

Product: New Holland W50TC,W60TC,W70TC,W80TC Compact Wheel Loader Service Repair Workshop Manual

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 NEW HOLLAND



# NEW HOLLAND

**W50TC**  
**W60TC**  
**W70TC**  
**W80TC**

Repair manual

Repair manual

Print No. 87618246  
English - Printed in Italy

**W50TC**  
**W60TC**  
**W70TC**  
**W80TC**

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 **NEW HOLLAND**

PROVEN PERFORMANCE

## TO READER

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

**CNH ITALIA S.p.A.**  
Viale delle Nazioni, 55  
41100 MODENA - Italy

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:

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## REFERENCES

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

- Operator's Manual
- Parts Catalogue

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## COMPLETE REPAIR MANUAL

The complete Repair Manual consists of two volumes:

- W50TC - W60TC - W70TC - W80TC Repair Manual "WHEEL LOADERS"
- W50TC - W60TC - W70TC - W80TC Repair Manual "Engine"

The Repair Manuals for "Wheel loaders" 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 Repair Manual which covers the loader models W50TC - W60TC - W70TC - W80TC consists of the following volumes, which can be identified through their print number as stated below:

| VOLUME                          | MACHINE TYPE                  | PRINT NUMBER |
|---------------------------------|-------------------------------|--------------|
| Repair Manual - "Wheel loaders" | W50TC - W60TC - W70TC - W80TC | 87618246     |
| Repair Manual - "Engine"        | W50TC - W60TC - W70TC - W80TC | 87618255     |

### **TO PREVENT ACCIDENTS**

The majority of accidents and injuries which 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 and / or technician is the best insurance 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.

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#### **⚠ WARNING**

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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# **SECTION 00 - INTRODUCTION**

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*SECTION 00 - INTRODUCTION*

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## 1. 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.

In this manual you will find the following indications:

---

### **⚠ WARNING**

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

---

### **⚠ DANGER**

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

---

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

Moreover in the present Manual have been given some instructions with texts in italics, preceded by the words **NOTE** and **CAUTION**, with following meanings for machine protection:

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

---

### **⚠ WARNING**

It warns the operator of a possible hazard of machine damage in case he does not follow a determined procedure.

---

Your safety and that of people around you depends on you. It is essential that you understand this manual for the correct operation, inspection, lubrication and maintenance of this machine.



## 1.1 GENERAL SAFETY INSTRUCTIONS

Carefully read this Manual before proceeding with maintenance, repairs, refuelling or other machine operations.

Repairs have to be carried out only by authorized and instructed staff; specific precautions have to be taken when grinding, welding or when using mallets or heavy hammers.

Not authorized persons are not allowed to repair or carry out maintenance on this machine. Do not carry out any work on the equipment without prior authorisation.

Ask your employer about the safety instructions in force and safety equipment.

Nobody is allowed to seat on the operator's place during machine maintenance unless he is a qualified operator helping with the maintenance work.

If it is necessary to move the equipment to carry out repairs or maintenance, do not lift or lower the equipment from any other position than the operator's seat.

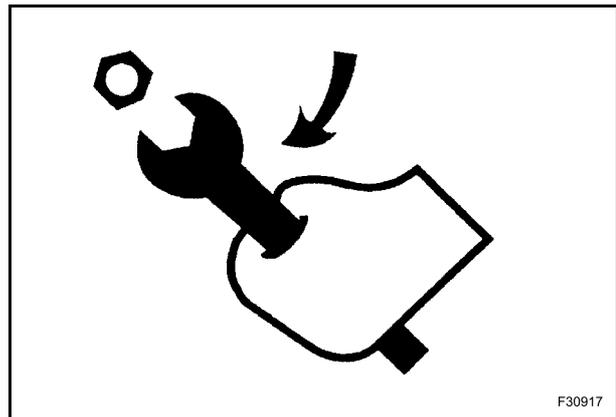
Never carry out any operation on the machine when the engine is running, except when specifically indicated.

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.

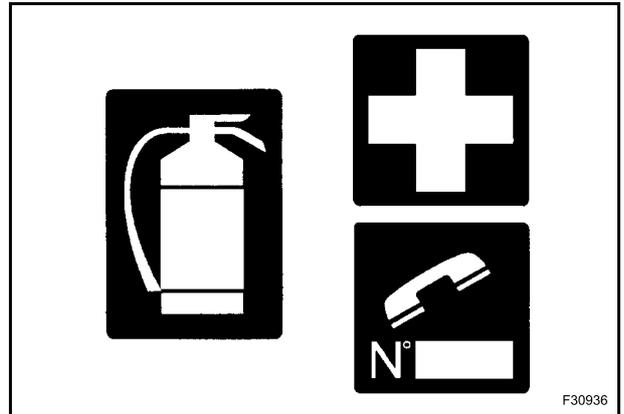
Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.

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



## 1.2 EMERGENCY

Be prepared for emergencies. Always keep at disposal on the machine a first aid kit and a fire extinguisher. Make sure that the fire extinguisher is serviced in accordance with the manufacturer's instructions.



## 1.3 EQUIPMENT

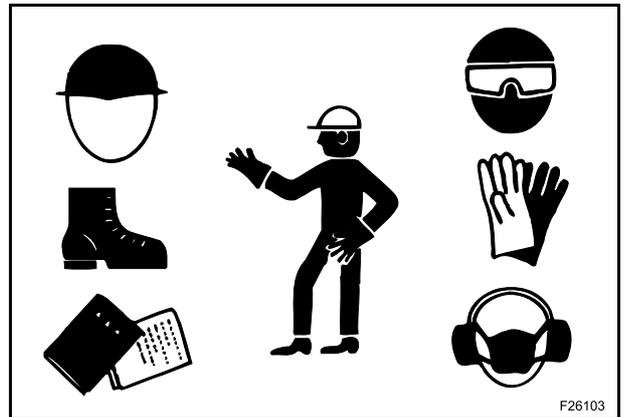
Wear close fitting clothing and safety equipment appropriate for the job:

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

If environment condition require it 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.

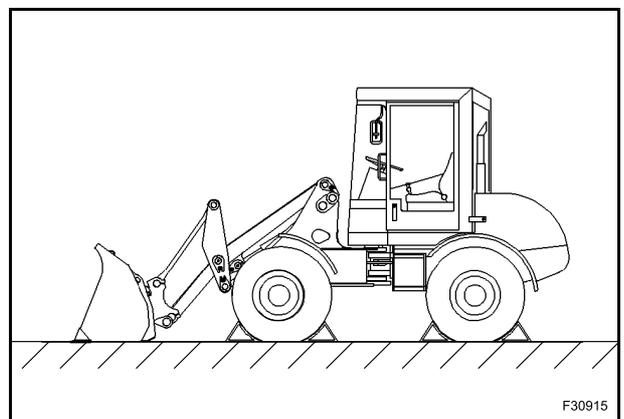
Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught into moving parts.



## 1.4 WHEEL LOADER POSITION

Before carrying out any maintenance on this machine, proceed in the following manner:

- park the machine on a flat, hard ground;
- lower the wheel loader bucket until it rests on the ground;
- shut off the engine and remove the ignition key;
- apply the parking brake;
- block the wheels to prevent any machine movement.



## 1.5 ENGINE - RADIATOR

Never leave the engine run in closed spaces without ventilation and not able to evacuate toxic exhaust gases. Keep the exhaust manifold and tube free from combustion materials.

Do not keep the engine running during refuelling and pay particular attention if the engine is hot because of the risen hazard of fire in case of fuel spilling.

Never attempt to check or adjust the fan belts when the engine is running.

Never lubricate the machine with the engine running.

Pay attention to rotary pieces and do not allow to anyone to approach to avoid becoming entangled.

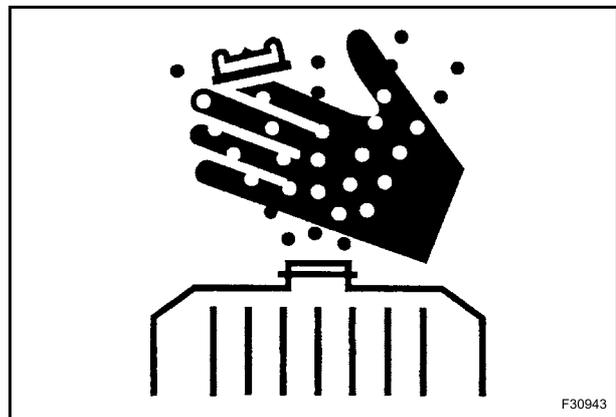
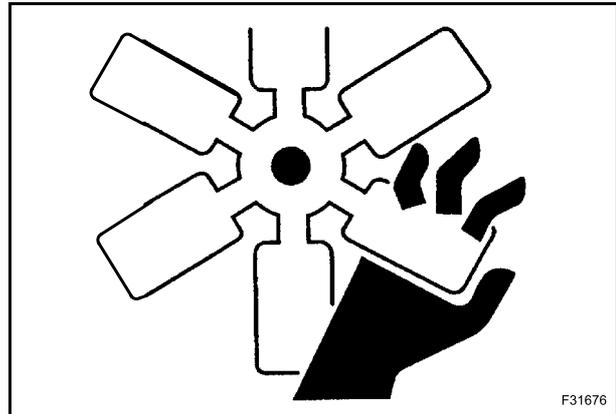
If hands, clothes or tools get caught in the fan blades or in the transmission belt, this can cause amputations, violent tears and generate condition of serious danger; for this reason avoid touching or to come close to all rotary or moving parts.

A violent jet of the coolant from the radiator can cause damages and scalds.

If you are to check the coolant level, you have to shut off the engine previously and to let cool down the radiator and its pipes. Slowly unscrew the cap to release the inside pressure.

If necessary, remove the cap with hot engine, wear safety clothes and equipment, then loosen the cap slowly to relieve the pressure gradually.

When checking the fuel, oil and coolant levels, use exclusively explosion proof classified lamps. If this kind of lamps are not used fires or explosions may occur.



## 1.6 HYDRAULIC SYSTEMS

Splashes of fluids under pressure can penetrate the skin causing serious injuries.

Avoid this kind of danger by releasing the pressure before disconnecting the hydraulic hoses or other lines.

Release the residual pressure by moving the control levers several times.

Tighten all connections before applying pressure.

To protect eyes wear a facial shield or safety goggles.

Look for possible leaks with a piece of cardboard. Protect your hands and body from possible splashes of fluids under pressure.

In case of accident ask for appropriate medical help urgently.

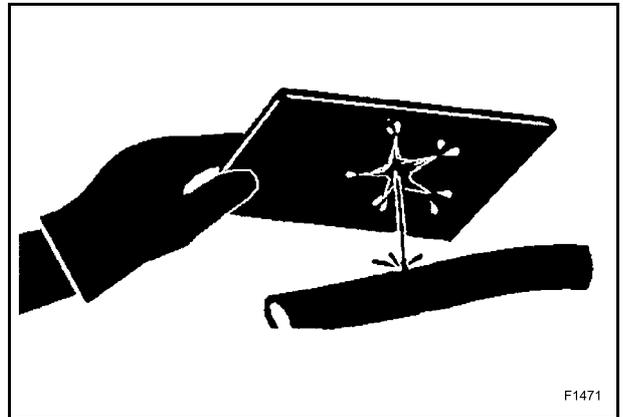
Any fluid penetrating the skin must be removed within few hours to avoid serious infections.

Flammable splashes may originate because of the heat near pipes with fluids under pressure, with the result of serious scalds for the persons hit.

Do not weld or use torches near pipes containing fluids or other flammable materials.

Pipes under pressure can accidentally be pierced when the heat expands beyond the area immediately heated.

Arrange for fire resistant temporary shields to protect hoses or other components during welding, etc.



## 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 connections. 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 position have failed and will ultimately separate completely.

A hose with a frayed outer sheath will allow the water penetration. Concealed corrosion of the wire reinforcement will subsequently occur along the hose length with resultant hose failure.

Swelling 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 flow restriction, a speed reduction of operation and ultimate hose failure.

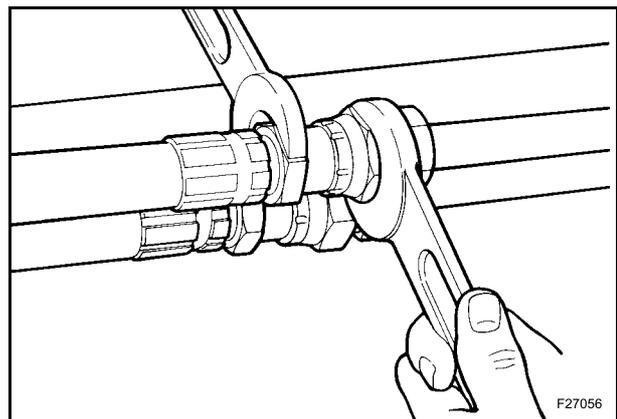
Free-moving, unsupported hoses must never be allowed to touch each other or related working surfaces. This causes chafing which reduces hose life.

## O-RING

Replace O-rings, seal rings and gaskets whenever they are disassembled.

Never mix new and old O-rings or seal rings, regardless of condition. Always lubricate new seal rings and O-rings with hydraulic oil before installation to relevant seats.

This will prevent the O-rings from rolling over and twisting during assembly which will jeopardize sealing.

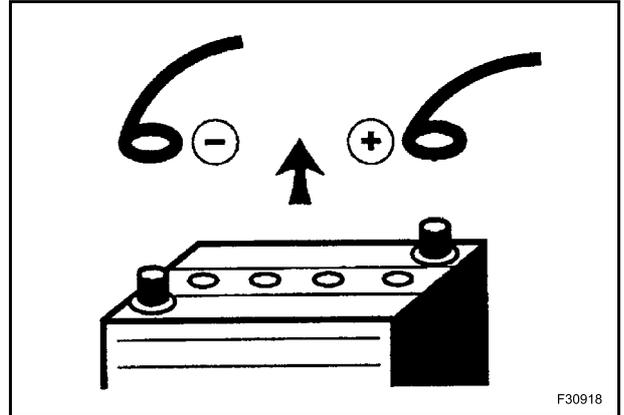


## 1.7 BATTERY

A spark or flame can cause the hydrogen in 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.

Battery electrolyte causes 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 abundantly with water for 15 minutes and consult a doctor.
- 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.



## 1.8 REFUELLING

Stay away from open flames during refilling of hydraulic oil or fuel.

Fuel or oil splashes can cause slippings and therefore accidents; clean immediately and accurately the areas eventually smeared.

Always tighten the safety plugs of fuel tank and hydraulic oil tank firmly.

Never use fuel to clean the machine parts eventually smeared with oil or dust.

Always perform fuel or oil refilling in well aired and ventilated areas.

Do not smoke during these operations.

During refuelling hold the pistol firmly and keep it always in contact with the filler neck until the end of the refuelling, to avoid sparkles due to static electricity.

Do not overfill the tank but leave a space for fuel expansion.



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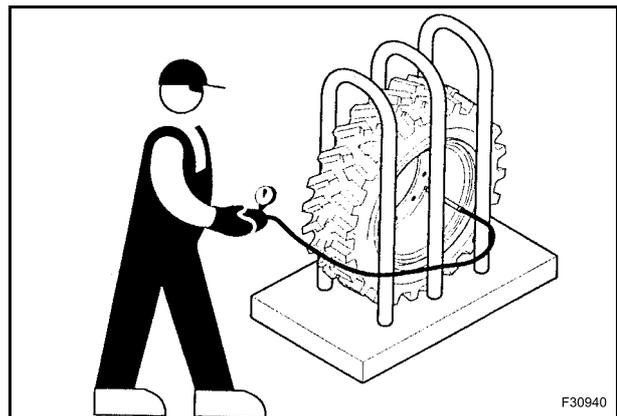
## 1.9 TYRES

Before inflating the tyres, always check the condition of rims and the outer condition of tyres to find out the presence of dents, cuts, tears of reinforcement plies or other faults. Before inflating a tyre, make sure that there are no nearby persons, then position yourself at tread side.

Make sure that the inflating pressure of tyres is the same prescribed by manufacturer and check periodically its integrity. Always check that the right tyre pressure corresponds to the pressure of the left tyre. The pressure check must be carried out with machine unloaded and cold.

Never use reconditioned rims because possible welds, heat treatments or brazings not performed correctly can weaken the wheels and cause following damages or failures. Deflate the tyres before their disassembly.

Before taking out possible jammed objects from the rims, it is necessary to deflate the tyres. Inflate tyres by means of a pistol complete with extension and pressure switch of control.



F30940

## 1.10 CLEANING

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 fluids can damage the O-rings and cause skin irritation.

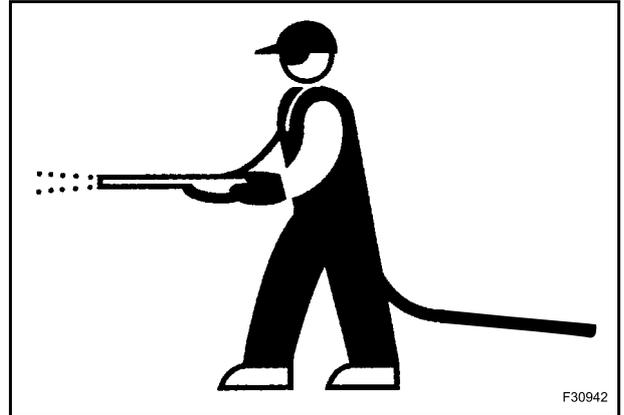
Check that solvents are suitable for the cleaning of components and that they are no risky for personal safety of the user.

Dirt from oil or grease and scattered tools or faulty pieces are dangerous for persons, because they can generate slipping or falls.

For the machine cleaning, use a jet of warm water or steam under pressure and commercial detergents. Never use diesel fuel, petroleum or solvents, because the first ones leave an oily layer that favours the sticking of dust, while solvents (even if weak) damage the paint and favour the formation of rust.

If a jet of water penetrates into the electric devices, beyond causing oxidation of contacts, it can also prevent the machine start or cause a sudden and abrupt start of the engine. For this reason, never use water jets or steam on sensors, connectors or other electric components.

Avoid that the water jet penetrates inside of the cab.



## 1.11 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.

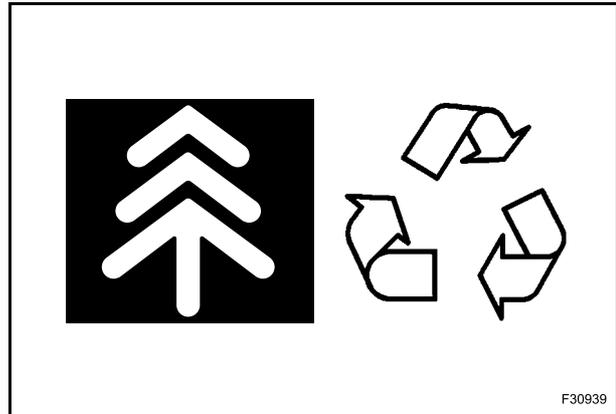
At preset intervals these products will be delivered to disposal stations legally recognized and present in this Country.

Hereunder are listed some products of the machine requiring disposal:

- lube oil;
- brakes system oil;
- coolant mixture, condensation rests and pure anti-freeze;
- diesel oil;
- oil and diesel oil filter elements;
- engine and air conditioning air filter elements;
- battery.

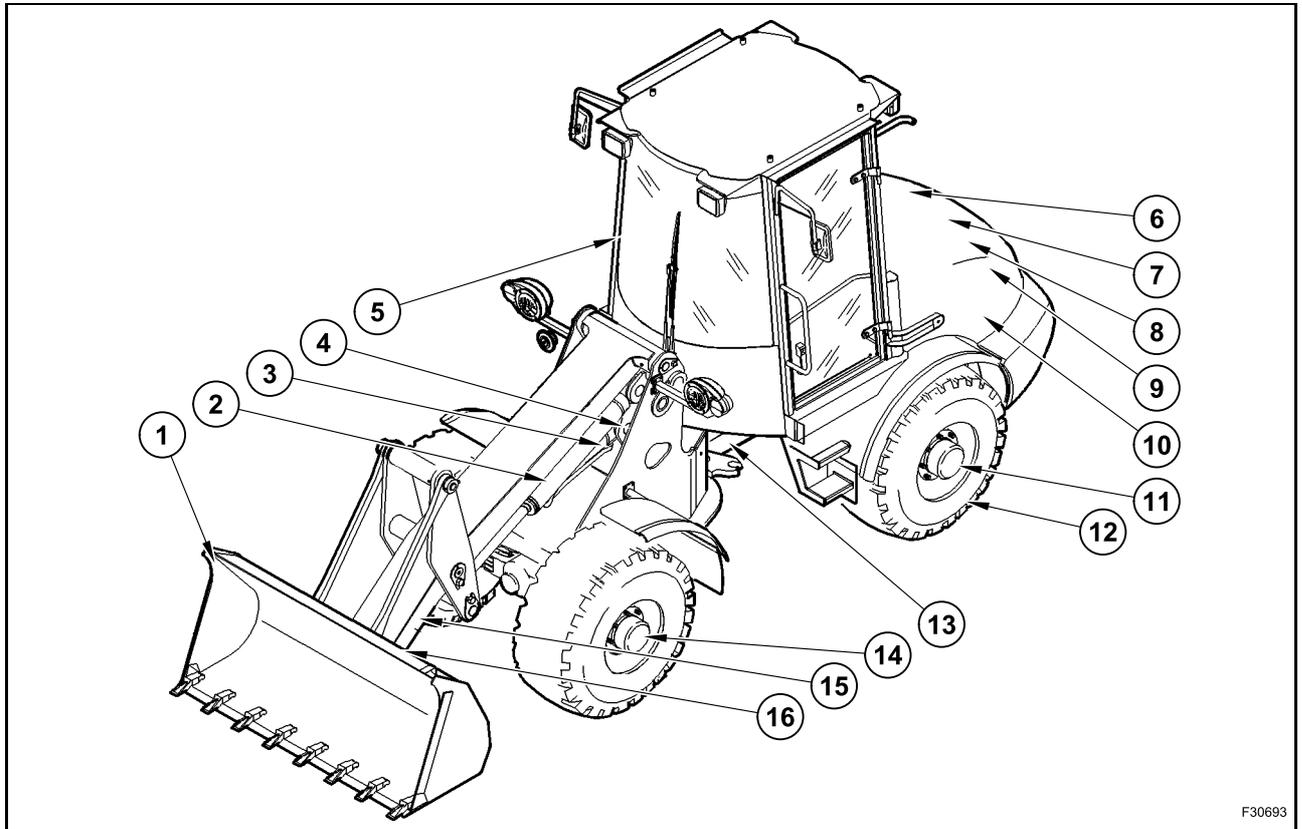
Also polluting rags, paper, sawdust and gloves must be disposed in compliance with the same procedures.

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



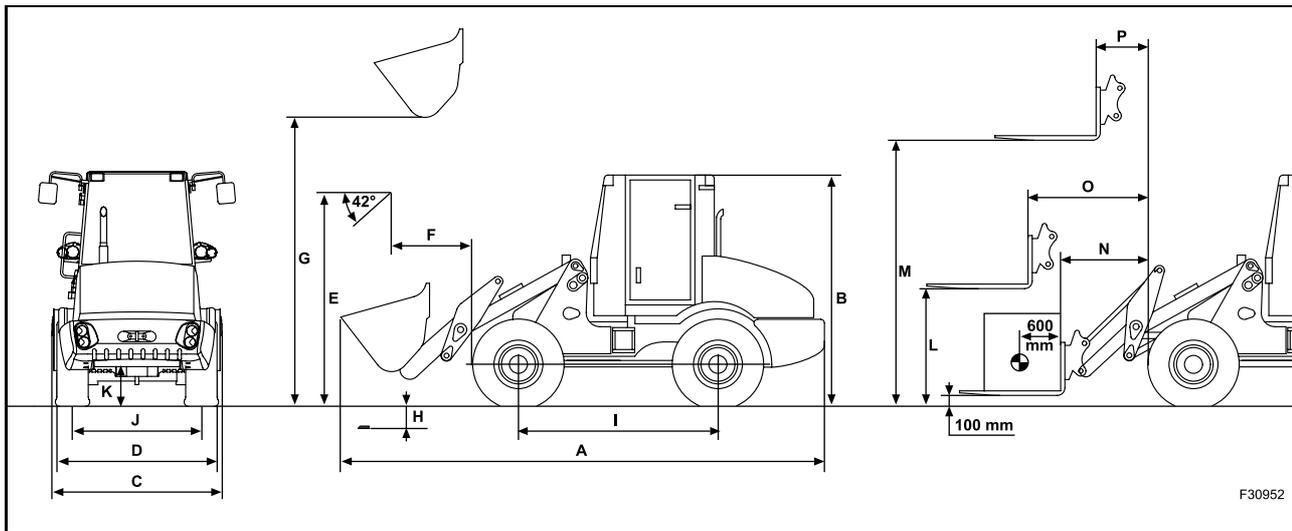
## 2. TECHNICAL SPECIFICATIONS

### 2.1 MAIN COMPONENTS



- |                        |                           |
|------------------------|---------------------------|
| 1. Wheel loader bucket | 9. Hydraulic pumps        |
| 2. Dumping cylinder    | 10. Battery               |
| 3. Lifting cylinder    | 11. Rear axle             |
| 4. Fuel tank           | 12. Transmission          |
| 5. Cab                 | 13. Steering cylinder     |
| 6. Hydraulic oil tank  | 14. Front axle            |
| 7. Air filter          | 15. Working equipment arm |
| 8. Diesel engine       | 16. Quick tool coupler    |

## 2.2 SIZES AND PERFORMANCES



F30952

| MULTIFUNCTIONAL BUCKET                         |                                |    | W50TC | W60TC | W70TC | W80TC |
|--|--------------------------------|----|-------|-------|-------|-------|
| A  | Total length                   | mm | 5250  | 5250  | 5600  | 5750  |
|  |                                | ft | 17.2  | 17.2  | 18.4  | 18.9  |
| B  | Cab height                     | mm | 2680  | 2800  | 2800  | 2800  |
|  |                                | ft | 8.5   | 9.1   | 9.1   | 9.1   |
| C  | Bucket width                   | mm | 1900  | 2050  | 2050  | 2100  |
|  |                                | ft | 6.2   | 6.7   | 6.7   | 6.9   |
| D  | Wheels outer edges width       | mm | 1850  | 1910  | 1910  | 1980  |
|  |                                | ft | 6.1   | 6.3   | 6.3   | 6.5   |
| E  | Dumping height                 | mm | 2550  | 2600  | 2600  | 2650  |
|  |                                | ft | 8.4   | 8.5   | 8.5   | 8.7   |
| F  | Dumping reach                  | mm | 820   | 780   | 840   | 890   |
|  |                                | ft | 2.7   | 2.6   | 2.7   | 2.9   |
| G  | Maximum height from bucket pin | mm | 3250  | 3300  | 3400  | 3450  |
|  |                                | ft | 10.7  | 10.5  | 11.4  | 11.3  |
| H  | Dumping depth                  | mm | 80    | 50    | 85    | 90    |
|  |                                | ft | 0.26  | 0.16  | 0.29  | 0.29  |
| I  | Wheelbase                      | mm | 2200  | 2250  | 2350  | 2350  |
|  |                                | ft | 7.2   | 7.4   | 7.7   | 7.7   |
| J  | Tread                          | mm | 1480  | 1520  | 1520  | 1520  |
|  |                                | ft | 4.8   | 4.9   | 4.9   | 4.9   |
| K  | Gap from ground to brake disc  | mm | 330   | 330   | 330   | 330   |
|  |                                | ft | 1.1   | 1.1   | 1.1   | 1.1   |
| Operating load (with additional counterweight) |                                | kg | 4730  | 5045  | 5545  | 5894  |
|  |                                | lb | 10427 | 11122 | 1224  | 12994 |

| PALLET FORKS                                   |    | W50TC | W60TC | W70TC | W80TC |
|--|----|-------|-------|-------|-------|
| Total length                                   | mm | 1200  | 1200  | 1200  | 1200  |
|  | ft | 3.9   | 3.9   | 3.9   | 3.9   |
| Width of the forks support                     | mm | 1450  | 1450  | 1450  | 1450  |
|  | ft | 4.8   | 4.7   | 4.7   | 4.7   |
| Forks weight                                   | kg | 370   | 370   | 370   | 370   |
|  | lb | 819   | 816   | 816   | 816   |
| L Height with maximum outreach                 | mm | 1370  | 1440  | 1490  | 1490  |
|  | ft | 4.5   | 4.7   | 4.9   | 4.9   |
| M Maximum height                               | mm | 3040  | 3100  | 3180  | 3260  |
|  | ft | 10    | 10.1  | 10.4  | 10.7  |
| N Outreach at ground                           | mm | 850   | 750   | 750   | 820   |
|  | ft | 2.8   | 2.5   | 2.5   | 2.7   |
| O Maximum outreach                             | mm | 1330  | 1270  | 1300  | 1350  |
|  | ft | 4.4   | 4.2   | 4.3   | 4.4   |
| P Outreach at maximum height                   | mm | 590   | 530   | 570   | 560   |
|  | ft | 1.93  | 1.7   | 1.9   | 1.8   |
| Payload on flat ground (80%) - articulated     | kg | 1640  | 1780  | 2120  | 2220  |
|  | lb | 2712  | 2954  | 3505  | 3660  |
| Payload on rough ground (60%) - articulated    | kg | 1230  | 1340  | 1590  | 1660  |
|  | lb | 2706  | 2948  | 3498  | 3652  |
| Operating load (with additional counterweight) | kg | 4780  | 5045  | 5545  | 5845  |
|  | lb | 10538 | 11122 | 12224 | 12886 |

| MULTI-FUNCTIONAL BUCKET                |                 | W50TC | W60TC | W70TC | W80TC |
|--|-----------------|-------|-------|-------|-------|
| Standard bucket capacity (density 1.8) | m <sup>3</sup>  | 0.7   | 0.8   | 0.9   | 1.1   |
|  | ft <sup>3</sup> | 24.7  | 28.2  | 31.8  | 38.8  |
| Tensile force                          | daN             | 5400  | 5900  | 5800  | 7500  |
|  | lbf             | 12140 | 13264 | 13039 | 16861 |
| Dumping load - ISO line                | kg              | 3350  | 3500  | 4270  | 4420  |
|  | lb              | 7385  | 7716  | 9414  | 9744  |
| Dumping load - joint at 40° ISO        | kg              | 2950  | 3100  | 3650  | 3750  |
|  | lb              | 6504  | 6834  | 8047  | 8267  |
| Bucket width                           | mm              | 1900  | 2050  | 2050  | 2100  |
|  | ft              | 6.2   | 6.7   | 6.7   | 6.8   |
| Lifting capacity at ground (hydraulic) | daN             | 4260  | 5050  | 5500  | 6050  |
|  | lbf             | 9577  | 11353 | 12364 | 13601 |

| WEIGHTS  |         | W50TC      | W60TC      | W70TC      | W80TC      |
|--|---------|------------|------------|------------|------------|
| Engine   | kg (lb) | 250 (550)  |            |            |            |
| Front axle   | kg (lb) | 230 (507)  | 318 (701)  |            |            |
| Rear axle (speed gearbox included) and hydraulic motor | kg (lb) | 312 (688)  | 251 (553)  |            | 315 (694)  |
| Cab  | kg (lb) | 470 (1036) |            |            |            |
| Pump at variable displacement                          | kg (lb) | 30 (66)    |            |            |            |
| Hydraulic motor  | kg (lb) | 35 (77)    |            |            |            |
| Lifting frame  | kg (lb) | 420 (926)  | 600 (1322) |            |            |
| Lifting cylinder                                       | kg (lb) | 30 (66)    |            |            |            |
| Cylinder for quick coupler                             | kg (lb) | 12 (26)    |            |            |            |
| Counterweight  | kg (lb) | 393 (866)  | 415 (915)  | 676 (1490) | 786 (1733) |

## 2.3 NOISE

|                               | W50TC    | W60TC    | W70TC | W80TC |
|-------------------------------|----------|----------|-------|-------|
| External noise level $L_{WA}$ | 98 dB(A) | 99 dB(A) |       |       |
| Internal noise level $L_{pA}$ | 77 dB(A) |          |       |       |

## 2.4 DIESEL ENGINE

|  | W50TC  | W60TC                 | W70TC                | W80TC                                   |                      |
|--|--|-----------------------|----------------------|---|----------------------|
| Manufacturer and type                  | Deutz<br>F4M 2011                                |                       |                      | Deutz<br>BF4M 2011                      |                      |
| Operation                              | 4-stroke diesel engine                           |                       |                      |   |                      |
| Combustion system                      | Naturally aspirated engine with direct injection |                       |                      | Turbocharged engine at direct injection |                      |
| Cylinders number                       | 4  |                       |                      |   |                      |
| Cylinders arrangement                  | Vertical, in line                                |                       |                      |   |                      |
| Boring mm (in)                         | 94 (0.30)  |                       |                      |   |                      |
| Stroke mm (in)                         | 112 (0.37)                                       |                       |                      |   |                      |
| Displacement $cm^3$ (ft <sup>3</sup> ) | 3108 (0.109)                                     |                       |                      |   |                      |
| Power<br>DIN 70 020<br>(at rated rpm)  | kW/CV<br>(hp)                                    | 40.4 / 55.0<br>(54.1) | 44.0 / 59.9<br>(59)  | 45.0 / 61.2<br>(60.3)                   | 56.0 / 76.2<br>(75)  |
| Rated rpm<br>(at full load)            | 1/min  | 2300                  | 2400                 | 2500                                    | 2300                 |
| Rpm at no load                         | 1/min  | 900 ± 50              |                      |   |                      |
| Maximum rpm with no load               | 1/min  | 2390 <sup>+100</sup>  | 2530 <sup>+100</sup> | 2580 <sup>+100</sup>                    | 2390 <sup>+100</sup> |
| Ignition order                         | 1,3,4,2  |                       |                      |   |                      |
| Rotation direction                     | leftwards in relation to flywheel position       |                       |                      |   |                      |
| Compression ratio                      | 19 : 1   |                       |                      | 17,5 : 1                                |                      |
| Oil pressure<br>(at 900 rpm)           | bar (psi)  | 1.4 (20.3)            |                      |   |                      |
| Oil pressure<br>(at 1800 rpm)          | bar (psi)  | 2.2 (31.9)            |                      |   |                      |
| Oil pressure<br>(at 2800 rpm)          | bar (psi)  | 3.0 (43.5)            |                      |   |                      |
| Weight                                 | kg (lb)  | 256 (564)             |                      |   | 257 (565)            |

**TIGHTENING TORQUES**

| Position                    | Tightening |        |
|-----------------------------|------------|--------|
|                             | Nm         | lbf-ft |
| Head cover                  | 8.5        | 6.3    |
| Cylinder head cover         | 8.5        | 6.3    |
| Rocker arm adjustment screw | 21         | 15.5   |
| Intake duct                 | 8.5        | 6.3    |
| Foot rigid suspension       | 45         | 33.2   |
| Foot elastic suspension     | 106        | 78.2   |
| Air intake duct             | 21         | 15.5   |
| Exhaust manifold            | 22         | 16.2   |
| Oil drain plug              | 55         | 40.6   |
| Oil pan (sheet metal)       | 21         | 15.5   |
| Oil pan (cast)              | 31         | 22.9   |
| Ignition pipes fastening    | 30         | 22.1   |
| Injection valves attachment | 21         | 15.5   |
| Element filter              | 27         | 19.9   |
| Fittings                    | 4          | 2.9    |

## 2.5 BRAKES SYSTEM

### BRAKE PEDAL VALVE

|                                  |                       |
|----------------------------------|-----------------------|
| Allowable service pressure ..... | 150 bar (2175 lbf-ft) |
| Adjusted pressure .....          | 55 bar (797 lbf-ft)   |
| Pressure of brake on disc .....  | 55 bar (797 lbf-ft)   |

### Accumulator charging valve

|                         |                       |
|-------------------------|-----------------------|
| Infeed pressure .....   | 100 bar (1450 lbf-ft) |
| Shut-off pressure.....  | 150 bar (2175 lbf-ft) |
| Allowable pressure..... | 150 bar (2175 lbf-ft) |

### PRESSURE SWITCHES

#### Brake light pressure switch

|                       |                     |
|-----------------------|---------------------|
| Infeed pressure ..... | 3.5 bar (51 lbf-ft) |
| Function .....        | when closing        |

#### Accumulator charge pressure switch

|                       |                      |
|-----------------------|----------------------|
| Infeed pressure ..... | 80 bar (1160 lbf-ft) |
| Function .....        | bidirectional        |

#### Gear change pressure switch (high speed only)

|                       |                     |
|-----------------------|---------------------|
| Infeed pressure ..... | 40 bar (580 lbf-ft) |
| Function .....        | when closing        |

### ACCUMULATORS

#### Brake accumulator

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Capacity .....                       | 0.32 litres (0.10 gal)               |
| Allowable service overpressure ..... | 210 bar (3045 lbf-ft)                |
| Allowable service temperature .....  | -10 °C at + 80 °C (-22 °F at 176 °F) |
| Filling gas .....                    | nitrogen                             |
| Filling gas overpressure .....       | 20 ± 1 bar (362 ± 15 psi)            |
| Weight .....                         | 1.3 kg (3 lbs)                       |

#### Pump accumulator

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Capacity .....                       | 0.16 litres (0.04 gal)               |
| Allowable service overpressure ..... | 210 bar (3045 lbf-ft)                |
| Allowable service temperature .....  | -30 °C at + 80 °C (-22 °F at 176 °F) |
| Filling gas .....                    | nitrogen                             |
| Filling gas overpressure .....       | 25 ± 1 bar (362 ± 15 psi)            |
| Weight .....                         | 0.8 kg (2 lbs)                       |

**2.6 STEERING SYSTEM**

Primary safety pressure ..... 175 bar (2537 psi)

Secondary safety pressure ..... 240 bar (3480 psi)

**POWER STEERING**

|                        |  | <b>W50TC - W60TC - W70TC</b> | <b>W80TC</b>  |
|------------------------|--|------------------------------|---------------|
| Model                  |  | OSPC200LS                    | OSPC315LS     |
| Displacement           | cm <sup>3</sup> /rev<br>(in <sup>3</sup> /rev) | 200<br>(12.2)                | 315<br>(19.2) |
| Rated oil flow         | litre/min<br>(gal/min)                         | 20<br>(5.3)                  | 32<br>(8.4)   |
| Weight                 | kg (lb)  | 5.8 (13)                     | 6.2 (14)      |
| Relief valve adjusting | bar (psi)                                      | 170 (2465)                   | 170 (2465)    |
| Shock valve adjusting  | bar (psi)                                      | 215 (3117)                   | 225 (3262)    |

**Tightening torques**

| <b>Position</b>                           | <b>Tightening</b> |               |
|---|-------------------|---------------|
|   | <b>Nm</b>         | <b>lbf·ft</b> |
| Steering wheel nut                        | 55                | 40            |
| Power steering to steering column bracket | 23                | 17            |
| Power steering end cover                  | 30                | 22            |
| Power steering end pipe connection        | 45                | 33            |
| Power steering pipe adaptors              | 55                | 40            |
| Check valve                               | 30                | 22            |
| Shock valve                               | 30                | 22            |

**STEERING CYLINDER**

|          |         | <b>W50TC</b> | <b>W60TC</b> | <b>W70TC</b> | <b>W80TC</b> |
|----------|---------|--------------|--------------|--------------|--------------|
| Quantity |         | 1            |              |              |              |
| Ø rod    | mm (in) | 32 (1.2)     | 32 (1.2)     | 32 (1.2)     | 40 (1.6)     |
| Ø piston | mm (in) | 70 (2.7)     | 70 (2.7)     | 70 (2.7)     | 80 (3.15)    |
| Stroke   | mm (in) | 300 (0.9)    | 300 (0.9)    | 300 (0.9)    | 300 (0.9)    |

## 2.7 HYDRAULIC SYSTEM

### PRESSURES ADJUSTMENT

#### Working equipment

|  |                    |
|--|--------------------|
| Primary safety pressure .....                                  | 230 bar (3335 psi) |
| Secondary safety pressure - side dumping cylinder bottom ..... | 250 bar (3625 psi) |
| Secondary safety pressure - side dumping cylinder rod .....    | 280 bar (4061 psi) |
| Secondary safety pressure - side lifting cylinder bottom.....  | 280 bar (4061 psi) |

#### Transmission

|                                    |           | W50TC      | W60TC      | W70TC      | W80TC      |
|------------------------------------|-----------|------------|------------|------------|------------|
| Supply pressure (loading platform) | bar (psi) | 25 (362)   | 27 (391)   | 27 (391)   | 27 (391)   |
| Adjustment start                   | bar (psi) | 50 (725)   |            |            |            |
| Adjustment end                     | bar (psi) | 400 (5801) |            |            |            |
| Pressure cut-off                   | bar (psi) | 430 (6236) |            |            |            |
| Maximum pressure valve opening     | bar (psi) | 465 (6744) | 467 (6773) | 467 (6773) | 467 (6773) |
| Hydraulic motor adjustment start   | bar (psi) | 255 (3698) | 200 (2900) | 200 (2900) | 200 (2900) |

### PUMP AT VARIABLE DELIVERY

|  |  | W50TC  | W60TC                       | W70TC                       | W80TC                       |
|--|--|--|-----------------------------|-----------------------------|-----------------------------|
| System   |  | Pump with adjustment depending on engine speed |                             |                             |                             |
| Type   |  | AV4VG40DA1D2<br>/ 32R                          | A4VG56DA1D2<br>/ 32R        | A4VG56DA1D2<br>/ 32R        | A4VG71DA1D2<br>/ 32R        |
| Volumetric delivery                              | cm <sup>3</sup> /rev<br>(in <sup>3</sup> /rev) | 40<br>(2.44)                                   | 56.0<br>(3.41)              | 56.0<br>(3.41)              | 71.0<br>(4.33)              |
| Power (useful)                                   | kW (hp)  | 34.4<br>(46.1)                                 | 38.0<br>(51)                | 38.5<br>(51.6)              | 49.0<br>(65.7)              |
| Transmission through                             |  | diesel engine direct drive i = 1.0             |                             |                             |                             |
| Service revolutions<br>(= engine rated speed)    | 1/min  | 2300   | 2400                        | 2500                        | 2300                        |
| Maximum oil delivery                             | bar (psi)                                      | 88.9<br>(1289)                                 | 131.3<br>(1904)             | 136.9<br>(1986)             | 159.3<br>(2310)             |
| Supply pressure<br>(rotation speed at full load) | bar (psi)                                      | 25<br>(362)                                    | 27<br>(391)                 | 27<br>(391)                 | 27<br>(391)                 |
| Adjustment start                                 | bar (psi)                                      | 50 (725)<br>(at 1100 rpm)                      | 50 (725)<br>(at 1100 rpm)   | 50 (725)<br>(at 1100 rpm)   | 50 (725)<br>(at 1150 rpm)   |
| Adjustment end                                   | bar (psi)                                      | 400 (5801)<br>(at 1900 rpm)                    | 400 (5801)<br>(at 2100 rpm) | 400 (5801)<br>(at 2100 rpm) | 400 (5801)<br>(at 1800 rpm) |
| Pressure cut-off                                 | bar (psi)                                      | 430 (6234)                                     |                             |                             |                             |
| High pressure relief valves<br>- opening -       | bar (psi)                                      | 465<br>(6744)                                  | 467<br>(6773)               | 467<br>(6773)               | 467<br>(6773)               |
| Hydraulic motor adjustment<br>start              | bar (psi)                                      | 255 (3698)<br>(at 2100 rpm)                    | 200 (2900)<br>(at 2300 rpm) | 200 (2900)<br>(at 2300 rpm) | 210 (3045)<br>(at 2000 rpm) |
| Voltage  | V  | 12   |                             |                             |                             |

**DOUBLE GEAR PUMP**

|                     |  | <b>W50TC</b>                         | <b>W60TC</b> | <b>W50TC</b>          | <b>W60TC</b> | <b>W70TC</b>                   | <b>W80TC</b> | <b>W70TC</b>          | <b>W80TC</b> |
|---------------------|--|--------------------------------------|--------------|-----------------------|--------------|--------------------------------|--------------|-----------------------|--------------|
| Operation           |  | Working and steering equipment       |              | Fan and service brake |              | Working and steering equipment |              | Fan and service brake |              |
| Type                |  | Gear pump                            |              |                       |              |                                |              |                       |              |
| Displacement        | cm <sup>3</sup> /rev<br>(in <sup>3</sup> /rev) | 22.5<br>(1.37)                       | 28<br>(1.7)  | 11<br>(0.67)          |              | 28<br>(1.7)                    | 32<br>(1.95) | 11<br>(0.67)          | 14<br>(0.85) |
| Transmission        |  | primary until through-shaft, i = 1.0 |              |                       |              |                                |              |                       |              |
| Service revolutions | 1/min  | 2300                                 | 2400         | 2300                  | 2400         | 2500                           | 2300         | 2500                  | 2300         |
| Service pressure    | bar<br>(psi)                                   | 270<br>(3914)                        |              | 150<br>(2175)         |              | 270<br>(3914)                  |              | 150<br>(2175)         |              |
| Oil supply          | l/min<br>(gal/min)                             | 50<br>(13.2)                         | 67<br>(17.7) | 25<br>(6.6)           | 26<br>(6.9)  | 70<br>(18.5)                   | 73<br>(19.3) | 27<br>(7.1)           | 32<br>(8.4)  |

**HYDRAULIC CYLINDERS**

|                                    |         | <b>W50TC</b> | <b>W60TC</b> | <b>W70TC</b> | <b>W80TC</b> |
|------------------------------------|---------|--------------|--------------|--------------|--------------|
| <b>Lifting cylinder</b>            |         |              |              |              |              |
| Quantity                           |         | 1            |              |              |              |
| Ø rod                              | mm (in) | 50 (1.96)    | 55 (2.16)    | 55 (2.16)    | 60 (2.36)    |
| Ø piston                           | mm (in) | 90 (3.54)    | 100 (3.93)   | 100 (3.93)   | 110 (4.33)   |
| Stroke                             | mm (in) | 721 (28.38)  | 728 (28.66)  | 728 (28.66)  | 730 (28.74)  |
| <b>Dumping cylinder</b>            |         |              |              |              |              |
| Quantity                           |         | 1            |              |              |              |
| Ø rod                              | mm (in) | 50 (1.96)    | 55 (2.16)    | 55 (2.16)    | 60 (2.36)    |
| Ø piston                           | mm (in) | 90 (3.54)    | 100 (3.93)   | 100 (3.93)   | 110 (4.33)   |
| Stroke                             | mm (in) | 459 (18.07)  | 454 (17.87)  | 490 (19.29)  | 490 (19.29)  |
| <b>Quick tool coupler cylinder</b> |         |              |              |              |              |
| Quantity                           |         | 1            |              |              |              |
| Ø rod                              | mm (in) | 25 (0.98)    | 25 (0.98)    | 25 (0.98)    | 25 (0.98)    |
| Ø piston                           | mm (in) | 40 (1.57)    | 40 (1.57)    | 40 (1.57)    | 40 (1.57)    |
| Stroke                             | mm (in) | 60 (2.36)    | 60 (2.36)    | 60 (2.36)    | 60 (2.36)    |

**Stroke times**

| <b>With bucket empty</b> |     | <b>W50TC</b> | <b>W60TC</b> | <b>W70TC</b> | <b>W80TC</b> |
|--------------------------|-----|--------------|--------------|--------------|--------------|
| Lifting                  | sec | 6.0 ± 0.5    | 5.7 ± 0.5    | 5.5 ± 0.5    | 6.3 ± 0.5    |
| Lowering                 | sec | 3.0 ± 0.5    | 3.0 ± 0.5    | 3.2 ± 0.5    | 3.2 ± 0.5    |
| Lifting                  | sec | 1.0 ± 0.5    | 1.0 ± 0.5    | 1.2 ± 0.5    | 1.2 ± 0.5    |

**HYDRAULIC MOTOR**

|                                  |                                       | <b>W50TC</b>               | <b>W60TC</b>               | <b>W70TC</b>               | <b>W80TC</b>                |
|----------------------------------|---------------------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|
| Type                             |                                       | A6VM80HA1U1 / 63W          |                            |                            | A6VM107HA1U1 / 63W          |
| Displacement $Q_{max} / Q_{min}$ | cm <sup>3</sup><br>(in <sup>3</sup> ) | 80 / 18.8<br>(4.88 / 1.15) | 80 / 23.7<br>(4.88 / 1.44) | 80 / 24.8<br>(4.88 / 1.51) | 107 / 31.5<br>(6.53 / 1.92) |
| Maximum service revolutions      | rpm                                   | 4362                       | 5289                       | 5292                       | 4811                        |
| Delivery pressure                | bar (psi)                             | 25 (362)                   | 25 (362)                   | 25 (362)                   | 25 (362)                    |
| Service pressure                 | bar (psi)                             | 245 (3552)                 | 190 (2755)                 | 185 (2682)                 | 200 (2900)                  |
| Pressure increasing spring       | bar (psi)                             | 20 (290)                   | 10 (145)                   | 10 (145)                   | 10 (145)                    |
| Voltage                          | V                                     | 12                         |                            |                            |                             |

**2.8 ELECTRICAL SYSTEM**

Service voltage..... 12 V

**Battery:**

Capacity (20 h)..... 92 Ah

Critical current..... 900 A

**Alternator** ..... 55 A

**2.9 BUCKETS**

|              |                                      | <b>W50TC</b>  |                |                | <b>W60TC</b>   |                | <b>W70TC</b>   |                 | <b>W80TC</b>   |                |                |
|--------------|--------------------------------------|---------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|
| SAE capacity | m <sup>3</sup><br>(ft <sup>3</sup> ) | 0.65<br>(23)  | 0.70<br>(24.7) | 0.80<br>(28.2) | 0.80<br>(28.2) | 0.90<br>(31.8) | 0.90<br>(31.8) | 1.00<br>(35.3)  | 1.00<br>(35.3) | 1.10<br>(38.8) | 1.20<br>(42.4) |
| Width        | mm<br>(ft)                           | 1800<br>(5.9) | 1900<br>(6.2)  | 1900<br>(6.2)  | 2050<br>(6.7)  | 2050<br>(6.7)  | 2050<br>(6.7)  | 2100<br>(6.900) | 2100<br>(6.9)  | 2100<br>(6.9)  | 2100<br>(6.9)  |
| Weight       | kg<br>(lb)                           | 250<br>(551)  | 265<br>(584)   | 295<br>(650)   | 315<br>(694)   | 335<br>(738)   | 335<br>(738)   | 365<br>(805)    | 365<br>(805)   | 370<br>(816)   | 410<br>(904)   |

## 2.10 AXLES

### FRONT AXLES

|   | W50TC   | W60TC - W70TC - W80TC                              |
|---|---|--|
| Model   | 28.16 (CA147195)                                    | 28.25 (CA150144)                                   |
| Differential type   | limited slip  |  |
| Dry weight  | 230 kg (507 lb)                                     | 318 kg (701 lb)                                    |
| Bevel gear ratio  | 2.90 / 1  | 3.667 / 1  |
| Epicyclical gear ratio  | 6.00 / 1  | 6.00 / 1   |
| Total ratio   | 17.45 / 1   | 21.000 / 1   |
| Input rotation  | clockwise   |  |
| Bevel gear set backlash   | 0.17 ÷ 0.24 mm (0.0066 ÷ 0.0094 in)                 |  |
| Pinion bearings preloading<br>(measured on D = 34.5 mm (1.35 in) without seals)                 | P = 9.2 ÷ 13.7 daN (20.6 ÷ 30.8 lbf)                |  |
| Pinion-ring gear bearings total preloading<br>(measured on D = 34.5 mm (1.35 in) without seals) | T = (P+3.1)+(P+4.7) daN<br>(T=(P+6.9)+(P+10.5) lbf) | T = (P+2.5)+(P+3.8) daN<br>(T=(P+5.6)+(P+8.5) lbf) |
| Maximum service pressure  | 55 bar (797)  |  |

### REAR AXLES

|   | W50TC   | W60TC - W70TC - W80TC                              |
|---|---|--|
| Model   | CA147194+CA150145<br>28.16 + TB150                  | CA147189+CA150146<br>28.20 + TB150                 |
| Differential type   | CA147194: standard<br>CA150145: limited slip        | CA147189: standard<br>CA150146: limited slip       |
| Dry weight  | 255 kg (562 lb)                                     | 276 kg (608 lb)                                    |
| Bevel gear ratio  | 2.91 / 1  | 3.66 / 1   |
| Epicyclical gear ratio  | 6.00 / 1  | 6.00 / 1   |
| Transmission box gear ratio   | 2.257 / 1   | 2.257 / 1  |
| Total ratio   | 39.38 / 1   | 49.65 / 1  |
| Input rotation  | counterclockwise                                    |  |
| Bevel gear set backlash   | 0.18 ÷ 0.23 mm<br>(0.0070 ÷ 0.0090 in)              | 0.17 ÷ 0.24 mm<br>(0.0066 ÷ 0.0094 in)             |
| Pinion bearings preloading<br>(measured on D = 34.8 mm (1.37 in) without seals)                 | P = 9.2 ÷ 13.7 daN (20.6 ÷ 30.8 lbf)                |  |
| Pinion-ring gear bearings total preloading<br>(measured on D = 34.8 mm (1.37 in) without seals) | T = (P+3.1)+(P+4.7) daN<br>(T=(P+6.9)+(P+10.5) lbf) | T = (P+2.5)+(P+3.8) daN<br>(T=(P+5.6)+(P+8.5) lbf) |