Operating manual

AMMANN

Rammax 1515-M, 1515-MI, 1515-MC, 1515-MCI
Hatz

Serial Nr. 50000-

ID: 1163838

Index: a

Creation date 26.08.2010

Product identification:

Type:	Rammax 1515
Model:	-M/-MC/-MI/-MCI
Series number:	
Production date:	

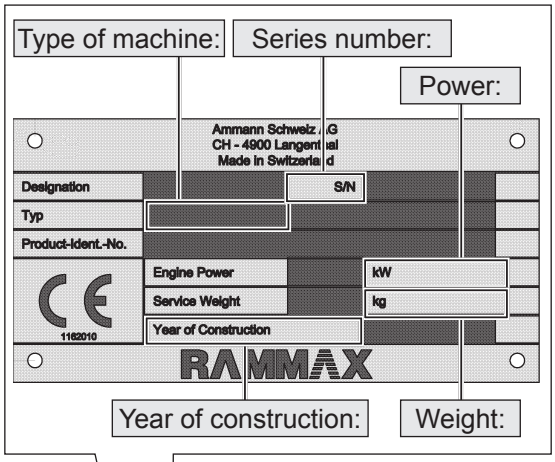
Manufacturer:

Ammann Schweiz AG
Eisenbahnstrasse 25
CH-4901 Langenthal
Telefon 0041 (0)62 916 61 61
Telefax 0041 (0)62 916 68 04
www.ammann-group.com

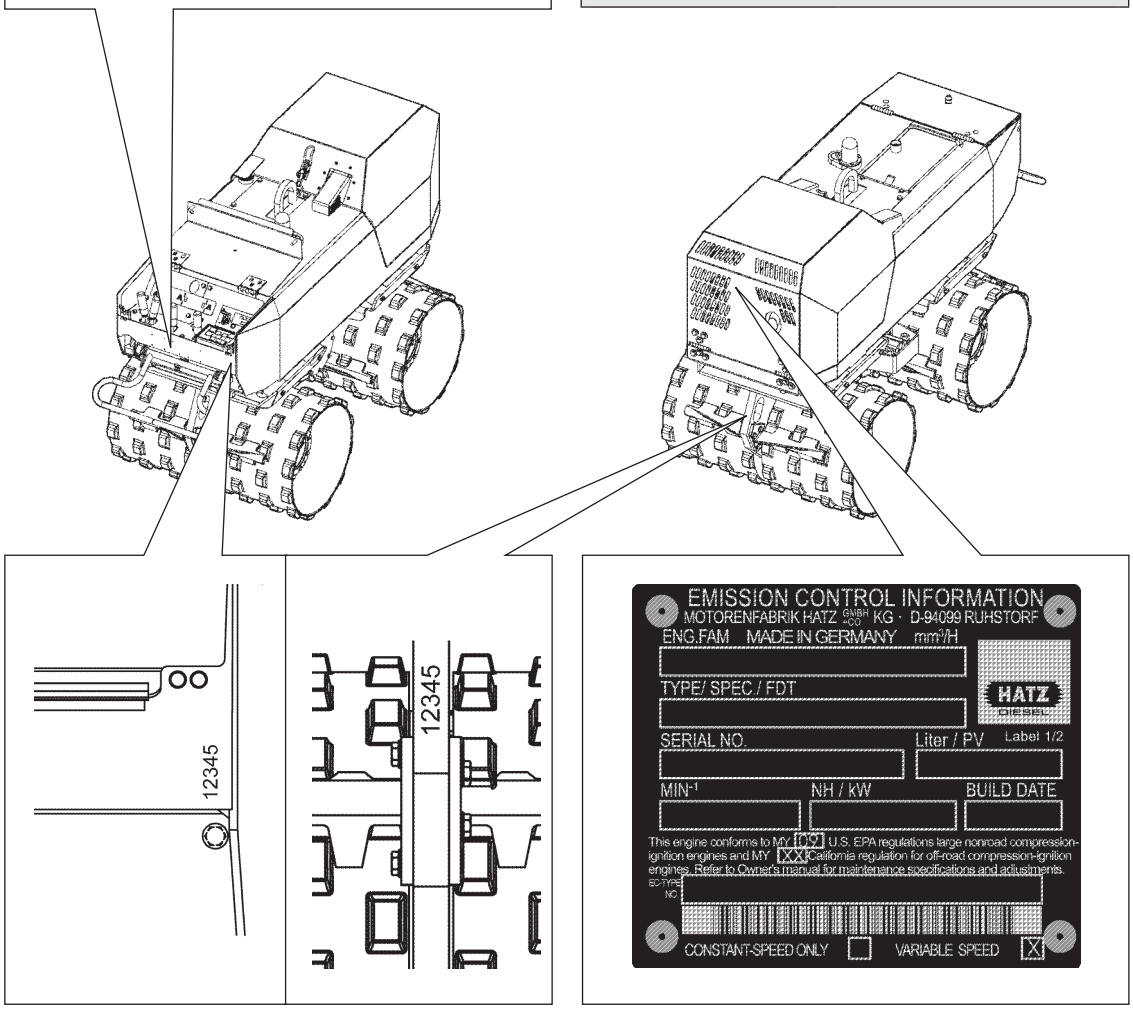
Document identification:

Title:	Operating manual (translation of the original operating manual)
Document number:	**1163838**
Change index:	a

A member of our staff or a dealer will instruct you on use and maintenance of the machine at delivery. Enter the following data when commissioning the machine.



Enter during machine commissioning
Type of machine .....
Series number .....
Engine type .....
Engine number .....



The practical development and construction, as well as the experience of many years in manufacturing vibration trench rollers, guarantee that you have a high-quality and extremely reliable machine. The following operating and maintenance instruction comprise:

- Safety regulations
- Description of the machine
- Operating and Maintenance manual
- Maintenance instructions
- Troubleshooting table

Liabilty; Liability claims

Ammann Schweiz AG accepts no liability for machine function

- when operated differently to the stipulated procedure,
- when used for other application purposes that differ from the authorised
- utilisation (see *"Authorised utilisation"*)
- or the listed application areas (see *"Application areas"*).

Guarantee; Guarantee claims

No warranty claims may be lodged in the case of:

- operating mistakes,
- poor maintenance and/or
- using the wrong operating materials!

Only Ammann spare parts are to be used for both your own safety and in order to ensure that the machine works correctly (see *"Modifying the machine"*). The spare parts catalogue and the operating manual are also available from your Ammann dealer in other languages, if you specify the machine number.

The warranty and liability conditions contained in the General Terms and Conditions of Ammann Schweiz AG are not extended or replaced by the information contained above or below.

Ammann Schweiz AG Langenthal

TABLE OF CONTENTS

Purpose of the operating manual

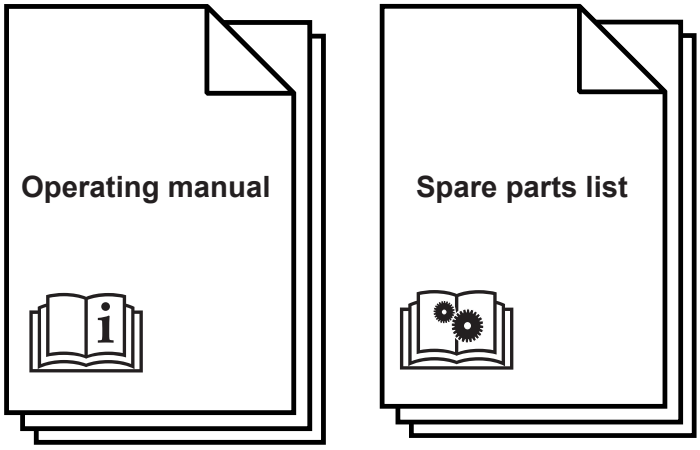
When you read this manual:
- it will make it easier for you to learn to use the machine,
- prevent faults from occurring due to incorrect operation.

If you carry out the maintenance regularly:
- your machine will run reliably on the building site,
- your machine will last longer,
- your machine will have less downtime and cause less repair costs.

Target group

This manual is aimed at the machine's operating and maintenance personnel. More precise details regarding the necessary personnel training and qualifications can be found in Chapter *"Organisation / Personnel"*.

Documentation layout



The machine documentation is divided into 2 individual document groups:

- The operating manual contains all of the information needed to operate the machine and details regarding maintenance intervals and undertaking the maintenance work.
- The spare parts list contains all of the available spare parts and part sets.

The individual chapters of the operating instructions contain the following topics:

Chapter 1:
- Description of the machine
- Technical data
- Equipment features
- Accessories

Chapter 2:
- lGeneral safety instructions
- Machine danger areas
- Safety equipment
- Qualifications needed by the operator and the service personnel
- Product specific and additional dangers
- Specifications for an emergency.

Chapter 3:
- Machine design and functions.

Chapter 4:
- Display and operating controls
- Machine operating modes

Chapter 5:
- Commissioning the machine

Chapter 6:
- Using the machine

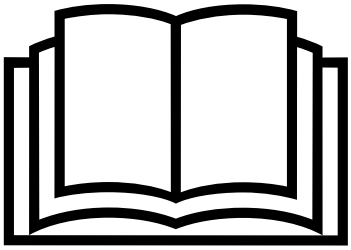
Chapter 7:
- Transporting the machine

Chapter 8:
- Machine maintenance

Chapter 9:
- Bolt connection tightening torques

Chapter 10:
- Troubleshooting table

Safekeeping and completeness of the operating instructions



This manual is an integral part of the machine and must always be available so that the machine operator can consult it at any time. It must always be kept close to hand. Never remove a chapter of these operating instructions. Missing instructions or missing pages - particularly the "Safety instructions" chapter - must be replaced immediately if they are lost.

The operating instructions must be kept for the service life of the machine and be passed on to each later owner or operator.

Updating service:

This manual is not subject to Ammann Schweiz AG's revision service. This documentation can be changed without notification.

Displaying the information

Used font weights/typeface

The text sections have been arranged in the topics so that you can find the information that you need quickly. The titles are listed as follows for better orientation:

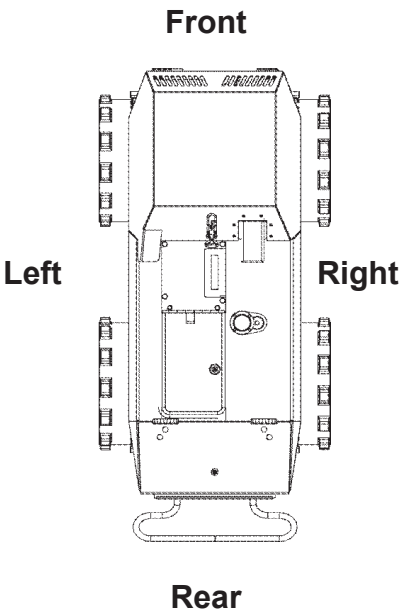
Helvetica World 18Pt Bold	**CHAPTER HEADING**
Arial 12Pt Bold	**Section title**
Arial 10Pt Bold italic	***Sub-title***
Arial 10Pt Regular	Main text
Arial 10Pt Kursiv	*Marginalia and cross-references*
Arial 10Pt Bold	**Passages to be adhered to**
Arial 8Pt Kursiv	*Picture title*

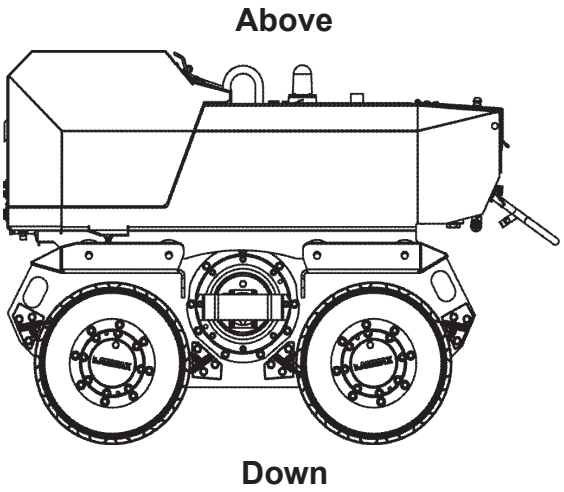
This orientation aid is also used:

►	To indicate handling procedures given in the safety instructions
➡	To indicate a specific handling procedure
✓	To indicate a handling result
•	To indicate that certain points have been itemised
–	To indicate sub-points within an itemisation or a handling step

Machine orientation

The important sections of the machine are shown here in order to make machine orientation easier for you. Specifications in the text concerning situation and position are based on the following principle: All specifications on situation or position are to be seen from the cockpit in driving direction. The descriptions are therefore characterised as follows:





Used trademarks

HATZ® is a registered trademark belonging to Motorenfabrik HATZ GmbH & CO KG

Mobil™ is a trademark of the ExxonMobil Central Europe Holding GmbH

Texaco® is a registered trademark of Chevron Products Company, USA

Texaco Rando® is a registered trademark of Chevron Products Company, USA

Copyrights

Eisenbahnstrasse 25
CH-4901 Langenthal
www.ammann-group.com

Tel: 0041 (0)62 916 61 61
Fax: 0041 (0)62 916 68 04

Description

The new development of the Rammax 1515 is based on many years of experience gained in the development and design of vibratory trench rollers. The enormous degree of operating convenience, which provides both for cable and infrared control, enables the user to use the machine in a flexible way. The hard-wearing, compact design offers a high degree of security even in the most difficult terrain. The Rammax 1515 is fitted with hydrostatic steering, vibration and drive. The machine is extremely maintenance friendly (with the exception of the diesel engine), no V-belts, drive belts, lubrication nipples or shiftable clutches are used. Most modern control electronics, as well as the proven 8 strippers for the drums characterise this machine.

Areas of application

The Rammax 1515 vibratory trench roller is a roller especially designed for trench compaction. The complete lack of side walls on the drum enables compaction right up to the trench wall also in very small and narrow trenches. Wet, clay-based soils in canalisation, pipeline construction, road substructure and construction backfills, etc., are the applications that this modern trench roller can be used for.

The infrared control also permits driving underneath bracings when constructing trenches. During dangerous construction-site operations, it is possible for the operator to control the machine from a safe distance and not to expose himself to hazards.

Intended use

The machine is exclusively conceived for the compaction of loose backfill, such as earth, gravel, or sand, as well as mixtures of these. The machine may not be used on hard, already compacted or frozen soils.

Workplace

The proper work area for the machine operator depends on the manner of operation: With manual control the machine operator's intended work area is at the rear of the machine within the effective range of the OFF switch handle.

With remote control, the proper work area is at the rear of the machine in a radius of 2 to 20 metres.

Danger areas

While the machine is in operation, it poses risk to life and limb within the effective area. People can be grabbed and run over or crushed by the machine or its parts. It can also hurl stones, dirt and debris in the air and injure people. Only the machine operator should be in the effective area, and he should remain in the intended work area. Other persons must maintain a safety distance of at least 2 metres around the machine. They must not enter the machine's effective area until the motor has reached a complete standstill.

Modifications to the machine

Special fittings

For reasons of safety, users are prohibited from making their own modifications or conversions to the machine. This machine may only be equipped with original spare parts, which have been constructed for this machine and correspond to the requirements of the manufacturer. The installation or use of special `equipment or special parts can impair driving safety.

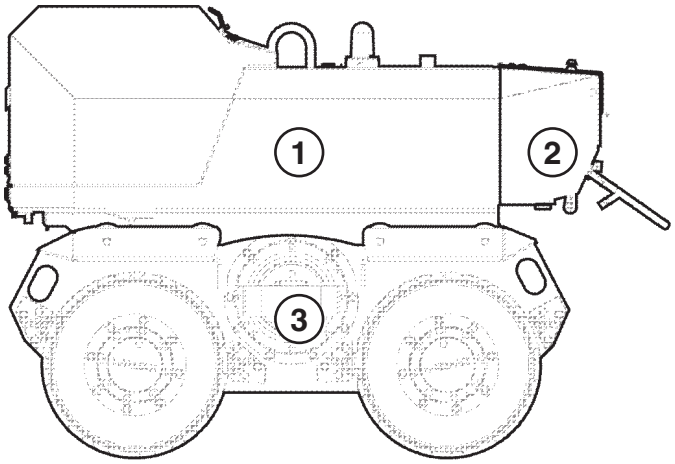
Liabilty

The manufacturer will accept no liability for damage caused as a result of the use of non-original parts or special equipment.

Machine design

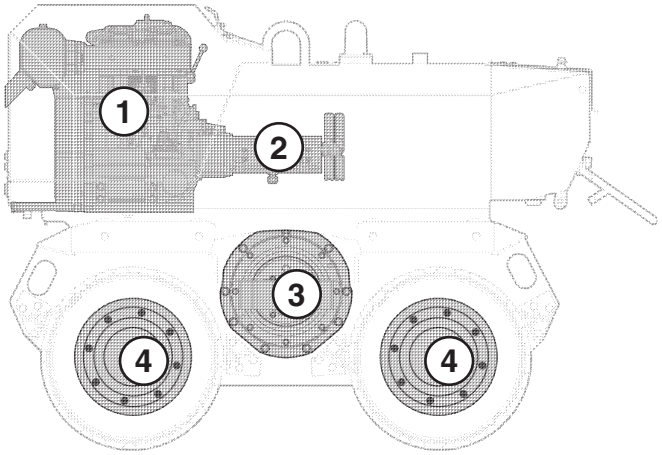
Main components

Superstructure	1
Control unit / Cockpit	2
Chassis	3



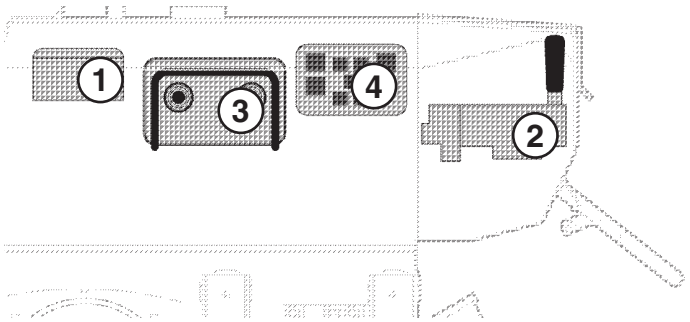
Drive components

Diesel engine	1
Hydraulic pump	2
Exciter unit	3
Drum drive	4



Control components

Machine controller	1
Valve-block manual control	2
Remote infrared control	3
Cable remote control	4



Verdichtung

RAMMAX

EG-Konformitätserklärung

EC-Declaration of Conformity / Déclaration ”CE” de Conformité
Dichiarazione di conformità CE

gemäß Maschinen-Richtlinie 2006/42/EG, Anhang II A und der Outdoor Richtlinie 2000/14/EG
as defined by the Machinery Directive 2006/42/EC Annex II A and Noise directive 2000/14/EG
conformément à la directive "CE"' relative aux machines 2006/42/CE, Annexe II A et á la directive outdoor 2000/14/EG
in conformità alla Direttiva sui Macchinari 2006/42/CE, Allegato II A et ala Direttiva outdoor 2000/14/EG

Hersteller (Name und Anschrift): Manufacturer (name and adress): Fabricant (nom et adresse): Costruttore (nome ed indirizzo)	***Rammax Maschinenbau GmbH*** ***Gutenbergstr. 33*** ***D-72555 Metzingen***
Hiermit erklären wir, daß die Maschine (Typ, Versionsnummer) Herewith we declare that the machinery (Type, version number) Par la présente, nous déclarons que la machine (Type, numèro de version) Con la presente dichiariamo che il macchinario (Tipo, numero di versione)	***Vibrationsgrabenwalze*** ***Vibratory trench roller / Cylindre vibrant pour fossés*** ***Rammax 1515 –M/-MI/-MC/-MCI / Hatz 2G40 / 20030401***
Nutzleistung: Effective output / puissance utile / capacitá utile:	**13,4 kW / 2600 U/min**
Seriennummer: Serial number / Numéro de série / Numero di serie	
Ordnungsnummer: Ordinal number / Nombre ordinal / Numero ordinale	**8.1**
folgenden einschlägigen Bestimmungen entspricht: complies with the following provisions applying to it: correspond aux dispositions pertinentes suivantes: risponde a quanto richiesto dalle seguenti direttive in materia:	*2006/42/EG Anhang 11 A; 89/336/EWG; 2000/14/EG* *2006/42/EC Annex 11 A; 89/336/EC; 2000/14/EC* *2006/42/CE Annexe 11 A, 89/336/CE, 2000/14/CE*
Angewandte harmonisierte Normen: Applied harmonized standards: / Normes harmonisées appliquées: / Norme armonizzate applicate:	*EN 500-1; EN 500-4*
Die gemeldete Stelle nach Anhang IX aus 2000/14/EG The notified body according to Annex IX of 2000/14/EC L´organisme habilité conformément à l'Annexe IX de 2000/14/CE L'ufficio responsabile secondo l'Allegato IX di 2000/14/CE	*TÜV Süddeutschland* *Niederlassung Stuttgart* *D- 70794 Filderstadt*
wurde (wird) eingeschaltet zur / was (is) engaged for / intervient pour: **è intervenuto (interverrà) per:**	
Konformitätsbewertung nach Anhang VI aus 2000/14/EG valuation of conformity to Annex VI of 2000/14/EC conformément à l'Annexe VI de 2000/14/CE Valutazione di conformità secondo l'Allegato VI di 2000/14/CE	
An repräsentativem Baumuster gemessener Schallleistungspegel L_{WA} nach ISO 3744: Measured sound power level L_{WA} of ISO 3744 on represented construction model: Niveau de puissance de son L_{WA} mesuré à ISO 3744 du modèle de construction représentatif: Livello di potenza sonora L_{WA} misurato su un modello rappresentativo secondo ISO 3744:	
Gemessener Schallleistungspegel $L_{WA,m}$: Guaranted sound power level: Niveau de puissance de son garanti: Livello garantito di potenza sonora:	*107 dB(A)*
Garantierter Schallleistungspegel $L_{WA,g}$: Guaranted sound power level: Niveau de puissance de son garanti: Livello garantito di potenza sonora:	*109 dB(A)*
Verantwortliche Person zur Aufbewahrung der Unterlagen: Responsible person for safekeeping the documents Presonne responsable puor garde des documents Persona responsabile per conservazione dei documenti	Frank Edmaier Ltg. Konstruktion/Entwicklung

Metzingen,

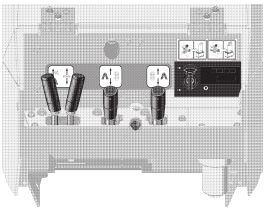
Ort, Datum
Place, date / Lieu, date
Luogo, data

ppa. Thomas Remy, Ltg. Vertrieb i.A. Frank Edmaier, Ltg. Konstruktion
Unterschrift, Angabe der Funktion im Unternehmen
Signature, acting in the company / Signature, en qualité de
Firma, funzione all'interno della ditta

Rammax GmbH / Gutenbergstraße 33 / 72555 Metzingen / +49 (0) 7123 92230 / +49 (0) 7123 922350 / Service@Rammax.de

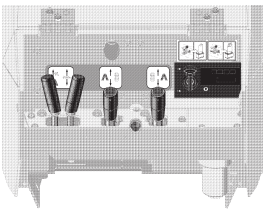
Machine version features

Rammax 1515-M	Trench roller with manual controls

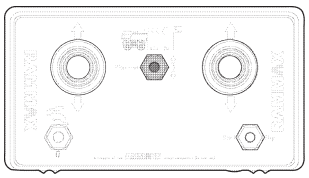


Manual controls

Rammax 1515-MI	Trench roller with manual controls and remote infrared controller

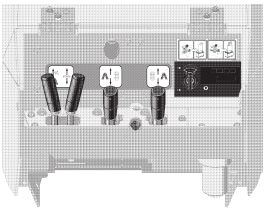


Manual controls

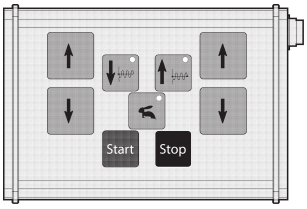


Remote infrared controller

Rammax 1515-MC	Trench roller with manual controls and remote cable controller

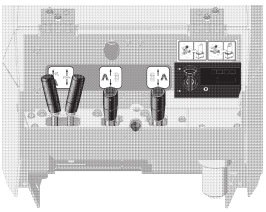


Manual controls

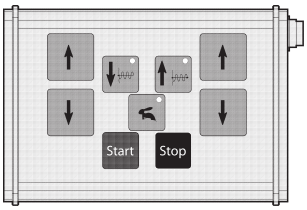


Remote cable controller

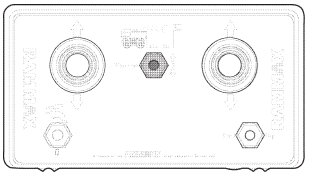
Rammax 1515-MCI	Trench roller with manual controls and remote cable and infrared controllers



Manual controls



Remote cable controller

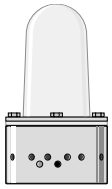


Remote infrared controller

Optional auxiliary functions

Ammann Compaction Expert

Optical compaction controller
The ACE system enables the soil consistency to be controlled when moving over a surface.



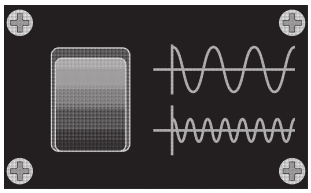
Optical display

Activation switch

Variable flyweight mass

Rammax 1515-MV
Rammax 1515-MIV
Rammax 1515-MCV
RW1515-MCIV

You can switch between two compaction forces with machines fitted with variable flyweight mass.

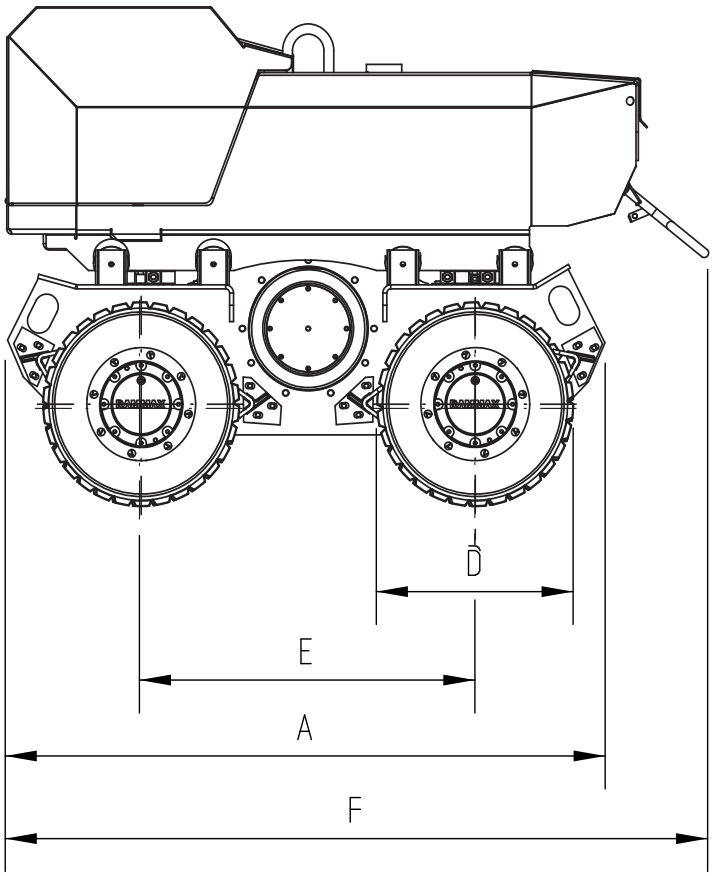


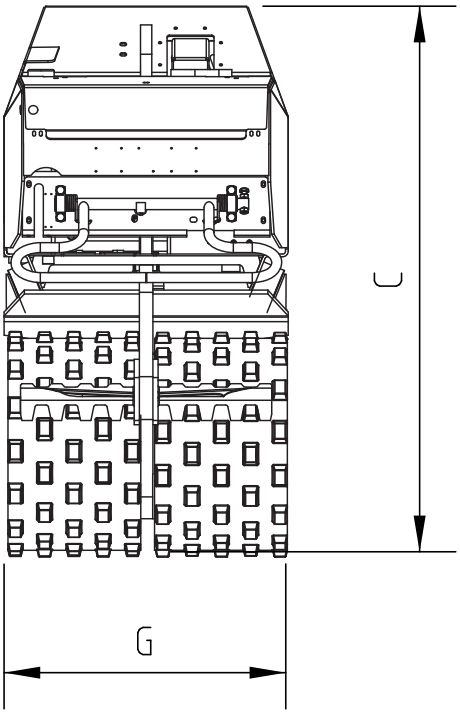
Compaction force change-over switch

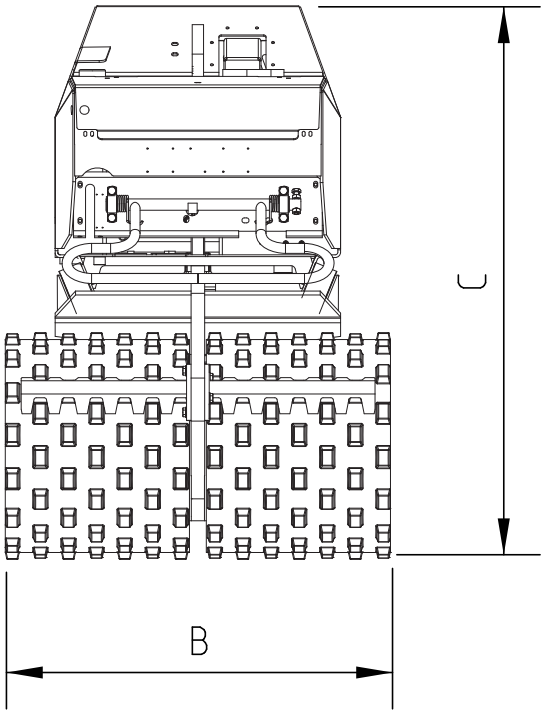
Machine dimensions

Details in Millimeter		
A:	1520	mm
B:	850	mm
C:	1200	mm
D:	500	mm
E:	850	mm
F:	1780	mm
G:	630	mm

Details in inches		
A:	59.8	inch
B:	33.5	inch
C:	47.2	inch
D:	19.7	inch
E:	33.7	inch
F:	70.1	inch
G:	24.8	inch







Rammax 1515-M/-MI/-MC/-CI/-MCI			Drum width 850 mm	Drum width 630 mm
dimension				
Working width		mm	850	630
Overall width		mm	850	630
Overall length		mm	1780	1780
Overall height		mm	1200	1200
Distance between axles		mm	850	850
Facing diameter		mm	500	500
Weights				
Intrinsic weight		kg	1413	1341
Working weight		kg	1480	1408
Mean axle load		kg	740	704
Drive unit				
Engine / model			Hatz 2G40	Hatz 2G40
Power rating		kW/PS	13,2 / 18	13,2 / 18
at revs/min			2700	2700
Anzahl Zylinder/Kühlung			2 / air cooled	2 / air cooled
Batterie		V	12	12
		Ah	72	72
Antriebsart			hydrostatic	hydrostatic
Angetriebene Bandagen			4	4
Vibration system				
Centifrugal force	*Vibration forward*	kN	86	86
	Vibration reverse	kN	86	86
Amplitude	*Vibration forward*	mm	2,4	2,4
	Vibration reverse	mm	2,4	2,4
Frequency	*Vibration forward*	Hz	32	32
	Vibration reverse	Hz	32	32
Drive configuration			hydrostatic	hydrostatic
Vibrating drum			4	4

Rammax 1515-M/-MI/-MC/-CI/-MCI		Drum width 850 mm	Drum width 630 mm
Brakes			
Service brake		hydrostatic	hydrostatic
Parking brake		hydromechanical	hydromechanical
Steering			
Steering mode		lever steering	lever steering
Steering actuation		hydrostatic	hydrostatic
Driving characteristics			
Speed (forward/reverse)			
With vibration	m/min	0-16	0-16
Without vibration	m/min	0-16	0-16
High speed	m/min	0-35	0-35
Climbing capability			
With vibration	%	45	45
Without vibration	%	55	55
Optional equipment			
Drums	*Standard profile*	Cam height 15 mm	Cam height 15 mm
Drums	*Special profile*	Cam height 18 mm	Cam height 18 mm

Remote controller dimensions

Remote infrared controller

Dimensions		
Width	mm	230
Depth	mm	135
Height	mm	212

Weight		
Total	kg	1,74

Power supply		
from integrated power source		
Supply type		Solar cells and battery
Voltage	V	3,5
Power consumption	µA	35

Remote cable controller

Dimensions			
Width		mm	165
Depth		mm	111
Höhe		mm	43
Cable length	Slack	mm	900
	Stretched	mm	2500

Weight		
Total	kg	1,2
Body	kg	0,6
Cable	kg	0,6

Power supply		
through connecting cable from machine battery		
Supply type		Battery
Voltage	V	12
Power consumption	µA	No details

Operating fluids

		Quantity	Specification	Ex-factory
Fuels:				
Diesel	l	22	EN 590 oder DIN 51601 - DK oder BS 2869 A1 / A2 oder ASTM D 975 - 1D/2D	
Hydraulics:				
Hydraulic oil				
Standard refilling	l	55	DIN 51524-2 HLP 46 ISO 6743-4 HM 46 ISO 6743-6 CKC 46	Fuchs Renolin B15 VG46
Bio-hydraulic oil refilling	l	55	ASTM D-6046-98a: PW1, TW1, TS1	Panolin HLP Synth 46
Lubricants:				
Engine oil	l	3	ACEA E2/B3/A3 API CG-4/SJ MIL-L-2104E	Fuchs Titan universal 15W40
Bearing grease per bearing	gr	ca.100	KHLPF2R	Aeronix MoS2

Noise and vibration specifications

The noise and vibration specifications listed below in accordance with the EC Machine Directive in the draft (93/68/EEC) were determined under operating conditions typical for the machinery in question with vibration over a specified travel surface (DIN 45635).

In operational application, deviating values may result depending on the prevailing operating conditions.

Noise specification

The noise emission specification stipulated in accordance with Annex 1, Section 1.7.4.f of the EC Machine Directive is as follows:

Noise level at operator position	*LpA :*	**86,9 dB(A)**
Sound power level	*LWA :*	**102,7 dB(A)**

These noise emission values were determined in accordance with ISO 6081 for the sound pressure level (LpA) and ISO 3744, DIN 45635, for the sound power level (LWA).

Vibration specification

The vibration specifications stipulated in accordance with Annex 1, Section 2.2 / 3.6.3. a of the EC Machine Directive are as follows:

Hand-arm vibration values	**10,3 m/sec²**

This weighted effective acceleration value was determined in accordance with ISO 8662 Part 1, DIN 45675, Section 9.

Technical modifications reserved

Rammax 1515

Representation and meaning of the used safety instructions

Different safety instructions are used in this manual. They always appear before the potentially dangerous activity. The safety instruction is shown and explained here:

Display:	Meaning:
DANGER!	Indicates a dangerous situation that might result in severe injuries or even death.
WARNING!	Indicates a dangerous situation that might result in severe injuries or even death.
CAUTION!	Indicates a dangerous situation that might result in light or minor injuries.
CAUTION!	Indicates a situation where the machine might be damaged.

The instruction always comes after the handling process or as a supplement to the text.

NOTE

Gives additional information about economical machine use and useful supplements.

ENVIRONMENT

Gives additional information about environmentally friendly machine use as well as disposal instructions for the machine and its components.

Intended use

The machine has been solely designed for compacting loose backfill, such as earth, gravel, sand or mixtures of these.

Unauthorised use is when the machne is used:
- on hard, already compacted or frozen ground.
- In flooded trenches.
- Underground.
- In enclosed areas and poorly ventilated surrounding
- For transporting objects or animals.

Operating personnel requirements

The personnel are only allowed to operate the machine alone if:
- They are at least 18 years old.
- They are physically fit and mentaly capable.
- They have read and understood all of this operating manual.
- They have been trained in the use of the machine and have proved their capability to the company.
- You can rely on them to carry out the jobs given to them.
- The company has authorised them to carry out the compacting.

Maintenance and repair personnel requirements

- Only qualified construction machinery drivers or mechanics are allowed to undertake the maintenance and repair work.
- Only specialists with hydraulic training are allowed to undertake the work on the hydraulic system.
- Only specialists with electrics or electronics qualifications are allowed to undertake the work on the electrical system.

Trainees

Trainees operating the machine

Trainees under the age of 18 are only permitted to operate the machine under supervision and only for training purposes.

Trainees maintaining the machine

Trainees under the age of 18 are only permitted to maintain the machine under supervision and only for training purposes. Only specialists holding the relevant qualifications are allowed to undertake the work on the electrical or hydraulic systems.

Safety equipment

The machine is equipped with various safety equipment. The function of the safety equipment must be checked before operating the machine. The machine must never operated with defective or missing safety devices. Do not disassemble, bypass or link out safety devices. Defective safety devices must be replaced immediately. The machine is equipped with the following safety equipment.

Shut down yoke

The shutdown yoke is fitted at the rear of the machine below the operating unit. It has two switch positions: "Locked“ *(Fig.S1)* and "Unlocked“ *(Fig.S2)*.

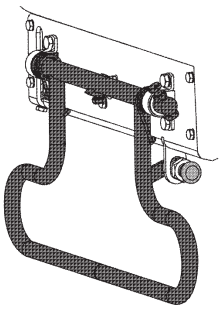


Abb. S1: Shut down yoke locked

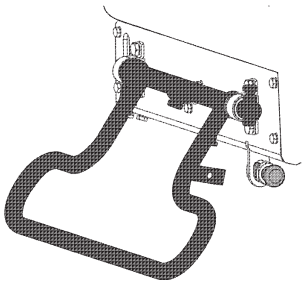


Abb. S2: Shut down yoke unlocked

This protects you from the machine jamming or being overrun when moving backwards. You can only move the machine forwards and away from an obstruction if it is activated. You can only move in reverse again after you have moved the shut down yoke back into the "Unlocked“ position. The shut down yoke must be unlocked before you can use the machine again.

Always use the shut down yoke to lock the machine when:
- transporting it,
- maintaining it,
- reparing it or
- parking it.

Unlock using the shut down yoke:

➡ Holding the shut down yoke tightly with your left hand.
➡ Pull out the spring-loaded locking bar with your right hand until the shut down yoke is visually unlocked *(Fig. S3)*.

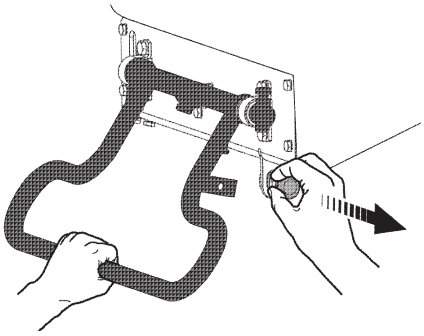


Abb. S3: Unlocking the shut down yoke

➡ Now use your left hand to move the shut down yoke upwards.
✓ The shut down yoke is now unlocked.

Locking using the shut down yoke:

➡ USe both hands to press the shut down yoke downwards until it visually locks into place *(Fig. S4)*.

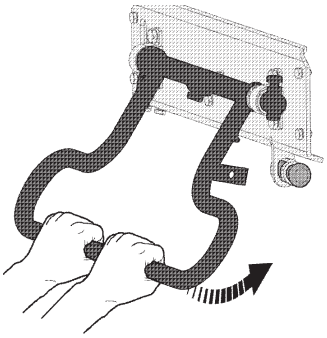


Fig. S4: Locking the shut down yoke

✓ The shut down yoke is now locked.

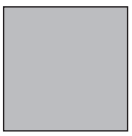
In-situ and remote shutting down

In-situ and remote shutting down processes are only applicable to machines equipped with remote infrared controllers. The processes are integrated in the machine's electronic control system. The machine will be stopped if either of them is activated. The engine will continue to run but all other functions will be stopped. It can only be used again after in-situ or remote shut down has been de-activated.

In-situ shutting down will be activated whenever the distance between the remote infrared controller and the machine drops to less than two metres. Increase the distance to de-activate this function. You must ensure that the in-situ shut down does not react to people that approach the machine. It must only react to the remote infrared controller.

Remote shut down will be activated whenever the distance between the remote infrared controller and the machine increases to more than twenty metres. Reduce the distance to de-activate this function.

Remote shut down



Active range

In-situ shut down

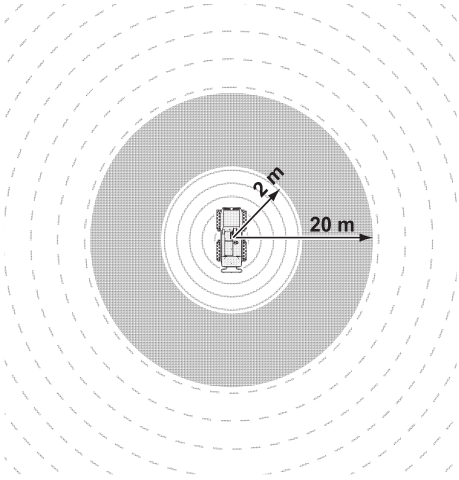


Fig. S5: Remote infrared controller

Inclination indicator

An inclination indicator has been integrated in the machine controller housing in machines fitted with remote cable and/or infrared controllers. It is integrated in the cockpit in the case of machines that only have manual controls.

The engine will be shut down if the machine exceeds a 45° inclination angle. The inclination direction is irrelevant here *(Fig. S6-S7)*. The machine can only be restarted after the inclination angle has been reduced and is no longer in the shut down range.

The inclination encoder does **not** prevent the machine from tipping over!

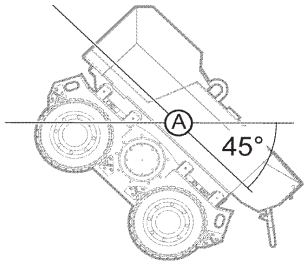


Fig. S6 630 mm drum

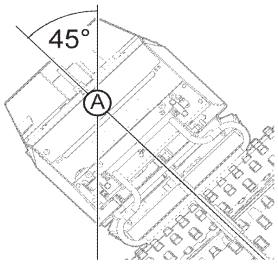


Fig. S7 Inclination angle

Centre of gravity

Always bear in mind the centre of gravity changes with the different drum widths *(Fig. S8-S9)*. The danger of tipping over sideways is greater with smaller drums than with wider drums. Machines fitted with 630 mm wide drums will tip over at a 30° side inclination and 850 mm wide drums will tip over at 40°.

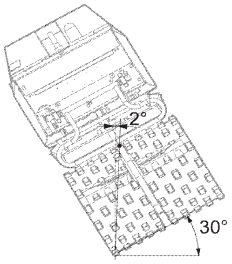


Fig. S8 630 mm drum

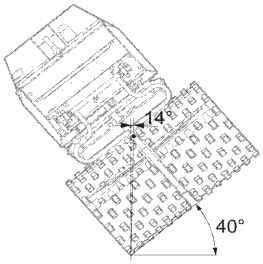
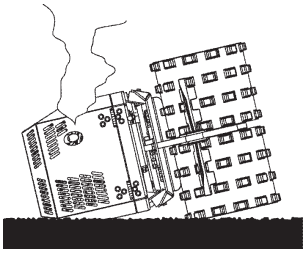


Fig. S9 850 mm drum

BEWARE!



Engine damage!

Engine oil can penetrate into the combustion chamber if the machine tips over The engine can be damaged, if it is started.

► Stand the machine upright. Never restart the engine.

► Inform your service workshop.

Operator's workplace

The operator's authorised workplace is the area at the rear of the machine, behind the cockpit The control commands for the machine's moving directions are only relevant from this position.

Under manual control

Operate the machine solely within the range marked in grey *(see Fig. S10)*. This is the shut down yoke's working range. You must ensure that both of your legs are always behind the shut down yoke, as the shut down yoke's working range is limited.

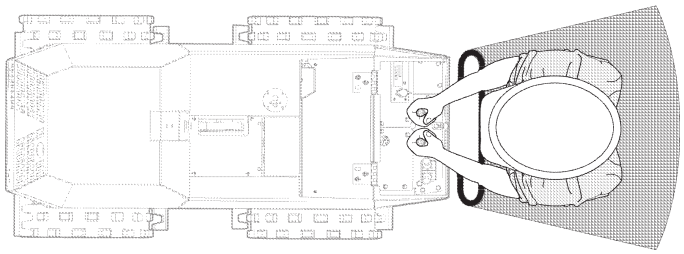


Fig. S10: Working position with manual controls (top view)

Using the remote cable control

Operate the machine solely within the range marked in grey *(see Fig. S11)*. The shut down yoke's working range is limited. You must ensure that both of your legs are always behind the shut down yoke when you are standing right by the machine.

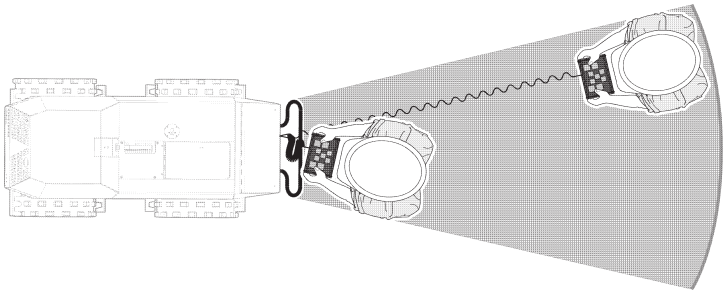


Fig. S11: Working position with remote cable controller (top view)

Using the infrared remote control

The range with the white background represents the controller's control switch and **not** the machine's moving direction. Operate the machine solely within the range marked in grey *(see Fig. S12)*.

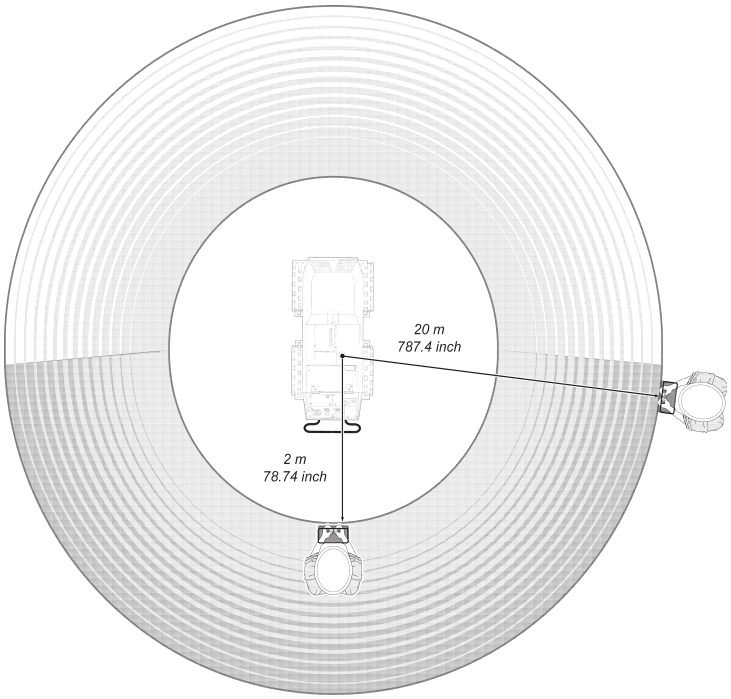


Fig. S12: Working position with remote infrared controller (top view)

Moving outside the shut down yoke's working range is only allowed if you maintain a safe distance due to the remote infrared controller's in-situ shut down function.

Machine operating safety

Personal protective clothing (PPC)

- **Industrial safety shoes**

Always wear industrial safety shoes when operating the machine.

- **Hearing protectors**

The obligation to wear hearing protectors depends on the law of the country in which the machine will be used. Check the local regulations and apply them accordingly.

The obligation to wear hearing protectors exists in Germany if the permitted noise level of 85 dB(A) is exceeded. This level can be exceeded, but it depends on where the machine is being used. Always wear hearing protectors if the noise level is exceeded.

General safety instructions

- The machine is only to be used as authorised and operated as stipulated in this operating manual.
- The machine is only to be operated from the designated operator driving position.
- The machine is only to be operated if all of the safety devices are working correctly.
- The machine operator must stop the machine if a person enters the danger zone. People must not enter the machine's danger zone until the diesel engine has reached a complete standstill.
- Any operational work on the machine that cannot be undertaken from the machine driver's position is only to be carried out after the machine has been stopped and secured against tipping over.
- The machine must only be used and operated so that its stability is guaranteed.
- The machine must be operated so that there is no danger of it falling in or tipping over when working in cracks, trenches, tips and embankments or by the sides of trenches and ledges.
- You must ensure that sufficient clean breathing air is present when working in enclosed areas, tunnels, galleries or deep trenches.
- The machine operator must leave the machine on solid ground that is as horizontal as possible before taking a workbreak or finishing for the day; The machine must also be secured against tipping over and sliding away if it is placed on sloping ground.
- The effectiveness of the positioning controls must never

be altered or increased without permission.
- The machine operator must always stand facing uphill when moving on declines.
- The machine operator then has the chance to secure the roller against inadvertent movement before leaving the machine operator's position. If the machine operator has to leave the roller he must first stop the traction drive engine and lock it against being switched back on.

Monitoring and checking

- The machine operator must check that the safety devices have been fitted correctly and that the operating controls and the safety devices work correctly before starting each working shift.
- The machine supervisor must monitor the compacting machine whilst it is being used to ensure that it is in a safe operating state.
- The supervisor must be informed immediately if any safety device problems or any other problems that might affect the safe operation of the machine are found.
- The machine must be stopped immediately if the problem endangers the personnel.
- The working safety of the compacting machine must be inspected at least once a year by a specialist or more often depending on the working conditions and the working ratio. The inspection result must be written down and kept at least until the next inspection. A specialist is someone who, as a result of his specialist training and experience, has adequate knowledge of the road roller and ground compactor sector and is also familiar with the applicable national occupational safety regulations, the accident prevention regulations and the generally recognised technology regulations (e.g. BG regulations, DIN standards, VDE agreement) so that he is able to evaluate the working safety of the road rollers and the ground compactors.

Safety when using the remote infrared control to operate the machine

- The remote infrared controller and the machine must be on the same channel when using the remote infrared controller to operate the machine. Read the *Remote „infrared controller / Resetting the channel“* chapter if you have to reset the channel.

Using several machines in synchronised operation

- You must ensure that the machines are using different channels.
- You can set up a maximum of ten machines to work in synchronisation. Ten is the number of channels available
- You must ensure that the machine operator is not obs-

tructed or endangered by this.

Safety when refuelling

- Only refill the machine when the engine is shut down.
- Refill the machine only after the engine has cooled down. The fuel might ignite if it comes into contact with a hot part of the engine.
- Always close the tank lid after refilling.

Safety when loading and transporting

- Suitable slings must be connected to the hoist connecting points when loading and transporting the compacting machines.
- If articulated roller have to be transported using hoists then the articulated section must be secured against moving beforehand.
- The loading ramps must be capable of taking the load, stable and free of dirt and ice. You must ensure that nobody will be endangered by the equipment tipping over or sliding off as well as when the equipment is being lifted or lowered.
- The machine's climbing ability must not be exceed during loading.
- The compactors must be secured in place against rolling, sliding and tipping over on the transport vehicle

Safety during maintenance

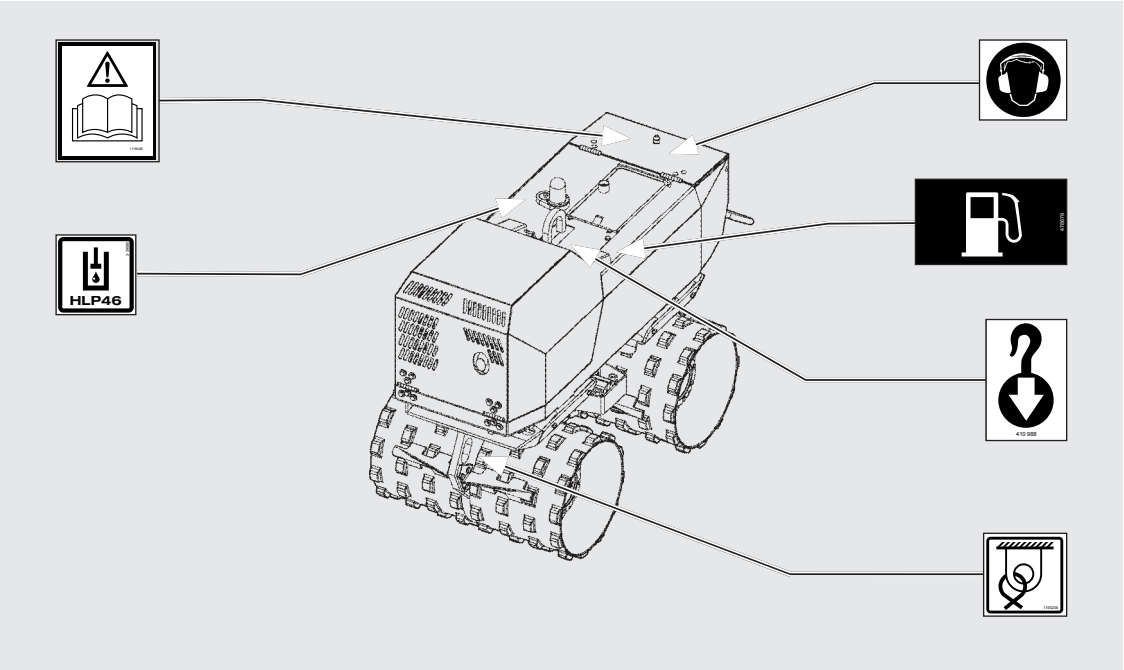
Service work covers inspections, maintenance and repairs.

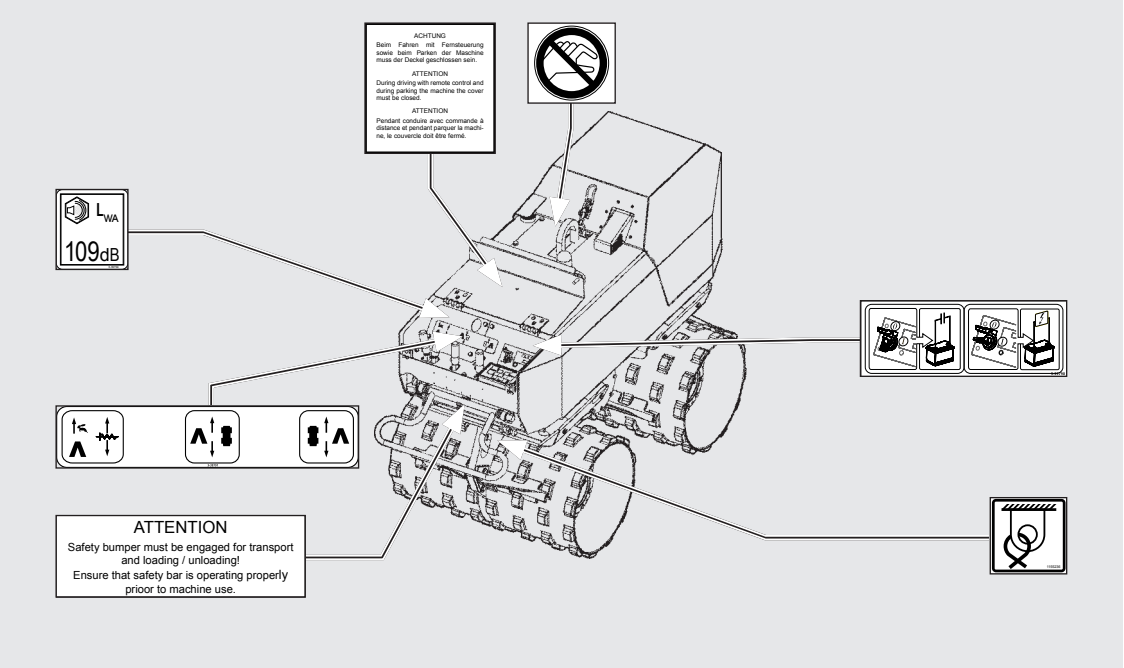
- Only specialists who have been trained on the equipment are allowed to undertake the work.
- The service work must be carried out as stipulated in this operating and maintenance manual.
- The service work is only to be carried out after the drives has been stopped. You are only permitted to deviate from this if the work cannot be carried out without a drive running.
- The hydraulic lines, pressurised lines and pressure accumulator must be depressurised before any work is carried out on them.
- The electrical connection between the combustion engine and the battery or the starter must be disconnected to prevent inadvertent restarting before working on non-fused parts of the compactor's electrical system.
- The articulated section of the articulated roller must be locked against moving and endangering the personnel before any maintenance work is carried out.
- The safety devices must be refitted correctly after the maintenance work has been completed.

Safety and advice sticker

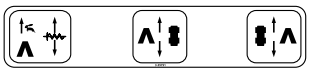
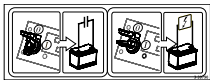
This sticker must be kept clean and legible. Replace any damaged or missing stickers immediately.

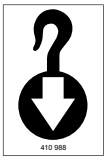
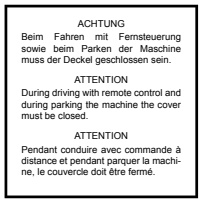
Sticker positioning





Sticker importance

Sticker	Meaning
	Shows the control lever switching directions for the following functions: Vibration / fast traverse, move left and move right.
	Shows the ignition switch positions for the following functions: Machine off / battery isolation switch active and ignition on / stand-by.
	Shows the noise level when the machine is running.
	WARNING! Hand injury! Do not put hands in the radiator fan when the machine is running.
	Indicates the hydraulic oil refilling opening. Only use hydraulic oil that meets the HLP 46 specification.
	Indicates the fuel refilling opening. Only use diesel that meets the following specifications: EN 590 or DIN 51601 - DK or BS 2869 A1 / A2 or ASTM D 975 - 1D/2D

Sticker	Meaning
	WARNING! Read the operating instructions! Read the operating instructions before operating the roller. Adhere to the safety regulations at all costs. Contact your Ammann representative if anything is unclear.
	Marked points where lashings can only be applied.
	Marked points at which the machine can only be lifted.
	WARNING! Wear ear protectors! Depending on the use of equipment it is possible that the allowed noise level of 85 dB (A) will be exceeded. Wear ear protectors in accordance with national accident prevention regulations when working at higher noise levels.
 ATTENTION Safety bumper must be engaged for transport and loading / unloading! Ensure that safety bar is operating properly prioor to machine use.	Attention Safety bumper must be engaged for transport and loading / unloading! Ensure that safety bar is operating properly prioor to machine use.
 ACHTUNG Beim Fahren mit Fernsteuerung sowie beim Parken der Maschine muss der Deckel geschlossen sein. ATTENTION During driving with remote control and during parking the machine the cover must be closed. ATTENTION Pendant conduire avec commande à distance et pendant parquer la machine, le couvercle doit être fermé.	Attention During driving with remote control and during parking the machine the cover must be closed.

The encapsulated construction protects the components against the effects of bad weather and dirt. The operating and maintenance points can easily be reached through the openings. Covers and flaps are used to close the openings.

BEWARE!

Risk of being crushed!

There are some sharp edges inbetween the openings and the adjacent components. Your fingers might get caught and cut by them when closing the openings.

Therefore:

- ► Always keep your hands and fingers away from the sharp points when closing the openings.
- ► Always use both hands to close the covers and flaps.
- ► Ensure that only one person closes the covers and flaps on their own.

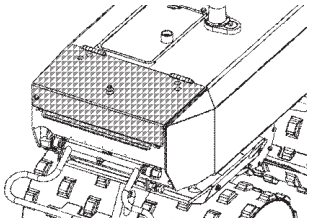
Damage caused by vibrations!

Vibrations occur when the machine is used. Any open or incorrectly closed covers and flaps might be damaged by the vibrations.

Therefore:

- ► Always ensure that all of the covers and flaps are closed correctly before you start using the machine.

Cockpit cover



The cockpit cover seals off the operating unit and protects the display and operating controls from dirt and humidity. There are holes on the left of the cockpit cover and the control unit. A commercial padlock can be fitted here to lock the cockpit cover in place *(Fig. OZ1)*.

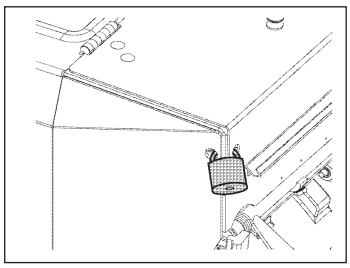


Fig. OZ1 Closing the cockpit cover

Two rubber brackets and two bolts (counter pieces) hold the cockpit cover closed *(Fig. OZ2-OZ3)*.

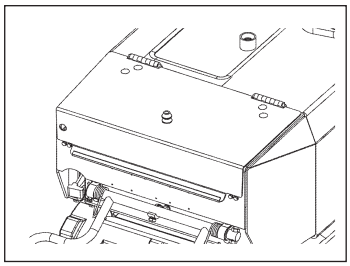


Fig. OZ2 Cockpit cover

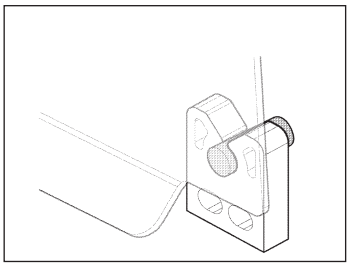


Fig. OZ3 Bracket

Opening the cockpit cover:

➡ Pull the cockpit cover slightly backwards and upwards *(Fig. OZ4)*.

➡ Now fold the cockpit cover downwards and press it down until it latches into the locking device *(Fig. OZ5)*.

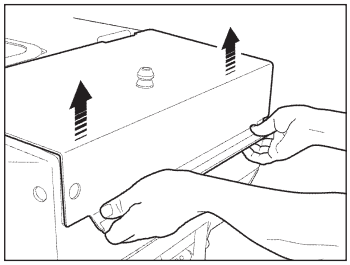


Fig. OZ4 Opening the cockpit cover

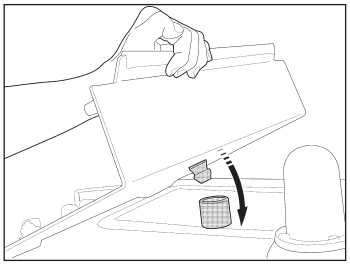


Abb. OZ5

✓ The cockpit cover is now open.

Closing the cockpit cover:

➡ Use both hands to pull the cockpit cover outwards until it is released from the locking device.

➡ Now use both hands to push the cockpit cover downwards until it is visually latched into both brackets.

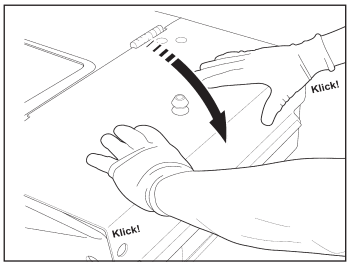


Fig. OZ6 Closing the cockpit cover

✓ The cockpit cover is now closed.

Storage compartment

The machine controller unit is built into the storage compartment. The remote infrared controller is stowed in the storage compartment for machines fitted with a remote infrared control system.

A spring-loaded locking bar holds the storage compartment cover closed. This locking bar is located in the centre of the operating unit.

Opening the storage compartment:

➡ Open the cockpit cover and hold it vertically, as shown in *Fig. OZ7*.

➡ Pull the locking bar "R“ *(Fig. OZ7)* up.

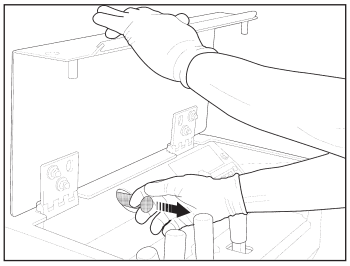


Fig. OZ7 Pulling the "R“ locking bar

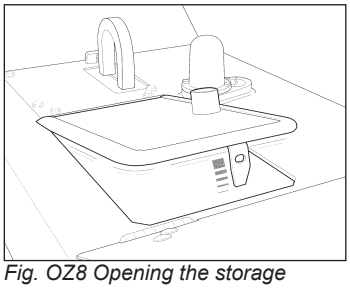


Fig. OZ8 Opening the storage compartment

✓ The storage compartment is now unlocked and folds up *(Fig. OZ8)*.

Closing the storage compartment:

➡ Use both hands to press the cover downwards until you hear it lock into place.

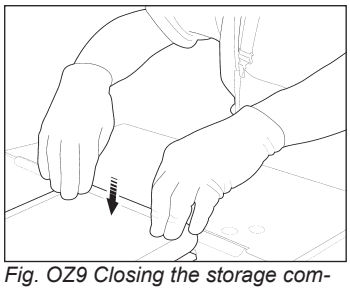


Fig. OZ9 Closing the storage compartment

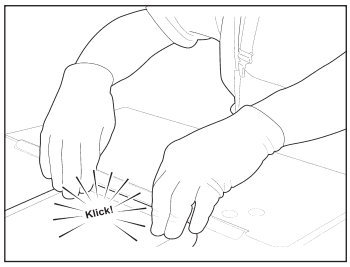
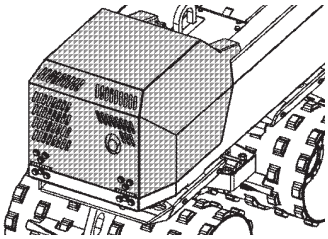


Fig. OZ10 Storage compartment locks into place

✓ The storage compartment is now closed.

Engine protection



The engine protector protects the diesel engine and the battery against dirt, humidity and mechanical damage. It also works as a noise insulator. The listed noise emission values were recorded with the engine protector closed.

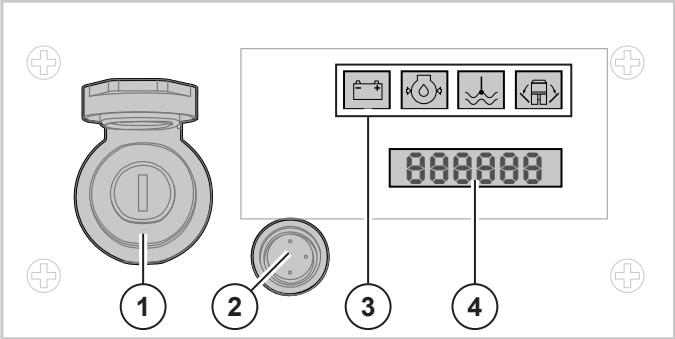
A fastener locks the engine protector in place. It is fitted in the centre at the top of the machine *(Fig. OZ10)*.

A gas-pressurised spring opens the engine protector when the fastener is unlocked. It supports the engine protector when it is open.

Opening the engine protector:
- ➡ Unlock the fastner.
- ➡ Press down on the engine protector with one hand and use your other hand to to push the locking hook upwards.
- ➡ Take your hand away from the engine protector to release it.
- ✓ The engine protector will fold upwards.

Closing the engine protector:
- ➡ Push the locking hook upwards so that it will be out of the way when you close the engine protector.
- ➡ Now use both hands to close the engine protector by pushing it downwards.
- ➡ Use one hand to hold the engine protector down and use the other hand to lock it in place with the fastener.
- ✓ The engine protector is now closed.

Cockpit view



1. **Ignition lock**
2. **Remote cable controller connection socket** *(not fitted with Rammax 1515-M)*
3. **Warning lights**
4. **Display**

Warning lights

Load check warning light

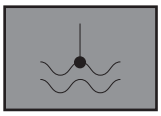
This warning light illuminates when the alternator is not generating the voltage. The stop program will be activated after the warning light has been on for 4 seconds. The machine is shutdown.

Possible cause: The alternator is defective. ► Contact your service workshop.

Oil pressure warning light

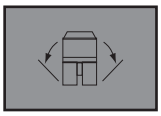
This warning light illuminates when the engine oil pressure drops. The stop program will be activated after the warning light has been on for 4 seconds. The machine is shutdown. It can only be moved again after the cause of the emergency stop has been eliminated.

Possible cause: Normally it is caused by the engine filling level being too low and it must be refilled with engine oil ► *See Page 63, "Refilling with engine oil" section*. **Contact your service workshop if low engine oil is not the casue.**



Water temperature warning light

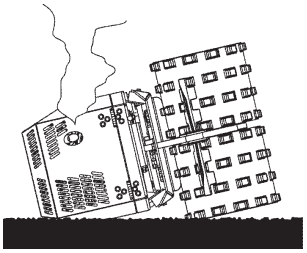
The machine is fitted with an air-cooled diesel engine. Therfore this warning light is not used with this model.



Tipping encoder warning light

This warning light illuminates when the tipping encoder trips. The engine switches itself off in this case automatically. The machine cannot be started as long as the inclination indicator is triggered.

CAUTION!



Engine damage!

Engine oil can penetrate into the combustion chamber if the machine tips over The engine can be damaged, if it is started.

Therefore:

► Stand the machine upright. Never restart the engine.

► Inform your service workshop.

Display

The display consists of a seven-digit display. It combines three different functions in a single display unit. These functions are:

Display example

Operating hour meter

The operating hour meter counts and saves the machine running time. The count starts when the ignition is switched on.

Display operating function example

Function code display

The function code display active when the machine is operating. It shows you the code's control command.

Fault display example

Fault code display

A possible defect will be detected by the machine controller and displayed.

Special fault display example

The defect is displayed as a fault code. There is a table with all of the fault codes and their meaning in the Appendix to this manual.

Cable remote control connection socket

Plug the remote cable controller's plug into this socket. The cable has been connected up in the factory. Machine version Rammax 1515-M does not have a connection socket.

Ignition lock

The ignition lock has three positions:

1) Ignition switched off: Switches the machine off. The ignition key can only be withdrawn in this position.
2) Stand-by : Switches the machine over to stand-by.
3) Sart engine: Activates the starter. The engine starts.

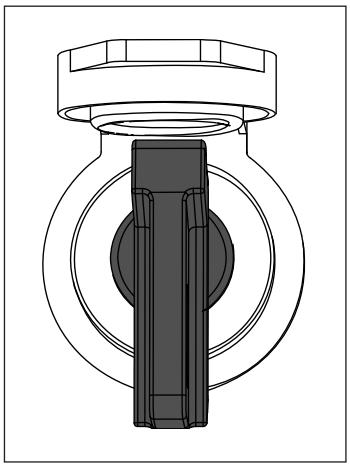


Fig. 1 Ignition switched off

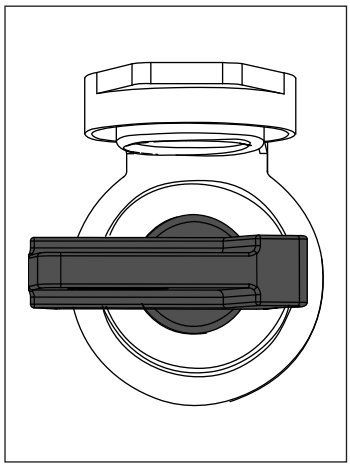


Fig. 2 Stand-by

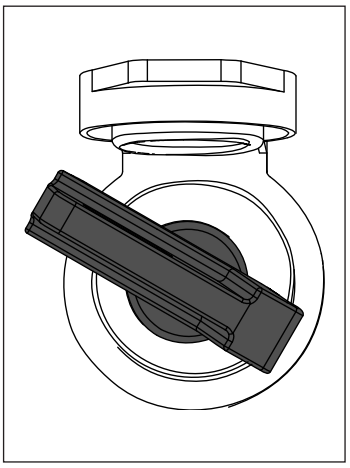
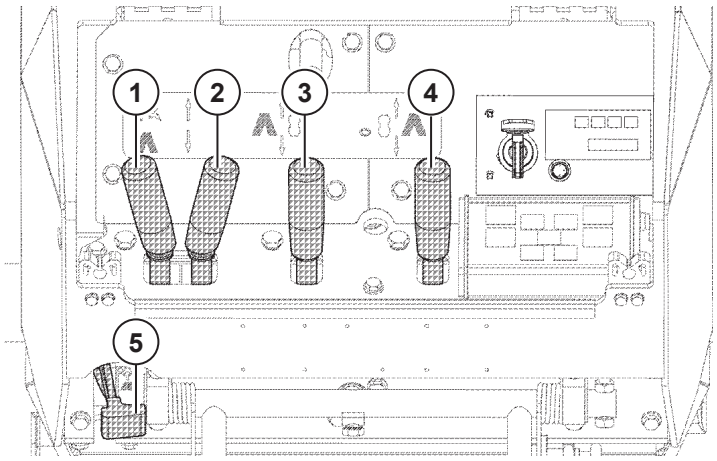


Fig 3 Start engine

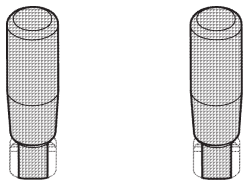
Manual controls

Controller controls view



1	**Fast traverse lever**
2	**Vibration lever**
3	**Left drum control lever**
4	**Right drum control lever**
5	**Gas lever**

Control lever



This lever is used to control the drum advance direction. The left control lever controls the left pair of drums and the right control lever controls the right pair. The drums cannot be controlled separately.

The machine will advance if you move both levers forwards. The machine will move in reverse if you move both levers backwards. The machine will turn on the spot if you move the lever diagonally.

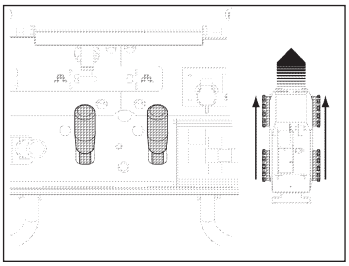


Fig. SE1 Traverse forward

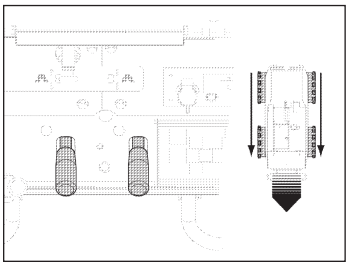


Fig SE2 Traverse backwards

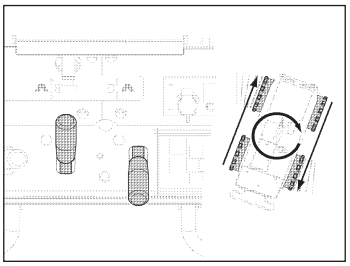
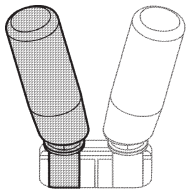


Fig. SE3 Turn to the right

Fast traverse lever



This lever is used to switch fast traverse On and Off. The machine moves twice as fast as normal mode when switched to fast traverse. The fast traverse lever function only works in conjunction with the control lever.

The lever has two switch position: Fast traverse switched off *(Fig. SE4)* and fast traverse switched on *(Fig. SE5)*:

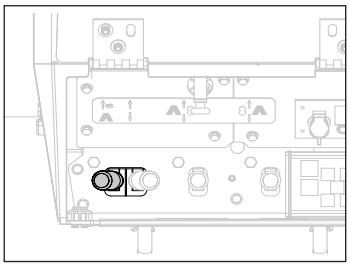


Fig. SE4 Fast traverse switched off

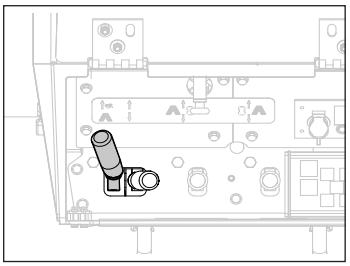
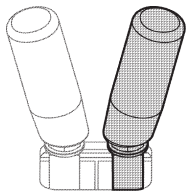


Fig. SE5 Fast traverse switched on

Fast traverse remains switched on until the lever is returned to the neutral position. Fast traverse is also switched off if one of the safety devices trips. However, the lever will remain locked in place. Move the lever into the neutral position before restarting the machine. Fast traverse is not activated automatically when the machine starts, only when the fast traverse lever is locked in place.

Vibration lever



This lever is used to change the vibration shaft's rotational direction or to switch the vibration function off. The vibration lever has three switch positions:

1) Vibration switched off *(Fig. SE6)*
2) Vibrate forwards *(Fig. SE7)*
3) Vibrate backwards *(Fig. SE8)*

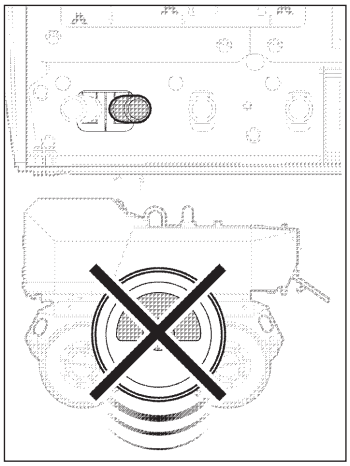


Fig. SE6 Vibration switched off

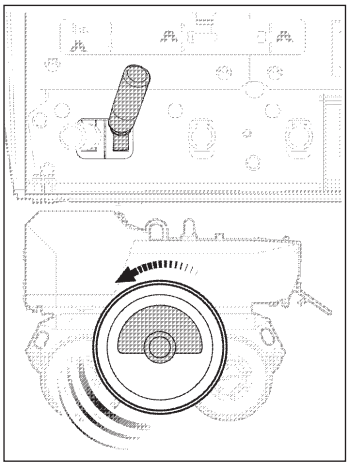


Fig. SE7 Vibrate forwards

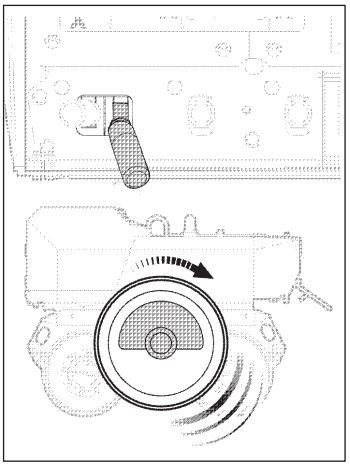


Fig. SE8 Vibrate backwards

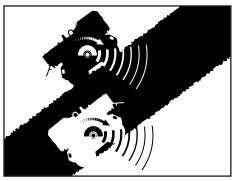
The vibration lever has a locking function. It remains in the position that it was switched to until it is moved again.

Reversing the rotational direction

Switch the vibration lever into the opposite position to reverse the vibration shaft's rotational direction.

The vibration shaft will be braked before it starts to accelerate in the opposite direction. This procedure takes a few moments.

NOTE



Change the rotational direction of the vibration shaft during the compacting work on slopes and declines so that it is always against the slope. This will increase the machine's climbing ability and the traction.

Engine revs setting lever

Use the setting lever to linearly control the engine revs. The engine can be switched off after the revs have been reduced to the minimum. The setting lever must be set to full power in order to build up the required machine operating pressure.

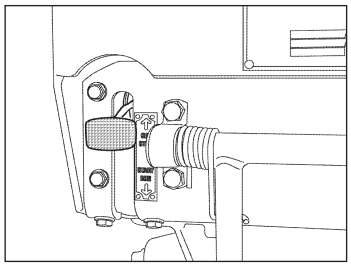


Fig. SE9 Stop engine

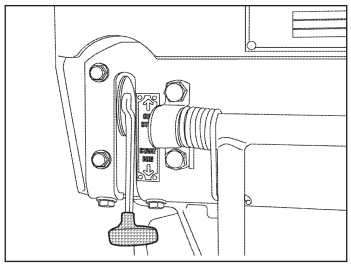


Fig. SE10 Maximum revs / full power

Variable excentric weight option

Machines with variable excentric weight use two different compression parameters. This option enables you to optimise the machine for use on different surfaces. The compression parameter selector switch is fitted on the left, above the cockpit:

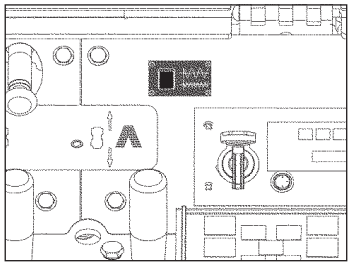


Fig. 1OV1 Selector switch location

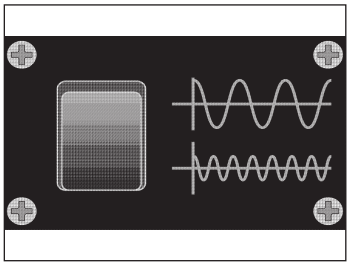
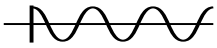


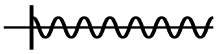
Fig. 2OV2 Selector switch

Compression parameter selector switch

The selector switch has two positions:



Switch position 1: Activates the larger amplitude. Use this switch position when working on saturated ground.



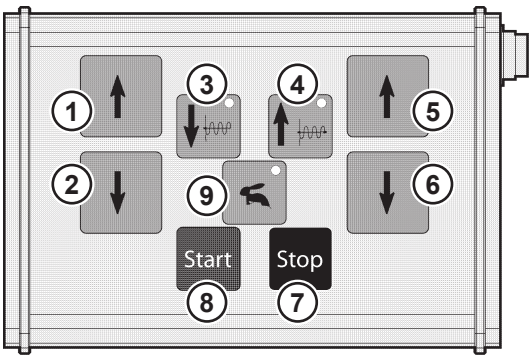
Switch position 2: Activates the smaller amplitude. Use this switch position when working on grainy and sandy ground or on gravel.

You can switch between the compression parameters at any time, even when you are using the vibration function.

Remote cable controller

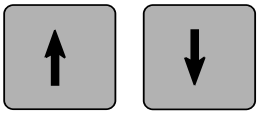
You can use the remote cable controller to control the machine from a safe distance. The maximum distance is about 80 cm.

Controls on the remote cable controller



1	**Drums left forward**
2	**Drums left backward**
3	**Vibration forward / Off**
4	**Vibration backward / Off**
5	**Right drums forward**
6	**Right drums backward**
7	**Stop engine**
8	**Start engine**
9	**Switching fast traverse On / Off**

Control buttons



These buttons are used to control the drums advance direction. The left control button controls the left pair of drums and the right control button controls the right drums. The drums cannot be controlled separately.

Press button 1 and 5 simultaneously to move the machine forwards.

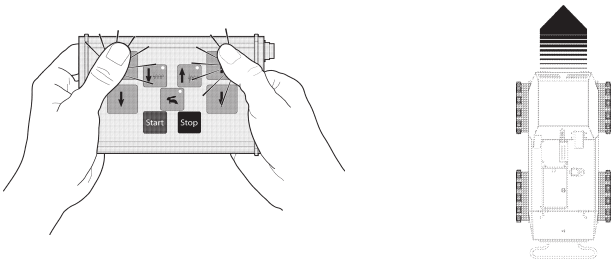


Fig. SE11 Traverse forward using remote cable controller

Press button ② and ⑥ simultaneously to move the machine backwards.

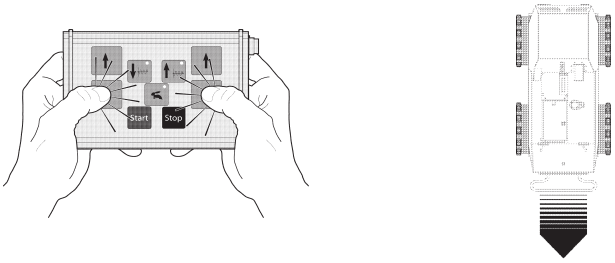


Fig. SE12 Traverse backward using remote cable controller

Press button ① and ⑥ simultaneously to turn the machine in position.

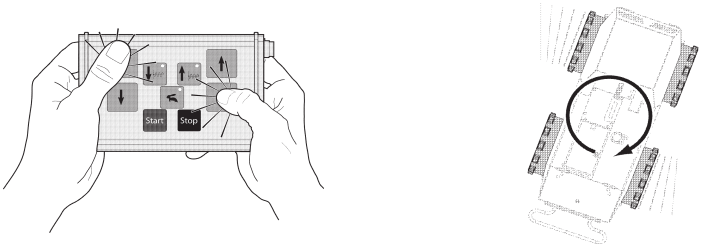


Fig. SE13 Turn right using remote cable controller

Fast traverse button

This button is used to switch fast traverse On and Off. The machine moves twice as fast as normal mode when switched to fast traverse. The fast traverse function can only be used in conjunction the traversing function.

The fast traverse button has two switch positions: Fast traverse switched off and fast traverse switched on. The diode on the button illuminates *(Fig. SE15)* when fast traverse is switched on.

Fig. SE14 Fast traverse switched off

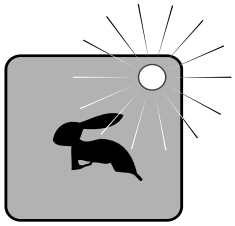


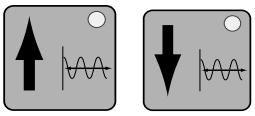
Fig. SE15 Fast traverse switched on

The fast traverse button has a locking function. It remains switched on after it has been pressed. Press the fast traverse button once again to switch the function off.

- The fast traverse function will be switched off automatically if:
- One of the dafety devices trips
- The vibration function is switched on
- The machine is shutdown.

You cannot switch over to fast traverse if the vibration function is switched on. Switch the vibration function off first and then switch the fast traverse function on.

Vibration buttons



These buttons are used to switch the vibration function On and Off. The vibration function has two rotational directions: Vibrate forward and vibrate backward.

The vibration buttons have locking functions. They remain switched on after either button is pressed. The diode on the active button illuminates when the vibration function is switched on *(Figs. SE16 - SE18)*.

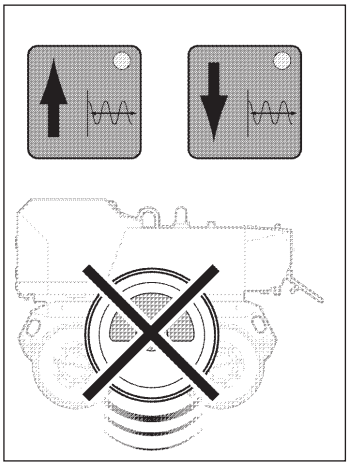


Fig. SE16 Vibration switched off

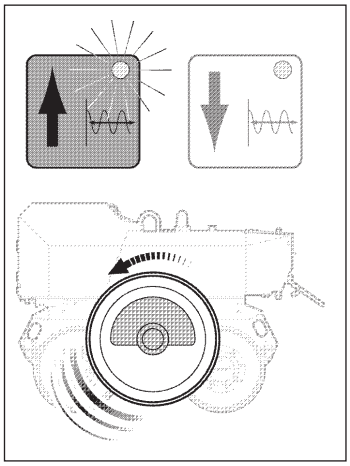


Fig. SE17 Vibrate forwards

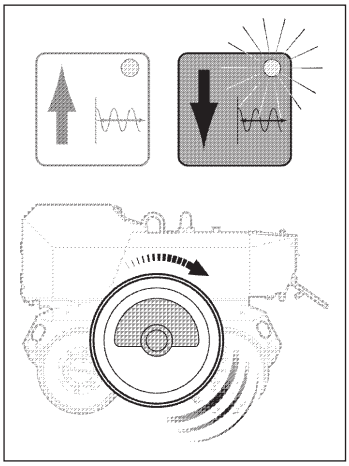


Fig. SE18 Vibrate backwards

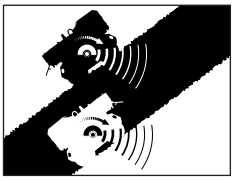
Reversing the rotational direction

Only one vibration button and therefore one rotational direction can be active at any time. Press the vibration button for

the opposite rotational direction to change the vibration shaft's rotational direction. The active vibration button will then be switched off automatically.

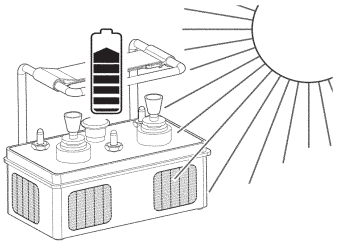
The vibration shaft will be braked before it starts to accelerate in the opposite direction. This procedure takes a few moments.

NOTE



Change the rotational direction of the vibration shaft during the compacting work on slopes and declines so that it is always against the slope. This will increase the machine's climbing ability and the traction.

Infrared controller

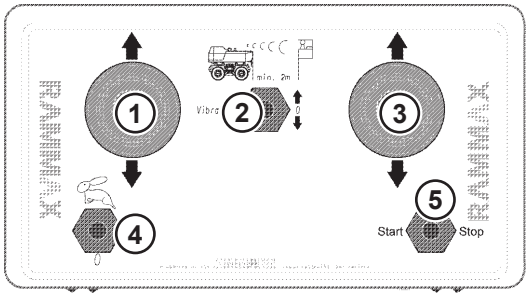


Use the remote infrared controller to control the machine from a safe distance. The maximum range is 20 m.

The power for the remote infrared controller comes from solar cells. Batteries are not needed.

Dust and dirt on the solar cell surfaces cause poor light yield, which results in low energy efficiency. Dirty solar cells can drain the batteries in the infrared remote control. Therefore, clean the solar cells immediately.

Controls on the remote infrared controller



①	**Left drums forward / backward**
②	**Vibration forward / backward / Off**
③	**Right drums forward / backward**
④	**Fast gear on/off**
⑤	**Engine Start / Stop**

Control lever

This lever is used to control the drums advance direction. The left control lever controls the left pair of drums and the right control lever controls the right pair. The drums cannot be controlled separately.

The machine will advance if you move both levers forwards. The machine will move in reverse if you move both levers backwards.

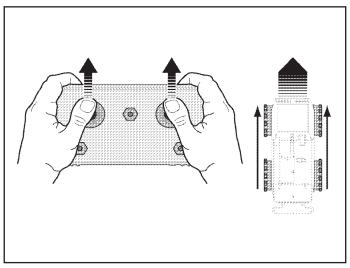


Fig. SE19 Traverse forward

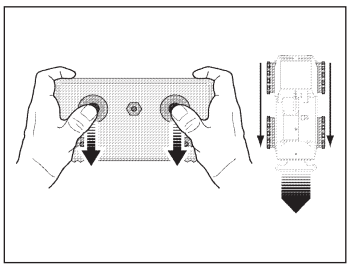
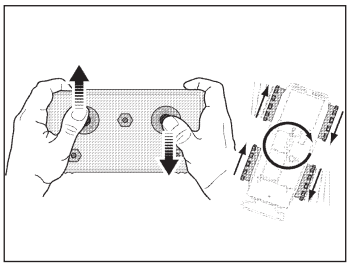


Fig SE20 Traverse backwards

The machine will turn on the spot if you move the lever diagonally.



FFig. SE21 Turn to the right

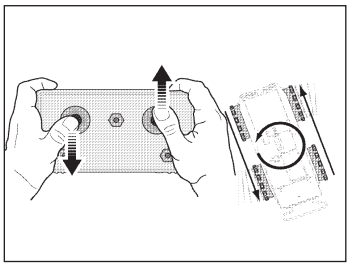


Fig. SE22 Turn to the left

Fast traverse switch

This switch is used to switch fast traverse On and Off. The machine moves twice as fast as normal mode when switched to fast traverse. The fast traverse switch function only works in conjunction with the control lever.

The lever has two switch position:

- Fast traverse switched off *(Fig. SE23)*
- Fast traverse switched on *(Fig. SE24)*

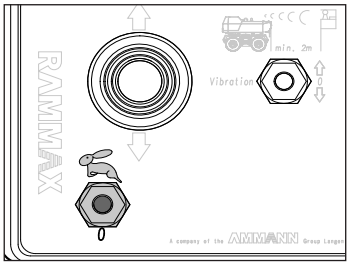


Fig. SE23 Fast traverse switched off

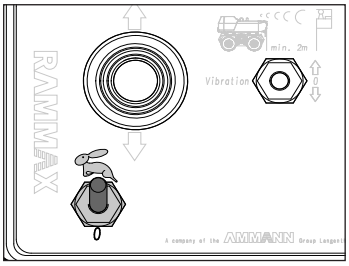
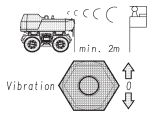


Fig. SE24 Fast traverse switched on

Fast traverse remains switched on until the fast traverse switch is returned to the neutral position. Fast traverse is also switched off if one of the safety devices trips. However, the switch will remain locked in place. Move the switch into the neutral position before restarting the machine. Fast traverse is not activated automatically when the machine starts, only when the fast traverse switch is locked in place.

Vibration switch



This switch is used to switch the vibration function On and Off. The vibrations switch has three switch positions:

- Vibration switched off *(Fig. SE25)*
- Vibratate forwards *(Fig. SE26)*
- Vibrate backwards *(Fig. SE27)*

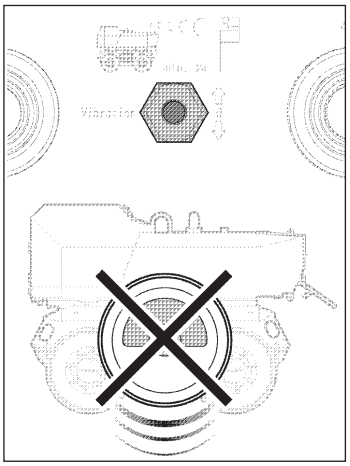


Fig. SE25 Vibration switched off

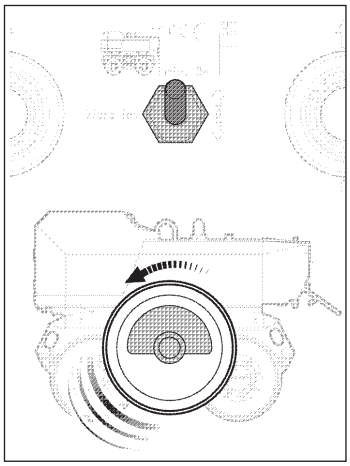


Fig. SE26 Vibratate forwards

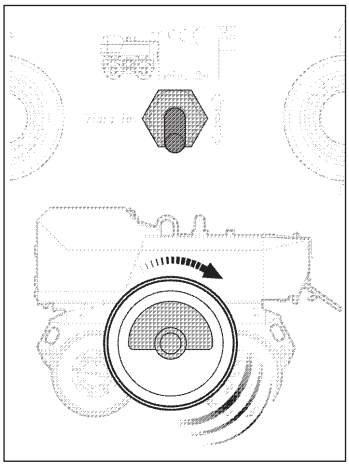


Fig. SE27 Vibrate backwards

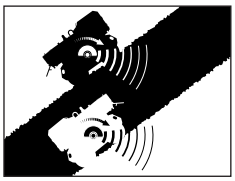
The vibration switch has a locking function. It remains in the position that it was switched to until it is moved again.

Reversing the rotational direction

Switch the vibration lever into the opposite position to reverse the vibration shaft's rotational direction.

The vibration shaft will be braked before it starts to accelerate in the opposite direction. This procedure takes a few moments.

NOTE



Change the rotational direction of the vibration shaft during the compacting work on slopes and declines so that it is always against the slope. This will increase the machine's climbing ability and the traction.

Setting up the transfer addresses

The remote infrared controller transfer the control command to the machine via an infrared signal. There are ten different transfer addresses. The same address must be selected on both so that the machine can react to the control command from the remote infrared controller. The adjustment wheels

(Fig.SE28) on the machine control unit and the remote infrared controller are used for setting up the transfer address. Address "5“ was set up in the factory.

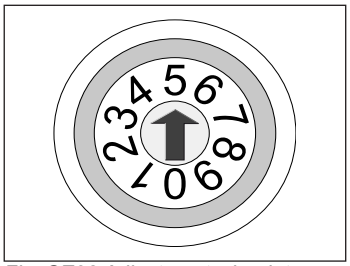


Fig. SE28 Adjustment wheel, top view

Setting the transfer addresses to be the same:

➡ Open the storage compartment.

➡ Use a small flat-ended screwdriver to select the transfer address on the machine control unit that you want to use *(Fig. SE29)*.

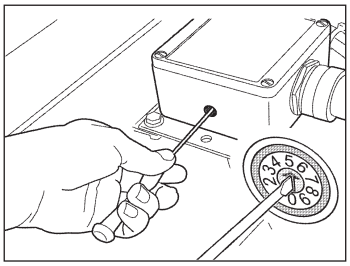


Fig. SE29 Setting up

➡ Remove the stopper on the remote infrared controller *(Fig. SE30)*.

➡ Setup the same transfer address on the remote infrared controller *(Fig. SE31)*.

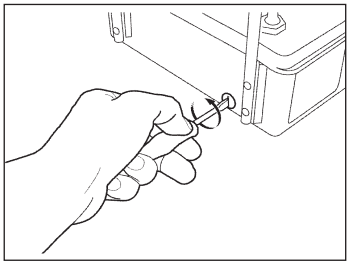


Fig. SE30 Machine controller adjustment wheel

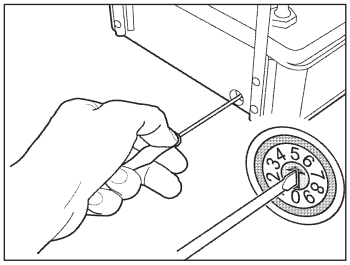


Fig. SE31 Remote infrared controller adjustment wheel

✓ The same transfer addresses have now been set up.

Refuelling

Check the fuel level in the fuel display *(Fig. BA1)*, before you refill with fuel. The fuel display is fitted on the left in the engine area *(Fig. BA2)*.

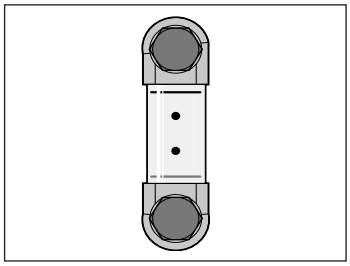


Fig. BA1 Fuel display

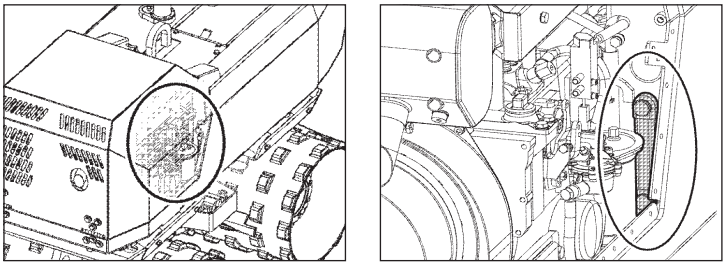


Fig. BA2 Fuel display location

Refill with fuel after:

- ➡ Switching the machine off and removing the ignition key.
- ➡ Opening the engine protector:
- ➡ Opening the tank cover *(Fig. BA3)*.
- ➡ Refill with diesel and check the fuel display filling level as well. Use a funnel or a fuel hose for the refilling *(Fig. BA4)*.

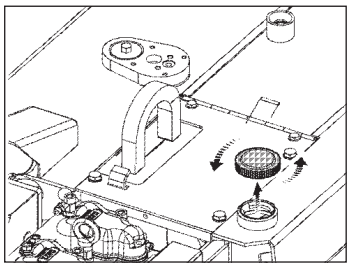


Fig. BA3 Opening the tank cover

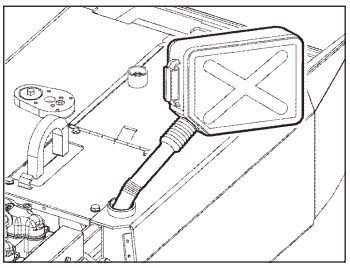


Fig. BA4 Refuelling using a fuel hose

Refilling with hydraulic oil

The hydraulic oil display *(Fig. BA5)* shows you the oil level in the hydraulic oil tank. It is fitted on the right in the engine area, above the battery *(Fig. BA6)*.

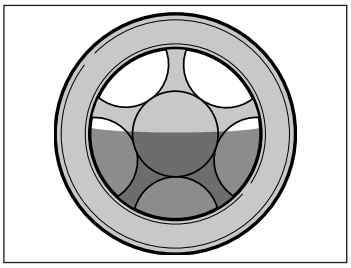


Fig. BA5 Hydraulic oil display

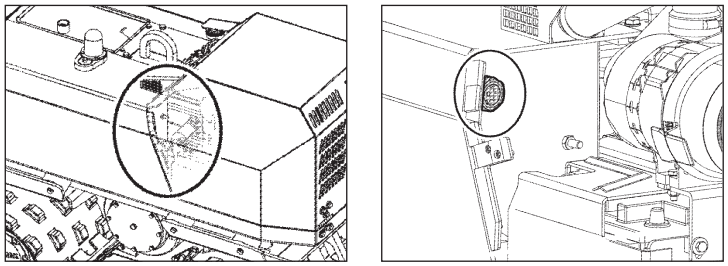


Fig. BA6 Hydraulic oil display location

The oil level must always be visible in the inspection glass. Refill with hydraulic oil if the oil level drops into the bottom third.

	NOTE
	The hydraulic system probably has a leak if the hydraulic tank oil level drops often and severely. ► Inform your service workshop.

Refill with hydraulic oil after:
- ➡ Switching the machine off and removing the ignition key.
- ➡ Opening the engine protector:
- ➡ Opening the tank cover.
- ➡ Refill with hydraulic oil and check the fuel display filling level as well.

Refilling with engine oil

Use the engine dip-stick to check the level of the engine oil. It is fitted on the right side of the engine *(Fig. BA8)*.

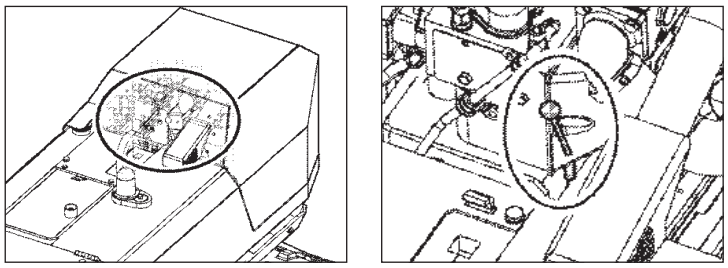


Fig. BA8 Engine oil dip-stick location

Check the engine oil level as follows:
- ➡ Open the engine protector:
- ➡ Pull out the engine oil dip-stick and use a clean cloth to wipe it clean.
- ➡ Put the engine oil dip-stick back in.
- ➡ Pull the dip-stick back out and read the level. The level must lie inbetween the two marks.

Refill with engine oil after:
- ➡ Opening the refilling opening cover *(Fig. BA9)*.
- ➡ Refill with engine oil and check the filling level as well.
- ➡ Repeat the previous process until the level lies inbetween the marks.
- ➡ Close the oil refilling opening cover.
- ✓ Refilling with engine oil has been completed.

Initial commissioning

Packing

Remove the film from the machine and dispose of it in compliance with the national regulations.

Machine data

Enter the data listed on Page 4 of this operating manual. The operating manual will help you set up the machine.

Ready for use

The machine is ready for use when it leaves the factory. The hydraulic oil and the engine oil tanks have already been filled.

The fuel tank has not been filled completely. Refill with fuel before starting work.

Checking before starting work

Check the operating medium levels

Always check the fuel and refill whenever necessary before starting work. You will find the fuel specifications in the *"Technical specifications"* chapter.

Check the safety devices

Check that the machine's safety devices are working. Only use the machine if the safety devices are working correctly.

Check the screw connections

Check that the screw connections are tight. Any loose components will be damaged when the machine is used.

Check that all of the accesses and openings have been closed or locked. The vibrations will damage any open covers or flaps when the machine is being used.

Always check the following before using the remote infrared controller

Check the address settings of all of the machines at the site before using them. You must ensure that each address is only used once per machine.

CAUTION!

Danger of injury!

Different addresses must be set up on the machines if you are going to use several machines simultaneously at the same site. Otherwise it might happen that you find yourself controlling several machines from a single remote infrared controller and injuring other people.

Therefore:

- ► Always check the transfer addresses on the machines that you will be using before starting work.
- ► Never use more than ten machines simultaneously in infrared mode.

Starting the machine

Check the surrounding area for possible sources of danger before starting work with the machine.

- ➡ Unlock the safety yoke.
- ➡ Set the engine revs adjustment lever to full power.
- ➡ Open the cockpit cover and insert the ignition key in the ignition lock.
- ➡ Turn the ignition key to Position 2.
- ✓ The machine is now at "Stand-by“. It is ready to start.

NOTE

Stop the start process if the diesel engine has not caught after 15 seconds.

The diesel engine is fitted with a starter protection module to protect the starter. The diesel engine cannot be restarted immediately after start attempt.

- ► Switch the ignition off and wait for 30 seconds.
- ► Restart the engine.
- ► Contact your service workshop if the diesel engine does not catch after several attempts.

Select the control mode that you want to work with:

Starting up using the manual controls

➡ Turn the ignition key to Position 3.
✓ The engine starts.

Starting up using the remote cable controller

➡ Press the "Start“ button until the engine starts.
✓ The engine starts.

Starting up using the remote infrared controller

➡ Press the "Start/Stop“ switch to the "Start“ position on the right until the engine starts.
✓ The engine starts.

Compacting subsoil

Several passes will be needed until the subsoil is fully compacted. The number of passes needed depends on the composition of the subsoil. Machines fitted with "Ammann Compaction Expert (ACE)“ display when the subsoil has been compacted. Table *MBT1* shows the approximate number of passes needed for a 30 cm layer:

Subsoil / Ground type	Passes needed
Gravel, sand	approx.3 - 5
Mixed ground	approx.3 - 5
Coarse clay, clay	approx.3 - 5

MBT1: Making a pass

Move the machine onto the ground that has to be compacted. Switch fast traverse on if you have to cover a long distance. Switch fast traverse off again before you start the compacting.

Compacting a level surface

The vibration shaft's rotational direction is not important on a level surface.

➡ Switch one of the two vibration functions on.

Compacting banks and slopes

WARNING!

Mortal danger!

Loose material on slopes can start to slip as a result of the vibrations or the weight of the machine. Personnel working lower down below the machine might be buried or run over by the machine.

Therefore

► Always proceed so that you are facing uphill when working

► Stop working if somebody is at the bottom of the slope.

► Never move crossways on a slope.

➡ Move the machine up to the edge of the embankment *(Fig. MB1-MB2)*.

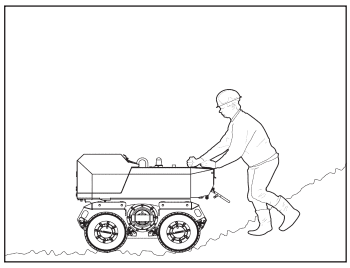


Fig. MB1 Coming from below

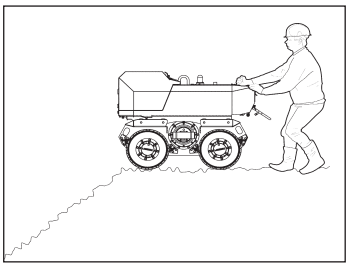


Fig. MB2 Coming from above

➡ Switch the vibration function to backward *(Fig. MB2)*: The flyweight shaft will rotate against the slope *(Fig. MB3)*

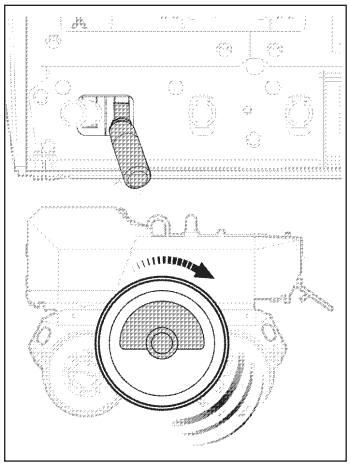


Fig. MB2: Vibration reverse

➡ Pass over the subsoil until it is compacted.

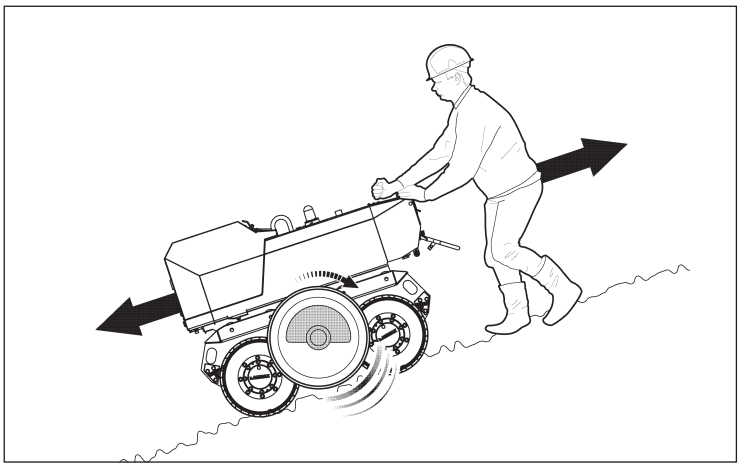


Fig. MB3: Compacting an embankment

Compacting embankments using a cable controller:

➡ Move the machine backward from below onto the base of the embankment *(Fig. MB4)*.

➡ Switch the vibration function to backward *(Fig. MB5)*.

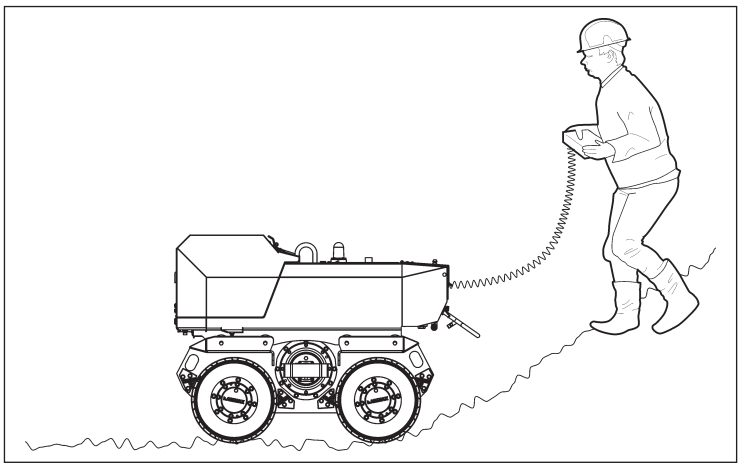


Fig. MB4: Machine at the bottom of an embankment

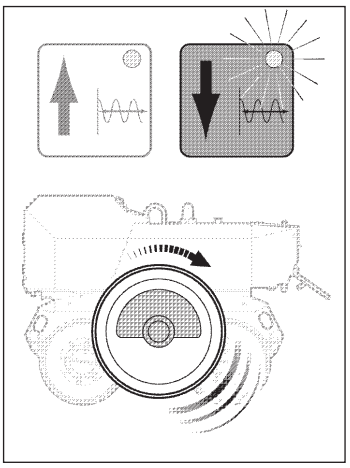


Fig. MB5: Vibration reverse

➡ Move the machine backwards and up and down the embankment until the subsoil is compacted.

Compacting embankments using a remote infrared controller:

➡ Move the machine backward from below onto the base of the embankment *(Fig. MB6)*.

➡ Switch the vibration function to backward *(Fig. MB7)*.

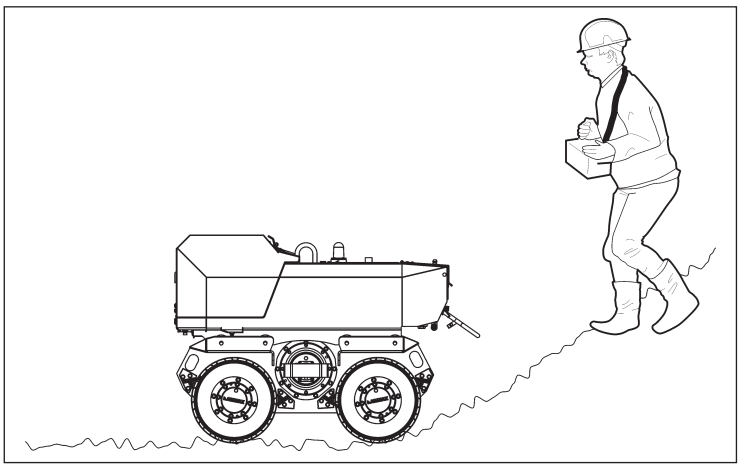


Fig. MB6: Machine at the bottom of an embankment

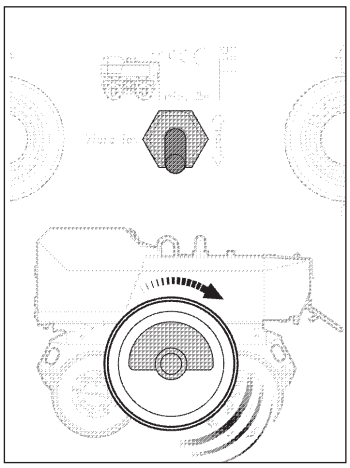


Fig. MB7: Vibration reverse

Changing the control mode

It might become necessary to change to another control mode whilst working. This can be done at any time. Bear the following in mind:

- The machine only reacts to the control mode with which your engine was started.

You can change over directly from remote infrared or cable control to manual control.

You must use the active remote control to switch the engine off first if you want to change beteen the two remote control modes.

Shutting down / parking the machine

Bear the following points in mind when shutting the machine down:

- Always try to park the machine on a level surface.
- Always use chocks if the machine if the machine has to be parked on a slope.
- You must ensure that the machine is not in anybody else's way.
- Retract the shut down yoke.
- Always remove the ignition key from the ignition lock.
- Stow the remote controllers in their correct places.
- Close the covers and flaps.

➡ Drive the machine on level ground.
➡ Turn the ignition key back to position 1 and remove it.

NOTE

Diesel engine run-on!

Despite activation of the stop signal, the diesel engine may run on for a while. This happens in the following situations:

- If the diesel engine is started and switched off several times during a short period.
- When there is air in the fuel circuit.

► After start-up, let the diesel engine run for at least 5 minutes.

► Avoid short running times and intervals.

► Don’t run the fuel reserve all the way to empty. Fill the fuel tank in a timely manner.

Only use a transport vehicle that has sufficient load bearing capability to transport the machine. Check the load distribution on the transport vehicle.

Lifting the machine onto the transport vehicle

Only use lifting equipment with a load lifting capability of at least 2,000 Kg.

The machine has a transport hoop *(Abb MT1)*. It is attached to the casing *(Fig. MT2)*. This ensures that the rubber-bonded metal, between the upper and lower casing, is not stressed when the machine is hoisted. Only the transport hoop is to be used to lift the machine.

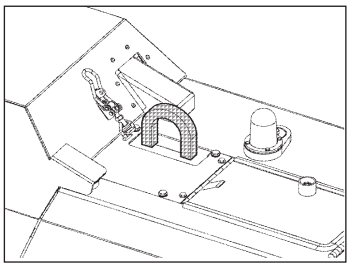


Fig. MT1: Transport hoop

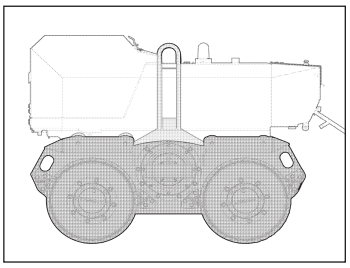


Fig. MT2: Upper and lower casing

The transport hoop must always swing free when the machine is being used *(Fig. MT3)*. Lifting equipment attached to the transport hoop will permanently rub against the transport hoop due to the casing's swinging movement. The material will be worn away and the transport hoop's cross-section will be reduced. This will reduce its load bearing capability *(Figs. MT3 to MT5)*.

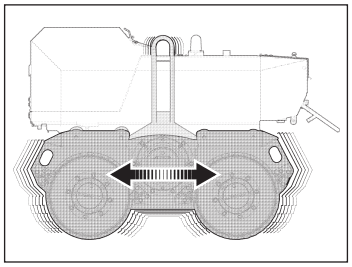


Fig. MT3: Swinging movement

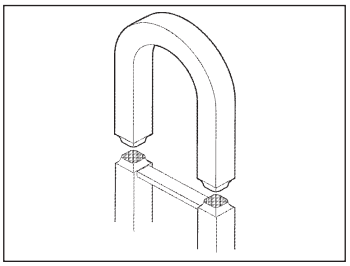


Fig. MT4: Cross-section

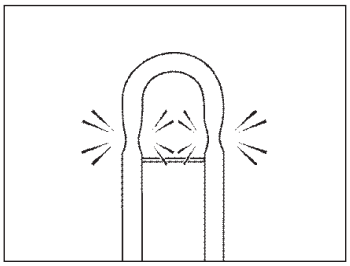


Fig. MT5: Cross-section

The area underneath the transport bracket is protected against the ingress of foreign matter and dirt by a foam sheet. Lifting gear attached to the machine can damage the foam sheet. It is possible that the lifting equipment (chains, ropes) might become trapped inbetween the transport hoop and the casing *(Fig MT6)*. If the hoop can no longer swing freely together with the chassis due to the trapped lifting gear then this will result in material fatigue at the weld seam *(Fig. MT7)* and strain the components. This can lead to cracking of the transport hoop and in the central beam of the chassis around the flyweight housing *(Fig. MT8)*.

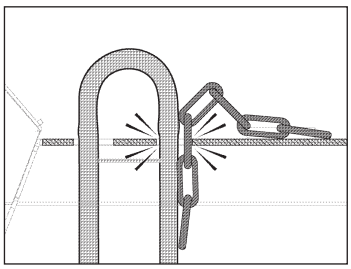


Fig. MT6: Lifting equipment trapped in place

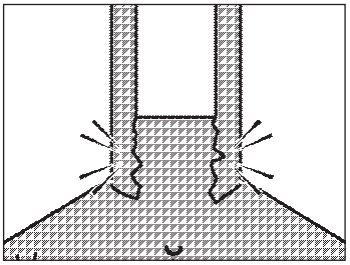


Fig. MT7: Material fatigue

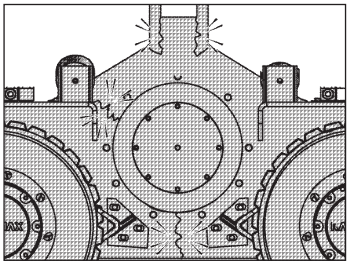


Fig. MT8: Cracks

WARNING!

Danger from falling objects!

Damaged transport hoops can break under load. Machines can be dropped during the loading and unloading process.

Therefore

► Always check the state of the transport hoop and the foam plate before loading.

► Change the foam plate immediately if you find that it is damaged.

► Remove any gravel or stones that have collected between the transport hoop and complete frame.

Load the machine as follows:

➡ Put chocks under the transport vehicles wheels.
➡ Lock the shut down yoke in place.
➡ Attach the lifting equipment to the machine's transport hoop.
➡ Load the machine.
➡ Remove the lifting equipment that was used after finishing the loading.

Driving the machine up onto the transport vehicle

Use a suitable driving ramp to move the machine onto the transport vehicle. Only use driving ramps:

- that are not damaged and are free of dirt, oil, grease and ice
- that have sufficient load bearing capability,
- have a suitable non-slip surface so that the machine will not slide off.
- of sufficient length so that the maximum incline angle is 30°

Always abide by the climbing capability of the machine. It must never be exceeded.

Use chocks to secure the transport vehicles wheels in place.

Use the remote cable or infrared controller (if fitted) to move the machine up onto the transport vehicle. This will enable you to stand away from the immediate danger area.

Always stand by the incline when moving the machine onto or off of the transport vehicle *(Fig. MT9)*

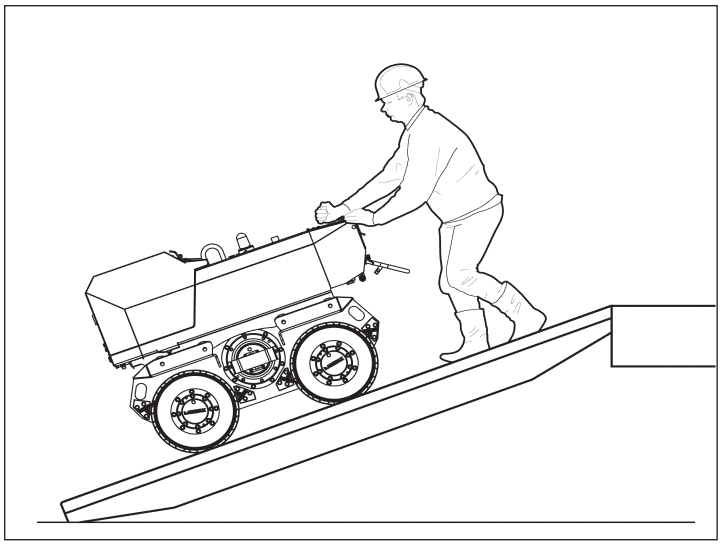


Fig. MT9 Going up an incline

Securing the machine for transport

Only use suitable slings to secure the machine for transporting.

The edges of the transport-eyes are sharp. Always use edge protectors when using fibre ropes. They will protect the fibre ropes from being damaged.

1) Lock the shut down yoke in place.
2) Put the chock blocks (K) on both sides of the machine centrally under the drums. ► The chock blocks must be aligned opposite to each other, since the machine could otherwise move in one direction.

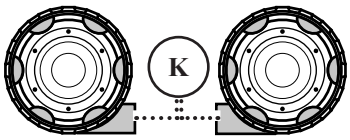


Fig. MT10 Correctly positioned

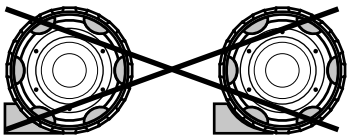


Fig. MT11 Wrongly positioned

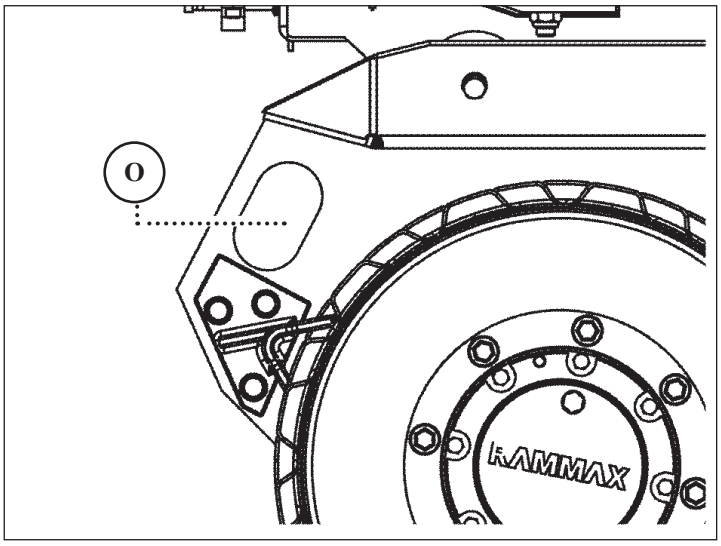


Fig. MT12 Front transport-eye

1) Attach the slings to the machine's transport-eyes (O) and the transport vehicle's eyes. Clamp the machine evenly above the cross on the transport platform.
2) Check the load safeguard equipment again before transport.
3) Remove all loose items from the load and transport platform. ► Loose items can fall off the vehicle when driving and endanger others.

Maintenance plan

Description:	Remarks:	Page:
Every day		
• Check engine oil level	• Observe gauge marking	35
• Check hydraulic oil level	• Oil sight glass	35
• Check hydraulic filter element		
• Check fuel level	• Sight glass	36
• Check air filter		38
• Diesel engine see Hatz 2G40 operating manual	(Annex)	
After 25 hours of operation		
• Check all bolts and screws for tightness	Tightening torques	
• Change the fuel filter		36
• Diesel engine see Hatz 2G40 operating manual	(Annex)	
• Replace high-pressure filter element		
After 75 hours of operation		
• Replace air filter cartridge (earlier, if necessary)		40
• Service the battery	Grease the terminals	37
• Attention! : engine oil for the diesel engine (see Hatz 2G40 operating manual)	(see Annex)	
Every 100 operating hours		
• Clean or replace air filter cartridge	(earlier, if necessary)	38
• Service the battery		43
Every 250 operating hours		
• Check the oil level in the travel drives		
• Check all bolts and screws for tightness	Tightening torques	41
• Drain water from diesel line filter or replace filter		36
• Inspect all diesel lines for leaks		36
Every 500 operating hours		
• Diesel engine see Hatz 2G40 operating manual	(see Annex)	40
• Change the transmission oil in the travel drives	(at least every 6 months)	
• Replace high-pressure filter element	(2nd service)	
Every 1000 operating hours		
• Change the hydraulic oil	(at least 1x per year)	40
• Replace high-pressure filter element		
• Change the fuel filter	(after the 3rd service, at least 1x per year)	36
• Replace suction filter		40
As required		
• Adjust stripper		41
• Check all bolts and screws for tightness	Tightening torques	41
• Engine conservation	see Hatz 2G40 operating manual (Annex)	

Note during the maintenance

Components must only be replaced by original spare parts.

Changing the engine oil and the oil filter

Change the engine oil in a new machine after 50 running hours. Change it every 250 running hours afterwards or after a year at the latest. Only use the engine oil that corresponds to the specifications listed in the "Operating materials“ table. Always change the oil filter as well when you change the engine oil.

Never start the engine when the oil has been drained from it.

ENVIRONMENT

Escaping lubricants harm the ground!

Working with lubricants endangers the ground. Lubricants that escape from defective machines, complete plants, tanks or through carelessness can pollute the ground and the ground water.

Therefore:

- ► Never spill any lubricant when refilling.
- ► Collect any lubricant that escapes or spills and dispose of it in compliance with the national regulations!
- ► Prevent any escaped lubricant from seeping into the ground.

NOTE

Let the diesel engine run for a few minutes before draining off the engine oil. The oil will drain out better if it is hot.

Proceed as follows:

- ➡ Place the machine on level ground.
- ➡ Undo the clip (2) on the oil drain hose (3) *(Fig. MW1)*.

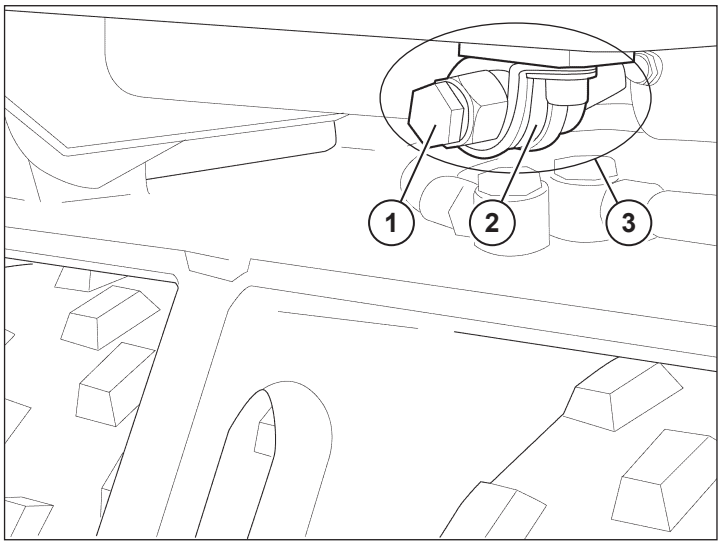


Fig. MW1: Undoing the "A" clip

➡ Have a collecting tank ready to catch the engine oil. The tank must be able to hold at least 4 litres and be undamaged.
➡ Hang the oil drainage hose in the collecting tank.

CAUTION!

Risk of scalding!

Hot engine oil can cause severe burns if it comes into contact with your skin if you do not protect your hands.

Therefore:

► Always wear industrial safety gloves when changing the

➡ Carefully unscrew the stopper in the (1) oil drainage hose (3).
✓ The engine oil will drain out into the tank.

➡ Wait until the diesel engine is fully drained.
➡ Unscrew the oil filter (4).

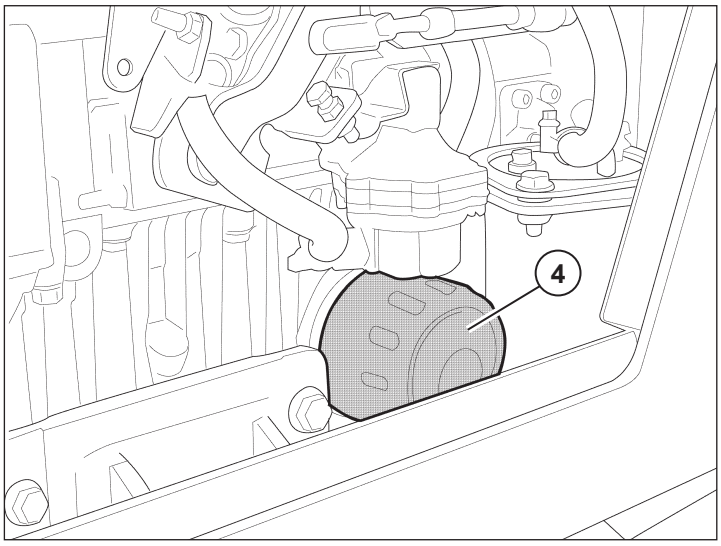
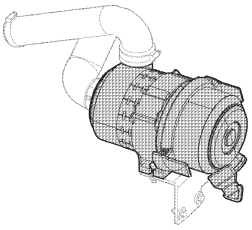


Fig. MW2: Diesel engine oil filter

- Use a lint-free cloth to clean the thread.
- Screw a new oil filter into place and hand-tighten only.
- Screw the stopper (1) back into the oil drainage hose and use the clip to secure it in place (2). You must ensure that hose is in the correct position. It must not touch any of the components.
- Use the retaining clip to secure the oil drainage hose (3) in place. (2)
- Refill with new engine oil.
- Use the oil dip-stick to check the level whilst refilling with suitable engine oil until the required level is reached.
- Dispose of the old engine oil and old oil filter in compliance with the national environmental regulations.

Cleaning / changing the air filter



The engine hood must be opened, in order to access the air filter. The air filter's removable cover can be accessed from the left side of the machine *(Fig. MW3)*.

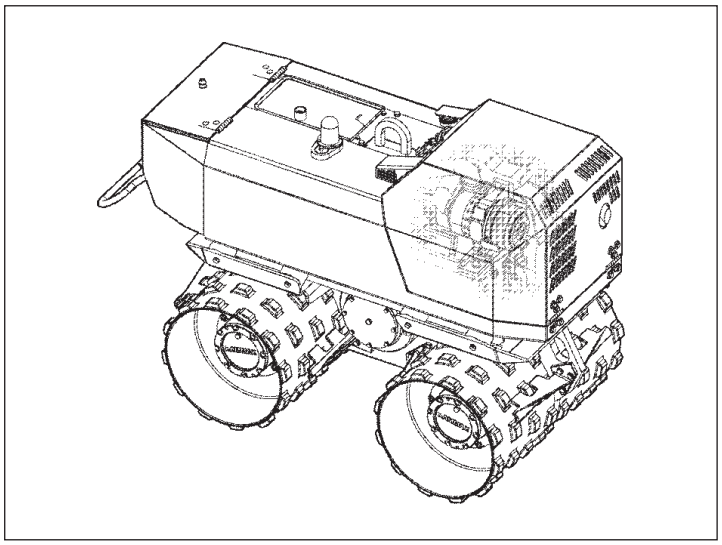


Fig. MW3: Air filter position

- ➡ Open the engine hood.
- ➡ Release the clamp on the air filter cover *(Fig. MW4)* and fold it to one side.

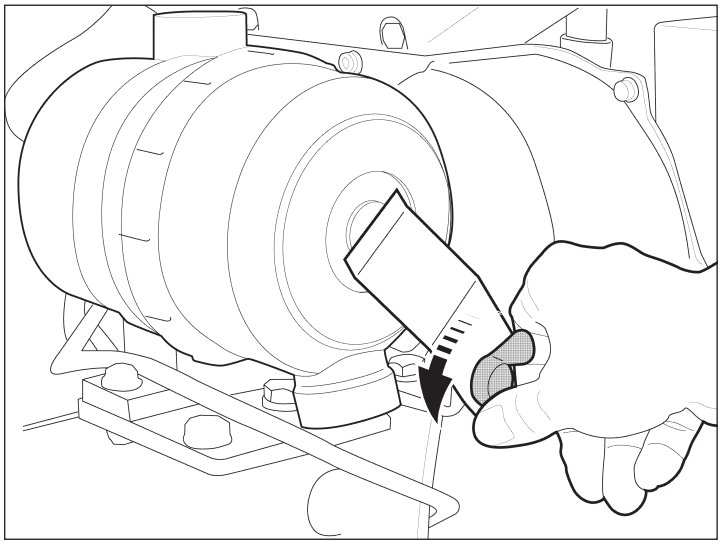


Fig. MW4: Undoing the clamp

- ➡ Use bith hands to turn the air filter cover to the left to remove it *(Fig. MW5)*.

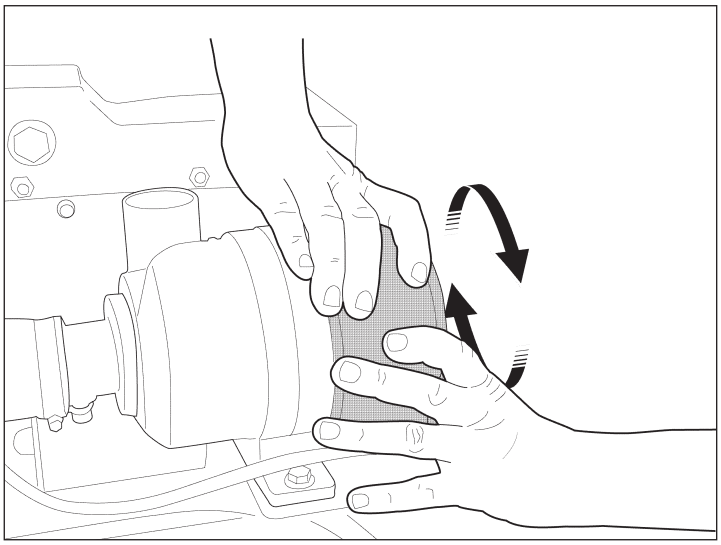


Fig. MW5: Removing the air filter cover

➡ Remove the air filter and inspect it to see if it is dirty.

BEWARE!

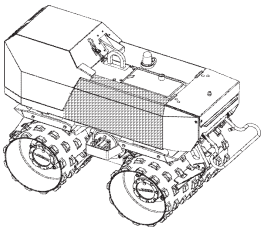
The surface of the air filter is fragile. The air filter might be damaged by incorrect cleaning. do not re-use damaged air filters. They can cause engine damage.

► Clean a dirty air filter by tapping it.

Do not use compressed air to clean the air filter. Do not wash it either!

➡ Clean the air filter carefully if it is dirty. Replace it with a new one if it is very dirty.
➡ Replace the cleaned air filter or fit new air filter. Replace the air filter cover and turn it until it is locked in place.

Emptying the fuel tank



The fuel can be drained out of the fuel tank through the drainage opening (1). i.e. to clean the fuel tank. The drainage opening is located on the left side of the machine at the bottom of the fuel tank *(see Fig. MW6)*.

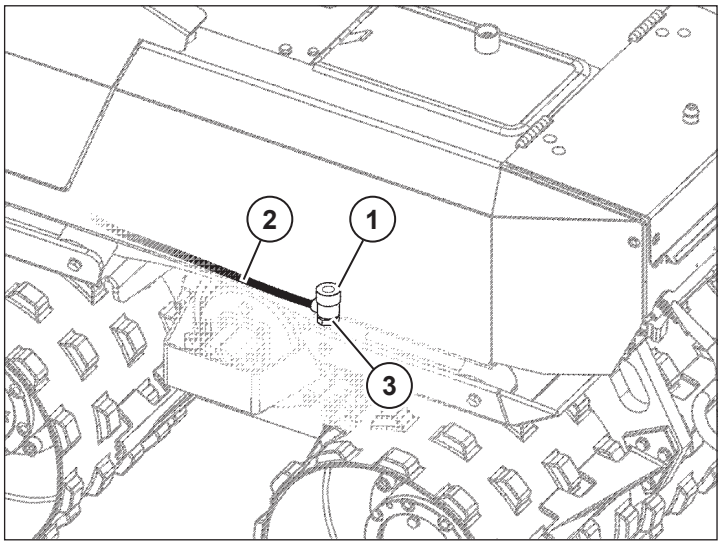


Fig. MW6: Fuel drainage opening

- ➡ Place an undamaged tank under the drainage opening. The tank must be capable of holding at least 25 litres.
- ➡ Hold a funnel and hose in place to catch the fuel. Hang the end of the hose (2) in the tank.
- ➡ Open the engine protector.

WARNING!

Fire danger!

Fuels are extremely flammable. Escaping fuel can ignite!

Therefore:

- ► Do not smoke when working on the fuel system.
- ► Keep naked flames and sparks away.
- ► Do not weld on or in the proximity of the fuel system.

- ➡ Undo the screw (3) and catch the draining fuel in the funnel.
- ➡ Take the cover off of the fuel tank so that the air can flow into the fuel tank.
- ✓ The fuel tank is now fully emptied.

ENVIRONMENT

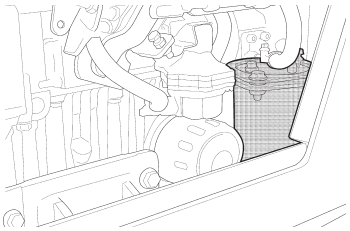
Leaking hydraulic oils pollute the soil!

Working with hydraulic oils endangers the ground. Fuel that escapes from defective machines, complete plants, tanks or through carelessness can pollute the ground and the ground water.

Therefore:

- ► Never spill any fuel when refilling.
- ► Collect any fuel that escapes or spills and dispose of it in compliance with the national regulations!
- ► Prevent any escaped fuel from seeping into the ground.

Draining the fuel filter



Condensation will build up whilst the diesel engine is running. This condensation collects in the fuel filter and it must be drained off every 200 running hours or once a year at the least.

The fuel filter is located in the engine area on the left side of the machine.

There is a plastic wheel underneath the fuel filter. This is used as a shut-off valve. Use this shut-off valve to drain the condensation.

Draining the fuel filter:

➡ Place a dry cloth under the fuel filter.

➡ Open the shut-off valve by turning the plastic wheel to the right until the water flows out of the fuel filter *(Fig. MW7)*.

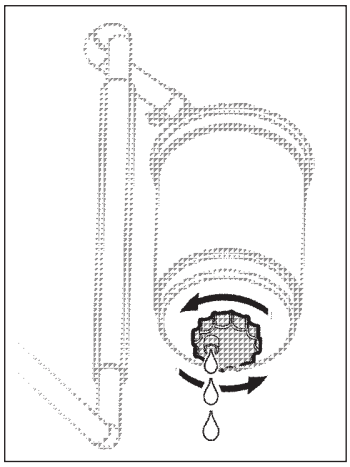


Fig. MW7: Draining the fuel filter

➡ Shut the shut-off valve as soon as diesel starts to flow out instead of water.

WARNING!

Fire danger!

Fuels are extremely flammable. Escaping fuel can ignite!

Therefore:

► Always check to see that the shut-off valve is fully closed.

Changing the fuel filter

Change the fuel filter every 200 running hours or once a year at least. The fuel system is self-purging.

➡ Undo the hexagonal screw (1) on the fllter holder and remove the fuel filter.

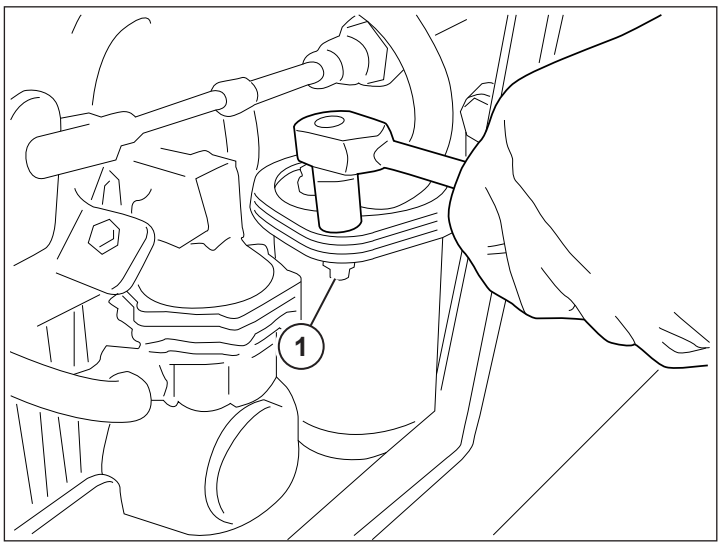
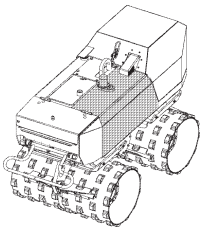


Fig. MW8 Going up an incline

- ➡ Pull the fuel hose off and insert a new fuel filter. Change the fuel hose if it is leaking or has become porous.
- ➡ Fit a new fuel filter in the reverse sequence.
- ➡ Check that the fuel system does not leak.

Changing the hydraulic oil / changing the hydraulic filter



Maintenance work on the hydraulic system is limited to filters and hydraulic tanks. All other aggregates do not require maintenance. However, you should inspect the hydraulic pipelines for leaks at regular intervals. Do not spray hydraulic hoses with paint. The hydraulic oil should be also be exchanged in the case of larger repairs on the hydraulic pipelines.

Replace the suction filter (SF) every time you change the hydraulic oil and after every 1,000 running hours.

Replace the return filter cartridge (RF):

- after 75 running hours,
- regularly after every 500 running hours,
- once a year at least,
- and every time the hydraulic oil is changed.

You can drain the hydraulic oil from the hydraulic oil tank whenever necessary. For this, the hydraulic oil tank is equipped with a discharge port. It is located on the right side of the machine, on the underside of the finished frame *(Fig. MW9)*.

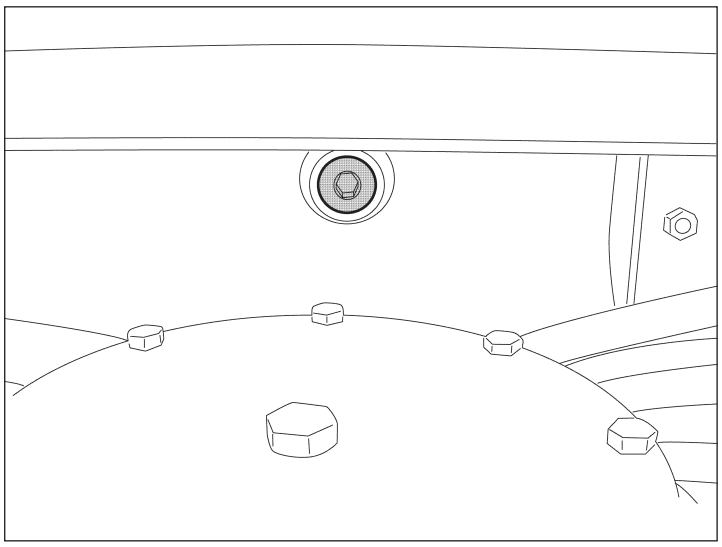


Fig. MW9: Discharge port

➡ Place an undamaged tank under the drainage opening. The tank must be capable of holding at least 45 litres.

WARNING!

Danger of injury by pressurised hoses!

The hydraulic system is subject to a high pressure during operation. Pressurised escaping hydraulic oil can pierce your skin and cause severe injuries and inflammations.

Pressurised escaping hydraulic oil is very fine and can form an explosive mixture!

Therefore:

► Always depressurise the hydraulic system before any work is carried out on it.

► Remove the ignition key so that the machine cannot be restarted.

Danger of fire or explosions!

Hydraulic oil is inflammable and can ignite easily. Oil soaked cloths and puddles of oil can ignite.

Therefore:

- ► Do not smoke when working on the hydraulic system.
- ► Avoid open flames and sparks.
- ► Do not weld on the hydraulic system or in its vicinity.
- ► Dispose of the oil soaked cloths in the special containers.

➡ Release the plug on the underside of the hydraulic tank.
➡ Remove the lid of the hydraulic oil tank to allow air to flow into the hydraulic oil tank. Allow the hydraulic oil tank to drain completely.
➡ Close the discharge port again with the plug and a new gasket.

The suction filter is located in the hydraulic oil tank *(Fig. MW10)*. To reach it, you need to remove the battery, the battery holder and the air filter.

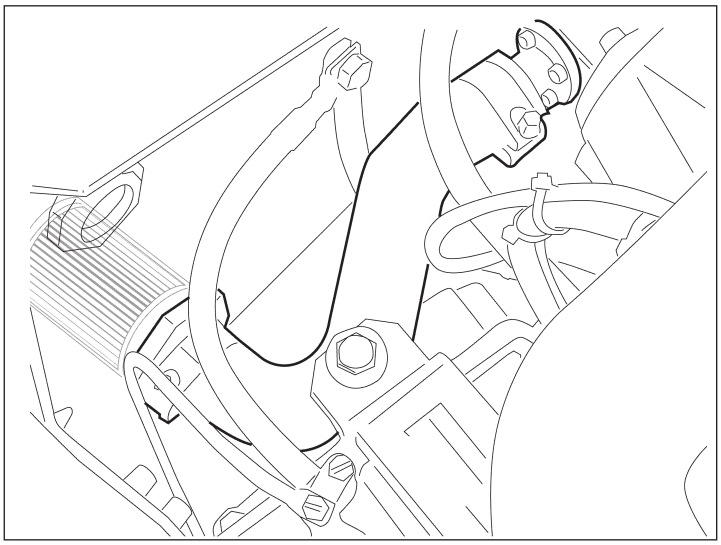


Fig. MW10 Suction filter

➡ Disconnect the battery and remove it.
➡ Pull off the air filter hoses.
➡ Remove the cable connectors.
➡ Remove the screws to the battery holder and remove the entire battery holder.

- ➡ Remove the clamp on the suction filter.
- ➡ Remove the suction filter with a No. 70 wrench.
- ➡ Clean or replace the suction filter element.
- ➡ Install the suction filter element with Omnifit 100M.
- ➡ Install the components again in reverse order.

The return filter is located on the underside of the control unit *(Fig. MW11)*.

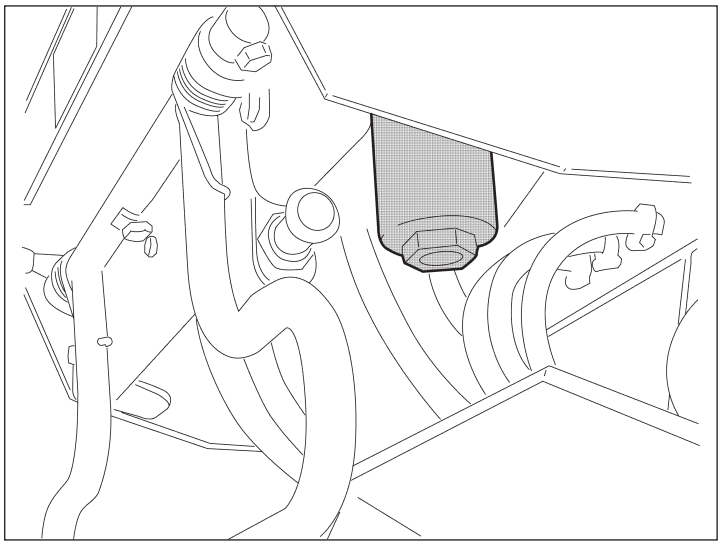


Fig. MW11: Return filter

- ➡ Remove the filter housing with a No. 36 box wrench.
- ➡ Screw off the filter housing and replace the filter cartridge.
- ➡ Replace the O-ring and screw the filter housing back on.
- ➡ Turn the filter housing tight with the box wrench and then turn it 1/8 of a rotation back again.

NOTE

If the filter housing is on too tight, thermal effects during operation will cause it to stick. Then it cannot be removed again.

Never tighten the housing all the way!

- ➡ Pour in the hydraulic oil until its level reaches the middle of the oil viewing window.
- ➡ Inspect the hydraulic system for leaks. ► Start the diesel engine and leave it to run at idle for 5 minutes. ► Check the oil level at the oil level gauge once again. Refill with hydraulic oil as necessary. Recommended types of oil see technical data.

ENVIRONMENT

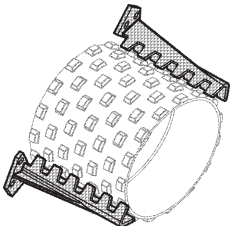
Leaking hydraulic oils pollute the soil!

Working with hydraulic oils endangers the ground. Hydraulic oil that leaks from from defective machines, complete plants, tanks or through carelessness can pollute the ground and the ground water.

Therefore:

- ► Never spill any hydraulic oil when refilling.
- ► Collect any hydraulic oil that escapes or spills and dispose of it in compliance with the national regulations!
- ► Prevent any escaped hydraulic oil from seeping into the ground.

Resetting the scraper / changing



The scraper cleans the drums. It prevents a layer of earth from building up on the drums. This happens quite often when working on loamey ground. If the earth builds up a layer then the area inbetween the drums and the complete frame it will become blocked. The machine will then lose its power and traction.

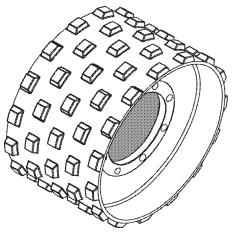
Always inspect the scraper before starting work and the gap between the drums and the scraper. This gap must be at least 10 mm in all positions.

Reset the scraper after:

➡ Undoing all three screws in the scraper (AS) and slide the scraper towards the drums. Note the stipulated gap.
If the scraper is already up against the stops and the gap between it and the drums is more than 30 mm then the scraper is worn and it must be changed.

➡ Retighten the screws.

Exchanging drums



The drums become worn due to machine use. The traction and the climbing capability decrease if the profile height is reduced. The 'knead' effect is also reduced during compacting. The drums must be changed when the profile height reaches 5 mm. Always change all four drums.

➡ Use suitable lifting equipment to hoist the machine by the transport hoop so that it is high enough for the work to be carried out easily.

WARNING!

Danger from falling objects!

Suspended loads can fall down! Objects on suspended loads can work lose and fall off!

Therefore:

► Never walk beneath a suspended load.

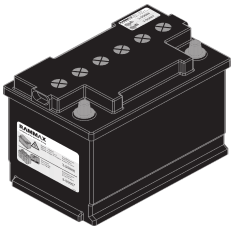
► Never stand beneath a suspended load.

► Never leave lose objects on the machine.

➡ Dismantle the scraper (A).
➡ Undo (BS) the drum securing screws.Do not unscrew the securing screws completely!
➡ Lower the machine until the drums are approx. 1 cm above the ground.
➡ Unscrew the securing (BS) bolts.
➡ Use a soft-headed hammer to tap the drum jacket until the drums come loose from the drive flange.
✓ The drums are now dismantled.

➡ Clean the drum flange surface.
➡ Fit the new drums on the drive flange.
➡ Use a torque wrench tp tighten up the securing screws (BS) in a cross pattern to 150 Nm / 110 ft-lb.
✓ The drums have been changed and the machine is ready for use again.

Servicing the battery



The battery is maintenance-free as per EN/DIN. That means it that during normal operating temperatures and correct controller voltage no water must be refilled. Water is used up in the case of deviation from the standard conditions. The following among others is considered as a deviation from normal conditions:

- High outside temperatures
- Demanding machine use
- Continuous operation on upward and downward gradients at extreme end of the range (just below the maximum gradeability).

The battery is located under the engine protector, on the left alongside the diesel engine *(Fig. MW12)*.

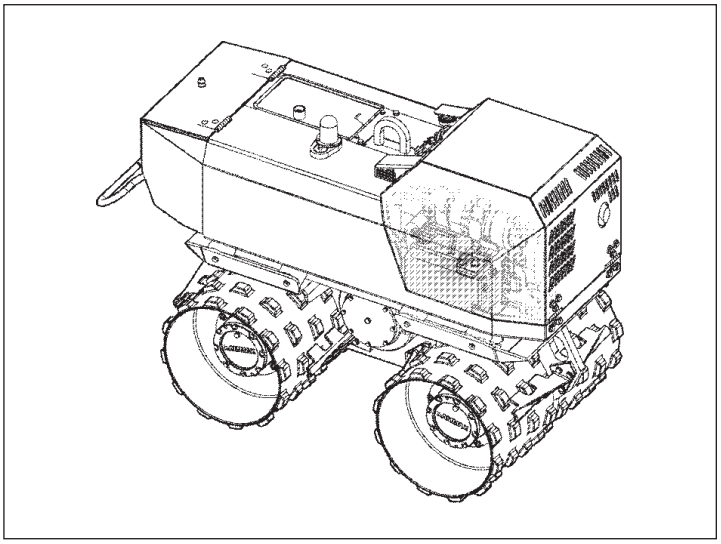


Fig. MW12 Battery position

It is advisable to check the water level of the battery in regular intervals. The service life is reduced substantially, if the battery is operated with a too low water level.

Clean the battery terminals and cable clips regularly and then grease generously using acid-resistant grease.

Check the water level

➡ Remove the ignition key.
➡ Disconnect the baterry's minus pin.

WARNING!

Danger of chemical burns from the battery acid!

The battery is filled with very corrosive battery acid. This battery acid can cause severe burns if it gets on your skin. Battery acid can cause blindness if it gets in your eyes.

Therefore:

► Always wear protective goggles and industrial safety gloves when carrying out maintenance work on the battery.

► Remove any piece of clothing that gets battery acid on it immediately.

► Wash the part of your skin that got acid on it immediately in clean water and send for a doctor.

➡ Open one of the sealing caps.
➡ Check the water level. ► The water level must reach up to the marking.
➡ Fill up with distilled water up to the marking, if the fill level is below the marking.

Storing the machine

- Move the operating lever into the neutral position
- Fit a chock under the machine so that it cannot roll away
- Remove the ignition key. This prevents unauthorised persons starting up the machine.

Overwintering / storing the machine for a longer period

Store the machine, if it is not going to be used for more than 2 weeks. It is possible to store the machine outdoors. Please note, that corrosion and decay of the components are accelerated outdoors.

BEWARE!

Fire danger!

Never operate the machine if the engine and exhaust are hot. Inflammable materials can ignite in the vicinity of these parts.

Therefore

► Do not store the machine near to combustible materials

► Only cover the machine after the engine and exhaust have cooled down.

Take the following precautions when storing the machine

- Earth, clay and mud often remain on the scraper bars and the drums. It is very difficult to remove this dirt after it has dried.

► Clean the machine thoroughly.

- Damaged components and loose screw connections are a safety risk. These defects are often forgotten when restarting the machine.

► Service the machine. Carry out the specified maintenance work. Check all screw connections for a firm fit. If necessary, retighten loose connections.

- Old and polluted engine oil flows less easily than new oil. Furthermore, low temperatures decrease the fluidity.

► Check the degree of pollution of the engine oil. Drain polluted engine oil and refill with new oil. Let the engine idle for about 5 minutes so that the oil can reach all parts.

► Low temperatures accelerate battery discharging. The

battery can be damaged by deep discharge, it is not regularly charged during machine operation.

► Remove the battery and clean the exterior surfaces. Charge the battery monthly when in storage. Also, fully charge the battery before starting the machine up again.

- Condensation can form in the hydraulic oil tank and fuel tank during storage. The inner walls of the tanks are therefore endangered by corrosion.

► Fill hydraulic oil into the hydraulic oil tank up to just below the maximum level. Fill diesel fuel into the fuel tank up to just below the maximum level. Then move the machine over uneven ground. The inner walls are now moistened with the liquids and protected against corrosion.

- Moisture can penetrate into the engine through the air filter unit and exhaust pipe.

► Cover the intake manifolds of the air filter unit and exhaust pipe with an adhesive tape. Don't forget to remove the adhesive tape before starting up the machine again!

- Diesel fuel loses its fluidity and thickens at temperatures starting from -15°C/5°F. This clogs up the fuel filter and the lines.

► Add appropriate additives to the Diesel fuel, before using it at lower temperatures.

- Humidity from the air can condense and corrode sliding engine parts if the engine is not used for a long time.

► Run the engine for 5 minutes every 2 to 3 months. Do not forget to remove the adhesive tape from the air filter unit and exhaust pipe! Additives must be added to the Diesel fuel at temperatures below -15°C!

Troubleshooting table

Fault:	Possible cause:	Remedy:
Engine runs but the machine does not move	Insufficient hydraulic oil in the tank.	• Check hydraulic oil level • Check the hydraulic system for leaks
Engine runs but the machine only moves forward!	Safety bar in engaged position	Pull safety bar out of engaged position. • Only engage safety bar during transport, not in the work mode
Machine has tipped over.		Stand the machine up and inform the service workshop
The display shows an error code		In the appendix, you will find a chart showing the error codes and their causes.

Tightening torques

Torque for bolts with standard metric threads

Bolt dimension	Tightening torques Nm			Tightening torques ft-lb		
	8.8	10.9	12.9	8.8	10.9	12.9
M 4	3	5	5	2	3	4
M 5	6	9	10	4	7	7
M 6	10	15	18	7	11	13
M 8	25	35	45	18	26	33
M10	50	75	83	37	55	61
M12	88	123	147	65	91	108
M14	137	196	235	101	145	173
M16	211	300	358	156	221	264
M18	290	412	490	213	303	361
M20	412	578	696	304	426	513
M22	560	785	942	413	559	695
M24	711	1000	1200	524	798	885
M27	1050	1480	1774	774	1092	1308
M30	1420	2010	2400	1047	1482	1770

Strength classes for bolts with untreated, unlubricated surface.

8.8 = 8G ; 10.9 = 10K ; 12.9 = 12K

The values represent 90% utilisation of the bolt yield strength with a coefficient of friction of μ ges. = 0.14. Adherence to the tightening torque levels is checked using a torque wrench. The specified tightening torques do not apply if MoSo2 lubricant is used.

Function codes

Manual operation function codes

Driving functions				
Display	***Executed functions***			
F H 0010	Driving	Right forward		
F H 0011	Driving	Right forward		High speed
F H 0020	Driving	Right backward		
F H 0021	Driving	Right backward		High speed
F H 0100	Driving	Left forward		
F H 0101	Driving	Left forward		High speed
F H 0110	Driving	Left forward	Right forward	
F H 0111	Driving	Left forward	Right forward	High speed
F H 0120	Driving	Left forward	Right backward	
F H 0121	Driving	Left forward	Right backward	High speed
F H 0200	Driving	Left backward		
F H 0201	Driving	Left backward		High speed
F H 0210	Driving	Left backward	Right forward	
F H 0211	Driving	Left backward	Right forward	High speed
F H 0220	Driving	Left backward	Right backward	
F H 0221	Driving	Left backward	Right backward	High speed

Vibration functions		
Display	***Executed functions***	
F H 1000	Vibration forward	
F H 1010	Vibration forward	Driving right forward
F H 1020	Vibration forward	Driving right backward
F H 1100	Vibration forward	Driving left forward
F H 1110	Vibration forward	Driving left forward right forward
F H 1120	Vibration forward	Driving left forward right backward
F H 1200	Vibration forward	Driving left backward
F H 1210	Vibration forward	Driving left backward right forward
F H 1220	Vibration forward	Driving left backward right backward
F H 2000	Vibration reverse	
F H 2010	Vibration reverse	Driving right forward
F H 2020	Vibration reverse	Driving right backward
F H 2100	Vibration reverse	Driving left forward
F H 2110	Vibration reverse	Driving left forward right forward
F H 2120	Vibration reverse	Driving left forward right backward
F H 2200	Vibration reverse	Driving left backward
F H 2210	Vibration reverse	Driving left backward right forward
F H 2220	Vibration reverse	Driving left backward right backward

Infrared mode function codes

Driving functions				
Display	***Executed functions***			
F I 0010	Driving	Right forward		
F I 0011	Driving	Right forward		High speed
F I 0020	Driving	Right backward		
F I 0021	Driving	Right backward		High speed
F I 0100	Driving	Left forward		
F I 0101	Driving	Left forward		High speed
F I 0110	Driving	Left forward	Right forward	
F I 0111	Driving	Left forward	Right forward	High speed
F I 0120	Driving	Left forward	Right backward	
F I 0121	Driving	Left forward	Right backward	High speed
F I 0200	Driving	Left backward		
F I 0201	Driving	Left backward		High speed
F I 0210	Driving	Left backward	Right forward	
F I 0211	Driving	Left backward	Right forward	High speed
F I 0220	Driving	Left backward	Right backward	
F I 0221	Driving	Left backward	Right backward	High speed

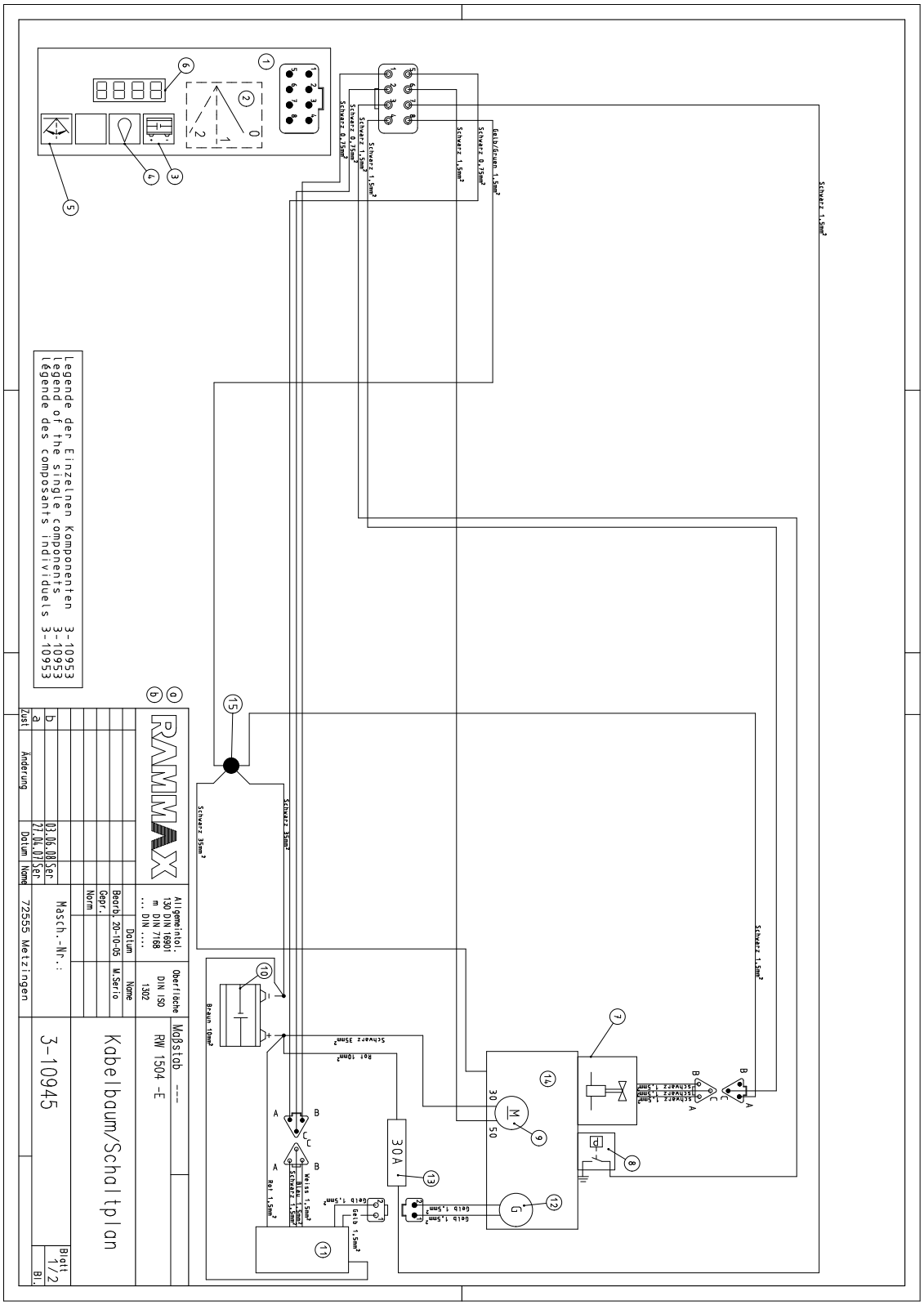
Vibration functions		
Display	***Executed functions***	
F I 1000	Vibration forward	
F I 1010	Vibration forward	Driving right forward
F I 1020	Vibration forward	Driving right backward
F I 1100	Vibration forward	Driving left forward
F I 1110	Vibration forward	Driving left forward right forward
F I 1120	Vibration forward	Driving left forward right backward
F I 1200	Vibration forward	Driving left backward
F I 1210	Vibration forward	Driving left backward right forward
F I 1220	Vibration forward	Driving left backward right backward
F I 2000	Vibration reverse	
F I 2010	Vibration reverse	Driving right forward
F I 2020	Vibration reverse	Driving right backward
F I 2100	Vibration reverse	Driving left forward
F I 2110	Vibration reverse	Driving left forward right forward
F I 2120	Vibration reverse	Driving left forward right backward
F I 2200	Vibration reverse	Driving left backward
F I 2210	Vibration reverse	Driving left backward right forward
F I 2220	Vibration reverse	Driving left backward right backward

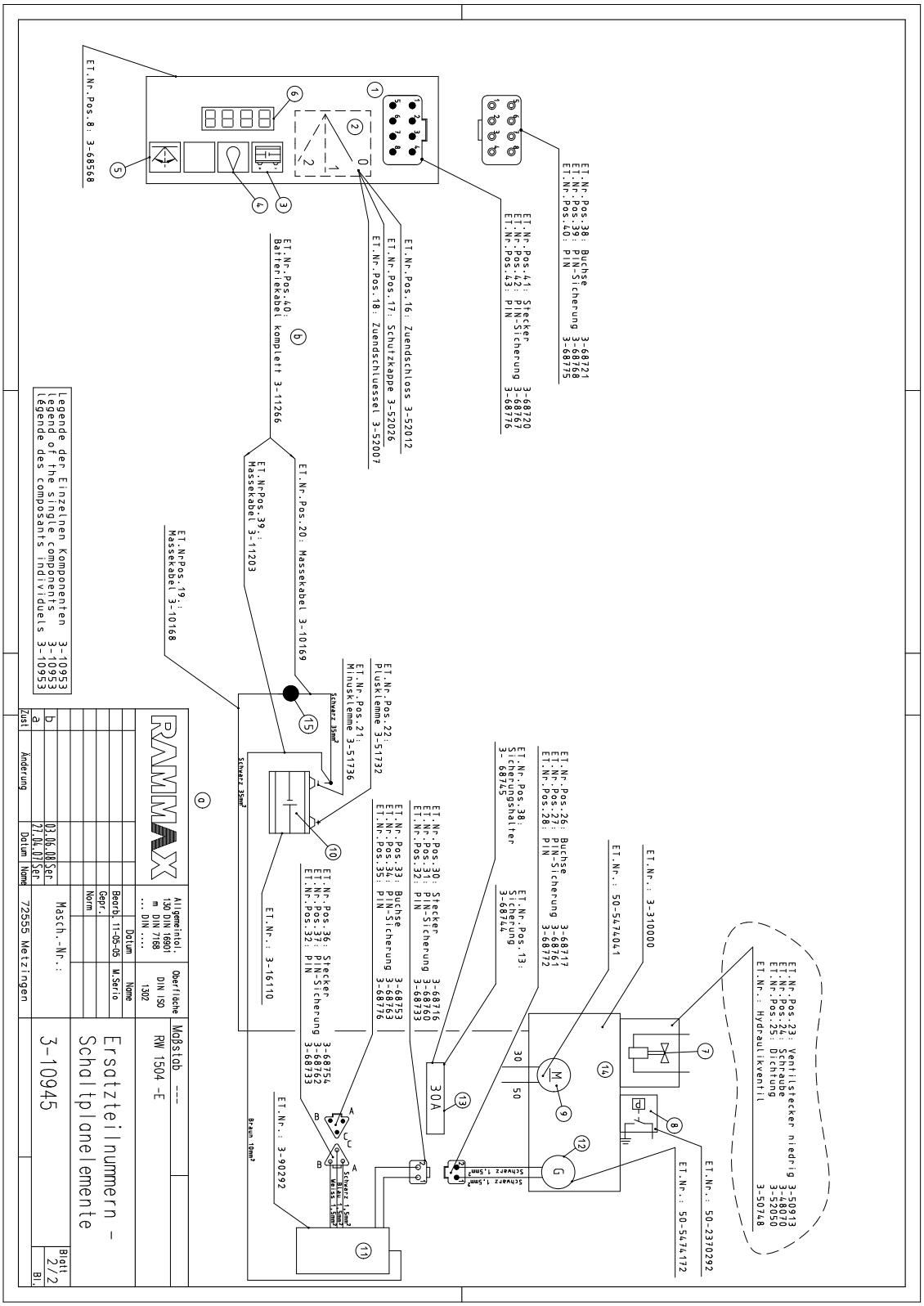
Error codes

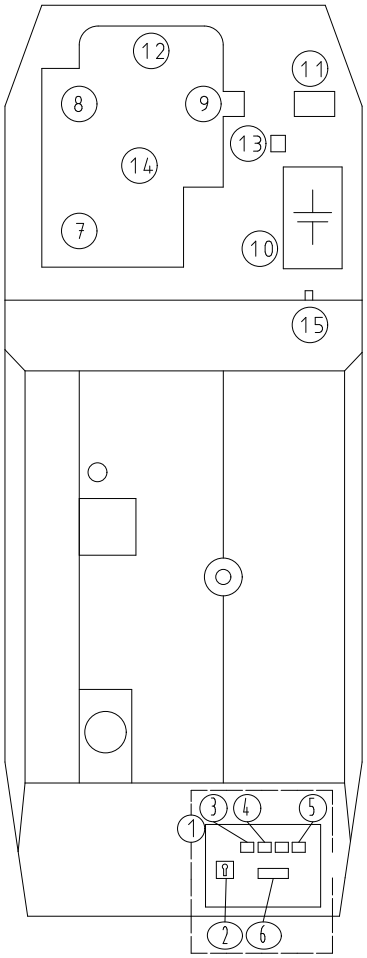
Error code:	Meaning:	Cause:	Solution:
FErr 1	An unknown signal has been received.	This message appears at a time when the connection between the machine's control device has been physically broken, for example when a cable breaks or a contact loosens.	Check the cables to the machine's control device. Replace defective parts.
FErr 2	For a certain period no more dispatches have been received from the machine's control device.	This error indicates a broken cable.	Check the cables to the machine's control device. Replace defective parts.
FErr 3	Internal processing is too slow or too complex.	There may be a hardware defect in the receiver module of the cockpit display.	Contact your service facility.
FErr 4	Internal processing is too slow or too complex.	There may be a hardware defect in the receiver module of the cockpit display.	Contact your service facility.
Err 1	Signal is received from the infrared transmitter even though the hand controls are active.	Start-up was done from the hand switch box, so operation through the infrared transmitter is not possible.	This error disappears as soon as no infrared signal is received.
Err 2	Signal is received from the hand controls even though the infrared transmitter is active.	Start-up was done from the infrared transmitter, so operation through the hand switch box is not possible.	This error disappears as soon as no signal is received from the hand controls.
			Machine must be operated with the infrared transmitter. Turn the machine off and start it again with the hand switch box.
Err 3	Valid infrared signal received, but address is wrong.	Addresses from the transmitter and receiver do not match	Check and match the addresses between the transmitter and the control device.
			Match the addresses from the sender and receiver (0-9)

Error code:	Meaning:	Cause:	Solution:
Err 13	Tilt sensor triggered	Machine is tilted.	Set the machine erect
	Control unit in wrong position	Example: Installation position wrong / installed wrong after repair, or not secured for the test.	Check the control for placement and position and correct, if necessary.
Err 21	Proximity switch stays on. This error can only occur during active infrared control.	Operator is standing too close to the machine.	Increase the distance between the transmitter (operator) and the machine.
Err 23	No RPM signal.	Regulator error (broken cable, chafing point)	Replace regulator. Replace cable.
	This error message also occurs during engine shut-down.	When the engine goes off, the controls query the status of the alternator.	No error / belongs to shut-off program.

Wiring diagrams




ET.Nr.Pos.38: Buchse 3-68721
ET.Nr.Pos.39: PIN-Sicherung 3-68768
ET.Nr.Pos.40: PIN 3-68775
ET.Nr.Pos.41: Stecker 3-68720
ET.Nr.Pos.42: PIN-Sicherung 3-68767
ET.Nr.Pos.43: PIN 3-68776
ET.Nr.Pos.8: 3-68568
ET.Nr.Pos.16: Zuendschloss 3-52012
ET.Nr.Pos.17: Schutzkappe 3-52026
ET.Nr.Pos.18: Zuendschluessel 3-52007
ET.Nr.Pos.40: Batteriekabel komplett 3-11266
ET.Nr.Pos.20: Massekabel 3-10169
ET.NrPos.39: Massekabel 3-11203
ET.NrPos.19: Massekabel 3-10168
ET.Nr.Pos.22: Pluskleme 3-51732
ET.Nr.Pos.21: Minuskleme 3-51736
Schwarz 35mm²
Legende der Einzelnen Komponenten 3-10953
legend of the single components 3-10953
légende des composants individuels 3-10953
ET.Nr.Pos.26: Buchse 3-68717
ET.Nr.Pos.27: PIN-Sicherung 3-68761
ET.Nr.Pos.28: PIN 3-68772
ET.Nr.Pos.38: Sicherungshalter 3-68745
ET.Nr.Pos.13: Sicherung 3-68744
ET.Nr.Pos.30: Stecker 3-68716
ET.Nr.Pos.31: PIN-Sicherung 3-68760
ET.Nr.Pos.32: PIN 3-68733
ET.Nr.Pos.33: Buchse 3-68753
ET.Nr.Pos.34: PIN-Sicherung 3-68776
ET.Nr.Pos.35: PIN
ET.Nr.Pos.36: Stecker 3-68754
ET.Nr.Pos.37: PIN-Sicherung 3-68762
ET.Nr.Pos.32: PIN 3-68733
ET.Nr.: 3-16110
ET.Nr.: 3-90292
Braun 10mm²
Schwarz 1,5mm²
Blau 1,5mm²
30A
30
50
ET.Nr.: 3-310000
ET.Nr.: 50-5474041
ET.Nr.: 50-5474172
ET.Nr.: 50-2370292
ET.Nr.Pos.23: Ventilstecker niedrig 3-50913
ET.Nr.Pos.24: Schraube 3-48070
ET.Nr.Pos.25: Dichtung 3-52050
ET.Nr.: Hydraulikventil 3-50748
RAMMAX
Allgemeintol. 130 DIN 16901 m DIN 7168 ... DIN ....
Oberfläche DIN ISO 1302
Maßstab ---
RW 1504 -E
Bearb. 11-05-05
Gepr.
Norm
Datum
Name
M.Serio
Masch.-Nr.:
72555 Metzingen
Ersatzteilnummern - Schaltplanelemente
3-10945
Blatt 2/2
Bl.
Zust.
Änderung
Datum
Name
03.06.08 Ser.
27.04.07 Ser.



Pos. 1 : Cockpit
cockpit
cockpit

Pos. 2 : Zündschloß
starter switch
sécurre de contact

Pos. 3 : Ladekontrolle
generator control
contrôle de charge

Pos. 4 : Ölkontrolle
oil control
contrôle huile

Pos. 5 : Neigungsgeber Anzeige
inclinometer indicator
clinomètre indicateur

Pos. 6 : Stundenzähler
hour counter
compteur horaire

Pos. 7 : Abschaltmagnet
hut-off solenoid
électro-aimant de déclenchement

Pos. 8 : Oeldruckschalter
oil pressure switch
contacteur pressure d'huile

Pos. 9 : Anlasser
starter
demarreu

Pos. 10 : Batterie
battery
batterie

Pos. 11 : Regler
regulator
regulateur

Pos. 12 : Lichtmaschine
alternator
alternateur

Pos. 13 : Zentralsicherung
central fuse
fusible central

Pos. 14 : Motor
engine
moteur

Pos. 15 : Masse Oeltank
Oiltank ground
masse de reservoire de hydraulique

Pos. 16 : Zuendschloss
starter switch
seccure de contact

Pos. 17 : Schutzkappe
protective cap
capuchon

Pos. 18 : Zuendschluessel
starter switch key
cle de contact

Pos. 19+20 : Massekabel
ground cable
cable masse

Pos. 21 : Minusklemme
minus clamp
serre cable deficit

Pos. 22 : Plusklemme
puls clamp
serre cable plus

Pos. 23 : Ventilstecker
valve connector
connecteur de vanne

Pos. 24 : Schraube
screw
vis

Pos. 25 : Dichtung
gasket
joint

Pos. 26+33 : Buchse
bearing bush
boite

Pos. 27+31+34+37 : Pin-Sicherung
pin protection
broche securite

Pos. 28+32+35 : Pin
pin
broche

Pos. 30+36 : Stecker
connector
connecteur

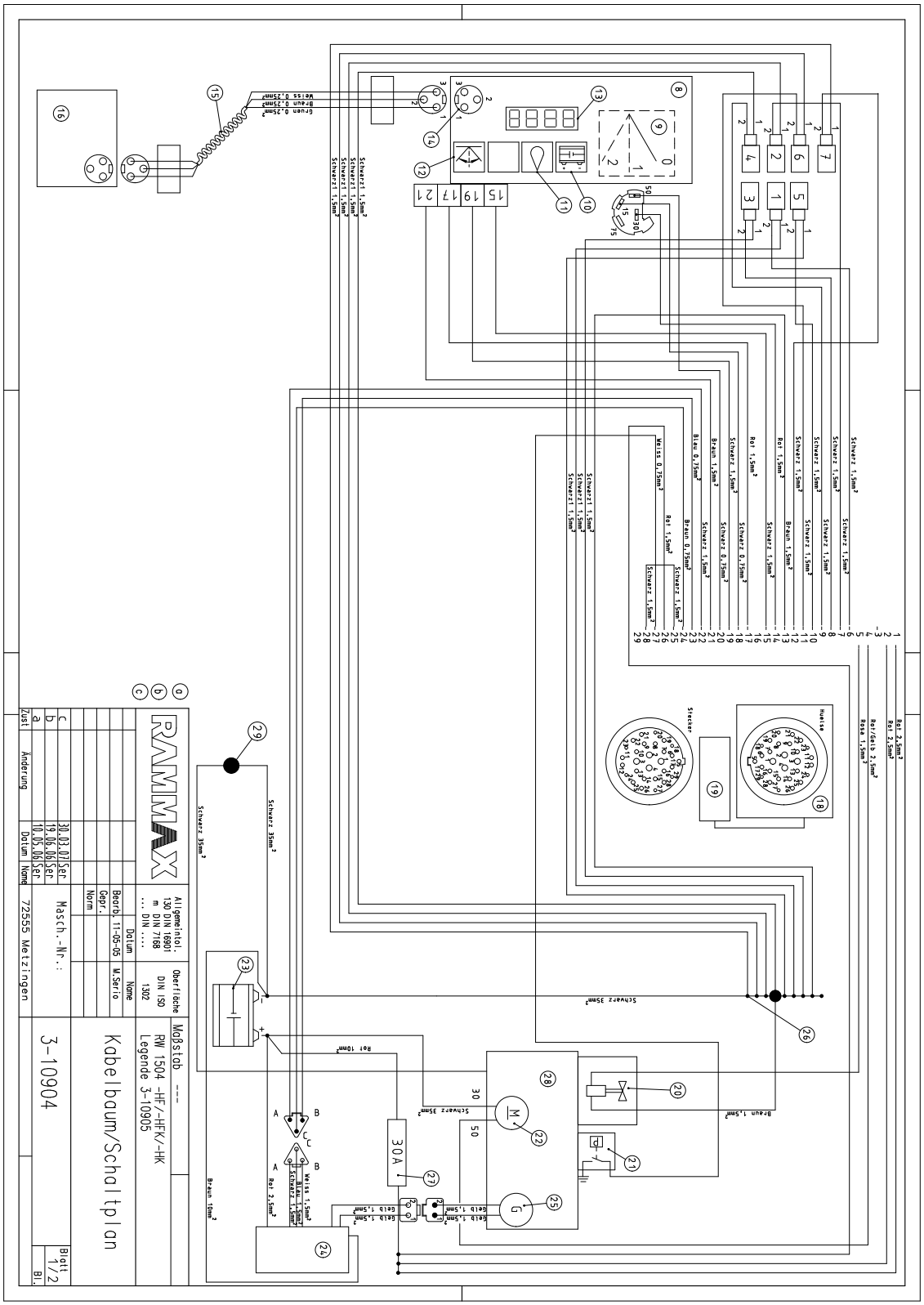
Pos. 38 : Sicherungshalter
fuse holder
boiter fussible

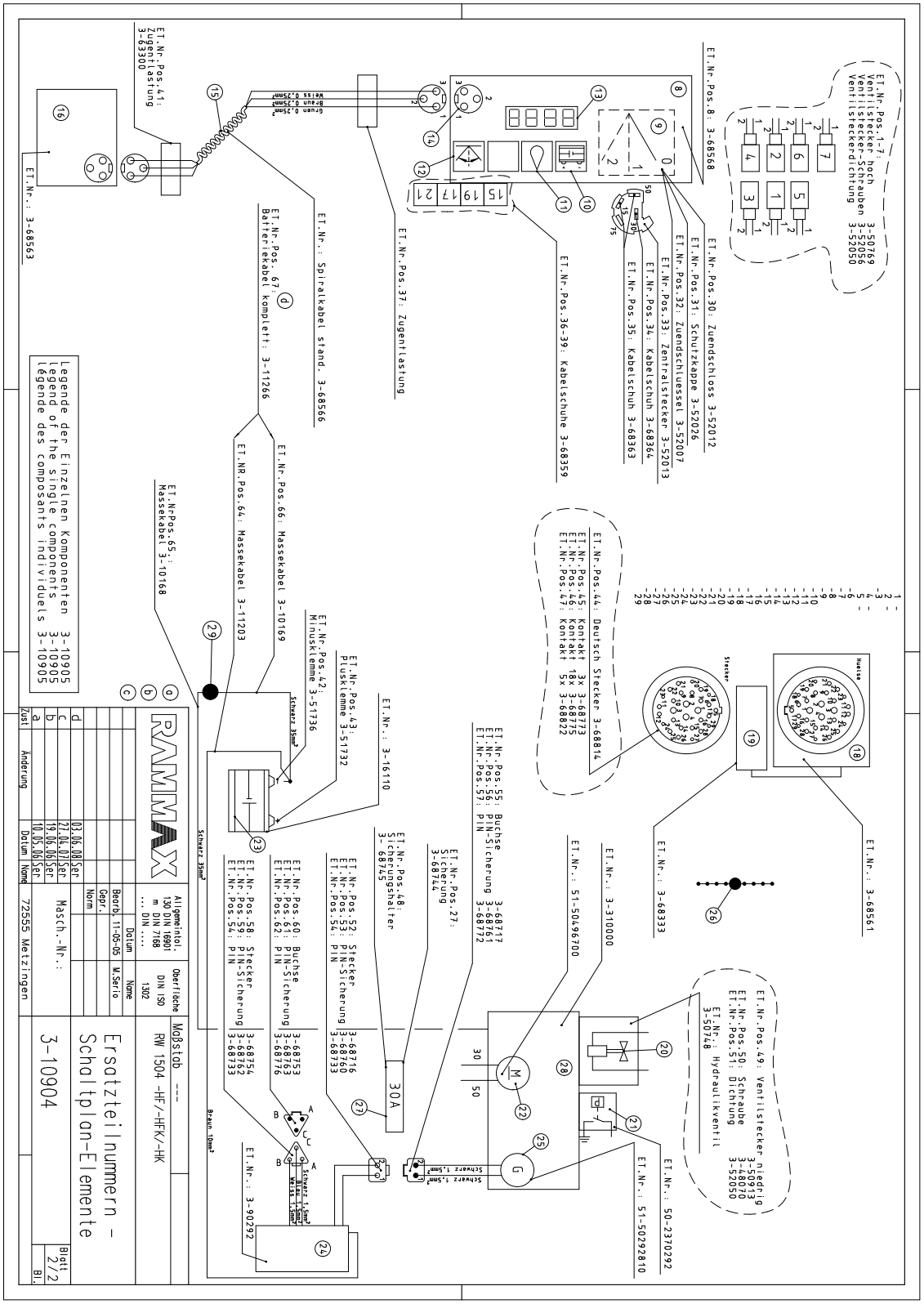
(b) Pos. 39 : Batteriekabel
battery cable
cable batterie

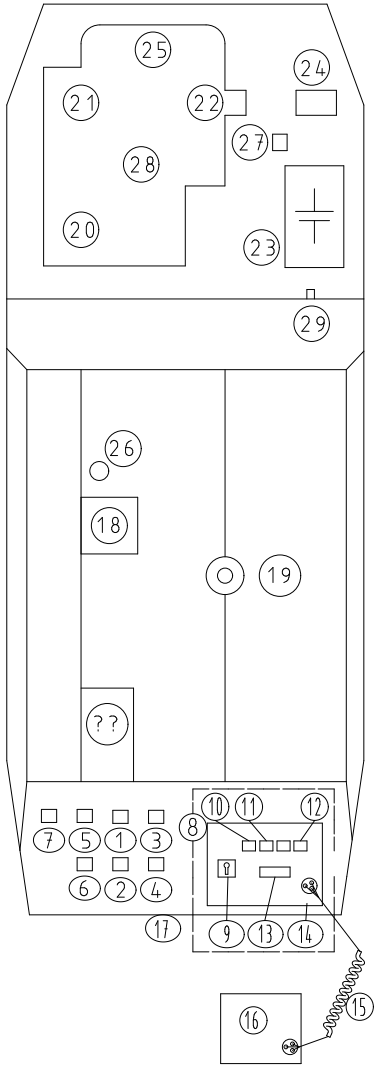
Legende ist abhaengig von Kabelbaum-Schaltplan 3-10945
legend depends on diagram of wiring harness 3-10945
légende dépend de la diagramme du faisceau 3-10945

RAMMAX			Allgemeintol. 130 DIN 16901 m DIN 7168 ... DIN	Oberfläche DIN ISO 1302	Maßstab 1:1	
					RW 1504 -E	
			Datum	Name		
			Bearb. 20-10-05	M.Serio	Elektrokomponente	
			Gepr.			
			Norm			
b		03.06.08	Ser	Masch.-Nr.:	3-10953	Blatt
a		27.04.07	Ser			Bl.
Zust	Änderung	Datum	Name	72555 Metzingen		

(a)


RAMMAX
Kabelbaum/Schaltplan
3-10904
RW 1504 -HF/-HFK/-HK
Legende 3-10905
Maßstab ---
Oberfläche DIN ISO 1302
Allgemeintol. 130 DIN 16901 m DIN 7168 ... DIN ....
Bearb. 11-05-05 M.Serfio
Gepr.
Norm
Masch.-Nr.:
72555 Metzingen
Änderung
Datum
Name
30.03.07 Ser
19.06.06 Ser
10.05.06 Ser
Blatt 1/2
Bl.
Schwarz 1,5mm²
Rot 1,5mm²
Braun 1,5mm²
Blau 0,75mm²
Weiss 0,75mm²
Schwarz 0,75mm²
Rot 2,5mm²
Rot/Gelb 2,5mm²
Rosa 1,5mm²
Schwarz 35mm²
Rot 10mm²
Braun 10mm²
Gelb 1,5mm²
Grün 0,25mm²
Braun 0,25mm²
Weiss 0,25mm²
Stecker
Hupe
30A


ET.Nr.Pos.1-7: Ventilstecker hoch 3-52059
Ventilstecker niedrig 3-52050
Ventilsteckerdichtung 3-52050
ET.Nr.Pos.8: 3-68568
ET.Nr.Pos.30: Zuendschloss 3-52012
ET.Nr.Pos.31: Schutzkappe 3-52026
ET.Nr.Pos.32: Zuendschluessel 3-52007
ET.Nr.Pos.33: Zentralstecker 3-52013
ET.Nr.Pos.34: Kabelschuh 3-68364
ET.Nr.Pos.35: Kabelschuh 3-68363
ET.Nr.Pos.36-39: Kabelschuhe 3-68359
ET.Nr.Pos.37: Zugentlastung
ET.Nr.: Spiralkabel stand. 3-68566
ET.Nr.Pos.41: Zugentlastung 3-68300
ET.Nr.: 3-68563
ET.Nr.Pos.67: Batteriekabel komplett 3-11266
ET.NR.Pos.64: Massekabel 3-11203
ET.Nr.Pos.66: Massekabel 3-10169
ET.NrPos.65: Massekabel 3-10168
ET.Nr.Pos.42: Minuskleme 3-51736
ET.Nr.Pos.43: Pluskleme 3-51732
ET.Nr.: 3-16110
ET.Nr.Pos.44: Deutsch Stecker 3-68814
ET.Nr.Pos.45: Kontakt 3x 3-68773
ET.Nr.Pos.46: Kontakt 18x 3-68775
ET.Nr.Pos.47: Kontakt 5x 3-68822
ET.Nr.Pos.55: Buchse 3-68717
ET.Nr.Pos.56: PIN-Sicherung 3-68761
ET.Nr.Pos.57: PIN 3-68772
ET.Nr.Pos.27: Sicherung 3-68744
ET.Nr.Pos.48: Stromlaufschalter 3-68745
30A
ET.Nr.Pos.52: Stecker 3-68716
ET.Nr.Pos.53: PIN-Sicherung 3-68760
ET.Nr.Pos.54: PIN 3-68733
ET.Nr.Pos.60: Buchse 3-68753
ET.Nr.Pos.61: PIN-Sicherung 3-68763
ET.Nr.Pos.62: PIN 3-68776
ET.Nr.Pos.58: Stecker 3-68754
ET.Nr.Pos.59: PIN-Sicherung 3-68762
ET.Nr.Pos.54: PIN 3-68733
ET.Nr.: 3-90292
ET.Nr.: 3-68561
ET.Nr.: 3-68333
ET.Nr.: 3-310000
ET.Nr.: 51-50496700
ET.Nr.Pos.49: Ventilstecker niedrig 3-50913
ET.Nr.Pos.50: Schraube 3-48070
ET.Nr.Pos.51: Dichtung 3-52050
ET.Nr.: Hydraulikventil 3-50748
ET.Nr.: 50-23702292
ET.Nr.: 51-50292810
Legende der Einzelnen Komponenten 3-10905
Legend of the single components 3-10905
Légende des composants individuels 3-10905
RAMMAX
Allgemeintol. 130 DIN 16901 m DIN 7168 ... DIN ....
Oberflache DIN ISO 1302
Maßstab ---
RW 1504 -HF/-HFK/-HK
Datum Name
Bearb. 11-05-05 M.Serio
Gepr.
Norm
Masch.-Nr.:
Ersatzteilnummern - Schaltplan-Elemente
3-10904
Blatt 2/2
Bl.
72555 Metzingen
d 03.06.08 Ser
c 21.04.07 Ser
b 19.06.06 Ser
a 10.05.06 Ser
Zust. Änderung Datum Name



Pos. 1 : Fahren li. vorwärts
drive left forward
mercher gauche en avant
Pos. 2 : Fahren li. rückwärts
drive left backward
mercher gauche en arrière
Pos. 3 : Fahren re. vorwärts
drive right forward
mercher droite en avant
Pos. 4 : Fahren re. rückwärts
drive rightbackward
mercher droite en arrière
Pos. 5 : Vibration vorwärts
vibration forward
vibration en avant
Pos. 6 : Vibration rückwärts
vibration backward
vibration en arrière
Pos. 7 : Eilgang
high speed
marche rapid
Pos. 8 : Cockpit
cockpit
cockpit
Pos. 9 : Zündschloß
starter switch
sécurre de contact
Pos. 10 : Ladekontrolle
generator control
contrôle de charge
Pos. 11 : Ölkontrolle
oil control
contrôle huile
Pos. 12 : Neigungsgeber Anzeige
inclinometer indicator
clinomètre indicateur
Pos. 13 : Stundenzähler
hour counter
compteur horaire
Pos. 14 : Buchsenstecker Spiralkabel
socket plug, helix cable
connecteur prise femelle, câble spiralé
Pos. 15 : Spiralkabel
helix cable
câble spiralé
Pos. 16 : Handsteuergerät
manuel control unit
boitier manuel
Pos. 17 : Sicherungsschalter
fuse switch
bouton fusible
Pos. 18 : Ventilsteuerung,Motorsteuerung
valve-, motor controlling mode
valvule controle, commande moteur
Pos. 19 : Vorverstaerker
pre-amplifier
préamplificateur
Pos. 20 : Abschaltmagnet
hut-off solenoid
électro-aimant de déclenchement
Pos. 21 : Oeldruckschalter
oil pressure switch
contacteur pressure d'huile
Pos. 22 : Anlasser
starter
demarreu
Pos. 23 : Batterie
battery
batterie
Pos. 24 : Regler
regulator
regulateur
Pos. 25 : Lichtmaschine
alternator
alternateur
Pos. 26 : Zentralmasse
central ground
masse centrale
Pos. 27 : Zentralsicherung
central fuse
fusible central
Pos. 28 : Motor
engine
moteur
Pos. 29 : Masse Oeltank
Oiltank ground
masse ...
Pos. 30 : Zuendschloss
starter switch
sécurre de contact
Pos. 31 : Schutzkappe
protective cap
capuchon
Pos. 32 : Zuendschluessel
starter switch key
clé de contact
Pos. 33 : Zentralstecker
coupler
prise

Pos. 34-39 : Kabelschuh
cable bracket
cosse de câble
Pos. 40+41 : Zugentlastung
strain-relief
Soulagemont detraction
Pos. 42 : Minusklemme
minus clamp
serre câble deficit
Pos. 43 : Plusklemme
puls clamp
serre câble plus
Pos. 44 : Deutsch-Stecker
deutsch connector
deutsch connecteur
Pos. 45-47 : Kontakt
contact
contact
Pos. 48 : Sicherungshalter
fuse holder
boitier fusible
Pos. 49 : Ventilstecker
valve connector
connecteur de vanne
Pos. 50 : Schraube
screw
vis
Pos. 51 : Dichtung
gasket
joint
Pos. 52+58 : Stecker
connector
connecteur
Pos. 55+60 : Buchse
bearing bush
boite
Pos. 53+56+59+61 : PIN-Sicherung
pin protection
broche sécurité
Pos. 54+57+62 : PIN
pin
broche
Pos. 63 : Kabelbaum
wiring harness
faisceau
Pos. 64+65+66 : Massekabel
ground cable
câble masse
(d) Pos. 67 : Batteriekabel
battery cable
cable batterie

(a) (b) (c)

Legende ist abhaengig von Kabelbaum-Schaltplan 3-10904
legend depends on diagram of wiring harness 3-10904
légende dépend de la diagramme du faisceau 3-10904

RAMMAX				Allgemeintol. 130 DIN 16901 m DIN 7168 ... DIN	Oberfläche DIN ISO 1302	Maßstab ---	
						RW 1504 -HF/-HFK/-HK	
					Datum	Name	
				Bearb.	18-05-05	M.Serio	Elektrokomponente
				Gepr.			
				Norm			
d		03.06.08	Ser				
c		30.03.07	Ser	Masch.-Nr.:		3-10905	Blatt
b		19.06.06	Ser				
a		10.05.06	Ser				Bl.
Zust	Änderung	Datum	Name	72555 Metzingen			

Fuel circuit

Fuel circuit components

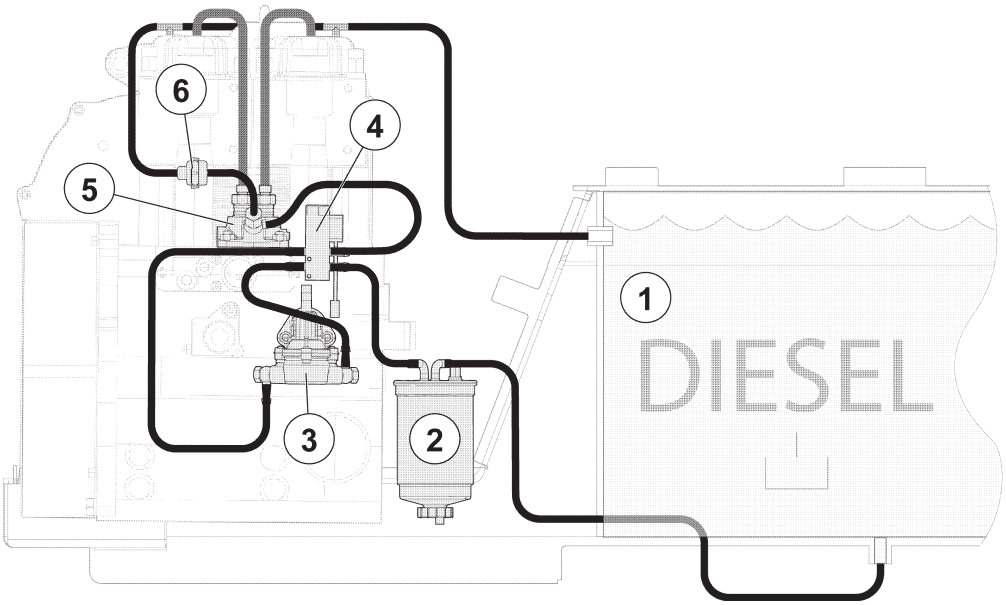
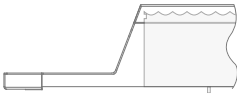
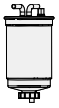
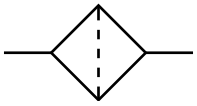
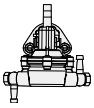
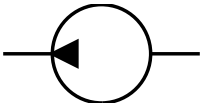
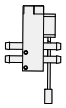
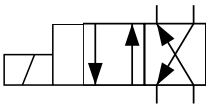
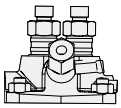
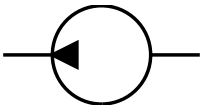
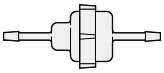
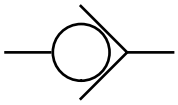
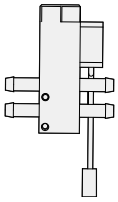


Fig. 1: Fuel circuit layout

Key			
Pos	**Figure**	**Symbol**	**Name**
1			Fuel tank
2			Fuel filter
3			Fuel supply pump
4			Fuel shut-off valve
5			Injection pump
6			Non-return valve



Fuel shut-off valve

Job of the fuel shut-off valve: Stops the engine. The fuel shut-off valve interrupts the fuel supply going to the engine, if:

1) The ignition is switched off.
2) The inclination encoder has tripped

The fuel shut-off valve is a 2/4-way valve with an electrical solenoid. It can move into two switch positions and it has four connections. These are identified by the numbers 1 - 4.

Power to the fuel shut-off valve is disconnected whilst the engine is running. The solenoid is de-activated. The fuel shut-off valve then has the same switching state as shown in Fig. 1: The fuel flows through the valve from Connection 1 to connection 3 and from Connection 2 to Connection 4.

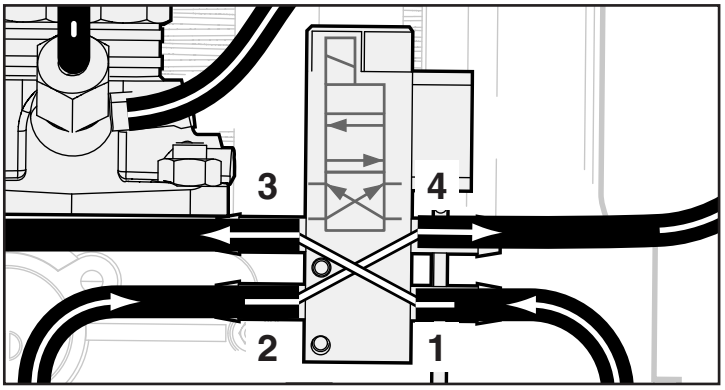


Fig 1: Flow direction through the fuel shut-off valve when running

The solenoid is activated when the engine is stopped. The fuel shut-off valve then has the same switching state as shown in Fig. 2: The fuel flows through the valve from Connection 1 to connection 2 and from Connection 3 to Connection 4.

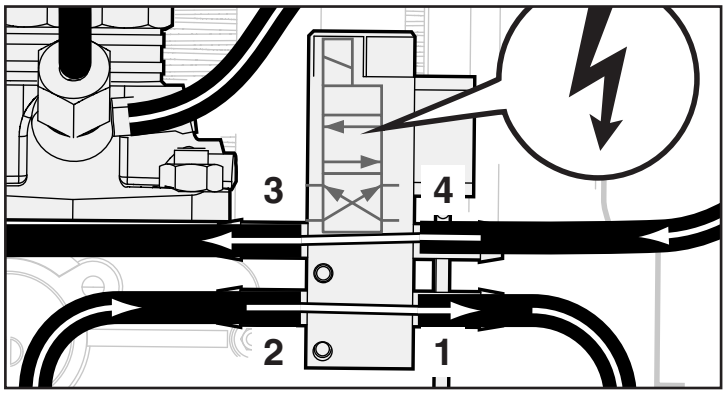
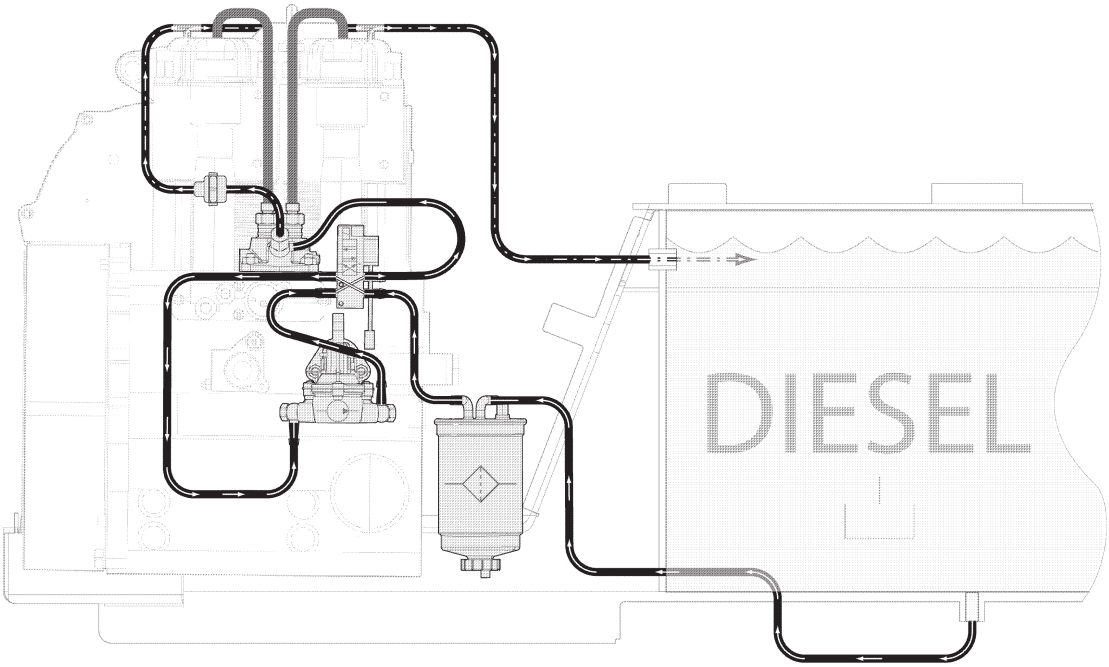
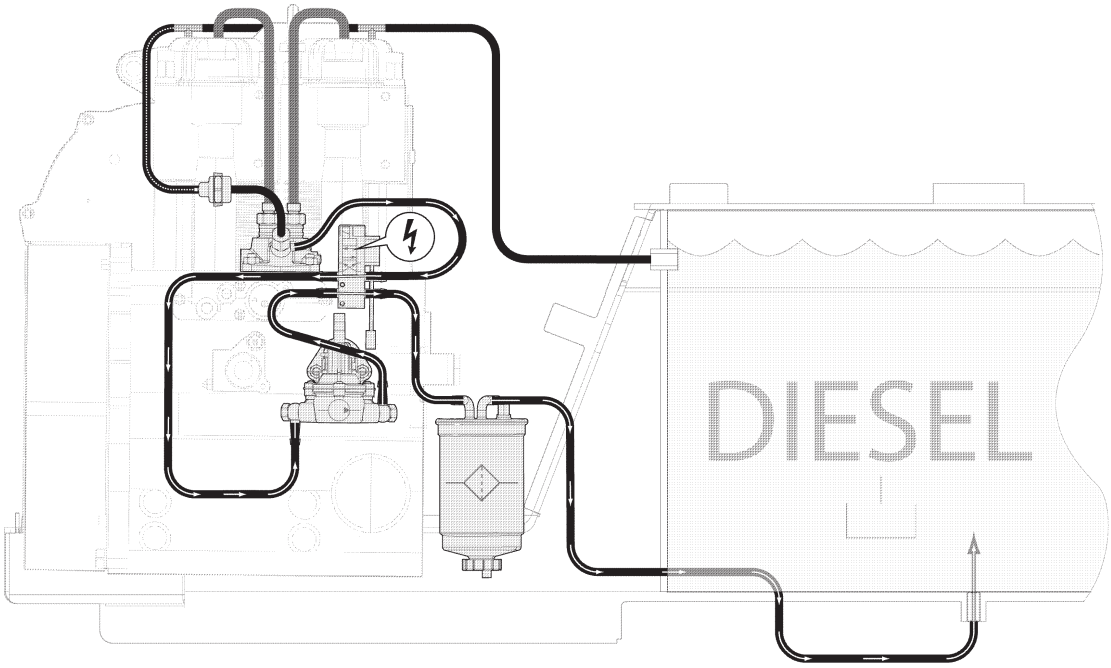


Fig. 2: Flow direction through the fuel shut-off valve when the engine is stopped

Fuel circuit when the engine is running



Fuel circuit when stopping the engine



Technical modifications reserved

Ammann Schweiz AG
Eisenbahnstrasse 25
CH-4901 Langenthal
Telefon 0041 (0)62 916 61 61
Telefax 0041 (0)62 916 68 04
www.ammann-group.com

Printed in Switzerland