

# MINI DIGGER

# **SPRINGER-E**



Owner's manual

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#### 1. INTRODUCTION

This instruction contains basic informations of usage and terms of use mini digger Springer-E. Proper maintenance and the correct way to use the machine condition the safe and reliable operation. The procedures described in this manual are the optimal methods of working with the machine and perform maintenance. In order to reduce the likelihood of an accident and prevention of incidents as a result of which the machine could be damaged or cause to make it dangerous to be thoroughly familiar with the content of warnings and comments given in the instructions for the machinery.

Operators should carefully read all of this manual and observe all its recommendations.



#### Warning!

Do not operate the machine, do not start work and do not perform any of the actions before reading the instructions for the machine

Failure to follow these recommendations could be the basis for the withdrawal of the manufacturer's warranty for the product.

This manual must be readily available and always kept near the mini digger!

ELGO-PLUS reserves the right to change specifications, construction, instruction, and extension or modernization of the product without prior notice. ELGO-PLUS Company is not obligated to make such changes to previously manufactured machines.

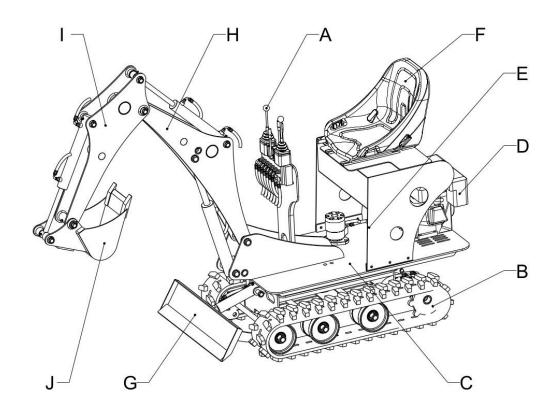
## Description of signs used in instruction:

$\triangle$	Warns that failure to follow instructions <b>may</b> result in serious injury, possibly death and/or destruction of equipment.
<u>^</u>	Warns that failure to follow instructions <b>will</b> result in serious injury and / or equipment damage.
İ	Symbol draws attention to important informations.

#### 2. MACHINE FEATURES

## 2.1. General descprition

The machine is designed for earthworks carried out in normal daylight conditions. If the machine is to be used for other purposes or have to work in a potentially hazardous environment, then follow the special safety regulations, and the machine itself should be equipped according to the working conditions. For further information, please contact the manufacturer.



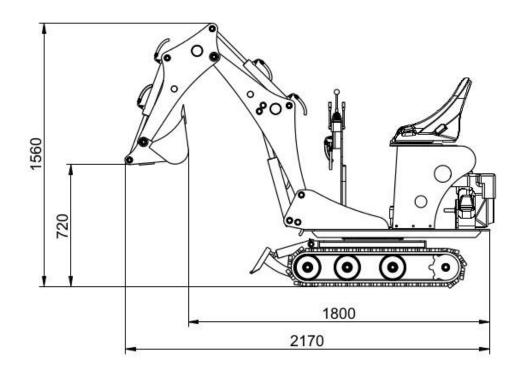
PIC.2.1 GENERAL CONSTRUCTION

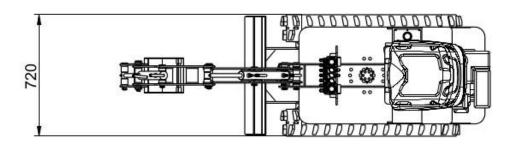
Α	Steering levers
В	Rubber track chassis
С	Rotatable body
D	Electric engine
E	Hydraulic pump
F	Seat
G	Support
Н	Arm
1	Jib
J	Bucket – changable equipment

# 2.2. Technical data

Engine	Electric engine Tamel 3SG1 12M – 4PC
Power	5,5 kW
Voltage (± 10% tolerance)	3x400 VAC/N/PE
Frequency (± 2%	50 Hz
tolerance)	
Electrical protection level	IP55
Electrical scheme	Included in instruction
Hydraulic pump	4 cc
Hydraulik tank capacity	17 L

Weight	450 kg
Rotation	360°
Digging depth	1,2 m
Work temperature	from 5 to 40 °C
Noise	No more than 85 dB(A)





PIC.2. MACHINES DIMENSIONS



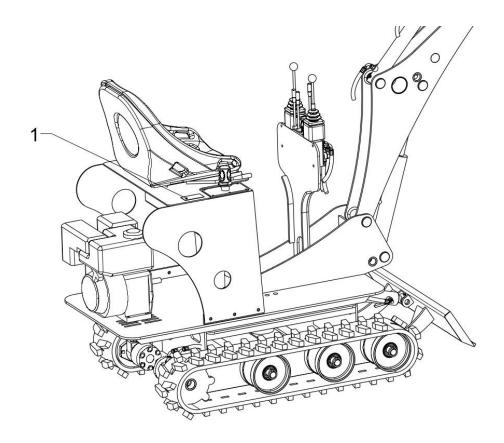
## Important:

Detailed information about drive unit located in the engine manual.

# 2.3. Equipment

Grading bucket 60 cm wide
Bcuekt (20cm wide)
Bucket (30cm wide)
Teeth ripper tool

# 2.4. Name plate



PIC. 2.3 NAME PLATE

1. Name plate
Contains information such as:
- CE marking
- The name and address of the manufacturer
- Machines model
- Serial number
- Year of production
- Weight of machine
- Rated voltage

#### 3. SAFETY INSTRUCTIONS

The mini diggers user duties are knowledge of and compliance with applicable laws, therefore, included safety instructions are only recommendations.

- The operator must be healthy and be at least 18 years of age.
- Mini digger must be maintained in good condition.
- Inspection and repairs can be carried out only after the machine is turned off
- It is forbidden to make unauthorized modifications to the machine without the manufacturer's consent
- It is forbidden to work the machine in explosive atmospheres and confined spaces without adequate ventilation
- Mini digger is not intended for public roads, it can only moves beyond them.
- It is forbidden to smoking and approaching other sources of ignition while refueling.
- The operator should exercise extreme caution when working, all people nearby mini digger should still be within his sight.
- Do not fill fuel other than what is recommended for the engine. Detailed recommendations are contained in the engine manual.
- Mini digger can be operated at the appropriate level of engine and hydraulic oil.
- Mini digger is designed to work in the daytime, in the case of work in conditions of limited visibility, it should be provided appropriate lighting equipment to the work area on Your own.
- It is forbidden to use the machine in clothing unsuitable for this or another that can cause danger (eg. long dangling pieces of clothing).
- It is forbidden to use the machine if the operator contamination with substances such as oil, grease, etc. that may cause a slip hazard.

Warning:



Before operating the machine, the mini digger user must have sufficient knowledge and read the instructions.

Unqualified user can cause serious injury or even death.

The contents of this chapter contains instructions and precautions that must be followed to ensure proper and safe operation and maintenance.

These rules do not exempt the operator from the obligation to comply with the law or other applicable rules regarding safety and health.

#### User responsibilities

The user is obliged to pay attention to the specific requirements and hazards during work as well as personal safety. This is necessary to prevent serious injury or damage, and even deaths.

#### Responsibility for other

It should work with the machine so as to avoid the risk of accidents and injuries. You have the right and obligation to prevent this. No one is allowed to enter the working area of the machine during its operation without prior notice to the operator. If someone must enter into the working area of the machine to perform a specific job, that person must exercise extreme caution and without the need not to move from the back of the machine or remain in a dangerous area

If someone is in the area of machine operation the operator must keep extra care. The operator can operate the machine only when you see this person, or if this person comprehensible signals to the operator, where it is located





Do not sit or stand on the machine on site suitable for this operator which would prevent safe operation of the machine.

## **Damages**

User duty is to report any damage or wear that could affect safety. During the inspection, maintenance and repairs, on-site operator allowed to stay only person with the required knowledge of operating the machine and knowledge of controls.

## Description of the marks on the machine



Warns that before using, the operator must read the instruction manual.



Symbol draws attention to take special care in time staying close to working mini digger.



Symbol informs about place, where the hydraulic oil valve is located.



Symbol informs that, the element marked with this symbol contains  $230\text{VAC} \div 400\text{VAC}$  circuits.



This symbol is located near the safety button and indicates the possibility of emergency stop using it.

#### 4. TURNING ON AND TURNING OFF THE MACHINE



#### Warning:

In electrical circuits there are dangerous for health and life voltages that can cause a shock or death.



#### Warning:

Do not modify the electrical installation without the written consent of ELGO-PLUS Company.

## 4.1. Connecting to the electric network





To ensure proper power supply to the machine by using an external power source (eg power generator), it should be remembered that it should have a power factor of approximately 30% more than the machine needs.



#### Warning:

All plugs and other electrical components should be clean and dry when plugged in.

#### Warning:



Before performing any operation check that the voltage and frequency correspond to those on the rating plate and in the documentation. The ELGO-PLUS company is not responsible for any malfunction of the machine.

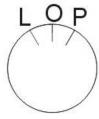
The machine is equipped with a power socket located next to the electric motor. Make sure the direction switch is set to "0" before connecting the power supply. Plug the power plug into the power socket of the machine.



PIC.4.1 Mini diggers connection socket



PIC.4.2 Engine rotation direction switch



RYS.4.3 Engine rotation direction switch – possible positions

L	Left direction of rotation
0	Engine is turned off
Р	Right direction of rotation

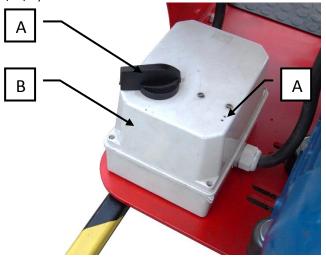
#### 4.2. Switching the direction of rotation of engine

The phase sequence in the junction box may vary depending on the work place. An incorrect phase sequence would result in a bad direction of engine rotation that could damage the hydraulic pump. The machine is equipped with a sensor of their order, which prevents such work.

The sensor only allows operation when the direction of rotation of the motor is correct.

The phase sequence sensor is equipped with LED indicators located on the direction switch housing.

Switching the direction of rotation is done by means of the cam switch type ŁUK. The switch has 3 possible positions (L, O, P).



RYS.4.4 Switching the direction of rotation of engine

Α	The switcher of ration direction
В	Switchers cover
С	LEDs diodes

To determine the correct direction of rotation, when the power plug is plugged into the socket, set the engine direction switch to "L" or "P". Then pay attention to the LEDs.

Poniżej przedstawiono w formie tabeli znaczenie sygnalizacji diod LED i zależne od nich dalsze postępowanie.

LEDs colours	Meaning	Procedure
Green	Power indication / proper phase sequence.	You can start the machine
Red	Not proper phase sequence	Change the direction of rotation with the switch (to "L" or "P") so that the green LED lights up.
There is no light	No phase / voltage asymmetry greater than 55V.	Ensure that the switch is not in the "0" position. Check the

	connection with an electric
	networ or other source of
	power

## 4.3. Turnig on the machine

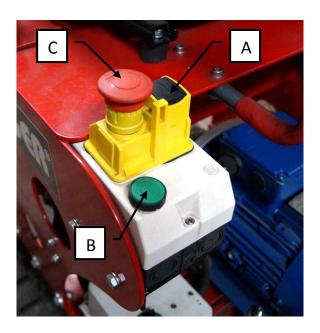


Warning:

Do not operate the mini digger before thoroughly reading the position and function of all controls.

Before starting, make sure the red stop button is unlocked. Then press the black button to supply voltage to the power supply.

The green button on the driver's seat is used to start the mini excavator. When pressed, the electric motor is switched on, which then drives the hydraulic pump. The machine is fully prepared to start work.



PIC.4.5 Turning on and turning off

Α	Button for supplying power to the engine power supply
В	Engine activating button
С	Engine stop button / Emergency stop button

#### 4.4. Stopping the machine / emergency stopping

The red button on the operator's seat is used to stop the electric motor. This button is also an emergency stop button. When it is pressed, the electric motor is cut off immediately, resulting in the stopping of the electric motor.



#### Warning:

Emergency stop should be used whenever the machine can cause personal injury or damage to equipment in the vicinity.

#### Restart the machine



#### Warning:

In the event of an emergency stop, do not operate the mini digger until the cause of the stop has been eliminated and make sure that the machine can operate safely.

In order to restart the machine, the red stop button must be unlocked. To do so, turn it clockwise until it bounces back up.

Once unlocked, you can start the machine with the black and green button on the operator's seat.

#### 4.5. Accidental disconnection of the power cord or power failure

The machine is protected against automatic start-up in case of power failure and re-occurrence. This may happen as a result of accidental disconnection of the power cord or when there is no power supply or power supply (eg power generator).

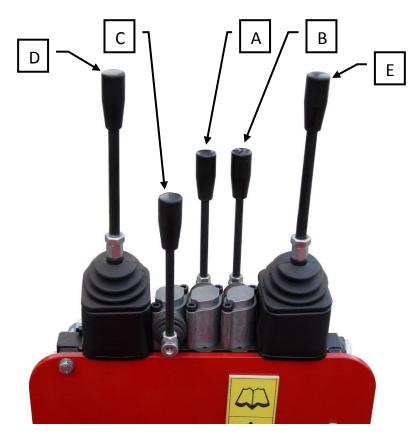
Press the green button next to the driver's seat to start working again.

## 4.6. Turning off the machine

To stop the machine, stop using the red button. Then unlock it and switch the direction switch to "0".

After doing so, you can remove the plug from the mains socket.

## 5. STEERING LEVERS



PIC.4.1 Steering levers

Α	Left track steering lever
В	Right track steering lever
С	Support position steering lever
D	Arm position and rotation steering lever
E	Jib position and bucket work steering lever

#### Left track steering (A, Pic.4.1)



- 1 forward in order to move track forward, push steering lever forward (A, Pic.4.1)
- **N** neutral track stops (the lever returns to this position automatically)
- 2 backward in order to move track backwards push steering lever backwards (A, Pic.4.1)

#### Right track steering (B, Rys.4.1)



- 1 forward in order to move track forward, push steering lever forward (B, Pic.4.1)
- **N** neutral track stops (the lever returns to this position automatically)
- 2 backward in order to move track backwards push steering lever backwards (B, Pic.4.1)

#### **Moving forward**

Push forward both steering levers (A and B, Pic.4.1), machine will go forward.

#### Moving backward

Pull back both steering levers (A and B, Pic.4.1), machine will go backward.

## **Turning left**

Push forward the right steering lever (B, Pic.4.1), the right track starts to move forward, the machine will go forward turning left.

Or:

Pull back left steering lever (A, Pic.4.1) the left track starts to move backward, the machine will go back turning to the left.

#### **Turning right**

Push forward the left steering lever (A, Pic.4.1), the left track starts to move forward, the machine will go forward turning right.

Or:

Pull back right steering lever (B, Pic.4.1) the right track starts to move backwards, the machine will go back turning to the right.

#### Caution!



It is forbidden turning in opposite movement of the two tracks, doing so may cause damage to the mini digger.

## Support position lever (C, Pic.4.1)

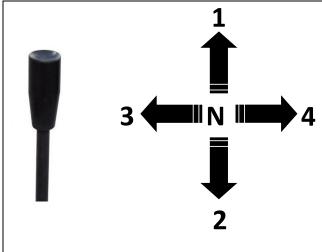


1 – support lowering

**N** – neutral position – support stops (the lever returns to that position automatically)

2 - support lifting

## Arm steering lever (D, Pic.4.1)



N - neutral position (arm stay in neutral position)

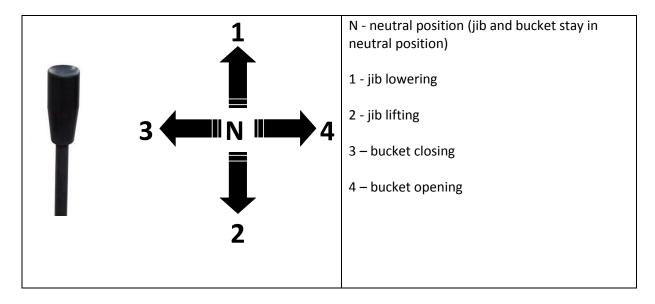
1 – arm lifting

2 – arm lowering

3 – turning left

4 – turning right

## Jib/Boom steering lever (E, Rys.4.1)



#### 6. USAGE

#### 6.1. Driving



#### Warning:

While driving, pay attention to the power cable of the machine, whether it is too tight or not damaged.



#### Warning:

Do not use the machine when the power cable is damaged, such as to cause electric shock.

When driving on flat ground, set back attachments and lift it off the ground to avoid knocked out of the terrain elements.

When driving on uneven terrain should move the machine so as not tilted to one side more than 10°.

#### Riding uphill

If the tracks are sliding on the slope, push the bucket into the ground and pull the arm backwards to facilitate the uphill drive.

### Riding downhill

In case of downhill riding, drive the mini digger as slow as possible.

#### Warning:



Do not change the direction of travel. Especially in case of change of direction in place stop the machine.

#### 6.2. Stopping

To park the machine choose flat terrain

- 1. Set steering levers in neutral position
- 2. Lower the bucket to the ground, keeping the bottom of the bucket parallel to the ground

#### 6.3. Parking

#### **Important**



To park the machine choose flat terrain. If you can not avoid parking on a slope, under each of the tracks to put a block of wood and push the bucket teeth into the ground.

Pay attention to weather conditions and take necessary steps to ensure that the machine is not frozen to the ground, plunged into it, or suffered other consequences

#### 6.4. Long term parking

Observe the parking instructions and additionally:

- Check the machine for leaks and if there are no damage to the working system and the crawlers.
- remove the accumulated soil from the caterpillars
- protect the units from exposure to atmospheric agents, lubricate the machine thoroughly
- fill the tank up to the maximum
- disconnect the machine from the power source
- protect the electrical outlet from moisture

#### 6.5. Working with bucket

Mini digger is a multi-purpose machine that can be equipped with a variety of specialized work equipment in order to perform many types of work. Below are described some operations

#### **Digging ditches**

Install a appropriate bucket for this kind of work. To work effectively set tracks in accordance with the direction of the ditch.

In the case of a broad ditches first dig on both sides of the trench, and then select the material from the central area.

#### Loading

In order to increase the effectiveness of the trolley set it in order to obtain a small angle of the mini diggers arm and good visibility for the operator

Caution:



- 1.Do not use inertia of driving the machine.
- 2.No dig, do not squeeze the spoons teeth into the ground using inertia driving the machine. This can overload the rear of the machine and damage the crawler drive.
- 3. Do not extend the hydraulic cylinder piston completely. This shortens the life of the machine. Work out as much as possible.
- 4. Do not use inertia of falling buckets
- 5. Do not dig by dropping the boom or use the spoons as a pickaxe. Digging with a stroke or continuous striking can damage the working system.
- 6. Do not perform crane work
- 7. Do not use inertia of the body rotation. This may damage the machine and its accessory.



Caution!

Always lower the support to the ground so that the machine is properly supported.





Pay particular attention to the difference in machine stability, depending on the angle of rotation of the body.

### 6.6. Transport

While transporting the machine, follow the existing rules on weight, width, height, length and anchoring loads.

Remove grease, oil, mud, ice, etc., from ramps or platform surface to prevent slipping off the machine.

#### 6.7. Loading of the machine

- 1. Turn on brakes of transporting vehicle
- 2. Put blocks under the wheels of transporting vehicle
- 3. Secure the ramps
- check the strength, width, length and thickness of the plank ramps is sufficiently safe for loading,
- pay attention to the angle of ramps was 15 ° or less.
- 4. Check that the left and right ramp are the same height.
- 5. Ride slowly to the ramps.



Warning:

When the machine is on the platform do not pull any levers except the drive lever.

- 6. Load the machine on a vehicle properly and ensure its secured
- 7. Turn off the engine.
- 8. After loading, put blocks under tracks and attached machine using transport belts
- 9. Disconnect the mini digger from power supply.

## 6.8. Equipment changing

 $\wedge$ 

Warning:

When striking the pins, there can break the metal debris and injured eyes

Always wear goggles, helmet and gloves.

- 1. Place the machine on a flat, sturdy and level ground.
- 2. Lower the light fixture to touch the ground.
- 3. Stop the engine.
- 4. Remove the bolts securing the mounting equipment to the jib and the jib cylinder.
- 5. Remove the bolts and remove the equipment.



Important:

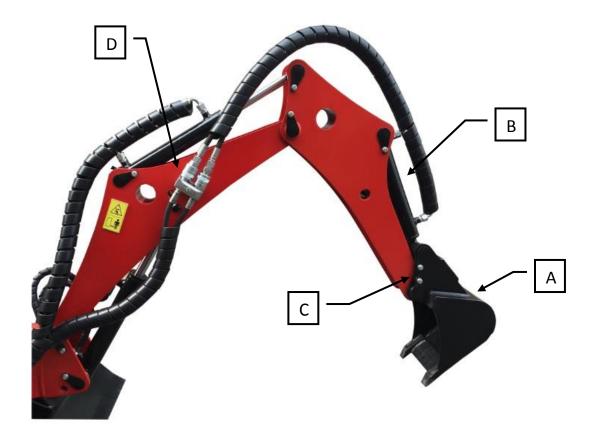
Keep pins clean.

# Warning:



Do not put your fingers into the holes in order to verify their concentricity, it can lead to serious accident.

- 6. Set the jib that the mounting holes are concentrically positioned fixture with jib holes / arm and the hydraulic cylinder.
- 7.Lubricate the inner surface
- 8. Put pins
- 9. Tighten the screw bolts..



PIC.5.1 Bucket changing

Α	Bucket - removal equipment		
В	Hydraulic cylinder		
С	Pins with protection		
D	Hydraulic quick connect nipple		

## 6.9. Before working



#### Warning:

Do not adapting these rules may result an accident, serious injury or death.

- Before starting the mini digger familiar with the contents of this manual.
- Defects and damages that affect safety must be removed before use.
- Do not operate the machine while under the influence of alcohol, drugs or other intoxicants.
- Dress in appropriate clothing that allows for safe operation.
- To increase the safety of the head is recommended to use a protective helmet.
- Do not overload the machine. Overloading adversely affect safety.
- Before starting the mini see if there is someone in her immediate vicinity.
- Check for leaks.

- Check for damaged or loose parts that could cause damage.
- Check if there is fuel in the tank.
- Check the hydraulic oil tank.
- Before driving check that the machine is not near other people.
- When it is very cold do not direct the machine to work hard after starting.
- Check that the power supply is in accordance with the instructions.
- Check the condition of the electrical wires for aging, cracks or rubbing.

#### 7. Handling



#### Warning:

A person who does not apply to the safety instructions and who ignore included warnings, must be sure that its approach work is safe.

#### Warning:



Before starting any maintenance work, disconnect the machine from the power source (unless it is necessary to carry out these operations) and make sure that there are no hazards due to other factors.

## 7.1. Service position



## Warning:

If you need to start working on the machine before it cools, watch for hot liquids and bands machine, which can cause burns.

#### Before working by the machine:

- 1. Set the machine on a flat, sturdy and level ground.
- 2. Working system should rest on the ground.
- 3. Allow machine to cool.

#### Warning:

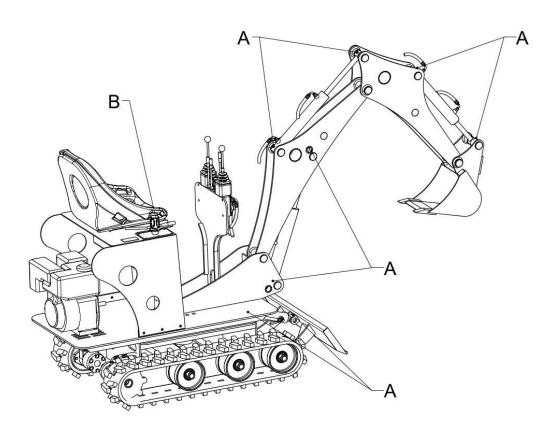


Improperly executed service may be dangerous. In order to carry out the service in the right way, make sure that you have the relevant knowledge, correct information and the correct equipment.

When draining / emptying avoid spilling oil. Oil spilled on the ground will harm the environment and can cause fire.

To work with the machine not to assume too loose clothing or jewelry that could get into the machine and cause damage.

Whenever required by your work wear personal protective equipment.

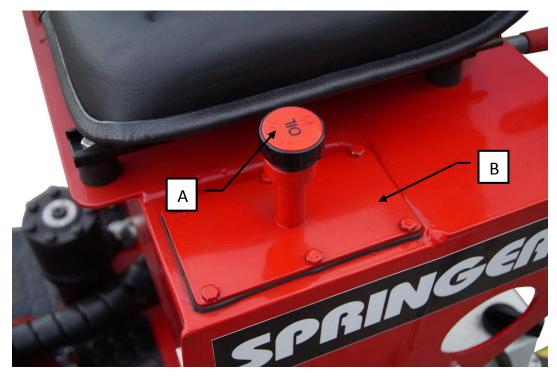


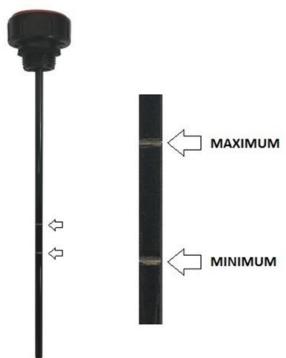
PIC.6.1 POINTS OF LUBRICATION AND HYDRAULIC OIL REPLENISHMENT

Α	Hydraulic cylinders and pins lubrication
В	Hydraulic oil replenishment

# 7.2. Hydraulic oil replenishment

Take care of proper hydraulic oil level. The tank is located under the driver's seat and has got 17 liters of oil.





PIC.6.2 HYDRAULIC OIL FILLING

Α	Hydraulic oil filler cap
В	Oil tank cap

The hydraulic oil level is checked with a bayonet placed under the oil fill cap.

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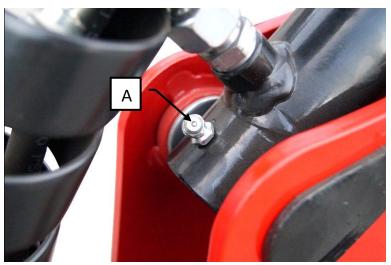
#### 1.1. Hydraulic oil replenishment

It is recommended that the oil and oil filter were changed once a year, assuming that the machine is working 8 hours a day. In justified cases, the exchange should be carried out frequently. The oil filter is located under the oil tank cap B (Pic.6.2).

Recommended hydraulic oil is AGIP ARNICA 46 or other with the same parameters (norm ISO L-HV and DIN 51524 t.3 HVLP).

#### 7.3. Hydraulic cylinders and pins lubrication

All points where parts are in move must be properly lubricated. Below there is exepmplary lubrication point, All these points are equipped with grease nipples. It is required to lubricate every time before working.



PIC.6.3 LUBRICATION

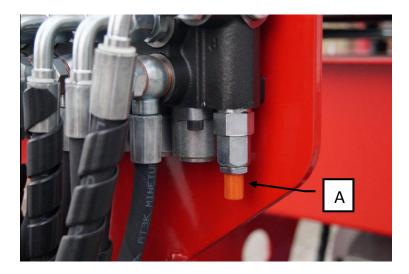
A Grease nipple

#### 7.4. Hydraulic pressure control

Warning:



Working pressure of the hydraulic system is factory-set to 140 atm. Regulatory made only in justified cases. Changing the operating pressure is not recommended for unexperienced users..



PIC.6.4 HYDRAULIC PRESSURE CONTROL

A Hydraulic system pressure regulater (under orange cap)

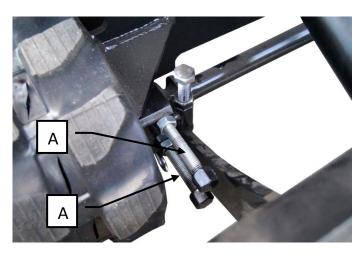
## 7.5. Tracks tension regulation



# Warning:

Do not use the mini digger when her tracks are too much or too little strained. Doing so may destroy them. Tracks tension should be checked every time before working.

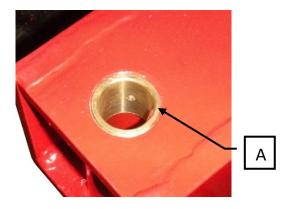
In case of too low tracks tension it is necessary to adjust it by using the adjustment screws on both sides of the mini digger.



PIC.6.5 TRACKS TENSION REGULATION

## 7.6. Brass pins changing

In the case of use of the brass pins, replace them with new ones. Knock out the pins out of the nest and embed new.



PIC.6.6 BRASS PIN

Α	Brass pin
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## Warning:

When knockig out the brass pins, there can break the metal debris and injured eyes. Always wear goggles, helmet and gloves.

## 7.7. Hydraulic oil tank valve

The hydraulic oil tank is equipped with shut-off valve. The valve is used when operating the hydraulic pump and preventing oil spills after disconnecting the hydraulic hose..



PIC.6.7 HYDRAULIC OIL TANK VALVE

Α	Hydraulic oil tank valve
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## Warning:



During operationing, the valve should always be in the open position, otherwise it may cause damage to the hydraulic pump. The valve should be closed only during the work-related hydraulic pump and while transporting the machine

## 7.8. Machine maintenance table

Regular mainten	ance	Every use	After first 5 hours of using	3months/ 50 hours	6 months/1 00 hours	12 months/ 300 hours
Hydraulic oil	Check level	x	X(1)			
	Change					Х
Pins	Check	х				
Screws	Check/tighten	х				
Lubrication	Perform	x(or 10h)				
Electric wires	Check	х				
	Check	Replace in case of damage				
Hydraulic hoses	Check	х				X (2)
	Check	Replace in case of leaks				

- (1) Empty the tank, when the oil filter is not heavily soiled, you can use it again.
- (2) Change the hydraulic hoses if a braid is visible.

Recommended hydraulic oil is AGIP ARNICA 46 or other with the same parameters (norm ISO L-HV and DIN 51524 t.3 HVLP).

Important:



Detailed information about the quality of fuel, lubrication and maintenance instructions of the drive unit are located in the engine manua.

### 7.9. List of major electrical components

Elements code	Name	Producer
GV2K031	Emergency switch	Schneider Electric
K30F003UP	Cam switch	Schneider Electric
B091118	-CKF-B Phase Controle Sensor	F&F
LC1K0610P7	Contactor	Schneider Electric
XB7NA35	Harmony-XB7 self-control	Schneider Electric
	button	
3SG112M-4PC	Electric engine	TAMEL S.A

All the above items are included in the electrical schema attached to the operating instructions.

#### 8. Spare parts

In the case of ordering spare parts, the information given on the machine's nameplate or the symbol from the part should be provided.



## Warranty card

- 1. Warranty for smooth operation of the device is granted for a period of 24 months from the date of purchase. Warranty does not cover consumable parts subject to normal wear (replace parts).
- 2. The manufacturer provides free repair, in case of under warranty against manufacturing defects.
- 3. The manufacturer provides to resolve the complaint within 30 days from the date of notification.
- 4. The buyer loses all rights guarantees in the event of unauthorized changes in construction or operation contrary to the instructions.
- 5. Any damage caused by improper transportation or storage device, its improper operation, maintenance and other reasons not caused by the manufacturer can be removed only at the expense of the user.
- 6. If the above mentioned causes have caused permanent changes in the quality unit granted the guarantee expires.
- 7. Machine repairing made during the warranty period by persons not authorized by the manufacturer will void the warranty.
- 8. Warranty does not cover direct and indirect losses caused by defective machine.
- 9. The warranty card is not valid without the date stamp and signature, as well as amendments and deletions made by unauthorized persons.
- 10. In matters not covered by these warranty conditions apply to the Civil Code.
- 11. The buyer cover the transportation cost for the mini digger to and from the service point or cover the travel cost for a service technician to the service point.

#### Mini digger SPRINGER-ELECTRIC

Purchase date:
Serial number:
Sellers stamp and signature:
SERVICE

Reporting date	Release date	Steps taken	Service
date			confirmation