DEVICE IGA-1M.

The passport and the operation manual

4224-001-12704605-2001

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Data on copyrights.

The author of invention and developer of indicator:Kravchenko Yurii Pavlovich,Russian Federation, Ufa.

Device possesses patent cleanliness on territory of R.F. and protected by following documents:

. The copyright certificate of U.S.S.R 1828268 13.10.92.

b. The certificate on useful model 2448 16.05.96

c. Patent 2080605 27.05.97

d. Patent 2119680 27.09.98

e. Patent 2116099 27.07.1998

v. Patent 2202812 20.04.2003

Data on conformity

To operating standard documents R.F.

The conformity certificate RU.36.08870 27.04.2001

 RU.36.07346 27.12.2004

 RU.36.22390 19.12.2007

DEVICE IGA-1M.

Passport

1. Appointment

 Device IGA – 1M is intended for:

 — detection of geophysical anomalies for underground investigation karstic emptiness, breaks, landslips, water veins.

 — for searching metal and nonmetal pipelines (including polyethylene), being underground or snow cover.

2. Action principle

Device is a high-sensitivity selective measuring instrument of an electromagnetic field, set up on fixed frequency of natural radiation of geomagnetic field of the Earth in a range of superlong waves and represents self-contained unit with the independent power supply from the accumulator.

In device there is used phase shift on frequency of reception as entrance parameter, which size changed on the border of transition of environments ground-water, ground-emptiness.

3. Technical characteristics

accuracy of detection the border of water vein – 0,2 meter,

the depth of detection of emptiness confirmed with drilling 300 meters,

water veins -60 meters;

power usage no more than 5 Wt;

the weight of the complete set of the device does not exceed 2,3 kg (without accumulator);

working capacity is provided at temperatures -40C - + 40C and humidity up to 80 %.

4. Completeness ( pic. 1 )

IGA-1M

1- The indicator block. (950g.) 2- Power unit and

 charging device. (1,8kg.)

 3- Aerial. 4- The zeroing button.

Into the device complete set enters:

the measuring gauge - 1 piece.;

power unit - 1 piece.;

a suitcase the packing portable - 1 piece.;

passport and operation manual - 1 piece.

spare safety locks: 0,063 - 2 pieces.

bag - 1 piece.;

voltage converter 110V/220V - 1 piece

5. Guarantee of the supplier

The enterprise guarantees device non-failure operation at observance of conditions transportation, storage and operation and at observance of condition of manufacturer’s seal. Storage warranty period – 6 months, operation warranty period – 12 month from the date of device sale.

6. Storage

 Devices before introduction in operation should be stored on warehouses in packing of manufacturers at air temperature between -40Ў and +40Ў. In premises for storage of devices the maintenance of dust, vapors, acids and alcalines, aggressive gases and other harmful impurity causing corrosion, should not exceed the maintenance of aggressive-corrosion agents for atmosphere type 1 in accordance with ГОСТ 15150

 Price $4 999 (four thousand nine hundred and ninety nine USD)

7. Transportation

Devices are transported by the closed transport of any kind. At transportation by plane devices should be placed in heated tight compartments. Holds of the vehicles used for transportation of devices, should not have traces of cement, coal, chemicals etc. Value of transport jolting should not exceed 40 blows in a minute with the maximum acceleration 30 /s.

8. Acceptance certificate

Device IGA-1M \_\_\_\_\_\_\_\_\_\_\_ is made and accepted according to operating engineering specifications, 4224-001-12704605-2001 and recognised by serviceable.

**The operation manual**

1. Prepare for working

Before the work beginning it is necessary to establish controls in following positions:

The Switch “ФИЛЬТР”(FILTER) - in position 3.

The Switch “ЛЕТО-ЗИМА” (ЛЕТО-SUMMER, ОСЕНЬ -AUTUMN, ЗИМА –WINTER, ЗИМА -SPRING) in position, according to a season.

Handle “УСИЛЕНИЕ” «Intensification»(ГРУБО-(ROUGHLY),ТОЧНО -(FINE) in extreme left position.

On a power unit the toggle-switch to establish in the switched off position.

Indicator Aerials to wipe the cotton wool (napkin) moistened in spirit.

To Connect a cable (from indicator structure) the measuring block to a power unit. To join the handle with the indicator block.

The Toggle-switch on a power unit to establish in position . (ON)Thus indicators should light up + 24C, - 24C. Install power unit on the ground. To sustain the device during 5 minutes At air temperature above - 5 C and 15 minutes at lower temperatures.

1.1 To Take the device for the handle and to focus a plane of aerials downwards in parallel an earth surface. To press the zeroing button. Keeping the button in the pressed condition and smoothly rotating the handle ГРУБО (ROUGHLY) clockwise to achieve occurrence of insignificant fluctuations of an arrow of the indicator about zero position. Then smoothly to rotate the handle ГРУБО (ROUGHLY) counter-clockwise to an establishment of steady indications of the indicator (elimination of fluctuations). To release the zeroing button. To press on 3-4 seconds and to release the zeroing button again. Thus the arrow of the indicator should remain within not less than 5 seconds on a zero mark with accuracy one small division.

1.2 To Take the device for the handle and to focus a plane of aerials downwards in parallel an earth surface. To press the zeroing button. Keeping the button in the pressed condition and smoothly rotating the handle ТОЧНО (FINE) clockwise to achieve occurrence of insignificant fluctuations of an arrow of the indicator about zero position. Then smoothly to rotate the handle ТОЧНО (FINE) counter-clockwise to an establishment of steady indications of the indicator (elimination of fluctuations). To realease the zeroing button. To press on 3-4 seconds and to release the zeroing button again. Thus the arrow of the indicator should remain within not less than 5 seconds on a zero mark with accuracy one small division. To press for 3-4 seconds and to release the zeroing button. To bring a palm to the device aerial smoothly (without concerning the aerial) on distance of 3-10 sm. Thus the arrow of the indicator in steps should deviate. In a case if the arrow of the indicator deviates poorly, it is need to establish the switch ФИЛЬТР (FILTER) in position 1or 2 and repeat points. 1.1, 1.2.

2. The Technique of definition of border of emptiness, lines of a water vein .

The note: At work in the street the tumbler "0.5-1" to put in position «1» .By search of borders of emptiness and water veins, it is necessary to remember:

The Device reacts and to communications passing in investigated area which bring errors in measurement process, are a hindrance at detection of emptiness and water veins. (pic. 2):

 React of the device (pic. 2):

Pic.2 Location scheme of characteristic points in the work with

 IGA-1M.

 1, 2, 7, 8 - lines of secondary signals.

 3, 6 – lines of the edges of the trench.

 4, 5 – axial lines signals.

 d – diameter of the pipe.

 h – depth of the pipeline (h=h1).

 h 1 – distance between axial line signals and secondary

 signals.

on pipeline edges (an axial signal) points 4,5;

op trench edges, points 3,6.( Provided that the ground density in trench differs from density of a ground out of a trench);

on secondary signals points 1,2,7,8;

secondary signals from polyethylene pipelines are stronger, than an axial signal.

from metal pipelines the axial signal is stronger than the secondary.

 Depth of location of the pipeline is equal to distance between a line of edge of a pipe (points 5 or 4) and the line of a secondary signal located on the same party (8 or 1).

Search works is better to make in dry or frosty weather, and also at in regular intervals humidified ground. At moisture hit on the device aerial, it is necessary for drying.

The device Aerial should be on distance not less than 1 meter from the earth.

Seasonal passage of electromagnetic radiation of the Earth reaches a maximum in December - January, a minimum in June-July. Accordingly optimum months for works with the device are December-January, least - June-July. Before the beginning of search works by means of the device it is necessary to make a zero exhibition in a search place according to points 1.1 and 1.2. After a zero exhibition, smoothly moving the measuring gauge along an earth surface, and periodically nulling it, to note a place where the indicator in sharp deviate of zero position. Then to recede from noted point on 1-2 meters, and moving on a circle from noted point, to find the following point where the indicator in steps deviates zero position. Moving along the line formed by found points, to make a mark of a contour of emptiness or a line of a water vein.

 3. Investigation of emptiness, definition of a line of a water veinFor search of emptiness it is necessary moving along an investigated site of district ( pic.3.)

Pic.3. The movement scheme at definition of a contour of emptiness,

being powerful geopathogenic zone (when pipeline cross water flow, geological rift or cavern then increase corrosion and mechanical load pipeline, resulting in rupture pipes).

And periodically nulling the indicator

to note a point 1, where the arrow of the indicator deviates in steps. Then moving according pic. 3, similarly to note points 2, 3, 4 etc., which, also form border of a contour of emptiness. On pic. 3 the pipeline crossing the investigated site which brings an error in process of measurement of border of emptiness is shown.

At investigation of water veins, it is necessary to have in view of that they have width from 1 to 3 meters, coil also their direction goes under a district bias.

4. Work with the device, by searching pipelines. It is necessary to remember at performance of search works with the device:

 4.1. React of the device (pic. 2):

Pic.2 Location scheme of characteristic points in the work with

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 d – diameter of the pipe.

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 h 1 – distance between axial line signals and secondary

 signals.

 4.1.1. on pipeline’s edges (an axial signal) points 4,5;

 4.1.2. on trench’s edges, 3,6.( Provided that density

 ground in trench differs from ground density

 out of a trench.)

 4.1.3. on secondary signals points 1,2,7,8.

4.2. secondary signals from polyethylene pipelines are stronger, than an axial signal.

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Depth of location the pipeline is equal to distance between a line of edge of a pipe (points 5 or 4) and the line of a secondary signal located on the same party (8 or 1). Search works is better to make in dry or frosty weather, and also at in regular intervals humidified ground. It is necessary for drying at moisture hit on the device aerial.

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 5. Procedural works.

 Periodically, in 25 hours of operation to wipe a napkin moistened with spirit, the aerial and an insulator of the measuring gauge. At work in dusty conditions aerial and insulator cleaning to spend each time after work then to dry the measuring gauge at temperature + 20Ў during 30 min.

6. Charging of accumulators.

 The charging of accumulators are necessary for making at repayment of light-emitting diodes «-24» and «+24».

The charging device is located in one case with a device power unit.

Important factor! :

It is necessary each time before using the device IGA-1M to charge the battery in the power supply.

To charge from the mains 110 V is necessary to use a voltage converter 110V/220V.

 Before charging of accumulators the device should be switched off, the device plug must be disconnected. By means of a network cord to connect charging the device to a network 110V(220 V). To switch on tumbler «.»(ON) 220.

The light-emitting diode lights up «»(CHARGE). At achievement of nominal capacity of accumulators the light-emitting diode dies away.

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