

CLOSED JOINT STOCK COMPANY "Ikar" Science and research center

The plant has picked up prestigious awards at international exhibitions:



Gold medal,
Geneva, Switzerland, 2004

Silver medal,
Brussels, Belgium, 2003

Bronze medal,
Geneva, Switzerland, 1994

IZUMRUD-SI

**PASSPORT
AND
OPERATION MANUAL**

Izhevsk

Attention! Carefully read the present passport prior to starting up the device.

1. Purpose

"Izumrud-SI" device (mod. 01os-50), hereinafter referred to as the device, is designed for post-treatment of centralized drinking water supply system and production of activated drinking water of the highest quality (SanPiN (Sanitary Regulations and Norms) 2.1.4.1116-02) with predetermined mineral composition and antioxidant properties *.

The device provides:

- ✓ post-treatment of water against all chemical, bacterial, organic contaminations according to SanPiN requirements;
- ✓ efficient water disinfection even in case of its contamination;
- ✓ correction of ion composition of mineral elements in water (Ca^{2+} , Mg^{2+} , K^+ , $\text{I}^- \dots$);
- ✓ water containing antioxidant properties;
- ✓ automatic control of all main components of operation.

"Izumrud-SI" device (mod. 01os-50) uses reverse osmosis system for preliminary treatment of water. All drawbacks typical for such systems are eliminated (patents RU 2299859, 0074909, 0023302, 00145022, <http://ikar.udm.ru/sb/sb43-1.htm>, <http://ikar.udm.ru/sb/sb44-1.htm>).

It is proved that water after treatment by reverse osmosis system becomes:

- ✓ distilled (demineralised) and actually nonpotable;
- ✓ deionized (oxidated) as its oxidation-reduction potential (ORP) measured relatively to silver-chloride electrode is positive +200...+400 mV.

Usage of new unique activation technologies based on patented devices and methods allowed for creation of brand new generation device for preparation of drinking water of the highest quality (DWHQ) with resonance microcluster structures. Currently the device has no analogs in the world. The device is equipped with integrated controller, display, automatic doser-mineralizer and three flow-type sensors with two-level indicating system - monitoring operation of osmosis (treatment), activation (water ionization), mineralization (optimizing mineral composition).

* activated water solutions with antioxidant properties - liquids transferred into unbalanced thermodynamic state with ORP revised into negative values (liquids with vortexes - localized resonance microcluster structures - http://ikar.udm.ru/c_n_aw.htm).

The closest analog of drinking water obtained by means of "Izumrud-SI" device (mod.01os-50) is beverage "Your Health" (<http://gepatitunet.ru>, <http://ionvoda.ru>, ~400 rub/l) and beverage obtained by means of microhydrin (~100 rub/l).

2. Operation conditions

2.1. Standard requirements

- Relative humidity of ambient air up to 80% (at 25 °C).
- Ambient temperature +5...+40 °C.
- The device shall be mounted inside living room.

2.2. Source water requirements

- Source water temperature +7...+32 °C.
- Pressure range 2...5 atm.
- Max. mineralization not more 500 mg/l.
- Chlorides, sulphates 300 mg/l max.
- Max. hardness 7 mg-eq/l.
- Ca²⁺ 50 mg/l max.
- Mg²⁺ 50 mg/l max.
- Fe²⁺ 0.3 mg/l max.
- Fe³⁺ 0.3 mg/l max.
- Mn 0.1 mg/l max.
- pH range 5...10

3. Technical characteristics

Maximum capacity, l/day	50
Minimum water intake from tank, l/day	2
Effective tank volume, l	8 ± 1
Mineralizer volume, l	0.6
Changing of ORP, mV*	-250...-600
Power supply voltage, V	220 ± 5%
Power supply frequency, Hz	50
Maximum power consumption, Wt	50
Nett weight (water), kg	20
Packing overall dimensions (W x H x D), mm	440×480×490

* see measurement of unbalanced water solutions ORP ("Torments of choice of instrument for water ORP measurement..." – <http://ikar.udm.ru/faq.htm>, <http://ikar.udm.ru/dsi-2.htm>).

4. Scope



Fig.1 Scope of the device.

- | | |
|---------------------------------------|----------|
| 1. Osmosis system with storage tank | - 1 pc. |
| 2. Activation and mineralization unit | - 1 pc. |
| 3. Clean water tap | - 1 pc. |
| 4. Plastic connecting tube, set | - 1 pc. |
| 5. Inlet water connection set | - 1 pc. |
| 6. Set for drainage tie-in | - 1 pc. |
| 7. Filter housing unscrewing wrench | - 1 pc. |
| 8. Mineralizer water draining hose | - 1 pc. |
| 9. Indicating unit | - 1 pc. |
| 10. Power adapter | - 1 pc. |
| 11. Mineral supplement * | - 1 set. |
| 12. Passport | - 1 pc. |

* set of completed (dissolved) mineral supplement "Severyanka+" is already primed into mineralizer and in case of supply in winter period mineral supplement (concentrated) is delivered in separate reservoir therefore it is necessary to perform works specified in it.10.1 prior to commencement of works.

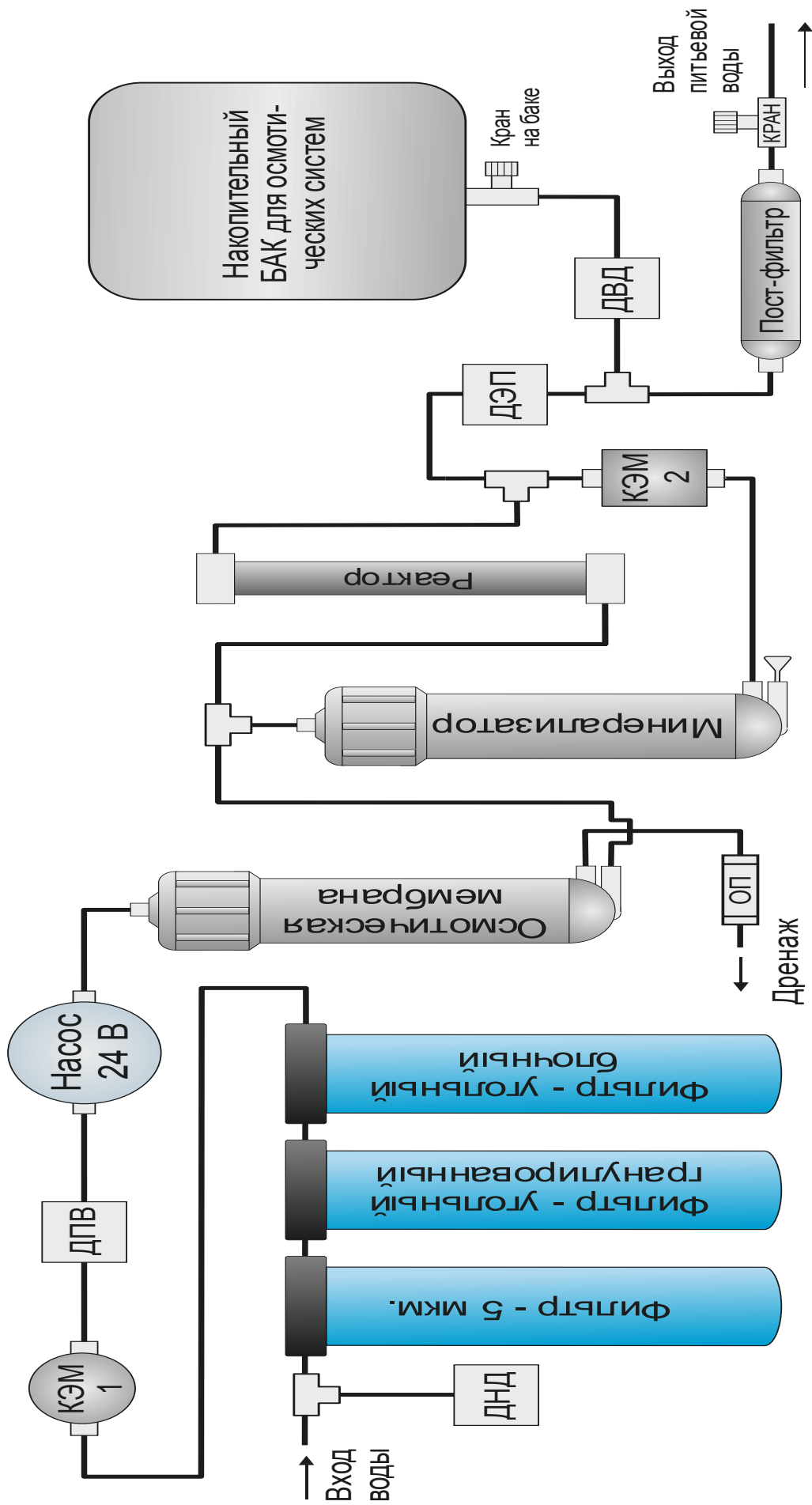


Fig.2. "Izumrud-SI" device flow diagram (mod.01os-50)

Notes: ДЭП - conductivity sensor, ДПВ - water passage sensor,
 ДВД - high pressure transmitter, ДНД - low pressure transmitter,
 ОП - membrane flow limiter, КЭМ1 - inlet valve,
 КЭМ2 - measuring valve.

5. Design and operation principle

5.1. Description

Reverse osmosis system unit represents 5 staged filtration system which principle of operation is based on reverse osmosis technology. Source main water first passes through 3 primary filters (fig.3). At first stage primary filter (1) filters mechanical impurities. Second stage filter (2) with activated carbon removes odor and residual chlorine from water. Third stage filter with carbon cartridge (3) removes organochloride substances, bad tastes and odors. After passing through three stages filtered water comes into fourth stage - reverse osmosis filter (4). Diameter of filter membrane does not exceed 0.0001 microns and it infiltrates only water molecules and dissolved oxygen.

Further water treatment in device is performed in activation and mineralization unit. "Faraday cell" resonance activator of special design made of modern materials allows for activation of very fresh water, effective disinfection, improving cluster structures and shifting of ORP to negative values. As a result water obtains antioxidant properties.

When water passes through device mineralizer microelements (Ca^{2+} , Mg^{2+} , K^+ , I^-) useful for human organism are added thereto and further water comes into storage tank wherefrom it is supplied to clean water tap through pos-filter (5).

Antioxidant water filled into storage tank maintains its negative ORP in case of daily water intake.

Special sensors, located in the device give information about functioning of device by means of indication: green light - normal condition; red light - deviation from normal condition (pos.11, 12, 13 fig.5A). By means of keyboard and display it is possible to monitor and control device operation modes.

Device is running in automatic mode 24 hours a day. For this purpose water supply tap and tank valve shall be open and device power supply cables shall be connected to network. When device is running normally all indicators under the tap shall be of green light. Short time red light is acceptable when it is related to transient processes in device operation. All errors are displayed in menu "Condition" (see it. 5.2.).

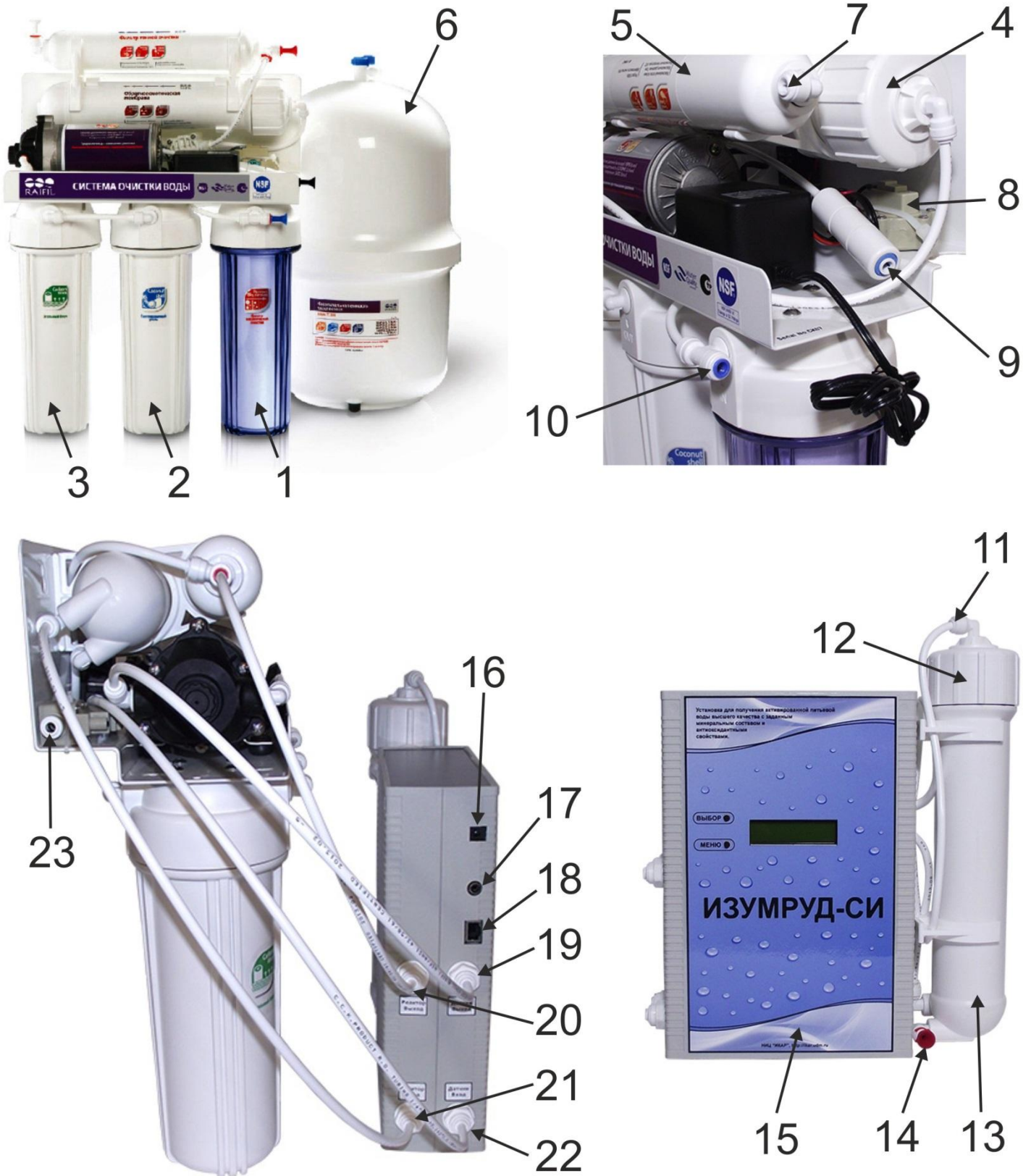


Fig.3. Appearance of "Izumrud-SI" device main components (mod. 01os-50):

- | | |
|---|--|
| 1 – primary filter No.1 (polypropylene), | 14 - mineralizer casing blind, |
| 2 - filter No.2 (granular coal), | 15 - activation and mineralization unit, |
| 3 - filter No.3 (briquette coal), | 16 - power adapter connection, |
| 4 – filter No.4 (reverse osmosis membrane), | 17 - pH reactor connection (purchased separately), |
| 5 – filter No.5 (coal post-filter), | 18 - indicating unit connection (multifunc- |

- 6 - storage tank,
- 7 - clean water tap outlet,
- 8 - low pressure relay,
- 9 - outlet to drainage,
- 10 – main water inlet,
- 11 - inlet mineralizer fitting,
- 12 - mineralizer casing cover,
- 13 - mineralizer casing,

- tional connector),
- 19 - passage sensor outlet,
- 20 - ORP reactor outlet,
- 21 - ORP reactor inlet,
- 22 - passage sensor inlet,
- 23 - high pressure relay and outlet in storage tank.

5.2. Installation menu

"Main" menu

```
-- Information -
- Full tank
```

is basic menu.
Displays device operation process.

Table No.1

Full tank	- storage tank is full, the device switched to standby mode.
Tank is being primed	- water withdrawn from storage tank, the device is switched to water priming mode.
Start xxxx	- transition from standby mode to operation mode, where xxxx - value for diagnostics.
Replace supplement	- mineralization of prepared water lower than selected limit.
Replace filter	- reverse osmosis membrane is contaminated.
Replace ORP reactor	- activation of prepared water lower than selected limit.
Short-circuit failure in reactor	- short circuit in reactor or strong mineralization.
Circuit termination in reactor	- no contact in reactor or no water.

When user uses any other menu item and does not use any keys for more than 3 minutes in "**Full tank**" mode the device will automatically transit to "**-- Information --**" menu and turn off LED and display backlighting (if "**Energy saving**" is "**On**").

```
Condition
OK
```

Shows device stored errors condition. If there are no errors "**OK**" is indicated, otherwise - last stored errors (see table No.1). Using "**Selection**" key you can scroll all errors (around a circle). Errors are automatically reset when the device is started.

Parameters
Water

Enables enter into "**Water**" menu in order to control device parameters in "DWHQ" mode.

Language
Russian

Enables changing output language.

Accessories
None

Enables changing the type of used accessory (connected to connector fig.3. pos.18).

Indicators sound
On

Switching on and off audio signal informing about messages (critical).

Energy saving
On

Switching on and off energy saving function (extension of LED and display backlight service life).

Displ. contrast
-|||||||.....+

Display contrast adjustment.

Service mode

Service menu enter
(only for maintenance department personnel).

"Water" menu

Running hours
0

Contains information about the number of **minutes** of device operation in DWHQ preparation mode from the beginning of operation.

Mineral. (μS)
100

You can choose the level of mineralization of prepared water (\sim water electrical conductivity). The device allows for water preparation with customized mineralization level. (**attention** – *preparation of water with customized mineralization level is performed only when the device is filling the tank and when mineral supplement is available in mineralizer reservoir*). When mineralization level of water sent to the tank is reduced lower than selected limit (decreasing of solution concentration in mineralizer) the device will beep and change the colour of mineralization indicator from green to red.

Using "**Selection**" key you can choose required mineralization value ($\sim \mu\text{S}$):
50...500;

"**Off**" - 5...40 μS (this mode can be used when you don't want to use mineral supplements or you want to prepare osmotic ionized water), in this case "**Mineralization**" indicator goes out and sensor readings is ignored.

Filter control
40

Control of reverse osmosis system membrane contamination is set.

When increasing membrane contamination above selected level the device will beep and change the colour of "**Osmosis**" indicator from green to red.

Using "**Selection**" key you can choose membrane contamination level ($\sim \mu\text{S}$):
30...70;

"**Off**" - ignoring of membrane contamination level, "**Osmosis**" indicator goes out.

ORP power
100 %

Using "**Selection**" key you can set the level of prepared water activation ($\sim \Delta\text{ORP}$):

25%, 50%, 100% - activation level;

"**Off**" – ignoring of water activation sensor, "**Activation**" indicator goes out and ORP reactor is switched off.

pH Power
off

Using "**Selection**" key you can increase pH level of prepared water ($\sim \Delta\text{pH}$):

10% ... 100% - pH level;

"**Off**" - ignoring of water pH level sensor and pH reactor is switched off. (**pH reactor is purchased separately**)

Quit

Back to "Main" menu.

All changes made are memorized automatically 10 seconds after last key pressed.

6. Safety precautions

- 6.1.** Installation, usage and maintenance shall be performed in strict accordance to the present instructions. Manufacturer is not responsible for events related to improper installation, usage or maintenance performed in conflict with instructions.
- 6.2.** If you are not acquainted with water supply equipment please consult with professional sanitary technician or make use of his services.
- 6.3.** Do not use the device to prepare drinking water from unknown sources without analyzing and consulting with specialists.
- 6.4.** Do not install the device at hot water supply line.
- 6.5.** Do not install the device in very humid (more than 80% at 25 °C) rooms in order to prevent corrosion of its metallic parts and electric contacts.
- 6.6.** It is prohibited to store and transport the device at temperature lower than 0 °C, without removing water previously.
- 6.7.** New membranes from manufacturer's packing shall be washed out prior to use according to article 9.
- 6.8.** Cartridge-filters and membrane shall be periodically replaced (see it.10 of the passport - guideline terms)
- 6.9.** Do not vent air from storage tank.
- 6.10.** If the device is not used for a long time (more than 7 days) or it is out of service it's required to disconnect power supply, stop water supply and drain water from the tank.

7. Unpacking

- 7.1.** Unpacking of the device from transport package shall be started after keeping it at least for 4 hours at room temperature.
- 7.2.** Remove all parts of packing from the package and check scope of supply.
- 7.3.** Free hole in fitting (fig.3, pos.11) in the cover of mineralizer flask from process blind (as a plug) and then connect open end of tube to that fitting.

8. Installation

The device is designed to be located under wash-basin in kitchen. Tap is mounted on wash-basin or on surface close to wash-basin. Parts from device set shall be used for water supply to the inlet of the device. The device is connected to sewage pipeline above siphon for dirty water drainage. For installation of clean water tap it is required to provide level, flat surface on the sink which enable placement of round indicating unit with at least 52 mm diameter. It is not recommended to install the tap on porcelain basins due to high probability of breach (in this case it is better to locate the tap on table surface near to basin).

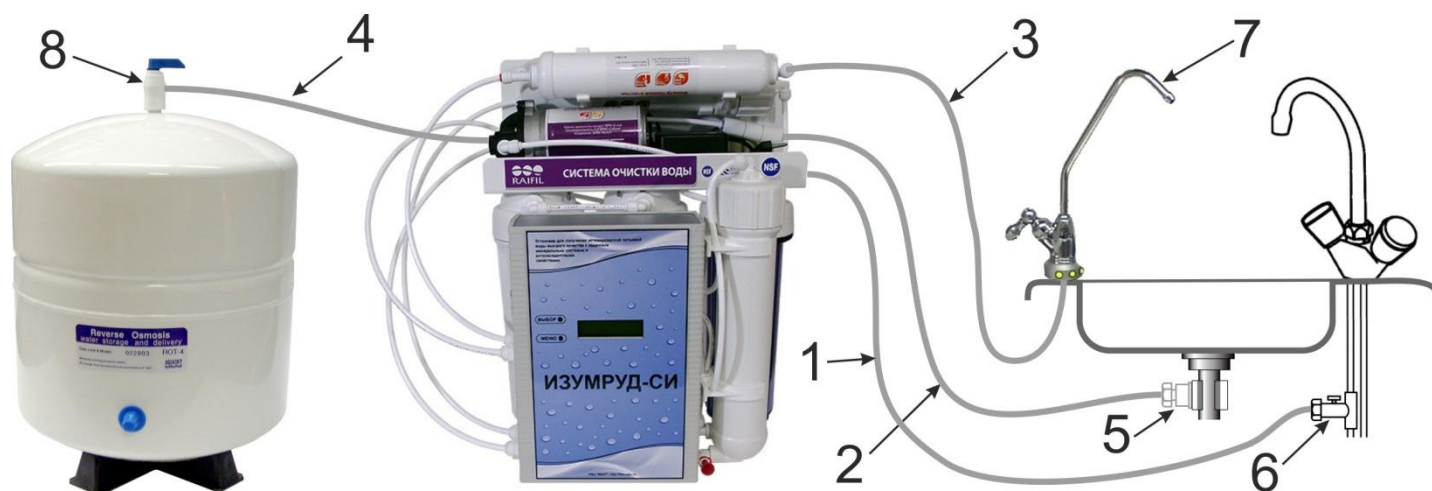


Fig.4 Device hydraulic diagram

- | | |
|---------------------------|-------------------------|
| 1 - inlet water tube, | 5- drainage clamp, |
| 2 - drainage tube, | 6 - water supply tap, |
| 3 - clean water tap tube, | 7 - clean water tap, |
| 4 - storage tank tube, | 8 - storage tank valve, |

- 8.1.** Choose the place of installation under the sink (Fig. 4.)
- 8.2.** Close the valve supplying cold water to the **mixer** tap on the sink (usually located on the water inlet to the apartment).
- 8.3.** Open the cold water tap on the **mixer** and relieve pressure in the tap.

Instllation of clean water tap on stainless steel basins.

Mark and drill two holes, remove the partition between them as shown in Fig.5B. Grind the edges and remove metal chips.

- 8.4.** Install the tap from the device set in accordance with Fig.5A. There are two types of connection of the tube to the tap(see Annex 3).

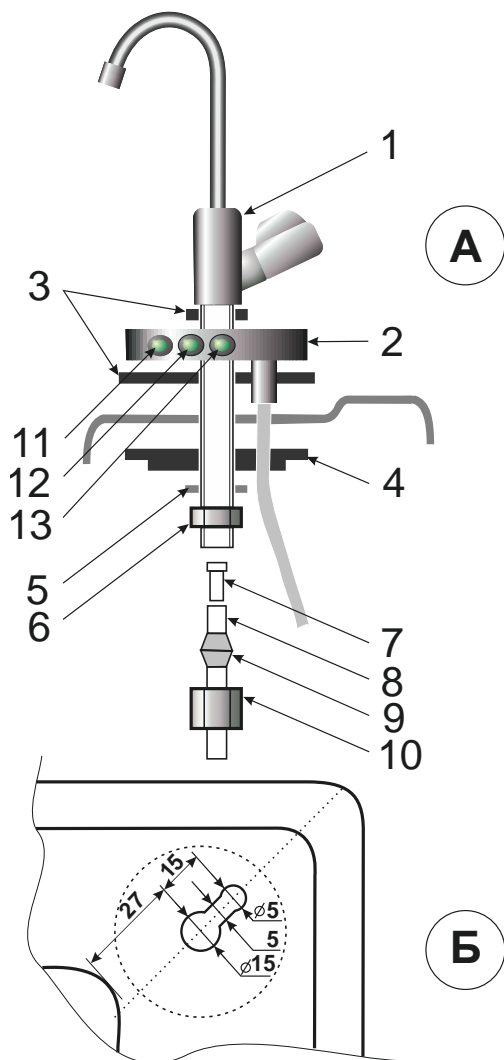


Fig.5. Tap installation.

- 1 - clean water tap,
- 2 - indicating unit,
- 3 - rubber gaskets,
- 4 - mounting disc,
- 5 - washer,
- 6 - nut,
- 7 - bushing,
- 8 - connecting tube,
- 9 - compression bushing,
- 10 - coupling nut,
- 11 - "osmosis" indicator,
- 12 - "activation" indicator,
- 13 - "mineralization" indicator.

Cold water line tie-in.

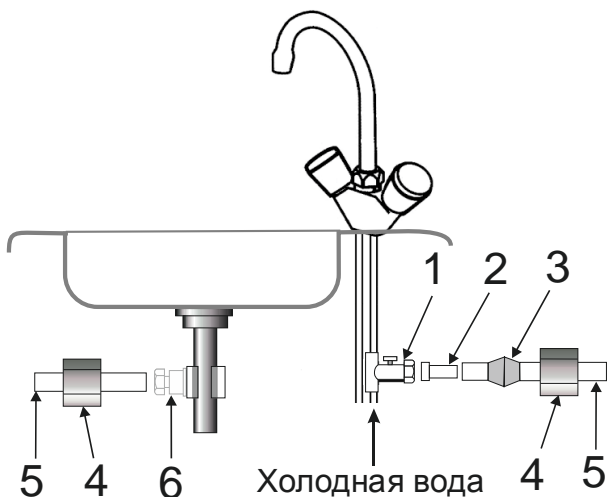


Fig.6. Cold water supply tie-in and drainage outlet tie-in.

- 1 - coupling with water supply tap,
- 2 - bushing,
- 3 - compression bushing,
- 4 - coupling nut,
- 5 - connecting tube,
- 6 - drainage clamp,

Attention! Only cold water shall be supplied to the device inlet. Hot water may cause irreparable damages of the device.

- 8.5. Choose inlet water connection set from the device set.
- 8.6. Attach tap water to the coupling, wrapping its threaded end with three turns of teflon tape.
- 8.7. Disconnect flexible connection from cold water tube. Attach coupling from the set to the pipe. Don't forget to install seal gasket.

- 8.8. Attach flexible hose from mixer tap to the coupling.
- 8.9. Close water supply tap on the coupling.
- 8.10. Open the valve supplying water to the mixer tap and check the tightness of assembled connection.

Drainage tie-in

- 8.11. Choose drainage clamp in the device set. Disconnect drainage bracket with side hole.
- 8.12. Attach drainage bracket on draining pipe of wash-basin **above siphon (mandatory condition for long service life of membrane)** (fig.6) and drill a blind hole in the pipe (only one wall) \varnothing 6 mm using hole in bracket as a guide.
- 8.13. Impose sealing gasket from the set on the hole in the pipe, cover the pipe with clamp brackets, so that the holes in drainage bracket and pipe match and evenly tighten clamp fasteners.

Assembly of device

- 8.14. Install storage tank and reverse osmosis system unit with activation and mineralization unit under the sink, the back plane of bracket to the wall and, if necessary, attach the bracket to the wall.
- 8.15. Take supplied plastic tube, measure the distance from the high pressure relay (Fig.3,pos.23) before entering storage tank valve. Add 10-15 cm to size and cut the relevant section of the tube with a sharp knife (Fig.4, pos.4).
- 8.16. Attach tube section one end to the output of the high pressure relay and the other end to storage tank valve.
- 8.17. Measure distance from clean water tap inlet (Fig.4, pos.7) to device outlet fitting (Fig.3, pos.7), measure the distance from the device inlet (Fig.3, pos.10) to inlet tap (Fig.4, pos.6) and distance from the drainage outlet (Fig.3,pos.9) to the clamp (Fig.4, pos.5). Increase obtained sizes by 10-15 cm and cut relevant tubes (Fig.4, pos.1, pos.2, pos.3).
- 8.18. Attach the ends of obtained tubes to device fittings, relevant taps and drainage clamp (see Fig. 4).
- 8.19. Attach tube ends from reverse osmosis system unit to fittings on activation unit in accordance with sticks located on tube ends and activation unit casing (see Fig.3, pos.19, pos.20, pos.21, pos.22).
- 8.20. Connect connector of indicating unit (Fig.1, pos. 9) to activation unit connector (Fig.3, pos.18).
- 8.21. Connect power adapter (Fig.1, pos. 10) to activation unit connector (Fig.3, pos. 16).

9. Preparation for work

- 9.1.** Switch off power adapter (Fig.1, pos.10) of activation unit and power cable of reverse osmosis system (hereinafter ROS) from the electrical network.
- 9.2.** Close water tap (Fig.4, pos.6), open clean water tap (Fig.4, pos.7) and close storage tank valve (Fig.4, pos.8).
- 9.3.** 9.3. Disconnect tube from the fitting in mineralizer flask cover (Fig.3, pos.11) and direct it into small reservoir.
- 9.4.** Connect ROS power cable to electrical network.
- 9.5.** Open water tap. The pump will be automatically started up. After several minutes water will pour out of the tube.
- 9.6.** Wait a few minutes and disconnect ROS power cable from electrical network.
- 9.7.** Connect the tube (see item 9.3.) to mineralizer flask cover fitting.
- 9.8.** Connect power supply unit of activation unit and ROS power cable to electrical network.
- 9.9.** After 30 minutes (time to flush the system) open storage tank valve, close clean water tap. Before the first use of the system drain water from the tank by opening clean water tap (the first priming).
- 9.10.** Check system tightness.

Notes:

1. When the device is in operation the light sound is possible (presence of air in the system).
2. While first priming or after a long interruption of work (several days), after water intake through the tap indicators may be red.

10. Maintenance

The production of drinking water of the highest quality requires regular replacement of filter cartridges and mineral supplement. Indicating unit (see Fig.5A) indicates the necessity of such replacement, when the relevant indicator changes its light from green to steady red:

- position 11 - replacement of reverse osmosis membrane;
- position 12 - regeneration or replacement of reactor;
- position 13 - priming of new mineral supplement;

Frequency of cartridges replacement (strongly depends on inlet water):

- 1 stage ~ 2...4 months or 6000 litres
- 2 and 3 stages ~ 4...8 months or 6000 litres
- 4 stage ~ 12...24 months or 12000 litres
- 5 stage ~ 4...8 months or 6000 litres

for "Severyanka +" mineral supplement of composition No. 4:

- when the level of mineralization is of 100 ~ 2000 liters
(Service life of mineralizer depends on the type of used mineral supplement, selected level of mineralization and water temperature.)

10.1. Replacement of mineral supplement

Perform activities specified in it.9.1 and 9.2. Then close clean water tap (Fig.4, pos.7).

Then remove retaining ring and take out the blind (Fig.3, pos.14). Attach a hose instead of it (Fig.1, pos.8) to drain water from mineralizer and direct it into reservoir with 1 liter volume. Perform activities specified in it. 9.3. Holding mineralizer casing (Fig.3, pos.13) unscrew the cover (Fig.3, pos.12). Wait until all water (if any) will pour out of the casing. Then disconnect hose, insert blind and retaining ring.

Mineral supplement may be as follows:

- a) Supplied in a bottle with a volume of 0.33 liters in device set (in winter).
- b) Acquired in separate package ("Severyanka+" composition No. 4).

Fill clean reservoir (not less than 1 liter) with mineral supplement in the amount of 300 ml and reverse osmosis (or distilled) water in the amount of 300 ml. Then mix the resulting solution in reservoir with a clean stick and pour it into mineralizer casing.

If necessary, add reverse osmosis (or distilled) water into mineralizer casing to the top (so that there is no air bubble). Close the cover tightly (Fig.3, pos.12). Perform works specified in article 9.

10.2. Replacement of filter elements

Perform works specified in it. 8.2, 8.3 and wait a few minutes, then perform works specified in it. 9.1, 9.2. Then use the wrench (Fig.1, pos.7) to untighten the flask of replaceable filter and remove it. Remove the used cartridge and install a new one. Tighten the flask back with the wrench.

After replacing necessary filters disconnect tube from fitting (Fig.3, pos.22) and direct it into reservoir with a volume of several liters. Open the valve supplying cold water to the mixer tap. Open water tap (fig.4, pos.6). Connect ROS power cable to electrical network. After 2 minutes (filters flushing period) disconnect ROS power cable from electrical network and then close water tap. Connect tube to the fitting (fig.3, pos.22). Perform works specified in article 9.

Note:

See "Membrane replacement procedure" in Annex 3 for replacement of ROS membrane.

10.3. Entering diagnostic mode

Disconnect power adapter (fig.1, pos.10) from electric network, press and hold "Menu" button, connect power adapter to electric network. Release the button when logo disappears.

The following menu will appear: "**D1.0 F4.0**" where digits after **D** – type of device, and digits after **F** - firmware version. Further when device is running in tank priming mode four groups of digits will appear which shall be recorded (or photographed) with 5 seconds interval during several minutes. Then these data shall be transferred to customer service when any problems with device operation occur. Other parameters can be viewed by pressing the "**Select**" key (number of additional parameters group that is the digit followed by #symbol).

11. Troubleshooting

Trouble	Possible cause	Troubleshooting method	Remark
Milky water is coming out from clean water tap	Air in the system		Air in the system - normal case when starting up the system. In case of normal usage it will disappear during 1-2 weeks.
Water is not coming into storage tank or is coming slowly	Low pressure in supply main	Eliminate	Water supply rate into storage tank (after membrane) shall be at least 100 ml/min.
	Cartridges of 1, 2, 3 prefiltering stages are plugged	Clean or replace cartridges	Cartridges may be quickly contaminated due to volley of mud into water pipeline or very dirty inlet water.
	Osmotic membrane is plugged.	Replace	Membrane may be quickly contaminated if hard water is used.
Little water is coming from storage tank	Low gage pressure in storage tank	Increase pressure	Normal pressure in empty tank shall be 0.4-0.5 atm.
Leakages	Fittings are not tightened	Tighten connections	
Water tastes or smells unpleasantly	Coal post-filter service life expired	Replace	
	Preservative residuals in storage tank	Drain <u>all</u> water from tank and refill it	
	Minimum water intake specified in passport is not provided	Drain <u>all</u> water from tank, follow article 9 and refill it	Water may stagnate and obtain unpleasant taste and smell
Indicators are out	Indicator cable plug bad contact	Disconnect and reconnect indicator cable	
Pressure relay clicks constantly	Inlet filters service life is expired or insufficient pressure in water supply network	Replace inlet filters and check pressure in insufficient pressure water supply network	

12. Manufacturer warranty

- 12.1. Warranty period is 1 year from the date of device purchase.
- 12.2. The device is designed for residential use with a daily use of water not more than 50 liters. Otherwise service life of the replaceable cartridges and activation unit reactor will be reduced significantly.
- 12.3. Manufacturer guarantees device operation when consumer observes specified operating, safety and maintenance conditions.
- 12.4. Consumables: cartridge-filters, post-filter, reverse osmosis membrane and mineral supplement are not covered by warranty, changing of consumables during operation belongs to consumer responsibility.
- 12.5. In case of device failures during warranty period by manufacturer's fault, device should be returned to manufacturer for warranty repair with this passport.
- 12.6. If the device was damaged by consumer as a result of violations of operation rules repair is made at the expense of consumer.
- 12.7. If any problems occur during operation of the device, it is necessary to disconnect it from network, shut off water supply and contact your local dealer engaged in aftersales service or the manufacturer.
- 12.8. Consumer has the right to reject the device any time before it is handed over, and after handing over - within seven days.

Notes: The manufacturer reserves the right to make modifications of the device which are not specified in this passport and do not affect the functionality of the device.

13. Acceptance certificate

"Izumrud-SI" device (mod. 01os-50) serial No. _____ corresponds to Spec. 3697-035-00206807-12 and is considered to be fit for service.

QCD representative _____

Stamp here

Date of sale _____



CJSC S&RC "Ikar"
426075, Izhevsk, p/o box 1619
ikar@udm.ru, <http://ikar.udm.ru>

Annexes

Antioxidant water solutions properties

Medics consider oxidation-reduction potential (ORP) of solutions the most important indicator of their biological activity. Water and solutions based thereof obtained in devices "Izumarud-SI" with negative ORP are electron-donor relatively to mediums with positive ORP. Such water as electron-donor is an antioxidant which explains its biostimulating effect on body tissues. Water with parameters $\Delta\text{ORP} \sim -(200...400)$ mV stimulates physiological regeneration processes, particularly DNA synthesis of dodecadactylon mucosa cells, has immunocorrective effect, enhances detoxifying function of liver, stabilizes permeability of cell membranes and normalizes their energy potential. Ordinary drinking water with ORP $\sim (250...450)$ mV is electron-acceptive relatively to the cells and tissues of organism consisting of 80-90% of the water. As a result biological structures of organism undergo oxidative damage and aging.

During activation water, while maintaining complete biocompatibility (without any chemical additives) turns into effective antioxidant. It is reminder that vitamins E, C, PP, K and series of other vital substances being a part of food stuff are the most important antioxidants.

Oxidation-reduction reactions play a crucial role in exchange of substances and energy. In various diseases or harmful external effects on a living organism the imbalance of oxidation-reduction processes occurs.

Activation of oxidation processes in organisms tissues are traced in case of avitaminosis, harmful action of exogenous chemical agents (alcohol, nicotine poisoning, etc.) and physical factors (cold, fever, radiation injury, etc.), chronic emotional stress, cardiovascular diseases and other pathological processes and aging.

Numerous experiments on animals in laboratories, on farms, drinking of antioxidant water by volunteers showed that the activation of protective forces of an organism, decreasing of susceptibility to cold-related and infectious diseases occurs.

Note that attempts to obtain biologically active water simply by addition of chemical substances do not lead to similar results.

Numerous studies have shown the absence of toxicity and mutagenicity in antioxidant water.

Activation allows not only to disinfect source water, but also to obtain water with bactericidal and biostimulating properties.

Antioxidant water is a powerful stimulant of biological processes, obtain high extracting and dissolving properties. For example, propolis is dissolved in activated water heated to 40-50 °C during 4 hours, while under normal conditions it is dissolved only by alcohol during 24 hours.

Activated water is an immune stimulator and stimulates processes of physiological and reparative regeneration of tissues, normalizes metabolism, improve circulatory processes in tissues, stimulates tissue respiration, improves reliability of antioxidant protection of liver and myocardium, enhances detoxifying function of liver.

This water is easily absorbed by organism, in case of regular use human needs less food and as a result, gets rid of excess weight.

Use of this water improves metabolism, excretion of toxins and chemicals not absorbed by organism and leads to activation of all human organism systems, primarily activation of immune system work.

It is effective for the prevention of geriatric diseases, hypertension, atherosclerosis, diabetes and others.

It is effective in cosmetics, prevents the appearance of wrinkles by softening the skin and give it healthy appearance, when rinsing hair makes it shining and reduce hair loss.

The effectiveness of phytopreparations is significantly rising when using this water.

Activated water has a strong extracting properties reaching maximum at 70°C, therefore herbal extracts infused with such water contain much more useful and necessary for treatment substances.

As a result the efficiency of their use is much higher.

The effectiveness of therapeutic baths and aromatherapy with the use of activated water increases.

Physiological sufficiency of drinking water is characterized first by ORP and its mineral composition, which must meet biological needs of human organism. In international and national documents of major industrialized countries minimum rates are established only for hardness of water. This parameter is expressed either directly by the value of total hardness, or in form of minimum concentrations of divalent calcium and magnesium. WHO guideline includes instruction on minimum level of total mineralization of drinking water - 100 mg/l, and optimum level of mineralization is 200...500 mg/l.

"Severyanka" composition (<http://www.severyanka.spb.ru>) was designed and certified in Saint-Petersburg specifically for soft water in this region which can be used to normalize water for drinking and cooking by ions of calcium and magnesium. The composition is used by adding it to drinking water in accordance with instruction.

"Izumrud-SI" devices provide you with decontaminated, disinfected, activated drinking water. Using dispenser integrated into the devices, you can add thereto any mineral supplements (based on experts recommendations) which are missing in your region, facilitating thereby their absorption by your organism.

WISH YOU GOOD HEALTH!

Your guidebook – "MIS-RT" magazine.

<http://www.ikar.udm.ru/mis-rt.htm>

Main features of "Izumrud-SI" device (mod. 01os-50)

Reverse osmosis systems of any manufacturers available at market may be used in the device as water preliminary preparation systems (for example: "Geysler", "Rainbow", "Aquapro", etc). All these systems has similar sequence of treatment stages, i.e.

I stage – mechanical treatment,

- material, foamed polypropylene, porosity - 5 μm (EFM, PPS series)
- wounded from polypropylene thread, porosity - 5 μm (SWS series, Korea)
- based on corrugated polypropylene, porosity - 5 μm (APP series)

II stage - chlorine and chlorine-containing compounds treatment,

- material - granulated coconut coal (GAC, UPF, YS-168 series)

III stage -organic compounds treatment,

- material - pressed fine-pored coal (APC, CBC series)

IV stage – membrane treatment based on reverse osmosis method,

- material - thin-film composite with holes diameter of 1 angstrom (10^{-10} m) infiltrates only water molecules and remaining dissolved admixtures flowing around membrane surface are drained (RO membrane Filmtech, TFC, CSM series)

V stage – advanced treatment from odors and gases after integrated treatment,

- material - pressed activated coconut coal (AIC, AIP series)

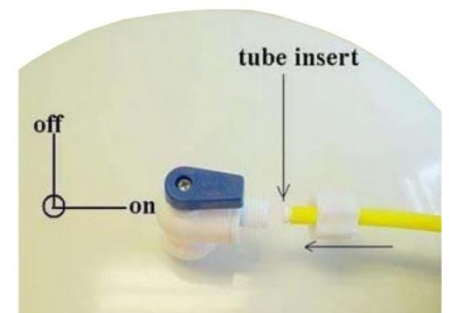
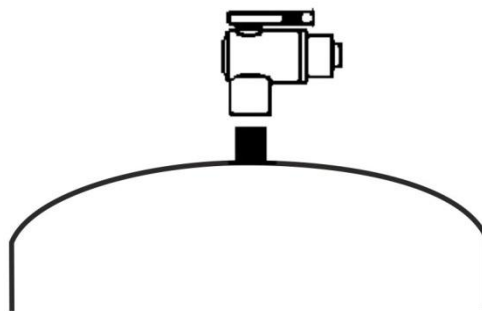
Feature of "Izumrud-SI" device (mod. 01os-50) is that after IV stage of pretreatment after obtaining water with admixtures not more than 10 mg/l it is supplied into activation and mineralization unit where it is finally disinfected and obtain antioxidant properties (negative values of ORP) and receives necessary quantity of vital microelements. Water becomes alive and biologically useful and maintains its properties being in storage tank for at least 3 days. Before water intake via tap water passes through coal post-filter (V stage).

Typical removable cartridges-filters are on sale in all markets selling reverse osmosis systems. Mineralizer is filled with fresh "Severyanka+" solution according to censor 3.

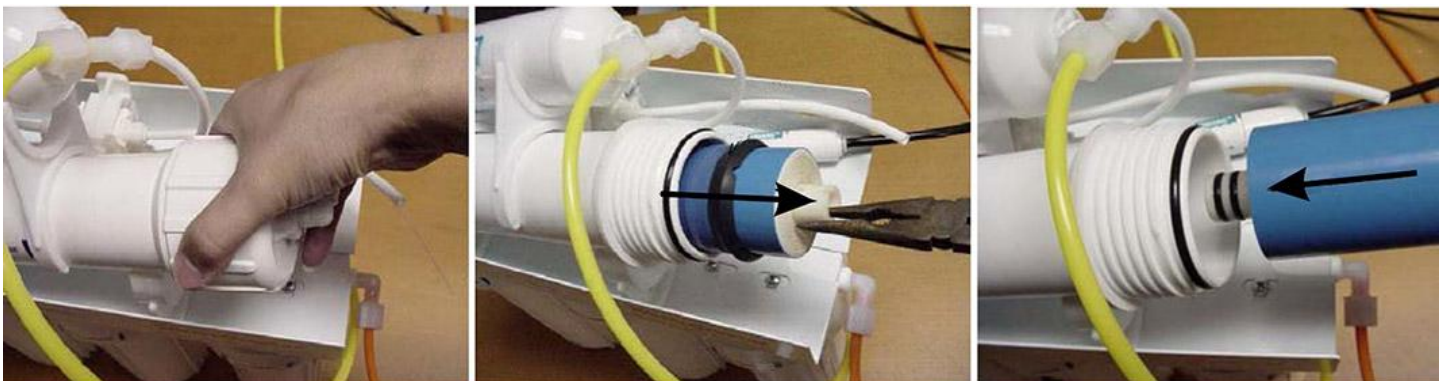
COLD WATER LINE TIE-IN



STORAGE TANK VALVE INSTALLATION



MEMBRANE REPLACEMENT PROCEDURE

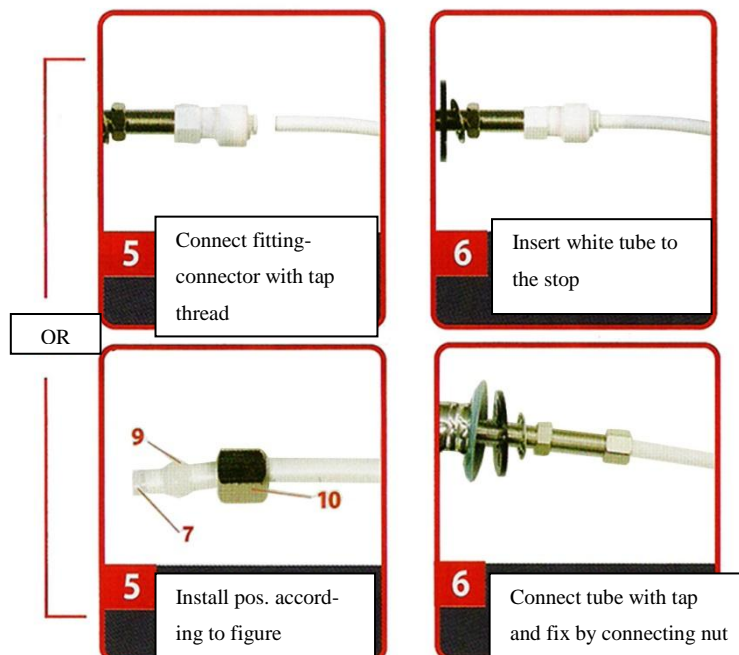


If necessary to replace membrane unpack barrier pack with new membrane and insert it into the casing (having removed used one).

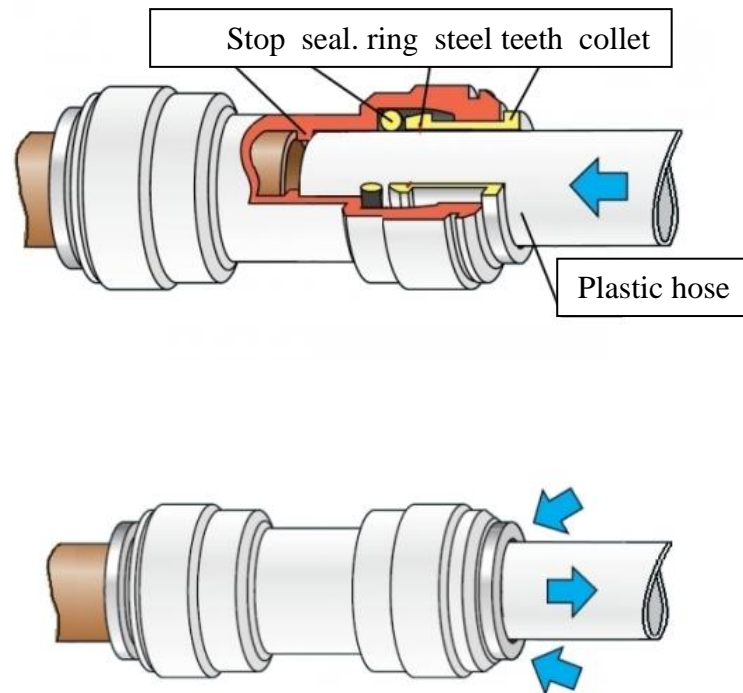
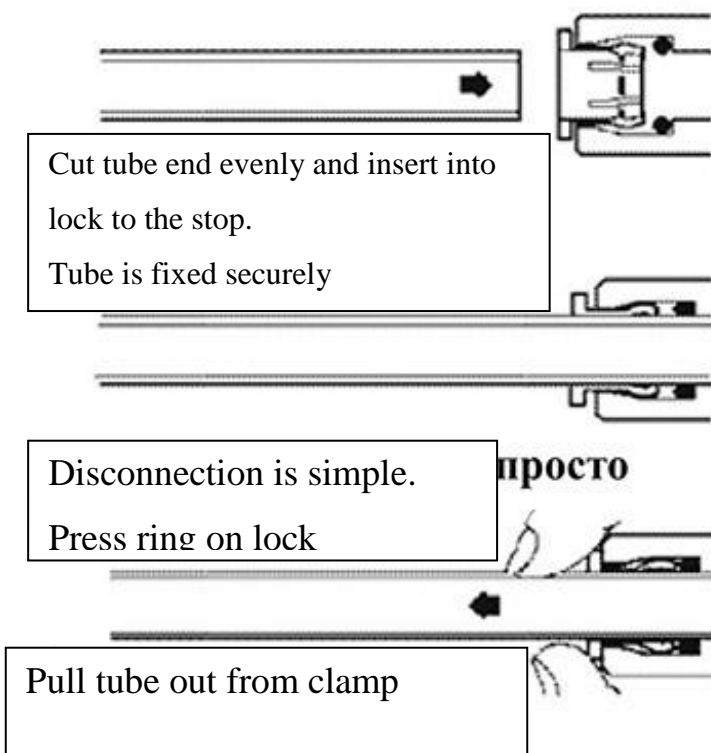
DRAINAGE CLAMP ATTACHMENT



CLEAN WATER TAP INSTALLATION



FLEXIBLE TUBES CONNECTION



Note: 2 types of fittings (quick-release plastic connections) may be used in the device:

1) **JACO-type**, coupling nut connection. Prior to connecting the special bushing is inserted into the tube. When nut is tightened it presses the tube fixing and sealing connection.

2) **JG-type**, connection without nut. Tube is fixed in fitting with mechanical clamp and rubber ring inside fitting seals connection.

Connecting tube to fitting. Insert tube in fitting to the stop. Tube is fixed with mechanical clamp. Apply additional force for sealing of connection. In this case tube will move approximately for 5-6 mm more and will be tightly pressed by fitting rubber ring. Slightly pull the tube out from fitting for checking connection.

Disconnecting tube from fitting. Ensure tube is depressurized. Press (symmetrically) mechanical clamp ring to fitting base. It will release the tube. Pull the tube out holding and symmetrically pressing the ring.

Attention! Tube end connected to fitting shall not be scratched or dented.

"Severyanka+" mineral supplement composition No.4

Currently "Severyanka+" is the best balanced mineral supplement. If you did not manage to find it in markets of your city you can order it directly by LLC "Eco-project" (www.severyanka.spb.ru).

"Severyanka+" mineral supplement

By physicochemical parameters composition No.4 shall meet standards specified in table No.1.

Table No.1

Ion concentration in water.			
Ca^{2+}	Mg^{2+}	K^{+}	I^{-}
75-85 g/dm ³	17-22 g/dm ³	4-6 g/dm ³	80-120 mg/dm ³

Supplement is used as follows:

- at home; in preschool institutions and schools
- in the process of water treatment at industrial production of drinking water, beverages and food.

Transportation and storage rules:

- Transportation of supplement is performed in transport package by any transportation mode in accordance with shipping rules applicable for definite mode of transport.
- Transportation and storage of supplement is performed at temperature from -30 to 30 °C, no light admission.
- Guaranteed storage life of supplement - 18 months.



(mod. 01)



(mod. 02)

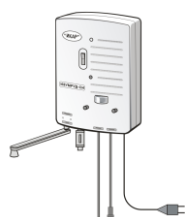


(mod. 03)

Air ionizer "ЛЧ-1" (compact household plasmatron– Chizhevskiy lamp) sanitary and hygienic apparatus for room air enrichment by light negative ions and compensation of air ionization deficiency at working places of personal computer users for aeroionotherapy and air ionizing in rooms and protection against "display illness".

Apparatus modification:

- mod. 01** – multipurpose portable,
- mod. 02** - ceiling and wall panels mounted,
- mod. 03** - mounted into 5" computer base unit compartment.



(mod.01– 03)



(mod.01d)

"Izumrud-SI" multipurpose plant for preparation of drinking water with predetermined mineral composition and antioxidant properties and for obtaining of the following solutions based thereon: detergent, disinfecting and sterilizing solutions.

Apparatus modification:

- mod. 01** – obtaining of drinking ionized water with negative oxidation-reduction potential (ORP) and predetermined mineral composition
- mod. 02** – function mod. 01 plus pH and ORP control
- mod. 03** – function mod. 02 plus obtaining of detergent, disinfecting and sterilizing solutions
- mod. 01d** – multiple access plant based on dispenser

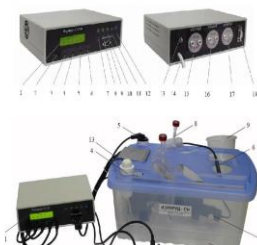


(mod.01os)

mod. 01os – in order to obtain activated water of the highest quality with predetermined mineral composition and antioxidant properties the plant is equipped with integrated controller and three flow-type sensors with two-level indicating system - monitoring of operation of osmosis system (purification). activation (ionization), mineralization (optimization of mineral composition)



(mod.04c)



mod. 01 r/w – independent option for railway and water passenger transport

mod. 04c, mod. 04uni – universal device for obtaining of activated liquids with negative ORP (drinking water, beverages, physical solutions, blood) based on noncontact and contact activation of liquids for household use and in different national economy branches (medicine, agriculture, industry, oil production); **"Vlada"** – chafing dish - activator for obtaining of activated water at home (contact and noncontact activation of water solutions).



"Vlada"



(mod.04uni)



(mod. 0-n-0)



mod. 0-n-0 – the plant for obtaining of detergent, disinfecting and sterilizing solutions, water disinfection in swimming pools.