BAUER

FOR A GREEN WORLD

OPERATING MANUAL

for

BAUER CENTERSTAR 9000

133 EL, 168 EL, 168 E, 203 EL, 203 E,

Version: XII / 2013
850 9979

Centerstar 9000
Operating Manual
English

Introduction

Thank you for buying BAUER CENTERSTAR 9000 !

The present **manual** is a very important document that describes how to operate and service **BAUER CENTERSTAR 9000.**

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 CENTERSTAR 9000 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 CENTERSTAR 9000** !
Strictly observe all instructions pertaining to system handling, operation and service!
On this condition, **BAUER CENTERSTAR 9000** 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 CENTERSTAR 9000**. 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 CENTERSTAR 9000** in all inquiries, correspondence, warranty problems, or parts orders.

We wish you a lot of success with BAUER CENTERSTAR 9000 !

Owner of the machine

This machine with the serial number

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 CENTERSTAR 9000 .....**	
Serial number	**.....**	
Central tower	**fixed .....**	**towable .....**
Configuration of span	**.....**	
Spans	**fixed .....**	**towable .....**
Booster pump	**yes .....**	**no .....**
End rain gun	**yes .....**	**no .....**
Equipment	**.....**	
Comments	**.....**	
	.....	
	.....	
	.....	

Producer of the machine:

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Tel.: +43 3142 200 – 0
Fax: +43 3142 200–320 / -340
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www.bauer-at.com

Dealer:

Name: ……

Address: ……

……

Tel. / Fax: ……

Index

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.
EC Declaration of conformity (see Annex)

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

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

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

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

Product liability

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

Duty to furnish information

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

Intended use

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

2 WARNING SYMBOLS

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

1.

WARNING !

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

2.

WARNING !

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

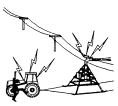
3.

WARNING !

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

4.

WARNING !



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

5.

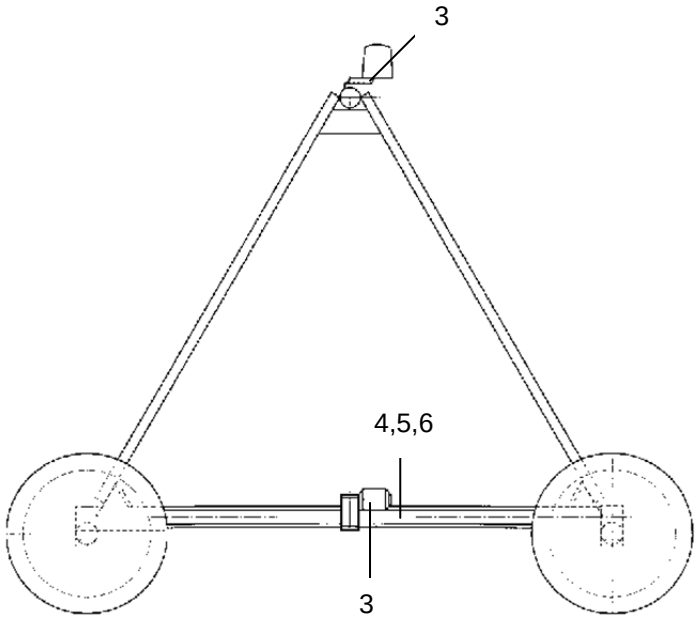
WARNING !

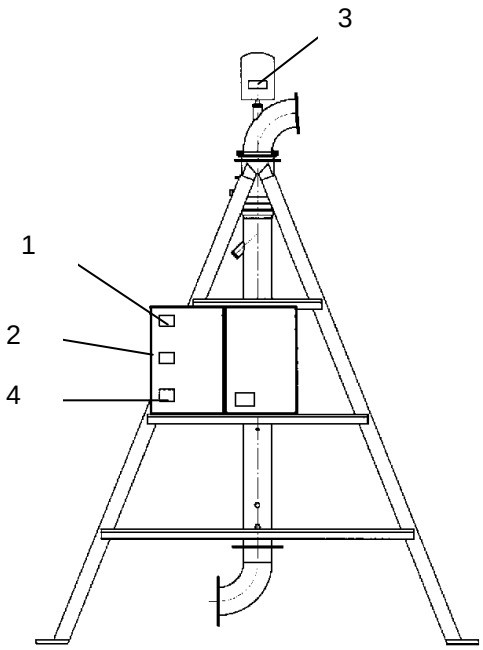
The system can start automatically. Always keep a safe distance from the towers.

6.

WARNING !

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





3 GENERAL

BAUER CENTERSTAR 9000 is an irrigation system rotating around a fixed centre (pivot tower) and thereby irrigating a full circle or a part circle.
The boom elements (towers, spans) are driven electrically.
The joints (tower couplings) mounted between the spans allow horizontal and vertical angular deviation between the individual boom elements so that the system can adjust perfectly to existing site conditions.
Electric alignment controls between the spans control the horizontal angular deviation and ensure that the system runs in a straight line.
Through varying spray nozzle set-ups and system speeds it is possible to tailor the water application exactly to all possible plant and soil requirements.

4 GENERAL INSTRUCTIONS FOR SAFETY AND ACCIDENT PREVENTION

Check the operational safety of the machine before every star.

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

Electrical system check-up

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

Maintenance

1. 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!
2. Check proper seat of nuts and screws regularly, and tighten them, if needed!
3. Dispose of oil, grease, and filters in accordance with regulations.
4. Always disconnect system from power before starting any work on the electrical system!
5. Before electrical welding on the system itself or built-on components, disconnect the mains or generator supply cable!
6. Spare parts must meet minimum technical requirements by the manufacturer of the device.! This is guaranteed by original equipment parts!

5 SAFETY PRECAUTIONS FOR CENTERSTAR 9000

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

5.1 GROUNDING

WARNING !

THE PIVOT SYSTEM MUST BE GROUNDED COMPLETELY!

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

5.2 ELECTRICAL SYSTEM

WARNING !

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

1. Before working on system electrical components, make sure the system is disconnected from all poles and sources.
2. Provide a lock-out at the main switch 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.

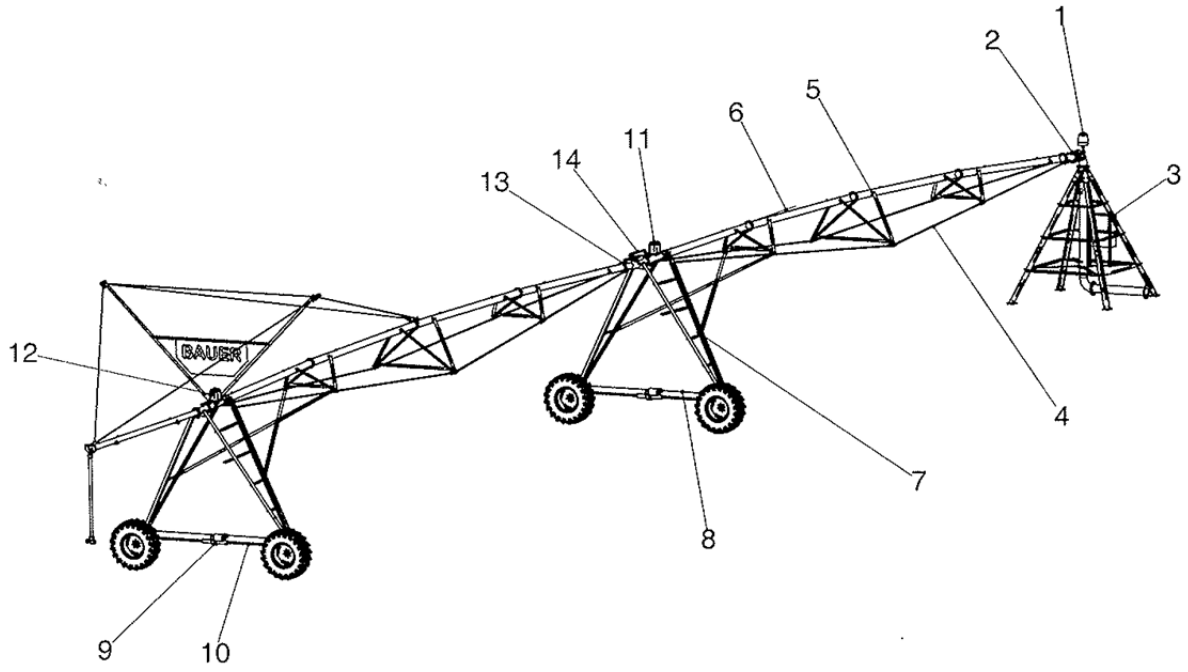
5.3 MECHANICAL SYSTEM

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 switch to “0” and lock the switch to prevent unintentional reclosing. Do not depend on others to disconnect the power – do it yourself!

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

6. TECHNICAL DESCRIPTION



1	Slip ring collector
2	Tower coupling
3	Pivot control unit
4	Truss rod
5	Bracing angle
6	Pipe
7	Tower brace
8	Wheel base
9	Driving motor
10	Drive shaft
11	Tower box
12	End control
13	Drive tower coupling
14	Transmission device

PIVOT COMPONENTS

PIVOT
Fixed centre of the system around which CENTERSTAR 9000 rotates.

PIVOT PANEL
System controlling and monitoring device

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

PIVOT COUPLING
Vertically movable joint between pivot and first span.

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.

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.

DRIVE MOTOR
Electric motor with reducing gear.

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

GEARBOX
Transmits the torque of the drive motor onto the wheels.

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

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

OVERHANG
Overhanging part from last tower to system end.

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

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

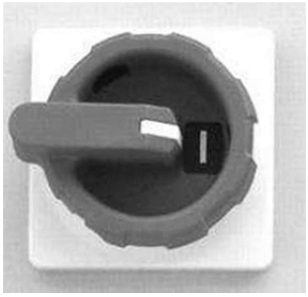
7 CONTROL UNITS

7.1 Control unit UNIVERSAL

Design and materials according to ÖVE and VDE standard, built-in components correspond with IEC standard as well as VDE specifications.

- Water-tight sheet steel cabinet (protection IP 54) with lockable front door and corrosion-resistant coating.
- Hinged control panel, can only be opened when main switch is switched off.
- High-voltage connection: 3 x 400 V/50 Hz + PEN, power source with grounded neutral conductor.
- Control voltage: 230 V single-phase
- Isolating transformer for control voltage
- Commercial-type industrial switching devices
- Cable connections with terminal ends
- Hinged control panel which can only be opened when main switch is off.

7.1.1 STANDARD BUILT-IN COMPONENTS



Q 2 **<u>Main switch</u>**

Power infeed to the machine in position "1" .
For safety reasons the hinged control panel (inner door) is locked.

Q 2 **<u>Main switch</u>**

In position "O" the main switch is fitted with a lock-out against unintentional reclosing.
The hinged control panel can only be opened in this switch position

P 1 Voltmeter

Indicates the voltage between the phases L1 and L2.

P 2 Hour meter

Shows the total hours the system has operated.

S 1 CENTERSTAR OFF/ON switch

When turned to "ON" position, the system can be started by pushing the buttons S2 or S3. If turned to “OFF” the system stops.

S 2 Illuminated "FORWARD START" pushbutton

Push this button to start the system in forward direction. The button is illuminated as long as the system is operating in forward run (clockwise).

S 3 Illuminated „REVERSE START“ pushbutton

Push this button to start the system in reverse direction. The button is illuminated as long as the system is operating in reverse run (counter-clockwise)

S 4 „SAFETY CIRCUIT ON-OFF“ switch

When turned “ON“, malfunction (e.g. doglegging) will shut off the entire system.

The “OFF” position serves **exclusively for system alignment.**

This switch MUST always be turned to “ON” while system is operating!
This is the only way to guarantee safety when system is operating unattended.

S 5 “WET-DRY“ switch

In the “WET” position, the system is shut down by means of a pressure switch mounted on the infeed water pipe (optional) when pressure drops below the limit. The “DRY” position allows to run the system dry (e.g. if the CENTERSTART has to be returned to its parking position dry without irrigating).

NOTE! This switch is effective in combination with the automatic stop option only !

S 6 “STOP IN SLOT ON-OFF“ switch

In “ON“ position, the system stops in the desired parking position. The parking position can be adjusted by shifting the momentary-contact limit switch on the infeed water pipe.

NOTE! This switch is only effective in combination with the AUTOMATIC STOP option!

K 4 Percentage timer "SPEED"

Speed adjustment.
The percentage timer is used to define the end tower run time per minute and thus control the rotating speed of the pivot.

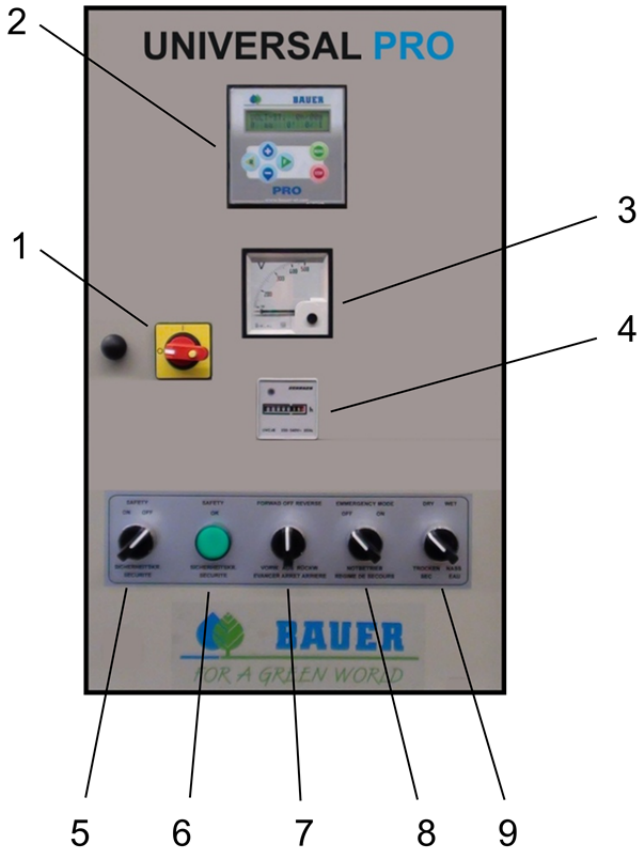
Setting the rotary button at 50 % therefore means that the end tower will run for 30 seconds and stand still for 30 seconds in one minute. This setting can be corrected any time during the run.

7.2 CONTROL UNIT UNIVERSAL PRO

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

- Waterproof polyester box (protection class IP 54) with lockable front door.
- 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 control unit always locked during operation in order to prevent impurity and splash water**



1. Main switch
2. Panel UNIVERSAL PRO
3. Voltmeter
4. Hourmeter
5. Switch safety circuit „ON – OFF“
6. Luminous push button „safety circuit”
7. Switch “FORWARD – OFF – REVERSE”
8. Switch „EMERGENCY MODE OFF-ON
9. Switch „WET – DRY“
10. EMERGENCY STOP switch (not shown on the picture)

7.2.1 STANDARD BUILT-IN COMPONENTS

7.2.1.1 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.

7.2.1.2 . CONTROL PANEL UNIVERSAL PRO

7.2.1.2.1 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).

7.2.1.2.2 FUNCTION/MENU BUTTONS

START FORWARD (F)	Start the Pivot forward (clockwise)
START REVERSE (R)	Start the Pivot backwards (anti-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)** stop operation and multi–usage of this button for operating at the technician level and for saving and leaving the programming modus.

+ 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.

WARNING: For a detailed functional description of the control panel UNIVERSAL PRO, see the operating instructions under separate cover.

7.2.1.3 VOLTMETER
Indicates the voltage between phases L1 and L2.

7.2.1.4 HOURMETER
Shows the total hours the machine has operated.

7.2.1.5 SWITCH "SAFETY CIRCUIT ON – OFF"
When turned “ON“, malfunction (e.g. doglegging) will shut off the entire system.
The “OFF” position serves exclusively for system alignment by a qualified operator. **This switch MUST always be turned to “ON” while system is operating!!**
This is the only way to guarantee safety when system is operating unattended.

7.2.1.6 LUMINOUS KEY "SAFETY CIRCUIT"
Is lit when the "SAFETY CIRCUIT ON – OFF" switch is in "OFF" position.
Is lit when the "SAFETY CIRCUIT ON – OFF" switch is in "ON" position and the machine is not in the safety circuit.

7.2.1.7 SWITCH "EMERGENCY MODE OFF – ON"
In "ON" position, the machine will be run in emergency mode in the event of a failure of the Pro Module.
When operating the machine with the Pro Module, this switch must be in "OFF" position.

7.2.1.8 SWITCH "FORWARD – REVERSE"
In emergency mode, the machine will be started forward (clockwise rotation) in switch position "FORWARD" and it will be started reverse (counter-clockwise rotation) in switch position "REVERSE".

7.2.1.9 SWITCH "WET – DRY"
In emergency mode, an irrigation run at maximum speed will be made in "WET" position and a dry run also at maximum speed will be made in "DRY" position (machine speed cannot be changed in emergency mode).

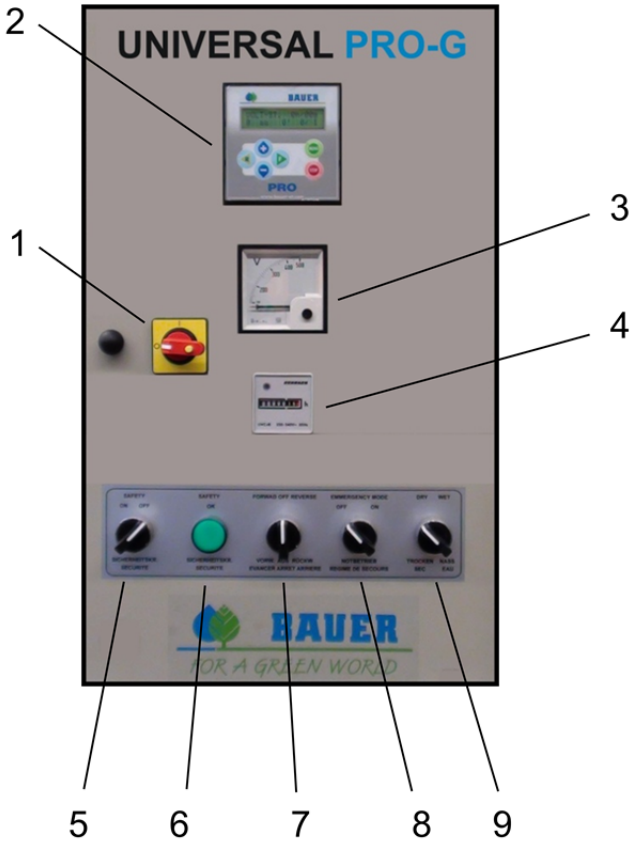
7.2.1.10 "EMERGENCY STOP" BUTTON
This switch serves to interrupt the voltage supply to the control unit (not shown on the picture).

7.3 CONTROL UNIT UNIVERSAL PRO - G

Design and materials in accordance with ÖVE and VDE standards, built-in components in accordance with IEC standards as well as VDE regulations.

- Waterproof polyester box (protection class IP 54) with lockable front door.
- 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 devices

WARNING! Keep 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. Hourmeter
5. Switch safety circuit „ON – OFF“
6. Luminous push button „safety circuit”
7. Switch “FORWARD – OFF – REVERSE”
8. Switch „EMERGENCY MODE OFF-ON
9. Switch „WET – DRY“
10. EMERGENCY STOP switch (not shown on the picture)
11. GPS unit (not shown on the picture)

7.3.1 STANDARD BUILT-IN COMPONENTS

7.3.1.1 MAIN SWITCH

The main switch turns off or on the entire power supply.
In position **„I“** the electrical supply of the machine 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.

7.3.1.2 CONTROL PANEL UNIVERSAL PRO - G

Programming of up to 6 sectors with individual precipitation rates is possible.

7.3.1.2.1 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 (adjustable timer for background lighting).

7.3.1.2.2 FUNCTIONS / MENU BUTTONS

START FORWARD(F)	Start the Pivot forwards (clockwise)
START REVERSE(R)	Start the Pivot backwards (counter-clockwise)
MENU and **ENTER**	By pressing this key you get to the operator level – double usage for entering the programming mode of a parameter and for acknowledging an entry.
STOP (ESC and machine)	Stop 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.

WARNING: For a detailed functional description of the control panel UNIVERSAL PRO-G, see the operating instructions under separate cover.

7.3.1.3 VOLTMETER
Indicates the voltage between phases L1 and L2.

7.3.1.4 HOURMETER
Shows the total hours the machine has operated.

7.3.1.5 SWITCH "SAFETY CIRCUIT ON – OFF"
When turned “ON“, malfunction (e.g. doglegging) will shut off the entire system.
The “OFF” position serves exclusively for system alignment by a qualified operator. **This switch MUST always be turned to “ON” while system is operating!!**
This is the only way to guarantee safety when system is operating unattended.

7.3.1.6 LUMINOUS KEY "SAFETY CIRCUIT"
Is lit when the "SAFETY CIRCUIT ON – OFF" switch is in "OFF" position.
Is lit when the "SAFETY CIRCUIT ON – OFF" switch is in "ON" position and the machine is not in the safety circuit.

7.3.1.7 SWITCH "EMERGENCY MODE OFF – ON"
In "ON" position, the machine will be run in emergency mode in the event of a failure of the Pro Module.
When operating the machine with the Pro Module, this switch must be in "OFF" position.

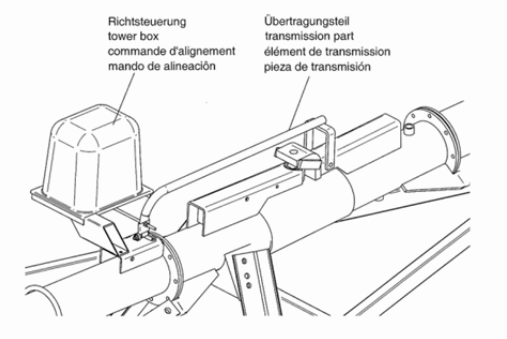
7.3.1.8 SWITCH "FORWARD – REVERSE"
In emergency mode, the machine will be started forward (clockwise rotation) in switch position "FORWARD" and it will be started reverse (counter-clockwise rotation) in switch position "REVERSE".

7.3.1.9 SWITCH "WET – DRY"
In emergency mode, an irrigation run at maximum speed will be made in "WET" position and a dry run also at maximum speed will be made in "DRY" position (machine speed cannot be changed in emergency mode).

7.3.1.10 "EMERGENCY STOP" BUTTON
This switch serves to interrupt the voltage supply to the control unit (not shown on the picture).

7.3.1.11 GPS UNIT
GPS unit for absolute position recognition, mounted at the outermost tower (not shown on the picture).

7.4 TOWER BOX

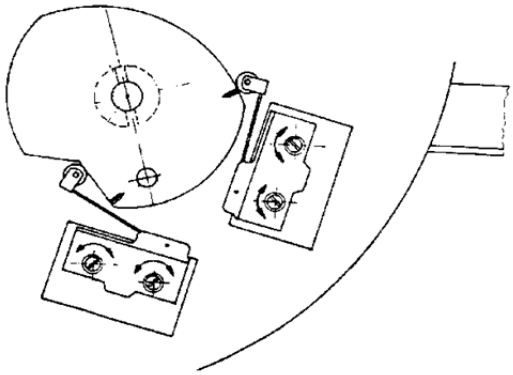


- The alignment control guarantees that the pivot runs in as straight a line as possible. .
- Therefore it is of utmost importance to set and maintain the switching elements properly.
- In addition to the micro switches, an RC safety element is mounted which compensates peak voltages and protects the switchgear
- Operating voltage 400 V, control voltage 230 V / 50Hz

7.4.1 MICROSWITCH ADJUSTMENT

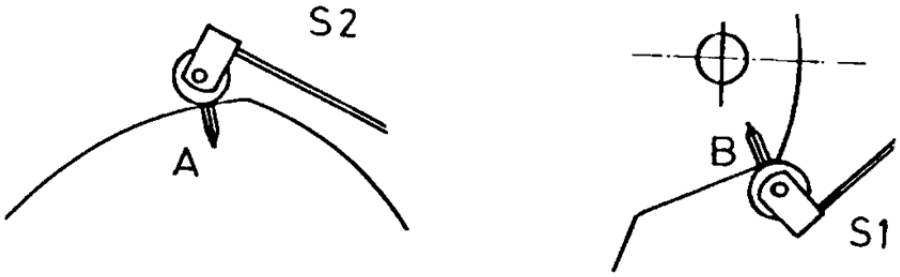
If a new micro switch (control or safety switch) is mounted in a tower box, it must be set precisely at the correct working position.
DISCONNECT the ENTIRE SYSTEM from power before starting the installation. Disconnect the electrical connections, remove the defective switch and replace it by a new one. Connect electrical cables again. Set the micro switches according to the instructions below:

a) Loosen the screws.



b) To set the control switch, rotate the switching cam until the roller rests in the notch “A”. Adjust the switch in the boltholes towards the switching cam until the control switch (micro switch) actuates (clicks). Thereby the bracket of the switch lies near the switch housing.

c) To set the safety switch, rotate the switching cam until the roller rests in notch “B”. Move the switch to the cam until you hear the switching actuating (click).



d) Tighten the screws.

e) Check the switching points, repeat the setting procedure, as needed.

7.5 **TERMS**

Forward
Seen from above the CENTERSTAR is travelling clockwise.

Reverse
Seen from above the CENTERSTAR is travelling counter-clockwise.

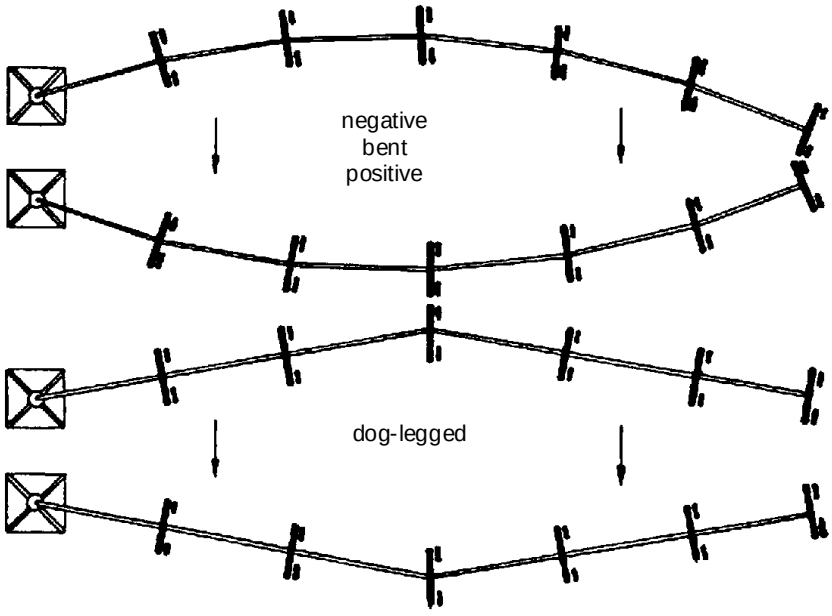
Inward
towards the pivot

Outward
towards the end tower

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

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

Doglegging
Occurs when one tower slows down or stands still or travels ahead of the other towers.

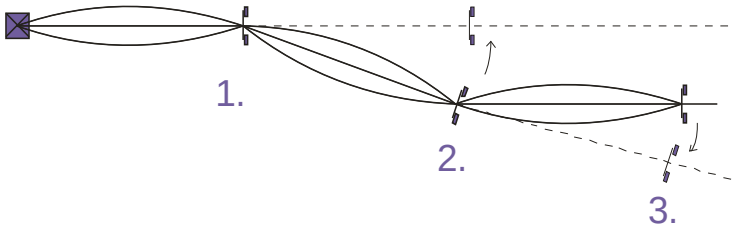


7.6 ALIGNMENT OF TOWERS AFTER INSTALLATION

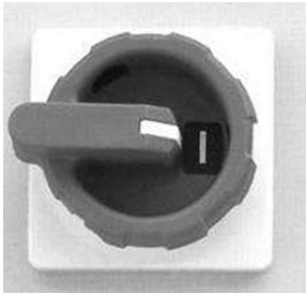
If the system is not exactly aligned after installation – that means the assumed connecting line of all driving motors with the pivot centre is not a perfectly straight line - then the system must be realigned according to the instructions below.

WARNING: The following instructions refer to the control units ***UNIVERSAL, UNIVERSAL PRO & UNIVERSAL PRO-G.***

7.6.1 ALIGNMENT OF TOWERS WITHOUT TOWER ALIGNMENT SWITCH



1. Turn "SAFETY CIRCUIT" / "SICHERHEITSKREIS" switch to "OFF".



2. Turn main switch to "1".

3. Turn the CENTERSTAR switch to "ON" (only for *UNIVERSAL* control unit).

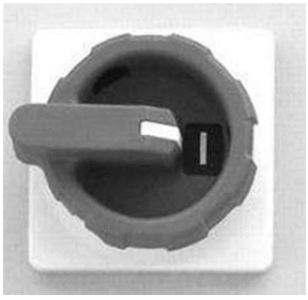
4. In order to avoid mechanical overload of the span after installation, operate the system in every direction for ca. 20 – 30 seconds by means of the push buttons "FORWARD START" *(UNIVERSAL)* and/or "FORWARD" and "REVERSE START" *(UNIVERSAL)* and/or "REVERSE":

5. Alignment of the system explained by means of the above sketch.
   - 5.1. Keep "FORWARD START" and/or "FORWARD" pressed until *span 3* and *span 2* are in a straight line. The drive motors of *towers 3, 2* and *1* are in alignment. A second person is needed for alignment.
   - 5.2. Release "FORWARD START" and/or "FORWARD".
   - 5.3. Adjust the alignment control on *span 2* according to the instructions (see ***7.6.3 TOWERBOX ADJUSTMENT***).
   - 5.4. Keep „REVERSE START“ and/or „REVERSE“ pressed until *span 2* and *span 1* are in a straight line.
   - 5.5. Release „REVERSE START“ and/or „REVERSE“.
   - 5.6. Adjust the alignment control on *span 1* according to the instructions (see ***7.6.3 TOWERBOX ADJUSTMENT***).

7.6.2 ALIGNMENT OF TOWERS WITH TOWER ALIGNMENT SWITCH

1. Turn "SAFETY CIRCUIT" / "SICHERHEITSKREIS" switch to "OFF".

WARNING!	The "SAFETY CIRCUIT" switch in "OFF" position takes the safety system out of operation. If the switch is in "OFF" position during operation, it may damage the system.



2. Turn main switch to "1".

3. Turn the CENTERSTAR switch to "ON" (*only for UNIVERSAL control unit*).

4. Turn the "EMERGENCY MODE" switch to position "ON" (*only for UNIVERSAL PRO & PRO-G control unit*).

5. Turn the “FORWARD - OFF - REVERSE” switch to “FORWARD” or to “REVERSE” in order to start the system in the desired direction (*only for UNIVERSAL PRO & PRO-G).*

6. Actuate the tower alignment switches in order to align the towers with the pivot centre (sight over the drive motors).

NOTE!	In order to avoid mechanical overload on the trussing, align the system step by step from the system end. In the end, the assumed connecting line between all tower motors and the pivot centre must be perfectly straight.

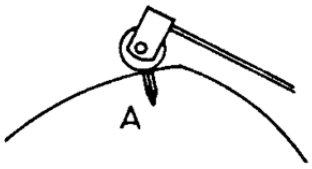
7.6.3 TOWERBOX ADJUSTMENT

WARNING!	Make sure yourself that the main switch Q2 is set at “0”. Secure the switch against reclosing with a padlock on the switch or lock the control box door against unintentional reclosing.

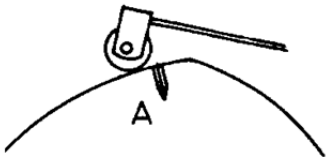
Before this adjustment can be done, the spans must be aligned in a straight line.
If this is the case, use the bolts on the threaded rod to adjust the operating cam until the roller of the control switch is positioned exactly in the middle between switching point (notch A) and reversing point (between the two clicks).
This guarantees the same control angle both in FORWARD and REVERSE run.

The micro switches are adjusted according to the instructions below.

1. Rotate the operating cam by turning the hex. nut on the threaded rod until the control switch lies in the notch “A” and actuates.

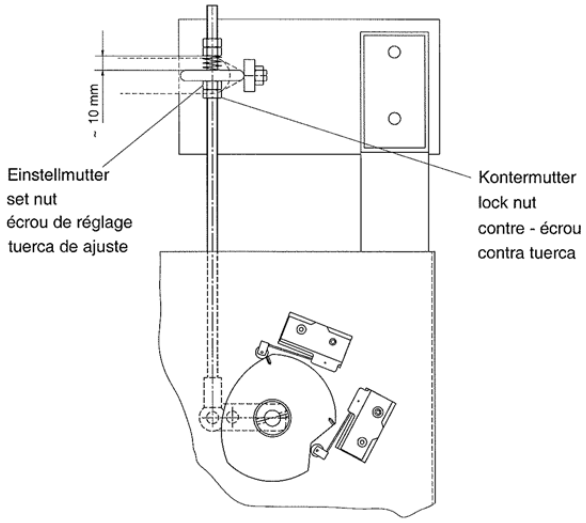


2. Rotate the operating cam clockwise to the reversing point of the control switch, counting the number of rotations of the hex. nut or wrench turns.



3. Turn back the operating cam by half of the nut or wrench rotations counted under point 2 above - the roller is positioned exactly in the middle between switching and reversing point of the control switch.

4. Secure the set nut on the threaded rod with the locknut. Adjust both other nuts in such a way that the spring is pretensioned about 10 mm.



7.7 **ALIGNMENT CHECK-UP**

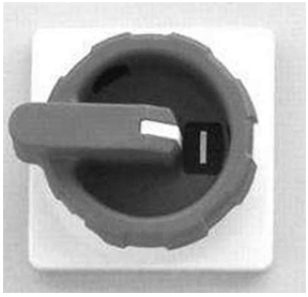
The CENTERSTAR is properly aligned if a positive bow of the same size forms in both directions of rotation.

Forward travel

Reverse travel

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

7.7.1 ALIGNMENT OF THE SYSTEM – CONTROL UNIT UNIVERSAL



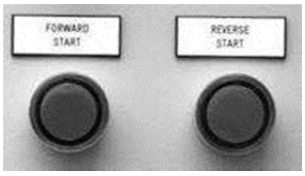
1. Turn main switch Q2 to "1".

2. Turn "SAFETY CIRCUIT" switch "ON".

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

3. Set the rotary percentage timer at the desired value.
   The speed and the appropriate precipitation can be taken from the charts supplied with the pivot system.

4. Turn "CENTERSTAR ON - OFF" switch to "ON".



5. Press the green "FORWARD START" or "REVERSE START" pushbutton and hold it depressed until the electric switch audibly actuates and the towers start moving.

6.

a) Check, if the driving motor of the first tower is located **in front of** an assumed connecting line between the drive motor of the second tower and the pivot centre. If this is not the case, the tower box on the first tower must be readjusted as follows: Loosen the hex. nuts and turn the threaded rod until the above requirement is fulfilled. (See also ***7.6.3 Towerbox adjustment***)

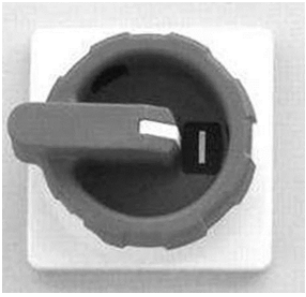
b) The next step is to check if the drive motor of the second tower is positioned **in front of** an assumed connecting line between the drive motor on the third tower and the pivot centre. If this is not the case correct the tower box on the second tower.

c) Now check all towers step by step as described under a) and b) above. Re-adjust tower boxes, as needed. At the end of this procedure the CENTERSTAR should form a positive bow, which means that the middle towers must be positioned in front of an assumed connecting line between end tower and pivot centre.

7. Turn "CENTERSTAR OFF - ON" switch to “OFF".

8. Turn main switch switch to "O".

7.7.2 ALIGNMENT OF THE SYSTEM – CONTROL UNIT UNIVERSAL PRO



1. Turn main switch to position "1".

2. Turn switch "Safety circuit ON – OFF" to position "ON".

3. Turn the "EMERGENCY MODE" switch to position "OFF".

4. Turn the "WET – DRY" switch to the requested position according to the required operating mode.

5. Control panel
   - Press key "FORWARD" and/or "REVERSE".
   - Press key "+" to set a higher precipitation rate.

6.

a) Check if drive motor of 1st drive tower is before the imagined connection line between drive motor of 2nd drive tower and middle of central tower. If not, adjust the alignment control at the 1st drive tower as follows: Unfasten nut and twist thread rod until the above mentioned claim is met. (See also ***7.6.3 Towerbox adjustment***)

b) As a second step check if drive motor of the 2nd drive tower is before the imagined connection line between drive motor of the 3rd drive tower and the middle of the central tower. If not, adjust the alignment control at the 2nd drive tower.

c) Check all drive towers as described in a) and b) and adjust the alignment controls if necessary. After checking all drive motors the CENTERSTAR has to perform a “positive” bow in both driving directions, this means the drive towers in the middle have to be in front of the imagined line between end tower and central tower.

7. Control panel
   - Press key "STOP".

8. Put main switch Q 2 in position "0".

7.7.3 ALIGNMENT OF THE SYSTEM – CONTROL UNIT UNIVERSAL PRO - G

See ***7.7.2 ALIGNMENT OF THE SYSTEM – CONTROL UNIT UNIVERSAL PRO.***

7.7.4 INSTRUCTIONS FOR DETERMINING TRACKS

1. Run once "dry"; i.e. 0 mm (UNIVERSAL PRO), with timer setting of 100 % (UNIVERSAL) over the entire field.
2. A second time run "wet" with timer setting 80 - 90 % over the entire field.

Subsequent operation of the system as desired.

If the tracks become too deep, they need to be levelled out or filled up. Then run the system dry with timer setting 100 % over the entire field. The reverse run „wet“ with the same timer setting.

For start-up of your *CENTERSTAR 9000*, see the following chapter
8 INITIAL START-UP

8 INITIAL START-UP

After the system has been completely assembled and installed and successfully put into operation for the first time by the supplier’s specialist, the CENTERSTAR 9000 irrigation system is released for operation and start-up by the customer!

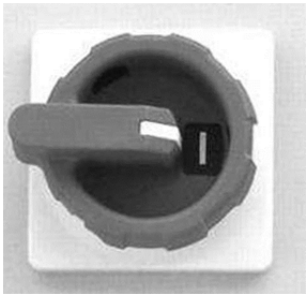
Being powered by 400 as well as 460 volts, all control system components and electrical service must always be handled with utmost care! All repair or maintenance work on this equipment to be performed by qualified electricians only!

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 to BAUER CENTERSTAR 9000 in standard design without optional equipment. If your system is equipped with different options (refer to Optional Features), they must be adjusted or turned on before the system is put into operation.

For setting of the control unit *UNIVERSAL PRO* and *UNIVERSAL PRO-G*, see the operating instructions of the control panel supplied under separate cover.

8.1 START PROCEDURE with CONTROL UNIT UNIVERSAL



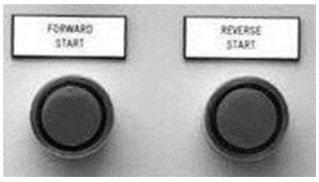
1. Turn the main switch to position "1".

2. Turn the "SAFETY CIRCUIT" switch to "ON".

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

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

4. Turn "CENTERSTAR OFF - ON " switch to "ON".



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

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

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

	The control panel should be closed during the run in order to protect it against dirt and splashes.

8.2 SHUT-OFF PROCEDURE WITH CONTROL UNIT UNIVERSAL

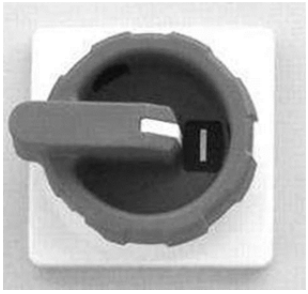
NOTE!	Systems without optional equipment can be shut off by hand only. **Exception**: The system is stopped automatically through the safety system only in case of malfunction such as doglegging or drive unit failure.

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

2. Turn "CENTERSTAR OFF - ON" switch to "OFF".

3. Turn main switch to "O".

8.3 START PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO



1. Turn the main switch in position "1".

2. Turn the "SAFETY CIRCUIT" switch to "ON".

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

3. Turn the "EMERGENCY MODE" switch to "OFF".

4. Put the "WET – DRY" switch to the requested position according to the required operating mode.

Carry out the required settings on the UNIVERSAL PRO control panel and start the CENTERSTAR 9000 as desired.

For settings, see the operating instructions of the UNIVERSAL PRO control panel supplied under separate cover.

8.4 SHUT-OFF PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO

NOTE!	Systems without optional equipment can be shut off by hand only. **Exception**: The system is stopped automatically through the safety system only in case of malfunction such as doglegging or drive unit failure.

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

2. Press the "ESC (STOP)" button on the UNIVERSAL PRO control panel.

3. Turn the main switch to "0".

8.5 START PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO-G

See ***8.3 START PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO***.

Carry out the required settings on the UNIVERSAL PRO-G control panel and start the CENTERSTAR 9000 as desired.

For settings, see the operating instructions of the UNIVERSAL PRO-G control panel supplied under separate cover.

8.6 SHUT-OFF PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO-G

See ***8.4 SHUT-OFF PROCEDURE WITH CONTROL UNIT UNIVERSAL PRO***.

NOTE!	Systems without optional equipment can be shut off by hand only. **Exception**: The system is stopped automatically through the safety system only in case of malfunction such as doglegging or drive unit failure.

NOTE!	The UNIVERSAL PRO-G control unit contains a GPS option so that it is also possible to shut-off the system automatically depending on the setting.

See in this context the operating instructions of the UNIVERSAL PRO-G control panel supplied under separate cover.

8.7 EMERGENCY MODE

With the *UNIVERSAL PRO* or the *UNIVERSAL PRO-G* control unit, an *emergency mode* of the system is always possible in case of a failure of the electronics.

WARNING: In emergency mode, the speed cannot be changed. The system always runs at maximum speed.

8.7.1 Start procedure

1. Turn the main switch in position "1".

2. Turn the "SAFETY CIRCUIT" switch to "ON".

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

3. Turn the "EMERGENCY MODE" switch to "ON".

4. Put the "WET – DRY" switch to the requested position according to the required operating mode.

5. Turn the "FORWARD – OFF – REVERSE" switch to "FORWARD" or to "REVERSE" in order to start the system in the desired direction.

8.7.2 Shut-off procedure

1. Turn the "FORWARD – OFF – REVERSE" switch to "OFF" in order to stop the system.

2. Turn the "EMERGENCY MODE" switch to "OFF" in order to stop the system.

3. Turn the main switch to "0".

9 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 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 all power before starting any maintenance work. Turn the main switch 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.

9.1 Service intervals

- ***Monthly service***
- ***Annual service***

9.2 **Service plan**

Extent of Service	Monthly Service	Annual-Service
Central tower		
- Check all screwed joints as well as the pivot hold down		**X**
- Controlling the sealing ring in the feeding pipe on leakage (replace if necessary)		**X**
- Lubricate the upper bend *(rotating in the supporting angle)*	**X**	**X**
- Check the stuffing box packing of the cable conduit		**X**
- Check if electric cable entries into the pivot panel are tight		**X**
- Check full-surface contact of brushes with rings in the slip ring collector		**X**
- Check collector brushes and slip rings for signs of wear		**X**
- Check condition of all electric connections as well as tightness of the collector housing		**X**
- Check smooth running of collector bearing and verify that the driver is isolated from power		**X**
- Check operation function of switch for end stop, automatic reverse and end gun sector control	**X**	**X**
Trussing, overhang, coupling		
- Check all screwings on flanges, truss rods, braces, on towers and on overhang		**X**
- Check tightness of the flexible hose of tower couplings.		**X**
- Lubricate ball joint of the drive tower coupling	**X**	**X**
- Empty sand trap	**X**	**X**
- Booster pump – turning of the shaft between engine and pump – check if runner of the pump pivots without problems.		**X**
- Check end gun (if existent)		**X**
Tower box, transmission device		
- Check and adjust (if necessary) the switch cam		**X**
- Check shifting travel of the micro switch	**X**	**X**
- Check function of micro switch (operation switch and safety switch)		**X**
- Check all electric connections on safe contact		**X**
- Check tightness of all cable entries into the tower box		**X**
- Check tightness of alignment control cover		**X**
- Lubricate the ball joints of the transmission devices	**X**	**X**
- Exact control – Check tightness of guiding cables		**X**
- Sight control of alignment of the spans	**X**	**X**

Extent of Service	Monthly Service	Annual-Service
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**
- Gearbox Type TNT – Lubricate the bal assembly	**X**	**X**
- Drive motor: Make sure that the drainage hole at the bottom of the motor is not blocked.		**X**
- Gearbox, drive motor - check tightness of shaft sealing ring	**X**	**X**
- Lubricate outside hubs of towable gearboxes		**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**	**X**
- Check wheel nuts	**X**	**X**
- Check tire pressure: 1,5 bar with tires 14,9 – 24 2,1 bar with tires 11,2 – 24 0,8 bar with tires 16,9 – 24	**X**	**X**
- Make sure that tires are not damaged		**X**
- Check anti twist device of axle drive shaft cover	**X**	**X**

9.2.1 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.

9.2.2 Pre-season maintenance

1. Check pivot panel 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

9.2.3 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	16230
M 10	8.8	50	25791
M 12	8.8	87,3	37657
M 14	8.8	138,3	51681
M 16	8.8	210,8	71196
M 20	8.8	411,9	111305
M 24	8.8	711	160338

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

Don´t fasten the bolts 1/2" UNC for tightening the wheel gears with a power screwdriver.
There may be a danger in damaging the winding in the gear casing..

10 TROUBLESHOOTING

FAULT	POSSIBLE CAUSE	REMEDY
Leakage: - stuffing box - upper bend / riser pipe - pivot or tower coupling	 - loose packing gland - lip of seal ring damaged - O-ring not inserted properly - loose hose clamp	 - tighten screw - exchange seal ring - insert O-ring properly - tighten hose clamp
Slip ring collector does not rotate	- collector is not moved along by the driver	- ensure precise guidance in the driver
Momentary-contact limit switch not actuated	- the holding ring on pivot infeed elbow is not tight enough – as a result it is lifted up by the water pressure	- tighten the holding ring halves
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	- main switch turned off - safety disconnect Q1 turned off - fuses of fuse switch disconnector defective - fuses F1, F2, F3, F4 defective - safety circuit interrupted because system flex larger than maximum permissible bending angle - no water pressure (only with low-pressure shut-off option) - system in parking position (only with FULL-CIRCLE AUTOMATIC STOP option)	- turn it on - turn it on - replace defective fuses - replace defective fuses - see “Restart after doglegging” - check water supply - readjust pressure switch - STOP IN SLOT ON-OFF switch to OFF - start the system when the switching bracket has left the limit switch, turn the STOP IN SLOT ON-OFF switch to "ON"
A certain tower always runs in the safety circuit	- Wrong micro switch setting in the tower box - micro switch defective - contactor defective - cable loose - tower slips - thermal protection (built into the motor) triggered because of: - obstacle in the track - deep soil - low oil in gearbox	- readjust the micro switch - replace the micro switch - replace the contactor - check connections and tighten, if required - level the track - remove obstacle - fill up and level the track - refill oil
Pro Module values outside normal range	Current fluctuation	Load parameter See "Firmware update“ of separate operating instructions Universal PRO and/or PRO-G

10.1 RESTART AFTER DOGLEGGING – WITH TOWER ALIGNMENT SWITCH

NOTE!	Before you follow the instructions below, the cause that led to doglegging must be located and eliminated (see Troubleshooting)

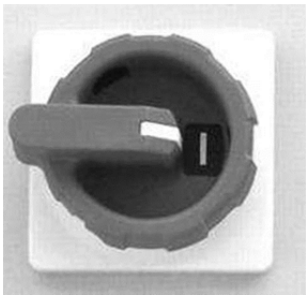
NOTE!	In order to prevent a mechanical overload of the truss, align the Centerliner step by step starting at the system end. The assumed connecting line between all tower motors with the centre of the centre tower must be perfectly straight.

If your machine is only slightly doglegging, please proceed as indicated under **Fehler! Verweisquelle konnte nicht gefunden werden.** ***ALIGNMENT OF TOWERS AFTER INSTALLATION*** *or under* **Fehler! Verweisquelle konnte nicht gefunden werden.** ***RESTART AFTER DOGLEGGING - WITHOUT TOWER ALIGNMENT SWITCH***.

10.1.1 CONTROL UNIT UNIVERSAL

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

WARNING!	In the “OFF” position, the "SAFETY CIRCUIT" switch deactivates the safety system.



2. Turn main switch to “1".

3. Turn "CENTERSTAR ON - OFF" switch to "ON".

4. Return the “doglegging” towers into a straight line with the other towers and the pivot again with the help of the *tower alignment switch* (alignment control).

5. Turn the "SAFETY CIRCUIT" switch to “ON".

6. Check correct start-up of CENTERSTAR by a test start (starting button "FORWARD START" and "REVERSE START").

10.1.2 CONTROL UNIT UNIVERSAL PRO

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

WARNING! In “OFF” position, the "SAFETY CIRCUIT" switch deactivates the safety system.

2. Turn the "MAIN SWITCH" switch to "1".

3. Turn the "EMERGENCY MODE" switch to "ON".

4. Turn the “FORWARD - OFF - REVERSE” switch to “FORWARD” or to “REVERSE” in order to start the system in the desired direction (*only for UNIVERSAL PRO & PRO-G).*

5. Return the “doglegging” towers into a straight line with the other towers and the pivot again with the help of the *tower alignment switch* (alignment control).

6. Turn the "SAFETY CIRCUIT" switch to "ON".

7. Turn the "EMERGENCY MODE" switch to "OFF".

8. Check correct start-up of CENTERSTAR by a test start (*starting button forward "F" and/or reverse "R" on the UNIVERSAL PRO control panel*).

10.1.3 CONTROL UNIT UNIVERSAL PRO-G

See ***10.1.2 CONTROL UNIT UNIVERSAL PRO.***

10.2 RESTART AFTER DOGLEGGING – WITHOUT TOWER ALIGNMENT SWITCH

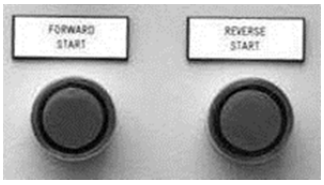
NOTE! Before carrying out the following jobs, it is essential to repair the cause of doglegging (see trouble-shooting).

10.2.1 CONTROL UNIT UNIVERSAL

1. Set SPEED" at 100 %.

2. Turn the “SAFETY CIRCUIT" switch to "OFF".

WARNING! In “OFF” position, the "SAFETY CIRCUIT" switch deactivates the safety system.



3. Set proper running direction. Select that direction that brings the outermost system end into radial alignment.

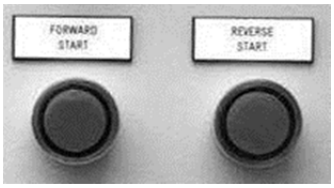
This means, if the outer, doglegged tower column is pointing “FORWARD”, you have to push the REVERSE START button; if the outer doglegged tower column is pointing in “REVERSE” direction, push “FORWARD”.
Press the green "FORWARD START" or "REVERSE START" button and check the running direction when the outer, misaligned towers start moving.

WARNING! 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.

WARNING! The towers only run as long as you hold the "FORWARD START or "REVERSE START" button depressed.

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

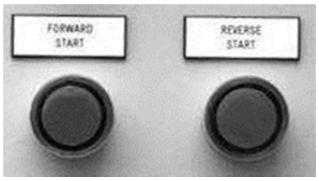
WARNING! Continuously check tower movement after the start in order to be able to stop the system again immediately should the doglegging continue (Let go the “FORWARD START" or "REVERSE START" button).



4. As soon as the towers are aligned again (in radial alignment) and the inward towers start to move, too, the green "FORWARD START" or "REVERSE START" button should be no longer depressed.

5. Turn the "SAFETY CIRCUIT” switch to “ON”.

NOTE! Running BAUER CENTERSTAR with "SAFETY CIRCUIT OFF" is only permitted for system alignment .



6. Check proper CENTERSTAR start-up by a test start (shortly depress the "FORWARD START" and "REVERSE START" buttons). The pushbutton lights up if the system is operating correctly.

10.2.2 CONTROL UNIT UNIVERSAL PRO

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

2. Press key "FORWARD" or "REVERSE" and keep it pressed in order to set the proper running direction. Select that direction that brings the outermost system end into radial alignment.

   This means, if the outer, doglegged tower column is pointing “FORWARD”, you have to push the "R" button (reverse); if the outer doglegged tower column is pointing in “REVERSE” direction, push the “F” button (forward).

WARNING!	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.

WARNING!	The towers only run as long as you hold the "F" and/or "R" button depressed.

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

WARNING!	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 “F" and/or "R" button).

As soon as the towers are aligned again (in radial alignment) and the inward towers start to move, too, the "F" and/or "R" button should be no longer depressed
.

Subsequently turn the "SAFETY CIRCUIT” switch to “ON” again.

NOTE!	Running BAUER CENTERSTAR with "SAFETY CIRCUIT OFF" is only permitted for system alignment .

Check proper CENTERSTAR start-up by a test start (shortly depress the "F" and "R" buttons). The pushbutton lights up if the system is operating correctly.

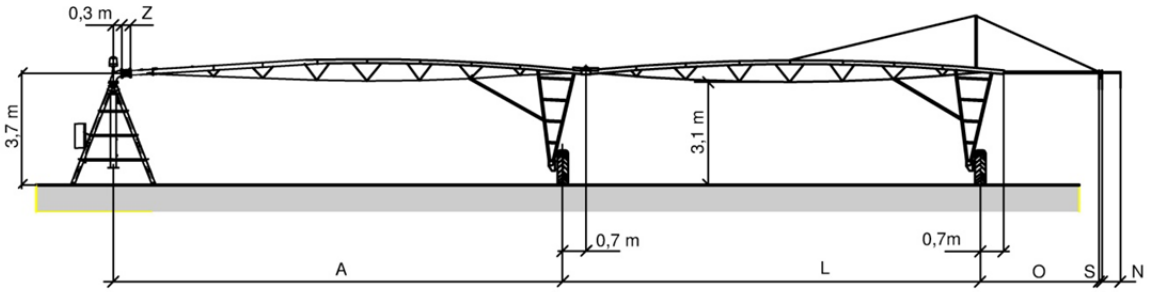
10.2.3 CONTROL UNIT UNIVERSAL PRO-G

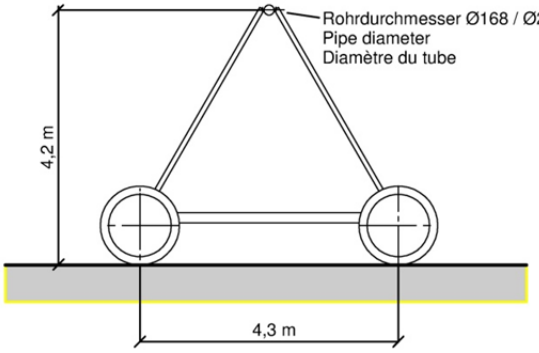
See ***10.2.2 CONTROL UNIT UNIVERSAL PRO.***

11 TECHNICAL DATA

11.1 DIMENSIONS OF BAUER CENTERSTAR 9000 - 168/203 EL

CENTERSTAR 9000 - 168 EL / 203 EL



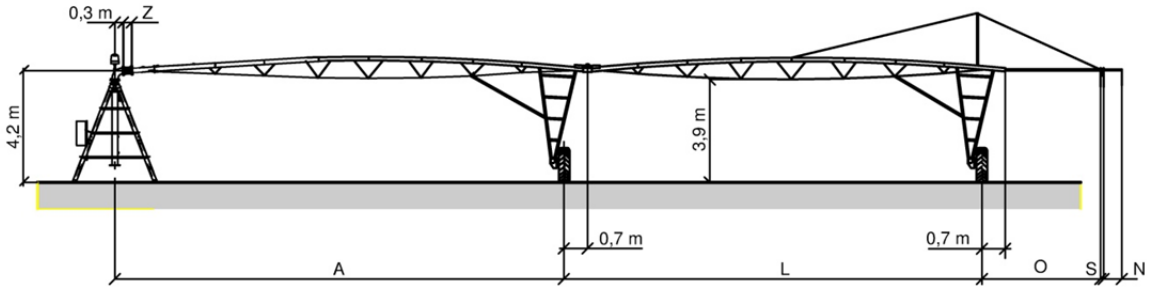


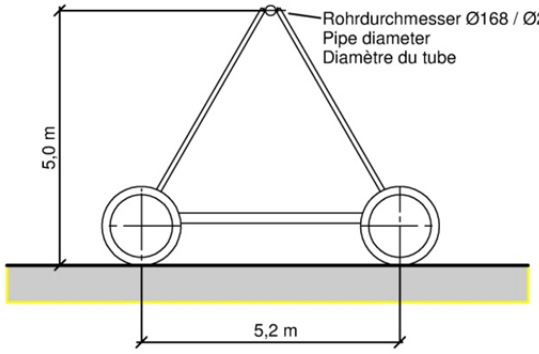
Span / Span / Span		59,8 *	54,0	48,1	42,3
Länge / Length / Longueur	L m	59,80	53,95	48,10	42,25
Länge / Length / Longueur	A m	59,53	53,68	47,83	41,98
Zentralturmkupplung / Central Tower Coupling / Raccord tour centrale	Z m	0,32	0,32	0,32	0,32

Überhang / Overhang / Porte-a`-faux		23,4	17,6	11,7	5,9	0
Länge / Length / Longueur	O m	24,1	18,3	12,4	6,6	0,7
Sandfang / Sand trap / Dessableur	S m	0,15	0,15	0,15	0,15	0,15
Sprühdüsenverlängerung / Spray nozzle extension / Rallonge de buse atomiseur	N m	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0

* Centerstar 203 EL nicht verfügbar
Centerstar 203 EL not available
Centerstar 203 EL non disponible

CENTERSTAR 9000 - 168 E / 203 E





Span / Span / Span		59,8 *	54,0	48,1	42,3
Länge / Length / Longueur	L m	59,80	53,95	48,10	42,25
Länge / Length / Longueur	A m	59,53	53,68	47,83	41,98
Zentralturmkupplung / Central Tower Coupling / Raccord tour centrale	Z m	0,32	0,32	0,32	0,32

Überhang / Overhang / Porte-a`-faux		23,4	17,6	11,7	5,9	0
Länge / Length / Longueur	O m	24,1	18,3	12,4	6,6	0,7
Sandfang / Sand trap / Dessableur	S m	0,15	0,15	0,15	0,15	0,15
Sprühdüsenverlängerung / Spray nozzle extension / Rallonge de buse atomiseur	N m	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0

* Centerstar 203 E nicht verfügbar
Centerstar 203 E not available
Centerstar 203 E non disponible

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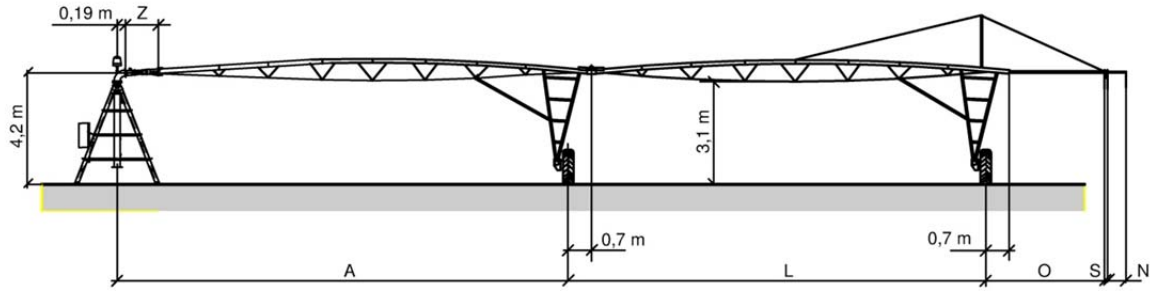
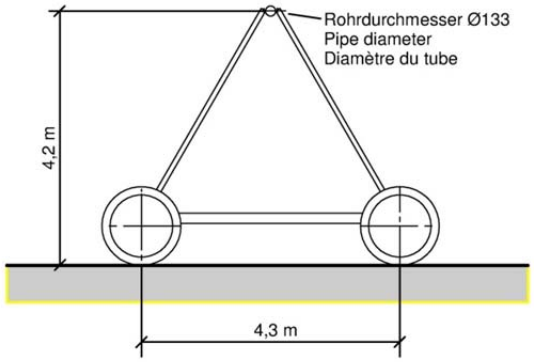
11.2 DIMENSIONS OF BAUER CENTERSTAR 9000 - 133 EL

CENTERSTAR 9000 - 133 EL



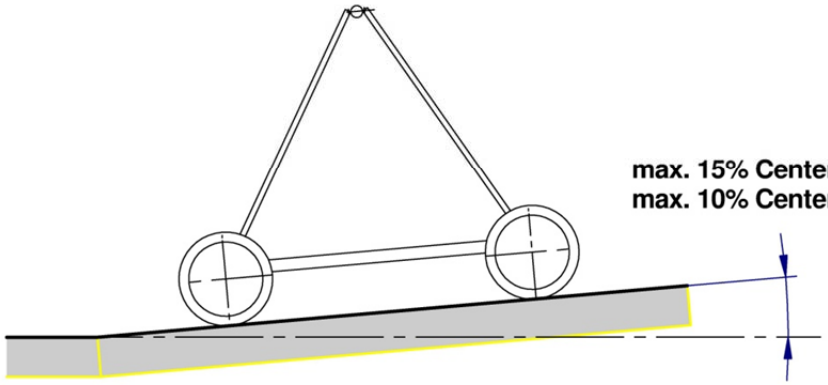


Span Span Span		59,8 *	54,0	48,1	42,3
Länge Length Longueur	L m	59,80	53,95	48,10	42,25
Länge Length Longueur	A m	59,66	53,81	47,96	42,11
Zentralturmkupplung Central Tower Coupling Raccord tour centrale	Z m	1,01	1,01	1,01	1,01

Überhang Overhang Porte-à-faux		23,4	17,6	11,7	5,9	0
Länge Length Longueur	O m	24,1	18,3	12,4	6,6	0,7
Sandfang Sand trap Dessableur	S m	0,15	0,15	0,15	0,15	0,15
Sprühdüsenverlängerung Spray nozzle extension Rallonge de buse atomiseur	N m	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0	1,2 3,0

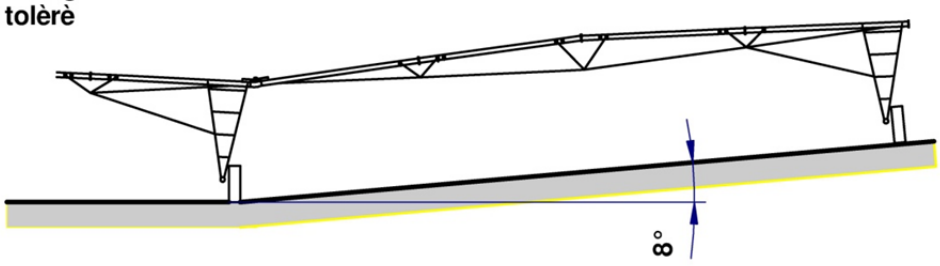
Begrenzungen / Limits / Limitations

Steigung
Inclination
Pente



max. 15% Centerstar 168/203
max. 10% Centerstar 133

Zulässige Abwinkelbarkeit
Allowed angle
Angle tolèrè



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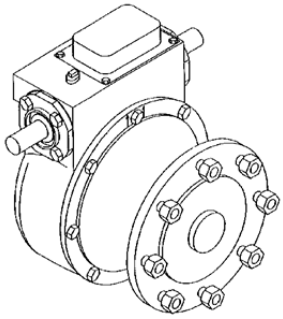
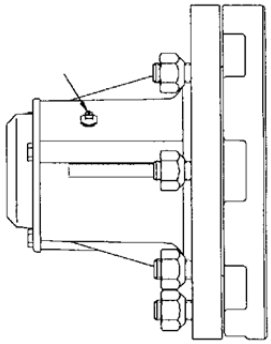
11.3 Gearbox and drive motors

11.3.1 Gearbox

Worm gear with 50:1 reduction ratio.

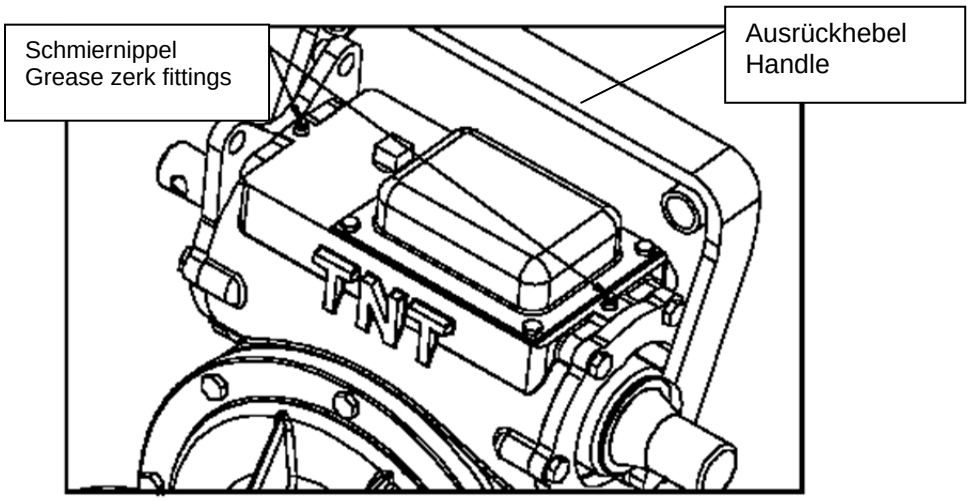
Execution:	For stationary systems. For towable systems with freely rotating hub.
Type of oil:	SAE 85W-140, multigrade oil
Oil quantity approx.	3.8 litres up to lower edge of filling hole Oil expansion is compensated by expansion membrane.





Wheel gear TNT

The wheel gears, model TNT, are equipped with grease fittings for greasing the bale assembly (see fig.).
We would like to point out that the gear has to be lubricated before initial installation as well as once or twice per season (depending on the frequency of towing).
Use a lithium grease (e.g. CASTROL Grease LMX or SHELL Retrinax LX 2). After greasing acute the handle several times for distributing the grease evenly.



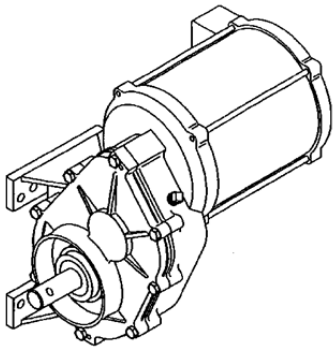
Wheel gear TNT2

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

11.3.2 Drive motor

Spur gearing with 40:1 reduction ration, optional 30:1 reduction.
standard motor output: 0.55 kW; optional 1.1 kW

Driving speed with tires 14.9-24	reduction 40:1 = 144 m/h reduction 30:1 = 193 m/h
Type of oil: :	SAE 50W or SAE 20W-50 multigrade motor oil
Amount of oil approx.	3.8 litres up to lower edge of filling hole



12 OPTIONAL FEATURES

Please find below a list of the optional features available. For a more detailed functional description, see the operating instructions of the control panel in question, UNIVERSAL / UNIVERSAL PRO / UNIVERSAL PROG-G, supplied under separate cover.

12.1 AUTOMATIC CIRCLE STOP

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

Control unit UNIVERSAL

Turn the „STOP IN SLOT ON-OFF“ switch to „ON“ in order to stop the machine automatically in the requested position (parking position).
Turning the "STOP IN SLOT ON-OFF" to "OFF" makes it possible to irrigate in full circles.
For restart after AUTOMATIC STOP, turn the switch to “OFF” and push the start button. When the switching bracket has left the momentary-contact limit switch, turn the switch to “ON”.

Control unit UNIVERSAL PRO

When working with control unit UNIVERSAL PRO, this option is also used as *rounds counter.*
After running a preset number of rounds, the machine will stop automatically. For restart press either key "F" (Forward) or "R" (Reverse) for a forward and/or reverse run.

Control unit UNIVERSAL PRO - G

When working with control unit UNIVERSAL PRO-G, the automatic stop option already is integrated electronically (GPS). The components shown on the picture are not required.

12.2 SECTOR CONTROL WITH AUTOMATIC REVERSE – AUTOMATIC SECTOR STOP

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

Control unit UNIVERSAL

The "AUTO REVERSE OFF-ON" switch is built into the pivot panel. In “OFF” position the system shuts off automatically when the sector limit is reached.
The “ON" setting makes it possible to irrigate the sector defined by the limit switches without interruptions, as needed. After the number of irrigation runs is finished; the system must be shut off by hand.

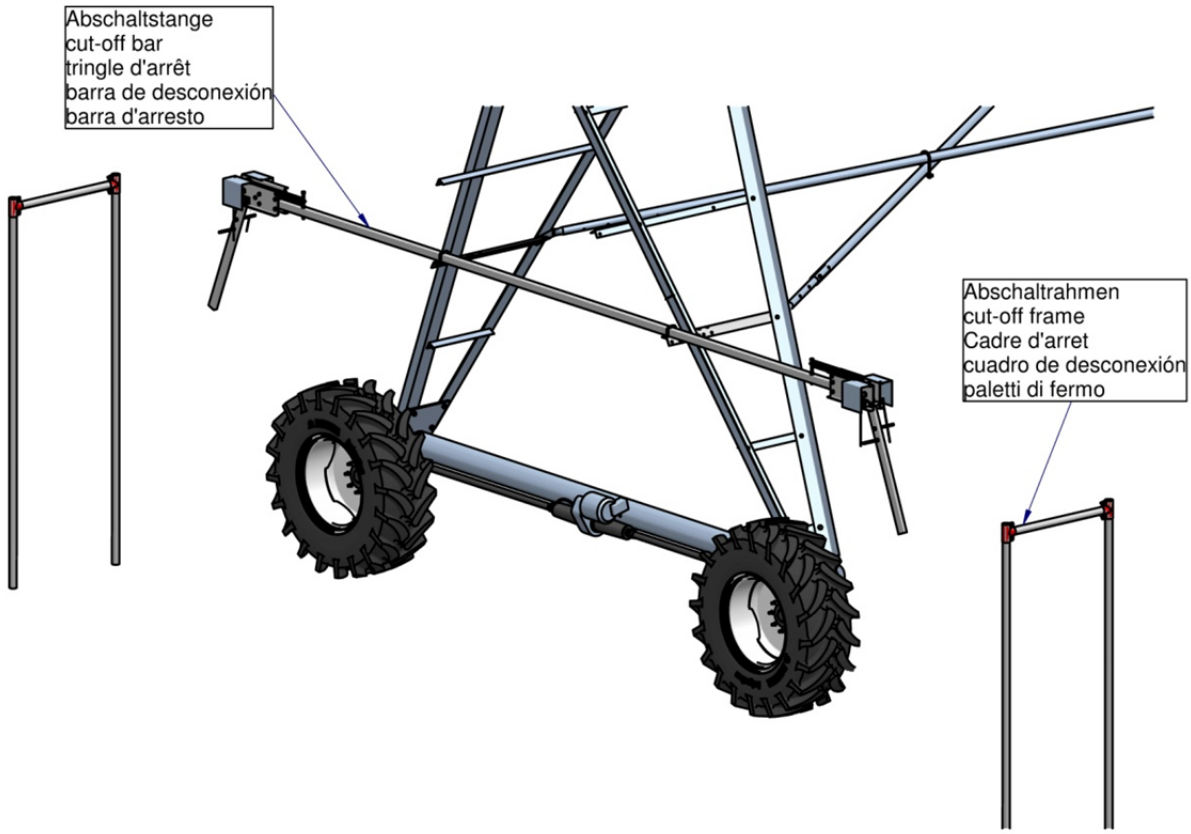
Control unit UNIVERSAL PRO

With the AUTO REVERSE function switched off, the system shuts off automatically at the sector limit. With the AUTO REVERSE function switched on, the system changes direction automatically and runs to the other sector limit until the maximum number of rounds set has been reached. Then the system stops automatically.

Control unit UNIVERSAL PRO - G

When working with the UNIVERSAL PRO-G control unit, the SECTOR CONTROL WITH AUTO REVERSE already is integrated electronically (GPS). The components shown on the picture are not required.

12.3 **END STOP - AUTOMATIC REVERSE**



End stop and/or automatic reverse
If it is necessary to stop or switch over the system precisely when the sector boundaries are reached, the system shuts off at the system end. A cut-off bar mounted on the end tower is actuated by a cut-off frame positioned in the track. Thus the machine is stopped precisely at the desired sector limit and/or it changes to the opposite driving direction.

12.4 **LOW-PRESSURE SHUT-OFF**

The pivot supply pressure is monitored by a pressure control on the pivot. If the supply pressure is lower than the minimum pressure set on the pressure control, the CENTERSTAR is shut off automatically.

WARNING! To activate the *low-pressure shut-off,* turn the "WET-DRY" switch to "WET".

With the pressure control, the machine can run without irrigating (dry) in the "DRY" mode. This function can be used to move the CENTERSTAR to the parking position due to natural rainfall.

WARNING! When set to “DRY”, the "WET-DRY" switch inactivates the *low-pressure shut-off*.

12.5 **AUTOMATIC PUMP UNIT SHUT-OFF**

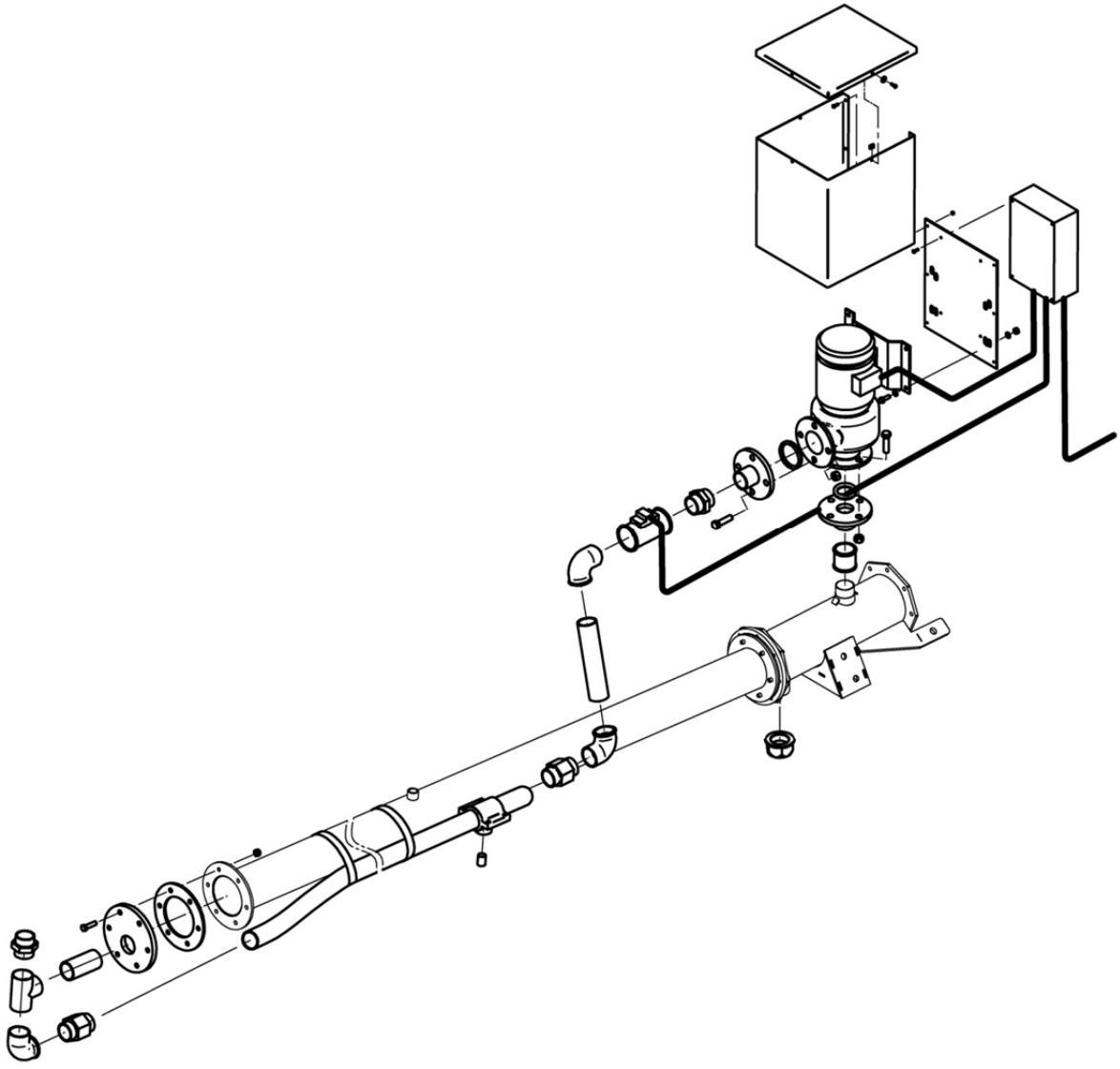
When the system is at standstill and/or when a malfunction occurs, the pumping unit is shut off automatically if it is wired with the control unit UNIVERSAL / UNIVERSAL PRO / UNIVERSAL PRO-G.

12.6 **AUTOMATIC ELECTRIC SHUT-OFF VALVE CONTROL**

An electric shut-off valve in the pivot infeed line stops automatically the water supply when the CENTERSTAR is turned off manually / automatically or stops due to malfunction.

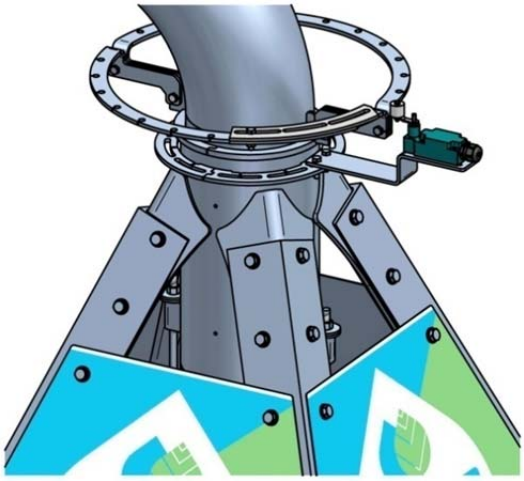
12.7 **ENDGUN WITH BOOSTER PUMP**

To increase the CENTERSTAR'S irrigation radius, it is possible to mount an endgun at the end of the pivot overhang. If necessary, a booster pump is inserted on the last tower. Rain gun and pump are connected with an external hose.



12.8 SECTOR CONTROL FOR ENDGUN

If you do not want to use the endgun permanently over the entire circle, the *sector control* allows to set up to 5 switch on/switch off points.
Switching segments mounted on the pivot are infinitely adjustable. A momentary-contact limit switch controls a solenoid valve which closes the water supply to the booster pump and thus also to the endgun. The pump motor is shut off simultaneously.



12.9 RUNNING CONTROL

If your machine is equipped with the *running control* option and if the wheels on the last tower start slipping, the entire system is shut off automatically after a certain, adjustable time in order to avoid overwatering.
The time for system shut off can be adjusted on the time relay of the next-to-the-last *tower box.*

12.10 TOWER ALIGNMENT SWITCH

This switch is mounted outside on the base plate of the tower box. With this switch the individual towers can be moved forward or back without having to open the tower control box. This feature makes it easy to align the system for the initial start-up. The same applies to realignment of towable systems in their new position.

12.11 RUNNING LIGHT

The running light can be mounted directly on the pivot, on any of the towers or also directly on the first trussing just in front of the pivot. The light burns as long as the CENTERSTAR is operating.

13 REPOSITIONING OF CENTERSTAR

GENERAL INSTRUCTIONS

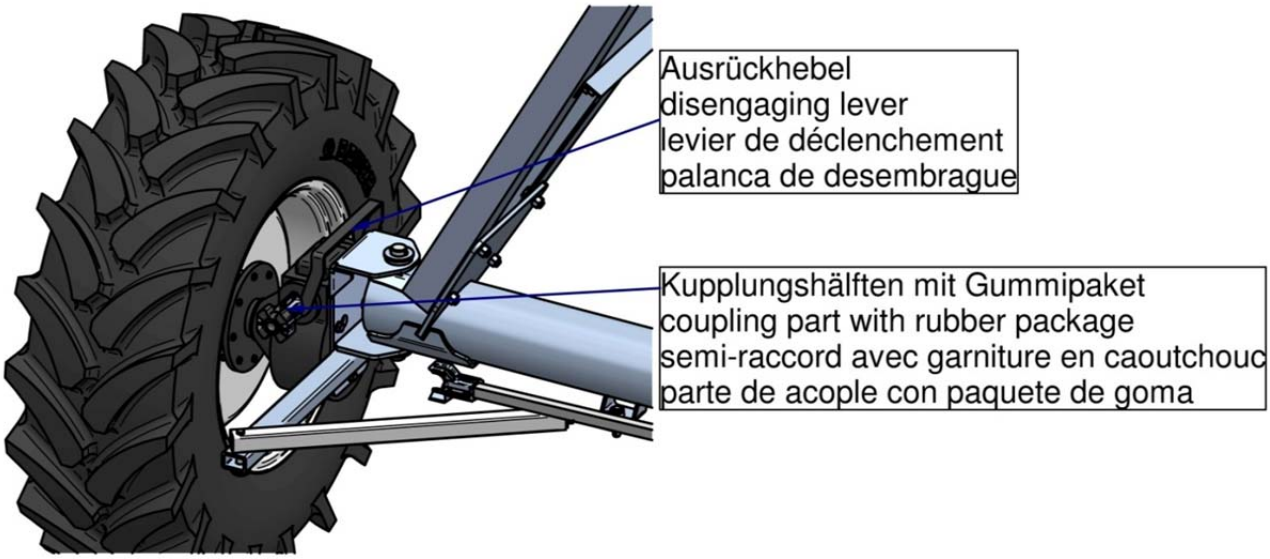
- System should be towed on a level and preferably on a paved road (width 7 m).
- The track must be level and free from ruts, grooves, and furrows.
- If there are ruts in the lane they have to be levelled
- Towing of the system in the field (off the road) should be avoided.
- If the system has to be towed in the field, the travelling lane must be levelled first and any obstacles removed in order that the rolling resistance is not minimised.
- Max. “towing speed”: 4 km/h
- Min. tire pressure: 1 – 1.5 bar

13.1 TOWING THE CENTERSTAR ON THE PIVOT SIDE

When towing the system on the pivot side, a cable bracing must be provided from the pivot to the first tower.

13.1.1 Turning the tower wheels

- Loosen and push back the drive shaft covers of the gearboxes.
- Loosen the driver on the wheel hub. Disengage gearboxes with lever.
- Loosen fastening of gearbox support.
- Turn gearbox support and wheel by 90°. The coupling parts with the rubber packages have to stay at the gearbox. If necessary lift wheel base with jack or tractor's hydraulic.

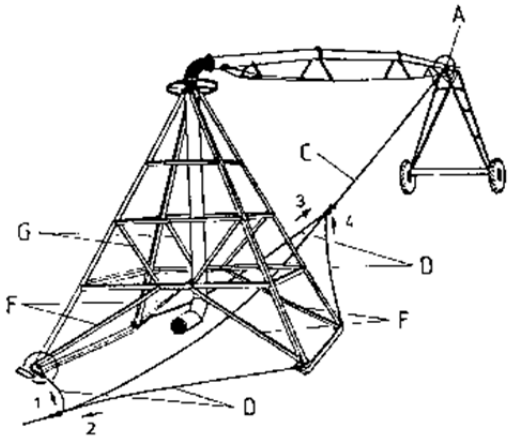


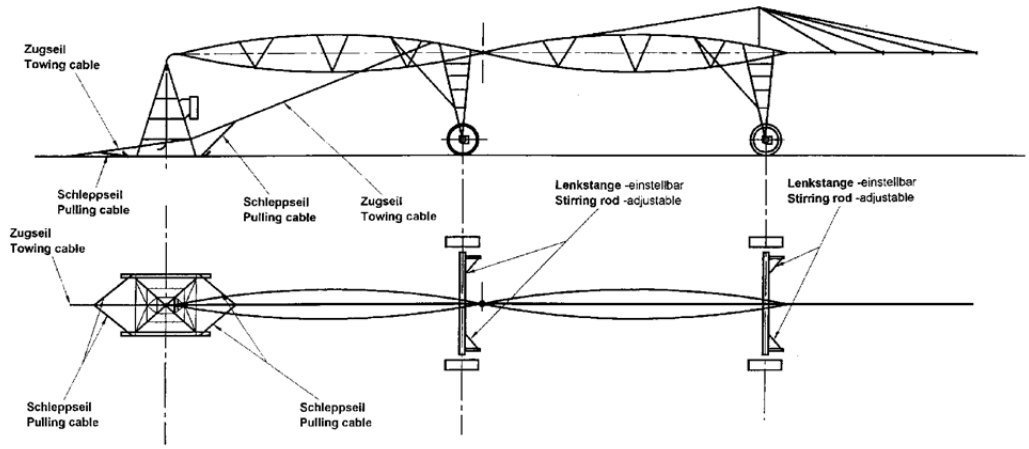
- Fix the gearbox support with the connecting brace.
- Deposit the drive shaft with the coupling halves on the connecting brace.

13.1.2 Mounting the tow cable on pivot with skids

- Turn the pivot into the towing direction.
- Mount the clamp (A) on the end pipe of the first tower.
- Fasten the tow cable (C) on clamp (A).
- Fasten the pivot tow cables (D) on the pivot.
- Fasten the tow cables (D) on the tow cable (C) with a cable clip according to the drawing.
- The pulling force indicated by the arrows (1 and 2) should be adjusted in such a way that the front ends of the pivot skids are elevated about 100 to 200 mm in order to avoid “digging in” during the towing procedure. The ropes (arrows 3 and 4) must be tightly stretched, too, to avoid a “rolling” movement of the pivot. .

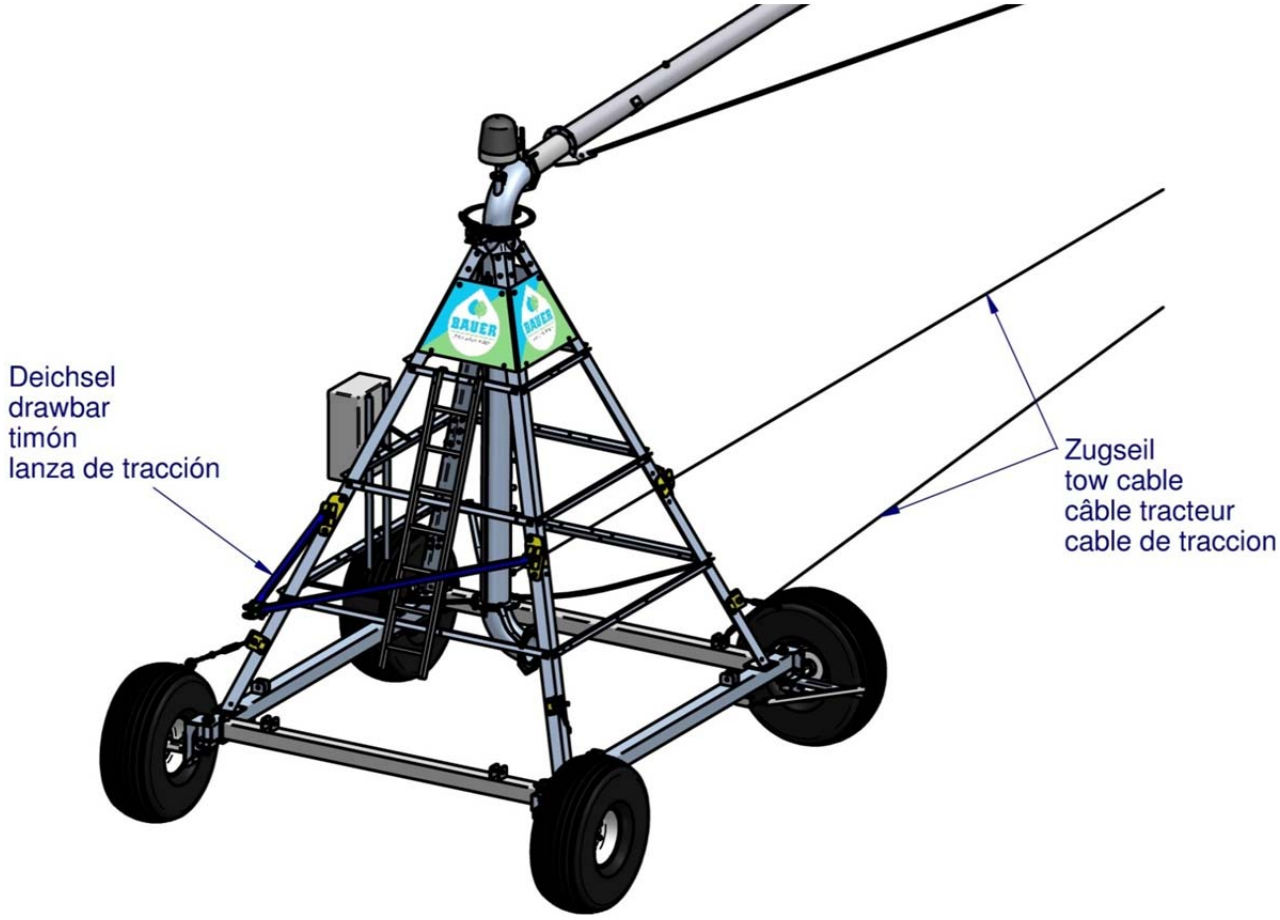
NOTE !	The pivot braces (F and G) are decisive for the pulling force of the pivot. Tow the machine only if the pivot is equipped with these braces (F and G).

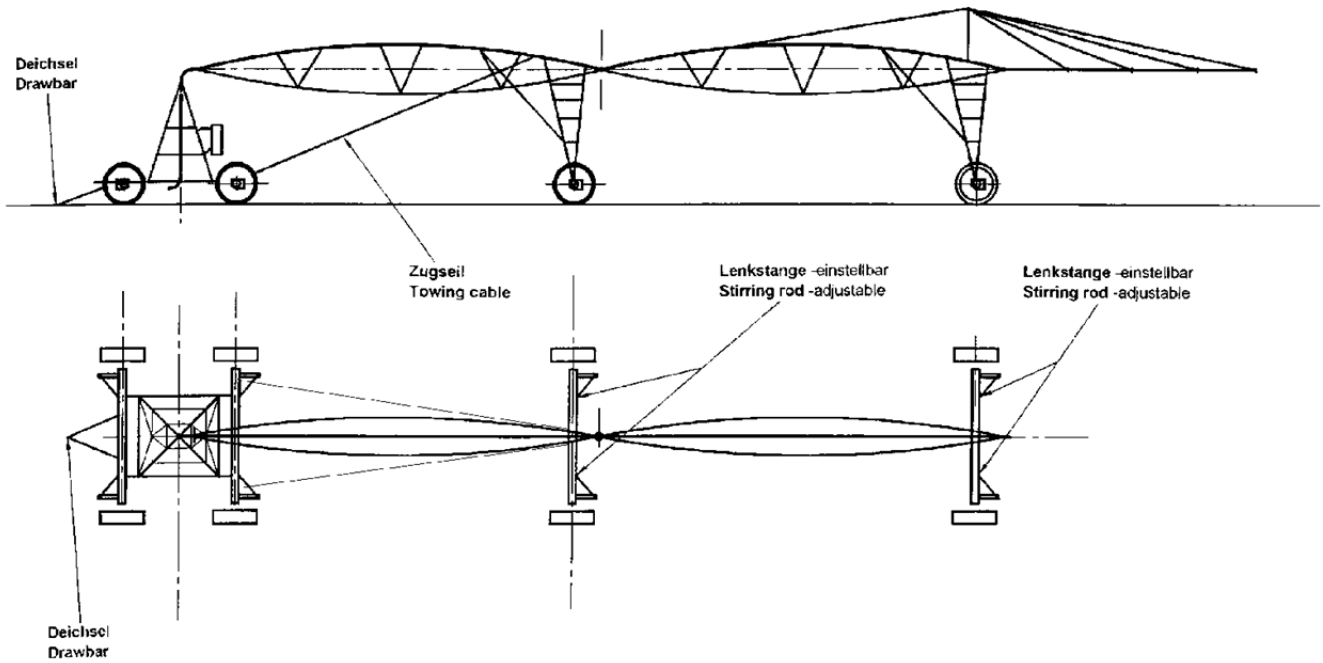




13.1.3 Mounting the tow cables on 4-wheel pivot

- Turn pivot into the driving direction, if necessary. For this purpose position the wheels tangentially to the pivot point and fix them with the braces.
- Fasten the clamp on the end pipe of the first tower.
- Mount and adjust cable with tightener (the first time).
- Mount the drawbar (the first time).



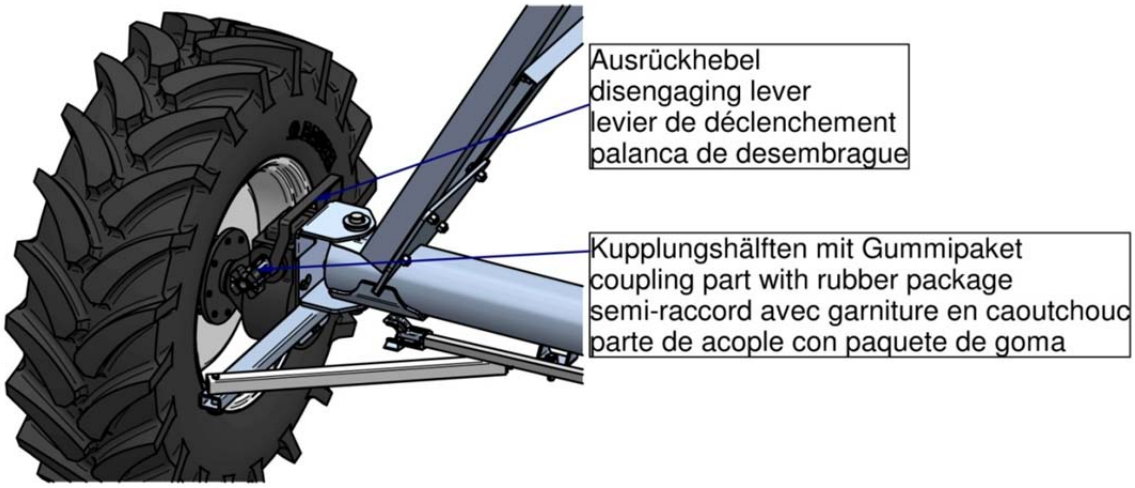


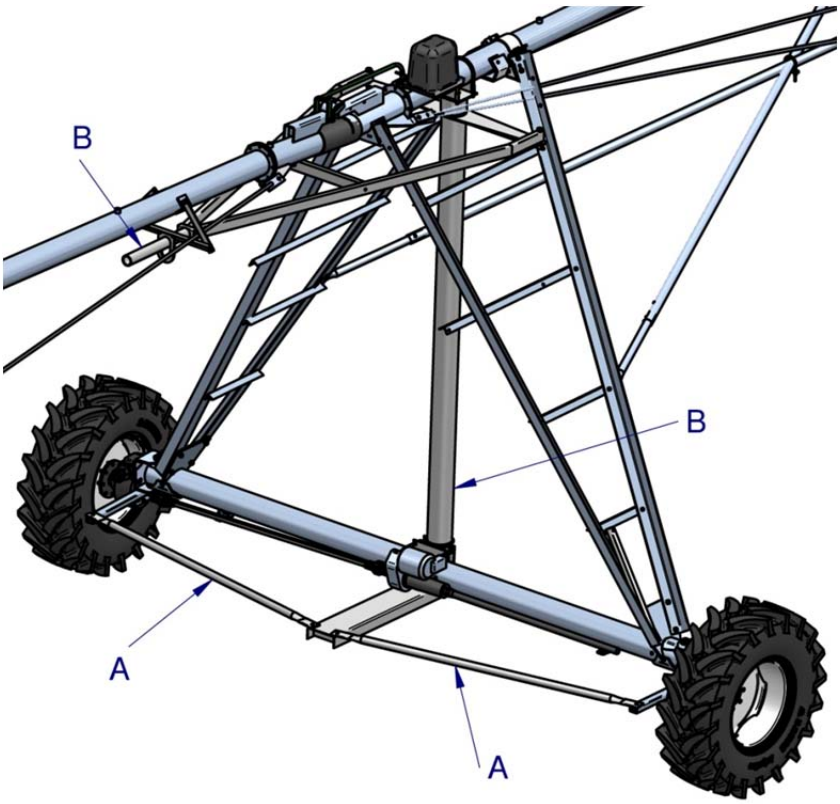
13.2 TOWING THE CENTERSTAR ON THE END TOWER

NOTE ! Towing of CENTERSTAR on the overhang side is possible only with **4-wheel pivot** !

13.2.1 Turning the tower wheels

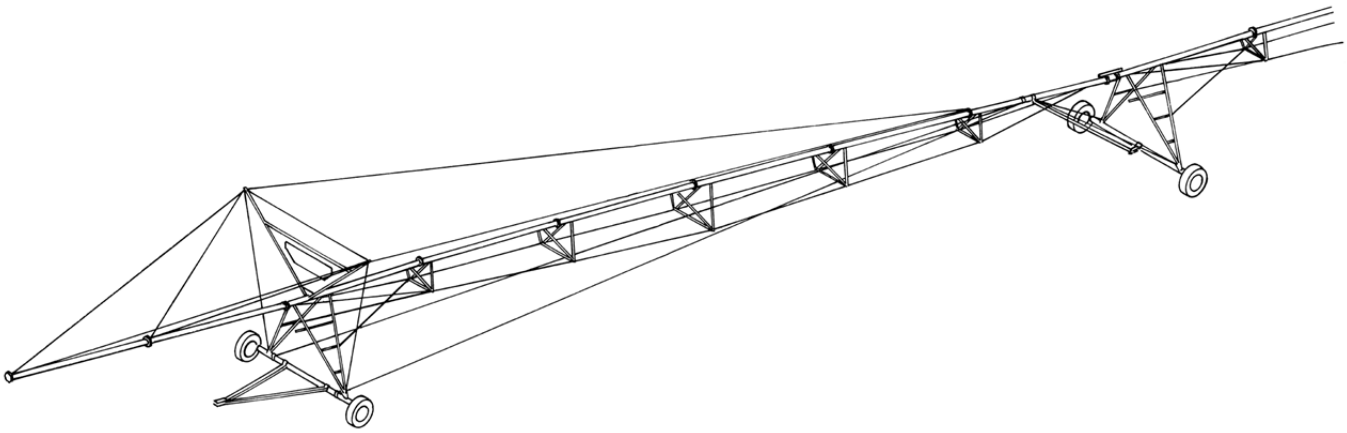
- Loosen and push back the drive shaft covers of the gearboxes.
- Loosen the driver on the wheel hub. Disengage gearboxes with lever.
- Loosen fastening of gearbox support.
- Turn gearbox support and wheel by 90°. The coupling parts with the rubber packages have to stay at the gearbox. If necessary lift wheel base with jack or tractor´s hydraulic.
- Fix the gearbox support with the connecting braces "A".
- Mount the steering device “B” on all towers except for end tower (on overhang).





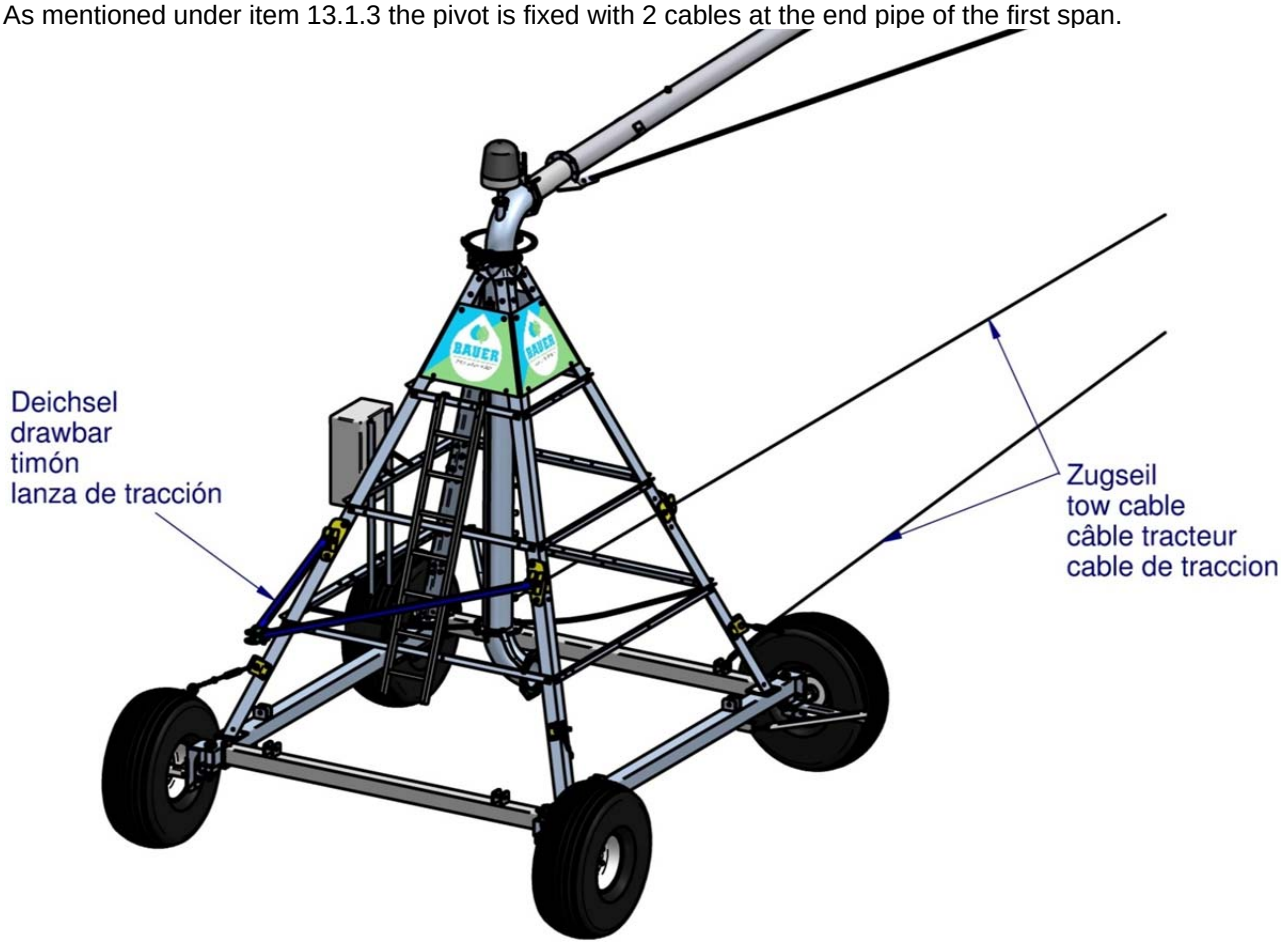
13.2.2 Bracing the end tower

- The end tower (on the overhang) is braced with 2 cables on the span.
- A drawbar is attached on the wheel base.



13.2.3 Bracing the 4-wheel pivot

As mentioned under item 13.1.3 the pivot is fixed with 2 cables at the end pipe of the first span.



14 ELECTRICAL WIRING DIAGRAMS

14.1 PIVOT PANELS

14.1.1 Pivot panel Universal - infeed

14.1.2 Pivot panel Universal - control

14.1.3 Pivot panel Universal - wiring diagram

14.1.4 Pivot panel Universal - autoreverse - infeed

14.1.5 Pivot panel Universal - autoreverse - control

14.1.6 Pivot panel Universal - autoreverse - wiring diagram

14.1.7 Pivot panel - Universal PRO - infeed

14.1.8 Pivot panel - Universal PRO - control

14.1.9 Pivot panel - Universal PRO - wiring diagram

14.1.10 Pivot panel - Universal PRO with autoreverse - infeed

14.1.11 Pivot panel - Universal PRO with autoreverse - control

14.1.12 Pivot panel - Universal PRO with autoreverse - wiring diagram

14.1.13 Pivot panel - Universal PRO-G - infeed

14.1.14 Pivot panel - Universal PRO-G - control

14.1.15 Pivot panel - Universal PRO-G - wiring diagram

14.2 BOOSTER PUMP FOR ENDGUN

14.3 TOWER BOX

14.3.1 Tower box standard

14.3.2 Tower box with tower alignment switch

14.3.3 Tower box with running control

14.3.4 Tower box with tower alignment switch and running control

14.3.5 End control standard

14.3.6 End control with tower alignment switch

14.3.7 End control standard with limit stop

14.3.8 End control with limit stop and tower alignment switch

14.3.9 End control standard with limit stop and autoreverse

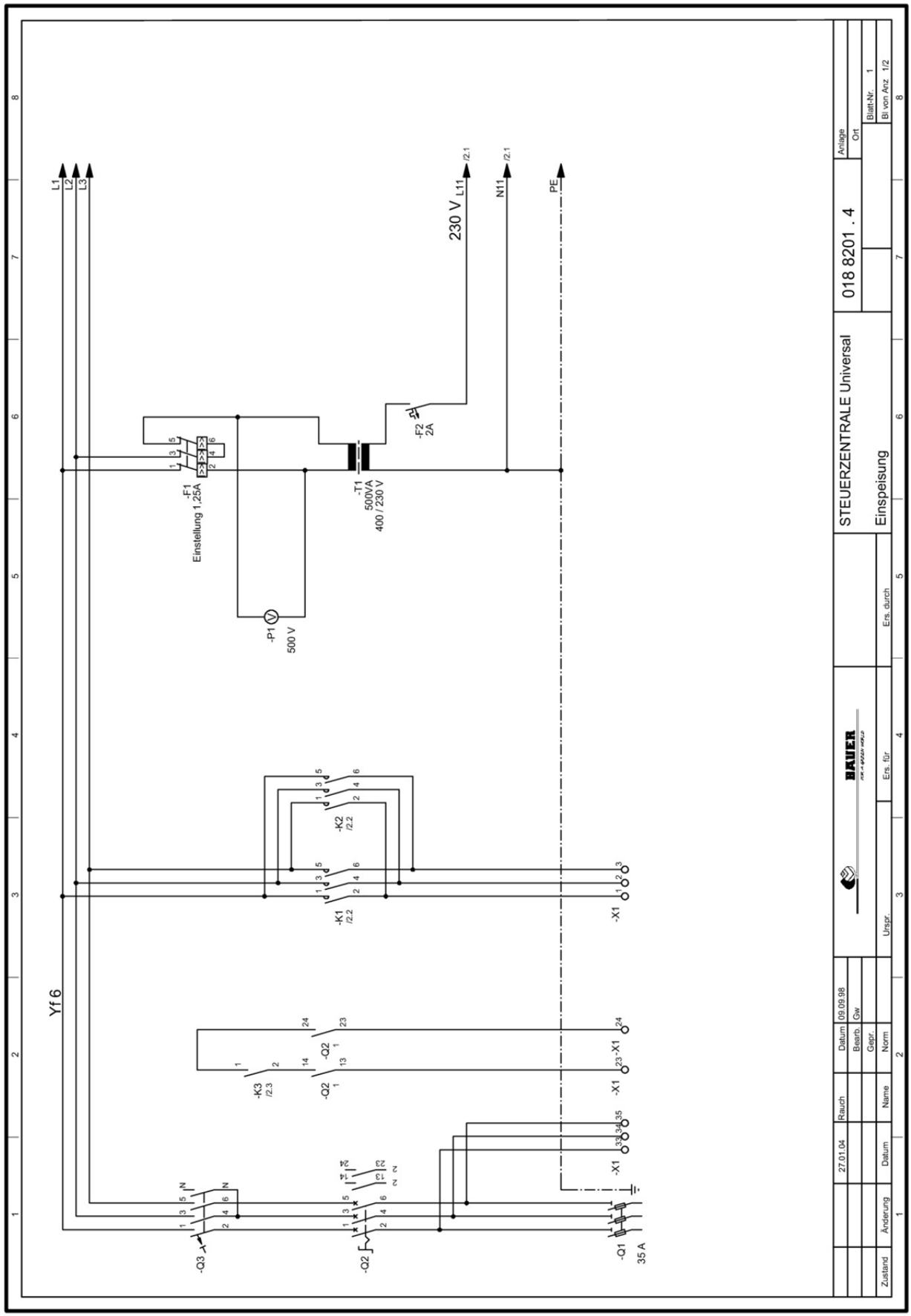
14.3.10 End control with tower alignment switch, limit stop and autoreverse

14.3.11 End control PRO-G with tower alignment switch

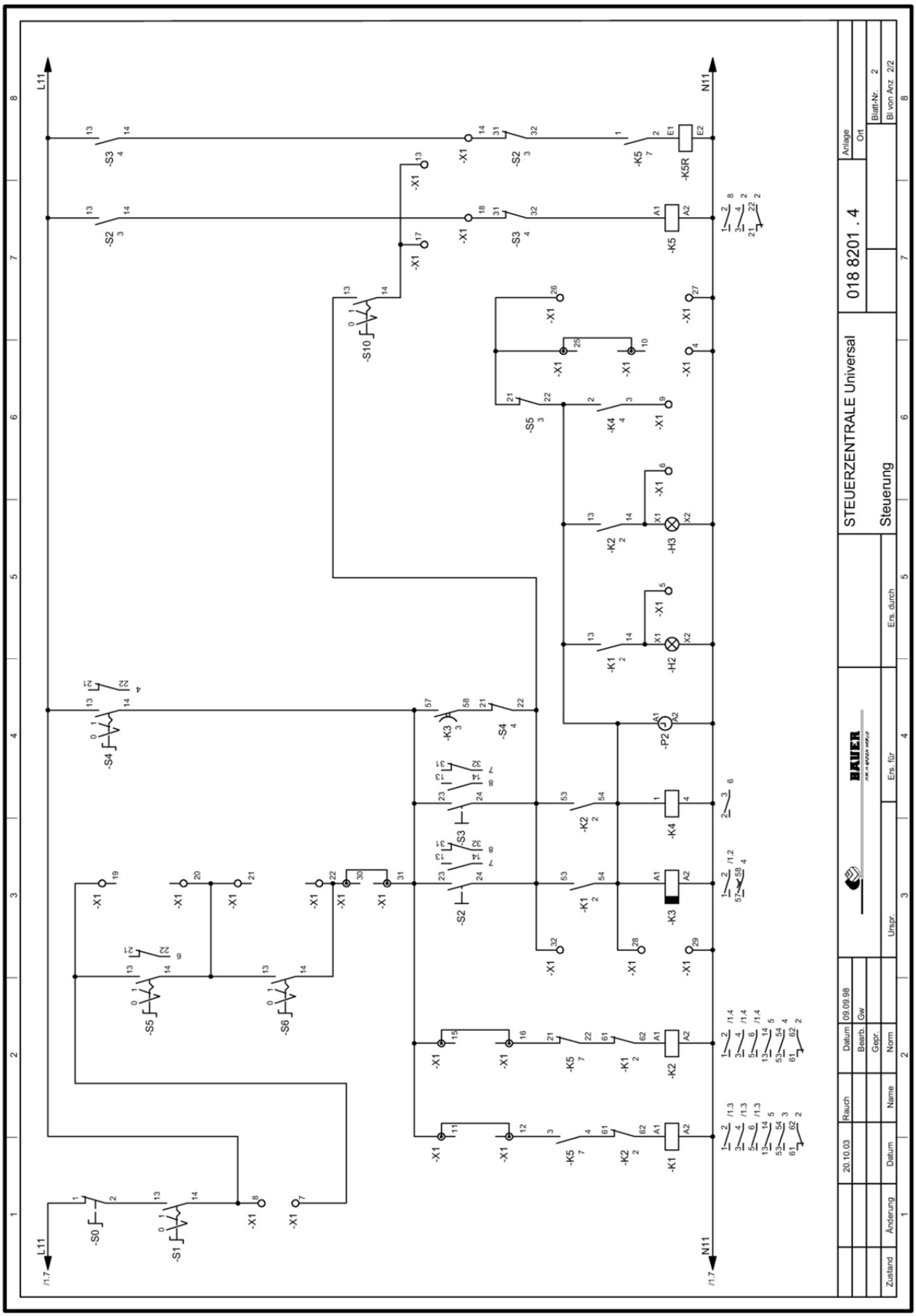
14.3.12 End control PRO-G standard

14.1 PIVOT PANELS

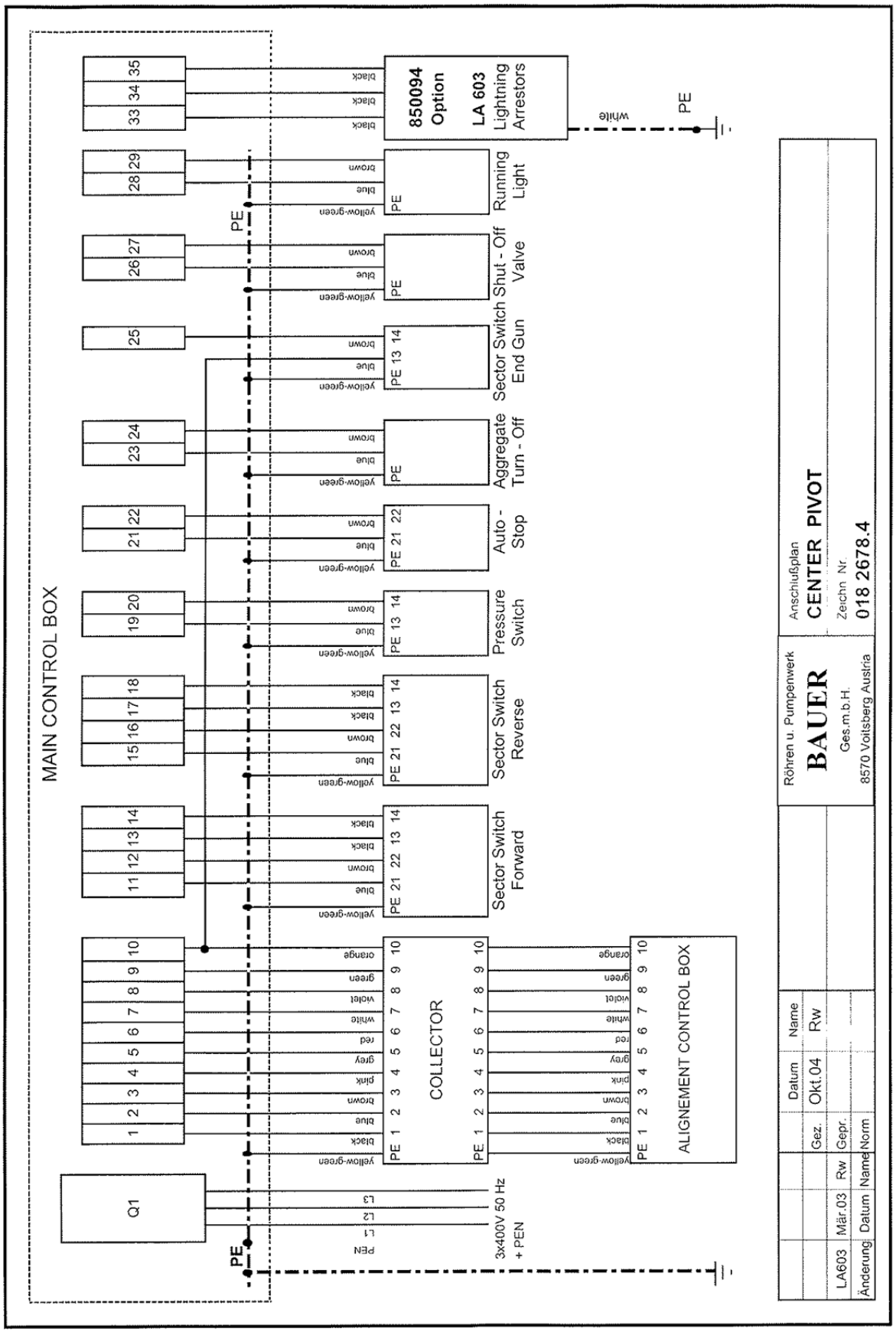
14.1.1 Pivot panel UNIVERSAL - infeed



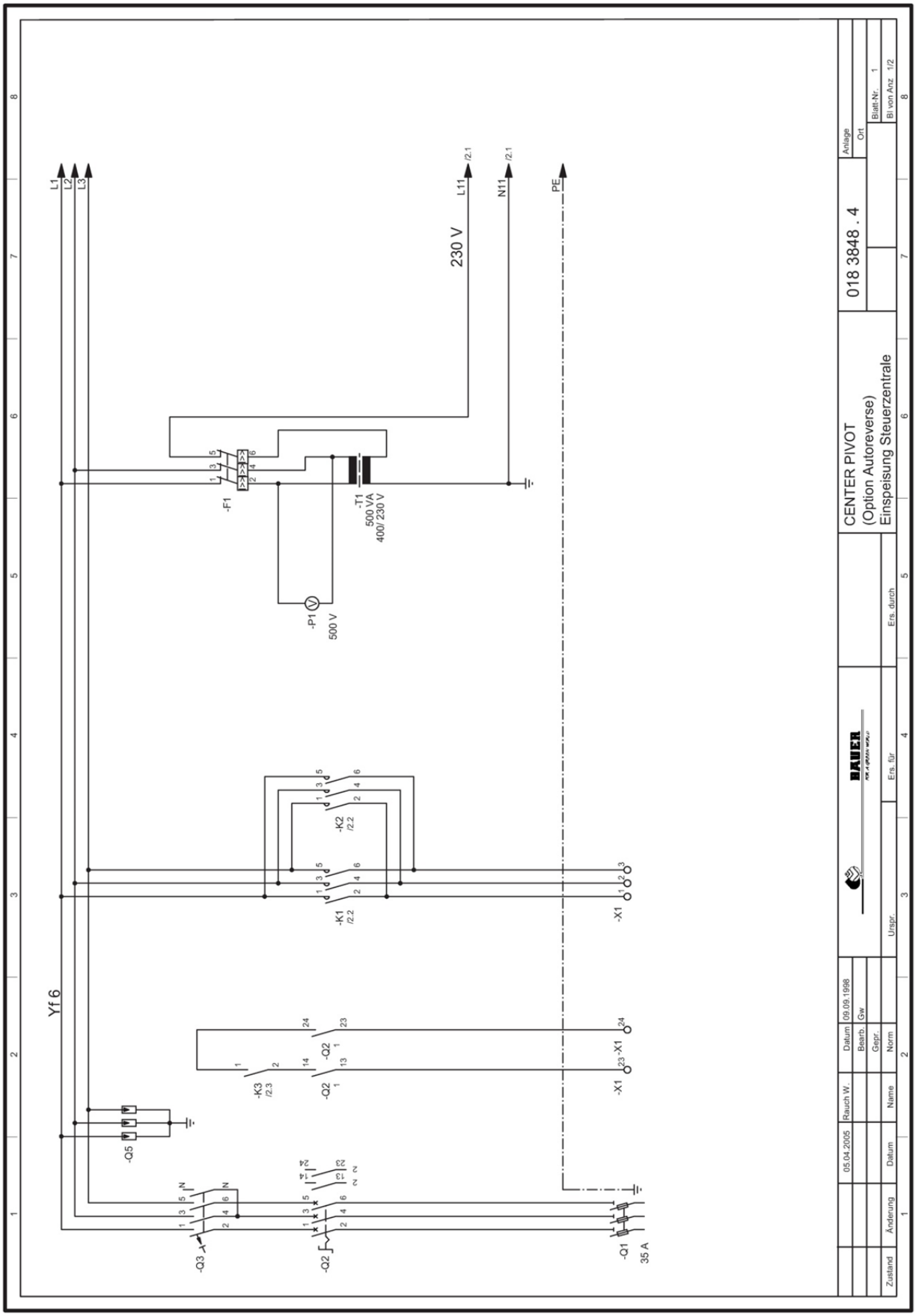
14.1.2 Pivot panel UNIVERSAL – control



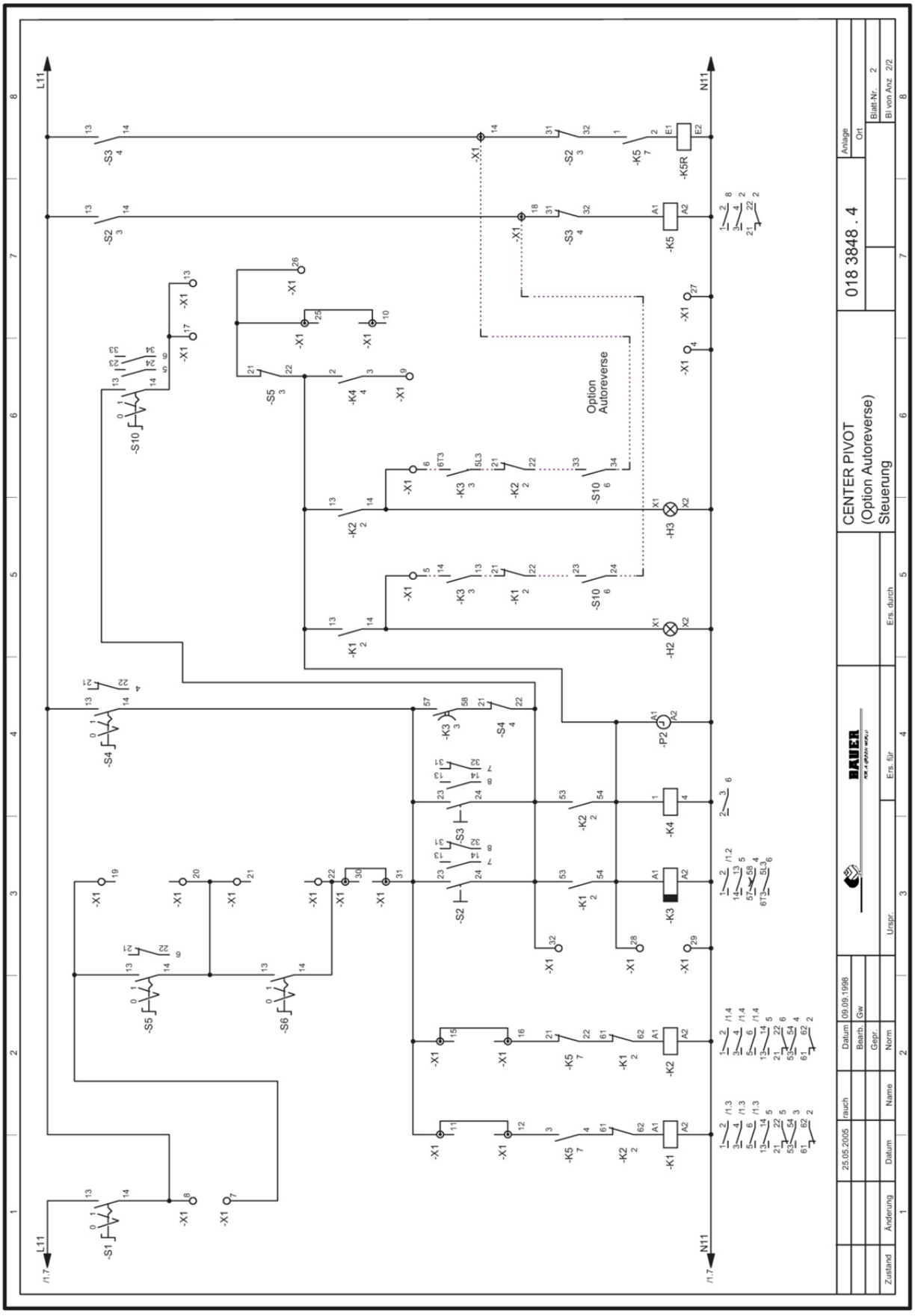
14.1.3 Pivot panel UNIVERSAL– wiring diagram



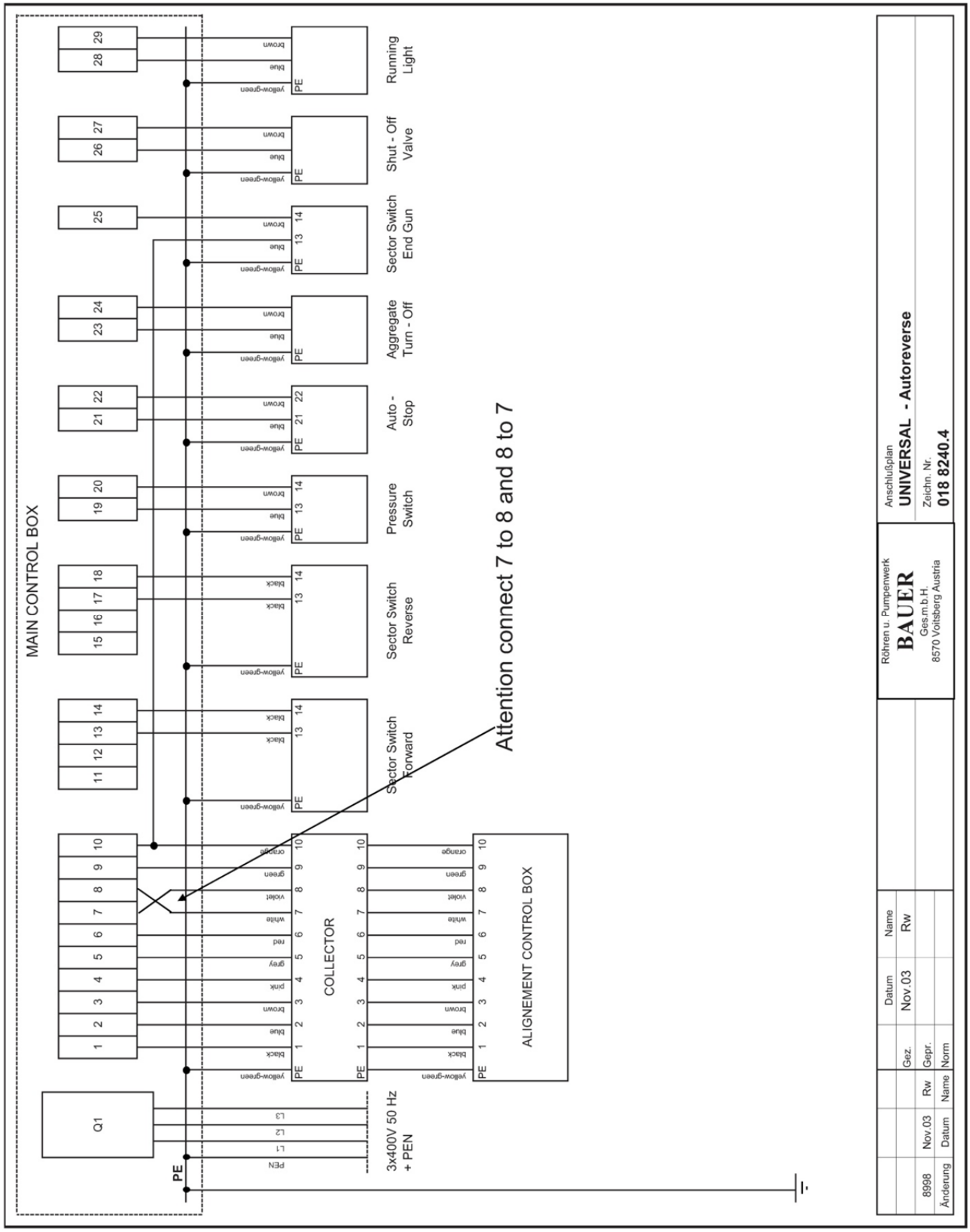
14.1.4 Pivot panel Universal with autoreverse – infeed



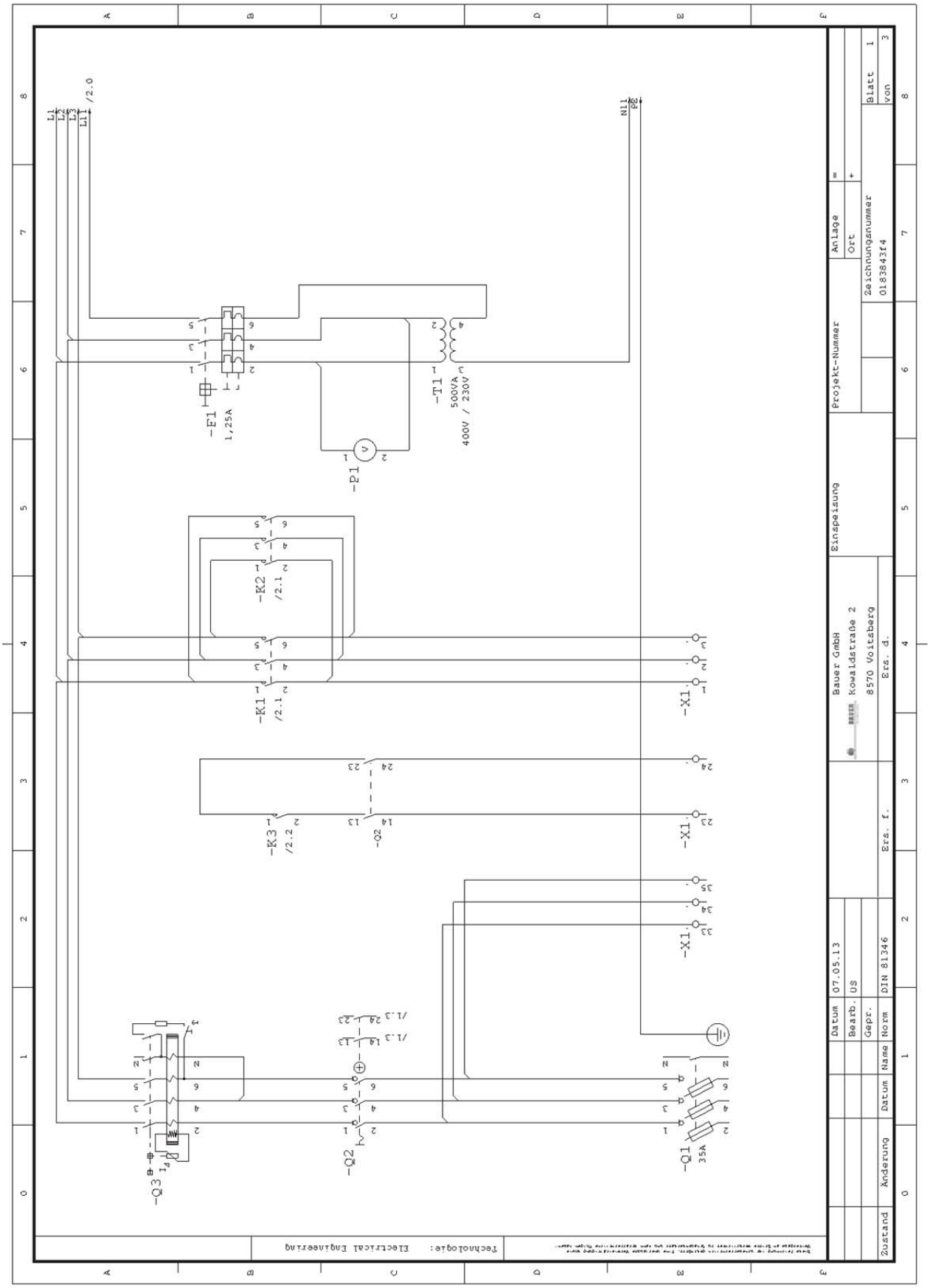
14.1.5 Pivot panel Universal with autoreverse - control



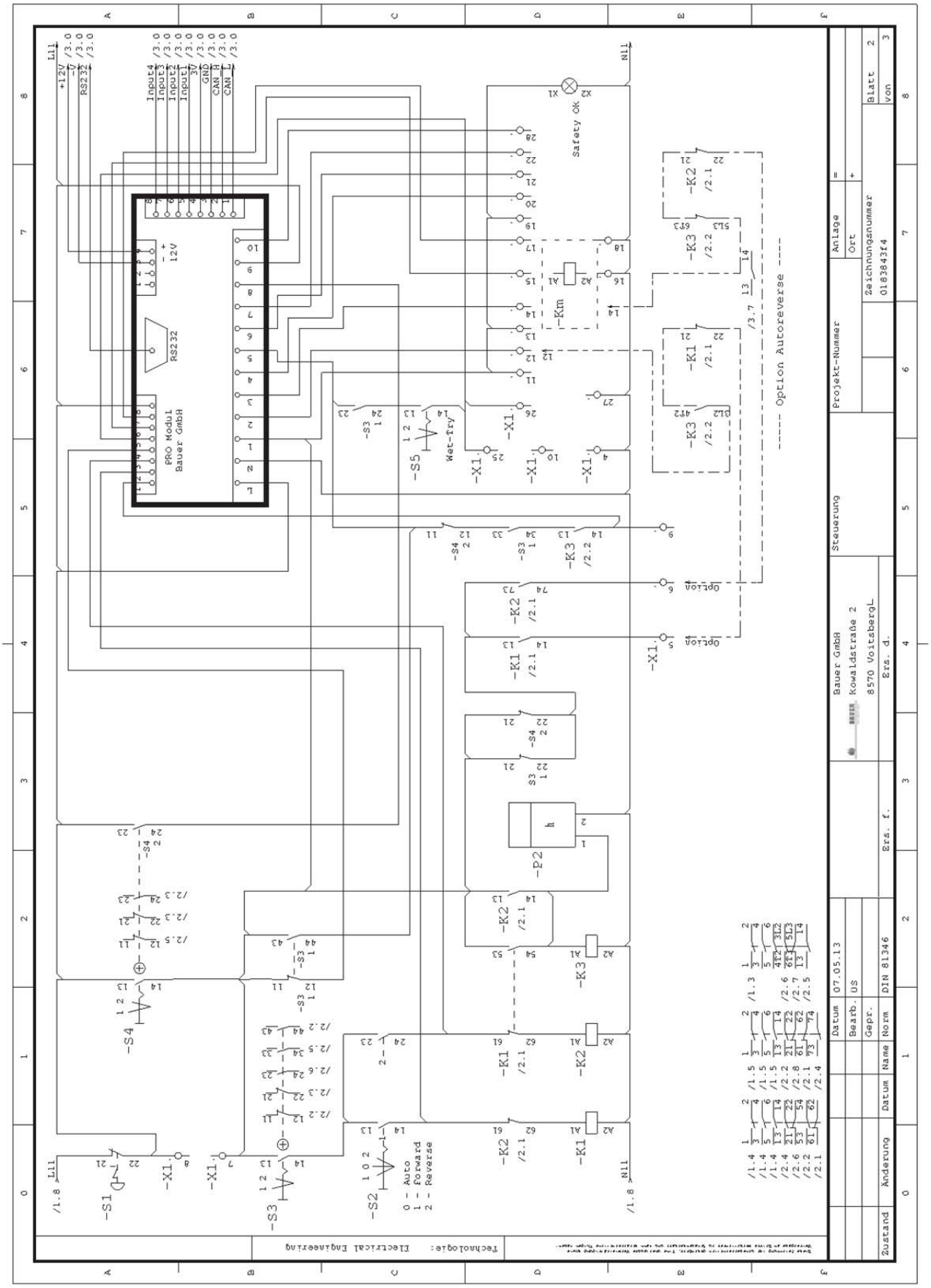
14.1.6 Pivot panel Universal with autoreverse – wiring diagram



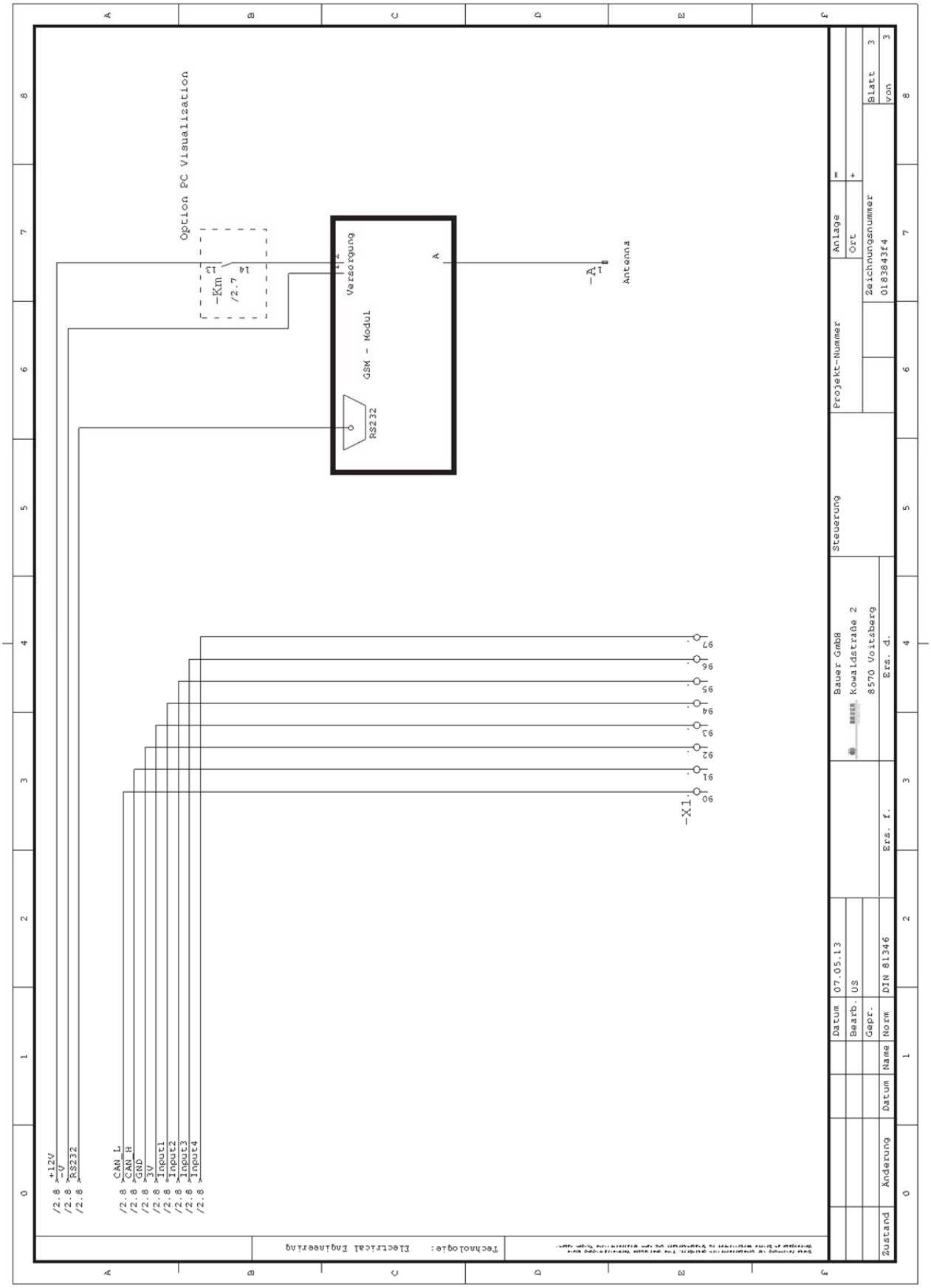
14.1.7 Pivot panel Universal PRO - infeed



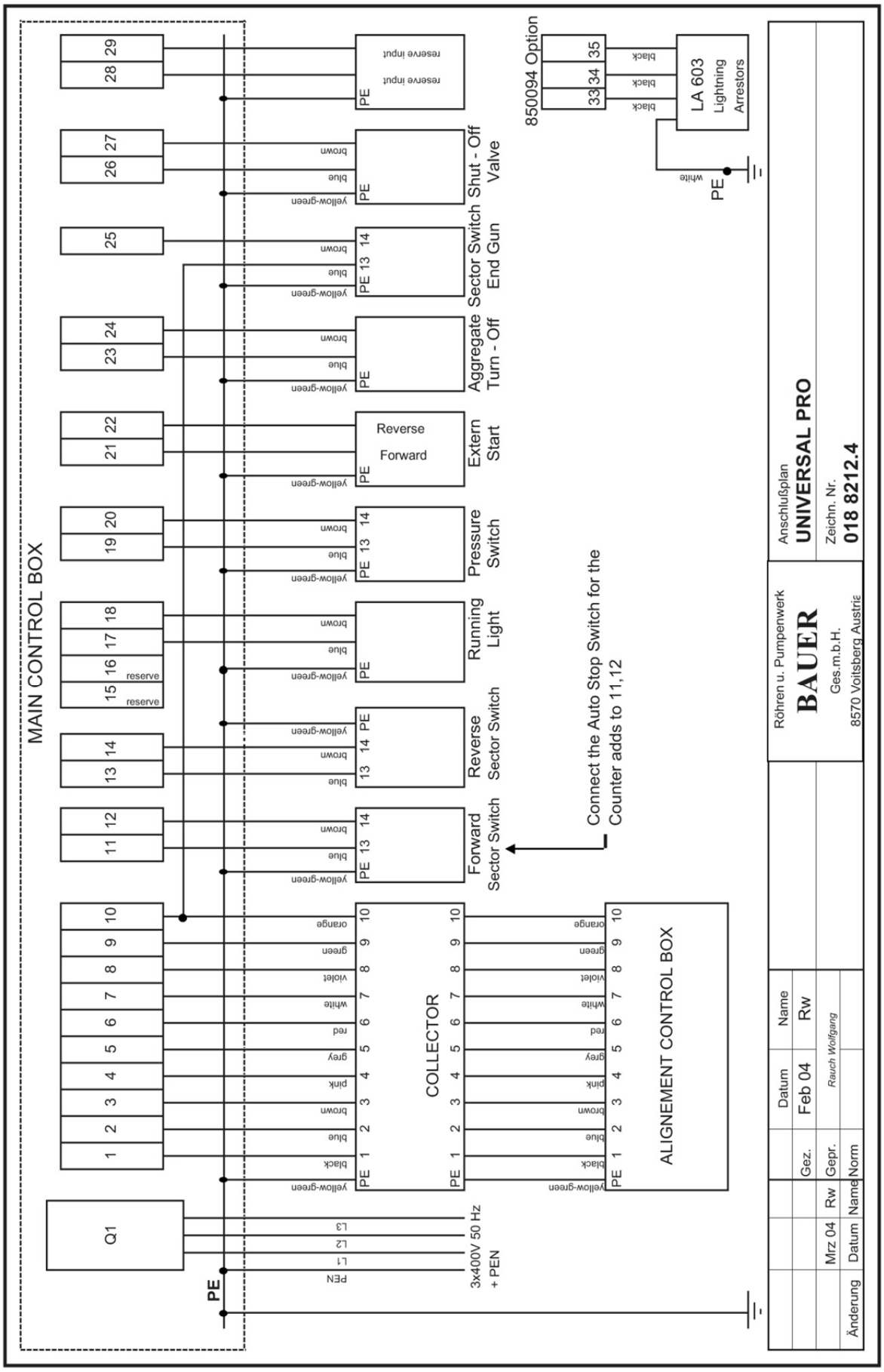
14.1.8 Pivot panel Universal PRO – control



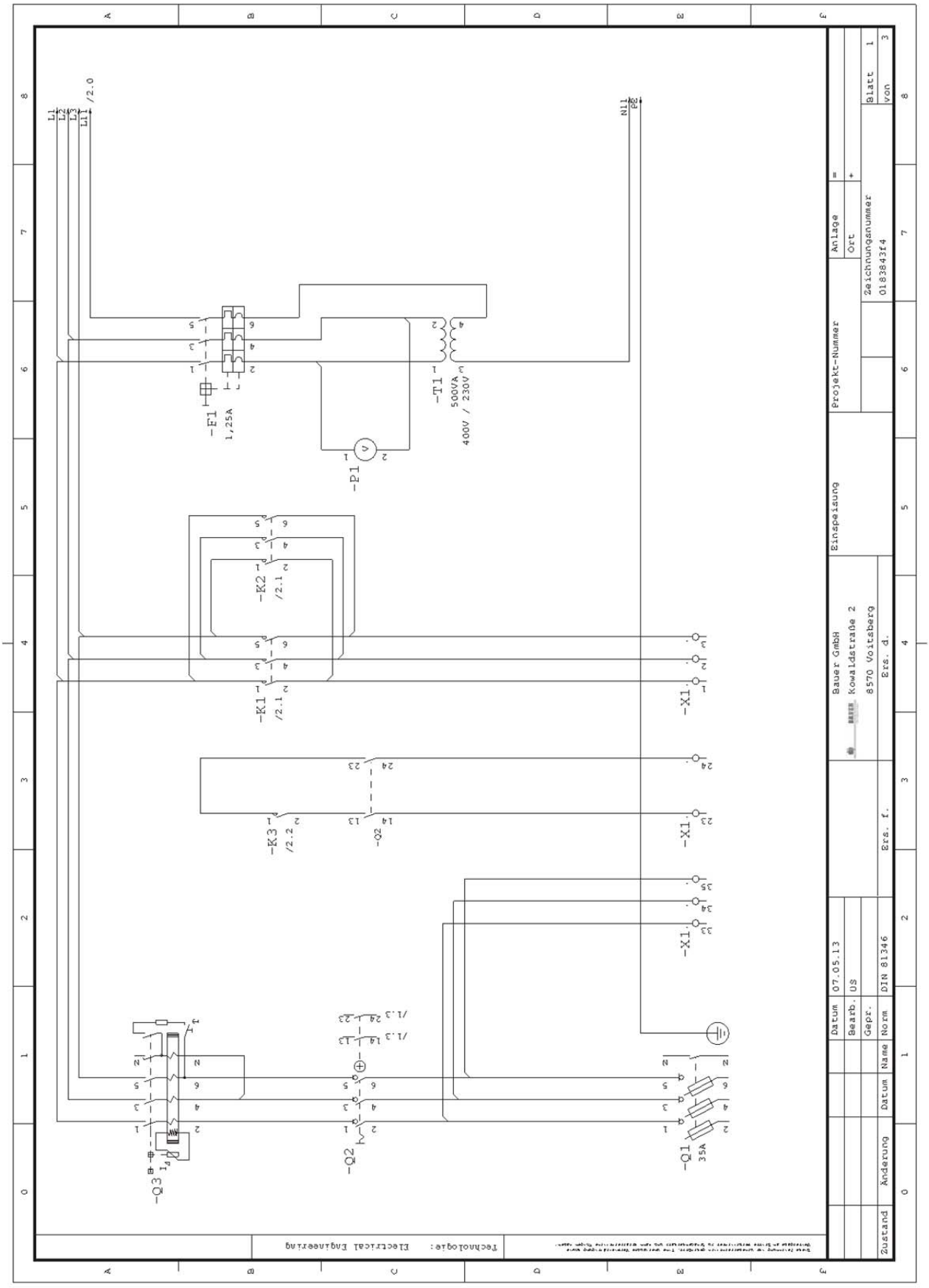
Pivot panel Universal PRO – control



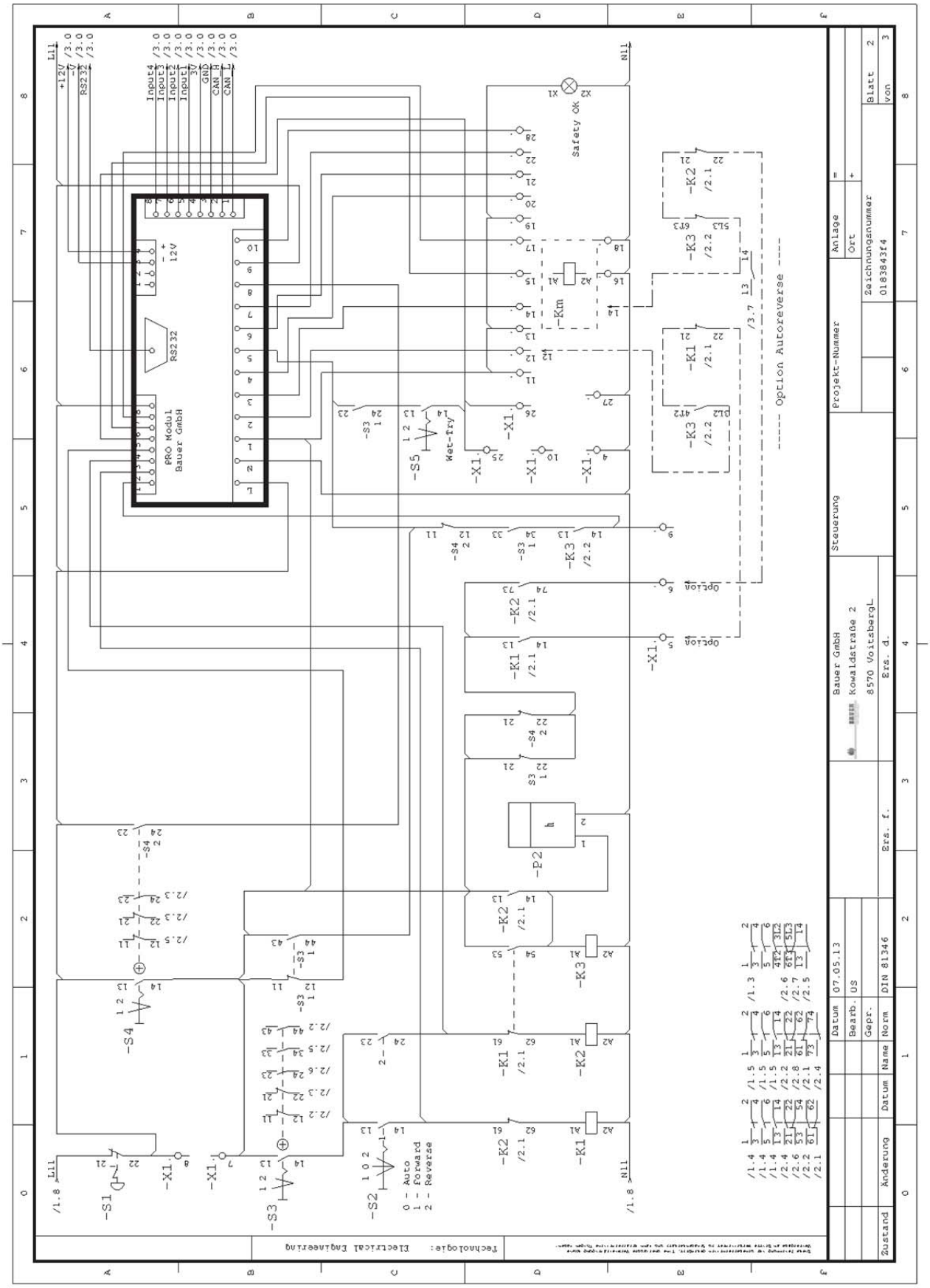
14.1.9 Pivot panel Universal PRO – wiring diagram



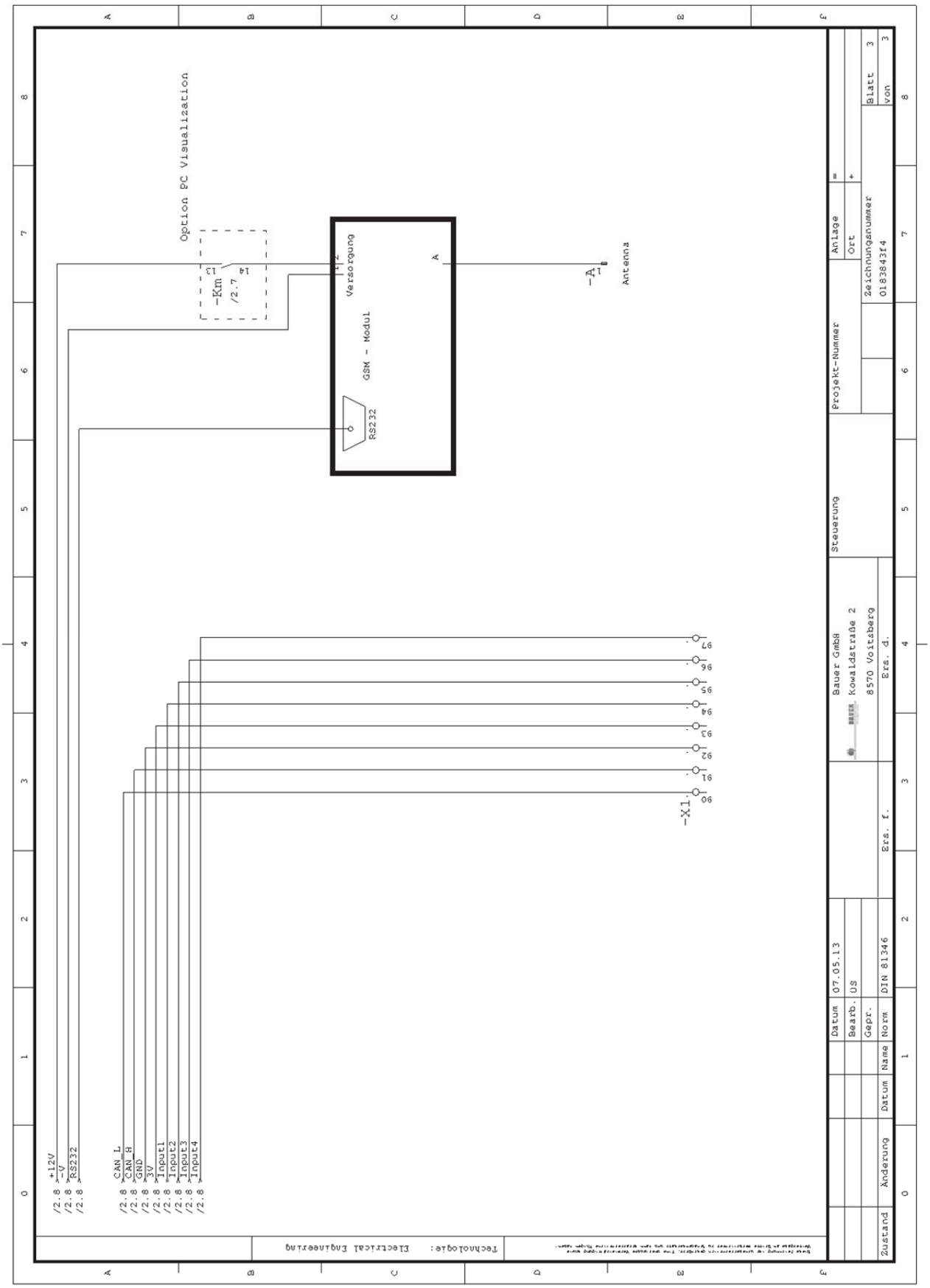
14.1.10 Pivot panel Universal PRO with autoreverse - infeed


L1
L2
L3
L11 /2.0
N11
PE
-F1
1,25A
-T1
500VA
400V / 230V
-P1
V
-K2
/2.1
-K1
/2.1
-K3
/2.2
-Q2
/1.3
-Q3
-Q1
35A
-X1
Einspeisung
Projekt-Nummer
Anlage
Ort
Zeichnungsnummer
018843f4
Blatt 1
von 3
Bauer GmbH
Kowaldstraße 2
8570 Voitsberg
Ers. d.
Ers. f.
Datum 07.05.13
Bearb. US
Gepr.
Norm DIN 81346
Name
Datum
Änderung
Zustand
Technologie: Electrical Engineering

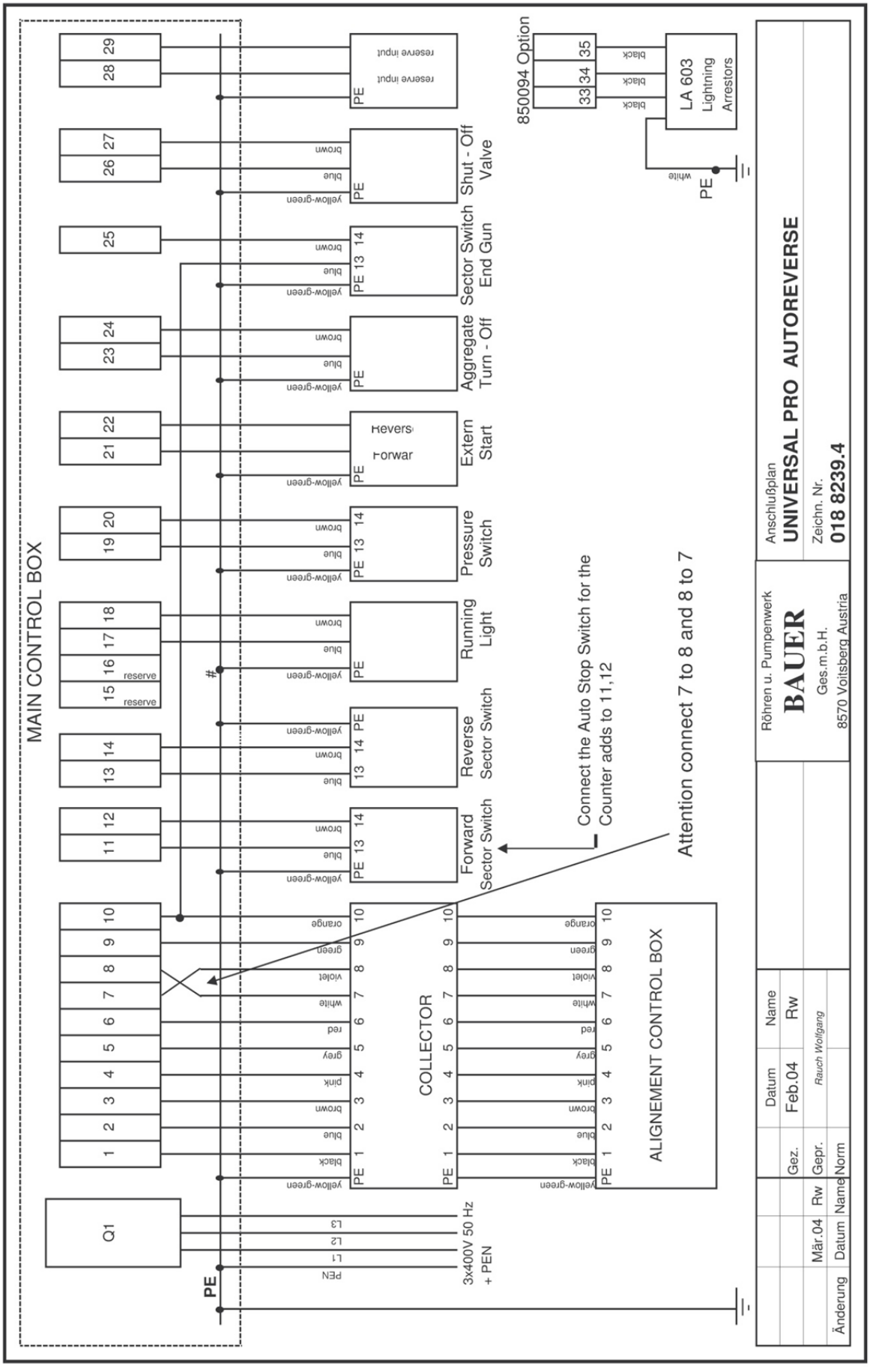
14.1.11 Pivot panel Universal PRO with autoreverse - control



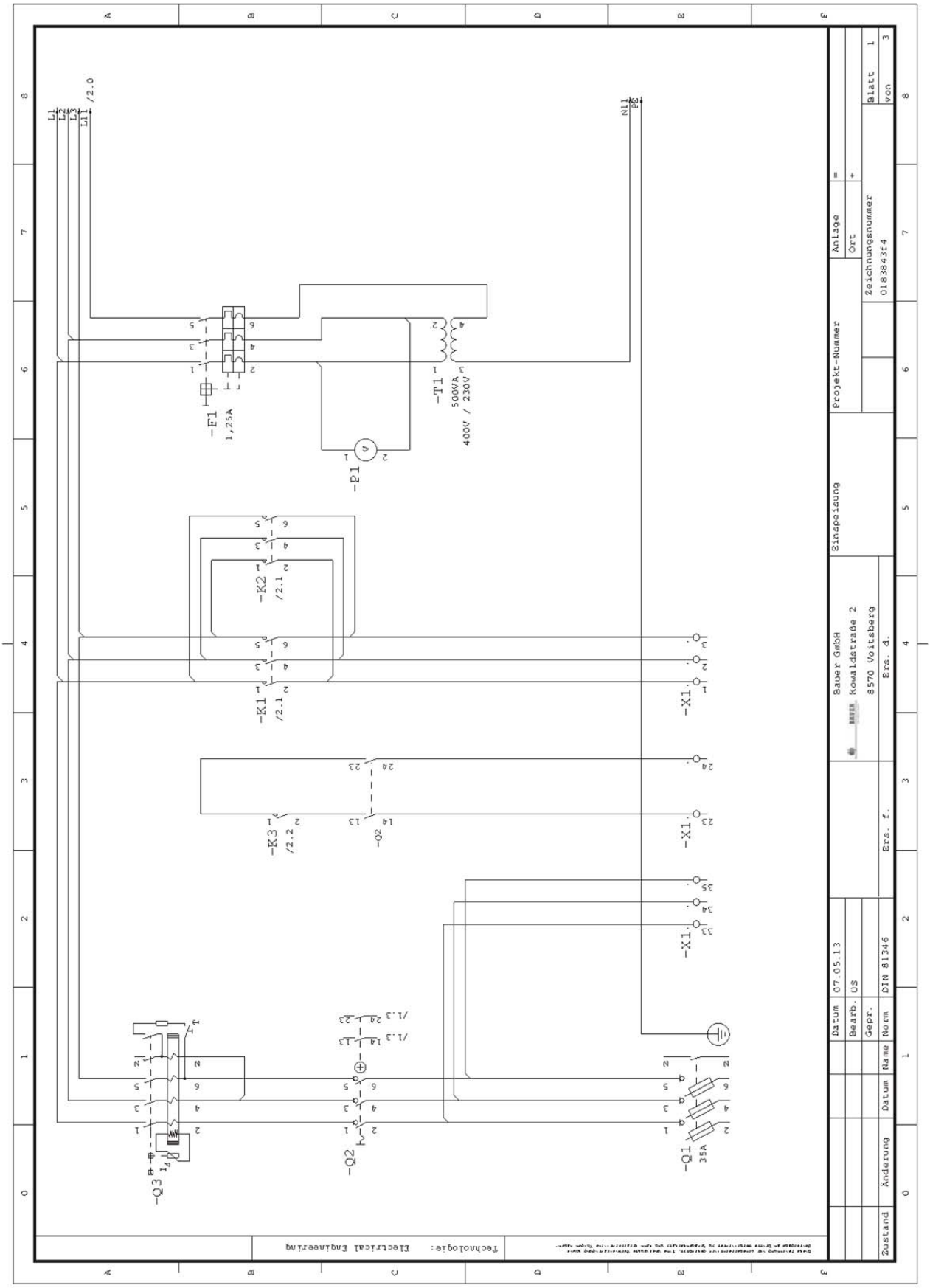
Pivot panel Universal PRO with autoreverse - control



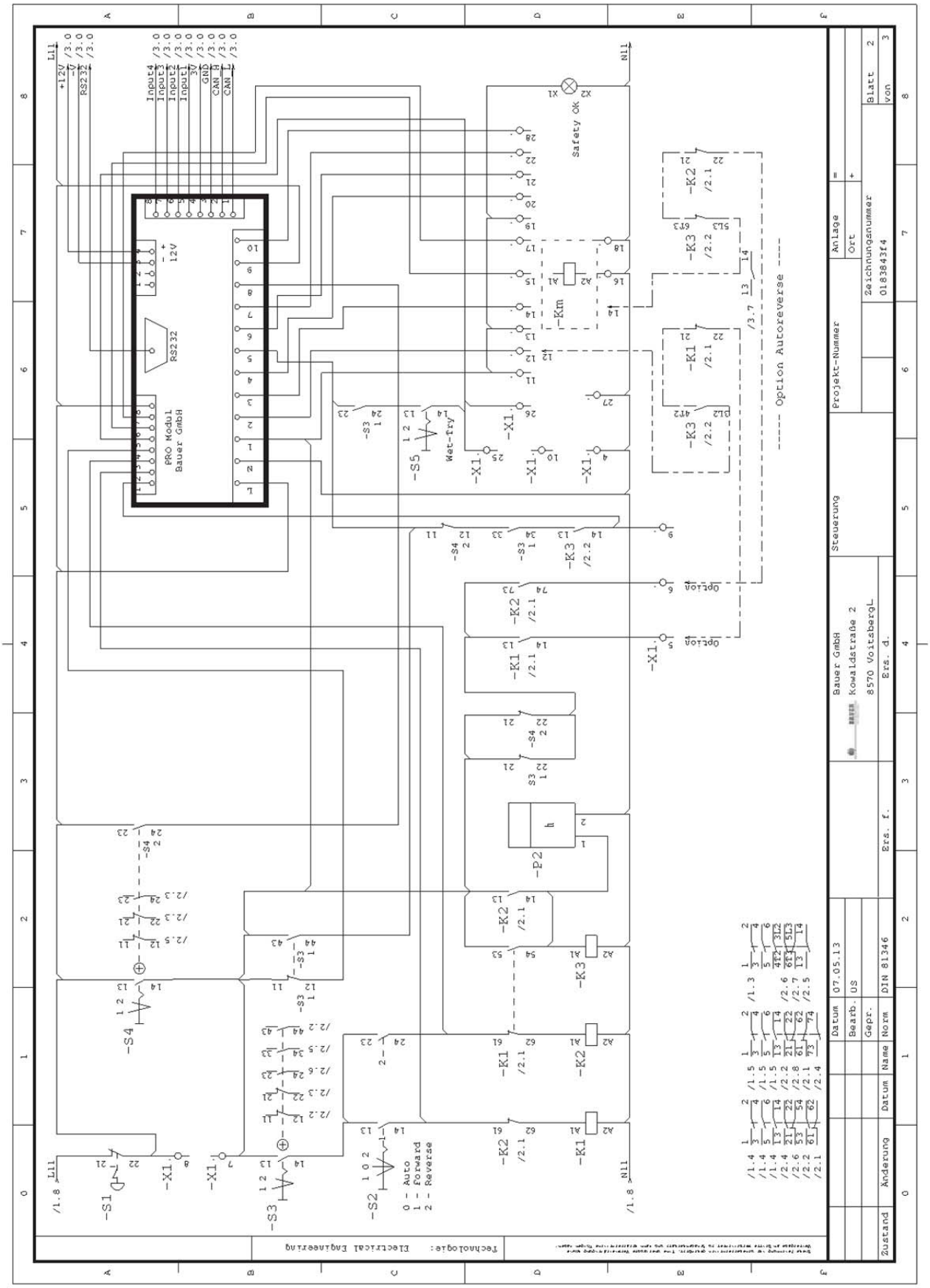
14.1.12 Pivot panel Universal PRO with autoreverse – wiring diagram



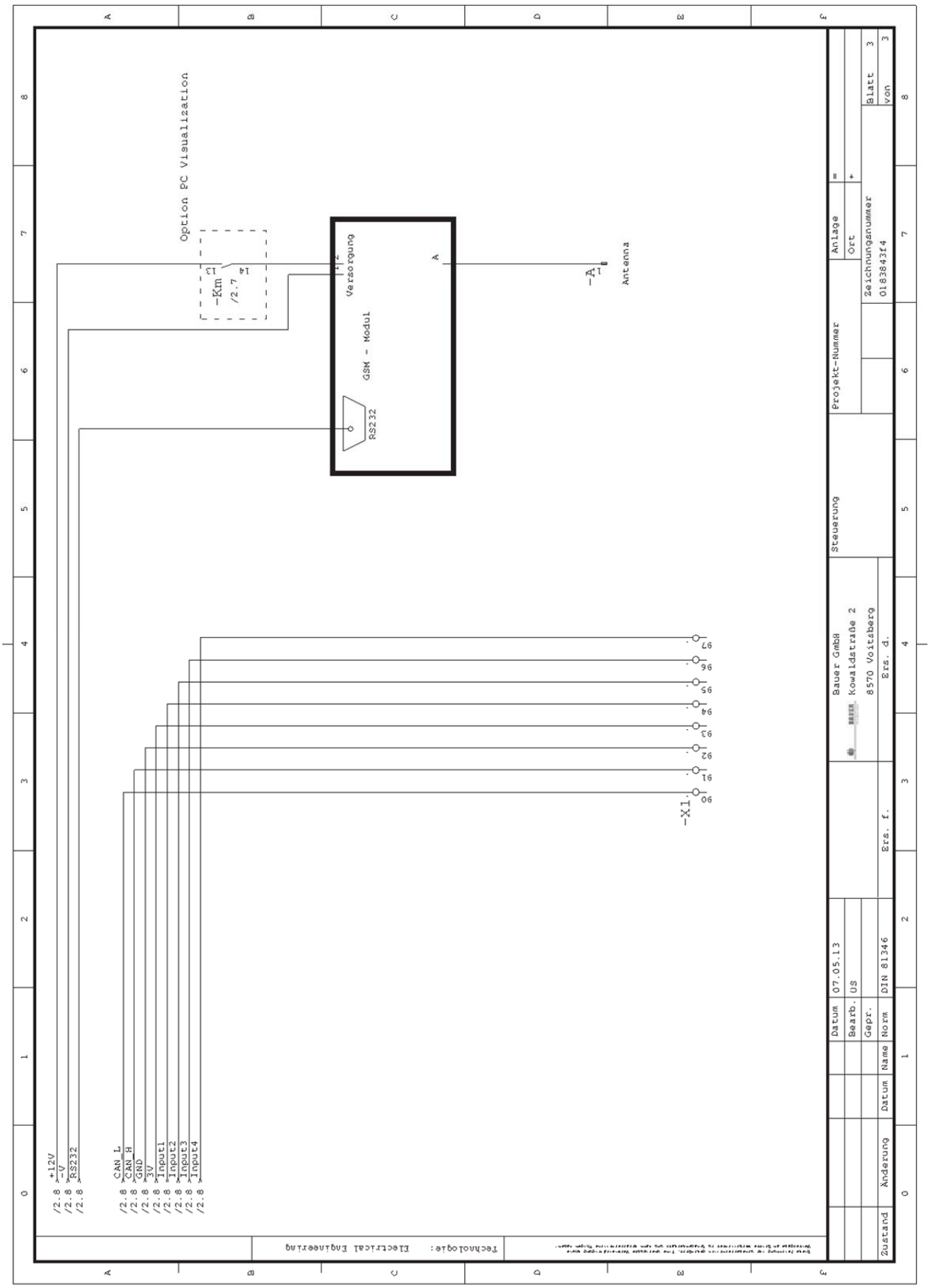
14.1.13 Pivot panel Universal PRO-G - infeed



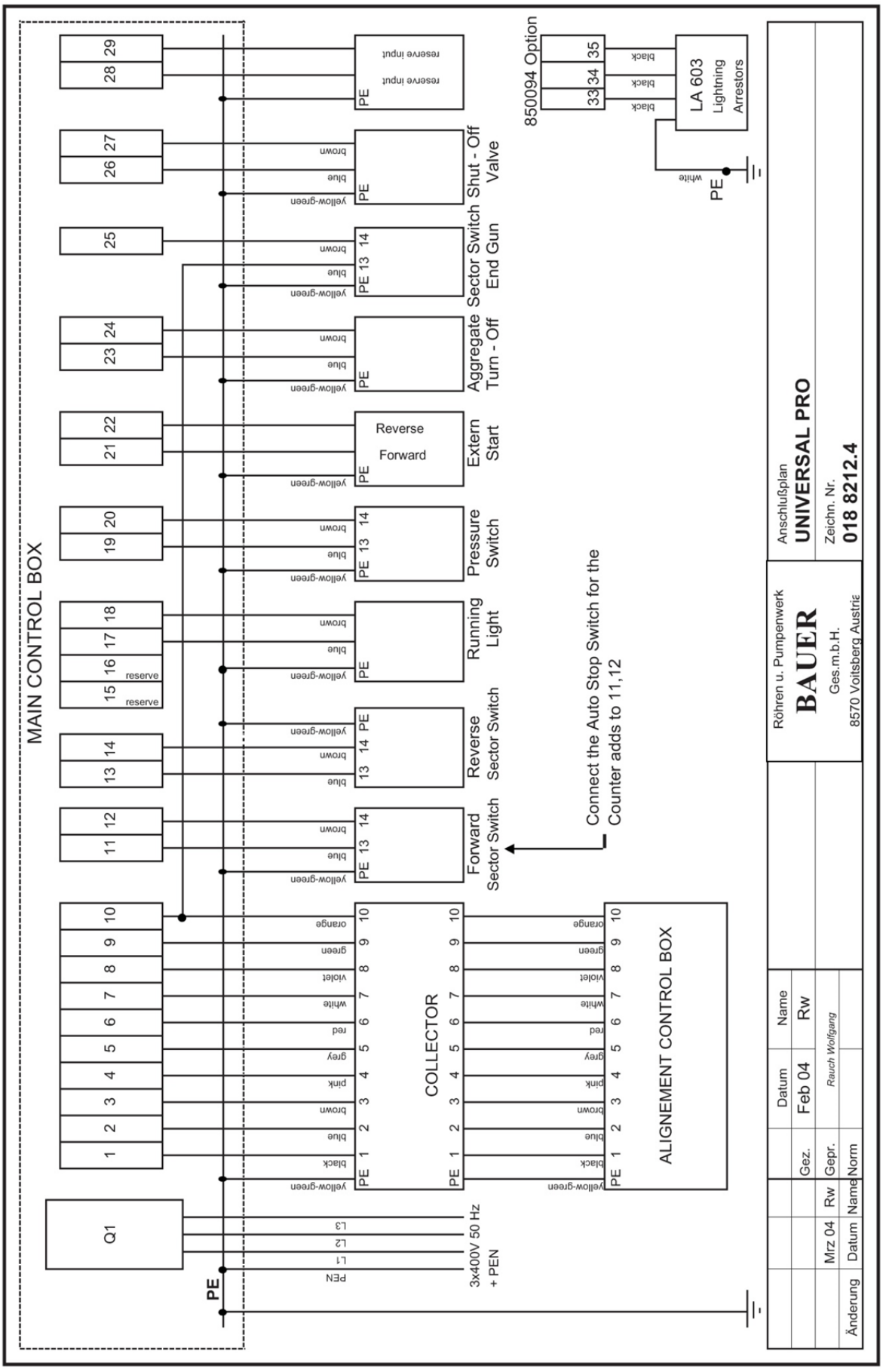
14.1.14 Pivot panel Universal PRO-G - control



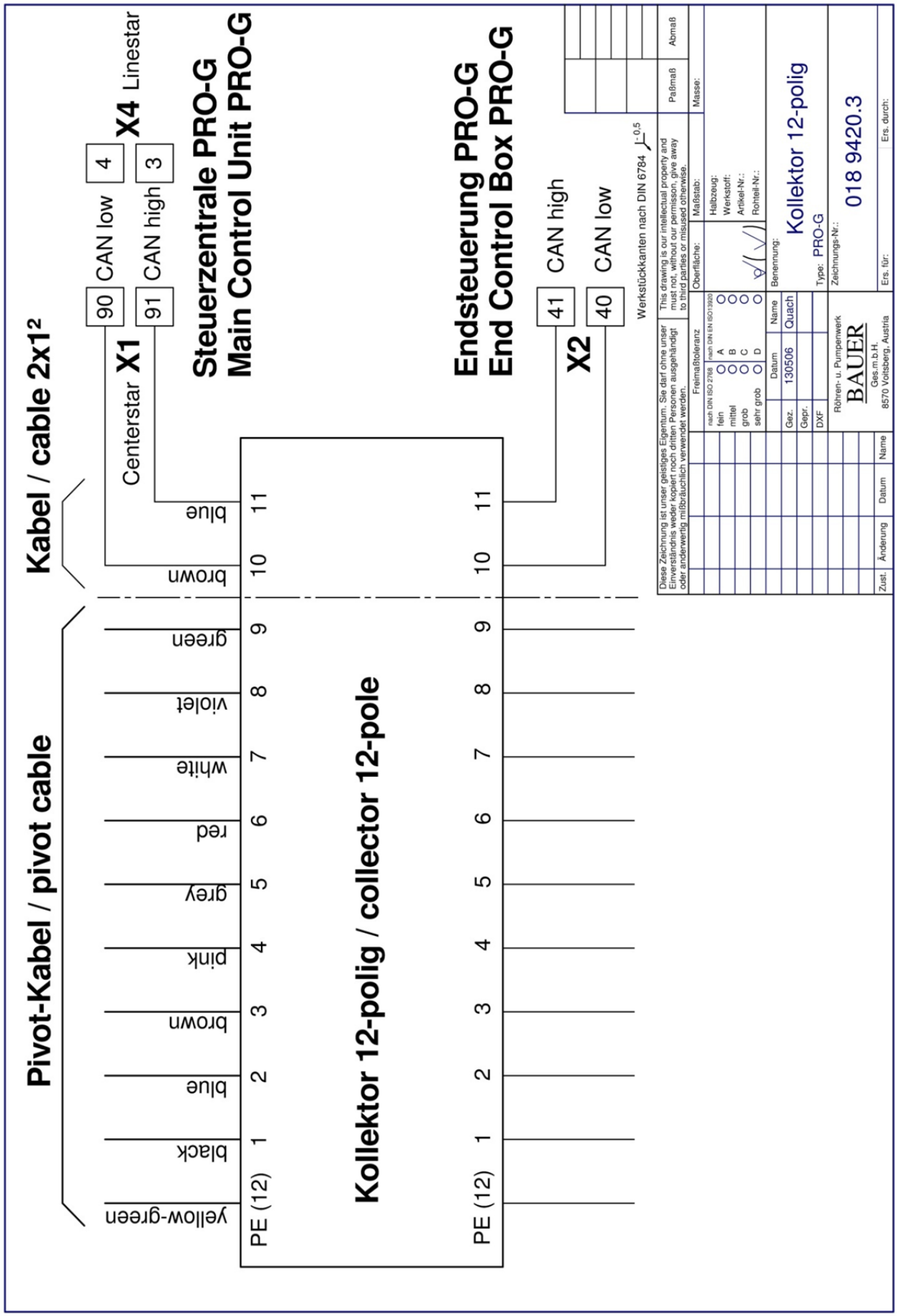
Pivot panel Universal PRO-G - control



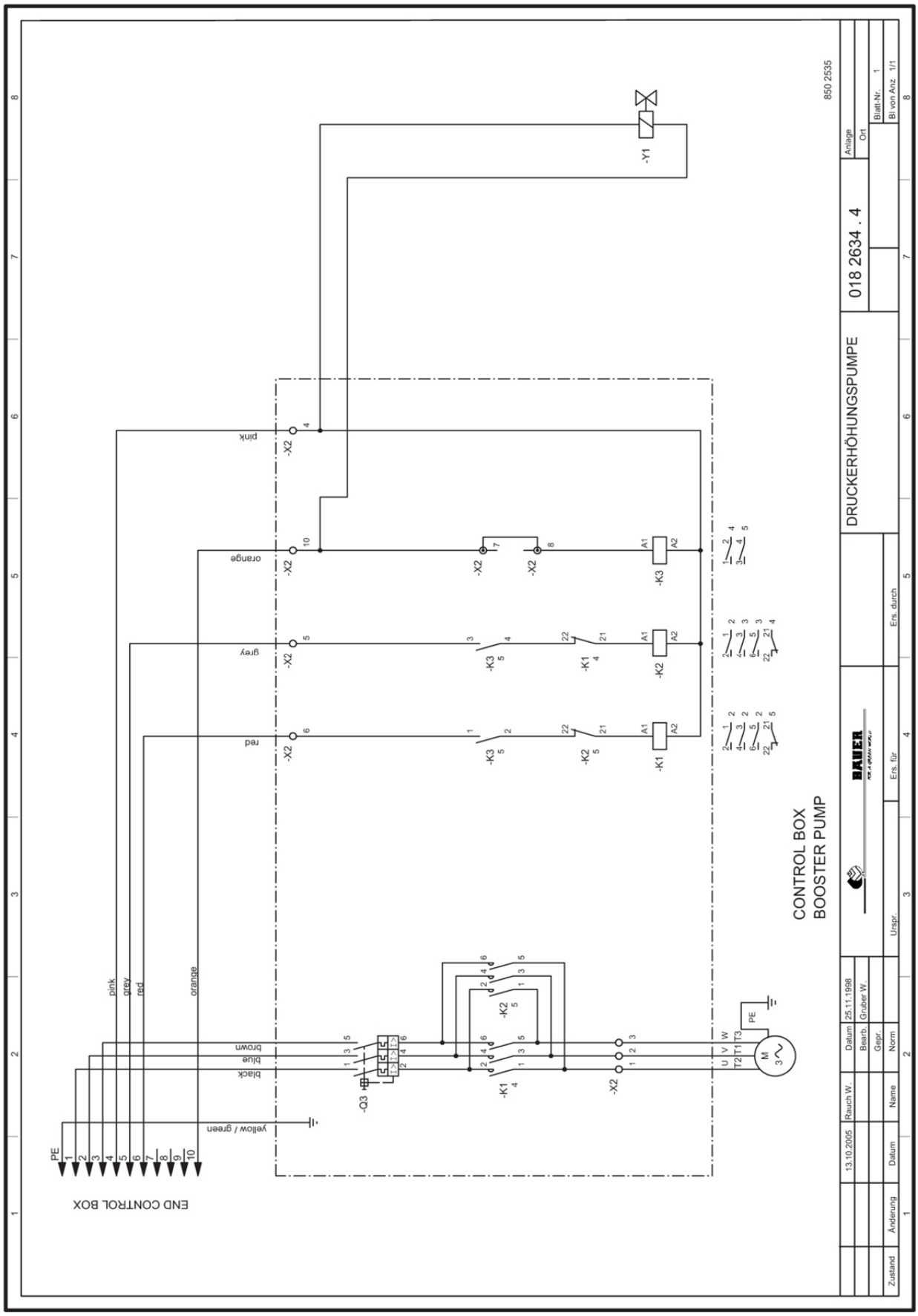
14.1.15 Pivot panel Universal PRO-G – wiring diagram



14.1.16 Pivot panel Universal PRO-G – wiring diagram

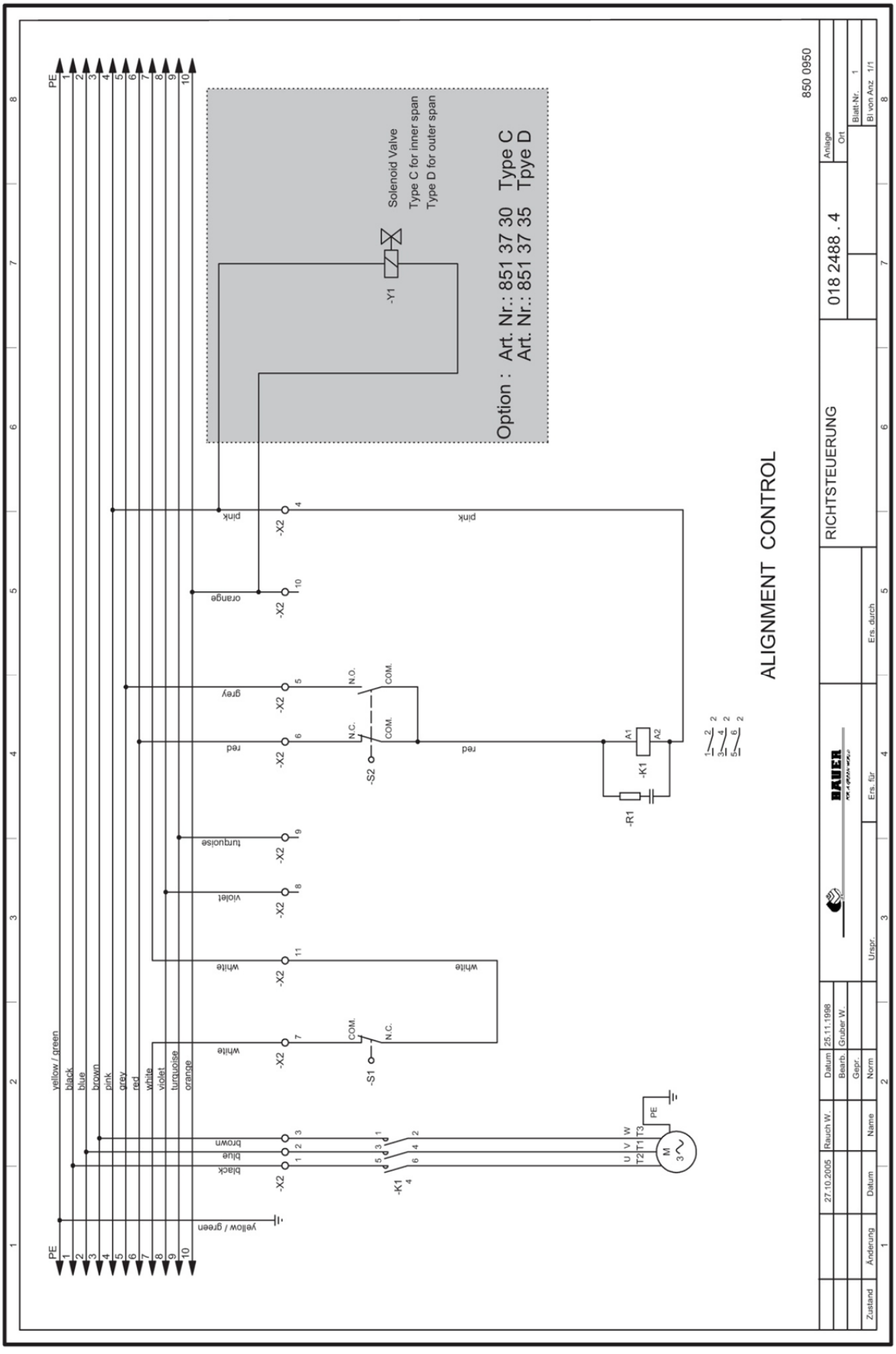


14.2 **BOOSTER PUMP FOR ENDGUN**

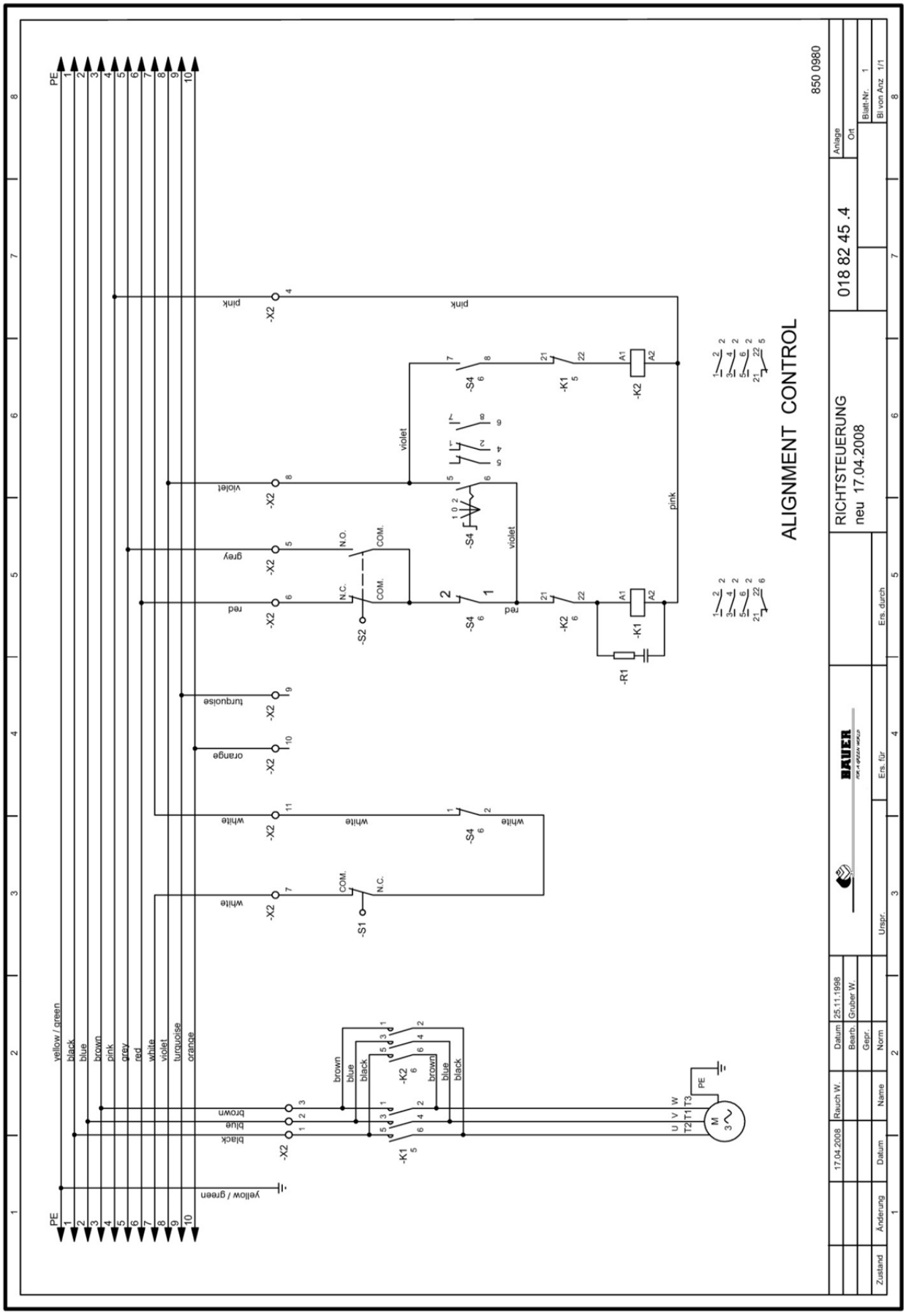


14.3 TOWER BOX

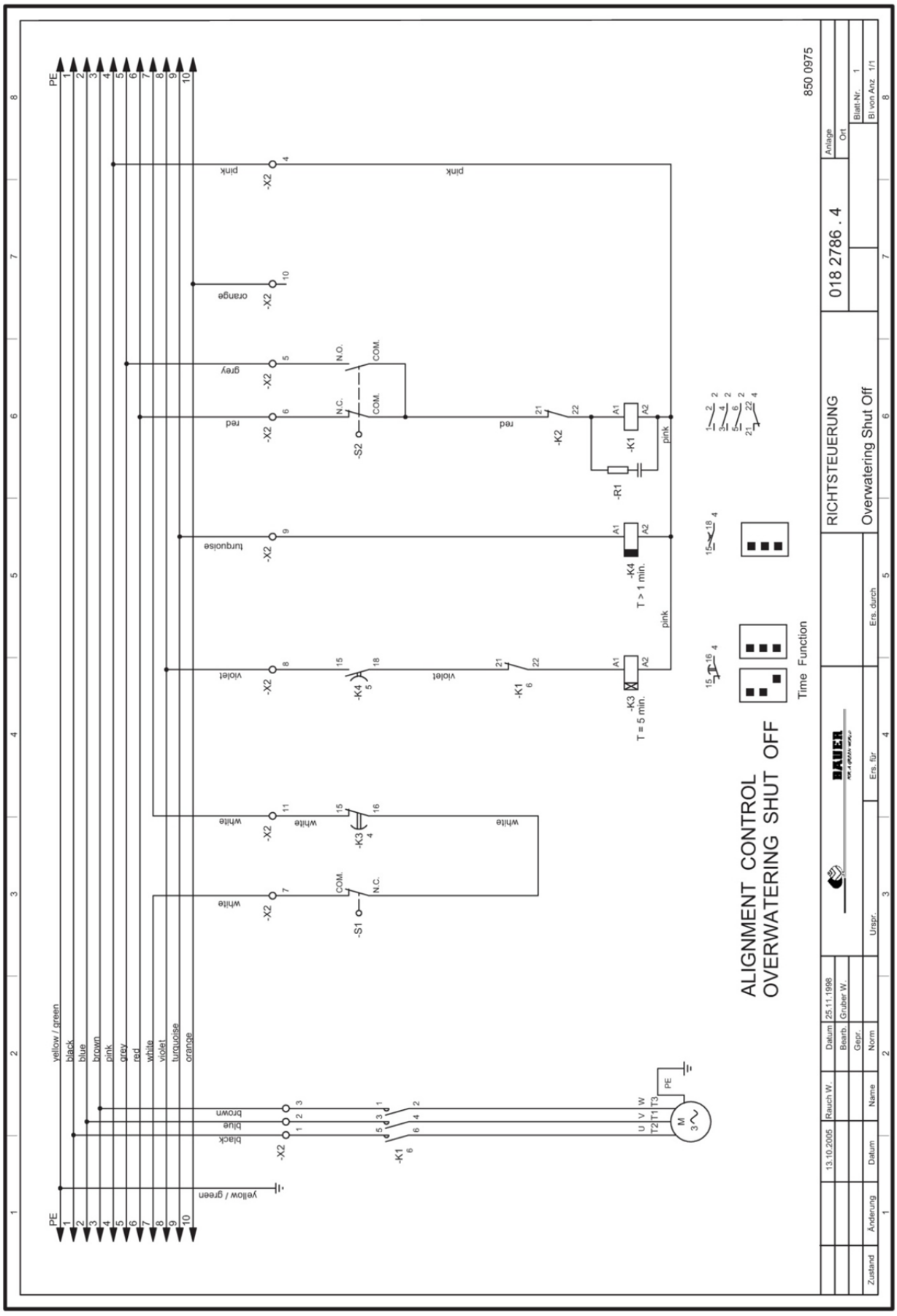
14.3.1 Tower box standard



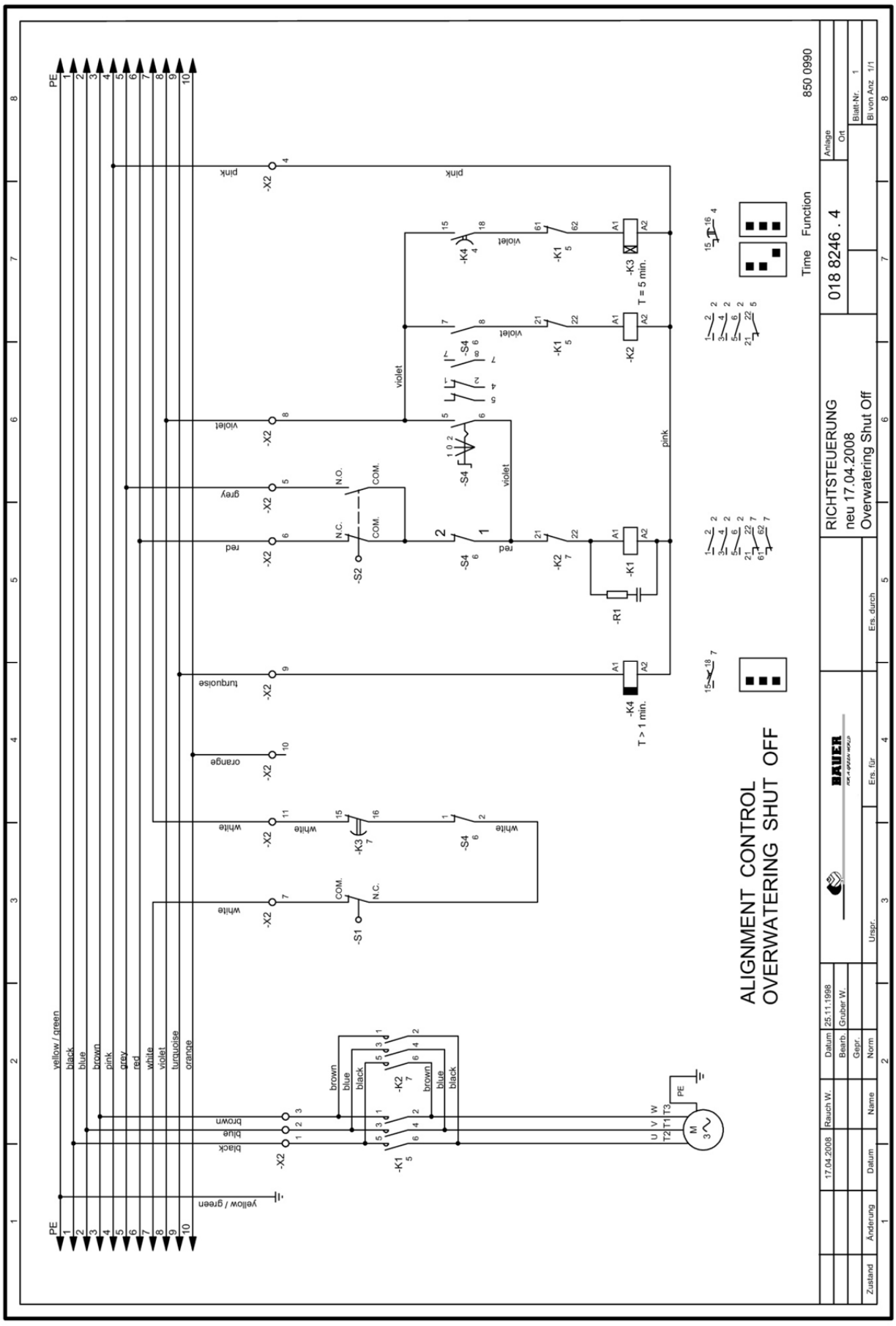
14.3.2 Tower box with tower alignment switch



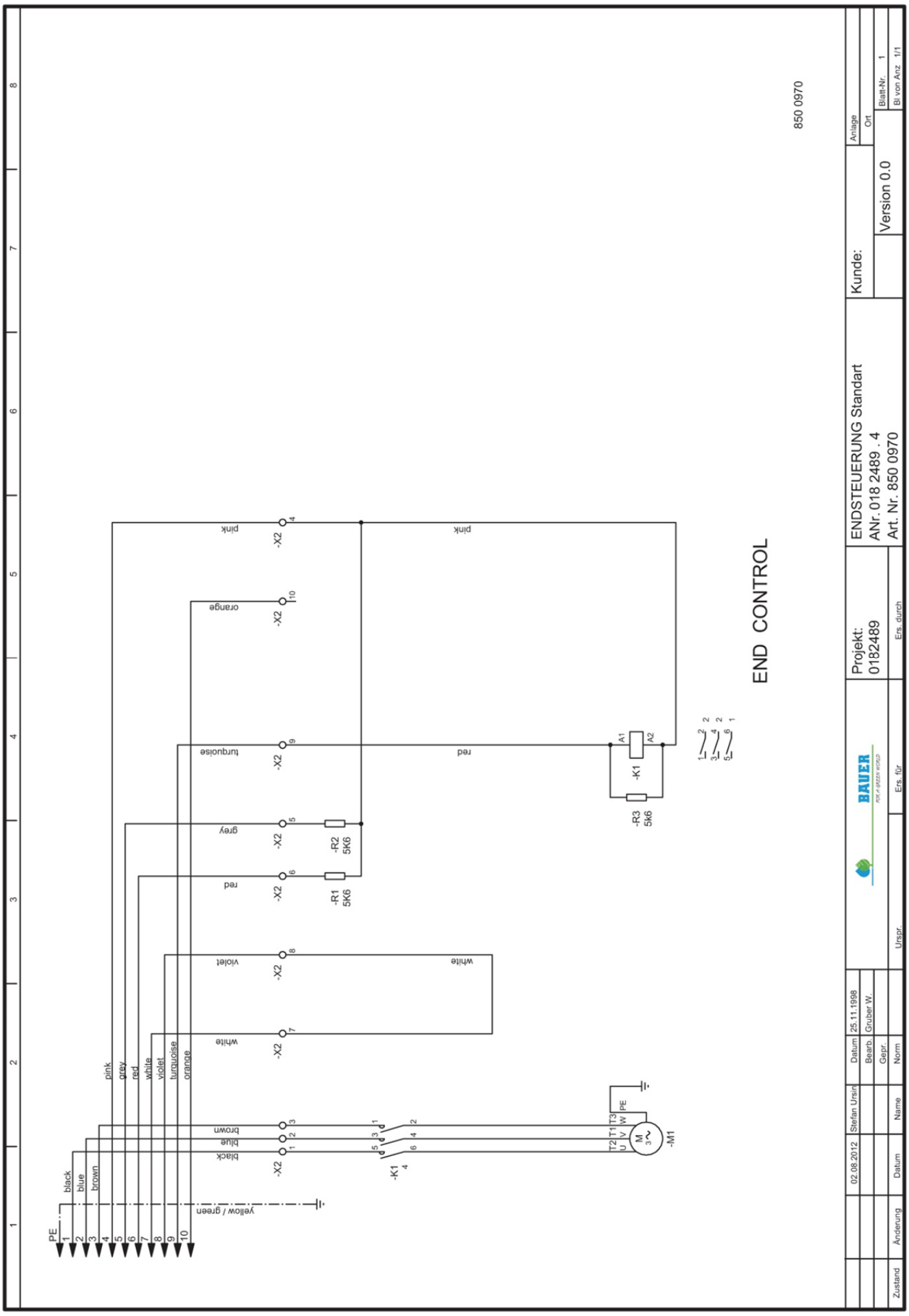
14.3.3 Tower box with running control



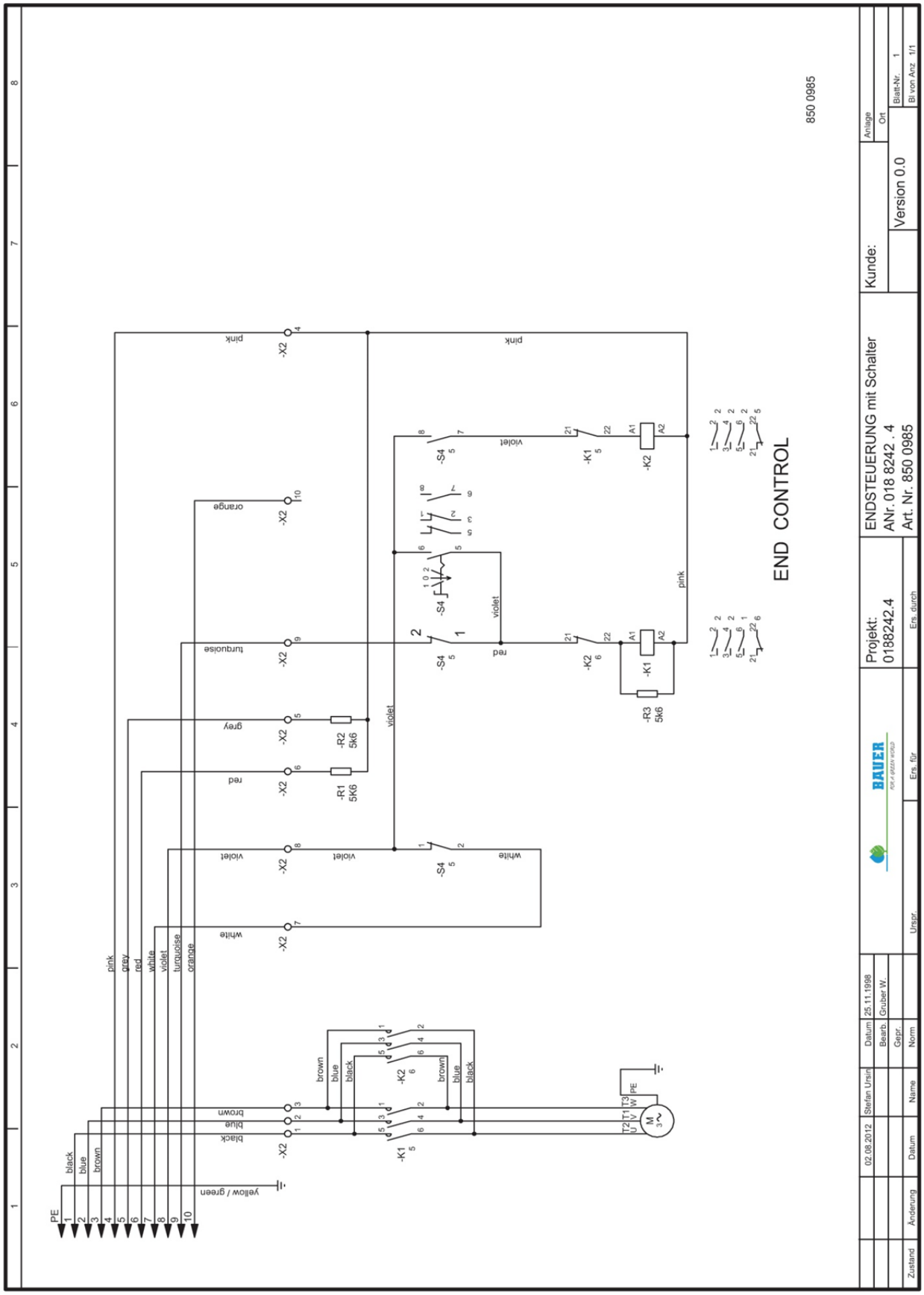
14.3.4 Tower box with tower alignment switch and running control



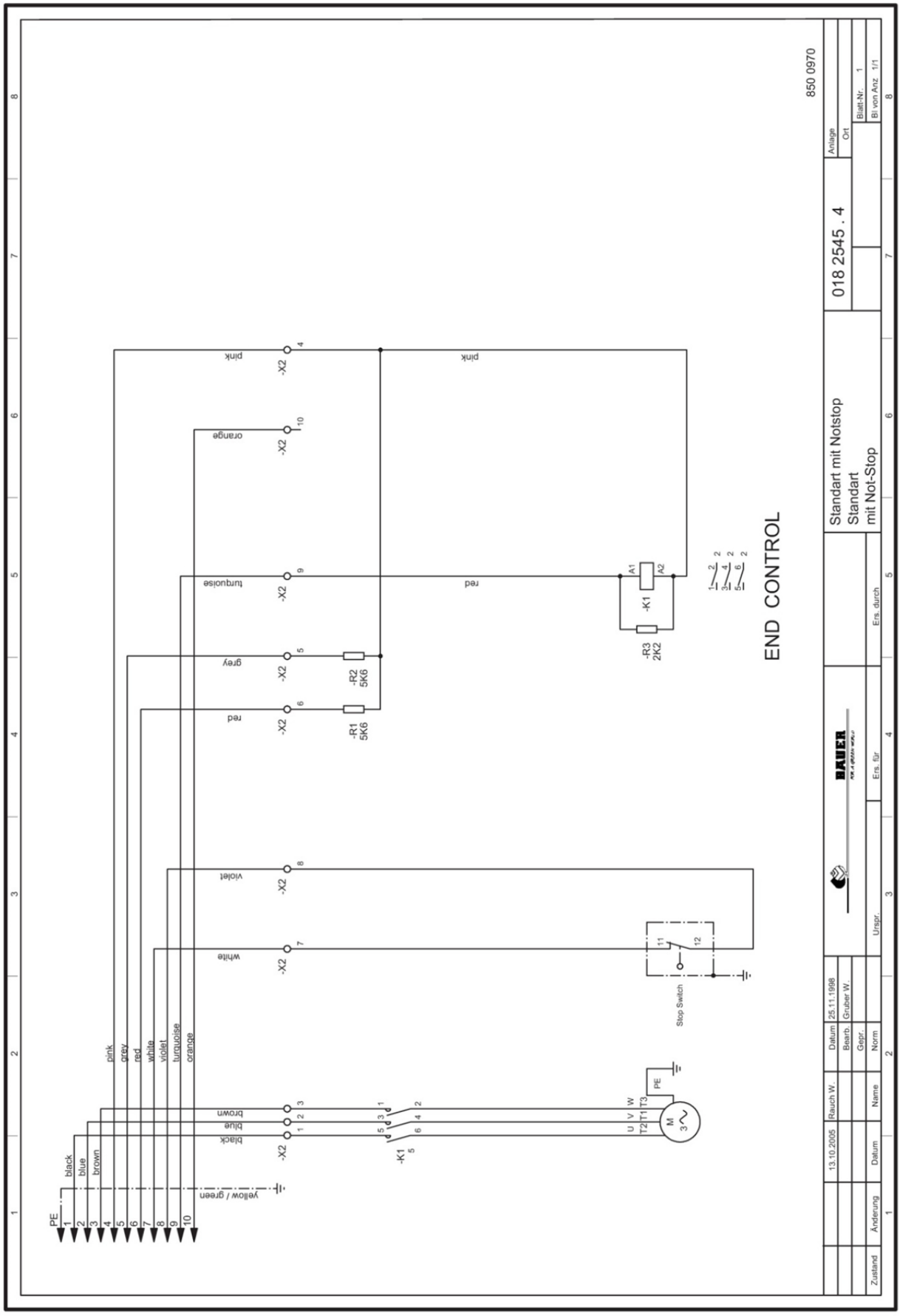
14.3.5 End control standard



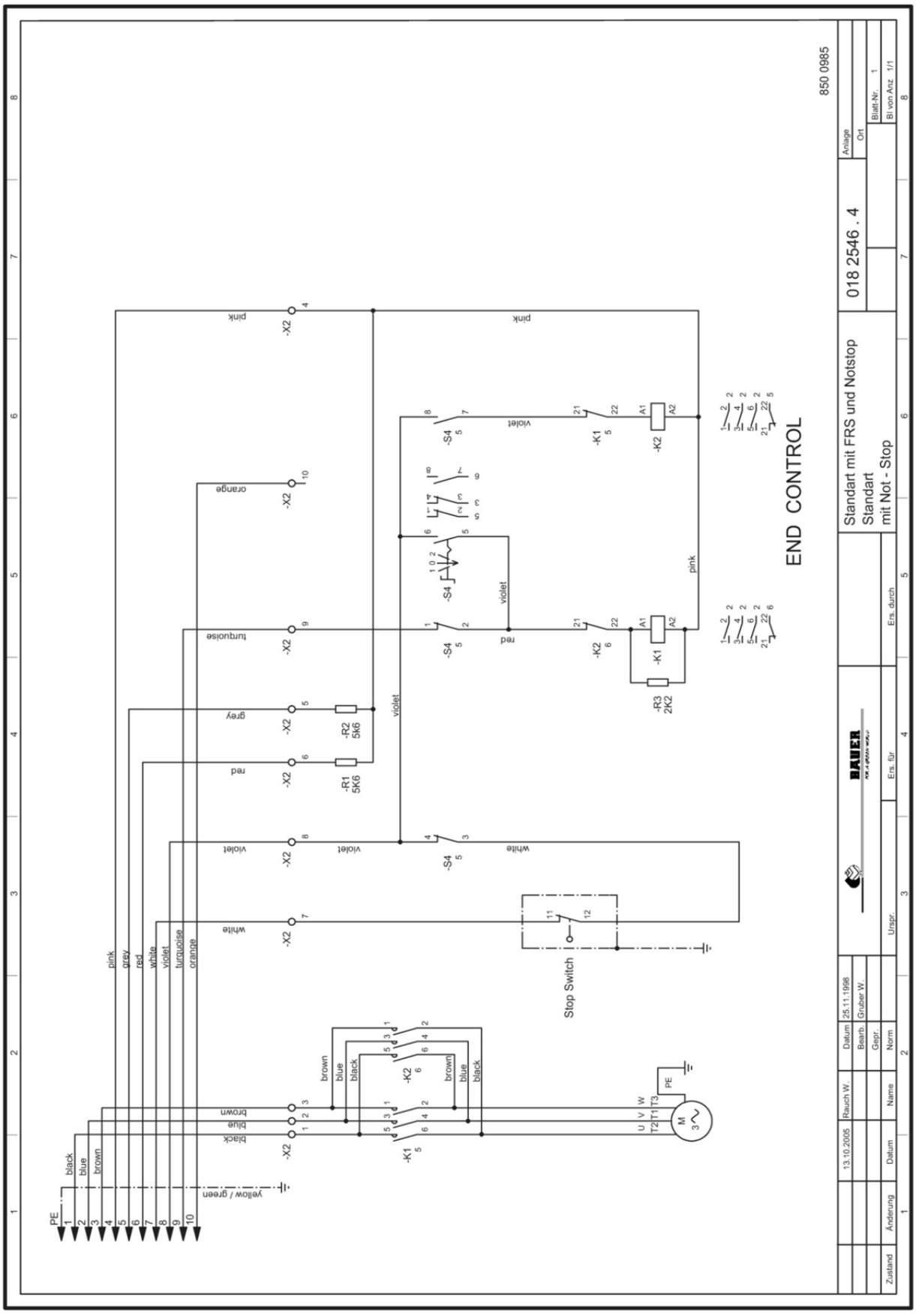
14.3.6 End control with tower alignment switch



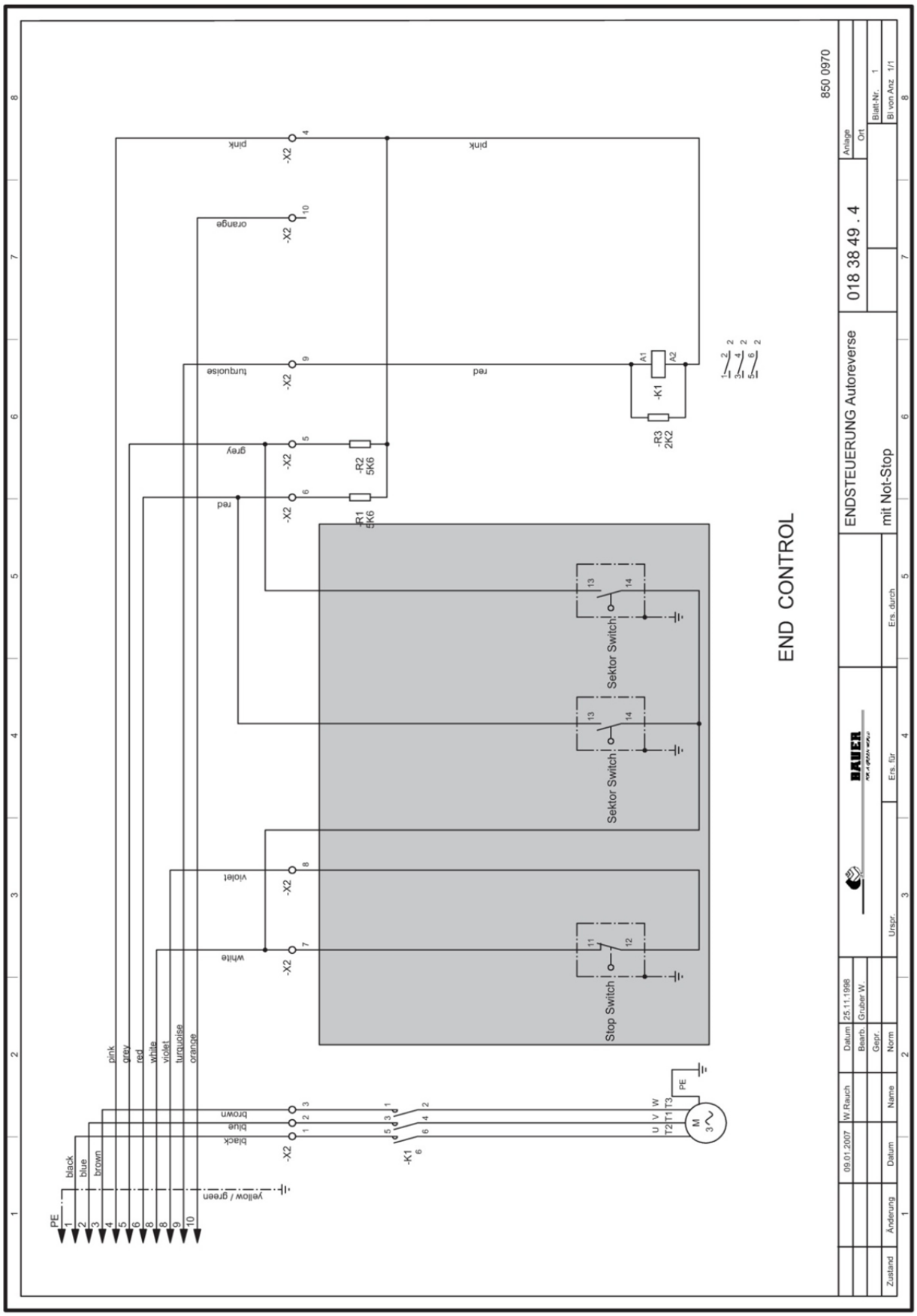
14.3.7 End control standard with limit stop



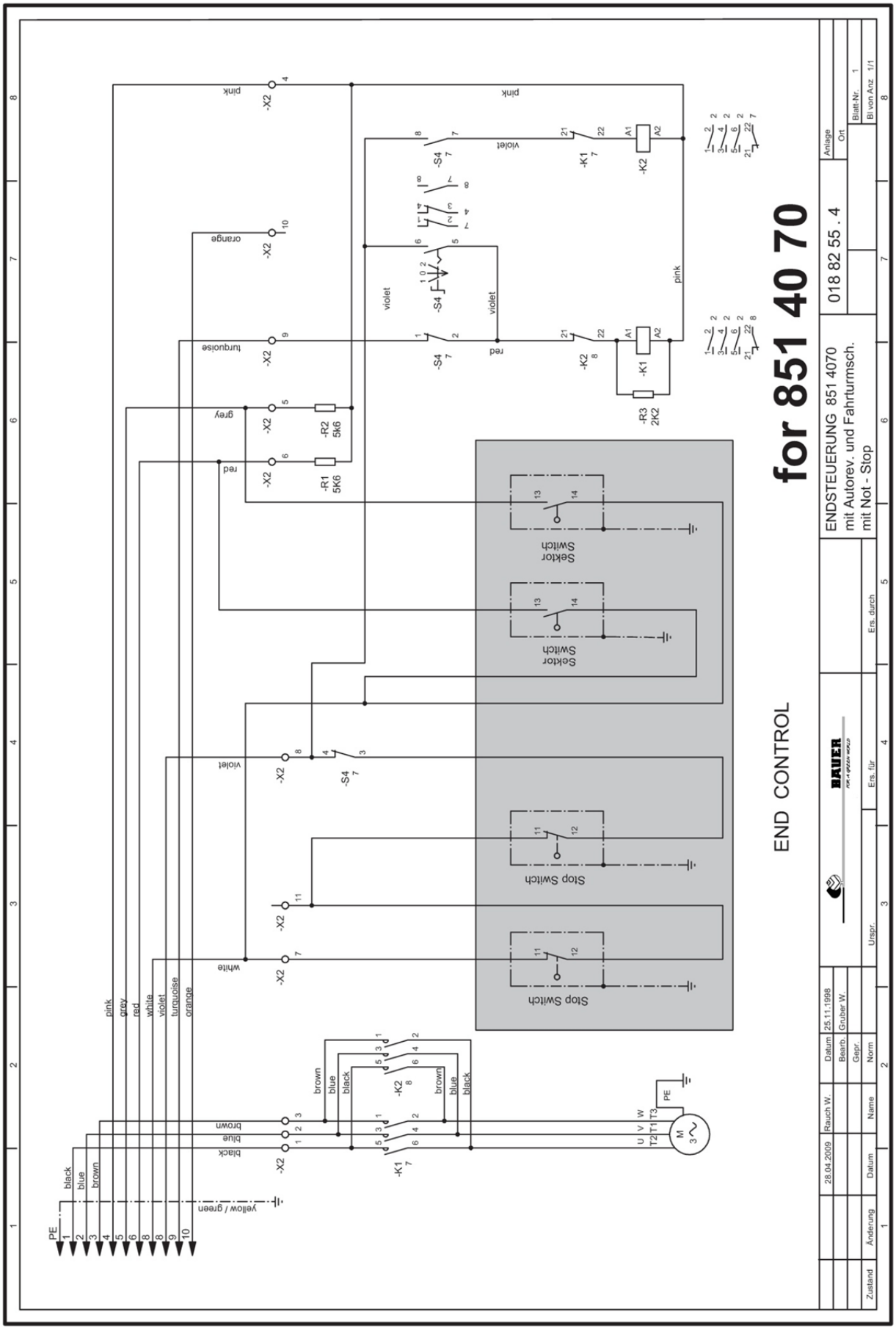
14.3.8 End control with limit stop and tower alignment switch



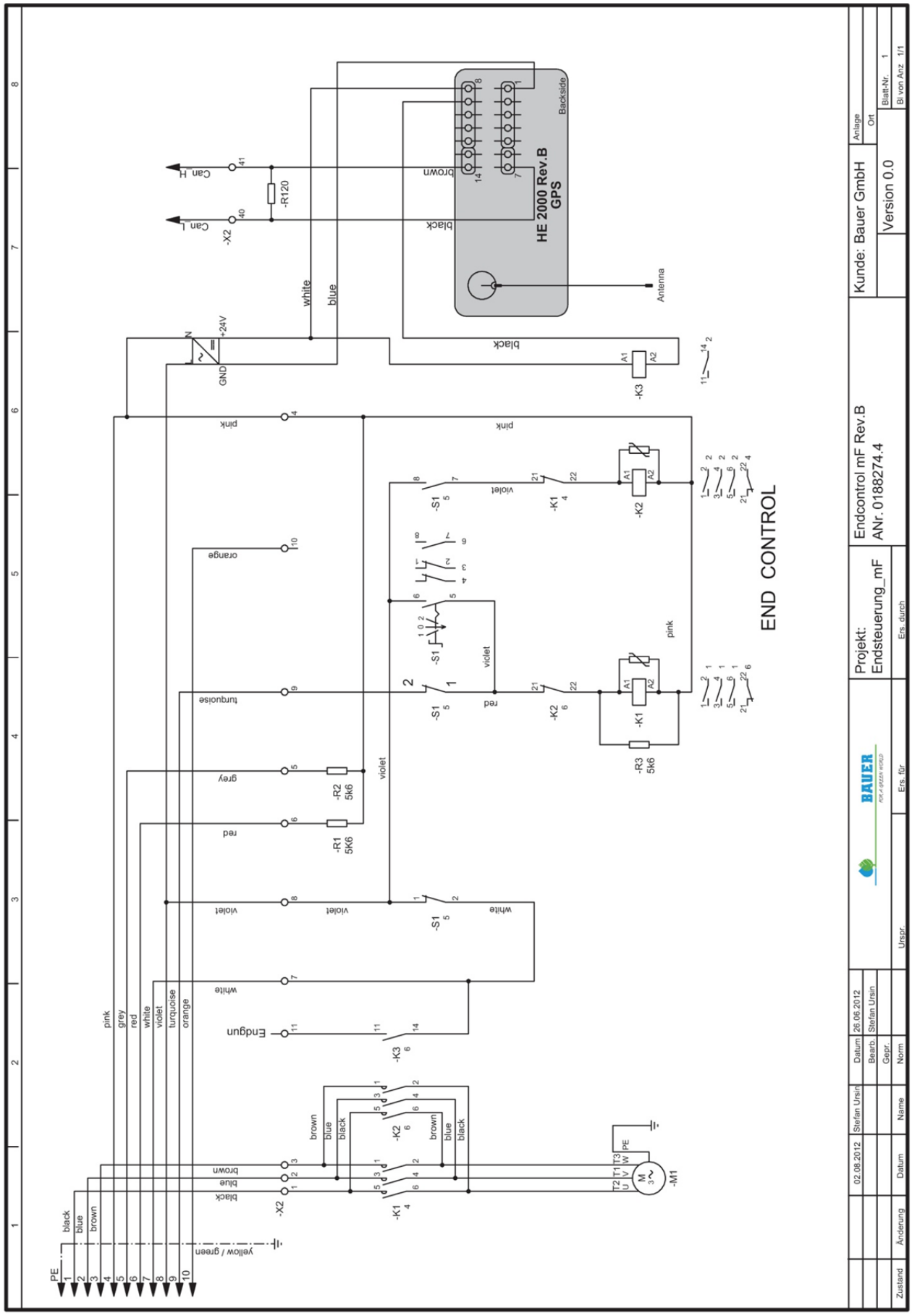
14.3.9 End control standard with limit stop and autoreverse



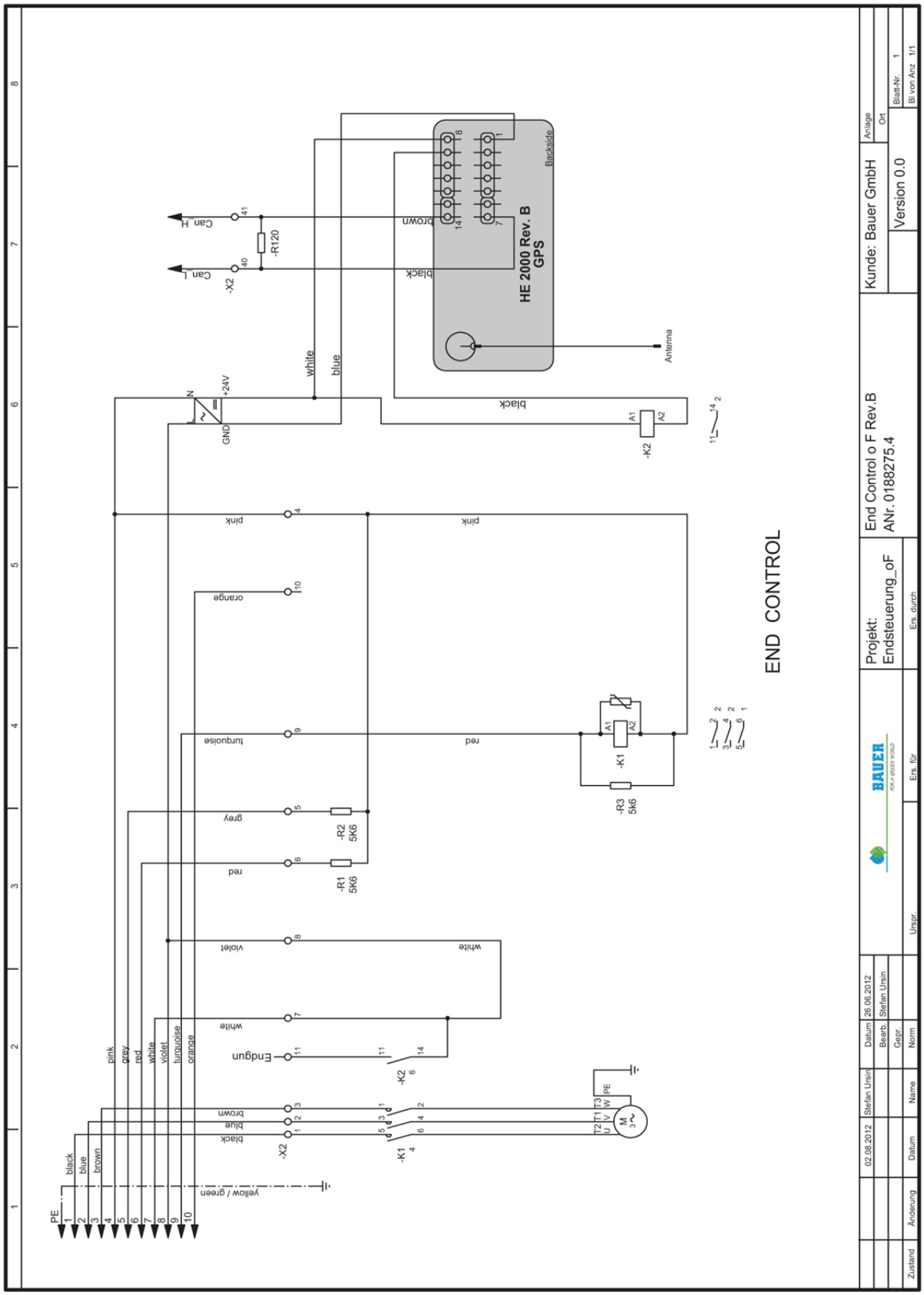
14.3.10 End control with tower alignment switch, limit stop and autoreverse



14.3.11 End control PRO-G with tower alignment switch



14.3.12 End control PRO-G standard



15 Service Proof

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

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

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

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

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

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

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

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

16 CONFORMITY CERTIFICATE

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 CENTERSTAR 9000**
Machine type / basic units	**133 EL, 168 EL/E, 203 EL/E**

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, 08.05.2013