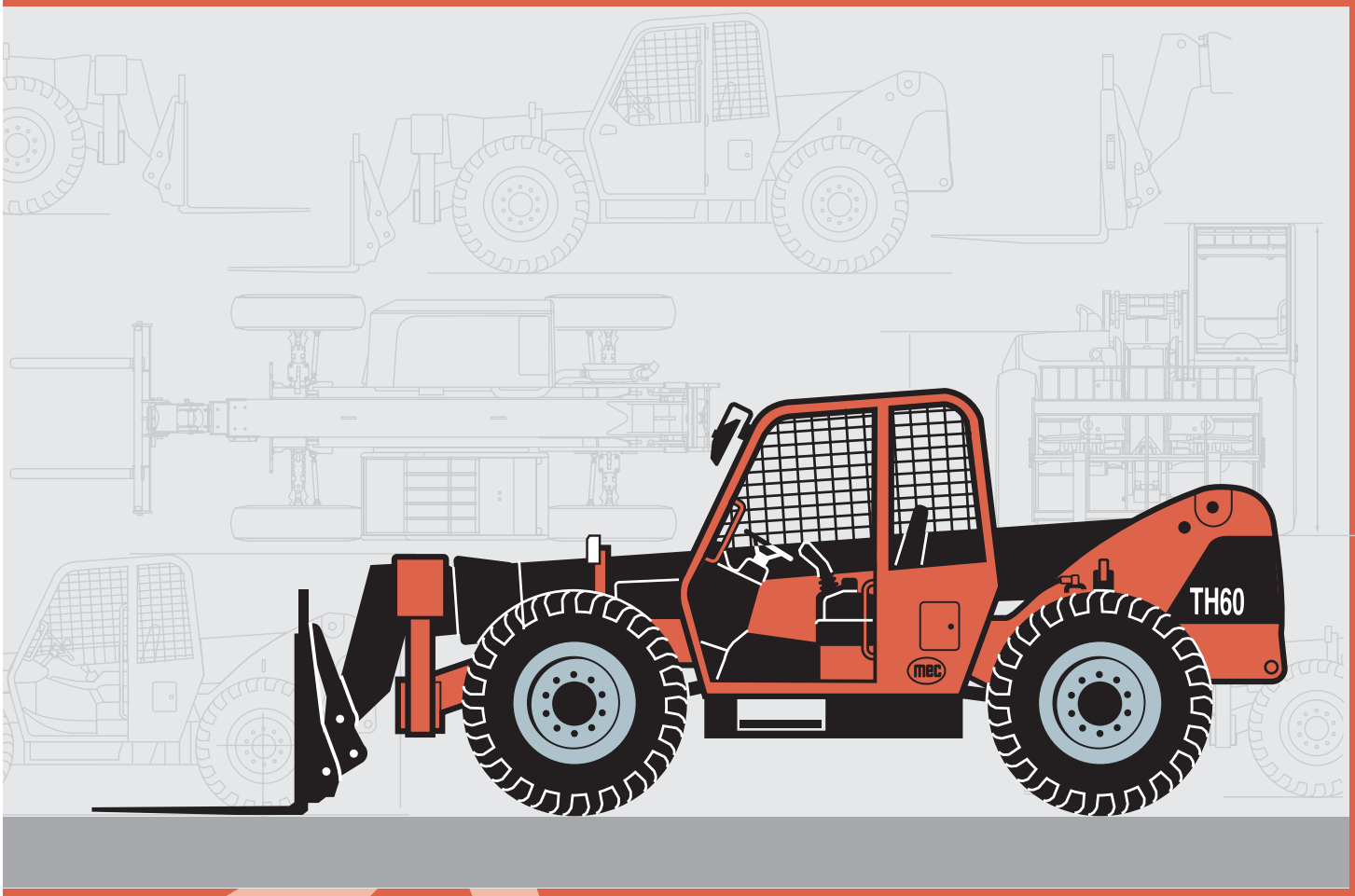
OPERATOR'S MANUAL

TH60/TH80



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Foreword

This Operator's Manual is intended as a guide for the correct use and maintenance of the machine. Therefore, study it carefully before starting and operating the machine, or before carrying out any preventive maintenance.

Keep the manual in the cab so that it is always at hand. Replace it immediately, if it is lost.

The manual describes the applications for which the machine primarily is intended and is written to apply for all markets. We therefore ask you to disregard the sections which are not applicable to your machine or to the work for which you use your machine.

NOTE: The information in the manual applies to both machine types, TH60 and TH80, unless otherwise stated.

Many hours are spent on design and production to make a machine that is as efficient and safe as possible. The accidents which occur in spite of this, are mostly caused by the human factor. A safety conscious person and a well maintained machine make a safe, efficient and profitable combination. **Therefore, read the safety instructions and follow them.**

We continually strive to improve our products and to make them more efficient through changes to their design. We retain the right to this without committing ourselves to introducing these improvements on products, which have already been delivered. We also retain the right to change data and equipment, as well as instructions for service and other maintenance measures without prior notice.

Safety regulations

It is the operator's obligation to know and follow the applicable national and local safety regulations. The safety instructions in this manual only apply to cases when there are no national or local regulations.

WARNING!

The symbol above appears at various points in the manual together with a warning text. It means: Warning, be alert! Your safety is involved! It is the obligation of the operator to make sure that all warning decals are in place on the machine and that they are readable. Accidents may otherwise occur.

Get to know the capacity and limits of your machine!

Identification numbers

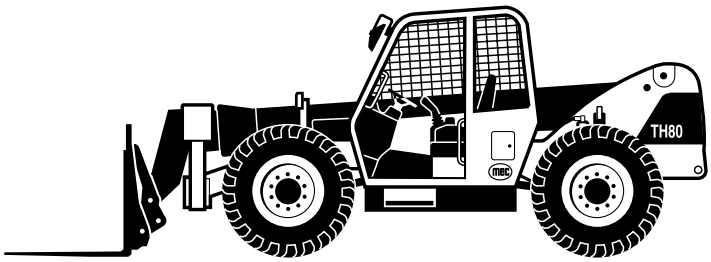
State the identification number of the machine and the components below. The number should be stated when contacting the manufacturer and when ordering spare parts. The plates are described on page 8.

Manufacturer	MEC Aerial Platform Sales Corp 1775 Park Street, Suite 77 Selma, CA 93662 USA
PIN (Serial No.)	
Engine	
Transmission	
Drop box	
Front axle	
Rear axle	
Cab/Open ROPS	

Table of contents

Presentation

The following pages contain a presentation of the machine.



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Intended use

The machine is intended to be used under normal conditions for the applications described in the Operator's Manual. If it is used for other purposes or in potentially dangerous environments, for example explosive atmospheres, fire hazardous areas or areas with dust containing asbestos, special safety regulations are to be followed and the machine to be equipped for such use. Contact the manufacturer/dealer for further information.

Engine

The engine, D4D, is a four-cylinder, four-stroke, low-emission, direct injection diesel with 4.04 litre (1.07 US gal) cylinder capacity. It is turbocharged and liquid cooled. The muffler is not equipped with a spark arrester.

Electrical system

The electrical system consists of start motor, alternator, Open ROPS and chassis electrics, battery, lights and fuses.

Transmission

The transmission is a four forward, three reverse transmission with torque converter and column mounted electro-hydraulic direction control lever.

The transmission is also equipped with a drop box to transfer the power from the transmission to the propeller shafts.

Brakes

The machine features a single brake circuit. The brakes are oil-immersed, self-adjusting and located in the front and rear axle.

The service brake is hydraulically operated.

The parking brake is electro-hydraulically operated by a switch on the instrument panel.

Steering

The machine has a hydrostatic steering system that operates double acting hydraulic cylinders located on the front and rear axle.

The machine is equipped with four-wheel steer system, which allows the operator to choose between two-wheel steer mode, crab steer mode and the four-wheel steer mode.
The function is operated with a switch on the front instrument panel.

Cab/Open ROPS

The machine is available with two different types of cabs. The Open ROPS is an open cab without door or windows. The cab is an enclosed cab with door and windows. Both types incorporate a full FOPS and ROPS structure with full instrumentation, ergonomic hand control for the boom and tilt movements, control for machine angularity, and vinyl seat.

FOPS and ROPS

The cab is approved as a protective cab according to FOPS and ROPS standards, see page 131. FOPS is an abbreviation of Falling Object Protective Structure (roof protection) and ROPS is an abbreviation of Roll Over Protective Structure (roll over protection).

Never carry out any unauthorised alterations to the cab, e.g. lowering the roof height, drilling, welding on brackets for fire extinguisher, radio aerial or other equipment, without first having discussed the alteration with personnel at the MEC Engineering Department. This department will decide whether the alteration causes the FOPS and ROPS approval to become void.

It is important that all parties concerned are aware of these regulations.

Axles

The axles provide full time four-wheel drive. The axles features spiral crown and pinion driving through epicyclic hubs and inboard oil immersed brakes.

Drive is provided by propeller shafts direct from the transmission/dropbox.

Hydraulic system

The hydraulic system has a fixed gear pump with closed center and a fixed displacement gear pump for boom and fork functions. Functions are controlled through the control valve. The machine can be equipped with extra hydraulic outputs at the front end of the boom for different applications.

Alternator

The alternator drive belt is of self adjusting type.

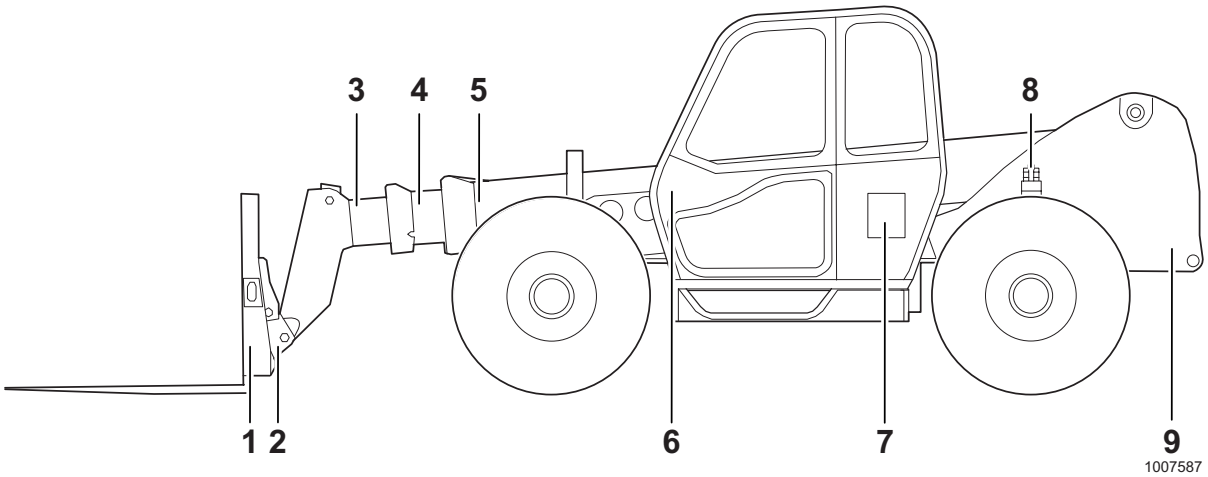
Equipment

MEC supplies a range of after-market kits and options. Contact your MEC dealer for further details.

Machine view

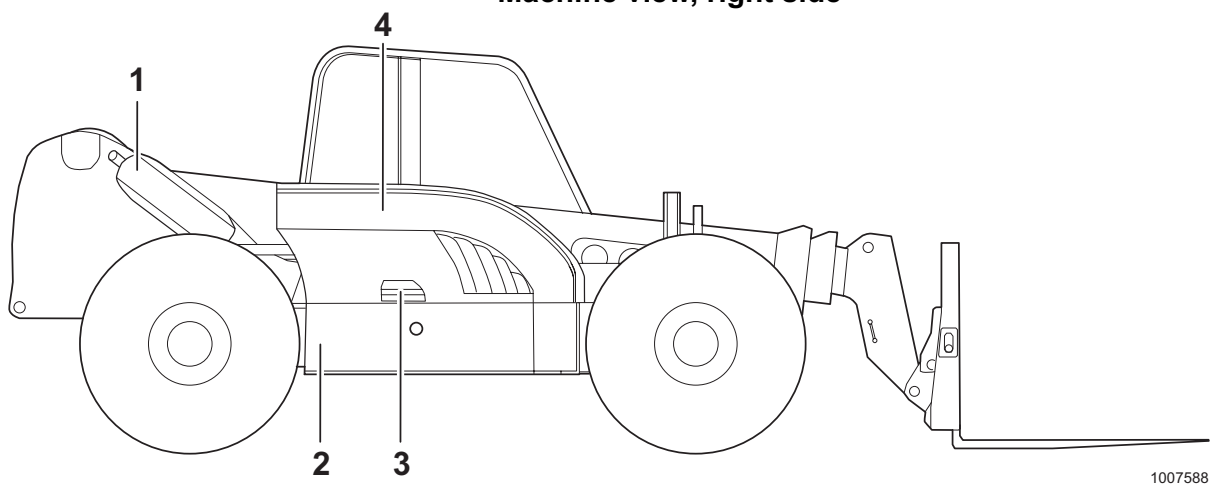
The terms left-hand and right-hand, when used in this manual, indicate the sides of the machine as seen from the operators seat facing the front of the machine.

Machine view, left side



1	Carriage	6	Cab/Open ROPS
2	Attachment bracket	7	Fuel cap cover
3	Third boom section	8	Machine tilt cylinder/rear axle pivoting lock
4	Second boom section	9	Counterweight (if fitted)
5	First boom section		

Machine view, right side



1	Muffler	3	Engine cover key insert
2	Hydraulic oil tank	4	Engine cover

Product plates

When ordering spare parts, and in all telephone inquiries or correspondence the model designation and the Product Identification Number (PIN) must always be quoted.

Product plate

- The product plate on the machine shows the manufacturer's name and address, the model designation, PIN, the machine mass, the engine net power and the manufacturing year. The plate is positioned on the left hand side of the machine.

Engine product plate

- The engine product plate contains the type designation and the part and serial numbers and is positioned on the engine inside the engine cover on the right side of the machine.

Transmission product plate

- The transmission product plate contains the type designation and the part and serial numbers and is positioned on the transmission.

Axle product plate

- The axle product plate contains the type designation and part and the serial numbers and is positioned on each axle.

Cab/Open ROPS product plate

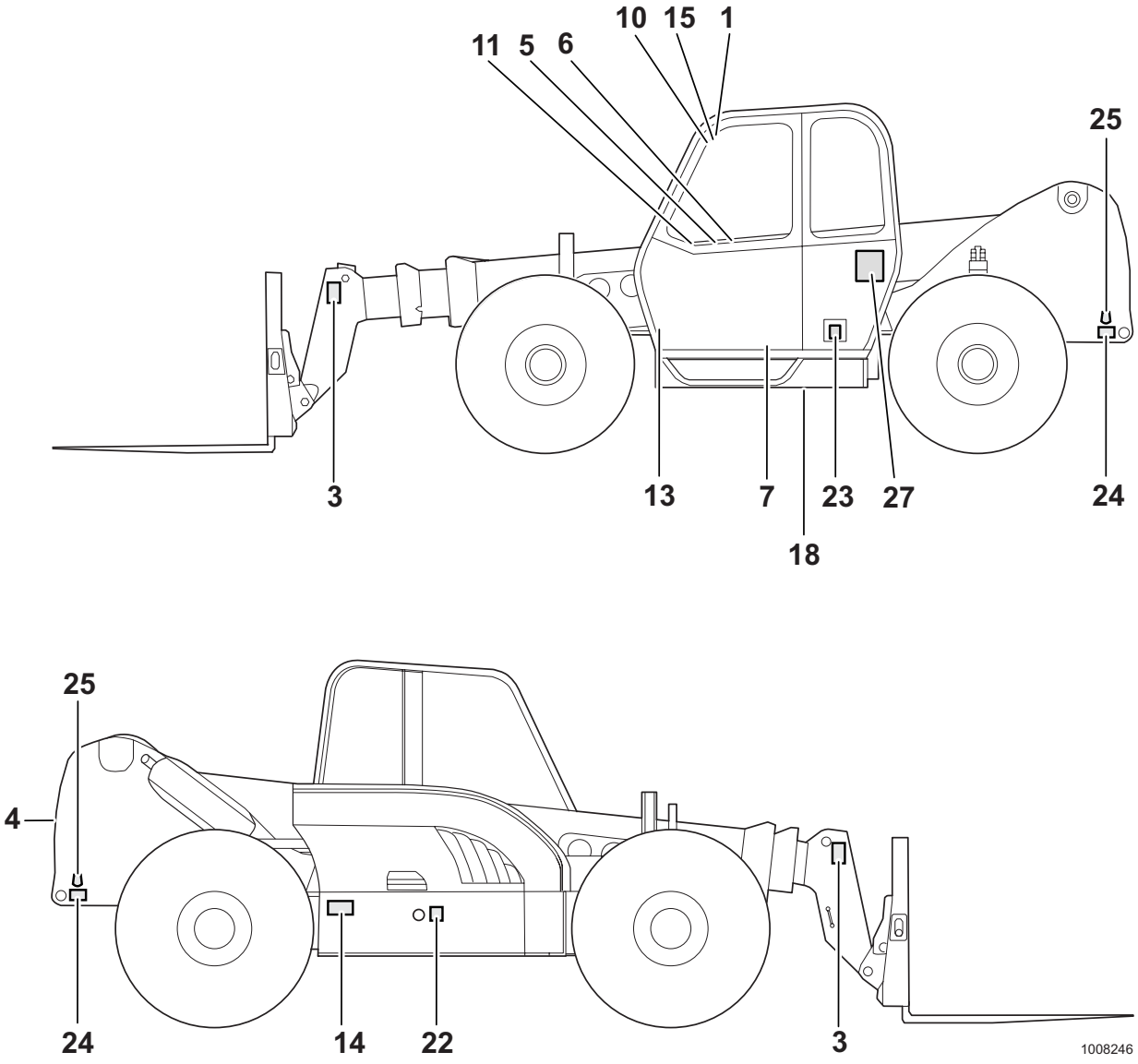
- The Cab/Open ROPS product plate contains the manufacturer’s name and address, the cab serial number, the machine type, the ROPS/FOPS number and the max. machine mass. The plate is positioned on the right hand side of the storage under the Cab/Open ROPS seat.

Each country (state) has its own safety regulations. This also has an effect on the plates on the machine. Should the plates in this manual differ from those prescribed in your country, the local instructions for machine plates must be followed.

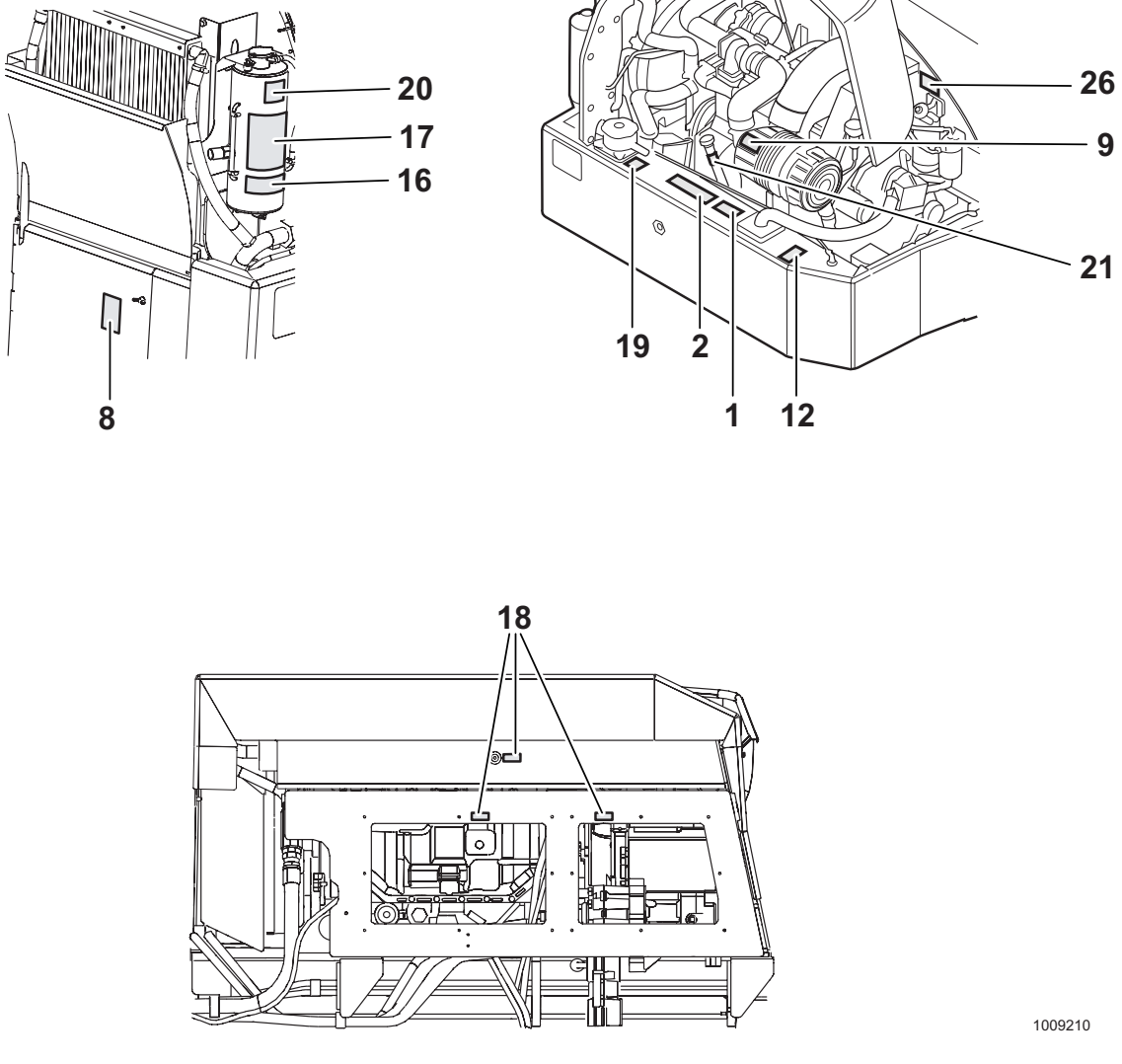
Information and warning decals

The operator should know and pay attention to the information and warning decals which are positioned on the machine. All decals are not installed on all machines, as they are market and machine dependent.

The decals must be kept free from dirt, so that they can be read and understood. If they have been lost or no longer are legible, they must be replaced immediately. The part number (order number) is given on the respective decals and in the Parts Catalogue.



10 Information and warning decals



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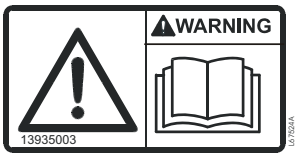
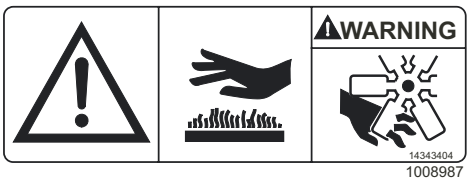
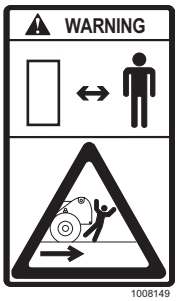


1 WARNING! First read the operator's manual



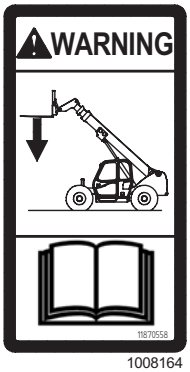
2 WARNING! Rotating fan and hot surfaces

3 WARNING! Do not walk under raised attachment and boom

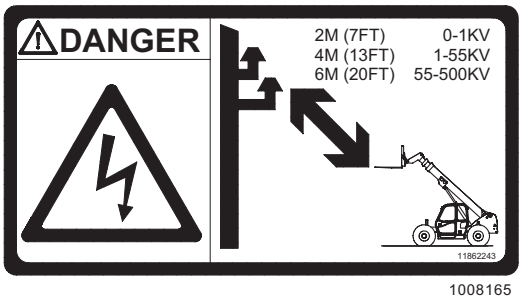


4 WARNING! Reversing machine

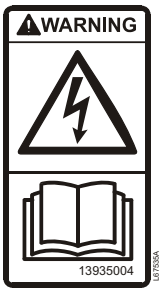
5 WARNING! Do not travel with the boom elevated



6 WARNING! Before picking a load, check the maximum permitted load in the Operator's Manual



7 WARNING! High voltage

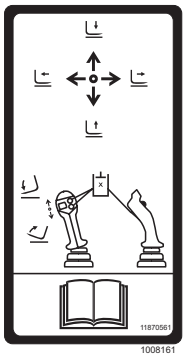


8 WARNING! Before connecting jump leads read the Operator's Manual

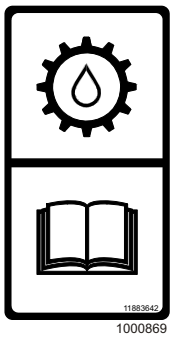
9 WARNING! Do not use starting gas (ether)

10 WARNING! Lower implement before leaving seat

12 Information and warning decals

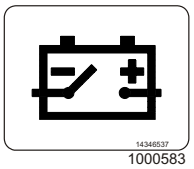


11 Boom control lever – read the Operator's Manual



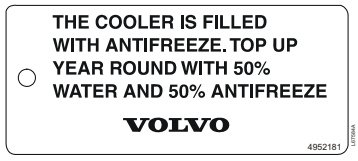
12 Transmission oil – read the Operator's Manual

13 Emergency exit



14 Battery disconnect switch

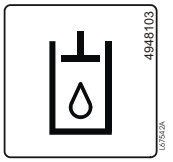
15 Always use seat belt



16 Coolant anti-freeze

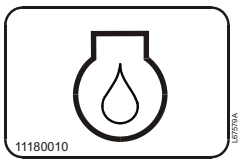
17 Coolant level indicator

18 Draining point

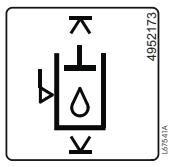


19 Hydraulic oil filler point

20 Engine coolant filler point



21 Engine oil filler port

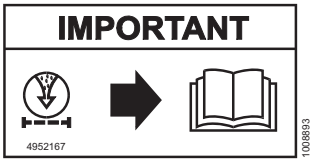


22 Hydraulic oil level

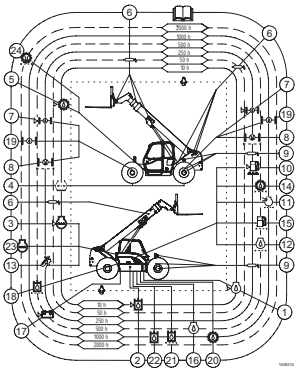
23 Fuel filler point

24 Attaching point for tie down

25 Point for lifting



26 Air cleaner – read the Operator's Manual



27 Lubrication and service chart

The USA Federal Clean Air Act

The Federal Clean Air Act Section 203 (a) (3) prohibits the removal of air pollution control devices or the modification of an EPA-certified non-road engine to a non-certified configuration.

The Federal regulations implementing the Clean Air Act for non-road engines, 40 C.F.R.Section 89.1003(a)(3)(i), reads as follows:

The following act and the causing thereof are prohibited:

For a person to remove or render inoperative a device or element of design installed on or in a non-road engine vehicle or equipment in compliance with regulations under this part prior to its sale and delivery to the ultimate purchaser or for a person knowingly to remove or render inoperative such a device or element of design after the sale and delivery to the ultimate purchaser.

The law provides a penalty of up to $2,500 for each violation.

An example of a prohibited modification is the recalibration of the fuel system so that the engine will exceed the certified horsepower or torque.

You should not make a change to an EPA-certified non-road engine that would result in an engine that does not match the engine configuration certified to meet the Federal Standards.

Customer Assistance

MEC Construction Equipment wishes to help assure that the Emission Control System Warranty is properly administered. In event that you do not receive the warranty service to which you believe you are entitled under the Emission Control System Warranty, you should contact your nearest MEC Construction Equipment Regional office for assistance.

Normal Non-Road Engine Use

The Maintenance Instructions are based on the assumption that this conventional machine will be used as designated in the Operator's Instruction Manual and operated only with the specified fuel and lubrication oils.

Non-Road Engine Maintenance

The non-road engine is of conventional design and any local dealer may perform the necessary non-road engine emission control maintenance defined in this manual.

MEC recommends that the purchaser use the service program for the non-road engine, known as Preventative Maintenance, including the recommended engine emission control maintenance.

In order to document that the proper regular maintenance has been performed on the non-road engine, MEC recommends that the owner keep all records and receipts of such maintenance. These records and receipts should be transferred to each subsequent purchaser of the non-road engine.

Service Performed By Your Local Dealer

Your local dealer is best qualified to give you good, dependable service since he has trained service technicians and is equipped with genuine original manufacturer´s parts and special tools, as well as the latest technical publications. Discuss your servicing and maintenance requirements with your local dealer. He can tailor a maintenance program for your needs.

For regular scheduled service or maintenance, it is advisable to contact your local dealer in advance to arrange for an appointment to ensure availability of the correct equipment and service technician to work on your machine. This will aid your local dealer in efforts to decrease service time on your machine.

Preventative Maintenance Program

To retain the dependability, noise level and exhaust emission control performance originally built into your conventional non-road engine, it is essential that the non-road engine receive periodic service, inspections, adjustments and maintenance.

Fuel System

Fuel Recommendations

The fuel used must be clean, completely distilled, stable and non-corrosive. Distillation range, cetane level and sulfur content are most important when selecting fuel for optimum combustion and minimum wear.

Engine working conditions and ambient temperature influence the selection of the fuel with respect to cold handling properties and cetane levels.

In cold weather conditions, below 32 °F (0 °C), the use of lighter distillate or higher cetane level fuel are recommended. (Final boiling point max. 660 °F (349 °C) and a cetane min. 45).

To avoid excessive deposit formation and to minimize the emissions of sulfur dioxide into the ambient air, the sulfur content of the fuel should be the lowest available. The diesel fuels recommended for use in MEC engines should meet ASTM designation: D 975 No. ID (C-B) or No. 2D (T-T); with a cetane level above 42 and sulfur content not exceeding 0.5 percent by weight.

Check for fuel leaks (while the engine is running at fast idle):

- Visually check unions and hose connections.

Check the conditions of the fuel hoses for:

- Aging
- Cracks
- Blisters
- Scuffing

Check the condition of the fuel tank:

- Drain water condensation.
- Check for cracks.
- Check for leaks.
- Check the mounting.

Check the turbocharger:

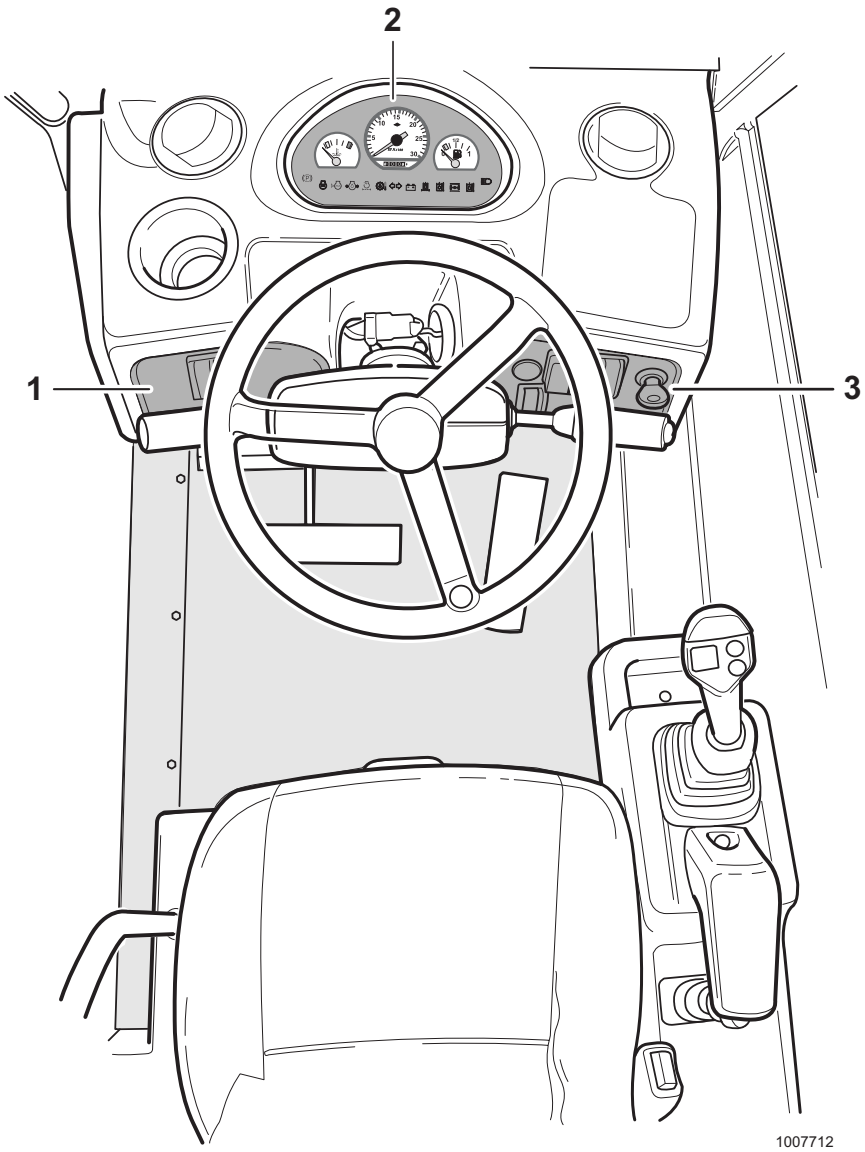
- Visually check for leaks in the intake hoses and exhaust pipe of the turbocharger.

Instrument panels

WARNING!

Do not operate the machine until you are thoroughly familiar with the position and function of the various instruments and controls. Read through the Operator's Manual thoroughly – Your safety is involved!

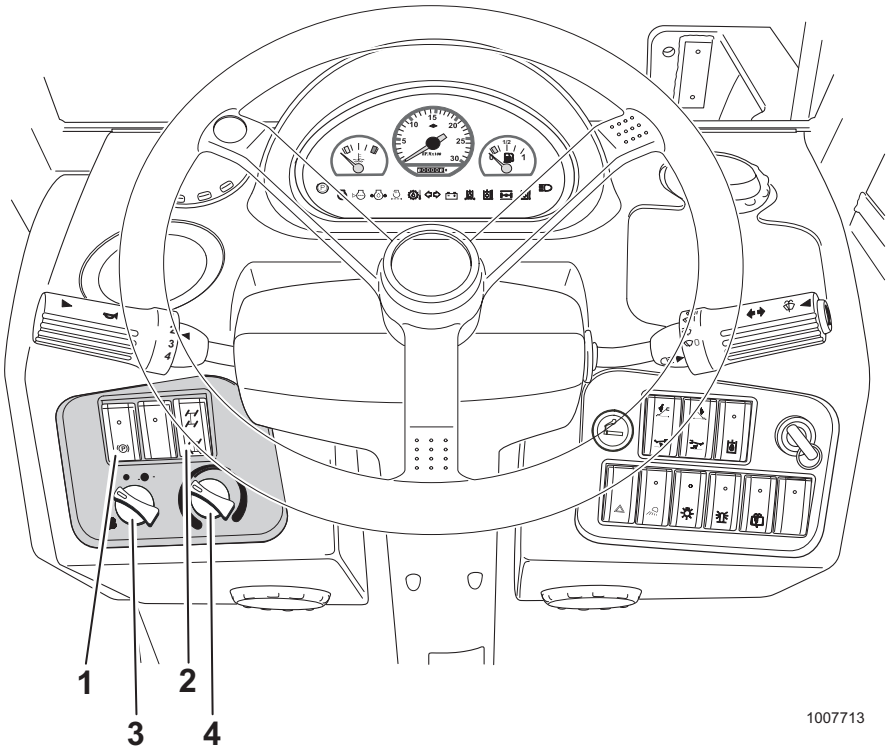
Keep the Operator's Manual in the cab so that it is always at hand.

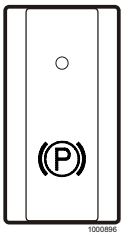


1 Left instrument panel
2 Center instrument panel
3 Right instrument panel

18 Left instrument panel

Left instrument panel





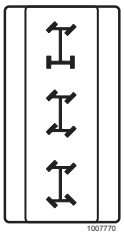
1 Parking brake

Two position switch.

- Switch in upper position = Released
- Switch in lower position = Applied

Do not apply the parking brake while driving the machine.

The parking brake will automatically be applied when the ignition key is turned to off position.

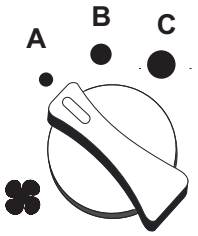


2 Steer mode switch

Three position switch.

For instructions how to change steer modes, see page 45.

- Switch in upper position = Two-wheel steer
- Switch in middle position = Crab steer
- Switch in lower position =Four-wheel steer



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A Off
B Low speed
C High speed

3 Heater speed control (cab only)

A three speed blower is installed for the movement of air in the cab.

- A= Off
- B = Low speed
- C = High speed

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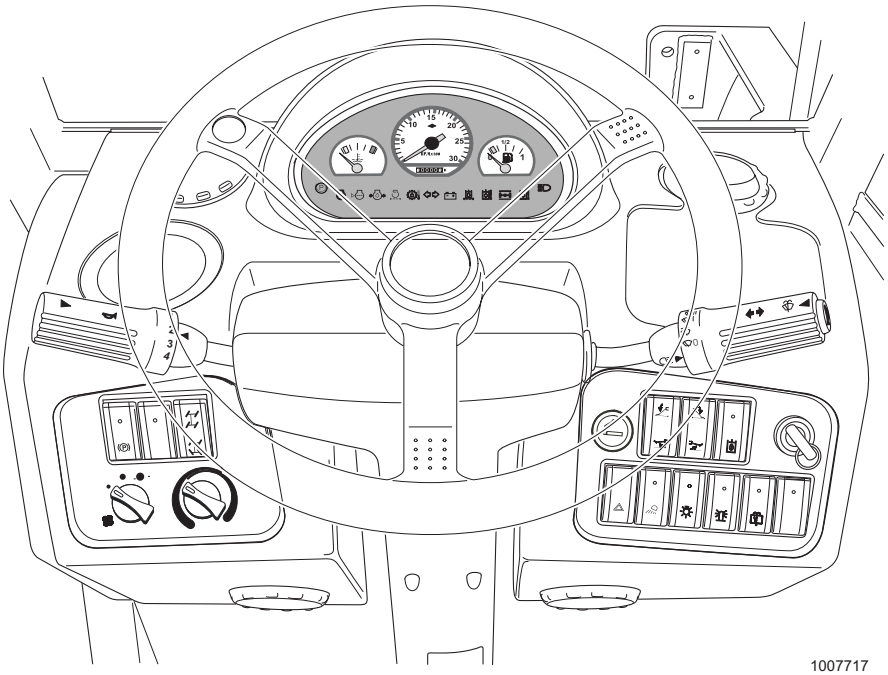
D Cold
E Warm

4 Temperature control (cab only)

- Turn the temperature control towards blue area (D) = cold
- Turn the temperature control towards red area (E) = warm

Center instrument panel

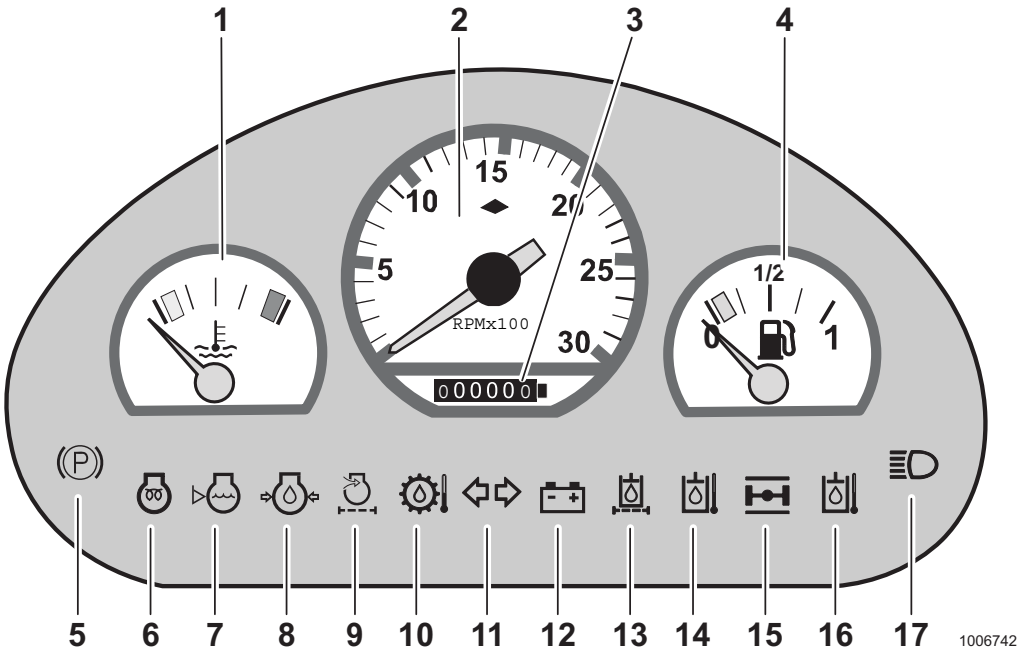


By taking action in time, it is possible to prevent serious damage to the machine. Therefore, look now and then at the center instrument panel, where information is provided, to be able to take action in time if something should happen. In order to be able to check the function of instrument and controls, the current must be turned on and the ignition key must be in position 1 (running position).

The information for the operator is provided in different ways depending on the functions involved:

– **The control lamps** are alight when the respective functions are engaged or faulty.

– **The gauges** show the speed of the engine, the coolant temperature, the number of running hours and the fuel level.



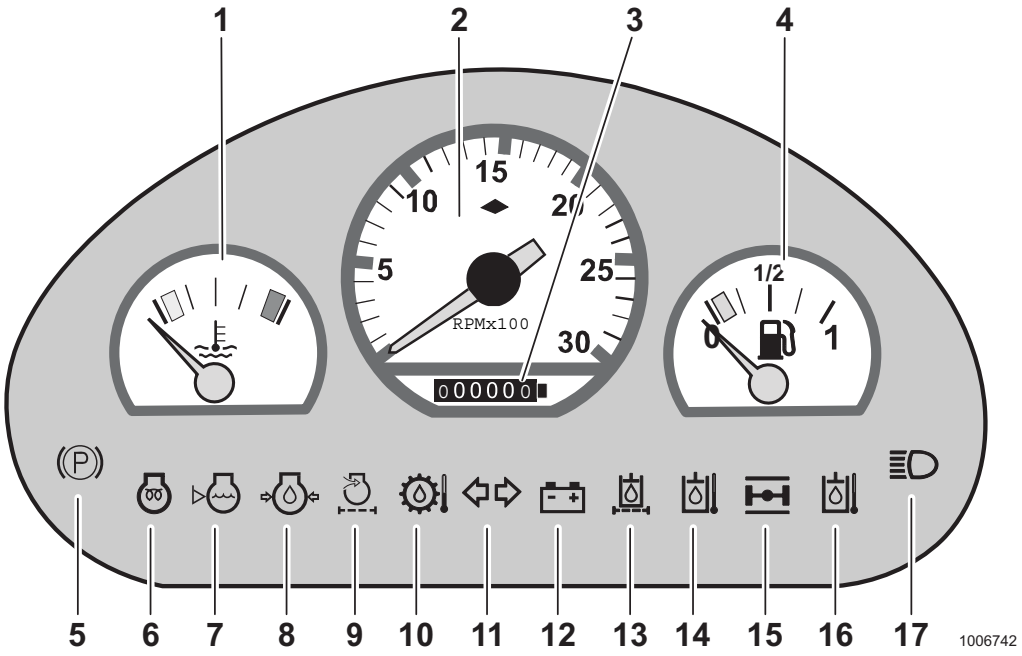
Gauges

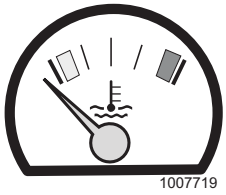
1 Coolant temperature, engine
2 Tachometer
3 Hour recorder
4 Fuel level

Warning and control lamps

5 Parking brake/low brake pressure (red)
6 Preheating element, engine (amber)
7 Low coolant level (red)
8 Low oil pressure, engine (red)
9 Clogged air filter, engine (amber)
10 High oil temperature, transmission (red)
11 Direction indicators (green)
12 Battery charging (red)
13 Clogged hydraulic oil filter (amber)
14 High hydraulic oil temperature (red)
15 Axle pivoting lock (amber)
16 Low hydraulic oil temperature (amber)
17 High beam lights (blue)

22 Center instrument panel

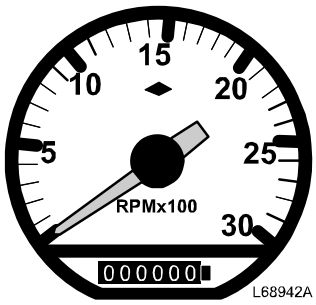




1 Coolant temperature, engine

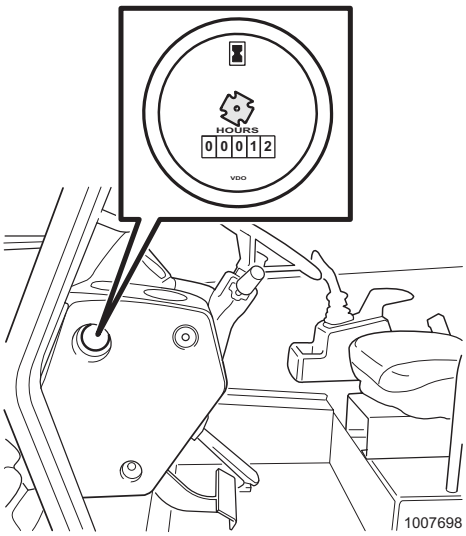
Normal operating temperature is shown when the pointer indicates in the blue sector.

If the pointer enters the red sector, stop the machine and investigate the cause, see page 88.



2 Tachometer (RPM)

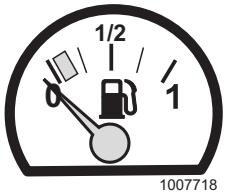
The tachometer shows the engine speed in revolutions per minute. Using the machine constantly at high revolutions will result in increased fuel consumption.



3 Hour recorder

The hour recorder shows the number of engine running hours.

NOTE! This machine is equipped with two hour recorders. One is located on the instrument panel, in the tachometer cluster and the other one is located on the fuse box cover. Always read the number of hours on the hour recorder located on the fuse box cover.



1007718

4 Fuel level

The fuel tank holds approximately 122 litres (32.2 US gal).

The gauge shows the fuel level. If the pointer enters the red sector, the machine should be refuelled in order to avoid air entering the system.

If the fuel tank is empty, fill with at least 20 litres (5.3 US gal) before starting the engine.

L67301A

5 Parking brake applied/low brake pressure

Control lamp with two functions:

- The lamp is alight when the parking brake is applied.
- The lamp is alight and the buzzer sounds if the brake pressure is too low. Stop the machine and investigate the cause.


L68730A

6 Preheating element, engine

The lamp is alight when the preheating element is connected.

For further instructions on how to preheat the engine, see page 43.


1007653

7 Low coolant level

The buzzer sounds and the lamp is alight if the coolant temperature is too high. Turn off the engine and check the coolant level in the expansion tank, see page 88 and that the radiator and oil cooler are not clogged, see page 90.

If the lamp is still alight, turn off the engine and investigate the cause.


L57166

8 Low oil pressure, engine

The buzzer sounds and the lamp is alight if the lubricating oil pressure in the engine is too low. If this happens, turn off the engine immediately and rectify the fault.


L68731A

9 Clogged air filter, engine

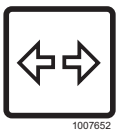
The lamp is alight if the air filter is clogged. Stop the engine immediately and rectify the fault. For instructions on how to replace the air filter, see page 87.


57174

10 High transmission oil temperature

The buzzer sounds and the lamp is alight if the transmission oil temperature in the transmission is too high.

Stop the engine immediately and investigate the cause.

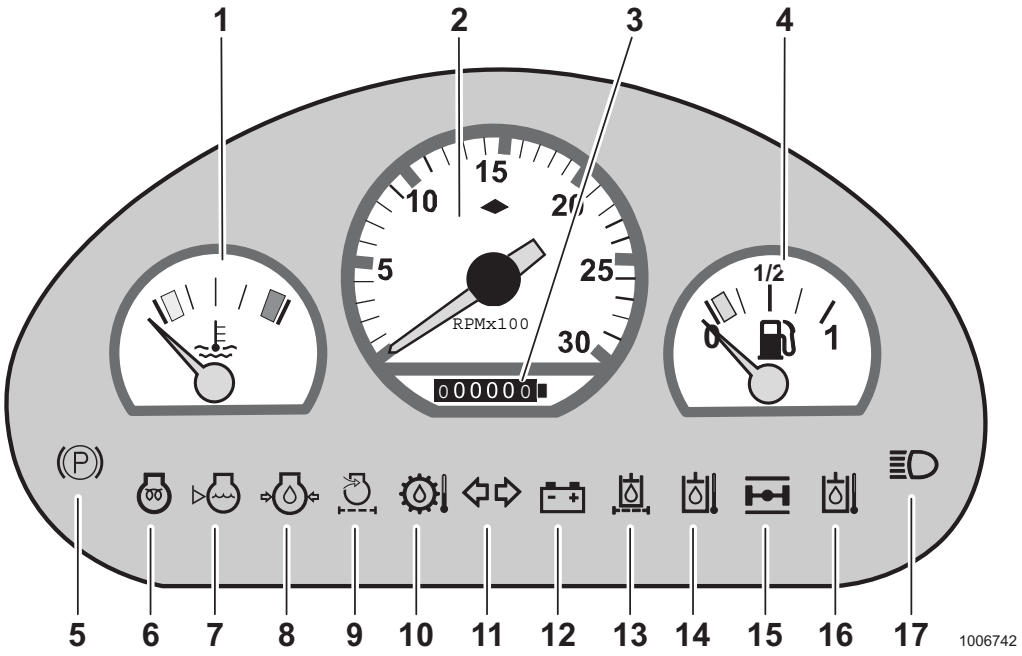

1007652

11 Direction indicators

The lamp flashes when the direction indicator control is moved for turning left or right.

Uneven flashing pulses indicate a faulty bulb, which then should be changed.

24 Center instrument panel



12 Battery charging

The lamp is alight if the alternator is not charging the battery/batteries. For instructions on how to charge the battery/batteries, see page 92.

13 Clogged hydraulic oil filter

The lamp is alight when the hydraulic oil filter has to be replaced. For instructions on how to replace the hydraulic oil filter, see page 106.

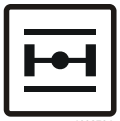
14 High hydraulic oil temperature

The lamp is alight and the buzzer sounds if the hydraulic oil temperature is too high.

Proceed as follows when the hydraulic oils is too high:

1 Place the machine on firm level ground.
2 Remove any load from the attachment.
3 Apply the parking brake and place the gear selector in neutral.
4 Let the engine idle and operate the boom up and down at the same time as tilting the attachment up and down.
5 Carry out these boom movements until the high hydraulic oil temperature control lamp goes off. When the control lamp is extinguished the machine is ready to use. If the control lamp does not extinguish, clean the radiator and oil cooler, see page 90.

Contact a by MEC authorized workshop if the hydraulic oil heats up even if the steps above are carried out.


1002784

15 Rear axle pivoting lock

The lamp is alight and the rear axle pivoting lock is engaged if the boom is raised more than 40°.


L68734A

16 Low hydraulic oil temperature

The lamp is alight if the hydraulic oil temperature is too low.

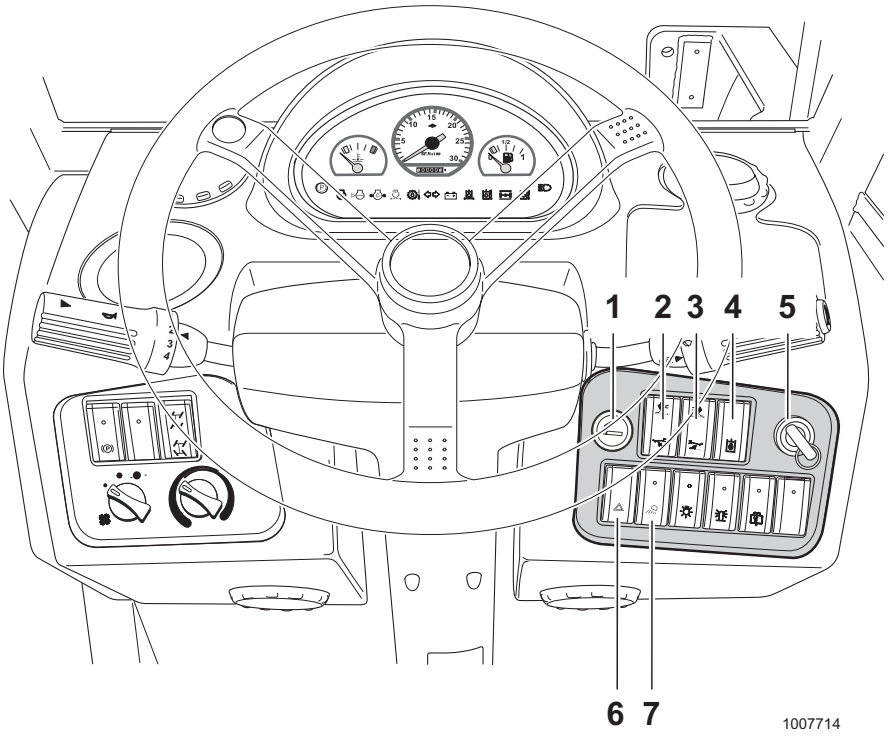
For instructions how to warm up the hydraulic oil, see page 44.

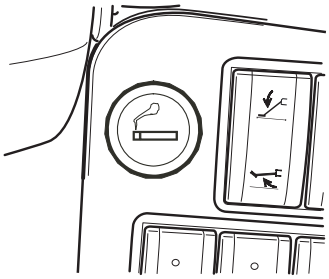

L66344A

17 Main/upper beam lights

The lamp is alight when the high beam lights are switched on, see page 31.

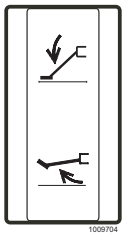
Right instrument panel




1007803

1 Cigarette lighter

- Voltage: 12 V

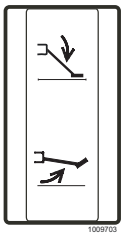

1009704

2 Left outrigger (optional equipment)

Always lower the attachment (carriage) before operating the outrigger.

Three position switch.

- Switch in upper position = Outrigger down
- Switch in lower position = Outrigger up

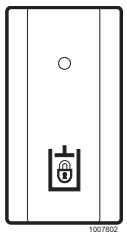

1009703

3 Right outrigger (optional equipment)

Always lower the attachment (carriage) before operating the outrigger.

Three position switch.

- Switch in upper position = Outrigger down
- Switch in lower position = Outrigger up

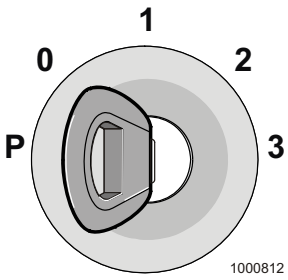


4 Boom control lever lockout

Two position switch.

The boom control lever should be locked when travelling.

- Switch in upper position = Off
- Switch in lower position = Boom control lever locked



5 Ignition switch

The ignition switch has five positions as shown in the figure.

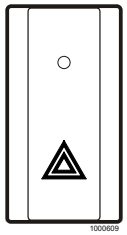
P = Accessory position.

0 = Off, engine stop. All electrical circuits are turned off except for hazard warning lights (optional equipment), parking lights (optional equipment), rotating beacon, horn and cigarette lighter.

1 = On, fuel supply switched on. All electrical circuits are switched on. Control lamp test, the buzzer sounds.

2 = Heat, cold-starting aid connected (spring return).

3 = Start, starter motor engaged (spring return).
(Cold-starting aid disconnected)

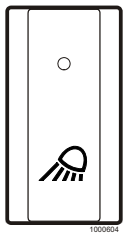


6 Hazard flashers (optional equipment)

Two position switch.

The hazard flashers can be used even if the ignition key has not been turned on.

- Switch in upper position = Off
- Switch in lower position = All direction indicators on the machine will flash in time with the lamp in the switch together with the control lamp for direction indicators.

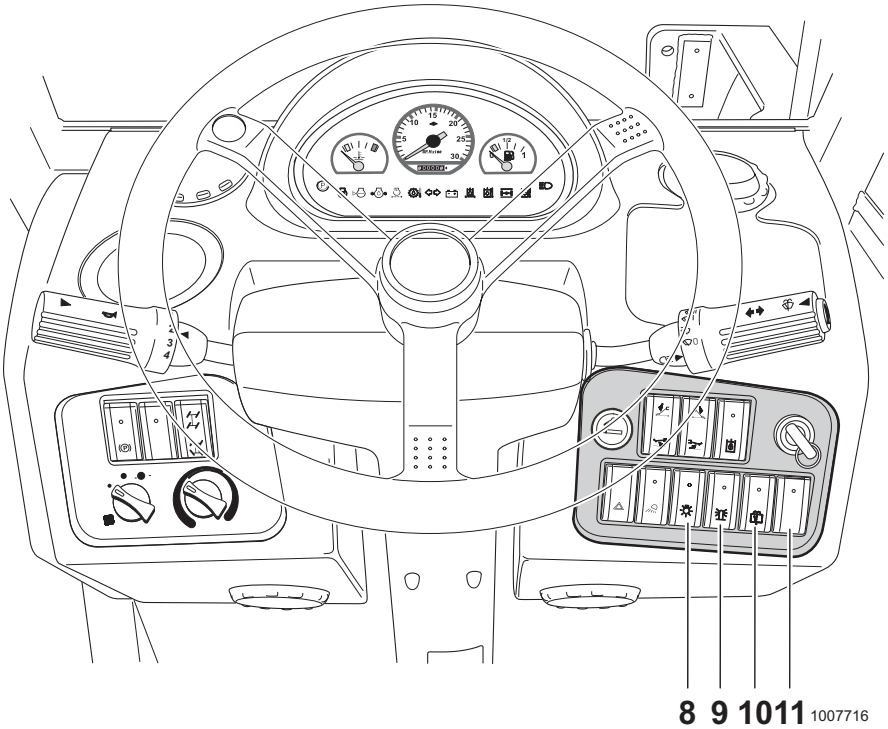


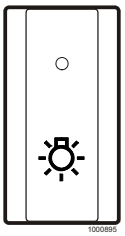
7 Work lights (optional equipment)

Two position switch.

- Switch in upper position = Off
- Switch in lower position = On

28 Right instrument panel

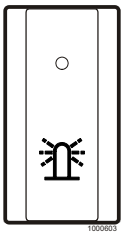




8 Lights (optional equipment)

Two position switch.

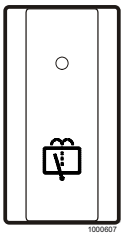
- Switch in upper position = Off
- Switch in lower position = On



9 Rotating beacon (optional equipment)

Two position switch.

- Switch in upper position = Off
- Switch in lower position = On



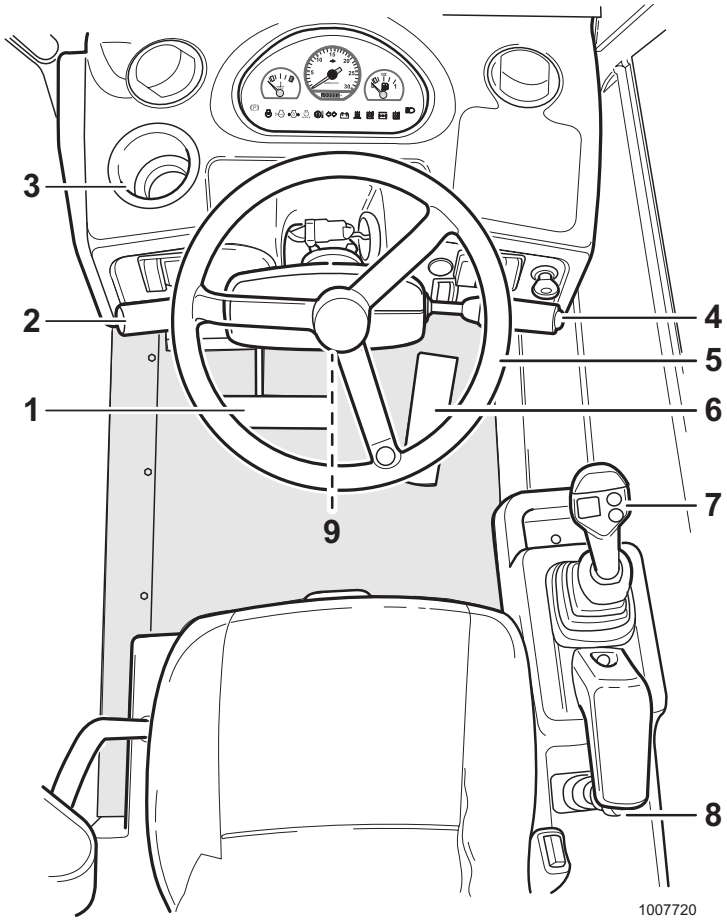
10 Rear window wiper/washer (optional equipment)

Three position switch.

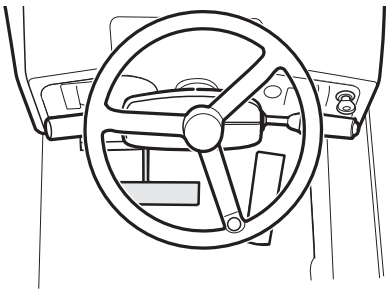
- Switch in upper position = Off
- Switch in middle position = Wiper On
- Switch in lower position = Wash and wiper On

Other controls

Controls



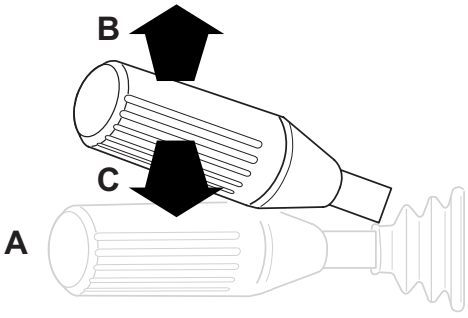
1	Brake pedal
2	Gear selector / Horn
3	Cup holder
4	Multifunctional lever
5	Steering wheel
6	Accelerator pedal
7	Boom control lever
8	Frame tilt lever
9	Steering wheel adjustment (optional equipment)

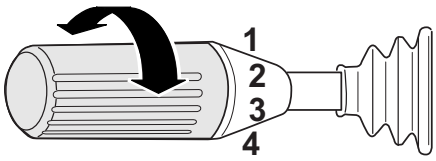


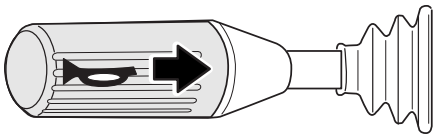
Brake pedal

1 Brake pedal

Press the brake pedal downwards to slow or stop the machine.







2 Gear selector/ Horn

Gear selector

WARNING!

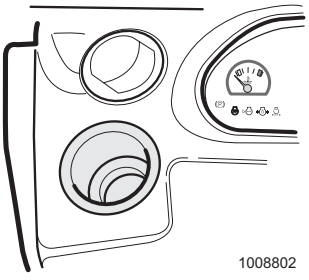
The gear selector must, for reasons of traffic safety, under no circumstances be moved to neutral when operating downhill.
Never leave the machine with the gear selector in forward or reverse position while the engine is running – there is a risk that the machine may begin to move.

- Shifting between forward and reverse is done by lifting the lever upwards and at same time operate the lever forwards or backwards.
  - A Neutral
  - B Forward
  - C Reverse
- Shifting between different speed gears is done by turning the control.

For further instructions on gear shifting, see page 48.

Horn

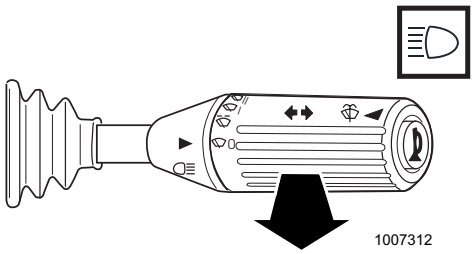
- Push the ring towards the steering wheel = Horn



Cup holder

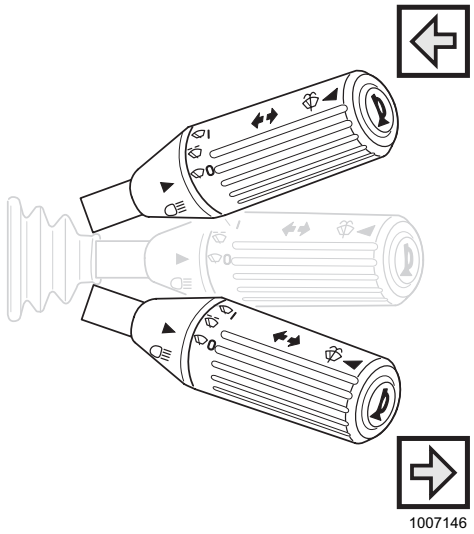
3 Cup holder

4 Multifunctional lever



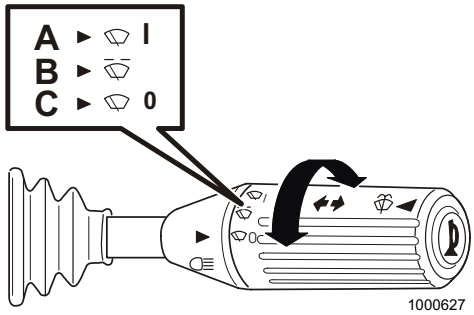
Low - High beam

- Lever in neutral position = Low beams
- Lever downward = High beams



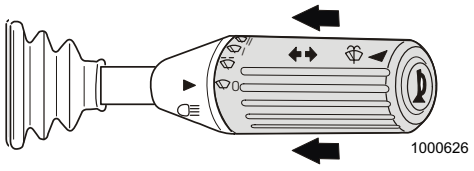
Direction indicator

- Lever forward = Direction indicator left
- Lever backward = Direction indicator right



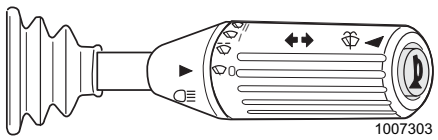
Windscreen wiper

- Position A = Windscreen wiper, fast
- Position B = Interval wiper
- Position C = Off



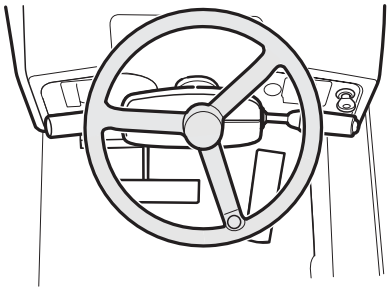
Windscreen washer, front window

- Push the ring towards the steering wheel = Window washer



Horn

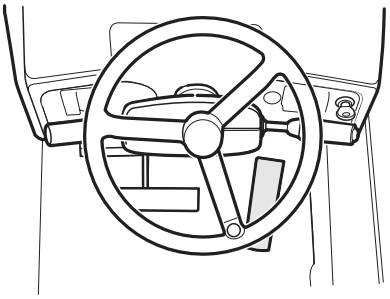
- Depress the button to operate the horn



Steering wheel

5 Steering wheel

- The machine is equipped with three steering modes, two-wheel steer, four-wheel steer and crab steer.
- For information how to steer the machine, see page 45.

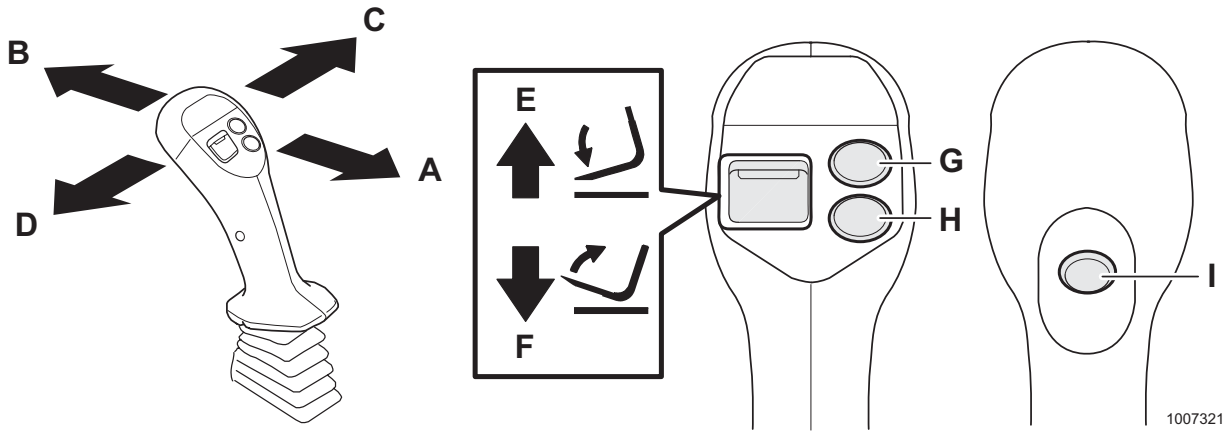


Accelerator pedal

6 Accelerator pedal

Press the pedal downwards to increase the engine speed. When the pedal is released the engine speed will decrease.

7 Boom control lever



A Pull the lever backward to raise the boom.

B Push the lever forward to lower the boom.

C Move the lever to right to extend the boom.

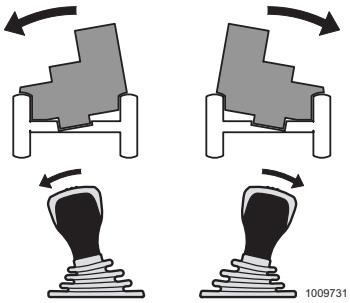
D Move the lever to left to retract the boom.

E Move the roller up to tilt the attachment forwards.

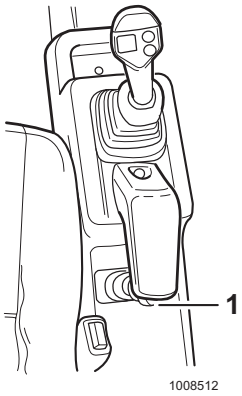
F Move the roller down to tilt the attachment backwards.

G, H Buttons for auxiliary hydraulic functions. The hydraulic functions, that can be connected to the front of the third boom section, are used if the machine, for example, is equipped with side tilt carriage. Press the button to activate the function.

I Press the button to activate a detent function for the auxiliary buttons. When the detent function is activated, press any of G or H buttons to provide a continuous flow to the attachment. May be used for hydraulically powered rotating attachments.



Frame tilt lever

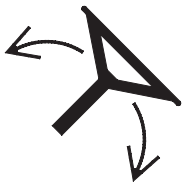


Frame tilt lever position

8 Frame tilt lever

- Move the lever to right to tilt the frame right.
- Move the lever to left to tilt the frame left.

For instructions how to level the frame, see page 47.



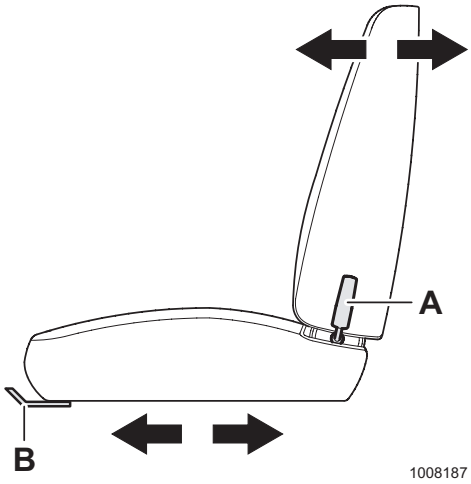
9 Steering wheel adjustment (optional equipment)

The pedal is positioned below the steering wheel.

- Depress the pedal and incline the steering wheel to required angle, release the pedal to lock the steering wheel in the required angle.

WARNING!

Do not adjust the steering wheel while driving/operating the machine.



Operator's seat

Operator comfort

Operator seat

The amount of vibration depends on different factors, many of which are not related to the construction of the machine, such as ground conditions, speed and operating techniques. Note the following:

– Keep the ground on the work site in good condition.
– Choose the appropriate operating technique and speed for the existing circumstances.

IMPORTANT! Do not adjust the seat while the machine is moving.

A correctly adjusted operator seat increases the operator comfort and safety. An incorrectly adjusted seat may lead to injuries. The adjustments that should be made are:

A Back rest inclination
B Longitudinal (leg room)

Checking and maintaining seat belt

- Replace the seat belt if it is worn, damaged or if the machine has been involved in an accident where the belt had to take some strain.
- Changes to the seat belt or its mountings must never be made.
- The seat belt is intended for one adult person only.
- Keep the seat belt rolled-up when not in use.
- Change the seat belt every third year regardless of its condition.
- When washing, use a mild soap solution and allow the seat belt to dry while it is fully pulled out, before retracting it into the seat belt housing. Make sure that the belt is installed correctly.

Operating instructions

This chapter contains rules which must be followed to make working with the machine safe. However, these rules do not relieve the operator from following laws or other national regulations for traffic safety, industrial safety and labour welfare.

To avoid the risk of accidents, alertness, judgement and respect for applicable safety regulations is a condition.

Running-in

During the first 50 hours, the machine should be operated with a certain amount of care. During the running-in period it is important to check oil and fluid levels often.

Wheel bolts are to be check-tightened after the first eight hours of operation, see page 103.

Safety rules when operating

Operator duties

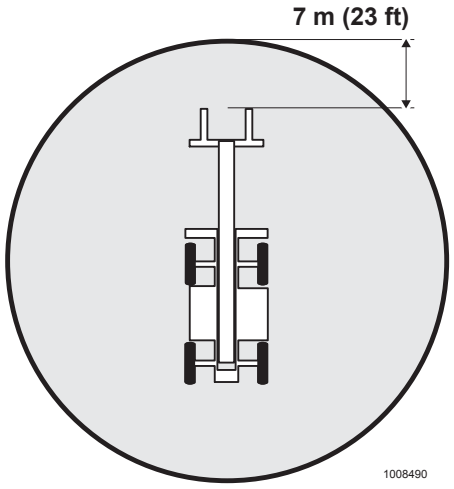
- Read and understand the Operator's Manual.
- The machine operator must operate the machine in such a way that the risk of accidents is minimized for both operator, other road users and persons present at the work site.
- Never allow an untrained or unqualified person to operate the machine.
- All operators must be trained according to OSHA regulation 1910.178.
- OSHA regulations 1910.178 and 1926.602, and ANSI Standard ASME B56.6-2002 must be read and understood.
- Read and understand the EMI Safety Manual for rough terrain forklifts.
- The machine operator must be thoroughly familiar with how to operate and maintain the machine and should undergo required training on the machine.
- The machine operator must follow the rules and recommendations given in the Operator's Manual, but also pay attention to any statutory and national regulations or specific requirements or risks that apply at the work site.
- The machine operator must be thoroughly rested and must never operate the machine under the influence of alcohol, medicine or other drugs.
- The machine operator is responsible for the load of the machine both when travelling on public roads as well as when working on site.
  - There must be no risk of the load falling off while operating.
  - Refuse to take a load which is an obvious safety risk.
  - Respect the stated maximum load for the machine. Pay attention to the effect of different distances to the center of gravity and the influence of different attachments.
- The machine operator must be in charge of the working area of the machine.
  - Prevent persons from walking or standing under raised boom, unless the boom have been made safe or supported.
  - Prevent persons from staying in the risk zone, i.e. the area around the machine and at least 7 m (23 ft) beyond the maximum reach of the attachment. The operator may allow a person to remain in the risk zone, but should then observe caution and operate the machine only when the person is visible or has given clear indications of where he or she is.
  - Prevent persons from being in the cab of a vehicle which is placed so that there is a risk that the cab may be hit by other machines or falling objects. This does not apply if the cab is sufficiently strong or protected to withstand the impact of such external forces.

WARNING!

An operator of and the management for a construction machine are responsible for the working area of the machine and must turn away any person who is not authorised to be there when the machine is operating. The operator must keep a good lookout forward, backward and to both sides to avoid the risk of running into persons or objects.

WARNING!

Do not exceed rated capacities. Any attempt to lift or carry loads in excess of those shown in the load charts may cause machine tipover, loss of load or structural damage.



The risk zone around an operating machine is at least 7 m (23 ft) beyond the maximum reach of the attachment.

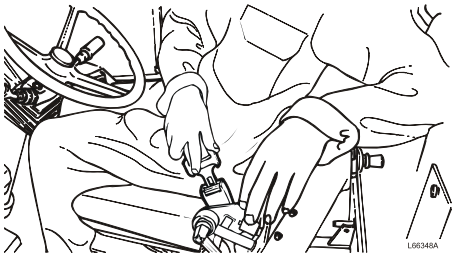
Accidents

- Accidents and incidents should be reported to the site management immediately.
- If possible leave the machine in position.
- Only take necessary action so as to reduce the effect of damage, especially personal injuries. Avoid action which may make an investigation more difficult.
- Wait for further instructions from the site management.

Machine operator safety

WARNING!

Do not operate machine without seat belt fastened. Failure to wear seat belt may result in serious injury or death.



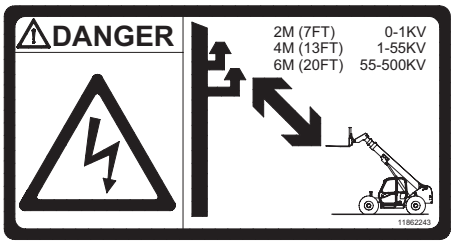
- The machine must be operational, i.e. faults which can cause accidents must be rectified.
- Suitable clothing for safe handling should be worn.
- Always sit in the operator seat when starting the engine/machine.
- Keep your hands and feet away from areas where there is a risk of crushing, e.g. covers, doors and windows.
- Always use the lap type seat belt.
- Use steps and handholds when entering or leaving the machine. Use the three-point grip, i.e. two hands and one foot or two feet and one hand. Always face the machine – do not jump!
- The door should be closed.
- Check that any attachment is properly attached and locked.
- The vibrations (shaking) which arises when operating may be harmful to the operator. Reduce this by:
  - adjusting the seat and tightening the seat belt.
  - picking the smoothest operating surface for the machine (leveling the surface when necessary).
  - adapting the speed.
- The cab is for the protection of the machine operator and it meets the requirements for Roll Over Protective Structures according to the testing standard "ROPS". Therefore, hold firmly onto the steering wheel if the machine should roll over – do not jump!
- The cab is also designed to meet the requirements for falling objects, the weight of which agrees with testing methods according to "FOPS".
- Keep hands and feet inside the operator's designated area or compartment. Do not put any part of the body outside of the Cab/Open ROPS of the machine.
- Only step or stand on surfaces which are provided with anti-slip protection.

Working within dangerous areas

Working within areas where there are pipes, power lines or cables

- It is the duty of the employer to know and mark the position of pipes for gas, water, sewage or power lines or cables on the work site and to inform the operator about these. Failure to do so may have legal consequences. When required, local authorities and/or communication and power companies should be contacted regarding maps, drawings and advice.
- Cables and power lines must be protected against damage in a suitable way. Electric cables should, if possible, have the power turned off.
- Information about where the gas and water can be turned off should be made available, so that these supplies can be quickly turned off, if they are ruptured.

High voltage overhead power lines



WARNING! High voltage

Observe great care when working in the proximity of high voltage overhead power lines, as an electrical flash-over can damage the machine and injure the operator at fairly great distances from the power line. Note the following:

The distance sideways between machine and power line must be:

- at least 2 m (6.5 ft) in case of low voltage.
- 4 m (13 ft) in case of high voltage of at the most 55 kV (line normally supported on fixed insulators).
- 6 m (20 ft) in case of high voltage above 55 kV (line normally carried on suspended insulators).

The distance vertically between machine and overhead power line must be:

- at least 2 m (6.5 ft) in case of low voltage.
- 4 m (13 ft) in case of high voltage.

The safety distances also apply to any load. The boom height when lifting may have to be adjusted to be within the safety margins. The cab suspension and the sideways swinging of lifting sling or power line in high winds are other factors which affect the safety distance.

If you suspect the machine is in contact with a power line, do not leave the cab or let anyone touch the machine. Call for assistance that can turn the power off.

Operating under ground

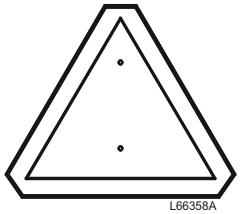
- Special equipment, e.g. certified engine is required in EU and EEA countries. Contact a MEC dealer.

Working in confined areas

- Check that there is sufficient room for machine and load.
- Move slowly.
- Drive in the middle of a doorway which is too narrow to allow two machines to meet.

Working near danger areas

- Take great care near marked danger areas.
- Do not operate too close to the edge of a quay, ramp etc.



SMV emblem

Travelling and operating (working) on public roads

A machine operator is considered to be a road-user and therefore required to know and follow applicable traffic regulations.

It is important to bear in mind that the machine, in comparison with the rest of the traffic, is a slow moving and wide machine, which may cause obstruction. Bear this in mind and pay attention to the traffic behind you. Facilitate overtaking.

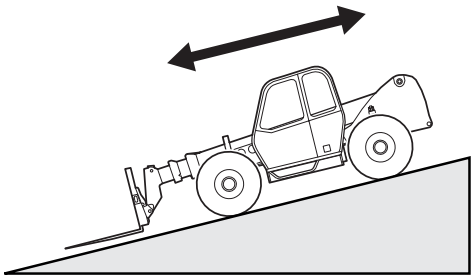
The use of a SMV-plate (Slow Moving Vehicle plate) is recommended. It should be positioned on the machine where it is easily visible, not inside the rear window or any other window. It should be positioned at a height of 0.6–1.8 m (2–6 ft) above the ground, measured from the lower edge of the plate. Pay attention to national traffic regulations.

- The boom must be in travelling position while driving on public roads.

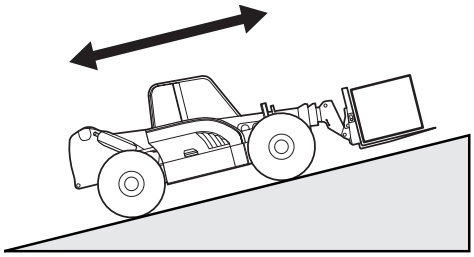
Travelling and operating on slopes

Driving on slopes or inclines can result in machine tipover or loss of load. Machine tipover may result in serious injury or death. Reduce the tipover risk by:

- Avoid excessively steep slopes or unstable surfaces. If you must drive on a slope, keep the load low and proceed with extreme caution. **Do not drive across slopes under any circumstances.**
- Avoid turning on a slope, if possible. If it is necessary, use extreme caution and make the turn as wide as possible.
- Ascend or descend slopes with the "heavy end" of the forklift pointing up the slope.
  - When the machine has no load, the rear of the machine is considered the heavy end. Travel with the forks pointed downhill.
  - When the machine is carrying a load, the front is considered the heavy end. Travel with the forks pointed uphill.



No load, forks pointed downhill



Carrying a load, forks pointed uphill

WARNING!

Do not raise boom while on a slope unless the load is level. Failure to comply may result in machine tipover. Machine tipover may result in serious injury or death.

Center of gravity

1 Boom angle below 40 degrees

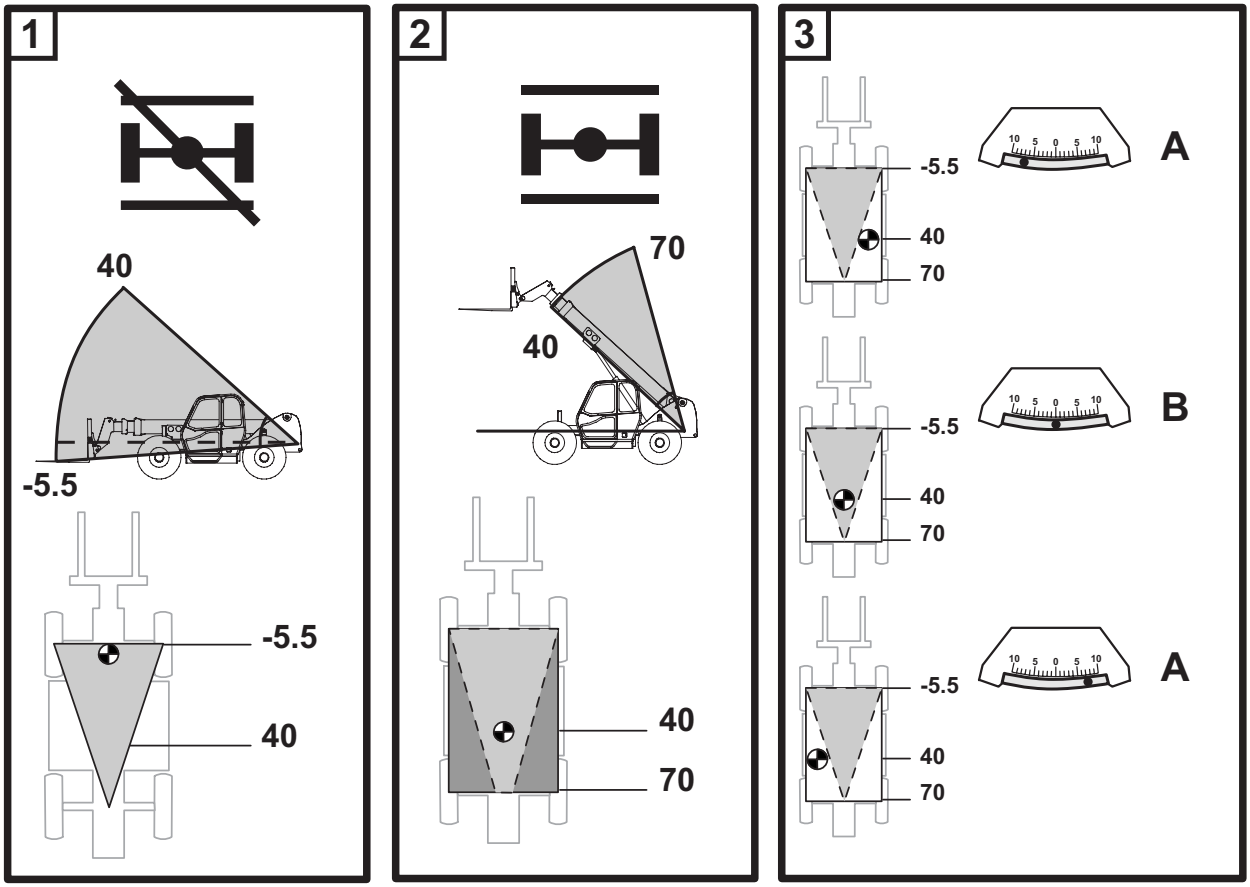
- The rear axle pivoting lock is disengaged when the boom is below 40°. The machine is now easy to manouver while transporting loads and driving the machine on the work site or on the road.
- Even if the rear axle pivoting lock is disengaged under 40°, it is not allowed to transport the load with the boom raised. The boom must always be lowered when transporting a load or driving the machine.
- Remember that a small pot hole on the work site or even a sinking wheel can make the load unstable, this may lead to machine tipover or falling object hazard.

2 Boom angle between 40 and 70 degrees

- When the boom is raised more than 40 degrees, the pivoting axle lock will be engaged. This means that the stability of the machine is increased during operation. Note that the axle pivoting lock helps the center of gravity to stay within the stability triangle. Operating with loads over 40° does not mean that tipover hazard is excluded.
- Remember that a small pot hole on the work site or even a sinking wheel can make the load unstable, this may lead to machine tipover or falling object hazard.

3 Tipover hazard

- If the center of gravity moves out to the white area, the machine will tipover. This is caused by the machine set up on the work site or/and the frame level is incorrect.
- Even if the rear axle pivoting lock is activated (the boom raised more than 40°) the machine is even more sensitive against wrong machine set up and/or frame level. According to the illustration (3), the white area gets bigger when the boom is raised, which means that the operator must ensure that all parameters are correct before operating with the boom/attachment.



A Center of gravity in white area, tipover hazard.

B Center of gravity within stability triangle.

Measures before operating

1 Carry out daily service, see page 109.
2 Ensure good visibility.
3 Clean headlights, safety decals, handholds and footsteps.
4 Check for damage to the tires and check the tire pressure, see page 103.
5 Check that the battery disconnect switch is turned on, see page 91.
6 Check that the wheels are not blocked.
7 Check that the engine hood, fuel cover and tool box is closed.
8 Check for loose, damaged or missing parts.
9 Enter the Cab/Open ROPS by using the three-point grip.
10 Fasten the seat belt.
11 Turn the gear selector into neutral.
12 Make workers and bystanders aware.
13 Start the engine.

WARNING!

The machine must operate on ground that can manage to carry the machine weight. The condition of the ground should be checked before the machine is used.

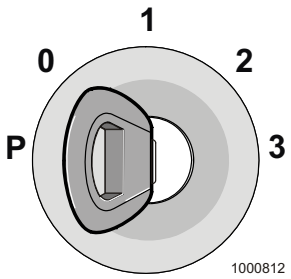
Additional measures in cold weather

- Make sure that the freezing point of the coolant corresponds to the weather conditions, see page 88.
- Use the recommended lubricating oil for winter use, see page 117.

After operating

- Fill the fuel tank, as this will counteract the formation of condensation water.

IMPORTANT! If the fuel tank has been run dry or if air for any reason has entered the fuel system, this must be bled before the engine can be started, see page 84.



P = Accessory position.

0 = Off, engine stop. All electrical circuits are turned off except for hazard warning lights (optional equipment), parking lights (optional equipment), rotating beacon, horn and cigarette lighter.

1 = On, fuel supply switched on. All electrical circuits are switched on. Control lamp test, the buzzer sounds.

2 = Heat, cold-starting aid connected (spring return).

3 = Start, starter motor engaged (spring return). (Cold-starting aid disconnected)

Control lamp for preheating

WARNING!

Starting gas must not be used at the same time as the preheating element.

Starting engine

WARNING!

The engine must only be started with the ignition switch in the Cab/Open ROPS.

The operating temperature for this machine is –15 °C to +46 °C (–5 °F to +115 °F). If the temperature is below –15 °C (–5 °F) the engine will have to be preheated before it is started.

1. Place the gear selector in neutral.
2. If the temperature is below –15 °C (–5 °F), preheat the engine by turning the ignition key to position 2 during 10 seconds. The control lamp for preheating lights up on the instrument panel.
3. Turn the ignition key to position 3.
4. Release the key as soon as the engine has started.
5. Check that the brake system warning lamp and the battery control lamp have been extinguished.
6. If the engine does not start, turn the key back to position (0), before making a new starting attempt.*
7. Check that gauges, controls and instruments are functioning. If not, contact a workshop authorized by MEC.
8. If any of the control lamps still are alight, check the control lamp function, see page 20.
9. Check that the attachment is securely fastened to the machine by pressing it against the ground.
10. Press down the brake pedal.
11. Sound the horn to make workers and bystanders aware.
12. Release the parking brake.
13. Select suitable gear, 1–4 by rotating the gear selector.
14. Select forward or reverse.
15. Release the brake pedal and depress the accelerator pedal to increase the engine speed, and the machine starts to move.

*** Starting with booster battery, see page 92.**

Hydraulic system, warming up

When the oil is cold, it is viscous. For this reason some machine functions will be slower than when the oil is hot. Therefore it is important that the oil in the hydraulic system is properly warmed up before operating the machine.

- To race the engine immediately after it has been started may also endanger the lubrication and cooling of the turbocharger with great risk of bearing seizure as a consequence.

Moving the machine a short distance (for example when loading onto or off a trailer) can be done without a complete warm up. These operations must be executed with great care. In such situations, the engine speed must not exceed 1200 rpm.

1. Apply the parking brake.
2. Start the engine and let it idle for five minutes.
3. Lower the stabilizers and the loader boom to the ground.
4. Increase the engine speed to 1000 rpm.
5. Raise and lower the boom with full lever travel.
6. Tilt the attachment up and down with full lever travel.
7. Extend and retract the boom half way out while the boom is lowered.
8. Then make a series of boom and transport movements to distribute the heated hydraulic oil to the hydraulic cylinders and the pump.
9. Continue making these movements until the hydraulic system has warmed up.
10. Release the parking brake and drive the machine forwards and backwards on level ground. This is to ensure that the axles have proper lubrication.

It is forbidden to force the oil warming up process. Forced warm up can damage the machine.

Steering

The machine has three steering modes: two-wheel steer, four-wheel steer and crab steer.

The steering modes are controlled by the steer mode switch inside the Cab/Open ROPS.

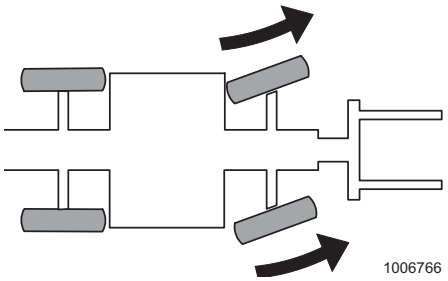
WARNING!

As the wheels can be set in various positions, there is a risk that the machine steers in uncontrolled way. Before changing steer mode, always align the wheels. Do not change the steer modes while moving.

WARNING!

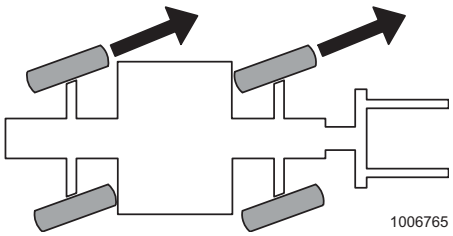
Do not use the four-wheel steer when travelling with the machine at high speeds, as this can cause tipover.

Two-wheel steer



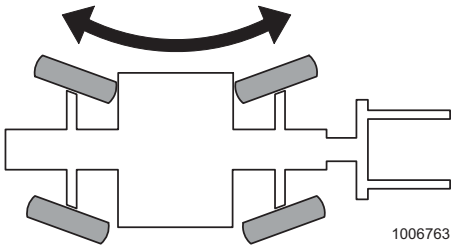
- The two-wheel mode should be used when travelling at higher speeds and on roads. This mode should also be used when the machine is loaded on to a truck.
- The front wheels will steer in the direction that the steering wheel is turned.

Crab steer

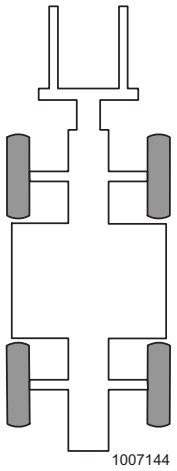


- Use this steering mode when there is a need to move the machine sideways.
- All wheels will steer in same direction.

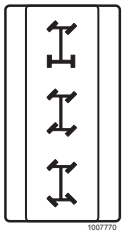
Four-wheel steer



- The four-wheel mode should be used when operating the machine in mud or sand and when maneuvering in tight areas. The rear wheels will follow the front wheels.
- The front wheels will steer in the direction that the steering wheel is turned. The rear wheels will steer in the opposite direction.



Aligned wheels



Steer mode switch

Changing steer modes

Preparation

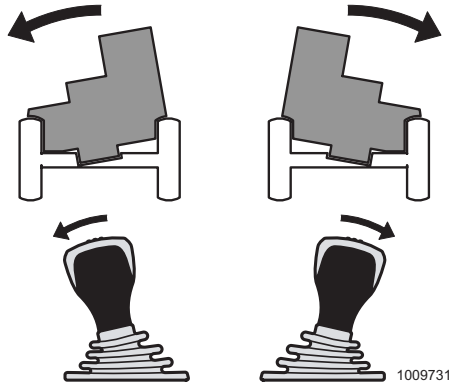
Before changing steer mode, all wheels must be aligned.

1. Place the machine on level ground. Remove any load from the attachment. Lower the boom and place the attachment on the ground. Apply the parking brake and place the forward/reverse lever in neutral.
2. Engage the four-wheel steer and turn the steering wheel until the rear wheels are aligned as shown.
3. Engage the two-wheel steer and turn the steering wheel until the front wheels are aligned as shown.

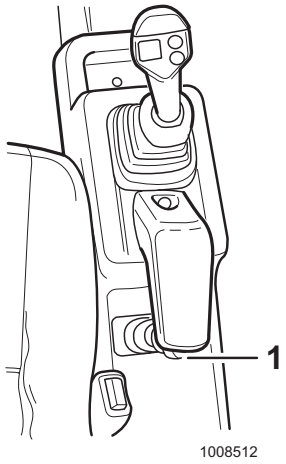
Select steer mode

4. Use the steer mode switch to select required steer mode.

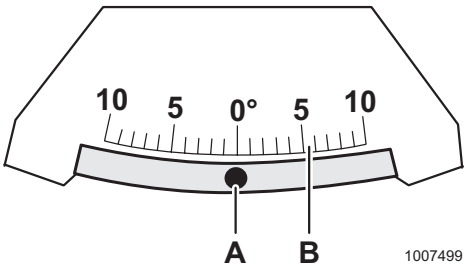
- Switch in upper position = Two-wheel steer
- Switch in middle position = Crab steer
- Switch in lower position = Four-wheel steer



Frame tilt lever



Position of lever



Frame level indicator

A Indicator

B Scale

Leveling the machine frame

The machine can be tilted hydraulically to make sure that the attachment is level during operation.

WARNING!

Do not level the frame with boom elevated. Failure to comply may result in machine tipover. Machine tipover may result in serious injury or death.

Leveling

Before the machine frame can be tilted to either left or right, the boom must be lowered.

Leveling the frame should not be used to position an elevated load, instead, lower the load and reposition the machine.

- Move the lever (1) to right to tilt the frame right.
- Move the lever to left to tilt the frame left.

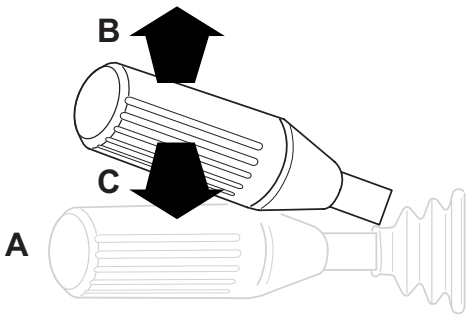
Level the machine so that the frame level indicator (A) is positioned at the 0° mark on scale (B).

If it is impossible to reach the 0° mark, the machine is incorrect positioned or the ground is too uneven. Reposition the machine or/ and use a bucket attachment to level the ground.

Gear shifting

Manual gear shifting

- Select a suitable gear by turning the gear selector to the required position and then select travelling direction forwards or backwards.
  - Use gear 1 or 2 when operating with the machine, and transporting loads.
  - Use gear 3 or 4 when travelling the machine without any load and when travelling the machine on public roads.



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Gear selector
A Neutral
B Forward
C Reverse

Directional gear

Lever in position A = Neutral

Lever in position B = Operating forwards

Lever in position C = Operating backwards

WARNING!

The selector control must, for reasons of traffic safety, under no circumstances be moved to neutral when operating downhill – no engine retarding effect.
Never leave the machine with the selector in forward or reverse while the engine is running – there is a risk that the machine may begin to move.

When changing from forward to reverse or vice versa, the speed of the machine and of the engine should be reduced as much as possible, particularly if the machine is working on firm ground.

Do not shift between forward and reverse at higher speeds than 2nd gear.

Braking

Brake smoothly! This is particularly important when operating with a load and on slippery ground.

IMPORTANT! Do not apply the parking brake while driving the machine. The parking brake should only be used when the machine has been stopped or as a machine emergency brake.

Brake test

Carry out the brake tests as required. Always use the seat belt when using the machine.

Conditions

WARNING!

Brake test and checking the parking brake should only be done within an area where it cannot cause accidents.

- Acceptable values can only be obtained if the test is carried out on dry asphalt, dry concrete or other similar surfaces.
- Make sure that the working area around the machine is clear of persons.
- The machine must not be loaded.

Service brake, static checking

1. Stop the machine.
2. Depress the service brake pedal fully.
3. Release the parking brake.
4. Select second gear and put the forward/reverse lever into forward gear.
5. Depress the accelerator pedal fully.
6. The machine should stand still.
7. If the machine moves, contact a by MEC authorized workshop.

Service brake, dynamic checking

1. Run the machine to maximum speed in second gear on dry asphalt ground.
2. Depress the service brake pedal to fully.
3. Measure the brake distance.

The braking distance should not exceed 1 m (3.28 ft). If the maximum braking distance is exceeded, contact a by MEC authorized workshop.

Parking brake, checking

The parking brake should always be capable of holding the machine stationary on 15 % dry swept-concrete grade under all conditions of loading in both forward and reverse directions. If there is any suspicion that the parking brake does not have the intended function, it should be checked by a MEC authorized workshop.

Stopping the machine

The machine is stopped in the following way:

1 Reduce the engine speed.
2 Apply the brake and when the machine is stationary move the gear selector to neutral.
3 Lower the attachments to the ground.
4 Apply the parking brake, see page 18. The parking brake will automatically be applied when turning the ignition key to off position.

Stopping the engine

1 Let the engine idle a couple of minutes before turning it off in order to safeguard the lubrication and cooling of the turbocharger.
2 Turn the ignition key to 0, so that the control lamps go out and the engine stops.

WARNING!

When you are entering or leaving the machine, always face the machine and use the steps or hand holds to avoid slipping. Always use the "three-point" grip, i.e. both hands and one foot or both feet and one hand, when entering or leaving – Do not jump!

Do not leave the machine with the engine running.

Parking

1 Place the machine on level ground, if possible. Otherwise, block the wheels so that the machine cannot start moving. Lower the attachment against the ground.

2 Apply the parking brake. Check that the control lamp is alight. The parking brake will be applied automatically when the engine is turned off.

3 Check that all switches and controls are in the "off" position or in neutral.

4 Remove the ignition key.

5 If the machine is to be left unattended for some time, turn off the current supply with the battery disconnect switch, see page 91.

6 Lock all covers, fuel cap, windows and the doors.

Long-term parking and storage

1 Carry out the measures as described above.

2 Place the machine in service position 1, see page 70.

3 Wash the machine and touch up the paint finish to avoid rusting.

4 Treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces.

5 Check the tire pressure, see page 130.

6 Fill the fuel tank and the hydraulic oil tank to the max. marks to minimize condensation water in the tanks.

7 Cover the exhaust pipe (not with plastic) if parking outdoors and close the engine hood.

8 Remove the battery if the machine is stored for more than three months. When the battery is removed, connect it to a battery charger for maintenance charging.

IMPORTANT! If the machine is stored for long periods or disabled, block the wheels.

After long-term parking/storage

- Check all oil and fluid levels.
- Check the condition of the fan belt.
- Check the tire pressure.
- Check the air cleaner.
- Check the battery/batteries.
- Check for possible leakage.
- Remove the cover from the exhaust pipe.
- Remove all anti-rust agents and other corrosion protection.
- Test-run the machine until the engine, hydraulic system and other components have reached normal operating temperature. Check all systems/functions (controls, doors, windows, cover plates, hatches, electrical system, all lights, steering and braking systems).

Contact a workshop authorized by MEC if any malfunction occurs.

Towing

The machine has no brake pressure when the engine is not running. Therefore the brakes will only work as long as there is pressure left in accumulator.

WARNING!

Before taking any steps in preparation for recovering or towing, the parking brake must be applied and the wheels blocked to prevent the machine from moving. The greatest care must be taken in connection with towing to avoid serious injury which at worst could be fatal.

IMPORTANT! The machine should not be towed over long distances. Speeds over 8 km/h (5 mph) are not recommended since damage to the machine may otherwise occur.

WARNING!

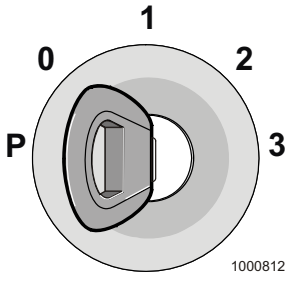
The machine is not intended to be used as a towing vehicle. The machine can and must not be equipped with a towing hook.

Measures

- If possible, the engine should be running to make the brakes and steering operational.

WARNING!

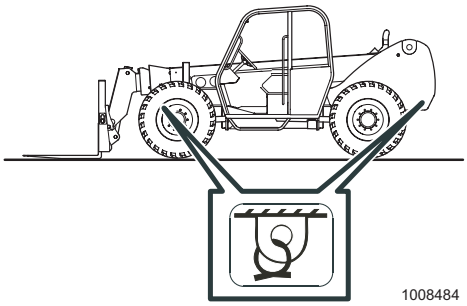
If the engine cannot be started:
As the braking and steering functions will be limited when towing, it must only be done as an emergency measure, and over the shortest possible distance by trained personnel, see under "Towing" on next page. If possible, transport the machine on a trailer.



Ignition switch

Preparation

- Turn the ignition key to position 1.
- Apply the parking brake.
- If possible, the engine should be running to make the brakes and steering operational.
- The boom must be lowered to transport position. Do not tow the machine with the boom raised.
- Secure the outriggers (optional equipment) in their upper position with tensioning straps.
- Set the gear shift lever to neutral.
- Release the parking brake. If the parking brake can not be released with the parking brake switch, see page 54 how to manually release the parking brake.



Tie down points

Towing

- Connect the wire rope to the recovery points (tie down points).
- The towing vehicle or machine must be at least as heavy as the machine to be towed and must have sufficient engine power and braking capacity to pull and brake both machines in any up or down hills.
- If possible, transport the machine on a trailer.

NOTE! It is not possible to start the engine by towing.

Follow the national regulations where required.

IMPORTANT! The manufacturer's warranty does not apply to damage occurring during towing. Make sure that no part of the machine projects into the road or highway.

IMPORTANT! It is the operator’s responsibility to ensure that the towing rope, wire or chain is capable of towing a machine of up to 10000 kg (22050 lb).

After towing

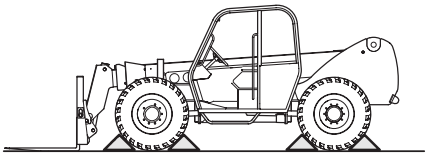
Before the wire rope is removed, the following safety measures must be taken:

1 Place the machine on level ground, if possible.

2 Block the wheels to prevent the machine from moving.

3 If possible, restore the parking brake and make sure that the parking brake passes the parking brake test on page 49.

NOTE! If the machine is left without functional brakes, this must be indicated by attaching a label to the steering wheel with the information that the parking brake has been disabled, along with blocking the wheels.



Blocking the wheels

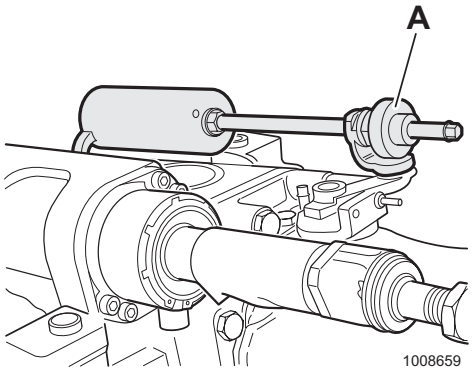
Parking brake, manual release

WARNING!

Always block the wheels before releasing the parking brake to prevent the machine from moving.

Manually releasing the electronic parking brake must only be done when the machine has to be towed. Immediately after towing has been completed, the parking brake must be restored.

NOTE! If the machine is left without having restored the parking brake, this must be indicated by attaching a label to the steering wheel with the information that the parking brake has been disabled, along with blocking the wheels.



Parking brake cylinder

Release and restore the parking brake

1. Block the wheels.
2. Release the brake by giving a light hammer blow to the external ring of check unit (A).
3. Once the machine has been secured to the trailer or has been moved to its destination, reset the parking brake by starting the machine to introduces pressure into the braking system. Check that, at the end of the piston stroke, the check unit is actually engaged onto the rod.
4. Make a parking brake function test, see page 49.

IMPORTANT! If the parking brake is no longer operational, the machine must not be used. Contact a workshop authorized by MEC.

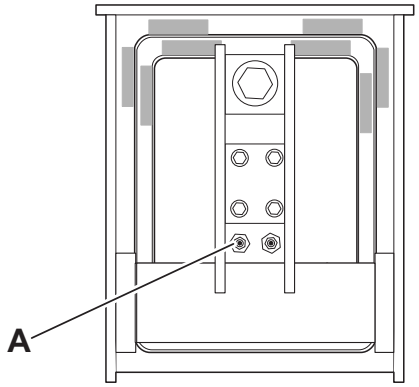
Boom, manual lowering

Lowering of the boom is hydraulically controlled. If hydraulic power is lost, it is possible to lower the boom manually.

IMPORTANT! Lowering of the boom should only be done manually in case of failure on the machine/equipment.

1 Secure the risk zone around the machine from unauthorized persons.
2 Remove load and secure the machine.
3 Block the wheels.
4 Support the boom with a suitable stand or packing.
5 Open the hatch on the back of the machine.
6 Loosen the lock nut (A) on the extended cylinder counterbalance valve. Turn the socket head screw clockwise until the boom retracts.

IMPORTANT! If the boon is horizontal, it will be necessary to use a winch to push the boom into fully retracted position.



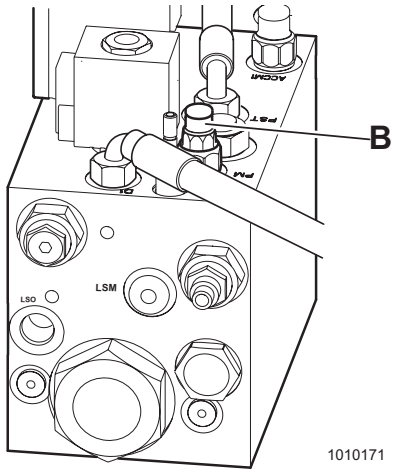
Boom extended cylinder counterbalance valve

WARNING!

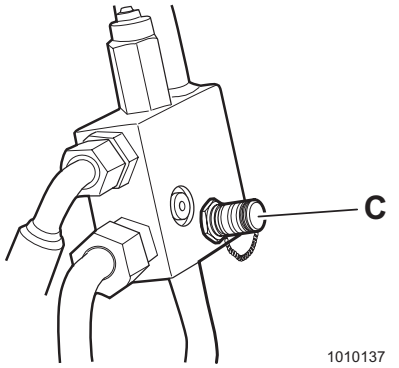
The boom must be retracted before it can be lowered. Lowering the boom while it is still extended may cause forward instability resulting in machine tipover.

7 Support the boom at the head using a suitable lifting equipment. Remove the stand or packing.
8 Attach a minimess hose to the pressure nipple (B) on the port PM on the main valve manifold.
9 Attach the other end of the minimess hose to the boom nipple (C) on the cylinder valve.
The boom will lower very slowly.

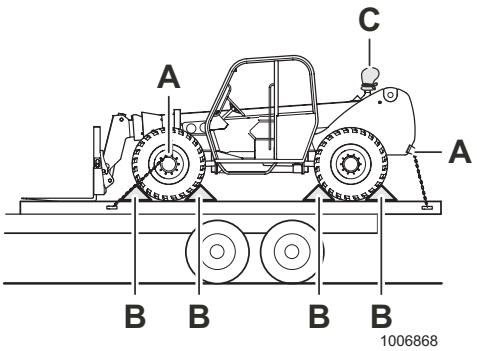
IMPORTANT! The extended cylinder counterbalance valve must be replaced after the setting has been altered to lower or retract the boom. Contact a workshop authorized by MEC.



Main valve manifold



Cylinder valve



A Attaching points for tie-down/lifting
B Wheel chocks
C Protection on exhaust pipe

Transporting the machine

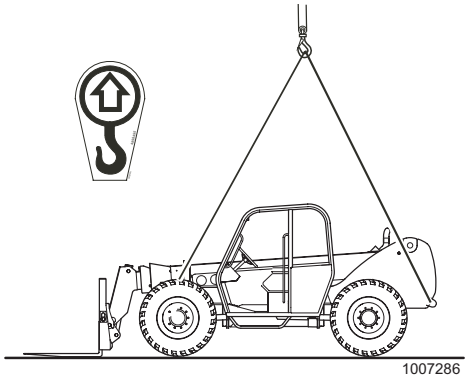
WARNING!

If the machine is driven across from a loading dock onto the platform of a truck or trailer, make sure that this vehicle is securely braked, i.e. the wheels blocked and that there is no risk that the vehicle will tip or tilt in a dangerous way as the machine is driven across.

NOTE: To avoid air from being forced down the exhaust pipe when transporting, it should be covered with suitable protection (C) (not plastic). Otherwise the turbocharger may be damaged.

On another vehicle

- If the machine is lifted up onto another vehicle:
  - Use attaching points intended for lifting.
- Tie down (lash) the machine.



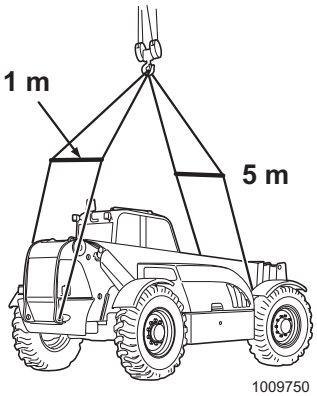
Lifting eyes

Tie-down

- Block the wheels (B).
- Tie (lash) the machine down using attaching points (A) intended for this purpose, so that it cannot tip or begin to move.

Lifting

- Lift the machine by the therefore intended lifting eyes.
  If the machine, for example, is equipped with road lights, it is necessary to utilize a spreader bar when lifting the machine. The length of the spreader bar should be 1 m (3.3 ft) and the length of the lifting cables should be 5 m (16.4 ft).



Lifting with spreader bar.

Across ramp

- First check that the ramp is amply wide enough and has the required strength and that it will not be displaced.

In elevator or other narrow spaces

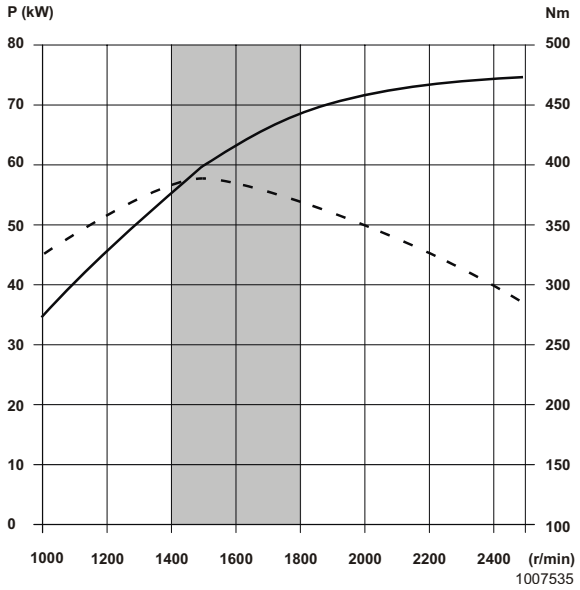
1. Reverse the machine in.
2. Apply the parking brake and turn off the engine before starting the elevator.

Also follow national or state regulations.

Operating techniques

The following pages contain advice and instructions on how to operate the machine and examples of how the most common attachments should be used. It is important that the correct technique is used to obtain safe and efficient use of the machine.

The machine has sufficient power to be fully operational at low engine speeds. This will result in lower fuel consumption, reduced engine noise and improved operator comfort.



Economical engine speed (grey area)

— Engine power

.... Torque

Attachments

Using the correct attachment for a particular job is a deciding factor when it comes to the capacity of the machine.

IMPORTANT! Only use attachments approved by MEC.

The machine has either direct-mounted attachment or attachment mounted in an attachment bracket which allows rapid changes of attachment.

When choosing attachment, follow the recommendations in the Attachment catalogue or documents issued by MEC. Because of great variations in for example usage, material and working environment, deviations from these recommendations may be necessary. In such cases, the MEC dealer should first be contacted for further information and approval. The operator is responsible for the safety regarding the combination of machine and attachment and also that the national safety requirements are met.

IMPORTANT! Never use an attachment with broken couplings or hoses.

WARNING!

Do not fit the machine with any form of personal work platform. Failure to comply may result in serious injury or death.

WARNING!

Always use the appropriate load chart when using load carrying attachments on the machine.

WARNING!

Never use an attachment until you have checked that it is securely fastened and that the attachment including hydraulic hoses, connections and similar are undamaged – your and others safety is involved.

WARNING!

Check that the attachment is properly locked by pressing its outer edge against the ground.

If you are uncertain as to whether the attachment is securely locked, you must visually check that the locking pin is in the locked position.

WARNING!

Do not sit or stand in an unsuitable place on the machine, e.i. on the attachment (bucket, fork, platform etc.) or any other mounted equipment, so that the operator cannot handle the machine in a safe way.

WARNING!

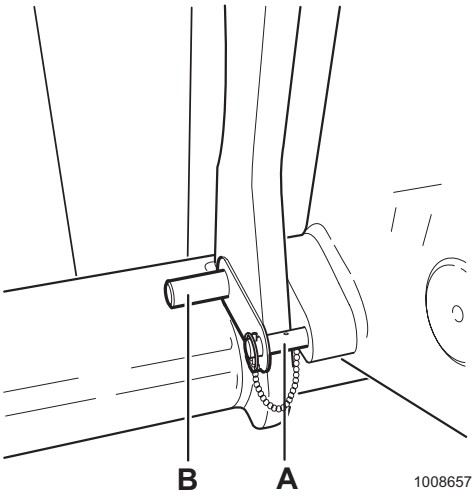
Do not use the machine with the attachment bracket in open position.

Attachment, disconnecting

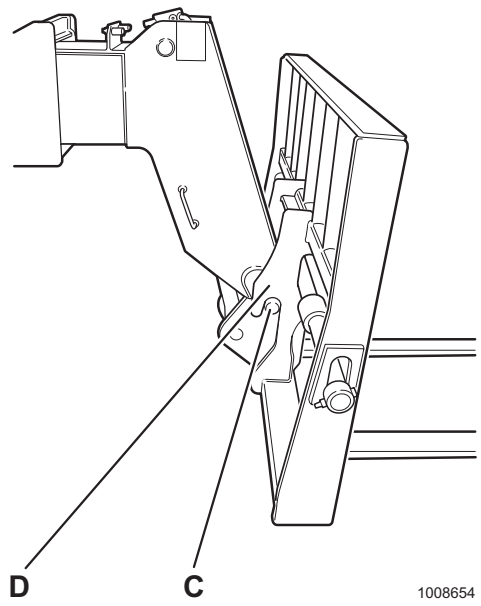
1 Fully retract the boom.
2 Fully lower the boom so that the attachment is laying against the ground.

NOTE! It may be necessary to extend the boom slightly before lowering it to the ground in the event that the ground is uneven or facing uphill or downhill such that the attachment cannot fully contact the ground.

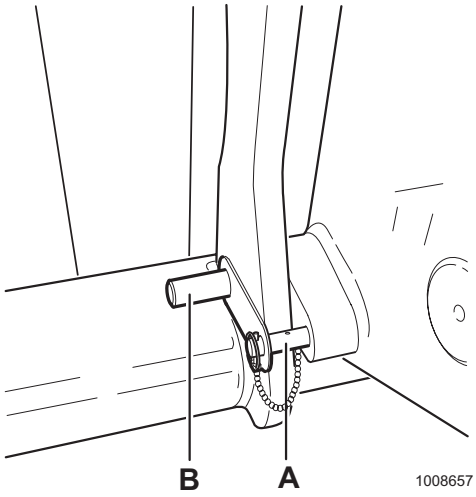
3 Park the machine on firm level ground.
4 Apply the parking brake.
5 Turn off the engine.
6 Unfasten seat belt and exit the machine using the handholds.
7 Pull out the locking pin (A) and remove the pin (B).
8 If the attachment is using hydraulic power, disconnect the hydraulic couplings, see page 65.
9 Make sure that no bystanders are in the machine working area. Enter the machine using the handholds. Fasten the seat belt.
10 Start the engine.
11 Tilt the attachment bracket forwards and at same time reverse the machine so the attachment comes off.



Locking pins



Attachment hook and bracket



Locking pins

Attachment, connecting

1 Fully retract the boom.

NOTE! It may be necessary to extend the boom slightly before lowering it to the ground in the event that the ground is uneven or facing uphill or downhill such that the attachment cannot fully contact the ground.

2 Lower the boom and tilt the attachment bracket (C) forwards.

3 Hook the attachment hooks (D) onto the attachment brackets and tilt the attachment backwards.

4 Lower the attachment onto the ground.

5 Turn off the engine.

6 Unfasten seat belt and exit the machine using the handholds.

7 Install pin (B).

8 Ensure that locking pin (A) is correctly engaged.

9 If the attachment needs hydraulic power, connect the hydraulic couplings, see page 65.

10 Make sure that no bystanders are in the machine working area. Enter the machine using the handholds.

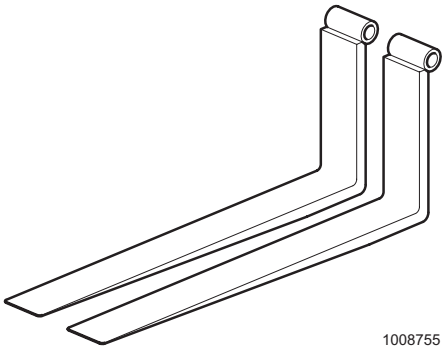
11 Fasten the seat belt.

12 Start the engine.

13 Check that the attachment is properly locked by pressing the front edge of the attachment against the ground.

14 If the attachment is hydraulically powered, check the hydraulic function.

Pallet forks



Pallet forks

IMPORTANT! Only use pallet forks approved by MEC.

The fork arms are dimensioned according to ISO 2330 and are classified together with the machine according to applicable regulations.

- Check the pallet forks regularly as regards wear. It is particularly important to check the heel of the fork tine.
- The pallet forks must not be used if:
  - the fork tine has been worn down to 90%, or less, of its original thickness.
  - the angle between fork tine and shank has become greater than 93°.
  - the fork brackets are worn or cracked.
- Cracks or wear must not be repaired by welding.

IMPORTANT! Never use pallet forks with broken couplings or hoses.

Pallet forks, operating

The most important points for work with pallet forks are:

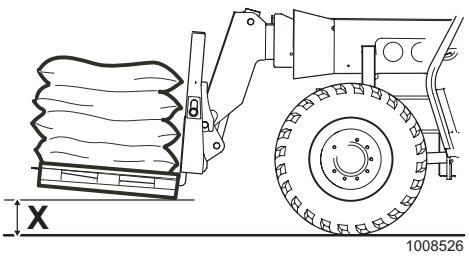
- The operator should have suitable training.
- The operator is responsible for that permissible load values are not exceeded.
- The forks make a semi-circular movement when they are raised. Therefore, start raising the forks a little bit away from the place where the load is to be placed.
- The forks must only be raised other than when stacking or depositing loads.
- When operating without a load on the forks, the tines should be held low and tilted upward.
- When stacking material, the fork tines should be kept horizontally.
- The travelling speed should be adapted to the ground conditions.
- The boom must always be lowered while moving/driving the machine.

Picking up a load

Previously deposited pallets or goods may be damaged as the penetrating force of the fork tines is very strong.

1. Place the load as close to the vertical shank of the forks as possible.
2. Lift the load with the least possible inclination of the pallet forks and do not tilt back the pallet forks more than 10°.

There may be deviations from the complete parallel movement and this may affect the use of the forks.



Keep the load low X=30–40 cm (X=12–16 in) above the ground to achieve the best possible stability and vision.

Operating with a load

- Tilt the load backwards to keep it more secure.
- If the load obscures the vision, reverse the machine to the place where the load is to be deposited.
- Adapt the speed to the existing conditions.

Approval and legal provisions

The rated operating load capacity according to the CEN standard EN 474-3 is given as a percentage of the tipping load.

The percentage values, which must not be exceeded, are as follows:

Rough terrain: 60% of tipping force

Firm and even ground: 80% of tipping force

It must be possible to control and handle the load hydraulically in all likely positions at the same time as all other hydraulic circuits are actuated. The maximum permissible load capacity is either determined by the stability or the hydraulic capacity of the machine whichever is less. In countries outside the EU/EEA other regulations may apply. Therefore, always check which local rules apply.

Fork carriages

Fork carriages need to be maintained regularly to prevent from damage and improper operation, see page 107.

Maximum permissible load for the machine using pallet forks is shown on the load chart. Do not exceed the given limits, see page 133–138. This machine can be equipped with following carriages.

When operating with side tilt and side shift carriages always pay attention that those affect the center of gravity more than the fixed carriage.

Fixed carriage

The fixed carriage is connected onto the attachment bracket.

Before picking a load:

– **read and understand the load chart for fixed carriage, see page 135–138.**

Side tilt carriage

- The side tilt carriage can be tilted to either left or right by using the auxiliary buttons on the boom control lever, see page 32.
- This attachment is hydraulically powered. Connect/disconnect the hydraulic hoses onto the auxiliary couplings on the third section of the boom, see page 65.

Before picking a load:

– **read and understand the load chart for side tilt carriage, see page 135–138.**

– learn the side tilt carriage behavior and button operation on the boom control lever.

Side shift carriage

- The side shift carriage can be shifted to either left or right by using the auxiliary buttons on the boom control lever, see page 32.
- This attachment is hydraulically powered. Connect/disconnect the hydraulic hoses onto the auxiliary couplings on the third section of the boom, see page 65.

Before picking a load:

- **read and understand the load chart for side swing carriage, see page 135–138.**
- learn the side tilt carriage behavior and button operation on the boom control lever.

Accumulator

The machine is fitted with a brake accumulator, located on side of the Cab/Open ROPS.

IMPORTANT! Do not carry out any jobs on the accumulator. Contact a workshop authorized by MEC for advice.

WARNING!

Even if the engine has been stopped, there is still an accumulated pressure in the system. If the system is opened, without having first released the pressure, oil under high pressure will jet out and this could cause injuries.
Even retightening of leaking couplings and unions should not be done until the pressure in the system has been fully released.

Hydraulic couplings

WARNING!

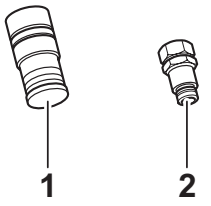
Immediately after operating the machine, the hot hydraulic oil can cause severe burns to unprotected skin. Hydraulic pressure can remain in the hydraulic system. Serious injuries can result if this remaining pressure is not released before any service is done on the hydraulic system.

IMPORTANT! When connecting or disconnecting hydraulic couplings, ensure that the couplings and surrounding area around is clean.

IMPORTANT! Make sure that the engine cannot be started while the hoses are disconnected.

IMPORTANT! This job should be carried out in a clean environment.

IMPORTANT! Do not use couplings or hoses, which are worn out or broken.



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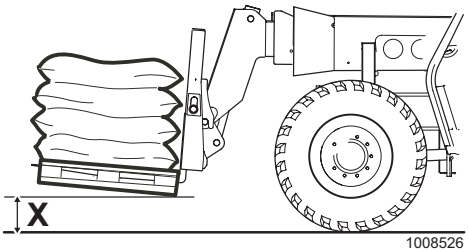
1 Female coupling
2 Male coupling

Disconnecting hydraulic couplings

1 Place the machine on firm level ground. Lower the attachment to the ground.
2 Turn off the engine.
3 Allow the hydraulic system to cool down.
4 Clean the area around the couplings with a clean cloth.
5 Pull back the ring on the female coupling (1) to disconnect the couplings.
6 Ensure that the male coupling (2) does not become damaged. Protect the male coupling with a cover.

Connecting hydraulic couplings

1 Place the machine on firm level ground. Lower the attachment to the ground.
2 Turn off the engine.
3 Allow the hydraulic system to cool down.
4 Clean both male and female couplings with a clean cloth.
5 Connect the couplings.
6 Ensure that the hydraulic coupling is properly connected. Test the hydraulic function.



Keep the load low X=30–40 cm (X=12–16 in) above the ground to achieve the best possible stability and vision.

Off-road operation

Do under no circumstances move or drive the machine with the boom raised. When transporting/moving loads, ensure that the boom is lowered and that the load is tilted backwards.

Working in water areas

Do not exceed the maximum permitted water depth (the foot step on the Cab/Open ROPS entry or/and the bottom of the hydraulic oil tank).

After working in water, lubricate the propeller shafts to avoid damage, see page 116.

Signalling diagram

For manual signalling to operator of lifting equipment.

If a rapid lifting, lowering or moving movement is required, the boom movements should be carried out more lively. If two different machines are used for lifting the same load, there should be an agreement beforehand how the lift should be carried out and what signals should be given to the respective operators.

Start
Both arms are extended horizontally with the palms facing forward

Stop
Right arm pointing upward with the palm facing forward

End
Both hands are clasped at chest height

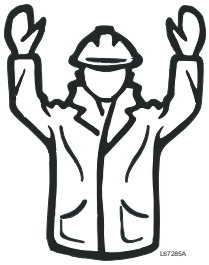
Raise
Right arm pointing upward with the palm facing forward and the hand slowly making a circle

Lower
Right arm pointing downward with the palm facing forward and the hand slowly making a circle

Vertical distance
The hands are indicating the relevant distance

Move forward
Both arms bent with the palms turned upward and the forearms slowly moving toward the body several times

Move rearward
Both arms bent with the palms turned downward and the forearms slowly moving downward away from the body several times



Danger (emergency stop)
Both arms pointing upward with the palms facing forward

68 Signalling diagram

Operate in indicated direction
The arm extended horizontally with the palm facing downward and the arm making small slow movements to the right

Operate in indicated direction
The arm extended horizontally with the palm facing downward and the arm making small slow movements to the left

Horizontal distance
The hands are indicating the relevant distance

Safety when servicing

This section deals with the safety rules which must be followed when checking and servicing the machine. MEC disclaim all responsibility if other tools, lifting devices or working methods are used than those described in this publication.

Further safety rules and warning texts are given within the respective sections.

Service positions

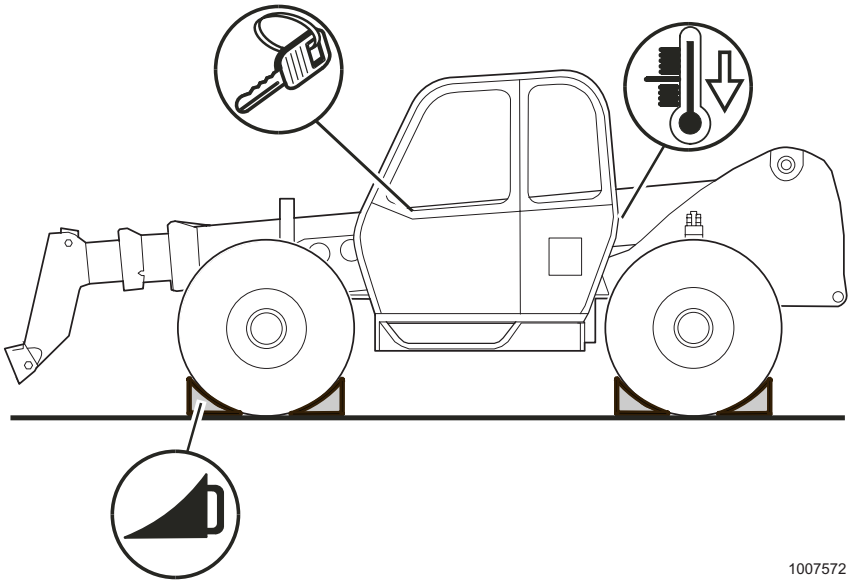
BEFORE you begin service work the machine must be placed in any of the service positions described. See specific service job for which service position which should be used.

NOTE: Lifting with a jack must only be carried out by trained personnel.

WARNING!

If work has to be carried out on the machine before it has cooled, there is risk of burns. Therefore, take care when working with hot liquids and machine parts.

Service position 1



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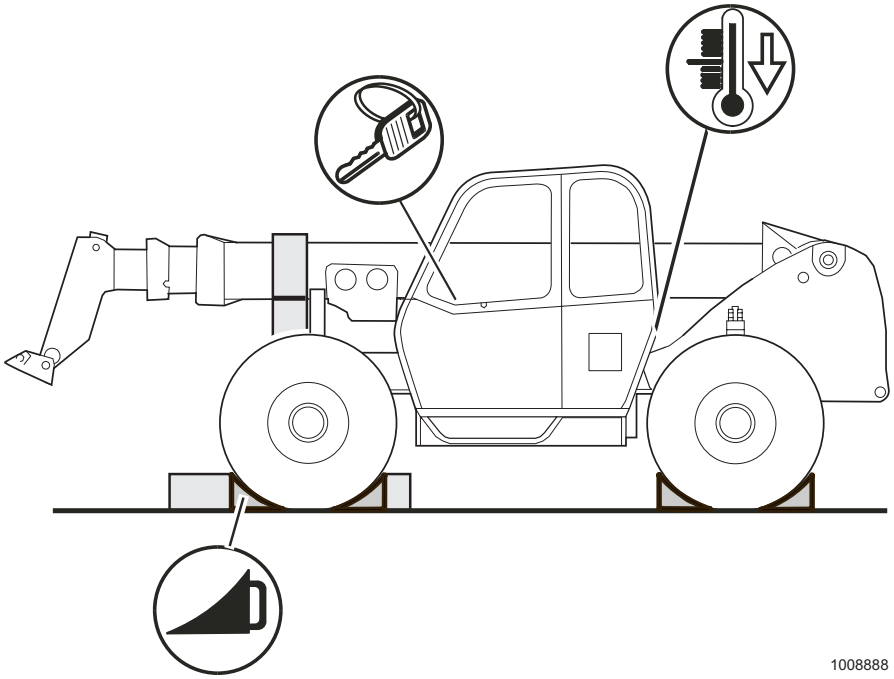
1 Remove the attachment from the attachment bracket, see page 59.
2 Fully retract the boom.
3 Fully lower the boom so that the boom supports to the machine frame.
4 Park the machine on firm level ground.
5 Apply the parking brake.
6 Turn off the engine.
7 Remove the ignition key.
8 Allow the machine to cool down.

WARNING!

If work must be done on the machine before it has cooled down; beware of hot fluids and hot components that can cause severe burns.

9 Attach a black and yellow label to the steering wheel with the message "forbidden to start the engine".
10 Unfasten seat belt and exit the machine using the handles.
11 Block the wheels.

Service position 2



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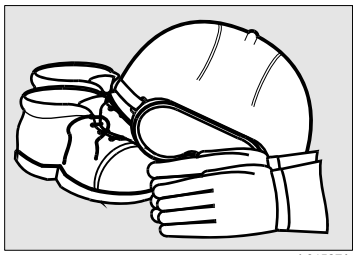
1 Remove the attachment from the attachment bracket, see page 59.
2 Fully retract the boom.
3 Place a support under the boom.
4 Park the machine on firm level ground.
5 Apply the parking brake.
6 Turn off the engine.
7 Remove the ignition key.
8 Allow the machine to cool down.

WARNING!

If work must be done on the machine before it has cooled down; beware of hot fluids and hot components that can cause severe burns.

9 Attach a black and yellow label to the steering wheel with the message "forbidden to start the engine".
10 Unfasten seat belt and exit the machine using the handles.
11 Block the wheels.

Before service read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- Read the Operator's Manual and the plates and instructions found on the machine to obtain the required knowledge and information about the machine.
- To be able to carry out the service correctly, it is important that you use the correct tools and equipment. Replace or repair broken tools and faulty equipment.
- Use a hard hat, safety glasses, protective shoes and gloves and an approved respirator (dust mask) or other protective articles when required.
- Do not wear loose-fitting clothing or jewellery.
- Keep service surfaces, steps and handholds clean from oil, dirt and ice.

- Use the steps provided with anti-slip protection to avoid the risk of slipping.
- Make sure that there is sufficient ventilation when starting the engine indoors.
- Do not stand in front of or behind the machine while the engine is running.
- Use a long-handled window scraper and brush or a ladder when cleaning the outside of the windows.
- The installation of two-way radio, mobile telephone, or similar equipment must be carried out by trained personnel.
- When carrying out service work under raised loader boom, the units should be secured and parking brake applied.
- Take care when changing oil in engine, hydraulic system or transmission as the oil may be hot and cause burns.
- Machine modifications are not allowed. For advice concerning attachments, fenders etc. contact your MEC dealer.

- When emptying/draining oil or fuel, collect the liquids in a suitable vessel. Spillage will damage the environment and may cause a fire. Waste oil and other contaminating liquids should be taken care of by a firm especially authorized to carry out such work.

- When operating in an area which is contaminated or unhealthy, the machine must be especially equipped for this purpose. Special local safety regulations apply within such areas and also when servicing the machine.

- Turn off the engine before opening engine covers etc. Make sure that no tools or other objects, which may cause damage, are left in or on the machine.

- Check that the equipment used for lifting or supporting parts of the machine, e.g. straps, slings, ratchet blocks and ground support, can safely cope with the strain they are exposed to and meet applicable national regulations.

- Release the pressure in pressure vessels, components and systems carefully and in the prescribed way, so that the excess pressure is released without risk.

- When connecting hydraulic hoses, check that the hydraulic function operates in the expected way.

- The hoses, the pipes and the hydraulic attachment brackets may be pressurized even if the machine is stationary and the engine turned off. Such pipes and hoses should therefore only be disconnected by trained personnel.

- When looking for leaks, use a piece of paper or wood, not your hand.

- Never set a pressure-limiting valve to a higher pressure than that recommended by the manufacturer.

Fire prevention measures

There is always a risk of fire. It is important that you use a fire extinguisher that suits your machine and working environment and that you learn how to use it.

If the machine is to be provided with a hand-held fire extinguisher, it should be of the ABE type (ABC in the USA), which means that it is possible to extinguish fires in both solid and liquid carbonaceous material and that the active compound does not conduct electricity.

The effectiveness grade I means that the time the extinguisher is effective must not be less that 8 seconds, grade II at least 11 seconds and grade III at least 15 seconds.

A hand-held fire extinguisher ABE I (in the USA ABC type) normally corresponds to a powder content of 4 kg (EN-grade 13A89BC), standard EN 3-1995, parts 1, 2, 4 and 5.

At the slightest sign of fire, and if the situation allows, take the following steps:

1. Drive the machine away from the fire-sensitive area caused by the fire.
2. Lower the boom to the ground.
3. Turn off the engine.
4. Leave the cab.
5. Turn off the battery disconnect switch.
6. Start putting out the fire and notify the fire brigade/department if necessary.

- It is forbidden to smoke or have an open flame near a machine when filling with fuel or when the fuel system is open and in contact with the surrounding air.
- Diesel fuel oil is flammable and must not be used for cleaning. Use an approved solvent and do not inhale the fumes. Also bear in mind that certain solvents can cause skin rashes and constitute a fire hazard.
- Store flammable starting aids in cool, well ventilated locations. These aids must not be used in connection with electric preheating of the induction air.
- Keep the place, where the service is to be carried out, clean. Oil or water makes the floor slippery and are also dangerous in connection with electrical equipment or electrically powered tools. Oily or greasy clothes are a serious fire hazard.
- Check daily that the machine and the equipment, e.g. under body plates are free from dust and oil. In this way the risk of fire is reduced and it is easier to detect faulty or loose components.

If a high-pressure jet is used for cleaning, take great care as the insulation of electric leads can be damaged even at a moderately high pressure and temperature.
Protect electrical leads in an appropriate way.

- Take extra care when cleaning the machine after it has been used in a fire-sensitive environment, e.g. saw-mills and refuse dumps.
- Sound absorbing material in the engine compartment must be kept clean to minimise the fire hazard.
- Fire prevention equipment which is installed on the machine must be maintained and regarded as a complement to the actions of the operator in case of a fire.
  Check that fuel lines, hydraulic and brake hoses and electrical cables have not been damaged by chafing or are not in danger of being damaged in that way because of incorrect installation or clamping. This applies particularly to unfused cables, which are red and marked R (B+) and routed:
  - between the batteries
  - between battery and starter motor
  - between alternator and starter motor
  - to the preheating element on the engine

  Electrical cables must not lie directly against oil or fuel lines.
- The following applies for welding and grinding work:
  - A fire extinguisher should be kept near to hand.
  - The ventilation must be good when working indoors.
  - Approved respirator should be used
  - The work surface must be cleaned.
  - Do not weld or grind on components which are filled with flammable liquids, e.g. tanks and hydraulic pipes. Exercise care with such work also in the proximity of such places.

Working on painted surfaces

WARNING!

Be careful when welding, grinding and gas cutting near painted surfaces and near rubber or plastic parts. Paint and polymer materials can, when heated, form compounds which are dangerous to health and environment.

When welding, grinding and gas cutting, the paint finish must first be removed from an area with a radius of at least 10 cm (4 in) from the point where the work is to be carried out. The reason for this is that paint, when heated, gives off a large number of different substances which can cause irritation and be very harmful to a person's health in case of long or frequent exposure.

In addition to the health hazard, the weld will also be of inferior quality and strength, which in the future may cause the weld to break. Therefore, never weld directly on a painted surface.

Methods and precautionary measures when removing paint:

- Blasting
  - use respirator and eye protection
- Paint remover or other chemicals
  - use a portable air extractor, respirator and protective gloves
- Grinding machine
  - use a portable air extractor, respirator and protective gloves and eye protection

Fluoro-carbon rubber

Observe extra great care when it is suspected that you may have to handle fluoro-carbon rubber.

Certain seals which have to withstand high operating temperatures (e.g. in engines, hydraulic pumps) may be made from fluoro-carbon rubber, which, when exposed to strong heat (fire), forms hydrogen fluoride and hydrofluoric acid. This acid is very corrosive and cannot be rinsed or washed off from the skin. It causes very severe burns which take a long time to heal.

It usually means that damaged tissue must be surgically removed. Several hours may pass after contact with the acid, before any symptoms appear and therefore one is not given any immediate warning. The acid may remain on the machine parts for several years after a fire.

If swelling, redness or a stinging feeling appears and one suspects that the cause may be contact with heated fluoro-carbon rubber, contact a medical doctor immediately. If a machine, or part of a machine, has been exposed to fire or severe heat, it should be handled by specially trained personnel. In all handling of machines after a fire, thick rubber gloves and effective goggles must be used.

The area around a part which has been very hot and which may be made of fluoro-carbon rubber should be decontaminated by thorough and ample washing with lime water (a solution or suspension of calcium hydroxide, i.e. slaked lime in water). After the work has been completed, the gloves should be washed in lime water and then discarded.

Rubber and plastics

Polymer materials can, when heated, form compounds which are dangerous to health and environment and must therefore never be burned when scrapped. Also take care when handling machines which have been exposed to fire or other extreme heat.

If gas cutting or welding is to be carried out near such materials, the following safety instructions must be followed:

– Protect the material from heat.

Use protective gloves, protective goggles and an approved respirator.

Waste hazardous to the environment

- Painted parts or parts made of plastic or rubber which are to be scrapped must never be burnt, but must be taken care of by an approved refuse-handling plant.
- Batteries, plastic objects and anything else which might be dangerous to the environment must be taken care of in an environmentally safe way.

Check list after fire

When handling a machine which has been damaged by fire or been exposed to intense heat, the following protective measures must under all circumstances be followed:

- Use thick, gloves made of rubber and wear goggles which are certain to protect your eyes.
- Never touch burnt components with your bare hands, as there is a risk that you may come into contact with melted polymer materials. First wash thoroughly with plenty of lime water (a solution or suspension of calcium hydroxide, i.e. slaked lime in water).
- As a precaution, seals (O-rings and other oil seals) should always be handled as if they were made of fluoro-carbon rubber.
- Treat skin, which may have come into contact with burnt fluoro-carbon rubber, with Hydrofluoric Acid Burn Jelly or something similar. Seek medical advice. Symptoms may not appear until several hours afterwards.
- Discard gloves, rags etc. which may have come into contact with burnt fluoro-carbon rubber.

Service and maintenance

L52168B

For the machine to function satisfactorily and at the lowest possible cost, thorough maintenance is required. This section of the manual describes the maintenance work which the operator can carry out. If certain work requires trained service personnel and special equipment, this will be stated.

The intervals recommended between checks, oil changes and lubrication apply provided that the machine is used under normal environmental and operating conditions.

For service and maintenance intervals, see page 109–113.

Paintwork maintenance

Machines which are operated in corrosive environment are more exposed to rust than others. As a preventive measure, any damage to the paintwork should be re-painted and anti-rust agent should be applied every six month.

1 Wash the machine. If using water with high pressure, keep a certain distance between the nozzle and the machine and do not let the water temperature exceed 60 °C.

2 Let the machine dry.

3 Check if there are any damaged areas to the paintwork. If found - touch-up those.

4 Apply Dinol 77B (or equivalent) to a thickness of 70–80 µ.

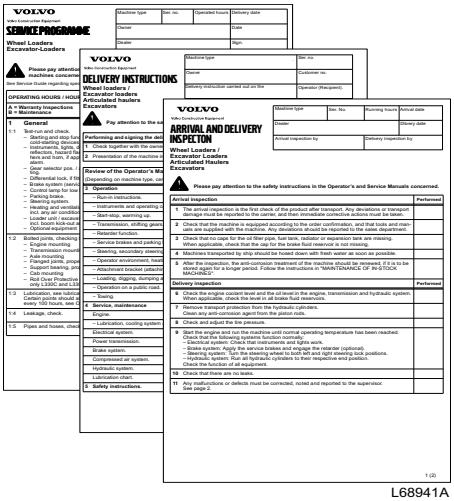
5 Also apply a protective layer of underbody seal, Dinitrol 447 (or equivalent) under mudguards, where mechanical paint damage can be expected.

Arrival and delivery inspection

Before the machine leaves the factory, it is tested and adjusted. The dealer must also, if the warranty is to apply, carry out "Arrival and delivery inspections" according to applicable form, which must be signed.

Delivery Instructions

When handing the machine over, the dealer must give the buyer "Delivery instructions" according to applicable form, which must be signed, if the warranty is to apply.


VOLVO

SERVICE PROGRAMME

Wheel Loaders
Excavator-Loaders

DELIVERY INSTRUCTIONS

Wheel loaders /
Excavator Loaders
Articulated haulers
Excavators

ARRIVAL AND DELIVERY INSPECTON

Wheel Loaders /
Excavator Loaders
Articulated Haulers
Excavators

L68941A

Service programme

Warranty inspection

Two warranty inspections should be carried out if the warranties are to apply. The first within 100 hours and the second at the latest at 1000 operating hours.

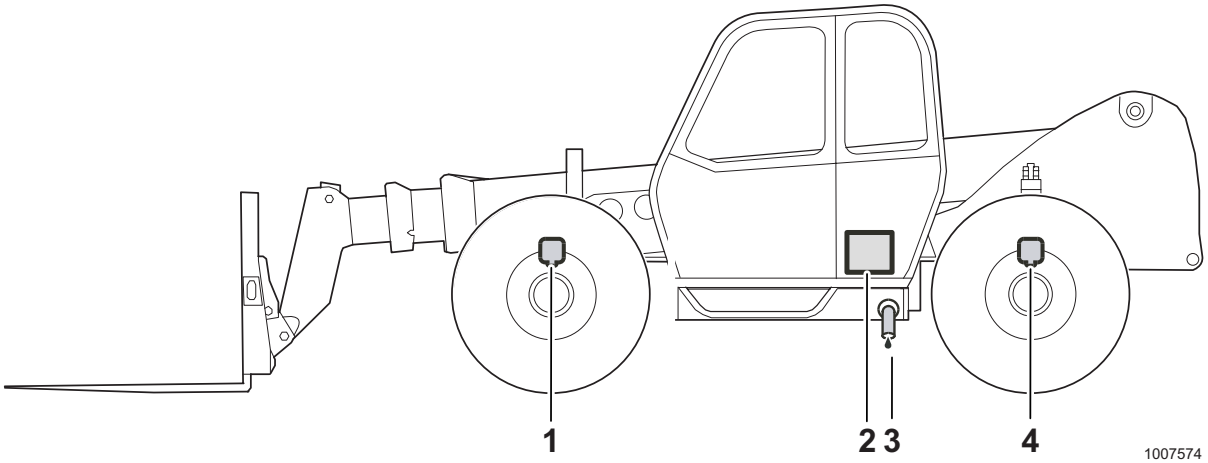
The carrying out of these inspections is a condition for the warranty to apply.

Condition test

Condition Test is carried out at workshops authorized by MEC and provides information about the general condition of the machine.

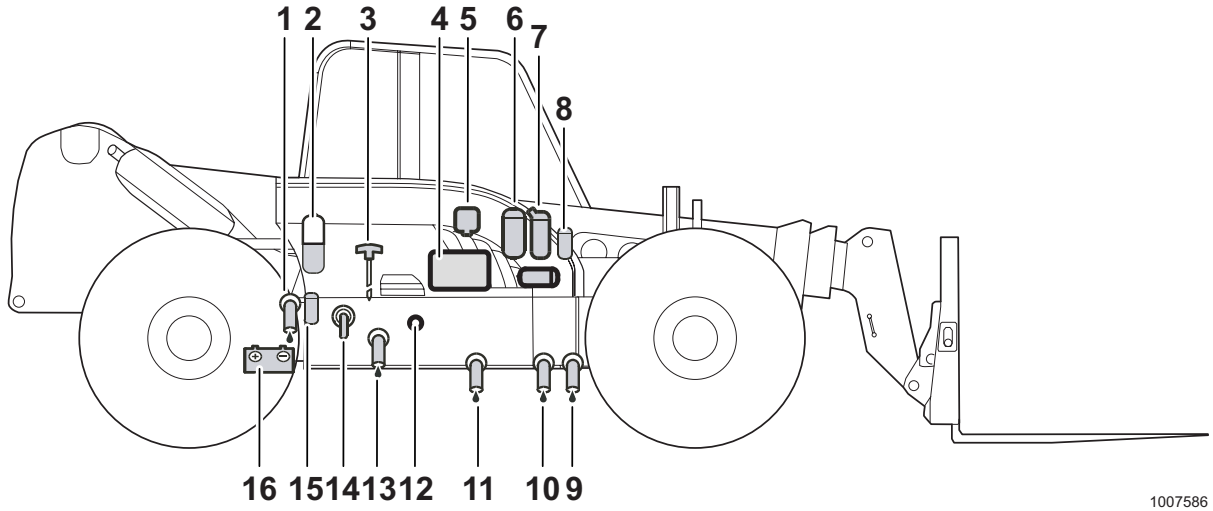
Service points

Left side



1	Ventilation filter, front axle	3	Draining, fuel
2	Filling point, fuel	4	Breather filter, rear axle

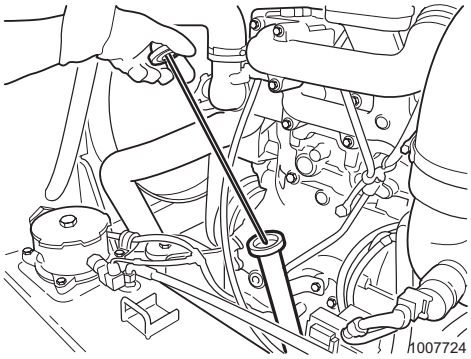
Right side



1	Draining point, coolant	9	Draining point, drop box
2	Expansion tank	10	Draining point, transmission
3	Filling point/oil dipstick, engine	11	Draining point, hydraulic tank
4	Air cleaner	12	Level sight glass, hydraulic tank
5	Breather filter, hydraulic tank	13	Draining point, engine
6	Oil filter, engine	14	Battery disconnect switch
7	Primary fuel filter and water trap	15	Return oil filter, hydraulic system and filling point for hydraulic system
8	Secondary fuel filter	16	Battery

Engine

Engine oil, checking



Engine oil dipstick

WARNING!

The engine, turbo and the exhaust system may be very hot. Make sure that these parts are cool before doing this job.

Check the oil level daily or every 10 hours.

Place the machine in service position 1, see page 70.

The engine dipstick is positioned on the right side of the machine.

- Check the oil level with the machine on level ground.
- The check should be carried out when the oil is cold and has had time to run down to the bottom of the sump.
- Check that the oil level is between the marks on the dipstick. Add oil if necessary.

For oil specifications, see page 117.

Engine oil, changing

WARNING!

Take care when changing oil, as hot oil can cause burns to unprotected skin.

WARNING!

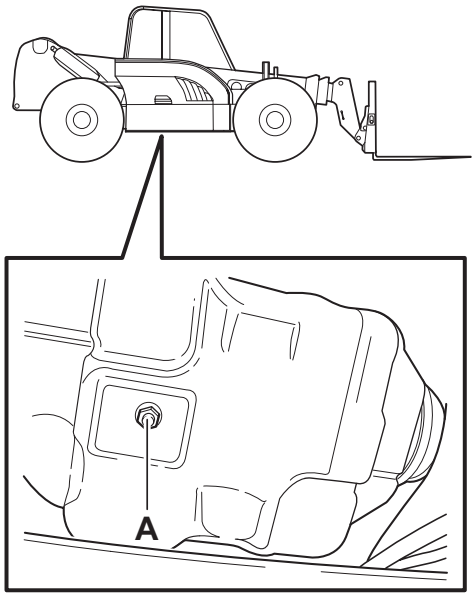
The engine, turbo and the exhaust system may be very hot. Make sure that these parts are cool before doing this job.

Change the oil every 500 hours.

Place the machine in service position 1, see page 70.

The following conditions must be met if the 500 interval between oil changes is to apply:

- Oil of correct viscosity for the ambient air temperature is selected according to diagram, see page 117.
- The oil is of a certain grade, see page 117.
- The lubricating oil filter is replaced every time the oil is changed.
- The lubricating oil filter is a genuine MEC filter.
- The sulphur content in the fuel does not exceed 0.5% by weight.
- Prevailing ambient temperatures does not exceed 10 °C (14 °F) and oil temperatures does not exceed 60 °C (84 °F).
- Bio diesel fuel according to DIN 54606-FAME is used.



Engine oil drain plug

Draining

Drain the oil while the engine is still warm.

1 Place a container under the drain hole to collect the oil.
2 Remove the oil filler cap and unscrew and remove the drain plug (A).
3 Re-install the drain plug securely.

Take care of waste oil and liquids in an environmentally safe way!

Filling

Fill with oil through the filler pipe.

Oil capacity when changing: approx. 12.0 litres (3.12 US gal) including filters.

1 Refill the engine with the correct grade of oil up to the MAX level on the dipstick. Allow time for the oil to settle in the engine. Replace the filler cap.
2 Run the engine and check for oil leaks.

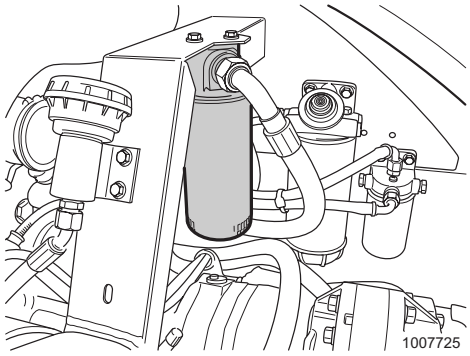
For oil specifications, see page 117.

Engine oil filter, replacing

Replace the engine oil filter every 500 hours.

The filter is of the disposable type, i.e. it cannot be cleaned, but must be replaced.

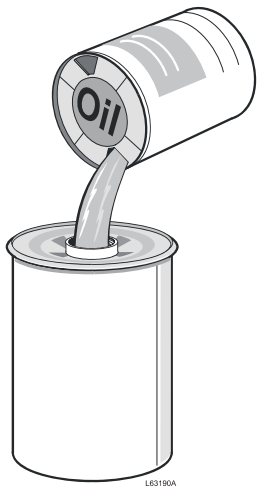
The oil filter is located on the right side of the engine.



Engine oil filter

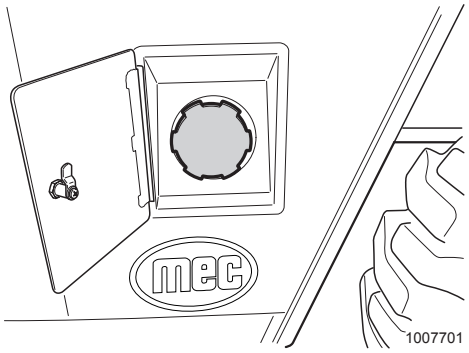
Replace the filter every time the oil is changed.

1 Place the machine in service position 1, see page 70.
2 Clean the outside of the filter head, filter casing and surrounding part of the engine. Use a filter clamp to unscrew the filter, and dispose it.
3 Fill the new filter with oil, and apply oil to the filter seal.
4 Screw on the new filter, by hand, until the rubber seal just touches the filter head. Then tighten it a further ¾ turn, by hand.



NOTE! After replacing the oil filter, the engine must be run at low idling for at least one minute to ensure proper lubrication before the machine is put to work.

IMPORTANT! It is important that the filter is filled with oil before it is installed. This is to ensure lubrication of the engine immediately after it is started.



Fuel cap

Fuel system

Fuel tank

The fuel tank should be filled daily at the end of the working day to avoid condensation.

- The fuel cap is located on the left side of the machine next to the Cab/Open ROPS entry.
- Carefully clean around the filler cap before removing it.
- Avoid spilling fuel when filling as this attracts dirt.

Fuel tank capacity: 122 litres (32.2 US gal).

Use correct fuel quality, see page 118.

Fuel filters

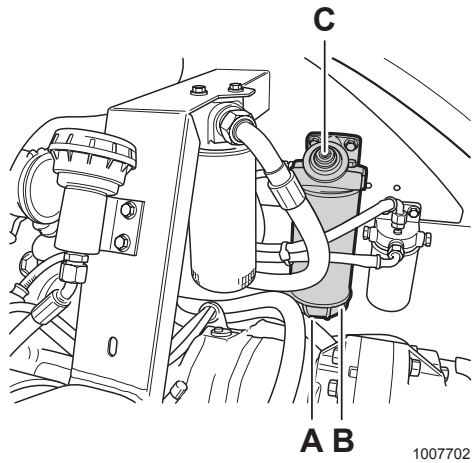
The fuel system incorporates one primary filter, one secondary filter and one water trap. The water trap is integrated into the primary filter unit. Both the primary filter/water trap and the secondary filter are positioned on the right side of the machine in the engine compartment.

Primary filter, replacing

Replace the filter every 500 hours.

Take care of fuel spillage by collecting it in a suitable vessel.

1. Place the machine in service position 1, see page 70.
2. Drain all fuel from the primary filter and the water trap with the draining nipple (A).
3. Remove the primary filter by using a filter clamp.
4. Remove the transparent water trap (B) from the primary filter.
5. Install the water trap on the new filter.
6. Install the primary filter onto the filter head. When installing the filter, it should be tightened by hand.



Primary fuel filter
A Draining nipple
B Water trap
C Hand pump

Water trap, draining

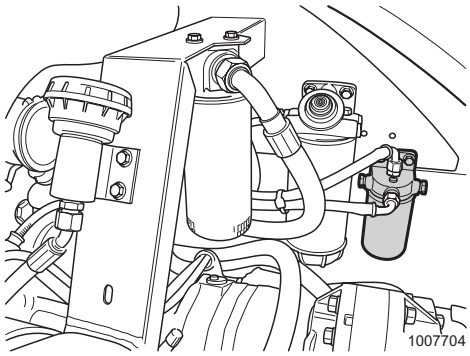
Drain the water trap every 250 hours.

Take care of fuel spillage by collecting it in a suitable vessel.

When draining water from the fuel, this must be done by hand.

A non-return valve in the filter head prevents the fuel from running back to the tank. As no fuel can run back, the pressure will remain and as a consequence no water will be drained unless new fuel is pumped in.

1. Place the machine in service position 1, see page 70.
2. Connect a hose to the draining nipple (A).
3. Loosen the draining nipple.
4. Pump with hand pump (C) until the water trap is empty.
5. Tighten the draining nipple and remove the hose.



Secondary filter

Secondary filter, replacing

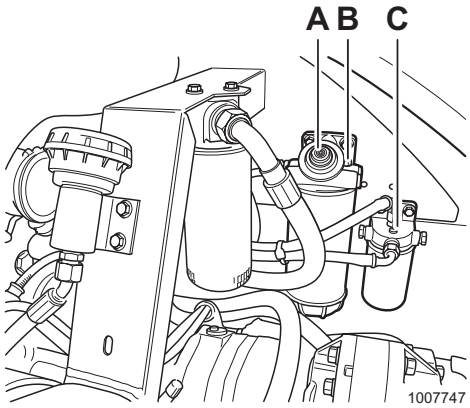
Replace the secondary fuel filter every 1000 hours.

Take care of fuel spillage by collecting it in a suitable vessel.

The secondary filter inserts should be replaced by service personnel from a MEC authorised workshop.

1 Place the machine in service position 1, see page 70.
2 Clean around the filter head and filter.
3 Use a filter clamp to unscrew the filter.
4 Fill the new filter with fuel, lubricate the seal and screw on the filter until the rubber seal just touches the filter head, then tighten a further ¾ turn.
5 After filter replacement, the fuel system must be bled, see page 84.

The filter is top filled with fuel. Observe when changing the fuel filter.



A Hand pump
B Bleeder screw, primary filter/water separator
C Bleeder screw, secondary fuel filter

Fuel system, bleeding

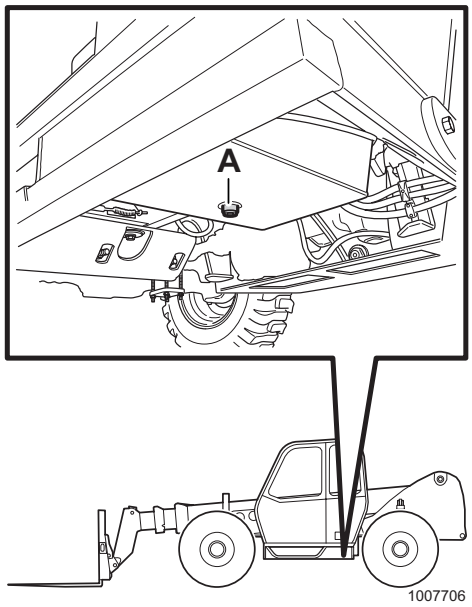
Bleed the fuel system if required.

1 Place the machine in service position 1, see page 70.
2 Fill the fuel tank completely.
3 Loosen the bleeder screw (B) on top of the primary filter/water separator.
4 Pump with the hand pump (A) until fuel free from air bubbles flows out.
5 Close the bleeder screw on top of the water separator.
6 Pump the hand pump until resistance is felt.
7 Loosen the bleeder screw (C) on the secondary fuel filter.
8 Pump the hand pump until fuel free from air bubbles flows out.
9 Close the bleeder screw on the fuel filter.
10 Pump the hand pump until resistance is felt.
11 Start the engine.

IMPORTANT! If the engine has run out of fuel, do not attempt to start the engine without first bleeding the fuel system.

IMPORTANT! Check after starting that there are no leaks.

Take care of waste oil and liquids in an environmentally safe way!



A Fuel drain plug

Fuel system, draining

WARNING!

Never smoke or have an open flame near the machine when filling with fuel or when the fuel system has been opened and in contact with air.

If the fuel system has become contaminated, the fuel tank must be drained immediately.

IMPORTANT! Do not perform this operation under dirty conditions. Clean the area around the tank before draining the fuel system.

1 Place the machine in service position 1, see page 70.
2 Clean around the drain plug (A).
3 Place a container under the drain plug.
4 Remove the drain plug and drain completely.
5 Use clean fuel to wash the inside of the tank. Fill through the fuel fill point.
6 Clean and install the drain plug.
7 Fill the fuel tank completely.

Take care of waste oil and liquids in an environmentally safe way!

Turbocharger

The turbocharger is lubricated and cooled by the engine lubrication system.

Important for the function of the turbocharger is that:

- lubrication and cooling is safeguarded by
  - not racing the engine immediately after it has been started.
  - by allowing the engine to run at low idle for a couple of minutes before it is turned off.
- engine oil is changed and lubricating oil filter replaced at prescribed service intervals.
- the air cleaner is serviced regularly and that the exhaust system and lubricating oil lines do not leak.

If jarring noises can be heard, or if the turbocharger vibrates, it must be reconditioned or replaced immediately.

Only workshops authorized by MEC should carry out work on the turbocharger.

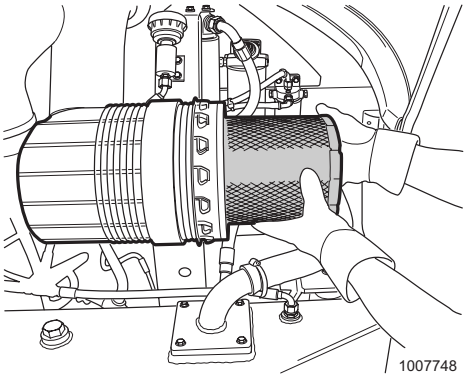
Air cleaner

The degree of engine wear depends largely on the cleanliness of the induction air. The air cleaner prevents dust and other impurities from entering the engine. Therefore, it is very important that the air cleaner is checked regularly and maintained correctly.

The air cleaner is positioned inside the engine hood.

Clean the air filter cover by pressing the rubber manifold, located at the bottom on the air cleaner cover. This job should be carried out when required.

Primary filter, maintenance and replacement



Primary filter

Replace the primary filter every 1000 hours.

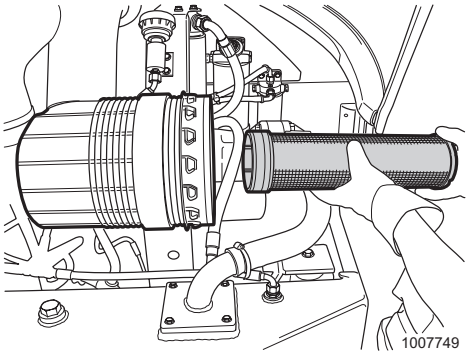
- As well as replacing the filter, the cover for the air cleaner should also be cleaned as this works as a container for particles which have not been trapped in the filter.
- Check that all hose and pipe connections from the air cleaner to the engine induction manifold are tight.

1 Place the machine in service position 1, see page 70.
2 Pull the yellow locking tab to release the cover lock.
3 Turn the filter cover anticlockwise and remove the cover.
4 Remove the primary filter.

Always empty and clean the cover when changing filter.

Do not, under any circumstances, run the engine without a filter or with a damaged one.

Secondary filter, replacing



Secondary filter

Replace the secondary filter every 1000 hours.

The secondary filter works as a protective filter if the main filter is damaged.

If the air filter warning lamp is alight, in spite of the fact the primary filter has been replaced, this indicates that the secondary filter is blocked.

This job must be carried out in a clean environment. If possible place the machine inside in a workshop or on a wet surface to prevent dust from entering the engine.

1 Pull the yellow tab to release the cover lock.
2 Turn the cap anticlockwise and remove the cover.
3 Remove the primary filter.
4 Remove the secondary filter.

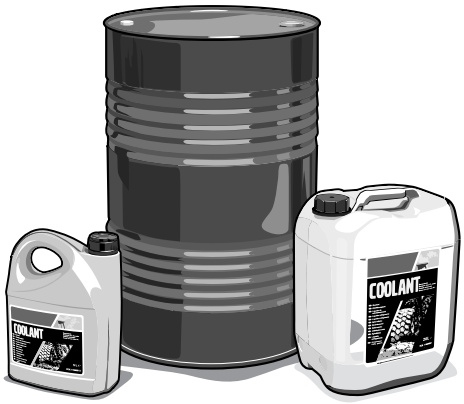
The secondary filter must always be replaced, never cleaned.

Cooling system

The following measures must be carried out regularly to ensure that the cooling system functions correctly:

- Check the coolant level.
- Clean the radiator grille.

Coolant



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Coolant with anti-freeze and corrosion protection

These additives have a limited durability, therefore the coolant should be changed once a year or every 2000 hours.

When delivered from the factory, the cooling system is normally filled with an anti-freeze/water mixture. This coolant mixture lowers the freezing point down to –37 C (–35 F). If there is a risk that the ambient temperature will drop below this temperature, contact a workshop authorized by MEC.

To protect the engine from corrosion and the radiator from clogging up, the concentrated anti-freeze contains active anti-corrosion additives.

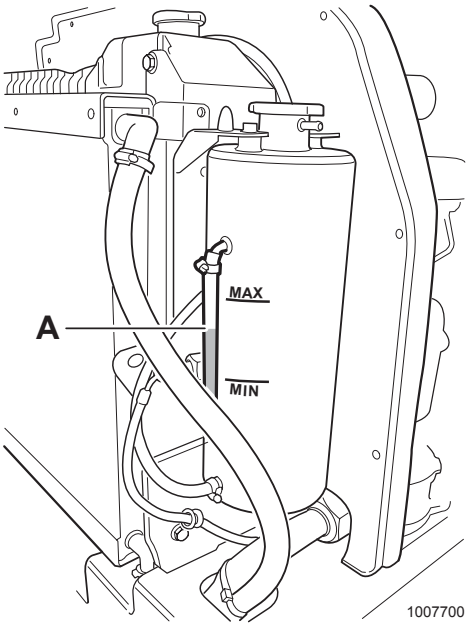
The coolant with anti-freeze must stay in the coolant during winter and summer, in order to ensure adequate protection against corrosion.

NOTE! Do not mix different makes of anti-freeze as this can have a negative effect on the system.

The anti-freeze content must not be less than 50%.

The cooling system capacity, including the radiator and the expansion tank, is approx. 13.5 litres (3.6 US gal). 50% (6.8 litres) (1.8 US gal) anti-freeze content lowers the freezing point down to –37 C (– 35 F).

IMPORTANT! To avoid engine damage, the coolant should never be prepared with industrial waste water, river water, sea water or brackish water.



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A Sight hose

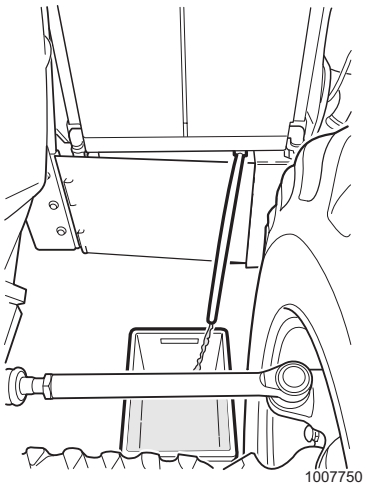
Coolant, checking

WARNING!

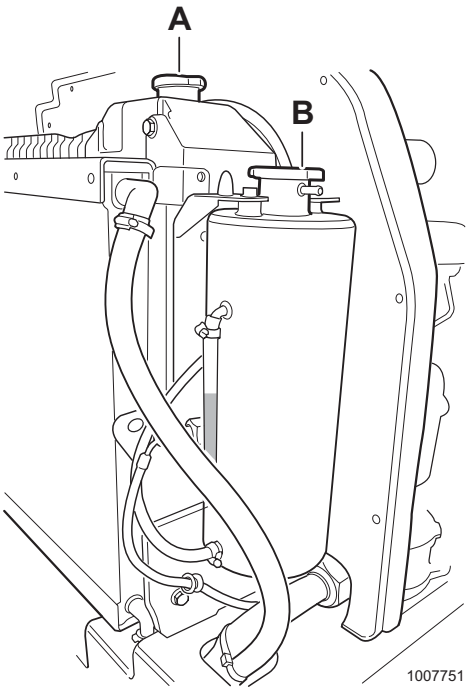
There is a risk of scalding when the expansion tank cap is removed because of the excess pressure in a hot cooling system.

Check the coolant level daily or every 10 hours.

1. Place the machine in service position 1, see page 70.
2. The level of the sight hose should be between the min. and max. level indication.
3. If the level is too low, fill the expansion through the filler port.



Coolant draining point



A Radiator filler port
B Expansion tank filler port

Coolant, changing

Change coolant every 2000 hours.

IMPORTANT! Never fill a hot engine with cold coolant, as this may cause the cylinder block or the cylinder head to crack. Failure to change coolant increases the risk of clogging and consequently engine damage.

IMPORTANT! Engine must be cold before changing the coolant.

The engine must be turned off before changing coolant.

Place the machine in service position 1, see page 70.

Draining

1 Remove the radiator cap and the expansion tank cap.
2 Open the battery box.
3 Attach a hose onto the radiator drain nipple. Drain into a suitable container.
4 Open the draining nipple.
5 Drain completely.
6 Close the draining nipple.

Take care of waste oil and liquids in an environmentally safe way!

Filling

WARNING!

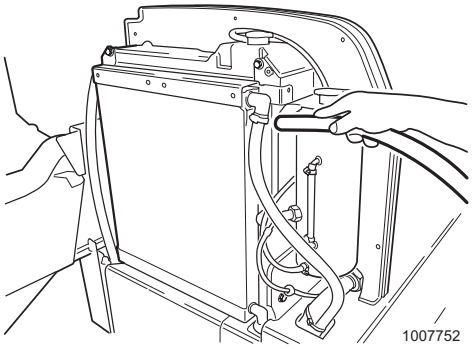
Do not remove radiator and expansion tank caps while cooling system is hot.

1 Remove the radiator cap and then the expansion tank cap.
2 Fill the radiator with coolant in port (A) until the coolant level in the sight hose on the expansion tank reaches the middle position.
3 Put the expansion tank cap on.

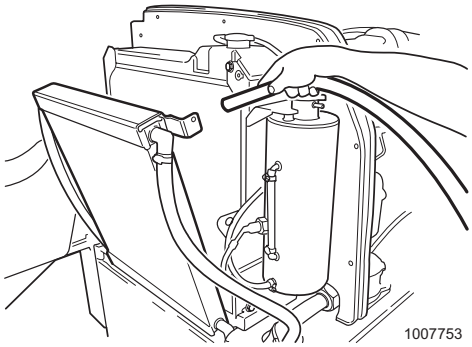
NOTE! Make sure not to put the expansion tank cap on the radiator and the radiator cap on the expansion tank. The caps will fit, but the expansion tank cap is a pressure cap while the radiator cap is not.

IMPORTANT! Do not put both caps back at the same time. This could cause overfilling or too low air content in the expansion tank.

4 Fill the radiator with coolant up to the hole.
5 Put the radiator cap on.
6 Start the engine and let it run until warm.
7 Turn off the engine and allow it to cool.
8 Check that the radiator is filled completely and that the coolant level in the expansion tank is correct. When checking the level of coolant in the radiator only open the radiator cap.
If you need to add some coolant in the expansion tank, only open the expansion tank cap.



Cooling system, cleaning



Cooling system, cleaning

Radiator and oil cooler, cleaning

WARNING!

The engine must be turned off when cleaning the radiator. Rotating parts can cause injury.

Clean the radiator and the oil cooler every 250 hours.

NOTE! When operating under especially dusty conditions, the radiator should be checked daily or every 10 hours.

1. Place the machine in service position 1, see page 70.
2. Loosen screws and tilt the rear cover backwards.
3. Undo the catches located on both sides of the radiator.
4. Hinge the oil cooler forwards.
5. Clean the radiator and oil cooler with air. Clean both the front and rear sides of the radiator and the oil cooler. Blow from the inside and out.
6. After cleaning, check that the radiator and oil cooler is locked back in the upright position.

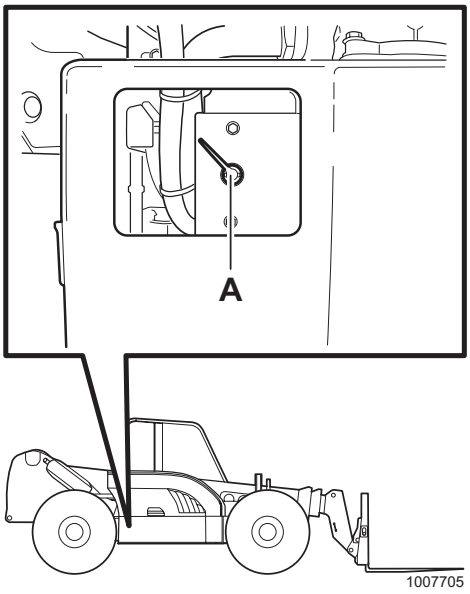
Always repair water or oil leaks immediately to prevent dust build up on wet surfaces.

NOTE! The radiator and oil cooler fins can easily be damaged if not handled carefully.

Electrical system

Check the control lamps daily or every 10 hours.

Check the road lights and working lights daily or every 10 hours if fitted.



A Battery disconnect switch

Battery disconnect switch

The battery disconnect switch (A) is positioned on the right side of the machine.

- Battery disconnect switch turned clockwise = The electrical system is switched on.
- Battery disconnect switch turned anticlockwise = The electrical system is switched off.

Battery, maintenance

Check the battery electrolyte level every 500 hours.

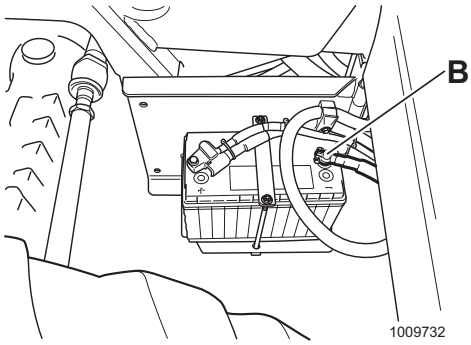
- The level should stand approx. 10 mm (0.4 in) above the cell plates.
- Top up with distilled water if necessary.
- Check that the cable terminals and the pole studs are clean, well tightened and coated with petroleum jelly or similar.
- In hot climates there may be some loss of electrolyte by evaporation.
- In cold climates the battery may need an occasional charge from an external source.

Battery, safety rules

- Never smoke near the battery, as it gives off explosive gases.
- Wear safety glasses when working with the battery. If you get electrolyte in the eyes, flush with water and seek medical attention immediately.
- Make sure that metal objects (such as tools, rings, watch straps, etc.) do not come into contact with the battery pole studs. Protection should be installed over the battery pole studs, otherwise there is a risk of injuries and fire.
- Never tilt a battery in any direction. Battery electrolyte may leak out.
- When removing a battery, disconnect the ground cable (B) first.
- When installing a battery, connect the ground cable last. The risk of sparks, which can cause a fire, is reduced.
- When using a booster battery to aid starting, follow the instructions on page 92.

The battery contains substances dangerous to health and the environment. It must therefore be disposed of according to local and/or national regulations.

Remember that battery electrolyte is corrosive and toxic.



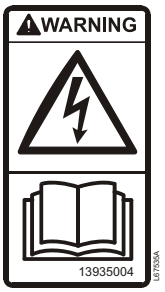
Ground cable

Battery, charging

WARNING!

When a battery is being charged an explosive mixture of oxygen and hydrogen is formed. A short circuit, an open flame or a spark in the neighbourhood of the battery can cause a powerful explosion. Always turn off the charging current before disconnecting the charging clips. Ventilate well, especially if the battery is charged in a confined space.

IMPORTANT! The battery electrolyte contains corrosive sulphuric acid.
Any electrolyte that is spilled on the skin should be removed immediately. Wash with soap and plenty of water.
If you get splashes of electrolyte in your eyes or on any other part of your body, rinse at once with plenty of water and seek medical advice immediately.



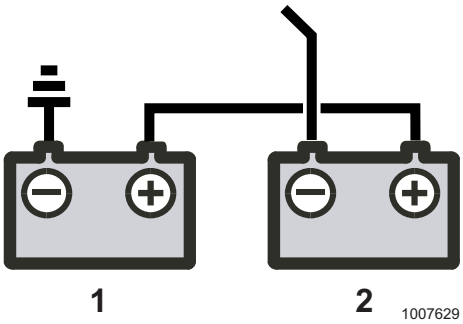
Starting with booster battery

WARNING!

Due to current surges, batteries can explode causing injury, if a fully charged battery is connected to a completely discharged one.

Check that the booster battery or any power source has the same voltage as the battery installed on the machine.

1 Move the gear selector to neutral.
2 Lower the attachment to the ground. Make sure that there are no persons around the machine when starting with a booster battery.
3 Open the battery box.
4 Check that the booster battery or any other power source has the same voltage as the standard battery.
5 Never disconnect the cables from the standard battery!
6 Connect (+) on the booster battery to (+) on the standard battery.
7 Connect the other jump lead from the (–) terminal on the booster battery to the frame of the machine.
8 Start the engine with the ignition key in the cab.
9 When the engine has started, first disconnect the jump lead between the machine frame and the negative (–) terminal of the booster battery. Then remove the jump lead between the positive (+) terminals.
10 Re-install the insulating caps on the battery terminals.
11 Close the battery box.



1 Machine battery
2 Booster battery

Fuses and relays

The fuses and relays are located inside the Cab/Open ROPS inside the instrument panel.

The main fuses are located inside the engine compartment.

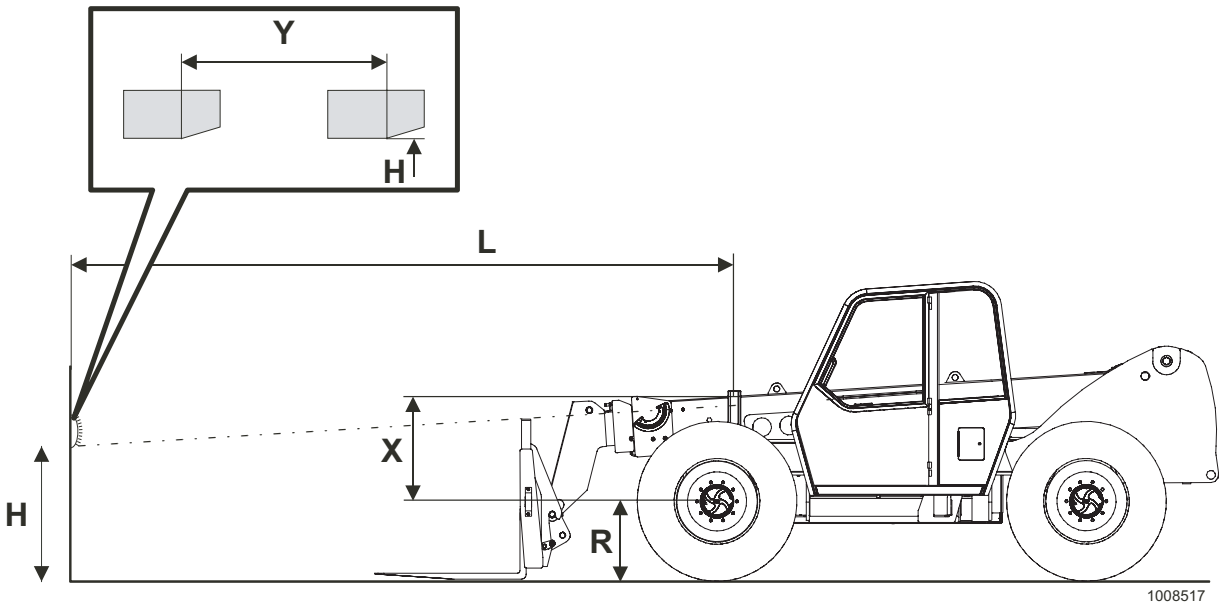
For fuse and relay specification, see page 122–124.

Headlamps, adjusting

The headlight adjustment is of great importance in order to avoid dazzling oncoming traffic. The headlights are of the asymmetrical type, which means that one has to take extra care when adjusting.

Place the machine, which must not be loaded, on level ground at right angles to a wall or similar.

Adjust the upper boundary (H) of the low/dipped beams at a distance of (L) from the headlamps. Check the distance (Y) between the centers of the high/upper beams. The distance should be the same as between the headlamps on the machine.



Adjusting measurements

L = 5000 mm (16 ft 4.8 in)

H = (827 mm+R) multiplied by 0.85 ((2 ft 8.6 in+R) multiplied by 0.85)

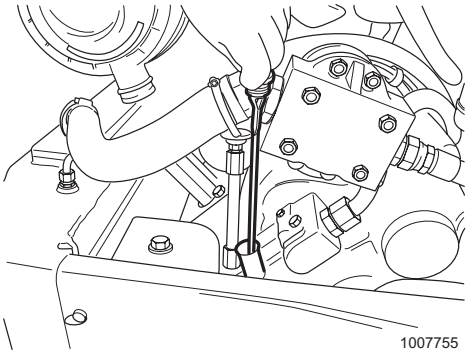
Y = 562 mm (1 ft 10.1 in)

X = 827 mm (2 ft 8.6 in)

R = The distance from the floor / the ground to the center of the front wheel hub.

Transmission

Transmission oil level, checking



Transmission oil level, checking

WARNING!

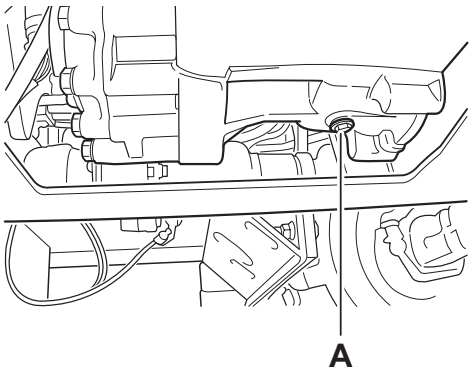
Take care when checking the transmission oil level, as hot oil can cause burns to unprotected skin.

Check the transmission oil level daily or every 10 hours.

1 Start the engine and let it idle until the operating temperature is reached.
2 Place the machine in service position 1, see page 70.
3 Turn off the engine.
4 Check the transmission oil using the dipstick. The oil should be up to max. marking. Add oil if necessary.

The difference between min. and max. on the dipstick is 1.5 litres (0.4 US gal).

Transmission, changing oil



Transmission oil drain plug

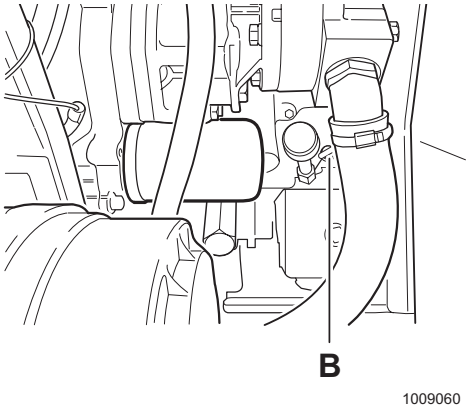
Change the transmission oil every 1000 hours.

1 Place the machine in service position 1, see page 70.
2 Clean around the drain plug.
3 Place a container under drain plug (A).
4 Drain the oil by removing the drain plug.
5 Re-install the drain plug and fill the transmission with new oil through filler port (B).

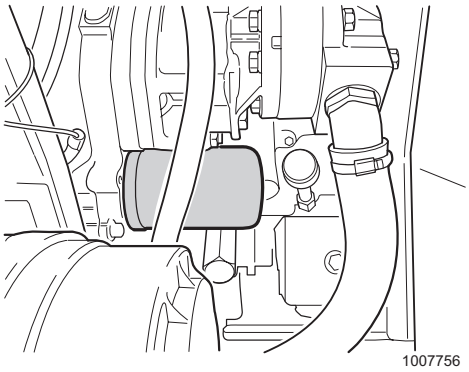
Transmission capacity when changing is approx. 13.5 litres (3.5 US gal)

6 Check the transmission oil level using the instruction above.

Take care of waste oil and liquids in an environmentally safe way!



Transmission oil filler port

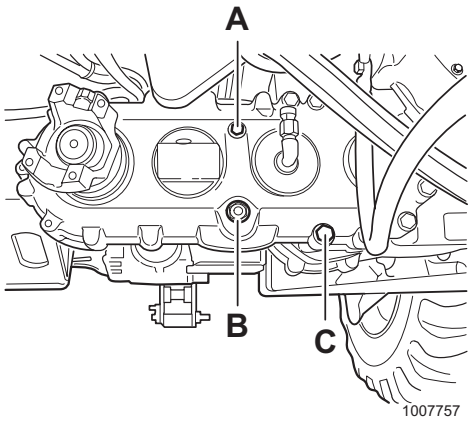


Transmission oil filter

Transmission, replacing oil filter

Replace the transmission oil filter every 500 hours.

1 Place the machine in service position 1, see page 70
2 Use a filter clamp to remove the filter.
3 Fill the new transmission oil filer with correct oil, see page 117.
4 Screw on the new filter by hand until the gasket just seals. Then tightening a further ½ turn by hand.
5 Start the engine and check that the gasket seal.



Drop box
A Filler port
B Sight glass
C Drain plug

Drop box

Drop box oil level, checking

Check the drop box oil level daily or every 10 hours.

1 Place the machine in service position 1, see page 70.
2 Check the oil level through the sight glass (B). The oil level should be up to max. mark (in the middle of the sight glass). Add oil if necessary.

Drop box oil, changing

Change the drop box oil level every 1000 hours.

If the machine is to be used in special application where the atmosphere is contaminated or dusty, replace the drop box oil every **500 hours**. Contact a by MEC authorized workshop for further advice.

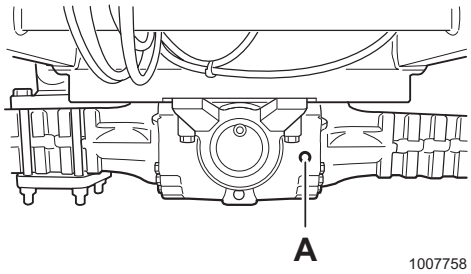
1 Place the machine in service position 1, see page 70.
2 Clean around the drain plug.
3 Place a container under drain plug (C).
4 Drain the oil by removing the drain plug.
5 Re-install the drain plug and fill the drop box with new oil through the filler port (A).

Take care of waste oil and liquids in an environmentally safe way!

Axles

For oil specifications, see page 117.

Axles, checking oil level



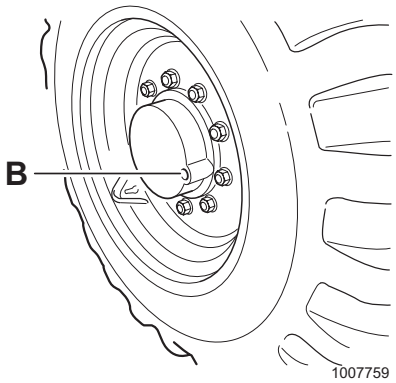
A Oil level plug

The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.

Check the oil levels in the front and rear axles every 250 hours.

1 Place the machine in service position 1, see page 70.
2 Place a container under the center of the axle.
3 Remove the oil level plug (A).
4 The oil should be up to the edge of the hole.
5 Fill the axle with more oil if necessary through the oil fill port.

Axle hubs, checking oil level



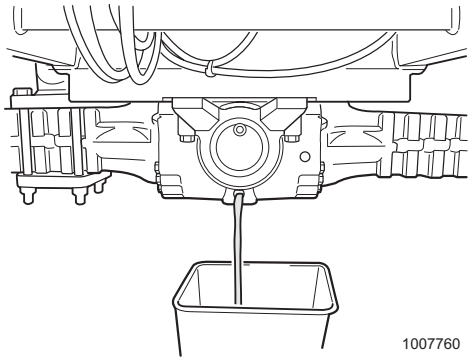
B Oil level plug

The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.

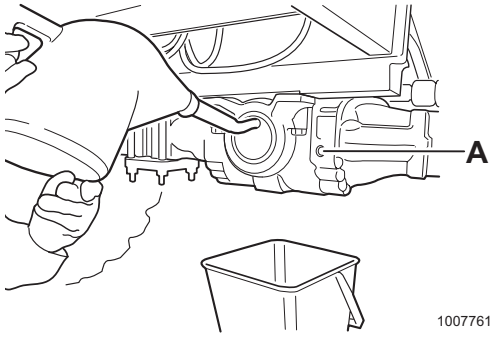
Check the axle hubs oil level every 250 hours.

1 Move the machine so that the oil level marking is horizontal.
2 Remove the oil level plug (B), same plug as for filling and draining. The oil should be up to the hole. Fill with oil if necessary.

For oil specification, see page 117.



Axles, draining oil



Axles, filling oil

Axles, changing oil

WARNING!

Take care when changing oil, as hot oil can cause burns to unprotected skin.

Change the oil every 1000 hours.

1 Place the machine in service position 1, see page 70.
2 Place a container under the center of the axle.
3 Clean around the plugs.
4 Remove the oil level or oil fill plug.
5 Remove the oil drain plug.
6 The oil drain plug is equipped with a magnet. The magnet and the plug must be cleaned before installing.
7 When all oil has been drained, re-install the drain plug.
8 Fill with new oil through the fill port. Fill until oil comes out from the oil level hole (A).
9 Re-install the oil level plug and the oil fill plug.

The axle oil capacity is when changing 8.7 litres (2.3 US gal).

Take care of waste oil and liquids in an environmentally safe way!

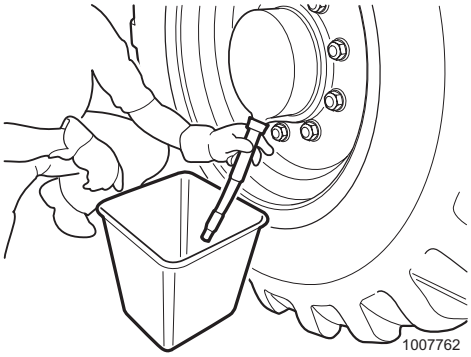
Axles, changing hub oil

WARNING!

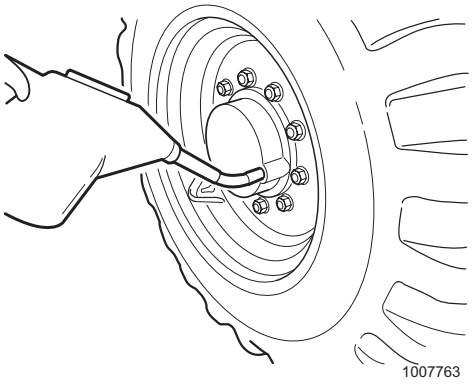
Ensure that no persons are around and under the machine while doing this job.

WARNING!

Take care when changing oil, as hot oil can cause burns to unprotected skin.



Axle hubs, draining oil



Axle hubs, filling oil

The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.

Check the oil levels in front and rear axles every 1000 hours.

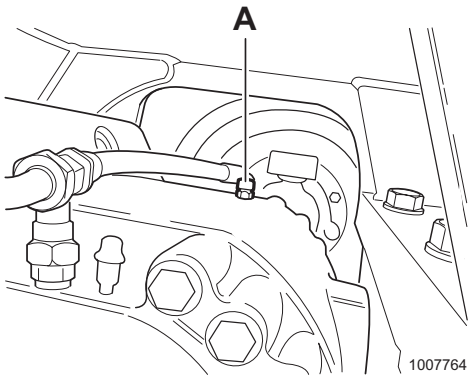
1 Place the machine in service position 1, see page 70.
2 Move the machine so that the hubs are in fill/level position.
3 Turn off the engine.
4 Clean around the drain plug.
5 Place a container under the drain plug.
6 Remove drain plug to release the internal pressure, use the same plug for filling and draining.
7 Re-install the drain plug.
8 Drive the machine so that the hub is in drain position.
9 Place a container under the drain plug.
10 Remove the drain plug. Drain completely.
11 Re-install the drain plug.
12 Drive the machine so that the hub is in fill/level position.
13 Fill with new oil. The oil should be up to the hole.

Axle hubs, capacities

Oil capacity front and rear axle hub when changing: 1.5 litres (0.4 US gal).

For oil specification, see page 117.

Axle breather, cleaning



Axle breather, cleaning

Clean the axle breather every 250 hours.

There is one breather on each axle.

1 Place the machine in service position 1, see page 71.
2 Remove the breather (A).
3 Use compressed air to clean breather.

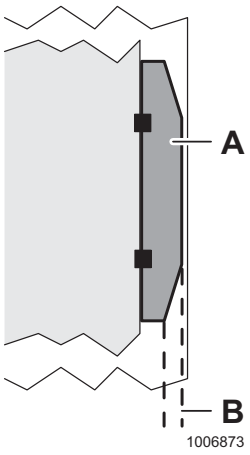
Brake system

Service jobs on the brake system should only be carried out by a MEC authorized workshop.

For checking service brakes and parking brakes functionality, see page 49.

Boom

Boom wear pads



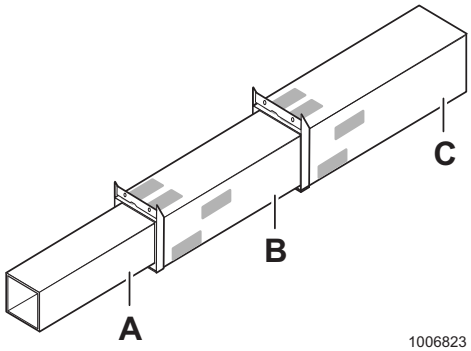
Boom wear pad
A Wear pad
B Chamfer (wear indicator)

- Each boom wear pad is chamfered at each end (B). This functions as a wear indicator.
- The wear pads must be replaced if they have become worn below the chamfered area. Contact a workshop authorized by MEC.

Boom wear pads, checking

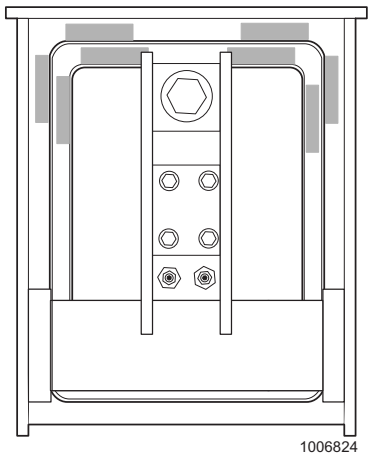
Check the boom wear pads every 250 hours.

NOTE! Check the boom wear pads more often if operating in dusty conditions.



Front wear pads
A Third boom section
B Second boom section
C First boom section

1. Place the machine in service position 1, see page 70.
2. Use a feeler gauge to measure the clearance between the upper wear pad and the inner boom. The clearance should not exceed 3 mm (0.125 in).
3. Use a feeler gauge to measure the clearance between the side boom wear pads and the side of the boom section at each side. Add the clearance from corresponding side pads together (lower left and lower right, and upper left and upper right). This number must not exceed 3 mm (0.125 in).
4. Raise the boom and remove the boom support.
5. Fully retract and lower the boom.
6. Open the hatch on the back on the machine.
7. Use a feeler gauge to measure the clearance between the top wear pads and the outer boom. The clearance should not exceed 3 mm (0.125 in).
8. Use a feeler gauge to measure the clearance between the side wear pads on each side and the outer boom. Add the clearance from corresponding side pads together (lower left and lower right, and upper left and upper right). This number must not exceed 3 mm (0.125 in).
9. If the maximum clearance is exceeded, adjustments must be made. Contact a workshop authorized by MEC.
10. If the wear pads are worn below the chamfered area, replace the wear pads. Contact a workshop authorized by MEC.



Rear wear pads

Boom wear pads, greasing lanes

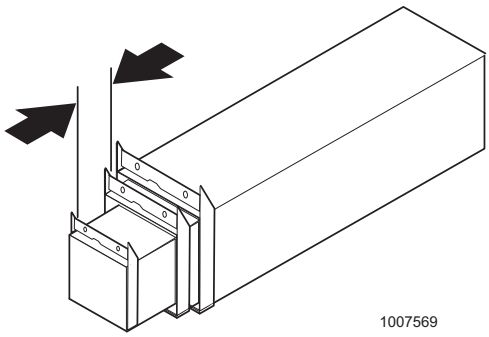
Grease the boom wear pad lanes every 1000 hours or when changing wear pads.

1 Raise the boom fully to allow all sections to fully retract.
2 Lower the boom so the boom is laying against the machine frame.
3 Place the machine in service position 1, see page 70.
4 Grease the surfaces where the boom wear pads slide.

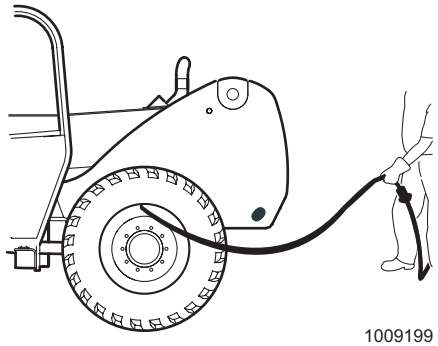
Boom chains, checking

Check the boom chains every 2000 hours.

1 Raise the boom fully to allow all sections to fully retract.
2 Lower the boom so the boom is laying against the machine frame.
3 Place the machine in service position 1, see page 70.
4 Measure the distance between the brackets on top of the boom section 2 and 3. If the clearance is less than 28 mm (1.1 in) the chains require adjustment, contact a workshop authorized by MEC.



Boom chains, checking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Tires

Inflating tires

Recommended tire pressures should normally be followed. Special operations may justify a different pressure. In such cases, follow the instructions from the tire manufacturer and do not exceed the maximum permissible pressures, see page 130.

The tire pressure may have been raised before the machine was delivered from the factory. Therefore, check and adjust the tire pressure according to recommendations, before putting the machine to work for the first time, see page 130.

WARNING!

Repair work on tires and rims must be carried out by personnel who have been especially trained for this and have the correct equipment.

The instructions stated below apply to an inflated tire where the pressure needs to be increased. If the tire has lost all pressure, a trained service engineer should be called in.

– When checking the air pressure, the tire should be cold and the machine be without a load.
– Ask all other persons to leave the risk zone (in front of the rim).
– Stand by the tire tread as shown in the figure. Tire installed on a split rim may explode causing injury or in the worst case death.
– Use a long air hose (with a self-attaching air chuck) which allows you to stand outside the risk zone.
– Tires on stored wheels (spare wheels) should be kept in a lying down position and only be inflated sufficiently to keep the rim parts in position.
– Never attempt to force back into position, or in any other way reposition, rim parts or lock ring which have worked loose, while there still is air pressure left in the tire.

WARNING!

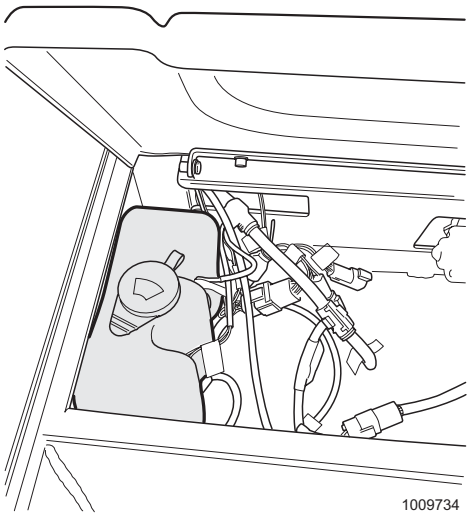
Do not fill the tires with water or any other liquid.

Wheel nuts, check-tightening

After having changed a tire or if the wheel has been removed and installed for any other reason, the wheel bolts must be check-tightened after eight hours of operation.

Check the wheel nut torque's every 250 hours.

Tightening torque, 400–480 Nm (90–108 lbf ft).



Window washer reservoir

Cab/Open ROPS

Window washer reservoir (cab only), front and rear

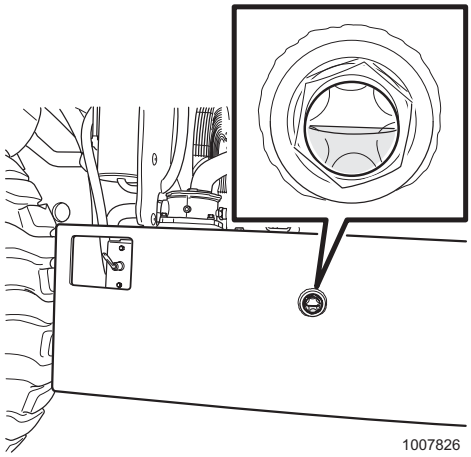
The front and rear window washer is located in the cab rear storage compartment behind the operators seat.

The liquid should contain a de-icing fluid to prevent freezing.

IMPORTANT! Do not use engine coolant anti-freeze.

Hydraulic system

IMPORTANT! Any work on the hydraulic system requires great demands on cleanliness. Even very small particles can cause damage or clog up the system. Therefore, wipe areas in question clean before any work is carried out.



Hydraulic oil level, sight glass

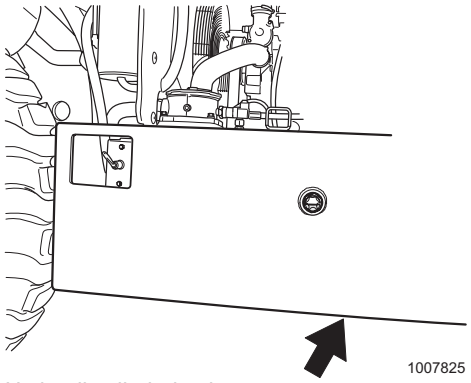
Hydraulic system, checking oil level

WARNING!

Take care when changing oil, as hot oil can cause burns to unprotected skin.

Check the hydraulic oil level daily or every 10 hours.

- The oil level should be above middle of the sight glass.
- Add oil throgh the hydraulic filter if necessary.
- The difference between min. and max. in the sight glass is 7 litres (1.8 US gal).



Hydraulic oil, drain plug

Hydraulic system, changing oil

Change hydraulic oil every 1000 hours.

The capacity of the hydraulic oil tank when changing: approx. 103 litres (27.2 US gal).

The difference between min. and max. in the sight glass is 7 litres (1.8 US gal).

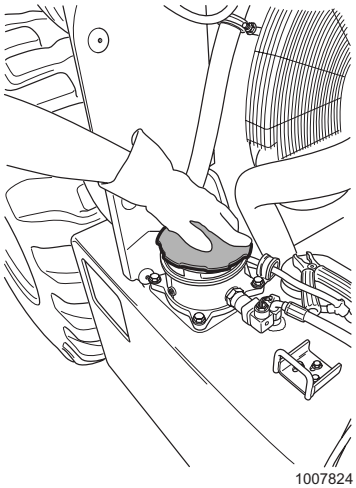
For oil specifications, see page 117.

Place the machine in service position 1, see page 70.

Draining

1 Clean around the drain plug.
2 Place a container under the drain plug.
3 Remove the drain plug.
4 Drain completely.
5 Re-install the drain plug.

Take care of waste oil and liquids in an environmentally safe way!



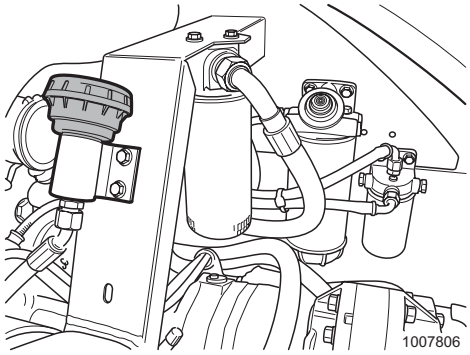
Hydraulic oil filter cover

Filling

1 Remove the hydraulic filter cover.
2 Fill with oil through the hydraulic system filter.

NOTE! Remove the hydraulic breather filter when filling.

3 The oil level should be between the red dot and the top of the sight glass.



Hydraulic system, breather filter

Hydraulic system, replacing breather filter

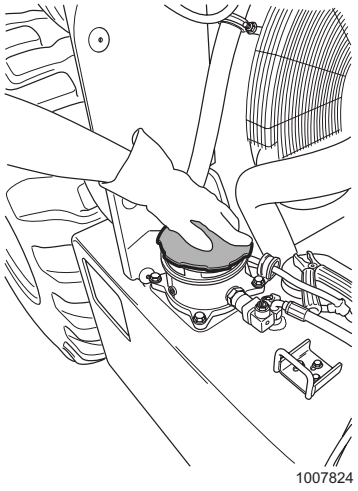
Replace the breather filter every 500 hours.

1 Place the machine in service position 1, see page 70.
2 Remove the hydraulic breather filter.
3 Install a new hydraulic breather filter.
4 Tighten the new filter by hand.

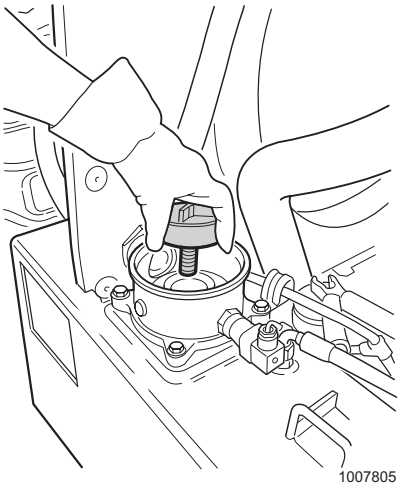
Hydraulic system, replacing oil filter

Replace the hydraulic oil filter every 1000 hours.

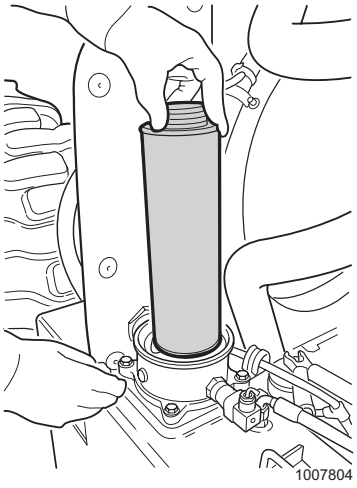
1 Place the machine in service position 1, see page 70.
2 Clean around the cover.
3 Remove the cover.
4 Remove the cap.
5 Lift up the hydraulic oil filter and replace it with a new filter.
6 Re-install the cap and the cover.



Cover



Cap

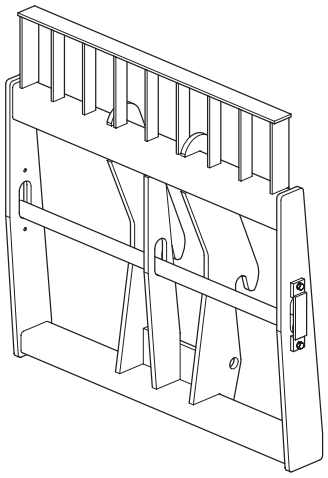


Hydraulic oil filter

Attachments, maintenance

WARNING!

Never use an attachment until you have checked that it is securely fastened and that the attachment including hydraulic hoses, connections and similar are undamaged – your safety is involved.



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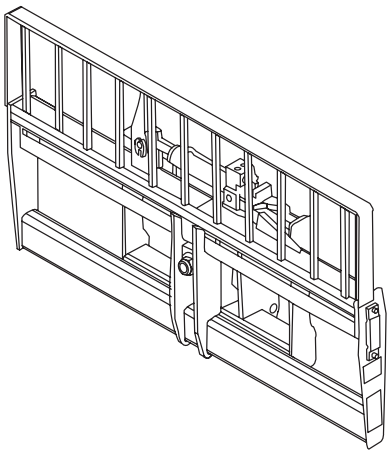
Fixed carriage

Fixed carriage

Once a month the fixed carriage should be inspected for loose nuts, capscrews etc.



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Side tilt carriage

Side tilt carriage

Lubricate the side tilt carriage cylinder ends and pivot points after first eight hours and every 40 hours thereafter.

The side tilt carriage has three lubrication points.

Once a month the side tilt carriage should be inspected for loose nuts, capscrews, bearings etc. Tighten as required and replace where necessary. Clean the attachment of all dirt, oil, grease etc. This will assist in making visual inspections and help avoid overlooking worn or damaged components.

Always keep all warning/safety decals clean and legible. Replace if damaged or worn.

Inspect all hydraulic hoses for deterioration and replace if necessary.

Side shift carriage

Once a month the fixed carriage should be inspected for loose nuts, capscrews etc.

Lubrication and service chart

Symbol key

These standard symbols are used in the “Lubrication and Service Chart” on pages 110–113.

Engine oil

Transmission

Hydraulic system

Tires

Axles/differential and hubs

Fuel system

Battery

Engine, coolant

Lubrication

Oil/liquid

Filter

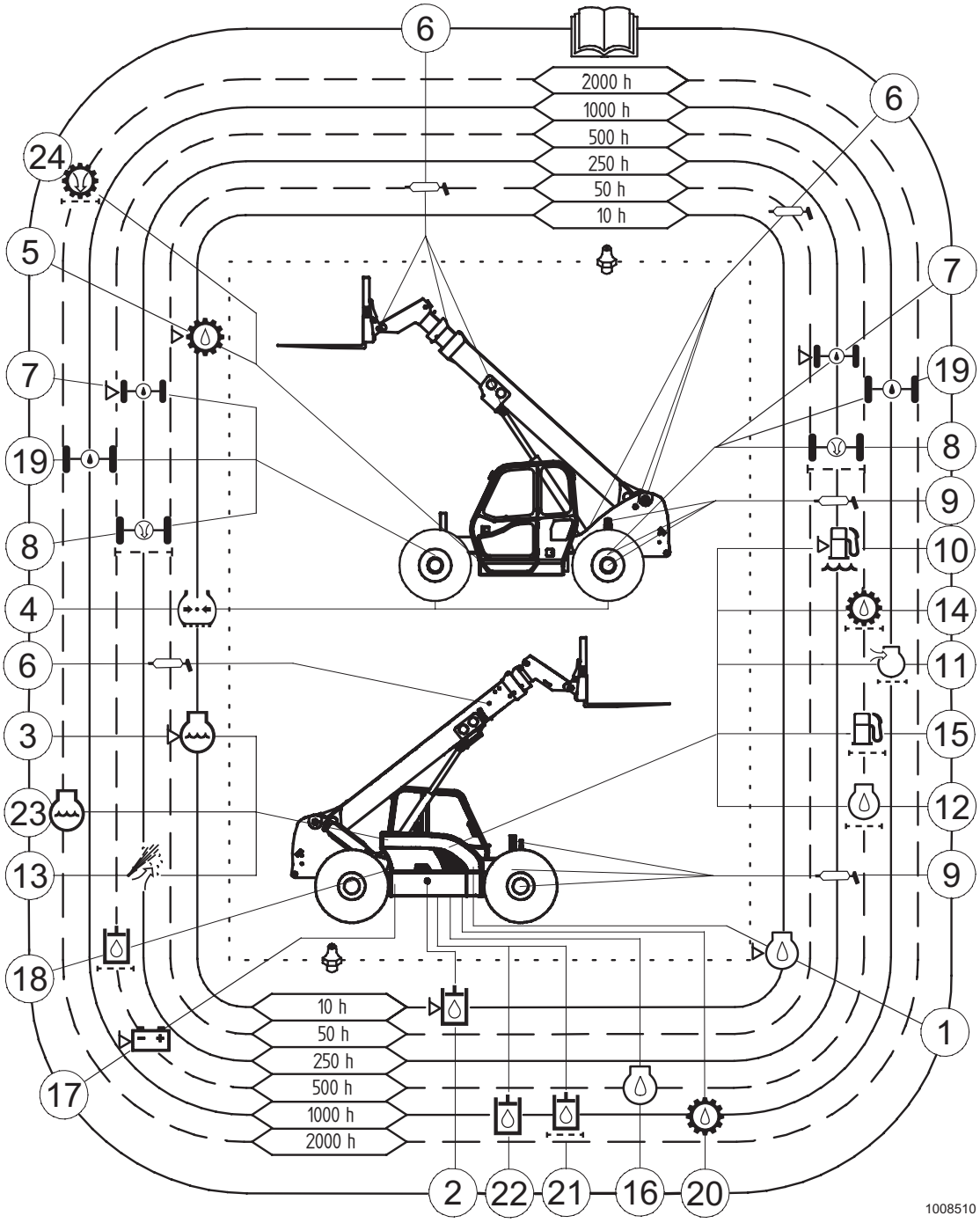
Air filter

Level check

Clean

110 Lubrication and service chart

Lubrication and service chart



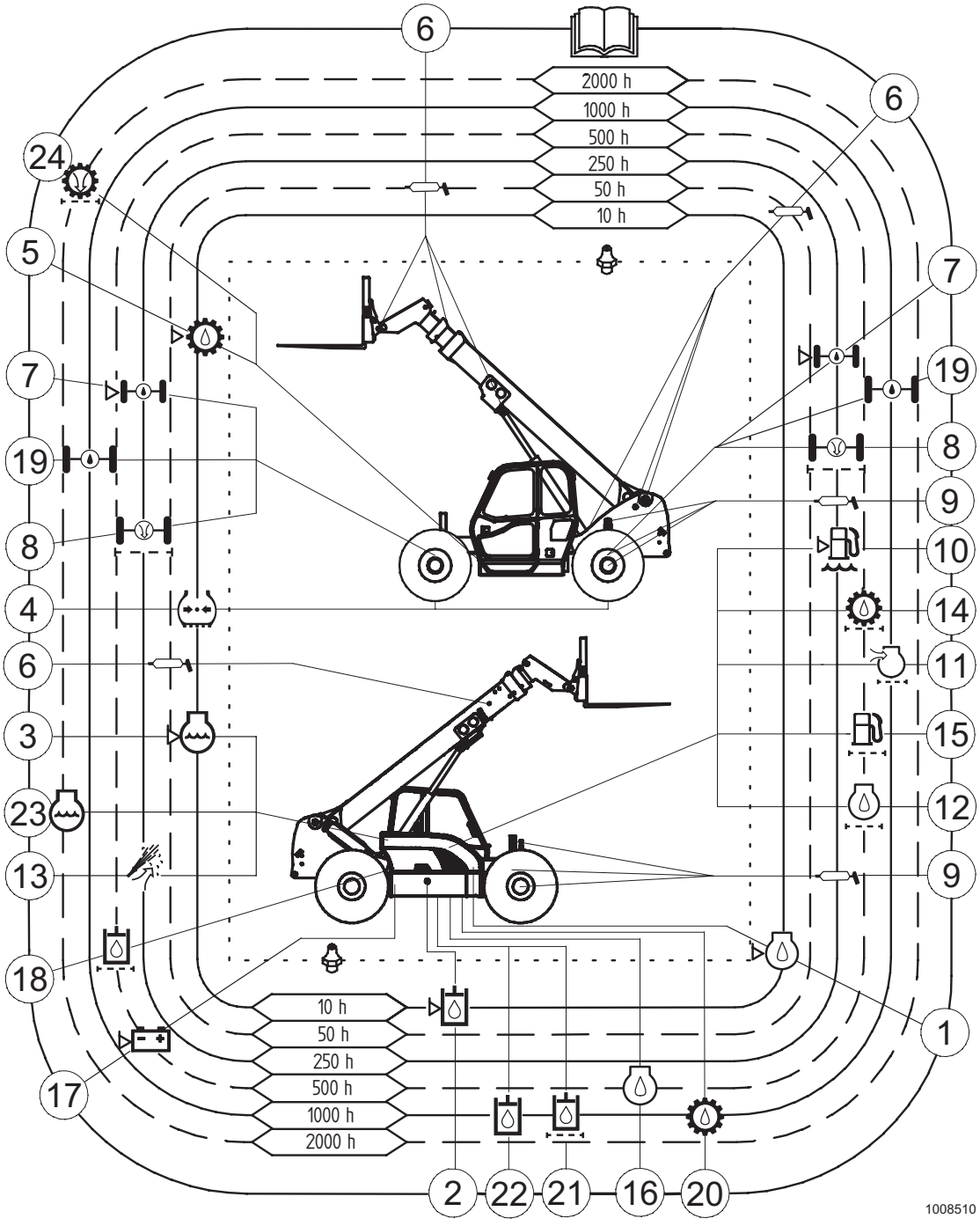
Measure	Item	Page
DAILY OR EVERY 10 HOURS		
Check function of control lamps		
Check travel lights, working lights, reversing alarm		
Check the engine oil level	1	81
Check hydraulic oil level	2	105
Check the coolant level	3	88
Check front and rear tires pressure and damage	4	103
Check transmission oil level	5	94

Measure	Item	Page
A = EVERY 50 HOURS **After carrying out Daily service**		
Lubricate boom	6	114
Lubricate outriggers (optional equipment)		114

B = EVERY 250 HOURS **After carrying out Daily and A services**		
Check front and rear axle oil level	7	97
Check front and rear axle hub oil level	8	97
Clean the front and rear axle breather	8	99
Lubricate front and rear axles[1)]	9	115
Check fuel system water trap	10	83
Clean the radiator and oil cooler	13	90
Check the wheel nuts		103
Check the boom wear pads		101
Lubricate propeller shaft (front and rear)[1)]		116

1) When operating under especially wet or dusty conditions, lubricate every 50 hours.

112 Lubrication and service chart



Measure	Item	Page
C = EVERY 500 HOURS After carrying out Daily, A and B services		
Change engine oil filter	12	82
Replace transmission oil filter	14	95
Replace primary fuel filter	15	83
Change the engine oil	16	81
Check the battery electrolyte level	17	91
Replace the hydraulic oil tank breather filter	18	106
Replace the engine oil filter		82

Measure	Item	Page
D = EVERY 1000 HOURS After carrying out Daily, A, B and C services		
Change drop box oil		96
Replace engine air filters, primary and secondary filters	11	87
Change axle oils, front and rear	19	98
Change front and rear axle hub oil	19	99
Change the transmission oil	20	94
Replace the hydraulic oil filter	21	106
Change hydraulic oil	22	105
Replace secondary fuel filter		84
Grease the boom wear pad lanes		102

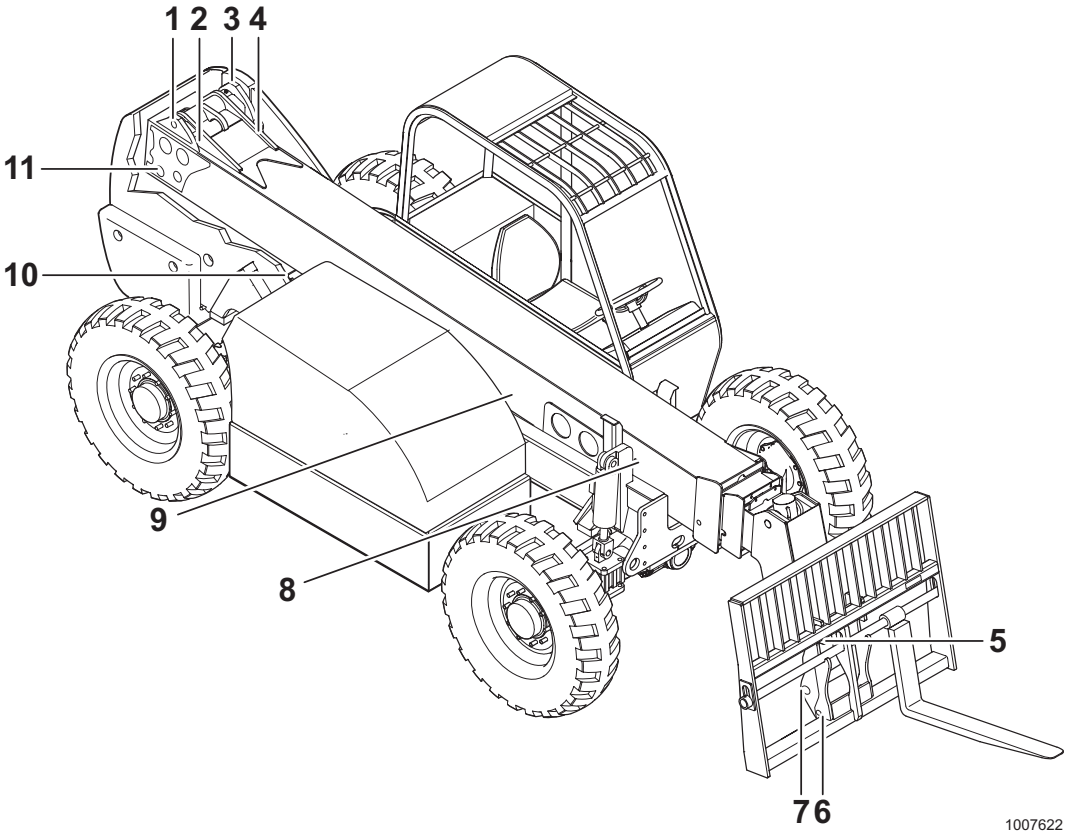
Measure	Item	Page
E = EVERY 2000 HOURS After carrying out Daily, A, B, C and D services		
Change coolant	23	89
Check boom chains		102
Check the transmission breather	24	
Workshop job		
Check engine valve clearance		

Lubrication points

Boom

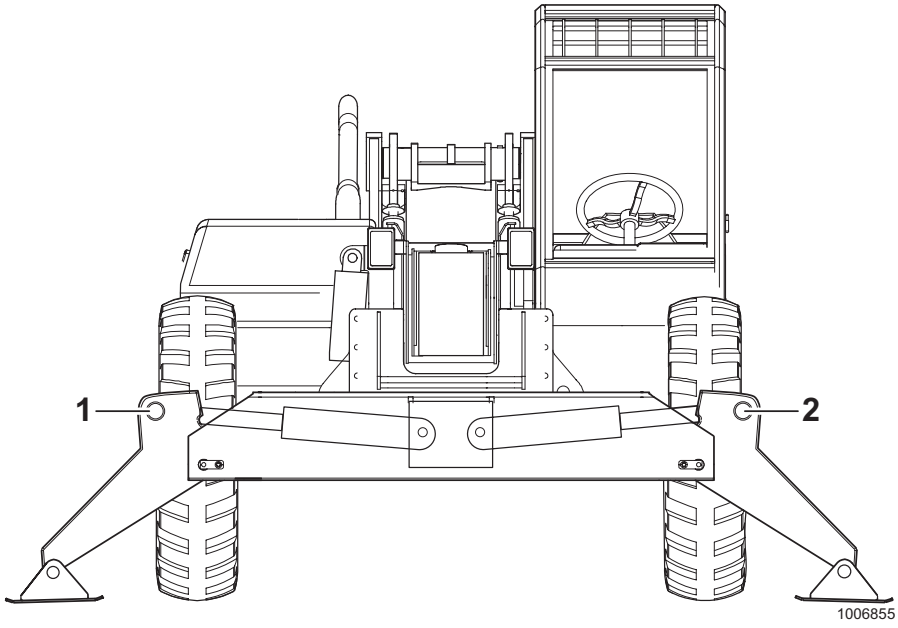
Lubricate boom every 50 hours

Place the machine in service position 1, see page 70, except when lubricating points 9 and 10 place the machine in service position 2, see page 71.



Outriggers (optional equipment)

Lubricate outriggers every 50 hours

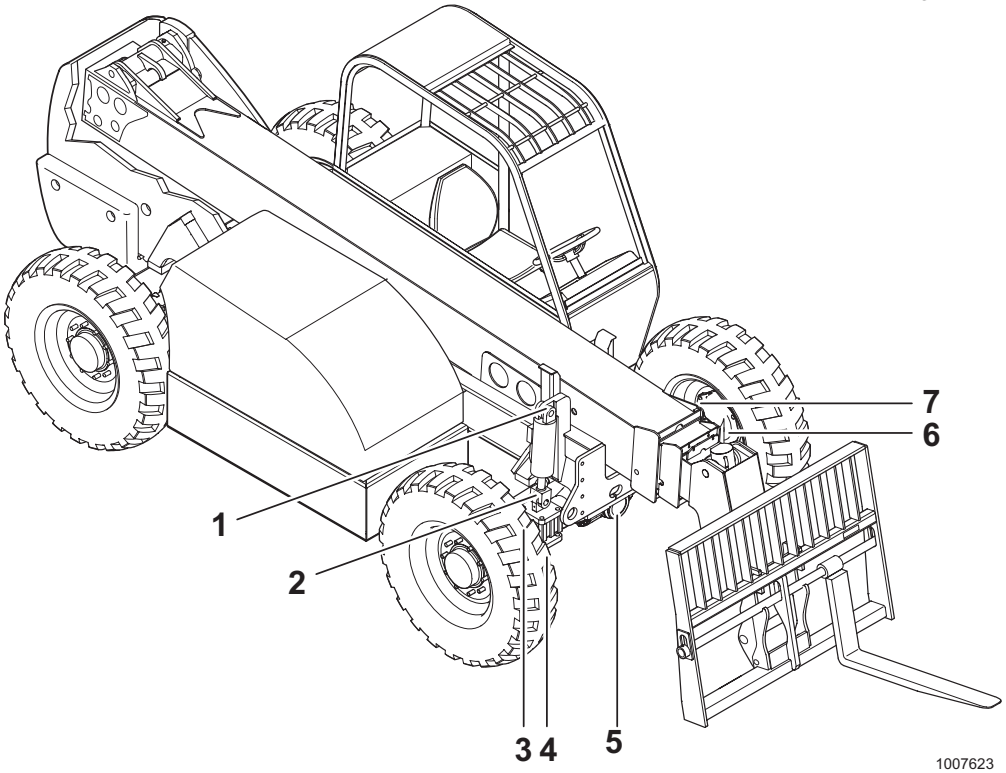


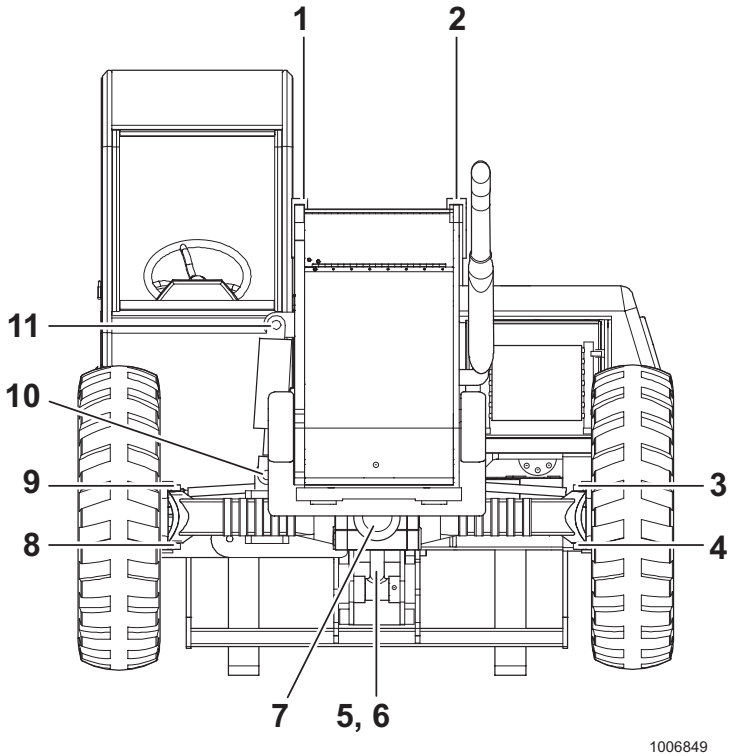
Axles, front and rear

Lubricate front and rear axles every 250 hours

When operating under especially wet or dusty conditions, the axles should be lubricated every 50 hours.

Place the machine in service position 1, see page 70.



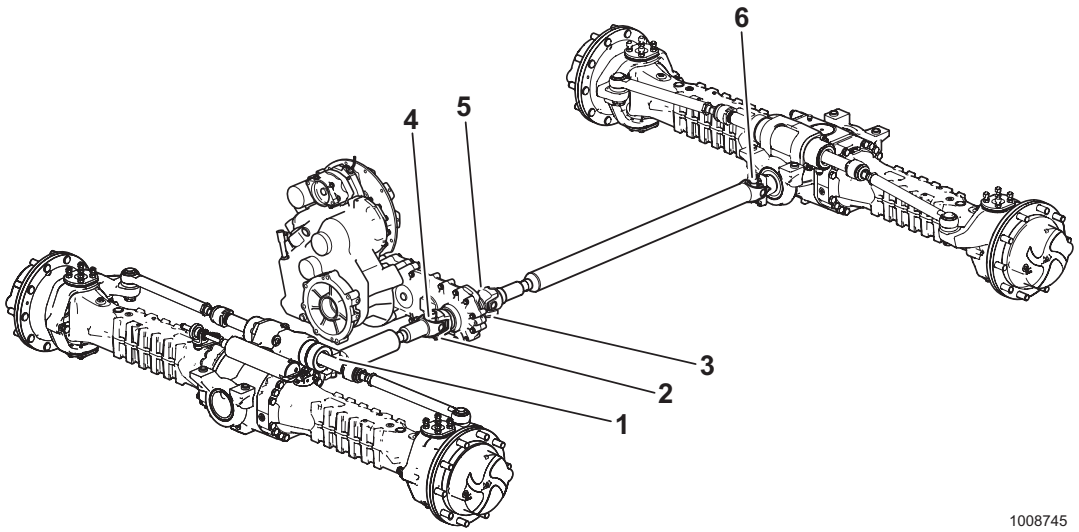


Propeller shafts

Lubricate the propeller shafts every 250 hours.

When operating under especially wet or dusty conditions, the propeller shafts should be lubricated every 50 hours.

The front and rear propeller shaft have 3 lubrication points each.

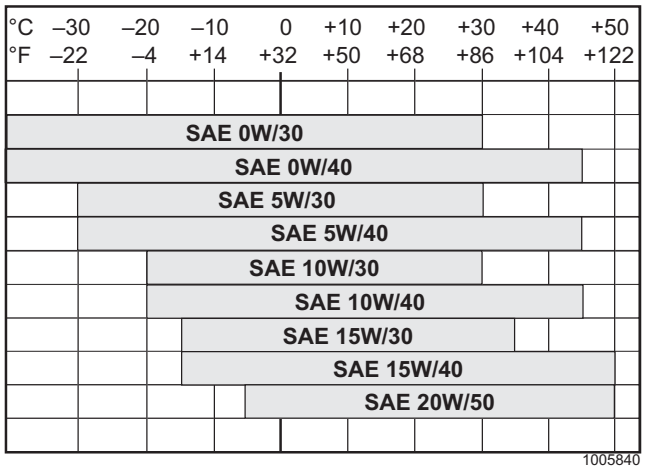
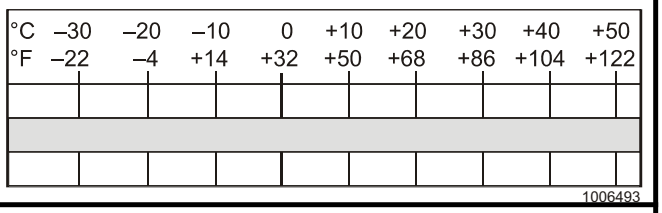
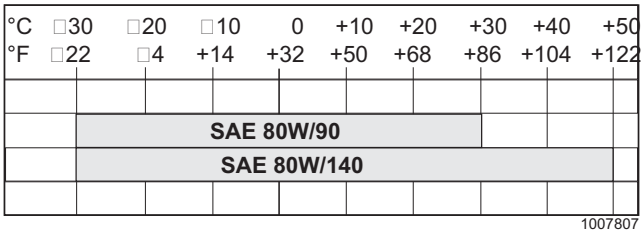
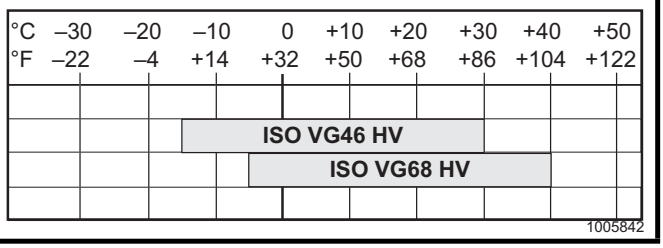


Specifications

Recommended lubricants

The MEC lubricants have been specially developed to fulfil the demanding operating conditions, in which MEC"s machines are used in. The oils have been tested according to MEC's specifications and therefore meet the high requirements for safety and quality.

Other mineral oils can be used if they conform to our viscosity recommendations and meet our quality requirements. The approval of MEC is required, if any other oil base quality (e.g. biologically degradable oil) is to be used.

	Oil grade	Recommended viscosity at varying ambient temperatures
Engine *) For severe operations ACEA E3-96 (CCMC-D5) is recommended to give optimum service life.	**MEC Diesel Engine Oil** MEC VDS API CF API CF-4 API CG-4 API CH-4 ACEA E1-E3 -96 ACEA E4 -98 DHD-1	
Axles and transmission	**MEC WB101** **MEC Wet Brake Transaxle Oil** For trade names and requirements of the oil, see page 126.	
Hubs and dropbox	**MEC Super Transmission Oil** API GL-5	
Hydraulic system Steering system Working hydraulics	**Hydraulic oil** **MEC Super Hydraulic Oil** ISO 6743 / 4HV	

Grease

General lubrication points

Grease with lithium base with EP additives and consistency NLGI No. 2.

Boom wear pad lanes

Grease with Keystone Zeniplex Aluminium Complex EP Grease.

Cooling system

–MEC original anti-freeze

– USA: Coolant norm ASTM D4985

Fuel

Quality requirements

The fuel should at least meet the legal requirements, and national and international standards for marketed fuels, for example: EN590 (with nationally adapted temperature requirements), ASTM D 975 No 1D and 2D, BS 2896 Class A 2, ISO 8217 DMX.

The cetane number must not be below 49 according to EN 590 ISO 5165 (40 according to ASTM D 975 Grade No 1-D and 2-D). If the cetane number is too low, it may cause starting problems and white smoke development.

Sulphur content

According to legal requirements (the sulphur content must not exceed 0.3 percent by mass according to ISO 8754, EN 24260).

Service capacities and lubricants

Capacities	When changing	
	Litres	US gal
Engine, oil including filter	12.0	3.12
Engine, coolant - Radiator - Expansion tank	 11.0 2.9	 2.9 0.77
Transmission - Transmission only - Oil filter	 13.5 0.6	 3.5 0.16
Dropbox	1.1	0.29
Axles - Housing - Hub	 7.7 1.3	 2.0 0.38
Hydraulic oil tank	103	27.2
Fuel tank, total	122	32.2

Engine, specifications

MakeMEC	
Designation	D4D CDE2
Type	Dry sleeve
Flywheel output according to SAE J1349, gross	70 kW (94 hp) at 33.3 r/s (2000 rpm)
Flywheel output according to SAE J1349, net	68 kW (91 hp) at 33.3 r/s (2000 rpm)
Max. torque, SAE J1349 gross	389 Nm (287 lbf ft) at 25.1 r/s (1500 rpm)
Max. torque, SAE J1349 net	385 Nm (284 lbf ft) at 25.1 r/s (1500 rpm)
Direction of rotation	When facing flywheel, anticlockwise
Engine RPM (governed)	46.7 r/s (2500 rpm)
Number of cylinders	4
Cylinder bore	101 mm (3.98 in)
Stroke	126 mm (4.96 in)
Cylinder capacity, total	4.04 litres (244 in^3)
Compression ratio	19.0:1
Compression pressure	3–3.8 MPa (30–38 bar) (435–551 psi)
Number of valves	8
Valve clearance, warm and cold engine	inlet valve 0.30 mm (0.0112 in) exhaust valve 0.50 mm (0.0197 in)
Idling speed, low	13.4 r/s (800 rpm)
Air cleaner	Cyclone cleaner – Primary filter – Secondary filter
Lubrication system	
Type	Forced feed circulation lubrication
Oil pressure when operating 1100 rpm or higher	0.45 MPa (4.5 bar) (65 psi)
Oil pressure, low idling min.	0.08 MPa (0.8 bar) (11.6 psi)
Oil flow at 41.7 r/s (2500 rpm)	65 litres (17.2 US gal) per minute
Oil temperature normal	80 °C (176 °F)
Oil temperature max	125 °C (257 °F)
Fuel system	
Type	Direct injection
Feed pressure	0.5 MPa (5 bar) (72 psi)
Order of injection	1-3-4-2
Cold-starting device	Preheating element in inlet manifold
Cooling system	
Type	Liquid-cooled with integrated oil cooler
Coolant pump type	Belt-driven centrifugal pump
Thermostat type	Piston thermostat
Thermostat begins to open at	83 °C (181.4 °F)
Thermostat fully open at	95 °C (203 °F)

Electrical system, specifications

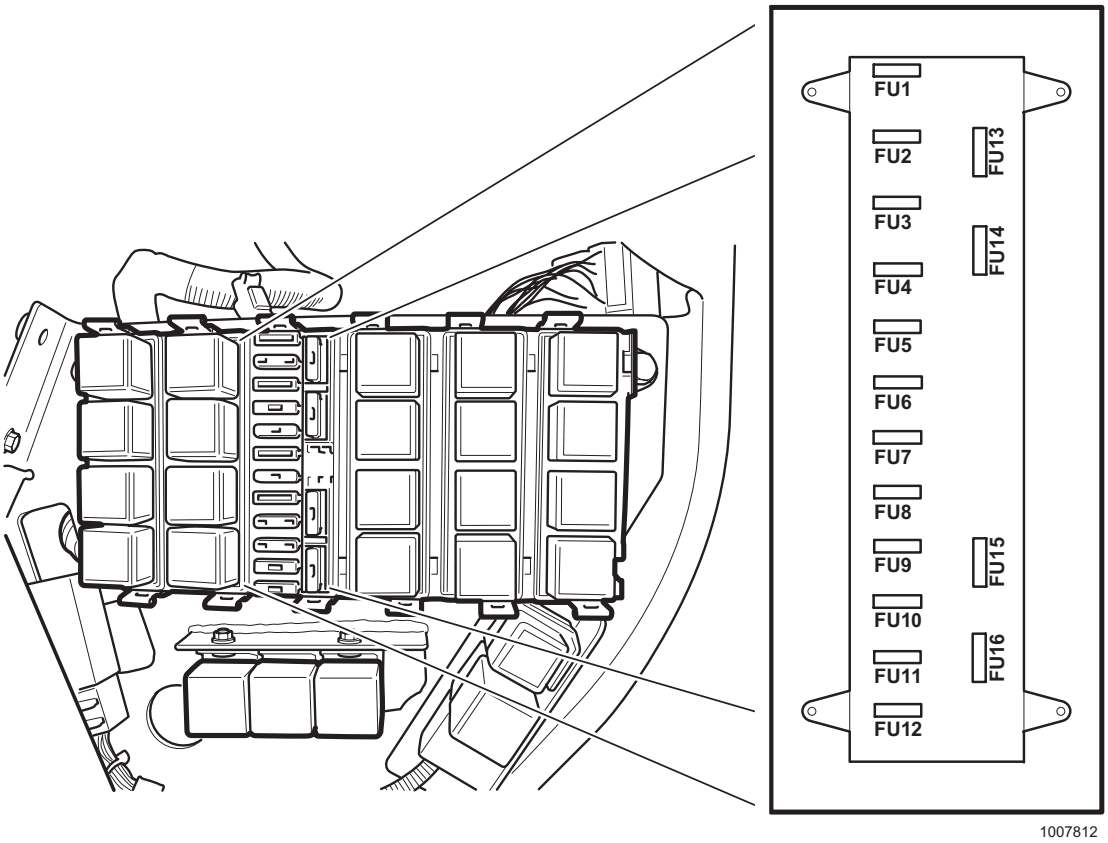
System voltage	12 V
Battery voltage	12 V
Battery capacity	170 Ah
Alternator	1300 W / 95 A
Starter motor output	3.0 kW / 4.0 hp

Battery electrolyte density kg/dm^3	
Fully charged battery	1.275–1.285 kg/dm^3
The battery should be recharged at a density of	1.250 kg/dm^3

Bulbs	Watt	Socket
Travel lights, asymmetrical Main/upper beam Dipped/lower beam	 55 W 55 W	 H7 H3
Parking lights	5 W	BA 15 s
Marker lights	5 W	BA 15 s
Stop lights	21 W	BA 15 s
Direction indicators	21 W	BA 15 s
Work light	55 W	H3
Rotating beacon	21 W	H3
Cab light	21 W	BA 15 s

Fuses

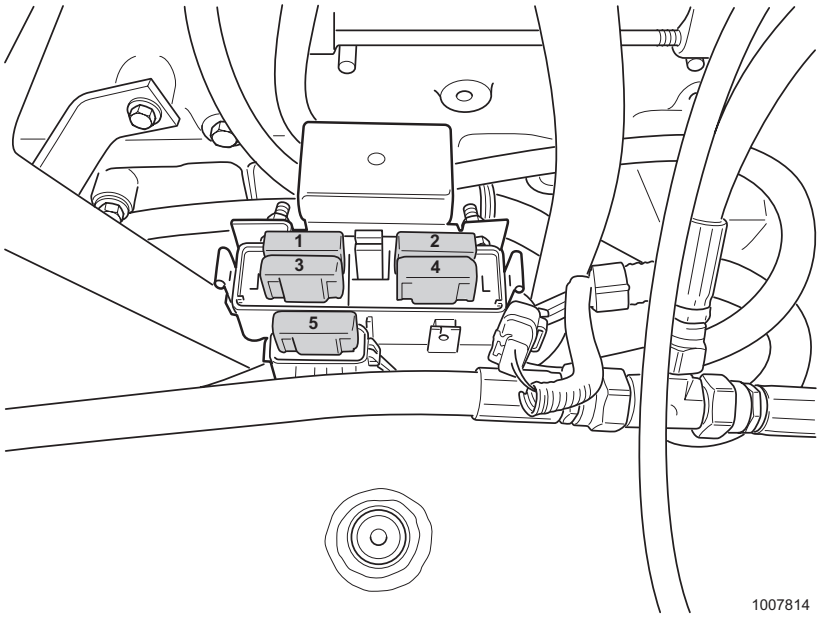
Never install a fuse with a higher rating than that given on the decal inside the fuse box. There is a risk of fire on the circuit board.



FU	A	Function	FU	A	Function
1	10	Radio	9	10	Rotating beacon
2	10	Preheater	10	20	Lamps
3	10	Starter relay fuse	11	15	Wipers
4	10	Position lights	12	15	Lights and horn
5	10	Hour recorder	13	20	Cigarette lighter
6	10	Transmission control unit	14	15	Working lights
7	10	Power outlet	15	15	Working lights
8	10	Optional hydraulic function	16	10	Position lights

Main fuses

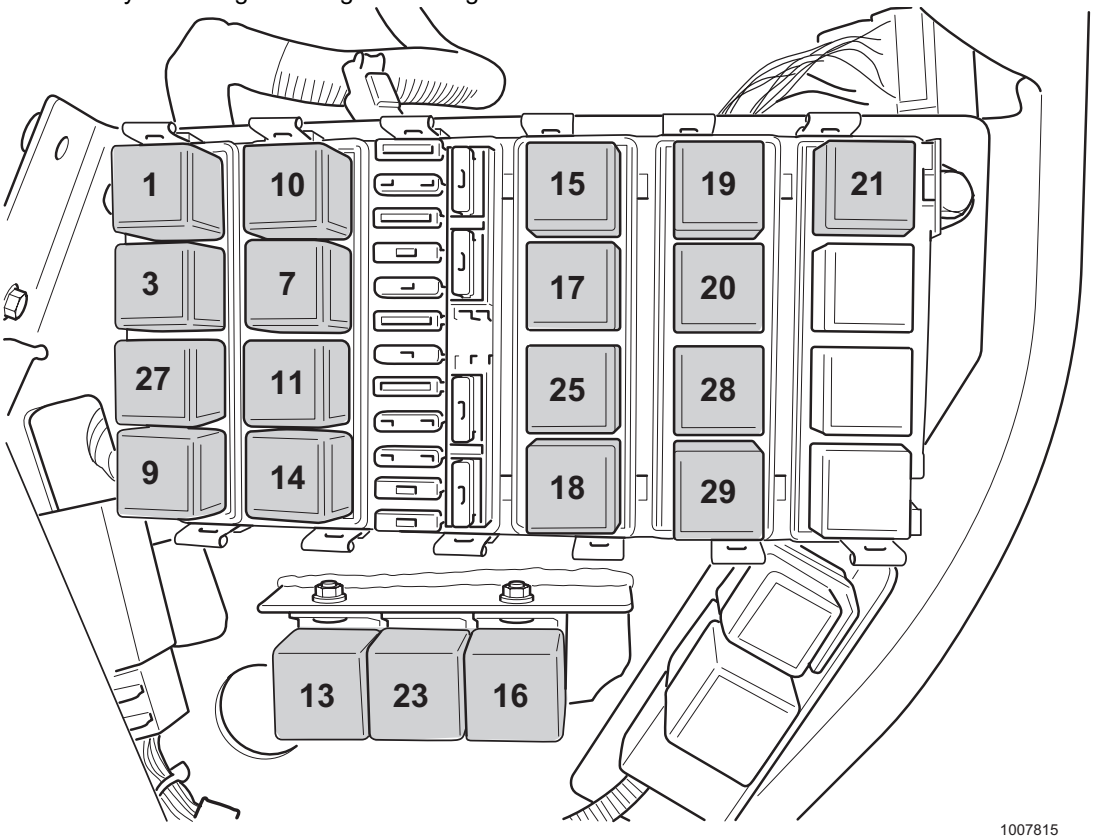
The main fuses are located inside the engine compartment.



FU	A	Function	FU	A	Function
1	20 A	After key	4	30 A	Horn and work light
2	40 A	Key switch	5	20 A	Starter motor
3	30 A	Signal light and output power			

Relays

Never install relay with a higher rating than that given below.



RE	A	Function	RE	A	Function
1	30	Starter	17	30	Axle lock
3	30	Neutral	18	30	Hydraulic oil filter pressure
7	30	Forward speed	19	30	Auxiliary 1
9	30	Gear box valve D	20	30	Auxiliary 2
10	30	Gear box valve C	21	30	Work light
11	30	Reverse speed	23	30	Blink relay
13	30	Low accumulator pressure	25	30	Axle lock
14	30	Pre accumulator	27	30	Plus after key
15	30	Pre accumulator indicator	28	30	Right blink light
16	30	Stop motor	29	30	Left blink light

Transmission, specifications

Transmission	
Type	Power shift transmission
Designation	T12000
Torque converter, ratio	2:1
Number of gears forward/reverse	4/4
Pump flow at 33.4 r/s (2000 rpm)	53 litres (14 US gal) per minute
Gear-shifting system	Electro hydraulic
Filter	External spin on

Speed range forward/reverse	
Gear	
1st	5.1 km/h (3.1 mph)
2nd	11 km/h (6.8 mph)
3rd	22 km/h (13.7 mph)
4th	34 km/h (21.1 mph)

Transmission ratio	
Gear	Forward/reverse
1st	4.47
2nd	2.05
3rd	1.00
4th	0.66

Drop box, specifications

Type	Shaft drop box
Drop box ratio	1:1

Axle, hubs, transmission and dropbox oils

Oil grade MEC WB 101

Requirements

Property	Unit	Transmission oil MEC WB 101		Test method
Density	kg/m^3		To be stated	ASTM D 1298
Flash point COC	°C	min.	180	ASTM D 92
Pour point	°C	min.	–27	ASTM D 97
Viscosity at 40 °C (104 °F)	mm^2/s (cSt)		To be stated	ASTM D 445
Viscosity at 100 °C (212 °F)	mm^2/s (cSt)	min. max.	9.0 12.5	ASTM D 445 DIN Draft 51350
Viscosity at 100 °C after shearing 30 cycles	mm^2/s (cSt)	min.	8.8	CEC-L-14-A-78
Viscosity at 20 °C (68 °F)	mPas	max.	3500	ASTM D 2602
Rust protection 24 h			No rust	ASTM D 665A
API class			GL-4	ASTM STP-512A
Additive			Lubrizol/Unizol LZ 9990A Oronite OLOA 9725XV Oronite OLOA 9727V	
Solid particles	code	max.	18/13	ISO 4406

Examples of oils which meet the requirements according to the table on the next page.

Other requirements

The oil should meet the requirements according to the following two norms:

FORD – ESN – M2 C134 – D and JD JDQ95

The oil should have properties that counteract oxidation, corrosion and foaming, and be suitable for the stated purpose.

Examples of oils which meet the requirements according to the table on the previous page.

Oil company	Trade name
Q8	Q8 T2200
MOBIL	MOBILFLUID 424
ESSO	TORQUE FLUID 56
SOLENE INDUSTRIAL LUBRICANT	SOLENE TRACTELF CH-5
STATOIL	TRANSWAY WB
AGROL	AGROL HYBRAN
ARAL	ARAL FLUID HGS
TEXACO	TEXACO TEXTRAN TDH PREMIUM
VALVOLINE	VALVOLINE UNITRAC
ELF	TRACTELF CH-5
OMV AS	OMV AUSTROMATIC IGB
FINA	TRANSFLUID JD, 10W-30
AVIA	HYDROFLUID JD, 10W-30
CALTEX	TEXTRAN TDH PREMIUM
DELTA	SPECIAL UTTO 170
TOTAL	TRANSMISSION MP
PANOLIN AG	PANOLIN HMO 324
PETROBAS	LUBRAX UNITRACTOR

The following oils are approved **provided the oil contains additive Lubrizol LZ9990A** (also appears under the name Unizol).

Oil company	Trade name
FUCHS	FUCHS RENEGEAR HYDRA MC- ZF 20W/40
CASTROL	CASTROL POWERTRANS
SHELL	DONAX TD or FT/TD
BP	BP TRACTRAN 9
BP	HYDRAULIKÖLE TF-JD
ELF	ELF TRACTELF BF12

Axles, specifications

Front and rear axle

Type	Drive/steer axle with external planetary reduction in the hub
Total gear ratio	1:23.25

Front and rear axle hub

Hub reduction gear ratio	1:6.00
Number of satelites	4

Brakes/steering system, specifications

Service brakes	
Service brakes, type	Single circuit, oil immersed brakes. The brakes are hydraulically operated.
Number of discs per axle, front/rear	8
Number of brake counter discs per axle, rear	10
Brake friction area per wheel	1174.8 cm^2
Brake disc thickness, min.	4.35–4.45 mm (0.171–0.175 in)
Brake disc thickness, new	4.75–4.85 mm (0.187–0.191 in)
Counter discs thickness, new	2.60–2.70 mm (0.102–0.106 in)
Maximum operating pressure	50 bar (725 psi)

Parking brake	
Parking brake, type	Internal SAHR (Spring Applied, Hydraulic Released). Located on the front axle.
Brake friction area per wheel	1174.8 cm^2

Steering system	
Type	Powered Orbitol
Number of steering wheel revolutions, total	3.5
Steering angle	45 degree steering angle
Turning radius curb–curb	3.9 m (12 ft 11 in)

Tire combination chart, specifications

IMPORTANT! Use the same tires for front and rear. Do not mix tire sizes on the machine.

Size	Pressure	Manufacturer
Tire: 13x24 Rim: 24x9	448 kPa 4.5 bar 65 psi	TITAN Tires
Tire: 13x24 Foam filled Rim: 24x9		TITAN Tires
Tire: 15.5x25 Rim: 25x13	448 kPa 4.5 bar 65 psi	TITAN Tires
Tire: 15.5x25 Foam filled Rim: 25x13		TITAN Tires

Cab/Open ROPS, specifications

General	
The cab is an enclosed cab with door and windows. The Open ROPS is an open cab without door or windows. Both the Cab and Open ROPS are tested according to FOPS and ROPS (see below for details) The Cab/Open ROPS is fitten onto the machine frame.	
The Cab/Open ROPS is tested and approved as a protective cab according to ISO 3471-1994 and SAE J040-MAY 94 (ROPS), ISO 3449-1992 (FOPS) and ISO 6055-1997 (protective roof for rider trucks).	
Cab/Open ROPS interior fittings and upholstery	Fire retardant (fire resistant) ISO3795-1989 and EN474-1.
Heating and ventilation (Cab only)	
The cab is equipped with a ventilation system. The ventilation system is controlled by the operator by the control panel inside the cab.	
Operator seat	
The operator seat is equipped with a retractable lap seat belt. The standard seat belt is 50 mm (2 in) and the optional seat belt is 76.2 mm (3 in) wide.	
The suspended seats meet the vibration standard ISO7096 class 3 and 4.	
The seats meet the flammability standard FMVSS302.	
Standard seat, type	Adjustable seat, longitudinal and back-rest inclination, without suspension. Vinyl type.
Suspended seat, type (optional equipment)	Adjustable seat, longitudinal and back-rest inclination, with suspension. Vinyl or cloth type.
Sound level	
The measuring of sound power level around the machine has been carried out according to 2000/14/EC with applicable appendices and measuring method according to EN 12053:2001.	

Hydraulic system, specifications

Hydraulic pump	
Type	Gear pump
Displacement	51.49 cm^3/rev (3.14 in^3/rev)
Direction of rotation	Clockwise
Flow at 41.3 r/s (2500 rpm)	128.73 litres (33.98 US gal) per minute
Continuous pressure	25 MPa (250 bar) (3600 psi)
Intermittent pressure	27.5 MPa (275 bar) (4000 psi)
Peak pressure	31 MPa (310 bar) (4500 psi)
Valve block	
Type	Open centre load sensing valve with flow sharing functions
Maximum inlet flow	150 litres (40 US gal) per minute

Machine capacity

WARNING!

Do not exceed rated capacity. If rated capacity is exceeded, the machine may be damaged or tipover which can cause injury or death.

Using the load charts and boom angle indicator

The load charts are found inside the Cab/Open ROPS or in this manual, see page 135–138.

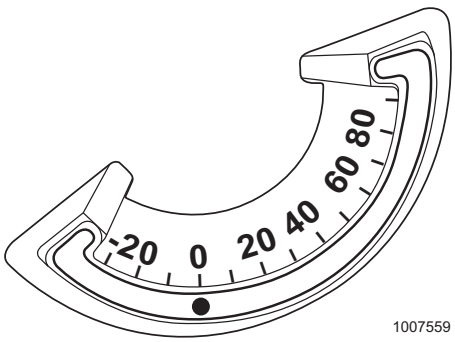
1 Determine the mass (weight) of the load, the height to which the load will be lifted and the distance from the front of the machine chassis to the structure receiving the load.
Use the conversion tables on page 134 to convert the weight to pound (lb) and length to feet (ft).

2 Use the load chart to determine maximum weight which can be lifted. Ensure that correct load chart is used together with connected attachment.

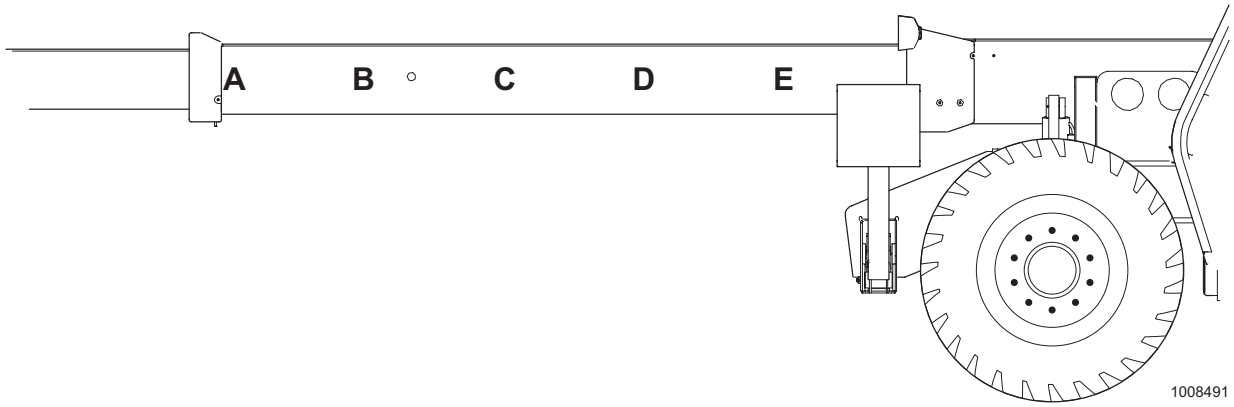
3 Use the boom angle indicator to determine the boom angle.

4 Use the letters located on the second part of the boom to determine how far the boom is extended. The letters correspond to the curved lines drawn on the load charts.

IMPORTANT! The machine must not be used if a letter is for some reason removed/unreadable. Replacement of letters must be carried out by a workshop authorized by MEC.



Boom angle indicator



Boom letters

Measurement conversion tables

Length

Unit	m	in	ft	yd
m	1	39.37	3.2808	1.0936
in	0.0254	1	0.08333	0.02777
ft	0.3048	12	1	0.3333
yd	0.9144	36	3	1

Weight

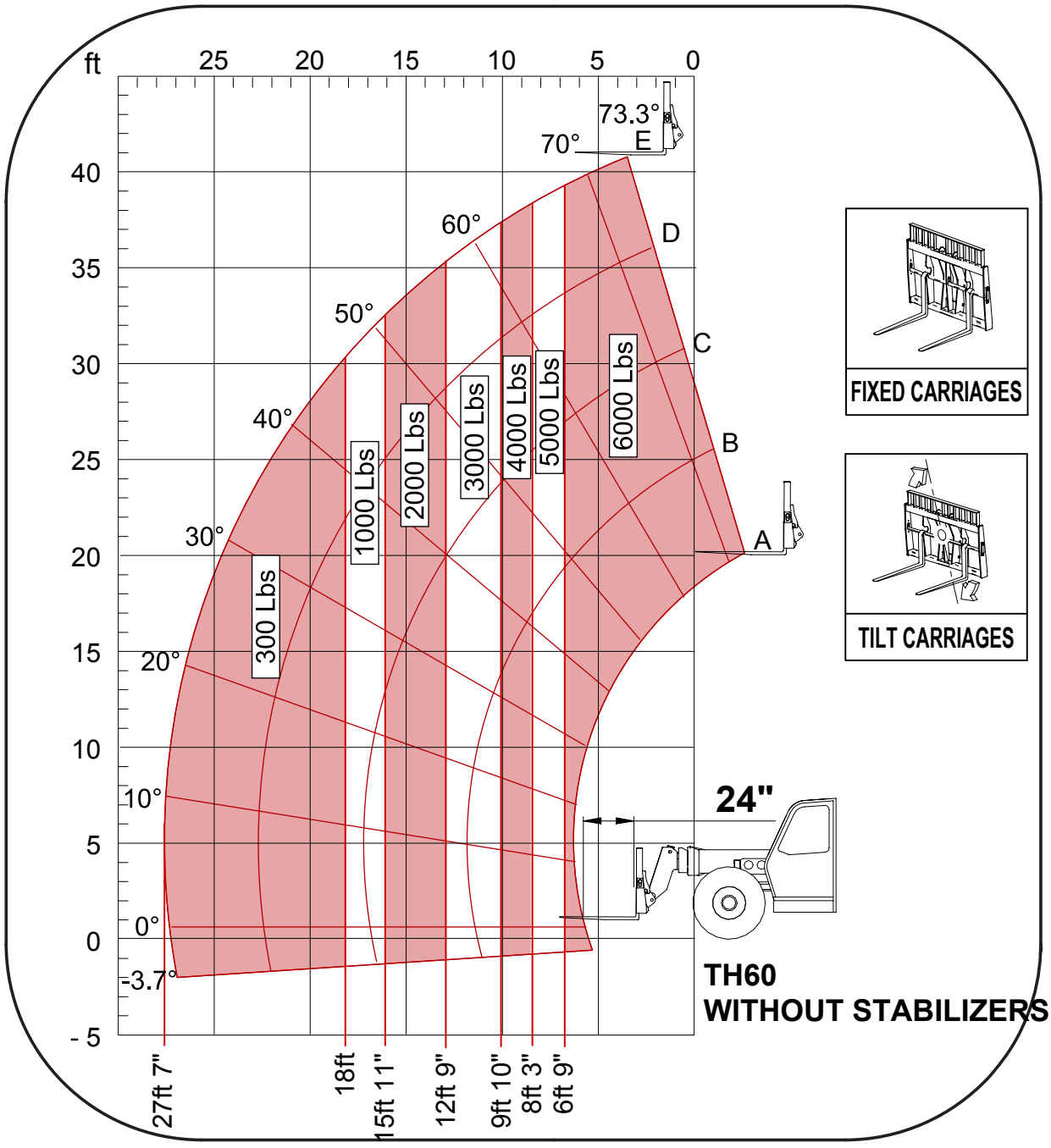
Unit	g	kg	oz	lb
g	1	0.001	0.03527	0.0022
kg	1000	1	35.273	2.20459
oz	28.3495	0.02835	1	0.0625
lb	453.592	0.45359	16	1

Load charts

TH60

Without stabilizers

The load chart applies for a machine used with fixed carriage, side tilt carriage or side shift carriage.

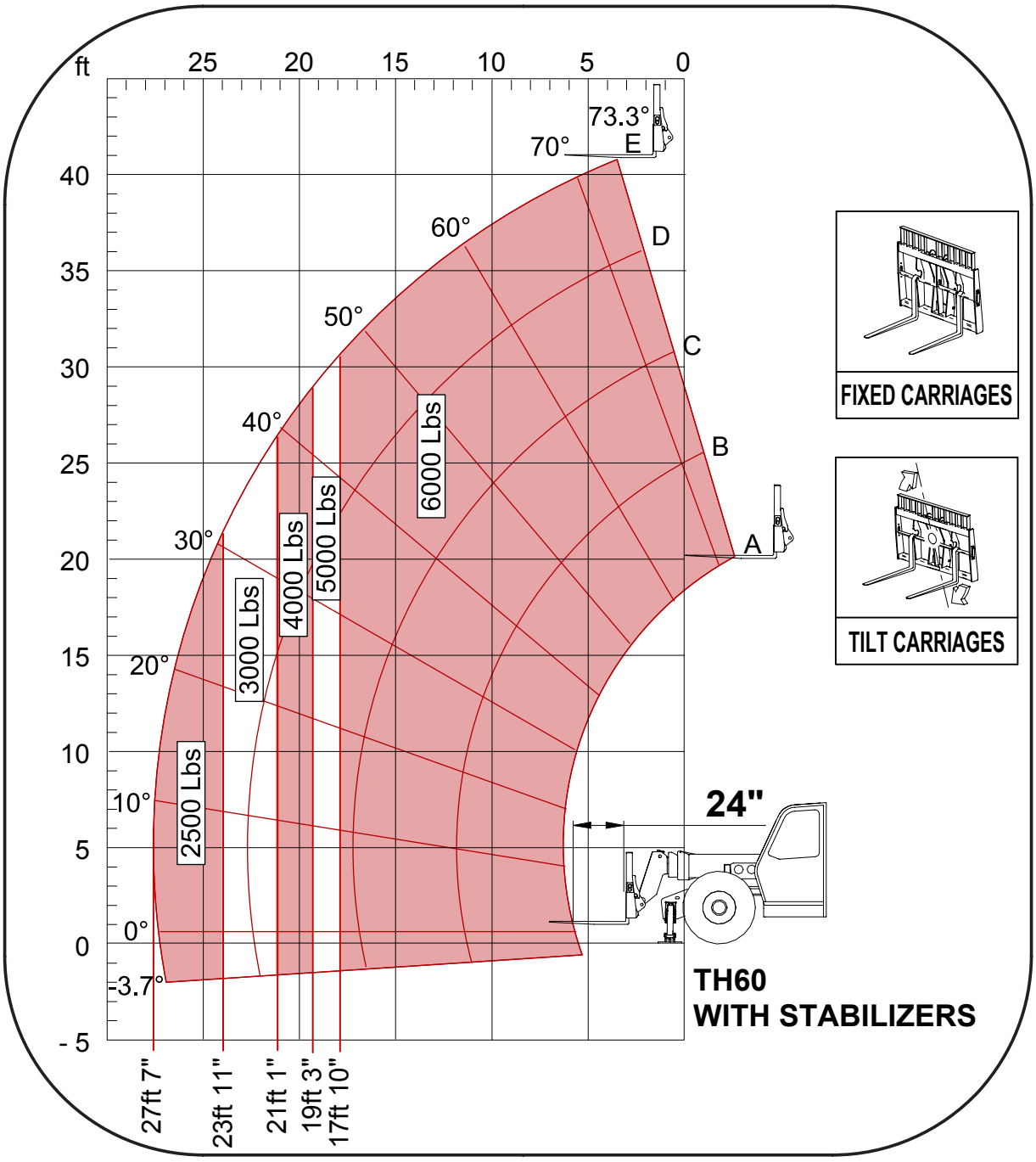


The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

TH60

With stabilizers

The load chart applies for a machine used with fixed carriage, side tilt carriage or side shift carriage.

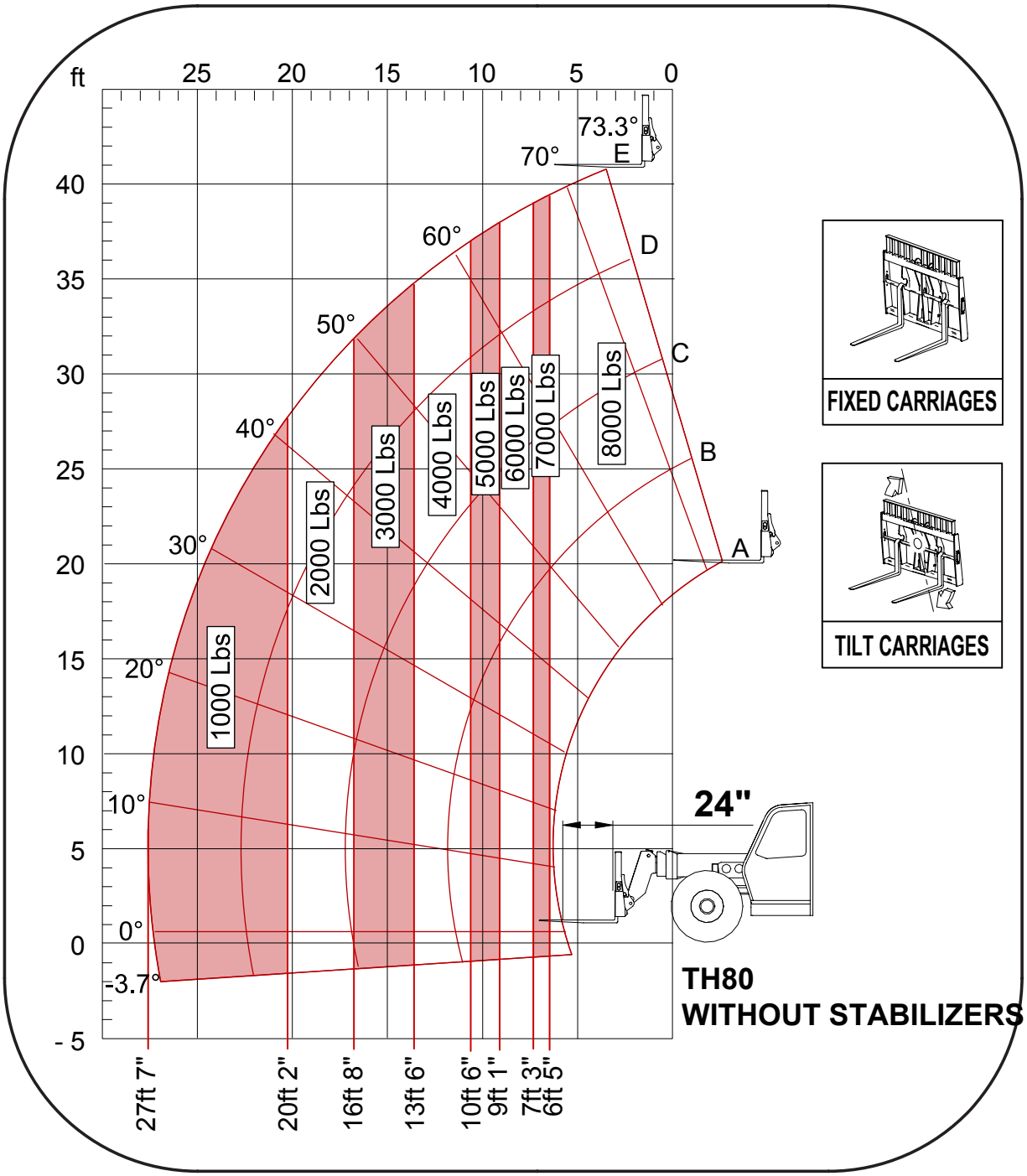


The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

TH80

Without stabilizers

The load chart applies for a machine used with fixed carriage, side tilt carriage or side shift carriage.

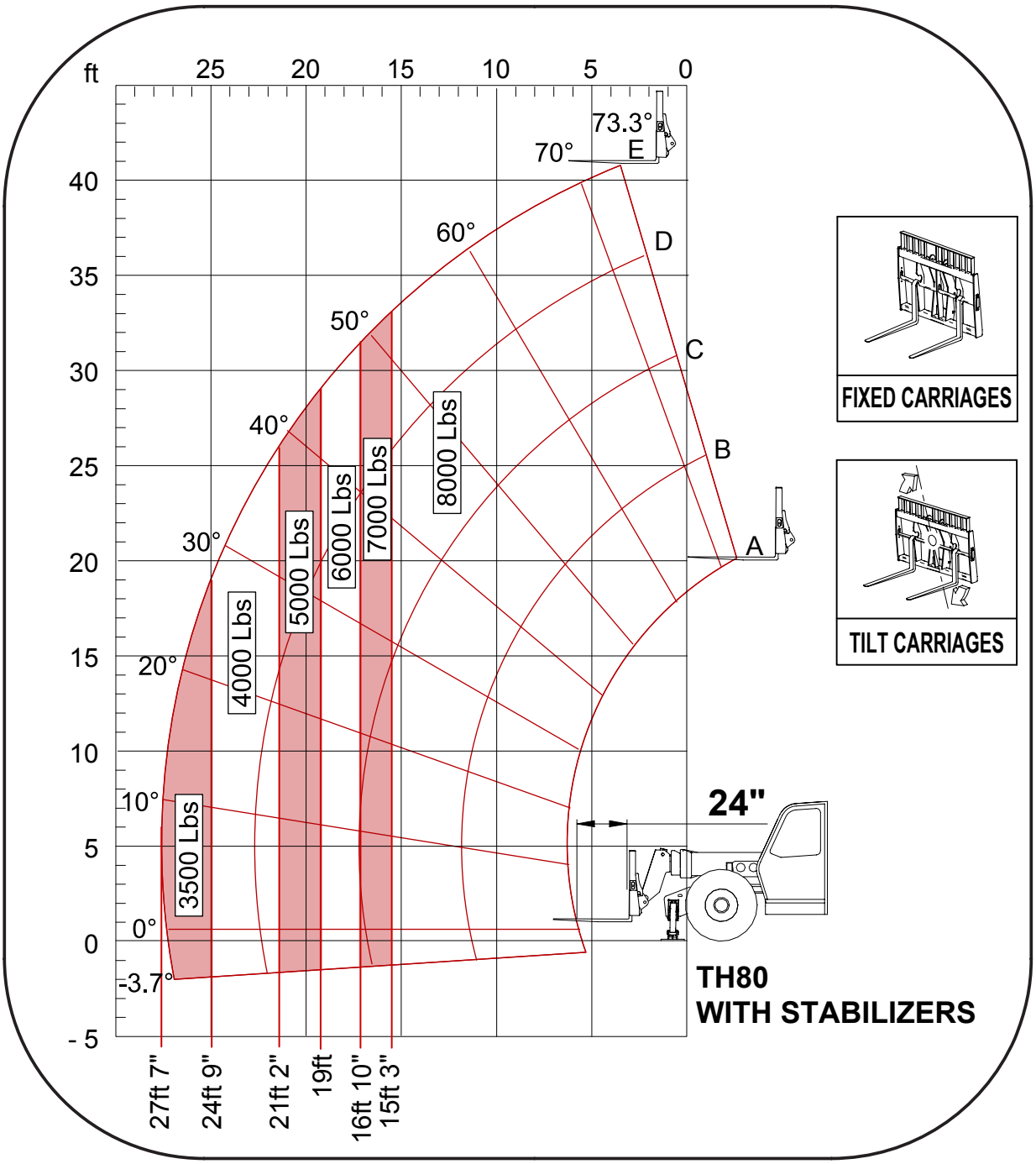


The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

TH80

With stabilizers

The load chart applies for a machine used with fixed carriage, side tilt carriage or side shift carriage.

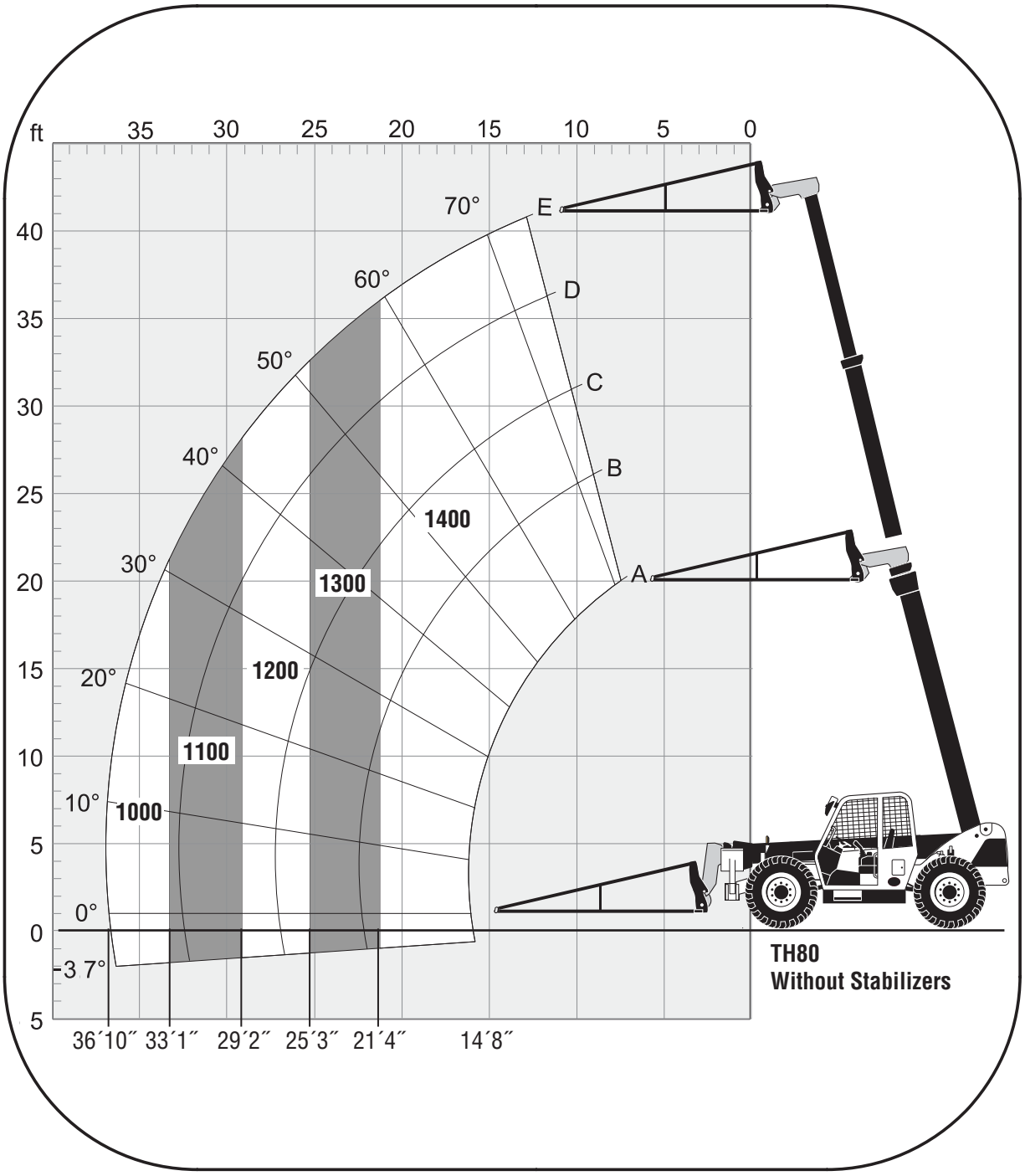


The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

TH80

Without stabilizers

The load chart applies for a machine used with a 1400 pound capacity truss boom.



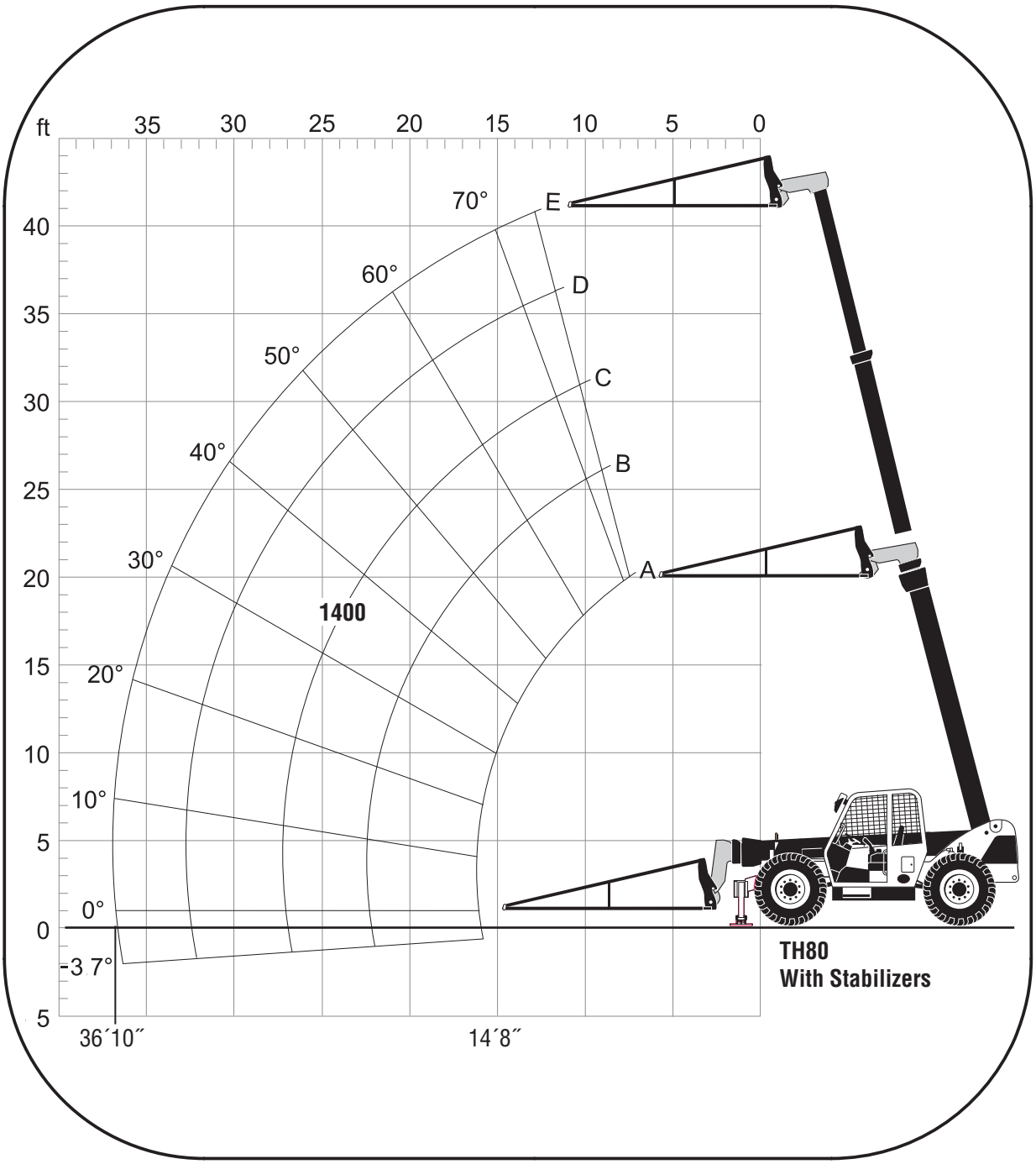
The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

138-b Machine capacity

TH80

With stabilizers

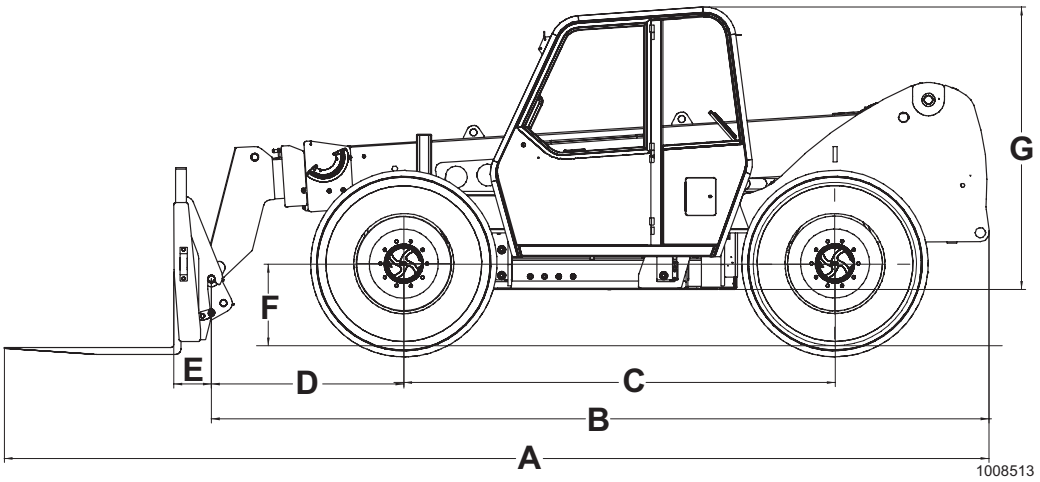
The load chart applies for a machine used with a 1400 pound capacity truss boom.



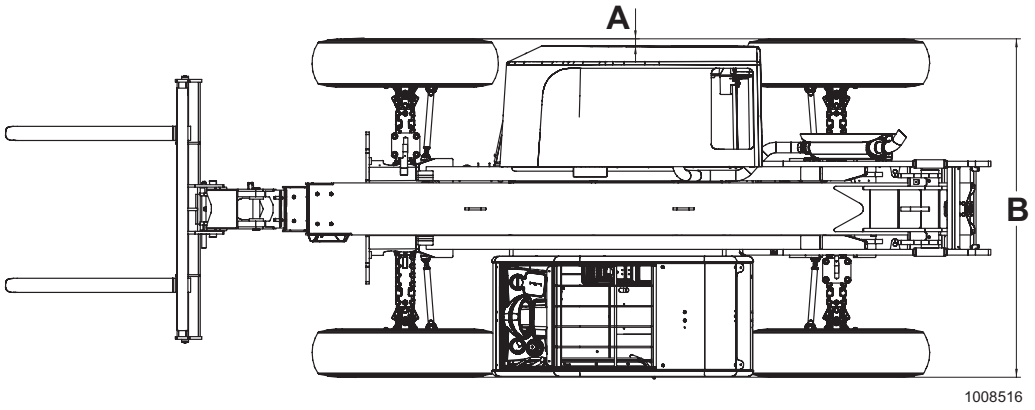
The Y-axis shows the height to which the load will be lifted (in feet).
The X-axis shows the distance from the front of the machine chassis to the structure receiving the load (in feet).
The mass of the load is shown in pound.

Dimensional drawing

This dimensional drawing only applies to a machine with 13x24 - 16 ply titan tires, with a fixed carriage with forks.

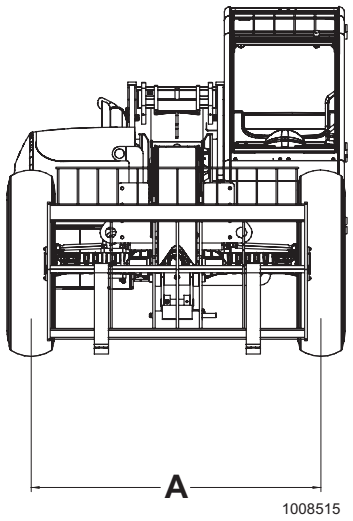


Item	Dimensions
A	7077 mm (23 ft 2.6 in)
B	5589 mm (18 ft 4.0 in)
C	3101 mm (10 ft 2.1 in)
D	1382 mm (4 ft 6.4 in)
E	270 mm (10.6 in)
F	587 mm (1 ft 11.1 in)
G	2029 mm (6 ft 7.9 in)



Item	Dimensions
A	50 mm (1.97 in)
B	2432 mm (7 ft 11.7 in)

140 Dimensional drawing



Item	Dimensions
A	2083 mm (6 ft 10 in)

Alphabetical index


mec