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## Operation Manual

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PIKE-12 seismic source

# Contents

<b>Description and operation</b> .....	2
<b>Designation</b> .....	2
<b>Specifications</b> .....	2
<b>Delivery set</b> .....	3
<b>Source structure</b> .....	3
<b>Safety requirements</b> .....	4
<b>Operation with the equipment</b> .....	5
<b>Borehole preparation</b> .....	5
<b>Loading</b> .....	5
<b>Shot</b> .....	5
<b>Maintenance and care</b> .....	6
<b>Cartridges for the PIKE-12 seismic source</b> .....	9
<b>Repair service</b> .....	10
<b>Utilization</b> .....	10

## Description and operation

### Designation

PIKE-12 seismic source is designed for near-surface high-resolution seismic surveys. To generate seismic signal, energy of gunpowder from a 12-gauge blank cartridge is used. Burning of hunting powder is performed in a closed volume formed between the chamber of the tool and the bottom of a shallow borehole drilled in the ground.

### Specifications

*Table 1 Technical data, parameters and dimensions*

Parameter	Value
Weight	≤7.5 kg
Overall dimensions of the assembled source with a protective disk	1320*370*165 mm
Charge type	12-gauge blank cartridges
Actuation	manually with a rubber or plastic hammer
Diameter of a borehole	from 60 mm
Borehole depth*	0.4-1 m

\* For operation in boreholes more than 1 m depths, Pike can be equipped with an optional rod extension.

## Delivery set

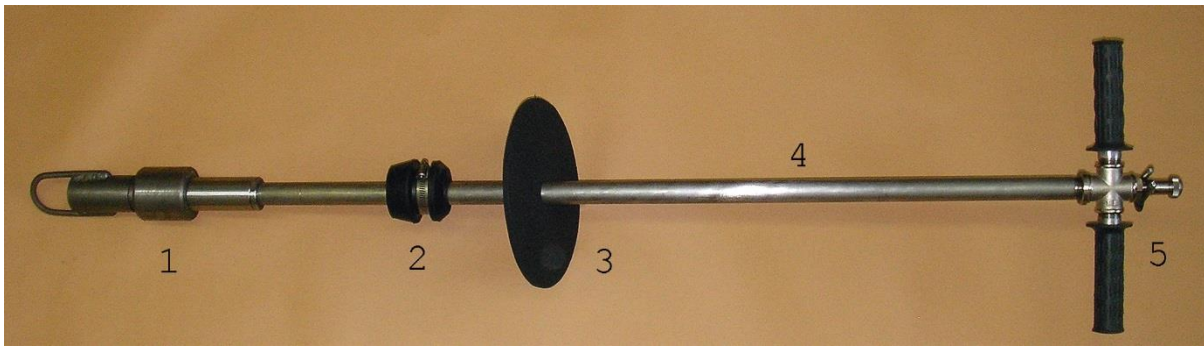


Figure 1. PIKE-12 source

- 1 – source head
- 2 – gasket
- 3 – protective disk
- 4 – rod
- 5 – crossbar

### Source structure

The source head (1) consists of the cartridge chamber with protective bracket, receiver, adapter, and firing pin housing. Inside the receiver and firing pin housing are the firing pin, recoil spring, thrust washers and PTFE tube guide.

Gasket (2) is designed to seal the borehole. It prevents the release of gases and soil from it and increases source power.

The protective disk (3) is made of rubber or plastic. It moves freely on the rod (4).

The rod (4) is designed to put the source head into a borehole. Inside it there is a striker shaft.

The crossbar (5) with two rubber handles ensures comfortable holding of the source during operation.

For transportation PIKE-12 can be disassembled into 5 parts and packed in compact transport case. Assembly of device takes no more than 5 minutes.



Figure 2. Disassembled device for transportation

## Safety requirements

The PIKE-12 must be used only with specially loaded 12-gauge blank cartridges. The cartridges must have a clear (semi-transparent) plastic cartridge casing loaded with up to 5.2 g of smokeless powder.

**TO USE SHOTGUN CARTRIDGE CONTAINING BIRDSHOT, BUCKSHOT, OR BULLETS, AND ANY CARTRIDGES OF UNKNOWN ORIGIN ARE ABSOLUTELY FORBIDDEN!**

Before loading the device, make sure that the firing pin has returned to its original position after the previous shot or source head assembly and is not stuck in the receiver hole. If the firing pin is stuck in the receiver hole, it is a malfunction and further use of the device is strictly prohibited until the source is fixed.

When working with a seismic source, the operator and his assistant should wear eye protection - safety glasses or masks. Shoes should be made of dense material, have toe protection and fully cover the feet.

The design of the source completely excludes the possibility of powder gases bursting through the rod, but some surges of soil, dirt and water at the edges of the borehole and under the protective disk are possible.

The presence of unauthorized persons in the working area within a radius of 10 m from the borehole is not allowed.

While operating outside the borehole aiming the device at people closer than 10 meters away **is not allowed**.

The safety lock must be used when moving with a loaded source. The source should be lowered into the borehole only with the safety lock in order to prevent the device from accidentally triggering when hitting the bottom of the borehole. Set the safety lock immediately after firing without pulling the device out of the borehole. The safety lock should be removed only before the next shot. Operation of the safety lock is shown in Figs. 3a and 3b.



Figure 3. a) Safety-lock set up



b) Safety-lock remove

When the PIKE-12 is activated, the operator must hold the cross bar by the handle with one hand and stand on the protective disk with the foot. It is forbidden to lean over the source placed in the borehole. During shooting, the powder gases tend to push the source out of the borehole. If it is not held firmly enough, injury can result.

## Operation with the equipment

### Borehole preparation

The size of the source head requires a borehole with a diameter of 60-70 mm. Its depth should be more than 350 mm to ensure a tight fit of the protective disk to the ground. The maximum depth of the borehole without the use of an extension rods is 1 m.

PIKE-12 can be used without restrictions in any soil, as well as in waterfilled and contaminated boreholes.

### Loading

Before loading, ensure that the firing pin has returned to its original position after the previous shot or source head assembly and is not stuck in the receiver hole. If the firing pin is stuck, remove the receiver, remove the firing pin (fig. 5) and eliminate the nature of the failure (it may be dirt or soot).

Insert a blank cartridge in cartridge chamber.

The cartridge chamber is secured by a four-way thread. The cartridge chamber must be screwed in 1.5 turns to be fully engaged. Always tighten the cartridge chamber as far as it will go. Failure to do so may result in a misfire or the case bottom may burst and cause difficulty in extracting the cartridge case.

During the loading process, tighten the cartridge chamber by hand, without the use of tools. Do not use any tool to tighten the cartridge chamber with the cartridge loaded. If the cartridge chamber is difficult to rotate, clean and lubricate the four-way threads.

Protective bracket can be used as a support for tommy bar in case of difficulty in unscrewing the cartridge chamber and **ONLY AFTER THE SHOT**.

### Shot

Lower the loaded source into a borehole until the bracket stops in the bottom.

Lower the protective disk (3 in Figure 1) onto ground in order to block the top of a borehole.

Place one foot on the protective disc.

Remove a safety-lock.

Hold the handle of the cross-bar with one hand.

Upon the seismograph operator's command, strike the end cap lightly with a hammer (Fig. 4).

Set a safety-lock.

Remove the source from a borehole. When removing PIKE-12 do not rotate it counterclockwise, as this will lead to unscrewing the cartridge chamber.

Unscrew the cartridge chamber. In case of difficulty, use a tommy bar and pipe wrench.

Push out the used cartridge case with a 250-300 mm long pin.

If necessary, clean the threads of the cartridge chamber with a stiff brush and lubricate it with liquid mineral oil or silicone grease.



Figure 4. Shot in a contaminated pit

### Maintenance and care

At the end of operation, disassemble the source. Remove the source head from the rod. Extract the striker shaft. Wash parts with water, dry and lubricate with liquid mineral oil or silicone grease.

After working in waterfilled or contaminated wells, completely disassemble the source head for cleaning and lubrication. The external view of the source head and the sequence of installation of the parts are shown in Fig. 5.

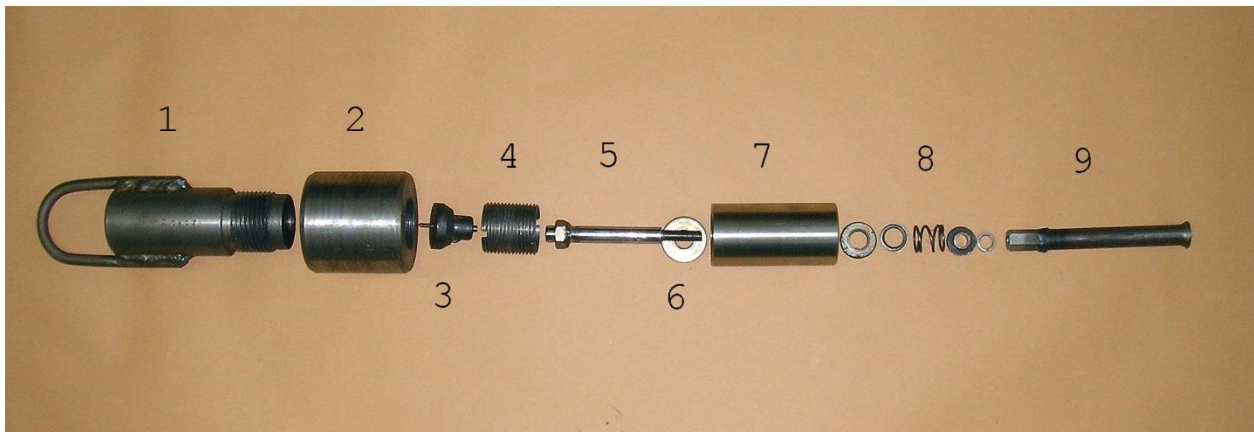


Figure 5. The parts of source head

1. Cartridge chamber with protective bracket
2. Receiver
3. Striking pin assembly (Figures 6 and 7)
4. Socket
5. Striker shaft
6. Washer
7. Shaft's tube
8. Recoil spring with centering washer
9. Guide tube

The assembly sequence of parts is shown in Figures 6 - 11.

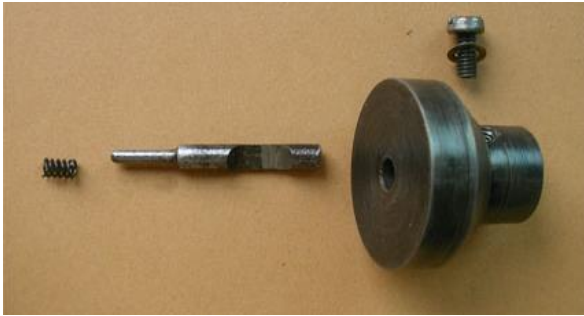


Figure 6. Firing pin parts



Figure 7. Firing pin assembly



Figure 8. Receiver with firing pin and socket



Figure 9. Shaft's tube and guide tube assembly





Figure 10. Source head with the cartridge chamber

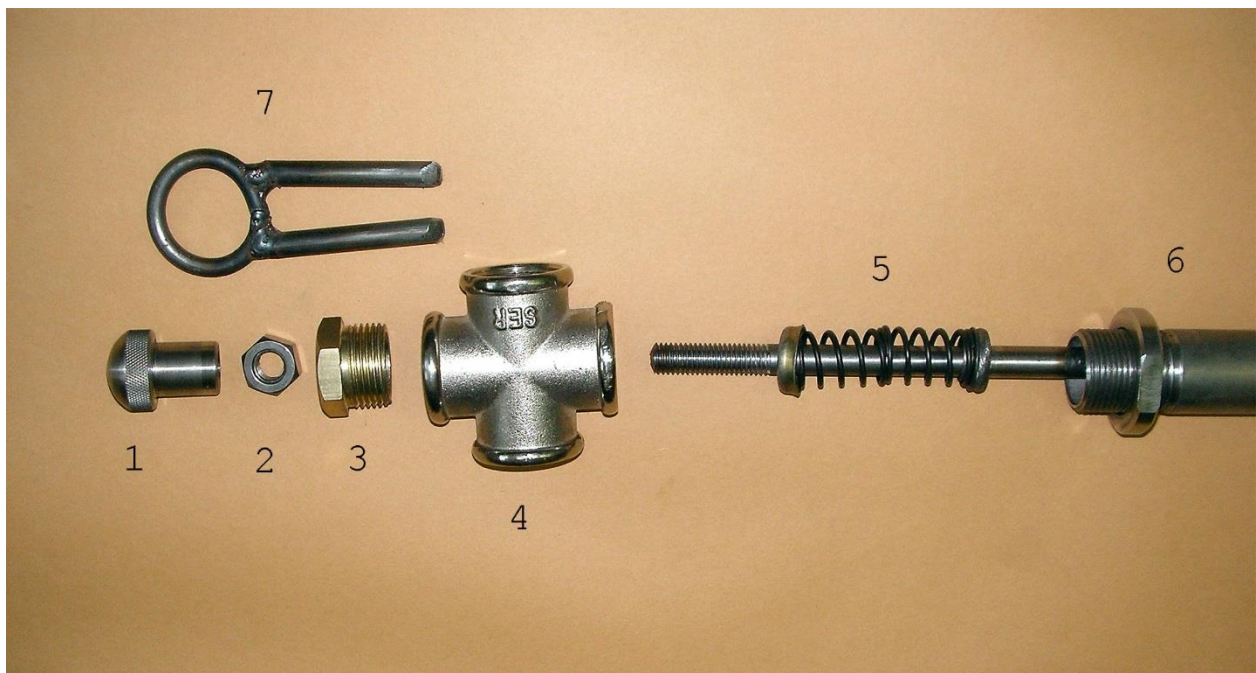


Figure 11. Crossbar assembling diagram

1. End cap
2. Lock nut
3. Plug with hole for shaft
4. Crossbar
5. Shaft with safety spring and centering washers
6. Rod with the lock nut
7. Safety-lock (secured by spring 5).

### Cartridges for the PIKE-12 seismic source

The PIKE-12 must be used only with specially loaded 12-gauge blank cartridges. The cartridges must have a clear (semi-transparent) plastic cartridge casing loaded with up to 5.2 g of smokeless powder.



*Figure 12. Cartridges*

### **Repair service**

**ATTENTION: REPAIR SERVICE CAN BE CONDUCTED ONLY BY THE MANUFACTURER (GEODEVICE) AND ITS PARTNERS WHICH HAVE SPECIAL MAINTENANCE CERTIFICATES ISSUED BY THE MANUFACTURER.**

IT IS STRONGLY PROHIBITED TO PROVIDE REPAIR SERVICE BY UNAUTHORIZED PERSONNEL.

In case of unauthorized repair of the equipment – all warranty obligations are cancelled.

### **Utilization**

The Buyer (Owner) is responsible for the utilization of the equipment after the end of its lifecycle.

IT IS STRONGLY PROHIBITED TO DISCARD THE EQUIPMENT TOGETHER WITH DOMESTIC GARBAGE

It is recommended to separate the equipment onto different parts (metal, plastic, rubber etc.) and utilize them according to corresponding regulations of local authorities.