



BAUER

FOR A GREEN WORLD

OPERATING MANUAL

for

RAINSTAR A1, A2



Version II-2012
Art. No. 827 9982

**RAINSTAR A1, A2
E**

Introduction

Thank you for buying BAUER RAINSTAR A1, A2 !

The present manual is a very important document that describes how to operate the **BAUER RAINSTAR A1, A2**.

This manual describes the system as detailed as possible. If you need still more information, please contact your dealer or turn directly to **BAUER** in Voitsberg/Austria.

Please note that the content of this manual neither constitutes part of nor alters in any way any previous or existing agreement, promise or legal relationship. **BAUER's** commitment is based solely on the respective purchase contract which also contains the complete and only valid warranty agreement. Said contractual warranty is neither extended nor limited by the content of this manual.

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

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

BAUER RAINSTAR A1, A2 is designed for highest performance safety and reliability provided it is operated in accordance with the present operating instructions.

Therefore you should study this manual thoroughly before starting your **BAUER RAINSTAR A1, A2 !** Strictly observe all instructions pertaining to system handling, operation and service!

On this condition, **BAUER RAINSTAR A1, A2** will operate to your satisfaction for many years!
Non-observance of this manual may cause personal injury or damage the equipment!

This manual is to be considered an integral part of BAUER RAINSTAR A1, A2 . Suppliers of both new and used systems are advised to put down in writing that they delivered the manual together with the system.

Please make this manual available to your staff. State the type and serial number of your **BAUER RAINSTAR A1, A2** in all inquiries, correspondence, warranty problems, or parts orders.

We wish you a lot of success with BAUER RAINSTAR A1, A2 !



Product details

Type designation: RAINSTAR A1, A2

Serial number¹: _____

Dealer:

Name: _____

Address: _____

ph./fax: _____

Date of shipment: _____

Manufacturer:

Röhren- und Pumpenwerk **BAUER** Ges.m.b.H.
Kowaldstr. 2
A - 8570 Voitsberg/Austria
Tel.: +43 3142 200 – 0
Fax: +43 3142 200 –320 /-340
www.bauer-at.com
e-mail: sales@bauer-at.com

Owner or operator:

Name: _____

Address: _____

ph. / fax: _____

Note: Please make a note of the type and serial number of your RAINSTAR A1, A2 and accessories. Be sure to specify these details every time you contact your dealer.

Print date / Version: October 2011 / 00

¹In all warranty claims and correspondence relating to this machine it is essential to specify the full serial number group including all letters. This applies to both the machine and the components concerned. We cannot emphasise this point often enough.

General Safety Instructions

Symbols and terms



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.



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 cause damage to or destroy the machine or individual components.

NOTE

It is very important to observe this note or condition!

Qualified operators are persons who on account 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

As defined by the product liability law every farmer is also 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 the customer passes on the machine later-on he is obliged to hand the operating manual on to the new receiver, too. The receiver of the machine must be instructed with reference to the mentioned regulations.

Intended use

- BAUER RAINSTAR A1, A2 is appropriate for the irrigation of golf courses and sports grounds, for seed crops and horticultures, for parks and all kind of grassland (intended use).
- Any use beyond this normal use is considered non-conforming. 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 the manufacturer’s operating, maintenance and service instructions.
- The BAUER RAINSTAR A1, A2 may be used and operated only by persons who are familiar with the device and aware of the hazards involved.
- All rules for accident prevention as well as any other generally valid 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.



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General instructions for safety and accident prevention

Check the operational safety of the machine before every start-up.

1. In addition to the instructions contained in this manual, all specifications generally valid for safety and accident prevention must be observed!
2. The warning and instruction signs affixed to the machine give very important instructions for safe operation. Observing them serves your own personal safety!
3. Never put the machine into operation unless all guards and safety devices are completely mounted and in their proper working position!
4. Acquaint yourself with all equipment components and controls as well as their respective functions before starting to work. It is too late when the device is already running!
5. The operator's clothes should fit tightly. Avoid wearing loose clothes!
6. When handling slurry always keep in mind that the gasses produced are highly toxic and extremely explosive in combination with oxygen. Therefore, open fires, light tests, sparking and smoking are strictly forbidden!
7. Utmost care is required with regard to gasses in slurry and dung channels at open valves to the preliminary pit, before the main pit, or at cross channels. The same applies to mixing and withdrawal points when mixers or pumps are running!
8. When handling slurry always ensure sufficient ventilation!
9. Keep the machine clean to avoid fire hazards!

Power take-off (applies only to PTO driven machines)

1. It is not allowed to use any other types of PTO drive shafts except the ones prescribed by the manufacturer!
2. Drive-shaft guard tube and guard cone as well as the PTO guard – also on the machine side - must be mounted and in good working order!
3. When using a PTO drive shaft always observe the specified overlap in transport and working position!
4. Never connect or disconnect the PTO drive shaft unless the PTO is stopped, the engine turned off, and the ignition key pulled out!
5. Make sure the drive shaft is always connected and secured properly!
6. Attach the safety chain to keep the drive shaft guard from rotating with the shaft!
7. Before you turn on the PTO make sure that the selected tractor PTO speed corresponds with the permissible implement speed!
8. Before starting the PTO make sure that nobody is standing in the danger zone of the machine!
9. Never turn on the PTO when the engine is turned off or during a transport drive!
10. When working with the PTO nobody is allowed near the turning PTO or drive shaft!
11. Warning! The PTO shaft may continue turning due to its centrifugal mass after the PTO has been turned off! Keep clear of the machine during this time and do not touch until the PTO shaft stands absolutely still!
12. For cleaning, greasing, or adjusting the PTO driven implement or drive shaft, PTO and engine must be switched off and the ignition key pulled out!
13. Place the disconnected drive shaft on the provided support!
14. When drive shaft has been removed put the guard on the PTO shaft!
15. If a defect occurs repair it immediately before starting to work with the machine!

Hydraulic system

1. Hydraulic system is under high pressure!
2. When connecting hydraulic cylinders and motors, make sure the hydraulic hoses are connected as specified!
3. Before coupling the hydraulic hoses with the tractor's hydraulic system make sure that the entire hydraulic system is pressureless both on the tractor and implement side !
4. Inspect the hydraulic lines at regular intervals and replace them immediately in case of defects or ageing. Replaced hoses must comply with the technical specifications of the implement manufacturer!
5. When looking for leaks use only suitable equipment because of the injury hazard involved!
6. Liquids emerging under high pressure (hydraulic oil) may penetrate the skin and cause serious injuries! An injured person must see a doctor immediately! Danger of infection!
7. Before working on the hydraulic system the machine must be lowered, the system depressurised and the engine turned off!



Electric-driven implements

1. All work beyond normal maintenance of the implement should be performed only by a professional electrician!
2. Defective or broken plugs and sockets must be replaced by a professional electrician!
3. Never pull a plug out of the socket at the flexible electric cord!
4. Extension cables for power supply should be used only temporarily! Never use such lines permanently as a substitute for the required fixed installations!
5. Flexible lines laid across traffic areas on the farm must have at least 5 m ground clearance!
6. Always turn off the power supply before you do any work on the machine!
7. Check all electric lines for visible defects before you put the machine into operation! Replace defective cables and do not start the machine before that!
8. Never use electric-driven implements in damp situations or locations exposed to fire hazard unless they are adequately protected against moisture and dust!
9. Covering electric motors may cause heat concentration with high temperatures which could destroy the operating equipment and cause fires!

Hand-operated devices (valves)

1. Because of the slurry gasses produced in the lines, no slurry is allowed to remain in closed pipelines – bursting hazard!
2. Lay the pipelines with sufficient inclination and make sure that the selected closing order of valves allows all lines to be drained completely!
3. Protect the valves against unauthorised handling!
4. If a valve gets jammed do not apply force! Use only the operating levers supplied with the implement!
5. Observe the permissible maximum operating pressure of valves and pipelines when pumps are operated!
6. Service only when the tanks are empty!

Maintenance

1. Never perform any maintenance, service or cleaning work or fault elimination steps unless the drive is turned off and the engine is standing still!
2. Check proper fit of all nuts and bolts regularly and tighten them, if necessary.
3. If maintenance work is required on the lifted machine always secure it by means of appropriate supports!
4. When exchanging tools with cutting edges always use proper tools and wear safe protective gloves.
5. Dispose of oil, grease and filters according to local laws and regulations!
6. Always turn off power before working on the electric system!
7. Before electric welding on the tractor and mounted machines the generator and battery cables must be disconnected!
8. Spare parts must meet manufacturer's minimum technical specifications! This is the case for instance with original spare parts!

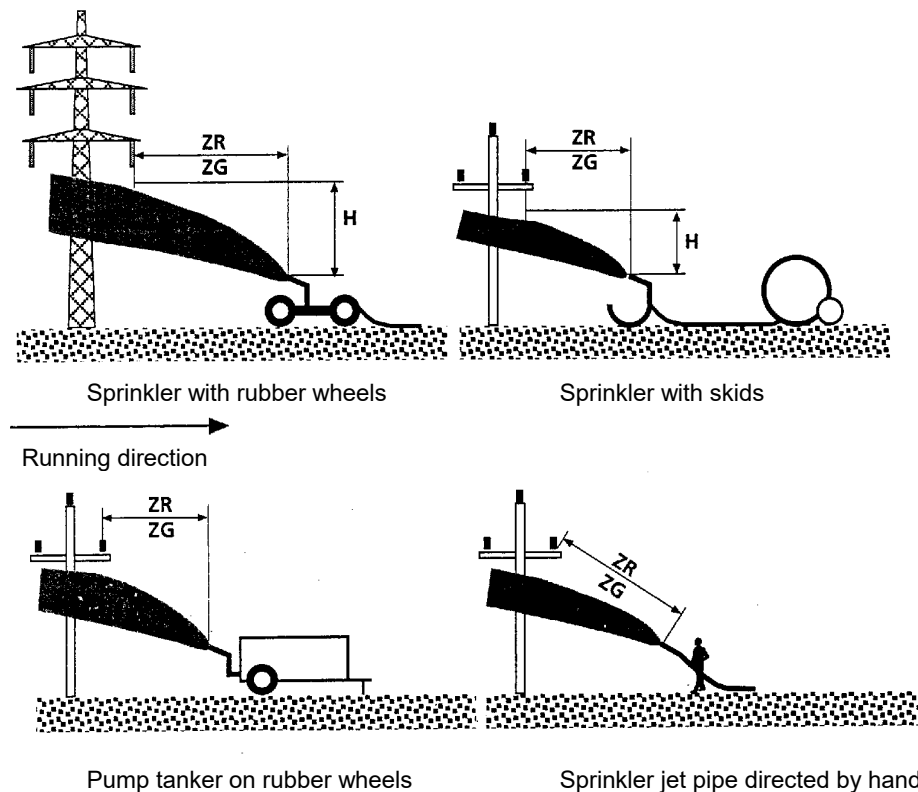
Safety distances Z from electric lines at:

IRrigation = ZR e. g.: with drinking water, ground water (e. g. well) or running water (e. g. river)

SlurryG = ZG e.g.: with liquid manure or slurry

H = minimum distance between sprinkler upper edge and conductor cable when crossing beneath an electric line

The safety distance when crossing beneath an electric line, is reached when the distances as per the below chart are kept. The water beam may touch the conductor cable but it must not be higher than the conductor cable.



ATTENTION: DO NOT SPRAY SLURRY ON INSULATORS AND MASTS!

Type and operation mode of the sprinkler		Safety distance Z in m, measured on the ground							
		With rubber wheels or directed by hand With metal or synthetic pipes				With skids or stationary/fixe With metal cart and metal pipes			
		Nozzle diameter in mm or flow in m ³ /h							
				26 mm \triangleq 50 m ³ /h		36 mm \triangleq 100 m ³ /h		26 mm \triangleq 50 m ³ /h	
Jet type		Spray	Full	Spray	Full	Spray	Full	Spray	Full
Up to 1.000 V H = 1 m	ZR	1	5	1	5	1	5	1	5
	ZG	1	8	1	8	1	8	1	8
Up to 30.000 V H = 2,5 m	ZR	3	9	5	21	3	7	4	9
	ZG	5	11	7	23	5	9	6	11
Up to 110.000 V H = 3 m	ZR	3	12	5	24	3	9	4	15
	ZG	5	14	7	26	5	11	6	17
Up to 220.000 V H = 4 m	ZR	4	14	6	26	4	12	6	22
	ZG	6	16	8	28	6	14	8	24
Up to 380.000 V H = 5 m	ZR	5	16	7	26	5	14	6	22
	ZG	7	18	9	28	7	16	8	24

The safety distances indicated in the above chart are valid for a nozzle diameter of 26 mm and/or 36 mm at an operating pressure of 5 bar. **For higher operating pressures the safety distances have to be increased by 2 m.** The safety distances are not valid when standardized jet pipes like those of fire brigades are being used.





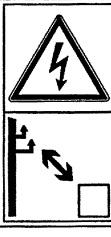

When applying polluted water or slurry, note that a conductive layer can build up on the insulators. **Therefore do not spray on the insulators!** Flashovers and insulator damage can otherwise cause power failure.

If metal sprinkler pipes are laid in parallel to a high voltage power line, this can lead even without irrigation to a perceptible contact voltage because of the electric influence. Touching the pipes is not dangerous but can be unpleasant and painful. This is why it should be avoided to lay metal pipes in parallel to high voltage lines or only over the shortest distances possible. When using synthetic pipes, you will not encounter any of these problems.

Note! Do not put pipeline pieces into a vertical position in the range of high voltage lines! Only transport them horizontally!

WARNING SIGNS

The hazard points of the RAINSTAR A1, A2 are marked by special safety labels on the machine. These labels must be affixed well visibly to the points indicated and they serve to protect persons staying around the machine.

- | | | |
|----|---|--|
| 1. |  |  <p>WARNING !</p> <p>Study and observe carefully the operating manual and the safety hints before starting the machine.</p> |
| 2. |  |  <p>WARNING!</p> <p>Stop the machine and read the operating manual before carrying out maintenance jobs and repairs.</p> |
| 3. |  |  <p>WARNING!</p> <ol style="list-style-type: none"> 1. The working range of the RAINSTAR A1, A2 always must be at a safe distance from electric high-voltage lines. 2. The water jet of the nozzles and the sprinkler must not reach any electric lines. |



4.

**WARNING!**

Safety covers must not be removed during operation.
For repairs, make sure that the reel of the RAINSTAR A1, A2 cannot move.
Slacken the PE pipe.

5.

**WARNING!**

Do not stay at rear of the RAINSTAR A1, A2 !
Operator is in danger of being crushed by the retracted sprinkler cart. Keep
the distance !

GENERAL

BAUER products are designed and manufactured carefully, subject to a system of continuous quality control. The BAUER RAINSTAR A1, A2 is a turbine-driven machine designed for fully mechanised and labour-saving irrigation.

The BAUER RAINSTAR A1, A2 is a universal machine suitable of covering fields of varying lengths and widths. There is no need for supervision while the system is operating.

Strict observance of all operating and service instructions in this manual is the basic prerequisite for many years of trouble-free operation. Therefore please make sure that all operators on your staff are familiar with the instructions given in this manual.

The model number as well as the serial number (Vehicle identification number) are stamped into the nameplate. In addition, the serial number is stamped into the frame of the undercarriage. Please state these data in all your inquiries, correspondence, warranty matters and parts orders.

We warrant according to our General Terms of Sale.



1 SAFETY PRECAUTIONS FOR THE RAINSTAR A1, A2

1. Read this manual before putting the system into operation for the first time.
2. Never handle the PE-pipe near the machine or the machine itself during pull-off or pull-in.
3. During PE-pipe rewind with the tractor's PTO or during pipe pull-off, always make sure that the shifting lever is in the proper position. Moreover, the maximum permissible speed must not be exceeded. **Max. speed: 200 rpm**
4. During PTO drive, the automatic final shut-off device is out of service. Therefore the PTO shaft must be stopped in due time.

**WARNING!**

Danger by improper handling!

5. Never carry out service- or setting jobs (except speed settings) while the machine is operating.
6. Keep clear of all moving parts.
7. Never expose any moving parts by removing protective elements.
8. Keep a safe distance from the sprinkler during operation.
9. Be careful in case of high connecting pressure!
10. Make sure that the water jet from spray nozzles does not hit public roads.
11. The RAINSTAR A1, A2 is licensed for transport in agricultural operation only. For transportation on public roads, all applicable traffic requirements must be strictly observed.

**WARNING!**

For safety reasons, it is not allowed to transport the RAINSTAR A1, A2 by pulling it with a fork-type drawbar (OPTION) nor with the toolbar!

12. When loading the machine on a trailer, note that the water remaining in the pipe shifts the system's centre of gravity upward.
13. When driving in curves with the RAINSTAR A1, A2 loaded on a trailer, the permissible maximum driving speed is reduced considerably in dependence on the position of the RAINSTAR A1, A2's centre of gravity!
14. Always make sure that the locks and stops are secured according to the machine's general conditions for transport.
15. Before starting irrigation near electric power lines, you should contact your local power supply company regarding the safety distances to be observed.
16. Maximum permissible speed: 10 km/h.
17. With **3-wheel OPTION**, fold up and lock the drawbar during irrigation (wheel is braked) because at the end of the irrigation run, the support with cart will be lifted automatically to transport position. On slopes, use additional wheel chocks in order to prevent the RAINSTAR from rolling away.

2 DESCRIPTION

RAINSTAR A1, A2 is appropriate for sprinkling golf courses and sports grounds, seed crops and horticultures, parks as well as all kind of grassland.

The main components are a two-wheel undercarriage, the reel with the special PE-pipe, the compact gearbox and the TCN 10 turbine as well as the high-rise cart with the BAUER small- and wide-range gun.

The material of the PE-pipe corresponds to the latest state-of-the-art. One end of the pipe connects to the reel drum and to the water supply through its axle. The other end of the pipe is coupled with the high-rise cart. The cart's track width is infinitely adjustable (see technical data).

The heart of the RAINSTAR A1, A2 is the TCN 10 turbine. This is a turbine, nearly insensitive to soiled water and offers maximum efficiency. The drive shaft is made of stainless steel. The nozzle inside the turbine is made of wear-proof plastic.

The lifetime lubricated drive shaft bearing is sealed by a maintenance-free rotating mechanical seal.

The TCN 10 turbine is designed for water flow rates from 3 to over 20 m³/h and features a wide control range. Impeller speeds range from 200 to 1600 rpm.

The system's connecting pressure should not exceed 8 bar.

Power is directly transmitted from the turbine to the change-speed gearbox as well as from the chain drive onto the reel. A reel brake prevents fast reverse rotation of the reel in the final shut-off position when the PE-pipe is stretched.

The reel brake and the gearwheels in the gearbox filled with oil, act as brake and prevent the PE-pipe windings on the reel from loosening during pipe pull-out.

For safety reasons, the drive is fitted with an emergency stop and a reversing stop. With this emergency stop device, the drive can be stopped immediately by hand.



WARNING!

Never remove the drive cover before you have turned off the water supply to the machine and slackened the stretched PE-pipe.

A winding carriage moved by a helically grooved spindle ensures that the PE-pipe is wound up properly on all layers.



Mechanical regulation: To keep the retraction speed constant on all layers independent of the pipe length still lying on the field, the RAINSTAR A1, A2 is equipped with a layer compensating device. It is actuated by the shut-off frame that is always resting against the PE-pipe and acts on the regulating flap of the turbine via control rods.

At the end of the irrigation strip, the cart is lifted automatically to transport position. Thereby the drive is shut-off automatically by rods.

After shut-off, the cart lifted automatically, is locked through the transport lock. If the machine is equipped with a shut-off valve, the water supply will be shut off simultaneously. After shut-off, the RAINSTAR A1, A2 can be transported to its next setting-up position immediately. Pull-off or lay down the PE-pipe, connect the water supply and the machine is ready for the next run.

On public roads, the drawbar must be hitched to the tractor's yoke. The driving speed must not exceed 10 km/h.

3 PUTTING INTO OPERATION

Before and during the first start-up, grease all bearings, chains and guide parts of the winding mechanism. Use normal ball bearing grease for all bearing assemblies with grease nipples and a viscous and durable type of grease for chains, guide rods and joints.

Tighten the wheel nuts before the first starting and check the tires on the specified pressure (see technical data).

Tighten also the connecting bolts according to the "Service and Maintenance" table.

3.1 STEPS TO BE CARRIED OUT ONCE OR FROM TIME TO TIME



Set the required track width on the cart depending on the existing type of crop.



OPERATING MODE I: PE-PIPE PULL-OFF

3.1.1 Transport of Machine to Set-up Position



The reel brake must be applied. Cart, jack and both rear support legs must be lifted.



Adjust the undercarriage in a level position with the jack.



Remove the lock bolt from the cart lift.

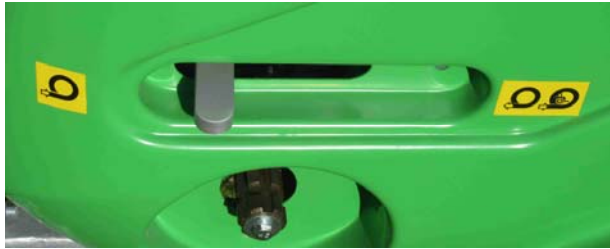


Loosen the reel brake and at the same time extend the wheel cart with the cart lift and the support into the ground. Then lock the reel brake.

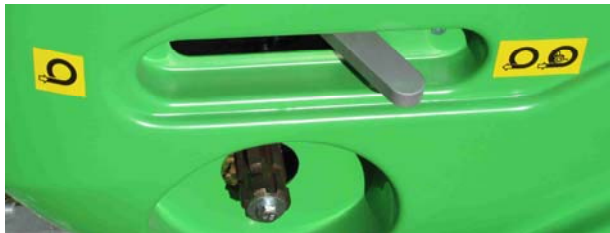
On very hard soil, the supports must be extended into holes dug into the ground for this purpose.



POSITIONS OF THE SHIFT LEVER



Working position PE-pipe retraction



PE-pipe pull-off
Tractor rewind

3.1.2 PULLING OFF THE PE-PIPE



Hitch the toolbar on the pulling hook and pull the cart into the field.



The standard wheel cart need not be lifted (therefore 1 pulling hook is sufficient).
Pull-off speed: Do not exceed 5 km/h!

Do not stop abruptly but slow down gradually at an intermediate stop or at the end of the pull-off.



WARNING!

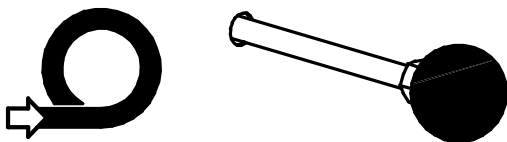
If the PE-pipe was exposed to the sun for a longer period or if its surface temperature rose above 35°C, you will have to cool the pipe by water flow before rewinding it.



Couple the pressure hose. Open the water supply.



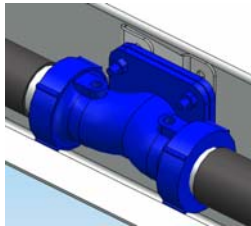
When the full operating pressure has been reached and clear water is discharged at the sprinkler's nozzle in a full jet without air bubbles, push the gear shift lever to the "PE-pipe retraction" position.



The reel starts to rewind the PE-pipe.



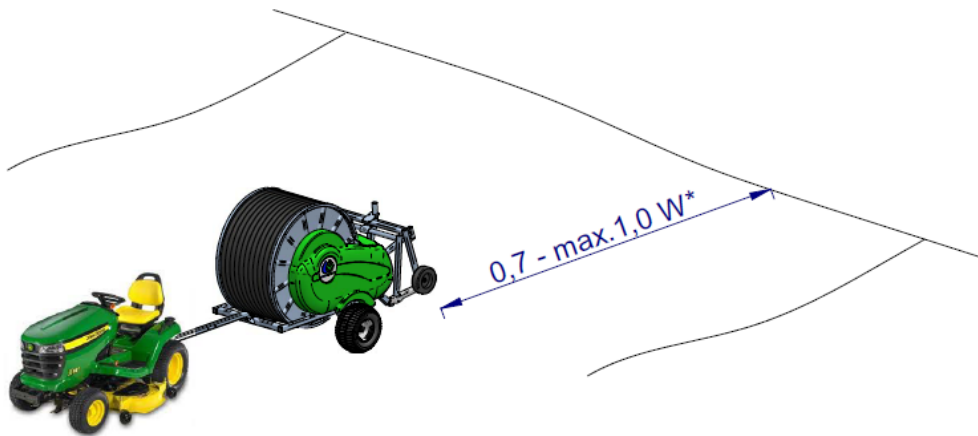
At the end of irrigation, the cart is lifted automatically and the drive is shut off by means of rods.



The water supply is stopped by the optional "overpressure shut-off valve".

3.2 OPERATING MODE II: Laying down the PE-pipe

In addition to the pull-off method, the PE-pipe also can be laid down on the ground. This method is used in situations where the field is longer than once the PE-pipe length. Moreover, the laying down method allows to use smaller tractors because no pulling forces are applied on the pipe.



Drive into the field with the RAINSTAR A1, A2 taking into consideration the sprinkler's distance of throw.

*) W = distance of throw of the sprinkler



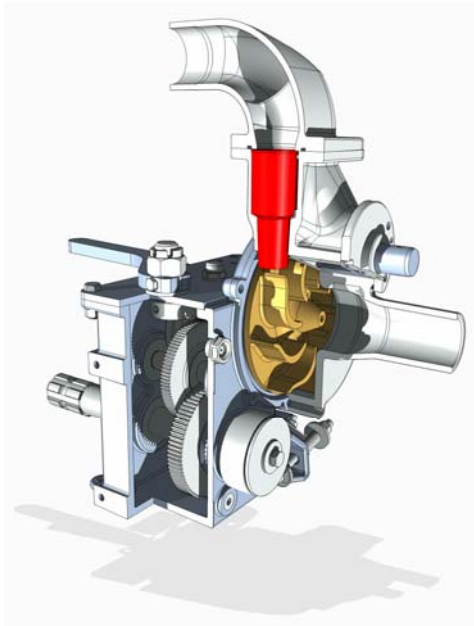
Lower the cart as described under Operating Mode I, item "Lowering the Cart" and anchor it slightly. Now move the machine across the field.

Carry out the next steps as already described.



3.2.1 FUNCTIONAL DESCRIPTION OF THE MAIN COMPONENTS

3.2.1.1 MACHINE DRIVE – TURBINE



The **turbine TCN 10** is a drive turbine of specific design with large cross sections and minimum pressure loss. Therefore they are also suited for high retraction speeds at very low flow rates. They provide the energy needed for the PE-pipe retraction. The turbine speed is directly taken off the impeller shaft and transmitted to the change-speed gearbox.

The **change-speed gearbox** consists of toothed wheels that reduce the turbine speed. Reel drive stop at the end of the irrigation strip is ensured by disengagement of the toothed clutch.



WARNING!

Removal of the drive cover for service jobs only is permitted when the PE-pipe has been slackened completely! Move the gear shift lever to shut-off position! This shut-off position also must be used for the transport of the machine on the roads!

**PTO REWIND:**

If required, you can rewind the PE-pipe also with the tractor's PTO system. Push the shifting lever to "Tractor retraction" position.

Winding up the PE-pipe with the PTO will become necessary when there is no need to continue irrigation due to natural rainfall.

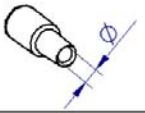
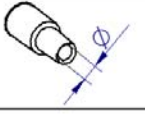
**WARNING!**

- Retract the PE-pipe at lowest possible PTO speed – start slowly and smoothly and avoid jerks.
- **Highest PTO speed = 200 rpm**
- Avoid strain by excessive articulation of the PTO shaft.
- If the PE-pipe is covered with mud, it should be loosened and lifted off the ground to reduce the retraction forces before rewinding it.
- If the soil is deep and heavy, the PE-pipe must be wound up more slowly to make sure that the permissible loads on PE-pipe and machine are not exceeded.
- If you disengage the PTO shaft during PE-pipe retraction, make sure that the pipe reel stands still when you re-engage the PTO shaft. Double motion may cause severe damage!
- When driving the reel with the PTO, the automatic shut-off system is inactive. Therefore you must stop the PTO shaft in time.



When driving the reel with the PTO, the automatic shut-off system is inactive. Therefore you must stop the PTO in time and wind up the end of the PE-pipe with the hand wheel. This will prevent damage to cart, shut-off system, gearbox etc.

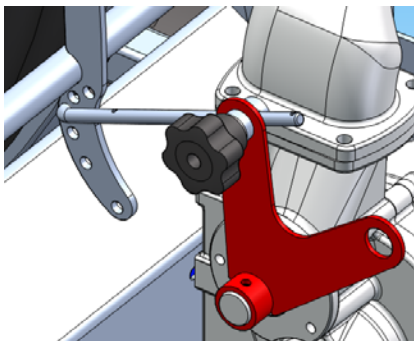
4 Selection of the correct nozzle for operation

A 1	m ³ /h	3	4	5	7	11
	mm	8	12	14	18	20
A 2	m ³ /h	5	7	11	16	20
	mm	14	18	20	24	24

835 1578

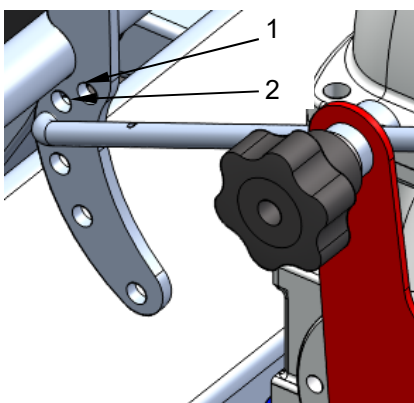
If the selected retraction speed cannot be reached, the nozzle must be changed to the next smaller diameter. The larger the selected nozzle, the higher the efficiency of the turbine.

5 Mechanical Regulation



The retraction speed is steplessly adjustable and it is set by means of the adjusting lever which is fixed with the knurled nuts after adjustment. The speed is nearly constant from the first to the last layer. This is achieved by means of the layer compensating lever resting against the PE-pipe in any position

... It actuates via control rods the regulating flap mounted on the turbine and it regulates hence the turbine speed.



Varying conditions of ground as well as low water flow may lead to inconstant retraction speeds despite of the layer compensating device. This can be remedied by fixing the control rod one hole up or down when PE-pipe retraction becomes faster or slower.

**Factory setting: RAINSTAR A1 - hole 1
RAINSTAR A2 - hole 2**

The exact setting of the regulation also depends on the PE-pipe diameter and it is different for PE-pipes of 40 - 58 mm.

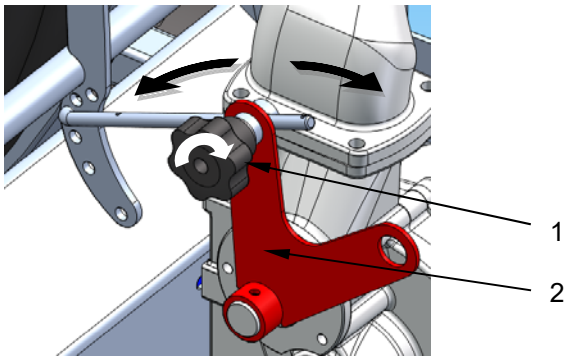
By fixing the control rod one hole up, regulation will be reduced so that the retraction speed increases up to the last layer.

By fixing the control rod one hole down, regulation will be increased so that the retraction speed is reduced up to the last layer.

IMPORTANT!

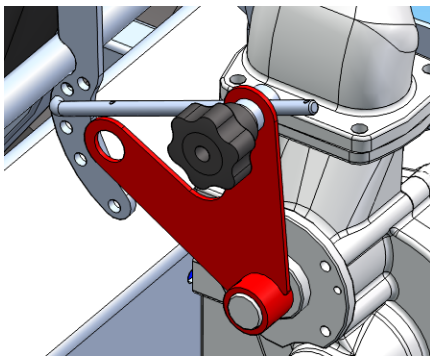
Do not set the speed unless the PE pipe has been rewound for half a winding and/or unless traction has been applied.

Small water quantities

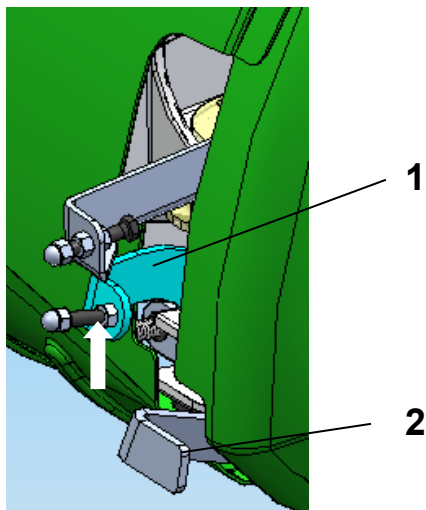


Loosen the knurled nut (1) that fixes the control lever. Set the retraction speed that can be read on the speedometer (option), by means of the control lever (2). - To the left "slower" and to the right "faster". Then fix the control lever (2) again by means of the knurled nut (1).

Big water quantities



6 QUICK STOP



The PE-pipe retraction can be stopped immediately by actuating the shut-off frame or the gear shifting lever. Thereby the gearbox is disengaged.

Pull up the brake locking lever (1) to avoid slackening of the PE-pipe. Then slacken the PE-pipe slowly by pulling the brake lever (2).

7 WINDING MECHANISM



The winding mechanism operates synchronously with the winding or unwinding of the PE-pipe. Starting from the reel, it is operated through a chain and the helically grooved spindle that transports the winding carriage of the PE-pipe. The winding mechanism ensures that the PE-pipe is guided properly winding for winding. When you put the machine into operation for the first time, pull off the full length of the PE-pipe to let it take a circular shape under pressure and eliminate ovality. This step is essential for trouble-free operation of the winding mechanism.

8 SHUT-OFF AND SAFETY EQUIPMENT



Unattended operation of the RAINSTAR A1, A2 is ensured by a final- and safety shut-off device. The final shut-off device is actuated when the cart lift actuates the gearbox shut-off lever stopping thus the drive. To avoid troubles caused by faulty windings of the PE-pipe on the reel, the shut-off device also is activated by the shut-off frame when faulty pipe windings build up on the reel.

9 CART



The high construction of the cart provides maximum crop protection. With infinitely variable track width, the cart adapts to any crop row spacing. For easier PE-pipe pull-off, the cart is equipped with a draw-out hook.

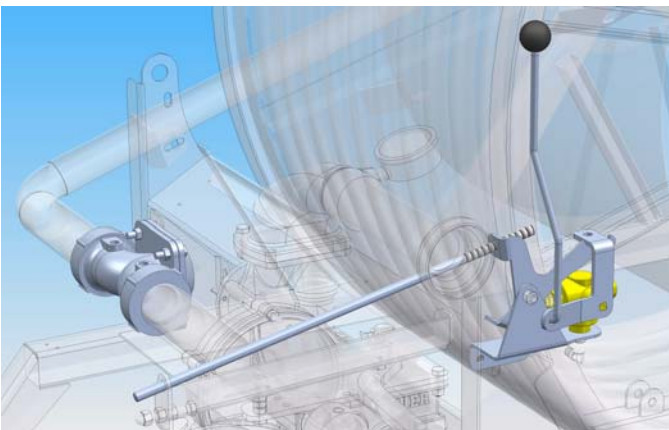


You pick up this hook with the tractor's toolbar and pull-off the PE-pipe.

To reposition the RAINSTAR A1, A2 to a new set-up position, the cart must be pulled back to its end position.

For retraction, the cart and the support are lifted automatically.

10 OVERPRESSURE SHUT-OFF VALVE (Option)



With an overpressure shut-off valve, the water supply to the machine is interrupted completely at the end of the irrigation run. When the valve closes, pressure rises in the supply line.



11 3-WHEEL OPTION



The 3-wheel option allows to reposition the RAINSTAR A1, A2 effortlessly to the requested working position.



Locking of the front wheel brake

If necessary, braking stirrup (1) can be adjusted and adapted to the wheel.

1



WARNING!

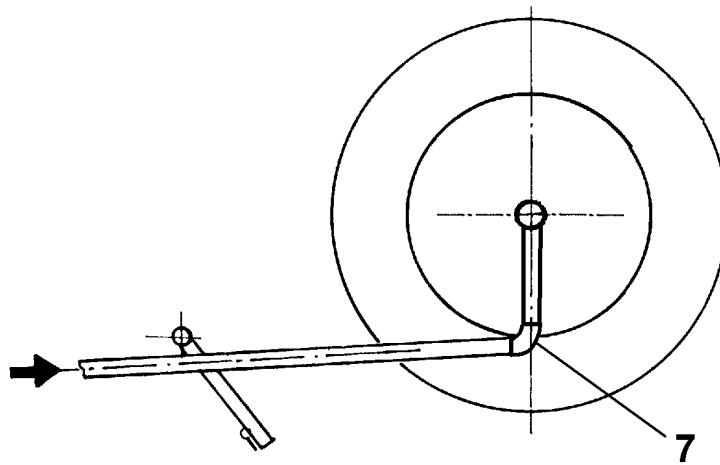
In working position, the front wheel always must be braked because the support will be retracted automatically from the ground at the end of the operation cycle. On a slope the RAINSTAR would roll away.

12 WINTERIZATION – DRAINING

In areas where frost is likely in winter after the irrigation season, the machine must be drained in time. A compressor with a minimum air capacity of 500 l/min. at 1 bar overpressure is best suited for this purpose. The small amount of water remaining in the PE-pipe after the draining will not do any harm.

Turn out the drain plug on the bottom of the TCN 10 turbine. We recommend to turn it in again only when you start up the machine again at the beginning of the next season. Clean the RAINSTAR A1, A2 and grease all appropriate points. The machine should preferably be stored in a roofed shelter where it is protected from direct exposure to the weather.

13 WINDING MECHANISM – STARTING POSITION



Step 1:

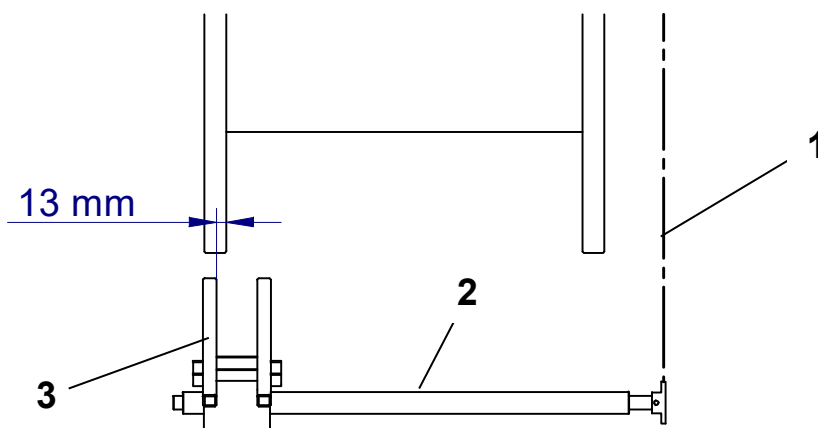
Pull off the PE-pipe and adjust the connecting bend (7) in a vertical position pointing down.

Step 2:

Loosen the winding chain (1) between the reel and the helically grooved spindle (2).

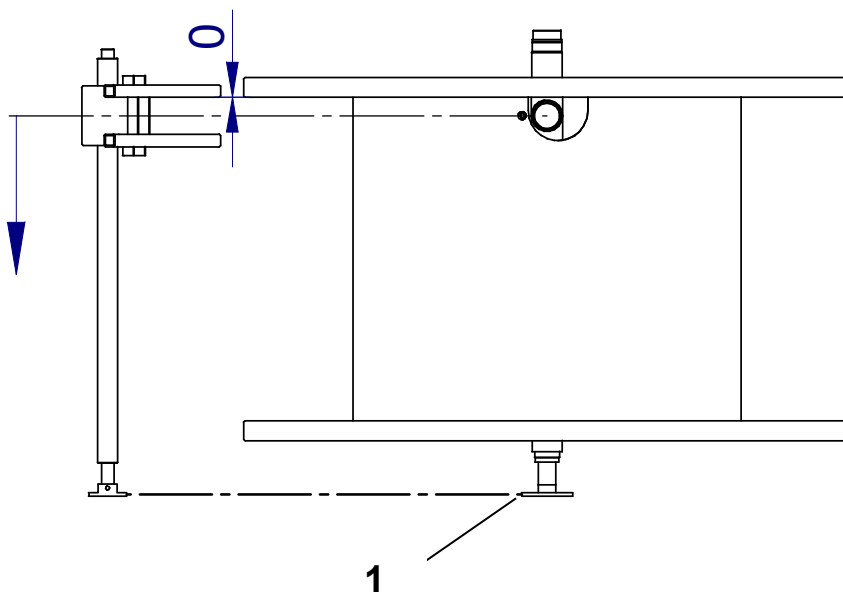
Step 3:

By turning the helically grooved spindle (2), the winding carriage (3) is moved to the left outer reversing point of the groove → value: 27 mm. The winding carriage (3) can be adjusted via long holes on the guiding pipe.



Step 4:

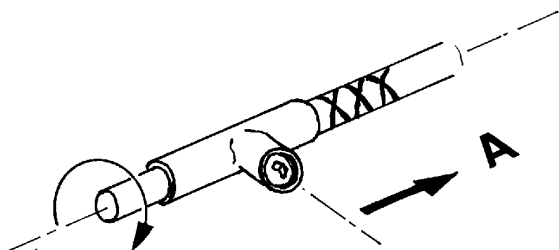
By turning the helically grooved spindle, move the left guide bar to the value of "0" towards the inner reel side wall.


WARNING!

Thereby the spindle must be turned in the direction of winding (clockwise, see sketch).
 At this point, the winding carriage moves from the reversing point to the right (direction A).

Step 5:

Mount the winding chain (1), the reel remains unchanged with the inlet bend pointing down.
 Tighten the winding chain (1).



14 SETTING THE GEARBOX SHUT-OFF DEVICE

Push a chock (K) into the gap between tripod lift and bracing (23) which can be found on the drive side behind the tripod lift (21).

1. Adjusting the shut-off of the gear drive

Click the tripod hook into place and add a distance of 4mm; unscrew the bolt (13) until the gear drive shuts off. The moment when the gear drive disconnects can be determined best by using the hand wheel and pretension approximately 5 to 10 kg by hand. As soon as the gear drive disconnects the hand wheel resets. Pretension can also be reached with a weight.

2. Adjusting the set screw

Adjust the set screw (11) and leave 7mm gap to the tripod lift. There is still a distance of 4mm between tripod hook (10) and bolt

3. Adjusting the brake

Click the brake handle into place (minor brake force – belt brake spring length 29 mm); and then click the tripod lift hook into place with a 2mm distance. Unscrew the bolt (15) until the brake handle is unlocked and skips forward. Please be aware that when turning the bolt it is in one line with the borehole, otherwise the adjustment changes when the bolt is tightened.

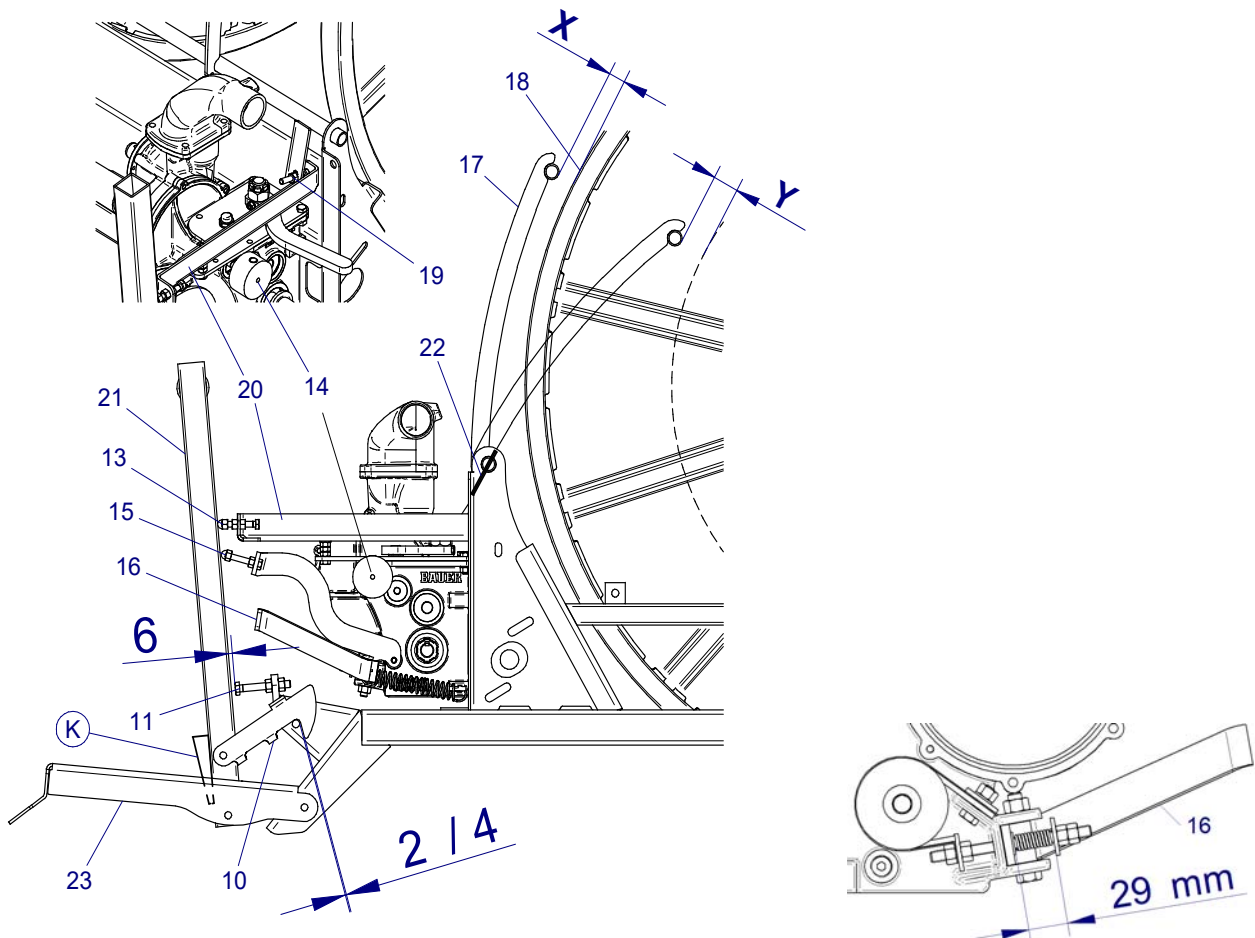
Secure the bolts. After adjusting the shut-off, remove the chock (K) again.

The shut-off frame (17) is set with a distance of **X** mm to the reel (18) (see table).

Adjust screw (19) to the shut-off device (20), lock with nut.

Drive in dowel pin (22) at the value of "Y" until it supports at the console on the frame.

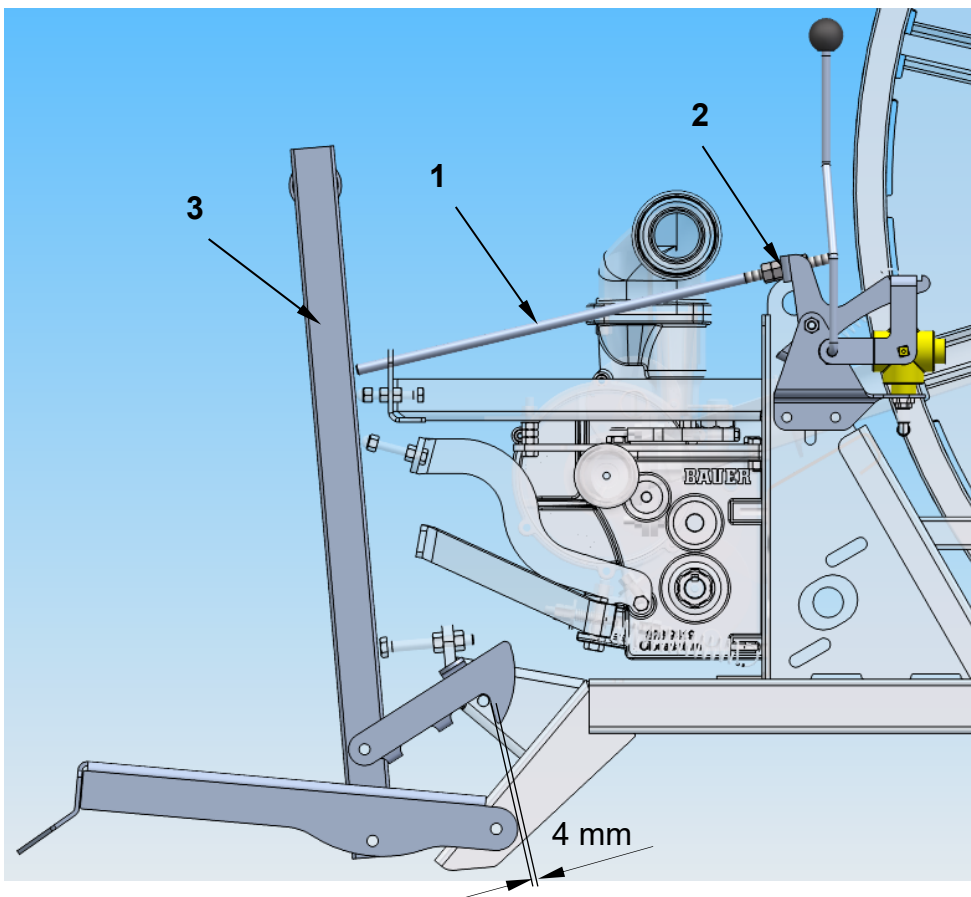
Machine	X mm	Y mm
RAINSTAR A1, A2	25	80



14.1 TESTING THE SHUT-OFF DEVICE

1. Unlock the cart lift (21), engage the gear. Then put the cart lift again to shut-off position until hook (10) has locked. Simultaneously turn the shaft (14) at the gear (magnetic disk with optional speedometer). When the PTO does not turn anymore, shut-off position is reached. (Put a hand wheel on the PTO for easier checking of the turning movement.)
2. Put the shut-off frame (17) against the PE-pipe (last layer). Unlock the cart lift (21). Put the shut-off console (20) via the shut-off lever to position "PE-pipe retraction". Pull the shut-off frame (17) to shut-off position (= X mm off the reel). Simultaneously turn the shaft (14) at the gear (magnetic disk with optional speedometer). When the PTO does not turn anymore, shut-off position is reached. (Put a hand wheel on the PTO for easier checking of the turning movement.)

15 SETTING OVERPRESSURE SHUT-OFF VALVE (Option)



Pull up the rod with the ball coupling, until the arm of the ball valve snaps into place.

When adjusting the cart hook 4mm, see also adjustment of the gear shut-off under point 14, the hand lever (1) with the nut (2) must be set to the cart lift until the ball valve is activated.

Then tighten the nut with the second nut.

Mount two other nuts (2) at the inner surface of the arm of the ball valve with a distance of 2mm and tighten them.

16 SPEEDOMETER (Option)



Operating Instructions **SPEEDOMETER**

Description:

This speedometer allows to read the sprinkler's retraction speed comfortably on the big LCD display. For an exact indication of the retraction speed in m/h, the existing PE-pipe layer must be selected with the keyboard. The exact retraction speed is calculated via measuring pulses in the electronic box and it is based on the selected operating data. These measuring pulses are taken over contactless with magnetic sensors at the gear input. The machine data remain saved permanently in the electronics and they need to be entered only once during assembly. If necessary these data can be reprogrammed to other machine types any time.

Technical data:

Power supply: 9 Volt battery (type PP3) – holds for 1.000 speed measuring's of 4 minutes each
 Box: made of synthetic material, dimensioned 82 mm x 80 mm x 50 mm
 Sensor: permanent magnetic insert and magnetic sensor on gear input shaft

Operating steps:

1. Press the . – The display is switched ON.
 Important note! – The display is switched off automatically after 4 minutes.
2. Press the until the existing pipe layer is on display.
3. Press the until the gear used is on display.
4. The retraction speed in m/h is displayed immediately on the right side of the display.
5. As long as the is pressed, the revolutions per minute at the gear input are on display.
6. Blinking on the display indicates low battery voltage (less than 7.5 Volt). – Replace the battery!

Programming of machine data:

Factory setting of the speedometer is based on the machine data according to the below table. For an exact and appropriate indication of the retraction speed of your machine, its specific parameter data must be entered.

Constant no.	Description	Possible setting range	Standard setting
1	Pulses per meter in gear 1	100-4000	1000
2	Pulses per meter in gear 2	100-4000	900
3	Pulses per meter in gear 3	100-4000	800
4	Pulses per meter in gear 3	100-4000	700
5	Pulses per meter in gear 3	100-4000	600
6	Pulses per meter in gear 3	100-4000	500
7	Reel core diameter (in mm)	500-3000	1400
8	PE-pipe diameter (in mm)	40-200	100
9	Number of layers	1-9	5
A	Number of gears	1-6	3
b	By pressing the "ON" key, the data are saved		

For the specific machine data of the machine types, see chart sheets 1 and 2.

Entering machine data:

1. Press the 3 keys: and for at least 3 seconds. Figure -1- (constant no. 1) is blinking on the display. – Enter the pulses per meter according to sheet 1 or 2.
2. By pressing the the entered number increases. By pressing the the entered number decreases.
3. By pressing the , the speedometer changes to the next constant. Enter the values as described before. Enter the data up to constant "A" and/or press the until "b" is on display.
4. When "b" is on display, save the machine data by pressing the . Hence the machine data are saved permanently in the electronics, and they remain saved even when replacing the battery.
5. Check the electronics' version number: Press the . Before pressing the the version number is displayed.

SPEEDOMETER		A1 A2					
Gerätespezifische Maschinendaten / Unit specific machine data							
Eingabewerte zur Programmierung / Input for programming							
		A1		A2		A2	
Grundgerät / Basic unit		A1	A1	A2	A2	A2	
Gerätetype / Type		40 - 135	43 - 125	50 - 135	55 - 120	58 - 115	
		Konstante					
		Nr.					
Impulse Schaltstufe 1 / Impulse Switch step 1		1	2442	2432	1942	1931	1925
m / h							
Impulse Schaltstufe 1 / Impulse Switch step 1		1	745	742	592	589	587
ft / h							
<hr/>							
Haspel-Kerndurchmesser / Drum - core diameter	[mm]	7	620	620	780	780	780
Rohrdurchmesser / Pipe diameter	[mm]	8	40	43	50	55	58
Anzahl der PE - Rohrlagen / Number of PE pipe layers		9	4	4	4	4	4
Anzahl der Getriebeschaltstufen / Number of gears		A	1	1	1	1	1

17 SERVICE AND MAINTENANCE

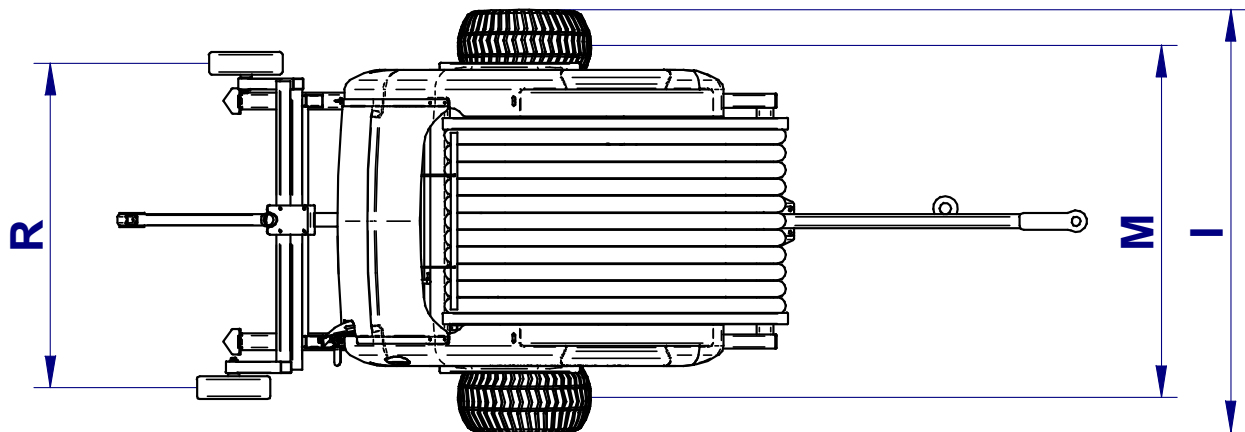
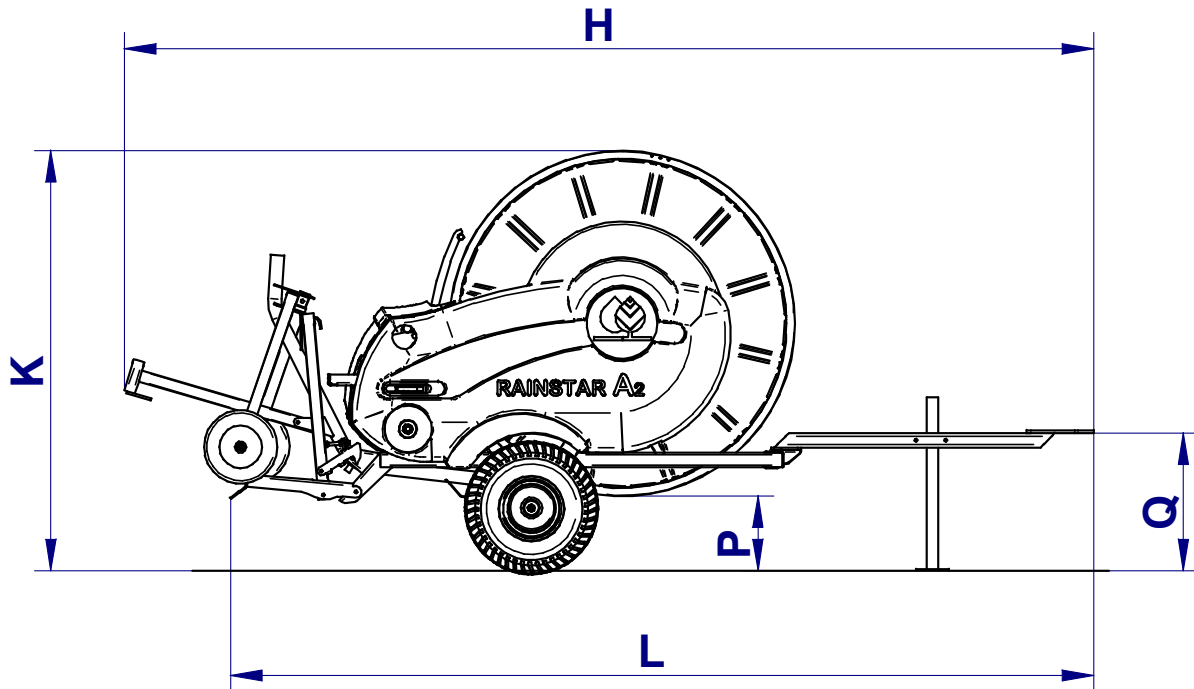
We cannot emphasise often enough that proper service at the right time is essential for the operating reliability and service life of a machine. At the end of every irrigation season, the RAINSTAR A1, A2 should be checked and cleaned thoroughly and all parts should be greased carefully.

Machine part	Service interval	Lubricant, grease, oil
1. Helically grooved spindle of the winding mechanism	every 250 service hours or once a year	Alvania Grease 3
2. Driving chain of winding mechanism	every 250 service hours or once a year	Alvania Grease 3
3. Driver (spindle nut) of winding mechanism	every 250 service hours or once a year	Alvania Grease 3
4. Driving chain	as required	Alvania Grease 3
5. Change-speed gear	First oil change after 500 service hours and then after 500 – 800 service hours or once a year	0,9 l of oil SAE 90 EP
6. Screwed joints – drawbar	after 500 – 800 service hours or once a year	Tightening torque 45 Nm



18 TROUBLE-SHOOTING

FAULT	CAUSE	REMEDY
The PE-pipe cannot be pulled off.	Incorrect gear shift lever position.	Put it into the pull-off position.
	Brake band sticks to the brake drum.	Loosen the brake band.
PE-pipe retraction stops before the final shut-off is actuated	Turbine blocked by a foreign body.	Remove the foreign body.
	Pressure drop in supply line.	Check pumping station and hydrant connections.
	Over winding of PE-pipe activates the safety shut-off.	Adjust the winding mechanism.
Repair broken winding chain.		
The final shut-off is activated but the shut-off valve does not close.	Values for the shut-off valve activation are not set correctly.	Adjust the settings according to the manual.
The reel overwinds or the windings become loose when the PE-pipe is pulled off.	Tractor stopped abruptly.	Slow down gradually.
	No oil in the change-speed gear.	Refill oil.
	Brake band worn.	Re-tension or replace it.
The retraction speed is not constant from PE-pipe layer to PE-pipe layer.	Varying conditions of the ground	Adjust the regulation to the conditions of the ground (adjust the rods at the layer compensating lever).
The selected retraction speed is not reached.	Incorrect nozzle.	Select proper nozzle.
	Blocked sprinkler nozzle.	Remove blockage.
	General: Compare connecting pressure and water flow with performance chart values.	
Cart is not lifted.	Incorrect nozzle.	Select proper nozzle.
	Wrong position of control rod.	Mount control rod one hole up.



- | | | | |
|----------|---------------------------------|----------|--------------------------------|
| A | PE-pipe diameter x length | M | Track width of undercarriage |
| B | Max. strip length | N | Tires of undercarriage |
| C | Flow | O | Tire pressure of undercarriage |
| D | Connecting pressure | P | Ground clearance |
| E | Nozzle range | Q | Hitch height - standard |
| F | Weight incl. PE-pipe with water | R | Cart track width |
| G | Weight incl. empty PE-pipe | S | Cart tires |
| H | Overall length incl. cart | T | Cart tire pressure |
| I | Max. width of largest track | | |
| K | Overall height | | |
| L | Length of machine without cart | | |



Type		<i>RAINSTAR A1</i>		<i>RAINSTAR A2</i>		
		40 - 135	43 - 125	50 - 135	55 - 120	58 - 115
A	mm x m	40 x 135	43 x 125	50 x 135	55 x 120	58 x 115
B	m	150	140	155	140	135
C	m ³	3,0 - 10		3,2 - 20		
D	bar	3,2 - 8				
E	mm	7 - 12		7 - 16		
F	kg	389	393	526	546	568
G	kg	269	268	341	351	353
H	mm	3220		3430		
I	mm	1360		1490		
K	mm	1230		1480		
L	mm	2850		3050		
M	mm	1180		1240		
N		16x6.50-8 4PR		18x9.50-8 4PR		
O	bar	1,5		1,6		
P	mm	220		260		
Q	mm	430		480		
R	mm	1000 - 1500				
S		4.10/3.50-4 4PR				
T	bar	3,0				

CONFORMITY CERTIFICATE

EC Declaration of Conformity according to EC Directive 2006/42/EC

The manufacturer

Röhren- und Pumpenwerk BAUER Gesellschaft m.b.H.
Kowaldstraße 2, 8570 Voitsberg, Austria
phone +43 3142 200-0; fax: +43 3142 200-320/-340

herewith confirms that the machine mentioned below

Designation of machine	RAINSTAR
Machine type / basic units	A1, A2
Consists of	Irrigation machine with cart

corresponds analogously to the requirements of the Machinery Directive 2006/42/EC.
In case of a modification of the machine not accorded with BAUER GmbH, this declaration will cease to be valid.

The following standards as amended have been applied analogously:

DIN EN ISO 12100-1	Safety of machines – Basic concepts, general principles for design, Part 1: Basic terminology, methodology
DIN EN ISO 12100-2	Safety of machines – Basic concepts, general principles for design, Part 2: Technical principles and specifications
DIN EN 60204-1	Safety of machines - Electrical equipment of machines, Part 1: General requirements
EN ISO 14121-1	Safety of machines – Risk assessment

Norms related to products

DIN EN 908 Irrigation machine with hard hose reel

Person in charge of documentation: Thomas Theissl, Kowaldstraße 2, 8570 Voitsberg, Austria,



Technical Designer in Charge



Röhren- und Pumpenwerk
BAUER
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A-8570 Voitsberg / Austria

Commercial Manager

Voitsberg, 06.10.2011