



Laboratory equipment co.,limited

# HYDRAULIC PROBING RIG SPT-C

## PRODUCT MANUAL



### **C-TECH LABORATORY EQUIPMENT CO., LTD**

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🌐 [www.testmould.com](http://www.testmould.com)


SINCE 2006


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## I. Overview

SPT-C is a dynamic penetration device with simple operation and convenient use. It can carry out the penetration test of falling weight DPL, DPM, DPH, SPT, the drop distance is adjustable 500mm or 750mm, and is equipped with probe rods and cone heads of different sizes, in accordance with the standard EN 22476-2.



Note

Read the instructions before you start any work.

## II. Use specifications

SPT-C is designed to carry out dynamic penetration tests and soil sampling. If used for any other purpose, the warranty period and operation permit will expire.

### Action Tips

The operating instructions are the basis for all operations on the device. The equipment user must always be made aware that the operating instructions are an integral part of the equipment. The prerequisite for safe work on the device is that all specified safety instructions and warnings must be followed. Therefore, before starting any work, personnel must carefully read and understand these operating instructions. In addition, the local accident prevention regulations and general safety regulations applicable to the location where the equipment is used must be observed.

### Characters, abbreviations and technical terms

In this document, the use of characters, abbreviations, and technical terms has the following meanings:

Meaning	Character
List	▶
List	-
Number	1
Steps	1.



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## Symbol Description

Warnings and safety precautions in the manual are marked with pictograms and displayed on a gray background. Warnings and safety tips have also been introduced to remind people to pay attention to basic dangers, and to indicate the degree of damage through signal words. These structures are as follows:



### Dangerous!

... Indicates an imminent danger that, if not added, will result in death or serious injury.

- ▶ Be careful at work to avoid accidents, personal injury and loss of property.
- ▶ All warnings and safety instructions, hieroglyphics and signals must be observedWord- relatedIt means:



### Signal word!

Sources of Danger Describes the siffyd dweud with hazards and how to avoid them.



### Warning!

... Indicates the risk of death or serious injury if not avoided.



... Indicates a potential hazard that, if not avoided, can in minor injuries.



### Attention!


... Indicates a potential hazard that, if not avoided, may result in property damage.


## Tips and suggestions



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These instructions use the following symbols to indicate tips and suggestions:

**Attention!**

... Focus on tips and recommendations, as well as information on effective and trouble-free operations.

**Special safety instructions**

To alert you to special hazards, the following pictographs are used in conjunction with safety instructions:



...Indicates the danger caused by crushing. Failure to follow the safety instructions may result in serious injury to moving parts.



...Indicates that the current is dangerous. Failure to pay attention to safety information may result in serious personal injury or even death.



...Indicates the danger of high temperature. If the safety instructions are not followed, the skin may be seriously injured by burns or burns.


**Scope of responsibility**


All information and instructions in this manual take into account the applicable standards and regulations.


The manufacturer is not liable for damage due to the following reasons:

- ▶ Didn't follow the instructions
- ▶ Improper use
- ▶ Untrained personnel
- ▶ Self-modifying

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- ▶ Technical changes
- ▶ Use of unapproved spare parts

The obligations stipulated in the delivery contract, our company's general terms and conditions, the manufacturer's delivery terms, and the legal provisions in force at the time the contract is concluded apply.

## Warranty

The manufacturer provides a warranty for the equipment based on sales and delivery conditions. The warranty is void if:

- ▶ Damage caused by improper operation,
- ▶ Repairs or interventions carried out by unauthorized personnel
- ▶ Accessories and spare parts that do not match the equipment were used.

The defect must be reported immediately after testing. Defects must be fixed immediately to minimize damage and do not compromise safety. If the requirements are not met, the warranty claim will expire. Changes in the sense of technological improvement are reserved for manufacturers.

## Customer Service

Our customer service provides technical information. Information about the contacts in the responsible area can be obtained over the phone and can be faxed, e-mailed or InternetDoingContact.



### Attention!

My Company company's contact details can be found on the cover.

## Copyright Protection

This document is protected by copyright. Without the written permission of the issuer, the instructions may not be transferred to a third party, copied in any form, excerpted, or used or communicated. Violations must be compensated. We reserve the right to make further claims.



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### III. Safety

This section outlines important safety aspects to protect operators from possible hazards and the company's safe and trouble-free operation. Failure to follow the instructions listed, warnings and safety instructions can cause serious danger.

#### Intended use

The device is intended exclusively for the following purpose in the industrial area: The device is used for ramming probes and ram core drilling.

#### Improper use

Exceeding the scope of application mentioned in **Intended use** is considered incorrect operation and the manufacturer is not responsible for any damage caused thereby. In this case, the user bears the risk. Unauthorized mechanical, electrical or structural changes to the device, the manufacturer does not assume any responsibility for any damage caused thereby. The intended use also includes compliance with the commissioning, operation and maintenance conditions provided by the manufacturer, as well as consideration of foreseeable misconduct. Marks have been affixed to the equipment and must be observed.

#### Misuse

This section describes the dangers of misuse of the equipment.



#### Warning!

Danger due to improper use!


In addition to the intended use of the device, any other use may cause danger.


Use the device only in accordance with the intended use in this document, especially in accordance with the usage restrictions specified in the technical data.


- Do not use the device in any other way beyond the scope.
- Do not modify or modify the structure or individual components of the equipment to change the scope of application or the availability of the equipment.



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## Operator responsibilities

The operator is any natural or legal person who uses the device or leaves it to a third party for use, and must be responsible for the safety of users, staff, or third parties during use.

### Operator's obligations

The device is used in the industrial field. Therefore, the operator of the device must bear the legal responsibility for occupational safety.

In addition to the warnings and safety instructions in this manual, you must also comply with the safety and environmental regulations applicable to the area where the equipment will be used.

### Operators must comply with the following:

- ▶ Inform yourself of applicable health and safety regulations and identify, through risk assessment, other hazards that may arise from special conditions of use at the place where the equipment is used,
- ▶ The behavior requirements necessary to implement the operation of the device in the operating instructions,
- ▶ During the entire period of use of the device, please regularly check whether the operating instructions of the device comply with the current status of the regulations,
- ▶ If necessary, adapt the operating instructions to the new standards and conditions of use,
- ▶ Clearly regulate the responsibilities of equipment installation, operation, maintenance and cleaning,
- ▶ Make sure that all employees who use the device have read and understood the operating instructions. In addition, personnel must be regularly trained on the use of the equipment and informed of possible dangers, and use of designated and recommended protective equipment can be used by personnel working on the equipment.

In addition, it is the operator's responsibility to ensure that the equipment:

- ▶ Always in a technically sound state,



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- ▶ Perform maintenance according to the prescribed maintenance cycle,
- ▶ And regularly check the integrity and function of the equipment's safety equipment.

In addition, the operator must designate qualified personnel responsible for the equipment in writing.

The "Occupational Safety Regulations" require operators to conduct risk assessments based on expected work tasks and determine routine inspection cycles and test depth.

## Liability

The device is used in the industrial sector. Therefore, employees must comply with the legal requirements for occupational safety. In addition to the warnings and safety information in this manual, safety, accident prevention and environmental protection regulations applicable to applications must be observed.

In particular, staff:

- ▶ Understand applicable health and safety regulations,
- ▶ Meet the operating requirements of the field operating equipment as given in the operating instructions,
- ▶ Properly perform ingons of equipment, maintenance and cleaning,
- ▶ Before you begin work, you must fully read and understand the operating instructions. Use regulations and recommended protective equipment.
- ▶ In addition, it is the responsibility of everyone responsible for the equipment to ensure that the equipment is always in good condition.
- ▶ Maintenance according to the maintenance cycle,
- ▶ Check the integrity and functionality of all safety equipment regularly.

## Personnel requirements

- ▶ Any activity on the device can only be performed by people who can work correctly and reliably and meet specific requirements.



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- ▶ Persons whose ability to react, such as the consumption of drugs, alcohol or drugs, is affected, shall not work.
- ▶ Staff must always comply with the age and occupation requirements of the operating site.

**Warning!**

Risk of injury if you are not eligible!

Improper work can result in significant personal injury and property damage. All operations can only be carried out by personnel with the necessary training, expertise and experience.

**Instructor**

Instructor refers to the operator who can inform them in detail and clearly about tasks and possible dangers

**Technical staff**

Technical personnel are those who are able to correctly perform assigned work due to their professional training, knowledge and experience, and knowledge of relevant regulations, independently identify possible hazards and avoid personal injury or property damage.


**Electrician**


In principle, all work of electrical equipment can only be carried out by electricians.

Electricians are people who can correctly perform work on electrical systems due to their professional training, knowledge and experience, and understanding of relevant regulations, independently identifying possible hazards and preventing current from causing personal injury and property damage.

**Unauthorized person****C-TECH LABORATORY EQUIPMENT CO., LTD**

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**Warning!**

Risk of injury if not allowed!

Untrained personnel do not understand the hazards in the work area and are therefore considered unauthorized. Keep unauthorized people away from the work area, communicate with them, and direct them to leave the work area. As long as unauthorized personnel enter the work area, work can be interrupted.

## Personal Protective Equipment

Personal protective equipment must be worn at work to minimize health risks.

- ▶ Wear the specified protective equipment correctly and wear it during work before you start any work.
- ▶ Also, it is important to note that the personal protective equipment attached to the work area has a hieroglyphic logo.

The protective equipment listed below must, in principle, be worn and must always be in good condition.

**Overalls**

Tight overalls, with low tear resistance, narrow sleeves and no protruding parts, mainly to prevent them from being caught by moving equipment parts. Do not wear rings, necklaces or other jewelry.

**Gloves**

Protect your hands from bruises, scratches, hurts, cuts, stab wounds or similar surface skin damage.


**Safety shoes**


Protect your feet from falling parts and slippery ground.


**Industrial hard hats**

Protect the head from injury caused by falling parts and materials above.

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### Earplugs

Prevent hearing damage caused by noise at work.



### Goggles

Prevent eye damage from splashing parts, particles, liquid splashes, or compressed air leaks.

## Danger

The device has been assessed against risk. Eliminate identified hazards as much as possible and reduce identified risks. Nevertheless, there is still a residual risk to the equipment, as described in the following sections.

The warnings and safety instructions listed here and in the operating sections of this manual must be observed in order to avoid harm to health and dangerous situations.

### Risks posed by machinery



#### Warning!

Risk of injury from moving parts!

Driven moving components or parts may cause serious injury

- Do not let people stay in or near the danger zone.
- Do not invalidate safety equipment or functions, making them unusable.
- Do not touch the running equipment.



#### Warning!

Risk of crushing!


Driven moving components or parts can cause serious injuries, and moving parts can crush body parts during operation.


- Do not enter the hazardous area during operation.
- Always carry out inspection and maintenance work and troubleshooting, especially pay attention to tightening points.


When working in a hazardous location, wear protective equipment to prevent pressure injuries.



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### Risk of electric shock



#### **Dangerous!**

Danger to life from electric current!

Touching live parts leads to death. Damage to the insulation or individual components can be life-threatening.

- Before starting any work on the electrical system, switch off the electrical system. Check that there is no voltage
- Before carrying out maintenance, cleaning and repair work, switch off the electrical power supply and secure it against being switched on again.
- If the insulation is damaged, switch off the power supply immediately and arrange for repairs.
- Do not bypass fuses or put them out of operation.
- When replacing defective fuses, always pay attention to the correct amperage rating.
- Keep moisture and moisture away from live parts.

### Risks from thermal hazards



#### **Be careful!**

Risk of burns!


Contact with hot components may cause burns.


-Suitable for all work close to high-temperature parts, for example: wear protective clothing and protective gloves when using the motor of the device.


Before starting any work, make sure that the components have cooled to ambient temperature.



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### Noise risk

**Warning!**

Noise can cause hearing damage!

Noise generated in the work area can cause severe hearing loss or hearing loss.

-In principle, hearing protection is required for all work.

-Only stay in hazardous areas when necessary.

### Vibration risk

**Warning!**

Strong vibrations can damage your health.

-During operation, do not stop in or near the violent vibration danger zone.

### Risks posed by materials

**Warning!**

Risk of poisoning when using lubricants! Lubricants can cause poisoning or skin irritation.

-Please follow the lubricant manufacturer's safety instructions.

-Avoid spraying.


-Do not eat, drink or smoke at work.


-Before using lubricant, please apply skin protection cream.


-Wear plastic protective gloves when working, and safety glasses with side shields when using oil.

-Wash and apply skin cream after get off work.

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**Warning!**

Risk of explosion when handling fuel!

When in contact with sparks or fire, fuel will burn and explode.

- Avoid spilling and spraying when refueling and working.
- Do not smoke while working. Avoid contact with skin and eyes.
- Wear plastic protective gloves when working, and safety glasses with

## Safety device for dynamic penetration

**Warning!**

Safety device failure or bridging can result in death!

Malfunctions, bridged or disabled safety devices cannot guard against danger and may cause serious injury or death.

- Before starting work, be sure to check that all safety devices are properly installed and working properly.
  - Never exceed safety devices.
- Make sure that the safety device is always accessible.

### SPT-C Safety Device

Model SPT-C has a safety device in the form of a safety hook. When working on the boom or in front of the mast, the impact device must be inserted into it. Figure 1 shows how to prevent the impact device from falling through the safety pawl during the hammer.

1. Raise the impact device to the stop of the mast head at a lower speed: the safety catch automatically engages.

**WARNING!**

Protection against falling impact unit is only provided if the safety catch is correctly inserted. Before working under the impact unit, make sure that the impact unit is secured by the locking pawl.



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Figure 1: Impact device is properly placed on safety claws

Please release the limit block as follows:

2. Raise the shock device again until it stops.
3. Pull the limiter manually and slowly reduce the impact device (see Figure 2).
4. Put down the shock device until it passes through the safety lock and releases again.



Figure 2: To release the securing device, the rope of the securing pawl is pulled and the impact unit is moved past it

### Emergency stop

The device has an emergency stop switch. This switch will immediately depressurize the hydraulic system and shut down the engine.



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## Spare parts

For safety reasons, only manufacturer's spare parts can be used. Information can be obtained from the manufacturer.



### Attention!

Our company's contact information can be found on the cover page.

## Secure against restart



### WARNING!

Risk of injury due to unauthorized restart!

When working on the device, people at the danger points can be injured by unauthorized switching on the power supply.

- I. Always observe the information on securing against being switched on again in the instructions in this manual.
- II. Before carrying out any work on components, assemblies or individual components, follow the procedure described below for securing against being switched on again.

After completing the work:

- ▶ Reinstall all safety devices properly and check that they are functional.
- ▶ Make sure that there are no people in danger areas and in the entire danger area.

## Behavior in the event of danger and accidents

In this section, the correct behavior in the event of danger and accidents is addressed.

Preventive measures

Always be prepared for accidents and fire.



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- ▶ Keep first aid facilities (first-aid kit, blankets, etc.) and fire extinguishers within reach.
- ▶ Make personnel familiar with the accident reporting, first aid and rescue facilities.
- ▶ Always keep access routes for emergency vehicles clear.

Do the right thing if the worst comes to the worst

- ▶ Shut down the device immediately.
- ▶ Initiate first aid measures.
- ▶ Rescue affected persons from the danger zone. Inform the responsible person on site.
- ▶ In the event of serious injuries, call a doctor or fire service. Keep access routes for escape routes open.

## Signage



### ATTENTION!

Risk of injury due to illegible symbols!

Stickers and signs that have become indistinct no longer identify danger spots sufficiently and cannot point out possible risk of injury.

- Always keep the pictograms, safety, warning and operating instructions in a legible state.
- Immediately replace damaged or unrecognizable pictograms, labels, signs or stickers.



### Refer to the manual!

Read the operating instructions before starting any work.



### Risk of crushing!

There is a risk of serious injury to moving parts on the marked component.



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## Working place

Basically, the device should be used outdoors. The use of equipment in closed rooms is strictly forbidden because the exhaust from the hydraulic press is harmful to health. If it is necessary to work in a closed room, if you have any questions, please contact the manufacturer.



### Attention!

My company's contact information can be found on the page after the cover.

## IV. Parameters

### Dimensions

Length	2550mm
Width	790mm
Height	1550mm
Working height	2900mm
Track width	790mm

### Weight

The weight of the device refers to the total weight without accessories.

Total weight	850kg
Drop hammer part	89kg

### Power part

The power of the device is provided by Honda GX 390, the standard configuration is electric start



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operation, and its performance values are listed in the table below. If other power is selected due to additional options, the corresponding data can be found in the manufacturer's operating manual in the appendix of this document.

### Power parameters

Name	Value
Number of cylinders	1
Maximum power/3600rpm	8.7KW
Displacement	389cm <sup>3</sup>
Oil capacity	1.1L



#### Note!

-Using the wrong fuel will damage the equipment!  
 -Using incorrect or poor quality consumables can cause equipment damage. Use only specified fuel

#### Fuel

Gasoline

### Power supply

Type	Value
Direct current power supply (DC)	12V
Capacity	20A

### Hydraulic oil





#### Note!


Using incorrect hydraulic oil will damage the equipment! Cause equipment damage. Therefore, only use the specified hydraulic oil.



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Hydraulic oil

See data sheet (data sheet in appendix)

## Operating conditions

This machine is only suitable for outdoor use. The place of use must be level to ensure that the machine is placed upright.

Content	Value
Maximum running time	Suitable for continuous operation
Power-on pause	No mandatory requirements
Maintenance interval	Reference engine
life	> 10years

## Noise

Content	Value
Noise	75dB(A)

## Storage requirements


Only store devices in the following situations:


- ▶ Do not store the device outdoors.
- ▶ Please store the device in a dry and dust-free place.
- ▶ Do not expose the equipment to corrosive media.
- ▶ Protect the equipment from direct sunlight.
- ▶ Storage temperature: 5°C to 45°C
- ▶ Relative humidity: up to 60%
- ▶ If stored for more than 3 months, generally check the condition of all parts regularly



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## Nameplate

The nameplate is on the device. The nameplate is used for equipment identification.

## V. Structure and function

This section introduces the structure and function of the product.

### Overview

This equipment is a soil survey equipment that can be used to perform drilling, tamper depth measurement and ram core drilling. The equipment runs on belt tracks with rubber tracks. In the basic version, the device is equipped with a drop hammer device.

The basic components are:

- ▶ Power part
- ▶ Hydraulic system with control valve
- ▶ Equipment frame
- ▶ Mast
- ▶ Annex

### Structure

1	Lifting arm	8	Chassis frame
2	Mast	9	Hydraulic oil tank
3	Hydraulic rope winch	10	Storage box
4	63.5kg drop weight	11	Extractor
5	Probe rod positioning fixture	12	Power part
6	Mast lifting part	13	Control lever
7	Rubber tracked chassis		

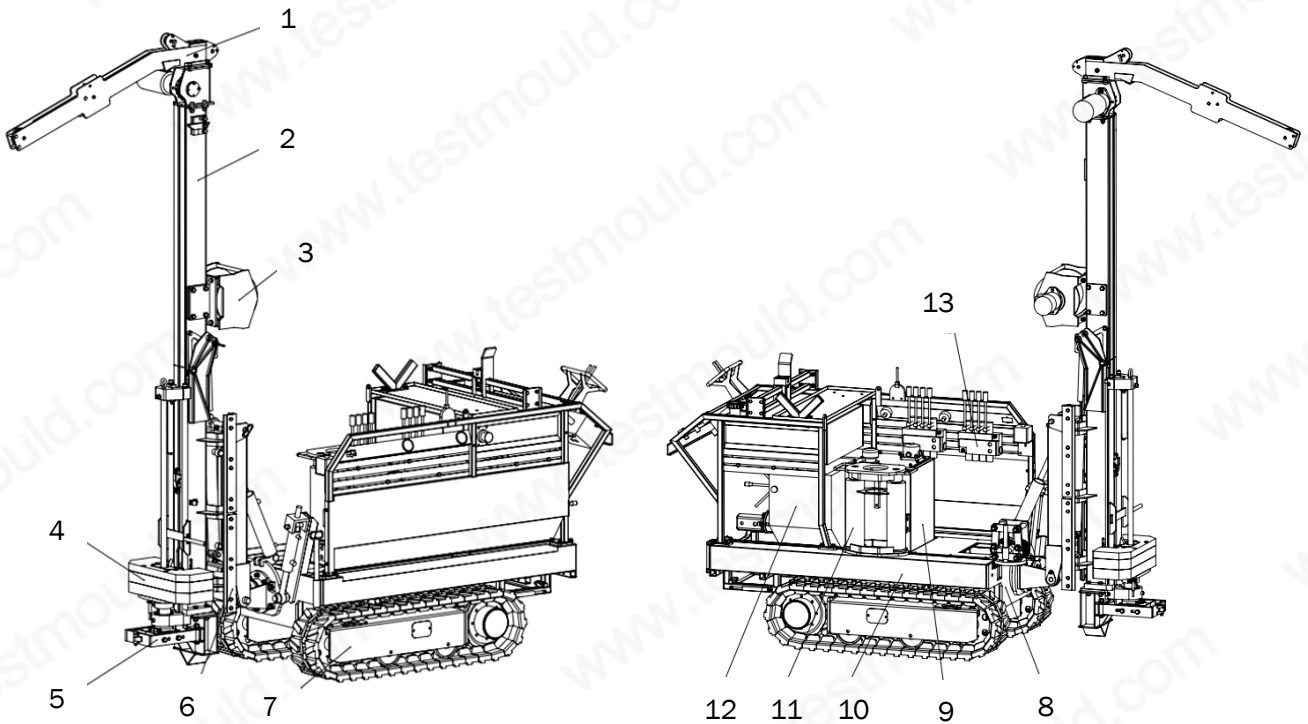


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### Hydraulic valve

The device has one or two valve blocks (depending on the device). This valve block is on the left. The valve function is displayed as a symbol on the label below the valve. The arrangement of the valve stem varies from device to device.



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No.	Functions	No.	Functions
V1	Chain drive(fast)	V5	Chain drive(slow)
V2	Hydraulic rope winch	V6	Mast folding
V3	Extractor	V7	Mast lifting
V4	Break hammer	V8	Mast rotates sideways


### Detailed description of valve function


The detailed description of valve functions assumes that the operator is standing in front of the valve block. The action will be described from his perspective below.


NO.	OPERATION DIRECTION	ACTION RESPONSE
V1	Push forward	Chain moves upwards
	Pull backward	Chain moves downwards
V2	Push forward	Lifting hook upwards
	Pull backward	Lifting hook downwards
V3	Push forward/ Pull backward	Extractor starts (if you push forward, the extractor can't lift normally, please pull the lever back)
V4	Push forward/ Pull backward	Break hammer starts (if you push forward, the break hammer can't start normally, please pull the lever back) Chain moves upwards, impact unit is driven along.
V5	Push forward	Chain moves upwards
	Pull backward	Chain moves downwards
V6	Push forward	Mast straightens up
	Pull backward	Mast deposits  Note: The mast must be brought into the central position before it is deposited-this is because it can make contact with and damage other parts of the machine during depositing.
V7	Push forward	Mast raises
	Pull backward	Mast lowers  Note: Please pay attention to the bolt position of each function
V8	Push forward	Mast bends to the right



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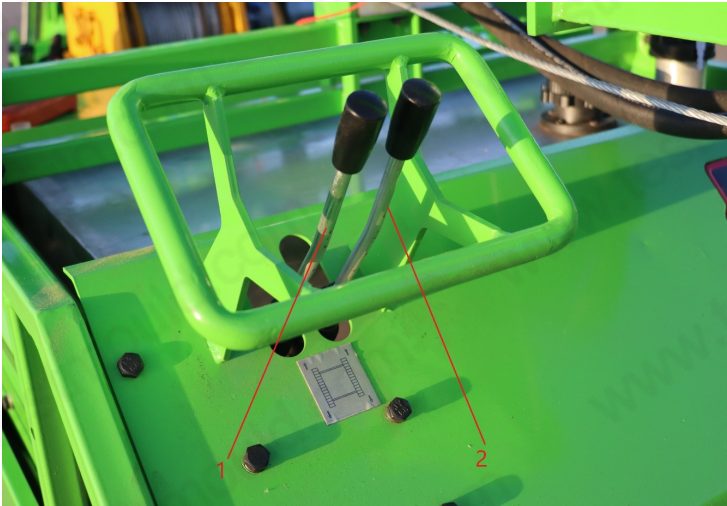
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Pull backward

Mast bends to the left

## Driving control

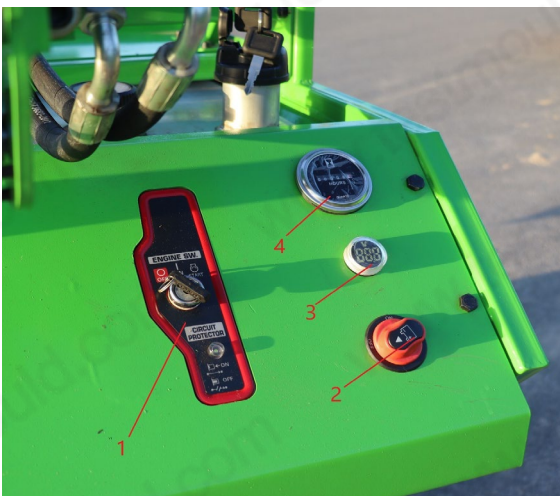
At the rear of the equipment is the driving control lever, through which they can be operated independently or in combination to realize steering, forward and backward.



No.	Item
1	Left lever
2	Right lever

## Engine control panel

During work breaks, transportation, when the machine is idle for a long time or unattended, the power switch must be turned off and the key must be removed. Avoid unnecessary consumption of batteries. In the event of a battery problem or complete failure, the engine can be started by pulling the starter plate.



No.	Item
1	Ignition Switch
2	Power switch
3	Voltmeter
4	Timer



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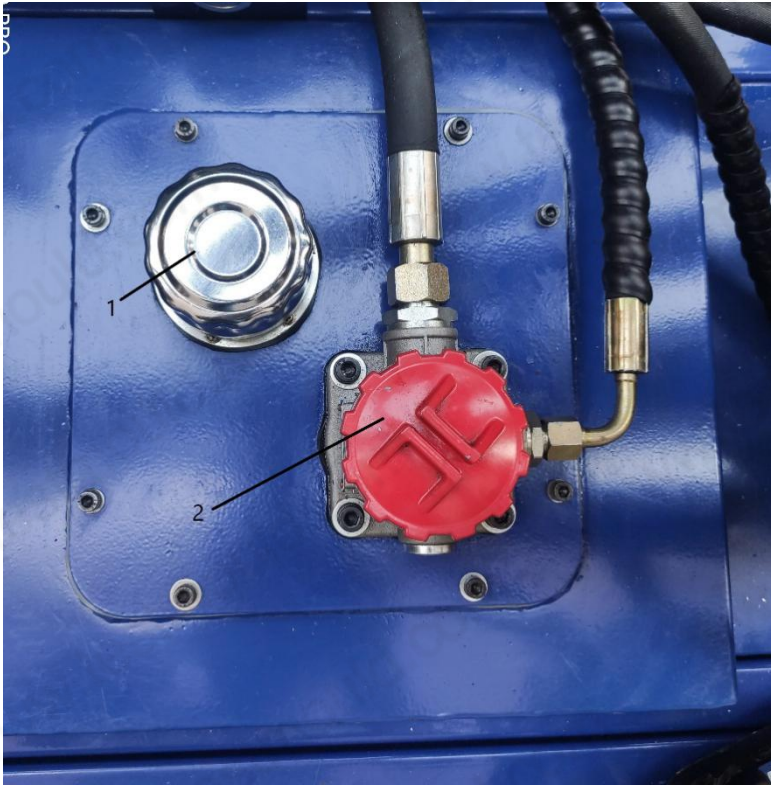
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## Hydraulic oil tank

The hydraulic oil of the entire hydraulic system of the equipment is located in the hydraulic oil tank. Its inlet is connected with an air filter (item number 1) and an oil return filter (item number 2).



Item	Description
1	Air filter
2	Return oil filter

**Note:** There is a filter element for filtering impurities inside the oil return filter, which needs to be replaced according to the working time, so as to prevent the filter element from being blocked, increase the back pressure of the oil return, and cause the failure of the hydraulic system.

## Fuel tank

Equipped with a fuel tank with a capacity of 50L. There is a filter element on the fuel pipe, and the filter element needs to be replaced according to the working time.

## Automatic reciprocating valve



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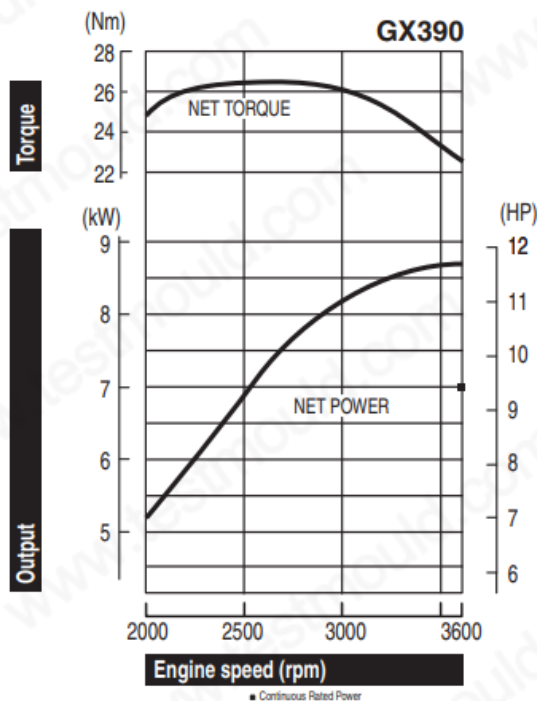
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The automatic reciprocating valve can change the direction of the actuator every time the oil in the valve stops moving. There is no maximum pressure setting in the valve. The spool moves through two springs and is locked by the imbalance of the pressure in the valve. When the flow in the valve no longer increases, the spool changes position to reverse the actuator. The engine speed will be reduced when commutation, but it will not crash.

## Engine

The engine is Honda GX390, please refer to the manual for specific maintenance details.

Power curve



Specifications

Model	GX390
Engine type	Air cooled 4-stroke single cylinder OHV petrol engine
Bore x Stroke	88 x 64 mm
Displacement	389 cm <sup>3</sup>
Compression ratio	8.2:1
Max. net power	8.7 kW / 3600 rpm
Cont. rated power	7.0 kW / 3600 rpm
Max. net torque	26.5 Nm / 2500 rpm
Fuel cons. at cont. rated power	3.5 L/h - 3600 rpm
Fuel tank capacity	6.1 L
Fuel	Unleaded gasoline
Ignition system	Digital CDI with variable ignition timing
Air cleaner	Dual, Cyclone, Low-profile
Lubrication system	Pumping spray system
Engine oil capacity	1.1 L
Dimensions (L x W x H)	380 x 460 x 448 mm
Dry weight	31.7 kg
Starting system	Recoil starter (Electric start optional)

Hydraulic break hammer (optional)



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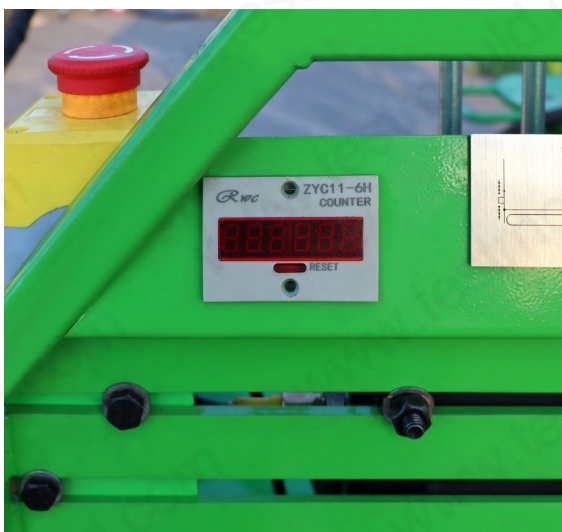
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Hydraulic oil flow	26-34L/min
Working pressure	105-140Bar
Maximum back pressure of oil return	25Bar
Hydraulic oil working temperature	30-70°C
Nitrogen charging pressure of accumulator	45Bar
Maximum output pressure	172Bar
30L/min frequency of blows	28Hz
P and T fittings	G3/8 quick coupler

### Counter

The figure on the left shows the count display, which can display the number of hammer strokes, and has a reset button. The figure on the right shows the counting sensor. When the nylon part is compressed, the sensor position needs to be adjusted to keep the distance between the probe and the hammer at 3-5mm.



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## VI. Transport, packing and storage



### NOTE!

Transportation, installation and initial start-up may only be performed by authorized employees of the manufacturer or their authorized personnel. If necessary, the operator or maintenance personnel may proceed according to the instructions of these agents and taking into account the following information.

### Transportation safety



#### Danger!

Risk of injury and property damage!

Do not use lifting gear when transporting equipment by forklift.



#### Caveat!

Danger to life due to load drop!

Falling cargo or parts of it may cause death.

-Never stand under a suspended load.

-During operation, please do not enter the rotating range of the crane.

-When using the crane, please be sure to wear a helmet.



#### Caveat!

Danger of injury when transporting goods in rotation!

Goods with an eccentric center of gravity will rotate significantly when they are lifted, causing serious injury to nearby people. Observe the transportation instructions and symbols on the transported goods. When using a crane, be sure to wear a helmet

### Transportation

There is a hoisting hole on the left and right of the position shown in the figure.

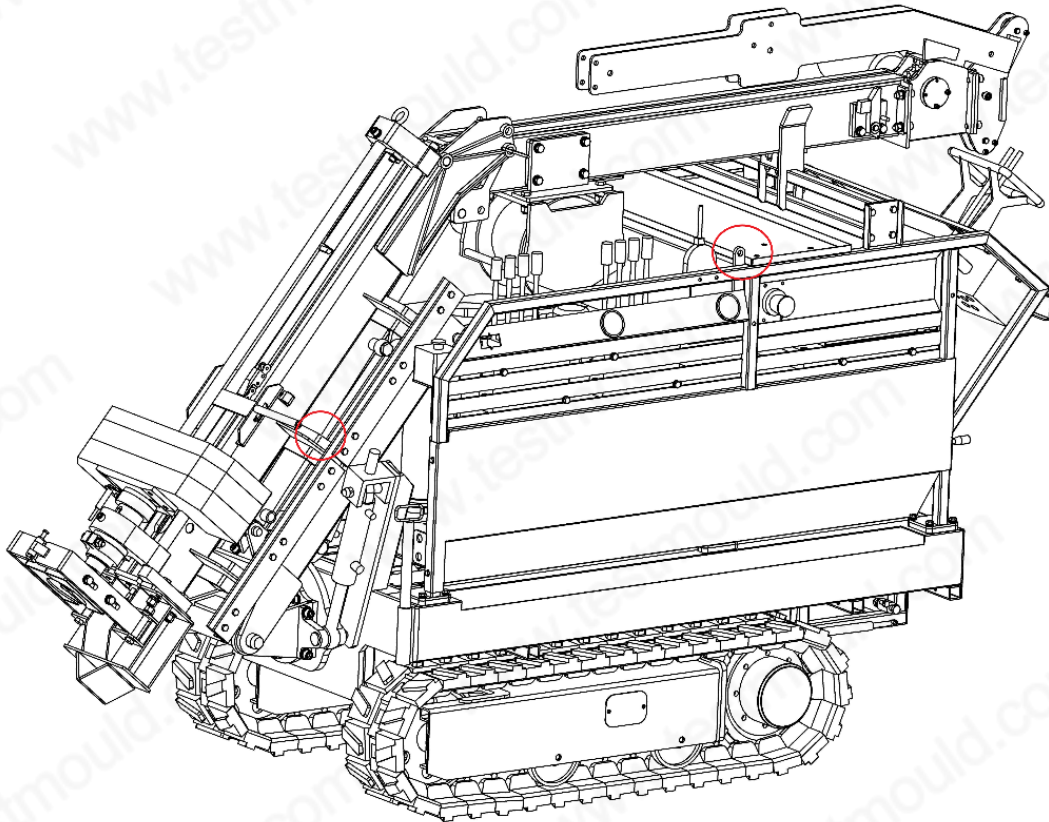


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## Storage



**Danger!**

**Damaged bearing!**

If the device is stored for a long time, the storage device may be damaged. therefore:

- The shut-off valve of the fuel tank must be closed to extend the storage time
- For longer storage time, the mast must be in place and the attachment must be above the center of gravity of the equipment
- All exposed metal surfaces must be oiled to prevent corrosion

## VII. Installation and debugging

This chapter describes how to install and debug the equipment. Please pay special attention to the



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following safety instructions.

### Installation safety instructions



**Caveat!**

**Risk of injury due to improper debugging!**

Incorrect work execution and errors during debugging can lead to serious injuries during work and life-threatening situations.

- Any installation work may only be carried out by trained personnel and those authorized by the operator.

- Before you start working, make sure you have enough work space.

- Always pay attention to the order and cleanliness of the work area!

### Installation and debugging

The equipment is debugged by professionals. The following information on personnel and personal protective equipment must be observed:

Staff	▶ Trained Professionals
Personal protective equipment	▶ Protective work clothes
	▶ Protective gloves
	▶ Non-slip safety shoes

## VIII. Operation

This section describes how to operate the device. Please pay particular attention to the following safety instructions.

### Operation Safety instructions



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**Caveat!**

Risk of injury due to improper handling!

Improper handling can result in serious injury.

- Operate only by trained personnel authorized by the operator.
- Before starting any work, make sure that the protective device is correct.
- Do not disable protective devices.
- Always pay attention to the order and cleanliness of the work area! Many surrounding objects, parts, workpieces and tools and cleaning equipment were the source of the accident.



Risk of personal injury from moving parts!

During operation, moving parts can cause serious personal injury!

- Do not stay in or near hazardous areas.
- Do not stop the safety device from working.
- Do not touch running equipment.
- Before working in a hazardous location, wait for the components to come to a complete stop.



**Danger!**

Risk of injury due to incorrect working conditions!

Doing the wrong job can result in serious injury or even death. therefore:

- Always stand behind the device while driving.
- Never walk next to the device.

The equipment is operated by professionals. The following information on personnel and personal protective equipment must be observed:

Staff	▶ Trained Professionals
Personal protective equipment	▶ Protective work clothes
	▶ Protective gloves
	▶ Non-slip safety shoes

**Preparation**



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**Caveat!**

Risk of injury if not prepared properly!

Improper preparation can also cause serious injury and property damage. therefore:

- Operate only by trained personnel authorized by the operator.
- If there is an abnormal situation, please turn off the equipment immediately and notify the relevant personnel.
- Before starting any work, make sure the protective devices are properly installed and working properly.
- Do not disable protective devices.
- Always pay attention to the order and cleanliness of the work area! Many times surrounding objects, parts, workpieces, tools and cleaning equipment are also the source of accidents.
- Check hydraulic oil level and fuel tank level, and change hydraulic oil or add gasoline.
- Check hydraulic system, fuel tank and transmission for leaks.
- Check that the screw connections are secure.

## Turn the engine on and off

To turn the motor on and off, follow these steps:

- ▶ All hydraulic control valves are in the neutral position.
- ▶ Unlock the emergency stop switch.
- ▶ Turn on the power switch, turn the ignition key switch, start the engine or start the engine according to the engine manufacturer's instruction manual.

**Attention!**

When the engine is running, the hydraulic system is also under pressure. So make sure all hydraulic levers are in the neutral position before starting the engine.

## Driving

**Caveat!**


Risk of injury due to incorrect mast position!


The device can only be driven with the mast installed. therefore:


- Make sure the mast is in the transport position on the equipment.



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While driving, stand behind the device and activate the joystick. Each motor is individually hydraulically controlled, which means:

Operating	Action
Push both control lever forward evenly	Equipment goes straight forward
Pull both control lever back evenly	Equipment goes straight backward
The left control lever is more forward than the right one	The device turns left
The right control lever is more forward than the left one	The device turns right

The travel speed of the device, like any other hydraulic function, depends on the engine speed: the higher the engine speed, the faster the travel speed, and vice versa, the slower.

When the lever is released, the parking brake is activated.



#### Danger!

Risk of tipping over on sloping terrain!

If the terrain slopes accordingly, the device may tip over. therefore:

- Drive slowly and carefully.
- When in doubt, stop and make sure the tilt is not dangerous to the device.

If you want to stop, slowly return the drive lever to neutral.



#### Attention!

Immediately after releasing all levers, the device stops and the parking brake is activated.

## Working space

This section introduces how to properly arrange the work place to ensure the safety of the equipment.


To set the penetration point, please perform the following operations:


1. Ensure the surface level.
2. If the ground is soft, use a wooden board to provide firm support for the rig.



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3. Straighten the mast and align the mast base vertically.

### Straighten the folding mast



**Danger!**

Risk of crushing when straightening or folding the mast! therefore:

- Work only by trained personnel.
- Move slowly. Do not move suddenly.



**Danger!**

Risk of personal injury and property damage from lifting accessories!

Fold the mast when the drop weight section (or other accessory) is on top of the mast may result in personal injury and equipment damage. Therefore, when straightening and folding the mast, always keep the drop weight (or other accessory) at the bottom of the mast.

In the transport position, the mast is folded on the equipment. Please follow the steps below to raise the mast:

1. Check the space under the mast!
2. Place the lower part of the mast in the vertical working position through the hydraulic control valve.
3. Pull out the pin in the middle of the mast (as shown in the picture below)



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4. When the mast is all in the vertical working position, insert the pin into the corresponding hole



**Danger!**

If the mast is in the wrong position, there is a risk of injury!

To illustrate the danger of equipment overturning if the operating procedures are not followed, here is another example where the danger is particularly high:

The operator selects the soft foundation that has been inclined laterally as the installation location. Now he erects the mast. When he raises the drop hammer to the top of the mast, the center of gravity of the rig will move, the ground may collapse, and the equipment may overturn. Folding the mast while raising the drop hammer can cause injury and property damage. Therefore, when lifting and folding the mast, be sure to place the drop hammer at the bottom end of the mast.

### Folding and lifting of the mast

This section describes how to move the mast up and down to adapt the mast to the working conditions according to the ground conditions.



1. Pull out the pin on the mast, as shown in the figure.
2. Now the mast can move up and down through the mast lift control valve.



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**Note!**

The lifting cylinder in the mast has two functions:

- Folding mast up and down
- Move the lower part of the mast to slide with the mast

By inserting the pin into the mast (see picture),

The mast slide rail has been fixed, and the top of the mast can be folded up and down.

## Penetration operation process

1. Move the device to the expected detection point. Be careful when turning and avoid excessive tilting of the equipment when going uphill or driving on complicated terrain.
2. Ensure that the equipment is safely and stably installed at the detection point.
3. Erect the upper part of the mast and fix it with a pin, and rotate the mast forward beyond the vertical direction.
4. Place the mast on the ground while slightly raising the front of the crawler chassis. Make sure the mast is stable, and if the ground is soft, use a base (such as a wooden board or similar material).
5. Adjust the mast to a vertical position.
6. Insert the lifting pin into the drop hammer device and use the chain to raise it to the top of the mast.

**Caveat!**

Only by hooking the drop hammer correctly can it prevent it from falling.

Before the drop hammer device works, make sure it has been hooked by the anti-drop limit.



7. Open the guide at the bottom of the mast and install a suitable nylon guide block. Place the probe and place the copper cap on the top of the probe. Then lock the guide.



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8. Raise the drop hammer device to the top. Pull the rope to lift the stopper and slowly lower the impact device, then drop it on the probe rod. The copper cap must be fully inserted into the anvil.
9. Pull out the lift pin.
10. Check the impact counter and set it to "0".

**Danger!**

Before starting to work, please check the following points again:

- Is the equipment stable and is the mast aligned vertically with the probe pole?
- Has the lift pin been pulled out?
- Is there anyone in the hammer drop area?

11. Turn on the chain motor and start penetration.
12. When the falling weight device falls to the bottom of the mast, the falling weight automatically stops and the chain continues to run, but the falling weight is no longer lifted. If the penetration depth of each impact of the probe is greater than 10 cm (on soft ground), the last impact may cause the drop hammer to hit the lower limit of the mast. Observe the process and stop hammering beforehand if necessary.
13. Insert the lifting pin and lift the drop hammer device to the top of the mast.
14. Install the upper and lower probe rods, tighten them, and start the test again.

**Danger!**

There is a risk of being squeezed during the penetration operation!


- When connecting the probe for the first time and when installing another probe, the operating instructions must be strictly followed to ensure safety.
- During operation, do not perform any operation on the running drop hammer device.
- When operating the equipment, prohibit others from entering the dangerous area!


**Danger!**


When using the falling weight device, it is very important to ensure that the frame of the falling weight device falls after each impact, that is, before each impact, the distance between the anvil and the frame is fixed.

- The tilt of the probe will cause the anvil to get stuck in its guide, which will increase the weight loss of the entire drop hammer!
- When penetrating, a copper cap must be placed on the top of the probe.

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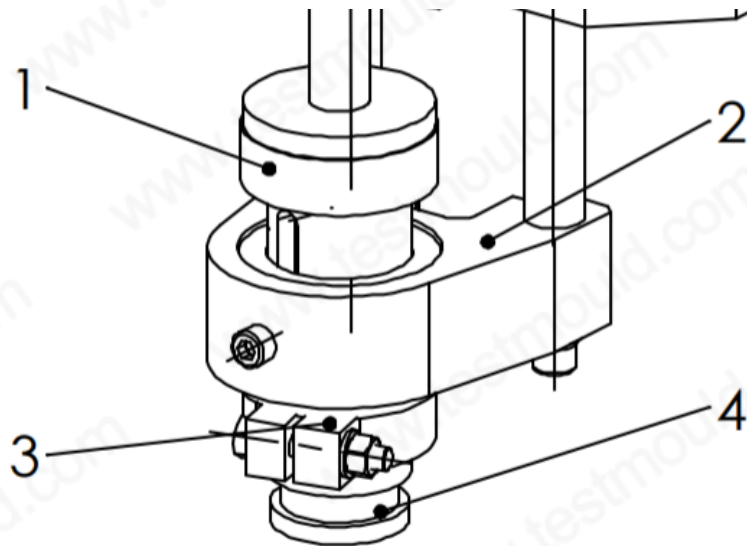
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**Prompt:**

When using a falling hammer device, it must be ensured that the frame of the falling hammer device follows each stroke, that is, the frame slides down the mast. Before each stroke, the top of the anvil must be seen above the lower guide part.



Item number	Name
1	Anvil with sliding area
2	Carriage lower guide
3	Lower edge of the anvil
4	Dynamic probing rod with brass hammer

**Pulling out the probe**

The equipment is equipped with a hydraulically controlled switching valve, called an automatic reciprocating valve, which will automatically change direction during the lifting process. The following describes the steps of lifting operation:

1. Insert the lift pin and lift the drop hammer to the top.
2. Tilt the mast backwards. The mast feet always remain at their original contact points, and the position of the equipment has not changed, so the test can be performed again.

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3. Lower the backing plate (optional), and place the lifting cylinder on the backing plate.
4. Put the probe chuck on the probe.
5. Open the lifting operation lever, the lifting action will be automatically performed.

**Danger!**

The ongoing operation of the probe rod will cause crushing hazard

**Danger!**

The lifting process is automatic. In the case of unsupervised operation, this may cause the probe to be pulled out of the ground several meters high, and then may fall and hit the equipment or the obstacle above.


### Changing the weight of the falling weight


According to EN-ISO-22476 standard, this equipment can be used for light, medium, heavy and super heavy penetration detection.


1. Place the drop hammer device at the bottom end.
2. Loosen the four screws on the top with an Allen wrench and remove the counterweight (13.5kg). The weight will drop from 63.5kg to 50k.
3. Take off another counterweight one by one, the weight will be reduced from 50kg to 30kg.
4. After removing all the counterweights, the remaining weight is 10kg.

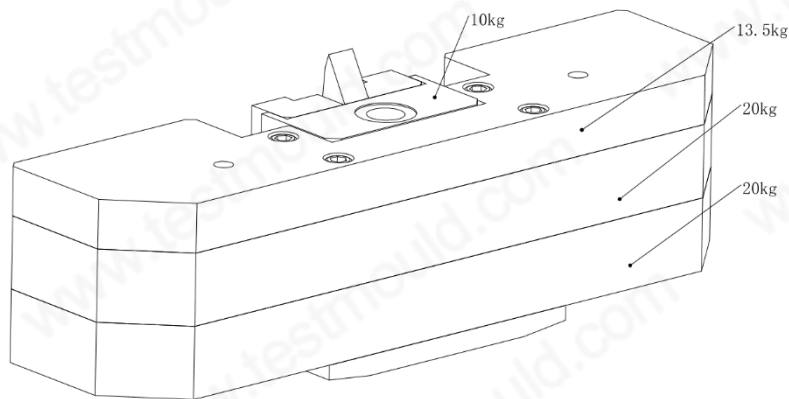


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### Accessories replacement



Use the lifting arm to replace the accessories. The lower part of the mast must have reliable support, and adjust the angle through the swing of the upper part of the mast to achieve the appropriate hanging position. When the drop hammer part is replaced, the connection plug of the counting cable



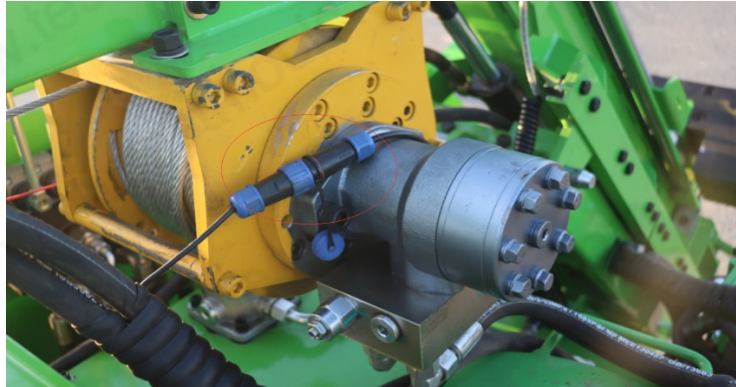
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must be disconnected, as shown in the figure:



## Hydraulic Breaker

Introduce the use of hydraulic breaker through the following points:

1. Use a chain to raise the hydraulic hammer on the mast to the highest position and ensure that the anti-fall limit is stuck.
2. Insert a suitable impact cap into the hydraulic hammer and lock it, put the penetration rod in a suitable nylon guide and lock it.
3. Raise the hydraulic hammer to the maximum again, loosen the anti-falling limit, and slowly lower the hydraulic hammer until the top of the penetrating rod is inserted into the hydraulic breaker.
4. Pull the valve of the hydraulic breaker with your left hand. Now, the hydraulic breaker has started to work. Operate and hold the valve of the chain with your right hand (away from your body) until the chain starts to move down (feed), and then press the hydraulic hammer onto the penetrating pipe (pressure). The hammer began to strike.
5. Use a throttle valve to adjust the feed speed of the chain to obtain a good hammering effect

Insufficient feed pressure: hydraulic hammer no longer penetrates or less penetration

Feed pressure is too high: the hydraulic hammer is stuck and no longer hits.

6. When the hydraulic hammer reaches the lower position of the mast, the chain no longer applies feed pressure. Turn off the hammer, and then move the chain up to the latch position.



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## Emergency shutdown

In dangerous situations, the equipment must be stopped as soon as possible and the power must be turned off.

When danger occurs:

1. Turn off the engine or press the emergency stop switch.
2. Notify the person in charge.
3. If necessary, remind the doctor and the fire department.
4. Rescue the injured and take first aid measures.
5. Ensure that the rescue vehicle enters the route



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smoothly.

After rescue measures:

1. If necessary, please notify the competent authority.
2. Assign professionals to troubleshoot.

**Danger!**

It is life threatening to turn it on again!

Before turning on the power again, make sure that no one is in the danger zone.

3. Before putting the equipment back into operation, please thoroughly check its technical condition and ensure that all equipment has been installed correctly and can operate safely.

## IX. Maintenance

This section involves equipment maintenance to ensure the continuous and safe operation of the equipment.

### Maintenance safety instructions

**WARNING!**

Risk of injury due to improper maintenance!

Improper maintenance can lead to serious injuries. Maintenance work may only be carried out by trained specialist personnel authorized by the operator.

- Ensure sufficient freedom of assembly before starting work.
- When using a pressure washer, never direct the jet onto the valve blocks.
- Before recommissioning, make sure that all protective devices are correctly installed and functional.


Before switching on again, make sure that there are no people in the danger area.


**WARNING!**


Risk of injury due to wrong spare parts!

Faulty spare parts can severely impair safety and cause damage, malfunctions or total failure. Only use original spare parts.

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**WARNING!**

Risk of injury from hazardous substances!

Hazardous substances contain components that are harmful to health and can lead to poisoning, burns or skin irritation.

- I. Observe the manufacturer's safety data sheet.
- II. Avoid spilling and misting.
- III. Do not eat, drink or smoke at work. Avoid skin and eyecontact. Avoid skin and eye contact.

**WARNING!**

Risk of injury due to unauthorized restart!

When working on individual components, people can be injured by switching on the power supply unexpectedly. Before carrying out any work on individual components, switch off the power supply and secure it against being switched on again.


## Maintenance schedule


The following sections describe the maintenance work required for optimal and trouble-free operation.

- ▶ If increased wear and tear on the components is found during regular checks, shorten the maintenance intervals based on the actual signs of wear.
- ▶ Prepare a maintenance log for every maintenance job. The log helps with fault analysis, enables the required intervals to be adapted to the actual conditions of use and any warranty claims to be made.
- ▶ The execution of the named work is time and / or load-dependent in some cases. When specifying the interval both in terms of deadlines and in operating hours (Bh), the first case applies.

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- For questions about maintenance work and intervals: contact the manufacturer.

**NOTE!**

My company's contact information can be found on the cover.

Interval	Maintenance work	Staff
Before every start-up	Check operating elements and safety devices for perfect technical condition, have defective components replaced if necessary or arrange for repairs.	Operator
	Oil level, hydraulic oil, fuel.	Operator
Daily	If the device is very dirty, clean the device, oil the chain and mast guide.	Professional
	Check the tension of the rubber track.	Operator
Weekly	Check the emergency stop switch.	Operator
	Clean device and visual inspection of all device parts.	Professional
	Tension, clean and oil the drive chain.	Professional
Yearly	Replace the hydraulic oil.	Professional

As shown in the figure, the parts that need to be lubricated with grease before each work:



1	Chain
2	Track
3	Drop hammer rod

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## Maintenance work

The various maintenance tasks to be performed are listed and described in the following sections.

### Cleaning

<b>Staff</b>	Instructed staff
	Protective clothing
<b>Personal protective equipment</b>	Firm protective gloves when working on components. Chemical-resistant protective gloves when handling hazardous substances.
	Safety shoes
	Light respiratory protection when handling hazardous substances.
	Safety glasses with side protection when working on pressurized system components.

Check device for contamination daily. If surface contamination occurs:

1. Switch off the device and secure it against being switched on again.
2. Remove dirt properly. It should be noted: Do not use corrosive cleaners. Absorb oil deposits with adhesives.


It should be noted that:


- ▶ Do not use aggressive cleaning agents.
- ▶ Dispose of cleaning cloths and processing residues in an environmentally friendly manner in compliance with applicable local regulations.
- ▶ After cleaning, check that all previously opened covers and safety devices have been properly closed again and are functional.
- ▶ When using a high-pressure cleaner, do not spray the valve blocks with a strong jet, as this can damage the seals.



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## Charging

When the starting battery is dead, it must be charged. Proceed as follows:

1. Turn off the device and make sure it will not turn on again
2. Connect the battery to the battery charger.
3. After the battery is fully charged, please store the charger safely to avoid misoperation or damage.



### **Caveat!**

#### **Dangerous battery!**

If the battery fails, there is a risk of the battery bursting.  
therefore:

- Use a safe charger
- Avoid prolonged charging

## Tension the sprocket

A spring balance must be used to check the tension of the chain weekly. To do this, follow these steps:


1. Place the drop hammer device at the bottom of the mast.
2. Hook the spring balance in the middle of the chain between the active sprocket and the passive sprocket at the front of the mast. Under a tension of 4-5 kg, the distance from the mast surface to the chain is about 8 mm.


Please tighten the sprocket as follows:


1. Loosen the lock nut of the tension wheel on the side of the mast.
2. Loosen the lock nut at the bottom of the mast.
3. Tighten the nut on the tension fork until the tension is reached.
4. Tighten the lock nut at the bottom again, and finally tighten the lock nut of the tension wheel.

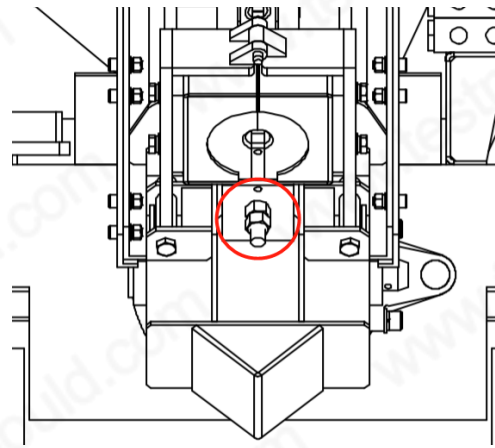
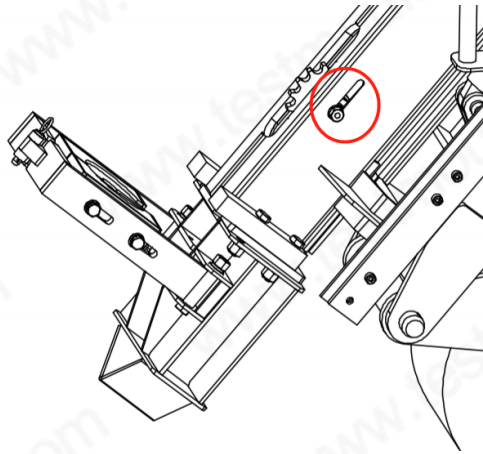


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### Hydraulic oil tank



#### **Caveat!**

**Oil leakage can cause property damage!**

The hydraulic oil heats up during operation and expands in the process. This can cause hot oil to overflow. therefore:

**Do not add too much hydraulic oil**

The hydraulic oil tank has an air filter and an oil return filter for the hydraulic oil. If the equipment leaks oil due to a leak, a broken hose, or the like, the oil level in the oil tank must be filled with the same type of oil until the bottom of the steel strainer is covered with oil.


### Complete maintenance work


After completing the maintenance work, turn on the device and perform the following steps:


1. Check whether all loose screw connections are firm.
2. Check whether all the previously removed protective devices and protective covers have been correctly reinstalled.
3. Ensure that all used tools, materials and other equipment have been removed from the work area.
4. Clean the work area and remove all leaking materials such as liquids, processed materials or the like.
5. Ensure that all safety equipment of the equipment is working properly.



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## X. Troubleshooting

This section describes how to deal with failures.

### Safety instructions for troubleshooting



**Caveat!**

Risk of injury due to incorrect troubleshooting!

Improper workmanship during troubleshooting can cause serious injury.

-Repair work can only be carried out by trained personnel and professionals authorized by operators.

-Before starting work, please make sure that there is enough operating space.

-Always pay attention to the cleanliness of the work area! The surrounding parts, workpieces and tools and cleaning equipment are the root causes of many accidents.

-If the components are replaced, please check if the parts are assembled correctly. Are all fasteners installed correctly?

-Before restarting, please make sure that all protective equipment is properly installed and operating normally.

-Before turning on again, make sure that no one is left in the danger zone.



**caveat!**

Unauthorized restart will cause injury hazard!


Before starting any operations on individual components, turn off the power and make sure that you will not turn on the power again.


### Emergency measures


1. If a failure occurs, which directly threatens people or property, please turn off the equipment immediately.
2. Turn off all power supplies and make sure they do not turn on again.
3. Notify the person in charge at the place of use.
4. According to the type of failure, determine the cause and eliminate the failure by a qualified and authorized professional.



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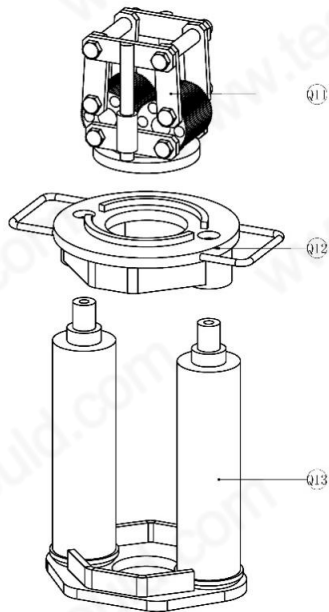
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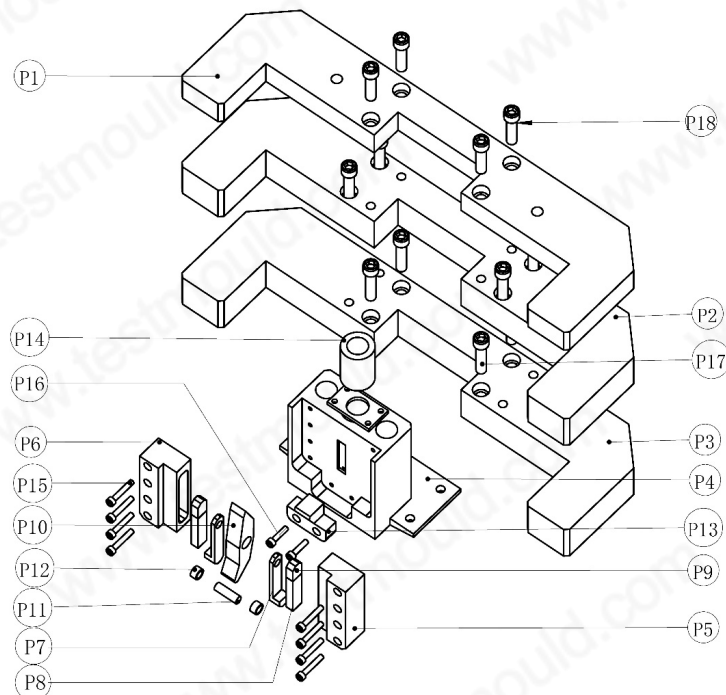
## Appendix Description of important parts

### 16T extraction device



No.	Description
1	Extraction chuck
2	Top seat of extractor cylinder
3	The hydraulic oil cylinder

### Counterweight part



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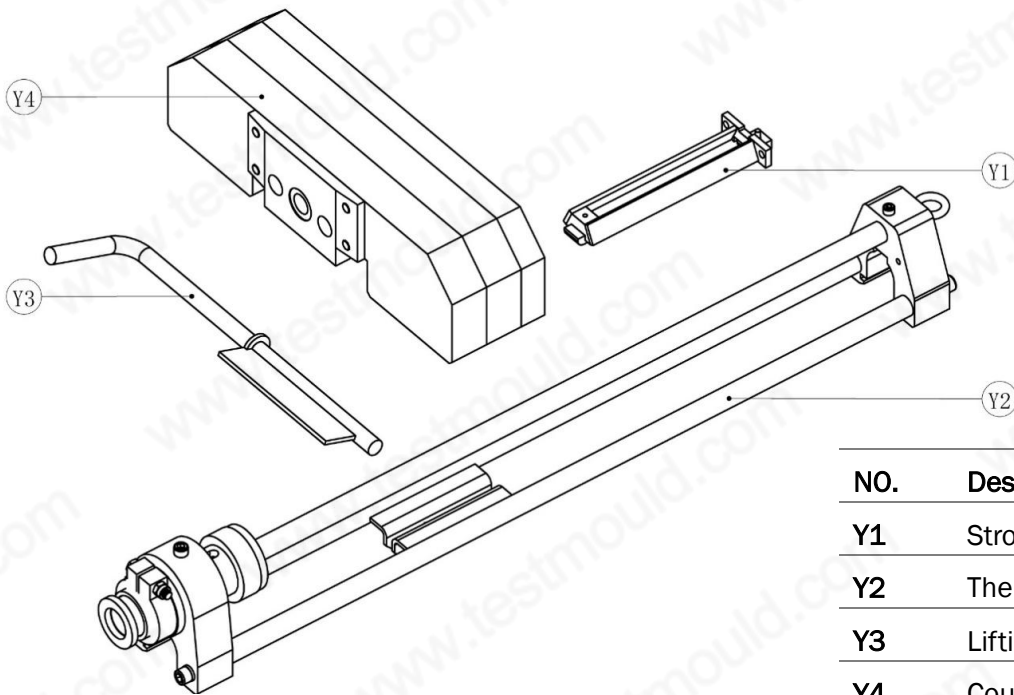
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NO.	Description	NO.	Description
P1	13.5kg	P10	bolt
P2	20kg	P11	shaft
P3	20kg	P12	casing
P4	10kg	P13	Chain block
P5	Pressing block	P14	casing
P6	Pressing block	P15	bolt
P7	Latch mounting seat	P16	bolt
P8	buffer	P17	bolt
P9	buffer	P18	bolt

Moving seat part



NO.	Description
Y1	Stroke control
Y2	The framework
Y3	Lifting bolt
Y4	Counterweight block

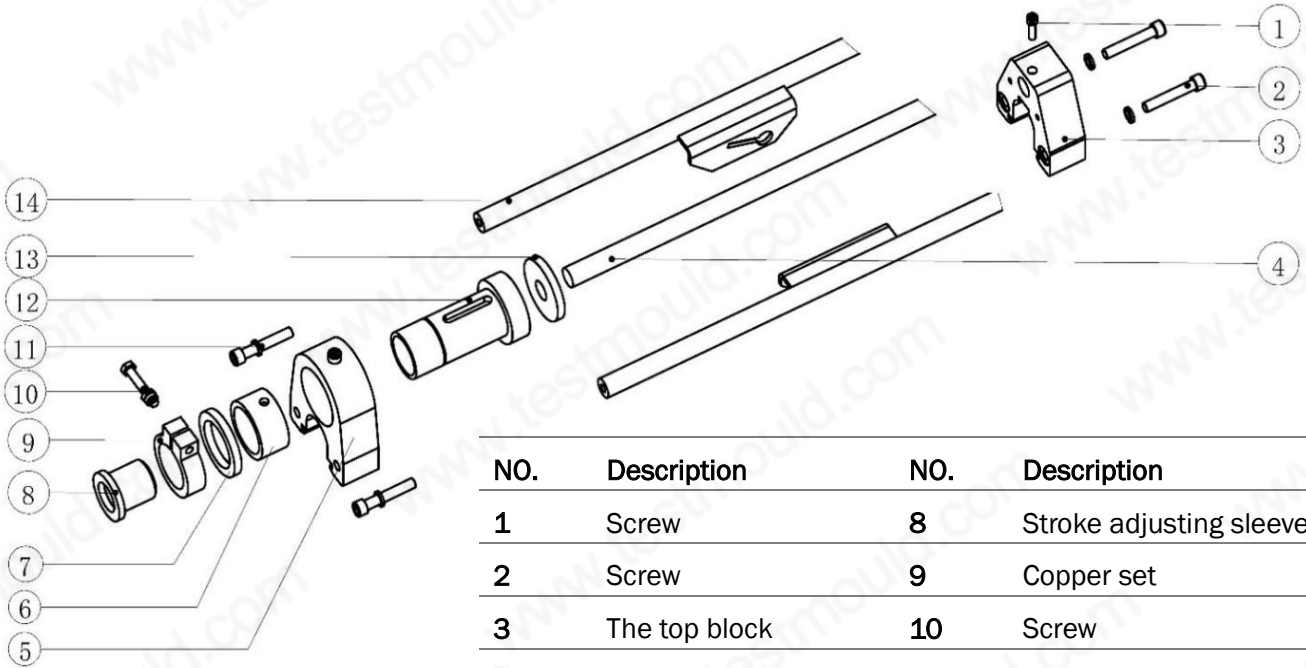


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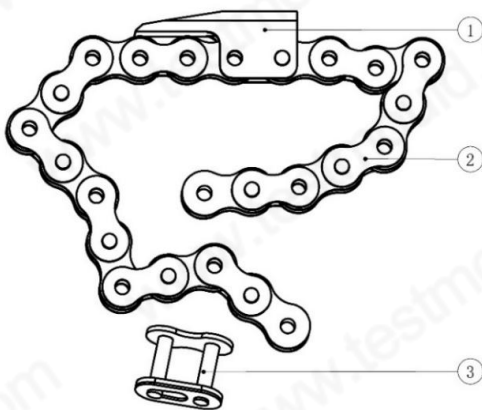
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NO.	Description	NO.	Description
1	Screw	8	Stroke adjusting sleeve
2	Screw	9	Copper set
3	The top block	10	Screw
4	Guide bar	11	Screw
5	Bottom block	12	Anvil block
6	Nylon sleeve	13	Nylon cushion
7	Nylon cushion	14	Fixed rod

**Chain**



NO.	Description
1	Chain block
2	12A chain
3	Chain lock

**Accessories**

Item name	Item number	Quantity
32 - M20 probe rod		10
22 - M16 probe rod		2



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22 mm brass cap	1
Brass cap 32 mm	1
Cone 90 ° 10 cm2	1
Cone 90 ° 15 cm2	1
Cone 90 ° 16 cm2	1
Cone 90 ° 20 cm2	1
PE vertical fixture 22mm	1
PE vertical fixture 32mm	1
PE vertical fixture 51mm	1
extract chuck (20-75mm)	optional
extract chuck (20-65mm)	1
Hydraulic extractor 16T	1
Hydraulic extractor 6T	optional


## Tools


Item	Quantity
Open-ended wrench 14-17	1
Open-ended wrench 19-21	2
Open-ended wrench 27	2
Allen wrench 10	1
Allen wrench 5	1
Allen wrench 8	1
Spring balance 5 kg	1
12 chain lock	1
Engine tool	1
Tool kit	1



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