



BOMAG

FAYAT GROUP

Operating instructions Maintenance instructions

Original operating instructions

BW 80 AD-5/BW 90 AD-5/BW 100 ADM-5

BW 90 SC-5 / BW 100 SC-5

BW 100 ACM-5/BW 100 SCC-5

S/N 101 462 00 1139 > / S/N 101 462 01 1053 > / S/N 101 462 03 1065 >
S/N 101 462 05 1027 > / S/N 101 462 07 1013 >
S/N 101 462 04 1028 > / S/N 101 462 06



Tandem Vibratory Roller

Combination Roller

Catalogue No.
008 067 01

05/2012

1 Foreword

These BOMAG machines are products from the wide product range of BOMAG machines for earth and asphalt construction, refuse compaction and stabilizing/recycling.

BOMAG's vast experience in connection with state-of-the-art production and testing methods, such as lifetime tests of all important components and highest quality demands guarantee maximum reliability of your machine.

This manual comprises:

- Safety regulations
- Operating instructions
- maintenance instructions
- Trouble shooting

Using these instructions will

- help you to become familiar with the machine.
- avoid malfunctions caused by unprofessional operation.

Compliance with the maintenance instructions will

- enhance the reliability of the machine on construction sites,
- prolong the lifetime of the machine,

- reduce repair costs and down-times.

BOMAG will not assume liability for the function of the machine

- if it is handled in a way not complying with the usual modes of use,
- if it is used for purposes other than those mentioned in these instructions.

No warranty claims can be lodged in case of damage resulting from

- operating errors,
- insufficient maintenance and
- wrong fuels and lubricants.

Please note!

This manual was written for operators and maintenance personnel on construction sites.

Always keep this manual close at hand, e.g. in the tool compartment of the machine or in a specially provided container. These operating and maintenance instructions are part of the machine.

You should only operate the machine after you have been instructed and in compliance with these instructions.

Strictly observe the safety regulations.

Please observe also the guidelines of the Civil Engineering Liability Association "Safety Rules for the Operation of Road Rollers and Soil

Foreword

Compactors” and all relevant accident prevention regulations.

For your own personal safety you should only use original spare parts from BOMAG.

For your machine BOMAG offers service kits to make maintenance easier.

In the course of technical development we reserve the right for technical modifications without prior notification.

These operating and maintenance instructions are also available in other languages.

Apart from that, the spare parts catalogue is available from your BOMAG dealer against the serial number of your machine.

Your BOMAG dealer will also supply you with information about the correct use of our machines in soil and asphalt construction.

The above notes do not constitute an extension of the warranty and liability conditions specified in the general terms of business of BOMAG.

We wish you successful work with your BOMAG machine.

BOMAG GmbH

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Please fill in

.....

Machine type (Fig. 1)

.....

Serial-number (Fig. 1 and 2)

.....

Motor type (Fig. 3)

.....

Motor number (Fig. 3)

i Note

Supplement the above data together with the commissioning protocol.

During commissioning our organisation will instruct you in the operation and maintenance of the machine.

Please observe strictly the safety regulations and all notes on risks and dangers!

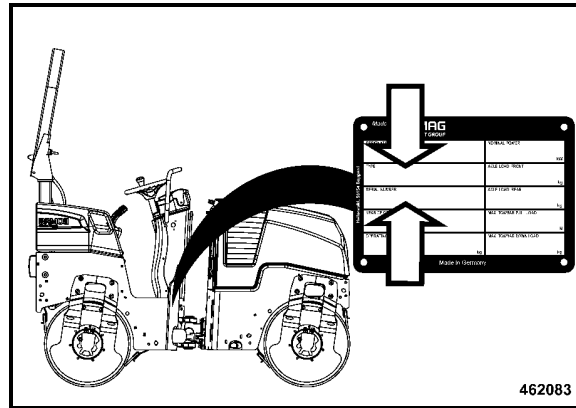


Fig. 1

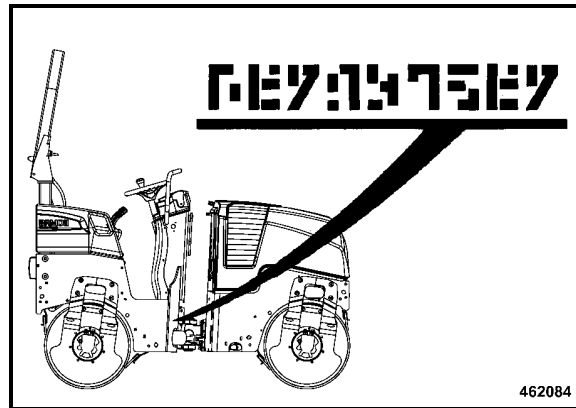


Fig. 2

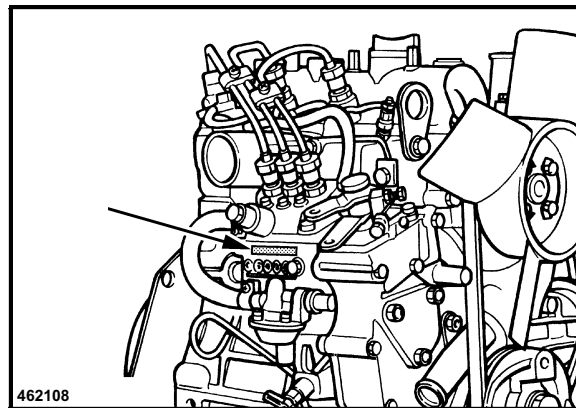


Fig. 3

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2 Technical data

Technical data

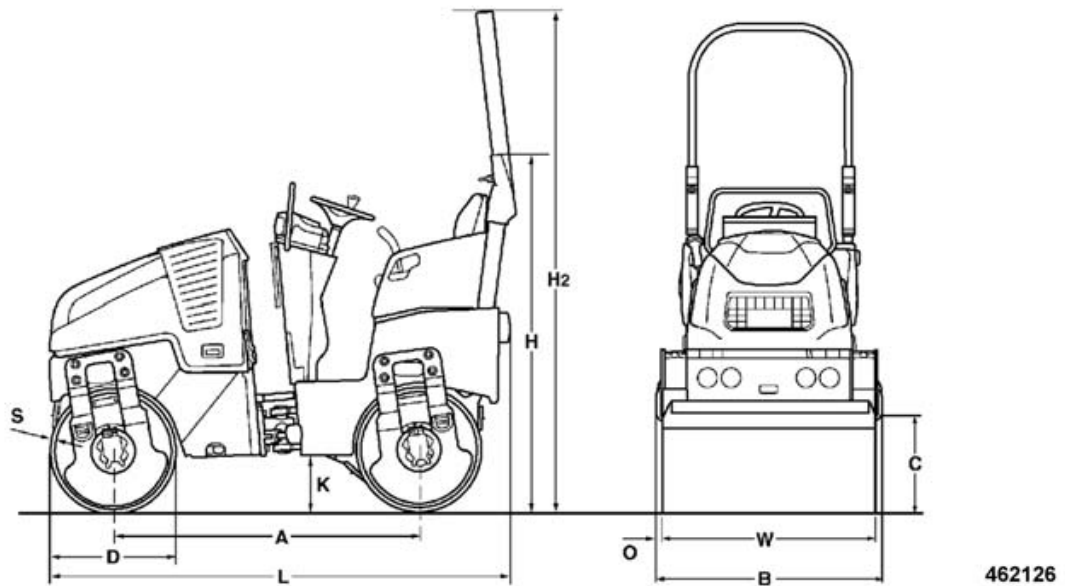


Fig. 4

BW 80 AD-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	856	433	580	1627	2304	255	2194	28	13	800
in in	58.4	33.7	17.0	22.8	64.1	90.7	10.0	86.4	1.1	0.51	31.5

Technical data

1

BW 80 AD-5

Weights

Operating weight (CECE)	kg (lbs)	1550 (3417)
Mean static linear load (CECE)	kg/cm (pli)	9,7 (54.3)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Driven drum		front + rear

Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	2080 (81.9)

Vibration system

Technical data

1

BW 80 AD-5

Vibrating drum		front + rear
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,50 (0,020)
Centrifugal force (1)	kN (lbf)	17 (3822)
Centrifugal force (2)	kN (lbf)	8 (1798)

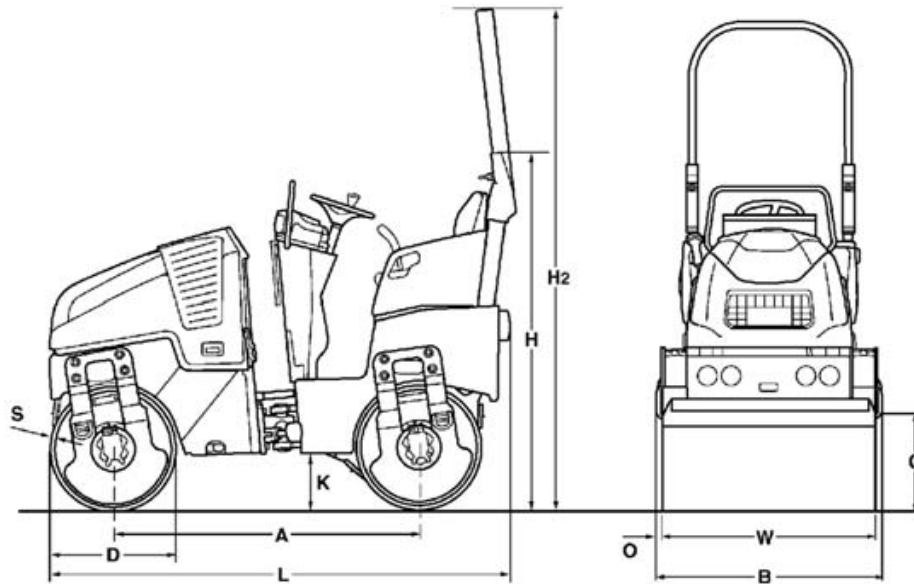
Water sprinkler system

Type		Pressure
------	--	----------

Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Fig. 5

BW 90 AD-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	956	433	580	1627	2304	255	2194	28	12	900
in in	58.4	37.6	17.0	22.8	64.1	90.7	10.0	86.4	1.1	0.47	35.4

Technical data

1

BW 90 AD-5

Weights

Operating weight (CECE)	kg (lbs)	1600 (3527)
Mean static linear load (CECE)	kg/cm (pli)	8,9 (49.8)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Driven drum		front + rear

Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	2030 (79.9)

Vibration system

Technical data

1

BW 90 AD-5

Vibrating drum		front + rear
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,50 (0,020)
Centrifugal force (1)	kN (lbf)	17 (3822)
Centrifugal force (2)	kN (lbf)	8 (1798)

Water sprinkler system

Type	Pressure
------	----------

Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Technical data

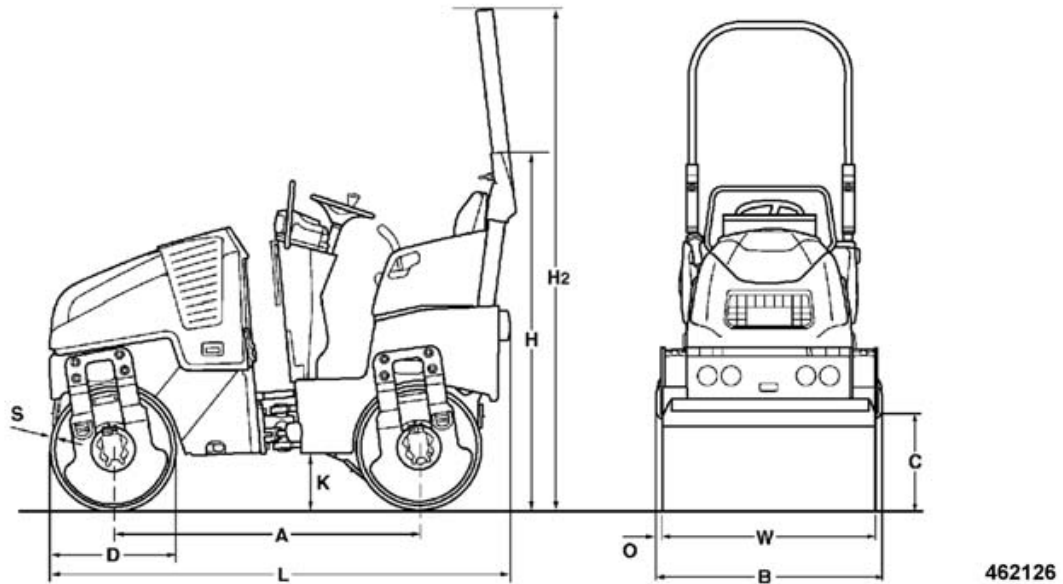


Fig. 6

BW 100 ADM-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	1056	433	580	1627	2304	255	2194	28	12	1000
in in	58.4	41.6	17.0	22.8	64.1	90.7	10.0	86.4	1.1	0.47	39.4

1

BW 100 ADM-5

Weights

Operating weight (CECE)	kg (lbs)	1650 (3638)
Mean static linear load (CECE)	kg/cm (pli)	8,3 (46.2)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Driven drum		front + rear

Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	1980 (78.0)

Vibration system

Technical data

1

BW 100 ADM-5

Vibrating drum		front + rear
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,40 (0,016)
Centrifugal force (1)	kN (lbf)	17 (3822)
Centrifugal force (2)	kN (lbf)	8 (1798)

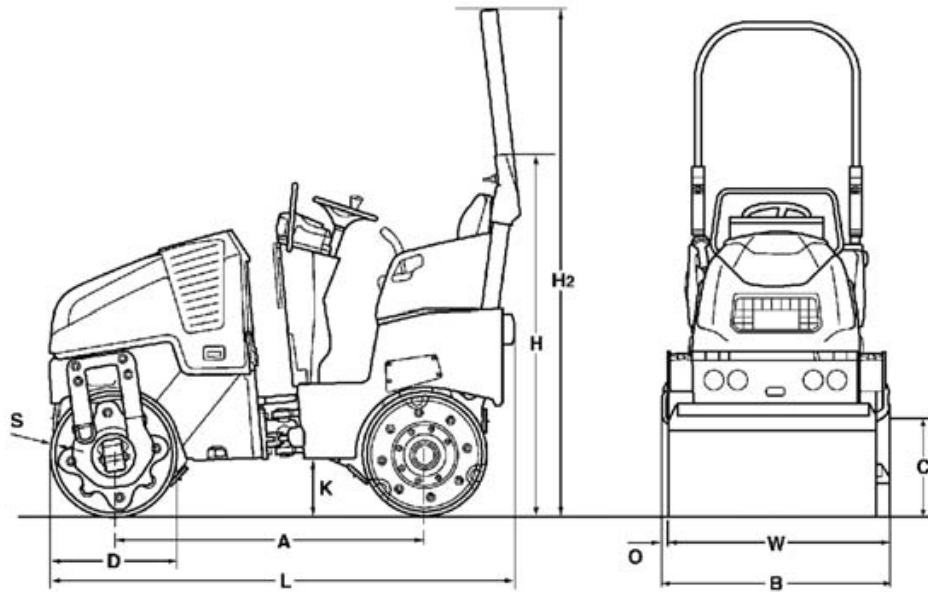
Water sprinkler system

Type		Pressure
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Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Fig. 7

BW 90 SC-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	960	435	580	1627	2304	255	2194	52	12	960
in in	58.4	37.8	17.1	22.8	64.1	90.7	10.0	86.4	2.0	0.47	37.8

Technical data

1

BW 90 SC-5

Weights

Operating weight (CECE)	kg (lbs)	1650 (3638)
Mean static linear load (CECE)	kg/cm (pli)	9,2 (51.5)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Driven drum		front + rear

Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	2000 (78.7)

Vibration system

Technical data

1

BW 90 SC-5

Vibrating drum		front + rear
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,50 (0,020)
Centrifugal force (1)	kN (lbf)	19 (4271)
Centrifugal force (2)	kN (lbf)	8 (1798)

Water sprinkler system

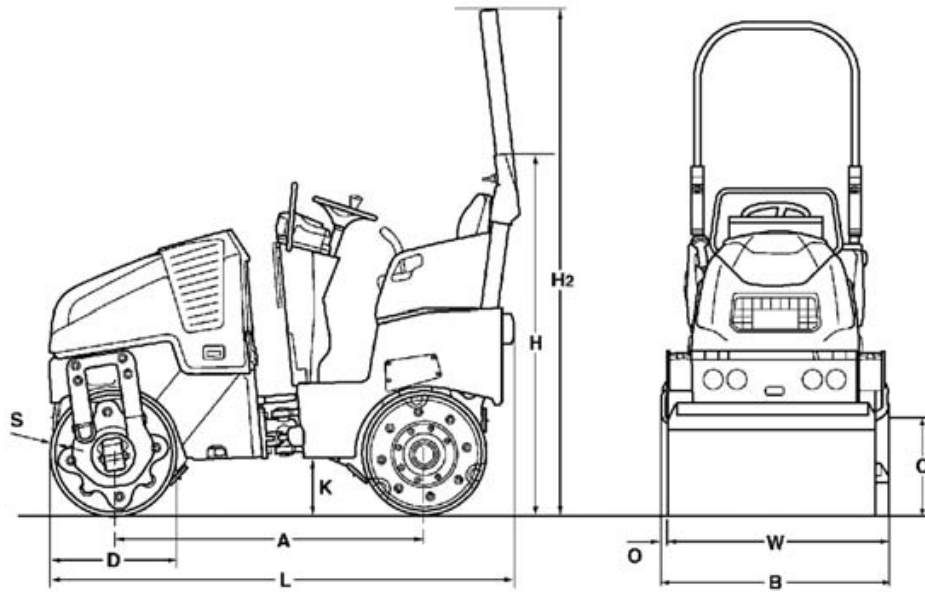
Type	Pressure
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Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Technical data



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Fig. 8

BW 100 SC-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	1060	435	580	1627	2304	255	2194	52	12	1060
in in	58.4	41.7	17.1	22.8	64.1	90.7	10.0	86.4	2.0	0.47	41.7

1

BW 100 SC-5

Weights

Operating weight (CECE)	kg (lbs)	1700 (3748)
Mean static linear load (CECE)	kg/cm (pli)	8,5 (47.6)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Driven drum		front + rear

Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	1950 (76.8)

Vibration system

Technical data

1

BW 100 SC-5

Vibrating drum		front + rear
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,50 (0,020)
Centrifugal force (1)	kN (lbf)	19 (4271)
Centrifugal force (2)	kN (lbf)	8 (1798)

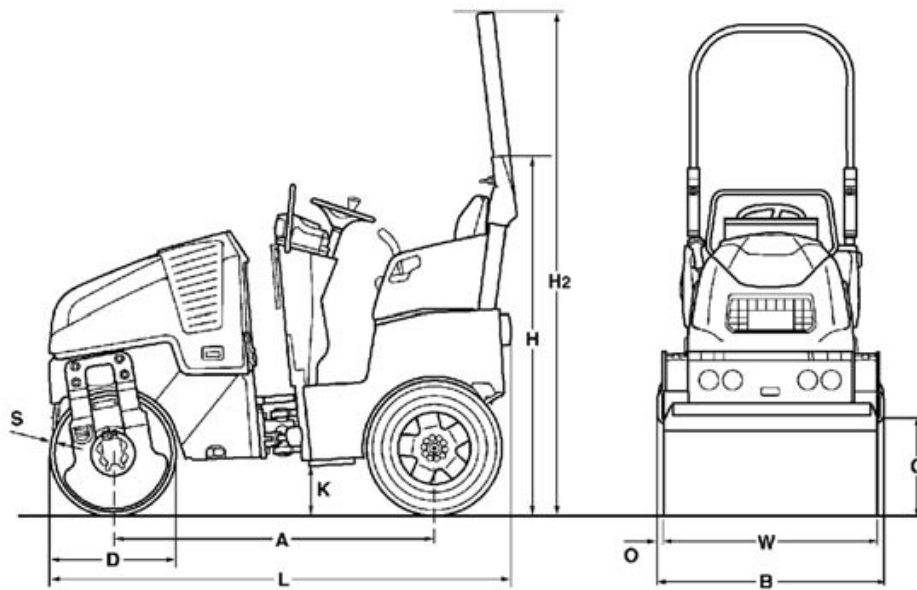
Water sprinkler system

Type	Pressure
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Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Fig. 9

BW 100 ACM-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	1056	435	580	1663	2340	240	2194	28	12	1000
in in	58.4	41.6	17.1	22.8	65.5	92.1	9.4	86.4	1.1	0.47	39.4

Technical data

1

BW 100 ACM-5

Weights

Operating weight (CECE)	kg (lbs)	1700 (3748)
Wheel load (CECE)	kg (lbs)	225 (496)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Wheels driven		4
Driven drum		front

Tires

Tire size		205/60-15
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Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic

Technical data

1		BW 100 ACM-5
Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	1980 (78.0)

Vibration system

Vibrating drum		front
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,40 (0,016)
Centrifugal force (1)	kN (lbf)	17 (3822)
Centrifugal force (2)	kN (lbf)	8 (1798)

Water sprinkler system

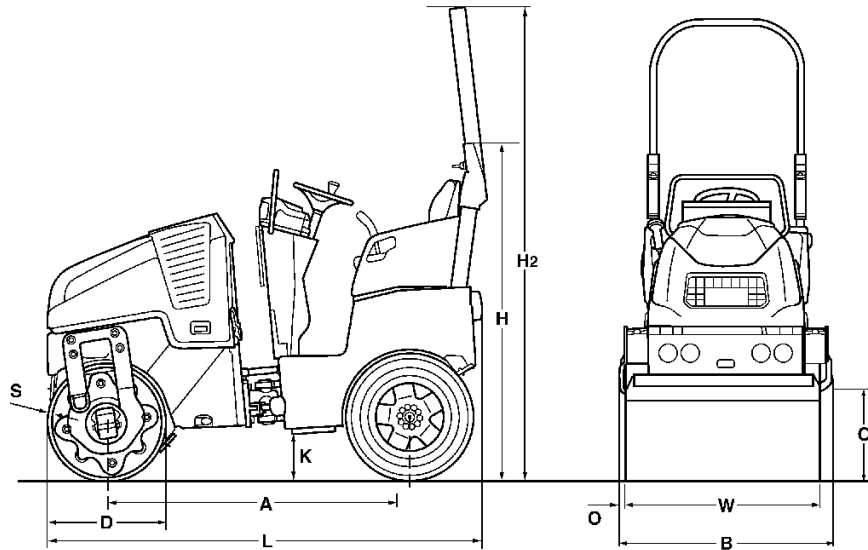
Type		Pressure
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Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Emulsion (sprinkling system)	l (gal us)	approx. 11 (2.9)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

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Technical data



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Fig. 10

BW 100 SCC-5

Dimen- sions	A	B	C	D	H	H ₂	K	L	O	S	W
in mm	1483	1056	435	580	1663	2340	240	2194	52	12	1030
in in	58.4	41.6	17.1	22.8	65.5	92.1	9.4	86.4	2.0	0.47	40.6

1

BW 100 SCC-5

Weights

Operating weight (CECE)	kg (lbs)	1700 (3748)
Wheel load (CECE)	kg (lbs)	225 (496)
Max. operating weight	kg (lbs)	1800 (3968)

Travel characteristics

Max. travel speed	km/h (mph)	10,0 (6.2)
Max. working speed with vibration	km/h (mph)	4,5 (2.8)
Max. gradability without/with vibration (soil dependent)	%	40/30

Drive

Engine manufacturer		Kubota
Type		D902
Cooling		Water
Number of cylinders		3
Rated power ISO 14396	kW	15.1
Rated power SAE J 1995	hp	20.2
Fixed engine speed (1)	min ⁻¹	3000
Fixed engine speed (2)	min ⁻¹	2100
Electrical equipment	V	12
Drive system		hydrostatic
Wheels driven		4
Driven drum		front

Tires

Tire size		205/60-15
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Brakes

Service brake		hydrostatic
Parking brake		hydro-mechanical

Steering

Type of steering		Oscill.-articul.
Steering operation		hydrostatic

Technical data

1

BW 100 SCC-5

Steering/oscillation angle	+/-°	33/8
Inner track radius	mm (in)	1980 (78.0)

Vibration system

Vibrating drum		front
Drive system		hydrostatic
Frequency (1)	Hz (vpm)	63 (3780)
Frequency (2)	Hz (vpm)	42 (2520)
Amplitude	mm (in)	0,50 (0,020)
Centrifugal force (1)	kN (lbf)	19 (4271)
Centrifugal force (2)	kN (lbf)	8 (1798)

Water sprinkler system

Type		Pressure
------	--	----------

Filling capacities

Fuel (diesel)	l (gal us)	approx. 30 (7.9)
Water (sprinkling system)	l (gal us)	approx. 100 (26.4)
Emulsion (sprinkling system)	l (gal us)	approx. 11 (2.9)
Hydraulic oil	l (gal us)	approx. 14 (3.7)
Engine oil	l (gal us)	approx. 3.9 (1.0)
Coolant	l (gal us)	approx. 9 (2.4)

1 The right for technical modifications remains reserved

The following noise and vibration data acc. to

- EC Machine Regulation edition 2006/42/EC
- the noise regulation 2000/14/EG, noise protection guideline 2003/10/EC
- Vibration Protection Regulation 2002/44/EC

were determined during conditions typical for this type of equipment and by application of harmonized standards.

During operation these values may vary because of the existing operating conditions.

Noise value

Sound pressure level on the place of the operator:

$L_{pA} = 84 \text{ dB(A)}$, determined acc. to ISO 11204 and EN 500

Guaranteed sound power level:

$L_{WA} = 104 \text{ dB(A)}$, determined acc. to ISO 3744 and EN 500

Danger

Wear your personal noise protection means (ear defenders) before starting operation.

Vibration value

Vibration of the entire body (driver's seat)

The weighted effective acceleration value determined according to ISO 7096 is $\leq 0.5 \text{ m/s}^2$.

Hand-arm vibration values

The weighted effective acceleration value determined according to EN 500/ISO 5349 is $\leq 2.5 \text{ m/s}^2$.

Technical data

3 Safety regulations

Safety regulations

General

This BOMAG machine has been built in compliance with the latest technical standard and complies with the applicable regulations and technical rules. However, dangers for persons and property may arise from this machine, if:

- it is used for purposes other than the ones it is intended for,
- it is operated by untrained personnel,
- it is changed or converted in an unprofessional way,
- the safety instructions are not observed.

Each person involved in the operation, maintenance and repair of the machine must therefore read and comply with these safety regulations. If necessary, this must be confirmed by obtaining the signature of the customer.

Furthermore, the following obviously also applies:

- applicable accident prevention instructions,
- generally accepted safety and road traffic regulations,
- country specific safety regulations. It is the duty of the operator to be acquainted with these instructions and to apply these accordingly. This applies also for local regulations concerning different types of handling work. Should the recommendations in these instructions be different from the regulations valid in your country, you must comply with the safety regulations valid in your country.

Intended use

This machine must only be used for:

- Compaction of bituminous material, e.g. road surface layers,
- light to medium compaction work in earth construction or road sub-bases.

Unintended use

Dangers may arise from the machine when it is used for purposes other than the one it is intended for.

Any danger caused by intended use is the sole responsibility of the customer or driver/operator, the manufacturer cannot be made liable.

Examples for unintended use are:

- work with vibration on hard concrete, cured bitumen layers or extremely frozen ground
- cleaning the drums while driving or changing nozzles during travel.
- driving on unstable subbases or insufficient grip or too small contact area (danger of tipping over)
- Passing over high borders (e.g. curbstones, embankments, trenches, pot-holes)
- unauthorized use of public roads
- Using the machine for towing

Transporting persons, except the machine driver, is prohibited.

Starting and operation of the machine in explosive environments and in underground mining is prohibited.

Remaining dangers, remaining risks

Despite careful work and compliance with standards and regulations it cannot be ruled out that further dangers may arise when working with and handling the machine.

Both the machine as well as all other system components comply with the currently valid safety regulations. Nevertheless, remaining risks cannot be ruled out completely, even when using the machine for the purpose it is intended for and following all information given in the operating instructions.

A remaining risk can also not be excluded beyond the actual danger zone of the machine. Persons remaining in this area must pay particular attention to the machine, so that they can react immediately in case of a possible malfunction, an incident or failure etc.

All persons remaining in the area of the machine must be informed about the dangers that arise from the operation of the machine.

Regular safety inspections

Have the machine inspected by an expert (capable person) as required for the condition the machine is working under, but at least once every year.

Safety regulations

Who is allowed to operate the machine?

Only trained, instructed and authorized persons of at least 18 years of age are permitted to drive and operate this machine. For operation of the machine the responsibilities must be clearly specified and complied with.

Persons under the influence of alcohol, medicine or drugs are not allowed to operate, service or repair the machine.

Maintenance and repair work requires specific knowledge and must therefore only be performed by trained specialists.

Changes and conversions to the machine

Unauthorized changes to the machine are prohibited for safety reasons.

Original parts and accessories have been specially designed for this machine.

We wish to make explicitly clear that we have not tested or approved any parts or accessories not supplied by us.

The installation and/or use of such products may have an adverse effect on the active and/or passive safety.

The manufacturer explicitly excludes any liability for damage caused by the use of non-original parts or accessories.

Damage, deficiencies, misuse of safety installations

Machines which are not safe to operate or in traffic must be immediately taken out of service and shall not be used, until these deficiencies have been properly rectified.

Safety installations and switches must neither be removed nor must they be made ineffective.

Notes on safety in the operating and maintenance instructions

 **Danger**

Paragraphs marked like this highlight possible dangers for persons.

Caution

Paragraphs marked like this highlight possible dangers for machines or parts of the machine.

Note

Paragraphs marked like this contain technical information for the optimal economical use of the machine.

Environment

Paragraphs marked like this point out practices for safe and environmental disposal of fuels and lubricants as well as replacement parts.

Observe the regulations for the protection of the environment.

Loading / transporting the machine

Loading with loading ramp

Use only stable loading ramps of sufficient load bearing capacity. The ramp inclination must be less than the gradability of the machine.

The ramp must be free of grease, oil, snow and ice.

Make sure that persons are not endangered by the machine tipping or sliding off.

During demonstration and when loading the machine do not remain in the danger zone of the machine.

Secure the machine with the articulation lock after driving it on the transport vehicle.

Loading by crane

Lifting tackle must only be attached to loads by expert personnel (qualified person).

Engage the articulation lock.

Always use suitable lifting tackle on the lifting points to lift the machine.

Check all lifting points and fastening elements for damage before lifting the machine. Do not use damaged or in any other way impaired lifting points.

Safety regulations

Lift the machine only with suitable lifting gear. Use only safe lifting gear of sufficient load bearing capacity Minimum lifting capacity of lifting gear: see operating weight in chapter "Technical Data".

Do not lift or lower the machine jerkily.

The tension must always be effective in vertical direction.

The machine must not swing about when being lifted.

Do not step or stand under suspended loads.

Lashing

Always use suitable lashing gear on the lifting points to lash down the machine.

Check all lashing points for damage before lashing down the machine. Do not use a damaged or in any other way impaired lashing points.

Always apply the articulation lock for transportation.

Lash the machine down, so that it is secured against rolling, sliding and turning over.

After transport

Operate the machine only with the foldable ROPS¹ properly fastened and the fastening screws tightened with the correct tightening torque.

After transport release the articulation lock again and store it in the receptacle.

Towing the machine

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away before releasing the parking brake.

Use a tow bar (to be provided by the operating company).

Use a towing vehicle with sufficient traction and braking power for the unbraked towed load.

The machine cannot be steered.

Tow the machine only after having released the parking brake.

Max. towing speed 1 km/h (0.6 mph), max. towing distance 500 m (0.3 mi).

1 Optional equipment

Checking the Roll Over Protective Structure (ROPS)

The frame of the machine must not be warped, bent or cracked in the area of the ROPS fastening.

The ROPS must not show any rust, damage, hairline cracks or open fractures.

The real machine weight must never exceed the testing weight for the ROPS.

The ROPS must not rattle about when driving. This indicates that it is not properly fastened. All bolted connections must comply with the specifications and should be absolutely tight (observe the tightening torques). Screw and nuts must not be damaged, bent or deformed.

No accessories may be welded or bolted on and no additional holes must be drilled without the consent of the manufacturer, since this will impair the strength of the unit.

The ROPS must therefore also not be straightened or repaired if it is damaged.

A defect ROPS must generally be replaced with an original spare part in close coordination with the manufacturer.

Starting the machine

Before starting

The machine must only be operated from the driver's seat.

Use only machines which are serviced at regular intervals.

Become acquainted with the equipment, the control elements, the working principle of the machine and the working area.

Wear your personal protective outfit (hard hat, safety boots, etc.). Wear ear defenders.

Before mounting the machine check whether:

- persons or obstructions are beside or under the machine
- the machine is free of oily and combustible material
- all grips, steps and platforms are free of grease, oils, fuel, dirt, snow and ice
- engine hood is closed and locked

Use steps and grips to mount the machine.

Before starting the machine check whether:

- the machine shows any obvious faults

Safety regulations

- all guards and safety elements are in place
- steering, brakes, control elements, light system and warning horn work correctly
- the seat is correctly adjusted
- mirrors (if present) are clean and correctly adjusted.

Do not start the machine with defective gauges, control lights or control elements.

Do not take any loose objects with you or fasten them to the machine.

On machines with roll over protection system you must always wear your seat belt!

Starting

Start and operate the machine only from the driver's seat.

For starting set all control levers to 'neutral position'.

Do not use any starting aids like start pilot or ether.

After starting check all gauges and control lights.

Starting with jump wires

Connect plus to plus and minus to minus (ground cable) – always connect the ground strap last and disconnect it first! A wrong connection will cause severe damage in the electric system.

Do not start the engine by shorting the electric terminals on the starter motor, because the machine may start to drive immediately.

Starting and operation of the machine in closed rooms and trenches

Exhaust gases are highly dangerous! Always ensure an adequate supply of fresh air when starting and operating in closed rooms and trenches!

Driving the machine

Persons in the danger area

Before taking up work, also after breaks, you should always convince yourself that the danger zone is free of persons or obstructions, especially when driving in reverse.

Give warning signals, if necessary. Stop work immediately if persons remain in the danger zone, despite the warning.

Do not step or stand in the articulation area of the machine when the engine is running. Danger of squashing!

Driving

Always wear the seat belt when driving.

Do not drive on bases with insufficient load bearing capacity.

Do not drive on ice and snow.

In events of emergency and in case of danger actuate the emergency stop switch immediately. Do not use the emergency stop switch as service brake.

Restart the machine only after the danger that caused the actuation of the emergency stop switch has been eliminated.

Do not drive the machine with the hydraulic breaker¹ connected.

Do not switch on the rotary switch for hydraulic breaker¹ while driving. The machine would be abruptly braked without braking delay. In case of frequent use the wear on the multi-discs brakes will be very high.

If the machine has contacted high-voltage power lines:

- do not leave the operator's stand.
- warn others from coming close to or touching the machine.
- if possible drive the machine out of the danger zone.
- have the power switched off.

Operate the machine only from the driver's seat.

Do not adjust the driver's seat while driving.

Do not climb onto or off the machine while the machine is driving.

Change the travel direction only at standstill.

Do not use the machine to transport persons.

In case of unusual noises and development of smoke perform trouble shooting and have the fault corrected.

Always keep a sufficient distance to excavation walls and embankments and do not use working methods that could impair the stability of the machine.

1 Optional equipment

Safety regulations

Always keep a sufficient distance when passing through subways, under bridges, tunnels, electric power lines etc.

Driving on inclinations and slopes

Do not drive on gradients exceeding the maximum gradability of the machine. On slopes drive extremely careful and always directly up or down the slope. Change to a lower gear before starting to drive.

Wet and loose soils considerably reduce the ground adhesion of the machine on inclinations and slopes. Higher risk of accident!

Inclination

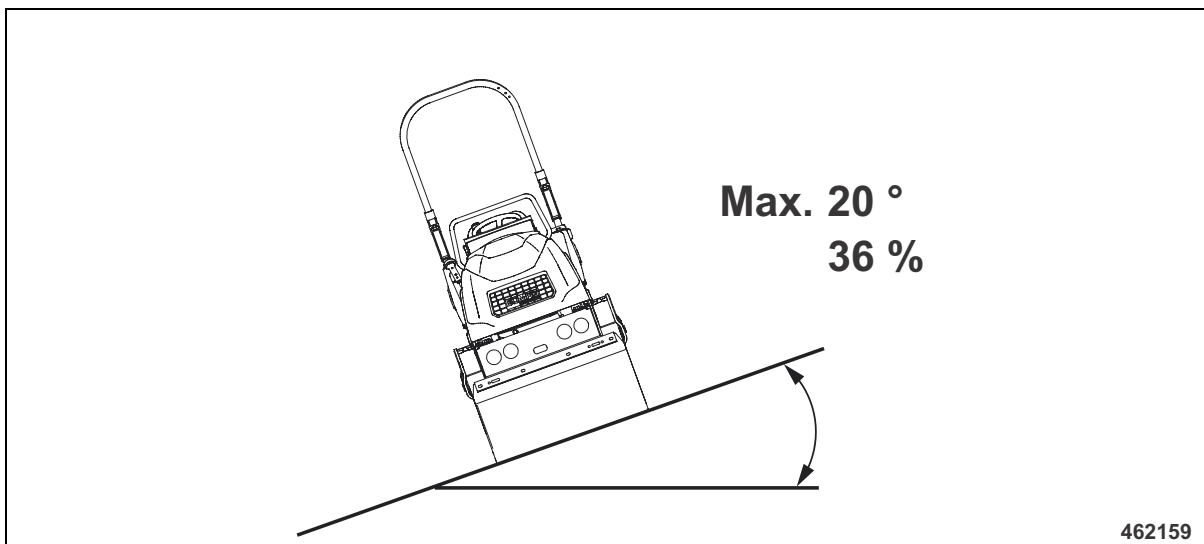


Fig. 11

The tipping angle was measured in static condition on level, hard ground with the machine stopped, no steering and without vibration.

The maximum permissible inclination of the machine may be limited by the permissible inclination of the engine.

The specified angle (Fig. 11) must not be exceeded.

With loose soil, acceleration/deceleration, running vibration, steering or attached accessories the tipping angle may be considerably lower.

Driving across slopes should therefore be strictly avoided, because of the high risk of tipping over and the related risk of severe or even fatal accidents.

You should therefore always drive straight up or down a slope.

For rollers with a drum width of 1 m (3.3 ft) or less there is a considerable risk of tipping over near edges (e.g. curbstones, embankments, trenches, pot-holes) when driving over these edges.

Behaviour in traffic

Match the speed to the working conditions. Do not make extreme steering movements when driving with high speed, danger of tipping over!

Always give way to loaded transport vehicles.

Switch the lights on if the visibility is poor.

Keep away from edges and embankments.

Checking the effect of vibration

When compacting with vibration you must check the effect on nearby buildings and underground supply lines (gas, water, sewage, electric power), if necessary stop compaction work with vibration.

Do not work with vibration on hard concrete, cured bitumen layers or extremely frozen ground. Danger of bearing damage!

Parking the machine

Park the machine on horizontal, level, firm ground.

Before leaving the machine:

- Shift the travel lever to neutral position and lock it in parking brake position. The parking brake is applied.
- Shut down the engine, pull off the ignition key

Mark machines, which could be in the way, with a clearly visible sign.

Parking on slopes and inclinations

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away.

Refuelling

Do not inhale any fuel fumes.

Refuel only with the engine stopped and the auxiliary heater switched off.

Always use access steps.

Do not refuel in closed rooms.

Safety regulations

No open fire, do not smoke.

Do not spill any fuel. Catch running out fuel, do not let it seep into the ground.

Wipe off spilled fuel. Keep dirt and water away from the fuel.

A leaking fuel tank can cause an explosion. Ensure tight fit of the fuel tank cover, if necessary replace immediately.

Fire protection measures

Familiarise yourself with the location and the operation of fire fighting equipment. Observe all fire reporting and fire fighting possibilities.

Maintenance work

Comply with the maintenance work described in the operating and maintenance instructions, including the information concerning the replacement of parts.

Maintenance work must only be performed by qualified and authorized persons.

For overhead maintenance and assembly work use the access steps and working platforms provided or other secure means. Do not use machine parts as access steps.

Keep unauthorized persons away from the machine.

Do not perform maintenance work while the machine is driving or the engine is running.

Park the machine on horizontal, level, firm ground.

Pull the key out of the ignition switch.

Secure the articulated joint with the articulation lock.

Work on hydraulic lines

Relieve hydraulic pressures before working on hydraulic lines. Hydraulic oil escaping under pressure can penetrate the skin and cause severe injury. When being injured by hydraulic oil consult a medical doctor immediately, as otherwise this may cause severe infections.

Do not step in front of or behind the drums/wheels when performing adjustment work in the hydraulic system.

Do not change the setting of pressure relief valves.

Drain the hydraulic oil at operating temperature – danger of scalding!

Any hydraulic oil must be caught and disposed of in an environmentally friendly manner.

Always catch and dispose of hydraulic oils separately.

Do not start the engine after draining the hydraulic oil.

Once all work is completed (with the system still depressurized!) check all connections and fittings for leaks.

Changing hydraulic hoses

Hydraulic hoses must be visually inspected at regular intervals.

Hydraulic hoses must be immediately replaced if:

- the outer layer is damaged down to the inlay (e.g. chafing, cuts, cracks).
- the outer layer is brittle (formation of cracks in the hose material).
- the hose shows deformations in pressurized and depressurized condition, which do not comply with the genuine shape of the hydraulic hose.
- the hose shows deformations in bends, e.g. squeezing, buckling, layer separation, formation of blisters,
- parts of the hose are leaking.
- hoses are not correctly installed
- the hydraulic hose has separated from the fitting
- the fitting shows corrosion that impairs both function and strength.
- fittings are damaged or deformed, whereby the function and strength of the hose/hose connection is impaired.

hoses are mixed up by mistake.

Only genuine BOMAG replacement hydraulic hoses ensure that the correct hose type (pressure range) is used at the right location.

Working on the engine

Shut down the engine before opening the engine hood.

Drain the engine oil at operating temperature – danger of scalding!

Wipe off spilled oil, catch running out oil and dispose of environmentally.

Store used filters and other oil contaminated materials in a separate, specially marked container and dispose of environmentally.

Safety regulations

Do not leave any tools or other objects, that could cause damage, in the engine compartment.

Check and change coolant only when the engine is cold.

Catch coolant and dispose of environmentally.

Working on electric parts of the machine

Before starting to work on electric parts of the machine disconnect the battery and cover it with insulating material.

Do not use fuses with higher ampere ratings and do not bridge fuses. Fire hazard!

Disconnect the battery before starting welding work on the machine.

Working on the battery

When working on the battery do not smoke, do not use open fire!

Do not let acid come in contact with hands or clothes! When injured by acid flush off with clear water and seek medical advice.

Metal objects (e.g. tools, rings, watch straps) must not come in contact with the battery poles – danger of short circuit and burning!

When recharging non-serviceable batteries remove all plugs, to avoid the accumulation of explosive gases.

Observe the applicable instructions when starting with an auxiliary battery.

Switch off the charging current before removing the charging clamps.

Ensure sufficient ventilation, especially if the battery is to be charged in a closed room.

Dispose of old batteries according to regulations.

Working on the fuel system

Do not inhale any fuel fumes.

Avoid open fire, do not smoke, do not spill any fuel.

Catch running out fuel, do not let it seep into the ground and dispose off environmentally.

Working on wheels and tires

Explosion-like bursting of tires or parts of tires and rims can cause most severe or even deadly injuries.

Install the tires only if are sufficiently experienced and with the right tools at hand. If necessary have the tires assembled in a qualified workshop.

Always ensure the correct tire pressure and do not exceed the specified maximum pressure.

Check tires and wheels every day for pressure, cuts, bulges, damaged rims, missing wheel studs or nuts. Do not drive with damaged tires or wheels.

Ant-sticking emulsions for tires must only consist of water and anti-sticking agent, in a concentration in accordance with the specifications of the manufacturer of the anti-sticking agent. Observe applicable environmental regulations.

Cleaning work

Do not perform cleaning work while the motor is running.

Do not use gasoline or other easily inflammable substances for cleaning.

When cleaning with steam cleaning equipment do not subject electrical parts and insulation material to the direct jet of water, or cover it beforehand.

- Do not guide the water jet into the exhaust and into the air filter.

After maintenance work

After all maintenance work is completed reinstall all guards and safety installations.

Repair

Mark a defective machine by attaching a warning tag to the steering wheel.

Repair work must only be performed by qualified and authorized persons. Use our repair instructions for this work.

Exhaust gases are highly dangerous! Always ensure an adequate supply of fresh air when starting in closed rooms!

Test

The safety of compaction equipment must be checked by a specialist as required in dependence on the application and the operating conditions, however at least once every year.

Information and safety stickers/decals on the machine

Keep stickers/decals in good and legible condition (see spare parts catalogue) and comply with their meaning.

Safety regulations

Replace damaged and illegible stickers/decals.

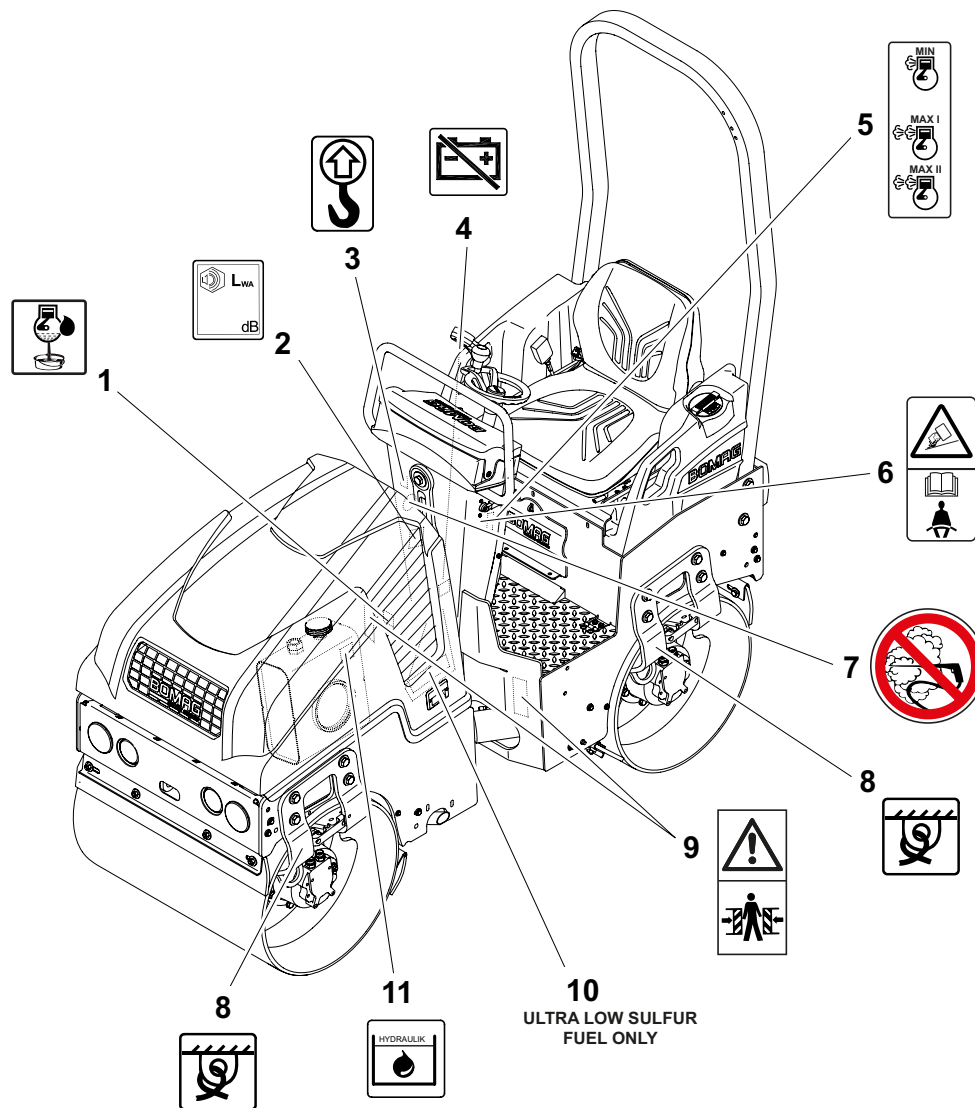


Fig. 12

462161

Decals and stickers BW 80 AD-5 / BW 90 AD-5 / BW 100 ADM-5

- | | | | |
|---|---|---|---|
| 1 | Information sticker - Engine oil drain | 6 | Warning sticker - Danger of tipping over |
| 2 | Information sticker - Guaranteed sound capacity level | 7 | Prohibition sticker - High pressure cleaner |
| 3 | Information sticker - Lifting point | 8 | Information sticker - Lashing point |
| 4 | Information sticker - Battery | 9 | Warning sticker - Danger of |
| 5 | Operation sticker - Throttle lever | | |

Safety regulations

crushing
10 Information sticker - Ultra-low

sulphur fuel
11 Information sticker - Hydraulic oil

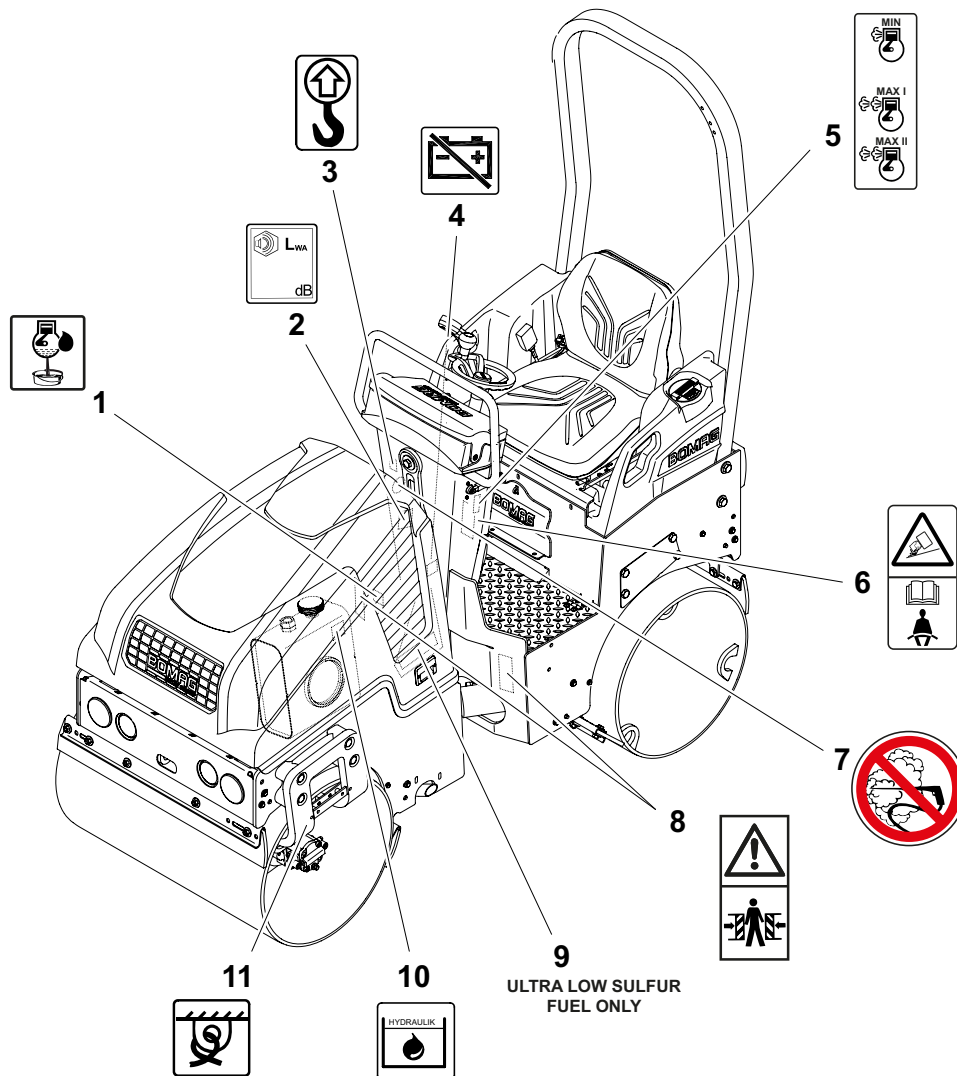


Fig. 13

462163

Decals and stickers BW 90 SC-5 / BW 100 SC-5

- | | | | |
|---|---|---|---|
| 1 | Information sticker - Engine oil drain | 6 | Warning sticker - Danger of tipping over |
| 2 | Information sticker - Guaranteed sound capacity level | 7 | Prohibition sticker - High pressure cleaner |
| 3 | Information sticker - Lifting point | 8 | Warning sticker - Danger of crushing |
| 4 | Information sticker - Battery | 9 | Information sticker - Ultra-low |
| 5 | Operation sticker - Throttle lever | | |

Safety regulations

- 10 sulphur fuel
- 10 Information sticker - Hydraulic oil
- 11 Information sticker - Lashing point

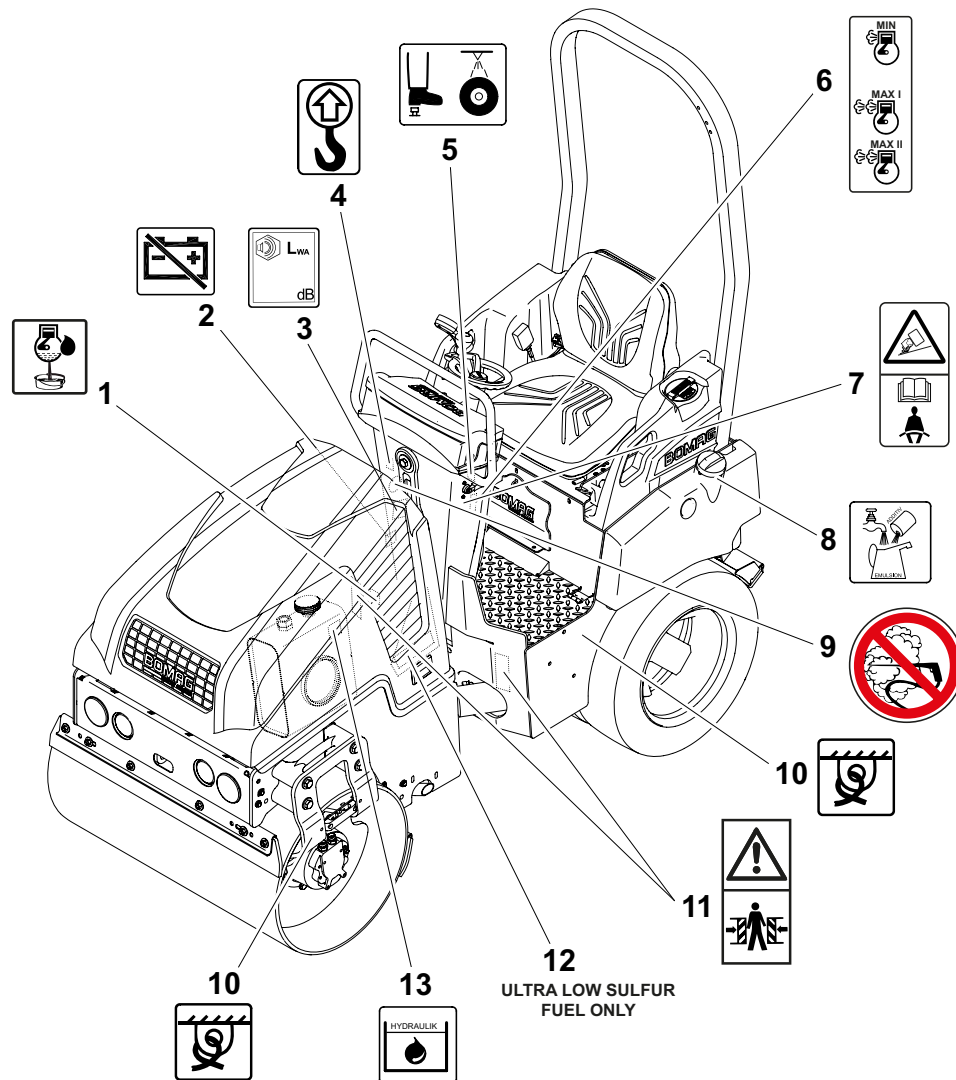


Fig. 14

462162

Stickers and decals BW 100 ACM-5

- | | | | |
|---|---|---|---|
| 1 | Information sticker - Engine oil drain | 6 | Operation sticker - Throttle lever |
| 2 | Information sticker - Battery | 7 | Warning sticker - Danger of tipping over |
| 3 | Information sticker - Guaranteed sound capacity level | 8 | Information sticker - Emulsion |
| 4 | Information sticker - Lifting point | 9 | Prohibition sticker - High pressure cleaner |
| 5 | Information sticker - Foot switch | | |

Safety regulations

- 10 Information sticker - Lashing point
- 11 Warning sticker - Danger of crushing
- 12 Information sticker - Ultra-low sulphur fuel
- 13 Information sticker - Hydraulic oil

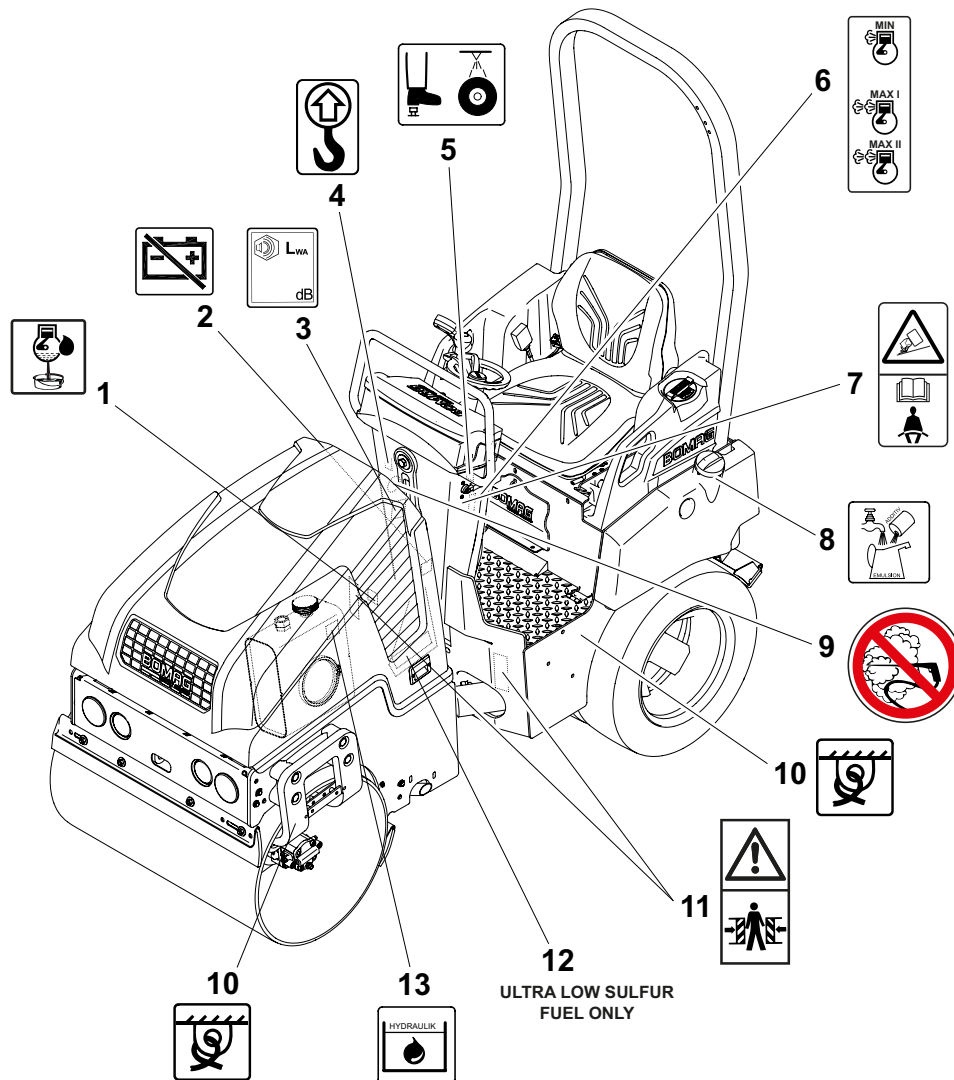


Fig. 15

462160

Stickers and decals BW 100 SCC-5

- | | | | |
|---|---|---|---|
| 1 | Information sticker - Engine oil drain | 6 | Operation sticker - Throttle lever |
| 2 | Information sticker - Battery | 7 | Warning sticker - Danger of tipping over |
| 3 | Information sticker - Guaranteed sound capacity level | 8 | Information sticker - Emulsion |
| 4 | Information sticker - Lifting point | 9 | Prohibition sticker - High pressure cleaner |
| 5 | Information sticker - Foot switch | | |
| | | | tire sprinkling system |

Safety regulations

- 10 Information sticker - Lashing point
- 11 Warning sticker - Danger of crushing
- 12 Information sticker - Ultra-low sulphur fuel
- 13 Information sticker - Hydraulic oil

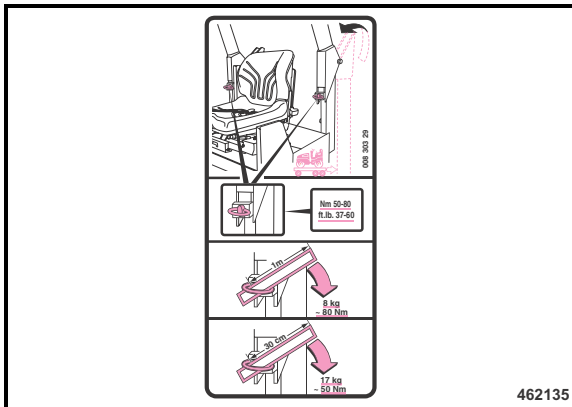


Fig. 16
Information sticker - Foldable ROPS
- Operation¹

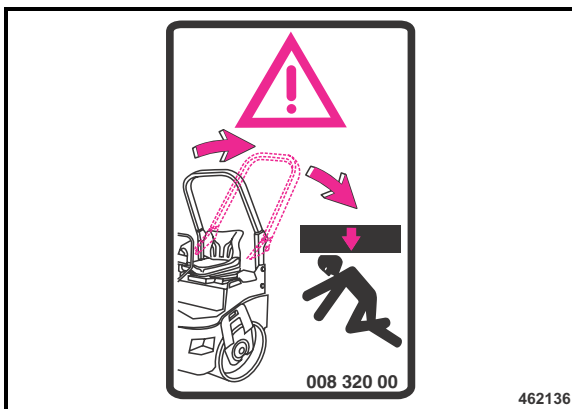


Fig. 17
Warning sticker - Foldable ROPS¹

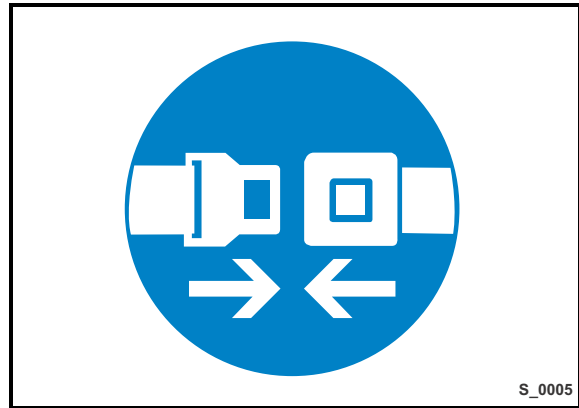


Fig. 18
Instruction sticker - Always wear your
seat belt²

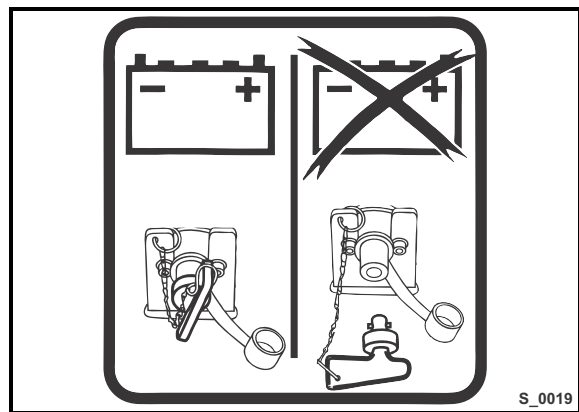


Fig. 19
Information sticker - Main battery
switch³

1 Optional equipment

2 Optional equipment
3 Optional equipment

Safety regulations

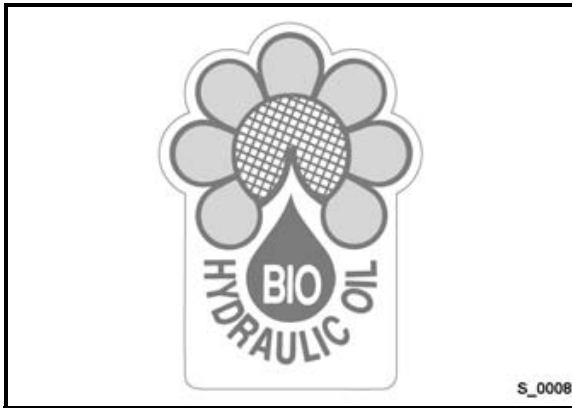


Fig. 20

Information sticker - Biodegradable hydraulic oil¹



Fig. 21

Information sticker - Panolin 46²

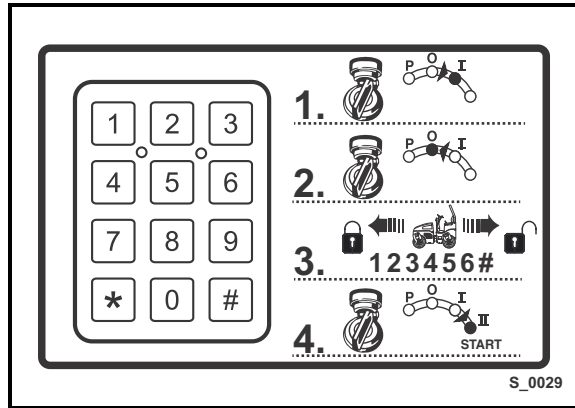


Fig. 22

Information sticker - Electronic immobilizer³

1 Optional equipment
2 Optional equipment

3 Optional equipment

4 Display and control elements

Display and control elements

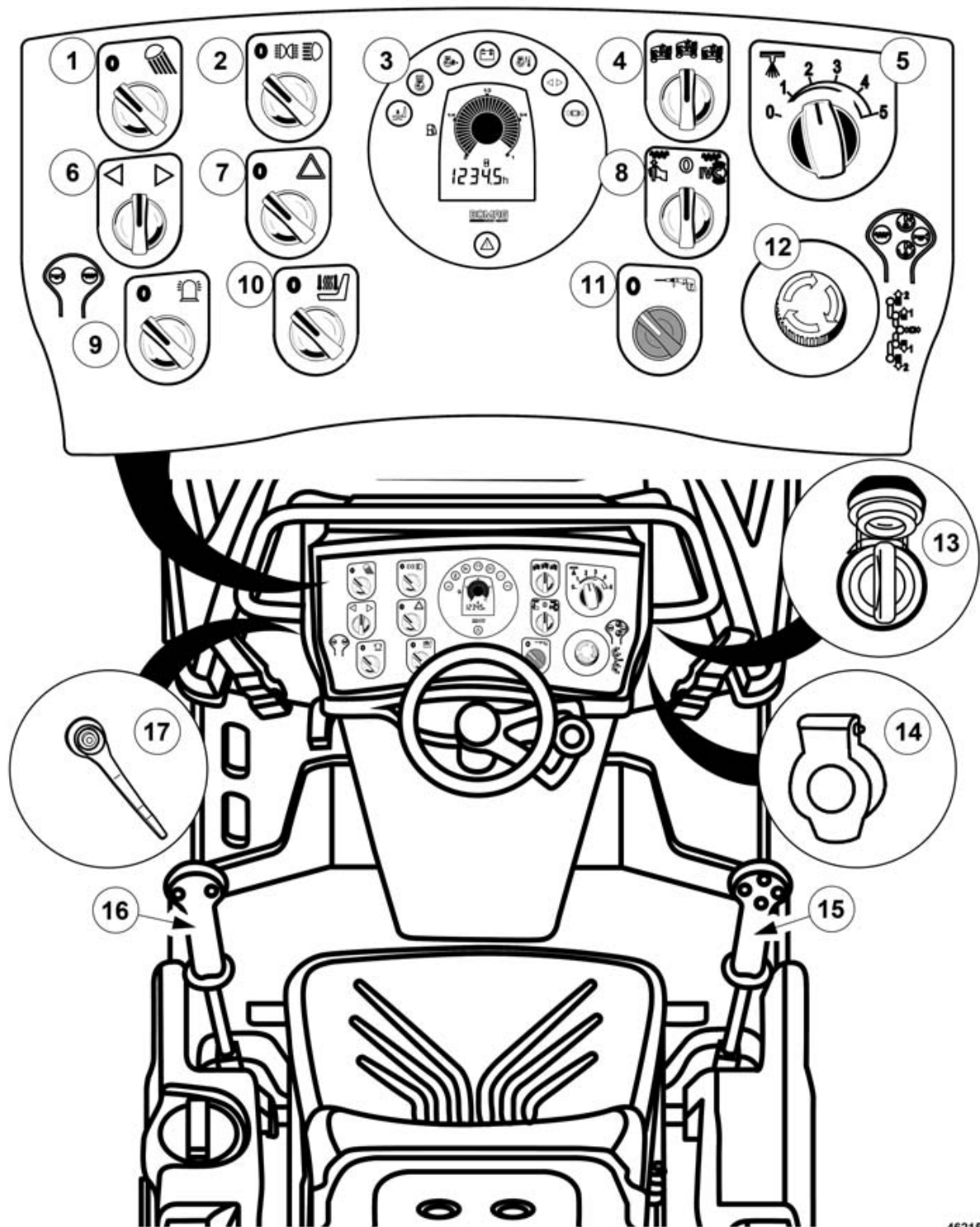


Fig. 23

462153

Display and control elements

- 1 Rotary switch for working lights
 - 2 Rotary switch for lighting¹
 - 3 Instrument cluster
 - 4 Rotary switch for vibration, drum pre-selection²
 - 5 Interval switch for pressure sprinkling system
 - 6 Rotary switch direction indicators¹
 - 7 Rotary switch for hazard light system¹
 - 8 Rotary switch for vibration pre-selection
 - 9 Rotary switch for flashing beacon¹
 - 10 Rotary switch for seat heating¹
 - 11 Rotary switch for hydraulic breaker¹
 - 12 Emergency stop push button
 - 13 Start switch
 - 14 12V socket
 - 15 Travel lever with buttons for vibration, warning horn and edge cutter¹
 - 16 Double travel lever¹ with buttons for vibration and warning horn
 - 17 Throttle lever
- 1 Optional equipment
2 not on ACM/SCC-machines

4.1 General notes

If you are not yet familiar with the control and display elements on this machine you should read this section thoroughly before starting any operation on the machine. Here all functions are described in detail.

The section "Operation" contains only brief descriptions of the individual control steps.

4.2 Description of indicators and control elements

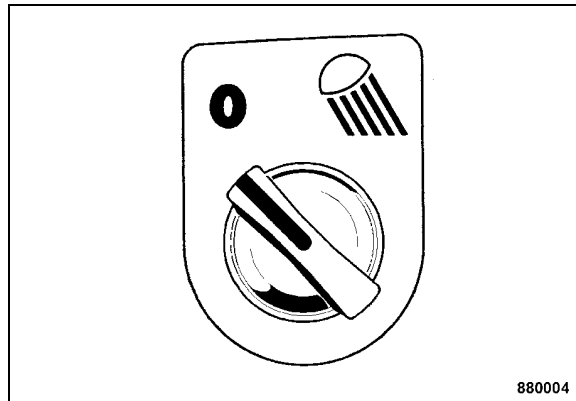


Fig. 24

No. 1 = Rotary switch for working lights

Position Left = Working lights off
Position Right = Working light on
(with starter switch in position "I")

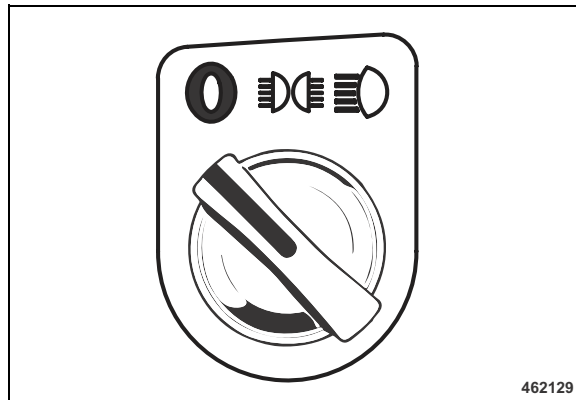


Fig. 25

No. 2 = Rotary switch for lighting¹

1 Optional equipment

Display and control elements

- Position Left = Light off
- Position "middle" = Side lights on (also in switch position "0")
- Position Right = Travel lights on (in switch position "I")

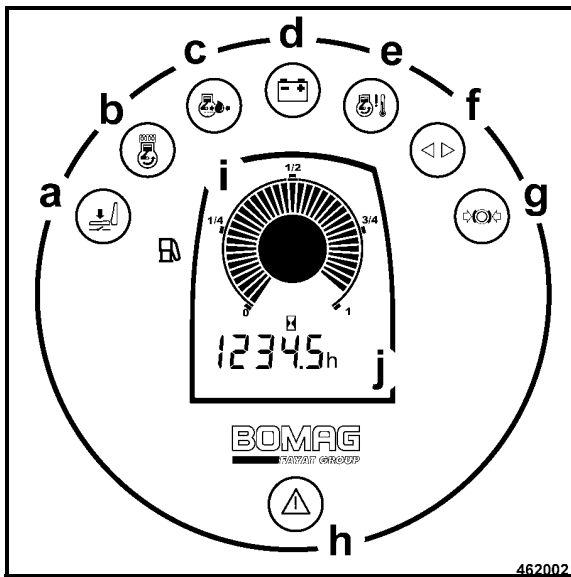


Fig. 26

No. 3 = Instrument cluster

i Note

With the ignition switch in position "I" all control and warning lights are switched on for a moment.

- a** yellow = Warning lamp seat contact switch with machine driving
The warning buzzer sounds, the engine is shut down after 2 seconds.
- = Warning light for seat contact switch with machine at rest

Engine is shut down when travel lever is moved out of "0"-position.

- b** yellow = Preheating control lamp
Lights in starter switch position "II"
Preheating for starting at low temperatures.
Goes out after 10 seconds
- c** red = Engine oil pressure warning lamp
Flashes when the engine oil pressure is too low, the warning buzzer sounds, the engine is shut down after 10 seconds.
Check engine oil level, repair the engine if necessary.
- d** yellow = Charge control lamp
Lights if the battery is not being charged.
Check the V-belt, if necessary repair the generator.
- e** red = Engine temperature warning lamp
Lights if the engine overheats, the warning buzzer sounds, the engine is shut down after 2 minutes.
Switch off vibration, run engine with idle speed or shut down engine if necessary, clean engine oil cooler and radiator, if necessary repair engine.
- f** green = Indicator control light

Display and control elements

g red = Parking brake warning lamp
Lights when the travel direction switch is in parking brake position.

h red = Central warning light
Lights when the water proportion in the fuel filter reaches the sensor contacts¹, the warning buzzer sounds, the engine is shut down after 2 minutes.

Clean the water separator.

= The warning lamp flashes in case of a fault on the rotation angle sensor of the sprinkling system interval switch.

i = Fuel level gauge²

j = Operating hour meter
Counts the operating hours while the engine is running. Maintenance work is to be carried out in accordance with the indicated operating hours.

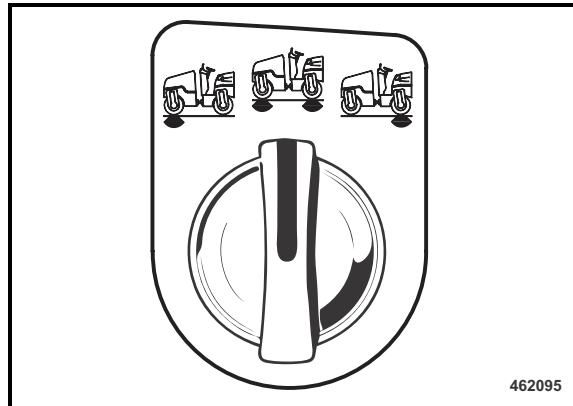


Fig. 27

No. 4 = Rotary switch for vibration, drum pre-selection³

i Note

Vibration change-over is only activated if the vibration is switched off beforehand.

Position Left = Vibration of front drum

Position "middle" = Vibration of front and rear drums

Position Right = Vibration of rear drum

1 Optional equipment

2 Optional equipment

3 not on ACM/SCC-machines

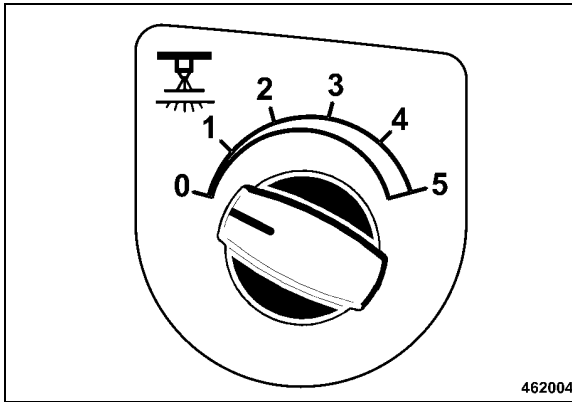


Fig. 28

No. 5 = Interval switch for pressure sprinkling system

Position "0" = Sprinkling off

Position "1" to "4" = various sprinkling intervals

Position "5" = Permanent sprinkling

i Note

With the travel lever in neutral position and interval switch in position "5" (permanent sprinkling) the sprinkling system is already active.

With interval sprinkling the machine needs to drive forward or backward.

With the travel lever in neutral position sprinkling will continue for another 15 seconds.

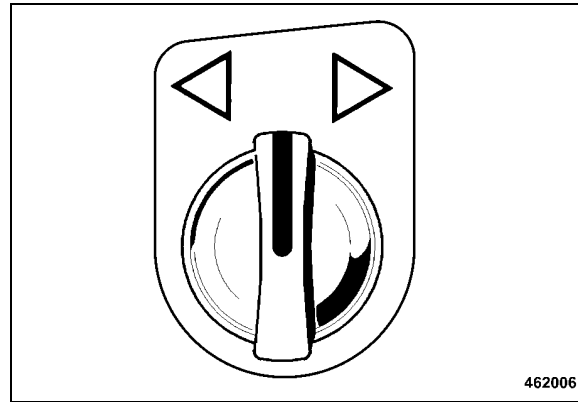


Fig. 29

No. 6 = Rotary switch for direction indicators¹

Position "middle" = Direction indicators off

Position Left or Right = The front and rear direction indicators for the corresponding side of the machine and the direction indicator control light in the instrument cluster are flashing

¹ Optional equipment

Display and control elements

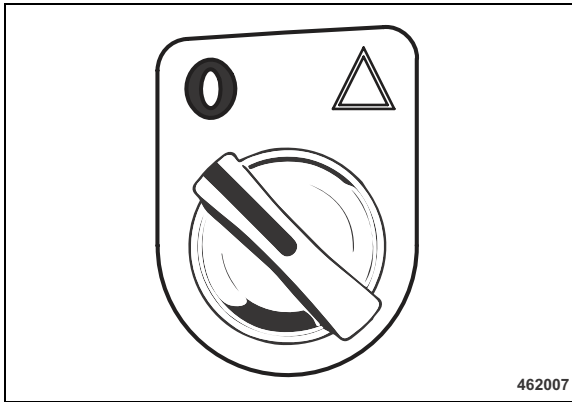


Fig. 30

No. 7 = Rotary switch for hazard light system¹

Position Left = Hazard light system off

Position Right = Hazard light system on
All direction indicators, warning lights in switch and indicator control light in the instrument cluster start flashing.

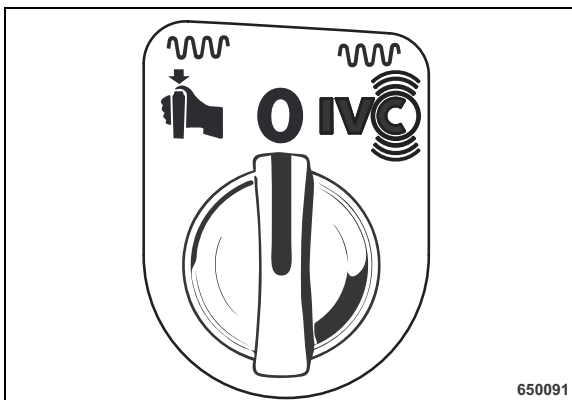


Fig. 31

No. 8 = Rotary switch for vibration pre-selection

¹ Optional equipment

Position Left = Pre-selection for vibration activation during travel via the vibration push button in the travel lever

Position "middle" = Vibration off

Position Right = Pre-selection for automatic activation or deactivation of vibration when exceeding or falling short of a certain travel speed:
Vibration on from approx. 1 km/h (0.6 mph).
Vibration off when the travel lever is shifted through position "1" to position "2".
The vibration push button in the travel lever is not active.

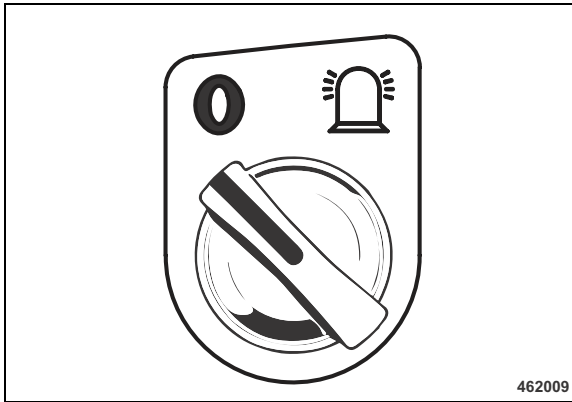


Fig. 32

No. 9 = Rotary switch for flashing beacon¹

- Position Left = Flashing beacon off
- Position Right = Flashing beacon on

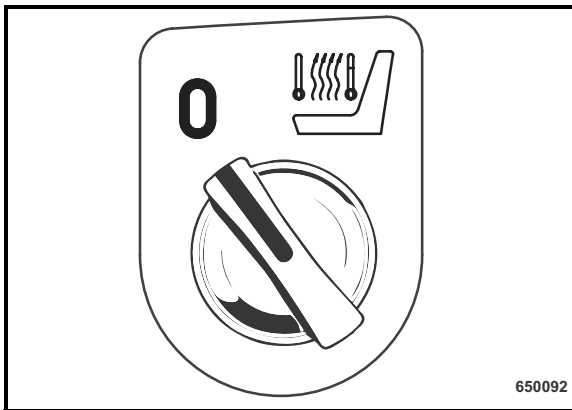


Fig. 33

No. 10 = Rotary switch for seat heating²

- Position Left = Seat heating off
- Position Right = Seat heating on

1 Optional equipment
2 Optional equipment

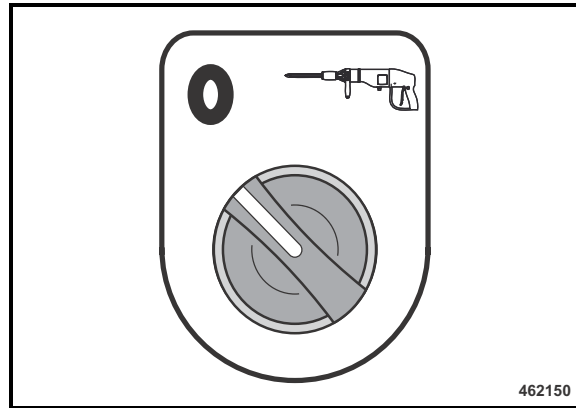


Fig. 34

No. 11 = Rotary switch for hydraulic breaker³

⚠ Danger

Danger of accident!

Do not drive the machine with the hydraulic breaker connected.

Do not switch on the rotary switch for hydraulic breaker while driving. The machine would be abruptly braked without braking delay.

⚠ Caution

Once the rotary switch for the hydraulic breaker has been switched to the right, the hydraulic breaker is active. The parking brake is applied at the same time. The machine is no longer able to drive. Always keep the travel lever in parking brake position.

- Position Left = Hydraulic breaker off

3 Optional equipment

Display and control elements

Position Right = Hydraulic breaker on, parking brake applied

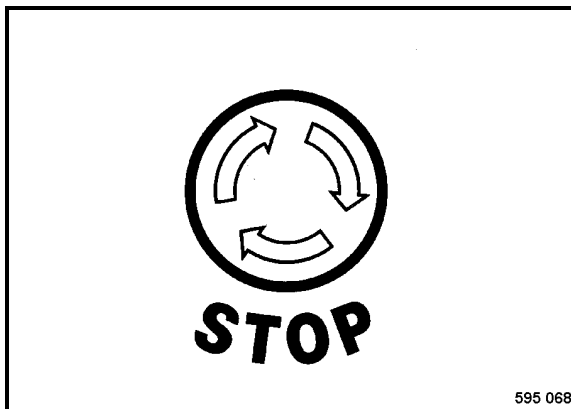


Fig. 35

No. 12 = Emergency stop push button

⚠ Danger

Danger of accident!

Use only in events of emergency during operation.

Do not use as parking brake.

Restart the machine only after the danger that caused the actuation of the emergency stop switch has been eliminated.

The machine is braked immediately, the engine is shut down.

i Note

The emergency stop switch is automatically actuated when the dashboard protection is closed.

actuate = Press the button completely down,

it automatically locks in fully pressed position.

switch off/unlock = Turn button clockwise. Restart the engine.

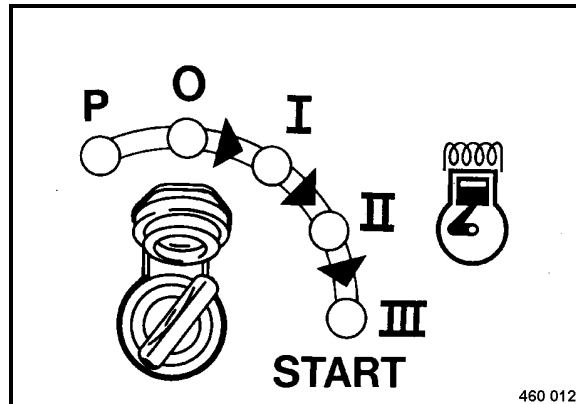


Fig. 36

No. 13 = Start switch

Position "P"/"O" = Ignition off, key can be pulled out

Position "I" = Ignition on, all warning and control lights in the instrument cluster light up for a moment (test function), the lighting system can be switched on.

Position "II" = Pre-heating position, at temperatures below +10 °C (+50 °F) hold the ignition key in position "II" for up to 10 seconds,

the pre-heating control light lights up.
The pre-heating control light in the instrument cluster lights up.

i Note

The engine can only be started if the travel lever is in braking position and the emergency stop switch is unlocked.

The starter switch is designed with a re-start lock. The ignition key must first be turned back to position "0" before a new starting attempt can be made.

Position "III" = Turn further against spring pressure, the engine starts, turn the ignition key back to position "I" once the engine has started.

⚠ Caution

Run the engine warm for a short while before starting work. Do not rev up a cold engine to high idle speed/full load speed.

Do not shut down the engine all of a sudden from full load speed, but let it idle for about 2 minutes.

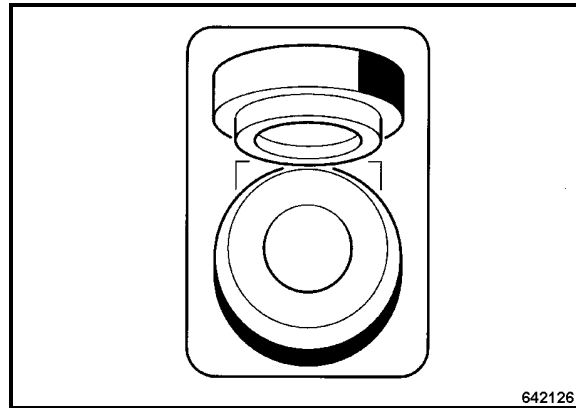


Fig. 37

No. 14 = 12V-socket

Permanent current, loadable up to 10 A.

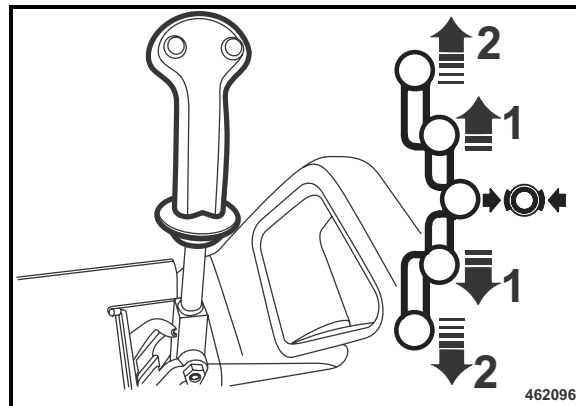


Fig. 38

No. 15 = Travel lever

Position "0" = Neutral position for engine start, brake closed.

Position "1" = Forward/reverse travel up to approx. 5 km/h (3.1 mph)

Position "2" = Forward/reverse travel up to approx. 10 km/h (6.2 mph)

Display and control elements

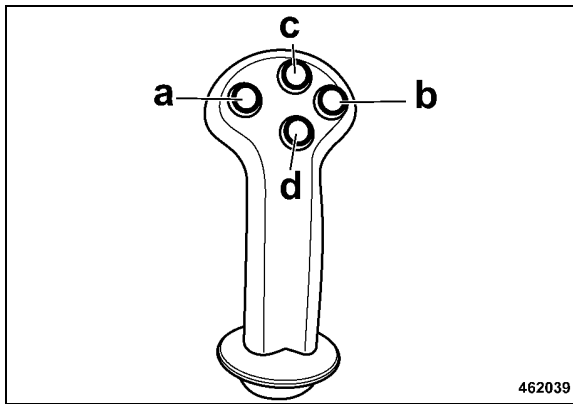


Fig. 39

- a = Button vibration on/off
- b = Button for warning horn
- c = Button, edge cutter¹ up
- d = Button edge cutter¹ down

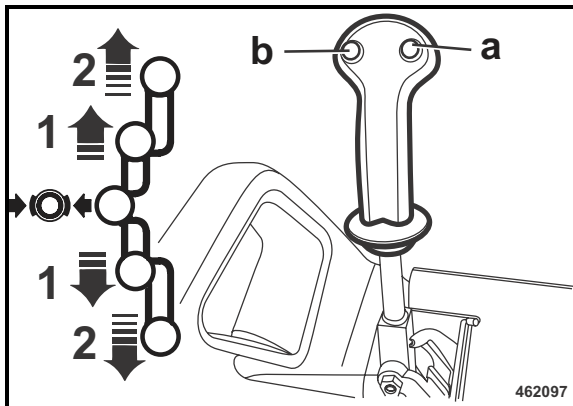


Fig. 40

No. 16 = Double travel lever²

- Position "0" = Neutral position for engine start, brake closed.
- Position "1" = Forward/reverse travel up to approx. 5 km/h (3.1 mph)

1 Optional equipment
2 Optional equipment

Position "2" = Forward/reverse travel up to approx. 10 km/h (6.2 mph)

a = Button vibration on/off

b = Button for warning horn

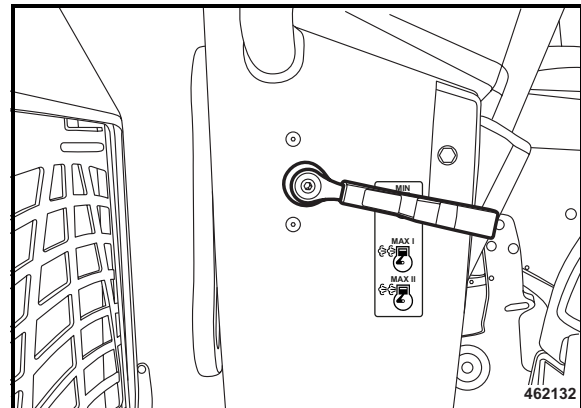


Fig. 41

No. 17 = Throttle lever

Position "MIN" = Idle speed position

Position "MAX I" = Full load position I, operating position for driving and vibration

Position "MAX II" = Full load position II, operating position for driving and vibration

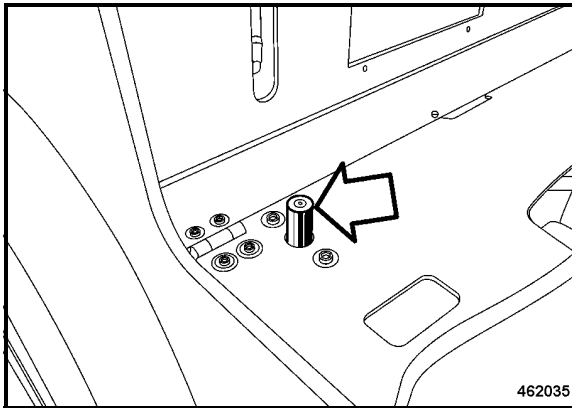


Fig. 42

No. 18 = Foot switch for rubber tire sprinkling system¹

press = Sprinkling on
release = Sprinkling off

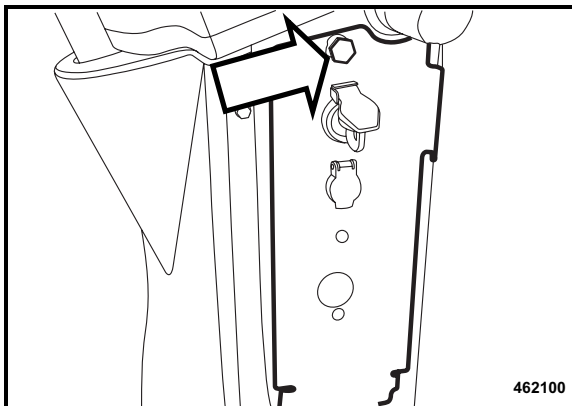


Fig. 43

No. 19 = Central electrics with fuses

- Unscrew the fastening screws and fold out the central electrics against the end stop.

¹ only on ACM/SCC-machines

	F06	5A		F08	15A
	F119	10A		F03	10A
	F153	10A		F139	30A
	F241	15A		F103	10A
Pot. 30	F68	10A		F48	30A
	F23	10A		F04	7,5A
	F30	10A		F09	10A
	F11	15A		F10	10A
	F12	15A		F45	10A
	F156	15A		F37	10A
	F240	10A		F05	10A
	F07	15A		JP1	5A

Fig. 44

Danger

Fire hazard!

Do not use fuses with higher amperage ratings and do not bridge fuses.

Note

The printed circuit board is equipped with a fuse test socket (Fuse Test). When plugging in an intact fuse an LED lights up.

F06 (5A)	= Interval switch for pressure sprinkling system
F119 (10A)	= Motor
F153 (10A)	= Potential 15
F241 (15A)	= Optional headlights
F68 (10A)	= Potential 30
F23 (10A)	= Warning horn
F30 (10A)	= Potential 15

Display and control elements

F11 (15A)	= Headlights, left
F12 (15A)	= Headlights, right
F156 (15A)	= StvzO lighting
F240 (10A)	= Hydraulic cutter
F07 (15A)	= Hazard light system
F08 (15A)	= Direction indicators and working head lights
F03 (10A)	= Vibration
F139 (30A)	= Engine solenoid
F103 (10A)	= Potential 15
F48 (30A)	= Preheating system
F04 (7,5A)	= Instruments
F09 (10A)	= Parking and tail light, left
F10 (10A)	= Parking and tail light, right
F45 (10A)	= Edge cutter
F37 (10A)	= Sprinkling pump
F05 (10A)	= 12 V socket
JP1 (5A)	= Vibration also with travel lever in position 2

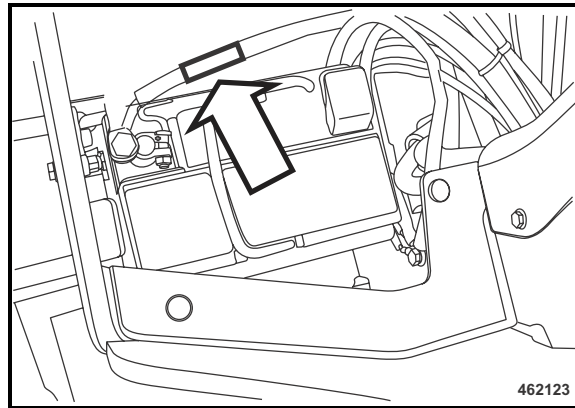


Fig. 45

No. 20 = Main battery fuse

F00 = 80A

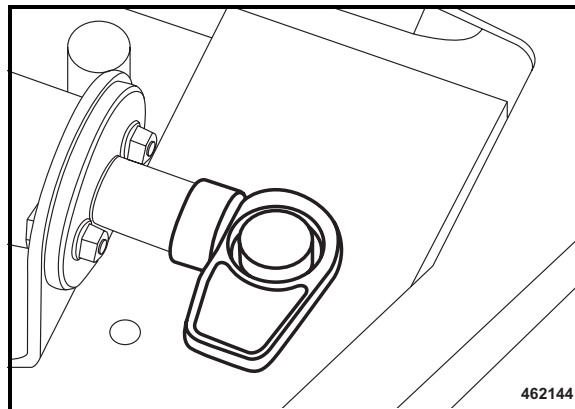


Fig. 46

No. 21 = Main battery switch¹

i Note

The main battery switch is located inside the battery compartment.

Position horizontal = Disconnects the batteries from the vehicle electrics in case of burning cables and fire in the engine compartment, protec-

¹ Optional equipment

Display and control elements

tion against unauthorized use, during welding work on the machine. Can be removed.

Position 90° up = Operating position, engine can be started.

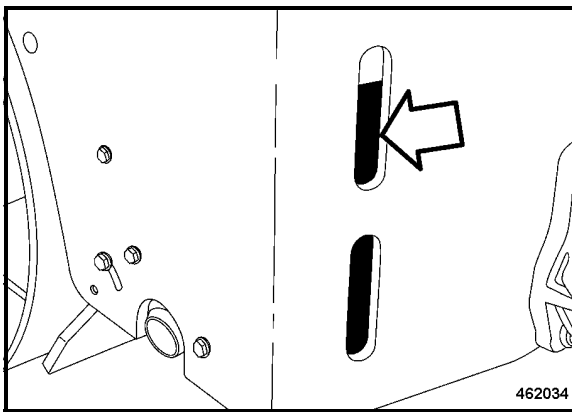


Fig. 47

No. 22 = Fuel level gauge

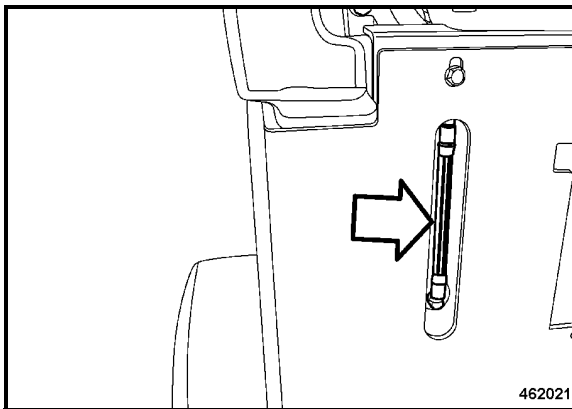


Fig. 48

No. 23 = Water level gauge

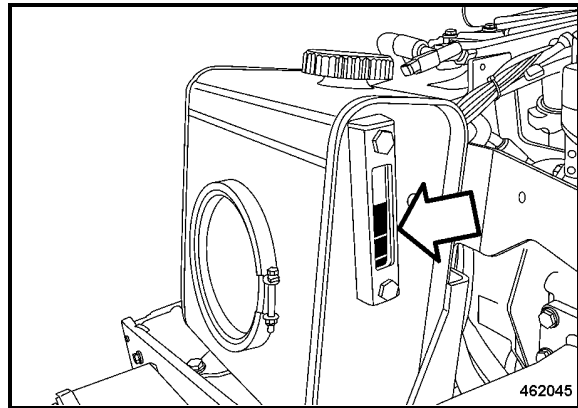


Fig. 49

No. 24 = Hydraulic oil level gauge

Display and control elements

5 Operation

5.1 General

If you are not yet acquainted with the controls and indicating elements on this machine you should thoroughly read chapter "Indicators and control elements" before starting work.

All indicators and control elements are described in detail in this chapter.

5.2 Tests before taking into operation

Before the everyday use or before a longer working period the following tests and inspections must be performed.

Danger

Please observe strictly the safety regulations in the corresponding section of this instruction manual!

- Park the machine on ground as level as possible.

Check:

- fuel tank and fuel lines for leaks
- Screw connections
- function of steering
- function of emergency stop
- function of parking brake
- machine for cleanliness, damage
- presence of the appropriate operating and maintenance instructions
- proper maintenance of the machine
- Air pressure in rubber tires (only ACM/SCC-machines)

i Note

For a description of the following tasks refer to the chapter "maintenance every 10 operating hours".

- Engine oil level, top up if necessary
- Fuel level, top up if necessary.
- Hydraulic oil level, top up if necessary.
- Hydraulic oil filter element, change if necessary
- Coolant level, top up if necessary
- Water level, top up if necessary.
- Emulsion level, fill up if necessary (only ACM-/SCC-machines)

5.3 Electronic immobilizer¹

Before starting the engine the anti-theft protection* must be disarmed by entering a code.

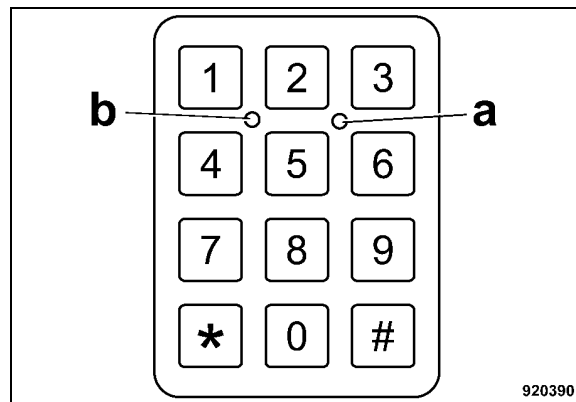


Fig. 50

i Note

With the electronic immobilizer armed, the light emitting diode (a) (Fig. 50) flashes slowly.

- Slowly enter the six-digit user code.

i Note

When entering the code, the light emitting diode (6) lights up with every digit.

- Press the diamond button.
- The electronic immobilizer is now disarmed and the engine can be started within the next 15 minutes.

1 Optional equipment

i Note

After entering the service code (for maintenance work) the electronic immobilizer remains switched off.

5.4 Adjusting the driver's seat

⚠ Danger

Danger of accident!

Do not adjust the driver's seat while driving.

Make sure that all settings are securely locked.

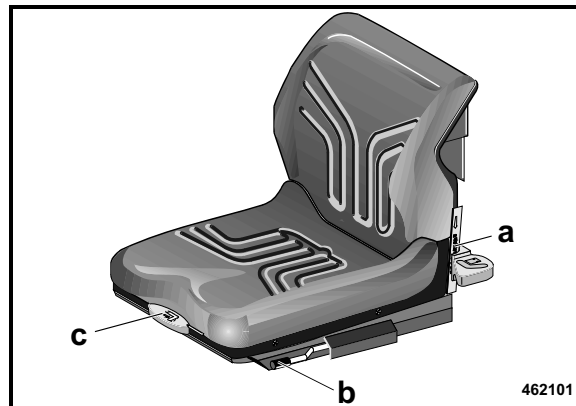


Fig. 51

- Use lever (a) (Fig. 51) to adjust to the weight of the operator.

i Note

In its adjustment lever (a) is locked in upwards direction. This lock can be released by pressing the lever completely down against the stop. Then adjust to the weight of the operator by sliding the lever down.

- Pull up lever (b) and adjust the seat in longitudinal direction by sliding it forward or back.

- Pull up lever (c) and adjust the backrest.
- Make sure that all settings are securely locked.

5.5 Starting the engine

⚠ Danger

Danger of accident! Danger of injury!

Wear your personal noise protection means (ear defenders) before starting operation.

Start and operate the machine only from the driver's seat.

⚠ Caution

In this chapter it is assumed that the operator is fully acquainted with the function of the different control elements on the machine.

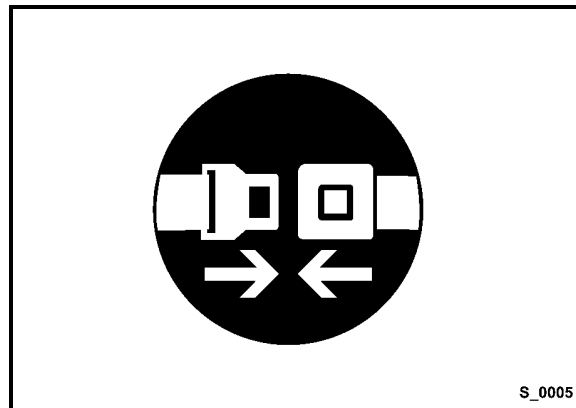


Fig. 52

- Fasten your seat belt (Fig. 52).

Operation

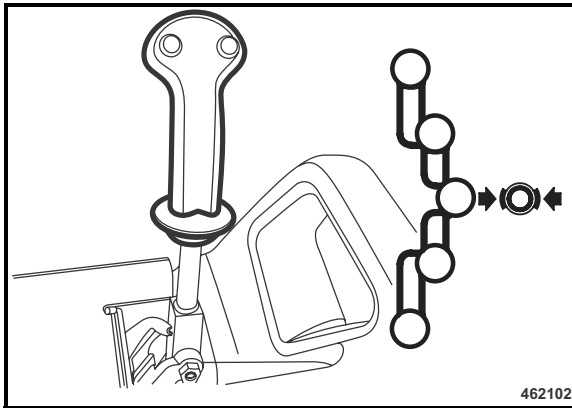


Fig. 53

- Shift the travel lever (Fig. 53) to parking brake position.

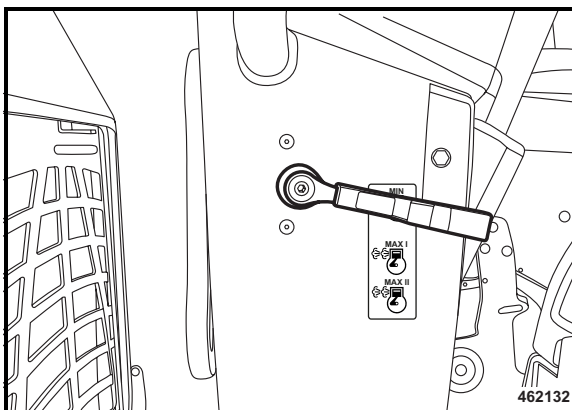


Fig. 54

- Set the throttle lever (Fig. 54) to position "MIN".

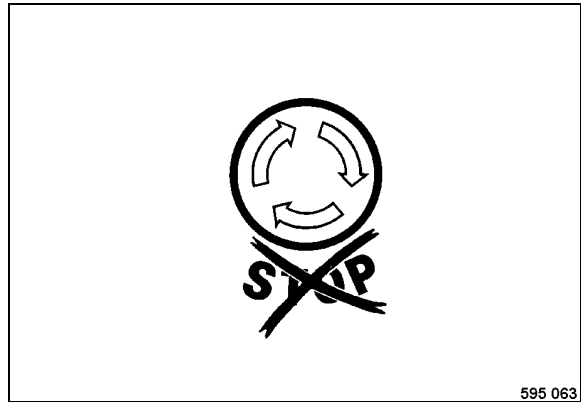


Fig. 55

- Check, whether the emergency stop switch (Fig. 55) is unlocked.

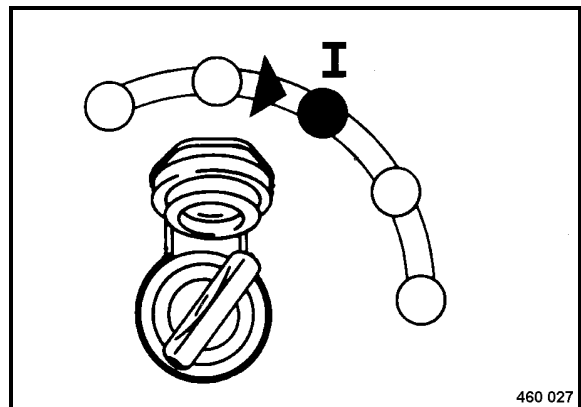


Fig. 56

- Turn the ignition key (Fig. 56) to position "I".

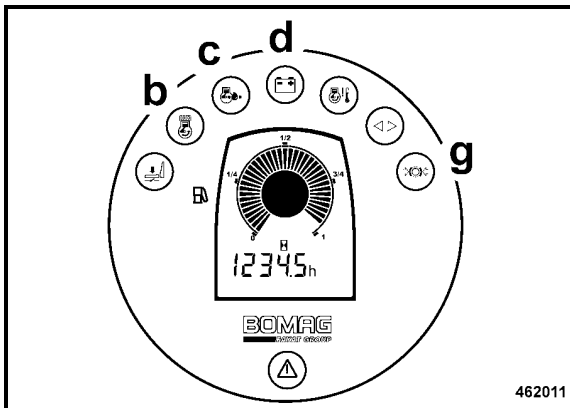


Fig. 57

All control and warning lights (Fig. 57) in the instrument cluster light up for approx. 3 seconds.

Engine oil pressure warning light (c), charge control light (d) and parking brake warning light (g) stay on.

⚠ Caution

Run the starting process for maximum 20 seconds without interruption and pause for a minute between starting attempts.

If the engine has not started after two attempts, determine the cause.

i Note

The starter switch is designed with a re-start lock. The ignition key must first be turned back to position "0" before a new starting attempt can be made.

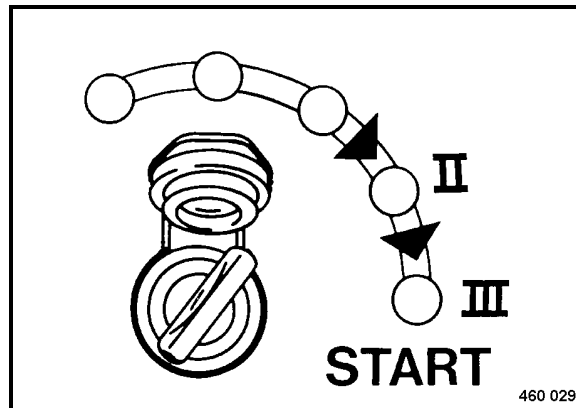


Fig. 58

- Turn the ignition key (Fig. 58) through position "II" to position "III", the starter will crank the engine.
- With cold ambient temperatures hold the ignition key up to 10 seconds in position "II"; the preheating control light (b) (Fig. 57) lights up.
- As soon as the engine ignites return the ignition key to position "I".

The engine oil pressure warning light and the charge control light go out. The parking brake warning light stays on.

⚠ Caution

Run the engine warm for a short while before starting work. Do not rev up a cold engine to high idle speed/full load speed.

5.6 Starting with jump wires

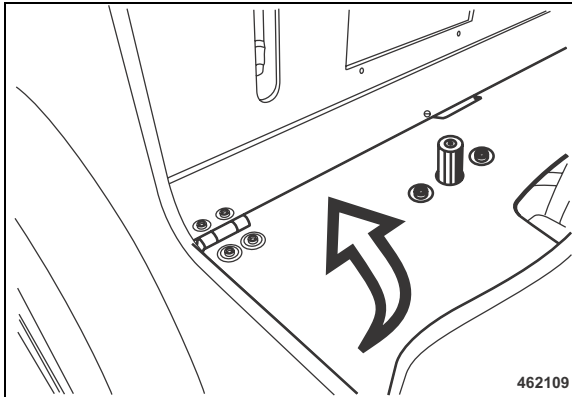


Fig. 59

- Fold the cover on the battery compartment (Fig. 59) to the front.

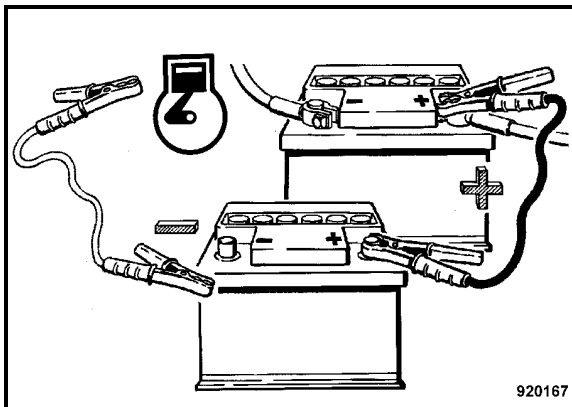


Fig. 60

⚠ Caution

A wrong connection will cause severe damage in the electric system.

- Bridge the machine only with a 12 Volt battery.

- When jump starting with an external battery connect both plus poles first.
- Then connect the ground cable first to the minus pole of the current supplying battery and then to engine or chassis ground, as far away from the battery as possible (Fig. 60).
- Start as described in section "Starting the engine".
- Once the engine is running switch on a powerful consumer (working light, etc.).

⚠ Caution

If no powerful consumer is switched on voltage peaks may occur when separating the connecting cables between the batteries, which could damage electrical components.

- After starting disconnect the negative poles (ground cable) first and the positive poles after.
- Switch off the consumer.

5.7 Driving the machine

⚠ Danger

Life hazard! Danger of accident!

Wet and loose soils considerably reduce the ground adhesion of the machine on inclinations and slopes.

Soil conditions and weather influences impair the climbing ability of the machine.

Do not drive up and down inclinations which exceed the maximum gradability of the machine (see chapter "technical data").

Driving across slopes should therefore be strictly avoided, because of the high risk of tipping over and the related risk of severe or even fatal accidents.

You should therefore always drive straight up or down a slope.

For rollers with a drum width of 1 m (3.3 ft) or less there is a considerable risk of tipping over near edges (e.g. curbstones, embank-

ments, trenches, potholes) when driving over these edges.

Do not drive without wearing your seat belt.

Always give way to loaded transport vehicles!

Before starting to drive make sure that the drive range is absolutely safe.

Drive and operate the machine only from the driver's seat.

Do not drive the machine with the hydraulic breaker¹ connected.

Do not switch on the rotary switch for hydraulic breaker¹ while driving. The machine would be abruptly braked without braking delay.

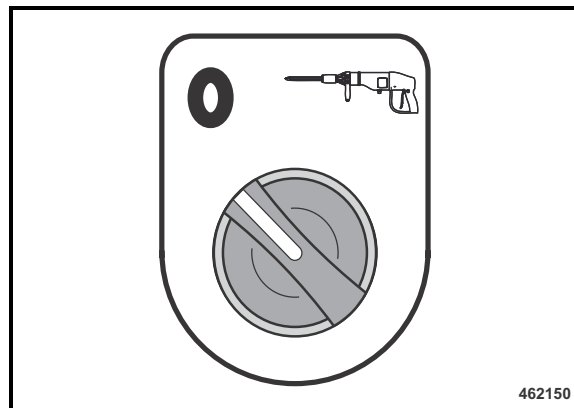


Fig. 61

- Turn the rotary switch for hydraulic breaker (Fig. 61) anti-clockwise to position "0".

1 Optional equipment

Operation

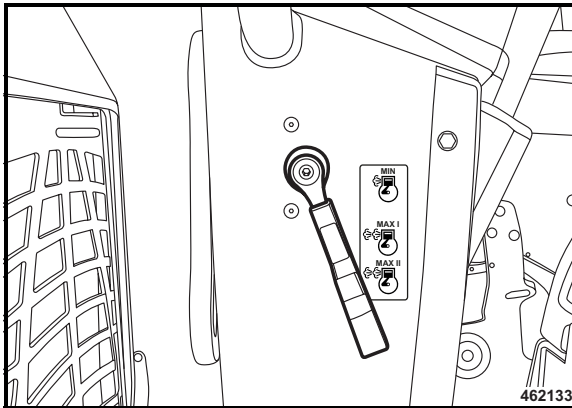


Fig. 62

- Set the throttle lever (Fig. 62) to full load position "Max I" or "MAX II".

Caution

During operation the throttle lever always remains engaged in full load position "MAX I" or "MAX II". Control the travel speed with the travel lever.

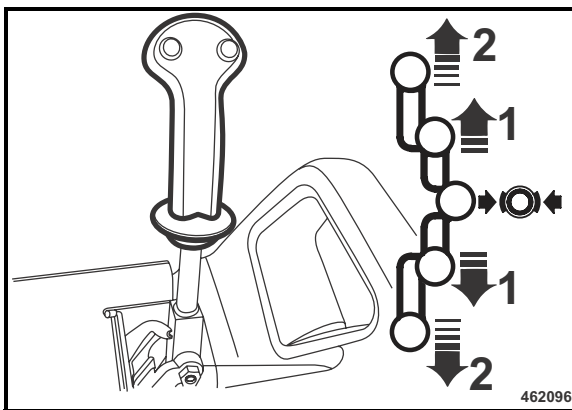


Fig. 63

Caution

Do not operate jerkily!

- Disengage the travel lever (Fig. 63) out of braking position and move it slowly to the desired travel direction.

Position "1" = Forward/reverse travel up to approx. 5 km/h (3.1 mph)

Position "2" = Forward/reverse travel up to approx. 10 km/h (6.2 mph)

Important notes on travel operation

Caution

When changing the travel direction hold the travel lever for a moment in "0"-position, until the machine has stopped, before actuating to the new travel direction.

Do not operate jerkily! Control the travel speed with the travel lever.

When driving up and down inclinations move the travel lever slowly back towards neutral to brake the machine.

Seat contact switch

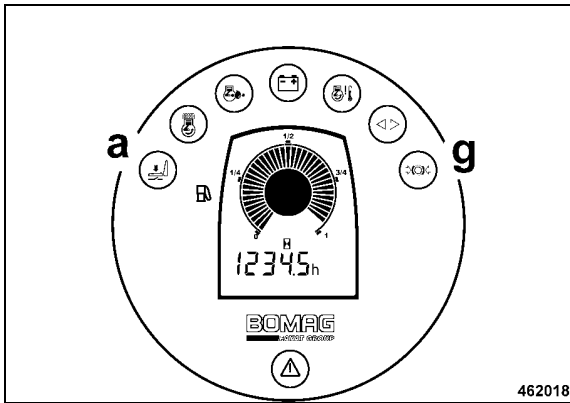


Fig. 64

With the machine parked the warning light for the seat contact switch (a) (Fig. 64) lights up together with the parking brake warning light (g) when the driver's seat is not occupied. The machine cannot drive.

i Note

When moving the travel lever out of braking position the engine will be shut down immediately.

⚠ Danger

Danger of accident!

If the seat is not occupied when the machine is driving, the warning buzzer will sound, the engine will be shut down after 2 seconds and the parking brake will close.

- To continue driving occupy the seat and put on the seat belt within 2 seconds. The warning lights go out and the warning buzzer stops to sound.

- If the engine stops restarting is required.

5.8 Stopping the machine, operating the parking brake

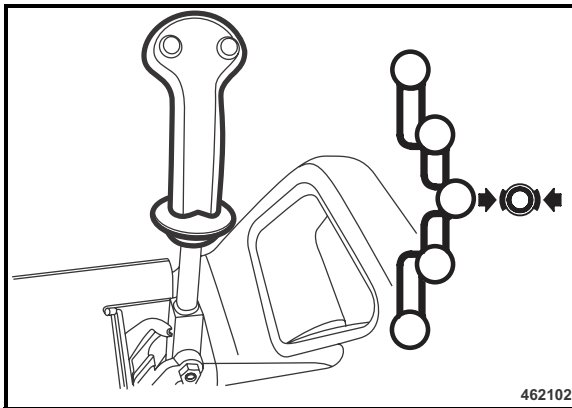


Fig. 65

- Shift the travel lever (Fig. 65) slowly back to neutral position and lock it in parking brake position.

The machine is automatically braked by the hydrostatic drive and the parking brake is applied.

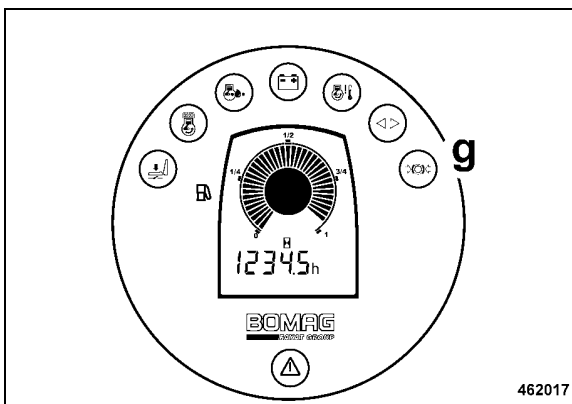


Fig. 66

The parking brake warning light (g) in the instrument cluster (Fig. 66) lights up.

5.9 Shutting down the engine

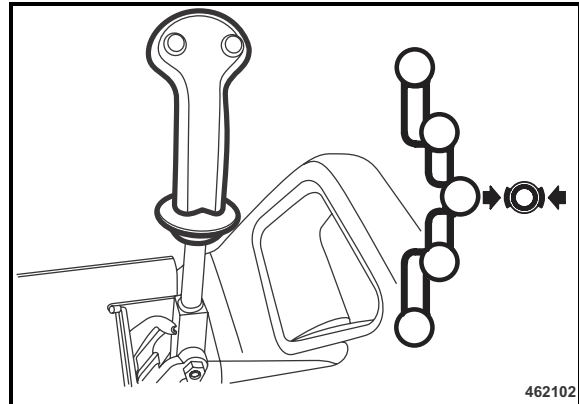


Fig. 67

- Shift the travel lever (Fig. 67) slowly back to neutral position and lock it in parking brake position.

The machine is automatically braked by the hydrostatic drive and the parking brake is applied.

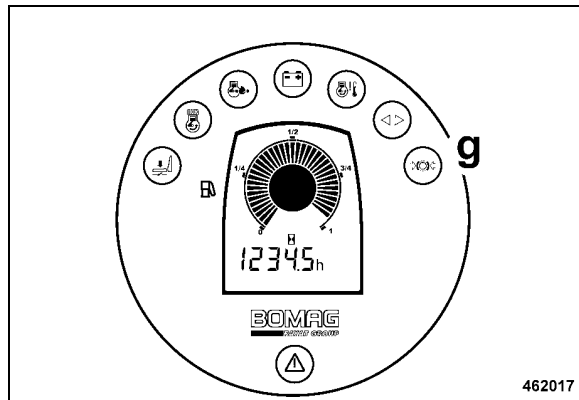


Fig. 68

The parking brake warning light (g) (Fig. 68) in the instrument cluster lights up.

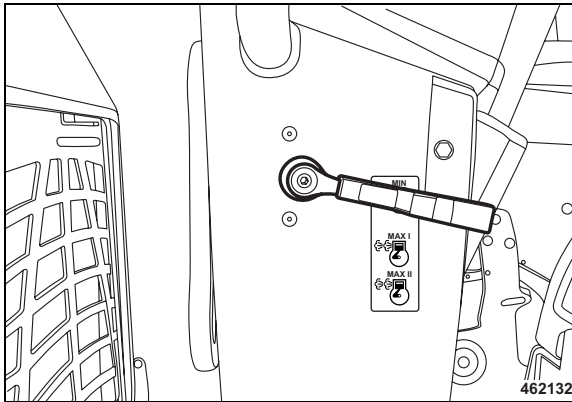


Fig. 69

- Set the throttle lever (Fig. 69) to position "MIN" (idle speed).

⚠ Caution

Do not shut down the engine all of a sudden from full load speed, but let it idle for about 2 minutes.

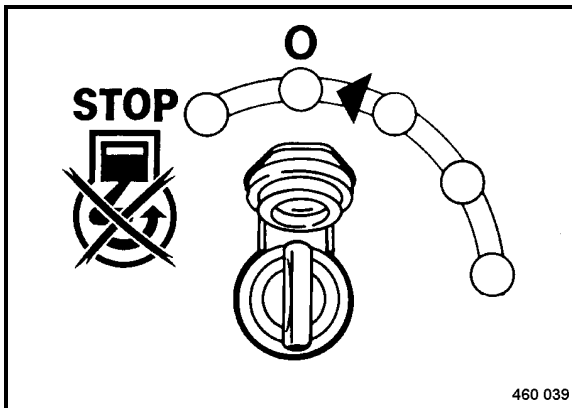


Fig. 70

- Turn the ignition key (Fig. 70) to position "0" and pull it out.

⚠ Danger

Danger of accident!

Secure the machine against unauthorized use, pull the ignition key out.

Mark machines, which could be in the way, with a clearly visible sign.

5.10 Switching the vibration on and off

Caution

Switch the vibration on only at maximum engine speed.

Note

Vibration at standstill causes transverse ruts, therefore:

- switch the vibration on only after shifting the travel lever to the desired travel direction.
- Switch the vibration off before stopping the machine.

Caution

Danger of bearing damage!

Do not activate the vibration on hard (frozen, concrete) ground.

Danger

Risk of damage!

When compacting with vibration you must check the effect of nearby buildings and underground supply lines (gas, water, sewage, electric power), if necessary stop compaction with vibration.

Pre-selecting the drum¹

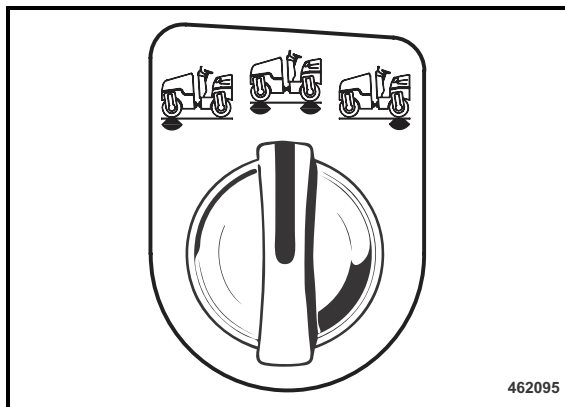


Fig. 71

- Use the rotary switch for drum pre-selection (Fig. 71) to pre-select the desired drum(s).

Note

The rotary switch for drum pre-selection is not installed in ACM-machines and SCC-machines.

Note

The drum pre-selection can only be changed after the vibration has been switched off.

¹ not on ACM/SCC-machines

Vibration in manual mode

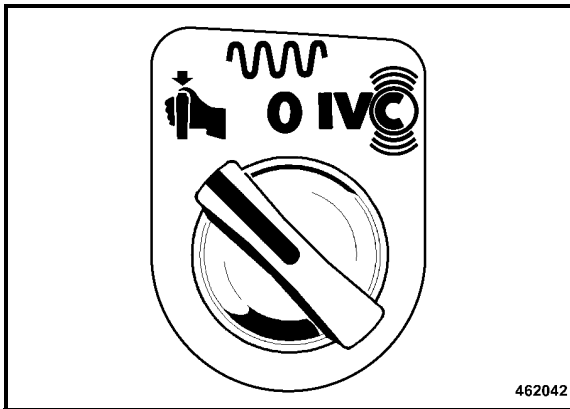


Fig. 72

- Turn the rotary vibration pre-selection switch (Fig. 72) anti-clockwise to the symbol "Manual".

Switching the vibration on

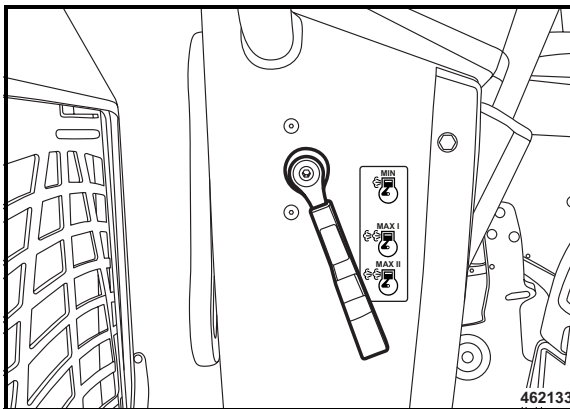


Fig. 73

⚠ Caution

Switch on vibration only with the throttle lever in position "MAX I" or "MAX II".

- Set the throttle lever (Fig. 73) to position "Max I" or "MAX II".

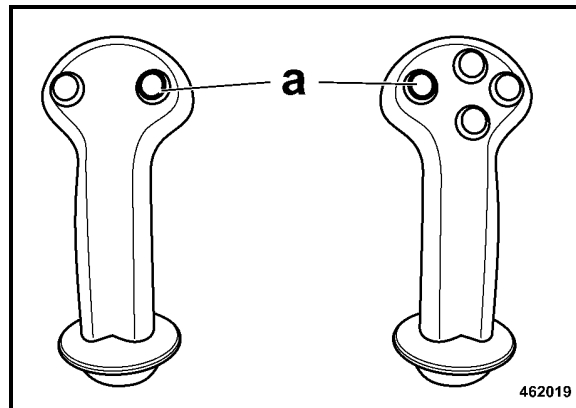


Fig. 74

- Actuate the vibration push button (a) (Fig. 74) in left¹ or right hand travel lever only after shifting the travel lever to the desired travel direction.

Switching the vibration off

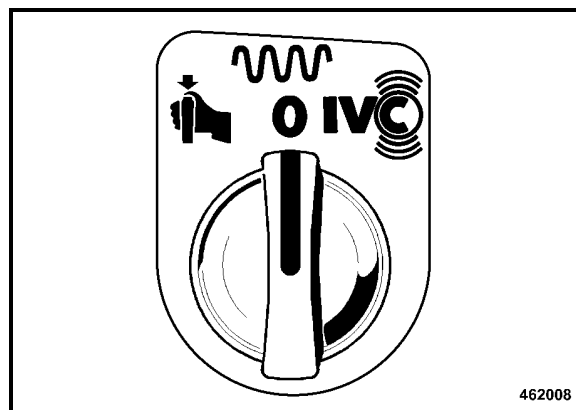


Fig. 75

- Press the vibration push button (a) (Fig. 74) again or turn the rotary switch for vibration pre-selection to position "0" (Fig. 75).

¹ Optional equipment

Operation

i Note

Always switch the vibration off before stopping the machine.

Vibration in automatic mode

In automatic mode the vibration is switched on when exceeding a travel speed of 1 km/h (0.6 mph).

When the travel lever is shifted through position "1" to position "2" or if the speed drops below 1 km/h (0.6 mph), vibration will automatically switch off.

This avoids the formation of transverse marks caused by vibration with the machine at standstill.

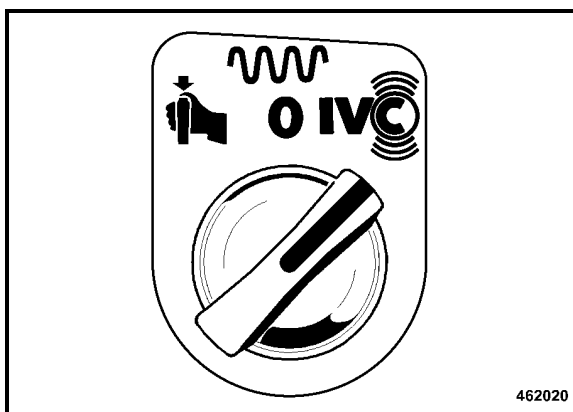


Fig. 76

- Turn the rotary vibration pre-selection switch (Fig. 76) clockwise to position "IVC".

Switching the vibration on

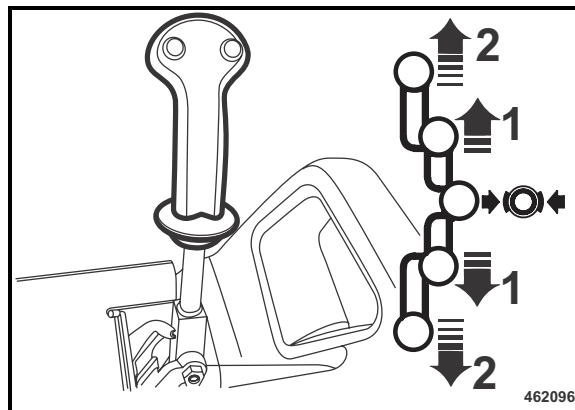


Fig. 77

- Shift the travel lever (Fig. 77) to the desired travel direction forward or reverse.

i Note

The vibration comes on automatically at a travel speed of approx. 1 km/h (0.6 mph).

When shifting the travel lever through position "1" to position "2", the vibration will be automatically switched off.

Switching the vibration off

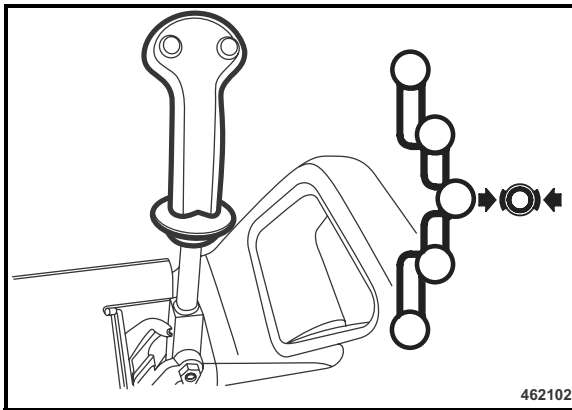


Fig. 78

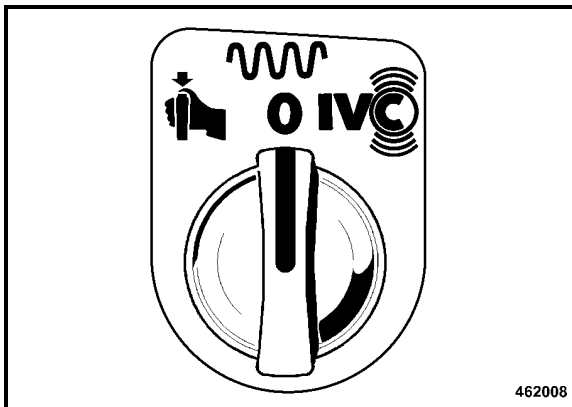


Fig. 79

- Shift the travel lever (Fig. 78) in direction "0" to decelerate the machine, or turn the rotary switch for vibration pre-selection to position "0" (Fig. 79).

i Note

The vibration switches off automatically when falling short of a travel speed of approx. 1 km/h (0.6 mph).

If the vibration is to be switched on with the travel lever in position "2", a

5 A fuse must be plugged into JP1 (see fuse assignment).

5.11 Switching the pressure sprinkling system on and off

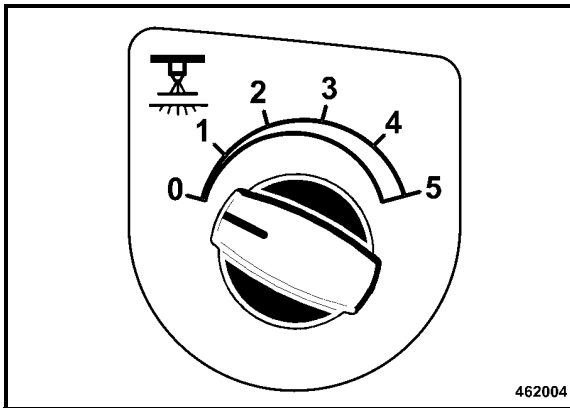


Fig. 80

- Switch the interval switch for pressure sprinkling (Fig. 80) to the desired flow interval.

Position "0" = Sprinkling off

Position "1" to "4" = various sprinkling intervals

Position "5" = Permanent sprinkling

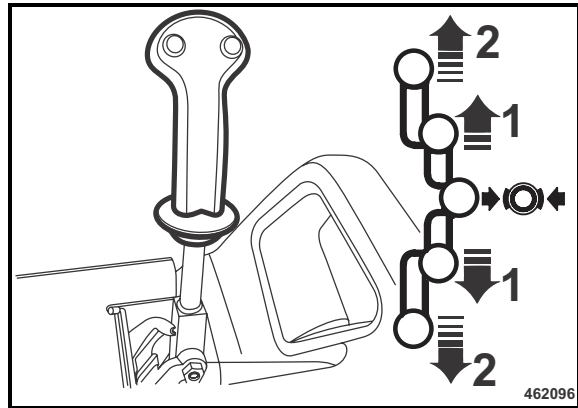


Fig. 81

- To switch on the pressure sprinkling system pull the travel lever (Fig. 81) out of braking position.

i Note

With the travel lever in neutral position and interval switch in position "5" (permanent sprinkling) the sprinkling system is already active.

With interval sprinkling the machine needs to drive forward or backward.

With the travel lever in neutral position sprinkling will continue for another 15 seconds.

- To switch off the pressure sprinkling system switch the interval switch for pressure sprinkling (Fig. 80) to position "0".

Test position

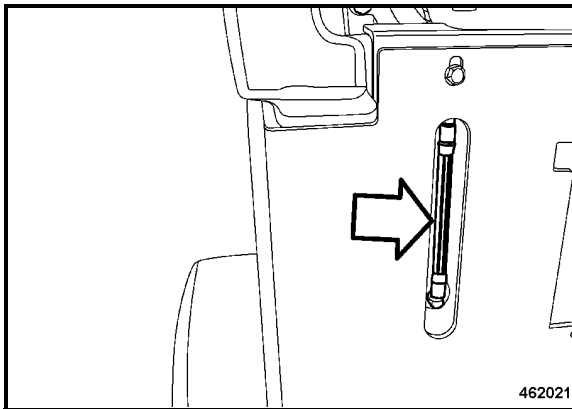


Fig. 82

- Check on the water level indicator (Fig. 82) whether the water tank is sufficiently filled.

⚠ Caution

In test position the water pump will be running.

Do not remain too long in test position, because the water pump may get damaged when the water tank is empty or the batty will be discharged.

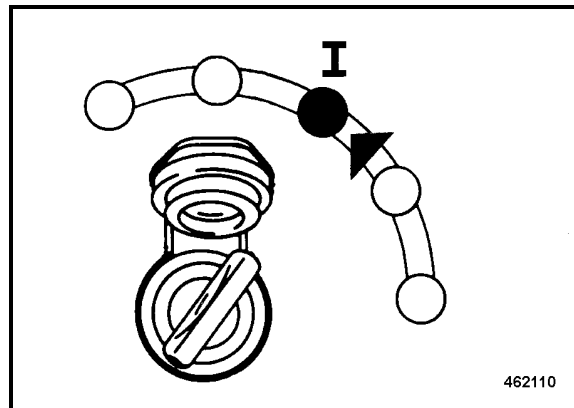


Fig. 83

- To test the pressure sprinkling system shut down the engine and set the ignition key (Fig. 83) to position "I".

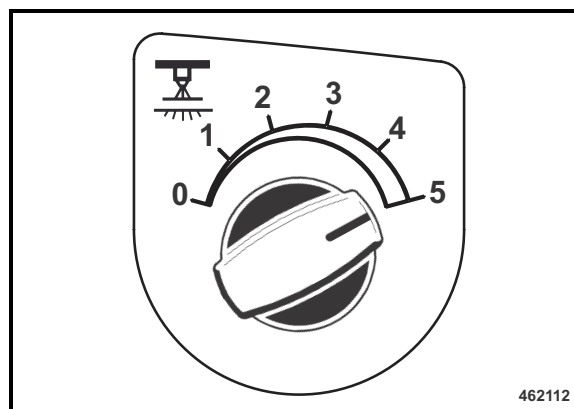


Fig. 84

- Set the interval switch for pressure sprinkling (Fig. 84) to position "5" (permanent sprinkling).

The pressure sprinkler system is switched on.

- Check water output and spray pattern on all nozzles.

i Note

In positions "1" to "4" the corresponding interval is activated once. Then the pump is switched off.

5.12 Switching the tire sprinkling system on and off¹

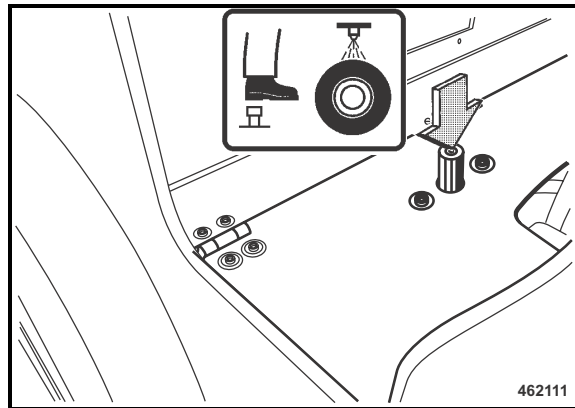


Fig. 85

- Actuate the foot switch (Fig. 85).

The tire sprinkling system is switched on.

- Release the foot switch.

The tire sprinkling system is switched off.

¹ only on ACM/SCC-machines

5.13 Setting the crabwalk

⚠ Danger

Danger of accident! Life hazard!

Lifting tackle must only be attached to loads by expert personnel (qualified person).

Always use shackles on the lifting points to lift the machine.

Check all lifting points and fastening elements for damage before lifting the machine. Do not use damaged or in any other way impaired lifting points.

Lift the machine only with suitable lifting gear. Use only safe lifting gear of sufficient load bearing capacity. Minimum lifting capacity of lifting gear: see operating weight in chapter "Technical Data".

Do not lift or lower the machine jerkily.

The tension must always be effective in vertical direction.

The machine must not swing about when being lifted.

Do not step or stand under suspended loads.

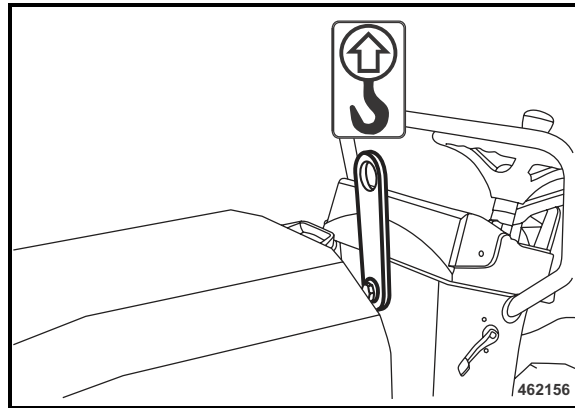


Fig. 86

- Lift up the machine by the central lifting device (Fig. 86) so that it is just above the ground.

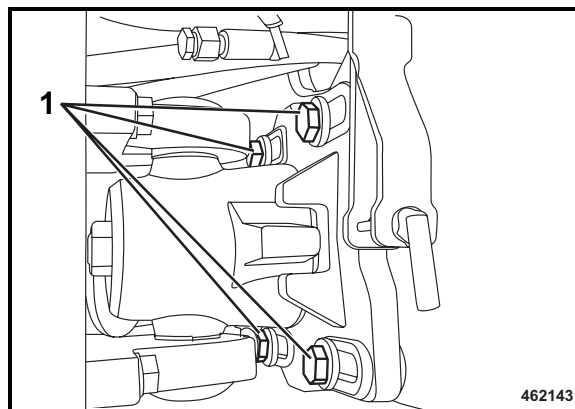


Fig. 87

- Disengage the articulation lock (Fig. 87).
- Slightly loosen the screws (1).
- Displace the front frame.
- Lower the machine to the ground.
- Tighten the screws, tightening torque. 300 Nm (221 ft.lbs).

5.14 What to do in events of emergency

Actuating the emergency stop switch

⚠ Danger

Danger of accident!

In events of emergency and in case of danger actuate the emergency stop switch immediately.

Start travel operation of the machine only after the danger that caused the actuation of the emergency stop switch has been eliminated.

⚠ Caution

Do not use as service brake. The deceleration is extremely high. In case of frequent use the wear on the multi-discs brakes will be very high.

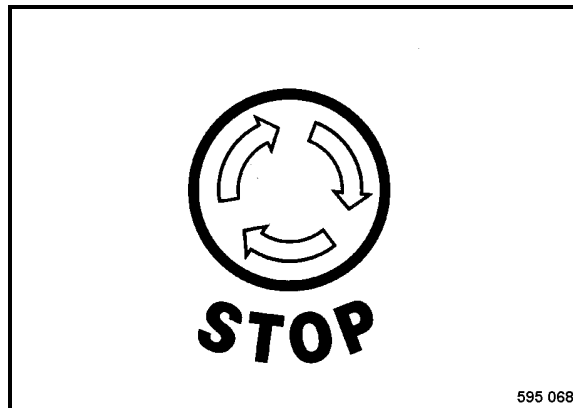


Fig. 88

- Press the button of the emergency stop switch (Fig. 88) completely down, it automatically locks in fully pressed position.

i Note

Shuts the engine down and closes the brake.

- Turn the button clockwise to unlock the emergency stop switch.
- Start the engine again, see chapter "Starting the engine".

Disconnecting the battery

⚠ Danger

In order to be able to disconnect the battery quickly in case of danger (e.g. cable fire or electrical malfunction) the minus terminal has been designed as a quick release pole clamp.

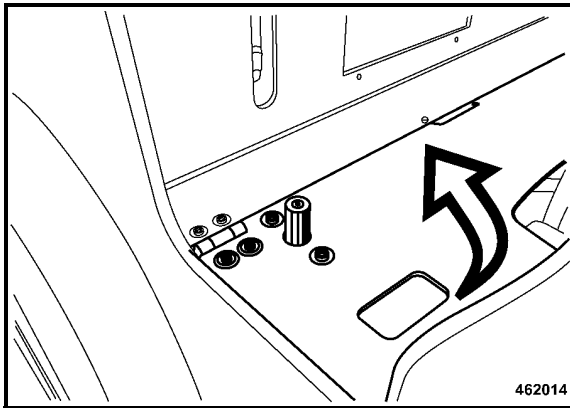


Fig. 89

- Fold up the covering flap in the foot well (Fig. 89).

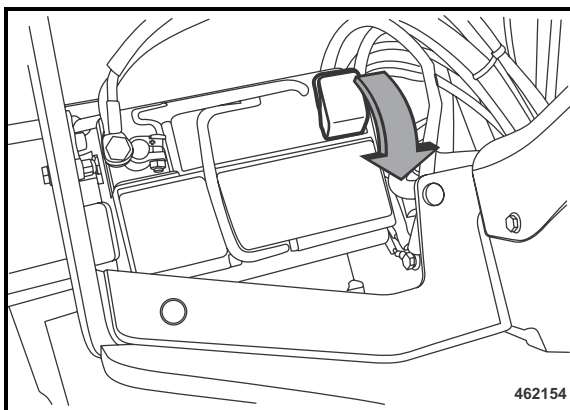


Fig. 90

- Pull up the cap from the minus pole (Fig. 90). The pole clamp on the minus pole thereby becomes loose.
- Disconnect the pole clamp from the minus pole of the battery and lay it to the side.

5.15 Connecting/disconnecting the hydraulic breaker¹

⚠ Danger

Danger of accident!

Do not drive the machine with the hydraulic breaker connected.

⚠ Caution

Once the rotors switch for the hydraulic breaker has been switched to the right, the hydraulic breaker is active. The parking brake is applied at the same time. The machine is no longer able to drive. Always keep the travel lever in parking brake position.

¹ Optional equipment

Operation

Connecting the hydraulic breaker

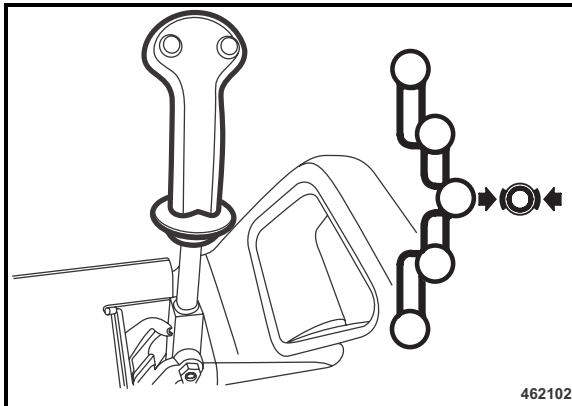


Fig. 91

- Stop the machine. Shift the travel lever (Fig. 91) slowly back to neutral position and lock it in parking brake position.

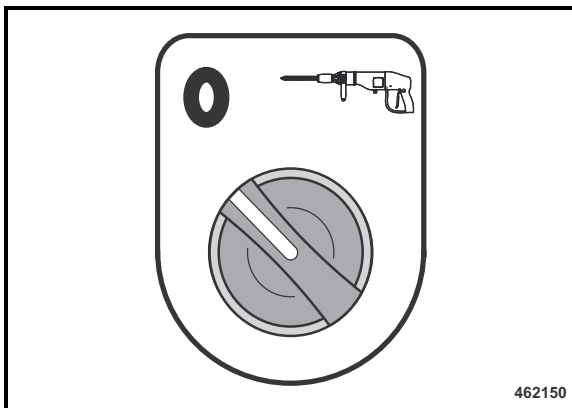


Fig. 92

- Before connecting hydraulic lines to the couplings make sure that the rotary switch for the hydraulic breaker (Fig. 92) is in position "0".

Caution

Clean the hydraulic couplings.

Contaminants or dirt must not enter into the hydraulic circuit.

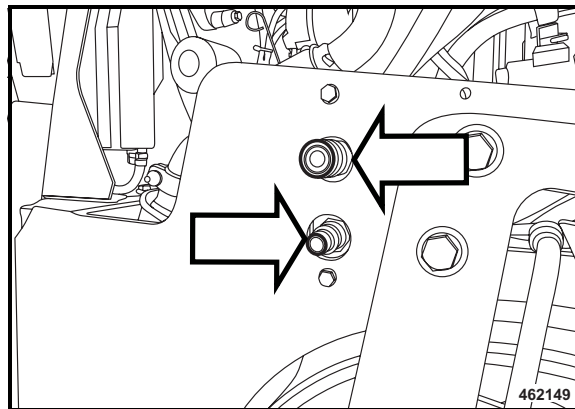


Fig. 93

- Clean the hydraulic couplings (Fig. 93).
- Connect the hydraulic breaker to the couplings.

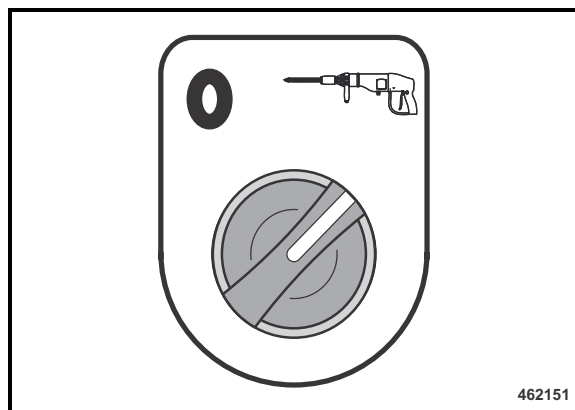


Fig. 94

- Turn the rotary switch for hydraulic breaker (Fig. 94) clockwise.

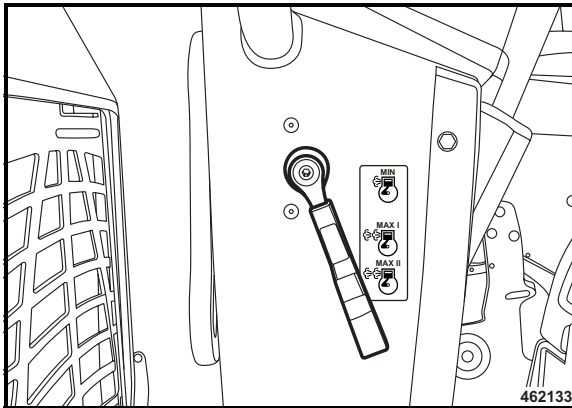


Fig. 95

- Set the throttle lever (Fig. 95) to position "MAX II".

The hydraulic breaker can now be used.

Connecting the hydraulic breaker

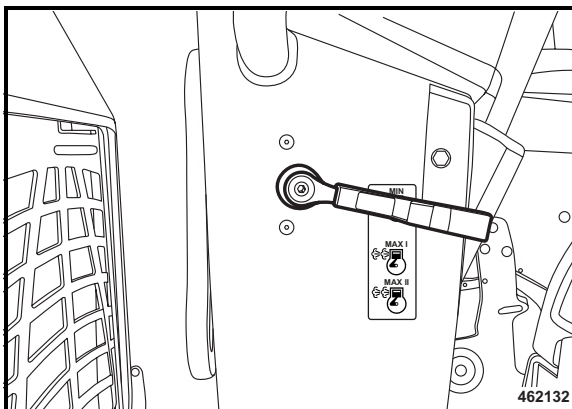


Fig. 96

- Set the throttle lever (Fig. 96) to position "MIN".

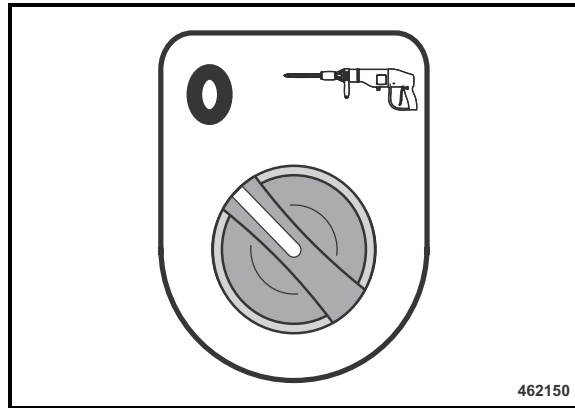


Fig. 97

- Turn the rotary switch for hydraulic breaker (Fig. 97) anti-clockwise to position "0".
- Disconnect the hydraulic breaker from the couplings .

5.16 Towing

⚠ Danger

Danger of accident!

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away before releasing the parking brake.

Use a towing vehicle with sufficient traction and braking power for the unbraked towed load.

Use a tow bar (to be provided by the operating company).

The machine cannot be steered.

⚠ Caution

Tow the machine only after having released the parking brake.

Max. towing speed 1 km/h (0.6 mph), max. towing distance 500 m (0.3 mi).

Towing AD/ADM/SC-machines

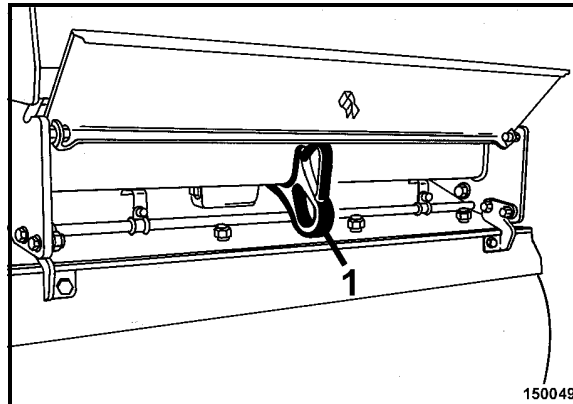


Fig. 98

- Tow the machine by the front or rear towing eye (1) (Fig. 98).

Releasing the brake

i Note

Release the brakes in both drums.

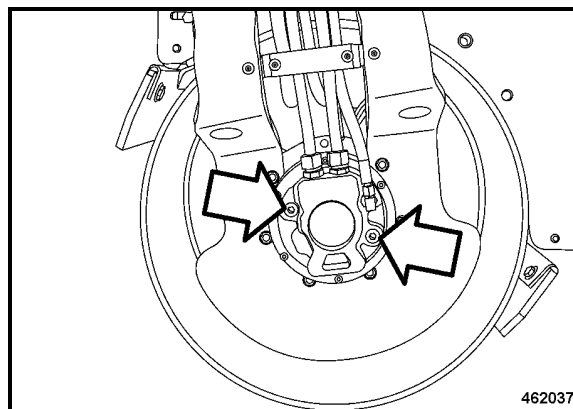


Fig. 99

- Remove two plugs (Fig. 99).

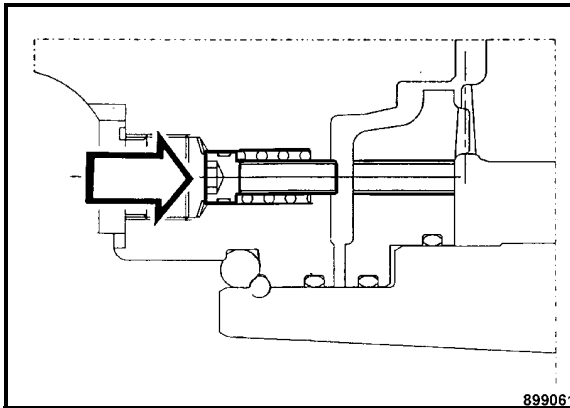


Fig. 100

- Press both screws (Fig. 100) in against springs.
- Tighten both screws alternately and in steps with 35 Nm (25.8 ft.lbs) until they bottom.

After towing

⚠ Danger

Danger of accident!

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away before disconnecting the tow bar.

The machine must only be started without the mechanical brake releasing device being activated.

Apply the brakes in both drums.

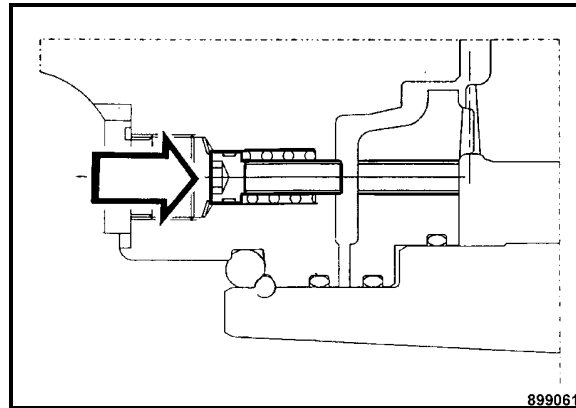


Fig. 101

- Completely release both screws (Fig. 101) to close the brake.

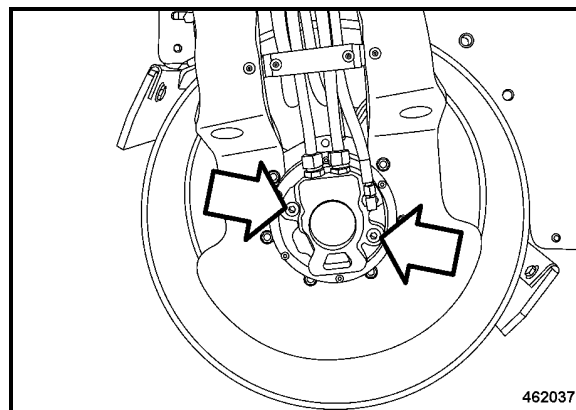


Fig. 102

- Screw both plugs (Fig. 102) back in and tighten them with 20 Nm (14.8 ft.lbs).

Operation

Towing ACM/SCC-machines

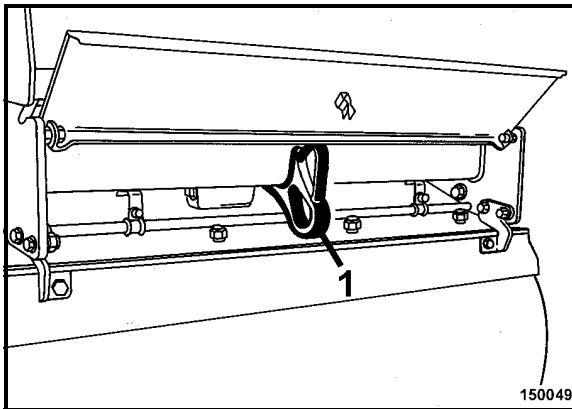


Fig. 103

- Tow the machine by the front or rear towing eye (1) (Fig. 103).

Releasing the brake

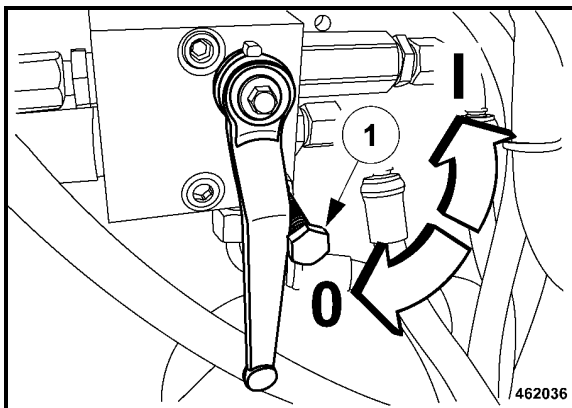


Fig. 104

- Unscrew the locking screw (1) (Fig. 104) and switch the ball valve¹ to position "I".
- Turn the steering wheel slowly approx. two turns in clockwise direction.

1 Optional equipment

After towing

⚠ Danger

Danger of accident!

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away before disconnecting the tow bar.

The machine must only be started without the mechanical brake releasing device being activated.

Always secure the ball valve of the brake releasing feature with the locking screw.

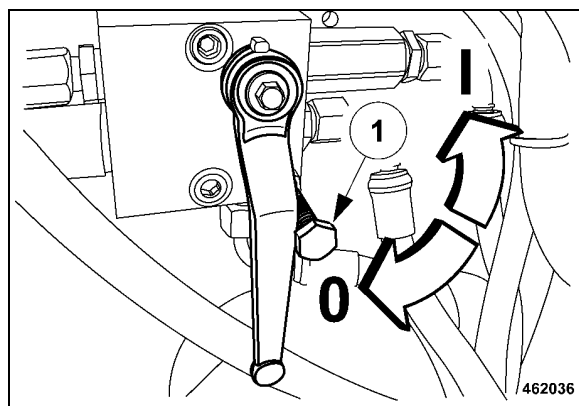


Fig. 105

- Switch the ball valve (Fig. 105) back to position "0", turn the locking screw (1) back in and counter it with the hexagon nut.

5.17 Loading/transport

Loading with loading ramp

⚠ Danger

Danger of accident! Life hazard!

Use only stable loading ramps of sufficient load bearing capacity. The ramp inclination must be less than the gradability of the machine.

Loading ramps must be free of grease, oil, snow and ice.

Make sure that persons are not endangered by the machine tipping or sliding off.

During demonstration and when loading the machine do not remain in the danger zone of the machine.

Secure the machine with the articulation lock after driving it on the transport vehicle.

- Drive the machine carefully on the transport vehicle.

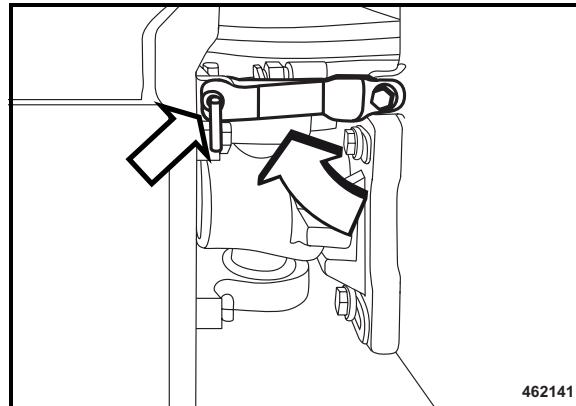


Fig. 106

- After driving the machine onto the transport vehicle attach and secure the articulation lock (Fig. 106).

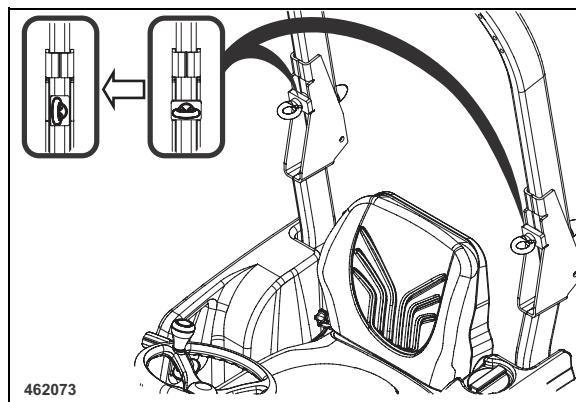


Fig. 107

- Fold down the foldable ROPS¹ for transport. Loosen the eye bolts (Fig. 107) and adjust the clamping plates vertically.
- Fold the foldable ROPS back.

1 Optional equipment

Operation

Loading by crane

⚠ Danger

Danger of accident! Life hazard!

Lifting tackle must only be attached to loads by expert personnel (qualified person).

Engage the articulation lock.

Always use suitable lifting tackle on the lifting points to lift the machine.

Check all lifting points and fastening elements for damage before lifting the machine. Do not use damaged or in any other way impaired lifting points.

Lift the machine only with suitable lifting gear. Use only safe lifting gear of sufficient load bearing capacity Minimum lifting capacity of lifting gear: see operating weight in chapter "Technical Data".

Do not lift or lower the machine jerkily.

The tension must always be effective in vertical direction.

The machine must not swing about when being lifted.

Do not step or stand under suspended loads.

- Fold down the foldable ROPS¹
- Engage the articulation lock.

¹ Optional equipment

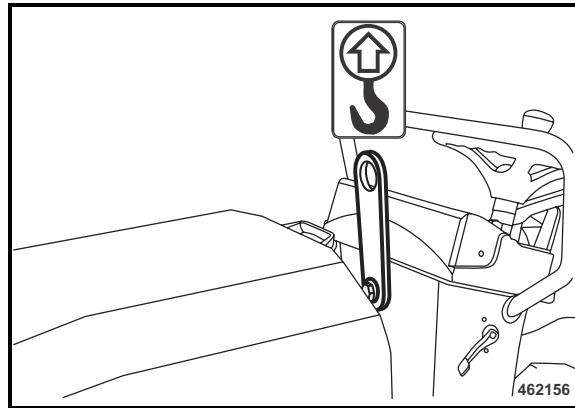


Fig. 108

- Use the central lifting facility (Fig. 108) to lift the machine.

Lashing

⚠ Danger

Danger of accident! Life hazard!

Always use suitable lashing gear on the lifting points to lash down the machine.

Check all lashing points for damage before lashing down the machine. Do not use a damaged or in any other way impaired lashing points.

Lash the machine down, so that it is secured against rolling, sliding and turning over.

Always apply the articulation lock for transportation.

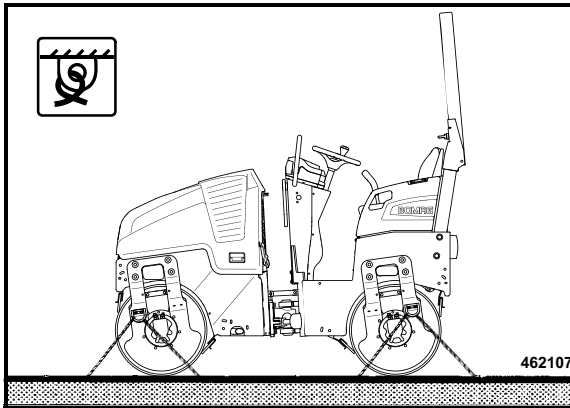


Fig. 109

- Lash the machine to the transport vehicle, use the lashing eyes (Fig. 109) on front and rear frame for this purpose.

After transport

⚠ Danger

Life hazard!

Operate the machine only with the foldable ROPS¹ properly fastened and the fastening screws tightened with the correct tightening torque.

After transport release the articulation lock again and store it in the receptacle.

1 Optional equipment

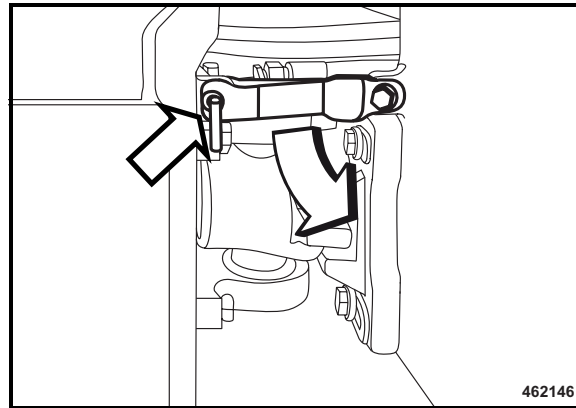


Fig. 110

- After transportation loosen the articulation lock (Fig. 110).

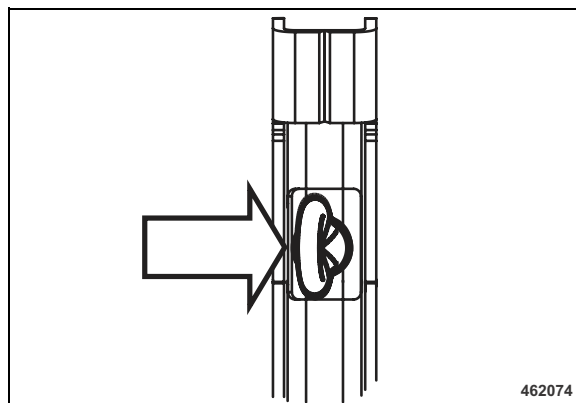


Fig. 111

- To fold up the foldable ROPS align the clamping plates on both sides vertically (Fig. 111).

Operation

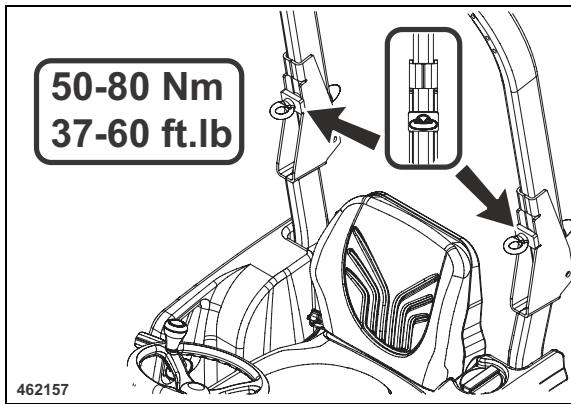


Fig. 112

- Fold up the foldable ROPS (Fig. 112).
- Turn the clamping plates to horizontal position and tighten the eye bolts with a tightening torque of 50 – 80 Nm (37 – 60 ft.lbf).

6 Maintenance

6.1 General notes on maintenance

When performing maintenance work always comply with the appropriate safety regulations.

Thorough maintenance of the machine guarantees far longer safe functioning of the machine and prolongs the lifetime of important components. The effort needed for this work is only little compared with the problems that may arise when not observing this rule.

The terms right/left correspond with travel direction forward.

- Always clean machine and engine thoroughly before starting maintenance work.
- For maintenance work stand the machine on level ground.
- Always remove the main battery switch for all maintenance work.
- Perform maintenance work only with the motor switched off.
- Relieve hydraulic pressures before working on hydraulic lines.
- Before working on electric parts of the machine disconnect the battery and cover it with insulation material.
- When working in the area of the articulated joint attach the articulation lock (transport lock).



Environment

During maintenance work catch all oils and fuels and do not let them seep into the ground or into the sewage system. Dispose of oils and fuels environmentally.

Keep used filters in a separate waste container and dispose of environmentally.

Catch biodegradable oils separately.

Notes on the fuel system

The lifetime of the diesel engine depends to a great extent on the cleanliness of the fuel.

- Keep fuel free of contaminants and water, since this will damage the injection elements of the engine.

- Drums with inside zinc lining are not suitable to store fuel.
- When choosing the storage place for fuel make sure that spilled fuel will not harm the environment.
- Do not let the hose stir up the slurry at the bottom of the drum.
- The fuel drum must rest for a longer period of time before drawing off fuel.
- The rest in the drum is not suitable for the engine and should only be used for cleaning purposes.

Notes on the performance of the engine

On diesel engines both combustion air and fuel injection quantities are thoroughly adapted to each other and determine power, temperature level and exhaust gas quality of the engine.

If your engine has to work permanently in "thin air" (at higher altitudes) and under full load, you should consult the customer service of BOMAG or the customer service of the engine manufacturer.

Notes on the cooling system

Prepare and check coolant with highest care, since otherwise the engine may be damaged by corrosion, cavitation and freezing.

The coolant is prepared by mixing a cooling system protection agent (ethylene glycol) into the coolant.

Mixing with cooling system protection agent is necessary in all climatic zones. It prevents corrosion, lowers the freezing point and raises the boiling point of the coolant.

Notes on the hydraulic system

During maintenance work on the hydraulic system cleanliness is of major importance. Make sure that no dirt or other contaminating substances can enter into the system. Small particles can produce flutes in valves, cause pumps to seize, clog nozzles and pilot bores, thereby making expensive repairs inevitable.

- If, during the daily inspection of the oil level the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.

Maintenance

- Seal external leaks immediately. If necessary inform the responsible customer service.
- Do not store drums with hydraulic oil outdoors, or at least under a cover. Water can be drawn in through the bung hole when the weather changes.
- We recommend to use the BOMAG filling and filtering unit with fine filter to fill the system. This ensures finest filtration of the hydraulic oil, prolongs the lifetime of the hydraulic oil filter and protects the hydraulic system.
- Clean fittings, filler covers and the area around such parts before disassembly to avoid entering of dirt.
- Do not leave the tank opening unnecessarily open, but cover it so that nothing can fall in.

6.2 Fuels and lubricants

Engine oil

Quality

Lubrication oils are classified according to their performance and quality class. Oils according to other comparable specifications may be used.

If low sulphur fuel (0.05%) is used, you must only use engine oils of API¹-classification CF, CF-4, CG-4, CH-4 and CI-4.

For operation of an engine with high sulphur fuels it is recommended to use an engine oil of classification CF or higher with a total base number of at least 10.

 Caution
--

Engine oils of classification CJ-4 must not be used!

Oil viscosity

Since lubrication oil changes its viscosity with the temperature, the ambient temperature at the operating location of the engine is of utmost importance when choosing the viscosity class (SAE-class) .

Optimal operating conditions can be achieved by using the following oil viscosity chart as a reference.

1 American Petroleum Institute

Maintenance

Ambient temperature	Viscosity
> 25 °C (77 °F)	SAE 30 SAE 10W-30 SAE 15W-40
0 °C to 25 °C (32 °F to 77 °F)	SAE 20 SAE 10W-30 SAE 15W-40
< 0 °C (32 °F)	SAE 10 SAE 10W-30 SAE 15W-40

Oil change intervals

The longest permissible time a lubrication oil should remain in an engine is 1 year. If the following oil change intervals are not reached over a period of 1 year, the oil change should be performed at least once per year, irrespective of the operating hours reached.

API: CF, CF-4, CG-4, CH-4 and CI-4: 250 operating hours

 Caution
--

When using fuels with a sulphur content higher than 0.5% the oil change intervals must be halved.

Fuels

Quality

Cetan index number: The recommended minimum index number for the Cetan value is 45. A Cetan index number higher than 50 should preferably be used, especially at ambient temperatures below -20°C (-4 °F) and when working at altitudes of 1500 m (4921 ft) and more.

Diesel fuel specifications: With respect to the percentage (ppm) of sulphur the fuel used in the engine must comply with all relevant exhaust emission regulations in the area of use of the engine.

It is highly recommended to use a fuel with a sulphur content of less than 0,10% (1000 ppm).

When using a diesel fuel with a high sulphur content of 0.50% (5000 ppm) to 1.0% (10.000 ppm), the engine oil change intervals must be halved.

 **Caution**

Do not use any fuels with a sulphur content of more than 1,0% (10000ppm).

It is recommended to use diesel fuel that complies with the specifications EN590 or ASTM D975.

Diesel fuel with the designation no. 2-D is a distillate fuel with low volatility, which is especially suitable for industrial engines and heavy-duty commercial vehicles (SAE J313 JUN87).

Since KUBOTA diesel engines with a rated power of less than 56 kW (75 HP) comply with the exhaust emission standard of EPA¹-stage 4, the use of low or ultra-low sulphur fuel is mandatory for these engines, if the engines are operated within the validity area of the EPA standard. As an alternative to no. 2-D you may also use diesel fuel no. 2-D S15; with ambient temperatures below -10°C (+14 °F) the diesel fuel no. 1-D S15 should be used for no. 1-D.

Fuel should always be replenished in due time.

Winter fuel

 **Danger**

Fire hazard!

Diesel fuels must never be mixed with gasoline.

For winter operation use only winter diesel fuel, to avoid clogging because of paraffin separation. At very low temperatures disturbing paraffin separation can also be expected when using winter diesel fuel.

Coolant

Always use a mixture of anti-freeze agent and clean, dehardened water with a mixing ratio of 1:1.

1 United States Environmental Protection Agency

Maintenance

Under particularly extreme temperature conditions you should consult the service representation of the engine manufacturer with respect to the anti-freeze agent to be used.

There are various types of anti-freeze agents available. For this engine you should use ethylene glycol.

Before filling in the coolant mixed with anti-freeze agent the radiator must be flushed with clean water. This procedure should be repeated two to three times to clean the inside of radiator and engine block.

Mixing the anti-freeze agent: Prepare a mixture of 50% anti-freeze agent and 50% low mineral, clean water. Stir well before filling it into the radiator. The method for mixing water and anti-freeze agent depends on the brand of the anti-freeze agent. In this respect see standard SAE J1034 and also the standard SAE J814c.

Add anti-freeze agent: If the coolant level drops because of evaporation, only clean water is to be used for topping up. In case of leakages you must always fill in anti-freeze agents of the same brand and the same mixing ratio.

Caution

Do not mix different coolants and additives of any other kind.

Do not use any radiator cleaning agent after the anti-freeze agent has been mixed in. The anti-freeze agent also contains a corrosion protection agent. If this mixes with cleaning agent it may cause the development of sludge, which could damage the cooling system.

Anti-freeze concentration

50% = -37 °C (-35 °F)

Environment

Coolant must be disposed of environmentally.

Mineral oil based hydraulic oil

The hydraulic system is operated with hydraulic oil HV 46 (ISO) with a kinematic viscosity of 46 mm²/s at 40 °C and 8 mm²/s at 100 °C. For topping up or for oil changes use only high-quality hydraulic oil, type HVLP according to DIN 51524, part 3, or hydraulic oils type HV according to ISO 6743/3. The viscosity index (VI) should be at least 150 (observe information of manufacturer).

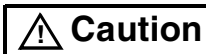
Bio-degradable hydraulic oil

The hydraulic system can also be operated with a synthetic ester based bio-degradable hydraulic oil.

The biologically quickly degradable hydraulic oil Panolin HLP Synth.46 meets all demands of a mineral oil based hydraulic oil according to DIN 51524.

In hydraulic systems filled with Panolin HLP Synth.46 always use the same oil to top up.

When changing from mineral oil based hydraulic oil to an ester based biologically degradable oil, you should consult the lubrication oil service of the oil manufacturer for details.



Check the filter more frequently after this change.

Perform regular oil analyses for content of water and mineral oil.

Replace the hydraulic oil filter element every 500 operating hours.

6.3 Table of fuels and lubricants

Assembly	Fuel or lubricant		Quantity Attention! Observe the level marks
	Summer	Winter	
Motor			
- Engine oil	Engine oil API: CF, CF-4, CG-4, CH-4 or CI-4 SAE 10W-40 (-20 °C to +40 °C) (-4 °F to +104 °F) (BOMAG 009 920 06; 20 l) SAE 10W-30 (-15 °C to +30 °C) (+5 °F to +86 °F) SAE 15W-40 (-15 °C to 40 °C) (+5 °F to +104 °F)		approx. 3.9 l (1.0 gal us)
- Fuel	SAE 30 (+5 °C to +30 °C) (+41 °F to +86 °F)	SAE 10 (-30 °C to -5 °C) (-22 °F to +23 °F)	approx. 30 l (7.9 gal us)
	Diesel	Winter diesel fuel (down to -12 °C) (10.4 °F)	
- Coolant	Mixture of water and anti-freeze agent (BOMAG 009 940 08; 20 l)		approx. 9 l (2.4 gal us)

Assembly	Fuel or lubricant		Quantity Attention! Observe the level marks
	Summer	Winter	
Hydraulic system	Hydraulic oil (ISO), HLP 46 (BOMAG 009 930 09; 20 l) or ester based biodegradable hydraulic oil		approx. 14 l (3.7 gal us)
Sprinkler system	Water	Anti-freeze mixture water ¹	approx. 100 l (26.4 gal us)
- Rubber tire sprin- kler system	Emulsion		approx. 11 l (2.9 gal us)

¹ Mix water and anti-freeze agent by following the instructions of the manufacturer.

6.4 Running-in instructions

The following maintenance work must be performed when running in new machines or overhauled engines:

 Caution
--

Up to approx. 250 operating hours check the engine oil level twice every day.

Depending on the load the engine is subjected to, the oil consumption will drop to the normal level after approx. 100 to 250 operating hours.

Maintenance after 50 operating hours

- Change engine oil and filter
- Check the engine for leaks
- Retighten the fastening screws on air filter, exhaust and other attachments.
- Check screw connections on the machine, retighten as necessary.

6.5 Maintenance table

No.	Maintenance work	Note
With all maintenance intervals perform also the work for shorter preceding service intervals.		
Every 10 operating hours		
6.6	Check the engine oil level	Dipstick mark
6.7	Check the fuel level	
6.8	Check the hydraulic oil level	Inspection glass
6.9	Check the hydraulic oil filter element	Contamination indicator
6.10	Check the coolant level	Inspection glass
6.11	Check the water level	
6.12	Check the emulsion level	only on ACM/SCC-machines
Every 50 operating hours		
6.13	Check, clean the air filter, replace if necessary	min. 1 x year
6.14	Check fuel lines and clamps	
6.15	Check, clean the water separator	

No.	Maintenance work	Note
Every 250 operating hours		
6.16	Change engine oil and oil filter cartridge ¹	min. 1 x year see foot note pole grease
6.17	Check, tension, replace the V-belt	
6.18	Check the air intake lines	
6.19	Clean radiator and hydraulic oil cooler	
6.20	Battery service	
6.21	Check radiator hoses and hose clamps	
6.22	Check scrapers, adjust if necessary	
Every 500 operating hours		
6.23	Drain the fuel tank sludge	
6.24	Change the fuel filter	
6.25	Check the anti-freeze concentration and the condition of the coolant	

- 1 Running-in instructions: oil change after 50 operating hours, then every 250 operating hours
When using fuels with a sulphur content higher than 0.5% the oil change intervals must be halved.

Maintenance

No.	Maintenance work	Note
Every 1000 operating hours		
6.26	Check, adjust the valve clearance	on cold engine Intake and exhaust valve: 0.15 mm (0.006 in)
6.27	Check the engine mounts	
6.28	Check the travel control	
Every 2000 operating hours		
6.29	Change hydraulic oil and breather filter ¹	see foot note at least every 2 years
6.30	Change the hydraulic oil filter ¹	see foot note at least every 2 years
6.31	Change the coolant	at least every 2 years
6.32	Change the fuel lines	at least every 2 years
6.33	Check the injection nozzles	only by authorized service personnel

¹ Also after repairs in the hydraulic system.

No.	Maintenance work	Note
Every 3000 operating hours		
6.34	Check the fuel injection pump	only by authorized service personnel
As required		
6.35	Check the tire pressure	only on ACM/SCC-machines
6.36	Water sprinkler system, maintenance in the event of frost	
6.37	Tightening torques	
6.38	Measures to be applied for longer periods of rest	

6.6 Check the engine oil level

⚠ Caution

The machine must be in horizontal position. When the engine is warm, shut it down and check the oil level after five minutes. With a cold engine the oil level can be checked immediately.

For quality of oil refer to the "table of fuels and lubricants".

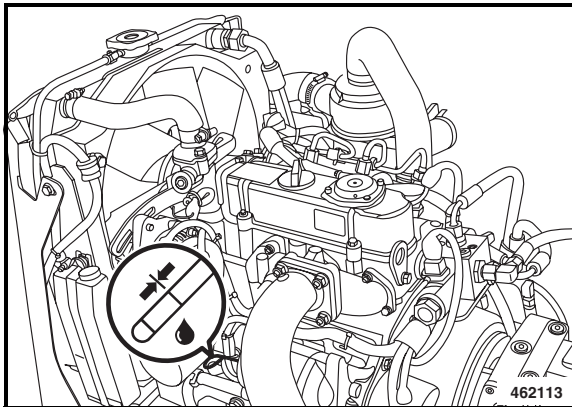


Fig. 113

- Pull the dipstick (Fig. 113) out, wipe it off with a lint-free, clean cloth and reinsert it until it bottoms.
- Pull the dipstick back out.

The oil level must always be between the "MIN"- and "MAX"-marks.

- If the oil level is too low top up oil immediately.

- If the oil level is too high, determine the cause and drain the oil off.

6.7 Check the fuel level

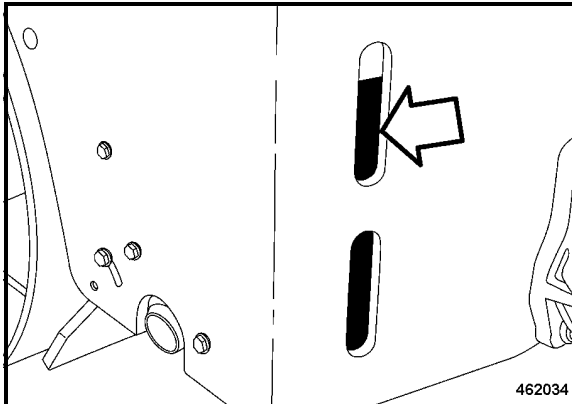


Fig. 114

- Check the fuel level on the fuel gauge (Fig. 114).

Refuelling

⚠ Danger

Fire hazard!

When working on the fuel system do not use open fire, do not smoke, do not spill any fuel.

Do not refuel in closed rooms.

Shut down the engine.

⚠ Danger

Health hazard!

Do not inhale any fuel fumes.

⚠ Caution

Contaminated fuel can cause malfunction or even damage of the engine. If necessary, fill in fuel through a funnel with screen.

Monitor the entire refuelling process.

For quality and quantity of fuel refer to the "table of fuels and lubricants".

♻ Environment

Catch running out fuel, do not let it seep into the ground.

- Shut down the engine.
- Open the engine hood.

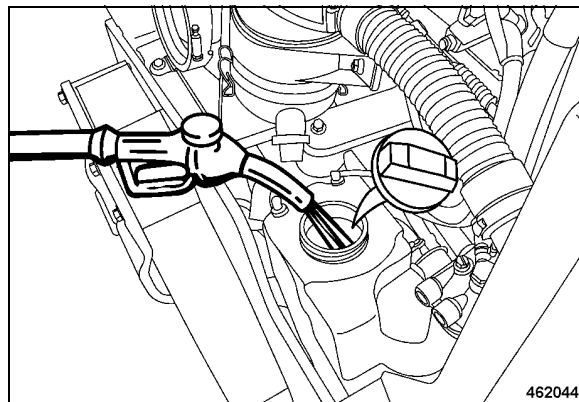


Fig. 115

- Clean the area around the filler opening.
- Open the cover (Fig. 115).
- Top up with fuel (diesel or winter diesel).
- Screw the cover back on again.

6.8 Checking the hydraulic oil level

⚠ Caution

If, during the daily inspection of the oil level the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.

In hydraulic systems filled with Panolin Synth. 46 use only the same oil to top up. With other ester based oils consult the lubrication oil service of the respective oil manufacturer.

For quality of oil refer to the "table of fuels and lubricants".

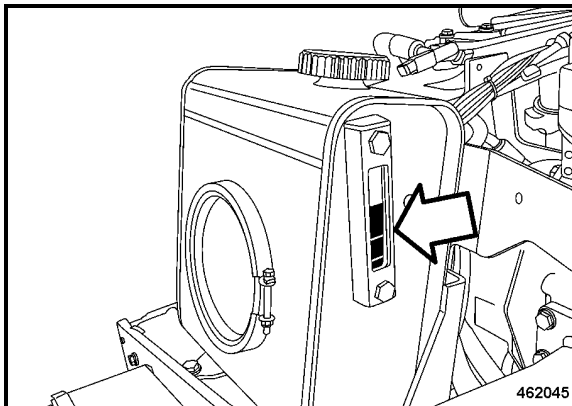


Fig. 116

- Check the oil level in the oil level inspection glass (Fig. 116).

i Note

At a room temperature of approx. 20 °C (68 °F) the oil level should reach

approx. 2/3 way up the inspection glass.

- If the oil level is too low top up hydraulic oil immediately.

6.9 Checking the hydraulic oil filter element

⚠ Caution

If the hydraulic oil is very cold the pin may pop up, you should therefore only check the filter and press the pin in at operating temperature.

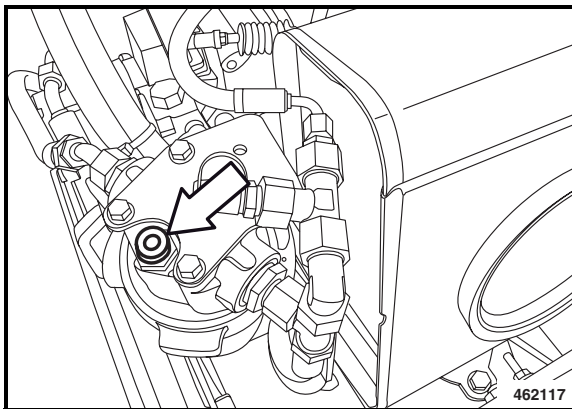


Fig. 117

- Check the contamination indicator (Fig. 117) at operating temperature and with the engine running at maximum speed.
- If necessary press the pin in.

Pin remains pressed in = Hydraulic oil filter element o.k.

Pin pops out = Replacing the hydraulic oil filter element

6.10 Checking the coolant level

⚠ Danger

Danger of scalding!

Open the cap on the coolant compensation tank only when the engine is cold.

⚠ Caution

If, during the daily inspection the coolant level is found to have dropped, check all lines, hoses and engine for leaks.

For quality of coolant refer to the chapter on "fuels and lubricants".

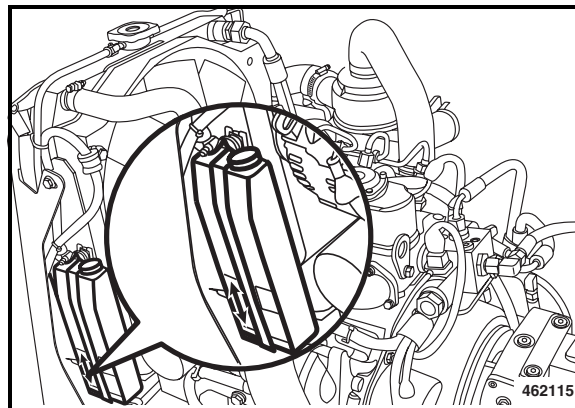


Fig. 118

- Check the coolant level in the compensation tank (Fig. 118).
- To top up unscrew the filler cap and fill in coolant up to the MAX-mark.

6.11 Checking the water level

⚠ Caution

If there is a risk of frost observe the special service instructions in chapter "water sprinkler system, maintenance in case of frost".

Make sure that the ventilation bore in the filler cap is free.

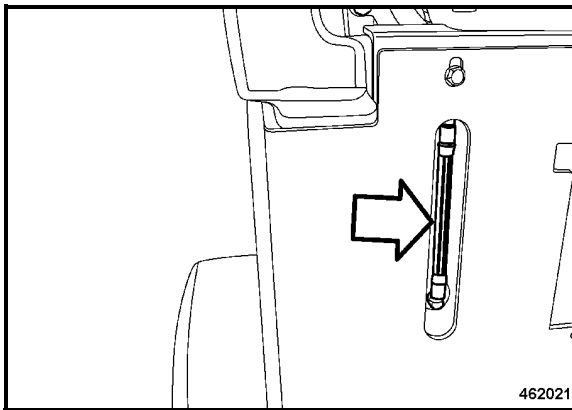


Fig. 119

- Check the water tank filling level on the water level gauge (Fig. 119).

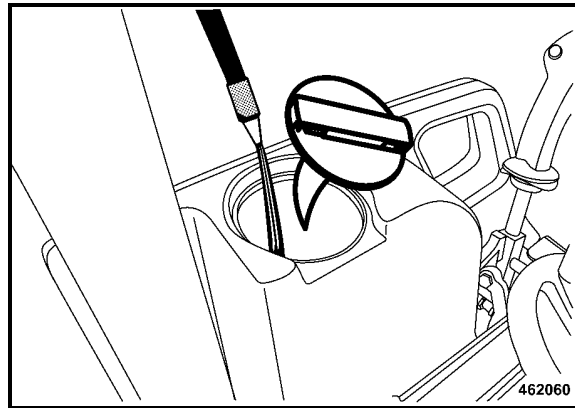


Fig. 120

- Open the cover (Fig. 120).
- If necessary fill in water through the filler screen and close the cap again.

Every 10 operating hours

6.12 Check the emulsion level¹

Caution

Different emulsions must not be mixed. If necessary drain off the emulsion beforehand.

For mixing ratio of water and emulsion refer to the specification of the respective manufacturer.

Make sure that the ventilation bore in the filler cap is free.

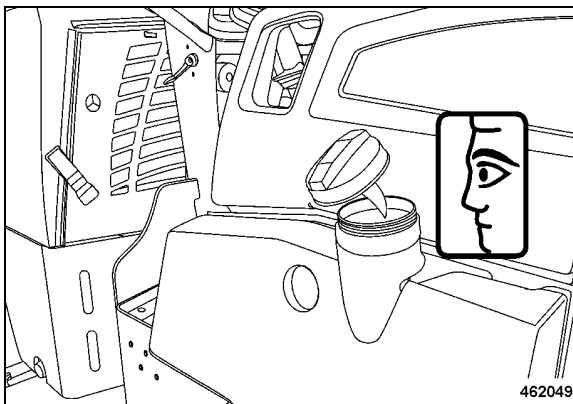


Fig. 121

- Open the lid (Fig. 121) on the tank, fill up with emulsion as necessary and close the lid again.

¹ only on ACM/SCC-machines

6.13 Checking, cleaning the air filter, replacing if necessary

⚠ Caution

Perform cleaning, maintenance and repair work only with the engine shut down. Do not start the engine after removing the filter element.

Do not use gasoline or hot fluids to clean the filter element.

After cleaning the filter element must be inspected for damage using a torch.

Air filter cartridge with damaged paper bellows or seal lips must be replaced in any case.

The air filter cartridge must be replaced after 6 times cleaning, but at the latest after one year, irrespective of the operating hours.

Cleaning does not make sense if the main filter cartridge is covered with a sooty deposit. Use a new air filter cartridge.

Incorrectly handled air filter cartridges may become ineffective because of damage (e.g. cracks) and cause damage to the engine.

- Open the engine hood.

i Note

Under very dusty conditions you may have to check the filter service indicator every day.

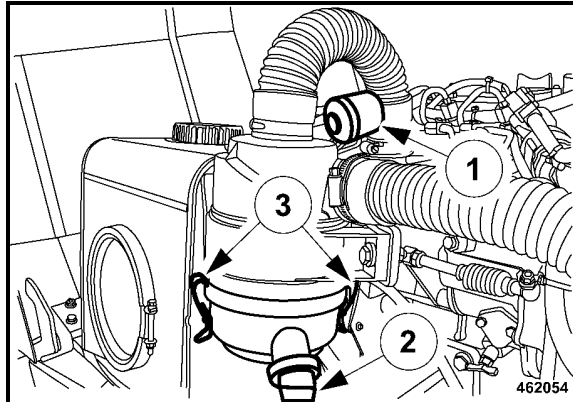


Fig. 122

Service of the air filter is due when the red piston of the filter service indicator (1) (Fig. 122) reaches into the transparent window.

⚠ Caution

After cleaning the air filter press the reset button for the red piston on the filter service indicator.

- Under normal conditions open the evacuation valve (2) once per week (or every day under very dusty conditions), in order to remove big dust and dirt particles.
- Unclip the clamps on the housing cover (3) and take off the cover .

Every 50 operating hours

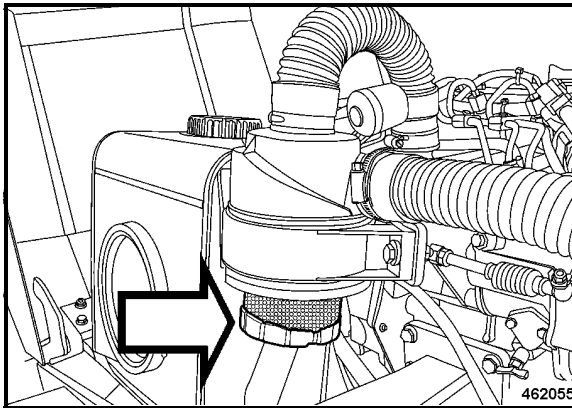


Fig. 123

- Pull the air filter cartridge (Fig. 123) out of the air filter housing.
- Clean out the air filter housing with a cloth.

⚠ Caution

Do not use compressed air to blow out the air filter housing.

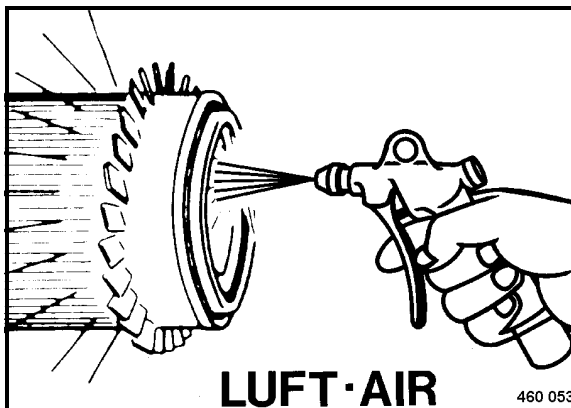


Fig. 124

⚠ Danger

Eye injury!

Wear safety goggles.

- Blow the air filter cartridge (Fig. 124) out with clean and dry compressed air (max. 2 bar (30 psi)) by blowing along the inner creases.

⚠ Caution

Do not hold the compressed air nozzle closer to the filter than 3 cm

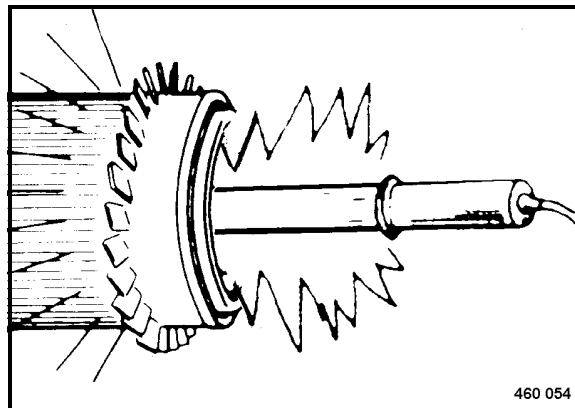


Fig. 125

- Check the air filter cartridge (Fig. 125) from inside with a torch for holes, cracks, flutes or other damage.
- Always replace damaged filter cartridges.

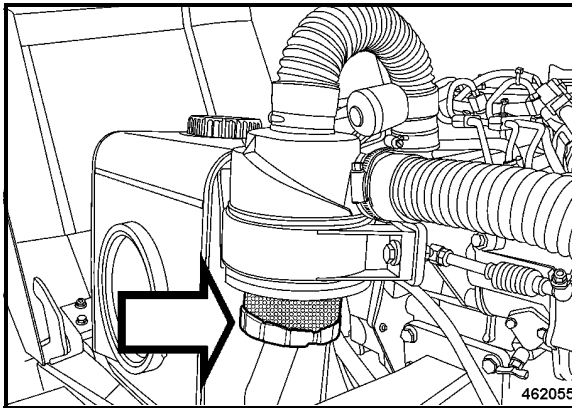


Fig. 126

- Before re-installation check the sealing faces on the air filter cartridge (Fig. 126).

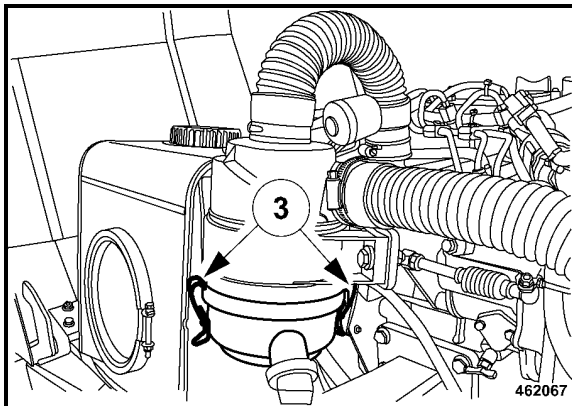


Fig. 127

- Insert the air filter cartridge, attach the housing cover and fasten with fastening clamps (3) (Fig. 127).

⚠ Caution

If the clamps are not fastened correctly dirt and dust may be drawn in. This can damage the engine.

6.14 Check fuel lines and clamps

⚠ Danger

Danger of burning!

Perform inspection work only after the engine has cooled down and with the engine stopped.

⚠ Caution

If fuel lines or hose clamps are found to be damaged, the corresponding parts must be immediately repaired or replaced.

Removed or new fuel lines must be closed with clean cloths on both ends, to make sure that no dirt will enter into the fuel system. Dirt particles can destroy the injection pump.

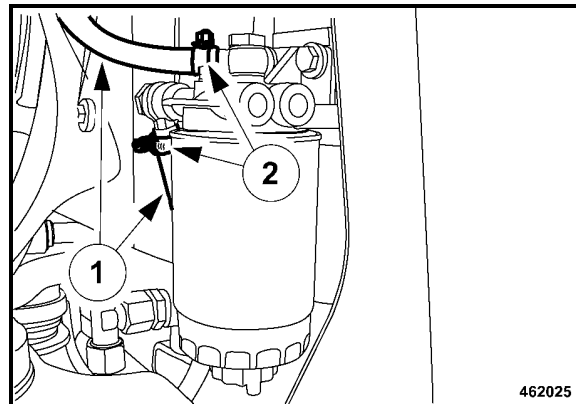


Fig. 128

- Check the condition and tight fit of all fuel lines (1) (Fig. 128) and hose clamps (2).

Every 50 operating hours

6.15 Checking, cleaning the water separator

⚠ Danger

Fire hazard! Health hazard!

When working on the fuel system do not use open fire, do not smoke, do not spill any fuel.

Shut down the engine.

Do not inhale any fuel fumes.

i Note

The service intervals for the water separator depend on the water content in the fuel and can therefore not be determined precisely. After taking the engine into operation you should therefore check the water separator every day for signs of water.

♻ Environment

Any fuel must be caught and disposed of in an environmentally friendly manner.

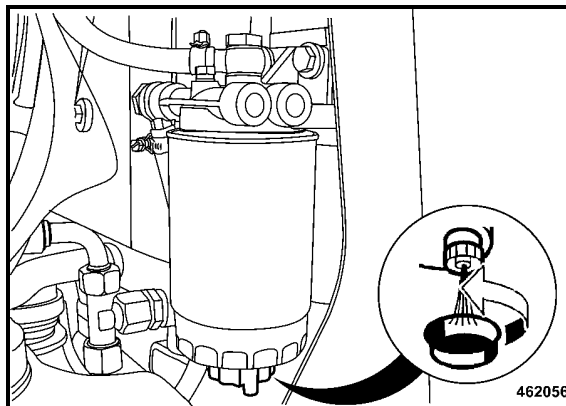


Fig. 129

- Slacken the drain plug (Fig. 129) for a few turns and catch running out fuel / water.
- Tighten the drain plug again and check for leaks, if necessary replace the seal ring.

6.16 Changing engine oil and oil filter

Danger

Danger of scalding!

When draining off hot oil.

By hot oil when unscrewing the engine oil filter.

Caution

The oil change at 250 operating hours refers to the use of fuels with a sulphur content of less than 0.5%. When using fuels with a sulphur content of more than 0.5% the oil change intervals must be halved.

Drain the engine oil only when the engine is warm.

For quality and quantity of oil refer to the "table of fuels and lubricants".

Environment

Catch running out oil and dispose of environmentally together with the oil filter cartridge.

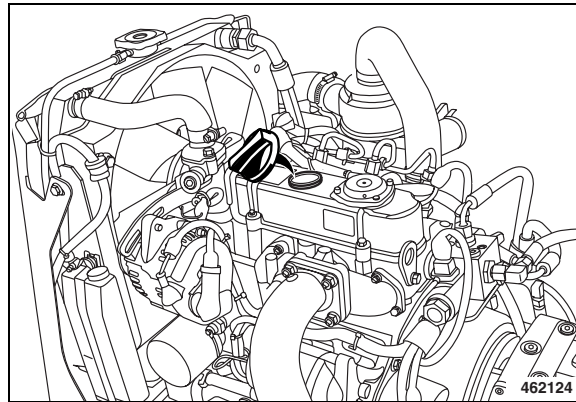


Fig. 130

- Unscrew the oil filler plug (Fig. 130).

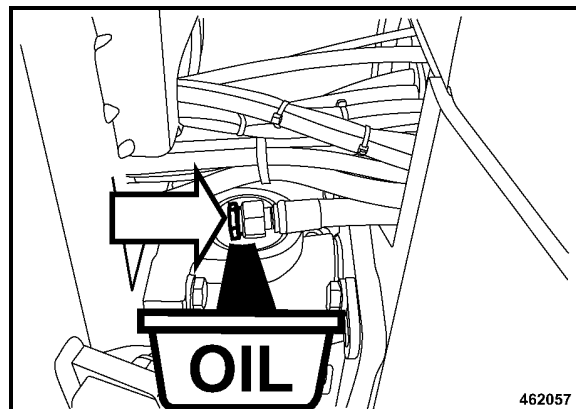


Fig. 131

- Unscrew the drain plug (Fig. 131) and catch running out oil.
- Turn the oil drain plug back in with a new seal ring.

Every 250 operating hours

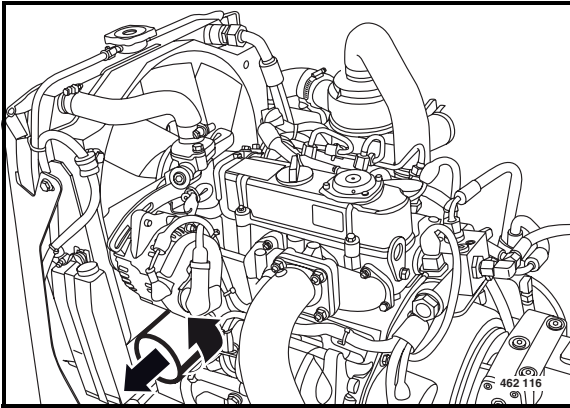


Fig. 132

- Unscrew the filter cartridge (Fig. 132) using an appropriate filter wrench.
- Clean the sealing face on the filter carrier from any dirt.

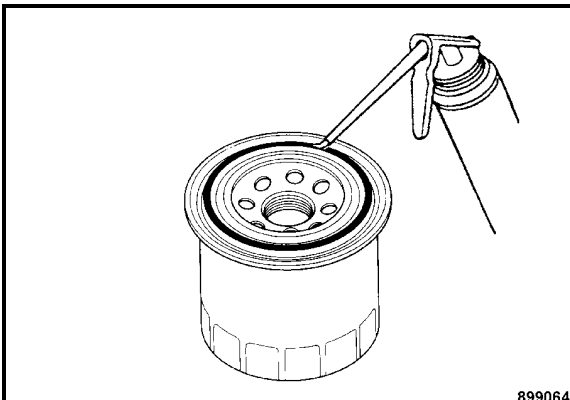


Fig. 133

- Slightly oil the rubber seal on the new filter cartridge (Fig. 133).
- Turn the new filter cartridge on by hand, until the seal contacts.
- Tighten the filter element for another half turn.

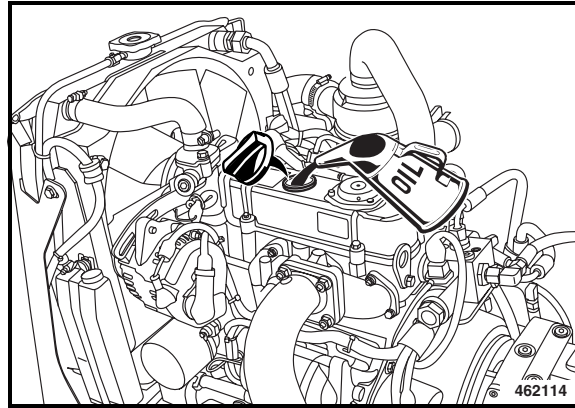


Fig. 134

- Fill in new engine oil (Fig. 134).
- Tighten the oil filler cap properly.

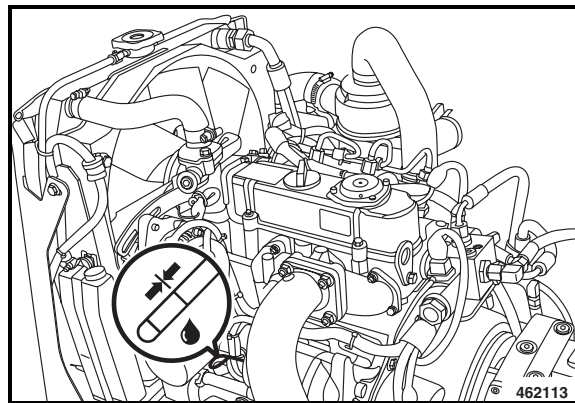


Fig. 135

- After a short test run check the oil level once again (Fig. 135), if necessary top up to the top mark (MAX).

6.17 Checking, tensioning, replacing the V-belt

Checking the V-belt

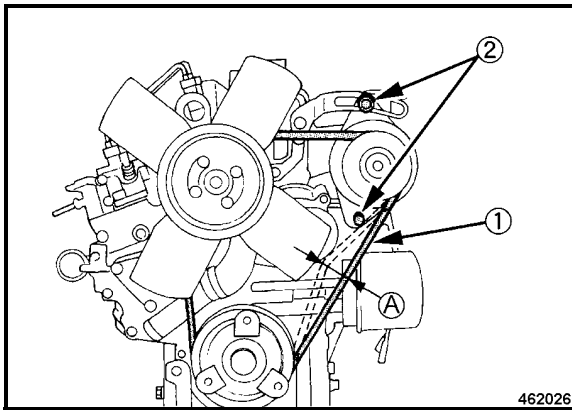


Fig. 136

- Inspect the entire circumference of the V-belt (1) (Fig. 136) visually for damage and cracks.
- Replace a damaged or cracked V-belt immediately.
- Check with thumb pressure whether the V-belt can be depressed more than 7 to 9 mm (0.28 – 0.35 inch) between the V-belt pulleys, retighten if necessary.

Tightening the V-belt

- Slightly slacken the fastening screws (2) .
- Press the generator in direction outward using a lever, until the correct V-belt tension is reached.

- Retighten all fastening screws and check the V-belt tension once again.

Changing the V-belt

- Slightly slacken the fastening screws (2) .
- Press the generator completely against the engine.
- Remove the old V-belt.
- Fit the new V-belt to the V-belt pulleys.
- Tension the V-belt as previously described.

6.18 Checking the air intake lines

⚠ Danger

Danger of burning!

Perform inspection work only after the engine has cooled down and with the engine stopped.

⚠ Caution

Take care that no contaminants enter into the air intake system, since this could damage the engine!

If an air intake hose is damaged, both hose and hose clamp must be replaced immediately.

- Check the condition and tight fit of all air intake lines and hose clamps.

6.19 Cleaning radiator and hydraulic oil cooler

⚠ Danger

Danger of injury!

Perform cleaning work only after the engine has cooled down and with the engine stopped.

⚠ Caution

Do not damage any cooling fins on the cooler core when cleaning.

Dirt on fan blades and radiator reduce the cooling effect. Dirt deposits in these areas are substantially supported by oil and fuel on these surfaces. For this reason you should always seal any oil or fuel leaks in the vicinity of the cooling fan or the radiator and clean the cooling surfaces after.

Every 250 operating hours

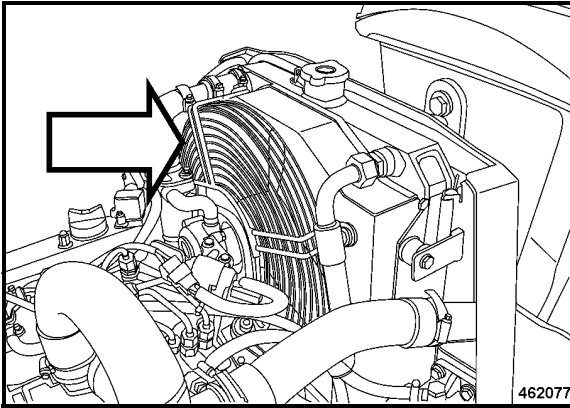


Fig. 137

- Remove the fan grille (Fig. 137).
- Blow the radiator out with compressed air.

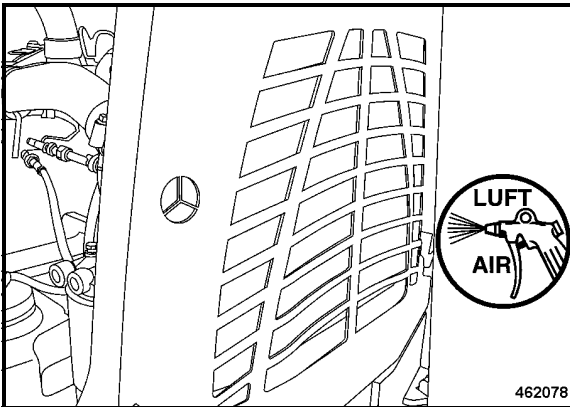


Fig. 138

- Blow the hydraulic oil cooler (Fig. 138) out with compressed air.

Cleaning with cold cleansing agent

Caution

Protect electrical equipment such as generator, regulator and starter against the direct water jet.

- Spray engine and cooler with a suitable cleansing agent (e.g. cold cleanser), let it soak in for a while and spray it off with a strong water jet.
- Reassemble the fan grille.
- Run the engine warm for a while to avoid corrosion.

6.20 Battery service

Danger

Danger of cauterisation ! Danger of explosion!

When working on the battery do not use open fire, do not smoke!

The battery contains acid. Do not let acid come in contact with skin or clothes!

Wear protective clothing!

Do not lay any tools on the battery!

For recharging remove the plugs from the battery to avoid the accumulation of highly explosive gases.

Environment

Dispose of the old batteries environmentally.

Note

Maintenance free batteries also need care. Maintenance free only means that the fluid level does not need to be checked. Each battery suffers under self-discharge, which may, in not checked occasionally, even cause damage to the battery as a result of exhaustive discharge.

The following therefore applies for the service life:

- Switch off all consumers (e.g. ignition, light, inside light, radio).
- Check open-circuit voltage of the battery at regular intervals. At least once per month.

Reference values: 12.6 V = fully charged; 12.3 V = 50% discharged.

- Recharge the battery immediately after an open-circuit voltage of 12.25 V or less is reached. Do not perform quick charging.

The open-circuit voltage of the battery occurs approx. 10 hours after the last charging process or one hour after the last discharge.

- After each charging process allow the battery to rest for one hour before taking it into service.
- For resting periods of more than one month you should always disconnect the battery. Do not forget to perform regular open-circuit voltage measurements.

Caution

Exhausted batteries (batteries with formation of sulphate on the plates) are not covered under warranty!

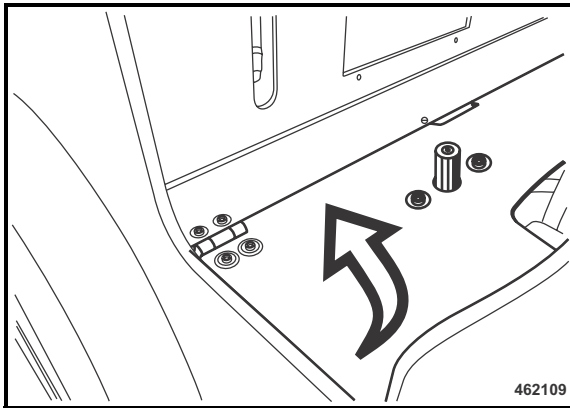


Fig. 139

- Fold up the covering hood (Fig. 139).

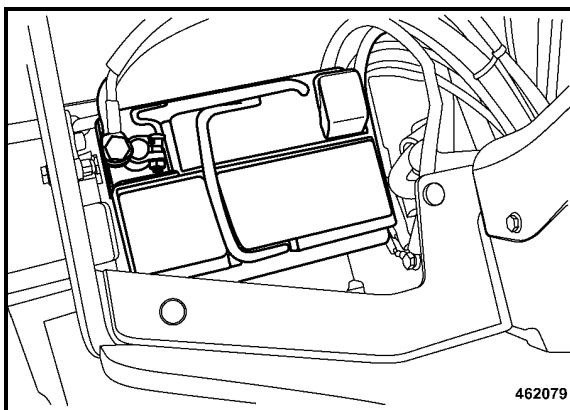


Fig. 140

- Clean battery (Fig. 140) and battery compartment.
- Clean battery poles and pole clamps and grease them with pole grease (Vaseline).
- Retighten the pole clamps.
- Check the fastening of the battery.

6.21 Checking radiator hoses and hose clamps

⚠ Danger

Danger of burning!

Perform inspection work only after the engine has cooled down and with the engine stopped.

⚠ Caution

If a radiator hose is swollen, hardened or cracked, both hose and hose clamp must be replaced immediately.

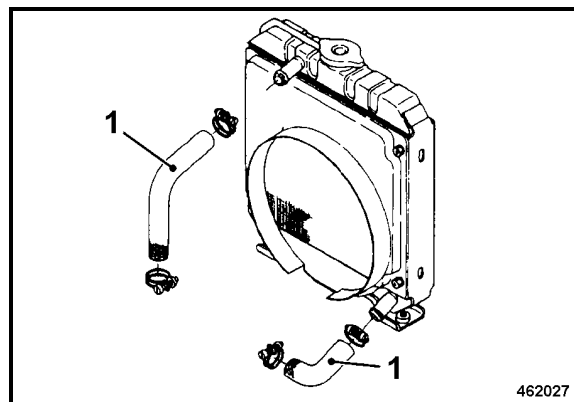


Fig. 141

- Check the condition and tight fit of all radiator hoses and hose clamps (Fig. 141).

6.22 Check the scrapers, adjust if necessary

Drums

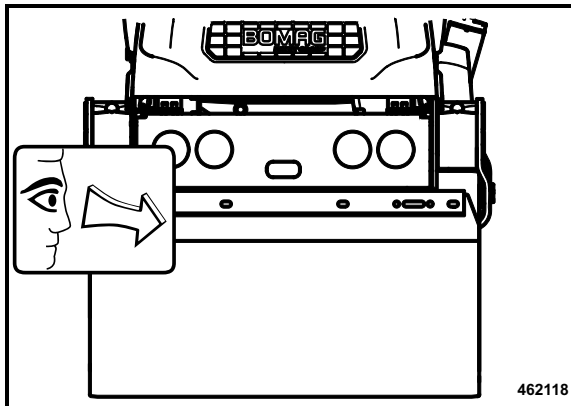


Fig. 142

- Check the scrapers (Fig. 142), adjust if necessary

Wheels¹

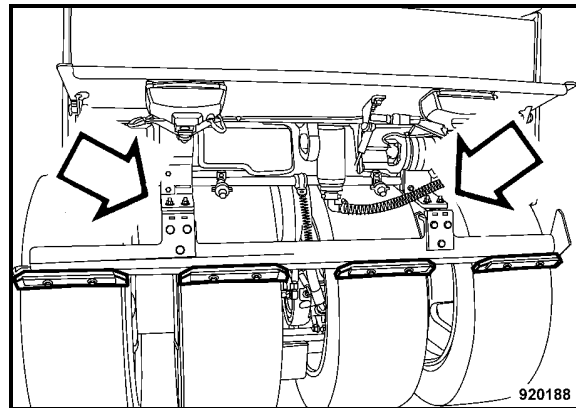


Fig. 143

- Open the rear flap, check the scrapers, replace if necessary (Fig. 143).
- Adjust the scrapers with the screws to a uniform distance of approx. 2 mm (0.08 in) from the rubber tires.

¹ only on ACM/SCC-machines

6.23 Drain the fuel tank sludge

⚠ Danger

Fire hazard!

When working on the fuel system do not use open fire, do not smoke.

Do not spill any fuel.

⚠ Danger

Health hazard!

Do not inhale any fuel fumes.

🌱 Environment

Catch running out fuel, do not let it seep into the ground.

i Note

When performing this work the fuel tank shall only hold max. 5 l (1.3 gal us) of fuel, pump off if necessary.

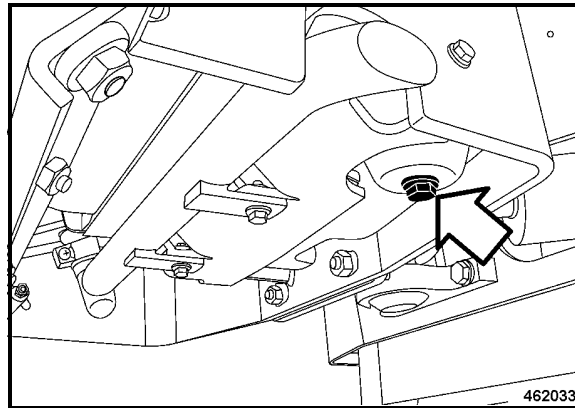


Fig. 144

- Place the suitable container under the fuel tank drain plug(Fig. 144).
- Unscrew the plug and drain off fuel.
- Once all fuel has run out screw the drain plug back in with a new seal ring.
- Fill the fuel tank with clean fuel.

Every 500 operating hours

6.24 Change the fuel filter

⚠ Danger

Fire hazard!

When working on the fuel system do not use open fire, do not smoke.

Do not spill any fuel.

⚠ Danger

Health hazard!

Do not inhale any fuel fumes.

🌿 Environment

Catch running out fuel, do not let it seep into the ground.

Dispose of the used fuel filter environmentally.

Changing the fuel pre-cleaner

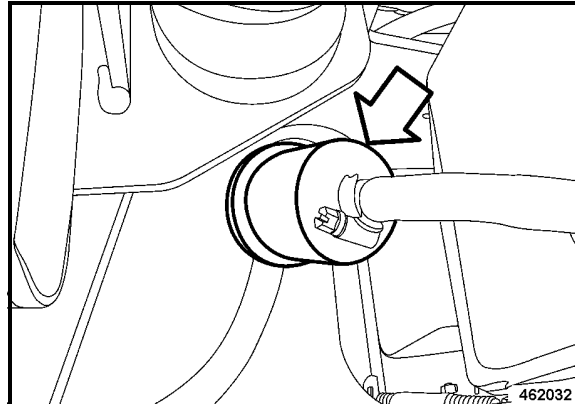


Fig. 145

- Unscrew the hose clamps (Fig. 145) on the fuel pre-cleaner.
- Pull the fuel filter out of the hoses.
- Install the new fuel pre-filter and observe the flow direction (arrow).
- Fasten the hose clamps.

Change the fuel filter cartridge

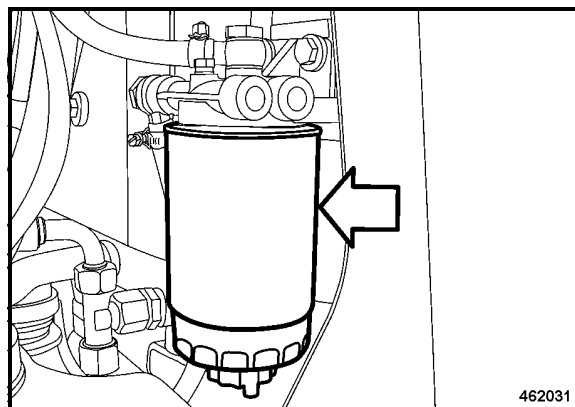


Fig. 146

- Slacken and unscrew the fuel filter cartridge (Fig. 146).

- Clean the sealing face on the filter carrier from any dirt.
- Apply a thin film of fuel to the seals and screw the new filter cartridge on hand-tight.

6.25 Check the anti-freeze concentration and the condition of the coolant

 **Danger**

Danger of scalding!

Check the anti-freeze concentration only when the engine is cold.

 **Caution**

In order to avoid damage to the engine (e.g. by corrosion, cavitation and freezing), particular attention must be paid to the inspection of the coolant.

For coolant quality refer to the "table of fuels and lubricants".

Do not mix different coolants and additives, see section "Fuels and Lubricants - Coolant".

If the coolant is contaminated by corrosion residues or other suspended matter, flush the cooling system, see section "Changing the coolant".

 **Environment**

Catch coolant and dispose of environmentally.

Every 500 operating hours

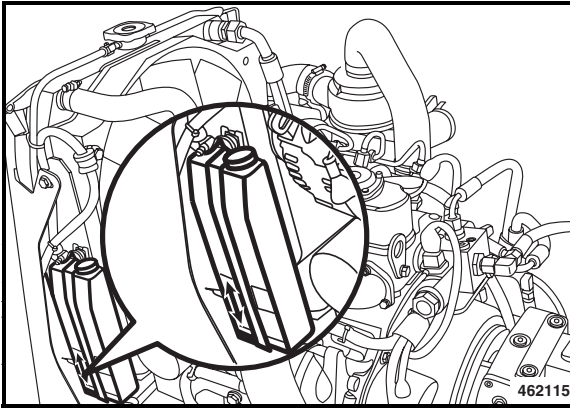


Fig. 147

- Remove the cap (Fig. 147) from the coolant compensation tank and check the anti-freeze concentration with a conventional tester.
- Check the condition of the coolant.
- Screw the cap back on.

6.26 Checking, adjusting the valve clearance

⚠ Caution

We recommend to have this work carried out by trained personnel or our after sales service.

Check and adjust only when the engine is cold.

Cylinder 1 is on the flywheel side.

Valve clearance:

Intake and exhaust valve = 0.15 mm (0.006 in)

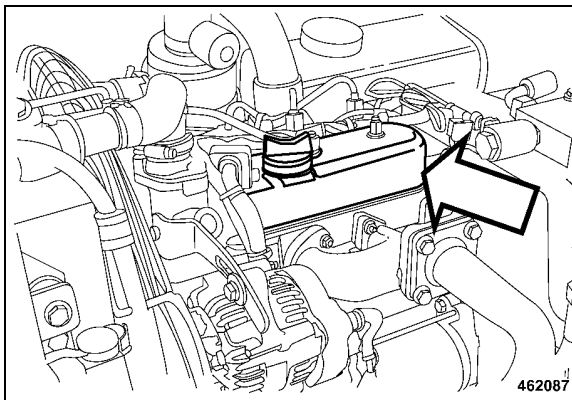


Fig. 148

- Remove the valve cover (Fig. 148).

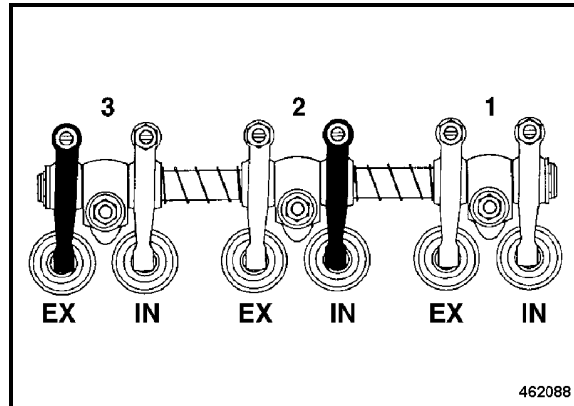


Fig. 149

Crankshaft position 1

IN = Intake valve

EX = Exhaust valve

- Crank the engine until both valves on cylinder 1 are “overlapping”.
- Perform the adjustment of the valve by following the adjustment diagram 1”(Fig. 149), black mark.

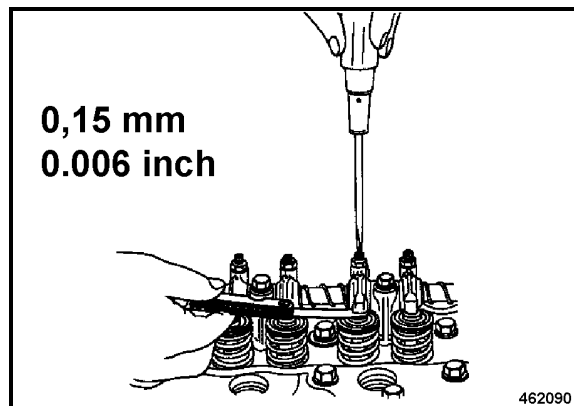


Fig. 150

- Check the gap between rocker arm and valve with a feeler gauge (Fig. 150).

Every 1000 operating hours

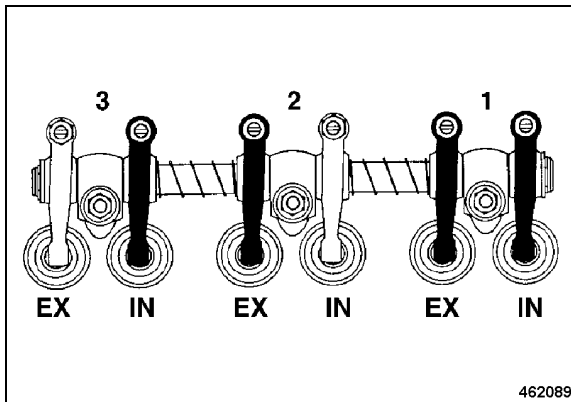


Fig. 151

Crankshaft position 2

IN = Intake valve

EX = Exhaust valve

- Turn the crankshaft one revolution (360 °) further.
- Perform the adjustment of the valve by following the adjustment diagram 2" (Fig. 151), black mark.
- Install the cylinder head cover with a new gasket.

i Note

After a short test run check the engine for leaks.

6.27 Check the engine mounts

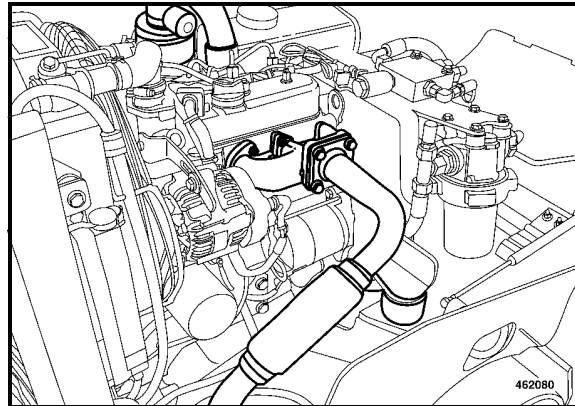


Fig. 152

- Check air intake and exhaust manifold fastenings (Fig. 152) for tight fit.
- Check sockets and clamps on the air filter for tight fit and leak tightness.
- Check fastening and tightness of the lubrication oil sump.
- Check condition and tight fit of engine mounts.

6.28 Check the travel control

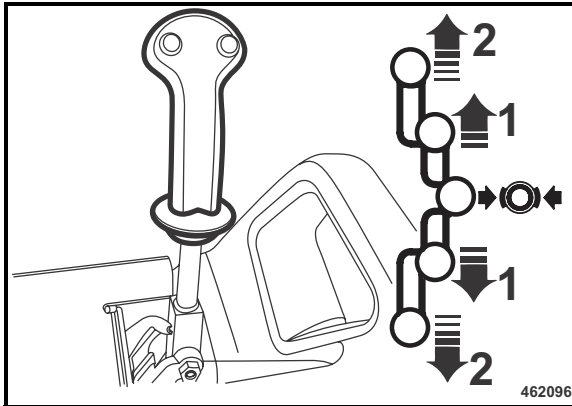


Fig. 153

- Move the travel lever (Fig. 153) forward, backwards and to braking position. Thereby check for function, light movement, clearance and damage.
- In case of malfunction perform trouble shooting and replace the corresponding parts.

⚠ Caution

Only operate the machine after the travel control has been repaired.

Every 1000 operating hours

6.29 Changing hydraulic oil and breather filter

Note

See also the notes on the hydraulic system in the chapter "General notes on maintenance".

Danger

Danger of scalding!

When draining off hot hydraulic oil!

Caution

The hydraulic oil must also be changed after major repairs in the hydraulic system.

Perform the oil change when the hydraulic oil is warm.

Replace the hydraulic oil filter element with every hydraulic oil change.

Change the filter only after the hydraulic oil change and after the test run.

Clean the area round hydraulic oil tank, filler opening and breather filter.

Do not start the engine after draining the hydraulic oil.

Do not use any detergents to clean the system.

Use only lint-free cleaning cloths.

For quality and quantity of oil refer to the "table of fuels and lubricants".

When changing from mineral oil based hydraulic oil to an ester based biologically degradable oil, you should consult the lubrication oil service of the oil manufacturer for details.

Environment

Catch running out oil and dispose of environmentally.

Every 2000 operating hours

i Note

Generally replace the hydraulic oil filter element after the test run.

- Drive the machine, until the hydraulic oil has reached operating temperature.
- Shut down the engine.

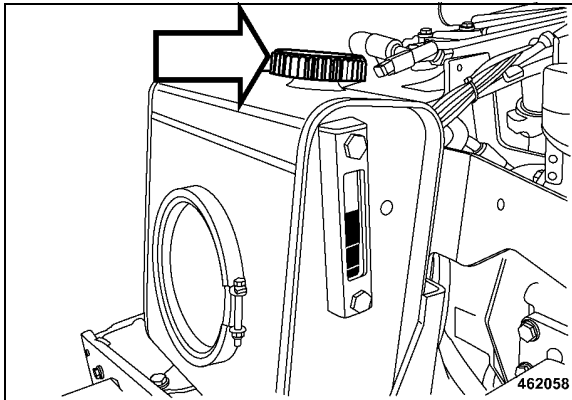


Fig. 154

- Remove the cap from the hydraulic oil tank (Fig. 154).

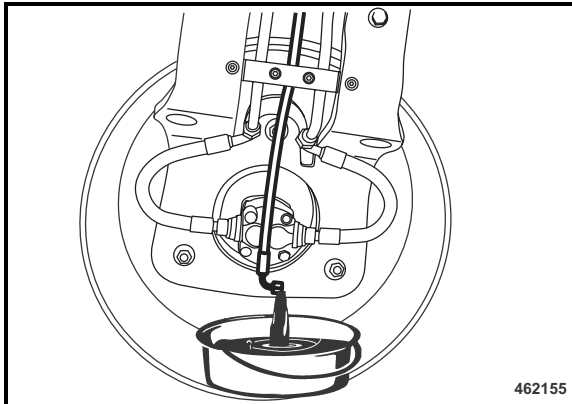


Fig. 155

Machines with lateral overhang:

- Disconnect the leak oil hose from the front right hand vibration motor

(Fig. 155), drain off and catch all hydraulic oil.

- Reconnect the leak oil hose tightly.

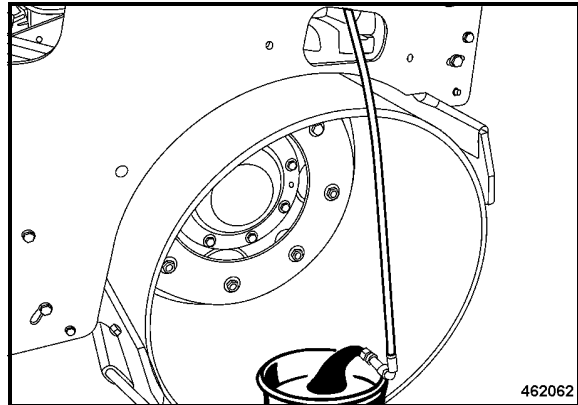


Fig. 156

Machines without lateral overhang:

- Unscrew the leak oil return line at the right front inside the frame, route it to the outside (Fig. 156) and allow all hydraulic oil to run out and catch it.
- Reconnect the leak oil hose tightly.

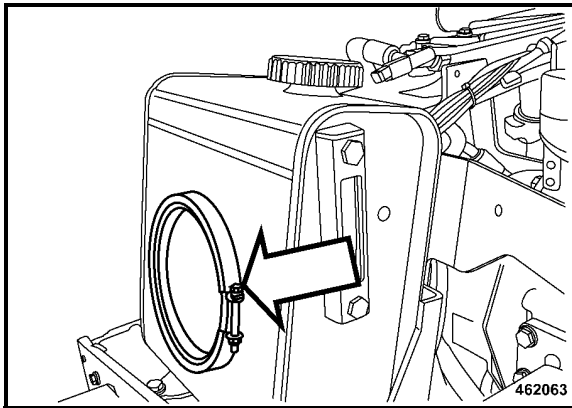


Fig. 157

- Loosen the strap (Fig. 157) on the hydraulic oil tank and take it off with the cover.
- Wipe the inside of the hydraulic tank clean with the lint-free cloth.
- Attach the cover and tighten the strap.

i Note

We recommend to use our filling and filtering unit with fine filter to fill the system. This ensures finest filtration of the hydraulic oil, prolongs the lifetime of the hydraulic oil filter and protects the hydraulic system.

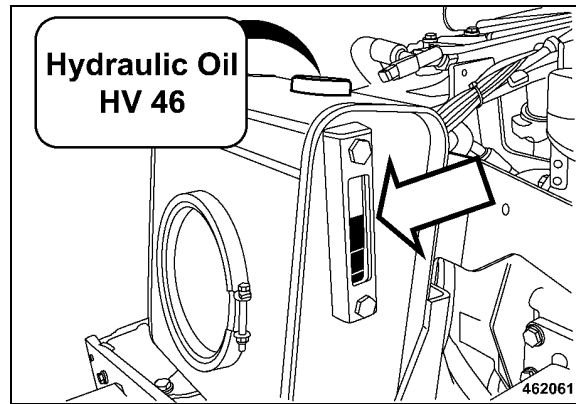


Fig. 158

- Fill in new hydraulic oil (Fig. 158).
- Check the hydraulic oil level in the inspection glass.
- Close the tank with a new cover.
- Perform a test run and check the system for leaks.

i Note

The breather filter for the hydraulic oil tank is integrated in the filler cap, you must therefore replace the complete filler cap.

6.30 Change the hydraulic oil filter

⚠ Danger

Danger of scalding!

Danger of scalding by hot oil when unscrewing the oil filter.

⚠ Caution

If the filter has to be changed together with the hydraulic oil, the filter must only be changed after the oil change and after the test run.

Do not use the oil in the filter bowl again.

Visible dirt may be an early sign for the failure of system components and indicate the possible failure of components. In this case determine the cause and replace or repair the defective components, if necessary. Negligence may cause destruction to the entire hydraulic system.

Do not clean or reuse the filter element.

Apart from the normal oil change intervals, the filter element must also be changed after major repairs in the hydraulic system.

♻ Environment

Catch running out oil, dispose of oil and filter element environmentally.

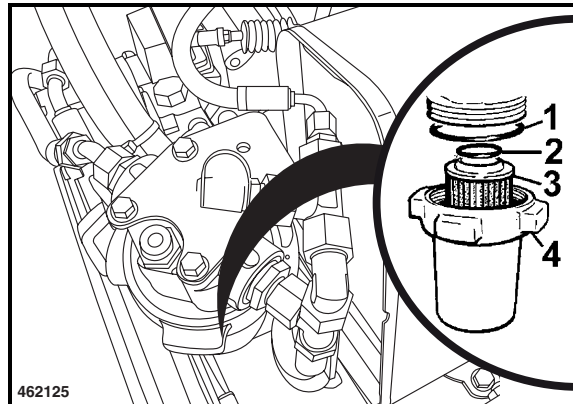


Fig. 159

- Clean the area around the hydraulic oil filter.
- Remove filter bowl (4) (Fig. 159) with filter element (3).
- Examine the surface of the filter element thoroughly for any visible dirt.
- Take out the old filter element and clean filter bowl and thread.
- Reassemble the filter bowl with a new filter element and new loop rings (1) and (2).

Changing the high pressure filter

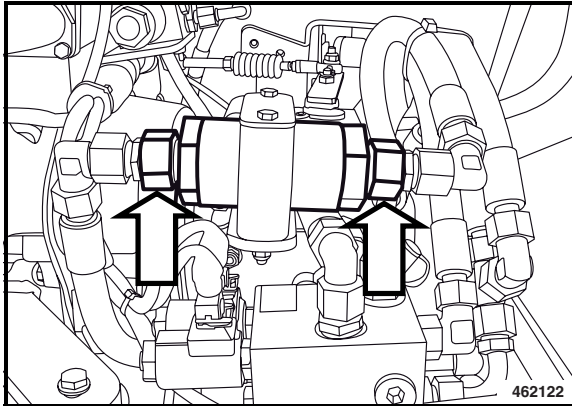


Fig. 160

- Clean the area around the high pressure filter (Fig. 160).
- Disconnect the high pressure oil lines from the high pressure filter.
- Disassemble the high pressure filter and assemble the new high pressure filter, pay attention to the flow direction (arrow).
- Connect and tighten the hydraulic lines.
- After a short test run check hydraulic oil filter and high pressure filter leaks.

6.31 Changing the coolant

Danger

Danger of scalding!

Change the coolant only when the engine is cold.

Do not remove the radiator cap when the engine is still hot.

Always wear gloves when handling anti-freeze agent.

Caution

Always screw the radiator cap tightly back on (second detent).

Always fill the engine cooling system with an anti-freeze mixture (corrosion protection).

Do not use more than 50% anti-freeze.

Do not mix different coolants and additives of any other kind. If necessary flush the cooling system 2-3 times with clear water.

For quality and quantity of coolant refer to the "table of fuels and lubricants".

Environment

Catch running out coolant and dispose of environmentally.

Every 2000 operating hours

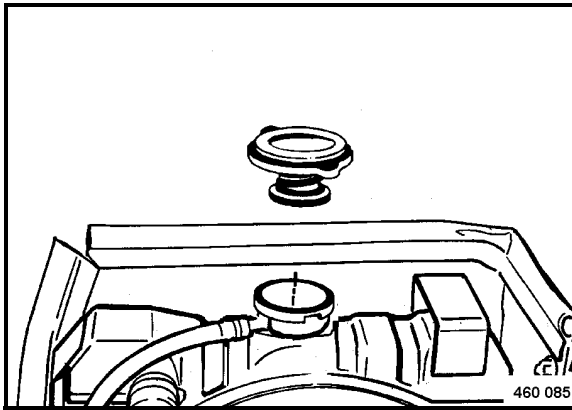


Fig. 161

- Remove the radiator cap (Fig. 161).

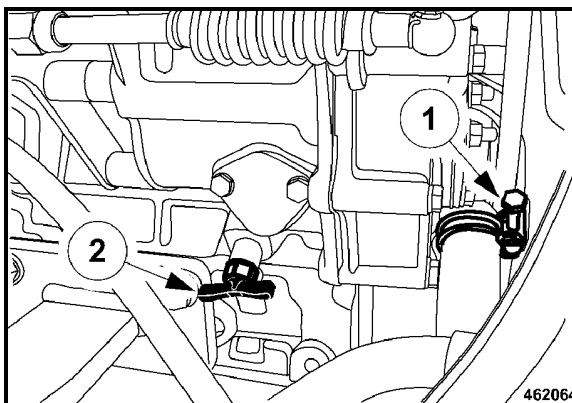


Fig. 162

- Open the clamp (1) (Fig. 162) and pull off the radiator hose.
- Open the shut-off cock (2).
- Drain the coolant completely off and collect it.
- Close the drain tap again.
- Assemble the coolant hose and tighten the clamp.
- Check the condition of radiator hoses, if necessary replace all radiator hoses.

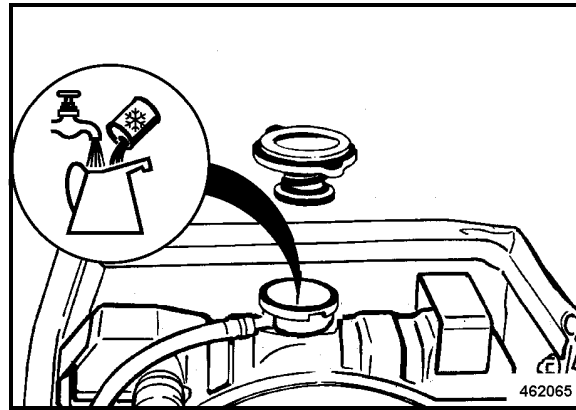


Fig. 163

- Fill in coolant until the level reaches the bottom edge of the filler socket (Fig. 163).

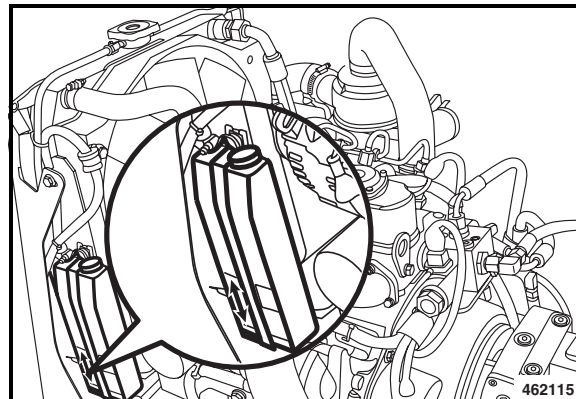


Fig. 164

- Fill in coolant up to the MAX mark (Fig. 164).
- Reattach the radiator cap and the cap of the compensation tank.
- Start the diesel engine and run it warm to operating temperature.
- Let the engine cool down and check the coolant level again, if necessary top up in the compensation tank.

6.32 Changing the fuel lines

 **Danger**

Fire hazard!


When working on the fuel system do not use open fire, do not smoke.

Do not spill any fuel.

 **Danger**

Health hazard!

Do not inhale any fuel fumes.

 **Caution**

For safety reasons this work should be performed every two years.

Hoses consist of rubber or plastic material and age over the course of time.

 **Environment**

Catch running out fuel, do not let it seep into the ground.

- Replace all fuel hoses, including their hose clips.

6.33 Check the injection nozzles

 **Caution**

This work must only be performed by authorized service personnel.

Every 2000 operating hours

6.34 Check the fuel injection pump

 **Caution**

This work must only be performed by authorized service personnel.

Every 3000 operating hours

6.35 Check the tire pressure¹

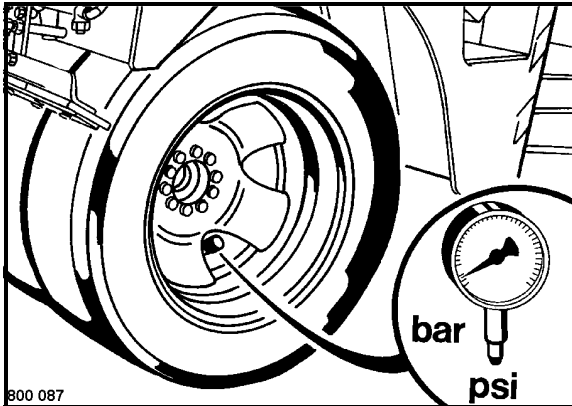


Fig. 165

- Check the tire pressure with a pressure gauge (Fig. 165) on the tire valve.

i Note

Ensure equal pressure in all rubber tires!

Nominal value 2 – 2.5 bar (29 – 36 psi)

¹ only on ACM/SCC-machines

6.36 Water sprinkler system, maintenance in case of frost

⚠ Caution

If there is a risk of frost the water sprinkler system must be emptied or filled with an anti-freeze mixture.

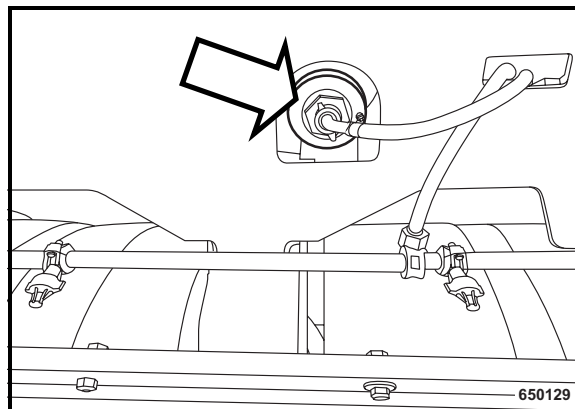


Fig. 166

- Open the rear flap, unscrew the screw plug for water provision (Fig. 166) and let all water run out (only AC machines).
- Close the screw plug again.

As required

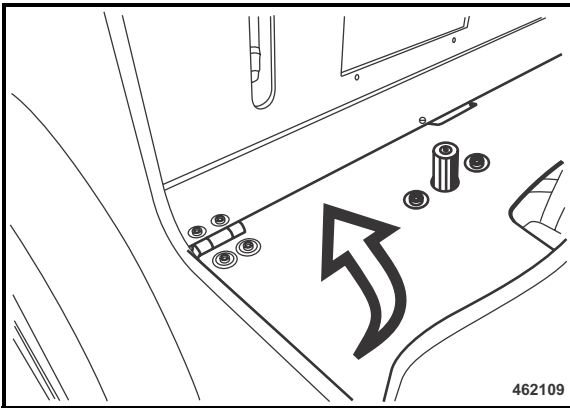


Fig. 167

- Fold up the covering hood (Fig. 167).

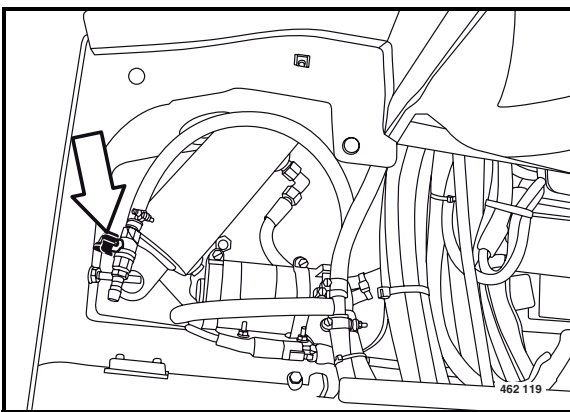


Fig. 168

- Route the hose to the outside. open the water drain tap (Fig. 168) and let all water run out.
- Close the drain tap again.

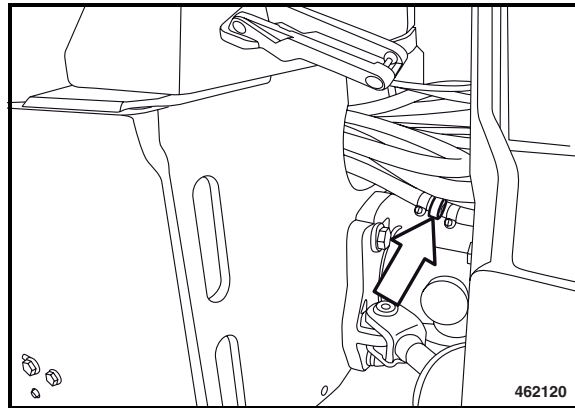


Fig. 169

- Open the sprinkling system line connection (Fig. 169) and let all water run out.
- Switch on the pressure sprinkling system for a short while and drain the water from the pump.
- Close the line connection again.

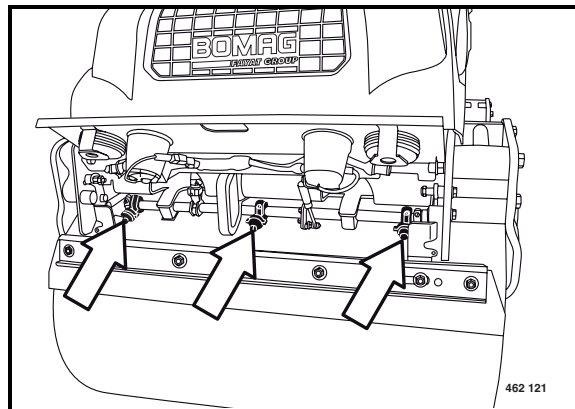


Fig. 170

- Unscrew the water sprinkling nozzles (Fig. 170) at front and rear and let all water run out.
- Screw the nozzles back in before using the machine the next time.

6.37 Tightening torques for screws with metric unified thread

Bolt dimensions	Tightening torques Nm*		
	8.8	10.9	12.9
M4	3	5	5
M5	6	9	10
M6	10	15	18
M8	25	35	45
M10	50	75	83
M12	88	123	147
M14	137	196	235
M16	211	300	358
M18	290	412	490
M20	412	578	696
M22	560	785	942
M24	711	1000	1200
M27	1050	1480	1774
M30	1420	2010	2400

Fig. 171

* Strength classes for screws with untreated, non-lubricated surface. Screw quality designations are stamped on the screw heads.

8.8 = 8G

10.9 = 10K

12.9 = 12K

The values result in a 90% utilization of the screw's yield point at a coefficient of friction $\mu_{m\ total} = 0.14$. = 0.14.

Compliance with the tightening torques is checked with torque wrenches.

When using MOS_2 lubricants the specified tightening torques do not apply.

i Note

Self-locking nuts must always be replaced once they have been unscrewed.

6.38 Measures to be applied for longer periods of rest

Before you take the engine out of service for longer than just a few months you should clean the machine from any dirt and check the anti-freeze concentration is sufficient.

Drain off dirty engine oil, fill in new oil and run the engine for approx. 5 minutes, so that the oil is distributed to all parts.

Check all screws and nuts and tighten these, if this should be necessary.

Remove the battery, fill up the acid level and charge it.

If the engine is not to be used for a longer period of time, run it every 2 to 3 months for about 5 minutes, to rule out the formation of rust.

Caution

If the stored engine is not run at regular intervals, moisture in the air may condensate and settle on moving engine parts, which will finally lead to corrosion.

If you have forgotten to run the engine over a period of more than 5 to 6 months apply a sufficient amount of engine oil to the valve guidance and the valve stem seal and make sure that the valves

move without friction before you start the engine.

Park the machine on level ground and pull out the ignition key.

Do not store the machine in a place with combustible materials like hay or straw.

Only cover the machine after the engine has cooled down.

7 Trouble shooting

7.1 General notes

Please observe strictly the safety regulations in the corresponding section of these operating and maintenance instructions.

Malfunctions are frequently caused by incorrect operation of the machine or insufficient maintenance. Whenever a fault occurs you should therefore thoroughly read these instruction on correct operation and maintenance.

If you cannot locate the cause of a fault or rectify it yourself by following the trouble shooting chart, you should contact our customer service department.

7.2 Engine problems

Fault	Possible cause	Remedy
No or poor starting of engine	Fuel tank empty	Fill fuel tank
	Fuel filter clogged, in winter due to paraffin separation	Change the fuel filter, use winter fuel
	Fuel lines leaking	Check all line connections for leaks and tighten the fittings, bleed the fuel system
	Water in the fuel system	Cleaning the water separator.
	Travel lever not in "0"-position	Shift the travel lever to position "0".
	Battery discharged or not connected, battery power too low	Charge the battery, clean the terminal clamps, tighten and cover them with acid-free grease, have battery tested
	Emergency stop push button is locked	Unlock the emergency stop switch
Especially in winter: use of too viscous engine oil	Use the correct engine oil for the ambient temperatures	

Trouble shooting

Fault	Possible cause	Remedy
Engine runs irregularly with poor power	<p>Fuel supply too low, fuel system clogged by paraffin separation (winter operation)</p> <p>Injection valve or injection pump defective</p> <p>Air filter dirty</p> <p>Excessive play in throttle cable</p>	<p>Change the fuel filter, check line connections for leaks and tighten fittings, use winter fuel under cold conditions</p> <p>Have examined by a specialist</p> <p>Clean the filter, replace if necessary.</p> <p>Adjust the throttle cable, replace if necessary</p>
Engine loses power and speed, excessive exhaust smoke	<p>Engine oil level too high</p> <p>Poor quality fuel</p> <p>Air filter dirty</p> <p>Injection nozzle defective</p>	<p>Drain the oil down to the top dipstick mark</p> <p>Use specified fuel</p> <p>Clean the filter, replace if necessary.</p> <p>Have examined by a specialist</p>

Trouble shooting

Fault	Possible cause	Remedy
Engine over-heating, engine must be shut down immediately!	Radiator heavily soiled	Clean the cooling fins
	Coolant level too low	Fill up coolant, check for leaks
	Injection nozzle defective	Have examined by a specialist
	Engine oil level too low	Fill up oil down to the top dipstick mark
	V-belt loose or broken	Tension or replace the V-belt
	Radiator internally corroded	Replace the radiator, flush the cooling system
	Thermostat defective	Check the thermostat, replace if necessary.

Trouble shooting

8 Disposal

8.1 Final shut-down of machine

If the machine can no longer be used and needs to be finally shut down you must carry out the following work and have the machine disassembled by an officially recognized specialist workshop.

Danger

Danger of cauterisation ! Danger of explosion!

When working on the battery do not use open fire, do not smoke!

The battery contains acid. Do not let acid come in contact with skin or clothes!

Wear protective clothing!

- Remove the batteries and dispose of in compliance with legal regulations.



Environment

Catch all fuels and lubricants, do not let them seep into the ground and dispose of in compliance with legal regulations.

- Empty the fuel tank.
- Drain the hydraulic oil tank.
- Drain coolant from engine and cooling system.
- Drain the lubrication oil from the engine.

Danger

Danger of explosion!

Parts that previously contained combustible fluids must not be cut with a cutting torch.

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