



**BAUER**

*FOR A GREEN WORLD*

# **ASSEMBLY INSTRUCTIONS**

for

## **BAUER – CENTERSTAR 9000** **133, 168, 203, 219, 254**



## INTRODUCTION


This manual gives you all the information required for correct installation, set-up, and initial start-up of your **BAUER CENTERSTAR 9000**. Therefore, the installation team should study this manual carefully before starting to assemble the system.

Start-up and operation of the system are covered in a separate manual.

This manual has been drawn up with as many details as possible. If you have further questions please contact your dealer or turn to **BAUER** headquarters in A-8570 Voitsberg, Austria.

All information contained in this manual is based on the latest product information available at the time of printing.

**BAUER** company reserves the right to change without notice, without assuming any liability!

 <b>WARNING !</b>	CENTERSTAR powered electrically. Faulty installation and handling may cause severe personal injury as well as equipment damage. Therefore it is essential to have electrical work performed by qualified electricians only !
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## PRODUCT DETAILS

**Type designation:**

**BAUER - CENTERSTAR 9000**

**Model:**

133 EL, 133 E  
168 EL, 168 E  
203 EL, 203 E  
219 EL  
254 EL

**Number of Spans:**

**Span length:**

**Overhang:**

**Serial number<sup>1</sup>:**

**Dealer:**

**Name:**

**Adress:**

**Tel./Fax:**

**Date of shipment:**

**Manufacturer:**

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**Owner or user:**

**Name:**

**Adress:**

**Tel. / Fax:**

Note: Please make a note of the type and serial number of your BAUER CENTERSTAR 9000 and its accessories!

Be sure to state these details every time you contact your dealer.

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<sup>1</sup> It is very important to register the complete serial number (the sticker is placed inside the control panel) of the machine and its individual components. Please specify this number in all warranty matters and correspondence relating to this machine.

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# 1 GENERAL INSTRUCTIONS

## CE SYMBOL



The **CE symbol** that has to be affixed on the machine by the manufacturer outwardly demonstrates compliance of the machine with the directives for machines and other relevant EU directives.

## EU conformity certificate (see Annex)



### **WARNING !**

This “Warning” symbol refers to important safety instructions in this manual. Whenever you see this symbol be aware of possible injury hazards. Read the note following the symbol very carefully and inform the other operators accordingly.



### **CAUTION !**

Non-observance of this instruction may damage or destroy the machine or individual components.

### **NOTE!**

It is very important to observe this note or instruction carefully!

## Qualified operators

These are persons who on behalf of their training, experience and instruction as well as their knowledge of relevant standards, rules, precautions to be taken for accident prevention, and prevailing operating conditions, have been authorised by the person in charge of plant safety to perform the respective tasks required, and in doing so are able to recognise and avoid potential hazards. Among other things, knowledge of first-aid procedures is also required.

## Product liability

According to the product liability law every farmer is an entrepreneur!

According to §9 PHG (Product Liability Law), liability for damage to corporeal things caused by defective products is expressly excluded. This exclusion of liability also applies to parts not manufactured by **BAUER** itself but purchased from external suppliers.

## Duty to furnish information

Even if he passes on the machine to a new owner later-on, the customer is obliged to hand on the operating manual to the new owner, too. The receiver of the machine must be instructed with reference to the mentioned regulations.


## Intended use

- BAUER CENTERSTAR 9000 has been constructed exclusively for use in normal irrigation (intended use).
- Any employment beyond this normal use is considered non-conforming. The manufacturer is not liable for damage resulting from such non-conforming use, the sole liability for damage from non-conforming use is with the user.
- Intended use also includes compliance with manufacturer’s operating, maintenance and service instructions.
- BAUER CENTERSTAR 9000 may be used and operated only by persons who are familiar with the system and aware of the hazards involved.
- All relevant rules for accident prevention as well as any other generally accepted specifications and regulations relating to safety, work medicine and traffic law must be strictly observed.
- Unauthorised modifications on the machine release the manufacturer from liability for damage resulting therefrom.

## 2 WARNING SYMBOLS

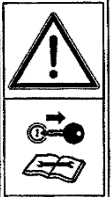
Danger points on the pivot system are specifically marked by safety stickers. These stickers must be affixed at the mentioned points clearly visible and serve for protection of persons working on or near the system.

1.
 




**WARNING !**

Study and observe the manual and all safety instruction carefully before you put the system into operation.
  
2.
 



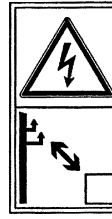
**WARNING !**

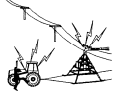
Before maintenance and repair work, always stop the system, disconnect all power, and read the operating manual.
  
3.
 



**WARNING !**


  1. This system is powered by 400 Volts!  
**Danger of electrical shock / injury hazard !**
  2. Do not attempt to check any components while the system is live!
  3. Open the inner pivot panel door only when main disconnect is OFF.
  
4.
 





**WARNING !**

  1. The working range of the pivot must always be at a safe distance from electrical power lines.
  2. Pull towable systems only at a safe distance from electrical power lines.
  3. Make sure that the water jet from spray nozzles and Endgun does not hit electrical lines.
  
5.
 



**WARNING !**

The system can start automatically. Always keep a safe distance from the towers.

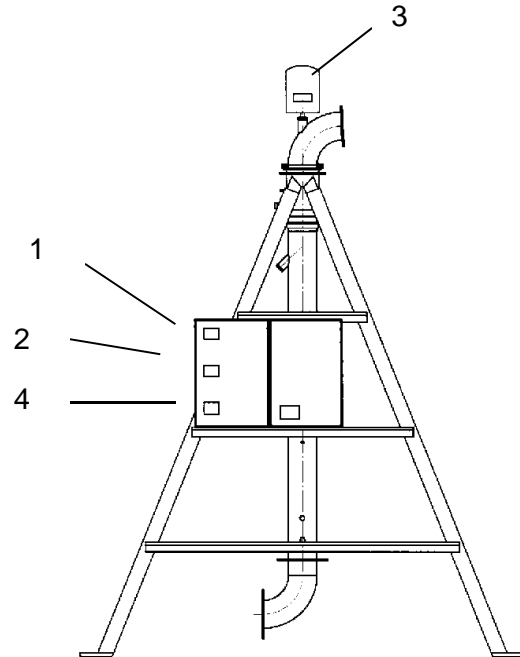
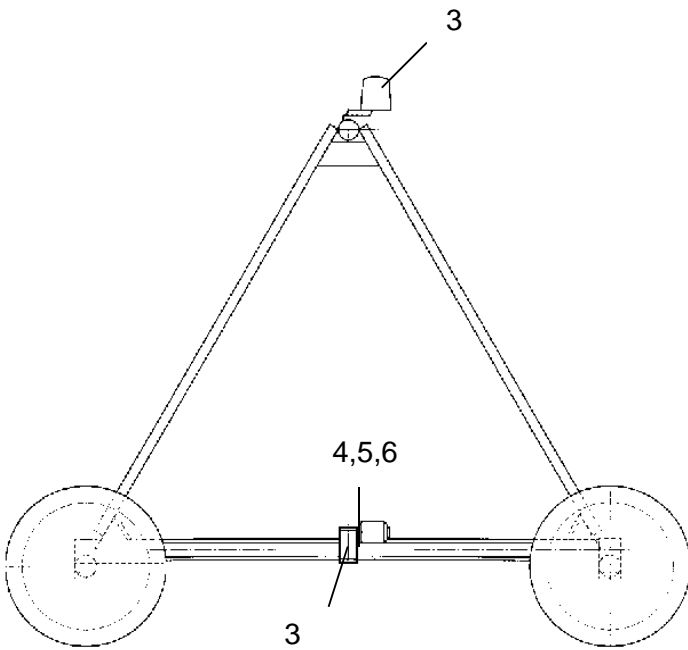


6.



**WARNING !**

1. Do not remove shaft guards.
2. When repair work is performed on the system, make sure that system cannot start running automatically. Disconnect the complete system from power.







### 3 GENERAL

**BAUER CENTERSTAR 9000** is an irrigation system rotating around a fixed centre (pivot tower) and thereby irrigating a full circle or a part circle.

The boom elements (towers, spans) are driven electrically.

The joints (tower couplings) mounted between the spans allow horizontal and vertical angular deviation between the individual boom elements so that the system can adjust perfectly to existing site conditions. Electric alignment controls between the spans control the horizontal angular deviation and ensure that the system runs in a straight line.

Through varying spray nozzle set-ups and system speeds it is possible to tailor the water application exactly to all possible plant and soil requirements.

### 4 GENERAL INSTRUCTIONS FOR SAFETY AND ACCIDENT PREVENTION

**Check the operational safety of the machine before every start.**

1. In addition to the instructions in this manual, be sure to observe all specifications generally valid for safety and accident prevention!
2. The warning signs and notes affixed to the machine contain information essential to safe operation. Observing them serves your own personal safety!
3. Do not start the machine unless all guards and safety devices are mounted completely and in proper working position!
4. Acquaint yourself with all system components and controls as well as their respective functions, before you start to work. It is too late for this when the system is already running!
5. Check the vicinity of the system before start-up (children!). Make sure that sight is unobstructed!
6. For towing, couple the device according to the instructions and fix it only at the prescribed devices!

#### **Electrical system check-up**

1. Before the first start-up, check the electrical system and ensure that the installation complies with the safety requirements.
2. Check the electrical system visually before every start-up.
3. All work beyond normal maintenance of the system is to be performed by a qualified service person only!
4. Never repair or service any part of the before all power has been disconnected!

#### **Maintenance**

- As a rule, maintenance and cleaning work as well as repairs of malfunctions may be done only with the drive and the motor turned off!
- Check proper seat of nuts and screws regularly, and tighten them, if needed!
- Dispose of oil, grease, and filters in accordance with regulations.
- Always disconnect system from power before starting any work on the electrical system!
- Before electrical welding on the system itself or built-on components, disconnect the mains or generator supply cable!
- Spare parts must meet minimum technical requirements by the manufacturer of the device! This is guaranteed by original equipment parts!

## 5 SAFETY PRECAUTIONS FOR CENTERSTAR 9000

In addition to the GENERAL INSTRUCTIONS FOR SAFETY AND ACCIDENT PREVENTION, the following safety principles must be observed for operating BAUER CENTERSTAR 9000.

### 5.1 Grounding



**WARNING !**

#### **THE PIVOT SYSTEM MUST BE GROUNDED COMPLETELY!**

1. All metal parts of the system must be connected with each other, all tower couplings must be bridged with a cable.
2. The entire metal structure of the Pivot must be connected and grounded at the pivot tower with an earthing rod or earthing bar in such a manner that the grounding resistance according to the legal code is reached.
3. In addition, the yellow-green protective conductor lead along with the power supply must be connected to the grounding terminal in the control panel and therefore grounded properly.
4. Dimensioning of grounding, grounding nail or grounding bar must be executed by a qualified electrical contractor.
5. For towable systems, suitable grounding connection must be provided at every pivot centre. In every new system setting the grounding must be connected firmly with the pivot tower.

### 5.2 Electrical system



**WARNING !**

**Since system is powered by 400V, always practice extreme caution when dealing with the electrical system and the electric drive !**

1. Before working on system electrical components, make sure the system is disconnected from all poles and sources.
2. Provide a lock-out at the main disconnect to protect yourself against unintentional reclosing.
3. Verify safe isolation from supply.
4. Never repair or short-circuit a fuse by means of a wire or any other item.
5. Immediately replace all wires with defective insulation.
6. Short-circuiting of system safety circuit is to be done only by a qualified person and only for the purpose of realigning a span.

### 5.3 Mechanical system

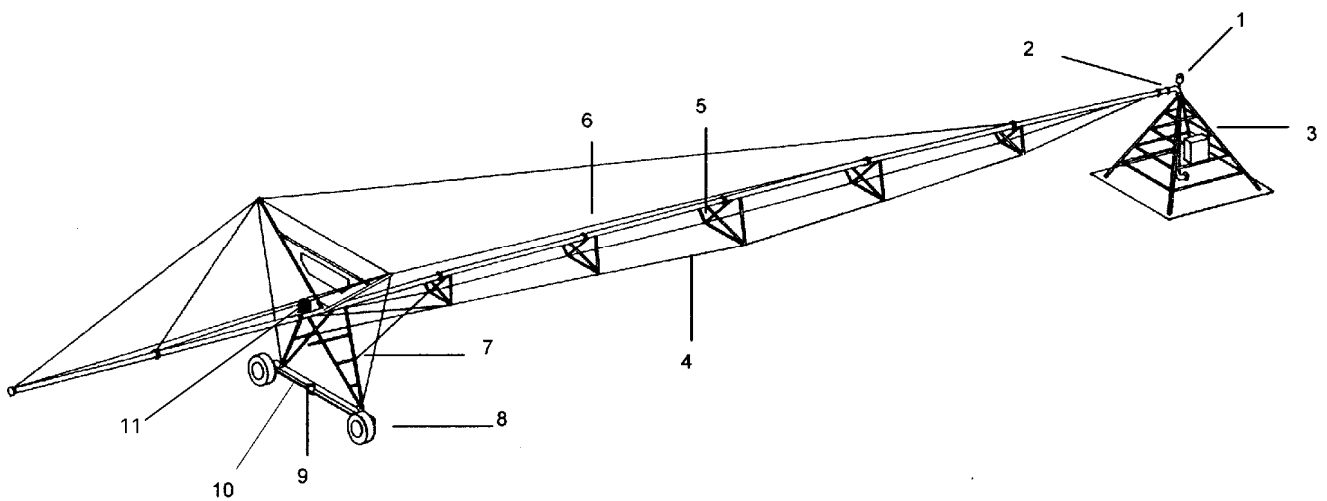


**WARNING !**

1. Never service or repair any part or system component while the plant is operating.
2. Always disconnect the system from power before starting any maintenance work. Turn the main disconnect to "0" and lock the switch to prevent unintentional reclosing. Do not depend on others to disconnect the power – do it yourself!
3. Before you start, make sure that all persons have left the operating range of the system !
4. Make sure that no objects or vehicles are in or near the system tracks when system is running/starting to operate.
5. When the system is operating the towers come on and off automatically, therefore keep a safe distance from the towers.

6. Never step on the system while it is running.
7. Utmost care is required by the operator when spans are aligned.
8. Always turn off the system and the water supply before working on sprinklers or spray nozzles.
9. Use adequate means of access (ladder, elevating platform) for work on sprinklers or spray nozzles.
10. Proceed with the utmost caution when system is working near or under electric power lines. Make sure that neither the pivot system nor the water jets get in contact with live wires.
11. When towing movable systems you have to make sure that the system does not get in contact with a power line.
12. Make sure that no neighbouring plots or roads are wetted by the endgun. This could cause damage or accidents.
13. If fertilisers or other chemicals are added to the irrigation water, avoid the mist and do not inhale it.

## 6 TECHNICAL DESCRIPTION



- |    |                        |
|----|------------------------|
| 1  | Slipring collector     |
| 2  | Central Tower coupling |
| 3  | Control Panel          |
| 4  | Truss rod              |
| 5  | Truss angle            |
| 6  | Main pipe              |
| 7  | Drive Tower legs       |
| 8  | Base beam              |
| 9  | Driving motor          |
| 10 | Driving shaft          |
| 11 | Tower alignment box    |



## 6.1 Pivot components

### **CENTRAL TOWER**

Fixed centre of the system around which CENTERSTAR 9000 rotates

#### CONTROL PANEL

System controlling and monitoring device.

#### COLLECTOR

Electrical connection by means of slip rings between the fixed pivot and the mobile spans.

#### CENTRAL TOWER COUPLING

Vertically movable joint between pivot and first span

### **SPAN**

Arc-shaped truss structure consisting of pipes, truss rods and truss angles.

#### PIPE

Water-conducting part of the machine

#### TRUSS ROD

Round stock – connects the truss angles.

#### TRUSS ANGLE

Angle section – connects pipe and truss rods.

### **DRIVE TOWER**

Provides the electromechanical drive of the system and carries the span weight.

#### BASE BEAM

Tower base with driving motor and gearbox.

#### DRIVE TOWER LEGS

Angle section – connects span and base beam.

#### DRIVE MOTOR

Electric motor with reducing gear.

#### DRIVE SHAFT

Cardan joint between drive motor and gearbox with flexible intermediate element.

#### GEARBOX

Transmits the torque of the drive motor onto the wheels.

### **TOWER COUPLING**

Joint between the spans. Possible articulation: up to 30 %.

### **ALIGNMENT CONTROL BOX**

Tower control system that monitors horizontal angular deviation between the spans and switches the drive motors.

### **OVERHANG**

Overhanging part from last tower to system end.

### **ENDGUN**

Wide-range sprinkler at the end of the overhang serves for extra spraying system spraying range.

### **BOOSTER PUMP**

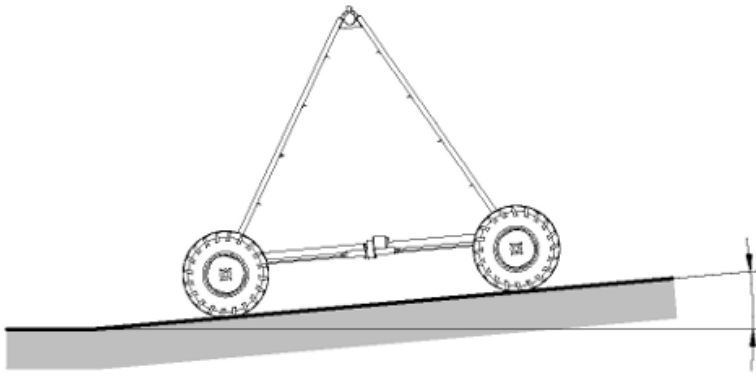
Electric pump on the last tower for increase of pressure to endgun.

## 7 PERMISSIBLE BENDING ANGLES

### 7.1 Slope

The maximum permissible slope is 15% (for CENTERSTAR 133 only 10%)

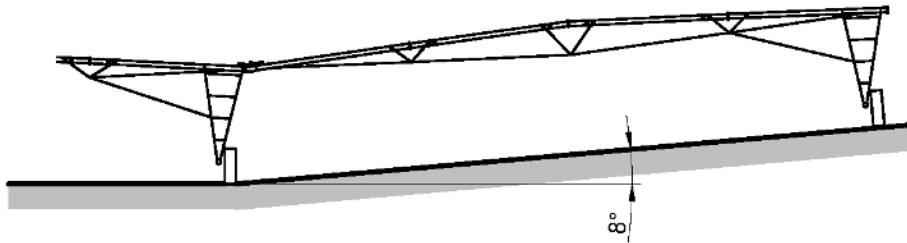
This means that the difference in level between the two wheels of a tower may not exceed 0.63 m for the EL system or 0.75 m for the E system.



max. 15% - CENTERSTAR 254/219/203/168  
max. 10% - CENTERSTAR 133

### 7.2 Vertical

The permissible vertical bending angle is 8°.



## 8 TERMS AND DEFINITIONS

### Forward

Seen from above the CENTERSTAR is travelling clockwise.

### Reverse

Seen from above the CENTERSTAR is travelling counter-clockwise.

### Inward

towards the pivot.

### Outward

towards the end tower

### Leading or positive bow

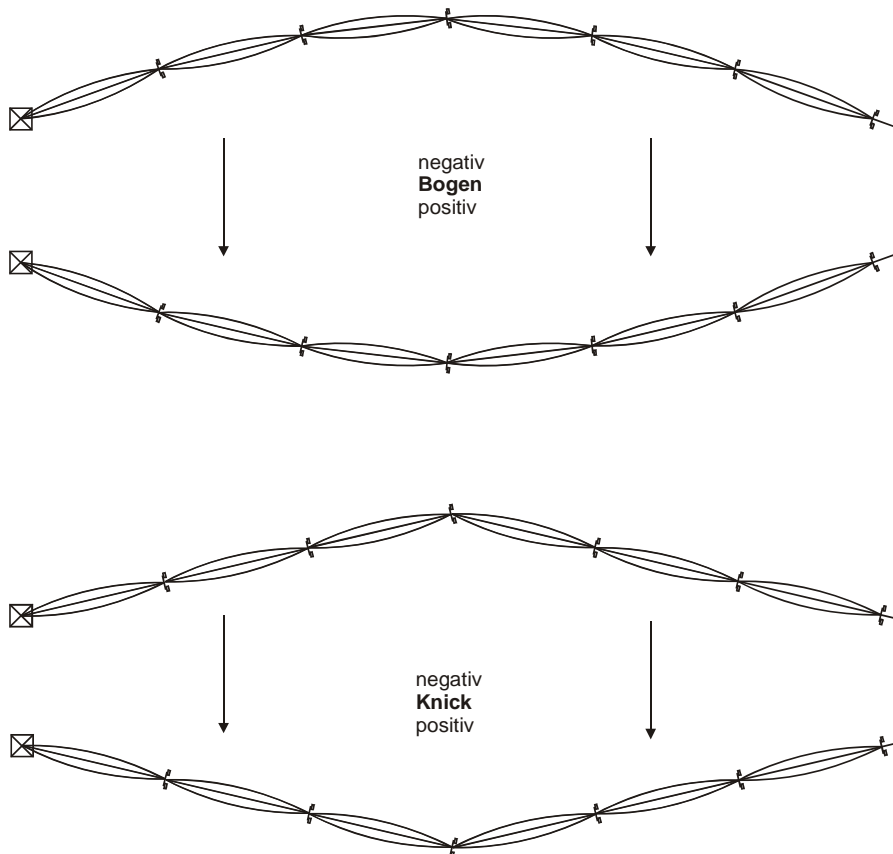
When the middle towers are located before an assumed straight line between pivot and end tower.

### Trailing or negative bow

When the middle towers are behind an assumed straight line between pivot and end tower.

### Doglegging

This situation occurs when one tower slows down or stands still or travels ahead of the other towers.



## 9 PREPARATIONS FOR ASSEMBLY

### 9.1 Staff requirement

Following staff is required for efficient and safe installation:

- 4 fitters, at least one of them must be a qualified electrician
- 1 crane driver

Must have experience in steel construction.

### 9.2 Tools and equipment required

1. A crane truck or a vehicle with hoisting system with following capacity:
  - Loading capacity 3 tons
  - Crane hook clearance 5 m
  - Working range 3 m
2. 2 nylon sling bands 3 m, for 3 tons load
3. 1 pneumatic or electrical impact screw driver ( ½" driving square, torque 30-250Nm)
4. 1 two-part ladder, length 3 – 6 m
5. Fitter's and electrician's tools consisting of:
  - 5.1. Double-ended open-jawed spanner (DIN 31107) SW 13, 17, 19, 22, 24, 27, 30, 36
  - 5.2. Double-ended ring spanner (DIN 838) SW 13, 17, 19, 22, 24, 27, 30, 36
  - 5.3. Set of sockets for wrenches ½" for impact screw driver with inserts (DIN 3124) SW 17, 19, 22, 24, 27, 30
  - 5.4. 1 set screw drivers
  - 5.5. small screw drivers, one each 6,5 x 25 and 8 x 35
  - 5.6. 1 pipe wrench 1½"
  - 5.7. 1 cable stripper 0,8 – 6,0 mm<sup>2</sup>
  - 5.8. 1 combination pliers (DIN 5244)
  - 5.9. 1 crimping tool for cables, pressing range 2,5 – 6,0 mm<sup>2</sup>
  - 5.10. 1 side cutting pliers, length 200 mm
  - 5.11. 1 cable stripping knife, length 190 mm
  - 5.12. fitter's hammer, 200 gram
  - 5.13. 2 mounting rods, length 400 mm
  - 5.14. 1 steel brush
  - 5.15. 1 flat file, length 250 mm
  - 5.16. 1 round file
  - 5.17. 1 flat chisel
  - 5.18. 1 cape chisel
  - 5.19. 1 metal cutting saw
  - 5.20. 1 screw tap ¾"
  - 5.21. 1 rotary thread cutter ¾"
  - 5.22. 1 water level
  - 5.23. 1 grease gun
  - 5.24. 2 screw clamps
  - 5.25. 1 electric measuring and testing instrument, multimeter with ampere indication

### 9.3 Time required

Due to varying site conditions and different CENTERSTAR system options as well as differences in assembly teams and their equipment it is impossible to determine the time actually required for assembly. However, the following may serve for guidance:

The number of spans is equal to the number of assembly days.

For a 6-span pivot system this means about 6 days assembly time including start-up and test run. If they are well prepared, professional teams are able to assemble and erect 2 and more spans per day.



## 9.4 Pivot foundation

Before the Pivot central tower can be fixed in the center, the concrete foundation must be poured and cured.

Depending on the type of system, there are various types of foundations:

1. Foundation for permanently installed Pivots CENTERSTAR 254/219 EL (low)
2. Foundation for permanently installed Pivots CENTERSTAR 203/168 EL (low)
3. Foundation for permanently installed Pivots CENTERSTAR 133 EL (low)
4. Foundation for permanently installed Pivots CENTERSTAR 254/219 E (high)
5. Foundation for permanently installed Pivots CENTERSTAR 203/168 E (high)
6. Foundation for permanently installed Pivots CENTERSTAR 133 E (high)
7. Foundation for towable Pivots CENTERSTAR 203/168 EL with skids
8. Foundation for towable Pivots CENTERSTAR 203/168 EL with 4-wheel central tower

A collective overview of all foundation plans **850 9965.4** is supplied with every system and can also be found on our website.

### NOTE

Normally, the pivot foundation is laid horizontally. However, if the installation site is sloping the foundation can be laid in the same slope, too. In this case the fixed pivot installations can do without the flexible pivot central tower coupling.

### 9.4.1 Positioning and excavating

Before laying the foundation, its position must be precisely determined by surveying the site.

Excavations and reinforcement ( as required) must be performed according to the enclosed foundations drawings.

### 9.4.2 Formwork, concrete work, and inserting the bolts

After excavation of the earth, the slab is defined by means of boardings which are placed horizontally or parallel to the site. If a reinforcement is planned, it must be laid according to the drawing. Then the concrete can be cast.

Immediately after pouring in the concrete the foundation bolts must be inserted in the still soft concrete. Thereby the spacings must be observed exactly. The thread should stand out about 40 mm from the concrete.





## 9.5 Pretensioning forces and tightening values of bolts

The listed pretensioning forces and turning moments are guide values for standard metric thread according to DIN 13 and head requirements according to DIN 912, 931, 934, 6912, 7984 and 7990. They result in bolt utilization with a yield point of 90%. A friction factor of 0.14 (new bolt without after-treatment, unlubricated) was used as the basis.

<b>Screws standard metric thread DIN 13</b>			
dimension	quality	turning moment Nm	pretensioning force kN
M 8	8.8	27,3	18,0
M 10	8.8	53,2	28,8
M 12	8.8	93,1	41,9
M 14	8.8	148,0	57,5
M 16	8.8	230,0	78,8
M 20	8.8	464,0	127,0
M 24	8.8	798,0	183,0

<b>Screws UNC standard thread</b>			
dimension	quality	turning moment Nm	pretensioning force kN
1/4"	S	12,5	10,1
5/16"	S	21,3	13,9
1/2"	S	92,7	38,5

<b>Screws UNF standard thread</b>			
dimension	quality	turning moment Nm	pretensioning force kN
9/16"	S	150	57,1

Don't fasten the bolts 1/2" UNC for tightening the wheel gears with a power screwdriver. There may be a danger in damaging the winding in the gear casing.



## 10 TRANSPORT AND LAYING DOWN OF SYSTEM COMPONENTS

Usually the pivot system is transported to the installation site by truck. (1 truck for 7 to 8-spans). In most cases, it is impossible to drive the truck along the assembly line. Therefore the equipment should be unloaded near the pivot centre and stored in component groups.

At this point, it is also possible to check in detail if the shipment is complete. From this storage place the equipment is transported to the individual installation points on tractors and trailers and laid down along the assembly line.

### 10.1 Grouping the equipment during unloading

For easier transport, storage and assembly, many of the small components are already clearly arranged in boxes according to the different system components. Truss braces are bundled and numbered.

In order to be able to find and take the components from the storage place quickly during assembly, the following components should be stored separately in a clearly arranged manner:

1. Loose components for Central Tower, the box with control panel and small parts of central tower
2. Main pipes
3. Span-Truss angle packages
4. Truss rods
5. Overhang - Pipes
6. Base beam
7. Drive Tower legs
8. Left wheels, right wheels, separately
9. Boxes with small parts of Span and Driver towers: end pipes, gearboxes, driving motors, cardan shafts, shaft guards, tower alignment boxes, etc.
10. Drop pipes and nozzles

### 10.2 Selecting the assembly line

Starting at the pivot foundation, choose an area as level as possible for installation of the system. This is necessary to ensure that the trussing of the spans lies on the ground as evenly as possible during installation and can be mounted without twist.

Starting from the pivot flange, the span lengths are now exactly measured. Drive in a marking (for instance a wooden stake) at every tower or span end, by means of which the pivot parts can be unloaded exactly.

### 10.3 Laying down the assembly equipment

Usually, the pivot system equipment is transported from the storage place to the assembly line in several trips. A tractor with a front loader is suited for loading and unloading the equipment.

In order to ensure that as little as possible of the equipment has to be moved by hand, the equipment should be laid down exactly at the appropriate points:

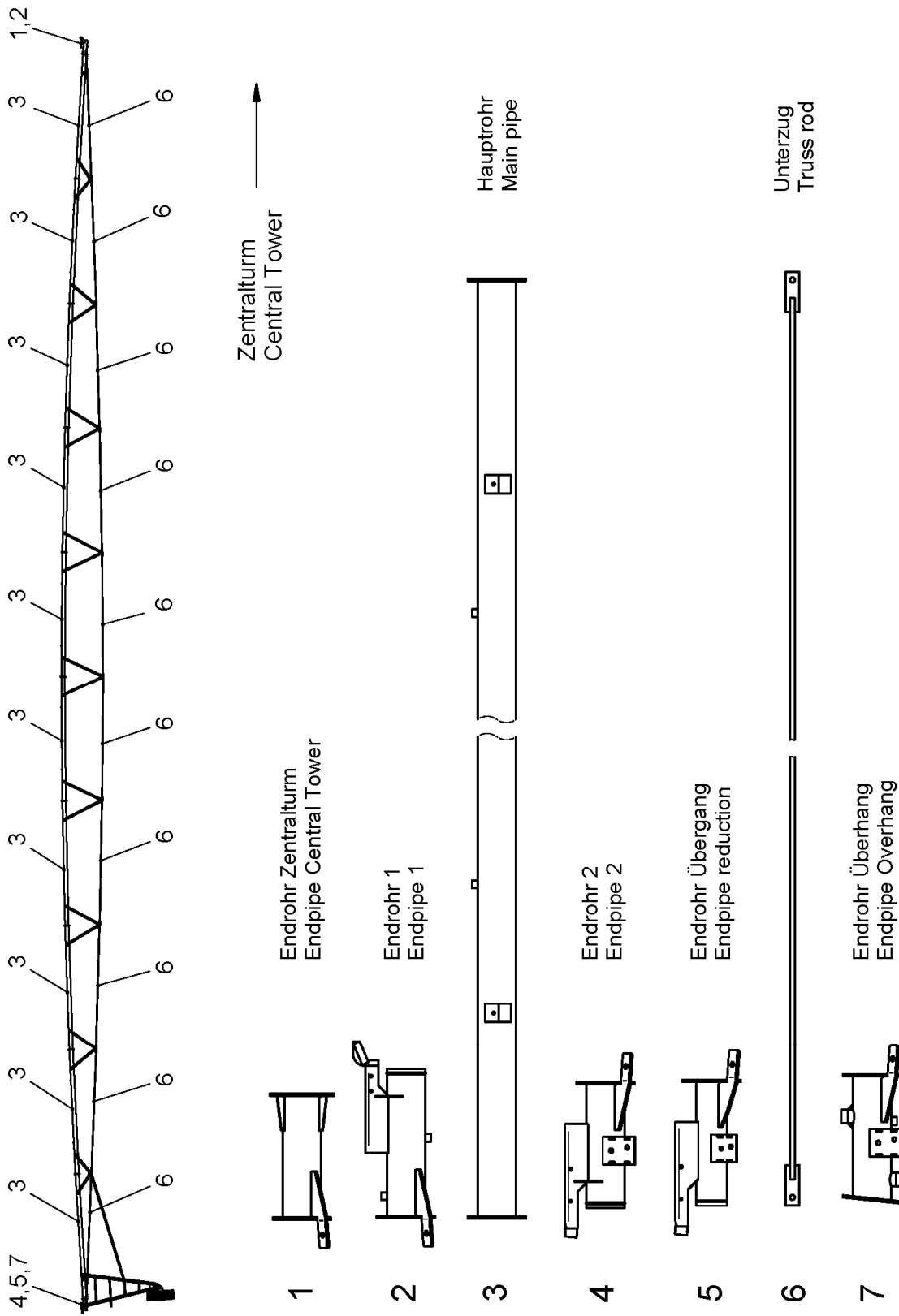
1. All parts of the pivot tower are put down by the concrete foundation (system centre):  
Central tower legs, bundles of braces (ladder braces), upper bend, rising pipe, box for central tower with collector, control panel as well as all small parts required for the central tower.
2. The main pipes are laid down along the entire assembly line. Place the respective end pipes at the beginning and end of every span (pivot end pipe, end pipe 2 with flanges for towers, end pipe 1, end pipe overhang). Two end pipes and the coupling must be put down exactly at the markings previously measured and defined. The pivot end pipe should start about 0.5 m from the foundation centre. If a flexible central tower coupling is used the spacing should be about 1 m.
3. Put down the following equipment and parts at every marking or span end:  
1 base beam, 1 right wheel, 1 left wheel, 4 tower legs, bundles of ladder braces, 1 box for the respective tower (the span length is mentioned on the box – this is important because of cable lengths, numbers of bolts and junction plates).
4. Put down one package of truss angles (consisting of 5 angle sections each) at every pipe-flange connection along the spans – the short angles at the end of the span, the longer angles towards the centre of the span (see drawing with details).
5. Lay down the overhang pipes as well as the truss braces of the overhang at the end of the pivot system. Depending on the packing system, the small parts of the overhang are in a separate box or included in the box of the end tower.

#### **CAUTION!!**

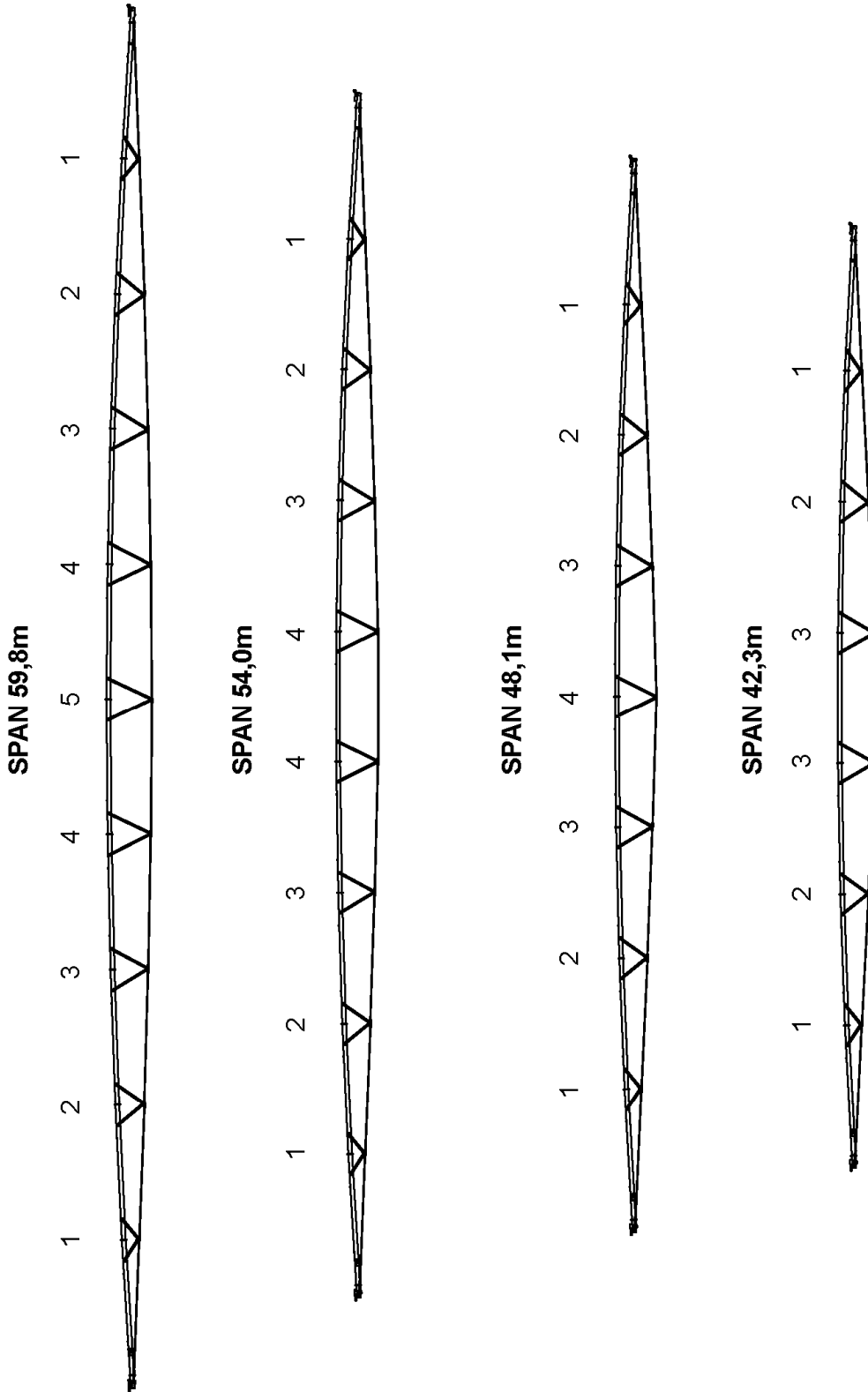
Unload all system components and parts – especially the boxes with electrical components – very carefully. Never throw them from the transporter!



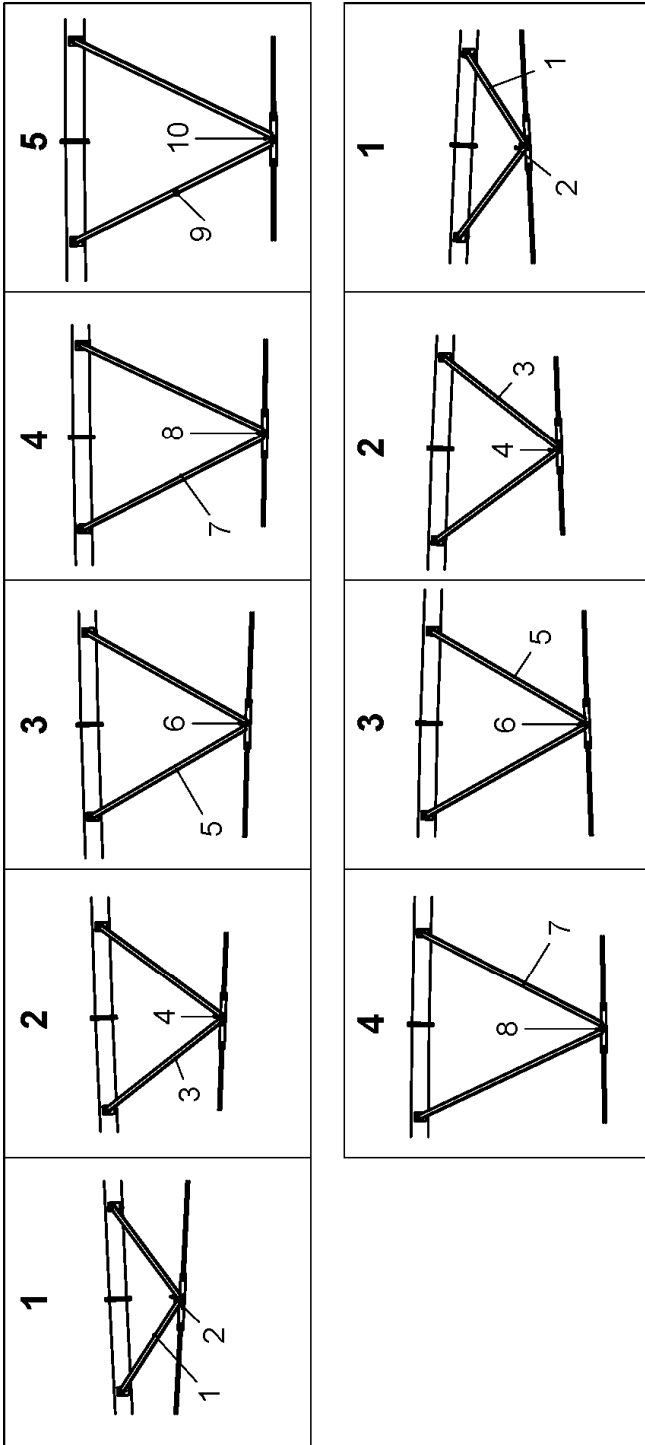
### 10.3.1 CENTERSTAR 9000 – Pipes and truss rods



### 10.3.2 CENTERSTAR 9000 – truss angle packages



### 10.3.3 CENTERSTAR 9000 - Details Truss angle packages



Truss angle- package Nr..	colour	Truss angle	Pcs./ package	length (mm)
<b>1</b>	red	1	4	1248
		2	1	1280
<b>2</b>	yellow	3	4	1778
		4	1	2149
<b>3</b>	blue	5	4	2217
		6	1	2790
<b>4</b>	green	7	4	2513
		8	1	3210
<b>5</b>	black	9	4	2635
		10	1	3383

	59,80 M	53,95 M	48,10 M	42,25 M
<b>1</b>	x 2	x 2	x 2	x 2
<b>2</b>	x 2	x 2	x 2	x 2
<b>3</b>	x 2	x 2	x 2	x 2
<b>4</b>	x 2	x 2	x 1	—
<b>5</b>	x 1	—	—	—

## 11 CENTRAL TOWER

Note:

When assembling the Pivot towers, make sure that the screws are tightened after you have finished the assembly of the Pivot tower.

### 11.1 Central Tower Standard

#### 11.1.1 Angle structure



Main parts of the central tower



Place the tower leg carrier horizontally on the ground and align two central tower legs.

Preassemble bolts and nuts with washers on the inner and outer side, but do not tighten.





Assemble the central tower braces on the bottom side.



Assemble the remaining 2 central tower legs.



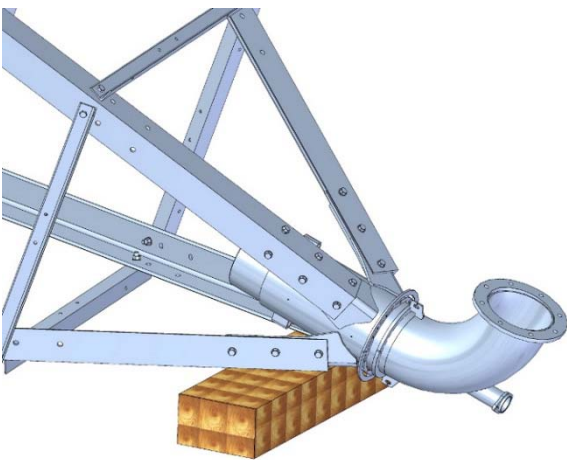
Assemble the central tower braces on the remaining 3 sides of the central tower, and tighten all bolts.





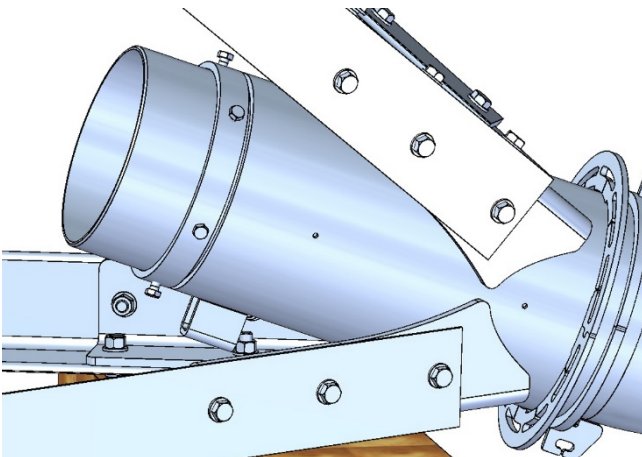


Grease the guide surface well before installing the upper bend!



Insert the upper bend in the tower leg carrier.

Check the pipe end of the upper bend and make sure that the surface is smooth to guarantee a good seal and long life of the central tower gasket. If the surface is uneven due to galvanizing, smooth it with a file or sandpaper.



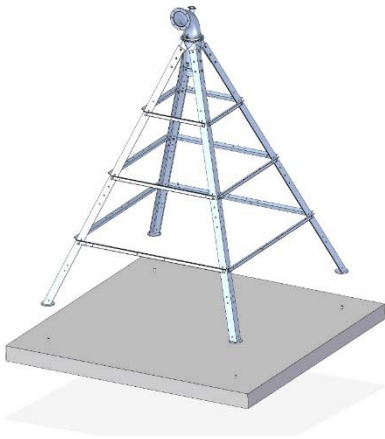
Mount the riser clamp so that the upper bend still turns easily and with a minimal gap to the tower leg carrier.

The gap should be max. 5mm.

Tighten all bolts of the riser clamp.

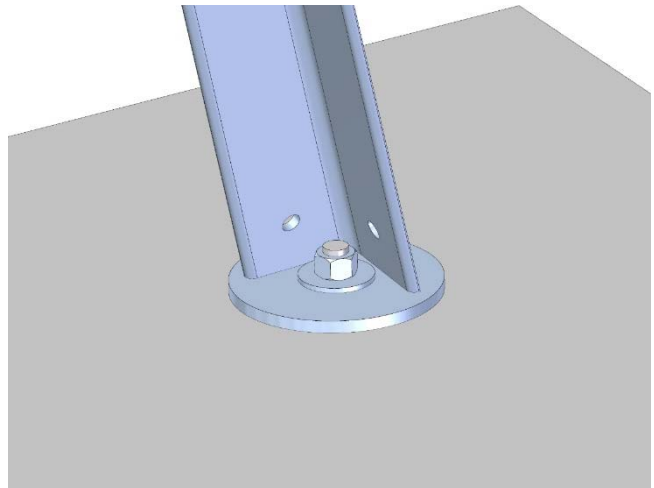
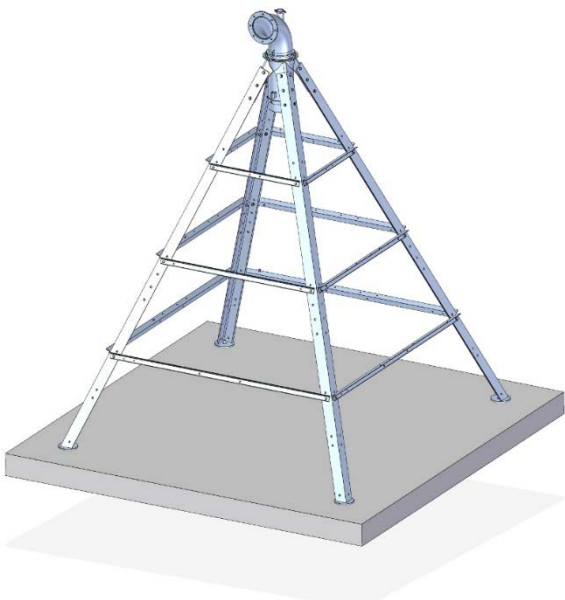


Lift up the central tower with the help of a crane truck.

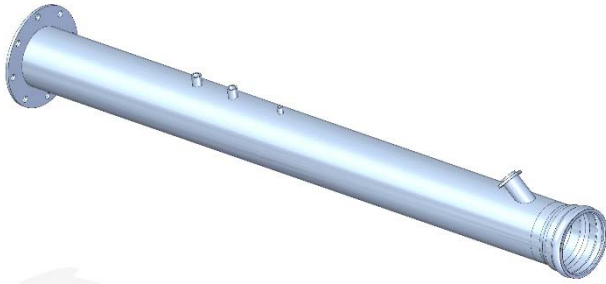


Place the central tower on the foundation.

Set all four central tower legs onto the foundation bolts and tighten them.



### 11.1.2 Rising main



Check the sealing surface in the riser pipe. This must be completely free of zinc residues or zinc splashes.

If irregularities are found, these must be removed to guarantee a good seal and long life of the central tower gasket.

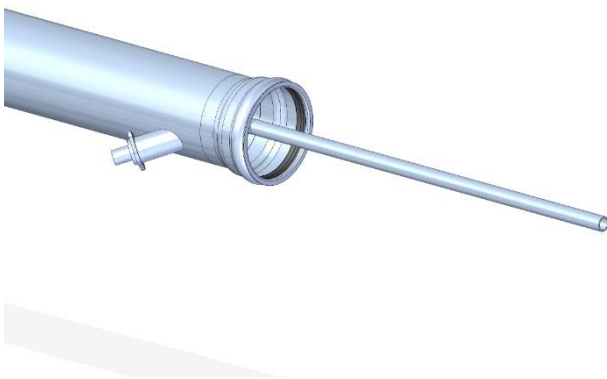


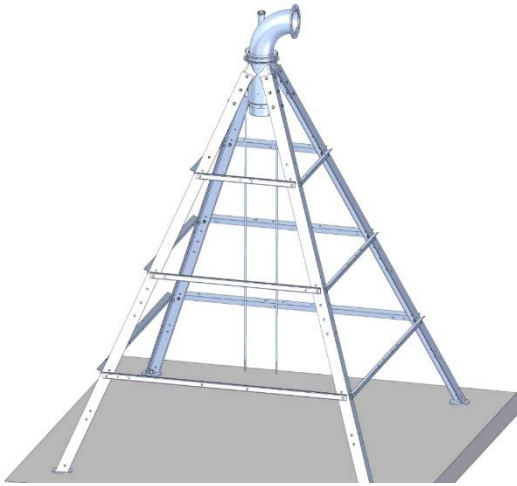
Put the gasket into the socket of the riser pipe.

The 3 sealing lips must be directed downward.

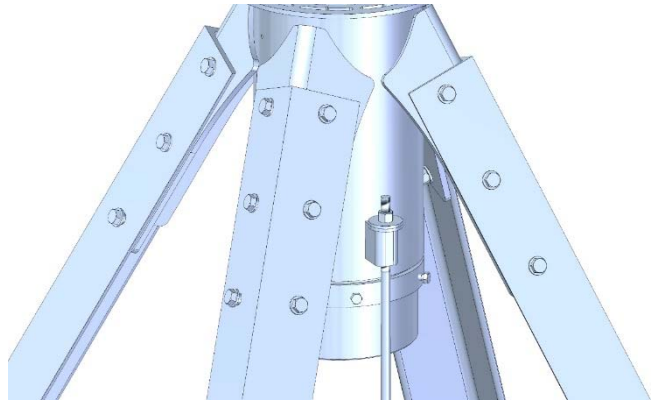


Insert the cable pipe into the riser pipe.





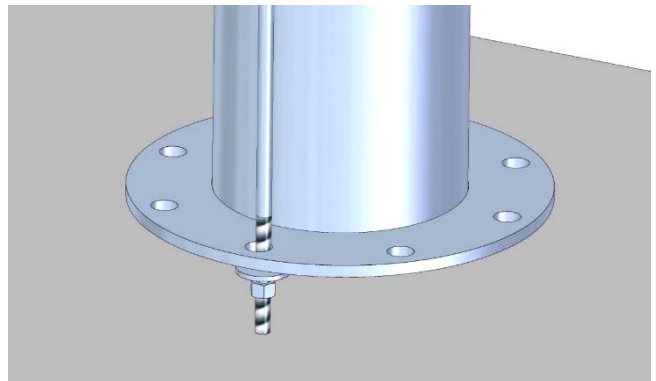
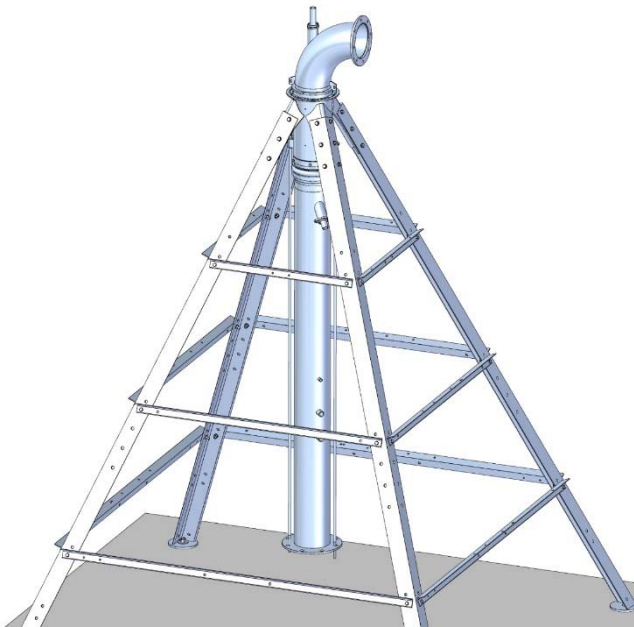
Preassemble the 2 threaded rods at the central tower and prepare them for the installation of the riser pipe.



Mount the prepared riser pipe with the cable pipe to the upper bend and the threaded rods.

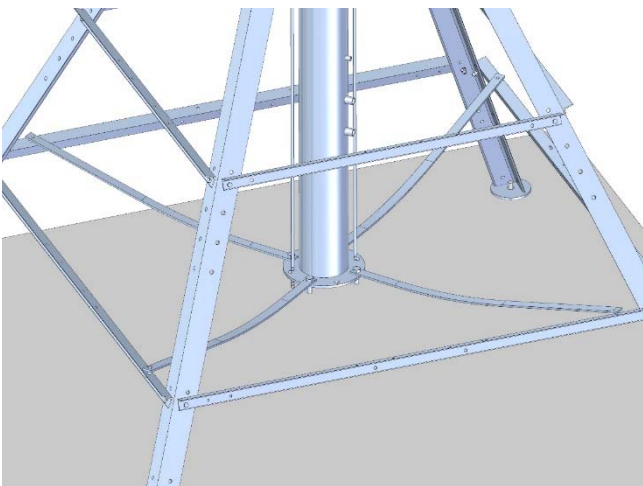
It is important to ensure that the gasket is not damaged!

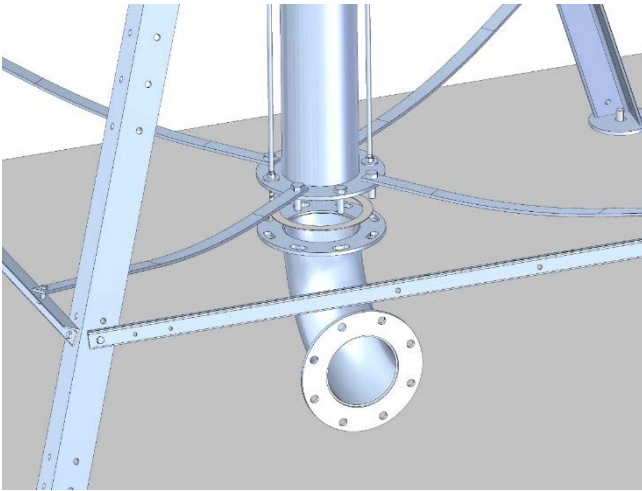
Fix the riser pipe with nut and washer temporarily with the threaded rods.



Preassemble the centering struts and center the riser pipe.

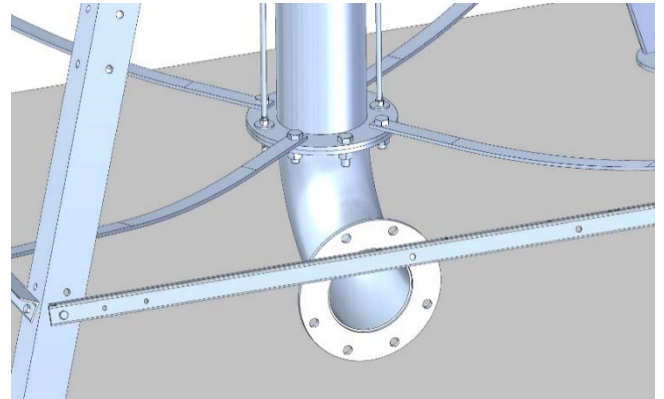
Place the bolts at the riser pipe flange to fix the centering struts, but do not mount it.





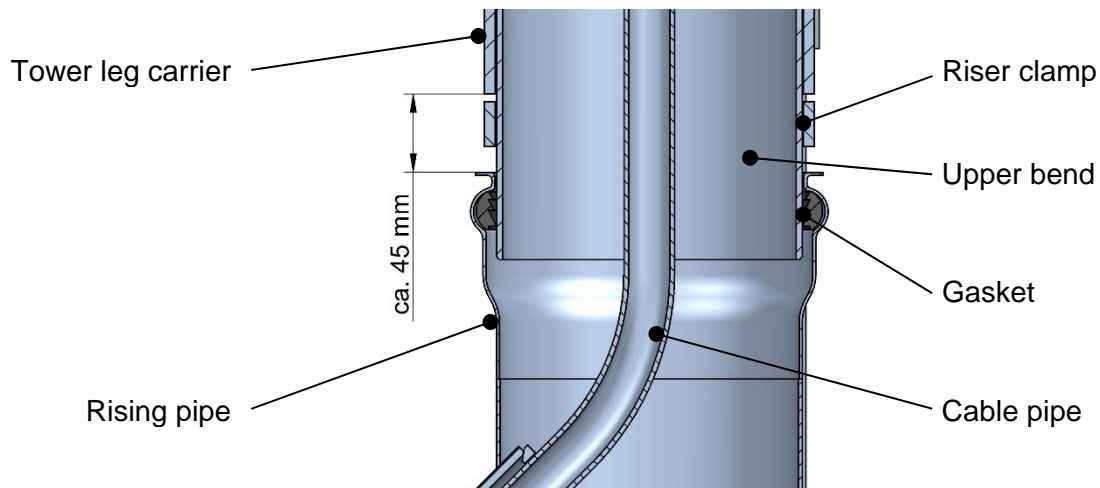
Mount the nut and washer on the upper side of the riser pipe flange at the threaded rods.

Assemble the inlet bow with the gasket.



Make sure that the gasket has enough overlap with the guide pipe of the upper bend to guarantee proper function.

The height can be adjusted with the threaded rods and the centering struts.



Insert the packing of the stuffing box (4 pieces) between the cable pipe and upper bend.



Press the packing into the stuffing box.

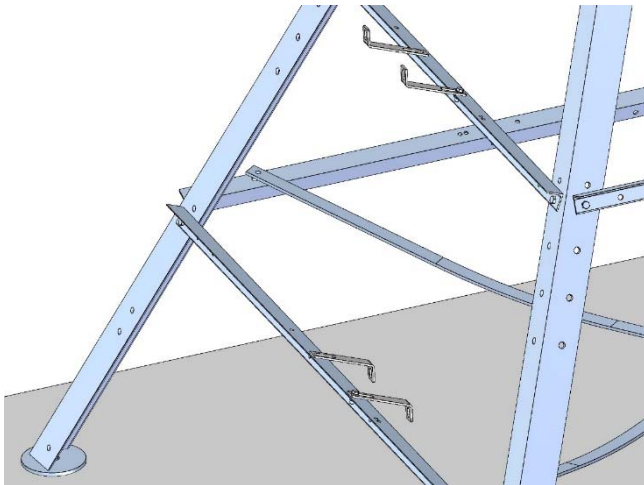
Place the gland and tighten bolts evenly.



The outlet of the cable pipe at the riser pipe must be sealed with packing of stuffing box as above.



### 11.1.3 Brackets for Control Panel

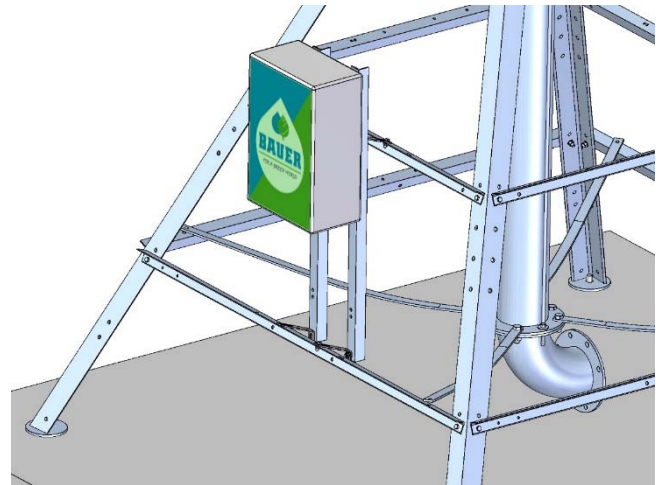
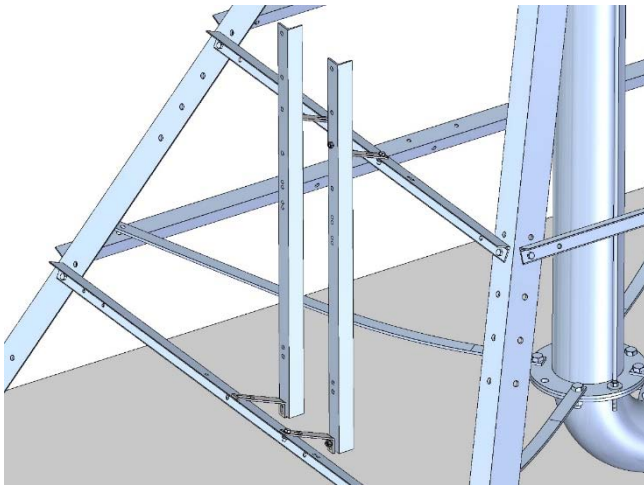


Mount the 4 holders for the control panel on the lowest 2 central tower braces.

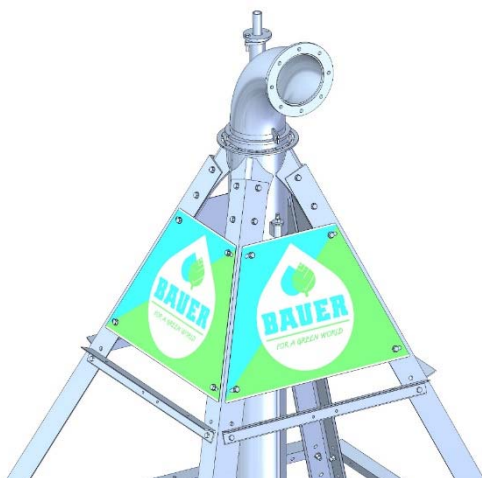
*There are possible mounting positions on all 4 sides of the central tower.*

Assemble the support angles.

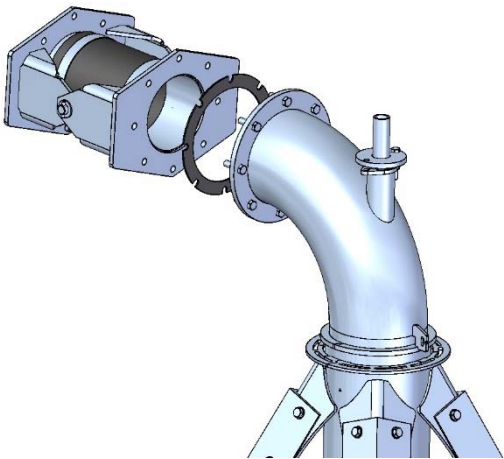
Mount the control panel on the support angles.  
*There are two different mounting options for adapting the height.*



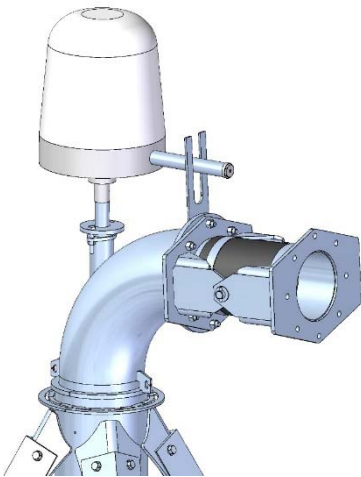
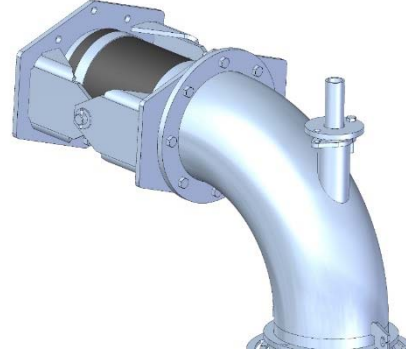
### 11.1.4 Accessories



Mount the 4 design plates with the enclosed bolts on the central tower legs.



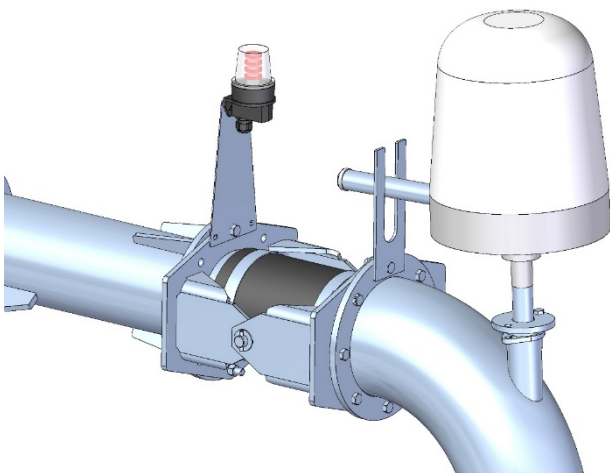
Mount the central tower coupling with gasket on the upper bend.  
*It is possible to mount the coupling to the central tower endpipe while on the ground and couple it with the span.*



Thread the cable from the collector through the cable pipe and screw the collector on the thread.

Assemble the carrier at the flange and place the guide pipe for the collector between the bracket.

Mount the cable gland on the end of the pipe.



Mount the running light on the central tower coupling.

*Optionally, the running light can be mounted on the overhang or the drive tower.*

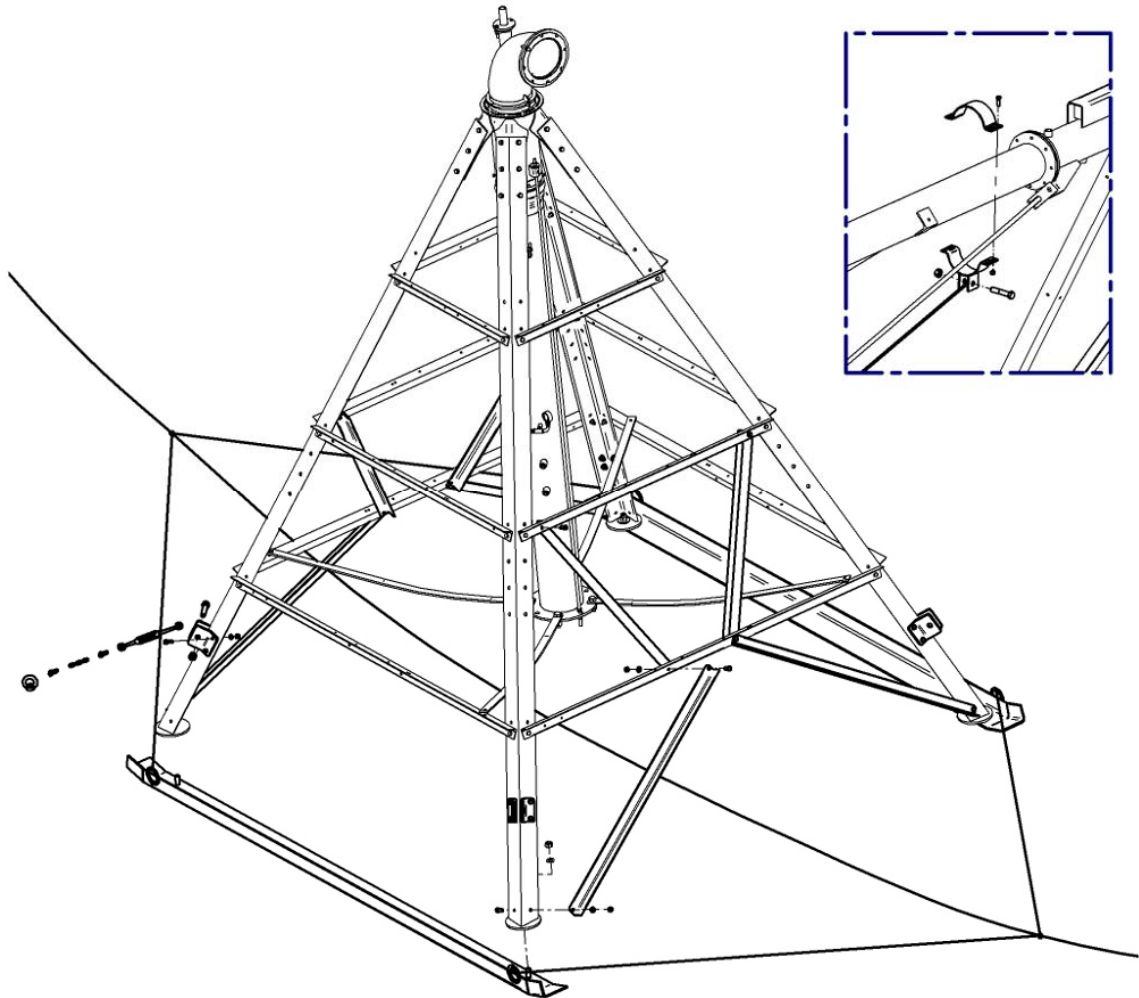


## 11.2 Central Tower towable

### 11.2.1 towable with skids

Installation of the central tower as described under 11.1, except that the central tower is installed on skids instead of on the foundation.

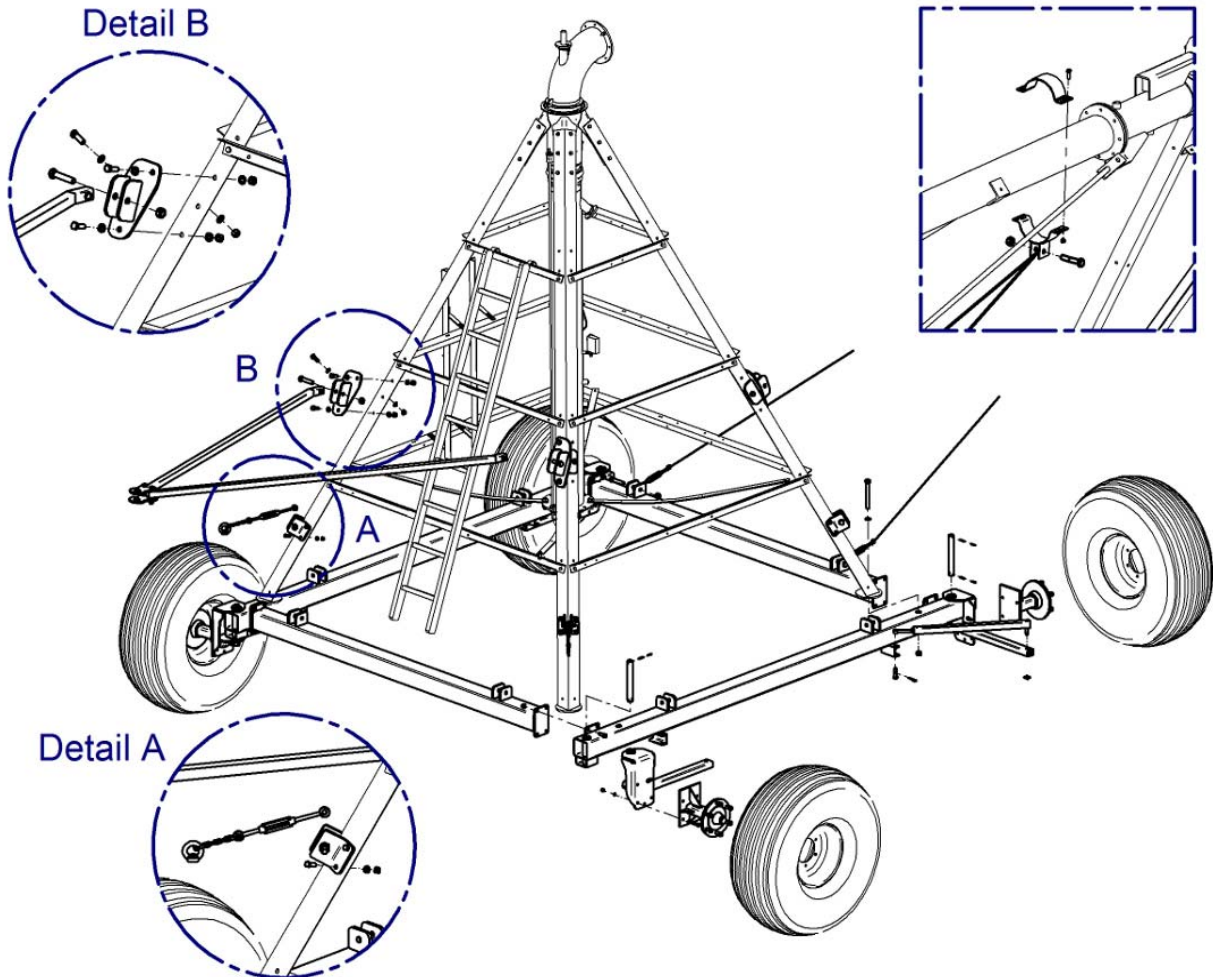
In addition, braces and a guy cable are installed for towing.





### 11.2.2 4-Wheel cart

Installation of the central tower as described under 11.1, except that the central tower is installed on a central tower cart instead of on the foundation.  
In addition, a drawbar and a guy cable are installed.



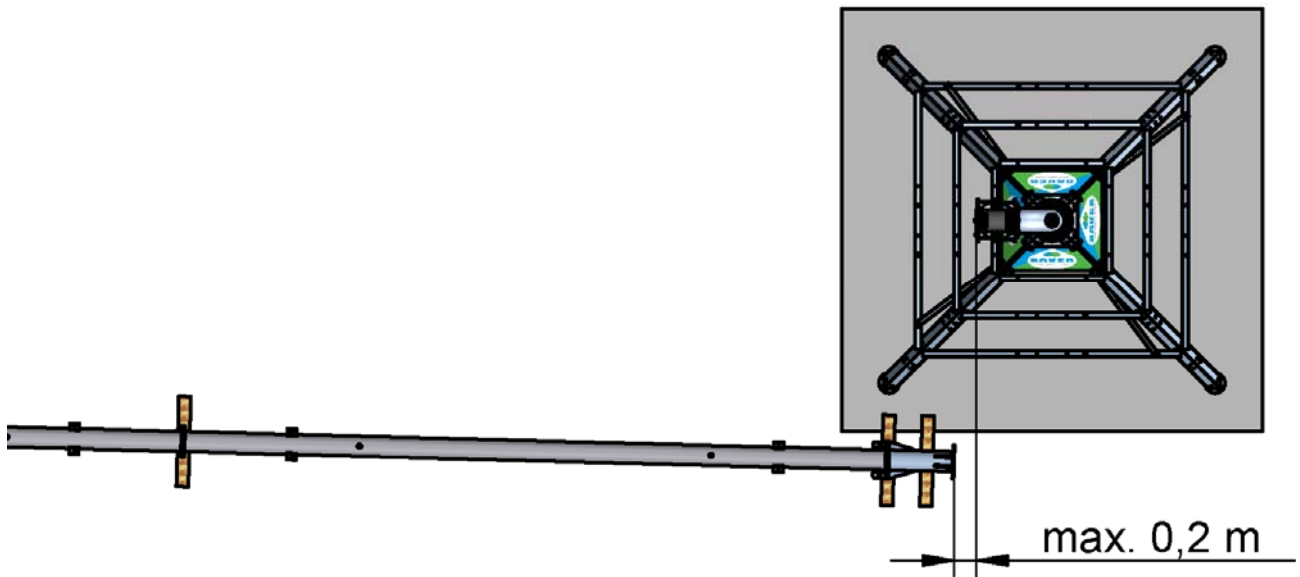
## 12 SPAN

### 12.1 Laying out the material

The first truss structure begins with the central tower end pipe, which may be offset a maximum of 0.2 m from the central tower coupling (or central tower bend).

If the distance is too large, there can be problems later when coupling the SPAN.

The respective end pipes are packed in the span boxes and noted on the material list.



Lay the main pipes of the entire span in a straight line.

The sprinkler connections must point upwards.

*The number of main pipes depends on the span length, which can be looked up in the machine specification and the replacement parts list.*



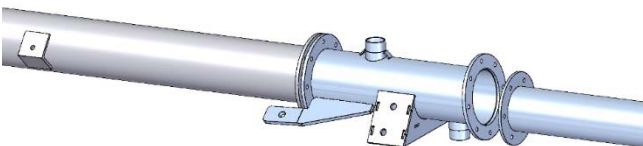
Leave a main pipe spacing of about 1.2 m between each Span.



Take note of the span lengths in the machine specification, and place the appropriate span box containing end pipes 1 and 2 between the spans.



Place end pipes 1 and 2 between the main pipes.



Place the end pipe overhang at the end of the last truss structure and lay out the overhang pipes, if present.

Place a flange gasket between each pipe. These are packed in the span boxes.



Place 2 truss rods next to each main pipe.



Lay out the correct truss angle packages along the Span.  
(See *Layout 10.3*)

The packages are marked in different colors:

- Truss angle package 1 – red*
- Truss angle package 2 – yellow*
- Truss angle package 3 – blue*
- Truss angle package 4 – green*
- Truss angle package 5 – black*





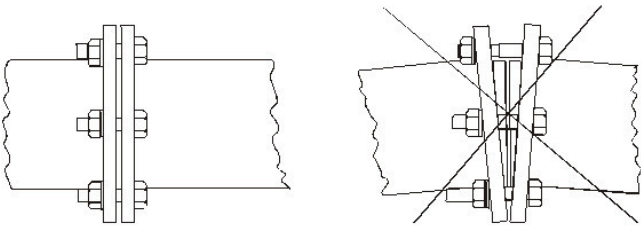
## 12.2 SPAN assembly



Position the flange gasket and bolt the pipes together.

Do not tighten the bolts too firmly!  
(See 9.5)

A piece of wood can be placed underneath for easier handling.

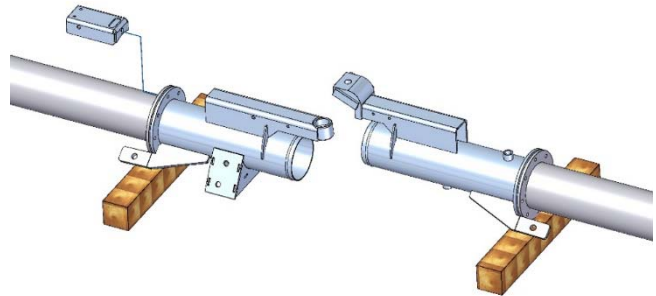


The flanges must be parallel to each other after assembly.



Bolt the end pipes to the main pipes.

For end pipe 2, install the alignment box bracket.



Position 2 junction plates at every truss angle package.

Pre-install the junction plates with 2 truss angles, as shown in the picture. The legs of the angle must be on the outside.

Do not yet tighten the bolts.

*1 package consists of 5 angles. 4 of these have the same length. Bolt these onto the junction plates.*



Place the assembled truss angles and junction plates as shown.



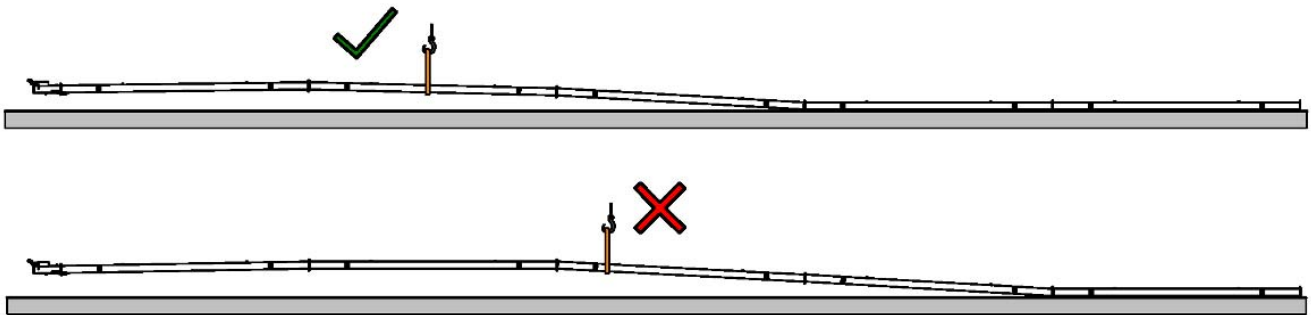


Use the crane truck to lift up the main pipes at the 1st truss angle package in order to complete the assembly.



**Important!**

No more than 2 main pipes may hang freely in the air at the same time! Otherwise deformation can occur.







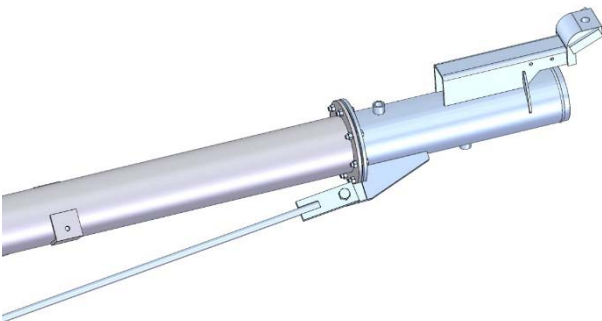
Install the 4 truss angles onto the brackets at the main pipes.  
Do not yet tighten the bolts.



Install the longer 5th truss angle horizontally.



Tighten all bolts.



Install the truss rod at the links of the end pipe. Do not yet tighten the bolts.



Connect the other end of the truss rod and the 2nd truss rod to the junction plate at the truss angle package.



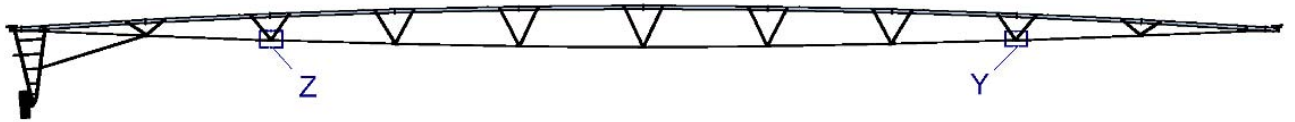
Install the other truss angle packages in the same way.  
Take care to install the bracket for the number 2 truss angle packages.



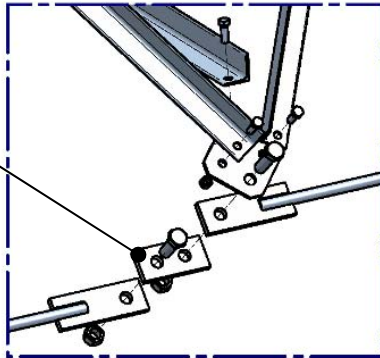
**Important!**

An additional bracket must be installed for truss angle packages 2 between the junction plate and the truss rod.

Install the bracket as shown in detailed images “Z” and “Y”.

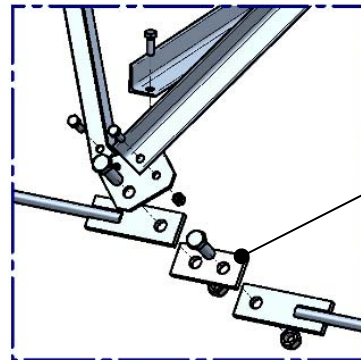


Detail Z

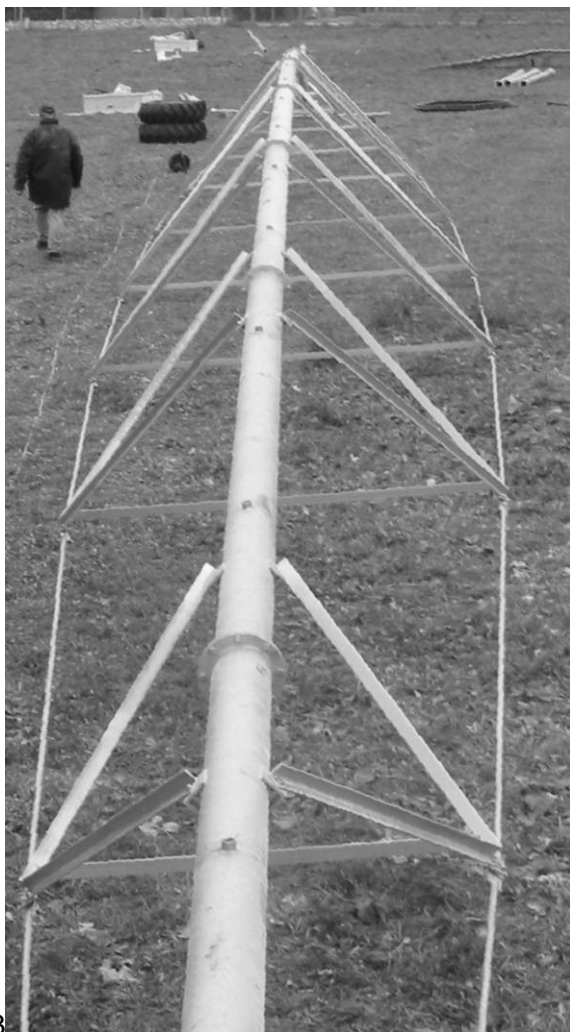


Bracket

Detail Y



Bracket

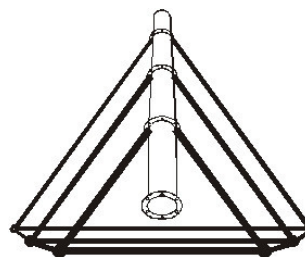


3

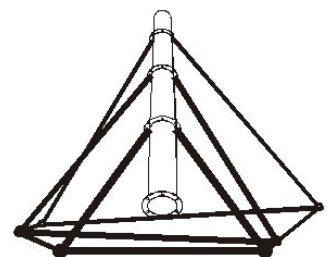
After all truss angle packages and truss rods of the span have been installed, ensure that all horizontal truss angles are parallel. If this is not the case, these must be realigned.

This is the only way to guarantee that the span hangs evenly and level.

Make certain that all bolts are tightened. (See 9.5)



Correct



Incorrect



## 12.3 Drop pipes and running cables

### 12.3.1 Installation of elbows



Install the elbows for the flexible drop pipes onto the span alternately facing left and right.

The machine specification lists whether a flexible drop pipe (elbow), rigid drop pipe or a plug is to be installed.

### 12.3.2 Running cables

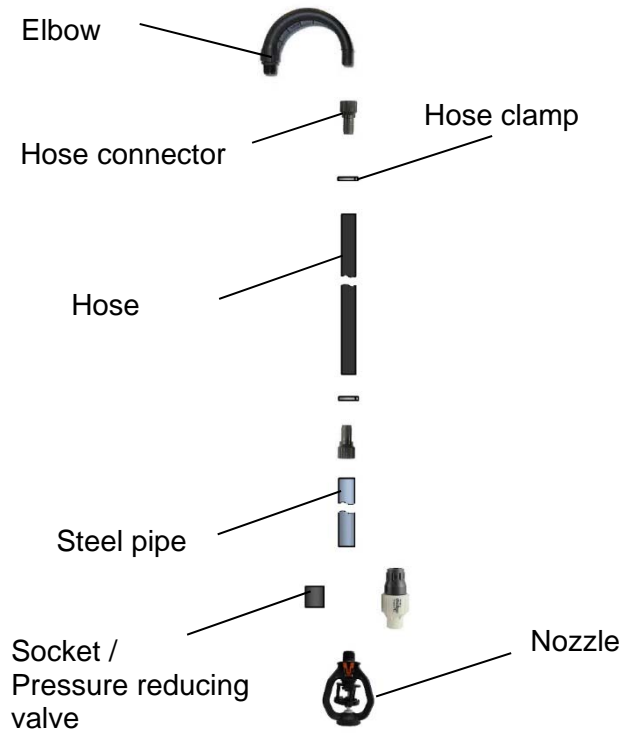


Place the Pivot cable alternately on the right and left side of the nozzle outlets.

Then attach the cable to the span with spring clips or cable ties.



### 12.3.3 Flexible drop pipes



Pre-assemble the drop pipes.

Pressure reducing valves are optional. A socket is installed, if not already present.

For nozzles with extra weight, the steel tube (see below) is not supplied. The hoses must then be cut 0.5 m longer.

*The nozzle inserts must be assembled according to the supplied nozzle assembly plan.*



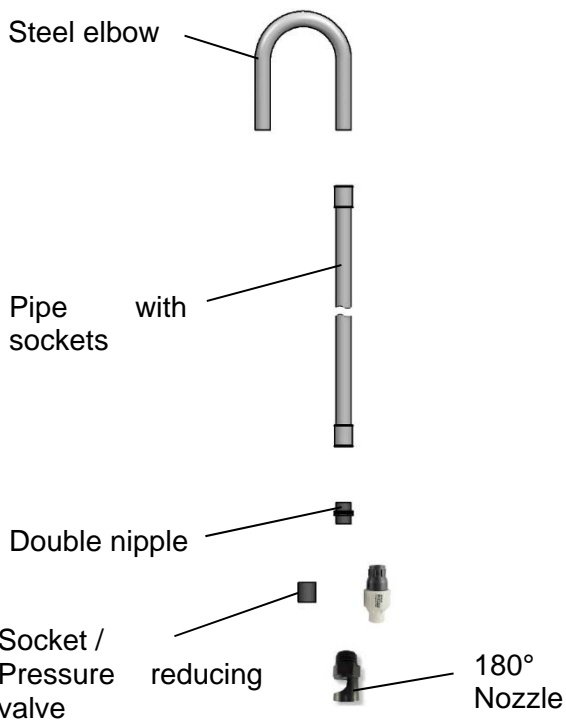
Prepare hoses with the appropriate length according to the machine specification.

*For easier handling, sort the hoses by length.*

Install the pre-assembled drop pipes on the elbows on the span.



### 12.3.4 Rigid drop pipes



Pre-assemble the rigid drop pipes.

Pressure reducing valves are optional. A socket is installed, if not already present.

*The nozzle inserts must be assembled according to the supplied nozzle assembly plan.*

The rigid drop pipes can only be installed during or after connection of the spans. On many systems, the rigid drop pipe is installed on end pipe 1. In this case, an additionally supplied nozzle tube and a socket must be installed.



## 13 OVERHANG

After the last span with the end pipe overhang has been completely assembled on the ground, you can begin with the assembly of the overhang pipes, braces and cables.  
The length of the overhang can be found in the machine specification.

### 13.1 Steel structure and guy cables



Install the flange gasket and the transition flange on the end pipe overhang.

You can place a piece of wood underneath for easier installation.



On the other side of the flange, install the gasket 133 and the first overhang pipe.



Depending on the length of the overhang, install the remaining overhang pipes. Place a gasket 133 between every flange connection.



At every flange, install two cable holder for the guy cables on the two upper bolts.



**Important!**

There are 2 different designs of the cable holder, depending on the overhang length. Consult the supplied replacement parts list for orientation.

*For overhang lengths of 5.9 m and 11.7 m, there is only one design, however with left and right link.*

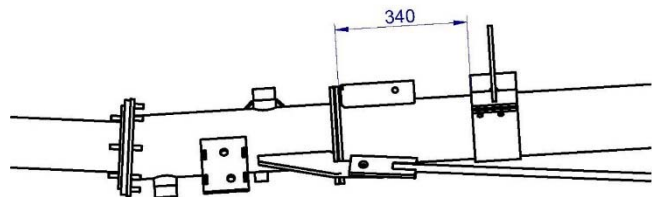
*For the overhangs 17.6 m, 23.4 m and 29.3 m, the 2nd cable mount design is installed as of the third overhang pipe. There is no differentiation here between left and right.*



Install the end flange and the appropriate cable mounts on the last overhang pipe.



Installation of the overhang clamp on the last main pipe of the End Span.





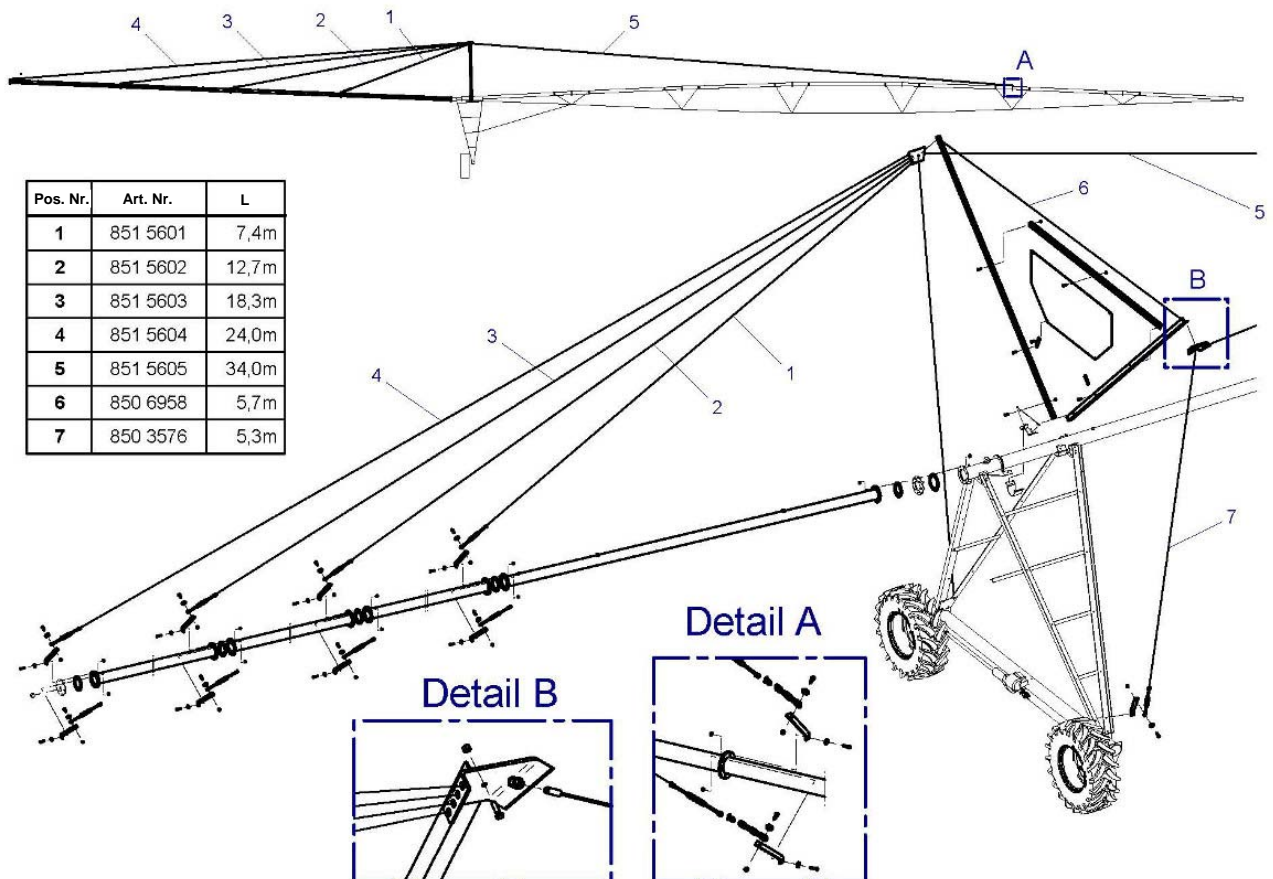
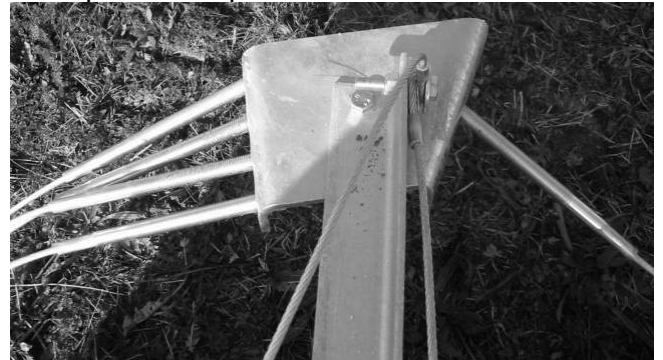


Overhang clamp installed



Installation of the brackets L and R on the overhang struts.

Subsequent installation of the guy cables. Consult the replacement parts list for assistance.





Install the two overhang struts and the cross strut at the junction plate of the overhang clamp.



Tension the two overhang struts horizontally with a cable.

Connect the cable ends to the cable holders on the overhang pipes.  
Pre-tension the cables such that the overhang makes a slight upward bend. Ensure that the overhang struts are perpendicular / at right angles to the overhang pipe.

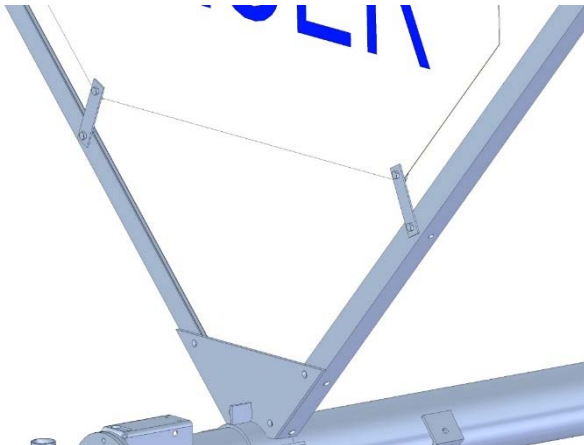


Overhang with tensioned cables, assembled on the ground.

## 13.2 Advertising plate



Installation of the advertising plate on the cross strut.



Fasten the advertising plate to the overhang struts with links.

## 13.3 End gun, booster pump, sand trap (options)

It is possible to install either just an end gun or an end gun with a pump for boosting the pressure. A solenoid valve is additionally installed for switching the gun on and off in specific circle segments.

### 1. End gun installation

The end gun is installed at the end flange of the overhang.

Insert the nozzle into the gun. Select the nozzle diameter according to the computer irrigation table. A sector angle of approximately 150°-160° to the outside must be set on the gun.

### 2. Pressure booster pump installation

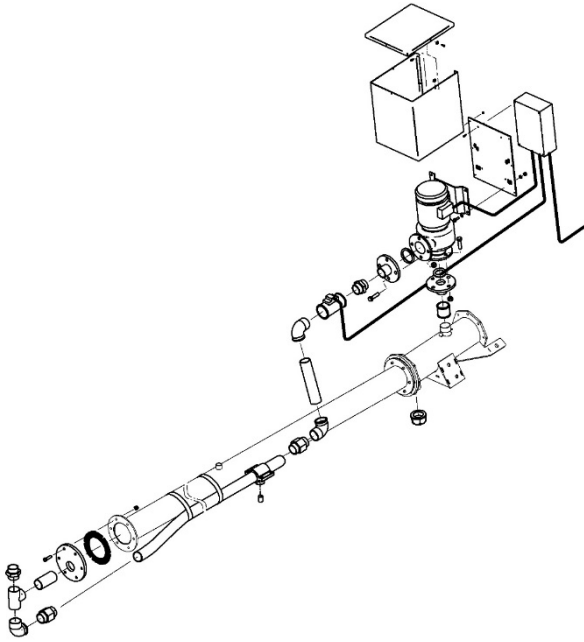
The booster pump is installed on the last tower. The pump is positioned vertically on the threaded connection on the end tube, and the end gun is supplied via a PE pipe. An electric controller is also installed on the pump that receives the signal for starting and stopping the pump from the sector circuit on the central tower.

### 3. Solenoid valve

Both for end gun operation and for end gun with pressure booster pump, a solenoid valve can be used for the interval control. This valve is installed between the end flange and the end gun or between the pressure booster pump and PE pipe to the end gun. This valve is controlled directly by the control unit or, when using a pressure booster pump, via the pump controller. (See electrical wiring diagrams)



Installation of the booster pump on the end pipe overhang.

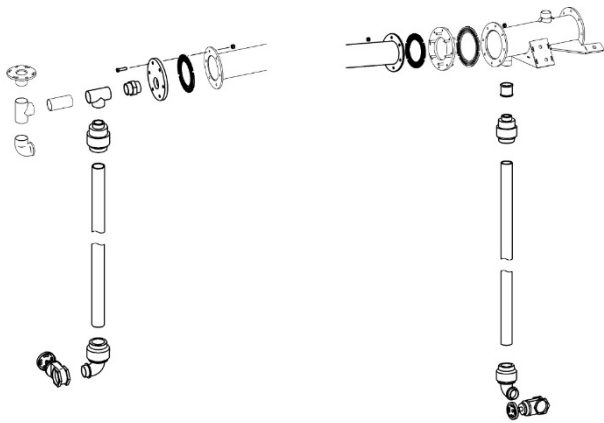


Installation of the end gun with connection for a booster pump.



The PE pipe from the booster pump to the end gun is fastened to the overhang pipe with clamps.





The sand trap is installed after lifting up the span and can be fastened to the end pipe overhang or the end of the overhang.



## 14 DRIVE TOWER

### 14.1 Drive tower legs and support rods

The drive tower is installed on the side, where end pipe 2 is located. Lift up the span with a sling band and crane.



**Important!**

To prevent the span from twisting while being lifted up, it must be supported at the outer truss angles with wood placed underneath. In addition, the span must be stabilized in the middle by 2 people.



Installation of the bracket and clamp for fastening the drive tower legs to the main pipe





Install the two drive tower supports to the 1st junction plate on the span.

Install the supports such that they cross over each other.



Fasten all four drive tower legs to the brackets with a loose bolt.



Lift up the span until the drive tower legs hang vertically.



Positioning of the base beam under the span.





Install the drive tower legs on the junction plate of the base beam.



Slide together the short and long portions of the drive tower supports, and fasten this to the drive tower legs at the height of the 2nd drive tower brace.

The tower supports must be installed crossed and NOT parallel!



Affix the two halves of the drive tower support with bolts and screw tight.



Install the drive tower braces on both sides of the tower.





Bolt on each drive tower leg with the 2nd bolt.

When tightening, ensure that the horizontal truss angles of the span are parallel to the base beam!



Affix the crossed drive tower supports with the U-bend.



## 14.2 Gearboxes and tyres

### 14.2.1 Rigid base beam



Install the 2 gearboxes onto the base beam with the UNC bolts (marked in green).



**Important!**

Do not tighten the UNC bolts with the impact driver! This could damage the thread of the gearbox.



**Important!**

At the 1st and 2nd drive tower, the corresponding wedge plates must be inserted to set the tyres for the shorter curve radius.

*Package 851 2396 with the wedge plates, bolts and installation drawing is packed in the central tower box.*



Install the left and right tyre on the gearbox.

Note the direction of rotation!



### 14.2.2 Gearbox carrier of towable base beam



Place the towable gearbox on the ground and position the gearbox carrier.



Assemble the gearbox carrier with the UNC bolts (marked in green) and spring washers.

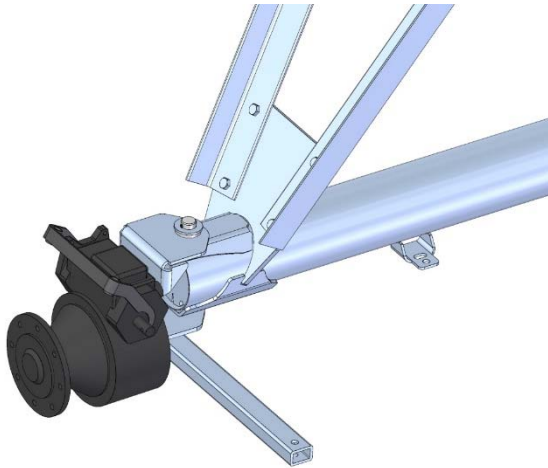


**Important!**

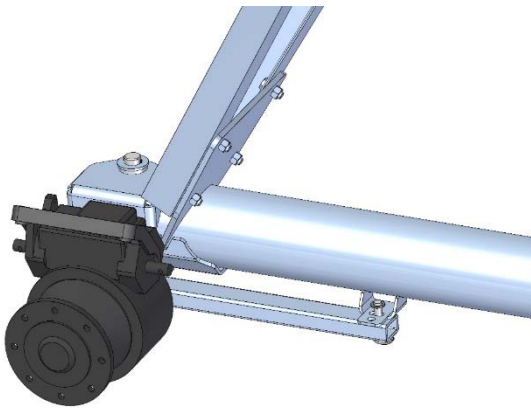
Do not tighten the UNC bolts with the impact driver! This could damage the thread of the gearbox.



Knock in the roll pin on one side of the bolt.



Install the gearbox carrier onto the basebeam with pin and washer.



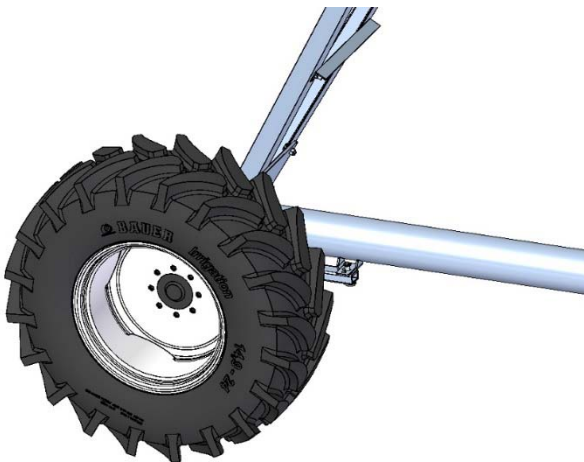
Affix the gearbox carrier with the locking pin.



**Important!**

On the first 2 drive towers, the gearbox mount must be inserted into the provided hole with a 3° inclination in order to set the wheels at an angle for the tighter curve radius.

On the remaining drive towers, the gearbox carrier must be aligned parallel to the base beam (insert into oblong hole).



Install the wheels on the gearbox carrier.

Note the direction of rotation!



Install the remaining drive towers at every span.



At the last tower, the overhang strut must be installed on the drive tower leg.  
(See 13.1)





## 15 COUPLING THE SPAN

All spans are lying with one end on the ground and the other end resting on the assembled drive tower. The central tower is assembled and affixed to the foundation in the correct position.

### 15.1 First SPAN

Depending on the machine design, the first span is connected directly to the central tower with a flange or installed with a moving central tower coupling.



Install the central tower coupling with gasket onto the end pipe central tower.



Lift up the first span with a crane and sling band.

The flange of the end pipe or the central tower coupling is brought up to the upper bend.



If the span is too close to the central tower or too far away, the span must be moved forward or backward. In the case of a towable design, this can be done with the crane while the wheels are swiveled. For a non-towable design, the drive tower must be moved at the same time, such as with a tractor.



Bolt the flange connection.

## 15.2 Intermediate and End SPAN



Fasten a sling band on end pipe 1.



Install the ball for the coupling.

Prepare the hose and clamps as shown in the image.



Lift and position the span.



**Important!**

The ball and socket must be well greased.

Position the span with a crane and slide the tower coupling hose over top at the second pipe end.







Lower the ball into the socket and connect the span.



Affix the hose with the hose clamps.

Connect the two end pipes with the grounding cable.



## 16 GEARMOTOR AND DRIVE SHAFT



Install the gearmotor on the base beam.

Install the coupling for the drive shaft on both sides.



Thread the protective tube and protective bell with hose clamps onto the drive shaft.



Install drive shafts on both sides between the gearmotor and gearbox.



Connect the cable for the gearmotor according to the circuit diagram.



Affix the protective tube and protective bell with a cable clamp.

*Connect the two protective tubes together with the supplied chain to prevent the protective tube from turning with the shaft.*

## 17 TOWER ALIGNMENT BOXES AND TRANSMISSION PARTS

### 17.1 Tower alignment box

There are various designs for the alignment box, depending on the machine specification and options.

#### Tower Alignment Switch (TAS)

This switch is installed outside on the base plate of the alignment box. The respective tower can be individually moved forward or backward by pressing this switch. This makes it easier to align the machine during initial commissioning as well as during the moving of towable systems.

#### End Tower monitoring device (EMD)

If the wheels at the last tower slip, causing the Pivot to come to a standstill, the entire machine will be automatically switched off after a certain time (configurable on the timer relay of the next-to-last alignment box) to prevent over-irrigation. A unit shutoff or an electric shut-off valve should be provided in the Pivot supply.

#### PRO-G

An additional GPS module is installed in the end control for the UNIVERSAL PRO-G control unit.

To install on the truss structure:	Name	TAS	EMD	Article number
First and Intermediate SPAN	Alignment box	without	without	850 0950
First and Intermediate SPAN	Alignment box	with	without	850 0980
Next-to-last SPAN	Alignment box	without	with	850 0975
Next-to-last SPAN	Alignment box	with	with	850 0990
End SPAN	End control	without	-	850 0970
End SPAN	End control	with	-	850 0985
End SPAN	End control PRO-G	without	-	850 0935
End SPAN	End control PRO-G	with	-	850 0947

#### 17.1.1 Setup and installation

The alignment box is installed with the bracket on end pipe 2 (tower) of every span.

The alignment box with the option of movement monitoring is installed on the next-to-last span. This option contains an additional timer relay that monitors the operation of the last tower.

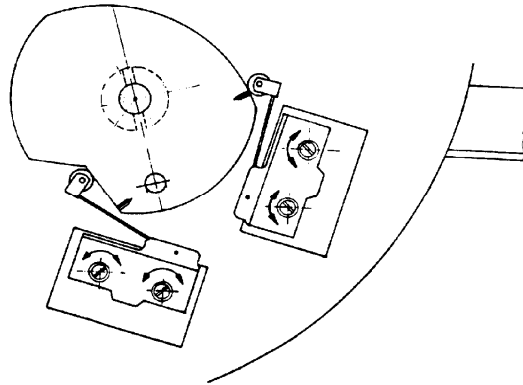
The end control is installed on the last tower. This control contains no trip cam and microswitch. No transmission component is installed.



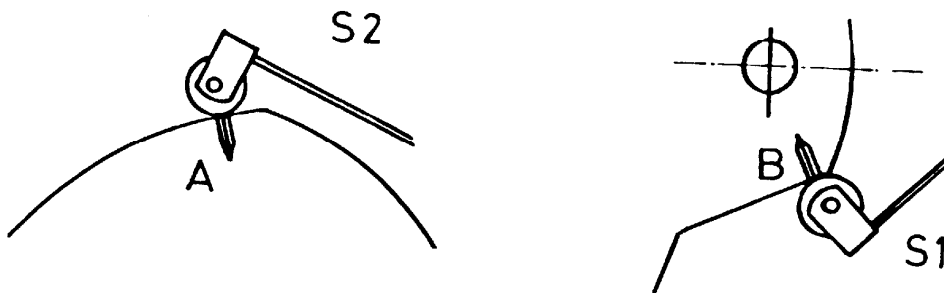
Alignment box installed.

### 17.1.2 Checking the switching points

The microswitches on the alignment boxes are installed and configured at the factory. To be on the safe side, however, a check should still be performed before installation of the transmission lever.



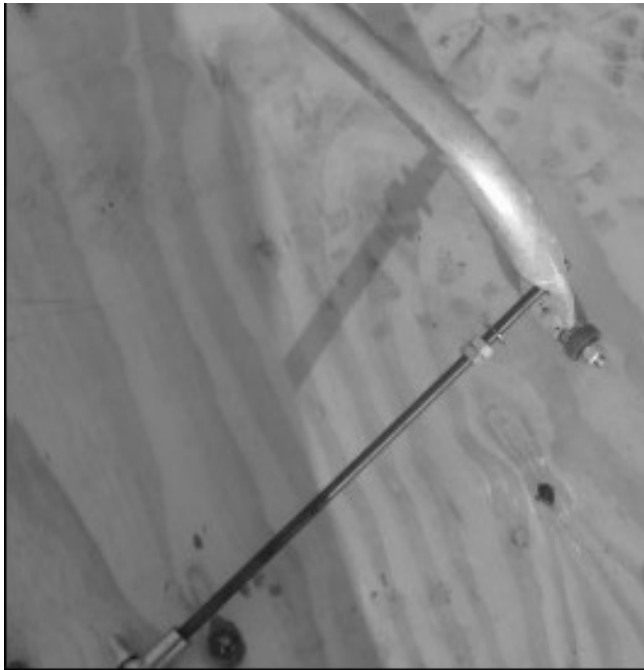
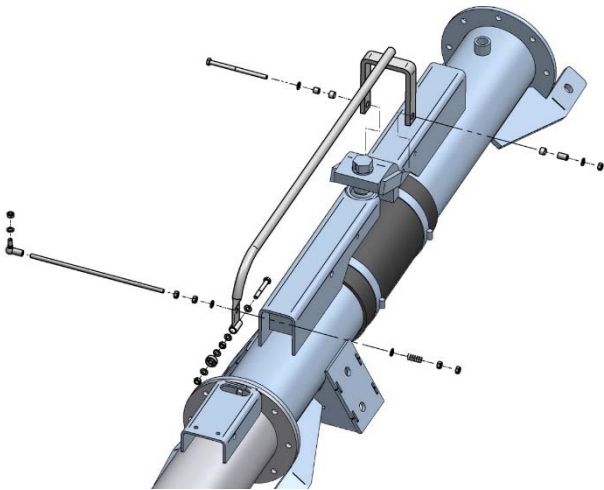
1. To adjust the control switch, the trip cam must be turned (counterclockwise) until the switch roller comes to rest at notch "A". The control switch must switch (click) in this position. The ribbon of the switch will be positioned near the switch housing. If the switching point is incorrect, the fastening screws of the switch must be loosened and the position of the switch corrected such that the switching position is correct. Repeat the check.
2. To adjust the safety switch, the trip cam must be turned (clockwise) until the switch roller comes to rest at notch "B". The safety switch must switch (click) in this position. The ribbon of the switch will be positioned near the switch housing. If the switching point is incorrect, carry out the adjustment procedure and check as described under item 1).





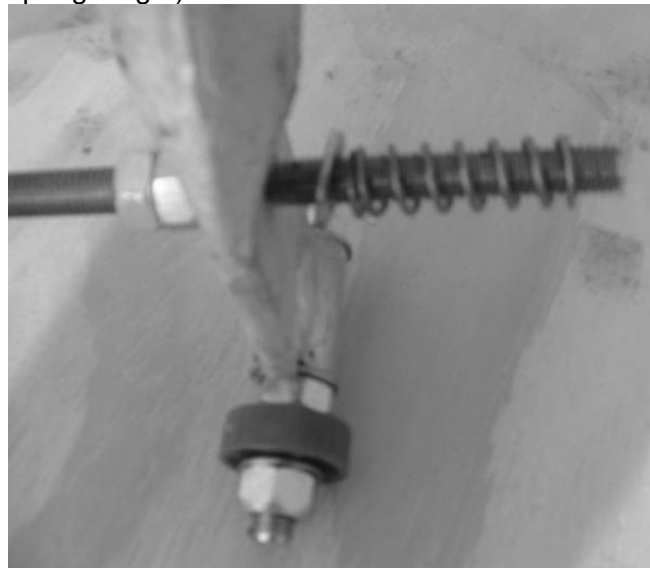
## 17.2 Transmission part Standard

Install the transmission part on the tower coupling.



Install the threaded rod on the transmission lever.

Affix the compression spring on the threaded rod with nuts. Do not pre-tension too much. (~10 mm of spring length)



Install the transmission part on the bracket of end pipe 1.



The transmission lever must be installed with the bushings such that it has no play in order to guarantee the highest switching precision.

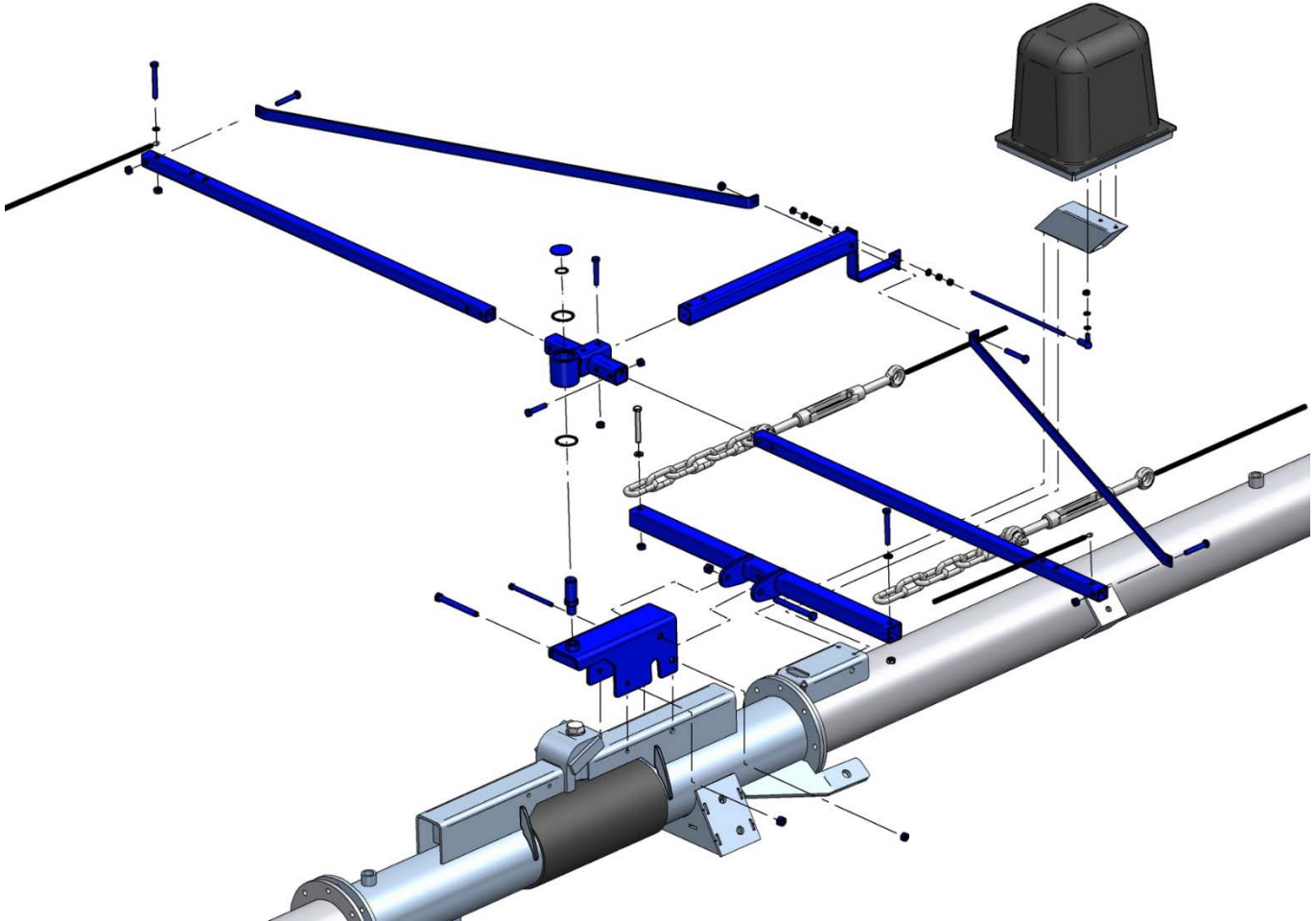


Install the transmission component on the trip cam of the alignment box.



### 17.3 Precision control

If a Pivot consists of more than 12 spans, exact control must be provided on every span for accurate functioning. For this purpose, two cables are additionally tensioned along the entire span length and connected with a cross bar (see replacement parts list).





## 18 OPTIONAL FEATURES

### 18.1 Automatik circle stop

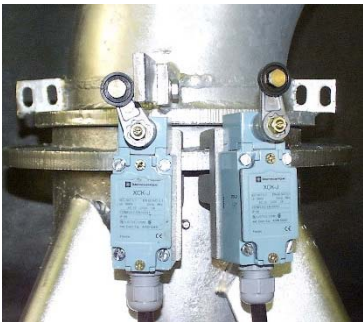


A switching bracket mounted on the pivot operates a momentary-contact limit switch that automatically stops the system in a certain position (parking position).

Turning the "AUTOMATIC STOP ON-OFF" switch to "OFF" makes it possible to irrigate in full circles.

For restart after automatic stop, turn the switch "OFF" and push the start button. When the switching bracket has left the momentary-contact limit switch, turn the switch to "ON".

### 18.2 Sector control with automatic reverse – sector automatic stop

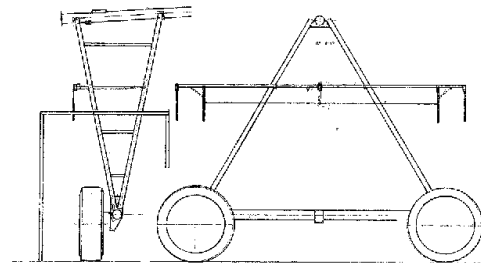


Two momentary-contact limit switches are mounted on the pivot, which can be fixed at the desired position for limiting the sector. The limit switches are actuated by a switching bracket mounted on the pivot feed elbow.

The "AUTO REVERSE OFF-ON" switch is built into the pivot panel. In "OFF" position the system shuts off automatically when the sector limit is reached.

The "ON" setting makes it possible to irrigate the sector defined by the limit switches without interruptions, as often as needed. After the number of applications has been completed the system must be shut off by hand.

### 18.3 Endstop with automatic reverse



If it is necessary to stop or reverse the system precisely when the sector boundaries are reached, the system is shut off at the system end. A momentary contact limit switch mounted on the end tower is actuated by a shut-off frame which is positioned in the track of the end tower at the sector boundary and stops the machine.

With the "AUTO REVERSE OFF-ON" switch it is possible to choose between the „sector stop“ or “automatic reverse” functions.

### 18.4 Low-pressure shut-off

The pivot supply pressure is monitored by a flow control on the pivot feed pipe. If the supply pressure drops below the minimum pressure set on the flow control, the CENTERSTAR is shut off.



#### CAUTION!

For this purpose the "WET-DRY" switch must be set at "WET".  
 When set at "DRY", the "WET-DRY" switch inactivates the flow control..

In the "DRY" setting the machine can run without irrigating (dry) (e.g. if CENTERSTAR is to be moved to the parking position due to natural rainfall).

### 18.5 Automatic pump unit shut-off

When the CENTERSTAR is at standstill or when a malfunction occurs, the pumping unit is shut off automatically if it is wired with the control panel.



## 18.6 Automatic control for electric shut-off valve

An electric shut-off valve in the pivot feed line is closed automatically when the CENTERSTAR is turned off or stops due to malfunction.

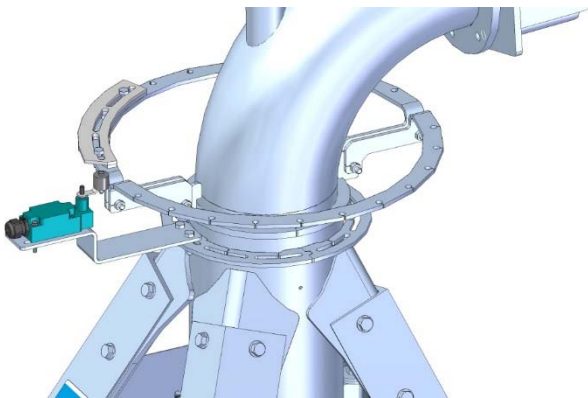
## 18.7 Fertiliser injection pump

A socket on the outside of the pivot panel is provided for connecting an electric fertiliser injection pump. Power supply to the fertiliser injection pump is interrupted when the CENTERSTAR stops.

## 18.8 Sector control for Endgun

Within one circle the endgun can be switched on and off in up to four sectors.

For this purpose, infinitely adjustable switching segments are mounted on the pivot. A solenoid valve controlled through a position switch serves to interrupt water flow to the booster pump and thus to the endgun. The pump motor is switched off simultaneously.

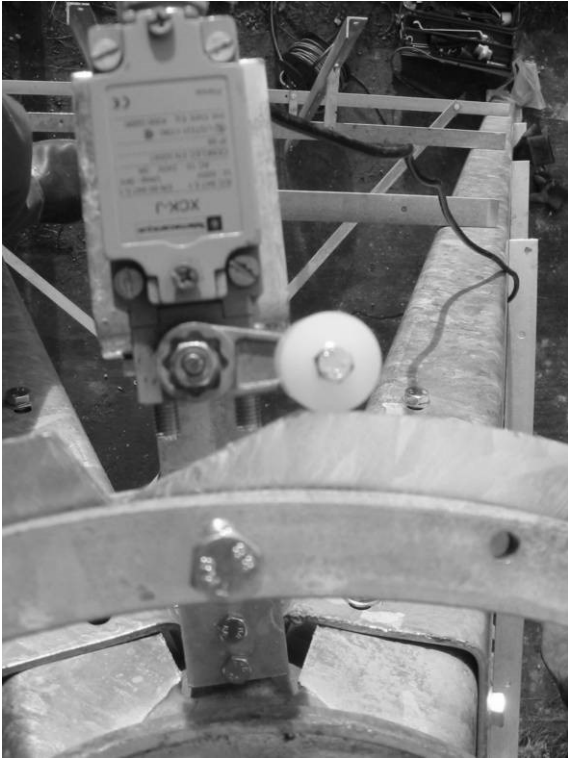


Install the cam holder on the links at the central tower elbow.

Fasten the switch with the bracket to the ring of the angle mount.




Mount the switch roll to the limit switch lever.



Up to 4 switch segments/sectors can now be configured with the cams.



## 19 ELECTRICAL SYSTEM

 <b>WARNING !</b>	<b>System is powered by 220 Volts and 400 Volts (460 Volts) ! All installation and service work must be performed with extreme care - only by a qualified person - and in strict compliance with the relevant safety codes !</b>
---	--

 <b>WARNING !</b>	<b>Complete electrical installation to be carried out ONLY with the system de-energised !</b>
---	---

### 19.1 Cables and markings

1. The pivot cable consists of 11 phases which are marked by colours.

	Phase colour	Phase number
Power circuit	Black	1
	Blue	2
	Brown	3
Control circuit	Pink	4
	Grey	5
	Red	6
	White	7
	Violet	8
	Green	9
	Orange	10
Grounding conductor	Yellow / Green	

2. Cable lengths

The cables are cut to length and stripped at their ends already in the factory.


Moreover, the length of the cable of the first span is also different depending on whether a collector is used for full circle systems or if a part circle pivot is mounted without a collector

Die Kabellängen sind so abgestimmt, dass die beiden Enden jeweils in einem leichten Bogen in die Richtsteuerungen eingeführt werden können.

3. Mounting the cables


On the tower end of the span, where the tower box is mounted on the end pipe, the cable end is laid to the end of the pipe and in this position it is fixed on the pipe with the spring clip. In this position the cable mounting length is correct on both sides.

## 19.2 Installation, connection of the Control Panel

 <b>WARNING !</b>	<b>The electrical supply line must be disconnected from all power for connecting the pivot panel and for all system electrical work !</b>
--	---

1. On pivots with a collector, lay down the collector cable through the cable conduit in the feed pipe. Pull this collector cable into the pivot panel and connect it to the terminal strip according to the wiring diagram.
2. On a sector pivot without collector the cable of the first span is laid directly into the pivot panel and connected according to the wiring diagram. For this system version, the cable of the first span is designed appropriately longer.
3. Connect the three phases of the electrical supply line in the pivot panel according to the wiring diagram.
4. Tighten the screwed joints at the panel inlet to prevent entry of moisture.

## 19.3 Grounding

 <b>WARNING !</b>	<b>The entire pivot system must be grounded at the pivot tower ! Grounding resistance must conform to local codes.</b>
--	--

1. A ground strip is laid at the pivot foundation. Choose a strip length with which the required grounding resistance is reached. This ground strip must be firmly connected to the steel structure of the pivot.
2. On towable pivots such a ground strip must be laid at every pivot set-up position (every foundation) and connected firmly to the system every time the pivot is repositioned.
3. The required length of grounding strip must be determined by a qualified electrician in accordance with local ground conditions and local legal codes.

## 19.4 Connection Tower alignment boxes

1. The beginning of the pivot cable on the first span is connected to the collector. Numbering of the connections in the pivot panel, in the collector and in the tower boxes is identical (see wiring diagrams - chapter 29).
2. Lay 3 cables into the tower box:
  - incoming feeder cable,
  - forwarding of feeder cable,
  - cable to the tower drive motor
3. Connections to be made according to the enclosed wiring diagrams (see wiring diagrams – chapter 29).
4. Distinguish between different tower box options (see Section 17.1).

<b>NOTE !</b>	Correct wiring of all tower boxes is essential. If phases are exchanged the towers travel into different directions !
---------------	---



5. Both coupling halves of the spans must be connected to the grounding conductor.
6. Tighten the screwed cable entry into the box to prevent moisture from penetrating into the housing.

## 20 INITIAL START-UP

### 20.1 Central Tower check up

1. Are all screwed joints tightened?
2. Is the pivot firmly screwed to the foundation ?
3. Is the feed pipe 2 in the pivot head lubricated ? (recommended: Molykote BR 2 plus)
4. Is the stuffing box gland or are the packing bolts not tightened too strongly ?
5. Is the feed pipe 1 flush with feed pipe 2 ?
6. Do the clamps fit tightly to the counter bearing and are they tightly screwed ?
7. Are the pivot panel and the slip ring collector correctly wired ?  
Test the conductive continuity by means of the circuit diagrams with a measuring instrument.

### 20.2 Check up of SPAN and Drive towers

1. Are all screwed joints firmly tightened? (according to section 9.5)
2. Are the ball screws of the wheels firmly tightened? (according to section 9.5)
3. Is the tyre pressure:  
1,5 bar with tyres 14,9 – 24  
1,1 bar with tyres 16,9 – 24
4. Are the gearboxes and drive motors filled with oil?
5. Are the ball joints in the tower couplings lubricated ? (recommended: Molykote BR 2 plus)
6. Are the electric cables fixed properly?
7. Are the cable entries moisture-tight ?
8. Are the sprinklers or spray nozzles installed in the proper position according to the supplied computer chart ?

## 20.3 Gearboxes and drive motors

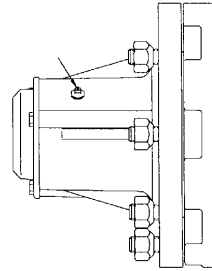
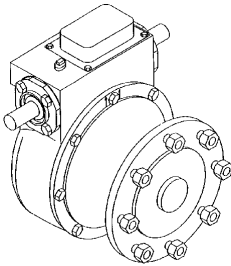
### 20.3.1 Gearboxes

Worm gear with 50:1 reduction ratio.

Execution: for stationary systems  
for towable systems with freely rotating hub

Oil check-up:

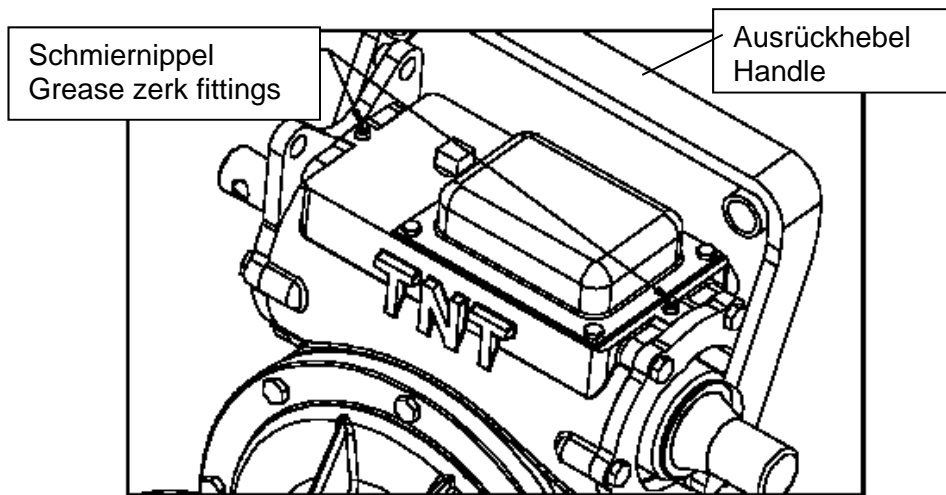
Used oil quality: SAE 85W-140, multigrad oil  
Oil quantity approx. 3,8 litres up to bottom edge of filling hole.  
Oil expansion is compensated by expansion membranes



### Wheel gear TNT

The wheel gears, model TNT, are equipped with grease fittings for greasing the bale assembly (see fig.). We would like to point out that the gear has to be lubricated before initial installation as well as once or twice per season (depending on the frequency of towing).

Use a lithium grease (e.g. CASTROL Grease LMX or SHELL Retrinax LX 2). After greasing acute the handle several times for distributing the grease evenly.



### Wheel gear TNT2

The wheel gear type TNT2 have not got any grease fittings for greasing the bale assembly.

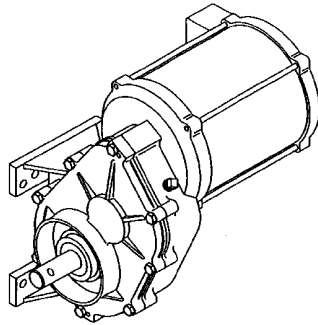
### 20.3.2 Gearmotor

spur gear with 40:1 reduction ratio, 30:1 optional ,  
 standard output 0,55 kW; optional 1,1 kW


Driving speed with tyres 14.9-24,                      ratio 40:1        = 144 m/h  
 (at 50 Hz)    ratio 30:1        = 193 m/h

Oil check-up:

Used oil quality:    SAE 50W, or SAE 20W-50 multirange motor oil  
 Approx. oil quantity:                                      3.8 litres up to bottom edge of filling hole



### 20.4 Control panel

 <b>WARNING !</b>	<p>All work on electrical control system to be done only by a qualified electrician !          All metal components of the pivot system must be properly grounded or fitted with an electroconductive connection with a yellow/green protective conductor!          The protective conductor must be connected to a suitable grounding (conforming to local codes).</p>
---	---

#### 20.4.1 Check-up of voltage and wiring

1. Check mains voltage by measuring.  
 3—phase alternating current :  
 380 V / 400 V +/- 5% / 50 Hz +/- 2%  
 or alternately 460 V +/- 5% / 60 Hz +/- 2%
2. Check the control voltage on transformer (L11, N11). 220 V +/- 5%
3. Disconnect power supply and disconnect the wires no. 4, 5, and 6 in the pivot panel thus interrupting the control circuit to the tower boxes.
4. Turn on the power supply by reclosing the main disconnect Q1.
5. Turn the "SAFETY CIRCUIT" switch to OFF position

 <b>WARNING !</b>	<p>In OFF position the "SAFETY CIRCUIT" switch deactivates the safety system!</p>
---	---

6. If optional features are mounted, turn them off by means of their respective controls.
7. „CENTERSTAR“ „ON“
8. Push the green button "FORWARD START" so that the reversing contactor K2 picks up. Towers must not start to operate.
9. While pushing the "FORWARD START" button check with a measuring instrument if the control voltage of 220 V is applied between the terminals 4 and 6. If not, turn off main disconnect and exchange the lines to the terminals 5 and 6 in the pivot panel
10. Crosscheck in position "REVERSE START" according to diagrams 6 and 7: The control voltage must be applied between the clamps 4 and 5.
11. Turn off power infeed at main disconnect Q1.
12. Reconnect the cores no. 4, 5 and 6 of the pivot cable in the pivot panel.



### 20.4.2 Check-up of drive tower travel direction

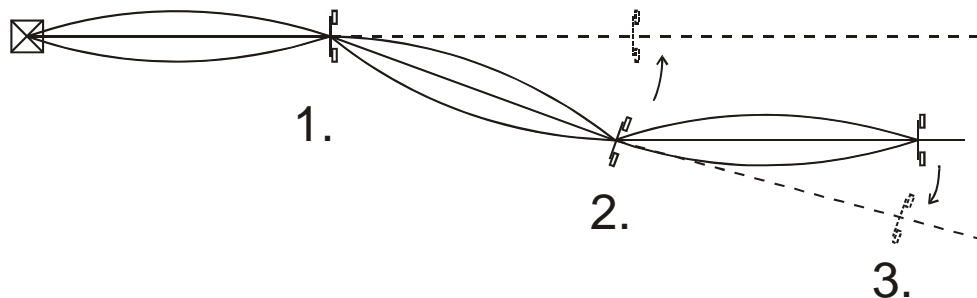
1. Turn the "SAFETY CIRCUIT" switch to OFF position.

 <b>WARNING !</b>	In OFF position, the "SAFETY CIRCUIT" switch deactivates the safety system!
--	---

2. Turn on power supply at the main disconnect Q1.
3. Turn „CENTERSTAR“ to ON
4. Hold the "FORWARD START" button depressed. The system must start in clockwise direction. When pushing the "REVERSE START" the system must start counter-clockwise.
5. In case of faulty run the "FORWARD START" or „REVERSE START" must be released immediately !
6. If none of the towers starts correctly into the selected travel direction, two phases of the feeder on the main disconnect Q1 must be exchanged after disconnecting the system from power.
7. If only individual towers run faulty (travel into the wrong direction), reverse the poles of the motor supply cable at the respective tower – after system has been disconnected from power.

### 20.4.3 Drive tower alignment

If the pivot system is not exactly aligned after installation - i.e. the assumed connecting line of all drive motors with the pivot centre is not a precisely straight line – the system must be aligned.



#### Tower alignment without tower alignment switch (optional)

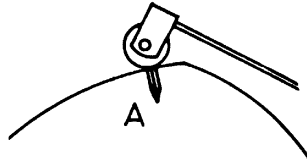
1. Turn "SAFETY CIRCUIT" to OFF position.
2. MAIN DISCONNECT to position "I".
3. „CENTERSTAR“ switch to "ON".
4. To slacken the spans after the installation, put the system into operation in every direction for about 20 to 30 seconds with the FORWARD START and REVERSE START buttons.
5. Align the system according to the example in the drawing above.
  - 5.1. Hold FORWARD START depressed until span 3 forms a straight line with span 2. The drive motors of the towers 3, 2, and 1 are in a straight line. A second person is required for directing.
  - 5.2. Release FORWARD START
  - 5.3. Tower box, adjust transmission lever on span 2 according to instructions (Chapter 19.4).
  - 5.4. Hold REVERSE START depressed until span 2 and span 1 form a straight line.
  - 5.5. Release the REVERSE START button.
  - 5.6. Tower alignment box, adjust the transmission lever on span 1 according to the following instructions (Chapter 20.4.4)

#### 20.4.4 Adjustment of tower alignment boxes

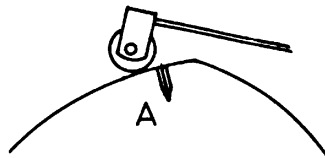
For this adjustment, all spans must be aligned in a straight line.

The tower boxes are adjusted as described below:

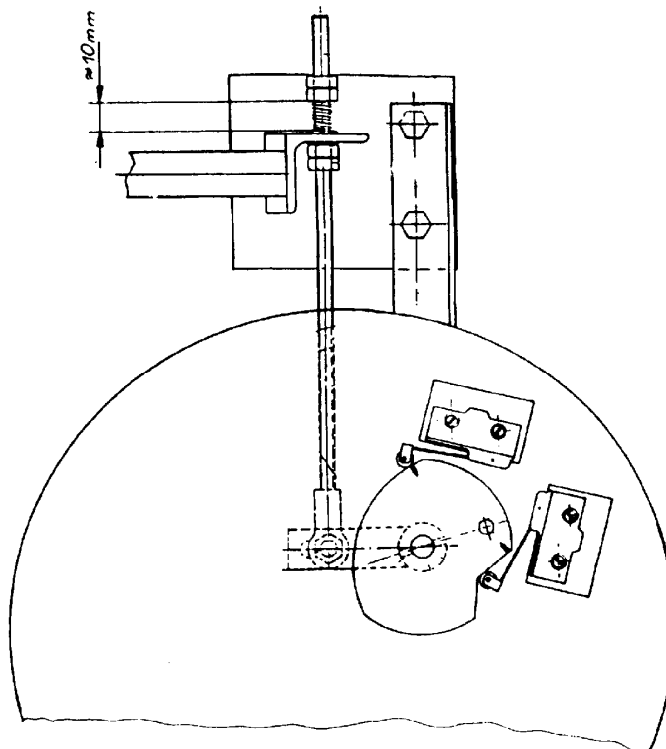
1. Turn the hex. nut on the threaded rod (transmission element between lever and cam) so that the cam turns counter-clockwise until the control switch lies at the notch "A" and switches (clicks).



2. Turn the hex. nut on the threaded rod so that the switch cam moves clockwise until the reversing point of the control switch. In doing so, the number of rotations of the nut or the wrench turns must be counted.



3. Turn back the operating cam by half of the nut or wrench rotations counted under point 2 above – the roller is positioned exactly in the middle between switching and reversing point of the control switch.
4. Secure the set nut on the threaded rod with the locknut. Adjust both nuts in such a way that the spring is pretensioned about 10 mm.



## 20.4.5 Alignment check-up

The CENTERSTAR is properly aligned if a positive bow of the same size forms in both directions of rotation.

Forward travel



Reverse travel



If this is not the case, realign the system as follows:

1. Turn the main disconnect Q2 to position "1" .
2. Turn the "SAFETY CIRCUIT" switch to ON.



Turn the "SAFETY CIRCUIT" switch to ON or leave it in this position.

**This switch MUST always be "ON" while system is operating.**  
This is the only way to guarantee safety during unattended operation!

3. Set the rotary percentage timer at the desired value.
4. Turn the "CENTERSTAR ON – OFF" to ON.
5. Press the green "FORWARD START" or "REVERSE START" pushbutton and hold it depressed until the electric switches are audibly actuated and the towers start moving.
6. Check-up of pivot bow
  - 6.1. Check, if the driving motor of the first tower is located in front of an assumed connecting line between the drive motor of the second tower and the pivot centre. If this is not the case, the tower box on the first tower must be readjusted as follows: Loosen the hex. nuts and turn the threaded rod until the above requirement is fulfilled.
  - 6.2. The next step is to check if the drive motor of the second tower is positioned **in front of** an assumed connecting line between the drive motor on the third tower and the pivot centre. If this is not the case correct the tower box on the second tower.
  - 6.3. Now check all towers step by step as described under 6.1 and 6.2 above. Re-adjust tower boxes, as needed. At the end of this procedure the CENTERSTAR should form a positive bow, which means that the middle towers must be positioned in front of an assumed connecting line between end tower and pivot centre.

## 21 STARTING PROCEDURE



1. Turn the main disconnect to position "1".



2. Turn the "SAFETY CIRCUIT" switch to "ON" or leave it in that position.

**This switch MUST always be "ON" while system is operating"!!**  
This is the only way to guarantee safety in unattended operation.



3. Turn the rotary SPEED knob (percentage timer) to the desired position. Please take from the charts supplied with the pivot system, which percentage to set for the desired watering height.



4. Turn "CENTER STAR OFF - ON" switch to "ON".



5. Press the green "FORWARD START" or "REVERSE START" button and hold it depressed until the towers start moving

6. Connect water supply by starting the pumping unit or opening the stop valve.

7. With the system running, check pipeline tightness, operating pressure stability, and power supply.

## 22 SHUT-OFF PROCEDURE

**NOTE!**

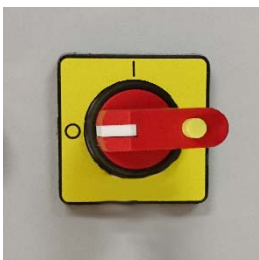
Systems without optional equipment can be shut off by hand only.

**Exception:** The system is stopped automatically through the safety system only in case of malfunction such as doglegging or drive unit failure.

1. Close water supply by turning off the pumping unit or closing the stop valve.



2. Turn the "CENTERSTAR OFF – ON" switch to "OFF"



3. Turn the main disconnect to "O".

## 23 RINSING THE SYSTEM

1. Open the valve on the sand trap.
2. Open the water supply by starting the pumping unit or opening the stop valve.
3. Close the valve on the sand trap again as soon as the discharged rinsing water is clean and without dirt (mostly after not more than 5 minutes).
4. Close water supply by shutting down the pumping unit or closing the stop valve.

## 24 TEST RUN

The final test run should be carried out in the presence of the customer. Its purpose is to check all settings again and acquaint the customer with the system by means of the operating manual.

## 25 NOTES

CENTERSTAR 9000 is released for operation by the customer ONLY after complete installation of the system and successful initial start-up by the supplier's specialists !

Being powered by 400 as well as 460 volts, all control system components and electrical service must always be handled with utmost care! All repair or maintenance work on this equipment to be performed by qualified electricians only!

Before starting up the system, all auxiliary units (generator, pump) should also be checked for proper functioning. It is absolutely necessary to have all defects repaired by the competent service department before starting to irrigate. In doing so, special attention should be given to all current-bearing components.

More details on optional equipment, service and maintenance, dimensions, towing equipment and the like are contained in the operating manual.



## **26 MAINTENANCE INSTRUCTIONS**

See operating manual

## **27 TROUBLESHOOTING**

See operating manual

## **28 TOWING CENTERSTAR**

See operating manual Centerstar 9000

## **29 WIRING DIAGRAMS**

All required circuit diagrams are supplied with the machine and can be found in the control unit or the respective control.

All circuit diagrams can also be found in the operating manual for the CENTERSTAR 9000.