Operating Instructions

Translation of original operating instructions

POWERPLAN PP Screeding Machine

PP

1 Contents

2 EC-Declaration of Conformity

Designation: POWERPLAN PP Screeding Machine
Type: PP
Order no.: 5130.0011
Manufacturer: Probst GmbH
Gottlieb-Daimler-Straße 6
71729 Erdmannhausen, Germany
info@probst-handling.de www.probst-handling.de

CE

The machine described above complies with the relevant requirements of the following EU directives:

2006/42/EC (EC Machinery Directive)

2014/30/EU (Electro magnetic compatibility)

The following standards and technical specifications were used:

DIN EN ISO 12100
Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)

DIN EN ISO 13857
Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008).

Minimum distances to avoid crushing parts of the human body.

DIN EN 60204-1 (IEC 60204-1)
Safety of machinery – Electrical equipment of machines. Part 1: General requirements

Authorised person for documentation:

Name: J. Holderied
Address: Probst GmbH; Gottlieb-Daimler-Str. 6; 71729 Erdmannhausen; Germany

Signature, the undersigned:
Erdmannhausen, 05.02.2020.....
(Eric Wilhelm, Managing Director)

3 Safety

3.1 Information on these operating instructions

These operating instructions contain important information on how to properly and safely operate the screeding machine POWER PLAN PP and are intended for the following persons:

- The machine owner
- Assistants
- Operating personnel
- Maintenance personnel

These instructions contain information on both how to operate and maintain the machine.

These instructions must be carefully read and understood before the machine is started for the first time.

These instructions and all of the separate documents associated with them, e.g. operating tips, operating manual for the engine (KUBOTA), the combined cooler (EMMEGI) and the crawler undercarriage (TFW), must be kept at the machine's site of use at all times.

3.2 Hazard classification

⚠DANGER **HAZARD**

Indicates an immediate hazard that can lead to serious injury or death if not avoided.

⚠WARNING **DANGER**

Indicates dangerous situations that can lead to serious injury or death if not avoided.

⚠CAUTION **CAUTION**

Indicates dangerous situations that can lead to minor or medium severity injury if not avoided.

NOTICE ***WARNING***

Indicates dangerous situations that can lead to damage to property if not avoided.

3.3 The structure of the safety information provided in this manual

⚠WARNING

Type of danger

The potential consequences of this danger

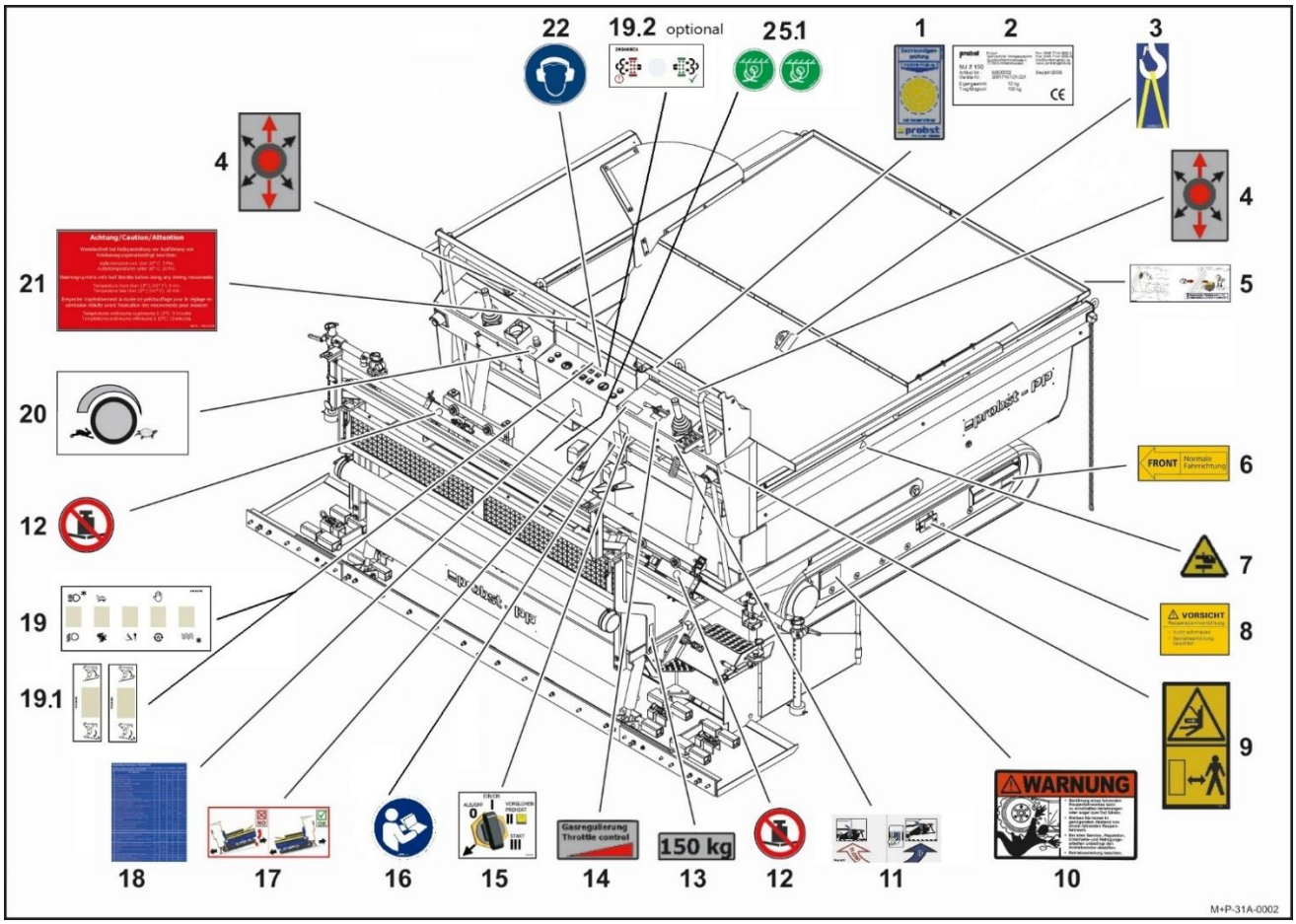
- Safety measure

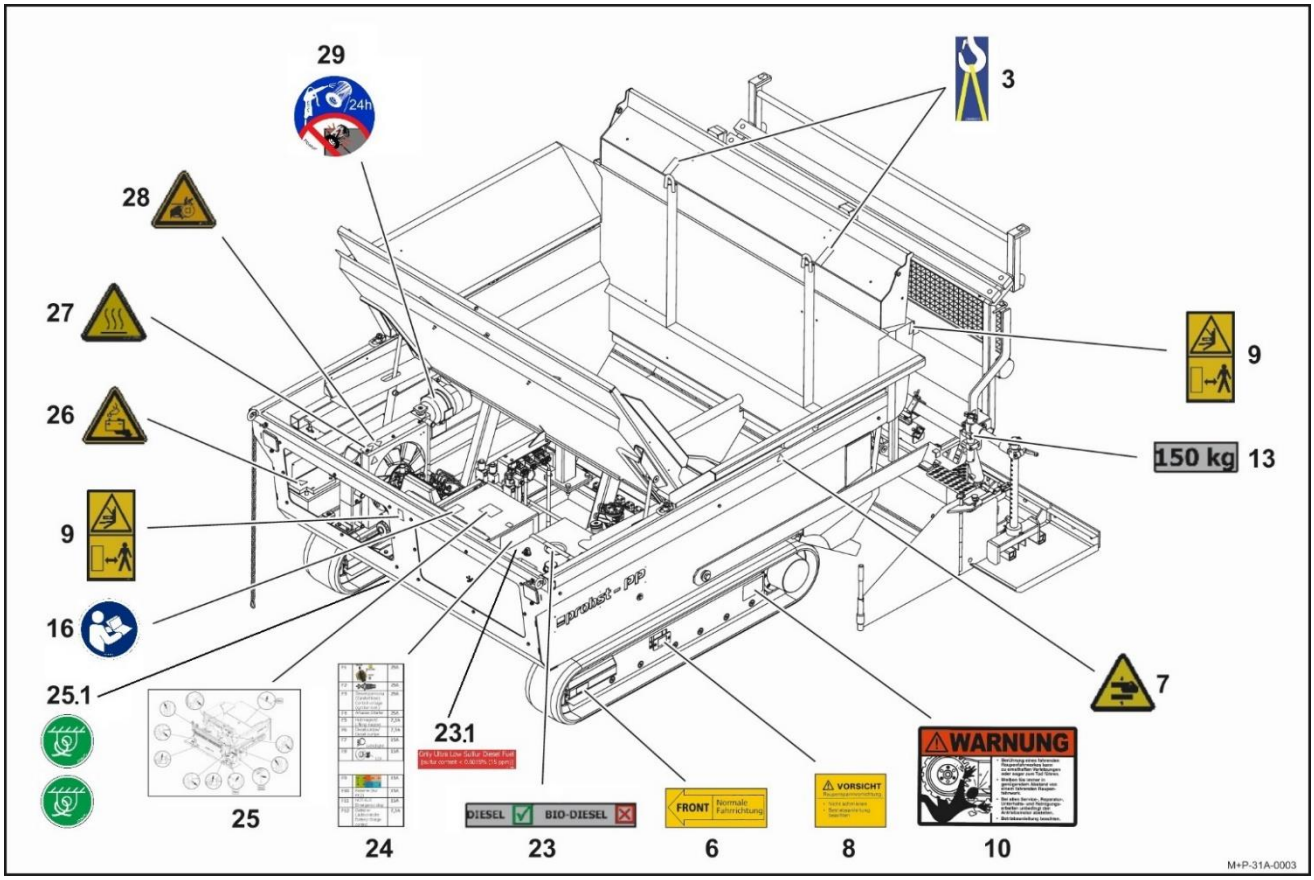
3.4 Description of symbols and warning signs

These operating instructions may contain any of the following symbols.

	**Danger** Failure to implement the measures needed to avoid this danger can lead to death, injury or damage.
	**Dangerous electric voltage** Failure to implement the measures needed to avoid this danger can lead to death, injury or damage as a result of high voltage.
	**Risk of explosion** Failure to implement the measures needed to avoid this danger can lead to death, injury or blindness as a result of explosive gasses or contact with corrosive acids.
	**Risk of burns** Failure to implement the measures needed to avoid this danger can lead to injury from burns.
	**Risk of injury from rotating parts** Failure to implement the measures needed to avoid this danger can lead to injury from rotating parts.
	**Toxic substances** Failure to implement the measures needed to avoid this danger can lead to injury and damage to health from toxic substances.
	**Toxic gasses** Failure to implement the measures needed to avoid this danger can lead to injury from inhaling toxic gasses.
	**Risk of falling** Failure to implement the measures needed to avoid this danger can lead to death or injury from falling.
	**Environmentally hazardous substances** Failure to implement the measures needed to avoid this danger can cause significant harm to the environment from environmentally hazardous substances.

3.5 Overview of hazard symbols and information signs





	Designation	Order number
1	Specialist testing inspection plate	2904.0056
2	Type plate	N/A
3	Attachment points for lifting gear	2904.0370
4	Joystick operating diagram	2904.0487
5	Main switch operating diagram	2904.0484
6	Driving direction front	2904.0552/2904.05
7	Risk of crushing	53 2904.0220 (50
8	Crawler chain tension information	mm) 2904.0554
9	Keep at a safe distance from the machine	2904.0756
10	Keep at a safe distance from the crawler undercarriage	2904.0555
11	Smoothing board operating diagram	2904.0482
12	Do not subject to any loads	2904.0550
13	Maximum permissible load for the measuring bar	2904.0207
14	Engine speed control	2904.0485
15	Ignition switch operating diagram	2904.0488
16	Read the operating instructions before starting for the first time	2904.0666 (50
17	Sign with information on shipping the machine	mm) 2904.0549
18	Maintenance plan	2904.00563
19	Operating elements and indicators operating diagram	2904.0799
19.1	Levelling (left / right)	2904.0800
19.2	Diesel particle filter (optional)	2904.0801
20	Speed control button for automatic mode	2904.0556
21	Leave the machine to run for the specified period to warm up	2904.0258
22	Use ear protection	2904.0298
23	Fuel type information (Diesel ✓ / No Bio Diesel ×)	2904.0483
23.1	Fuel type information (Ultra low sulfur Diesel fuel)	2904.0841
24	Fuse assignment diagram	2904.0548
25	Lubrication chart	2904.00564
25.1	Lashing eye (secure the machine by using the marked lashing eyes using chain tensioners or tension belts)	2904.0755
26	Battery warning	2904.0551
27	Warning sign for risk of burns	2904.0396
28	Warning sign for risk of injury from belt drive	2904.0451
29	Clean air filter every day	2904.0687

3.5.1 Maintaining/caring for safety symbols and information signs

- The hazard symbols and information signs must be kept in perfect condition and easy to read.
- Damaged or missing hazard symbols and information signs must be replaced.
- Only clean the hazard symbols and information signs with mild detergents and water. Do not use solvent-based detergents.

3.6 Personnel requirements

The machine must only be operated and maintained by personnel who:

- Have carefully read and understood these operating instructions.
- Have the requisite qualifications for their job and have received training for the work they will be performing on/with the machine.

Assistants must:

- Have first aid training and be able to apply first aid.
- Be aware of the potential hazards associated with assisting in the operation/maintenance of the machine.

Operating personnel must:

- Meet the same requirements as assistants.
- Have the physical and mental skills required to work with the machine.
- Be at least 16 years of age.
- Be aware of the potential hazards associated with operating the machine.
- Be aware of and have understood all of the safety-related information, sources of danger and safety measures detailed in these instructions.
- Have been trained in how to respond in the event the machine malfunctions.

Maintenance personnel must:

- Meet the same requirements as assistants and operating personnel.
- Have received corresponding training from Probst or a person authorised by Probst for performing the maintenance and inspection work described in these operating instructions.

3.7 Personal safety

⚠WARNING

Risk of personal injury and damage to property

The machine must only be operated and maintained by qualified personnel! Failure to do so can lead to personal injury and damage to property.

- The machine and all of its accessory equipment must only be operated and maintained by qualified personnel and as specified in these operating instructions. Also See “Personnel requirements”.
- All of the personnel who work on and with the machine must have read and understood these operating instructions, hazard symbols and information signs.

3.7.1 Personal safety equipment

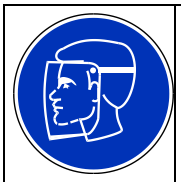
⚠WARNING

Risk of personal injury

Failure to wear corresponding personal safety equipment when working with/on the machine can lead to injury and damage to health.

- Personnel must wear the corresponding personal safety equipment specified under the national regulations for the respective type of work they are performing.
- Always wear tightly fitting and closed work and protective clothing.
- Take off rings and scarves.
- Secure long hair using tightly fitting headdresses or a hair net.

	**All personnel must wear protective clothing** Failure to wear the required protective clothing can lead to injury.
	**All personnel must wear high visibility vests** Failure to wear the required high visibility vest can lead to accidents.
	**All personnel must wear protective shoes** Failure to wear the required protective shoes can lead to foot injuries.
	**All personnel must wear a safety helmet** Failure to wear the required safety helmet can lead to head injuries.
	**All personnel must wear ear protectors if the noise level exceeds 85 dB(A)** Failure to wear the required ear protection can lead to hearing loss. *For noise levels above 80 dB(A), personnel are recommended to wear hearing protectors, for noise levels above 85 dB(A), personnel are required to wear ear protectors by law.*
	**All personnel must wear a safety gloves** Failure to wear the required safety gloves can lead to injury to hands.
	**All personnel must wear safety goggles** Failure to wear the required safety goggles clothing can lead to eye injuries and blindness.

	**All personnel must wear a face shield** Failure to wear the required face shield can lead to face injuries.
	**All personnel must wear a dusk mask** Failure to wear the required dusk mask can cause damage to health.
	**All personnel must wear breathing protection** Failure to wear the required breathing protection can cause damage to health.

3.8 Accident prevention

As well as a the operating instructions, personnel must also observe the relevant applicable national regulations on, e.g. the following topics:

- Occupational safety
- Accident prevention
- Health protection
- Environmental protection

⚠WARNING

Risk of personal injury and damage to property

Failure to observe these safety measures can lead to injury and damage.

- Fence off the work area to keep out unauthorized persons.
- Protect the machine from access by unauthorized persons during breaks and after finishing work as specified in the section on “Switching the machine off”.
- Only ever park the machine in a place where it will not be in the way, e.g. of other construction site traffic.
- Make sure the work area is adequately illuminated.
- Do not use the machine during a thunderstorm.
- Proceed with care when working with wet, slightly frozen or contaminated bedding material.
- Do not use the machine in temperatures below +3 °C (37.5 °F).

3.9 Hazard zone

⚠DANGER

Risk of personal injury

Operating the machine incorrectly can lead to injury and death.

- When operating the machine and while its engine is running, only the operator and no more than one assistant are permitted inside the machine's hazard zone.

- The machine's hazard zone is defined as all of the areas in front, next to, behind and underneath the machine that are outside the machine operator's field of vision, as well as the area around the machine in which the machine could also reach other people as it moves.
- In the event of danger, people must be warned accordingly using hand signals.
- If a person fails to leave the hazard zone despite having been signalled that there is danger, stop the machine.
- Keep the machine at a sufficient distance from solid structures such as walls, scaffolding or other machines at all sides to prevent creating crushing hazards.
  If it is not possible to keep at a safe distance from such objects, fence off the work area.
- If working in areas that are difficult to keep in view, work with another person to guide you.

3.10 Testing the machine's operation and performing a visual inspection

3.10.1 General information

⚠WARNING

Risk of personal injury

Dirty and ice-covered steps and platforms can be slip hazards and cause falls.

- Remove and keep steps, platforms and shoes free from e.g. dirt, mud, ice and snow and wear anti-slip shoes.

⚠WARNING

Risk of personal injury and damage to property

If the machine is not in perfect working order, there is a risk of injury and damage.

- Do not use any methods and modes of operation that could affect the machine's safety.
- Always observe the operating instructions for all of the work performed with and on the machine.
- The operating instructions, safety-related instructions and safety information must always be kept complete and in a legible condition at the machines place of use.
- Check the machine's proper operation and its condition before every use.
- If the machine has any faults that impact on its safety, it must only be operated once these faults have been fully removed.
- Stop the machine immediately if it has any cracks, splits or if any of its components are damaged.
- Do not remove the machine's type plates.
- Replace damaged or missing hazard symbols and information signs.

⚠WARNING

Risk of personal injury and damage to property

There is a risk that the machine may fall off slopes and sloping edges. Falls can lead to injury and damage.

- Check the load bearing capacity and gradient of the ground before starting any work and always mark the minimum distance to which the machine can be moved near slopes or edges and keep to this distance when operating the machine.
- Never drive diagonally to a slope or in a waving pattern when on slopes. When working on

slopes, there is a risk that the machine may tip over.

- Slopes with an incline of up to 12 % must only be descendent with an empty hopper and pointing straight forwards, and ascended pointing backwards.
- The machine is not suitable for ascending slopes with an incline of more than 25°.
- Protect the machine from moving when parking it on slopes.

⚠CAUTION

Risk of personal injury and environmental damage

Failure to observe the relevant environmental protection regulations can lead to injury and environmental damage.

- Observe the relevant environmental protection regulations.
- Make sure that no environmentally hazardous substances such as grease, hydraulic fluids and lubricating oils, fuels, coolants and solvent-containing detergents find their way into the ground or the sewer system.
- Environmentally hazardous substances must be stored, transported, collected and disposed off in suitable containers.
- If any of the above fluids find their way into the ground, they must be stopped from doing so and the fluid absorbed using a suitable binding agent. If necessary, excavate the affected soil.

NOTICE

Risk of damage to property

Carelessness when driving and working with the machine can lead to damage.

- Always take account of the machine's dimensions, which can be found in the "Dimensions" section.
- Take note of overhead clearances when driving the machine.
- If working in areas that are difficult to keep in view, work with another person to guide you.
- Fasten loose parts such as tools and other accessories.

3.10.2 Hydraulic pipes and connections

⚠WARNING

Risk of personal injury and damage to property

If the machine's hydraulic pipes are not in perfect working order, there is a risk of injury and damage.

- Check all of the hydraulic pipes and connections for leaks and chafe marks. Damaged parts must be replaced by qualified specialists and only once the system has been depressurised.
- Only operate the machine if the required operating pressure is constantly available. If necessary, get the hydraulic system checked by a qualified specialist.

3.11 Driving and operating the machine

- The machine must only be operated by qualified personnel and as specified in the operating instructions. See "Personnel requirements".
- Before starting the engine, always check the machine for damage, loose parts, and fuel and hydraulic fluid leaks.
- Check the machine for unusual noises and vibrations.
- Makes sure there are no people in the machine's hazard zone.
  - Keep the machine's engine hood closed, as this reduces the risk of injury and its noise level.

3.11.1 Driving mode

- To use driving mode, switch the machine to driving setting **0** or **I.** See "Driving settings and driving mode".
- Always leave the front chute down when using driving mode.
- Always check the load bearing capacity of bridges, basement ceilings and roofs before driving onto them.
- Take note of the clearances of building structures and the dimensions and weight of the machine before driving into underground passages or underground car parks. See "Technical data".
- When driving the machine, raise the smoothing board.

3.11.2 Screeding mode

- To use screeding mode, switch the machine to driving setting **0**;please refer to the section "Driving settings and driving mode".
- Check the ground's inclination and load bearing capacity before starting to screed.
- Always wear the correspondingly required personal protective equipment when performing any work.
- If the light is poor, illuminate the work area.
- Do not overload the machine and load it in such a way that the bedding material will not fall out.
- Only use suitable bedding material.
- The hopper must be filled with material at all times when screeding.
- Cover manhole covers, foundations and drains at ground level with steel plates.
- Use the chain guide as an aid when driving to keep at the correct distance to kerbs.
- Only use the machine in such a way that it's standard level of safety is guaranteed at all times.
- Keep at an adequate distance to sloping edges.

3.11.3 Laser safety class

The Rugby laser transmitter's rotating laser generates an infrared laser beam that emits from the rotating head.
This infrared laser beam is a laser class 1 laser. This class of laser does not require any special safety measures when used properly.
Please refer to the separate manual for the Rugby laser sender for more detailed information.
If using a different laser transmitter, the rotating head's speed must be at least 900 min^{-1}.

3.12 Guide

- If working in areas that are difficult to keep in view, work with another person to give you directions and guide you where to drive.
- Always agree hand signals and calls with your guide in advance.
- The guide must be located within the machine operator's field of view and outside the hazard zone.

3.13 Working in closed spaces

⚠DANGER

Risk of personal injury

Inhaling exhaust fumes is harmful to health, can lead to a loss of consciousness and be fatal.

- Always use an additional exhaust air extraction system and make sure there is adequate ventilation when working in closed spaces such as underground car parks.
- Observe the relevant national regulations.
- Always wear the corresponding personal protective equipment such as breathing protection.

⚠DANGER

Risk of personal injury and damage to property

When working in closed spaces, the work area may be very restricted. Any damage caused to

building structures or the machine can lead to injury and even death.

- Determine the safety distances to structures and observe them.

3.14 Maintenance

⚠WARNING

Risk of personal injury and damage to property

Failure to perform maintenance work properly can lead to injury and environmental damage.

- The machine must only be maintained by qualified personnel and as specified in the operating instructions. See “Personnel requirements”.
- Only perform maintenance work on level and adequately load bearing ground.
- Only open the engine hood when the engine has been switched off.
- Adequately secure the components that need to be maintained to prevent them from falling down.
- Switch off the main switch to prevent the electrical system from becoming damaged and the machine from being accidentally started.
- Do not place any metal objects or tools onto the battery.
- Only use original Probst spare parts and approved operating fluids. Failure to do so will void the warranty.
- In winter, only fuel the machine using winter diesel.
- Reattach and/or reconnect all safety equipment, such as the EMERGENCY STOP button, engine hood, etc. before restarting the machine.
- Observe the relevant environmental protection, recycling and disposal regulations.

⚠WARNING

Risk of personal injury and damage to property

If the machine’s electrical system is not in perfect working order, there is a risk of injury and damage.

- The electrical system must always be kept in proper working order.
- Do not operate the machine if any of its fuses are missing.
- Replace broken fuses immediately.
- Always switch off the electrical system by switching off the main switch before commencing any work on the electrical system and in particular before disconnecting electrical lines.
- If jump-starting the machine, the charging circuit must be 12 V.
- Only use digital multimeters or voltmeters to test the electrical system. Do not use a test lamp.

⚠WARNING

Risk of personal injury and damage to property

Failure to perform the machine’s first scheduled inspection can lead to injury and damage.

- The first inspection must be performed after 50 operating hours.

⚠WARNING

Risk of personal injury and damage to property

There is a risk of fire and explosions when performing maintenance and inspection work.

- Never refuel the machine when the engine is running.
- Do not smoke.
- Do not use open flames.
- Keep a fire extinguisher within reach.
- Store cleaning cloths that are soaked with flammable fluids in non-combustible, sealed containers.

⚠WARNING

Risk of personal injury

Engine oil and hydraulic fluid can become hot and cause serious burns.

- Unless stated otherwise, only perform maintenance and inspection work when the machine components are cool.
- Always wear corresponding personal protective equipment such as acid-resistant gloves.

⚠WARNING

Risk of personal injury

Rotating parts can cause injuries.

- Unless stated otherwise, only perform maintenance and inspection if the engine is switched off.

⚠WARNING

Risk of personal injury

Battery acid causes burns to skin, eyes and clothing. Oil, grease, fuel and detergents cause damage to skin and eyes.

- Use a protective skin cream.
- Do not touch your eyes with dirty hands.
- Always wear corresponding personal protective equipment such as acid-resistant gloves and goggles.
- Immediately neutralize any acid that gets onto your skin or clothes with soap or acid neutralizer and clean with water.

3.14.1 Hydraulic hoses and pipes

⚠WARNING

Risk of personal injury and damage to property

When disconnecting hydraulic hoses or pipes or other hydraulic system components, the pressurized hydraulic fluid may eject with force. This can lead to gangrene, other injuries and damage.

- All of the hydraulic hoses and pipes must be regularly checked for leaks, external damage and operating time by a qualified person, at least once a year, and replaced if required.
- Visually check all of the hydraulic system components every day.
- Observe the relevant regulations on restrictions on the period of use for hydraulic hoses and pipes.
- Thoroughly clean the surrounding area before opening any hydraulics connections.

3.15 Fuel

⚠WARNING

Risk of personal injury and damage to property

Failure to use fuel appropriately can be harmful to health.

- Do not smoke.
- Do not use open flames.
- Do not inhale fuel vapours.
- Do not allow fuel to get in contact with skin, eyes or clothing.
- Always wear corresponding personal protective equipment such as acid-resistant gloves.

3.16 Loading and transporting the machine.

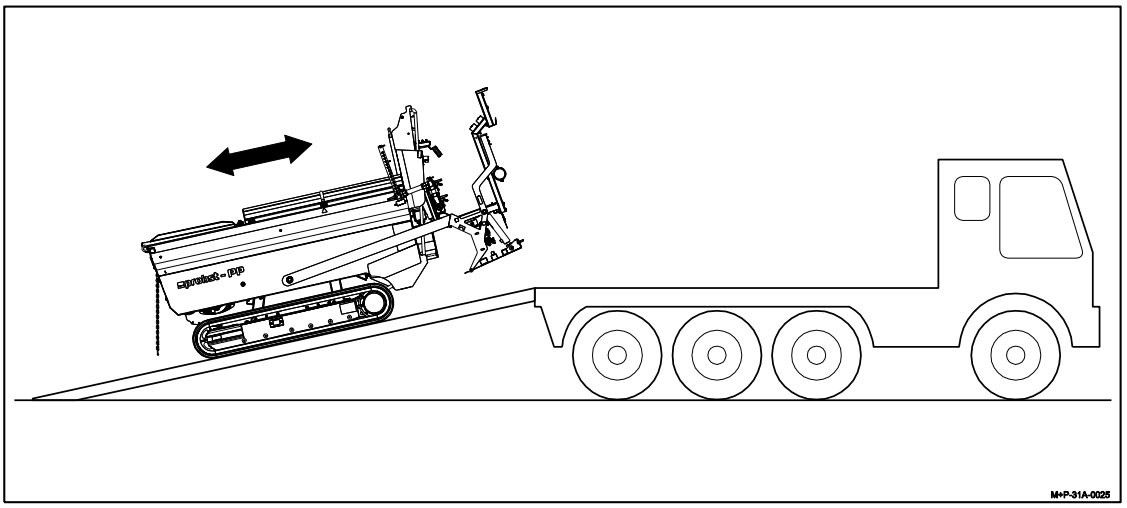
- Check the machine's loading dimensions.
- Check the transport vehicle's permissible axle loads, wheel loads and permissible total load.
- Take note of the dimensions and load bearing capacities of roads and bridges, as well as their overhead and side clearances.

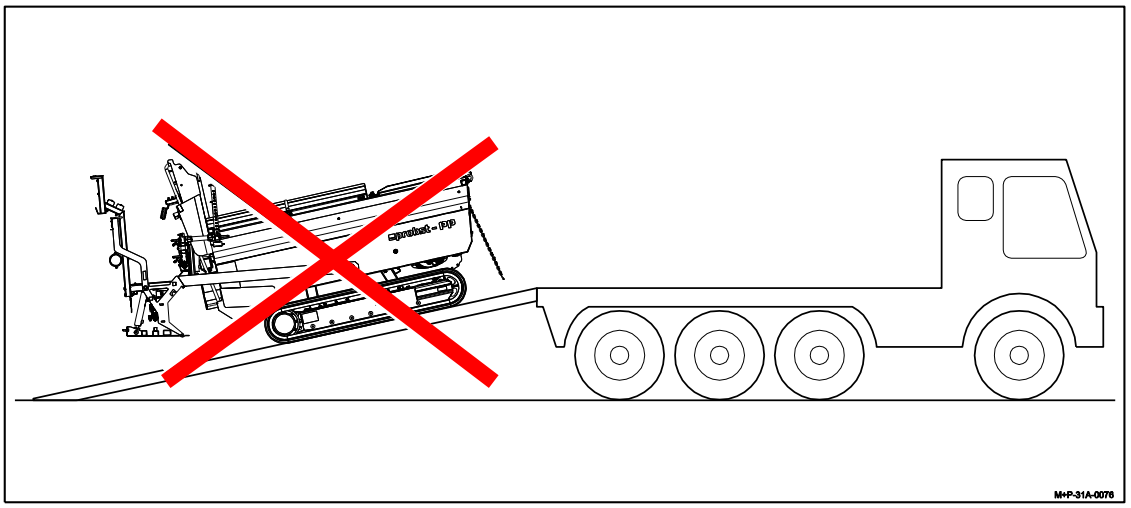
⚠WARNING

Risk of personal injury and damage to property

Failure to load and transport the machine properly can lead to injury and damage.

- The machine must only be loaded and transported by qualified personnel and as specified in the operating instructions. See "Personnel requirements".
- Only load the machine on even and solid ground.
- Only drive straight forwards when on the ramp and the transport vehicle.
- Due to weight of the engine, the machine must always be reversed onto the transport vehicle, as there is otherwise a risk it might slide off the ramp.





4 General

4.1 Correct use

The *Screeding Machine POWER PLAN PP* is designed for creating a sub-base using different bedding materials. This could, for example, be aggregates and sand with grain sizes of 0-56 mm (#) or earth-moist concrete. Depending on the sub-base requirements, the sub-base's height can be measured by ultrasound or laser.

Ultrasound is used if the installation site has several different inclines, such as an inward slope, or includes small areas that have different heights. In this case, it is necessary to set up two lines of string that are exactly parallel to one another for one line, along which the *Screeding Machine POWER PLAN PP* then moves along with the ultrasonic height sensor. If there are kerbstones, rails or asphalt edges, there is no need to set up any lines of string.

The laser is used if the installation site has one or several slopes. In this case, it is necessary to establish the two axes of the area and the incline. The laser sender must be set up and adjusted at the point where the two axes intersect.

(#) Example for determining the installation height:

Factor 2.5 x grain size/gravel size = Installation height for the sub-base
2.5 x 32 mm grain size = 80mm (8 cm) -> Sub-base height 8 cm

4.2 Hints to the correct operation

Recommended operating principles → direct filling of the hopper by example a wheel loader, while creating a sub-base.

The Screeding Machine POWER PLAN PP is not intended to transport bedding material over longer distances, when the hopper is fully charged. Should it be required in exceptional cases, ensure absolutely, that the **total weight** is **not** exceeded.

The driving with fully charged hopper is only allowed in drive position "0". See chapter "Selecting the drive setting and driving mode". *

The following must be avoid, especially when the hopper is fully charged:

- Turning of the POWER PLAN PP on one point, or driving very small curves..
- Driving over sharp edges, concrete terrace (step), curbstone, manhole cover, etc.
- Exceed the maximum permitted total weight!
  ATTENTION: Depending on the density of the bedding material, the hopper cannot be filled fully under circumstances!

NOTE: The size of the blade facilitates (makes easier) the filling by means of a wide shovel of the wheel loaders.. In particular, the two sideway extendable chutes of the hopper serve as baffle plates during the filling.

The sideway extendable chutes of the hopper must never be used to overcharge the hopper with heaped up bedding material.

- The driving, when a sub-base is created, is allowed only in drive position "0". See chapter "Selecting the drive setting and driving mode *
- The two lower hopper flaps (or at least one of them) are opened during the the driving.
  The bedding material, which was filled into the hopper, flows through the hopper flaps , "in the flow" out again and is incorporated directly into the sub-base.

ATTENTION: Failure to observe the points above, the life span of the rubber chains (crawler tracks) and the drive wheels may be highly limited.

* Drive setting "0" for screeding mode (for driving with filled hopper).

4.3 Incorrect use

It is prohibited to use the *Screeding Machine POWER PLAN PP* for any purposes other than those described under "Correct use".

It is prohibited to make any unauthorised modifications to the machine and to use any, potentially self-built, additional equipment.

It is prohibited to transport people, animals, packaged construction materials and similar with the *Screeding Machine POWER PLAN PP.*

It is prohibited to attach loads to the *Screeding Machine POWER PLAN PP* using ropes, chains or similar.

The Screeding Machine POWER PLAN PP must not be used on public roads, and is designed only for use on construction and private sites.

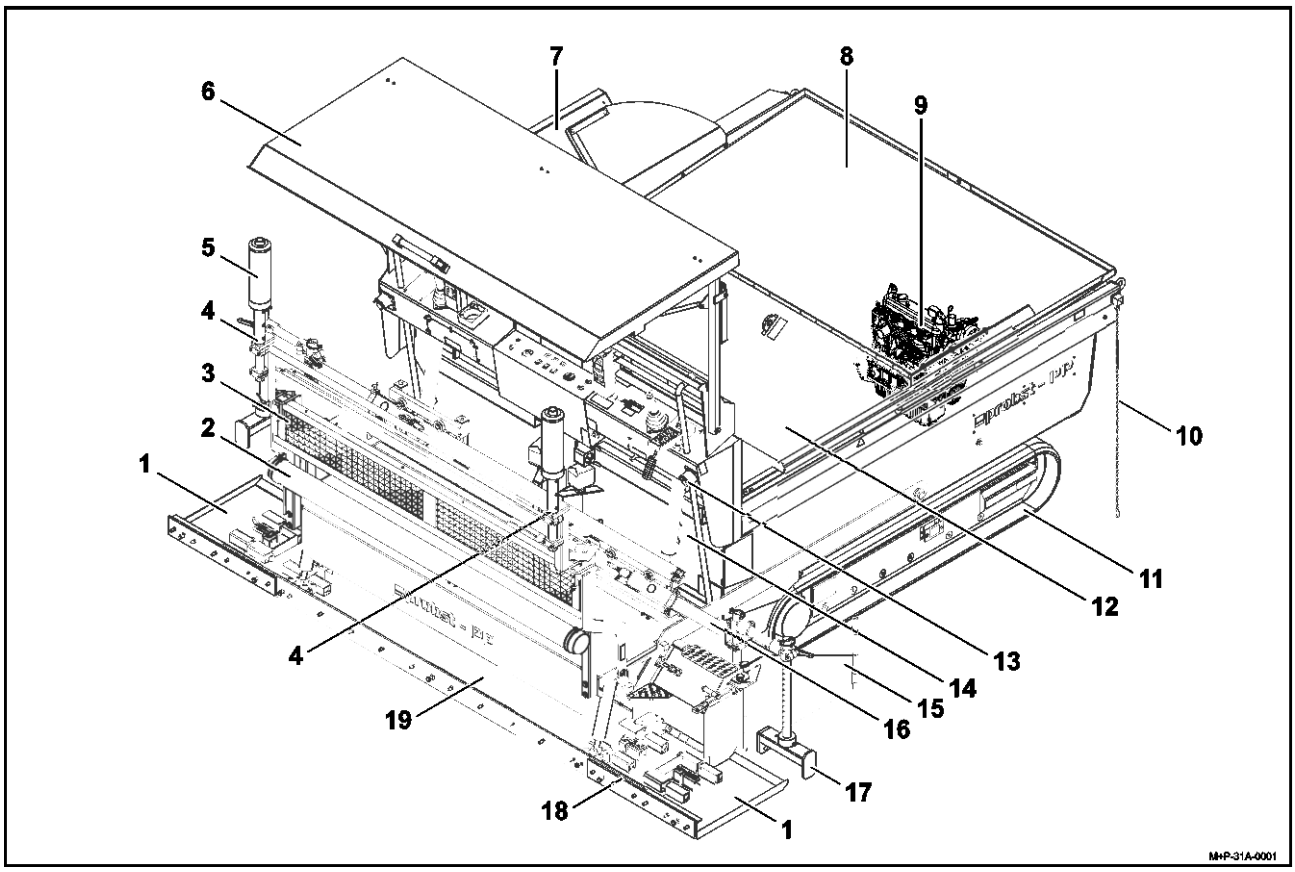
4.4 Warranty

The manufacturer does not accept warranty claims that arise from incorrect use, incorrect operation, insufficient maintenance or the use of unapproved operating fluids.

Failure to use original Probst spare parts will void the warranty.

When ordering spare parts or making claims under the warranty and/or for all other enquiries, please always state the machine type, machine number and year of manufacture. See "Type plate information".

4.5 Overview and structure

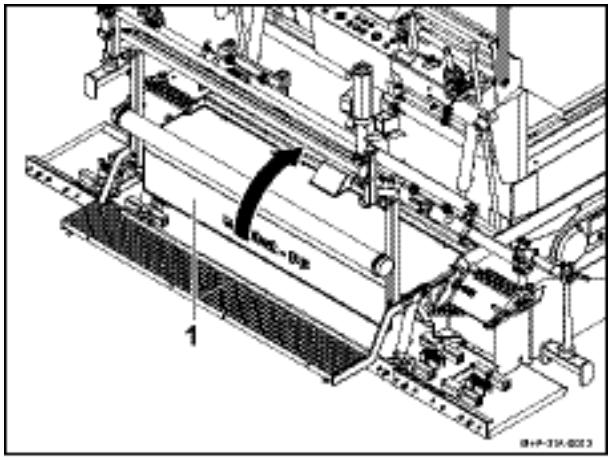


1	Smoothing board	See “Raising/lowering the smoothing board”
2	Holder for levelling board, shovel, etc.	
3	Measuring bar (folded)	See “Overview of safety symbols and information signs”.
4	Holder for MOBA laser receiver	See separate operating tips in the section on “Laying and connecting the cable for the laser receiver”.
5	MOBA laser receiver	See separate operating tips in the section on “Laying and connecting the cable for the laser receiver”.
6	Driver cab roof	See “Taking down the driver cab roof”.
7	Sideway extendable chutes	
8	Front chute	See “Manual control unit”.
9	Engine	See “Overview of engine compartment”.
10	Chain guide (reference)	See “Chain guide”.
11	Crawler tracks	See “Maintaining the crawler tracks”.
12	Hopper	
13	EMERGENCY STOP button (3 x)	
14	Driver’s cab	
15	Adjustable panel	See “Adjusting the adjustable panel”.
16	Linear guide unit	See separate operating tips in the “Adjusting the ultrasonic height sensors” section.
17	Ultrasonic height sensor	See separate operating tips in the “Ultrasonic height sensors” section.
18	Spreading board	See “Fitting the smoothing and spreading board”.

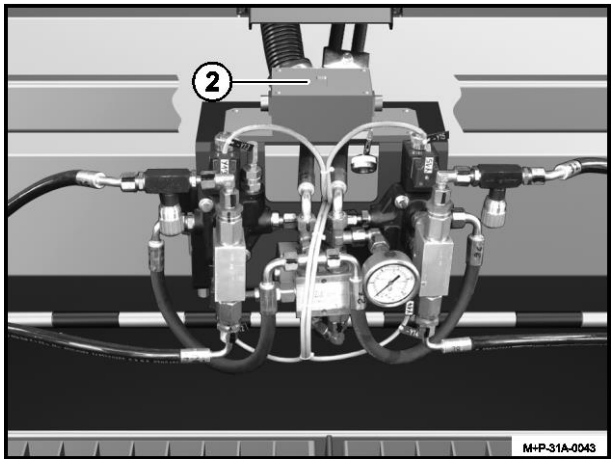
19 Main board — See separate operating tips in the "Creating the sub-base" section.

Tilt sensors

The tilt sensors are used for detecting heights when using the ultrasound and laser technology.



Fold open the measuring bar (1) by pulling it in the direction of the arrow.



2 Tilt sensor

4.6 Training

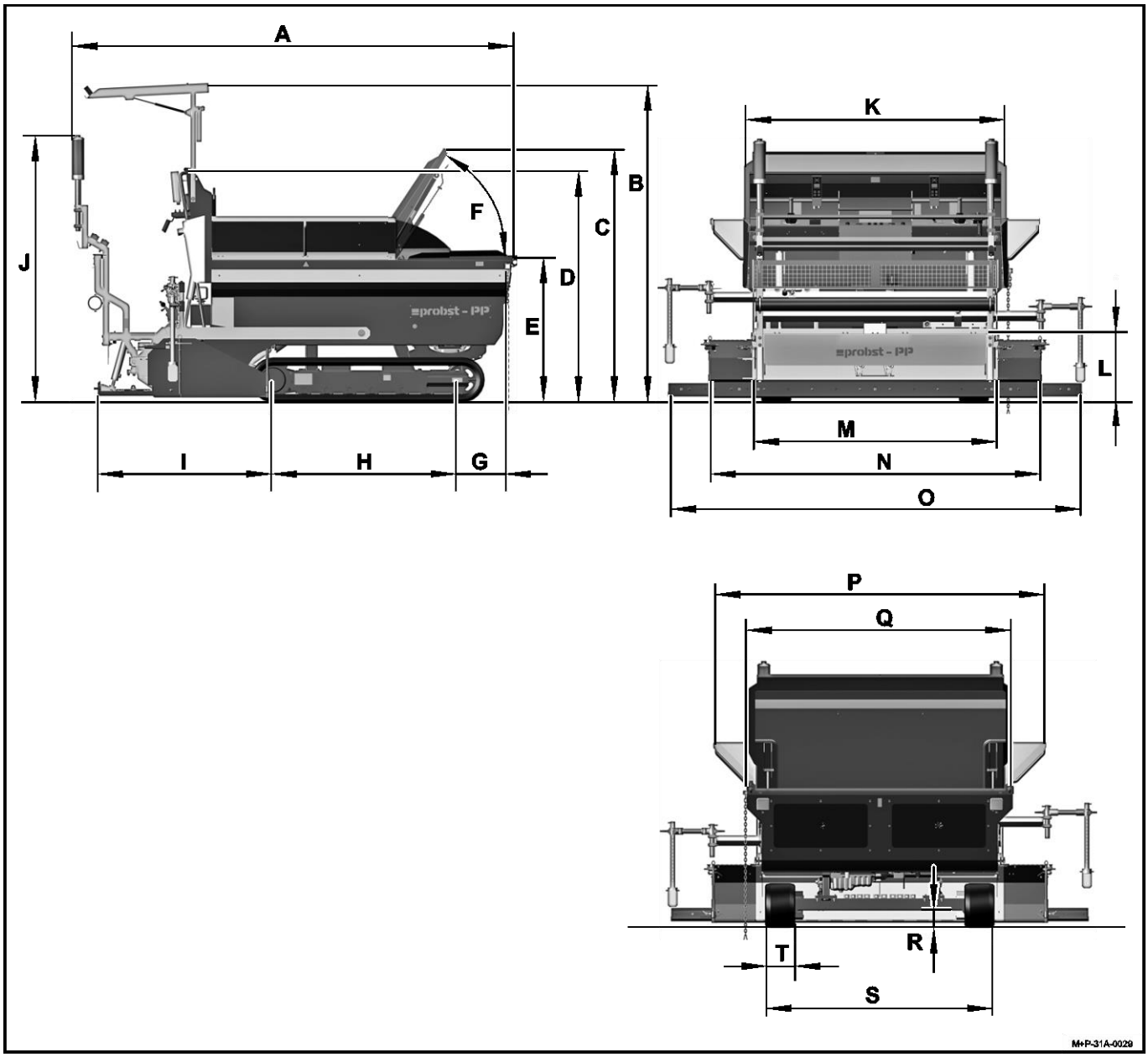
The machine must only be operated and maintained by correspondingly trained and briefed personnel. For this reason, personnel will be correspondingly trained and briefed when the machine is handed over. This training includes:

- Going through each page of the operating instructions and complementing this with practical exercises performed on the machine.
- Discussing the observance of the relevant national accident prevention regulations.
- Explaining the use of the operating equipment.
- Discussing the inspections that need to be performed before the engine is started.
- Discussing the regulations for running-in the engine.
- Discussing the operation of all of the machine's functions.
- Explaining the maintenance intervals and the points listed on the maintenance and inspection plan on the machine.
- Discussing the lubrication intervals and lubrication points.
- Handing over the separate operating manuals for the engine (KUBOTA), the combined cooler (EMMEGI) and the crawler undercarriage (TFW), the MOBA control unit, the Rugby laser sender and the operating tips.
- Explaining the warranty terms.

4.7 Technical data

Model:	POWER PLAN PP
Drive power:	18,5 kW (25,2 HP)
Engine:	Diesel engine V1505-E4-B Please refer to the engine (KUBOTA) and combined cooler's (EMMEGI) operating manuals for their technical data
Cylinder capacity:	1.498 cm³
Equivalent permanent sound level LpA:	82 dB[A]
Vibration values:	
Effective acceleration value acting on the upper limbs:	< 2.5 m/s²
Effective acceleration value acting on the body:	< 0.5 m/s²
Undercarriage:	Crawler tracks Please refer to the crawler undercarriage's (TFW) operating manual for the technical information
Speed control:	Continuous hydrostatic drive
Speeds:	
Driving setting 0	1.6 km/h
Driving setting 1	3.2 km/h
Weights & Measurements:	
Max. total weight:	6,000 kg (13,200 lbs)
Dead weight:	2,500 kg
Hopper volume:	approx. 2.5 m³
Transportation measurements (Compact):	1.900 x 2.050 x 3.400 mm (75"x81"x134") (H x B x L)
Carrying capacity:	3,500 kg (7,700 lbs)
On-board voltage:	12 V DC
Installation depth (sub-base height)	16 cm
Filling capacities:	
Fuel tank:	30 litres (tank filling is sufficient for ca. 8-10 working hours)
Engine oil:	6 litres
Hydraulic fluid:	30 litres
Operating fluids:	
Fuel:	Diesel (Ultra low sulfur diesel fuel [sulfur content < 0.0015% (15 ppm)] ***DO NOT USE BIO DIESEL.***
Engine oil:	SAE 15W-40 / API-CF4
Hydraulic fluid:	HLP46 (hydraulic fluid as specified under ISO 2943) RKM filter, 100/15 µm (filter mesh)
Lubricating grease:	Conventional high-performance multi-purposes grease

4.7.1 Dimensions



A	Total length	3665 mm
B	Total height	2623 mm
C	Height of the front chute when open	2089 mm
D	Height up to the driver's cab	1930 mm
E	Height up to the hopper	1172 mm
F	Opening angle of the front chute	60°
G	Protrusion at the front starting at the drive	457 mm
H	Distance between the drive units	1564 mm
I	Distance between rear drive and the main board	1450 mm
J	Height up to the MOBA laser receiver	1920 mm

K	Width of front chute	2090 mm
L	Height up to the driver's cab step	521 mm
M	Width of the main board	2050 mm
N	Width of the main board when extended with 2 extension boards	2750 mm
O	Width of the main board when extended with 2 extension boards and 2 smoothing boards	3450 mm
P	Width with chutes folded out at the side	2749 mm
Q	Width of hopper	2202 mm
R	Ground clearance	150 mm
S	External dimensions of the crawler tracks	1900 mm
T	Width of the crawler tracks	250 mm

5 Operating the machine

⚠WARNING

Risk of personal injury and damage to property

Failure to observe the instructions in the introductory sections of these instructions can lead to injury and damage.

- The information provided in the "Safety" and "General information" sections in particular must be observed.

- Always observe the safety regulations and perform the required maintenance measures before starting the machine.
- When starting the machine for the first time, the machine's fuel level must be checked before starting it, as the tank may be empty on delivery (< 1 litre). See "Checking the fuel level".
- The machine must be warmed up as follows every day before starting it:
- If outside temperatures are above +10 °C, the engine must be left to run for 5 minutes to warm up
- If outside temperatures are below +10 °C, the engine must be left to run for 10 minutes to warm up

The ensure the machine's safe and smooth operation, the following inspections must be performed every day:

- Check the fuel level. See "Checking the fuel level".
- Check the engine oil level. See "Checking the engine oil level".
- Check the hydraulic fluid level. See "Checking the hydraulic fluid level".
- Check the coolant level. See the "Checking the coolant level" section.
- Check the air filter. See "Cleaning the air filter".
- Check the accelerator. See "Checking the accelerator".

NOTICE

Risk of damage to property

Low fluid levels (coolant, engine oil and hydraulic fluid) can cause engine damage and damage to other machine components.

- Check all of the operating fluids (coolant, engine oil and hydraulic fluid) and top up if required before starting the machine for the first time and thereafter every time before starting it.

⚠CAUTION

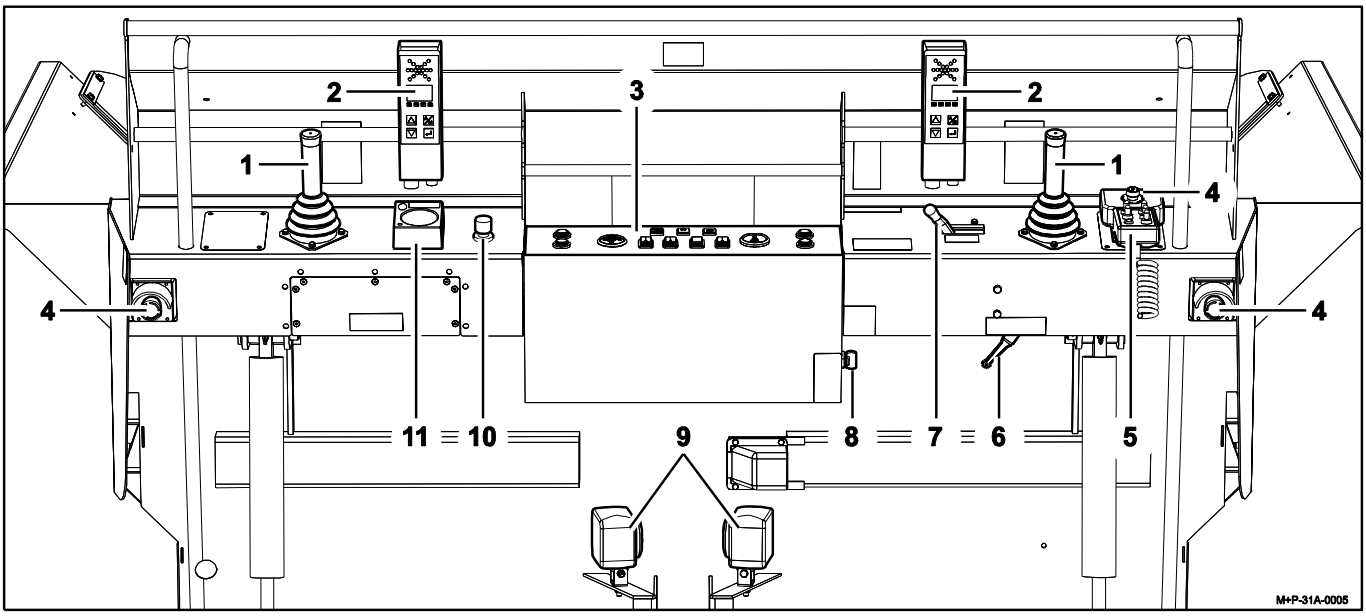
Risk of environmental damage

Diesel or engine oil that find their way into the ground or sewer system can cause environmental damage.

- Do not spill any fluids when topping the machine up.

5.1 Driver's cab

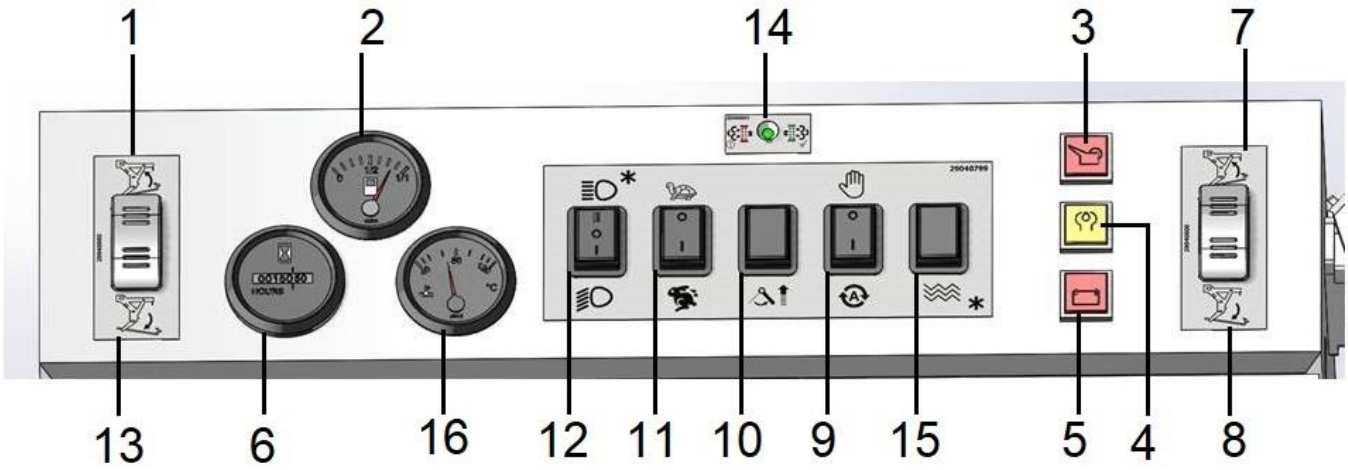
5.1.1 Overview of the driver's cab

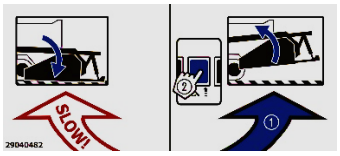
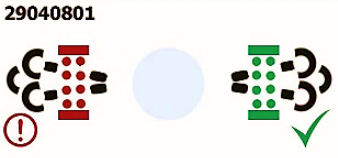
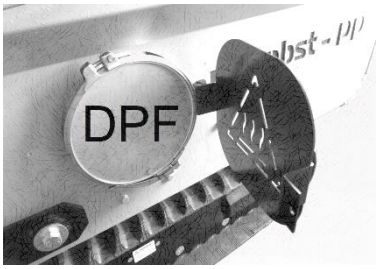


1	Joystick (for driving forwards, backwards and sideways)	See "Steering".
2	MOBA control unit #	See "MOBA control unit".
3	Operating equipment and indicators	See "Operating equipment and indicators".
4	EMERGENCY STOP button (3 x)	
5	Manual control unit	See "Manual control unit".
6	Lever for raising/lowering the smoothing board	See "Raising/lowering the smoothing board"
7	Engine speed control lever	See "Controlling the engine speed".
8	Ignition switch	See "Starting the engine".
9	Headlights	See "Changing the bulbs".
10	Throttle valve for controlling the driving speed in "automatic" mode	See "Selecting the driving settings and operating mode".
11	Drinks holder	

# Denotes optional equipment

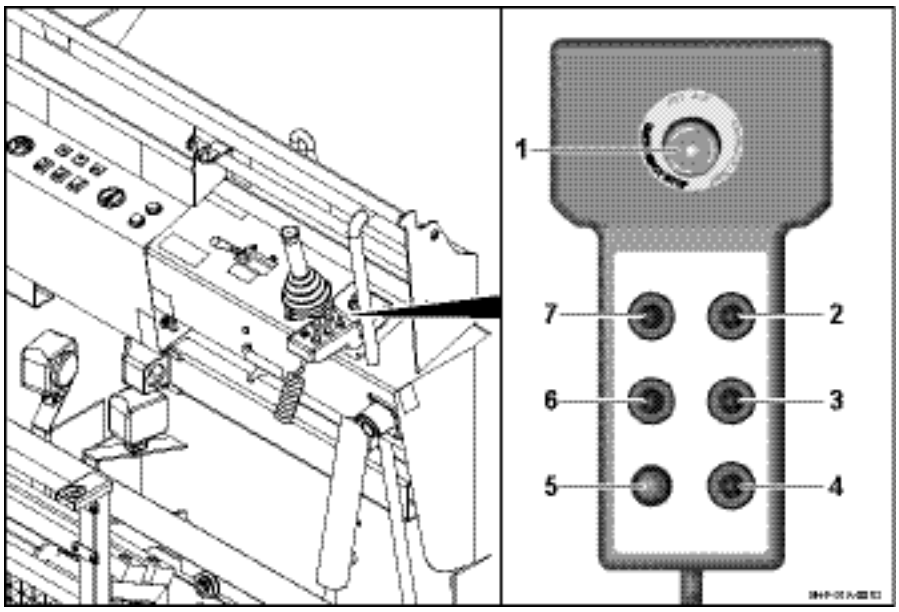
5.1.2 Operating equipment and indicators

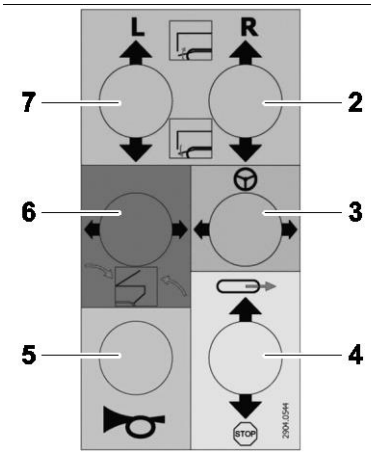


1	Raise the smoothing board on the left	
2	Fuel indicator	
3	Oil pressure control light →	See “Oil pressure control light”.
4	Preignition indicator →	See “Starting the engine”.
5	Battery control light→	See “Battery control light”.
6	Operating hours indicator	
7	Raise the smoothing board on the right	
8	Lower the smoothing board on the right	
9	“Manual” (driving setting 1) or “Automatic” (driving setting 0) driving mode	See “Selecting the driving settings and operating mode”.
10	Raise the smoothing board (adjusting lever to the right + press the button) Lower the smoothing board (adjusting lever to the left)	
11	Driving setting switch → **0** Driving setting for screeding mode **I** Driving setting for driving mode	See “Selecting the driving settings and operating mode”.
12	Working lights (* optional light package)	
13	Lower the smoothing board on the left	See arrows in figure below
14	Indicator for optional diesel particle filter DPF Display RED = Replace particle filter Display GREEN = Particle filter OK **29040801** 	
15	Vibrator function of the hopper (* optional)	
16	Coolant temperature	See “Coolant temperature indicator”.

5.1.3 Manual control unit

The manual control unit can be fastened to the magnetic plates on both the right and left side of the driver's cab.





1 EMERGENCY STOP button
2 Open/close the right hopper flap
3 Direction correction for "Automatic" mode
4 Automatic mode on/off
5 Horn
6 Open/close front chute
7 Open/close the left hopper flap

5.2 Engine compartment

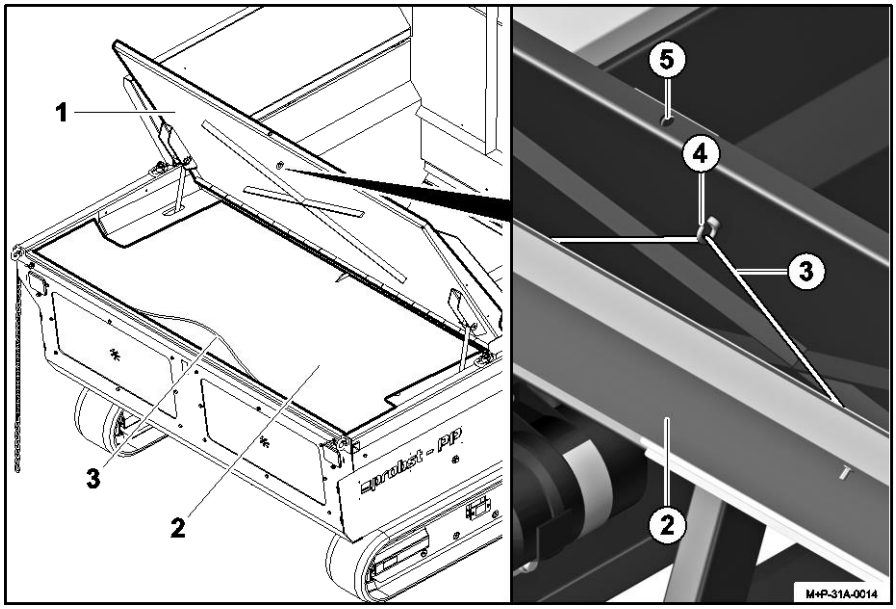
5.2.1 Opening the engine hood

⚠WARNING

Risk of personal injury

Because of the weight of the front chute, there is a risk of injury when manually opening the engine hood.

- The front chute must only be opened partway and with the help of another person.



Opening the engine hood hydraulically

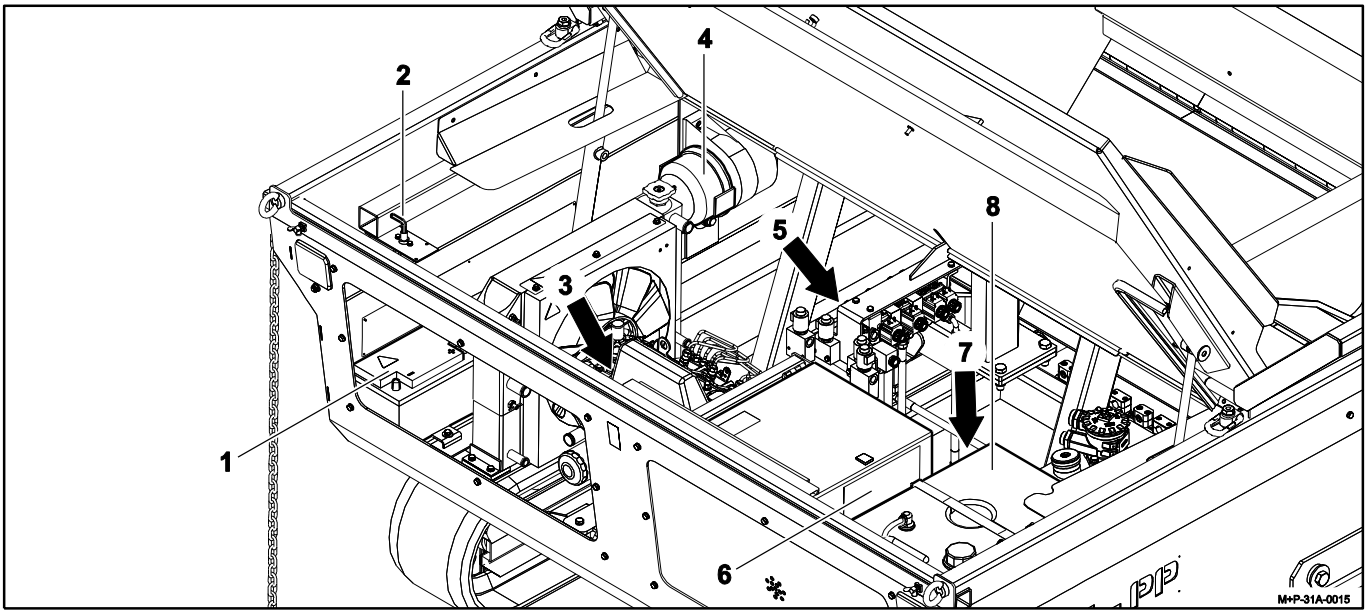
1. Open the front chute (1). See “Manual control unit”.
2. Clip the engine hood (2) into the hook (4) with the steel wire (3).

Opening the engine hood manually

If the battery or the fuel tank is empty, the engine hood has to be opened by manually. To do so:

1. **Carefully** open the front chute (1) partway with the help of another person.
2. Clip a suitable chain into the hole (5) and fully open the front chute (1) with the aid of a digger.
3. Clip the engine hood (2) into the hook (4) with the steel wire (3).

5.2.2 Overview of the engine compartment



1	Battery	See “Maintaining the battery”.
2	Main switch	See “Main switch”.
3	Dipstick for checking the oil level	See “Checking the oil level”.
4	Air filter	See “Cleaning the air filter”.
5	Throttle valve for adjusting the damper speed for the front chute	See “Adjusting the damper speed for the front chute”.
6	Fuse box	See “Changing fuses”.
7	Hydraulic fluid level indicator	See “Checking the hydraulic fluid level”.
8	Fuel tank (with level indicator)	See “Checking the fuel level”.

5.3 Daily inspections

5.3.1 Checking the fuel level

NOTICE

Risk of damage to property

The use of fuels that do not comply with the requirements of the European standard EN 590 can lead to increased wear and damage the engine.

Do not use any of the following fuels:

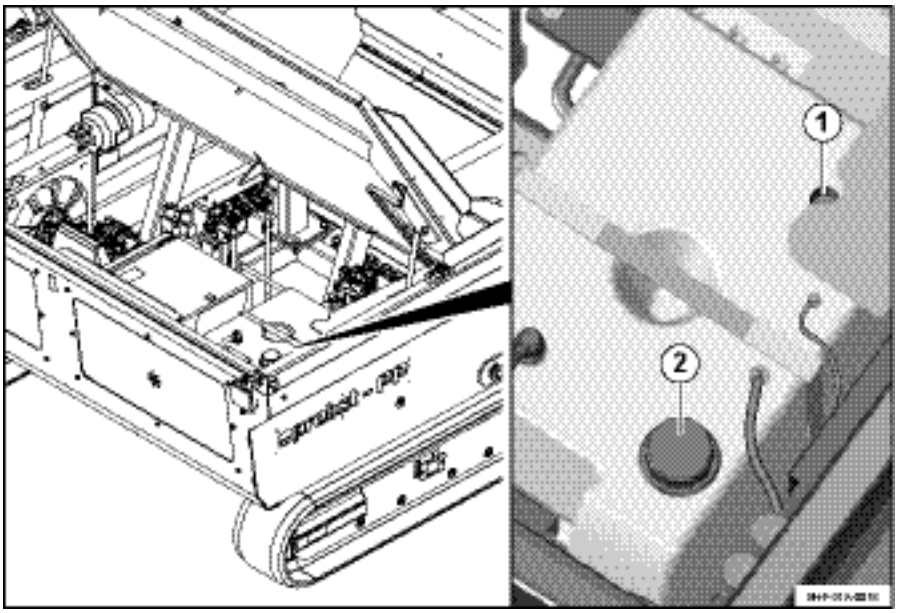
- Marine diesel
- Heating oil
- Biodiesel
- Vegetable oil
- Petrol
- Petroleum
- Kerosene

NOTICE

Risk of damage to property

When refuelling the machine from a can, there is a risk of the fuel lines and/or diesel injection system become blocked with particles from the can.

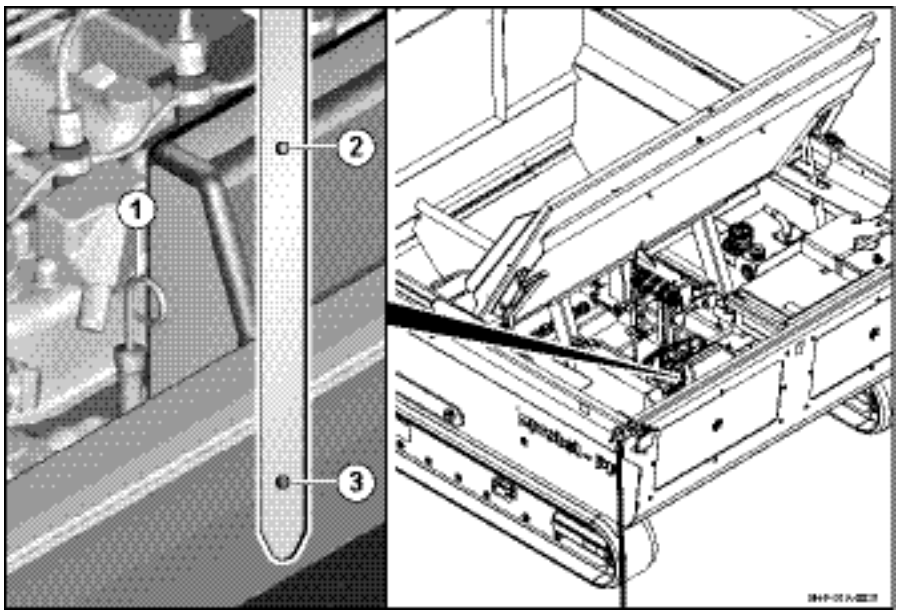
- When refuelling from a can, always use a filter.



1. Open the engine hood. See “Opening the engine hood”.
2. Check the fuel level by checking the fuel level indicator (1).
   - If the float gauge is red: The tank is empty
   - If the float gauge is red/green: The tank is half full
   - If the float gauge is green: The tank is full

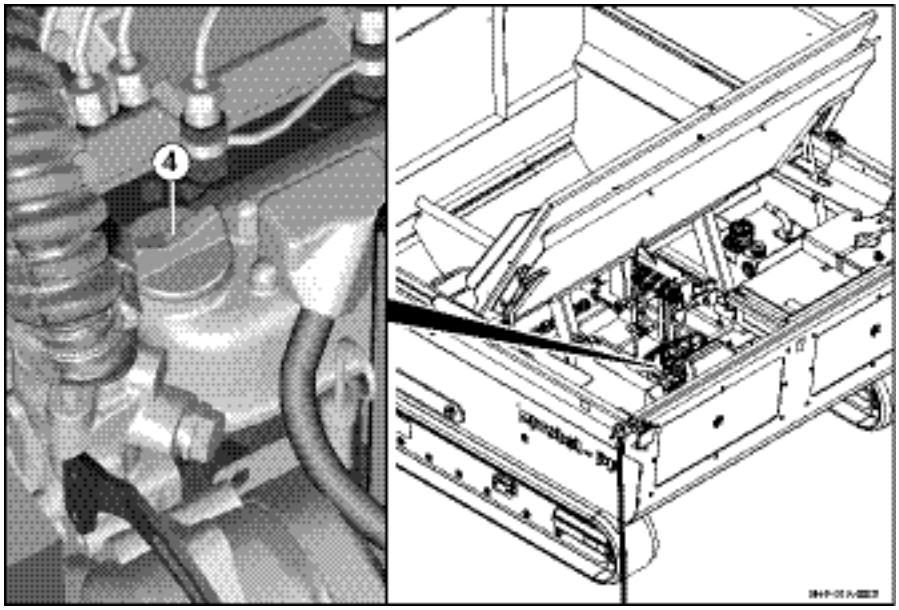
   If the fuel needs to be topped up:
3. Unscrew the cap (2).
4. Fill the fuel tank with diesel. See “Technical data” for information on operating fluids and filling capacities.
5. Screw the cap (2) back on.
6. Close the engine hood

5.3.2 Checking the engine oil level



1. Park the machine on level ground, switch it off and leave to cool for around 5 minutes.
2. Open the engine hood. See “Opening the engine hood”.
3. Pull out the dipstick (1) and clean with a lint-free, clean cloth.
4. Reinsert the dipstick (1) and pull it out again.

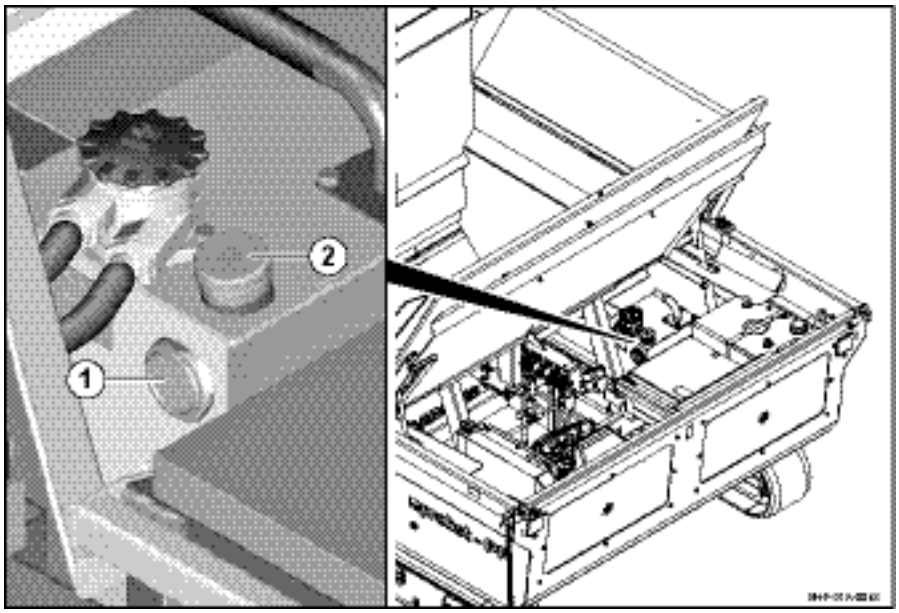
   The oil level must be between marks (2) and (3).



If the engine oil needs to be topped up:

5. Unscrew the cap (4) and top up with engine oil through the filler pipe.
6. Once the oil has been topped up, wait for at least 5 minutes. Now check the oil level again.
   See “Technical data” for information on operating fluids and filling capacities.
7. Close the engine hood

5.3.3 Checking the hydraulic fluid level



1. Park the machine on level ground.
2. Open the engine hood. See “Opening the engine hood”.
3. Check the hydraulic fluid level at the fluid level indicator (1).

   ◡ Fluid level in the middle: Ideal fluid level.

   ○ Fluid level right at the bottom or no longer visible: The tank is nearly empty. Top up the hydraulic fluid immediately.

   ● Fluid level right at the top: Hydraulic fluid level is too high. Contact customer services.

   If the hydraulic fluid needs to be topped up:
4. Unscrew the cap (2) and top up with hydraulic fluid through the filler pipe. See “Technical data” for information on operating fluids and filling capacities.
5. Close the engine hood

5.3.4 Checking the coolant level

⚠WARNING

Risk of personal injury

The engine cooling system is pressurized. Coolant can be hot and cause serious burns.

- Only unscrew the cap once the engine has cooled down. When doing so, the coolant temperature indicator must be below +40 °C.

NOTICE

Risk of damage to property

Failure to mix the anti-corrosion agent, anti-freeze and water at the correct ratios can lead to damage.

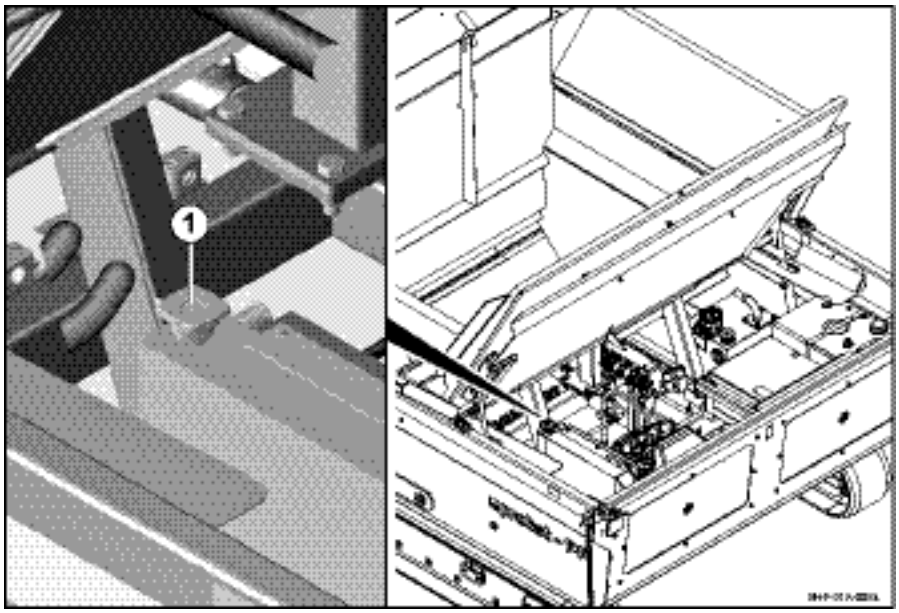
- To avoid damage, observe the information on the mixing ratios for the anti-corrosion agent, antifreeze and water. Please refer to the separate operating manual for the combined cooler (EMMEGI) for more information.

NOTICE

Risk of damage to property

Failure to use the correct anti-corrosion agent and anti-freeze can lead to damage.

- To protect the machine from corrosion, the cooling system must be kept filled with a coolant mixture throughout the entire year (both in summer and winter).
- Only use the specified anti-corrosion agents and antifreeze. See the separate operating manual for the combination cooler (EMMEGI) for more information.



1. Park the machine on level ground.
2. Open the engine hood. See “Opening the engine hood”.
3. Carefully unscrew the cap (1) and allow the excess pressure to escape.
4. Carefully continue unscrewing the cap (1) and remove.

   If the coolant reaches up to the bottom lip of the filler pipe, the cooler contains sufficient cooler.

   If the coolant needs to be topped up:
5. Top up the coolant until it reaches the bottom lip of the filler pipe. For information on operating fluids and filling capacities, see the separate operating manual for the combination cooler (EMMEGI).
6. Screw the cap (1) back on.
7. Close the engine hood

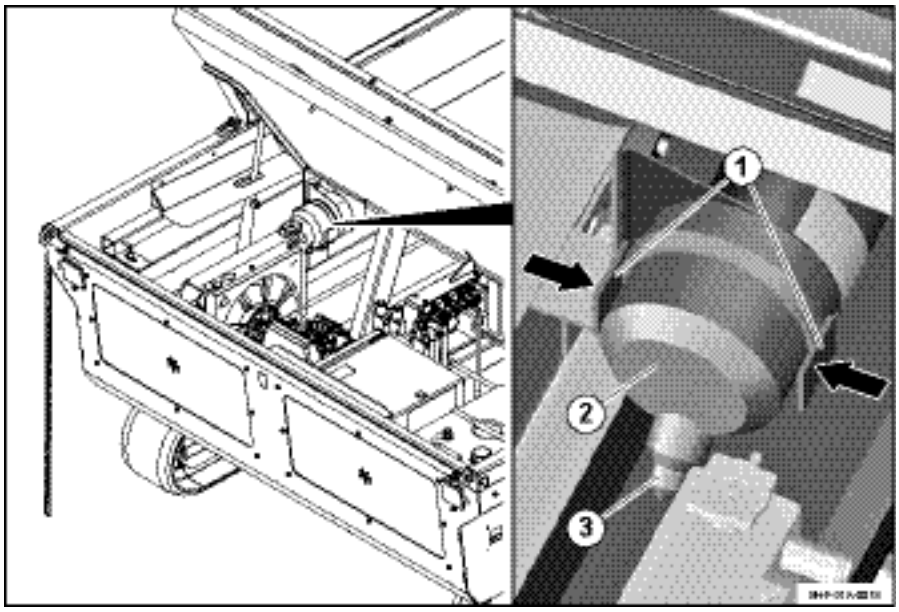
5.3.5 Cleaning the air filter

NOTICE

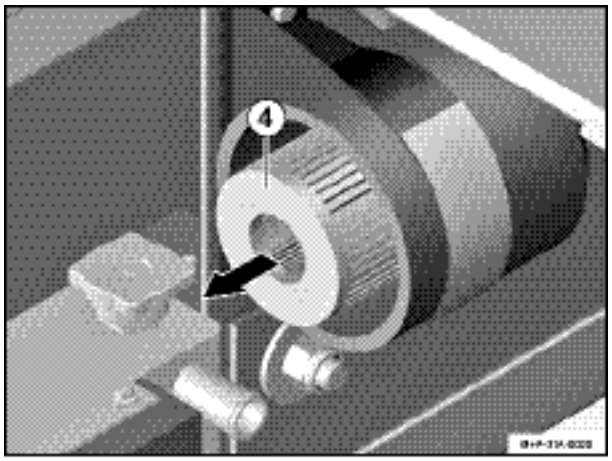
Risk of damage to property

Failure to properly clean the air filter can lead to filter blockages and the creation of highly flammable gasses.

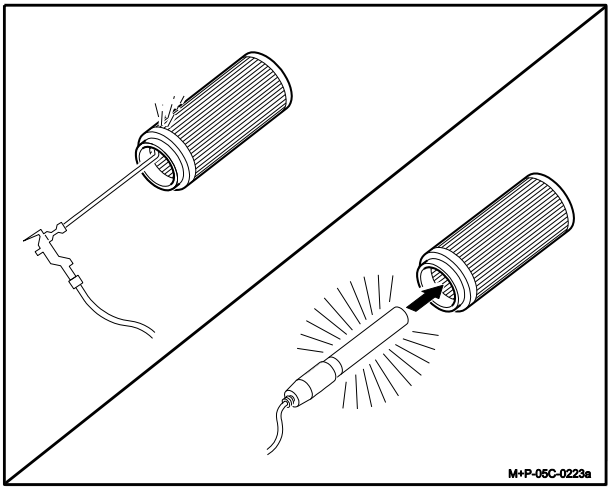
- Do not wash the air filter, brush out the dirt or clean it with fuel.
- When blowing the air filter out, makes sure that none of the dust finds its way into the inside of the filter.



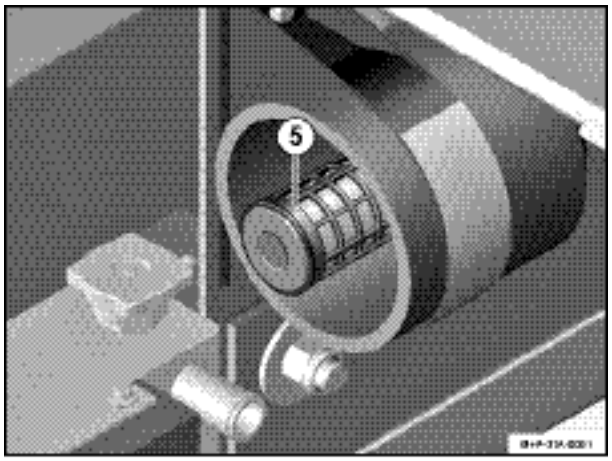
1. Open the engine hood. See “Opening the engine hood”.
2. Carefully open the clips (1) and remove the cover (2).
3. Squeeze the dust outlet (3) and check for caked up dust. If necessary, clean.



4. Pull out the air filter (4).

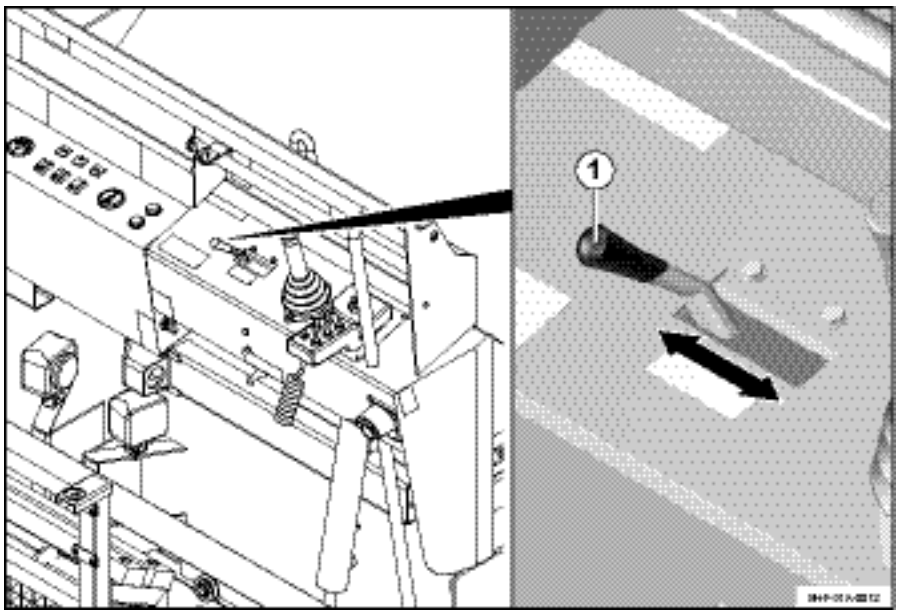


5. Blow dry, compressed air (max. 5 bar) into the inside of the air filter (4) until there is no longer any dust coming out of it.
6. Check each of the paper profiles for tears and holes using a suitable flashlight.
7. If damaged, change the air filter.



8. Pull out the prefilter (5) and blow out with dry, compressed air.
   If heavily soiled, replace the prefilter.
9. Clean the inside of the housing and the cover (2) with a damp cloth.
10. Fit the prefilter (5).
11. Fit the air filter (4).
12. Reinstall the cover (2) and secure with the clips (1).
13. Close the engine hood.

5.3.6 Checking the accelerator



Move the accelerator (1) to the left and right dead stop.
The accelerator (1) must be easy to move.

5.4 Before starting the machine

5.4.1 Main switch

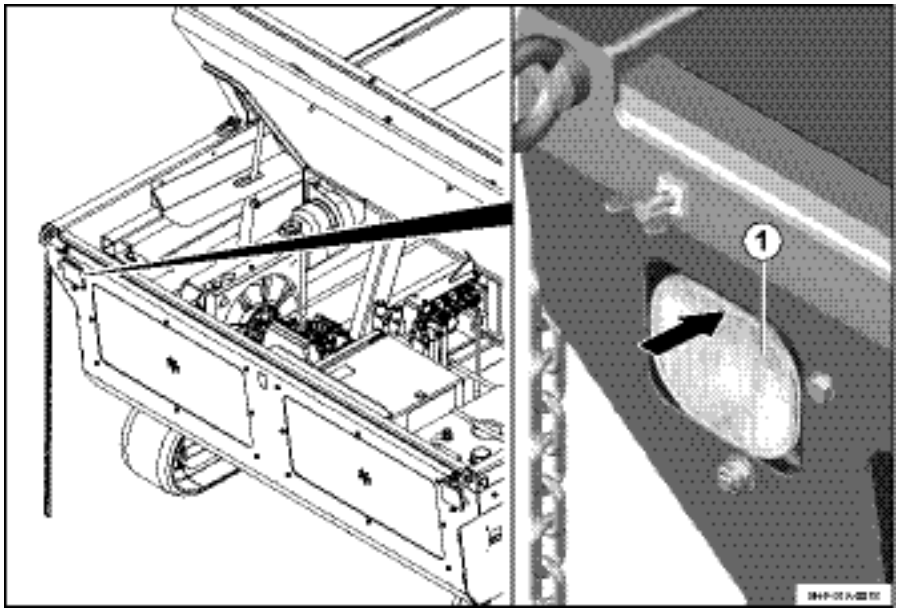
⚠WARNING

Risk of accident

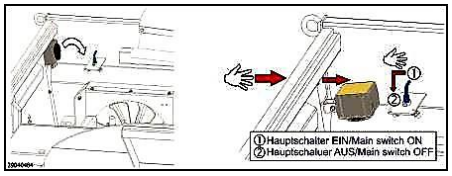
Failure to use the machine correctly and appropriately can lead to accidents - as can its use by authorized

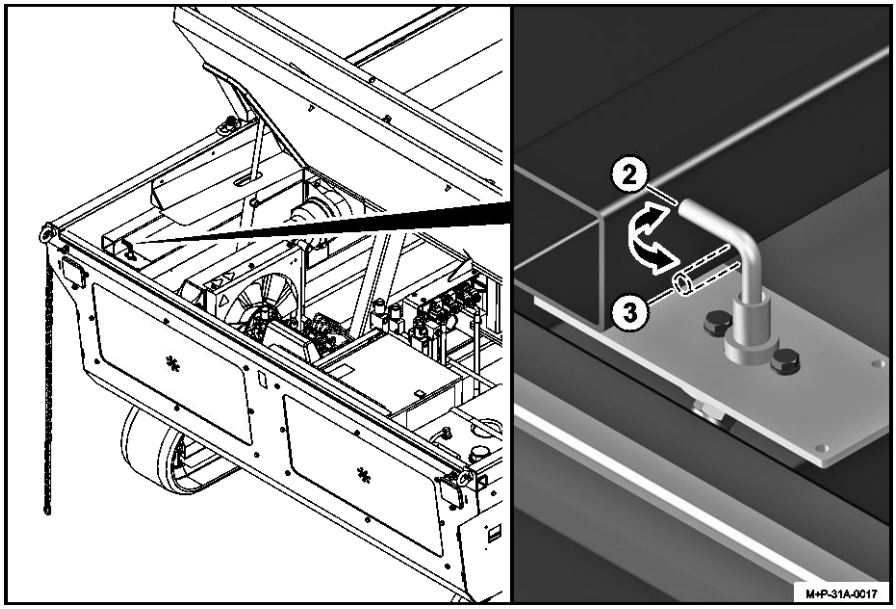
persons.

- After screeding, switch off the machine as specified. See “Switching the machine off”.
- Once stopped, switch off the main switch, remove the lever and store in a safe place.



1. Push against the headlight (1) until it has fully flipped.



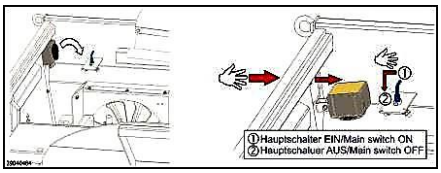


Switching off the main switch

2. Turn the lever (2) anticlockwise until it is in position (3) and remove.

Switching on the main switch

3. Insert the lever in position (3) and turn clockwise.
4. Flip back the headlight (1).



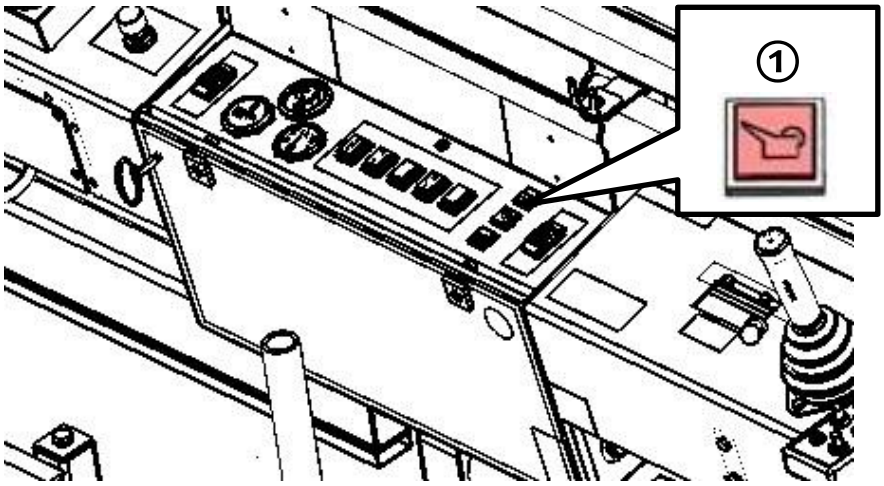
5.5 Operation

5.5.1 Inspections to be performed before starting the engine

Daily, before starting the machine for the first time:

- Switch on the main switch. See “Main switch”.
- Perform the daily inspections. See “Daily inspections”.
- Visually check the machine for damage, loose parts and oil, fuel and coolant leaks.

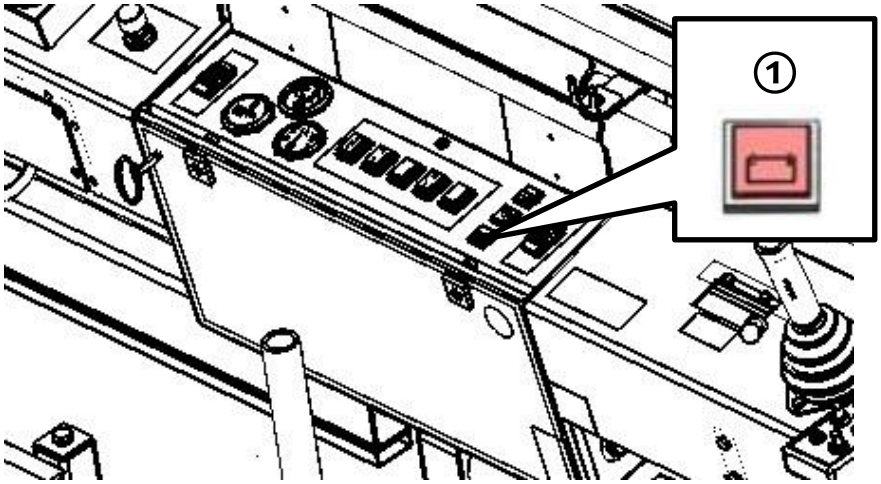
Checking the oil pressure



The oil pressure control light (1) must be illuminated when the ignition switch is set to I. See “Starting the engine”.

When the engine is running, the oil pressure control light must extinguish. If it does not, there is a fault.

Battery control light



The battery control light (1) must be illuminated when the ignition switch is set to I. See the section on "Starting the engine".

When the engine is running, this control light must extinguish. If it does not, there is a fault.

Coolant temperature indicator

NOTICE

Risk of damage to property

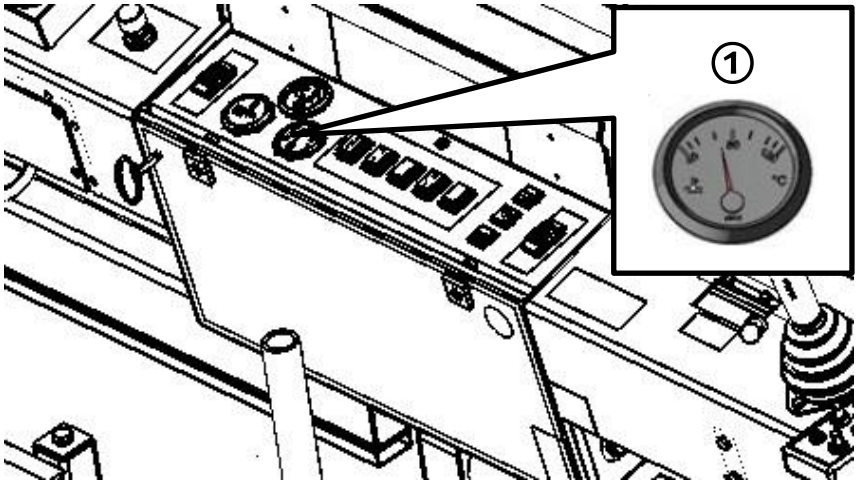
Operating the machine with coolant that is too hot can lead to damage.

If the coolant temperature rises above +110 °C:

- Cleaning the air filter or replace if necessary,
- Blow clean the cooling fins with compressed air,
- Check the coolant level and top up coolant if required.

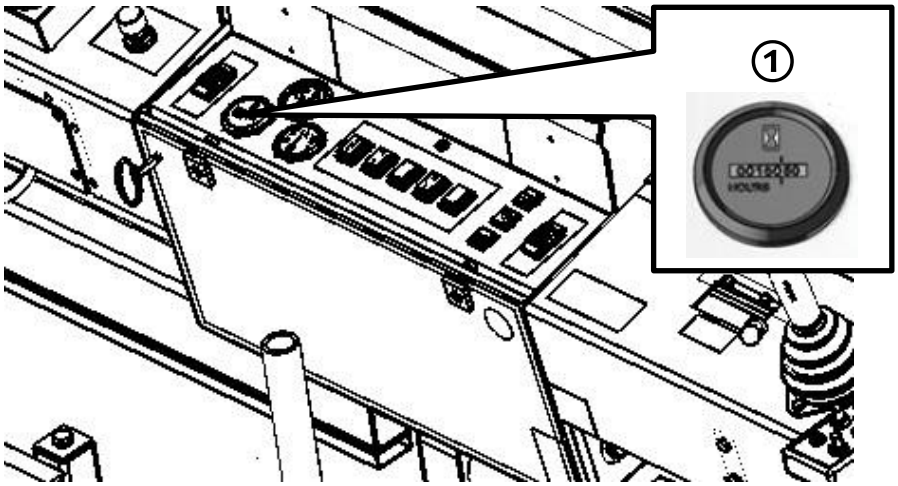
If none of the above works:

- Contact customer services.



During normal driving mode and if the coolant level is within the specified range, the coolant temperature indicator (1) can go up to +110 °C.

Operating hours indicator



To observe the specified operating-hour based maintenance intervals, they must be regularly checked at the operating hours indicator (1).

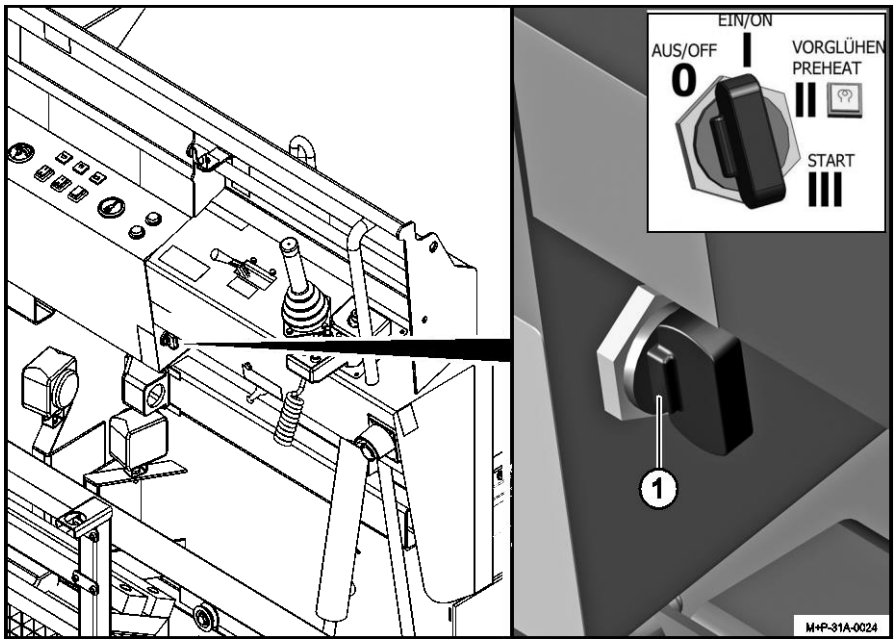
5.5.2 Starting the engine

DANGER

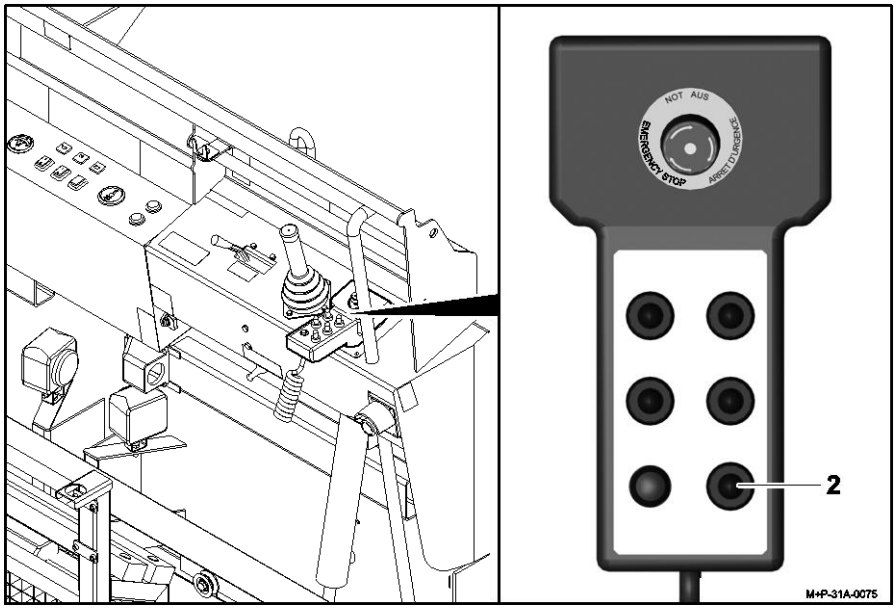
Risk of personal injury

Sudden machine movements can lead to injuries.

- Always make sure that there are no persons inside the machine's hazard zone before starting the engine.



1. Switch the ignition switch (1) to position **I** (ignition ON).
2. Check whether all of the indicator lights are on.
3. Switch the ignition switch (1) to position **II** and hold it there until the pre-ignition indicator extinguishes (after approx. 3 seconds).
4. Once the pre-ignition indicator has extinguished, switch the ignition switch (1) to position **III** and hold it there until the engine starts.



5. If the machine is in automatic mode, it will make a signal sound.
   Push the toggle switch (2) down.
6. Push the toggle switch (2) up.
   The *Screeding Machine POWER PLAN PP* is now ready to be driven.

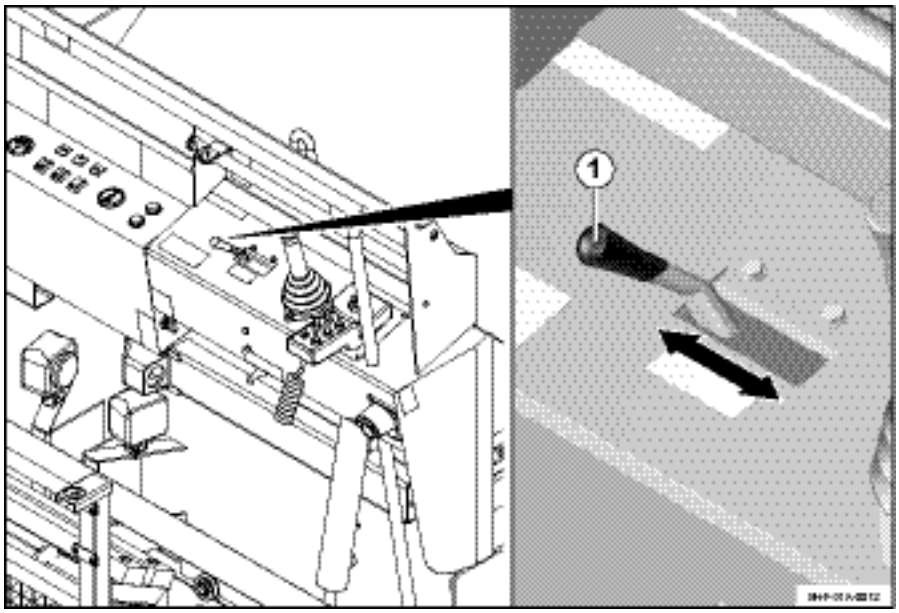
NOTICE

Risk of damage to property

If the warning lights fail to extinguish, there is a fault.

- Repair the fault immediately.

5.5.3 Controlling engine speed



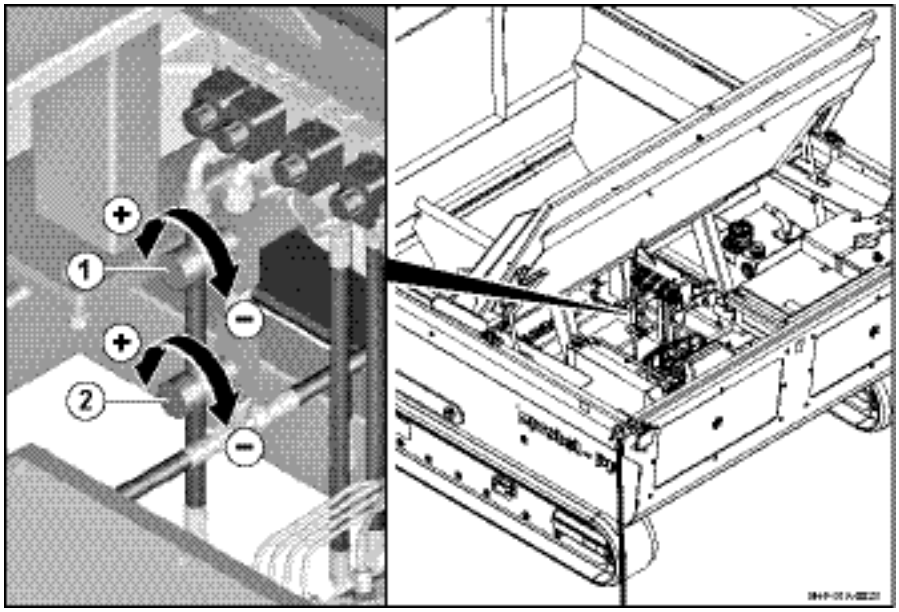
Move the lever (1) into the required position.

Lever positions:

- Left: Low speed for use when starting the engine or during brief operating breaks.
- Right: High speed for driving mode or when driving up slight elevations.
- Operating speed: ⅔-speed, which guarantees that the hydraulic system works at its optimum.

5.5.4 Adjusting the damper speed for the front chute

Depending on the operating method and operator's speed, the damper speed of the front chute can either be increased or reduced.

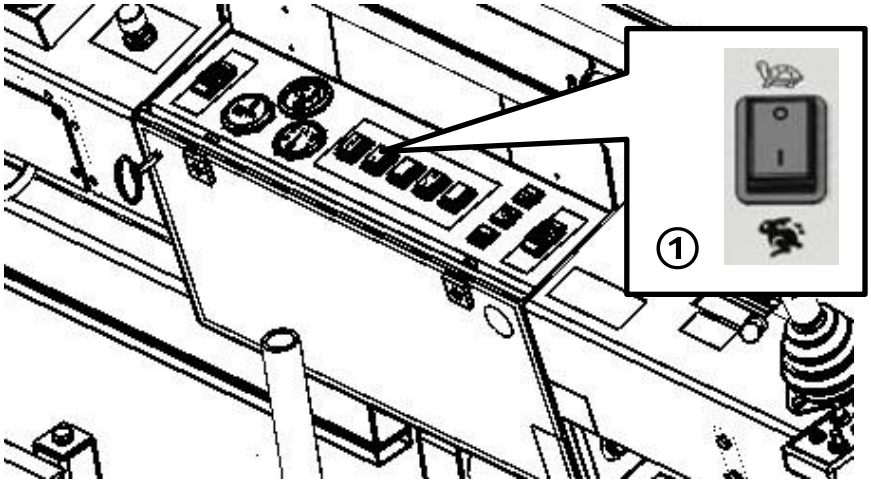


Throttle valve (1) = Raises the front chute.
Throttle valve (2) = Lowers the front chute.

Adjusting the damper speed **Setting**	**Effect**
Turning it clockwise	Reduces the speed
Turning it anticlockwise	Increases the speed

1. Loosen the grub screw on the throttle valve.
2. Turn it by ¼ turn into the relevant direction.
3. Now actuate the front chute.
4. If necessary, readjust the damper speed.
5. Tighten the grub screw.

5.5.5 Selecting the drive setting and driving mode

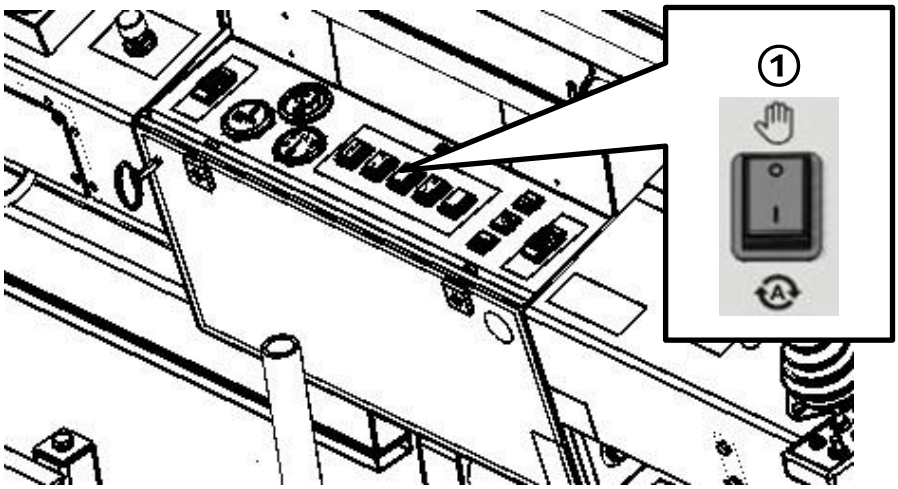


Drive setting "0" for screeding mode (for driving with filled hopper).

Switch toggle switch (1) to **0** (max. speed 1.6 km/h)

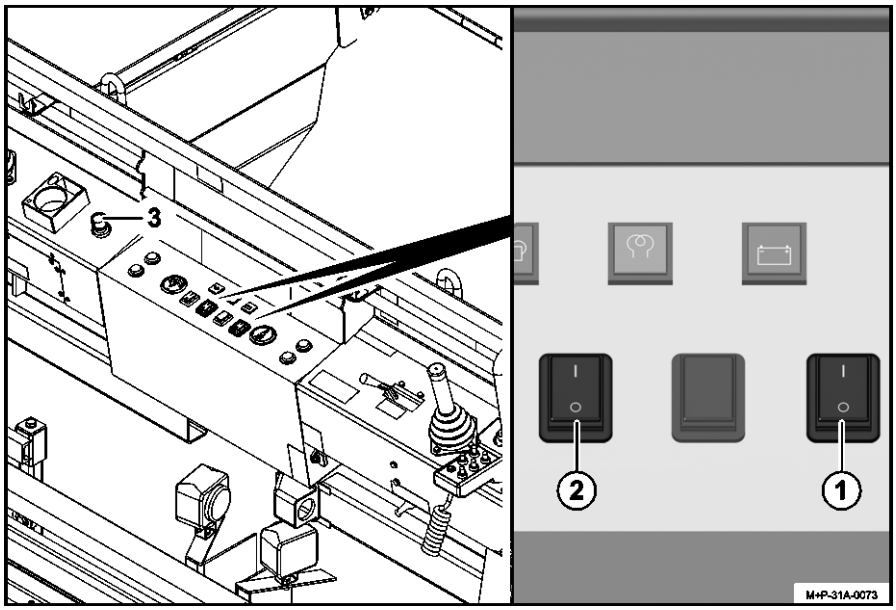
Drive setting "I" for driving mode (for driving with empty hopper)

Switch toggle switch (1) to **I** (max. speed 3.2 km/h)



Manual driving mode

1. Switch toggle switch (1) to **0**.



Automatic driving mode

1. Switch toggle switch (1) to **0**.
2. Switch toggle switch (2) to **I**.
3. Switch toggle switch (4) on the manual control unit on. See “Manual control unit”.
4. Adjust the drive speed at the throttle valve (3).

Setting	Effect
Turning it clockwise	Increases the speed
Turning it anticlockwise	Reduces the speed

When driving the machine in automatic mode, it can only be steered using the toggle switch on the manual operating unit. See “Manual control unit”.

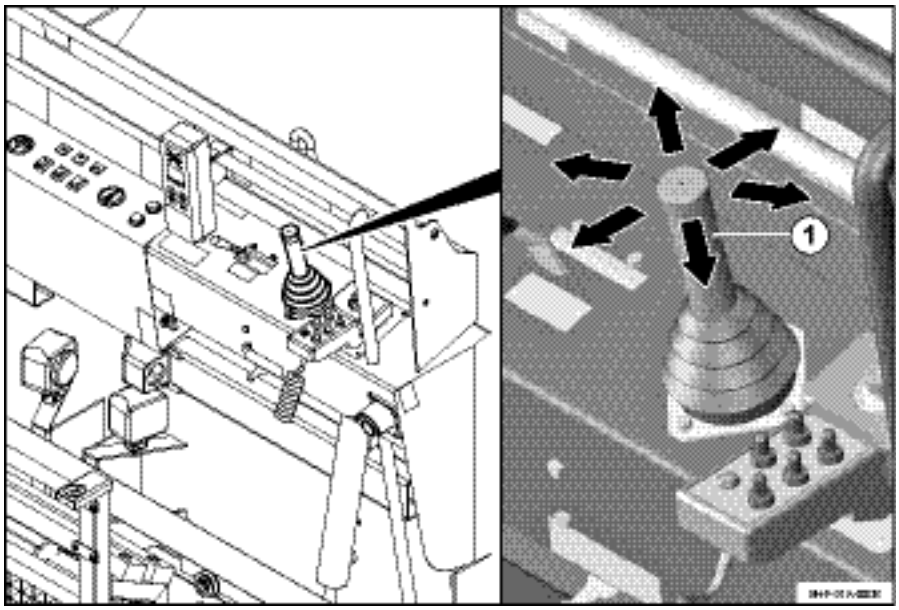
5.5.6 Starting to drive

⚠WARNING

Risk of accident

Lack of attention when starting to drive the machine in driving mode can lead to accidents.

- In the event of danger, warn people accordingly using hand signals.
- It must be ensured that there are no people in the machine's hazard zone.



Manual driving mode

1. Set the driving mode switch to **0** - manual mode.
2. Start the engine. See "Starting the engine".
3. Carefully move the joystick (1) into the direction you want to drive.

Automatic driving mode

1. Set the driving mode switch to **I** – automatic mode.
2. Start the engine. See "Starting the engine".
3. Press the toggle switch on the manual control unit to make slight adjustments to the direction of drive. See "Manual control unit".

5.5.7 Chain guide

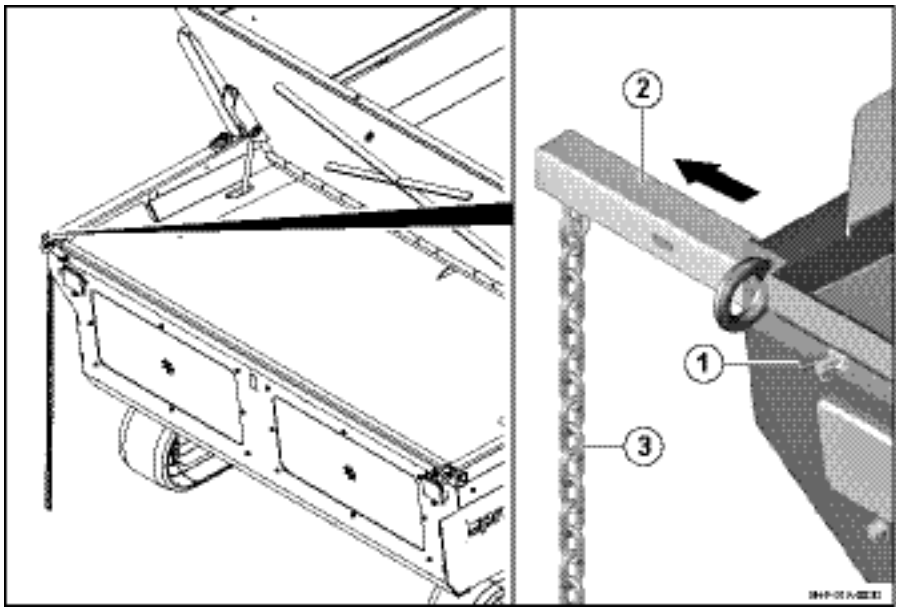
The chain guide acts as a point of reference for the operator when working with the machine.
It, for example, makes it easier to drive the machine closely along the sides of kerbstones and road kerbs (in particular in corners).
The chain guide can be attached on the left or right side of the machine.

NOTICE

Risk of damage to property

While driving, there is risk that the protruding chain guide or the loose chain collides with objects or that they get caught. This can lead to damage.

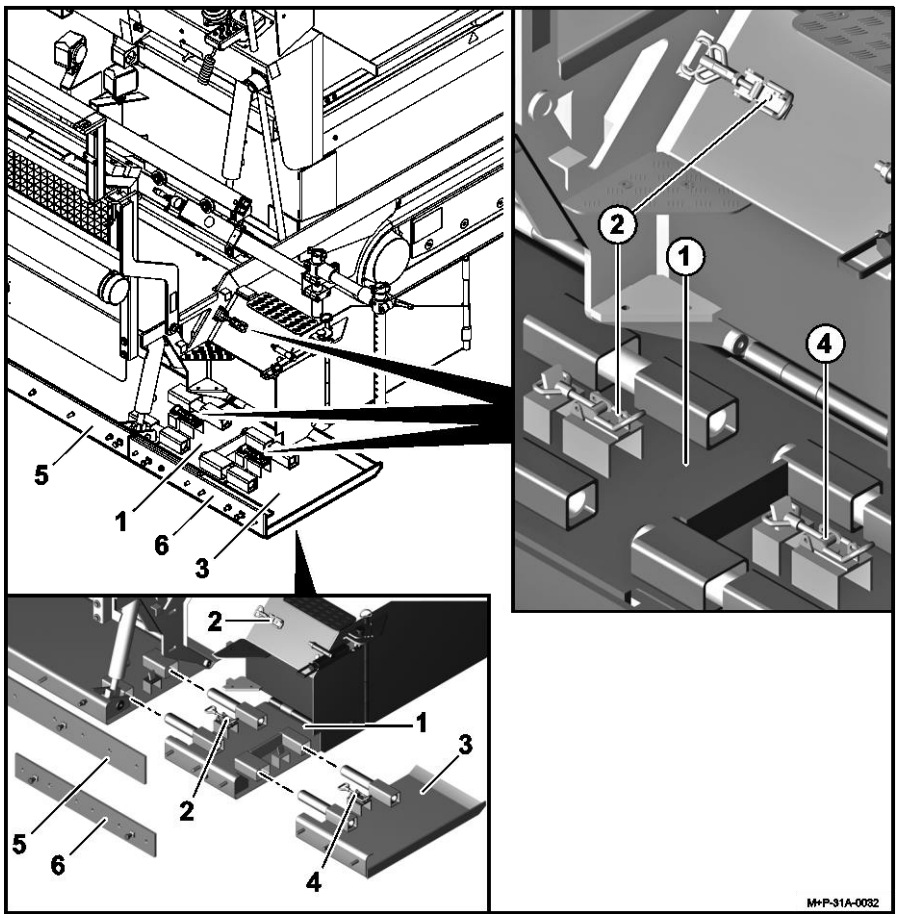
- Only leave the chain guide extended during operation.
- Take great care when driving the machine.
- Clip the chain back into place, push it fully back in and secure it after operation.



1. Undo the wing screw (1).
2. Pull out the chain guide (2) to the required length.
3. Let the chain (3) drop.
4. Tighten the wing screw (1).

5.5.8 Fitting/removing the smoothing and spreading board

The smoothing and spreading board can be attached on the left and right side of the machine.



Fitting the boards

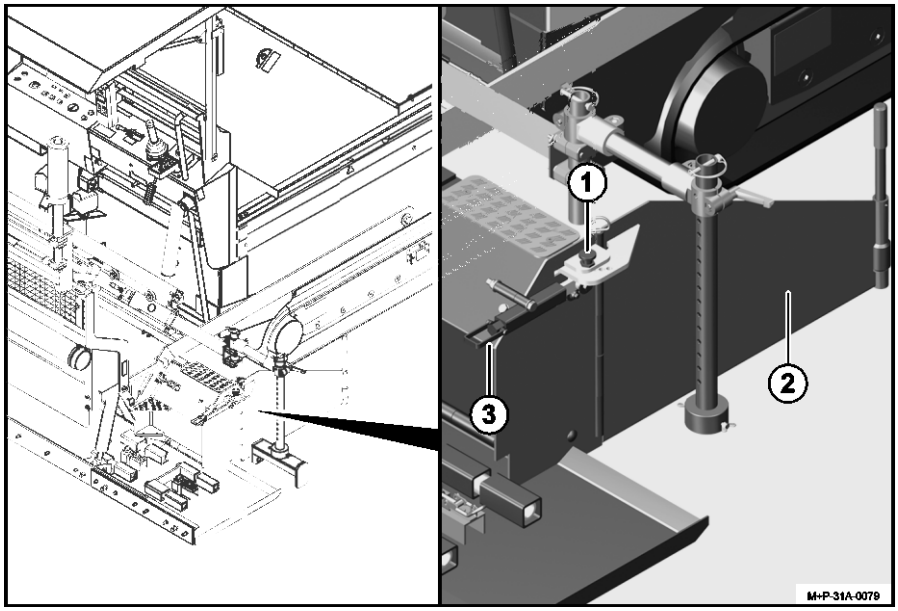
1. Put the spreading board (1) into position and lock the fasteners (2).
2. Put the smoothing board (3) into position and lock the fasteners (4).
3. Fasten the rubber wipers (5) and (6) with the nuts.

Removing the boards

4. Remove the nuts.
5. Tighten the screws by a few turns. This will push the rubber wipers (5) and (6) outward.
6. Remove the rubber wipers (5) and (6).
7. Open the fasteners (4) and remove the smoothing board (3).
8. Open the fasteners (2) and remove the spreading board (1).

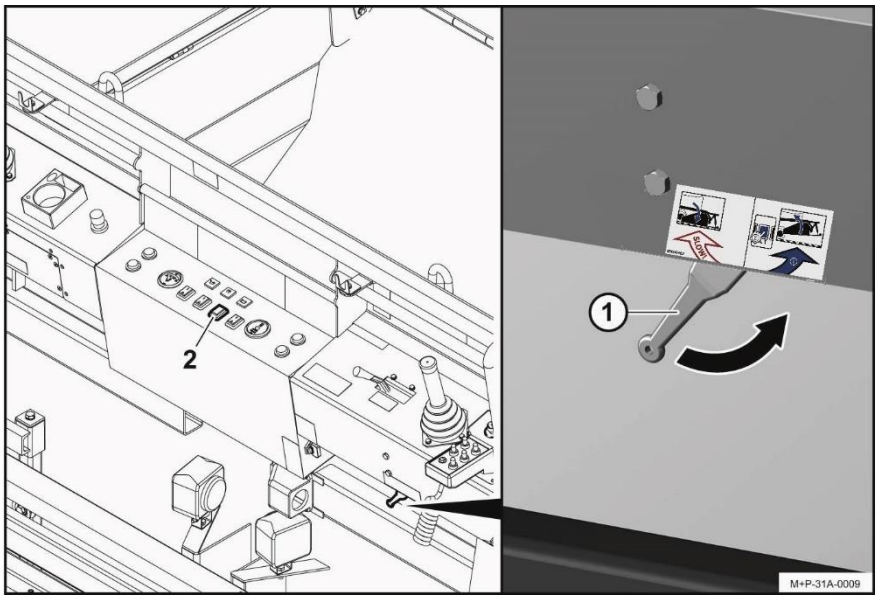
5.5.9 Adjusting the adjustable panels

The adjustable panels are located on the left and right side of the machine.



1. Pull out the lock bolt (1) and turn.
2. Move the adjustable panel (2) into the required position. A detailed description of how the adjustable panel can be adjusted during operation can be found in the separate operating tips, in the section “Adjusting the adjustable panels”.
3. Keep turning the lock bolt (1) until it audibly engages.
4. If necessary, continue turning the lever (3) until the bottom lip of the adjustable panel (2) is parallel to the ground.

5.5.10 Raising/lowering the smoothing board

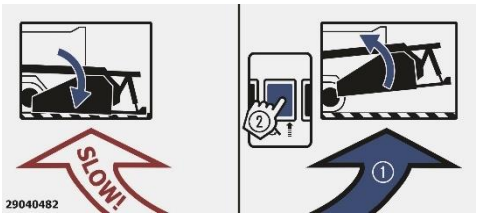


Raising the smoothing board

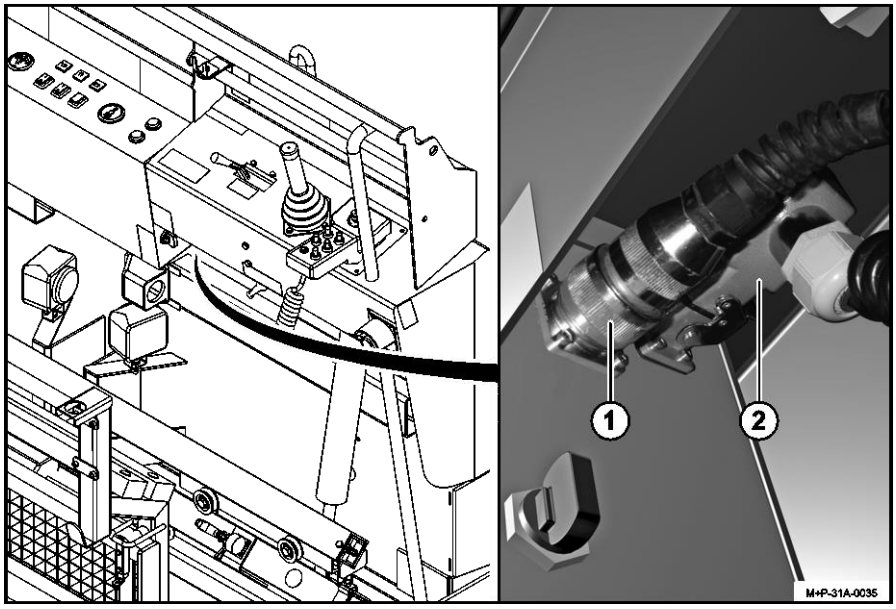
1. Move the lever (1) in the direction of the arrow.
2. Continue pressing the toggle switch (2) until the smoothing board has been fully raised.

Lowering the smoothing board

Slowly move the lever (1) in the direction opposite the arrow.



5.5.11 Switching the machine off



1. Park the machine on solid and even ground.
2. If parked on an incline, protect the machine from moving.
3. Fully lower the smoothing board. See “Raising/lowering the smoothing board”
4. Switch off the engine.
5. Switch off the electrical system at the main switch. See “Main switch”.
6. Undo the screw connection (1) of the MOBA control unit on the left and right side of the machine.
7. Undo the quick fastener (2) of the manual control unit on the left and right side of the machine.
8. Remove the MOBA control unit, manual control unit and laser receiver and store in a save place.
9. If necessary, push in any linear guide units and secure. See separate operating tips in the section “Adjusting the ultrasonic height sensors”.
10. If necessary, fully push in the chain guide and secure. See separate operating tips in the section “Chain guide”.
11. Clean the hopper.

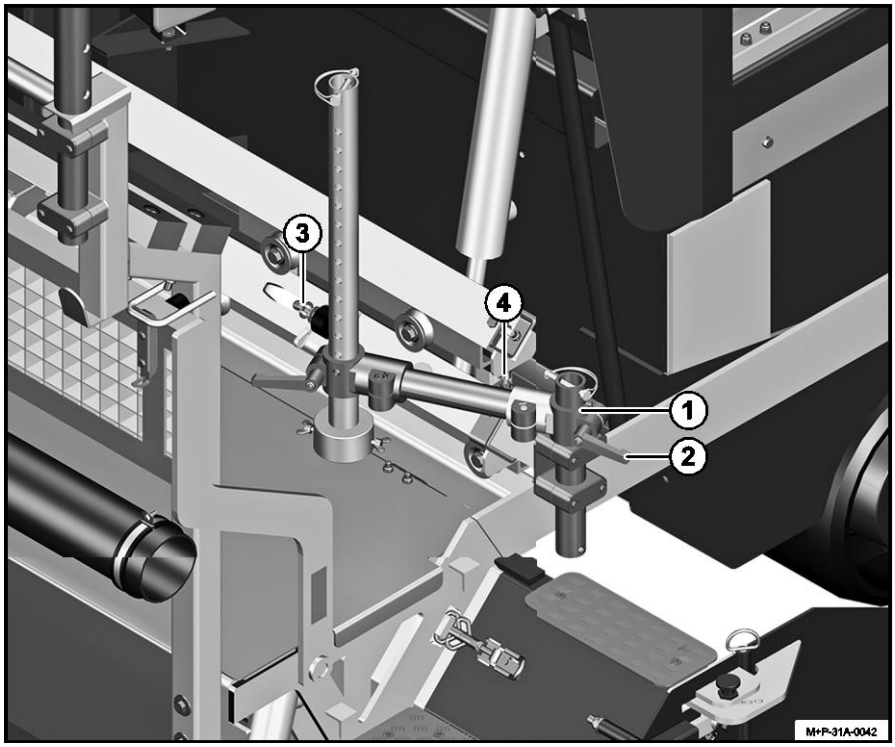
5.6 Transport

5.6.1 General information

The following points in particular must be observed:

- Take note of the machine’s loading dimensions. See “Dimensions”.
- Take note of the machine’s transport weight. See “Technical data”.
- When transporting the machine on a lorry, take down the driver’s cab roof on the lorry and secure. See “Taking down the driver’s cab roof”.

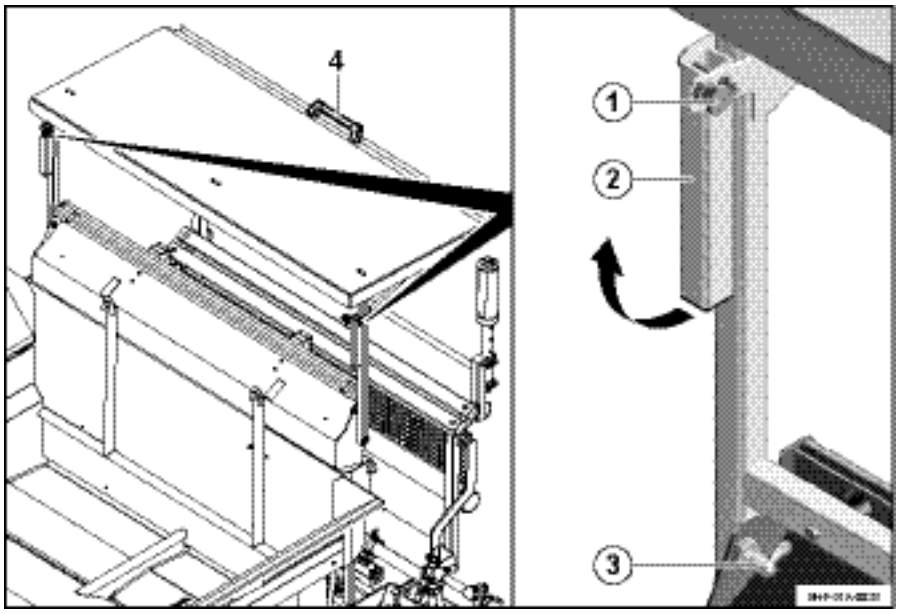
5.6.2 Preparing the machine for transport



1. Completely empty the hopper.
2. Collapse the adjustable panels. See “Adjusting the adjustable panels”.
3. Fold up the sideway extensions of the chutes.
4. Take down the smoothing and spreading board. See “Fitting the smoothing and spreading board”.
5. Raise the entire smoothing board. See “Raising/lowering the smoothing board”
6. Remove the manual control unit, MOBA control unit, ultrasonic and height sensors and store in a save place.
7. Move the holder (1) into the transport position as shown in the illustration and secure with the locking lever (2) and (3) and fasten with the wing screw (4).

5.6.3 Taking down the driver’s cab roof

Taking down the roof requires two people.
Undo the driver’s cab roof on the left and right side of the machine.



1. Fold up the sideway extensions of the chutes.
2. Pull out the lock bolt (1) and turn.
3. Fold out the feet (2) in the direction of the arrow.
4. Keep turning the lock bolt (1) until it engages.
5. Undo the locking lever (3). When doing so, the roof must be held in place by another person.
6. Hold on to the driver’s cab roof at the handle (4) and slowly collapse it towards the front.

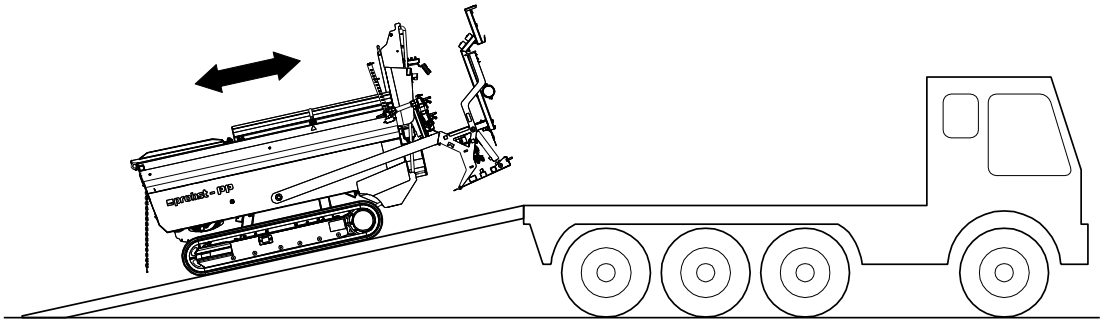
5.6.4 Loading and transporting the machine.

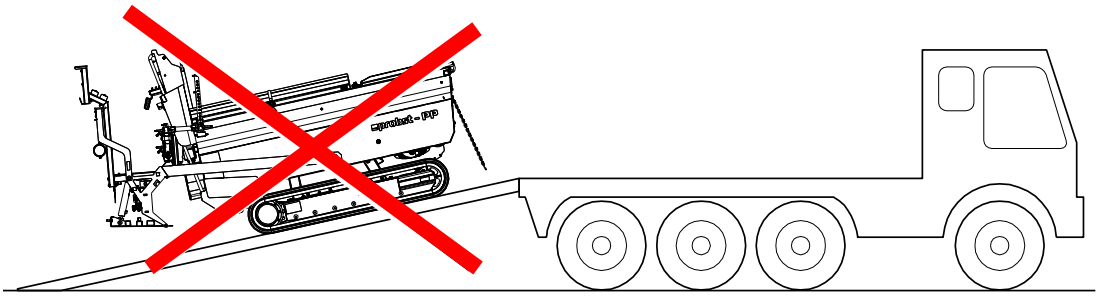
⚠WARNING

Risk of accident

If the machine is driven onto the transport vehicle pointing forward and the angle of the ramps is too step, there is a risk of accidents.

- Due to weight of the engine, the machine must always be reversed onto the transport vehicle, as it might otherwise slide off the ramp.
- The ramps' angle must not exceed 15°. If the angle is greater, the smoothing board will scrape over the floor when the machine is loaded and the machine will come down onto the loading platform with excessive force once its heaviest point has moved onto the platform.





1. Remove any mud, snow and ice from the loading platform and ramps of the transport vehicle and the machine's crawler tracks.
2. Brace the ramps in such a way that they will not bend under the machine's weight.
3. Ensure that the ramps will not move when driving onto them with the machine.
4. Start the engine. See "Starting the engine".
5. Switch the drive setting switch to **0**. See "Drive settings and driving mode".
6. Move the engine speed control lever to ⅔-speed. See "Controlling the engine speed".
7. Align the machine in front of the ramps in such a way that it can be moved onto the loading vehicle's platform by reversing it up in a straight line and without have to make any change in direction.
8. Slowly reverse the machine onto the loading platform. Take particular care when reversing up the ramps and at the point where the ramps meet the loading platform.
9. Fully lower the smoothing board. See "Raising/lowering the smoothing board"
10. Switch off the engine.
11. Press the EMERGENCY STOP button on the manual control unit and on the left and right side of the driver's cab.
12. Switch off the main switch. See "Main switch".
13. Tie the machine to the marked lashing eyes using chain tensioners or tension belts.
    When doing so, insert suitable shackles into the lashing eyes.

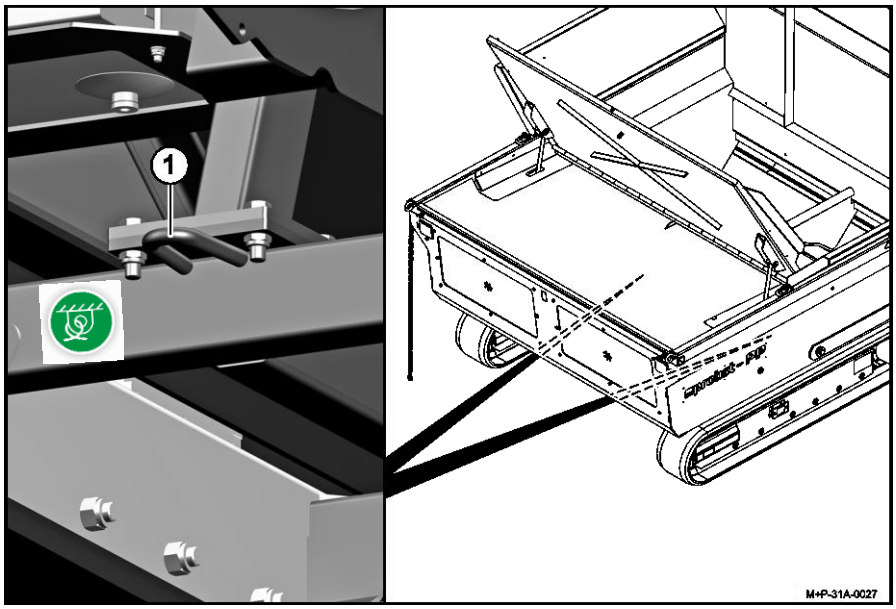
Lashing eyes

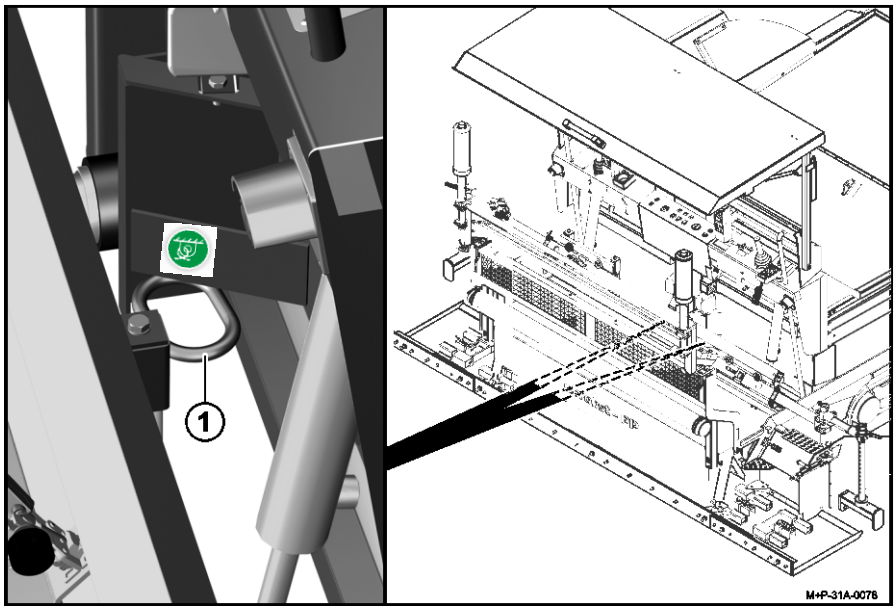
⚠WARNING

Risk of accident

Failure to tie down the machine can lead to accidents.

- Tie down the machine at the specified lashing eyes to prevent it from sliding around on the platform and from tilting over.





Tie the machine to the 4 lashing eyes (1) using chain tensionrs or tension elts.

Lashing ese

5.6.5 Lifting the machine

DANGER

Risk of personal injury

When raised, the machine is a hazard to people within its vicinity and can cause injury and even death.

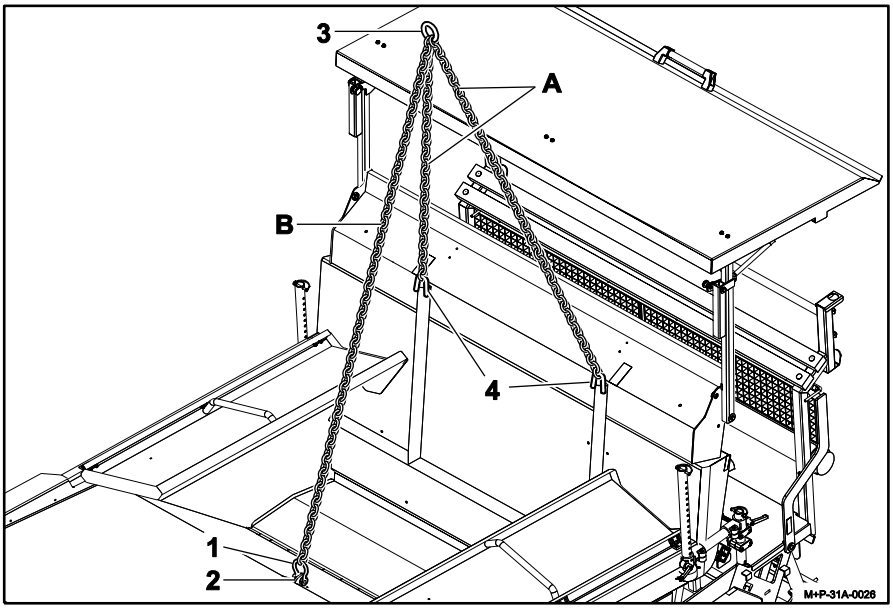
- Make sure that there are no persons' near the raised machine.

WARNING

Risk of personal injury and damage to property

Failure to lift the machine without or without suitable lifting gear can lead to injury and damage.

- The machine must only be lifted with suitable and adequately dimensioned lifting gear at the lifting eyes described below.
  Suitable lifting gear can be obtained and ordered from Probst.
- The stated chain lengths must be observed.
- Each of the lifting gear's individual strands of chain and its fastening elements (eyes, shackles etc.) must be suitable for lifting weights of 2500 kg.



1. If necessary, completely empty the hopper.
2. Fasten the shackle (1) to the lifting eye (2).
3. Fasten the lifting gear (3) to the lifting eyes (2) and (4) as shown.
   - A 1700 mm
   - B 2000 mm
4. Lift the machine at the lifting eyes (2) and (4).

When using lifting gear from another manufacturer, the shackle (1) must be secured with a bolt with a diameter of at least Ø 25 mm.

6 Maintenance and care

⚠WARNING

Risk of personal injury and damage to property

Failure to observe the instructions in the introductory sections of these instructions can lead to injury and damage.

- The information provided in the “Safety” and “General” sections in particular must be observed.

⚠WARNING

Risk of personal injury and damage to property

Failure to perform maintenance work and inspections properly can lead to injury and damage.

- Only maintain and inspect the machine as described in these operating instructions and any enclosed additional operating manuals.
- To ensure the machine’s smooth operation, operating safety and long life, the maintenance intervals must be observed.
- Only use original spare parts and approved operating fluids. Failure to do so will void the warranty.
- Probst only accepts warranty claims if the machine has been maintained as specified. See the enclosed maintenance record. Always include a copy of the maintenance record when making a claim under warranty.
- The machine must only be maintained and inspected when it is switched off.
- The machine must only be restarted once all of the maintenance work and inspections have been fully completed.

⚠WARNING

Risk of personal injury and damage to property

When maintaining and inspecting the machine, there is a risk of injury and damage from sharp edges, pointy, heavy and bulky components.

- Wear corresponding personal protective equipment.
- If necessary, work with a second person or use lifting gear, e.g. a crane, when working on heavy and bulky components.

6.1 Maintenance intervals

Mechanical components

Maintenance interval	*Maintenance work to be performed*
First inspection after 50 operating hours	• Check all fastening screws and retighten if necessary. Observe the tightening torques.
Every 50 operating hours	• Retighten all fastening screws. Observe the tightening torques. • Check all joints, guides, bolts and gear wheels for proper function and readjust or replace if necessary. • Lubricate all lubrication points. See "Lubrication".
At least 1x year (in harsh operating conditions, this interval must be shortened)	• Check all suspension components, bolts and shackles. • Check the machine for cracks, wear, corrosion and operating safety.

Hydraulics

Maintenance interval	*Maintenance work to be performed*
First inspection after 50 operating hours	• Check all fastening screws and retighten if necessary. Observe the tightening torques.
Every 50 operating hours	• Retighten all hydraulic connections. • Check the hydraulics system for leaks. • Check the hydraulic hoses for kinks and chafing.

Also the separate *Maintenance Intervals* for the engine (KUBOTA), the combination cooler (EMMEGI) and the crawler undercarriage (TFW) must absolutely be observed.

6.2 Maintenance plan

Regular maintenance operations

Also the service intervals of the separate operating manual for the engine (KUBOTA), the combination cooler (EMMEGI) and the crawler undercarriage (TFW) must absolutely be observed.

No.	Maintenance work	Before each start-up	After the first 50 h	Every 100 h	Every 200 h	Every 1000 h	Every year	Every 2 years
1	Check the engine oil	●						
2	Change the engine oil		●		●			
3	Change the engine oil filter		●		●			
4	Check the hydraulic fluid level, top up if required	●						
5	Change the hydraulic fluid		●			●	●	
6	Change the hydraulic fluid filter		●			●	●	
7	Clean the air filter; if very dirty → replace		●	●				
8	Change the air filter						●	
9	Clean the fuel filter (change all 400 h)		●	●				
10	Check the fuel pipe and clamp		●		●	●	●	
11	Check the battery acid level and oxidised connections		●	●				
12	Check the v-belt tension		●		●			
13	Check the cooler hose and clamp; replace if necessary				●	●	●	
14	Replace the cooler hose and clamp							●
15	Check the cooling fins for dirt		●		●	●		
16	Check the coolant level, top up if required	●	●		●			
17	Change the coolant and antifreeze (approx. 4 l)							●
18	Check the antifreeze in the coolant (before every frost forecast)						●	
19	Check the opening pressure of the cooler's lid				●			
20	Check the nozzle opening pressure					●		
21	Check the compression pressure					●		
22	Remove deposits from the fuel tank					●		
23	Check electrical cables for loose connections		●		●	●	●	
24	Check the combustion pipe and clamp					●		
25	Recharge the battery (recharge the battery all 1-2 month)						●	
26	Check the hydraulic hoses for leaks (retighten connections)		● + every 50 h					
27	Check the operating equipment and indicators	●			●			
28	Check for damaged, deformed components and unusual noises	●	● + every 50 h					
29	Retighten all screws and nuts, replace missing screw connections		● + every 50 h					
30	Check the crawler chain tension, tighten if required		● + every 50 h					
31	Lubricate as specified in the lubrication chart		●		●	●		
32	Check load-bearing components for cracks						●	
33	Adjust the valve clearance of the rocker arm (0.15 mm)					●		

6.3 Cleaning

⚠WARNING

Risk of personal injury

Cleaning the machine when it is at operating temperature can lead to serious injury.

- Only clean the machine with the engine switched off and once all components have cooled down.

⚠WARNING

Risk of personal injury

There is an increased risk of slipping and falling when cleaning the machine.

- When using water and/or a pressure washer, use a working platform and do not climb unto the machine.

⚠WARNING

Risk of personal injury and damage to property

When using metal-based cleaning implements, there is an increased risk of explosion as a result of spark formation (electrostatic charging or short circuiting).

- Only use non-metal brushes and paint brushes.

⚠WARNING

Risk of personal injury

When cleaning components with compressed air or a pressure washer, inappropriate clothing can lead to injuries.

- Wear suitable protective clothing.
- Wear goggles.
- If necessary, use a working platform.

⚠CAUTION

Risk of environmental damage

Cleaning the machine without the availability of an oil separator can lead to environmental damage.

- Only clean the machine if there is an oil separator.

NOTICE

Risk of damage to property

Cleaning the machine with water or a pressure washer can lead to damage.

- Do not inject water into the air filter opening and exhaust pipe.
- Do not use a pressure washer to clean electrical components, hydraulics connections and seals.

6.3.1 Dry-cleaning with compressed air

Only dry-clean the machine with compressed air if it is only lightly soiled with dry dust.

6.3.2 Cleaning the machine with water and detergents

If the machine is only lightly soiled with dust, oil and fuel:

- Only use neutral or alkaline detergents.
- Apply detergent with a brush, leave to soak and hose off with water.
- After cleaning, lubricate the machine. See “Lubrication”.

6.3.3 Cleaning the machine with a pressure washer

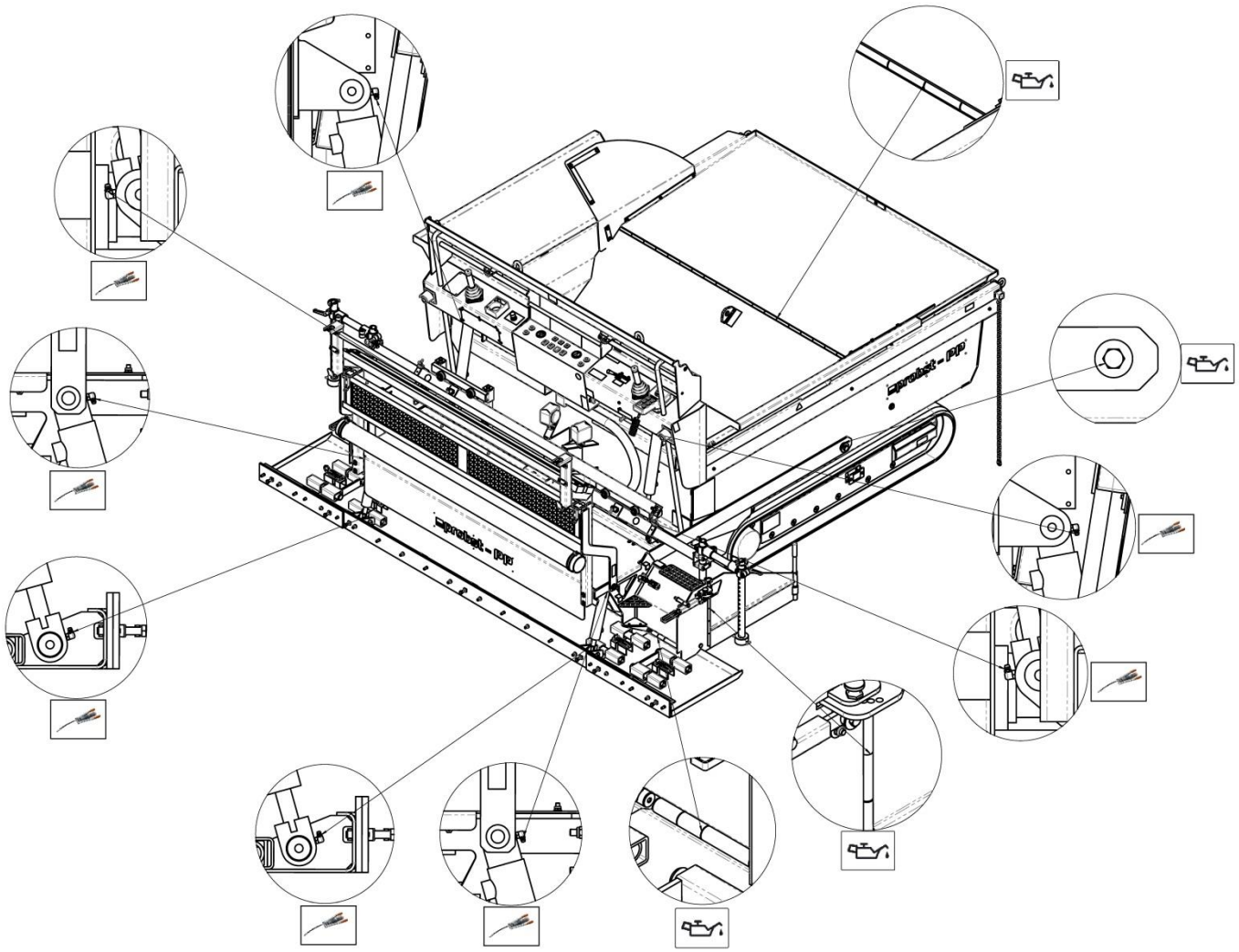
If the machine is heavily soiled, including with oil and fuel:

- Keep the pressure washer’s nozzle at least 300 mm away from the machine.
- The pressure washer’s jet pressure must not exceed 100 bar.
- The water jet temperature must be 80-90 °C.
- Only use neutral or alkaline detergents.
- Use a brush or a similar aid to remove solid dirt deposits.
- After cleaning, lubricate the machine. See “Lubrication”.

6.3.4 Cleaning the outside of the engine

- The cleaning methods listed below should be used depending on the level of soiling.
- Protect electronic components and seals from direct contact with water.
- Leave the engine running until it gets warm after cleaning to allow residual water to evaporate and prevent the formation of rust.

6.4 Lubricating



- For maintenance intervals, see “Maintenance plan”.
- Thoroughly clean the lubrication points.
- Keep adding lubricant until it starts to exit from the relevant openings.
  See “Technical data” for information on operating fluids and filling capacities.

6.5 Maintenance work

6.5.1 Changing the engine oil and oil filter

The first oil and oil filter change is due after the first 50 operating hours and must be performed by Probst customer services. Thereafter, the oil and oil filter must be changed every 200 operating hours.

Please refer to the separate manual for the engine (KUBOTA) for a detailed description.

6.5.2 Changing the hydraulic fluid and hydraulic fluid filter

The first hydraulic fluid change is due after the first 50 operating hours and must be performed by Probst customer services. Thereafter, the hydraulic fluid must be changed every 1000 operating hours or 1x year.

The hydraulic fluid filter change is due after the first 50 operating hours and must be performed by Probst customer services. Thereafter, the filter must be changed every 1000 operating hours or 1x year.

6.5.3 Maintaining the cooling system

The cooling system must be regularly maintained by customer services.

Please refer to the separate manual for the combination cooler (EMMEGI) for a detailed description.

6.5.4 Maintaining the fuel system

The following maintenance work must be performed by customer services:

- Changing the fuel filter bowl - every 50 operating hours
- Changing the fuel filter - every 400 operating hours
- Bleeding the fuel system

Please refer to the separate manual for the engine (KUBOTA) for a detailed description.

6.5.5 Checking the v-belt tension

The v-belt tension must be checked for the first time after 50 operating hours and thereafter every 200 operating hours.

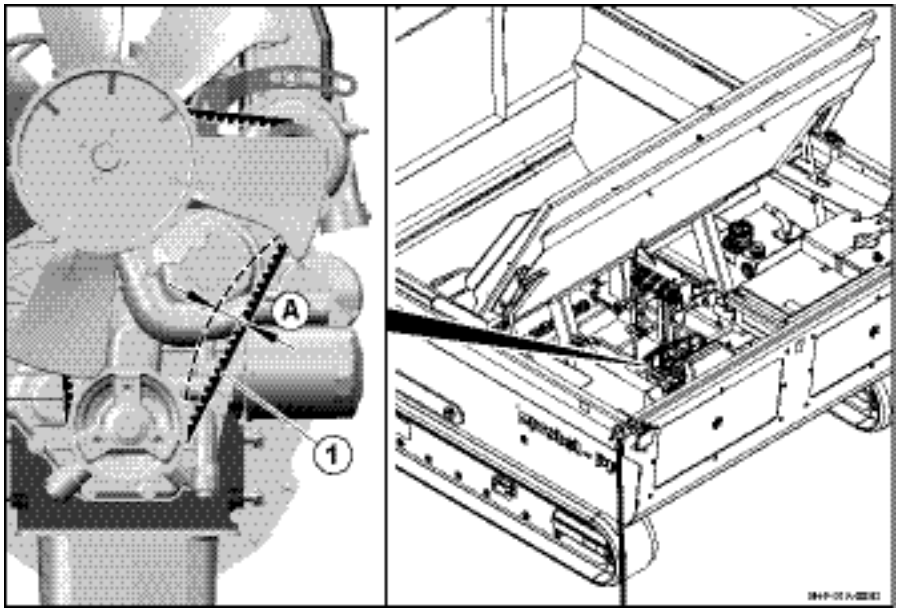
The v-belt must only be tensioned and, if damaged, replaced, by customer services.
Please refer to the separate manual for the engine (KUBOTA) for a detailed description.

⚠WARNING

Risk of personal injury

Rotating parts can cause injuries.

- Only check the v-belt's tension when the engine is switched off.

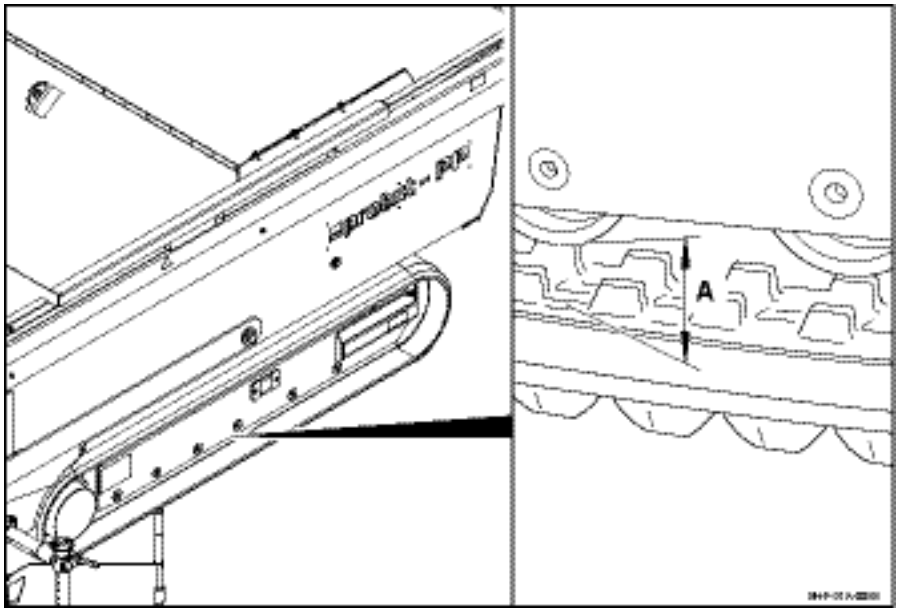


1. Open the engine hood. See “Opening the engine hood”.
2. Press onto the v-belt (1) with your thumb. The v-belt should give by about 7-9 mm (A) when pressed down.
3. If necessary, get the v-belt tensioned by customer services.
4. If necessary, get the v-belt changed by customer services.
5. Close the engine hood.

6.5.6 Maintaining the crawler tracks

Checking the crawler chain tension

The crawler chain tension must be checked at the **first 50** hours and then **every 50 operating hours**.
Please refer to the separate manual for the engine crawler undercarriage (TFW) for a detailed description.



1. Lift the machine a small section off the floor. See inter alia chapter “Lifting the machine”, or see the following “Figure A1” in this chapter (“Maintaining the crawler tracks”).

2. Check the dimensions of (A) in the centre of the chain guide.
Measure (A) should be 10-30 mm. If necessary, tension or loosen the crawler chain.

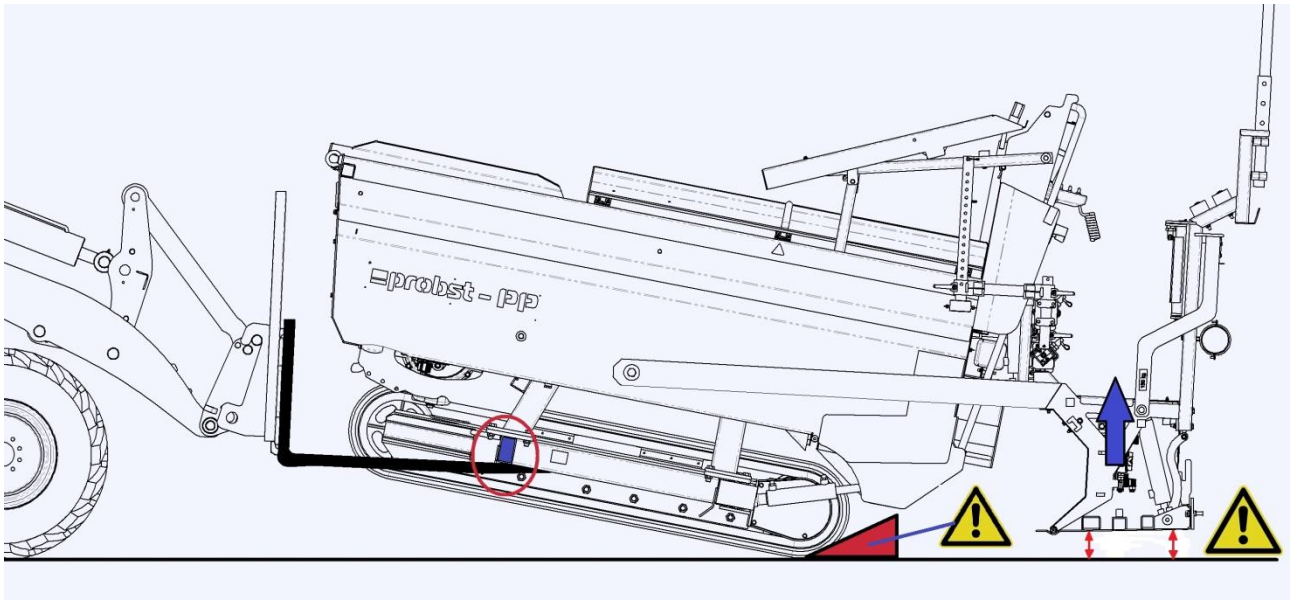
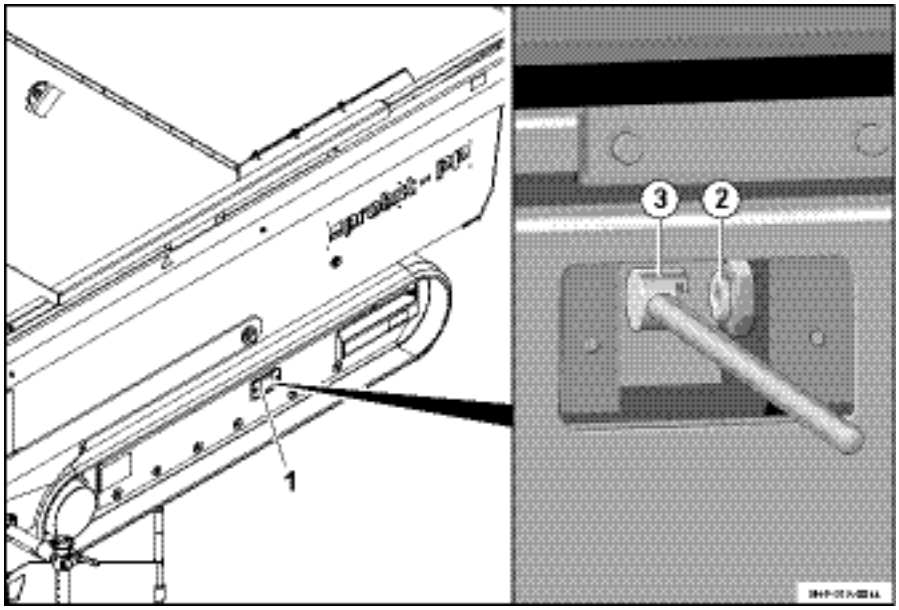


Figure A1

Tensioning/loosening the crawler chain



Loosening

1. Unscrew the cover panel (1).
2. Keep unscrewing the valve (2) until lubricant starts to exit.
3. Allow lubricant to exit until (A) has reached the correct dimensions.
4. Tighten the valve (2).
   Tightening torque 40-60 Nm.
5. Screw on the cover panel (1).

Tensioning

1. Unscrew the cover panel (1).
2. Inject lubricant into the valve (2) with a grease gun until (A) has reached the correct dimensions.
3. Tighten the valve (2).
   Tightening torque 40-60 Nm.
4. Screw on the cover panel (1).

6.5.7 Maintaining the battery

⚠WARNING

Risk of personal injury

Battery fumes, which are created in particular when charging batteries, are explosive and can therefore lead to injuries.

- Keep the battery away from sparks and open flames.
- When working in closed spaces, make sure there is adequate ventilation.
- Wear corresponding personal protective equipment such as acid-resistant gloves and goggles.

⚠WARNING

Risk of personal injury

Battery acid causes burns to skin, eyes and clothing.

- Do not touch your eyes with dirty hands.
- Wear corresponding personal protective equipment such as acid-resistant gloves and goggles.
- Immediately neutralize any acid that gets onto your skin or clothes with soap or acid neutralizer and clean with water.

NOTICE

Risk of damage to property

Failure to handle batteries properly can lead to damage.

- Do not allow the positive terminal of the battery to come into contact with machine parts.
- Do not place any metal objects or tools onto the battery.
- Keep the battery terminals, connectors and battery surface clean and dry as this could otherwise lead to the formation of creeping currents, as a result of which the battery could be drained.
- Only use conventional and non-fuel based detergents.
- Batteries are only able to reach their specified service life if they are adequately charged at all times.

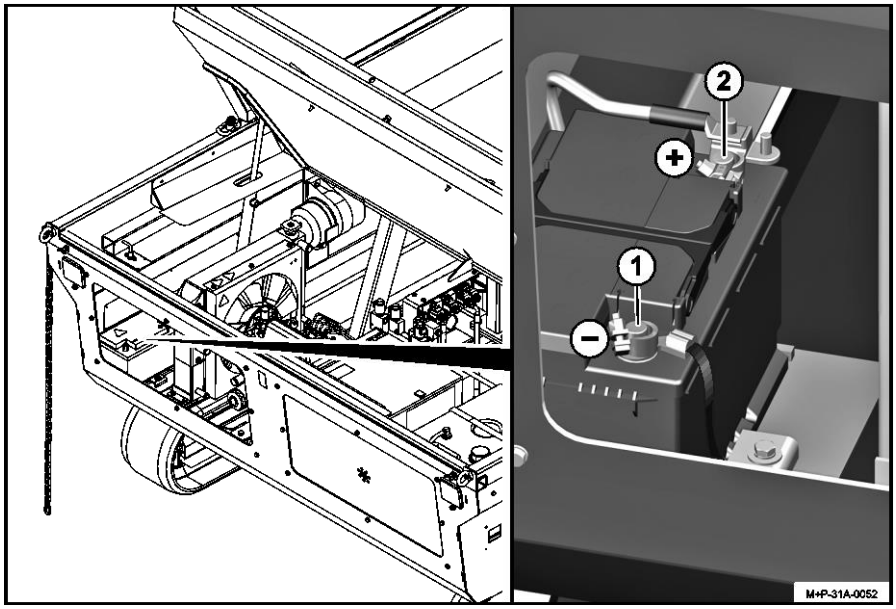
Connecting and disconnecting the battery

⚠CAUTION

Risk of personal injury

There is a risk of short circuiting and sparking when connecting and disconnecting the battery.

- Only connect and disconnect the battery if the electrical system has been switched off at the main switch.
- Make sure to connect and disconnect the battery in the stated order.



Disconnecting:

1. Open the engine hood. See “Opening the engine hood”.
2. Remove the protective cap from the positive terminal.
3. Disconnect the negative clamp (1). Make sure that the clamp is no longer in contact with the negative terminal.
4. Disconnect the positive clamp (2).

Connecting:

5. Grease the top of terminals and cable clamps with acid-free grease.
6. Connect the positive clamp (2) first, then the negative clamp (1).
7. Attach the protective cap over the positive terminal.
8. Close the engine hood.

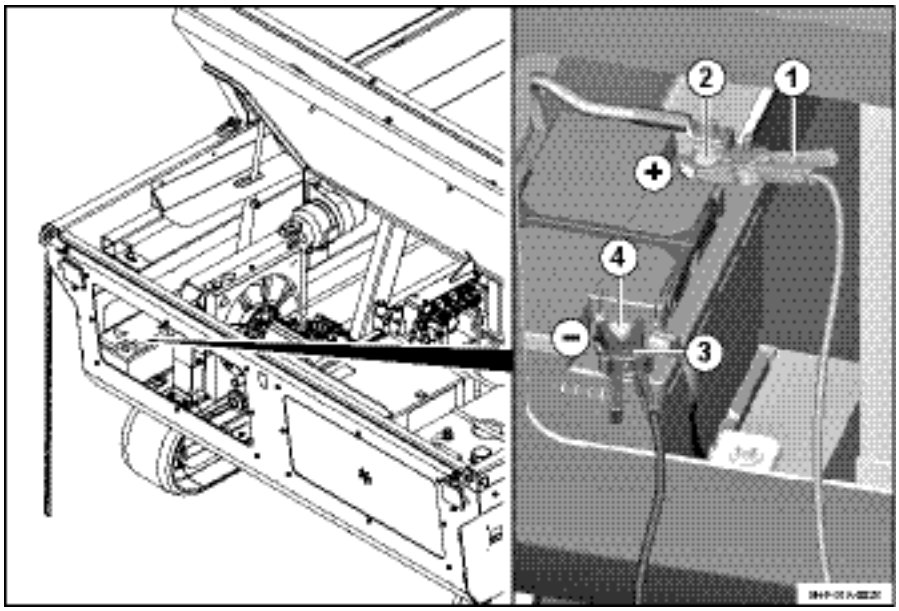
Charging the battery

⚠CAUTION

Risk of personal injury and damage to property

Failure to properly charge empty or frozen batteries can lead to injury and damage.

- Empty batteries can already start to freeze at temperatures of -10 °C.
- Check frozen batteries for frost damage (damage to housing).
- Allow frozen and undamaged batteries to defrost before charging.



1. Open the engine hood. See “Opening the engine hood”.
2. Remove the protective cap from the positive terminal.
3. Connect the positive lead (1) to the positive terminal (2).
4. Connect the negative lead (3) to the negative terminal (4).
5. Set up the charger as specified in the device manufacturer’s operating manual and switch it on.
6. Once the battery is fully charged, switch off the charger.
7. Disconnect the negative lead (3) from the negative terminal (4).
8. Disconnect the positive lead (1) from the positive terminal (2).
9. Attach the protective cap over the positive terminal.
10. Close the engine hood.

Jump-starting

If the battery is empty:

- The machine can be jump-started with another vehicle with an on-board voltage of 12 V.
- The machine can be started using a suitable charger.

⚠CAUTION

Risk of personal injury

Failure to jump-start the machine properly can lead to injuries.

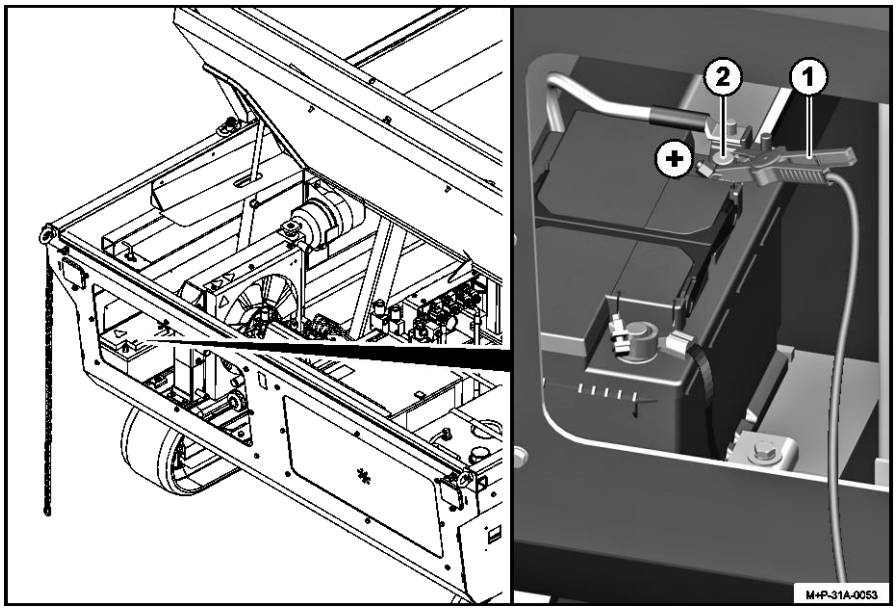
- Make sure to connect and disconnect the battery in the stated order.

NOTICE

Risk of damage to property

Jump-starting the machine can cause damage to the electrical system.

- The charging circuit must be 12 V.
- If the machine is jump-started with the help of a charger, only use a charger with an output stabilization control.
- Always make sure that the connecting clamps are connected to the right terminals.
- Only use adequately dimensioned jump-start leads (min. 95 mm²).
- Do not jump-start the machine if the battery has been taken out of the machine or has been disconnected.
- Do not jump-start the machine if the battery is damaged.



1. Open the engine hood. See “Opening the engine hood”.
2. Remove the protective cap from the positive terminal.
3. Connect the positive lead (1) to the positive terminal on the second battery.
4. Connect the positive lead (1) to the positive terminal (2).
5. Connect the negative lead to the negative terminal on the second battery.
6. Earth the negative lead on the machine, e.g. connect it to the engine or frame.
7. Start the motor of the vehicle you are using to jump-start the machine.
8. Start the engine of the machine. See “Starting the engine”.
9. Once the motor has started, disconnect the minus lead first while the engine runs at idle speed. Always start with the other vehicle’s battery when disconnecting the leads.
10. Disconnect the positive lead (1) from the positive terminal (2). Always start with the other vehicle’s battery when disconnecting the leads.
11. Attach the protective cap over the positive terminal.
12. Close the engine hood.

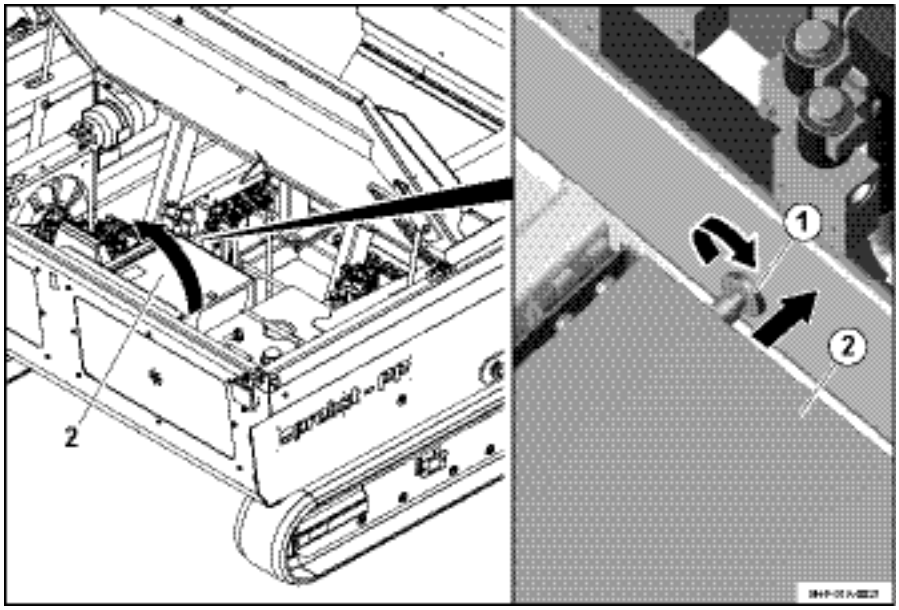
6.5.8 Changing fuses

NOTICE

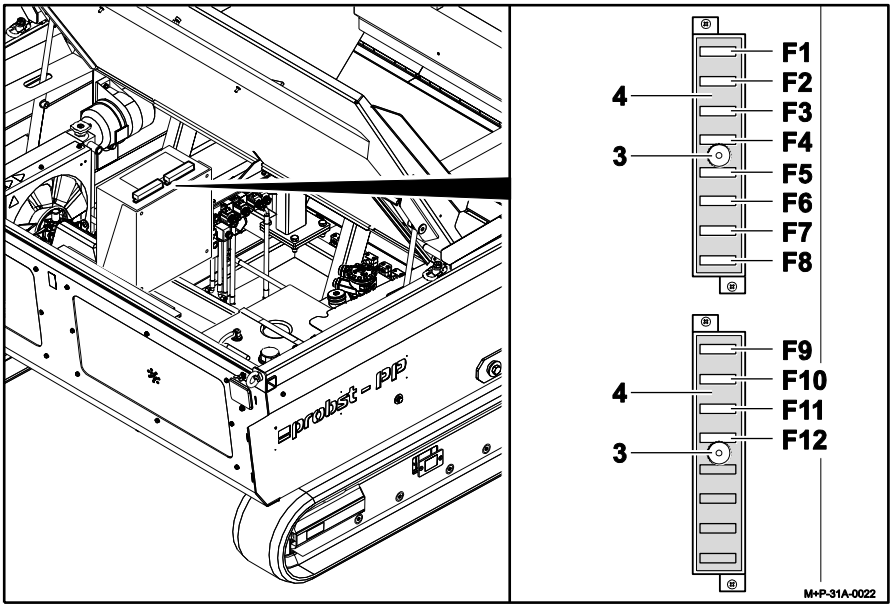
Risk of damage to property

Faulty fuses can cause damage to the electrical system.

- Repair the fault that damaged the fuse.
- Replace the fuse immediately and make sure that the new fuse has the right amps.
- Do not repair or bypass fuses.



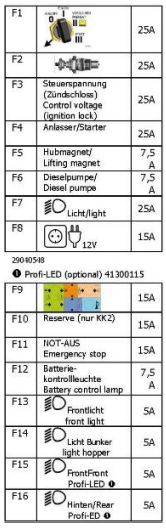
1. Open the engine hood. See “Opening the engine hood”.
2. Pull out the lock bolt (1) and turn.
3. Push the fuse box up (2).

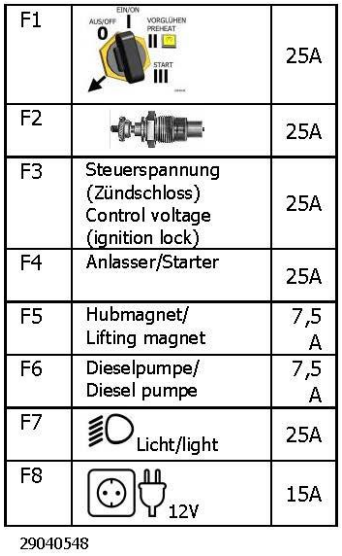


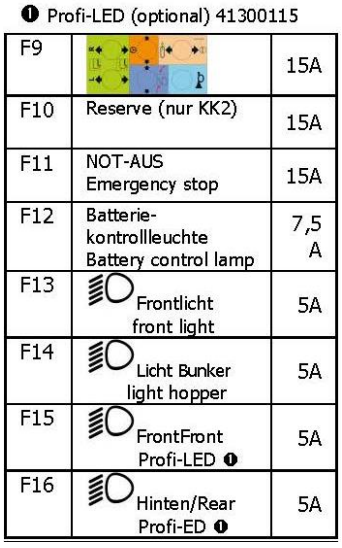
4. Undo the screws (3) and remove the cover (4).
5. Locate the broken fuse and replace. Check the “Fuse assignment plan” for fuse assignment information.
6. Push down the fuse box (2) and Keep turning the lock bolt (1) until it audibly engages.
7. Close the engine hood.

Fuse assignment diagram

No.	Consumer	Fuse rating
Top terminal box		
F1	Control voltage (ignition switch)	25 A
F2	Glow plugs	25 A
F3	Control voltage (downstream of ignition switch)	25 A
F4	Starter motor	25 A
F5	Lifting magnet	7.5 A
F6	Diesel pump	7.5 A
F7	Lights	15 A
F8	12 volt power socket	15 A
Bottom terminal box		
F9	Manual control unit	15 A
F10	Spare fuse (only in the bottom terminal box)	15 A
F11	EMERGENCY STOP	15 A
F12	Battery control light	7.5 A
F13	Front light	5 A
F14	Light hopper	5 A
F15	Profi LED (optional)	15 A







6.5.9 Changing light bulbs

⚠CAUTION

Risk of personal injury and damage to property

Light bulbs and lamp holders become hot when the lights are switched on. They can cause burns if touched and can ignite flammable objects.

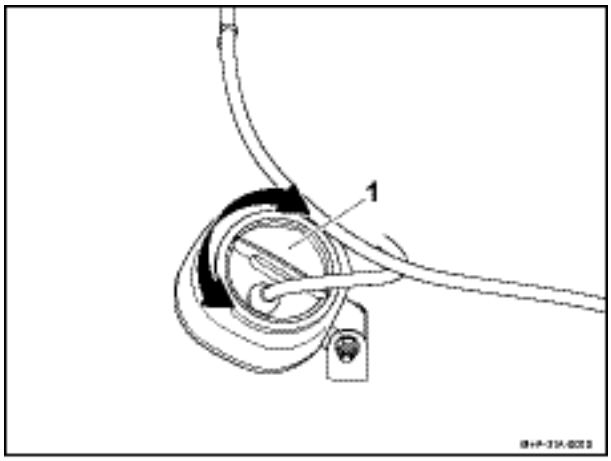
- Keep at a minimum distance of 500 mm from flammable objects.
- Turn off the lights in plenty of time before changing light bulbs.
- Allow lamps to sufficiently cool before changing light bulbs.

NOTICE

Risk of damage to property

Failure to change light bulbs properly can lead to short circuits.

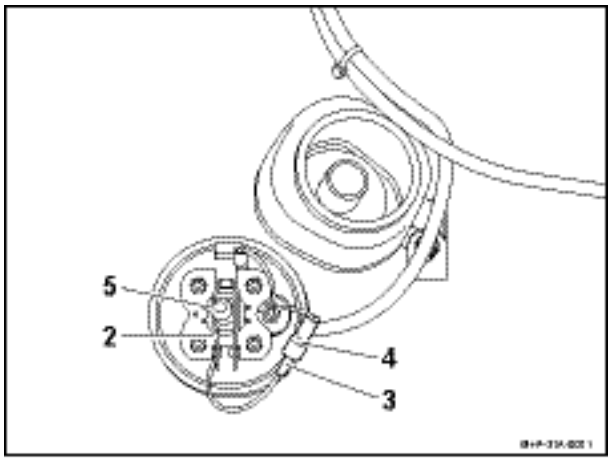
- Allow lamps to sufficiently cool before changing light bulbs.
- Do not touch the glass bulbs of the lamps with bare hands. Even minor particles can burn into the light bulbs and reduce their service life.
- Only touch light bulbs with a clean, dry and lint-free cloth.
- Observe the light bulb's type, volts and Watts.



Light bulbs H3, 55 W, 12 V DC

The procedure described below applies both to changing the headlights' and working headlights' light bulbs.

1. Open the housing cover (1) by turning it.



2. Press together the clamp and remove it.
3. Remove the cable (3) from the connector (4).
4. Remove the light bulb holder with the defective light bulb (5) and remove the defective light bulb.
5. Fit the new light bulb in reverse order.

6.6 If the machine is not used for a longer period of time / disposing of the machine

6.6.1 If the machine is not used for a longer period of time

If the machine will not be used for more than 2 months:

- Park the machine on even ground and in a dry place inside a hall or, if parked outside, on even ground and fully cover with a dark tarpaulin.
- Thoroughly lubricate all lubrication points. See “Lubrication”.
- Replace the engine oil with anti-corrosion oil.
  Leave the engine to run for a few minutes to allow the anti-corrosion oil to evenly distribute.
- Check the mixing ratio of the antifreeze and water in the coolant and adjust if necessary.
- Top up the fuel with 10 % of anti-corrosion oil.
  Leave the engine to run for a few minutes to allow the internal components of the injection system to be wetted with anti-corrosion oil.
- Coat the exposed piston rods of the levelling cylinders with anti-corrosion grease such as a Shell anti-corrosion grease.
- Remove the battery, store it in a frost-proof place and regularly recharge. See “Maintaining the battery”.
- Fill the fuel tank with diesel up to the brim. See section on “Checking the fuel level”.
- Remove the v-belt and store.
- Spray the groves of the v-belt pulleys with anti-corrosion oil.
- Cover the exhaust pipe opening with rigid foil and seal with adhesive tape.
- In areas with high humidity (tropical climates), top up the hydraulic fluid tank up to the brim.

Before taking the machine back into operation:

- Remove the foil and tape from the exhaust pipe.
- Charge and install the battery. See “Maintaining the battery”.
- Remove the anti-corrosion oil from the v-belt pulleys.
- Fit the v-belt.
- Adjust the hydraulic fluid level.
- Remove the anti-corrosion oil from the piston rods of the levelling cylinders.
- Replace the anti-corrosion oil with engine oil.

If the machine has not been used for more than 12 months:

- Change the hydraulic fluid.

6.6.2 Disposal

⚠CAUTION

Risk of environmental damage

Failure to professionally dispose of the machine at the end of its life cycle can lead to environmental damage.

- The machine must only be disposed of by a qualified disposal company.

6.7 Repairing faults

⚠WARNING

Risk of personal injury and damage to property

Faults can lead to injury and damage.

- If there is a fault, stop the machine as quickly as possible and make it safe.
- Establish the cause of the fault and repair it immediately.
- For faults on the engine, refer to the separate manual for the engine (KUBOTA).
- For faults on the combination cooler, refer to the separate manual for the combination cooler (EMMEGI).
- For faults on the MOBA control or the Rugby laser transmitter, refer to the corresponding separate operating manual.

Fault	*Cause*	*Remedy*
Machine doesn't start.	• Main switch is switched off. • Faulty fuse. • Battery empty or defect.	• Switch on the main switch. See "Main switch". • Change the fuse. See "Changing fuses". • Jump-start. See "Maintaining the battery". • Charge the battery. See "Maintaining the battery". • Change the battery. See "Maintaining the battery".
Battery control light is illuminated.	• Faulty v-belt. • Electrical system fault. • Alternator defective.	• Check the v-belt and get it changed by customer services if necessary. • Contact customer services. • Contact customer services.
Starter motor turns slowly or not at all.	• Battery empty or defect. • Starter motor defective.	• Jump-start. See "Maintaining the battery". • Charge the battery. See "Maintaining the battery". • Change the battery. See "Maintaining the battery". • Contact customer services.
Ignition is on, but the engine does not start.	• Fuel tank is empty. • Dirt in fuel system.	• Check the fuel level. If necessary, top up fuel. See "Checking the fluid level". • Bleed the fuel system. See the separate manual for the engine (KUBOTA). • Contact customer services.
Machine under-performs.	• Dirt in fuel system. • Air filter blocked. • Engine overheated. • Operating pressure too low. • Hydraulic pump defective.	• Contact customer services. • Clean the air filter and replace if necessary. See "Cleaning the air filter". • Check the coolant level • If necessary, contact customer services. • Contact customer services. • Contact customer services.
Automatic driving mode does not work.	• The machine is set to drive setting **0**. • The toggle switch on the	• Switch the drive setting switch to **I**. See "Drive settings and driving mode". • Switch the toggle switch on the manual control

Fault	Cause	Remedy
	manual control unit is set to STOP.	unit to "Automatic". See "Drive settings and driving mode".
Hydraulic pump makes noises.	• Hydraulic pump defective.	• Contact customer services.
Hydraulic system too hot.	• Hydraulic fluid level too low.	• Check the hydraulic fluid level and top up if required. See "Checking the hydraulic fluid level".
	• Combination cooler blocked.	• Contact customer services.
	• Hydraulic fluid filter blocked.	• Contact customer services.
The crawler chains do not move when the machine is being driven.	• The crawler chains do not have any traction.	• Fill the hopper with bedding material. Do not overfill.
The levelling cylinders do not properly extend or retract.	• Levelling cylinder defective.	• Contact customer services.
The ultrasonic height sensor does not work. The LEDs on the MOBA control unit are not illuminated.	• Strong winds or rain are interfering with the ultrasound.	• Move the ultrasonic height sensor closer to the string or sub-base.
	• The cable leading to the MOBA control unit has come loose.	• Check the cable and reconnect if required.
	• MOBA control unit defective.	• See the separate operating manual for the MOBA control unit. • Contact customer services.
The Rugby laser sender does not work.	• The laser beam's range is blocked.	• Do not block the area between the laser sender and MOBA laser receiver.
	• The cable leading to the MOBA control unit has come loose.	• Check the cable and reconnect if required.
	• MOBA control unit defective.	• See the separate operating manual for the MOBA control unit. • Contact customer services.

6.8 Duty of inspection

- Under BGR 500, the machine owner has a duty to ensure that the machine is inspected by a qualified expert at intervals of at least once a year and that any faults found are repaired immediately.
- The corresponding legal regulations and the declaration of conformity must be observed.
- This inspection must be documented in writing.
- Probst recommends attaching the specialist testing inspection plate in a clearly visible place on the machine once the inspection has been completed and any faults repaired. See "Overview of safety symbols and information signs". Label 1.

Device	Year	Date	Expert	Company

6.9 Information on the type plate

- When ordering spare parts or making claims under the warranty and/or for all other enquiries, please always state the machine type, machine number and year of manufacture.
- The maximum carrying capacity is the maximum load that the device is designed to carry.
  Do not exceed the maximum carrying capacity.
- The machine weight stated on the type plate must be taken into account when using lifting gear/transport devices such as cranes, chain hoists, forklifts, diggers etc.

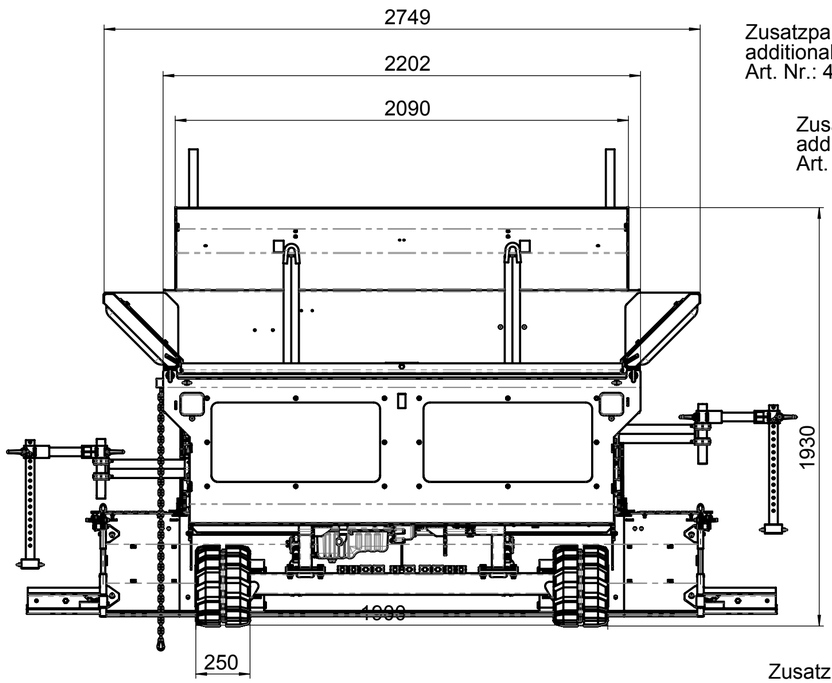
The type plate is located on the driver's cap. See the "Overview of safety symbols and information signs". Label 2.

The device number is also stamped into the frame next to the fuse box.

Example type plate

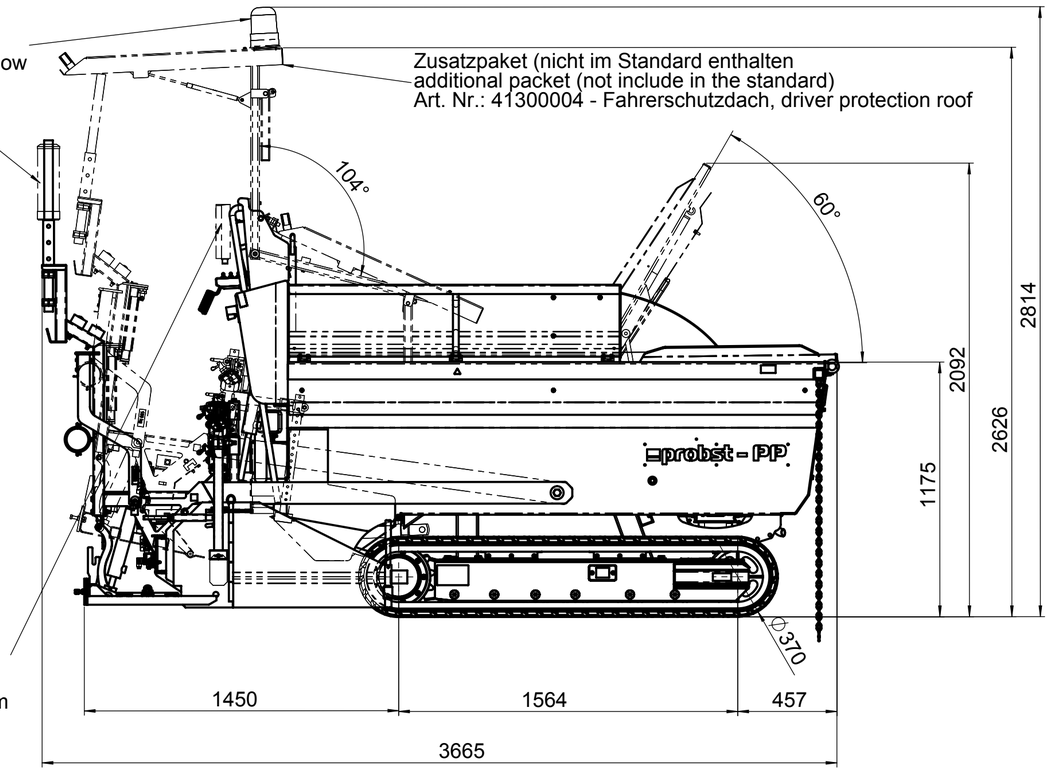
6.10 Information on hiring out PROBST machinery

All PROBST machinery must be supplied with the associated original operating instructions if hired out.
If the instruction manual's language differs from the language of the relevant country of use, the original operating instructions must be translated into the relevant language and the translation supplied with the machinery.

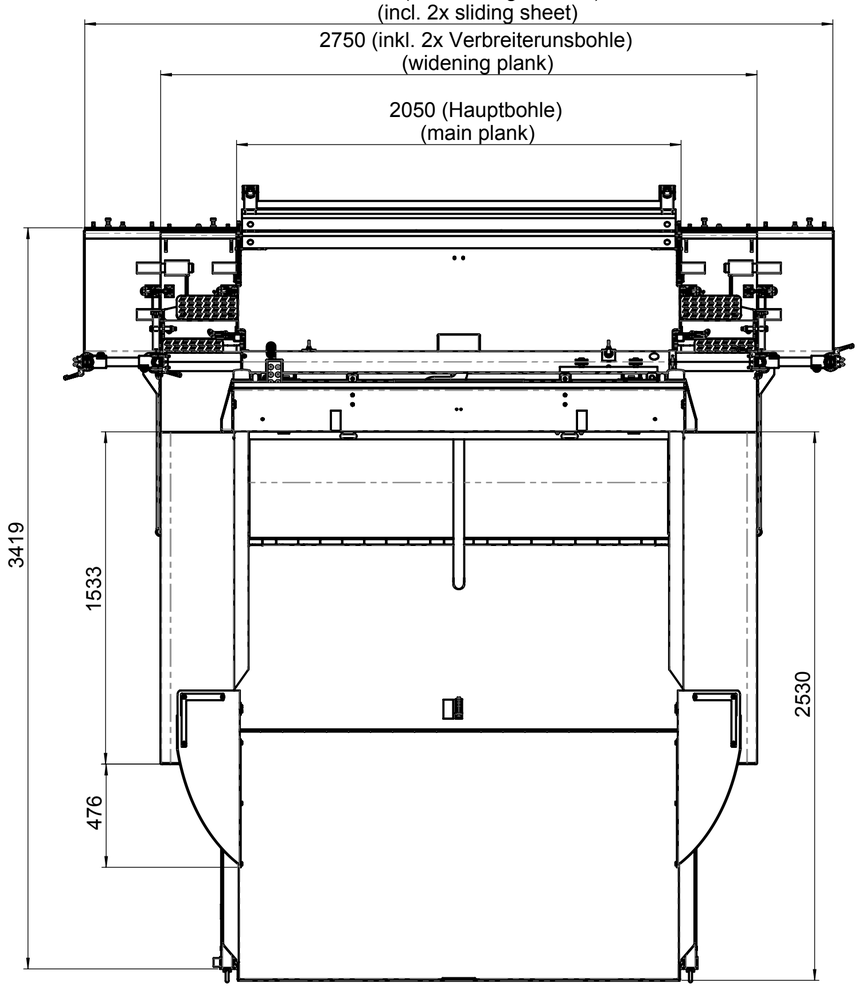


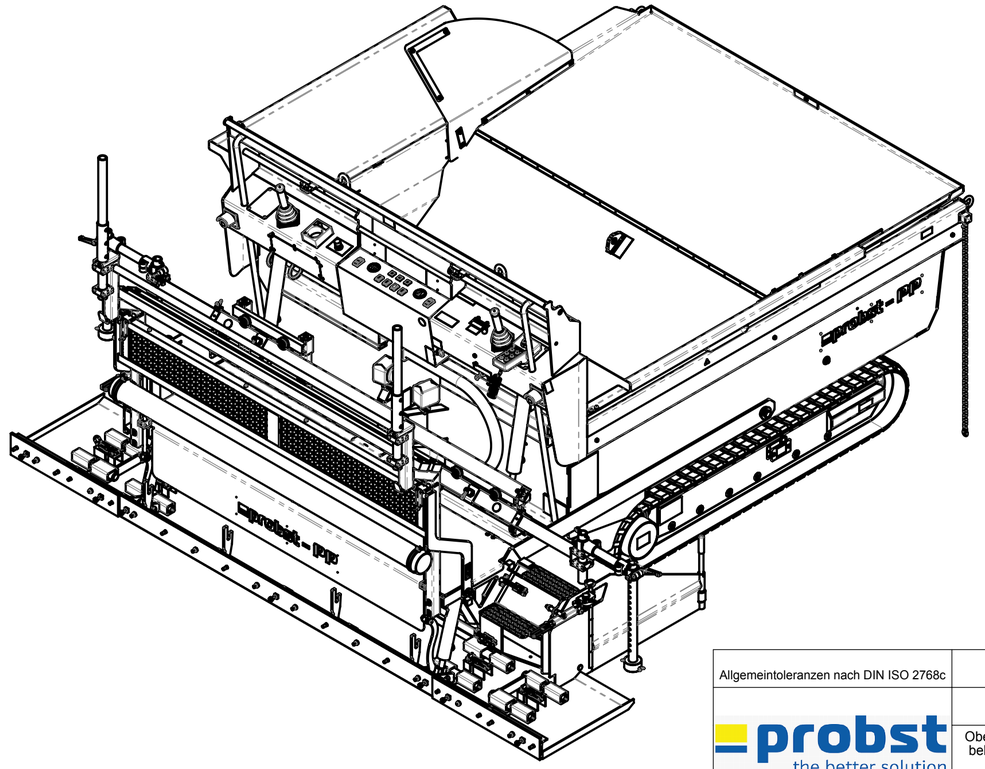
Zusatzpaket (nicht im Standard enthalten)
additional packet (not include in the standard)
Art. Nr.: 41300109 - Rundumleuchte, gelb, turning light, yellow

Zusatzpaket (nicht im Standard enthalten)
additional packet (not include in the standard)
Art. Nr.: 41300006 - Laserempfänger, laser receiver



Zusatzpaket (nicht im Standard enthalten)
additional packet (not include in the standard)
Art. Nr.: 41300005 - Maschinensteuerung, Control system





Eigengewicht:
dead weight:: 2500 kg (5511 lbs.)

max. Gesamtgewicht:
max. total weight: 6000 kg (13225 lbs.)

Leistung:
power: 18,5 KW / 25,2 PS

Allgemeintoleranzen nach DIN ISO 2768c	Oberflächen nach DIN ISO 1302	allgemeiner Biegehalbmesser = Blechstärke	
probst the better solution	Bei Änderungen Rücksprache mit TB !		
	Oberflächen-behandlung	Format: A2	Maßstab: 1:20 1:15 / Gewicht: 2433,3 kg
	Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!		

	Datum	Name
Erst.	27.1.2016	M.Kaltenbach
Gepr.	22.3.2016	M.Kaltenbach

Benennung
Flächenfertiger Power Plan
PP

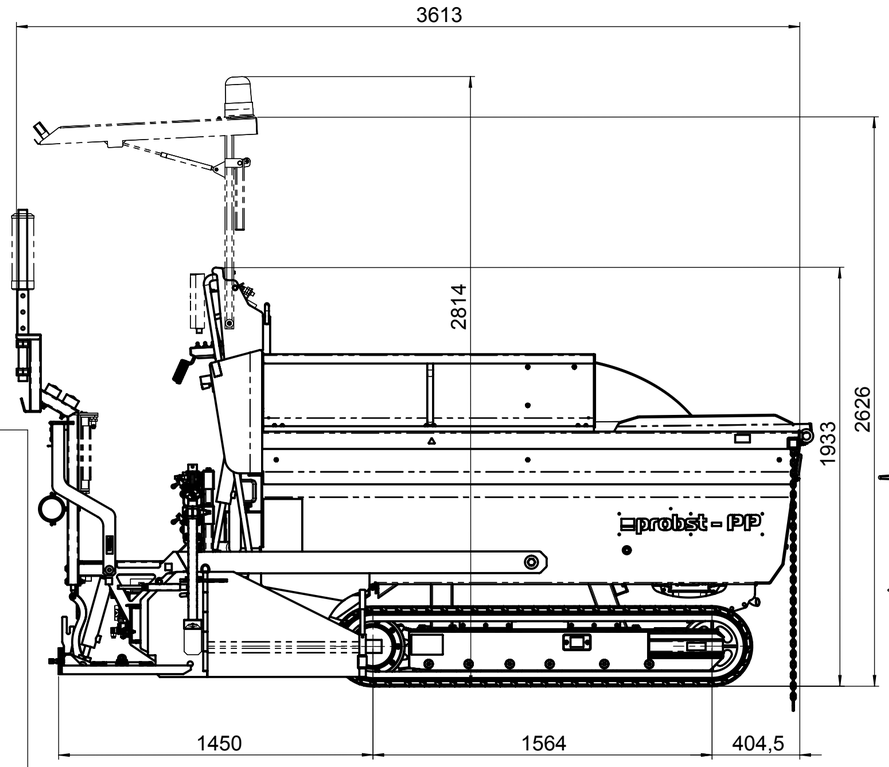
WA:
Kunde:

Artikelnummer/Zeichnungsnummer
D51300011

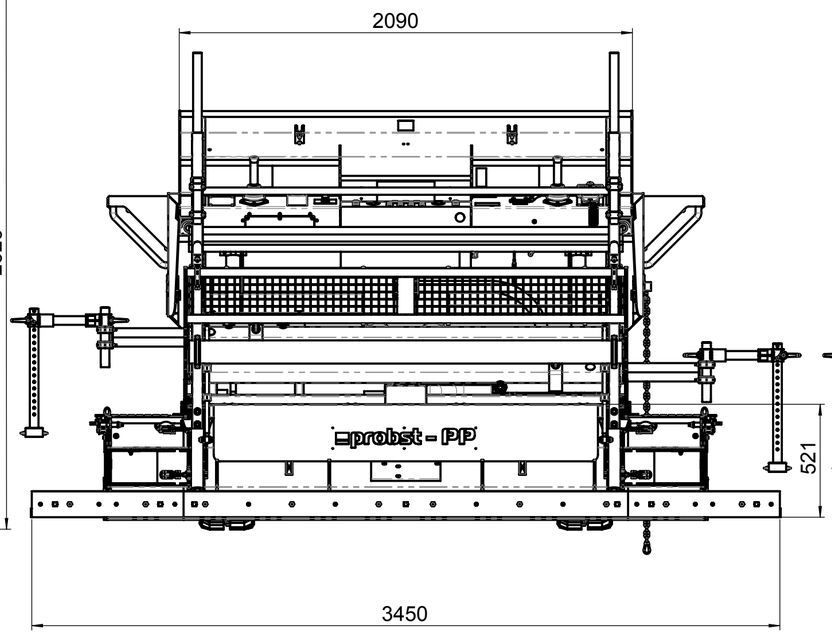
Blatt 1 von 5

Zust.	Änderungstext	Datum	Von	Urspr.	Ers. f.	Ers. d.

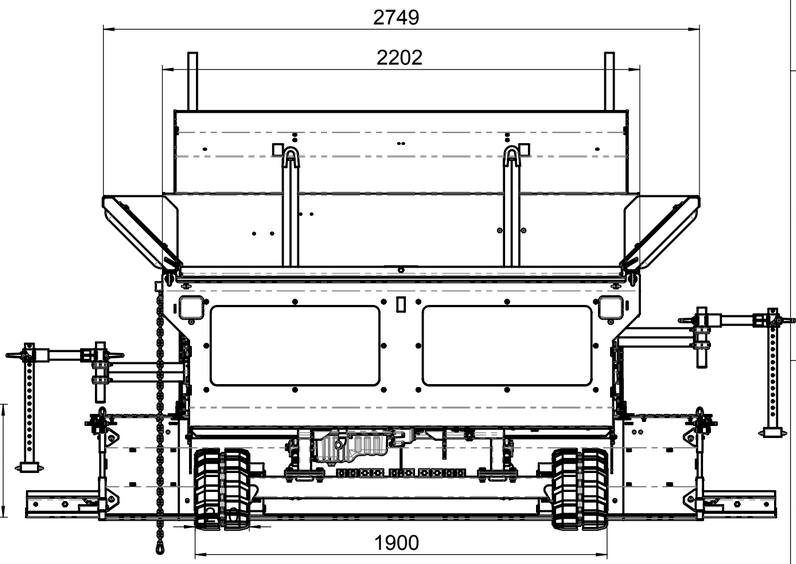
Ansichten ohne Zusatzpakete
view without additional packet



Seitenansicht
side view



Heckansicht
rear view



Frontansicht
front view

Technische Spezifikationen:

Hydraulik: Antrieb Fahrschiffe

Tandem- Axialkolbenverstellpumpe
Fördervolumen: 2x 17cm³
Max. Druck: 250bar

Fördervolumen: 2x 6cm³ (Speisepumpe)
Rechtsdrehend; SAE B

Arbeitshydraulik:

Tandemzahnradpumpe
Fördervolumen: 6cm³/ 4,5cm³
Baugröße 2; Rechtsdrehend

Hydrauliktank:

Tankvolumen: 30 Liter
Filter: RKM 100/ 15µm (Filterfeinheit)
Hydrauliköl: HLP46 (Druckflüssigkeiten nach ISO2943)

Raupenfahrwerk (Bis Fahrgestellnummer A01PP126):

Fahrgeschwindigkeit: 1,6 / 3,2 km/h (1.Gang / 2.Gang)
Steigfähigkeit: 68% / 34° (1.Gang)
Steigfähigkeit: 23% / 13° (2.Gang)

Raupenfahrwerk (Ab Fahrgestellnummer A01PP127):

Fahrgeschwindigkeit: 2,1 / 4,3 km/h (1.Gang / 2.Gang)
Steigfähigkeit: 41% / 22° (1.Gang)
Steigfähigkeit: 14% / 8° (2.Gang)

Getriebeöl: SAE80W- 90 (API - GL 5 / MIL - L - 2105B oder 2105C)

technical specifications:

hydraulic: drive crawler chassis

tandem axial-piston variable displacement pump
delivery volume:: 2x 17cm³
Max. Druck: 250bar

delivery volume: 2x 6cm³ (feed pump)
clockwise; SAE B

working hydraulic:

tandem gear pump
delivery volume: 6cm³/ 4,5cm³
on size 2; clockwise

hydraulic tank:

tank volume: 30 Liter
filter: RKM 100/ 15µm (filter fineness)
hydraulic oil: HLP46 (pressure fluid after ISO2943)

crawler chassis (to chassis number A01PP126):

driving speed: 1,6 / 3,2 km/h (1.Gang / 2.gear)
climbing ability: 68% / 34° (1.gear)
climbing ability: 23% / 13° (2.gear)

crawler chassis (from chassis number A01PP127):

driving speed: 2,1 / 4,3 km/h (1.Gang / 2.gear)
climbing ability: 41% / 22° (1.gear)
climbing ability: 14% / 8° (2.gear)

gear oil: SAE80W- 90 (API - GL 5 / MIL - L - 2105B or 2105C)

Technische Spezifikationen /
technical specifications:

Dieseltank:

Tankvolume / tank volume: 30 Liter
Kraftstoff: nur Diesel nach EN590 (KEIN BIO-DIESEL!!)
fuel: only diesel according to EN590 (NO BIO DIESEL)

Technische Spezifikationen /
technical specifications:

Antrieb / drive:

Kubota: V1505 Dieselmotor /diesel engine
Zylinder / cylinder: 4
Hubraum / cubic capacity: 1.498 cm³
Leistung / power: 18,5 KW / 25,2 PS
Abgas Norm/ Emission: EPA TIER IV
Ölwannenvolumen / oil volume: 6 Liter
. (SAE 15W-40 / API CF4)

Bordspannung / on board voltage: 12V DC

Technische Spezifikationen / technical specifications:

Power Plan:

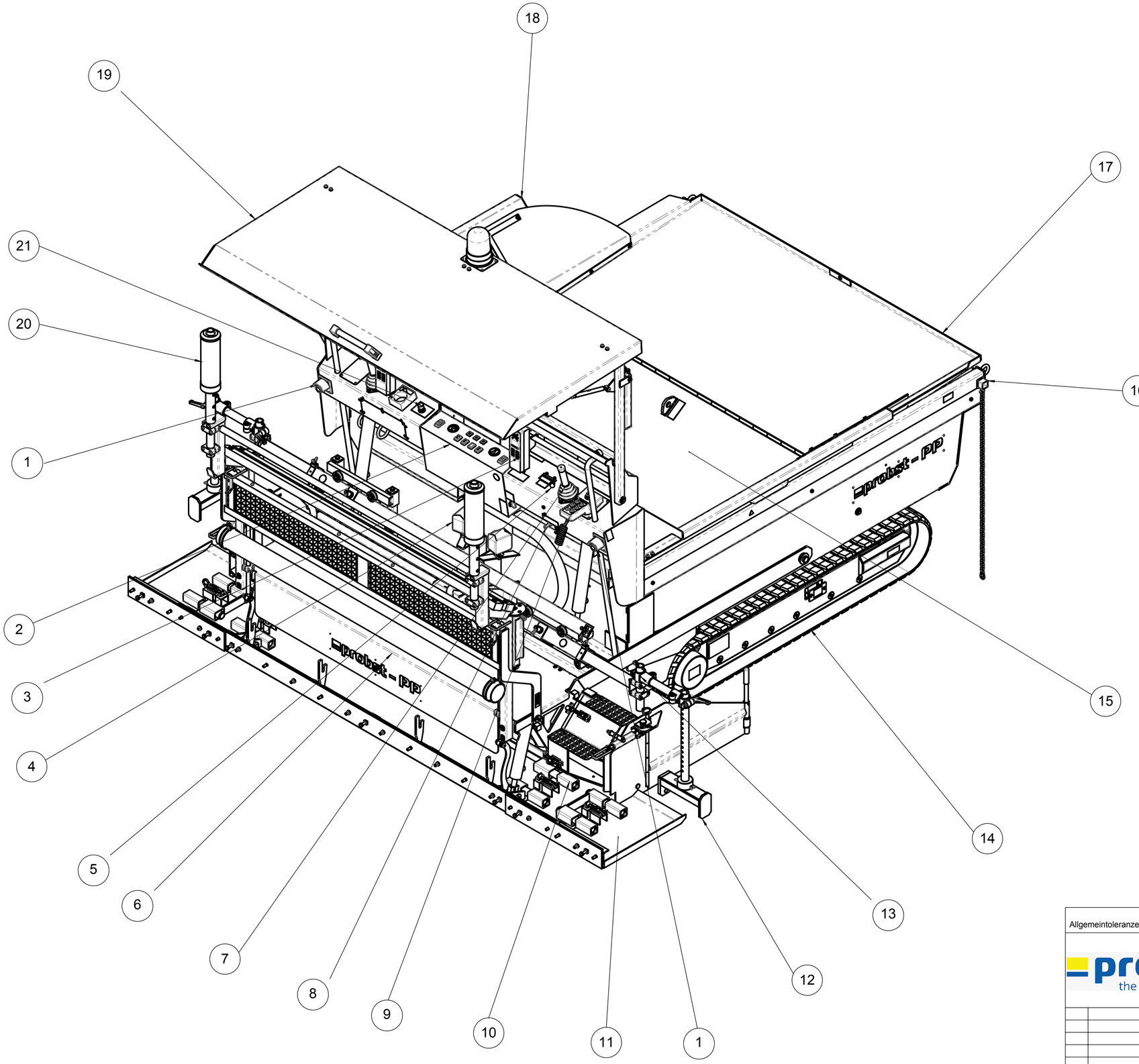
max. Gesamtgewicht:
max. total weight: 6000kg / 13225 lbs.

Eigengewicht:
dead weight: 2500kg / 5511 lbs.

Bunkervolumen / bunker volume: ca. 2,5m³

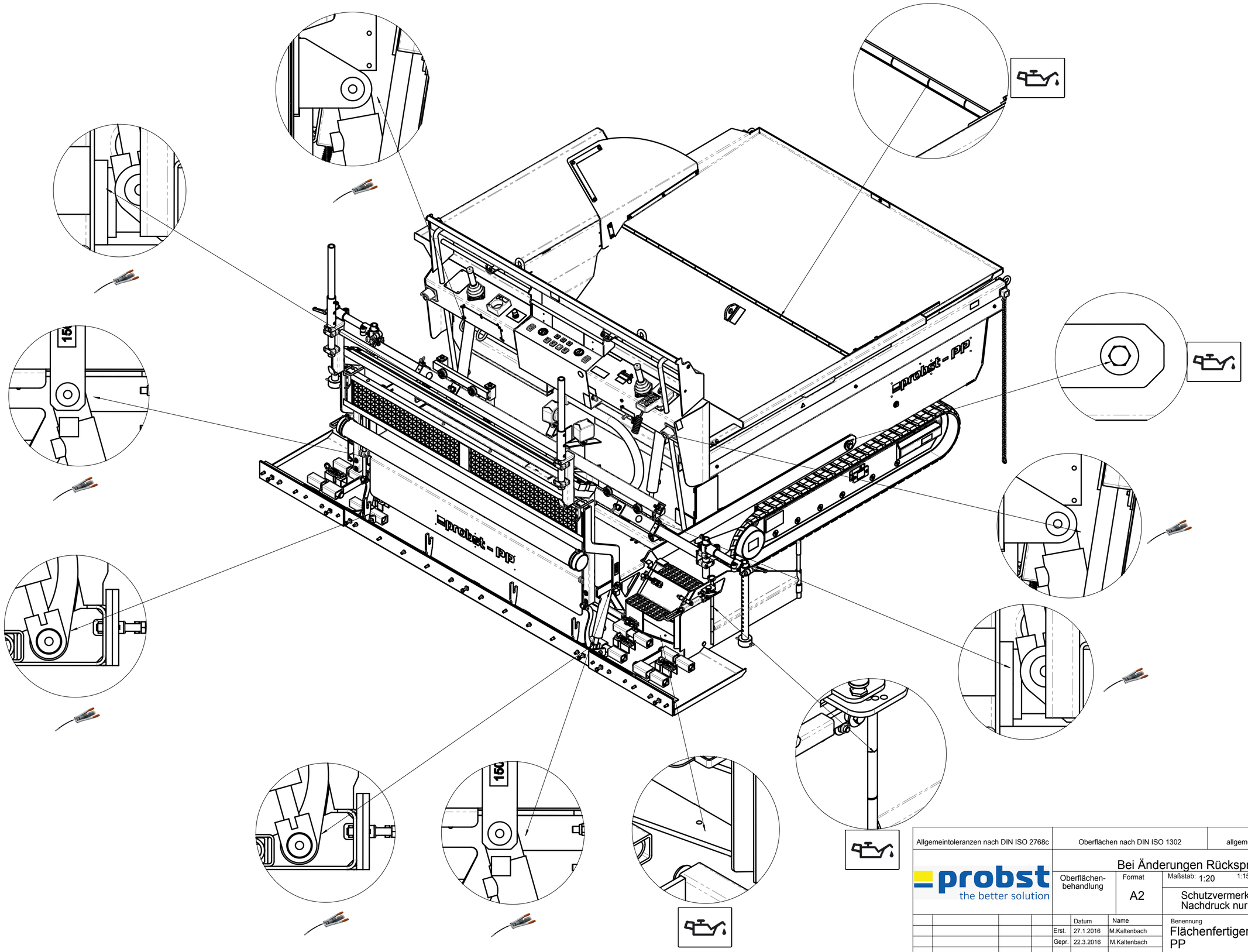
(Je nach Dichte des Materials muss darauf geachtet werden, dass das Gesamtgewicht des Power Plans von 6000kg (13225lbs.) nicht überschritten wird!!)
(Depending on the density of material it must be consider that the total weight of 6000kg (13225lbs) of the Power Plan is not allowed to be exceed.

Allgemeintoleranzen nach DIN ISO 2768c				Oberflächen nach DIN ISO 1302		allgemeiner Biegehalbmesser = Blechstärke	
probst the better solution				Bei Änderungen Rücksprache mit TB !			
				Oberflächen-behandlung	Format A2	Maßstab: 1:20 1:15	Gewicht: 2433,3 kg
				Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!			
					Datum	Name	Benennung
				Erst.	27.1.2016	M.Kaltenbach	Flächenfertiger Power Plan PP
				Gepr.	22.3.2016	M.Kaltenbach	
				WA:			Artikelnummer/Zeichnungsnummer D51300011
				Kunde:			Blatt 2 von 5
Zust.	Änderungstext	Datum	Von	Urspr.		Ers. f.	Ers. d.



1. 3x NOT-STOP- TASTER / NOT-STOP pushbutton
2. Bedien- Anzeigelemente / operator control- display elements
3. MOBA- Controller / MOBA- Controller
4. Arbeitsscheinwerfer / working headlights
5. Motordrehzahlgulierung / engine speed regulation
6. Hauptbohle / Bedienerstand / main plank / user-standing
7. Fahr- Bedienhebel / moving-use lever
8. Umschalthebel Bohle Schwimmstellung / Bohle anheben
   Lift the reversing lever plank floating position / board
9. Handbediengerät / manual control device
10. Verbreiterungsbohle / widening plank
11. Abgleitbohle / sliding plank
12. Ultraschall- Höhensensor (Sonic-Ski) / ultrasonic height sensor
13. Lineareinheit / linear unit
14. Raupenfahrwerk / crawler chassis
15. Bunker / bunker
16. Distanzrohr / distance sleeve
17. Frontrutsche / front slide
18. Seitliche Einlaufrutsche / lateral inlet slide
19. Fahrerschutzdach / driver protection roof
20. MOBA- Laserempfänger / MOBA-laser receiver
21. Geschwindigkeitsregulierung für Automatik / speed regulation for automatic

Allgemeintoleranzen nach DIN ISO 2768c				Oberflächen nach DIN ISO 1302		allgemeiner Biegehalbmesser = Blechstärke	
probst the better solution				Bei Änderungen Rücksprache mit TB !			
				Oberflächen-behandlung	Format A2	Maßstab: 1:20 1:15	Gewicht: 2433,3 kg
				Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!			
					Datum	Name	Benennung: Flächenfertiger Power Plan PP
				Erst.	27.1.2016	M.Kaltenbach	
				Gepr.	22.3.2016	M.Kaltenbach	
				WA:			Artikelnummer/Zeichnungsnummer: D51300011
				Kunde:			Blatt 3 von 5
Zust.	Änderungstext	Datum	Von	Urspr.		Ers. f.	Ers. d.



Allgemeintoleranzen nach DIN ISO 2768c | Oberflächen nach DIN ISO 1302 | allgemeiner Biegehalbmesser = Blechstärke

probst
the better solution

Bei Änderungen Rücksprache mit TB !

Oberflächen-behandlung | Format: A2 | Maßstab: 1:20 1:15 | Gewicht: 2433,3 kg

	Datum	Name
Erst.	27.1.2016	M.Kaltenbach
Gepr.	22.3.2016	M.Kaltenbach

Benennung
Flächenfertiger Power Plan
PP

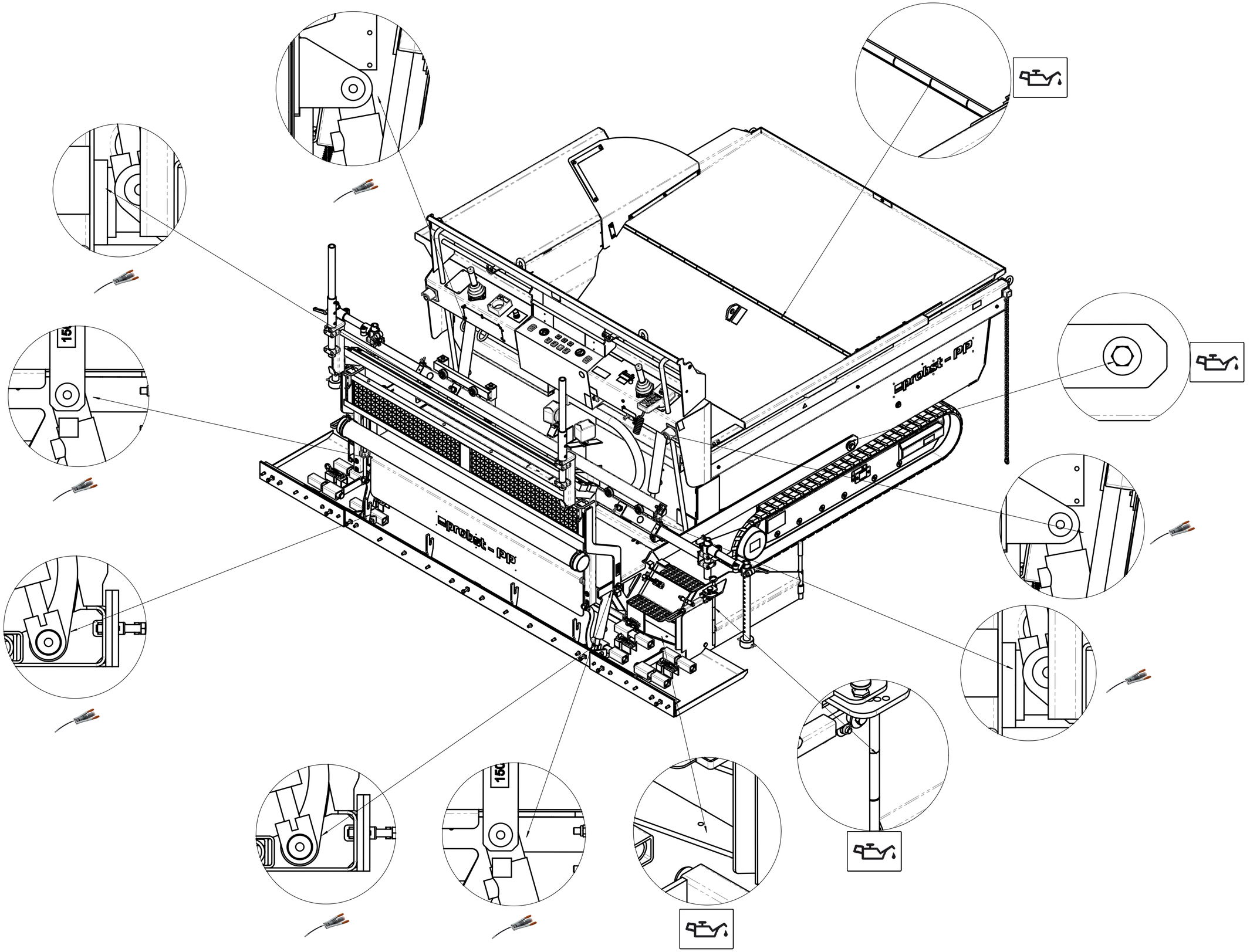
WA:
Kunde:

Artikelnummer/Zeichnungsnummer
D51300011

Blatt 4 von 5

Zust.	Änderungstext	Datum	Von

Ursprung | Ers. f. | Ers. d.


15
probst - PP

41300109

41300004
siehe separate Liste
see separate list

41300005

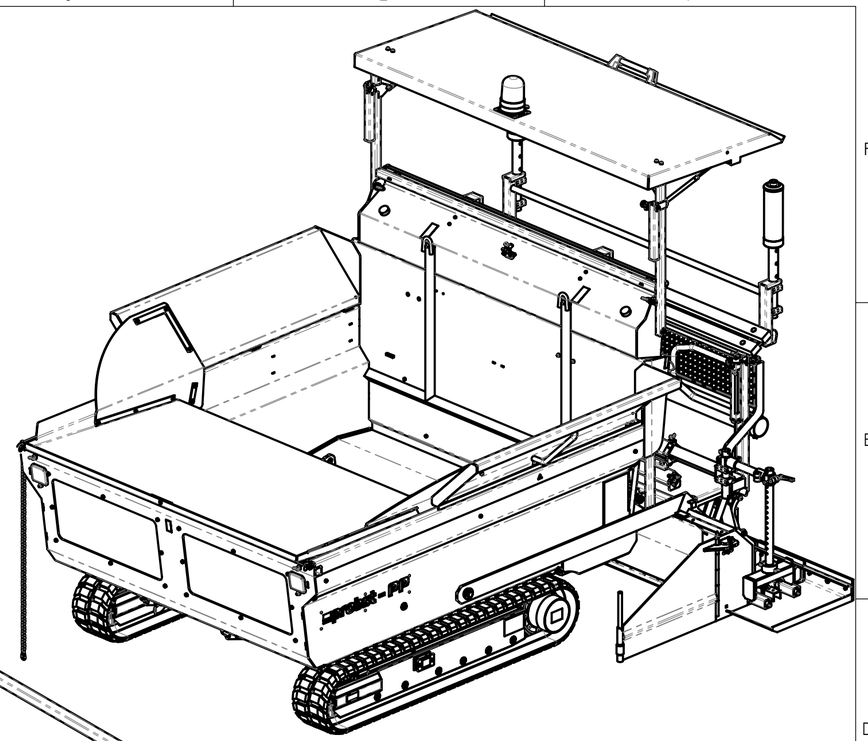
41300006
siehe separate Liste
see separate list

33100105

30300243

siehe Hydraulikschaltplan
see circuit diagramm

20060001



41300079

41300207
siehe separate Liste
see separate list

41300026
siehe separate Liste
see separate list

41300106
siehe separate Liste
see separate list

20100018

24110114

24100079

41300061
siehe separate Liste
see separate list

41300007

Zusatzpaket nicht im Standard enthalten!

probst handling equipment

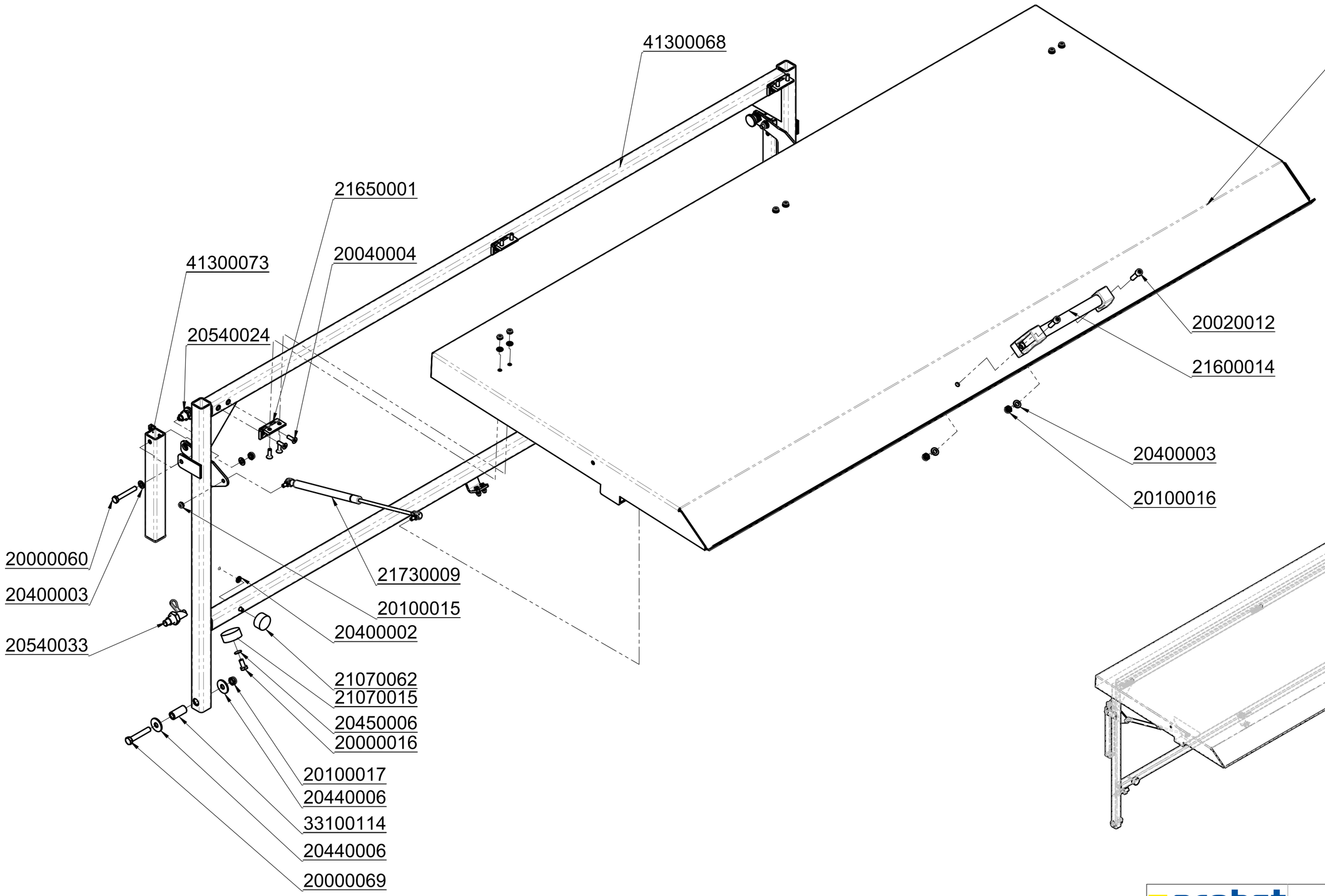
		Datum	Name
	Erst.	27.1.2016	M.Kaltenbach
	Gepr.	22.3.2016	M.Kaltenbach

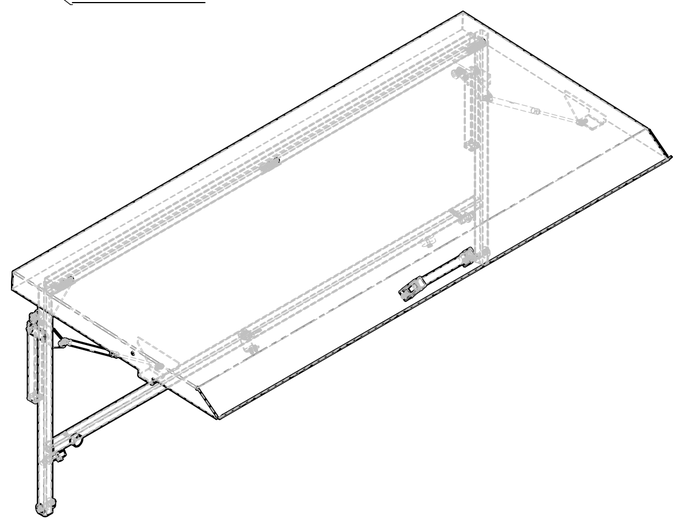
Benennung
Flächenfertiger Power Plan
PP

Artikelnummer/Zeichnungsnummer
E51300011

Blatt 1 von 1

Zust. | Urspr. | Ers. f. | Ers. d.





probst handling equipment

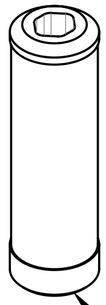
		Datum	Name
	Erst.	17.3.2011	M.Kaltenbach
	Gepr.	18.7.2017	I.Krasnikov

Benennung
Fahrerschutzdach, abklappbar, demontierbar für Flächen-
fertiger PP

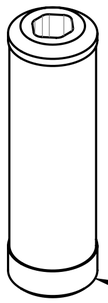
Artikelnummer/Zeichnungsnummer
E41300004

Blatt 1 von 1

Zust. | Urspr. | Ers. f. | Ers. d.



24030022



24030022

probst handling equipment

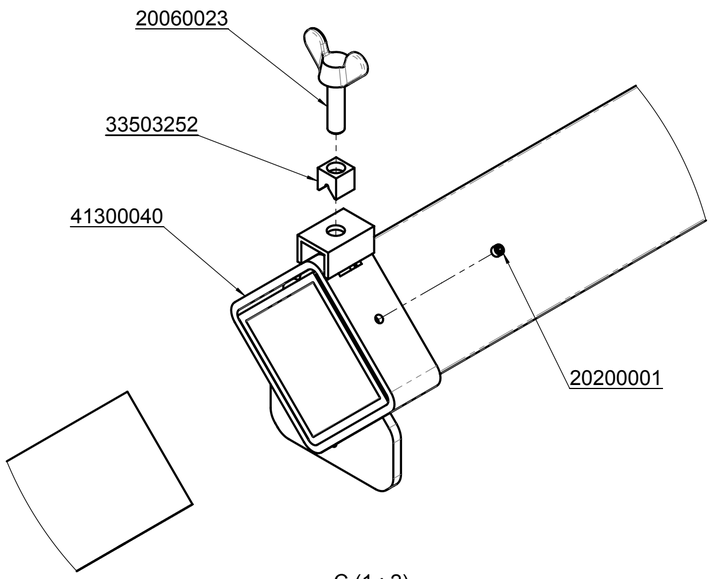
		Datum	Name
	Erst.	25.2.2011	M.Kaltenbach
	Gepr.	18.7.2017	I.Krasnikov

Benennung
Laser-Kit
Laser-Empfänger-Ergänzung
für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300006

Blatt 1
von 1

Zust. | Urspr. | Ers. f. | Ers. d.



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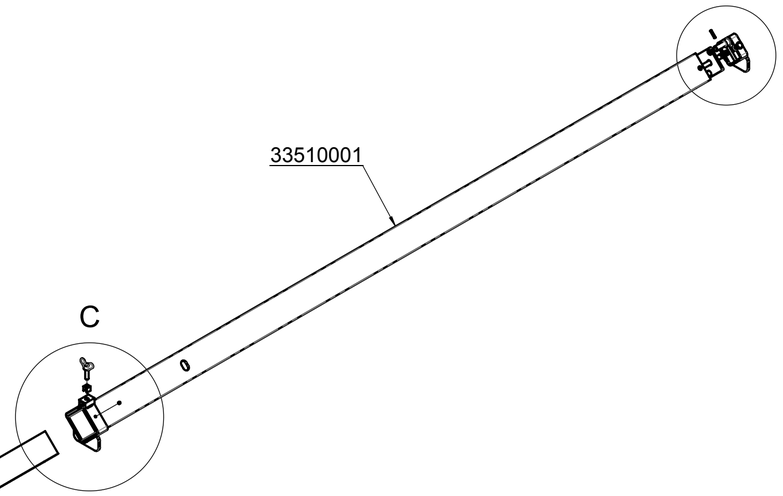

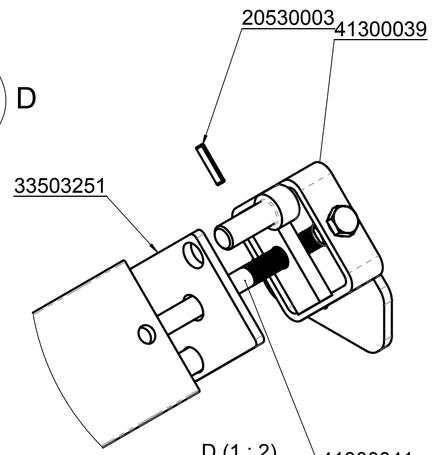

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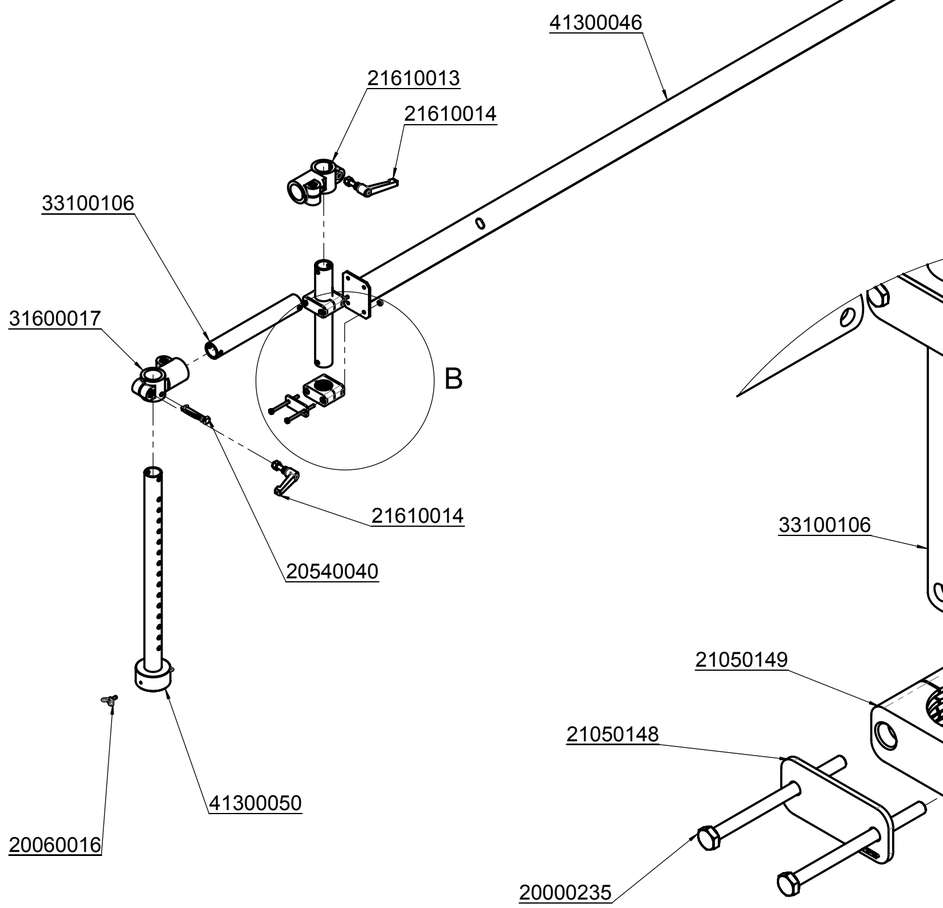

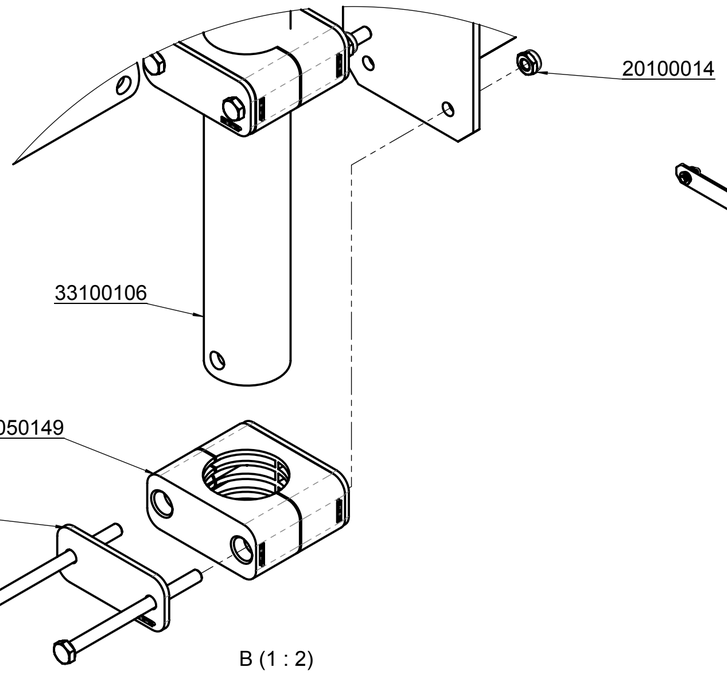

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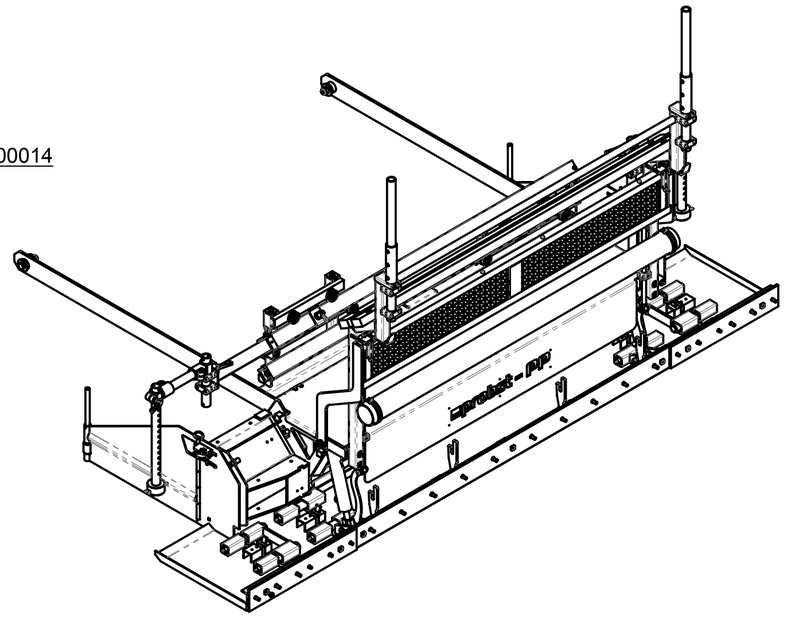


probst handling equipment

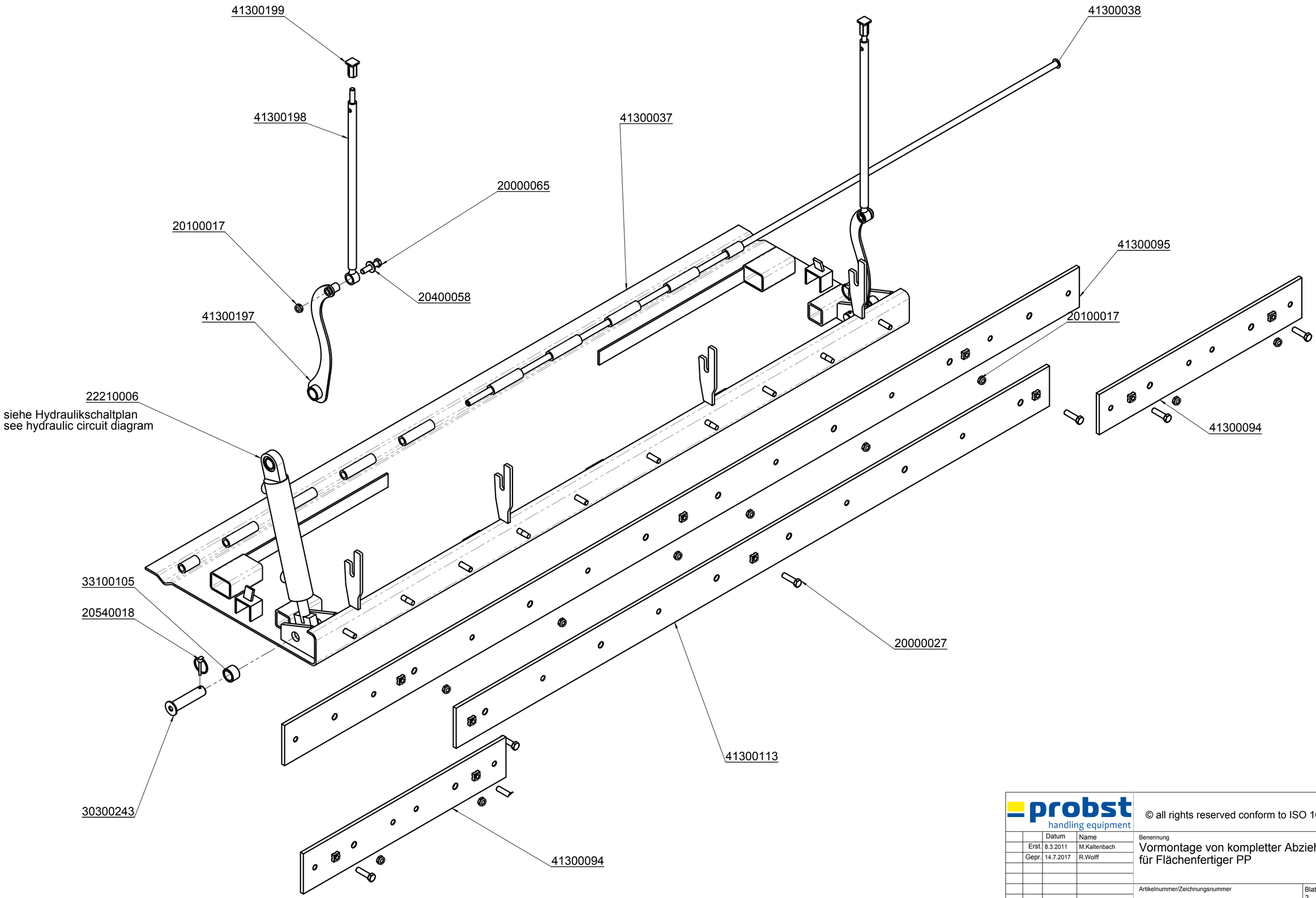
		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff

Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

Blatt 1 von 6

1 | Zust. | Urspr. | Ers. f. | Ers. d.



probst handling equipment

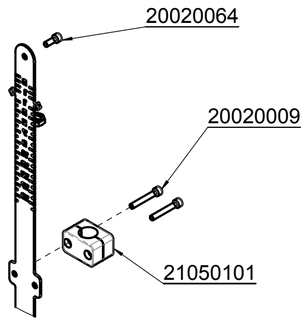
		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff
1			

Zust. | Urspr. | Ers. f. | Ers. d.

Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

Blatt 2 von 6



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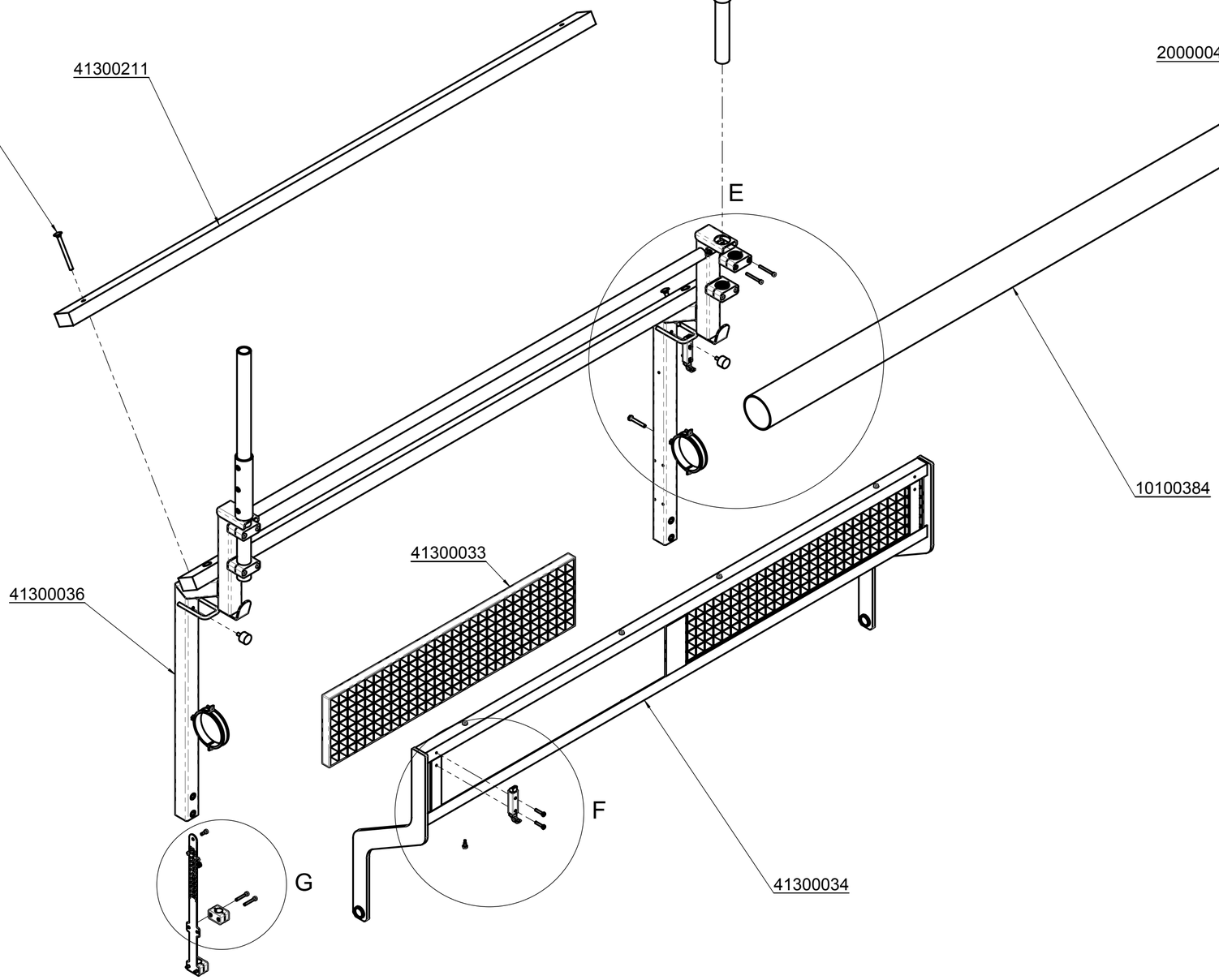
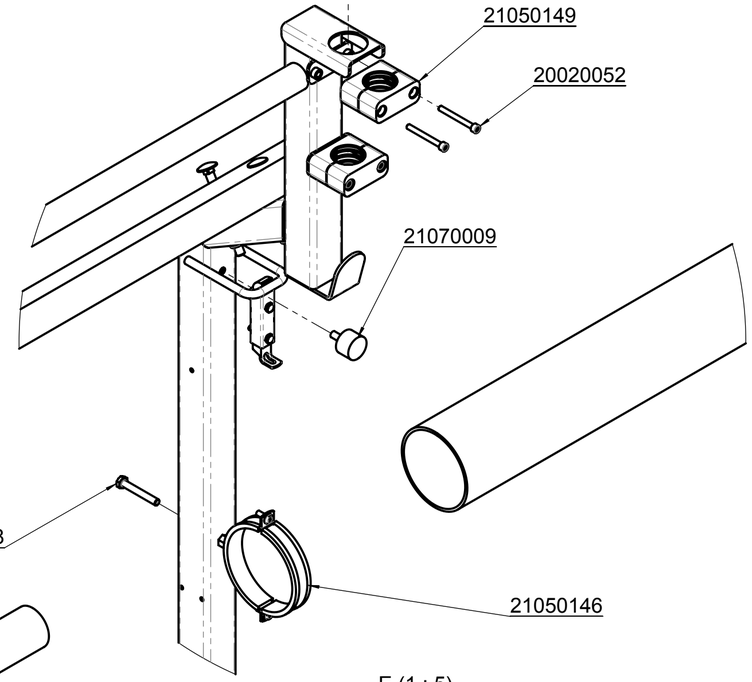
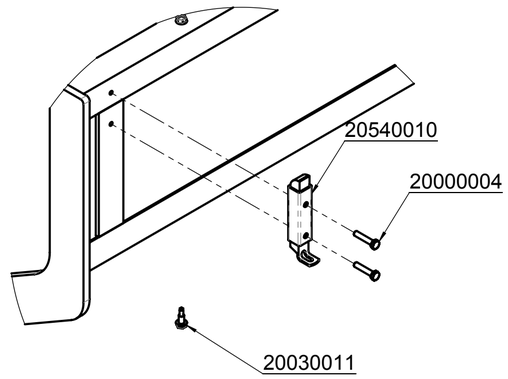




E (1 : 5)



F (1 : 5)

probst handling equipment

		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff

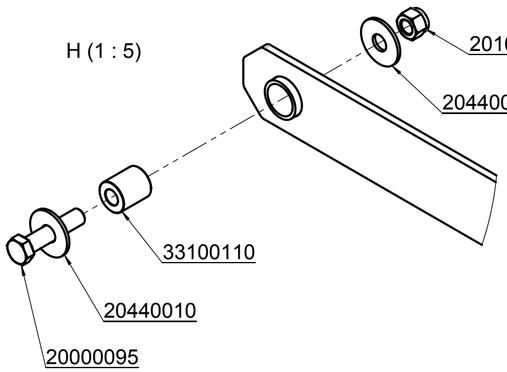
Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

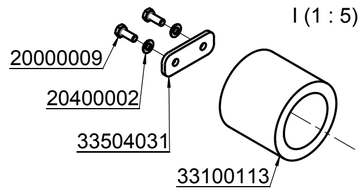
Blatt 3 von 6

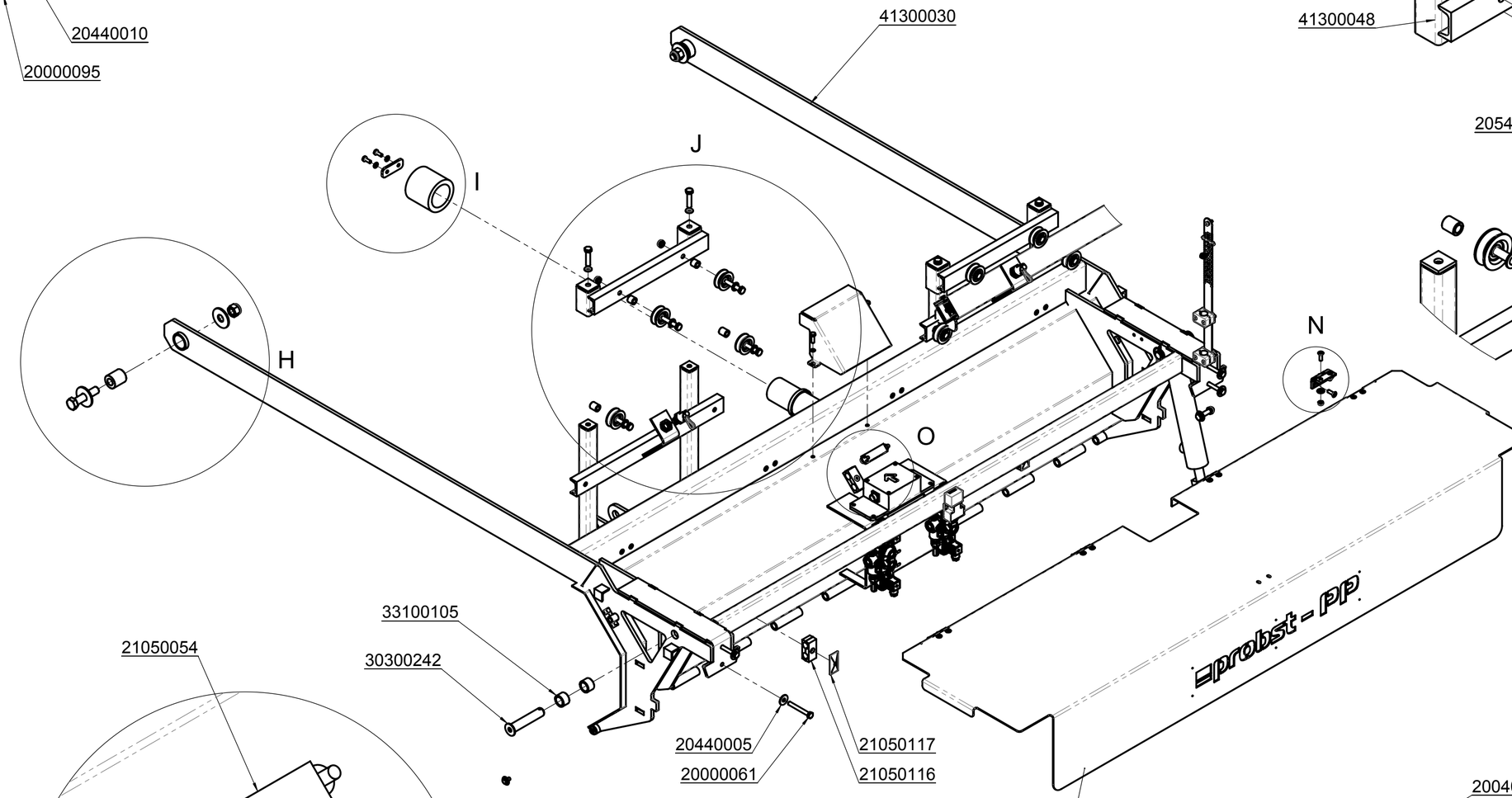
1				
Zust.	Urspr.		Ers. f.	Ers. d.

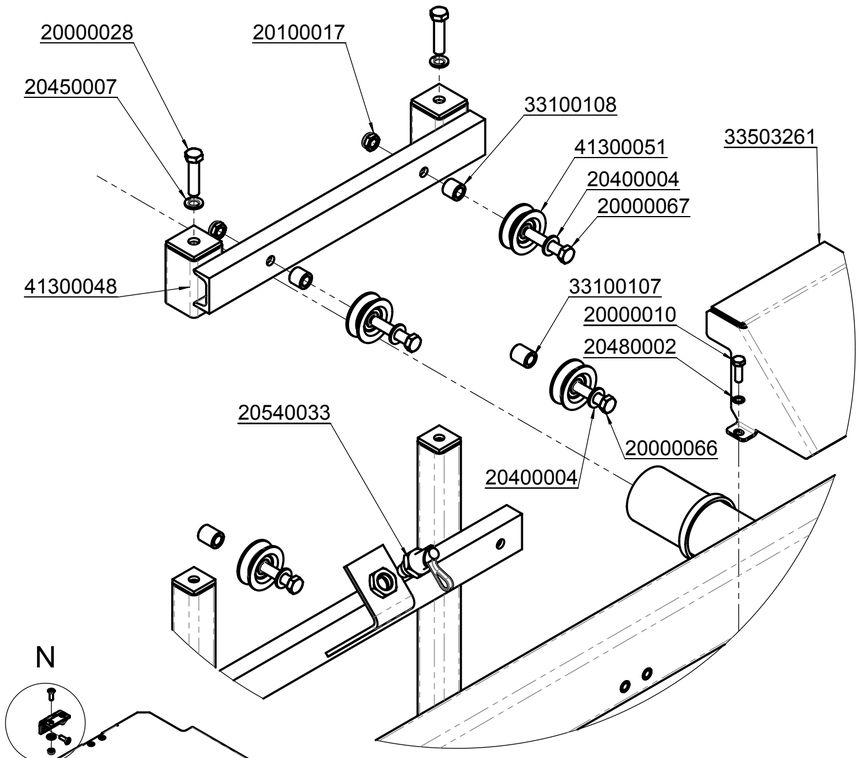
H (1 : 5)



I (1 : 5)







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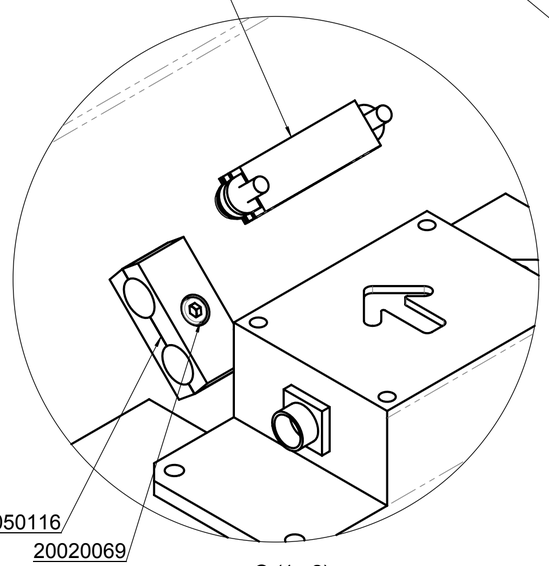

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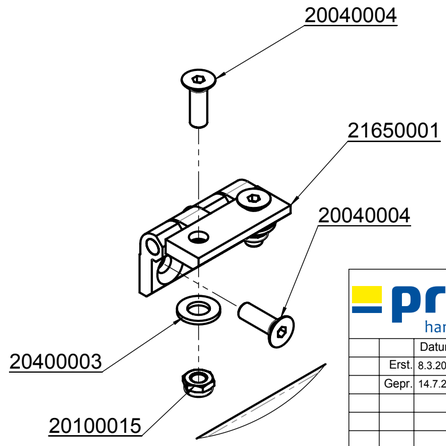


N (1 : 2)

probst handling equipment

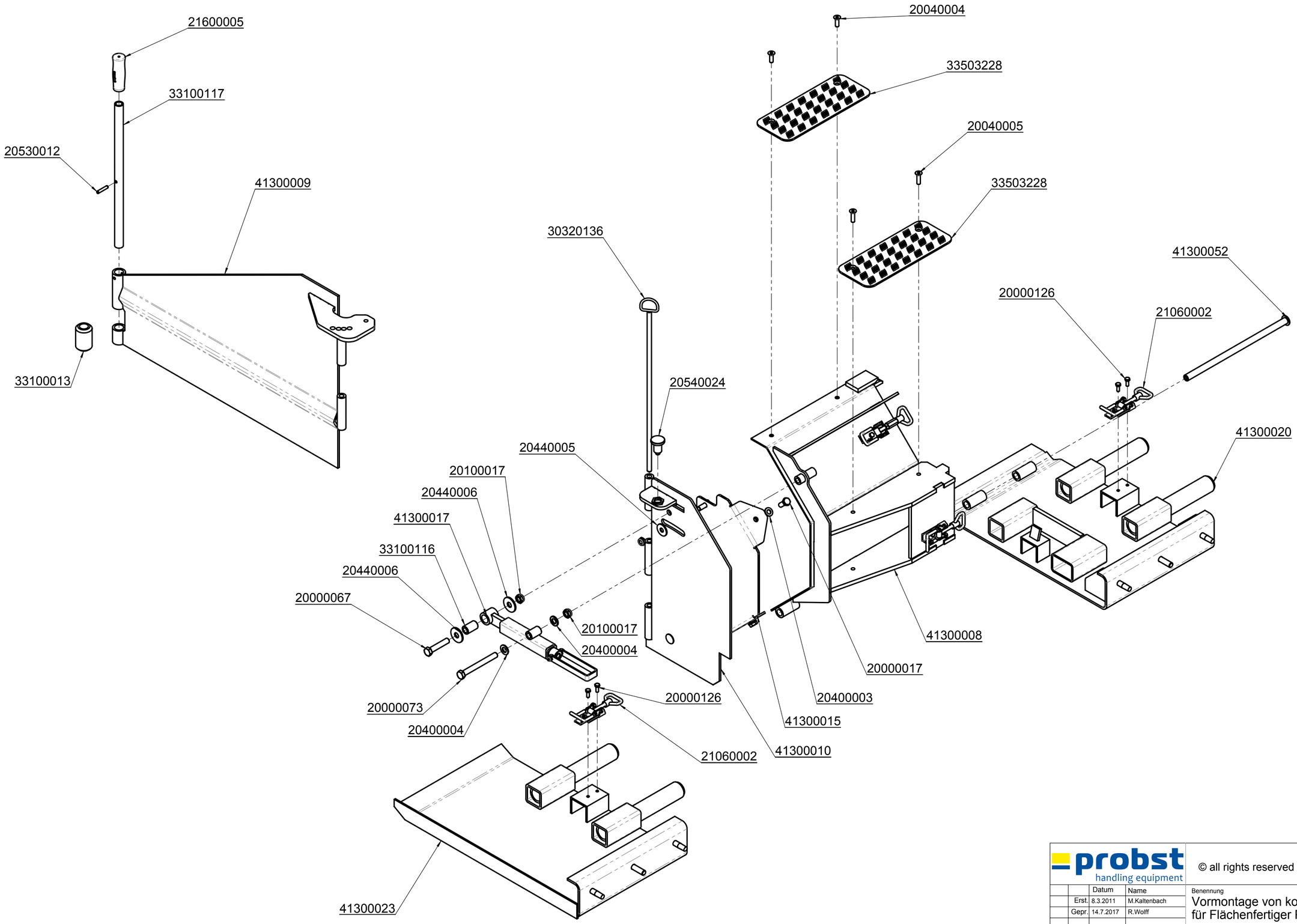
		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff

Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

Blatt 4 von 6

Zust. | Urspr. | Ers. f. | Ers. d.



probst handling equipment

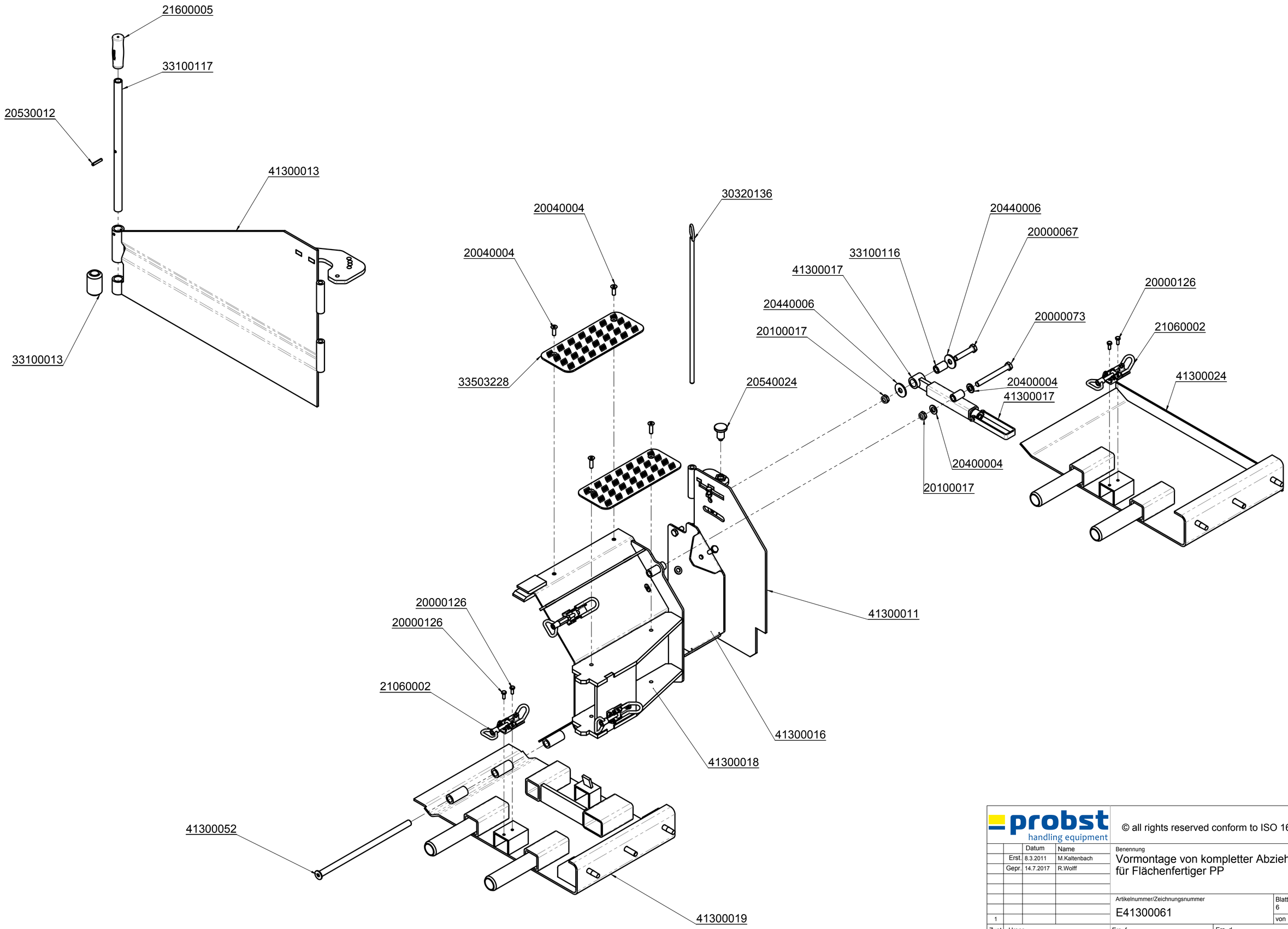
		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff

Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

Blatt 5 von 6

Zust.	Urspr.	Ers. f.	Ers. d.
1			



probst handling equipment

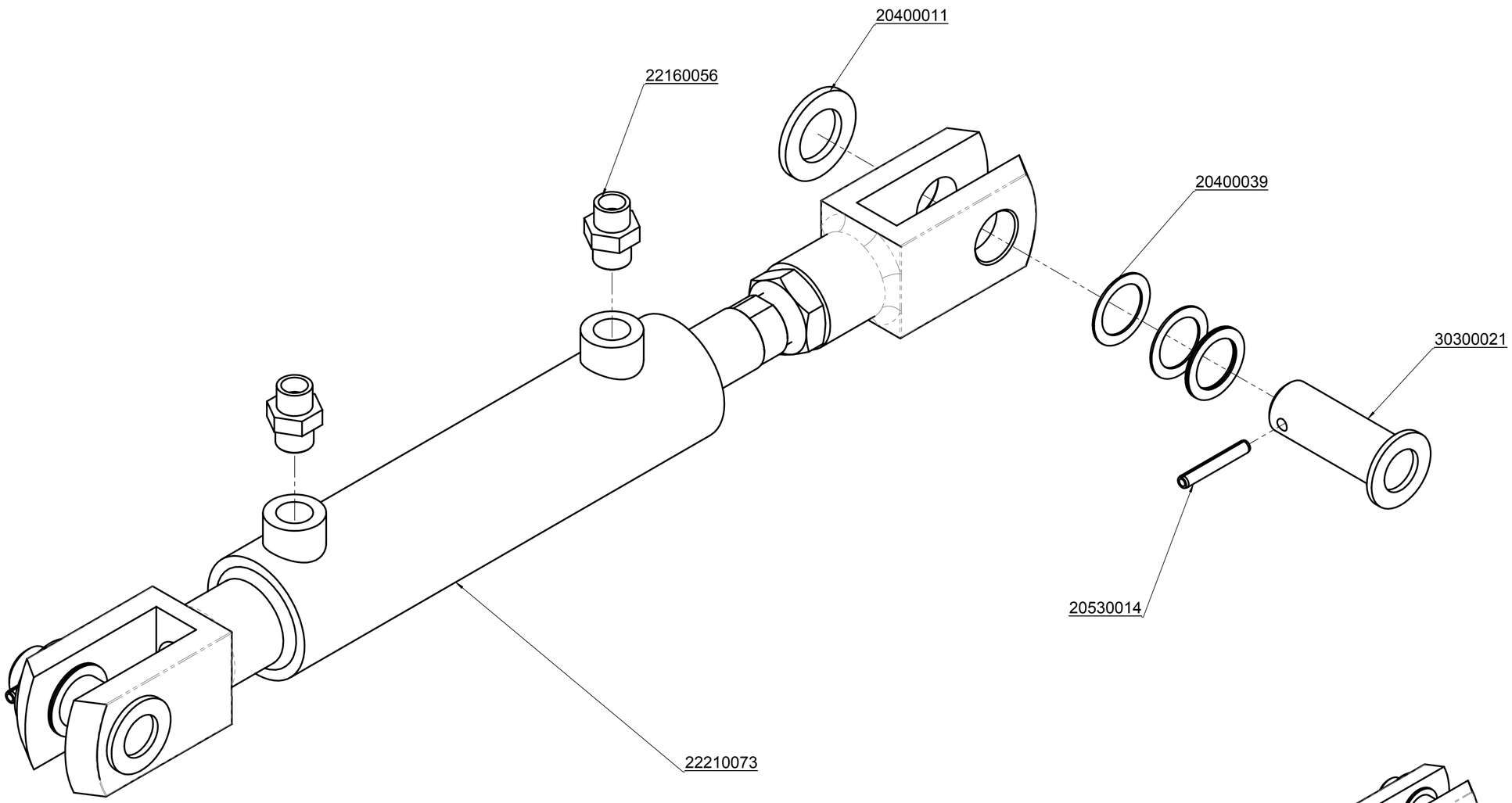
		Datum	Name
	Erst.	8.3.2011	M.Kaltenbach
	Gepr.	14.7.2017	R.Wolff

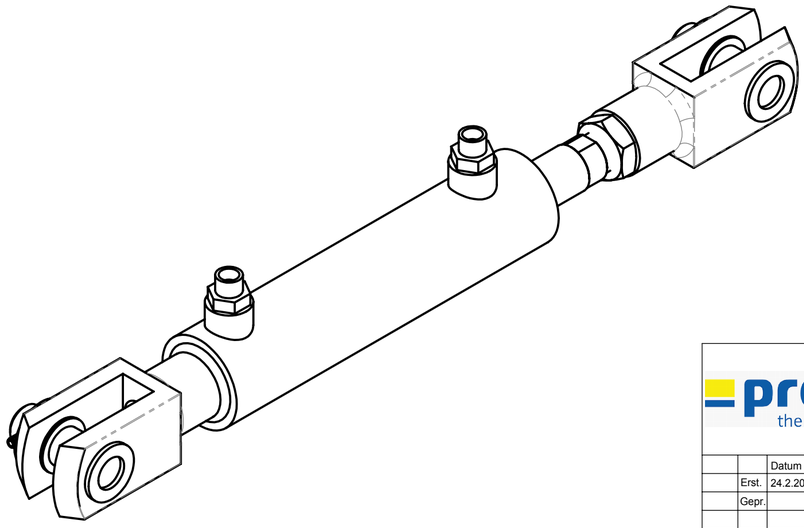
Benennung
Vormontage von kompletter Abzieheinheit für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300061

Blatt 6
von 6

Zust.	Ursprung	Ers. f.	Ers. d.
1			





probst
the better solution

Bei Änderungen Rücksprache TB !

Gewicht: 7,8 kg

	Datum	Name
Erst.	24.2.2011	M.Kaltenbach
Gepr.		

Benennung
HD-Zylinder vormontiert für Bunkerklappe an Flächen-fertiger PP

WA:
Kunde:
Zust. Urspr.

Artikelnummer/Zeichnungsnummer
E41300106

Blatt 1 von 1

Ers. f. Ers. d.

41300099
33504030
41300097
41300098
20400002
20000009
41300027
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20400001
20100014
20190026
20040021
41500034
33503542
20040043
41300107
siehe separate Liste
see separate list
24300018
20100016
27230009
20000002
20400001
33700541
41300195
20100014
41300067
siehe separate Liste
see separate list
41300105
20450005
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41300038
20440004
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20440004
20450005
20000009

J (1 : 6)

probst handling equipment

		Datum	Name
	Erst.	26.1.2016	M.Kaltenbach
	Gepr.	7.6.2017	R.Wolff
1			
Zust.	Urspr.		

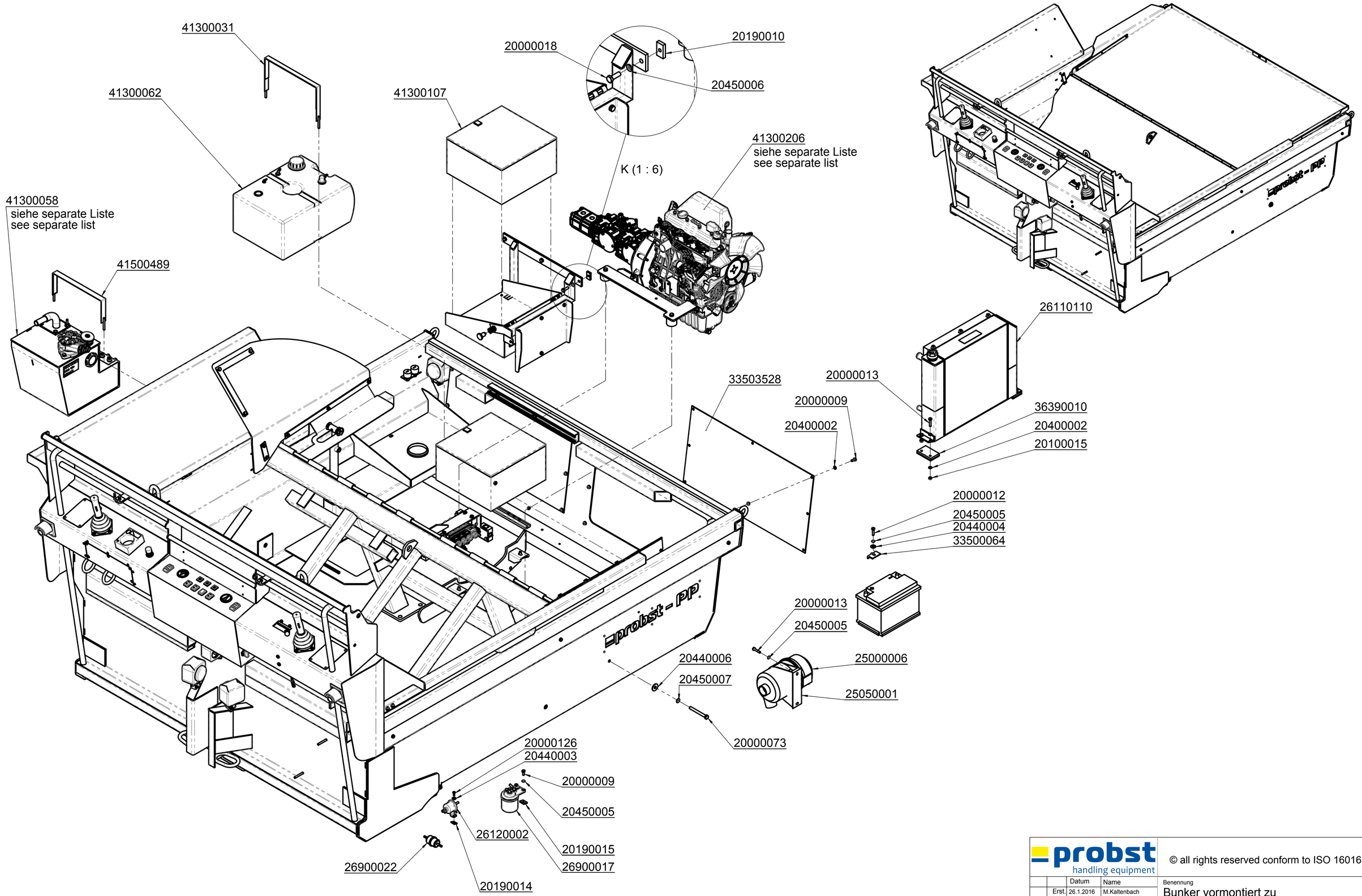
Benennung
Bunker vormontiert zu Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300207

Blatt 1 von 2

Ers. f.

Ers. d.



probst handling equipment

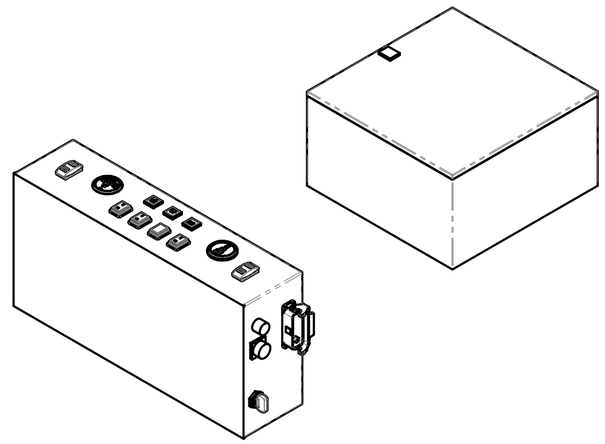
		Datum	Name
	Erst.	26.1.2016	M.Kaltenbach
	Gepr.	7.6.2017	R.Wolff

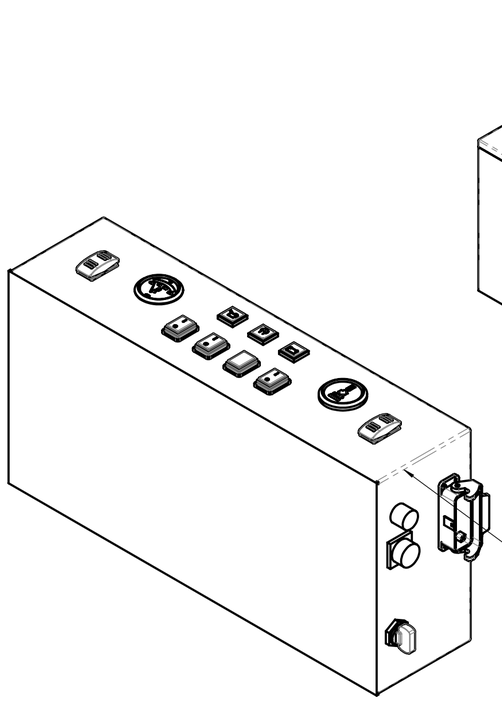
Benennung
Bunker vormontiert zu Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300207

Blatt 2 von 2

Zust.	Ursprr.	Ers. f.	Ers. d.
1			



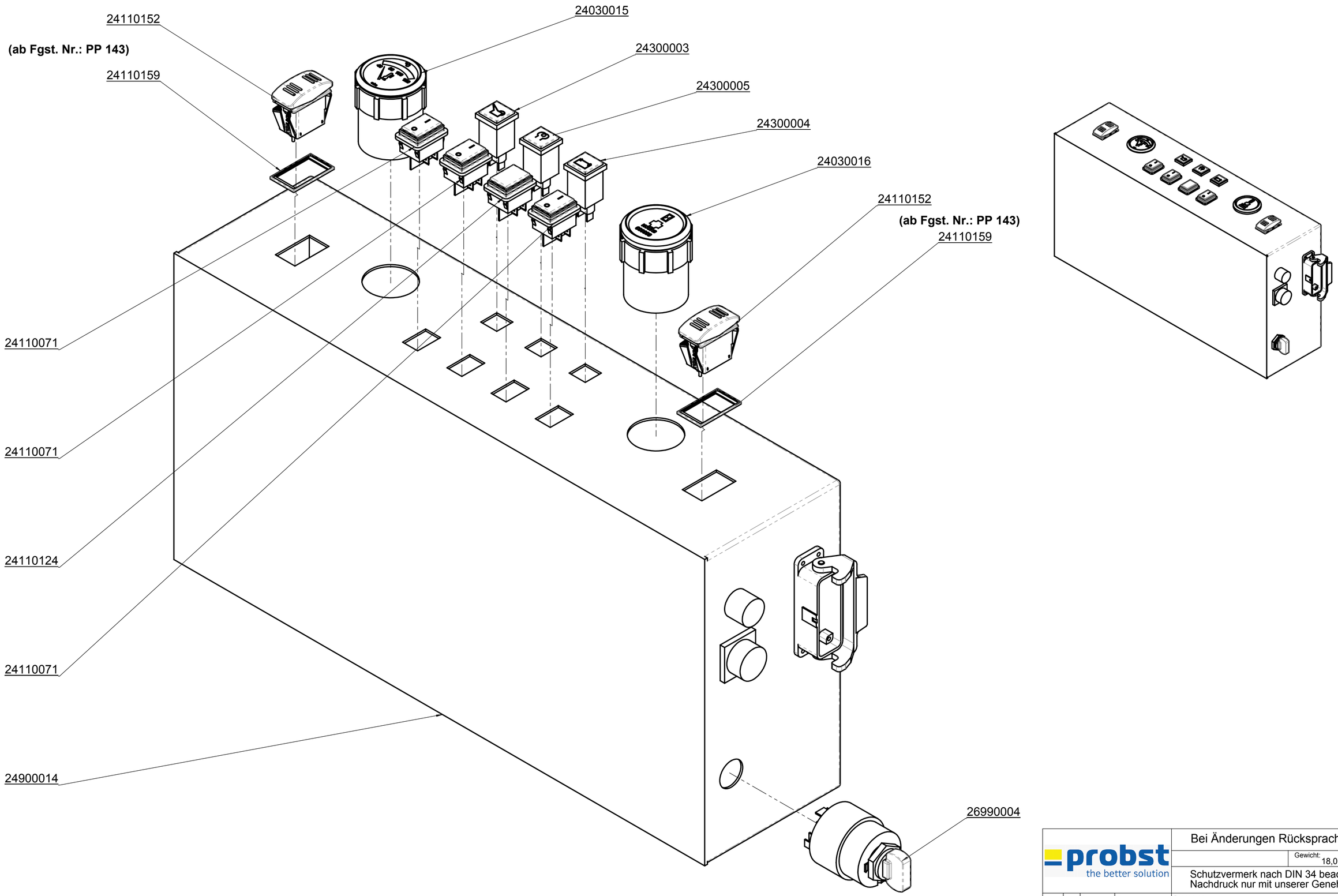


41300078

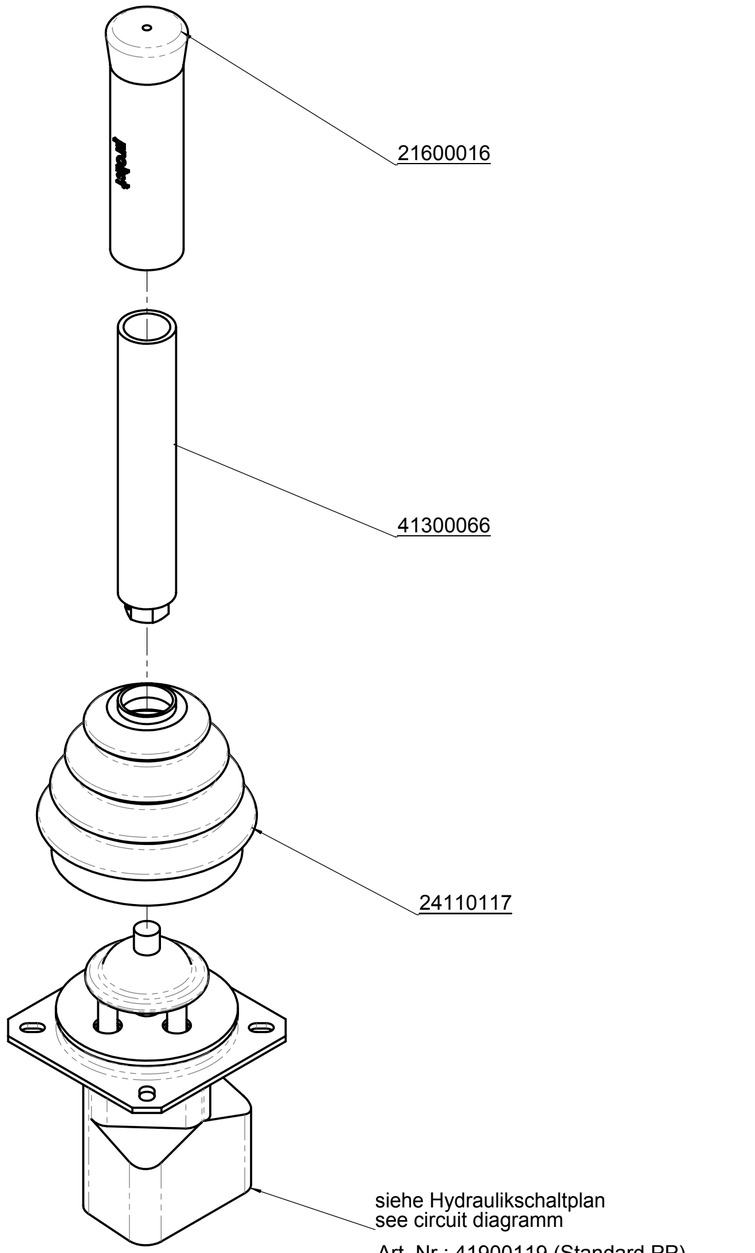
41300077

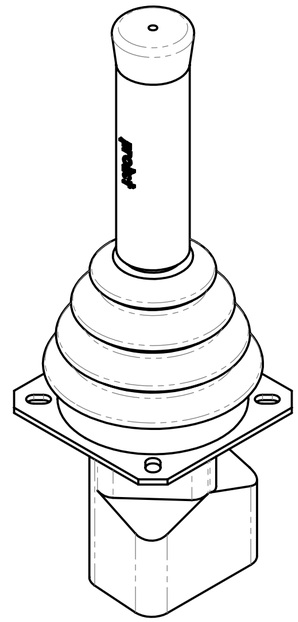
siehe separate Liste
see separate list

probst the better solution			Bei Änderungen Rücksprache TB !	
			Gewicht: 33,2 kg	
			Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!	
		Datum	Name	Benennung: Komplette Elektrik zu Flächen-fertiger PP bestehend aus:
	Erst.	30.7.2014	M.Kaltenbach	
	Gepr.	30.7.2014	M.Kaltenbach	
	WA:			Artikelnummer/Zeichnungsnummer: E41300107
	Kunde:			Blatt 1 von 1
Zust.	Urspr.			Ers. f. / Ers. d.



probst the better solution				Bei Änderungen Rücksprache TB !
				Gewicht: 18,0 kg
				Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!
		Datum	Name	Benennung: Haupschaltschrank an Bunker (hinten für Flächenfertiger PP)
	Erst.	31.8.2011	M.Kaltenbach	
	Gepr.			
	WA:			Artikelnummer/Zeichnungsnummer: E41300077
1	Kunde:			Blatt 1 von 1
Zust.	Urspr.			Ers. f. / Ers. d.





Art. Nr.: 41900119 (Standard PP)
Art. Nr.: 41900118 (PP mit Außenrüttler)

probst
the better solution

Bei Änderungen Rücksprache TB !

Gewicht: 4,2 kg

		Datum	Name
Erst.		25.2.2011	M.Kaltenbach
Gepr.			

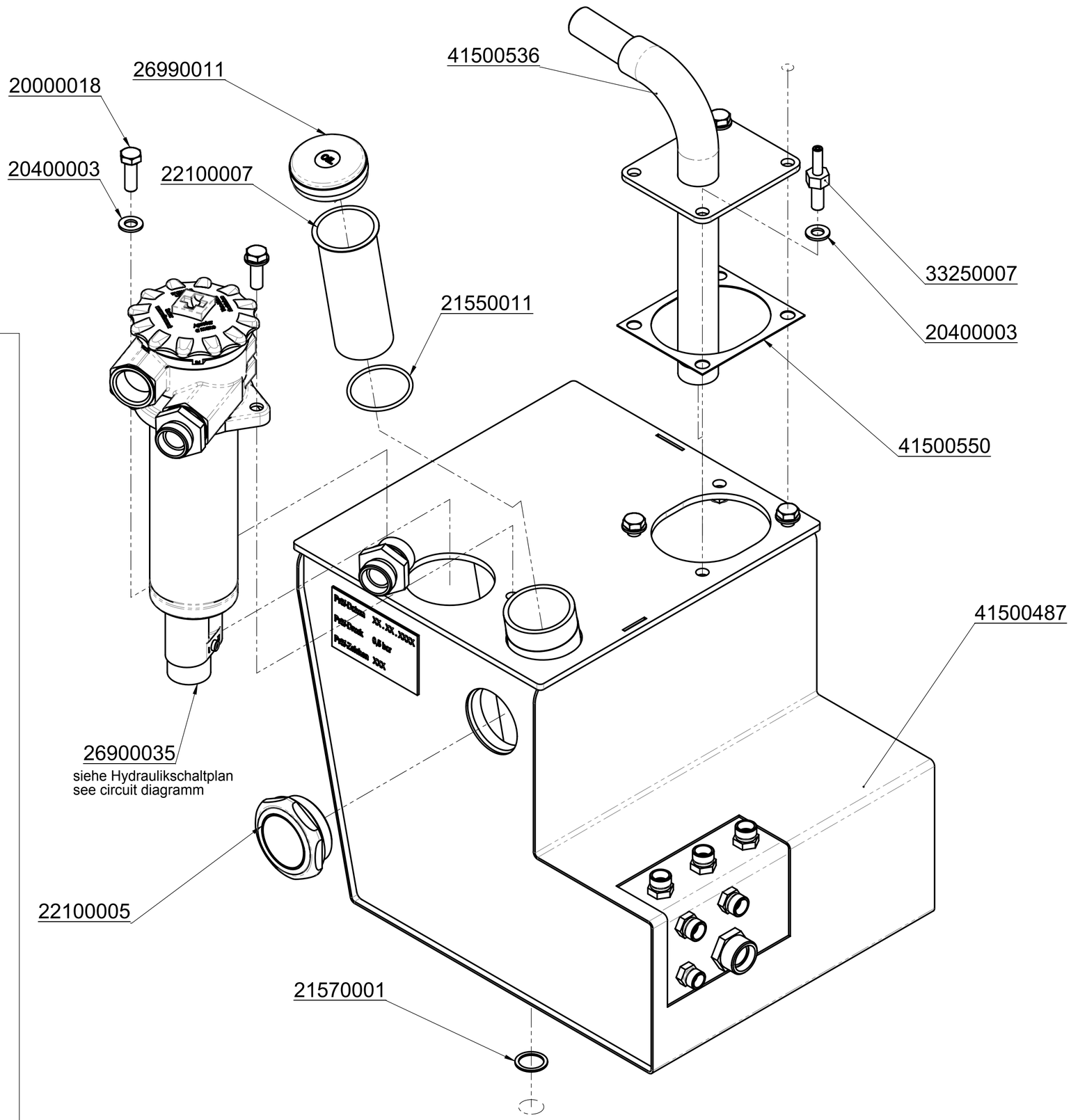
Benennung
Vorsteuereinheit, vormontiert
für Flächenfertiger PP

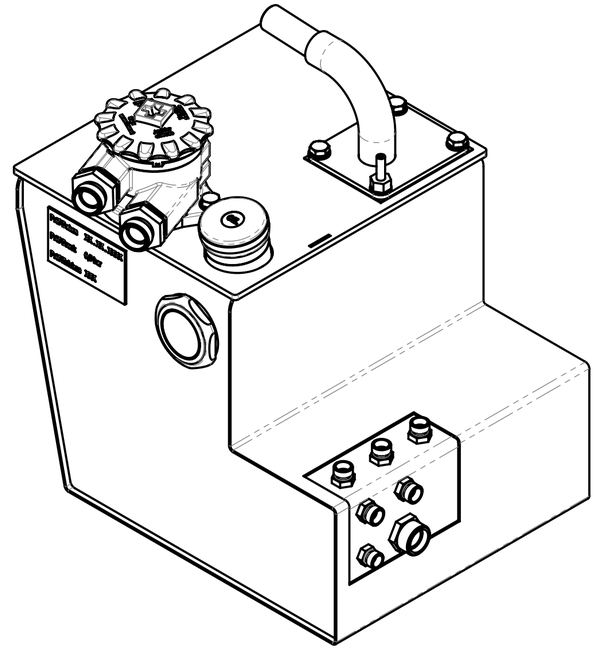
WA:
Kunde:
Zust. Urspr.

Artikelnummer/Zeichnungsnummer
E41300067

Blatt 1 von 1

Ers. f. Ers. d.





probst handling equipment

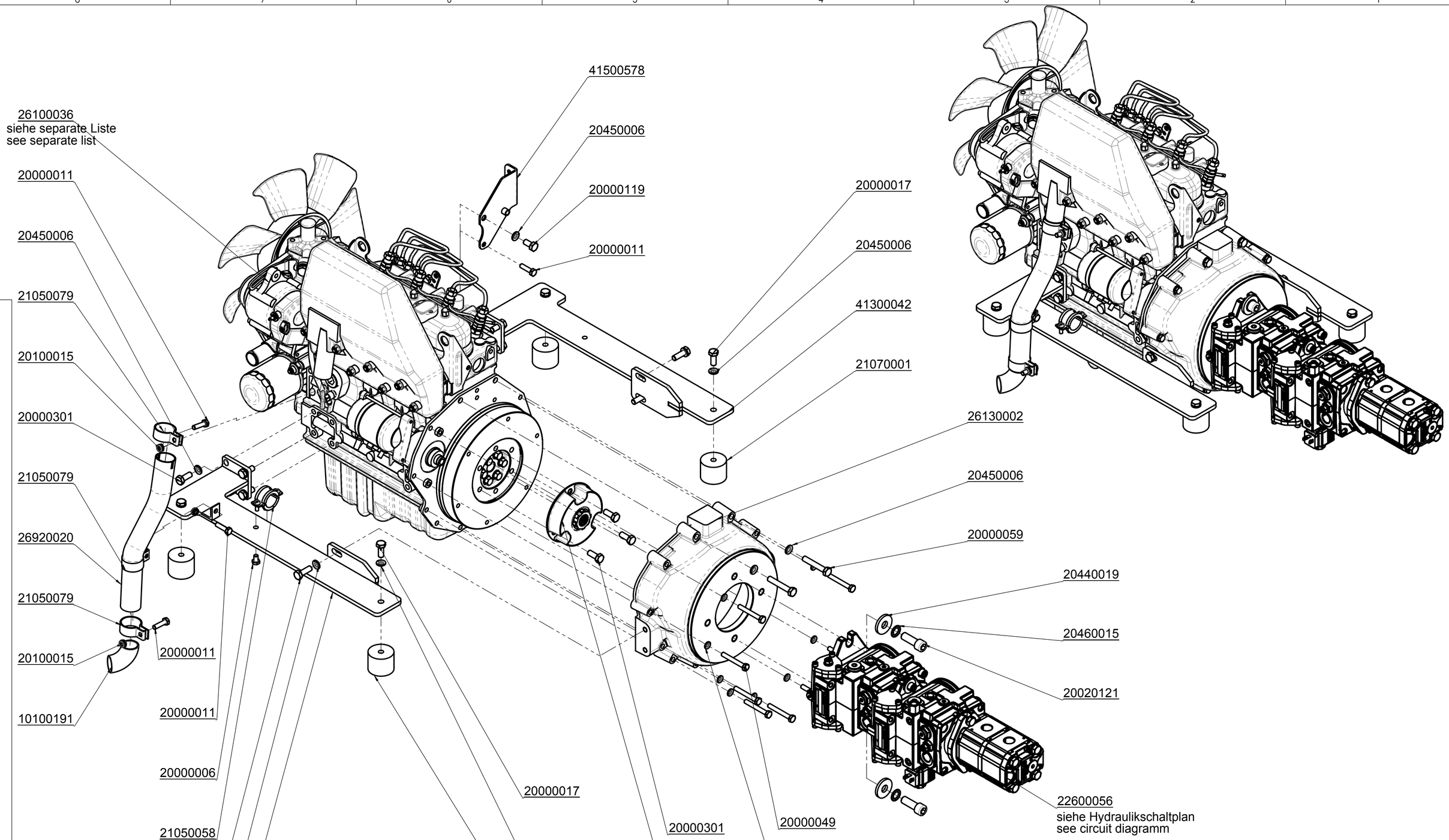
		Datum	Name
	Erst.	30.8.2011	M.Kaltenbach
	Gepr.	18.7.2017	I.Krasnikov
1			

Zust. | Urspr. | Ers. f. | Ers. d.

Benennung
Hydrauliktank,vormontiert,
für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300058

Blatt 1
von 1



probst
the better solution

Bei Änderungen Rücksprache TB !

Gewicht: 165,9 kg

		Datum	Name
	Erst.	25.1.2016	M.Kaltenbach
	Gepr.	23.3.2016	M.Kaltenbach

Benennung
Dieselmotor, einbaufertig vormontiert, für Flächenfertiger PP
(V1505-E4B)

WA:

Kunde:

Zust. | Urspr.

Artikelnummer/Zeichnungsnummer
E41300206

Blatt 1 von 1

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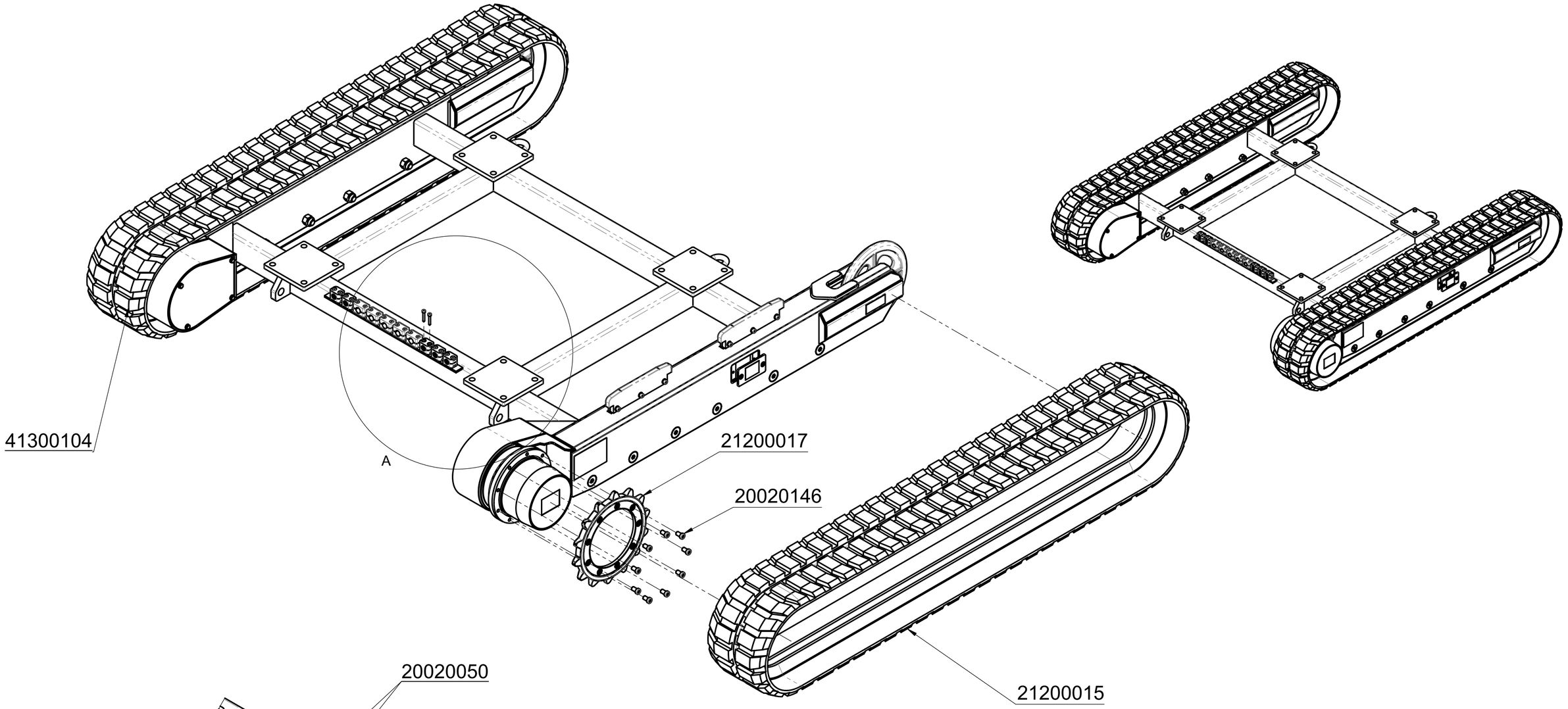
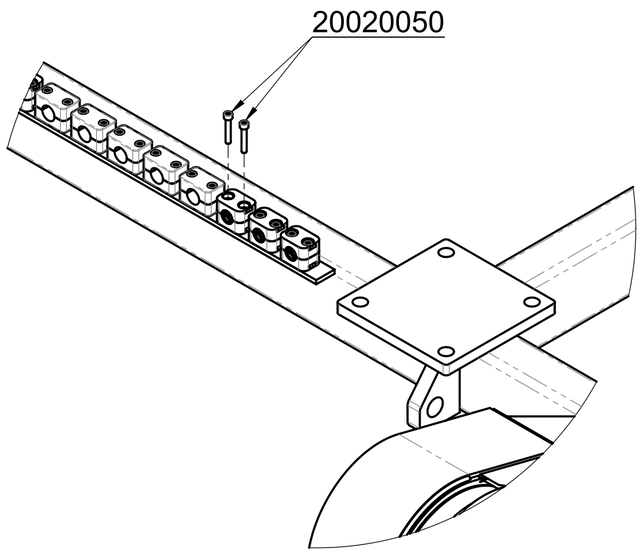




A (1 : 5)

probst handling equipment

		Datum	Name
	Erst.	25.2.2011	M.Kaltenbach
	Gepr.	18.7.2017	I.Krasnikov

Benennung
Fahrwerk vormontiert für Flächenfertiger PP

Artikelnummer/Zeichnungsnummer
E41300026

Blatt 1 von 1

Zust.	Urspr.	Ers. f.	Ers. d.
2			
1			

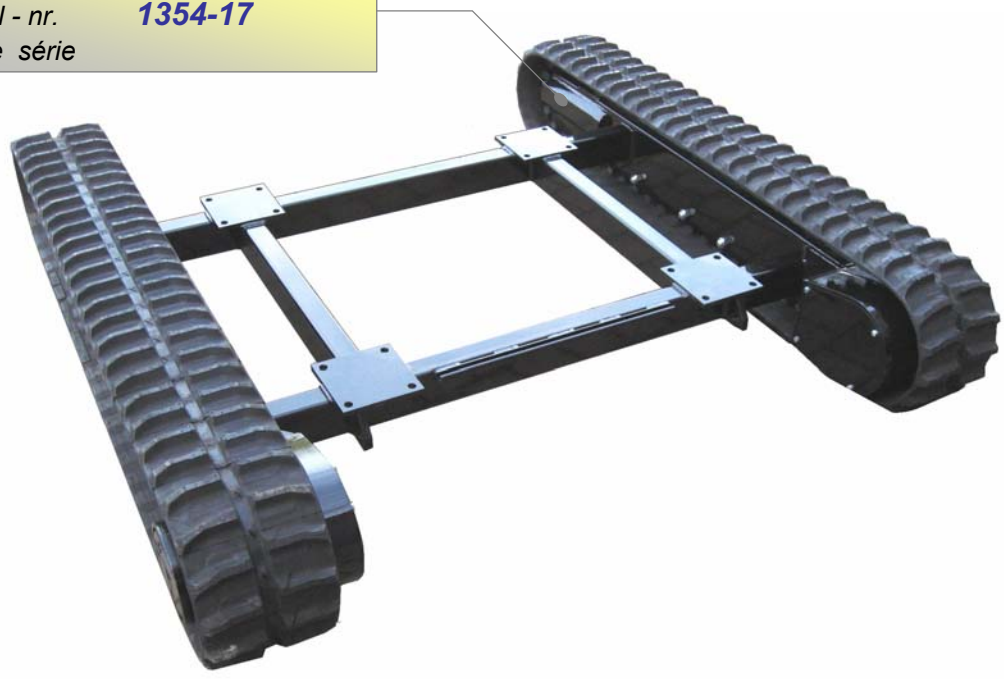
RAUPENFAHRWERK
TRACKED CHASSIS
TRACTION A CHENILLE

TFW

D	GB	F
Bedienungs - und Wartungsanweisung	**Operating and maintenance instructions**	**Instructions de service et entretien**

Ersatzteilliste	**Spare parts list**	**Catalogue de pièces**

Serie - Nr.
Serial - nr. **1354-17**
N° de série

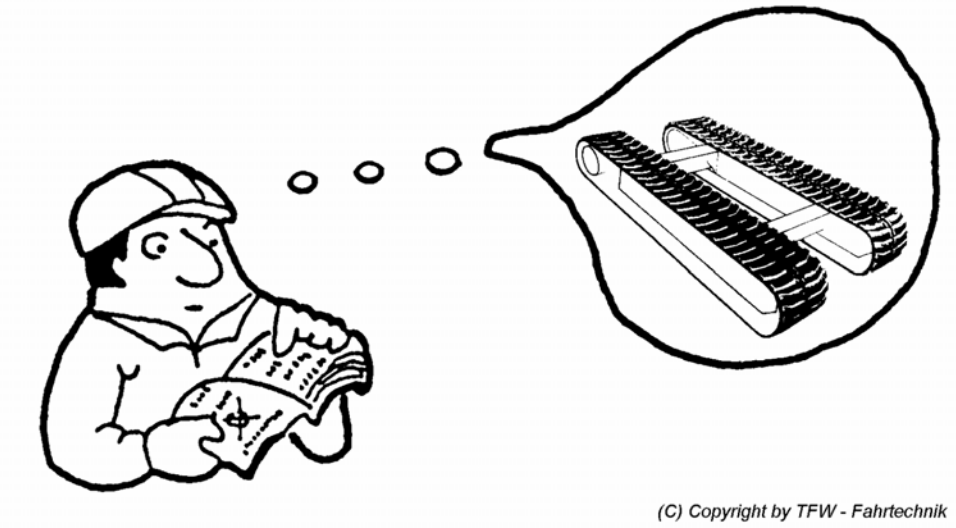


Fahrantrieb Typ **702C2K - MAG 26VP- 4**	**Track drive type** **702C2K - MAG 26VP- 4**	**Engrenage de chenille** **702C2K - MAG 26VP- 4**

Bauklasse 1.7 - 2.7 **6 - rollige Ausführung**	**Construction 1.7 - 2.7** **6 - roller type**	**Classe de constr. 1.7 - 2.7** **6 - poulie type**

Ausgabe vom 29.04.2012

Mit allen zur Bedienung notwendigen Informationen vertraut machen	First familiarise yourself with all the information you need to operate the equipment	Pour se familiariser avec toutes les informations nécessaires pair l'utilisation



D

- Diese Betriebs - und Wartungsanleitung befaßt sich mit der Inbetriebnahme, Bedienung und Wartung des ***TFW*** - Raupenfahrwerkes.
- Vergewissern Sie sich, dass die mit dem Betrieb und Unterhalt der Fahrwerke allgemein vertrauten Personen diese Anleitung durchlesen, verstanden haben und auch strikte befolgen.
- Unbedingt die Bedienungsanleitung lesen.
- Zusätzlich die nationalen Bestimmungen beachten (z.B. Unfallverhütungsvorschriften)
- Befolgen Sie unbedingt alle Anweisungen, um die Fahrwerke und Fahrantriebe stets in bestem Betriebszustand zu halten.

GB

- These maintenance and operating instructions refer to start-up, operation and maintenance of the ***TFW*** - undercarriage.
- Make sure that the persons encharged read, understand and follow these instructions.
- Read the operating instructions in any case.
- Also comply with any national legal requirements (e. g. accident prevention regulations).
- Follow all instructions in order to keep the undercarriage and gear in best working condition.

F

- Ces instructions de fonctionnement et manutention s'occupante de la mise en marche, fonctionnement et manutention du train de chenille ***TFW***.
- Assurez vous que les personnes en chargés du fonctionnement et manutention lisent et suivent strictement ces instructions.
- Il faut lire les instructions en tout cas.
- En plus, il faut considérer les normes nationales (p. e. les normes de sécurité).
- Suivez toutes les instructions pour maintenir les trains de chenilles et les engrenages toujours en parfait état de fonctionnement.

⚠ **Vorsicht:**

Weist auf die Möglichkeit von Verletzungen und Lebensgefahr, sowie auf Sachschäden hin, wenn die Anleitungen, Hinweise und Vorschriften nicht korrekt befolgt werden.

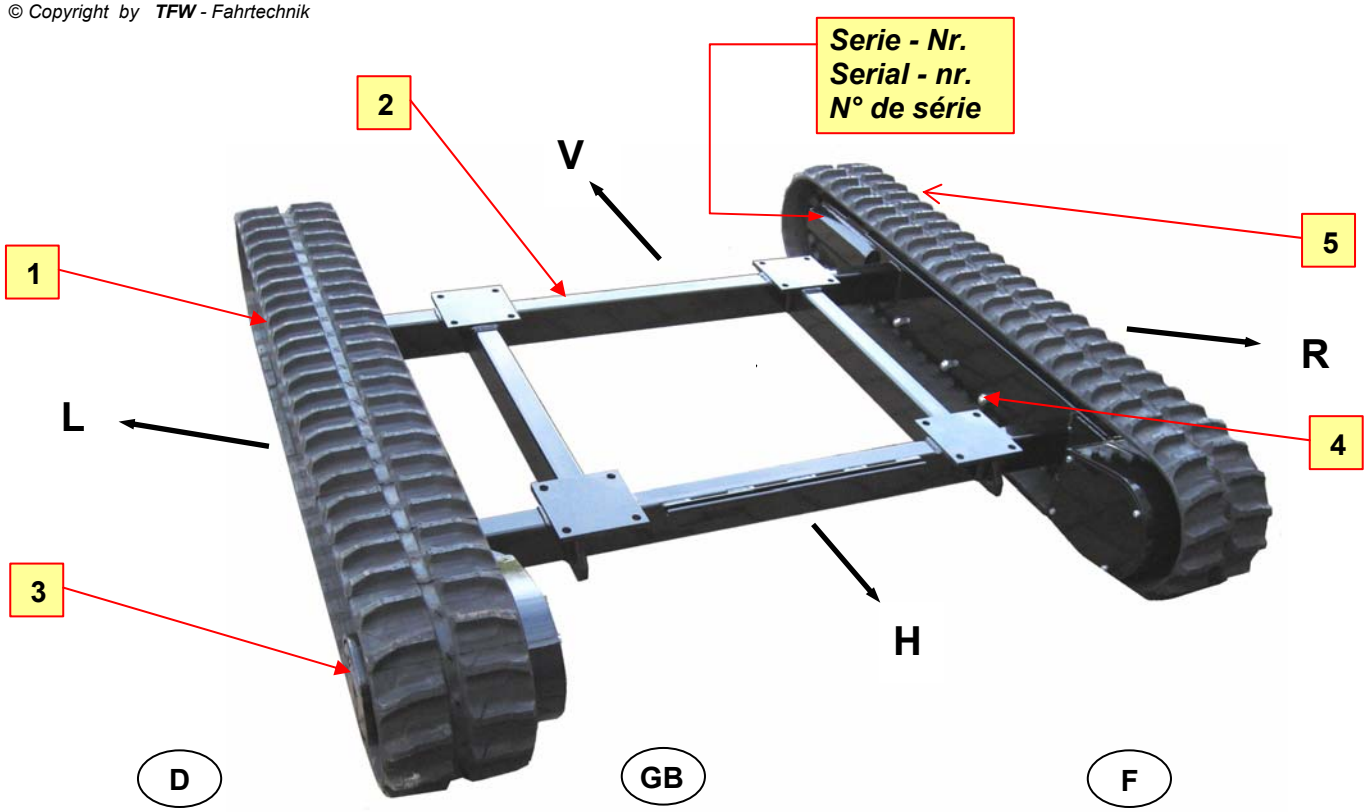
⚠ **Caution:**

Refers to the possibility of injuries and deadly accidents as well as material damage if the instruction and indications are not complied with.

⚠ **Précaution:**

Indique la possibilité de blessures et danger de mort, ainsi que des dommages matériels en cas ne pas suivre correctement les instructions et indications.

Aufbau, Benennung und Verwendungszweck des Raupenfahrwerkes	Construction, naming and purpose of the undercarriage	Construction, dénomination et finalité du train de chenille



D	GB	F
1 Gummiraupenband oder Stahlraupenkette **2** Querträger **3** Fahrantrieb **4** Laufrolle **5** Leitrad **V** Vorne, normale Fahrtrichtung **H** Hinten, Fahrantriebsseite **L** Links **R** Rechts Die Serie - Nr. befindet sich auf der Innenseite, vorne rechts beim Leitrad	**1** Rubber crawler track or **2** steel crawler track **3** Cross member **4** Track drive **5** Roller **6** Idler **V** Front, normal travel direction **H** Back, track drive - side **L** Left **R** Right The Serial number is located in front on the inner side (right) near to the idler	**1** Bande en caoutchouc ou chaîne d'acier **2** Traverse **3** Moteur hydraulique **4** Galet **5** Roue guide **V** Avant, direct. De marche norm. **H** Arrière, moteur hydraulique **L** Gauche **R** Droite Le No. De série se trouve à l'intérieur avant chez la roue guide.

⚠ **Das Raupenfahrwerk dient zum Bewegen von Arbeitsmaschinen und Geräten**

Jede andere Verwendung der Fahrwerke ist unzulässig.

Die Fahrwerke dürfen nur Personen bedienen und warten, die dazu körperlich, geistig und fachlich geeignet sind.

⚠ **The crawler undercarriage serves for the translation of machines.**

Any other use of the undercarriages is forbidden.

Only persons who are physically and mentally fit and are fully qualified may operate and maintain the undercarriage.

⚠ **Le train de chenilles sert au mouvement des machines et appareils.**

Toute autre utilisation des trains de chenilles est interdite.

Les trains de chenilles seulement peuvent être utilises et maintenus par personnes physiquement et mentalement prépares.

⚠ Sicherheitsmaßnahmen beim allgemeinen Einsatz von Raupenfahrwerken	⚠ Safety measures for general use of the track chains	⚠ Mesures de sécurité pour l'emploi général des trains des chenilles

D

- Vorsicht , niemals ein Gerät ungesichert in abfallendem Gelände oder auf einer Rampe stehen lassen !
- Muss ein Gerät in einer Steigung abgestellt werden, dann muss es unbedingt mit Unterlegkeilen gegen Wegrollen gesichert werden !
- Unterhalb einem, in einer Steigung abgestellten oder fahrenden Gerät, dürfen sich niemals Personen aufhalten !
- Bei normaler Bergauffahrt sollten die Fahrantriebe hinten (talwärts) und bei einer normaler Talfahrt hinten (Bergaufwärts) sein ! Gewichtsverteilung der Maschine zuerst beachten !
- Beim Befahren von Gefällen eventuelles unkontrolliertes Rollen durch feinfühlige Betätigung der Fahrhebel vermeiden !
- Brüske Änderungen von Vor - auf Rückwärtsfahrt und umgekehrt, oder Überladen des Raupenfahrwerkes können zu Schäden am Fahrwerk oder Fahrantrieb führen !
- Kontrollen, Wartungen und Servicearbeiten nur bei stillstehendem Motor durchführen. Falls eine Kontrolle oder Wartung nur bei laufendem Motor möglich ist, muss eine zweite Person den Motor im Notfall sofort abstellen können !
- Handzeichen vorher absprechen !
- Niemals bei laufendem Motor unter oder zwischen dem Fahrwerk irgendwelche Kontrollen oder Arbeiten vornehmen !
- Bedienungsfehler und mangelhafte Pflege / Wartung führen zu Arbeitsausfällen und Reparaturen !

GB

- Never leave a machine unsecured on a slope or ramps !
- If parking on a slope is unavoidable, it has to be secured with choke !
- No persons allowed under a parked or moving machine on a slope !
- When travelling uphill the wheel motors should be behind. Downhill the should be at the back. Consider weight distribution of the machine first !
- Avoid uncontrolled rolling by fine manipulation of the commands. When travelling downhill leave the hydraulic engine turn at normal rpm !
- Sharp changes from forward to reverse or vice versa or overcharging of the undercarriage may produce damages of the same or at the driving gear !
- Maintenance and repair works should be performed only with shut down engine. If a control with running engine is necessary, a second person has to be at hand in order to stop the engine at once !
- Convene previously a handsign !
- Never perform any repair work under or at the undercarriage with a running engine !
- Operation mistakes and a poor maintenance result in breakdowns and avoidable repairs !

F

- Jamais laisser une machine non freiné sur un pente on rampe !
- Si une machine doit se garer sur une pente et doit être assuré par des cales !
- Jamais il doit avoir des personnes, en aval d'une machine garée ou en marche !
- En montant une pente , les moteurs hydrauliques doivent se trouver en arrière et en descente il doivent se trouver en arrière. Faire attention a la distribution du poids de la machine !
- Rouler sur des pentes en actionnent finement les commandes. En descente prolongée, laisser tourner le moteur hydraulique avec un numéro des révolutions normales !
- Il faut éviter les changements trop brusques de la marche avant a la marche arrière on a l'envers. Ca pourrait causer des pannes du train de chenilles on du engrenage !
- Réaliser les contrôles, travaux de manutention etc. uniquement avec le moteur arrêté. S'il faut réaliser un contrôle avec le moteur en marche une deuxième personne doit pouvoir arrêter le moteur !
- Convenir avant un signe manuel !
- Ne réaliser jamais des travaux sous ou entre le train de chenilles avec le moteur en marche !
- Les erreurs d'utilisation et une mauvaise manutention causent des pertes des heures de travail et des réparations évitables !

⚠ Unfallverhütungs-Massnahmen beim Einsatz von Raupenfahrwerken	⚠ Safety measures when working with crawler machines	⚠ Mesures pour lévitation des accidents

D

- Unachtsamkeit ist die häufigste Unfallursache. Daher sollten Sie Ihre Aufmerksamkeit nie von der Arbeit abwenden. Vorausgesetzt, dass der Bedienungsmann vor der Inbetriebnahme mit dem Gerät vertraut gemacht wurde, ist die Beachtung der nachfolgenden Unfallverhütungsvorschriften unbedingt notwendig.
- Unbefugten ist der Aufenthalt im Gefahrenbereich des Raupenfahrwerkes verboten.
- Der Gefahrenbereich des Raupenfahrwerkes darf nur bei stillstehendem Motor und Arbeitsgerät betreten werden.
- Der Gefahrenbereich darf nur mit ausdrücklicher Zustimmung des Geräteführers betreten werden.
- Der Gefahrenbereich ist zu räumen bevor die Arbeits - oder Fahrbewegung eingeleitet wird.
- Bei Kontroll - und Servicearbeiten am Fahrwerk muss der Antriebsmotor immer ausgeschaltet und das Fahrwerk gegen Wegrollen gesichert sein.
- Reparatur und Wartungsarbeiten dürfen nur vorgenommen werden, wenn vorher die angehobene Seite des Raupenfahrwerkes durch geeignete Hilfsmittel unterlegt wurde . Das Hubsystem (Hydraulik) muss während diesen Arbeiten völlig entlastet sein.
- Das Verladen von Geräten mit Raupenfahrwerken darf nur von erfahrenen und geübten Personen vorgenommen werden.
  Wenn das Gerät in einem Gefälle abgestellt werden muss, dann ist es immer, auch dann, wenn der Fahrantrieb mit einer mechanischen Feststellbremse ausgerüstet ist, mit Unterlegkeilen, Holzbalken oder ähnlichem, gegen Wegrollen zu sichern.

GB

- Lack of attention is the main accident cause. Never distract yourself from the work supposing that the operator has been instructed about the machine previously, following safety measures have to be absolutely followed.
- Access of unauthorised persons at the working zone of the undercarriage is not allowed.
- The working range of the undercarriage can only be approached with the machine and the engine shut down.
- The working range can only be approached after indication of the operator.
- The working range has to be cleared before starting the engine or movements.
- In case of maintenance works at the undercarriage, the engine has to be shut down and the undercarriage choked.
- Repair and maintenance works can only be made if previously the elevated part of the undercarriage has been secured with some supports. The hydraulic system has to be completely without pressure while doing tens.
- Loading of crawler machines has to be carried out by trained personnel only.
- When parking on a slope, the machine has to be secured with chokes even if the wheel motor has a parking brake.

F

- Une manque d'attention est la cause la plus fréquente des accidents. Jamais il faut détourner l'attention du travail en course. A condition que l'opérateur de la machine soit au courent du fonctionnement, il faut absolument suivre les prescriptions de sécurité suivantes.
- Accès interdit aux personnes non autorisées dans le rayon de travail du train de chenilles. L'accès a la zone de travail est permis uniquement avec le moteur et machine hors de fonction.
- L'accès a la zone de travail se fait uniquement après indication de l'opérateur de la machine.
- Il faut dégager la zone de travail avant le commencement du travail ou du mouvements.
- En cas de travaux de manutention ou contrôle du train de chenilles il faut éteindre le moteur et caler le train de chenilles.
- On peut réaliser des travaux de réparation et manutention seulement si on a placé des supports sous la partie élevé du train de chenilles. Le système hydraulique doit être complètement sous charge pendant ces travaux.
- La charge des machines sur chenilles sur de moyens de transport doit être effectuer par personnel expérimenté.
- Si la machine doit être garé sur une pente, elle doit être assuré avec des cales, pièces en bois ou similaires, même si la machine est équipé d'un frein de parking.

⚠ Vorsichtsmaßnahmen beim Einsatz von Gummiraupenbänder	⚠ Safety measures when working with rubber tracks	⚠ Mesures de sécurité dans l'emploi des bandes en caoutchouc

D

- Vermeiden Sie das Überfahren von scharfkantigem Material wie vorstehende Betoneisen, scharfe Ecken und Vorsprünge.
- Vermeiden Sie in einem flachen Winkel auf Trottoirs, Treppen, oder Mauervorsprünge zu fahren.
- Vermeiden Sie brüske Schwenkmanöver, die Raupen werden dadurch sehr stark belastet.
- Vermeiden Sie auch schnelles Absteuern auf rauhen Unterlagen wie Beton, Asphalt etc. mit hohem Reibungskoeffizient.
- Während dem Fahren über Vorsprünge, Schwellen und Kanten sollten keine grossen Richtungsänderungen vorgenommen werden.
- Vermeiden Sie längere Einwirkung von Benzin, Diesel - Motoren - oder Hydraulikoel auf die Gummiraupen.
- Nach einem Einsatz in salzhaltigem Boden (z.B. Meerwasser) sollten die Gummiraupenbänder gut mit Wasser abgespritzt werden, da sonst der Metallkern angegriffen wird und sich von dem Gummi trennen könnte.
- Bei einem längeren Stillstand des Gerätes sollte das Fahrwerk gereinigt und an einem relativ trockenen Ort eingestellt werden (Garage, Unterstand etc.)
- Nicht über längere Zeit direkter Sonneneinstrahlung und Witterung aussetzen.
- Bei einer starken Abnützung des Antriebskranzes muss dieser ersetzt werden. Ein verschlissener Zahnkranz ergibt an den Gummiraupenbänder einen zu hohen Verschleiß, welcher unter Umständen zum Bruch im Metallkern führen kann. Im Extremfall könnte dieser Metallkern vom Gummiband herausgerissen werden.

GB

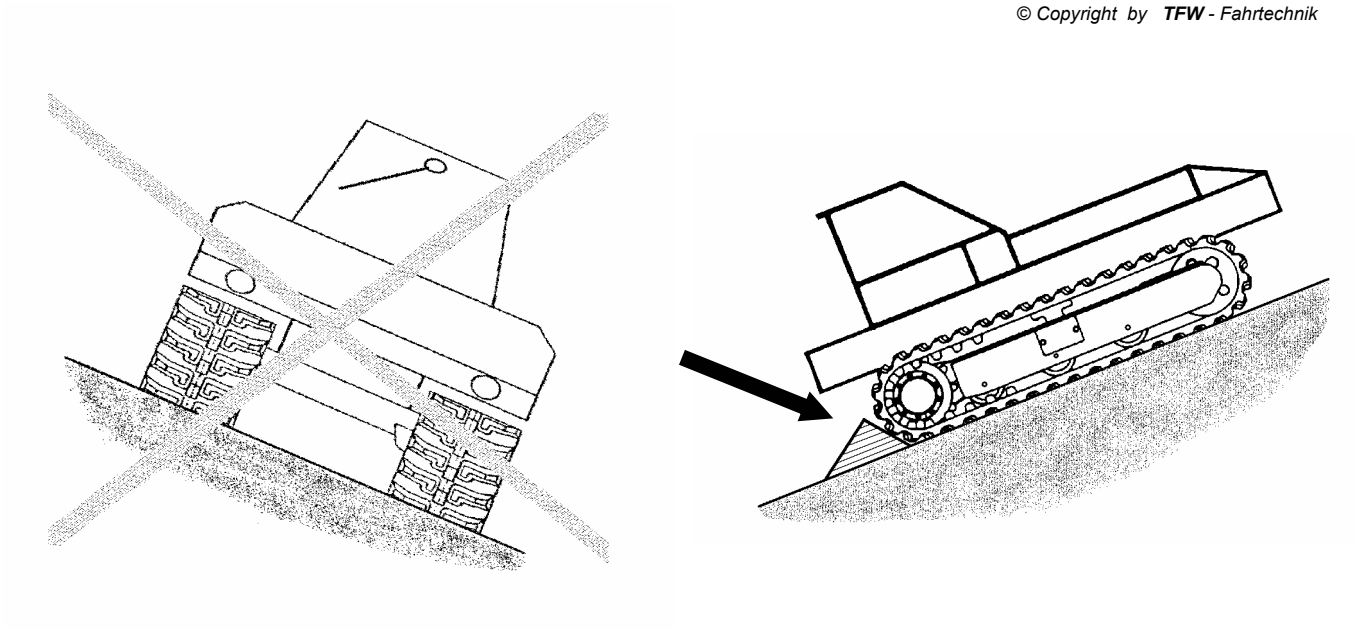
- Avoid passing over sharp material as concrete irons, edges etc.
- Avoid passing in a flat angle over sidewalks, stairs, walls.
- Avoid fast turnings as the tracks are strongly.
- Do not make fast turns on rough surfaces as concrete, tarmac, etc. As they are highly abrasive.
- Avoid sharp direction changes when driving over edges or uneven places.
- Avoid long term contact of the rubber tracks with fuel, hydraulic or engine oils.
- After working on salty soils (for ex. near the sea) rinse the rubber tracks with water as the metal core could be damaged.
- In case of longer inactivity, the undercarriage should be cleaned and parked in a relatively dry place (Garage, under roof, etc.)
- Avoid long exposures to direct sunlight or other atmospheric elements.

In case of extreme wear of the sprocket, this should be changed . A worn out sprocket causes high wear of the rubber tracks and can in some cases produce breakage of the metal core. In extreme case this core could be torn of the rubber.

F

- Evitez le passage sur matériaux coupants tel quel fers de béton, coins etc.
- Evite passer sur des angles plats sur trottoirs, escaliers, murs.
- Evitez manoeuvres brusques de virage car les chaînes sont ainsi fortement abîmes.
- Evitez les virages rapides sur de surfaces raides comment le béton, asphalté, etc. surfaces d ' un haut coefficient abrasive.
- En passant sur des dénivellations il faut éviter des grandes changements de direction.
- Evitez le contact prolongée d'essence, huiles hydrauliques (on des moteurs) avec les bandes en caoutchouc.
- Après une utilisation sur terrain salé (eau de mer) il faut laver les bandes avec de l'eau douce, car le noyau métallique pourrait se détacher du caoutchouc.
- En cas d'arrêt prolongée, la machine doit se garer dans un lieu relativement sec (Garage, sous toit etc.)
- Ne la soumettre aux éléments atmosphériques (soleil, etc.) pour des périodes prolongées.
- En cas d'usure prononcé de la couronne il faut la changer. Une couronne très usagé produit une usure très forte des bandes en caoutchouc. Ca peut avoir la conséquence d'une casse du noyau en acier. Dans des cas extrêmes ce noyau d'acier peut être arraché du caoutchouc.

Kippgefahr beim Fahren an Hängen beachten Parken an Hängen	There is a risk of overturning when travelling on slopes Parking on slopes	Risque de renversement en cas conduite sur pentes Arrêt sur pentes



D	GB	F
• Die maximal zulässige Steigfähigkeit beträgt 46 % / 25 °. • An Hängen nur Bergauf oder Bergab fahren. • Nicht quer zum Hang fahren und nicht am Hang kurven, da sonst Kippgefahr besteht. • Vor jedem verlassen des Gerätes hydraulische Arbeitsgeräte und Werkzeuge absenken. • Beim Parken an Hängen das Gerät / Raupenfahrwerk gegen Wegrollen oder Rutschen absichern, z. B. durch Keil oder geeignetes Kantholz.	• The machines maximum permissible gradient is 46 % / 25 °. • Always travel up and down. • Do not travel across the line of the slope or make any turns on the slope (risk of overturning) • When leaving the machine, lower all hydraulic tools. • In case on parking on slopes, choke the machine with square woods etc.	• Le gradient max. admissible est de 46 % / 25 °. • Sur des pentes, uniquement monter ou descendre. • Eviter la conduite transversale sur une pente ou tourner. (risque de renversement) • Avant de quitter la machine poser tous les outils sur le sol. • En cas de garer sur des pentes assure la machine avec des cales pour éviter des glissements.

⚠ **Beim Parken unbedingt alle hydraulischen Arbeitsgeräte und Werkzeuge z. B. Planierschild, absenken und Druck entlasten.**

Sonst Verletzungsgefahr bei Schäden an der Hydraulik - anlage.

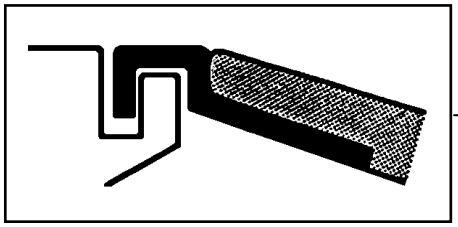
⚠ **When parking lower all hydraulic tools and discharge the pressure (f. e. dozer blade).**

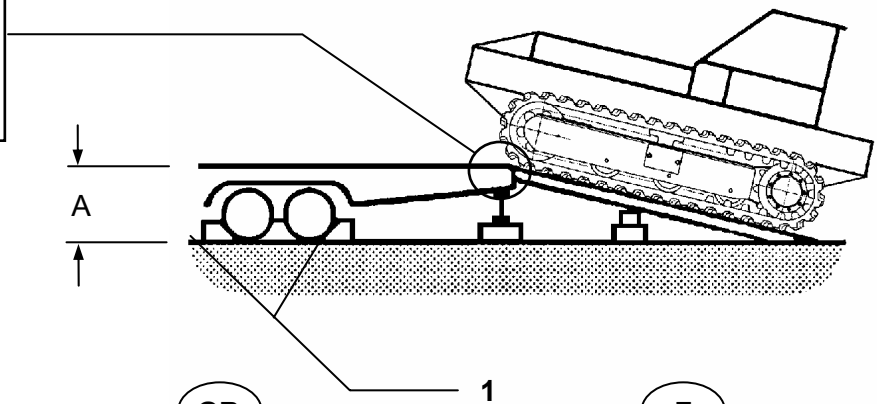
There is a risk of injuries Caused by damages of the hydraulic system.

⚠ **En cas de garer la machine, poser tous le outils hydraulique et appareils sur le sol et décharge la pression. (p. e. la feuille du dozer)**

Risque des blessures ou damages dans l'installation hydraulique.

Aufladen des Gerätes mit Raupenfahrwerk	Loading on to transport machine with crawler tracks	Charge d'une machine sur chenilles





D	GB	F
• Rampenbreite mindestens das 1,5 Fache einer Raupenbreite. • Rampenlänge (**A**) mindestens das 3,5 Fache der Verladehöhe. • Ladeflächen und Rampen wie abgebildet befestigen und abstützen. • Fahrzeug gegen Wegrollen sichern (**1**) und Handbremse anziehen. • Gerät vor die Rampen fahren und so ausrichten, dass sie ohne Richtungsänderung befahren werden können. • Falls Richtungsänderungen notwendig werden, ganz von den Rampen herunterfahren und das Gerät neu ausrichten.	• Ramps width to be at least 1,5 x one crawler track width. • Ramps length (**A**) must be at least 3,5 x height platform. • Secure surfaces and ramps as indicated. • Secure vehicle (**1**) and activate parking brake. • Put vehicle in front of the ramps so that they can by driven on without changing direction. • If the direction needs to be rectified, descend completely from the ramps and align again.	• Largeur min. de la rampe 1,5 fois la largeur d'une chenilles. • La longueur de la rampe (**A**) doit être au moins 3,5 fois l'auteur de la plate-forme. • Assurer surfaces et rampes comment indiqué et caler. • Assurer le véhicule de transport (**1**) et tirer du frein de main. • Situer la machine devant la rampe de façon qu'elle monte la rampe sans rectification de direction. • S'il faut rectifier la direction descendre complètement de la rampe et aligner de nouveau.

⚠ Absturzgefahr !

Das Verladen des Gerätes ist bei unsachgemäßem verhalten sehr gefährlich.

Nur erfahrene und geübte Personen dürfen Raupenfahrzeuge verladen.

Nicht auf den Rampen kurven oder irgendwelche Richtungs - änderungen vornehmen.

Das Verladen darf nur auf waagrechtem und festem Untergrund vorgenommen werden.

⚠ Risk of falling !

The loading of the machine is dangerous if the work is done imprudently.

Loading to be realised by experienced personnel only .

Do not make turns on ramps.

The loading process has to be carried out on flattened firm soils only.

⚠ Péril de chute !

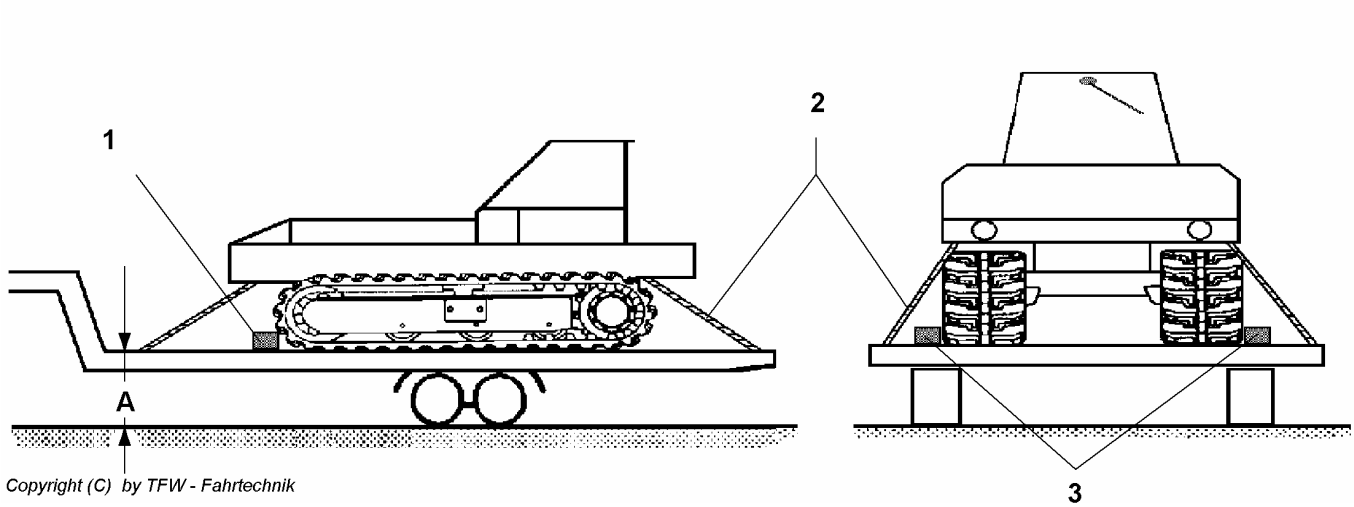
En cas de maniement imprudent, la charge des machines est très dangereuse.

La charge doit être réalisée par des conducteurs expérimentes.

Eviter les changements de direction sur les rampes.

La charges doit se réaliser sur une surface horizontale et stable.

Transport des Gerätes mit Raupenfahrwerk	Machine- / vehicle Transport	Transport de la machine sur chenilles



D

- Maximale Höhe (**A**): je nach Transportstellung des Gerätes, und zulässige Durchfahrtshöhe beachten.
- Mindestabmesssung des Transportfahrzeuges so wählen, dass das komplette Fahrwerk auf der Ladefläche steht.
- Maschine mit Ketten oder Seilen (**2**) sorgfältig gegen verrutschen, Kippen und Schwenken sichern. Ketten oder Seile resp. ähnliche Befestigungsteile auf Spannung bringen.
- Raupen verkeilen (**1**). Maschine mit Kanthölzern gegen seitliches verrutschen sichern (**3**).
- Kabinentüre abschließen, um ein aufschlagen während der Fahrt zu verhindern.

GB

- Maximum height (**A**): depends on machine' s transport positions and overhead clearances on route remark.
- Size of the transporting vehicle has to be chosen so that the whole undercarriage lies on the platform.
- Secure machine with chains or ropes (**2**) to prevent it from slipping, tilting or swinging. Tension the retaining chains or ropes.
- Chock the tracks (**1**). Use timber to prevent the machine from slipping sideways (**3**).
- Lock the cab door so that it cannot swing open during the journey.

F

- Hauteur max. (**A**): selon la position de transport et l'auteur permissive.
- Choisir le transporteur de façon que le train de chenilles soit complètement sur la surface de charge.
- Assurer soigneusement la machine avec des chaînes, câbles (**2**) pour éviter tout mouvement. Tensionner bien ces chaînes ou câbles.
- Caler les chenilles (**1**). Situer des morceaux en bois pour éviter des dérapages latéraux (**3**).
- Fermer la porte de la cabine pour éviter l'ouverture pendant le trajet.

⚠ **Das Verladen und Transportieren des Gerätes ist bei unsachgemäßem Verhalten sehr gefährlich.**

Achtung, Absturzgefahr !

Transportfahrzeug nicht überladen.

⚠ **Load and transport the machine with the greatest possible care, avoiding all risk of it moving or falling of the transport vehicle.**

Danger, Risk of falling !

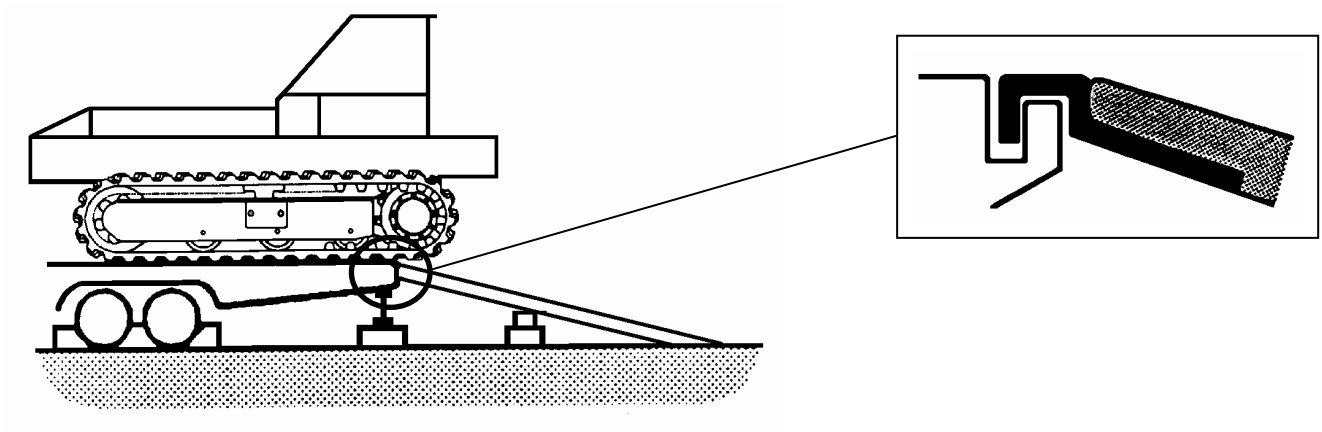
Do not overload the transport vehicle.

⚠ **La charge et le travaux de la machine est très dangereuse en cas de maniement imprudent danger de chute.**

Danger de chute !

Eviter la surcharge du véhicule transporteur.

Abladen des Gerätes mit Raupenfahrwerk	Unloading of a machine with crawler tracks	Décharge d'une machine sur chenilles



D	GB	F
• Ladeflächen und Rampen wie abgebildet befestigen und abstützen. • Fahrzeug gegen Wegrollen sichern und Handbremse anziehen. • Gerät vor die Ladekante fahren, anhalten und Ausrichtung kontrollieren. • Langsam über die Ladekante fahren bis das Gerät auf die Rampen kippt. • Anhalten, Ausrichtung kontrollieren, wenn in Ordnung, dann langsam hinunterfahren. • Falls Richtungsänderungen notwendig werden, das Gerät wieder auf die Ladefläche zurückfahren und neu ausrichten.	• Secure surfaces and ramps as indicated. • Secure vehicle and activate the parking brake. • Drive the machine in front of the edge and check direction. • Drive slowly over the edge till the machine turns onto the ramps. • Stop, adjust direction and if correct, drive slowly downwards. • If the direction has to be rectified, than return onto the transporting vehicle and adjust the direction.	• Assure des surfaces et des rampes (voir dessin) • Stabiliser la machine et tirer du frein de main. • Placer la pente, arrêter et contrôler la direction. • Conduire doucement sur la rampe jusque la machine point vers le bas. • Arrêter et contrôler la direction. Si Celle - ci est correcte, continuer lentement vers le bas. • En cas de nécessité de changement de direction, remonter a la surface horizontale et refaire l'opération.

⚠ Absturzgefahr !

Das Abladen des Gerätes ist bei unsachgemäßem verhalten sehr gefährlich.

Nur erfahrene und geübte Personen dürfen Raupenfahrzeuge abladen.

Nicht auf den Rampen kurven.

Das Verladen darf nur auf waagrechtem und festem Untergrund vorgenommen werden.

⚠ Risk of falling !

The unloading is very dangerous if the work is done unskilfully.

Unloading has to be performed by experimented persons only.

Do not make turns on ramps.

The unloading process has to be carried out on flat and firm soils only.

⚠ Danger de chute !

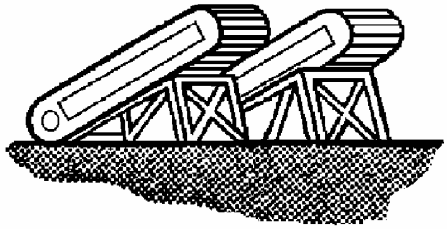
La décharge d'une machine est très dangereuse en cas d'un comportement négligent !

La décharge doit être réaliser uniquement par des individus expérimentes.

Pas virer sur es rampes.

La décharge doit se réaliser uniquement suir des surfaces horizontales et ferme.

Sicherheitsanweisungen Standsicherheit	Safety instructions Ensure stability	Instructions de Sécurité Stabilité



D

- Erst die Wartungsanweisung lesen, dann die Wartungsarbeit durchführen.
- Nur die Wartungen durchführen, die hier beschrieben sind.
- Nur Original ***TFW*** - Ersatzteile verwenden.
- Fahrwerk erst nach erfolgreichem Abschluß der Wartungsarbeit wieder in Betrieb nehmen.

GB

- First read the maintenance instructions, then perform maintenance work.
- Only perform maintenance works which is described here.
- Use only original ***TFW*** - spare parts.
- Start using machines only after having completed maintenance work successfully.

F

- Lire les instructions avant de réaliser les travaux.
- Réaliser uniquement les travaux indiques ici.
- Utiliser uniquement pièces originales ***TFW***.
- Utiliser les machines uniquement après avoir terminé satisfactoirement les travaux de manutention.

⚠ **Bei Arbeiten am, oder unter dem Fahrwerk unbedingt die Standsicherheit beachten.**

Alle Arbeitswerkzeuge und Planierschild auf den Boden absenken oder abstützen.

Fahrwerk gegen Wegrollen sichern. Gerät vorsichtig aufbocken und mit geeigneten Hilfsmittel unterstellen.

Motor unbedingt abstellen.

Sonst Verletzungsgefahr bei Schäden am Hydrauliksystem.

⚠ **Working at or under the machine, make sure that it is stable.**

Lower dozer blade or other tools on soil.

Ensure undercarriage against any movement.
Carefully support the machines when working on the underside.

Stop engine in any case.

Failing this, damage to the hydraulic system may lead to injury.

⚠ **En travaillant autours ou sous le train des chenilles il faut assurer la stabilité.**

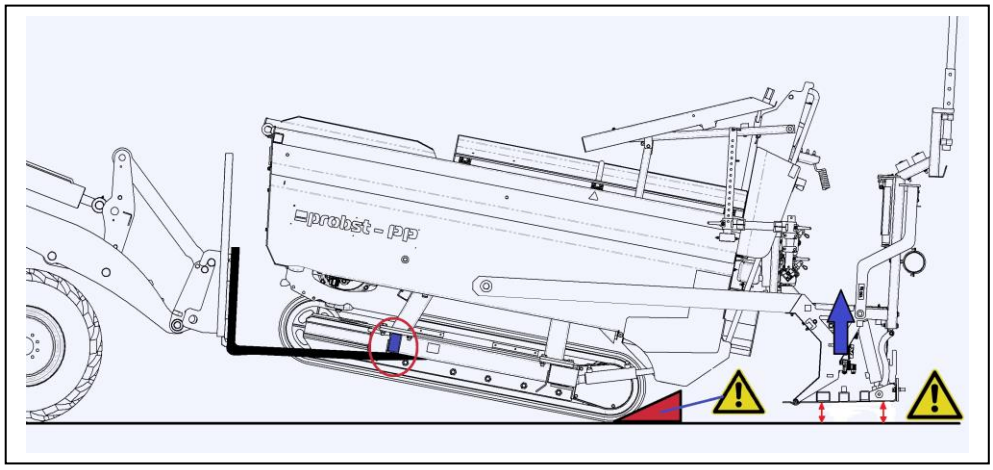
Descendre au sol ou caler la feuille du dozer ou autres outils.

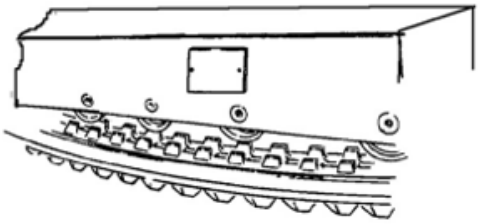
Assurer e train des chenilles contre tout mouvement. Caler la machine avec des moyens appropriées.

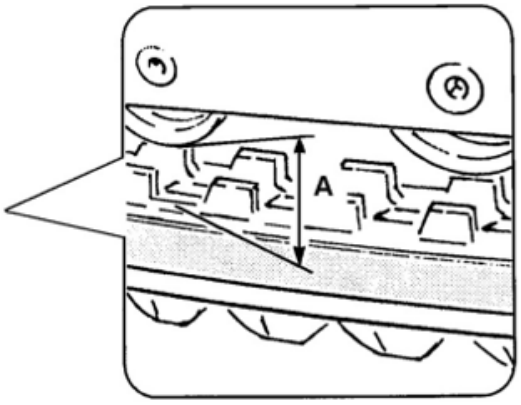
En tout cas arrêter le moteur.

Autrement il existe danger de blessure en cas de dommage du système hydraulique

Raupenkette / Raupenband Spannung kontrollieren	Checking rubber - or steel crawler tension	Contrôle de la chaîne / bande







D

- In den ersten 50, und danach alle 50 Betriebsstunden.
- Fahrwerk mit geeigneten Hilfsmitteln einseitig abheben (siehe z.B. wie in Abbildung darüber).

Durchhang (**A**): ca. 10 - 30 mm (zwischen Rollen - und Raupenband Lauffläche gemessen)

- Bei Bedarf die Raupenkette lockern oder spannen.
- Siehe Tafel 17.20.050 17.20.075

GB

- Check after the first 50 and then every 50 operating hours.
- Lift undercarriage on one side using appropriate tools (see e.g. figure above).

Sag (**A**): approx. 10 - 30 mm (between roller - and rubber track running surface)

- If necessary, loosen or tension crawler track
- See separate page 17.20.050 17.20.075

F

- Chaque première inspection après 50 heures de service et après toutes les 50 heures de travail.
- Elever train de chenilles d'une coté utilisant des moyens appropriés (avoir p.ex. figure au-dessus).

Courbure (**A**): approx. 10 - 30 mm (Entre galet et chenilles)

- Lâcher ou Tenser la chaîne
- Voir tabelle 17.20.050 17.20.075

⚠ **Nicht unter die Raupen kette oder zwischen Raupenkette und Laufrollen gelangen !**

Sonst Quetschgefahr und Verletzungen bei unbeabsichtigtem Absenken des Fahrwerkes.

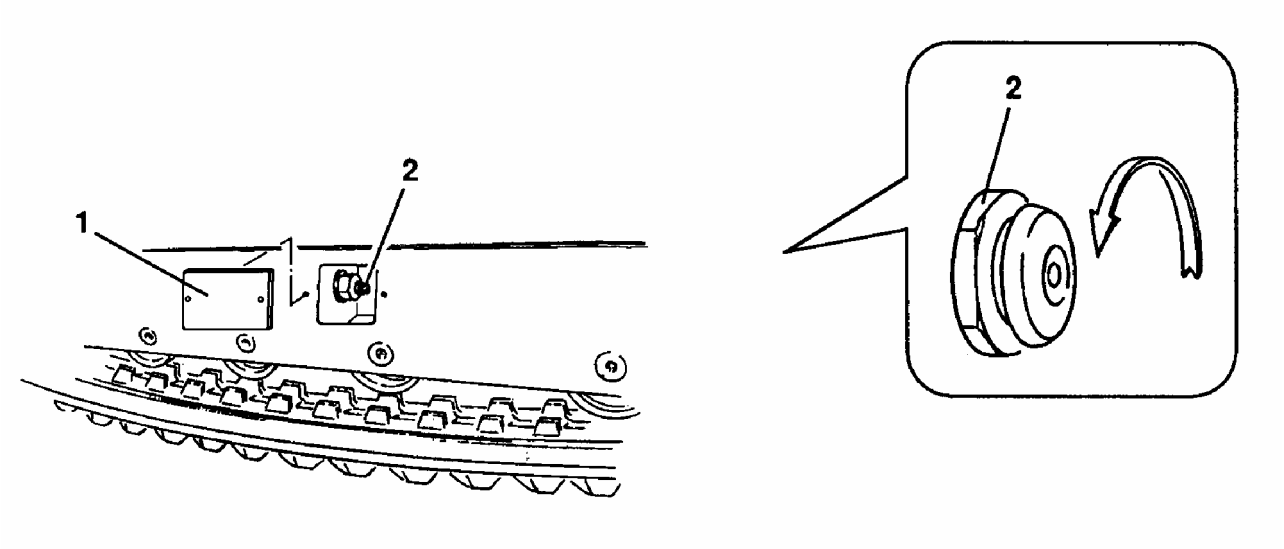
⚠ **Do not reach beneath the crawler tracks or between the tracks and the rollers !**

There is a risk of being crushed if the travel gear should unintentionally be lowered.

⚠ **Eviter de se situer sous la chaîne et les galets.**

Danger d'être coincée par une descente non prévue du train de chenille.

Raupenkette / Raupenband lockern	Loosening crawler track	Detensionner la chaîne / bande



D	GB	F
• Deckel (**1**) abschrauben.	• Unscrew cover (**1**).	• Dévisser couvercle (**1**).
• Füllventil (**2**) losdrehen, bis Fett austritt, ca. 2 - 3 Umdrehungen.	• Loosen filler valve (**2**) 2 - 3 turns, until the grease appears.	• Dévisser le ventile (**2**) 2 - 3 tours, jusque l'apparition de la graisse.
• Solange Fett austreten lassen, bis der Durchhang (**A**) der Raupenkette stimmt. Siehe Blatt 17.20.025	• Allow grease to emerge until sag (**A**) of the crawler track is correct. See page 17.20.025	• Laisser sortir la graisse jusque la courbure (**a**) de la chaîne est correcte. Voire page 17.20.025
• Füllventil (**2**) festziehen: Anzugmoment ca. 40 - 60 Nm.	• Tighten filler valve (**2**): tightening torque 40 - 60 Nm.	• Revisser ventile (**2**): moment de serrage approx. 40 - 60 Nm.
• Füllventil (**2**) und Umgebung säubern und kontrollieren, ob kein Fett austritt.	• Clean filler valve (**2**) and check that no grease emerges.	• Nettoyer ventile (**2**) et alentours et contrôler fuites de graisse.
• Deckel (**1**) wieder anschrauben	• Screw cover (**1**) back on.	• Revisser couvercle (**1**) .

⚠ **Raupenkette nicht zu stark lockern.**

Sonst kann sie beim Fahren abspringen.

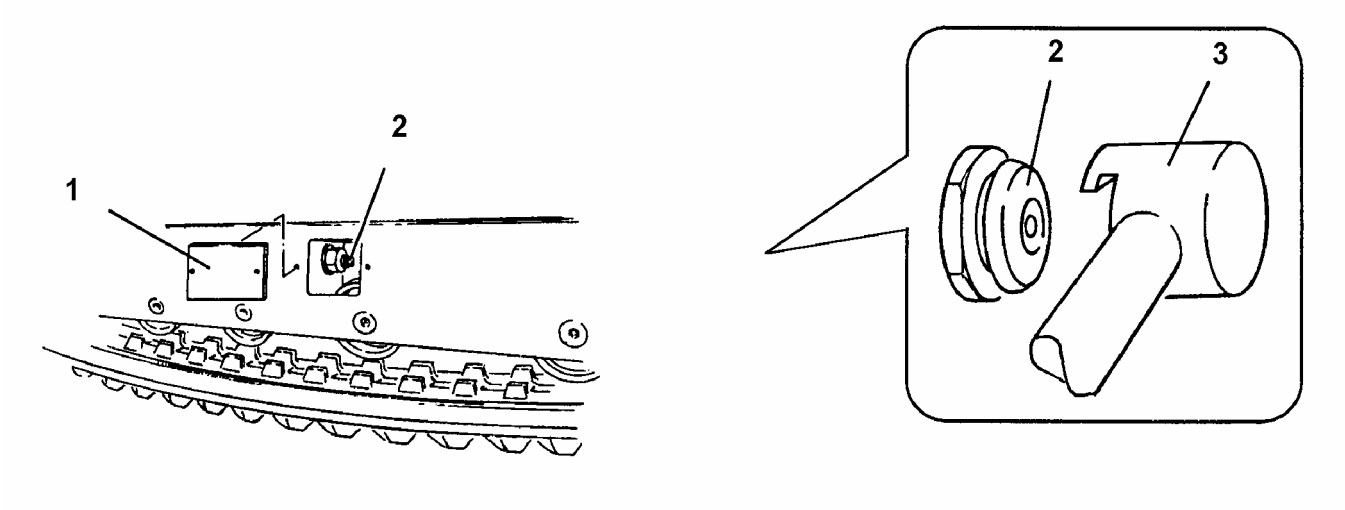
⚠ **Do not loosen crawler track too much.**

Otherwise crawler track may come off during travel.

⚠ **Pas relâcher trop la chaîne.**

Elle pourrait sortir pendant la marche.

Raupenkette / Raupenband spannen	Tension rubber - or steel crawler track	Comment tensionner la chaîne / bande ou caoutchouc



D	GB	F
• Deckel (**1**) abschrauben.	• Unscrew cover (**1**).	• Dévisser couvercle (**1**).
• Mit Fettpresse und Schiebekupplung (**3**) solange Fett in Füllventil (**2**) einpressen, bis der Durchhang (**A**) der Raupenkette stimmt. Siehe Blatt 17. 20. 025	• Use grease gun and sliding coupling (**3**) to press grease into filler valve (**2**) until sag (**A**) is correct. See page 17. 20. 025	• Avec le graisseur et raccord (**3**) la graisse par (**2**) jusque atteindre le comblement (**A**) correct. Voire page 17. 20. 025
• Füllventil (**2**) säubern und kontrollieren, ob kein Fett austritt.	• Clean filler valve (**2**) and check that no grease emerges.	• Nettoyer valve (**2**) de graissage et contrôler une éventuelle sortie de graisse.
• Falls Fett austritt, Füllventil (**2**) festziehen: Anzugsmoment 40 - 50 Nm.	• If it does, tighten filler valve (**2**): Tightening torque 40 - 60 Nm.	• En cas positif, serrer la valve (**2**): Moment de serrage 40 - 60 Nm.
• Deckel (**1**) wieder aufschrauben.	• Screw cover (**1**) back on.	• Revisser couvercle (**1**).

⚠ **Raupenkette nicht überspannen.**

Sonst zu rascher Verschleiß an den Fahrwerkteilen.

⚠ **Do not over - tension the crawler track.**

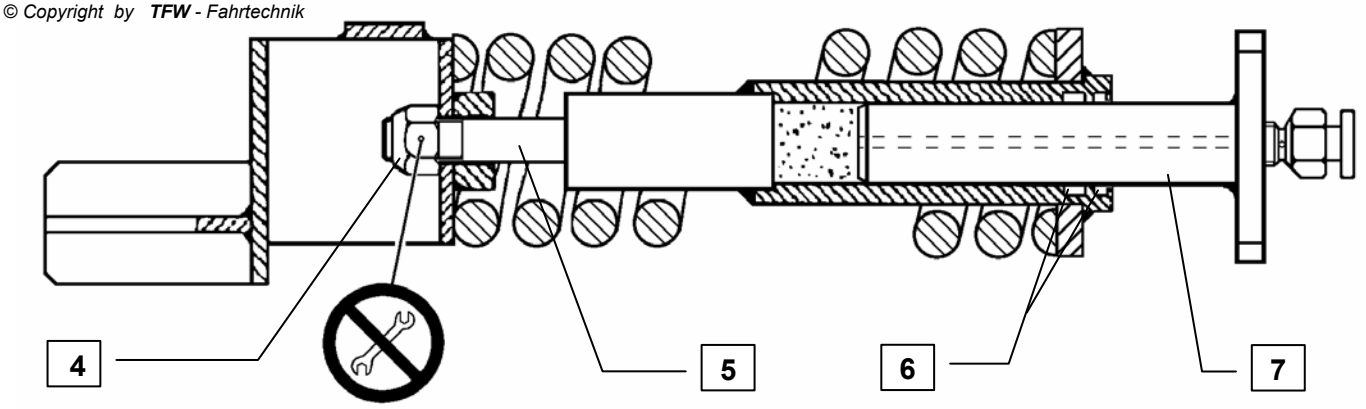
Otherwise rapid wear will occur.

⚠ **Eviter sur tensionner la chaîne.**

Autrement il y aura une usure prématuré des pièces.

Federspannpaket Kontroll - und Wartungs - Informationen	**Tension unit check up and maintenance instructions**	**Dispositif de serrage Instructions de contrôle et entretien.**

⇦ **Spannrichtung** **Tension Range** **Direction de tension** ⇨



	GB	F
• Das ganze Federspannpaket ist grundsätzlich Wartungsfrei. • Wenn viel in tiefem Morast gefahren wird, sollten die Spannpakete aber trotzdem einmal jährlich ausgebaut und äußerlich gereinigt werden. • Achtung **!** dabei niemals die Mutter (**4**) demontieren**.** • Spannpakete immer so Handhaben und Lagern, dass bei einem unerwarteten Bruch, z.B. des Gewindeschaftes (**5**) sich keine Personen in unmittelbarer Nähe, resp. in der Spannrichtung aufhalten. • Zur Überprüfung der Abdichtung (**6**) den Spannkolben (**7**) herausziehen. • Die Feder darf nur von autorisiertem Fachpersonal demontiert werden. Verlangen Sie dazu die spezielle Anleitung **!**	• The tension unit is basically maintenance free. • Nevertheless, in case of working intensively on muddy soils the tension units should be dismounted once in a year to be cleaned externally. • Attention **!** Never dismount nut (**4**). • These units have to be stored and manipulated so that in case of unexpected breaking f. e. of the shaft (**5**) no person is near or in the tension range . • In order to check the seal (**6**) extract the piston (**7**). • Dismounting of the spring to be carried out by authorised specialists only. Ask special instruction hereto **!**	• Le dispositif de serrage est basiquement sans entretien. • Néanmoins en cas d'utilisation prolongée sur des terrains marécageux il faut démonter les dispositifs une fois par an pour les nettoyer extérieurement. • Attention **!** Jamais dévisser l'écrou (**4**). • Manipuler et emmagasiner le dispositif de sorte que en cas d'une casse imprévue, p. e. d'une tige (**5**) personne ne se trouve dans la proximité inmediate, par exemple dans la direction de tension. • Pour examiner le jeu de joint (**6**) il faut extraire la tige de tension (**7**). • Le démontage du ressort doit être réalise par des spécialistes autorises. Demandez les instructions correspondantes **!**

⚠ **Vorsicht !**

Federspannpakete immer mit größter Sorgfalt behandeln und nicht fallen lassen !

Niemals die Mutter (4) entfernen !

Sonst schwere Verletzungsgefahr bei einem unerwarteten Bruch eines Bauteils wie z. B. des Gewindeschaftes (5).

⚠ **Attention !**

Always handle spring tensioner units with greatest care and never drop them !

Never dismount nut (4) !

Danger of serious injuries by unexpected breaking of any part as f. e. the thread shaft (5).

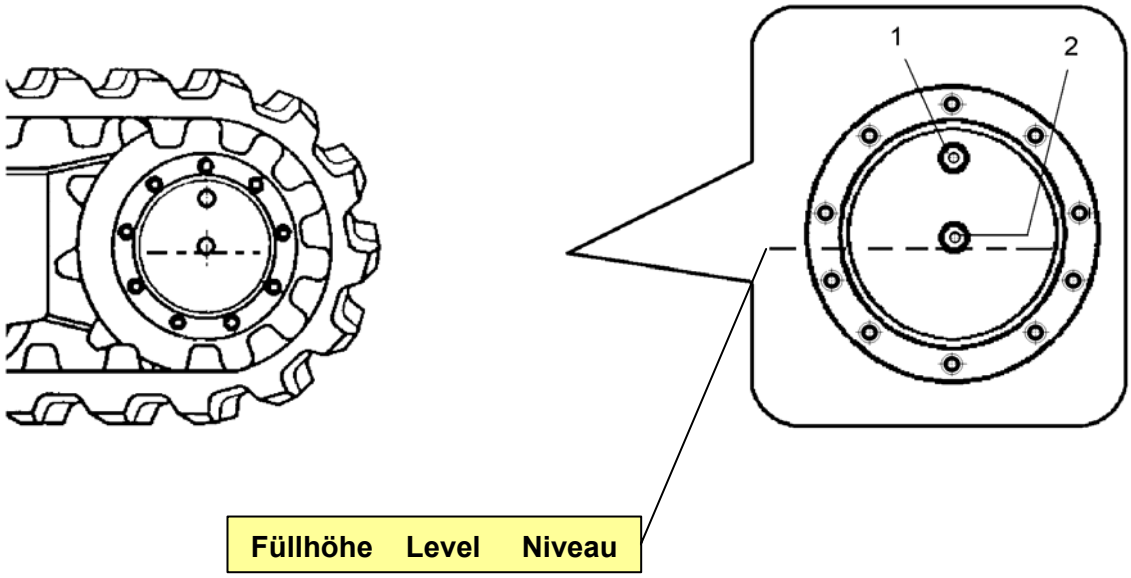
⚠ **Attention !**

Manipuler les dispositifs de serrage toujours avec soin et pas le laisser tomber !

Jamais enlever l'écrou (4) !

En cas contraire, péril de graves blessures par casse imprévue d'une pièce, p. e. de la tige (5).

Ölstand kontrollieren alle 250 Betriebsstunden	Check oil level every 250 operating hours.	Contrôler niveau d'huile chaque 250 heures de travail



D	GB	F
• Verschluss-Schraube (**2**) herausschrauben. • Das Oel muss bis unterhalb der Öffnung stehen. • Bei Bedarf Verschlußschraube (**1**) herausschrauben und Oel durch diese Öffnung nachfüllen. • Alle Verschlußschrauben fest einschrauben.	• Unscrew plug (**2**). • The oil level must be just below the opening. • If necessary , take out screw plug (**1**) and add oil through this opening. • Tighten screw plugs.	• Dévisser (**2**). • L'huile doit être juste sous l'ouverture. • S'il faut, ajouter de l'huile dévissant le tapon (**1**). • Revisser tous les vis.

Empfohlene Öle:

Siehe technisches Datenblatt.

⚠ **Synthetische Öle nicht mit Mineralöl vermischen.**

Recommended oils:

See technical data sheet.

⚠ **Do not mix synthetic oils with mineral oils.**

Huiles recommandes:

Voir spécifications techniques.

⚠ **Ne mélanger des huiles synthétiques avec des huiles minéraux.**

Fahrantrieb Ölwechsel alle 1000 Betriebsstunden Umweltschutz beachten	Travel gear renewing oil every 1000 operating hours Protect environment	Echange d'huile engrenage planétaire chaque 1000 heures Protégez l'environnement

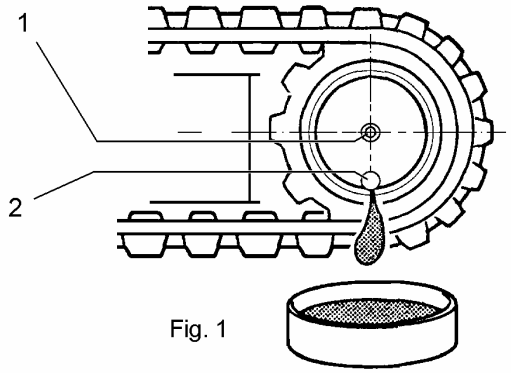


Fig. 1

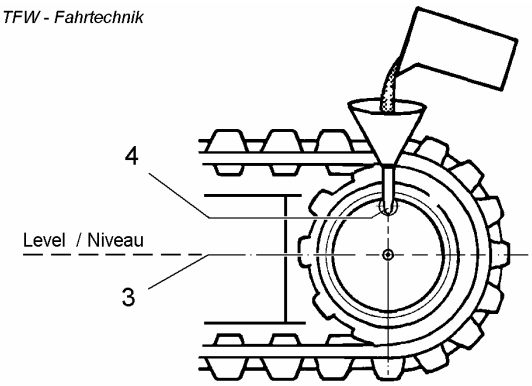


Fig. 2

D

- **Spätestens jedoch nach 12 Monaten**
- Erstmalig nach 100 Betriebsstunden.
- Auffangbehälter bereitstellen.
- Maschine so positionieren, dass beide Verschlusszapfen gem. **Fig. 1** zu stehen kommen.
- Verschlusschrauben (**1 und 2**) herausschrauben.
- Oel auffangen und vorschriftsmäßig entsorgen.
- Mit der Maschine soweit fahren, dass beide Öffnungen gem. **Fig. 2** zu stehen kommen.
- Neues Oel durch Öffnung (**4**) einfüllen, bis der richtige Ölstand (**3**) erreicht ist.
- Verschlusschrauben (**1** und **2**) wieder fest einschrauben. (mit Teflonband abdichten)

GB

- **At the very latest after 12 months**.
- Initially after 100 operating hours.
- Have the oil trap vessel at hand.
- Move machine till both plugs are situated as on **fig 1**.
- Take out screw plugs (**1** and **2**).
- Trap oil and dispose of in the officially stipulated manner.
- Move machine till both holes, are situated as on **fig**. **2**.
- Add new oil through aperture at (**4**) until the correct oil level (**3**) has been reached.
- Securely tighten screw plugs (**1** and **2**). (seal off using Teflon tape)

F

- **Au plus tard après 12 mois.**
- Initialement après 100 heures de fonctionnement.
- Préparer un récipient.
- Situer la machine de façon de placer les deux bouchons selon **fig. 1**.
- Dévisser (**1** et **2**).
- Recueillir huile et disposer réglementairement.
- Mouvoir la machine jusqu'à placer les deux trous selon **Fig. 2**.
- Remplir avec huile nouveau par l'ouverture (**4**) jusque arriver au niveau correcte (**3**).
- Visser firmement vis (**1** et **2**). (ajouter bande de Téflon)

Empfohlene Öle und Füllmenge:

Siehe technisches Datenblatt.

⚠ **Synthetische Öle nicht mit Mineralöl vermischen.**

Oel nicht in den Boden, Gewässer oder Kanalisation gelangen lassen.

Recommended oils and quantity to be added:

See technical data sheet.

⚠ **Do not mix synthetic oils with mineral oils.**

Never allow oil to leak away into the ground or watercourses, or to escape to the public drainage system.

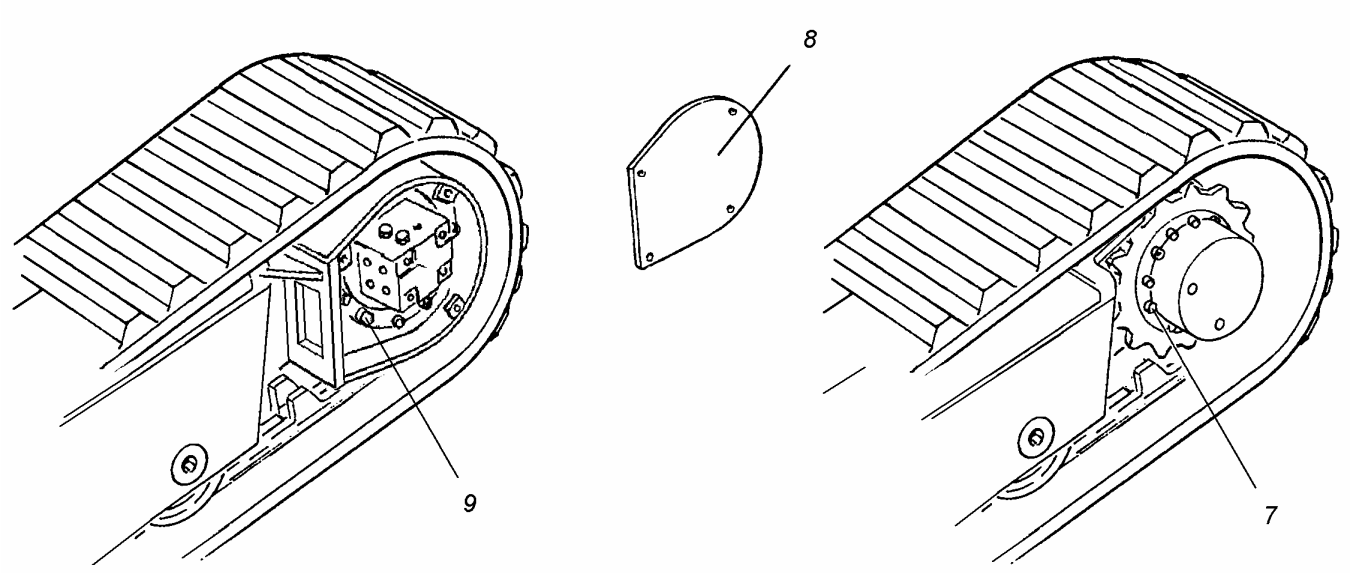
Huilés raccomandees et quantité:

Voir spécifications techniques.

⚠ **Pas mélanger huiles synthétiques avec des huiles minéraux.**

Eviter les fuites dans le sol, l'eauo les canalisations.

Schraubensitz kontrollieren	Checking firm seating of screws	Contrôler serrage des vis



D	GB	F
• Befestigungsschrauben der beiden Antriebskränze (**7**) kontrollieren: • Anzugsmoment 65 Nm. • Beide Getriebedeckel (**9**) abschrauben. • Befestigungsschrauben der Fahrantriebe (**8**) kontrollieren: • Anzugsmoment 83 Nm.	• Check attachment for both drive sprockets (**7**): • Starting torque 65 Nm. • Unscrew both the gear covers (**9**). • Torque when attaching gearboxes (**8**): • Starting torque 83 Nm.	• Contrôler les vis (**7**) des deux jante dentée: • Moment serrage 65 Nm. • Dévisser les deux couvercle (**9**). • Contrôler les vis (**8**) de engrenages: • Moment serrage 83 Nm.

A-Rad Schrauben	Sprocket Screw	Jante Dentée Vis
Kontrolle alle 250 Betriebsstunden	**Check every 250 operating hours**	**Chaque 250 heures de travail**
Erstmals nach 50	**Initially after 50**	**La première fois aux 50**

Ersatzteilliste	Spare parts list	Catalogue de pièces

D	GB	F
• **Bestellbeispiel:** • (Bildtafel 17.30.003, Pos. N° 8) 1 Antriebsrad Best. N° 1007. 285 • Bei Bestellung unbedingt die Serie - N° vom Fahrwerk angeben • **ACHTUNG:** Teile ohne Bestell - N° sind als einzelne Ersatzteile nicht lieferbar !	• **Specimen order:** • (Fig. No.17.30.003,Pos. No° 8) 1 Sprocket Order No. 1007. 285 • When submitting orders, always state the Serial number. • **IMPORTANT:** Parts without an order No. cannot be supplied as spare parts !	• **Exemple de commande:** • (Planche n°17.30.003,Pos. No.8) 1 Jante dentée Ordre No. 1007. 285 • Le numéro de fabrication est à indiquer dans tous les cas sur la commande. • **ATTENTION:** Les pièces sans Ordre No. ne peuvent pas être livrées comme pièces détachées !

Wir weisen darauf hin, dass aus den Ausführungen dieses Ersatzteilkataloges Ansprüche, - insbesondere solche konstruktiver Art - nicht hergeleitet werden können.

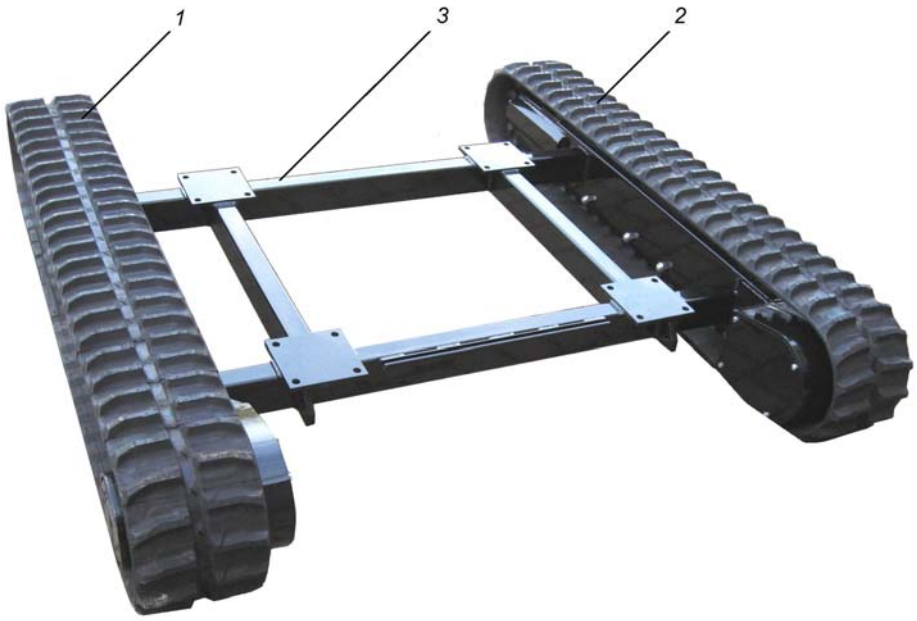
Da wir ständig bemüht sind, unsere Fahrwerke zu verbessern, ist es möglich, dass Ihr Fahrwerk Neuerungen aufweist, die bei Drucklegung dieses Ersatzteilkataloges noch nicht berücksichtigt werden konnten.

Please note that no claims, in particular pertaining to design matters, can be entertained on the basis of the information provided in this parts list.

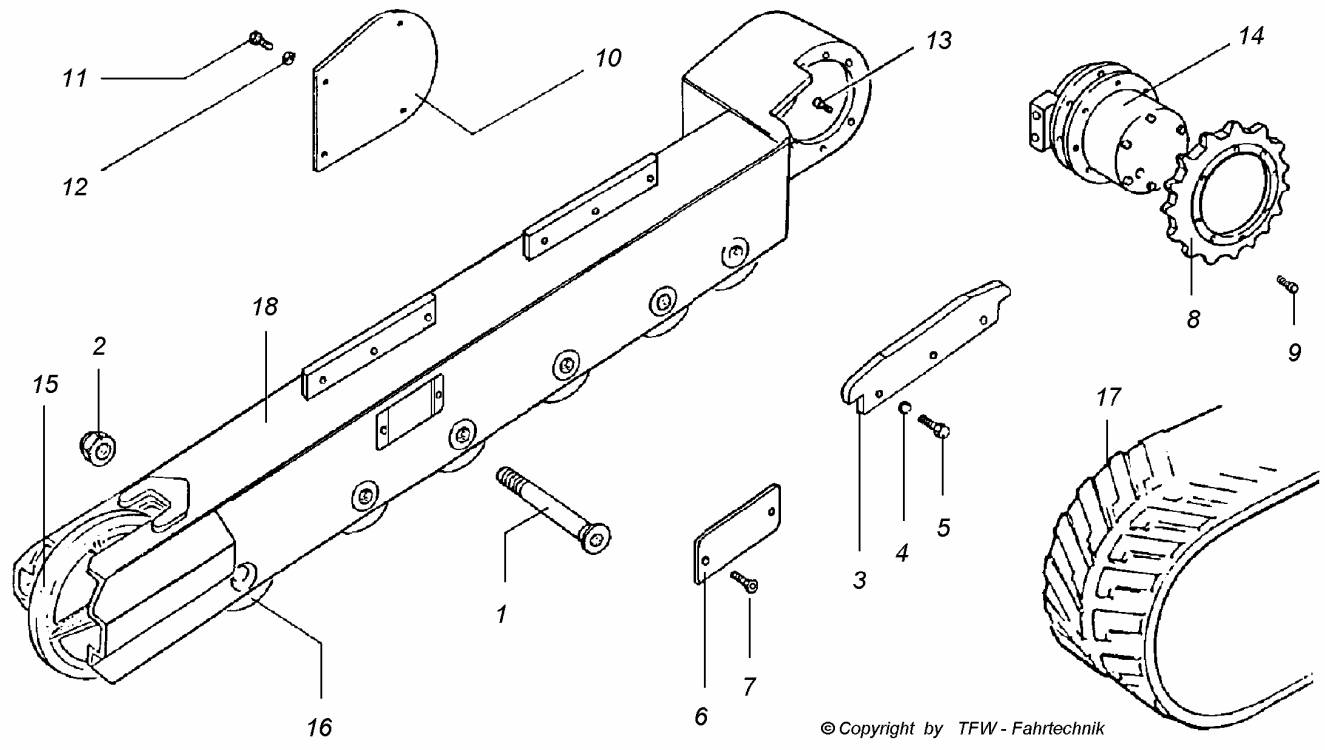
As we are engaged in a constant process of improving our undercarriages, it is possible that your undercarriage will incorporate innovations which could not be taken into consideration when this parts list was printed.

Nous attirons votre attention sur le fait que les précisions fournies dans le présent catalogue de pièces ne pourront en aucun cas être invoquées pour faire valoir des réclamations, notamment concernant la conception ou la construction des pièces fournies.

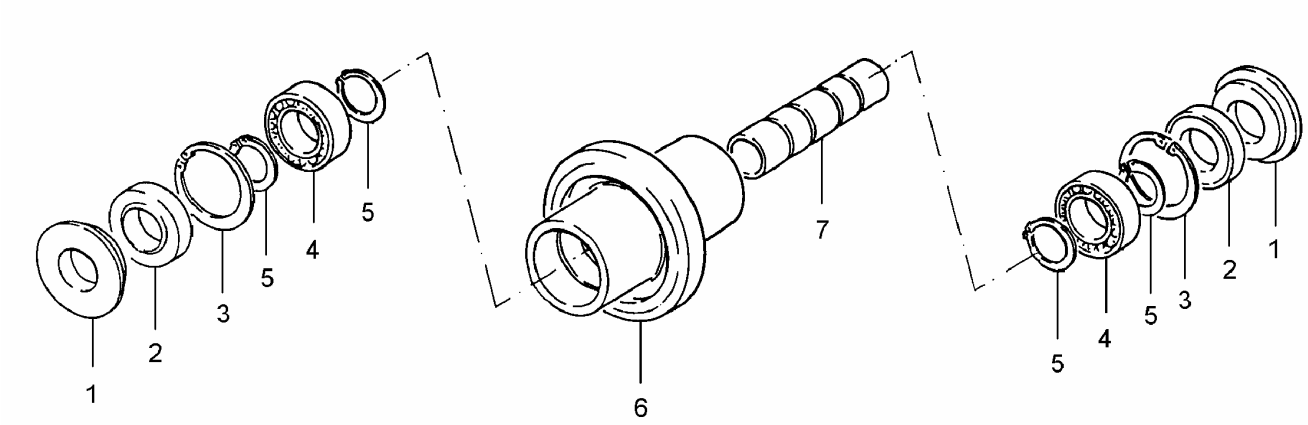
En raison de nos efforts permanents pour l'amélioration de nos productions, il est possible que votre Traction a chenille présente des innovations qui n'ont pas encore pu être prises en compte pour la réalisation du présent catalogue.



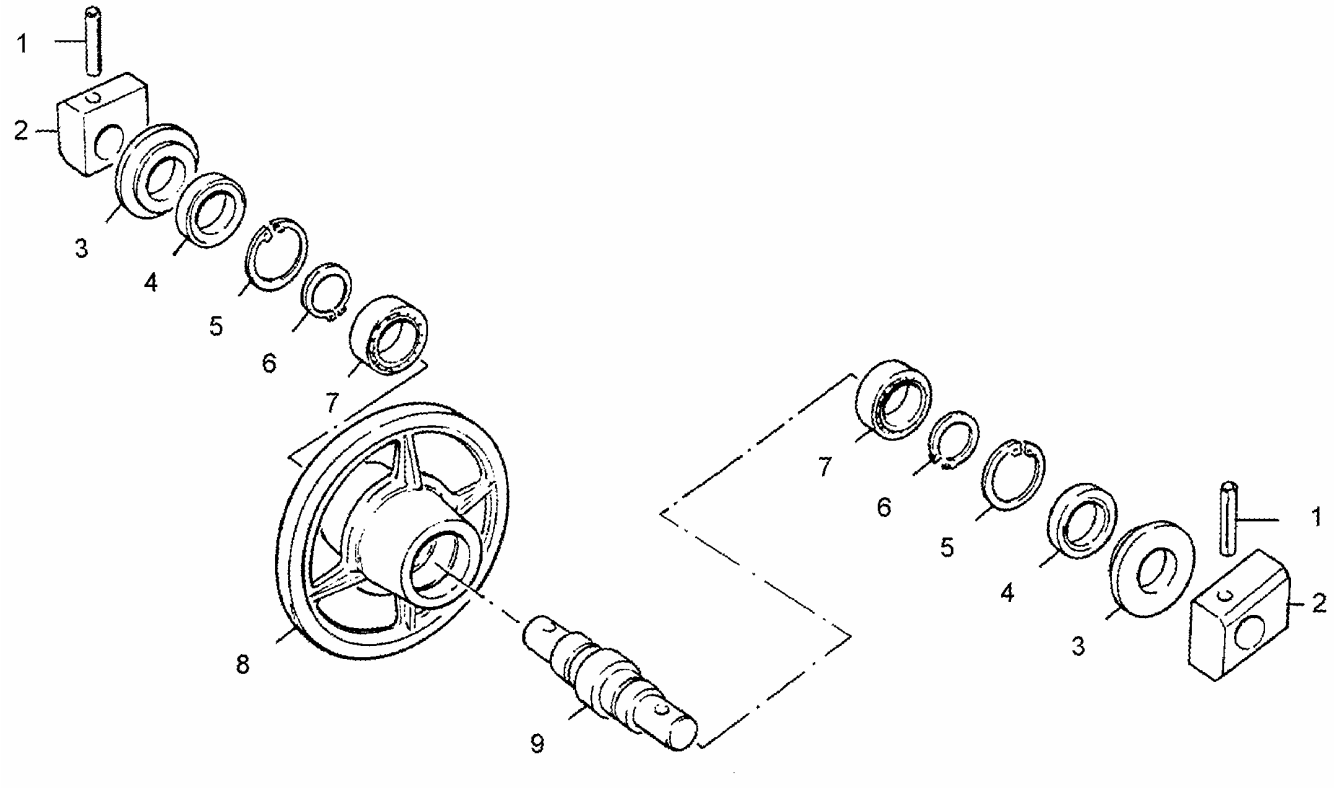
POS NO.	BEST. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1220.113	1	FAHRWERK KOMPLETT	UNDERCARRIAGE COMPLETE	TRACTION A CHENILLE COMPLET	POS.1 - 3



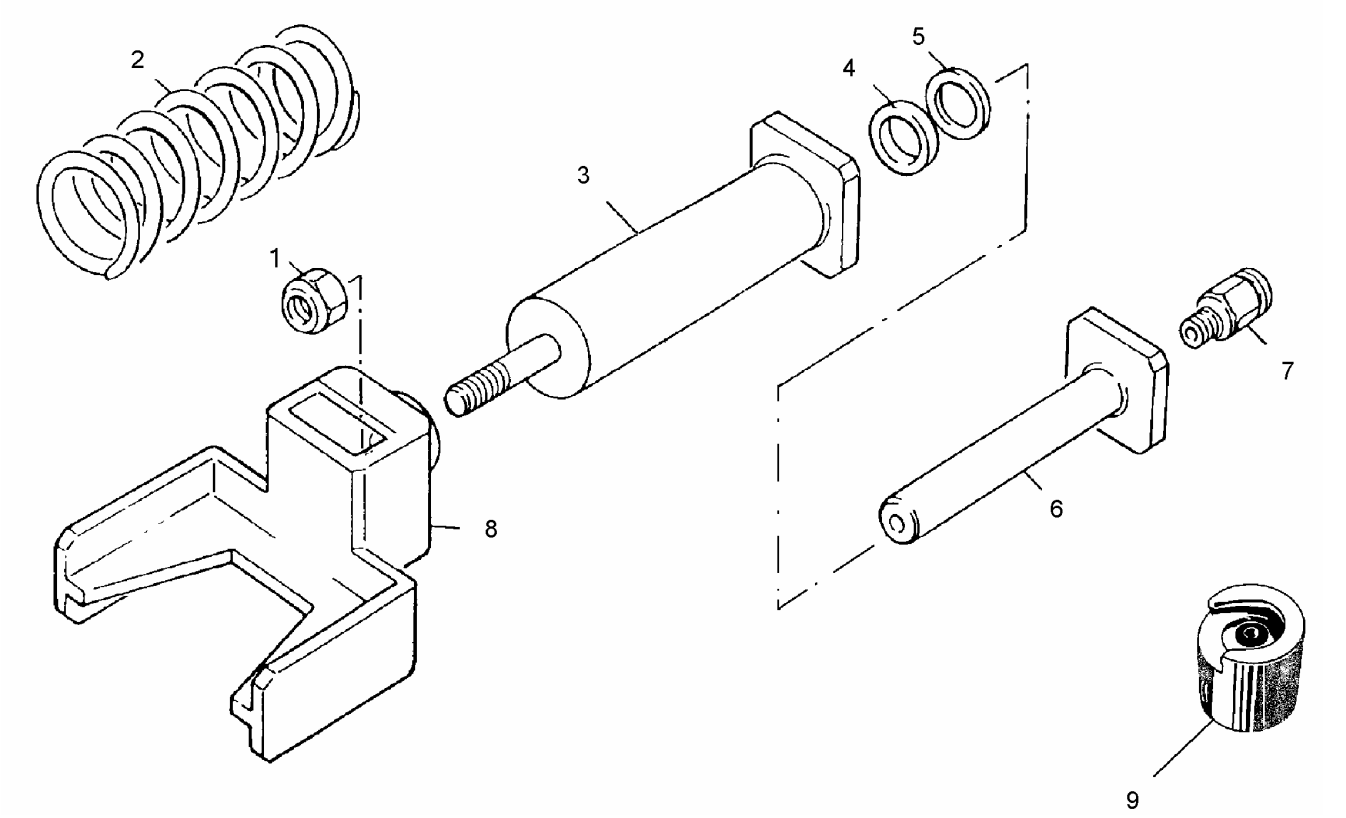
POS NO.	BEST. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1171.061	1	FAHRSCHIFF KOMPLETT LINKS	TRACK SIDEFRAME COMPLETE LEFT	TRACTION A CHENILLE COMPLETE GAUCHE	POS. 1 - 17
	1171.062	1	FAHRSCHIFF KOMPLETT RECHTS	TRACK SIDEFRAME COMPLETE RIGHT	TRACTION A CHENILLE COMPLETE DROIT	POS. 1 - 17
	1131.399		FAHRSCHIFF LINKS	SIDEFRAME LEFT	CAISSON GAUCHE	REF. 1171.11 / 1172.72
	1131.400		FAHRSCHIFF RECHTS	SIDEFRAME RIGHT	CAISSON DROIT	REF. 1171.11 / 1172.72
1	1018.101	12	SENKSCHRAUBE MIT INNENSECHSKANT	COUNTERSUNK SCREW	VIS NOYE	M 20 x 135 DIN 7991 10.9
2	1018.600	12	MUTTER	NUT	ECROU A SIX PANS	M 20 DIN 985 6 / 8
3	1131.125	4	GLEITKUFE	SLIDE SKID	PATIN GLISSANT	REF. 1131.24
4	1019.154	12	FEDERRING	SPRING WASHER	RONDELLE A RESSORT	M 8 DIN 127
5	1018.150	12	SCHRAUBE	BOLT	VIS A TETE SIX PANS	M 8 x 25 DIN 933 8.8
6	1131.104	2	DECKEL	COVER	COUVERCLE	121 x 66 mm
7	1018.100	4	SENKSCHRAUBE	COUNTERSU.SCREW	VIS NOYE	M 8 x 12 DIN 963A 8.8
8	1007.285	2	ANTRIEBSRAD Z 14	SPROCKET T 14	JANTE DENTEE	REF. 1007.25.0.3
9	1018.041	18	SCHRAUBE ISEKA	ALLEN SCREW	VIS A TROU SIX PANS	M 12 x 20 DIN 7984 8.8
10	1131.171	2	GETRIEBEDECKEL	GEAR COVER	COUVERCLE D'ENGRENAGE	REF. 1172.59.1.3
11	1018.151	8	SCHRAUBE	BOLT	VIS A TETE SIX PANS	M 8 x 20 DIN 933 8.8
12	1019.001	8	U-SCHEIBE	WASHER	RONDELLE	M 8 DIN 128
13	1018.030	18	SCHRAUBE ISEKA	ALLEN SCREW	VIS A TROU SIX PANS	M 12 x 25 DIN 912 8.8
14		2	FAHRANTRIEB KOMPLETT	TRACK DRIVE COMPLETE	ENTRAINEMENT PLANETAIRE COMPLET	TAF. FIG. PLAN. 35.32.269
15		2	LEITRAD KOMPLETT	IDLER COMPLETE	ROUE GUIDAGE COMPLET	TAF. FIG. PLAN. 13.30.400
15		2	SPANNPAKET KOMPLETT	ADJUSTING DEVICE COMPLETE	DISPOSITIV DE SERRAGE COMPLET	TAF. FIG. PLAN. 17.30.301
16		12	LAUFROLLE KOMPLETT	ROLLER COMPLETE	POULIE COMPLET	TAF. FIG. PLAN. 13.30.350
17	1012.053 /D	2	GUMMIRAUPENBAND	RUBBER CRAWLER	CHENILLE CAOUTCHOUC	250 x 57 x 72 "DONGIL"



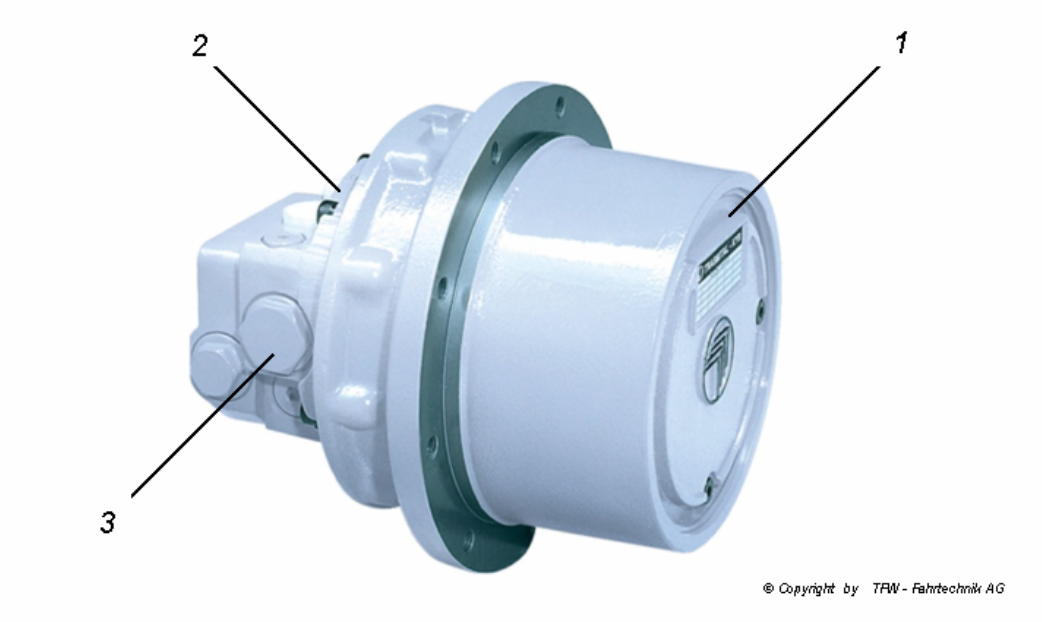
POS NO.	Best. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1002.010	1	LAUFROLLE KPL.	ROLLER CPL.	POULIE COMPLETE	REF. 1001.02 POS. 1 - 7
1	1002.600	2	DECKSCHEIBE	WASHER	RONDELLE	REF. 1002.06 POLYAMID Ø 64 x 7
2	1021.502	2	RADIALDICHTRING	OIL SEAL	JOINT D'ETANCHEITE	Ø 55 / 30 x 10
3	1019.353	2	SICHERUNGSRING	CIRCLIP	ANNEAU DE RETENUE	Ø 55
4	1021.002	2	KUGELLAGER	BALL BEARING	ROULEMENT A BILLES	6006 2 RS
5	1019.402	4	SICHERUNGSRING	CIRCLIP	ANNEAU DE RETENUE	Ø 30
6	1002.200	1	LAUFROLLE	ROLLER	POULIE	REF. 1002.04 Ø 130
7	1002.400	1	WELLE	AXLE	ESSIEU	REF. 1002.05 Ø 30 x 88



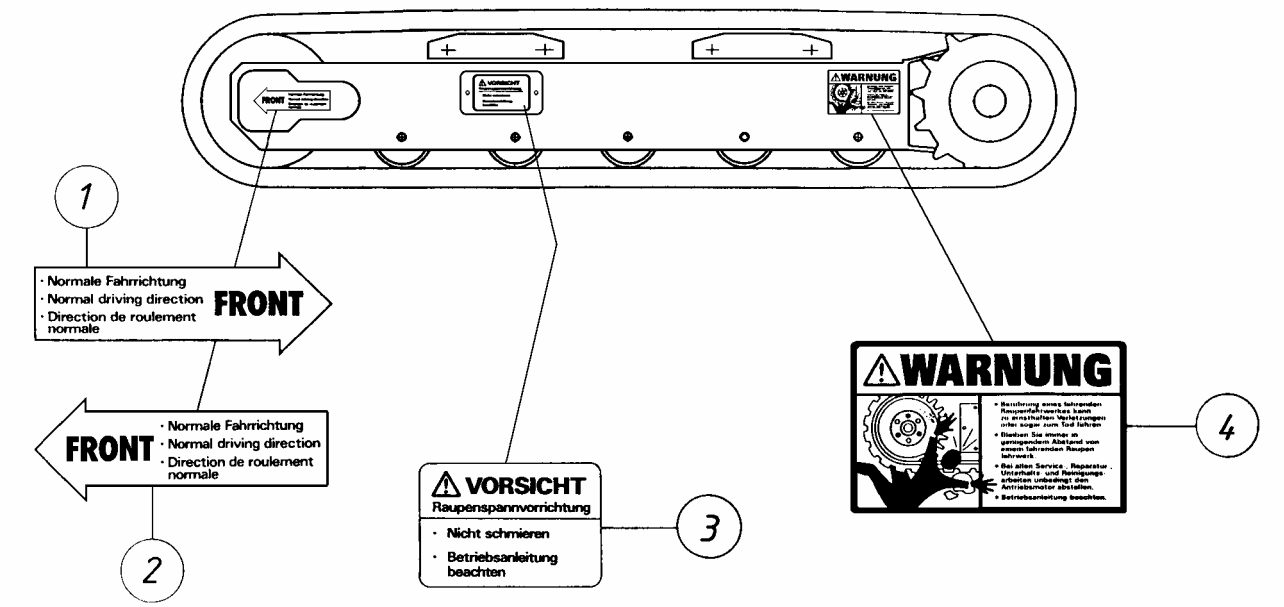
POS NO.	BEST. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1004.010	1	LEITRAD	IDLER	ROUE DE GUIDAGE	POS. 1 - 9
1	1019.502	2	SPANNHUELSE	ADAPTOR SLEEVE	DOUILLE DE SERRAGE	10 x 50
2	1004.500	2	LAGERBOCK	BEARING SUPPORT	SUPPORT DE PALIER	82 x 50 x 30
3	1004.300	2	DECKSCHEIBE	WASHER	RONDELLE	REF. 1005.08
4	1021.501	2	RADIALDICHTRING	OIL SEAL	JOINT D'ETANCHEITE	B 1 SL / 35 / 62 x 7
5	1019.352	2	SICHERUNGSRING	CIRCLIP	ANNEAU DE RETENUE	Ø 62
6	1019.401	2	SICHERUNGSRING	CIRCLIP	ANNEAU DE RETENUE	Ø 35
7	1021.001	2	KUGELLAGER	BALL BEARING	ROULEMENT A BILLES	6007 2 RS
8	1004.100	1	LEITRAD LOSE	IDLER	ROUE DE GUIDAGE	Ø 290
9	1004.200	1	WELLE	AXLE	ESSIEU	Ø 45 x 160



POS NO.	BEST. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1135.004	1	SPANNPAKET KPL.	ADJUSTING DEVICE	DISPOSITIV DE SERRAGE	Kl. 1.7 / Pos. 1 - 8
1	1018.606	1	SICH. MUTTER STAHL	LOCK - NUT STEEL	ECROU A SIX PANS	M 16 DIN 980 V / 8.8
2	1135.133	1	SPANNFEDER	TENSION SPRING	RESSORT DE TENSION	Ø 18 x 250
3	1135.110	1	ZYLINDERROHR	CYLINDER TUBE	TUYAU DE CYLINDRE	
4	1015.451	1	NUTRING	U - RING	BAGUE DE RAINUREE	Ø 30 / 38 x 9
5	1015.500	1	ABSTREIFER	WIPER SEAL	SEGMENT RACLEUR	Ø 30 / 38,6 x 5,3
6	1135.120	1	SPANNKOLBEN	PISTON TENSION	BOULON DE TENSION	
7	1019.451	1	FETTFUELLNIPPEL	NIPPLE	NIPPLE	G 3 / 8 " x 37 mm
8	1135.100	1	LEITRADGABEL	IDLER BRACKET	FOURCHETTE DE ROUE GUIDAGE	Ref. 1135. 22
9	1022.004	1	SCHIEBEKUPPLUNG	BUTTON HEAD COUPLER	AGRAFE HYDRAULIQUE	M 22 / M 10 x 1



POS. NO.	BEST. NR. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
	1007.135	1	FAHRANTRIEB KPL. MIT HYDRAULIK-MOTOR UND FAHR - BREMSVENTIL	TRACK GEAR CPL. WITH HYDRAULIC MOTOR AND COUNTER BALANCE VALVE	ENGRENAGE PLANETAIRE AVEC MOTEUR HYDRAULIQUE ET SECTION DE SOUPAPE	POS. 1 - 3
1		1	PLANETENGETRIEBE KPL. OHNE HYDRAULIK-MOTOR	PLANTARY GEAR CPL. WITHOUT HYDRAULIC MOTOR	ENGRENAGE PLANETAIRE SANS MOTEUR HYDRAULIQUE	
2		1	HYDRAULIKMOTOR KOMPLETT	HYDRAULICMOTOR COMPLETE	MOTEUR HYDRAULIQUE COMPLET	
3		1	FAHR - BREMSVENTIL	COUNTER BALANCE VALVE	SECTION DE SOUPAPE	



POS NO.	BEST. Nr. ORD. NO.	STK QNT	BENENNUNG	DESCRIPTION	DESIGNATION	BEMERKUNG REMARK, REMARQUE
1	1130.413	1	FRONT RECHTS			D
1	1130.415	1		FRONT RIGHT		GB
1	1130.417	1			FRONT DROITE	F
1	1130.410	1	NORMALE RIJRICHTING	(RECHTS)		NL
2	1130.414	1	FRONT LINKS			D
2	1130.416	1		FRONT LEFT		GB
2	1130.418	1			FRONT GAUCHE	F
2	1130.411	1	NORMALE RIJRICHTING	(LINKS)		NL
3	1130.402	2	VORSICHT RAUPENSPANNVORRICHTUNG			D
3	1130.403	2		CAUTION TRACK TENSIONER		E
3	1130.407	2			AVIS TENDEUR DES CHENILLES	F
3	1130.408	2	LET OP ! RUPSBANDSPANNER			NL
4	1130.404	2	WARNUNG			D
4	1130.405	2		WARNING		E
4	1130.406	2			AVERTISSEMENT	F
4	1130.409	2	WAARSCHUWING			NL
1 - 4	1130.426	1	SCHILDER (SATZ)			D
1 - 4	1130.427	1		LABLES (SET)		E
1 - 4	1130.428	1			ETIQUETTES (SET)	F
1 - 4	1130.429	1	STICKERS (SET)			NL

Gewichte, Masse und Leistungsdaten	Weights, dimensions and performance data	Poids, dimensions et prestations

D GB F

Gewicht	Weight	Poids	
Max. Einsatzgewicht	Max. operating weight	Le poids opérationnel max.	6000 Kg
Unterwagen kpl.	Undercarriage complete	Chariot complet	420 Kg
1 Gummiraupenband	1 Rubber crawler	1 Chenille caoutchouc	79 Kg

Hauptabmessungen	Principal dimensions	Dimensions principales	
Gesamtlänge Fahrschiff über Gummiraupen	Total length of track assembly	Longueur hors tout train de chenilles	1915 mm
Gesamthöhe Fahrschiff über Gummiraupen	Total height of track	Hauteur totale Train de chenilles	382 mm
Achsdistanz Mitte A - Rad / Mitte Leitrad	Centre length Sprocket to idler centre	Distance entre essieux Centre couronne / Guide	1544 mm
Raupenbreite	Width rubber crawler	Largeur bande caoutchouc	250 mm

Fahrgeschwindigkeit	Travelling speed	Vitesse de déplacement	
1. Stufe	1. travel stage	1ère vitesse	2,1 km/ h
2. Stufe	2. travel stage	2 ère vitesse	4,2 km/ h
Bei maximal Oelfluss (pro Fahrantrieb)	With a max. Oil flow (per hydraulic motor)	Avec flux max. d'huile (par chaque mot. hydr.)	43 l / min
Max. Ausg. Drehmoment (Fahrantrieb)	Max. output torque (Wheel motor)	Max. couple de sortie (Engrenage planétaire)	3329 Nm 190 bar

Steigfähigkeit	Max. Gradient	Gradient max.	bei 6'000 kg
1. Stufe	1. travel stage	1ère vitesse ≈	42 % / 22 °
2. Stufe	2. travel stage	2 ère vitesse ≈	13 % / 7 °
Bei Betriebsdruck	By operating pressure	Avec une pression de	190 bar

Bodendruck	Ground pressure	Pression sur le sol	
Leergewicht 1800 Kg Gesamtgewicht 6000 Kg	Machine weight 1800 Kg Operating weight 6000 Kg	Poids net 1800 Kg Poids total 6000 Kg	0,233 Kg / cm^2 0,770 Kg / cm^2

 04.04.2011

Hydrauliköl, Schmiermittel und Einsatztemperatur	**Hydraulic oil, lubricating oil operating temperature**	**Huile hydraulique et Engrenage Température d'utilisation**

D GB F

Getriebeöl	**Travel gear oil**	**Engrenage planet. huile**	

Kennzeichnung	Identification	Identification	
API - GL 5 MIL - L - 2105 B oder MIL - L - 2105 C	API - GL 5 MIL - L - 2105 B or MIL - L - 2105 C	API - GL 5 MIL - L - 2105 B ou MIL - L - 2105 C	

Viskosität	Viscosity	Viscosité	
Arktisches Klima	Arctic climate	Climat arctique	SAE 80 W - 90
Gemäßigtes Klima	Temperate climate	Climat tempéré	SAE 90
Tropisches Klima	Tropical climate	Climat tropical	SAE 140
Alle Klimazonen	All climate zones	Toutes zones climatiques	ISO VG 150

Füllmenge / Liter	Capacities / Litres	Capacité / Litres	0,6
Die angegebene Füllmenge ist ein Richtwert. Maßgebend ist immer das vorgeschriebene Niveau.	The quantity Indicated is a guide value. The prescribed level is determinating.	La quantité indiquées est un valeur nominale. La niveau indicatif est déterminant.	

Hydrauliköl	**Hydraulic oil**	**Huile hydraulique**	

Kennzeichnung	Identification	Identification	
Mineralöl DIN 51524	Mineral oil DIN 51524	Huiles minéral DIN 51524	ISO VG 46
Viskosität	Viscosity	Viscosité	20 - 70 mm²/s
Max. Oeltemperatur	Max. Oil temperature	Temp. max. huile	80 ° C
Filtrierung	Filtering	Filtrage	20 - 25 µm

Einsatztemperatur	**Operating temperature**	**Température d'utilisation**	

- 25° C bis + 55 ° C	- 25° C up to + 55 ° C	- 25° C à + 55 ° C	

TFW-Fahrtechnik AG

EG-Einbauerklärung für unvollständige Maschinen

(Maschinenrichtlinie 2006/42/EG, Anhang II, sub. B)

Hersteller: ***TFW - Fahrtechnik AG***
Adresse: *Speerstrasse 26, CH-8853 Lachen / Schweiz*

Name der Person, welche bevollmächtigt ist, die relevanten technischen Unterlagen zusammenzustellen:

Frei Theodor, Speerstrasse 26, CH-8853 Lachen / Schweiz

Wir erklären hiermit, dass für die unvollständige Maschine

Beschreibung: **Raupenfahrschiffe und Raupenfahrwerke**
Typ: allgemeine Ausführungen mit Gummi- oder Stahlraupen
Serie-Nr: ……..

- Folgende grundlegenden Anforderungen der Maschinenrichtlinie (2006/42/EG) zur Anwendung kommen und eingehalten werden

  2.1, 2.3.1.6, 2.5.2, 2.7

- Spezielle technische Unterlagen gemäss Anhang VII Teil B erstellt wurden und diese den einzelstaatlichen Behörden auf begründetes Verlangen per Post oder elektronisch übermittelt werden

- Und diese unvollständige Maschine konform ist mit den einschlägigen Bestimmungen folgender weiterer EU-Richtlinien:

  ISO 10265:2008-02 (E) / 6.2 Parkbrems - System

Des weiteren erklären wir, dass

- diese unvollständige Maschine erst dann in Betrieb genommen werden darf, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht

Ort, Datum: Unterzeichner:

CH-8853 Lachen, 02.01.2010 Theodor Frei (Geschäftsführer)

Montageanleitung nach Anhang VI

(EG-RL 2006/42/EG)

Bei der Montage der unvollständigen Maschine

" Raupenfahrwerk mit Gummi oder Stahlraupen "

müssen folgende Bedingungen erfüllt sein,

damit sie ordnungsgemäß und ohne

Beeinträchtigung der Sicherheit und

Gesundheit von Personen

mit anderen Teilen zu einer

vollständigen Maschine zusammengebaut

werden kann:

- bei der Montage des Fahrwerkes müssen alle fachlich und technisch geltenden Vorschriften eingehalten werden.
- alle Verbindungen mittels Schweißen oder Schrauben, etc. müssen nach den allgemein geltenden Vorschriften ausgeführt werden.
- die kompletten Verbindungen von Maschine und Fahrwerk müssen den allgemeinen Maschinenrichtlinien entsprechen.
- die Tragfähigkeit der Verbindung muss generell überprüft werden.
- die Anschlusskonstruktion muss mit der Maschine am Schluss eine Einheit bilden, damit die Verwindungssteifigkeit der beiden Fahrschiffe zueinander gewährleistet ist.
- die hydraulischen Steuerelemente der Maschine mit den hydraulischen Komponenten der Fahrantriebe müssen unbedingt übereinstimmen.
- die Anschlüsse der Leckölleitung mit dem Bremslüftanschluss dürfen auf keinen Fall vertauscht angeschlossen werden.
- alle hydraulischen Anschlüsse und Verbindungen müssen gemäss deren Funktion richtig angeschlossen sein.
- die maximale Oelfördermenge und der maximale Betriebsdruck je Fahrantrieb resp. Hydraulikmotor dürfen nicht überschritten werden.
- nach Fertigstellung muss die vollständige Maschine mit dem Fahrwerk zusammen geprüft werden und es muss sichergestellt sein, dass die Fahrwerkbremsen im Drucklosen Zustand der Hydraulikanlage die vollständige Maschine in einem Gefälle / Steigung sicher halten kann.
- nach kompletter Fertigstellung der Maschine sind die Warn- und Hinweisschilder am Fahrwerk anzubringen
- in der Betriebsanleitung der vollständigen Maschinen muss darauf hingewiesen werden, dass bei einer fahrenden Maschinen sich keine Personen in der Nähe vom Raupenfahrwerk aufhalten dürfen.
- bei einem fahrenden Raupenfahrwerk ist der Aufenthalt von Personen und Tieren vor und hinter dem Fahrwerk sehr gefährlich. In diesem Bereich besteht höchste Unfallgefahr für Mensch und Tier.
- bei einem fahrenden Raupenfahrwerk muss darauf geachtet werden dass niemand in den Bereich der offenen Raupenkette, Laufrollen, Leitrad und Antriebsrad gelangen kann. In diesem Bereich besteht höchste Unfallgefahr für Mensch und Tier.

Sicherheitsmaßnahmen
beim allgemeinen Einsatz von Raupenfahrwerken
(EG-RL 2006/42/EG)

Bei der Inbetriebnahme
von einem
Gerät mit einem

Raupenfahrwerk
mit
Gummi- oder Stahlraupen

müssen folgende
Sicherheitsmaßnahmen
beachtet werden:

- bevor Sie den Motor starten machen Sie einen Kontrollgang um das ganze Gerät herum
- bevor Sie den Motor starten vergewissern Sie sich, dass sich auch niemand in der Servicegrube unter dem Gerät aufhält
- niemals den Motor starten, wenn sich jemand unter einem aufgebockten Fahrwerk befindet
- bevor der Motor gestartet wird muss unbedingt darauf geachtet werden, dass keine Arbeiten und Handlungen im Bereich des Raupenfahrwerkes mehr vorgenommen werden.
- bevor mit dem Gerät gefahren wird muss unbedingt darauf geachtet werden, dass sich keine Personen mehr in der Nähe beim Raupenfahrwerk aufhalten
- wenn mit dem Gerät gefahren wird, dürfen sich keine Personen in unmittelbarer Nähe vom Raupenfahrwerk aufhalten
- der Aufenthalt von Personen und Tieren vor - hinter und neben dem Fahrwerk ist sehr gefährlich.
- In diesem Bereich besteht höchste Unfallgefahr für Mensch und Tier.
- bei einem fahrenden Raupenfahrwerk muss darauf geachtet werden dass niemand in den Bereich der offenen Raupenkette, Laufrollen, Leitrad und Antriebsrad gelangen kann.
- In diesem Bereich besteht höchste Unfallgefahr für Mensch und Tier
- Vorsicht , niemals ein Gerät ungesichert in abfallendem Gelände oder auf einer Rampe stehen lassen
- Muss ein Gerät in einer Steigung abgestellt werden, dann muss es unbedingt mit Unterlegkeilen gegen Wegrollen gesichert werden
- Unterhalb einem, in einer Steigung abgestellten oder fahrenden Gerät, dürfen sich niemals Personen aufhalten
- Niemals bei laufendem Motor unter oder zwischen dem Fahrwerk irgendwelche Kontrollen oder Arbeiten vornehmen !

GUMMIRAUPEN
RUBBER TRACKS
CHENILLES CAOUTCHOUC

TFW

D | GB | F

BEDIENUNGS - UND WARTUNGS - ANWEISUNG	OPERATING AND MAINTENANCE INSTRUCTIONS	INSTRUCTIONS DE SERVICE ET ENTRETIEN

Vorsichtsmassnahmen beim Einsatz von Gummiraupen	Safety measures when working with rubber tracks	Mesures de sécurité dans l'emploi des chenilles caoutchouc

Verschleiss und Schäden an Gummiraupen	Wear and damages of rubber tracks	Usure et dommages en chenille caoutchouc

D	GB	F
Verschleiss und Schäden an Gummiraupen	**Wear and damages of rubber crawlers**	**Usure et Dommages des Bandes en Caoutchouc**

Fig. 1

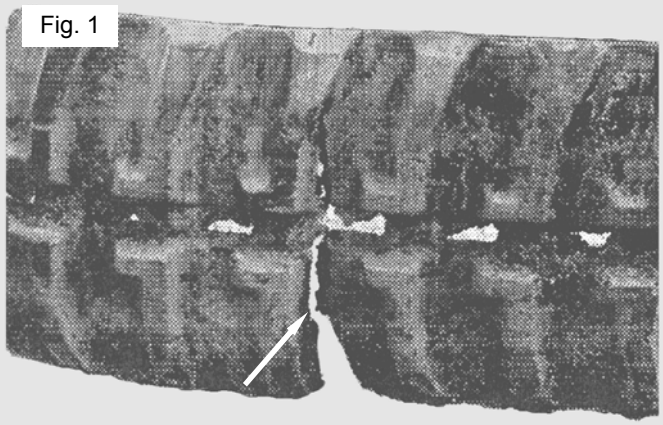


Fig. 2

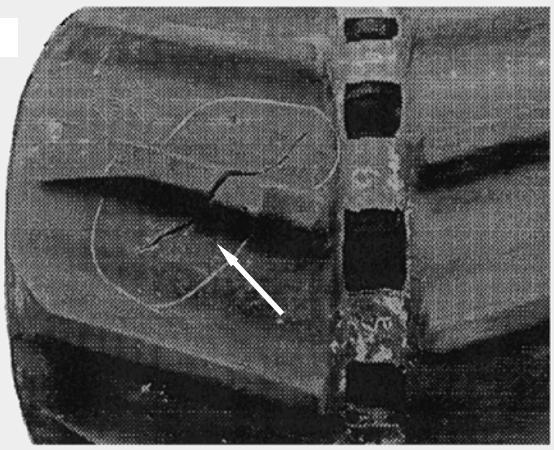


Fig. 1 Bruch der Stahllitzen	**Fig. 1 Breakage of the steel strings**	**Fig. 1 Casse des fils d'acier**
• Übermäßige Spannung der Raupenbänder kann zum Bruch der Stahllitzen führen und zwar durch folgende Umstände: • durch eingeklemmte Steine • wenn durch irgendeinen Grund das Raupenband beim Antriebs - oder Leitrad herausspringt. • durch brüskes Abschwenken auf rauhem Untergrund mit hohem Reibungskoeffizient. • nicht richtig funktionierende Raupenspannvorrichtung. • eingefrorenes Material zwischen den Laufrollen oder auf dem Boden festgefrorene Raupenbänder.	• Overtensioning of the rubber crawler can produce breaking of the steel strings due to following circumstances: • in crusted stone. • deviation for any reason of the track from sprocket or idler. • sudden turning on rough ground with high wear coefficient. • inefficiently working tension unit. • frozen materials between rollers or crawlers frozen on soil.	• Des bandes sur tenssionnees peuvent causer la casse des fils d'acier par les circumstances suivantes: • par des pierres incrustées. • si par un raison quelconque la bande saute a l'hauteur de la couronne ou guide. • par des virages brusques sur une surface rugueuse d'un haut coefficient abrasive. • un dispositif de serrage défectueux. • du matériel gelé entre les galets ou des bandes gelés ou sol.

Fig. 2 Risse / Schnitte im Profil	**Fig. 2 Tears / Cuttings on profil**	**Fig. 2 Déchirements / coupures**
• Entstehen durch äußere Einwirkungen wie z. Beispiel : • fahren über scharfkantiges Material • fahren über vorstehende Stahlteile, Stahlbleche oder Betoneisen.	• Caused by external reasons as : • travelling on cutting materials. • travelling over protruding steel parts steel sheets or concrete irons.	• Causés par influences comment externes par exemple: • passage sur des matériaux coupants. • passage sur des pièces d'acier aiguës, tôles fers béton.

⚠ **Vermeiden Sie das Überfahren von scharfkantigem Material wie vorstehende Betoneisen, scharfe Ecken und Vorsprünge.**

Bei einem spürbaren Fahrwiderstand zuerst Ursache abklären, anstatt mit Gewalt weiterfahren.

Im Winter bei Frostgefahr die Maschine mit den Gummiraupen auf Holzbretter fahren.

⚠ **Avoid travelling over sharp materials as concrete irons, sharp corners etc.**

In case of feeling resistance, check reason first, instead of trying to continue working by force.

With freezing temperatures park the machine on wood plants.

⚠ **Evitez passer sur de matériaux tels que fers béton, bords, etc.**

En cas d'une résistance notable, déterminer avant tout le motif en lieu de la forcer la marche.

En hiver en cas de gel garer la machine sur des planches en bois.

D	GB	F
Verschleiss und Schäden an Gummiraupen	**Wear and damages of rubber crawlers**	**Usure et Dommages des Bandes en Caoutchouc**

Fig. 3

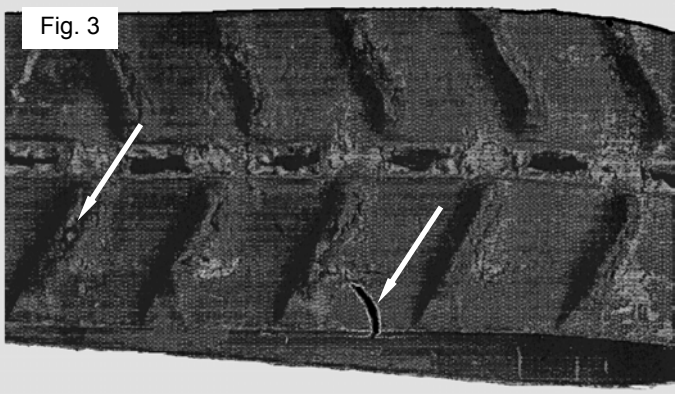


Fig. 4

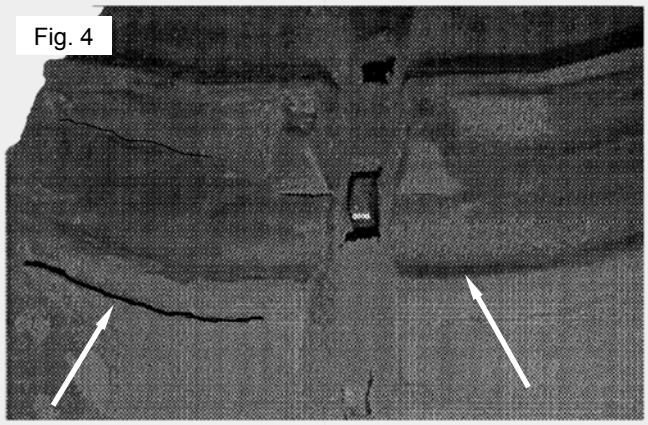


Fig. 3 Verschleiss und Risse	**Fig. 3 Wear and tear**	**Fig. 3 Usure et coupages**
• Verschleiss an den Profilstollen oder Risse an den Raupenband - Außenseiten entstehen durch folgende Umstände : • sehr harte Einsatzbedingungen auf rauhem Untergrund, Fels oder steinigem Boden. • allgemeines Fahren und Absteuern auf gesprengtem oder gebrochenem Fels. • seitliches Anfahren gegen Kanten, Vorsprünge und Hindernisse.	• Wear of profiles or tears at outer sides are caused by : • very hard conditions on rough ground, rocky or stony soils. • travelling and turning on blast or broken rock. • lateral bumping against corners and obstacles.	• L'usure des profils ou des coupages sur les parties externes des bandes sont le résultat des circumstances suiventes : • des conditions d'utilisation extrême sur des surfaces rugueuses, roches ou pierre. • conduction et virages sur des roches coupes ou cassés. • frapper latéralement un bordures, angles ou obstacles.

Fig. 4 Risse am Profilfuss	**Fig. 4 Tears at profile basis**	**Fig. 4 Déchirures au pièce de profil**
• Entstehen durch äußere Einwirkungen wie zum Beispiel : • sehr harte Einsatzbedingungen auf rauhem Untergrund, Fels oder steinigem Boden. • fahren und überqueren von scharfkantigen oder hohen Hindernissen. • bei alten, wenig gebrauchten Bändern kann es auch auf Materialermüdung zurückzuführen sein.	• These are caused by external influences as : • very hard conditions on rough grounds rocky or stony soils. • travelling and crossing over sharp or high obstacles. • in case of old but little used crawlers damages can be caused by material fatigue.	• Sont le résultat des influence externes, tels que : • des conditions d'utilisation extrêmes sur des surface rugueuses, roches ou pierre. • passer sur des obstacles hauts ou anguleux. • en cas des bandes vielle peu utilises la cause peut être la fatigue du matériel.

⚠ **Beim überfahren von hohen Hindernissen mit scharfen Ecken unbedingt Kanthölzer davorlegen, damit die Auffahrhöhe geringer wird.**

Während dem Fahren über Vorsprünge, Schwellen und Kanten sollten keine grossen Richtungsänderungen vorgenommen werden.

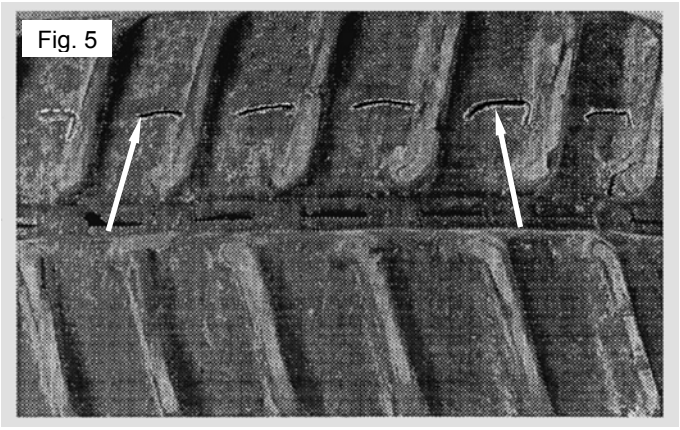
⚠ **When crossing high obstacles with sharp corners remember to put in place some wooden wedges in order to decrease the elevation.**

When travelling on corners or edges avoid sharp turnings.

⚠ **En passant sur des obstacles élevés avec des angles aigus situer des cales en bois afin de diminuer l'hauteur.**

En passant sur des bordures ou angles éviter des changements de direction brusques.

D	GB	F
Verschleiss und Schäden an Gummiraupen	**Wear and damages of rubber crawlers**	**Usure et Dommages des Bandes en Caoutchouc**



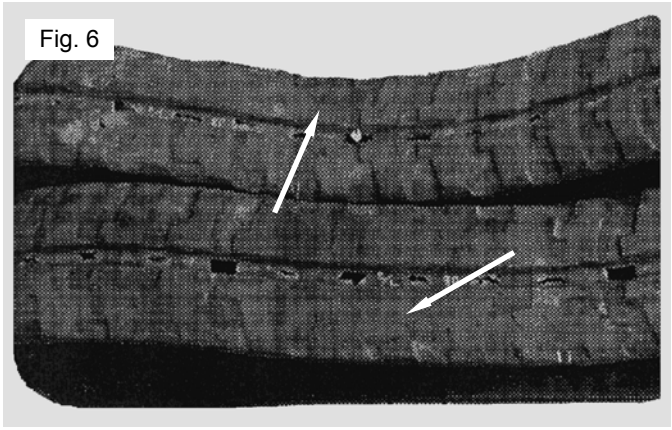


Fig. 5 Äußere Risse in Längsrichtung • Können durch äußere Einwirkungen entstehen wie zum Beispiel : • wenn mit dem Gerät in einem flachen Winkel über Hindernisse wie Randsteine oder Treppenvorsprünge gefahren wird. • beim Absteuern, wenn das Raupenband seitlich stark eingedrückt und um den inneren Stahlkern umgepresst wird.	**Fig. 5 External tears across and lenghtwise** • Can be caused by following external influence : • travelling in a flat angle over obstacles as curbs or steps. • turning under strong side pressure on the steel core.	**Fig. 5 Déchirures externes en sens longitudinal en travers de la bande** • Peuvent être origines par cause externes comment : • passant avec la machine dans un angle plat sur des obstacles comment bordures ou escaliers. • en virant sous une forte pression latéral autour de l'âme d'acier.

Fig. 6 Verschleiss des Profils • Stark verschlissenes Profil, aber noch einsatzfähig. • Ist grundsätzlich normale Erscheinung, wird vor allem durch die verschiedenen Einsatzgebiete bedingt früher oder später zum Ersatz der Bänder führen. • Je nach Einsatzgebiet müssen die Bänder gewechselt werden. Grundsätzlich kann jedoch gefahren werden, bis kein Profil mehr sichtbar ist.	**Fig. 6 Profile wear** • Heavily worn profile, but in working order. • Its a basically normal effect to various conditions. • Depending of the use the crawlers have to be changed. But basically the track can be used until there is no profile.	**Fig. 6 Usure du profil** • Profil très use mais en conditions de travail. • C'est basiquement un effet normal du aux différents utilisation ayant comment des bandes. • Selon le type d'utilisation il faut change les bandes. Basiquement on peut travailler jusqu'à l'absence du profil.

⚠ **Vermeiden Sie auch schnelles Absteuern auf rauhen Unterlagen wie Beton, Asphalt etc. mit hohem Reibungskoeffizient.**
Bei sehr kalten Betriebsbe - dingungen muss allgemein vorsichtiger gefahren werden. Das Gummiraupenband wird steifer und ist deshalb weniger elastisch, dadurch kann das Raupenband durch äußere Einflüsse schneller beschädigt werden.

⚠ **Avoid fast turning on rough surface als concrete, tarmac etc. with a high abrasion coefficient.**

Under extreme cold conditions slower driving is necessary. The rubber crawler becomes stiffer and less elastic. External influence can damage the track easier.

⚠ **Evitez des virages brusques sur des surfaces rugueuses telles que le béton, asphalte etc. avec un haut coefficient de friction.**

En cas des conditions d'utilisation par froid extrême il faut conduire avec des précautions la bande devient plus rigide et en conséquence elle peut être affecte plus facilement par des influences externes.

D	GB	F
Verschleiss und Schäden an Gummiraupen	**Wear and damages of rubber crawlers**	**Usure et Dommages des Bandes en Caoutchouc**

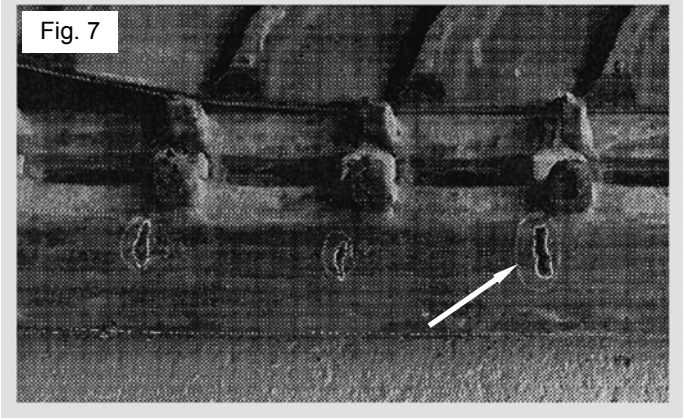


Fig. 7

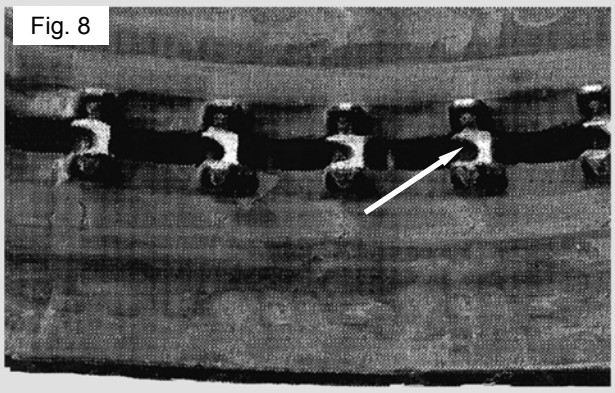


Fig. 8

Fig. 7 Risse auf der Innenseite beim Metallkern	**Fig. 7 Tears on inside near to the core**	**Fig. 7 Déchirures a l'intérieur a cote de l'âme en acier**
• Können die verschiedensten Ursachen haben : • Fahren mit hohem Gewicht oder Fremdmaterial zwischen den Laufrollen und dem Raupenband. • diese beeinträchtigen den Betrieb aber grundsätzlich nicht.	• Can have the most different origins : • travelling with high weights or dirt (stone) between rollers and track. • but they do not influence basically the function.	• Peuvent être de conséquence de origines plus diverses : • voyager surchargé a cause des corps étranges entre les galets et la bande. • mais ils ont pas une influence importante sur le fonctionnement.

Fig. 8 Verschleiss der Stahlkerne	**Fig. 8 Wear of the steel core**	**Fig. 8 Usure des âmes en acier**
• Normaler Verschleiß, bedingt durch den Antrieb und die Kraftübertragung durch das Antriebsrad. • Durch sehr starken Verschleiss könnte der Stahlkern verbogen werden und zum Bruch führen. • Durch die Verbiegung bedingt kann der Stahlkern aber auch aus dem Raupenband herausgerissen werden.	• Normal wear caused by the power transmission and the sprocket. • In case of very severe wear the core could bend and brake. • In case of bending of the core this could not torn out of the rubber crawler track.	• Usure normale par la traction et transmission de force par la roue motrice. • Suite a une forte usure, l'âme pourrait se déformer et casser. • A cause d'une déformation l'âme d'acier peut aussi être arraché hors de la bande.

⚠ **Bei einer starken Abnützung des Antriebskranzes muss dieser ersetzt werden. Ein verschlissener Zahnkranz ergibt an den Gummiraupenbänder einen zu hohen Verschleiß, welcher unter Umständen zum Bruch im Metallkern führen kann.**

Bei einem längeren Stillstand des Gerätes sollte das Fahrwerk gereinigt und das Gerät an einem relativ trockenen Ort eingestellt werden.
(Garage, Unterstand etc.)

⚠ **In case of strong sprocket wear this has to be replaced. A worn out sprocket results in severe wear of the rubber crawler and can cause breaking of the metal core.**

Previous to a longer stand still the undercarriage should be cleaned and stored in a relatively dry place.
(Garage or shelter)

⚠ **En cas de forte usure de la roue motrice celle ci doit être remplace. Une couronne usé cause une usure très forte des bandes ayant comment conséquence la casse de l'âme d'acier.**

En cas d'une période longue d'inactivité if faut nettoyer la machine et la garer dans un endroit relativement sec.
(Garage, au couvert, etc.)

D	GB	F
Verschleiss und Schäden an Gummiraupen	**Wear and damages of rubber crawlers**	**Usure et Dommages des Bandes en Caoutchouc**

Fig. 9 CONVENTIONAL TYPE

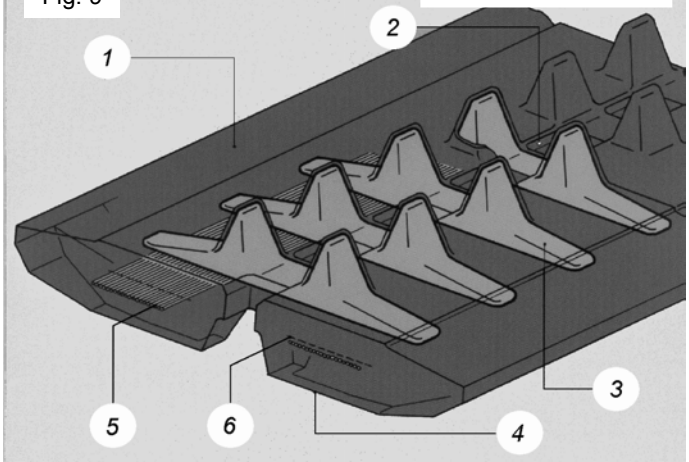


Fig. 10 INTERCHANGEABLE TYPE

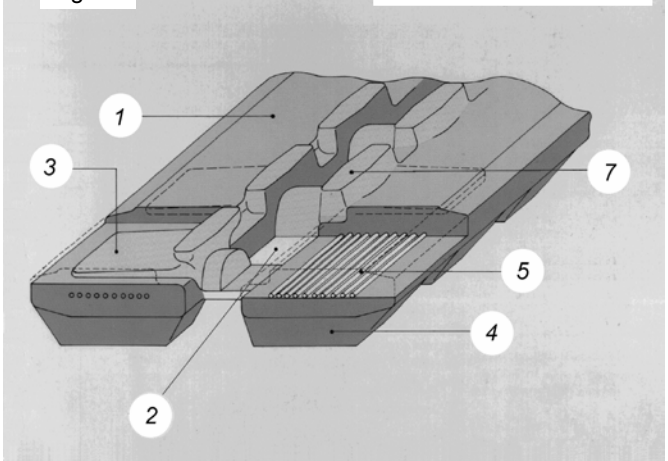


Fig. 9 / 10 Raupenband Schnittbilder	Fig. 9 / 10 Rubber crawler pictures	Fig. 9 / 10 Chenille Caoutchouc figuré
1 Raupenband Basis	1 Rubber crawler casing	1 Chenille Caoutchouc basique
2 Öffnung für die Antriebsradnocken	2 Sprocket hole	2 Ouverture dents couronne
3 Geschmiedeter Stahlkern	3 Embedded metal	3 Âme en acier forge
4 Profilstollen	4 Lug	4 Profil
5 Stahllitzen	5 Steel cord	5 Acier câblé
6 Zwischenlage, Kunststoffgewebe	6 Intermediate canvas	6 Toile intermédiaire
7 Auflage - / Führungsnocken	7 Guide	7 Guide

⚠ Allgemeine Hinweise und Vorsichtsmaßnahmen

Vermeiden Sie längere Einwirkung von Benzin, Diesel - Motoren - oder Hydraulikoel auf die Gummiraupen.

Nicht über längere Stillstandzeit direkter Sonneneinstrahlung und Witterung aussetzen. Durch Sonnenstrahlung und Witterungseinflüsse altert der Gummi früher.

Nach einem Einsatz in salzhaltiger Umgebung sollten die Gummiraupenbänder gut mit Wasser abgespritzt werden, da sonst der Metallkern angegriffen wird und sich von dem Gummi trennen könnte.

Die normale Betriebstemperatur beträgt im Normalfall - 25 ° C bis + 55 ° C.

⚠ General instructions and safety measures.

Avoid long exposure of the rubber crawlers to fuel, diesel, engine or hydraulic oils.

Do not leave the under the sun for longer periods. This accelerates the aging process.

After working in salty environments clean the crawlers thoroughly with water as the core could be attacked and separate from the rubber.

The normal working temperature range is between - 25 ° C to + 55 ° C.

⚠ Conseils généraux et me sures de sécurité.

Evitez l'exposition prolongé d'essence, huiles diesel, de moteurs ou hydrauliques sur les bandes.

Eviter expositions aux rayons pendant des périodes de temps prolonges. Le caoutchouc vieillisse prématurément dans ces conditions.

Après une utilisation dans un environnement sale il faut bien rincer les bandes car au contraire l'âme en acier peut être attaque et se détacher du caoutchouc.

La température de fonctionnement normale est entre - 25 ° C et + 55 ° C.

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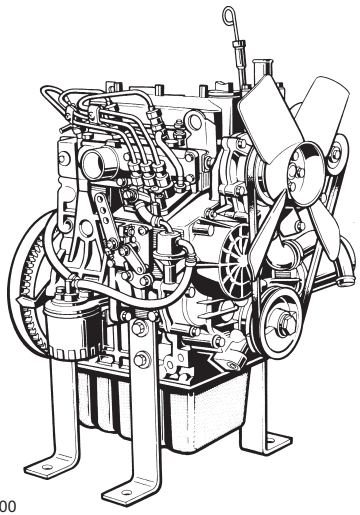
ISO 9001:2008

OPERATOR'S MANUAL

ENGLISH

KUBOTA
DIESEL ENGINE

MODELS **D1005-E4 · D1105-E4**
D1305-E4 · V1505-E4



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READ AND SAVE THIS MANUAL

Kubota

California Proposition 65

⚠ WARNING ⚠

Engine exhaust, some of its constituents, certain vehicle components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

ENGLISH

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.

CONTENTS

ENGLISH

ENGLISH

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 protection, 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.

1AEAAAAAP0130

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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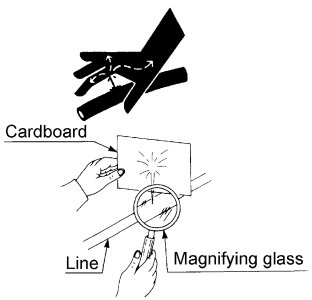
7. ESCAPING FLUID

- 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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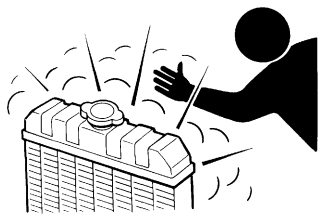

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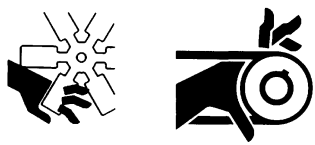
9. KEEP HANDS AND BODY AWAY FROM ROTATING PARTS

- 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 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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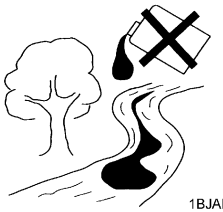

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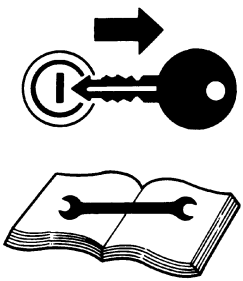
11. CONDUCTING SAFETY CHECKS & MAINTENANCE

- 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.



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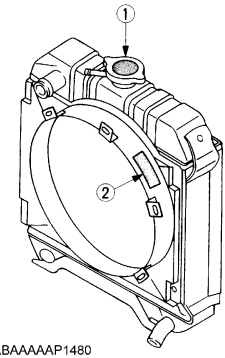
- Replace fuel pipes and lubricant pipes with their hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and age gradually.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep a first aid kit and fire extinguisher handy at all times.

12. WARNING AND CAUTION LABELS



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

1ABACAAAP036K

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


1AGAMAAAP2620

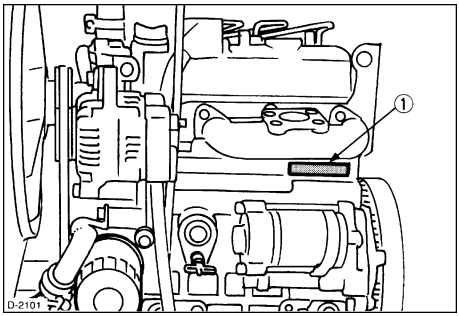
13. CARE OF WARNING AND CAUTION LABELS

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.

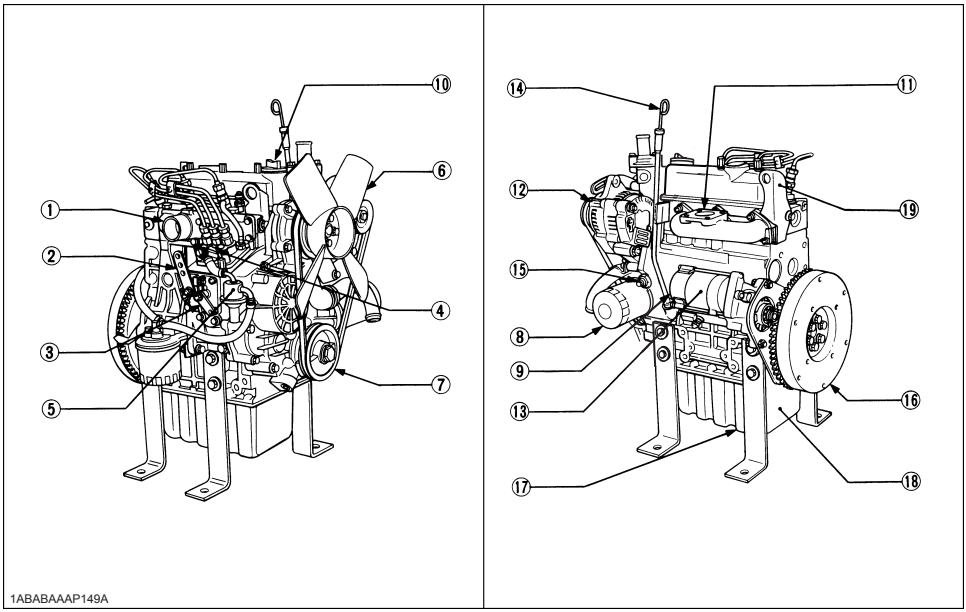
	Type	Serial No.
Engine		
Date of Purchase		
Name of Dealer		
(To be filled in by purchaser)		



(1) Engine serial number

ENGLISH

NAMES OF PARTS



(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 19
	(2) Engine oil level and contamination	15
	(3) Amount of fuel	12
	(4) Amount of coolant	17
	(5) Dust in air cleaner dust cup	19
	(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

ENGLISH

OPERATING THE ENGINE

STARTING THE ENGINE(NORMAL)

CAUTION

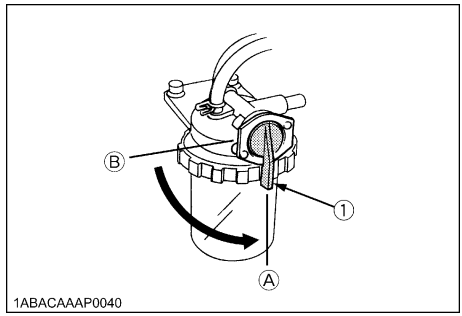
To avoid personal injury:

- **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.

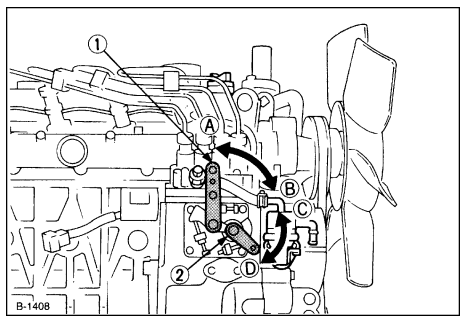
1. Set the fuel lever to the "ON" position.



(1) Fuel lever
(A) "ON"
(B) "OFF"

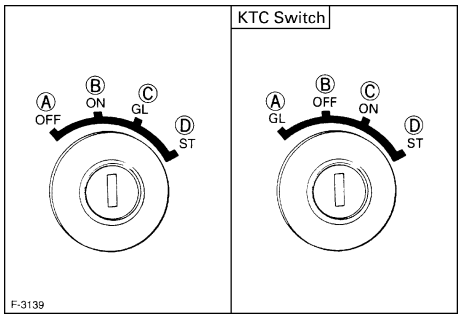
2. Place the engine stop lever to the "START" position.

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"

(A) "PREHEATING"
(B) "SWITCHED OFF"
(C) "OPERATION"
(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	

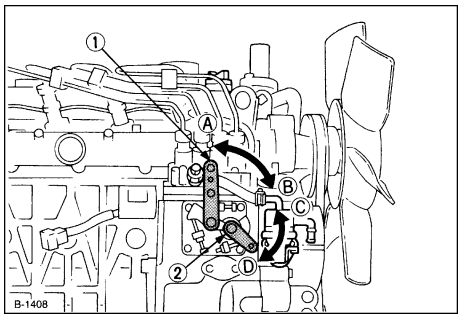
NOTE :
- In case of installing standard glow lamp, glow lamp goes off after about 6 seconds, when the starter switch key is turned to preheating position. However if necessary, keep the starter switch key at preheating position for longer time, according to the left recommendation.

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
(2) Engine stop lever
(A) "IDLING"
(B) "OPERATION"
(C) "START"
(D) "STOP"

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.**

If the coolant temperature warning lamp lights up or if steam or coolant does not stop squirting from the radiator overflow pipe, turn off the load and **keep the engine idling (COOLING-DOWN) for at least 5 minutes** to let it cool down gradually. Then stop the engine and take the following inspection and servicing.

1. Check to see if the coolant runs short or 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; and
5. Check to see if radiator water pipe is clogged.

■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.)

■**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.

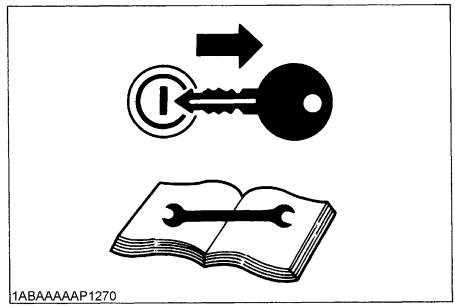
ENGLISH

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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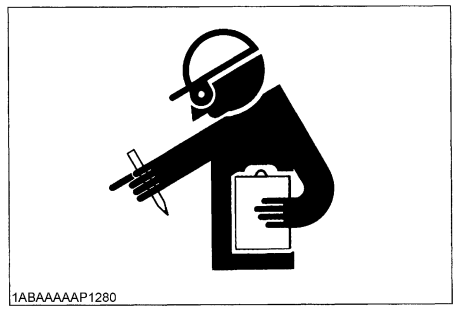

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SERVICE INTERVALS

Observe the following for service and maintenance.

Interval	Item	Ref. page		
Every 50 hours	Check of fuel pipes and clamp bands	13		@
See NOTE	Change of engine oil	15 to 16	◎	
Every 100 hours	Cleaning of air cleaner element	19	*1	@
	Cleaning of fuel filter	14		
	Check of fan belt tightness	21		
	Draining water separator	-		
Every 200 hours	Check of radiator hoses and clamp bands	18		
	Replacement of oil filter cartridge (oil pan depth: 90 mm (3.54 in.))	16	◎	
	Check of intake air line	-		@
Every 400 hours	Replacement of oil filter cartridge (oil pan depth: 124 mm (4.88 in.))	16	◎	@
	Cleaning of water separator	-		
Every 500 hours	Removal of sediment in fuel tank	-		
	Cleaning of water jacket (radiator interior)	17 to 19		
	Replacement of fan belt	21		
Every year	Replacement of air cleaner element	19	*2	@
	Check of damage in electric wiring and loose connections	-		
Every 800 hours	Check of valve clearance	23		
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.)	18 to 19		
	Replacement of radiator hoses and clamp bands	18		
	Replacement of fuel pipes and clamp bands	13	*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≧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 ultra low sulfur fuel is mandatory for these engines, when operated in US EPA regulated areas. Therefore, please use No.2-D S15 diesel fuel as an alternative to No.2-D, and use No.1-D S15 diesel fuel as an alternative to No.1-D for ambient temperatures below -10°C (14°F).
  No.1-D or No.2-D, S15 : Ultra Low Sulfur Diesel (ULSD) 15 ppm or 0.0015 wt.%

- 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 15W-40
-10 to 25°C (14°F to 77°F)	SAE10W-30 or 15W-40
Below -10°C (14°F)	SAE10W-30

- 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 : (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))	---
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

ENGLISH

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 ultra low sulfur fuel is mandatory for these engines, when operated in US EPA regulated areas. Therefore, please use No.2-D S15 diesel fuel as an alternative to No.2-D, and use No.1-D 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, 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

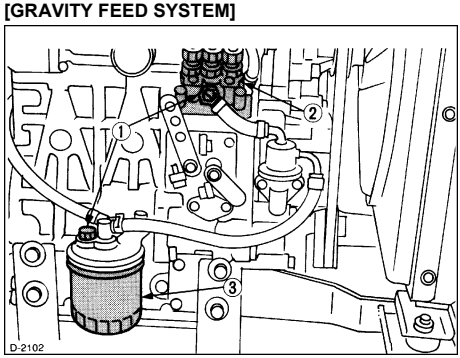
To avoid personal injury;

- **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 Ⓐ] (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]

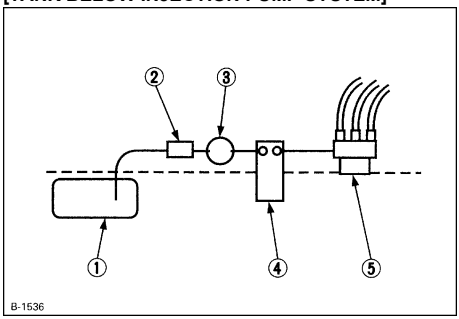


(1) Air vent plug
(2) Injection pump
(3) Fuel filter

[PROCEDURE Ⓑ] (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 Ⓐ)

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

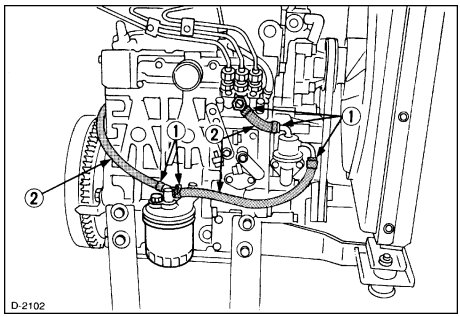
To avoid personal injury;

- **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.

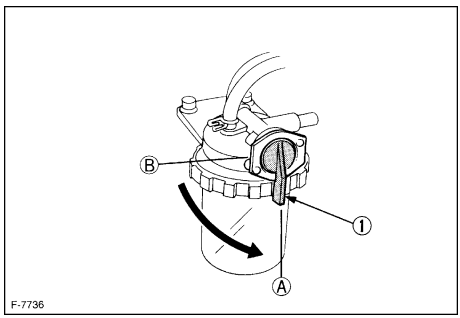


(1) Clamp band
(2) Fuel pipe

■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.

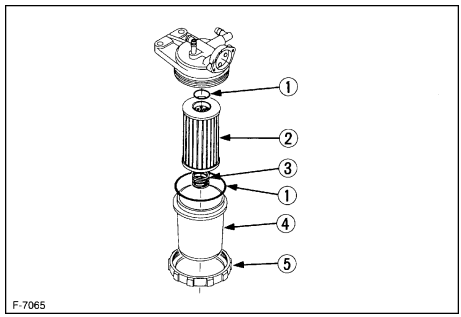


(1) Fuel filter lever
(2) Fuel filter pot
(A) "OFF"
(B) "ON"

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.



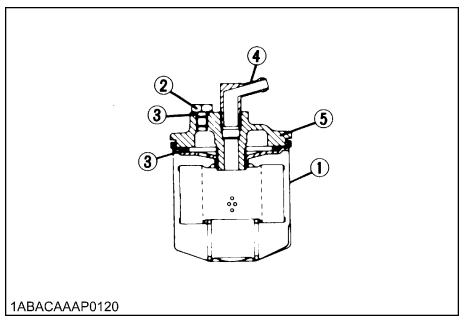
(1) O ring
(2) Filter element
(3) Spring
(4) Filter bowl
(5) Screw ring

■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

ENGINE OIL

CAUTION

To avoid personal injury:

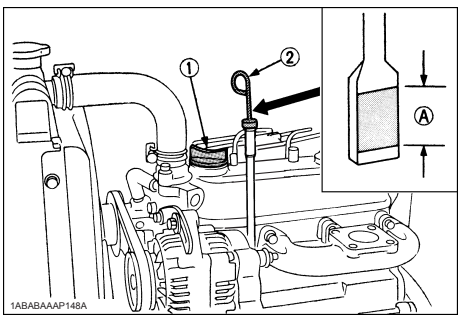
- **Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.**
- **Do not touch muffler or exhaust pipes while they are hot; Severe burns could result. Always stop the engine and allow it to cool before conducting inspections, maintenance, or for a cleaning 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.

■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.

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-E4, D1105-E4	5.1 L (1.35 U.S. gals.)
D1305-E4	5.7 L (1.51 U.S. gals.)
V1505-E4	6.0 L (1.59 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 SAE15W-40
-10°C to 25°C (14°F to 77°F)	SAE10W-30 or SAE15W-40
below -10°C (14°F)	SAE10W-30

- 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**

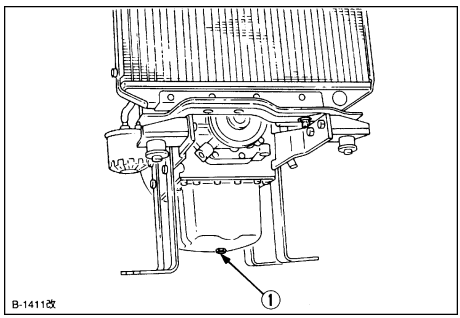
CAUTION

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.



(1) Oil drain plug

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

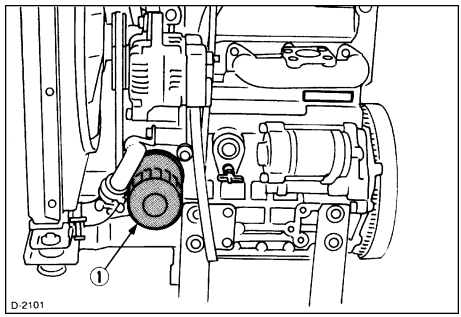
■**Replacing the oil filter cartridge**

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.



(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.

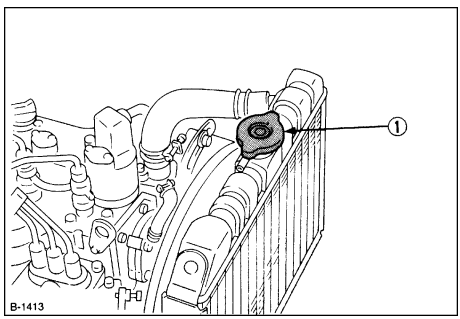
⚠ WARNING

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.

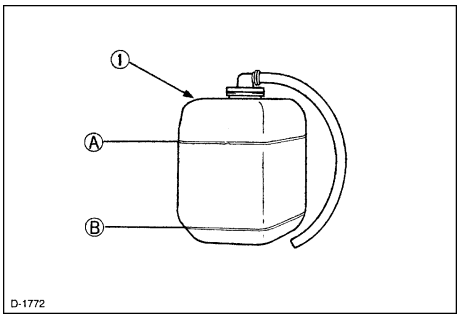
■Checking coolant level, adding coolant

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



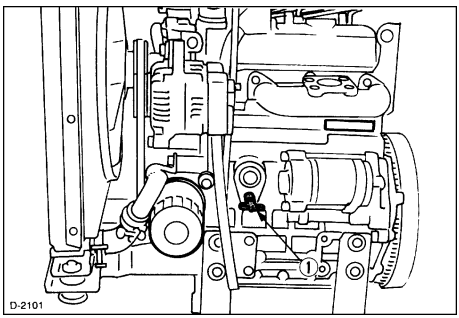
(1) Radiator pressure cap

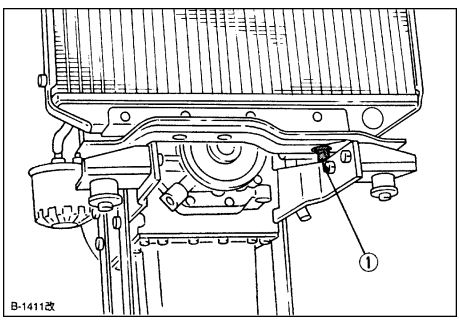
2. If the radiator is provided with a recovery tank, check the coolant level of the recovery tank. When it is between the "FULL" and "LOW" marks, the coolant will last for one day's work.



(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.





(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-E4, D1105-E4, D1305-E4	3.1 L (0.82 U.S.gals.)
V1505-E4	4.0 L (1.06 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 (Anti-freeze)

Season	Coolant
All seasons	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

The event that the coolant temperature is nearly or more than the boiling point is called **"OVERHEATING"**.
While running, make the following checks to see that all parts are working correctly. **If anything is unusual, inspect it, referring to the relevant description in "MAINTENANCE" and "PERIODIC SERVICE" section**.

◆ Coolant

If the coolant temperature warning lamp lights up or if steam or coolant does not stop squirting from the radiator overflow pipe, turn off the load and **keep the engine idling (COOLING-DOWN) for at least 5 minutes** to let it cool down gradually. Then stop the engine and take the following inspection and servicing.
1. Check to see if the coolant runs short or 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; and
5. Check to see if radiator water pipe is clogged.

■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 1.013×10^5 Pa (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 :

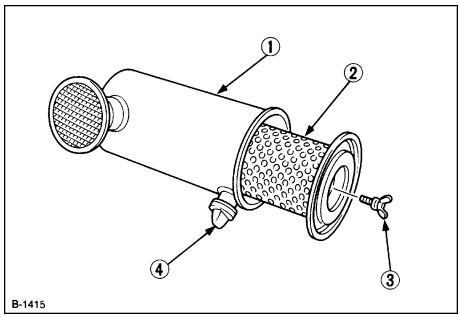
- The above data represent industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.

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/cm^2, 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

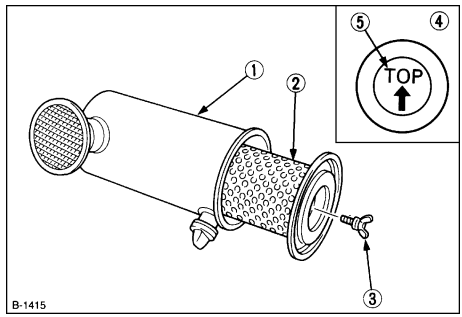
Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place - to get rid of large particles of dust and dirt.

■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 :

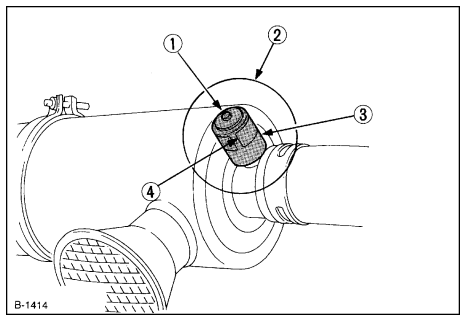
- If the dust cup is mounted incorrectly, dust or dirt does not collect in the cup, and direct attachments of the dust to the element will cause its lifetime to shorten to a great extent.



(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

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:

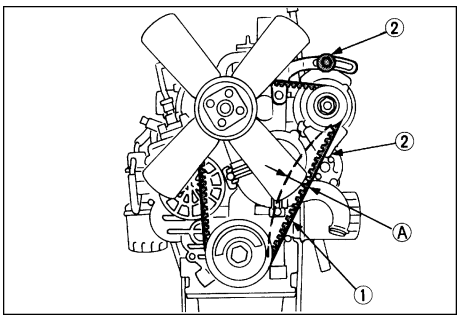
- **● Be sure to stop the engine and remove the key before checking the belt tension.**
- **● Be sure to reinstall the detached safety shield after maintenance or checking.**

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.

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.	* 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	* 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.
Engine oil becomes thick in cold weather and engine cranks slow.	* Change grade of oil according to the weather (temperature).
Battery is discharged and the engine will not crank.	* 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
Fuel is insufficient.	* Check fuel system.
Overheating of moving parts	* 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.
Air cleaner is dirty	* Clean the element every 100 hours of operation.
Injection pump wear	* 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.)

NOTE :

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

■When engine suddenly stops

Cause	Countermeasures
Lack of fuel	* Check the fuel tank and refill the fuel, if necessary. * Also check the fuel system for air or leaks.
Bad nozzle	* If necessary, replace with a new nozzle.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	* 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.

■When color of exhaust is especially bad

Cause	Countermeasures
Fuel is of extremely poor quality.	* Select good quality fuel. Use No. 2-D diesel fuel only.
Nozzle is bad.	* If necessary, replace with new nozzle.

■When engine must be stopped immediately

Cause	Countermeasures
Color of exhaust suddenly turns dark.	* Check the fuel injection system, especially the fuel injection nozzle.
Bearing parts are overheated.	* Check the lubricating system.
Oil lamp lights up during operation.	* Check the lubricating system. * 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	* Check oil level. Replenish oil as required.
Fan belt broken or elongated	* Change belt or adjust belt tension.
Coolant insufficient	* Replenish coolant.
Excessive concentration of antifreeze	* Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiator fin clogged with dust	* Clean net or fin carefully.
Inside of radiator or coolant flow route corroded	* Clean or replace radiator and parts.
Fan or radiator or radiator cap defective	* Replace defective parts.
Thermostat defective	* Check thermostat and replace if necessary.
Temperature gauge or sensor defective	* Check temperature with thermometer and replace if necessary.
Overload running	* Reduce load.
Head gasket defective or water leakage	* Replace parts.
Unsuitable fuel used	* Use the specified fuel.

SPECIFICATIONS

Model	D1005-E4	D1105-E4
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)	17.7/3200 (23.7/3200)	17.8/3000 (23.9/3000)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	15.4/3200 (20.6/3200)	15.4/3000 (20.7/3000)
Maximum bare speed rpm	3420	3220
Minimum bare idling speed rpm	1300	900
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.)	20°	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, 1.2 kW	
Charging generator	12 V, 480 W	
Recommended battery capacity	12 V, 65 AH, equivalent	

NOTE :

- Specifications are subject to change without notice.

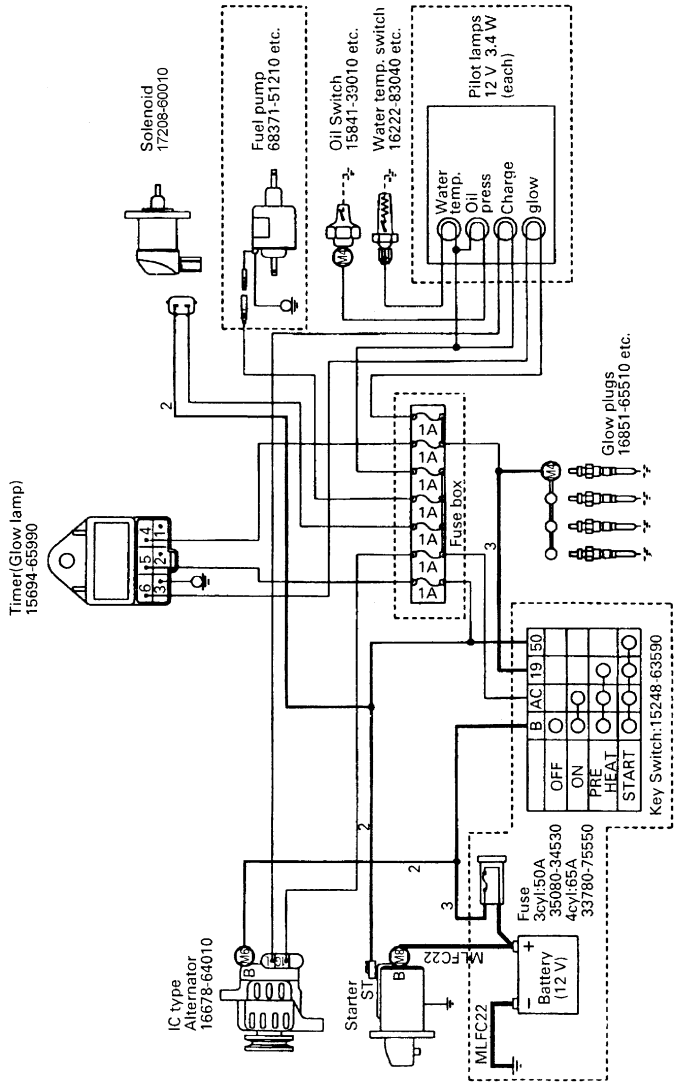
Model	D1305-E4	V1505-E4
Type	Vertical, water-cooled, 4-cycle diesel engine	
Number of cylinders	3	4
Bore and stroke mm (in.)	78 × 88 (3.07 × 3.46)	78 × 78.4 (3.07 × 3.09)
Total displacement cm^3 (cu.in.)	1261 (76.95)	1498 (91.41)
Combustion chamber	Spherical Type (E-TVCS)	
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	17.9/2600 (24/2600)	17.7/2300 (23.7/2300)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	15.5/2600 (20.8/2600)	15.4/2300 (20.6/2300)
Maximum bare speed rpm	2820	2520
Minimum bare idling speed rpm	1100	1150
Order of firing	1-2-3	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.)	16°	14°
Compression ratio	24 : 1	
Fuel	Diesel Fuel No.2-D (ASTM D975)	
Lubricant (API classification)	above CF grade	
Dimension mm (in.) (length × width × height)	497.6 × 396.0 × 590.1 (19.59 × 15.59 × 23.2)	591.3 × 396.0 × 607.0 (23.28 × 15.59 × 23.90)
Dry weight (BB Spec.) kg (lbs.)	95 (209)	110 (242.5)
Starting system	Cell starter (with glow plug)	
Starting motor	12 V, 1.2 kW	
Charging generator	12 V, 480 W	
Recommended battery capacity	12 V, 65 AH, equivalent	12 V, 75 AH, equivalent

NOTE :

- Specifications are subject to change without notice.

WIRING DIAGRAMS

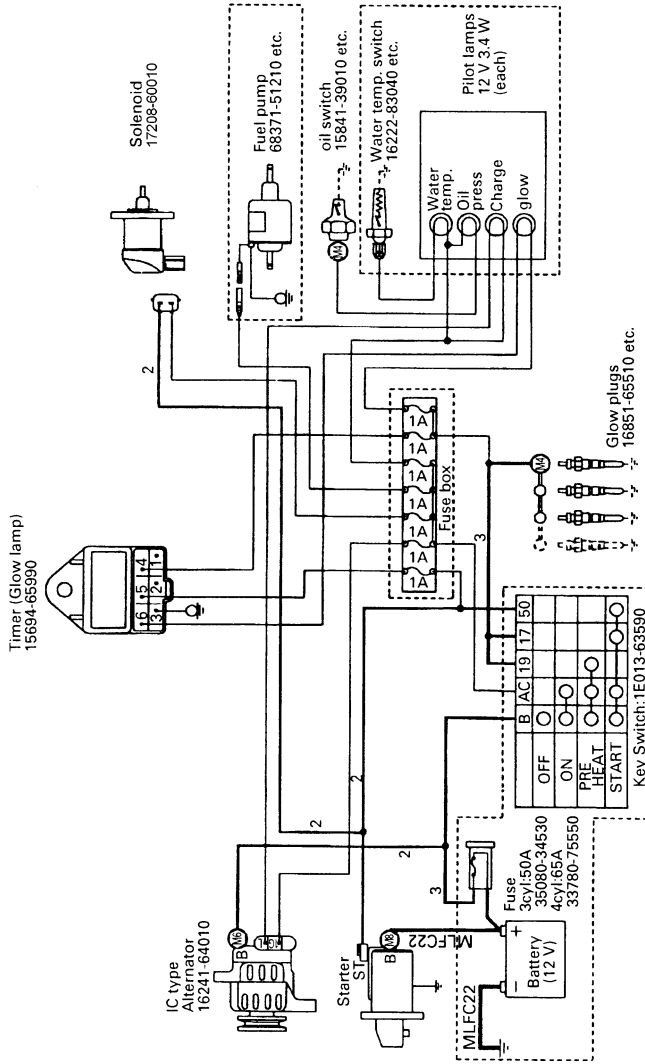
EU standard
(Energize to run)



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

ENGLISH

KEA/SAE standard
(Energize to run)



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

V1505-E4B-KEA-1-PROBST

Update Date: 09/03/2016, Printing Date: 09/03/2016

ILLUSTRATED PARTS LIST
LISTA DE PIEZAS
LISTE DES PIECES

KUBOTA

MODEL
MODELO
MODELE

V1505-E4B-KEA-PROBST

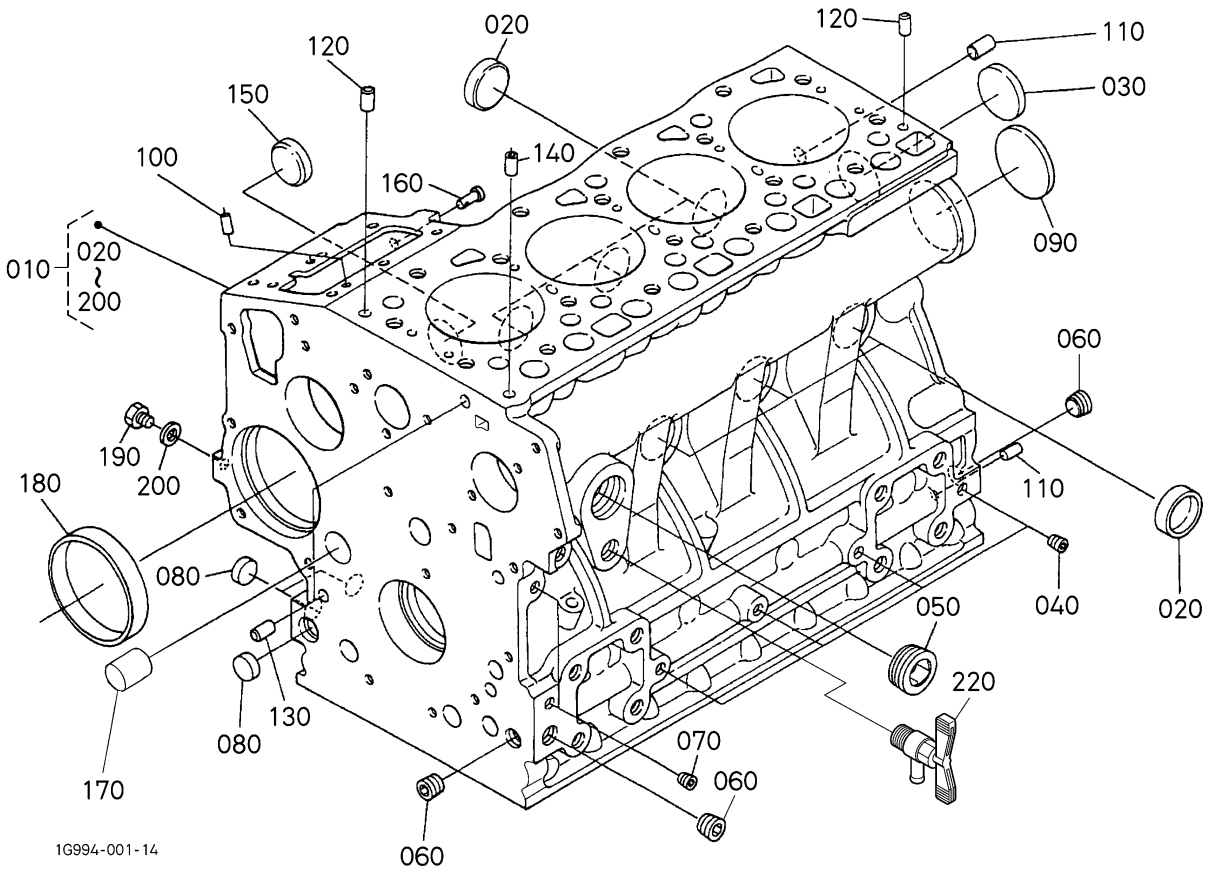
DIESEL ENGINE
MOTOR DIESEL
MOTEUR DIESEL

Kubota

March 9, 2016

V1505-E4B-KEA-1 -> ENGINE -> 000100 CRANKCASE ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

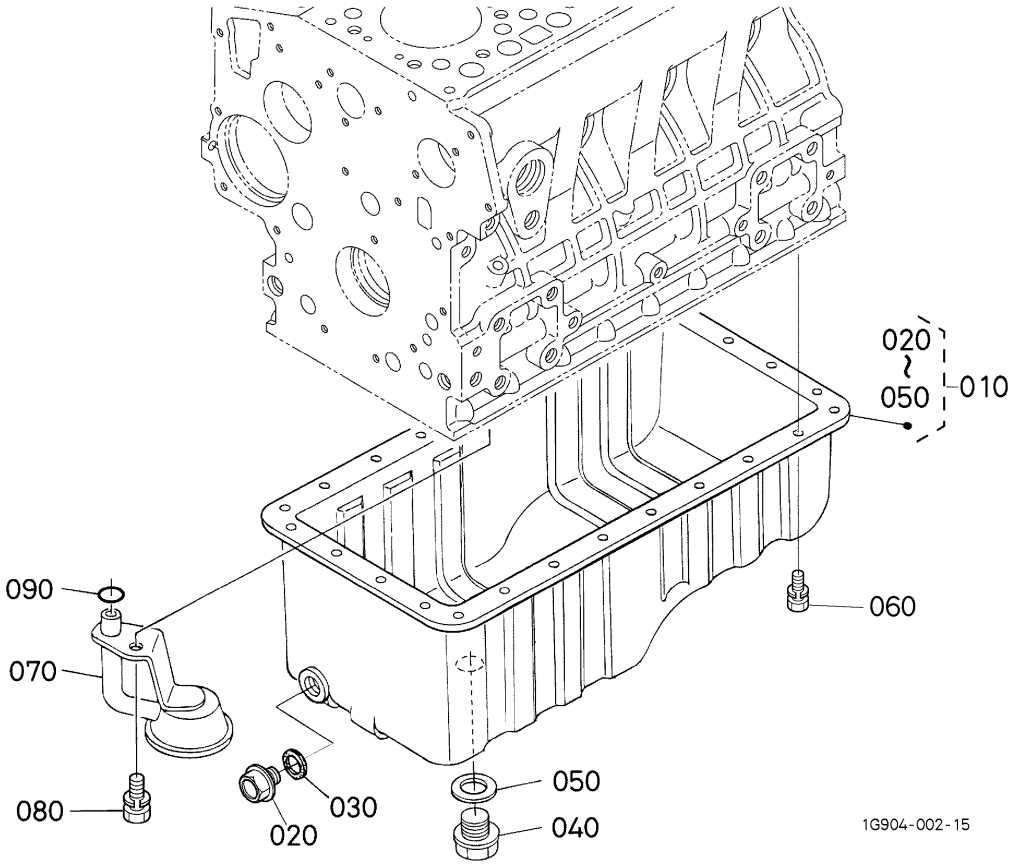


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G090-01013	COMP.CRANKCASE	1				0.0
020	15451-96270	CAP,SEALING	6				0.01
030	15221-03490	CAP,SEALING	1				0.02
040	15261-96010	PLUG	4				0.002
050	16683-96020	PLUG	1				0.088
060	16241-96010	PLUG	3				0.007
070	15521-96020	PLUG	2				0.003
080	17391-96160	PLUG,EXPANSION	3				0.003
090	16271-96160	PLUG,EXPANSION	1				0.025
100	05012-00508	PIN,STRAIGHT	2				0.001
110	05012-00814	PIN,STRAIGHT	2				0.006
120	05012-00610	PIN,STRAIGHT	2				0.003
130	15231-33960	PIN,PIPE	2				0.001
140	16241-33650	PIN,PIPE	1				0.002
150	16241-96262	PLUG,FUEL CAMSHAFT	1				0.007
160	16221-56280	PIN,START SPRING	1				0.005
170	16282-96010	PLUG	1				0.09
180	16271-55350	BUSHING(GEAR,GOBERNOR)	1				0.06
190	1G896-33610	PLUG	1				0.008
200	15021-33660	PACKING	1				0.001
220	16871-73020	COCK,ASSY(DRAIN)	1				0.034

V1505-E4B-KEA-1 -> ENGINE -> 000200 OIL PAN ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

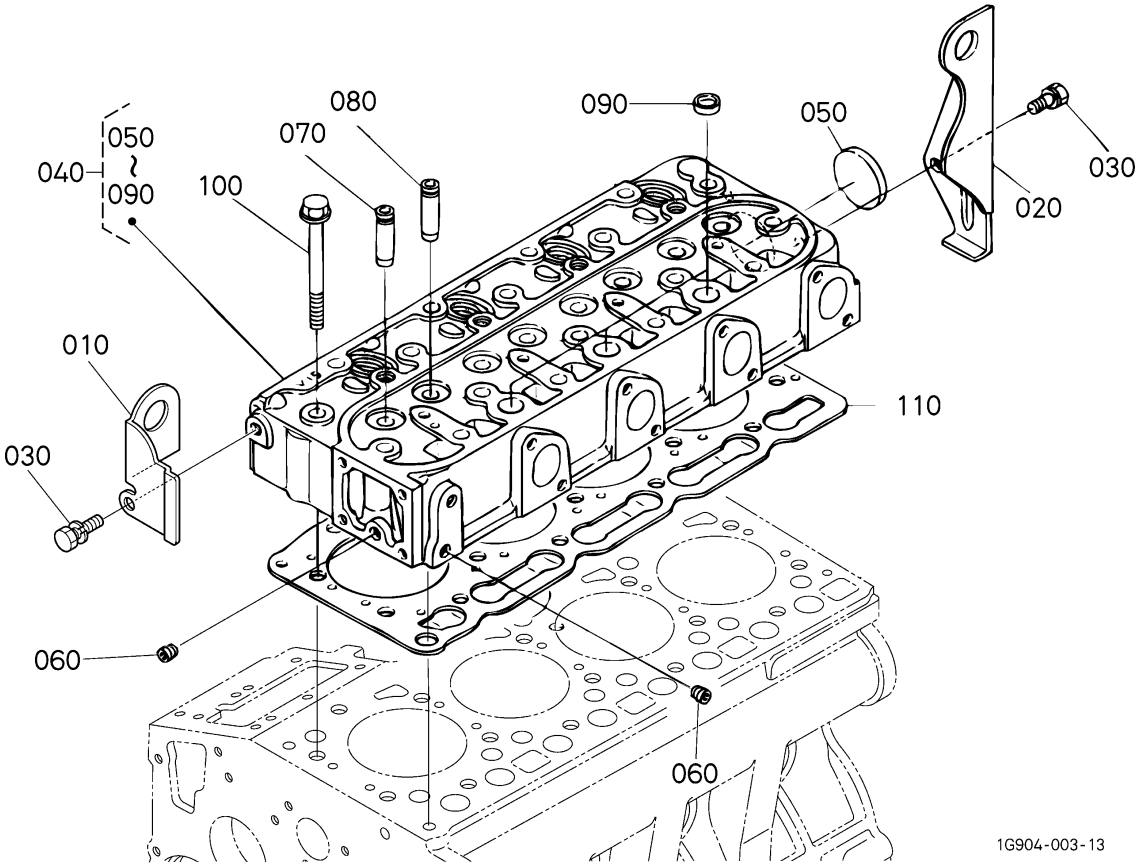


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16616-01600	KIT OIL PAN	1				2.11
020	13901-33750	PLUG,DRAIN	1				0.025
030	6C090-58960	GASKET	1				0.005
040	16286-33750	PLUG,DRAIN	1				0.09
050	16265-96670	PACKING	1				0.005
060	16221-91122	BOLT,SEMS	26				0.005
070	16226-32114	FILTER,OIL	1				0.28
080	01123-50816	BOLT,SEMS	1				0.011
090	04814-00160	O RING	1				0.001

V1505-E4B-KEA-1 -> ENGINE -> 000300 CYLINDER HEAD ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

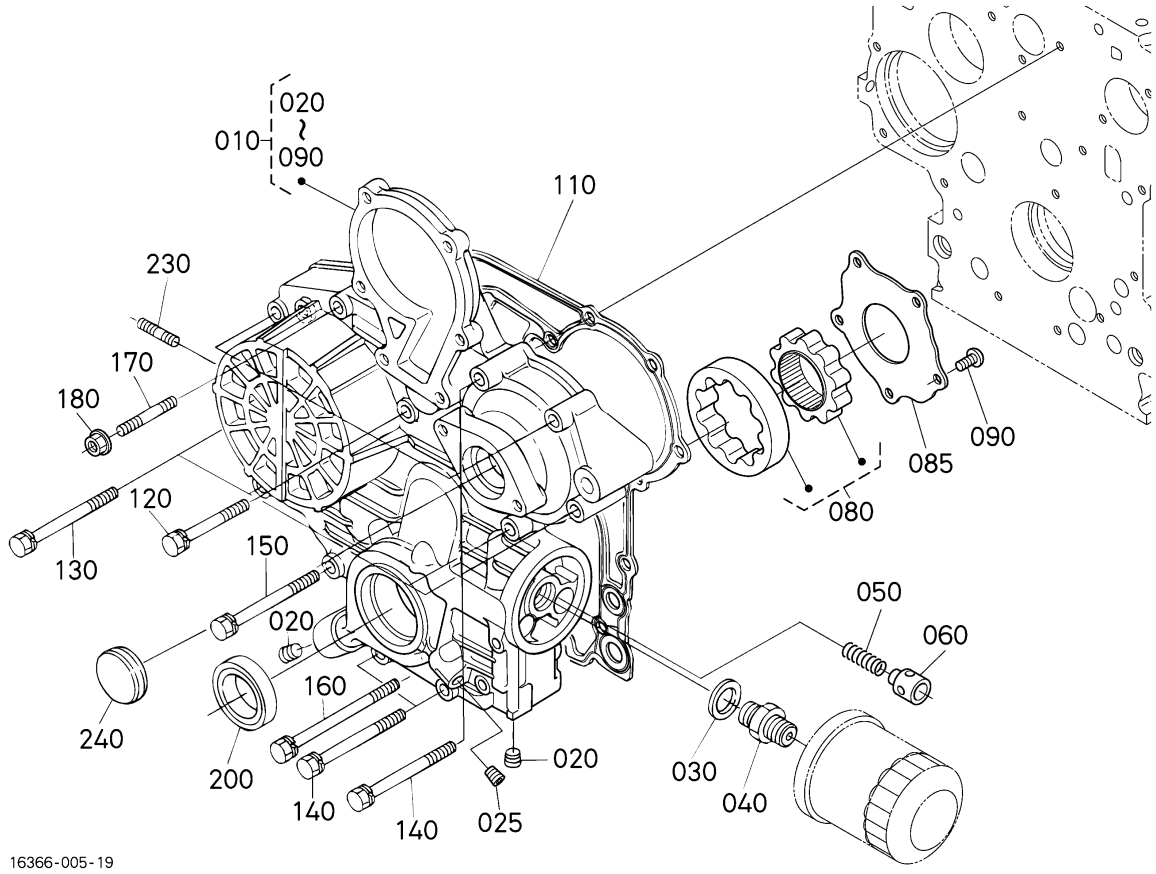


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16241-01753	HOOK,ENGINE	1				0.14
020	16241-01770	HOOK,ENGINE	1				0.175
030	01123-50814	BOLT,SEMS	2				0.01
040	1G677-03040	COMP.CYLINDER HEAD	1				11.7
050	15321-96260	CAP,SEALING	1				0.014
060	15261-96010	PLUG	2				0.002
070	16261-13540	GUIDE,INLET VALVE	4				0.02
080	16261-13560	GUIDE,EXHAUST VALVE	4				0.019
090	15261-03370	CAP,SEALING	3				0.005
100	16241-03450	BOLT,HEAD(CYLINDER)	18				0.05
110	16394-03313	GASKET,CYLINDER HEAD	1				0.2

V1505-E4B-KEA-1 -> ENGINE -> 000400 GEAR CASE ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

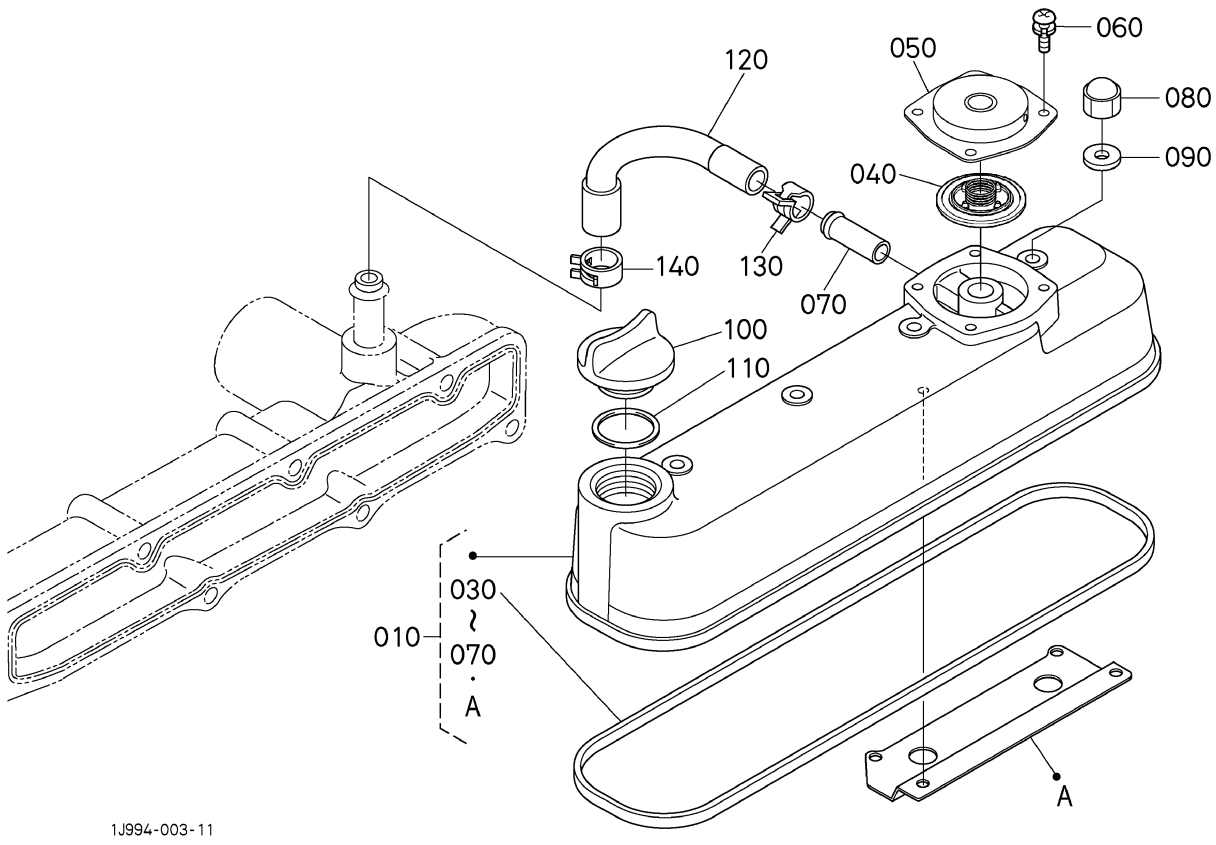


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16252-04024	COMP.CASE,GEAR	1				2.46
020	16241-96020	PLUG	2				0.015
025	15521-96020	PLUG	1				0.003
030	04011-50180	WASHER,PLAIN	1				0.012
040	15241-32290	JOINT,PIPE	1				0.053
050	1J050-36950	SPRING	1				0.004
060	1J050-36930	VALVE(RELIEF)	1				0.005
080	1J050-35070	ROTOR,ASSY(OIL PUMP)	1				0.244
085	1J050-35132	COVER(OIL PUMP)	1				0.085
090	03017-50614	SCREW,BINDING(PHILLIPS)	5				0.005
110	16264-04132	GASKET,GEAR CASE	1				0.01
120	01023-50645	BOLT,SEMS	3				0.01
130	01023-50650	BOLT,SEMS	4				0.012
140	01023-50655	BOLT,SEMS	4				0.012
150	01023-50665	BOLT,SEMS	1				0.015
160	16241-91040	BOLT	1				0.015
170	16245-91530	STUD	1				0.01
180	02751-50060	NUT,FLANGE	1				0.005
200	16241-04212	SEAL,OIL	1				0.012
230	16245-91540	STUD	2				0.005
240	16264-83342	COVER,GEAR CASE	1				0.01

V1505-E4B-KEA-1 -> ENGINE -> 000500 HEAD COVER ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

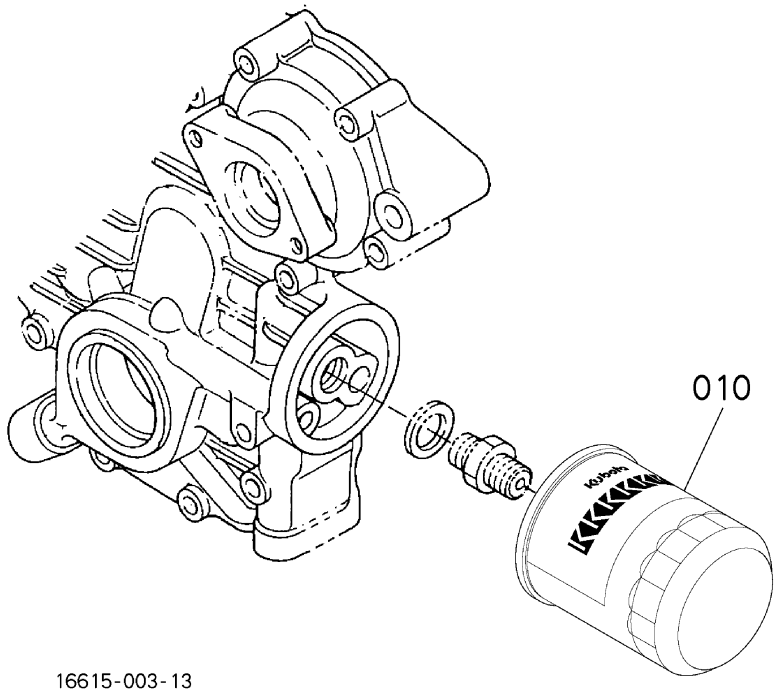


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G072-14506	ASSY COVER,CYL.HEAD	1				0.95
030	16241-14520	GASKET,HEAD COVER	1				0.012
040	1G911-05203	COMP VALVE,BREATHER	1				0.01
050	1G801-05120	COVER,BREATHER	1				0.035
060	03024-50510	SCREW,SEMS(PAN HEAD)	4				0.002
070	17331-73342	PIPE,WATER RETURN	1				0.01
080	15952-92330	NUT,CAP	4				0.01
090	15951-96660	PACKING	4				0.001
100	E9151-33140	PLUG(OIL FILLER)	1				0.017
110	1J001-96770	O RING	1				0.001
120	1G032-05510	TUBE,BREATHER	1				0.017
130	09318-88150	CLAMPHOSE	1				0.004
140	16259-05580	BAND,PIPE	1				0.03

V1505-E4B-KEA-1 -> ENGINE -> 000600 OIL FILTER ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

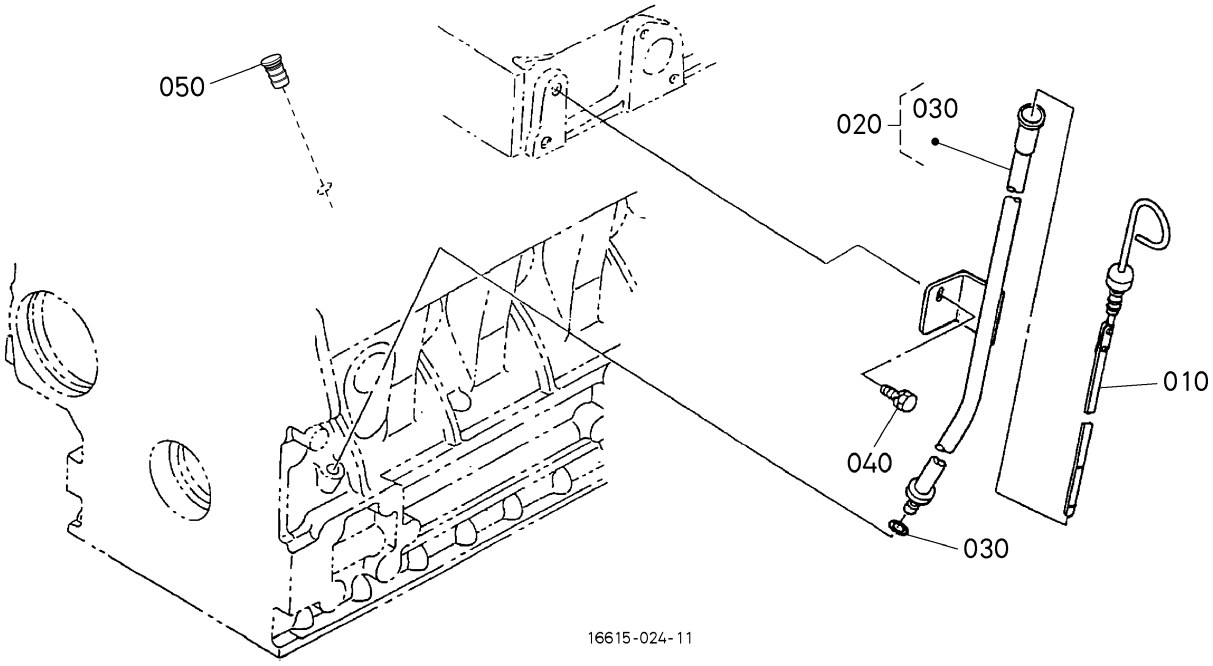


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	HH160-32093	CARTRIDGE OIL FILTER	1				0.36

V1505-E4B-KEA-1 -> ENGINE -> 000700 DIPSTICK AND GUIDE ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

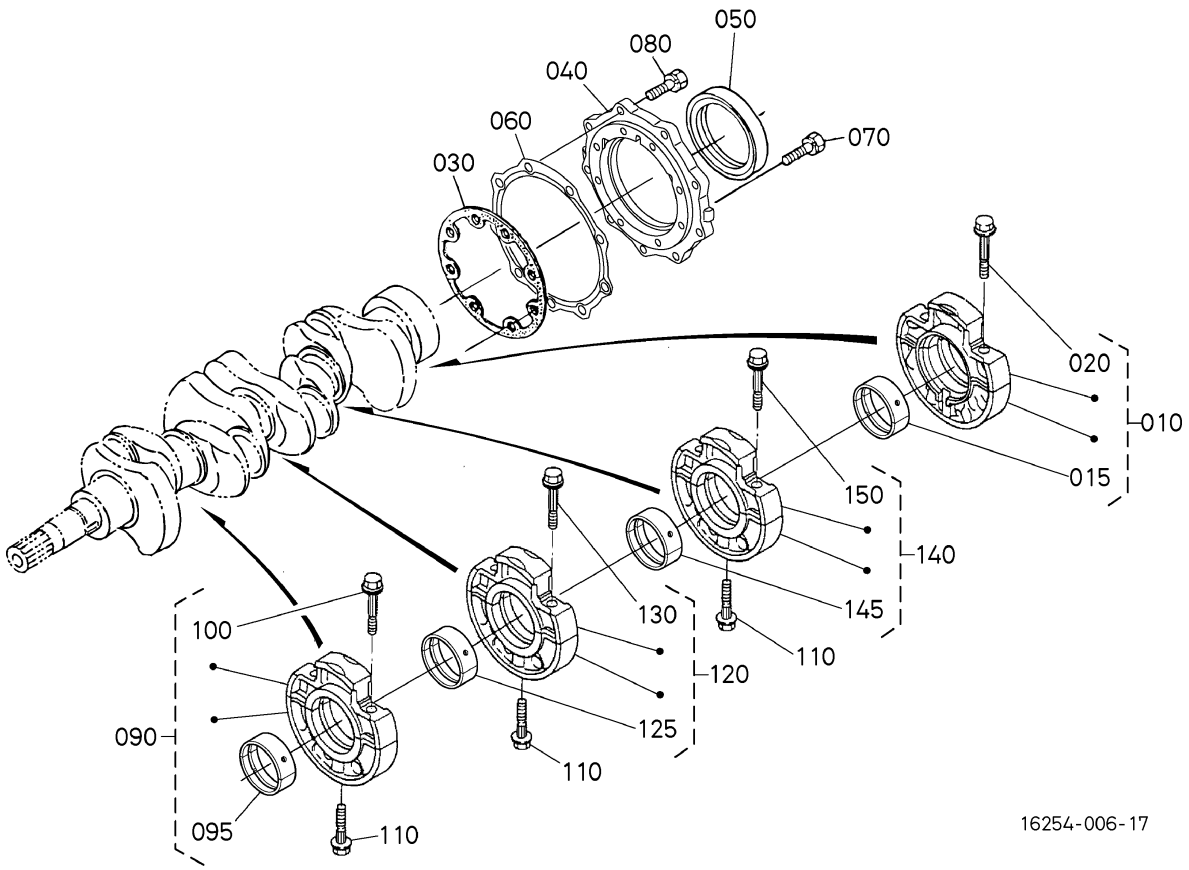


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16611-36413	GAUGE,OIL	1				0.028
020	16282-36500	ASSY GUIDE,OIL GAUGE	1				0.11
030	04814-00090	O RING	1				0.001
040	01123-50814	BOLT,SEMS	1				0.01
050	1G513-36550	PLUG,OIL GAUGE	1				0.004

V1505-E4B-KEA-1 -> ENGINE -> 010000 MAIN BEARING CASE ## V1505-E4B-KEA-1

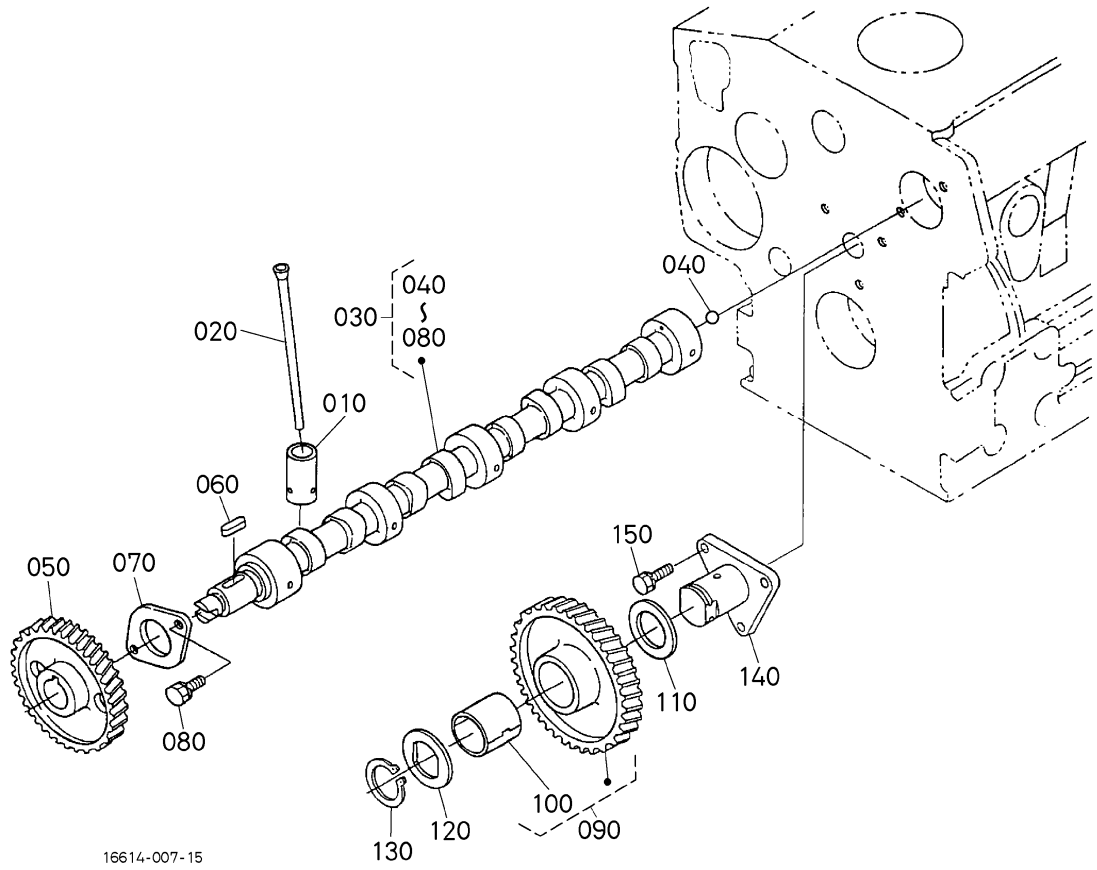
Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16292-07095	CASE,BRG,ASSY(WHEEL)	1				1.1
015	16292-23494	METAL,CRANKSHAFT	1			STD/SET	0.07
020	16241-04540	BOLT(CASE,BRG)	2				0.02
030	1J095-04360	GASKET(BRG.CASE)	1				0.006
040	16241-04815	COVER(CASE,BRG)	1				0.22
050	16285-04460	SEAL,OIL	1				0.003
060	16264-04822	GASKET	1				0.008
070	1G679-91010	BOLT	8				0.007
080	1G679-91020	BOLT	9				0.006
090	16261-07047	ASSY BRG.CASE,MAIN	1				0.86
095	16292-23483	METAL,CRANKSHAFT	1			STD/SET	0.05
100	16241-04540	BOLT(CASE,BRG)	2				0.02
110	16241-04560	BOLT(CASE,BRG)	3				0.03
120	16261-07057	ASSY BRG.CASE,MAIN	1				0.8
125	16292-23483	METAL,CRANKSHAFT	1			STD/SET	0.05
130	16241-04540	BOLT(CASE,BRG)	2				0.02
140	16282-07067	ASSY BRG.CASE,MAIN	1				0.87
145	16292-23483	METAL,CRANKSHAFT	1			STD/SET	0.05
150	16241-04540	BOLT(CASE,BRG)	2				0.02

Update Date: 03/06/2015, Printing Date: 09/03/2016

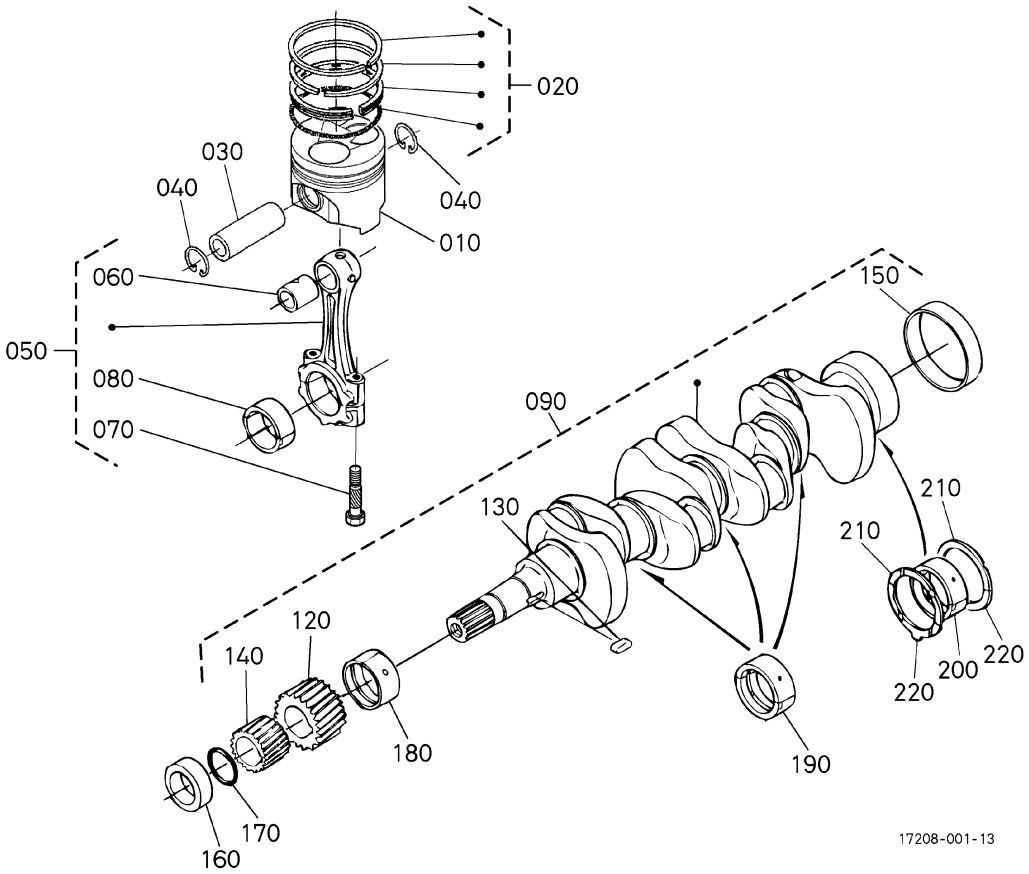


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G673-15550	TAPPET	8				0.035
020	16241-15114	PUSH ROD	8				0.028
030	1J098-16010	ASSY CAMSHAFT	1				1.825
040	07715-00401	BALL 1/4	1				0.001
050	16241-16510	GEAR,CAM	1				0.45
060	05712-00518	FEATHER KEY	1				0.003
070	16241-16270	STOPPER(CAMSHAFT)	1				0.04
080	01023-50616	BOLT,SEMS	2				0.006
090	16271-24012	COMP GEAR,IDLE	1				0.6
100	16271-24982	BUSH,IDLE GEAR	1				0.02
110	16241-24360	COLLAR,IDLE GEAR	1				0.01
120	16241-24370	COLLAR,IDLE GEAR	1				0.012
130	16241-24320	CIR CLIP,IDLE GEAR	1				0.003
140	16241-24250	SHAFT,IDLE GEAR	1				0.255
150	01023-50616	BOLT,SEMS	3				0.006

V1505-E4B-KEA-1 -> ENGINE -> 010200 PISTON AND CRANKSHAFT ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016



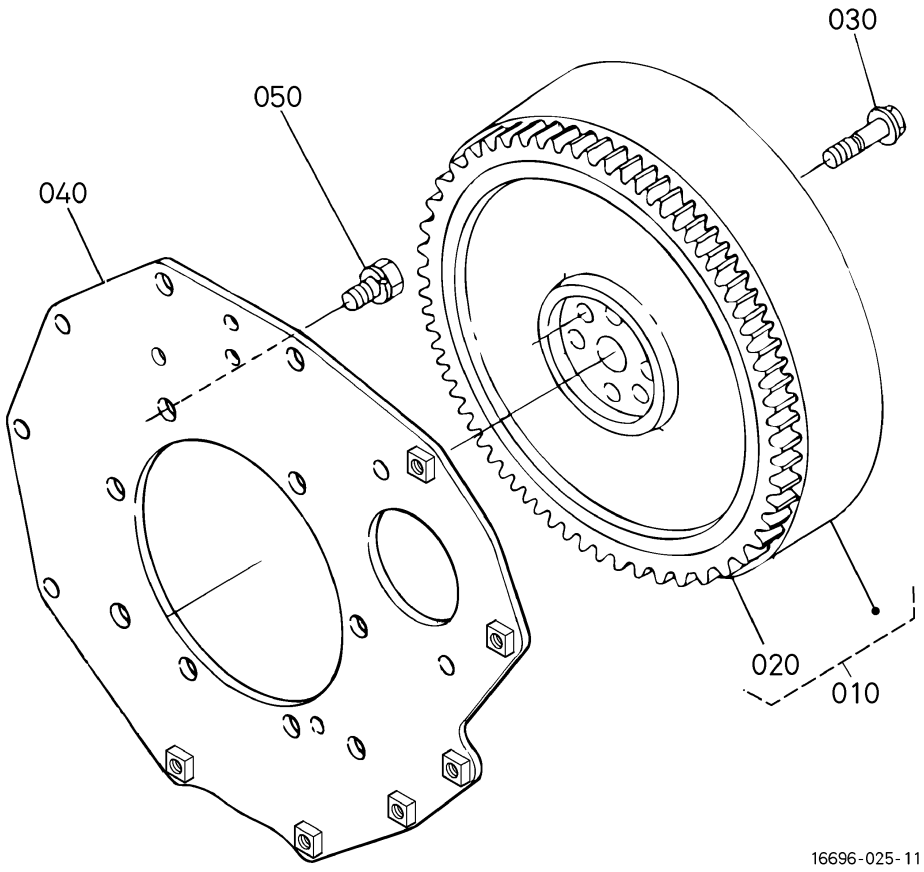
Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1J097-21110	PISTON	4			STD	0.414
010	1J097-21910	PISTON(05)	4			+0.50mm	0.425
020	1J050-21050	RING,PISTON,ASSY	4			STD	0.04
020	1J050-21090	RING,PISTON,ASSY 05	4			+0.50mm	0.032
030	16241-21310	PIN,PISTON	4				0.135
040	16241-21330	CIRCLIP(PIN,PISTON)	8				0.002
050	16292-22016	ROD,CONNECTING,ASSY	4				0.526
060	1G700-21980	BUSH,PISTON PIN	4				0.01
070	16241-22142	BOLT(CONNECTING ROD)	8				0.024
080	16292-22310	METAL(PIN,CRANK)	4			STD/SET	0.04
080	16292-22972	METAL,CRANKPIN	4			-0.20mm/SET	0.033
080	16292-22982	METAL,CRANKPIN	4			-0.40mm/SET	0.034
090	1G871-23016	COMP.CRANKSHAFT	1				10.45
120	1A055-24110	GEAR(CRANKSHAFT)	1				0.142
130	16271-95230	KEY	1				0.005
140	1J050-35630	GEAR(OIL PUMP DRIVE)	1				0.09
150	16241-23280	SLEEVE,CRANKSHAFT	1				0.06
160	1J050-23250	COLLAR(CRANKSHAFT)	1				0.047
170	04814-10280	RING	1				0.001
180	16292-23473	METAL(CRANKSHAFT)	1			STD	0.046
180	16292-23913	METAL(CRANKSHAFT)	1			-0.20mm	0.005

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
180	16292-23923	METAL(CRANKSHAFT)	1			-0.40mm	0.05
190	16292-23483	METAL,CRANKSHAFT	3			STD/SET	0.05
190	16292-23933	METAL,CRANKSHAFT	3			-0.20mm/SET	0.05
190	16292-23943	METAL,CRANKSHAFT	3			-0.40mm/SET	0.05
200	16292-23494	METAL,CRANKSHAFT	1			STD/SET	0.07
200	16292-23864	METAL,CRANKSHAFT	1			-0.20mm/SET	0.05
200	16292-23874	METAL,CRANKSHAFT	1			-0.40mm/SET	0.05
210	15521-23533	METAL,SIDE	2			STD	0.01
210	15521-23953	METAL,SIDE	2			+0.20mm	0.01
210	15521-23963	METAL,SIDE	2			+0.40mm	0.01
220	19202-23543	METAL,SIDE	2			STD	0.01
230	19202-23973	METAL,SIDE	2			+0.20mm	0.01
240	19202-23983	METAL,SIDE	2			+0.40mm	0.01

V1505-E4B-KEA-1 -> ENGINE -> 010300 FLYWHEEL ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

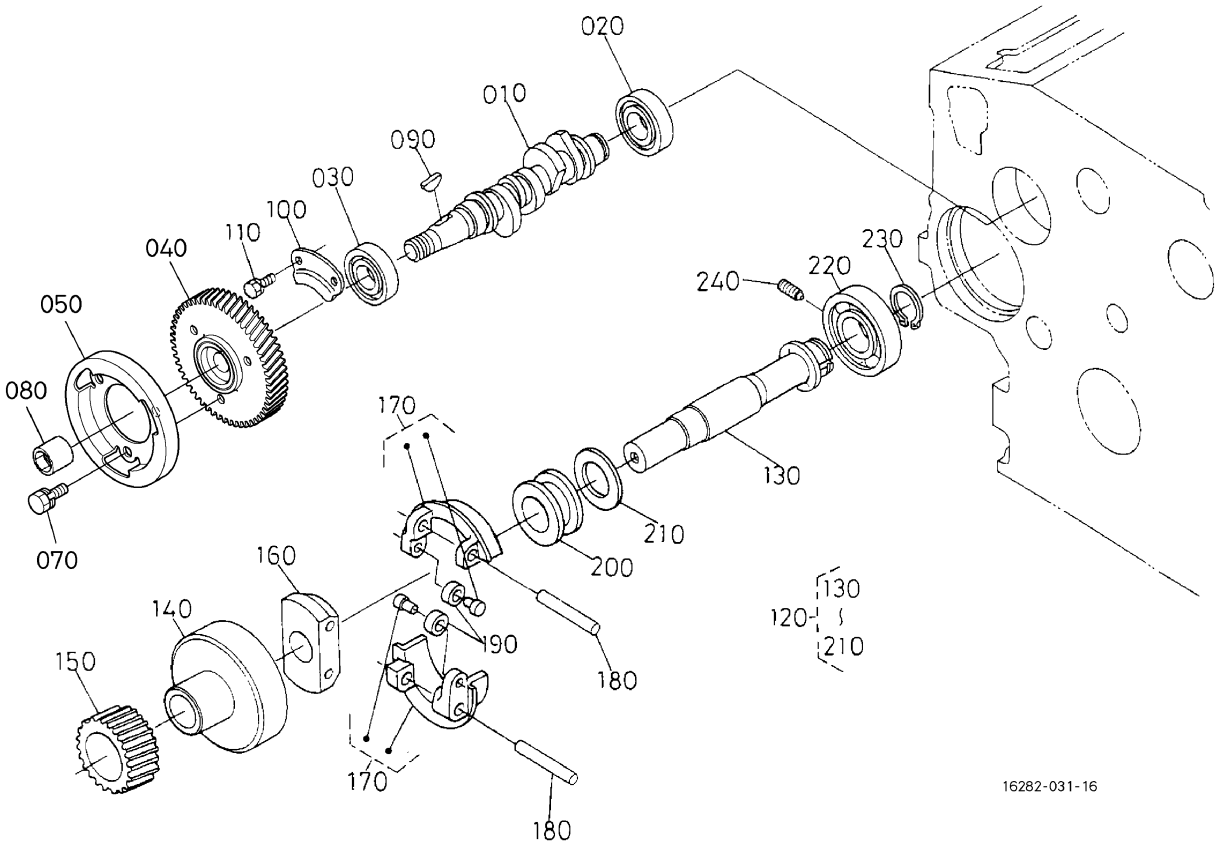


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16614-25012	COMP.FLYWHEEL	1				13.2
020	1G081-63820	GEAR,RING	1				0.63
030	16241-25160	BOLT,FLYWHEEL	6				0.03
040	16241-04620	PLATE,REAR END	1				2.77
050	15261-91190	BOLT	8				0.03

V1505-E4B-KEA-1 -> ENGINE -> 010500 FUEL CAMSHAFT AND GOVERNOR SHAFT ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

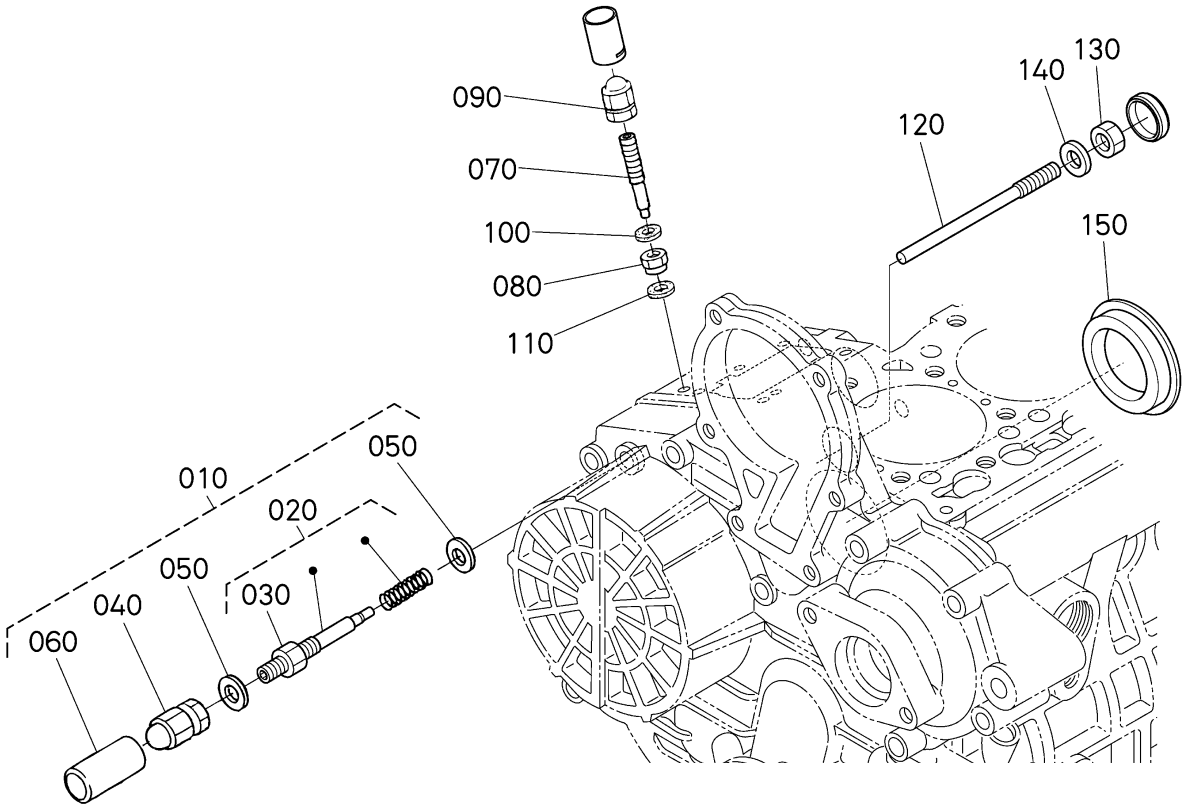


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16040-16170	CAMSHAFT,FUEL	1				0.32
020	16261-97300	BEARING,BALL	1				0.044
030	16261-97310	BEARING,BALL	1				0.1
040	1G065-51150	GEAR,INJECTION PUMP	1				0.49
050	16241-51114	CAM,FUEL	1				0.196
070	01023-50612	BOLT,SEMS	3				0.005
080	1J050-92330	NUT	1				0.021
090	16241-95230	KEY,WOODRUFF	1				0.001
100	16241-16320	STOPPER,FUEL.C/SHAFT	1				0.04
110	01023-50616	BOLT,SEMS	2				0.006
120	16282-55019	ASSY SHAFT,GOVERNOR	1				1.25
130	16271-55313	SHAFT,GOVERNOR	1				0.343
140	16241-55392	HOLDER,GOVERNOR GEAR	1				0.34
150	16282-55320	GEAR,GOVERNOR	1				0.24
160	16241-55270	HOLDER,GOV.WEIGHT	1				0.085
170	16241-55064	COMP.WEIGHT,GOVERNOR	2				0.085
180	16241-55260	SHAFT,GOV. WEIGHT	2				0.013
190	19484-55440	ROLLER	2				0.005
200	16241-55450	SLEEVE,GOVERNOR	1				0.04
210	16241-55463	WASHER,THRUST	1				0.005

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
220	16261-97320	BALL BEARING	1				0.14
230	16271-55410	CIR CLIP,GOV.SHAFT	1				0.005
240	16241-55554	SCREW,SET	1				0.007

Update Date: 03/06/2015, Printing Date: 09/03/2016

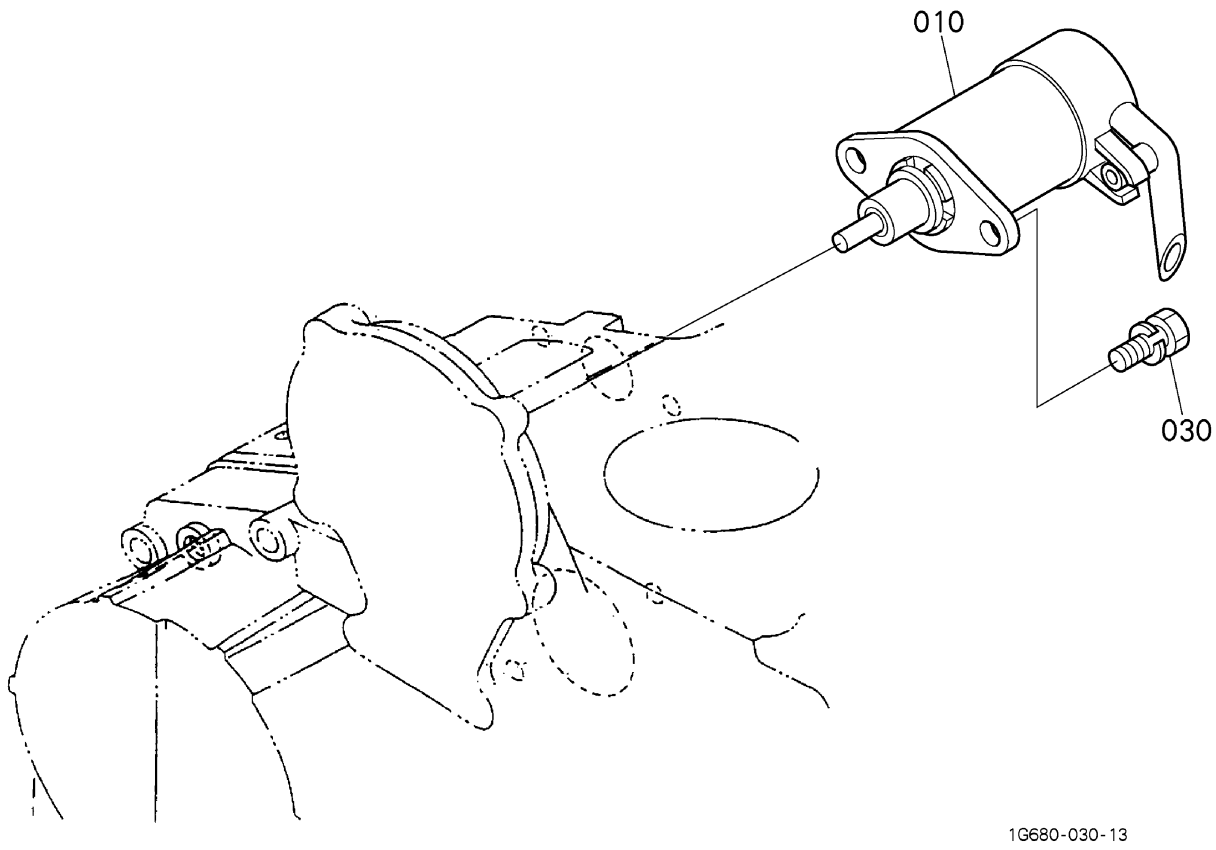


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16282-54093	ASSY APPARATUS,IDLE	1				0.025
020	16282-54103	ASSY BOLT,ADJUSTING	1				0.01
030	15841-92020	NUT	1				0.004
040	15852-92330	NUT,CAP	1				0.005
050	15601-96650	PACKING	2				0.001
060	16221-54420	CAP	1				0.001
070	16241-54122	BOLT,ADJUSTING	1				0.005
080	1G031-54210	NUT(LOCK)	1				0.003
090	15852-92330	NUT,CAP	1				0.005
100	15601-96650	PACKING	1				0.001
110	1G021-96650	GASKET	1				0.001
120	1G092-54150	BOLT	1				0.012
130	02056-50060	HEX.NUT	1				0.002
140	15601-96650	PACKING	1				0.001
150	16264-83153	COVER,HYDRAULIC PUMP	1				0.028

V1505-E4B-KEA-1 -> ENGINE -> 020100 STOP SOLENOID ## V1505-E4B-KEA-1

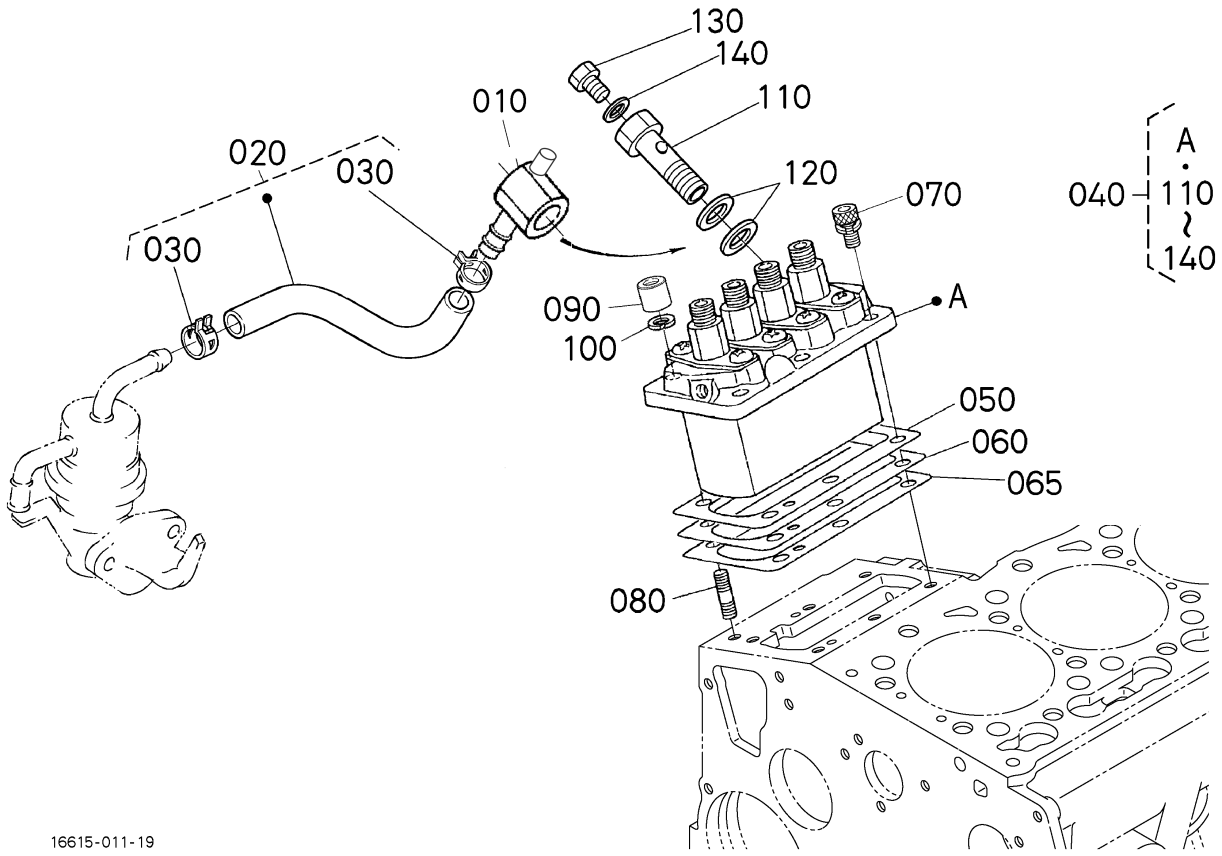
Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	17208-60016	ASSY SOLENOID,STOP	1				0.2
030	01311-10612	BOLT,SOCKET HEAD	2				0.005

Update Date: 09/03/2016, Printing Date: 09/03/2016

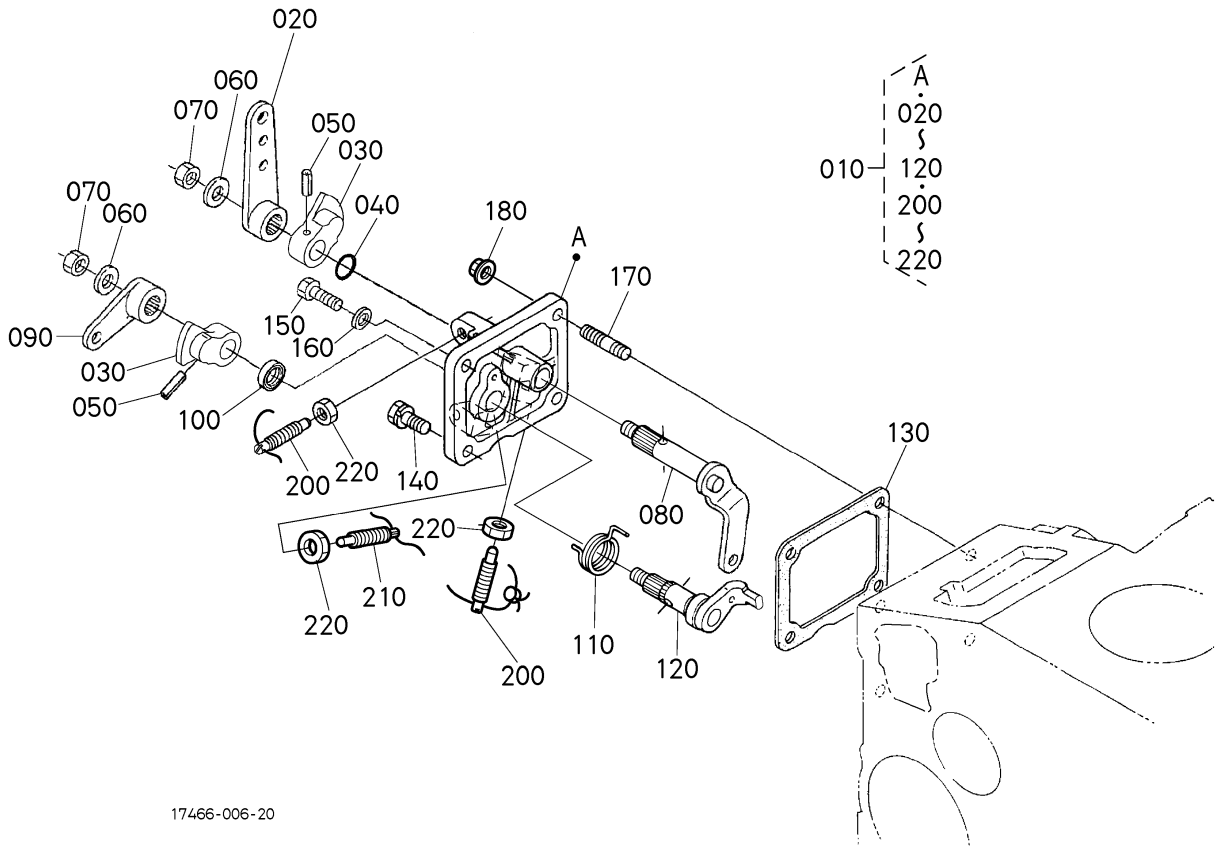


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16271-95690	JOINT,EYE	1				0.05
020	16241-42010	ASSY PIPE,FUEL	1				0.02
030	14911-42750	CLIP,PIPE	2				0.002
040	16060-51013	ASSY PUMP,INJECTION	1				1.3
050	16040-52092	SHIM,INJECTION	1			0.200mm	0.004
050	16040-52112	SHIM,INJECTION PUMP	1			0.250mm	0.005
060	16040-52122	SHIM,INJECTION PUMP	1			0.300mm	0.006
060	16040-52160	SHIM,INJECTION PUMP	1			0.350mm	0.008
065	16040-52200	SHIM,INJECTION	1			0.175mm	0.003
070	16871-91060	BOLT,SOCKET HEAD	3				0.007
080	15841-91500	STUD	3				0.02
090	15841-92320	NUT,CAP	3				0.01
100	04512-50060	WASHER,SPRING LOCK	3				0.001
110	16030-51320	BOLT,JOINT	1				0.07
120	15841-96650	GASKET	2				0.001
130	15841-51350	SCREW	1				0.005
140	15841-96660	GASKET	1				0.001

V1505-E4B-KEA-1 -> ENGINE -> 020500 SPEED CONTROL PLATE ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016



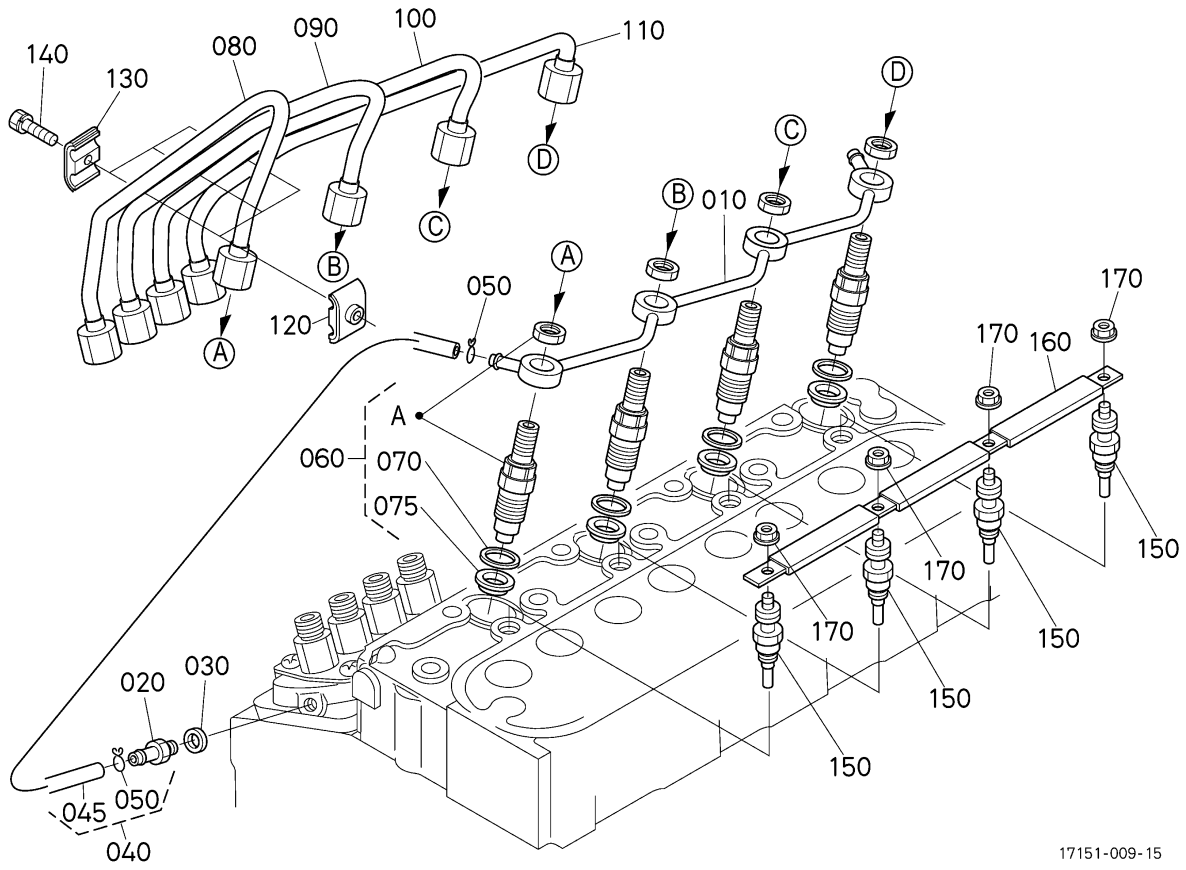
Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16299-57015	PLATE,ASSY(CONTROL)	1				0.32
020	16271-57150	LEVER,SPEED CONTROL	1				0.05
030	16241-57160	LEVER,SPEED CONTROL	2				0.02
040	04814-00100	O RING	1				0.001
050	05411-00420	PIN,SPRING	2				0.001
060	16241-94020	WASHER,PLAIN	2				0.002
070	16241-92020	NUT	2				0.002
080	16271-56023	COMP.LEVER,GOVERNOR	1				0.05
090	16271-57720	LEVER,ENGINE STOP	1				0.03
100	15471-57980	SEAL,OIL	1				0.001
110	16222-57510	SPRING,RETURN	1				0.01
120	16271-57740	SHAFT,STOP LEVER	1				0.039
130	16264-57210	GASKET	1				0.002
140	01023-50616	BOLT,SEMS	1				0.006
150	01053-50616	HEX.BOLT	1				0.005
160	15601-96650	PACKING	1				0.001
170	16245-91540	STUD	2				0.005
180	02751-50060	NUT,FLANGE	2				0.005
200	16241-57632	BOLT(ADJUSTING)	2				0.005
210	1G263-57630	BOLT,ADJUSTING	1				0.005

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
220	02056-50060	HEX.NUT	3				0.002

V1505-E4B-KEA-1 -> ENGINE -> 020600 NOZZLE HOLDER AND GLOW PLUG ## V1505-E4B-KEA-1

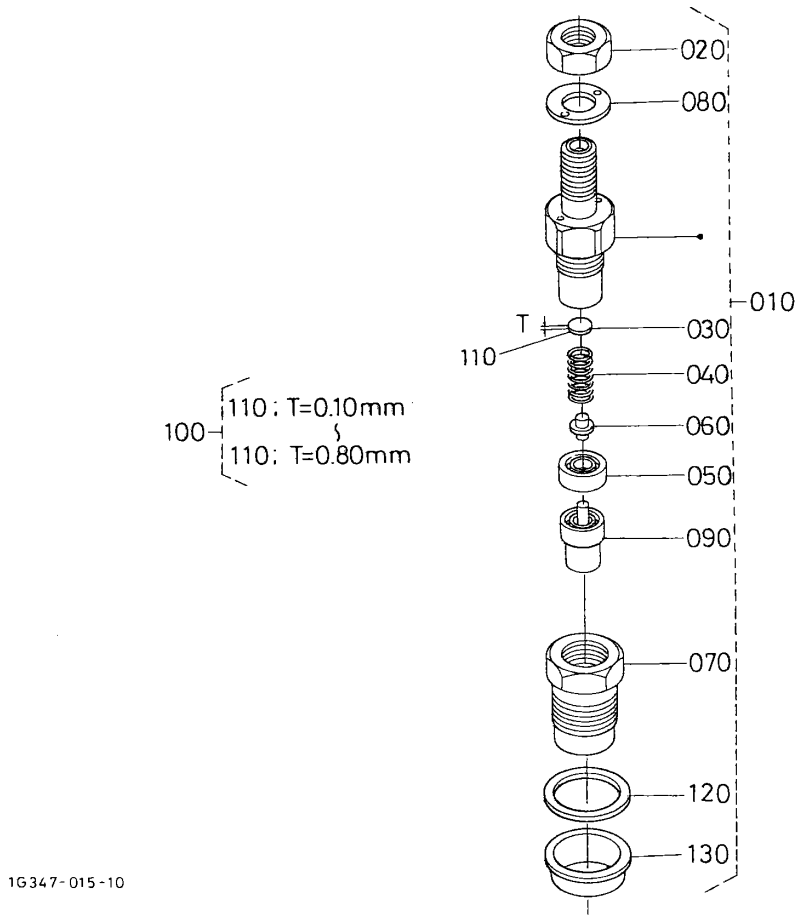
Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16271-42502	ASSY PIPE,OVER FLOW	1				0.01
020	15841-51360	SCREW, BLEATHER	1				0.008
030	15601-96650	PACKING	1				0.001
040	15841-42500	ASSY PIPE,OVER FLOW	1				0.01
045	15841-42520	PIPE,FUEL OVER FLOW	1				0.006
050	14971-42750	CLIP,PIPE	2				0.001
060	1G677-53903	KIT HOLDER,NOZZLE	1				0.152
070	15841-53622	GASKET	4				0.002
075	19077-53650	SEAL HEAT	4				0.002
080	16271-53712	PIPE,INJECTION	1				0.12
090	16271-53722	PIPE,INJECTION	1				0.12
100	16271-53732	PIPE,INJECTION	1				0.118
110	16271-53742	PIPE,INJECTION	1				0.12
120	15841-53850	CLAMP,PIPE	3				0.008
130	15841-53860	CLAMP,PIPE	3				0.008
140	03024-50520	SCREW,SEMS(PAN HEAD)	3				0.004
150	1G679-65512	PLUG,GLOW	4				0.016
160	16271-65560	CORD,GLOW PLUG	1				0.1
170	02761-50040	NUT,FLANGE	4				0.002

Update Date: 03/06/2015, Printing Date: 09/03/2016

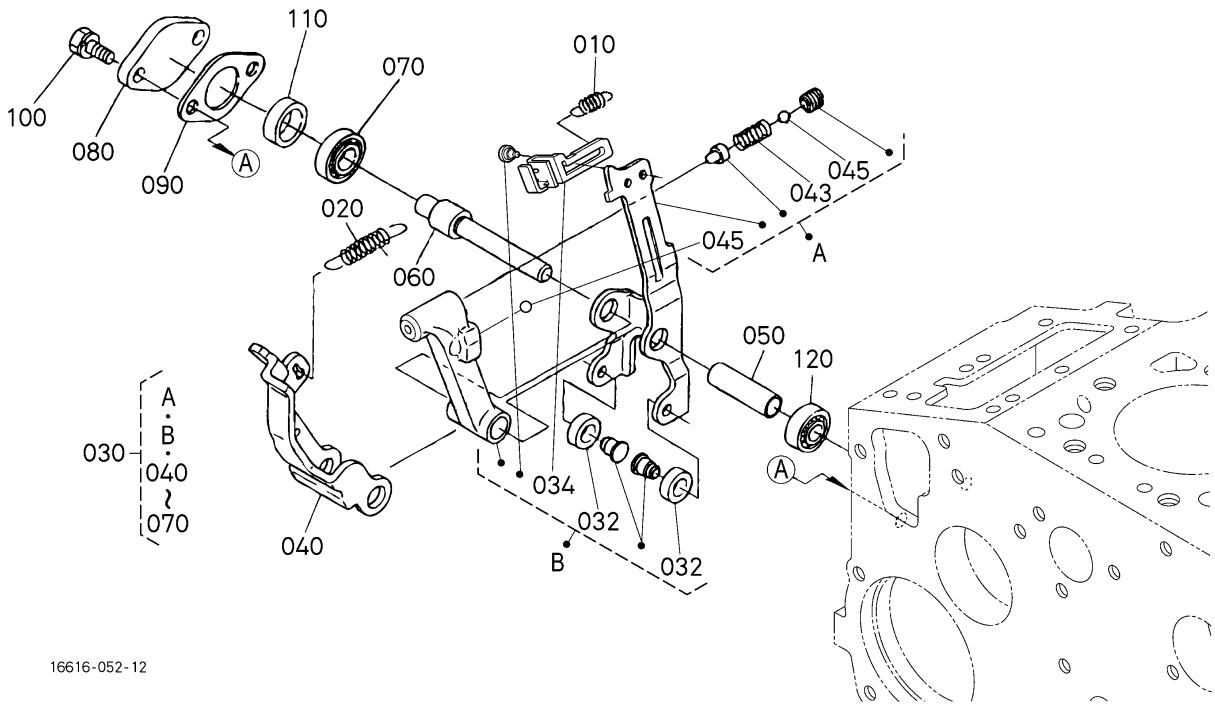


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G677-53903	KIT HOLDER,NOZZLE	4				0.152
020	1G826-92032	NUT	4				0.004
030	16032-53230	WASHER,ADJUSTING	4				0.001
040	16032-53170	SPRING,NOZZLE	4				0.007
050	16032-53350	SPACER,DISTANCE	4				0.02
060	16032-53160	PUSH ROD	4				0.001
070	16032-53280	NUT,NOZZLE	4				0.037
080	16032-94040	WASHER,PLAIN	4				0.002
090	1G677-53612	PIECE,NOZZLE	4				0.019
100	16032-98100	ASSY WASHER,ADJUST	4			OPTION	0.016
110	16032-98500	WASHER,ADJUSTING	4			0.100mm	0.001
110	16032-98510	WASHER,ADJUSTING	4			0.200mm	0.001
110	16032-98520	WASHER,ADJUSTING	4			0.300mm	0.001
110	16032-98530	WASHER,ADJUSTING	4			0.400mm	0.001
110	16032-98540	WASHER,ADJUSTING	4			0.500mm	0.001
110	16032-98550	WASHER,ADJUSTING	4			0.520mm	0.001
110	16032-98560	WASHER,ADJUSTING	4			0.540mm	0.001
110	16032-98570	WASHER,ADJUSTING	4			0.560mm	0.001
110	16032-98580	WASHER,ADJUSTING	4			0.580mm	0.001
110	16032-98590	WASHER,ADJUSTING	4			0.800mm	0.001
120	15841-53622	GASKET	4				0.002
130	19077-53650	SEAL HEAT	4				0.002

V1505-E4B-KEA-1 -> ENGINE -> 021200 FORK LEVER (GOVERNOR) ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

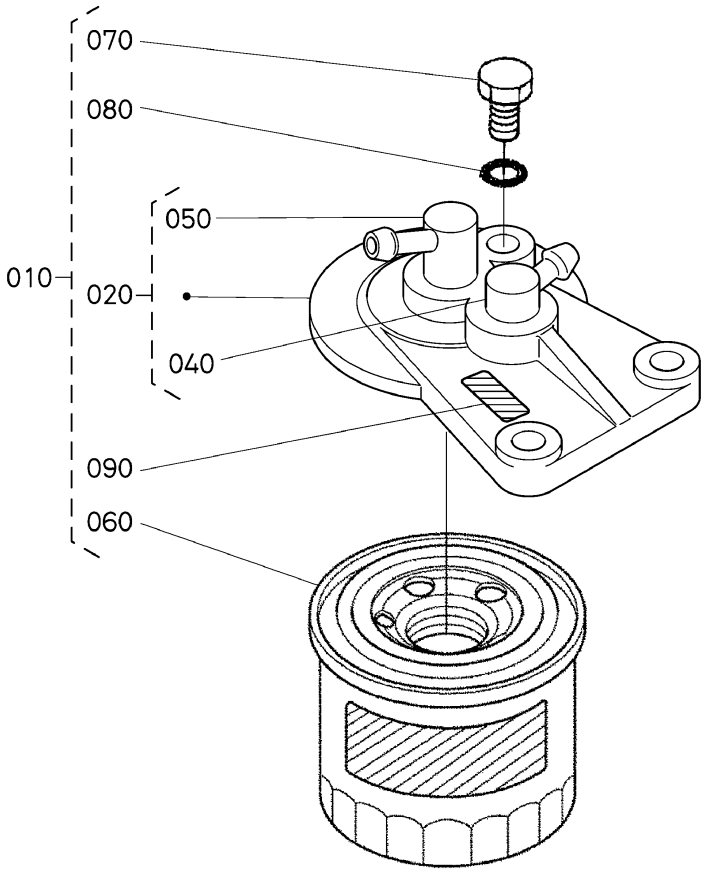


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16285-56480	SPRING,START	1				0.005
020	16222-56412	SPRING,GOVERNOR	1				0.026
030	1J098-56010	LEVER,ASSY(FORK)	1				0.257
032	19484-55440	ROLLER	2				0.005
034	16271-56214	LEVER.THRUST	1				0.01
040	1G032-56130	LEVER,FORK	1				0.08
043	16294-54230	SPRING	1				0.001
045	07715-03205	BALL 5/32	2				0.001
050	1G032-56150	SHAFT,FORK LEVER	1				0.007
060	1G032-56470	SHAFT,FORK LEVER	1				0.04
070	16241-56330	BEARING,MINIATURIZE	1				0.007
080	16241-56253	COVER,FORK LEV.SHAFT	1				0.025
090	16299-56260	GASKET	1				0.002
100	01023-50612	BOLT,SEMS	2				0.005
110	16241-56210	COLLAR	1				0.008
120	16241-56340	BEARING,MINIATURIZE	1				0.007

V1505-E4B-KEA-1 -> ENGINE -> 030001 FUEL FILTER ## V1505-E4B-KEA-1-PROBST

Update Date: 9/03/2016, Printing Date: 09/03/2016

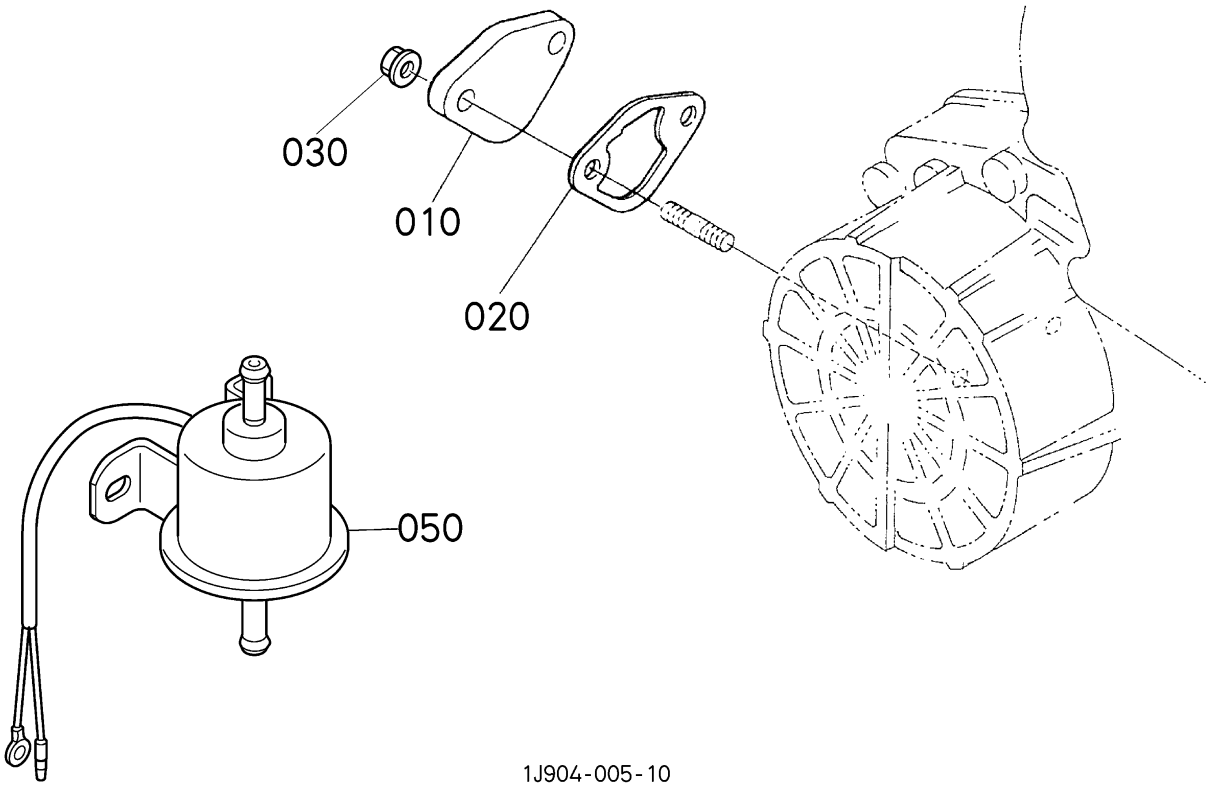


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	15224-43010	FILTER,ASSY(FUEL)	1				0.56
020	15224-43200	ASSY COVER,FILTER	1				0.215
040	15108-43610	JOINT,PIPE	1				0.02
050	15108-43780	JOINT,PIPE	1				0.02
060	15221-43170	ELEMENT,FILTER	1				0.3
070	19222-43280	PLUG,FILTER BREATHER	1				0.01
080	15108-43290	RING	1				0.001
090	15224-87760	MARK,FORM	1				0.003

V1505-E4B-KEA-1 -> ENGINE -> 030200 FUEL PUMP (ELECTRICAL) ## V1505-E4B-KEA-1-PROBST

Update Date: 09/03/2016, Printing Date: 08/03/2016



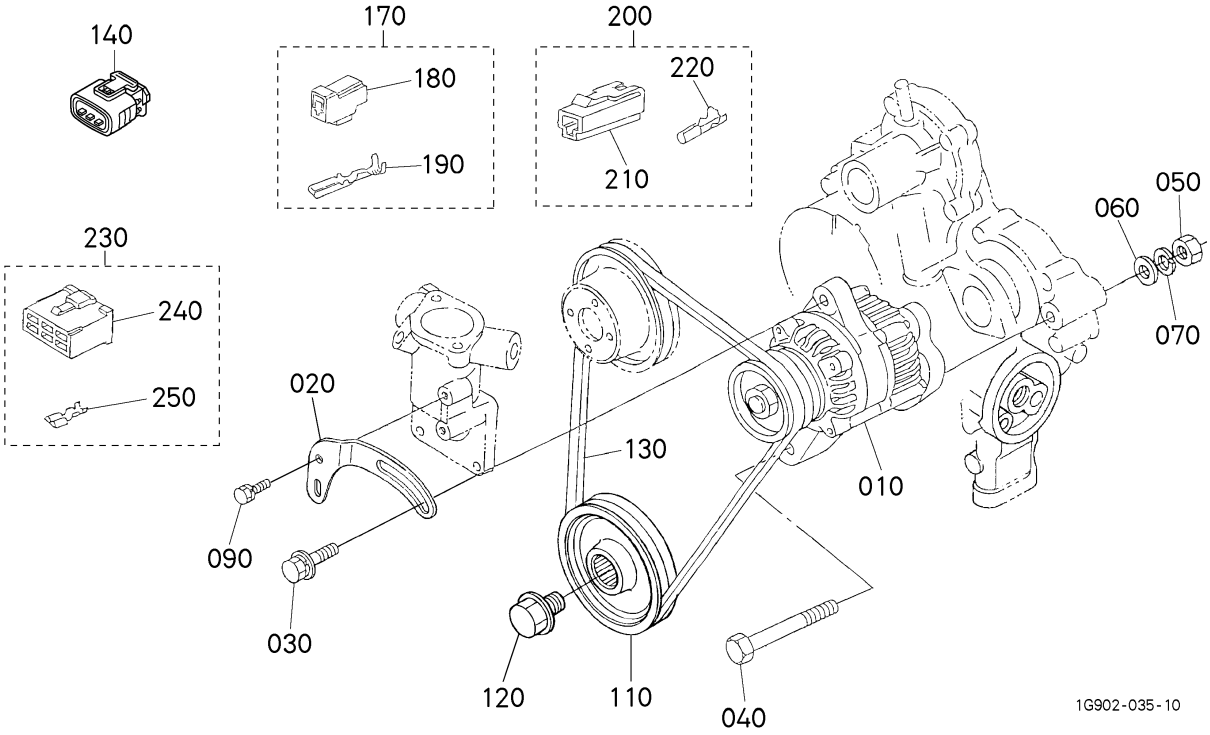
1J904-005-10

Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	15852-52850	COVER	1				0.05
020	16264-52140	GASKET,FUEL PUMP	1		<=8HZ999		0.001
020	16261-52140	GASKET,FUEL PUMP	1	>>	>=8J0001		0.001
030	02751-50060	NUT,FLANGE	2				0.005
050	1G662-52030	ASSY PUMP,FUEL	1				0.29

V1505-E4B-KEA-1 -> ENGINE -> 040200 ALTERNATOR AND PULLEY ## V1505-E4B-KEA-1-PROBST

Update Date: 9/03/2016 Printing Date: 08/03/2016

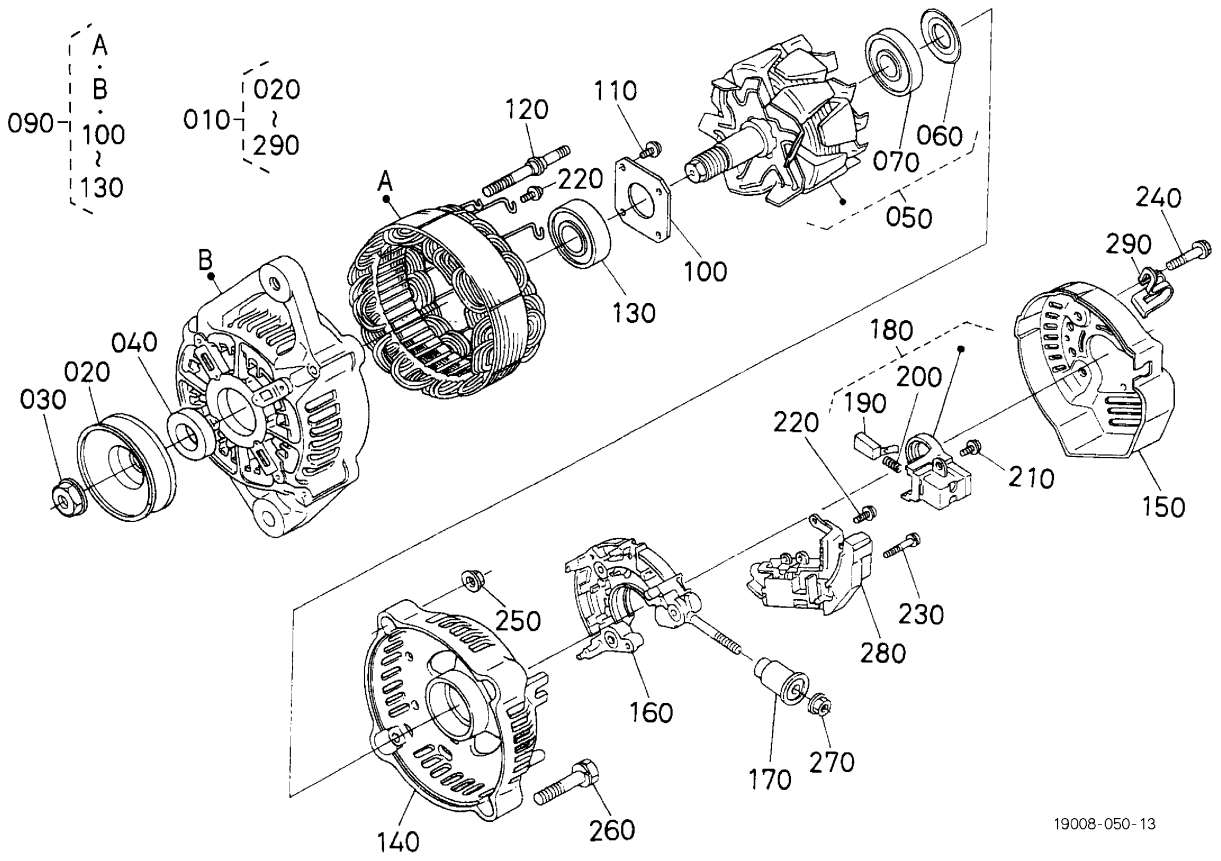


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	19630-64013	ASSY ALTERNATOR	1			12V60A	3.38
							3.38
020	16615-64422	STAY,DYNAMO	1				0.112
030	01127-50830	BOLT,W SEMS(LARGE WASHER)	1				0.023
040	01173-51085	HEX.BOLT	1				0.051
050	02176-50100	HEX.NUT	1				0.005
060	04011-50100	WASHER,PLAIN	1				0.002
070	04512-50100	WASHER,SPRING LOCK	1				0.003
090	01023-50616	BOLT,SEMS	1				0.006
110	16281-74280	PULLEY,FAN DRIVE	1				1.1
120	16241-91020	BOLT(FAN DRIVE)	1				0.1
130	14962-97010	V BELT	1				0.07
140	16678-65830	ASSY CONNECTOR,2	1				0.009
170	1C010-65830	ASSY COUPLER,SOLENO.	1				0.005
180	1C010-65880	CONNECTOR	1				0.005
190	1C010-65910	TERMINAL	2				0.001
200	19215-63750	TERMINAL	1				0.001
210	11521-65920	CONNECTOR	1				0.003
220	11521-65970	TERMINAL	1				0.003
230	16662-65830	ASSY COUPLER,CONNEC.	1				0.01

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
240	19872-65840	CONNECTOR	1				0.006
250	19237-65910	TERMINAL	5				0.001

Update Date: 9/03/2016, Printing Date: 08/03/2016



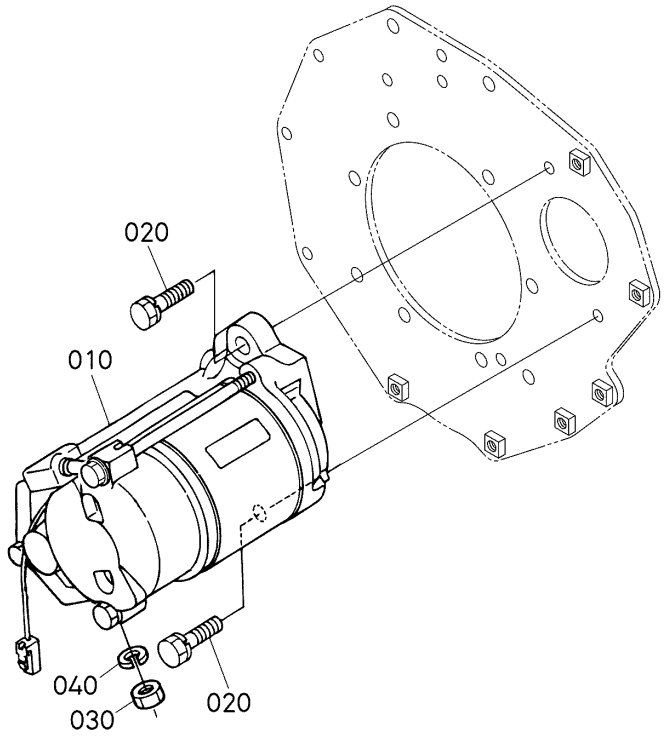
Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	19630-64013	ASSY ALTERNATOR	1				3.38
							3.38
020	15881-64110	PULLEY,DYNAMO	1				0.16
030	15881-92010	NUT	1				0.02
040	15881-64150	COLLAR	1				0.004
050	TA043-64040	ROTOR	1				1.465
060	15881-64800	COVER, BEARING	1				0.001
070	16652-64770	BEARING BALL	1				0.045
090	TA043-74030	FRAME(DRIVE END)	1		<=1EMZ999		1.275
090	TA043-74032	FRAME,DRIVE END	1	>>	>=1EN0001		1.275
100	16652-64780	BRG,BALL	1		<=1EMZ999		0.05
100	16652-64782	BEARING BALL	1	>>	>=1EN0001		0.05
110	15881-64710	PLATE, RETAINER	1				0.01
120	15881-93010	SCREW, ROUND HEAD	4				0.003
130	15881-64260	BOLT, THROUGH	2				0.01
140	TA043-64060	FRAME,END	1				0.2
150	16652-64230	COVER,END	1				0.035
160	TA043-64850	HOLDER	1				0.155
170	15881-64900	BUSH,INSULATION	1				0.006
180	16652-64310	HOLDER BRUSH	1				0.025
190	15881-64090	BRUSH	2				0.002
200	15881-64330	SPRING, BRUSH	2				0.002

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
210	15881-93020	SCREW, ROUND HEAD	2				0.005
220	15881-93030	SCREW, ROUND HEAD	6				0.003
230	15881-93040	SCREW, ROUND HEAD	1				0.003
240	15881-91040	BOLT	3				0.005
250	15881-92020	NUT	2				0.02
260	15881-91050	BOLT	2				0.01
270	14182-92030	NUT	1				0.003
280	16652-64600	ASSY REGULATOR	1				0.08
290	17369-67570	CLAMP CORD	1				0.001

V1505-E4B-KEA-1 -> ENGINE -> 040400 STARTER ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

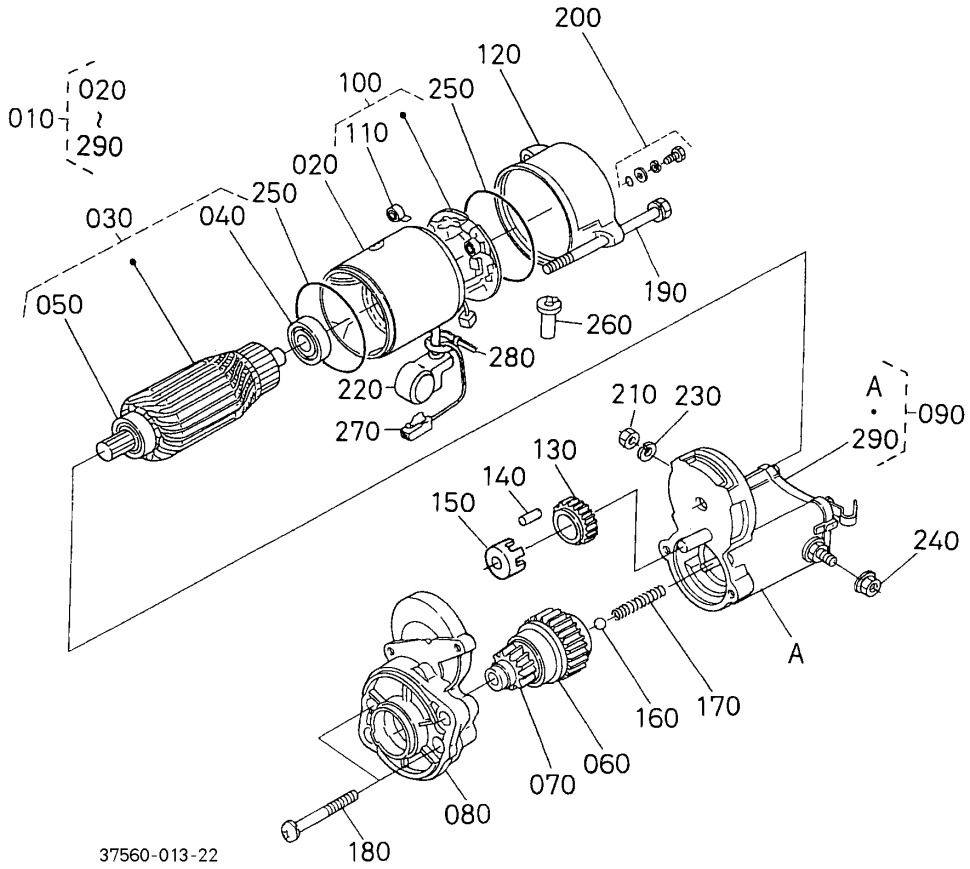


1J996-012-10

Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	37560-63010	ASSY STARTER	1			12V 1.2KW	3.45
020	01123-50830	BOLT,SEMS	2				0.015
030	02114-50080	HEX.NUT	1				0.005
040	04512-50080	WASHER,SPRING LOCK	1				0.002

Update Date: 03/06/2015, Printing Date: 09/03/2016

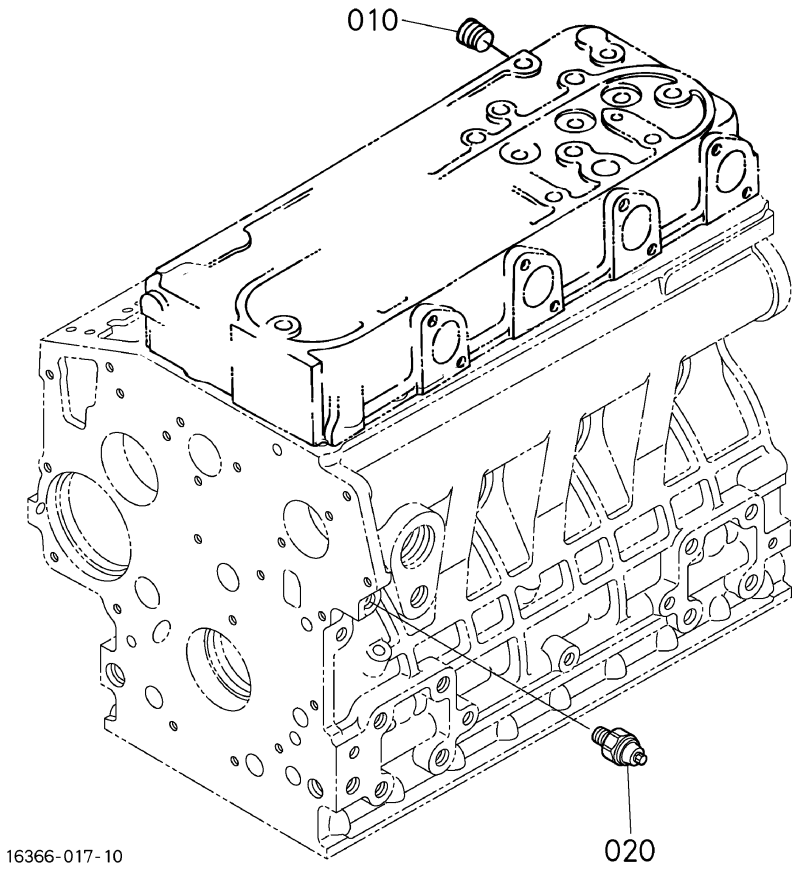


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	37560-63010	ASSY STARTER	1			12V 1.2KW	3.45
020	37560-63080	YOKE	1				0.83
030	11460-63070	ARMATURE	1				0.05
040	11460-63530	BEARING	1				0.02
050	11460-63500	BEARING	1				0.03
060	16285-63040	ASSY CLUTCH	1				0.55
070	16271-63140	PINION,BEVEL	1				0.05
080	16285-63030	ASSY HOUSING	1				0.43
090	16611-63020	ASSY SWITCH,MAGNETIC	1				0.91
100	11470-63380	ASSY HOLDER,BRUSH	1				0.3
110	11460-63390	SPRING,BRUSH	4				0.01
120	16285-63200	ASSY FRAME,END	1				0.103
130	11460-63270	GEAR	1				0.04
140	19212-63100	ROLLER	5				0.002
150	11460-63110	RETAINER	1				0.01
160	19212-97130	BALL	1				0.003
170	11460-63120	SPRING	1				0.01
180	11460-93310	BOLT	2				0.01
190	11460-63320	BOLT,THROUGH	2				0.02
200	15511-63760	ASSY BOLT	2				0.005
210	16285-92010	NUT,HEXAGON	1				0.005
220	16611-63450	COVER	1				0.03

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
230	13801-94100	WASHER,SPRING	1				0.002
240	16611-92020	NUT,HEXAGON	1				0.005
250	15511-96660	O RING	2				0.005
260	16285-63570	PIPE,DRAIN	1				0.005
270	16611-63660	CORD,STOP SOLENOID	1				0.005
280	16612-63100	BAND,COVER	1				0.01
290	16285-98050	ASSY COVER	1				0.048

Update Date: 03/06/2015, Printing Date: 09/03/2016

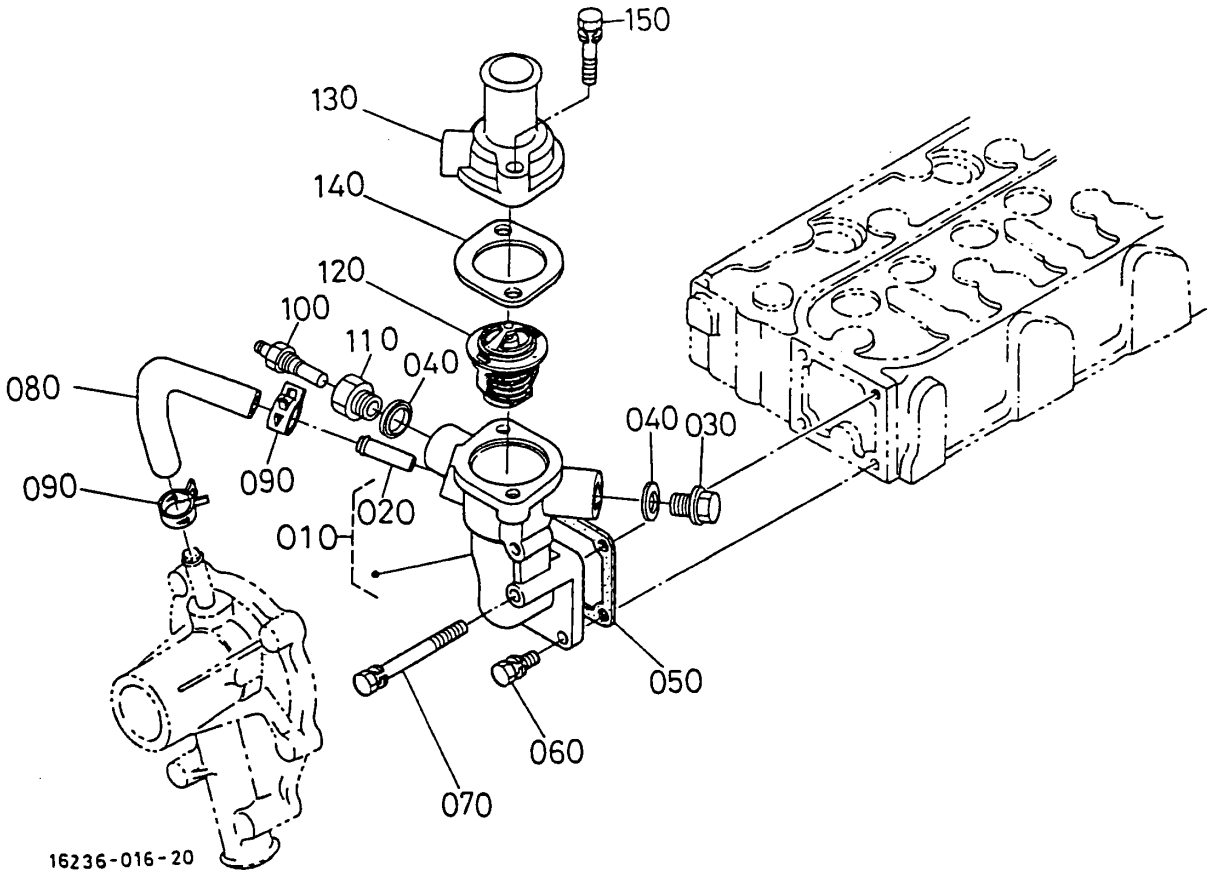


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	15841-96020	PLUG	1				0.02
020	15841-39010	SWITCH,OIL	1				0.03

V1505-E4B-KEA-1 -> ENGINE -> 050000 WATER FLANGE AND THERMOSTAT ## V1505-E4B-KEA-1-PROBST

Update Date: 9/03/2016, Printing Date: 09/03/2016

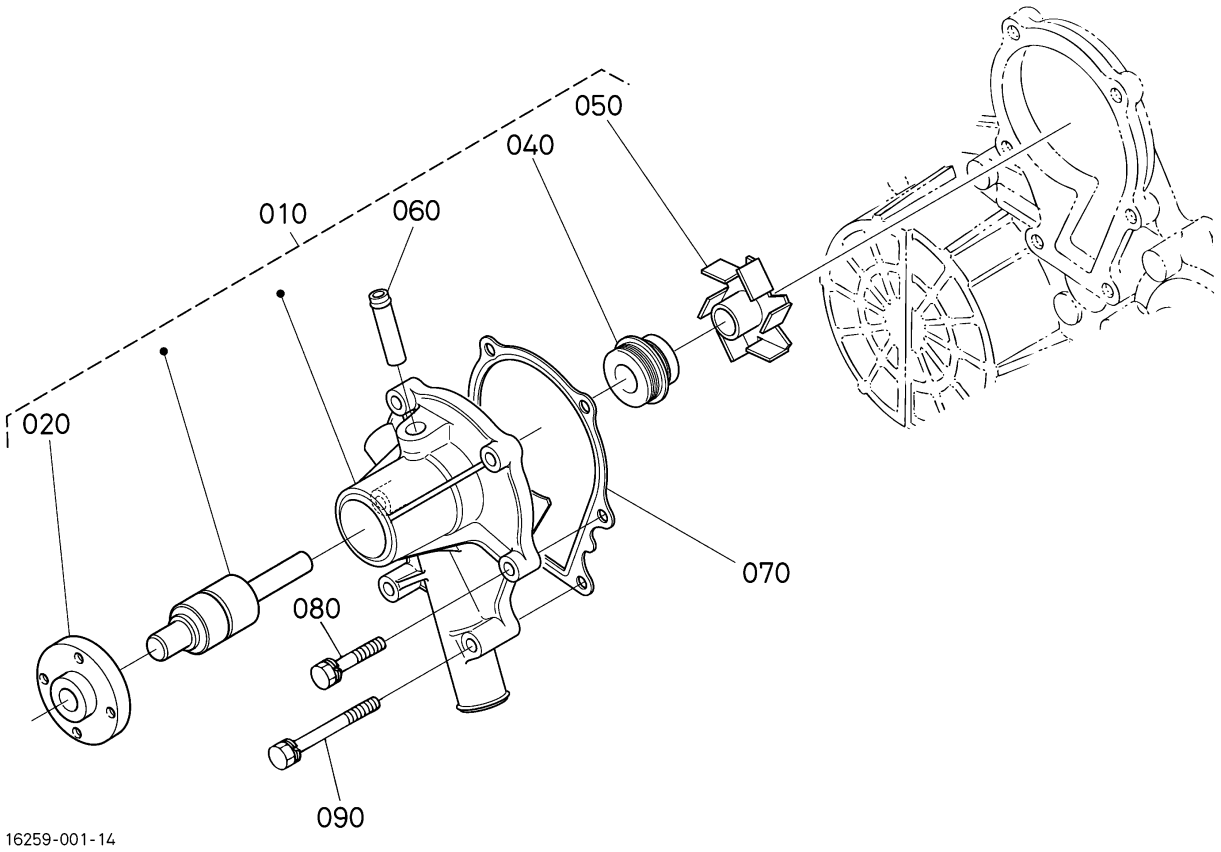


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	19008-72700	COMP FLANGE,WATER	1				0.268
020	16241-73370	PIPE,WATER RETURN	1				0.007
030	06311-55030	PLUG	1				0.05
040	16261-96710	GASKET	2				0.002
050	16264-72920	GASKET,WATER FLANGE	1				0.001
060	01023-50616	BOLT,SEMS	3				0.006
070	01023-50655	BOLT,SEMS	1				0.012
080	16241-73350	PIPE,WATER RETURN	1				0.015
090	16241-73360	BAND,PIPE	2		<=CFZ999		0.003
090	1G687-73362	CLAMP,HOSE	2	NI	>=CG0001		0.002
100	W26ES00112	ASSY THERMOSENSOR	1			SUPPLIED BY KDG/GERMANY	0.03
110	1G067-72840	ADAPTER	1				0.025
120	19434-73014	ASSY THERMOSTAT	1				0.07
130	16219-73260	COVER(THERMOSTAT)	1				0.099
140	16221-73270	GASKET,THEMOSTAT	1				0.001
150	01123-50835	BOLT,SEMS	2				0.02

V1505-E4B-KEA-1 -> ENGINE -> 050100 WATER PUMP ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

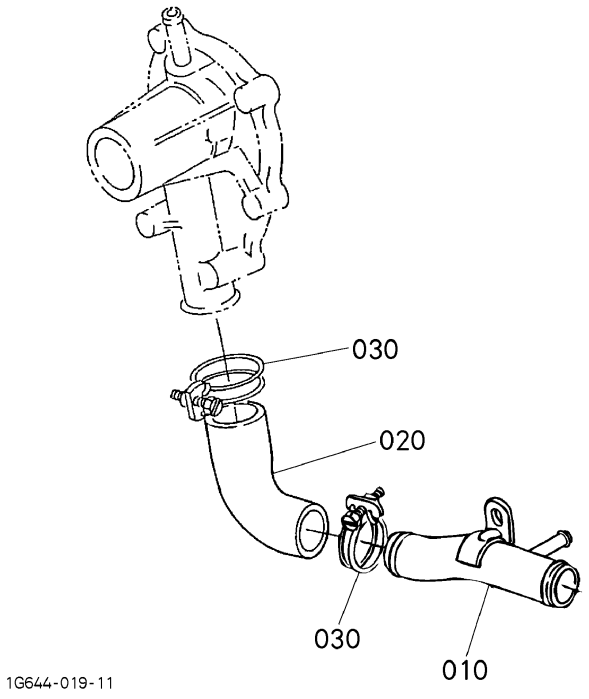


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16251-73034	PUMP,WATER,ASSY	1				0.8
020	16259-73520	FLANGE,WATER PUMP	1				0.15
040	1G642-73050	ASSY SEAL,MECHANICAL	1				0.03
050	16259-73512	IMPELLER,WATER PUMP	1				0.09
060	15852-73340	PIPE,WATER RETURN	1				0.02
070	16239-73430	GASKET,WATER PUMP	1				0.007
080	01023-50630	BOLT,SEMS	4				0.008
090	01023-50685	BOLT,SEMS	2				0.018

V1505-E4B-KEA-1 -> ENGINE -> 050300 WATER PIPE ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

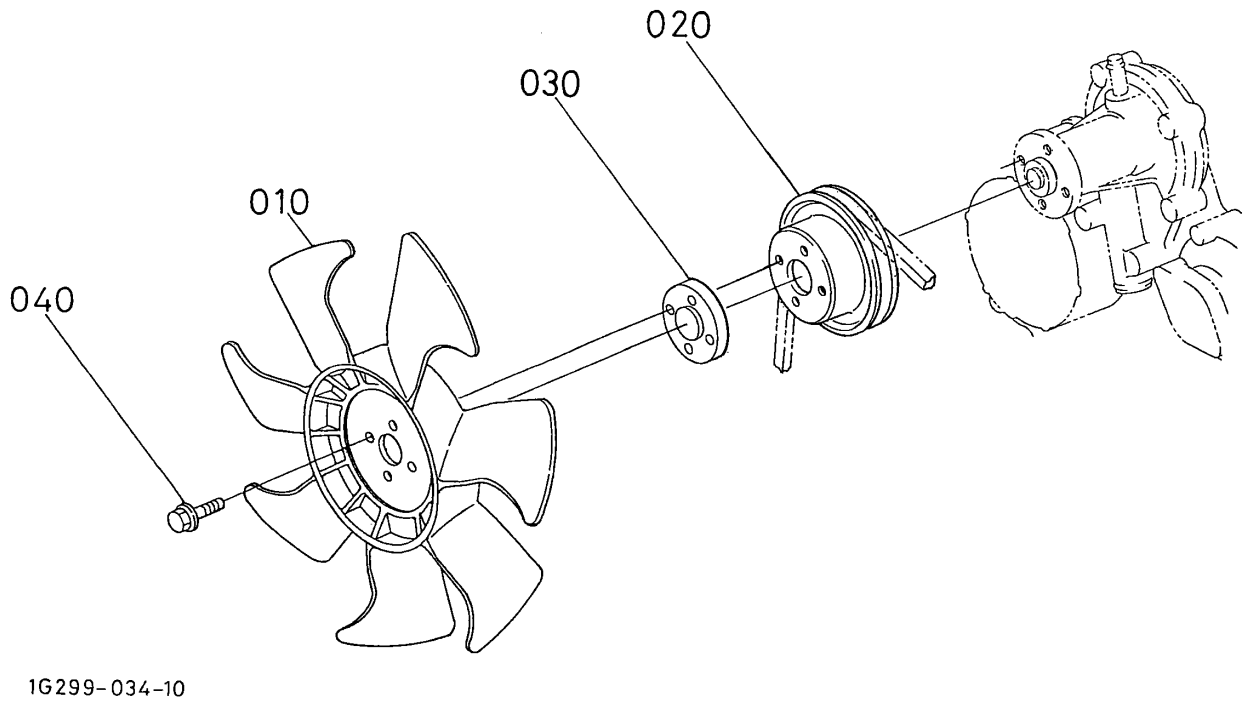


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	17203-72860	PIPE,WATER	1				0.16
020	1G680-72870	PIPE,WATER	1				0.053
030	1G677-72960	CLAMP,HOSE	2				0.024

V1505-E4B-KEA-1 -> ENGINE -> 050400 COOLING FAN ## V1505-E4B-KEA-1-PROBST

Update Date: 09/03/2016, Printing Date: 09/03/2016

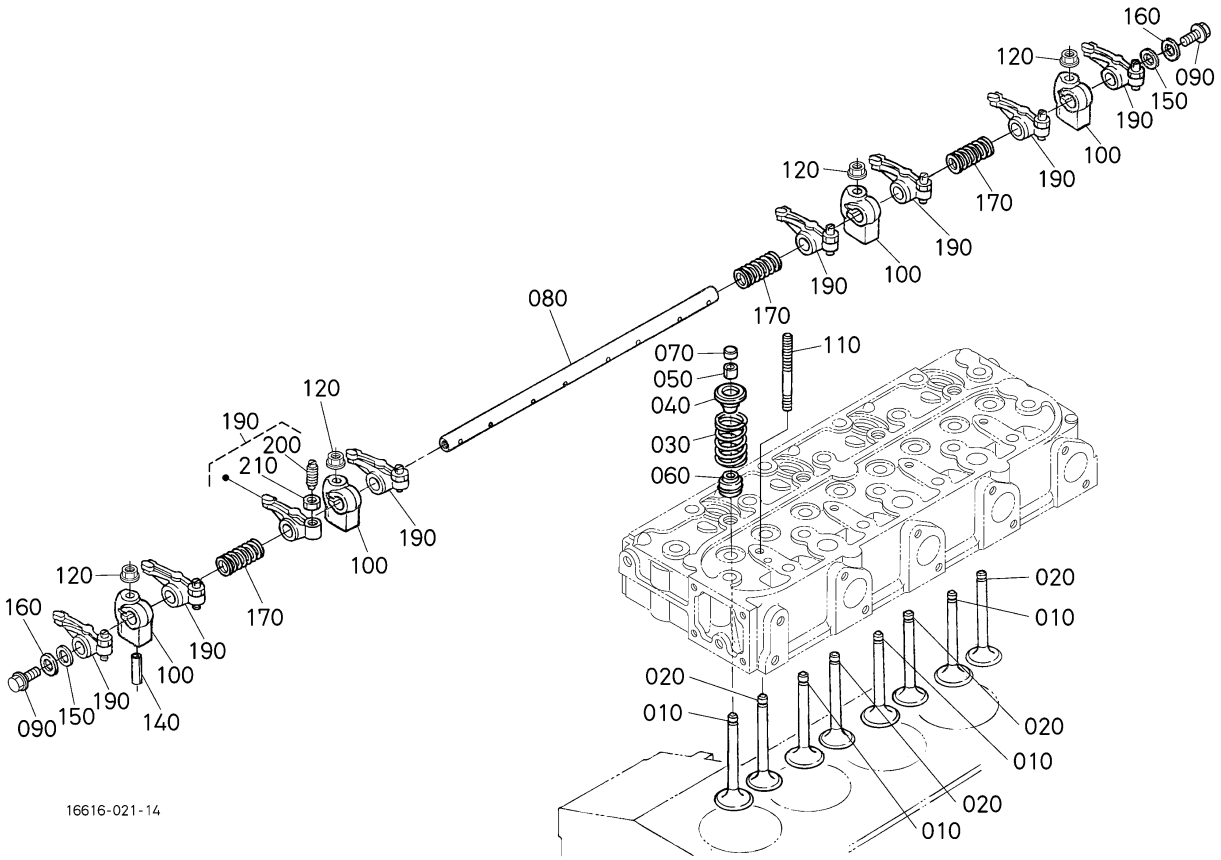


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16292-74110	FAN	1				0.54
020	16241-74250	PULLEY,FAN	1				0.24
030	15876-74152	COLLAR,FAN	1				0.05
040	01754-50620	BOLT,FLANGE	4				0.007

V1505-E4B-KEA-1 -> ENGINE -> 060000 VALVE AND ROCKER ARM ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

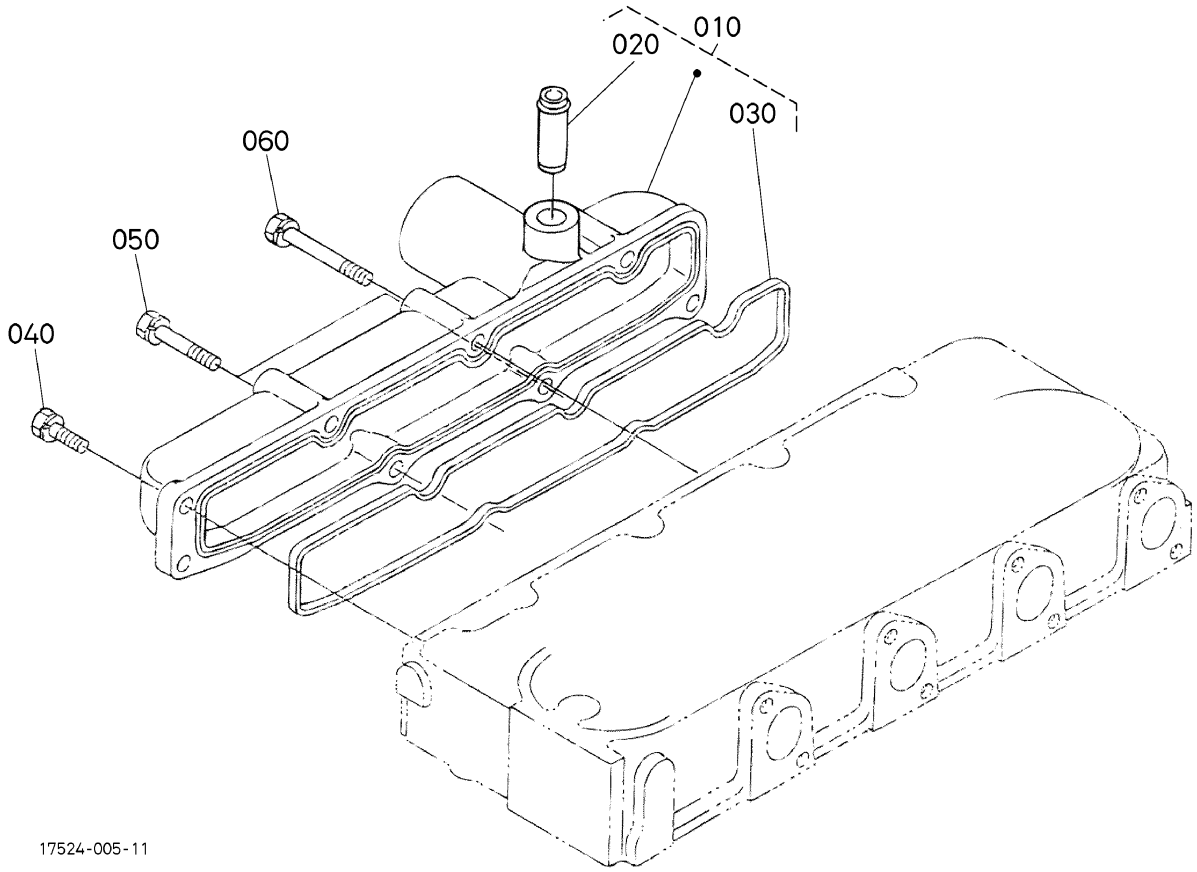


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G673-13110	VALVE,INLET	4				0.043
020	1G673-13120	VALVE,EXHAUST	4				0.043
030	16271-13240	SPRING,VALVE	8				0.015
040	16261-13330	RETAINER,VALVE SP.	8				0.015
050	15261-13980	COLLET(VALVE SPRING)	8			SET	0.002
060	1C010-13150	SEAL,VALVE STEM	8				0.002
070	16241-13280	CAP,VALVE	8				0.005
080	16241-14266	SHAFT,ROCKER ARM	1				0.22
090	01754-50610	BOLT,FLANGE	2				0.006
100	16241-14350	BRACKET(ARM,ROCKER)	4				0.04
110	16241-14410	STUD	4				0.022
120	1J095-92010	NUT,FLANGE	4				0.005
140	05411-00428	PIN,SPRING	1				0.002
150	16241-14430	WASHER(R-ARM.SHAFT)	2				0.002
160	15841-94022	WASHER,PLAIN	2				0.005
170	16241-14310	SPRING(ARM,ROCKER)	3				0.004
190	16241-14032	ARM,ROCKER,ASSY	8				0.052
200	16241-14230	SCREW,ADJUSTING	8				0.008
210	16241-14240	NUT	8				0.004

V1505-E4B-KEA-1 -> ENGINE -> 060100 INLET MANIFOLD ## V1505-E4B-KEA-1

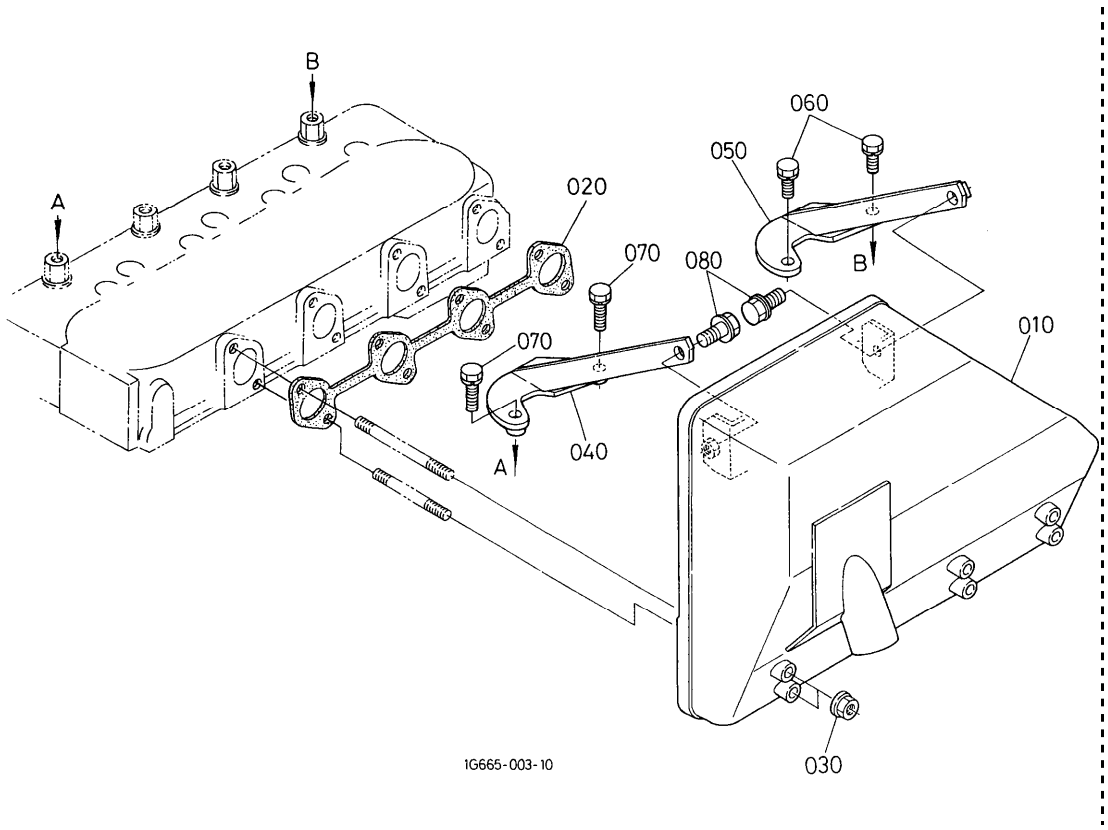
Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

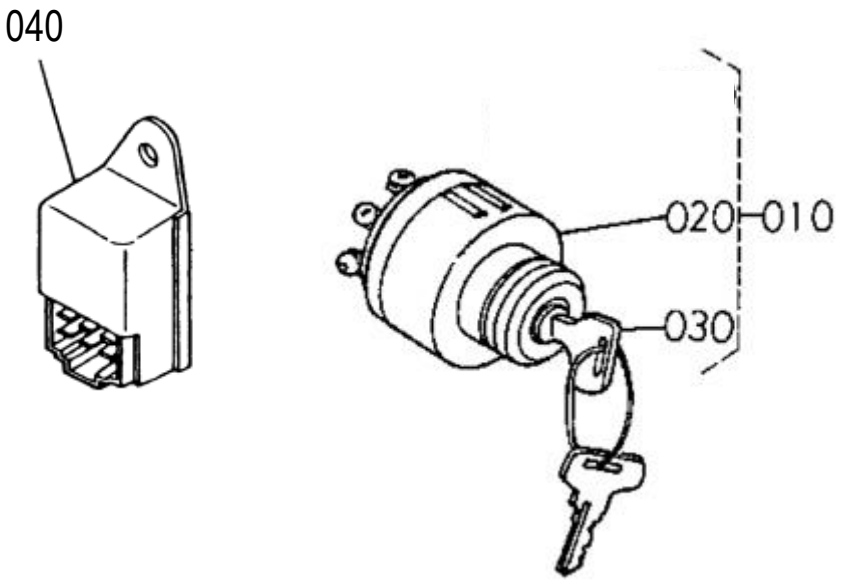
No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	16259-11774	ASSY MANIFOLD,INLET	1				0.377
020	16241-05550	JOINT,BREATHER PIPE	1				0.02
030	16241-11820	GASKET,IN-MANIFOLD	1				0.01
040	01754-50616	BOLT,FLANGE	3				0.006
050	01023-50630	BOLT,SEMS	2				0.008
060	01023-50650	BOLT,SEMS	3				0.012

Update Date: 9/03/2016 , Printing Date: 9/03/2016



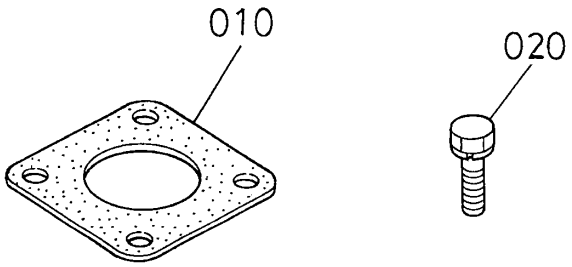
図番 REF.No.	品番 PART No.	部品名称	PART NAME	数量 Q'TY/S.No. A	互換 I.C.	備考 REMARKS
010	37560-8851-3	ﾏﾌﾗ, ｺﾝﾌﾟ	COMP.MUFFLER	1		
020	37560-1236-0	ﾊﾟｯｷﾝ(ｴｷｿﾞｰｽﾄﾏﾆﾎﾙﾄﾞ)	GASKET,EX-MANIFOLD	1		
030	16271-9201-0	ﾅｯﾄ	NUT	8		
040	1K581-1251-0	ｽﾃｰ(ﾏﾌﾗ, ﾏｴ)	STAY,MUFFLER FRONT	1		
050	37560-8852-2	ｽﾃｰ(ﾏﾌﾗ ｳｼﾛ)	STAY,MUFFLER REAR	1		
060	01123-60816	ﾎﾞﾙﾄ	BOLT	2		
070	01123-50830	ﾎﾞﾙﾄ	BOLT	2		
080	01774-61020	ﾌﾗﾝｼﾞﾎﾞﾙﾄ	BOLT,FLANGE	2		

Update Date: 09/03/2016, Printing Date: 09/03/2016



No▲	Part Number	Part Name	Qty	SB	IC	S/N	Remarks	Kg
010	W26EK00001	ASSY SWITCH,STARTER	1			KDG-GERMANY		0.25
020	W26ES00021	SWITCH,STARTER	1			KDG-GERMANY		0.241
030	W270001566	ASSY KEY	2			KDG-GERMANY		0.02
040	15694-65990	TIMER (GLOW LAMP)	1					

Update Date: 03/06/2015, Printing Date: 09/03/2016

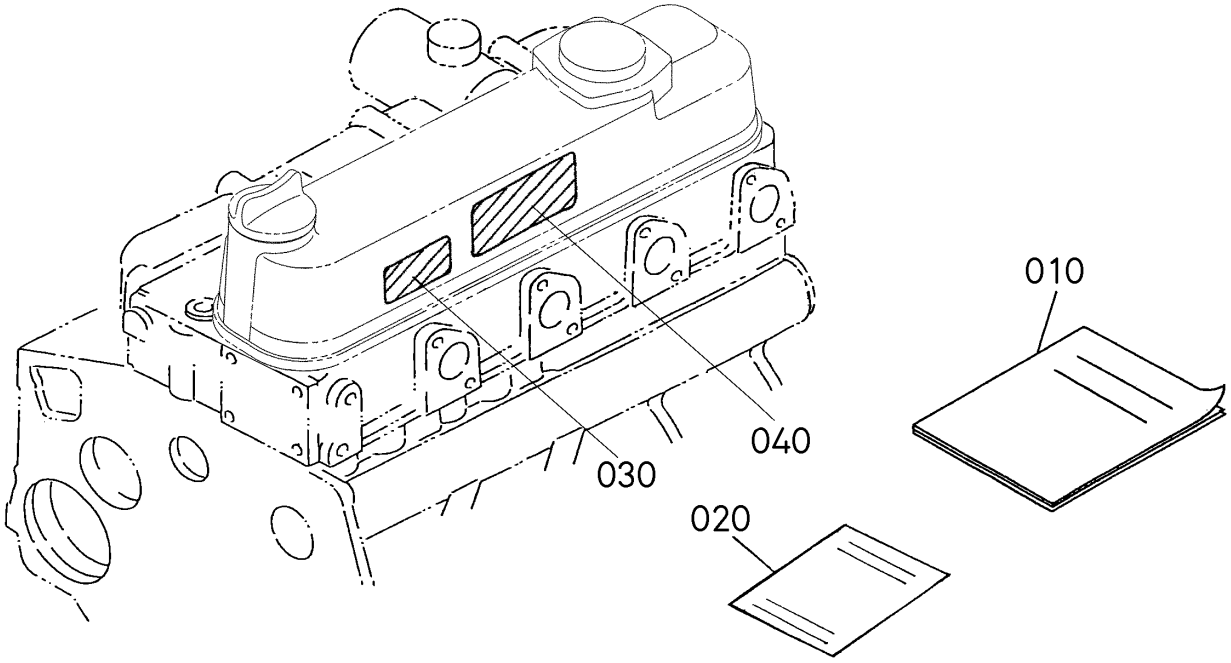


16225-034-10

Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	15263-12370	PACKING,MUFFLER	1				0.015
020	01123-50822	BOLT,SEMS	4				0.012

Update Date: 03/06/2015, Printing Date: 09/03/2016



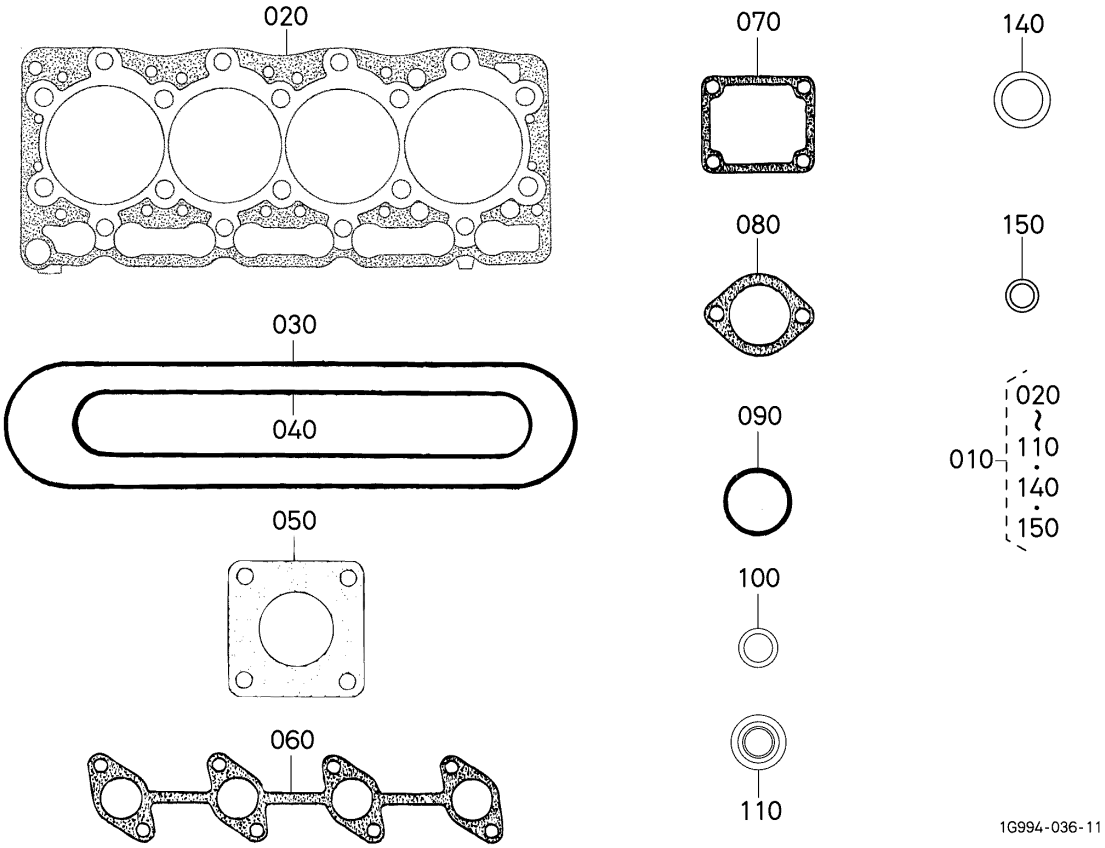
1G645-073-12

Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1J095-89160	MANUAL,OP	1				0.12
020	1J013-89810	STATEMENT,WARRANTY	1				0.011
030	19426-87903	LABEL	1				0.001
040	19426-87880	LABEL,INSTRUCTION	1				0.001

V1505-E4B-KEA-1 -> ENGINE -> 090001 GASKET KIT [OPTION] ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

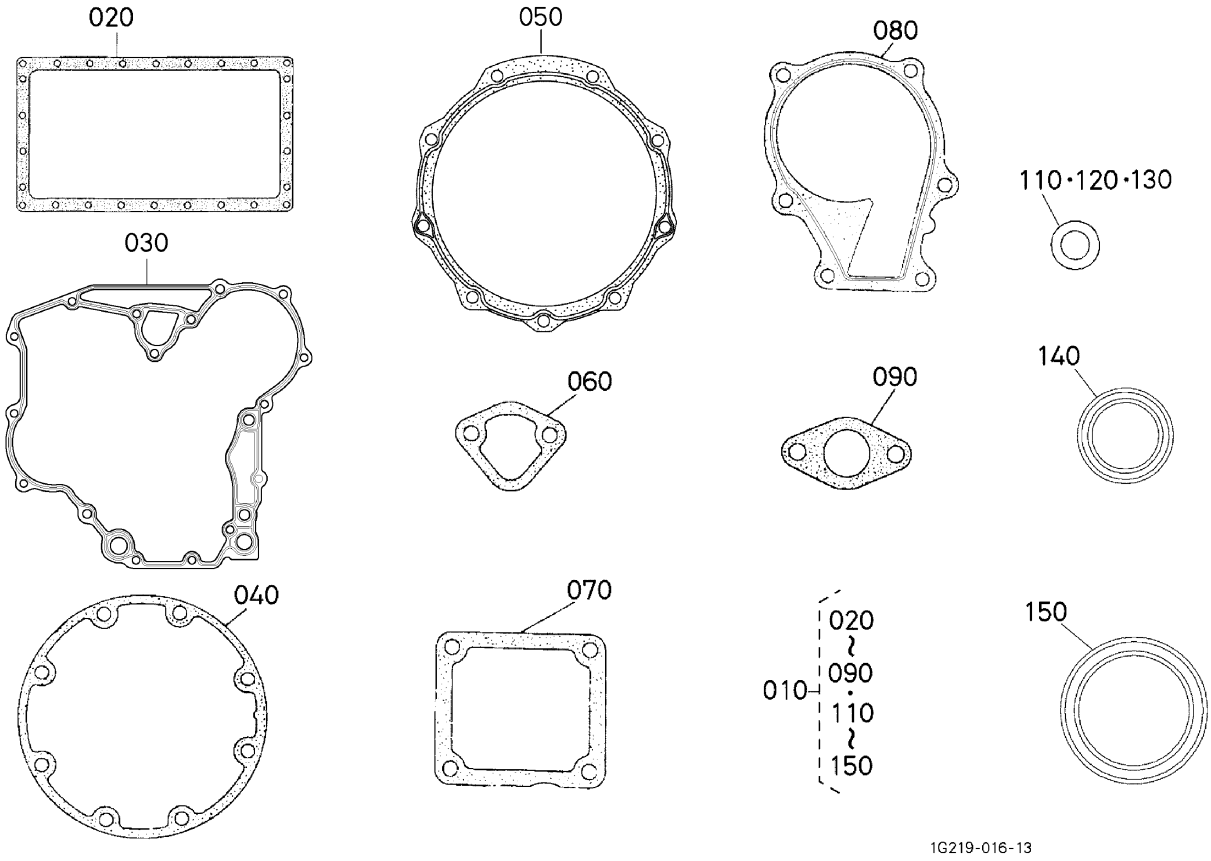


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G994-99354	KIT GASKET UPPER	1				0.387
020	16394-03313	GASKET,CYLINDER HEAD	1				0.2
030	16241-14520	GASKET,HEAD COVER	1				0.012
040	16241-11820	GASKET,IN-MANIFOLD	1				0.01
050	15263-12370	PACKING,MUFFLER	1				0.015
060	16299-12360	GASKET,EX-MANIFOLD	1				0.02
070	16264-72920	GASKET,WATER FLANGE	1				0.001
080	16221-73270	GASKET,THEMOSTAT	1				0.001
090	04814-50300	O RING	1				0.001
100	15951-96660	PACKING	4				0.001
110	1C010-13150	SEAL,VALVE STEM	8				0.002
140	19077-53650	SEAL HEAT	4				0.002
150	15841-53622	GASKET	4				0.002

V1505-E4B-KEA-1 -> ENGINE -> 090002 GASKET KIT [OPTION] ## V1505-E4B-KEA-1

Update Date: 03/06/2015, Printing Date: 09/03/2016

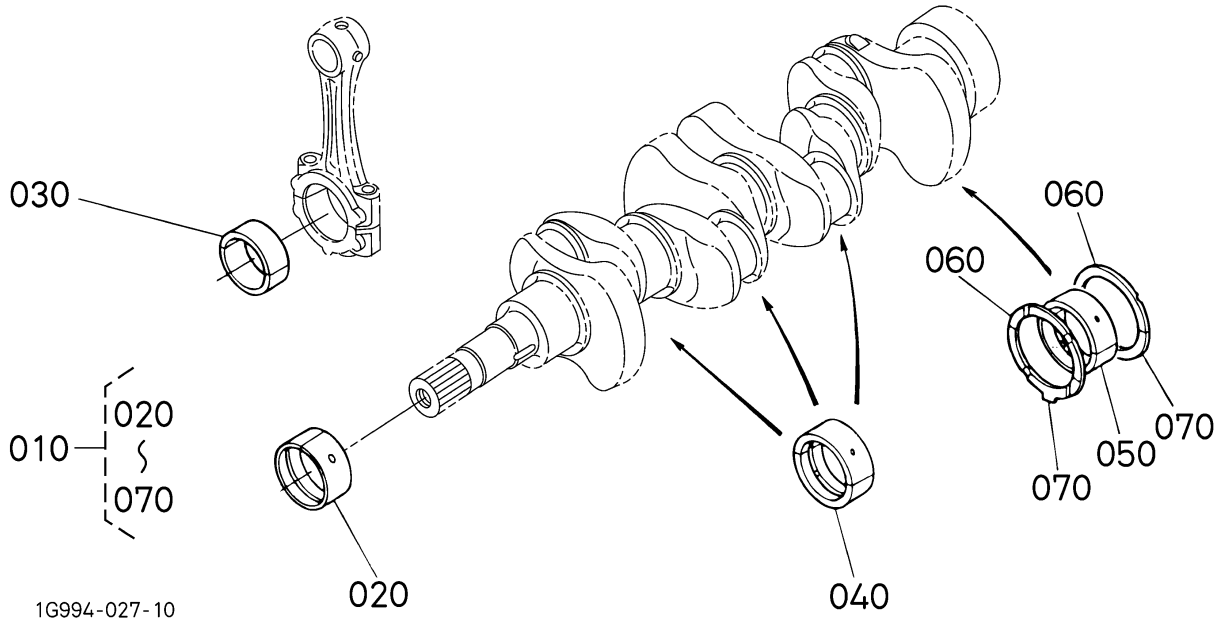


Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G986-99367	KIT GASKET LOWER	1				0.166
020	16252-01630	GASKET,OIL PAN	1				0.012
030	16264-04132	GASKET,GEAR CASE	1				0.01
040	1J095-04360	GASKET(BRG.CASE)	1				0.006
050	16264-04822	GASKET	1				0.008
060	16261-52140	GASKET,FUEL PUMP	1				0.001
070	16264-57210	GASKET	1				0.002
080	16239-73430	GASKET,WATER PUMP	1				0.007
090	16299-56260	GASKET	1				0.002
110	15601-96650	PACKING	6				0.001
120	6C090-58960	GASKET	1				0.005
130	16265-96670	PACKING	1				0.005
140	16241-04212	SEAL,OIL	1				0.012
150	16285-04460	SEAL,OIL	1				0.003

V1505-E4B-KEA-1 -> ENGINE -> 090100 METAL KIT [OPTION] ## V1505-E4B-KEA-1

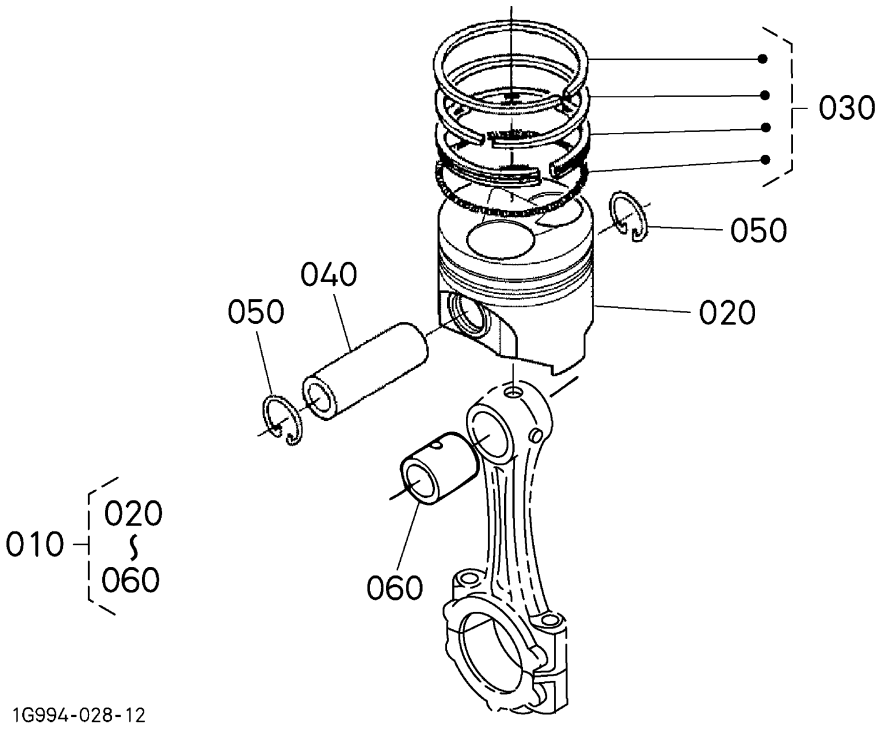
Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1G992-23755	METAL,KIT(ENGINE)	1			STD	0.392
010	1G992-23765	KIT METAL,ENGINE	1			-0.20mm/+0.20mm	0.394
010	1G992-23775	KIT METAL,ENGINE	1			-0.40mm/+0.40mm	0.646
020	16292-23473	METAL(CRANKSHAFT)	1			STD	0.046
020	16292-23913	METAL(CRANKSHAFT)	1			-0.20mm	0.005
020	16292-23923	METAL(CRANKSHAFT)	1			-0.40mm	0.05
030	16292-22310	METAL(PIN,CRANK)	4			STD/SET	0.04
030	16292-22972	METAL,CRANKPIN	4			-0.20mm/SET	0.033
030	16292-22982	METAL,CRANKPIN	4			-0.40mm/SET	0.034
040	16292-23483	METAL,CRANKSHAFT	3			STD/SET	0.05
040	16292-23933	METAL,CRANKSHAFT	3			-0.20mm/SET	0.05
040	16292-23943	METAL,CRANKSHAFT	3			-0.40mm/SET	0.05
050	16292-23494	METAL,CRANKSHAFT	1			STD/SET	0.07
050	16292-23864	METAL,CRANKSHAFT	1			-0.20mm/SET	0.05
050	16292-23874	METAL,CRANKSHAFT	1			-0.40mm/SET	0.05
060	15521-23533	METAL,SIDE	2			STD	0.01
060	15521-23953	METAL,SIDE	2			+0.20mm	0.01
060	15521-23963	METAL,SIDE	2			+0.40mm	0.01
070	19202-23543	METAL,SIDE	2			STD	0.01
070	19202-23973	METAL,SIDE	2			+0.20mm	0.01
070	19202-23983	METAL,SIDE	2			+0.40mm	0.01

Update Date: 03/06/2015, Printing Date: 09/03/2016



Interchangeable =, Not Interchangeable NI, New for Old >>, Old for New <<

No	Part Number	Part Name	Qty	IC	S/N	Remarks	Kg
010	1J097-21770	PISTON,KIT(STD)	4			STD	0.658
010	1J097-21790	PISTON,KIT(050)	4			+0.50mm	0.668
020	1J097-21110	PISTON	4			STD	0.414
020	1J097-21910	PISTON(05)	4			+0.50mm	0.425
030	1J050-21050	RING,PISTON,ASSY	4			STD	0.04
030	1J050-21090	RING,PISTON,ASSY 05	4			+0.50mm	0.032
040	16241-21310	PIN,PISTON	4				0.135
050	16241-21330	CIRCLIP(PIN,PISTON)	8				0.002
060	1G700-21980	BUSH,PISTON PIN	4				0.01

Einleitung

Introduction

EMMEGI Öl/Luft Wärmetauscher werden zur Kühlung des Hydrauliköles in den Rücklaufleitungen von Hydrauliksystemen eingesetzt.
Die kalte Umgebungsluft wird mittels eines Axialventilators, angetrieben durch einen Elektro- oder Hydraulikmotor, über einen aus hochfestem Aluminium, in speziellen Löt- und Schweißverfahren hergestellten Kühlerblock geblasen und bewirkt die Rückkühlung des heißen Hydrauliköles auf die gewünschte Betriebstemperatur.
Speziell entwickelte Turbulatoren in den ölführenden Rohren und Verwirbelungselemente in den Luftkanälen garantieren hohe Kühlleistungen in allen Durchflussbereichen.

EMMEGI air-oil heat exchangers are used for cooling oil hydraulic systems using as the coolant ambient air that passes over the radiant by means of a fan operated by an electric or hydraulic motor.
The cooler element, in high resistance aluminium alloy, is obtained by means of a braze-welding process carried out under vacuum.
The particular configuration of the cooling pipes increase the turbulence of the fluid consequently of the exchange capacity; moreover, the presence of special jets on the cooler finning further improves the total transmission coefficient.
The result is a very small, light and robust technologically advanced product.

Zulässige Hydraulikflüssigkeiten

- MINERALÖLE, HL, HLP
- WASSER-ÖL EMULSIONEN
- WASSER-GLYCOL
- Bei anderen Betriebsmedien Rücksprache mit **EMMEGI** erforderlich

Compatible fluids

- *MINERAL OILS, HL, HLP.*
- *WATER-OIL EMULSION.*
- *WATER-GLYCOL.*
- *Consults EMMEGI for other fluids.*

Technische Daten Kühlelement

- Werkstoff: Aluminium "Long Life"
- Betriebsdruck: 20 bar
- Prüfdruck: 35 bar
- Max. Betriebstemperatur: 120 °C
- Bei "aggressiven" Umweltbedingungen Rücksprache mit EMMEGI erforderlich.

Technical specification of Cooler Element

- *Material: "long life" aluminium.*
- *Operating pressure: 20 bar.*
- *Test pressure: 35 bar.*
- *Max operating temperature: 120°c.*
- *For specially "aggressive" atmospheres contact EMMEGI.*

Installation

Der Wärmetauscher muss so installiert werden, dass die Zu- und Abfuhr der Kühlluft ungehindert erfolgen kann. Die minimalen Abstände (siehe Fig. 1) zu eventuellen Hindernissen in der Saug- und Abluftzone sind zu beachten.
Der Einbau des Kühlers muss in der Rücklaufleitung erfolgen. Zur Vermeidung von äusseren Krafteinleitungen und Vibrationen auf das Kühlelement durch die Anschlussleitungen, sind unbedingt Hydraulikschläuche zu verwenden.
Druckspitzen und Pulsationen im Ölstrom können das Kühlelement zerstören und sind zu vermeiden.
Um Beschädigungen des Kühlers bei Kaltstart durch hohe Ölviskositäten zu verhindern, empfehlen wir den Einbau eines Bypass-Ventiles (siehe Fig. 2).

Installation

The exchanger can be fitted in a horizontal position, respecting the minimum distance from the wall (see fig.1) so as to ensure a natural flow of cooling air.
The exchanger is usually installed on oil tank return piping; it must also be protected from impacts and mechanical vibrations by supports and must be connected to the plant with flexible pipes.
Avoid subjecting the exchanger to sudden changes in flow, hammering and pulsations that can cause irreversible damage to the element.
We recommend installing a by-pass valve (see fig.2) to protect the exchanger from over-pressure generated when the plants is started up due to high oil viscosity.

Wartung

Um eine gleichbleibende Kühlleistung zu gewährleisten, ist das Kühlelement in regelmäßigen Abständen zu reinigen. Die Intervalle richten sich nach den jeweiligen Umwelt- und Betriebsbedingungen.

Reinigung der Ölseite

Zur Reinigung der ölführenden Rohre ist der Wärmetauscher zu demontieren. Durch Spülen der Rohre mit einem Aluminiumverträglichen Reinigungsmittel entgegen der Durchflussrichtung sind die Verschmutzungen, Öl- und Fettrückstände in den Rohren zu entfernen.

Reinigung der Luftseite

Die Luftlamellen sind mit Pressluft, oder bei starker Verschmutzung mit Öl oder Fett, mit heißem Wasser oder Wasserdampf zu reinigen. Es ist darauf zu achten, dass der Luft- oder Wasserstrahl parallel zu den Lamellen ausgerichtet wird, damit Beschädigungen an den Turbulatoren vermieden werden. Der Elektromotor ist vor der Reinigung vom Stromnetz zu trennen und vor Feuchtig-keit zu schützen.

Beispiel zur Auslegung eines Wärmetauschers

Berechnungsbeispiel zur Kühlerauslegung gemäß der nachstehenden Betriebsparameter:

Erforderliche Kühlleistung	:	19,5	[KW]
Durchflussmenge Öl ISO VG32	:	90	[lpm]
Öleingangstemperatur	:	60	[°C]
Ölausgangstemperatur	:	30	[°C]

Anschlussspannung Ventilator 230/400V-50 Hz.

Ermittlung der notwendigen spezifischen Kühlleistung in [kW/°C] mit der bekannten Kühlleistung und Temperaturdifferenz ΔT (Differenz zwischen Öleintrittstemperatur und Lufteintrittstemperatur).

$$P = \frac{19{,}5\ KW}{60°-30°} = 0{,}65\ KW/°C$$

Mit der Öldurchflussmenge (90 l/min) und der ermittelten spezifischen Kühlleistung (0,65 kW/°C) ist die notwendige Kühlergrösse und -type aus den Diagrammen zu ermitteln.

Maintenance

You should be particularly carefully in cleaning the cooler element to guarantee a natural exchange of air, in order to prevent a reduction in thermal efficiency.

Cleaning oil side

The exchanger should be dismantled to clean on the oil side. The dirt can be removed by flushing, in counter-current, de-greasing substance, compatible with aluminium. Wash with hydraulic oil before re-connecting the product to the plant.

Cleaning air side

Cleaning on the air side can be done using compressed air or water, directing the jet parallel to the fins so as not to damage them.
Oily dirt or grease can be removed with a jet of steam or hot water. During this operation, the electric motor must be disconnected from the voltage supply, and must be adequately protected.

Example of how to choose a heat exchanger

Proceed with sizing the exchanger, with a knowledge of the data as the example below shows:

Power to dissipate	:	*19,5*	*[KW]*
ISO VG 32 oil flow	:	*90*	*[lpm]*
Oil input temperature	:	*60*	*[°C]*
Ambient temperature	:	*30*	*[°C]*

Fan operating with an electric motor 230/400V-50Hz.

You can then calculate the specific heat exchange power KW/°C if you know the power to dissipate and the ΔT (the difference between the oil input temperature and the ambient temperature).

$$P = \frac{19{,}5\ KW}{60°-30°} = 0{,}65\ KW/°C$$

Note the oil flow (90lpm) and specific exchange power (0,65 KW/°C), product research is made by referring to the graph in the catalogue which is relevant to each model.

Proof of maintenance

probst handling equipment

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.com / via fax or post

Operator: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Device type: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ **Article -No.:** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Device-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

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