1. TO THE OPERATOR

1.1. General

This manual is intended for TANA Shark shredder operator and maintenance person. The manual contains essential information and instructions on how to operate TANA Shark shredder.

The service life, operating costs and reliability of TANA Shark shredder depend on how well the instructions provided in this manual are followed.

The manual must be always kept with the shredder. Read the manual carefully before operating or servicing the machine.

This manual is intended for TANA Shark 220D, Shark 220Deco, Shark 440D, Shark 440Deco, Shark 220DT, Shark 220DTeco, Shark 440DT, Shark 440DTeco, Shark 220E and Shark 440E shredders.

TANA Shark 220D, Shark 220Deco, Shark 440D and Shark 440Deco are diesel engine powered shredders on a semi-trailer platform.

TANA Shark 220DT, Shark 220DTeco, Shark 440DT and Shark 440DTeco are diesel engine powered shredders on tracks.

TANA Shark 220E and Shark 440E are electrically powered shredders on a stationary platform.

Eco-models are shredders that meets the emission requirements of U.S. EPA Tier 4 Final, CARB Tier 4 Final and EU Stage IV.

The images in the manual may portray a machine different from yours.

Please read this manual carefully and follow the instructions. If anything is still unclear in the manual concerning the operation or maintenance of the machine, please contact the nearest TANA distributor or e-mail to *service@tana.fi*.

1.2. Operator’s responsibility

Only person authorized by TANA OY is permitted to perform adjustments to the control system, hydraulic units and engine of the TANA Shark shredder during the warranty period.

TANA Shark shredder is intended for handling solid waste and energy waste.

Flammable, explosive or poisonous materials or containers that have contained such materials cannot be fed in the shredder. Neither are hot substances, which can be a fire hazard.

Proper and safe operation and maintenance are very important to the operational reliability of the TANA Shark shredder. The warranty does not apply to damage caused by insufficient maintenance, misuse of the shredder, the use of lubricants and hydraulic fluids that are not recommended in the manual, or changing of the above-mentioned adjustments without proper authorisation.

The operators / maintenance personnel must always work safely and use common sense. Only professionals trained in the work to be performed are allowed to operate, supervise, or perform maintenance of the machine.

Never operate the machine if the protective equipment is misplaced or switched off.

Danger of bodily injury.

Improper use of the machine could cause death or serious injuries.

Do not operate or service the machine unless you have read and understood the operation and maintenance manuals of the machine.

2. SAFETY DEFICIENCY REPORTING

2.1. TANA Shark 220D, Shark 220Deco, Shark 440D and Shark 440Deco machines located in the United States

If you believe that machine has a defect that could cause an accident or lead to injury or death, you must immediately report the issue to the National Highway Traffic Safety Administration (NHTSA) and machine manufacturer TANA OY.

If NHTSA receives similar complaints, it is be able to start an investigation and if it will establish that the defect is present in several machines, it can order a machine recall and repair campaign. However, NHTSA cannot participate in a resolution of the individual problem between you and dealer or manufacturer TANA OY.

After contacting NHTSA, you can call “Vehicle Safety Hotline” toll-free number 1-888-327-4236 (TTY: 1-800-424-9153), or you can visit internet pages http://nhtsa.safercar.gov, or write to the address: “Administrator, NHTSA, 1200 New Jersey Avenue SE, Washington, DC 20590”.

You can look up the information related to the safety of other motor vehicles on internet pages at http://www.safecar.gov

2.2. TANA Shark 220DT, 220DTeco, 440DT, 440DTeco, 220E and 440E machines located in the United States and machines in other countries

If you discover safety defect in the machine, contact immediately the local TANA reseller.

3. MACHINE CONSTRUCTION

3.1. Intended use

TANA Shark shredder is intended for handling solid waste and energy waste.

The machine is best suited for materials that fit easily in the shredder mouth between the rotor and the counter wall and that the rotor knives can grab well. Such materials are, for example:

- Municipal waste and biodegradable waste
- Blocks of wood, wood debris from demolition and bark
- Bulk plastic and loose paper
- Passenger car tyres

Materials that do not fit into the feeding opening or that the rotor knives cannot grab are more challenging for the machine. Such materials are, for example:

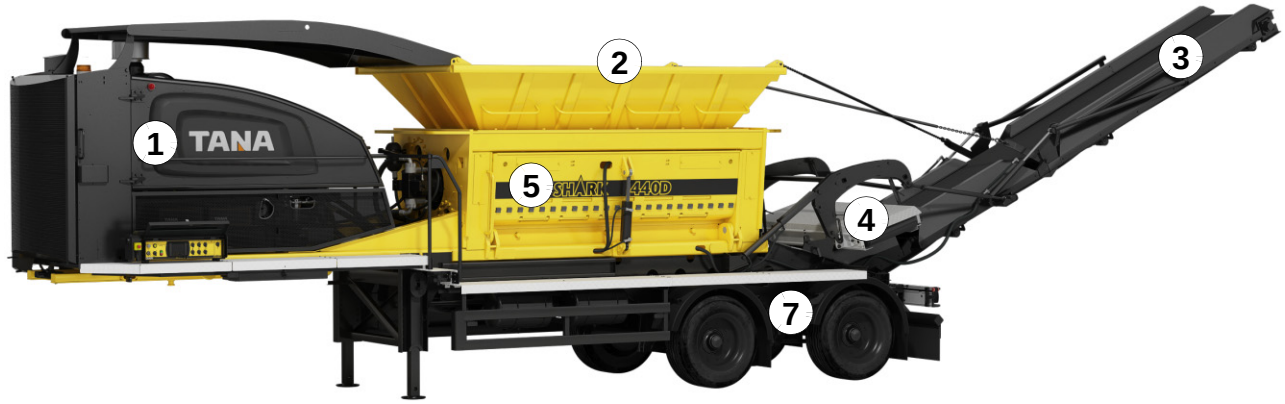
- Large tree stumps
- Big plastic containers, such as barrels
- Lorry tyres
- Hard and dense sheets, like plywood and plates

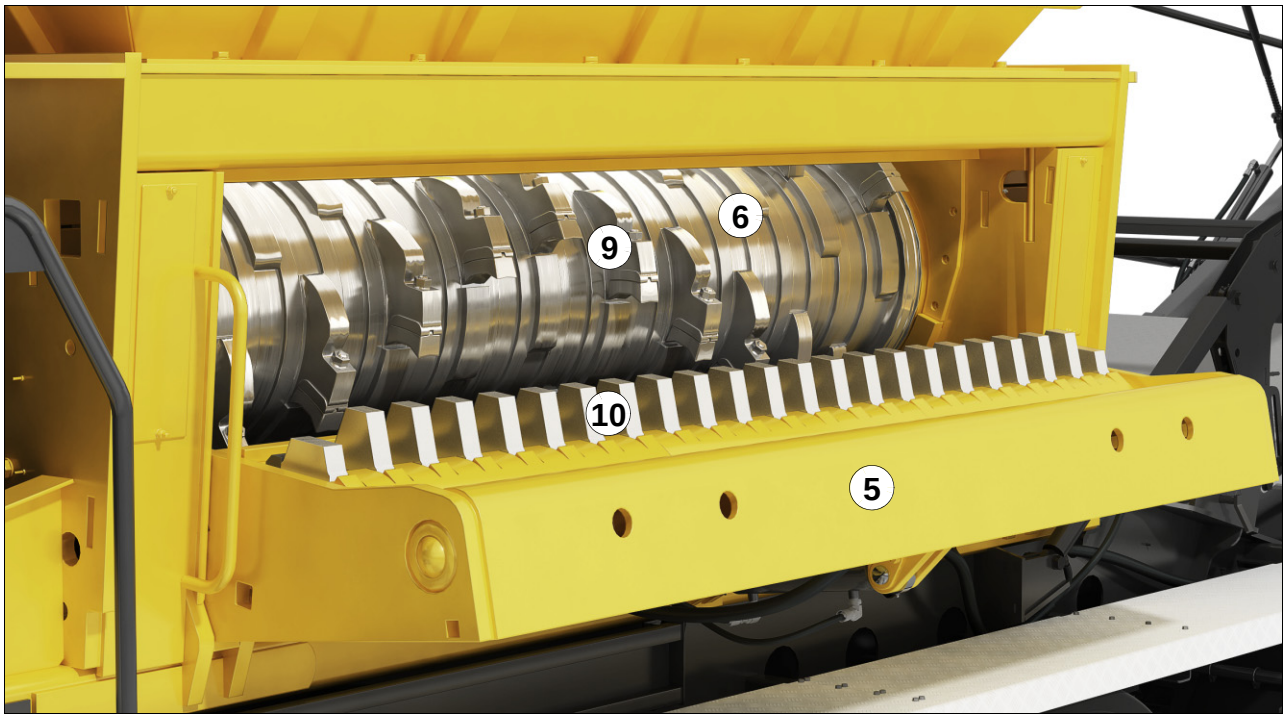
The machine must **not** be used for the following materials:

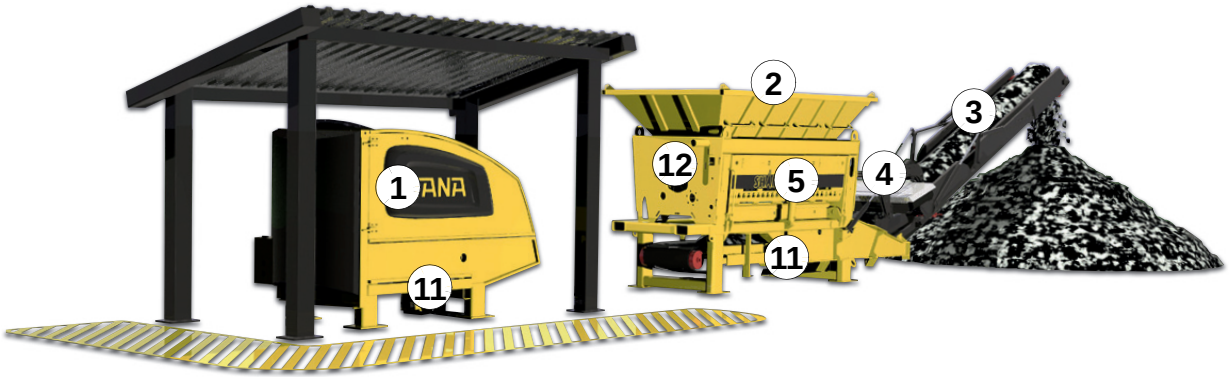
- Metal
- Concrete
- Stones
- Earthmoving machines' tyres including special tyres

Flammable, explosive or poisonous materials or containers that have contained such materials cannot be fed in the shredder. Neither are hot substances, which can be a fire hazard.

3.2. Main components







1. Powerpack (engine compartment)
2. Material feeding funnel
3. Belt conveyor (depending on delivery)
4. Metal separator (belt magnet), optional extra equipment
5. Rotor counter wall
6. Rotor
7. Semitrailer platform (Shark 220D, 220Deco, 440D and 440Deco)
8. Track platform (Shark 220DT, 220DTeco, 440DT and 440DTeco)
9. Rotor knives
10. Rotor counter knives
11. Stationary platform (Shark 220E and 440E)
12. Crusher unit

Machine front / back

The diesel engine is located in the front of the machine, and the conveyor at the back of the machine. Thus, the left and right sides of the machine are determined by the way they are seen when hauling / driving the machine forward.

The coolers in the powerpack of Shark 220E and 440E machines are located in the front of the machine. Material discharge end in the crusher unit is in the back.

3.3. Principle of operation

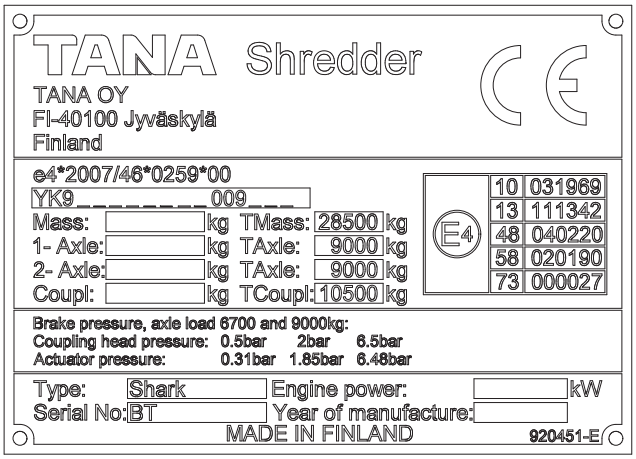
The engine (diesel engine or two electric motors) and hydraulic pumps produces the required volume flow for rotating the rotor and tracks (Shark 220DT, Shark 220DTeco, Shark 440DT and Shark 440DTeco), for hydraulic cylinders and for driving the conveyors.

The machine operator controls and operates the machine from the control panel via control system.

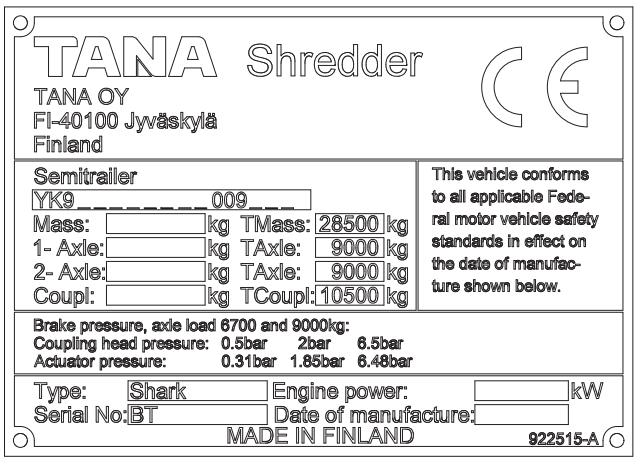
With its heavy steel construction, the machine is durable and reliable in handling solid waste and energy waste.

3.4. Type plate (CE mark)

Type plate Shark 220D, 220Deco, 440D and 440Deco, all others except machines delivered to the United States territories:



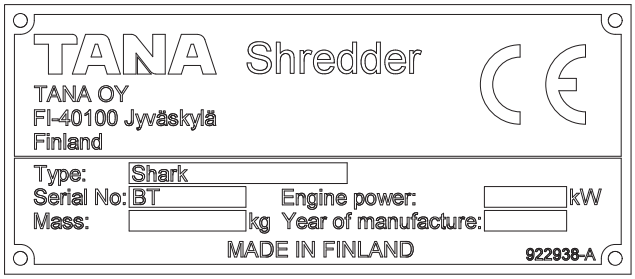
Type plate Shark 220D, 220Deco, 440D and 440Deco, machines delivered to the United States territories:



The type plate is attached to the shredder's crusher frame.

The information on the type plate must be included when, for example, ordering spare parts. This information confirms the machine model, serial number, year of manufacture, engine output, and total weight.

Type plate Shark 220DT, 220DTeco, 440DT and 440DTeco:



3.5. Main dimensions

The dimensions and technical specifications given in this manual are not binding. The manufacturer reserves the right to make alterations.

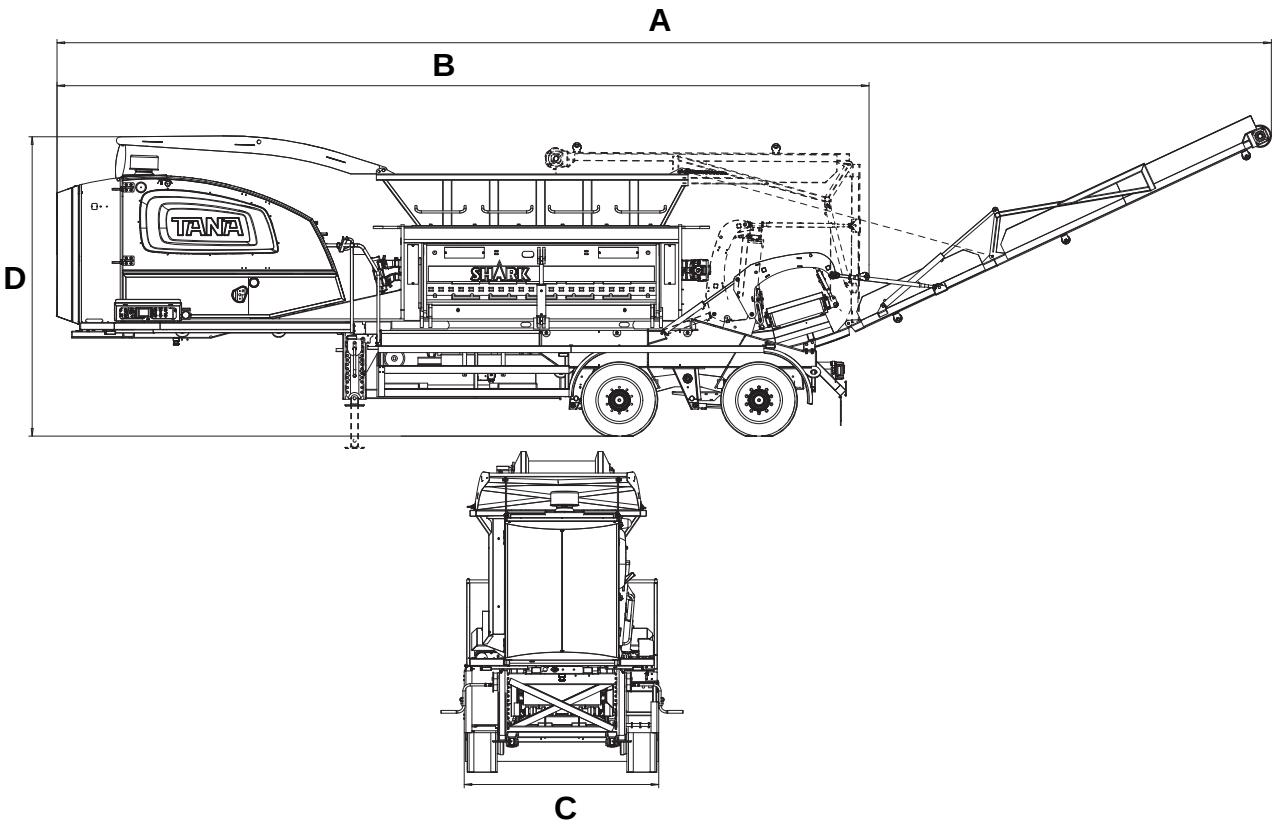
NOTICE

Risk of machine breakdown.

During transit machine may sustain damages from the transportation.

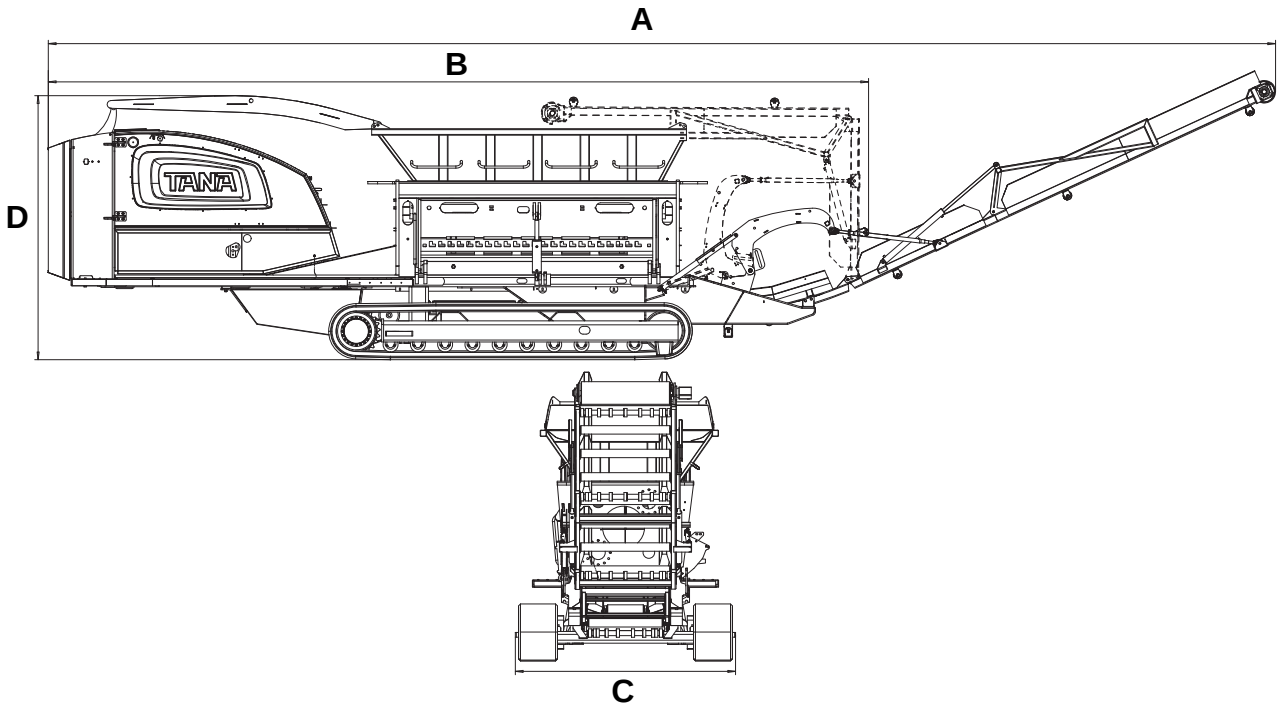
Take into consideration the machine measurements when selecting the location or preparing for transportation. The weights are not precise. The weight depends on the selected machine's equipment.

Main measurements (Shark 220D, Shark 220Deco, Shark 440D and Shark 440Deco)



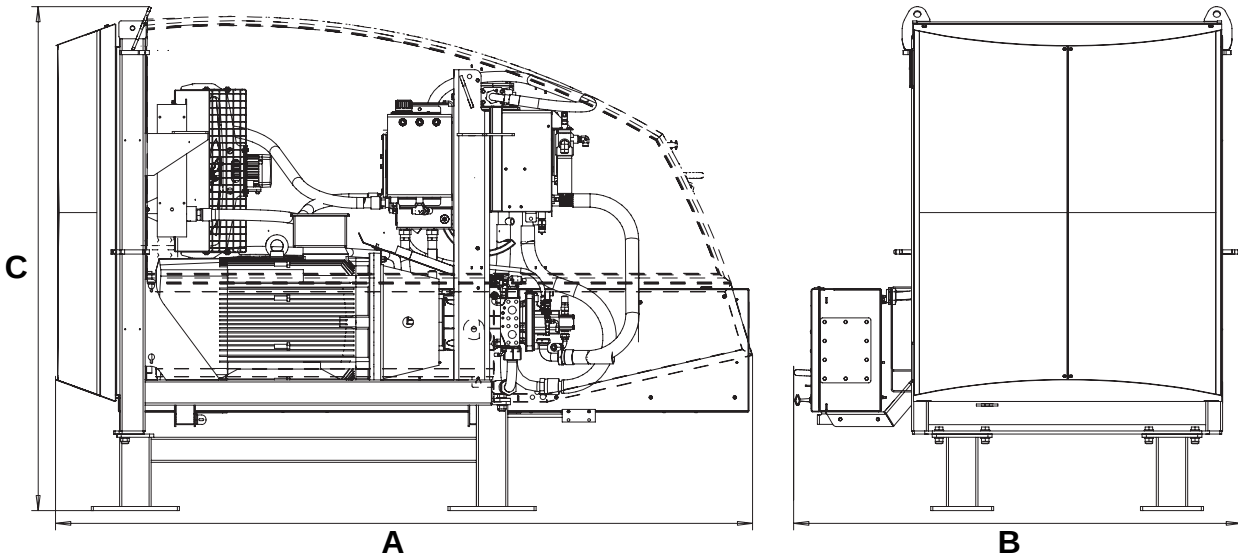
Semi-trailer platform	Machine model	
	Shark 220D and Shark 220Deco	Shark 440D and Shark 440Deco
Weight	approximately 25,000 kg (55,116 lb.)	approximately 28,000 kg (61,729 lb.)
Total length (conveyor open) **(A)**	15,750 mm (620.1 in.)	
Total length (transport position) **(B)**	10,530 mm (414.6 in.)	
Total width **(C)**	2,520 mm (99.2 in.)	
Total height (transport position) **(D)**	3,880 mm (152.8 in.)	

Main measurements (Shark 220DT, Shark 220DTeco, Shark 440DT and Shark 440DTeco)

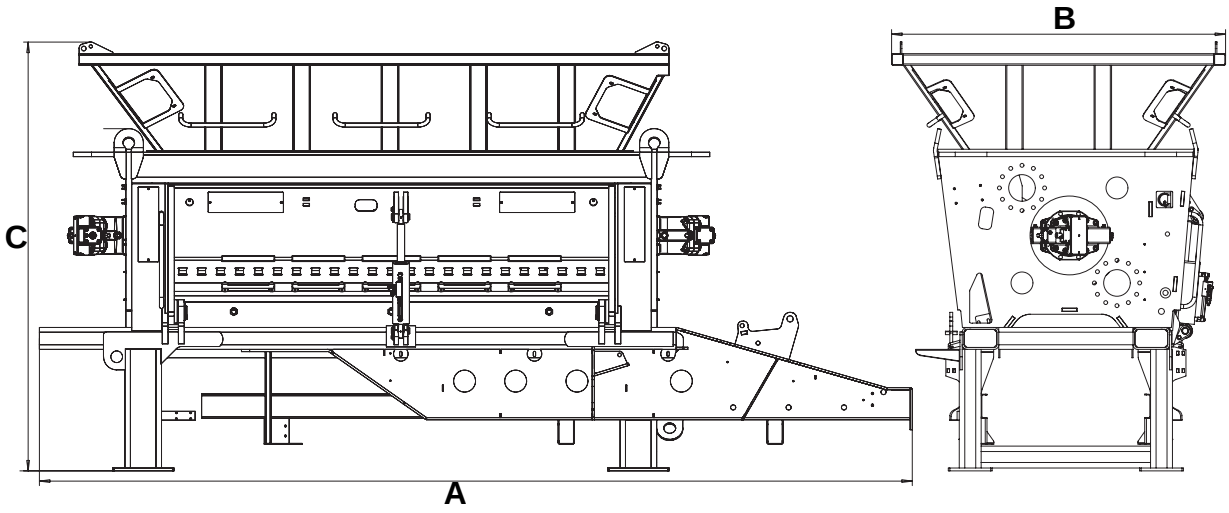


Track platform	Machine model	
	Shark 220DT and Shark 220DTeco	Shark 440DT and Shark 440DTeco
Weight	approximately 29,000 kg (63,934 lb.)	approximately 32,000 kg (70,548 lb.)
Total length (conveyor open) **(A)**	15,750 mm (620.1 in.)	
Total length (transport position) **(B)**	10,530 mm (414.6 in.)	
Total width **(C)**	2,830 mm (111.4 in.)	
Total height (transport position) **(D)**	3,390 mm (133.5 in.)	

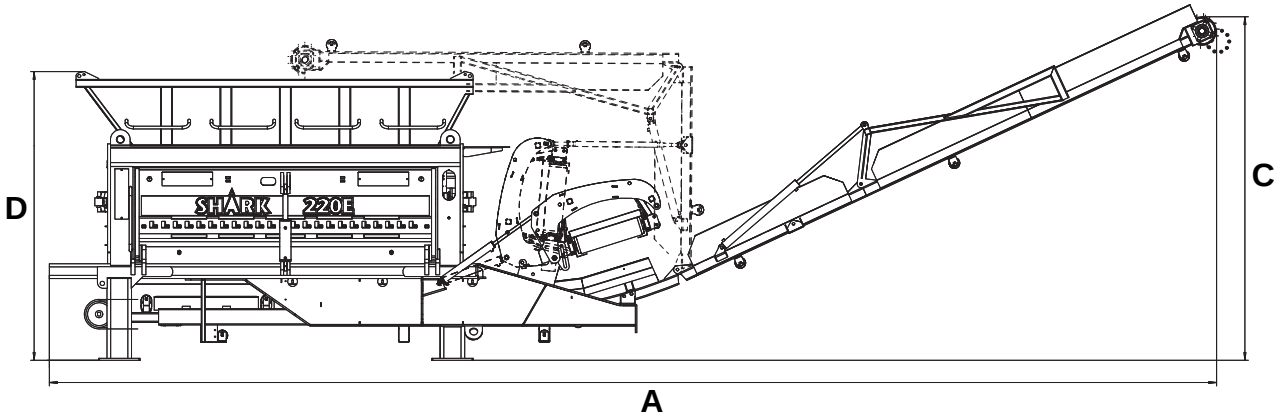
Main measurements (Shark 220E and Shark 440E)

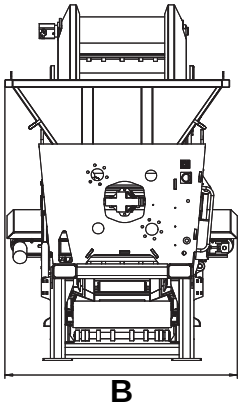


Stationary platform, powerpack	Machine model	
	Shark 220E	Shark 440E
Weight	approximately 3,300 kg (7,275 lb.)	approximately 4,500 kg (9,921 lb.)
Total length **(A)**	3,320 mm (130.7 in.)	
Total width **(B)**	2,040 mm (80.3 in.)	
Total height **(C)**	2,400 mm (94.5 in.)	



Stationary platform, crusher unit (without conveyor)	Machine model	
	Shark 220E	Shark 440E
Weight, crusher unit (without conveyor)	approximately 11,500 kg (25,353 lb.)	approximately 13,200 kg (29,101 lb.)
Total length (without conveyor) **(A)**	5,980 mm (235.4 in.)	
Total width (without conveyor) **(B)**	2,290 mm (90.2 in.)	
Total height (without conveyor) **(C)**	2,940 mm (115.8 in.)	





Stationary platform, crusher unit (with conveyor)	Machine model	
	Shark 220E	Shark 440E
Weight, crusher unit (with conveyor)	approximately 15,300 kg (33,731 lb.)	approximately 16,900 kg (37,258 lb.)
Total length (conveyor open) **(A)**	11,880 mm (467.7 in.)	
Total width (with conveyor) **(B)**	2,290 mm (90.2 in.)	
Total height (conveyor open) **(C)**	3,490 mm (137.4 in.)	
Total height (to the upper edge of the feeding funnel) **(D)**	2,935 mm (115.6 in.)	

4. SAFETY INSTRUCTIONS

Most accidents caused during the machine's operating are due to a disregard for safety regulations and instructions. They can be avoided by anticipating possible hazardous situations. Improper use of the machine is dangerous and may cause injuries or death.

This section provides basic safety instructions as well as safety instructions concerning the operation of the machine. Please also read the maintenance safety instructions in the maintenance manual.

Hazard signs are attached to the machine in places where violation of warnings could cause serious injury or death.

Since the machine manufacturer cannot anticipate every possible circumstances that may lead to hazardous situations, the warnings in this manual and the warnings on the machine cannot be exhaustive. If operation of the machine is not in compliance with our recommendations, the operator must ensure that the operation does not put the operator or anyone else in danger and that the machine is not damaged or becomes unsafe.

Do not discard any protection, safety device, sign, or warning or prevent their function.

4.1. Warning symbols

The warning symbols in this manual emphasise especially important issues.

DANGER

DANGER. Danger means an immediate hazardous situation which, if not avoided, will result in death or serious injury.

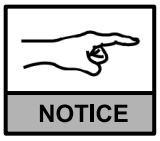
WARNING

WARNING. Warning means a potential hazardous situation which, if not avoided, could result in death or serious injury. The signal word WARNING identifies dangers with a lesser degree of risk than dangers identified by the signal word DANGER.

CAUTION

CAUTION. The signal word CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices associated with events that could lead to personal injury.

NOTICE



Note special instructions or procedures. NOTICE symbol may also be used to alert against potentially unsafe operating methods that could endanger the environment or damage the machine.

4.2. Safety instructions - machine location and equipment

Work site - general

Use care in selecting the work site for the machine. Make sure that there is enough space in the work site around the machine and also above it. Check that the lighting in the work site is sufficient.

Make sure that the bearing capacity of the platform under the machine is adequate. The machine must be positioned on a platform as solid and level as possible. If the platform is not naturally level, it must be levelled to ensure safe operation of the machine. The machine may not be used at an inclination over 5 degrees from the platform along the length of the machine or over 2.5 degrees in relation to the lateral direction.

Keep the machine and the work site clean. Cleanliness is essential for visibility, fire safety, and detection of defects and malfunctions. Proper cleanliness and order prevent occurrences of slipping and other bodily injury. Also remove snow and ice from the top of the machine, maintenance platforms, conveyors and around the machine.

Slip hazard.

Machine maintenance platforms and steps can be slippery and slipping could cause serious injuries. Use caution while moving on the maintenance platform and steps.

Keep the machine clean, especially the maintenance platforms and steps. Wear a dust mask and goggles when cleaning the machine with compressed air.

Work site - diesel powered shredders

Diesel powered shredders: Toxic gases hazard.

Diesel engine fumes pose dangerous health risk and could cause death or serious injuries.

Run the diesel engine only in well ventilated areas. If the engine is used indoors, the exhaust gases must be directed out.

Do not locate the shredder in the immediate vicinity of buildings.

The shredder must not move or sink into the ground during operation. Sand or clean icy or otherwise slippery surfaces or make sure in other ways that the machine cannot slide during operation.

Clean all oil, grease, and fuel stains from the machine and its surroundings.

Installation site - electric powered shredders

The powerpack unit, crusher unit and control panel of the stationary platform machine may be located separately. The powerpack unit may be 2-12 metres (79-472 in.) from the crusher unit. The powerpack and crusher units must be on the same level.

The control panel may be located 10 metres (393 in.) from the powerpack unit. There must be a visual connection from the control panel to the crusher unit.

Powerpack unit can be installed indoors. In that case special attention must be paid to the machine receiving cooling air. The ambient temperature at the installation site may be +40°C (+104 °F) at the most.

A separate shelter must be built if the powerpack unit is installed outdoors.

The crusher unit and the powerpack unit must be fixed to their platform appropriately and firmly. The required servicing platforms and railings must be built around the machine in accordance with the installation site.

The cables and hoses between the powerpack and crusher units must be appropriately protected so that they will not be damaged.

Since the manufacturer cannot know exactly the conditions at the location of use, the customer that purchased the machine must be responsible for the safety of the shredder's installation and set-up. In accordance with safety regulations, the customer that purchased the machine is also responsible for placing the required safety equipment, such as emergency stop switches.

Power supply - electric powered shredders

The customer that purchased the machine is responsible for the safety of the shredder's electric power supply.

The power supply cable connected to the machine must be protected and carefully attached as required by local regulations. Only authorized electrician may perform electrical installations. The type of the power supply cable depends on the place of use and it must be a connection cable adaptable to the place of use. Necessary ducts must be made for the cable in the machine electrical control cabinet.

4.3. Safety instructions - operators and maintenance personnel

Use personal protective gear such as a safety helmet, safety goggles, protective shoes, protective gloves, respirator mask and hearing protectors. Pieces of material could fly out of the machine during operation, or shredded material may fall from the conveyor. Wear a respirator mask If the material handling produces dust.

Keep all clothing and body parts away from the places, where they may get jammed or caught on the moving or rotating parts. Do not touch the conveyor rolls or belt when the machine is in operation. Never have long hair untied, wear loose clothes or jewellery which may get caught in the moving parts of the machine.

Danger of bodily injury.

Staying near the machine in operation could cause death or serious injuries.

Ensure that there are no people or vehicles in the operating area of the machine while it is running. In particular, the operating areas of the engine, material feeding opening, and conveyor must be clear while the engine is running. Please note that there is a blind area behind the machine.

The machine must always be operated by a professional, trained person who is acquainted with the safe operation of the machine. Only authorised personnel are allowed to perform mechanical and electrical adjustments. Electrical installation can be performed only by authorized electrician with adequate expertise and skills.

Never operate or service the machine under the influence of alcohol or other intoxicants. Intoxicants impair your attention and ability to concentrate. Never smoke or use open flame in close proximity to the machine.

Danger of bodily injury.

The machine has a permanent magnet above the conveyor belt (extra equipment). The magnetic field is at the distance of 0.05 T 200 mm (7.9 in.) from the magnet. The magnetism remains even when the machine is stopped and the engine is shut off. Magnetism can be dangerous to the person with a cardiac pacemaker. Magnetism may also damage electronic devices, watches, and bank cards, or pull a metal object from your hand.

Do not go near magnet if you have pacemaker or some other electronic and/or medical device containing magnetic material. Contact your doctor for more detailed instruction. Do not bring any other electronic devices near magnetic cross-section.

Explosion hazard.

Connecting / disconnecting cables to the accumulator may cause an explosion resulting in accident or death. Attaching and disconnecting other electrical devices may also cause an explosion.

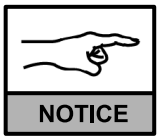
The procedures described here must only be performed in non-explosive circumstances.

Danger of bodily injury.

Careless use of the machine and negligence in failing to follow the instructions could cause dangerous situations.

Your safety and safety of others depends on how carefully and properly you operate the machine. A diligent operator is the best preventive measure to avoid accidents and damages.

Take notice of special local regulations, work instructions and procedures.



Danger of bodily injury and environmental contamination.

Fluids and materials used in the machine are dangerous to people and environment.

Make sure that you are familiar with safety data sheet regarding the fluids and materials used in the machine and that you follow it.

4.4. Safety instructions - operation

Danger of bodily injury.

Improper use of the machine could cause death or serious injuries.

Do not operate the machine if you have not read or understood the safety instructions or the operation manual of the machine. An operator without the necessary knowledge or level of concern is a hazard to him- or herself and others. Appropriate use is very important to the reliability and safety of the shredder.

Before starting the work, make sure there is no noticeable defect in the machine. Also make sure that all doors, hoods, covers, and protectors are locked and installed, both when starting the machine and during its operation. Make sure that there are no oily or easily flammable materials in the machine.

The support legs of the mobile shredders on a semi-trailer platform (Shark 220D, 220Deco, 440D and 440Deco) must always be lowered during operation. The platform brakes must be engaged, and wedge pads must be placed on both sides of the base wheels to prevent the machine from rolling.

Before starting the operation, the charging machine driver must become familiar with the measurements of the funnel in the material feeding opening and the rotor’s distance from the funnel.

The charging machine bucket could hit the rotor during charging and sustain damages if it is lowered into the funnel in the material feeding opening.

If a fault occurs in the machine, stop the machine and contact the service department. Notify the maintenance personnel immediately of any defects or malfunctions.

Danger of bodily injury.

Removing materials from the machine while machine is in operation could cause death or serious injuries.

It is not permitted to remove any processing material from the machine while it is in operation. If the machine becomes clogged, stop the machine and remove the jam. Never try to remove the jam while the machine is in operation.

Danger of bodily injury.

Staying on the top of the machine while machine is in operation could lead to fall and cause death or serious injuries.

It is strictly forbidden to remain on the top of the machine while the machine is in operation. It is forbidden to stay in the danger zone while the machine is in operation.

Danger of bodily injury.

Operating the machine during maintenance and repair could cause death or serious injuries.

Do not start the engine or shift any controls if a sign ‘Do not operate’ or similar warning is attached to the machine, or if, for example, maintenance is being performed on the equipment.

Danger of bodily injury.

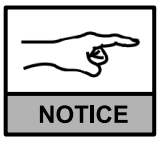
If the machine is left unattended with the engine running, unauthorized persons may gain access to the machine or machine can be damaged.

Never leave the machine unattended when the engine is running.

Danger of bodily injury.

Incorrect climbing onto or down from the machine could cause injuries.

Always use the steps on the side of the machine when climbing onto or down from the machine. Do not jump from the machine.



Risk of bodily injury and machine breakdown.

If the machine is parked for a longer time (over 2 hours), switch off the power from the main switch. Leaving the main switch on will eventually drain the batteries. It is also important that the main power is switched off in the unattended machine for safety reasons.

Never turn the main switch off while the engine is running. Turning the main switch off while the engine is running will damage the battery charging generator and the control system.

TANA Shark shredder is intended for handling solid waste and energy waste.

For instance, the shredder can be used for handling the following materials:

- Household waste
- Wood
- Packaging waste

Flammable, explosive or poisonous materials or containers that have contained such materials cannot be fed in the shredder. Neither are hot substances, which can be a fire hazard.

The shredder is not designed for handling steel wires, cables, or metallic objects.

If you have any questions about the processing materials, please contact a representative of TANA OY.

Make sure during operation that material will not fall into places where it may cause malfunction.

4.5. Safety instructions - engine and hydraulic system

Keep the engine compartment tidy and clean. Cleanliness is important in preventing dirt from entering the systems when replacing parts of the engine and hydraulic system. Cleanliness and tidiness help in finding possible leaks in the system. If leaks occur, they must be repaired immediately. Oil leaks can cause damage and create a fire hazard.

Do not store flammable materials in the engine compartment.

Remember that, after operation, the fluids in the engine, gears, and hydraulic system are hot. Be particularly careful when servicing these areas. Also, be careful with the hot surfaces in the engine compartment.

Pressurised hydraulic fluid can cause serious injury. Do not touch pressurised components. Open the hydraulic connections carefully and let any pressure be released before fully opening the connections.

Support and ensure mechanically the actuators supported by hydraulics, before releasing the pressure from the hydraulic circuit. When you release hydraulic pressure by loosening a hose joint, the pressurized hydraulic oil may cause an injury. Also, some component of the machine may suddenly move causing the danger of crushing or catching. Also some parts of the machine may be damaged by uncontrolled movement.

When the machine is running, it is forbidden to be in the engine compartment or open the engine covers. Only trained service personnel should open the engine covers when the machine is running for example to do the pressure adjustment.

Diesel powered shredders: Fire hazard.

Smoking or open flame during fueling can cause fire.

Do not smoke or use flame when fueling the machine.

Diesel powered shredders: Risk of burns.

Engine coolant is hot and pressurised after operation. The steam released from the cooler can cause serious burns.

After stopping the engine, do not open the cooler cap until the coolant has cooled down!

TANA Shark 220Deco, Shark 440Deco, Shark 220DTeco and Shark 440DTeco: Diesel engine exhaust after-treatment system has components that are extremely hot during and after the use of the machine. Be particularly careful when servicing these areas. Keep tidy the surroundings of the exhaust after-treatment system.

Explosion hazard and corrosion hazard.

Handling open flame near batteries can cause an explosion. Fluid in the battery is corrosive acid. Handling open flame near batteries can cause an explosion. Fluid in the battery is corrosive acid.

Smoking and open flame near the batteries is prohibited! Wear necessary protective gear when you handle the batteries.

Gases under pressure.

Erroneous installation and handling of pressure accumulators may cause a serious accident.

Handle pressure accumulators with care. Only qualified expert personnel is allowed to work on pressure accumulators!

4.6. Safety instructions - conveyor

The model of the conveyor depends on the machine. All machines do not have conveyors. Various parts can drop or fly from the conveyor during operation. Falling and flying parts can cause severe injury. Do not stay in the danger zone of the machine when machine is in operation.

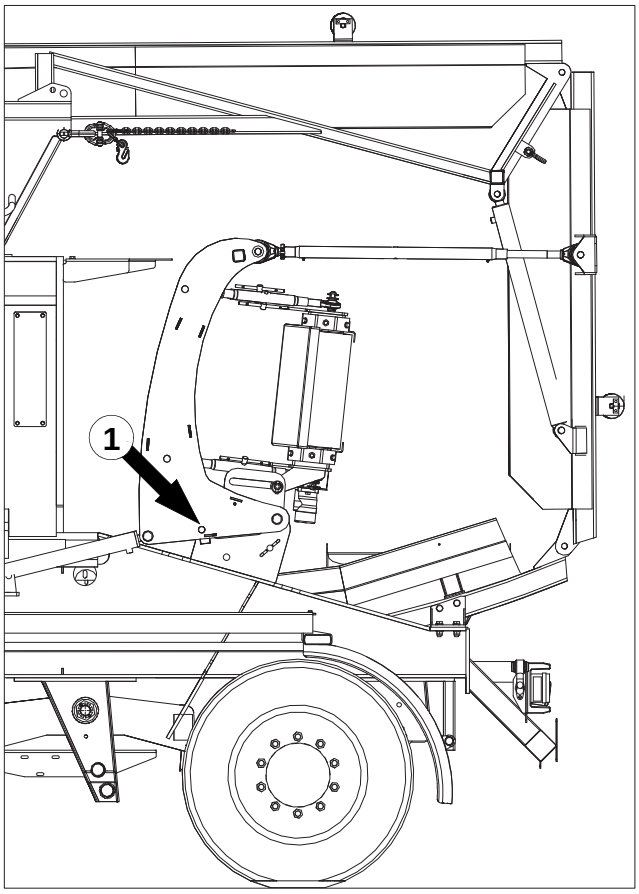
The conveyor has moving and rotating parts. Do not touch moving or rotating parts of the conveyor when conveyor is in operation. If shredded material gets stuck in the conveyor, turn off the machine and remove the excess material.

Use protective gloves to avoid cuts when handling shredded material. Do not use the conveyor as a walking pathway or maintenance platform. Do not climb on top of the conveyor.

Danger of bodily injury.

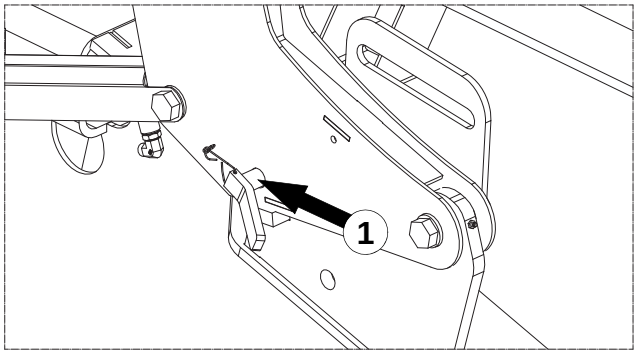
The machine has a permanent magnet above the conveyor belt (extra equipment). The magnetic field is at the distance of 0.05 T 200 mm (7.9 in.) from the magnet. The magnetism remains even when the machine is stopped and the engine is shut off. Magnetism can be dangerous to the person with a cardiac pacemaker. Magnetism may also damage electronic devices, watches, and bank cards, or pull a metal object from your hand.

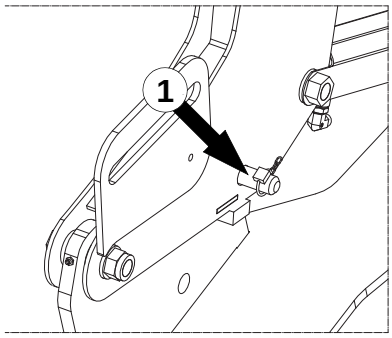
Do not go near magnet if you have pacemaker or some other electronic and/or medical device containing magnetic material. Contact your doctor for more detailed instruction. Do not bring any other electronic devices near magnetic cross-section.



Lock conveyor with the locking pin (1) in transport position during transit.

The locking pin must be removed before opening the conveyor.





4.7. Safety instructions - lubrication and fuels

Fuel or lubricant leaked or splashed onto hot surfaces or electrical components can cause a fire hazard. Remove leaked or splashed oil or lubricant immediately.

Use suitable lubricants and fuels. The products must be selected according to the requirements of the lubricating point and local conditions. Wrong lubricants and fuels could cause severe damages, extra maintenance and repair work, or result in reduced operating output.

Diesel powered shredders: Explosion hazard.

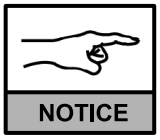
Mixing de-icer with fuel could cause an explosion hazard.

Do not mix de-icer with fuel.

Diesel powered shredders: Fire hazard.

Smoking or open flame when servicing fuel system can cause fire.

Do not smoke or use an open flame when servicing the fuel system!



Danger of bodily injury and environmental contamination.

Fluids and materials used in the machine are dangerous to people and environment.

Adhere to the handling and safety instructions provided by the oil, grease, and fuel suppliers, as well as the regulations issued by local authorities.

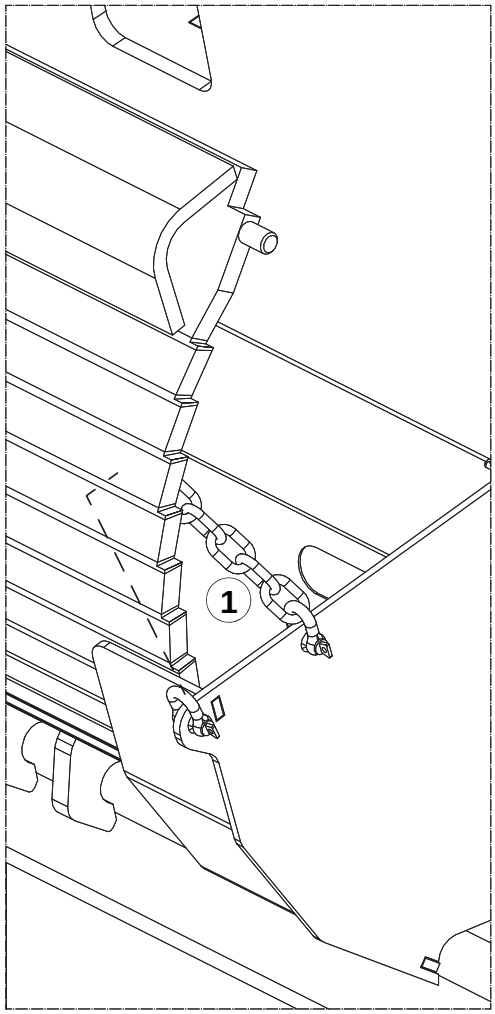
To protect the environment, do not let oil or fuel soak into the ground or in the drain, but collect them in a receptacle them when draining them.

4.8. Safety instructions - transport

General information

Make sure that doors, hoods, and covers are installed and locked before transport. Ensure that the conveyor is locked in the transport position with the locking pin. No loose parts are allowed in the engine compartment, inside the machine, or on the maintenance platforms during transport.

Plan the transportation well in advance and note the machine measurements and weight when planning transportation equipment and route. **Make note of local transport regulations.**



There is a rack on the right-hand side of the machine for storing the sieve during transport. Shark 220E and 440E machines do not have a rack for storing the sieve.

If the sieve is in the rack during transportation, it must be secured with a chain (1). The sieve must be locked to the transportation rack from both ends.

Machine on a semi-trailer-platform (Shark 220D, 220Deco, 440D and 440Deco)

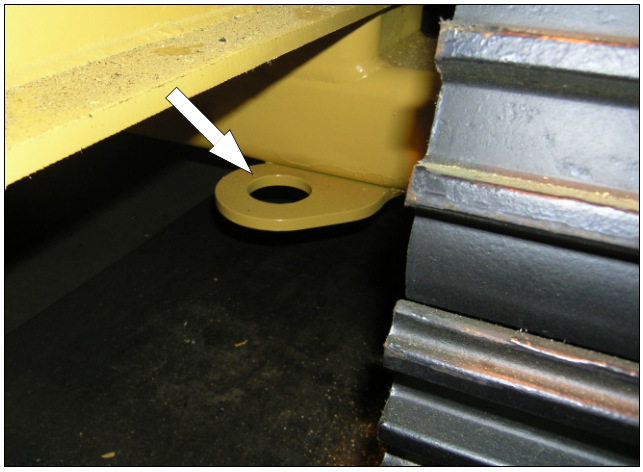
Make sure that the ground supports are raised up. Check that the platform's lights are intact when driving on public roads. In case the machine is going to a country with left-side traffic, the fog light torch in the tail light panel must be changed to the right side. In a country with right-side traffic, the fog light torch must be on the left side of the tail light panel.

The machine is equipped with ABS brakes. If you have questions concerning brakes or axles, contact a local repair workshop specialising in servicing heavy equipment trailers.

Machine on a track-platform (Shark 220DT, 220DTeco, 440DT and 440DTeco)

Short transfers within the construction site can usually be driven on the machine's tracks. If the transport distance is longer, an appropriate transport platform must be used. Exercise special care when driving the machine to the transport platform.

Secure the machine appropriately to the transport platform. There are tie loops on both ends and sides of the machine's tracks. There are a total of four tie loops.



Machine on a stationary platform (Shark 220E and 440E)

WARNING

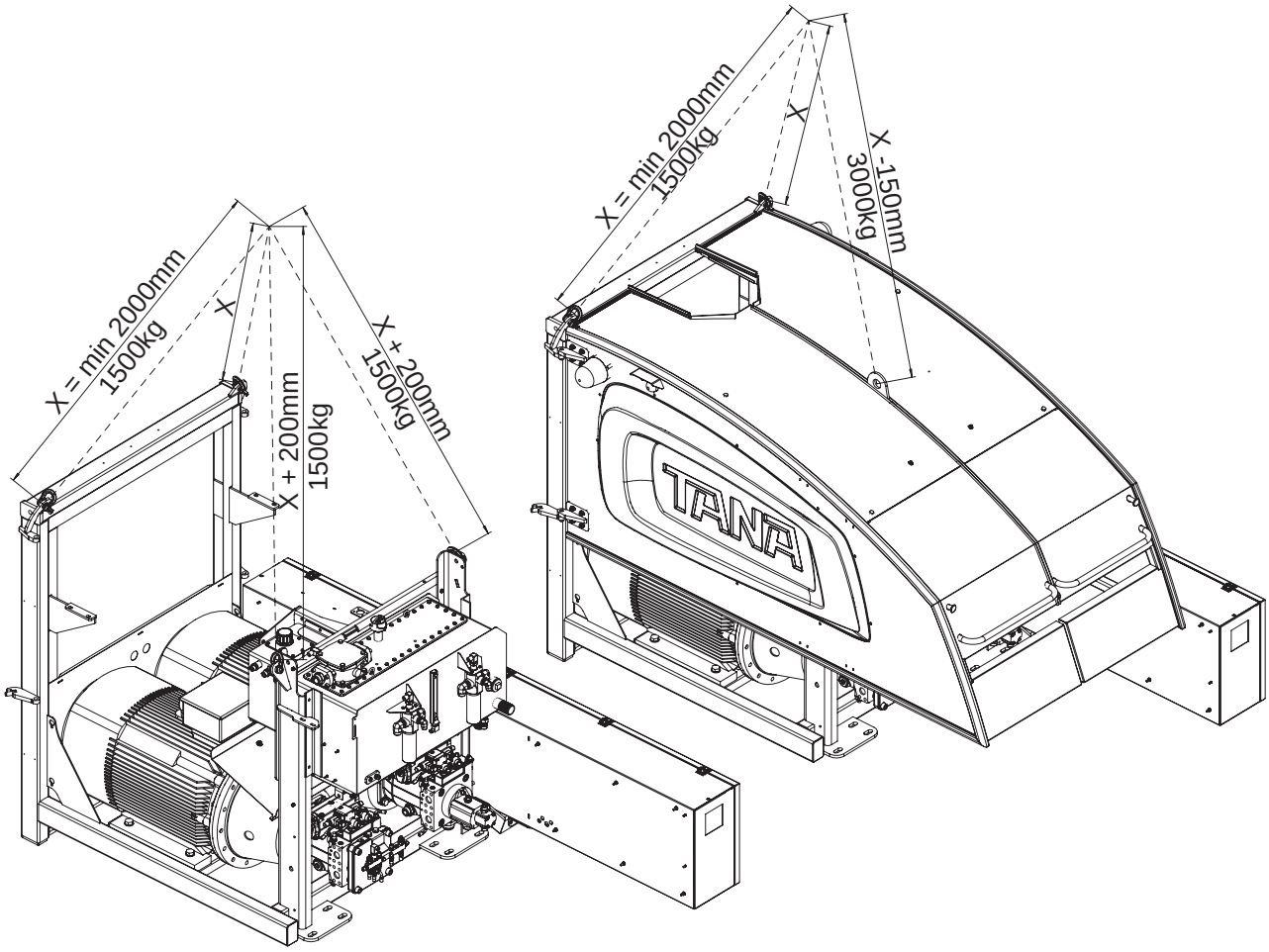
Crashing hazard and fall hazard.

Using improper lifting tools when lifting the machine can cause machine to fall and could cause death or serious injuries.

Be particularly careful when lifting. Use inspected and strong enough chains intended only for lifting.

Lifting and transporting the powerpack unit

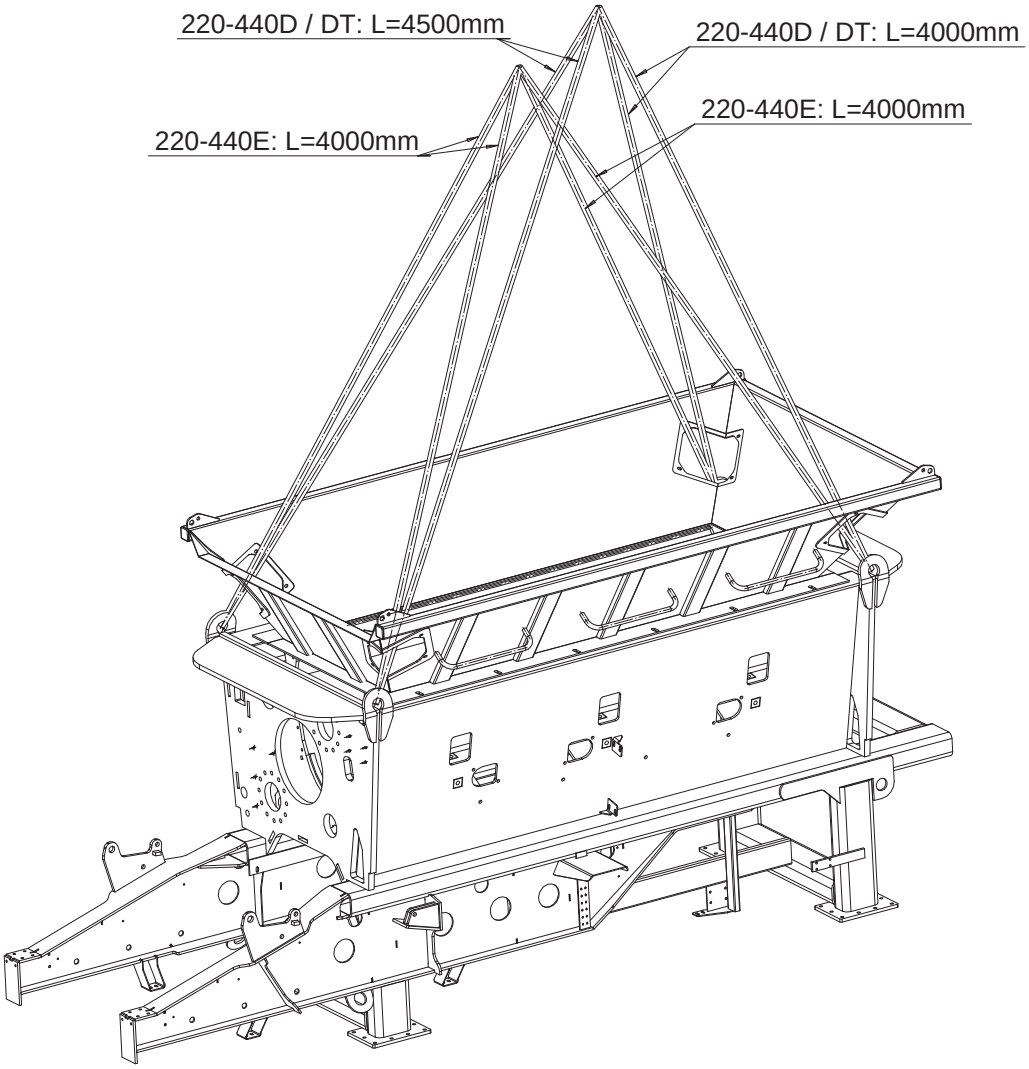
Lift the powerpack unit from the lifting points indicated in the accompanying image. Attach the powerpack unit to the transportation platform well enough for the duration of the transport.



Lifting and transporting the crusher unit

When lifting the crusher unit, remove the four hatches in the funnel. The crusher unit frame has four lifting points. Use the chains strong enough for lifting.

There are four tie loops. Attach the crusher unit from the tie loops well enough to the transportation platform for the duration of the transport.


220-440D / DT: L=4500mm
220-440D / DT: L=4000mm
220-440E: L=4000mm
220-440E: L=4000mm

4.9. Noise emission

The noise level measurement procedures comply with the following standards:

- Directive 2000/14/EC
- EN ISO 3744:1994 (E)
- ISO 6394:1992 (E)
- EN ISO 11201:1995 (E)

Model: TANA Shark 220D, 440D, 220DT and 440DT (Cummins QSX15 diesel engine)

- Sound intensity outside the machine (L_{WA}) is 120 dB (A).

Model: TANA Shark 220Deco, 440Deco, 220DTeco and 440DTeco (Cummins QSX15 diesel engine)

- Sound intensity outside the machine (L_{WA}) is 120 dB (A).

Model: TANA Shark 220E and 440E (two electric motors)

- Sound intensity outside the machine (L_{WA}) is 120 dB (A).

Noise hazard.
Continuous exposure to noise may cause hearing loss.
Wear hearing protectors.

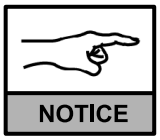
4.10. Safety equipment

- Emergency stop switches, 2 pcs. In Shark 220E and 440E machines case-specific.
- Portable fire extinguisher (in accordance with local regulations)
  Note! The operator is responsible for the appropriate extinguishers.
- Flashing beacon
- Warning signs and stickers
- Steps, maintenance platforms, railings and handles.
  Required safety equipment must be built around a stationary platform machine in accordance with the local regulations.

Danger of bodily injury.

Damaged safety equipment could cause death or serious injuries.

Replace damaged safety equipment. Do not remove or ignore any safety devices.

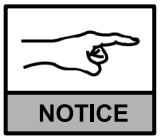


If a fire extinguishing system has been installed in the machine, the customer that purchased the machine must make sure that the system is inspected during commissioning and at the necessary intervals as required by the insurer and the legislation.

4.11. Emergency stop switches

The fastest way to stop the machine is to press the emergency stop switch. Use the emergency stop function in a situation where continuing the operation could cause injury, danger to life, or severe damage to the equipment (such as fire or the wrong type of material entering the machine). The emergency stop switches are located near the control units. Before operating the machine, find out where the emergency stop switches are located.

Pressing the emergency stop switch stops the engine. After the dangerous situation is over and the machine is inspected, the emergency stop switch must be restored to the upper position manually.



Risk of machine breakdown.

An emergency stop may cause damages to the diesel engine due to the heat.

The emergency stop function is intended for emergency stopping only. During normal use the machine must be stopped using the control switches. Inspect regularly the functioning of the emergency stop switches.

Location of the emergency stop switches, diesel powered shredders

The locations of the emergency stop switches (1) are shown in the images below (2 pcs).

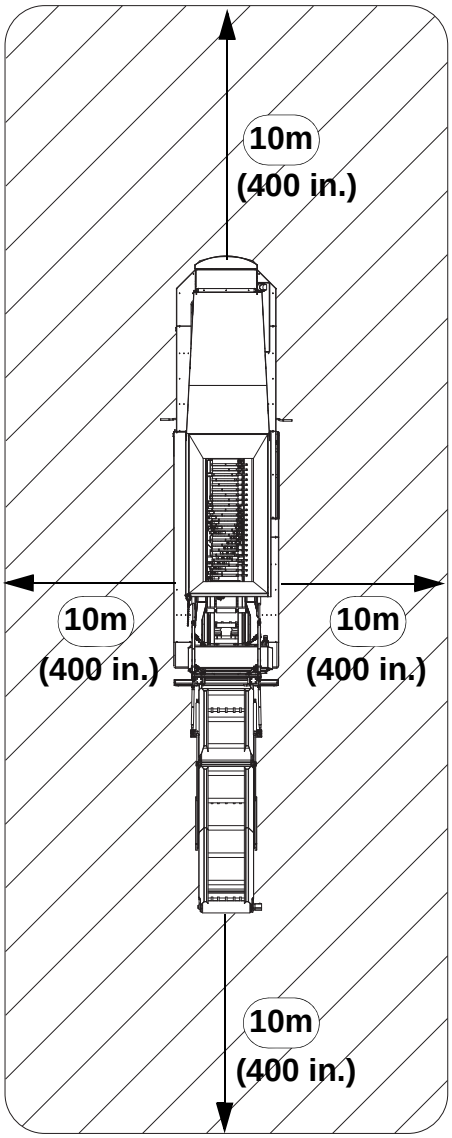
Location of the emergency stop switches, electric powered shredders

The location of the emergency stop switches vary in accordance with installation location and local regulations. The customer that purchased the machine is responsible for placing the switches in accordance with safety regulations.

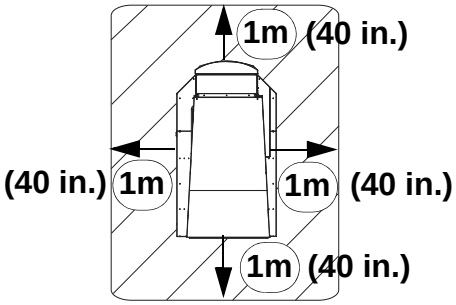
Before operating the machine, find out where the emergency stop switches are located.

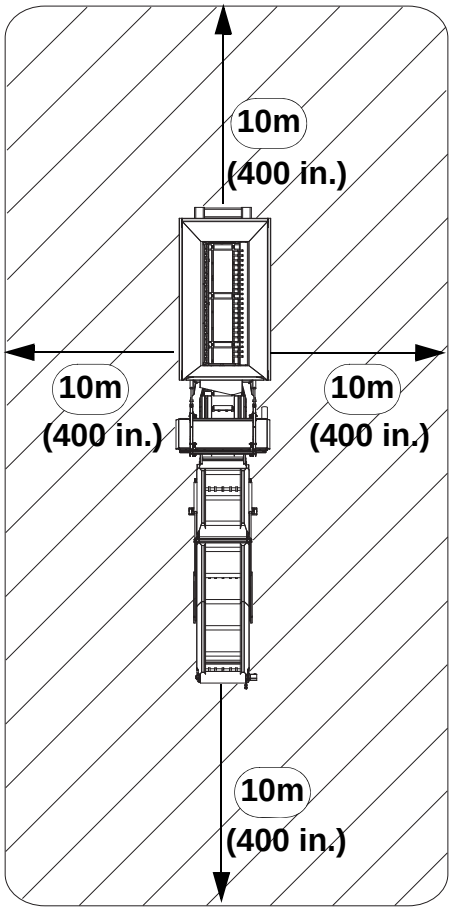
4.12. Danger zones

Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT and 440DTeco



Shark 220E and 440E





Danger of bodily injury.

Staying near the machine in operation could cause death or serious injuries. Do not approach the machine while machine is in operation. Minimum allowed distance from the machine in operation is 10 m (400 in.)!

When machine is in operation, the danger zone can be entered only in the following circumstances:

- **One trained professional is allowed to enter to operate the control panel. Control panel must be accessed through the front of the machine staining as far from the rotor as possible when the shredder is in operation. When machine is in operation, avoid unnecessary access to the control panel. Wear personal protective gear, such as hard hat, protective goggles, protective boots and protective gloves, respiration protection, when necessary, and hearing protection if engine is idling high.**
- **Trained professional can also enter the danger zone to replace the sieve or for inspection when material is not being crashed. Use extreme caution when replacing the sieve and during the inspection.**
- **In addition, it is allowed to access the danger zone on a loader to feed shredding material into the machine funnel. Loader cab must be protected and closed, and the loader must be protected from dust.**

Shark 220DT, 220DTeco, 440DT and 440DTeco: Risk of bodily injury.

Staying near the machine when it is moving could cause death or serious injuries.

When the track-platform machine is manoeuvred using a remote control, the remote control operator must maintain a distance of a minimum of 10 metres (400 in.). Other persons must stay at a minimum distance of 20 metres (800 in.) from the machine.

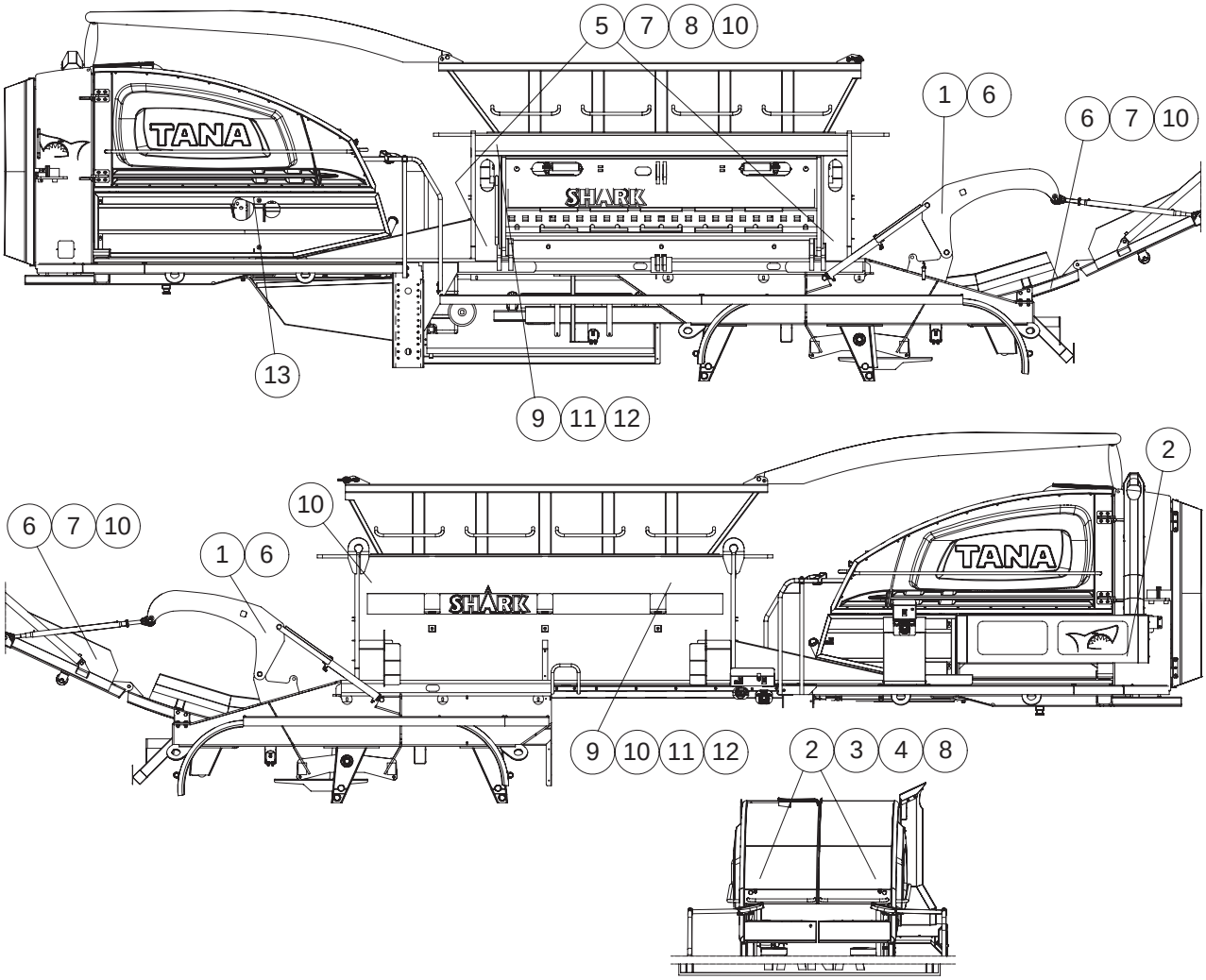
4.13. Warning signs

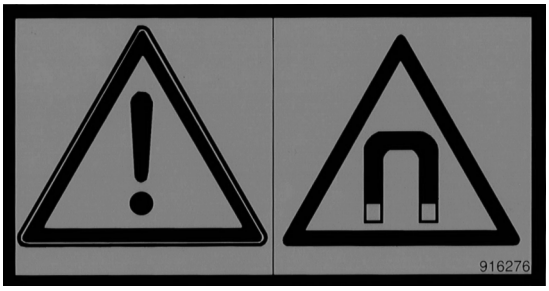
CAUTION

Danger of bodily injury.

Dirty or damaged warning sign can obscure the sign visibility and could cause bodily injury.

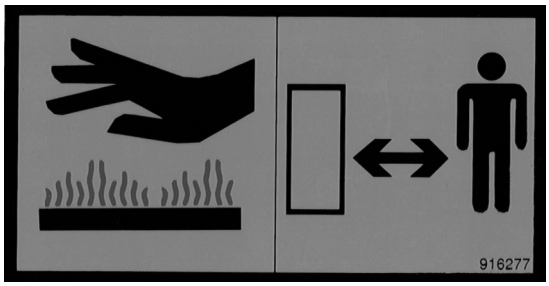
Keep the warning signs clean! Replace damaged signs.





1. Magnetic field

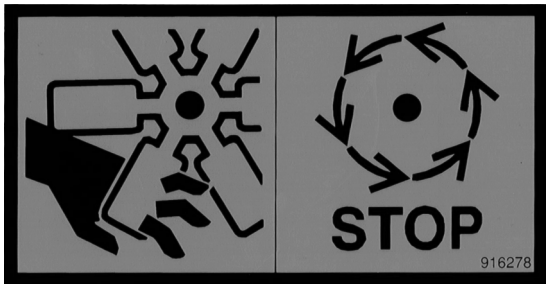
The ferrous metal separation belt mounted crosswise is a strong magnet. Magnetic field is 0.05T at 200 mm (7.9 in.) distance from the magnet. Magnetic field could damage or interfere with electronic devices, such as watches and phones. Do not go near magnet if you have pacemaker or some other electronic and/or medical device containing magnetic material. Contact your doctor for more detailed instruction. Strong magnet pulls ferrous metal objects. Keep this in mind when working near the magnet. Magnet can rip the tool from your hand and injure you or other persons near you.



2. Hot surface

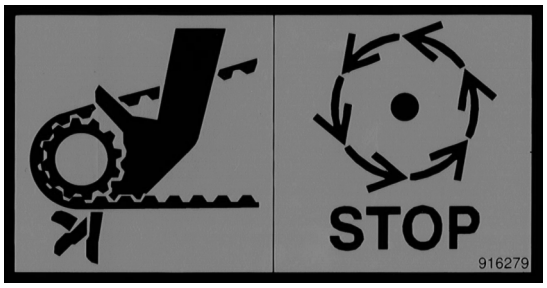
There are hot surfaces in the engine compartment, such as the exhaust system and turbocharger. The heat can burn your skin. If you need to work in the engine compartment, let the engine cool down before starting the work.

Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Diesel engine exhaust after-treatment system has components that are extremely hot during and after the use of the machine. Be particularly careful when servicing these areas. Keep tidy the surroundings of the exhaust after-treatment system.



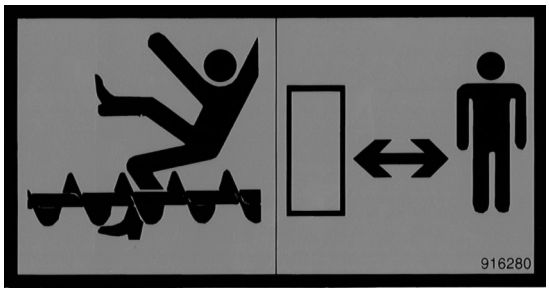
3. Danger of shearing

There is a cooling fan in the engine compartment that rotates when the engine is running. Always stop the engine and remove the main switch and TANA keys before any maintenance or repair work. Make sure that the engine cannot be started while you are doing maintenance work or inspections.



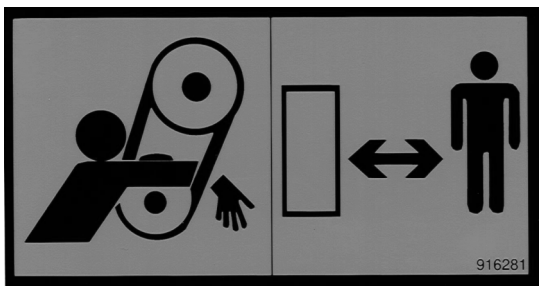
4. Danger of a hand getting caught

There is a cooling fan and alternator belt in the engine compartment that rotates when the engine is running. Always stop the engine and remove the main switch and TANA keys before any maintenance or repair work. Make sure that the engine cannot be started while you are doing maintenance work or inspections.



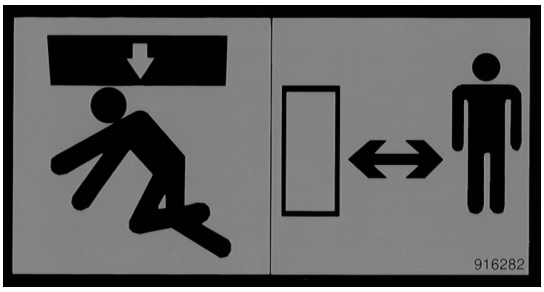
5. Danger of a leg getting caught

There is a rotating rotor that has shredding knives in the feeding opening of the shredder. Do not go in or near the feeding opening when the engine is running because of the danger of getting a leg caught in the rotor. Getting caught in the rotor causes life-threatening injuries. Always stop the engine and remove the main switch and TANA keys before any maintenance or repair work. Make sure that the engine cannot be started while you are doing maintenance work or inspections.



6. Danger of an arm getting caught

When you are near the conveyor belt, your arm can get caught in the belt or roller assembly. Always stop the engine and remove the main switch and TANA keys before any maintenance or repair work. Make sure that the engine cannot be started while you are doing maintenance work or inspections.

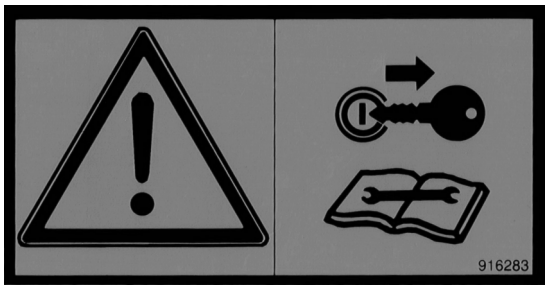


7. Crashing hazard

Never go underneath the machine. If the stand supports collapse, for example due to the soft ground, the machine could crash the person beneath.

When the counter wall is opened, you can get crushed between the mudguard and the wall. Keep a safe distance.

No not go under the conveyor. There is a danger of getting crushed under the conveyor due to conveyor support failure or a mistake in use.



8. Maintenance operations

Stop the engine and remove the main switch and TANA keys before any maintenance or repair work. Read the user guide and service manual carefully before operating or servicing the machine.

9. Eye protection, noise protection, hard hat, face mask, protective gloves and protective footwear

Wear goggles. When the machine is used, dust and other materials that are harmful to the eye float in the air, and can damage eyes.

Wear hearing protection. The noise level of the machine is high and can damage hearing.

Wear a hard hat. When the machine is operated, objects that can cause damage may fall out of the feeding machine, hopper or conveyor belt.

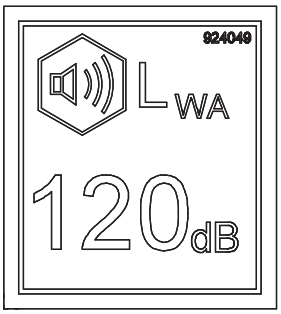
Wear a face mask. When the machine is used, dust and other materials that are harmful to respiration float in the air.

Wear protective gloves when maintaining or repairing the machine. Shredded material may cause cuts.

Wear safety boots when using or doing maintenance or repair work on the machine.

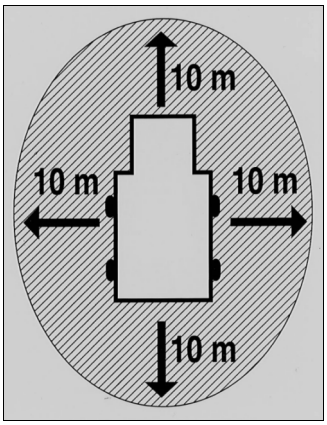
10. Falling objects

When the machine is used, objects that can cause damage may fall out of the feeding machine, feeding opening or conveyor belt. Make sure that you are not in the danger zone.



11. Noise

Noise level during the use of the machine. Wear hearing protectors.

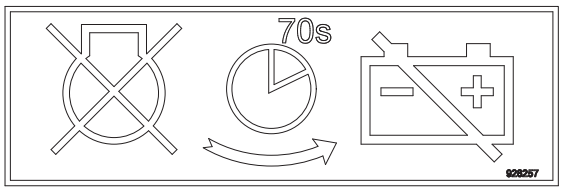


12. Dangerous area

When the machine is in operation, the danger zone is 10 metres (400 in.) around the machine. Do not stay in the danger zone of the machine when it is in operation.

13. Main switch

If the machine is parked for a longer time (over 2 hours), switch off the power from the main switch. Leaving the main switch on will eventually drain the batteries. It is also important that the main power is switched off in the unattended machine for safety reasons.

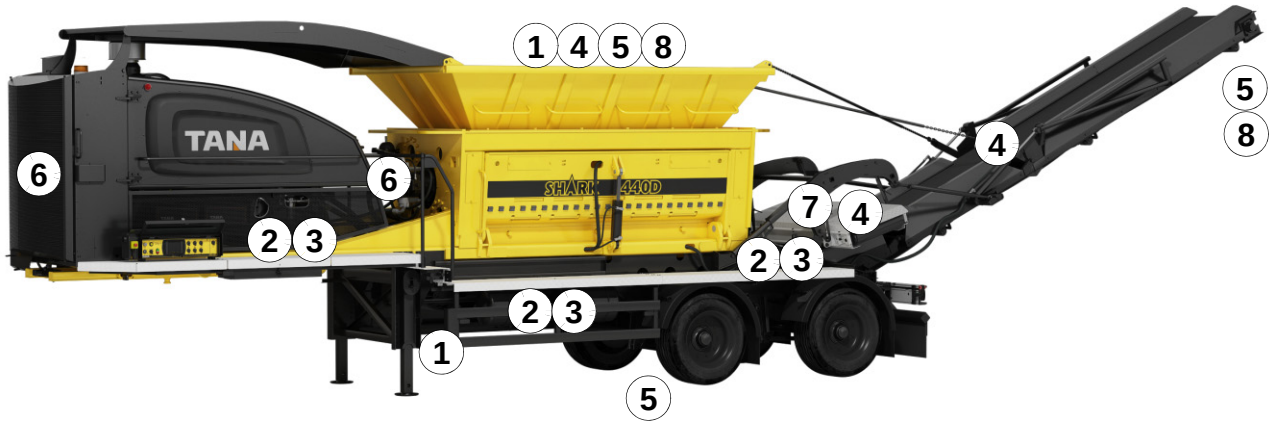


Never turn the main switch off while the engine is running. Turning the main switch off while the engine is running may damage the alternator and modules.

The main switch must be turned off before opening the electrical cabinet!

Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Keep the power switched on the main switch for at least 70 seconds after stopping the engine, in order to diesel exhaust fluid pump gets drained and vented the system.

4.14. Dangerous zones



1. Crashing hazard
2. Danger of falling
3. Slip hazard
4. Risk of entanglement
5. Flying objects
6. Hot surfaces
7. Strong magnetic field
8. Harmful dust

Danger of bodily injury.

Improper use of the machine could cause death or serious injuries.

If you are not sure what to do, stop, and consult the closest TANA retailer. The operators / maintenance personnel must always work safely and use common sense.

4.15. Access to the maintenance platforms

The machine's maintenance platforms are used for maintenance and daily inspections.

Crushing hazard and fall hazard.

When a machine is serviced, or daily inspections are made in such a narrow place that there is no room to open the hoods normally, the safety catches can be released with a quick-release lock, and turn away from above the service levels. Do not use the quick-release lock outdoors. Wind may slam the hood down (crush hazard). When the quick-release lock is opened, make sure that work is safe (danger of falling).

Danger of bodily injury.

Staying on the service platforms, in the engine compatment or tracks (Shark 220DT, 220DTeco, 440DT and 440DTeco) while the machine is in operation could cause death or serious injuries.

It is strictly forbidden to remain on the service platforms, tracks or in the engine compartment (Shark 220DT, 220DTeco, 440DT and 440DTeco) while the machine is in operation.

Slip hazard.

Machine maintenance platforms and steps can be slippery and slipping could cause serious injuries.

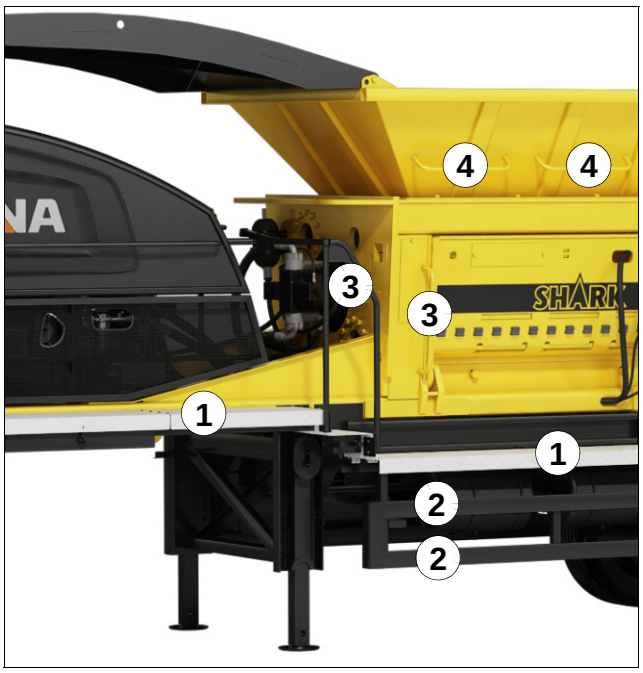
Keep the machine clean, especially the maintenance platforms and steps.

Danger of bodily injury.

Incorrect climbing onto or down from the machine could cause injuries.

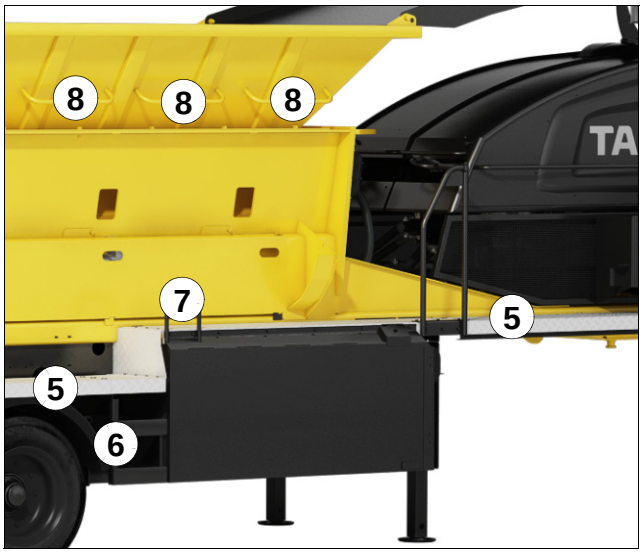
Always use the steps on the side of the machine when climbing onto or down from the machine. Do not jump from the machine.

Machine on a semi-trailer-platform (Shark 220D, 220Deco, 440D and 440Deco)



Left side maintenance platform of the machine

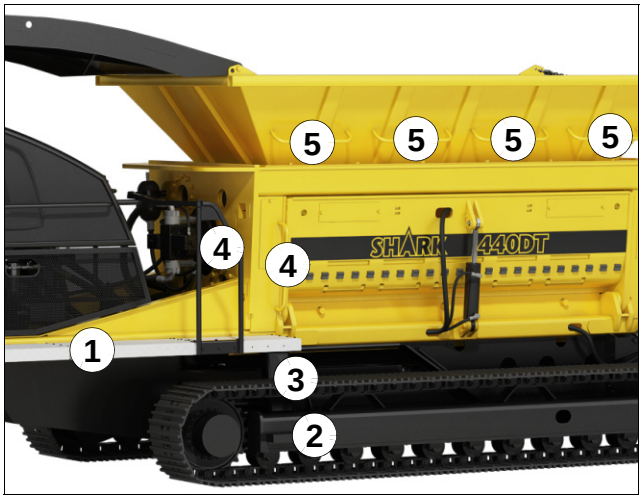
When moving onto the servicing levels (1) on the left side of the machine, use the steps (2) and handholds (3) for support. Use the handrails (4) and handholds (3) for support when moving around the platform.



Right side maintenance platform of the machine

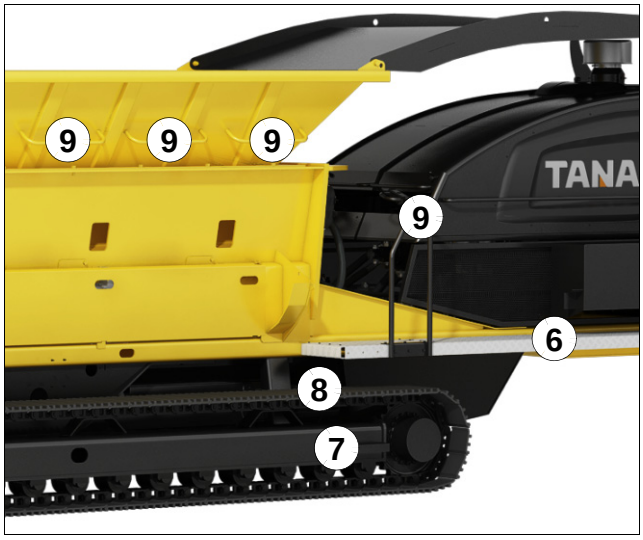
When moving onto the servicing levels (5) on the right side of the machine, use the steps (6) and handholds (7) for support. Use the handrails (8) for support when moving about the platform.

Machine on a track-platform (Shark 220DT, 220DTeco, 440DT and 440DTeco)



Left side maintenance platform of the machine

Use the steps (2), track (3), and handholds (4) for support when accessing the left-hand side maintenance platform (1). Use the handrails (5) and handholds (4) for support when moving around the platform.



Right side maintenance platform of the machine

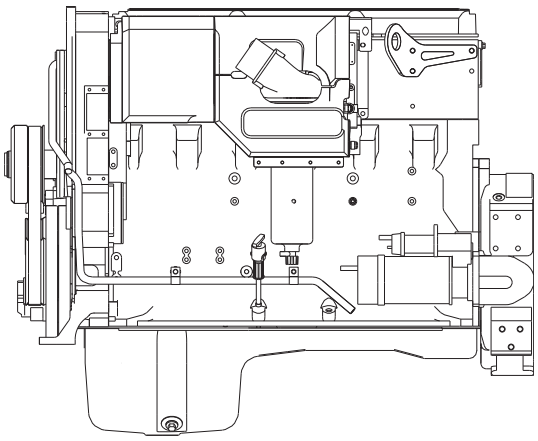
Use the steps (7), track (8), and handholds (9) for support when accessing the right-hand side maintenance platform (6).

Machine on a stationary platform (Shark 220E and 440E)

Required maintenance platforms, hand railings and steps must be built around a stationary platform machine in accordance with the installation site and local regulations. The operator is responsible for building the maintenance platforms, hand railings and steps.

5. MACHINE CONSTRUCTION

5.1. Engine

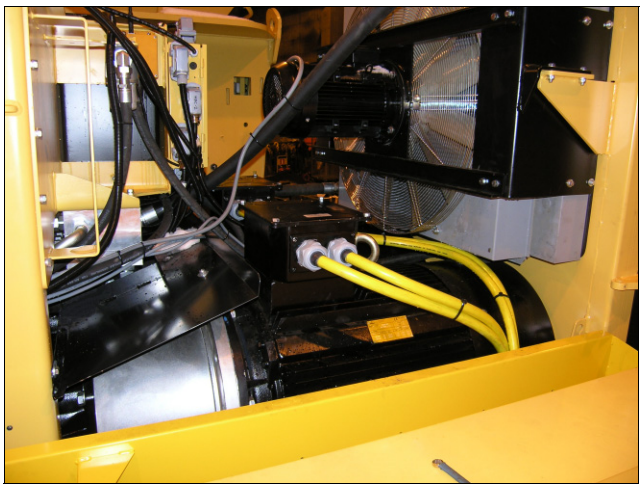


Shark 220D, 440D, 220DT and 440DT

- Cummins QSX15 diesel engine that meets the emission requirements of U.S. EPA Tier 3, CARB Tier 3 and EU Stage IIIA.

Shark 220Deco, 440Deco, 220DTeco and 440DTeco

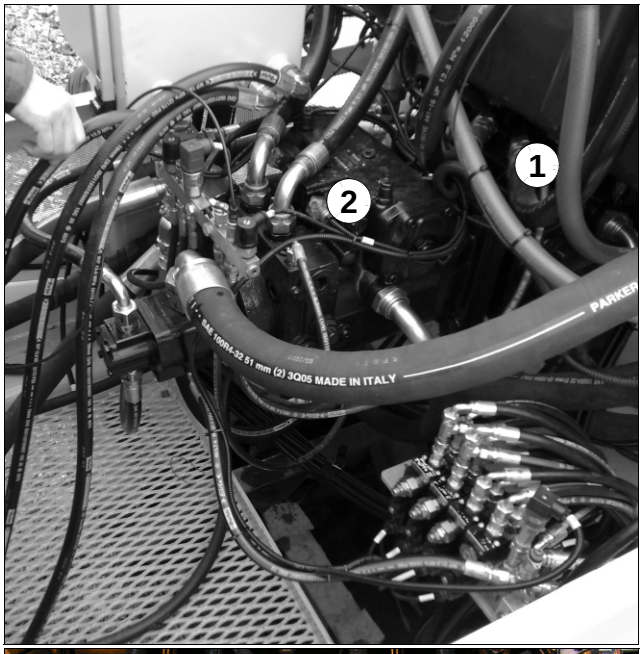
- Cummins QSX15 diesel engine that meets the emission requirements of U.S. EPA Tier 4 Final, CARB Tier 4 Final and EU Stage IV.

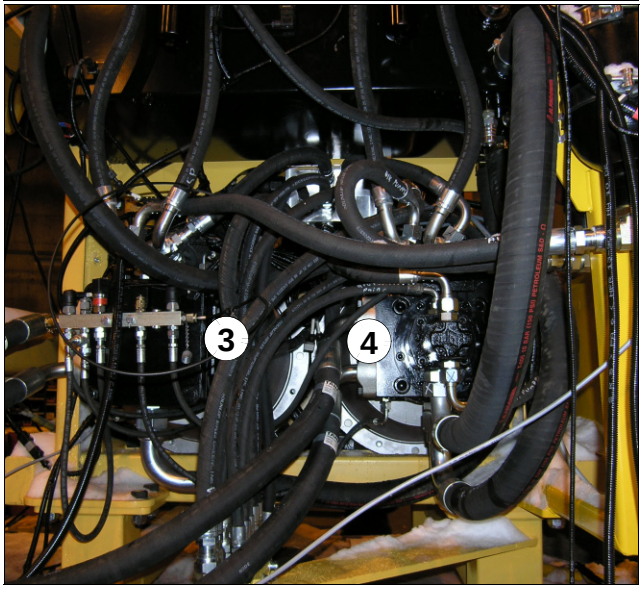


Shark 220E and 440E

- The machine is powered by two electric motors.

5.2. Hydraulic system

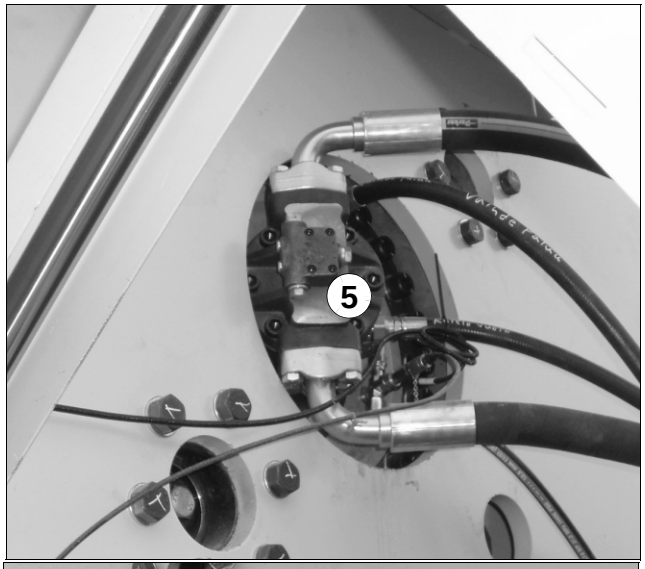


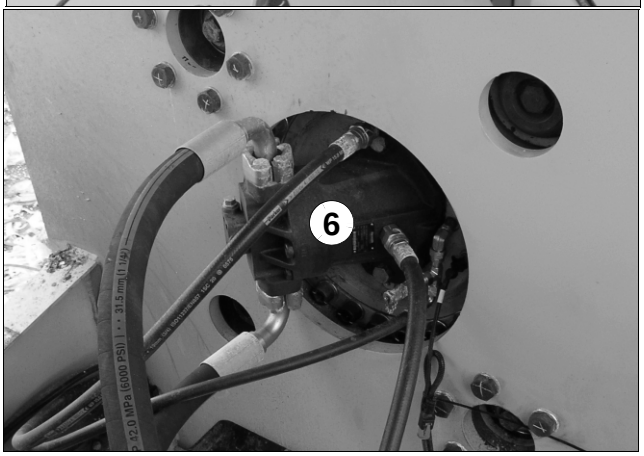


All of the shredder's operations are based on hydraulics. The hydraulics are divided into two separate systems; drive hydraulics (rotor drive and track hydraulics) and cylinder and belt drive hydraulics. They function independently of each other. The systems have a common oil tank, oil return filter, and oil cooler.

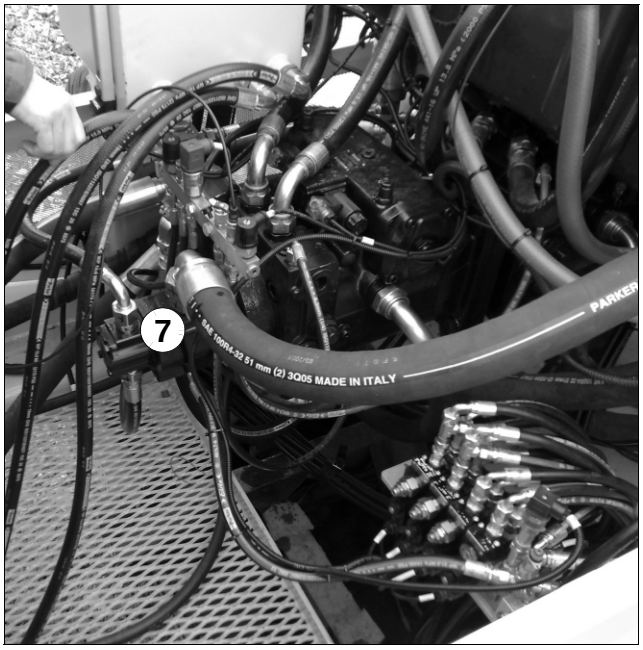
Rotor drive hydraulics

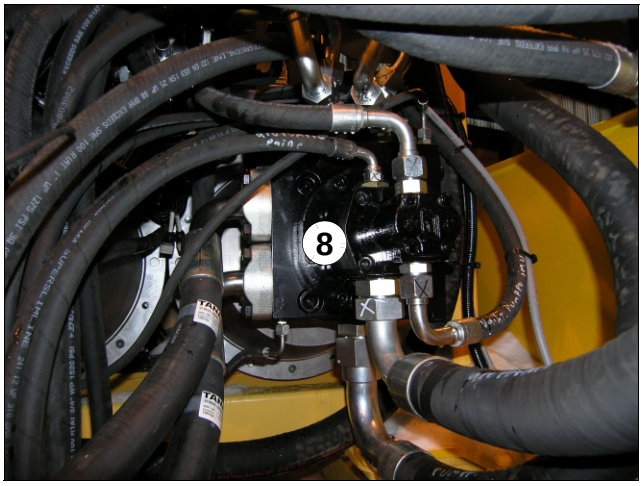
In diesel powered shredders, two hydraulics pumps (1 and 2) have been connected to the diesel engine. In electric powered shredders are two electric motors; one drive hydraulics pump (3 and 4) has been connected to the end of each motor.

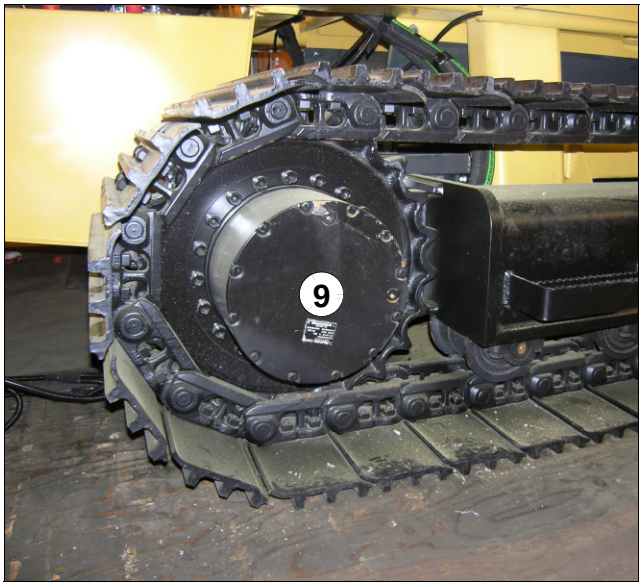




The pumps produce oil flow and run the two hydraulic motors (5 and 6) that have been installed to the final drives mounted to the ends of the rotor. The final drives serve to drive the shredder’s rotor.







Cylinder hydraulics and belt final drives

The rotor hatch is opened and closed with one hydraulic cylinder. The rotor hatch is locked with two hydraulic cylinders.

One hydraulic motor is used to rotate each one, the shredder magnet belt (optional equipment) and the conveyor belt. There a total of four hydraulic cylinders for folding the conveyor from transport position to work position.

In diesel powered shredders, the cylinders and the hydraulic motors for rotating the belts are powered by the pump (7) installed as a extension to the rotors' drive hydraulics pumps.

In electric powered shredders, the cylinders and the hydraulic motors for rotating the belts are powered by the pump (8) installed as a extension to the other rotor's drive hydraulics pump.

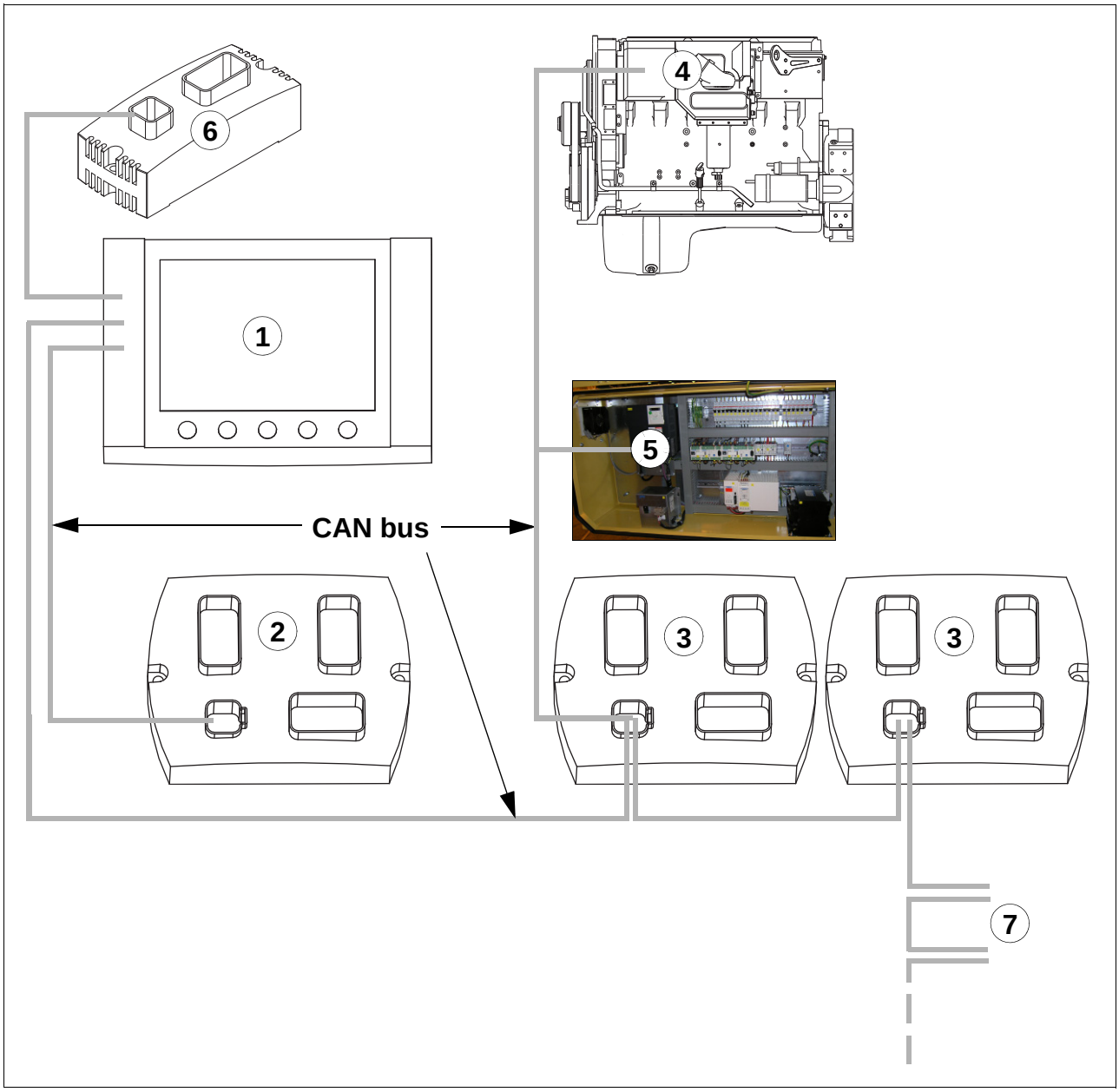
Track hydraulics (Shark 220DT, 220DTeco, 440DT and 440DTeco)

The operation of the tracks of a track-mounted machine is handled hydraulically. The track mechanism has two hydraulic motors (9) that operate the tracks. These motors receive the oil flow from the drive hydraulics pumps.

The hydraulic motors that rotate the belts are located in the front of the machine, one on each side.

5.3. Electric control and monitor system

TANA Shark shredder is equipped with a distributed total control system that operates the engine, hydrostatic power transmission, cylinder hydraulics and belt drive and the auxiliary function associated with them. The system is comprised of independent modules, each of which controls different operations of the machine. In addition, the engine has its own control unit, which is connected a part of the other control system. The modules are interconnected via a CAN-bus (**C**ontroller **A**rea **N**etwork), which is a fast and interference-resistant data transmission bus.



Control of the different functions of the machine is divided between the modules as follows:

1. Display module

Operates as the operator's user interface to the machine. The gauges of the machine are visible on the display. In addition, it is possible to analyse the fault memory of the machine, and change and save the settings of the machine.

2. Control module

Primarily, the control switches are connected to this module.

3. Frame modules

Primarily, the diesel engine control bus and the hydraulics' control outputs are connected to frame modules.

4. Diesel engine control unit (only diesel powered shredders)

The control unit independently controls the operation of the diesel engine and transfers data from the engine's own sensors to the other control systems of the machine.

5. Electric motor control units (only electric powered shredders)

The control units control the electric motor operation and transmit data from the motor sensors to the other control systems of the machine.

6. Remote connection module

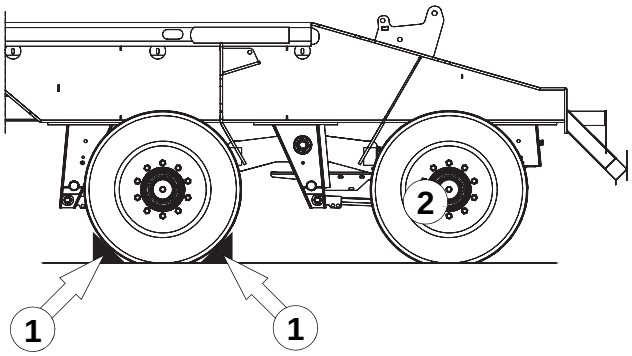
7. Sensors

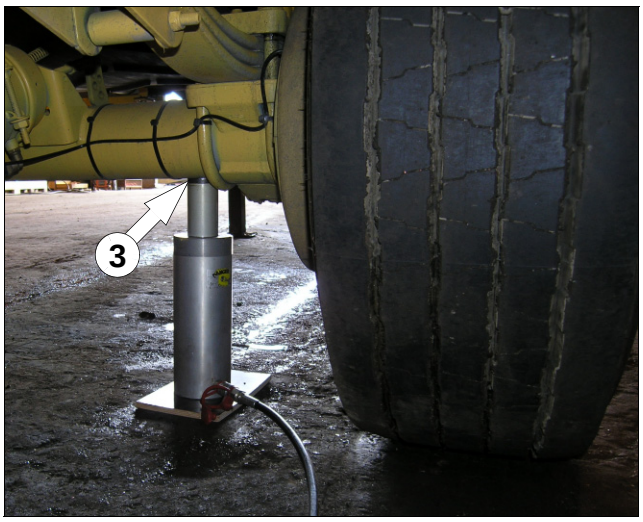
5.4. Wheel dismounting and mounting (only Shark 220D, 220Deco, 440D and 440Deco)

Danger of bodily injury.

Incorrect tire removal procedure can cause the machine to fall and could cause death or serious injuries.

Only a qualified and trained person can remove and mount a wheel. Follow the instructions provided and handle the wheels with care.





Wheel dismounting

A wheel must be dismount for brake inspection and tyre change. Remove only one wheel at a time.

Make sure that the machine is on a flat surface.

Install the wedge pads (1) in front and behind the wheel next to the wheel (2) to be dismounted.

Lift the wheel to be dismounted in the air using a jack. Use the axle end (3) as the lifting point. Before lifting, make sure the ground under the jack has enough bearing capacity. Make also sure that the jack is located steadily under the axle, and will not slip.

Crushing hazard.

There is a danger of crushing if the jack or ground collapse.

Never go underneath the machine lifted with a jack.

Remove the mounting nuts of the wheel, and lift the wheel from the machine.

Wheel mounting

Make sure that the threads of the bolts are clean and undamaged. Check also that the points connecting the rim to the hub are clean.

Lift the wheel back in place. First, tighten all the wheel nuts by hand, and see that the wheel fit in the place. Then tighten the nuts in a crosswise sequence. See the order of tightening in the adjacent picture. The tightening torque is 600 Nm (443 lb ft).

Whenever a wheel is dismounted, the wheel nuts must be retightened to the given torque both after 50 km (31 mile) and 150 km (93 mile) of driving.

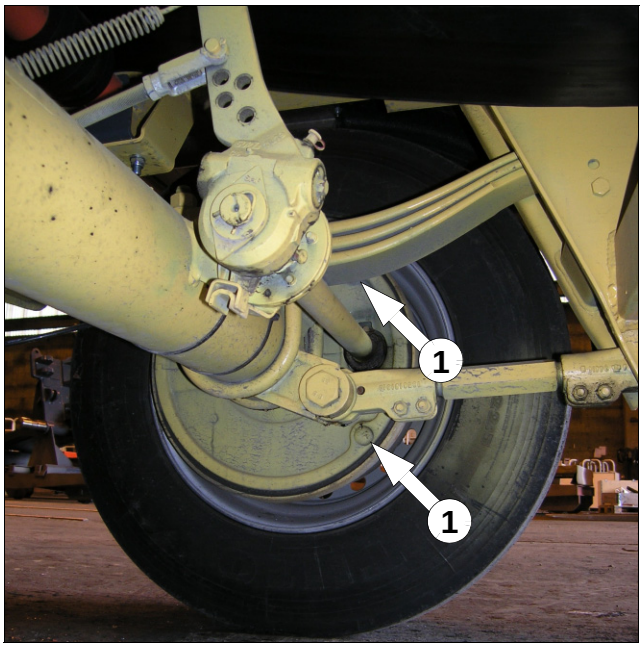
5.5. Inspection of platform brakes (only Shark 220D, 220Deco, 440D and 440Deco)

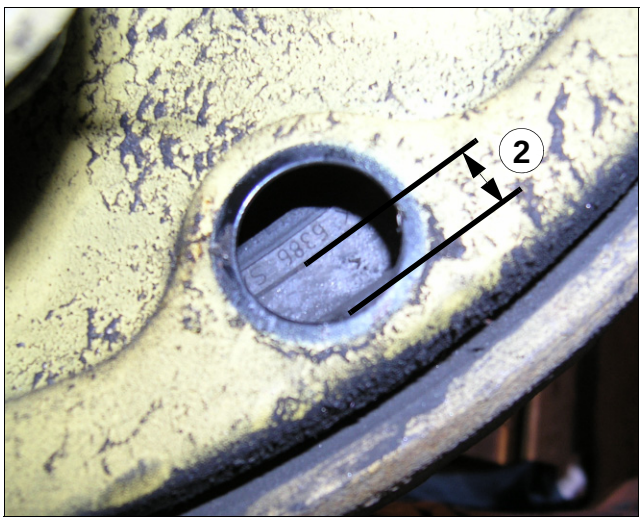
Risk of bodily injury and machine breakdown.

Brake failure could cause an accident and result in death or serious injuries.

Brakes can only be inspected by a qualified and trained person, who is familiar with the brake system. Follow the instructions given and use original spare part for repairs.

Inspection of brake band wear





Two different brake bands are riveted to each brake shoe. Brake bands are wearing parts, and their wear must be monitored.

The wear of brake bands can be checked through the inspection opening in the cover plates (1) of the brake bands. There are two inspection openings in each cover plate. Remove the caps protecting the inspection openings.

Measure the thickness (2) of the wearing surface of the brake bands. The minimum thickness allowed for the brake bands is 5 mm (0.2 in.). The thickness of the new brake band is 20.6 mm (0.8 in.). If the brake band thickness is close to the minimum thickness allowed, replace the brake band with a new one.

After the inspection, replace the caps carefully so that no dirt gets into the brakes.

Inspection of brake drum wear

Brake drums are wearing parts. Check the wear of the brake drum and possible cracks every time when changing brake bands.

Removal and inspection of brake drum

Dismount the wheel and hub cap.

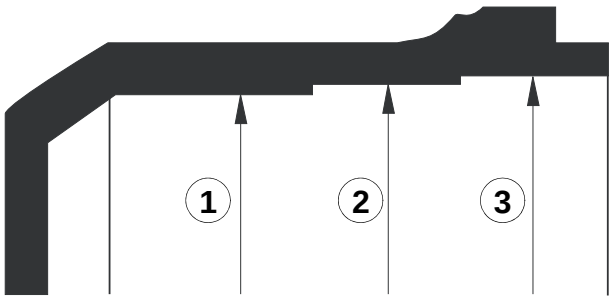
Remove the ABS sensor from its bracket and place it inside the axle. The sensor bracket may be attached to the spinner nut.

Unscrew the spinner nut. In travel direction on the right side, a spinner nut has a right-hand thread. In travel direction on the left side, a spinner nut has a left-hand thread.

Pull the brake drum with its hub from the axle.

Vacuum clean or otherwise dry clean the brake drum.

Check the wearing surface of the brake drum carefully. If there are fine capillary cracks on the break drum, the drum can still be used. If there are scores or grooves, the brake drum needs to be machined. If there are cracks in the brake drum after machining, the brake drum must be replaced with a new one.



Check the diameter of the brake drum.

The brake drum can be machined to the following oversize, if it is not too worn. The brake drum can be machined to the following oversize, if it is not too worn out. The maximum allowed machined measurement is 424,0 mm (16.69 in.). The maximum allowed wear measurement is 425,0 mm (16.73 in.). If the measurement is larger, the brake drum must be replaced with a new one.

1. Normal size (new brake drum) 420.0 mm (16.54 in.)
2. To be machined 1. oversize 422.0 mm (16.61 in.)
3. To be machined 2. oversize 424.0 mm (16.69 in.)

If a brake drum must to be replaced, remove the brake drum from the hub, and replace the brake drum with a new one.

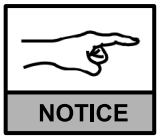
Mounting a brake drum

After the inspection of the brake drum, lubricate the axle end carefully all over with a special lubricant. Do not use copper or graphite grease.

Push the brake drum with its hub in place, and tighten the spinner nut. In travel direction on the right side, a spinner nut has a right-hand thread. In travel direction on the left side, a spinner nut has a left-hand thread. Tighten the spinner nut. The pretension torque is 150 Nm (110 lb ft). Spin the brake drum 5 times round its own axle and then do the final tightening 30°.

Lubricate the ABS sensor and set it in the bracket. Push the hub cap in place and check the hold. Remove the cap from the middle of the hub cap. Press the ABS sensor against the toothed rim. Set the cap back in the middle of the hub cap.

Finally check the operation of the brakes and the adjustments.



Risk of bodily injury and machine breakdown.

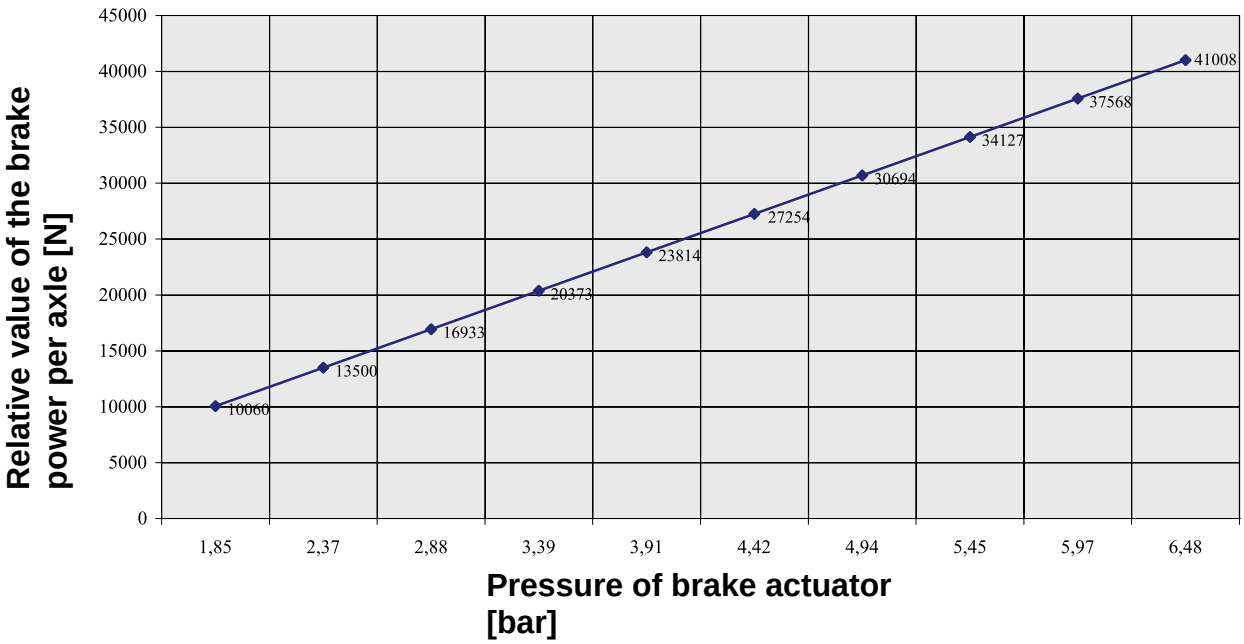
Brake failure could cause an accident and result in death or serious injuries.

If brake shoes are replaced in connection with brake service, basic adjustment of brake ratchet must be done.

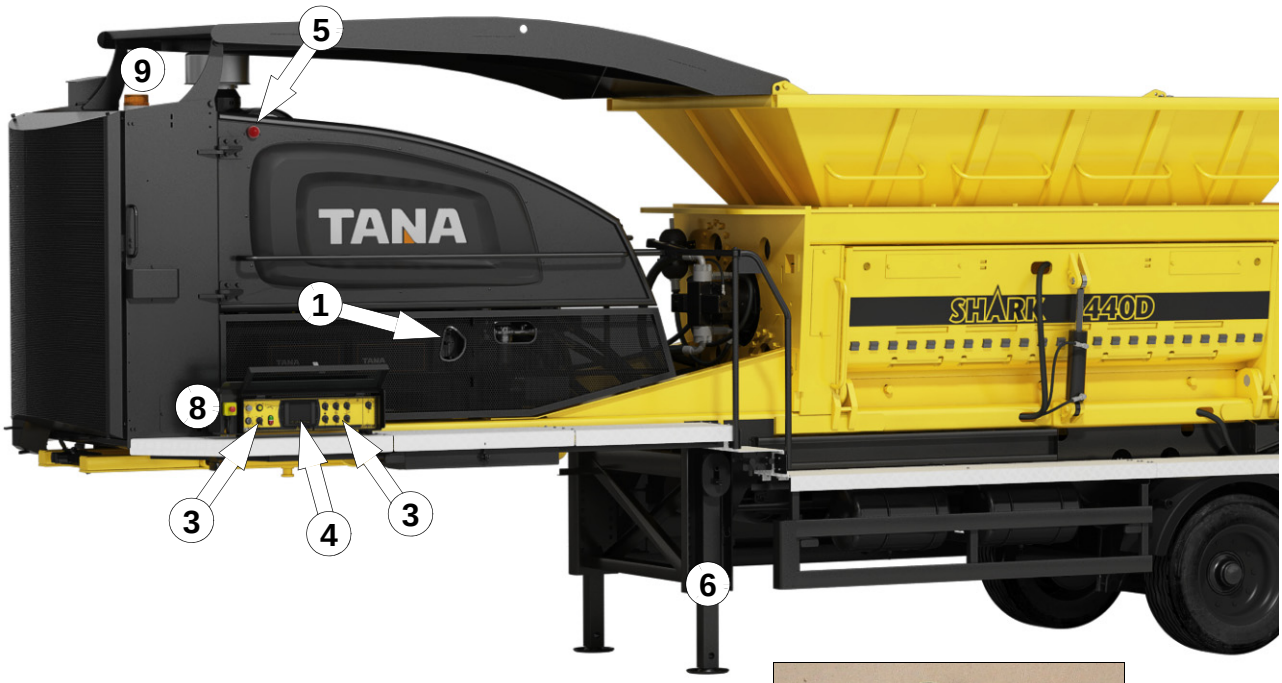
5.6. Relative values of brake power (only Shark 220D, 220Deco, 440D and 440Deco)

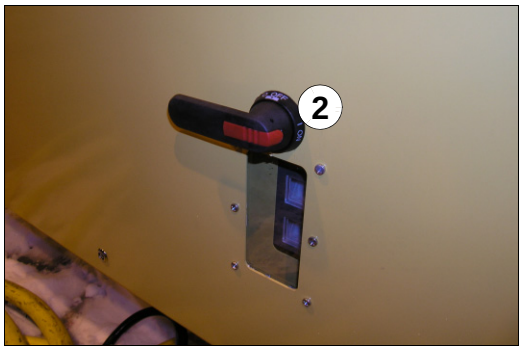
The relative values of brake powers have been calculated using original part in brakes. If other than original parts are used in brakes, the brake powers and brake endurance may possibly be weaker. The table and graphic below show the relative values of break power per axle.

Pressure of brake actuator		Relative value of brake power
Axle 1	Axle 2	
0,31 bar (4.5 psi)	0,31 bar (4.5 psi)	0,00 kN (0 lbf)
0,82 bar (11.9 psi)	0,82 bar (11.9 psi)	0,00 kN (0 lbf)
1,34 bar (19.4 psi)	1,34 bar (19.4 psi)	3,61 kN (811 lbf)
1,85 bar (26.8 psi)	1,85 bar (26.8 psi)	7,22 kN (1,623 lbf)
2,37 bar (34.4 psi)	2,37 bar (34.4 psi)	10,84 kN (2,437 lbf)
2,88 bar (41.8 psi)	2,88 bar (41.8 psi)	14,45 kN (3,248 lbf)
3,39 bar (49.2 psi)	3,39 bar (49.2 psi)	18,06 kN (4,060 lbf)
3,91 bar (56.7 psi)	3,91 bar (56.7 psi)	21,67 kN (4,872 lbf)
4,42 bar (64.1 psi)	4,42 bar (64.1 psi)	25,28 kN (5,683 lbf)
4,94 bar (71.6 psi)	4,94 bar (71.6 psi)	28,89 kN (6,495 lbf)
5,45 bar (79.0 psi)	5,45 bar (79.0 psi)	32,51 kN (7,309 lbf)
5,97 bar (86.6 psi)	5,97 bar (86.6 psi)	36,12 kN (8,120 lbf)
6,48 bar (94.0 psi)	6,48 bar (94.0 psi)	39,73 kN (8,932 lbf)
6,99 bar (101.4 psi)	6,99 bar (101.4 psi)	43,34 kN (9,743 lbf)
7,51 bar (108.9 psi)	7,51 bar (108.9 psi)	46,95 kN (10,555 lbf)



6. CONTROL DEVICES





1. **Main switch (diesel powered shredders)**
2. **Main switch (electric powered shredders)**

The main switch is located on the cover of the electrical control cabinet.

3. **Control switches**
4. **LCD display**
5. **Indicator light (1 pcs / side)**

The location of the indicator lights in Shark 220E and 440E machines depends on the installation site and varies from case to case. Find the indicator lights before operating the machine.

6. **Ground support (1 pcs / side), only in Shark 220D, 220Deco, 440D and 440Deco machines**
7. **Remote control (standard in Shark 220DT, 220DTeco, 440DT and 440DTeco, optional in others)**
8. **Emergency stop switch (1 pcs / side)**

The locations of the emergency stop switches in Shark 220E and 440E machines depends on the installation site and they vary from case to case. Before operating the machine, find out where the emergency stop switches are located.

9. **Indicator light assembly**

The location of the indicator lights in Shark 220E and 440E machines depends on the installation site and varies from case to case. Find the indicator lights before operating the machine.

6.1. Main switch

Electric powered shredders: Electrical shock hazard.

Dangerous voltage could cause death or serious injuries.

Whenever the switch cabinet of the machine is opened or connections are made in the switch cabinet, the main power switch must be open and dead. Electrical installation can be performed only by authorized electrician with adequate expertise and skills.

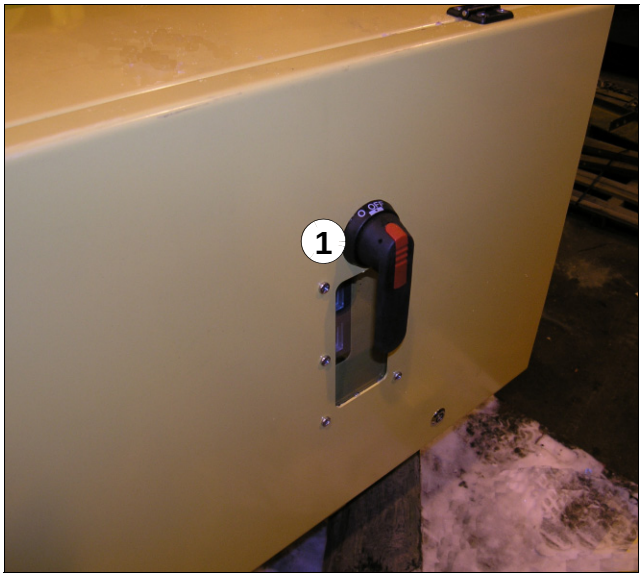
Diesel powered shredders

The main switch (1) is located on the left side of the machine powerpack.

The main power of the machine can be switched off from the main switch. When the main switch key is vertical, the power is on.

When the main switch key is horizontal, the power is off.

Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Keep the power switched on the main switch for at least 70 seconds after stopping the engine, in order to diesel exhaust fluid pump gets drained and vented the system.



Electric powered shredders

The main switch (1) is located on the cover of the electrical control cabinet.

The main power of the machine can be switched off from the main switch. When the main switch key is vertical, the power is on.

When the main switch key is horizontal, the power is off.

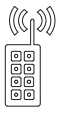
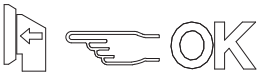
Risk of bodily injury and machine breakdown.

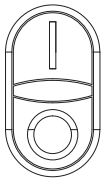
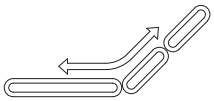
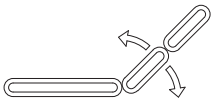
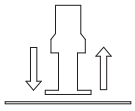
If the machine is parked for a longer time (over 2 hours), switch off the power from the main switch. Leaving the main switch on will eventually drain the batteries. It is also important that the main power is switched off in the unattended machine for safety reasons.

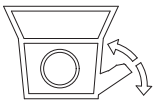
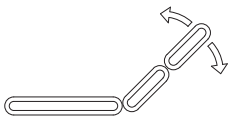
Never turn the main switch off while the engine is running. Turning the main switch off while the engine is running will damage the battery charging generator and the control system.

6.2. Control switches

No.	Switch	Symbol	Operation
1.	USB port		The USB port serves as the ignition of the machine, and the TANA key serves as the ignition key. A user level USB key must be inserted in the USB port before the machine can be operated. The USB port is also used for updating control system software, acceptance of maintenance measures and updating machine settings.
2.	Start/stop button Emergency stop reset		When the Start/stop button is pressed and is kept pressed, the power is switched on and an alarm sounds (2 seconds) and the engine starts. If the engine does not start within 10 seconds, the starting attempt is interrupted. The operating mode switch (3) must be in the neutral position when starting the engine. When the Start/stop button is pressed while the engine is running, the engine shuts down and the power is switched off. An emergency stop is reset by setting off the alarm pop-up screen and by pressing the Start/stop button.

No.	Switch	Symbol	Operation
3.	Operating mode switch (key switch)		Operating mode: Manual operation (manual controls)
			Neutral position
			Operating mode: Automatic operation
			Operating mode: Remote operation Remote control must be switched on before this mode is selected. If the remote control is not switched on, the diesel engine will switch off as a result of an emergency stop. **When the remote control mode is selected, the remote control must be in reach of user hand.**
4.	Multi-use switch		The multi-use switch is used to select different options on the display. For example, the operating mode is selected with this switch. In manual operation, the speed of the rotor and conveyor can be increased or decreased by turning the multi-use switch to the + or - position while operating, for example, the rotor switch.
			Selections are entered by holding the multi-use switch down (when operating mode switch is automatic or remote operation position, the settings of the programming modes can be adjusted).

No.	Switch	Symbol	Operation
5.	Automatic operation start/ stop		When the automatic operating mode is selected, the green button (1) starts automatic operation. The red button (0) ends automatic operating mode.
6.	LCD display		See the appropriate section.
7.	Conveyor operation (manual run)		Right: conveyor belt forward rotation. Middle: neutral position. Left: conveyor belt reverse rotation.
8.	Counter wall locking control (manual run)		Right: counter wall locks open. Middle: neutral position. Left: counter wall locks shut.
9.	Conveyor turning, folding joint 1 (manual operation)		Right: conveyor joint 1 turning open. Middle: neutral position. Left: conveyor joint 1 turning shut.
10.	Shark 220D, 220Deco, 440D and 440Deco: Supports up/ down (optional) (manual operation)		Shark 220D, 220Deco, 440D and 440Deco: Right: raise supports. Middle: neutral position. Left: lower supports.

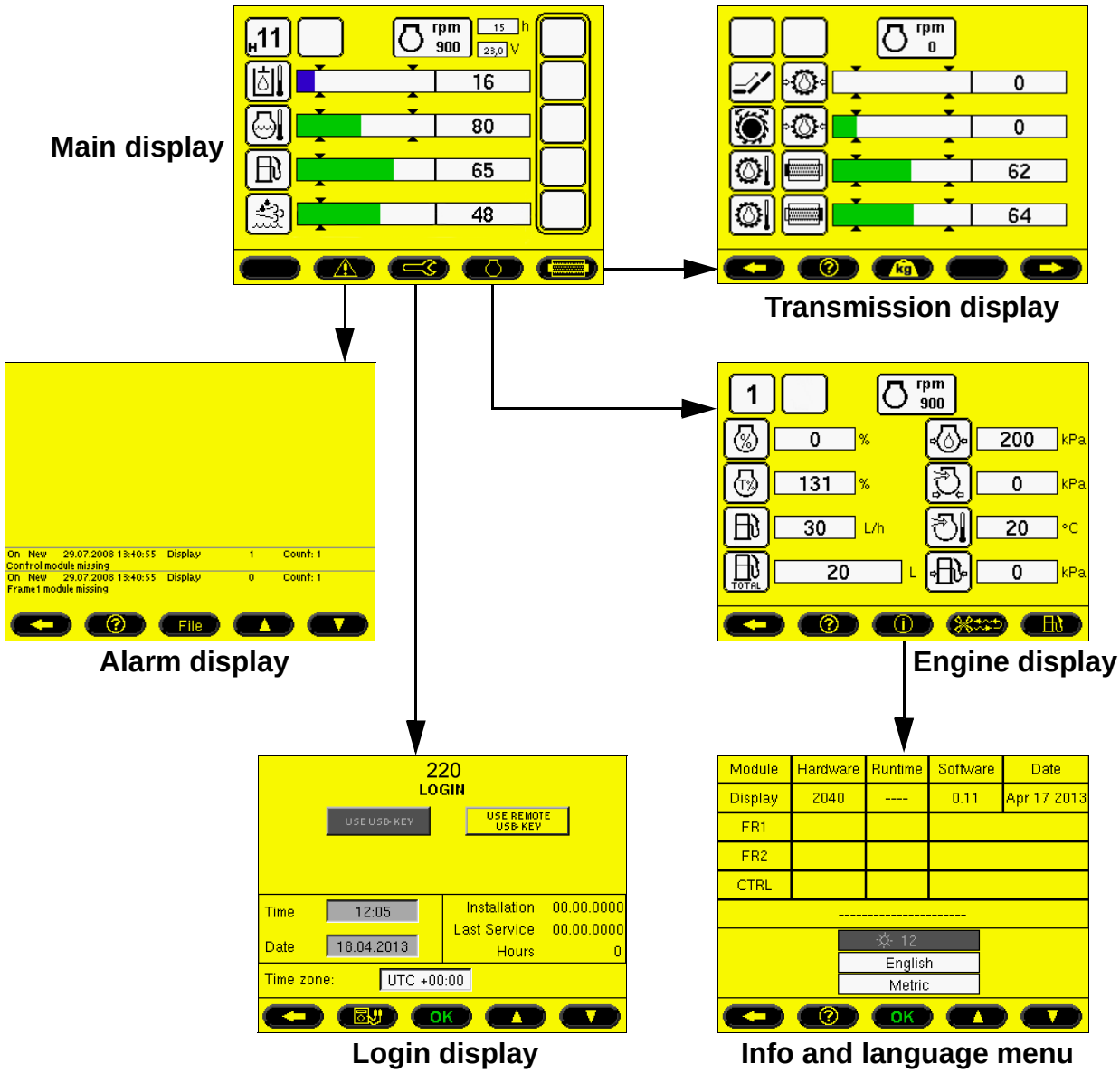
No.	Switch	Symbol	Operation
11.	Lights control		No lights on
			Work lights (optional equipment) switched on.
			Maintenance lights switched on.
			Work and maintenance lights switched on.
12.	Rotor operation (manual run)		Right: rotor forward (shredding direction). Middle: neutral position. Left: rotor reverse.
13.	Counter wall open/shut (manual operation)		Right: open counter wall. Middle: neutral position. Left: close counter wall.
14.	Conveyor turning, folding joint 2 (manual operation)		Right: conveyor joint 2 turning open. Middle: neutral position. Left: conveyor joint 2 turning shut.

6.3. LCD display

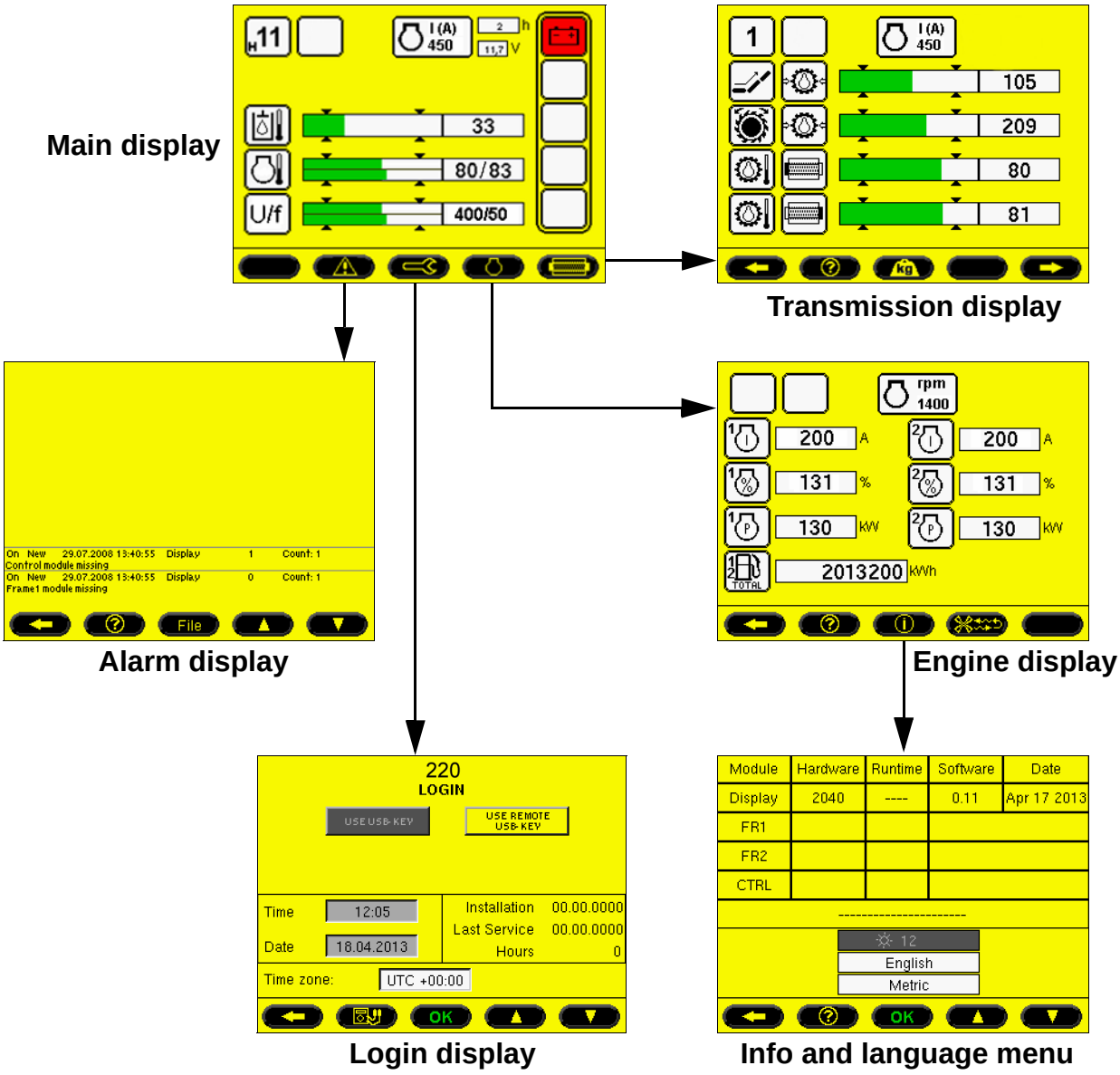
The chart below illustrates the navigation between different displays. The arrows indicate the movement to the subsequent display after pressing the icon button in question.

To return to the main display from the alarm, transmission, engine, or service mode display, press the icon button in the bottom left-hand corner. In the info and language menu display, the main display can be accessed via the engine display. The main display can be accessed at any point by pressing button 1 for a few seconds.

Display chart, diesel powered shredders

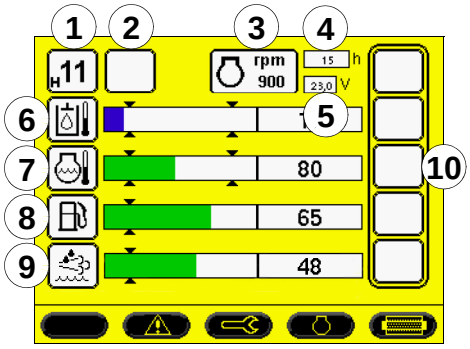


Display chart, electric powered shredders

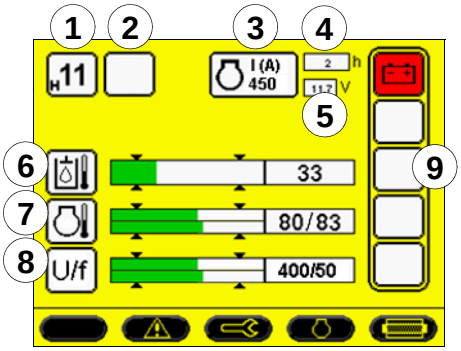


Main display

Diesel powered shredders



Electric powered shredders



1. Programming mode

Shows the operating mode selected with the multi-use switch. When the automatic hydraulic oil warm up is on, the display shows letter ´H´.

2. Remote control mode (standard in Shark 220DT, 220DTeco, 440DT and 440DTeco, optional equipment in other machines)

When the remote control is on, and remote operating mode is selected, the display shows a black remote control.

3. Diesel engine operating speed, rpm (only diesel powered shredders)

Selected programming mode affects the operating speed of the engine.

NOTE! If the engine speed rises too high, the engine control unit issues an alarm signal. Stop the engine immediately and determine the cause of the malfunction. If necessary, contact an authorised Cummins service.

3. Electric motor power, A (only electric powered shredders)

Always displays the electric motors' current in amperes.

4. Operating hours, h

Report operating hours of the machine.

5. Charging voltage, V (only diesel powered shredders)

Indicates the charging voltage. When the batteries are fully charged and the ignition is switched on, the voltage is approximately 24 - 25 V. When the engine is running, the voltage should be approximately 27 - 28 V. Check the condition of the charger, if the voltage goes down.

The control system issues an alarm and restricts machine functions in the following cases:

- Voltage below 22 V and over 5 seconds when the engine is running: diesel engine maximum rpm limits at 1,400 rpm.
- Voltage over 29.5 V over 2 seconds when the engine is running: control system gives an alarm and the diesel engine rpm limits at 1,400 rpm.
- Voltage over 30 V over 2 seconds when the engine is running: the control system shuts the engine down.

5. Battery voltage, V (only electric powered shredders)

Displays the battery voltage in volts. The battery is needed, so the control system can be used when electricity input is turned off. In case of faults, check the batteries and the charging system. The inspection may only be done by a professional electrician.

6. Hydraulic oil temperature, °C / °F (only diesel powered shredders)

Displays the hydraulic oil temperature. The scale is +20 °C…+90 °C (+68 °F…+194 °F).

The control system issues an alarm and restricts machine functions in the following cases:

- Oil temperature below -20 °C (-4 °F): diesel engine maximum rpm limits at 1,200 rpm
- Oil temperature below 0 °C (+32 °F): diesel engine maximum rpm limits at 1,400 rpm
- Oil temperature below +20 °C (+68 °F): diesel engine maximum rpm limits at 2,000 rpm
- Oil temperature over +85 °C (+185 °F): diesel engine maximum rpm not limited
- Oil temperature over +90 °C (+194 °F): drive pump maximum output (rotor speed) limits at 75 %.
- Oil temperature over +95 °C (+203 °F): automatic operation stops.

In all the cases described above the alarm given by the control system (the alarm buzzer sounds and the red alarm light is lit) is stored in the fault memory, which can be seen on the alarm display. The alarm is acknowledged by visiting the alarm display.

6. Hydraulic oil temperature, °C / °F (only electric powered shredders)

Displays the hydraulic oil temperature. The scale is +20 °C…+90 °C (+68 °F…+194 °F).

The control system issues an alarm and restricts machine functions in the following cases:

- Oil temperature below -20 °C (-4 °F): electric motor current limits at 33 % of the maximum.
- Oil temperature below 0 °C (+32 °F): electric motor current limits at 50 % of the maximum.
- Oil temperature below +20 °C (+68 °F): electric motor current limits at 67 % of the maximum.
- Oil temperature over +85 °C (+185 °F): electric motor current not limited.
- Oil temperature over +90 °C (+194 °F): drive pump maximum output (rotor speed) limits at 75 %.
- Oil temperature over +95 °C (+203 °F): automatic operation stops.

In all the cases described above the alarm given by the control system (the alarm buzzer sounds and the red alarm light is lit) is stored in the fault memory, which can be seen on the alarm display. The alarm is acknowledged by visiting the alarm display.

7. Diesel engine temperature, °C / °F (only diesel powered shredders)

Indicates the temperature of the engine coolant. The range is +60°C…+105°C (+140°F...+221°F).

If the coolant temperature rises too high, stop driving and leave the machine to idle for a few minutes, which will cause the temperature to drop. Stop the engine and search for the cause of the heating, which may be, for example, a dirty cooler or low coolant level. Do not continue work until the fault is rectified. Do not run the engine under +60 °C (+140 °F) for prolonged periods, as this can damage the engine.

The diesel engine sets off an alarm if the coolant temperature exceeds +110 °C (+230 °F) for 10 seconds.

If the coolant temperature exceeds +102 °C (+215 °F), the engine's own control unit will start to reduce the amount of fuel injected and hence cut the maximum torque of the engine by 30 %. Should this happen, stop driving and leave the machine to idle for a few minutes, which will cause the temperature to drop. Stop the engine and search for the cause of the heating. If necessary, contact an authorised Cummins service.

Risk of burns.

Engine coolant is hot and pressurised after operation. The steam released from the cooler can cause serious burns.

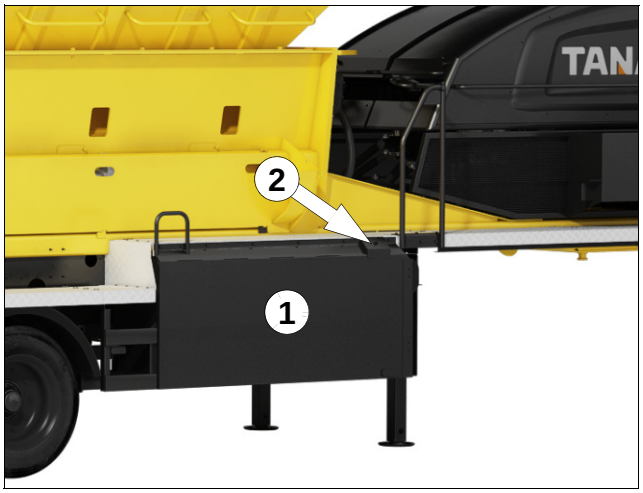
After stopping the engine, do not open the cooler cap until the coolant has cooled down!

7. Electric motor temperatures, °C / °F (only electric powered shredders)

Displays the electric motor temperature. The temperature bar is divided in two parts. The upper part of the bar shows the temperature of motor 1, and the lower part the temperature of motor 2. Looking at the motors in the machine from the direction of the hydraulic oil tank, the one on the left is motor 1, and the one on the right is motor 2.

8. Fuel level (only diesel powered shredders)

Check that there is enough fuel for the day's operations. The range is 10 %…100 %. The control system sets off an alarm if the fuel level in the tank drops below 5 % of the tank volume. Tank capacity is approximately 750 litres (198 gal (US)) (165 gal (UK)).

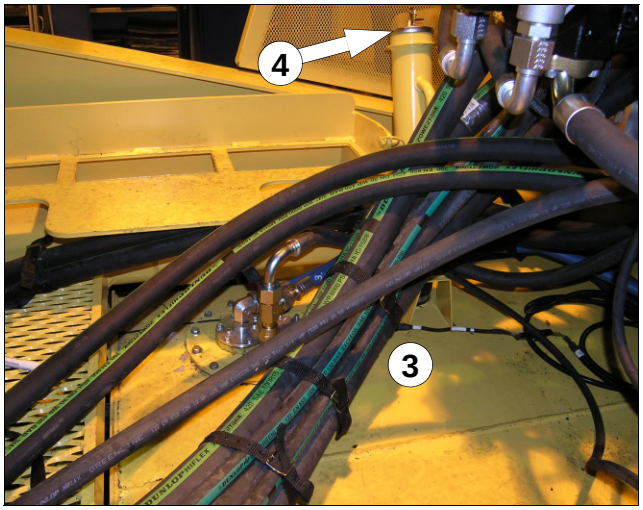


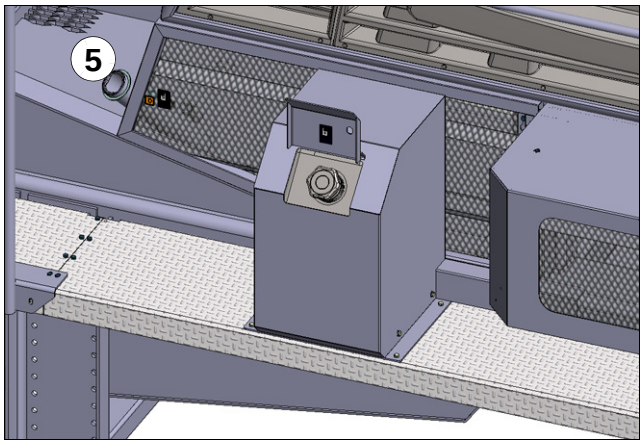
On a trailer-platform machine, the fuel tank (1) is located on the right-hand side of the rig. The filler hole (2) is located on top of the tank.

In a track-platform machine, the fuel tank (3) is located under the machine.

Shark 220DT and 440DT: the filler hole (4) is located next to the hydraulic pumps.

Shark 220DTeco and 440DTeco: the filler hole (5) is located on the right side of the machine.





8. Input voltage and frequency, V / Hz (only electric powered shredders)

Displays the input voltage in volts and frequency in hertz. The bar is divided in two parts. The upper part displays the input voltage and the lower displays the frequency. If the voltage or frequency do not fulfil requirements, the machine will not start. In this case, the control system issues an alarm (the alarm buzzer sounds and the symbol blinks on the display). The alarm can be seen on the alarm display.

9. Urea solution quantity (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)

Check that there is enough urea solution for the day’s operations. The range is 0 %…100 %.

The control system issues an alarm and restricts machine functions in the following cases:

- The control system sets off an alarm and an indicator light is lit when the level in the tank drops below 10 % of the tank volume.
- An indicator light starts to blink when the level in the tank drops below 5 % of the tank volume.
- An indicator light blinks and the engine's maximum torque is limited to 25 % when the level in the tank drops below 2.5 % of the tank volume.
- An indicator light blinks and the engine's maximum torque is limited to 50 % when the level in the tank drops to 0 % of the tank volume. If the tank volume is 0 % for 30 minutes or longer, the engine rpm are dropped to slow idling.

In all the cases described above the alarm given by the control system (the alarm buzzer sounds and the red alarm light is lit) is stored in the fault memory, which can be seen on the alarm display. The alarm is acknowledged by visiting the alarm display.

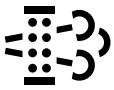
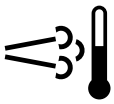
The urea solution tank volume is approximately 56 litres (15 gal (US)) (12.5 gal (UK)).

10. Alarm symbols

If the control system of the machine sets off an alarm for a reason other than the engine oil temperature, hydraulic oil temperature, coolant temperature, transmission oil temperature, or fuel level, the symbol for the alarm in question will appear in one of the boxes at the right-hand edge of the display. The symbol remains on the display as long as the alarm is active, and the event is recorded in the fault memory.

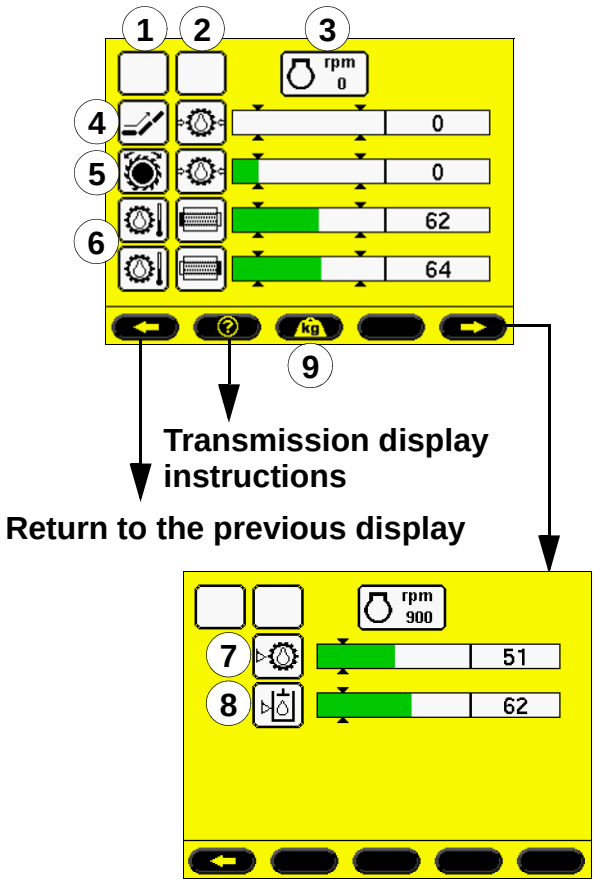
SYMBOL	ALARM	DESCRIPTION
	Engine oil pressure (only diesel powered shredders)	The engine control unit will set off an alarm if the oil pressure drops below the lowest allowed value. The alarm buzzer sounds and the warning light is lit. NOTE! If the oil pressure remains low for five seconds or longer, the control unit limits the engine maximum rpm and torque. Stop the engine immediately and determine the cause of the malfunction. If necessary, contact an authorised Cummins service.
	Engine oil level (only diesel powered shredders)	The alarm is triggered when the limit is reached while the engine is running or when the ignition is on. The alarm buzzer sounds and the warning light is lit.
	Engine air filter clogging (only diesel powered shredders)	The alarm is set off when the limit is reached. The engine speed is limited to 1,800 rpm. The alarm buzzer sounds and the warning light is lit. Automatic operation stops.
	Coolant level (only diesel powered shredders)	The alarm is set off when the limit is reached. The alarm buzzer sounds and the warning light is lit. NOTE! If the coolant level remains too low for 20 seconds or more, the control unit limits the engine torque. Stop the engine immediately and determine the cause of the malfunction. If necessary, contact an authorised Cummins service.
	Charging (only diesel powered shredders)	The symbol appears and automatic operation stops if the voltage drops below 22 V while the engine is running. The symbol appears and the engine stops in 10 seconds if the voltage exceeds 29.5 V while the engine is running. The alarm buzzer sounds and the indicator light is lit.
	Hydraulic oil level	The alarm is triggered when the limit is reached while the engine is running or when the ignition is on. Diesel powered shredders: automatic operation stops and the diesel engine shuts off with a 10 seconds delay. Electric powered shredders: automatic operation stops and the electric motor shuts off with a 10 seconds delay. The alarm buzzer sounds and the warning light is lit.

SYMBOL	ALARM	DESCRIPTION
	Clogging of the hydraulic system's return filter or charge pressure filter	The alarm is triggered when the limit is reached while the engine is running or when the ignition is on. Diesel powered shredders: diesel engine maximum rpm limits to 1,600 rpm. Electric powered shredders: Electric motors current limits to 67 % of the maximum. The alarm buzzer sounds and the warning light is lit. If the hydraulic oil temperature is below +50°C (+122 °F), no alarms are displayed. 1. Front pump charge pressure filter 2. Back pump charged pressure filter
	Driving hydraulics - charge pressure	The alarm is set off when the limit is reached while the engine is running. Diesel powered shredders: diesel engine maximum rpm limits to 1,600 rpm. The automatic operation stops, and the diesel engine switches off with a 10 second delay. Electric powered shredders: Electric motors current limits to 67 % of the maximum. The automatic operation stops, and the electric motors switch off with a 10 second delay. The alarm buzzer sounds and the warning light is lit. 1. Front pump charge pressure 2. Back pump charge pressure
	Service interval alarm	The machine's control system issues an alarm as determined by the pre-set maintenance interval. The symbol appears on the display 50 / 10 operating hours (first service) before the end of the maintenance interval and disappears when servicing has been confirmed from a separate display in service mode. This confirmation is stored in a separate service log. In case service is not done 50 / 10 operating hours (first service) after the end of the maintenance interval, the symbol disappears from the display, but an entry remains in the service log. **Accepting the maintenance outside service intervals, or neglecting maintenance may lead to cancellation of warranty.**

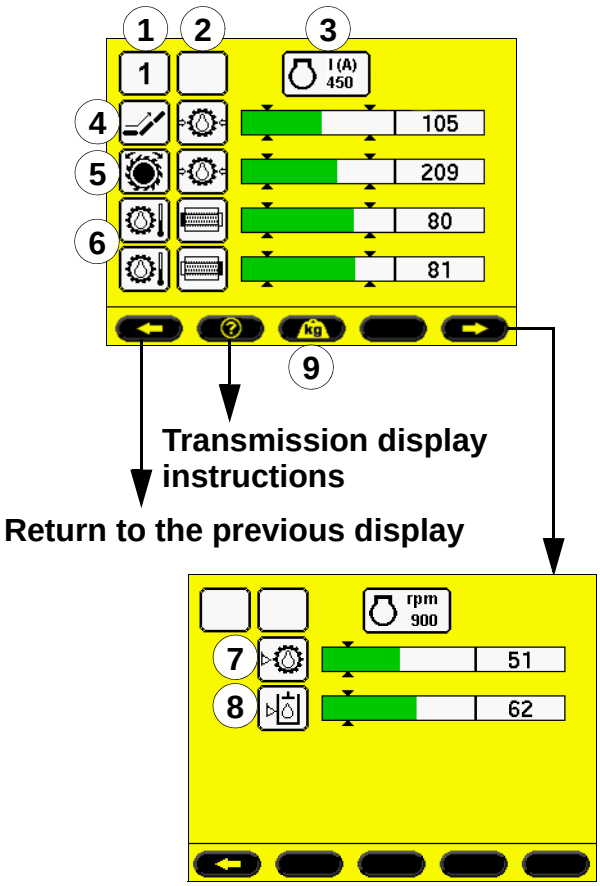
SYMBOL	ALARM	DESCRIPTION
	Exhaust particulate filter regeneration (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	The indicator light for exhaust particulate filter regeneration is lit when the system has not automatically regenerated the exhaust treatment system in the set time and regeneration is necessary. Ensure that the exhaust particulate filter regeneration prevention is not turned on and complete manual regeneration when it is possible. Before manual regeneration, make sure that the machine is not in danger of fire. If an exhaust particulate filter regeneration is not performed in a timely manner, the indicator light for exhaust particulate filter regeneration and the check engine lamp are lit and engine power will be reduced. Make sure that the machine is not in danger of fire and complete manual regeneration as soon as possible. If the indicator light for exhaust particulate filter regeneration flashes, regeneration is underway. Once the light turns off, the operator can resume normal work activity.
	Exhaust particulate filter regeneration prevention (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	The indicator light for the prevention of exhaust particulate filter regeneration is lit when the regeneration prevention is chosen. Thus, regeneration is not performed automatically or manually.
	Level of urea solution (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	The alarm is triggered when the limit is reached while the engine is running or when the ignition is on. The alarm buzzer sounds and the warning light is lit. Refill the urea solution tank with urea solution.
	High temperature of exhaust treatment system (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	The indicator light for high temperature of exhaust treatment system is lit when regeneration is underway. The light is also lit if the exhaust temperature is too high.

Transmission display

Diesel powered shredders



Electric powered shredders



1., 2. and 3. as in main display

4. **Conveyor's operating pressure, bar (psi)**
5. **Rotor's operating pressure, bar (psi)**

6. Final drive temperature, °C / °F (only diesel powered shredders)

Indicates the temperature of the final drives. The scale is +20 °C…+90 °C (+68 °F…+194 °F).

The control system issues an alarm and restricts machine functions in the following cases:

- Drive oil temperature over +90 °C (+194 °F): diesel engine maximum rpm not limited
- Drive oil temperature over +100 °C (+212 °F): diesel engine maximum rpm limits at 1,700 rpm
- Drive oil temperature over +110 °C (+230 °F): automatic operation stops.
- Difference in the drive oil temperature is over 20 °C (+68 °F): automatic operation stops.

In all the cases described above the alarm issued by the control system (the alarm buzzer sounds and the symbol blinks on the display) is stored in the fault memory, which can be seen on the alarm display. When the diesel engine rpm is limited, the red lights on both sides of the machine also blink (1 s on, 3 s off, 1 s on...).

6. Final drive temperature, °C / °F (only electric powered shredders)

Indicates the temperature of the final drives. The scale is +20 °C…+90 °C (+68 °F…+194 °F).

The control system issues an alarm and restricts machine functions in the following cases:

- Final drive oil temperature over +90 °C (+194 °F): electric motor current not limited.
- Final drive oil temperature over +100 °C (+212 °F): electric motor current limits at 75 % of the maximum.
- Drive oil temperature over +110 °C (+230 °F): automatic operation stops.
- Difference in the drive oil temperature is over 20 °C (+68 °F): automatic operation stops.

In all the cases described above the alarm issued by the control system (the alarm buzzer sounds and the symbol blinks on the display) is stored in the fault memory, which can be seen on the alarm display. When the electric motor current is limited, the red lights on both sides of the machine also blink (1 s on, 3 s off, 1 s on...).

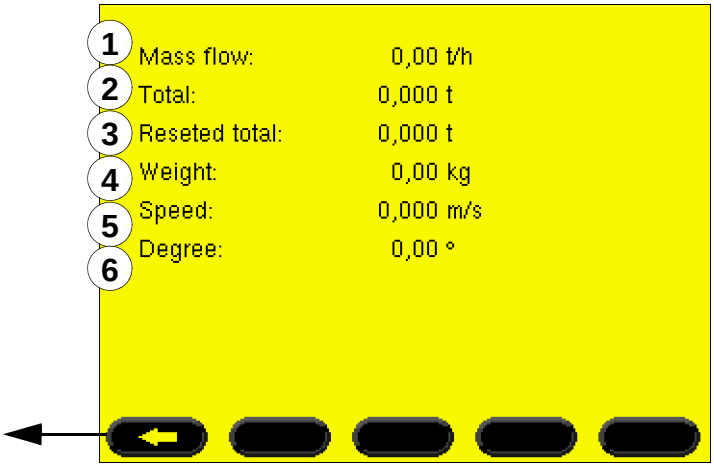
7. Transmission oil level

Indicates the oil level of the transmission oil tank. When the machine is on a level surface and the oil is at the operating temperature, the oil level should be between 80 % (maximum) and 60 % (minimum).

8. Hydraulic oil level

Indicates the oil level of the hydraulic oil tank. When the machine is on a level surface and the oil is at the operating temperature, the oil level should be between 80 % (maximum) and 60 % (minimum).

9. Scale display (optional)

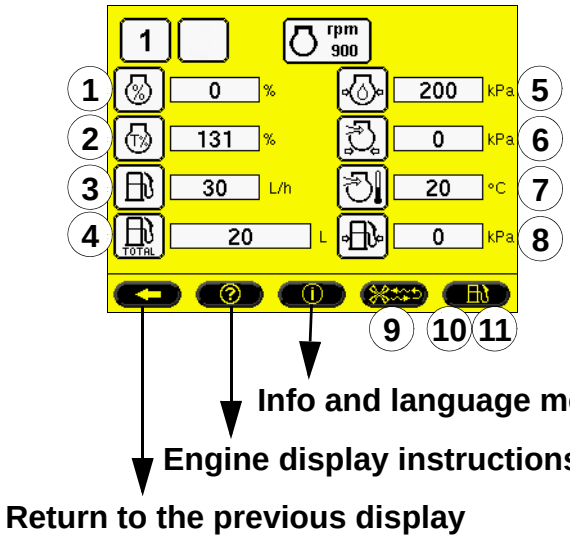


Return to the previous display

1. **Mass flow, t/h**
2. **Total, t**
3. **Reseted total, t**
4. **Weight, kg**
5. **Speed, m/s**
6. **Degree**

Engine display

Diesel powered shredders

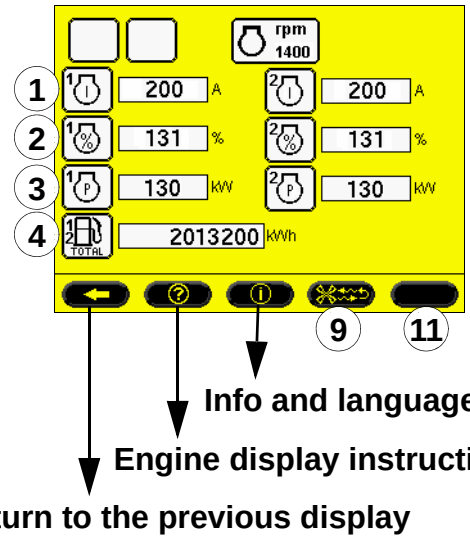


Info and language menu

Engine display instructions

Return to the previous display

Electric powered shredders



Info and language menu

Engine display instructions

Return to the previous display

1. **Engine load rate in percents (only diesel powered shredders)**
1. **Engines' 1 and 2 current, A (only electric powered shredders)**
2. **Engine torque in percents (only diesel powered shredders)**
2. **Engines' 1 and 2 power in percents from the nominal output (only electric powered shredders)**
3. **Temporary fuel consumption, l/h (only diesel powered shredders)**
3. **Engines' 1 and 2 power, kW (only electric powered shredders)**
4. **Consumed fuel, l (only diesel powered shredders)**
4. **Consumed electricity, kWh (only electric powered shredders)**
5. **Engine oil pressure, kPa (nominal runtime oil pressure) (only diesel powered shredders)**

- Shark 220D, 440D, 220DT and 440DT: Minimum idle running at the operating speed of (600 rpm): 69 kPa (10.0 psi), At maximum rpm (2,100 rpm) 245 kPa (35.5 psi)
- Shark 220Deco, 440Deco, 220DTeco and 440DTeco: 83 kPa (12.0 psi)@700 rpm, 276 kPa (40.0 psi)@2,100 rpm

6. Boost pressure, kPa (only diesel powered shredders)

- Shark 220D, 440D, 220DT and 440DT: At nominal power (2,100 rpm): 167 kPa (24.2 psi), At maximum power (1,800 rpm): 181 kPa (26.3 psi), At maximum torque (1,400 rpm) 182 kPa (26.4 psi)
- Shark 220Deco, 440Deco, 220DTeco and 440DTeco: 209 kPa (30.3 psi)@2,100 rpm (at nominal power), 243 kPa (35.2 psi)@1,800 rpm (at maximum power) 236 kPa (34.2 psi)@1,400 rpm (at maximum torque)

7. Air inlet temperature (only diesel powered shredders); alarm limits

- Shark 220D, 440D, 220DT and 440DT: +88 °C (+190 °F)
- Shark 220Deco, 440Deco, 220DTeco and 440DTeco: +121 °C (250 °F)

Engine load and ambient temperature affect the inlet air temperature. If the temperature is too high, check that the intercooler core and the pre-filter mesh in front of the cooler are clean.

8. Fuel pressure, kPa (only diesel powered shredders)

9. Turning the fan blades manually (cooler cleaning) (only diesel powered shredders)

When the machine is switched on, the fan blades rotate automatically at certain intervals. They can be turned manually by pressing the button.

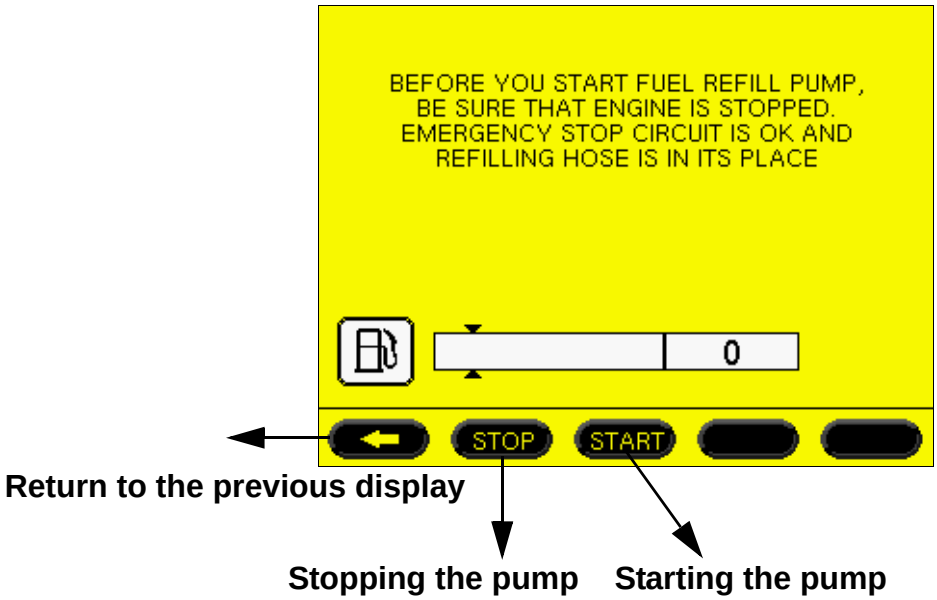
Turning the fan blades removes accumulated dust and improves cooling efficiency. Regular maintenance and cleaning is still required.

9. Reversing the fan turning direction (only electric powered shredders)

The turning direction of the fan can be changed momentarily by pressing the button.

Changing the rotation direction cleans the cooler in dusty circumstances and thus improves the cooling power. Regular maintenance and cleaning is still required.

10. Controlling the fuel pump (optional) (only diesel powered shredders)

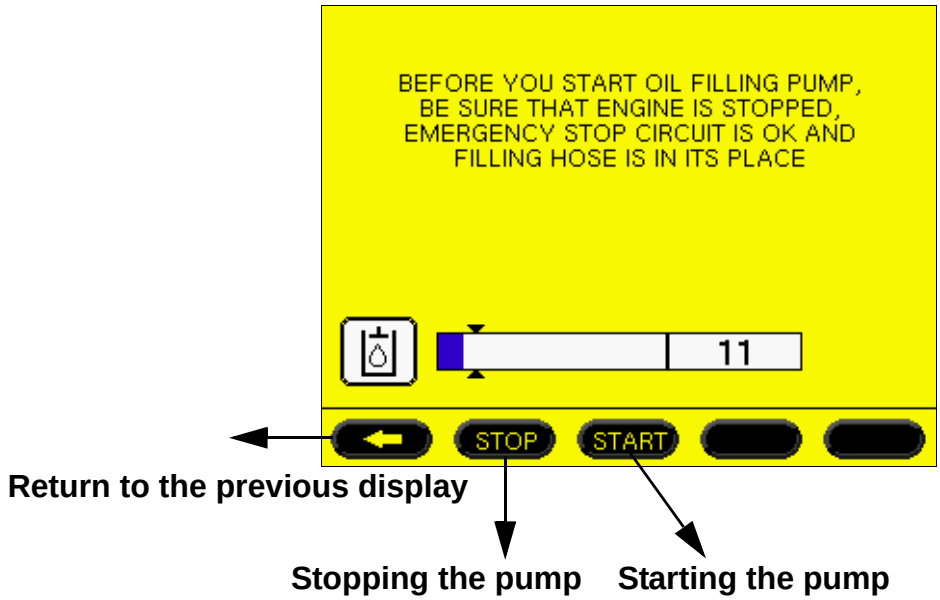


CAUTION

Before starting the fuel pump, ensure that the engine is switched off, the emergency stop circuit is in good condition and the filler hose is in place.

The automatic fuel pump (optional) can be started with the "START" button if the tank is not full. Fuelling stops automatically when the tank is full. You can stop the fuelling by pressing the "STOP" button.

11. Controlling the hydraulic oil filling pump



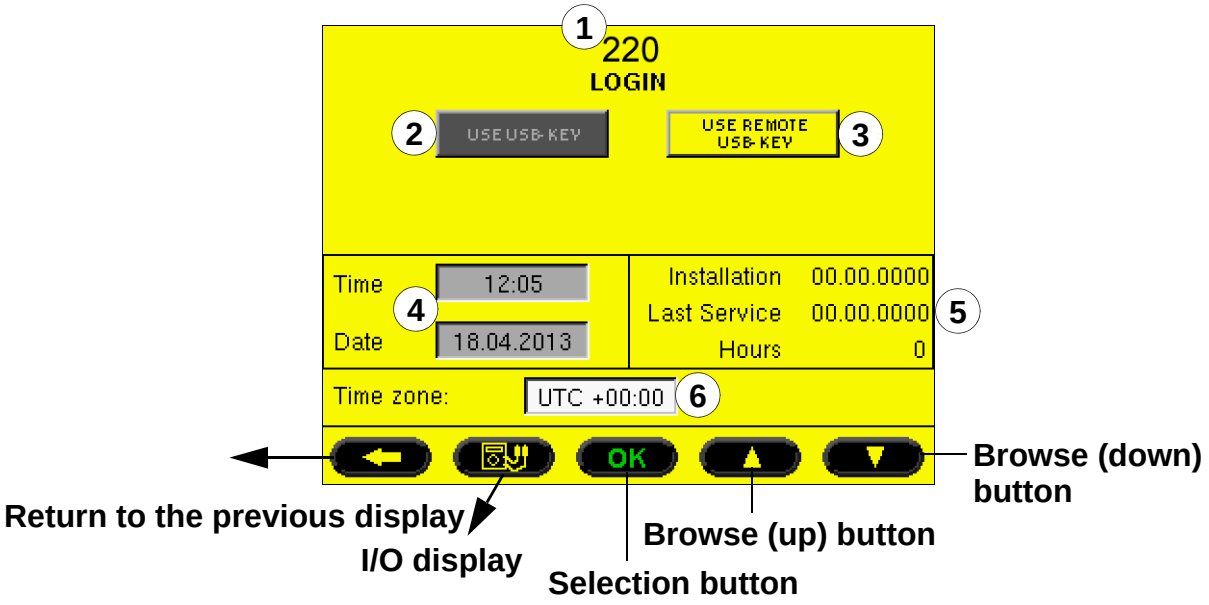
CAUTION

Before starting the hydraulic oil filling pump, ensure that the engine is switched off, the emergency stop circuit is in good condition and the filler hose is in place. Make sure also that the shut-off valve of the oil filling circuit is open.

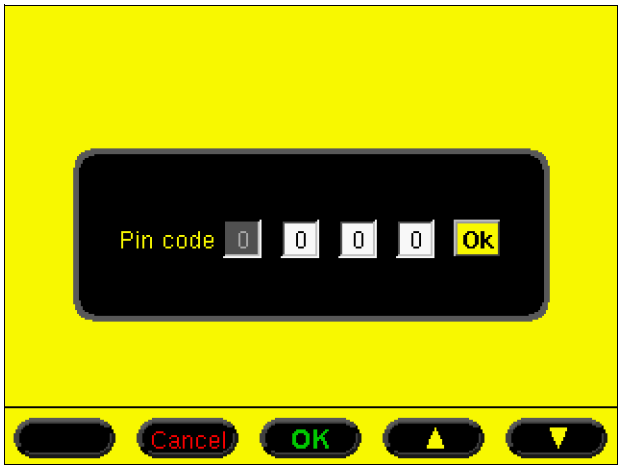
The hydraulic oil filling pump starts when the "START" button is pressed. When the tank fill level is 80 %, the pump stops automatically. The hydraulic oil filling pump can be stopped at any time by pressing the "STOP" button.

Login display

You can access the machine's service pages by using the TANA key and your personal service page password, or with a service page password corresponding to the counterpassword.



When the USB key is inserted in the USB port in the operating switch panel, the operator is requested to provide the TANA key PIN code. Enter your own personal PIN code (4 characters) as instructed below.



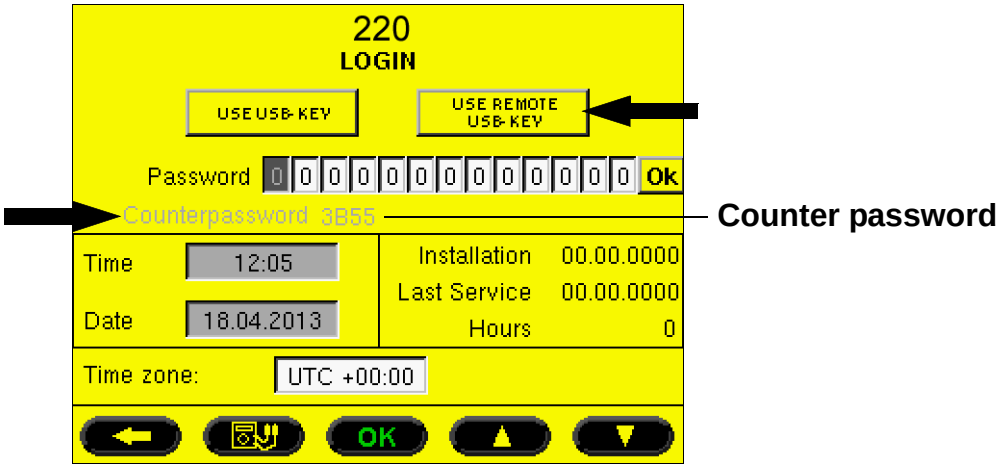
- Press "OK" –the field turns black.
- Select the desired character using the up and down buttons. The character may be a number 0-9 or a letter A-F.
- Press "OK" – field turns grey again.
- Move to the next character using the down button. When the last character is entered, press "OK". After entering the code, a notification will appear on the display indicating whether the code is correct.

1. Machine type

2. Login with personal TANA key

When the TANA key is inserted in the USB port in the operating switch panel and you have entered your own personal PIN code correctly, you will be able to access the service pages.

3. Login with a remote password



Select “Use Remote USB Key” to access the service pages without a USB memory stick. In such case, a password (13 characters) corresponding to the counter password must be entered into the machine. The password corresponding to the counter password is intended for factory use (remote USB use).

4. Date and time

See section “Time zone”.

5. Machine commissioning date and date of most recent maintenance and operating hours

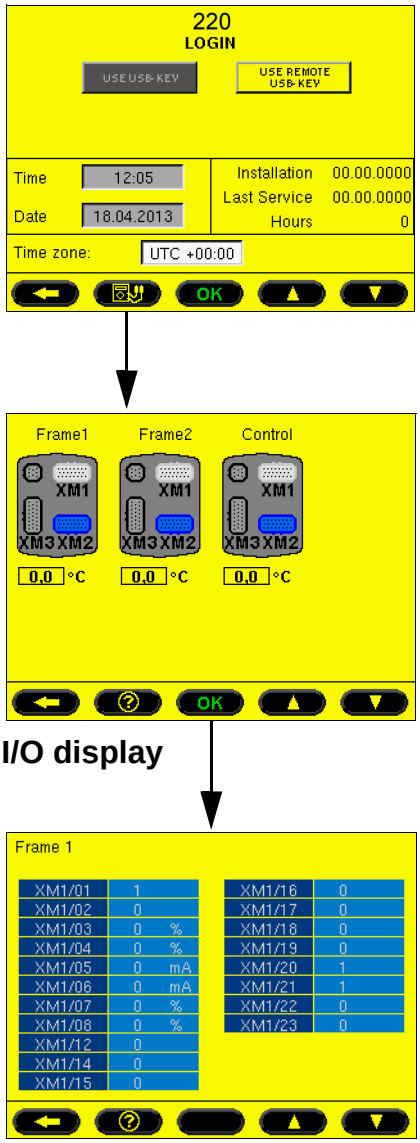
6. Time zone

Move to Time zone selection by pressing down button. Press "OK" –the field turns black. Set the local time zone by pressing up and down buttons. Exit to main page and return to LOGIN page to verify that time is correct local time. Time can not be changed manually, it is updated via GPS.

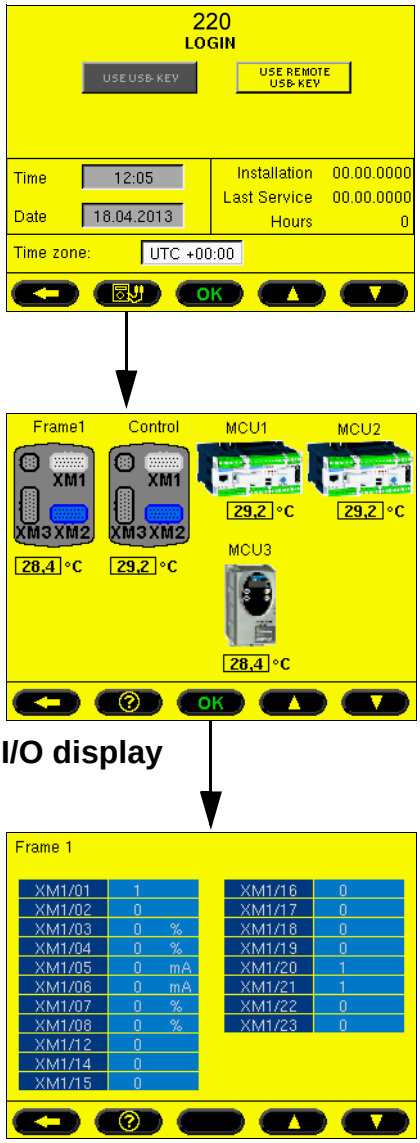
Time zone must be changed when time is changed from normal time to daylight saving time and vice versa.

I/O display

Diesel powered shredders

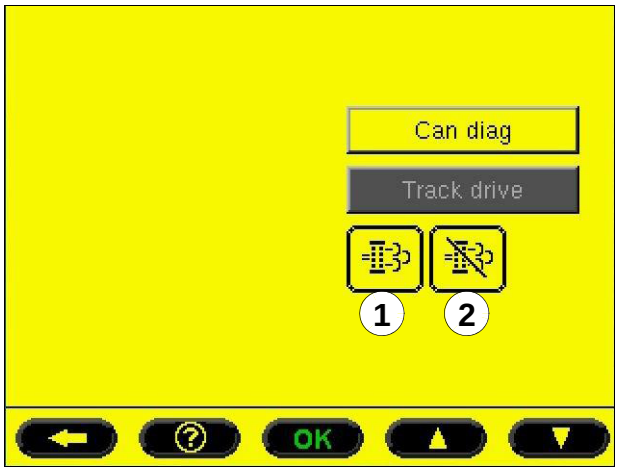


Electric powered shredders



The I/O display shows the I/O data from the frame modules. Use the + and – buttons to move between the connectors (XM1–XM4) and modules. The connector chosen with the up and down keys turns dark and the "OK" button brings the I/O data of the chose connector on the display. The values are displayed for each pin 1-23. Pressing “?”, displays a list of all the pins of the modules and their data. The I/O display also shows the module temperatures.

Exhaust particulate filter regeneration prevention and manual regeneration (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)



In the service pages you can turn on exhaust particulate filter regeneration prevention and manual regeneration.

1. Exhaust particulate filter manual regeneration

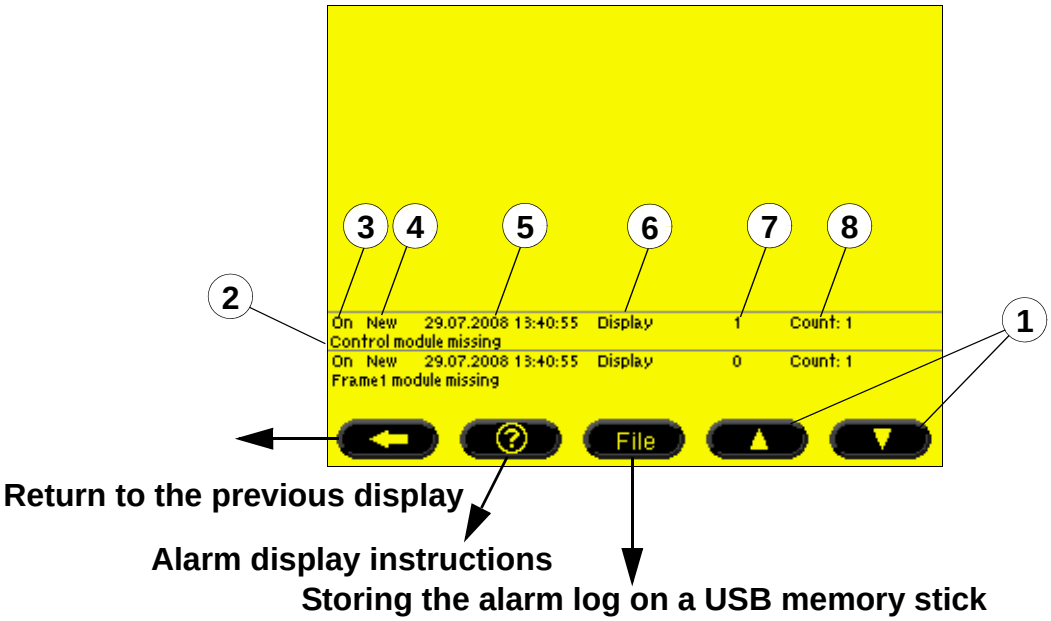
Switches on and off the exhaust particulate filter regeneration. The display shows a window for confirming the operation. Make sure that the machine is not in danger of fire.

2. Exhaust particulate filter regeneration prevention

Switches on and off the exhaust particulate filter regeneration prevention. The display shows a window for confirming the operation.

If the machine is in danger of fire, regeneration prevention must be switched on.

Alarm display

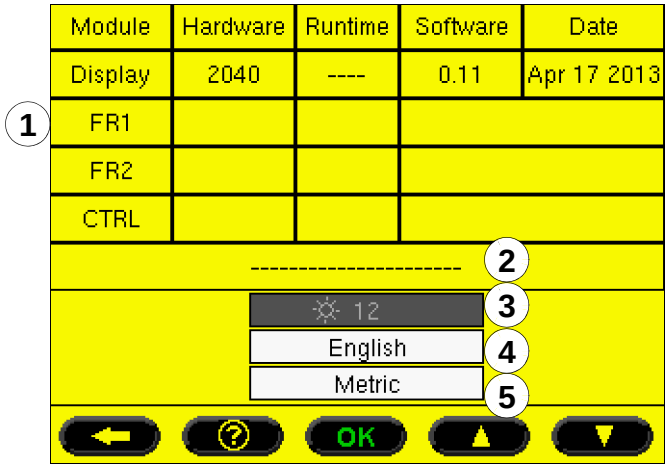


All alarms set off by the control system are recorded and the information made available from the display. If there are active alarms, the alarm display symbol blinks in red. The alarms are acknowledged by visiting the alarm display. The alarm log can accommodate 1,000 alarms. The up and down keys **(1)** can be used to browse old alarms. When the alarm log is full, the oldest alarms are deleted automatically.

The following information is included in each alarm entry:

- Cause of the alarm **(2)**.
- On / Off status of the alarm **(3)**.The alarm status "on" announces that the alarm is active, i.e. the fault causing the alarm is still a problem.The alarm status "off" announces that the alarm is no long active.
- If the status is ‘New’ **(4)**, the alarm has not yet been read. When the alarm page is accessed, the text ‘New’ disappears.
- Alarm date and time **(5)**.
- Originator of the alarm **(6)**.
- Alarm ID **(7)**.
- Number of successive alarms **(8)**.

Info and language menu



1. **Information about the modules and the software versions**
2. **Software package version**
3. **Display contrast adjustment**
4. **Display language menu**

With this menu, the language of the display texts can be changed. If the language you want is not displayed, contact your TANA distributor.

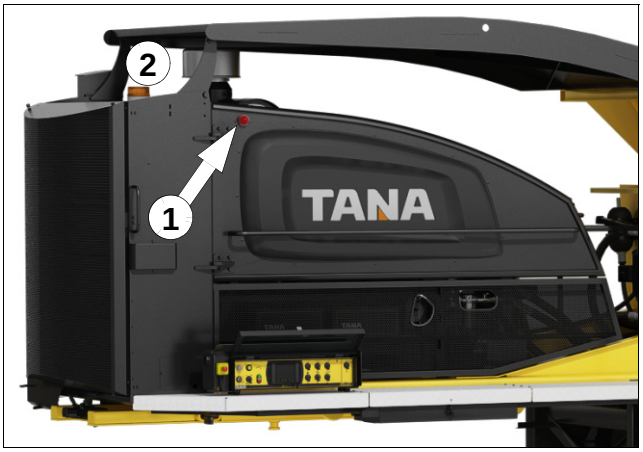
5. **Display units of measure**

You can select between metric, Imperial and USA units.

6.4. Indicator lights

Both sides of the machine's powerpack have red indicator lights (1) and beacon (2) on top of the machine. They tell of the operative state of the machine.

The location of the indicator lights in Shark 220E and 440E machines depends on the installation site and varies from case to case. Find the indicator lights before operating the machine.



The flashing beacon (2) blinks when the engine is running and the drive mode switch is not in the 0 position.

The red light (1) indicates the machine operations as follows:

Priority	Reason	Red signal light operation
1	Failure / alarm causing operation to stop	The light blinks; 0.25 s on, 0.25 s off, 0.25 s on...
2	Change of direction during high pressure.	Light is lit for 3 s
3	Limiting power due to error, temperature etc.	The light blinks; 1 s on, 3 s off, 1 s on...
4	Fuelsave-mode on.	The light blinks; 1 s on, 0.25 s off, 1 s on, 3 s off, 1 s on, 0.25 s off, 1 s on, 3 s off...

6.5. Supports (only Shark 220D, 220Deco, 440D and 440Deco)

The machine has two ground supports. The ground supports enable stable and level positioning of the machine at the work site.

During operation, the shredder supports must always be lowered. During transport and transfer, the supports must always be raised.

Make sure the ground has sufficient bearing capacity. The machine must be positioned on a platform as solid and level as possible. Level the ground surface if is not naturally level. The machine may not be used at an inclination over 5 degrees from the platform along the length of the machine or over 2.5 degrees in relation to the lateral direction.

The shredder must not move or sink into the ground during operation. If the surface is not hard, place load-bearing plates under the supports. Sand or clean icy or otherwise slippery surfaces or make sure in other ways that the machine cannot slide during operation.

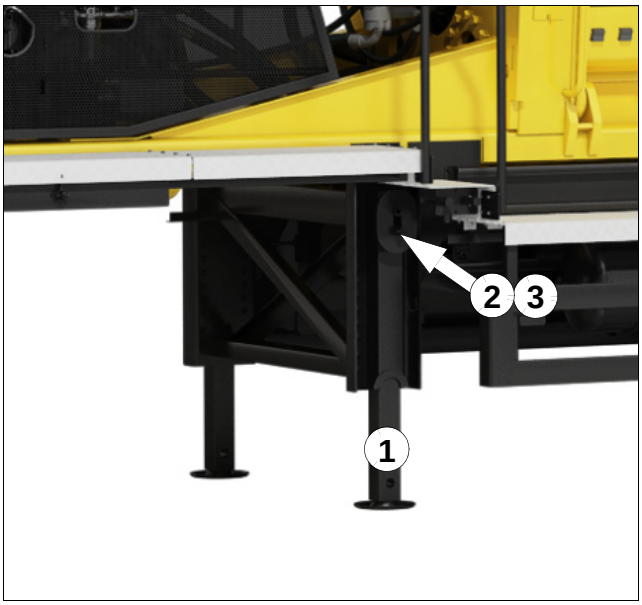
The front end of the machine drops a little when detached from the drawing vehicle. The drawing vehicle's fifth wheel should be lifted 20 to 30 cm (8-12 in.) using the air-spring suspension before the front supports are lowered.

Crushing hazard.

Machine may collapse onto the ground and cause death or serious injuries.

Never go beneath the machine – danger of crushing if the ground supports or platform collapse!

Mechanical ground supports



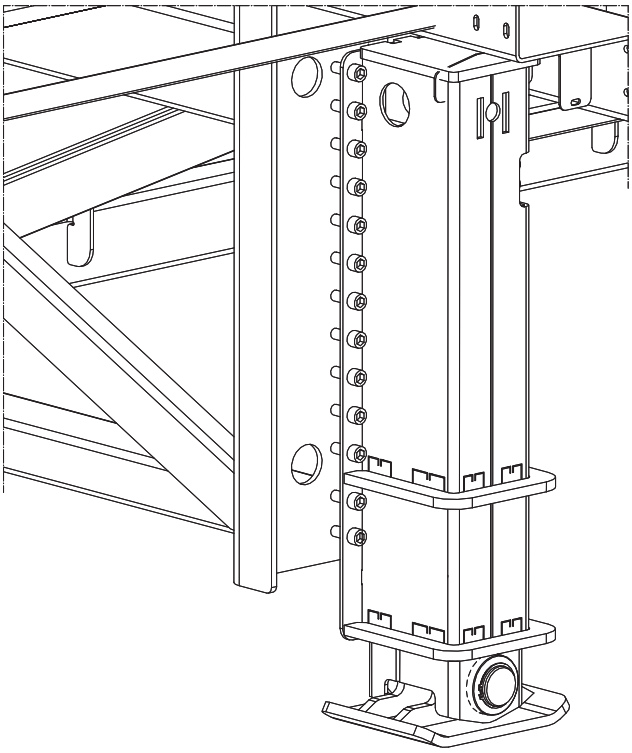
1. Ground support
2. Ground support lowering/lifting arm
3. Drive shaft

The ground support is lowered by turning the arm clockwise and lifted by turning the arm anti-clockwise.

A faster gear ratio for the support leg can be selected by pulling the support drive shaft (3) outward. If greater force is required to move the support leg, push the drive shaft to the inner position.

During operation and transport, the arms of the ground supports must be locked in place behind the mounting loop.

Hydraulic support (optional equipment)

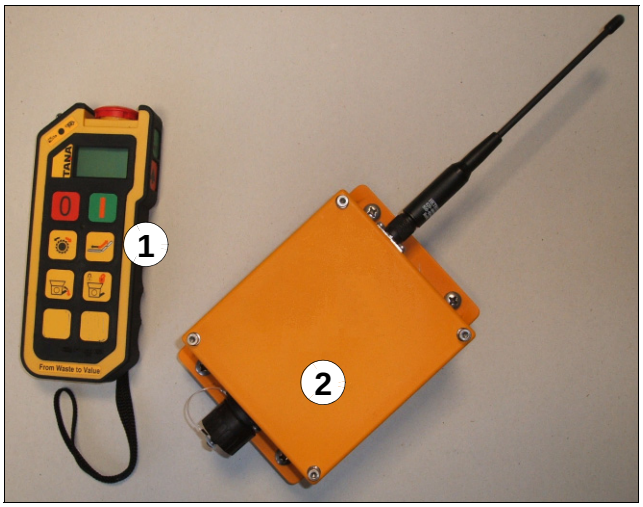


The mechanical supports can be optionally replaced with hydraulic supports.

The hydraulic supports are operated with the up/down switch (1) on the operating panel. The ground supports are lifted by turning the switch to the right, and lowered by turning it to the left.

The supports can be operated when the engine is running and manual operating mode is selected.

6.6. Remote control



The remote control is standard in Shark 220DT, 220DTeco, 440DT and 440DTeco machines. In other machines it is optional. With the remote controller (1), the machine can be controlled from a remote location, such as the cabin of the charging machine.

Shark 220D, 440D, 220DT, 440DT, 220E and 440E: the remote control receiver (2) is located in the engine compartment, near the switchboard.

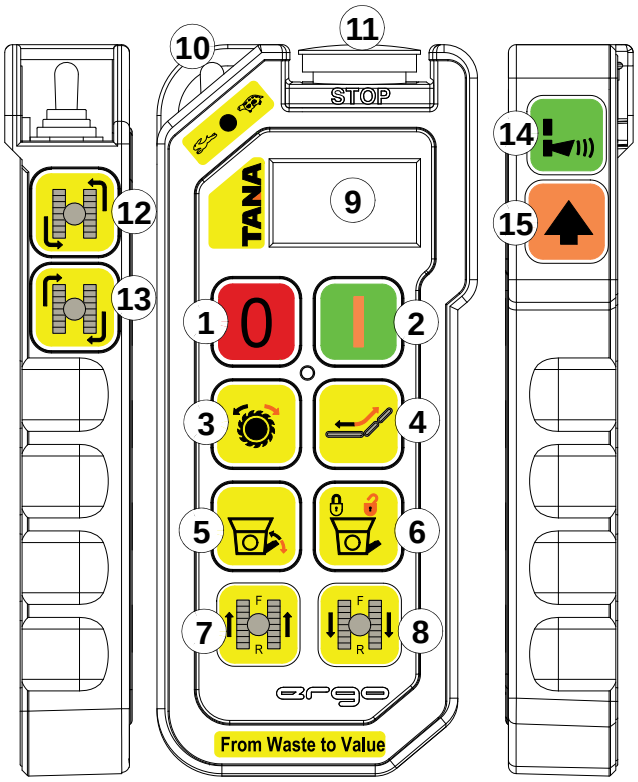
Shark 220Deco, 440Deco, 220DTeco and 440DTeco: the remote control receiver (2) is located in the powerpack, on the side of the battery case.

The remote control is powered by a rechargeable battery that can be charged with the AC-DC charger delivered with the control or with the vehicle charger.

When remote control operation is selected, the operator must have the remote control within reach. The remote control must be activated before turning the operating mode switch to the remote control position.

Switch off the remote control during breaks, maintenance, and inspections, as well as after you have stopped working. Before switching off the remote control, turn the operating mode switch away from the remote control position.

Functions of the remote controller



1. Stopping the machine

When the button is pressed, the automatic operation of the machine is stopped. This button is also used to acknowledge alarms displayed on the display of the remote controller.

2. Remote start up of the automatic operation

When pressing buttons 15 and 2 simultaneously (press first button 15), the machine will initiate the automatic operation based on the selected programming mode. The operating mode switch on the control panel must be in the remote access position.

3. Rotor operation (manual run)

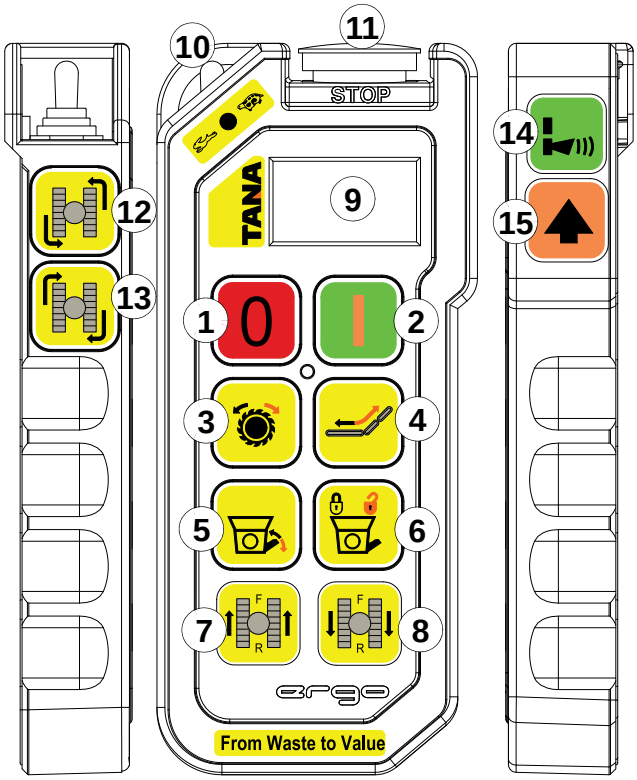
Automatic operation must be stopped and the rotor must be stationary before the button is pressed. When the button is pressed, the rotor rotates in reverse. When buttons 15 and 3 are pressed simultaneously (press first button 15), the rotor rotates forwards.

4. Conveyor operation (manual run)

When the button is pressed, the machine's conveyor rotates in reverse. When buttons 15 and 4 are pressed simultaneously (press first button 15), the conveyor rotates forwards.

5. Counter wall open / shut (manual run)

When the button is pressed, the counter wall closes. When buttons 15 and 5 are pressed simultaneously (press first button 15), the counter wall opens.



6. Counter wall locking control (manual run)

When the button is pressed, the counter wall locking mechanism is engaged. When buttons 15 and 6 are pressed simultaneously (first press button 15), the counter wall locking mechanism opens.

7. Driving the tracks forwards (only in Shark 220DT, 220DTeco, 440DT and 440DTeco machines)

When the button is pressed, the machine moves forward. Can be used together with button 12 or 13.

8. Driving the tracks backwards (only in Shark 220DT, 220DTeco, 440DT and 440DTeco machines)

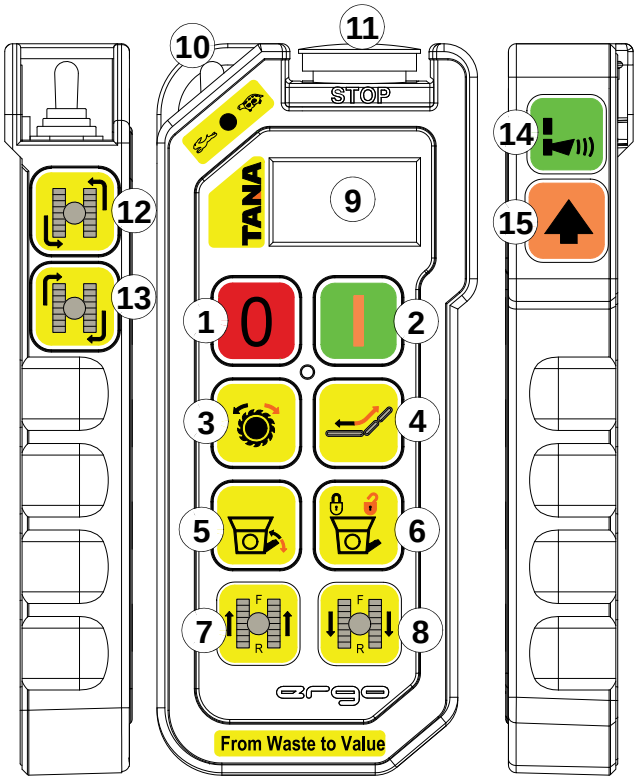
When the button is pressed, the machine moves backward. Can be used together with button 12 or 13.

9. Screen of the remote controller

System information and alarms are displayed on screen. Some of the alarms can be acknowledged using button 1 on the remote controller.

10. Machine drive speed change switch

When the switch is turned to the left, the machine drive speed changes to high. When the switch is turned to the right, the machine drive speed changes to low. When the switch is in the centre position, the drive speed is normal.
The switch also has an effect on the speed of operation of buttons 3, 4, 7, 8, 12 and 13.



11. Emergency stop (STOP) / shutting off the remote controller

When pressed during drive, the engine is turned off and the machine loses power.

Risk of machine breakdown.

An emergency stop may cause damages to the diesel engine due to the heat.

NOTICE

The emergency stop function is intended for emergency stopping only. During normal use the machine must be stopped using the control switches. Inspect regularly the functioning of the emergency stop switches.

When the machine is stopped and the operation mode switch on the operating panel is switched away from the remote control position, the remote controller shuts off when the button is pressed.

12. Turning the machine to the left (Shark 220DT, 220DTeco, 440DT and 440DTeco models only)

When the button is pressed, the machine turns to the left. Can be used together with button 7 or 8.

13. Turning the machine to the right (Shark 220DT, 220DTeco, 440DT and 440DTeco models only)

When the button is pressed, the machine turns to the right. Can be used together with button 7 or 8.

14. Signal sound / starting the remote controller

When the button is pressed while the operating mode switch is in remote control position, the machine's sound signal is emitted. The button is also used to turn the remote controller on.

15. Confirmation / selection button

When pressed simultaneously with another button, the functions indicated in orange become available for use. Always press first this button, and only then simultaneously the other button you want to use.

Charging the remote controller battery

Explosion hazard.

Use of incorrect batteries may result in battery explosion.

Use original batteries only.

The remote controller runs off a rechargeable NiMH battery. The symbol on the remote controller's screen indicates the remaining charge of the battery. Remove the dead battery from the casing located at the back of the remote controller.

Insert the dead battery into the battery charger until it clicks into place. The “CHARGE” LED will flash for two seconds and then remain illuminated while charging. When the battery is fully charged, the “READY” LED will illuminate and the “CHARGE” LED will turn off.

The recharging time for an empty battery is approximately 5 hours. A full battery provides approximately 10 hours of operating time for the remote control. If the operation time of the battery is considerably lower, replace the battery with a new one.

The battery can also be speed charged. Insert the battery into the battery charger. The “CHARGE” LED will flash for two seconds and then remain lit while charging. Press the “FAST CHARGE” button. The “FAST CHARGE” LED also illuminates and remains lit for the duration of the fast charge. When the battery is fully charged, the “READY” LED will illuminate and the “CHARGE” and “FAST CHARGE” LEDs will turn off.

Charging should take place at a temperature of 0...+40 °C (+32 °F…+104 °F).

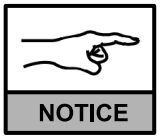
Recycle batteries in accordance with local rules and regulations.

Starting the remote controller

Press the remote controller's start button. When starting, the remote controller will conduct a self-diagnostic procedure. When the remote controller has been started, the operating mode switch can be set to operation with the remote controller.

Switching the remote controller off

Stop the machine by pressing the remote controller's machine stop button. Turn the operation mode selection switch away from the remote control position. Press the remote controller's emergency stop (STOP) / controller shutoff button. The remote controller is now switched off.



Danger of bodily injury.

Damaged remote control could cause death or serious injuries.

Do not operate the machine with a damaged remote controller.

7. DRIVING INSTRUCTIONS

7.1. Procedures before start up

Operators responsible for the operation and maintenance of the machine must be thoroughly familiarised with the contents of this operation manual. Only a trained operator may operate the machine.

Before moving the machine to another work site, an appropriate location for the machine must first be found.

For more information on machine location and positioning, refer to the ‘Safety instructions’ section.

Once a suitable location has been found, lower the supports (trailer-platform models) and ensure that the machine is properly supported. Engage the platform brakes and place wedges in front and behind the wheels to prevent the machine from moving.

Before starting work, check each of the items specified in the daily maintenance instructions, such as the fuel, coolant, and oil levels.

In addition, after the first few days of operation check all screws, bearing pivot pins of the hydraulic cylinders, and the connections of the hydraulic hoses. Tighten any loosened parts immediately.

7.2. Maintenance every 10 hours or daily

Before carrying out the maintenance, remove the main switch key and the TANA key from the USB port. Keep the keys safely stored away so that the machine cannot be started or switched on accidentally.

INSTR. NO	SERVICE ITEM	MAINTENANCE				
		10 h	Maintenance I	Maintenance II	Maintenance III	Maintenance IV
1.	Check the coolant level (only diesel powered shredders)	☐				
2.	Check the engine oil level (only diesel powered shredders)	☐				
3.	Check / clean the air filter (only diesel powered shredders)	☐				
4.	Check/clean the cooling system's condenser cores	☐				
5.	Check the cooling fan blades and belts	☐				
6.	Check the hydraulic oil level	☐				
7.	Check the lights and control devices	☐				
8.	Check the hydraulic lines and components	☐				
9.	Check the counter knives, rotor knives, rotor, and sieve mesh	☐				
10.	Drain water from the water separator (only diesel powered shredders)	☐				
11.	Check engine intake air system (only diesel powered shredders)	☐				
12.	Check the crankcase breather pipe (only diesel powered shredders)	☐				
13.	Check the transmission oil level	☐				
14.	Clean the conveyor belt	☐				
15.	Check the support of the machine and the surface underneath it	☐				
16.	Check the aftertreatment exhaust piping (only eco-models)	☐				
17.	Check the operation of central lubrication system (optional) pumping unit	☐				

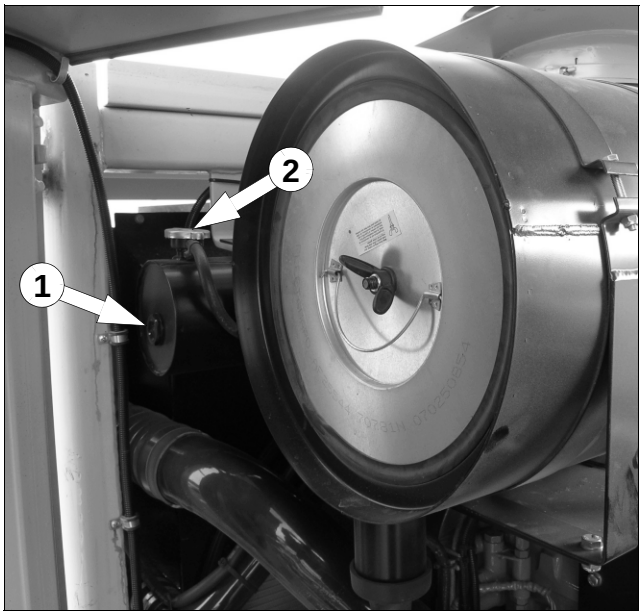
☐ CHECK / CLEAN / ADD

■ REPLACE

The procedures included in the Maintenance I, II, III, and IV are described in the Maintenance manual.

Instructions for the daily inspections (10 h) mentioned in the table are presented on the following pages.

☐ 1. Check the coolant level (only diesel powered shredders)



Coolant level check

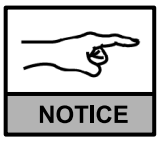
The expansion tank of the cooler is located on top of the engine block.

The coolant level must be at the top edge of the sight glass (1) when the coolant has cooled down. If necessary, add the recommended coolant through the filling cap (2).

Risk of burns.

Hot coolant could spray on you and cause serious injuries.

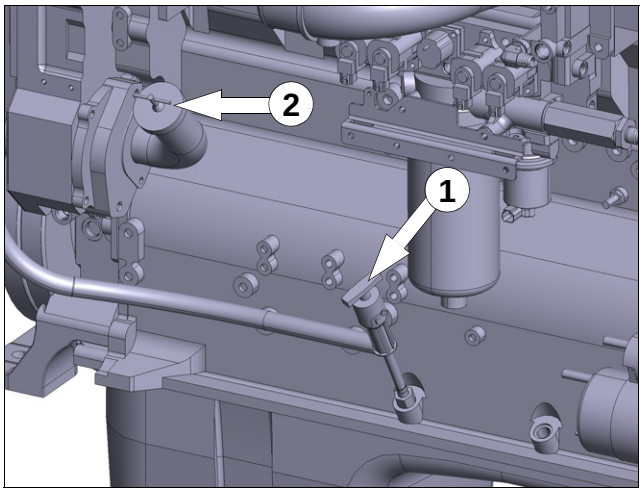
Never open the radiator cap when the engine is hot. Wait until the temperature is below +50°C (+122°F). Remove the cap slowly to relieve the pressure in the cooling system.



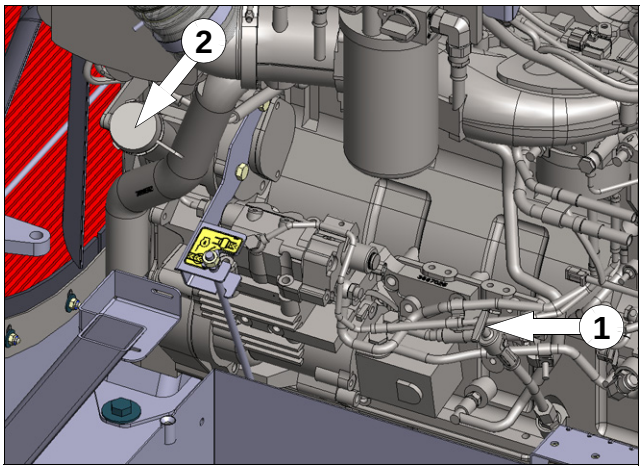
Risk of machine breakdown.

Do not add cold fluides into the engine before it has cooled down below +50°C (+122°F). Adding cold coolant into the hot engine can damage the engine. Do not use sealing fluids in the system. For additional information, see the Cummins manual.

☐ 2. Check the engine oil level (only diesel powered shredders)



Shark 220D, 440D, 220DT and 440DT



Shark 220Deco, 440Deco, 220DTeco and 440DTeco

1. Dipstick
2. Oil filler

Checking the engine oil level

- In order to check the oil level properly, the machine must be in levelled position.
- Wait about 15 minutes after turning the engine off before checking the oil levels.
- Check the oil level from the dipstick. Keep the oil level between the low and high marks on the dipstick.
- Add oil if the level is at the low mark.
- **For additional information, see the Cummins manual.**

NOTICE

Risk of machine breakdown.

Low or too high level of engine oil could cause damages to the engine.

Never run the engine if the oil level is below the ADD mark or above the FULL mark.

☐ 3. Check / clean the air filter (only diesel powered shredders)

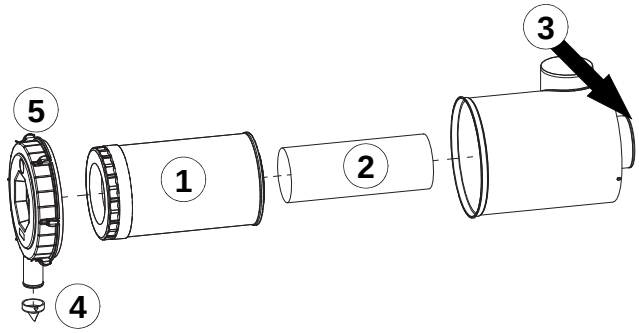
NOTICE

Risk of machine breakdown.

Dirty air filter could cause damages to the engine.

The air filter is a vital component to engine operation. When cleaning/ replacing the filter, ensure that the system remains clean.

Air filter, Shark 220D, 440D, 220DT and 440DT



The air filter is located on top of the engine block.

Air filter's main components

1. Primary filter (main filter)
2. Secondary filter (safety cartridge)
3. Clogging indicator (the warning is shown on the display)
4. Dust collector
5. Lockers

Cleaning the air filter

If the cleaning of the pre-cleaner is neglected, the air filter will become clogged quickly.

Clean the pre-cleaner by pressing the dust collector (4) in the bottom edge of the end.

Remove the dust collector by pulling it out and clean the tube, wherein the dust collector is mounted. Install the dust collector back.

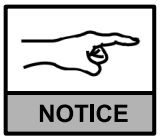
Clean or replace the primary filter if the machine's control system/clogging indicator warns of a clogged air filter. Increased smoke or decreased power may also indicate a clogged air filter.

Cleaning the primary filter, Shark 220D, 440D, 220DT and 440DT

Dust hazard.

Hazardous dust may float in the air during cleaning.

When you use pressurised air to clean the filter, use goggles and a respiration mask during work.



Risk of machine breakdown.

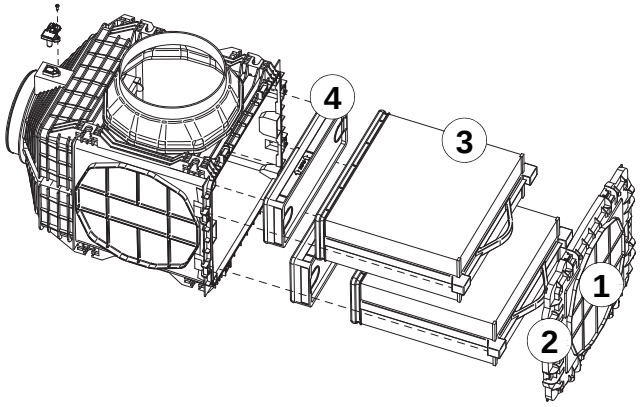
When cleaning the filter, follow the filter manufacturer's instructions as well. If the primary filter is not damaged, it can be cleaned a maximum of four times.

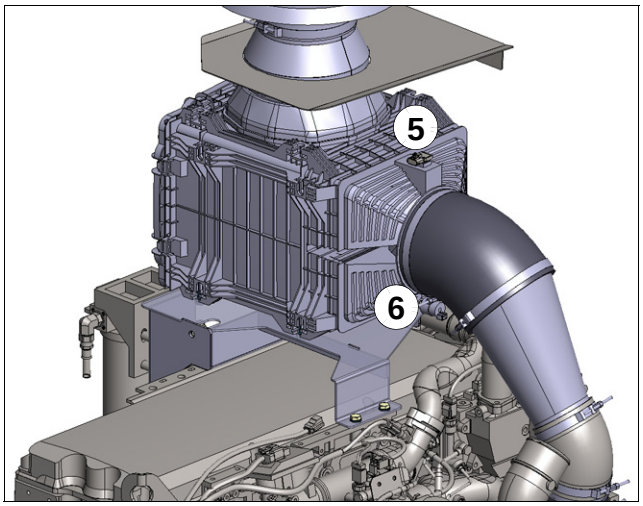
- Open the cover and remove the primary filter carefully.
- Remove the filter by pulling it directly out, and be careful not to damage the secondary filter.
- Remove the secondary filter if necessary. The filter must be changed whenever the primary filter has been faulty, and always after 1,500 operating hours or in connection with every third primary filter replacements. **The filter is not to be cleaned!**
- Check the filter housing for seal debris and other impurities.
- Clean the housing with a lint-free cloth. Never use cotton waste.
- Check the primary filter, seals, and the filtering surfaces. A damaged filter must always be replaced (see the following paragraph).
- Clean a dirty filter with compressed air (max. 6 bar (87 psi)) by blowing. Always blow from the clean to the dirty side, i.e. from the inside to the outside. Do not hold the dusting gun’s nozzle too close to the filter surface (min. distance to use: 50 mm (2 in.)).
- Re-check the seal surfaces, lubricate the surfaces lightly with oil, and install the filter carefully. Twist the filter slightly to seat the seals properly.
- Reinstall the cover.

Changing the primary filter, Shark 220D, 440D, 220DT and 440DT

- Remove the old filter as described above and clean the housing.
- Check the new filter. The seals and filtering surfaces can be damaged during transport.
- Oil the seals lightly and install the new filter carefully. Twist the filter slightly to seat the seals properly.
- Reinstall the cover.

Air filter, Shark 220Deco, 440Deco, 220DTeco and 440DTeco





The air filter is located on top of the engine block.

Air filter's main components

1. Cover
2. Cover clips (4 pcs)
3. Air filter cartridge, primary filter, 2 pcs
4. Air filter cartridge, secondary filter, 2 pcs
5. Temperature and pressure gauge (the warning is shown on the display)
6. Clogging indicator (the warning is shown on the display)

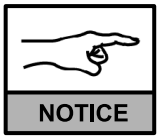
If the cleaning of the pre-cleaner is neglected, the air filter will become clogged quickly.

Replace the primary filters if the machines control system/clogging indicator warns of a clogged air filter. Increased smoke or decreased power may also indicate a clogged air filter.

Replacing the primary filters, Shark 220Deco, 440Deco, 220DTeco and 440DTeco

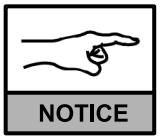
- Open the cover clips and remove the cover. Remove carefully both primary filters.
- Remove the filters by pulling them directly out, and be careful not to damage the secondary filters.
- Remove both secondary filters if necessary. The secondary filter is replaced whenever the primary filter is found to be damaged, and every 1,500 hours of operation or every third time the primary filter is replaced. **The filters must not be cleaned!** Dirty or damaged filter must always be replaced.
- Check the filter housing for seal debris and other impurities.
- Clean the housing with a lint-free cloth. Never use cotton waste.
- Check the new filters. The seals and filtering surfaces can be damaged during transport.
- Oil the seals lightly and install the new filters carefully.
- Reattach the cover.

☐ 4. Check/clean the cooling system’s condenser cores



Risk of machine breakdown.

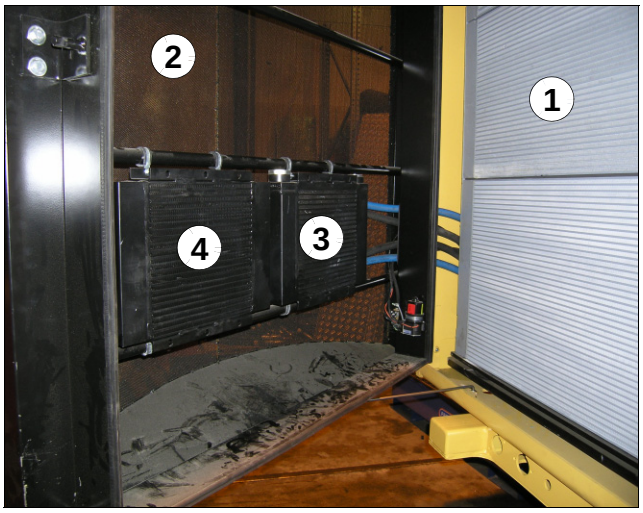
Do not damage the fins of the cooler. Bent fins impair the cooling effect.



Risk of machine breakdown.

The radiators cleaning should be done carefully in order to achieve sufficient cooling capacity. If water is used for cleaning, the radiator should be allowed to dry completely before using the machine.

Cooler cores, diesel powered shredders



Radiator cores (1)

The cores are located on top of each other in front of the engine. The uppermost core is for the intercooler, which cools the air entering the intake manifold of the engine. The centre core is for the engine cooling system and the lowermost core for the hydraulic oil cooler.

Pre-filter (2)

The hinged air guide in front of the coolers is fitted with a cleanable pre-cleaner which reduces the amount of dust and dirt entering the Cooler cores. Clean the pre-cleaner with compressed air, a high-pressure washer, or a brush.

Transmission oil cooler (3)

The transmission oil cooler is located in front of the engine Cooler cores, behind the air guiding plates.

Fuel cooler (4)

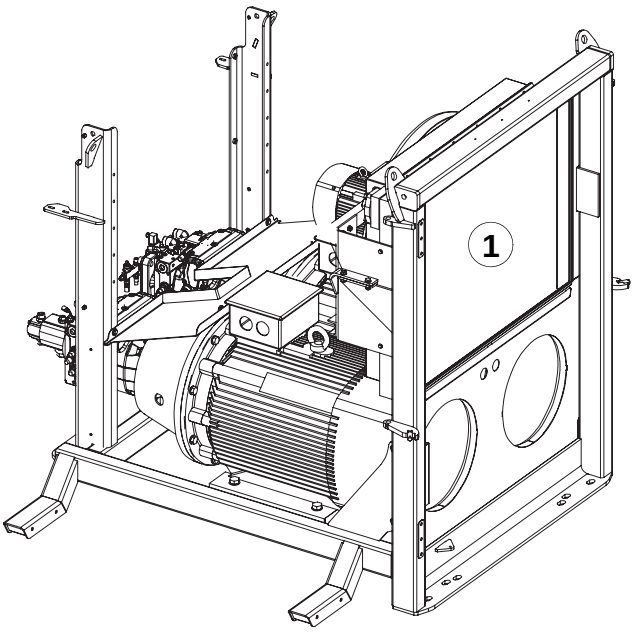
Cleaning the coolers

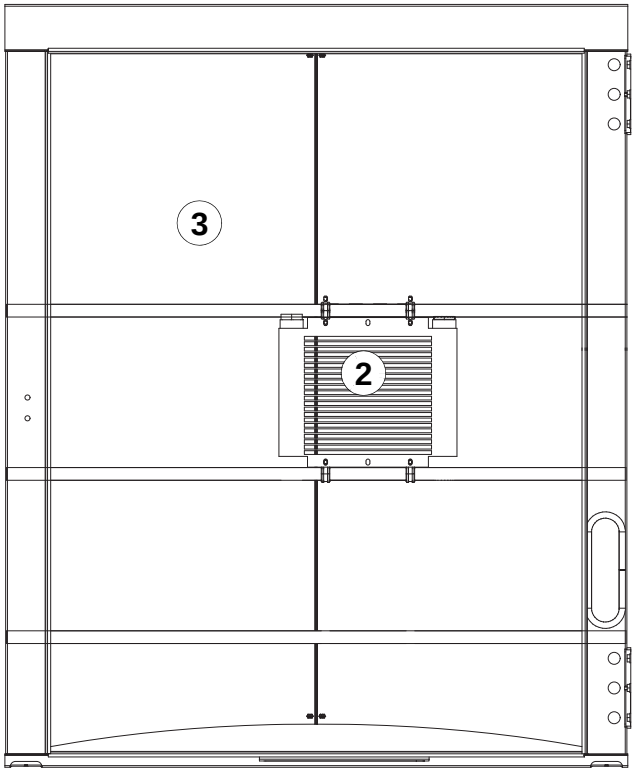
Clean the radiators with compressed air, a high-pressure washer, or a brush.

Pre-clean by blowing with a compressed air nozzle outward from the engine side to remove larger particles possibly lodged between the cooler fins.

Wash, if needed, after cleaning with compressed air. Let the radiators dry thoroughly before using the machine. Dry possible water from the casings and crevices after washing to make sure that residue water in the structures does not wet the dust that later gathers on the radiator causing even worse clogging.

Cooler cores, electric powered shredders





Hydraulic oil cooler (1)

Transmission oil cooler (2)

Pre-filter (3)

The hinged air guide in front of the coolers is fitted with a cleanable pre-cleaner which reduces the amount of dust and dirt entering the Cooler cores. Clean the pre-cleaner with compressed air, a high-pressure washer, or a brush.

Cleaning the coolers

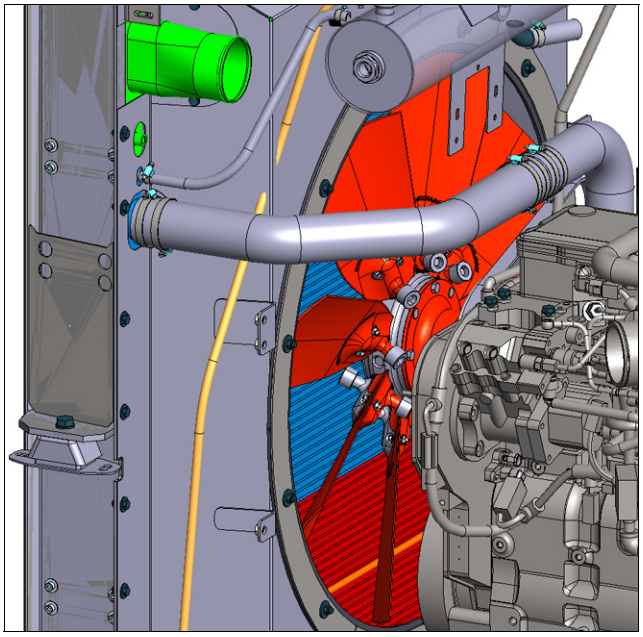
Clean the radiators with compressed air, a high-pressure washer, or a brush.

Pre-clean by blowing with a compressed air nozzle outward from the electric motors side to remove larger particles possibly lodged between the cooler fins.

Wash, if needed, after cleaning with compressed air. Let the radiators dry thoroughly before using the machine. Dry possible water from the casings and crevices after washing to make sure that residue water in the structures does not wet the dust that later gathers on the radiator causing even worse clogging.

☐ 5. Check the cooling fan blades and belts

Cooling fan blades and belts, diesel powered shredders



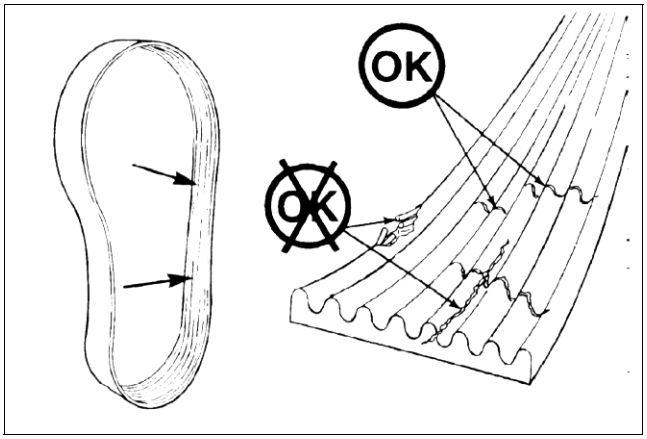
Blades

Check that the fan blades are not fractured, and that the blade mounting screws are not coming loose. A damaged fan must be replaced immediately.

NOTICE

Risk of machine breakdown.

Do not rotate the fan by pushing or pulling at a blade, as it may be damaged.



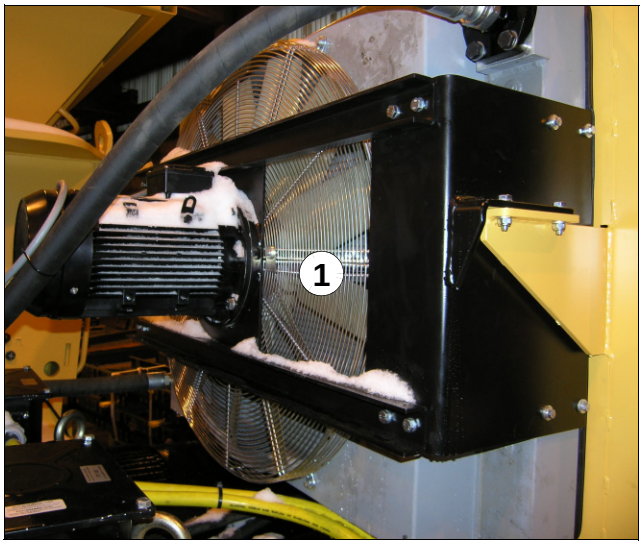
Belts

Check that all drive belts are free from defects, such as frays or cuts.

Replace damaged belts.

For additional information, see the Cummins manual.

Cooling fan blades, electric powered shredders



Blades

Check that the fan blades (1) are not fractured, and that the blade mounting screws are not coming loose.

Check that the electric motor fans (2) are intact.

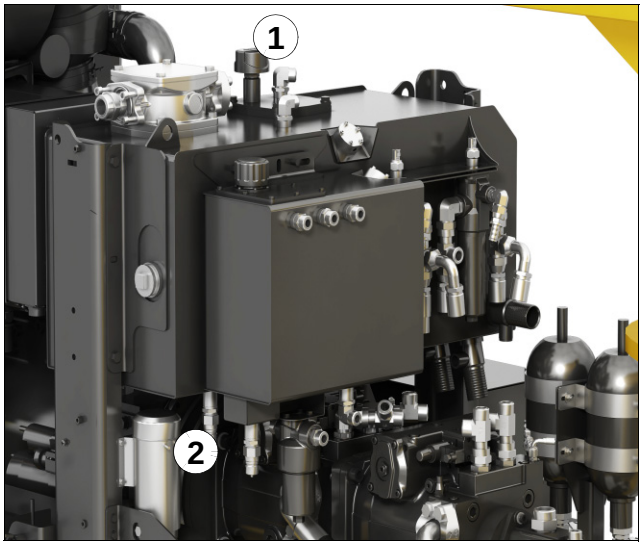
A damaged fan must be replaced immediately.

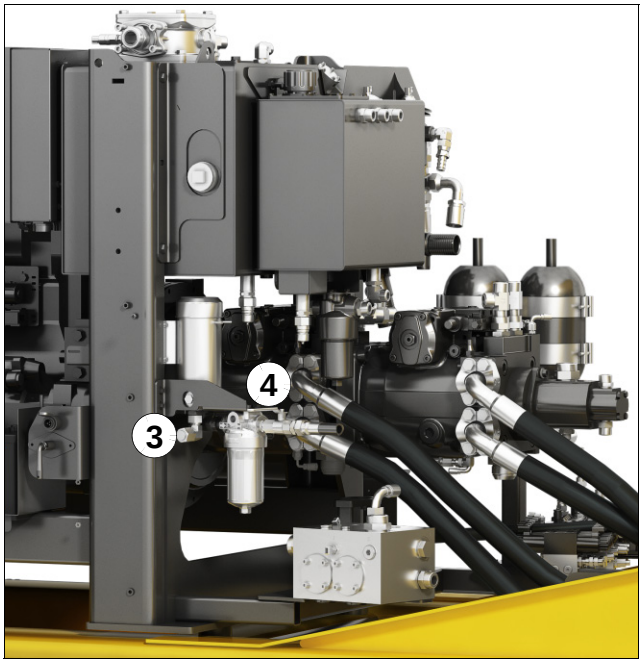
NOTICE

Risk of machine breakdown.

Do not rotate the fan by pushing or pulling at a blade, as it may be damaged.

☐ 6. Check the hydraulic oil level





The hydraulic oil tank is located in the engine compartment, above the pumps.

Inspection

- Check the hydraulic oil level using the bar on the screen when the machine is on a level surface and the oil is at the operating temperature. The oil level should be between 80 % (maximum) and 60 % (minimum).
- If the oil level is low, add the recommended grade of oil, using the filling pump installed on the machine. **See the oil recommendations at the end of the manual!**
- A breather (1) is fitted on top of the tank. If the area around the breather is wet from oil, the oil level in the tank may be too high. Drain the excess oil from the drain valve (2) at the bottom of the tank.

Filling

- Connect the clean suction hose, delivered with the machine, to the lower part of the pump (3) and insert the hose into the oil container.
- Open the refilling valve (4).
- The filling pump is started from the "START" button on the screen. The filling pump stops automatically when the tank fill level is 80 %. You can stop the pump by pressing the "STOP" button. Close the refilling valve.
- Operate the machine and re-check the oil level.
- Fill the hydraulic oil, if it is necessary.

☐ 7. Check the lights and control devices

Checking the lights and controls

The operation of the controls must be checked before work commences. If you detect any flaws in operation, do not operate the machine before the flaws have been corrected.

Check the alarm display log and establish that no alarms have remained active. If there are active alarms, identify the cause and take appropriate action immediately.

Inspect the general condition of the lights and the platform of the machine.

Check the support brakes in Shark 220D, 220Deco, 440D and 440Deco.

☐ 8. Inspect the hydraulic lines and components

Checking the hydraulic lines and components

Check the condition of the hydraulic hoses and components for possible leaks.

If oil leaks occur, they must be repaired immediately. Oil leaks can cause damage and create a fire hazard.

Use only original spare parts when replacing hoses, seals, and fittings, in order to ensure that they fit.

☐ 9. Check the counter knives, rotor knives, rotor, and sieve mesh

NOTICE

Shredder knife is a registered design (design patent D705281).

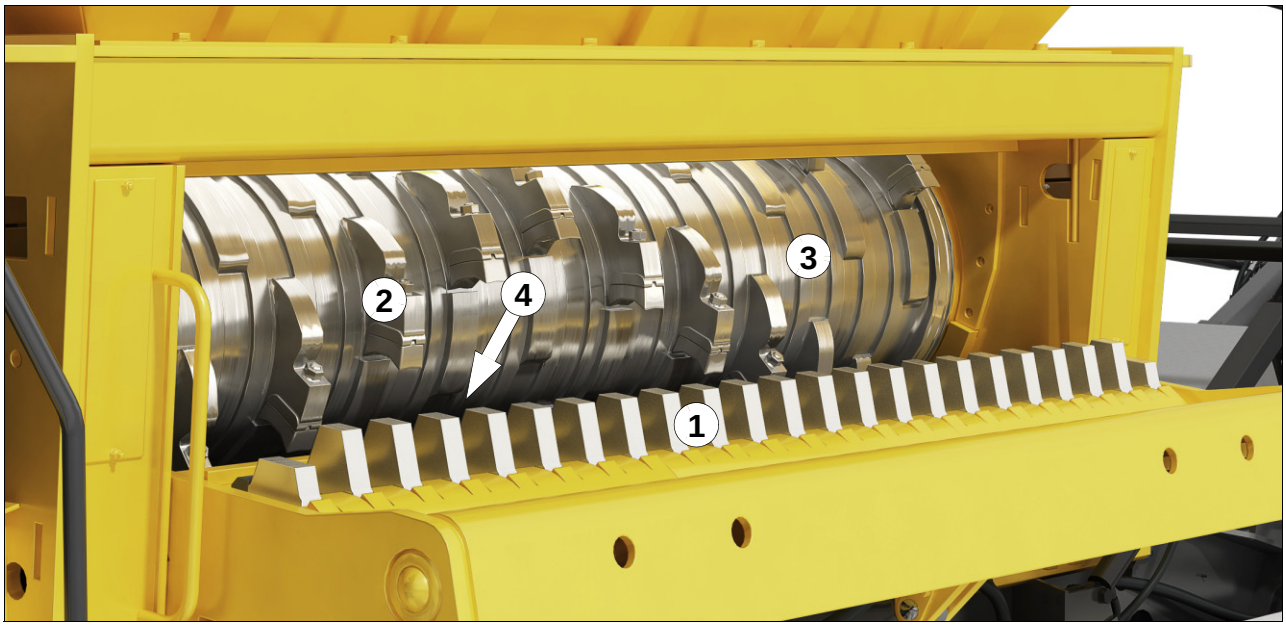
See additional information on knife service in the section titled “Wear part care”.

The counter knives (1), rotor knives (2), rotor (3), and sieve mesh (4) are subjected to heavy loads. A daily inspection is an important part of preventive maintenance. They should be inspected when non-crushable material is removed, also.

NOTICE

Risk of machine breakdown.

The rotors should be inspected during each break or at least daily. The inspection is aimed at minimising damage and wear and tear of the steel forceps if the knife is damaged.



Inspection of the counter knives rotor knives, rotor and sieve mesh.

- Unlock the counter wall and inspect the counter knives.
- Drive the counter wall open, and inspect the counter knives.
- Inspect the condition of the sieve mesh.
- Rotate the rotor, and check that the rotor knives are in the proper place.
- If the knives or sieve mesh require closer inspection, stop the engine, switch off the main power, and take the main switch key and the TANA key from the USB port with you when you go to inspect the knives or the sieve mesh.
- Replace possibly bent or damaged knives. Instructions for the knives replacement can be found on the following pages:
- Remove any wires and cables from around the rotor and from the rotor end plates.
- Tighten any loosened rotor knives' screws, tightening torque is 820 Nm (605 lb ft).
- Welding coating has been made on the rotor and saddle surfaces at the factory. The coatings are intended to protect the rotor surfaces, saddles and wearing parts. The wear of the coatings is to be monitored regularly during work. The coatings must be redone before they wear too much.
- If damage to the rotor is detected, inform the maintenance personnel immediately.

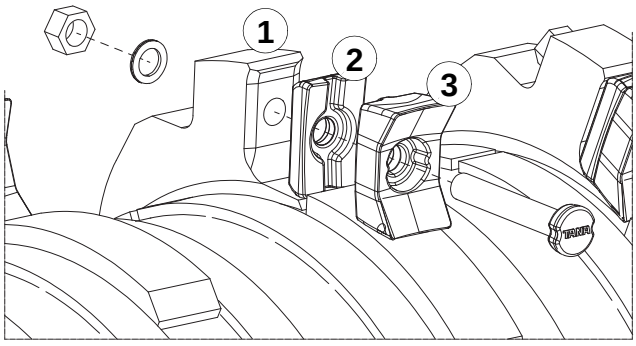
Avoid feeding wire ropes and cables into the machine. Also, avoid feeding any hard materials into the machine, as these damage the knives and strain the power transmission needlessly. Examples of hard materials are iron, stone, and concrete.

Use original knives suitable for the purpose of use. This reduces damage to the knives, rotor, and power transmission. Using a knife of the wrong shape could cause severe damage or impair the operation of the machine.

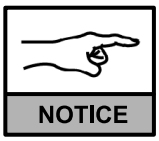
The knives should be turned or replaced when the machine’s output drops considerably and the size of the end product increases, which indicate that the points of the knives have become highly rounded (corner radius of approximately 5 mm (0.2 in.)) or that most of the knife points have been damaged and the guide edges have been torn away.

Turning / replacing the rotor knives

- Start up engine.
- With the operation mode selector switch, select the position for manual operation.
- Open the counter wall locking pins.
- Drive the counter wall all the way open.
- Rotate the rotor so that the knives are readily accessible.
- Stop the engine, switch off the main power, and take the main switch key with you when you climb on top of the counter wall.



- Open the rotor retaining screw and detach the blade. There is a counter piece (2) between the rotor's saddle (1) and blade (3).
- Check that the blade's counter piece is intact.
- If the knife has come off and the counterpart has been damaged, the counter piece should be replaced. The counter piece is attached by welding it to the rotor's saddle. Damaged counted pieces cannot be welded and sharpened, but it must be replaced.
- If the knife is still fit for use, it can be turned and mounted again.
- **Carefully clean the fixing area of the blade and the counter wall of all impurities, corrosion and hardening residue.**
- Install the knife and ensure that the nut, screw and the washer are still fit for use. Tighten the screw to 820 Nm (605 lb ft). Always install the new knife with a new screw, new nut and new washer.



Risk of machine breakdown.

Blades fixing may become loose in operation after the installation and cause damage to the machine.

Remember to retighten the knives after 3-5 hours!

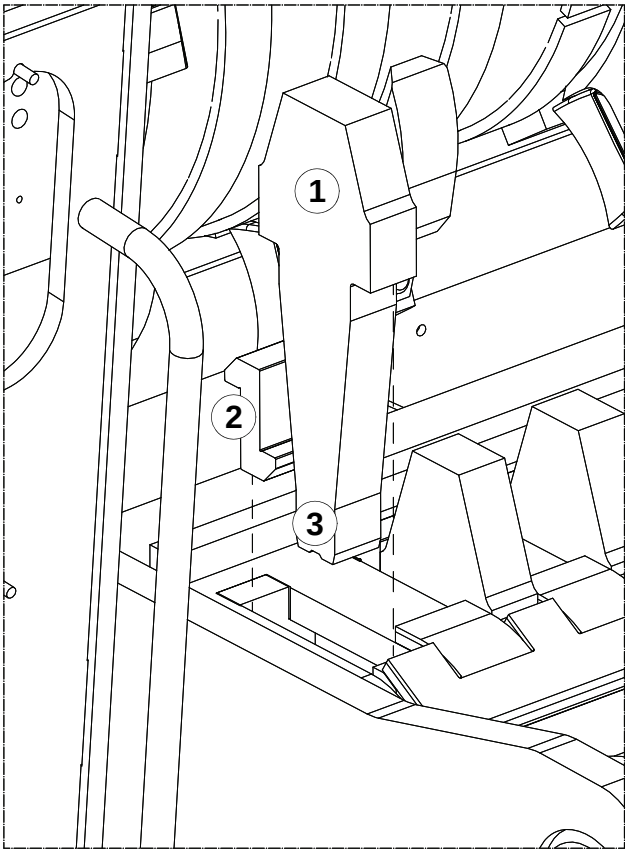
- Inspect all rotor knives, rotating the rotor as necessary. **When you are rotating the rotor, make sure that no person is near the rotor.**
- If the knives are damaged – i.e., if the guide edges have been torn or otherwise twisted – replace the knives with new ones.
- When all knives have been turned or replaced, start the engine. Close the counter wall, and lock the counter wall locking pins.
- Rotate the rotor using manual drive for a few rotations. Ensure that the rotor rotates freely in relation to the counter knives.
- The rotor is now ready for production use.

Turning / replacing the counter knives

It is recommendable to check and service the counter knives at the same time as the rotor knives.

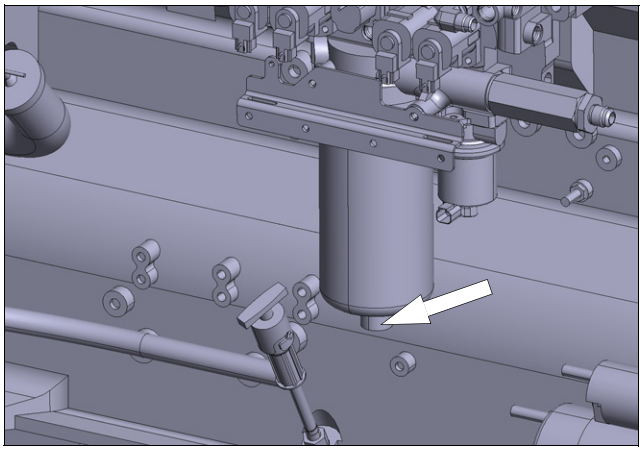
The counter knives should be turned or replaced when their edges and points have become highly rounded (corner radius of approximately 5 mm (0.2 in.)) or if large parts of the points have broken off.

The counter knives are turned/replaced according to the following principle.

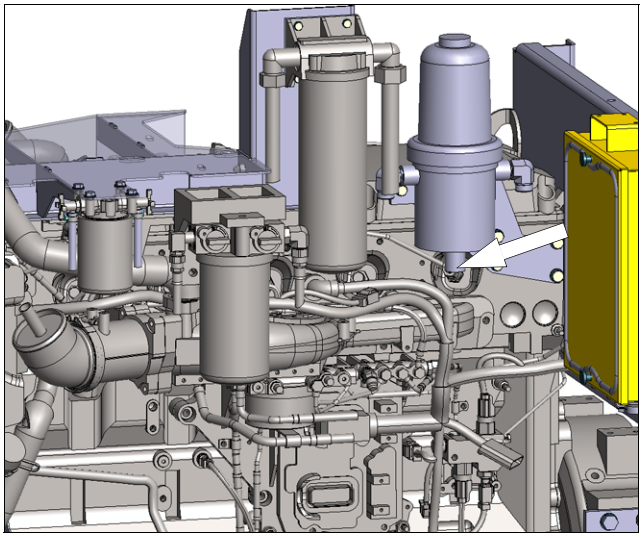


- Lift the counter knife (1) up from the guiding pocket (2). A jammed knife can be struck with a sledge hammer onto the end of the counter knife (3) when the counter wall is slightly ajar. The counter knife's end will become visible on the outside of the counter wall.
- Turn the knife or replace it with a new one, and press it back into the guiding pocket. Ensure that the knife base and the guiding pocket are clean. Also ensure that the guiding pocket is intact and clean.
- When the knives have been checked, close the counter wall.
- Using manual drive, check that the rotor rotates freely in relation to the counter knives.
- The shredder is now ready for production use.

☐ 10. Drain water from the water separator (only diesel powered shredders)



Shark 220D, 440D, 220DT and 440DT



Shark 220Deco, 440Deco, 220DTeco and 440DTeco

Fire hazard.

Fuel leaking or splashing onto hot surfaces or electrical components can cause a fire hazard.

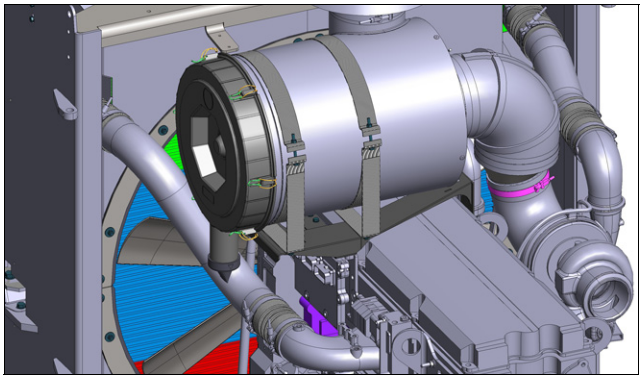
Handle fuel with utmost care and caution.

Draining water from the water separator

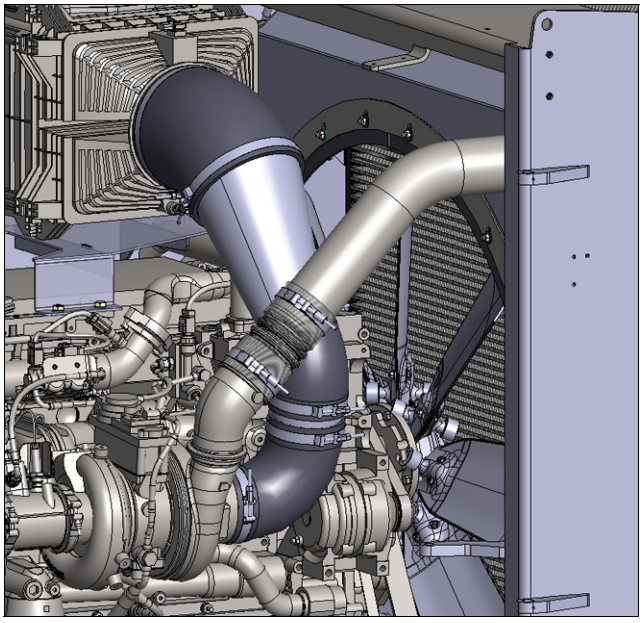
The water separator is located in the fuel filter on the left-hand side of the engine.

- Shark 220D, 440D, 220DT and 440DT: Open the valve (1) at the bottom of the fuel filter so that the valve drops down by approximately 2 - 3 cm (0.8-1.2 in.).
- Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Open the valve at the bottom of the fuel filter.
- Drain the fuel until it is clear. Collect draining water / fuel into an appropriate receptacle.
- **Close the valve until finger tight.**

☐ 11. Check engine intake air system (only diesel powered shredders)



Shark 220D, 440D, 220DT and 440DT



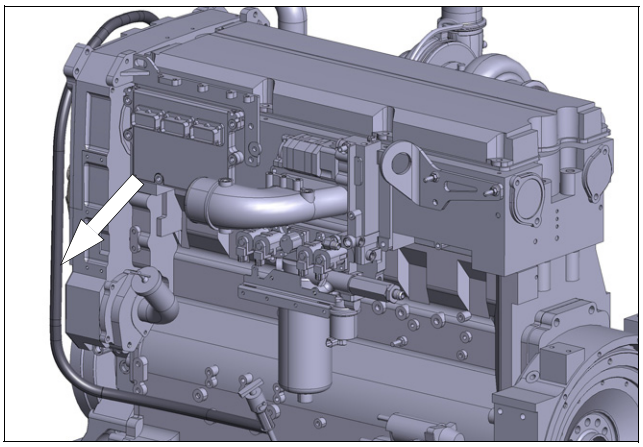
Shark 220Deco, 440Deco, 220DTeco and 440DTeco

Inspecting the engine intake air system

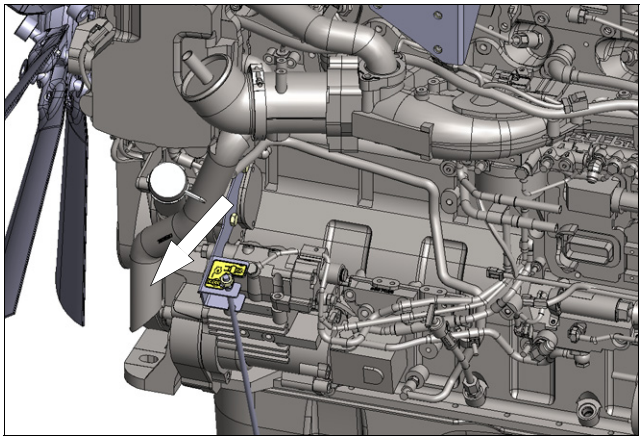
Check the intake air system daily and tighten any loose connections immediately. In addition, replace any damaged hoses, pipes, and hose clamps. Take care that no corrosion is formed in the hose and pipe connections.

Pay special attention to the conical pipe and its retaining clamps located between the air filter and turbocharger. Replace damaged components immediately since impurities in the air intake system are especially dangerous to the engine.

☐ 12. Check the crankcase breather pipe (only diesel powered shredders)



Shark 220D, 440D, 220DT and 440DT



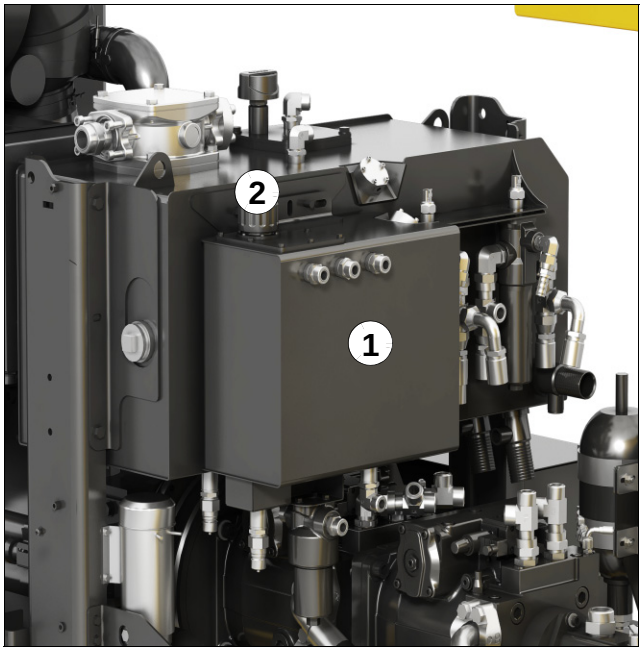
Shark 220Deco, 440Deco, 220DTeco and 440DTeco

Checking the crankcase breather pipe

If the machine is operated in cold conditions, check the crankcase breather pipe daily since ice build-up in the pipe can clog the pipe.

If ice has formed, remove the breather pipe if needed and remove the ice build-up.

☐ 13. Check the transmission oil level



Checking the transmission oil level

The transmission oil tank (1) is located in the engine compartment, next to the hydraulic oil tank.

Check the transmission oil level using the bar on the screen when the machine is on a level surface and the oil is at the operating temperature.

If the oil level is low, add the recommended grade of oil via the filling cap (2). See the oil recommendations at the end of the manual.

☐ 14. Clean the conveyor belt

The model of the conveyor depends on the machine. All machines do not have conveyors. The conveyor belt must be cleaned and inspected daily, and all defects discovered must be rectified as soon as possible. During inspection and cleaning, the conveyor belt must be stopped and empty.

Risk of entanglement.

Touching the moving conveyor could case serious injuries.

Never touch the conveyor belt when it is moving. Never try to remove any material from the conveyor belt when it is moving.

Conveyor cleaning

Clean the conveyor belt of shredded material.

Check that there is no shredded material in places where it could cause problems. Such places are, for example, the gap between the conveyor belt rolls and the belt as well as the gap between the belt and the conveyor's sides and the surfaces of drive and idler drums.

Clean the roller stands and the rolls of any accumulated material. Excess material may prevent the rolls from rolling or deflect the belt from the middle.

If the material includes wires or springs, perform the inspection and cleaning more often.

☐ 15. Check the support of the machine and the surface underneath it

Checking the machine supports and base

Clean up the surroundings of the machine, and remove material that has accumulated under the machine. Check that the ground under the machine can support the load.

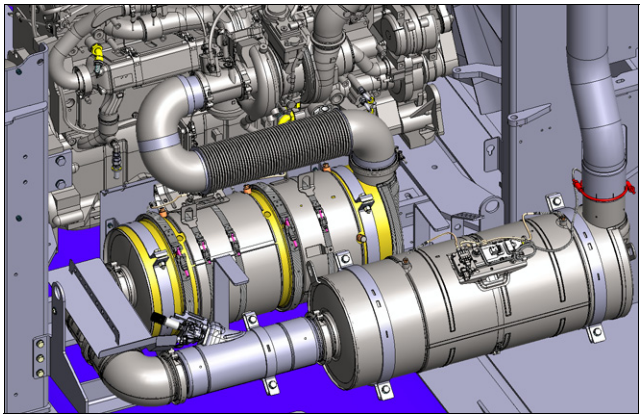
Check the ground supports in Shark 220D, 220Deco, 440D and 440Deco. Check that the ground supports are solidly in place and that the machine has not sunk. Check that the ground under the ground supports can support the load. If the surface is not hard, place load-bearing plates under the ground supports.

Check that the machine is in a level orientation on the work site. If the surface is icy or otherwise slippery, sand must be used.

☐ 16. Check the aftertreatment exhaust piping (only eco-models)

Risk of burns.

Diesel engine exhaust after-treatment system has components that are extremely hot during and after the use of the machine. Avoid contact with hot surfaces since they can cause skin damage. Be particularly careful when servicing these areas. Keep tidy the surroundings of the exhaust after-treatment system.



Checking the aftertreatment exhaust piping

Check the aftertreatment exhaust piping for leaks, cracks and loose connections. Tighten loose connections and repair any leaks and cracks.

Clean the debris and dirt from the aftertreatment exhaust system vicinity.

☐ 17. Check the operation of central lubrication system (optional) pumping unit

Check the operation of central lubrication system (optional) pumping unit. Check that the lubrication lines pressurization works and that the alarm lights are not lit in the pumping unit.

7.3. Starting the motor

At the beginning of each work shift, perform the daily maintenance for the machine and ensure that it is in faultless condition and that there are no inappropriate objects near the rotating parts or touching them. Checking helps prevent large-scale repairs later.

Also check that all doors, covers, and housings are locked and correctly in place.

Danger of bodily injury.

Operating the machine during maintenance and repair could cause death or serious injuries.

Do not start the engine or shift any controls if a sign ‘Do not operate’ or similar warning is attached to the machine, or if, for example, maintenance is being performed on the equipment.

Diesel powered shredders: Toxic gases hazard.

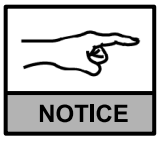
Diesel engine fumes pose dangerous health risk and could cause death or serious injuries.

Run the diesel engine only in well ventilated areas. If the engine is used indoors, the exhaust gases must be directed out.

Start-up

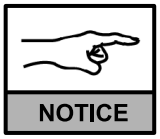
- If the ambient temperature is below +6°C (+42°F), ensure sufficient pre-heating of the diesel engine. Use optional diesel engine and hydraulic oil heaters.
- Turn the machine on using the main switch.
- Make sure that all control switches are in the neutral position.

- Insert the TANA key into the USB port (1). When the Start/stop button (2) is pressed and is kept pressed, the power is switched on and an alarm sounds (2 seconds) and the diesel engine / electric motors start. The diesel engine control unit automatically detects the outside circumstances and adjusts the air-fuel mixture accordingly. If the diesel engine does not start within 10 seconds, the starting attempt is interrupted. Wait for two minutes before the next attempt. When the Start/stop button is pressed while the engine is running, the engine shuts down and the power is switched off.
- In the electric powered machines the electric motors start one after another; first motor 1 and then motor 2.



Diesel powered shredders: Risk of machine breakdown.

The engine oil pressure must reach its normal level within 15 seconds from start-up. If the system issues an alarm on low oil pressure after the said period, turn of the engine immediately and check the motor oil level.

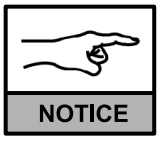


Diesel powered shredders: Risk of machine breakdown.

Do not use the starter motor when the flywheel is rotating.

Diesel engine warm up running (only diesel powered shredders)

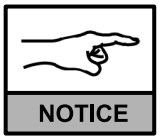
Let the engine idle at a low speed (approximately 900 rpm) after start-up in temperatures below 0°C (+32°F) for 15 minutes and in temperatures over 0°C (+32°F) for 3 - 5 minutes. The turbocharger can be damaged if the engine speed is increased before lubrication has properly started. For more information, refer to the Cummins instruction manual.



Risk of machine breakdown.

An engine that has reached its operation temperature should not be allowed to idle for long periods. The temperature in the combustion chambers can drop so low that the engine may be damaged.

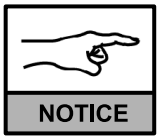
Always stop the engine when leaving the machine!



Risk of machine breakdown.

Do not place load on a cold engine.

Warming up the oil for the driving hydraulics



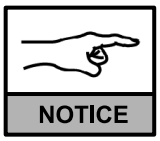
Risk of machine breakdown.

Always use the electrical hydraulic oil heaters when the temperature is below 0 ºC (+32 °F).

After a cold start, the oil in the hydraulic pumps and tank is cold.

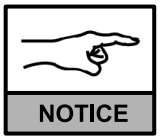
Only diesel powered shredders: first run the diesel engine on idle according to the directions given on the previous page.

If the hydraulic oil temperature is below +20 °C (+68 °F) and the automatic operation mode is started with the green button, the machine starts automatic hydraulic oil warm up operation. When the automatic hydraulic oil warm up is on, material feeding into the machine is not allowed. When the hydraulic oil temperature reaches +20 °C (+68 °F), the machine will automatically start operation with the selected program mode. When the automatic hydraulic oil warm up is on, the machines main display shows letter ´H´.



Risk of machine breakdown.

Neglecting to carefully warm the hydraulic oil damages the components in the hydraulic system.



Risk of machine breakdown.

When the engine starts, the following alarm may be displayed:

- **Hydraulic oil too cold.**

The alarm will disappear after a while. Should this not happen, contact the service department.

7.4. Driving a track-platform machine on tracks using remote control (only Shark 220DT, 220DTeco, 440DT and 440DTeco)

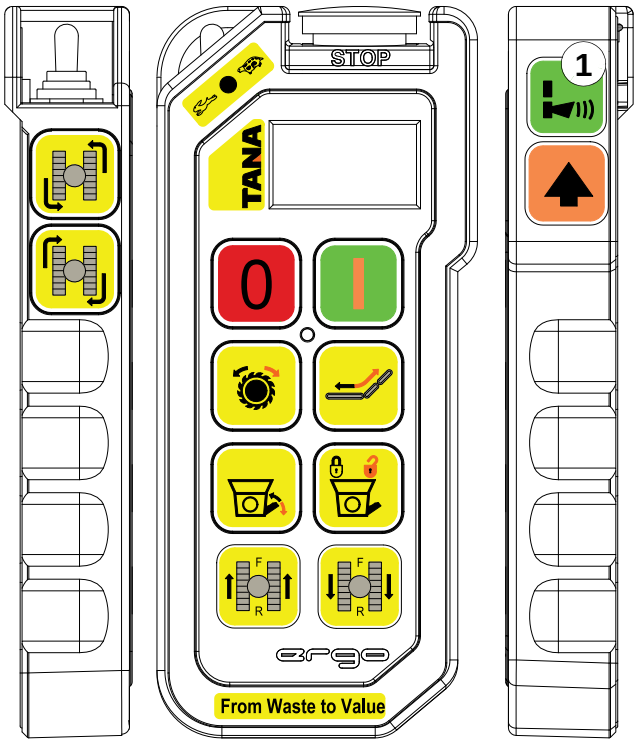
Driving a track-platform machine on tracks is done using the remote controller. When the machine is driven using the tracks, all hatches must be closed. The machine cannot be driven on tracks when the automatic drive is engaged.

WARNING

Danger of bodily injury.

Staying near the machine when it is moving could cause death or serious injuries.

When the track-platform machine is manoeuvred using a remote control, the remote control operator must maintain a distance of a minimum of 10 metres (400 in.). Other persons must stay at a minimum distance of 20 metres (800 in.) from the machine.



Driving your vehicle

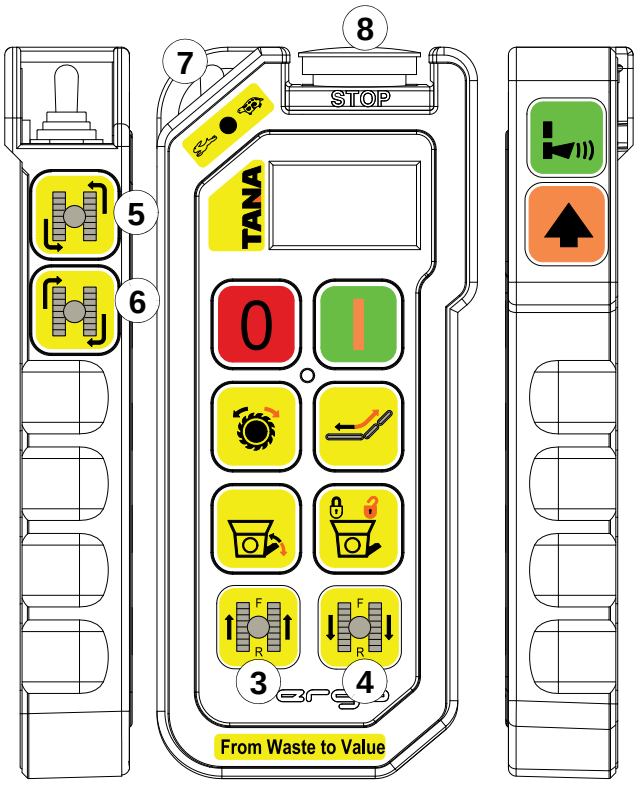
Turn the machine on using the main switch.

Make sure that all control switches are in the neutral position.

Start up engine.

Complete the warming up of the motor and the hydraulics in accordance with the specified instructions.

Turn the remote controller on by pressing the remote controller start button (1).



Turn the operating mode switch (2) to the operation with remote controller. The selection window of the operation mode is displayed.

The machine's tracks are operated by pressing buttons (3), (4), (5) and (6). The tracks' rotation speed can be adjusted using a switch (7).

Exercise special care when driving the machine on the tracks. In an emergency press the emergency stop button (8), which turns off the engine power and shuts the machine off.

If work is not to be continued with the machine after driving using the tracks, turn the operating mode switch (2) to the 0 position on the control panel. Press the remote controller's off button (8). Now the remote controller is switched off.

Let the engine idle for 3–5 minutes after loading to let the temperature differences even out in the engine.

Stop the engine by pressing the Start/stop button (9).

Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Keep the power switched on the main switch for at least 70 seconds after stopping the engine, in order to diesel exhaust fluid pump gets drained and vented the system.

Turn the machine off using the main switch.

7.5. Driving a track-platform machine on tracks using display (only Shark 220DT, 220DTeco, 440DT and 440DTeco)

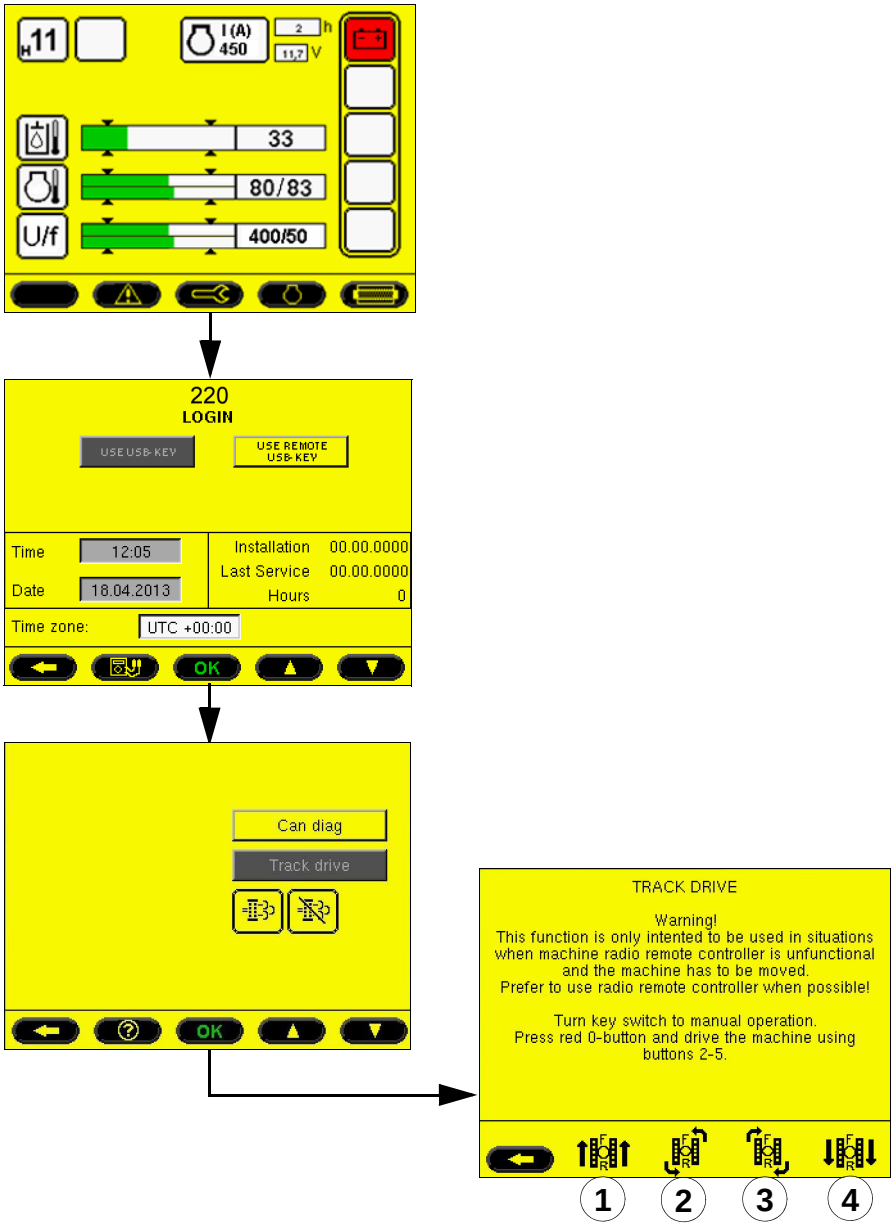
Driving a track-platform machine on tracks by using the display should only be done in case the remote controller is lost or damaged. When the machine is driven on tracks, all hatches must be closed. The machine cannot be driven on tracks when the automatic drive is engaged.

WARNING

Danger of bodily injury.

Staying near the machine when it is moving could cause death or serious injuries.

When driving a track-platform machine on tracks by using the display, visibility in front, back and right side of the machine is poor. Because of that, another person must be available to make sure that the machine can be moved safely. Other persons must stay at a minimum distance of 20 metres (800 in.) from the machine.



1. **Driving the tracks forwards**
2. **Turning the machine to the left**
3. **Turning the machine to the right**
4. **Driving the tracks backwards**

Driving the tracks

- Enter the Login display and press “OK”. Select “Track drive” and press “OK”. Read the warning text on the track drive window before moving the shredder.
- Turn the operation mode selector switch (5) to the manual operation position.

- Press the automatic operation start/stop switch “red” button (6) and hold it down with one hand. Simultaneously use track control buttons on the display to drive the machine forward, backward, left or right.
- When the machine is moved to the desired location, continue working or stop the engine.

7.6. Folding the conveyor to work position and transport position

The model of the conveyor depends on the machine. All machines do not have conveyors.

The conveyor belt is articulated from two points. Folding of the conveyor belt into the work position and transport position is hydraulically driven. It is controlled with the control switches on the left-hand side of the machine. The engine must be running during the folding of the conveyor.

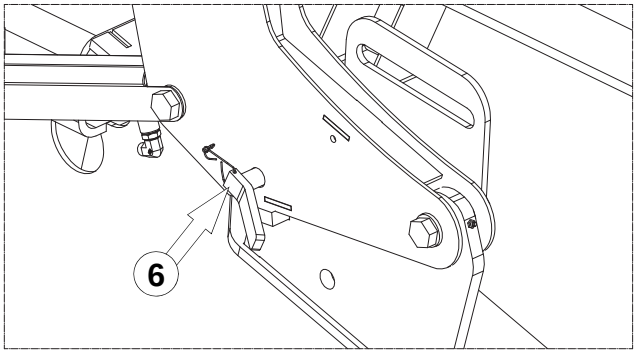
CAUTION

Risk of machine breakdown.

If machine if moved with the conveyor in open position, the machine could be damaged.

When the machine is being transported or moved, the conveyor belt must be in the transport position.

1. Conveyor joint 1
2. Conveyor joint 2
3. Conveyor joint 1 operating switch
4. Conveyor joint 2 operating switch
5. Change-over switch



6. Conveyor locking pin for transportation

Preparing the conveyor belt for operation

- Remove the conveyor locking pin.
- Turn the operation mode selector switch to the manual operation position.
- Open joint 1 fully by turning the joint 1 control switch to the right.
- Open joint 2 fully by turning the joint 2 control switch to the right.
- Check that the conveyor belt is fully opened and that the supporting chains are tight.
- Drive the conveyor belt in the discharge direction for approximately half a minute so that the belt settles into its place after transport. Check that the magnet belt starts to rotate simultaneously with the conveyor belt.

Danger of bodily injury.

Material fragments may fly from the conveyor causing serious injuries.

Before driving the conveyor belt, check that there is no-one near it. The danger zone is 10 m (400 in.).

Folding the conveyor belt into the transport position

- Stop the conveyor belt, and check that it is empty.
- Turn the operation mode selector switch to the manual operation position.
- Close joint 2 fully by turning the joint 2 control switch to the left.
- Close joint 1 fully by turning the joint 1 control switch to the left.
- Before transport, ensure that the conveyor belt is in the proper transport position.
- Use the locking pin to secure the conveyor for transport.

Danger of bodily injury.

Before folding the conveyor, check that there is no-one near the conveyor.

7.7. Operation

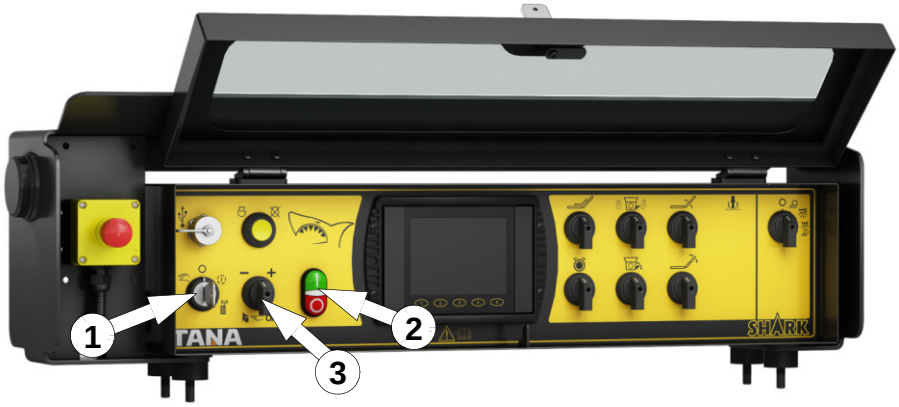
Danger of bodily injury.

Staying near the machine in operation could cause death or serious injuries. Do not approach the machine while machine is in operation. Minimum allowed distance from the machine in operation is 10 m (400 in.)!

When machine is in operation, the danger zone can be entered only in the following circumstances:

WARNING

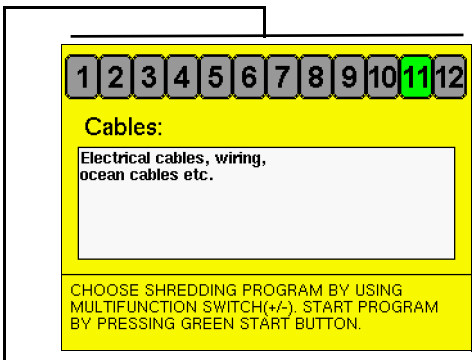
- **One trained professional is allowed to enter to operate the control panel. Control panel must be accessed through the front of the machine staining as far from the rotor as possible when the shredder is in operation. When machine is in operation, avoid unnecessary access to the control panel. Wear personal protective gear, such as hard hat, protective goggles, protective boots and protective gloves, respiration protection, when necessary, and hearing protection if engine is idling high.**
- **Trained professional can also enter the danger zone to replace the sieve or for inspection when material is not being crashed. Use extreme caution when replacing the sieve and during the inspection.**
- **In addition, it is allowed to access the danger zone on a loader to feed shredding material into the machine funnel. Loader cab must be protected and closed, and the loader must be protected from dust.**



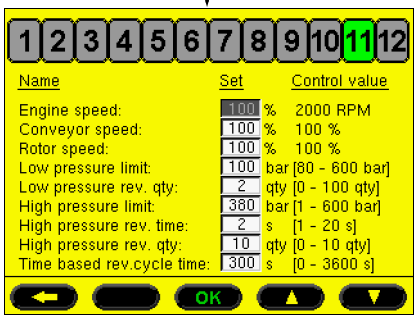
You can start the work when the engine and the hydraulic oil have warmed sufficiently. It is recommendable to facilitate hydraulic oil warming by driving the rotor and the conveyor using manual drive.

- Choose the desired operating mode from the operating mode switch (1) (manual, automatic or remote-access (optional in Shark 220D, 220Deco, 440D, 440Deco, 220E and 440E machines)).
- The flashing beacon on the top front part of the machine indicate when operation starts, and remain lit throughout active operation. The beacon begin to flash as soon as the operation mode switch (1) is turned to a position other than 0 position.

- When automatic operation is selected, the programming mode selection window is automatically displayed. Different programming modes can be selected for different materials. The programming mode determines, e.g. the engine running speed (the electric motors of 220E and 440E models run at constant speeds) and the rotor rotation speed. The active mode is displayed in green. The desired programming mode is selected with the multi-use switch (3).



Selection window of the programming mode



Adjustable settings for the programming modes 1 - 12

- The selected settings of the programming modes can be adjusted by holding the multi-switch (3) down for 2 seconds. Programming modes 1 - 12 have nine adjustable settings. If the programming mode setting is being modified, an exclamation mark will appear in the upper left-hand corner of the programming mode number box. When necessary, please contact TANA OY service for setting change.
- To start or stop automatic operation, use the automatic operation start/stop switch (2). When the automatic operating mode is selected, the green button (1) starts automatic operation and the red button (0) stops it. If the hydraulic oil temperature is below +20 °C (+68 °F) and the automatic operation mode is started with the green button, the machine starts automatic hydraulic oil warm up operation. When the automatic hydraulic oil warm up is on, material feeding into the machine is not allowed. When the hydraulic oil temperature reaches +20 °C (+68 °F), the machine will automatically start operation with the selected program mode. When the automatic hydraulic oil warm up is on, the machines main display shows letter ´H´.

- To be able to use the remote control to run the machine, the remote control must be switched on before the operation mode switch is turned to the remote control position. Switch the remote control on. Then turn the operation mode switch to the remote control position. Start automatic operation by pressing the remote control buttons 15 and 2 simultaneously (press first button 15). Automatic operation is stopped by pressing the red button “0” on the remote control, or by pressing the red button “0” on the control panel. You can return from the operation mode display to the main display by pressing the red “0” button on the remote control. Manual operation functions work always when the remote control is selected.
- Ensure that the conveyor and the magnet start rotating immediately. If they do not, stop the machine.
- Charging can be started when the rotor and the conveyor belt are rotating.

The running direction, the work speed, and the power of the rotor are controlled automatically via the control system. The automatic adjustment of the driving hydraulics selects the highest suitable volume flow (speed).

Most damage that occurs during the service life of the machine does not happen without indications or warnings in advance. To reveal possible emerging damage, look and listen for possible changes in the behaviour or sound of the machine. Also browse through the alarm display daily and each time the machine sets off a new warning.

It is recommended to have an operator’s log in the cabin. All of the operator’s observations, any repairs, possible malfunctions, etc. are noted in this log. The operator's log enables finding the cause for faults that appear later.

Feeding material into the machine

The way the machine is fed is probably the most important factor affecting the machine’s capacity and durability.

The best feeding method is to use a material-handling machine equipped with a powerful even-lip, fully rotating material grapple and a rising cabin or with the machine located such that the driver can see the rotor. Alternatively, visual contact can be provided with a mirror.

Before commencing operation, the material-handling machine’s driver must become familiar with the dimensions of the funnel in the material feed opening and the rotor’s distance from the funnel.

The material-handling machine bucket or grapple could hit the rotor during charging and become damaged if it is lowered into the material feed opening funnel.

The machine operates at its best when loading of material is not excessive. Material should be distributed along the entire length of the rotor. The material-handling machine’s driver should place materials of different sizes in a manner facilitating their entry into the feeding opening.

The material should ‘boil’ in the feed funnel. If the material does not move in the feed funnel, it may have formed an arch above the rotor. Even easily fed material can form an arch if the funnel is filled to the top. A plate-type object on top of the rotor may also block the flow of material into the shredder.

If possible, pre-crush objects of difficult shape with the material-handling grapple.

If the material to be handled in the machine is challenging, avoid using a wheel loader for loading. Challenging materials include large tree stumps, big plastic containers, plywood, and sheet metal.

Municipal waste, biodegradable waste, blocks of wood, demolition wood waste, and bark can be loaded without problems by means of a wheel loader.

Risk of machine breakdown.

Feeding into the machine prohibited materials can cause damage to the machine.

Do not use the machine for stone, metals, earth-mover tyres, chains, wire ropes, or non-crushable material.

Danger of bodily injury.

Removing materials from the machine while machine is in operation could cause death or serious injuries.

It is not permitted to remove any processing material from the machine while it is in operation. If the machine becomes clogged, stop the machine and remove the jam. Never try to remove the jam while the machine is in operation.

Coarse and normal shredding

The quantity and model of the counter knives, as well as different kinds of sieves, can be used to affect the size of the end product the machine produces. In normal shredding, all counter knives are in place.

Coarse shredding

When a slightly coarser final product regarding its size is desired, a half knife can be used in place of the counter knife. Its cutting surface is half of the normal counter knife.

7.8. Stopping the engine

- Stop operation and move the operating mode switch (1) to the neutral position.
- **Only diesel powered shredders: Run the diesel engine on idle for 3 to 5 minutes after loading so that the temperatures in the engine can become even.**
- Stop the engine by pressing the Start/stop button (2).
- Shark 220Deco, 440Deco, 220DTeco and 440DTeco: Keep the power switched on the main switch for at least 70 seconds after stopping the engine, in order to diesel exhaust fluid pump gets drained and vented the system.

WARNING

Risk of bodily injury and machine breakdown.

If the machine is parked for a longer time (over 2 hours), switch off the power from the main switch. Leaving the main switch on will eventually drain the batteries. It is also important that the main power is switched off in the unattended machine for safety reasons.

Never turn the main switch off while the engine is running. Turning the main switch off while the engine is running will damage the battery charging generator and the control system.

7.9. Diesel engine preliminary run (only diesel powered shredders)

Proper operation and servicing of the engine are key factors in obtaining the greatest possible service life and cost-effectiveness.

The first hundred hours of operation are crucial to achieving a long service life for the engine and its parts. While the engine has been test run at the factory, more operation hours are required for the parts to settle into ideal position and for suitable clearances for the lubrication films to form.

1. Whenever possible, operate the engine at reduced output.
2. Avoid idling the engine.
3. Monitor the gauges and alarm lights closely during operation, and remember the normal readings of the gauges.
4. Strictly follow the instructions in this manual and in the Cummins manual.

7.10. Running the machine in

During the first 50 hours of operation, avoid difficult materials that may stress the transmission. Observe carefully the oil levels, temperature readings on the display, and alarms.

7.11. Engaging and disengaging the belt magnet

All machines do not have belt magnets (optional).

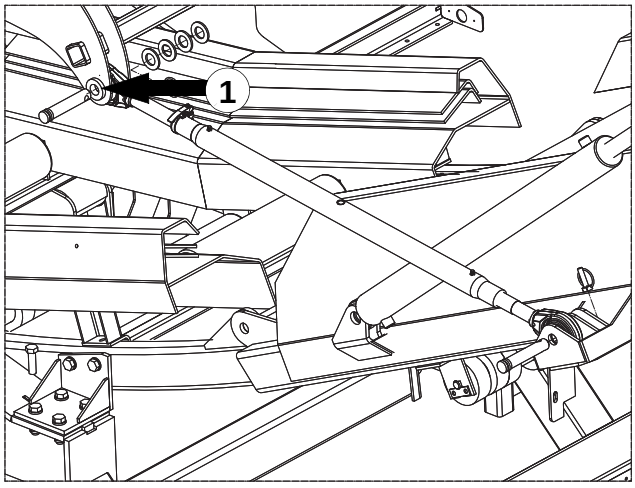
If use of the belt magnet is not required – i.e., if the iron is not to be removed from the material to be shredded or if there is a danger of the material becoming stuck to the magnet – the magnet must be disengaged.

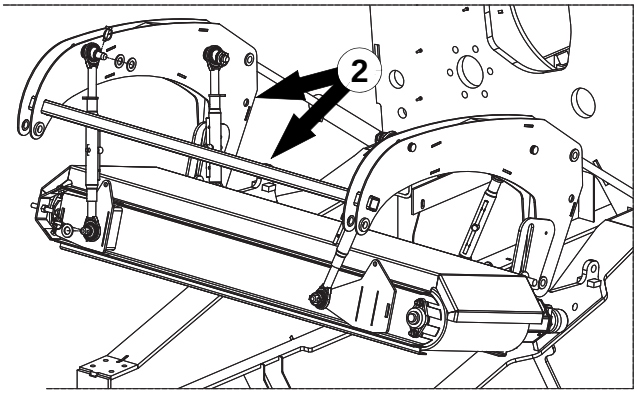
The belt magnet is equipped with selection mechanisms enabling it to be disengaged and engaged easily.

Disengaging the belt magnet

Mechanically, the belt magnet is disengaged via the following procedure.

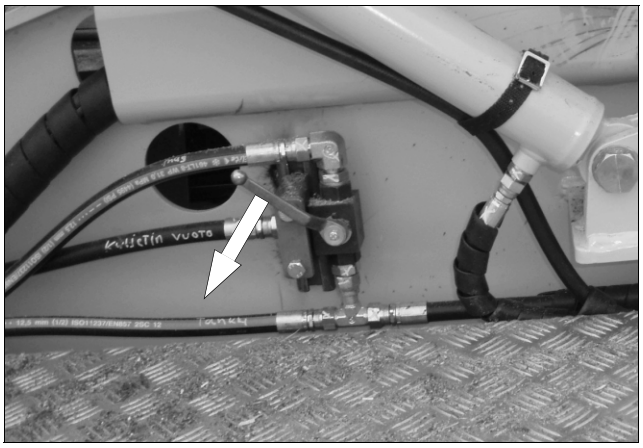
- Start up engine.
- Open the conveyor belt out into work position on the supporting chains.





- Select the manual operation position with the operation mode selector switch, and run the conveyor joint 1 back and forth so that the quick-release locking pins (1) can be removed. First remove the safety pins from the end of the locking pins.
- Run joint 1 up enough to place the quick-release locking pin at the operator’s side in the safety hole (2) when the belt magnet is up.
- Attach the safety pin to the locking pin in the above-mentioned safety hole.
- Insert the opposite side’s quick-release locking pin in the upper hole of the belt magnet, and insert the safety pin. This ensures that the locking pins stay with the machine when it is run without the belt magnet.

The belt magnet is now mechanically disengaged.



Hydraulically, the belt magnet is disengaged from the conveyor belt rotating line via the three-way valve. The valve is located on the right-hand side at the back end of the machine.

Turn the valve handle anticlockwise as far as you can.

The belt magnet is now hydraulically disengaged, too.

The shredder is now ready to be used in production without the belt magnet. By running the conveyor belt with manual drive, further ensure that the belt of the belt magnet does not rotate when the conveyor belt rotates.

Engaging the belt magnet for work

The belt magnet can easily be returned to operating position according to the following principle. The main conveyor belt must be in normal work position.

- Start up engine.
- Choose manual drive from the work mode switch and run joint 1 back and forth long enough to remove the locking pins (1). First remove the safety pins from the end of the locking pins.
- Run joint 1 down far enough to connect the conveyor belt support bars to the magnet frame with locking pins.
- Remove the safety pin from the other side, and remove the locking pin.
- Connect the support bars for both sides to the magnet frame with the locking pins.
- Attach the safety pins to the end of the locking pins.

The belt magnet is now mechanically engaged for normal operation.

Hydraulically, the magnet is connected to the conveyor belt rotating line via the three-way valve.

Turn the valve handle clockwise as far as you can.

By running the conveyor belt with manual drive, further ensure that the belt magnet rotates appropriately.

7.12. Installing and removing the sieve

Various sieves are available to accommodate different purposes of use and end product needs. One sieve weighs approximately 200 kg (440 lb.). When lifting a sieve, use appropriate, sufficiently strong lifting equipment.

Danger of bodily injury.

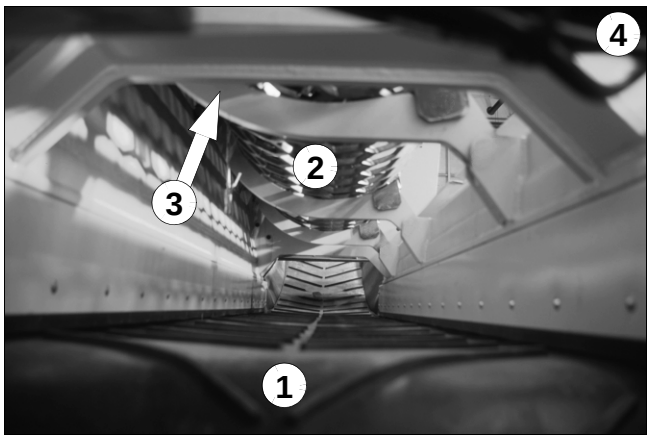
One sieve weighs approximately 200 kg (440 lb.). Improper method of installation could cause serious injuries.

The sieve must be installed by a professional and trained person. Follow the instructions given when installing.

Danger of bodily injury.

Running the machine during maintenance could cause death or serious injuries.

When someone is moving on the machine, the engine must always remain stopped and the main power switched off. For safety reasons, it is recommendable to take the key of the main power switch with you when working on the machine.



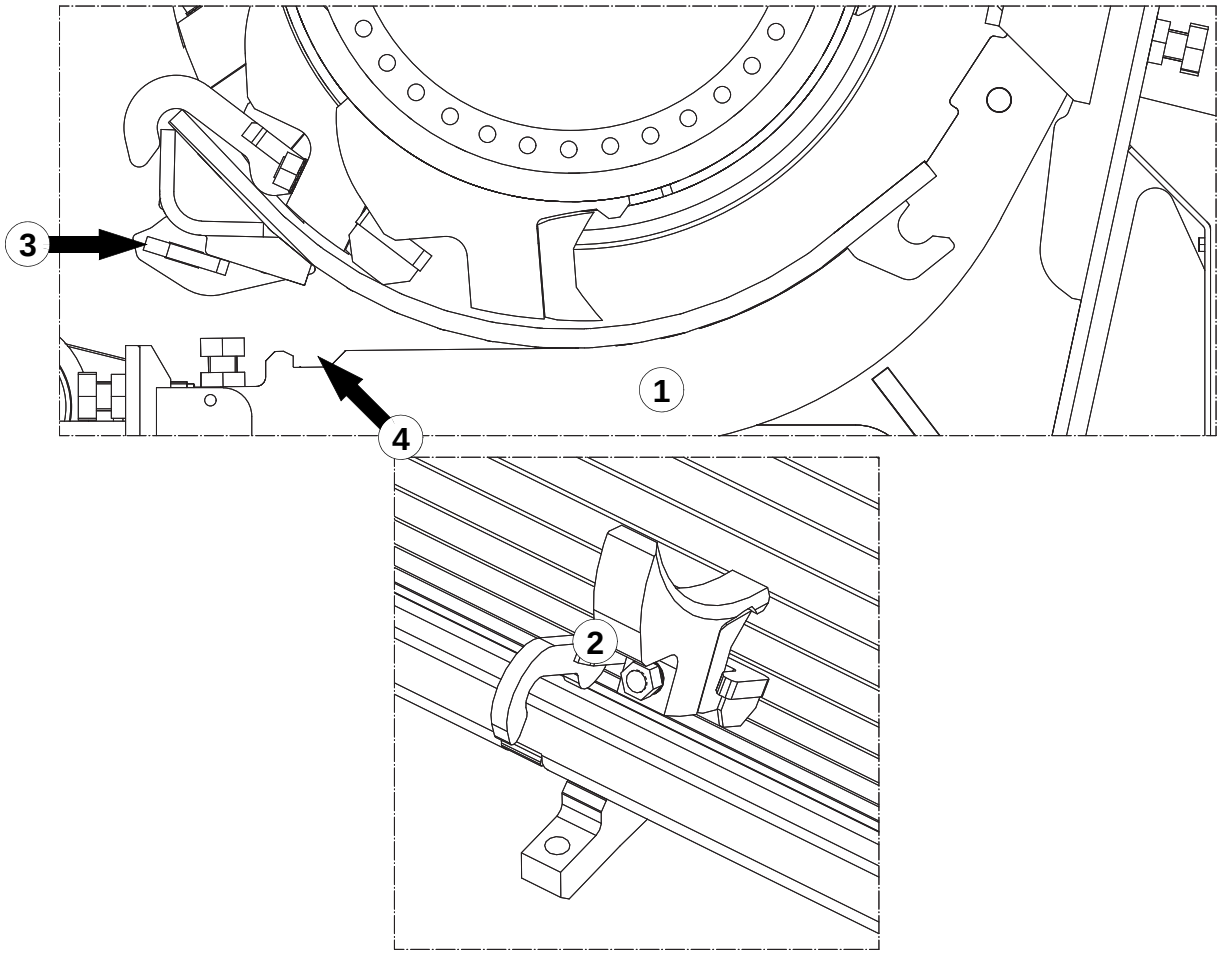
1. Conveyor belt
2. Sieve
3. Sieve supporting arch (3 pcs.)
4. Counter wall

In order to facilitate installation and provide load support, there are support ears at the support brackets of the sieve and guide pins at the ends of the plate.

Three sieve supporting arches have been mounted onto the shredder frame. The sieve supporting arch (sieve arch) weighs approximately 38 kg (84 lb.) each.

The sieve is installed on the supporting arches. From the other end, the sieve is supported by the clasps on the supporting arches, and from the side of the counter wall, it is supported by the clasps on the counter wall.

Installing the sieve on the machine



- Open the counter wall locking pins and the counter wall.
- Lift the sieve plate with a two-leg lifting chain over the opened counter wall and as far under the rotor as possible. For lifting, use a crane, forklift, or excavator.
- Push the sieve on top of the sieve arches (1). When the sieve plate is far enough under the rotor that it cannot slip back outward, remove the lifting chain.
- Place the sieve installation/removal tool (2) next to the middle sieve arch.
- Run the rotor slowly so that the blade catches the hook on the installation tool, and keep it turning until the sieve is in place.

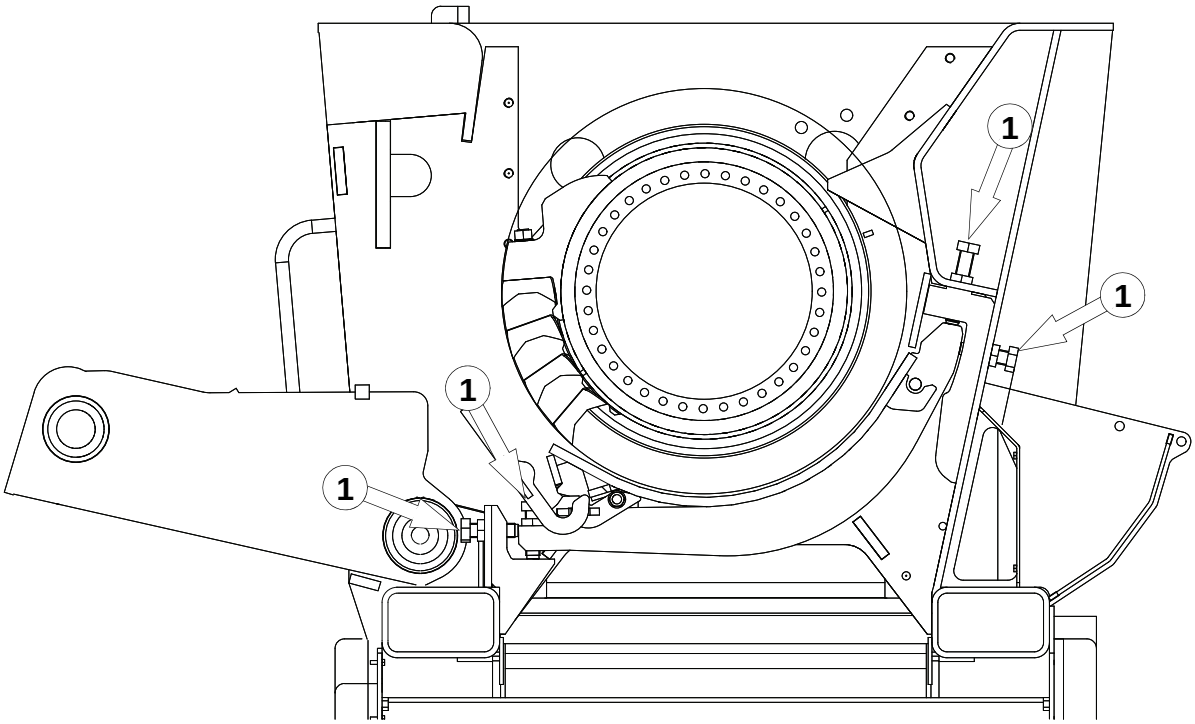
Danger of bodily injury.

Rotating rotor is extremely dangerous.

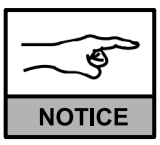
When rotating the rotor, make sure that there is no-one near it.

- Check that the sieve locks (3) slide into the slots in the sieve arches (4).
- Reverse the rotor and remove the tool.

Adjusting the sieve



- The sieve's position in relation to the rotor knives is adjusted in order to achieve optimal capacity. The adjustment is made with four adjuster bolts. Each of the three sieve arches have the same four adjuster bolts.
- There is an inspection hatch behind each sieve arch, which enable easy access to seeing the clearance between the sieve and the rotor knives. When the clearance between the sieve and the rotor knives is small, the rotor knives cut the materials stuck the sieve and the sieve remains clean. With materials that block the sieve, such as plastics, fabrics etc, the sieve is adjusted as close to the rotor knives as possible. However, the sieve must not touch the knives. A larger clearance can be used with wood and other materials that do not cause blockages. However, the clearance between the rotor knives and the sieve should never exceed 20 mm (0.8 in.).
- Verify that all three of the sieve arches are adjusted so that they all evenly support the sieve, otherwise the sieve will be damaged.
- After adjusting the sieve, make sure that there are no gaps between bolts and sieve arches by tightening the adjuster bolts situated horizontally on the counter wall to wrench tension (tightened without applying extensive force on the wrench). Next, tighten the same bolts again for 1/4 - 1/2 turns. Then, lock all sieve's adjuster bolts with tension nuts.

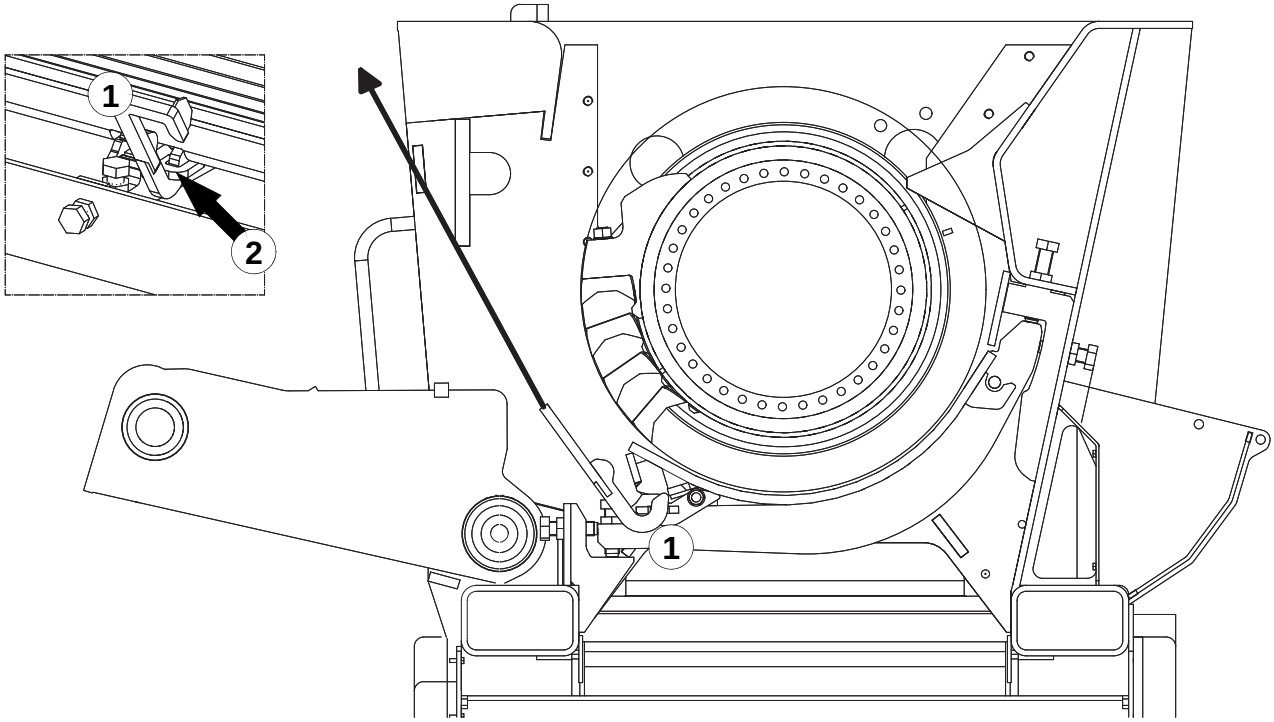


Risk of machine breakdown.

Do not over tighten the sieve adjustment bolts. Sieve's adjustment bolts may be damaged if tightened too much. In addition, over tightening causes unnecessary strain to the shredder's frame.

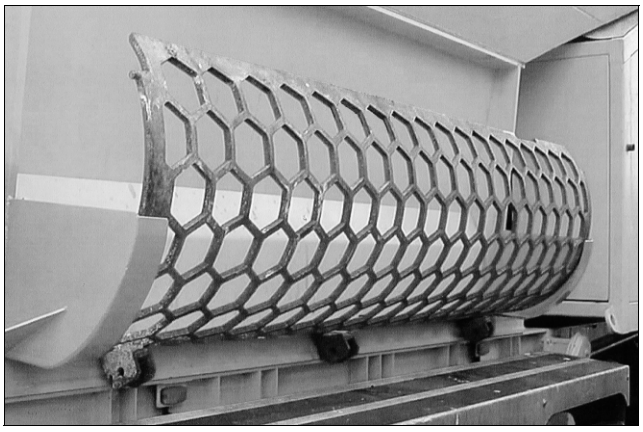
- After adjusting the sieve and before beginning shredding, it is advisable to first reverse the rotor on manual drive and to check that the rotor knives do not touch the sieve net at any point.
- Close the counter wall.

Removing the sieve from the machine

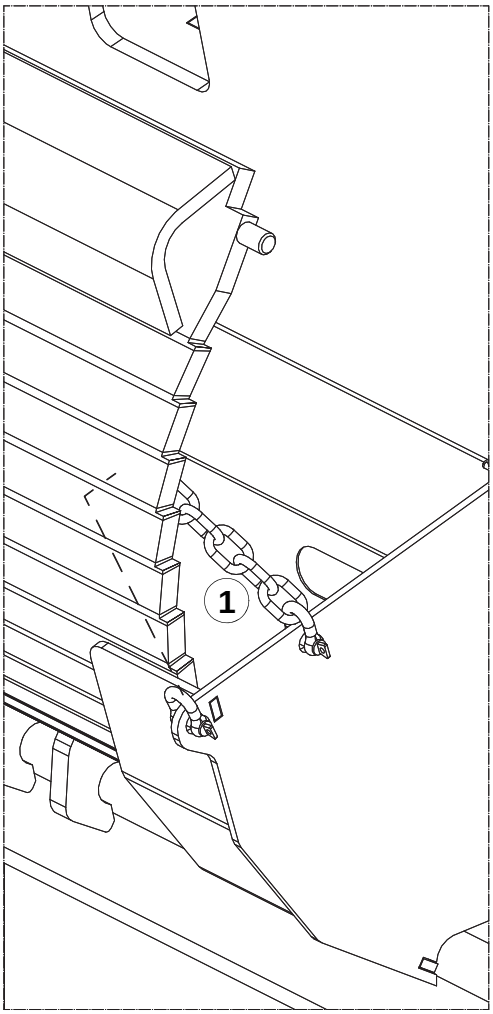


The machine can be used without the sieve. The sieve is removed as follows.

- Open the counter wall locking pins and the counter wall.
- Place the sieve installation/removal tool (1) at both ends of the lifting chain.
- Place the hooks of the tools in the loops of the locking bits (2).
- Lift the sieve with the chain. For lifting the sieve, use a crane, forklift, or excavator. Pull the sieve as vertically as possible. First the sieve locks open and then the sieve is lifted off.



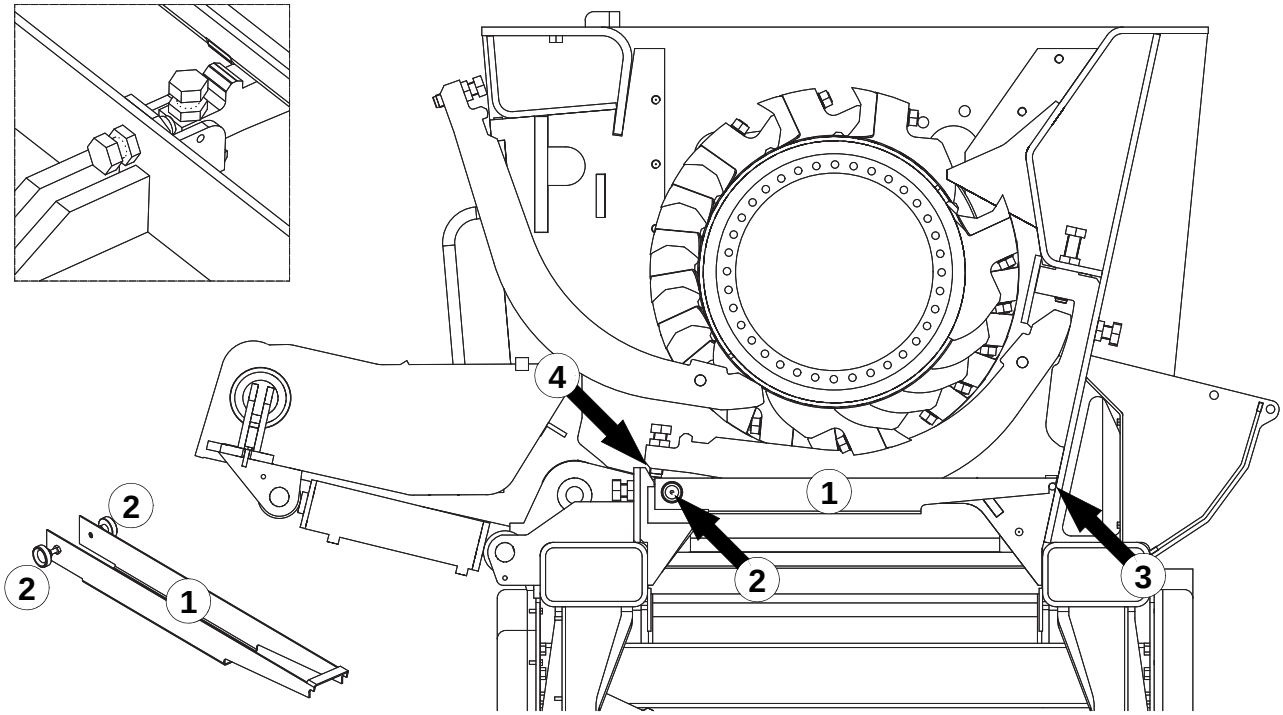
There is a rack on the right-hand side of the machine for storing the sieve during transport. Shark 220E and 440E machines do not have a rack for storing the sieve.



If the sieve is in the rack during transportation, it must be secured with a chain (1). The sieve must be locked to the transportation rack from both ends.

When you are work without a sieve for a prolonged time, it is recommendable to remove the sieve plate's supporting arches. The supporting arches are prone to gather material that can cause clogging and disrupt production. These include tyres and other materials liable to tear. The supporting arches are removed by removing the screw connections and lifting the arches away.

Installing the sieve arch



- Open the counter wall locking pins and the counter wall.
- Turn the rotor so that there is no knife where the sieve arch will be installed.

Danger of bodily injury.
Rotating rotor is extremely dangerous.
When rotating the rotor, make sure that there is no-one near it.

- There is an inspection hatch behind each sieve arch on the back of the shredder. Open the hatches and clean the holes where the sieve arch ends are to be positioned. If the holes are not cleaned, the sieve arch cannot be secured into place.
- Install the installation chute (1) with knurled-head screws (2). Set the end of the chute onto the round bar (3) on the counter wall.
- Push the sieve arch almost into place (4) along the chute. The arch is now resting on the frame without touching the chute.
- Remove the chute by loosening the knurled-headed screws and pulling the chute towards the hatch.
- Push the sieve arch into place.

7.13. Material-specific adjustment instructions

The below table presents material-specific machine adjustment instructions. The number of counter knives and the sieve are used to obtain the desired output size based on the intended purpose.

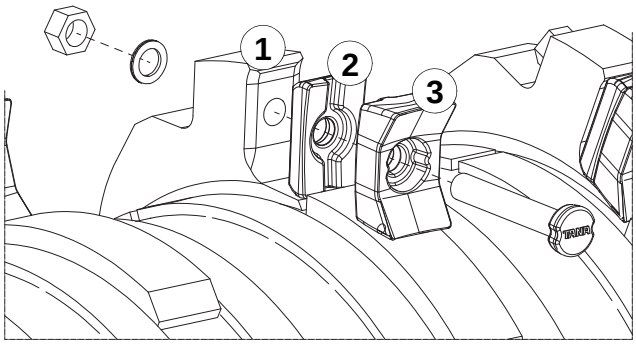
Intended use:		Minimum output size	Incineration	Pre-crushing	Composting	Fuel	Biofuel
Desired output size:		150-200 mm (5.9-7.9 in.)	200 mm (7.9 in.)	300-400 mm (11.8-15.7 in.)	200 mm (7.9 in.)	100 mm (3.9 in.)	100 mm (3.9 in.)
Material:	Adjustment object:						
Tree	Number of counter knives	All	All	50 %	All	-	All
	Sieve	No sieve	No sieve	No sieve	No sieve	-	100 mm (3.9 in.)
Paper	Number of counter knives	All	All	50 %	-	-	-
	Sieve	No sieve	No sieve	No sieve	-	-	-
Branches and twigs	Number of counter knives	All	All	-	All	-	All
	Sieve	No sieve	No sieve	-	No sieve	-	160 mm (6.3 in.)
Tyres	Number of counter knives	All	-	All	-	-	-
	Sieve	160 mm (6.3 in.)	-	No sieve	-	-	-
Community waste	Number of counter knives	All	All	50 %	-	All	-
	Sieve	No sieve	No sieve	No sieve	-	200 mm (7.9 in.)	-
Cables	Number of counter knives	-	-	50 %	-	-	-
	Sieve	-	-	No sieve	-	-	-
Equipment and machinery	Number of counter knives	50 %	-	33 %	-	-	-
	Sieve	No sieve	-	No sieve	-	-	-

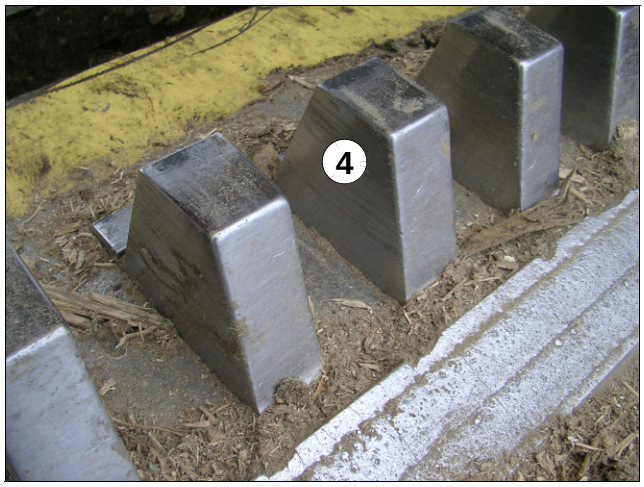
Intended use:		Minimum output size	Incineration	Pre-crushing	Composting	Fuel	Biofuel
Desired output size:		150-200 mm (5.9-7.9 in.)	200 mm (7.9 in.)	300-400 mm (11.8-15.7 in.)	200 mm (7.9 in.)	100 mm (3.9 in.)	100 mm (3.9 in.)
Material:	Adjustment object:						
Gypsum	Number of counter knives	All	-	50 %	-	-	-
	Sieve	No sieve	-	No sieve	-	-	-
Demolition waste	Number of counter knives	50 %	50 %	33 %	-	All	-
	Sieve	No sieve	No sieve	No sieve	-	200 mm (7.9 in.)	-
Plastic waste	Number of counter knives	All	-	All	-	All	-
	Sieve	No sieve	-	No sieve	-	200 mm (7.9 in.)	-
Carpets	Number of counter knives	All	-	50 %	-	-	-
	Sieve	No sieve	-	No sieve	-	-	-
Matresses	Number of counter knives	All	All	50 %	-	All	-
	Sieve	No sieve	No sieve	No sieve	-	200 mm (7.9 in.)	-
Fabric	Number of counter knives	All	All	50 %	-	-	-
	Sieve	No sieve	No sieve	No sieve	-	-	-
Furniture	Number of counter knives	All	All	50 %	-	All	-
	Sieve	No sieve	No sieve	No sieve	-	200 mm (7.9 in.)	-

8. WEAR PARTS SERVICE

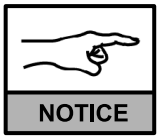
8.1. Terms

Multiple names are used for some shredder parts. Most common wear part terms are listed below.





1. Saddle or rotor saddle
2. Rotor knife counterpart
3. Rotor knife
4. Counter knife



Shredder knife is a registered design (design patent D705281).

8.2. General information

TANA Shark is designed to operate as a shredding machine but shredding is not possible without proper knives. The machine shreds, cuts and grinds fed material. It guarantees high capacity and homogenous particle sizes. Take good care of the wear parts of your shredder. Proper maintenance of the wear parts ensures minimum total cost of operation. Worn parts increase fuel consumption and wear out other shredder components.

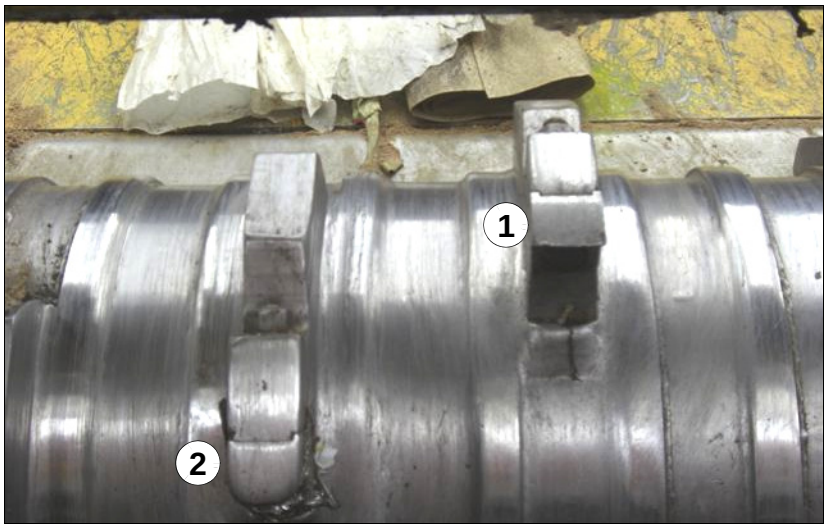
If the rotor knives and counter knives are too worn, the machine does not shred as it is intended to. Worn and round edged knives cannot shred, cut or grind material, but the rotor forces the material through the machine. Material is compressed in between rotor and counter wall causing enormous stress to components and overheating.

The machine capacity may still remain reasonable, even if the knives are worn. Measuring capacity is not the way to assess the need for replacing or fixing worn parts. Typically tools need to be serviced after 100-200 operational hours but highly abrasive conditions may require wear part service on each and every working day.

Counter knives can be repaired by welding, but rotor knives should not be repaired. They can be turned once and after that replaced by new tool. It is important that using worn parts may cause unusual wear in the rotor, counter wall and rotor case. Watering will reduce wear when shredding rubber based materials (for example, tyres).

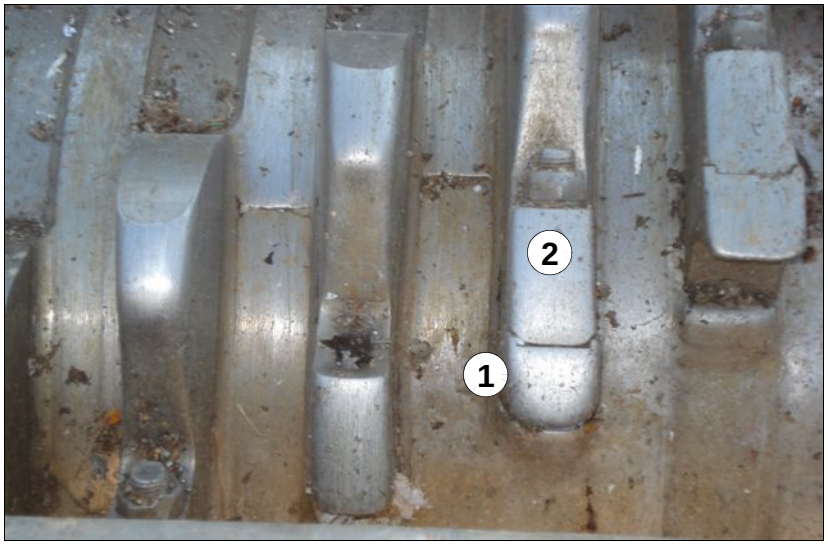
8.3. Rotor knives

Rotor knife must be turned or changed when sharp edges are worn (maximum radius 5 mm). Do not repair rotor knives by welding.



1. The rotor knife is in good condition.
2. The rotor knife is too worn.

An example of poor rotor knife maintenance, rotor knives

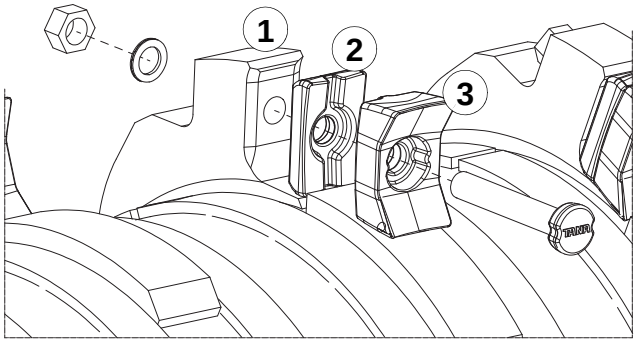


In this case, the counter knives and the rotor knives are badly worn and the rotor saddles are damaged.

The original width of the knives (1) has changed.

The worn knife does not protect the saddle (2) and the saddle has also worn.

Rotor knives replacement



- Open the rotor retaining screw and detach the blade. There is a counter piece (2) between the rotor's saddle (1) and blade (3).
- Check that the blade's counter piece is intact.
- If the knife has come off and the counterpart has been damaged, the counter piece should be replaced. The counter piece is attached by welding it to the rotor's saddle. Damaged counted pieces cannot be welded and sharpened, but it must be replaced.
- If the knife is still fit for use, it can be turned and mounted again.
- **Carefully clean the fixing area of the blade and the counter wall of all impurities, corrosion and hardening residue.**
- Install the knife and ensure that the nut and the screw are still fit for use. Tighten the screw to 820 Nm (605 lb ft). Always install the new knife with a new nut and new washer.

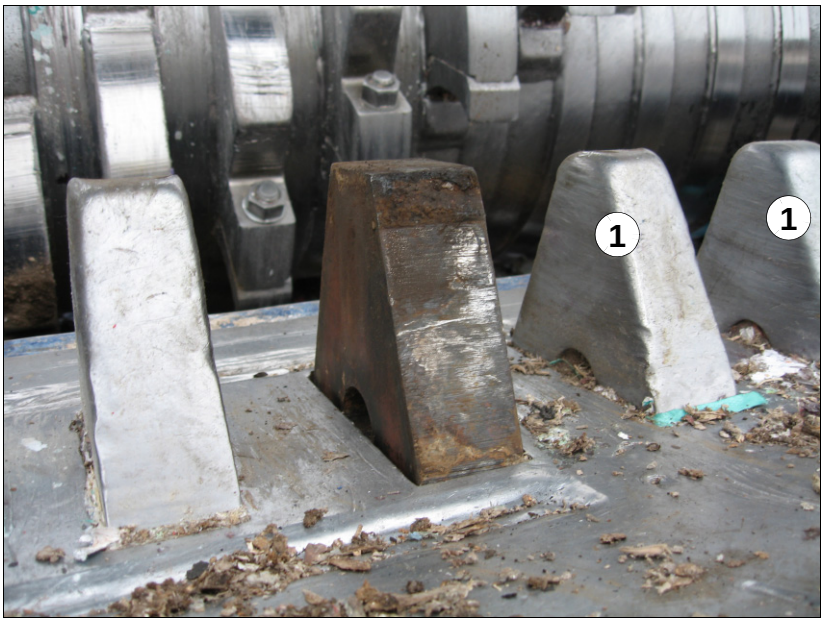
Risk of machine breakdown.

Blades fixing may become loose in operation after the installation and cause damage to the machine.

Remember to retighten the knives after 3-5 hours!

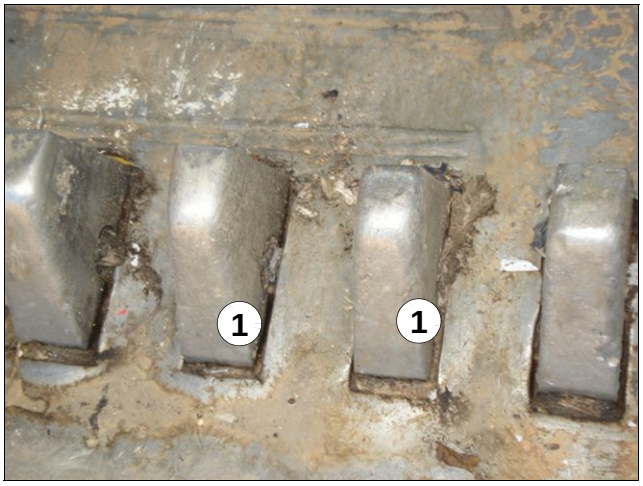
8.4. Counter knives

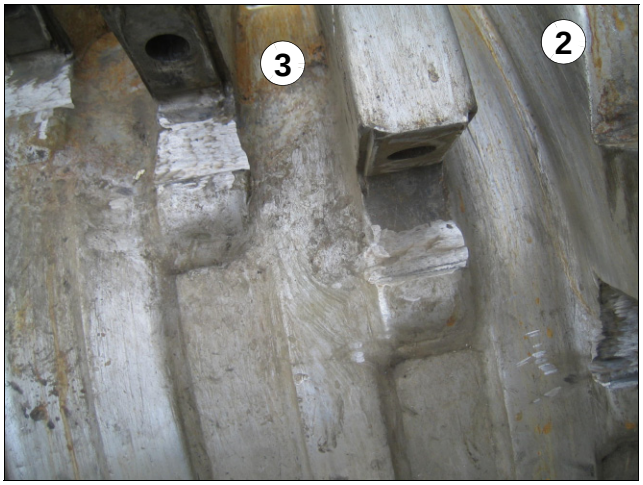
Picture below shows counter knives which need to be repaired. Below is the picture of counter knives that need to be repaired. The maximum cutting edge radius is 5 mm. At first, the counter knives seem to be in good condition, but when compared with a new counter knife, you can notice how worn they are.



The counter knife (1) is too worn and must be repaired.

An example of poor maintenance, counter knives



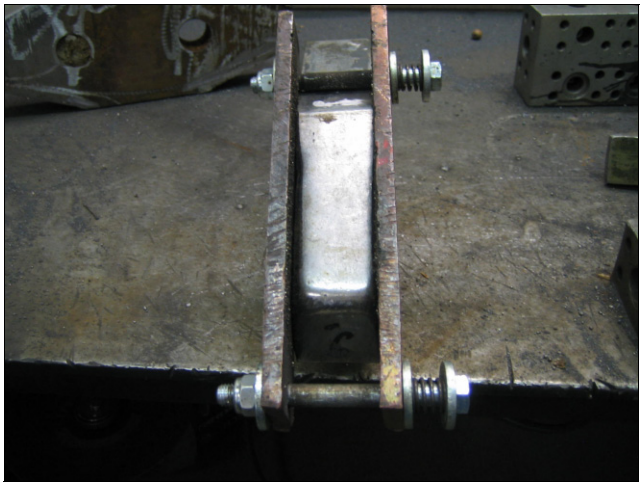


In this case, the counter knives (1) are too worn and the rotor saddles are damaged.

Counter knives that are too worn cause unusual wear in the saddles (2) and rotor surface (3).

8.5. How to repair counter knives

The counter knives can be repaired by welding. Before repair welding, the surface must be cleaned with a grinder.



Install copper plates on both sides of the counter knife.

Welding does not stick to copper. The copper plates help in achieving sharp edges in the counter knife.

Make new edges to the counter knives by welding.

Use Esab OK Tubrodur 15.50 welding wire or similar.

Never use ordinary welding wire for counter knife repair.

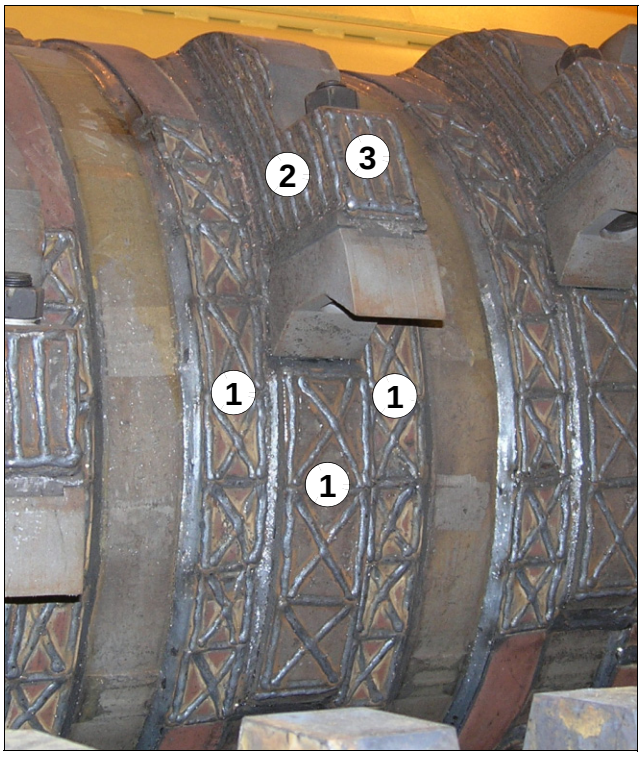
Make sure that the repaired knife is not wider or longer than the original. If necessary, grind the excess off.

An example of poor knife maintenance, counter knives repair

Never weld on counter knife side surface (1). Counter knife becomes too wide and will harm rotor saddles.

The counter knife edge correction has not been done appropriately. Edge is rounded again after short period of operation. Possible reasons are, that the surface was not smoothed before welding, wrong filling wire or wrong welding parameters.

8.6. Rotor surface and top of saddles



Welding coating has been made on the rotor surfaces (1) and saddle sides' (2), saddle tops' (3) surfaces at the factory. The coatings are intended to protect the rotor surfaces, saddles and wearing parts. The wear of the coatings is to be monitored regularly during work. The coatings must be redone before they wear too much. The best results can be achieved with Esab OK Tubrodur 15.50 or corresponding filler wire.

When adding weld surface to the saddle, make sure that the outer edge of the weld does not protrude further than the rotor knife outer surface.

After welding, make sure that the welds to not touch the counter knives at any point.

8.7. Recommended welding wires

Basic junction weldings (for example welding the saddle onto the rotor) are recommended to be done with Esab OK Tubrod 14.13 filling wire.

Hard surfacing is recommended to be done with Esab OK Tubrodur 15.50 filling wire or similar.

Always set welding parameters according to wire.

Dedicated hard face welding wire can provide 5-10 times more durability than just ordinary welding wire.

For more information, contact your TANA dealer, or send your questions to *service@tana.fi.*

9. COMMON FAILURE SITUATIONS

In case there is a defect or failure in the machine, first check the alarm display to see if any alarms are active.

The conveyor belt suddenly stops during automatic operation
Stop the machine immediately. Check that the crushed material is not clogging the conveyor belt. If necessary, remove the material and drive the conveyor belt using manual drive long enough that the material clogging the machine has been removed from the belt.

The magnet belt does not start to rotate or stops during automatic operation
Stop the machine. Check possible belt blockage and remove twisted or blocking materials. After removing the material, drive the conveyor belt using manual drive and ensure that the magnet belt is rotating.

The engine does not start or stops during automatic drive
Check the alarm display.
Check that the fuses are intact.
Make sure that there is fuel in the fuel tank (only diesel powered shredders).

Diesel engine rpm falls (only diesel powered shredders)
Check that the cooler grille is not dirty or clogged. If the grille is dirty or blocked, stop drive and leave the engine running on idle. Clean the grille. If the grille is clean, check the coolant level and add liquid if necessary.
Check the alarm log.

The machine is running automatically, but there is no material on the belt
The most probable cause is that the crushed material has formed an arch; stop drive and let the charging machine unload the arch.

Non-crushable material stops the machine
Switch to manual drive, and rotate the rotor backward a bit and then forward long enough that the rotor experiences load and stops. Back up the rotor a little. Open the counter wall locks, and run the counter wall open. Remove non-crushable material, and check the condition of the knives. Repair any damage, and close the counter wall and counter wall locks. Rotate the rotor forward by a generous full turn to ensure that there is no more non-crushable material in the machine. Start running the machine.

Automatic operation does not start
Check that the operating mode switch is in operating mode (not in neutral position). Check that there are no active alarms in the alarm log.

10. TANA SMART SITE™ (PREVIOUS TANA PROTRACK®)

10.1. General

With TANA SMART SITE™ (previous TANA ProTrack®) customers get faster and better support for problem solving from TANA's after sales service. By using TANA SMART SITE™ (previous TANA ProTrack®), customers can check the working hours in the machine, any maintenance carried out, and alarms as well as receive a monthly report on, e.g. fuel consumption, idle hours, and working hours per driver. The collected data is retained on the server for 10 years, and the system also allows for browsing history data.

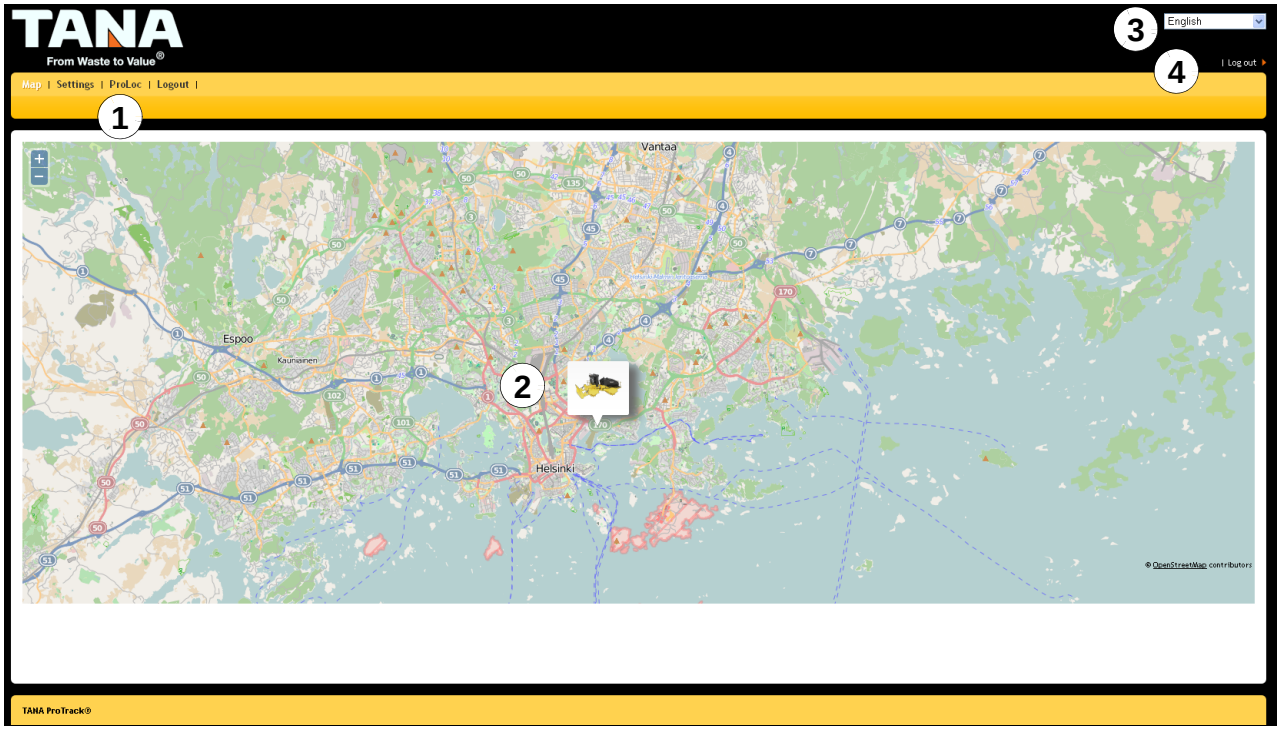
Even though TANA is able to observe the data related to the machine through remote access, it does not extend TANA's responsibility related to the machine operation, repair and maintenance.

10.2. Logging in

The TANA SMART SITE™ (previous TANA ProTrack®) system is used through an Internet browser. The recommended browsers are Internet Explorer (Version 8 or later) and Mozilla Firefox (Version 8 or later). The use of the TANA SMART SITE™ (previous TANA ProTrack®) system requires allowing Javascript in the browser settings.

Log in to the system at https://www.tanasmartsite.com/ by entering your personal username in the username field and your password in the password field. The login information is submitted by pressing the Login button.

10.3. General layout

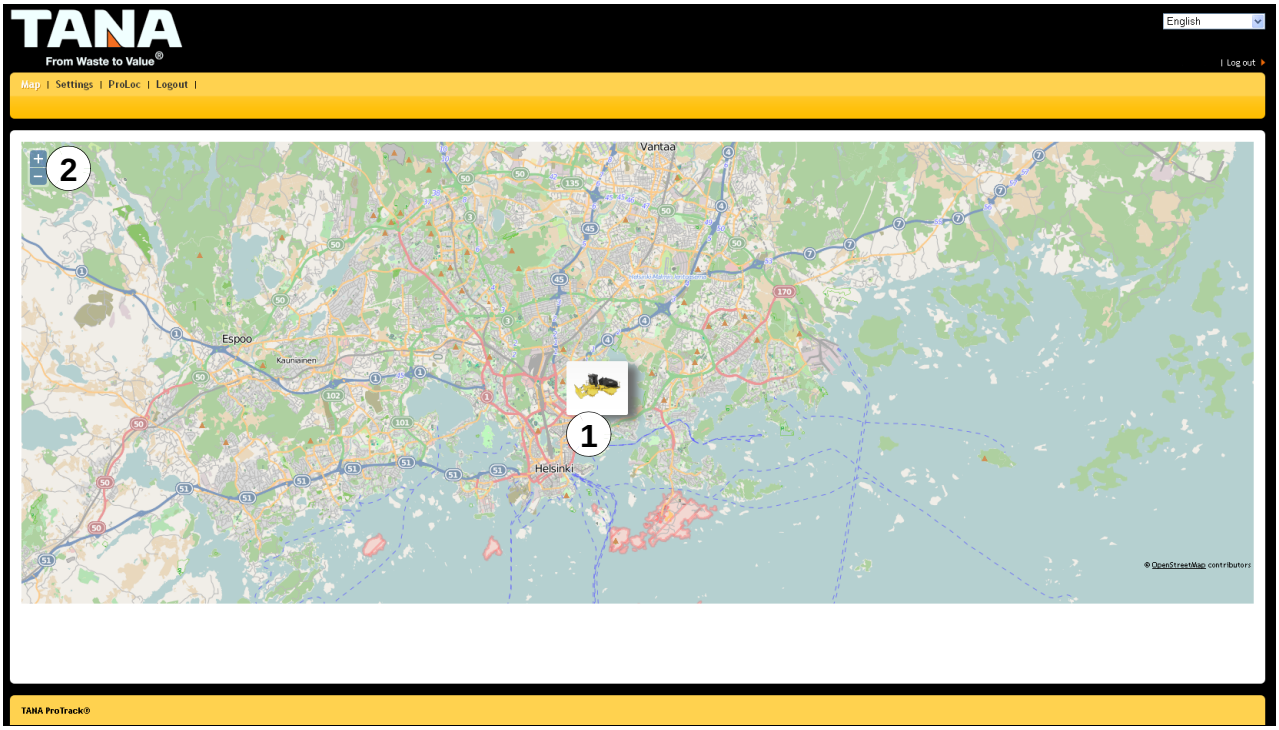


After a successful login, the TANA SMART SITE™ (previous TANA ProTrack®) system Map window opens. Use the top menu (1) to select what information is displayed in the main screen (2). The available options are Map, Settings, Proloc and Logout.

You can select the system language from the drop-down menu (3) in the upper right-hand corner.

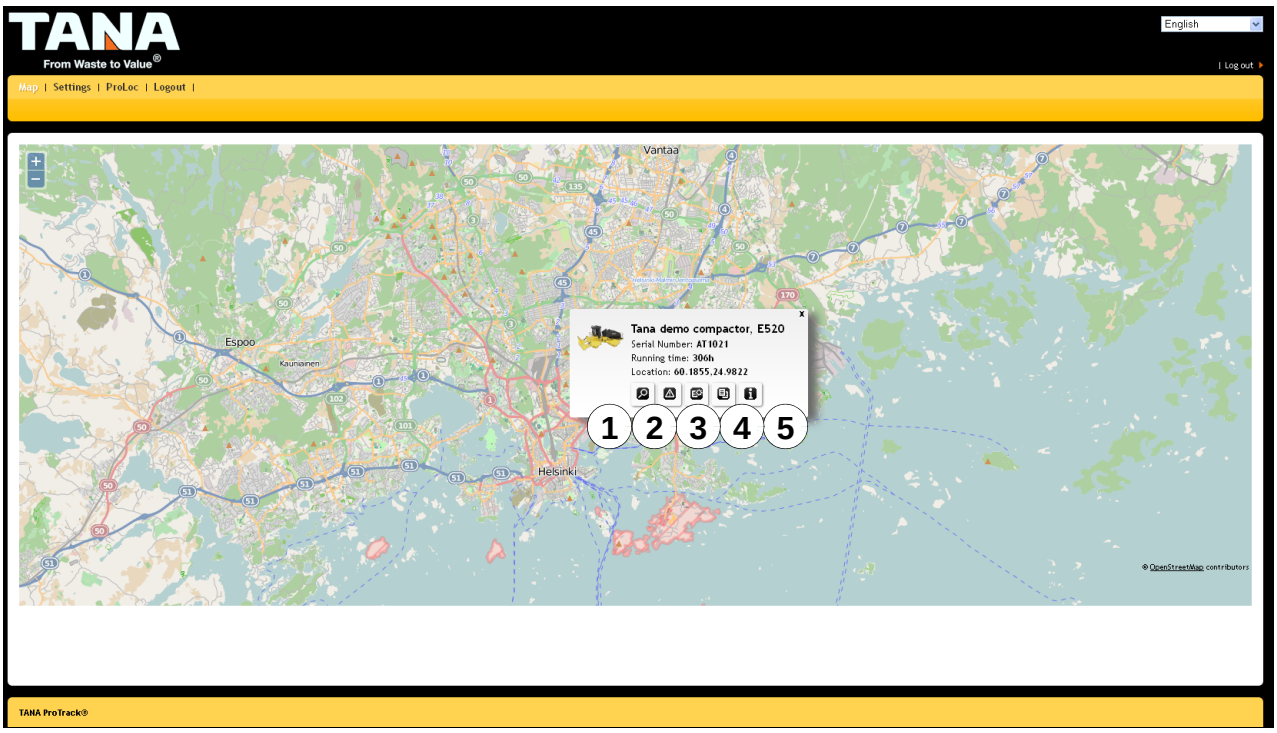
You can log out of the TANA SMART SITE™ (previous TANA ProTrack®) system by pressing Logout (4).

10.4. Map view

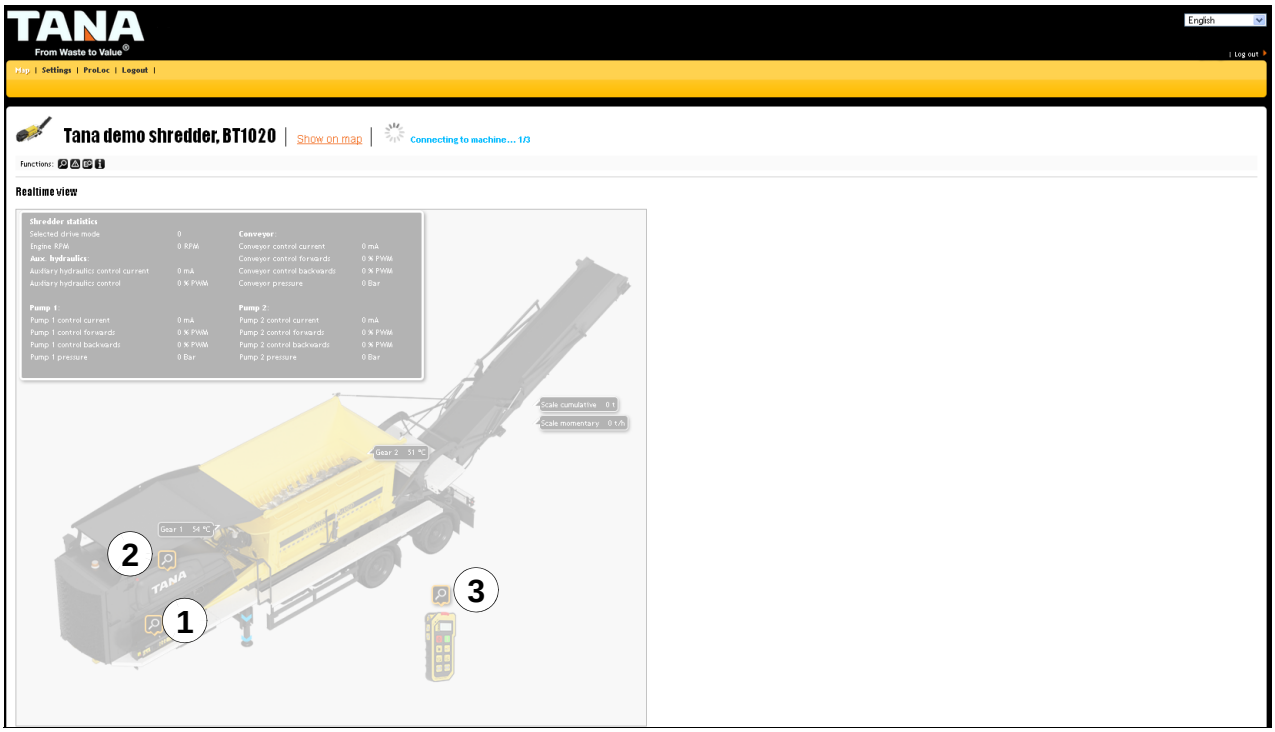


The Map view displays the machines (1) used by the logged-in user. Each machine is displayed at the site of use on the map. The map can be zoomed in and out as well as scrolled by using the buttons (2) in the upper left hand corner.

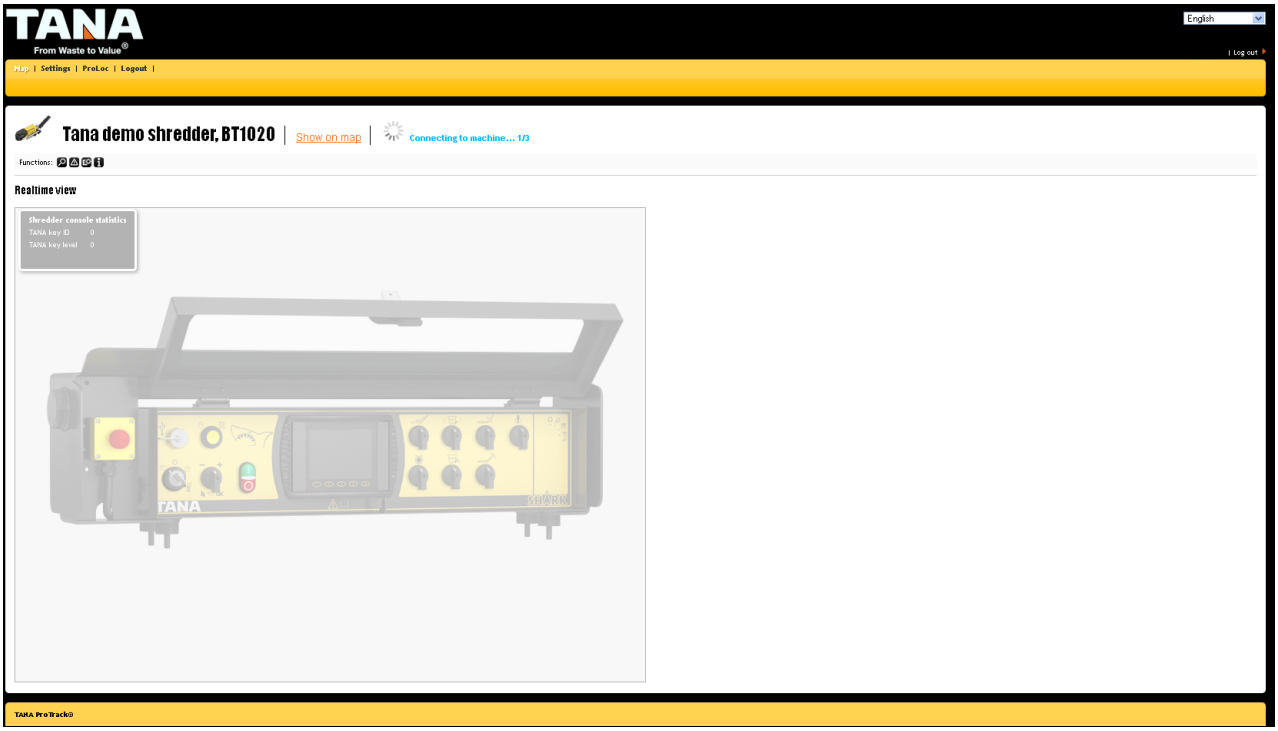
Clicking the machine symbol displays information on the machine: Realtime view (1), Alarm log (2), Service log (3), Reports (4), and Machine information (5).

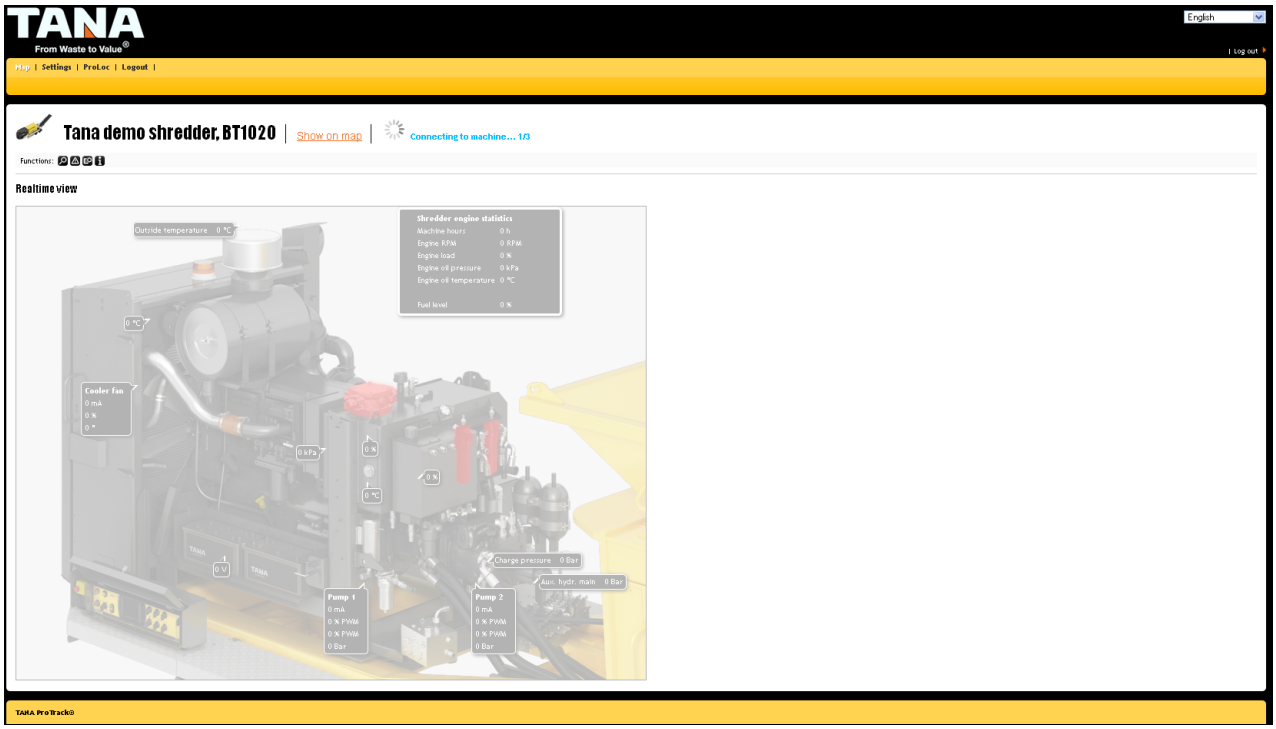


10.5. Realtime view



The realtime view displays information on the machine, such as oil temperatures, engine speed, and machine speed. The control panel (1), the powerpack (2), and the remote controller (3) have their own separate realtime view.




TANA
From Waste to Value
English
Log out
Map | Settings | ProLoc | Logout |
Tana demo shredder, BT1020
Show on map
Connecting to machine... 1/3
Functions:
Realtime view
Outside temperature 0 °C
Shredder engine statistics
Machine hours 0 h
Engine RPM 0 RPM
Engine load 0 %
Engine oil pressure 0 kPa
Engine oil temperature 0 °C
Fuel level 0 %
Cooler fan
0 mA
0 %
0 °
0 kPa
0 %
0 °C
0 %
0 V
Charge pressure 0 Bar
Aux. hydr. main 0 Bar
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0 % PWM
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Pump 2
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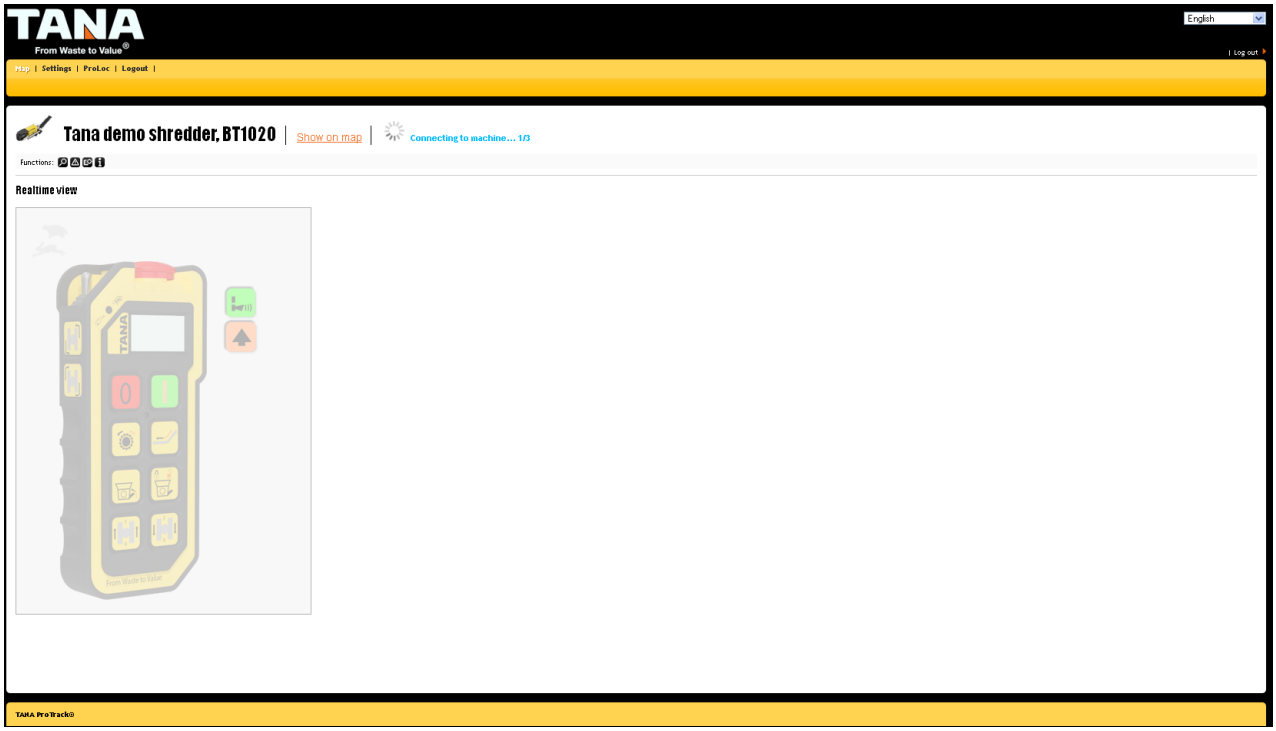
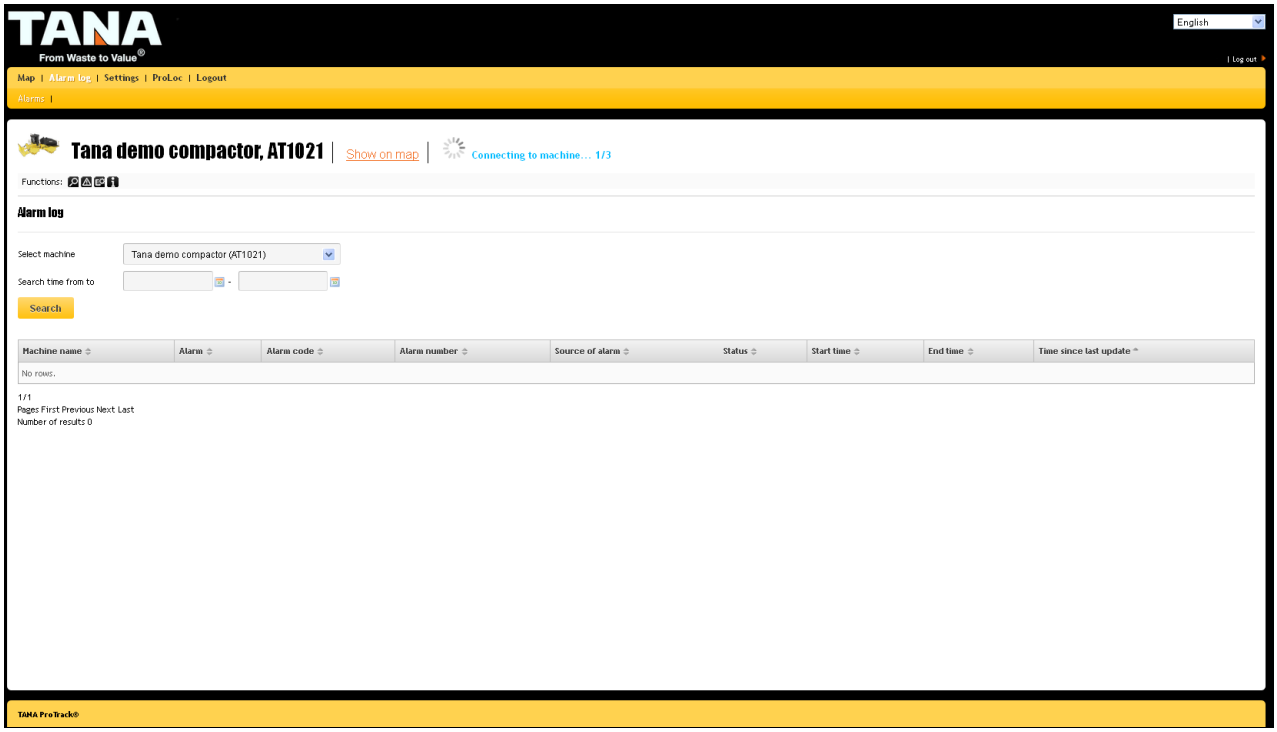
TANA ProTrack®


TANA
From Waste to Value
English
Log out
Map | Settings | ProLoc | Logout |
Tana demo shredder, BT1020
Show on map
Connecting to machine... 1/3
Functions:
Realtime view
TANA
TANA ProTrack®

10.6. Alarm log view



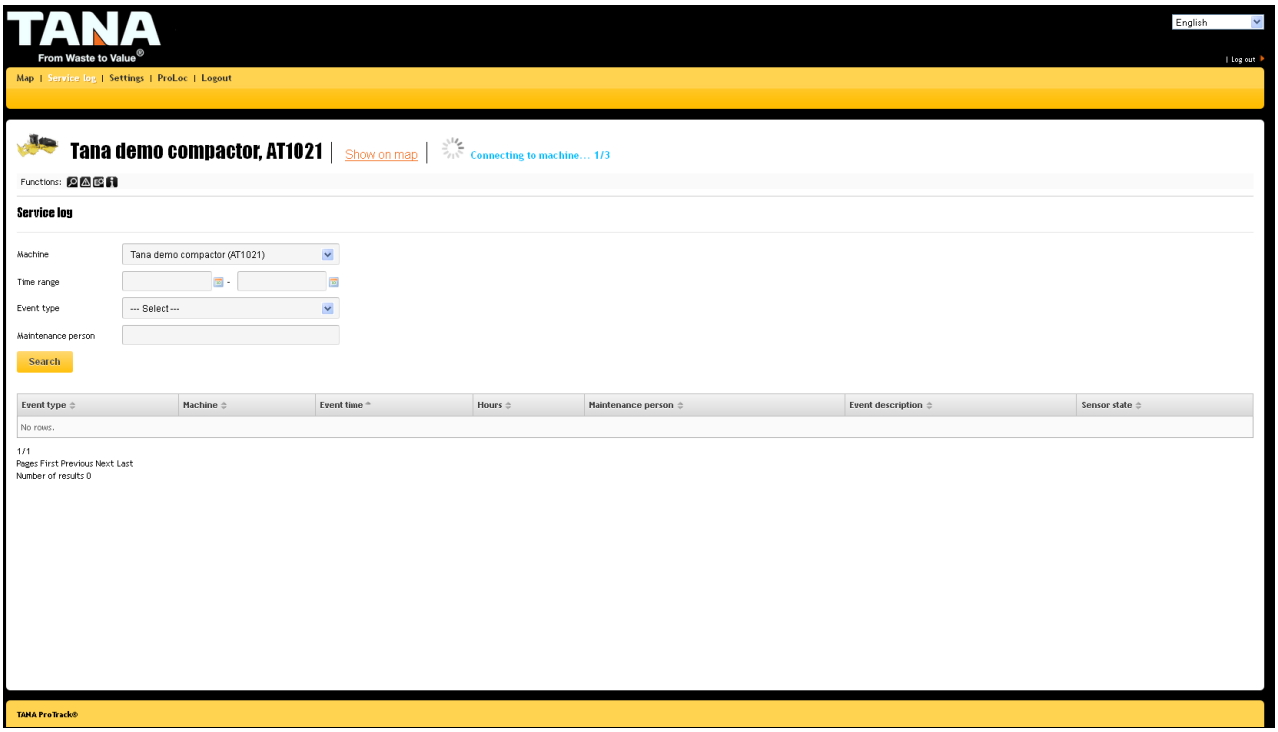
The Alarm log view displays a list of all alarms of all the machines in the fleet.

Each row displays the following information: Machine name, Alarm, Alarm code, Alarm number, Source of alarm, Status (on/off), Start time, End time, and Time since last update.

Information can be searched with search criteria by machine and/or over a certain period of time.

The system sends an e-mail of alarms to the desired persons. E-mail of alarms are sent immediately after the alarm was issued (for example, low engine oil pressure). The alarm forwarding rules can be used to determine to receives information on the alarm.

10.7. Service log view



The Service log view displays a list of all maintenance carried out on all the machines in the fleet.

Each row displays the following information: Event type, Machine, Event time, Hours, Maintenance person, Event description, and Sensor state.

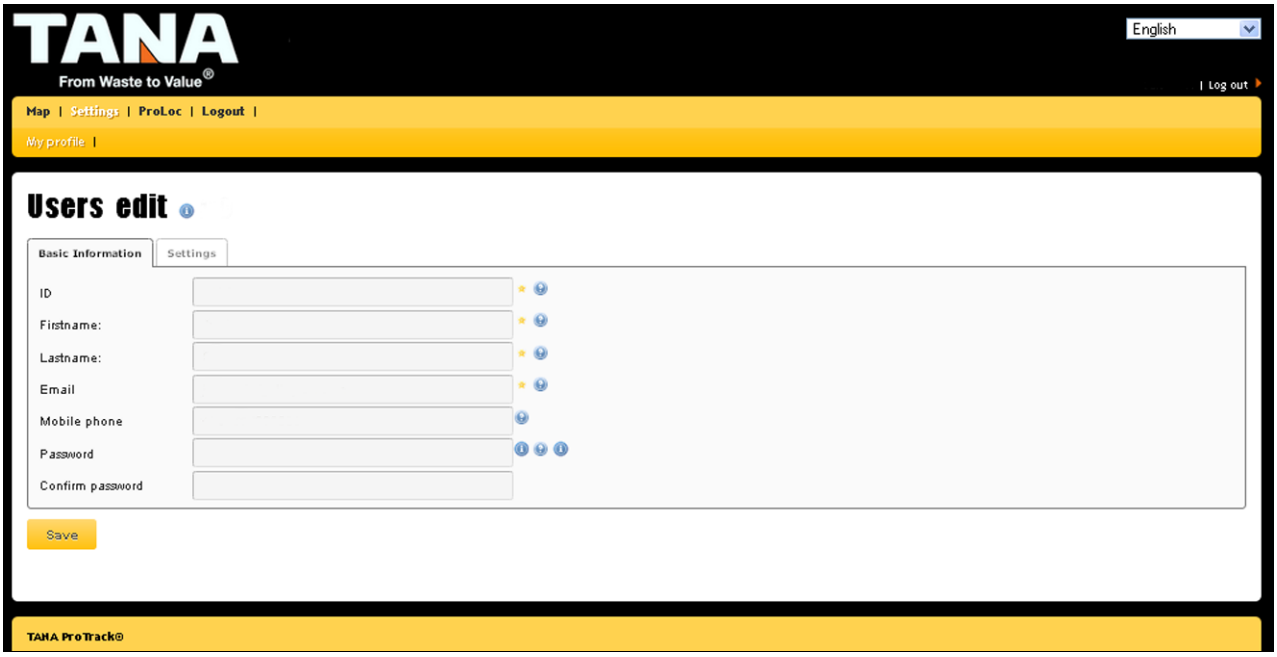
Information can be searched with search criteria by machine and/or over a certain period of time.

10.8. Reports

The reports contain information about the machine's operation. Different drivers are recognised via a personal TANA key, and they are displayed in the reports with different colours. The report shows all information gathered for each driver. A monthly report is e-mailed to the desired recipients. All monthly reports (old and new) can be read and downloaded from the TANA SMART SITE™ (previous TANA ProTrack®) web site.

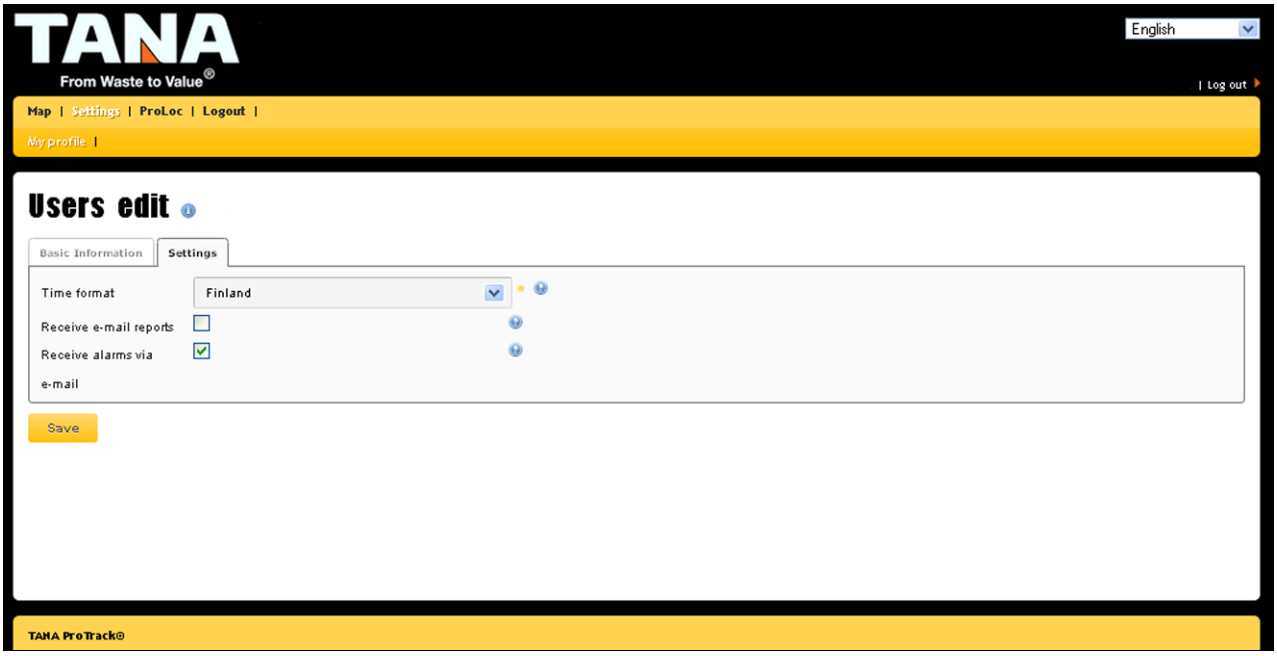
- Machine hours: hours at the beginning of the monthly report + report hours = total hours at the end of the report.
- Utilisation rate: the number of operating hours from the total hours of the month.

10.9. Settings view



The Settings view displays the user settings. The user settings are the private personal settings of the current users. The settings displayed in grey cannot be modified by the user but the system administrator must be contacted to modify them. The user can modify the information displayed in white.

In the Settings-tab user can change the time format and choose whether you want to receive e-mail reports and e-mail alarms from your machines. Reports are an optional extra service.



11. TECHNICAL DATA

11.1. Engine

Diesel engine (only diesel powered shredders)

Air-to-air after-cooled, water-cooled, turbocharged six-cylinder diesel engine equipped with electronic control.

	TANA Shark 220D, 440D, 220DT & 440DT	TANA Shark 220Deco, 440Deco, 220DTeco & 440DTeco
Type	Cummins QSX15 (U.S. EPA Tier 3, CARB Tier 3 and EU Stage IIIA)	Cummins QSX15 (U.S. EPA Tier 4 Final, CARB Tier 4 Final and EU Stage IV)
Maximum power	439 kW (589 bhp)@1,800 rpm	433 kW (580 bhp)@1,800 rpm
Maximum torque	2,539 Nm (1,873 lb ft)@1,400 rpm	2,644 Nm (1,950 lb ft)@1,400 rpm
Nominal Power	399 kW (535 bhp)@2,100 rpm; DIN 6271 (SAE J 1995)	399 kW (535 bhp)@2,100 rpm; DIN 6271 (SAE J 1995)
Total capacity	15.0 dm^3	15.0 dm^3

Electric motor (only electric powered shredders)

	TANA Shark 220E	TANA Shark 440E
Type	Two cage induction motors	
Rated output	2 x 110 kW	2 x 160 kW
Supply voltage	400 V / 50 Hz	
Nominal current	400A	630A

11.2. Shredding

	TANA Shark 220D, 220Deco, 220DT & 220DTeco	TANA Shark 440D, 440Deco, 440DT & 440DTeco
Rotor width	3,000 mm (118 in.)	
Rotor speed	According to operating requirement, 0-28 rpm	
Rotor diameter with knives	Approximately 870 mm (34.3 in.)	Approximately 920 mm (36.2 in.)
Number of knives	22	33
Knives height	Approximately 120 mm (4.7 in.)	
Knives width	70 mm (2.76 in.)	

	TANA Shark 220E	TANA Shark 440E
Rotor width	3,000 mm (118 in.)	
Rotor speed	According to operating requirement, 0-21 rpm	
Rotor diameter with knives	Approximately 920 mm (36.2 in.)	
Number of knives	22	33
Knives height	Approximately 120 mm (4.7 in.)	
Knives width	70 mm (2.76 in.)	

11.3. Rotor hydraulics

	TANA Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT, 440DTeco, 220E & 440E
Pump displacement	250 + 250 cm^3/r
Maximum pressure	380 bar (5,510 psi)

11.4. Cylinder hydraulics and belt final drives

	TANA Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT, 440DTeco, 220E & 440E
Hydraulic pump type	Gear pump
Maximum pressure	210 bar (3,050 psi)
Hydraulic cylinders	
Rotor hatch opening cylinder (1 pc.)	Double-acting cylinder
Rotor hatch locking cylinders (2 pcs.)	Double-acting cylinders
Conveyor belt folding cylinders (2 + 2 pcs.)	Double-acting cylinders
Belt final drives	
Magnet belt rotator motor	Gerotor motor
Conveyor belt rotator motor	Gerotor motor

11.5. Track hydraulics

	TANA Shark 220DT, 220DTeco, 440DT & 440DTeco
Hydraulic motor type (2 pcs)	Piston motor
Maximum pressure	300 bar (4,350 psi)

12. REFILL CAPACITIES

Item	TANA Shark 220D & 220Deco	TANA Shark 440D & 440Deco
Fuel tank	750 l (198 gal (US)) (165 gal (UK))	
Hydraulics, total capacity	320 l (84.5 gal (US)) (70.4 gal (UK))	
Hydraulic oil refill capacity	200 l (52.8 gal (US)) (44.0 gal (UK))	
Final drive, total capacity	100 l (26.4 gal (US)) (22.0 gal (UK))	150 l (39.6 gal (US)) (33.0 gal (UK))
Final drive oil refill capacity	Approximately 40 l (10.6 gal (US)) (8.8 gal (UK))	
Engine oil (without filter)	**Shark 220D & 440D:** 41,6 l (11 gal (US)) (9.2 gal (UK)) **Shark 220Deco & 440Deco:** 49,2 l (13 gal (US)) (10.8 gal (UK))	
Coolant	**Shark 220D & 440D:** 90 l (23.8 gal (US)) (19.8 gal (UK)) **Shark 220Deco & 440Deco:** 97 l (25.6 gal (US)) (21.3 gal (UK))	
Urea tank (only models Shark 220Deco and 440Deco)	56 l (15 gal (US)) (12.5 gal (UK))	

Item	TANA Shark 220DT & 220DTeco	TANA Shark 440DT & 440DTeco
Fuel tank	740 l (195 gal (US)) (162 gal (UK))	
Hydraulics, total capacity	320 l (84.5 gal (US)) (70.4 gal (UK))	
Hydraulic oil refill capacity	200 l (52.8 gal (US)) (44.0 gal (UK))	
Final drive, total capacity	100 l (26.4 gal (US)) (22.0 gal (UK))	150 l (39.6 gal (US)) (33.0 gal (UK))
Final drive oil refill capacity	Approximately 40 l (10.6 gal (US)) (8.8 gal (UK))	
Track final drive oil capacity	Approximately 3 l (0.79 gal (US)) (0.66 gal (UK))	
Engine oil (without filter)	**Shark 220DT & 440DT:** 41,6 l (11 gal (US)) (9.2 gal (UK)) **Shark 220DTeco & 440DTeco:** 49,2 l (13 gal (US)) (10.8 gal (UK))	
Coolant	**Shark 220DT & 440DT:** 90 l (23.8 gal (US)) (19.8 gal (UK)) **Shark 220DTeco & 440DTeco:** 97 l (25.6 gal (US)) (21.3 gal (UK))	
Urea tank (only models Shark 220DTeco and 440DTeco)	56 l (15 gal (US)) (12.5 gal (UK))	

Item	TANA Shark 220E	TANA Shark 440E
Hydraulics, total capacity	320 l (84.5 gal (US)) (70.4 gal (UK))	
Hydraulic oil refill capacity	200 l (52.8 gal (US)) (44.0 gal (UK))	
Final drive, total capacity	100 l (26.4 gal (US)) (22.0 gal (UK))	150 l (39.6 gal (US)) (33.0 gal (UK))
Final drive oil refill capacity	Approximately 40 l (10.6 gal (US)) (8.8 gal (UK))	

13. FILTERS

TANA Shark 220 & 440		
Filter	**Spare part number**	**Pcs**
Diesel engine (only TANA Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT & 440DTeco)		
Engine oil filter, Shark 220D, 440D, 220DT & 440DT	201653	1
Engine oil filter, Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202222	1
Fuel filter (cartridge), Shark 220D, 440D, 220DT & 440DT	200556	1
Fuel filter (cartridge), Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202639	1
Fuel filter cartridge, water separator, Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202161	1
Coolant filter, Shark 220D, 440D, 220DT & 440DT	58H939	1
Coolant filter, Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202220	1
Crankcase breather, Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202310	1
Engine air filter (only TANA Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT & 440DTeco)		
Filter cartridge (primary filter), Shark 220D, 440D, 220DT & 440DT	201458	1
Filter cartridge (primary filter), Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202183	2
Filter set (primary filter and secondary filter), Shark 220D, 440D, 220DT & 440DT	201459	1+1
Filter set (primary filter and secondary filter), Shark 220Deco, 440Deco, 220DTeco & 440DTeco	202182	2+2
Electrical control cabinet filters (only TANA Shark 220E & 440E)		
Electrical control cabinet filters (suction)	200638	3
Electrical control cabinet filter (outlet)		

TANA Shark 220 & 440		
Filter	**Spare part number**	**Pcs**
Hydraulic system (all models)		
Charge pressure filters	200900	2
Return filter	200897	1
Breather filter (hydraulic oil tank)	200905	1
Breather filter (transmission oil tank)	200481	1
Filling filter	200904	1
Transmission oil cooler filter	200902	1
Urea tank (only eco-models)		
Absorption filter	202157	1
Urea solution pump (only eco-models)		
Filter	202320	1

14. MAINTENANCE PACKAGES

14.1. Maintenance packages, diesel powered shredders

TANA Shark 220D, 220Deco, 440D, 440Deco, 220DT, 220DTeco, 440DT & 440DTeco	Spare part number
Maintenance I package (Shark 220D, 440D, 220DT & 440DT)	**201073C**
Maintenance I package (Shark 220Deco, 440Deco, 220DTeco & 440DTeco)	**202315A**
• Engine oil filter	
• Fuel filter (cartridge)	
• Water separator to the filter/fuel system	
Maintenance II package (Shark 220D, 440D, 220DT & 440DT)	**201219C**
Maintenance II package (Shark 220Deco, 440Deco, 220DTeco & 440DTeco)	**202316A**
• Engine oil filter	
• Air filter set	
• Fuel filter (cartridge)	
• Water separator to the filter/fuel system	
• Charge pressure filter cartridge (2 pcs)	
• Transmission oil cooler filter cartridge	
• Breather filter (hydraulic oil tank)	
• Breather filter (transmission oil tank)	
Maintenance III package (Shark 220D, 440D, 220DT & 440DT)	**201220B**
Maintenance III package (Shark 220Deco, 440Deco, 220DTeco & 440DTeco)	**202317A**
• Engine oil filter	
• Coolant filter	
• Air filter set	
• Fuel filter (cartridge)	
• Water separator to the filter/fuel system	
• Charge pressure filter cartridge (2 pcs)	
• Return filter cartridge	
• Breather filter (hydraulic oil tank)	
• Transmission oil cooler filter cartridge	
• Breather filter (transmission oil tank)	
Maintenance IV package (Shark 220D, 440D, 220DT & 440DT)	**201221B**
Maintenance IV package (Shark 220Deco, 440Deco, 220DTeco & 440DTeco)	**202318A**
• Engine oil filter	
• Coolant filter	
• Alternator belt	
• Fan belt	
• Air filter set	
• Fuel filter (cartridge)	
• Water separator to the filter/fuel system	
• Charge pressure filter cartridge (2 pcs)	
• Return filter cartridge	
• Breather filter (hydraulic oil tank)	
• Hydraulics filling filter cartridge	
• Transmission oil cooler filter cartridge	
• Breather filter (transmission oil tank)	
• Crankcase breather (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	
• Urea solution pump filter (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	
• Urea solution tank suction filter (only Shark 220Deco, 440Deco, 220DTeco and 440DTeco)	

14.2. Maintenance packages, electric powered shredders

TANA Shark 220E & 440E	Spare part number
Maintenance I package	**-**
Maintenance II package	**200635**
• Charge pressure filter cartridge (2 pcs)	
• Transmission oil cooler filter cartridge	
• Breather filter (transmission oil tank)	
• Breather filter (hydraulic oil tank)	
• Electrical control cabinet filter (3 pcs)	
Maintenance III package	**200636**
• Charge pressure filter cartridge (2 pcs)	
• Return filter cartridge	
• Breather filter (transmission oil tank)	
• Breather filter (hydraulic oil tank)	
• Transmission oil cooler filter cartridge	
• Electrical control cabinet filter (3 pcs)	
Maintenance IV package	**200637**
• Charge pressure filter cartridge (2 pcs)	
• Return filter cartridge	
• Breather filter (transmission oil tank)	
• Breather filter (hydraulic oil tank)	
• Hydraulics filling filter cartridge	
• Transmission oil cooler filter cartridge	
• Electrical control cabinet filter (3 pcs)	

15. FUELS AND LUBRICANTS

15.1. Engine oil (only diesel powered shredders)

Shark 220D, 440D, 220DT and 440DT machines

The engine manufacturer recommends the use of a high-quality **10W-40** or **15W-40** multi-grade engine oil that meets the API CH and Cummins CES20076 requirements.

API and CG engine oils can be used in areas where CH oils are not available. This, however, affects the engine oil change interval.

For additional information, see the Cummins manual.

Shark 220Deco, 440Deco, 220DTeco and 440DTeco machines

The engine manufacturer recommends high quality **5W-30**, **10W-30** or **15W-40** engine oil that meets the Cummins CES20081 requirements.

For additional information, see the Cummins manual.

15.2. Diesel fuel (only diesel powered shredders)

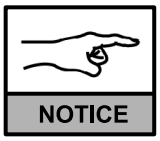
Before starting to determine a reason for poor efficiency or poor operation in cold air, check the fuel type being used.

For additional information, see the Cummins manual.

Explosion hazard.

Mixing de-icer with fuel could cause an explosion hazard.

Do not mix de-icer with fuel.



Risk of machine breakdown.

If the fuel tank is filled partly, condensation can occur at cold temperatures.

Fill the fuel tank after using the engine.

Shark 220D, 440D, 220DT and 440DT machines

The manufacturer recommends using No. 2 diesel fuel meeting ASTM specifications in order to ensure the best possible engine performance. If the ambient temperature is below 0 °C (+32 °F), acceptable performance is achieved by using a mixture of ASTM 2D and 1D fuels.

For additional information, see the Cummins manual.

Shark 220Deco, 440Deco, 220DTeco and 440DTeco machines

Use low-sulphur fuel in the machine. The sulphur content of the fuel must be maximum 15 mg/kg in the United States and maximum 10 mg/kg in Europe. 20 % biodiesel fuel can be used.

Using the wrong kind of fuel may quickly lead to damage in the engine and the after treatment system.

For additional information, see the Cummins manual.

15.3. Urea solution (Shark 220Deco, 440Deco, 220DTeco and 440DTeco)

Urea solution meeting the requirements of ISO 22241-1 must be used in the machine.

The urea solution must be stored protected from sunlight and in temperatures ranging from -5 C to +25 °C (+23 °F...+77 °F). The shelf life of urea solution is approximately one year.

For additional information, see the Cummins manual.

15.4. Coolant (only diesel powered shredders)

Shark 220D, 440D, 220DT and 440DT machines

Heavy-duty engines require high-class coolant. A high-class coolant has a correct-ratio mixture (50/50) of high-quality water and low-silicate antifreeze that meets the ASTM D4985 specifications and contains supplemental coolant additives (SCA).

Shark 220Deco, 440Deco, 220DTeco and 440DTeco machines

Use high-quality coolant that meets the requirements of ASTM D6210.

For additional information, see the Cummins manual.

15.5. Rotor final drives

Use high grade synthetic gear oil:

- **CLP 220 HC according to DIN 51517**
- **Viscosity ISO - VG 220 according to DIN 51519**

Final drive oil is exposed to extreme temperature changes. For this reason, the oil has to be sufficiently fast-flowing when starting so that the bearings will get their lubrication. However, during the work, the hot oil has to be sufficiently viscous for the gears to be lubricated. Because of this synthetic (Polyalphaolefine PAO) oils must be used for the gears. TANA recommends only Shell Omala S4 GX 220 oil. If you want to use some other oil, please ask for a recommendation via e-mail from *service@tana.fi.*

15.6. Tracks final drives (Shark 220DT, 220DTeco, 440DT and 440DTeco)

Use SAE80W/90 gear oil.

15.7. Hydraulic systems

The rotor drive hydraulics have a shared oil tank for the cylinder, belt final drive and track hydraulics. Use hydraulic oils that meet the following classifications:

HLP(HM) and HVLP according to DIN 51524, parts 2 and 3.

- Normal operating conditions: Shell S2 V68 or similar
- Cold operating conditions (outside temperature below -10°C (+14 °F)): Shell S2 V46 or similar

Use hydraulic oil warmer in cold conditions. In continuously cold conditions (outside temperature below -10°C (+14 °F)) you should use Shell S2 V46 or similar hydraulic oil to ease cold starts.

When selecting oils, contact the service department or your oil supplier.

15.8. Lubricating greases

The following properties are required of grease used in the shredder:

- Withstands the prevailing temperature differences
- Water-resistant
- Protects from dirt
- Anti-corrosive
- Pressure-resistant

Grease hardness NLGI 2, for example Lithium lead greases with EP additive and preferably molybdenum disulphide, are well suited for lubricating the machine.

16. POWER SUPPLY REQUIREMENTS (ELECTRIC POWERED SHREDDERS)

To ensure uninterrupted operation, the electricity fed into the machine must meet the following requirements:

- **Voltage:** Constant voltage 0.9 - 1.1 part of rated voltage.
- **Frequency:** 0.99 - 1.01 part of rated frequency continuously, 0.98 - 1.02 part of rated frequency for a short period.
- **Harmonic wave:** The sum of second to fifth harmonic wave does not exceed 10 % of the RMS. 2 % increase in the RMS of the sixth to thirtieth harmonic wave is allowed.
- **Voltage imbalance:** Three phase feed voltage negative sequence component and zero sequence component value may not exceed 2 % of the positive sequence component value.
- **Voltage blackouts:** A voltage blackout or zero potential does not exceed the 3 ms duration. The time between consecutive blackouts must be over 1 second.
- **Voltage dips:** Voltage dips may not exceed 20 % from the feed voltage maximum value for longer than one period. The time between consecutive dips must be over 1 second.

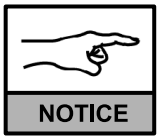
17. DISPOSAL OF THE MACHINE

The end user of the machine is responsible for its disposal. If the end user of the device does not have the resources or the possibility to disassemble the machine, the job must be given to a party that has the required skill and knowledge.

The following issues must be taken into consideration when disposing of the waste resulting from dismantling the machine:

- The machine frame, all steel components, and the aluminium and copper in the electric components can be recycled. Metals can be melted and used for new products, with the exception of the parts of the machine that have been in contact with waste classified as hazardous waste. Contaminated components can usually be cleaned/rinsed to make them recyclable.
- Most plastic components may be recycled in the same way as the metal components. Each plastic component carries a material identification code and manufacturing date with which the recyclability of the component can be determined.
- Rubber components are not regarded as hazardous, and they can be disposed of using standard procedures. Hoses (for example, hydraulic hoses) must be cleaned before disposal. Worn tyres can be returned to companies selling tyres.
- Electrical components that are classified as dangerous (batteries, circuit boards) and other dangerous materials must always be delivered to a licensed waste manager or disposed of in accordance with local regulations.
- Fluids and lubricants must be collected in designated receptacles and sorted. They must be disposed of through an authorised waste treatment facility.

These instructions are not binding, but provide a direction to good practices in waste handling. Local authorities will issue more detailed instructions and recommendations for disposal of various materials.



When disposing of the machine, currently applicable appropriate local waste handling regulations issued by the authorities must be followed.

18. ALPHABETICAL INDEX

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