

B110
B115

Repair
Manual

Repair Manual

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B110
B115

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 ITALIA S.p.A.

Technical Information
Viale delle Nazioni, 55
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REFERENCES

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

- Operator's Manual
- Parts Catalogue

COMPLETE HANDBOOK FOR INSTRUCTIONS AND REPAIRS

The complete Service Manual consists of two volumes:

- B110 - B115
Service Manual "LOADER BACKHOE"
- B110 - B115
Service Manual "Engine"

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

The complete Service Manual which covers the loader backhoe models B110 - B115 consists of the following volumes, which can be identified through their print number as stated below:

VOLUME	MACHINE TYPE	PRINT NUMBER
Service Manual - "Loader backhoe"	B110 - B115	87643846
Service Manual - "Engine"	B110 - B115	87643867

LOADER BACKHOE MODELS

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

	B110	B115
Powershift	•	•
Powershuttle	•	/
Stabilizer sideshift	•	•
Stabilizer centre pivot	/	•
Cab	•	•
4WD	•	•
4WS	/	•
Pilot control	•	•
Mechanical control	•	•
Engine Iveco 82 kW - 110 HP model F4HE9484C*J102	•	/
Engine Iveco 82 kW - 110 HP model F4HE9484C*J103	/	•
Long dipper	•	•

INDEX

SECTION 00 - SAFETY PRECAUTIONS

SECTION 01 - MAINTENANCE

SECTION 02 - TECHNICAL SPECIFICATIONS

1. MODELS.....	3
2. IDENTIFICATION OF MAIN COMPONENTS.....	4
3. TECHNICAL SPECIFICATIONS.....	5
4. LOADER ATTACHMENT DIMENSIONS AND PERFORMANCE	8
5. BACKHOE ATTACHMENT DIMENSIONS AND PERFORMANCE	12
6. LIFTING CAPACITIES.....	15
7. LOADER BUCKET WITH FORKS DIMENSIONS AND PERFORMANCE.....	18
8. FLUID AND LUBRICANT CAPACITIES AND SPECIFICATIONS.....	19

SECTION 17 - TORQUE CONVERTERS

1. POWERSHUTTLE TORQUE CONVERTER.....	3
1.1 DESCRIPTION AND OPERATION.....	3
1.2 TECHNICAL SPECIFICATIONS.....	4
1.3 OVERHAUL	4
1.4 INSPECTION.....	4
1.5 DISASSEMBLY AND ASSEMBLY.....	5
1.6 STALL TEST.....	5
1.7 FAULT FINDING.....	6
2. POWERSHIFT TORQUE CONVERTER.....	7
2.1 DESCRIPTION AND OPERATION.....	7
2.2 TECHNICAL SPECIFICATIONS.....	8
2.3 OVERHAUL	8
2.4 INSPECTION.....	9
2.5 DISASSEMBLY AND ASSEMBLY.....	9
2.6 STALL TEST.....	11
2.7 FAULT FINDING.....	12

SECTION 21 - TRANSMISSION

1. POWERSHUTTLE TRANSMISSION "TURNER MODEL COM-T4-2025"	3
1.1 TECHNICAL SPECIFICATIONS.....	3
1.2 TIGHTENING TORQUES.....	5
1.3 TRANSMISSION CONTROLS.....	6
1.4 LUBRICATION.....	11
1.5 TRANSMISSION OIL FLOW AND SUPPLY.....	12
1.6 TRANSMISSION HYDRAULIC VALVES AND PRESSURE TEST POINTS	18
1.7 TRANSMISSION POWER FLOW.....	19
1.8 TRANSMISSION 4WD COMPONENTS.....	23
1.9 TRANSMISSION REMOVAL	28
1.10 DISASSEMBLY AND ASSEMBLY.....	29
1.11 FAULT FINDING.....	87
1.12 SPECIAL TOOLS.....	90

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2. POWERSHIFT TRANSMISSION “DANA T16000”	91
2.1 TECHNICAL SPECIFICATIONS.....	91
2.2 TRANSMISSION CONTROLS	92
2.3 LUBRICATION	102
2.4 PRESSURE SPECIFICATIONS AND CHECK POINTS	103
2.5 TRANSMISSION COOLER.....	105
2.6 TRANSMISSION HYDRAULIC DIAGRAM	106
2.7 OPERATION	107
2.8 POWER FLOWS	114
2.9 GEAR AND CLUTCH LAY OUT	129
2.10 TRANSMISSION REMOVAL AND INSTALLATION	130
2.11 TRANSMISSION COMPONENTS	134
2.12 DISASSEMBLY AND ASSEMBLY	152
2.13 SPECIAL TOOLS.....	261
2.14 FAULT FINDING	262
2.15 FAULT FINDING	264

SECTION 25 - FRONT AXLES

1. FRONT AXLE 4WD “CARRARO”	3
1.1 TECHNICAL SPECIFICATIONS.....	3
1.2 DISASSEMBLY AND ASSEMBLY	9
1.3 FAULT FINDING	55
2. FRONT AXLE 4WS “CARRARO”	58
2.1 TECHNICAL SPECIFICATIONS.....	58
2.2 DISASSEMBLY AND ASSEMBLY	62
2.3 FAULT FINDING	115
3. SPECIAL TOOLS.....	118

SECTION 27 - REAR AXLE

1. REAR AXLE 2WS	3
1.1 DESCRIPTION AND OPERATION.....	3
1.2 TECHNICAL SPECIFICATIONS.....	6
1.3 DISASSEMBLY AND ASSEMBLY	8
1.4 FAULT FINDING	27
2. REAR AXLE 4WS “CARRARO”	28
2.1 TECHNICAL SPECIFICATIONS.....	28
2.2 DISASSEMBLY AND ASSEMBLY	32
2.3 FAULT FINDING	81
3. SPECIAL TOOLS.....	84

SECTION 33 - BRAKES SYSTEM

1. TECHNICAL SPECIFICATIONS.....	3
2. HAND BRAKE	6
2.1 HAND BRAKE ADJUSTMENT.....	7
3. BRAKE CYLINDERS	8
4. OIL BRAKE TANK.....	13
5. BLEEDING PROCEDURE	13

SECTION 35 - HYDRAULIC SYSTEM

1. HYDRAULIC DIAGRAMS	3
1.1 HYDRAULIC DIAGRAM - 2WS SIDESHIFT MECHANICAL MODELS.....	3
1.2 HYDRAULIC DIAGRAM - 2WS SIDESHIFT PILOT MODELS	5
1.3 HYDRAULIC DIAGRAM - 2WS CENTRE PIVOT PILOT MODELS	7
1.4 HYDRAULIC DIAGRAM - 4WS SIDESHIFT MECHANICAL MODELS.....	9
1.5 HYDRAULIC DIAGRAM - 4WS SIDESHIFT PILOT MODELS	11
1.6 HYDRAULIC DIAGRAM - 4WS CENTRE PIVOT PILOT MODELS	13
2. HYDRAULIC PUMP	15
2.1 DESCRIPTION AND OPERATION.....	15
2.2 TECHNICAL SPECIFICATIONS.....	15
2.3 LOAD SENSING VALVE	17
2.4 REMOVAL	19
2.5 COMPONENTS	20
2.6 DISASSEMBLY AND ASSEMBLY.....	21
3. CONTROL VALVES	25
3.1 CONTROL VALVES "REXROTH" (MECHANICAL MODELS)	25
3.2 CONTROL VALVES "REXROTH" (PILOT MODELS)	41
3.3 SOLENOID VALVE FOR PILOTING THE BACKHOE CONTROL VALVE (WITH HYDRAULIC CONTROL).....	50
3.4 RELIEF VALVES	53
3.5 ACCUMULATOR GLIDE RIDE "PARKER"	61
4. HYDRAULIC SWING SYSTEM	64
4.1 DESCRIPTION AND OPERATION.....	64
4.2 HYDRAULIC OIL FLOW	65
5. HYDRAULIC CYLINDERS.....	67
5.1 LOADER CYLINDER.....	68
5.2 LOADER BUCKET CYLINDER	74
5.3 4X1 BUCKET CYLINDER.....	80
5.4 BACKHOE BOOM CYLINDER	83
5.5 BACKHOE DIPPER CYLINDER.....	87
5.6 BACKHOE BUCKET CYLINDER.....	91
5.7 SHORT AND LONG TELESCOPIC CYLINDER.....	95
5.8 STABILIZER CYLINDER (CENTRE PIVOT MODELS).....	99
5.9 STABILIZER CYLINDER (SIDESHIFT MODELS).....	103
5.10 SWING CYLINDER.....	107
5.11 BACKHOE SIDESHIFT LOCKING CYLINDER (SIDESHIFT).....	111
5.12 SPECIAL TOOLS.....	113
6. HYDRAULIC CONTROL LEVERS	114
6.1 TECHNICAL SPECIFICATIONS.....	114
6.2 DESCRIPTION AND OPERATION.....	115
6.3 DISASSEMBLY AND ASSEMBLY.....	118
6.4 CONTROL LEVER VALVE	121
7. FAULT FINDING AND FLOW TESTING	124
7.1 PRELIMINARY CHECKS.....	124
7.2 FAULT FINDING (WITH "REXROTH" CONTROL VALVES).....	125

SECTION 39 - CHASSIS

1. DESCRIPTION AND OPERATION	3
2. REMOVAL AND INSTALLATION COMPONENTS	6
2.1 COMPONENTS WITHIN THE CHASSIS	6
2.2 COMPONENTS BELOW THE CHASSIS	7
2.3 COMPONENTS ATTACHED OUTSIDE THE CHASSIS	9
2.4 COMPONENTS ATTACHED ABOVE THE CHASSIS	10
2.5 TIGHTENING TORQUES	12

SECTION 41 - STEERING SYSTEM

1. STEERING SYSTEM 2WS	4
2. STEERING SYSTEM 4WS	7
3. POWER STEERING	12
3.1 TECHNICAL SPECIFICATIONS	13
3.2 COMPONENTS	15
3.3 DISASSEMBLY AND ASSEMBLY	16
3.4 SPECIAL TOOLS	33
3.5 FAULT FINDING	33

SECTION 50 - CAB HEATING AND AIR CONDITIONING

1. TECHNICAL SPECIFICATIONS	3
2. CAB HEATING	5
2.1 DESCRIPTION AND OPERATION	5
3. AIR CONDITIONING	12
3.1 PRINCIPALS OF AIR CONDITIONING	12
3.2 SAFETY PRECAUTIONS	16
3.3 DESCRIPTION AND OPERATION	17
3.4 FAULT FINDING AND TESTING	25
3.5 FLUSHING THE SYSTEM	43
3.6 EVACUATING THE SYSTEM	45
3.7 CHARGING THE SYSTEM	46
3.8 COMPONENTS OVERHAUL	47
3.9 COMPRESSOR	52
3.10 SPECIAL TOOLS	66

SECTION 55 - ELECTRICAL SYSTEM

1. GENERALITIES	3
1.1 TEMPORARY WIRING HARNESS REPAIR	3
1.2 FAULT FINDING	4
2. ELECTRICAL DIAGRAMS	5
2.1 ELECTRICAL DIAGRAMS - POWERSHUTTLE CAB	5
2.2 ELECTRICAL DIAGRAMS - POWERSHIFT CAB	22
2.3 ELECTRICAL DIAGRAMS - 4WS	39
3. CONTROLS AND INSTRUMENTS	57
3.1 FRONT INSTRUMENT PANEL	57
3.2 CALIBRATION OF SPEEDOMETER	59
3.3 SIDE INSTRUMENT PANEL	60
3.4 IMMOBILISER CIRCUIT	64

4. DIAGNOSTICS DISPLAY	65
4.1 SYMBOL	66
4.2 SETUP MENU	67
4.3 SETUP MENU	68
4.4 PROCEDURE ABOUT SELF TEST	69
4.5 ON BOARD ERROR CODE RETRIEVAL	70
4.6 BACKLIGHTING AND DIMMING.....	71
4.7 WORK HOURS.....	72
4.8 FUNCTIONAL DESCRIPTION	73
4.9 MAINTENANCE.....	79
4.10 WARNING MESSAGES	80
5. STARTING SYSTEM	86
5.1 DESCRIPTION AND OPERATION.....	86
5.2 FAULT FINDING.....	87
5.3 STARTER MOTOR.....	90
6. ALTERNATOR	96
6.1 TECHNICAL SPECIFICATIONS.....	96
6.2 DESCRIPTION AND OPERATION.....	96
6.3 COMPONENTS	98
6.4 REMOVAL	99
6.5 PRELIMINARY CHECK AND TESTS.....	100
6.6 FAULT FINDING.....	109
7. BATTERY	110
7.1 TECHNICAL SPECIFICATIONS.....	110
7.2 DESCRIPTION AND OPERATION.....	110
7.3 BATTERY REPLACEMENT	111
7.4 MAINTENANCE.....	113
7.5 TESTS	115
7.6 CONNECTING A BOOSTER BATTERY	117
7.7 BATTERY MASTER SWITCH	117
8. COMPONENT TESTING	118
8.1 GENERAL INTRODUCTION	118
8.2 COMPONENT TESTING	119
8.3 GROUND POINTS.....	119
8.4 KEY-START AND STOP SWITCH	121
8.5 ALTERNATOR.....	122
8.6 TRANSMISSIONS	122
8.7 PARKING BRAKE SWITCH	126
8.8 CAB	127
8.9 4WD SWITCH.....	132
8.10 BRAKE PEDAL SWITCHES	132
8.11 BRAKE OIL LEVEL SWITCH.....	133
8.12 FRONT WORK LAMP SWITCH (1) - REAR WORK LAMP SWITCH (2) MAIN LIGHT SWITCH ...	133
8.13 HAZARD SWITCH.....	134
8.14 FLASHER MODULE.....	134
8.15 MULTI FUNCTION SWITCH	135
8.16 FRONT WIPER MOTOR (1) - REAR WIPER MOTOR - (2).....	135
8.17 4WS -STEERING SELECTOR SWITCH	136
8.18 STEERING CONTROL UNIT.....	137
8.19 4WS REAR AXLE STEERING SENSOR	139
8.20 4WS FRONT AXLE STEERING SENSOR.....	139
8.21 STEERING SOLENOIDS.....	140

8.22 DIFFERENTIAL LOCK SWITCH (1)	141
8.23 LOADER	142
8.24 BACKHOE.....	144
8.25 REVERSING BUZZER.....	149
8.26 FUEL LEVEL SENDER.....	149

SECTION 82 - LOADER

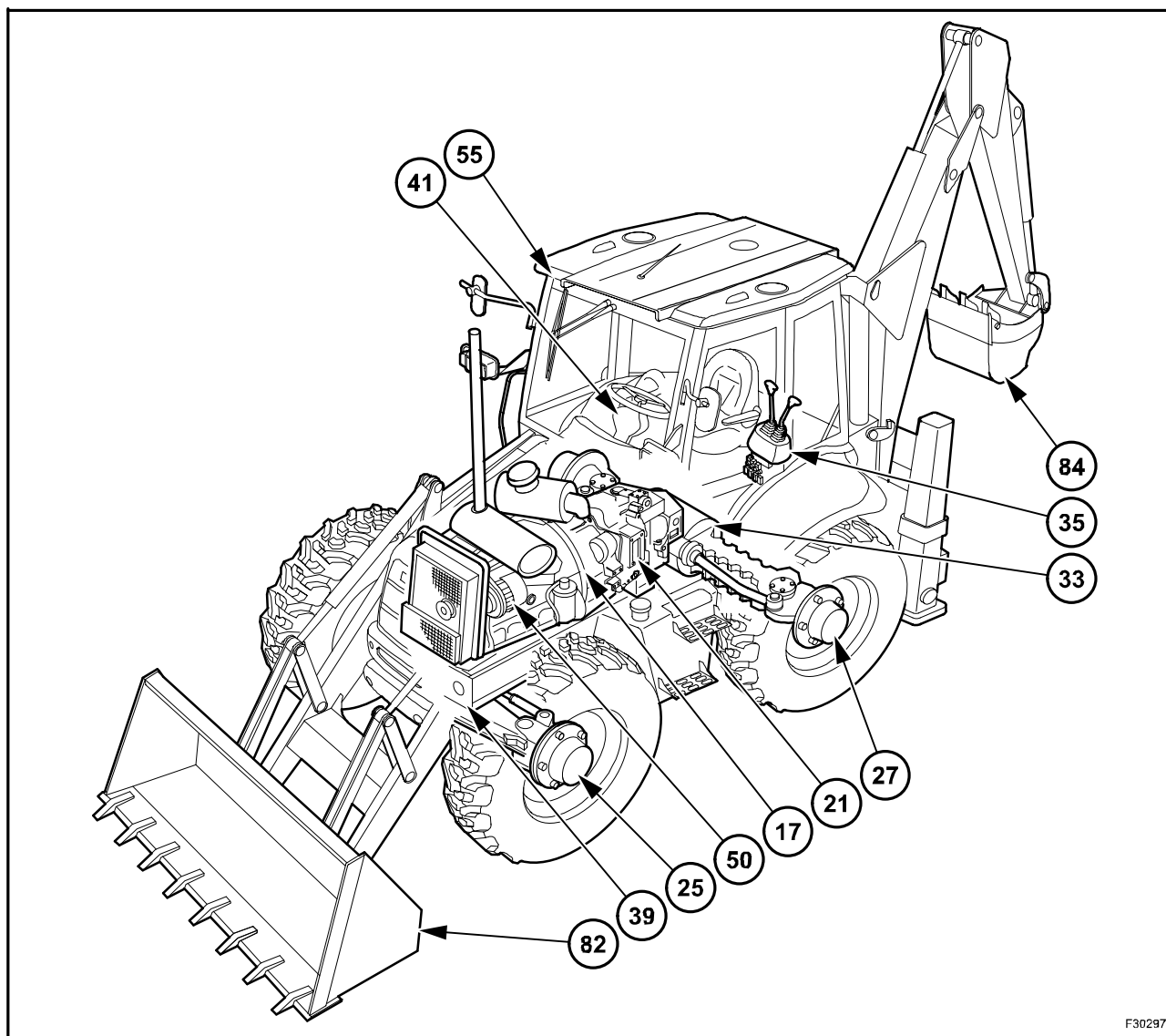
1. LOADER ATTACHMENT CONTROLS.....	4
2. LOADER BUCKET SELF LEVELING	7
3. LOADER ATTACHMENT SAFETY STRUT	10
4. LOADER BUCKET REMOVAL	12
5. LOADER REMOVAL (2WS).....	15
6. LOADER REMOVAL (4WS).....	17

SECTION 84 - BACKHOE

1. DESCRIPTION AND OPERATION.....	3
2. BACKHOE ATTACHMENT MECHANICAL CONTROL VERSION.....	6
3. BACKHOE ATTACHMENT HYDRAULIC CONTROLS VERSION	14
4. REMOVAL AND INSTALLATION	16
5. TELESCOPIC DIPPER REVISION.....	26

SECTIONS INDEX

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



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SECTION 17: TORQUE CONVERTERS

SECTION 21: TRANSMISSION

SECTION 25: FRONT AXLE

SECTION 27: REAR AXLE

SECTION 33: BRAKES SYSTEM

SECTION 35: HYDRAULIC SYSTEM

SECTION 39: CHASSIS

SECTION 41: STEERING SYSTEM

SECTION 50: CAB HEATING AND AIR CONDITIONING

SECTION 55: ELECTRICAL SYSTEM

SECTION 82: LOADER

SECTION 84: BACKHOE

B110
B115



SECTION 00 - SAFETY PRECAUTIONS

This warning symbol points out important messages involving personal safety.

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

In this manual you will find this symbol together with the following key-words:

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

DANGER - it gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved.



TO PREVENT ACCIDENTS

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

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

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

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

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

SAFETY RULES

- Carefully follow specified repair and maintenance procedures.
 - Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get hold into moving parts.
We advise to use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
 - Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are certified operators to assist in the operation to be carried out.
 - Never operate the machine or use attachments from a place other than sitting at the operator's seat.
 - Never carry out any operation on the machine when the engine is running, except when specifically indicated.
 - Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
 - All repair and maintenance operations should be carried out with the greatest care and attention.
 - Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.
 - Disconnect the batteries and label all controls to warn that the Machine is being serviced. Block the machine and all equipment which should be raised.
 - Never check or fill fuel tanks and accumulator batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
 - Brakes are inoperative when they are manually released for maintenance purposes. In such cases, the machine should be kept constantly under control using blocks or similar devices.
 - The fuel filling gun should remain always in contact with the filler neck.
Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity buildup.
 - Use exclusively specified towing points for towing the machine. Connect parts carefully.
Ensure that foreseen pins and/or locks are steadily fixed before applying traction.
Do not stop near towing bars, cables or chains working under load.
 - To transfer a failed machine, use a trailer or a low loading platform trolley if available.
 - To load and unload the machine from the transportation mean, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the forwarder.
 - For electrical heaters, battery-chargers and similar equipment use exclusive auxiliary power supplies with a efficient ground to avoid electrical shock hazard.
 - Always use lifting equipment and similar of appropriate capacity to lift or move heavy components.
 - Pay special attention to bystanders.
 - Never pour gasoline or diesel oil into open, wide and low containers.
 - Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.
 - Wear protection goggles with side guards when cleaning parts using compressed air.
 - Do not exceed a pressure of 2.1 bar (30 psi), in accordance with local regulations.
 - Do not run the engine in a closed building without proper ventilation.
 - Do not smoke, use open flames, cause sparks in the nearby area when filling fuel or handling highly flammable liquids.
 - Do not use flames as light sources when working on a machine or checking for leaks.
 - Move with caution when working under a Machine, and also on or near a Machine. Wear proper safety accessories:
helmets, goggles and special footwear.
 - During checks which should be carried out with the engine running, ask an assistant to sit at the operator's seat and keep the service technician under visual control at any moment.
In case of operations outside the workshop, drive the machine to a flat area and block it. If working on an incline cannot be avoided, first block the Machine carefully. Move it to a flat area as soon as possible with a certain extent of safety.
 - Ruined or plied cables and chains are unreliable. Do not use them for lifting or trailing. Always handle them wearing gloves of proper thickness.
 - Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stop near the fastening point, trailing chains or cables.
 - The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.
 - Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container. Before starting the Machine or its attachments, check, adjust and block the operator's seat. Also ensure that there are no persons within the Machine or attachment operating range.
 - Do not keep in your pockets any object which might fall unobserved into the Machine's inner compartments.
-

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

START UP

- Never run the engine in confined spaces which are not equipped with adequate ventilation for exhaust gas extraction.
- Never bring your head, body, arms, legs, feet, hands, fingers near fans or rotating belts.

ENGINE

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

ELECTRICAL SYSTEMS

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

dental explosion hazard due to build-up of gasses relieved during charging.

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

HYDRAULIC SYSTEMS

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

WHEELS AND TYRES

- Check that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check possible damages to the rims and tyres.
- Keep off and stay at the tyre side when correcting the inflation pressure.
- Check the pressure only when the machine is unloaded and tyres are cold to avoid wrong readings due to over-pressure. Do not reuse parts of recovered wheels as improper welding, brazing or heating may weaken the wheel and make it fail.
- Never cut, nor weld a rim with the inflated tyre assembled.
- To remove the wheels, block both front and rear Machine wheels. Raise the Machine and install safe and stable supports under the Machine in accordance with regulations in force.
- Deflate the tyre before removing any object caught into the tyre tread.
- Never inflate tyres using flammable gases as they may originate explosions and cause injuries to bystanders.

REMOVAL AND INSTALLATION

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

IMPORTANT ECOLOGICAL CONSIDERATIONS

The following are recommendations which may be of assistance:

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

Helpful hints

- Avoid filling tanks using jerry cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
 - In general, avoid skin contact with all fuels, oils, acids, solvents, etc.
Most of them contain substances which can be harmful to your health.
 - Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in ordinary heating systems.
 - Avoid spillage when draining off used engine coolant mixtures, engine, transmission and hydraulic oils, brake fluids, etc.
Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
 - Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
 - Do not open the Air-Conditioning system yourself. It may contain gases which should not be released into the atmosphere. Your air conditioning specialist has special equipment for discharging and charging the system.
 - Repair any leaks or defects in the engine cooling or hydraulic system immediately.
 - Do not increase the pressure in a pressurized circuit as this may lead to a catastrophic failure of the system components.
 - Protect hoses during welding as penetrating weld chips may burn a hole or weaken them, causing the loss of oils, coolant, etc.
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SECTION 01 - MAINTENANCE



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All maintenance and repair operations described in this manual should be carried out exclusively by 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.

GENERAL

Clean the exterior of all components before carrying out any form of repair. Dirt and 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 swagged 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.

Release the fittings and separate the hose or tube assembly, then remove and discard the O-ring seal from the fitting.

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. 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.

Use two suitable wrenches and tighten the fitting to the specified torque according to the size of the fitting.

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

SHIMMING

At each adjustment, select adjusting shims, measure them individually using a micrometre 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;

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