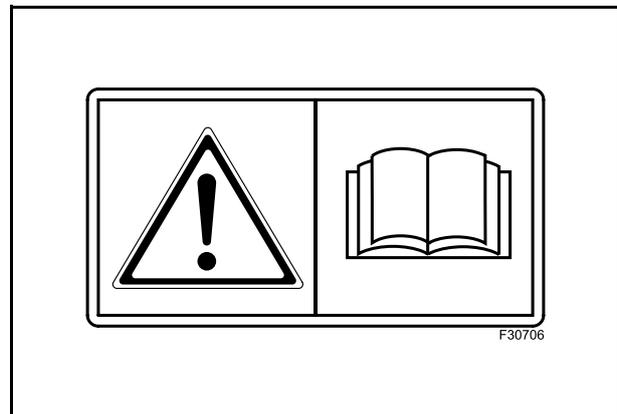
- you understand fully the symbols on the controls and the safety signs used in this manual and on the machine;
- you understand fully the speed, stability, braking and steering characteristics of the machine. If you are in any doubt, consult your Dealer.

The safety messages in this section concern situations which may arise during normal machine operation, servicing and repair. These safety messages also indicate the different ways of coping with these situations. Other safety messages are used throughout the manual to indicate specific dangers.

The information given in this chapter is a summary of the basic rules to respect at all times and does not exempt you from observing traffic regulations or the requirements of insurance companies.

The presence of grease, oil, mud or (in winter) ice on the steps and access handles can cause accidents. Make sure they are always clean.

When mounting or dismounting from the machine always face the machine and use the steps and access handles on the left-hand side of the machine.



Wear close fitting clothing and safety equipment appropriate for the job:

- safety helmet;
- safety shoes;
- heavy gloves;
- reflective clothing;
- wet weather clothing.

If the environment conditions make it necessary, the following personal safety equipment should be at hand:

- respirators (or dustproof masks);
- ear plugs or acoustic ears protections;
- goggles with lateral shield or masks for eyes protection.

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 caught into moving parts.

Do not use this machine for any applications or purposes other than those described in this manual.

If you use this machine for duties involving the use of attachments, accessories, or special tools, consult your Dealer to make sure that the adaptations or modifications carried out are in conformity with the machine's technical specifications and with current regulations on safety.

Any modifications or adaptations which are not approved by the manufacturer may invalidate the machine's original conformity with safety requirements.

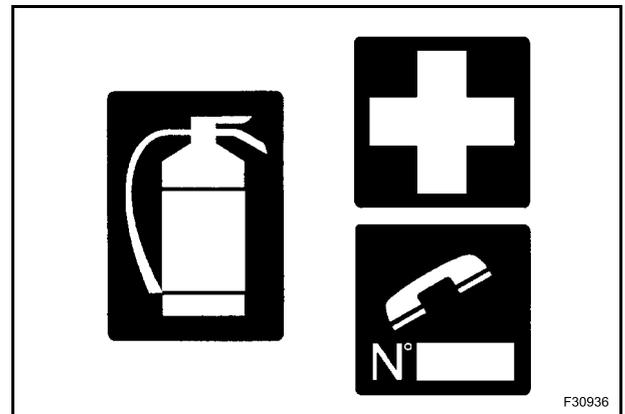
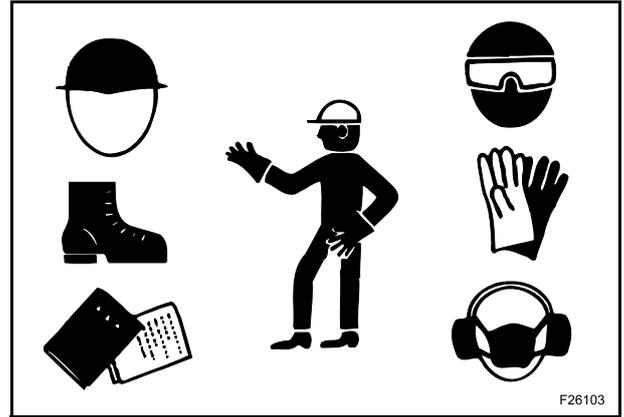
Any functional disorders, especially those affecting the safety of the machine, should therefore be rectified immediately.

Make sure that you fully understand the symbols of the safety decals applied on the machine. Make sure that they are always clean and perfectly legible.

Be prepared for emergencies.

Always keep a first aid kit and a fire extinguisher close at hand on the machine.

Make sure that the fire extinguisher is serviced in accordance with the manufacturer's instructions.



## PREVENTION OF FIRE OR EXPLOSIONS

The engine fuel can originate an explosion or a fire.

Never refuel when the engine is running.

Do not smoke during refuelling.

Take all the necessary safety measures when welding, grinding or when working near a naked flame.

Use a non-inflammable product for cleaning parts.



A spark or a flame can cause the electrolyte of the battery to explode.

To prevent any risk of explosion, observe the following instructions:

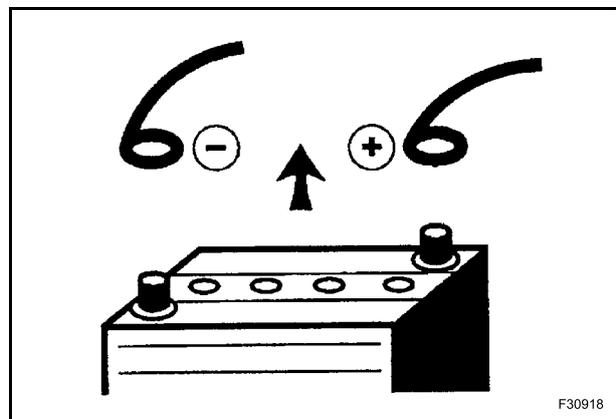
- when disconnecting the battery cables, always disconnect the negative (-) cable first;
- to reconnect the battery cables, always connect the negative (-) cable last;
- never short-circuit the battery clamps with metal objects;
- do not weld, grind or smoke near a battery.

The engine exhaust may produce sparks.

Before using the machine in an area which may contain inflammable vapours, ensure that there is good ventilation.

Always keep a fire extinguisher available on the machine.

Make sure that it is properly maintained in conformity with the manufacturer's instructions.



## PREVENTION OF BURNS

The battery electrolyte generates severe burns.

The battery contains sulphuric acid.

Avoid any contact with the skin, eyes or clothing.

Antidote:

- EXTERNAL: rinse well with water, removing any soiled clothing.
- INTERNAL: avoid vomiting. Drink water to rinse your mouth. Consult a doctor.
- EYES: rinse thoroughly with water for 15 minutes and get prompt medical attention.

When the electrolyte of a battery is frozen, it can explode if you attempt to charge the battery or if you try to start the engine using a booster battery.

Always keep the battery charged to prevent the electrolyte freezing.

Batteries generate explosive gases.

Keep all flames, sparks and cigarettes away.

Provide good ventilation when changing a battery or using a battery in an enclosed space.

Always protect your eyes when working near a battery.

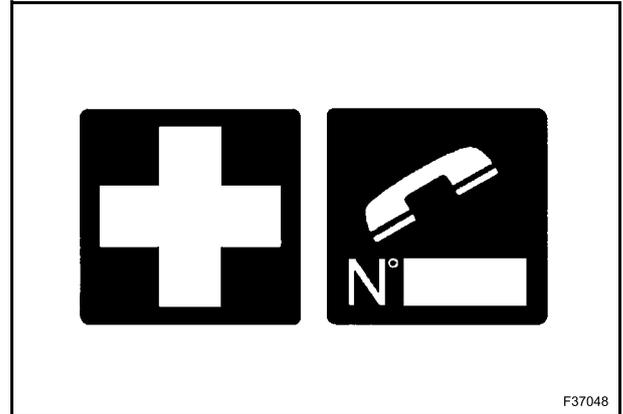
Never touch the battery terminals with your hands.

This can induce a state of electrolysis and impair the main organs of the body.

Hot coolant could spray out if the radiator cap is removed while the system is still hot.

To remove the cap: allow the system to cool down, turn the cap to the first notch and wait until there is no more pressure.

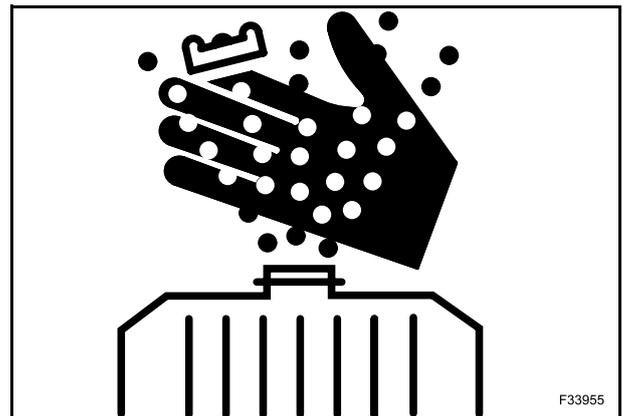
Then remove the cap.



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F33955

## PRECAUTIONS FOR WASTE DISPOSAL

Improperly disposing of waste can threaten the environment.

Each country has its own Regulations on this subject. It is therefore advisable to prepare suitable containers to collect and store momentarily all solid and fluid materials that must not be scattered in the environment to avoid pollution.

At preset intervals these products will be delivered to disposal stations legally recognized and present in this Country.

Here below is a list of the products in the machine which require disposal:

- hydraulic oil;
- brake system oil;
- coolant mixture, condensation residue and pure anti-freeze;
- diesel oil;
- oil and diesel oil filter elements;
- engine and air conditioning air filter elements;
- battery.

Also polluting rags, paper, sawdust and gloves must be disposed in compliance with the same procedures.

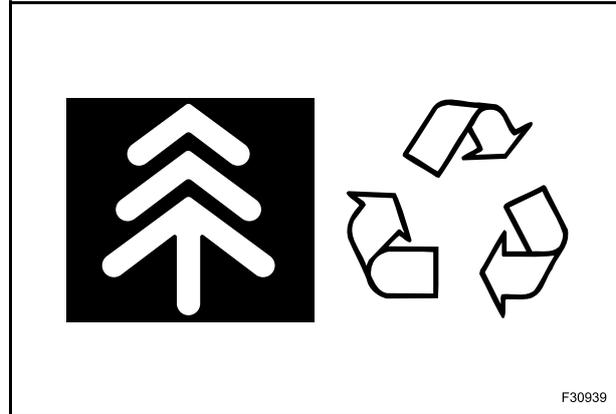
Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning coolant escaping into the air can damage the Earth's atmosphere.

Government regulations may require a certified air conditioning service centre to recover and recycle used air conditioning coolant.

Obtain information on the proper way to recycle or dispose of waste from your local environmental or recycling centre, or from your Dealer.



**B90B**

**B95B - B95BLR - B95BTC**

**B110B**

**B115B**



**SECTION 01 - MAINTENANCE**



Do not carry out any service operation until you have read and understood the instructions and warnings given in this manual.

Observe the adjusting, maintenance and inspection activities and intervals set out in the operating instructions, including information on the replacement of parts and equipment as this service concerns exclusively the qualified personnel.

Wear safety equipment and suitable clothing to perform maintenance operations on the machine.

During maintenance operations, apply a warning plate.

Always wear eye protection when using a tool which might project metal particles. Use a hammer with a soft face, such as copper, for pin assembly.

Incorrectly performed maintenance or adjustments can cause serious injury. If you do not understand a maintenance or adjustment procedure, consult your Dealer.

Before performing any maintenance operation on this machine, make sure it is in a safety condition.

Move the machine to a level and firm ground, away from any soft ground, excavations and poorly shored cavity.

Rest the loader attachment on the ground if no maintenance operation is to be performed on it. Otherwise, raise the attachment and block the support strut.

Place the backhoe attachment in road travel position if no maintenance operation is to be performed on it. Otherwise, rest it on the ground.

Place the direction-of-travel lever and gearshift lever in neutral position.

Immobilize the machine by means of the parking brake.

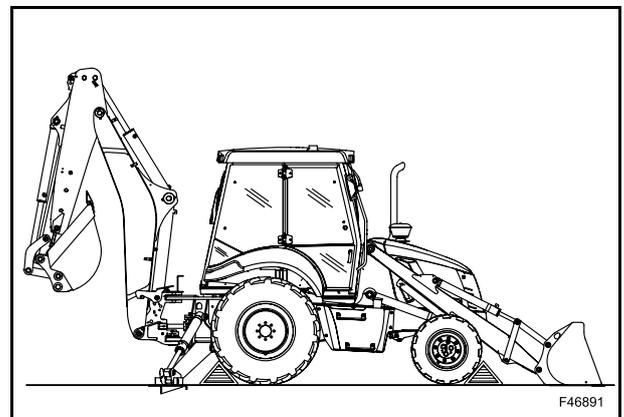
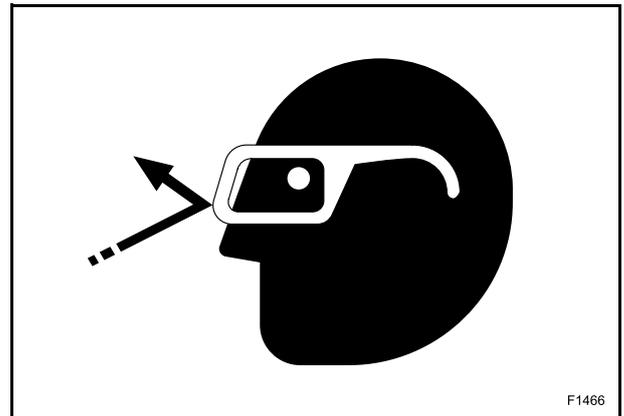
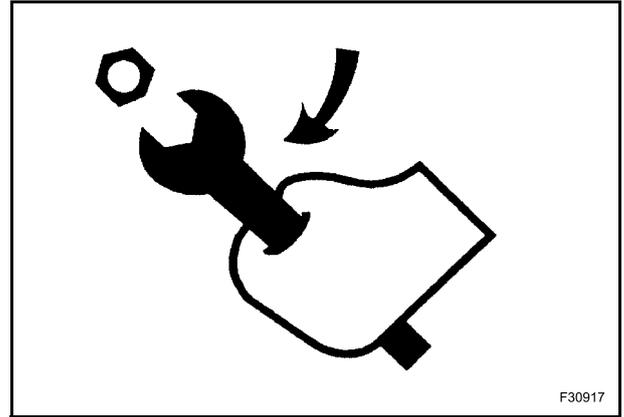
Completely raise the stabilizers and lock them mechanically.

Stop the engine and remove the starter key.

Open the oil tank plug.

Release the hydraulic pressure by operating the control levers in all directions. On hydraulically controlled machines, turn the key to ON and release the pressure by moving the hydraulic control levers in all directions.

Disconnect the electric system by disconnecting the battery master switch.



Place some wedges under the wheels so as to prevent the machine from moving.

Unauthorized modifications of the machine can cause serious injuries. Do not carry out any modification on this machine without obtaining prior authorization from your Dealer. Any modification carried out must be in conformity with the machine's technical specifications and must conform to current safety regulations.

Do not carry out any welding operation on the machine without prior authorization from your Dealer.

Some of the machine's components are subject to type approvals. It is mandatory when replacing those components to ensure that they are in conformity with regulations.

Hydraulic fluid or grease under pressure which penetrates the skin can cause serious injury. Take the necessary safety precautions (protective clothing and face and hand protection) to prevent all such risks. In addition, before handling these products, read the manufacturer's specific instructions for their use. If hydraulic fluid penetrates the skin a doctor must be called immediately.

When carrying out a welding operation on the machine, as authorized by the manufacturer and in accordance with his specifications, disconnect the electric system by means of the battery master switch, connect the welding set earth lead to the component on which the welding is to be carried out (never connect the ground lead to a hydraulic system component) and disconnect the electric cables of the motor control unit (in case of electronic motors).

A burst tyre can cause serious injury.

Regularly check the condition of tyres and always observe the inflation pressures defined in accordance with the type of tyre and ground conditions.

When checking the tyre pressure or during an inflation operation, never stay in front of the tyre but always keep to the tread side.

Always use an inflation cage when the wheel is removed from the machine.

Keep all other persons away from the area.

Never weld near a tyre. It is essential to remove the tyre before any welding operation.

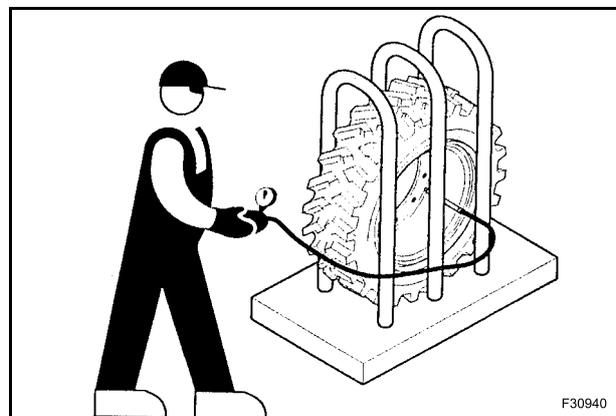
Take the necessary safety measures to protect your face when using compressed air.

The machine's structure is in conformity with the FOPS and ROPS protection standards.

Any modification (drilling, welding, etc.) may cause that conformity to be invalidated.



F33953



F30940

**O-RING FLAT FACE SEAL FITTING**

<b>O-RING FLAT SEAL FITTING TORQUE VALUES</b>					
Nominal		Dash size	Thread size (inch)	Swivel nut torque	
O.D. (inch)	Tube (mm)			lbf-ft	Nm
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

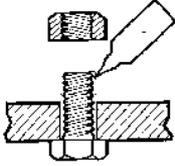
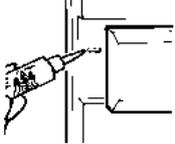
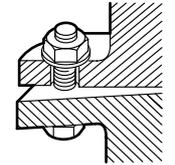
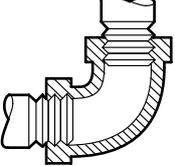
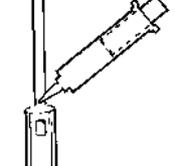
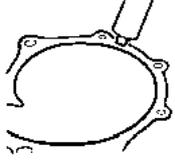
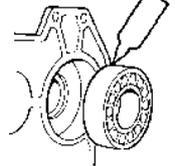
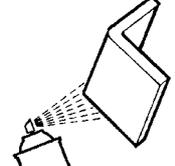
**MINIMUM HARDWARE TIGHTENING TORQUES lbf-ft (Nm)**

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

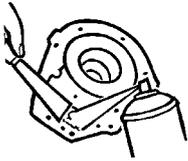
<b>METRIC HARDWARE AND LOCKNUTS</b>							
Nominal Size	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 with Class 8.8 bolt
	Unplated	Plated with zinc-chrome	Unplated	Plated with zinc-chrome	Unplated	Plated with zinc-chrome	
M4	15* (1.7)	19* (2.2)	23* (2.6)	30* (3.4)	33* (3.7)	42* (4.8)	16* (1.8)
M6	51* (5.8)	67* (7.6)	79* (8.9)	102* (12)	115* (13)	150* (17)	56* (6.3)
M8	124* (14)	159* (18)	195* (22)	248* (28)	274* (31)	354* (40)	133* (15)
M10	21 (28)	27 (36)	32 (43)	41 (56)	45 (61)	58 (79)	22 (30)
M12	36 (49)	46 (63)	55 (75)	72 (97)	79 (107)	102 (138)	39 (53)
M16	89 (121)	117 (158)	137 (186)	177 (240)	196 (266)	254 (344)	97 (131)
M20	175 (237)	226 (307)	277 (375)	358 (485)	383 (519)	495 (671)	195 (265)
M24	303 (411)	392 (531)	478 (648)	619 (839)	662 (897)	855 (1160)	388 (458)

**NOTA:** there is no note on the page that \* indicates lb-in and not lb-ft.

## SEALANTS

Description	PN CNH	Typical Applications	
THREAD LOCK AND SEAL 24 ml	82995773	General locking and sealing of metallic threads-medium strength. Oil tolerant. Resists vibration, seals against corrosion and leakage. Can be dismantled with standard tools.	
SUPER GLUE GEL 20 gm	82995778	General purpose instant non drip gel adhesive Ideal for repair of cab trim, mats, external trim etc. Bonds most materials including wood, rubber, metals, most plastics. Not absorbed by porous materials.	
FLEXIBLE GASKET SEALANT 50 ml	82995770	Replaces pre-cut gasket materials. Use on hydraulic lift cover joint, transmission to axle joint and all rigid machined faces. Anaerobic sealant cures on assembly. Will not cure and block oil ways etc.	
THREAD SEAL 50 ml	82995768	General purpose metallic thread and pipe sealant. Use on fuel system, hydraulics, air lines etc. Replaces pastes, hemp, pipe tape etc.	
CLEAR ADHESIVE 50 ml AND SEALANT 310 ml	82995775 82995776	Clear, flexible adhesive and sealant. Suitable for glass, metal, wood etc., seals and bonds gaps to 6 mm (0.24 in). Use to seal glazing and windshields, vehicle lamps, electrical boxes, sump joints etc.	
GASKET DRESSING 60 ml	82995774	Non hardening sealant-enhances sealing of all types of pre cut gaskets. Holds gasket in place-assists assembly. Dries slowly, sets to pliable film for easy dismantling.	
STUD AND BEARING LOCK 24 ml	82995772	General high strength metallic locking and sealing of all threaded fasteners and studs. Retains cylindrical parts, e.g. bushes, bearings, gears to shafts etc. Resists severe vibration loosening. Seals against corrosion	
SOLVENT CLEANER AND DEGREASER 400 ml	82995779	All purpose cleaner and degreaser. Specially designed for parts to be lubricated, bonded or sealed leaving no film or residue. Removes grease, oil and dirt from electrical parts, tools etc.	

**MISCELLANEOUS**

Description	PN CNH	Typical Applications	
GASKET REMOVER 300 ml	82995782	Spray on fast action foaming gasket remover. Removes old heat hardened gasket residue without damaging metal surfaces. Removes all Loctite gaskets and gasket residue. Removes carbon deposits from cylinder heads etc.	
CITRUS HAND CLEANER 400 ml 3 litre (0.79 gal)	82995780 82995781	Natural hand cleaner made from citrus oil. Removes ground in dirt, grease, grime, paint, glue oil and tar. Contains premium skin conditioners. Use with or without water.	