



Rotary Rake

ZGR-420



Assembly Instructions

Rel. 08/24

Rotary rake pulled version - first assembly instruction – BELCO



ATTENTION: This document is only a supplement to the full manual which the user is required to read before first use!

Step 1

Prepare necessary tools:

Drill, impact driver, drill bit PH2, hammer, rubber mallet, metal clippers, ratchet, Allen wrench 5 – 1pcs, Allen wrench 4 – 1pcs, thread glue
wrenches: M13 – 1 pcs, M17 – 1pcs, M19 – 1 pcs, M22 – 1pcs,
sockets: M10, M13, M17, long M19 with extension, M32 and M36,
Pin punch – 10mm diameter
Pin punch – 20mm diameter
Oil
Tape measure
Use gloves

You'll also need a forklift, belts, and a belt with tensioner

You'll need at least 2 people to assemble the machine

Step 2

Remove the screws on top of the box with the PH2 drill bit and take off all the boards that were held on top of the box

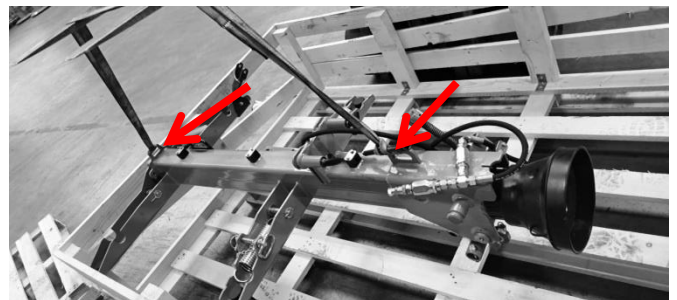
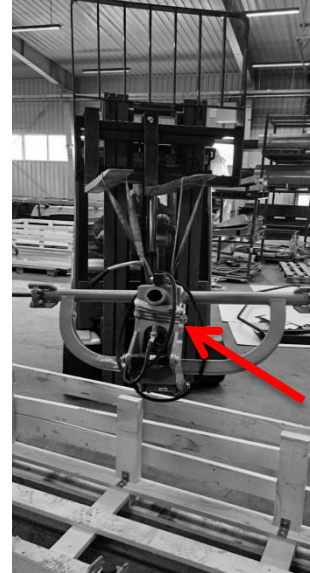


Step 3

After removing the boards, take out everything in the box

The tandem, gearbox, and body of the machine have to be removed from the box using a forklift
The red arrow shows the location where to fixture the parts with the belt

Gently place all the items from the box on the floor on either cardboard or bubble wrap so they don't get damaged. We will be using all of them individually in the following steps



Step 4

**We start the assembly with the tandem
Attach it to the fork lift and hold it slightly above
the ground
We will attach the wheels next**



Step 4.1

**Before attaching the wheels, assemble them. Use
the Long M19 socket on your impact driver.
Each tandem has the nuts for assembly on its axle.
Unscrew the nuts, place the wheel in place, and
tighten the nuts, securing the wheel in place.**



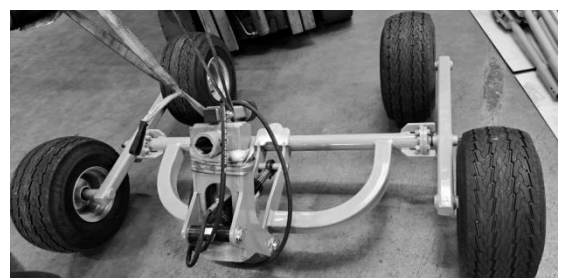
Step 5

**Take the 2 tandem wheels and attach them to the
axle at of the tandem
Make sure the wheels face outward on the
backside of the tandem when you are attaching
them (see picture for reference)**

**After the wheels are attached, you can lower the
unit to the ground**

**On one of the tandem wheels is a small bag where
the necessary items for fixturing the wheels to the
axle are located.**

**It contains 2 washers, 2 nuts, 2 bendable pins, and
2 rubber sleeves**



**First place one washer on the screw and then
screw a nut onto the screw
To tighten the nut, use the M32 socket on the
impact driver**

**Make sure not to tighten the nut completely.
The tandem has to have some room to still move.
Tighten it just enough, so that the wheels can still
copy the terrain freely**

**To secure the nut use one pin from the bag and
run it through the slot in the nut and the hole in
the screw**

**Use a hammer to insert the pin so its head is
almost flush with the thread of the screw
Bend the longer arm of the pin all the way around
so that it wraps around the top of the screw. Clip
off about half of the shorter arm of the pin and
use a hammer to bend it downward, so that it
interlocks with one side of the nut.**



After you're done with that, slide the rubber sleeve over the nut and partly over the bushing of the tandem you just fixtured, to seal it

Repeat the same procedure of fixturing the tandem on the other side using the remaining parts from the bag



Step 6

Installation of the gearbox in the tandem.

Lift the gearbox with the forklift and hover it over the tandem you just assembled.

Make sure the drive shaft of the gearbox is facing away from the cylinder on the tandem (see picture for reference)



Step 6.1

Remove the 2 zip ties holding the keys on the bottom of the gearbox shaft and align the keys with the slots in the upper bushing of the tandem.

The bushing on the tandem has 2 Allen 5 screws in it. Make sure to loosen them before installing the gearbox shaft.

Use oil on the shaft of the gearbox to make the installation easier



Step 6.2

After oiling the shaft, the gearbox should slide into place



Step 6.3

Secure the gearbox on both sides using the Allen wrench 5 on the 2 screws on the sides. Remove the screws completely and apply thread glue to them. Screw them tightly into place.



Step 7

Now we will attach the gearbox to the body of the machine. To start, you'll need to lift the body with a forklift and bring it closer to the gearbox

**Before attaching one to the other, remove the 4 bolts that are attached to the front side of the gearbox, where the drive shaft is coming out
The bolts should come out without any problems, but if they appear to be stuck, use a M22 wrench to loosen them**

We will use them again in step 7.3



Step 7.1

For easier assembly, we will also remove the 2 shafts on both sides on the rear of the body of the machine

They are located next to the springs

Remove the bendable pin and slide the shaft out of the hole.

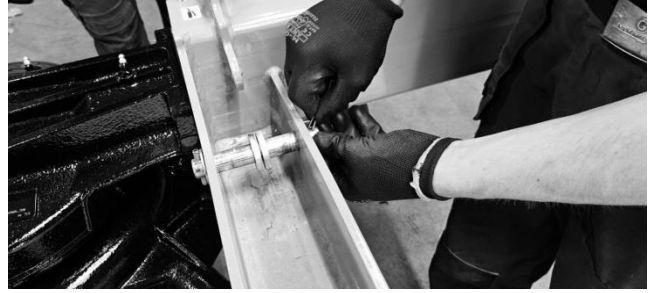
Make sure to **ONLY** remove the bendable pin!

On the other side of the shaft, a dowel pin is already installed. That one is not to be removed

Remove both shafts and collect all the washers that were installed on them. You can put them to the side. We will use them later.

You should have 2 shafts (both with a dowel pin in them), 4 thin washers, 4 thick washers, and a bag with extra dowel pins (it is attached with a zip-tie to one of these shafts)

Make sure to keep the bag for later to install the shafts in later steps of the assembly



Step 7.2

Now that these shafts are removed, we can attach the gearbox to the body.

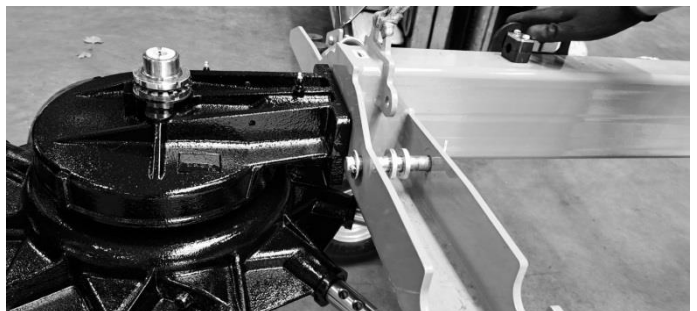
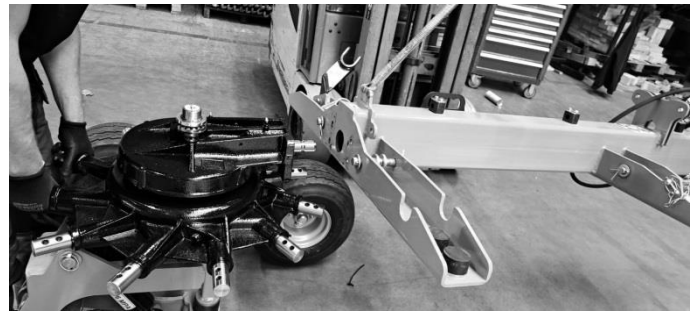
To do that, use the forklift to move the body up or down in the air in order to find the right height to fit the drive shaft of the gearbox into the drive shaft located on the back side of the body.

Make sure the drive shaft of the gearbox slides completely into the drive shaft in the body of the machine.

Do not force it in. You can lightly move the arms of the gearbox to rotate the drive shaft of the gearbox so that its slots fit into the slots in the body.

Once you're done, the gearbox and the machine body should be connected.

Next we will install the blots you removed in step 7



Step 7.3

Take the bolts (together with the washers that were attached to them) and apply some thread lock glue on the thread.

First lightly screw all 4 bolts into place.

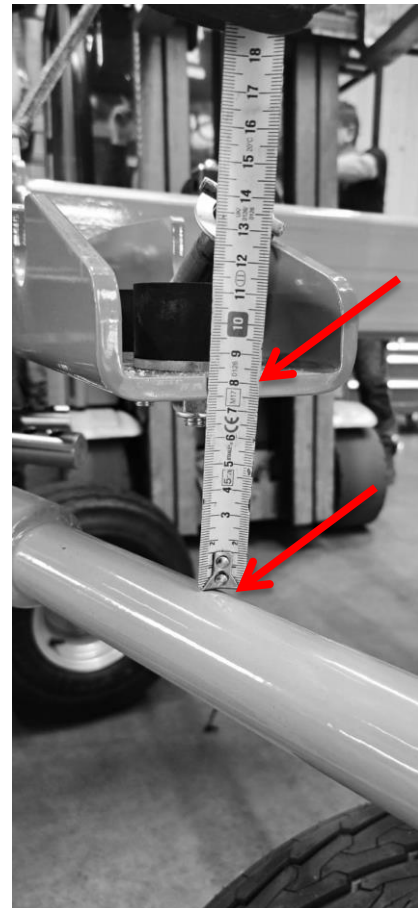


Before we tighten the bolts we have to first check if both ends of the body are leveled.

To do that, take one of the rake arms and temporarily install on the gearbox. We will use it as a gauge to measure the distance between the body of the machine and the rake arm.

Measure the distance as shown on the picture. It should be around 80mm from the top of the rake arm to the upper side of the U-profile (both points are marked by an arrow on the picture)

After you achieve the same measurement on both sides you can tighten the bolts using an M22 wrench and take the rake arm off.





Step 8

Now we will attach the drawbar to the body.
Prepare the drawbar and place it close to the body
of the machine.



Step 8.1

Remove the securing pin from the shaft under the
cylinder in the front of the machine.
Use the 10mm pin punch to extract the shaft from
the hole.



Step 8.2

Right under the shaft you just extracted is a smaller one. Take out the security pin from it and remove this shaft also.



Make sure to reinstall the plastic distance rings if they fall out during extraction of the shaft. The plastic ring is marked on the picture with an arrow



Step 8.2

Remove the nut and washer from the shaft coming out of the drawbar. Install the shaft into the bushing at the bottom of the cylinder on the side.



Lock the cylinder in place using the washer and nut we removed from the drawbar shaft.

Use the M36 socket on your impact driver to tighten it

Make sure it's not too tight, so it can still move without friction when adjusting it.



Step 8.3

Now we will fit the bushing of the drawbar into the slots we just removed the shafts from

To make installation easier use the adjusting screw of the cylinder to find the right position for easy installation of the part.

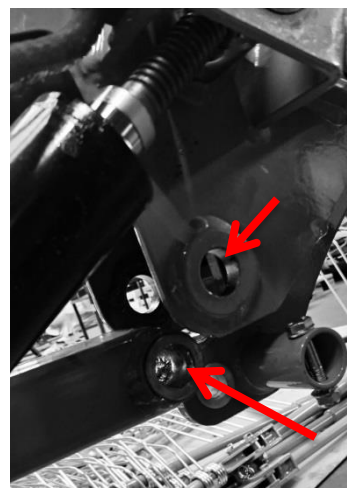
To adjust the cylinder, use the wrench located next to the cylinder.

Remove the securing pin from it and adjust the cylinder.



Step 8.4

After adjusting the cylinder, fit the bushing of the drawbar into the hole as shown in the picture by the arrows



Install the shaft back into place
Use a hammer to install it but make sure not to
damage the greasing nipple in the process
On the other side place the washer from the shaft
and lock the shaft in place with its security pin



Step 8.5
Align the lower bar of the drawbar with the hole
(shown with arrows on the picture) where the
plastic distance rings are and secure it in place with
the shaft from this hole.



Use a hammer to insert the shaft
Lock the shaft in place with the security pin which
you removed when extracting it.



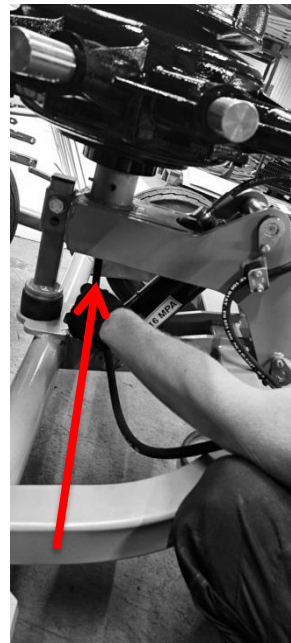
Step 8.6

Support leg and hydraulics installation

Attach the support leg to the drawbar by sliding it over the bushing on the side and securing it with the security pin on the chain



For installing the hydraulics, take the hose coming out of the cylinder on the tandem and run it through the hole in the shaft of the gearbox, so that it comes out on top and runs through the plastic sleeve in the upper shaft of the gearbox.



Tighten the Allen screw on the side of the plastic sleeve after running the hose through it with an Allen wrench 4



Take the hose and run it along the top of the body of the machine. Fixture it in the clamps on the body by unscrewing the bolts holding the top covers and then clamping the hose. After the hose is secured, tighten the bolts back in place. Use the M10 socket and ratchet to unscrew and tighten the bolts.



Run the hose all the way to the front and connect it to the hydraulic hoses there.

Use the M17 and M19 wrenches to attach and tighten the hoses.

The arrow on the picture shows where the hoses should be connected



Step 8.7

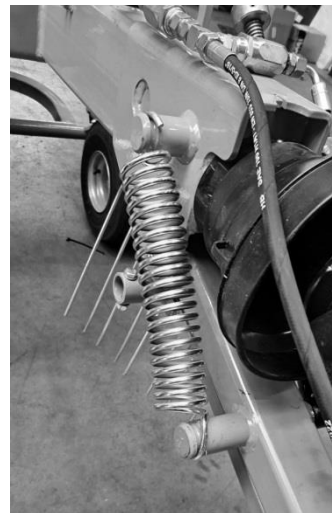
Tensioning the spring between the body of the machine and the drawbar.

Attach a belt to one side of the spring. Attach to it the belt with the tensioner. Place one hook through the loop of the belt and the other hook through the hole of the most front part of the drawbar.

See picture for reference.

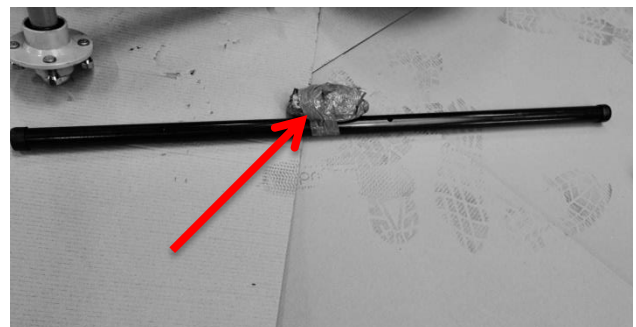


Use a hammer to snap the spring into place

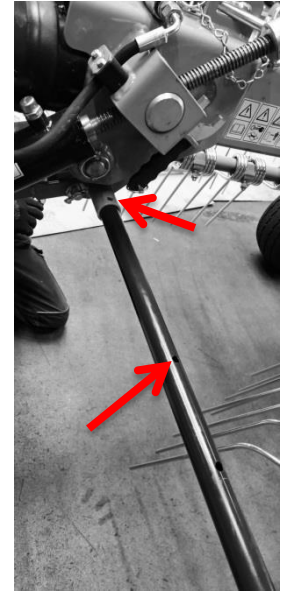


Step 8.8

Finish by installing the bar under the spring. To the bar is attached a bag with the dowel pins used to fixture the rake arms. Take the bag off and put it to the side. The bag is marked with an arrow on the picture



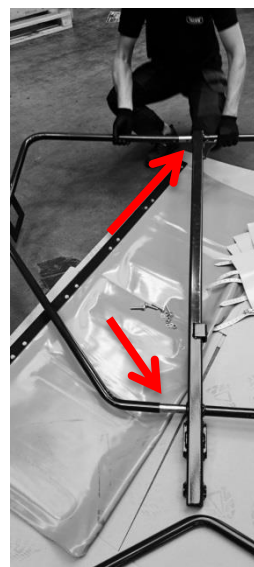
Take off the nuts from the bolts and run the bar through the hole. The bar has holes drilled into its side. Align the holes with the holes you just removed the screws from and put the screws back into place, securing the bar. You'll have to remove one plastic cover from the bar, to run it through the hole. Put the cap back on once you install the bar.



Tighten the nuts on the bolts using a M17 wrench and the M17 socket on your impact driver



Step 9
Assembling the barriers
To do that, unscrew the bolts in one of the barriers and fit the loose part of the barrier onto the shafts you just removed the bolts from. Insert the bolts back into place and tighten them with the M17 wrench and the M17 socket on your impact driver



Step 9.1
Installing the barriers

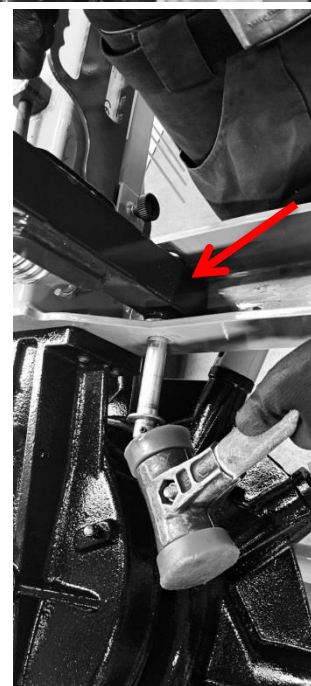
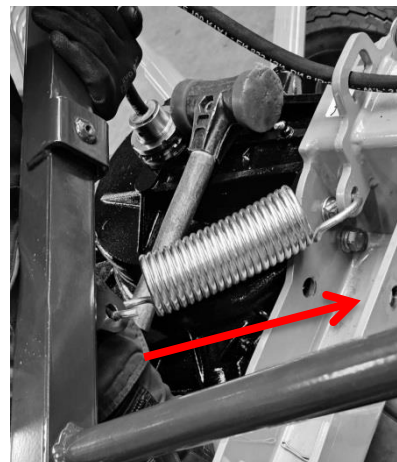
Start with the right side barrier. To distinguish between the sides of the barriers look at how they are constructed. The right side barrier has a little square metal sheet welded to it (marked with arrow) When mounting the barrier, that metal square should be facing the rear of the machine



Step 9.1

Connect the spring to the barrier and the body. Align the bushings with the holes on the U-profiles coming out of the body of the machine. Align the holes marked by the arrows so that you can lock them in place with the shaft

We will lock them with the shaft we removed in step 7.1

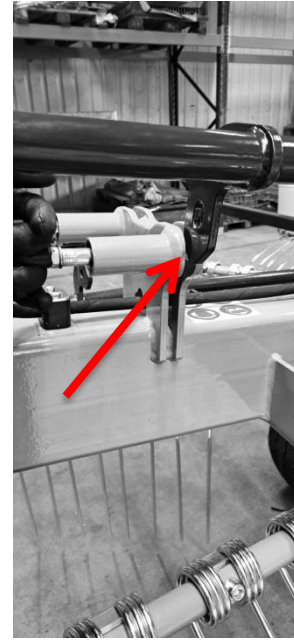


For easier installation of the barrier, lock the front part of it with the transport lock.

Pull back the pin and fit the hole into the slot as shown in the picture

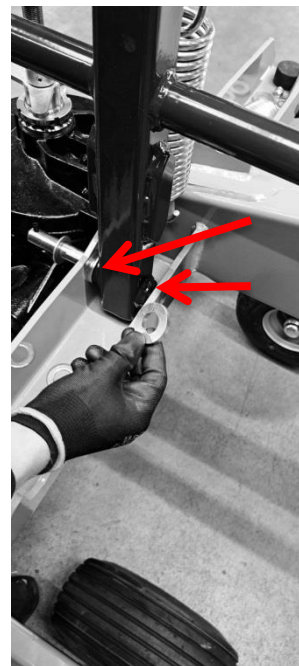
Also, remove the shaft located at the front of the machine (the front U-profiles) so you can mount the barrier.

Remove it the same way as the one in step 6.1 (Remove the bendable pin and slide it out. Do NOT remove the dowel pin from it)



**Align the holes and slide the shaft into place on both sides, to lock the barrier in place
Use the rubber mallet to insert the shafts**

Use the thick washers in the empty space between the bushing and the U-profile as shown by the arrow



Add the thin washer on the end of the shaft you just inserted and secure the shaft with the dowel pin from the bag using a hammer and the 20mm pin punch



Step 9.2

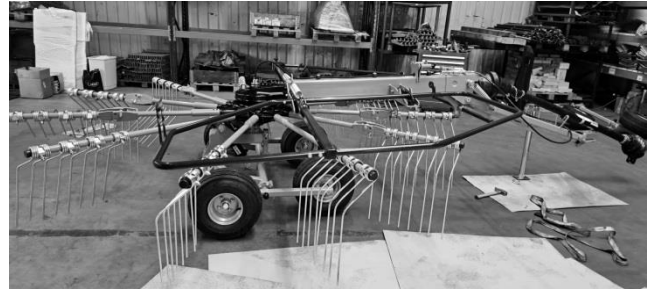
Repeat the same action on the other side of the barrier
Finish by inserting the thin washer and locking the shaft with a dowel pin

The installation of the left barrier follows the same instructions

Remove the shaft under the transport lock
Attach the spring and for easier installation, lock the barrier with the transport lock
Insert both shafts on the front and back side using a hammer.

Add the thick washers between the bushing and the inside of the U-profile

Lock the shafts with the thin washer and the dowel pins from the bag



Step 9.3

Now you can lower both barriers.
Next we will install the swath guard to the left barrier.

It will be attached to the left barrier in the spot marked with the arrow

Remove the 4 screws from the swath guard.
Place the guard on the barrier aligning the holes, you just removed the screws from, with the holes on the barrier



Insert the 4 screws into the holes and screw in the nuts with the washers from the bottom using a M13 wrench and the M13 socket on the impact driver



Step 9.4
On the right barrier install the red reflective triangle. Remove the screws from it and install it through the holes on the metal square sheet on the right barrier. Tighten the nuts on the screws using a M13 wrench and the M13 socket on your impact driver



Step 10
Install the rake arms

For the 11-arm rake insert the arms in the following order:

3 bendable arms
Followed by 3 rigid arms
Then 3 bendable arms
And then 2 rigid arms

Make sure the rakes face the ground when aligning the mounting holes with the holes on the gearbox arms

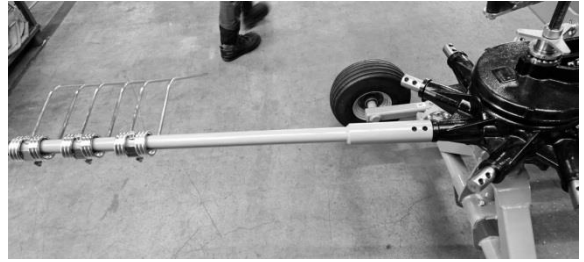
Take the dowel pins from the bag that was attached to the bar we mounted in step 8.8

In the bag are 2 kinds of dowel pins.
Use them after you aligned the rake arms with the holes on the gearbox.

Start by inserting the larger ones into the holes using a hammer

Once the larger ones are in place, use a hammer to insert the smaller ones into the bigger ones, to lock them in place

Use all pins from the bag to fixture the arms

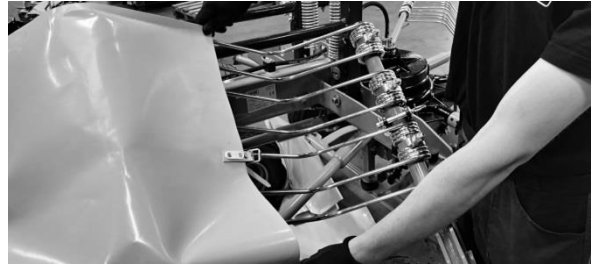


Step 11

The machine is fully assembled now

You should be left with a PTO shaft and a few yellow tarps.

The tarps are to be used on the bendable arms when you place the machine in the transport position



**After installing the PTO shaft in front of the machine,
it's ready to be used
The marking on the shaft shows which side of it should
be attached to the tractor**





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