



BAUER

FOR A GREEN WORLD

OPERATING MANUAL

for

BAUER CORNER SYSTEM

with

GPS - CONTROL



Version: VII / 2014
850 9976

Operating Manual
Corner System
English



Introduction

Thank you for buying a BAUER CORNER SYSTEM!

The present **manual** is a very important document that describes how to operate and service **BAUER CENTERSTAR** with **CORNER SYSTEM**. Special attention is given here to the latter aspect since a separate manual exists for the **BAUER CENTERSTAR**.

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.

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 CORNER SYSTEM 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 CORNER SYSTEM!**

Strictly observe all instructions pertaining to system handling, operation and service!

On this condition, **BAUER CORNER SYSTEM** 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 CORNER SYSTEM**. 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 pump type and serial number of your **BAUER CORNER SYSTEM** in all inquiries, correspondence, warranty problems or parts order.

We wish you a lot of success with BAUER CORNER SYSTEM!



Owner of the machine

This machine with the serial number	<input type="text"/>
Belongs to	
Name	
Address	
Residence	
Telephone number	
Dealer	
Bauer dealer	
Service – technician	
Telephone number	



Handing over record

A duly test run has been done in the presence of the client or a nominated agent of the client. The client confirms by signing that the machine has been test run before taken over. A copy of the handing over record needs to be sent back to the company BAUER GMBH.

Comments:

For the client

For the company BAUER GMBH



Product details

Date of delivery

Date of initial operation

Type	BAUER CORNER SYSTEM	
Serial number	
Central tower	fixed.....	
Configuration of span	
Spans	fixed.....	
Booster pump	yes	no
Endgun	yes	no
Equipment	
Comments	
	
	
	
	

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 Tel.: +43 3142 200 – 0
 Fax: +43 3142 200–320 / -340
 e-mail: sales@bauer-at.com
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Dealer: Name:

Address:

.....

Tel. / Fax:



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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.

EG conformity certificate (see Annex)

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.



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

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 authorized by the person in charge of plant safety to perform the respective tasks required, and in doing so are able to recognize 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 CORNER SYSTEM 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.
- The BAUER CORNER SYSTEM 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 Corner 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 door of the control cabinet only when main disconnect is OFF.

4.  **WARNING!**

1. The working range of the Corner System must always be at a safe distance from electrical power line.
2. 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.

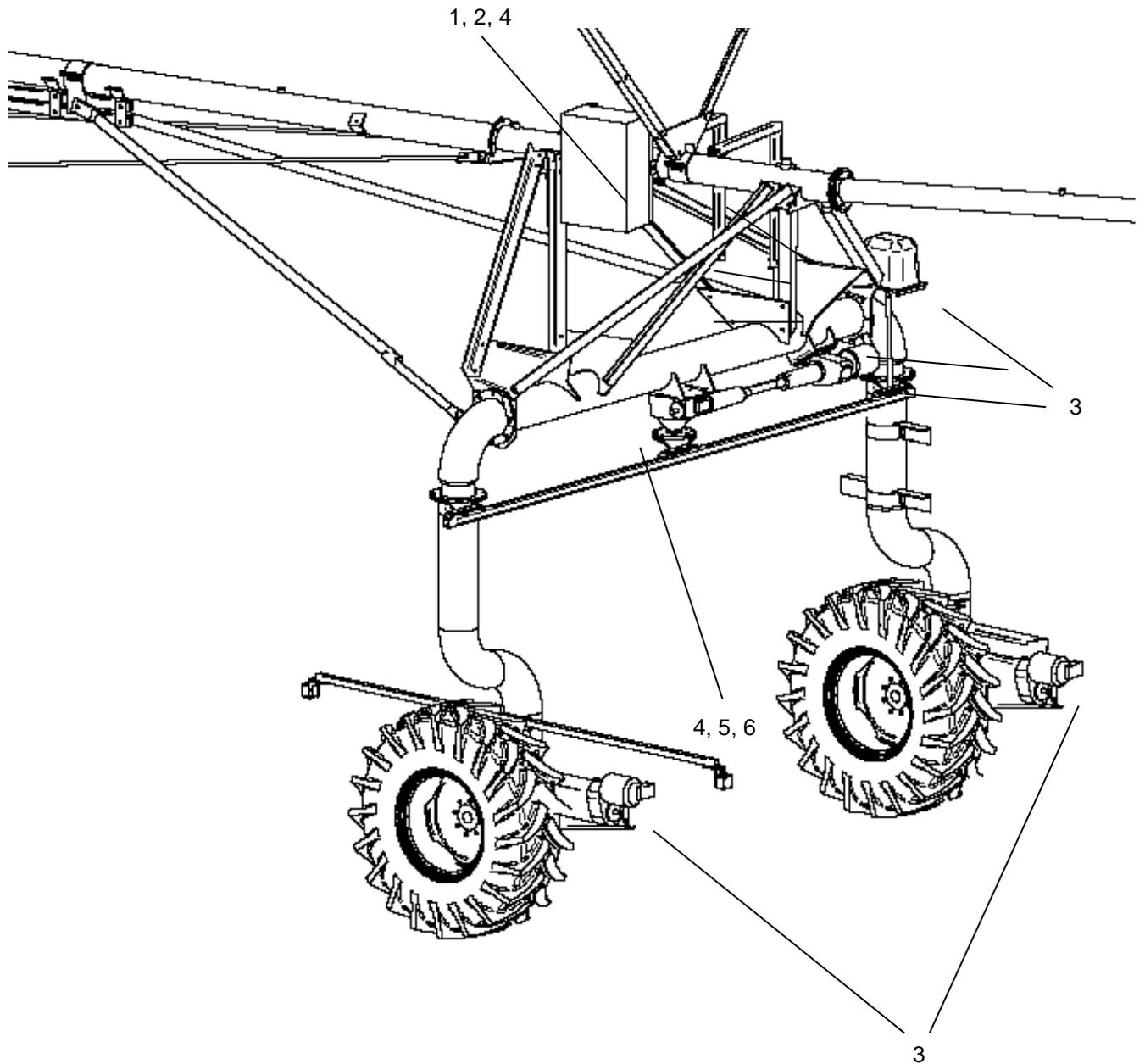


6.



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



WARNING!

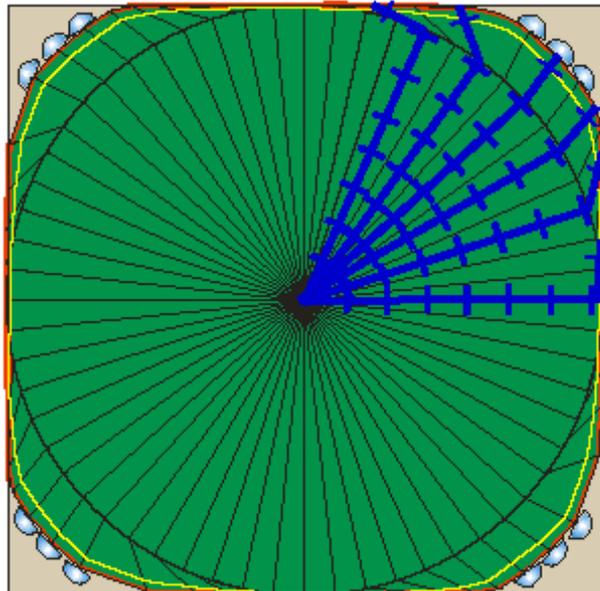
The operation of a BAUER CORNER SYSTEM requires detailed knowledge of a center pivot irrigation system. Always read the operating manual for the CENTERSTAR before continuing to the BAUER CORNER SYSTEM!

The **BAUER PRECISION CORNER** is part of an irrigation system rotating around a fixed center (pivot tower) and thereby irrigating a full circle or a part circle. Like the center pivot irrigation system itself, the BAUER CORNER is a fully automated system and consists of a truss structure, a moving tower and an overhang; it is attached to the end of a center pivot irrigation system.

The BAUER CORNER is connected to the center pivot irrigation system via a pivoting connection and can "swing inward" to just over a right angle and "swing outward" almost all the way straight (approx. 15°). The steering system on the CORNER makes this movement possible.

The BAUER BELOW GROUND GUIDANCE or the optionally available BAUER GPS CONTROL guides the corner tower precisely along a predefined track.

Use of a BAUER CORNER SYSTEM allows optimal use of the available area in connection with a square-shaped field or an area with irregular field borders or obstacles.



Uniform water distribution is ensured via sequential activation and deactivation of the irrigation nozzles. Actuation of the hydraulic valves takes place pneumatically.

The BAUER CORNER is driven electrically with continuous motion.



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!

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 system 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 THE BAUER CORNER SYSTEM

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

5.1 GROUNDING



WARNING!

THE PIVOT SYSTEM MUST BE GROUNDED COMPLETELY!

1. All metal parts of the system must be connected with each other; the tower coupling, which connects the BAUER CORNER with the center pivot irrigation system, must be bridged with a cable.
2. Moreover, 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 complied with (see here the CENTERSTAR operating manual)
3. In addition, the yellow-green protective conductor lead along with the power supply must be connected to the grounding terminal in the control unit and therefore grounded properly (see here the CENTERSTAR operating manual).
4. Dimensioning of grounding, grounding nail or grounding bar must be executed by a qualified electrical contractor (see here the CENTERSTAR operating manual).

5.2 ELECTRICAL SYSTEM



WARNING!

Since the 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

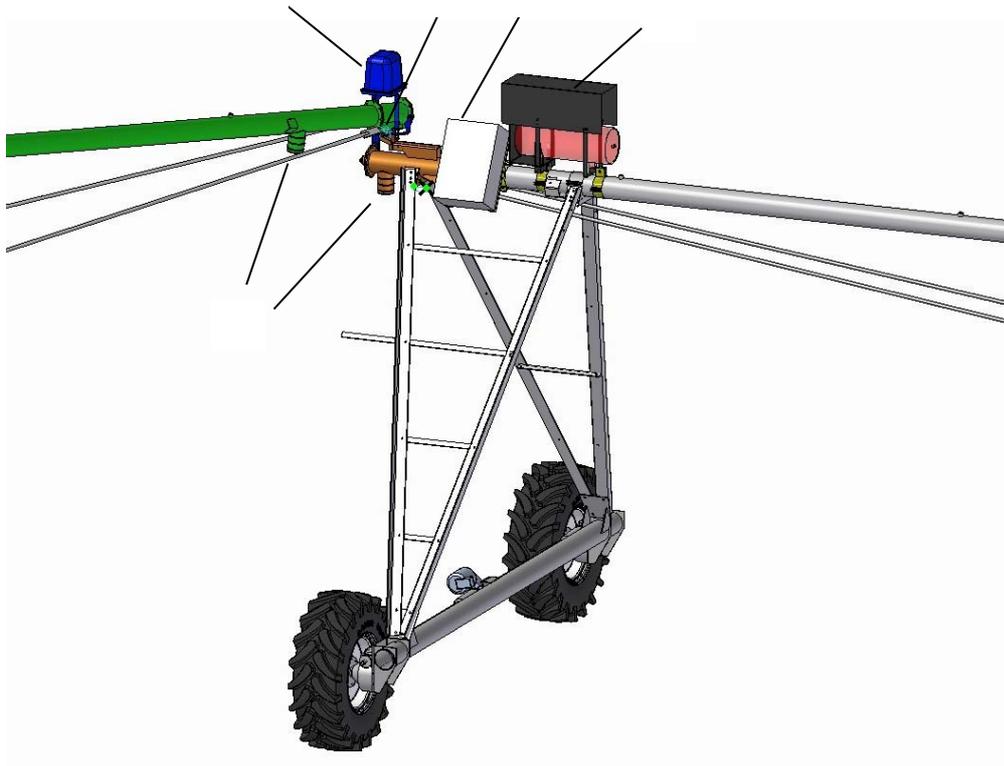
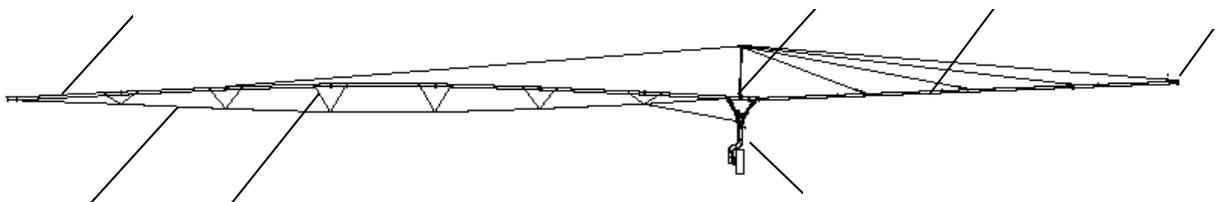


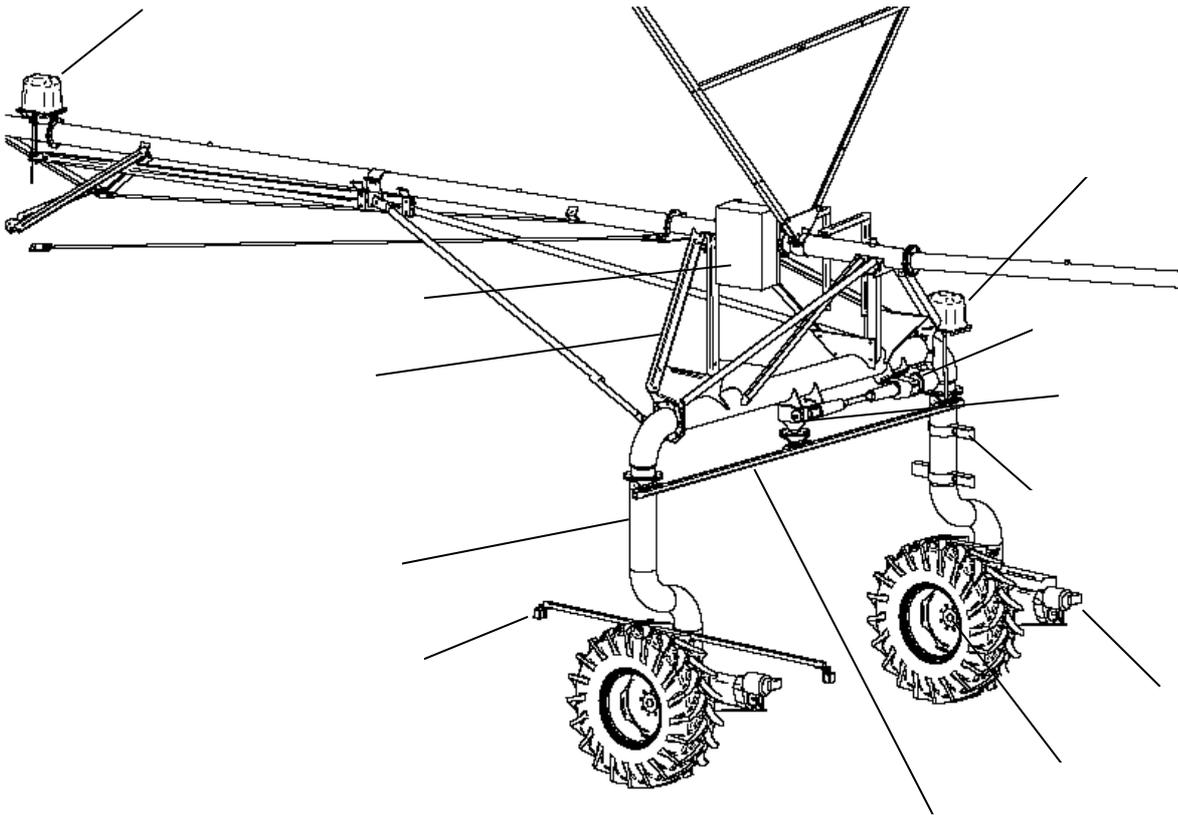
WARNING!

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 CORNER tower as well as all other towers switch 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 (see also the CENTERSTAR operating manual).
8. Always turn off the system and the water supply before working on sprinklers or spray nozzles. Make sure that the pneumatic compressor is depressurized.
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 CORNER SYSTEM itself nor the water jets come into contact with live wires.
11. Make sure that no neighbouring plots or roads are irrigated by the endgun. This could cause damage or accidents.
12. If fertilisers or other chemicals are added to the irrigation water, avoid the mist and do not inhale it.

6 TECHNICAL DESCRIPTION





- 1 Truss rod
- 2 Main pipe
- 3 Bracing angle
- 4 Overhang
- 5 Tower
- 6 Nozzle control
- 7 End tower control cabinet
- 8 Angle sensor tower box
- 9 Connection hose
- 10 Span sensor tower box
- 11 Steering tower box
- 12 Steering bar
- 13 Climbing aid
- 14 Drive motor
- 15 Wheel / wheel gearbox
- 16 Steering motor
- 17 Steering gearbox
- 18 Track unit control cabinet
- 19 Steering antennas of the BELOW GROUND GUIDANCE
- 20 Wheel base
- 21 Tower bracing angle
- 22 Corner tower coupling
- 23 Endgun
- 24 Booster Pump
- 25 Steering antenna of the GPS CONTROL
- 26 Base station of the GPS CONTROL



CORNER SYSTEM COMPONENTS

SPAN

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

PIPE

Water-conducting part of the machine.

TRUSS ROD

Round stock – connects the bracing angles.

BRACING ANGLES

Angle section – connects pipe and truss rods.

CORNER TOWER

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

WHEEL BASE

Tower base with driving motor and gearbox.

TOWER BRACING ANGLE

Angle section – connects span and wheel base / cross pipe.

DRIVE MOTOR

Electric motor with reducing gear.

GEARBOX

Transmits the torque of the drive motor onto the wheels.

TOWER COUPLING

Joint between the spans. Possible articulation: up to 30%, swing angle of max. 90°.

CONNECTION HOSE

Water feed point for the CORNER SPAN

STEERING

Ensures the directional control of the CORNER tower movement.

STEERING DRIVE

Electric motor with reducing gear.

STEERING GEARBOX

Transmits the torque of the steering motor to the steering bar.

STEERING BAR

Transmits the steering movement to the rotatable CORNER tower wheels.

STEERING ANTENNAS

Detect the track guidance signal for the directional control of the CORNER tower movement. The steering antennas are part of the BAUER BELOW GROUND GUIDANCE. The system can be optionally equipped with a track guidance system via GPS CONTROL with RTK base station.

TOWER BOXES

ANGLE SENSOR TOWER BOX

Monitors the angle between the CORNER SPAN and the center pivot irrigation system, required for switching the valves of the irrigation nozzles.

SPAN SENSOR TOWER BOX

Monitors the elastic deformation / bending on the CORNER TRUSS STRUCTURE, thereby regulating the speed of the corner tower drive.

**STEERING TOWER BOX**

Monitors the position of the tower wheels and limits the maximum "steering angle".

OVERHANG

Overhanging part from corner tower to system end.

ENDGUN

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

BOOSTER PUMP

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

NOZZLE CONTROL

Distribution of the irrigation nozzles on the CORNER truss structure into 9 switching groups, pneumatic compressor for actuation of the hydraulic valves.

END TOWER CONTROL CABINET

Control for continuous driving of the END TOWER, sequential activation and deactivation of the irrigation nozzles on the CORNER truss structure for uniform water distribution during the process of swinging in or out.

TRACK UNIT CONTROL CABINET

Control of the steering of the CORNER tower as well as the CORNER tower drive based on continuously collected data from the SPAN SENSOR TOWER BOX. Monitoring of the maximum "steering angle" with the help of the STEERING TOWER BOX.

CLIMBING AID

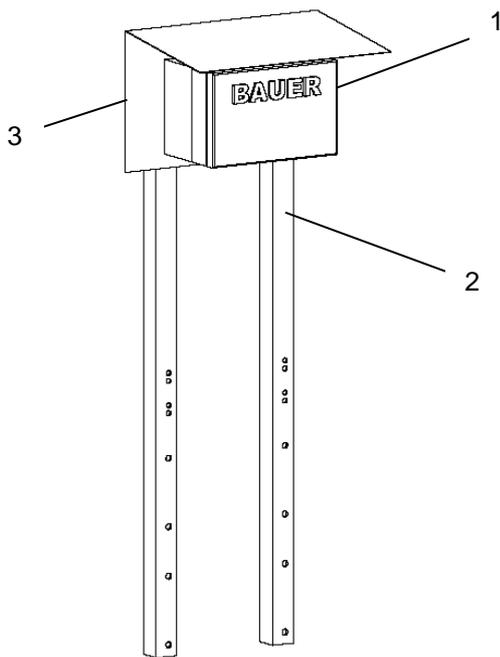
For climbing onto the CORNER tower or up to the control cabinet.

**WARNING!**

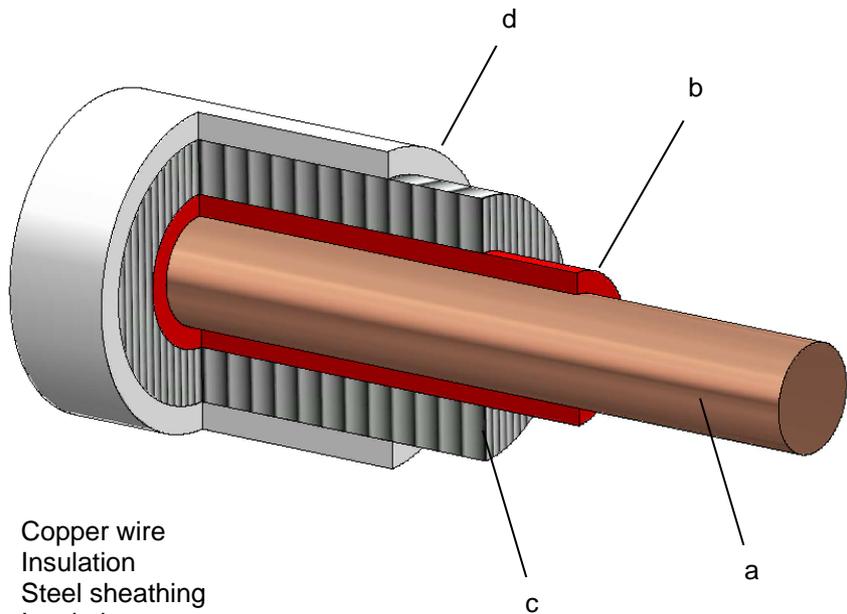
Note that fall protection with a rope and harness is required for climbing and for work at heights greater than 2.5 m. Failure to heed this requirement can result in severe injuries or even death.



BELOW GROUND GUIDANCE



- 1 Frequency generator
- 2 Mounting bracket
- 3 Cover
- 4 Track unit (contained in control cabinet - track unit)



- a) Copper wire
- b) Insulation
- c) Steel sheathing
- d) Insulation

FREQUENCY GENERATOR

Generates the signal required for the track guidance. This is fed into the conductor loop (underground cable).

MOUNTING BRACKET

The frequency generator and cover are mounted to the two mounting brackets. The two mounting brackets are inserted directly into the soil of the field.

COVER

The cover protects against weathering influences such as rain, wind, sun, etc.

TRACK UNIT

The signal received by the steering antenna is processed in the TRACK UNIT and sent to the control unit, which in turn sends a signal to the steering motor as necessary in order to implement a correction to the direction of motion.



UNDERGROUND CABLE

An underground cable specially developed for Bauer is used to transmit the underground signal. It must be noted that flawless and long-lasting functioning can only be guaranteed with use of an original BAUER underground cable.

The BAUER underground cable consists of a PVC-insulated copper wire with a steel sheathing that serves to protect against gnawing (by rodents, etc.).

STEERING ANTENNAS

For description, see above

RTK GPS CONTROL

GPS ANTENNA ROVER UNIT

The GPS antenna detects the position data via satellite and enables navigation of the CORNER TOWER with centimeter precision with the help of the RTK corrective data of the base station.

GPS CONTROL UNIT ROVER UNIT

The GPS control unit processes the signals received from the GPS antenna and sends a command to the steering motor when necessary to make a correction to the direction of travel.

AUTOMATIC ANTENNA ADJUSTMENT

The automatic antenna adjustment positions the GPS antenna based on the selected direction of travel (*forward, reverse*).

CONTROL UNIT OF THE AUTOMATIC ANTENNA ADJUSTMENT

The control unit of the automatic antenna adjustment sends the command to the automatic antenna adjustment when the direction of travel changes.

GPS ANTENNA OF THE BASE STATION

The GPS antenna of the base station is located in a fixed position on the central tower and receives the current position data via satellite.

GPS CONTROL UNIT OF THE BASE STATION

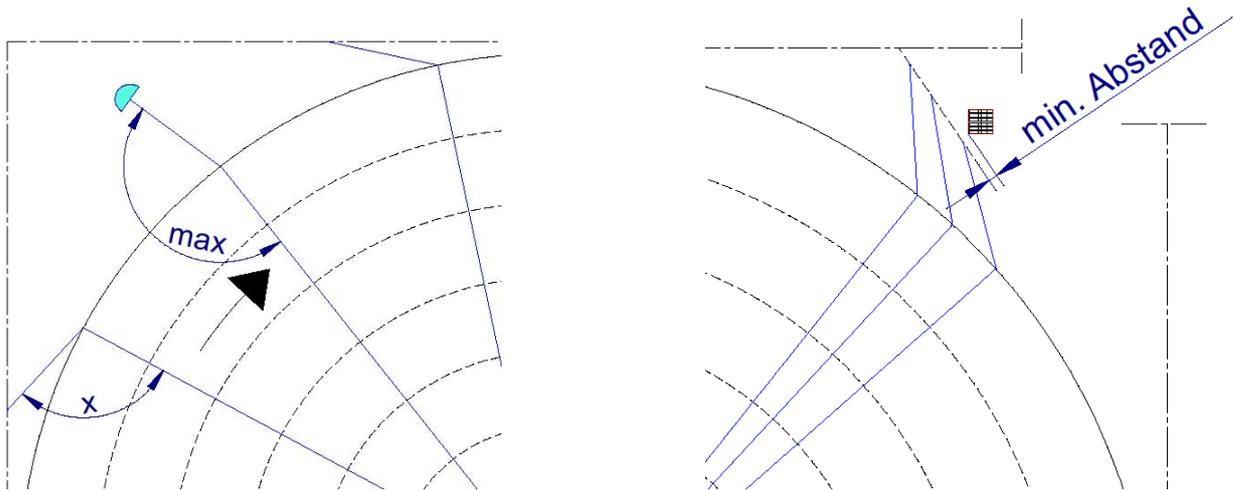
Due to the fixed location of the base station, the current deviation of the received position data relative to the actual location can be calculated. This corrective data is transmitted to the GPS control unit of the rover unit and enables precise position determination.

7 FUNCTIONAL PRINCIPLE OF THE BAUER CORNER SYSTEM

7.1 GENERAL

The BAUER PRECISION CORNER SYSTEM is a fully automated irrigation system that makes it possible to achieve an area utilization of up to 98% (assuming a square field). A center pivot irrigation system, CENTERSTAR, serves as the basis for this, with the BAUER PRECISION CORNER attached to the last truss structure. With regard to functioning and control, the PRECISION CORNER is an independent system. Operation of the system, however, takes place as usual using the control unit of the center pivot irrigation system CENTERSTAR.

When the CORNER is situated in the corners of an area to be irrigated, it can swing out continuously and fully automatically until reaching its maximally extended position, continue until approaching the edge of the field and then independently and uniformly begin to swing back in along a predefined curve. If an endgun was also selected (optional), this can also be activated to further optimize the area utilization.



If obstructions are located in the area to be irrigated, such as buildings, trees (under conservation protection), etc., the CORNER can swing in temporarily at this locations and then swing back out completely in accordance with the existing field borders. On surfaces with generally irregular edges, the travel track of the CORNER can also be adjusted to achieve optimal area utilization.

BAUER CORNER SYSTEMS can generally also be retrofitted to existing systems. For this purpose, please contact an authorized BAUER dealer or contact BAUER Austria directly.

7.2 RELEVANT COMPONENTS OF THE BAUER CORNER SYSTEM

7.2.1 DESCRIPTION OF CORNER TOWER - STEERING

7.2.1.1 General

The BAUER PRECISION CORNER travels with maximum precision along the track that has been defined by you to specify the field borders and/or the area to be irrigated.

ATTENTION: When using the BAUER BELOW GROUND GUIDANCE, the track you have specified in this way can only be changed with considerable effort. For this reason, this preliminary work must be performed with the greatest possible care.

Pay particular attention to the supplied **ASSEMBLY MANUAL**.

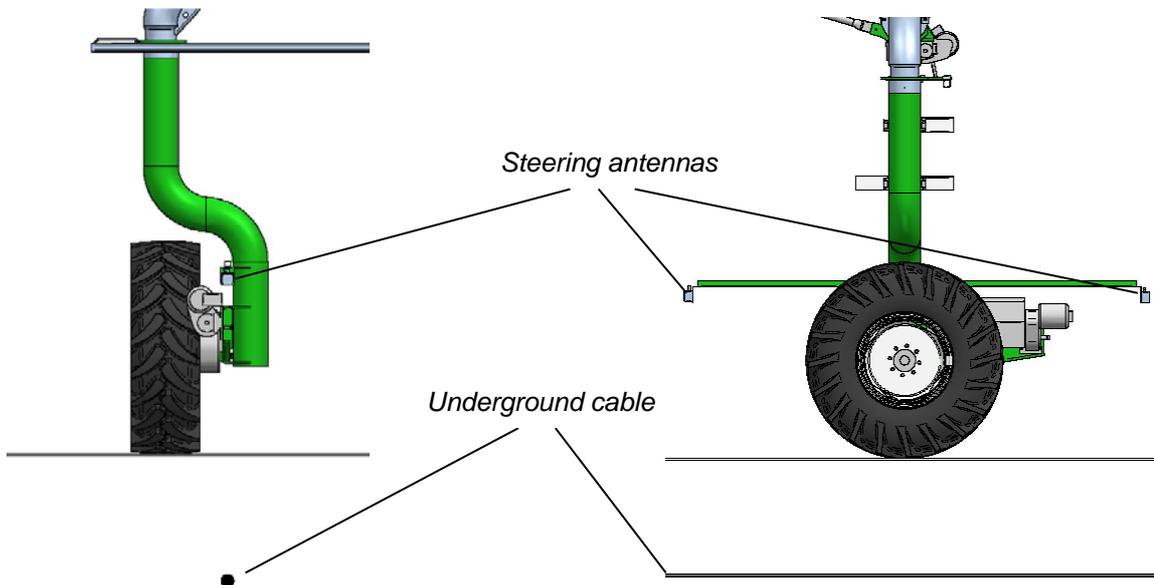
7.2.1.2 Description of TRACK GUIDANCE - BAUER BELOW GROUND GUIDANCE

To remain on the specified travel track of the CORNER tower with the minimum possible deviation, the BAUER CORNER makes use of an industrial track guidance system that has proven itself in many years of use.

The BAUER BELOW GROUND GUIDANCE, which can also be combined with other BAUER products, is a contact-free track guidance solution based on a guide wire. There are no projecting or above-ground track guidance components such as with classic cable and furrow controls, meaning that the BAUER BELOW GROUND GUIDANCE does not pose any possible dangers or obstructions. The components of the track guidance solution, which describes the path of the guide curve, are laid underground, as the name states. Only the generation of the track guidance signal itself takes place above ground. The detection and processing of the signal also takes place above ground. STEERING ANTENNAS are able to detect the position of the guide wire with high precision, and the information processed by the TRACK UNIT is forwarded to the control unit. If necessary, the control unit issues a steering pulse.



A signal specifically adapted to this application is generated and fed directly into the guide wire loop. The guide wire, hereafter referred to as the BAUER UNDERGROUND CABLE, is a BAUER development and was designed specially for the company's requirements. A long service life and operational reliability were key aspects in the design process.



For more detailed information on determining and surveying the field borders, on laying the UNDERGROUND CABLE and other information on the BAUER BELOW GROUND GUIDANCE, please consult the supplied **ASSEMBLY MANUAL**.

7.2.1.3 Description of TRACK GUIDANCE - BAUER RTK GPS CONTROL

The BAUER RTK GPS CONTROL is a track guidance system based on GPS position data. For precisely locating the current position of the CORNER tower, the tower is equipped with a precision GPS antenna (rover unit), which together with the RTK corrective data from the BASE STATION allows in theory navigation of the CORNER TOWER with millimeter precision (depending on the currently available satellites).

Another precision GPS antenna (base station) is also located in the middle of the machine (central tower). Due to the fixed location of the base station, the current deviation of the received position data relative to the actual location can be calculated. This corrective data is transmitted to the GPS control unit of the rover unit and enables extremely precise position determination.

The automatic antenna adjustment positions the GPS antenna on the CORNER TOWER based on the selected direction of travel (forward, reverse).

The CORNER tower path determined by the position data is specified during initial startup (see **9 Initial startup**) and stored in the GPS CONTROL. If the operating conditions change, this can be modified as needed. For this purpose, please contact an authorized BAUER dealer or contact BAUER Austria directly.

7.2.1.4 Description of STEERING - mechanical components

The steering movements on the CORNER tower are implemented by electromechanical means. Similar to typical moving towers (center pivot irrigation systems), an electric motor supplies the torque; in this case, however, other gearing stages are connected in-between in order to enable a higher gear reduction. This permits a correction of the steering angle in small, soft steps.

Angle changes that are too great would put unnecessary stress on the mechanical parts of the steering mechanism, disrupt the regulation of the CORNER tower drive and, in the worst case, cause vibrations. The consequence of this would be additional stress on the entire CORNER TRUSS STRUCTURE and on other mechanical components of the attached center pivot irrigation system.



In addition, the water distribution is heavily dependent on the uniformity of the CORNER TOWER movements as well as those of the tower drive and, in particular, the tower steering movements. A correctly functioning steering solution is therefore a requirement for a reliably functioning CORNER SYSTEM.

Refer to and follow the instructions in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

To prevent mechanical damage to the steering rod, a sensor continuously monitors the steering movements and simultaneously also limits the minimum and maximum steering angle. The maximum action angle of the CORNER tower steering is approx. 90°.

Note that with the CORNER tower, both drive wheels must be aligned parallel to each other, pointing in exactly the same direction. More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

7.2.2 DESCRIPTION OF CORNER TOWER - DRIVE

7.2.2.1 General

In addition to flawlessly functioning steering, a sufficiently robust drive chassis is required for reliable operation of the CORNER SYSTEM. The wheels are driven by one geared motor and one wheel gearbox per drive axis. Both drive motors, including the drive motor of the last tower of the center pivot irrigation system run continuously in this application and not in a start-stop rhythm as is otherwise typical.

The continuous driving of the CORNER tower and the complex design of the machine require sophisticated drive regulation that is sufficient to meet the associated requirements. As with the the CORNER tower steering described above, an improperly configured drive regulation can cause the CORNER truss structure to begin vibrating; this always results in additional stress on the machine, which can lead in the worst case to lasting damage or even a complete breakdown of the system.

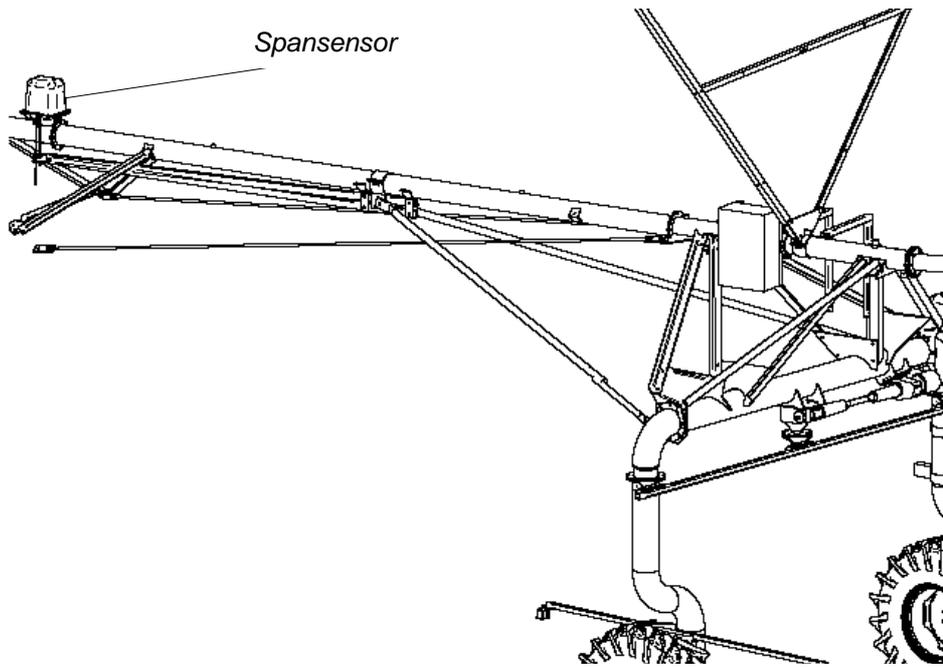
The CORNER tower drive regulation may only be configured by a service technician trained by BAUER! Never perform your own modifications or configurations on this components. There is a risk of fatal injuries!

7.2.2.2 Description of CORNER tower - drive regulation

The generally continuous adjustment of the required drive speed of the CORNER tower, adapted to the current driving maneuver, such as swinging the CORNER span in or out, makes it necessary to constantly adjust / correct the regulation.

The associated determination of the CORNER tower speed is not based on any mathematically predefined graph / track. The drive speed of the CORNER tower is continuously adapted to the speed of the last tower of the center pivot irrigation system. For this purpose, the SPAN SENSOR (mounted on the CORNER truss structure) detects all speed changes of the CORNER SPAN relative to the last tower of the center pivot irrigation system indirectly via the *deflection of the truss structure*. For example, if the CORNER tower moves too slowly, the tensile load on the truss structure increases and the deflection also increases slightly. If the CORNER tower moves too quickly, the tensile load on the truss structure is reduced and transitions to a compression load. In this case, the deflection first decreases slightly, then increases in the opposite direction.

The maximum permissible deflection is limited by a safety switch, which brings the system to an immediate standstill if the respective threshold is passed.



Additional information can be found in the separate **ASSEMBLY MANUAL**.

7.2.3 DESCRIPTION OF CORNER NOZZLE CONTROL

Due to the continuously changing volume of water required for irrigation while the CORNER SPAN swings in or out, it must be possible to adjust this volume in terms of both quantity and distribution. For this reason, all nozzles on the CORNER are divided into 9 switching groups, regardless of the length of the CORNER SPAN purchased. These 9 nozzle groups are activated or deactivated sequentially as necessary, whereby the switching sequence differs for the inward and outward swing movements.

Homogeneous and optimal water distribution in all CORNER travel situations is ensured only with a precisely positioned and laid UNDERGROUND CABLE or precisely determined GPS position data for the CORNER tower track and a precisely aligned tower steering.

To guarantee long-lasting and reliable operation of the nozzle control, all hydraulic valves are operated pneumatically rather than hydraulically. This means that even dirty or sandy water cannot result in clogging of the control lines, ensuring reliable opening and closing of the hydraulic valves over the long term. The application of the compressed air itself is controlled via electromagnetic valves. The compressed air is generated by a high-quality pneumatic compressor.

To prevent the plants from drying out, the hydraulic and pneumatic valves are switched such that all hydraulic valves on the CORNER SPAN are open in the event of a compressor failure that results in a loss of air pressure.

More detailed information can be found in the separate **ASSEMBLY MANUAL**.



8 CORNER SYSTEM CONTROL UNITS

8.1 CONTROL UNIT UNIVERSAL PRO-G FOR CORNER SYSTEM

Design and materials according to ÖVE and VDE norms; internals according to IEC norms and VDE prescriptions.

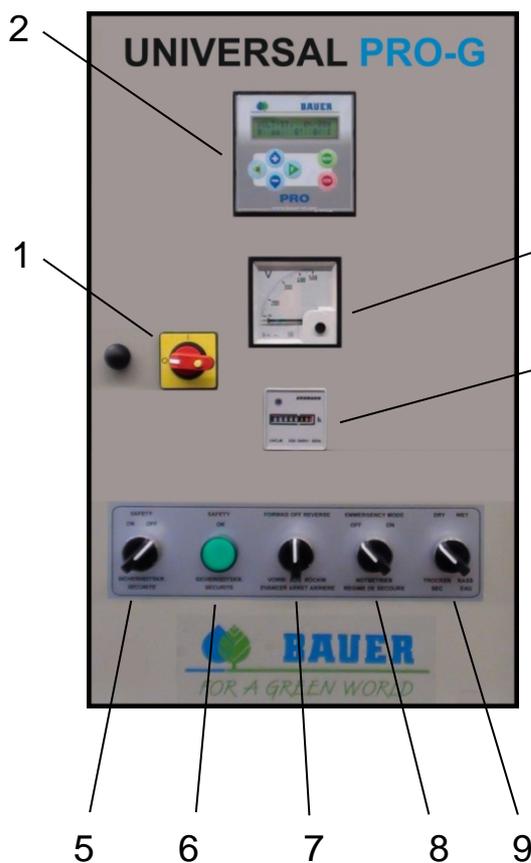


- Waterproof polyester box (protection class IP 54) with lockable frontdoor.
- Swivel mounted panel can only be opened when main switch is turned off.
- Operating voltage of system: 400 V
- Control voltage: 230 V single phase
- Isolating transformer for control voltage
- Industrial control gear usual in trade
- Cable connections with cable shoes
- Protective device



WARNING!

Keep the control unit always locked during operation in order to prevent impurity and splash water.



1. Main switch
2. Panel UNIVERSAL PRO-G
3. Voltmeter
4. Hour meter
5. Switch safety circuit „ON – OFF“
6. Illuminated push button safety circuit "OK"
7. Switch "FORWARD – OFF – REVERSE"
8. Switch "EMERGENCY OPERATION OFF-ON"
9. Switch "WET – DRY"
10. Switch „EMERGENCY STOP“ (*not shown on the picture*)
11. GPS unit (*not shown on the picture*)



8.1.1 STANDARD BUILT-IN COMPONENTS

8.1.1.1 Main switch

The main switch turns off or on the entire power supply.

In position "I" the electrical supply is established.

In this position the swivel mounted panel is locked due to safety reasons.

In position "0" the electrical supply of the system is cut off.

In this position the main switch can be locked in order to prevent an accidental or unintended turning on.

Only in this position the swivel mounted panel can be opened.

8.1.1.2 Panel UNIVERSAL PRO-G F. CORNER SYSTEM



8.1.1.2.1 DISPLAY

Display with 2x16 signs, 2 lines, background lighting. If you do not use the keypad for a predetermined time, the background lighting switches off automatically (timer for background lighting adjustable).

8.1.1.2.2 FUNCTION/MENU BUTTONS

START FORWARD (F)	Starts the system moving forward (clockwise)
START REVERSE (R)	Starts the system moving backwards (counter-clockwise)
MENU and ENTER	By pressing this key you get to the operator level – double usage for entering in the programming modus of a parameter and for deleting an entry.
STOP (ESC and machine)	Stops operation and multi-usage of this button for operating at the technician level and for saving and leaving the programming mode.



- + With this button you can change the depth of precipitation for the current driving direction while operating and multi-usage for altering the parameters.
- With this button you can change the depth of precipitation for the current driving direction while operating and multi-usage for altering the parameters.

ATTENTION: A detailed function description of the *Universal PRO-G f. CORNER control panel* can be found in the separate operating manual.

8.1.1.3 VOLTMETER

Shows voltage between phase L1 and L2

8.1.1.4 HOUR METER

Shows the entire operating hours of the machine

8.1.1.5 SWITCH "SAFETY CIRCUIT ON – OFF"

In position "ON" the entire machine is turned off in case of failures (e.g. kinking). Position "OFF" serves only for alignment of the machine by a qualified person. **During operation the switch has to be always in position "ON"!!** Only in this way security is guaranteed during unattended operation.

8.1.1.6 ILLUMINATED PUSH BUTTON "SAFETY CIRCUIT OK"

Illuminates if the switch "SAFETY CIRCUIT ON – OFF" is turned to "OFF"
Illuminates if the switch "SAFETY CIRCUIT ON – OFF" is turned to „ON“ and the machine is not inside the safety circuit.

8.1.1.7 SWITCH "FORWARD – OFF – REVERSE"

During the emergency operation the machine is started forward in switch position "FORWARD" (clockwise) and reverse in position "REVERSE" (counter clockwise).

8.1.1.8 SWITCH "EMERGENCY OPERATION OFF-ON"

In position "ON" an emergency operation of the machine takes place in case of failure of the PRO module. When operating with the Pro module turn the switch on "OFF".

8.1.1.9 SWITCH "WET – DRY"

During the emergency operation the machines runs in max. speed irrigation in switch position "WET" and dry-runs also with max. speed in switch position "DRY" (speed can not be changed in emergency operation).

8.1.1.10 SWITCH "EMERGENCY STOP"

This switch disconnects the power supply of the control.

8.1.1.11 GPS UNIT

GPS unit for absolute position detection, mounted on the outermost tower (*not shown*).

ATTENTION: A detailed function description of the *UNIVERSAL PRO-G F. CORNER control panel* can be found in the separate operating manual.



8.2 CORNER TOWER / TRACK UNIT CONTROL UNIT

Design and materials according to ÖVE and VDE norms; internals according to IEC norms and VDE prescriptions



- Waterproof polyester box (protection class IP 54) with lockable frontdoor.
- Hinged control panel
- Operating voltage of system: 400 V
- Control voltage: 230 V single phase
- Industrial control gear usual in trade
- Cable connections with cable shoes
- Protective device

**WARNING!**

Keep the control unit always locked during operation in order to prevent impurity and splash water.



1. CORNER tower control panel
2. Green illuminated button



8.2.1 STANDARD BUILT-IN COMPONENTS

8.2.1.1 CORNER TRACK UNIT CONTROL PANEL



8.2.1.1.1 DISPLAY

Display with 2x16 signs, 2 lines, background lighting. If you do not use the keypad for a predetermined time, the background lighting switches off automatically (timer for background lighting adjustable).

8.2.1.1.2 FUNCTION/MENU BUTTONS

START FORWARD (F)	Starts the system forward (clockwise) In programming mode: Switches to the next parameter
START REVERSE (R)	Starts the system backwards (counter-clockwise) In programming mode: Switches to the previous parameter
MENU and ENTER	Loads the parameter menu At the menu level: For entering the programming mode For accepting the input
STOP (ESC and machine)	Stops operation Enter the machine parameters menu At the menu level: For leaving the machine / parameters menu In programming mode: Exits without saving
+	At the menu level: Switches to the previous parameter block In programming mode: For setting the values
-	At the menu level: Switches to the next parameter block In programming mode: For setting the values

8.2.1.2 GREEN ILLUMINATED BUTTON

For bypassing the safety circuit.

ATTENTION: A detailed function description of the *CORNER TRACK UNIT control panel* can be found in the separate operating manual.



8.3 CORNER END TOWER CONTROL UNIT

Design and materials according to ÖVE and VDE norms; internals according to IEC norms and VDE prescriptions



- Waterproof polyester box (protection class IP 54) with lockable frontdoor.
- Hinged control panel
- Operating voltage of system: 400 V
- Control voltage: 230 V single phase
- Industrial control gear usual in trade
- Cable connections with cable shoes
- Protective device



WARNING!

Keep the control unit always locked during operation in order to prevent impurity and splash water.



3. CORNER end tower control panel / bottom
4. CORNER end tower control panel / top
5. Green illuminated button



8.3.1 STANDARD BUILT-IN COMPONENTS

8.3.1.1 CORNER END TOWER CONTROL PANEL TOP / BOTTOM



8.3.1.1.1 DISPLAY

Display with 2x16 signs, 2 lines, background lighting. If you do not use the keypad for a predetermined time, the background lighting switches off automatically (timer for background lighting adjustable).

8.3.1.1.2 FUNCTION/MENU BUTTONS

START FORWARD (F)	Starts the system moving forward (clockwise) In programming mode: Switches to the next parameter
START REVERSE (R)	Starts the system moving backwards (counter-clockwise) In programming mode: Switches to the previous parameter
MENU and ENTER	Loads the parameter menu At the menu level: For entering the programming mode For accepting the input
STOP (ESC and machine)	Stops operation Enter the machine parameters menu At the menu level: For leaving the machine / parameters menu In programming mode: Exits without saving
+	At the menu level: Switches to the previous parameter block In programming mode: For setting the values
-	At the menu level: Switches to the next parameter block In programming mode: For setting the values

8.3.1.2 GREEN ILLUMINATED BUTTON

For bypassing the safety circuit.

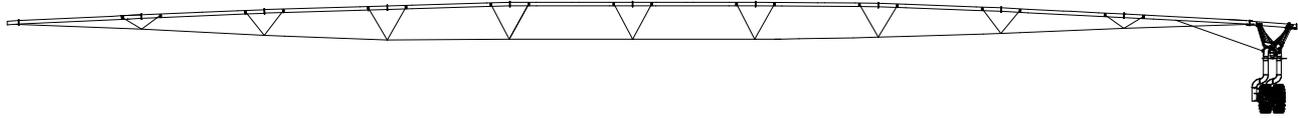
ATTENTION: A detailed function description of the *CORNER END TOWER control panel* can be found in the separate operating manual.



8.4 TERMS

Corner Span

A span is essentially a truss structure with a moving tower. The CORNER span is the last truss structure with a steerable CORNER tower in a CORNER System.



Forward

Seen from above the CORNER SYSTEM is travelling clockwise.

Reverse

Seen from above the CORNER SYSTEM is travelling counter-clockwise.

Inward

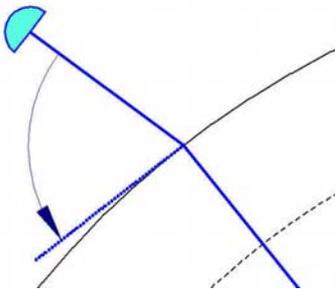
towards the pivot.

Outward

towards the last tower.

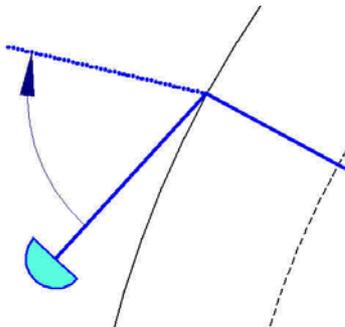
Swinging inward

The corner span moves toward the 90° position (viewed relative to the pivot).



Swinging outward

The corner span moves away from the 90° position (viewed relative to the pivot).





8.5 CORNER TOWER BOXES

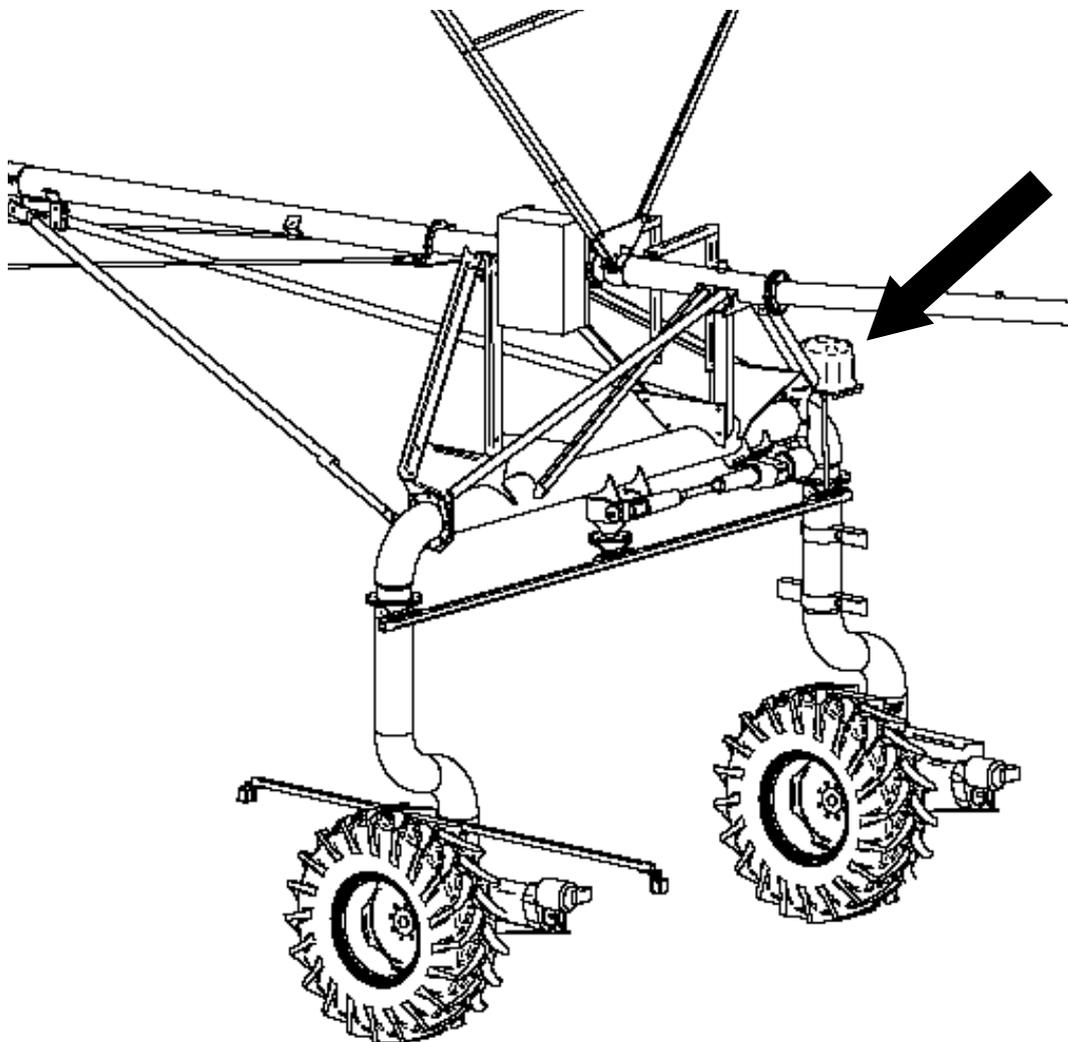
8.5.1 STEERING TOWER BOX

8.5.1.1 GENERAL

Before you configure any settings on the *steering tower box*, make sure that all components of the steering and all nuts and screws are correctly installed and tightened.

Also note that with the CORNER tower, both drive wheels must be aligned parallel to each other, pointing in exactly the same direction.

More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.





8.5.1.2 FUNCTION DESCRIPTION



The *steering tower box* continuously monitors the steering movements and simultaneously limits the maximum steering angle. The sensor is connected to the rotatable pusher part via an adapter sleeve. Make certain that the screw on the adapter sleeve is firmly tightened; otherwise the machine will not register any steering movements.

WARNING: The sensor allows a maximum rotation of 0° to 360° and is limited by a mechanical stop. Never attempt to turn the sensor past this range with force.

8.5.1.3 SETTINGS

If it is necessary to readjust the limits of the steering angle, proceed as described under **2.3.1.18 Endswitch L / Endswitch R. Endswitch L** (see the *CORNER TRACK UNIT CONTROL UNIT operating manual*) is the stop in the counter-clockwise direction, *Endswitch R* in the clockwise direction.

Carefully adjust the maximum steering angle in small steps. Then observe the steering carefully and make any necessary corrections.

ATTENTION: Also read the separate operating manual for the CORNER TRACK UNIT control unit.

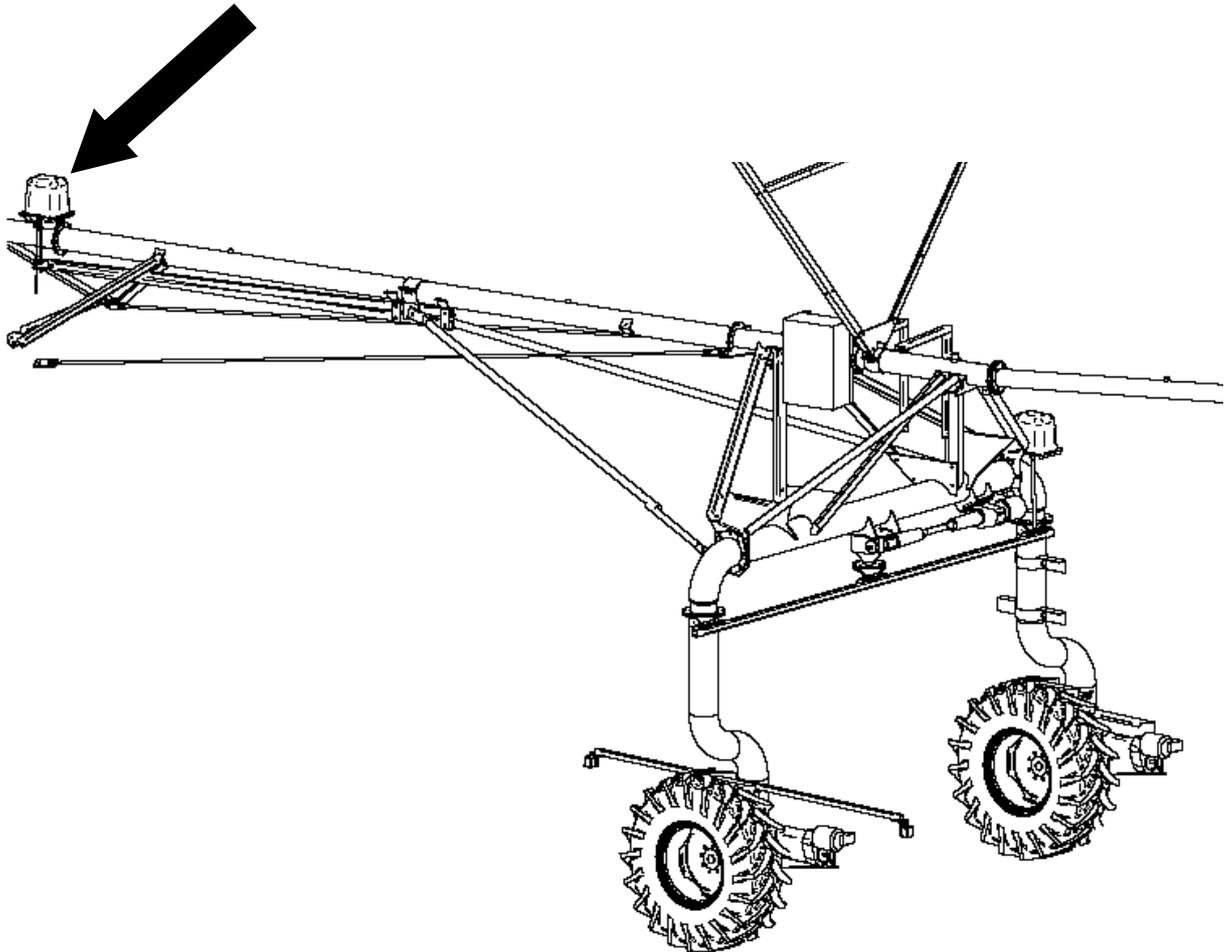


8.5.2 SPAN SENSOR TOWER BOX

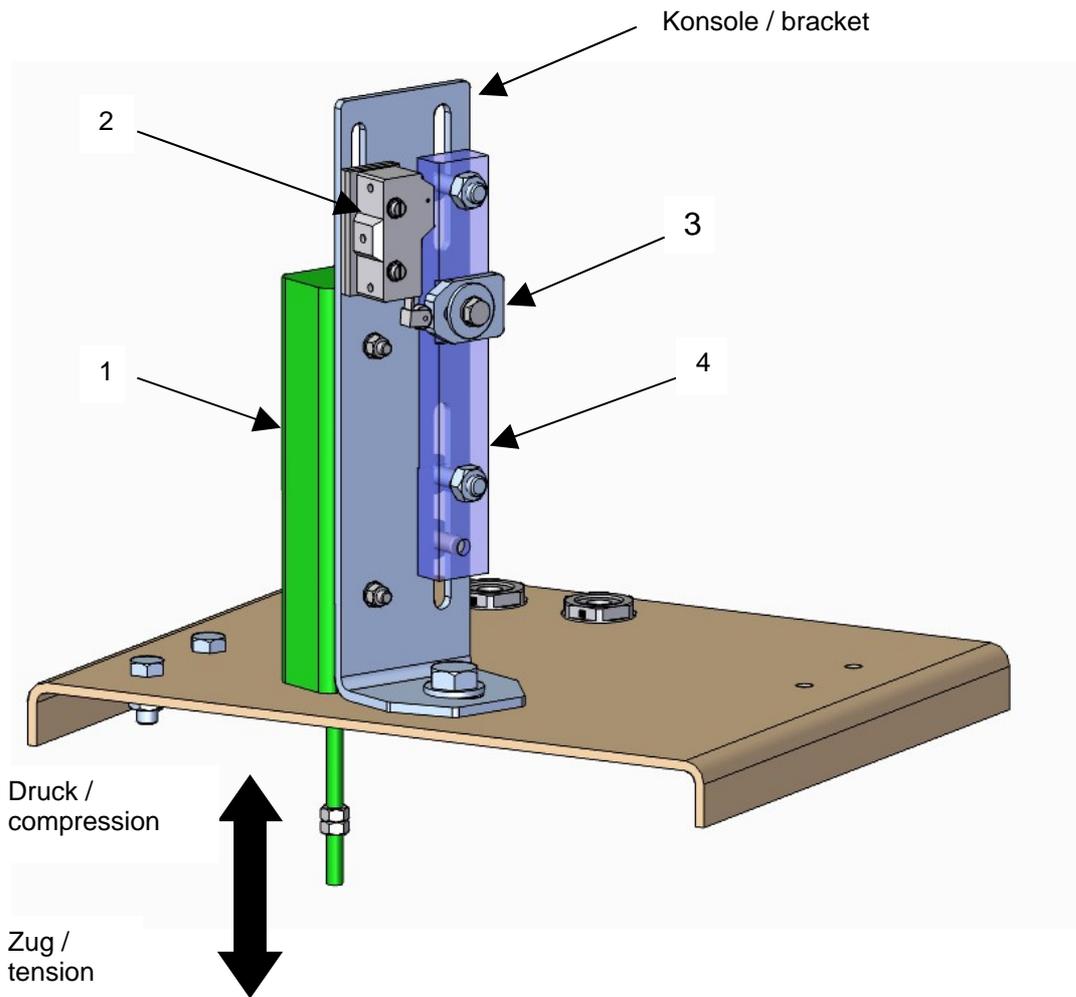
8.5.2.1 GENERAL

Before you configure any settings on the *span sensor tower box*, make sure that all components of the tower box and all nuts and screws are correctly installed and tightened.

More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.



8.5.2.2 FUNCTION DESCRIPTION



1 Span sensor

The span sensor is part of the speed regulation of the CORNER tower drive. It measures the deflection of the CORNER truss structure and indirectly the *tension* and/or *compression* load.

WARNING: The span sensor has a maximum measurement path of 100 mm, which is limited by a mechanical stop. When the machine is at a standstill, the span sensor must be located in the center position (approx. 50 mm); otherwise, it could be damaged during operation.

2 Safety switch

The safety switch interrupts the circuit in event of a malfunction of the CORNER tower or the end tower; in other words in event of elevated compression or tension load on the CORNER truss structure (insufficient traction at the wheels, malfunction of the span sensor, insufficiently tightened screws / nuts, etc.).

3 Safety cam

The safety cam actuates the safety switch in event of a machine malfunction. The precise setting of the cam and the safety switch is absolutely essential for safe operation of the machine. The safety shutdown protects the machine from a mechanical overload and prevents damage to the mechanical components.

4 Cam bar

The cam bar transmits the movements of the transmission part to the cam and is run within the bracket.



WARNING: To protect the electronic components during transport, the cam bar is firmly screwed to the bracket at the factory. During assembly, the screws must be loosened again sufficiently to allow the cam bar to glide easily .

8.5.2.3 SETTINGS

1 Span sensor

During the initial commissioning, the span sensor is calibrated mechanically and electrically by a trained service technician and subsequently requires no further readjustment.

To configure the span sensor, proceed as described under **2.3.1.11 Span Set F / Span Set R** (see the *CORNER TRACK UNIT CONTROL UNIT operating manual*). The set value for the forward or reverse travel can be defined there. This setting is required if you need to replace the span sensor or other associated parts.

WARNING: Only configure the settings on the *span sensor tower box* if you are 100% familiar with the machine. More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

2-3 Safety switch, safety cam

The safety switch and the safety cam are calibrated during the initial commissioning by a trained service technician and subsequently require no further readjustment.

In order to readjust the safety switch or the safety cam, loosen the respective screw, depending on which of the two parts you want to correct.

Set the safety switch and the safety cam such that the machine is just sufficiently away from being shut down in typical operation.

If you configure the switch path too narrowly, the machine could also come to a standstill during normal operation (uneven ground, wind gusts, etc.). If the switch path is configured too broadly, this can result in overloading and damage to the CORNER truss structure.

WARNING: Only configure the safety switch and/or safety cam if you are 100% familiar with the machine. More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

4 Cam bar

Loosen the two lock nuts and adjust the play of the cam bar using the two screws.

If the cam bar is too stiff, the safety switch can no longer be actuated. If the cam bar is too loose, it can catch / jam up during the up and down movements, and if the cam bar has far too much play, the switch roller of the safety switch can fall down from the cam.

WARNING: Only configure the settings on the cam bar if you are 100% familiar with the machine. More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

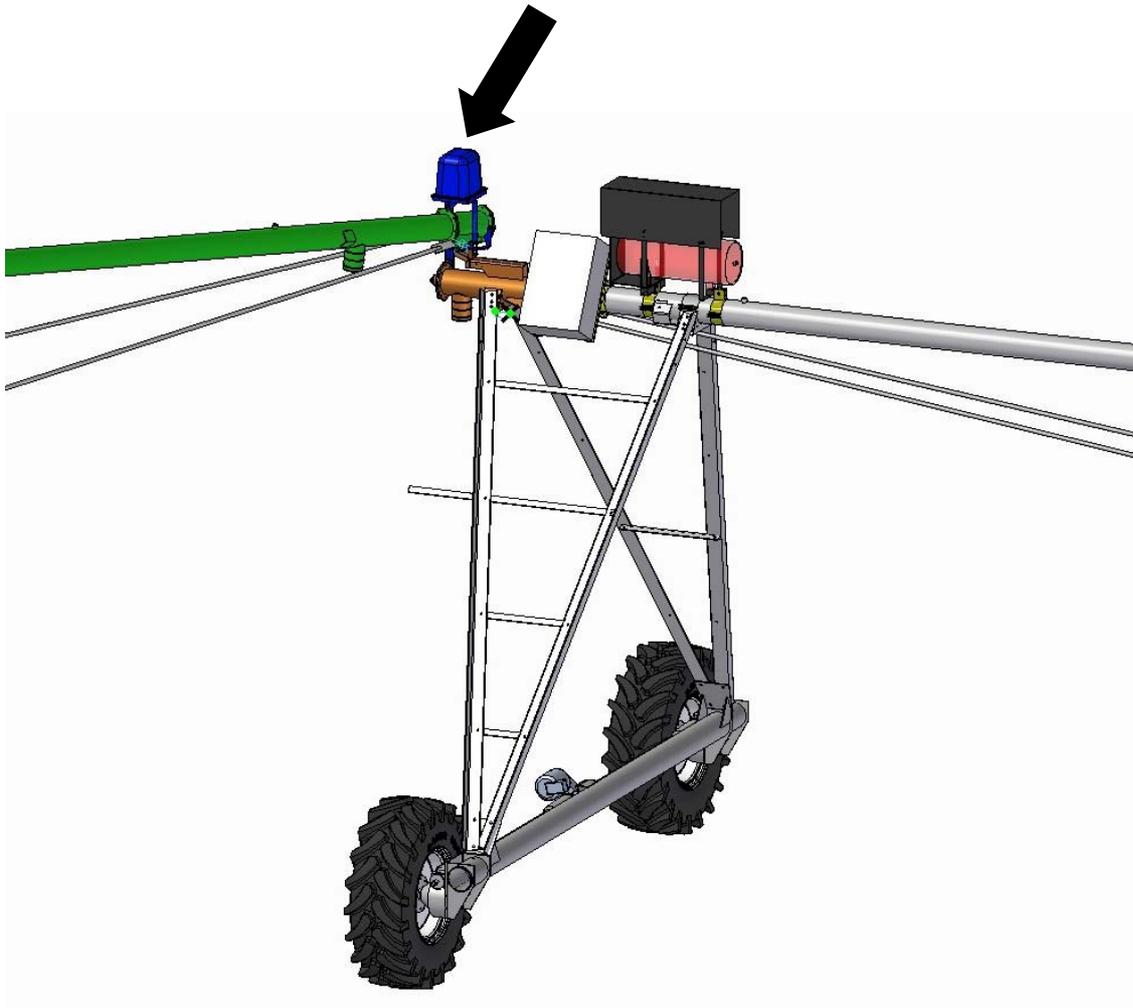


8.5.3 ANGLE TRANSMISSION TOWER BOX

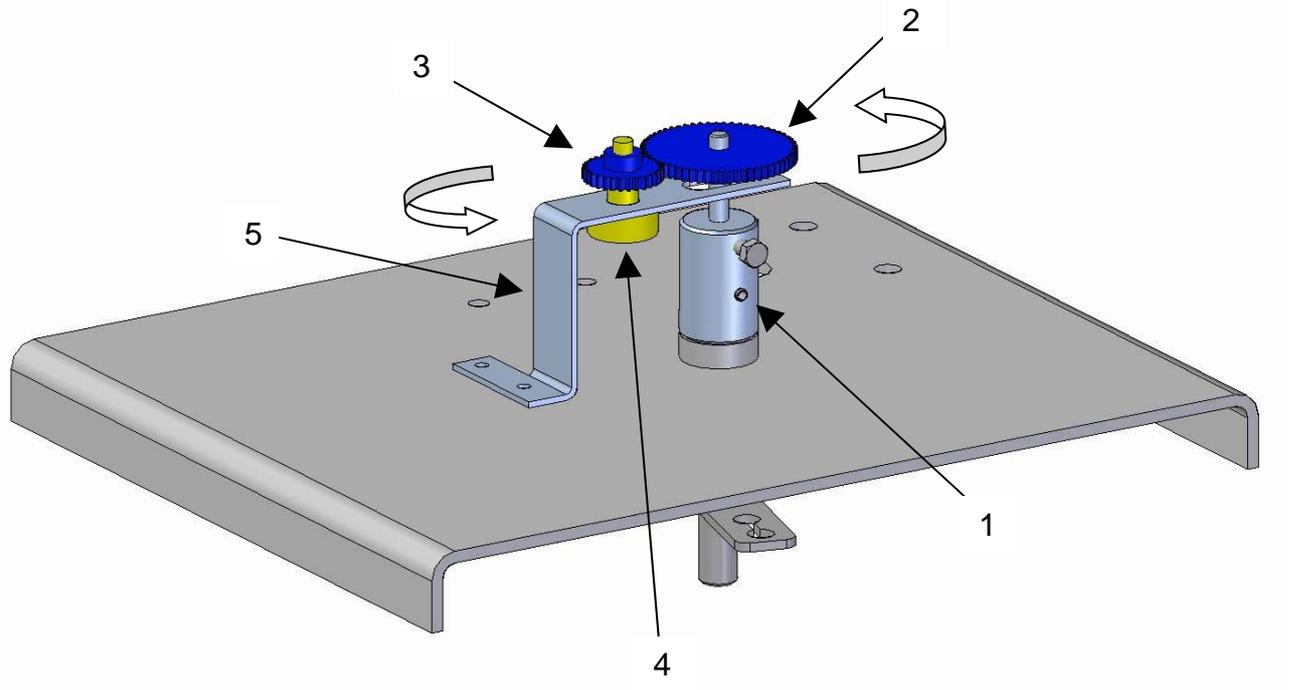
8.5.3.1 GENERAL

Before you configure any settings on the *angle transmission tower box*, make sure that all components of the tower box and all nuts and screws are correctly installed and tightened.

More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.



8.5.3.2 FUNCTION DESCRIPTION



1 Adapter sleeve

The adapter sleeve connects the transmission part to the first gear wheel (*large*).

2 Large gear wheel

The large gear wheel transmits the rotational movement to the small gear wheel.

3 Small gear wheel

The small gear wheel is connected to the sensor and transmits the rotational movement with a transmission ratio of $i = 2$.

4 Sensor

The sensor continuously registers the angle position of the CORNER span. This data is further processed in the control unit and is required for the sequential nozzle control. The current relative position of the CORNER span can be checked on the control panel at any time.

5 Sensor bracket

The sensor is mounted to the sensor bracket.

8.5.3.3 SETTINGS

1 Adapter sleeve

Loosen the screw on the adapter to disconnect the sensor from the transmission part. The gear wheels and sensor can now be adjusted as necessary. Make sure that the sensor is not moved against its mechanical limit while the CORNER span swings outward or inward. There is a transmission ratio of $i = 2$ between the gear wheels, meaning that if the CORNER span moves by 90° , the sensor will turn 180° .

WARNING: The sensor allows a maximum rotation of 0° to 360° and is limited by a mechanical stop. Never attempt to turn the sensor past this range with force.

2 Large gear wheel



You can change the position of the gear wheel by loosening the screw on the adapter sleeve. The gear wheel can then be moved up or down. Make sure that the two gear wheels are aligned over their entire width. Otherwise, early wear or slipping of the opposing gear could occur.

WARNING: To protect the electronic parts during transport, the *large gear wheel* is delivered uninstalled. During assembly, this must be installed as shown above. The two gear wheels must run without play.

3 Small gear wheel

The position of the small gear wheel cannot be changed in the vertical direction.

4 Sensor

To make adjustments to the sensor, proceed as described under 3.4.1.1 *Poti Offse / Corner (CORNER End Tower Control Unit)*. The value for the angle between the CORNER span and pivot can be configured or corrected there.

This setting is required if the span sensor or other associated parts need to be replaced. When doing so, make note of the angle displayed under 3.4.1.1 *Poti Offse / Corner* before beginning the replacement.

WARNING: Only configure the settings on the *angle transmission tower box* if you are 100% familiar with the machine. More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

WARNING: The sensor allows a maximum rotation of 0° to 360° and is limited by a mechanical stop. Never attempt to turn the sensor past this range with force.

5 Sensor bracket

Loosen the screws between the sensor bracket and the tower box base plate to adjust the gear wheels horizontally relative to each other. Always take special care to ensure that the gearing runs without play.

9 INITIAL STARTUP WITH GPS CONTROL

9.1 GENERAL INFORMATION

If you have purchased a *CORNER SYSTEM* with *GPS CONTROL*, you must define all position data for the track guidance during the initial startup. Follow the instructions below in order to do this.

9.2 DETERMINING THE CENTRAL POSITION

Create a 24-hour log file of the position of the central unit.

- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to "1".
- Open the housing of the BASE UNIT CONTROL UNIT.
- Set the jumper from "CON GPS" to "USB LOG".
- Now insert an empty and formatted USB stick in the USB port of the BASE UNIT CONTROL UNIT. Check the LED of your USB stick. If connected correctly, this should begin to blink to indicate saving of the LOG data.
- Leave the USB stick in the port for about 24 hours. Do not interrupt the power supply during this time.
- After about 24 hours, set the jumper from "USB LOG" to "CON GPS" and remove the USB stick again.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to "0".

If the process has completed successfully, there should now be data on your USB stick. Send this to your dealer or directly to BAUER Austria. We will process your data and integrate it directly into the software of the BASE UNIT CONTROL UNIT and ROVER UNIT CONTROL UNIT. We will then send this back to you.



- Save the data (BASE UNIT) you receive from us on an empty and formatted USB stick.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “1”.
- Open the housing of the BASE UNIT CONTROL UNIT.
- Set the jumper to “CON GPS”.
- Insert the USB stick with the data prepared by us into the USB port of the BASE UNIT CONTROL UNIT. Check the LED of your USB stick. If connected correctly, this should begin to blink.
- Ensure that the transmission of the new software is not interrupted. When the transmission is complete, the LED on the USB stick should stop blinking.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “0” and then to “1” to restart the GPS CONTROL.

Your *BASE UNIT CONTROL UNIT* has now been prepared for the initial startup.

9.3 DETERMINING THE POSITION DATA OF THE TOWER TRACK

With the position of the central tower just defined (*machine center*), you can now determine the CORNER tower track. To do this, you must manually drive the machine in one circuit while again saving the position data on a USB stick.

ATTENTION: Two people are needed at times for the steps described below.

Before creating a log file, do as follows:

- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “1”.
- Open the housing of the ROVER UNIT CONTROL UNIT.
- Set the jumper to “CON GPS”.
- Insert the USB stick with the data prepared by us into the USB port of the ROVER UNIT CONTROL UNIT. Check the LED of your USB stick. If connected correctly, this should begin to blink.
- Ensure that the transmission of the new software is not interrupted. When the transmission is complete, the LED on the USB stick should stop blinking.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “0” and then to “1” to restart the GPS CONTROL.

Your *ROVER UNIT CONTROL UNIT* has now been prepared.

- Determine all field borders and track points of the CORNER SYSTEM. Follow the same procedure as for BAUER BELOW GROUND GUIDANCE.

ATTENTION: For this, read the separate operating manual *Cable Laying Instructions for the BAUER CORNER SYSTEM*.

- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “1”.
- Open the housing of the ROVER UNIT CONTROL UNIT.
- Set the jumper from “CON GPS” to “USB LOG”.
- Now insert an empty and formatted USB stick in the USB port of the ROVER UNIT CONTROL UNIT. Check the LED of your USB stick. If connected correctly, this should begin to blink to indicate saving of the LOG data.

Manually drive the machine in a circuit along the previously measured track points (*according to the Cable Laying Instructions for the BAUER CORNER SYSTEM*). Do this as follows:

ATTENTION: The measured track points refer to the wheel of the CORNER tower on the outside of the curve.



- Connect the REMOTE CONTROL FOR CORNER to the PRO module of the TRACK UNIT CONTROL UNIT. The REMOTE CONTROL has 2 buttons with which you can manually steer *left* or *right*.

ATTENTION: When the REMOTE CONTROL FOR CORNER is connected, the safety circuit of the machine is automatically bypassed and deactivated.

- On the UNIVERSAL PRO-G CONTROL UNIT, set an irrigation amount of “0 mm” to travel at full speed.
- Start the system from the UNIVERSAL PRO-G CONTROL UNIT in the forward direction to begin the manual process.
- Steer the CORNER tower such that the wheel on the outside of the curve runs along the previously measured points.

During the manual travel, the GPS data will be recorded on the USB stick. At the same time, the previously measured track points are checked. You can also interrupt the travel at any time and continue it later.

After manually traveling the first circuit, please do as follows:

- Take the USB stick out of the ROVER UNIT CONTROL UNIT.
- Set the jumper from “USB LOG” back to “CON GPS”.
- Remove the REMOTE CONTROL FOR CORNER.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “0”.

If the process has completed successfully, there should now be data on your USB stick. Send this to your dealer or directly to BAUER Austria. We will process your data and integrate it directly into the software of the ROVER UNIT CONTROL UNIT. We will then send this back to you.

- Save the data you receive from us on an empty and formatted USB stick.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “0”.
- Open the housing of the ROVER UNIT CONTROL UNIT.
- Set the jumper to “CON GPS”.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “1”.
- Insert the USB stick with the data prepared by us into the USB port of the ROVER UNIT CONTROL UNIT. Check the LED of your USB stick. If connected correctly, this should begin to blink.
- Ensure that the transmission of the new software is not interrupted. When the transmission is complete, the LED on the USB stick should stop blinking.
- Set the main switch of the UNIVERSAL PRO-G CONTROL UNIT to “0” and then to “1” to restart the GPS CONTROL.

Your *GUIDANCE ROVER UNIT* has now been prepared for the initial startup. You can now start up your machine as described under **10 STARTUP**.

ATTENTION: For this, also read the separate operating manuals of the CONTROL UNITS.

10 INITIAL START-UP

10.1 GENERAL

After the system has been completely assembled and installed and successfully put into operation for the first time by the supplier’s specialist, the BAUER PRECISION CORNER system is approved for operation and start-up by the customer!

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.

The following start-up procedure applies only to the BAUER PRECISION CORNER. For this reason, the operating manual of the BAUER CENTERSTAR must also be read carefully.

10.2 BEFORE INITIAL START-UP

10.2.1 CHECKING THE CENTERSTAR ALIGNMENT

Check whether the spans of the CENTERSTAR are correctly configured. The CENTERSTAR is optimally configured if a uniform, positive arc is formed in both pivot directions.

Pivot direction forward



Pivot direction reverse



If this is not the case, proceed as described in the CENTERSTAR operating manual.



10.2.2 CORNER TOWER TRACK

The laying of the track guide wire for the BELOW GROUND GUIDANCE results in a loosening of the soil in these areas. This can cause the *corner tower wheels* to *sink in* because the track of the corner tower overlaps with the path of the track guide wire in many areas (especially when the corner span is in the swung-out position).

During irrigation, this effect is even more pronounced.

It is therefore absolutely essential to run the system through at least one dry cycle after completing assembly and at least as long as it takes until the corner tower track becomes visible. It is then necessary to **COMPACT THE TRACK** in the problematic areas (in fully swung-out position).

The ground along the track of the laid underground cable must be *compacted* immediately after laying of the cable or, as described above, after completion of the CORNER SPAN assembly.

More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

After completing the initial start-up, we recommend that the *corner tower track* be inspected after the initial cycles and any necessary adjustments or corrections made.

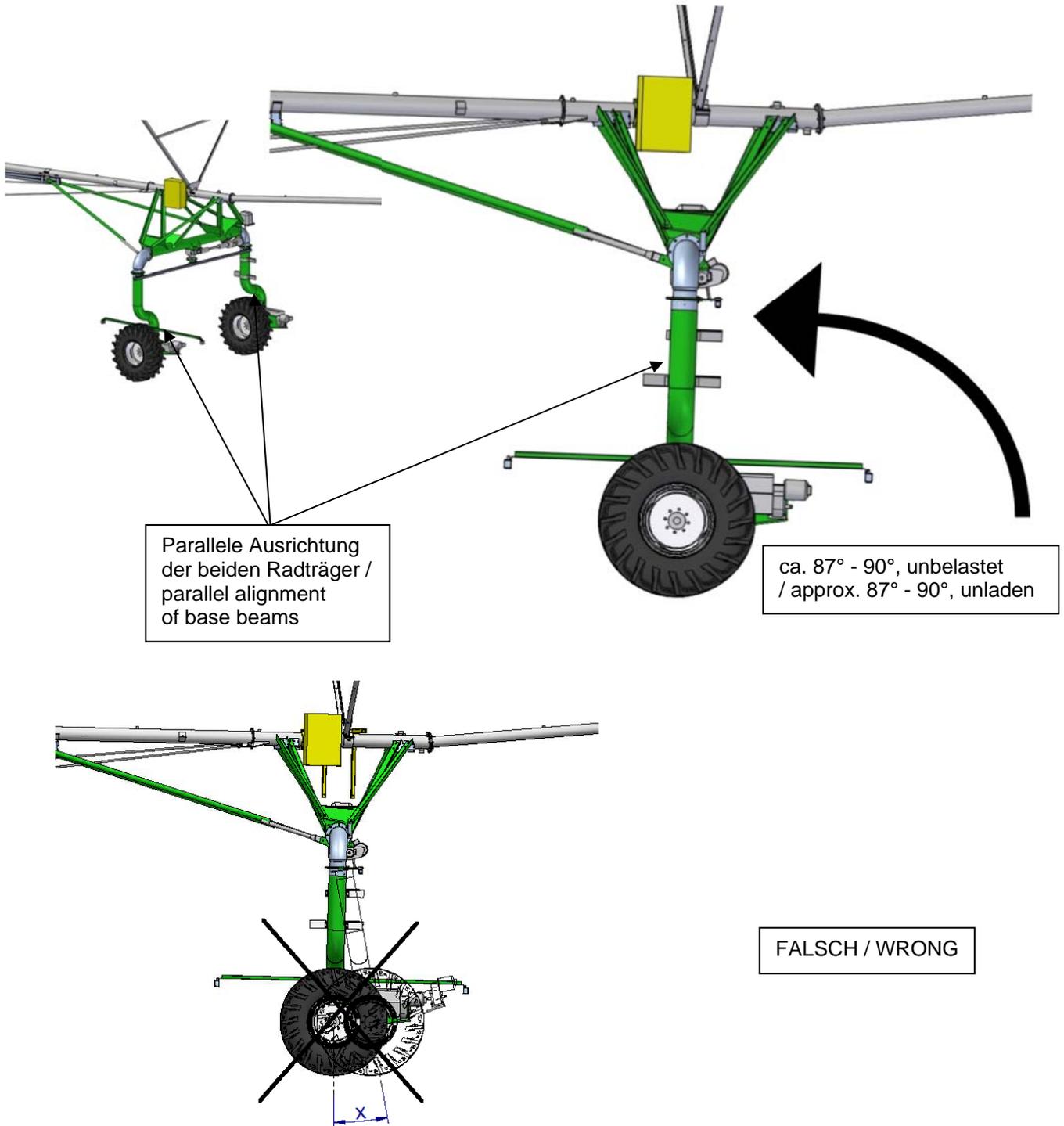
ATTENTION: Not required for GPS control.



10.2.3 CHECKING THE CORNER TOWER ALIGNMENT

Check the alignment of the two wheel bases on the CORNER tower relative to each other as well as to the ground and the CORNER span.

Both wheel bases must stand parallel to each other and nearly at a right angle to the ground while in the unladen state (see figure). Note that when the corner span is in the swung-out position, the angle is approx. 90°, while the angle in the swung-in position is approx. 87° - 88°.

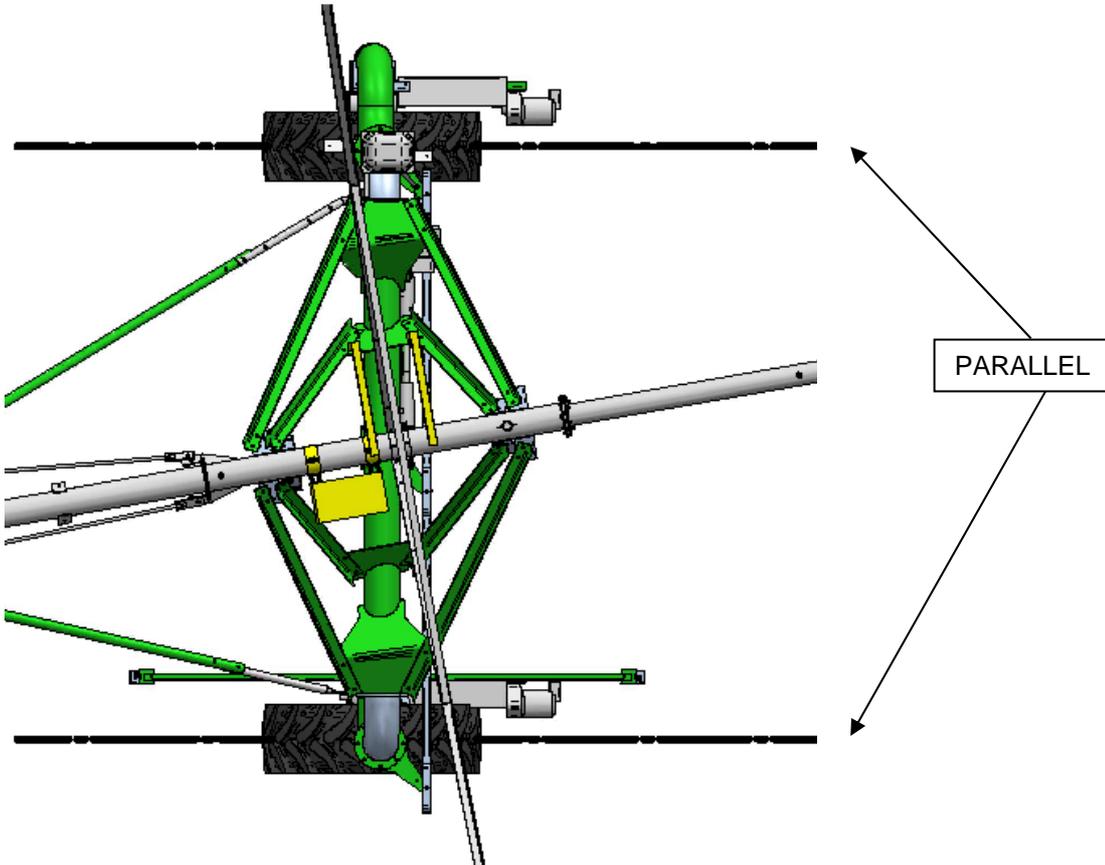


More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

10.2.4 CHECKING THE CORNER STEERING ALIGNMENT

Check the alignment of the two tower wheels to each other on the CORNER tower.

Both tower wheels must stand PARALLEL to each other.

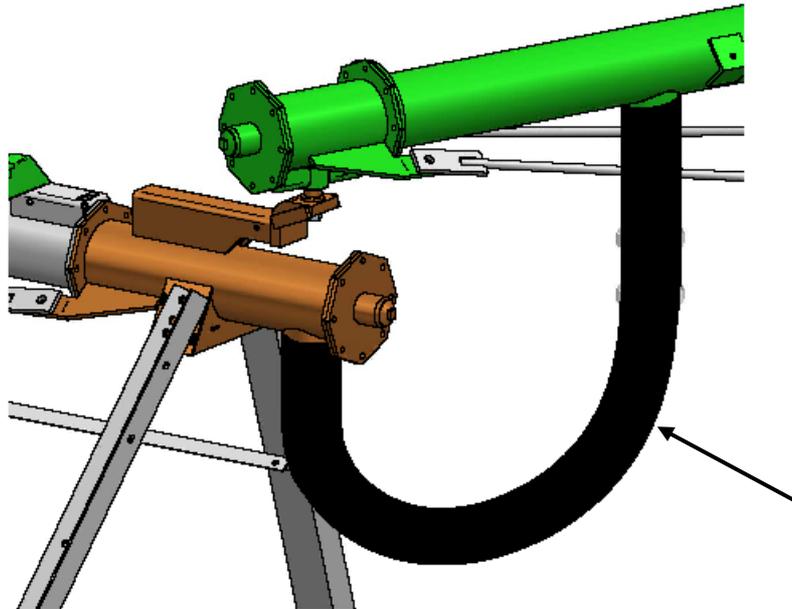


More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

10.2.5 CHECKING THE CORNER SPAN SUPPLY HOSE

Check whether the supply hose for the CORNER span is correctly installed.

Ensure that the hose is seated properly in the irrigation pipe. If the supply hose is not situated all the way to the top on the tube but has slid down, restore it to the correct position and affix it with hose clamps.



10.2.6 CHECKING THE CORNER SPAN PNEUMATIC HOSES

Visually inspect the correct seat of the pneumatic lines for the nozzle control on the CORNER span.

Pay particular attention to ensuring that all lines are connected properly with the fittings and hydraulic valves. If necessary, restore these connections.



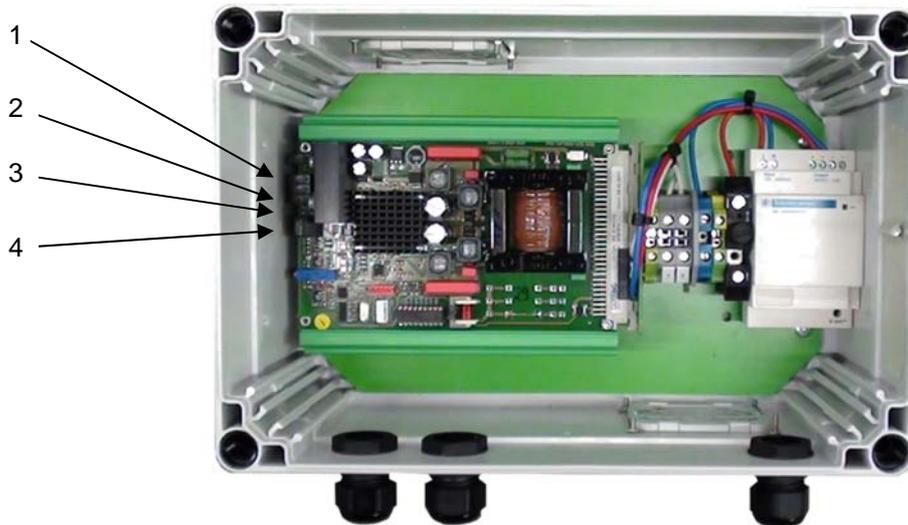
10.2.7 CHECKING THE FREQUENCY GENERATOR POWER SUPPLY

Check the power supply of the frequency generator. The frequency generator is mounted either inside the panel (central tower) or near the conductor loop (CORNER tower track).

It may be powered either by 230V alternating current or 24V direct current.



Open the housing cover of the frequency generator to check the operating state. The status lights are located on the left edge of the circuit board (see figure).



The side status lights indicate the following operating states:

1. *Power supply present / OK / sufficient.*
2. *Signal in the conductor loop OK / current strength in the conductor loop OK.*
3. *Current strength in the conductor loop too high, possible short-circuit in the conductor loop.*
4. *Current strength in the conductor loop too low, possible cable break in the conductor loop.*

More information can be found in the MAINTENANCE INSTRUCTIONS and in the separate **ASSEMBLY MANUAL**.

ATTENTION: Not required for GPS control.

10.3 STARTING PROCESS WITH UNIVERSAL PRO-G

As with the CENTERSTAR, start your system with PRECISION CORNER at the *control unit UNIVERSAL PRO - G* on the central tower. For this purpose, read the section *Control Unit Universal PRO-G* and the separate operating manual *BAUER - CENTERSTAR 9000*.

- (1) Make sure that the "EMERGENCY STOP" switch is not actuated.
- (2) Turn the main switch to the position "1".
- (3) Bring the switch "Safety circuit ON - OFF" to the "ON" position.
- (4) Bring the switch "EMERGENCY OPERATION OFF - ON" to the "OFF" position.
- (5) Make sure that the power supply for the frequency generator (BELOW GROUND GUIDANCE) is active.
- (6) Adjust any necessary settings on the PRO-G control panel and start the machine as described in the section *Control Unit Universal PRO-G*. Press the button (F) *START FORWARD* or (R) *START REVERSE* on the control panel to start the system in the clockwise or counter-clockwise direction.
If you have purchased a CORNER SYSTEM with RTK GPS CONTROL, wait until the display on the operating panel shows the status RTK (=signal strength sufficient).



10.4 STARTING PROCESS WITH CORNER TOWER / CORNER END TOWER CONTROL UNIT

After you have adjusted the settings for irrigation on the *control unit UNIVERSAL PRO - G*, you can also start or stop the system with these parameter values from the two control units of the CORNER SPAN.

WARNING: Parameter settings can only be configured at the control unit *UNIVERSAL PRO - G* on the central tower. These cannot be changed at the *CORNER TOWER* and *CORNER END TOWER* control units.

Before you start the machine, please configure the following settings on the central tower at the *control unit Universal PRO-G*:

- (1) Make sure that the "EMERGENCY STOP" switch is not actuated.
- (2) Turn the main switch to the position "1".
- (3) Bring the switch "Safety circuit ON - OFF" to the "ON" position.
- (4) Bring the switch "EMERGENCY OPERATION OFF - ON" to the "OFF" position.

You now have the ability to start and stop the system at either of the *CORNER TOWER* or *CORNER END TOWER* control units.

To do this, open the respective control cabinet and press the button *(F) START FORWARD* or *(R) START REVERSE* on the control panel to start the system in the clockwise or counter-clockwise direction.

A detailed description can be found under *CORNER TOWER / TRACK UNIT CONTROL UNIT* and *CORNER END TOWER CONTROL UNIT*.

10.5 SHUT-DOWN PROCESS

10.5.1 MANUAL SHUTDOWN OF THE MACHINE

- (1) Press the button *STOP (ESC and machine)* on the control panel at one of the 3 control units to start the system.
- (2) Turn the main switch to the position "0".

10.5.2 AUTOMATIC SHUTDOWN OF THE MACHINE

- (1) *Circle operation:*
After completing the number of cycles defined under *MAX. CYCLES*, the machine is stopped automatically.
- (2) *Sector operation:*
If *AUTOREVERSE* is active, the machine travels to the end of the sector, reverses its direction of travel and continues back to the start of the sector until the configured maximum number of cycles is finished. The program then ends and the machine is stopped automatically.
Every time a sector end is passed, 1 cycle is added to the cycle counter. A maximum of 9 cycles can be configured.
- (3) Then turn the main switch to the position "0" if you will not be starting up the machine again for a prolonged period of time.

10.6 EMERGENCY OPERATION

If the electronics fail, *no* emergency operation of a CORNER SYSTEM is possible.



The machine must be immediately inspected by a trained service technician and repaired.

11 MAINTENANCE INSTRUCTIONS

Notice

In case of warranties they will only be accepted if rules of handling and maintenance (according to service plan) has been followed. Service should be done by an authorised dealer and confirmed in the service plan. The service plan is considered as evidence for warranties.

The meaning of this service plan

The service plan suggests when to do a service and what kind of service should be done. In the fields that provides evidence we confirm the carrying out of the service. This services can be a condition for possible warranty claims.

We kindly ask you to understand that wasting and damages due to inroad, improper handling or changes are not included in the warranty.

- Always disconnect the system from power before starting any maintenance work. Turn the main disconnect to "0" and activate the safety lock-out to prevent unauthorised or unintentional re-closing of the system. Always disconnect the system yourself – do not depend on other persons!
- Always re-mount all protective devices dismantled during maintenance.



11.1 SERVICE INTERVALS

- *Monthly service*
- *Annual service*

11.1.1 SERVICE PLAN

Extent of Service	Monthly service	Annual service
Corner tower, truss structure, overhang, coupling, nozzle control		
- Check all screwed joints on flanges, truss rods, braces and on the corner tower and overhang		X
- Check tightness of the flexible hose of <i>corner tower coupling</i>		X
- Lubricate ball joint of the <i>corner tower coupling</i>		X
- Empty sand trap	X	X
- Check endgun (if existent)		X
- Lubrication of the two <i>corner tower guide pipes</i>	X	X
- Check the seal at the lubrication point <i>corner guide</i>	X	X
- Visual inspection of the fittings of the <i>nozzle control pneumatic lines</i>	X	X
- Check the guy wires of the <i>corner tower</i>	X	X
- Check the track / parallel alignment of the <i>corner tower wheels</i>	X	X
- Check the alignment of the <i>corner truss structure</i> , possible tilting	X	X
- Check the alignment of the wheel bases / corner guide of the <i>corner tower</i>		X
- Check the antennas of the BELOW GROUND GUIDANCE of the <i>corner tower</i>		X
- Check the screw connections at the corner tower steering	X	X
- Check the pneumatic compressor: air filter, oil level, general condition	X	X
Tower boxes, transmission parts		
- Check the tightening torques of all screw connections		X
- Check all electric connections on safe contact		X
- Check tightness of all cable entries into the tower box		X
- Check tightness of tower box covers		X
Drive unit		
- Check oil level of gearbox and drive motor		X
- Change oil after first irrigation season, then after every third irrigation season		X
- Gearbox: Make sure that drainage holes on the bearing covers and the hole for ventilation on the expansion chamber are not blocked		X
- Drive motor: Make sure that the drainage hole at the bottom of the motor is not blocked.	X	X
- Gearbox, drive motor - check tightness of shaft sealing ring		X
- Check screw connections of the driveline coupler		X
- Check if rubber packages of driveline coupler are damaged. Replace worn out and broken rubber packages		X
- Check wheel nuts	X	X
- Check tire pressure: 0.8 bar with tires 16.9 – 24	X	X
- Make sure that tires are not damaged	X	X



Extent of Service	Monthly service	Annual service
- Check anti twist device of axle drive shaft cover		X

11.1.2 POST-SEASON MAINTENANCE

1. Remove the drain valves and plugs in the pipeline.
2. Open sand trap stop valve.
3. Flush the pipelines.
4. Mount the drain valves and plugs again and close the sand trap stop valve again.

11.1.3 PRE-SEASON MAINTENANCE

1. Check the control units and tower boxes for damage by oxidation or rodents and insects:
2. Open sand trap stop valve and flush the pipelines.
3. Check tightness of flange seals and connecting hoses.
4. Close sand trap stop valve again.
5. Further checks => CHECKLIST



11.1.4 PRETENSIONING FORCES AND TIGHTENING VALUES OF BOLTS

The listed pretensioning forces and turning moments are guiding values for standard metric thread per DIN 13 and head requirements per DIN 912, 931, 934, 6912, 7984 and 7990 as well as thread measured in inches

rough (UNC) and smooth (UNF). They result in a bolt utilisation - limit of 90°.

It was based on a friction factor of 0.14 (new bolt without after treatment, unlubricated).

Screws standard metric thread DIN 13			
dimension	quality	turning moment Nm	pretensioning force N
M 8	8.8	25.5	16 230
M 10	8.8	50	25 791
M 12	8.8	87.3	37 657
M 14	8.8	138.3	51 681
M 16	8.8	210.8	71 196
M 20	8.8	411.9	111 305
M 24	8.8	711	160 338

Screws UNC standard thread			
dimension	quality	turning moment Nm	pretensioning force N
1/4"	S	12.5	10080
5/16"	S	21.3	13954
1/2"	S	92.7	38463

Screws UNF standard thread			
dimension	quality	turning moment Nm	pretensioning force N
9/16"	S	150	57143

WARNING: 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.



12 TROUBLESHOOTING

FAULT	POSSIBLE CAUSE	REMEDY
Abnormal motor or gearbox noise	low oil level oil worn defective bearing	top up oil exchange the oil exchange bearing
System does not start up	<p>main disconnect turned off safety disconnect Q1 turned off fuses of fuse switch disconnector defective fuses F1, F2, F3, F4 defective</p> <p>no water pressure (only with low-pressure shut-off option)</p> <p>safety circuit interrupted because system flex larger than maximum permissible bending angle</p> <p><i>Tilt sensor</i> safety circuit interrupted (end tower).</p> <p><i>Span sensor</i> safety circuit interrupted (corner tower).</p> <p>Error in the CAN communication</p> <p>BELOW GROUND GUIDANCE not receiving a signal or signal too weak</p> <p>Error on the I²C Bus.</p> <p>Error at the Real Time Clock.</p> <p>No GPS signal or GPS communication error</p> <p>system in parking position</p>	<p>turn it on turn it on</p> <p>replace defective fuses replace defective fuses</p> <p>check water supply Recalibrate pressure switch</p> <p>See restart after doglegging</p> <p>Inspect the tilt of the end tower.</p> <p>Inspect the span sensor. Hold the green illuminated button to bypass the safety circuit. Carefully operate the machine in the desired direction.</p> <p>Inspect the CAN bus communication cable. Inspect the control panel of frequency inverter.</p> <ul style="list-style-type: none"> - Inspect the orientation of the antennas - Inspect the connections of the BELOW GROUND GUIDANCE components - Inspect the power supply of the frequency generator <p>Re-start the system If this error occurs more often an error in the hardware exists. Replace Hardware.</p> <p>Re-start the system If this error occurs more often an error in the hardware exists. Replace hardware.</p> <ul style="list-style-type: none"> - <i>Inspect the open view of the GPS antenna</i> - <i>Inspect the connections of the GPS unit</i> <p>Set "<i>Parkposition</i>" to "OFF".</p>



12.1 CONTROL UNIT UNIVERSAL PRO-G - RESTART AFTER DOGLEGGING

If the safety circuit was interrupted due to an incorrect movement or a faulty component on the CORNER SPAN, skip this item and go directly to the next troubleshooting items.

However, if the safety circuit of the machine was interrupted by a general incorrect movement or doglegging without an error being registered on the CORNER SPAN itself, the machine can be restarted as described below.

- Put switch "SAFETY CIRCUIT ON - OFF" in position "OFF"
- Put main switch in position "1"
- Panel
 - Keep pressing button "FORWARD" or "REVERSE". The machine is in operation as long as the button is pressed. Press correct driving direction. Choose that driving direction that brings the end of the system in radial alignment.
 - This means, if the outer, bended drive towers point to the direction Forward, you have to press the button "REVERSE". If the outer, bended drive towers point in the direction Reverse, you have to press the button "FORWARD".
Press the button "FORWARD" or "REVERSE" and check the driving direction of the outer drive towers (that were out of correct driving direction) when the system starts.

Selecting the proper running direction ensures that only the outer misaligned towers start moving when the drive is turned on.
The wrong running direction will cause impermissibly high stresses on the trussing.



The towers only run as long as you keep the "FORWARD START" or "REVERSE START" button pressed.



The inward towers may start running for a short time after the start-up.



Continuously check tower movement after the start in order to be able to stop the system again immediately should the doglegging continue (Let go the "FORWARD" or "REVERSE" button)

As soon as the towers are aligned again (in radial alignment) and the inward towers start to move, too, the green "FORWARD" or "REVERSE" button should be no longer pressed: Turn the "SAFETY CIRCUIT" switch to "ON".

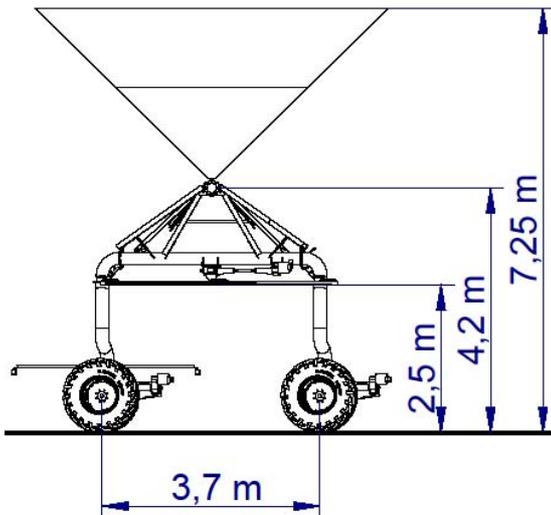
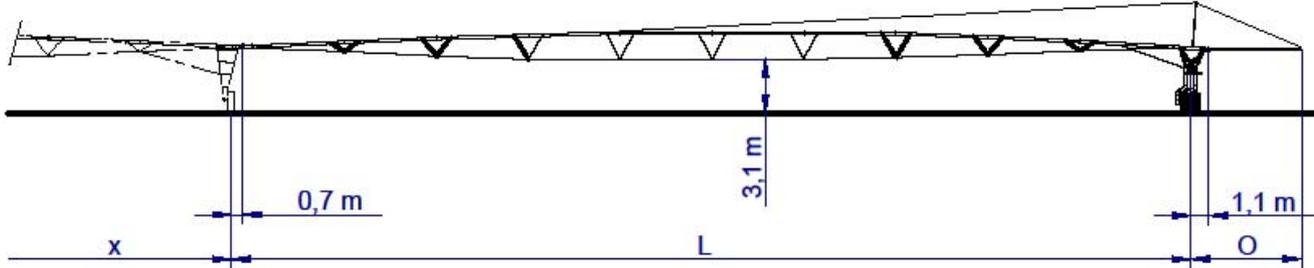
Operating the BAUER CENTERSTART with the setting "SAFETY CIRCUIT OFF" is only permitted for system alignment. Also pay particular attention to the CORNER SPAN since the entire safety circuit is switched off.

Check proper start-up of the CENTERSTAR with a test start (briefly press the start buttons "FORWARD" and "REVERSE"). The "Safety Circuit" indicator light must light up.



13 TECHNICAL DATA

13.1 DIMENSIONS OF THE BAUER PRECISION CORNER



Span		61,0 m	55,00 m
Span			
Span			

Länge			
Length	L [m]	60,5 m	54,65 m
Longueur			

Überhang		23,4 m	17,6 m	11,7 m	5,9 m	0,0 m
Overhang						
porte-à-faux						

Länge						
Length	O [m]	24,5 m	18,7 m	12,8 m	7,0 m	1,1 m
Longueur						



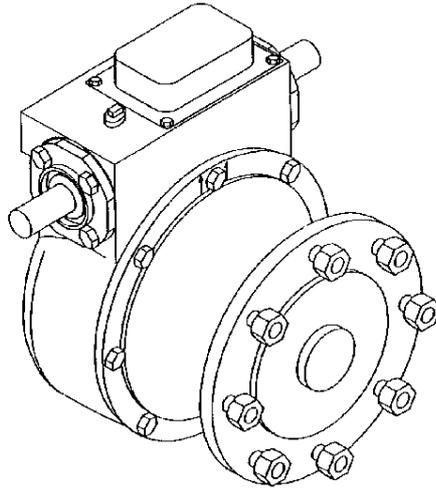
13.2 WHEEL / STEERING GEARBOX AND DRIVE / STEERING MOTORS

13.2.1 CORNER WHEEL / STEERING GEARBOX

Wheel / steering gearbox:

Worm gear with 50:1 reduction ratio
Execution: Gearbox with bronze running wheel (*only wheel gearbox*)

Type of oil: SAE 85W-140, multigrade oil
Oil quantity approx. 3.8 litres up to lower edge of filling hole
Oil expansion is compensated by expansion membrane.



13.2.2 CORNER DRIVE / STEERING MOTOR

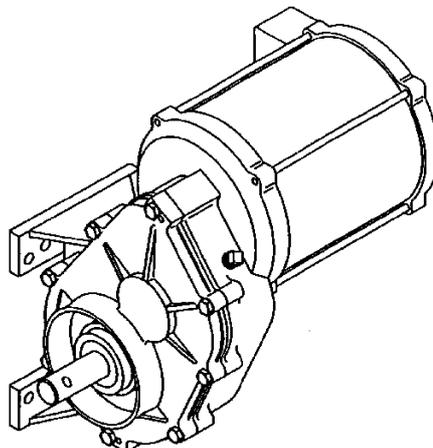
Drive motor

Spur gearing: 30:1 reduction ratio
Motor output: 1.1 kW

Steering motor:

Spur gearing: 60:1 reduction ratio
Motor output: 0.55 kW

Type of oil: SAE 50W or SAE 20W-50 multigrade motor oil
Oil quantity approx. 3.8 litres up to lower edge of filling hole





14 ELECTRICAL WIRING DIAGRAMS

14.1 PIVOT CONTROL UNIT

14.1.1 CONTROL UNIT UNIVERSAL PRO-G - INFEED

14.1.2 CONTROL UNIT UNIVERSAL PRO-G - CONTROL

14.1.3 CONTROL UNIT UNIVERSAL PRO-G - WIRING DIAGRAM

14.2 CORNER SPAN CONTROL UNITS

14.2.1 CORNER END TOWER CONTROL UNIT - INFEED

14.2.2 CORNER END TOWER CONTROL UNIT - CONTROL

14.2.3 CORNER END TOWER CONTROL UNIT - WIRING DIAGRAM

14.2.4 CORNER TOWER CONTROL UNIT - INFEED

14.2.5 CORNER TOWER CONTROL UNIT - CONTROL

14.2.6 CORNER TOWER CONTROL UNIT - WIRING DIAGRAM

14.3 GPS CONTROL UNITS

14.3.1 ROVER UNIT CONTROL UNIT

14.3.2 BASE UNIT CONTROL UNIT

14.3.3 ANTENNA ADJUSTMENT CONTROL UNIT

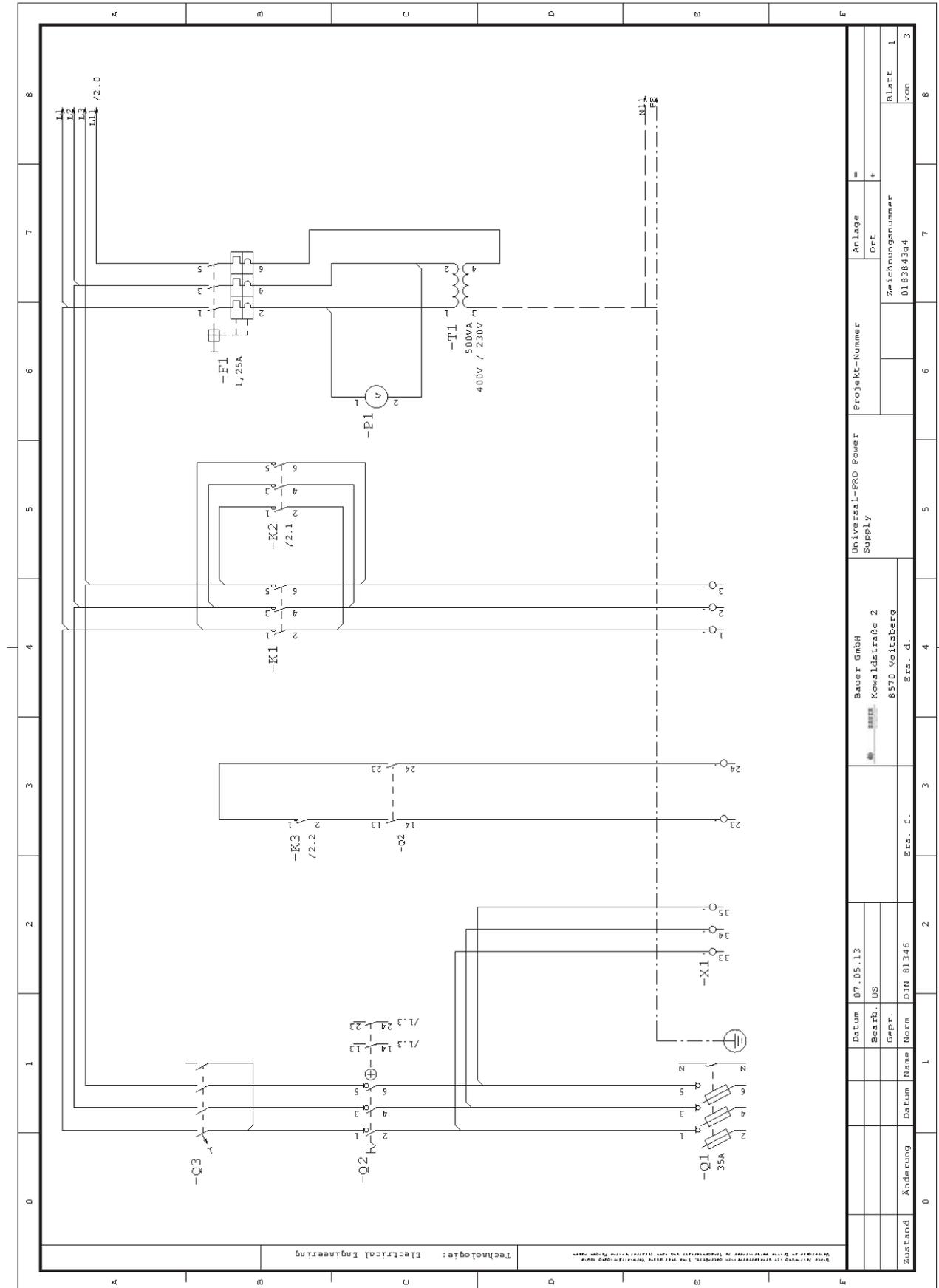
14.4 ANTENNA ADJUSTMENT CONTROL

14.5 CONNECTION DIAGRAM CAN BUS



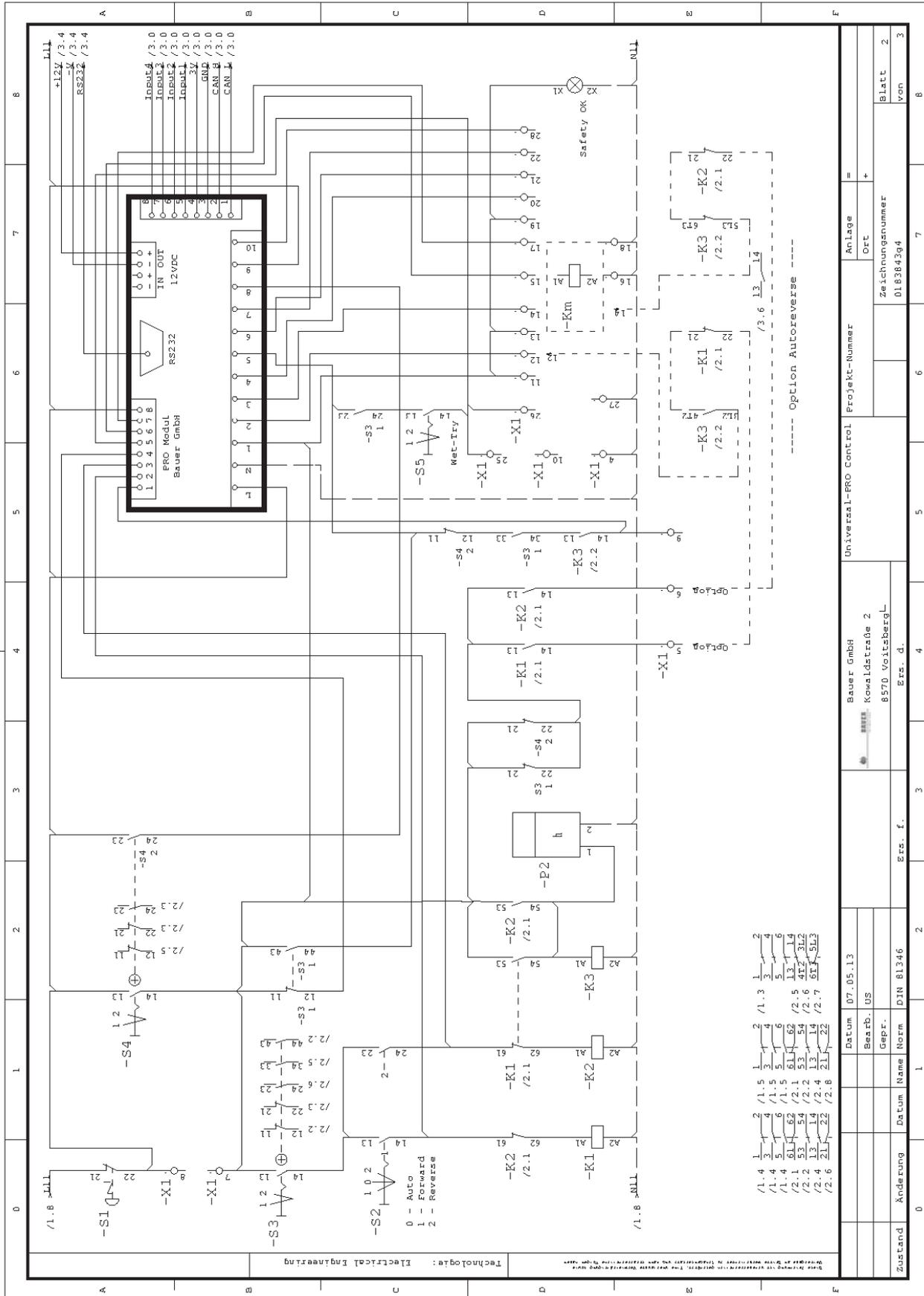
14.1 PIVOT CONTROL UNIT

14.1.1 CONTROL UNIT UNIVERSAL PRO-G - INFEEED





14.1.2 CONTROL UNIT UNIVERSAL PRO-G - CONTROL



Universal-PRO Control		Projekt-Nummer		Anlage	
Bauer GmbH		Kowaldstraße 2		Ort	
8570 Voitsberg		Zeichnungsnummer		Blatt	
Erst. d.		01.8384364		von	
				3	
				8	

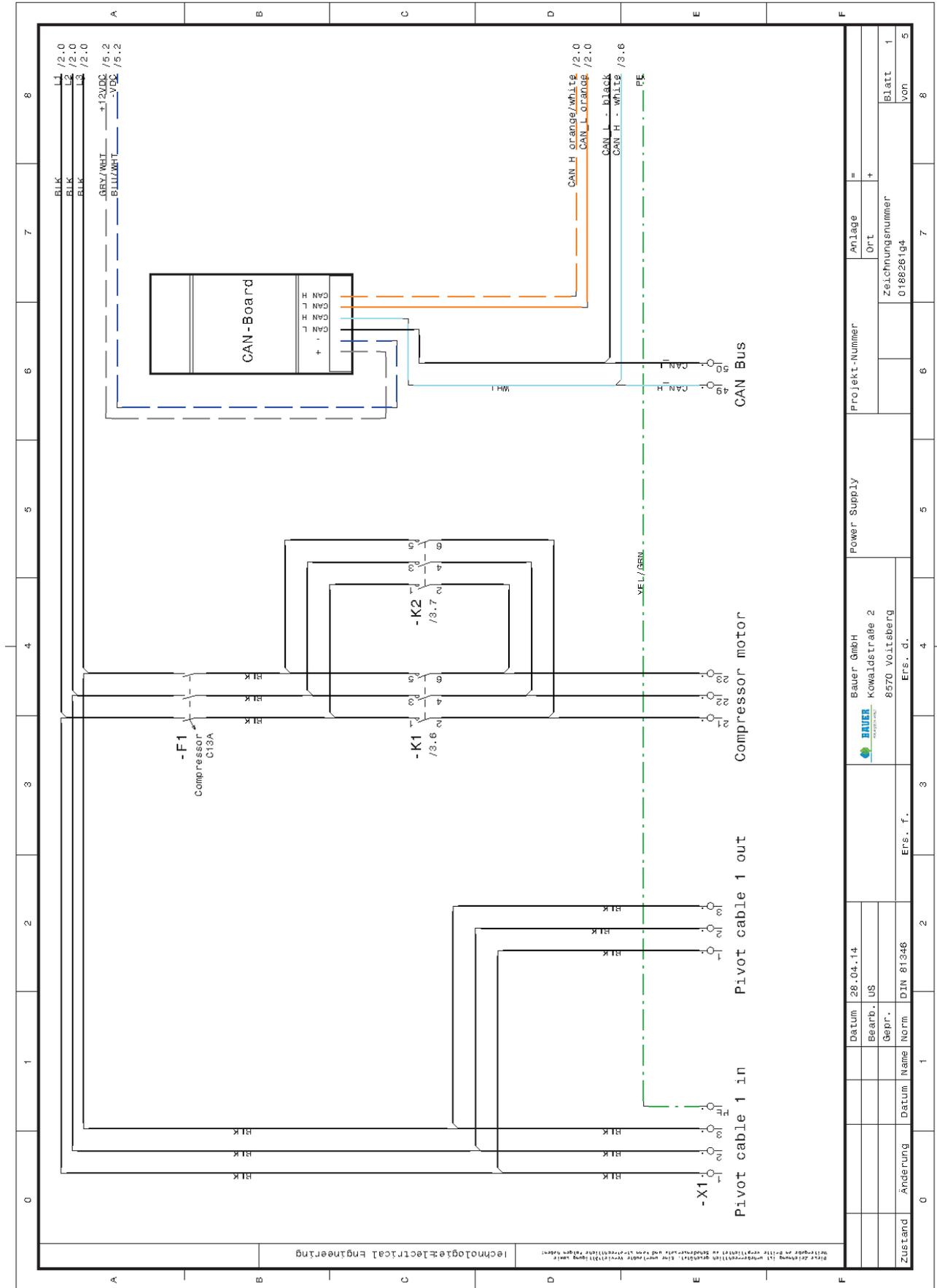


BAUER

FOR A GREEN WORLD

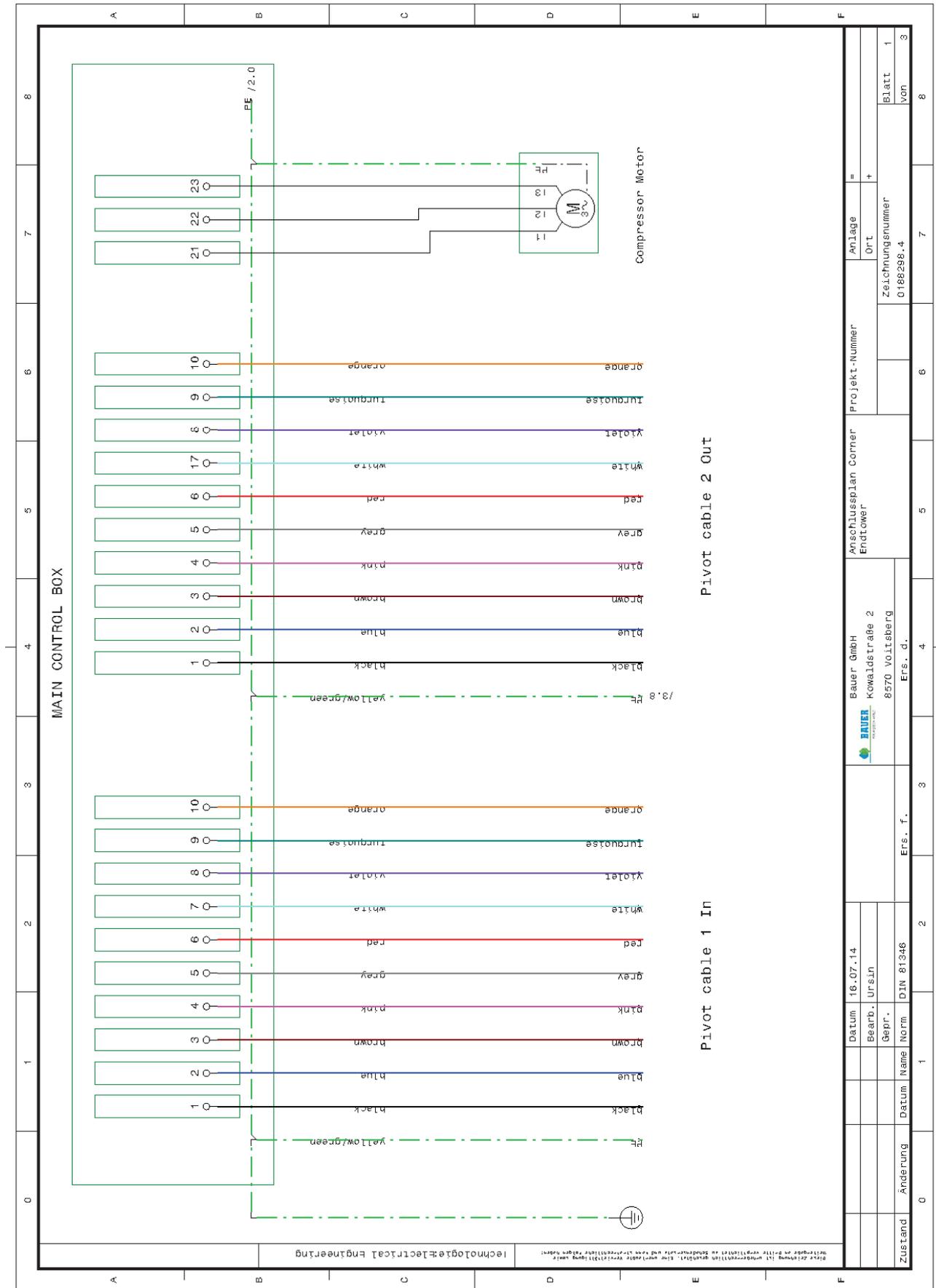
14.2 CORNER SPAN CONTROL UNIT

14.2.1 CORNER END TOWER CONTROL UNIT - INFEEED



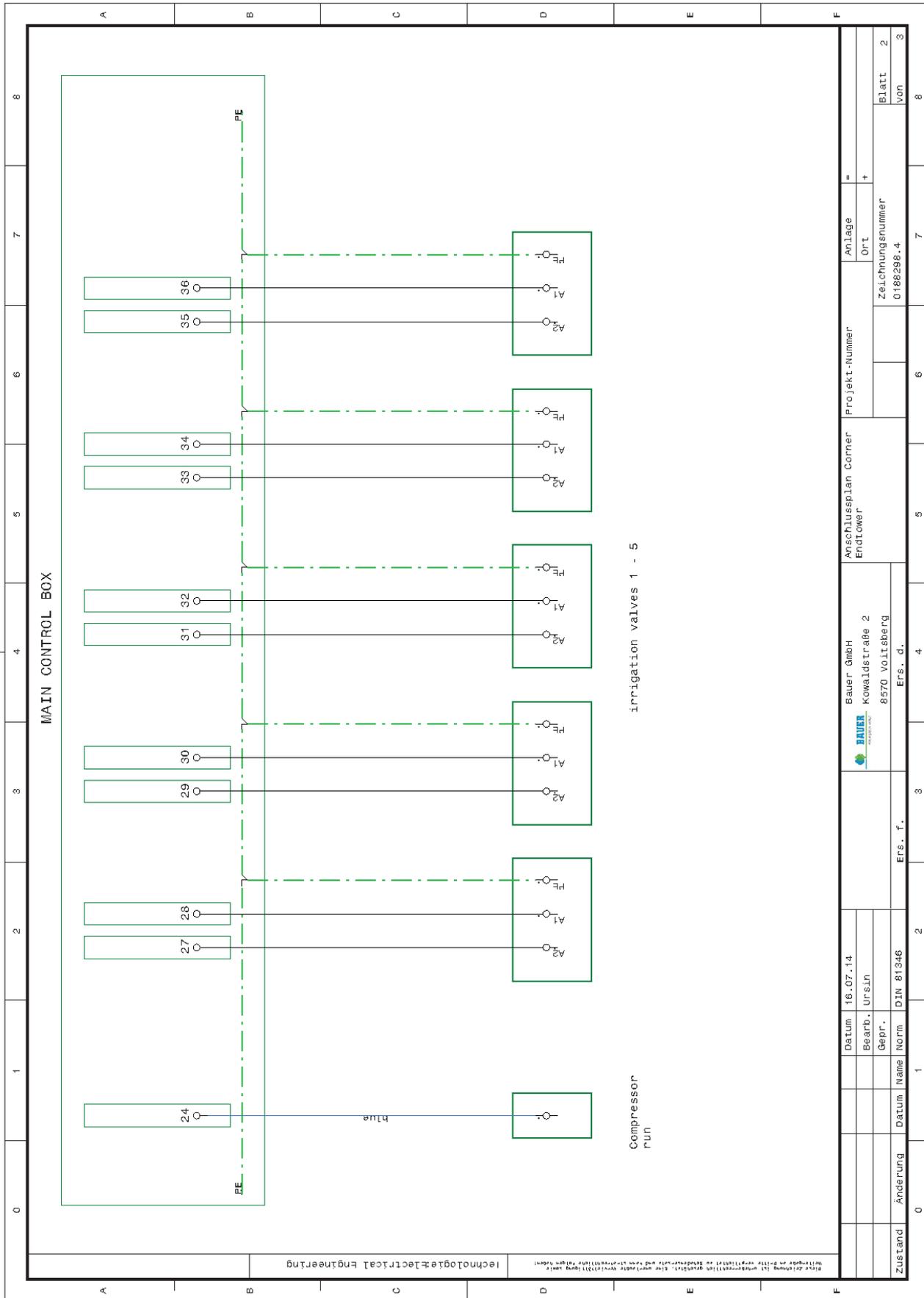


14.2.3 CORNER END TOWER CONTROL UNIT - WIRING DIAGRAM



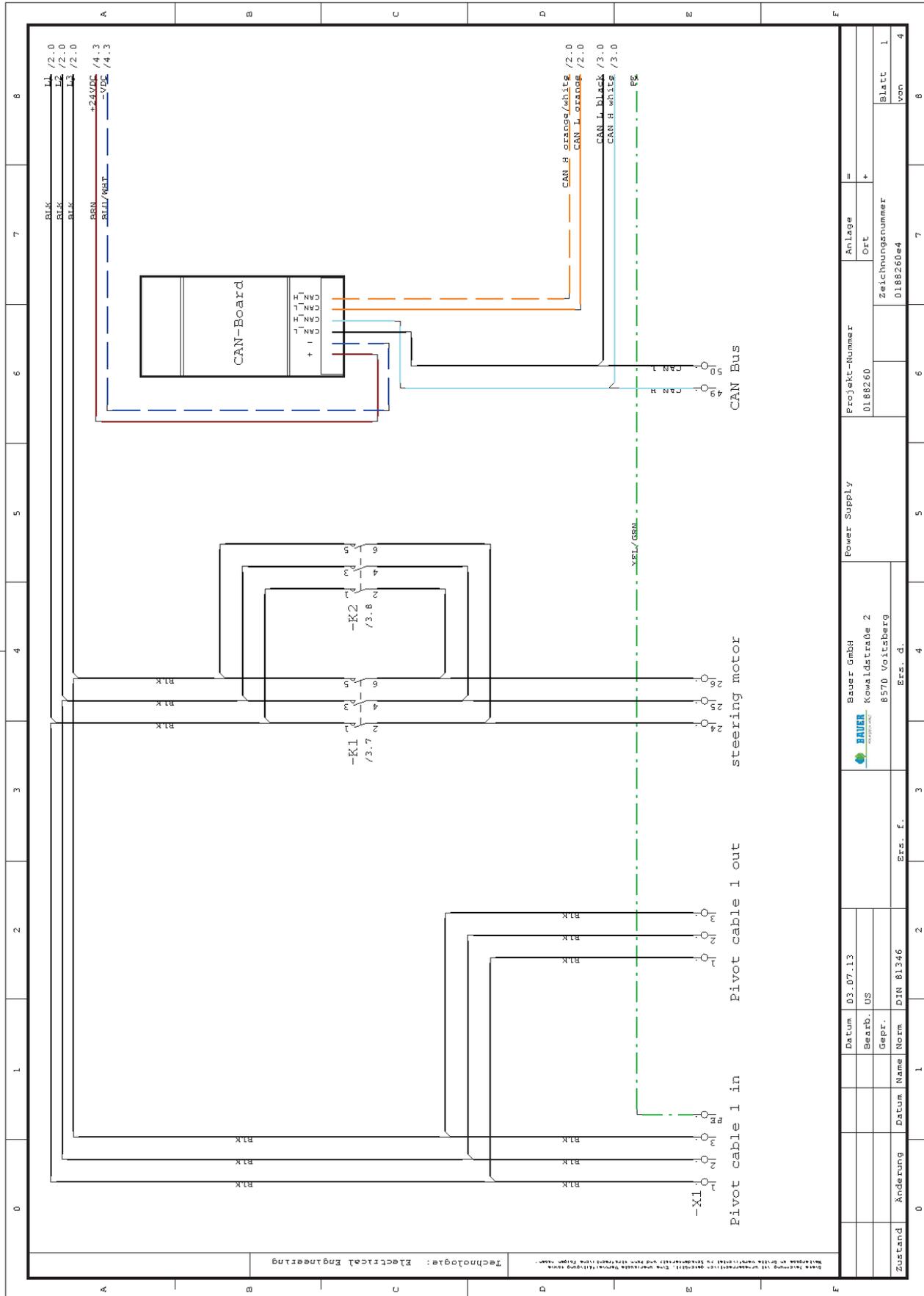


CORNER END TOWER CONTROL UNIT - WIRING DIAGRAM



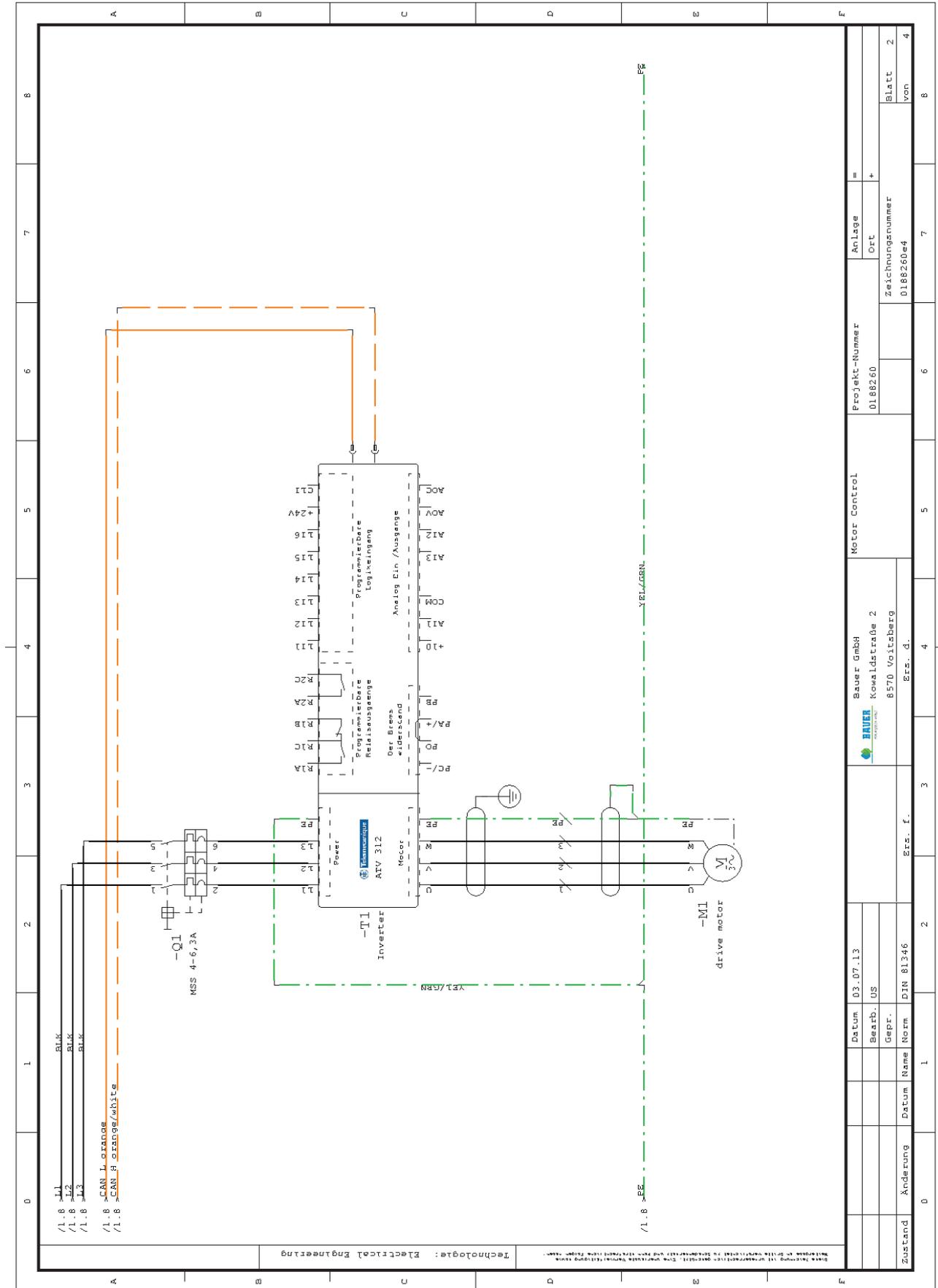


14.2.4 CORNER TOWER CONTROL UNIT - INFEED



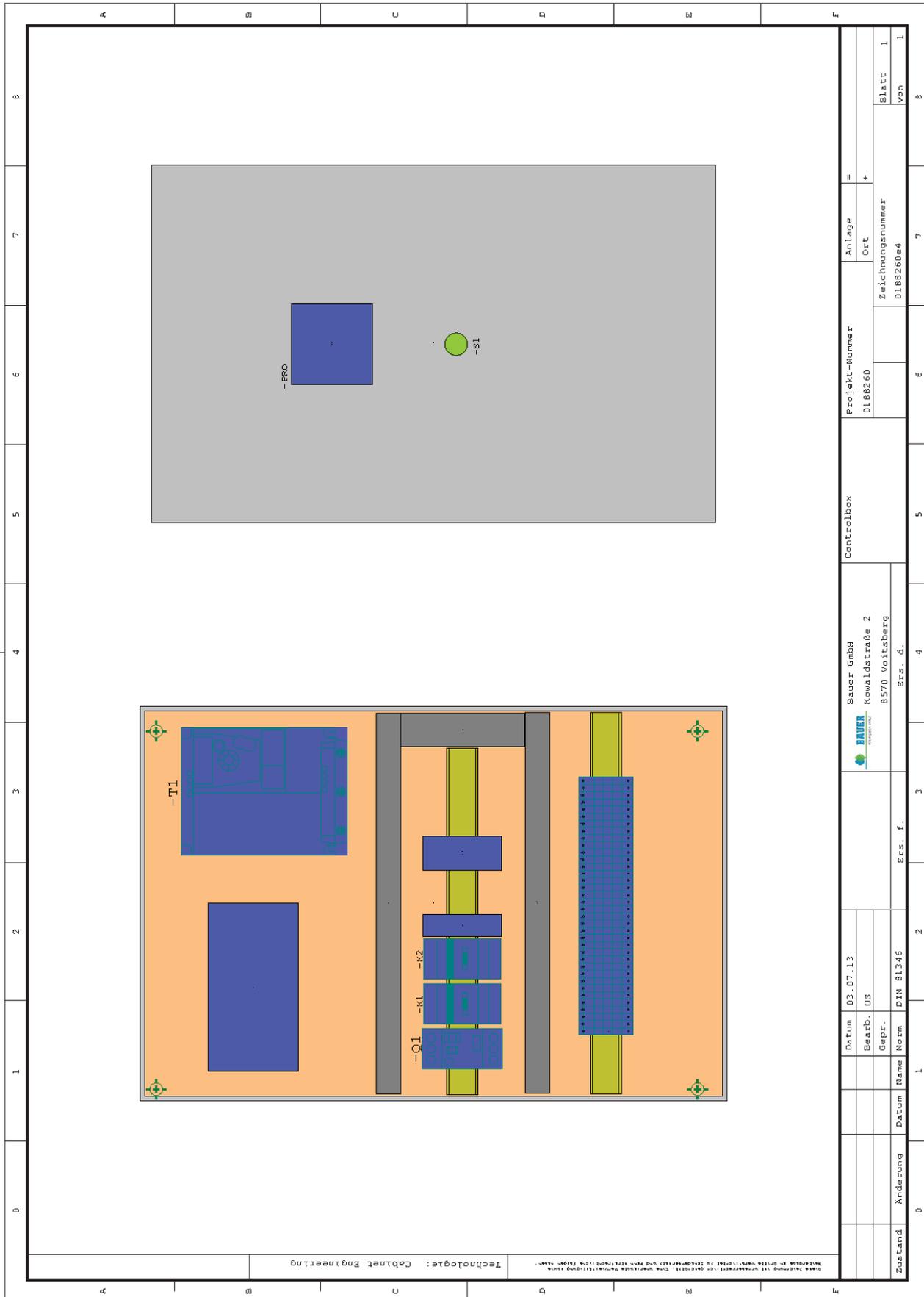


14.2.5 CORNER TOWER CONTROL UNIT – CONTROL



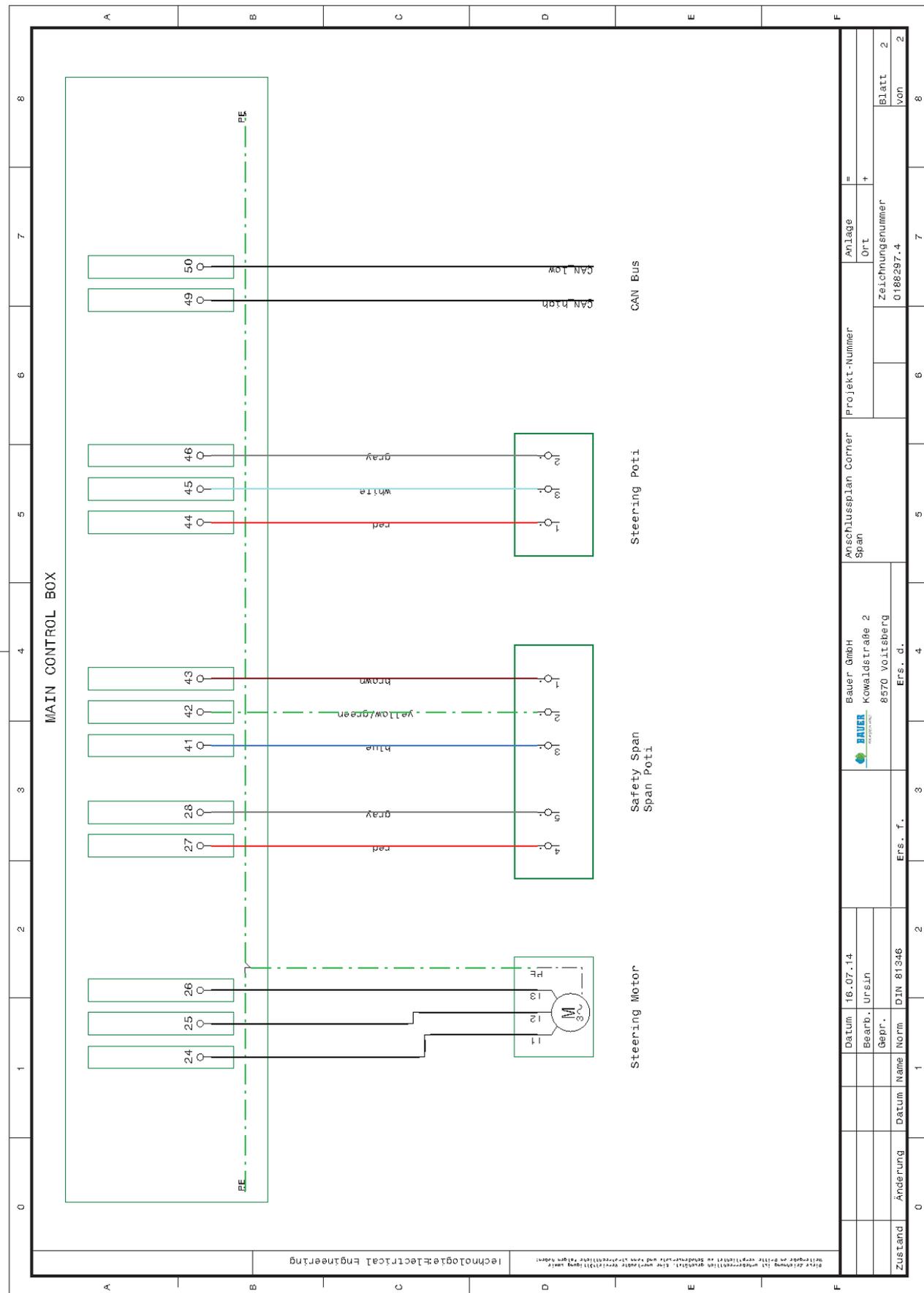


CORNER TOWER CONTROL UNIT – CONTROL





CORNER TOWER CONTROL UNIT - WIRING DIAGRAM

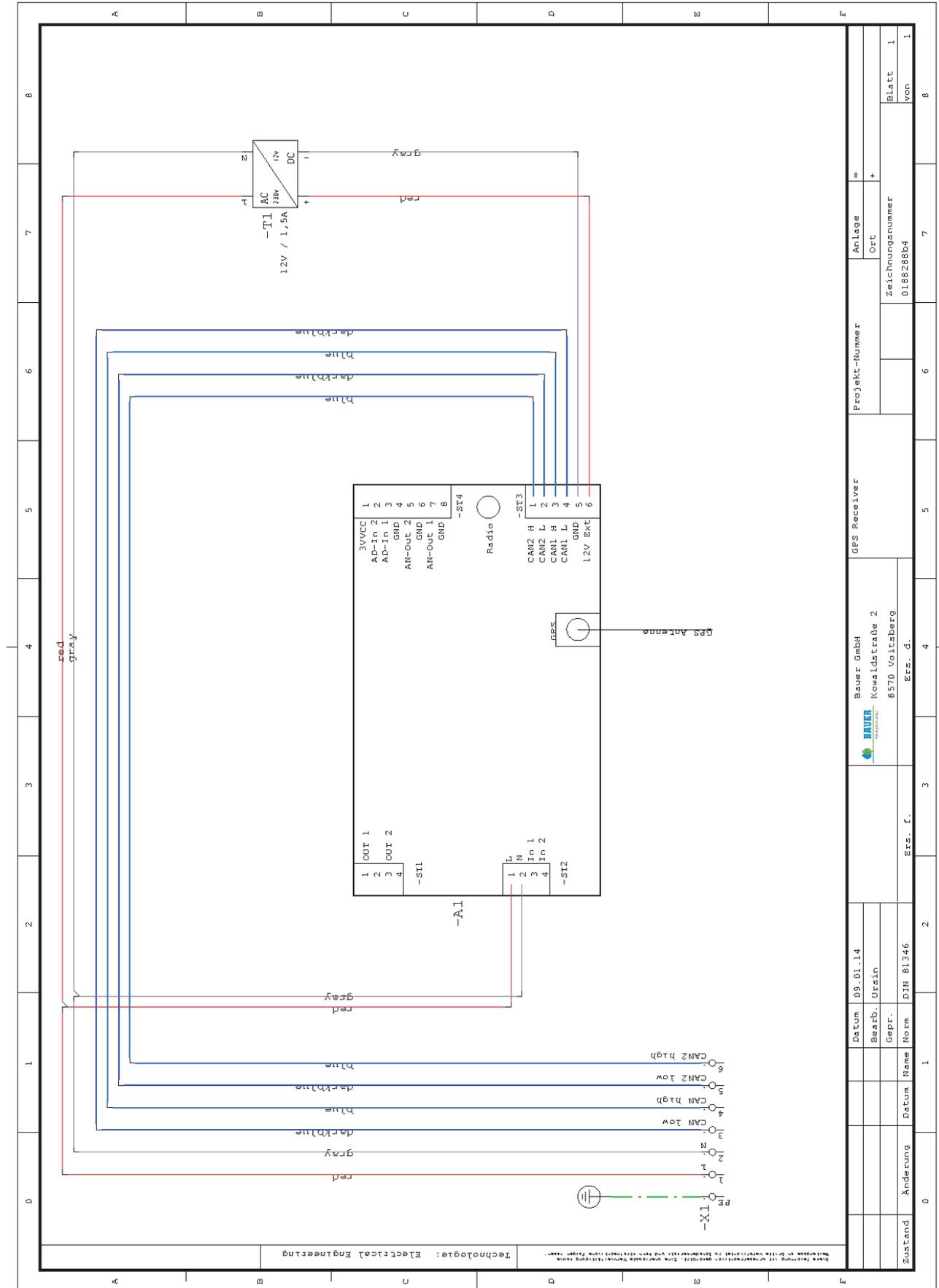


Zustand	Änderung	Datum	Name	IDIN	81346	Ers. f.		Ers. d.		Anschlussplan Corner Span		Projekt-Nummer	Anlage Ort	=	Blatt von	2
		16.07.14	UrsIn							Bauer GmbH Kowaldstraße 2 8570 Volzberg					0188297.4	2
			Gepr.													2
			Norm	DIN	81346											2



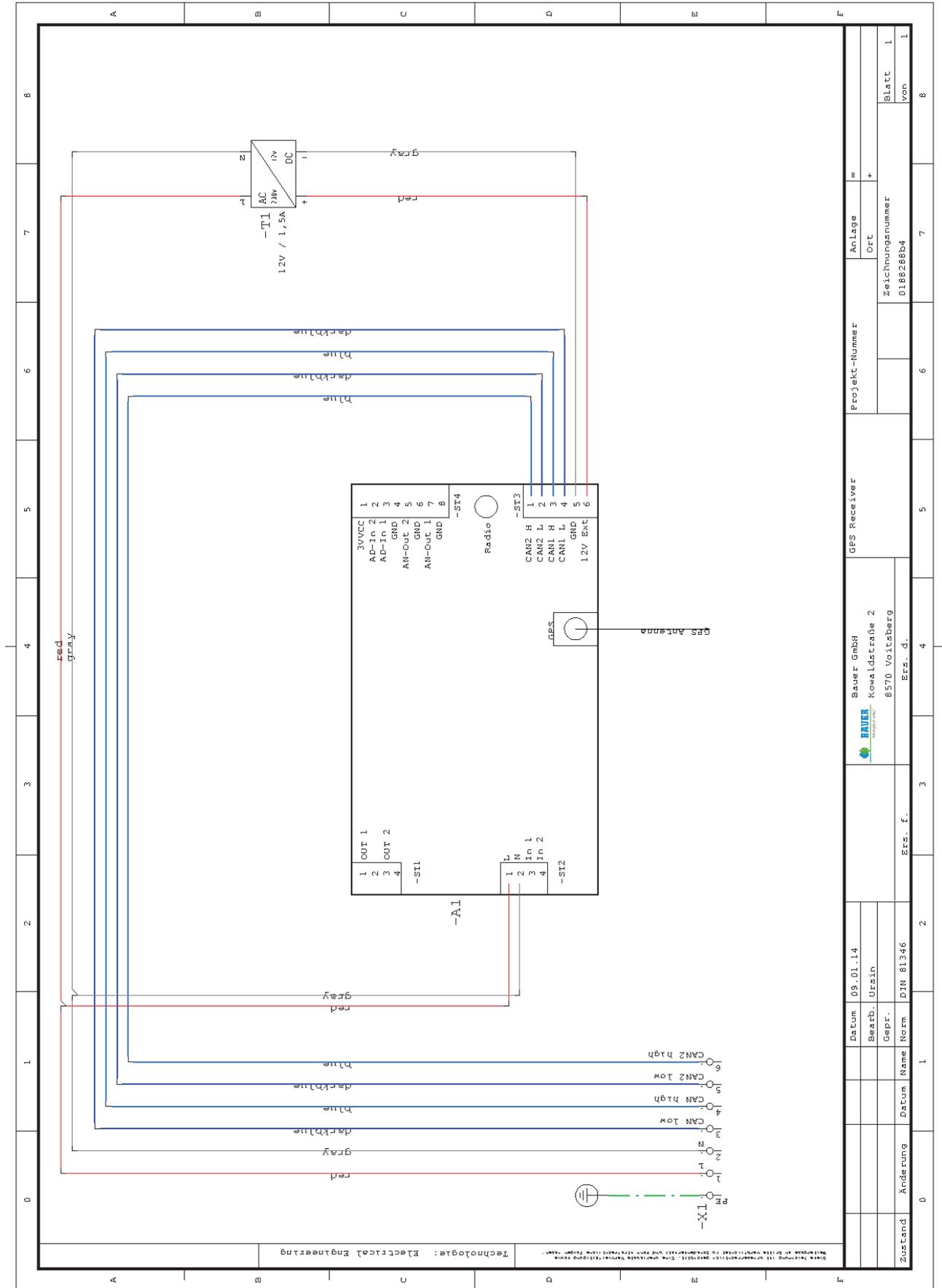
14.3 GPS CONTROL UNIT

14.3.1 ROVER UNIT CONTROL UNIT



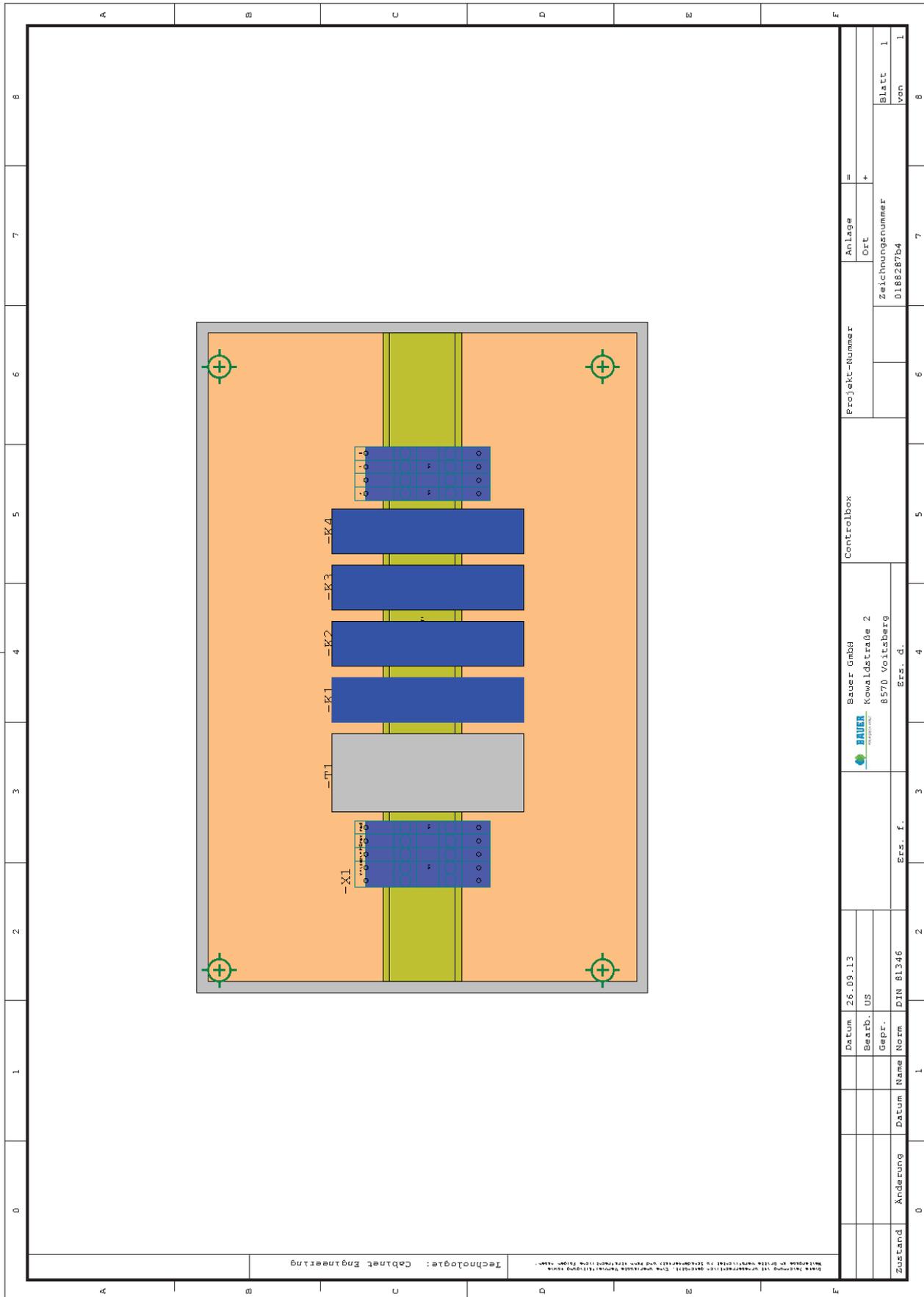


14.3.2 BASE UNIT CONTROL UNIT



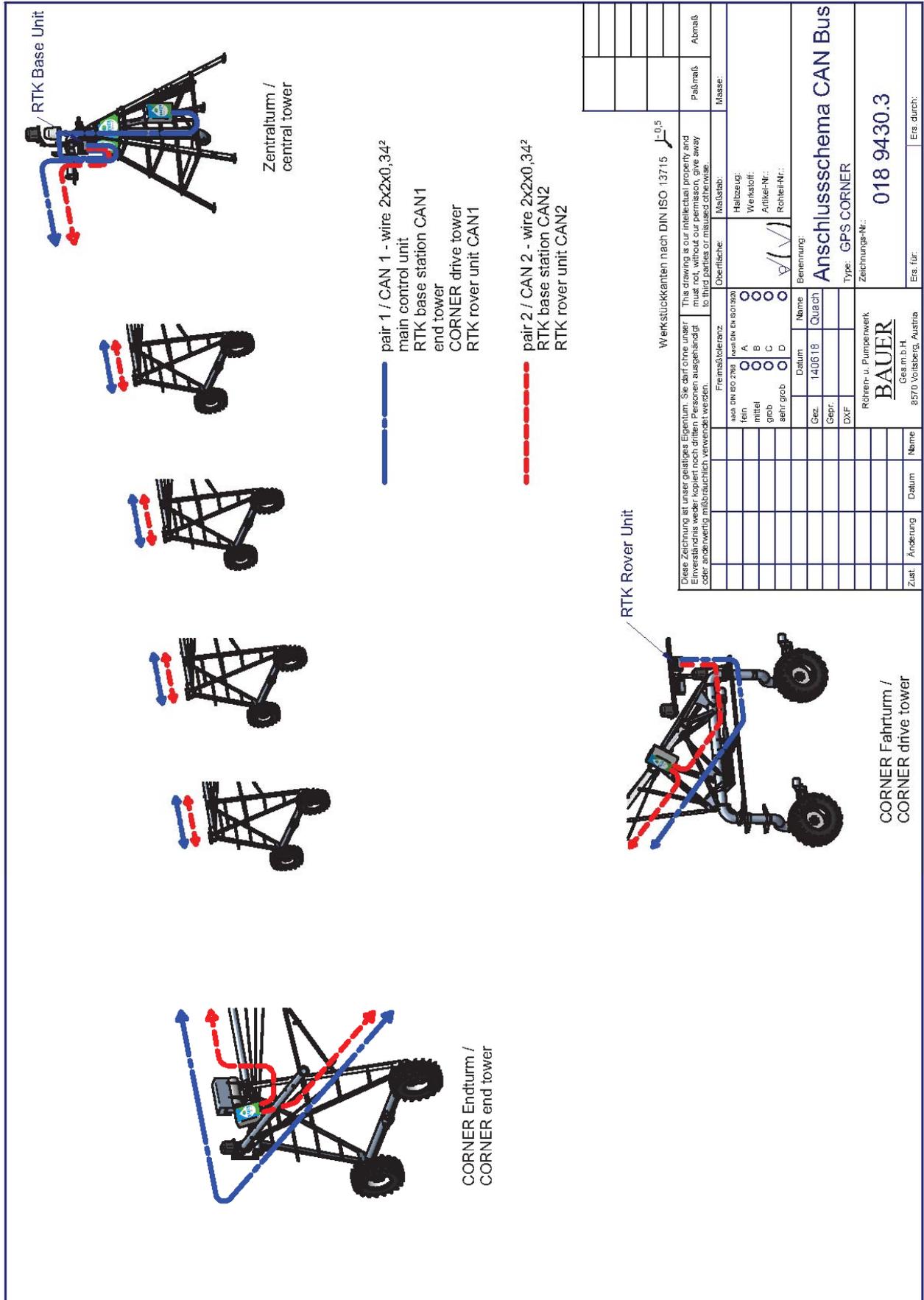


ANTENNA ADJUSTMENT CONTROL





14.4 CONNECTION DIAGRAM CAN BUS





15 Service – Proof

Has been done					
	Yes	No	Date	Operating hours	Proof for the accomplished service
Interim service					
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Annual service					

Has been done					
	Yes	No	Date	Operating hours	Proof for the accomplished service
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Oil change service					
Annual service					



Has been done					
	Yes	No	Date	Operating hours	Proof for the accomplished service
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Annual service					

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	Yes	No	Date	Operating hours	Proof for the accomplished service
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Oil change service					
Annual service					



Has been done					
	Yes	No	Date	Operating hours	Proof for the accomplished service
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Annual service					

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Oil change service					
Annual service					



Has been done					
	Yes	No	Date	Operating hours	Proof for the accomplished service
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Interim service					
Oil change service					
Annual service					



16 DECLARATION OF CONFORMITY

EC Declaration of Conformity

according to EC Directive 2006/42/EG

The manufacturer

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

herewith confirms that the machine mentioned below

Designation of machine **BAUER CORNER SYSTEM**
Machine type / basic units

corresponds analogously to the requirements of the Machinery Directive 2006/42/EG.

In case of 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 machinery - Basic concepts, general principles for design
Part 1: Basic terminology, methodology
DIN EN ISO 12100-2 Safety of machinery - Basic concepts, general principles for design
Part 2: Technical principles
DIN EN 60204-1 Safety of machinery - Electrical equipment of machines
Part 1: General requirements
EN ISO 14121-1 Safety of machinery - Risk assessment
Part 1: Principles
ÖNORM EN ISO 13857 Safety of machinery - Safety distances to prevent hazard zones being
reached by upper and lower limbs

Standards related to products

DIN EN 909 Agricultural and forestry machinery - Centre pivot and moving lateral
types irrigation machines - Safety

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

Technical Designer in Charge

Commercial Manager

Voitsberg, 16.01.2012