



Operating Instructions

Translation of original operating instructions

Installation Machine VM-X-PAVERMAX standard

VM-X-PAVERMAX standard



Bitte beachten Sie, dass das Produkt ohne vorliegende Betriebsanleitung in Landessprache nicht eingesetzt / in Betrieb gesetzt werden darf. Sollten Sie mit der Lieferung des Produkts keine Betriebsanleitung in Ihrer Landessprache erhalten haben, kontaktieren Sie uns bitte. In Länder der EU / EFTA senden wir Ihnen diese kostenlos nach. Für Länder außerhalb der EU / EFTA erstellen wir Ihnen gerne ein Angebot für eine Betriebsanleitung in Landessprache, falls die Übersetzung nicht durch den Händler/Importeur organisiert werden kann.

Please note that the product may not be used / put into operation without these operating instructions in the national language. If you did not receive operating instructions in your national language with the delivery of the product, please contact us. In countries of the EU / EFTA we will send them to you free of charge. For countries outside the EU / EFTA, we will be pleased to provide you with an offer for an operating manual in the national language if the translation cannot be organised by the dealer/importer.

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We hereby reserve the right to make changes to the information and illustrations in the operating instructions.

1 EC-Declaration of Conformity / UKCA-Declaration of Conformity

Description: **Installation Machine VM-X-PAVERMAX standard**
 Type: **VM-X-PAVERMAX standard**
 Order number: **51500027**

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The machine described above complies with the relevant requirements of the following EU directives:
 The object of the declaration described above is in conformity with the relevant UK-Regulations and UK-Guidelines:

EC-machinery directive 2006/42/EC (Reference: OJ L 157, 09.06.2006)

UK-Regulation: Supply of Machinery (Safety) Regulations 2008 (SI 2008 No. 1597)

2014/30/EU (Electromagnetic compatibility) / (Reference: OJ L 96, 29.03.2014)

UK-Regulation: Electromagnetic Compatibility Regulations 2016 (SI 2016 No. 1091)

The following standards and technical specifications were used:

DIN EN ISO 12100

Safety of machinery - General principles for design - Risk assessment and risk reduction

UK-Regulation: BS EN ISO 12100-1:2003+A1:2009

DIN EN ISO 13857

Safety of machinery - safety distances to prevent hazard zones being reached by upper and lower limbs.

UK-Regulation: BS EN ISO 13857:2019

2014/30/EU (Electromagnetic compatibility) / (Reference: OJ L 96, 29.03.2014)

UK-Regulation: Electromagnetic Compatibility Regulations 2016 (SI 2016 No. 1091)

DIN EN 60204-1 (IEC 60204-1)

Safety of machinery, electrical equipment of industrial machines. Part 1: General requirements.

UK-Regulation: BS EN 60204-1:2018

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Erdmannhausen, 29.07.2022.....

(Eric Wilhelm, Managing director)

2 Safety

2.1 Safety symbols

**Danger to life!**

Identifies imminent hazard. If you do not avoid the hazard, death or severe injury will result.

**Hazardous situation!**

Identifies a potentially hazardous situation. If you do not avoid the situation, injury or damage to property can result.

**Prohibition!**

Identifies imminent a prohibition. If you do not avoid the prohibition, death and severe injury, or damage to property will result.



Important informations or useful tips for use.

2.2 Definition skilled worker / specialist




Only skilled workers or specialists is it allowed to carry out the installation,- maintenance, - and repair work on these device!

Skilled workers or specialists must have for the following points (if it applies for these device), the necessary professional knowledge.






- for mechanic
- for hydraulics
- for pneumatics
- for electrics

2.3 Safety Marking

PROHIBITION SIGN

Symbol	Meaning	Order-No.	Size
	It is not allowed to stand under hanging loads. Danger to life!	29040210 29040209 29040204	Ø 30 mm Ø 50 mm Ø 80 mm
	It is forbidden to ride on the installation machine!°	29040762	Ø 80 mm
	Do not open the tool cover while the engine/system is running!	29040259	70 x 115 mm

WARNING SIGN

Symbol	Meaning	Order-No.	Size
	Danger of squeezing the hands.	29040221 29040220 29040107	30 x 30 mm 50 x 50 mm 80 x 80 mm
	Danger: Injury of hands and fingers – belt drive	29040451	48 x 54 mm
	Warning for hot surfaces.	29040396	31x27mm
	Warning of electric voltage.	29040397	31 x 27 mm
	Warning about dangers of batteries.	29040551	31 x 27 mm



Danger: Keep distance to the machine.

29040756

64 x 103 mm

REGULATORY SIGN

Symbol	Meaning	Order-No.	Size
	Each operator must have read and understood the operating instructions (and all safety instructions).	29040665 29040666 29041049	Ø 30 mm Ø 50 mm Ø 80 mm
	Seat belt duty On every drive with the machine the seat belt must always be worn.	29040450	Ø 52 mm
	Pull hand brake in idle machine time. To drive release handbrake.	29040267	45 x 80 mm
	Drive forward and backward with the right foot pedal. The pedal must not only be operated with the tips of the shoes! To be able to react quickly in dangerous situations, the shoe must be fully positioned on the control pedal.	29040760	68 x 43 mm
	OPTIONAL Lifting and lowering boom arm with left foot pedal.	29040759	48 x 43 mm
	Warming up time with half throttle before doing any driving: Temperature more than 10° C: 5 Min. Temperature less than 10° C: 10 Min	29041077	110 x 70 mm
DIESEL <input checked="" type="checkbox"/> BIO-DIESEL <input type="checkbox"/>	Fill-in only diesel – NO bio-diesel!	29040483	16 x 130 mm
	Clean the filter insert daily with compressed air. Do not knock out the filter insert! Exchange if very dirty.	29040687	Ø 50 mm



Suspension point for transport goods for lifting (recovering) the laying machine

29040370

23 x 60 mm



Lashing eyelet for securing the laying machine to the transport vehicle by means of chains or tension belts

29040755

Ø 60 mm



The steering of the machine must be locked before transport!

29040818

90 x 55 mm

OPERATING INFORMATION

Symbol	Meaning	Order-No.	Size
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Open cover hood

29040253

28 x 85 mm



Motor speed regulation Min. / Max.

29041050

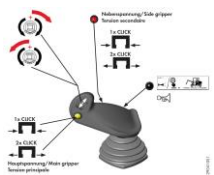
20 x 90 mm



Button for horn / reset button:
 Press reset button each time for the driving, when the machine will be started and when the driving was stopped caused by the standing up of the diver from the driver's seat (triggered by the seat switch).
 The reset button only works (and the driving of the machine), when the driver is sitting in the s seat.

29040716

90 x 23 mm



Joystick Funktionen:

- Steuerung einer hydraulischen Verlegezange (HVZ)
 → Öffnen/ Schließender der Haupt- und Nebenspannung
- Drehbewegung eines hydraulischen Drehkopfes
- Hupe/Resetknopf (Resetknopf zum Freigeben des Sitzschalters)

29041051

90 x 110 mm

2.4 Personal safety requirements



Each operator must have read and understood the operating instructions (and all safety instructions). Only qualified, authorized personal is allowed to operate the device and all devices which are connected (lifting device/carrier).



The **manual guiding** is **only** allowed for devices **with handles**.
Otherwise there is a risk of injury to the hands!

2.5 Protective equipment

The protective equipment must consist, according to the safety regulations of the following parts:

- Protective clothing
- Safety gloves
- Safety shoes

2.6 Noise emissions



The equivalent continuous sound pressure level emitted by the installation machine is below 85 dB(A). Noise pollution can cause hearing damage. Recommendation: Wear hearing protection. The operator must advise the operator of the installation machine to wear hearing protection.

2.7 Vibrations



The operation of the installation machine causes vibrations which are also transmitted to the body of the operator.
The operator is instructed to instruct the operators of the installation machine to undergo regular medical examinations.

2.8 Accident prevention



- The workplace has to be covered for unauthorized persons, especially children.
- **Caution at thunderstorm - danger of lightning!**
Depending on the intensity of the thunderstorm, stop working with the device if necessary.



- The workplace must be sufficiently illuminated.
- **Be careful with wet, frozen, iced and dirty building materials! There is a danger of the gripping material slipping out. → DANGER OF ACCIDENT!**



Caution during operation, dismantling and maintenance work on the laying machine!
There is a risk of electric shock, etching and burns from battery acid and various engine fluids. Appropriate protective measures must be taken and protective equipment worn in order to avoid serious injuries or even death!

2.9 Function Control

2.9.1 General



- Before every usage of the device check the functions and the working condition.
- Maintenance and lubrication are only permitted when device is shut down!



- Do not use the device, until all faults which can cause safety hazards are removed.
- If there are any cracks, splits or damaged parts on any parts of the device, immediately stop using it.



- The operating instructions must be available at the workplace every time.
- Do not remove the type plate of the machine.
- Unrecognisable information signs (such as regulatory or prohibition signs) must be replaced.

2.9.2 Hydraulic



Check all hydraulic hoses and connection for tightness before every operation. Only experts are allowed to replace faulty parts (depressurized).



Ensure a clean working environment before opening the hydraulic connection.



The hydraulic hoses must be free of breaks and abrasion. Take care that there are no outstanding edges, where the hoses could hook in.



The operator of the device is responsible for a constant line pressure, which is necessary for the working with this device.

Only under these conditions is a safety gripping, lifting and transporting of the gripping goods with this device ensured.

2.10 Safety procedures

2.10.1 Attachments



For all adjustment work on attachments (e.g. HVZ-UNI), it must be ensured that the attachment cannot close unintentionally. **Risk of injury!**

All adjustment work may only be carried out with the laying machine at a standstill (tighten/release parking brake) and the **engine switched off!**

2.10.2 Installation machine

- The installation machine has to be in good, safe working condition.
- **Never exceed the maximum capacity/working load limit (WLL) of the installation machine!**
- Only authorized and qualified persons are allowed to operate the installation machine.
- The operator must have all the necessary qualifications.

2.10.3 Safety when operating the installation machine



- Stepping in and out of the installation machine may only be allowed from the left-hand side (in the direction of travel) to prevent unintentional activation of the controls/operating elements.
- The installation machine may generally only be operated under optimum viewing conditions and sufficient lighting (e.g. daylight)!
- By retrofitting appropriate spotlights (Lighting Package VM-301), work is also allowed in the dark.
- Always lower the load to approx. 20 cm above the ground when moving!
- The **maximum load** of the installation machine, its attachments (e.g. HVZ-UNI) and the loads attached to it **must not be exceeded!**
- When leaving the installation machine, the driver must pull the handbrake and ensure that the installation machine is standing on a horizontal surface. If necessary, use chocks or the like to prevent the traverser from rolling away unintentionally.
- **It is not permitted to park the installation machine unattended on sloping and inclined surfaces!**
- During operation of the installation machine, the driver must always ensure that the machine is in a safe operating condition.



- **Never refill fuel while the engine is running, as there is a risk of explosion if the fuel overflows or spills!**
- **Never use starter spray, always use winter diesel in winter!**
- **Always disconnect the battery when working on the electrical system. Danger of electric shock!**



It is **forbidden** for persons to ride along the installation machine (by hanging on it from the outside)!
Accident/danger to life!



- Never open the motor cover while the engine is running. Always keep the motor cover closed due to the risk of injury and sound insulation.
- **It is generally forbidden for persons to stand in the working and travel area of the installation machine during installation work.**
A minimum safety distance of 1.5 m between the person and the machine must be observed!
Exception: It is essential due to the type of use of the implement, e.g. by manually guiding a implement at the handles.
- **It is generally forbidden to stand under a suspended load!**
- **It is strictly forbidden to stand in the steering area/kink area of the machine! Risk of crushing the feet/legs between the front wheels and the chassis.**
- **The driver must not leave the control position if the attachments of the laying machine are loaded with laying material and the system is in operation.**
- **Never let** the control lever valve (joystick) for operating the attachments, the control pedal for forward and reverse travel or the control pedal for up and down movement of the boom **spring back**.
Otherwise there will be pressure surges in the forward and return lines! The laying material may fall down and the hydraulic motors may be **damaged!**

2.10.4 Stability

Danger of overturning!

Only drive at walking speed and with the boom lowered (with and without load) if the following applies:



- No attachment equipment (e.g. HVZ-UNI) mounted on boom
- **Driving curves**
- Driving in **unpaved and uneven terrain**
- Terrain with **slope**
- Machine **slope** of more than 10° (~ 18 %)



Driving faster than step speed allowed if the following applies:

- Drive straight ahead (with and without attachment equipment and stone position)
- Driving in paved and level terrain



- Check terrain in advance for **sufficient surface condition** (such as large holes or broken ground).
- When using the laying machine on roofs, parking decks or other soft ground, the **load capacity of the ground** must be checked in advance.
- In the event of accidents or when the laying machine tilts over, load-bearing parts must be inspected by a specialist workshop before the machine is put back into operation.

3 General

3.1 Authorized use



- The machine is only designed for the use specified in this documentation.
- Every other use is not authorized and is forbidden!
- All relevant safety regulations, especially regulations of the declaration of conformity, and additional local health and safety regulations have to be observed.



Prior to every operation the user must ensure that:

- the machine is suited to the intended operation, the functioning and the working condition of the equipment is examined and the loads are suitable to be handled.

Any doubts about instructions should be raised with the manufacturer prior to use.

- The installation machine is used in conjunction with the hydraulic installation clamp HVZ/HVZ-UNI for laying interlocking paving stones, in conjunction with the kerbstone laying tongs VZ-H-UNI (for laying kerbstones, in conjunction with the sweeping broom EB-120/ EB-240 for rational sweeping of sand when laying interlocking paving stones or in conjunction with the hydraulic vacuum laying unit HVE for laying or resurfacing large-format concrete or natural stone elements.
- **Only** attachments from **Probst** may be fitted to the installation machine, such as:
 - HVZ-UNI, HVZ-UNI-II, HVZ-LIGHT, VZ-H-UNI, VZH-HS-50/150
- and by retrofitting the *hydraulic vacuum unit (HVE)*, also various vacuum attachments such as:
 - PJ-1650-H, SH-1000-MINI-H.



When using attachments from other manufacturers on the Probst installation machine, the relevant safety regulations and the technically necessary requirements (performance data) of the respective attachment must be observed. In addition, all technical requirements of the Probst installation machine must match those of the third-party attachment. The responsibility for this lies solely with the operator of the installation machine!

- the installation machine is **not a hoist!**
- all instructions in the manuals supplied with the machine must be followed.



Danger to life!

Due to the diesel engine, it must not be used in enclosed spaces or in areas where there is a risk of explosion or fire.



When using in tunnels and multi-storey car parks, ensure that there is **sufficient ventilation**. Otherwise there is a **risk of poisoning** from exhaust fumes!

It may be necessary to retrofit a diesel particulate filter. **The locally applicable exhaust regulations must always be complied with.**



The installation machine must not be operated on public roads - only on construction sites and private property / land!


NOT ALLOWED ACTIVITIES:

Unauthorized alterations of the device and the use of any self-made additional equipment could cause danger and are therefore **forbidden!**

Use of the machine after substantial modification, as well as after improper troubleshooting/maintenance

Never exceed the **carrying capacity/working load limit (WLL)** and the **nominal width/nominal size** of the device.

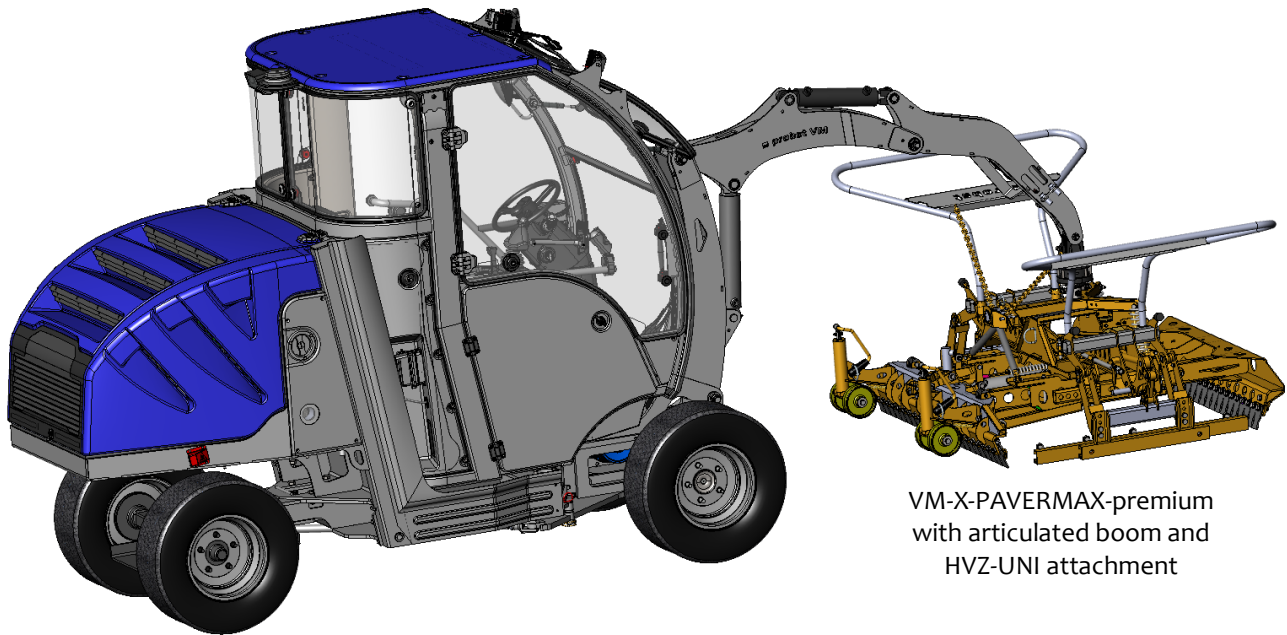
All unauthorized transportations with the device are not allowed:

- Transportation of people and animals.
- Transportation of other loads and materials than described in this manual.
- Never suspend any goods with ropes, chains or similar at the device.

3.1.1 Optionales Zubehör

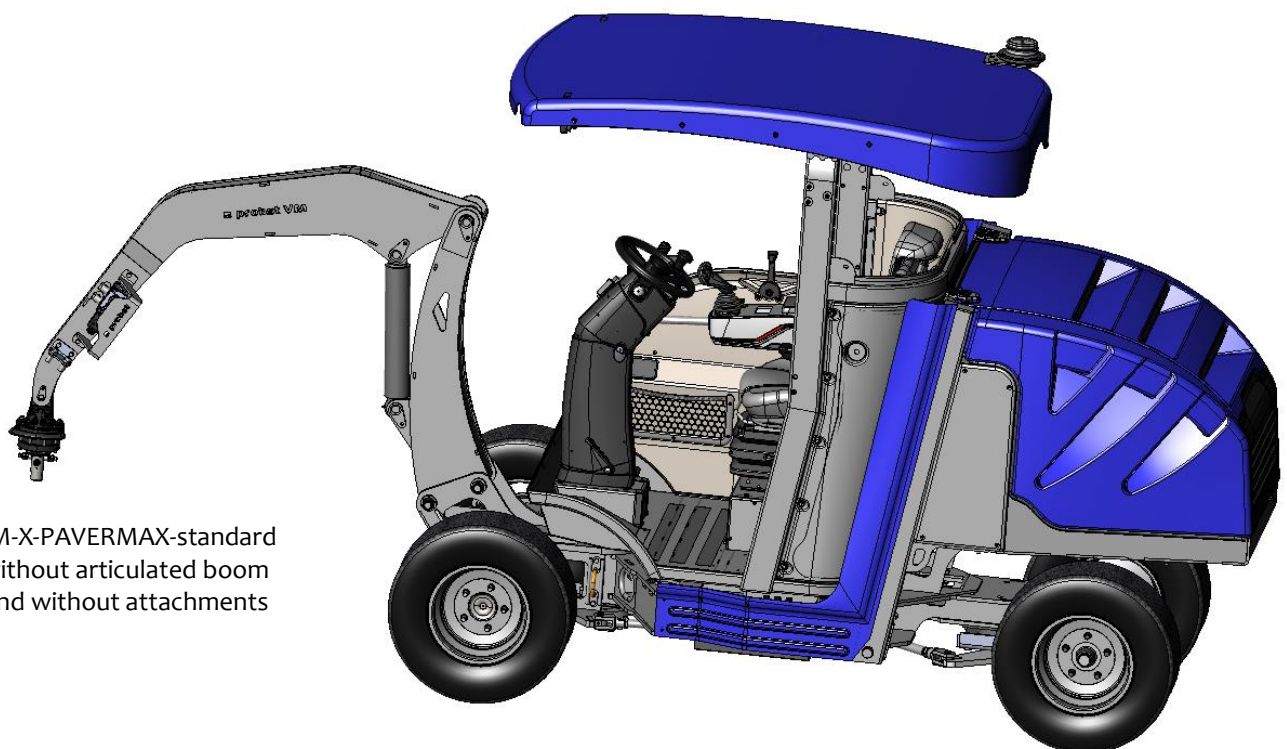
Type	Order No.	Description
LED light package	41501065	2 x LED front headlights, 1 x LED rear headlight, for all variants.
LED professional light package	41501093	2 x LED headlights for front apron. For standard, comfort and premium (prerequisite: LED light package).
LED rotating beacon	41501066	3 light modes - single flash, dual flash, all-round. For all variants
Exterior mirrors	41501056	For all variants
Sound package	41501067	DAB+ radio with Bluetooth, USB and loudspeaker. For comfort and premium
Mobile phone holder	26990089	For all variants
Reversing warning system	41501091	For all variants
Special paint	41501096	For standard, comfort and premium
Wiper function	41501064	For comfort and premium
Preparation for vacuum use	41501070	For mounting hydraulically driven vacuum units. For standard and comfort
Hydraulic endless turning head	41501095	For basic
Diesel particulate filter DPF	41501074	For all variants
Loading lugs/ crane loading	41501092	For all variants

3.2 Survey and construction



VM-X-PAVERMAX-premium
with articulated boom and
HVZ-UNI attachment

VM-X-PAVERMAX



VM-X-PAVERMAX-standard
without articulated boom
and without attachments

Optional equipment and attachments

3.3 Technical data

VM-X-PAVERMAX standard			
Engine performance:		18.5 kW (25 hp)	
Max. Torque		92.5Nm at 1,700 rpm.	
equivalent continuous sound pressure level LpA:		79 dB	
Vibration values:		RMS value of acceleration to which the upper limbs of the body are subjected:	< 2.5 m/s ²
		RMS value of acceleration to which the body is subjected:	< 0.5 m/s ²
Chassis:		Double articulated steering	
Speed control:		Hydrostat stepless	
Max. Speed:		approx. 16 km/h	
Dimensions and weights:			
Overall height/ overall width/ overall length:		2,000 mm/ 1,300 mm/ 3,800 mm	
Total weight:		1,500 kg ①	
Load capacity:		650 kg *	
Max. Weight of the stone layers:		420 kg *	
maximum lifting height:		2.250 mm	
Turning radius at the front inner wheel/outer wheel:		800 mm/ 2,510 mm	
Turning radius (over all):		2.580 mm	
Ground clearance:		160 mm	
Filling quantities:	Fuel tank	25 l	
	Engine oil SAE10W40	6,7 l	below 0°C:SAE10W, 0°-25°C:SAE20, above 25°C:SAE30
	Hydraulic oil	25 l	HLP 46
Kubota diesel engine V1505-E4B		Technical data see: Kubota diesel engine V1505	
Seat:	Continuously height-adjustable standard seat, forward and backward, adjustable backrest, mechanical suspension with adjustable suspension strength		
Display:	2.4" color LCD LED backlight		

* With adjusted travel speed and lowered load.

① Total weight increases, e.g. by retrofitting the hydraulic vacuum unit (HVE).

4 Operation

4.1 General



Depending on the outside temperature, the following warm-up times must be observed and adhered to before the laying machine is put into operation for the first time each day:

- Outside temperatures above 10 °C: 5 min
- Outside temperatures below 10 °C: 10 min



Before commissioning the laying machine, the safety regulations must be taken into account and the maintenance work must be carried out.

To ensure safe and trouble-free operation of the laying machine, the following daily checks in particular must be carried out.

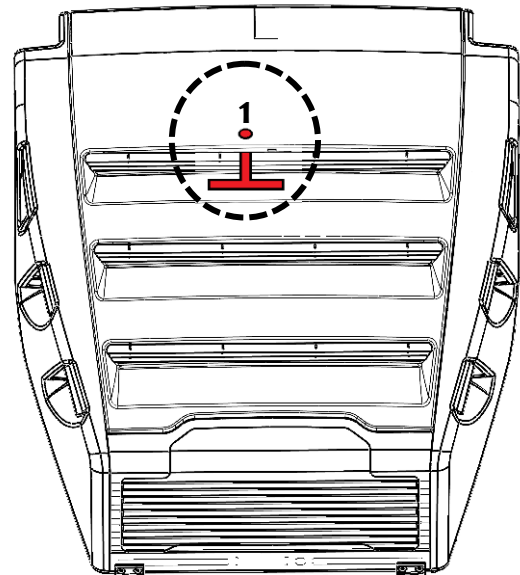
4.2 Daily controls



Before initial start-up and generally before every start-up, all fluid levels (radiator fluid and engine and hydraulic oil) must be checked and topped up if necessary!

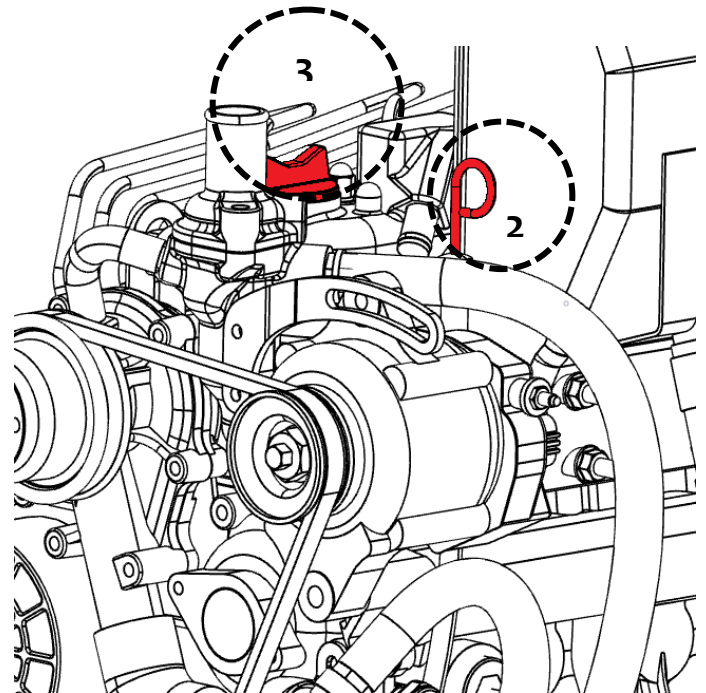
4.2.1 Fuel control

- One tank filling is sufficient for approx. 10 - 12 working hours.
- Fuel check possible in the display
- For refueling, unlock the engine hood by pulling the handle to the rear (1) and also fold it away to the rear.
- The local fire protection regulations apply when refueling the laying machine.
- **ATTENTION:** The laying machine must be safely stationary, switched off and cooled down before the refueling process is started (It is recommended to refuel the laying machine before starting work so that the fuel is sufficient for the entire working day).



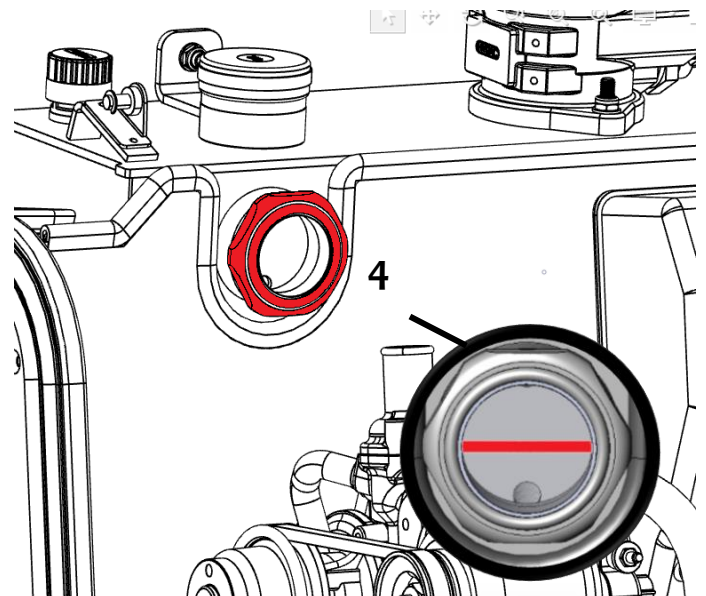
4.2.2 Engine oil check

- Laying machine must stand on absolutely level ground.
 - open engine hood as described under fuel check.
 - Pull out the oil dipstick (2).
- Oil level must be between the two marks.
 - If the oil level is too low, fill oil into oil filler neck (3).
 - If there is too much oil, drain oil through oil drain plug at the bottom of the engine.



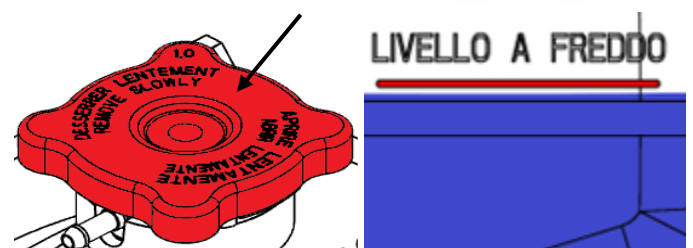
4.2.3 1.2.3 Hydraulic oil check

- The laying machine must stand on absolutely level ground.
- To check the hydraulic oil, the hydraulic cylinder of the boom must be fully retracted and the boom must therefore be on the ground.
- The oil level must be in the center of the sight glass (4).



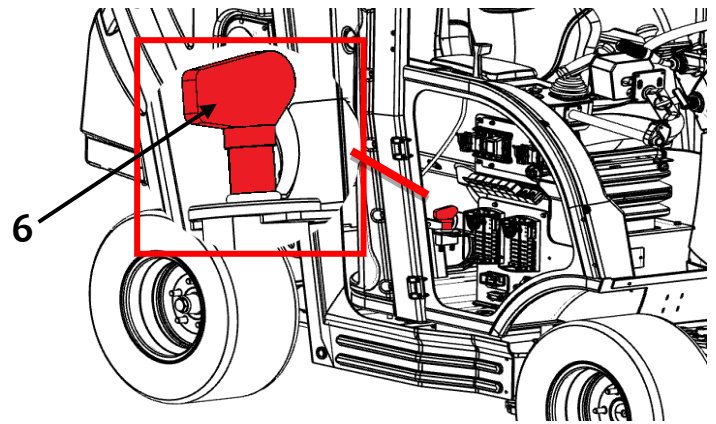
4.2.4 Cooling water control

- The laying machine must stand on absolutely level ground.
- Open the engine hood as described under fuel control.
- It is essential to observe the safety instructions in the Kubota operating manual!
- Unscrew cap (5) on radiator (be careful when engine is hot). Do not refill/fill more than the filling limit.
- Caution with hot engine, danger of scalding by steam!



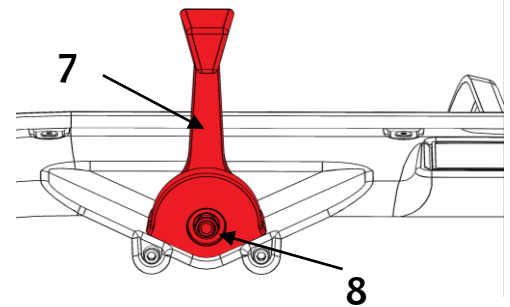
4.2.5 Main switch

- Plug in main switch (6) before start-up, always unplug it after work is finished!
- Main switch (6) is located in the service/maintenance flap on the left side.



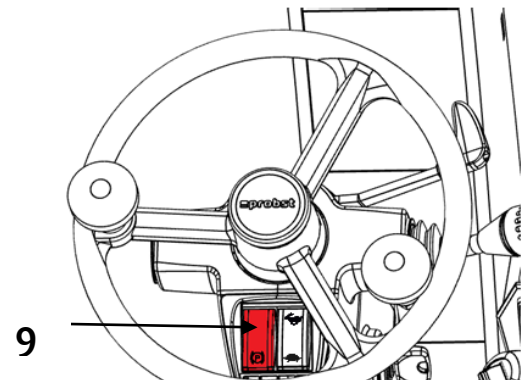
4.2.6 Throttle control

- The throttle lever (7) is located to the right of the driver's seat on the interior trim.
- Throttle lever (7) must hold by self-friction of the pretensioned disk springs.
- To adjust the throttle lever (7), the stop nut (8) on the inside of the throttle lever must be tightened using a ring wrench with a width across flats of 13 mm.



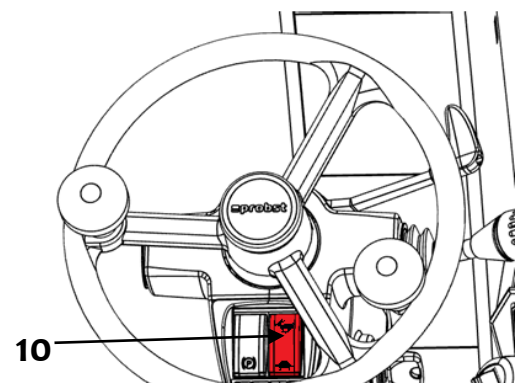
4.3 Parking brake

- The parking brake (9) is located on the steering column below the steering wheel.
- The parking brake (9) can be activated by simply pressing the toggle switch (until the switch engages).
- To deactivate the parking brake (9), press the toggle switch again



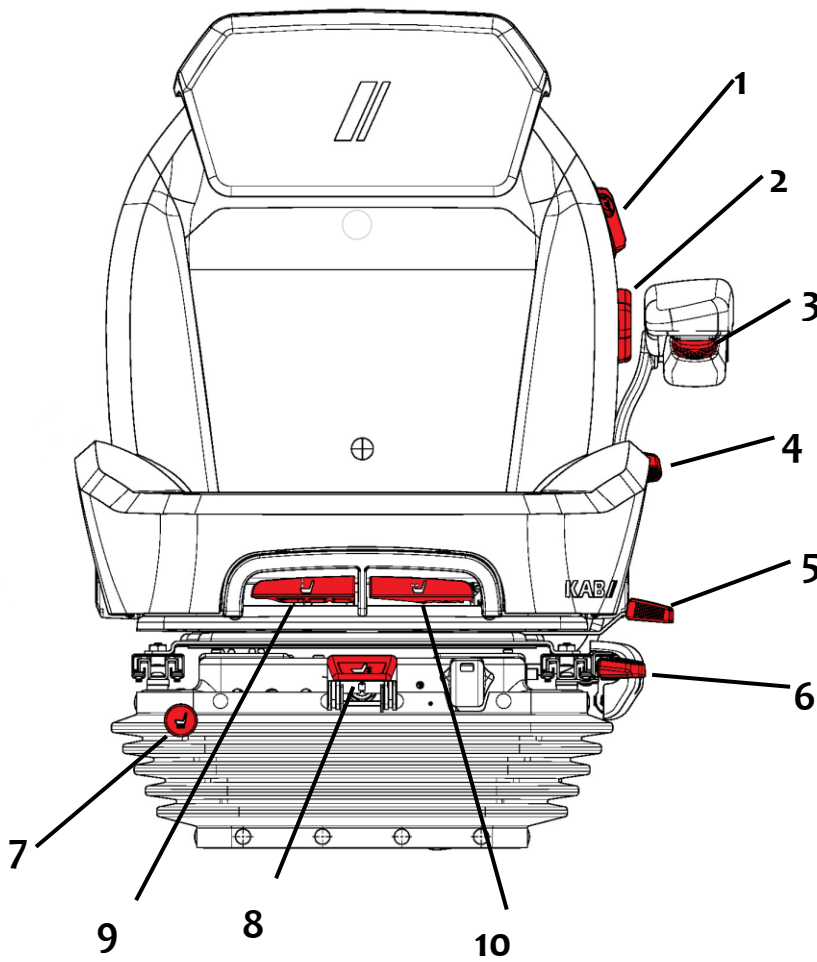
4.3.1 Speed range switching

- - Switch (10) on turtle
Slow gear (~8-9 Km/h)
- - Switch (10) on rabbit
Fast gear (~16 Km/h)



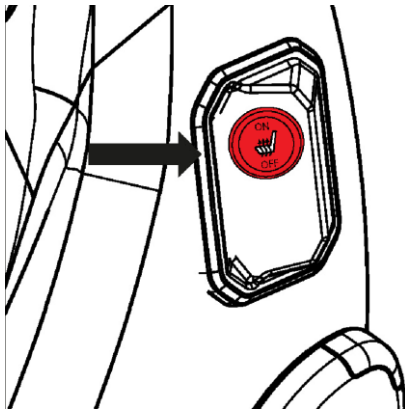
4.3.1.1 Seats

4.3.1.2 Overview seat KAB



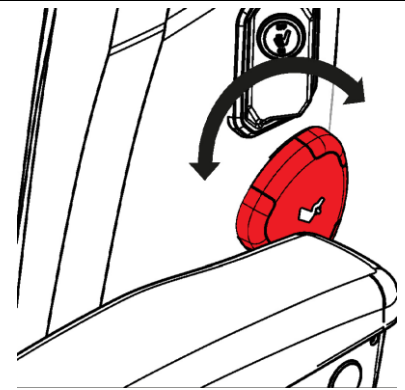
- 1 Seat heating
- 2 Lordosis support
- 3 Armrest
- 4 Backrest
- 5 Horizontal suspension
- 6 Swivel console
- 7 Seat cushioning
- 8 Seat height
- 9 Seat inclination
- 10 Seat depth
- 11 Lap belt (not visible)

4.3.2 Functions Seat KAB



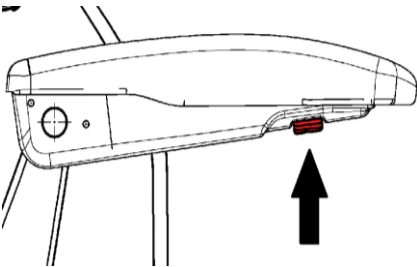
Seat heating system (1):

To switch on the seat heating, operate the toggle switch upward.
To switch off the seat heating, operate the toggle switch downward.



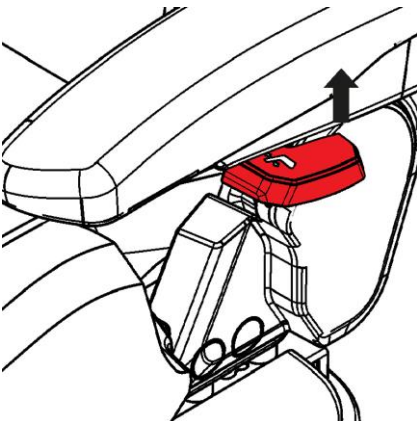
Lordosis support (2):

Mechanical adjustment of the lumbar support:
Turn the knob clockwise until the desired setting is reached. To return to the initial position, turn the knob back counterclockwise.



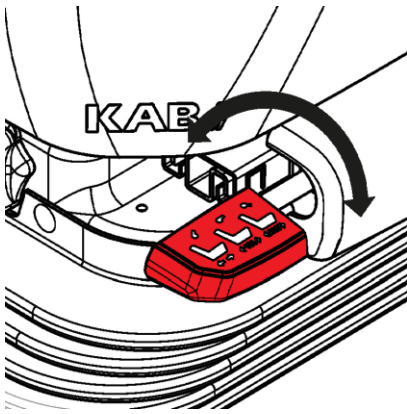
Armrest (3):

Adjust the inclination on the underside of the armrest. Turn the adjustment dial clockwise to increase the angle of attack or counterclockwise to decrease the angle of attack.
The armrests can be folded away towards the top rear when they are not needed.



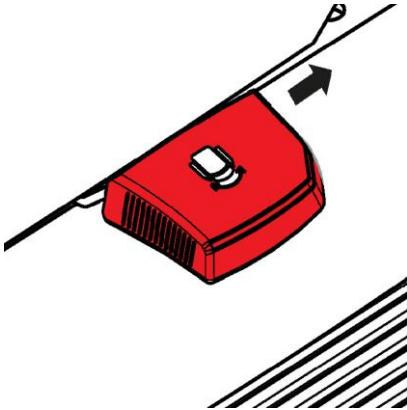
Backrest (4):

Push the lever of the backrest tilt adjustment upwards and simultaneously with the back against the backrest until the desired tilt angle is reached.



Horizontal suspension (5):

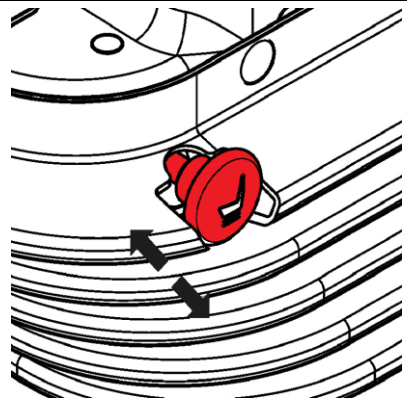
- Turn the lever and engage it in the lowest (3 positions possible) position. The horizontal suspension is now blocked.
- Engage the lever in the middle position: The horizontal suspension is unlocked and activated. Horizontal vibrations in the direction of travel are now damped.
- To adjust the seat in the longitudinal axis, hold the handle/lever in the highest position up (no locking function in this position). Now the correct seat position and distance to the steering wheel can be adjusted by moving the seat forward or backward. Once the correct position has been set, release the handle/lever and move the seat forwards/backwards until it audibly & noticeably engages.



Swivel bracket (6):

The swivel console can be unlocked by pushing it backwards. Now the seat can be rotated horizontally 20° left/right (pay attention to the armrests!).

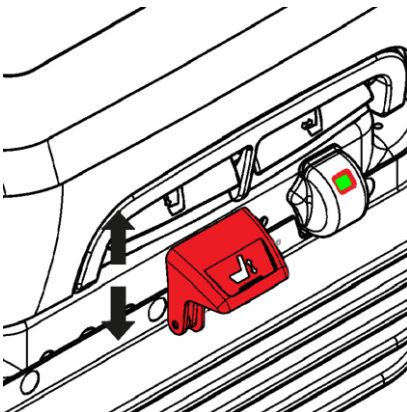
- The lever can be unlocked by pressing it backwards. Now the upper part of the seat can be turned up to 20° to the left or right.
- When the desired position is reached, release the locking knob again. The swivel bracket also audibly and noticeably engages in this position! Before each movement of the laying machine, it must be checked whether the seat is set safely and suitable for driving in all functions and positions (observe safety regulations!).



Seat cushioning (7):

Push the round button inside the seat for a softer damping adjustment. Pull the round button out from inside the seat for a harder damping adjustment.

The adjustable damper improves suspension comfort according to the user's needs when riding on different terrains.

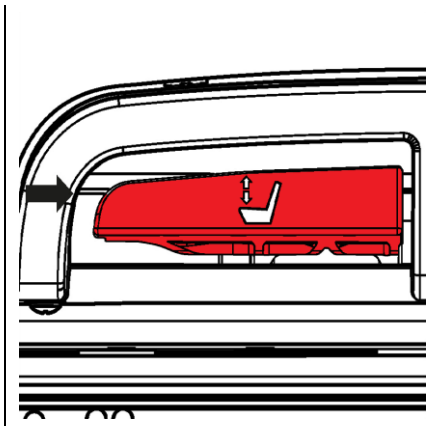


Seat height (8):

The seat height can be manually adjusted to the user's needs. by pulling up or pushing down the toggle lever.

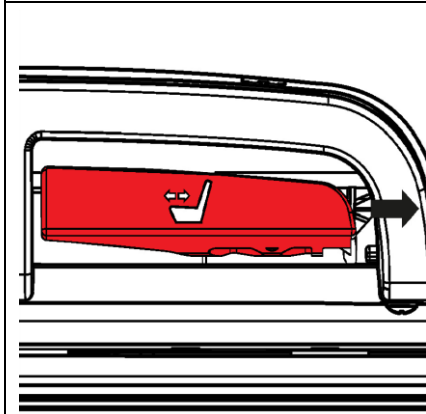
The increase takes place by means of an integrated compressor.

When adjusting the height, care must be taken to ensure that the indicator viewing window always shows "green" to ensure a high level of comfort.

**Seat tilt (9):**

The inclination of the seat cushion can be adjusted individually. This improves comfort and supports the legs at the knees

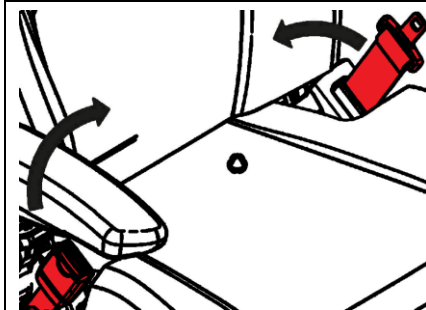
- Pull the lever up to place the seat cushion in 3 different tilt positions.
- Pull the lever up and with the body weight of the driver, the angle of inclination can be set flatter.

**Seat depth (10):**

The seat cushion can be pulled forward along the longitudinal axis to meet the needs of the driver.

of the driver to extend the seat cushion. This improves seating comfort for users of different heights.

- Pull the lever up and the seat cushion forward to extend the seat surface
- Pull the lever up and the seat cushion back to shorten the seat surface

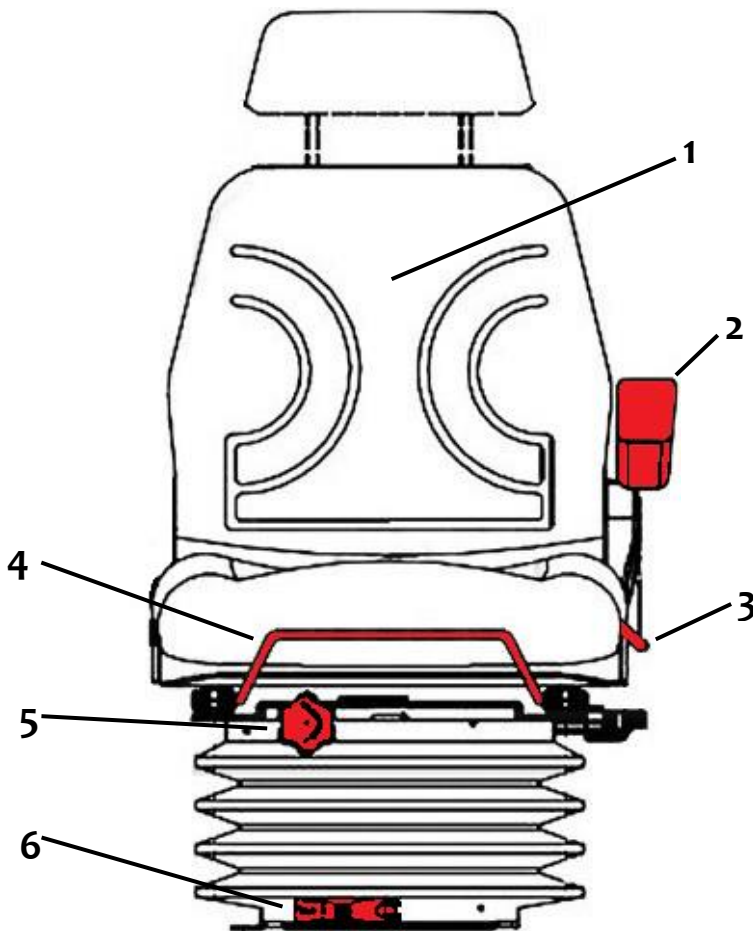
**2-point lap belt (11):**

A 2-point automatic lap belt provides additional driver safety.

Pull the belt out of the reel and pass it in front of the driver. On the opposite side of the belt reel, engage the buckle in the lock with a noticeable & audible "click". Check the safety function of the belt by pulling on it.

To release the belt, press the red-colored "release button"; the automatic system rolls the lap belt back to its original position.

4.3.3 Overview seat Qualitum 121M



- 1 Lordosis support
- 2 Armrest
- 3 Backrest tilt adjustment
- 4 Seat depth
- 5 Height limiter
- 6 Weight adjustment

4.3.3.1 Functions Seat Qualitum 121M

	<p>Lordosis support, at the back of the seat (1): Rotating knob lumbar support (back side backrest upholstery). Turn knob to the right increases lumbar support, turn to the left decreases lumbar support.</p>
	<p>Armrest (2): The armrests can be folded away to the top back when they are not needed.</p>

	<p>Backrest tilt adjustment (3):</p> <p>The backrest can be folded down and adjusted by 30°. To adjust the inclination of the backrest, pull the lever up and set the backrest to the desired position/ inclination.</p> <p>The backrest must engage perceptibly & audibly (observe safety instructions).</p>
--	--

	<p>Seat depth (4):</p> <p>The seat can be adjusted in the longitudinal axis forward according to the driver.</p> <ul style="list-style-type: none"> • Pull the lever up and with the weight of the rider pull the seat forward to adjust the seat according to the rider's size (smaller people) • Pull the lever upwards and push the seat backwards with the weight of the rider to adjust the seat according to the rider's size (taller people)
--	--

	<p>Height limiter (5):</p> <p>The spring travel limiter influences the seat height. Turning the knob counterclockwise increases the seat height and turning it clockwise reduces the seat height.</p> <p>This increases or reduces the spring travel.</p>
--	--

	<p>Weight setting (6):</p> <p>By turning the crank, the suspension can be adjusted to the rider's weight. To the left for heavier weight, to the right for lighter riders.</p>
--	---

4.4 Control displays/ function checks

Display control	The display must switch on when the key position is set to position I (ignition)	
Oil pressure control	The oil pressure indicator lamp must light up when ignition is set to stage I. It must go out when the engine is running.	
Battery check	The battery indicator light must be on when ignition is set to stage I. It must go out when the engine is running.	
Pre-annealing	When ignition is turned to stage II, the preglow control lights up (approx. 25 seconds). If the preheating control goes out, the engine can be started at stage III.	
Temperature control	<p>If the temperature display is in the red range, the air filter must be cleaned or replaced, or the cooling fins must be blown out with compressed air.</p> <p>If the temperature display is still in the red range, a suitable specialist workshop must be visited.</p>	
Fuse box	<p>The fuse box is located on the side of the maintenance flap.</p> <p>To replace the fuses, turn the fuse block covers on the red opening switch to the left and open them to the front.</p> <p>To close, carry out the procedure in reverse order.</p> <p>For fuse assignment, see the Maintenance chapter.</p>	
Horn/reset driving (seat switch)	<p>Key for horn/ reset key:</p> <p>The reset button for driving must be pressed every time the machine is moved or driving has been stopped due to the driver getting up from the driver's seat (triggered by the seat switch).</p> <p>The reset button (and driving the machine) only works when the operator is in the driver's seat.</p>	

4.4.1 Displays

4.4.2 Display 2,4“

4.5 Overview complete display



When the laying machine is started, the Probst logo appears for a short time. Subsequently, all LEDs/symbols of the display light up briefly and go out again immediately.



During this time, the laying machine is not yet ready for operation, as a complete system check is carried out and all system-relevant sensors are interrogated in order to be able to guarantee trouble-free operation of the laying machine.



If one of the sensors does not function properly, an error message is displayed. The laying machine must NOT be put into operation. **Risk of injury!** Troubleshooting according to chapter Troubleshooting. If this is not possible, contact your authorized specialist workshop or the Probst company.



4.5.1.1 Symbols



Tankanzeige

Level	~ Level in %
13 Bars	100
12 Bars	90
11 Bars	80
10 Bars	70
09 Bars	64
08 Bars	57
07 Bars	50
06 Bars	42
05 Bars	35
04 Bars	28
03 Bars	21
02 Bars	14
01 Bars	7

Below 20% filling level the laying machine should be refilled

**Hour counter total**

Indicates the hours of operation that the laying machine has run Total.

**Daily hour counter**

Displays the operating hours accumulated since the last reset.

**Cooler temperature**

At normal temperature gray, if the laying machine becomes too warm, the symbol turns red.

**Battery voltage**

symbol appears when the mains voltage drops below 12.4 V.

**Worklight**

Indicates whether the working lights are in operation.

**Parking brake**

Indicates whether the parking brake is activated.

**Oil pressure gauge**

If the oil pressure is insufficient, this symbol lights up.

Attention Action is required (otherwise damage to the engine cannot be ruled out).

**Pre-annealing**

symbol appears while the operator holds the key in the ignition lock on the "preheating position".

**CAN Malfunction**

If this symbol appears. Switch off the laying machine and contact the service department. **Risk of injury!**

4.5.2 Display 5" Touchscreen (Depending on model)

4.5.2.1 Overview complete display



When the laying machine is started, the Probst logo appears for a short time.

Subsequently, all LEDs/symbols of the display light up briefly in the pointer test (progress bar runs up and down) and immediately go out again.



During this time, the laying machine is not yet ready for operation, as a complete system check is carried out and all system-relevant sensors are interrogated in order to be able to guarantee trouble-free operation of the laying machine.



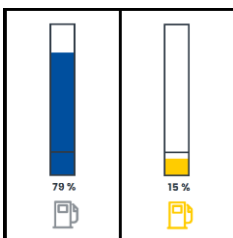
If one of the sensors does not function properly, an error message is displayed.

The laying machine must NOT be put into operation. **Risk of injury!**

Troubleshooting according to chapter Troubleshooting. If this is not possible, contact your authorized specialist workshop or the Probst company.



4.5.2.2 Symbols

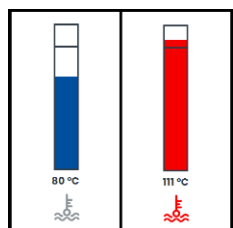


Fuel gauge

Displays the current filling level of the diesel tank.

Below 20%, the tank display jumps to yellow, the laying machine should be refueled promptly.

Attention: Observe safety measures when refueling!



Cooling water gauge

Displays the current temperature of the cooling system.

Above 107 degrees Celsius the display jumps to RED.

Switch off the laying machine and allow it to cool down. Check the cooling water and top up if necessary.

Caution: Risk of damage to the laying machine.

Further information can be found in the chapter Cooling water check.



Speed Indicator

Displays the current travel speed of the laying machine.

Speed is shown in two displays.

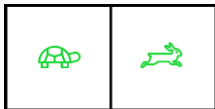
- In digital digits
- semicircular bar (display in %)



Light
Green = light on



Rotating warning light
Yellow = light on



Speed range switching
Tortoise = Slow gait | Hare = Fast gait



On-board voltage display
Displays the current battery voltage in real time

Menu buttons



- (1) Menu for selecting the driver profile
- (2) Menu for resetting the daily operating hours
- (3) Menu for setting the time, date, languages (DE/ GB/FR/ PL/ ESP) and brightness of the display. In addition, messages can be read out via this menu item (CAN bus) and the service menu can be called up.



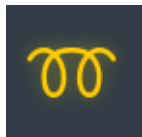
Articulated boom
Displayed when the articulated boom has been activated.
The articulated cantilever must be activated via the menu item Driver profiles.



Automatic program display
Display of which automatic program is currently active (1 or 2).
Automatic program must be activated via menu item Driver profiles.



Parking brake
Indicates whether the parking brake is activated



Pre-annealing
symbol appears while the operator holds the key in the ignition lock on the "preheating position".
Attention: Preglow Maximum 7 seconds!



Oil pressure gauge
If the oil pressure of the laying machine drops, this symbol appears.
Attention Need for action → Check the oil level (otherwise damage to the engine cannot be ruled out).



Diesel particulate filter
If this symbol lights up, check/wash out the particle filter immediately.
The particle filter should be washed out every 40 operating hours.
If the symbol still appears after washing out, consult a specialist workshop.



Battery voltage
symbol appears when the mains voltage drops below 12.4 V.



Driver profile

<ul style="list-style-type: none"> 1. very sensitive 2. sensitive 3. Normal 	<p>A quick switch of the driver profile is possible with one click.</p>
--	---

4.6 Starting the engine



To drive the machine, the steering lock (transport lock) **MUST** be removed, otherwise the machine will only drive straight ahead and steering is not possible. For this purpose, the safety cotter pin and the bolt on the steering lock must be removed.

- Before starting the engine, the daily checks must be performed.
- Plug in main switch (1) (always unplug after end of work, theft protection!).



The driver must be seated in the driver's seat and the seat belt must be fastened.

- Insert ignition key into ignition lock (2).
- Turn ignition key to level I and check if indicator lights are working (3).
- Turn the ignition key further to stage II until the preheating indicator lamp goes out (4). The display must be completely up for this!
- Turn ignition key to stage III (5) => engine starts.
- Set the throttle lever (6) to half throttle so that sufficient hydraulic pressure is built up to be able to operate the attachments.

- Press reset button (button 3 joystick) (7).
The driver briefly presses the reset button.
The horn sounds (as long as the button is pressed) to warn bystanders that the machine is starting to move.



The drive reset button **must be pressed each time** the laying machine is started or after leaving the operator's seat (triggered by the seat switch).

The reset button (and driving the machine) only works when the operator is in the driver's seat.

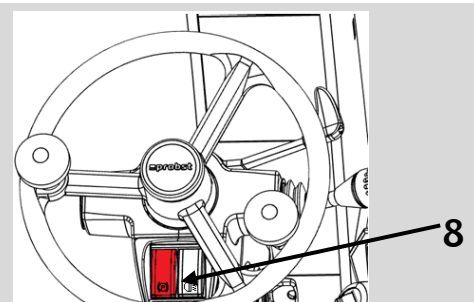
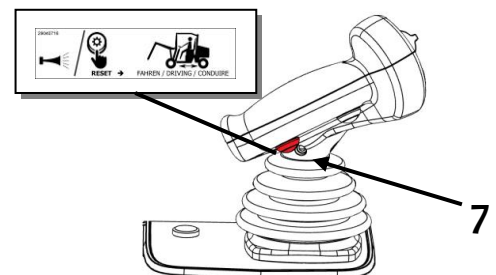
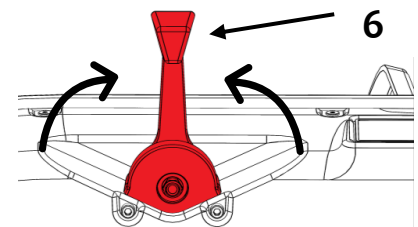
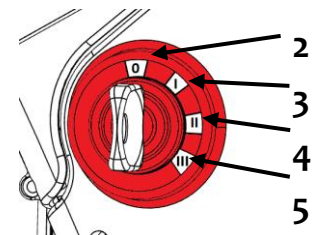
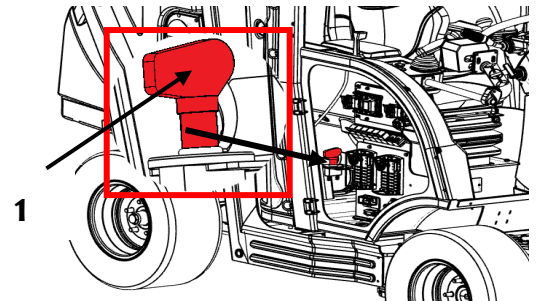


Do not release the parking brake (8) (on the steering column directly under the steering wheel) until the driver has taken his seat in the driver's seat and fastened the seat belt.

To do this, operate the toggle switch.

When the driver leaves the driver's seat, the parking brake must be activated again!

- To stop the engine, always set the ignition lock to level 0!



4.7 1.7 Driving with the laying machine

When reversing with the laying machine, the "**blind spot**" of the machine must be observed! Otherwise there is a risk of accident and death!

When leaving the laying machine, the attachment (e.g. HVZ) must be placed on the ground, the parking brake activated and the engine switched off!



- When driving on terrain with a slope, observe the following:
- Lower the boom arm with attachment (e.g. HVZ) both with and without load (e.g. stone layer) as far as possible.
- extremely careful and slow (slow walking speed) driving is required
- Abrupt braking (by changing the direction of travel by means of the foot pedal) is prohibited!
- Otherwise, there is a risk of tipping over, resulting in an accident and danger to life!

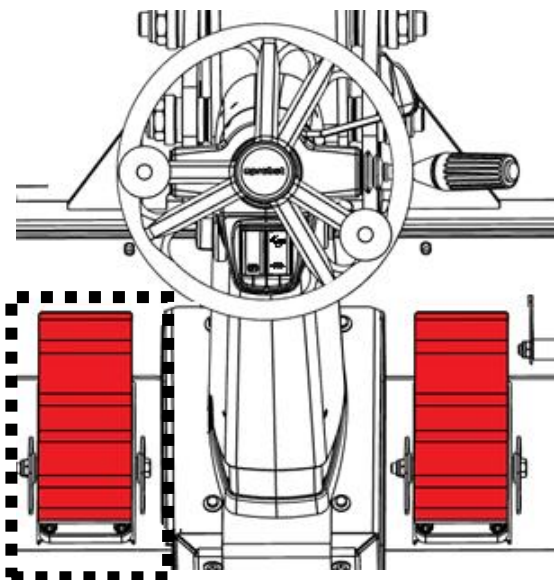
Emergency situation: if the laying machine threatens to **tip over**, lower the boom arm with attachment (e.g. HVZ) immediately!

4.8 Operating elements

- - The right control pedal is for the hydrostatic travel drive. This enables stepless forward and reverse travel.
The control pedal must never be confused with the accelerator pedal of a motor vehicle!
- Tipping the control pedal forward: Machine moves forward
- Tilt the control pedal backward: Machine moves backward

OPTIONAL:

- Left foot pedal for the function: Raising/lowering the articulated boom.
- Tipping the operating pedal forwards: Lowering the boom
- Tipping the control pedal backwards: Lifting the boom



Travel forward/backward with the right foot pedal.
The pedal must not be operated with the tips of the shoes only!
To be able to react quickly in dangerous situations, the shoe must be positioned completely on the control pedal.

Never operate the operating pedals in a jerky manner or allow them to snap back, as this will cause pressure surges in the supply and return lines which may damage the hydraulic motor!

Braking is achieved by slowly moving the control pedal to the 0 position (zero position).

Strong braking is achieved by counteracting the control pedal.

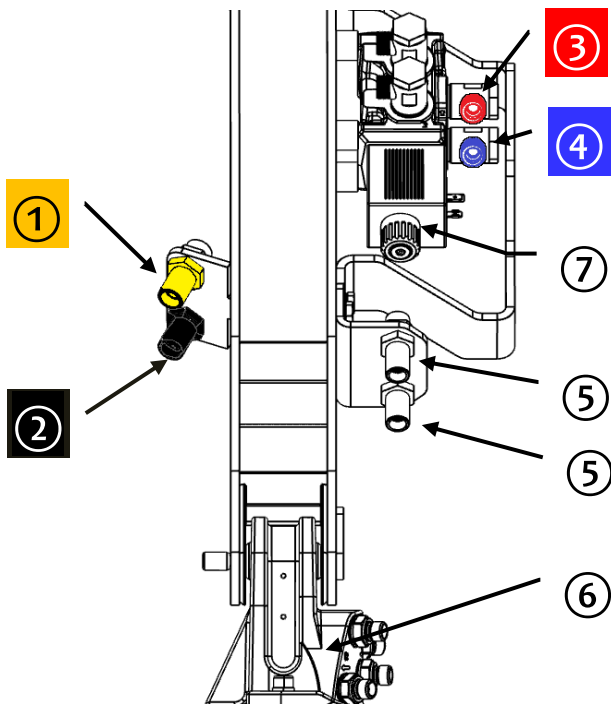


Never operate the operating pedals in a jerky manner or allow them to snap back, as this will cause pressure surges in the supply and return lines which may damage the hydraulic motor!

4.9 Attachment of additional equipment



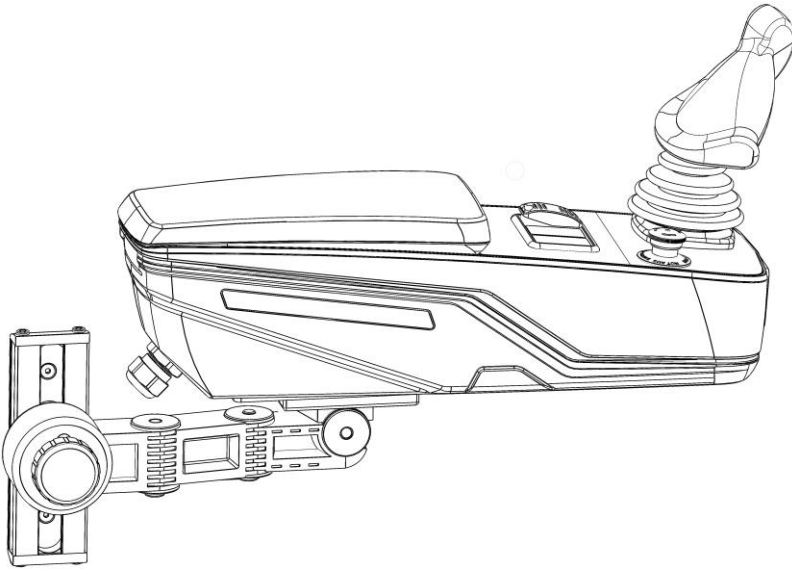
Various attachments (e.g. HVZ) can be mounted on the fixture.
Two separate oil circuits are available for the hydraulic supply.



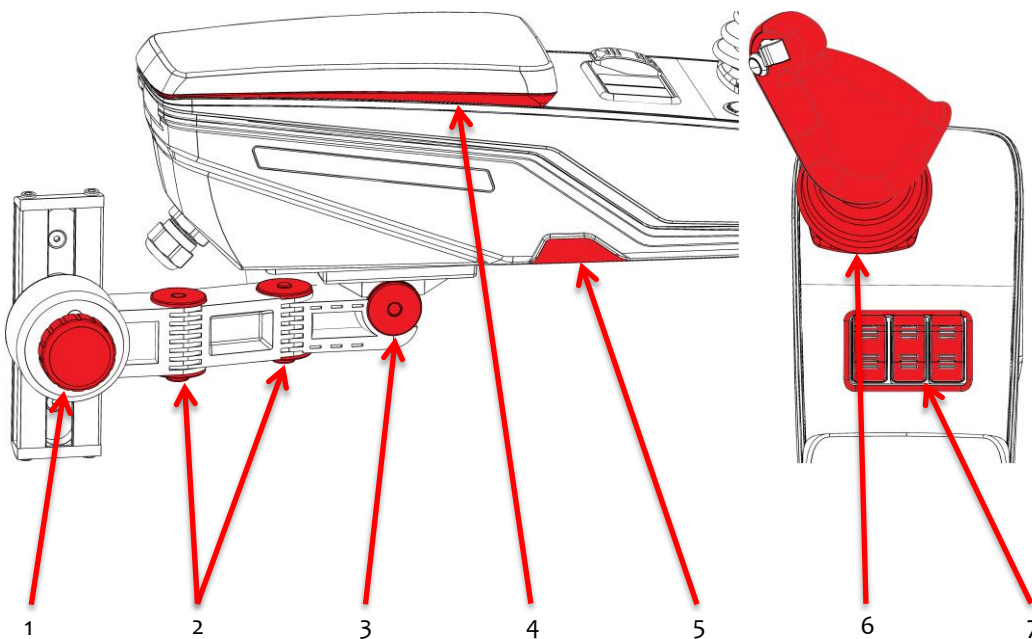
- 1 Connection HVZ main tension (yellow marking)
- 2 Connection HVZ main tension (black marking)
- 3 Connection HVZ side tension (red marking)
- 4 Connection HVZ side tension (blue marking)
- 5 Connections for hydraulic rotary head
- 6 Hydraulic rotary head
- 7 Setting the rotation speed for the hydraulic rotary head

4.10 Control panel/ right armrest

4.10.1 Overview



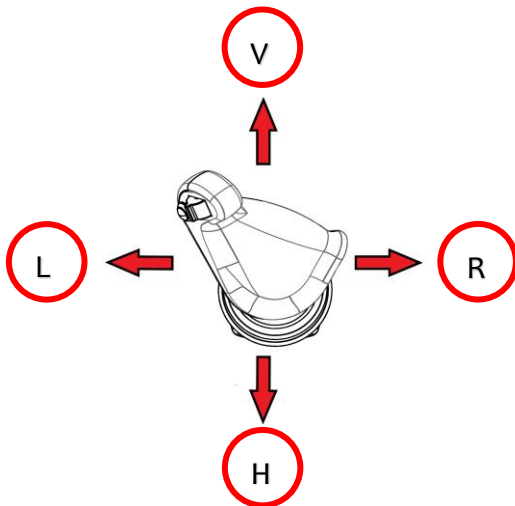
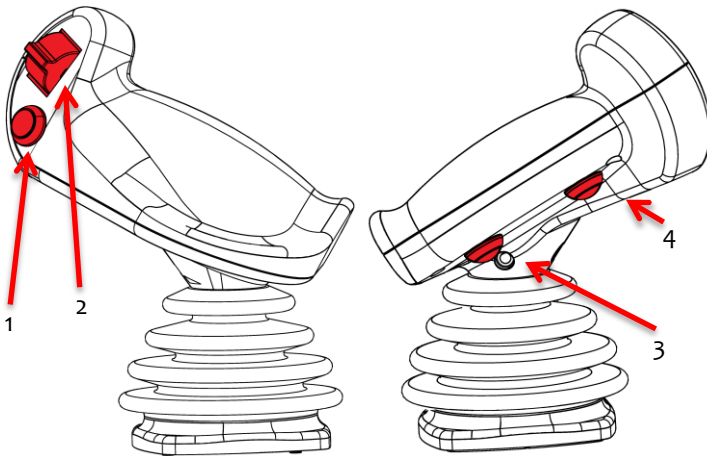
4.10.2 Functions



- 1) Knob for height adjustment
- 2) Joints for lateral adjustment
- 3) Joint for tilt angle adjustment
- 4) Height adjustment for lower armrest (integrated in compartment under armrest)
- 5) Depth adjustment control console
- 6) Joystick for boom & attachments
- 7) Toggle switch panel

	<p>Rotary knob for height adjustment To release the lock, turn the rotary knob counterclockwise. Caution: Armrest slides down when loosening! Set the desired height position of the armrest (infinitely variable). To lock the armrest, turn the rotary knob clockwise until the armrest has a secure and firm fit.</p>
	<p>Joints for side adjustment The side joints are preloaded and can be adjusted without tools by the driver in the way that is most optimal and ergonomic for him.</p>
	<p>Joint for tilt angle adjustment Side joint is under preload. To adjust the tilt angle, simply hold the console in front of the joystick and adjust up or down. This adjustment is also done without tools ! Do NOT pull/push the joystick!</p>
	<p>Height adjustment of the lower arm support Lift/open the lid of the support to the rear. There is a slider in the front of the compartment that can adjust the angle of the support. There are three fixed locking points in the console visually marked with notches. However, it can also be continuously adjusted to the needs of the driver.</p>
	<p>Depth adjustment console (back & forth) Push in the button to adjust the depth (possible on both sides of the console). Adjustment is possible in small detents. Important: The console must engage audibly and perceptibly!</p>
	<p>Joystick for Boom & Attachments The joystick is responsible for operating or controlling the boom (with & without articulation). In addition, it controls attachments such as HVZ-UNI-II/ HVZ-GENIUS, etc.</p>
	<p>Toggle switch panel Switch 1: Light switch on/off Switch 2: All-round warning light on/off Switch 3: Vacuum attachment on boom on/off</p>

4.11 Joystick - Functions



	<p>short description</p> <ul style="list-style-type: none"> • V = vorne/ front • R = rechts/ right • H = hinten/ back • L = links/ left
--	--

4.12 Horns/ reset button



Key for horn/ reset key:

The reset button for driving must be pressed every time the laying machine is started or the drive was stopped due to the driver getting up from the driver's seat (triggered by the seat switch).

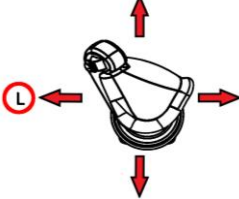
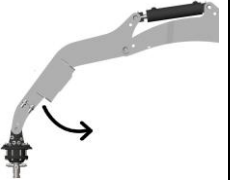
The reset button (and driving the machine) only works when the operator is in the operator's seat.

29040716

90 x 23 mm

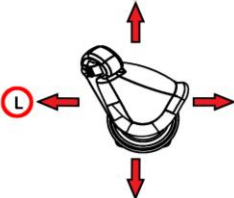
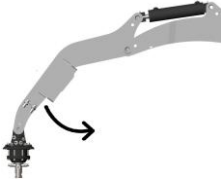
4.13 Functions in pincer mode

	<p>Pushbutton main voltage (pushbutton 1):</p> <ul style="list-style-type: none"> • Press button until movement is detected: main voltage closes automatically. The function is interrupted by clicking again • Double click: Main voltage opens automatically and the ADV bead breaker is automatically preloaded. The opening is interrupted by clicking again.
	<p>Thumbwheel/ Rocker switch (Button 2):</p> <ul style="list-style-type: none"> • up = Rotator turns to the right. • down = Rotator turns to the left.
	<p>Horn (Button 3):</p> <ul style="list-style-type: none"> ➔ Releasing the traction and working hydraulics ➔ Function described under point 1.2 (horn/reset button) ➔ The horn is active as long as the button is pressed.
	<p>Side tension button (button 4):</p> <ul style="list-style-type: none"> • Press the button until movement is detected: Side clamping closes automatically. The function is interrupted by clicking again • Double click: Side tension opens automatically. Opening is interrupted by clicking again. • Keep button pressed: If the button continues to be held down after the closing process has been completed, the side tension starts to open and close cyclically "Knock/ Shift". When the button is released, the side tensioner opens automatically. The opening is interrupted by another click. The side tension remains closed after release
	<p>Joystick to the front: Main boom moves down.</p> <p>Note: With the optional left foot pedal, the boom function on the joystick of the boom on the joystick is not active</p>
	<p>Joystick to the rear: Main boom moves upwards.</p> <p>Note: With the optional left foot pedal, the boom function on the joystick of the boom on the joystick is not active</p>
	<p>Joystick to the right: The articulated boom extends.</p> <p>If an articulated boom is available (depending on the model), it must be activated via the display.</p>

	<p>Joystick to the left: The articulated boom retracts.</p> <p>If an articulated boom is available (depending on the model), it must be activated via the display.</p>	
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4.14 Functions in vacuum mode (arm console switch)

	<p>Pushbutton vacuum (pushbutton 1): The suctioned stone can be detached by pressing the button. I.e. vacuum is interrupted and suction plate is ventilated. The vacuum starts automatically with a delay after lifting. The next stone can then be suctioned</p>
	<p>Thumbwheel/ Rocker switch (Button 2):</p> <ul style="list-style-type: none"> • up = Rotator turns to the right. • down = Rotator turns to the left.
	<p>Horn (Button 3):</p> <ul style="list-style-type: none"> ➔ Releasing the traction and working hydraulics ➔ Function described under point 1.2 (horn/reset button) ➔ The horn is active as long as the button is pressed.
	<p>Button 4: No function in vacuum mode</p>
	<p>Joystick to the front: Main boom moves down.</p> <p>Note: With the optional left foot pedal, the boom function on the joystick of the boom on the joystick is not active</p>
	<p>Joystick to the rear: Main boom moves upwards.</p> <p>Note: With the optional left foot pedal, the boom function on the joystick of the boom on the joystick is not active</p>
	<p>Joystick to the right: The articulated boom extends.</p> <p>If an articulated boom is available (depending on the model), it must be activated via the display.</p>

	<p>Joystick to the left: The articulated boom retracts.</p> <p>If an articulated boom is available (depending on the model), it must be activated via the display.</p> 
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5 Transport

5.1 Transport of the laying machine

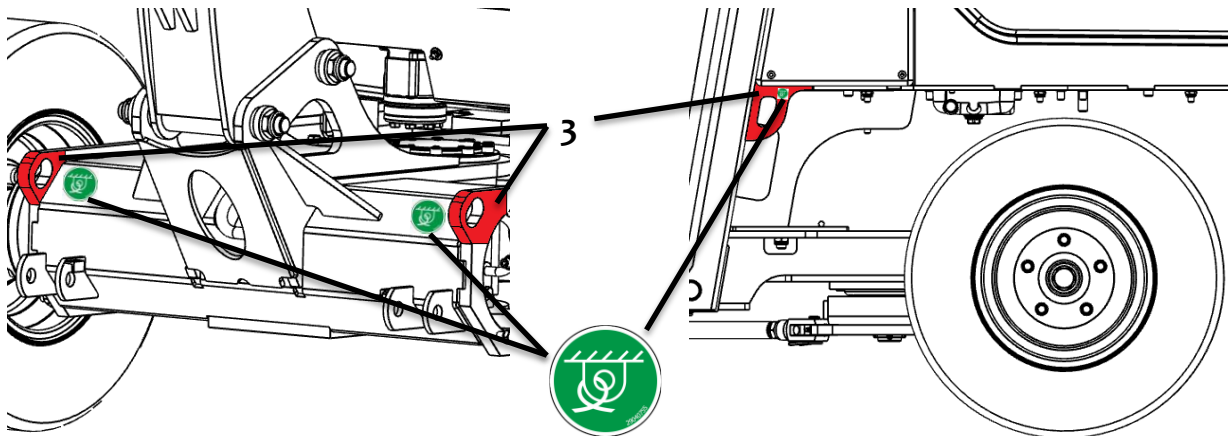


No lifting equipment is required to move the laying machine onto a trailer or onto the bed of a truck. The machine can be driven onto the loading area.



Use safe drive-up ramps! Observe the different track widths at the front and rear!
The parking brake must be applied, the laying machine must still be secured against rolling and shifting according to the regulations of the employers' liability insurance association!

Two lashing eyes (3) are attached to the front and side/rear of the laying machine for securing purposes:



Lashing eyes front

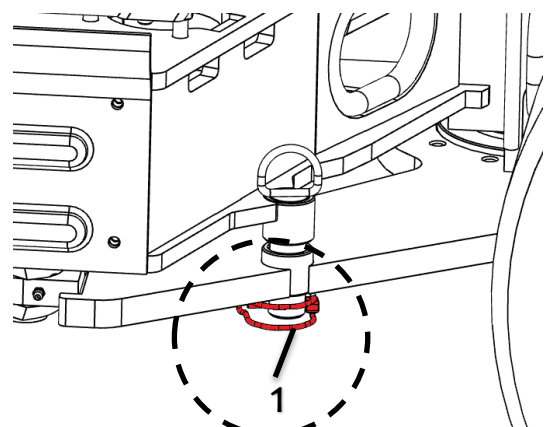
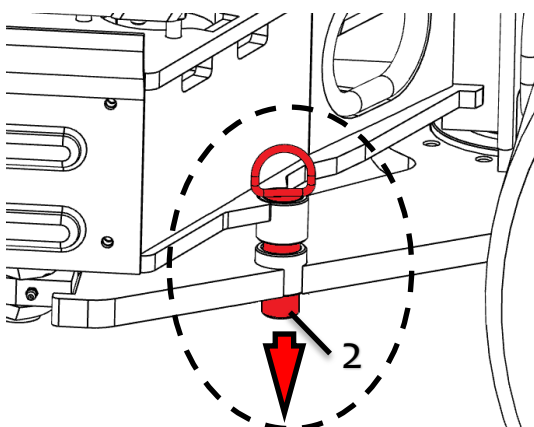
Lashing eyes side/rear (both sides)



The steering of the laying machine must be locked before transport!

Locking the steering during transport:

- Loosen the locking cotter pin (1) from the loose bolt.
- insert the bolt (2) downwards into the round sleeves
- reattach the locking split pin (1) to the bolt



Before unloading the machine, the steering lock must be removed again!

5.2 Towing the laying machine



To tow the laying machine, a so-called bypass valve must be opened. This enables towing without engine drive (e.g. in the event of engine damage).

- Open the engine hood by operating the engine hood lock (Fig. A) and fold the engine hood back (Fig. B).
- The bypass screw is located at the bottom of the hydrostat (Fig. C). Use a suitable open-end wrench (17 mm) to open the bypass screw by **max. 2 turns (Fig. D)**.
- Optionally, you can also access the bypass screw from below (Fig. E).

Now the laying machine can be pulled/pushed onto the loading area without motor drive (only the wheels turn).



Use safe drive-up ramps! Note the different track widths at the front and rear!

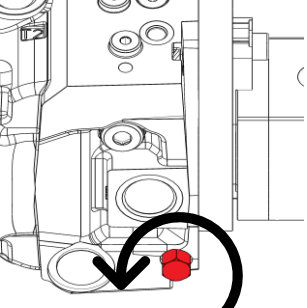
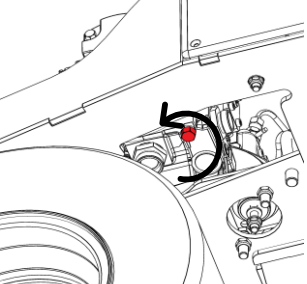


Before restarting the engine, UNCONDITIONALLY retighten the bypass screw with a suitable open-end wrench!



ATTENTION:
When towing, the parking brake is out of function!
The machine can only be braked down from the outside!

	<p>Unlocking the lock (Fig. A) Unlock/open lock using the key</p>
	<p>Opening the engine hood (Fig. B) Open the engine hood from the top to the rear. The engine hood is held by limits on the laying machine to prevent the hood from "tipping over" downwards.</p>
	<p>Seat of the bypass screw (Fig. C). The bypass screw is located at the bottom of the hydrostat (see marking). The screw can be opened from the engine compartment, but optionally also from below with the engine hood closed.</p>

	<p>Opening the bypass screw I (Fig. D) Open the bypass screw max. 2 turns with a suitable open-end wrench (17mm).</p>
	<p>Open bypass screw II (Fig. E). Optionally, the bypass screw can also be opened from the outside with the engine hood closed. This is done through a mounting hatch in the chassis from below (see illustration).</p>

6 Storage



If the installation machine is stored for a longer period of time:

- Store the installation machine in a flat and dry place indoors.
- When storing outdoors, place the installation machine on a wooden platform on level and horizontal ground and cover it completely with a dark protective plastic cover.
- **Activate parking brake!**
- Use chocks or similar to prevent the installation machine from rolling away unintentionally.
- Protect the machine from direct sea air (danger of corrosion!).
- Retract the lifting cylinder.
- Clean all components (joints) and the motor completely and oil them or lubricate them according to the lubrication schedule.
- Disconnect the battery.
- In the winter months, fill with sufficient cooling water antifreeze and fill with winter diesel.
- Place the attached laying clamp (HVZ) on the ground, place wooden beams under the gripping jaws.
- Close the main tension on the laying clamp (HVZ).
- Open the secondary tension on the laying clamp (HVZ).

7 Maintenance and care

7.1 maintenance



In order to guarantee perfect function, operational safety and service life of the laying machine, the maintenance work listed in the table below must be carried out after the specified intervals.

Only original spare parts may be used, otherwise the warranty expires.



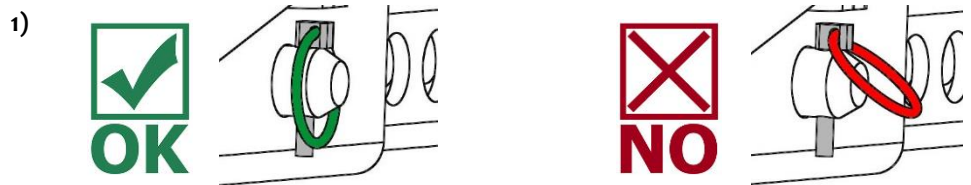
All work may only be carried out with the laying machine stopped (apply handbrake) and the engine switched off! It must also be on a horizontal surface.

Unattended parking of the laying machine on inclined surfaces is not permitted.

When carrying out any work on attachments (e.g. HVZ-UNI), it must be ensured that the unit cannot close unintentionally. **Risk of injury!!!**

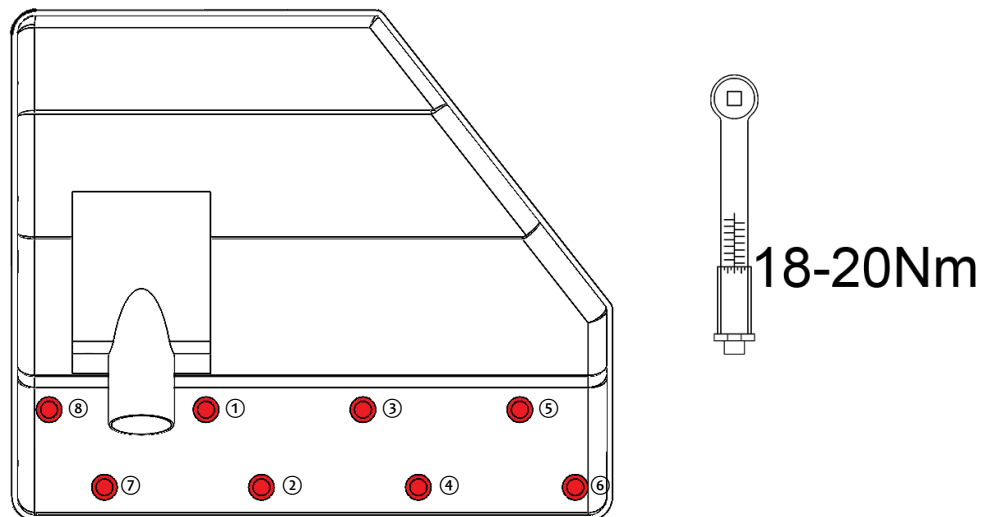
7.1.1 Mechanics

MAINTENANCE PERIOD	Work to be carried out
Initial inspection after 25 operating hours	<ul style="list-style-type: none"> Check or retighten all fixing screws (may only be carried out by a qualified person).
Every 50 operating hours	<ul style="list-style-type: none"> Retighten all fixing screws (make sure that the screws are retightened according to the valid tightening torques of the corresponding strength classes). Check all existing safety elements (such as folding pins) for proper function and replace defective safety elements. → 1) Check all joints, guides, pins and sprockets, chains for proper function, readjust or replace if necessary. Check gripper jaws (if present) for wear and clean, replace if necessary. All existing sliding guides, rack gears and joints of moving parts or machine components must be greased / lubricated to reduce wear and for optimum movement sequences (recommended grease: Mobilgrease HXP 462). Lubricate all grease nipples (if present) with grease gun.
At least 1x per year (shorten the inspection interval in case of harsh operating conditions)	<ul style="list-style-type: none"> Inspection of all suspension parts, as well as bolts and brackets. Inspection for cracks, wear, corrosion and functional safety by an expert.



After 50 operating hours

- Retighten all 5 mounting nuts (M7) at the exhaust silencer → 18-20 Nm.



Sequence for tightening torque: see marking ① - ⑥

7.1.2 Hydraulic

Service interval	Maintenance work
First inspection after 25 operating hours	<ul style="list-style-type: none">• Control and tighten all hydraulic thread joints and connection. (The implementation is only allowed by an expert).
All 50 operating hours	<ul style="list-style-type: none">• Tighten all hydraulic connections.• Check the hydraulic system for leaks.• Check the hydraulic oil filter, clean it if necessary (if available).• Check the hydraulic oil and replace it in accordance to the manufacturer information (recommended hydraulic oil: HLP 46 according to DIN 51524 – 51535).• Check the hydraulic hoses for breaks and abrasion. Damaged hydraulic hoses must be replaced (generally it is recommended to replace hydraulic hoses every 6 years). <ul style="list-style-type: none">• Only specified types of oil may be used!

Regular maintenance (it is essential to observe further instructions in the enclosed operating manual of the KUBOTA diesel engine!)

In order to maintain the machine functions and ensure a long operating span of the engine, the periodic checks must be performed according to the table below.

Warranty claims for this device are only valid if the prescribed maintenance work has been carried out (by an authorized specialist workshop)! After each maintenance interval has been carried out, this maintenance certificate (with signature and stamp) must be sent to us immediately (by e-mail to service@probst-handling.com/ by fax or post).

No.	Maintenance work (① Order number see enclosed maintenance record booklet)	Before each commissioning	After first 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 1000 hrs.	Every year	Every 2 years
1	Check hydraulic oil level, refill if necessary	●						
2	Changing the engine oil (SAE 15W40 ~ 4 l)		●		●			
3	Replacing the engine oil filter ①		●		●		●	
4	Replacing the hydraulic oil (RANDO HLP 46 ~ 25 l)		●			●	●	
5	Check hydraulic oil level, refill if necessary (RANDO HLP 46 ~ 25 l)	●						
6	Replacing the hydraulic oil filter ①		●			●	●	
7	Clean the air filter (replace if heavily soiled) ①.		●	●			●	
8	Replacing the air filter						●	
9	Cleaning the fuel filter ①/ ③		●	●				
10	Replacing the fuel prefilter ①		●		●			
11	Checking the fuel pipe and the clamping band		●		●	●	●	
12	Check V-belt tension on fan wheel		●	●				
13	Replacing the V-belt on fan wheel ①					●		
14	Checking the radiator hose and the clamping band Replace if necessary				●	●	●	
15	Removal of deposits from the fuel tank					●		
16	Checking the cooling fins for dirt				●	●		
17	Checking the electrical wiring for loose connections		●		●	●	●	
18	Checking the exhaust system and the clamping belt					●	●	
19	Change battery recharge when needed					●	●	
20	Checking the cooling water level Refill if necessary		●		●	●	●	
21	Replacement of the cooling water including antifreeze (~ 4 l)							●
22	Checking the antifreeze in the cooling water (before each frost period).					●	●	
23	Checking the opening pressure of the radiator cap				●	●		
24	Checking the nozzle opening pressure					●		
25	Checking the compression pressure					●		
26	Checking the hydraulic hoses for leaks (tighten connections)		● ②					
27	Check the function of the instruments and operating devices		●		●	●		
28	Check VM for damaged, deformed components and abnormal noises.		●		●	●		
29	Tighten all bolts and nuts, replace missing bolted connections		●		●	●		
30	Checking the tire pressure (front 2.5 bar/36 psi, rear 2.2 bar/32 psi)		●		●	●		

No.	Maintenance work (① Order number see enclosed maintenance record booklet)	Before each commissioning	After first 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 1000 hrs.	Every year	Every 2 years
31	Lubrication according to lubrication schedule		●	●	●	●		
32	Check ball joint for strength (135 Nm)		●		●	●		
33	Check load-bearing components for cracks (axles, chassis, swivel legs, Steering linkage)				●	●	●	
34	Retighten all wheel nuts (130 Nm)		●		●	●		
35	Checking the handbrake (readjust 3-4 teeth if necessary).		●		●	●		
36	Checking the wheel bearing and adjusting the axle pivot bearing if necessary					●		
37	Check the steering play, if necessary,					●		
38	Checking the alternator					●		
39	Adjusting the valve clearance of the rocker arm (0.15 mm)					●		
<p>To disconnect the electrical system from the battery, the main switch of the laying machine motor must be (in the maintenance flap) must be actuated/removed.</p> <p>During welding work, the battery main switch must generally be switched off, otherwise damage to the electronics may occur!</p> <p>Visual inspection before each start-up: V-belt tension. Engine oil. Hydraulic oil. Cooling water. Antifreeze. Battery acid.</p> <p>② and additionally every 50 hrs/ ③ replace every 400 hrs/ ④ replace every 500 hrs.</p>								

7.2 Recharging the battery

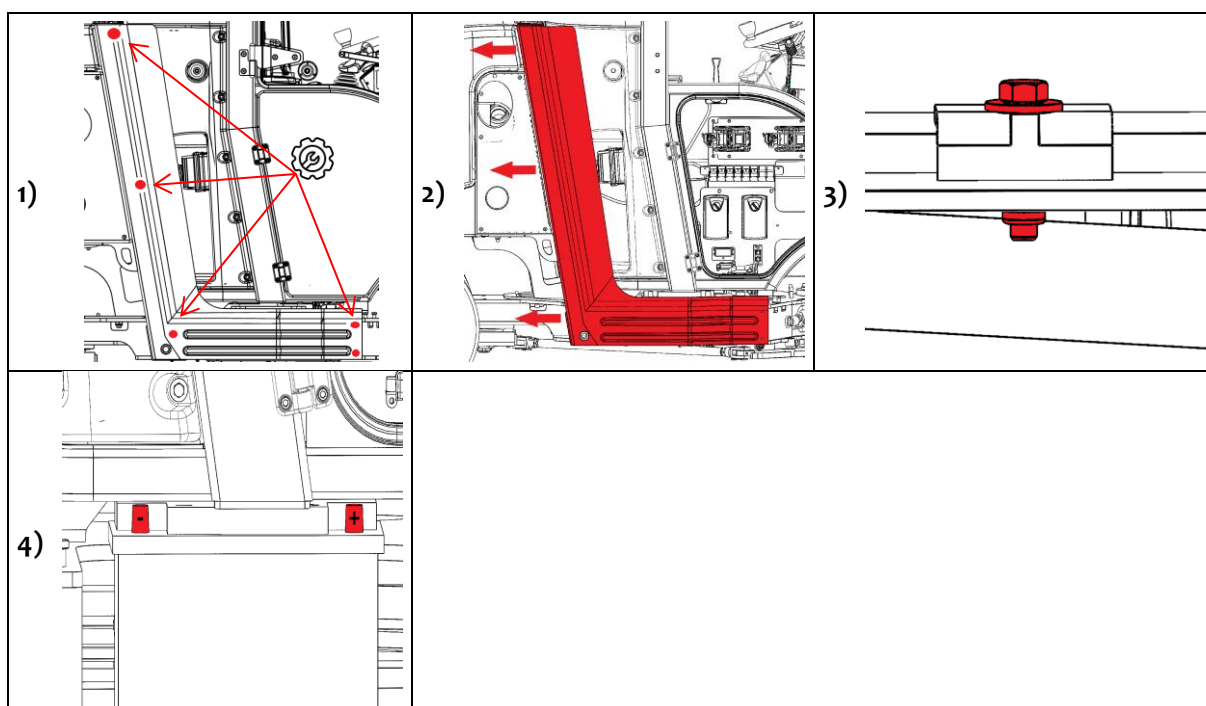


To get to the battery, the side covering must be removed

- Loosen the screws on the side covering below the service flap (Fig. 1) with the appropriate tool and remove the side covering (Fig. 2).
- The battery is secured against slipping with a locking screw (in the middle of the battery) on the chassis of the installation machine (Fig. 3).
- Note the polarity of the battery (Fig. 4).
- First remove the negative (-) pole, then the positive (+) pole.

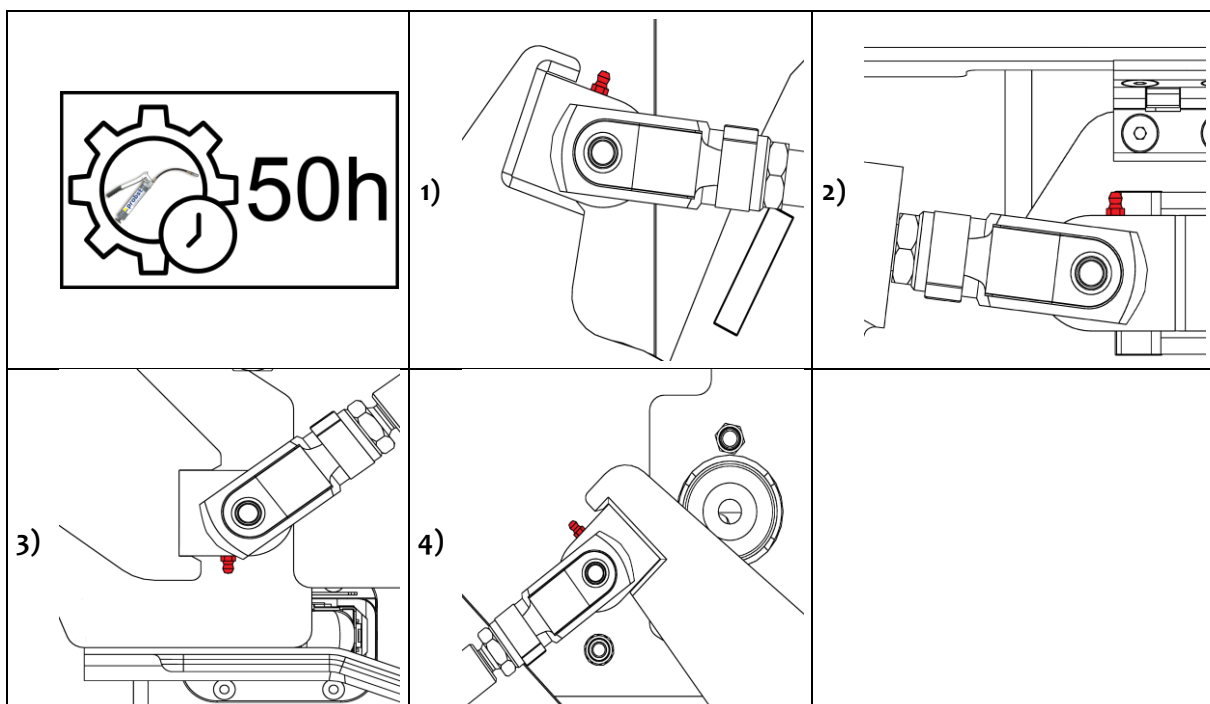
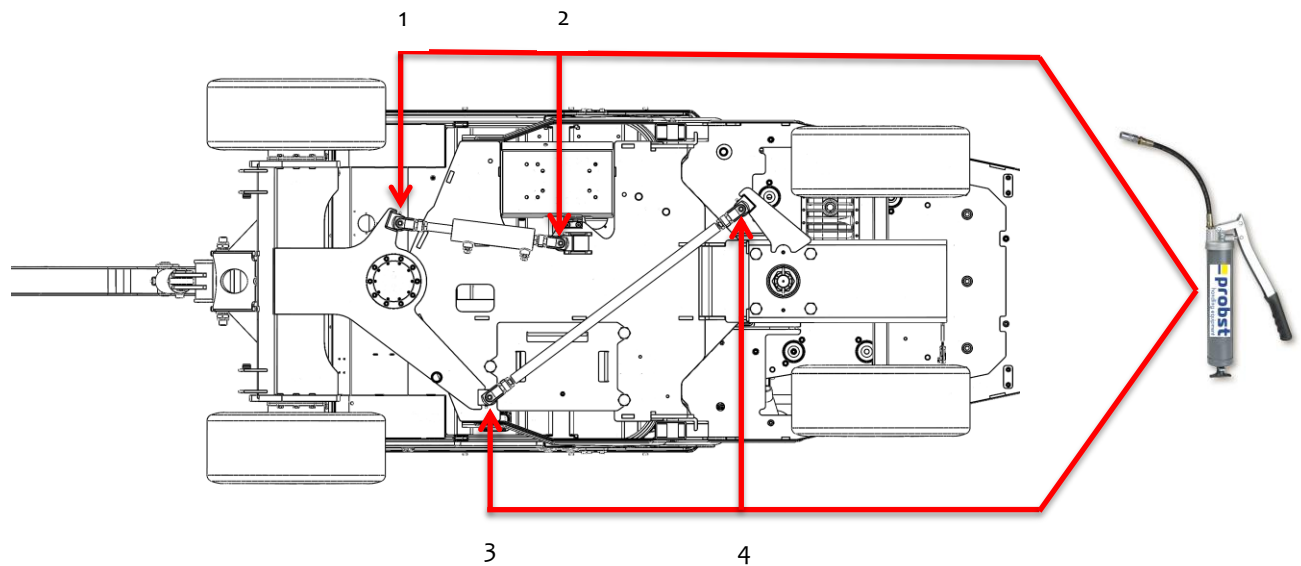


Caution: Danger of short circuit!

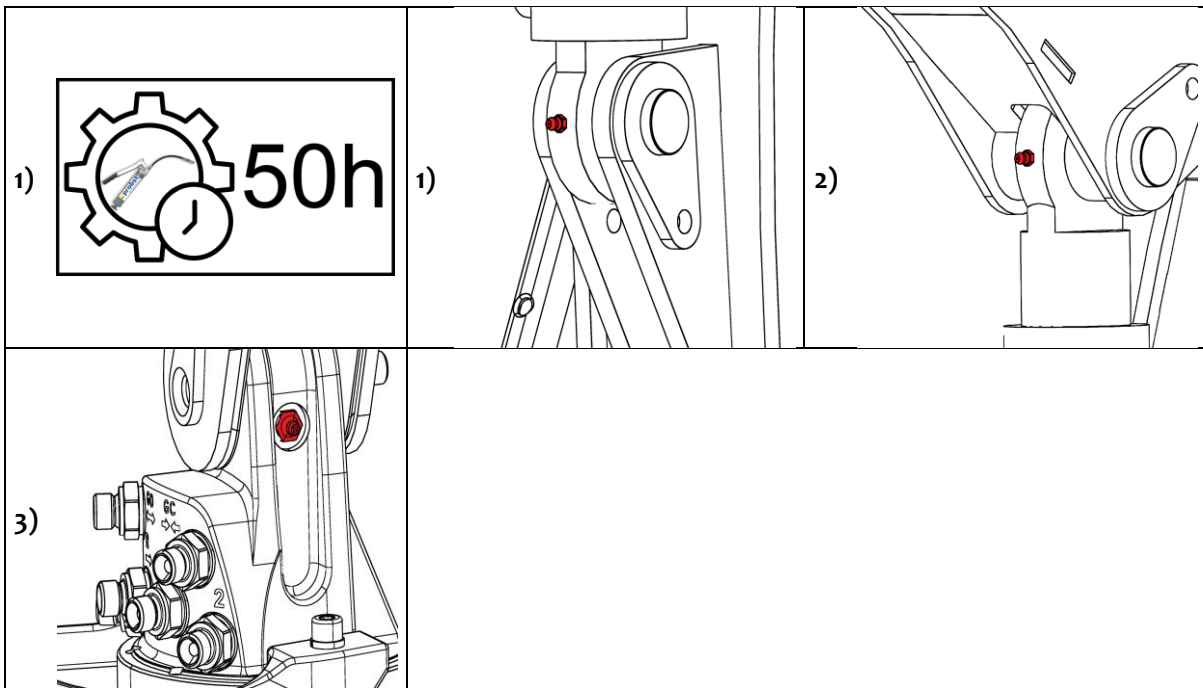
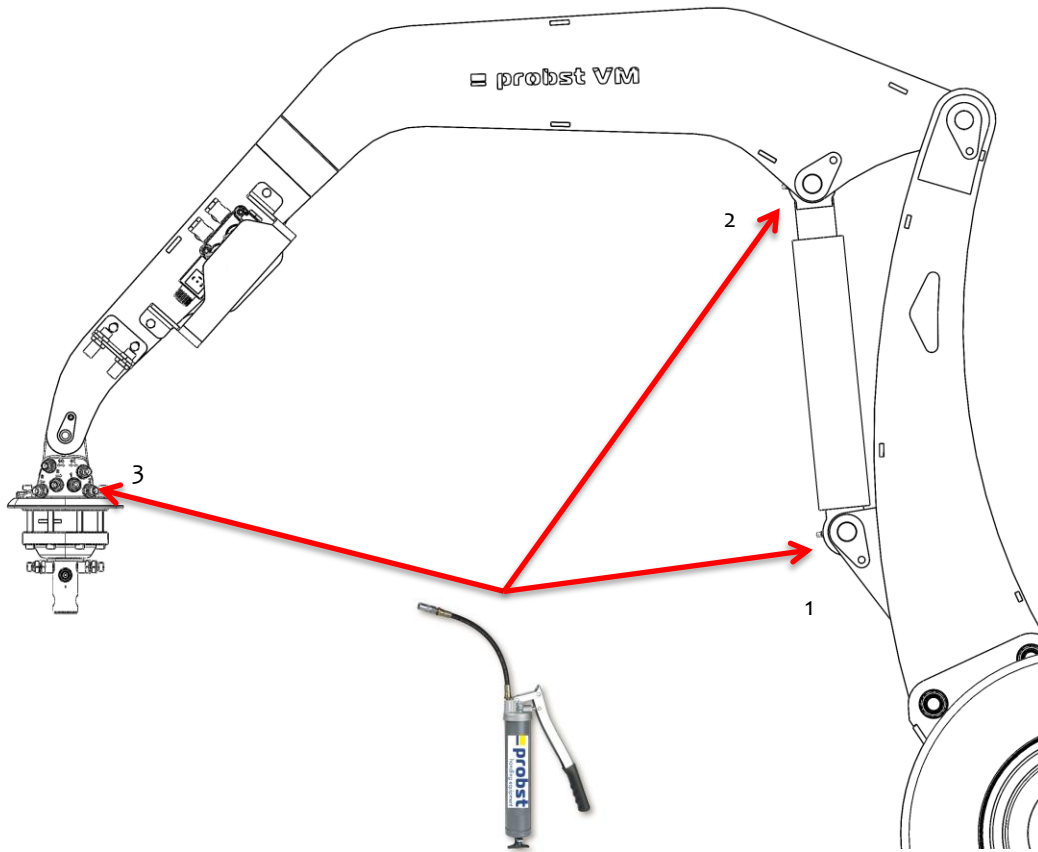


7.3 Lubrication schedule

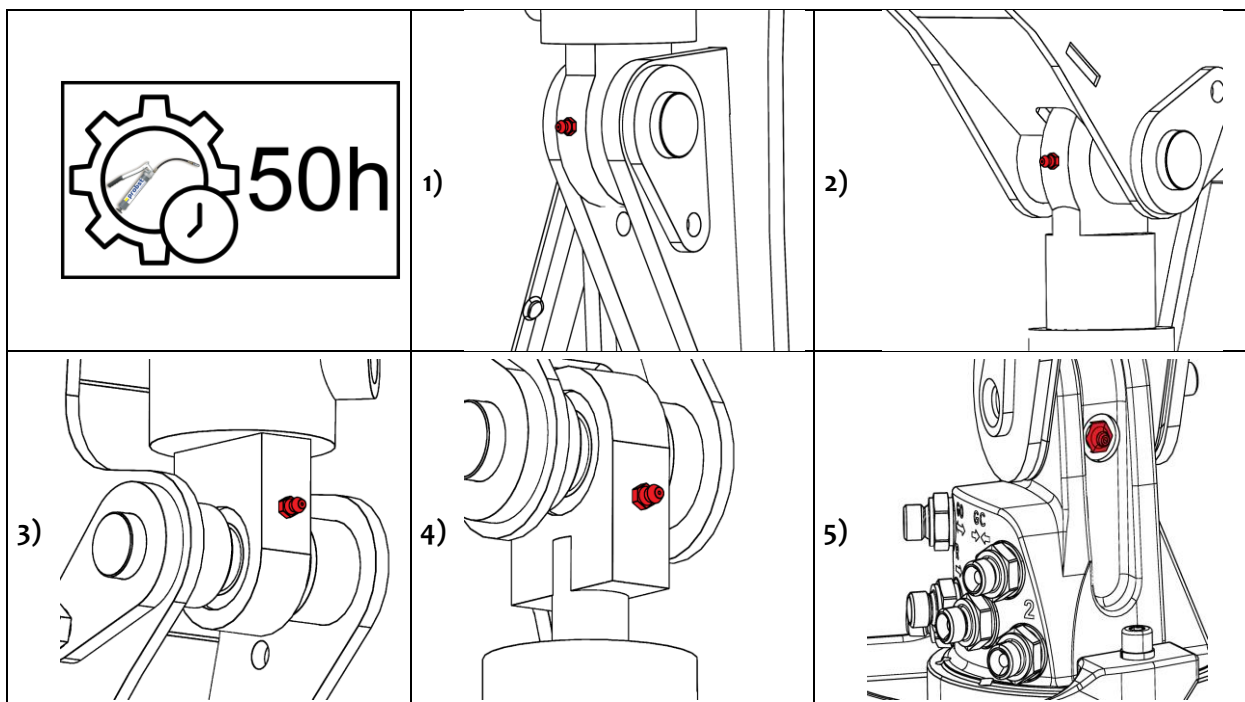
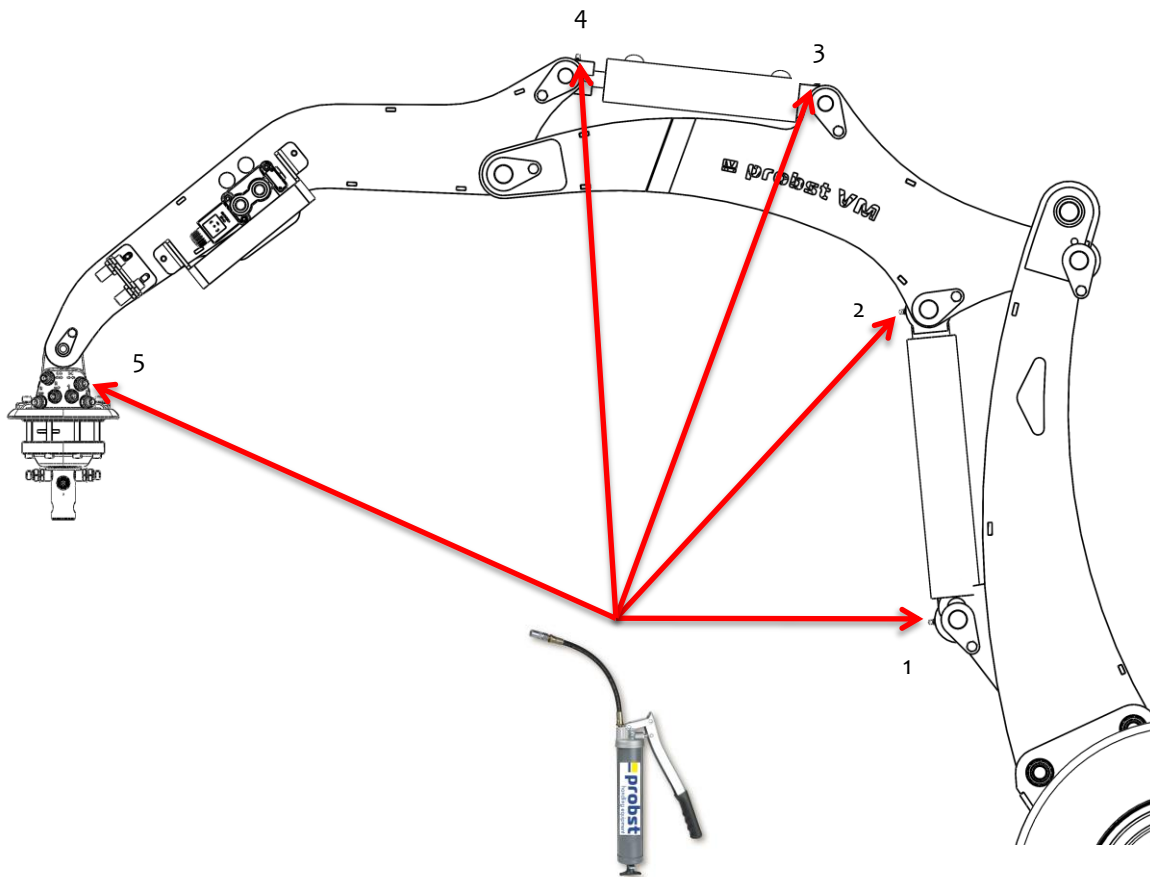
7.3.1 Underbody/steering lubrication



7.3.2 Lubrication at the boom (without buckling function)



7.3-3 Lubrication at the boom (with buckling function)

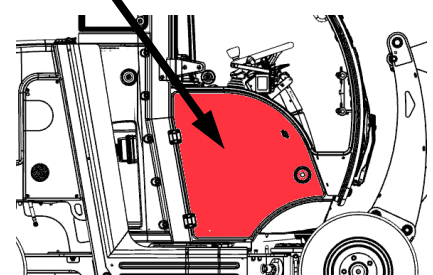
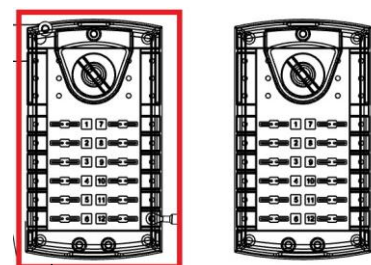


7.4 Trouble shooting

DISTURBANCE	CAUSE	REMEDY
Diesel engine malfunction		See diesel engine operation manual
Motor runs, but the laying machine does not move	Seat switch is active	Press reset button (horn) 1 x
The throttle is loose	Too little inherent friction, stop nut is loose	Tighten stop nut
The electric parking brake does not work	Cannot be deactivated	Replace fuse
Laying machine does not start	Main switch is not plugged in	Plug in main switch
	Fuse blown	Check fuses
	Battery defective, voltage too low	Check battery, charge battery
	No fuel in the tank	Refuel
	Preheating phase forgotten	Preheat, then start
Boom cannot be lifted	Hydraulic system has leakage	Fix leakage
	Too little hydraulic pressure	Set throttle lever to at least half throttle so that sufficient hydraulic pressure can be built up Check oil level
Fault message on the display	At startup, an error is detected during the routine self-test of the machine	Contact Probst Service
Fault message on the display	An error message/fault message is shown on the display during ongoing operation	Switch off the laying machine immediately and contact Probst Service.

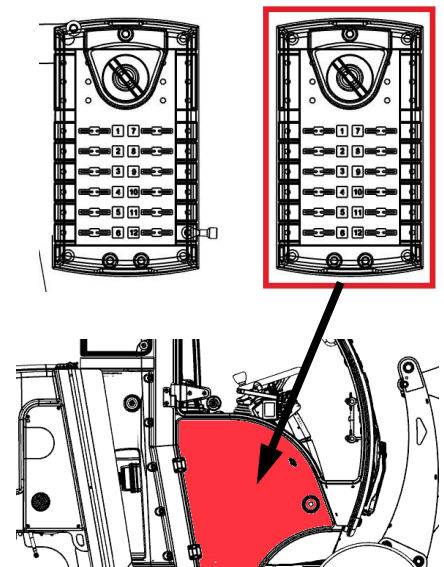
7.4.1 Fuse block I & II

CONSUMER	FUSE	AMPERE
Soot particle filter	1	3 A
— —	—	—
— —	—	—
— —	—	—
— —	—	—
Radio + interior lighting	7	5 A
Wiper + wiper water pump	8	10 A
Heating system	9	7,5 A
Seat heating + seat contact	10	15 A
Compressor + seat contact	11	15 A
12V power socket	12	10 A



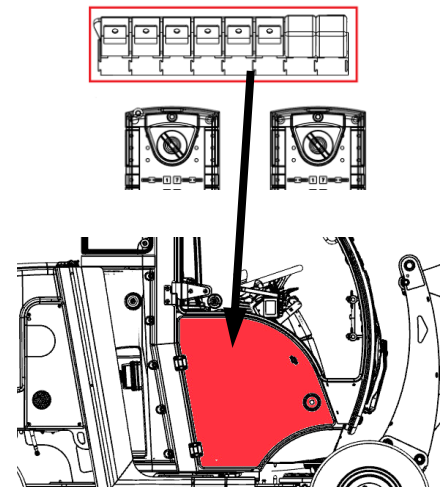
CONSUMER	FUSE	AMPERE
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Holding solenoid + fuel pump	1	5 A
Ignition	2	1 A
Joystick	3	3 A
Display	4	5 A
Relais Horn	5	10 A
Temperature switch + frequency sensor	6	3 A
Controller travel hydraulics + working hydraulics	7	3 A
Relay rotating all-round light	8	5 A
Relais Light	9	7,5 A
6/2- Coil	10	5 A
Parking brake switch + light switch	11	3 A
Pressure sensor + pressure switch	12	3 A



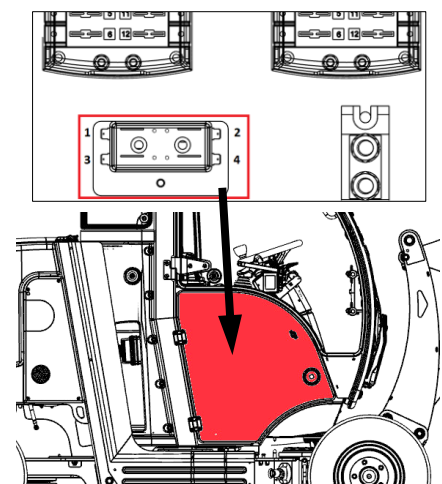
7.4.2 Relay block

CONSUMER	RELAY	TYPE
Ignition positive	1	
Ignition positive	2	
Cooler	5	
Horn	6	
Lighting package (optional)	7	
Rotating all-round light (optional)	8	



7.4.3 Fuse block III

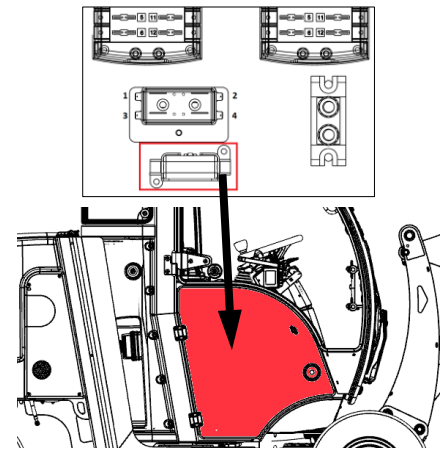
CONSUMER	FUSE	AMPERE
Control unit working hydraulics	1	5A
Traction hydraulics control unit	2	20A
Traction hydraulics control unit	3	20A
Relay cooler	4	30A
*= Control unit working hydraulics		
**= Traction hydraulics control unit		



7.4.4 Fuse block IV

CONSUMER	FUSE	AMPERE
----------	------	--------

Main fuse	1	60A



7.5 Repairs



Only persons with the appropriate knowledge and ability are allowed to repair the device. Before the device is used again, it has to be checked by an expert.

7.6 Safety procedures

- It is the contractor’s responsibility to ensure that the device is checked by an expert in periods of max. 1 year and all recognized errors are removed (→ DGUV norm 100-500).
- The corresponding legal regulations and the regulations of the declaration of conformity must be observed!
- The expert inspection can also be done by the manufacturer Probst GmbH.
Contact us at: service@probst-handling.de
- We recommend affixing the inspection sticker "„Sachkundigenprüfung / Expert inspection" in a clearly visible place (order no.: 2904.0056+Tüv sticker with year number) after the inspection has been done.



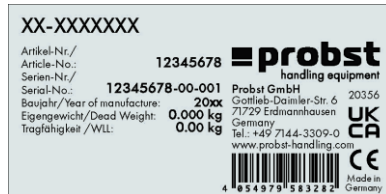
The check by an expert must be proved!

Device	Year	Date	Expert	Company

7.7 Hints to the type plate



- Type, serial-number and production year are very important for the identification of your device. If you need information to spare-parts, warranty or other specific details please refer to this information's.
- The maximum carrying capacity/working load limit (WLL) is the maximum load which can be handled with the device. Do not exceed this carrying capacity/working load limit (WLL).
- If you use the device in combination with other lifting equipment (Crane, chain hoist, forklift truck, excavator) consider the deadweight of the device.



Example:

7.8 Hints to the renting/leasing of PROBST devices



With every renting/leasing of PROBST devices the original operating instructions must be included unconditionally (in deviation of the user's country's language, the respective translations of the original operating instructions must be delivered additionally)!

8 Disposal / recycling of devices and machines



The product **may only** be taken out of service and prepared for disposal / recycling by qualified personnel. Correspondingly existing **single components** (such as metals, plastics, liquids, batteries/rechargeable batteries etc.) **must** be disposed of/recycled in accordance with the nationally/country-specific applicable laws and **disposal regulations!**



The product must not be disposed of in household waste!

OPERATOR'S MANUAL

ENGLISH

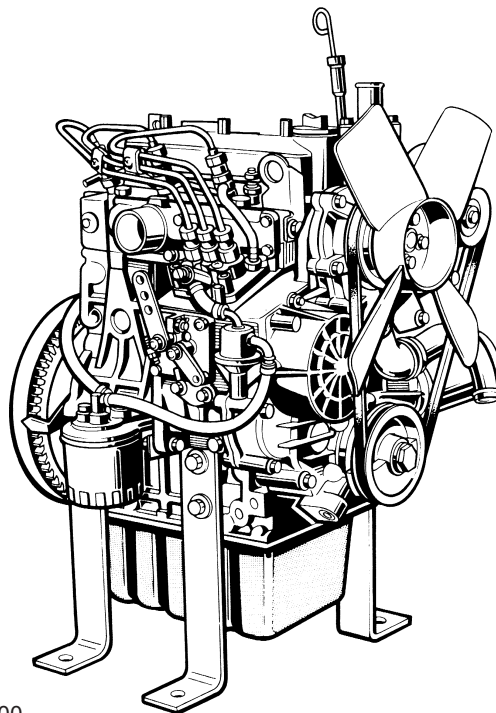
KUBOTA DIESEL ENGINE

MODELS

D1105-TE3

D1005-E3 · V1505-E3

D1105-E3 · D1305-E3 · V1505-TE3



1ABABAAAP1500

READ AND SAVE THIS MANUAL

Kubota

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FOREWORD

You are now the proud owner of a KUBOTA Engine. This engine is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your engine, please read this manual carefully. It will help you become familiar with the operation of the engine and contains many helpful hints about engine maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.



SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.



DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING : Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.



CAUTION : Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

IMPORTANT : Indicates that equipment or property damage could result if instructions are not followed.

NOTE : Gives helpful information.



SAFE OPERATION

Careful operation is your best assurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how much experience they may have, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's obligation to provide all operators with this information and instruct them on safe operation.

Be sure to observe the following for safe operation.

1. OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE ENGINE" before attempting to start and operate the engine.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life. If the engine does not perform properly, consult your local Kubota Engine Distributor first.



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2. WEAR SAFE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury.
- Use additional safety items-PPE, e.g. hard hat, safety goggles, gloves, etc., as appropriate or required.
- DO NOT operate the machine or any equipment attached to it while under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating the engine.



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3. CHECK BEFORE STARTING & OPERATING THE ENGINE

- Be sure to inspect the engine before operation. Do not operate the engine if there is something wrong with it. Repair it immediately.
- Ensure all guards and shields are in place before operating the engine. Replace any that are damaged or missing.
- Check to see that you and others are a safe distance from the engine before starting.
- Always keep the engine at least 3 feet (1 meter) away from buildings and other facilities.
- DO NOT allow children or livestock to approach the machine while the engine is running.
- DO NOT start the engine by shorting across starter terminals. The machine may start in gear and move. Do not bypass or defeat any safety devices.



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4. KEEP THE ENGINE AND SURROUNDINGS CLEAN

- Be sure to stop the engine before cleaning.
- Keep the engine clean and free of accumulated dirt, grease and trash to avoid a fire. Store flammable fluids in proper containers and cabinets away from sparks and heat.
- Check for and repair leaks immediately.
- DO NOT stop the engine without idling; Allow the engine to cool down, first. Keep the engine idling for about 5 minutes before stopping unless there is a safety problem that requires immediate shut down.



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5. SAFE HANDLING OF FUEL AND LUBRICANTS -KEEP AWAY FROM FIRE

- Always stop the engine before refueling and/or lubricating.
- DO NOT smoke or allow flames or sparks in your work area. Fuel is extremely flammable and explosive under certain conditions.
- Refuel at a well ventilated and open place. When fuel and/or lubricants are spilled, refuel after letting the engine cool down.
- DO NOT mix gasoline or alcohol with diesel fuel. The mixture can cause a fire or severe engine damage.
- Do not use unapproved containers e.g. buckets, bottles, jars. Use approved fuel storage containers and dispensers.



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6. EXHAUST GASES & FIRE PREVENTION

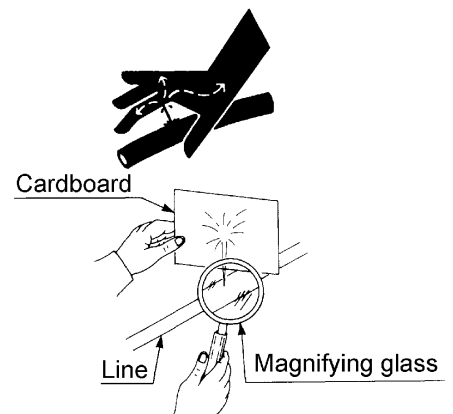
- Engine exhaust fumes can be very harmful if allowed to accumulate. Be sure to run the engine in a well ventilated location and where there are no people or livestock near the engine.
- The exhaust gas from the muffler is very hot. To prevent a fire, do not expose dry grass, mowed grass, oil or any other combustible materials to exhaust gas. Keep the engine and muffler clean at all times.
- To avoid a fire, be alert for leaks of flammable substances from hoses and lines. Be sure to check for leaks from hoses or pipes, such as fuel and hydraulic fluid by following the maintenance check list.
- To avoid a fire, do not short across power cables and wires. Check to see that all power cables and wirings are in good condition. Keep all electrical connections clean. Bare wire or frayed insulation can cause a dangerous electrical shock and personal injury.



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7. ESCAPING FLUID

- Relieve all pressure in the air, the oil and the cooling systems before disconnecting any lines, fittings or related items.
- Be cautious of possible pressure relief when disconnecting any device from a pressurized system that utilizes pressure. DO NOT check for pressure leaks with your hand. High pressure oil or fuel can cause personal injury.
- Escaping fluid under pressure has sufficient force to penetrate skin causing serious personal injury.
- Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: do not use hands and body. Use safety goggles or other eye protection when checking for leaks.
- If injured by escaping fluid, see a medical doctor immediately. This fluid can produce gangrene or severe allergic reaction.



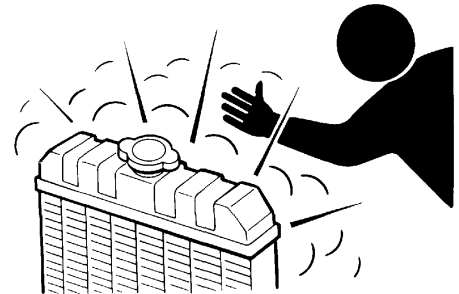
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8. CAUTIONS AGAINST BURNS & BATTERY EXPLOSION

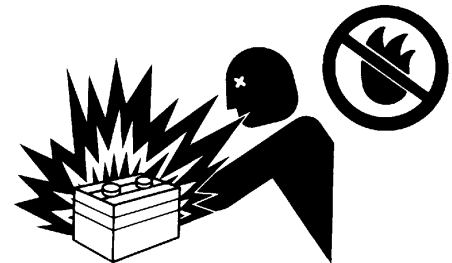
- To avoid burns, be cautious of hot components, e.g. muffler, muffler cover, radiator, hoses, engine body, coolants, engine oil, etc. during operation and after the engine has been shut off.
- DO NOT remove the radiator cap while the engine is running or immediately after stopping. Otherwise hot water will spout out from the radiator. Wait until the radiator is completely cool to the touch before removing the cap. Wear safety goggles.
- Be sure to close the coolant drain valve, secure the pressure cap, and fasten the pipe band before operating. If these parts are taken off, or loosened, it will result in serious personal injury.
- The battery presents an explosive hazard. When the battery is being charged, hydrogen and oxygen gases are extremely explosive.
- DO NOT use or charge the battery if its fluid level is below the LOWER mark. Otherwise, the component parts may deteriorate earlier than expected, which may shorten the service life or cause an explosion. Immediately, add distilled water until the fluid level is between the UPPER and LOWER marks.
- Keep sparks and open flames away from the battery, especially during charging. DO NOT strike a match near the battery.
- DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.
- DO NOT charge a frozen battery. There is a risk of explosion. When frozen, warm the battery up to at least 16°C (61°F).



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9. KEEP HANDS AND BODY AWAY FROM ROTATING PARTS

- Be sure to stop the engine before checking or adjusting the belt tension and cooling fan.
- Keep your hands and body away from rotating parts, such as the cooling fan, V-belt, fan drive V-belt, pulley or flywheel. Contact with rotating parts can cause severe personal injury.
- DO NOT run the engine without safety guards. Install safety guards securely before operation.



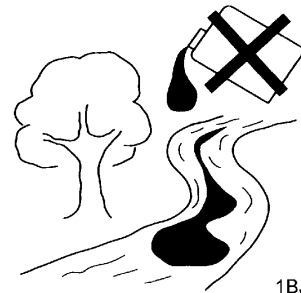
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10. ANTI-FREEZE & DISPOSAL OF FLUIDS

- Anti-freeze contains poison. Wear rubber gloves to avoid personal injury. In case of contact with skin, wash it off immediately.
- DO NOT mix different types of Anti-freeze. The mixture can produce a chemical reaction causing harmful substances. Use approved or genuine KUBOTA Anti-freeze.
- Be mindful of the environment and the ecology. Before draining any fluids, determine the correct way to dispose of them. Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.
- When draining fluids from the engine, place a suitable container underneath the engine body.
- DO NOT pour waste onto the ground, down a drain, or into any water source. Dispose of waste fluids according to environmental regulations.



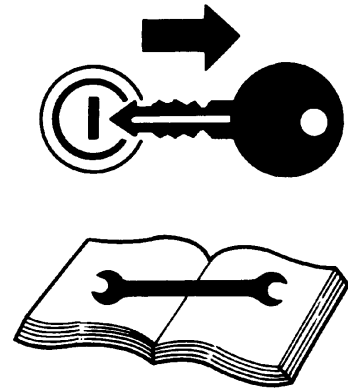
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11. CONDUCTING SAFETY CHECKS & MAINTENANCE

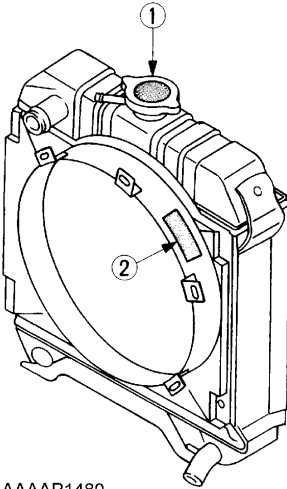
- When inspecting the engine or servicing, place the engine on a large flat surface. DO NOT work on anything that is supported ONLY by lift jacks or a hoist. Always use blocks or the correct stands to support the engine before servicing.
- Disconnect the battery from the engine before conducting service. Put a "DO NOT OPERATE!" tag on the key switch to avoid accidental starting.
- To avoid sparks from an accidental short circuit always disconnect the battery's ground cable (-) first and reconnect it last.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, service and cleaning.
- Check or conduct maintenance after the engine, coolant, muffler, or muffler cover have cooled off completely.
- Always use the appropriate tools and fixtures. Verify that they are in good condition before performing any service work. Make sure you understand how to use them before service.
- Use ONLY correct engine barring techniques for manually rotating the engine. DO NOT attempt to rotate the engine by pulling or prying on the cooling fan and V-belt. This practice can cause serious personal injury or premature damage to the cooling fan and belt.
- Replace fuel pipes and lubricant pipes with their hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and age gradually.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep a first aid kit and fire extinguisher handy at all times.



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12. WARNING AND CAUTION LABELS

- ① Part No.19077-8724-1 or 16667-8724-1
(55mm in diameter) (37mm in diameter)



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1ABACAAAP036K

- ② Part No.TA040-4957-1
Stay clear of engine fan and fan belt



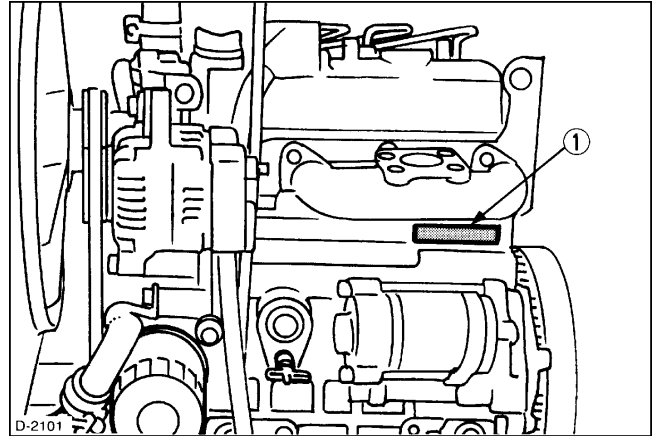
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13. CARE OF WARNING AND CAUTION LABELS

1. Keep warning and caution labels clean and free from obstructing material.
2. Clean warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing warning and caution labels with new labels from your local KUBOTA dealer.
4. If a component with warning and caution label(s) affixed is replaced with a new part, make sure the new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new warning and caution labels by applying to a clean dry surface and pressing any bubbles to the outside edge.

SERVICING OF THE ENGINE

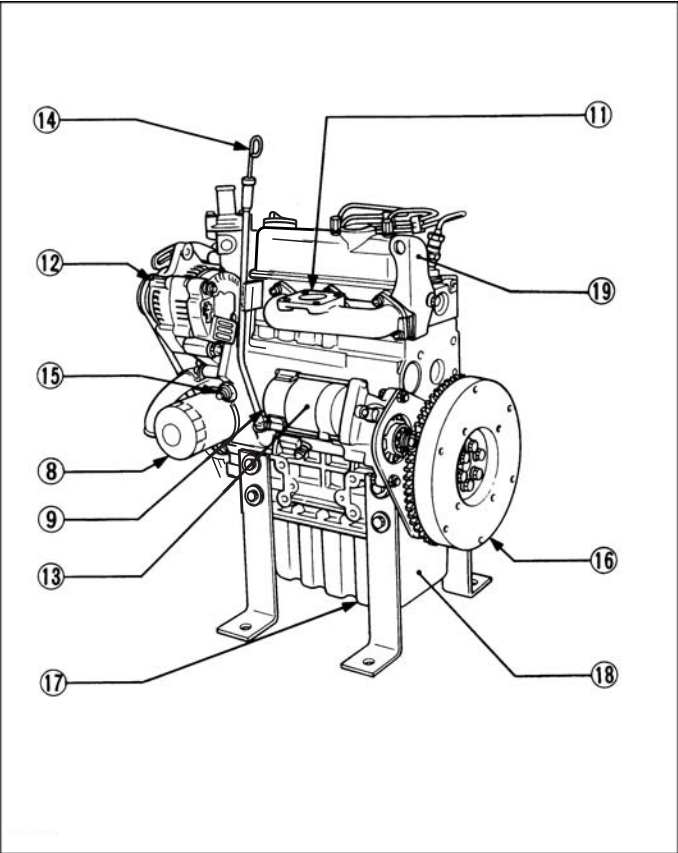
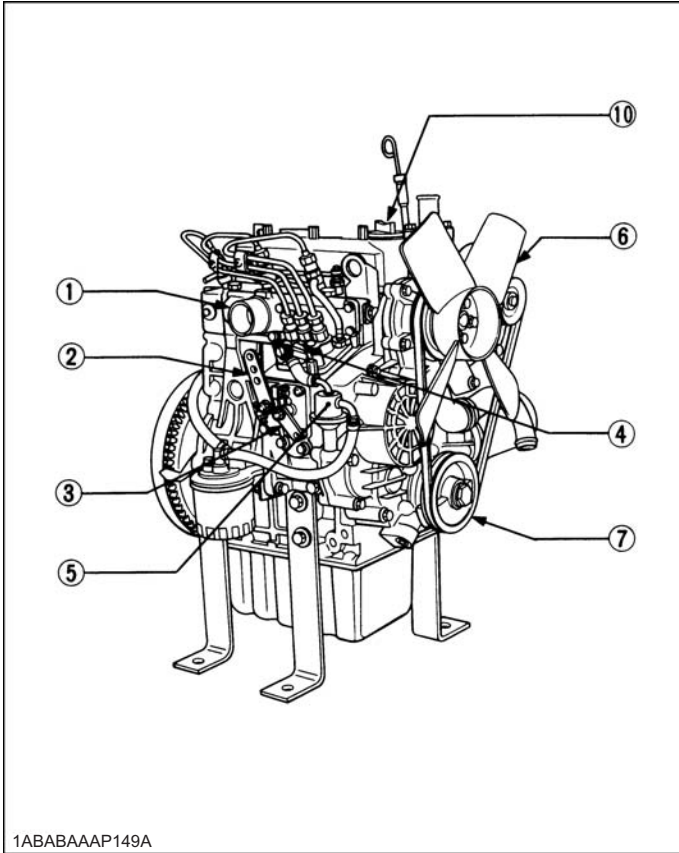
Your dealer is interested in your new engine and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself. However, when in need of parts or major service, be sure to see your KUBOTA dealer. For service, contact the KUBOTA Dealership from which you purchased your engine or your local KUBOTA dealer. When in need of parts, be prepared to give your dealer the engine serial number. Locate the serial number now and record them in the space provided.



(1) Engine serial number

	Type	Serial No.
Engine		
Date of Purchase		
Name of Dealer		
(To be filled in by purchaser)		

NAMES OF PARTS



1ABABAAAP149A

- (1) Intake manifold
- (2) Speed control lever
- (3) Engine stop lever
- (4) Injection pump
- (5) Fuel feed pump
- (6) Cooling fan
- (7) Fan drive pulley
- (8) Oil filter cartridge
- (9) Water drain cock

- (10) Oil filler plug
- (11) Exhaust manifold
- (12) Alternator
- (13) Starter
- (14) Oil level gauge
- (15) Oil pressure switch
- (16) Flywheel
- (17) Oil drain plug
- (18) Oil pan
- (19) Engine hook

PRE-OPERATION CHECK

BREAK-IN

During the engine break-in period, observe the following by all means:

1. Change engine oil and oil filter cartridge after the first 50 hours of operation. (See "ENGINE OIL" in "PERIODIC SERVICE" section.)
2. When ambient temperature is low, operate the machine after the engine has been completely warmed up.

DAILY CHECK

To prevent trouble from occurring, it is important to know the conditions of the engine well. Check it before starting.



CAUTION

To avoid personal injury:

- Be sure to install shields and safeguards attached to the engine when operating.
- Stop the engine at a flat and wide space when checking.
- Keep dust or fuel away from the battery, wiring, muffler and engine to prevent a fire. Check and clear them before operating everyday. Pay attention to the heat of the exhaust pipe or exhaust gas so that it can not ignite trash.

Item		Ref. page
1. Parts which had trouble in previous operation		-
2. By walking around the machine	(1) Oil or water leaks	15 to 20
	(2) Engine oil level and contamination	15
	(3) Amount of fuel	12
	(4) Amount of coolant	18
	(5) Dust in air cleaner dust cup	21
	(6) Damaged parts and loosened bolts and nuts	-
3. By inserting the key into the starter switch	(1) Proper functions of meters and pilot lamps; no stains on these parts	-
	(2) Proper function of glow lamp timer	-
4. By starting the engine	(1) Color of exhaust fumes	7
	(2) Unusual engine noise	7
	(3) Engine start-up condition	5
	(4) Slow-down and acceleration behavior	7

OPERATING THE ENGINE

STARTING THE ENGINE(NORMAL)



CAUTION

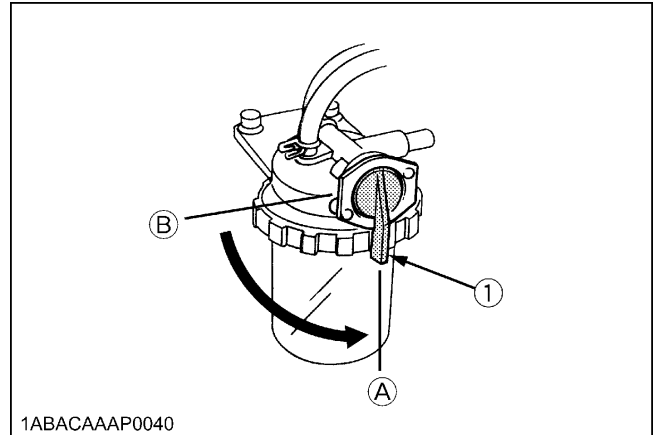
To avoid personal injury:

- Do not allow children to approach the machine while the engine is running.
- Be sure to install the machine on which the engine is installed, on a flat place.
- Do not run the engine on gradients.
- Do not run the engine in an enclosed area. Exhaust gas can cause air pollution and exhaust gas poisoning.
- Keep your hands away from rotating parts (such as fan, pulley, belt, flywheel etc.) during operation.
- Do not operate the machine while under the influence of alcohol or drugs.
- Do not wear loose, torn or bulky clothing around the machine. It may catch on moving parts or controls, leading to the risk of accident. Use additional safety items, e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.
- Do not wear radio or music headphones while operating engine.
- Check to see if it is safe around the engine before starting.
- Reinstall safeguards and shields securely and clear all maintenance tools when starting the engine after maintenance.

IMPORTANT :

- Do not use ether or any starting fluid for starting the engine, or a severe damage will occur.
- When starting the engine after a long storage (of more than 3 months), first set the stop lever to the "STOP" position and then activate the starter for about 10 seconds to allow oil to reach every engine part.

1. Set the fuel lever to the "ON" position.

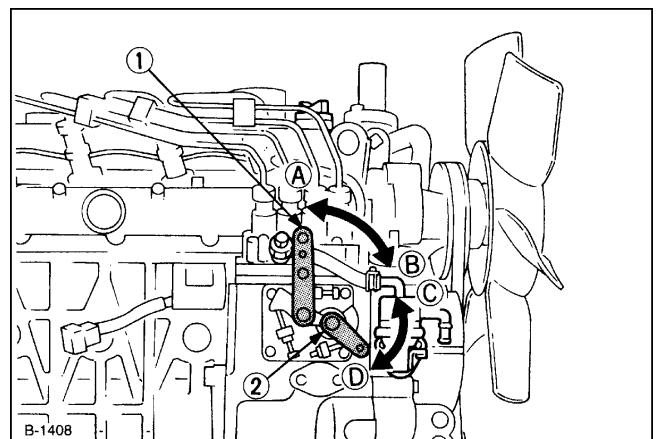


(1) Fuel lever

(A) "ON"
(B) "OFF"

2. Place the engine stop lever to the "START" position.

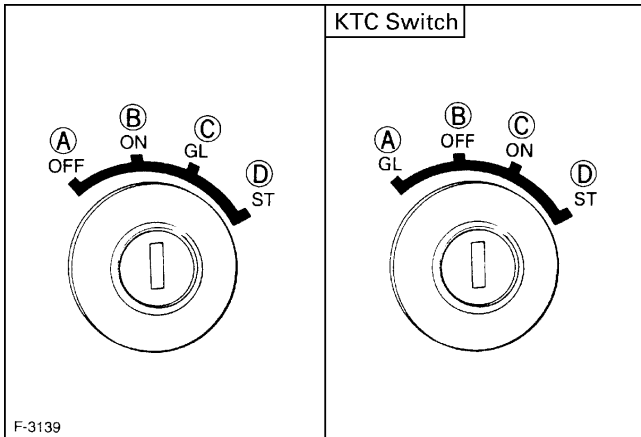
3. Place the speed control lever at more than half "OPERATION".



(1) Speed control lever
(2) Engine stop lever

(A) "IDLING"
(B) "OPERATION"
(C) "START"
(D) "STOP"

4. Insert the key into the key switch and turn it "ON".



- (A) "SWITCHED OFF"
- (B) "OPERATION"
- (C) "PREHEATING"
- (D) "STARTING"

5. Turn the starter switch to the "PREHEATING" position to allow the glow lamp to redden.

6. Turn the key to the "STARTING" position and the engine should start. Release the key immediately when the engine starts.

7. Check to see that the oil pressure lamp and charge lamp are off. If the lamps are still on, immediately stop the engine, and determine the cause. (See "CHECKS DURING OPERATION" in "OPERATING THE ENGINE" Section.)

NOTE :

- If the oil pressure lamp should be still on, immediately stop the engine and check;
 - if there is enough engine oil.
 - if the engine oil has dirt in it.
 - if the wiring is faulty.

8. Warm up the engine at medium speed without load.

IMPORTANT :

- If the glow lamp should redden too quickly or too slowly, immediately ask your KUBOTA dealer to check and repair it.

- If the engine does not catch or start at 10 seconds after the starter switch is set at "STARTING" position, wait for another 30 seconds and then begin the engine starting sequence again. Do not allow the starter motor to run continuously for more than 20 seconds.

COLD WEATHER STARTING

If the ambient temperature is below -5°C(23°F)* and the engine is very cold, start it in the following manner: Take steps (1) through (4) left.

5. Turn the key to the "PREHEATING" position and keep it there for a certain period mentioned below.

IMPORTANT :

- Shown below are the standard preheating times for various temperatures. This operation, however, is not required, when the engine is warmed up.

Ambient temperature	Preheating time	
	Ordinary heat type	With glow lamp timer
Above 10°C (50°F)	NO NEED	See NOTE:
10°C (50°F) to -5°C (23°F)	Approx. 5 seconds	
*Below -5°C (23°F)	Approx. 10 seconds	
Limit of continuous use	20 seconds	

NOTE :

- In case of installing standard glow lamp, glow lamp goes off after about 6 seconds, when the starter switch key is turned to preheating position. However if necessary, keep the starter switch key at preheating position for longer time, according to the left recommendation.

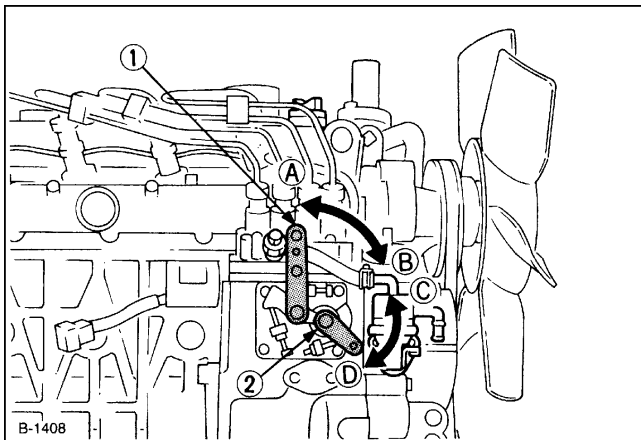
6. Turn the key to the "STARTING" position and the engine should start. (If the engine fails to start after 10 seconds, turn off the key for 5 to 30 seconds. Then repeat steps (5) and (6).)

IMPORTANT :

- Do not allow the starter motor to run continuously for more than 20 seconds.
- Be sure to warm up the engine, not only in winter, but also in warmer seasons. An insufficiently warmed-up engine can shorten its service life.
- When there is fear of temperature dropping below -15°C (5°F) detach the battery from the machine, and keep it indoors in a safe area, to be reinstalled just before the next operation.

STOPPING THE ENGINE

1. Return the speed control lever to low idle, and run the engine under idling conditions.
2. Set the engine stop lever to the "STOP" position.
3. With the starter switch placed to the "OFF" position, remove the key. (Be sure to return the engine stop lever to the "START" position to be ready for the next start.)



- | | |
|-------------------------|-----------------|
| (1) Speed control lever | (A) "IDLING" |
| (2) Engine stop lever | (B) "OPERATION" |
| | (C) "START" |
| | (D) "STOP" |

IMPORTANT :

- If equipped with a turbo-charger, allow the engine to idle for 5 minutes before shutting it off after a full load operation. Failure to do so may lead to turbo-charger trouble.

CHECKS DURING OPERATION

While running, make the following checks to see that all parts are working correctly.

■ Radiator Cooling water(Coolant)



WARNING

To avoid personal injury:

- Do not remove radiator cap until coolant temperature is well below its boiling point. Then loosen cap slightly to the stop position, to relieve any pressure, before removing cap completely.

When the engine overheats and hot coolant overflows through the radiator and hoses, stop the engine immediately and make the following checks to determine the cause of trouble:

Check item

1. Check to see if there is any coolant leak;
2. Check to see if there is any obstacle around the cooling air inlet or outlet;
3. Check to see if there is any dirt or dust between radiator fins and tube;
4. Check to see if the fan belt is too loose;
5. Check to see if radiator water pipe is clogged; and
6. Check to see if anti-freeze is mixed to a 50/50% mix of water and anti-freeze.

■ Oil pressure lamp

The lamp lights up to warn the operator that the engine oil pressure has dropped below the prescribed level. If this should happen during operation or should not go off even after the engine is accelerated more than 1000rpm, immediately stop the engine and check the following:

1. Engine oil level (See "ENGINE OIL" in "PERIODIC SERVICE" Section.)
2. Lubricant system (See "ENGINE OIL" in "PERIODIC SERVICE" Section.)

■ Fuel



CAUTION

To avoid personal injury:

- Fluid escaping from pinholes may be invisible. Do not use hands to search for suspected leaks; Use a piece of cardboard or wood, instead. If injured by escaping fluid, see a medical doctor at once. This fluid can produce gangrene or a severe allergic reaction.
- Check any leaks from fuel pipes or fuel injection pipes. Use eye protection when checking for leaks.

Be careful not to empty the fuel tank. Otherwise air may enter the fuel system, requiring fuel system bleeding. (See "FUEL" in "PERIODIC SERVICE" Section.)

■ Color of exhaust

While the engine is run within the rated output range:

- The color of exhaust remains colorless.
- If the output slightly exceeds the rated level, exhaust may become a little colored with the output level kept constant.
- If the engine is run continuously with dark exhaust emission, it may lead to trouble with the engine.

■ Immediately stop the engine if;

- The engine suddenly slows down or accelerates.
- Unusual noises are suddenly appear.
- Exhaust fumes suddenly become very dark.
- The oil pressure lamp or the water temperature alarm lamp lights up.

REVERSED ENGINE REVOLUTION AND REMEDIES



CAUTION

To avoid personal injury:

- Reversed engine operation can make the machine reverse and run it backwards. It may lead to serious trouble.
- Reversed engine operation may make exhaust gas gush out into the intake side and ignite the air cleaner; It could catch fire.

Reversed engine revolution must be stopped immediately since engine oil circulation is cut quickly, leading to serious trouble.

■ How to tell when the engine starts running backwards

1. Lubricating oil pressure drops sharply. Oil pressure warning light, if used, will light.
2. Since the intake and exhaust sides are reversed, the sound of the engine changes, and exhaust gas will come out of the air cleaner.
3. A louder knocking sound will be heard when the engine starts running backwards.

■ Remedies

1. Immediately set the engine stop lever to the "STOP" position to stop the engine.
2. After stopping the engine, check the air cleaner, intake rubber tube and then other parts and replace parts as needed.

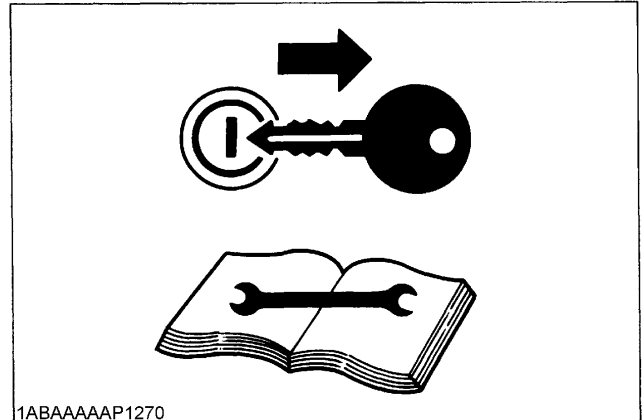
MAINTENANCE



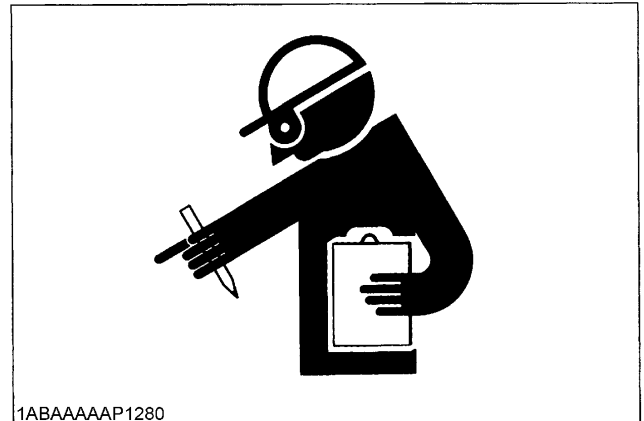
CAUTION

To avoid personal injury:

- Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and remove the key.
- Before allowing other people to use your engine, explain how to operate, and have them read this manual before operation.
- When cleaning any parts, do not use gasoline but use regular cleanser.
- Always use proper tools, that are in good condition. Make sure you understand how to use them, before performing any service work.
- When installing, be sure to tighten all bolts lest they should be loose. Tighten the bolts by the specified torque.
- Do not put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.



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SERVICE INTERVALS

Observe the following for service and maintenance.

The lubricating oil change intervals listed in the table below are for Class CF lubricating oil of API classification with a low-sulfur fuel in use. If the CF-4, CG-4, CH-4 or CI-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

Interval	Item	Ref. page		
Every 50 hours	Check of fuel pipes and clamp bands	14		@
See NOTE	Change of engine oil	15 to 17	☉	
Every 100 hours	Cleaning of air cleaner element	21	*1	@
	Cleaning of fuel filter	14		
	Check of battery electrolyte level	22		
	Check of fan belt tightness	24		
	Draining water separator	-		
Every 200 hours	Check of radiator hoses and clamp bands	19		
	Replacement of oil filter cartridge (oil pan depth: 90 mm (3.54 in.))	17	☉	
	Check of intake air line	-		@
Every 400 hours	Replacement of oil filter cartridge (oil pan depth: 124 mm (4.88 in.))	17		@
	Cleaning of water separator	-		
Every 500 hours	Removal of sediment in fuel tank	-		
	Cleaning of water jacket (radiator interior)	18 to 20		
	Replacement of fan belt	24		
Every one or two months	Recharging of battery	22,23		
Every year	Replacement of air cleaner element	21	*2	@
	Check of damage in electric wiring and loose connections	-		
Every 800 hours	Check of valve clearance	26		
Every 1500 hours	Check of fuel injection nozzle injection pressure	-	*3	@
Every 3000 hours	Check of turbo charger	-	*3	@
	Check of injection pump	-	*3	@
Every two years	Change of radiator coolant (L.L.C.)	19 to 20		
	Replacement of battery	22,23		
	Replacement of radiator hoses and clamp bands	19		
	Replacement of fuel pipes and clamp bands	14	*3	@
	Replacement of intake air line	-	*4	@

IMPORTANT :

- The jobs indicated by ☉ must be done after the first 50 hours of operation.
- *1 Air cleaner should be cleaned more often in dusty conditions than in normal conditions.
- *2 After 6 times of cleaning.
- *3 Consult your local KUBOTA Dealer for this service.
- *4 Replace only if necessary.
- When the battery is used for less than 100 hours in a year, check its electrolyte yearly. (for refillable battery's only)
- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.
Please see the Warranty Statement in detail.

NOTE :● **Changing interval of engine oil**

Models	Oil pan depth	
	Above 125 mm (4.9 in.) (110 mm D1305-E3)	*below 101 mm (4.0 in.)
All models	200 Hrs	150 Hrs
Initial	50 Hrs	

* 101 mm oil pan depth is optional.

**Standard replacement interval

- API service classification: above CF grade
- Ambient temperature: below 35°C (95°F)

NOTE :**Lubricating oil**

With strict emission control regulations now in effect, the CF-4 and CG-4 engine oils have been developed for use with low sulfur fuels, for On-Highway vehicle engines. When a Non-Road engine runs on high sulfur fuel, it is advisable to use a "CF or better" classification engine oil with a high Total Base Number (a minimum TBN of 10 is recommended).

● **Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.**

○ : Recommendable × : Not recommendable

Lubricating oil classification	**Fuel		Remarks
	Low-sulfur	High-sulfur	
CF	○	○	*TBN \geq 10
CF-4	○	×	
CG-4	○	×	
CH-4	○	×	
CI-4	○	×	

*TBN: Total Base Number

**Fuel

- Diesel Fuel Specification Type and Sulfur Content % (ppm) used, must be compliant with all applicable emission regulations for the area in which the engine is operated.
- Use of diesel fuel with sulfur content less than 0.10 % (1000 ppm) is strongly recommended.
- If high-sulfur fuel (sulfur content 0.50 % (5000 ppm) to 1.0 % (10000 ppm)) is used as a diesel fuel, change the engine oil and oil filter at shorter intervals. (approximately half).
- DO NOT USE Fuels that have sulfur content greater than 1.0 % (10000 ppm).
- Since KUBOTA diesel engines of less than 56 kW (75 hp) utilize EPA Tier 4 and Interim Tier 4 standards, the use of low sulfur fuel or ultra low sulfur fuel is mandatory for these engines, when operated in US EPA regulated areas. Therefore, please use No.2-D S500 or S15 diesel fuel as an alternative to No.2-D, and use No.1-D S500 or S15 diesel fuel as an alternative to No.1-D for ambient temperatures below -10°C (14°F).
1) No.1-D or No.2-D, S500 : Low Sulfur Diesel (LSD) less than 500 ppm or 0.05 wt.%
No.1-D or No.2-D, S15 : Ultra Low Sulfur Diesel (ULSD) 15 ppm or 0.0015 wt.%
- CJ-4 classification oil is intended for use in engines equipped with DPF (Diesel Particulate Filter) and is Not Recommended for use in Kubota E3 specification engines.

- Oil used in the engine should have API classification and Proper SAE Engine Oil according to the ambient temperatures as shown below:

Above 25°C (77°F)	SAE30, SAE10W-30 or 10W-40
0 to 25°C (32°F to 77°F)	SAE20, SAE10W-30 or 10W-40
Below 0°C (32°F)	SAE10W, SAE10W-30 or 10W-40

- Recommended API classification
 Refer to the following table for the suitable American Petroleum Institute (API) classification of engine oil according to the engine type (with internal EGR, external EGR or non-EGR) and the Fuel Type Used : (Low Sulfur, Ultra Low Sulfur or High Sulfur Fuels).

Fuel type	Engine oil classification (API classification)	
	Engines with non-EGR Engines with internal EGR	Engines with external EGR
High Sulfur Fuel [0.05 % (500 ppm) ≤ Sulfur Content < 0.50 % (5000 ppm)]	CF (If the "CF-4, CG-4, CH-4 or CI-4" engine oil is used with a high-sulfur fuel, change the engine oil at shorter intervals. (approximately half))	---
Low Sulfur Fuel [Sulfur Content < 0.05 % (500 ppm)] or Ultra Low Sulfur Fuel [Sulfur Content < 0.0015 % (15 ppm)]	CF, CF-4, CG-4, CH-4 or CI-4	CF or CI-4 (Class CF-4, CG-4 and CH-4 engine, oils cannot be used on EGR type engines.)

EGR: Exhaust Gas Re-circulation

PERIODIC SERVICE

FUEL

Fuel is flammable and can be dangerous. You should handle fuel with care.



CAUTION

To avoid personal injury:

- Do not mix gasoline or alcohol with diesel fuel. This mixture can cause an explosion.
- Be careful not to spill fuel during refueling. If fuel should spill, wipe it off at once, or it may cause a fire.
- Do not fail to stop the engine before refueling. Keep the engine away from the fire.
- Be sure to stop the engine while refueling or bleeding and when cleaning or changing fuel filter or fuel pipes. Do not smoke when working around the battery or when refueling.
- Check the fuel systems at a well ventilated and wide place.
- When fuel and lubricant are spilled, refuel after letting the engine cool off.
- Always keep spilled fuel and lubricant away from engine.

Fuel level check and refueling

1. Check to see that the fuel level is above the lower limit of the fuel level gauge.
2. If the fuel is too low, add fuel to the upper limit. Do not overfill.

Flash Point, °C (°F)	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuum, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

Distillation Temperatures, °C(°F) 90% Point		Viscosity Kinematic cSt or mm ² /s at 40°C		Viscosity Saybolt, SUS at 37.8°C(100°F)	
Min	Max	Min	Max	Min	Max
282 (540)	338 (640)	1.9	4.1	32.6	40.1

Sulfur, weight %	Copper Strip Corrosion	Cetane Number
Max	Max	Min
0.50	No. 3	40

- Cetane Rating : The minimum recommended Fuel Cetane Rating is 45. A cetane rating greater than 50 is preferred, especially for ambient temperatures below -20 °C (-4 °F) or elevations above 1500 m (5000 ft).
- Diesel Fuel Specification Type and Sulfur Content % (ppm) used, must be compliant with all applicable emission regulations for the area in which the engine is operated.
- Use of diesel fuel with sulfur content less than 0.10 % (1000 ppm) is strongly recommended.
- If high-sulfur fuel (sulfur content 0.50 % (5000 ppm) to 1.0 % (10000 ppm)) is used as a diesel fuel, change the engine oil and oil filter at shorter intervals. (approximately half).
- DO NOT USE Fuels that have sulfur content greater than 1.0 % (10000 ppm).
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)
- Since KUBOTA diesel engines of less than 56 kW (75 hp) utilize EPA Tier 4 and Interim Tier 4 standards, the use of low sulfur fuel or ultra low sulfur fuel is mandatory for these engines, when operated in US EPA regulated areas. Therefore, please use No.2-D S500 or S15 diesel fuel as an alternative to No.2-D, and use No.1-D S500 or S15 diesel fuel as an alternative to No.1-D for ambient temperatures below -10 °C (14 °F).
 - 1) SAE : Society of Automotive Engineers
 - 2) EN : European Norm
 - 3) ASTM : American Society of Testing and Materials
 - 4) US EPA : United States Environmental Protection Agency
 - 5) No.1-D or No.2-D, S500 : Low Sulfur Diesel (LSD) less than 500 ppm or 0.05 wt.% No.1-D or No.2-D, S15 : Ultra Low Sulfur Diesel (ULSD) 15 ppm or 0.0015 wt.%

IMPORTANT :

- Be sure to use a strainer when filling the fuel tank, or dirt or sand in the fuel may cause trouble in the fuel injection pump.
- For fuel, always use diesel fuel. You are required not to use alternative fuel, because its quality is unknown or it may be inferior in quality. Kerosene, which is very low in cetane rating, adversely affects the engine. Diesel fuel differs in grades depending on the temperature.
- Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.

■ Air bleeding the fuel system

CAUTION

To avoid personal injury;

- Do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.

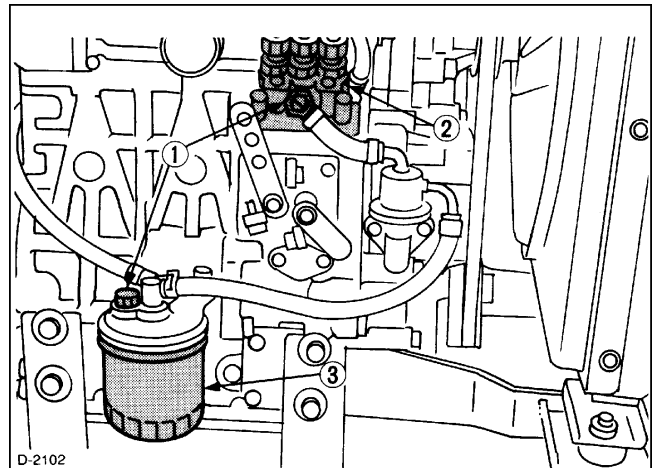
Air bleeding of the fuel system is required if;

- after the fuel filter and pipes have been detached and refitted;
- after the fuel tank has become empty; or
- before the engine is to be used after a long storage.

[PROCEDURE (A)] (gravity feed fuel tanks only)

1. Fill the fuel tank to the fullest extent. Open the fuel filter lever.
2. Loosen air vent plug of the fuel filter a few turns.
3. Screw back the plug when bubbles do not come up any more.
4. Open the air vent plug on top of the fuel injection pump.
5. Retighten the plug when bubbles do not come up any more.

[GRAVITY FEED SYSTEM]



- (1) Air vent plug
- (2) Injection pump
- (3) Fuel filter

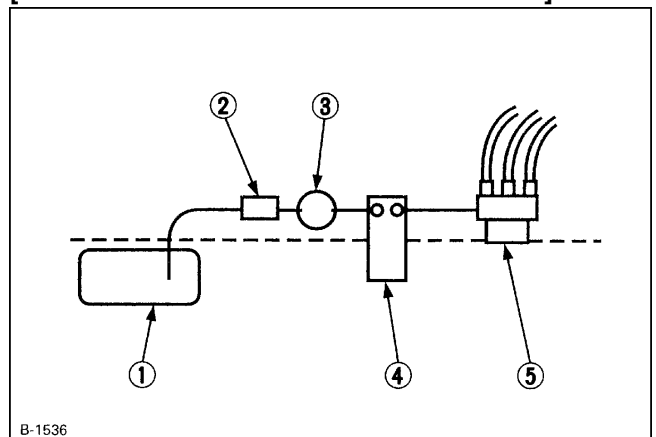
[PROCEDURE (B)] (fuel tanks lower than injection pump)

1. For fuel tanks that are lower than the injection pump. The fuel system must be pressurized by the fuel system electric fuel pump.
2. If an electric fuel pump is not used, you must manually actuate the pump by lever to bleed.
3. The primary fuel filter (3) must be on the pressure side of the pump if the fuel tank is lower than the injection pump.
4. To bleed follow (2) through (5) above. (PROCEDURE (A))

IMPORTANT :

- Tighten air vent plug of the fuel injection pump except when bleeding, or it may stop the engine suddenly.

[TANK BELOW INJECTION PUMP SYSTEM]



- (1) Fuel tank below injection pump
- (2) Pre-filter
- (3) Electric or Mechanical pump
- (4) Main Filter
- (5) Injection pump

■ Checking the fuel pipes



CAUTION

To avoid personal injury;

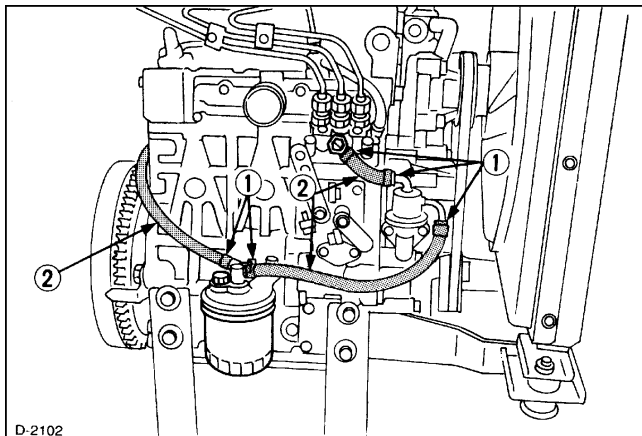
- Check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.

Check the fuel pipes every 50 hours of operation. When if;

1. If the clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. If the fuel pipes, made of rubber, became worn out, replace them and clamp bands every 2 years.
3. If the fuel pipes and clamp bands are found worn or damaged before 2 years' time, replace or repair them at once.
4. After replacement of the pipes and bands, air-bleed the fuel system.

IMPORTANT :

- When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dirt in the pipes can cause fuel injection pump malfunction.

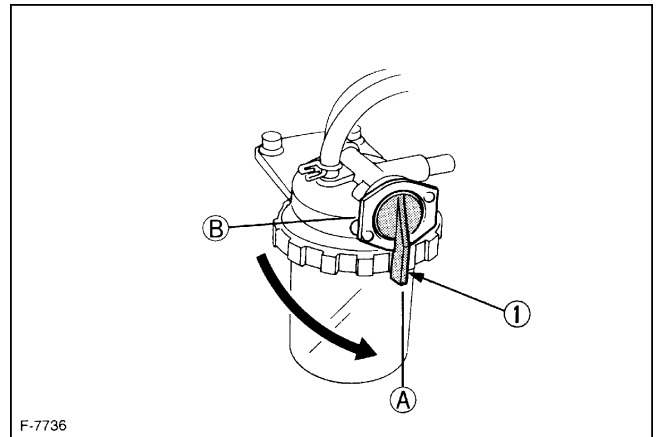


- (1) Clamp band
(2) Fuel pipe

■ Cleaning the fuel filter pot

Every 100 hours of operation, clean the fuel filter in a clean place to prevent dust intrusion.

1. Close the fuel filter lever.

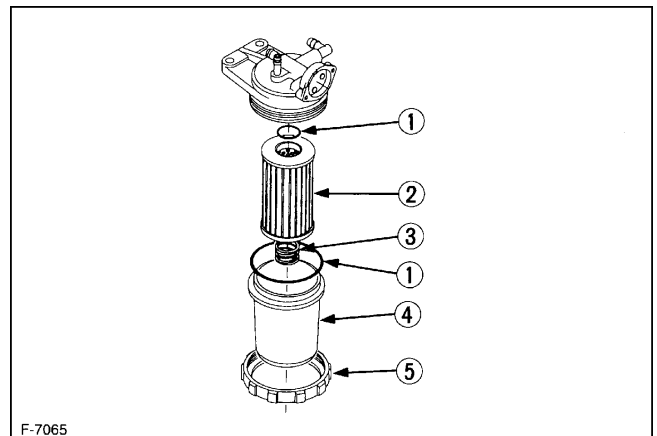


- (1) Fuel filter lever (A) "OFF"
(2) Fuel filter pot (B) "ON"

2. Remove the top cap, and rinse the inside with diesel fuel.
3. Take out the element, and rinse it with diesel fuel.
4. After cleaning, reinstall the fuel filter, keeping out of dust and dirt.
5. Air-bleed the injection pump.

IMPORTANT :

- Entrance of dust and dirt can cause a malfunction of the fuel injection pump and the injection nozzle. Wash the fuel filter cup periodically.



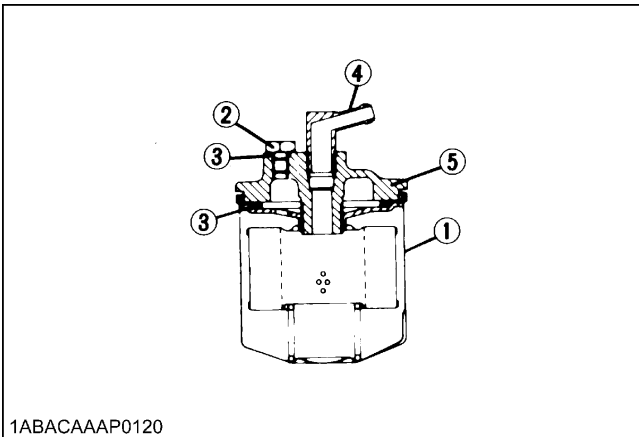
- (1) O ring
(2) Filter element
(3) Spring
(4) Filter bowl
(5) Screw ring

■ Fuel filter cartridge replacement

1. Replace the fuel filter cartridge with a new one every 400 operating hours.
2. Apply fuel oil thinly over the gasket and tighten the cartridge into position by hand-tightening only.
3. Finally, vent the air.

IMPORTANT :

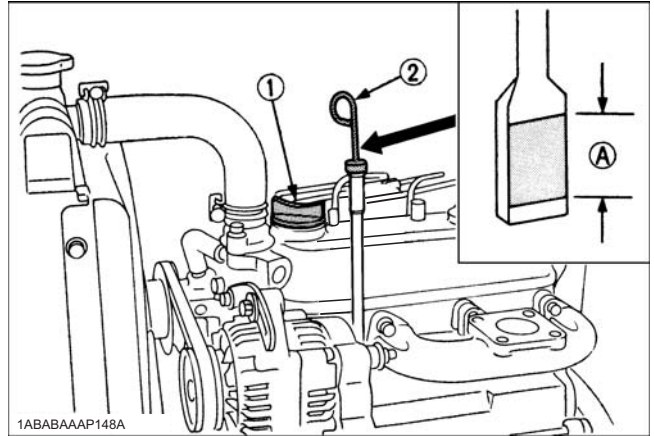
- Replace the fuel filter cartridge periodically to prevent wear of the fuel injection pump plunger or the injection nozzle, due to dirt in the fuel.



- (1) Fuel filter cartridge
- (2) Air vent plug
- (3) O ring
- (4) Pipe joint
- (5) Cover

■ Checking oil level and adding engine oil

1. Check the engine oil level before starting or more than 5 minutes after stopping the engine.
2. Remove the oil level gauge, wipe it clean and reinstall it.
3. Take the oil level gauge out again, and check the oil level.



- (1) Oil filler plug
- (2) Oil level gauge

[Lower end of oil level gauge]
(A) Engine oil level within this range is proper.

ENGINE OIL

⚠ CAUTION

To avoid personal injury:

- Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result. Always stop the engine and allow it to cool before conducting inspections, maintenance, or for a cleaning procedure.
- Contact with engine oil can damage your skin. Put on gloves when using engine oil. If you come in contact with engine oil, wash it off immediately.

NOTE :

- Be sure to inspect the engine, locating it on a level place. If placed on gradients accurately, oil quantity may not be measured.

4. If the oil level is too low, remove the oil filler plug, and add new oil to the prescribed level.
5. After adding oil, wait more than 5 minutes and check the oil level again. It takes some time for the oil to drain down to the oil pan.

Engine oil quantity

Model	Quantity
D1005-E3, D1105-E3, D1105-TE3	5.1 L (1.35 U.S. gals.)
D1305-E3	5.7 L (1.51 U.S. gals.)
V1505-E3	6.0 L (1.59 U.S. gals.)
V1505-TE3	6.7 L (1.77 U.S. gals.)

Oil quantities shown are for standard oil pans.

IMPORTANT :

- Engine oil should be MIL-L-2104C or have properties of API classification CF or higher. Change the type of engine oil according to the ambient temperature.

above 25°C (77°F)	SAE30 or SAE10W-30 SAE10W-40
0°C to 25°C (32°F to 77°F)	SAE20 or SAE10W-30 SAE10W-40
below 0°C (32°F)	SAE10W or SAE10W-30 SAE10W-40

- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

■ Changing engine oil

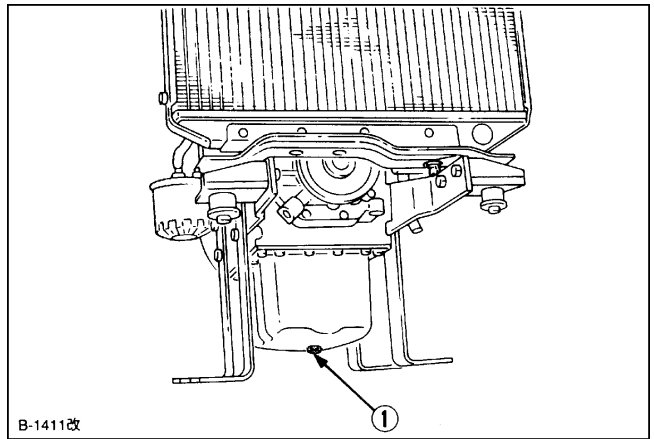


CAUTION

To avoid personal injury:

- Be sure to stop the engine before draining engine oil.
- When draining engine oil, place some container underneath the engine and dispose it according to local regulations.
- Do not drain oil after running the engine. Allow engine to cool down sufficiently.

1. Change oil after the initial 50 hours of operation and every 200 hours thereafter.
2. Remove the drain plug at the bottom of the engine, and drain all the old oil. Drain oil will drain easier when the oil is warm.



B-1411改

(1) Oil drain plug

3. Add new engine oil up to the upper limit of the oil level gauge.

■ Replacing the oil filter cartridge

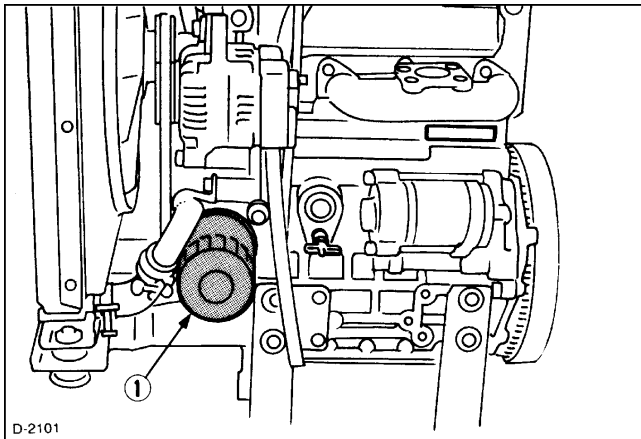


CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and cause burns.

1. Replace the oil filter cartridge after the initial 50 hours of operation and every 200 hours thereafter.
2. Remove the old oil filter cartridge with a filter wrench.
3. Apply a film of oil to the gasket for the new cartridge.
4. Screw in the cartridge by hand. When the gasket contacts the seal surface, tighten the cartridge enough by hand. Because, if you tighten the cartridge with a wrench, it will be tightened too much.



D-2101

- (1) Oil filter cartridge
Remove with a filter wrench
(Tighten with your hand)

5. After the new cartridge has been replaced, the engine oil level normally decreases a little. Thus, run the engine for a while and check for oil leaks through the seal before checking the engine oil level. Add oil if necessary.

NOTE :

- Wipe off any oil sticking to the machine completely.

RADIATOR

Coolant will last for one day's work if filled all the way up before operation start. Make it a rule to check the coolant level before every operation.



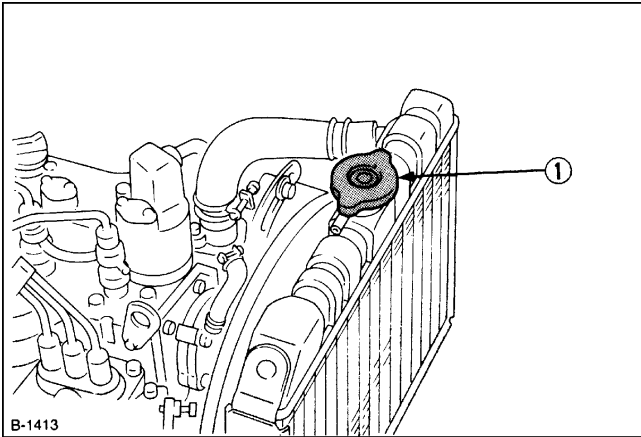
WARNING

To avoid personal injury:

- Do not stop the engine suddenly, stop it after about 5 minutes of unloaded idling.
- Work only after letting the engine and radiator cool off completely (more than 30 minutes after it has been stopped).
- Do not remove the radiator cap while coolant is hot. When cool to the touch, rotate cap to the first stop to allow excess pressure to escape. Then remove cap completely. If overheats should occur, steam may gush out from the radiator or recovery tank; Severe burns could result.

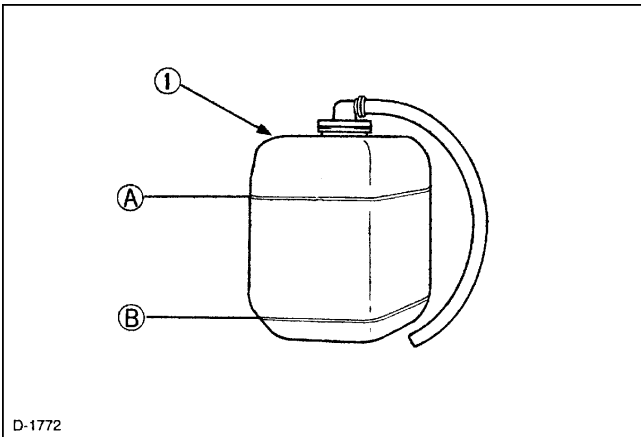
■ Checking coolant level, adding coolant

1. Remove the radiator cap, after the engine has completely cooled, and check to see that coolant reaches the supply port.



(1) Radiator pressure cap

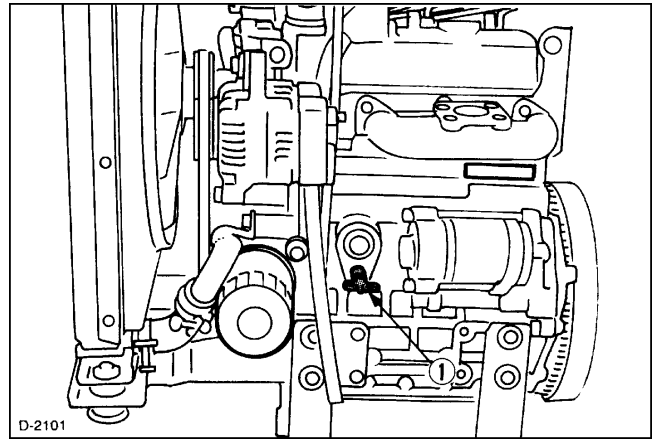
2. If the radiator is provided with a recovery tank, check the coolant level of the recovery tank. When it is between the "FULL" and "LOW" marks, the coolant will last for one day's work.



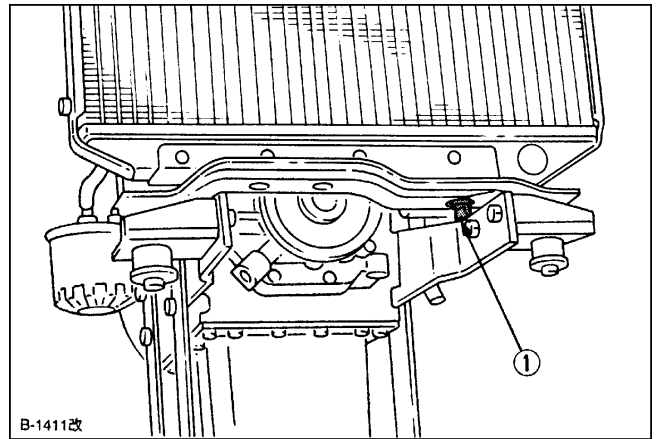
(1) Recovery tank

(A) "FULL"
(B) "LOW"

3. When the coolant level drops due to evaporation, add water only up to the full level.
4. Check to see that two drain cocks; one is at the crankcase side and the other is at the lower part of the radiator as figures below.



D-2101



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(1) Coolant drain cock

IMPORTANT :

- If the radiator cap has to be removed, follow the caution and securely retighten the cap.
- If coolant should be leak, consult your local KUBOTA dealer.
- Make sure that muddy or sea water does not enter the radiator.
- Use clean, fresh water and 50% anti-freeze to fill the recovery tank.
- Do not refill recovery tank with coolant over the "FULL" level mark.
- Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and decrease quickly.

■ Changing coolant

1. To drain coolant, always open both drain cocks and simultaneously open the radiator cap as well. With the radiator cap kept closed, a complete drain of water is impossible.
2. Remove the overflow pipe of the radiator pressure cap to drain the recovery tank.
3. Prescribed coolant volume (U.S.gallons)

Models	Quantity
D1005-E3, D1105-E3, D1105-TE3, D1305-E3	3.1 L (0.82 U.S.gals.)
V1505-E3	4.0 L (1.06 U.S.gals.)
V1505-TE3	5.0 L (1.32 U.S.gals.)

NOTE :

- Coolant quantities shown are for standard radiators.
4. An improperly tightened radiator cap or a gap between the cap and the seat quickens loss of coolant.
 5. Coolant (Radiator cleaner and anti-freeze)

Season	Coolant
Summer	Pure water and radiator cleaner
Winter (when temperature drops below 0°C (32°F)) or all season	Pure water and anti-freeze (See "Anti-freeze" in "RADIATOR" section.)

■ Remedies for quick decrease of coolant

1. Check any dust and dirt between the radiator fins and tube. If any, remove them from the fins and the tube.
2. Check the tightness of the fan belt. If loose, tighten it securely.
3. Check the internal blockage in the radiator hose. If scale forms in the hose, clean with the scale inhibitor or its equivalent.

■ Checking radiator hoses and clamp



CAUTION

To avoid personal injury:

- **Be sure to check radiator hoses and hose clamps periodically. If radiator hose is damaged or coolant leaks, overheats or severe burns could occur.**

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten hose clamp securely.
 2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.
- Replace hoses and hose clamps every 2 years or earlier, if checked and found that hoses are swollen, hardened or cracked.

■ Precaution at overheating

Take the following actions in the event the coolant temperature is nearly or more than the boiling point, what is called "Overheating". Take these actions if the engine's alarm buzzer sounds or the alarm lamp lights up.

1. Stop the engine operation in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly. Stop it after about 5 minutes of unloaded idling.
3. If the engine stalls within about 5 minutes of running under no load, immediately leave and keep yourself away from the machine. Do not open the hood and any other part.
4. Keep yourself and others well away from the engine for further 10 minutes or while the steam blown out.
5. Checking that there gets no danger such as burn, get rid of the causes of overheating according to the manual, see "TROUBLESHOOTING" section. And then, start again the engine.

■ Cleaning radiator core(outside)

If dust is between the fin and tube, wash it away with running water.

IMPORTANT :

- Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage specified fin or tube. It can cause coolant leaks or decrease cooling performance.

■ Anti-freeze

 **CAUTION**

To avoid personal injury:

- When using anti-freeze, put on some protection such as rubber gloves (Anti-freeze contains poison.).
- If should drink anti-freeze, throw up at once and take medical attention.
- When anti-freeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of anti-freeze. The mixture can produce chemical reaction causing harmful substances.
- Anti-freeze is extremely flammable and explosive under certain conditions. Keep fire and children away from anti-freeze.
- When draining fluids from the engine, place some container underneath the engine body.
- Do not pour waste onto the grounds, down a drain, or into any water source.
- Also, observe the relevant environmental protection regulations when disposing of anti-freeze.

Always use a 50/50 mix of long-life coolant and clean soft water in KUBOTA engines.

Contact KUBOTA concerning coolant for extreme conditions.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, flush the radiator with fresh water. Repeat this procedure 2 or 3 times to clean up the radiator and engine block from inside.
3. Mixing the LLC
Premix 50% LLC with 50% clean soft water. When mixing, stir it up well, and then fill into the radiator.
4. The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze. Refer to SAE J1034 standard, more specifically also to SAE J814c.

Vol % Anti-freeze	Freezing Point		Boiling Point *	
	°C	°F	°C	°F
50	-37	-34	108	226

*At 1.013 x 10⁵Pa (760 mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

5. Adding the LLC
 - (1) Add only water if the coolant level reduces in the cooling system by evaporation.
 - (2) If there is a coolant leak, add the LLC of the same manufacturer and type in the same coolant percentage.

*Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anti-corrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

NOTE :

- The above data represent industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.

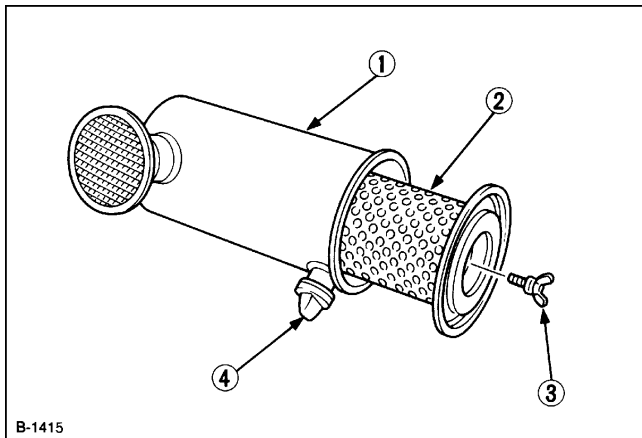
■ Radiator cement

As the radiator is solidly constructed, there is little possibility of water leakage. Should this happen, however, radiator cement can easily fix it. If leakage is serious, contact your local KUBOTA dealer.

AIR CLEANER

Since the air cleaner employed on this engine is a dry type, never apply oil to it.

1. Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place. This will get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth if it is dirty or wet.
3. Avoid touching the element except when cleaning.
4. When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm², 30 psi).
5. Replace the element every year or every 6 cleanings.



- (1) Air cleaner body
- (2) Element
- (3) Wing bolt
- (4) Evacuator valve

IMPORTANT :

- Make sure the wing bolt for the element is tight enough. If it is loose, dust and dirt may be sucked in, wearing down the cylinder liner and piston ring earlier and thereby resulting in poor power output.
- Do not overservice the air cleaner element. Overservicing may cause dirt to enter the engine causing premature wear. Use the dust indicator as a guide on when to service.

■ Evacuator valve

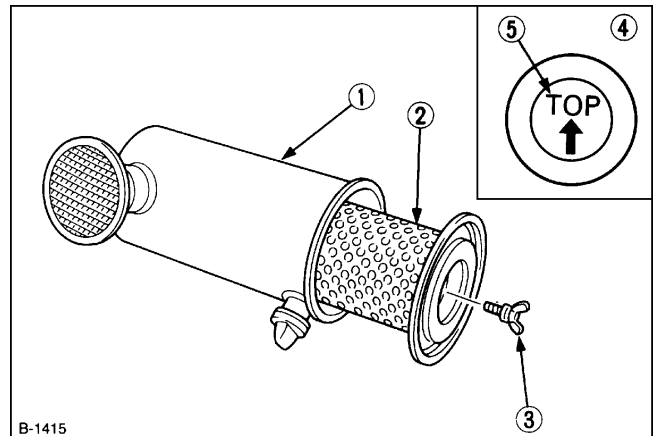
Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place - to get rid of large particles of dust and dirt.

■ For the air cleaner with a dust cup (optional)

Remove and clean out the dust cup before it becomes half full with dust; usually once a week, or even every day if the working surroundings are dusty. Install the air cleaner dust cup with "TOP" indicated on the rear of the cup in the up position. (However, it may be installed in either direction when the cover is placed at the lower part.)

IMPORTANT :

- If the dust cup is mounted incorrectly, dust or dirt does not collect in the cup, and direct attachments of the dust to the element will cause its lifetime to shorten to a great extent.

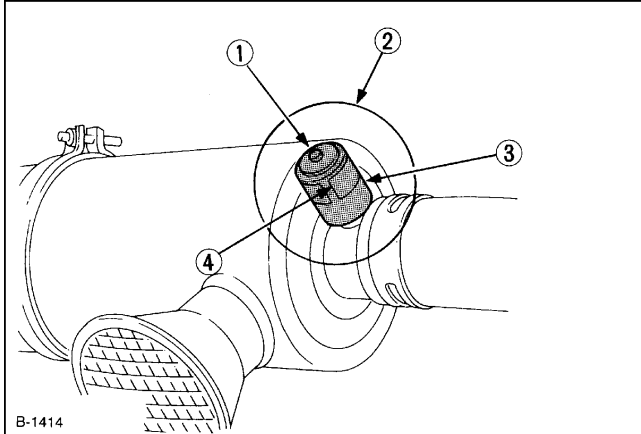


- (1) Air cleaner body
- (2) Element
- (3) Wing bolt
- (4) Dust cup
- (5) "TOP" mark

Dust indicator (optional)

If the red signal on the dust indicator attached to the air cleaner is visible, the air cleaner has reached the service level.

Clean the element immediately, and reset the signal with the "RESET" button.



- (1) "RESET" button
- (2) Dust indicator
- (3) Service level
- (4) Signal

BATTERY**CAUTION**

To avoid personal injury:

- Be careful not to let the battery electrolyte contact your body or clothing.
- Wear eye protection and rubber gloves, since the diluted sulfuric acid solution burns skin and eats holes in clothing. Should this occur, immediately wash it off with running water and get medical attention.

Mishandling of the battery shortens the service life and adds to maintenance costs. Obtain the maximum performance and the longest life of the battery by handling properly and with care.

Engine starting will be more difficult, if the battery charge is low. Be careful to recharge it at an early occasion before it is too late.

Battery charging**DANGER**

The battery comes in two types: refillable and non-refillable.

- For using the refillable type battery, follow the instructions below.

Do not use or charge the battery if its fluid level stands below the LOWER (lower limit level) mark.

Otherwise, the battery component parts may deteriorate earlier than expected, which may shorten the battery's service life or cause an explosion.

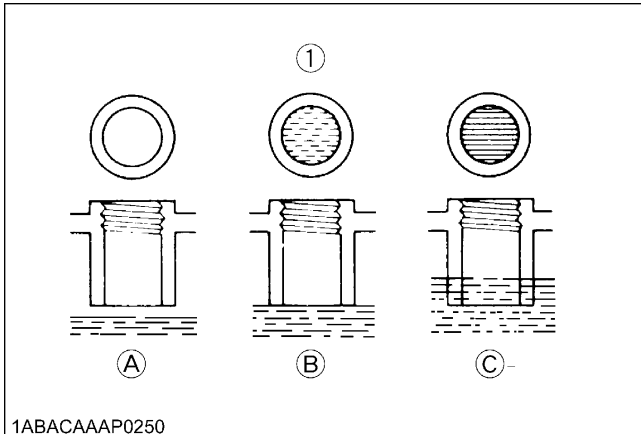
Immediately, add distilled water until the battery's fluid level is between the UPPER and LOWER levels.

**CAUTION**

To avoid personal injury:

- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging the battery, remove the battery vent plugs.
- When disconnecting the cable from the battery, start with the negative terminal, and when connecting them, start with the positive terminal first.
- DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.

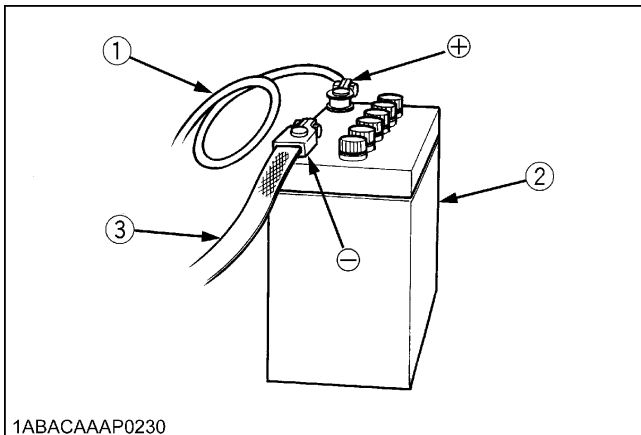
1. Make sure each electrolyte level is to the bottom of vent wells, if necessary, add only distilled water in a well-ventilated place.



1ABACAAAP0250

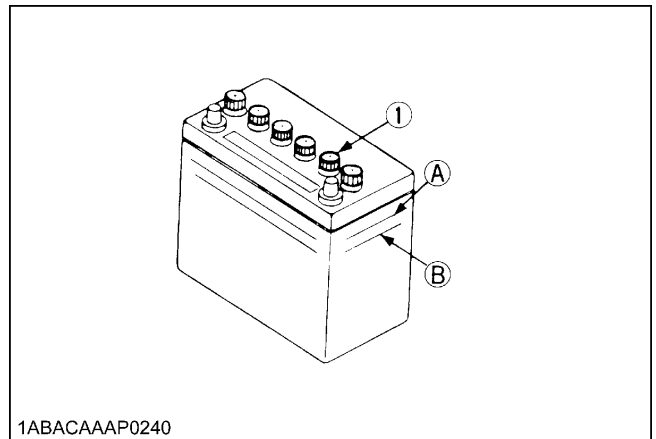
- (1) Battery electrolyte level
- (A) "TOO LOW"
 - (B) "PROPER"
 - (C) "TOO HIGH"

2. To slow charge the battery, connect the charger positive terminal to the battery positive terminal, and the negative to the negative, then recharge in the standard fashion.
3. Quick recharging charges the battery at a high rate in a short time. This is only for emergencies.
4. Recharge the battery as early as possible, or battery life will be extremely shortened.
5. When exchanging an old battery for a new one, use battery of equal specification shown in **Page 28, 29, 30.**



1ABACAAAP0230

- (1) Thick cable red(+)
- (2) Battery case
- (3) Earth cable black(-)



1ABACAAAP0240

- (1) Plug
- (A) "HIGHEST LEVEL"
- (B) "LOWEST LEVEL"

IMPORTANT :

- Connect the charger positive terminal to the battery positive terminal, and negative to the negative.
- When disconnecting the cable from the battery, start with the negative terminal first.
When connecting the cable to the battery, start with the positive terminal first.
If reversed, the contact of tools on the battery may cause a short.

Direction for long term storage

1. When storing the engine for long periods of time, remove the battery, adjust the electrolyte to the proper level, and store in a dry and dark place.
2. The battery naturally discharges while it is stored. Recharge it once a month in summer, and every 2 months in winter.

ELECTRIC WIRING

CAUTION

To avoid personal injury:

◆ Shorting of electric cable or wiring may cause a fire.

- Check to see if electric cables and wiring are swollen, hardened or cracked.
- Keep dust and water away from all power connections.

Loose wiring terminal parts, make bad connections. Be sure to repair them before starting the engine.

Damaged wiring reduces the capacity of electrical parts. Change or repair damaged wiring immediately.

FAN BELT

■ Adjusting Fan Belt Tension



CAUTION

To avoid personal injury:

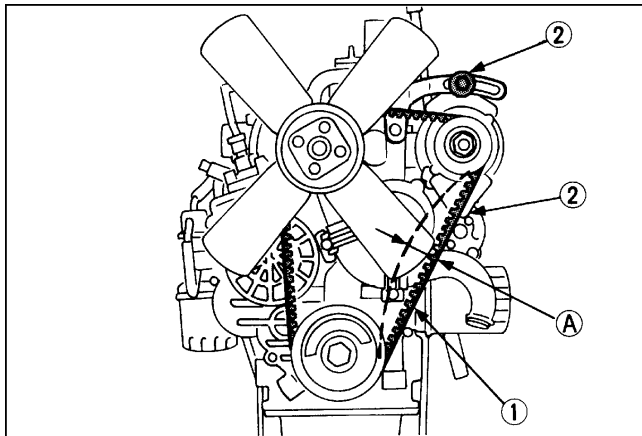
- Be sure to stop the engine and remove the key before checking the belt tension.
- Be sure to reinstall the detached safety shield after maintenance or checking.

Proper fan belt tension	A deflection of between 7 to 9 mm (0.28 to 0.35 in.) when the belt is pressed in the middle of the span.
-------------------------	--

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between the pulleys.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

IMPORTANT :

- If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Correct or replace belt.



(1) Fan belt
(2) Bolt and nut

(A) 7 to 9 mm (0.28 to 0.35 in.)
(under load of 10 kgf (22.1 lbs))

CARRIAGE AND STORAGE

CARRIAGE



CAUTION

To avoid personal injury:

- Fix the engine securely not to fall during operation.
- Do not stand near or under the engine while carrying it.
- The engine is heavy. In handling it, be very alert not to get your hands and body caught in.

1. Use carrier such as crane when carrying the engine, or hurt your waist and yourself. Support the engine securely with rope not to fall while carrying it.
2. When lifting the engine, put the hook securely to metal fittings attached to the engine. Use strong hook and fittings enough to hang the engine.

STORAGE



CAUTION

To avoid personal injury:

- Do not clean the machine with engine running.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- When storing the engine just after running, let the engine cool off.

Before storing the engine for more than a few months, remove any dirt on the machine, and:

1. Drain the coolant in the radiator. Open the cock at the bottom of the radiator, and remove the pressure cap to drain water completely. Leave the cock open. Hang a note written "No water" on the pressure cap. Since water may freeze when the temperature drops below 0°C (32°F), it is very important that no water is left in the machine.
2. Remove dirty engine oil, fill with new oil and run the engine for about 5 minutes to let the oil penetrate to all the parts.
3. Check all the bolts and nuts, and tighten if necessary.
4. Remove the battery from the engine, adjust the electrolyte level, and recharge it. Store the battery in a dry and dark place.
5. When the engine is not used for a long period of time, run it for about 5 minutes under no load every 2 to 3 months to keep it free from rust. If the engine is stored without any running, moisture in the air may condense into dew over the sliding parts of the engine, resulting in rust there.
6. If you forget to run the engine for longer than 5 to 6 months, apply enough engine oil to the valve guide and valve stem seal and make sure the valve works smoothly before starting the engine.
7. Store the engine in a flat place and remove the key from engine.
8. Do not store the engine in a place where has flammable materials such as dry grass or straw.
9. When covering the engine for storage, let engine and muffler cool off completely.
10. Operate the engine after checking and repairing damaged wirings or pipes, and clearing flammable materials carried by mouse.

ENGLISH

TROUBLESHOOTING

If the engine does not function properly, use the following chart to identify and correct the cause.

■ When it is difficult to start the engine

Cause	Countermeasures
Fuel is thick and doesn't flow.	<ul style="list-style-type: none"> * Check the fuel tank and fuel filter. * Remove water, dirt and other impurities. * As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene.
Air or water mixed in fuel system	<ul style="list-style-type: none"> * If air is in the fuel filter or injection lines, the fuel pump will not work properly. * To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, loose cap nut, etc. * Loosen joint bolt stop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.
Valve clearance is not as specified.	<ul style="list-style-type: none"> * Adjust valve clearance to 0.145 to 0.185 mm (0.0057 to 0.0073 in.) when the engine is cold.
Leaking valves	<ul style="list-style-type: none"> * Grind valve.
Fuel injection timing is not as specified.	<ul style="list-style-type: none"> * Check injection timing.
Engine oil becomes thick in cold weather and engine cranks slow.	<ul style="list-style-type: none"> * Change grade of oil according to the weather (temperature).
Low compression	<ul style="list-style-type: none"> * Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Battery is discharged and the engine will not crank.	<ul style="list-style-type: none"> * Charge battery. * In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.

■ When output is insufficient

Cause	Countermeasures
Compression is insufficient. Leaking valves	<ul style="list-style-type: none"> * Bad valve and excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts. * Grind valves.
Fuel is insufficient.	<ul style="list-style-type: none"> * Check fuel system.
Overheating of moving parts	<ul style="list-style-type: none"> * Check lubricating oil system. * Check to see if lubricating oil filter is working properly. * Filter element deposited with impurities would cause poor lubrication. Change element. * Check the clearance of bearing are within factory specs. * Check injection timing. * Adjust timing
Valve clearance is not as specified.	<ul style="list-style-type: none"> * Adjust to proper valve clearance of 0.145 to 0.185 mm (0.0057 to 0.0073 in.) with engine cold.
Air cleaner is dirty	<ul style="list-style-type: none"> * Clean the element every 100 hours of operation.
Fuel injection pressure is not as specified.	<ul style="list-style-type: none"> * Check injection pressure. 18.6 MPa(190 kgf/cm²)
Injection pump wear	<ul style="list-style-type: none"> * Do not use poor quality fuel as it will cause wear of the pump. Only use No. 2-D diesel fuel. (See "FUEL" in "PERIODIC SERVICE" Section.) * Check the fuel injection pump element and delivery valve assembly and replace as necessary.

NOTE :

- If the cause of trouble can not be found, contact your KUBOTA dealer.

■ When engine suddenly stops

Cause	Countermeasures
Lack of fuel	<ul style="list-style-type: none"> * Check the fuel tank and refill the fuel, if necessary. * Also check the fuel system for air or leaks.
Bad nozzle	<ul style="list-style-type: none"> * If necessary, replace with a new nozzle.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	<ul style="list-style-type: none"> * Check amount of engine oil with oil level gauge. * Check lubricating oil system. * At every 2 times of oil change, oil filter cartridge should be replaced. * Check to see if the engine bearing clearances is within factory specs.

■ When color of exhaust is especially bad

Cause	Countermeasures
Fuel governing device bad	<ul style="list-style-type: none"> * Contact dealer for repairs.
Fuel is of extremely poor quality.	<ul style="list-style-type: none"> * Select good quality fuel. Use No. 2-D diesel fuel only.
Nozzle is bad.	<ul style="list-style-type: none"> * If necessary, replace with new nozzle.
Combustion is incomplete.	<ul style="list-style-type: none"> * Cause is poor atomization, improper injection timing, etc. Because of trouble in injection system or in poor valve adjustment, or compression leakage, poor compression, etc. Check for the cause.

■ When engine must be stopped immediately

Cause	Countermeasures
Engine revolution suddenly decreases or increases.	<ul style="list-style-type: none"> * Check the adjustments, injection timing and the fuel system.
Unusual sound is heard suddenly.	<ul style="list-style-type: none"> * Check all moving parts carefully.
Color of exhaust suddenly turns dark.	<ul style="list-style-type: none"> * Check the fuel injection system, especially the fuel injection nozzle.
Bearing parts are overheated.	<ul style="list-style-type: none"> * Check the lubricating system.
Oil lamp lights up during operation.	<ul style="list-style-type: none"> * Check the lubricating system. * Check, if the engine bearing clearances are within factory specs. * Check the function of the relieve valve in the lubricating system. * Check pressure switch. * Check filter base gasket.

■ When engine overheats

Cause	Countermeasures
Engine oil insufficient	<ul style="list-style-type: none"> * Check oil level. Replenish oil as required.
Fan belt broken or elongated	<ul style="list-style-type: none"> * Change belt or adjust belt tension.
Coolant insufficient	<ul style="list-style-type: none"> * Replenish coolant.
Excessive concentration of antifreeze	<ul style="list-style-type: none"> * Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiator fin clogged with dust	<ul style="list-style-type: none"> * Clean net or fin carefully.
Inside of radiator or coolant flow route corroded	<ul style="list-style-type: none"> * Clean or replace radiator and parts.
Fan or radiator or radiator cap defective	<ul style="list-style-type: none"> * Replace defective parts.
Thermostat defective	<ul style="list-style-type: none"> * Check thermostat and replace if necessary.
Temperature gauge or sensor defective	<ul style="list-style-type: none"> * Check temperature with thermometer and replace if necessary.
Overload running	<ul style="list-style-type: none"> * Reduce load.
Head gasket defective or water leakage	<ul style="list-style-type: none"> * Replace parts.
Incorrect injection timing	<ul style="list-style-type: none"> * Adjust to proper timing.
Unsuitable fuel used	<ul style="list-style-type: none"> * Use the specified fuel.

SPECIFICATIONS

Model	D1005-E3		D1105-E3
Type	Vertical, water-cooled, 4-cycle diesel engine		
Number of cylinders	3		
Bore and stroke mm (in.)	76 × 73.6 (2.99 × 2.90)	78 × 78.4 (3.07 × 3.09)	
Total displacement cm ³ (cu.in.)	1001 (61.08)		1123 (68.53)
Combustion chamber	Spherical Type (E-TVCS)		
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	16.8/3000 (22.5/3000)	17.5/3600 (23.5/3600)	17.8/3000 (23.9/3000)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	14.6/3000 (19.6/3000)	15.2/3600 (20.4/3600)	15.5/3000 (20.8/3000)
Maximum bare speed rpm	3200	3800	3200
Minimum bare idling speed rpm	850 ~ 950		
Order of firing	1-2-3		
Direction of rotation	Counter-clockwise (viewed from flywheel side)		
Injection pump	Bosch MD Type Mini Pump		
Injection pressure	13.73 Mpa (140 kgf/cm ² , 1991 psi)		
Injection timing (Before T.D.C.)	18°	21°	18°
Compression ratio	24 : 1		
Fuel	Diesel Fuel No.2-D (ASTM D975)		
Lubricant (API classification)	above CF grade		
Dimension mm (in.) (length × width × height)	497.8 × 396.0 × 602.0 (19.60 × 15.59 × 23.7)		
Dry weight (BB Spec.) kg (lbs.)	93 (205.0)		
Starting system	Cell starter (with glow plug)		
Starting motor	12 V, 1.0 kW		
Charging generator	12 V, 360 W		
Recommended battery capacity	12 V, 65 AH, equivalent		

NOTE :

- Specifications are subject to change without notice.

Model	D1105-TE3	D1305-E3
Type	Vertical, water-cooled, 4-cycle diesel engine	
Number of cylinders	3	
Bore and stroke mm (in.)	78 × 78.4 (3.07 × 3.09)	78 × 88 (3.07 × 3.46)
Total displacement cm ³ (cu.in.)	1123 (68.53)	1261 (76.95)
Combustion chamber	Spherical Type (E-TVCS)	
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	23.5/3000 (31.5/3000)	21.0/3000 (28.2/3000)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	20.4/3000 (27.3/3000)	18.2/3000 (24.4/3000)
Maximum bare speed rpm	3200	
Minimum bare idling speed rpm	850 ~ 950	850 ~ 950
Order of firing	1-2-3	
Direction of rotation	Counter-clockwise (viewed from flywheel side)	
Injection pump	Bosch MD Type Mini Pump	
Injection pressure	13.73 Mpa (140 kgf/cm ² , 1991 psi)	
Injection timing (Before T.D.C.)	18°	19°
Compression ratio	24 : 1	
Fuel	Diesel Fuel No.2-D (ASTM D975)	
Lubricant (API classification)	above CF grade	
Dimension mm (in.) (length × width × height)	497.8 × 433.0 × 626.0 (19.60 × 17.05 × 24.65)	497.6 × 396.0 × 590.1 (19.59 × 15.59 × 23.2)
Dry weight (BB Spec.) kg (lbs.)	97 (213.8)	95 (209.4)
Starting system	Cell starter (with glow plug)	
Starting motor	12 V, 1.0 kW	12 V, 1.2kW
Charging generator	12 V, 360 W	12 V, 480 W
Recommended battery capacity	12 V, 65 AH, equivalent	12 V, 70 AH, equivalent

NOTE :

- Specifications are subject to change without notice.

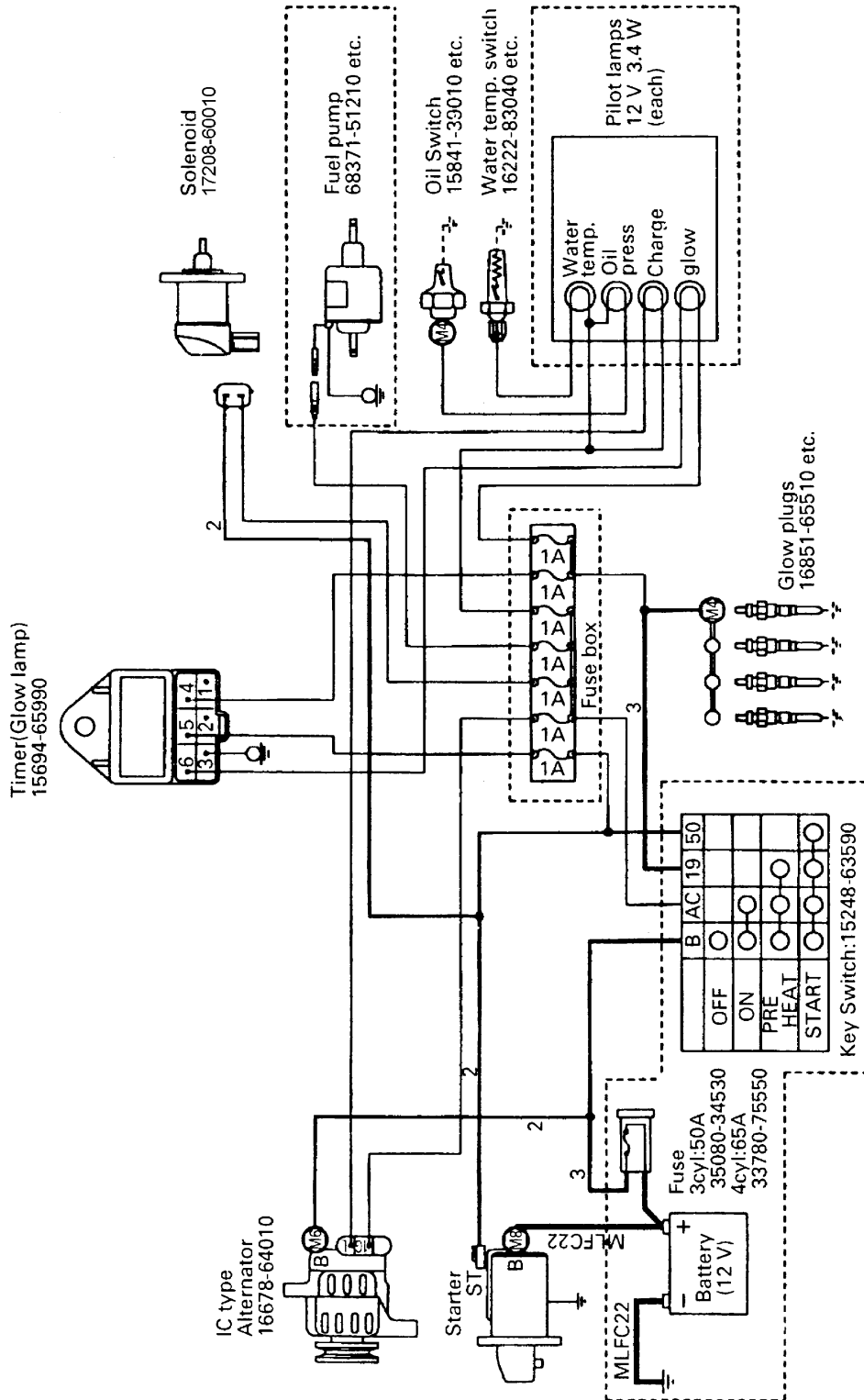
Model	V1505-E3		V1505-TE3
Type	Vertical, water-cooled, 4-cycle diesel engine		
Number of cylinders	4		
Bore and stroke mm (in.)	78 × 78.4 (3.07 × 3.09)		
Total displacement cm ³ (cu.in.)	1498 (91.41)		
Combustion chamber	Spherical Type (E-TVCS)		
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	25.0/3000 (33.5/3000)	27.5/3600 (36.9/3600)	31.3/3000 (42.0/3000)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	21.7/3000 (29.1/3000)	23.9/3600 (32.0/3600)	27.2/3000 (36.5/3000)
Maximum bare speed rpm	3200		
Minimum bare idling speed rpm	850 ~ 950		1000 ~ 1100
Order of firing	1-3-4-2		
Direction of rotation	Counter-clockwise (viewed from flywheel side)		
Injection pump	Bosch MD Type Mini Pump		
Injection pressure	13.73 Mpa (140 kgf/cm ² , 1991 psi)		
Injection timing (Before T.D.C.)	18°	21°	18°
Compression ratio	24 : 1		23 : 1
Fuel	Diesel Fuel No.2-D (ASTM D975)		
Lubricant (API classification)	above CF grade		
Dimension mm (in.) (length × width × height)	591.3 × 396.0 × 607.0 (23.28 × 15.59 × 23.90)		591.3 × 433.0 × 621.0 (23.28 × 17.05 × 24.45)
Dry weight (BB Spec.) kg (lbs.)	110 (242.5)		114 (251.3)
Starting system	Cell starter (with glow plug)		
Starting motor	12 V, 1.2 kW		
Charging generator	12 V, 360 W		
Recommended battery capacity	12 V, 70 AH, equivalent		

NOTE :

- Specifications are subject to change without notice.

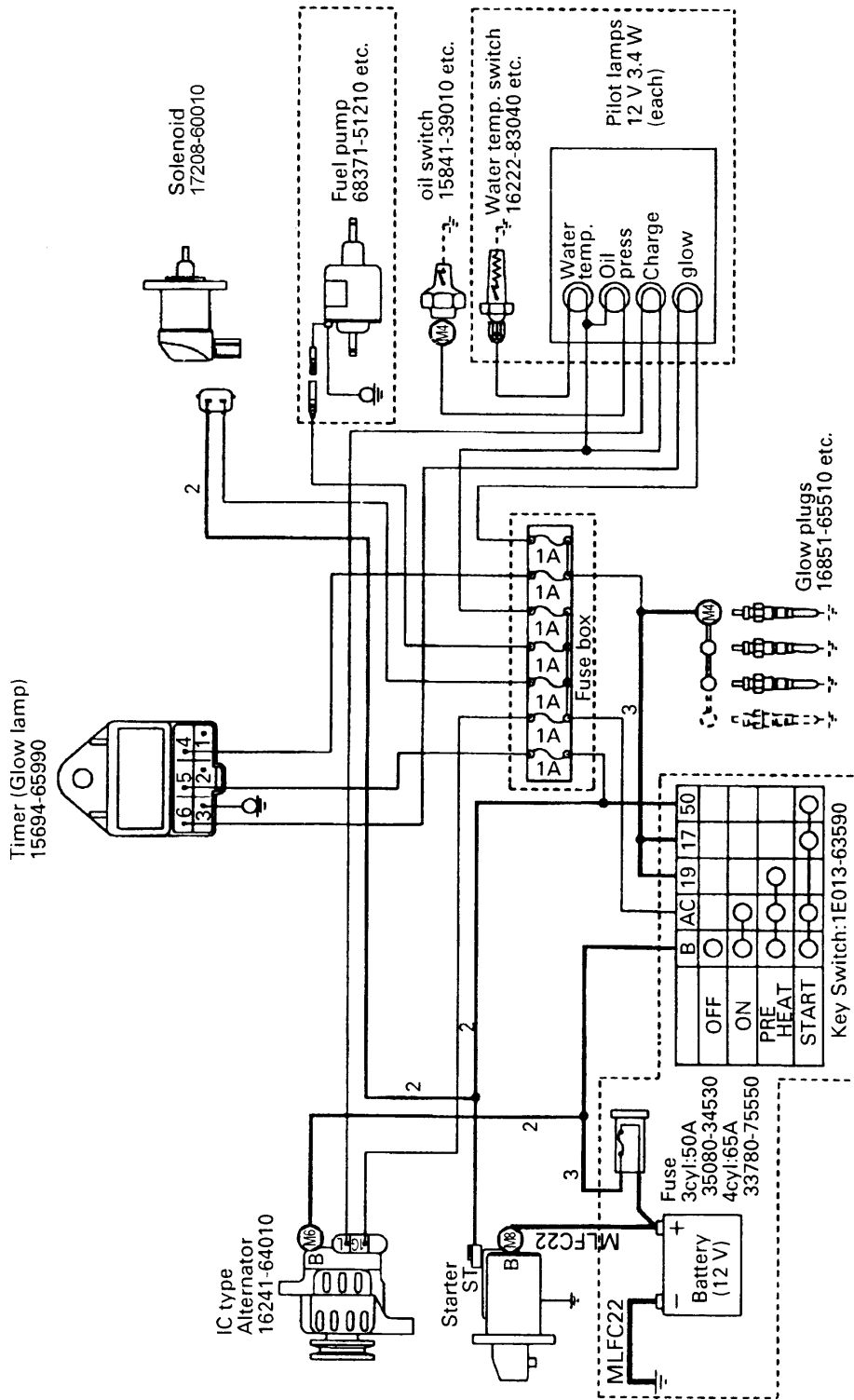
WIRING DIAGRAMS

EU standard
(Energize to run)



★ The parts boxed in are reference, NOT equipped for standard engine spec.
 ★ Non marked wire dia. is 0.8~1.25 mm².

KEA/SAE standard
(Energize to run)



- ★ The parts boxed in are reference, NOT equipped for standard engine spec.
- ★ Non marked wire dia. is 0.8~1.25 mm ϕ .

KUBOTA

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Telephone : (81)6-6648-2155 Fax : (81)6-6648-3521

Code No. 1J987-8916-1

Proof of maintenance

Warranty claim for this machine only apply for performance of the mandatory maintenance works (by an authorised specialist workshop)! After each completed performance of a maintenance interval the included form must be fill out, stamped, signed and send back to us immediately ¹⁾.

1) via e-mail to service@probst-handling.de / via fax or post

Operator: _____

Device type: _____

Device-No.: _____

Article -No.: _____

Year of make: _____

First inspection after 25 operating hours

Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature

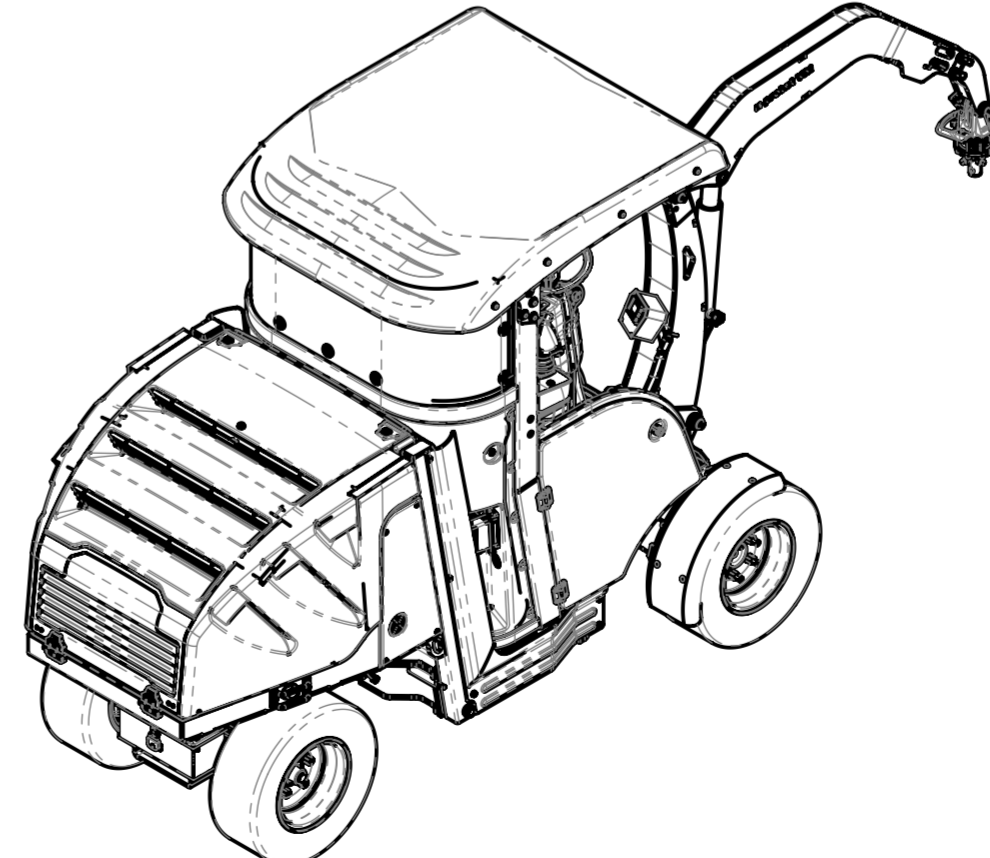
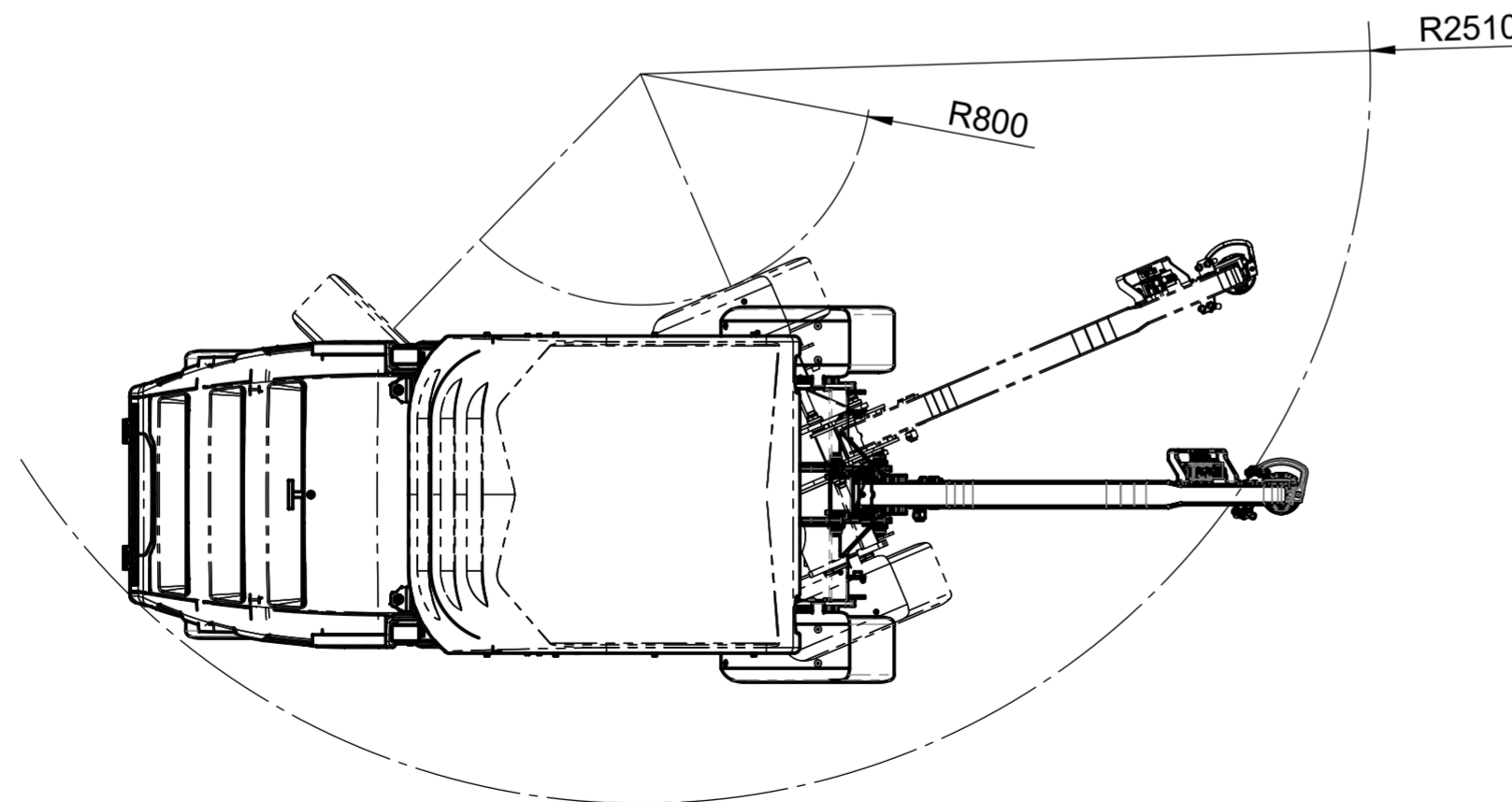
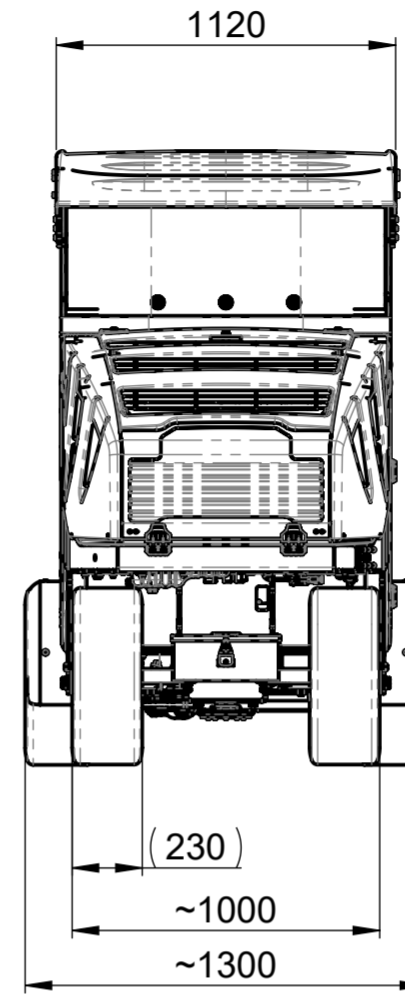
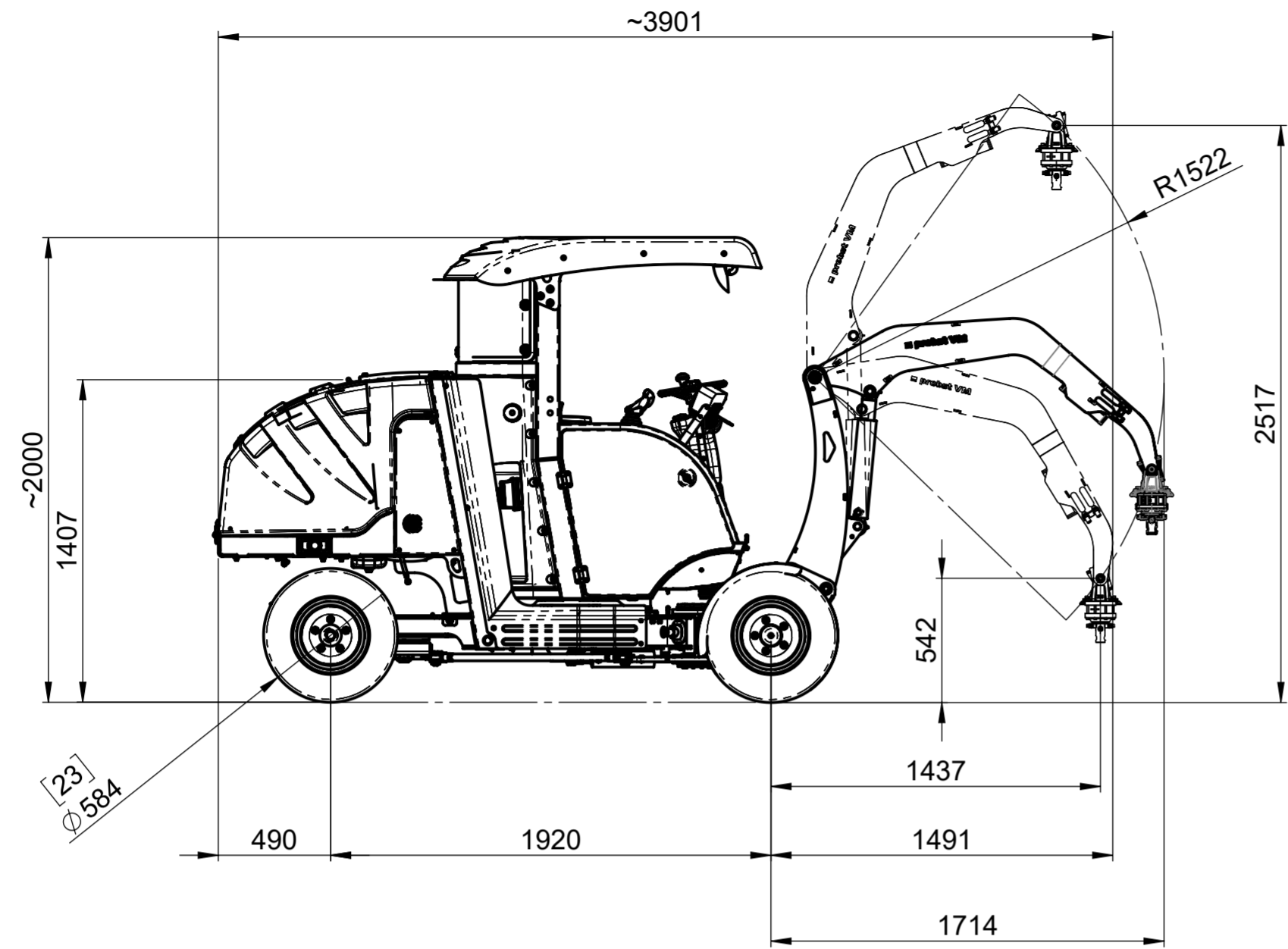
All 50 operating hours

Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature

Minimum 1x per year

Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature

GB



Antrieb:		
Motor:	Kubota V1505-E4B	
Zylinder:	4	-
Leistung:	18,5 / 25 (n=2300 min-1)	kW/PS
Drehmoment:	92,6 (n=1700 min-1)	Nm
Öl:	6,7	L
Kraftstoff:	Diesel	EN590 (kein Bio-Kraftstoff)
Tankvolumen:	~25	L
Elektrik:		
Bordspannung:	12	V
Generator:	65	A
Batterie:	74 / 680	Ah / A
Hydraulischer Fahrtrieb:		
Fahrpumpe:	Axial-Kolben-Verstellpumpe	
Fördervolumen:	35	cm³/U
max. Druck:	350	bar
Radmotor:	Radialkoben-Motor	
Schluckvolumen:	255	cm³/U
Bremse:	Lamellenbremse	-
Arbeitshydraulik		
Pumpe:	Zahnradpumpe	
Fördervolumen:	11	cm³/U
max. Druck:	200	bar
Tankvolumen:	~25	L

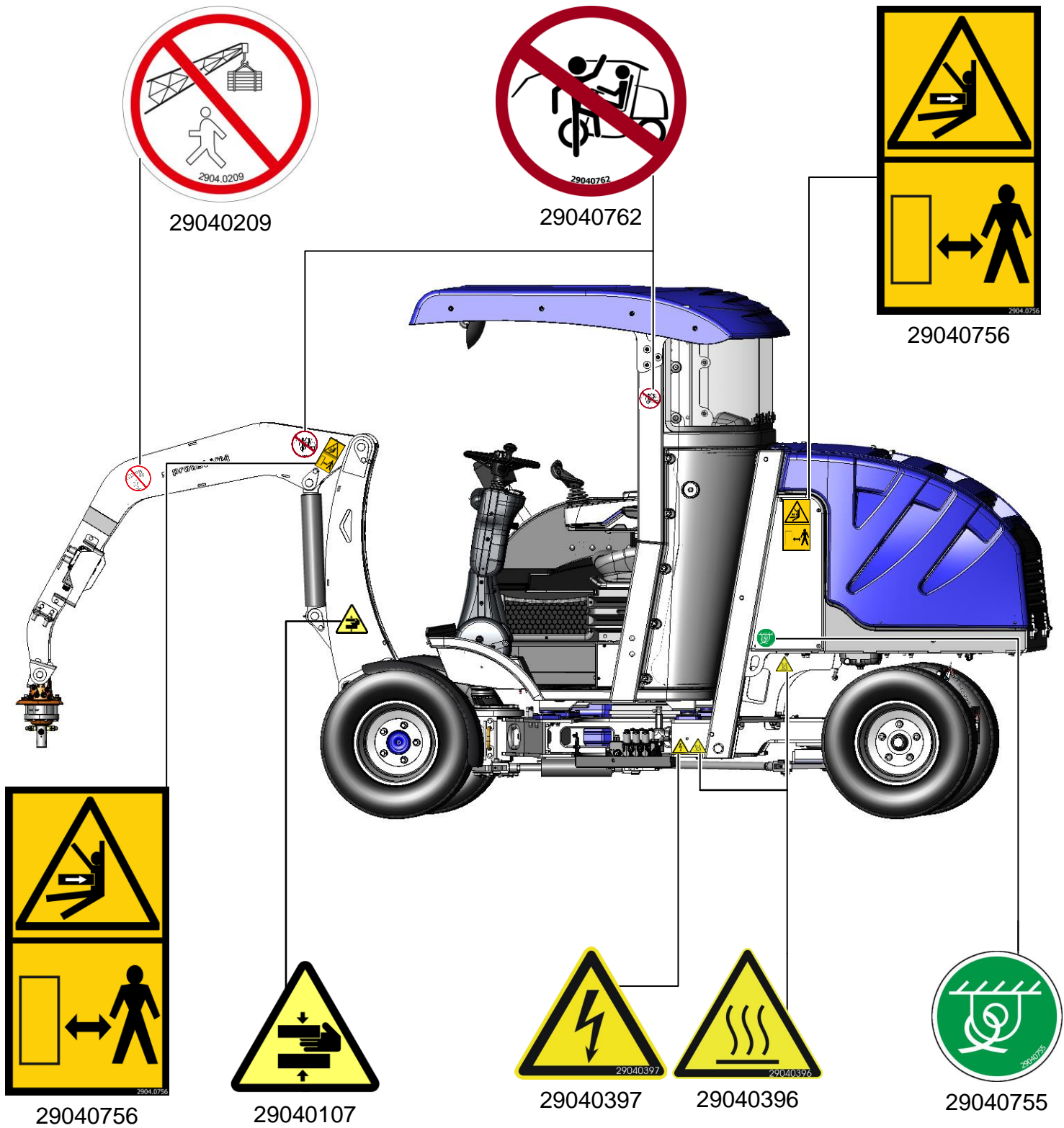
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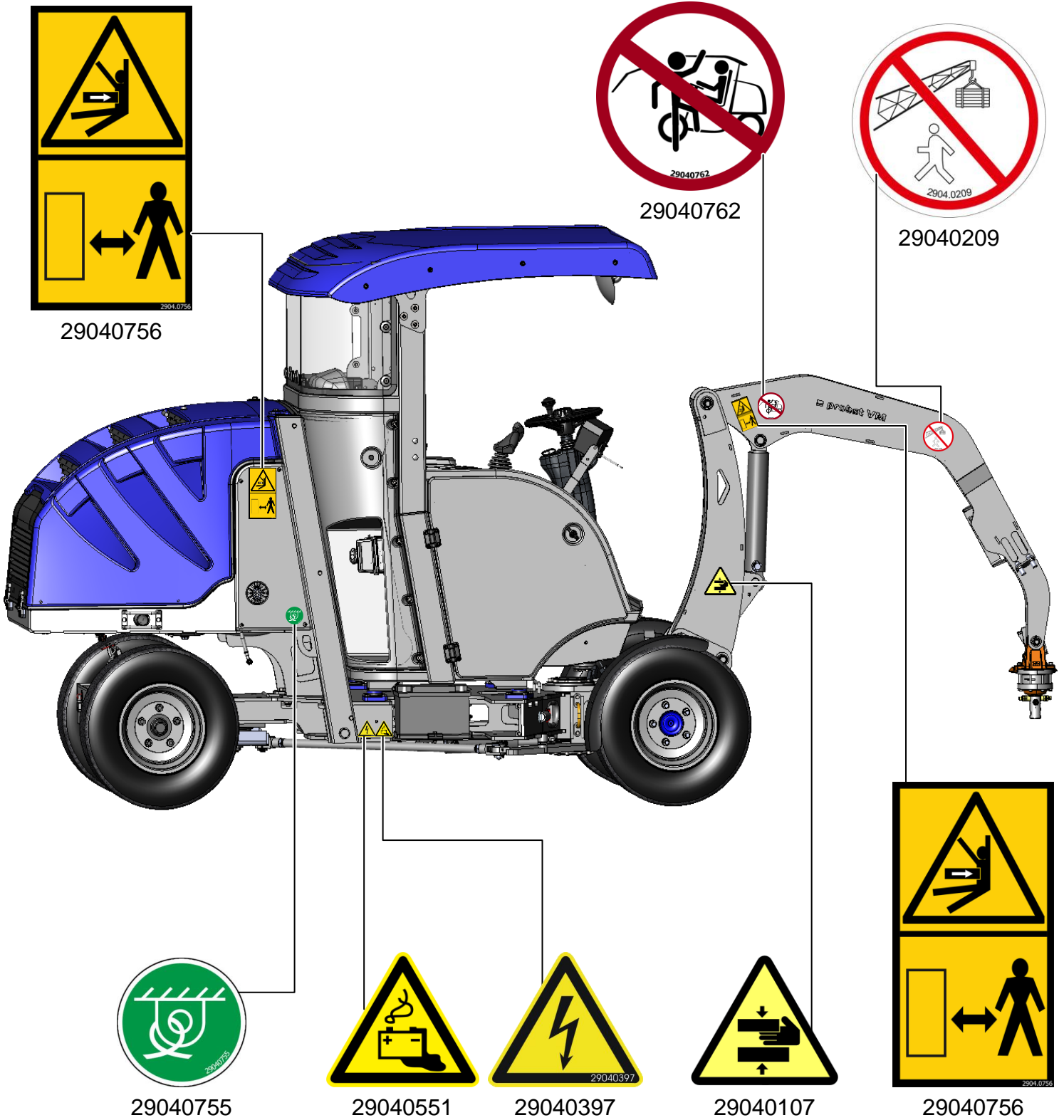
Eigengewicht / Dead Weight:
1500 kg / 3300 lbs

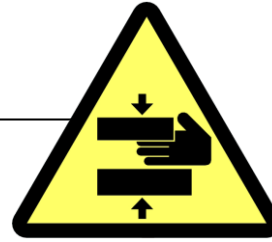
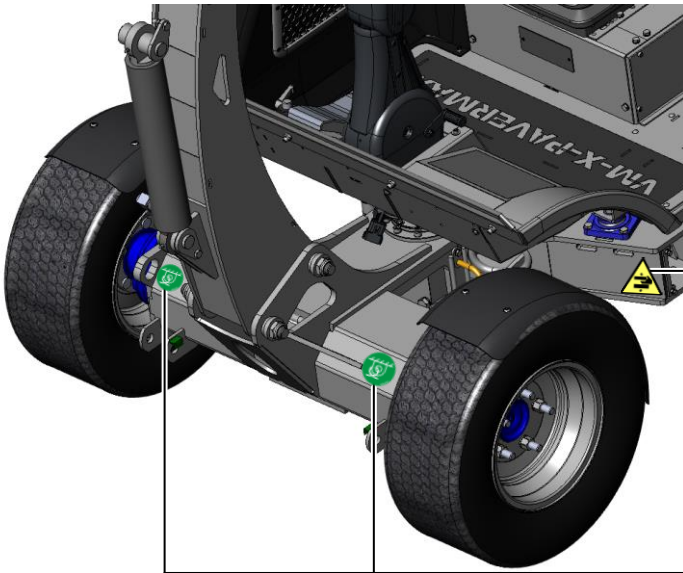
Product Name:
Installation machine VM-X-PAVERMAX standard

probst handling equipment © all rights reserved conform to ISO 16016

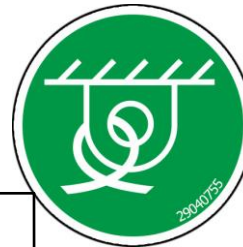
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		Artikelnummer/Zeichnungsnummer	Blatt
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			von 1
Zust.	Urspr.	Ers. f.	Ers. d.



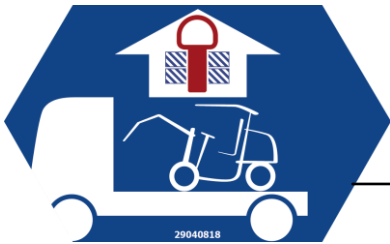




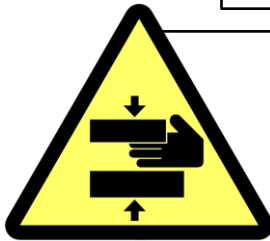
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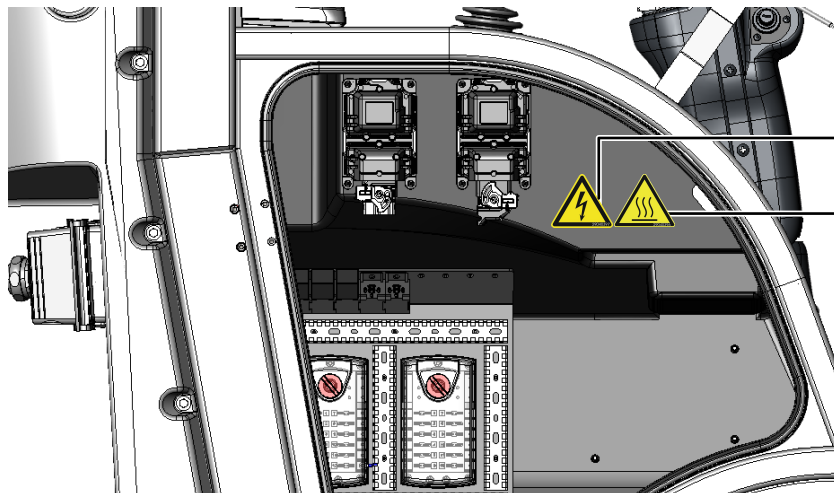
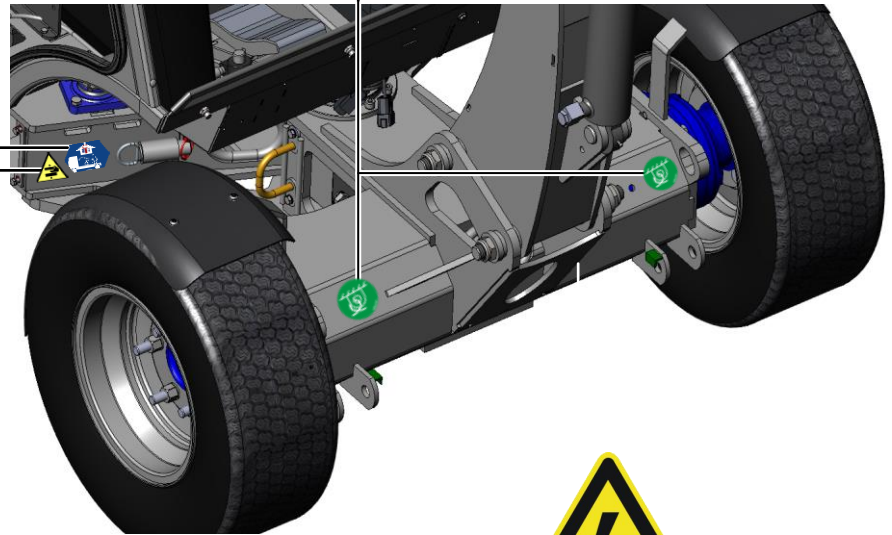
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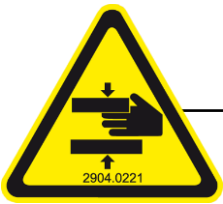
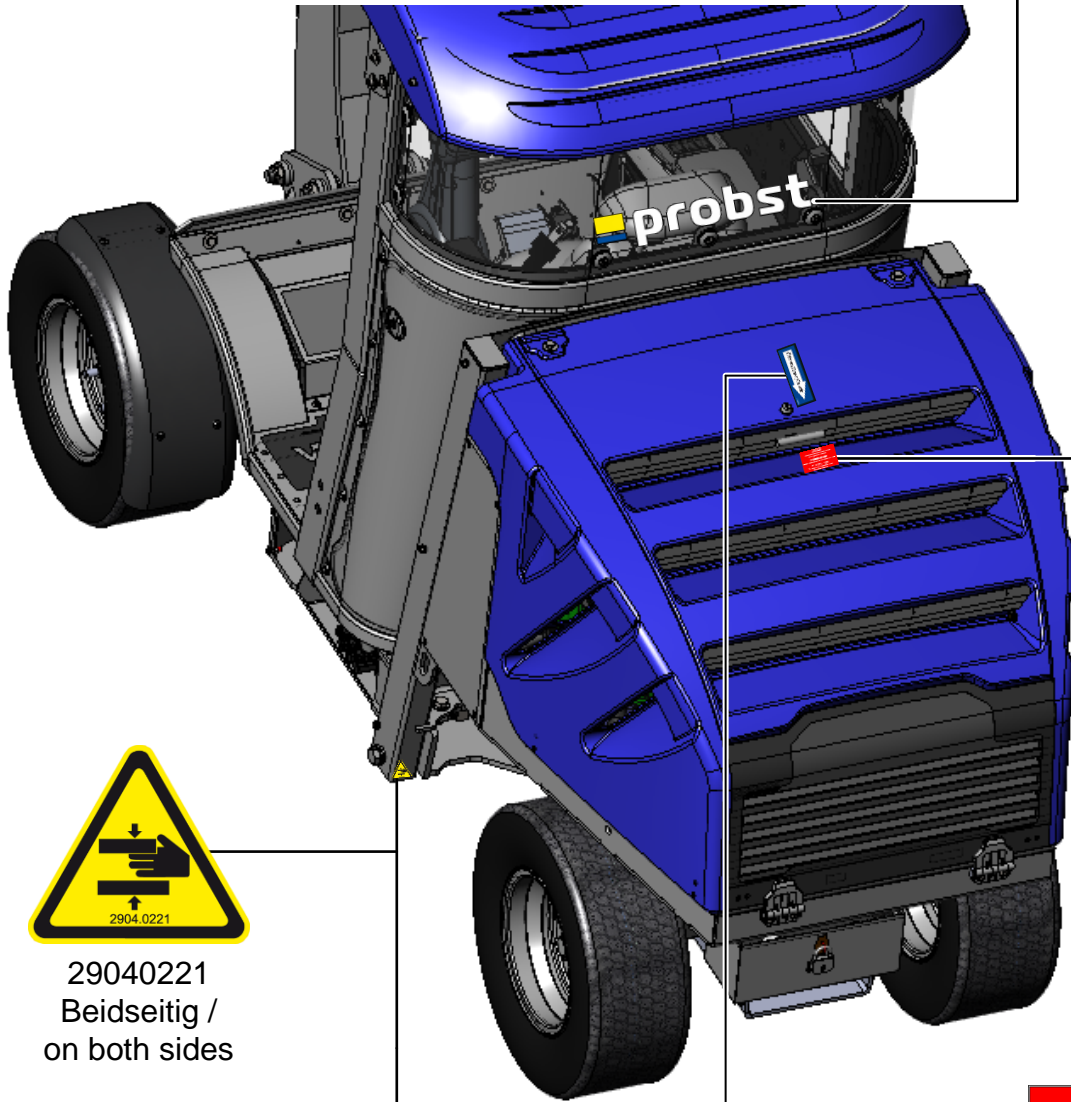
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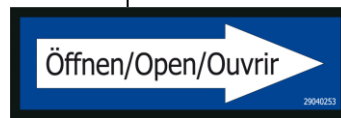
29040396



29041076



29040221
Beidseitig /
on both sides

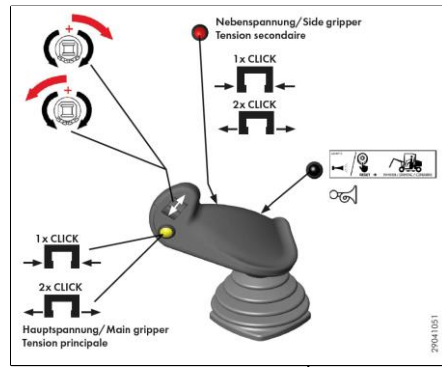


29040253

VERBOT!
Deckel darf bei laufendem Motor
nicht geöffnet werden.
PROHIBITION!
Do not open while the engine is running.
INTERDICTION!
Ne pas ouvrir le capot lorsque
le moteur tourne.

Art.Nr.: 2904.0259

29040259



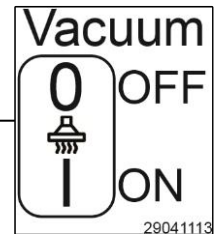
29041051

Achtung / Caution / Attention
 Warmlaufzeit bei Halbgasstellung vor Ausführung von Fahrbewegungen unbedingt beachten:
 Außentemperaturen über 10°C: 5 Min.
 Außentemperaturen unter 10°C: 10 Min.
 Warming-up-time at half throttle before doing any driving movements:
 Outdoor temperatures more than 10°C: 5 Min.
 Outdoor temperatures less than 10°C: 10 Min.
 Temps de chauffe à mi-régime avant d'effectuer des Respecter impérativement les mouvements de conduite :
 Températures extérieures au dessus 10°C: 5 Min.
 Températures extérieures en dessous de 10°C: 10 Min.

29041077



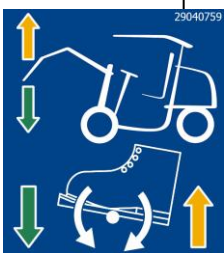
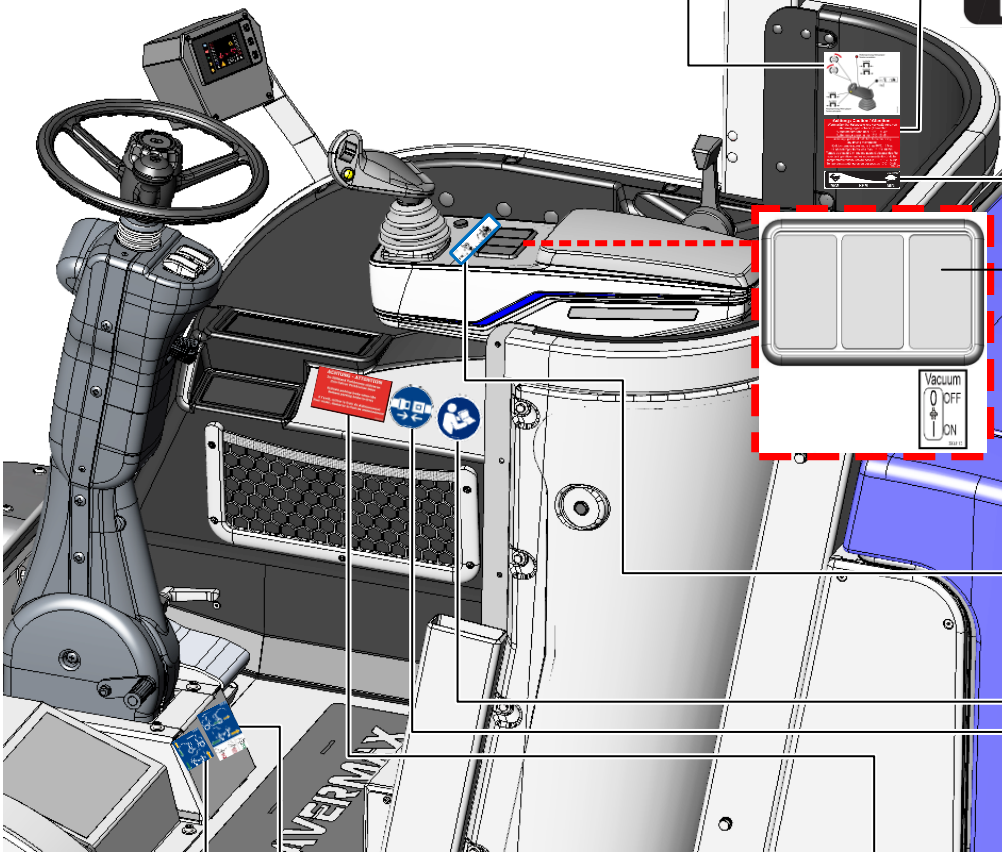
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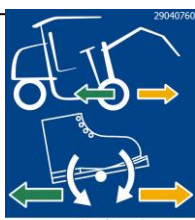
29041113 (optional)



29040716



29040759 (optional)



29040760

ACHTUNG - ATTENTION
 Im Stillstand Parkbremse aktivieren
 Zum Fahren Parkbremse lösen
 Activate parking brake when idle
 Release parking brake to drive
 A l'arrêt, activer le frein de stationnement
 Pour rouler, desserrer le frein de stationnement

29041054




29040666



29040450

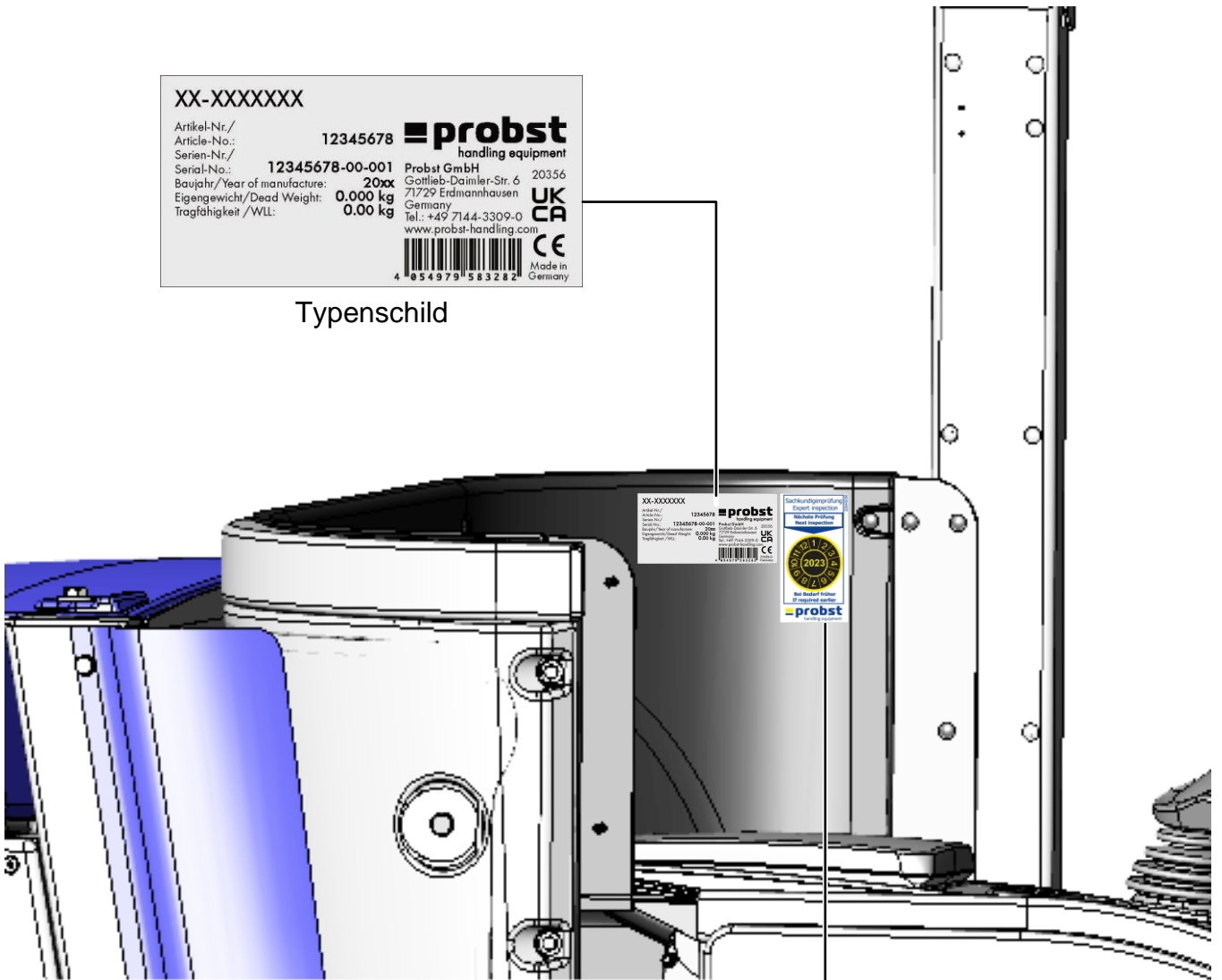
XX-XXXXXXX

Artikel-Nr./ Article-No.:	12345678	probst handling equipment
Serien-Nr./ Serial-No.:	12345678-00-001	Probst GmbH 20356
Baujahr/Year of manufacture:	20xx	Gottlieb-Daimler-Str. 6 71729 Erdmannhausen Germany
Eigengewicht/Dead Weight:	0.000 kg	UK CA
Tragfähigkeit /WLL:	0.00 kg	CE
		www.probst-handling.com
		Made in Germany



4 854979 583282

Typenschild



Sachkundigenprüfung
Expert inspection

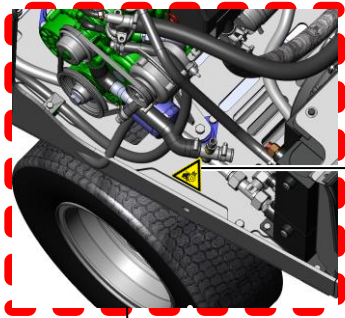
Nächste Prüfung
Next inspection



Bei Bedarf früher
If required earlier



29040056



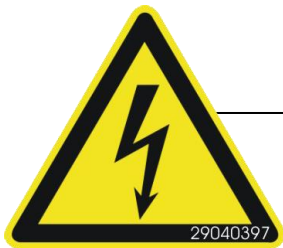
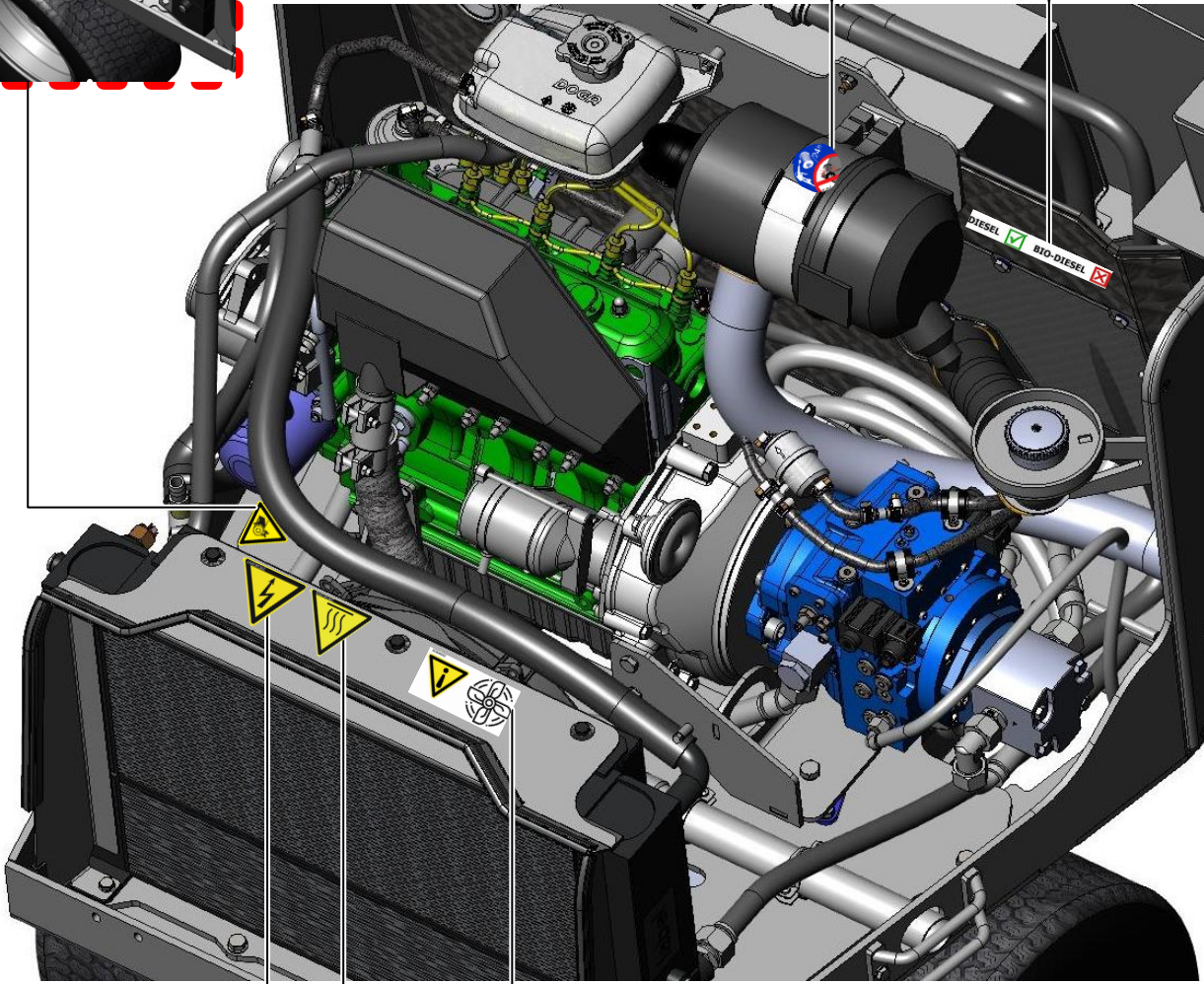
29040451



29040687

DIESEL BIO-DIESEL

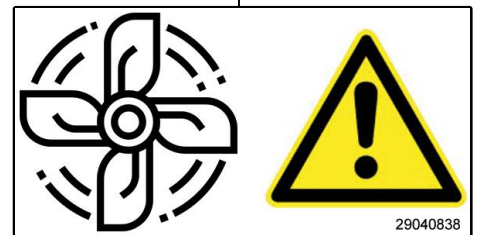
29040483



29040397



29040396



29040838

