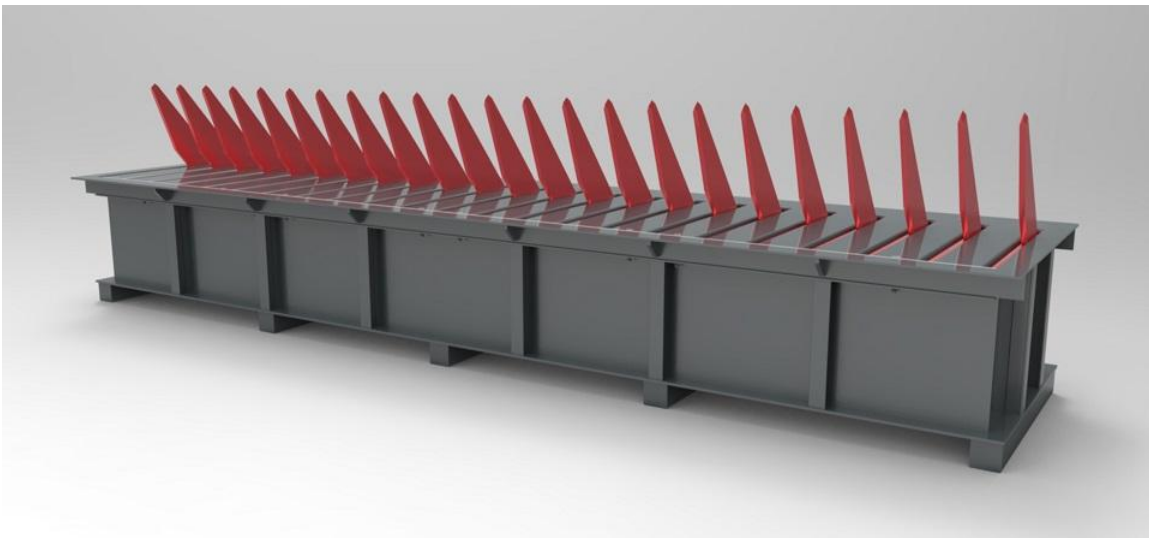


Operating Instructions

Tyre-Killer

Polite Security Products Pty.Ltd.



1. Introduction

Thank you very much for purchasing a Perimeter Protection product!

It is very important to be 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 Tyre-Killer.

1.2. Target group

These Operating Instructions are intended to be used by installers and users of the Tyre-Killer.

1.3. Technical progress

The manufacturer reserves the right to adapt technical data to the development progress without special notice. Perimeter Protection 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 delivery for all mechanical and electrical components of the Tyre-Killer, provided that the Operating Instructions have been complied with, that no unauthorized modifications have been carried out on the product, and that the devices do not show any mechanical damage.

If the daily use of the product exceeds that which is agreed, the warranty period shall be reduced proportionately.

1.5. General Safety Notes

The Tyre-Killer 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 Tyre-Killer 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 as-sets. Therefore, the Operating Instructions must be read completely and the safety notes must be observed.

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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.
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1.7. Qualified personnel

Personnel get familiar with the transport, the storage, the installation, the commissioning, the operation and the maintenance of the Tyre-Killer 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:	Tyre-Killer with electro-hydraulic drive in separate drive cabinet to integrate into roads
Blocking height:	0.45 m
Blocking Width:	2.8M/3.6M
Impact rate:	no specified impact rate, causes heavy damages to ax-les and tyres of a vehicle
Operational safety:	surveillance by operator
Maintenance and care:	low maintenance and care necessary compared to other known Tyre-Killer installations
Areas of application:	For preventing forceful infiltration of vehicle at facilities with high risk of terroristic attacks (i.e. embassies, military or police stations, car rental stations etc.).

2.2. Capability characteristics

Opening/closing cycle:	3 seconds / 3 seconds
Locking:	In final positions, or hydraulically during power failure
Drive:	Three-phase motor (380 V / 50Hz), Emergency operation via hand pump, optional with accumulator 2 cycles from accumulator in case of power failure
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:	no certification

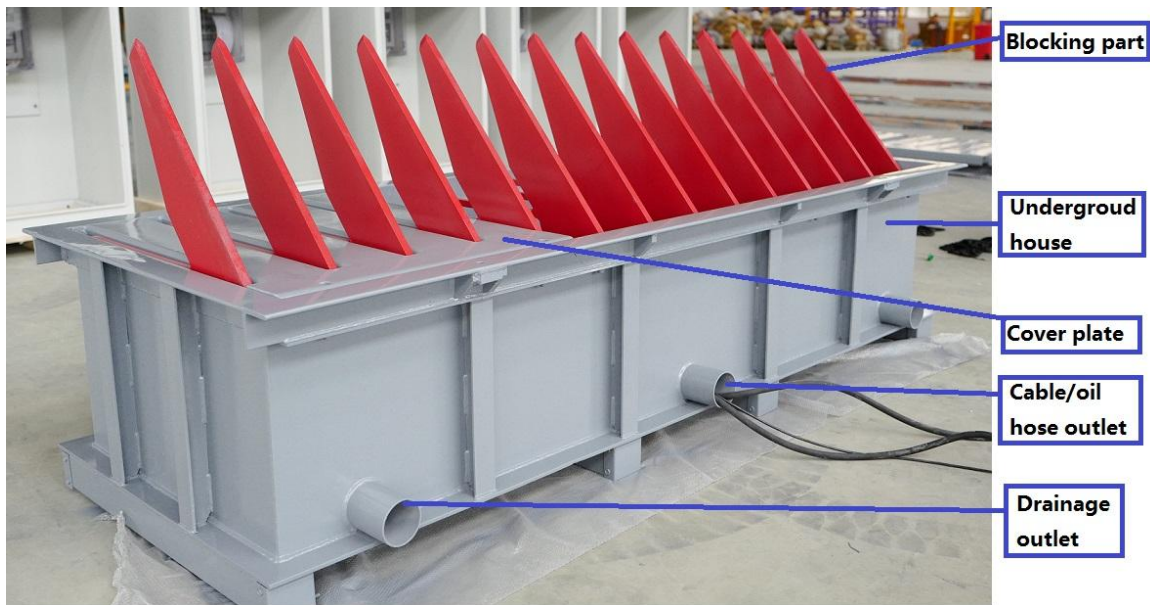


Image 1- Tyre Killer

2.3. Installation and assembly



Note

The Tyre-Killer is delivered completely assembled. Only the cables and oil tubes between the barrier and the drive cabinet must be connected.



Warning

Installation and assembly may only be performed by specialized personnel.

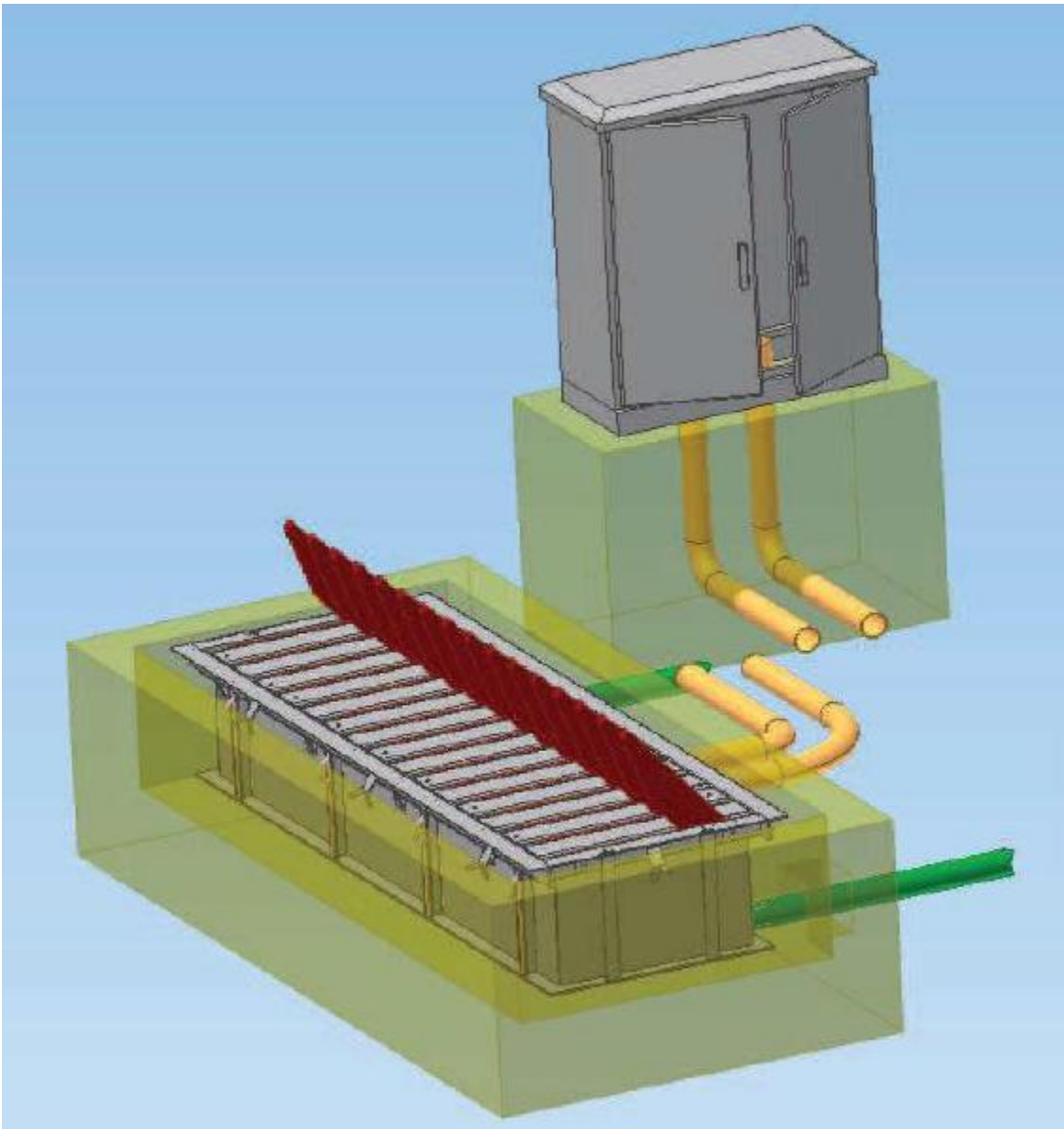


Image 2- Installation rendering

2.3.1. Local requirements for installation

- The material must be undamaged and complete according to the parts list/delivery note.
- Tools, measuring equipment and auxiliary means must be available.
- The Tyre-Killer 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 Tyre-Killer 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 Tyre-Killer.

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 – 5 – 6 – 8 – 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) Leveler (recommended) Mason line Electric measuring and inspection equipment
Auxiliary devices Crane Slings equipment (no chains) Shims of different thickness Square logs for supporting purposes

2.3.2. Preparing the Tyre-Killer for installation

The following instructions should guide you:

Unpack the pallets

- Place the drive cabinet at the specified place
- Place the Tyre-Killer into the foundation pit
- Connect the drainage and conduit pipes to the connectors at the underground housing
- Pull the electrical and hydraulic hoses through the conduit pipes to the cabinet.



Warning

Working inside the open Tyre-Killer is only allowed, if the blocking part is mechanically blocked against moving! Otherwise imminent danger to life, danger of personal injuries exists.

2.3.3. Preparation of foundations



Caution

When building the foundation adequate housing drainage must be provided. Ensure that a local drainage system is available. 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 4) (Image 5).

- The foundation for the control cabinet should be prepared at the beginning of installation process.
- It is recommended to place the Tyre-Killer into the prepared foundation pit and prepare then the rebar's (see Image 3).
- 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 Tyre-Killer and control cabinet must be provided and installed by the customer.
- Align the housing horizontally and vertically using underlain steel shims.
- 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.

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Image 4 – Layout plan foundations Tyre-Killer3.6M

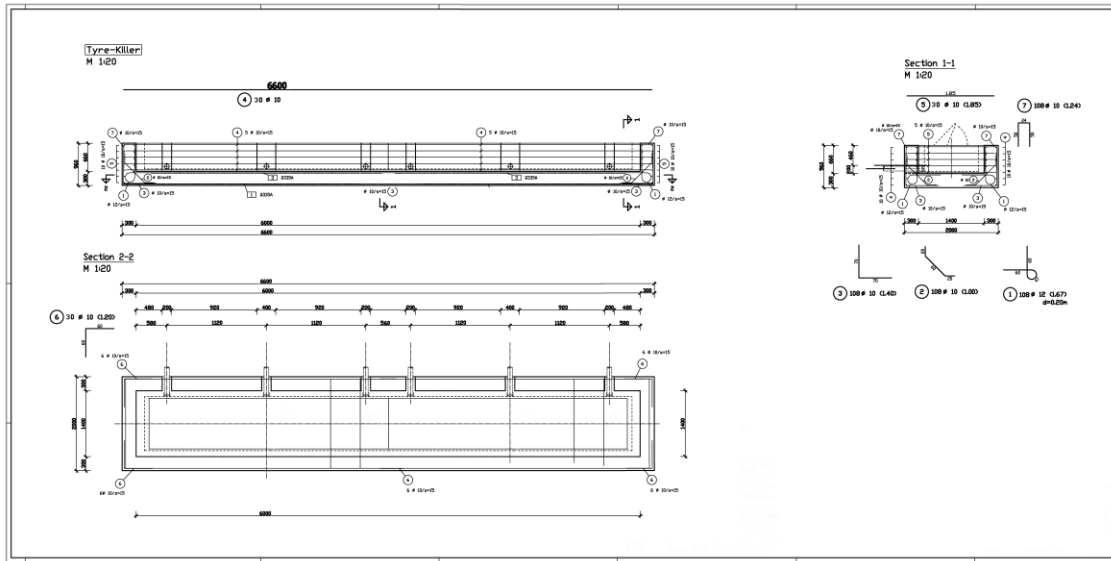


Image 5 – Layout plan foundations Tyre-Killer 5.6M

2.3.4. Installation



Caution

- The entire construction site must be sealed off to prevent access from unauthorized persons during assembly and/or other work on the Tyre-Killer.
- 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 Tyre-Killer 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.
- The oil contactor in cabinet mark with 'A' should be connected with cylinder contactor mark with 'A' via oil hose.Repeat the same with mark "B".
- Connect the main power lines (3 phases AC 380V, frequency 50Hz) to the control unit in the control cabinet.

2.3.5. Control cabinet and drive unit for Tyre-Killer

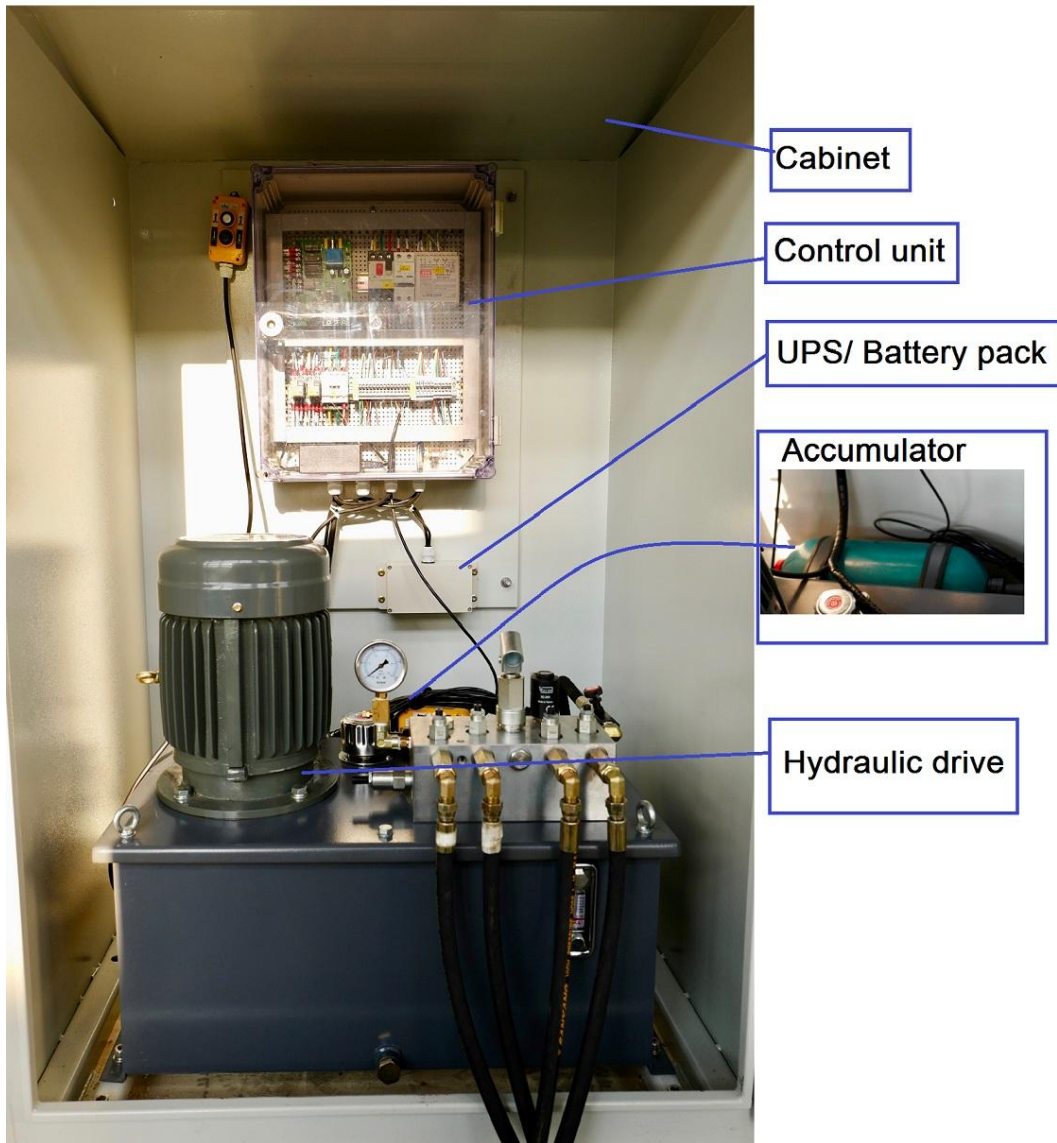


Image 6- control cabinet with hydraulic drive



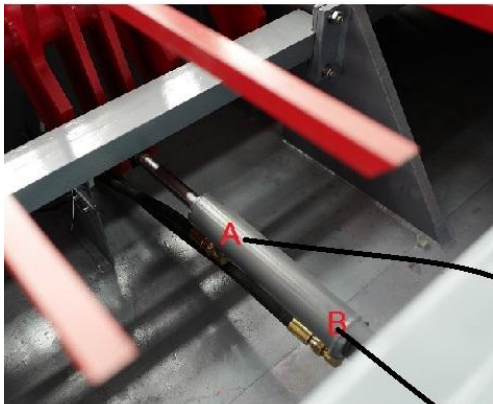
Note

Please ensure all oil hoses are fixed after connecting.

2.3.6. Hydraulic connection

To connect the Tyre-Killer hydraulically,

- Connect the hydraulic hoses with oil contactor in cabinet
- Connect the hydraulic hose with cylinder in Tyre killer underground house
- The oil contactor in cabinet mark with 'A' should be connected with cylinder contactor mark with 'A' via oil hose.
- The oil contactor in cabinet mark with 'B' should be connected with cylinder contactor mark with 'B' via oil hose.
- Make sure, that no air is inside the system.



hydraulic connection to the cylinder



Connection of hydraulic hoses inside of the cabinet

Image 7-Hydraulic oil hoses connection

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 Tyre-Killer. During operation no vehicles, goods or persons are allowed in the movement area of the blocking element of the Tyre-Killer 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 standard control is a push button switch "Open-Close". Customer related controls are optional possible.
- The end positions of the blocking element are detected by proximity switches.
- The Tyre-Killer can be either operated using normal or manual operation via hand pump. In normal mode it is operated by a electro-hydraulic drive
- The Tyre-Killer 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 underground housing is assured in order to avoid damage or destruction of the situated components. In winter during strong snowfall the area over the Tyre-Killer should be kept free of snow.

3.1. Operation during Power Failure

The system is equipped with a chargeable battery pack for 24V supply. This will supply the control unit and the valves for 12 hours after a failure of mains supply.

You can operate the Tyre-Killer for 3 cycles from the UPS/accumulator via the normal operators if the accumulator is completely filled. Thereafter only a manual operation via hand pump is possible.

Raising the blocking element

- Pressure the release button in solenoid valve 'raise' (11)(Image 9)
- Operate the Tyre-Killer by using the hand pump (14) (Image 9) until the fully raised position is reached.



Note

The hand pump fills the accumulator parallel to the cylinder.
The blocking part will raise only after a corresponding pressure level of the accumulator has been reached.

Lowering the blocking element

- Pressure the release button in solenoid valve 'raise' (12)(Image 9)
- Operate the Tyre-Killer by using the hand pump (14) (Image 9) until the fully lowered position is reached.

3.1.2 System with Accumulator

Item	Parts
1	Motor
2	Manometer
3	Oil tank
4	Oil contactor
5	Oil release
6	Accumulator
7	Oil infill
8	Accumulator rotatory switch
9	Oil valve assembly
10	Oil gauge
11	Solenoid valve 'raise'
12	Solenoid valve 'lower'
13	Solenoid valve 'accumulator'
14	Hand pump
15	Oil streamflow regulator
16	Oil pressure regulator

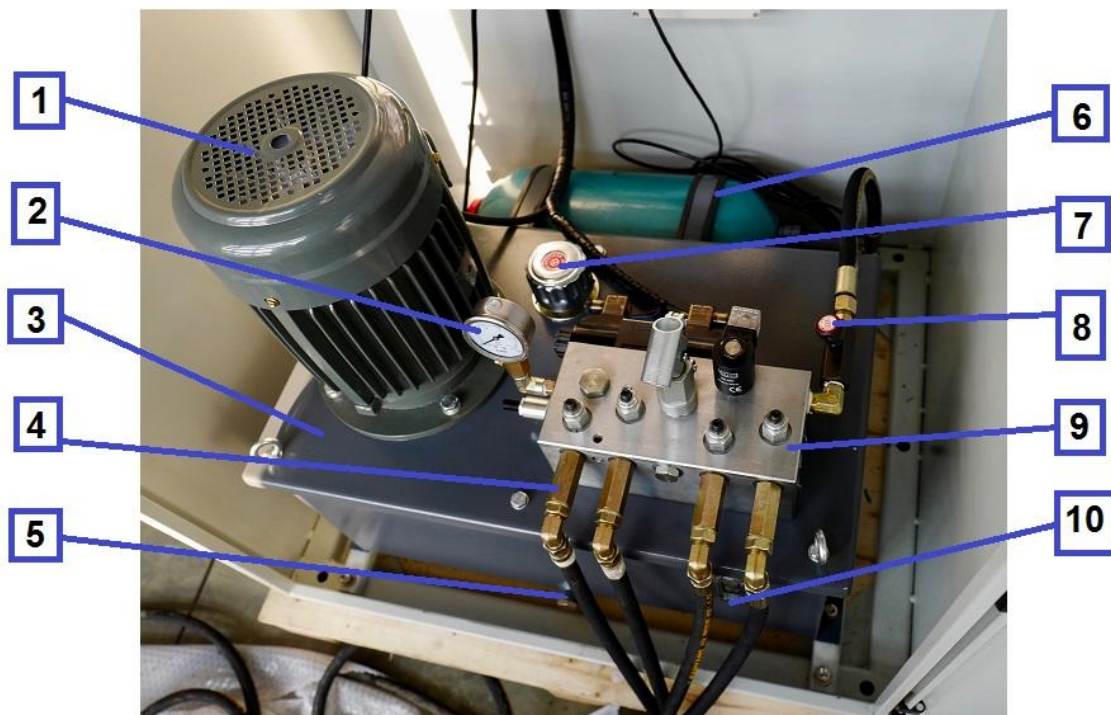


Image 8-Drive unit with accumulator

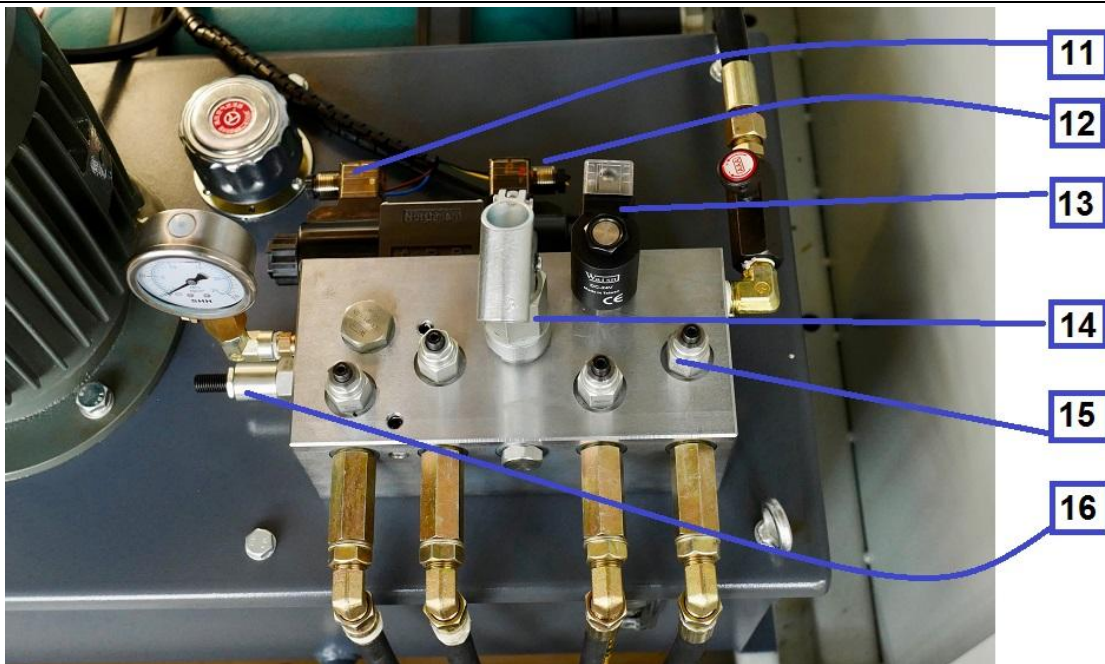


Image 9- valve block view

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 Tyre-Killer, 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 (5) (Image 10) must be switched off during all connection works.

Item	Parts
1	Control board
2	Relay 'lower'
3	Relay 'raise'
4	Motor cocontactor
5	Main switch
6	Air switch
7	Power supply
8	Terminal strip

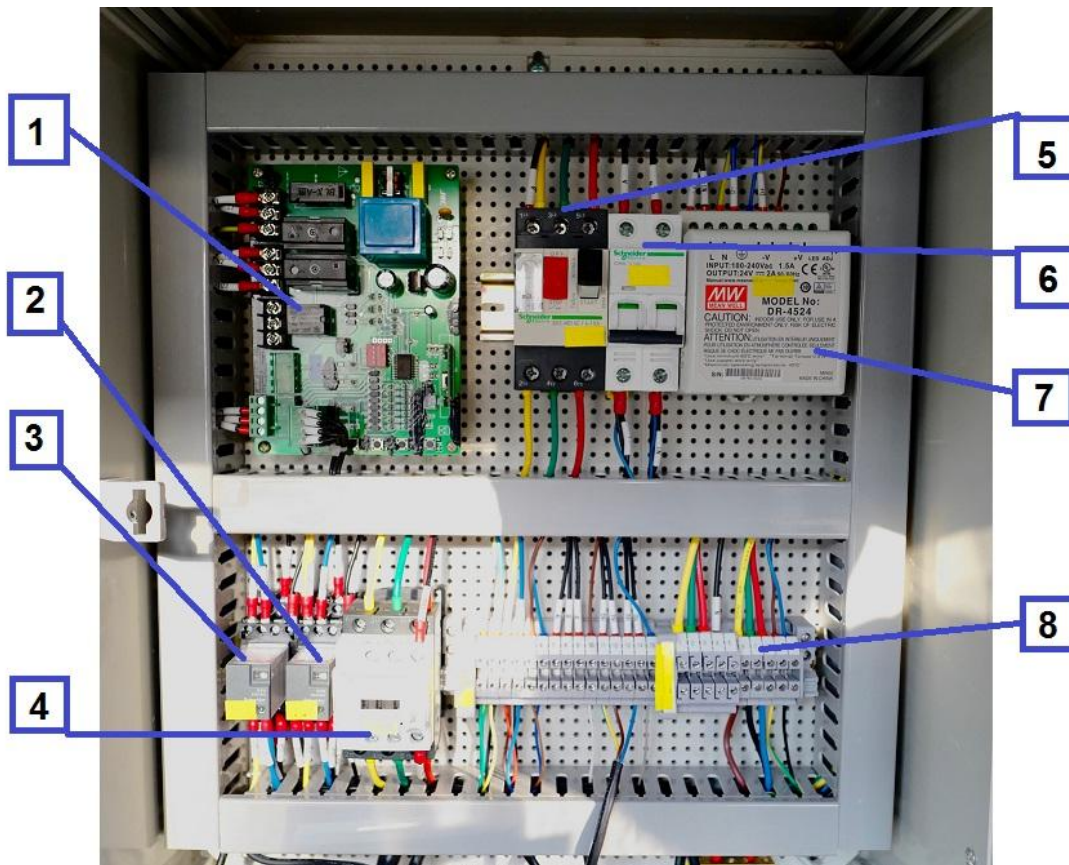


Image 10- Control unit inside control cabinet



Note

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

3.2.2. Connection of main supply voltage (380V)

- The supply voltage may only be connected by specialized personnel.
- The cables must be connected according to the terminal connection plan (Image 11).
- 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.

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Note

The main power supply is 3 phases AC, 380V at 50Hz. The rotating field turns clockwise. In case the motor runs in wrong direction, shift two phases.

Terminal function	Terminal No.	Terminal definition
Limited switch	7	Down limited
	8	Up limited
	9	Com
Push button	11	Com
	12	Raise
	14	Lower
380V Power	1	
	2	
	3	
	4	Null line

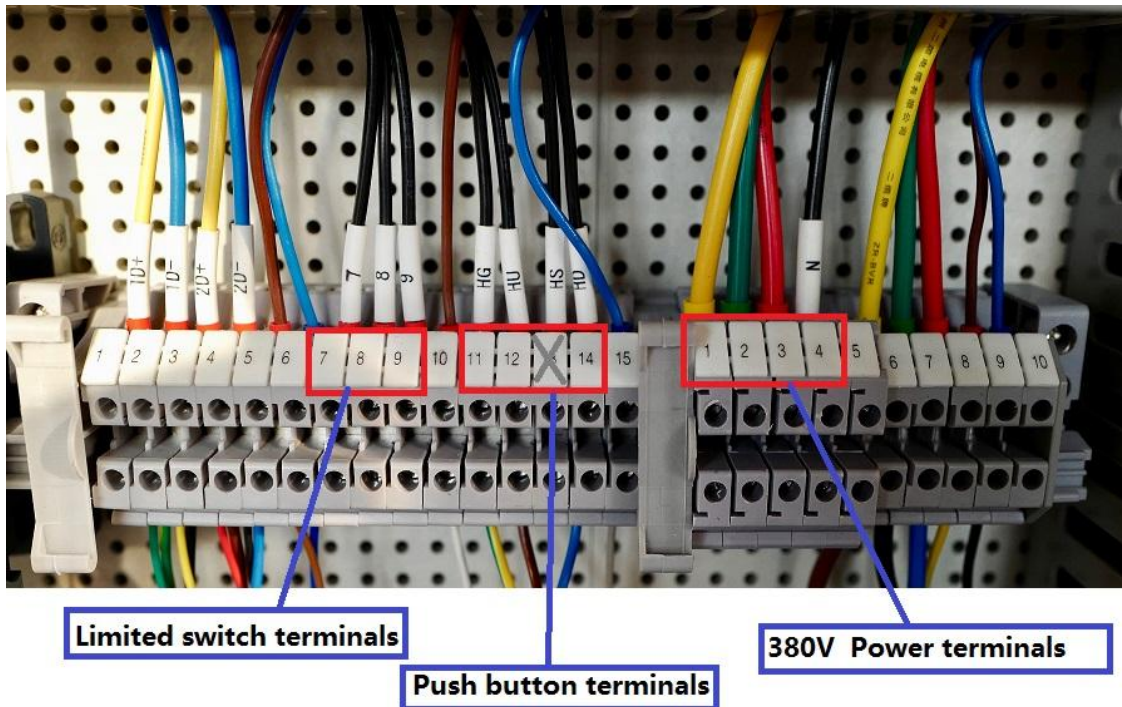


Image 11-Control unit-overview

- The biggest admissible motor size to be connected is 3.75 kW.
- The supply voltage must be connected via a lockable main switch.

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- Incoming earth must be connected to the grounding rail.

3.2.3. Adjustment of limit switches



Warning

Nobody must be in the range of the Tyre-Killer when the barrier is opened or closed.

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

- Open the cover grill of the underground housing above the cylinder.
- Adjust the lower limit switch for the raised position of Tyre-Killer.
- Adjust the upper limit switch for the lowered position of Tyre-Killer.



Note

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

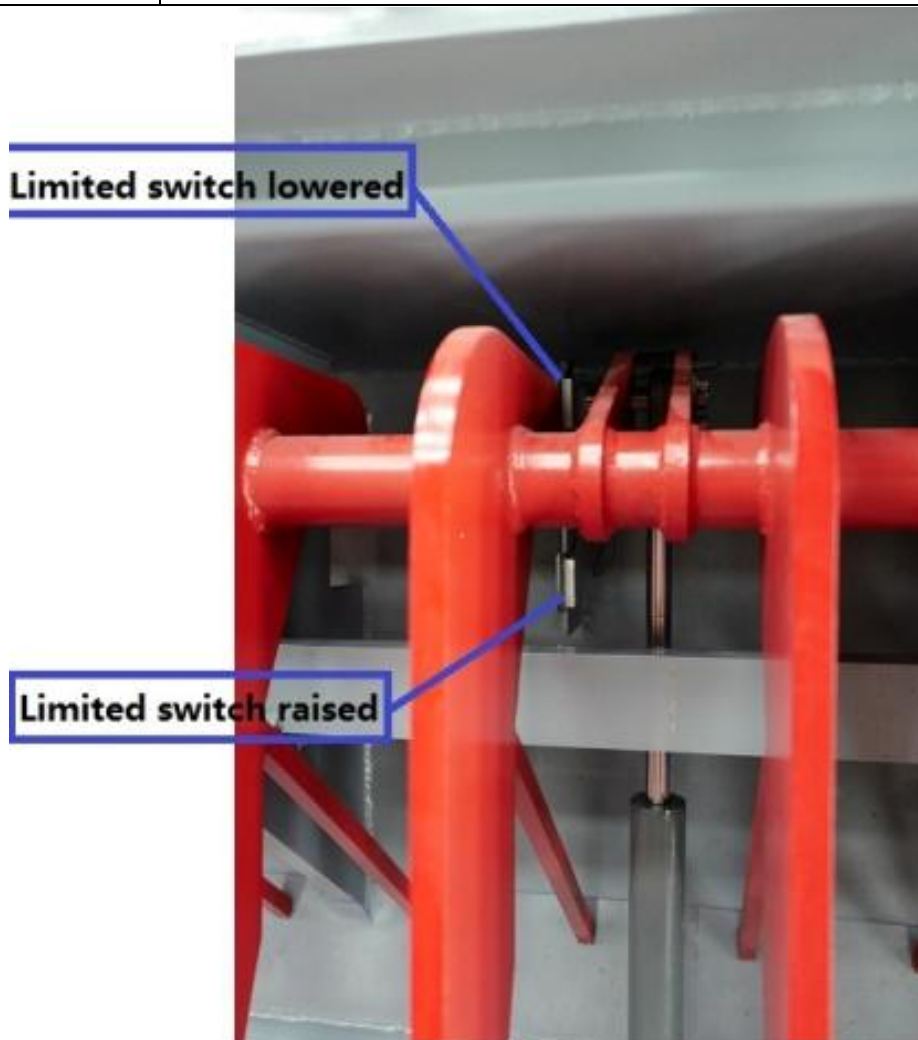


Image 12-Limited switch

3.2.4 Cable connection

	Warning All connection works must be performed by an approved installer.
	Warning Prior to servicing work, the Tyre-Killer drive must be switched off and secured against unintentional and unauthorized 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(s) of the underground housing above the cylinder(s).
- Remove the cover plate(s).

Pull out the limited switch cables and connect them with the terminal connection plan (Image 11)

3.2.5 Commissioning

	Warning Only when the Tyre-Killer 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 / Trouble shooting

4.1. Trouble shooting

Table 4 – Troubleshooting of system

<u>Malfunction</u>	<u>Possible cause</u>	<u>Remedies</u>
✓ System is power-less.	✓ 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.	✓ Tyre-Killer 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)

4.2. Dismantling the Tyre-Killer

	Warning All works on the electric installation must be performed by an approved installer.
	Warning Prior to work on the electric installation, the Tyre-Killer drive must be switched off and secured against unintentional and unauthorized activation. The system must be completely free of oil pressure. Release the accumulator!!

- The Tyre-Killer 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.
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- The foundation has to be cracked completely and removed.
- The Tyre-Killer 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.
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- 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 Tyre-Killer 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.

Recommendation: Forward to a base oil regeneration process.

4.5. Maintenance and service

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

	Warning Prior to servicing work, the Tyre-Killer drive must be switched off and secured against unintentional and unauthorized activation. The test run (functional check) is an exception from this.
	Caution Prior to servicing work, the blocking part must be lowered and secured against unintentional movement.
	Caution Do not remove or manipulate protection devices.
	Note The maintenance of Tyre-Killer 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 paint.

- 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 bolts 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 refill if necessary.
- 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 blocking part for any damages (cracks, dents etc.). Exchange the blocking part if necessary.

- Grease the joint head of the hydraulic cylinders.
- Grease the bearings of the blocking part.
- 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 intact-ness 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 color and/or viscosity
 - Strange smell
 - General visible impurities

Remark: New hydraulic oil has a chartreuse color, 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
	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 blocking part

The blocking part should be replaced after an impact occurred and the spikes and /or axle are fairly deformed. It is recommended to exchange the axle bearings at the same time. For the replacement a lifting device (crane, fork lifter etc.) is required.

The new blocking part will be supplied ready to final assemble it to the Tyre-Killer.

	Warning Prior to servicing work, the Tyre-Killer drive must be switched off and secured against unintentional and unauthorized activation. The test run (functional check) is an exception from this.
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- Operate the Tyre-Killer manually by hand pump to the lowered position.
- Remove the cover grills from the underground housing.
- Attach a lifting sling or similar to the axle and secure the spike axle against unintended moving.
- Dismantle the hydraulic cylinder(s) from the spike axle (Image 12) by loosen the fixings.
- Dismantle all distance rings and upper bearing housings from the axle bearings.
- Remove the spike axle by crane or fork lifter from the Tyre-Killer.

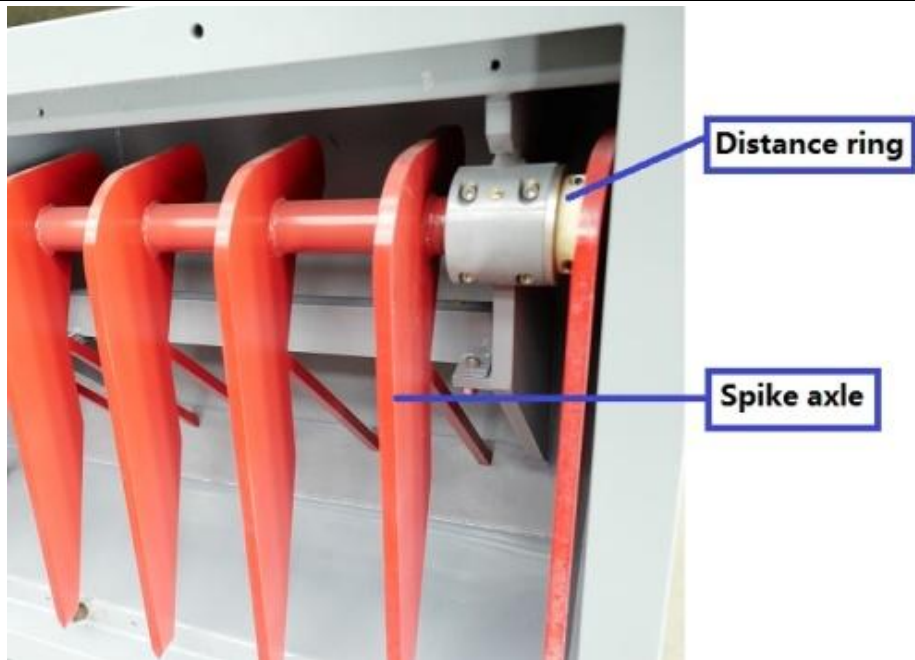


Image 12-Spike axle

4.9.2. Assembly of blocking part

Follow the instructions given under 4.9.1 in conversely order.

4.10. Service

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

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