



**HYDROPANELS  
of sodium analyzer**

**HP-7101**

INSTRUCTION MANUAL

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## 1 Purpose

Hydropanels of sodium analyzer model HP-7101 (hereinafter HP) is designed for the pre-treatment of the analyzed liquid: its flow stabilization through the measuring cell, with the housed combined pH electrode (with temperature sensor) and combined rNa electrode in it; for ensuring the interference immunity of measurements; for alkalizing the analyzed liquid with ammonia vapors, as well for the adjustment of control and buffer solutions of the sodium analyzer.

HP is mounted near the controlled facility or in the places of the analyzed liquid supply from the controlled facility.

Sodium analyzer with the channels of Na ions (pNa) and H ions (pH) measurement shall be installed on the HP.

HP complete with the analyzer can be used in nuclear power, heat power industry and other industries.

Operation conditions:

- ambient temperature 5...50°C;
- relative air humidity up to 95%;
- atmospheric pressure 84...106,7 kPa;
- position in space – vertical,  $\pm 5^\circ$ ;
- external vibration and shaking – is absent;
- analyzed liquid – chemically demineralized water and steam condensate of high pressure boilers and turbines, as well as water, before and after the H<sup>+</sup> - cation filters

## 2 Technical data

- measuring cell – flow.
- basic materials in contact with the analyzed liquid: polycarbonate and steel 12X18H10T.
- inlet flow rate 3...15 l/h.
- Temperature of the analyzed liquid 10...50°C.
- Value of the stabilized flow rate in the measurement zone, 5...6 l/h.
- Overall dimensions – see the Annex A.
- Weight max - 4,5 kg.
- average lifetime not less 10 years.

## 3 Completeness

The delivery set includes:

- hydropanels – 1 pc.;
  - combined pNa-electrode – 1 pc.;
  - combined pH-electrode — 1pc.
  - sodium analyzer - 1pc;
  - instruction manual – 1 pc. (it is allowed to attache 1 copy of IM for 5 HP, delivered to the same address);
- Spare electrodes and reagents are supplied on request.

#### 4 Assembly

The completeness, overall and mounting dimensions of HP are given in the Appendix A.

HP consists of the panel 2, where the measuring cell 6, industrial sodium analyzer SA-7101 (measuring device), the needle valve of total flow 12, the prefilter 5, rotameter of the analyzed liquid flow rate through the HP 14, the ground connector 15 are housed. pNa-selective electrode and a combined pH electrode are installed in the measuring cell.

Tubes 10x2 for supply and drain of the analyzed liquid are connected to the inlet and outlet adapter 13. The overflow device 11 is intended to obtain a stable flow rate through the measuring cell.

The reagent in the tank 8 (25% ammonia solution or 50% diethylamine solution) in conjunction with a band-stop device 10 provides the alkalinization of the analyzed liquid to the desired level (pH pNa > 3).

Three-way valve 9 switches the flow of the measuring cell to the analyzed liquid, or to a control solution in the buffer tank 4.

#### 5 Safety precautions

HP should be grounded.

The ground wire of the analyzer is connected to the ground connector 15 on the panel 2.

#### 6 Preparation for operation and installation order

##### 6.1 External examination

After the unpacking, identify the following conformance:

- no packaging violations during the transportation;
- no mechanical damage;
- no corrosion on the metal parts.

In the case of the identified nonconformance decision on the future use of the HP should be made.

HP with the included industrial sodium analyzer SA-7101 is supplied with the electrodes connected to the analyzer.

## ATTENTION!

**To avoid the drying of the measuring membrane layer during the transporting of the HP with connected electrodes, it is necessary to protect the electrodes with protective caps (included in the delivery set) filled with 0.1 M NaCl solution.**

### 6.2 Field fixture mounting

During the installation the following conditions should be observed:

- the mounting location should be easily accessible for the maintenance;
- there should be no cranes, flanges and pipes over the place of installation to prevent the drops of aggressive solutions;
- the mounting location should be selected for the best characterization of the the controlled process by the measured value.

Field HP mounting is performed in the following order:

- - HP should be mounted on the metal rail in a vertical position with 4 mounting bolts M6x30. The lower edge of HP should be at least 0.5 meters from the floor; the distance between the backwall of the panel and the wall should be sufficient for the easy wiring;
- the supply and drain of a controlled solution should be carried out by using the PVC tubes with 10x2 cross-section or stainless pipe;
- the line cable grooming of the analyzer should be produced through the rubber grommets on the panel.

### 6.3 Preparation of the pH-electrode

Before the installing into the measuring cell the combined pH-electrode should be soaked and calibrated in buffer solutions.

Soak the pH-electrode in an 0.1 H HCl solution for 8 hours.

After the soaking, storing and transportation of the pH-electrode is performed in 3M KCl solution.

For the buffer solutions calibration is placed in a beaker with 100 ml of buffer solution. The ground electrode contacting with the buffer is installed there too. The calibration is performed in accordance with the procedure attached in the instruction manual of the analyzer.

Place the pH electrode after the calibration into the measuring cell for the flow. It is recommended to ignore the values of the pH meter for 20-30 minutes, especially by the measuring of pH in ultrapure water.

### 6.4 Preparation of the pNa-electrode

Before the installing into the measuring cell the pNa-electrode should be soaked and calibrated in control calibration solutions.

Soak the pNa-electrode in an 0.1 N HCl solution for 5 minutes, then to wash with clean water and to soak the electrode within an hour in an 0.1 M NaCl solution.

Wash the electrode with distilled water.

Calibrate the electrode by two control solution: 100 mg / dm<sup>3</sup> and 1000 mcg / dm<sup>3</sup> of NaCl.

Keep the electrode soaked in the calibration solution of 1000mg / dm<sup>3</sup> NaCl.

## 7 Maintenance operation

### ATTENTION!

**The membrane of the pH and pNa measuring glass electrodes should be always immersed in the liquid to avoid the drying of the measuring layer. If the electrode membrane was in a dry state for a long time (30 minutes), it is necessary to soak it in an 0.1 N HCl solution for 8 hours for the pH electrode, and membrane of the pNa - electrode in 0.1M NaCl solution.**

The maintenance of the HP consists in providing a standardized regime of the flow adjustment of the controlled solution.

Calibrate the measuring electrodes, replace the reagent and fill up the pNa-electrode with electrolyte regularly in accordance with the regulations.

Monitor the status of the hydraulic wiring.

Avoid the clogging of the measuring cell, perform a periodically mechanical cleaning of the cell channels.

Replace the flexible pipes with a new one once a year.

## 8 Eventual failures and remedies

The list of possible failures and their remedies:

- pH values are unreliable and don't change → pH electrode is defective → replace by a new one;
- values of the pH channel are below normal → insufficient level of the reagent in the tank or its exhaustion → pour a new reagent to the desired level;
- absence of air periodic bubbles in the reagent tank → defective injector → check the sample flow through the hydropanels, connections hermiticity.

## 9 Marking, packaging, transportation and storage

9.1 On the HP label bears the following information:

- company – manufacturer;
- identification mark of HP;
- serial number;
- year of production

9.2 The documentation is enclosed into a package made of the polyethylene film and is placed with HP into carton boxes or in a case.

9.3 Transportation is performed by all types of closed transport including air transport, in heated air-tight cargo pits in compliance with rules for the freight carriage currently in force for this type of transport.

9.4 Transportation is performed in wooden cases or carton boxes. Transportation in containers is allowed.

9.5 The pattern of placement of HP into boxes must exclude its movement during transportation.

9.6 During handling operations and transportation boxes must not be subject to sharp impacts and effects of atmospheric precipitations.

9.7 Residence time for HP under appropriate conditions of transportation is max. 6 months

9.8 HP must be stored in heated rooms having the temperature of (5...40) °C and relative humidity not exceeding 80 %.

9.9 Air of the store rooms must be free of dust and impurities of aggressive vapors and gases causing corrosion of the HP components.

9.10 Storage of HP in packages must meet terms 3 as per GOST 15150.

## **10 Manufacturer's warranty**

The manufacturer warrants the conformity of the HP to the requirements of specifications provided service, transportation and storage conditions set forth in the present operation manual are observed by the customer.

The guarantee service life is 18 months from the date of commissioning, however, not more than 24 months from the date of shipment to the consumer.

Should the customer detect defects, provided operating, storage and transportation regulations are observed by the consumer within the warranty period, the company – manufacturer shall repair or replace the fixture free of charge.

# Annex A

## OVERAL AND FIXING DIMENSIONS

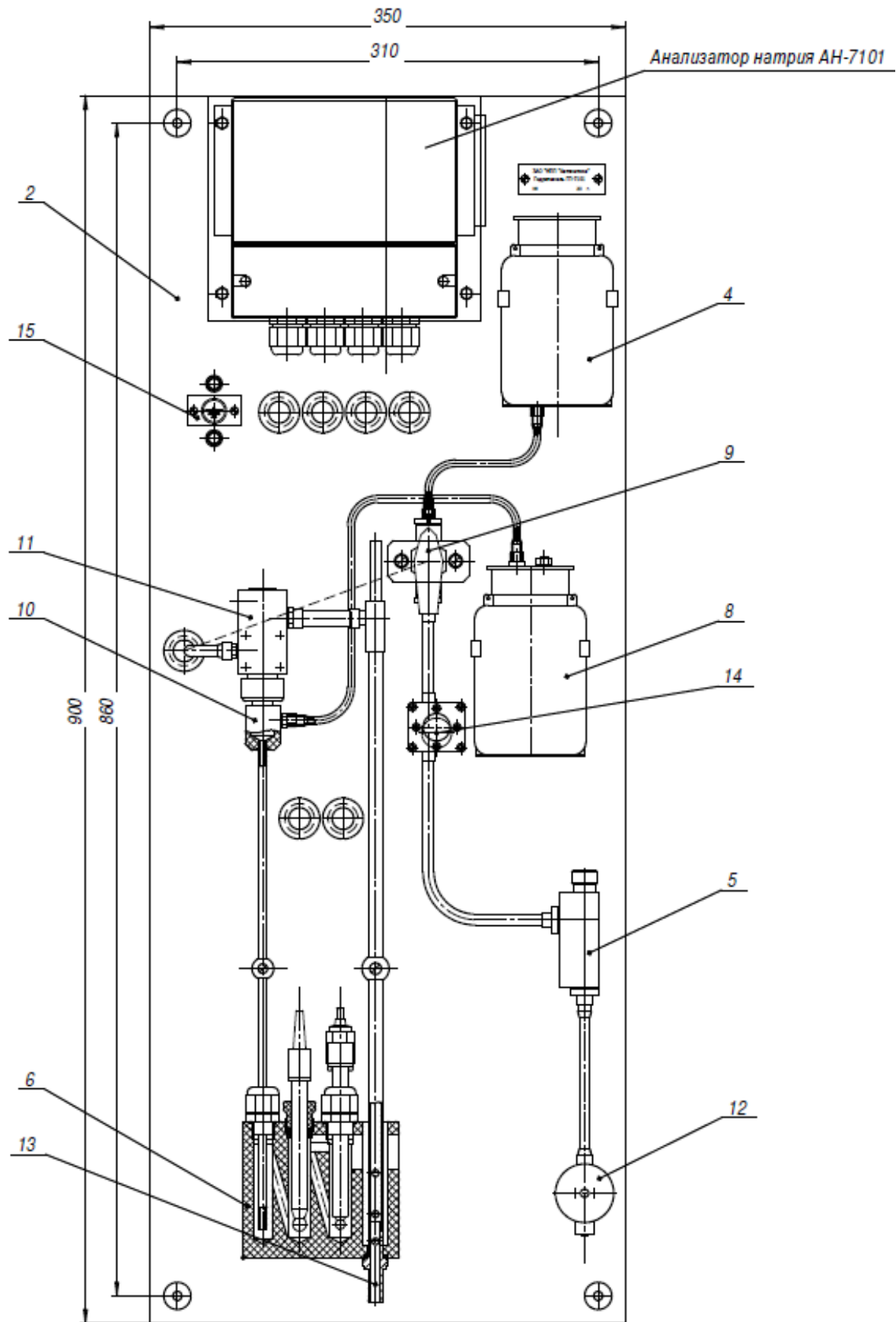


Fig.1.1- Hydropanels HP-7101