Wedge K12

Operating Instructions

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1. Introduction

Thank you very much for purchasing a Gunnebo product!

It is very important to get familiar with these Operating Instructions prior to assembly, installation or commissioning of this product.
Constructive parts and accessories must only be installed according to the Operating Instructions.

1.1. Purpose

The purpose of these Operating Instructions is to provide the information necessary to assemble, connect and put into operation as well as to operate the wedge.

1.2. Target group

These Operating Instructions are intended to be used by installers and users of the wedge barrier.

1.3. Technical progress

The manufacturer reserves to adapt technical data to the development progress without special notice. Gunnebo will promptly provide information about possible changes and extension of the Operation Instructions.

1.4. Guarantee

There is a guarantee of 1 year starting from the commissioning for all mechanical and electrical components of the wedge, provided that the Operating Instructions have been complied with, that no unauthorised intervention has been performed inside the devices, and that the devices do not present any mechanical damage.

1.5. General Safety Notes

The wedge barrier is designed and built with the objective of preventing forceful infiltration of vehicle. Any other use (e.g.: as a lifting device for loads or for jacking up vehicles) can lead to unforeseen hazards to a third party or to damage and/or destruction of the blocker. It must always be kept in the intended condition so that it does not become a possible cause of danger.
The wedge has been designed, constructed and tested operationally reliably according to the state-of-the-art, and has left the factory in technically faultless safe condition. Nevertheless, if operated inappropriately, this installation could present dangers to persons and assets. Therefore, the Operating Instructions must be read completely and the safety notes must be observed.

The manufacturer does not accept any liability and grants no guarantee if the product is used inappropriately or with any other than the intended purpose.

Three types of warnings are given in these Operating Instructions. The type of warning depends on the consequences of their non-observance.
The warning types – from extremely serious consequences down to minor – are the following:

Warning
Imminent danger to life, danger of personal injuries, hazard of injuries, health and accident hazards, hazard of substantial property damage.

Caution
Danger of property damage, possible minor injury risk.

Note
Facilitation of operation, notes to cross reference in the documentation.

1.6. Environmental and health risks

Warning
In case of non-intended or inappropriate use, or in case of use by uninstructed persons, there is danger to the user or for third parties, and danger of damage to installations, buildings or vehicles.

1.7. Qualified personnel

Personnel get familiar with the transport, the storage, the installation, the commissioning, the operation and the maintenance of the wedge and its accessories, as well as with the case of application, and which have a corresponding qualification with respect to these activities, are considered as qualified personnel. The barrier and the accessories must only be applied and/or used by qualified personnel under consideration of the technical data and the corresponding legal stipulations and safety regulations.

2. Description

2.1. Design, variants and areas of application

Design:	Wedge Barrier with electro-hydraulic drive in separate drive cabinet to integrate into roads
Blocking height:	1.2 m
Blocking Width:	2.0 m, 2.5 m, 3.0 and 3.5 m, 4.0 m
Impact rate:	K12 (7.5 tons truck travelling at 80km/h)
Operational safety:	surveillance by operator, warning shield with lights (optional)
Maintenance and care:	No increased maintenance and care in comparison to other known wedge barrier installations necessary
Areas of application:	For preventing forceful infiltration of vehicle at facilities with high risk of terroristic attacks (i.e. embassies, military or police stations etc.).

2.2. Capability characteristics

Opening/closing cycle:	**3.5 seconds / 3.5 seconds**
Locking:	In final positions, or hydraulically during power failure
Drive:	Three-phase motor (400 V / 50Hz), Emergency operation via hand pump, optional with accumulator
Drive over capability:	according to Bridge Class SLW 60 (DIN 1072), max. load per wheel is 100 kN (10 tons)
Opening/closing direction:	up and down, front side to the impact
Inspections/tests:	crash-tested according DOS K12 and PAS 68

2.3. Nameplates

According to European machinery directive, the following must be well visible and permanently fixed to power-operated machines:

- Manufacturer or supplier
- Year of construction
- Fabrication number
- Product name

Image 1 – Nameplate example

	**Note** Nameplates must not be removed or made illegible!
	**Note** Be aware of that any changes made on the wedge barrier after the installation will expire the warranty and product liability

	**Caution** Be aware of that the wedge barrier a product under the exception list article 1g of the European machinery directive.

2.4. Equipment options

Table 1 – Colour Options

Standard colour	
Underground housing	RAL 7030 stone grey
Blocking element and cover plates	RAL 7030 stone grey
warning plate (optional)	RAL 3000 flame red
Optional colours	
Blocking element and warning plate striped	❍ RAL9010 pure white / RAL3000 flame red ❍ RAL1007 daffodil yellow / RAL9005 jet black ❍ RAL-Colour _____ ❍ DB-Colour tone _____

Table 2 – Accessory Options (see Image 2)

control cabinet with 200mm base	1	❍ Indoor cabinet inside of a building
	2	❍ Outdoor cabinet with rain cover and outdoor coating RAL7035
Drive unit		❍ Standard drive without accumulator ❍ Drive unit for emergency fast operation ❍ Drive unit for remote operation in case of power failure. The accumulator is sufficient for 3 moves of the blocking part.
Drainage		❍ Connected to a drainage system via drainage pipe DN100 (max. 2 pcs.) ❍ Pump sump for drainage with an electrical pump (max. 2 pcs.; pump by client) ❍ Electrical pump for drainage 230 Volts only
Safety equipment		❍ warning plate with LED lights (recommended)

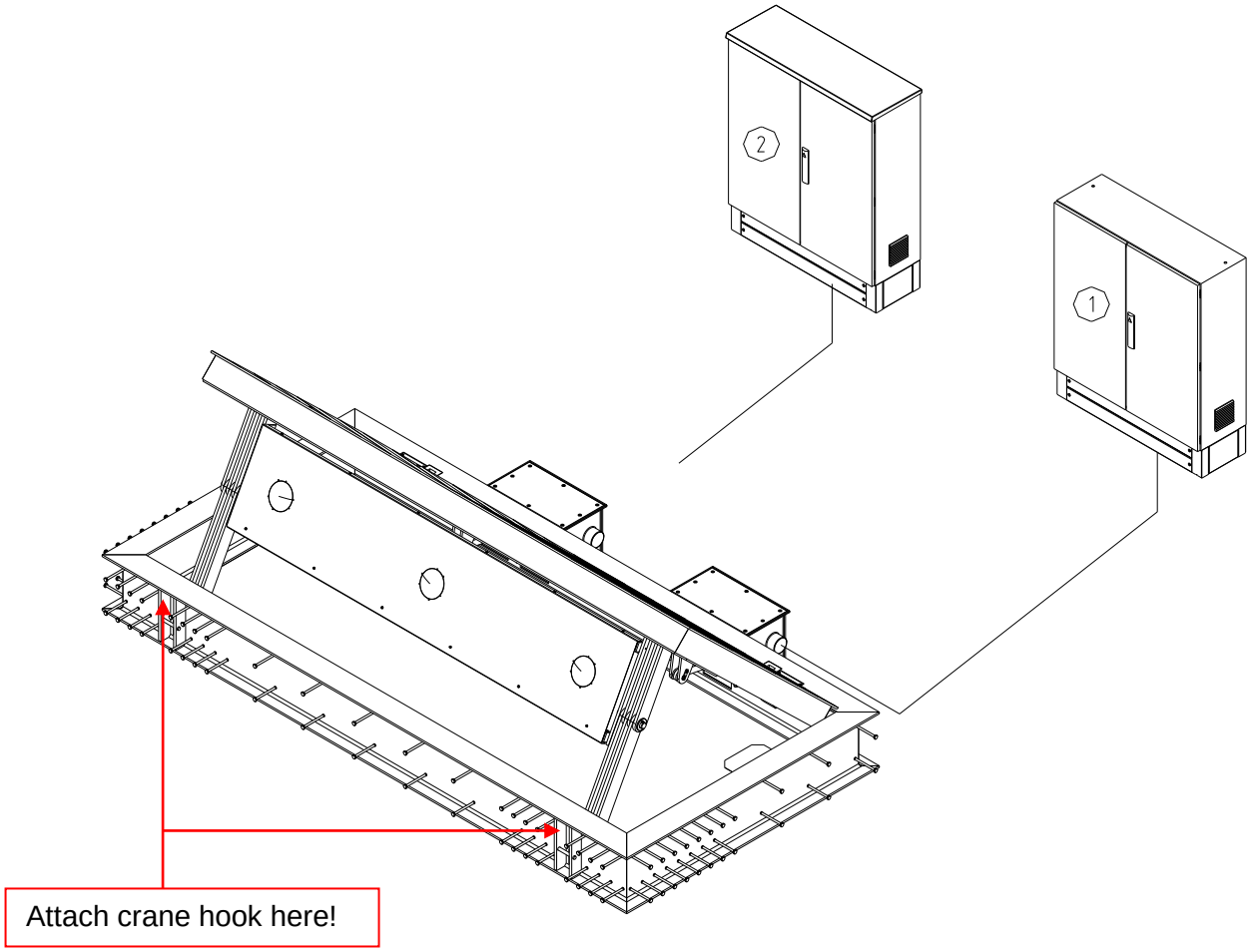

Image 2 – Options for control cabinet

2.5. Installation and assembly

	**Warning** Installation and assembly may only be performed by specialised personnel.
	**Note** The wedge comes with disassembled cylinder housings. Before installing the barrier these housings must be reassembled.

2.5.1. Local requirements for installation

- The material must be undamaged and complete according to the parts list/delivery note.
- Tools, measuring equipment and auxiliary means (Appendix 2) must be available.
- The wedge with accessories may only be installed in areas for which it is designed.
- Voltage and fusing must correspond to the installation instructions.
- Conduit pipes and canalization must be undamaged.
- The pipes must be equipped with taut wires.
- The pipes must not be filled with gravel, concrete, ice, water, etc.
- The connection of external control installations (card readers etc.) must be ensured in accordance with the connection specifications of the wedge control system.
- The place for the control cabinet must be specified and prepared according the layout plan.
- Crane or fork lifter is necessary for moving the wedge barrier. Use all 4 eyebolts (Image 2) for lifting.

2.5.2. Preparing the wedge for installation

After arrival of the wedge the cylinder housing(s) must be reassembled to the base frame. The cylinder housing(s) are together with the hydraulic hoses, the limit switches and with the connecting conduit pipe (only for wedge >3.0m) on a pallet. The signal contact lever is attached to the blocking part vice versa to correct position.
The following instructions should guide you:

- unpack the pallets
- assemble the signal contact lever at the blocking part to the correct position (Image 4)
- disassemble the cover plate (Image 3) of the housing(s)
- assemble the cylinder housing(s) to the base frame of the wedge (screws are already attached to the base frame) (see Image 3)
- Assemble the limit switches incl. holder to the base frame (Image 4)

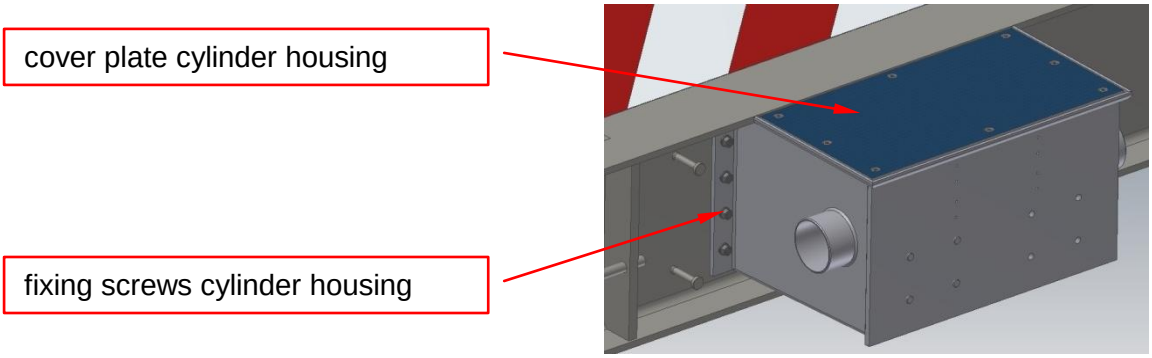

Image 3 – cylinder housing attached to base frame

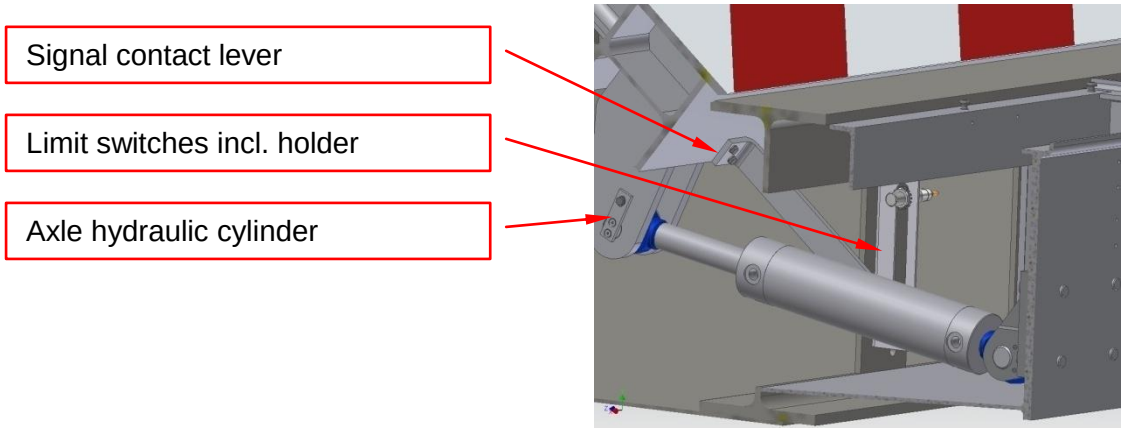

Image 4 – cylinder housing cut open to show details

- connect the housings with the conduit pipe supplied with the wedge (Image 5)

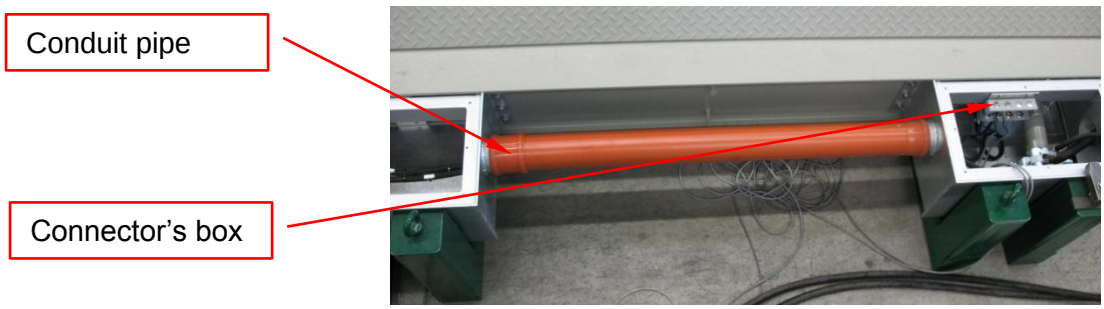

Image 5 – 2 cylinder housings connected by conduit pipe

- Pull the short hydraulic lines through the conduit to the cylinder in housing 1 and connect the hoses to the hydraulic cylinder.
- The connection of the hydraulic cylinder to the blocking part (see Image 4) should be done through the housing. If the access is not possible from this side, open the wedge with a crane to lift the blocking part, secure the blocking part with a supporter and assemble the cylinder to the blocking part from inside the wedge. (There are 4 eyebolts M20 supplied with to manually raise the blocking element with crane or similar.)
- Pull the electrical and hydraulic hoses through the conduit pipes to the cabinet.

	**Warning** Working inside the open wedge barrier is only allowed, if the blocking part is mechanically blocked against moving! Otherwise imminent danger to life, danger of personal injuries exists.

2.5.3. Preparation of foundations

Caution

When building the foundation adequate housing drainage must be provided. Ensure that the ground features good water absorption. Depending on the local environmental and soil conditions the drainage can be done by an electrical pump in a pump sump (option).

- The foundations must be prepared according to the layout plan and the reinforcement plan (Image 7).
- The foundation for the control cabinet should be prepared at the beginning of installation process.
- It is recommended to place the wedge into the prepared foundation pit and prepare then the rebar's (see Image 6).
- The concrete quality must be a minimum of C20/25.
- The curing time for the concrete must be complied with.
- The subsoil for the foundation must allow a base compression of 200 kN/m² and be frost-free!
- The reinforcement steel is grade BSt500S (DIN488) or similar, for details see reinforcement plan and steel list.
- Conduit pipes and cables between wedge barrier and control cabinet must be provided and installed by the customer.
- The VDE guidelines applying for this must be observed.
- Align the housing horizontally and vertically using underlain steel plates.
- If a roadway gradient is present a drainage channel is to be placed over the entire barrier length at the highest place. Thus the entrance of most surface water into the housing is prevented.

Image 6 – Wedge installation with reinforcement ready to pour the concrete

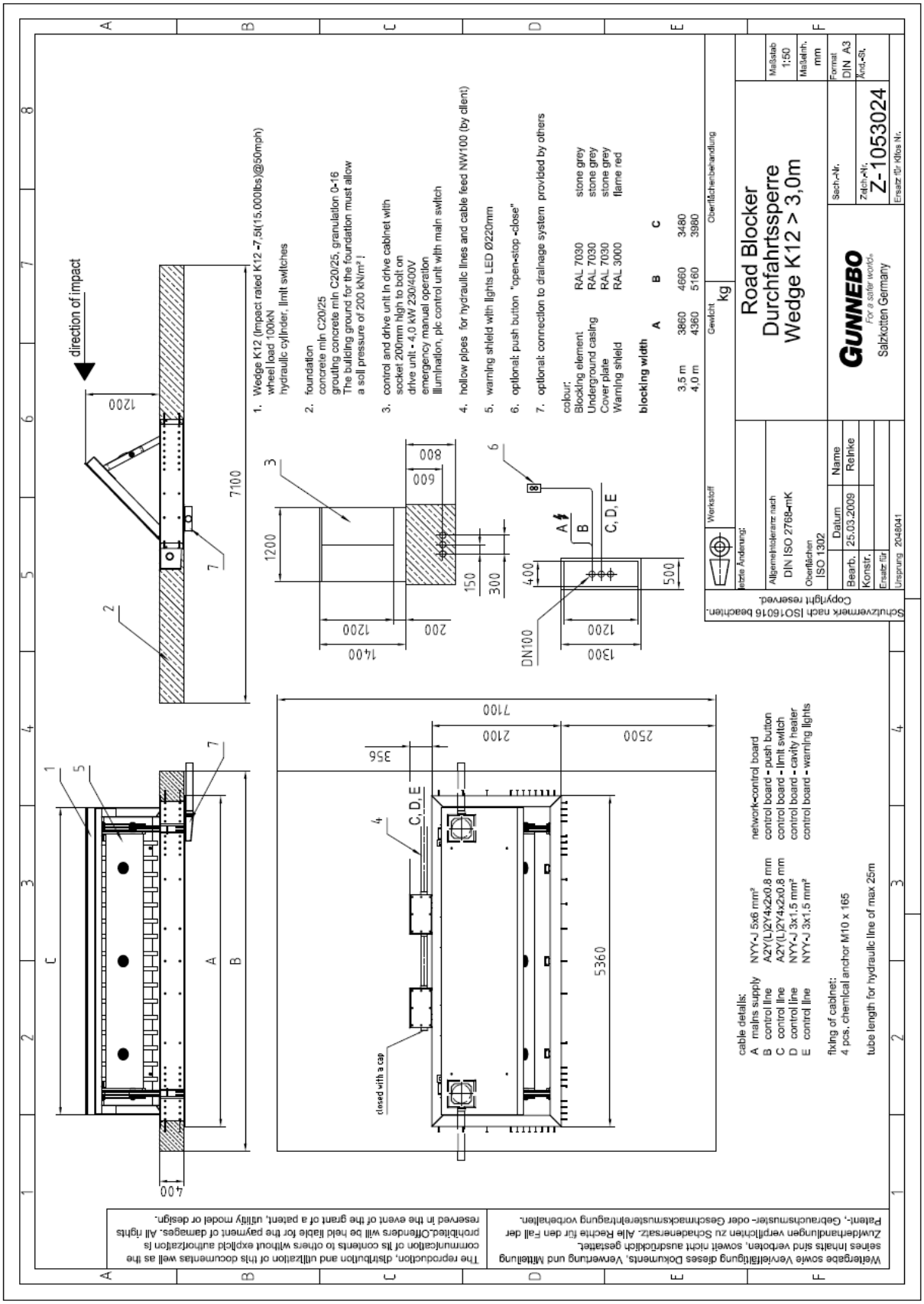

Image 7 – Layout plan foundations Wedge K12 (example)

2.5.4. Installation

Caution

- The entire construction site must be sealed off to prevent access from unauthorised persons during assembly and/or other work on the wedge.
- During the entire transport and assembly all regulations and safety precautions for persons and machines are to be adhered to without fail.

- Connect the cable feeder connection and the drainage pipe connection with the appropriate conduit pipes at the wedge barrier.
- Pull the cables through the lower revision openings of the control cabinet.
- When pouring the concrete foundation for the underground housing and the control cabinet it is especially important that the built-in conduit pipe for the electrical and hydraulic lines is free from contamination of any kind.

Caution

The drainage water must be able to completely flow off from the housing.

- The connections are to be professionally sealed.
- Guide cables and hydraulic lines through the conduit pipe the control cabinet.
- Connect the hydraulic lines marked with “A” to the drive unit connector marked with “A” inside of the control cabinet. Repeat the same with mark “B”.
- Connect the main power lines (3 phases AC 230/400V, frequency 50Hz) to the control unit in the control cabinet.

2.5.5. Control cabinet and drive unit for wedge

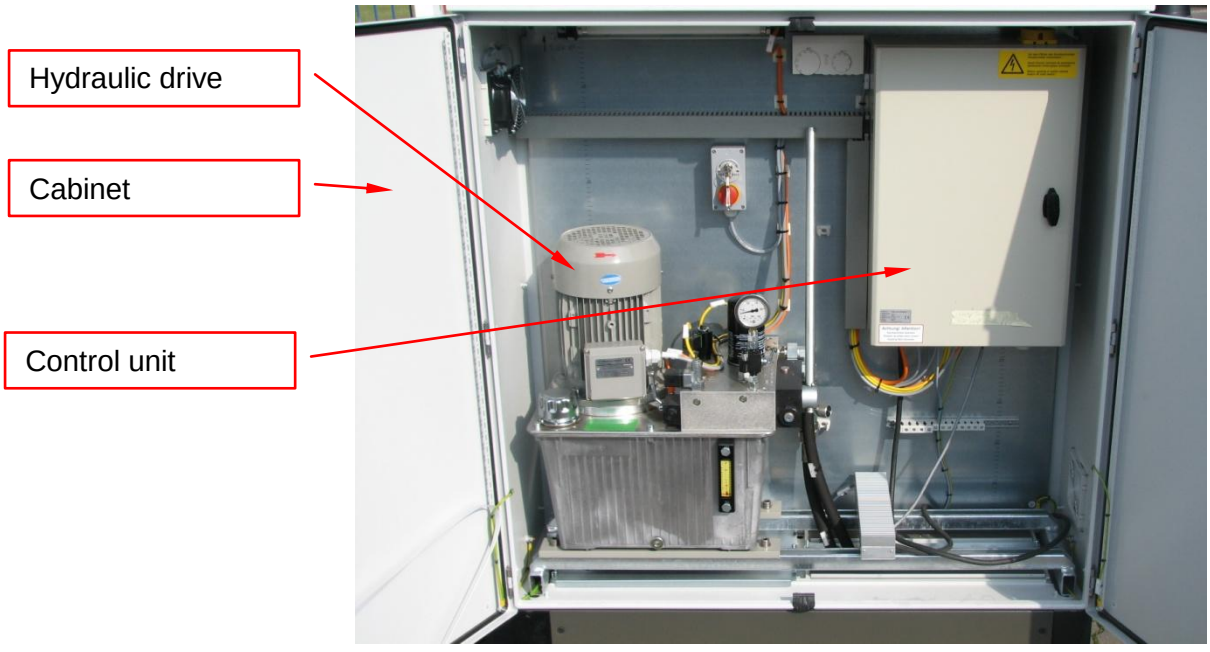

Image 8 – control cabinet with standard drive unit

2.5.6. Hydraulic connection

To connect the wedge hydraulically,

- Connect the line marked with “A” to the connector marked with “A”. (Image 11)
- Connect the line marked with “B” to the connector marked with “B”. (Image 11)
- Make sure, that no air is inside the system.

The connection at the wedge is done by factory (see Image 9). The connecting lines between both hydraulic cylinders have to be made at site (Image 10).

Image 9 – hydraulic line inside cylinder housing, outgoing to cabinet

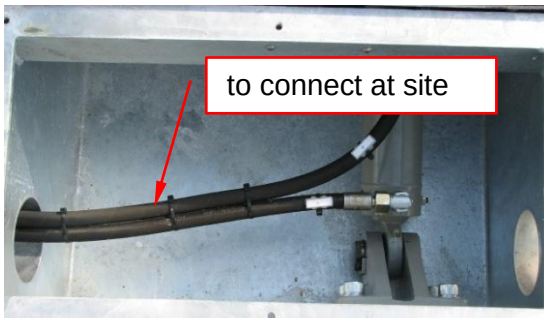

Image 10 – hydraulic hose inside cylinder housing, outgoing to second housing (only for Wedge>3.0m)

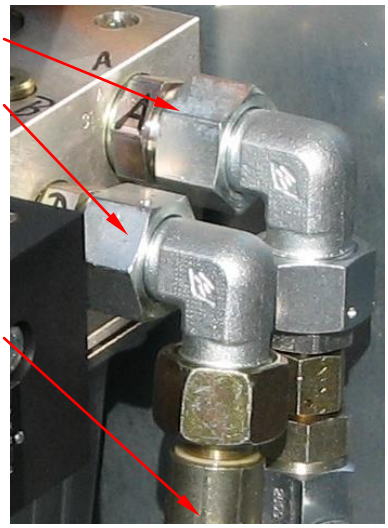

Image 11 – Connection of hydraulic hoses inside of the cabinet

3. Operation

Warning

Any claim for manufacturer's liability is barred if the blocker is used for any improper operation or if a forceful attempt to enter the activated system is made.

- Only qualified and/or certified persons are allowed to operate the wedge barrier. During operation no vehicles, goods or persons are allowed in the movement area of the blocking element of the wedge barrier in order to avoid collisions and injuries.
- The system is to be operated in such a way that approaching vehicles have time to stop in front of it. Every movement of the system's blocking element must be carefully monitored.
- The tolerable impact load of the wedge amounts to 1852 kJ. This is equivalent to the impact force of a 7.5 tons heavy duty truck with an impact speed of 80 km/h.
- The standard control is a push button switch "Open-Close- Emergency stop". Customer related controls are optional possible.
- The end positions of the blocking element are detected by proximity switches.
- The wedge barrier can be either operated using normal or manual operation via hand pump. In normal mode it is operated by a electro-hydraulic drive
- The wedge is designed for outdoor operation and therefore can be used without problem in outside temperature ranging from - 20°C to + 60°C. However attention needs to be paid that the drainage of the base frame is assured in order to avoid damage or destruction of the situated components. In winter during strong snowfall the area over the wedge should be kept free of snow.

3.1. Operation during Power Failure

Raising the blocking element

- Operate the wedge using the hand pump (6) (Image 12) until the fully raised position is reached.

Lowering the blocking element

- Operate the wedge opening the ball cock (5) (Image 12) until the fully lowered position is reached.
- Close the ball cock again.

3.1.1. System without Accumulator

4.Oil infill
5.Ball cock
6.Hand pump
7.Oil gauge
8.Oil release
9.Manometer
10.2/2-way valve “raise”
11.Oil filter
12.Pressure limit valve
13.2/2-way valve
14.Minimess coupling

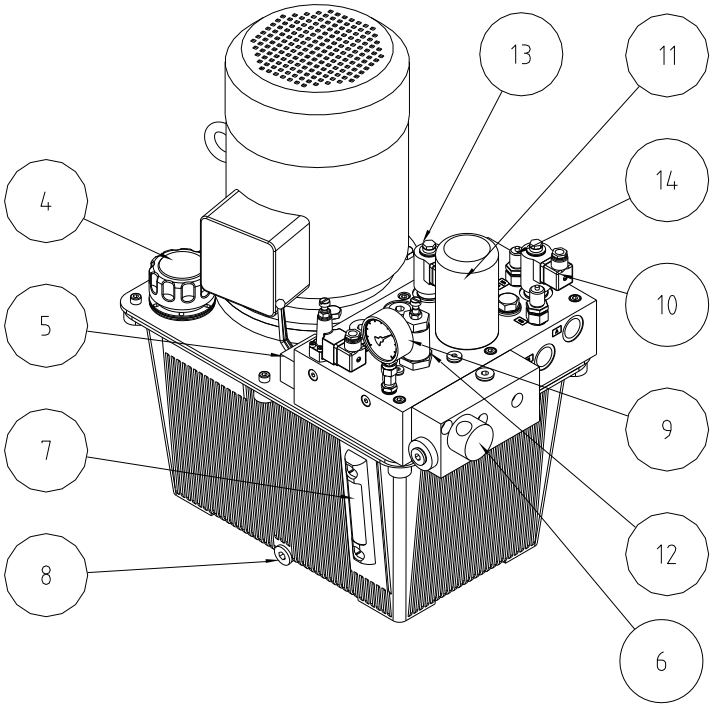

Image 12 – drive unit without accumulator (standard)

3.1.2. System with Accumulator

15.Accumulator
16.Pressure watcher accumulator
17.Connector “A”
18.Connector “B”

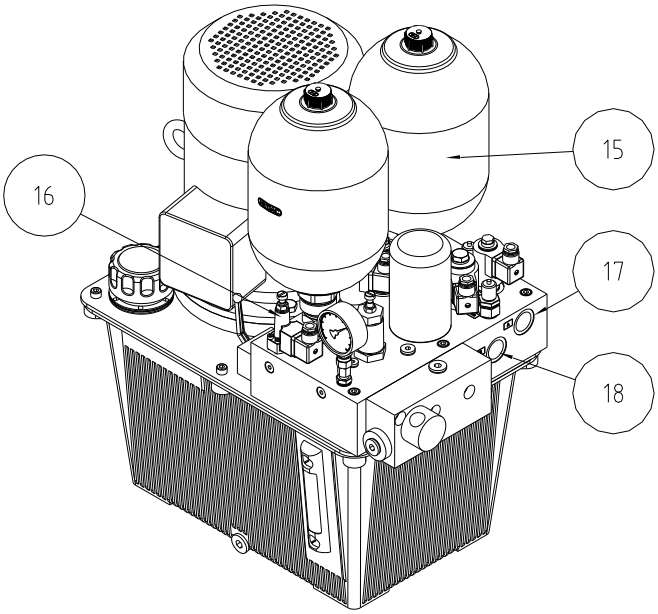

Image 13 – drive unit with accumulator (emergency fast operation

3.2. Control unit and electrical function

3.2.1. General

The control unit processes signals coming from outside via terminal strips.
It controls the commands for operation of the wedge, operates the solenoid valves of the hydraulic unit and offers a variety of indications and control elements.

	**Warning** All connection works must be performed by an approved installer.

	**Warning** The main switch (Image 14) must be switched off during all connection works.

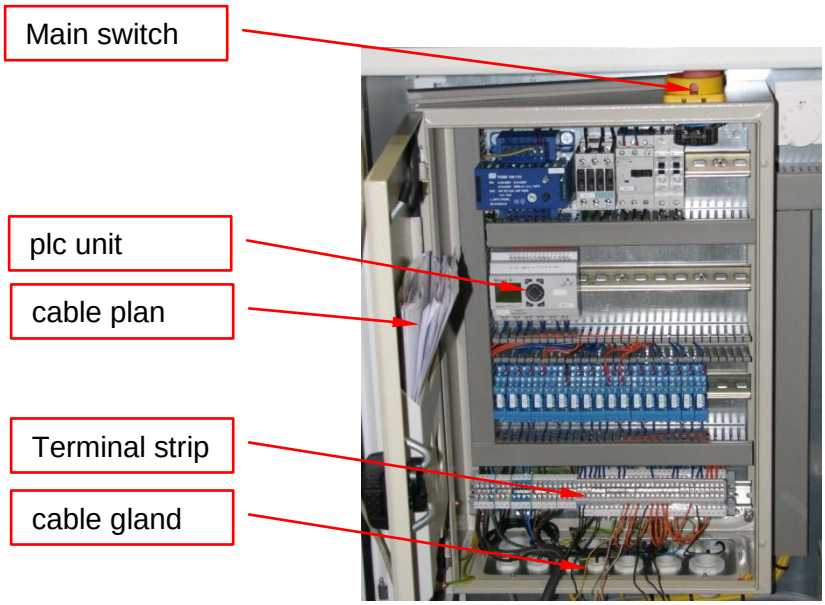

Image 14 – control unit box inside control cabinet

	**Note** Check whether the power supply voltage and the motor voltage are identical.

3.2.2. Connection of main supply voltage (400 V)

- The supply voltage may only be connected by specialised personnel.
- The cables must be connected according to the terminal connection plan (Appendix 7).
- The supply voltage to the circuit board must be protected with T10A as a maximum.
- The supply voltage must be connected via a lockable main switch.
- Incoming earth must be connected to the grounding rail.
- The motor runs counter clockwise. Ensure that the rotating field direction is correct.

Note

The main power supply is 3 phases AC, 400V at 50Hz. The rotating field turns clockwise. In case the motor runs in wrong direction, shift two phases.

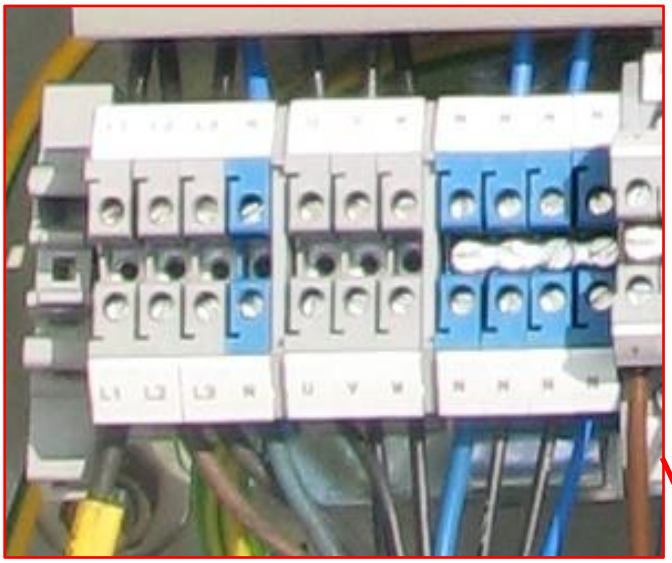

Image 16 – main power connection

Image 15 – control unit - overview

- The biggest admissible motor size to be connected is 4.0 kW.
- The supply voltage must be connected via a lockable main switch.
- Incoming earth must be connected to the grounding rail.

3.2.3. Operation controls and indicators

3.2.3.1. Inputs

Control device "stop"

After activation of a control switch "stop", the wedge stops immediately. A renewed movement of the wedge has to be started either by using the control switch "lower" or "raise".
If the function "automatic raise" is active, the wedge will automatically raise into its blocking position after the pre-adjusted time T10 has expired.

Control device "lower"

The wedge barrier moves into the completely lowered position after activation of the control switch "lower".
If the command "lower" is given during operation of the wedge, it will stop and will only lower after the pre-adjusted reversal time T2 has expired.

Control device "raise"

After activation of the control switch "raise" the wedge barrier moves into the completely raised position.
If the command "raise" is given during the lowering movement of the wedge, it will automatically stop and will move into the raised position after the pre-adjusted T2 time has expired.

Control device "emergency raise"

The command "emergency raise" moves the wedge barrier immediately into the completely raised position. If the command is given during the lowering movement of the wedge, the direction of movement reverses immediately.
The „emergency raise"-command is a priority command and overrides the safety function of the induction loops, light barriers and the command for fire-brigade.
As long as the control switch is operated, no movement of the wedge is possible.
The „emergency raise"-command is permitted even in case of a malfunction (oil temperature too high or oil level too low). Afterwards no further movements are possible with activated input "emergency raise".
The optional "emergency fast operation" with accumulator will move the blocking segment into its upright position with increased speed.

Fire alarm system / fire brigade

The fire alarm system causes an automatic lowering of the wedge, if the contact is opened by a control device. Therefore this contact always must be closed.
The wedge cannot be raised as long as the contact is open, neither automatically nor by control switches. To go back to normal function the contact has to be closed again.

Note

The "emergency raise"-function will override the fire alarm system.

Automatic on / off

In „automatic"-mode the wedge barrier moves automatically into the blocking position after expiration of the time pre-set T10, provided that the light barriers are not interrupted and the induction loops are not occupied.
The function of control switches "lower", "stop", "raise", induction loops and light barriers is always independent of the automatic function.

Pulse contact control
If the controller is operated while the wedge is in an intermediate position, the barrier moves into the lowered position.
If the controller is operated while the wedge is in the final position, the barrier moves into the opposite direction.
Any operation of the controller stops the movement of the wedge.
If the controller is operated several times during the movement of the wedge, the following switching sequence results: “raise“, “stop“ , “lower“, “stop“, “open“, etc.

Proximity switches “lowered” (S6) / “raised” (S7)
The limit switches indicates the final positions of the wedge.
If the limit switch for the preselected direction is occupied, the respective valve, as well as during raising the motor will be switched off after expiration of a pre-set time of one second.

Induction loop 1 A2.1 (close / safety) / Induction loop 2 A2.2 (safety)
After passing of both induction loops, and expiration of pre-set time T4, the wedge raises.
If one of the loops is occupied again while the wedge is raising, the barrier stops and lowers again. It’s raising again if the loops are not occupied and after expiration of the pre-set time.

Note
The function “emergency raise” will ignore an occupied induction loop.

Light barrier
After interruption of the light beam, the wedge can’t be raised. If the light beam is interrupted while the wedge is raising, the barrier stops and moves back into the completely lowered position.
In „automatic“-mode the wedge closes again after removal of the disturbance and expiration of the pre-set time T4. In “manual”-mode a command raise or lower is expected.
If the light beam is not interrupted, the wedge raises (if the loops are not occupied) after expiration of the pre-set time T4.
The function “emergency raise” will ignore an interrupted light barrier.

Note
An emergency move of the wedge into the raised position is possible via the input “emergency raise” except the motor circuit switch is disengaged.
Further electrically controlled movements of the wedge are afterwards no longer possible! If necessary, the wedge can be lowered manually by opening the ball cock valve (see no. 5 on Image 12) positioned directly at the aggregate.

3.2.3.2. Outputs

Hydraulic motor
The hydraulic motor runs only during the raising operation of the wedge (standard).
If the hydraulic drive unit is equipped with an accumulator (optional) the motor may running also to refill the accumulator. This process is activated by a pressure watcher and is not depending on the operation of the wedge.

Lighting blocking element
The lighting flashes during lifting and lowering. If the fully raised position is reached, the light shines continuous.

Solenoid valve "raise"
The solenoid valve "raise" is activated, in order to raise the wedge.

Solenoid valve lowering
The solenoid valve "lower" is activated, in order to lower the wedge.

Advance warning raise
The output is activated with the operation command "raise". The wedge raises after expiration of the adjustable pre-set time T3.
During the expiration of the advance warning pre-set time a red traffic light flashes.

Traffic light
The traffic light indicates green only if the limit switch "lowered" is occupied.
If the command "raise"is given in any position the traffic light will switch to red.

3.2.3.3. Potential free status signals

Wedge raised
If the wedge is in the completely raised position, then the potential-free status signal is activated.
The contact is available as change-over switch.

Wedge lowered
If the wedge is in the completely lowered position, then this potential free status signal is activated.
The contact is available as change-over switch.

Malfunction
The status signal "disturbance" is activated during run time excess, optionally too little oil, to high oil temperature or disengaged motor circuit switch (contact is available as change-over switch).

3.2.4. Change of time parameters at the control unit “Easy”

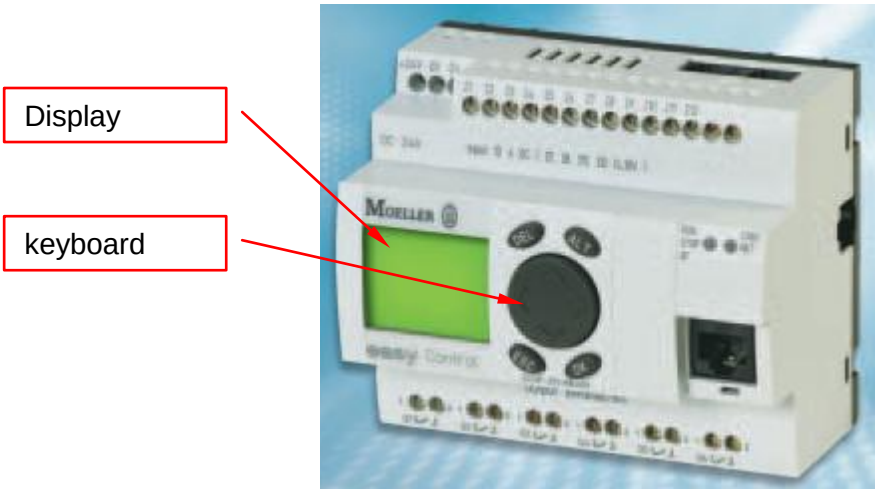

Image 17 – plc type „Easy 721-DC-TC“made by Moeller

The control is switched on and the word “run” will appear on the at the right hand bottom corner of the display.
With the ok key you enter the main menu.
Here you can confirm the menu option parameter selection (parameter flashes) by using the arrow keys up/down and the ok key. Now you are in the submenu parameter, where all alterable times are shown.
You can select a time parameter by using the arrow key up/down.
After the parameter (e.g. T1) is selected, confirm this with the ok key. The chosen time with its values will appear on the display (screen). By using the arrow keys you can select the current value which should be changed and confirm with the ok key.
Now you can move by using the arrow keys left/right in the line back and forth and increase or decrease the value with the arrow keys up/down.
Changes of values must be confirmed with the ok key.
With the “Esc”-key you will jump back to the previous step.
After you finished your changes, repeatedly press the Esc key, until the word “run” appears again at the bottom on the right hand side of the display.

Table 3 – Time parameters setting control unit „Easy 721-DC-TC“

Parameter	Description	Factory setting
T1	running time	15 sec
T2	reversal time	2 sec
T3	advance warning time raising	1 sec
T4	auto-closing after passage	2 sec
T5	follow-up time lower	0 sec
T6	follow-up time raise	0 sec
T9	advance warning time lower	1 sec
T10	auto-closing after no passage	20 sec

3.2.5. Adjustment of limit switches

Warning
Nobody must be in the range of the wedge when the barrier is opened or closed.

The final positions of the blocking part can be adjusted by two limit switches inside the cylinder housing

- Open the cover plate of the cylinder housing.
- Adjust the lower limit switch for the raised position of wedge.
- Adjust the upper limit switch for the lowered position of wedge.

Note
The limit switch detects the signal lever correct, if the indicator LED of the limit switch is on.

3.2.6. Cable connection

	**Warning** All connection works must be performed by an approved installer.
	**Warning** Prior to servicing work, the wedge drive must be switched off and secured against unintentional and unauthorised activation. The test run (functional check) is an exception from this.
	**Caution** Do not bend and observe the minimum bending radius for cables! Ensure that the cable insulation gets not damaged.

- Loosen the screws of the cover plate of the cylinder housing(s).
- Remove the cover plate.
- Take out and open the connection box.
- Pull out the cables and connect them according to the labelling in the connection box (Image 19) and the terminal connection plan (Appendix 7).
- Close and re-insert the connection box.
- Reinstall the cover plate to the cylinder housing(s).
- Screw the cables in the connector strip according to the terminal connection plan (Appendix 7).

Image 18 - connection box inside cylinder housing

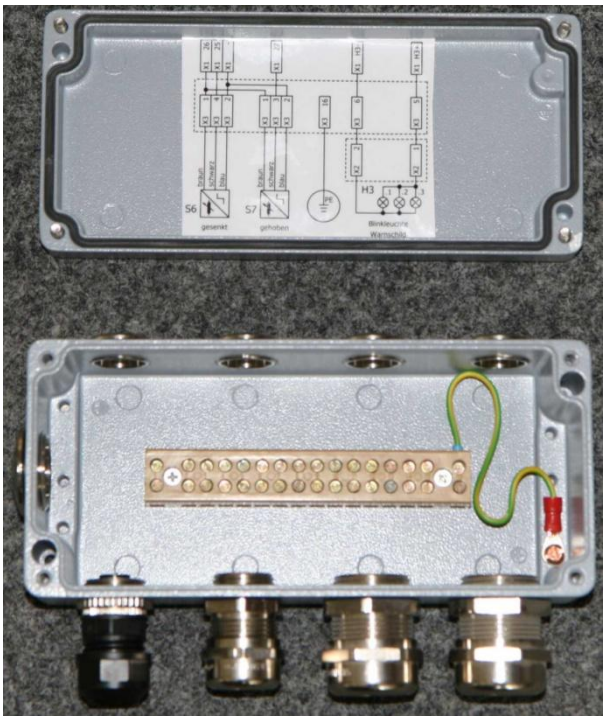

Image 19 – opened connection box

3.2.7. Commissioning

	**Warning** Before commissioning and correct adjustment of all safety devices, the installation may only be used with a dead man control unit.
	**Warning** Prior to commissioning, all screwed connections must be checked according to the table "Tightening torques" (Appendix 3).
	**Warning** Only when the wedge is completely lowered may it be passed by foot or with a vehicle.
	**Caution** Perform an electrostatic discharge process to your body before working in the control cabinet.

4. Service / Troubleshooting

4.1. Troubleshooting and error messages

Table 4 – Troubleshooting of system

Malfunction	Possible cause	remedies
▪ System is powerless.	▪ Power supply is interrupted	▪ Check the electrical lines of the current entry.
▪ Power is present. Even so motor does not run.	▪ Motor failure	▪ Check motor for operability and if necessary replace the motor.
▪ Power is present, motor runs but the blocking element does not move.	▪ Wedge is mechanically blocked. ▪ Malfunction of a hydraulic valve ▪ Motor rotation field is wrong	▪ Remove the blocking object. ▪ Check the valve function. ▪ Check rotating direction at fan.
▪ Operating pressure is too low	▪ The pressure limit valve has too low operating pressure.	▪ Adjust the pressure limit valve (increase operating pressure)
▪ System is losing oil	▪ some leakage of system ▪ screwed pipe joint is leaky	▪ check for leakages ▪ tighten screw connection, correct oil level
▪ Blocking element is distorted.	▪ Impact occurred.	▪ Repair the blocking element and/or replace it.
▪ blocking element does not reach the final position	▪ proximity switches are misaligned	▪ align the proximity switches
▪ hydraulic cylinder makes loud noises during operation	▪ piston rod sealing rings are dry	▪ lubricate the piston rod(s)

Table 5 – error messages of the control unit „easy 721-DC-TC“

Message	Explanation	remedy
▪ No display	▪ Power supply is interrupted ▪ easy LCD faulty	▪ Switch on the power supply ▪ Replace easy
Continuous display		
▪ TEST: AC ▪ TEST: EEPROM ▪ TEST: DISPLAY ▪ TEST: CLOCK	▪ Self-test aborted	▪ Replace easy
▪ ERROR: I2C	▪ Memory card removed or not inserted correctly before saving ▪ Memory card faulty ▪ easy is faulty	▪ Insert memory card ▪ Replace memory card ▪ Replace easy
▪ ERROR: EEPROM	▪ The memory for storing the retentive values or the easy circuit diagram memory is faulty.	▪ Replace easy

4.2. Dismantling the wedge

Warning

All works on the electric installation must be performed by an approved installer.

Warning

Prior to work on the electric installation, the wedge drive must be switched off and secured against unintentional and unauthorised activation.

- The wedge must be closed.
- Switch off the main switch of the control system.
- Disconnect all electric connections.
- Disconnect all hydraulic connections and disassemble the hydraulic cylinders.

Caution

The hydraulic oil must not contaminate the environment. Please ensure the correct disposal of all hydraulic fluids according your local regulations.

- The foundation has to be cracked completely and removed.
- The wedge can be loaded and transported now.

4.3. Transport

Warning

The specific safety regulations for the used auxiliary equipment, as e. g. forklift or crane, must be observed for this.

- Do not stand under suspended loads.
- The constructive parts may only be transported with vehicles with admissible loading capacity.
- The constructive parts must be secured against slipping with wedges and tensioning belts.

4.4. Disposal

Waste and rests of packaging material must be collected in a resistant, identified container and forwarded to a responsible entity for appropriate disposal.
The disposal of the wedge including accessories must be performed according to the local regulations.

Wastes or other objects must not be placed in corridors, escape ways and rescue ways.
Waste oil must be treated according to § 4 AltölVO (Waste Oil Ordinance).
Recommendation: Forward to a base oil regeneration process.

Upon consultation, Gunnebo will take back parts of the wedge barrier.

4.5. Maintenance and service

The maintenance work may only be carried out by qualified persons. The maintenance work consists of:

- -General visual examination of all components
- -Examination of screws
- -Examination of electrical and hydraulic connections
- -Change of the hydraulic oil
- -Cleaning of the wedge

	**Warning** Prior to servicing work, the wedge drive must be switched off and secured against unintentional and unauthorised activation. The test run (functional check) is an exception from this.
	**Caution** Prior to servicing work, the blocking part must be secured against unintentional movement. (see Appendix 8)
	**Caution** Do not remove or manipulate protection devices.
	**Note** The maintenance of wedge barrier must only be performed by persons familiar with the corresponding maintenance work and appointed by the operator.

4.6. Monthly Maintenance (visual check and cleaning)

4.6.1. Blocking Element and Underground Housing

- Outer visual examination of the entire system for damages, corrosion and deterioration. The long-term corrosion protection used here includes full galvanization of all steel components and a plastic coating of TRI-PROTECT®.
- Cold-hardening PVC or two-component material is used to repair any damaged areas of the corrosion protection.
- Check the bearings, bolts and axle support on the hydraulic cylinders for tightness and the scissor joint for any damages.
- Check a tight fit of the proximity switches for the position of the blocking element.
- Check visually the general condition of all functional parts.
- Clean the underground housing if necessary.
- Check the correct function of drainage of the housing.

4.6.2. Hydraulic Drive Unit and hydraulic components

- Check the hydraulic lines for damages.
- Check the hydraulic cylinder(s) and all hydraulic screw connections for leakage (tighten if necessary).
- Check the oil level in the oil tank and if necessary refill.
- Check the general condition of all functional parts.
- Check the system pressure and adjust to specified pressure if necessary.
- Clean the hydraulic unit and check the surrounding area for contamination and/or foreign parts of any kind.

4.6.3. Electrical Control

- Visual examination of the terminal box inside the cylinder housing and the terminal box inside of the control cabinet.
- Function test of the electrical heater of control cabinet.
- Conduct a general functions test.

4.7. Semi-Annual Maintenance or in each case of 50.000 cycles

This maintenance needs to be performed half-yearly or in each case of 50.000 cycles (1cycle corresponds once to lifting and lowering). The following work needs to be performed in addition to the work which is required for the monthly maintenance:

4.7.1. Blocking element and Underground Housing

- Check the warning plate for any damages (cracks, dents etc.). Exchange the warning plate if necessary.
- Grease the joint head of the hydraulic cylinders.
- Grease the upper and lower bearings of the scissor joints.
- Check that all functional parts are intact, if necessary replace.
- Remove sand and dirt from the underground housing as well as debris of any kind; clean-up any contamination and oil deposits.
- Clear the drainage.

4.7.2. Hydraulic Drive Unit and hydraulic components

- Remove oil filler neck and check for contamination, clean if necessary.
- Check the air filter and reverse-flow filters for dirt, clean or replace if necessary.
- Clean the control cabinet, all hydraulic components and the motor, especially oil residues.
- Check oil level and general oil condition.

4.7.3. Electrical Control

Warning

All works on the electric installation must be performed by an approved installer.

- Check the condition of the electrical control.
- Check that the contactors and relays function faultlessly.
- Conduct a function test.

4.8. General yearly inspections

The yearly inspection includes all work described in semi-annual maintenance (see 4.7). In addition to this the following tasks are required:

- Examination of all functional parts, connections and screw connections for their intactness and tight fit.
- Change the oil of the system if necessary.
  The oil has to be changed in following cases:
  - Impurity with water
  - obviously changes in colour and/or viscosity
  - strange smell
  - General visible impurities

Remark: New hydraulic oil has a chartreuse colour, is clear like water and smells very less.

Caution

Only same type of hydraulic oil (either mineral or biodegradable) must be used in the system! A mixture of hydraulic fluid may lead to the destruction of the sealing's within the system!

- Clean the oil filter.
- Clean the filter insert or replace it.
- Perform a function test.
- The function of the safety devices of the gate must be checked, e. g. safety edges, main switches, light barriers and other possibly existing safety circuits.
- All screwed connections must be checked according to the table "Tightening torques" (Appendix 3).

Note

Take care that oil, grease and other substances hazardous to water do not enter the canalization or seep into the earth.

Note

The inspection must be documented.

4.9. Exchange of warning plate

The warning plate is designed for an average life time of 50.000 cycles. After this number of cycles it should be replaced if necessary.
For the replacement a lifting device (crane, fork lifter etc.) is required.
The new warning plate will be supplied as package with all fixings to final assemble it to the wedge barrier.

	**Warning** Prior to servicing work, the wedge drive must be switched off and secured against unintentional and unauthorised activation. The test run (functional check) is an exception from this.

4.9.1. Dismantling of warning plate

- Operate the wedge manually by hand pump to the maximum raised position.
- Put the safety strut underneath the blocking part. (see Appendix 8)
- Dismantle the LED lights from the front plate and disconnect them electrically.
- Dismantle the front plate (Image 21) by loosen the fixings.
- Remove the fixing angles from the wedge.

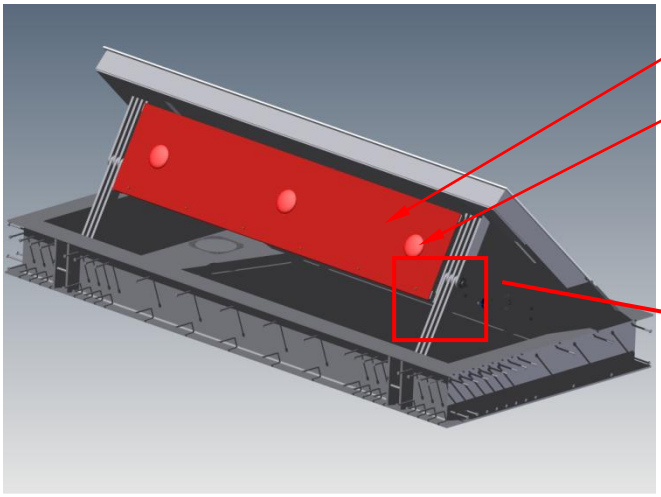

Image 21 – Front view wedge barrier

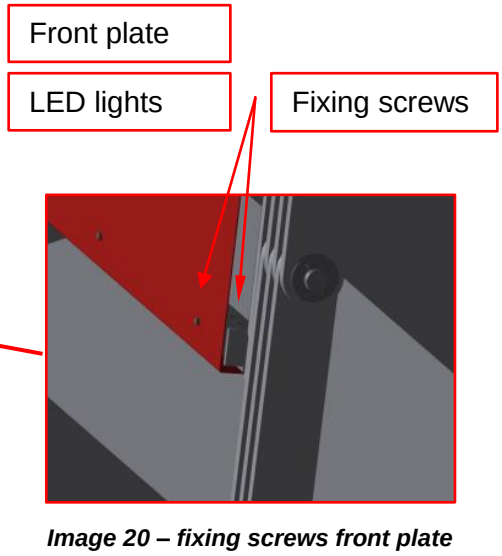

Image 20 – fixing screws front plate

4.9.2. Assembly of warning plate

Follow the instructions given under 4.9.1 in conversely order.
Secure the fixing screws of the bearing angles with Loctite™ or similar against loosing.
For the fixing torque see Appendix 3.

4.10. Service

An extensive service for our customers has always been of high importance for Gunnebo. In our After Sales Service Department, trained employees are active all over the country in order to give you exactly the service performance you need.

If you need us, please use the subsequently listed contacts.

Gunnebo Deutschland GmbH
Siemensstr. 1, D-85716 Unterschleißheim
info@gunnebo.de

http://www.gunnebo.de/NR/exeres/29990331-1700-49D6-BE71-B6B0747DF1DD.htm
Site Protection
Gates, fences, turnstiles, access control etc.
Service hotline
Tel +49-(0)5258-500 758
Fax +49-(0)5258-500 853
info@gunnebo-service.de

5. Supplement
Appendix 1 – Technical data of hydraulic drive

Caution

According the European Pressure Equipment Directive 97/23/EG the hydraulic drive and its components must be checked periodic.

Note

The normal lifetime of hydraulic hoses is depending on the pressure level and environmental conditions.
Latest after 6 years the hydraulic lines should be replaced to avoid aging effects.

Table 6 – electrical data of motor

Frequency [Hz]	Power [kW]	Voltage [V]	Current [A]	Motor speed [1/min]	Operating mode*	Protection class	Power factor cos φ
50	4.0	Δ 380-420	Δ 8.55 Y 4.86	1430	S1	IP55	0.82
60	4.8	Δ380-480	Δ 10.26 Y 5.83	1716			0.82

*S1 = Continuous operation; the motor is designed for continuous operation.

Table 7 – data of hydraulic drive

Drive option	pump size [l/min]	system pressure [bar]	Operating time [sec]			remote power failure operations
			raising	lowering	EFO	
Standard	24.0	140	3.5	3.5	-	-
EFO*	16.0	190	3.5	3.5	1.0	-
RO3**	16.0	190	3.5	3.5	1.0	3

* EFO – emergency fast operation
** RO3 – remote operation with 3 movements of blocking parts in case of power failure

Oil Type: Mineral Oil HLP 22
Bio-degradable Plantohyd 22 S NWG

Filling capacity of the hydraulic System: approx. 35 l + 0.2 l per meter of hydraulic line

Appendix 2 – Required tools, measuring devices and auxiliary devices

Tools

Open-ended and ring spanners	8 – 10 - 13 – 17 – 19 – 21 – 32 – 36
Torque wrenches	13 – 17 – 19 – 21 – 32 – 36
Allen wrenches	4 – 10
Screwdrivers (slitted/crosshead)	4 x 0.8 - 8 x 1.2 / size 2 – size 3

Hammer drill 20 mm (auxiliary equipment for cleaning the drilled holes)
General tools for electric installation (as e.g. side cutter, stripping tool, etc.)
Fitter's hammer
Rubber hammer

Measuring devices

Tape measure, folding rulers
Spirit level 1 m (ideally with magnetic foot)
Leveller (recommended)
Mason line
Electric measuring and inspection equipment

Auxiliary devices

Crane
Slinging equipment (no chains)
Shims of different thickness
Square logs for supporting purposes

Appendix 3 – Pre-tensioning forces and tightening torques for screwed connections

Friction coefficient μ=0.14

Dimension	Pre-tensioning force Fv (kN)					Tightening torque Ma (Nm)				
	4.6	5.6	8.8	10.9	12.9	4.6	5.6	8.8	10.9	12.9
M5	2.1	2.79	6.4	9.3	10.9	2.0	2.7	5.9	8.7	10
M6	2.96	3.94	9.0	13.2	15.4	3.5	4.6	10	15	18
M8	5.42	7.23	16.5	24.2	28.5	8.4	11	25	36	43
M10	8.64	11.5	26	38.5	45	17	22	49	72	84
M12	12.6	16.8	38.5	56	66	29	39	85	125	145
M14	17.3	23.1	53	77	90	46	62	135	200	235
M16	23.8	31.7	72	106	124	71	95	210	310	365
M18	28.9	38.6	91	129	151	97	130	300	430	500
M20	37.2	49.6	117	166	194	138	184	425	610	710
M22	46.5	62	146	208	243	186	250	580	830	970
M24	53.6	71.4	168	239	280	235	315	730	1050	1220
M27	70.6	94.1	221	315	370	350	470	1100	1550	1800
M30	85.7	114.5	270	385	450	475	635	1450	2100	2450

All values are indicative.

QTY. - Quantity
SP - recommended Spare part
AP -additional parts

Pos. 1 consists of Pos.1.1 + Pos.1.2 etc.
Pos. 1.7 consists of Pos.1.7.1 + Pos.1.7.2 etc.

spare parts list	Main Group Description	Colour Coating	Drawing Nr. STL.-Nr.	PN	Weight	rendered	Date	checked	Date
GUNNEBO For a safer world	Wedge K12 ≤ 3,0m		Z-1042125			Reinke	09.01.2008		
			Z-2013555			ÄI / ÄM: a	Date: 08.07.2009	checked	Date
		replaced by:			replacement for:				

Pos.	Qty.	SP	AP	Unit	Main Group / Description	Material	Drawing Nr./ Norm	PN	Weight	Comments
					Wedge K12					
1	1		x	piece	scissor joint complete with warning shield		Z-1042165	321 228	236,24 kg	only with option warning shield
1.1	2		x	piece	fixing profile warning shield 2,0m	S235 JRG2	Z-2048240		4,68 kg	only with option warning shield
1.1	2		x	piece	fixing profile warning shield 2,5m	S235 JRG2	Z-2048240	318 676	6,57 kg	alternative
1.1	2		x	piece	fixing profile warning shield 3,0m	S235 JRG2	Z-2048240		8,45 kg	alternative
1.2	2		x	piece	bracket fixing profile warning shield	S235 JRG2	Z-2048244		0,86 kg	only with option warning shield
1.3	8		x	piece	hexagon bolt M10 x 25	A2 - 70	ISO 4017	203 899	0,026 kg	only with option warning shield
1.4	8		x	piece	washer -10	A2	ISO 7089	054 067	0,004 kg	only with option warning shield
1.5	1		x	piece	sheet metal warning shield 2,0m	DX51D+Z275NA	Z-2048622	319 845	15,66 kg	only with option warning shield
1.5	1		x	piece	sheet metal warning shield 2,5m	DX51D+Z275NA	Z-2048622	319 846	19,58 kg	alternative
1.5	1		x	piece	sheet metal warning shield 3,0m	DX51D+Z275NA	Z-2048622	319 847	23,49 kg	alternative
1.6	2	x		piece	LED-lamp red		Gerst-electro	309 254	0,380 kg	only with option warning shield
1.7	2		x	piece	scissor joint complete	S235 JRG3	Z-2048236		86,80 kg	only with option warning shield
1.7	2		x	piece	scissor joint complete	S235 JRG2	Z-2013571	319 051	86,80 kg	standard without warning shield
1.7.1	1	x		piece	bolt d40h11x205	1.4571-S460	Z-1041919	318 728	2,00 kg	per scissor joint
1.7.2	2		x	piece	coiled spring pin 10 x 60	A2 - 70	ISO 8752	312 339	0,023 kg	per scissor joint
1.7.3	2		x	piece	washer B43	A4	DIN 125-1	319 058	0,180 kg	per scissor joint
					base frame					
2	2		x	piece	swivel bracket LD-30 N	GGG	DIN 24556	318 170	6,32 kg	incl. axle and axle keep plate
2.1	4		x	piece	socket head screw M16 x 40	8.8 hot dip galv.	ISO 4762	307 952	0,106 kg	
2.2	4		x	piece	washer -16	galv.	ISO 7089	081 188	0,011 kg	
3	2	x		piece	revision cover	S235 JRG2	Z-1041874	321 364	1,17 kg	
3.1	4	x		piece	round-head screw M8 x 25	A2 - 70	ISO 7380	080 237	0,014 kg	
4	4	x		piece	bearing bush GSM-5055-30	iglidur G	Igus	318 154	0,018 kg	axle blocking part
5	2		x	piece	axle blocking part, welded	S235 JRG2	Z-1041834	321 406	2,47 kg	
6	1		x	piece	cover cylinder housing	S235 JRG2	Z-1041876	318 673	19,63 kg	
7	2	x		piece	axle1, welded (scissor joint)	S235 JRG2	Z-1041879	321 143	1,77 kg	
8	5		x	piece	support blocking part	Murtfeld "S" grün	Z-1041112	318 074	0,104 kg	
9	5		x	piece	shim 3mm support blocking part	AlMg3	Z-2013337	318 851	0,060 kg	
10	10		x	piece	shim 1mm support blocking part	AlMg3	Z-2013339	318 850	0,020 kg	

QTY. - Quantity
SP - recommended Spare part
AP -additional parts

Pos. 1 consists of Pos.1.1 + Pos.1.2 etc.
Pos. 1.7 consists of Pos.1.7.1 + Pos.1.7.2 etc.

spare parts list	Main Group Description	Colour Coating	Drawing Nr. STL.-Nr.	PN	Weight	rendered	Date	checked	Date
GUNNEBO For a safer world®	Wedge K12 ≤ 3,0m		Z-1042125			Reinke	09.01.2008		
			Z-2013555			ÄI: a / ÄM:	08.07.2009		
		replaced by:			replacement for:				

Pos.	Qty.	SP	AP	Unit	Main Group / Description	Material	Drawing Nr./ Norm	PN	Weight	Comments
					blocking part					
11	1		x	piece	blocking part welded 2,0m		Z-1042145		687 kg	
11	1		x	piece	blocking part welded 2,5m		Z-1042145		833 kg	alternative
11	1		x	piece	blocking part welded 3,0m		Z-1042145		978 kg	alternative
12	2	x		piece	axle scissor joint, welded	S235 JRG2	Z-1041869	321 146	2,37 kg	
13	2	x		piece	hydraulic cylinder 70/35/180		Gunnebo	321 546	9,46 kg	
14	2	x		piece	proximity switch IGA3005-BPKG/6m M18 x 1		IFM IG5336	307 645	0,090 kg	
					hydraulic drive unit					
15	1		x	piece	hydraulic drive unit without accumulator Type D		Gunnebo	320 142	70,00 kg	(standard)
15	1		x	piece	hydraulic drive unit high speed Type C		Gunnebo	320 141	92,00 kg	(option)
16	1	x		piece	cartridge check valve RK 2		HAWE	321 932	0,30 kg	
17	2	x		piece	cartridge safety valve CMVX2C-210		HAWE		0,25 kg	drive unit type C
17	1	x		piece	pressur control valve CMV2C-140		HAWE	321 933	0,25 kg	drive unit type D
18	1		x	piece	ball cock NG 6		HAWE	321 934	0,35 kg	
19	2	x		piece	2/2-way directional seated valve EM 31 V - X 24		HAWE	321 937	0,25 kg	drive unit type D
19	2	x		piece	2/2-way directional seated valve EMP31VG-G24		HAWE			drive unit type C
20	1	x		piece	pressure gauge 63 ø (0 - 250 bar)		tecsis	321 936	0,10 kg	
21	1		x	piece	plug -in non return valve ER 11		HAWE			
22	1	x		piece	filter cartridge HC 9		Mahle	321 938	0,20 kg	
23	1		x	piece	manual pump HD13 P		HAWE	321 939	0,75 kg	
24	2		x	piece	diaphragm-accumulator					drive unit type C
					SBO210-3,5 E1/112A-210 AB 120		Hydac			
25	1		x	piece	main block	AlZnMgCu1,5	Z-1046933		12,42 kg	
26	2		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x 370		DIN EN 853	322 092	0,30 kg	
27	2		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x 610		DIN EN 853	322 091	0,49 kg	
28	1		x	piece	hydraulic oil jerrycan 20 litre HLP22	mineral		310 831	21,00 kg	
29	1		x	piece	hydraulic oil jerrycan 5 litre HLP22	mineral		312 689	6,00 kg	
30	1		x	piece	hydraulic oil jerrycan 20 litre Planthyd 22 S-NWG	biodegradable				alternative
31	1		x	piece	hydraulic oil jerrycan 5 litre Planthyd 22 S-NWG	biodegradable				alternative

QTY. - Quantity
SP - recommended Spare part
AP -additional parts

Pos. 1 consists of Pos.1.1 + Pos.1.2 etc.
Pos. 1.7 consists of Pos.1.7.1 + Pos.1.7.2 etc.

spare parts list	Main Group Description	Colour Coating	Drawing Nr. STL.-Nr.	PN	Weight	rendered	Date	checked	Date
GUNNEBO For a safer world®	Wedge K12 ≤ 3,0m		Z-1042125			Reinke	09.01.2008		
			Z-2013555			ÄI: a / ÄM:	08.07.2009		
		replaced by:			replacement for:				

Pos.	Qty.	SP	AP	Unit	Main Group / Description	Material	Drawing Nr./ Norm	PN	Weight	Comments
					control cabinet					
32	1	x		piece	control unit		Gunnebo		10,00 kg	
33	1		x	piece	thermostate - hygrostate HYM TM 700-1S		Lm-therm	320 306	0,10 kg	
34	1		x	piece	cabinet heater IP54 LH3002-AL		Lm-therm	311 354	0,50 kg	
35	1		x	piece	Fan-and-filter unit SK 3322.107		Rittal	316 890	0,50 kg	
36	1		x	piece	Outlet filter SK 3322.207		Rittal	307 667	0,10 kg	

QTY. - Quantity
SP - recommended Spare part
AP -additional parts

Pos. 1 consists of Pos.1.1 + Pos.1.2 etc.
Pos. 1.7 consists of Pos.1.7.1 + Pos.1.7.2 etc.

spare parts list	Main Group Description	Colour Coating	Drawing Nr. STL.-Nr.	PN	Weight	rendered	Date	checked	Date
GUNNEBO For a safer world®	Wedge K12 > 3,0m		Z-2048026			Reinke	09.07.2009		
			Z-2048797			ÄI / ÄM	Date	checked	Date
		replaced by:			replacement for:				

Pos.	Qty.	SP	AP	Unit	Main Group / Description	Material	Drawing Nr./ Norm	PN	Weight	Comments
					Wedge K12					
1	1		x	piece	scissor joint complete with warning shield		Z-1042165	321 228	236,24 kg	only with option warning shield
1.1	2		x	piece	fixing profile warning shield 3,5m	S235 JRG2	Z-2048240		10,76 kg	only with option warning shield
1.1	2		x	piece	fixing profile warning shield 4,0m	S235 JRG2	Z-2048240		12,23 kg	alternative
1.2	2		x	piece	bracket fixing profile warning shield	S235 JRG2	Z-2048244		0,86 kg	only with option warning shield
1.3	8		x	piece	hexagon bolt M10 x 25	A2 - 70	ISO 4017	203 899	0,026 kg	only with option warning shield
1.4	8		x	piece	washer -10	A2	ISO 7089	054 067	0,004 kg	only with option warning shield
1.5	1		x	piece	sheet metal warning shield 3,5m	DX51D+Z275NA	Z-2013229	319 848	30,26 kg	only with option warning shield
1.5	1		x	piece	sheet metal warning shield 4,0m	DX51D+Z275NA	Z-2013229	318 678	34,58 kg	alternative
1.6	3	x		piece	LED-lamp red		Gerst-electro	309 254	0,380 kg	only with option warning shield
1.7	2		x	piece	scissor joint complete	S235 JRG3	Z-2048236		86,80 kg	only with option warning shield
1.7	2		x	piece	scissor joint complete	S235 JRG2	Z-2013571	319 051	86,80 kg	standard without warning shield
1.7.1	1	x		piece	bolt d40h11x205	1.4571-S460	Z-1041919	318 728	2,00 kg	per scissor joint
1.7.2	2		x	piece	coiled spring pin 10 x 60	A2 - 70	ISO 8752	312 339	0,023 kg	per scissor joint
1.7.3	2		x	piece	washer B43	A4	DIN 125-1	319 058	0,180 kg	per scissor joint
					base frame					
2	2		x	piece	swivel bracket LD-30 N	GGG	DIN 24556	318 170	6,32 kg	incl. axle and axle keep plate
2.1	4		x	piece	socket head screw M16 x 40	8.8 hot dip galv.	ISO 4762	307 952	0,106 kg	
2.2	4		x	piece	washer -16	galv.	ISO 7089	081 188	0,011 kg	
3	2	x		piece	revision cover	S235 JRG2	Z-1041874	321 364	1,17 kg	
3.1	4	x		piece	round-head screw M8 x 25	A2 - 70	ISO 7380	080 237	0,014 kg	
4	4	x		piece	bearing bush GSM-5055-30	iglidur G	Igus	318 154	0,018 kg	axle blocking part
5	2		x	piece	axle blocking part, welded	S235 JRG2	Z-1041834	321 406	2,47 kg	
6	2		x	piece	cover cylinder housing	S235 JRG2	Z-1041876	318 673	19,63 kg	
7	2	x		piece	axle1, welded (scissor joint)	S235 JRG2	Z-1041879	321 143	1,77 kg	
8	5		x	piece	support blocking part	Murtfeld "S" grün	Z-1041112	318 074	0,104 kg	
9	5		x	piece	shim 3mm support blocking part	AlMg3	Z-2013337	318 851	0,060 kg	
10	10		x	piece	shim 1mm support blocking part	AlMg3	Z-2013339	318 850	0,020 kg	
					blocking part					
11	1		x	piece	blocking part welded 3,5m		Z-2048036		1125 kg	
11	1		x	piece	blocking part welded 4,0m		Z-2048036		1270 kg	alternative
12	2	x		piece	axle scissor joint, welded	S235 JRG2	Z-1041869	321 146	2,37 kg	
13	2	x		piece	hydraulic cylinder 70/35/180		Gunnebo	321 546	9,46 kg	
14	2	x		piece	proximity switch IGA3005-BPKG/6m M18 x 1		IFM IG5336	307 645	0,090 kg	

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Version: 0
Original version

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changed: 07.10.2009

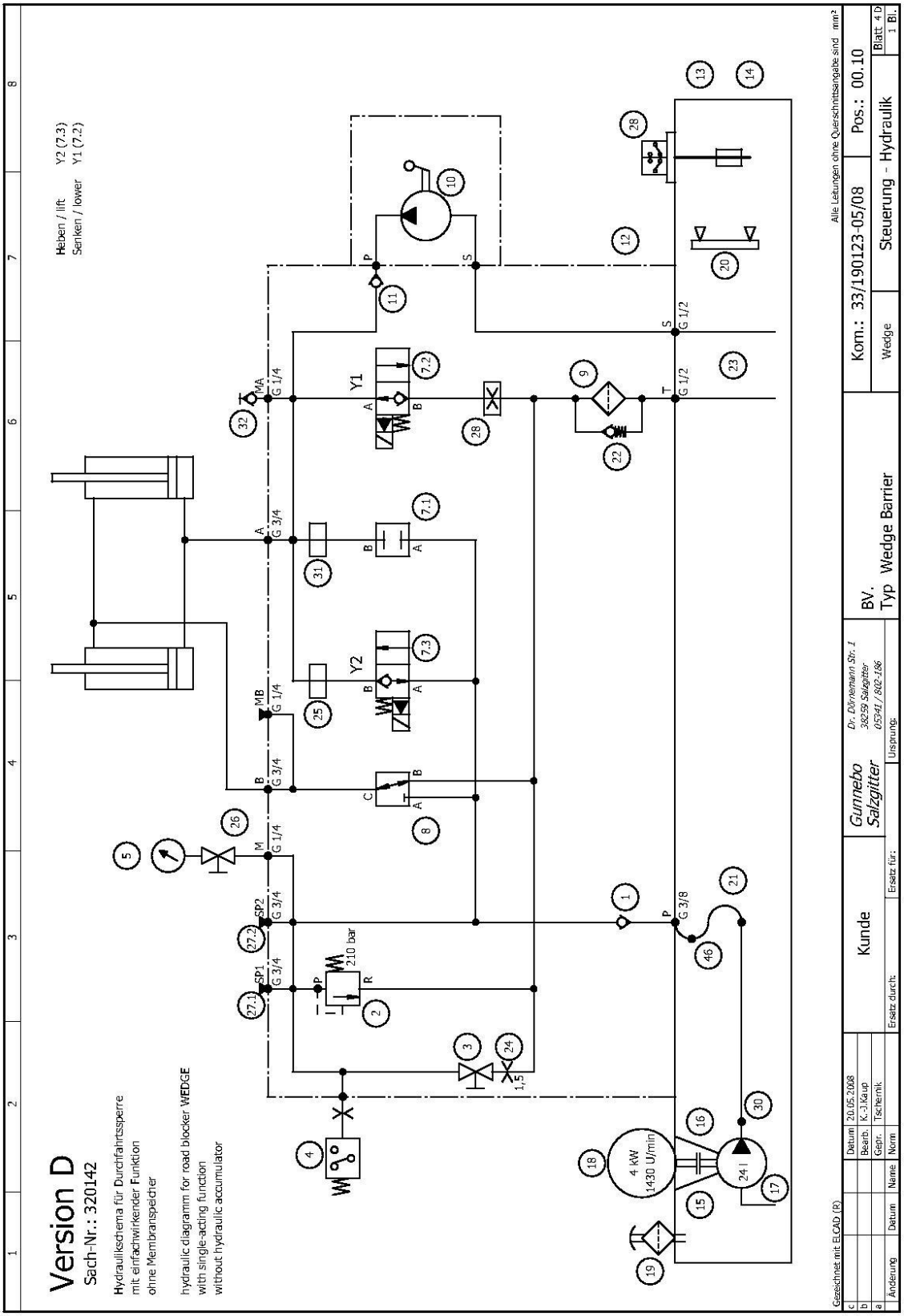
QTY. - Quantity
SP - recommended Spare part
AP -additional parts

Pos. 1 consists of Pos.1.1 + Pos.1.2 etc.
Pos. 1.7 consists of Pos.1.7.1 + Pos.1.7.2 etc.

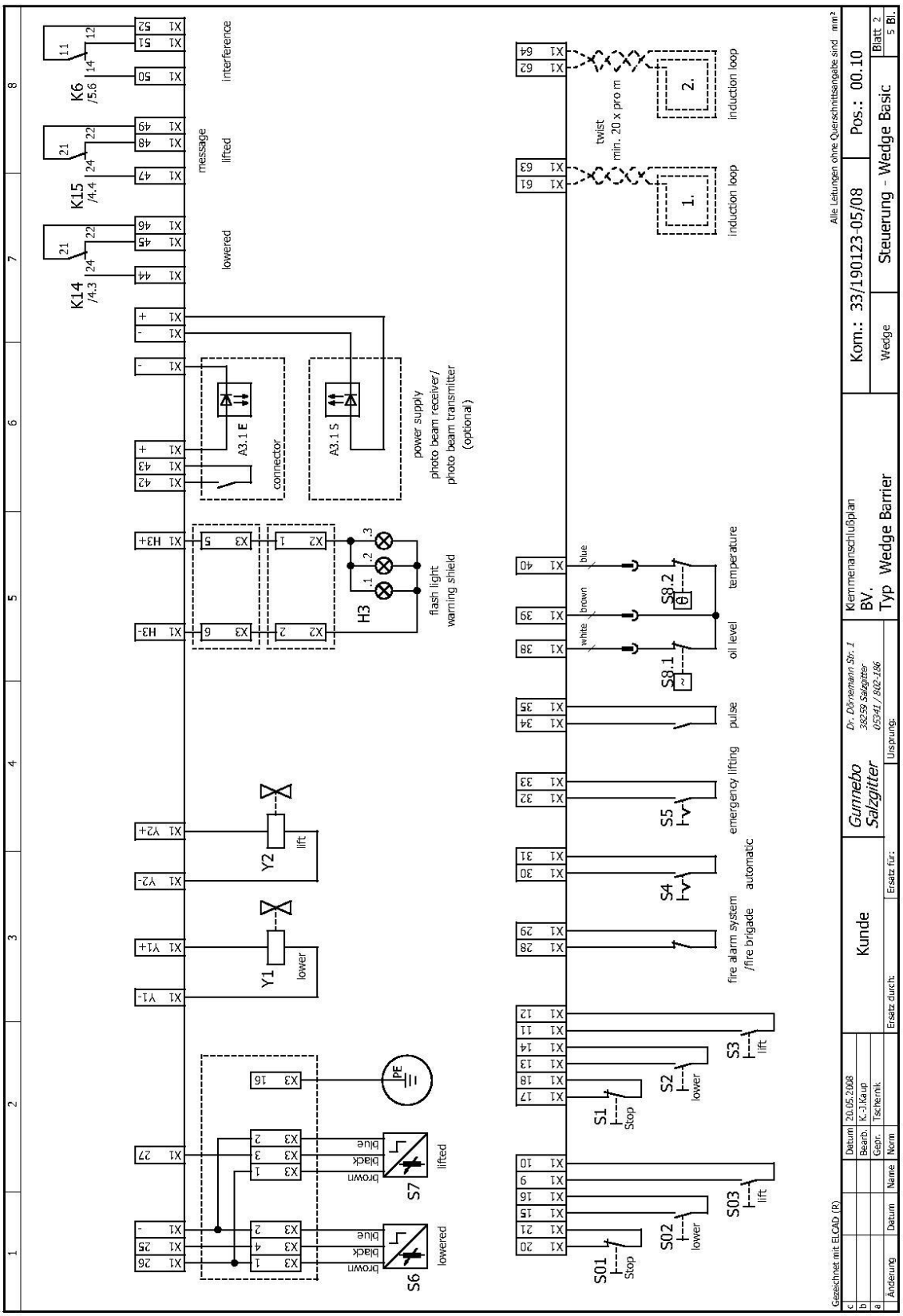
spare parts list	Main Group Description	Colour Coating	Drawing Nr. STL.-Nr.	PN	Weight	rendered	Date	checked	Date
						Reinke	09.07.2009		
GUNNEBO For a safer world®	Wedge K12 > 3,0m		Z-2048026			ÄI	ÄM	Date	checked	Date
			Z-2048797							
		replaced by:			replacement for:					

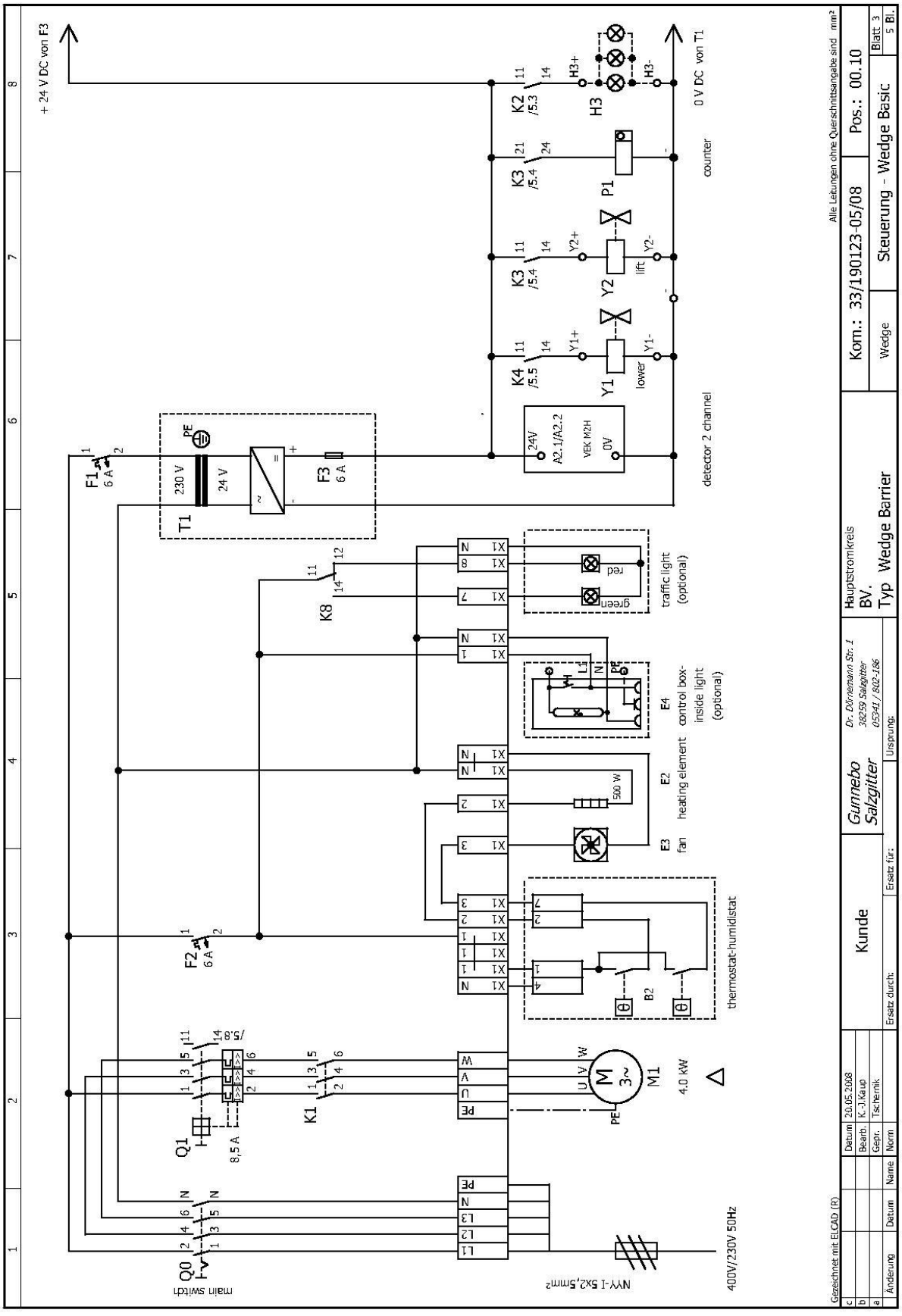
Pos.	Qty.	SP	AP	Unit	Main Group / Description	Material	Drawing Nr./ Norm	PN	Weight	Comments
					hydraulic drive unit					
15	1		x	piece	hydraulic drive unit without accumulator Type D		Gunnebo	320 142	70,00 kg	(standard)
15	1		x	piece	hydraulic drive unit high speed Type C		Gunnebo	320 141	92,00 kg	(option)
16	1	x		piece	cartridge check valve RK 2		HAWE	321 932	0,30 kg	
17	2	x		piece	cartridge safety valve CMVX2C-210		HAWE		0,25 kg	drive unit type C
17	1	x		piece	pressur control valve CMV2C-140		HAWE	321 933	0,25 kg	drive unit type D
18	1		x	piece	ball cock NG 6		HAWE	321 934	0,35 kg	
19	2	x		piece	2/2-way directional seated valve EM 31 V - X 24		HAWE	321 937	0,25 kg	drive unit type D
19	2	x		piece	2/2-way directional seated valve EMP31VG-G24		HAWE			drive unit type C
20	1	x		piece	pressure gauge 63 ø (0 - 250 bar)		tecsis	321 936	0,10 kg	
21	1		x	piece	plug -in non return valve ER 11		HAWE			
22	1	x		piece	filter cartridge HC 9		Mahle	321 938	0,20 kg	
23	1		x	piece	manual pump HD13 P		HAWE	321 939	0,75 kg	
24	2		x	piece	diaphragm-accumulator					drive unit type C
					SBO210-3,5 E1/112A-210 AB 120		Hydac			
25	1		x	piece	main block	AlZnMgCu1,5	Z-1046933		12,42 kg	
26	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x 370		DIN EN 853	322 092	0,30 kg	
27	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x 610		DIN EN 853	322 091	0,49 kg	
28	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x1360		DIN EN 853	321 809	1,09 kg	only 3.5m blocking width
28	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x1860		DIN EN 853		1,49 kg	only 4.0m blocking width
29	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x1210		DIN EN 853	321 915	0,97 kg	only 3.5m blocking width
29	1		x	piece	hydraulic hose 2SN 2433 DN16 DKOL/DKOL x1710		DIN EN 853		1,37 kg	only 4.0m blocking width
30	1		x	piece	hydraulic oil jerrycan 20 litre HLP22	mineral		310 831	21,00 kg	
31	1		x	piece	hydraulic oil jerrycan 5 litre HLP22	mineral		312 689	6,00 kg	
32	1		x	piece	hydraulic oil jerrycan 20 litre Planthyd 22 S-NWG	biodegradable				alternative
33	1		x	piece	hydraulic oil jerrycan 5 litre Planthyd 22 S-NWG	biodegradable				alternative
					control cabinet					
32	1	x		piece	control unit		Gunnebo		10,00 kg	
33	1		x	piece	thermostate - hygrostate HYM TM 700-1S		Lm-therm	320 306	0,10 kg	
34	1		x	piece	cabinet heater IP54 LH3002-AL		Lm-therm	311 354	0,50 kg	
35	1		x	piece	Fan-and-filter unit SK 3322.107		Rittal	316 890	0,50 kg	
36	1		x	piece	Outlet filter SK 3322.207		Rittal	307 667	0,10 kg	

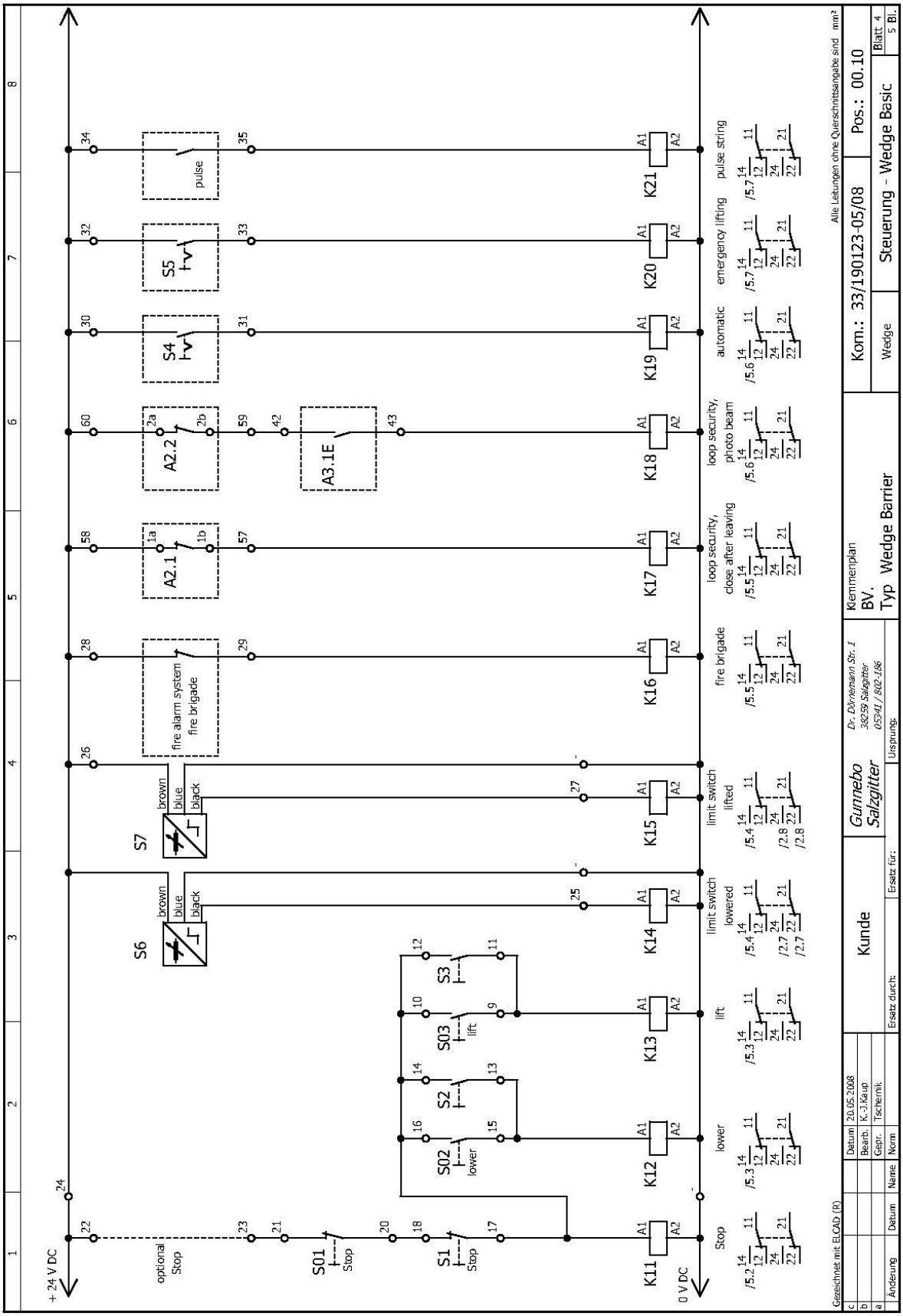
Appendix 6 – Hydraulic scheme wedge Basic

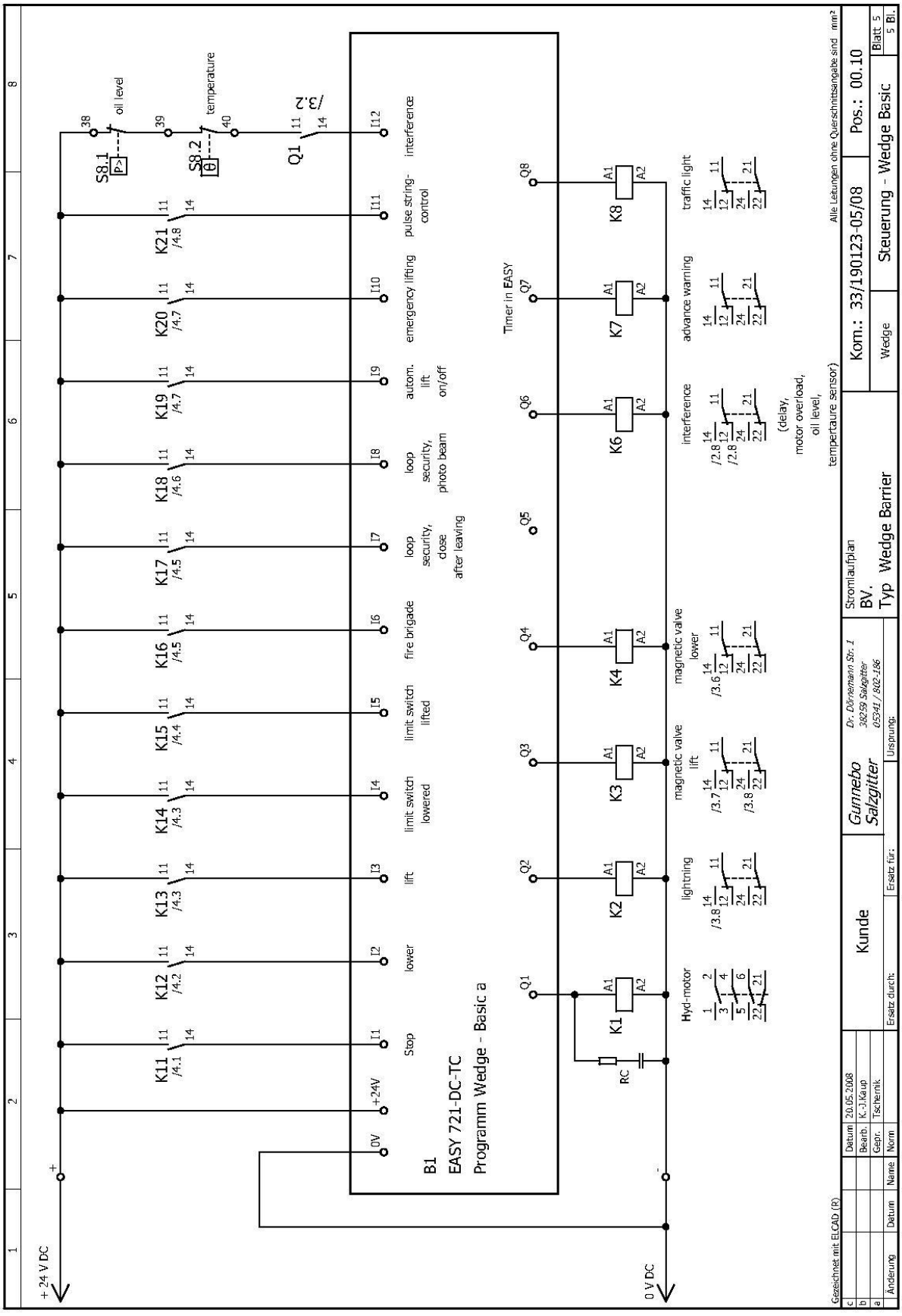


Appendix 7 – Terminal connection plan wedge Basic




+ 24 V DC von F3
0 V DC von T1
counter
detector 2 channel
traffic light (optional)
red
green
control box-inside light (optional)
heating element
fan
thermostat-humidistat
main switch
400V/230V 50Hz
Kom.: 33/190123-05/08
Pos.: 00.10
Typ Wedge Barrier
Steuerung - Wedge Basic
Wedge
Blatt 3
5 Bl.
Hauptstromkreis
Kunde
Gunnebo Salzgitter
Alle Leitungen ohne Querschnittsangabe sind mm²
Gezeichnet mit ELCAD (R)
Datum 20.05.2008
Bearb. K.-J.Kaup
Gepr. Tschernik
Norm
Name
Datum
Änderung


+ 24 V DC
0 V DC
optional Stop
S01 Stop
S1 Stop
S02 lower
S2
S03 lift
S3
S6
S7
brown
blue
black
fire alarm system fire brigade
A2.2
A3.1E
A2.1
S4
S5
pulse
K11
K12
K13
K14
K15
K16
K17
K18
K19
K20
K21
Stop
lower
lift
limit switch lowered
limit switch lifted
fire brigade
loop security, close after leaving
loop security, photo beam
automatic
emergency lifting
pulse string
Kom.: 33/190123-05/08
Pos.: 00.10
Wedge
Steuerung - Wedge Basic
Typ Wedge Barrier
Klemmenplan
BV.
Gunnebo Salzgitter
Dr. Dörnemann Str. 1
38259 Salzgitter
05341 / 802-186
Kunde
Datum 20.05.2008
Bearb. K.-J.Kaup
Gepr. Tischernik
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:
Alle Leitungen ohne Querschnittsangabe sind mm²
Gezeichnet mit: ELCAD (R)


+ 24 V DC
0 V DC
B1
EASY 721-DC-TC
Programm Wedge - Basic a
Timer in EASY
S8.1
oil level
S8.2
temperature
Q1
/3.2
K1
K2
K3
K4
K6
K7
K8
K11 /4.1
K12 /4.2
K13 /4.3
K14 /4.3
K15 /4.4
K16 /4.5
K17 /4.5
K18 /4.6
K19 /4.7
K20 /4.7
K21 /4.8
Stop
lower
lift
limit switch lowered
limit switch lifted
fire brigade
loop security, close after leaving
loop security, photo beam
autom. lift on/off
emergency lifting
pulse string-control
interference
Hyd-motor
lightning
magnetic valve lift
magnetic valve lower
interference
advance warning
traffic light
(delay, motor overload, oil level, tempertaure sensor)
RC
Gunnebo Salzgitter
Dr. Dörnemann Str. 1
38259 Salzgitter
05341 / 802-186
Kunde
Stromlaufplan
BV.
Typ Wedge Barrier
Kom.: 33/190123-05/08
Pos.: 00.10
Wedge
Steuerung - Wedge Basic
Blatt 5
5 Bl.
Alle Leitungen ohne Querschnittsangabe sind mm²
Gezeichnet mit ELCAD (R)
Datum 20.05.2008
Bearb. K.-J.Kaup
Gepr. Tschernik
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

1	2	3	4	5	6	7	8
no.	qty.	description	manufacturer	model-no.	Type	part-no.	article no.
1	1	control box	SAREL		83326	600 x 400 x 200	83389
2	1	control box-inside light	RITTAL	E4	SZ 4140.010	230 VAC / 8 W	320305
3	1	heating element	LM-THERM	E2	LH 3002-AL	230 VAC / 500 W	311354
4	1	Hygro-,Thermostat	LM-THERM	B2	Hym Tm 700-1S		320306
5	1	fan	RITTAL	E3	SK3322.107		316890
6	1	main switch	SÄLZER	Q0	H212-41400-033M4	20 A	113714
7	2	fuse	SIEMENS	F1, F2	5 SY 6106-6	B 6A	201342
8	1	control	MÖLLER	B1.1	EASY 721-DC-TC	24 V DC	317260
9	1	motor protection switch	SIEMENS	Q1	3 RV 1011-1JA10	7,0 - 10,0 A	309470
10	1	main contactors	SIEMENS	K1	3 RT 1026-1BB40	11 kW	
11	1	trafo	FREI	T1	FGSE 145-119	6A	202935
12	17	sub relais	FINDER	K2, ... K21	49.52.9.024.0650	24 V DC 2w	305783
13	16	terminals	PHÖNIX	L1, L2, L3, U, V, W, ...	UK5 N		85463
14	34	terminals	PHÖNIX		UKK5		83045
15	1	PE-terminal	WÖHNER		12 pol.		85466
16	8	cable single pass	LAPPKABEL		ST - M 20 x 1.5	M 20	203713
17	4	cable single pass	LAPPKABEL		ST - M 25 x 1.5	M 25	203714
18	2	cable single pass	LAPPKABEL		ST - M 32 x 1.5	M 32	203715
19	1	counter	SIEMENS	P1	7 KT5 811	24 VDC	321539
20	1	motor	GUNNEBO	M1	Q = 24 l/min	4,00 kW	320142
21	2	proximity switch	IFM	S6, S7	IG 5357	24 VDC	320191
22							
23	1	box	ABTECH	X2	Alu - ZAG 2	58 x 64 x 34 mm	307586
24	1	box	ABTECH	X3	Alu - ZAG 7	175 x 80 x 57 mm	316478
25							
26							
27		push-button	MÖLLER	S2, S3	lift/lower		313293
28		selector switch	MÖLLER	S4	on/off		313295
29		detector 1 channel	FEIG	A2.1	VEK M1-H		202642
30		detector 2 channel	FEIG	A2.1, A2.2	VEK M2-H		202878
31		photo beam transmitter	LEUZE	A3.1S	LSS 96 M - 175 W - 26	20 - 230 VAC / DC	202941
32		photo beam receiver	LEUZE	A3.1E	LSE 96 M/R-176 W-25	20 - 230 VAC / DC	202942
33							
34							
35							

c				Datum	20.05.2008	Kunde	Gunnebo Salzgitter	Dr. Dörnemann Str. 1 38259 Salzgitter 05341 / 802-186	Klemmenplan BV. Typ Wedge Barrier
b				Bearb.	K.-J.Kaup				
a				Gepr.	Tschernik				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	

Kom.: 33/190123-05/08		Pos.: 00.10
Wedge	Steuerung - Wedge Basic	Blatt 1 5 Bl.

Appendix 8 – service struts for fixing of blocking element

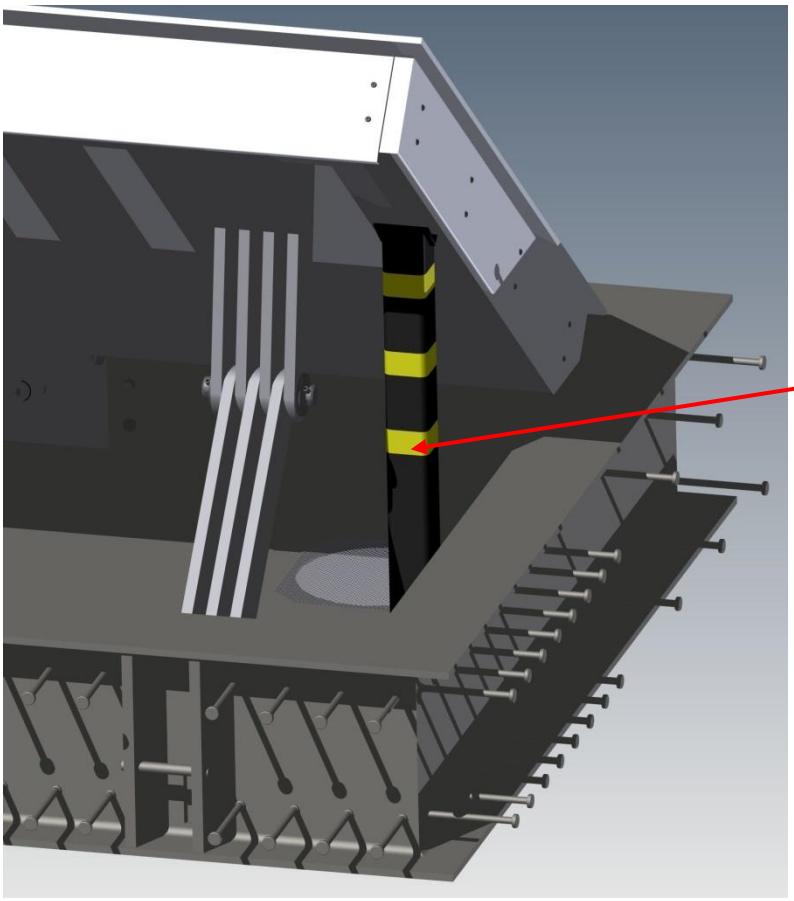


Image 22 – assembly of service struts

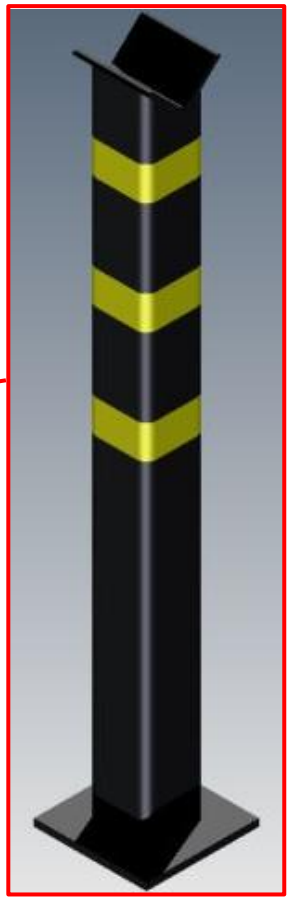


Image 23 – service strut

For service purpose the service strut must be placed on both sides to ensure any unintentional movement of the blocking part is impossible.
Alternative a squared timber 10cm by 10cm with length 90cm can be used.
The manufacturer recommends the service strut shown on Image 23 and Image 22.

⚠	**Warning** The entering of the wedge barrier without a mechanical support is for safety reasons strictly prohibited.

Appendix 9 - Technical Data Wedge

Power [kW]	Blocking Width [mm]	Barrier Height [mm]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
4,00	2000	1200	2360	2450	1100	1.800
4,00	2500	1200	2860	2450	1100	2.070
4,00	3000	1200	3360	2450	1100	2.330
4,00	3500	1200	3860	2450	1100	2.590
4,00	4000	1200	4360	2450	1100	2.850

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