MECALAC

SITE DUMPER

TA9, TA9P, TA9S, TA9SP & TA10P

Original Instructions

OPERATOR'S MANUAL

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Serial Number	
Year of Construction	
Date of Delivery	
Dealer Stamp	
Notice	

Table of Contents

1 Introduction

1.1 Important Information

Please read and follow this manual carefully. If you use the machine correctly:

- You will stay safe.
- Your machine will perform better and last longer.

We strongly recommend:

- That your machine is properly maintained and regularly serviced, as specified in this manual.
- That you use original spare parts obtained from a Mecalac dealer.

We continually make improvements to these machines. We reserve the right to amend the machine without changing these instructions.

Any modification to this machine which has not been approved by Mecalac in writing is prohibited and immediately invalidates the manufacturer's warranty.

The operator of this machine must be a **competent person** who has received thorough training in the use of this type of machine. The operator must be supervised by a **knowledgeable supervisor**.

For further information, please contact the Mecalac Service Department who will be happy to help you.

1.2 Safety Alert System

The Safety Alert System identifies important safety messages in this manual. When you see this symbol, adhere to all safety messages that follow to avoid possible injury or death.

1.3 Intended Use

The machine has been designed and tested to carry out the function of transporting various free flowing materials. If used correctly, it will provide an effective means of transportation and meet the appropriate performance standards and regulations.

This machine is not suitable for under ground working or use in hazardous environments.

Use of this product in any other way is prohibited and contrary to its intended use.

1.4 Operations Manual

This manual is a guide to the safe operation of the machine and the layout and position of all controls. It also contains details of checks and procedures within the scope of the operator to keep the machine in a safe and serviceable condition.

This manual is not a training manual. Contact your local dealer or representative for details of suitable training courses.

Any person who intends to use this equipment must read this operations manual carefully before operating the machine.

Make sure this operations manual is kept with the machine at all times and is in good condition - replace the manual immediately if it becomes dirty, damaged or has been lost. The manual holder is located in the back of the seat (Figure 1.1) and is lockable.

Replacement or additional copies of this publication can be ordered from your dealer.

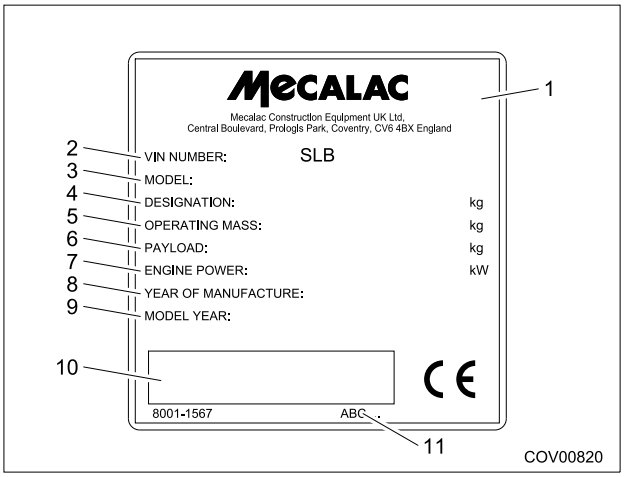
Figure 1.1 - Operations Manual Location

1.5 Identification Plate

The Vehicle Identification Number is recorded on a plate (Figure 1.2) located on the right hand side of the rear chassis frame.

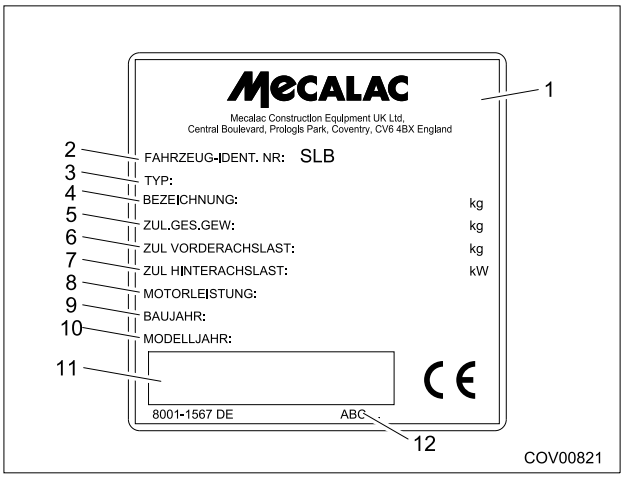
Figure 1.2 - Vehicle Identification Number Plate Location

You are advised to keep a record of your machine's VIN number and the information recorded on the plate in a safe place.



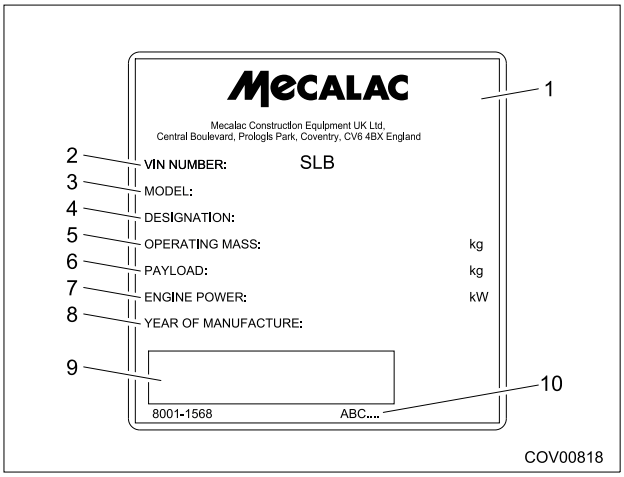
1. Company Address
2. Vehicle Identification Number
3. Machine Model
4. Designation
5. Operating Mass (Unladen)
6. Payload
7. Engine Power
8. Year of Manufacture
9. Model Year
10. Bar Code
11. Works Order Number

Figure 1.3 - Vehicle Identification Plate Information - CE Machines



1. Company Address
2. Vehicle Identification Number
3. Machine Model
4. Designation
5. Operating Mass (Laden)
6. Maximum Front Axle Load
7. Maximum Rear Axle Load
8. Engine Power
9. Year of Manufacture
10. Model Year
11. Bar Code
12. Works Order Number

Figure 1.4 - Vehicle identification Plate - German



1. Company Address
2. Vehicle Identification Number
3. Machine Model
4. Designation
5. Operating Mass
6. Payload
7. Engine Power
8. Year of Manufacture
9. Bar Code
10. Works Order Number

Figure 1.5 - Vehicle Identification Plate - Non-CE

1.6 Warranty Registration

Your dealer will have registered you as the owner with Mecalac at the time of sale. Should you have any queries, please consult your dealer in the first instance.

1.7 Warranty Terms and Conditions

Full terms and conditions of the machine's warranty will be found in the warranty certificate included in or accompanying this manual.

1.8 Service and Replacement Parts Enquiries

Please state the vehicle type and the Vehicle Identification Number (VIN) when making enquiries or orders and in all written correspondence.

1.9 Official Documents European Community Only

(1) CE mark

The Machinery Safety Directive is intended to harmonise all the machinery safety regulations throughout the community so that there will be no technical barriers to trade.

Compliance with the essential safety requirements of the EEC directives 2006/42/EC (machinery), 2000/14/EC (noise) and 2004/108/EC permits companies to CE mark their products.

The directive affects almost every equipment supplier and user in the community and, in particular, applies to this type of machine.

The regulations require that potential hazards from machinery are properly addressed and guarded against.

The EC declaration of conformity is a requirement of CE marking. The declaration for this machine (Figure 1.6) follows.

Contents of the EC Declaration of Conformity

2006/42/EC Machinery Directive

Manufacturer: Mecalac Construction Equipment UK Ltd
Central Boulevard
Prologis Park
Keresley End
Coventry
CV6 4BX
United Kingdom

Name of Person to Compile Technical File: Steve Price

Address of Person to Compile Technical File: Mecalac Construction Equipment UK Ltd

Generic Denomination:	Compact Dumper
Machine Function:	Earth-moving machinery
Model / Type :	TA9. TA9S
Serial/VIN number	
Commercial Name:	Same as Model /Type

MECALAC CONSTRUCTION EQUIPMENT UK LIMITED hereby declares that the above piece of machinery is in conformity with the relevant provisions of the Machinery Directive (2006/42/EC).

MECALAC CONSTRUCTION EQUIPMENT UK LIMITED hereby declares that the above piece of machinery is in conformity with the provisions of the following other EC-directives: Non-Road engine emissions (2016/1628/EC), Noise - Equipment Used Outdoors (2000/14/EC) and Electromagnetic Compatibility (EN 13309:2010) (presumption of conformity of conformance to 2014/30/EU According to EN 13309:2010 ANNEX ZA).

MECALAC CONSTRUCTION EQUIPMENT UK LIMITED hereby declares that the following standards have been used: EN474-1 & EN474-6

Place of Issue: Coventry, United Kingdom

Date of Issue:

Empowered signatory

Eric Lepine
Chief Operating Officer

Figure 1.6 - Copy of CE Certificate

1.10 California Proposition 65

California (USA) state law stipulates that the manufacturers of machines operated within its borders must provide a clear warning to customers regarding exposure to substances commonly associated with the machine that are recognized by the state as harmful. Mecalac complies with this requirement by providing the following information.

California Proposition 65
Warning: This machine and its service parts contain and/or emit chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm. Engine exhaust, many parts and systems, fluids and some component where by-products contain or emit these chemicals.

California Proposition 65
Warning: Mecalac sells machines and service parts that contain or emit chemicals known to the state of California to cause birth defects or other reproductive harm. Engine exhaust, many parts and systems, fluids and some component where by-products contain or emit these chemicals.

1.11 Bulletin Compliance

- You must take action and comply with any safety bulletins transmitted to you by your dealer or by Mecalac.
- Make sure the details of ownership of the machine are recorded by your dealer and the information is accurate and up to date. Failure to do so may result in critical safety information being withheld.
- Bulletins can only be issued to the recorded owner or keeper of the equipment. It is your responsibility to make sure that your dealer or Mecalac has your correct details.
- If you are the new owner contact your local dealer with your details and quote the machines VIN number to make sure you receive any future bulletins or updates.

1.12 Contacting the Manufacturer

At times it may be necessary to contact the manufacturer of this machine. You must supply the Model and VIN Number of the machine together with your name and contact details.

- You must contact Mecalac for:
- For any product modifications to your machine.
- To report an accident involving Mecalac equipment.
- Product applications and safety.
- Standards and regulations compliance.
- To report change of ownership or ownership details (if not reported to a dealer).

1.13 Transfer of Machine Ownership

If you sell or otherwise dispose of your machine you must tell your dealer (or otherwise Mecalac):

- The name and address of the new owner.
- The model and VIN number of the machine.
- The date of transfer or disposal.

2 Safety

This manual is designed as a guide to the Machine's Controls, Operation and Maintenance. IT IS NOT A TRAINING MANUAL

2.1 Safety Alert System

The Safety Alert Symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death

2.2 ANSI Hazard Classification System

(1) Only Applicable to ANSI Safety Signs

ANSI safety signs are only fitted to machines used in the US, Canada, Australia and New Zealand

A multi-tier hazard classification system is used to communicate potential personal injury hazards.

The following signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard

All are used as attention getting devices on safety signs fixed to the machinery to assist in potential hazard recognition and prevention

DANGER

DANGER - (Always used with a safety alert symbol and white letters on a red background) Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING - (Always used with a safety alert symbol and black letters on an orange background) Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION - (Always used with a safety alert symbol and black letters on a yellow background) Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(2) Property Damage

NOTICE

NOTICE - (Used without a safety alert symbol and white italic letters on a blue background) Is used to address practices not related to personal injury

(3) Procedure

PROCEDURE

PROCEDURE - (Used without a safety alert symbol and black letters on a green background). This indicates a procedure that must be followed step by step for safe operation. Make sure all safety notes have been considered before beginning the procedure.

2.3 Personal Protective Equipment (PPE)

You must wear the PPE shown in the tables below **at all times** when operating this equipment. Do not wear rings, scarves or open jackets. Make sure that all loose clothing is tightly secured. Long hair must be restrained.

Protective Helmet		A protective helmet must be worn at all times to prevent injury from falling objects	Safety Boots		Safety boots must be worn at all times when operating this equipment
Ear Defenders		Ear protection must be worn at all times when operating or near this equipment	Safety Glasses		Safety glasses must be worn at all times to prevent eye injury from flying objects
High Visibility Clothing		High visibility clothing must be worn at all times when operating this equipment.	Seat Belt		The seat belt must be worn at all times when operating this equipment

You must wear the following PPE **when site conditions dictate**.

Protective Gloves		Protective gloves must be worn when necessary to prevent injury from sharp objects.	Face Shield		A face shield must be worn when conditions dictate to prevent eye or facial injury from flying objects
Dust Mask		A dust mask must be worn when site conditions dictate	Respirator		A respirator must be worn when site conditions dictate
Protective Clothing		Protective clothing must be worn when site conditions dictate			

You must wear the following PPE when **performing maintenance** on the machine.

Safety Glasses		Safety glasses must be worn at all times to prevent eye injury from flying objects.	Safety Boots		Safety boots must be worn at all times to prevent injury.

You must wear the following PPE **when site conditions dictate when performing maintenance on the machine.**

Protective Clothing		Protective clothing must be worn when conditions dictate.	Protective Gloves		Protective gloves must be worn when conditions dictate
Dust Mask		A dust mask must be worn when conditions dictate	Face Shield		A face shield must be worn when conditions dictate to prevent eye or facial injury from flying objects

2.4 General Safety Information

Consult your dealer or distributor for details of training courses.

All the time you are working on or with the machine you must consider any possible hazards and how to avoid them.

Only authorised persons must be allowed to operate this machine.

Unauthorised use of this machine may invalidate your insurance.

Operators and maintenance staff **must always comply with the following precautions**. These precautions are given here for your protection. Review them carefully before operating the machine and before performing general maintenance or repairs. Supervising staff must develop additional precautions relating to the specific work area and local safety regulations.

Warnings about the Operator

- Before operating the machine make sure you have had proper training and are fully conversant with the machine and its operation - if in doubt, ASK!
- Make sure you, and anyone else who uses the machine, have been trained to operate it correctly and are physically and mentally fit.
- Do not operate the machine if you are unfit to do so because of alcohol or drugs etc.
- Personal Protective Equipment must be used as specified on *pages 2 - 2 and 2 - 3.*
- Read this instruction manual carefully before operating the machine. Make sure this instruction manual is kept with the machine at all times and is in good condition - replace the manual immediately if it becomes dirty, damaged or lost.
- Read and understand all safety signs before operating the machine.
- Check seat belts daily. YOU MUST ALWAYS WEAR A SEAT BELT WHEN OPERATING THE MACHINE**.**

- If the machine is fitted with ROPS and the machine should roll over, the operator must grip the steering wheel firmly allowing the seat belt to restrain him/her in the seat until the machine comes to rest.

Warning for the supervisor

- Establish a training programme for all operators to make sure they are fully familiar with its operation.

Warnings about other people

- Make sure all bystanders are made fully aware of the safety instructions associated with this machine and are kept well clear of the operating area.
- Do not carry passengers.

Warnings about the machine

- Make sure the ROPS is not damaged and has no unauthorised modifications.
- Always make sure there is adequate ventilation around the machine. Never run the engine in an enclosed area without good ventilation or next to combustible materials.
- Stop the engine before refuelling, if there is a spillage mop it up and do not start the engine until it has been done.
- The exhaust gets extremely hot. Do not place anything on top of it and keep all combustible materials clear. Do not attempt any maintenance on a hot engine.
- Check your local laws and regulations, the engine may require a spark arrester, etc.
- Before performing any maintenance on the machine, place a warning tag on the machine to prevent accidental start-up and remove the start key and battery isolator. Put the locking bar into position to prevent the front and rear chassis moving and creating a crushing zone.
- Do not inspect or clean the machine with the engine running.
- Make sure all guards or shields are in place before using the machine.
- Before carrying out maintenance on the hydraulic system make sure the hydraulic fluid is cool and there is no residual pressure in the hydraulic circuit - hydraulic fluid leaking under pressure can penetrate the skin.
- Do not operate the machine if it is damaged, improperly adjusted or not completely and correctly assembled.
- Keep footplates and steps free from dirt, oil, snow, ice, etc.
- Do not remove the radiator cap when the engine is hot. Do not add coolant to a hot engine.
- Tyre changes and repairs to punctured tyres MUST only be carried out by fully trained operatives using the correct equipment. The manufacturer of this machine recommends a competent firm is employed to carry out these tasks.

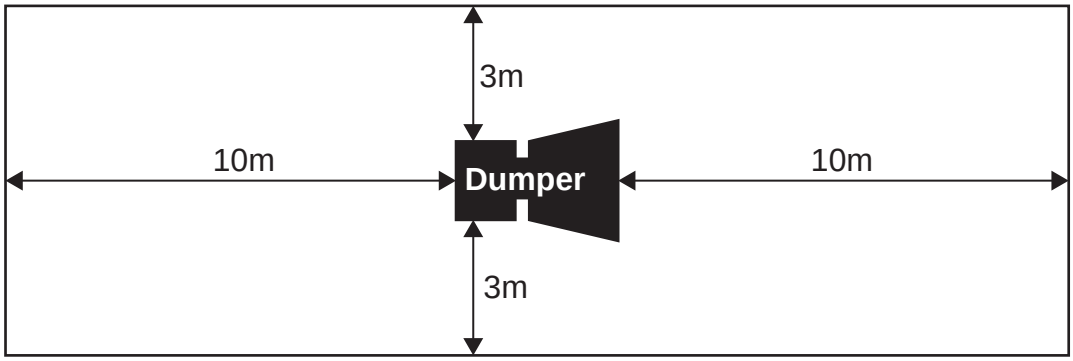
Warnings about the work environment

Danger Zone

Around the dumper, there a danger zone, as shown in the image. It extends 3m from the sides of the dumper and 10m from the front and back.

No person should be in the danger zone when the dumper is operating, other than the dumper operator.

The danger zone is in place to prevent serious accidents, following recommendations from experts across the Construction industry. Please follow this advice.



- Be familiar with all prohibited work areas such as excessive slopes and dangerous terrain conditions.
- Do not drive on slopes or gradients that exceed the safe limits stated for this machine in this manual.
- If the machine is to be used on the public highway or at night, lighting in accordance with national requirements of the country concerned must be fitted.
- Always use driveways approved by site management when driving around the site.
- In the event of an electrical/lightening storm park the machine in a safe place, dismount and seek shelter
- Always park the machine correctly on firm, level ground where it will not cause an obstruction or danger - chock the wheels if necessary. DO NOT LEAVE THE ENGINE RUNNING or the start key in the start switch.
- Before taking the machine on public roads make sure that the machine complies with all road traffic regulations and obey all driving laws.

Warnings about using the Skip

- Do not work under a raised skip unless the props/supports are fitted and locked in position.
- Only fill skip with free-flowing loads.
- When manoeuvring or driving the machine with the skip raised take extreme care as forward visibility will be restricted.
- Do not drive around the site with the skip raised.

- The operator must get off the machine when loading the dumper skip.
- Do not drive the machine on the public highway with the skip in the fully tipped position.

If anyone has any concerns with any safety aspect of the machine the problem must be reported and the machine must not be used until the safety concerns have been rectified or an authorised person has checked and satisfied the site personnel the machine is safe to use.

2.5 Shield and Shield Pro

Technology packs are available on these machines as a driving aid to help improve machine safety and performance.

Machines have Shield tech pack as standard, or Shield PRO as an option.

SHIELD includes:

- Start and drive interlock
- Seatbelt warning
- Speed limiter
- Parking brake neutral warning
- Idle shut-off
- Stop-Start
- Park brake test
- Service warning

SHIELD PRO extra features are:

- Skip interlock
- Skip speed limiter
- Tilt limit
- Rollover lockout
- Fuel loss warning
- Access to app
- Custom speed limiter
- Custom idle shut-off

Full details can be found in the standard Operating Procedures section

2.6 Seat Belt and Green Beacon

A seat belt is provided for operator safety. It is important that the seat belt is inspected and checked regularly. *See Maintenance Section.*

Failure to properly inspect and maintain a seat belt can result in death or serious injury.

The seat belt MUST be worn at all times when operating this equipment.

An optional green beacon is available. The green beacon shows from a distance that the dumper driver is wearing his seatbelt. The beacon is mounted on the ROPS frame and flashes when in operation. Do not use the green beacon on a public highway.

If the machine has a static, non-retractable seat belt, make sure before use that the seat belt has not become caught on or tangled in any other part of the machinery, e.g. under the bonnet.

2.7 ROPS

A ROPS (Roll Over Protective Structure) is provided for operator safety.

Although ROPS appear to be relatively maintenance-free, regular periodic inspections to make sure ROPS are damage-free and thus capable of functioning in a roll over cannot be over emphasised.

Through periodic inspections, cracks, loose bolts, damage, and other normal wear and tear related problems can be eliminated before they become serious.

Proper inspection and maintenance procedures can make sure that ROPS will perform the life saving function they are designed for and expected to do.

Details on the inspection and maintenance of the ROPS will be found in the *Maintenance Section*.

A damaged ROPS must be replaced by a genuine part from the original manufacturer of the machine and fitted by an authorised dealer.

Do NOT modify or attach items to the ROPS without the manufacturers approval.

Do NOT use the ROPS as an attachment point for towing or pulling equipment.

2.8 Lockout and Tag Out

To prevent unauthorised starting of the machine, before any maintenance you must always:

- Apply parking brake.
- Place transmission in Neutral.
- Remove start key.
- Turn battery isolator to OFF and remove key.
- Place warning notice in a prominent position warning others not to attempt to start or drive the machine.

2.9 Hydraulic Fluid

Fine jets of hydraulic fluid under pressure can penetrate the skin.

Relieve all pressure before dismantling any hydraulic system.

Do not use your fingers to check for small leaks or expose uncovered areas of your body to leaks.

Use a piece of cardboard or thick paper to check for leaks.

Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene will result.

2.10 Fluid Levels

Make sure the machine is on firm, level, stable ground. It must not be in a dangerous position or causing an obstruction. Apply the parking brake. Place gear lever in neutral and the make sure engine is stopped before checking ALL fluid levels.

2.11 Battery Electrolyte

Contact with battery acid can cause serious burns, blindness or even death. Protective clothing, gloves and a face shield must be worn at all times when handling or working on a battery.

(1) Skin Exposure

If the skin is exposed to battery electrolyte, the affected skin must be washed immediately with running water.

If burning is severe, seek immediate medical attention.

(2) Eye Contact

If eyes are exposed to battery electrolyte, wash eyes with running water and obtain immediate professional medical attention.

(3) Battery Charging

When charging the battery hydrogen gas is produced.

Make sure the area is well ventilated to prevent the risk of explosion from a build up of hydrogen.

(4) Frozen Battery Electrolyte

Batteries with frozen electrolyte may explode if used or charged.

Never 'jump start' a machine with a frozen battery.

To help prevent freezing, keep the battery fully charged.

Do not use a machine with frozen battery electrolyte.

2.12 Fires

Using water to extinguish an oil fire could spread the fire or give you a shock from an electrical fire.

Use a carbon dioxide, dry chemical or foam extinguisher whilst waiting for the fire brigade.

Keep fire extinguisher seviceable and have it checked regularly

Do not use water to extinguish a machine fire

2.13 Water Cooled Engines

Water cooled systems operate under pressure to increase the boiling point of the coolant. Therefore, the coolant temperature may be greater than boiling water at standard atmospheric pressure (100ºC).

Never perform maintenance on the cooling system when the engine is HOT.

2.14 Lubricants

Lubricants should be handled in accordance to the lubrication manufacturers recommended practices.

Whenever handling oil products, maintain good standards of care plus personal and plant hygiene.

For details of these precautions we advise you to read the relevant publications issued by your local health authority.

- Avoid contact with lubricants. Wear oil resistant gloves when performing maintenance.
- ALWAYS keep lubricants out of reach of children.
- NEVER store lubricants in open or unlabelled containers.

(1) New Oil

There are no special precautions needed for the handling or use of new oil other than the normal care and hygiene practices.

(2) Old Oil

Used engine crankcase lubricants contain harmful contaminants. In laboratory tests it was shown used engine oils can cause skin cancer and reproductive harm. Avoid inhalation of vapours, ingestion and prolonged skin contact with used engine oils. Dispose of used oil in accordance with local environmental regulations.

Observe the following precautions:

- Avoid prolonged, excessive or repeated skin contact with used engine oil.
- Apply a barrier cream to the skin before handling used engine oil.
- Note the following when removing engine oil from the skin.
- Wash skin thoroughly with soap and water. Using a nail brush will help.
- Use special hand cleansers to help clean dirty hands.
- Never use petrol, diesel fuel or kerosene.
- Avoid skin contact with oil soaked clothing.
- Do not keep oily rags in pockets.
- Wash dirty clothing before reuse.
- Throw away oil soaked shoes.

(3) First Aid - Oil

(a) Swallowing Oil

If oil is swallowed, do not induce vomiting.

Get medical advice.

(b) Skin Contact

In the case of excessive skin contact, wash with soap and water.

(c) Eye Contact

In the case of eye contact, flush with water for 15 minutes. If the irritation persists, get medical attention.

2.15 Oil or Fuel Spillage

Absorb with sand or a locally approved brand of absorbent granules. Scrape up and dispose of in a chemical disposal area.

2.16 Working on a Gradient

(1) Always Face the Top of a Slope

When ascending or descending a gradient with a dumper the skip MUST ALWAYS **face the top of the slope**. Always **drive up and reverse down** slopes (Figure 2.1). Do not attempt to drive down a slope as there is a serious risk of overturning.

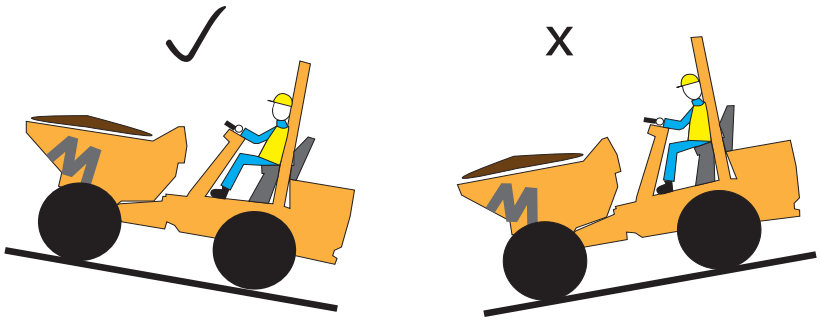


Figure 2.1 - Ascending or Descending Gradients

(2) Maximum Gradient

The maximum gradient for this machine is 20% (or 11º, or 1 in 5) See X in Figure 2.2. Do not exceed the maximum gradient.

Poor ground conditions such as muddy, slippy or uneven surfaces will reduce the maximum gradient.

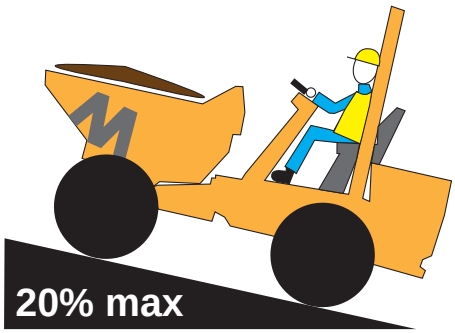


Figure 2.2 - Maximum Gradient

(3) Crossing a Slope

Greater care must be taken when crossing a slope to prevent the machine sliding sideways and out of control.

The maximum slope is 20% (11º, 1 in 5) See Y in Figure 3.3. Do not attempt to exceed this figure.

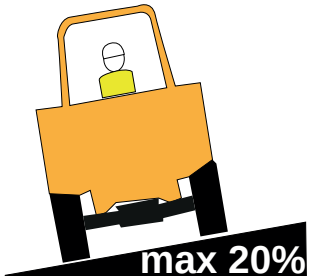


Figure 2.3 - Crossing a Slope

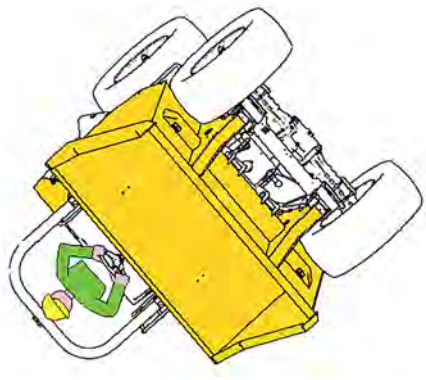
2.17 Responsibilities

Site management must identify possible dangers and make arrangements to eliminate them.

Site management are responsible for planning driveways around the site which will prevent the machine from experiencing excessive slopes, soft ground or having to drive over edges especially at an angle etc. The driveways must also avoid any other possible dangers e.g. overhead cables, work areas, etc.

The operator must make sure the machine is driven correctly at all times especially with regards to speed, overloading, only using the machine for the intended task, not driving dumpers with a lift-skip in the raised position, etc.

2.18 Overturning



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If the machine begins to overturn you must grip the steering wheel firmly allowing the seat belt to hold you in the seat until the machine comes to rest. Do not try to jump clear of the machine when it is overturning - the machine may crush you. The ROPS will provide protection in the event of a roll over.

⚠ DANGER

IF THE MACHINE BEGINS TO OVERTURN YOU MUST GRIP THE STEERING WHEEL FIRMLY ALLOWING THE SEAT BELT TO HOLD YOU IN THE SEAT UNTIL THE MACHINE COMES TO REST. DO NOT TRY TO JUMP CLEAR OF THE MACHINE WHEN IT IS OVERTURNING - THE MACHINE MAY CRUSH YOU.

2.19 Safety Signs

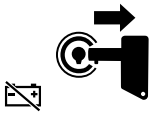
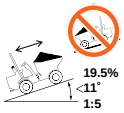
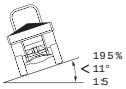
Safety signs are fitted to the machine to warn of possible dangers and MUST be replaced immediately if they become unreadable or lost.

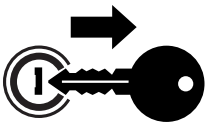
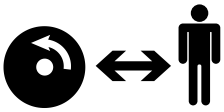
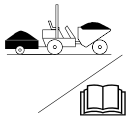
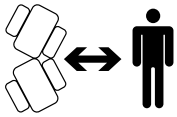
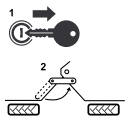
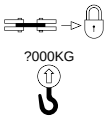
If the machine is repaired and parts have been replaced on which safety signs were fixed new safety signs must be fitted before the machine is put into service. Use mild soap and water to clean safety signs - DO NOT use solvent based cleaners as they will damage safety sign material.

ALL safety signs listed must be present on the machine and must be legible.

(1) Safety Sign Symbols

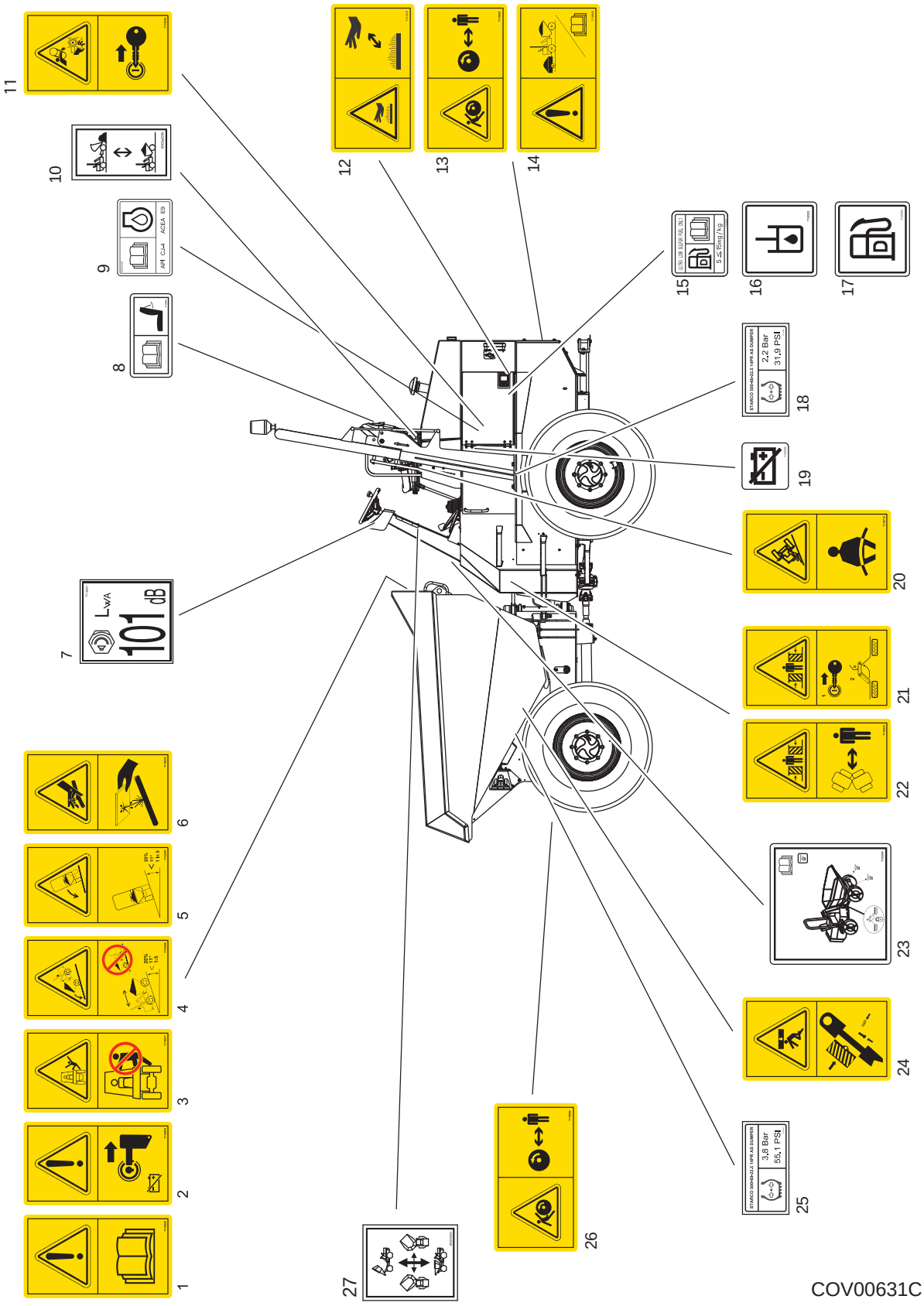
Table 2.1 - Description of Safety Symbols

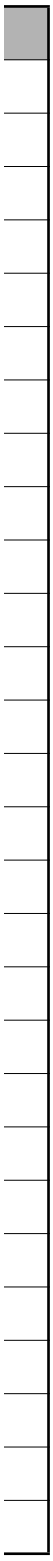
HAZARD		AVOIDANCE	
Attention - for your safety!			Read and understand operator's manual before using the equipment
Attention - for your safety!			Remove start key and isolate battery before maintaining the machine
Fall/Crush			Do not carry passengers or allow people to ride on the machine
Skin injection from high pressure fluid			Use cardboard or wood to check for leaks
Crush during roll over			Only drive up and reverse down inclines of 11° (19.5%, 1 in 5) or less
Crush during roll over			Do not drive across slopes exceeding 11° (19.5%, 1 in 5)
Crushing			Insert skip cylinder safety lock/ support
Burn			Keep clear of hot surfaces

Entanglement			Keep away from fan and belt. Turn off engine and remove key before servicing
Crushing			Stay clear of machine
Machine Instability			Read operators manual
Crush during roll over			Always wear a seat belt when operating the machine
Crush Zone			Stay clear of machine
Crush Zone			Turn the machine off and remove the key. Fit articulation lock
Crushing			Fit articulation lock before lifting. Use equipment rated for lifting the stated weight

(2) Safety Sign Location - ISO

Figure 2.5 - Safety Sign Location - ISO





3 Technical Data

3.1 Dimensions

(1) TA9

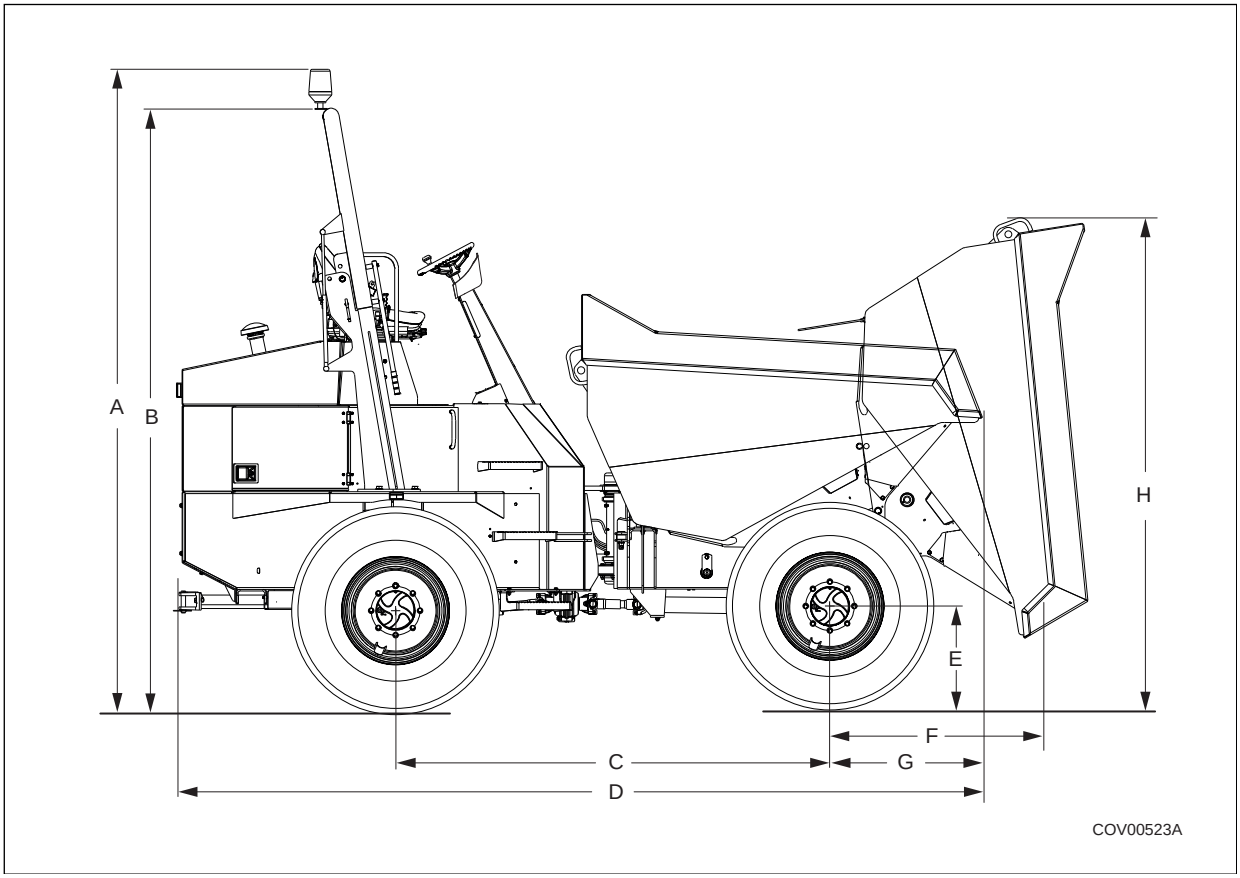


Figure 3.1 - Dimensions

Table 3.1 - Dimensions

Dimensions mm (in)										
Model	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Overall Width**	**Operating Mass**
TA9	3668 (144.4)	3416 (134.4)	2450 (96.4)	4489 (176.7)	540 (21.2)	1202 (47.3)	812 (32.0)	2728 (107.4)	2502 (98.5)	4795Kg* (10,571 lb) 4720** (10,405 lb)

* With Operator (75kg)
** Without Operator

(2) TA9S

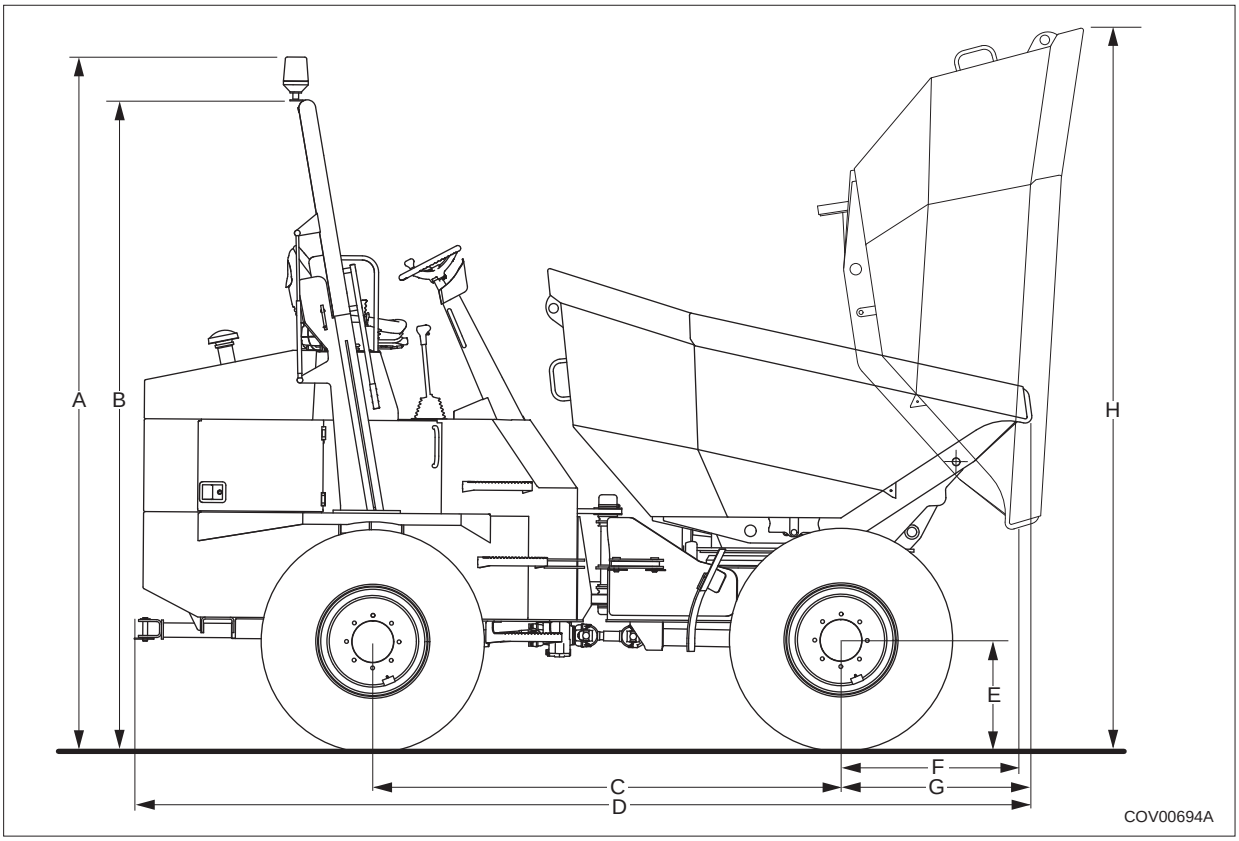


Figure 3.2 - Dimensions

Table 3.2 - Dimensions

Dimensions mm (in)										
Model	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Overall Width**	**Operating Mass**
TA9S	3668 (144.4)	3416 (134.4)	2540 (96.4)	4666 (183.7)	540 (21.2)	973 (38.30)	989.5 (38.95)	3747 (147.5)	2380 (93.7)	5135 Kg* (11,320 lb) 5060 Kg** (11,155 lb)

* With Operator (75kg)
** Without Operator

3.2 Turning Circle

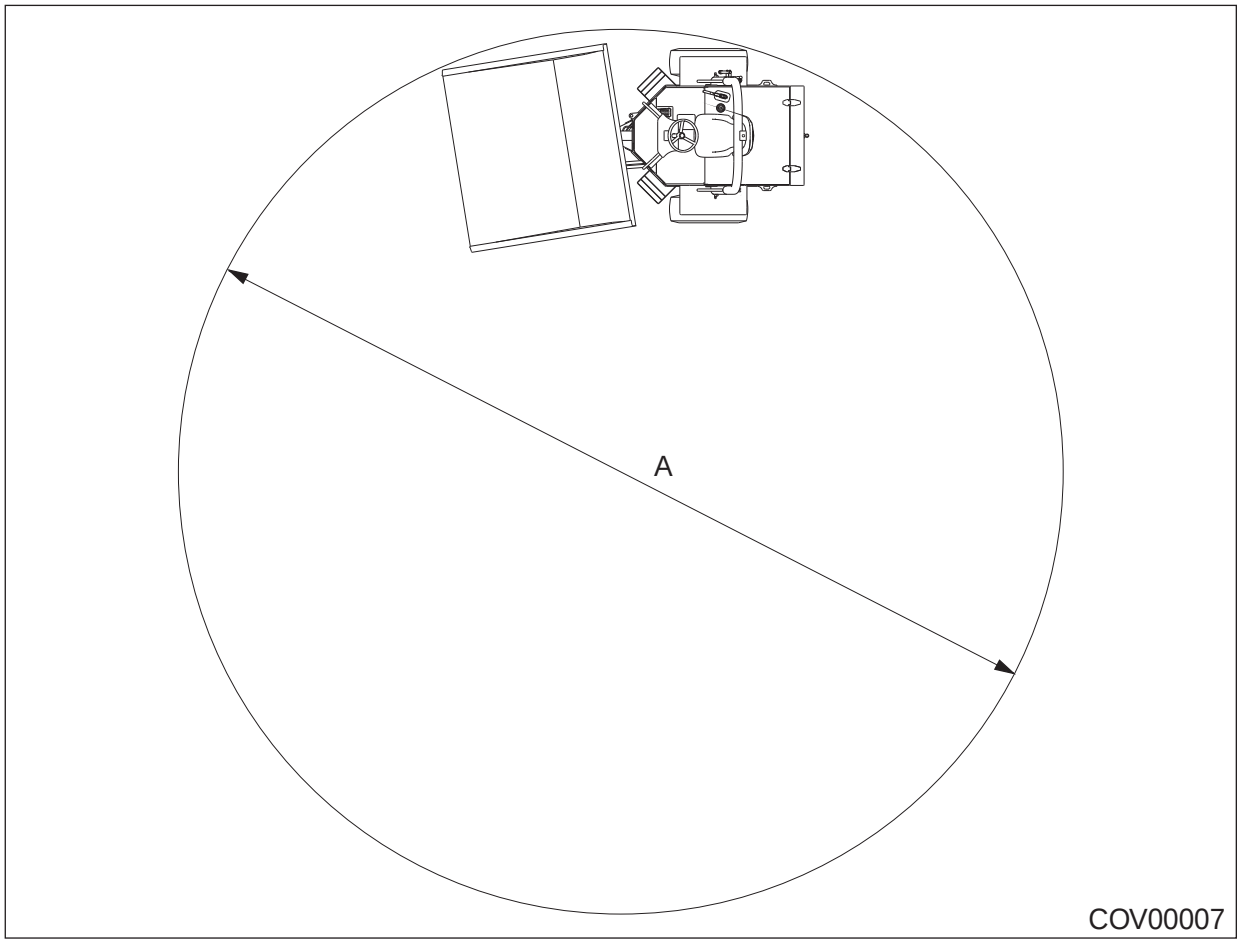


Figure 3.3 - Turning Circle

Table 3.3 - Turning Circle

Turning Circle - mm (in)		
	TA9	TA9S
A	11988 (472.0)	11632 (457.9)

3.3 Data

Table 3.4 - Data

Data	
	TA9, TA9S
Engine	
Manufacturer/Model	Perkins 904 Stage 5
Capacity	3621cc
Rated Power	55.4kW at 2200 rpm
Maximum Torque	424Nm at 1200 rpm
Oil Capacity	11 Litres (2.9 US Gal.)
Cooling System Capacity	24 Litres (36.3 US Gal.)
Gearbox	
Manufacture/Model	ITL SS620
Type	Synchro-Shuttle
Gears	4 Forward/4 Reverse
Machine Speed in Gears (kph)	
1st	4.5
2nd	7.2
3rd	13.4
4th	23.8
Oil Capacity	13 Litres (3.4 US Gal)
Transfer Box	**TA 9, TA9S**
Manufacturer/Model	ITL
Type	T6300/T6310
Oil Capacity	0.9 Litres (3.4 US Gal)
Front Axle	
Manufacturer/Model	DANA
Type	112
Oil Capacity - Axle	7.0 Litres (1.85 US Gal.)
Oil Capacity - Hubs	2.7 Litres (0.71 US Gal.)
Rear Axle	
Manufacturer/Model	DANA
Type	112
Oil Capacity - Axle	7.0 Litres (1.85 US Gal.)
Oil Capacity - Hubs	2.7 Litres (0.71 US Gal.)
Fuel System	
Type	Diesel
Specification	EN590 - Auto/C0/C1//C2/C3/C4
Tank Capacity	65.0 Litres (17.1 US Gal)
Hydraulic System	
Tank Capacity	50.0 Litres (13 US Gal)
Flow	61.2 L/Min (16.16 US Gal/Min)
Working Pressure	210 bar (3045 psi)

Table 3.4 - Data (Continued)

Data			
	TA9,TA9S		
Electrical System			
Type	12v Negative Earth		
Alternator	Belt Driven		
Output	85 Amps		
Battery	Varta Silver830 - 100AH		
Braking System			
Primary	Hydraulic Multi Plate In-board Wet Disc		
Parking	Mechanical (Disc on output shaft of transmission)		
Brake Reservoir	1.2 Litres (0.31 US Gallons)		
Wheels & Tyres			
Manufacturer	Starco		
Tyre Size	500/60 x 22.5		
Pressure - Front	3.8 bar (55 psi)		
Pressure - Rear	2.2 bar (32 psi)		
Wheel Nut Torque	630Nm (465 ft/lbs)		
Skip Capacity	**TA9**	**TA9S**	
Maximum Safe Payload	9000 kg (19,800 lbs)	9000 kg (19,800 lbs)	
Water - Level	2.07 $m.^3$ (2.7 $yd.^3$)	1.91m^3 (2.49 $yd.^3$)	
Struck Level	4.04 $m.^3$ (5.2 $yd.^3$)	3.34 m^3 (4.36 $yd.^3$)	
Heaped	4.6 $m.^3$ (6.1 $yd.^3$)	4.15 m^3 (5.42 $yd.^3$)	
Machine Weights	**TA9**	**TA9S**	
Unladen kg ISO 6016	4840	5060	
Operating Mass kg ISO 6016	4915	5135	
Front Axle Laden ISO 6016	9125	14135	Laden Weight kg ISO 6016
Rear Axle Laden ISO 6016	4790		
Operational Environment	This machine can operate in ambient temperatures of between -15°C and +46°C without special preparation. Refer to fluids and lubricants - Section 9.19		

3.4 Noise Emissions

Table 3.5 - Noise Emissions

Model	Declared Single-Number Noise Emission Values to ISO 4871	
	A- rated sound pressure level at operator station	A - rated sound power of machine
	LpAd	LWAd
TA9 & TA9S	83 dB	101dB

Note: The noise figures are only applicable for European CE Markets only.

3.5 Vibration Levels

Table 3.6 - Hand/Arm Vibration

	Operation	Value	Uncertainty
Hand Arm Vibration as defined in EN474-1	All operations	<2.5m/s2	N/A
Whole body vibration values as defined in ISO/TR 25398	Work Cycle	0.529 rms	0.264m/s2

Note: these values are for guidance only. Actual work site, operation and operator characteristics will have a large influence on actual values for specific circumstances.

4 Description

4.1 TA9 Dumper

Figure 4.1 - TA9 Dumper

4.2 TA9S Dumper

Figure 4.1A - TA9S Dumper

4.3 Description

This range of 4 wheel drive site dumpers has been designed to provide the greatest degree of component standardisation possible, thus providing the user with simplified servicing requirements.

There are 2 models in the range; the TA9 has a conventional forward tipping skip and the TA9S and TA9S has a rotatable skip.

(1) Skip

Both models in the range have a load carrying skip located over the front axle, ahead of the driver. The forward tipping machine discharges its load to the front of the machine; the TA9S has a swivel (swing) skip that in addition to forward tipping, can rotate through 180°, enabling the load to be discharged on either side of the machine when required.

(2) Engine

The machine is powered by a Perkins 904 Stage 5 diesel engine. The engine is positioned at the rear of the machine behind the driver. A “Stop-Start” automatic stop-start system* may be fitted.

All machines are fitted with electric starting; a separate key-operated switch is located adjacent to the steering wheel.

(3) Chassis

The chassis is of the two-part articulating type that has a centre pivot which articulates in both vertical and horizontal planes. Front and rear axles are bolted directly to the chassis.

(4) Steering

Steering of the dumper is by an 'Orbitrol' hydrostatic steering unit, that powers a single hydraulic cylinder connecting the front and rear chassis units.The steering unit is operated by a conventional steering wheel.

The steering wheel is fitted with a "spinner" knob to aid manoeuvring on the worksite. Under no circumstances must the knob be used to control the machine when it is used on the public highway. If possible the knob should be removed from the steering wheel before highway travel.

In the event of hydraulic failure, the steering will still operate but under these circumstances steering wheel loads are high and the dumper must only be driven at slow speeds.

(5) Transmission

A Synchro-Shuttle 4 speed gearbox is fitted. A transfer box transmits power to the front and rear axles.

(6) Braking System

Totally enclosed oil immersed brakes are fitted within the axles. These are self-adjusting and have multiplate sintered discs. The brakes are applied hydraulically by a foot pedal located on the floor plate.

A separate parking brake operates on a disc on the output shaft of the gearbox. This is controlled by an over-centre type lever located on the right hand side of the operators seat.

(7) Electrical System

A 12v negative earth electrical system is fitted. An isolator switch with removable key is fitted for added safety and security.

The machine is available with full lighting to comply with current EU/ISO road traffic regulations.

(8) Shield Technology

These machines are equipped with a Shield tech pack as a driving aid to help improve machine safety and performance. (See Standard Operating Procedures chapter for details).

A camera on the front of the skip shows the forward view to the driver on the dashboard screen.

A radar detects hazards in the path of the machine and displays a light and emits a bleep to warn the driver of hazardous conditions. (See appendix for details).

There are additional warnings and devices to help improve safety and performance.

Machines with Shield Pro also have access to an app called IQANrun. The app allows you to view and adjust speed units, set a horn alert on start up, monitor fuel loss on standing, activate the radar, view active errors and adjust idle stop time. Refer to Section 7.6 for instructions on how to install and use the app.

4.4 Skip

The site dumper is basically a load carrier and the skip can be used for a multitude of building/ contracting site functions, but essentially it is used for carrying free-flowing materials from excavations or demolitions and general site building activities. Either a conventional forward tip or swing (rotatable) skip is fitted.

On forward tip machines the skip is raised and lowered by two double acting hydraulic cylinders mounted between the front chassis and the underside of the skip.

On swing skip machines the hydraulic cylinder is mounted between the top of the turntable and the underside of the skip. The skip is mounted on a slew ring running on ball bearings and is rotated by twin hydraulic cylinders. The swing skip must be mechanically locked in the straight ahead position to prevent movement when travelling.

The joystick control for skip operations is positioned to the right of the drivers seat.

(1) Raised Skip

As a safety aid when working on the machine a support is provided to lock the skip in the raised position when performing maintenance or repairs on the machine This prevents the skip from lowering accidentally and causing injury. Do not reach or work under a raised skip without the support fitted.

(2) Swing Stop

On swing skip machines a locking device is used to locate the skip in the straight ahead position when travelling with the skip fully lowered. Before rotating the skip to the left or right it is necessary to raise the skip slightly to clear the stop.

The maximum payload of the machine when used on a public highway and also the maximum payload permitted when on the work site is shown on the Maximum Load Decal.

4.5 Machine Access

Steps and grab rails are located either side of the machine for access to the operator station and have the option of being highlighted in luminous yellow. When accessing the operators station always face the machine and maintain at least 3 points of contact when mounting or leaving the machine.

Except in an emergency always use the left hand side steps and grab rails; the right hand side has restricted access. Never use the steering wheel or control levers to assist in accessing the machine.

⚠ WARNING

Never jump from the machine always use the steps and grab rails provided.

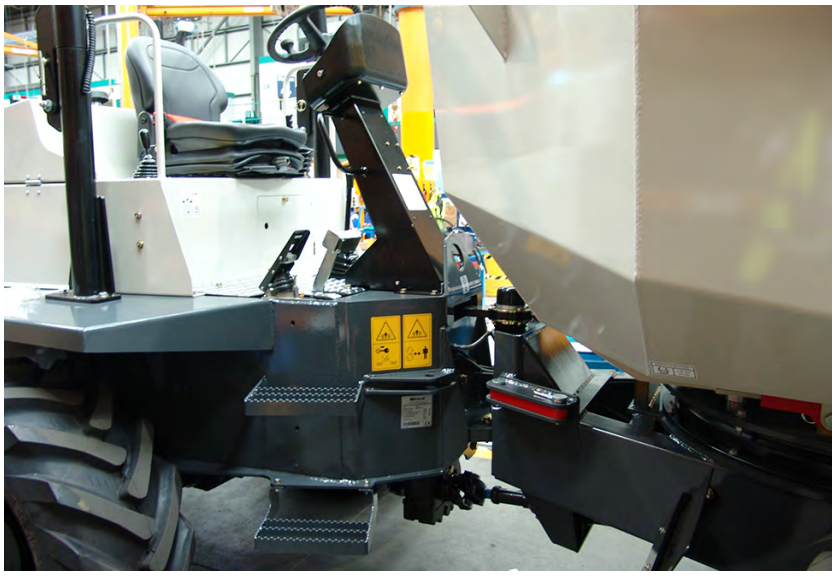


Figure 4.2 - Machine access - steps

4.6 Chassis

The two-part chassis is of the centre pivot articulating type and is of a design which enables both front and rear axles to be attached directly to the chassis.

The front and rear frames are connected in the middle by a vertical pivot in spherical bearings and a horizontal link, which connects between the spherical bearing of the vertical pivot and an additional spherical bearing located in the rear frame.

This arrangement is illustrated in Figure 4.2 and shows the articulation and oscillation of the chassis.

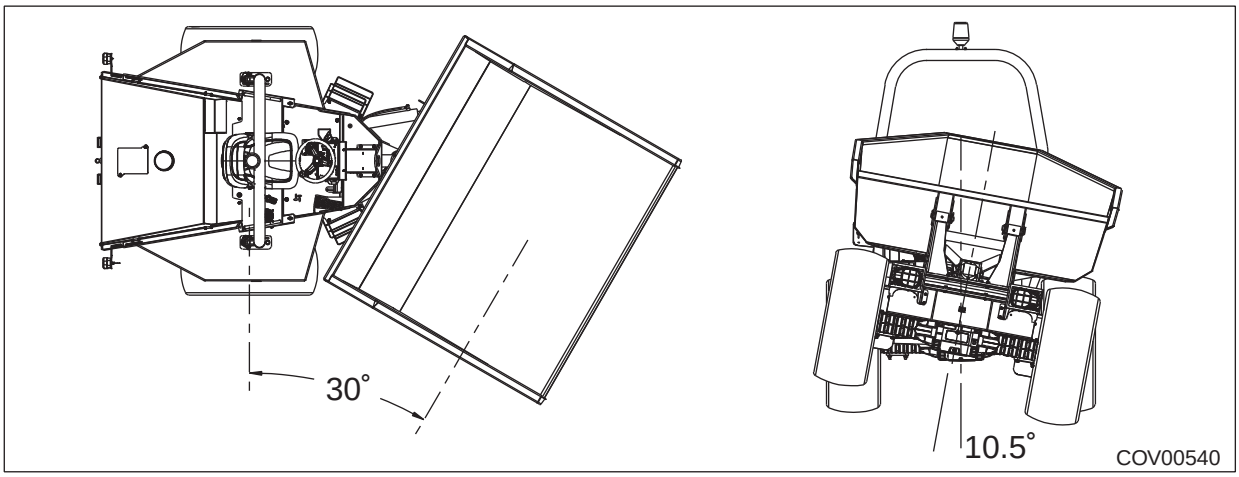


Figure 4.3 - Chassis Articulation Limits

4.7 Hydraulic System

The hydraulic system provides power to operate the vehicle steering and to power the skip elevation.

The system comprises an engine-driven hydraulic pump drawing oil from a tank located inside the chassis. The tank is fitted with a suction strainer, an oil level gauge, and a filler/breather cap.

The pump generates a maximum pressure of 210bar (3045 psi). The system is protected by a relief valve in the control valve that is set at the same pressure.

A return line filter is fitted to the circuit and is of the replaceable cartridge type.

An oil cooler is fitted to reduce the temperature of the hydraulic oil.

Steering of the dumper is by means of a single hydraulic cylinder connecting the front and rear frames, the oil supply to the hydraulic cylinder is controlled by an “Orbitrol” hydrostatic steering unit.

The unit receives oil via a carry over port in the 3-way control valve and constantly meters oil to the hydraulic cylinder as the steering wheel is turned.

The control valve, operated by a lever next to the drivers seat, controls the lifting, lowering and when applicable, the rotating of the skip.

The skip can be elevated at varying speeds dependent on engine speed, and it can be stopped at any intermediate point for discharging of partial loads.

4.8 Battery Isolator

The battery isolator is both a maintenance aid and an anti-theft and vandalism device. It has a removable key.

After stopping the engine allow 2 minutes to elapse before turning the isolator key to the OFF position.

Before any maintenance the isolator should be set to the OFF position and the key removed.

The key should also be removed when leaving or parking up the machine to prevent unauthorised use or theft.

Figure 4.4 - Battery Isolator

1. Isolator Key (ON Position)

(1) Operation

When the key is in the horizontal position the battery is supplying power to the machine and the machine may be used normally.

Turning the key anticlockwise to the vertical (OFF) isolates the power supply to the machine and allows the key to be removed from the isolator switch.

NOTICE

After stopping the engine, a period of 2 minutes must elapse before turning the key OFF position. Failure to follow this instruction will damage the ECU.

4.9 Audible Warning

The audible warning will sound to indicate one of the following conditions. It may be accompanied by a warning light from table 4.3 or 4.4 which will identify the issue.

The warning will sound for:

- the direction indicators are on
- the seatbelt is not fastened - continuous
- the seatbelt was fastened before the seat was sat on - intermittent beep
- a radar object is detected - slow then faster
- a tilt alarm
- low oil pressure
- an engine fault - 1 beep
- the transmission oil temperature exceeds a set level
- the coolant temperature exceeds a set level
- water in fuel is detected
- when the dpf lamp first comes on
- parking brake and neutral screen is on - engage the park brake and put the gear to neutral, for example in the park brake test.

If the buzzer sounds when engine is running, investigate the cause and resolve the issue.

4.10 The Dashboard and Switches

(1) Main Dashboard

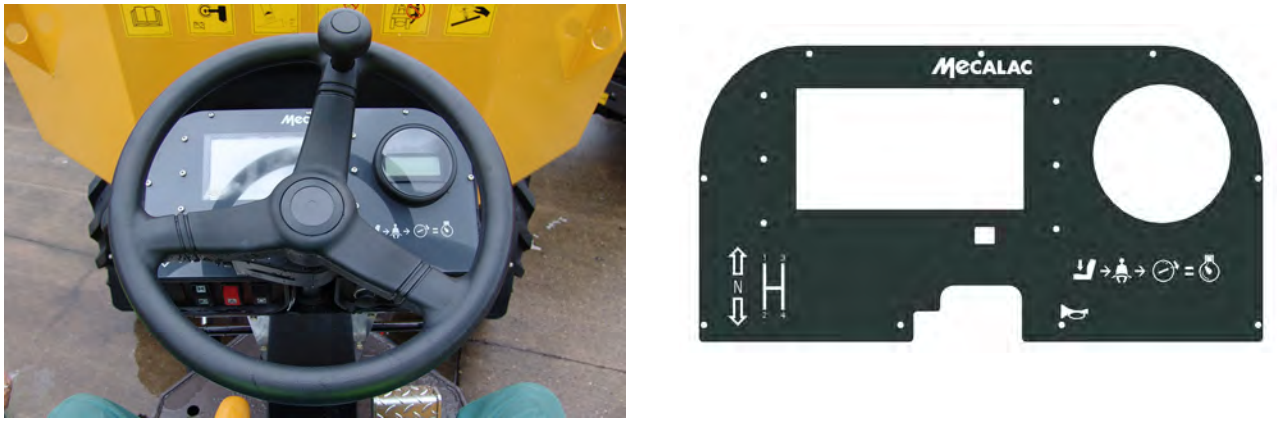


Figure 4.5 - Dashboard

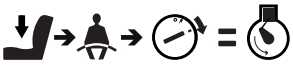
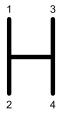
Symbol	Name	Description
	Start Sequence	This symbol indicates that the operator must be seated and wearing the seatbelt before the engine will start. See Ch 7 Standard Operating Procedures for the correct procedure.
	Forward / Reverse Switch	To move the machine forwards or backwards.
	Gear Lever Positions	This symbol indicates to the operator the position the gear lever needs to be in to select a certain gear.
	Horn Button	This symbol indicates that by pressing the button the horn will sound. The horn is used to warn others and must only be used for this purpose. Excessive use may cause others to ignore a genuine warning.

Table 4.1 Dashboard Symbols

(2) Dashboard Front Panels

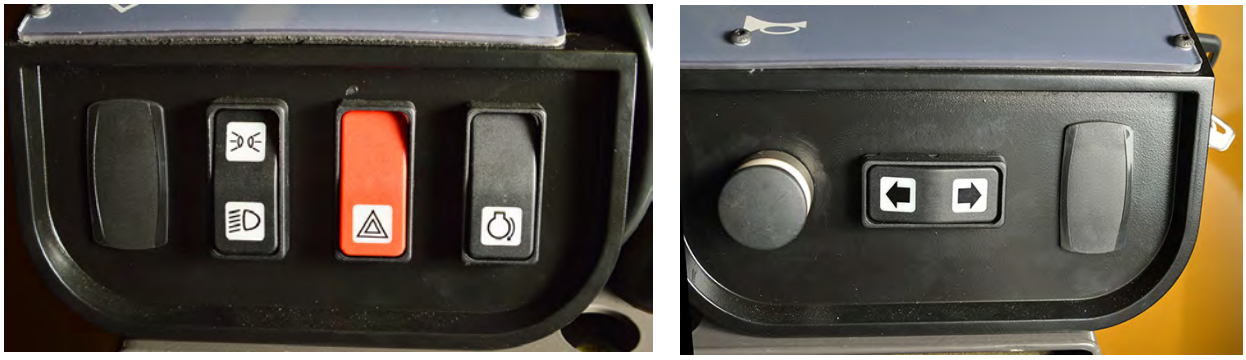


Figure 4.6 - Dashboard Front Faces

On the left and right front faces of the dashboard are two sets of switches to illuminate the dumper's lights. The switches are as follows:

Symbol	Name	Description
	Side light indicator	Comes on when the sidelights are switched on.
	Headlight indicator	Comes on when the headlights are switched on.
	Hazard warning lights	Comes on when the hazard warning lights are on.
	Stop Start button	The default is on. The switch toggles are between off and on.
	Right and left indicator	Depress to start each indicator.

Table 4.2 - Symbols on the front faces of the dashboard

(3) Multifunction LCD Display

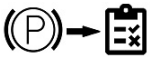
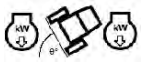
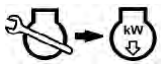
Figure 4.7 - LCD Display

The LCD display contains the warning lights listed here. Some may not be applicable to certain machines.

Table 4.3 - LCD Display Warning Lights

No.	Symbol	Name	Description
		Seatbelt	The seatbelt must be worn for safety.
		Transmission Oil Pressure	Not applicable to this machine.
		Transmission Oil Temperature	This light comes on then the transmission oil temperature exceeds a predetermined level. If the light comes on stop the machine and investigate the cause.
		Engine Oil Pressure	This warning light comes on when the engine oil pressure is too low. If the light comes on when the machine is working stop the engine and investigate the fault.
		Battery Charge	The battery charge warning light should only come on when the start switch is ON and the engine is NOT running. When the engine starts the warning light will go off.
		Parking Brake	This light comes on when the ignition is switched on and the parking brake is applied. It will go out when the parking brake is released.
		Red Engine Warning	When this light comes on there is a serious engine fault
		Water in Fuel	This warning light comes on when water is detected in the engine fuel filter.See chapter 7 Standard Operating Procedures, section on Water in Fuel for how to proceed.
		Engine DM1 fault active. Refer to Operations Manual.	If this light comes on stop machine and investigate, referring to the manual as necessary.
		Pre - Heat	This light is controlled by the engine ECM.
		Amber Engine Warning	When this warning light comes on there is a minor engine problem. It also comes on when there is a a restriction/blockage in the Air Intake Filter. In either case stop the engine and investigate the problem.
		Direction Indicators	This light will flash when the left or right direction indicators are selected.
		Stop-Start	The light comes on when stop-start is active. It flashes when the engine is stopped by the system.
		Transmission in Neutral	This light comes on when the transmission is in neutral.

Table 4.4 LCD Display Warning Lights - Central Area

No.	Symbol	Name	Comments
1		Park brake test is needed in the number of hours shown	For details of how to carry out the test - see the Shield section in chapter 7.  Park brake test active. Put park brake on and put foot on throttle 100%  Park brake test fail - engine limited  Park brake test pass
2		Speed limit	Target speed is displayed periodically.
3		Engine hours	
4		Coolant temperature	If the coolant temperature is too high the light flashes.
5		Regeneration is needed (DPF Filter - diesel particulate filter)	For details of how to carry out the regeneration - see the DPF Filter Section in Chapter 7.  Regeneration underway,  Regeneration has been disabled
6		Approaching gradient limit of vehicle - take safety precautions to prevent rollover	 Gradient limit of vehicle exceeded - engine derated
7	FMI:	Engine fault code - record	Contact Mecalac Service department
8	SPN:	Engine fault code - record	Contact Mecalac Service department
9		Engine needs servicing	 500h service time has been exceeded. Engine power has been derated
10		Fuel fill level	 Fuel empty
11		Radar	 1 cone object at a distance 3 cones object very close  radar fault
12		Skip raised	The radar system is switched off when the skip is raised.
13		Fuel spill or leak	Investigate
14		Seatbelt	
15			Apply park brake and/or put forward/reverse lever in neutral
16			The machine has been tipped over and has been immobiliised. Call an engineer to reset the machine.

4.11 Engine Ignition Switch

This switch is located on the side of the dash box. It allows the engine to start and stop. It has a removable key for security. See Standard Operating Procedure for how to start the engine.

Figure 4.8 - Ignition Switch

4.12 Camera

The camera is located on the front of the machine. It needs no adjusting. The camera view is shown on the dashboard when the machine is switched on.

Figure 4.9 - Camera and Screen

4.13 App

An app is available which can be downloaded onto an android or apple tablet (it is not available for smartphones). The app allows limited machine diagnostics to be viewed and some Shield features to be adjusted.

The functions are

- speed units
- speed limiter
- horn on start up
- fuel loss event record
- radar on/off

- view active errors and
- idle stop time

The app is called IQANrun and is made by Parker. For details see the Standard Operating Procedures chapter.

4.14 Stop-Start Function

This feature reduces fuel use and emissions, prevents overheating and prevents the machine from being left unattended with the engine running. The feature is selected by a button on the left hand side of the dash board, far right.

Figure 4.10 - Stop-Start Button

The stop-start system turns ON each time the engine ignition switch is switched on. Pressing the stop-start button toggles the system between on and off. A light on the dash lights up when the system is active and the engine is running. When the system is active and it stops the engine the light will flash.

After a prolonged period with the engine stopped by the stop-start system, power to the ignition is switched off to prevent the battery from being drained.

At times the engine may not switch off immediately because all predetermined criteria have not been met. Once all the criteria have been met the engine will stop.

NOTE: The stop-start system is not a security feature and the ignition should be switched off and the key removed to prevent unauthorised use when the machine is left unsupervised.

(1) Stop Function

The “Stop” function will operate when:

- The operator has left the seat (for more than 1 second)
- The parking brake is applied
- The engine has reached a predetermined temperature
- The battery has adequate voltage
- The forward/reverse lever is in the “Neutral” position
- The “Stop-Start” system is ON
- The engine canopy doors are closed

NOTE: The system only permits 5 stops in a predetermined period. When the period has elapsed the engine will stop.

(2) Start Function

The “Start” function will operate when:

- The “Stop-Start” system is ON
- The operator sits on the seat and fastens seat belt
- The forward/reverse lever is in the “Neutral” position

- The engine canopy doors are closed
- The throttle pedal is at idle (not pressed down)

4.15 Forward/Reverse Switch - “Synchro-Shuttle” Transmission

This switch allows the machine to be driven in the forward or reverse direction. The switch has 3 positions:

0 - Neutral
A - Forward
B - Reverse

Figure 4.11 - Forward/Reverse Switch

1. Forward/Reverse Switch

When the machine is not being used the switch must be returned to the Neutral position to prevent accidental Movement. If the parking brake is ON and forward or reverse is selected a buzzer will sound.

4.16 DPF Filter (Diesel Particulate Filter)

The DPF filter reduces emissions from the diesel engine to reduce damage to the environment.

The engine monitors the level of soot in the diesel particulate filter (DPF). It burns off the soot when the level gets too high. Details showing how to use this are shown in chapter 7.

4.17 Highway Lighting (when fitted)

(1) Direction Indicators

The direction indicators are controlled by a 3 position switch.

Figure 4.12 - Direction Indicator Switch

With the switch in the OFF position (0) the indicators do not operate.

(2) Brake Lights

The brake light switch is activated when the brake pedal is pressed and the lights will come on. The lights go out when the pedal is released.

(3) Front Light Unit

Each front light unit contains a head light, side light and indicator light.

Figure 4.13 - Front Light Unit

1. Headlight
2. Indicator
3. Side Light

(4) Rear Light Unit

Each rear light unit contains a rear light, brake light, indicator and reflector.

Figure 4.14 - Rear Light Unit

(5) Registration Plate Lights

Separate light units that operate in conjunction with the side and tail lights illuminate the rear registration plate.

4.18 Orange Obstruction Beacon

The beacon is provided to warn people of the machine's presence. A mounting for the beacon is located on the ROPS.

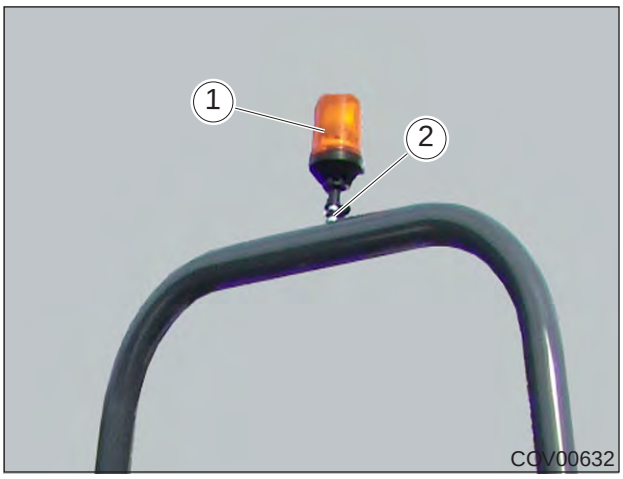


Figure 4.15 - Obstruction Beacon

1. Beacon
2. Mounting Stem

When the beacon is not required it can be removed and placed in its storage position within the engine compartment to prevent theft or vandalism. When the beacon is removed from the ROPS a rubber cover is fitted over the mounting stem to prevent the ingress of water.

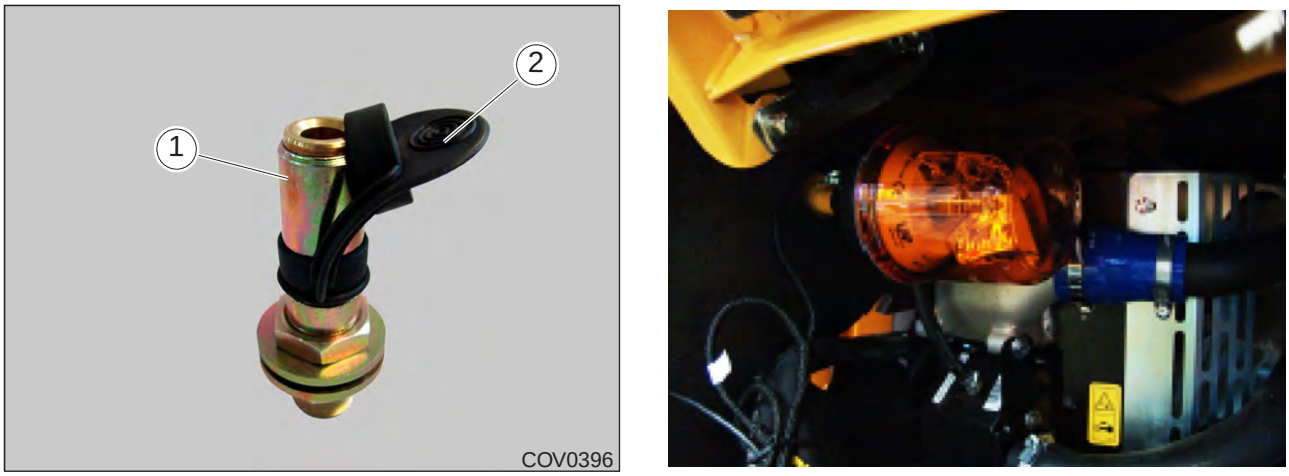


Figure 4.16 - Mounting Stem and Storage Location

1. Mounting Stem
2. Rubber Cover

4.19 Foot Brake and Throttle Pedals

Refer to figure 4.17. The pedals are positioned in standard automotive format. The throttle pedal controls the speed of the machine; the further the pedal is pressed down the faster the machine will travel. To slow the machine and apply the brakes press the brake pedal.

Figure 4.17 - Driving Controls

1. Foot Brake
2. Throttle Pedal

4.20 Gear Selector Lever

The lever allows any of the gearbox's 4 speed ratios to be selected. The lever moves in a conventional H pattern.

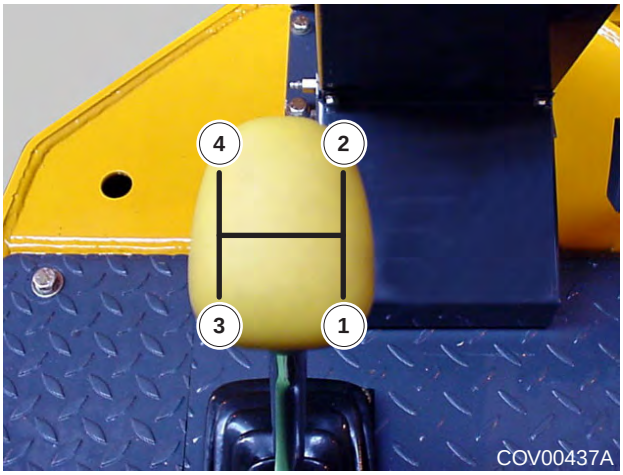


Figure 4.18 - Gear Change Pattern

An interrupt button on the knob is depressed and held while changing from one gear to another. Once the gear is selected the button is released. This button is the equivalent to a clutch pedal on a conventional vehicle.

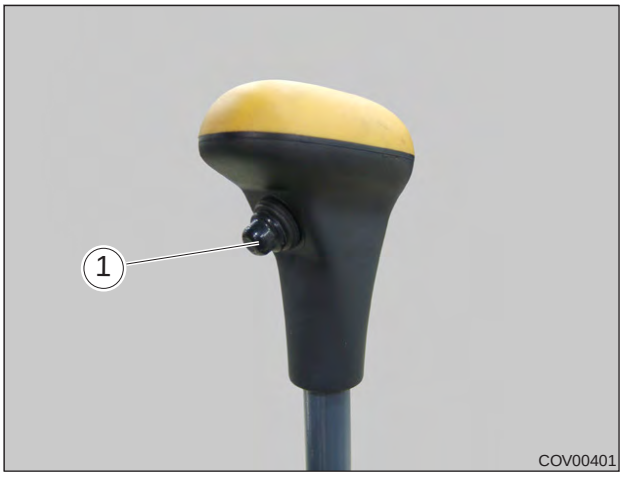


Figure 4.19 - Gear Selector Lever

1. Interrupt Button

4.21 Parking Brake

A lever to the side of the drivers seat provides braking.

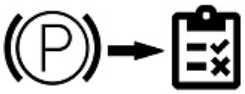
Figure 4.20 - Parking Brake Lever

With the lever vertical the brake is applied. A light will come on indicating the brake is applied. To release the brake it is necessary to press the release catch before pushing the lever to the horizontal position.

When the parking brake is applied (on) an interlock keeps the transmission in neutral regardless of the position of the direction control lever or if the interrupt button is pressed. Releasing the parking brake lever permits the transmission to engage if other functions permit.

⚠ WARNING

The parking brake may not hold the machine on gradients exceeding 8.5° (15%) do not park on slopes exceeding this figure. Whenever possible, park the machine across the slope and chock the wheels.



This symbol on the dashboard indicates that a park brake test is due. Follow the procedure in Chapter 7 to complete the test.

4.22 Skip Control Lever

The skip control lever is positioned to the right of the operators seat.Refer to the Standard Operating Procedures (Chapter 7) for functions of the lever.

Figure 4.21 - Skip Control Lever

4.23 Tow Hitch

The tow hitch has been fitted for recovery purposes. The dumper's primary purpose is not that of a towing vehicle, but if it is used as one, always make sure the weight of any trailer and its load does not exceed half the rated payload of the dumper.Only tow in first gear and only on firm level ground. Do not tow in AUTO on "Power Shift" transmission machines.

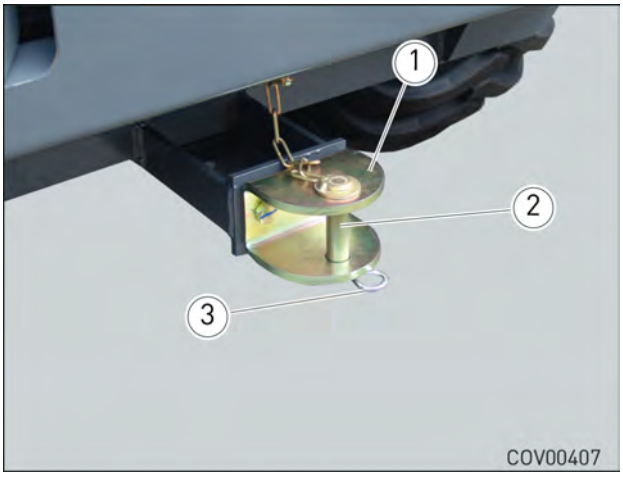


Figure 4.22 - Tow Hitch

1. Tow Hitch
2. Pin
3. Grip Clip

If towing with the dumper:

- Make sure the skip is loaded with half the rated payload to provide adhesion when braking.
- Never drive down gradients to avoid "jack knifing".
- Only use first gear.
- Never drive across inclines.

Always secure the towing pin with the grip clip once the trailer is attached.

⚠ WARNING

The dumper must not be used as a towing vehicle on public highways.

4.24 12v Accessory Socket

A 12v socket is located in the engine compartment above the battery isolator switch.

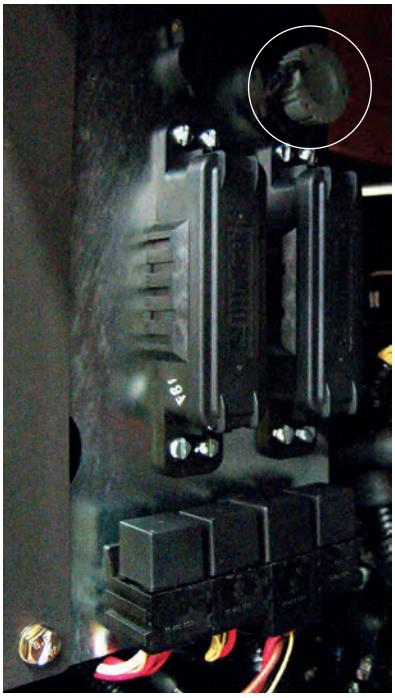


Figure 4.23 - 12v Socket.

The socket is useful for connecting inspection lamps etc. It has a cover to protect it when not in use

4.25 Seat Belt (with or without Green Beacon)

A seat belt is provided for the safety of the operator and must be worn at all times when operating this equipment. It is prohibited to alter or modify a seat belt. Avoid twisting the webbing.

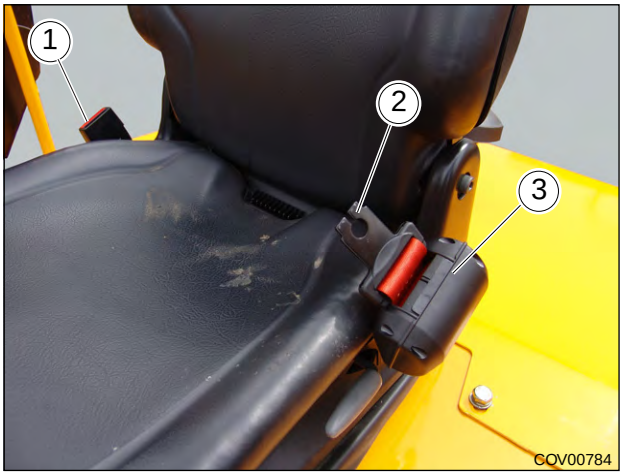


Figure 4.24 - Automatically Retracting Seat Belt

1. Release Button
2. Tongue
3. Retractor Unit

This type of belt retracts automatically when the release button is pressed and the tongue is released. When the tongue of the belt is inserted in the buckle and clicks into place a green coloured beacon (Figure 4.28) located on the ROPS frame will flash indicating to site management and others that the driver of the machine is correctly wearing their seat belt. The engine will not start unless the operator is wearing the seat belt correctly.

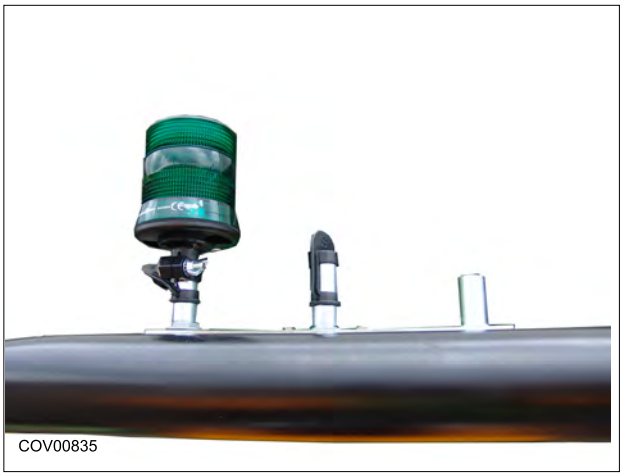


Figure 4.25 - Seat Belt Warning Beacon

1. Seat Belt Warning Beacon

4.26 Leg Guards (Option Available)

Metal leg guards protect the operator's legs from material overspilling from the skip, or being transferred from other construction equipment.

4.27 Additional Equipment (Specific to certain markets)

To satisfy specific regulations in certain countries additional equipment as follows is fitted when necessary to meet these requirements.

(1) Forward Facing White Marker Lights

These lights, positioned on each side of the machine, come on when the road lighting is switched on.

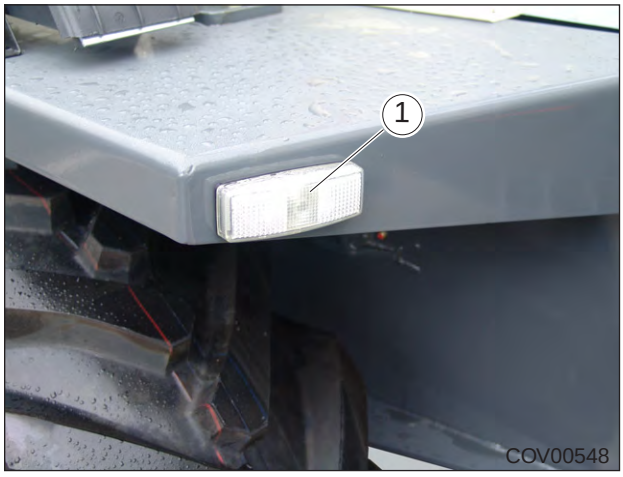


Figure 4.26 - Forward Facing Marker Light

1. Marker Light

2. Rear Reflectors

Light reflective markers are fitted on each side at the rear of the machine.

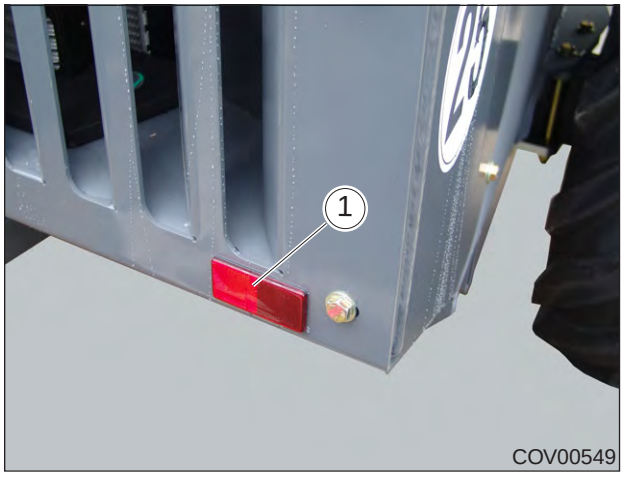


Figure 4.27 - Reflective Marker

1. Reflective Marker

3. Registration Plate

A mounting plate is provided to enable a registration plate to be fitted. This is located under the skip at the front of the machine.

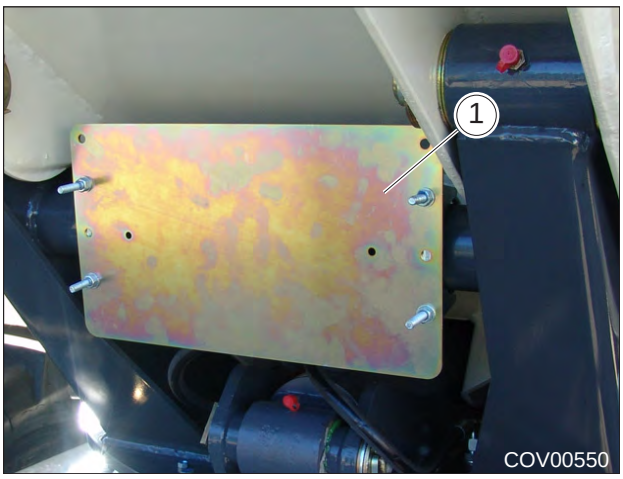


Figure 4.28 - Mounting Plate

1. Registration Mounting Plate.

4. Wheel Chock

A wheel chock is mounted on the wing. It is designed to be removed from its storage position and placed under a wheel of the machine to prevent movement when parked. After use, replace the chock in its housing.

⚠ WARNING

When parking the machine on sloping ground use the wheel chock to immobilise the machine.

Figure 4.29 - Wheel Chock

1. Wheel Chock

5. Control Valve Stop

The control valve stop is fitted to prevent the skip from tipping and discharging the load when the machine is travelling.

The stop must be in position before the machine is used on the public highway.

The stop must be released before attempting to discharge the load.

Figure 4.30 - Control Valve Stop

1. Control Valve Stop.

6. Maximum Load Decal

The maximum load decal indicates the maximum payload of the machine when used on the public highway and also the maximum payload permitted when on the work site.

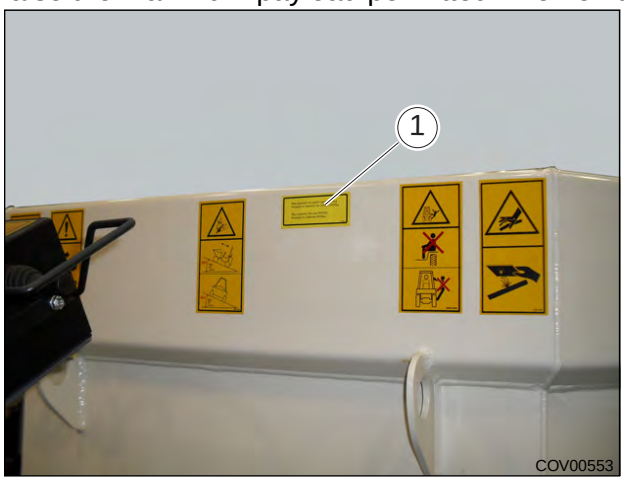


Figure 4.31 Maximum Load Decal

1. Maximum Load Decal

⚠ WARNING

Do not exceed the maximum payloads stated on the Maximum Load Decal.

7. Speed Indication Decals

Speed Decals are fitted each side and at the rear of the machine. They indicate the maximum authorised speed of the machine on a public highway.

Figure 4.32 - Speed Indication Decals

1. Speed Indication Decal

5 Transportation

Before transporting the machine on a railway wagon or on a public highway on a lorry or trailer where speeds will exceed 50 m.p.h. (80 kph), the beacon must be removed from the ROPS. It may be necessary to lower the ROPS when transporting the machine by rail or on a lorry or trailer.

⚠ DANGER

Never drive or use the machine with the ROPS lowered.

5.1 Transporting by Rail

Since railway transport is subject to special regulations that differ in each country you are advised to contact the appropriate authority in your area for information.

5.2 Loading on to a Trailer or Lorry Using Ramps

⚠ DANGER

Keep all bystanders well clear when loading or unloading a dumper.

When loading dumper onto a trailer or lorry, strong loading ramps must be used. Ramps must be strong enough to take the weight of the machine.

The angle of the loading ramps must not exceed the grade ability (1 in 5 - 20%) of the dumper. In wet, muddy or icy conditions this angle will be reduced considerably.

Make sure the trailer or lorry will not move during loading by applying its brakes and also chocking its wheels if necessary.

The skip must be empty when transporting the machine.

When the machine has been loaded and is positioned correctly fit the articulation lock.

Secure the machine to the trailer or lorry - *see Securing the Machine for Transport.*

Release the articulation lock before unloading.

NOTICE

If loading onto a trailer or lorry using a winch and not the dumpers own engine power the drive shaft between the gearbox and transfer must be disconnected; see Chapter 11. Failure to disconnect the drive shaft before towing will result in oil starvation and possible seizure of the transmission resulting in extensive damage. The parking brake will be inoperative when the drive shaft is disconnected.

5.3 Loading or Unloading Using a Crane

DANGER

The skip must be empty before loading or unloading.

Keep all bystanders well clear when lifting and lowering the dumper.

Refer to Figure 5.1. There are 2 holes in the rear frame, close to the top step, for inserting a hook to lift the machine. For straight skip machines using hooks at these 2 points will give a safe stable lift. Other methods of lifting are not recommended. In the case of swing skip machines, there are 2 holes on the front frame which must also be used together with the points on the rear frame to balance the weight of the skip.

The crane must have adequate capacity to lift the machine.

Any chains, ropes and straps used must be of sufficient strength to support the machine safely.

Before lifting, the machine must be in the straight ahead position with the front and rear chassis in line. Fit and secure the articulation lock before lifting.

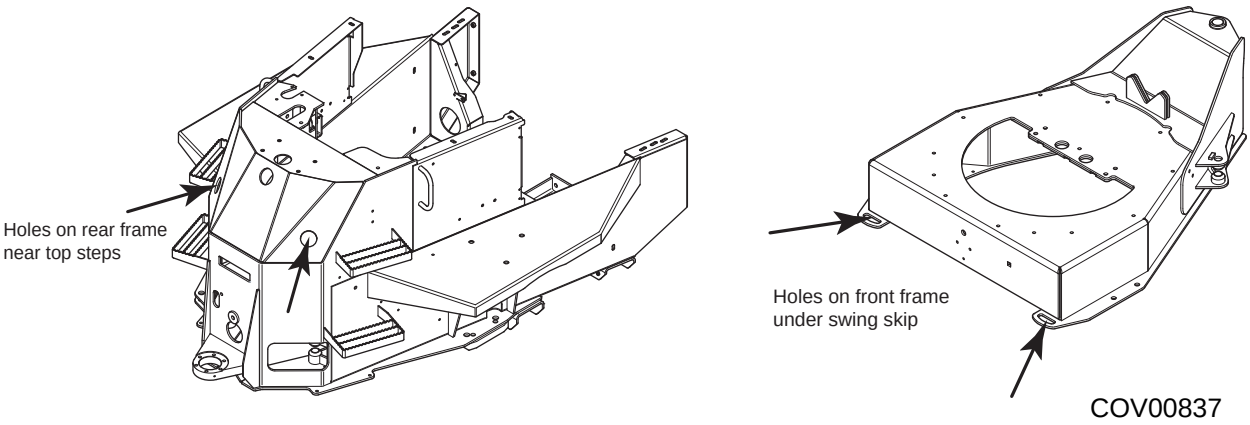


Figure 5.1. - Lifting Points

5.4 Articulation Lock

The articulation lock prevents chassis movement during transport or maintenance.

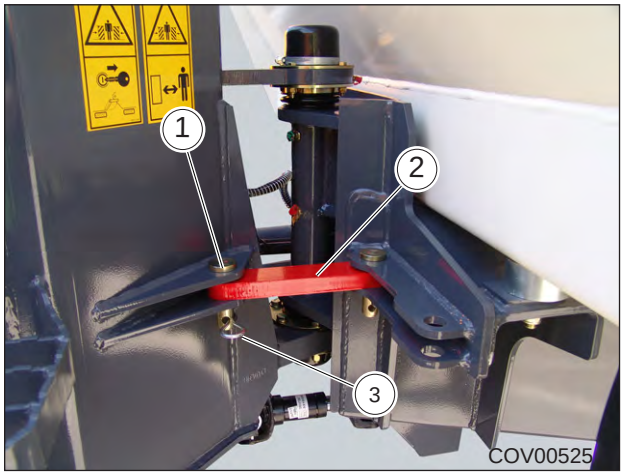


Figure 5.2 - Articulation Lock

1. Pin
2. Lock Bar
3. Grip Clip

(1) To fit the Articulation Lock

PROCEDURE

1 To fit the lock bar remove the grip clip and pin from the lock bar in its storage position.

2 Pivot the locking bar around until the holes in the bar are in line with the holes in rear chassis bracket.

3 It may be necessary to move the steering wheel slightly to align the holes

4 Re-fit the pin through the holes and secure with the grip clip.

5.5 To Lower the ROPs for Transport

The ROPs must be lowered to reduce the height of the machine when transporting by rail or on a lorry or trailer.

PROCEDURE

1. Remove the beacon.
2. Remove the lynch pins from the locking pins.
3. Remove the locking pins.
4. Lower the top section of the ROPs downwards.
5. Refit the locking pins and secure with the lynch pins.

5.6 Tie Down Points

Tie down points are provided at the front and rear of the machine. The chains, straps, ropes etc. must be attached to the machine's front tie down points, (Figures 5.3 and 5.4 on each side of machine), and rear tie down point (Figure 5.5).

(1) Forward Tip Machines

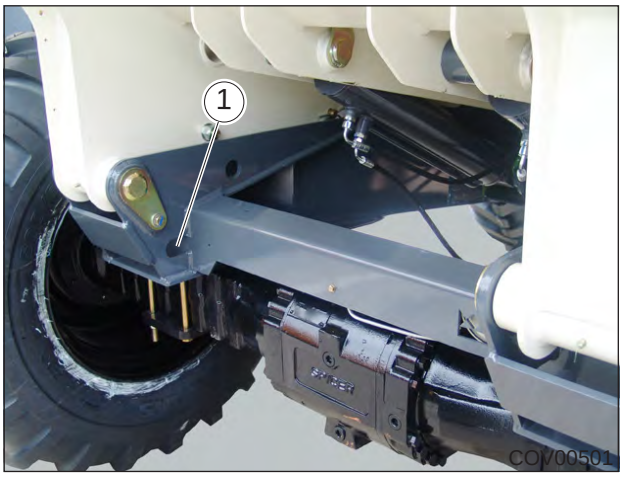


Figure 5.3 - Front Tie Down Point - Forward Tip

1. Tie Down Point

(2) Swing Skip Machine

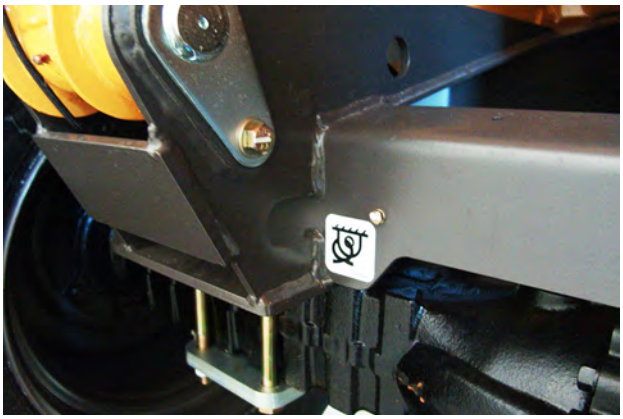


Figure 5.4 - Front Tie Down Point - Swing Skip

1. Tie Down Point

(3) Rear Tie Down

The rear towing eye is utilised as the rear tie down point.

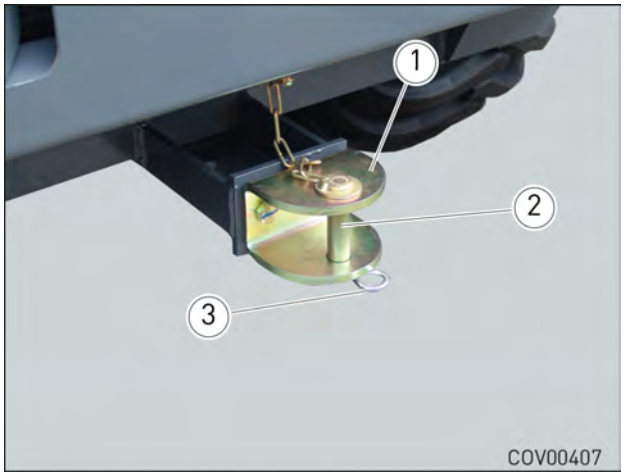


Figure 5.5 - Rear Tie Down Point

1. Towing Eye
2. Pin
3. R Clip

5.7 Securing the Machine

When the machine has been put in an acceptable position on the lorry or trailer it must be secured in place.

PROCEDURE

1 Place the machine in a suitable position.

2 Apply the parking brake.

3 Fit the articulation lock.

4 Remove battery isolator key.

5 Lower ROPS to transport position.

6 Nail blocks/chocks at the front, rear and outside of each wheel.

7 Tie down using tie down points provided with suitable chains straps or ropes.

8 Loose ends of chains, straps or ropes must be secured to the lorry/trailer bed.

After travelling a short distance, stop and recheck the tension of the ropes, straps, etc and make sure the load is still secure.

An alternative method of tie down using ropes or straps over the wheels is shown in Figure 5.6. When using this method nail blocks/chocks at the front, rear and outside of each wheel to prevent movement. Loose ends of the straps or ropes must be secured to the lorry/trailer bed.

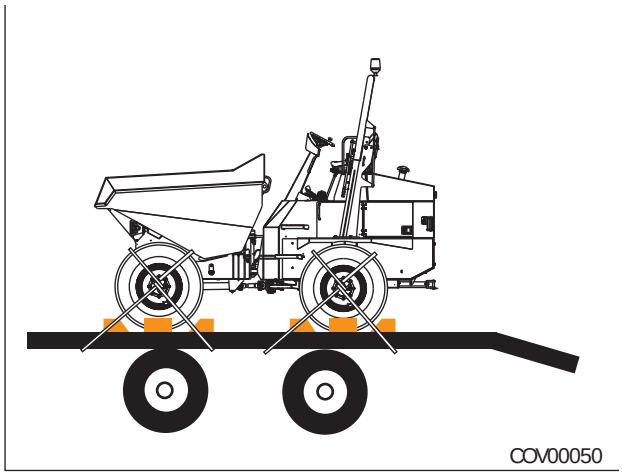


Figure 5.6 - Alternative Tie Down Method

6 Initial Setup & Adjustments

6.1 Delivery Checks

On delivery of the machine:

- Remove any packaging and shipping supports.
- Release any transport locks.
- Clean any protective coating from bright metal parts.
- Check for damage and missing parts.
- Install battery isolator key.
- Check all fluid levels (see Chapter 9 - Maintenance for correct specifications).
- Check tyres are inflated to correct pressures.
- Check that all manuals/handbooks are present and available to users.

6.2 Setup

Place the ROPS in the work position.

⚠ DANGER

The machine must not be used until the ROPS has been raised and secured in the work position. It is prohibited to use a machine without the ROPS installed in the work position.

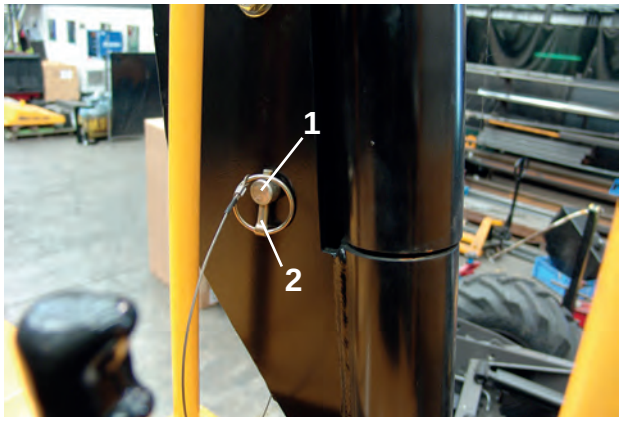


Figure 6.1 - ROPS Set Up

1 Lynch Pin

2 Locking Pin

PROCEDURE

1. Remove the lynch pins from the locking pins either side of the ROPS.
2. Remove the locking pins.
3. Push the top half of the ROPS upwards to the working position.
4. Re-fit the locking pins.
5. Secure the locking pins in position with the lynch pins.
6. Remove the rubber cover and fit the beacon to the stem on top of the ROPS.
7. Switch on the beacon and check it is working correctly.

6.3 Start Up

When all delivery checks have been made and the ROPS has been placed and secured in the work position:

- Start the engine and allow to run for a few minutes to warm up.
- Check all instruments and warning lights are functioning correctly.
- Check lighting and direction indicators operate (if fitted).
- Stop the engine and check for any fluid leaks or signs of overheating.
- Re-start the engine, drive the machine a short distance to check operation of transmission, brakes and steering.
- Check if the skip tips and lowers.
- Park up the machine and stop the engine.
- Report and have any faults rectified before placing the machine into service.

7 Standard Operating Procedures

Before using this equipment the operator must read and fully understand this Instruction Manual and pay particular attention to Section 2 - Safety and Section 4 - Description which describes the major components of the machine and the layout and function of all the controls.

ALL Operators of this machine must be authorised, mentally and physically capable of operating this machine and fully trained in its operation.

7.1 Pre-Start Checks

Make sure the machine has been cleaned to enable leaks, etc. to be noticed easily during the pre-start checks and during normal operation. Carry out the full daily service check as described in the Maintenance section, every day.

PROCEDURE

1. Check general condition of machine - missing parts, loose fasteners, fuel lines for damage, hydraulic hose end fittings for leakage, hose outer covers for ballooning, etc.
2. Check engine and hydraulic oil levels - make sure the engine and hydraulic tank are filled using clean oil and a clean container.
3. Check fuel tank is full - make sure the tank is filled when the engine is cold and the machine is in a well ventilated area, with the engine stopped using clean fuel and container. It is advisable to fill the tank at the end of a working session to prevent condensation forming in the tank during long periods of inactivity, e.g. overnight.
4. Check battery and battery cable condition.
5. Check for adequate ventilation if the machine is to be started or run in a building etc.
6. Make sure the ROPS is in the “work” position.

7.2 To Set the ROPS in the Work Position

Figure 7.1. - Linch pin, handle and ROPS work position

PROCEDURE

1. Remove the linch pins from the locking pins.
2. Remove the locking pins.
3. Using the red handle, move the top section of the ROPs to the horizontal position. Take care not to hit yourself or anyone else with the heavy ROPS.
4. Refit the locking pins and secure with the linch pins.
5. Fit the beacon.

7.3 To Lower the ROP's for Transport

PROCEDURE

1. Remove the beacon.
2. Remove the linch pins from the locking pins.
3. Remove the locking pins.
4. Using the red handle, move the top section of the ROPS back to the vertical position. Take care not to hit yourself or anyone else with the heavy ROPS.
5. Refit the locking pins and secure with the linch pins.

7.4 Machine Access

Steps and grab handles are provided each side of the machine. These must be used when mounting or dismounting to avoid personal injury. Always face the machine and maintain 3 points of contact at all times; either 2 hands and 1 foot or 2 feet and 1 hand. Never jump from the machine.

Figure 7.1 - Grab Handles and Access Steps

7.5 Seat

The seat is adjustable for operator comfort. The adjustments allow the seat to be moved forwards and backwards, the back of the seat may be tipped forwards and backwards and the seat suspension may be adjusted to the weight of the operator.

Figure 7.2 - Operators Seat

1. Fore and Aft Movement
2. Back Rest Angle Adjustment
3. Weight Adjustment

(1) Seat Adjustment

Refer to Figure 7.3. Lifting the lever (1) allows the seat to move forwards or backwards to suit the leg length of the operator. When the lever is released the seat is locked in position.

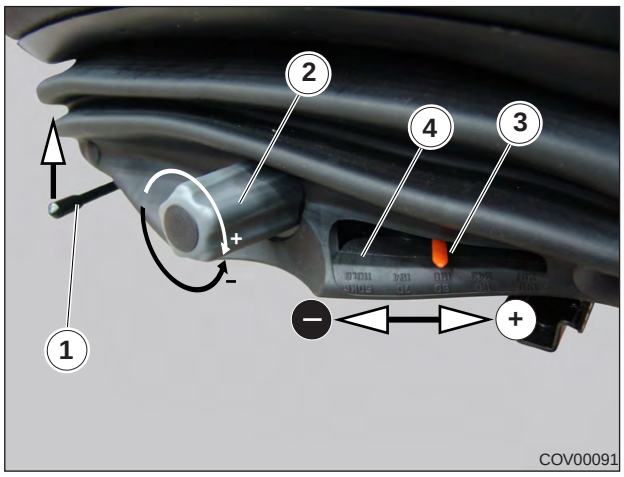


Figure 7.3 - Seat Adjustment

1. Fore and aft adjustment
2. Weight adjustment knob
3. Scale
4. Pointer

(2) Weight Adjustment

The weight adjustment knob (2) is used to adjust the seat characteristics to suit the weight of the operator.

Turning the knob clockwise adjusts the seat for the larger person and anticlockwise for the smaller person.

When the knob is turned, the pointer (4) moves to allow the operator to select the correct weight from the scale (3).

If the seat weight adjustment is not set, the Operator may experience discomfort or personal injury.

(3) Back Rest Angle Adjustment

Refer to Figure 7.4. Lifting the lever (1) allows the back of the seat to be pushed forwards or backwards to suit the preference of the operator. When the lever is released the seat is locked in the selected position.

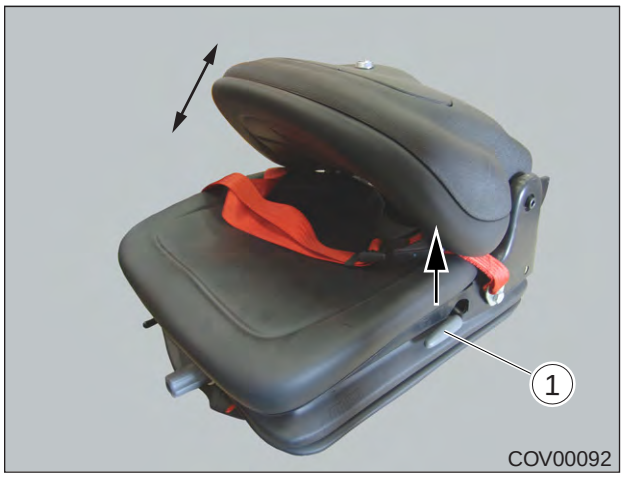


Figure 7.4 - Back Rest Angle

1. Adjustment Lever

(4) Seat Belt

⚠ WARNING

You must wear the seat belt at all times when operating this machine. Examine the belt for damage and correct operation each time you use the machine. Failure to wear a seat belt or keep the belt in good working order may result in death or serious injury.

(a) Static Seat Belt

Refer to Figure 7.5. Sit on the seat, place the seat belt across the hips and insert the tongue (3) into the buckle (1) until it locks into position.

Adjust by pulling the belt through buckle until it is a firm, comfortable fit across the hips.

To remove the seat belt, press the button (2) and lift the tongue (3) out of the buckle (1).

Figure 7.5 - Seat Belt

1.Buckle

2.Button

3.Tongue

(b) Self-Retracting Seat Belt

Sit on the seat, pull the belt from the retractor in one motion. The belt will automatically lock when the tongue is engaged in the buckle. Slack webbing will be retracted.

If the unit locks during fastening the webbing must be allowed to retract fully before another attempt can be made to fasten the belt.

To release the belt press the button and allow the tongue to release from the buckle. The belt will retract automatically.

Figure 7.6 - Automatically Retracting Seat Belt

1. Release Button
2. Tongue
3. Retractor Unit

7.6 To Start the Engine

Before starting the engine check to see that there are no obvious faults with the machine. Refer to Figure 7.7 for start key positions.

The starting procedure must be carried out in the order described or the engine will not start. This is part of the Shield tech pack enhancement which protects the driver and the machine.

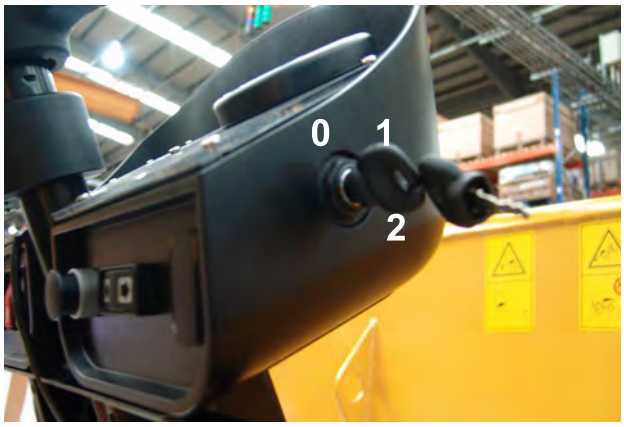


Figure 7.7 - Start Key Positions

PROCEDURE

1. Sit on the seat.
2. Put the gearstick in Neutral.
3. Check that the parking brake is applied and the forward/reverse switch is in Neutral.
4. Fasten the seatbelt around the seated operator.
5. Turn the switch to position 1. (The engine is ready for operation if the ambient temperature is below that predetermined in the engine control system. The preheating phase begins. The electronic engine control controls and activates the current feed to the glow plugs.)
6. Turn further clockwise against spring pressure to position 2. The engine will start.
7. Release the key immediately when the engine starts; the pilot lamps will go out.
8. The stop-start system turns ON each time the engine ignition switch is switched on. A light on the dash lights up when the system is active and the engine is running.
9. Should the engine fail to start after 2 attempts investigate the cause by referring to the fault table - Section 10 (Troubleshooting).

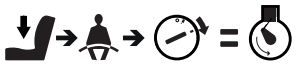
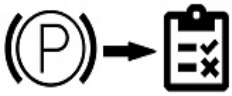
NOTICE

Do not use starting sprays to assist engine starting.

Do not crank engines for more than 20 seconds - allow 1 minute between starting attempts.

Never engage the starter motor when the engine is running.

7.7 Shield and Shield Pro

SHIELD	Operation
Start and drive interlock 	**To start the machine, it is necessary to carry out the following sequence in this order otherwise the machine will not start.** **1. Sit on seat** **2. Ensure FNR lever is in neutral** **3. Apply park brake** **4. Fasten seat belt** **5. Turn start key**
Seatbelt warning 	The dashboard shows the seatbelt warning symbol and buzzer.
Speed limiter	This is set by the manufacturer to the maximum speed limit and is not adjustable by the operator.
Handbrake neutral warning	If the handbrake or neutral is not engaged and the engine is not running a warning is displayed.
Idle Shutoff	The machine will shut down if it is idle for 15 minutes.
Fuel loss warning 	When the machine is stopped, the fuel level is recorded. When the key is turned on again, if the fuel is lower because fuel has been lost, the fuel loss symbol will be displayed.
Stop-Start 	If the engine is up to operating temperature, in neutral with the parking brake applied, the engine will stop when the operator leaves the seat to save fuel. After stopping 5 times in a 10 minute period, stop start will no longer operate in that session.
Park brake test  If the test is not carried out every 50 hours, the engine speed will be limited. A warning will be shown at each start up 10 hours before the test is required.	1. Ensure operator is seated with seat belt correctly fastened. 2. Start engine. 3. Engage forward on transmission selector (keeping parking-brake applied). 4. If synchro model engage fourth gear. 5. EITHER squeeze and release park brake, release trigger at least 5 times, holding in on the final squeeze OR hold in the release trigger and press and hold stop-start switch for 3 seconds. **DO NOT RELEASE PARKING-BRAKE.** 6. When the gauge displays parking-brake test screen  increase throttle to maximum and wait for the test to complete. Once complete the engine RPM will automatically drop to idle (regardless of throttle pedal position). 7. Release park brake release trigger, throttle pedal and select neutral.  indicates test pass  indicates fail
Service Warning	When a service is due a warning will be displayed on start-up.If the warning is ignored, after 100 hours the engine will derate.

SHIELD PRO	Operation
Skip interlock	The skip will not tip if the speed is above 3 kph or tilted more than a 6° angle.
Skip speed limiter	If the skip is raised, you cannot drive above 3 kph.
Tilt limiter	If the ground is steeper than the safe working gradient, the speed and operations available will be reduced.
Rollover lockout	If the machine has been rolled over it wont restart until unlocked by a Mecalac Service engineer.
Fuel loss warning	When the machine is stopped, the fuel level is recorded. When the key is turned on again, if the fuel is lower, fuel has been lost and an indicator light will show.
Access to app	
Custom speed limiter	This allows you to set a maximum speed limit.
Custom idle shutoff	This allows you to set a custom idle shut off time.

7.6 App

The App is called IQANrun and is available for free on the Apple Store or on Google Play. You can download it onto a tablet. (It is not available on smartphone). Check the platforms it is available on. It is produced by Parker.

PROCEDURE

1. Download the app.
2. Connect.
3. Search for the machine VIN number (on the label near the top step).
4. Click Bluetooth.
5. Connect to the machine.
6. You will be able to view limited machine diagnostics and adjust certain Shield features:
    - Change km/h to miles/h
    - Limit maximum speed of the machine
    - Activate initial movement alarm feature (Horn sounds twice at start up)
    - View and clear fuel loss event log
    - Activate radar function (if fitted)
    - Reset engine errors
    - Change the idle stop time up to 30 minutes.

7.7 To Stop the Engine

PROCEDURE

1. Stop the machine in a safe position on firm level ground.
2. Apply parking brake and place the forward/reverse switch in Neutral.
3. Place the gear selector lever in Neutral.
4. Leave the machine for 2 minutes at low idle.
5. Turn start key anticlockwise to OFF; position.
6. If leaving machine over night allow 2 minutes before turning battery isolator key off.
7. Remove battery isolator key.

7.8 To Move the Machine - “Synchro-Shuttle” Transmission

(1) Moving Off

PROCEDURE

1. Select forward or reverse on the forward/reverse switch.
2. Press and hold the interrupt button on the gear selector lever.
3. Select the gear required.
4. Release the interrupt button.
5. Release the parking brake.
6. Gently press the accelerator pedal until the machine begins to move.

(2) To Change Gear

(a) Changing Up or Down a Gear

PROCEDURE

1. Reduce engine speed by easing off the accelerator pedal.
2. Press and hold the interrupt button on the gear selector lever.
3. Move the gear selector to the gear required.
4. Release the interrupt button.
5. Gently press the accelerator pedal to increase speed if necessary.

(b) To Select Reverse Gear

PROCEDURE

1. Reduce engine speed by easing off the accelerator pedal.
2. Bring the machine to a halt with the brakes.
3. Move the forward/reverse switch to Reverse.
4. If necessary select another gear.
5. Gently press the accelerator pedal to increase speed.

⚠ DANGER

Only reverse at slow speeds. Look behind while reversing and be aware of bystanders in the vicinity of the machine.

NOTICE

Do not move from forward to reverse with the machine moving. The machine must be brought to a halt otherwise there will be damage to the transmission components.

(3) To Stop the Machine

PROCEDURE

1. Reduce engine speed by easing off the accelerator pedal.
2. Bring the machine to a halt with the brakes.
3. Apply the parking brake.
4. Move the forward/reverse switch to Neutral.
5. Move the gear selector to Neutral.
6. Stop the engine. (Refer to 7.5)

7.9 Gradients

Ascending, descending or crossing gradients should be done with extreme care. Refer to *Gradients* in the *Safety Section* of this manual.

⚠ CAUTION

A suitable low gear must be selected prior to descending a gradient. If in doubt select first gear.

7.10 Loading the Skip

Before the skip is loaded the operator should:

- Park the machine safely.
- Apply parking brake and stop engine.
- Get off the machine and stand clear.

⚠ WARNING

It is important to get off the machine and stand clear when loading the skip using a backhoe loader, digger, loader shovel or similar equipment to prevent injury from falling objects.

7.11 Skip Operation

⚠ WARNING

The machine must be in the “straight ahead” position before tipping. Do not attempt to tip the load when the machine is turned.

(1) To Tip the Load (Forward Tip Machines)

Refer to Figure 7.8.

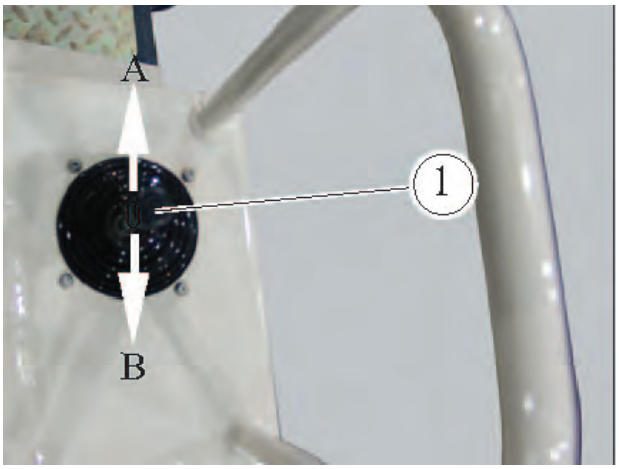


Figure 7.8 - Control Lever - Forward Tip

1. Control Lever

⚠ WARNING

Only tip or lower the skip while sitting on the operator’s seat. It is prohibited to tip or lower the skip from ground level.

PROCEDURE

1. Position the machine where the load is to be discharged.
2. Make sure the area is clear of bystanders.
3. Push the control lever forwards (A) towards the front of the machine; the skip will tip and the load will be discharged.

⚠ CAUTION

The centre of gravity will change when the load is being discharged. Take particular care when tipping sticky loads or single large objects. Only discharge the load on level, stable ground.

(2) To Lower the Skip

PROCEDURE

1. When the load has been discharged, move the control lever towards the back of the machine (B).
3. The skip will lower.

(3) To Tip the Load - Swing Skip Machines

Refer to Figure 7.9.

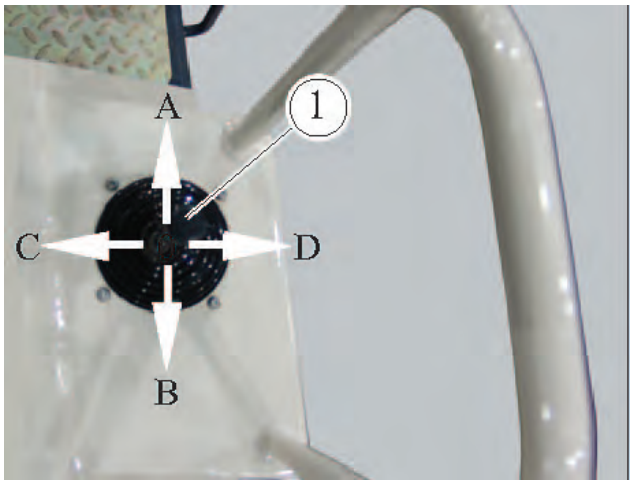


Figure 7.9 Control Lever - Swing Skip

1. Control Lever

PROCEDURE

1. Position the machine where the load is to be discharged.
2. Make sure the area is clear of bystanders.
3. Push the control lever forwards towards the front of the machine (A); the skip will tip and the load will be discharged in front of the machine.

⚠ CAUTION

The centre of gravity will change when the load is being discharged. Take particular care when tipping sticky loads or single large objects. Only discharge the load on level, stable ground.

(4) To Lower the Skip

PROCEDURE

1. When the load has been discharged, move the control lever towards the back of the machine (B).
3. The skip will lower.

(5) To Rotate and Tip the Skip

PROCEDURE

1. Position the machine where the load is to be discharged.
2. Make sure the area is clear of bystanders.
3. Push the control lever forwards towards the front of the machine to raise the skip by 75mm to enable the catch to clear the skip lock.
4. Move the control lever to the left (C) or right (D); the skip will rotate.
5. Push the control lever forwards; the skip will tip and the load will be discharged.

(6) To Lower the Skip

PROCEDURE

1. When the load has been discharged, move the control lever towards the back of the machine.
3. The skip will lower.

(7) To Return the Skip to the Ahead (Travelling) Position

PROCEDURE

1. If necessary raise the skip to clear the lock.
2. Rotate the skip to the ahead position.
3. Move the control lever towards the back of the machine; the skip will lower.
4. Make sure the skip is locked in the ahead position.

7.12 Parking the Machine After Use

At the end of the working day make sure the machine is parked safely and securely.

PROCEDURE

1. Find a safe, flat, well-lit area to park the machine where it will not cause an obstruction or danger to others.
2. The skip must be central and fully lowered onto the stops.
3. Stop the machine and apply the parking brake.
4. Set the Forward/Reverse switch to Neutral
5. Set the transmission to Neutral.
6. Stop the engine and remove the start key. (Refer to 7.5.)
7. Lift the engine cover, allow 2 minutes to elapse before turning the battery isolator to OFF and removing the isolator key.
8. Close the engine cover, lock and remove the key.

7.13 DPF filter (Diesel Particulate Filter)

The engine monitors the level of soot in the diesel particulate filter (DPF). It burns off the soot when the level gets too high. This usually happens during operation without any action from the operator.

If the soot level in the DPF is too high, this is indicated by the  symbol on the dashboard. The operator must park and perform a regeneration which will take between 5 and 20 minutes.

PROCEDURE

1. Ensure that the engine is up to working temperature before parking the machine for the regeneration.
2. Find a safe place to stop. This place must be further than 5m away from flammable materials and other people. (The exhaust gases can be up to 600 °C).
3. Park the machine and put the engine in idle, put the transmission in neutral and the park brake on. Stay in the operator's seat.
4. 4. When the regeneration is active the engine rpm will rise and the high exhaust temperature symbol  will be displayed.
5. Keep the machine parked and in neutral so that the excess soot can be cleared from the DPF.
6. At the end of the process the engine will return to idle. The light will extinguish when the exhaust has cooled down (after 1 minute).

⚠ WARNING

The machine must be kept further than 5m away from flammable materials and people during parked regeneration to prevent the hot DPF causing a fire or injury (burns).

NOTICE

If the  symbol is ignored the engine fault light will come on and a service engineer will need to be called to carry out a manual regeneration. If this is not carried out the engine will go into limp home mode and the DPF will need to be replaced at a substantial cost to the machine owner.

7.14 Water in Fuel

If the above symbol appears on the dashboard. **Do not start the machine.**

If it appears in operation, **Park the machine and turn the engine off, immediately.**

The primary water in fuel filter indicator is located in the left hand engine compartment.

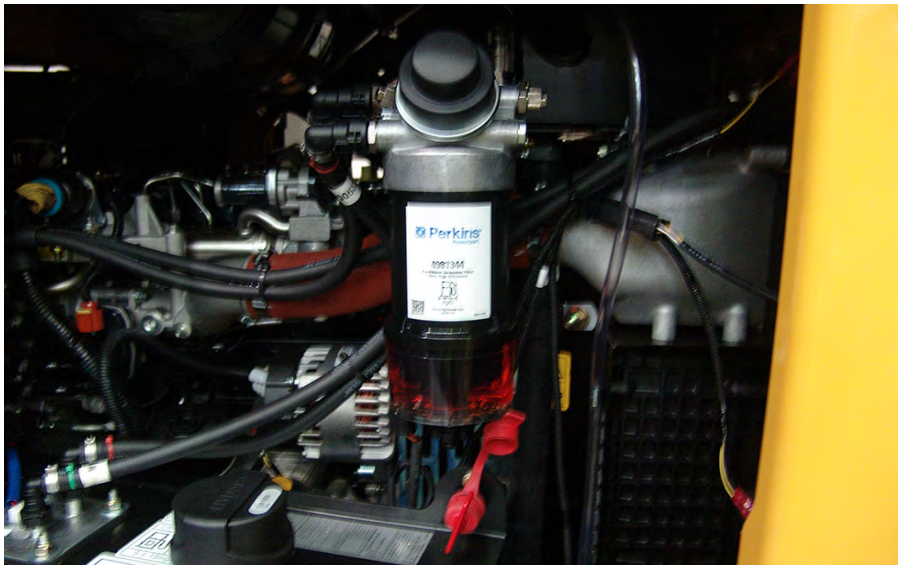


Fig 7.10 - Primary Fuel Filter

8 Emergency Operating Procedures

In the event of an emergency or system failure try and place the machine in a position of safety or in a safe condition.

Once the machine has been rendered safe the start key and battery isolator key must be removed to prevent start up and a warning tag placed in a prominent position warning others not to use the machine.

The fault or failure must be rectified before the machine is put back into use.

8.1 Running Out of Fuel on a Slope

PROCEDURE

1. If possible, place the machine across the slope in a safe position.
2. Apply parking brake.
3. Chock or block the wheels.
4. Re-fuel the machine.

8.2 To Lower the Skip with the Engine 'Dead'

If the skip is partially raised and the engine fails it will lower under gravity when the control lever is moved to the "lower" position.

If the skip is fully raised it will not lower by gravity and the skip prop or other suitable method of support must be fitted. Once the fault has been rectified and the engine restarted the skip can be lowered normally.

⚠ DANGER

NEVER reach or work under a raised skip unless the support or prop has been fitted securely.

8.3 Jump Starting a Machine

⚠ DANGER

It is essential to avoid sparks when connecting cables to a discharged battery because the battery generates inflammable gases and may pose a fire risk.
If the battery is frozen it may explode if the machine is jump started and the engine run. NEVER jump start a frozen battery.

It is possible to connect a slave battery to boost a discharged battery on the machine - refer to figure 8.1. When doing so you must wear the correct protective clothing, gloves and a face shield - *see Safety Section* in this manual.

Observe the following points:

- The discharged battery must not be frozen.
- The slave battery must be of the same nominal voltage as the discharged battery.
- The jumper cables are of sufficient capacity to carry the starting current.

It is necessary to remove the floor plate to gain access to the battery - see *Floor Plate Removal* in *Chapter 9 - Maintenance and Lubrication* section.

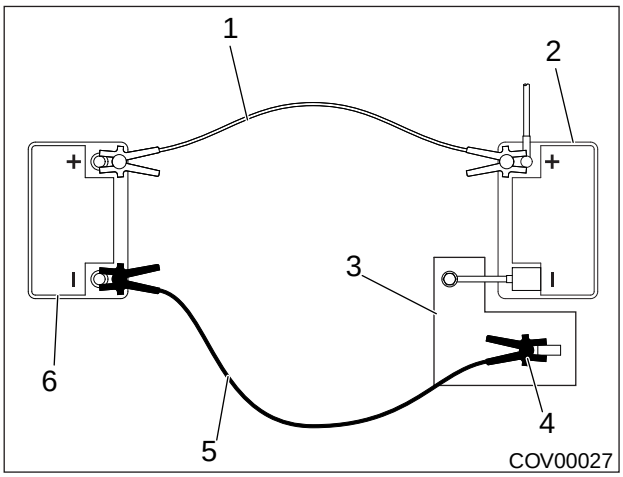


Figure 8.1 - Battery Jump Starting

1. Positive (+) Jump Lead
2 Discharged Battery on Machine
3 Machine Chassis
4 Jump Lead Connection on Chassis
5 Negative (-) Jump Lead
6 Slave Battery

PROCEDURE

1. Connect the positive jump lead from the positive terminal on the slave battery to the positive terminal on the machine battery.
2. Connect the negative cable to the negative terminal on the slave battery.
3. Connect the end of the negative cable to a suitable point on the machine chassis.
4. Start the engine using the machine's start key.
5. Allow engine speed to fall to idle.
6. Carefully remove the negative jump lead from the machine chassis. Do not let the cable touch any part of the machine.
7. Remove the negative jump lead from the slave battery.
8. Carefully remove the positive jump lead from the machine's battery.
9. Remove the positive jump lead from the slave battery.

9 Maintenance & Lubrication

9.1 General Information

This section lists the daily checks and tasks that are within the scope of the operator and are needed to keep the machine in optimum condition. A service schedule is included at the back of this chapter to enable owners/operators to organise regular maintenance. For detailed servicing or maintenance procedures refer to the maintenance manual for this machine available from Mecalac or consult your dealer.

Regular maintenance and lubrication will prolong the life of the machine and keep it in a safe working condition.

Refer to the Safety section of this manual and understand its contents before performing any maintenance tasks on this machine.

Contaminated water, fluids and oils removed from the machine must be disposed of legally.

9.2 Maintenance Notes

Before carrying out any service or maintenance work make sure that the following precautions have been taken.

- Park the machine on firm level ground.
- Stop engine and chock the wheels.
- Remove Start key to prevent accidental start up.
- Place a warning tag on the machine informing others not to use the machine.
- Only jack or raise the dumper using the correct equipment.
- Make sure jacks, axle stands, etc. are capable of supporting the weight of the machine.
- Always fit and lock in position a skip support before working under a raised skip.
- Always fit the articulation lock when working in the area of the centre pivot.
- Refer to and adhere to the Lubricating and Service Schedules detailed in this manual.
- When checking fluid levels the machine must be on a firm, level surface, in a well ventilated position away from naked flames, grinding sparks, etc.
- Make sure the work area is clean and tidy before starting and on completion of any maintenance.
- Make sure strict cleanliness is observed especially when dealing with hydraulic systems.
- Isolate electrical system by using the isolator switch or by disconnecting the battery.
- Make sure all guards and covers removed during maintenance are replaced before the machine is put back into work.
- OIL - Refer to Safety section BEFORE handling oil and other lubricants and observe and adhere to all the warnings and precautions listed. Avoid skin contact with used oils and lubricants.
- Always use genuine original equipment manufacturer’s replacement parts.

9.3 Cleaning The Machine

Clean the dumper thoroughly, this will make it easier to find oil leaks and loose fittings, etc.

- Take care to clean the oil and fuel tank filler necks.
- Drain plugs must also be cleaned.
- Remove debris from the radiator vents and blow out the radiator matrix with compressed air occasionally.
- Using water or a pressure washer to wash down the exterior of the dumper with or without detergent is generally all that is required.
- Avoid spraying electrical equipment and cables with pressure washers.
- When cleaning the dumper it is preferable to use a biodegradable cleaner. Do not use solvents or like products which can damage rubber and plastics.

(1) Safety Signs

All safety signs fitted to the machine must be legible, when cleaning only use mild soap and water to clean the signs - DO NOT use solvent based cleaners because they may damage the safety sign material. All safety signs MUST be replaced immediately if they become damaged or unreadable.

9.4 Battery Location

The battery can be found under the floor plate near the operator seat.

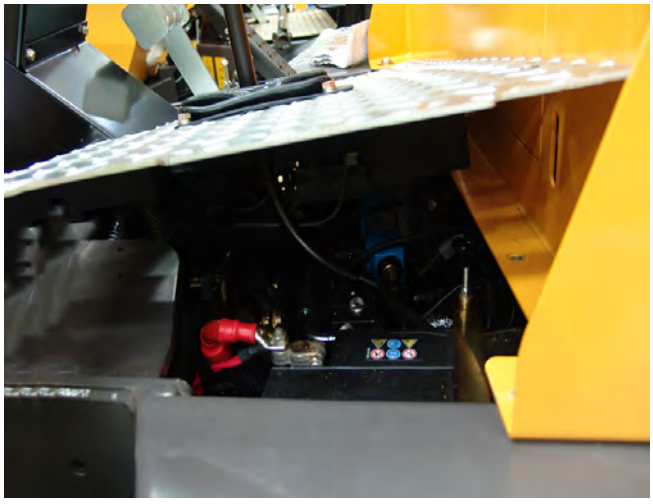


Figure 9.1 - Location of Battery

9.5 Battery Disposal

Refer to Section 12 - Storage, Decomissioning and Disposal.

9.6 Hydraulic Oil Under Pressure

Release any pressure in the hydraulic circuit before carrying out repairs to the hydraulic system or components.

⚠ WARNING

Fine jets of hydraulic fluid under pressure can penetrate the skin. Do not use your fingers to check for small leaks or expose uncovered areas of your body to leaks. Check for leaks using a piece of cardboard. If skin is penetrated with hydraulic fluid, get immediate medical help. Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene will result.

To release pressure in the hydraulic system: with the skip lowered and the engine stopped move the control lever in all directions.

9.7 Skip Support

A skip support or other method of supporting the skip in the raised position MUST be fitted and locked in position before working under a raised skip.

DANGER

NEVER reach or work under a raised skip unless a prop or similar method of supporting the skip safely is fitted.

(1) Forward Tip Machines

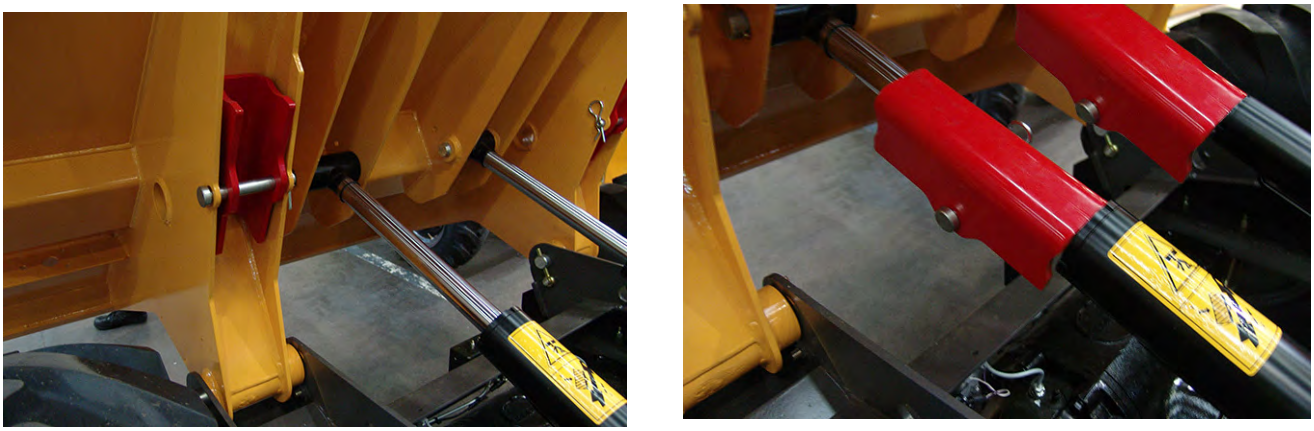


Figure 9.2 - Skip Support - Forward Tip Machines - stored and in position

Both struts must be used.

(a) To fit the Skip Support

PROCEDURE

1. Raise the skip.
2. Remove the clip and pin and take the skip support from its storage position.
3. Wrap the skip support around the ram
4. Refit the pin and secure with the clip.
5. Repeat the procedure for the prop on the other ram.
6. Lower skip onto supports.

(2) Swing Skip Machines

Figure 9.3 - Skip Prop - Swing Skip Machines - stored and in position

(a) To Fit the Skip Support

PROCEDURE

1. Place skip in ahead position.
2. Fully raise the skip.
3. Remove the clip and pin and take the skip support from its storage bracket.
4. Wrap the skip support around the ram.
5. Refit the pin and secure with the clip.
6. Lower skip onto the support.

9.8 Articulation Lock

The articulation lock must be fitted before working in the area of the centre pivot.

⚠ DANGER

Failure to fit the articulation lock could cause a pinch point or trap that will result in death or serious injury.

(1) To Fit the Articulation Lock

Refer to Figure 9.3.

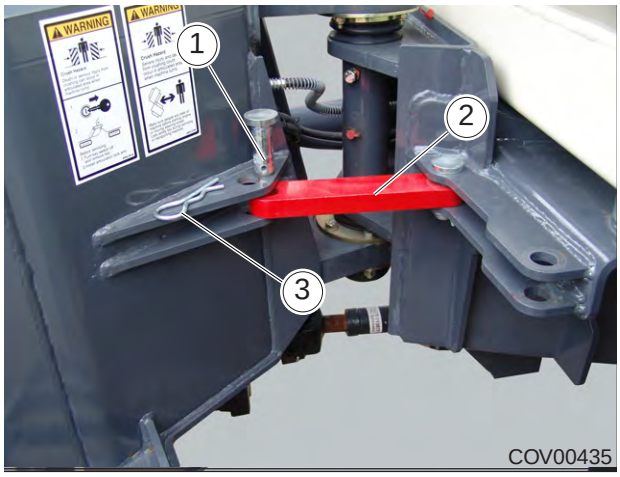


Figure 9.4 - Articulation Lock

1. Pin
2. Lock Bar
3. Grip Clip

PROCEDURE

1. Remove the grip clip and pin securing the bar in its storage position.
2. Pivot the lock bar round until it lines up with the holes in the chassis.
3. Refit the pin and secure with the grip clip.

9.9 ROPS

Check for:

- Worn, damaged or missing mountings. If there is excessive movement or rattling during operation the ROPS mountings must be checked and replaced if necessary.
- Loose or missing nuts, bolts and washers. Missing items must be replaced with those of the same grade/specification. Bolts and nuts should be tightened to the correct torque.
- Cracks in the ROPS and its mountings for any damage.
- Paint peeling and corrosion and take any necessary corrective action.

If the machine has been involved in a roll over or accident in which the ROPS could have been damaged the ROPS must be replaced. Do not use the machine until the ROPS has been replaced.

If you have any doubts regarding the integrity of the ROPS and for replacement parts consult your Mecalac dealer.

9.10 Floor Plate Removal

To gain access to the battery it is necessary to remove the floor plate.

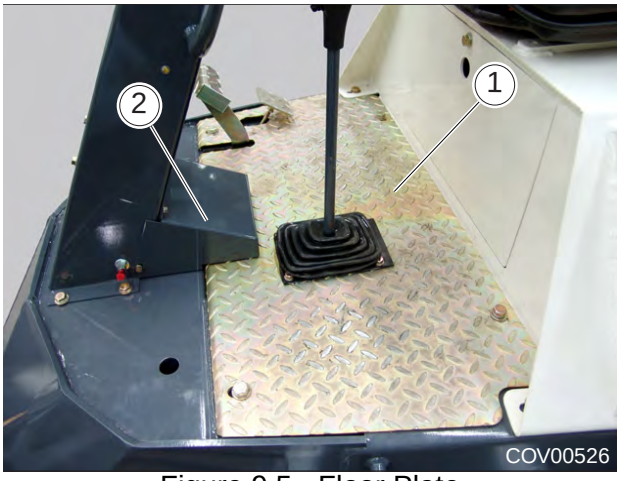


Figure 9.5 - Floor Plate

1. Floor Plate
2. Steering Hose Cover

PROCEDURE

1. Remove the four bolts securing the hose cover to the steering column.
2. Remove the four bolts fixing the floor plate to the rear frame.
3. Lift the floor plate clear of the machine.

9.11 Engine Coolant

The cooling system is pressurised to increase boiling point of the coolant and therefore extreme caution must be taken when the cooling system is hot to prevent scalding. Refer to Fluids and Lubricants - 9.17 for the correct type of coolant.

⚠ WARNING

NEVER perform checks or maintenance on the cooling system when it is hot. NEVER remove radiator cap when engine is hot - severe risk of scalding. NEVER remove radiator cap when the engine is running. Antifreeze is TOXIC. If accidentally swallowed, medical advice must be sought Immediately. Antifreeze is corrosive to the skin. If accidentally spilled on to skin, it must be washed off immediately. Protective clothing and eye protection must be worn when handling antifreeze.

(1) To Check the Coolant Level

Refer to Figure 9.5

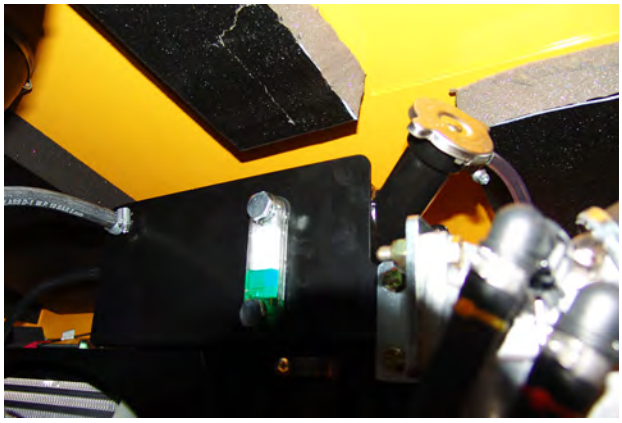


Figure 9.6 - Coolant Header Tank

The coolant filler and gauge are in the left hand engine compartment near the roof.

Allow the engine to cool before checking the level. With the engine cold the correct coolant level should be at the level indicated on the header tank. Should the level be below the “Low” mark, coolant of the correct specification must be added.

(2) To Add Coolant

PROCEDURE

1. Remove access panel on bonnet.
2. Remove the filler cap on the header tank.
3. Add the correct grade of coolant until the level on the gauge shows the tank is full.
4. Refit the filler cap and run the engine and check for leaks.

9.12 Engine Oil

The oil level is checked using the dipstick. The engine oil level must always be between the MIN and MAX on the dipstick. If the engine is warm switch OFF and leave for 5 minutes before checking levels. Refer to Fluids and Lubricants - 9.17 for the correct grade of oil.

⚠ WARNING

NEVER check the oil level or add oil with the engine running. Be careful of hot lubricating oil. Danger of scalding.

NOTICE

Low lubricating oil level can damage the engine. Over filling with oil can damage the engine.

(1) To Check the Engine Oil Level

Refer to Figure 9.6. The machine must be on firm, level ground when checking levels.

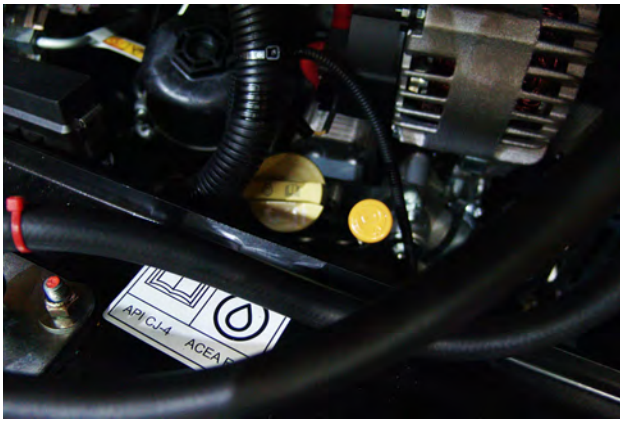


Figure 9.7 - Engine Oil Dipstick and Filler

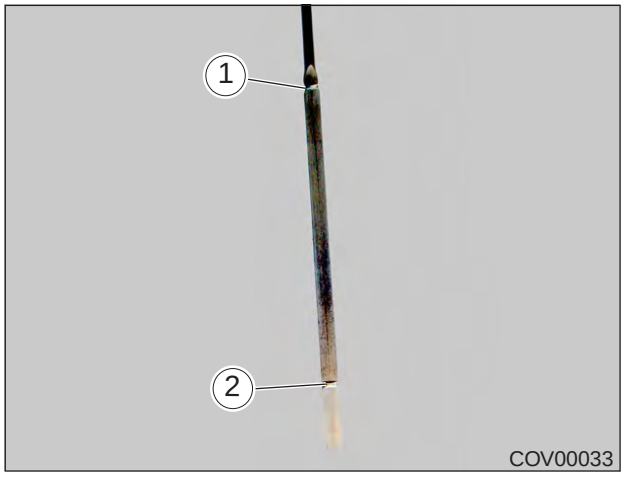


Figure 9.8 - Dipstick MAX (1) and MIN (2) marks

PROCEDURE

1. Pull out the dipstick and wipe off with a lint free cloth or paper.
2. Re-insert the dipstick as far as it will go.
3. Extract the dipstick and read off the level.
4. Add oil of the correct specification if necessary through filler to the left.

9.13 Synchro-Shuttle Gearbox

The level is checked using the dipstick/filler in the right hand engine compartment.

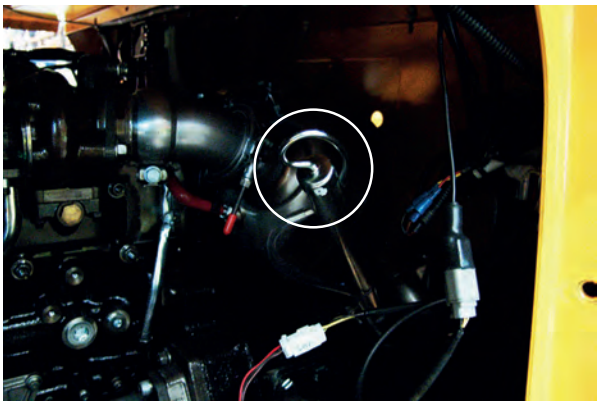


Figure 9.9. - Gearbox Dipstick/Filler

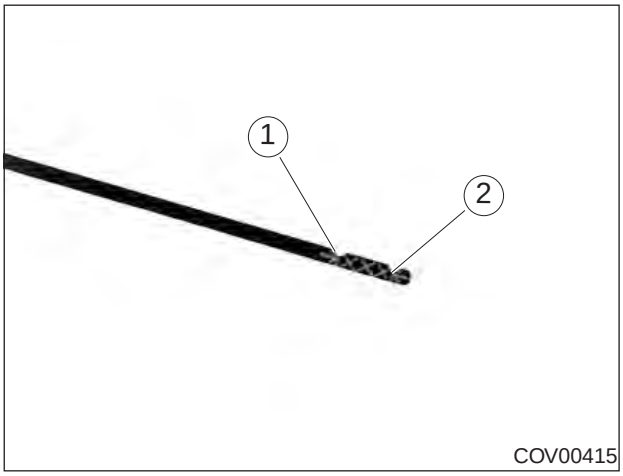


Figure 9.10. - Dipstick MIN and MAX marks

1. Dipstick Filler

With the oil warm, the level should be between MIN(2) and MAX (1) on the dipstick.

(1) To Check the Level

PROCEDURE

1. Drive the machine for about 1 minute and then stop and park up on flat level ground.
2. Pull out the dipstick and wipe off with a lint free cloth or paper.
3. Replace the dipstick and then remove again.
4. The level should be between the MIN and MAX marks on the dipstick.
5. If the oil is below the MIN mark, top up with the correct grade of oil.

(2) To Add Oil

PROCEDURE

1. Remove the dipstick/filler.
2. Add the correct grade of oil until it reaches the MAX mark on the dipstick.
3. Replace the dipstick.
4. Drive the machine for a few minutes then re-check the level.

NOTICE

Never overfill the transmission. This will result in oil breakdown due to excessive heat and aeration of the oil caused by the churning action of the oil. Breakdown of the oil will cause heavy sludge deposits that will block oil ports and build up on splines and bearings.

9.14 Hydraulic System

⚠ WARNING

Damaged hydraulic components and hoses can cause serious injury. Do not use a machine if a component or hose is damaged.

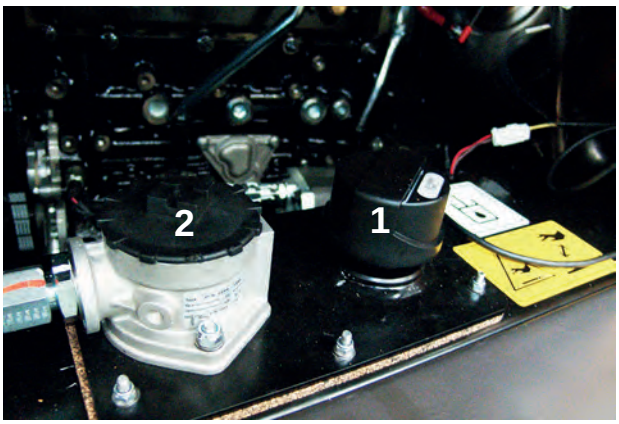
ALWAYS take extreme care to maintain the cleanliness of the hydraulic system. This will lead to fewer hydraulic failures

Keeping hydraulic systems clean can lead to massive cost savings

- Always thoroughly clean machine before any hydraulic maintenance. Use paper roll, not rag, to wipe parts.
- Relieve hydraulic pressure before working on the system.
- Always use fresh, clean hydraulic oil from a sealed container.
- Always make sure old gasket particles and excess sealing compound etc. do not enter the system. If they do clean them out.
- Never use dirty containers for oil storage.
- Never use dirty containers or funnels for filling hydraulic system.

A description of the hydraulics is contained in section 4 of this manual. Hydraulic diagrams will be found in Appendix 2. A filler/dipstick is provided on top of the tank.

1) To Check the Hydraulic Oil Level



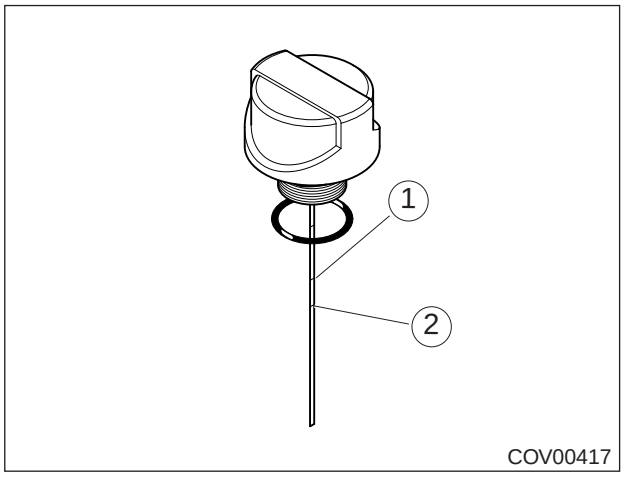


Figure 9.11 - Hydraulic Tank and Dipstick/Filler

1. Filler Dipstick
2. Return Line Filter

1. MAX mark
2. MIN mark

⚠ WARNING

Never attempt to tighten or loosen hydraulic fittings when the engine is running. Hydraulic oil leaks at high pressure can penetrate the skin - if the skin is penetrated with hydraulic oil seek expert medical attention immediately.

PROCEDURE

1. Remove the dipstick/filler cap, take care not to lose the O ring.
2. Wipe all traces of oil from the dipstick with lint free cloth or paper.
3. Replace the dipstick.
4. Remove the dipstick again and check the oil level, it should be between MIN and MAX
5. If the oil is below the MIN mark, add oil of the correct grade.

(2) To Add Hydraulic Oil

PROCEDURE

1. Remove the dipstick/filler
2. Add the correct grade of oil until it reaches the MAX mark on the dipstick.
3. Replace the dipstick/filler.

(3) Hydraulic Hoses

Examine all hydraulic hoses for wear, damage and ballooning. Replace hoses with those of the same size, specification and pressure rating. Hydraulic hoses must be replaced with genuine manufacturers parts available from your dealer. Do not attempt to mend or repair hoses - they must be replaced.

9.15 Fuel System

Diesel fuel must be to Specification EN590- See Chapter 3 - Technical Data. You must consult the engine manufacturer before using other fuel grades or Bio Diesel. For location of the fuel filler refer to Figure 9.15.

DANGER

Avoid sparks, naked flames or other sources of ignition when filling or maintaining the fuel system. Do not smoke when filling the fuel tank or maintaining the fuel system. Do not leave the engine running when filling or maintaining on the fuel system.

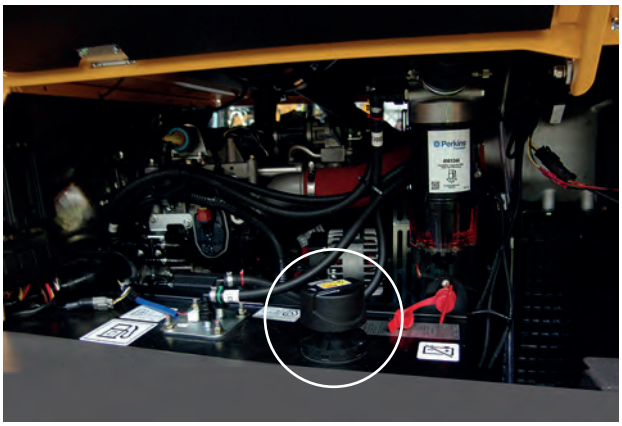


Figure 9.12 - Fuel Filler

NOTICE

Do not allow the fuel level to run too low. Running out of fuel could cost you severely. Injectors and high pressure pumps will overheat and become contaminated at low or empty fuel levels.

(1) To Add Fuel

PROCEDURE

1. Clean the area around the fuel filler cap.
2. Remove the filler cap and add the correct grade of diesel until the fuel level gauge reads full.
3. Replace the filler cap.
4. Clean up any spilt fuel.

9.16 Braking System

(1) Brake Arrangement

Oil immersed multi-plate brakes are fitted and are operated hydraulically. The brake system is charged with mineral oil not conventional brake fluid. A mechanically applied parking brake is incorporated.

NOTICE

The braking system uses mineral oil, not conventional brake fluid. Only use mineral oil to top up the brake reservoir. Never use conventional brake fluid. Never purge the brake system and refill with brake fluid as this will damage rubber components in the brake system and may cause brake failure.

The reservoir is visible through a slot in the front panel that enables the level to be checked. To add fluid, the brake reservoir is accessible by removing a cover on the seat support.

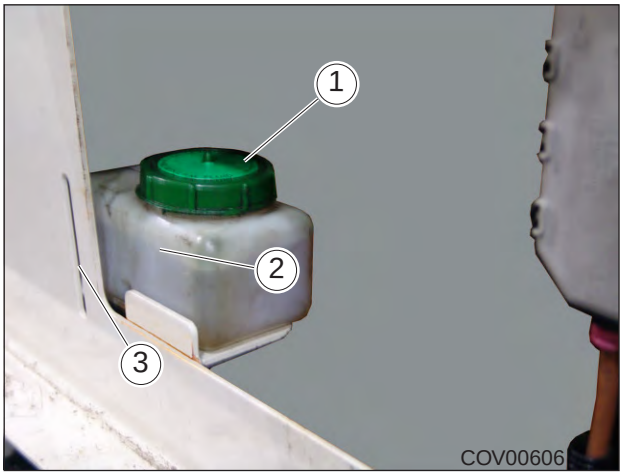


Figure 9.13 - Brake Reservoir

1. Filler Cap
2. Level Mark
3. Viewing Slot

(2) To Add Fluid

PROCEDURE

1. Remove the access cover
2. Clean the area around the filler cap.
3. Remove filler cap and add fluid.
4. Replace access cover.

(3) Parking Brake Test

When adjusted correctly the parking brake should hold the machine without movement at full engine revs in 4th gear. The machine must not be used if it fails the parking brake test, it must be checked immediately by a qualified engineer.

Test Fail

There is a maximum of 50 hours allowed between tests. The brake test can be carried out at any time up to 50 hours. Beyond 50 hours a warning light appears on the dashboard. If this is ignored the dumper will go into a limp mode until a successful brake test has been completed.

Test as follows:

PROCEDURE

1. Ensure operator is seated with seat belt correctly fastened.
2. Start engine.
3. If synchro model engage fourth gear..
4. Engage forward on transmission selector (keeping parking brake applied).
5. EITHER squeeze and release park brake release trigger at least 5 times (holding in on the final squeeze) OR hold in the release trigger and press and hold stop-start switch for 3 seconds. **DO NOT RELEASE PARK-BRAKE.**
6. When the gauge displays park-brake test screen 

   increase throttle to maximum and wait for the test to complete. Once complete, the engine RPM will automatically drop to idle (regardless of throttle pedal position).

   Test pass 

   Test fail 
7. Release park brake release trigger, throttle pedal and select neutral.

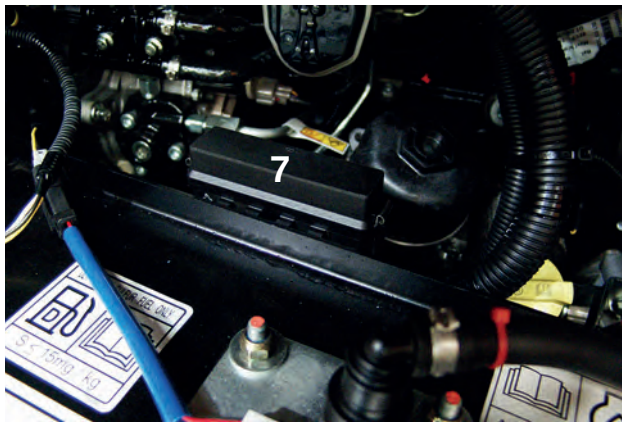
.

⚠ WARNING

Do not use the machine until the parking brake is adjusted correctly and passes the above test procedure. Make sure all personnel are clear of the area before performing the parking brake test. Danger of the machine moving unexpectedly.

9.17 Fuses and Relays

The fuses and relays are located in the left hand engine compartment.



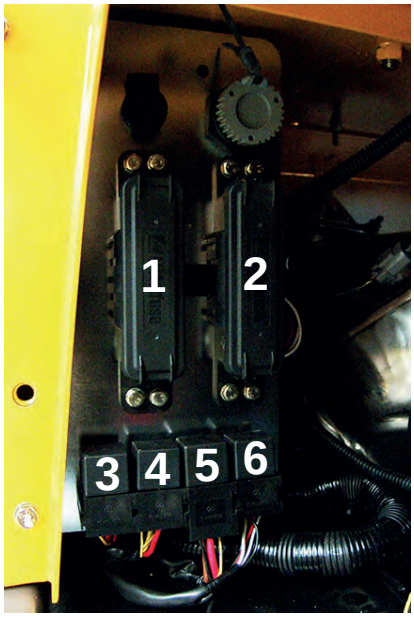


Fig 9.14 Location of Fuses and Relays

1. Fuse Box 1
2. Fuse Box 2
3. ECM Power Relay

4 Starter Relay

5. Glow Plug Relay
6. ECM Ignition
7. Fuse Box 3

An electrical diagram containing details of the fuses and relays will be found in Appendix 1.

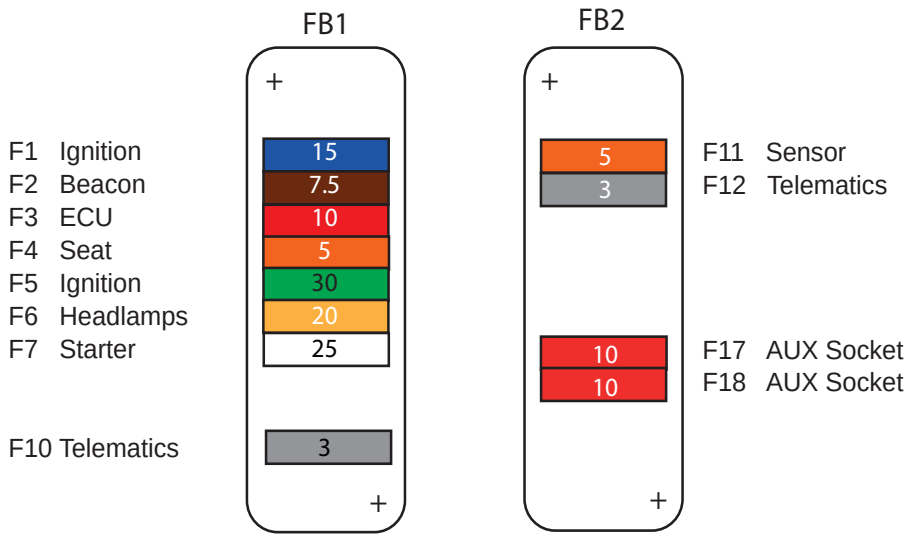


Figure 9.15 - Relays and Fuses

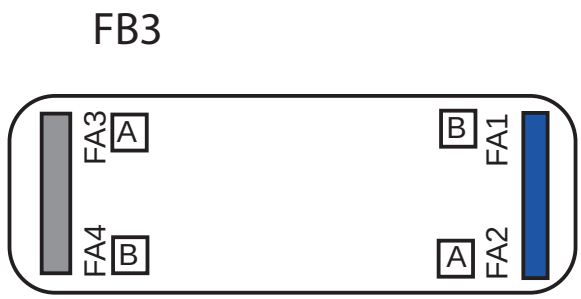


Figure 9.16 - Continued

9.18 Air Cleaner

To maintain maximum engine protection from dust, the air cleaner must be serviced at regular intervals. No hard and fast rules apply to servicing intervals as operating conditions vary so much. The only way to determine if the air cleaner requires servicing is to physically check it. A warning light on the dash display will light up if there is a blockage in the air inlet system but the 10-hour (daily) check as prescribed in the Service Schedule must still be performed.

NOTICE

Regular air cleaner checks must be performed otherwise serious dust damage to the engine will occur.

The machine has a 2 stage air filtering system consisting of a primary and a secondary element. The larger primary element can be cleaned, but the smaller secondary element is not serviceable and must be replaced when contaminated.

Figure 9.21 shows the main components of the filter system.

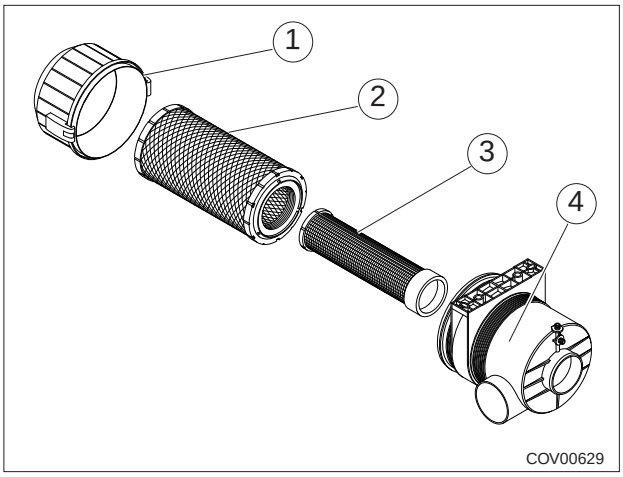


Figure 9.16 - Air Cleaner Elements

1. End Cap
2. Primary Element
3. Secondary Element
4. Main Body

PROCEDURE

1. Clean the surrounding area and release the clamps holding the end cap to the main body.
2. Remove the primary and secondary elements from the main body.
3. Clean the primary element carefully with compressed air to remove all contamination or by tapping gently on a hard surface. If necessary replace. Do not attempt to clean the secondary element.
4. Check the secondary element and replace as necessary.
5. Clean the body and end cap and reassemble.

9.19 Seat Belts

(1) All Belts

The seat belt must be replaced after an accident. The belt should be inspected daily.

Check:

- General condition of belt and anchorages
- Buckle fastens and releases
- Webbing not frayed or damaged

Clean all belts with warm soapy water. Do not use chemical cleaners, bleach or other like products.

(2) Self-Retracting Belts

Check:

- Belt retracts fully and smoothly. If pulled out quickly it should lock.

9.20 Maintenance Schedule

Service engineers should, if necessary, refer to the Maintenance Manual for the machine which is available from Mecalac or your local dealer.

A. DAILY service check (every 10 hours) by the operator	Tick box when check complete
Check ROPS for damage, etc. If damaged, DO NOT USE the machine and report ALL faults immediately.	
Check wheel rims, tyres & wheel nuts for condition and pressure. Report any faults immediately.	
Check skip prop is fitted & undamaged, if removed - REPLACE.	
Check steering lock bar is fitted & undamaged, if removed - REPLACE.	
Check engine oil level & top up if necessary using the correct specification of oil.	
Check hydraulic oil level & top up as necessary using the correct specification of oil.	
Check transmission oil level & top up as necessary using the correct specification of oil.	
Check fuel tank - NEVER allow the fuel tank to empty. Fill at the end of each shift.	
Check engine coolant level & top up as necessary.	
Squeeze the air cleaner dust ejector (if fitted).	
Check brake fluid reservoir level.	
Check operation of brakes (foot/hand). Report any faults immediately.	
Check operator platform & steps are clean & free from damage & obstructions. Report any faults immediately.	
Check seat belt & lock work properly. If fitted also check green beacon	
Check all start inhibitors are functioning correctly. Report any faults immediately.	
Check all warning lights & gauges are working correctly. Report any faults immediately.	
Check for loose bolts & fasteners, cab, axles & wheels. Report faults immediately.	
Visually check for fluid leaks, damage, missing parts, chaffing hoses. Report any faults immediately.	
Check there is no water in fuel pre-filter. Report any faults immediately.	
Check condition of road lights and work lights. Report any faults immediately.	

Table 9.1 - Service Schedules

B. WEEKLY service check (every 50 hours) in addition to 10-hour checks by the operator or service engineer	Tick box when check complete
Carry out the handbrake test. See Standard Operating Procedures, Chapter 7.	
Check alternator belt, for cracks, nicks etc. Replace as necessary.	
Check general structure for damage and cracks.	
Check air cleaner & inspect element, clean & replace as necessary.	
Check for air leaks on the air inlet/filter system. If present, DO NOT USE. Report ALL faults immediately.	
Check engine coolant hoses and clamps. Repair as necessary.	
Check parking brake adjustment. Report any faults immediately.	
Check wheel nut torque and tyre pressures.	
Check all hydraulic hoses - condition, wear, damage. Replace as necessary.	
Check for unreadable safety decals etc. Replace as necessary.	
Check for loose bolts & fasteners, especially the ROPS.	
Check leaking fluids beneath machine. Report any faults immediately.	
Check operators manual is in place on machine & still legible. Replace if missing or damaged.	
Drain water sediment from fuel pre-filter bowl.	
Lubricate centre pivot pin, bearings & top link bearings.	
Lubricate all other grease nipples - see lubrication chart. Including propshaft UJ's and slip joints.	
Lubricate all control pivots, e.g. tipping valve, ram pins & links.	
Lubricate engine cover hinges & lock mechanism.	

Table 9.1. - Service Schedules (Continued)

Maximum engine protection against dust is possible only if the air cleaner is serviced at regular intervals. No hard and fast rules apply to the regularity of servicing because operating conditions vary so much. The only way to determine if an air cleaner requires cleaning or replacing is to physically check it.

C. THREE MONTHS - (or 250 hours, whichever is first, after carrying out A & B service checks) by service engineer	Tick box when check complete
Drain engine oil & refill with fresh, clean oil (every 250 hours if sulphur content in fuel exceeds 0.2% of mass).	
Replace engine oil filter (every 250 hours if sulphur content in fuel exceeds 0.2% of mass).	
Replace Fuel Primary element (every 250 hours if sulphur content in fuel exceeds 0.2% of mass).	

D. Every SIX MONTHS (or 500 hours if first, in addition to all daily and weekly checks) by service engineer	Tick box when check complete
Check engine hoses - condition, chaffing. Replace as necessary.	
Check engine coolant antifreeze/water ratio - especially in sub zero conditions.	
Check engine front end accessory drive and condition, replace as necessary.	
Check engine cooling fan clearance to cowl.	
Check engine & transmission mounting bolts for tightness.	
Check ROPS mounting bolts for tightness.	
Check seat & seat belt mounting bolts for tightness.	
Check seat belt mechanism is working correctly. DO NOT USE if not. Report all faults immediately.	
Check tightness of centre pivot lock screws.	
Check front axle oil level - including hubs.	
Check axle mounting bolts for tightness.	
Check rear axle oil level - including hubs.	
Check front & rear axle breathers are clear of debris.	
Check transfer box oil level.	
Check slew-ring bolt tightness (if applicable).	
Check battery cables/connection tightness & condition.	
Drain engine & re-fil with fresh, clean oil.	
Replace engine oil filter.	
Replace fuel primary filter element.	
Replace fuel secondary filter element.	
Replace transmission filter element only.	
Replace hydraulic filter element only.	
Replace both air cleaner elements.	
Clean radiator/coolers & aftercooler matrix cores.	
Clean cab HVAC intake filter (inner and outer) - cab models only.	

Table 9.1. - Service Schedules (Continued)

E. Every 12 MONTHS - (or 1000 hours if first, in addition to 500 hours service) by service engineer	Tick box when check complete
Replace hydraulic oil - if not using Shell Tellus	
Check centre pivot pin nut torque setting.	
Check cooling belt and belt tensioner. Replace as necessary.	
Replace brake reservoir and flush/renew hydraulic brake oil.	
Replace transmission oil - clean suction strainer & replace filter element - replace with fresh clean oil.	
Replace transfer box oil - replace with fresh clean oil.	
Replace front axle oil.	
Replace front axle planetary hub oil (L & R).	
Replace rear axle oil.	
Replace rear axle planetary hub oil (L & R).	
Replace hydraulic filter element.	
Replace hydraulic tank filler/breather cap.	

F. Every 18 MONTHS - (or 1500 hours if first, in addition to 500 hours checks) by service engineer	Tick box when check complete
Replace engine crankcase breather element.	

G. Every 24 MONTHS -(or 2000 hours if first, in addition to 500 & 1000 hours checks) by service engineer	Tick box when check complete
Replace alternator drive belt & tensioning pulley.	
Replace hydraulic oil - use Shell Tellus S2 VX46 only, if not reduce hours to 1000hrs	
Replace engine coolant, see anti-freeze instructions in the Maintenance section of the operators manual.	
Inspect aftercooler core matrix - drain any water from inside.	
Inspect engine & transmission mounting AV mounts.	
Inspect starter motor.	
Inspect turbocharger.	

H. Every 30 MONTHS - (or 2500 hours if first, in addition to 500 & 1000 hours checks) by service engineer	Tick box when check complete
As 500-hour service in addition to daily and weekly checks.	

J. Every 36 MONTHS - (or 3000 hours if first) by service engineer	Tick box when check complete
Replace engine crankcase breather element.	
Replace alternator & fan belts.	
Replace radiator pressure cap.	
Replace coolant & antifreeze.	
Replace oxygen sensor.	
Inspect aftercooler core.	
Inspect alternator.	

Repeat all services, daily, weekly, monthly, 6 months, 12 months, 18 months, 24 months, 30 months, then 72 months.

K. Every 72 MONTHS - (or 6000 hours if first) by an authorised specialist	Tick box when check complete
General overhaul of complete machine, including:	
Front & rear axles.	
Transmission.	
Transfer box.	
Engine exhaust after-treatment.	
Engine.	
Repair body panels and repaint as necessary.	
Renew all safety decals.	

9.21 Fluids and Lubricants

(1) Engine Oil

Recommended Lubricant:

Recommended Lubricant: Shell Rimula RT4L 15W-40 Low Ash Oil

Specification APICJ-4 - ACEA E9

Recommended Viscosity Grades

Temperature Range	Oil Viscosity
-10° to +46° C	10W-30 (CJ4)
-30° to +50° C	5W-40 (CJ4)
-30° to +46° C	5W-40 (CH4)
-40° to +10° C	0W-20 (CH4)
-40° to +30° C	0W-30 (CH4)

Table 9.2 - Engine Oil Viscosity

(2) Gearbox

Recommended Lubricant:

Shell Spirax S4 CX 10W

(3) Transfer Box

Recommended Lubricant:

Shell Spirax A 80W/90

(4) Axles

Recommended Lubricant:

Shell Donax TD

(5) Brake Reservoir

Recommended Fluid:

Shell Tellus S2 VX 46

(6) Hydraulic System

Recommended Fluid:

Shell Tellus S2 VX 46

The following hydraulic bio oils may be used:

Shell Naturelle HF-E 46

Panolin HLP Synth 46.

Do not mix the hydraulic oils. Replace the bio oils every 1000 hours.

(7) Engine Coolant

Antifreeze/Water Mixture. Antifreeze to Specification:

ASTM D6210

Minimum Concentration 50% - Protection to - 40°C

Maximum Concentration 60% - Protection to - 56°C

(8) Fuel System

Diesel to Specification:

EN590 Ultra Low Sulphur

(9) Grease

Centre Pivot:

Starplex All Purpose Grease EP2 - Lithium Complex Grease - Gr Lic, NLGI 2

Other Grease Points:

Multi Purpose Grease EP2 - Lithium Grease Gr Li, NLGI 2

9.22 Fluid Capacities

Capacities - Litres								
Engine Sump	Gearbox	Transfer Box	Front Axle inc. hubs	Rear Axle inc. hubs	Fuel Tank	Hydraulic Tank	Brake System	Cooling System
11	13	0.9	9.7	9.7	65.0	64.0	1.2	12.3

Table 9.3 - Fluid Capacities

10. Troubleshooting

10.1 General Troubleshooting

(1) Engine will not start

Check fuel level.

Incorrect type or grade of fuel.

Contaminated fuel.

Fuel supply pipe blocked.

Blocked fuel filter.

Air in fuel system.

Leak in fuel injection line.

Below starting limit temperature for machine.

Wrong SAE viscosity class of engine lubricating oil.

Check electrical supply (see Electrical Troubleshooting).

Defective starter switch.

Defective starter motor.

Air filter blocked.

Exhaust system blocked

Low engine compression.

Engine electronics prevent starting.

(2) “Low” engine oil pressure light comes on

Low engine oil level.

Consult dealer before using the machine.

(3) “High” coolant temperature light comes on

Check if fan belt is loose or missing.

Check coolant level on header tank (do NOT add coolant until system is cold).

(4) Loss of coolant

Loose hose clips.

Split coolant hose.

Radiator leaking.

10.2 Electrical Troubleshooting

(1) Fuses keep blowing

Check wiring for damage and short circuits.

Check beacon socket (if the rubber cover is split or fitted incorrectly water can enter).

(2) System dead

Check battery isolator is set to “ON”.

Check battery connections.

Battery defective or discharged (flat).

Check circuit breaker has not “tripped”.

(3) Charge warning light remains On with engine running

Check if fan belt is loose or missing.

(4) Lights and direction indicators do not work

Check circuit breaker has not “tripped”.

Check if bulb has blown.

10.3 Hydraulic Troubleshooting

(1) No Pressure

Check if sufficient oil in tank.

(2) Machine will not steer

Check steering lock is NOT fitted.

Check steering cylinder hoses for leaks.

(3) Skip will not tip

Check hoses for leaks.

11. Recovery

11.1 In the Event of a Breakdown

In the event of engine failure or other breakdown it is possible to tow the machine for a maximum distance of 1 mile (1.6 km) at speeds not exceeding 9 mph (15 kph). For distances exceeding this the machine must be transported on a lorry or trailer.

Before towing it is essential that the drive shaft between the gearbox and transfer box is disconnected to prevent damage to the gearbox. Failure to do this may cause oil starvation in the gearbox and a possible cease.

Make sure the wheels are chocked before removing the drive shaft as once removed the parking brake is inoperative.

⚠ CAUTION

With the engine dead the hydraulic system will not function, the steering will still operate but under these circumstances steering wheel loads are high and the dumper must only be towed at very slow speeds. The parking brake will not work once the drive shaft is connected. Make sure that the wheels are chocked to prevent movement.

NOTICE

Towing at speeds in excess of 9 mph (15kph) or for distances greater than 1 mile (1.6 KM) will result in oil starvation and a possible cease in the transmission, resulting in extensive damage.

Only use the rear towing eye to tow the machine. DO NOT use the front tie down points.

12 Storage, Decomissioning & Disposal

12.1 Long Term Storage

The machine must be stored in a dry environment protected from the elements and on a hard standing. Any contaminated water / fluids / oils removed from the machine must be disposed of legally. Reference must be made to the engine manufacturers manual for specific instructions.

12.2 Decomissioning

Before placing the machine into storage:

- Thoroughly wash down the exterior of the machine and remove any build up of dirt etc.
- Repair all damaged paint work o prevent further corrosion.
- Grease all greasing points.
- Start and warm up the engine. Drain the engine oil and refill with clean fresh oil. Refer to the engine manufacturers handbook for further information on prolonged engine storage with regards to anti-corrosion oils and fluids.
- Check hydraulic oil level and top up as required.
- Drain and refill cooling system with water/antifreeze mixture of the correct ratio.
- Fill the diesel tank to prevent corrosion of the tank walls.
- Store the machine on solid, level ground which is not liable to flooding, standing water or airborne contamination.
- Chock the wheels securely to prevent the dumper moving.
- Smear exposed metal parts with grease.
- Remove the battery, store in a safe place and keep fully charged.
- Seal off the air intake opening on the air cleaner and the exhaust opening.
- Leave the parking brake in the OFF position.

12.3 Recomissioning

Before putting the machine back into use the following operations must be carried out:

- Clean grease or other protective film from piston rods and other exposed metal parts.
- Remove seals or covers from the air cleaner inlet and exhaust pipe.
- Check the condition of the air filter elements and replace if necessary.
- Thoroughly clean the machine.
- Make sure the battery has remained fully charged and re-connect to the machine.
- Carry out all measures for putting the engine back into use described in the engine manufacturer’s manual.
- Check all other fluid levels.

- Lubricate machine in accordance with lubrication diagram.
- Examine tyres and inflate to correct pressure.

(1) If stored for more than a period of 6 months:

- Replace hydraulic filters.
- Examine hydraulic oil for degradation and replace if necessary.
- Drain and replace oils in transmission, transfer box and axles.

12.4 Disposal

At the end of its life the machine must be disassembled by a competent person using safe working practices, wearing the appropriate Personal Protective Equipment and working in accordance with local regulations.

The appropriate lifting equipment, chocks and stands must be used to maintain a stable machine as components are removed and the machine's centre of mass changes.

Care must be taken when dealing with flammable liquids and the machine parts that contained those liquids. Any process that could ignite flammable materials must not be used on components that have contained flammable liquids in them or have residual flammable liquids on them.

Fire extinguishers must be readily available if cutting/welding equipment is so used.

Fluids must be drained off into suitable containers and if possible recycled or otherwise disposed of in an environmentally friendly way in accordance with local regulations.

Where possible recyclable materials must be separated out and processed in accordance with local regulations using an authorised agent.

12.5 Disposal of Used Batteries

When the battery reaches the end of its usual life it must be removed from the machine and recycled in an approved way in accordance with local environmental regulations.

This service is usually operated by battery vendors.

Machine users that cannot find a suitable battery recycling facility should contact Mecalac for assistance.

13 Glossary of Terms

ANSI - American National Standards Institute

Articulation Lock - Device preventing chassis elements moving during maintenance, transport, etc.

Battery Isolator - Device to shut off electrical supply from the battery.

Chock - Device placed in front of and behind wheels to prevent movement.

Hour Meter - An instrument that records and displays the total number of hours the engine has been running.

ISO - International Standards Organisation

Lynch Pin - Pin with spring loaded retaining clip.

Orbitrol - Hydrostatic steering unit - a valve controlled by the machines steering wheel that meters oil to the steering ram to turn the machine to the left or right.

Parking Brake - Mechanical device to prevent machine moving when not in use.

R Clip - A spring steel clip inserted through a hole in a pin to retain the pin in place.

ROPS - Roll Over Protective Structure - roll over bar.

Skip - Load carrying body.

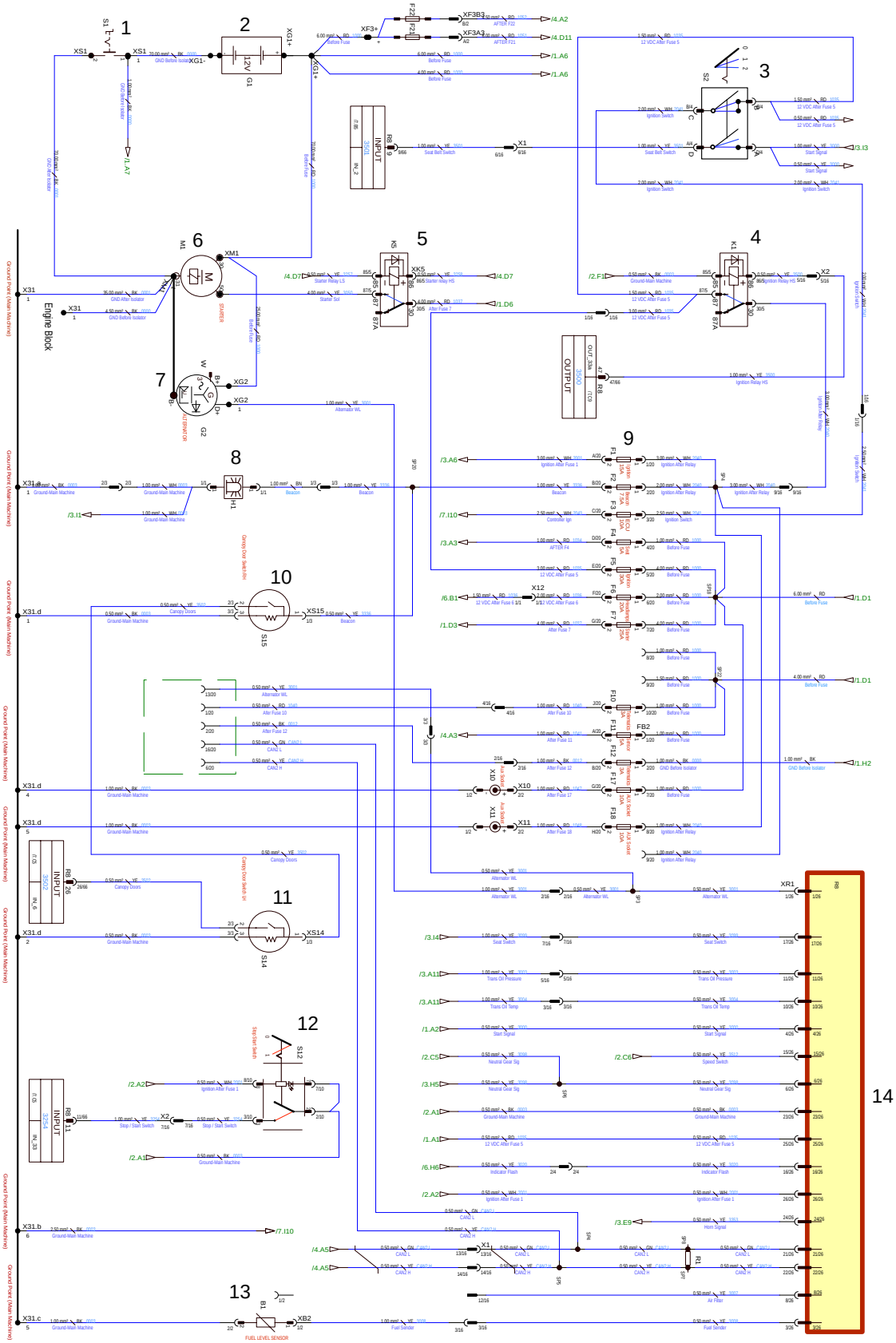
Skip Prop - Mechanical device supporting a raised skip to prevent it lowering during maintenance should the hydraulic system fail.

Synchro Shuttle - Semi-automatic gearbox where gears are changed without using a conventional clutch.

Transfer Box - Device to transmit engine power to the front and rear axles.

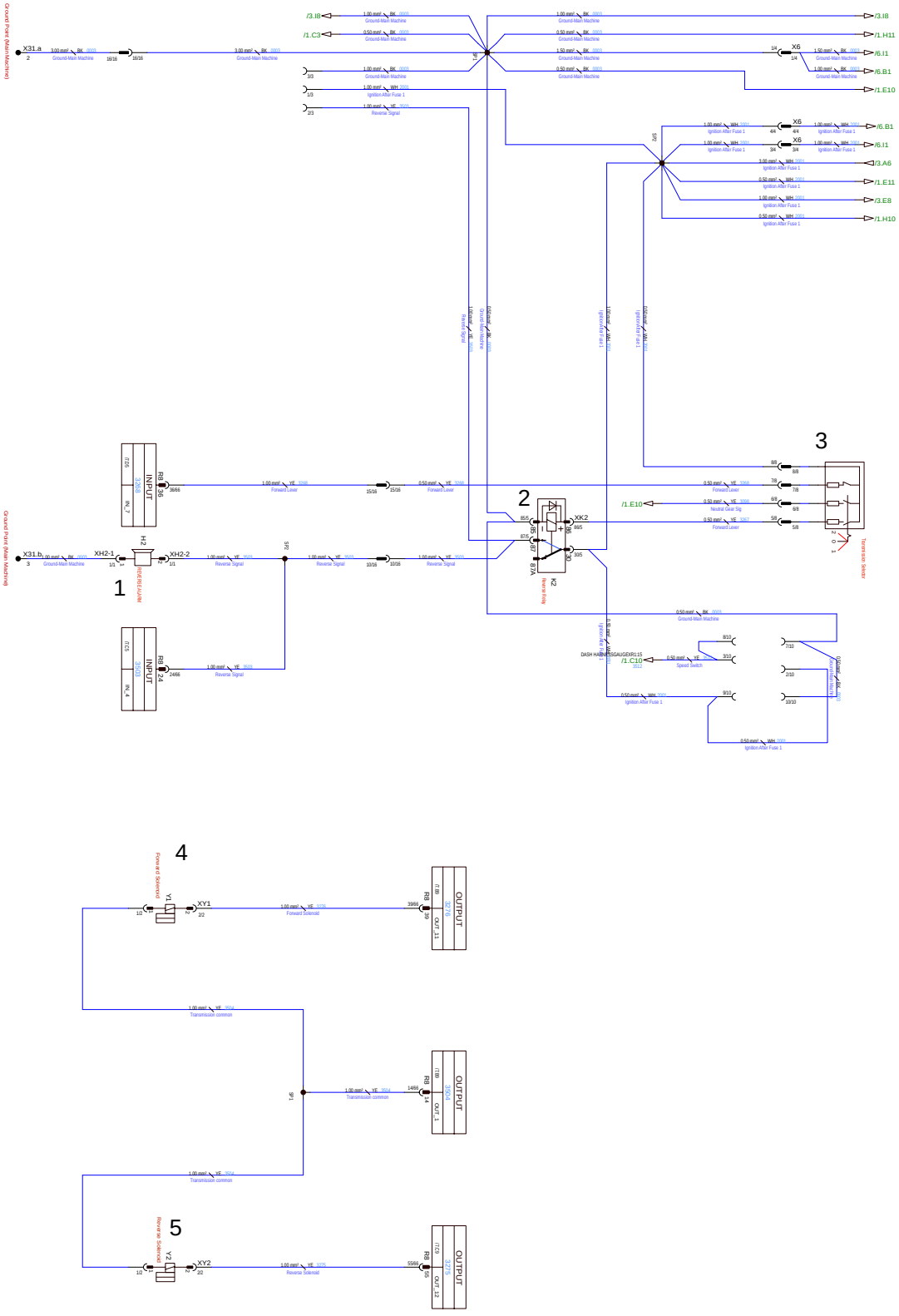
VIN Plate - Plate fixed to the machine recording the serial number and other identifying information.

Appendix 1 - Electrical Diagrams



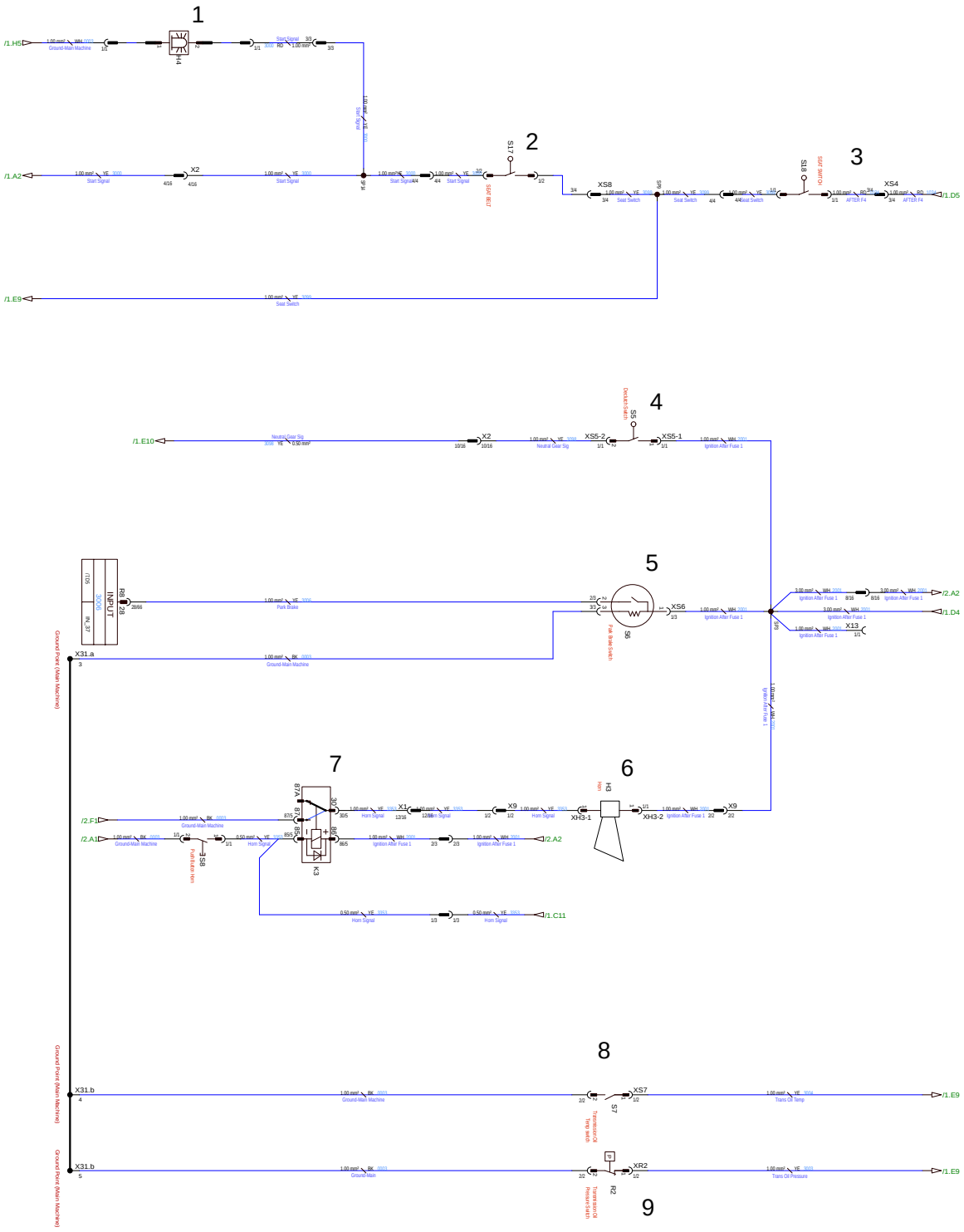
Electrical Diagram 1

1	Battery Isolator	Colour Codes
2	Battery 12V	RD - Red
3	Ignition Switch	WH - White
4	Relay - Ignition	YE - Yellow
5	Relay - Starter	GN - Green
6	Starter Alternator	BU - Blue
7	Alternator	GY - Grey
8	Beacon (Amber)	OR - Orange
9	Fuses F1 Ignition 15 A	BK - Black
	F2 Beacon 7.5 A	PU - Purple
	F3 ECU 10 A	PK - Pink
	F4 Seat 5 A	BN - Brown
	F5 Ignition 30 A	
	F6 Headlamps 20 A	
	F7 Starter 25 A	
	F10 Telematics 3 A	
	F11 Sensor 5 A	
	F12 Telematics 3 A	
	F17 Aux Socket 10 A	
	F18 Aux Socket 10 A	
10	Canopy Door Switch RH	
11	Canopy Door Switch LH	
12	Stop Start Switch	
13	Fuel Level Sensor	
14	Gauge - Multifunction	



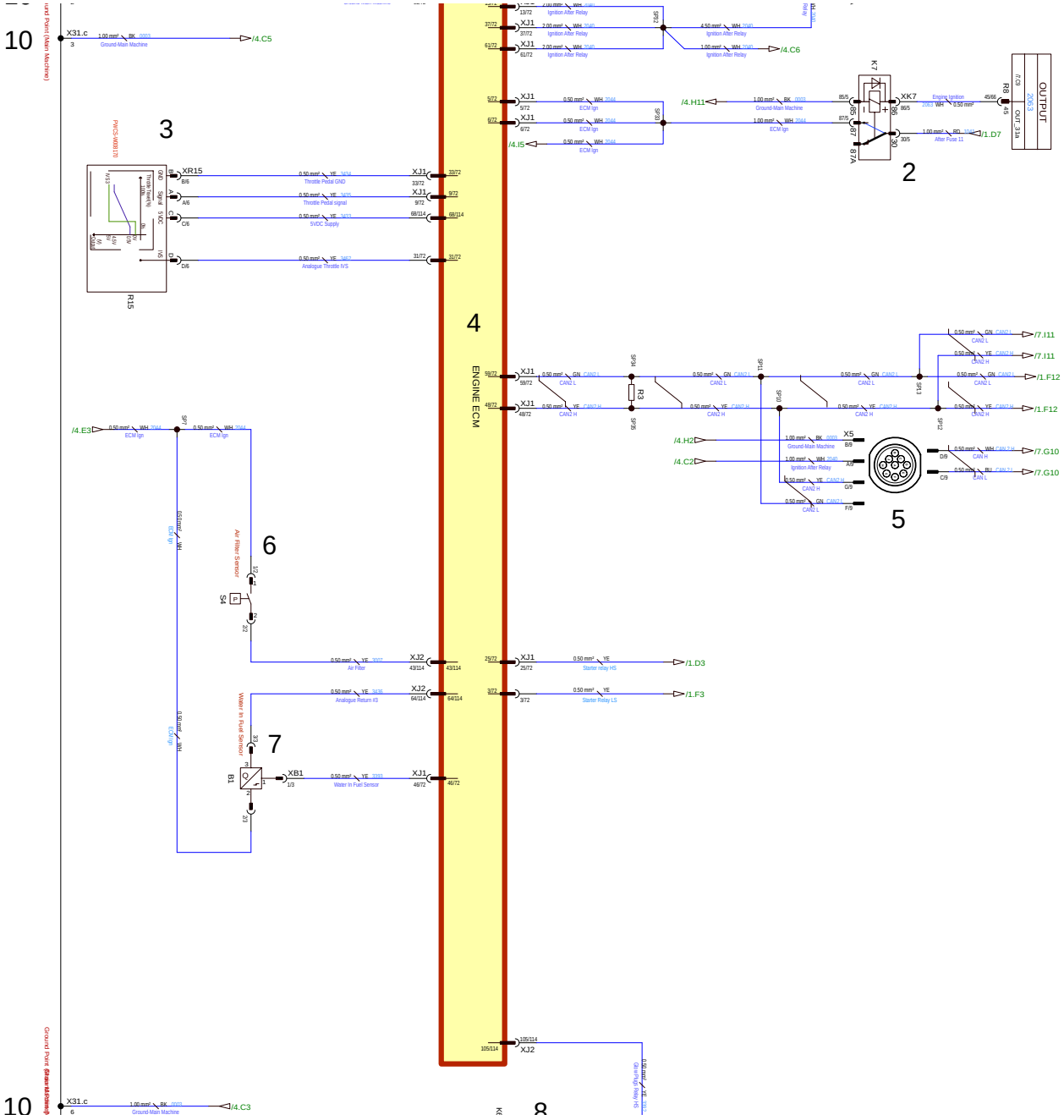
Electrical Diagram 2

1	Reverse Alarm	Colour Codes
2	Reverse Relay	RD - Red
3	Transmission Selector	WH - White
4	Forward Solenoid	YE - Yellow
5	Reverse Solenoid	GN - Green
		BU - Blue
		GY - Grey
		OR - Orange
		BK - Black
		PU - Purple
		PK - Pink
		BN - Brown



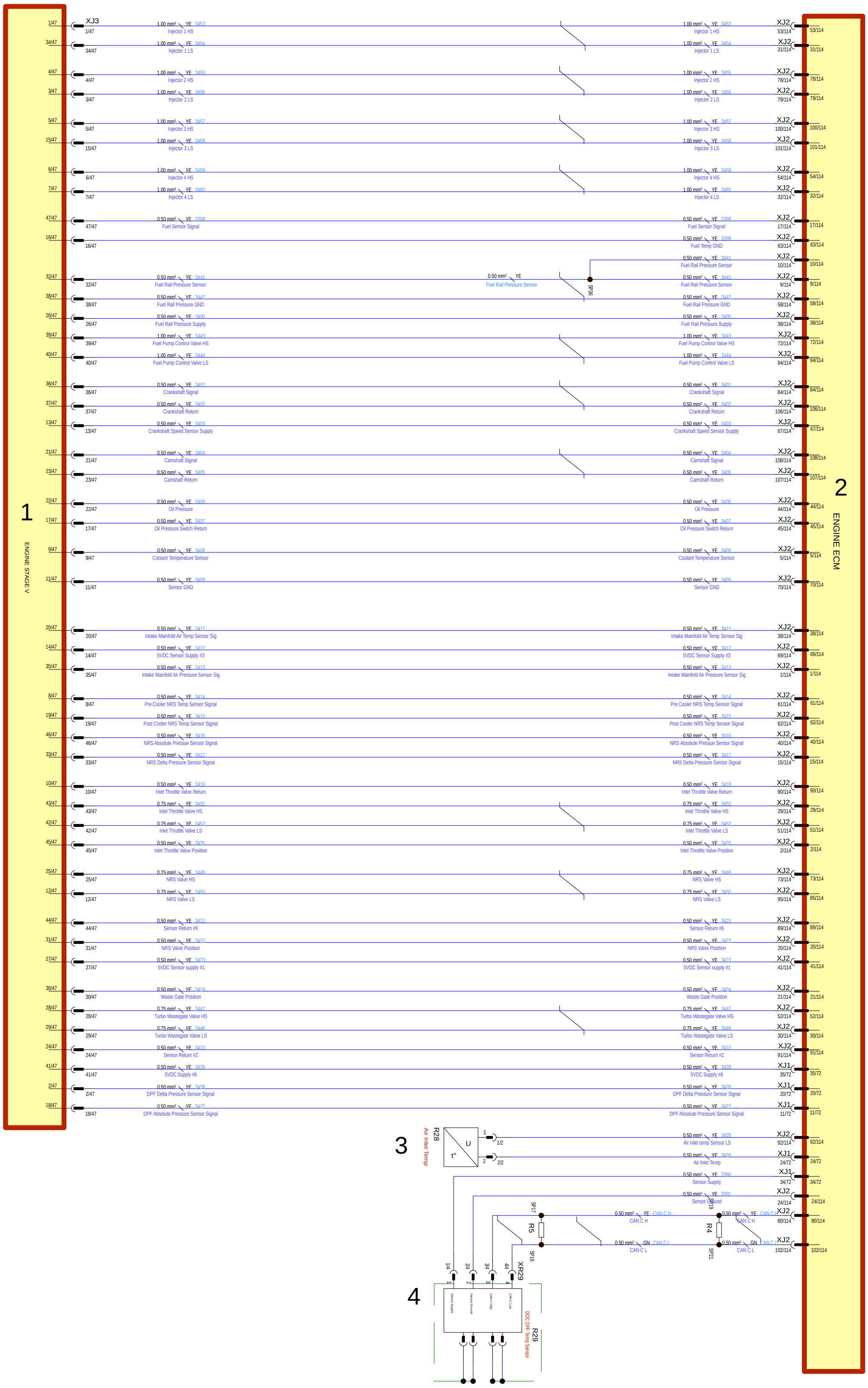
Electrical Diagram 3

1	Green beacon	Colour Codes
2	Seat belt	RD - Red
3	Seat switch	WH - White
4	Declutch switch	YE - Yellow
5	Park brake switch	GN - Green
6	Horn	BU - Blue
7	Horn Relay	GY - Grey
8	Transmission Temp Switch	OR - Orange
9	Transmission Oil Switch	BK - Black
		PU - Purple
		PK - Pink
		BN - Brown



Electrical Diagram 4

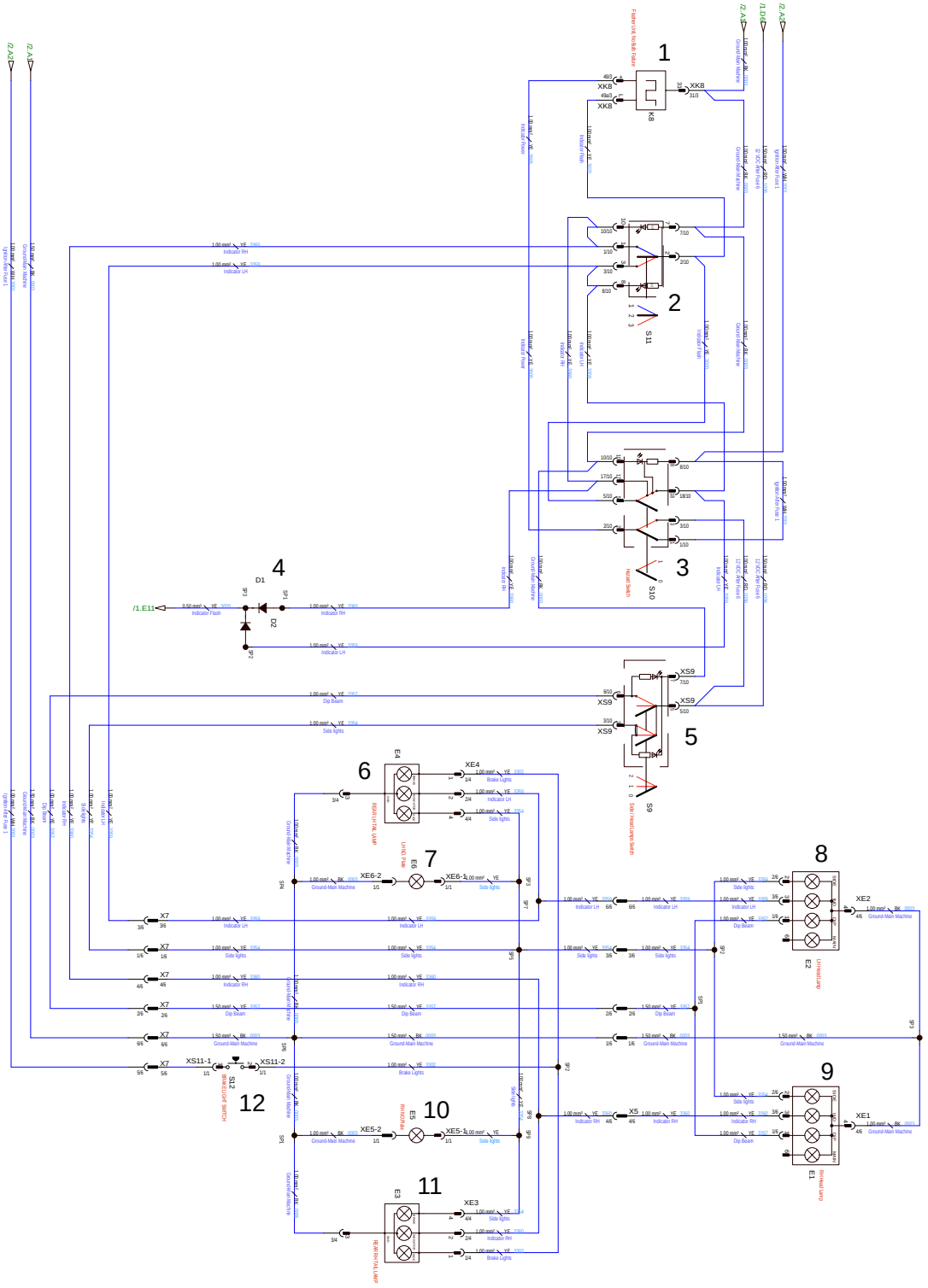
1	ECM Power Relay	Colour Codes
2	ECM Ignition Relay	RD - Red
3	Throttle Pedal	WH - White
4	Engine ECM	YE - Yellow
5	Diagnostic Connector	GN - Green
6	Air Filter Sensor	BU - Blue
7	Water in Fuel Sensor	GY - Grey
8	Glow Plug Relay	OR - Orange
9	Glow Plugs	BK - Black
10	Machine Ground Point	PU - Purple
		PK - Pink
		BN - Brown



Electrical Diagram 5

For Electrical Diagram 5

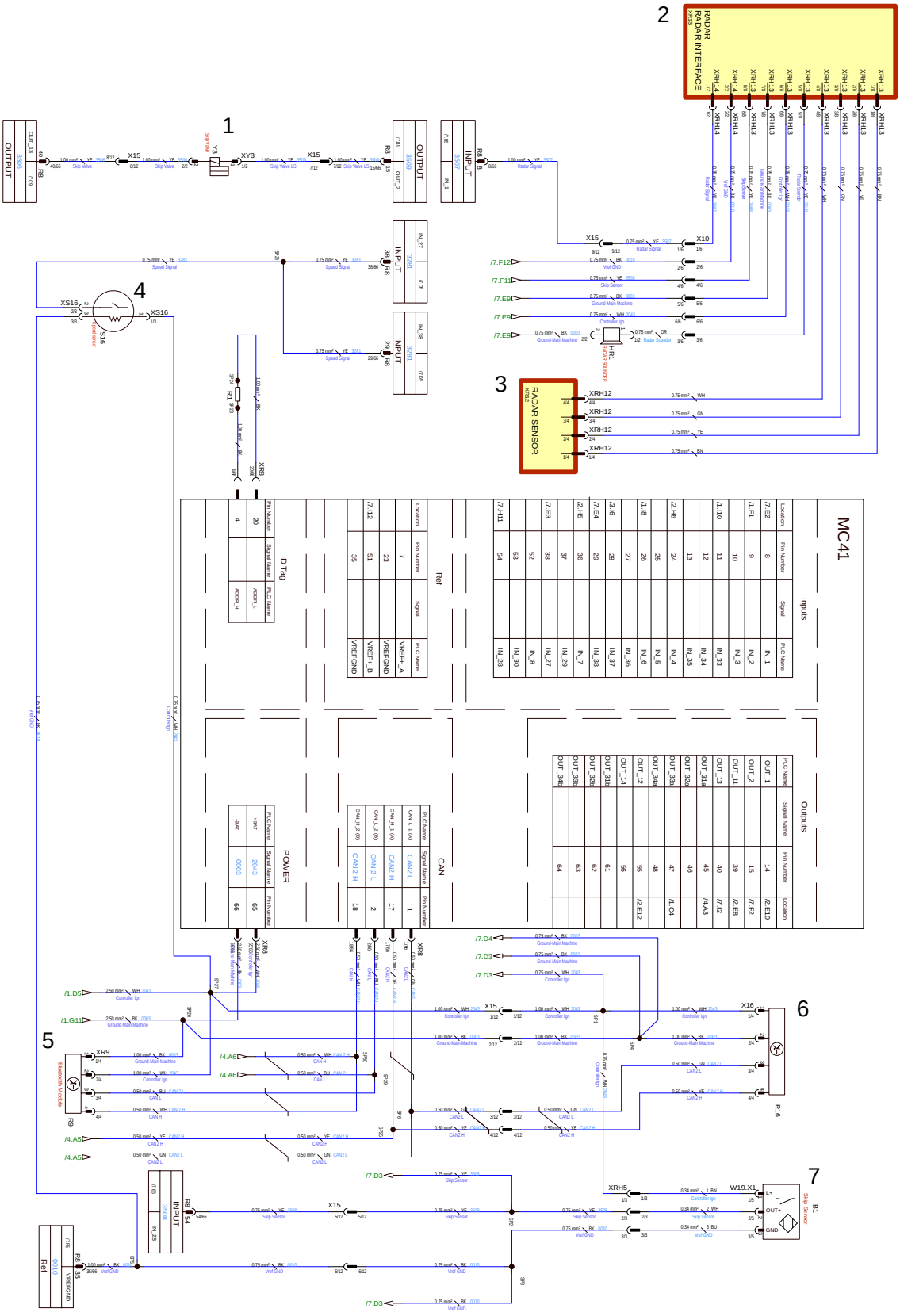
1	Engine Stage V	Colour Codes
2	Engine ECM	RD - Red
3	Air inlet temp	WH - White
4	DOC DPF Temp Sensor	YE - Yellow
		GN - Green
		BU - Blue
		GY - Grey
		OR - Orange
		BK - Black
		PU - Purple
		PK - Pink
		BN - Brown



Electrical Diagram 6

For Electrical Diagram 6

1	Flasher Unit	Colour Codes
2	Indicator Switch	RD - Red
3	Hazard Switch	WH - White
4	Indicator Diodes	YE - Yellow
5	Side/Head Lamps Switch	GN - Green
6	Rear LH Tail Lamp	BU - Blue
7	LH Number Plate	GY - Grey
8	LH Head Lamp	OR - Orange
9	RH Head Lamp	BK - Black
10	RH Number Plate	PU - Purple
11	Rear RH Tail Lamp Brake	PK - Pink
12	Brake Light Switch	BN - Brown

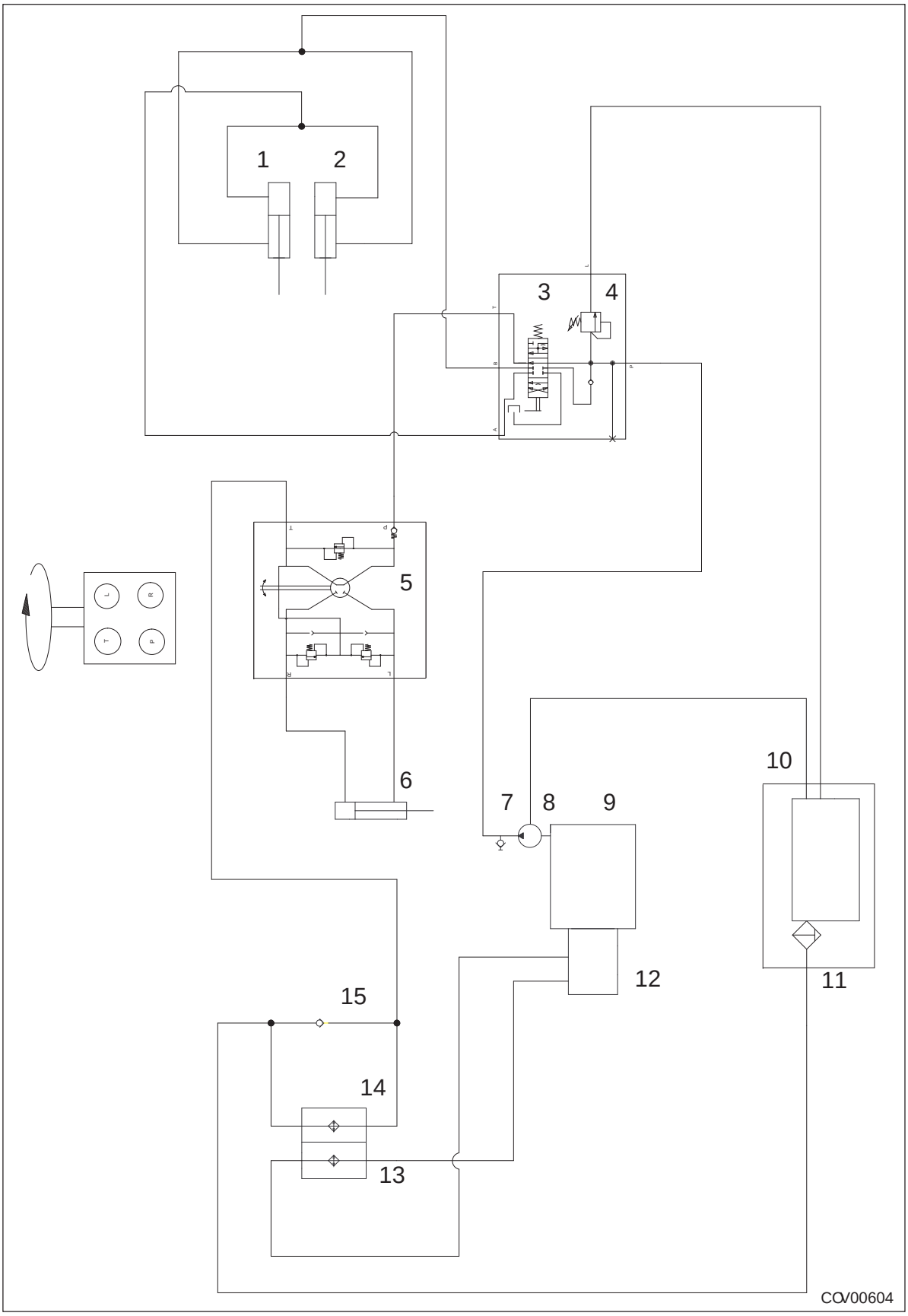


Electrical Diagram 7

For Electrical Diagram 7

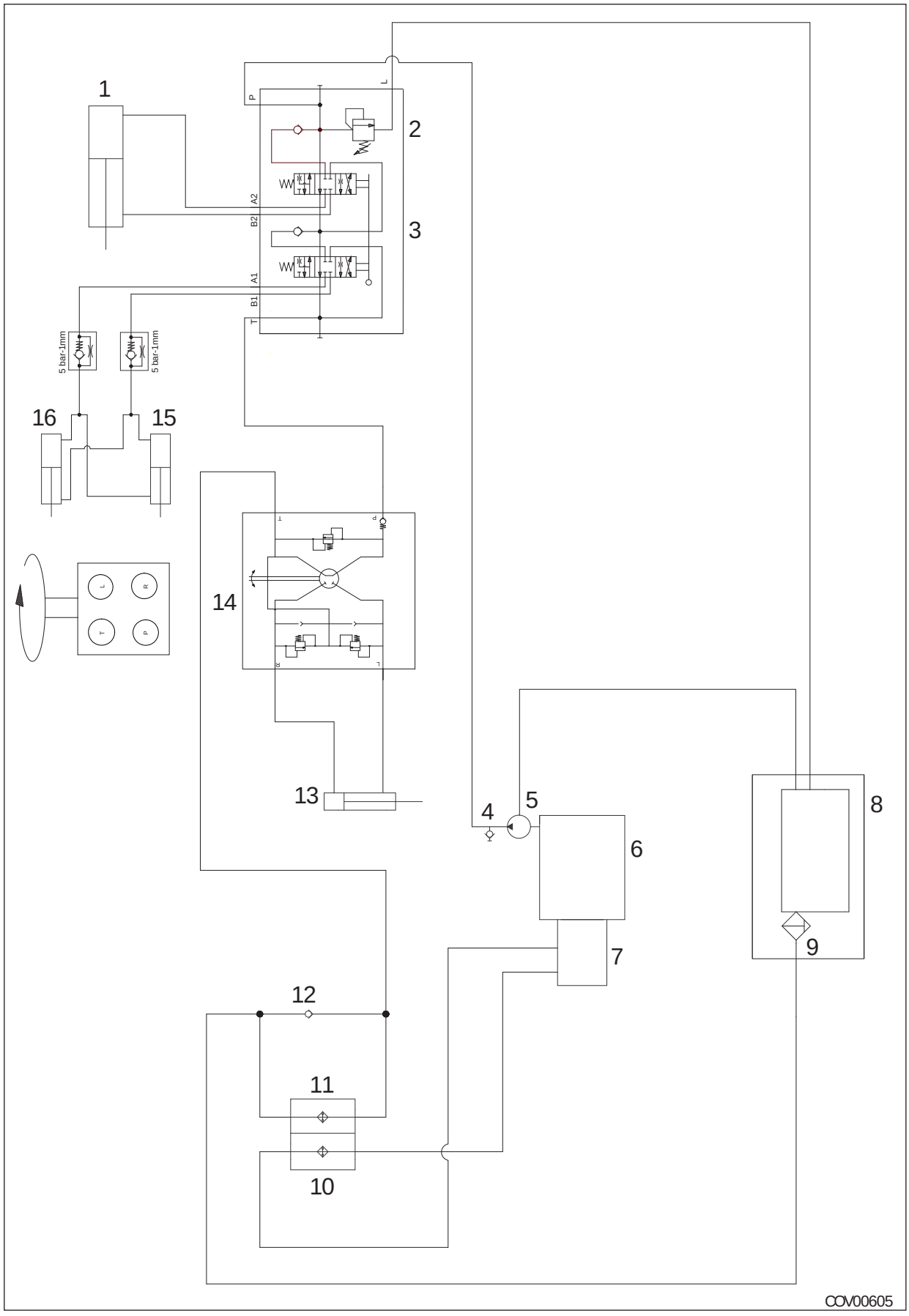
1	Skip Valve Radar	Colour Codes
2	Interface Radar	RD - Red
3	Radar Sensor	WH - White
4	Speed Sensor	YE - Yellow
5	Bluetooth Module	GN - Green
6	Tilt Sensor	BU - Blue
7	Skip Sensor	GY - Grey
		OR - Orange
		BK - Black
		PU - Purple
		PK - Pink
		BN - Brown

Appendix 2 - Hydraulic Diagrams



Hydraulic Diagram - TA9

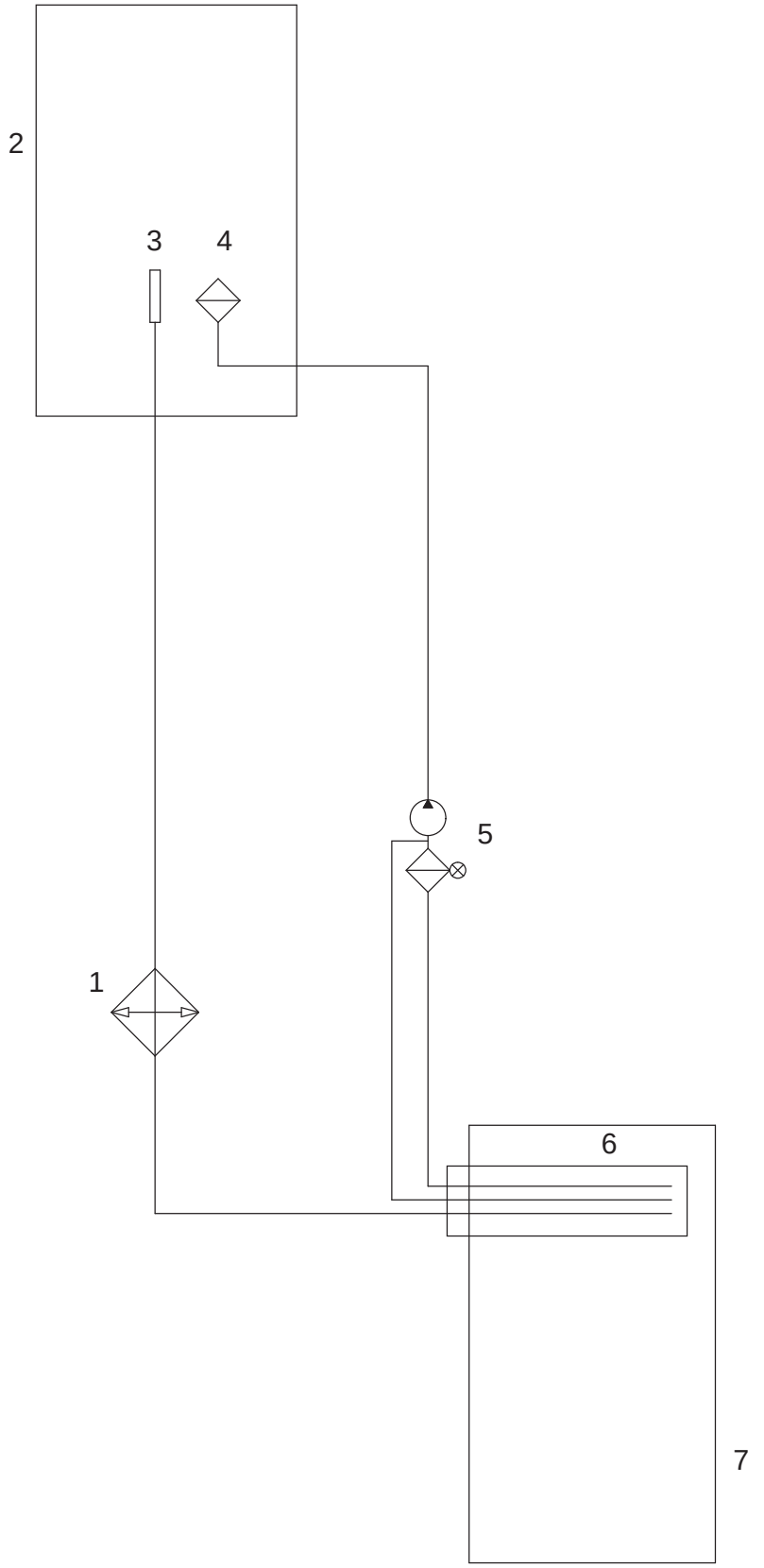
1	Skip Ram - Right Hand
2	Skip Ram - Left Hand
3	Skip Control Valve
4	Relief Valve - System Pressure 172 Bar
5	Steering Unit
6	Steering Cylinder
7	Pressure Test Point - On Valve
8	Pump - 21cc/rev (48.3 L/Min) Engine Mounted
9	Engine
10	Hydraulic Tank
11	Filter
12	Gearbox
13	Transmission Cooler
14	Hydraulic System Cooler
15	Check Valve - 10 Bar (Fitted to Chassis)



Hydraulic Diagram - TA9S

1	Skip Tip Ram
2	Relief Valve - System Pressure 172 Bar
3	Skip Control Valve
4	Pressure Test Point - On Valve
5	Pump - 21cc/rev (48.3 L/Min) Engine Mounted
6	Engine
7	Gearbox
8	Hydraulic Tank
9	Filter
10	Transmission Cooler
11	Hydraulic System Cooler
12	Check Valve - 10 Bar (Fitted to Chassis)
13	Steering Cylinder
14	Steering Unit
15	Slew Ram LH
16	Slew Ram RH

Appendix 3 - Fuel System Diagram



Fuel System Diagram

1	Fuel Cooler - Part of Cooling Pack
2	Engine
3	Fuel Return
4	Fuel IN - Engine Mounted Main Filter
5	Combined Water Seperator and Lift Pump - Mounted on Cooling Pack
6	Sender Unit
7	Fuel Tank

Appendix 4 - Hazard Detection System/Radar

Description

This is a system of hazard detection and warning to assist the user in the operation of the machine. It is designed to alert the user to hazards and objects in the path of the machine that may have been overlooked. The system comprises of a sensor located at the front of the machine and warning symbols on the dashboard. The system is easily removed when not required for security purposes.

DANGER

This system is an aid to the operation of the machine. Its use does not remove the need to keep personnel away from dangerous areas You must still adhere to all the instructions detailed in the Safety Section of this manual. Use of the hazard detection system is no excuse for overfilling the skip. Overfilling the skip will reduce forward visibility and is prohibited.

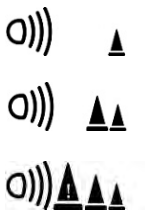
Warnings from the hazard detection system are viewed on the centre of the round LCD screen.

Operation

Start the engine.

When an object comes into range the first cone will show and an audible warning will be heard as the hazard is detected.

As the machine gets closer to the hazard the second and 3rd cones will come on in sequence and an audible warning will continue.



Daily Checks

Carry out the following checks on the system at the start of each working day:

1. Drive towards an object larger than 1 metre high and 300mm wide, the system should give a warning before 4.5 metres.
2. Make sure the sensor is clean and free from mud.
3. Make sure the front sensor, skip tip sensor and all electrical wiring is free from damage. Repair immediately if any part is damaged or loose.
   NOTE the system will not function with the skip raised. With the skip raised the speaker signal is cut and a warning symbol is displayed.

If the system loses sensitivity it will first affect detection at the edges of the machine. To test select an object larger than 1 metre high and 300mm wide in an otherwise clear area. and check that this is detected before it comes into the direct path of the machine.

WARNING

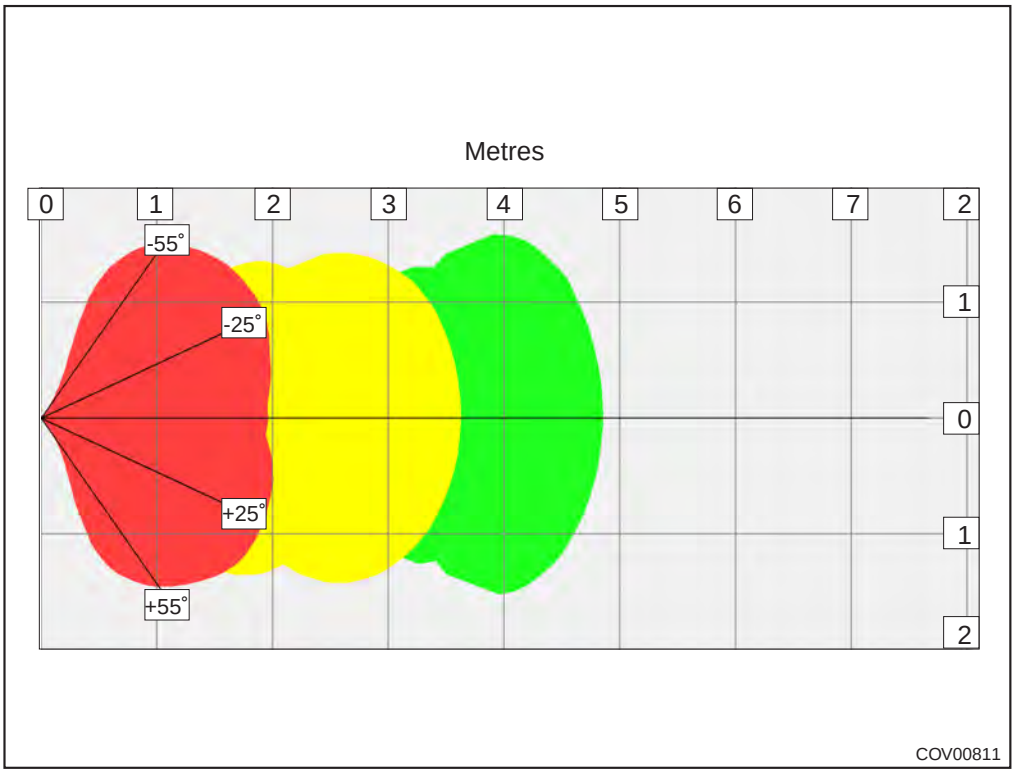
The system may not detect when going over the crest of a hill, when someone is very close to a front wheel, when the skip sensor is damaged or the skip is raised.

⚠ CAUTION

Although the system has been set up to avoid false readings the nature of radar systems and off-highway applications means that there is a possibility they may occur. To avoid false alarms keep to flat and level roads when possible. Keep away from objects at the roadside. Try and avoid travelling close to fences or hedges.

Detection Zones

The size and area of the detection zones is illustrated below



A4-1 Hazard Detection Zones - TA6 - TA10

Operators must be aware and familiar with the size, distance and shape of each hazard zone and also be aware of the safe speed for safe operation for the warning distance set. Consideration should also be given to the width of the detection zone and the effect when manoeuvring and turning.

Maintenance

Clean the sensor box when soil or mud build up. Do not use a pressure washer or detergent. The system is normally unaffected by dirt, dust, rain, snow or fog. The sensor box is waterproof.

When the radar system is removed the harness connection cap must be fitted to prevent the ingress of water into the wiring harness.

If the radar is moved to a machine that is not a 6T dumper, a new detection zone profile will need to be set up. See next page.

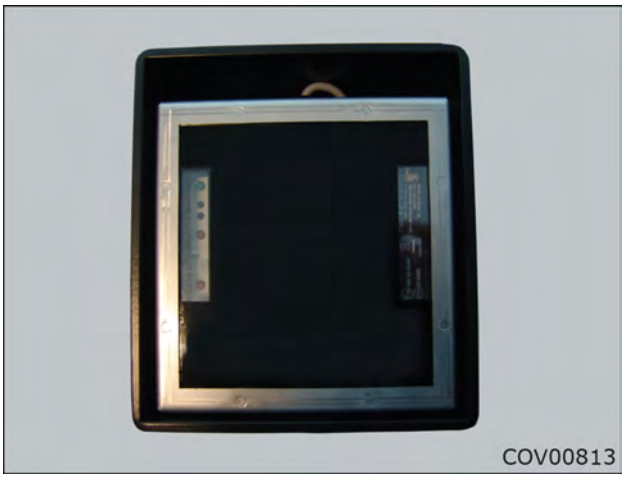
System Fault Indication

When the system is operating correctly and there are no objects within the detection zone of the machine the dash will not show any of these symbols.

If any fault is detected shows on the dashboard. When this symbol shows there will be no warning of hazards given by the system.

Sensor Box

The sensor is a radar which transmits a microwave signal which detects reflections from objects located in the predetermined detection zone. The shape, size and sensitivity has been pre-set to avoid unwanted alarm signals from uneven ground or other objects that may reflect microwave signals but do not constitute a hazard. The operator must familiarise themselves with the shape and size of the effective warning zones illustrated on the previous page.



A4-2 Sensor box

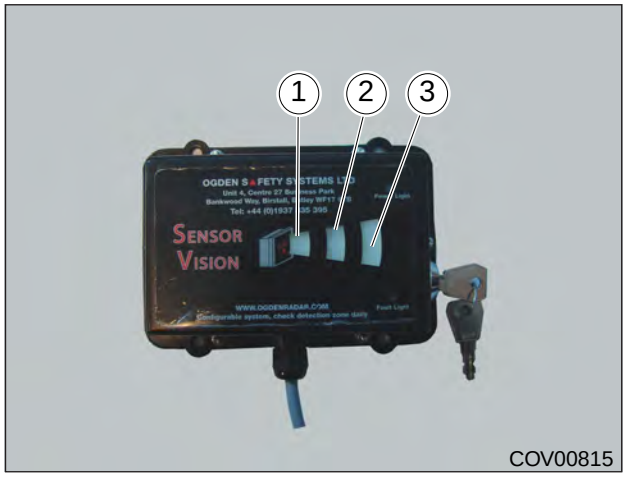
Setting a new machine profile

With the system installed on the dumper:-

1. Insert the key into the switch on the box.

2. Turn the key to the correct profile for the machine being operated, 3ton (Profile 1) or 6/9ton (Profile 2) Do not use Profile 3. The appropriate LED will light up.

3. Remove the key to prevent others form changing the profile.



1. 3 Ton Machines
2. 6, 9 and 10 Ton Machines
3. Not To Be Used

Specifications

Radio Frequency	13.4GHz to 14.0 GHz
Frequency Modulation	FMCW (Frequency-Modulated Continuous-Wave.
Voltage	10 VDC to 30 VDC
Power Required	2.25 Watts
Transmitted Power	<25 mW e.i.r.p.
Detection Angle (for person)	Programmable +/-20° to +/-65°
Max. Range (standard)	23 Metres
Dimensions (sensor box)	145mm x 150mm x 50mm
Weight (sensor box)	1.3 Kg
Detection Status Update State	32 milliseconds
Operating Temperature	-40°C to +75°C
Standard Interface	RS232

STANDARD LIMITED NEW PRODUCT WARRANTY - CONSTRUCTION

Mecalac Construction Equipment Limited trading as Mecalac Construction ("Mecalac Construction"), warrant the new Products manufactured or sold by it, to be free, under normal use and service, of any defects in manufacture or materials for the period of 12 months from (a) delivery to, and placement into service by the first user (including as a demonstrator) or (b) delivery to the first retail purchaser, or (c) will activate 6 months from delivery of the machine to the dealer regardless of use, whichever occurs first; provided that Mecalac Construction receives written notice of the defect within thirty (30) days of its discovery and Buyer establishes that (i) the equipment has been maintained and operated within the limits of rated and normal usage and (ii) the defect did not result in any manner from the intentional or negligent action or inaction by Buyer, its agents or employees. If requested by Mecalac Construction, Buyer must return the defective equipment to an authorized distributor of the Products ("Distributor") and defective parts to Mecalac Construction, and if Buyer cannot establish that conditions (i) and (ii) above have been met, then this warranty shall not cover the alleged defect. The term "Products" shall include only the following equipment manufactured by the following Mecalac Construction: Tractor loader backhoes, site dumpers, compaction equipment, rollers

The obligation and liability of Mecalac Construction under this warranty is expressly limited to, at Mecalac Construction's sole option, repairing or replacing, with new or remanufactured parts or components, any part, which appears, upon inspection by Mecalac Construction that manufactured or sold the equipment, to have been defective in manufacture or materials. Such parts shall be provided at no cost to the owner, FCA Mecalac Construction's parts facility from which the parts were purchased. This warranty shall be null and void if parts (including wear parts) other than genuine OEM Mecalac Construction parts are used in the equipment. No warranty shall cover any item on which serial numbers have been altered, defaced or removed. In addition, the foregoing warranty shall apply to powertrain and major structural components only on site dumpers, rollers and tractor loader backhoes, for a period of 24 months or 2,500 hours, whichever comes first.

BHL:
Powertrain – Engine, gearbox, axles, prop shaft (not inc U/J's & retaining hardware)
Structures – Chassis, ROP's/cab frame, loader arm, boom, dipper, mast casting

Dumper:
Powertrain – Engine, gearbox, dropbox , axles, prop shaft (not inc U/J's & retaining hardware)
Structures – Chassis, ROP's/cab frame, seat support, cross-members/rear panel

Roller: TV
Powertrain – Engine, drive motor, vib motor, belt drive
Structures – Frame/Chassis, seat support, cross-members/rear panel, drum legs

Roller : MBR
Powertrain – Engine, Transmission Unit
Structure - Bedplate/chassis

Normal maintenance, adjustments, or maintenance/wear parts are not covered by this warranty and are the sole maintenance responsibility of Buyer.

No employee or representative is authorized to modify this warranty unless such modification is made in writing and signed by an authorized officer of Mecalac Construction sought to be bound by such modification. The obligations of Mecalac Construction under this warranty shall not include duty, taxes, environmental fees, including without limitation disposal or handling of tires, batteries, petrochemicals, or any other charges whatsoever, or any liability for indirect, incidental, or consequential damages. Improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, or alteration or repair of the equipment by persons not authorized by Mecalac Construction shall render this warranty null and void.

Mecalac Construction reserves the right to inspect the installation of its respective Products and review maintenance procedures to determine if the failure was due to improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, or alteration or repair of the equipment by persons not authorized by Mecalac Construction. Mecalac Construction reserves the right to make improvements or changes to its Products without incurring any obligation to make such changes or modifications to Products previously sold.

Parts Warranty: Mecalac Construction warrant the parts ordered from their respective Parts Departments to be free of defect in manufacture or materials for a period of 12 months from date of retail sale to the owner / user. Parts fitted during an equipment warranty repair will take on the remaining equipment warranty.

TRANSFERABILITY OF WARRANTY: The unexpired portion of this warranty may be transferred, provided that (i) the warranty has not been voided or breached by the transfer or prior to transfer, (ii) Mecalac Construction has received warranty registration for the relevant Product and (iii) the transferee completes and returns to the appropriate Mecalac Construction the appropriate warranty transfer documentation which shall be provided on request. Contact your local Distributor for additional details.

THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) AND ALL OTHER OBLIGATIONS OR LIABILITY ON THE PART OF MECALAC CONSTRUCTION. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY CONTAINED HEREIN.

ITEMS NOT COVERED BY THIS WARRANTY

The following items are **NOT** covered under this Warranty (the following list is not exhaustive):

1. **Non-Distributor Sales:** Items sold by any individual, corporation, partnership or any other organization or legal entity that is not an authorized Distributor.

2. Replacement of assemblies: Mecalac Construction has the option to repair or replace any defective part or assembly. It is the policy of Mecalac Construction to refuse claims for the replacement of a complete assembly that is field repairable by the replacement or repair of defective part(s) within the assembly.

3. Normal Operational Maintenance Services and Wear Parts: Maintenance services and wear parts are excluded from warranty claims. Maintenance services not covered include, but are not limited to, such items as: tune-up, lubrication, fuel or hydraulic system cleaning, brake inspection or adjustment, or the replacement of any service items such as filters or brake linings made in connection with normal maintenance services.

4. Transportation: Any damage caused by carrier handling is a transportation claim and should be filed immediately with the respective carrier.

5. Deterioration: Repairs, work required or parts exposed as the result of age, storage, weathering, lack of use, demonstration use, or for transportation of corrosive chemicals.

6. Secondary Failures: Should the Buyer continue to operate a machine after it has been noted that a failure has occurred, Mecalac Construction will not be responsible under the warranty for resultant damage to other parts due to that continued operation.

7. Workmanship of Others: Mecalac Construction does not accept responsibility for improper installation or labor costs of personnel other than authorized Distributor personnel.

8. Stop and Go Warranty: Mecalac Construction does not recognize "Stop and Go" warranties; after the period of warranty commences, it shall not be tolled for any reason. No action by either party shall operate to extend or revive this limited warranty without the prior written consent of Seller

9. Incidental or Consequential Damage: LIMITATIONS ON LIABILITY: **NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN THIS WARRANTY, MECALAC CONSTRUCTION SHALL NOT BE LIABLE FOR ANY, AND SPECIFICALLY DISCLAIMS ALL, INDIRECT, CONSEQUENTIAL, INCIDENTAL AND OTHER DAMAGES OR LOSSES OF ANY KIND (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, LOSS OF PRODUCTION, LOSS OF USE, DOWNTIME OR HIRE CHARGES, INCREASED OVERHEAD, LOSS OF BUSINESS OPPORTUNITY, DELAYS IN PRODUCTION, COSTS OF REPLACEMENT COMPONENTS, PENALTIES OF ANY KIND, FAILURE OF EQUIPMENT TO COMPLY WITH ANY APPLICABLE LAWS AND INCREASED COSTS OF OPERATION) THAT MAY ARISE FROM ANY BREACH OF THIS WARRANTY, WHETHER OR NOT CAUSED DIRECTLY OR INDIRECTLY BY ANY NEGLIGENCE OF MECALAC CONSTRUCTION. Nothing in this paragraph, however, shall operate to exclude Mecalac Construction's liability for death or personal injury. Buyer's sole remedy for breach of this warranty shall be limited to (at the sole option of Mecalac Construction) repair or replacement of the defective part.**

10. **Labor:** Mecalac Construction shall not be responsible for related travel expenses such as meals and lodging; overtime or premium labor rates.

Mecalac Construction neither assumes nor authorizes any other person to assume for Mecalac Construction any other liability in connection with the sale of any Mecalac Construction's equipment. This warranty shall not apply to any Mecalac Construction equipment or any part thereof which has been subject to misuse, alteration, abuse, negligence, accident, acts of God or sabotage. No action by any party shall operate to extend or revive this limited warranty without the prior written consent of Mecalac Construction . The aggregate liability of Mecalac Construction shall in no event exceed the purchase price of the equipment, provided that nothing herein shall exclude liability of Mecalac Construction for death or personal injury.

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EUROPE (Revised November 2018)

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