



JÄRNHÄSTEN ESSENCE

ORIGINAL INSTRUCTION MANUAL



Read this manual carefully and make sure you have understood the contents before using JärnHästen.

Version

The table below lists the different versions that have existed of this document.

Version	Date	Author	Description
A	2020-06-08	Mikael Swartz	First edition before risk analysis.
B	2020-07-03	Mikael Swartz	After review with SMP
C	2020-10-20	Peter Rodin	Technical data and maintenance instructions updated
D	2021-04-06	Mikael Sundler	Updated the entire manual.
E	2021-07-06	Mikael Sundler	Hydraulic valves
F	2024-06-03	Mikael Swartz	Remote control range adjusted

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1 Introduction

The chapter covers the following paragraphs:

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1.1 About this manual

The manual, purpose and target group

These instructions describe in detail how the machinery is to be installed, used, operated and inspected. It also describes the measures to be taken for maximum safety, how the safety features are designed and function, and their control and supervision with possible repairs as a result.

The target group is the user of the machine and the person or persons who perform standardized service and maintenance measures.

More thorough servicing or troubleshooting shall be carried out by the dealer's service personnel.

Järnhästen or the IronHorse

In this instructions the word “Järnhästen” is used synonymously to “the IronHorse” and “the machine” and they all means the vechicle “Järnhästen Essence”

1.2 Important information for the user

Read this before using the product

All users must read the manual and it is especially important that all users read and understand the sections on security.

Intended use of the product

Järnhästen Essence® is a track-driven, remote-controlled tool and load carrier for transport and work primarily in outdoor terrain. Use in buildings requires good control of ventilation.

Prerequisites for use

In order to follow this manual and use the product, you must:

- Have basic knowledge and skills for work off-road.
- Received an introduction review from your dealer or directly from Lennartsfors AB's staff.

Safety instructions

This manual contains safety instructions (WARNING, CAUTION and ATTENTION) to enable you to use the product safely. See definitions below.



WARNING

WARNING recognizes a potentially dangerous situation that could result in serious injury or death. It is important that you do not proceed until you have met and understood all of the mentioned conditions.



CAREFUL

CAUTION draws attention to a dangerous situation that may lead to light or moderate personal injury. It is important that you do not proceed until you have met and understood all of the mentioned conditions.



OBSERVE

PLEASE NOTE means that you must follow the instructions to avoid damage to the product or to other equipment.

Symbols used

The following symbols are used on Järnhästen and in this manual.



Read this manual carefully and make sure you have understood the contents before using Järnhästen.



Hearing protectors must be worn.



Safety glasses must be worn.



Boots or work shoes with a steel toe cap and non-slip sole must be used.



Protective clothing must be worn.



Protective gloves must be worn.



Flammable substances.



Substances hazardous to health



Hazardous to the environment



No smoking



Warning hot surfaces

1.3 Related documentation

User documentation for Järnhästen Essence®

The user documentation listed in the table below is supplied with Järnhästen

Section	Description
Instructions	This document
Spare part list	Separate document
Service manual	In this document
Accessories documentation	Each accessory is accompanied by a separate instruction These instructions contain important information regarding the safety, assembly, use and maintenance of the accessory.

2 Safety instructions

About this chapter

This chapter describes the safety precautions and emergency measures.

The chapter covers the following paragraphs:

2.1	Safety precautions.....	8
2.2	Emergency procedures.....	12

Important



WARNING

Before installing, operating, using and maintaining the product, you as a user must have read and understood this entire chapter so that you are aware of the risks involved.

The manufacturer takes no responsibility for use where the instructions for use are not followed. This applies during all phases of use and lifetime of the machine.

2.1 Safety precautions

General precautions

As a user of this vehicle, you are responsible for your safety and that of those around you and for protecting our environment. Read and understand the contents of this manual where you will find valuable information about your vehicle including procedures for safe driving.

Personal protective equipment



The user(s) of Järnhästen or persons staying in its immediate vicinity shall be equipped with personal equipment as follows:

1. Hearing protection
2. Skyddshandskar
3. Protective clothing
4. Boots or work shoes with steel toe and non-slip sole.
5. Safety glasses should be worn when handling fuel and oil.

Safety distances

- Safety distance to operator when driving 5-10m.
- Safety distance for outsiders 25m, to avoid the risk of e.g. collision, overturning and throwing (snow blower) etc.
- Safety distance when using winch 10m.
- When driving downhill, never dwell in front of the machine
- Keep your distance and pay attention to moving parts.
- Pay attention when turning the switch for selecting the direction of travel. The front and rear of the joystick then perform the reverse function of the machine.

Driving

- The maximum slope for driving on slopes is defined as 20° (36%) degrees.
- The maximum slope for lateral travel is defined as 20° (36%) degrees.
- Pay attention to the risk of tipping over when driving on an incline when the chassis is adjusted front or rear (center of gravity displacement).
- Järnhästen stops in case of lost contact with remote control.
- Järnhästen stops when the remote control is tilted more than 90°.

Transport, loading and salvage

- Preferably drive on and off the machine from the transport vehicle without lifting. Always secure Järnhästen during transport.
- Wear gloves when unpacking a new machine.
- See more information on transport, loading and loading in Chapter 9.

Maintenance

- During maintenance work, the machine should always be powerless to avoid risks of injury. See Chapter 7 for more information.
- For lifting during maintenance, always understand the risks and how a safe lift should be done. Read more about lifting and securing hoisted machines under chapter 9.
- When servicing, be aware that there may be hot surfaces such as the engine, muffler and hydraulic components if the machine has just been running. Always wear protective gloves.

Fuel



- Before use, always read chapter 7.2 "Fuel Management" and the engine's separate operating instructions for safe handling of fuel.
- Be careful when working near fuel, as it is highly flammable and explosive. Cigarettes, sparks and fire must be kept at a safe distance from all fuel-related parts.

- Gasoline can cause skin and eye irritation. Always wear protective gloves and goggles when handling. Avoid skin and eye contact. In case of skin contact, clean with soap and water.
In case of eye contact, rinse immediately with plenty of water.
- Avoid inhalation of steam/aerosol. Always handle gasoline in a well-ventilated area.
- Avoid emissions into nature.
- Dispose of waste and residues in accordance with the requirements of local authorities.

**WARNING**

Fuel used has the following hazardous properties:

1. The liquid, its vapors and exhaust gases are toxic.
2. May cause skin irritations.
3. Is highly flammable and explosive.

Hydraulic fluid and engine oil



- Oils can cause skin and eye irritation. Always wear protective gloves and goggles when handling. In case of skin contact, clean with soap and water.
In case of eye contact, rinse immediately with plenty of water.
- Avoid inhalation of steam/aerosol. Always handle oil in a well-ventilated area.
- Avoid emissions into nature.
- Dispose of waste and residues (use oil) in accordance with the requirements of local authorities.

**WARNING**

Oils used have the following hazardous properties:

1. The liquid, its vapors and exhaust gases are toxic.
2. May cause skin irritations.
3. Is highly flammable.

Hot surfaces



- Pay attention to hot surfaces on Järnhästen. There is a risk of burning, especially from exhaust systems incl. silencers. But there is also a risk from hot surfaces on the engine and hydraulic components. Therefore, always wear protective gloves and protective clothing when working.

Winch

- Pay attention so that the machine does not tip over when using a winch or that the wire is damaged during work. See separate instructions in chapter 6.6 for safe handling.

Lift



- Be careful when using lifting. Always keep a safe distance to avoid any falling load.
- When activating the float mode (Option 1), always make sure that the hoist is in its lower end position as there is a risk of the hoist falling.

Accessories in general

- Be careful when assembling and disassembling accessories to avoid crushing and crushing injuries. Make sure that the accessory has sufficient support during shutdown.
- Be careful when installing and uninstalling hydraulic couplings. Hydraulic oil spills may occur, see more info under the hydraulic oil section above.
- Be sure to follow the instruction and marking of hydraulic connections to avoid incorrect and dangerous movements of the accessories.

2.2 Emergency procedures

Introduction

This section describes how you can turn off the machine in case of emergency.

It also describes what you should do if you suffer a breakdown or that the machine has stopped, jammed or overturned.

Nödavstängning av maskinen

The remote control has an emergency stop control that can be activated if necessary, causing the machine to stop and stop the engine.



The machine also has a control for emergency stop.



The machine has overturned

If the machine falls over or rolled, follow these instructions:

Step	Measure
1	If the engine is still running, press the emergency stop on the remote control or the emergency stop on the machine. Turn the starter key to the 0 position. See more info in chapter 6.2
2	Try to roll the machine back as soon as possible to prevent fuel and oil leaks and oil from entering the air filter.
3	If necessary, use an external winch and preferably winch upwards to prevent the machine from continuing to "roll".
WARNING Never stand below the machine and secure the machine with ropes or wire ropes when winching	
4	Check the machine for damage. Wipe off any fuel and oil spills
5	Check if oil has escaped into the air filter
6	Restart the engine

3 Description of Järnhästen Essence®

About this chapter

This chapter briefly describes the main parts, function and principles of navigation of the machine

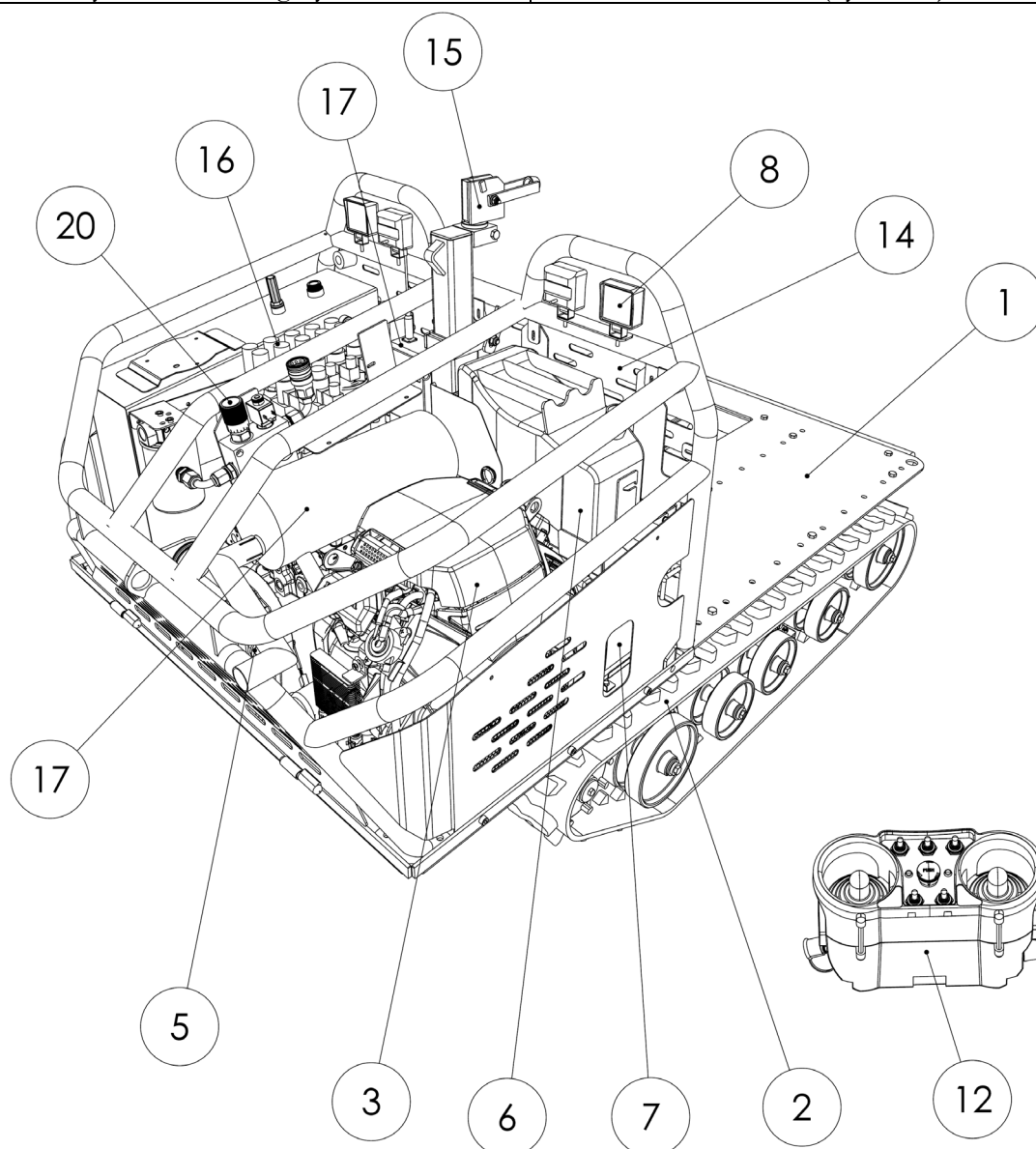
The chapter covers the following paragraphs:

3.1	Main parts of the machine.....	15
3.2	Operating principles	17
3.3	Approved accessories.....	17

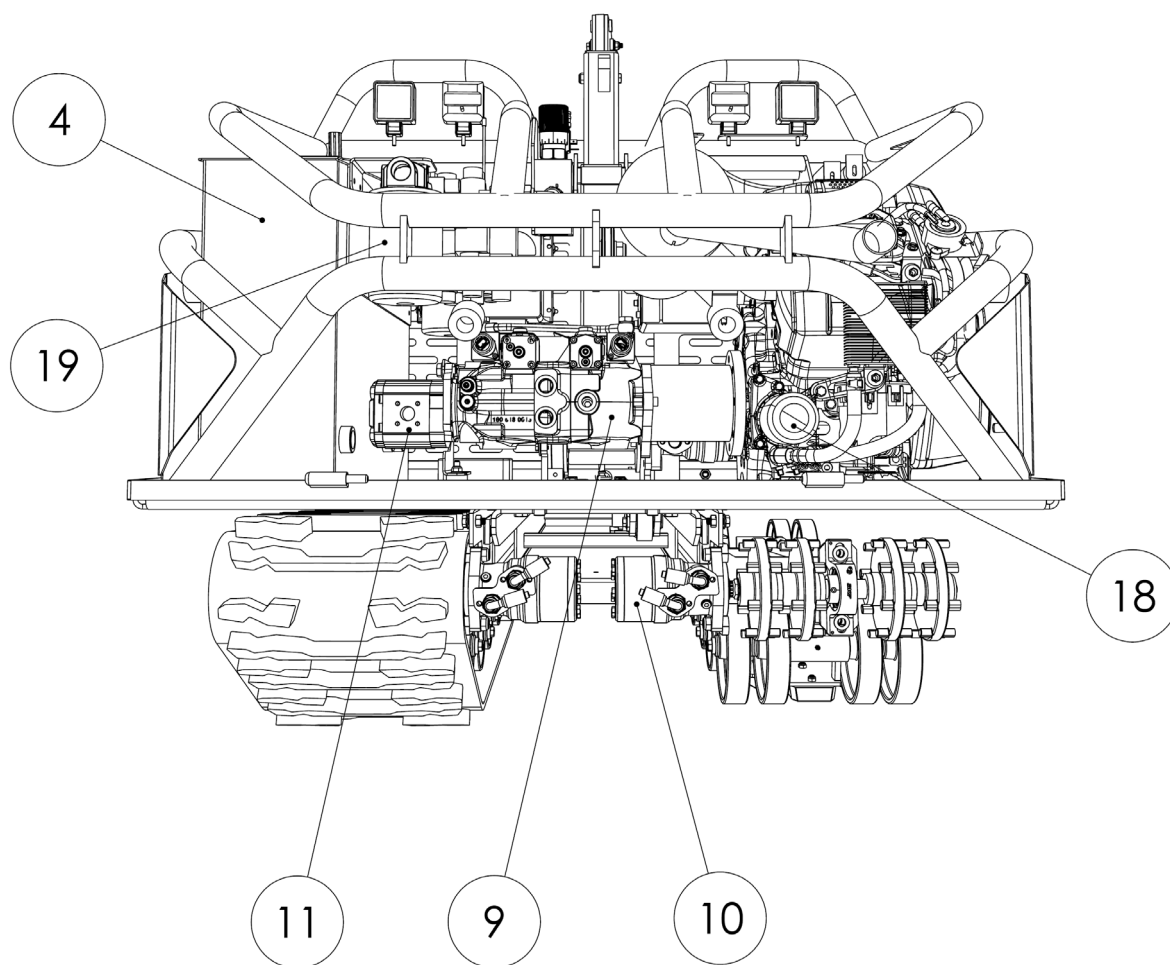
3.1 Main parts of the machine

Järnhästen Essence® consists of the following main parts:

1. Top movable chassis	11. Pump for secondary hydraulics
2. Lower chassis with drive system	12. Transmitter, radio control
3. Engine	13. Receiver, radio control
4. Hydraulic tank	14. Load protection
5. Olje cooler	15. Winch
6. Fuel tank	16. Hydraulic outlet
7. Battery	17. Silencer
8. Working lights	18. Oil filter (engine)
9. Hydraulic pumps for operation	19. Return filter (hydraulics)
10. Drive systems including hydraulic motors	20. Flow control valve (hydraulic)



1. Top movable chassis	11. Pump for secondary hydraulics
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8. Working lights	18. Oil filter (engine)
9. Hydraulic pumps for operation	19. Return filter (hydraulics)
10. Drive systems including hydraulic motors	20. Flow control valve (hydraulic)



3.2 Operating principles

Generally

The Essence® is designed as a remote-controlled load and tool carrier for use primarily in terrain.

The machine is powered by a gasoline engine that drives 2pcs. Variable hydrostatic pumps. These pumps then each drive a drive motor located in the lower chassis. Via the remote control, each belt can be operated individually, forward or reverse.

The position of the upper chassis can be moved relative to the lower chassis with a hydraulic piston, forward or backward to adjust the machine's centre of gravity and characteristics during operation.

The machine can work both forwards and backwards, and via a switch on the radio control you can also change the working position so that the controls for turning the machine are turned 180 degrees to make it easier to work with the machine when using tools intended for work "backwards".

The upper chassis is provided with 4 rows of threaded mounting holes into which various accessory brackets can be mounted.

Secondary or working hydraulics

A pump for working hydraulics drives the hydraulic functions needed and via the hydraulic jacks various accessories can be connected.

The control of the working hydraulics is controlled by various controls on the remote control. See chapter 5.1 for connection of accessories via hydraulic jacks.

3.3 Approved accessories

A number of approved accessories have been developed for Järnhästen Essence® and these are described in more detail in separate manuals and which are part of the complete documentation for the machine.



Please read these manuals carefully as they contain important safety information.

Customers who want to develop their own or other, by Lennartsfors AB, not approved accessories, are encouraged to contact us for advice.



Please note that function and safety are not guaranteed by Lennartsfors AB and that CE approval only covers approved accessories

4 Technical data

Measure

Dimensions (l x w x h)	1 933x1 157x1 194 mm
Loading platform	1 070x1 100 mm
Loading capacity	1 100 kg
Traction	1 100 kg
Weight	731 kg (incl. winch)
Ground clearance	190 mm
Width of each track	380 mm

Motor

Make	Honda iGX800
Number of cylinders	2
Effect	18,6 kW/24,9 hk / 3 600 rpm
Displacement	779 cm ³

Transmission

Transmission pumps	2 pcs. 0-13cc variable displacement
Driv motors	250cc
Pressure	170bar

Hydraulic

Pump, working hydraulic	14.4cc Gear pump
Flow	Max 50 l/min
Pressure	170 bar
Valves, sockets	3pcs double operating 1pcs single (constant flow) 1pcs free return

Electrical system

Voltage	12V
Battery	50Ah
Charging coil	17A

Radiostyrning

Make/model	Hetronic Nova L
Battery	3.6 V NiMH, 150mA. Normal continuous operating time: Min. 12h.
Frequency	434 MHz
Range	100 m
Safety	Active and passive stop function.

Volumes, types

Engine oil	1.8 litres 15W40
Hydraulic fluid	50 litres RENOLIN ZAF 32 XHV
Fuel tank	10 litres

Noise

A-weighted emission sound pressure level (L_{pA})	85 dB (A)
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5 Installation and start-up

About this chapter

This chapter describes the installation and start-up of the machine.

The chapter covers the following paragraphs:

5.1	Installing the product.....	20
5.2	Starting the machine for the first time	23

5.1 Installing the product

Delivery and unpacking

The machine is normally delivered unpacked from your dealer and no further installations need to be done.

However, on some occasions, unpacking and installation need to be carried out by the user:

Step	Measure
1	Remove wood and plastic packaging
2	Take out the box with tools and other documentation
3	Check for visible damage
4	Check the oil level in the engine as well as the hydraulic oil level
5	Check and, if necessary, charge the battery to the radio control

Identification and traceability

The nameplate contains information about machine type, manufacturing number, year of manufacture, manufacturer, CE marking, etc.

This information is important to know when ordering spare parts or in other contact with the manufacturer where the machine's identity is important.

Location and appearance as below.



Installation of uninstalled parts included with the delivery

The machine is delivered complete, but accessories can be supplied separately. It is important to carefully read the accompanying instructions for the accessory, which describes in detail how this is installed on the main machine.

Connection of hydraulic couplers

Connection of hydraulic equipment is done according to the table below. Connect the corresponding marked hose to the couplers.

On the hydraulic tank next to the valve package there is a label (see photo below) explaining hydraulic couplers 1-5 in accordance with the table.

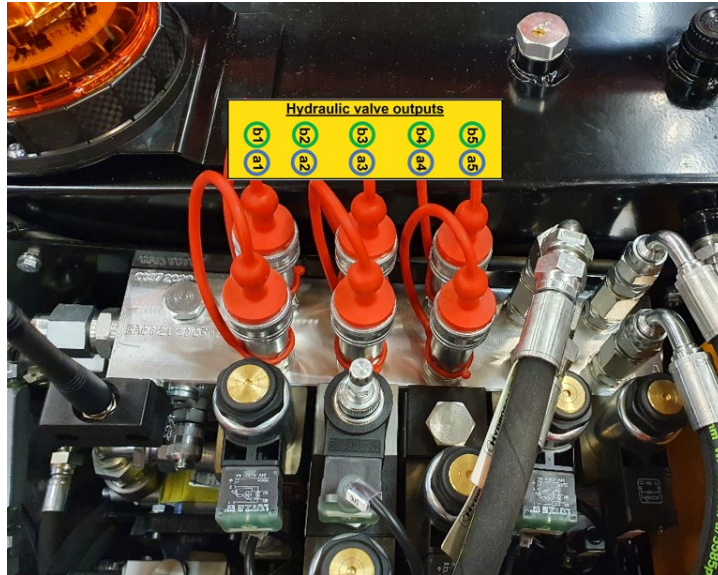
For withdrawal 6 see the next slide with explanations. Green marking indicates turn and blue free return.

Hydraulic couplers	Explanation
a1/b1	Extra
a2/b2	Lift, up and down (cylinder)
a3/b3	Lift tilt, up and down (cylinder)
a4/b4	Moving chassis, forward-backward (cylinder)
a5/b5	Winch, in and out (engine)
a6/b6	Feed

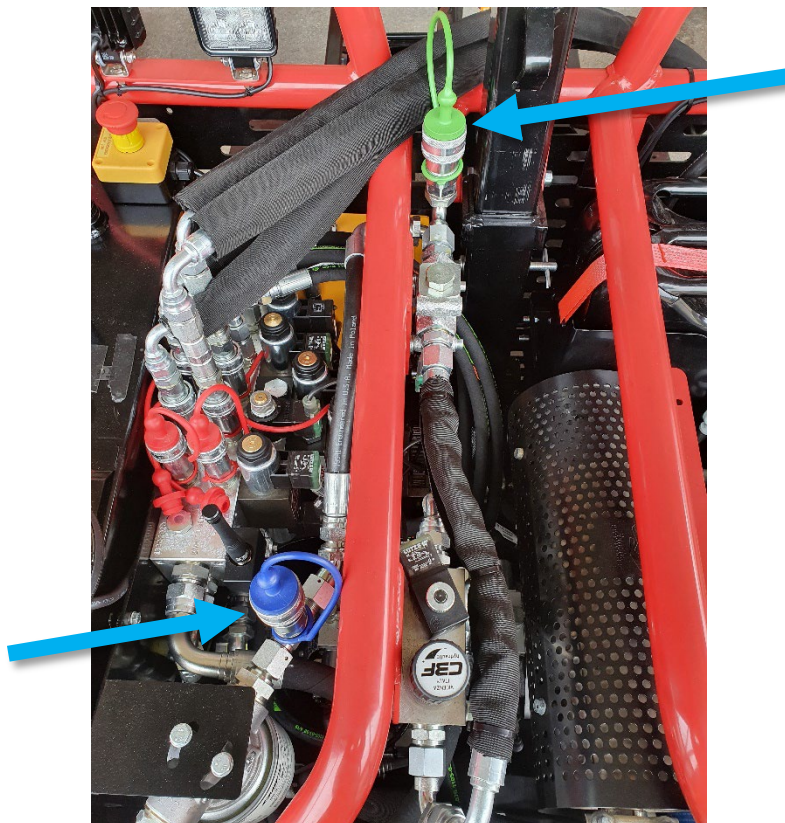


WARNING

Please note that it is important that hydraulic equipment is connected correctly to ensure that the machine works as intended and to maintain safety.



Hydraulic couplers 1-5 with descriptive label.



Hydraulic couplers 6. Green is turn and blue is free return.

5.2 Starting the machine for the first time

Introduction

The machinery is tested at the factory, but at the start for the first time it is recommended to do some extra checks

Start of the machine

Follow the instruction below:

Step	Measure
1	Make sure that the batteries in the remote control and the machine are fully charged.
2	Check the oil level in the engine and hydraulic fluid tank.
3	Check the removable fuel tank, make sure the lid is secured and no leaks have occurred. Check the fuel level and, if necessary, refuel or change the tank.
4	Check for any oil or hydraulic fluid leaks
5	Make sure that the machine is outdoors or in a well-ventilated room and that there are no obstacles to navigating the machine

6 Use of the machine

About this chapter

This chapter covers the basic steps fore, during and after driving.

The chapter covers the following paragraphs:

6.1	Pre-run check	24
6.2	Start and stop	25
6.3	Driving and navigation	31
6.4	Operating accessories	34
6.5	After driving	36
6.6	Use of integrated winch	37

6.1 Pre-run check

Introduction

Before driving, the operator should always perform a pre-run check to ensure safe handling

General review

Follow the instruction below:

Step	Measure
1	Check for hydraulic fluid leakage
2	Check any debris in the radiator and engine. Clean up if necessary
3	If necessary, check the removable fuel tank, make sure that the cover is secure and no leakage has occurred. Check the fuel level and, if necessary, refuel or change the tank. See Chapter 7.2 "Fuel Management" for safe handling.
4	Check that the drive belts and bogie wheels are free of mud, branches, snow and ice, etc. In winter, it is checked that the drive belts are not frozen against the ground.
5	Make sure that the machine is outdoors or in a well-ventilated room and that there are no obstacles to navigating the machine

6.2 Start and stop

Introduction

Description and instructions on how to start and stop the machine.

6.2.1 Start the machine

Follow the instruction below to start the machine:

Step	Measure
------	---------

- | | |
|---|--|
| 1 | Turn the main power switch to position 1 |
|---|--|



- | | |
|---|---|
| 2 | Check that the emergency stop functions are disabled on the machine and remote control. |
|---|---|



- 3 To turn on the remote control, turn the Switch B clockwise to position 1.
(Mode P is intended for programming functions only and then with a different key than the one supplied with the one supplied).
Then activate the remote control using the button A on the right side.
This must be done in order to start the machine in the next step.

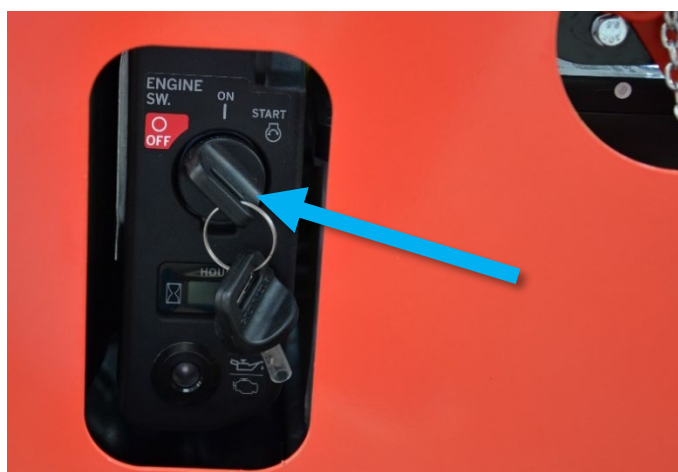


- 4 Turn the starter key to start the machine. The engine is an injection model and no choke is required in cold engines.
If the engine doesn't start after 5 seconds, release the starter key and wait 10 seconds, start again.
After starting the machine, the green button on the right side of the remote control must be pressed again to be able to change the speed of the engine.

If this does not work, start by checking that the remote control is on and activated as described in the previous point.
Otherwise, continue to check the fuel level, filter and battery voltage.

**OBSERVE**

Do not make more than 5 start attempts in a row as this can overheat the starter and damage it



Let the engine run for 2-3 minutes, especially in cold weather to allow the hydraulic system to warm up before driving.

6.2.2 Stop the machine

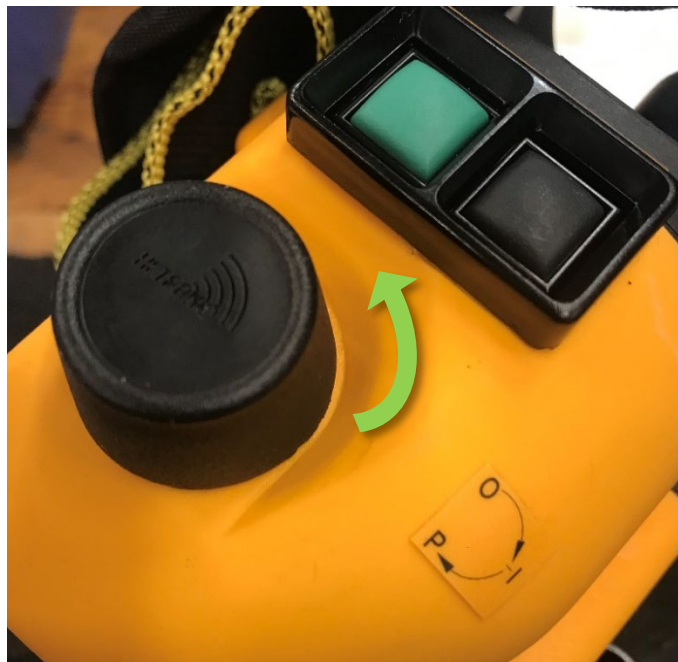
Follow the instruction below to stop the machine

Step	Measure
------	---------

- | | |
|---|---|
| 1 | Turn the starter key to the off position. |
|---|---|



- | | |
|---|---|
| 2 | Turn off the remote control by turning the slider counterclockwise to position 0. |
|---|---|

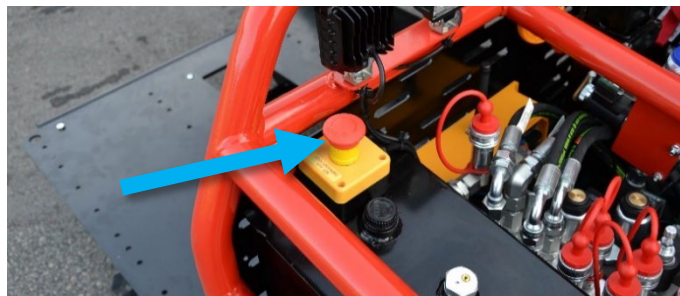


- 3 Turn the main power switch to position 0.



6.2.3 Emergency stop

Two emergency stop buttons are available to be used in case of danger or problems with the machine. One is located on the remote control and one on the machine.



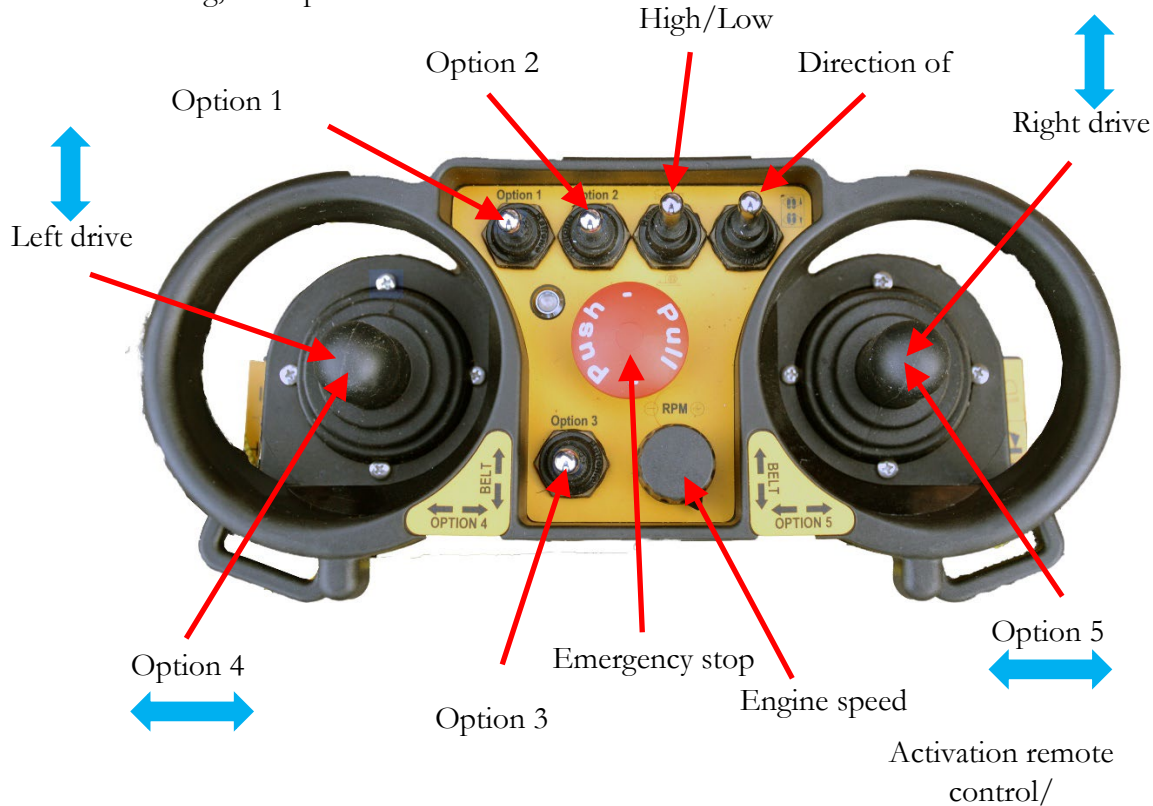
6.3 Driving and navigation

Introduction

Description of how driving and navigation are performed. Chapter 6.4 describes how accessories connected to the hydraulic outlets are operated.

The remote control

All navigation and activation of the operation of various functions except engine starting; takes place via the radio controlled Remote control:



Chassis movements



On-off remote control

Lights

Drive forward and backward

To drive the machine forward or backward, the two control levers on the remote control are gently pushed forward or backward at the same time (marked with "Belt" on the controller). The hydraulic pumps are variable, so the more the lever are pushed front or rear, the faster the machine runs.

Release the controls and the machine will stop immediately.

High/Low

On the control it is possible to choose between a high and low mode with a switch. This is only for speed control, thus there is no difference in gear ratio.



WARNING

Always maintain a safety distance of 5-10 m to the machine when driving.

Turning

To turn, one lever ("Belt") is activated more than the other.

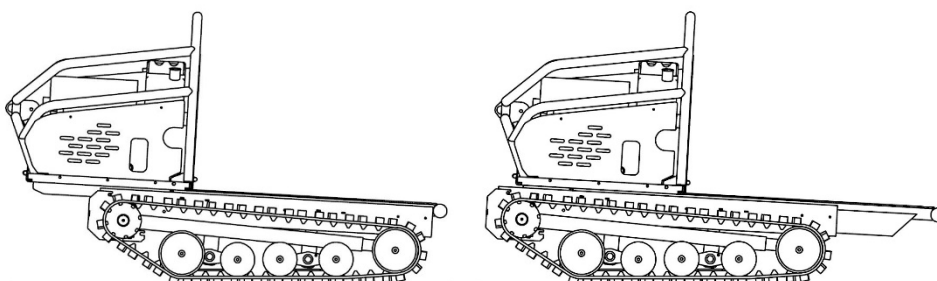
To "rotate on the spot", one of the control levers is moved forward and the other backward so that the machine eventually rotates around its own axis.

Driving uphill and downhill

When driving uphill or downhill, it may sometimes be necessary to use the possibilities of displacing the upper chassis relative to the lower chassis with the drive system. This means that the machine's center of gravity is shifted and adapted to the prevailing circumstances.

The maximum recommended slope is 20° (36%).

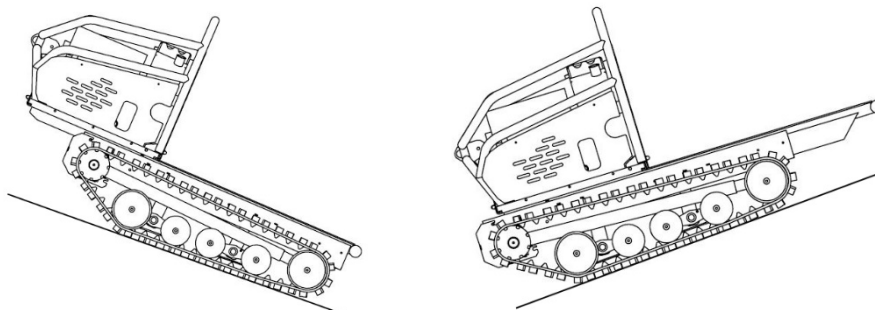
The chassis is moved using the buttons ("Chassis") on the left side of the remote control. Use + for backward motion and – for forward movement.



The pictures above illustrate the chassis movement.

On a steep slope, it is recommended to drive forward when driving upwards and reverse when driving downwards, if possible.

When driving forward on hills, it is recommended to drive with the upper chassis in the front position and for the corresponding downhill with the chassis in its rear position.



The images above illustrate the recommended chassis position when driving forward, uphill and downhill.

When passing ditches and smaller elevations, the chassis can also be moved with the controls to avoid any part of the machine getting stuck in the ground.

**WARNING**

Never stand below the machine when driving downhill!

Driving sideways in slopes

The machine can be driven sideways in slope, but then watch that the drive belts do not derail, especially under heavy loads and in combination with the machine turning.

The recommended maximum slope is 20° (36%).

**WARNING**

Never stand below the machine when driving sideways!

6.4 Operating accessories

Introduction

This describes in more detail how the various hydraulic outlets are operated from the remote control, which in turn are connected to the relevant accessories. For connection of the hydraulic outlets, see chapter 5.1
Also control of hydraulic flow with the flow control valve is described below.

The relationship of the different options with the hydraulic jacks

The different controls for "Option X" are connected to the different hydraulic jacks according to:

Option	Control valve (outlet)	Remark
1	2 and supply sockets (6)	2 different functions. The lever upwards provides float position for valve 2. Lever down - start and stop of supply outlets (6).
2	-	Not currently in use.
3	1	Extra withdrawals if necessary.
4	3	Lift tilt, up and down (cylinder)
5	2	Lift, up and down (cylinder)
Chassie +/-	4	Moving chassis, front and rear (cylinder)



WARNING

When activating the float position (Option 1), always make sure that the lift is in its lower end position as otherwise there is a risk of it falling down.

Hydraulic flow control

When using hydraulic attachments, the flow of the hydraulics may need to be regulated to adjust the speed of the accessory.

Control is done by turning the control valve that the arrow points to in the picture below. Counterclockwise increases speed (flow) and clockwise reduces speediness.

Be aware that using several hydraulic accessories at the same time will affect the speed (flow) of all accessories.



6.5 After driving

Introduction

Here is a description of the steps that should be performed after completion of the run.

Regular cleaning of the machine can extend the life of some components.

Perform the following steps

Follow the instruction below:

Step	Measure
1	Stop the machinery (see 6.2.2. for description).
2	Let the machine cool. WARNING Some surfaces of the machine may get hot – wear gloves.
3	Clean and clean oil coolers, engine intake grilles and soil and mud in the tracks. This is important to ensure that the machine runs as it should, but also to extend the life of it. OBSERVE Do not flush water directly against hot surfaces, electronics or cables, and motor. Too high a water pressure can damage components on the machine.

6.6 Use of integrated winch

Introduction

Here is described the use of the integrated winch (option).

Winching objects to the machine

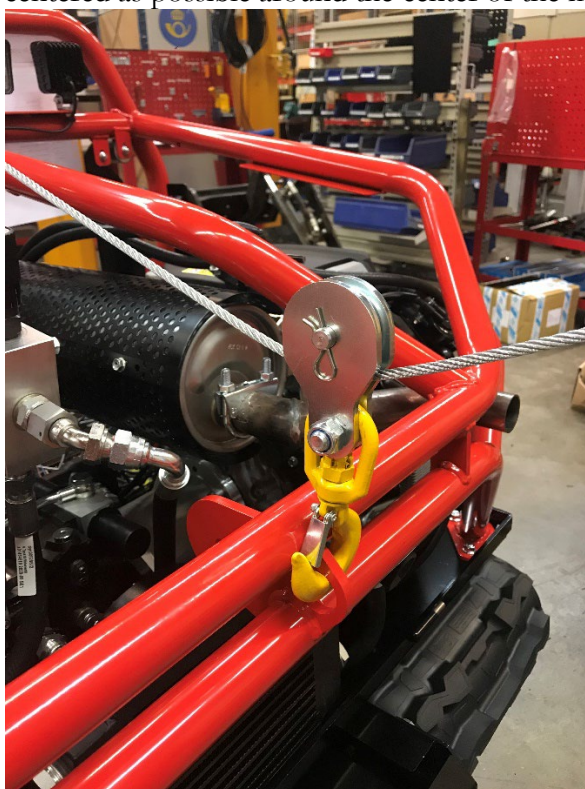
Follow the instruction below:

Step	Measure
1	Place the machinery in a location which allows the winch tower to be secured safely and the winch direction to be directed backwards.
2	Secure the machine using a rope to a fixed point, such as a tree, or equivalent that can withstand at least 1,000 kilograms of force
3	Unreel the winch cable with the designated remote control 
	At the same time, be sure to pull out the wire with your hand so that the winch drum does not continue to roll while the wire is not pulled out.
4	Attach the wire hook firmly to the object to be winched. If a free straight direction towards the machine cannot be achieved, use the throwing block to "carry off" in another direction.
5	To winch the object, press the remote control controls. Release the button immediately when getting stuck.

Winching the machine forward when stuck or towing heavy load

Follow the instruction below:

- | Step | Measure |
|------|--|
| 1 | Unreel the cable out in the direction of travel of the machine. Use the throwing block if necessary. |
| 2 | Route the cable via the breaker wheel to make the traction point as centered as possible around the center of the machine. |



- | | |
|---|--|
| 3 | Attach the wire rope to a fixed point that can withstand at least 1,000 kg of stress.
The attachment point must be located higher than the breaker wheel of the machine to create a slight "lifting" motion |
| 4 | Start the winching while driving the machine forward if possible |
| 5 | Stop the winch as soon as the machine has come loose and can go on its own. |



WARNING

Improper use of the winch may cause personal injury or machine damage. Always follow instructions and warnings.

7 Service and maintenance

About this chapter

This chapter describes the most common maintenance tasks and how to best store the machine in the long term.

The chapter covers the following paragraphs:

7.1	Maintenance of the different parts.....	39
7.2	Handling of fuel.....	42
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7.1 Maintenance of the different parts

Introduction

Here are described the maintenance steps for the different parts of the machine that you can normally perform yourself. If necessary, contact your dealer or authorized service center.

Chapter 7.2 compiles the maintenance points into a service schedule (a table of recommended intervals).

Maintenance often requires the machine to be lifted or hoisted up and placed on pallet jacks. See Chapter 9 section "Lifting the Machine" for instructions.

7.1.1 Engine

The engine is maintained according to separate operating instructions from the engine manufacturer.

Important with oil change, filter change and general cleaning, especially at the engine fan intake grille where light grass, and dirt can get trapped and prevent effective cooling of the engine

The left protective plate of Järnhästen (engine side) needs to be loosened to access the oil plug on the engine.

7.1.2 Chassis

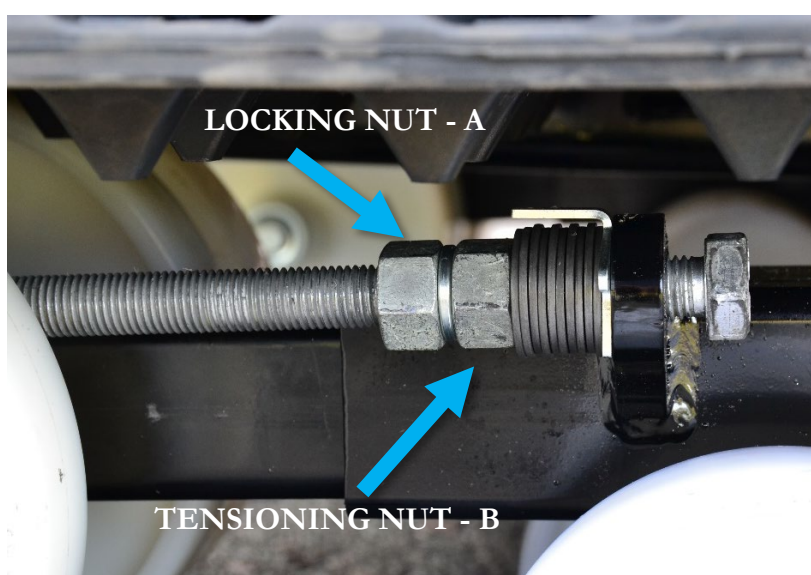
The chassis is generally checked for damage and the function of moving the center of gravity is tested.

7.1.3 Drive system

The drive system, which consists of wear parts such as drive wheels, bogie wheels and tracks, is checked for visible damage and wear.

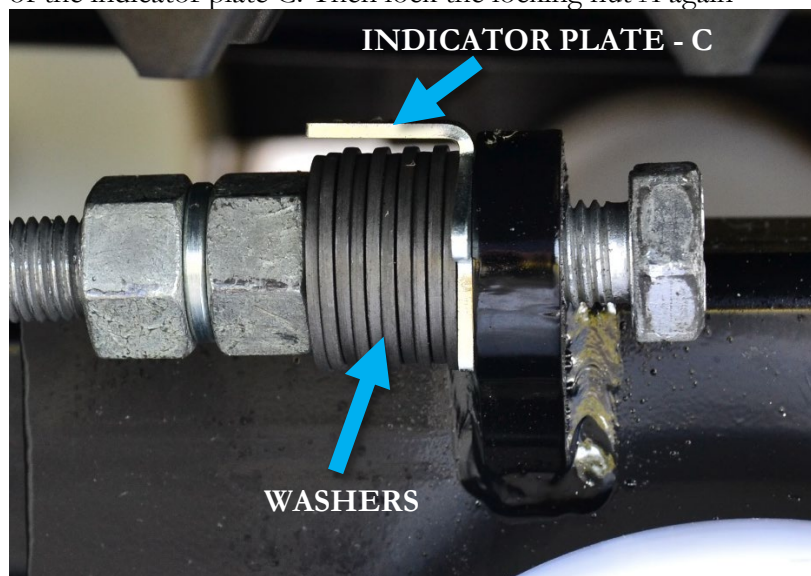
The tension of the tracks is checked and adjusted as described below:

Step	Measure
1	Hoist the entire machine or one side so that the track run freely.
2	Loosen nut A

**OBSERVE**

Correct track tension is very important to avoid unnecessary wear on the drive system and reduce the risk of detracking and breakdown in the field

- 3 Tension the track by adjusting nut B so that the washers on the threaded rod are pressed together enough to "fit" within the length of the indicator plate C. Then lock the locking nut A again



7.1.4 Transmission and hydraulics

Transmission and hydraulics are generally checked for visible hydraulic fluid leaks. In the event of a leak, contact your dealer for advice.

Return filters must be changed according to intervals in the service schedule, see Chapter 7.2. See Chapter 3.1 "Main parts of the machine" for placement of return filters.

7.1.5 Electrical system and control

Electrical systems are generally checked for damage to cables and connections. Lamps are checked and replaced if necessary.

Remote control battery is charged regularly with the supplied charger according to the service schedule.

Battery for machine does not normally need to be charged if the machine is running regularly.

In the event of prolonged stops or storage, it needs to be maintenance charged at regular intervals for best durability. See more under Chapter 7.4 Long-term storage.

7.1.6 Winch

Check for damage to the wire to the winch periodically. Change the wire if necessary so as not to risk creating dangerous situations when winching.

7.2 Handling of fuel

Fuel safety

Before use, always read and follow the engine's separate operating instructions with safety precautions for handling fuel.

The following is forbidden to do in the vicinity of fuel:

- To smoke.
- Having open flame or hot objects nearby.
- Having the engine running.



WARNING

Fuel used has the following hazardous properties:

1. The liquid, its vapors and exhaust gases are toxic.
2. May cause skin irritations.
3. Is highly flammable and explosive.

Recommended fuel

Always use unleaded gasoline according to the table below.
(taken from the engine's separate operating instructions).

Unleaded petrol	
USA	Pumped gasoline, octane rating of 86 or higher
Outside the U.S.	Petrol with an octane rating of 91 or higher
	Pumped gasoline, octane rating of 86 or higher

Refueling

Refuelling should take place in a well-ventilated area with the engine turned off and with the machine on an even surface. Allow the engine to cool down first if it has been running. Never fill up with fuel indoors where the gasoline vapors may come into contact with flames or sparks.

Never use gasoline that is old, contaminated, or mixed with oil. Make sure that dirt and water cannot get into the fuel tank. Clean the tank regularly and change the fuel filter according to the service schedule to avoid operational breakdowns.

Check and top up the petrol in the tank according to the points below.

Step	Measure
1	Wipe clean around the tank lid to avoid dirt in the tank and open the lid slowly to remove any excess pressure.
2	Check fuel level and refill the tank when the level is low. Where Care not to spill fuel.
3	Be sure to close the tank cap after filling to avoid leakage.

7.3 Service schedule

Introduction

The table below summarises the maintenance points at intervals and measures.

Service schedule chart

Subsystem	First 20h	Every 40h	Every 150h	Annually
<u>Engine and fuel system</u>				
Oil level	Inspect	Inspect		
Oil filter	Replace			Replace
Oil Replace				Replace
Air filter			Replacement in dusty conditions	Replace
Spark plug			Inspect	Replace
Fuel tank and hoses	Check for leakage	Inspect		Replace hoses/4yrs
Fuel filter				Replace
<u>Chassis</u>				
General inspection/injuries		Inspect		
Chassi movements			Inspect	
<u>Drive system</u>				
Rubber tracks	Inspect and tensioning	Inspect and tensioning	Internal wear Inspect	External wear Inspect
Drive wheels and axles			Inspect	
Bogie and bogie wheels			Inspect	
Detracking guides			Inspect	Replace if needed
<u>Transmission and hydraulics</u>				
Hydraulic pumps	Check for leakage	Check for leakage		
Valves, valve blocks	Check for leakage	Check for leakage		
Hydraulic motors	Check for leakage	Check for leakage		
Chassi movement piston	Check for leakage	Check for leakage		
Hoses, connections	Check for leakage	Check for leakage		
Hydraulic fluid tank	Check for leakage	Check for leakage	Replace filter	
Return filter	The filter is Replaced for the first time after 50 hours, then every 500 hours			
Radiator	Check for leakage	Leak check/cleaning		
Hydraulic fluid level	Inspect	Inspect		
Hydraulic fluid	Replaced for the first time after 500 hours, then every 2,000 hours			
<u>Electrical system</u>				
Battery		Inspect (Charge battery)		
Cables, connections	Inspect		Inspect	
Lamps & lighting		Inspect		
<u>Accessory</u>				
Wire to the Winch (Inspect/damage)			Inspect	

7.4 Long-term storage

Introduction

If the machine is not to be used for 6 months or more, here are instructions on how best to carry out long-term storage.

Generally

The machine should be stored under cover in temperatures between +0°C to +30°C and with a relative humidity not exceeding 65% for best durability and to avoid surface rust.

Engine and fuel

Follow the engine supplier's instructions for storing the engine and fuel in separate operating instructions.

Battery

The battery should be stored in a cool dry place (plus degrees). Disconnect the battery from the machine if it is not in plus degrees and maintenance charge it once a month to extend the battery life.

Use a charger designed for lead-acid battery (12V), with a charge current of no more than 17A.

8 Troubleshooting

About this chapter

Troubleshooting that can take place both in the field and in the workshop.
Below are explanations of the most common faults for each subsystem.

The chapter covers the following paragraphs:

8.1	Engine	46
8.2	Hydraulics	46
8.3	Drive system.....	47
8.4	Electrical system.....	48

8.1 Engine

Introduction

For troubleshooting of engine-related problems, refer to the engine supplier's owner's manual.

8.2 Hydraulics

Introduction

This section describes the most common problems that can occur to the hydraulic system with suggestions for solving the problem.

Frequently asked questions

The table shows troubleshooting for the hydraulic system.

Problem	Cause	Solution
Auxillary hydraulics to weak/slow/fast	Incorrectly connected accessory, incorrectly adjusted flow control valve	Check the flow and pressure of the different sockets, adjust the flow with the flowcontrolvalve to vary between fast or slow flows

	Faulty hydraulic oil	Use only prescribed hydraulic oil with proper viscosity and cooling-heating properties
	For cold or hot hydraulic oil	Check if the oil cooler fan is working, let the machine get to operating temperature in strong cold before using the hydraulics
Some hydraulic movements do not work	The electric valves do not "pull"	Check electrical connections and possible leaks

8.3 Drive system

Introduction

This section describes the most common problems that may occur for the drive system with suggestions for solving the problems.

Frequently asked questions

The table shows troubleshooting for the drive system.

Problem	Cause	Solution
Drive belts slide off sideways (detracking)	Too large side slope in combination with load	Do not attempt to drive on a constant side slope
	Incorrect track tension	Tighten the tracks
	Worn out detracking guides between the bogie wheels to support to the lugs of the track	Change detracking guides if necessary
Difficulty turning with high load	Too much friction against the ground surface	Shift chassis and load as much as possible backwards so surface to ground is minimized

8.4 Electrical system

Introduction

This section describes the most common problems that can occur for the electrical systems and control with suggestions for solving the problems.

Frequently asked questions

The table shows troubleshooting for the electrical system.

Problem	Cause	Solution
No contact between remote control and machine	Remote control tilt control activated	Activate the control again with the knob on the side
	Too little power in battery	Charge the battery or replace if necessary.
	Too far to the machine	Walk approaching the machine and/or make sure that the distance between the remote control is free of disturbing objects
Some electrical functions do not work	Fuse	Check the cause and, if necessary, replace the fuse

9 Transport, towing and lifting

About this chapter

For all transport and movement of the machine that does not take place via your own engine, it is important that the following instructions are followed.

Transport

When transporting (without packaging) it is recommended to drive Järnhästen on and off the transport vehicle. Make sure that the below points are followed.

1. Stop the engine
2. Make sure that the fuel filler cap and oil filler cap are securely in place.
3. Always secure Järnhästen frame securely with straps to the transport vehicle so that it does not shift or tip over during transport.
4. Remove the ignition key to prevent it from getting lost during transport.

Transport new machine

When transporting an iron horse on a pallet with packaging, it is easiest to lift it using a forklift. Always secure Järnhästen securely with straps to the transport vehicle so that it does not shift or tip over during transport.

Always wear gloves when unpacking a new machine.



WARNING

Make sure that the truck can lift at least 730kg (Iron horse's approximate weight without accessories).

Salvage

When salvaging ensure compliance with these points:

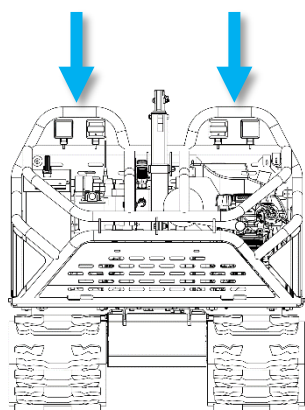
1. Stop the engine
2. If the machinery has overturned, follow the instructions in Chapter 2.2.
3. Attach the tow line as a starting point to the mounting loop at the front of the chassis. Alternatively, when salvaging backwards, the tow line can be routed around the pole and through the plate at the rear of the chassis. The machine should not be towed more than short distances.
4. Pull carefully and pay attention so the machine does not tip over, especially on inclines.

Lifting the machine

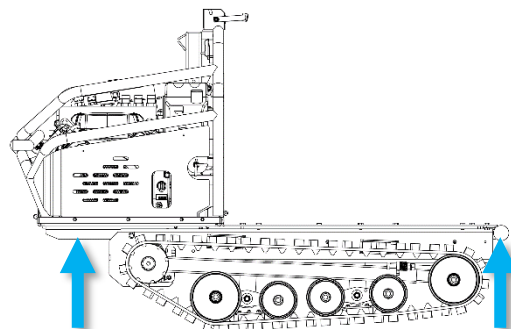
Lifting the machine is preferably done with a round sling in the pipe arches as shown below and with the chassis in the rear position for the best center of gravity (when the machine is unladen and without accessories). When lifting with accessories attached, the chassis may need to be adjusted front or rear for a better center of gravity depending on which accessories are mounted.

The machine can also be lifted with a jack and placed on pallet jacks. The machine needs to be in the front position to place the pallet benders. See lift points in the image below.

Always pay attention when lifting and never be under lifted load.



Lifting points for round slings



Lifting points for jacks and pallet benders.



WARNING

Always ensure that lifting takes place safely and always check that the lifting equipment (round sling) used can lift the machine (machine incl. winch weighs about 730 kg). Secure the machine with pallet jacks or equivalent for work under the machine.

10 Recycling and end-of-life

About this chapter

This chapter deals with the recycling and destruction of the machine.

Recycling and scrapping

When the machinery is used up, it must be recycled in accordance with the regulations in force. Contact staff specialized in recycling.

The machine is marked with fire and environmentally hazardous waste in the places where it is found.

11 EC declaration of conformity

Lennartsfors**EC DECLARATION OF CONFORMITY OF MACHINERY**

Original

Directive 2006/42/EC, Annex II, 1A

Manufacturer (and, where applicable, his authorised representative):

Company: Lennartsfors AB

Address: Lennartsfors 1, 672 92 Årjäng, Sweden

Ensures that:

Machine type: Järnhästen Essence

Machine No.: IH ESSENCE

Complies with the Machinery Directive 2006/42/EC.**Also complies with the following Directives:**

2015/30/EU, EMC

The following harmonized standards have been applied:

EN ISO 12100:2010 Safety of machinery — General principles for design — Risk assessment and reduction

The following other standards and specifications have been applied:**Competent to compile technical documentation:**

Name: Mikael Swartz

Address: Lennartsfors 1, 672 92 Årjäng, Sweden

Signature

Place/Date: Lennartsfors, 20 December 2020

Name:

Name clarification: Mikael Swartz

Position: CEO

12 Contact

Contact our support

Mail: support@lennartsfors.com
Phone: 0573-39200, select "Spare parts"

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