

IMPORTANT! Before using the machine, read the safety and operating instructions! They are of help in the safe usage of the machine and for high reliability and long life.

## Only qualified, trained personnel should use the machine!

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#### **Preface**

This instruction manual applies to the Carrierturf lawn care machine from Carrier Turf Sweden AB.

The instruction manual is intended to provide the knowledge necessary for the operation and maintenance of the Carrierturf Aerator. The manual should therefore be read by operators and service personnel before the machine is put into operation.

There is also a section on **Safety precautions** in the manual that should be considered carefully during use and service.

AN ACCIDENT MUST NOT OCCUR DUE TO LACK OF KNOWLEDGE ABOUT THE CARRIERTURF AERATOR'S FUNCTION OR SAFETY REGULATIONS!

#### **Identification of machine**

For all communication regarding the Carrierturf Aerator, and especially when ordering spare parts, in order to ensure prompt attention the following information, which can be found on the nameplate on the machine, should be given:

#### Machine model

#### • Production year

In order for our product liability to be applicable, checks and maintenance should be carried out in accordance with the instructions.

Damage caused by misuse, improper use of the equipment or the use of other than genuine spare parts from Tielman will result in product liability ceasing to apply.

In all applicable parts the Carrierturf Aerator Model CRT 175 and CRT 225 meet the requirements of EU Machinery, Low Voltage and EMC Directives, and, therefore, a Declaration of Conformity has been issued.

#### **Carrier Turf - Aerator**

Carrier Turf specialises in the care of all types of turf such as football pitches, golf courses, park areas, etc. These machines are focused on being effective and versatile so that the customer has as much freedom as possible in the planning of their management. In order to create good conditions for a healthy and viable grass area, air is needed. With a working depth of max 15cm, this can be achieved. Aerating improves drainage while at the same time increases the soil's ability to absorb water. This reduces its sensitivity to different weather conditions. An important new feature is the equipping of the machine with grass seed and granulated fertiliser dissemination units.

We work actively to develop products with new accessories and to increase machine performance and production efficiency. We therefore reserve the right to make changes to the products without prior notification.



#### 1.1 Intended use

**Carrierturf Aerator Model CRT 175 / CRT 225** is designed for the management of all types of turf such as football pitches, racecourses and golf courses, etc.

Carrierturf is attached to a tractor and connected to the tractor's hydraulic system.

The CRT models are equipped with the System Knife toolbar, which is an efficient tool for oxygenation of larger lawns such as golf course fairways and football pitches, as well as a roller which smoothes the surface.

System Knife consists of 14 or 18 discs each with 7 knives that cut through lawn and lead oxygen down to the grass roots. The toolbar's working depth is controlled hydraulically.

Carrierturf is designed to be a versatile tool that can easily be adapted for different tasks:

Accessories include Brush to bring down grass clippings so that they can more easily be worked down into the grass, Universal disc instead of knife disc with 8 solid spikes/punches which are mounted on universal disc, a total of 14 discs for CRT 175 and 18 discs for CRT 225. An additional accessory is an air-driven seed drill.

## **Important!**

The full responsibility for how the machine is operated, transported, maintained and repaired, etc. rests with the owner/operator.

Carrierturf is intended to be used in unfrozen soil which is free from stones larger than  $\emptyset$  ?? mm. It can be used with the intensity that is usually required within sports fields, golf resorts, racecourses etc. provided that maintenance is carried out in accordance with our instructions. This particularly concerns regular cleaning and lubrication.

Use of Carrierturf for other applications, performance or operation modes can change its performance, reliability, and lifespan. Risky situations can arise and our warranty and liability can be repealed.

## Contact Carrier Turf to get any planned change approved.

#### 1.2 EC declaration of conformity

The machine is manufactured in accordance with Council Directive 2006/42/EC on Machinery. See the separate Declaration of Conformity.

The machine is in the applicable parts manufactured in accordance with the following harmonised standards:

**SS-EN ISO 12100:2010**, Safety of machinery - General principles for design - Risk assessment and risk reduction

SS-EN ISO 4254-1, Agricultural machinery General requirements ??

**Noise emissions:** Depending on how the machine is equipped for the various tasks that can be performed by it, and the soil type it is performed on, there will be some noise emission. The main noise in connection with use, however, is emitted from the tractor.

It is the holder's responsibility to take measurements of the noise level and, if necessary, introduce protective measures against noise nuisance caused.



## 2. Safety regulations

### 2.1. General instructions for machine owner and users:

#### What does the law say?

The Work Environment Act (AML) specifies the requirements for workplaces. It contains, for example, measures to:

- Prevent ill health, accidents and adverse effects.
- Create healthy and safe working conditions.

**The employer** must ensure that workers have the necessary training, and know what the risks are of the work that is to be performed.

**The worker** should be involved in the work to create a good working environment, and is obliged to comply with specific regulations, use protective devices and in general observe the caution required to prevent ill-health or accidents. If a serious danger is detected in the work to be carried out, the employer shall be informed of this as soon as possible.

It is therefore of crucial importance that You, before You start working with the Carrierturf Aerator, read this manual and understand its instructions for machine operation and its safety rules.

# AN ACCIDENT MUST NOT OCCUR DUE TO LACK OF KNOWLEDGE ABOUT THE CARRIERTURF AERATOR'S FUNCTION OR SAFETY REGULATIONS!

#### **Basic requirements for operators of Carrierturf Aerator**

Good eyesight and hearing
 Good judgement

Mental balanceSense of responsibility

PROPER USE, INSPECTION, MAINTENANCE AND OPERATION IS CRUCIAL FOR WORK SAFETY.

## **Training**

Carrierturf Aerator may only be operated by a person who has received the necessary knowledge about its management and operation, and been given permission to use it by the machine owner!

It is the responsibility of the machine owner to always ensure that operators and maintenance personnel are trained, and are kept informed of changes in the machine's operation.

# USERS OF CARRIERTURF AERATOR ARE OBLIGED TO BE FAMILIAR WITH THE INSTRUCTIONS AND FOLLOW THEM!

#### As a user of Carrierturf Aerator, make sure of the following:

- Is Carrierturf Aerator in functional condition?
- Does the intended work task match what Carrierturf Aerator is designed for?
- Which protective, mounting and safety devices should be used? Are they in good condition?
- Is the use of other special equipment required?

#### Note and take into account:

- Presence of unauthorised personnel.
- Other risk factors



## 2.2 Responsibility

This instruction manual is developed based on the knowledge and experience gained during the development of Carrierturf. The advice and guidance provided should be seen as a guide and gives absolutely no responsibility to Carrier Turf. The full responsibility for how the machine is operated, transported, maintained and repaired, etc. rests with the owner/operator.

There are conditions such as current weather, climate, soil type, etc. which require other procedures other than those specified here.

## 2.3 Owner's responsibility

- The tractor's capability and suitability for work with Carrierturf. Use of tractor: see Swedish Work Environment Authority regulations AFS 2004:6 And AFS 2008:8.
- That the tractor to be used is of suitable size and in good condition.
- The machine's installation and mounting.
- The connection of the machine's hydraulic hoses to the tractor SCV, and the identification of the various actuators' functions on the machine.
- The connection to the tractor's electrical system and connection to the electronic control system. Always make sure that the machine's male couplings and the tractor's female couplings are clean and free from contaminants before attaching.
- That the driver's cabin is set up so as to ensure a good working environment, especially concerning ergonomics, lighting, temperature and air quality.
- Setting of Carrierturf at the correct working height in relation to the towing vehicle. Marking a sufficient safety zone on every side of the machine, where only authorised personnel are allowed during operation.
- That a **safety zone with approximately 20 m radius** is set up around the machine. People or animals should not be within the working area of the machine during operation, or when the machine is connected to the tractor and the tractor engine is running.
- Maintain a ban on riding on Carrierturf, or sitting, standing or climbing on it.
- That operators and service personnel are competent and appropriate for the tasks involved, and informed about the risks involved in this work. Only people experienced in the use of similar machines may use Carrierturf.
- That the machine is not driven faster than what is allowed for different uses:

In transport with raised Carrierturf max 40km/h. When working on grass area max 15 km/h, with seed drill 12 km/h.

- Establishment of procedures for operation, change of attachments, inspections and maintenance.
- That the machine is secured from falling down e.g. when changing attachments.
- That the operator has the appropriate equipment for the task, including for example safety shoes, hearing protection, gloves, and not too loose clothing (as specified by the machine owner).
- That supplied protection is always fitted and in good condition when the machine is in operation.
- Measuring of noise levels and, if necessary, protective measures against noise nuisance. The main source of noise emission is the tractor.



- That the machine is cleaned in an appropriate manner for the environment, safety and hygiene. This applies to choice of cleaning product, location and tools, as well as methods.
- That lighting at the workplace is satisfactory, so that work safety, production efficiency and quality is maintained at a high level.
- That no unauthorised persons can be in the vicinity of the machine when it is in operation.
- That no unauthorised persons can access the machine to start and drive it.
- That the machine is driven on permissible roads, and that the ground is sufficiently viable for the tractor and the machinery, and has no deep holes or large bumps.
- To adapt usage to traffic conditions.
- That the ground worked on is appropriate, i.e. that there is no rock in the soil surface. This may damage the machine, and our quarantee does not apply for incorrect use of the machine.
- That a risk analysis should be established for the machine's current workplace, and that the necessary accompanying measures to achieve adequate safety are taken. In particular, coordination with adjacent machinery, buildings and equipment should be taken into account.
- Measuring of the total noise level and, if necessary, protective measures against noise nuisance.
- Knowledge about the management of, and upkeep procedures for, the lawns.
- Implementation of controls, service and repairs.

#### 2.4 Tractor

#### **Tractor capacity**

The tractor needs to have sufficient load-bearing capacity on the 3-point hitch and enough weight for the torque to be sufficient, i.e. front wheels should have good contact with the ground.

Recommended oil grade ISO 32

It is beneficial to use wide tyres to reduce harmful soil compaction. The tyres should also be as low pressure as possible (check with tyre manufacturer). If the tractor is equipped with front weights these should be removed unless they are required for stability reasons.

#### 2.5 Technical data

Carrierturf	CRT 175	CRT 225
Working width, m	1.75	2.25
Transport width, m	2.05	2.50
Transport height, m	1.2	1.2
Weight excl. water in roller, kg Standard tines are included.	550 *	640 *
Lift power requirement, kg	770	920
Tractor power requirement, kW	35	40

<sup>\*</sup> Up to 200 kg of water can be added in CRT 175 and 280 I in CRT 225.

Carrierturf is dimensioned for a maximum speed of 40 km/h when driving on public roads. When working on grassy ground max speed is 15 km/h.



#### **Accessories:**

PS-200 air seeder 200 litres.

Brush.

Universal disc instead of knife disc, 8 solid spikes or punches mounted on universal disc, in total 14 discs CRT 175, 18 discs CRT 225.

## 3 Safety precautions for use

## 3.1. Before the machine is put into service



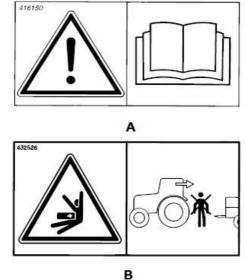
Always pay attention to the text or illustration by this symbol!



! This implement is intended for the compacting/cultivating of turf. Learn to handle the implement properly and carefully! The implement is dangerous in the wrong hands and when carelessly used.

Figure 3.1

# **3.2 Warning stickers**



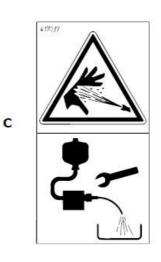


Figure 3.2



A Carefully read the instructions and make sure that you understand what they mean.

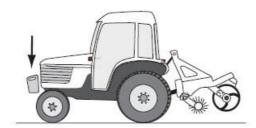
B Do not stand between the tractor and the implement when the tractor is backed up to be connected.

C Beware of piercing oil spray. Be very careful if hydraulic couplings are to be released from the implement.



Hydraulic oil is treated as hazardous waste. Use protective gloves when handling oil.

## 3.3 Other safety instructions



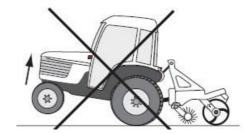


Fig. 3.3



! As the implement is heavy, front weights should be mounted on the tractor in most cases. Always make sure that the tractor has sufficient load on the front axle for safe transportation. See technical data

! Check that the tractor tyres are suitable for the weight of the appliance and that the tyres have the correct air pressure. Note that the load on the tractor's rear axle is heavy, particularly for road transport. Therefore, make sure that the maximum permissible axle load is not exceeded.

! Take into account the implement's width and swing radius during transport. Always follow national traffic regulations. The tractor driver is solely responsible for driving the vehicle and equipment in a safe way.

! Be aware that the implement is heavy and significantly extends braking distances.

! Use the implement's lighting in accordance with existing traffic regulations.

! Tractor and implement should be free from soil that can come off while the vehicle is travelling on public roads.

! Never go underneath the implement if it is only secured by the tractor's 3-point hitch!

! Never stand next to a pressurised hydraulic hose. During service work on the hydraulic system, any oil spills must be taken care of.



- ! Always make sure that the implement's male couplings and the tractor's female couplings are clean and free from contaminants before attaching the hydraulic hoses.
- ! Check that screws and nuts are tightened before driving.
- ! The implement should always be parked on a flat, hard surface. Release the support legs and fix with cotter pin. Lower the implement. The implement then rests on its support leg and roller.
- ! Always use Carrier Turf original spare parts to maintain the implement's quality and safety. The use of other than genuine parts will void all warranty and product safety assurances.
- ! Note that an incorrect welding can give rise to the risk of serious injury or death. If in doubt, contact a professional welder for instructions. Welding on the machine can produce toxic gases.



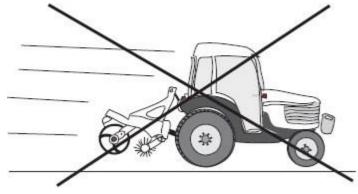


Fig. 3.4

- ! This machine/implement is dimensioned for a maximum speed of 40 km/h when driving on public roads. Note that national speed limits must be observed.
- ! Be aware that the implement is heavy and significantly extends braking distances.
- ! Nothing is urgent enough for safety to be ignored.
- ! Tractor and implement should be free from soil that can come off while the vehicle is travelling on public roads.
- ! Use the appliance's lighting in accordance with existing traffic regulations.



# 3.5 Location of signs on the implement

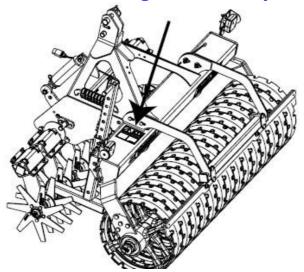


Fig. 3.5 Machine plates

# 3.6 Machine plates

## 3.6.1 Licence Plate



Figure 36

- A Model
- **B** Construction number

## **3.6.2 CE plate**

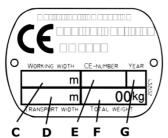


Figure 1.7



- C Working width
- D Transport width
- E CE number
- F Implement weight (kg). Total weight including System Knife, see also "Technical data"
- G Manufacturing code



## 4. DESCRIPTION OF CRT 175 & CRT 225



- 1. Mounting plate
- 2. Lift cylinder
- 3. Connecting hoses & power connection
- 4. Mounting plate for three-point hitch
- 5. Knife disc
- 6. Roller
- 7. Scraper
- 8. Arm on toolbar

Do not forget to empty the roller (6) of water during winter



# Accessories

# Universal disc



PS-200 seeder



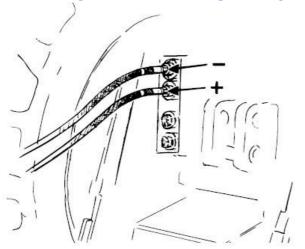
Brush





## 5 INSTRUCTIONS AND SETTINGS

# 5.1 Hitching and unhitching of implement

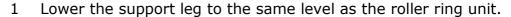


Fia. 5.1

## 5.1.1 Hitching

- 1 Hitch the implement to the tractor and connect the hydraulic hoses. Do not stand between the tractor and the implement when backing up the tractor to hitch to be connected!
- 2 Lift the support leg and secure with cotter pin.

## 5.1.2 Unhitching





- 2 Lower the implement onto a flat and stable surface.
- 3 Disconnect the hydraulic hoses and three-point couplings.

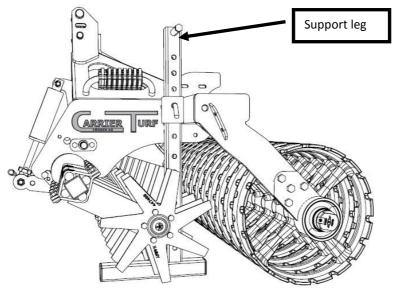


Fig. 5.2



## 5.1.3 Selecting of hitching points

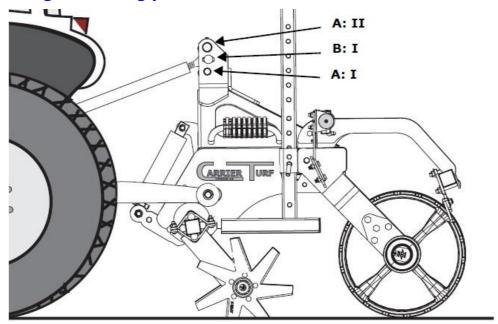


Fig. 5.3

The implement is designed for category I or II three-point hitching.

To minimize required lift power, the top link should be mounted on a high hitching point on the tractor and a low hitching point on the implement.

The round holes (A) are used if you want to use the length of the top link to adjust the height of the front part of the implement. When using these hitching points the tractor's hydraulic arms should be in float position when driving in the field.

The oblong hole (B) is used to adjust the height of the front part of the implement with the help of the hydraulic arm height setting. Adjust length of top link so that the cotter pin is in the middle of the oblong hole when the implement is parallel to the ground. Then fine-tune using the hydraulic arm height adjustment when driving in the field.

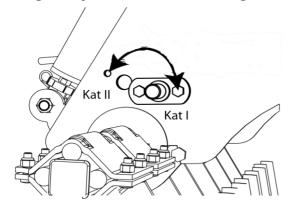


Figure 5.4

In kat II mode release the hydraulic arm attachments and moved them to their front positions.



## 5.1.4 Stabiliser bars on the tractor's hydraulic arms

! When driving in the field and during transport, the stabiliser bars for the tractor's hydraulic arms should be locked.

# 5.2 Adjusting work depth

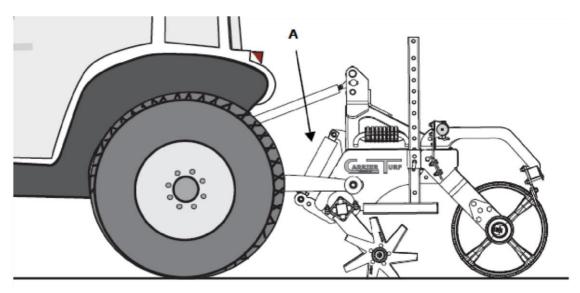


Figure 5.5

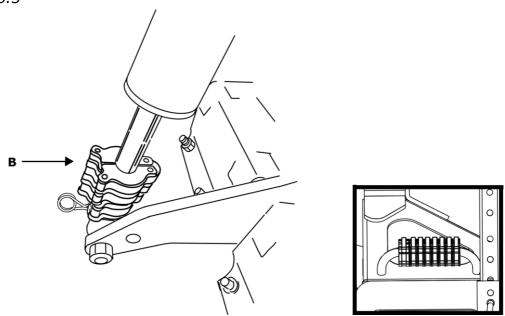


Figure 5.6

Disc depth is determined by the hydraulic cylinder (A). The piston rod can be supplied with clips (B) that fix the cylinder end. The more clips mounted, the shallower the depth. Clips that are not being used are stored in a hold above the frame.

## 5.3 Unhitching / changing implement



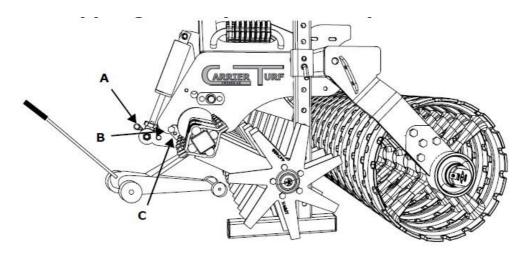


Fig. 5.7

- 1. Unhitch the machine. See "2.1.2 Unhitching" on page 11.
- 2. Place a small jack under the middle of the tool bar.
- 3. Loosen the cylinder in the lower attachment point (A).
- 4. Loosen 4 bolts (B) by the toolbar bearings and remove the brackets (C).
- 5. Lower the jack and pull away the toolbar.

#### **6 DRIVING INSTRUCTIONS**

## 6.1 Speed

Appropriate operating speed is 5-15 km/h.

#### **6.2 Irrigation system**

Pay attention to any irrigation systems (and other obstacles) in the ground.

It may be easiest to start work in an area by making the first passes near the sprinkler covers to then be able to work on the rest of the area with high efficiency.

Alternatively, the first pass can go straight over the sprinkler covers, but then the tool must be raised each time a cover is crossed.



#### 7 SERVICE AND MAINTENANCE

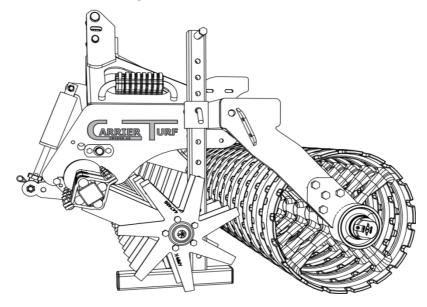


Figure 7.1

# **7.1** Securing of implement for service



• ! Unhitch the implement with support leg lowered. See "5.3 Unhitching" on page



#### **General on service**

# Maintenance work must be carried out by competent persons. Contact Carrier Turf if assistance is desired.

- ! Never stand next to a pressurised hydraulic hose. During service work on the hydraulic system, any oil spillage must be taken care of.
- ! Always use Carrier Turf original spare parts to maintain the implement's quality and safety. The use of other than genuine parts will render all warranty and product safety assurances void.
- ! Note that an incorrect welding can give rise to the risk of serious or even fatal injury. If in doubt, contact a professional welder for instructions.

## Checks to be carried out before every work session

- Check that hydraulic cylinders, couplings and hoses are not damaged or leaking.
- Check that power connections, cables and electrical components are undamaged.
- Check that screws and nuts are tightened.
- Check for gaps and wear and tear in joints and hydraulic cylinder attachments.
- Check that all signs are in place and legible.





Screws that make up a joint must not be tightened so hard that the conductive parts are crushed against each other.

#### 7.3 Operations manual

Checks and repairs performed should be documented in an **Operations manual**. See suggested layout below. This comprises: Date of inspection or repair, controlled status, repairs as well as information on who performed the inspection or repairs.

#### **OPERATIONS MANUAL - Service and Maintenance**

ce & maintenance
ce & maintenance ce & maintenance

#### 7.4 Storage

The machine should preferably be stored indoors or otherwise protected from rain when not in use as this helps the avoidance of corrosion.

Bright parts should be oiled over winter.

Clean the machine thoroughly before extended storage.

After washing, lubricate the machine in all grease nipples.

#### 7.5 Regular maintenance

- ! Lubricate the roller bearings 2 times/year and before and after winter storage. Bearings should also be lubricated after high pressure washing.
- ! Check screws, nuts and bolts are tightened before driving (not applicable to screws in moveable joints). Check tightness periodically during the season.
- ! Grease the piston rod before winter storage.



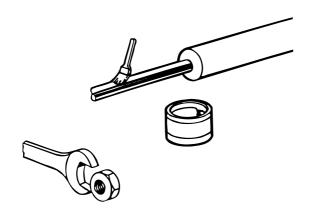


Figure 3.2

## 7.6 Adjustment of scraper

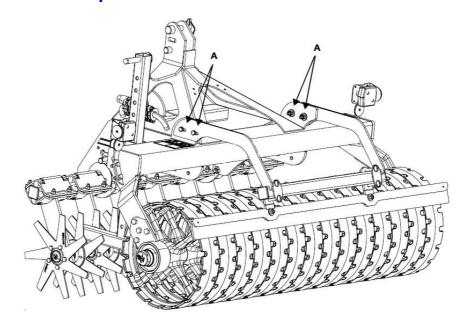


Fig. 7.3

The scraper should be mounted as close to the roller rings as possible. When worn, loosen the screws (A) and slide the scraper plate closer to the roller. Tighten the screws (A).

## 7.7 Knife replacement (System Knife)

Make sure that the toolbar is safely jacked up. For disc replacement, a ratchet or preferably an impact wrench should be used. Lock the disc with the help of a wood bock or similar so that it cannot rotate. The discs are sharp, so use gloves!

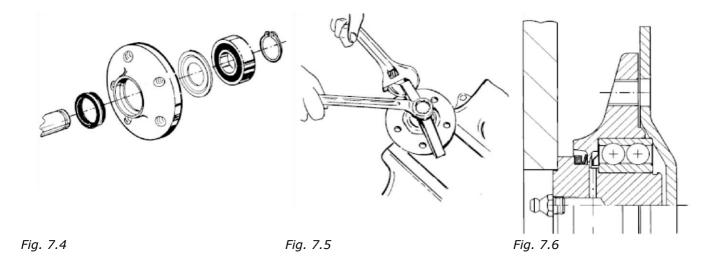
NOTE! Make sure that the toolbar is safely jacked up. Whenever working on the bearing dirt must be kept away!

The bearing has a ball bearing that is pressed onto the shaft pivot and locked with a Seeger ring. When removing it, circlip pliers and an extractor should be used.



When replacing the bearing, the new sealing rings should be greased. See Fig. for how the sealing components should be facing. The bearing must sit tightly on the shaft. Every bearing has a grease nipple that should be lubricated 2 times/year and always after high pressure washing, and at least once per season. Apply grease until it starts to come out.

## 7.8 Change of toolbar bearing



NOTE! Make sure that the toolbar is safely jacked up. Whenever working on the bearing dirt must be kept away!

The bearing has a ball bearing that is pressed onto the shaft pivot and locked with a Seeger ring. When removing it, circlip pliers and an extractor should be used.

When replacing the bearing, the new sealing rings should be greased. See Fig. for how the sealing components should be facing.

The bearing must sit tightly on the shaft. Every bearing has a grease nipple that should be lubricated 2 times/year and always after high pressure washing, and at least once per season. Apply grease until it starts to come out.



#### 7.9 Replacement of cylinder seal in hydraulic cylinder for toolbar depth setting

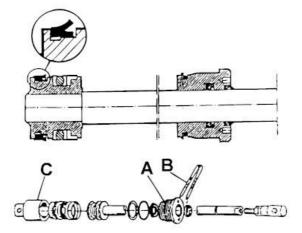


Fig. 7.8

- A Unscrew and remove the piston rod guide (A) with the pin spanner wrench (B).
- B Pull out the piston rod. The seal can now be replaced.

NOTE! Be very careful that the seals are facing the right way.

- C Check that the jacketed pipe (C) is free from scratches.
- D Assemble in reverse order.

Check with your fingers that the spill holes do not have any sharp edges. Scour with a fine abrasive cloth if needed.

Rinse the cylinder thoroughly before assembly. Mount the cylinder on the roller, see "Hydraulic diagram" on page 26 for cylinder placement, and bleed the hydraulic system as described in "7.11 Bleeding the cylinder" on page 23.

#### 7.10 Bleeding the cylinder

To bleed the folding cylinder, move the piston rod between its extended and retracted positions a few times until any air has been bled. During bleeding the cylinder should already be mounted on the tool!

#### 8 TROUBLESHOOTING

The functions of the machine are controlled by a chain with hydraulic and mechanical components, so the source of the problem can be difficult to find.

Troubleshooting work must be carried out by competent persons. Contact Carrier Turf or Your supplier if assistance is required.

#### 8.1 Hydraulic fault

Check that the hydraulic hoses are connected to the correct terminals on the tractor.

Check that quick couplers are not of the wrong type.

Check that the quick couplers are not worn or damaged in any way. Check that hydraulic cylinders, couplings and hoses are not damaged or leaking.



Check that all couplings on the machine are tightened properly.

#### 9 SPARE PARTS

All maintenance, replacement of parts and repairs shall be done with the relevant equipment taken out of operation and, if necessary, in service mode. Turn off the tractor engine.

Troubleshooting work must be carried out by competent persons. Contact Carrier Turf or Your supplier if assistance is required.

#### **General**

Only original spare parts should be used for replacement of parts. The warranty can otherwise be repealed in its entirety.

#### **Recommended spare parts**

It may be appropriate to obtain certain recommended spare parts for your own inventory. Contact us for suggestions on an appropriate inventory in regards to your circumstances.

### **Return of parts**

Do not return parts that have become worn through normal use or damaged by accident. Return worn, damaged or unusable parts if there is considered to be a fault under the warranty. In this case, return parts immediately, otherwise the right to compensation may be lost.

When returning parts, always include the data on the machine's nameplate, i.e.

Model

Construction number

Year

Describe under which operational conditions the damage occurred.

Do not forget to state Your administrator's name, address and telephone number.

#### **Ordering spare parts**

When ordering spare parts, please provide all data on the machine's nameplate.

Model

Construction number

Year

The spare part's article number or position number as given in the spare parts list Quantity

Spare parts drawings with parts lists are included as annexes



# 10. SPECIFICATIONS FOR REUSE



When the machine is finally destroyed it should be done in a way which promotes environmental considerations.

Carrierturf is made of recyclable materials, or of materials that can be reused. Specialist companies will take care of equipment that is no longer used and make use of material which can be reused. Oil is treated as hazardous waste.





# (in accordance with Machinery Directive 2006/42/EC Annex 2A)

#### Manufacturer:

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E-mail: info@carrierturf.se

Certifies under its sole responsibility that the following machine is in conformity with the Machinery Directive 2006/42/EC (AFS 2008:3)

Machine model: Carrierturf CTR 175 & CRT 225. Machine

number:.....

Year of manufacture: 2014 onwards

The undersigned is authorised to compile the technical documentation.

Västerås 2014-02-28

Carrier Turf Sweden AB Kjell Lilja

kýul lilja

CEO