C-3122.x.NP Conductometer — concentration meter two channel for nuclear power plants

The analyzer is a two-channel measurement device and consists of one or two active primary transducers (PT) and one wall-mounted measuring instrument (MI). The analyzer is developed on the basis of C-3122 and is designed for use in severe environmental conditions, namely: seismic instability, high-level radiation, unstable electromagnetic compatibility (EMC).

Application: nuclear power and other industries, requiring a super reliable measurement of specific electric conductivity (SEC) in aqueous solutions of salts, alkalis and acids. For use in the radiation zone, PT sensor may be removed from the electronic part PT with a special cable (split version).

The sensors design allows to use them for measuring SEC high-temperature liquids, for example, in evaporators.

The instrument can operate in the mode of measuring SEC difference between two channels. This is needed for controlling deficit of cooling or heating agents.

Primary transducers can be of single-channel and two-channel design.

PT housing is made of stainless steel and allows for its treating with decontamination fluids.
The analyzer provides a digital display of basic measured SEC temperature parameters, their converting into proportional values of unified DC output signals, data exchange via digital interface RS-485, adjustable alarm low/high of measured parameters, as well as archiving and graphic display of measurement results.
Special technical solutions (split connectors) allow to provide a quick replacement of the sensors in the regularly served NPP rooms.
Conductivity analyzers are designed in two versions:

1. Monoblock (electronic part of PT is mounted on the sensor)

2. Split (electronic part of PT is removed from the sensor up to 20 meters with the aid of a special connector and a nonflammable cable resistant to radiation).

BASIC TECHNICAL SPECIFICATIONS

PRIMARY TRANSDUCER

Measuring range:
- C-3122.1.NP ..... (0...1); (0...10); (0...100); (0..1000) µS/cm
- C-3122.2.NP[1)] ..... (0...1); (0...10); (0...100); (0..1000) mS/cm

Basic accurancy
- for conductometers (SEC) ..... 2,0 % (typ. 0,5 %)
- for concentration meters ..... max 5 %

Temperature range of the analyzed liquid [2)] ..... (5...120)°C
Refarence temperature for termocompensation [3)] ..... according to the order
Thermocompensation range relatively the reference temperature ..... ±15°C
Material of sensor ..... SS316, SS321, SS904, titanium BT1-00, tantalum
PT electronic unit enclosure material ..... SS321 or SS316
Viscosity of the analyzed liquid ..... max 0,2 Pa*sec
Pressure of the analyzed liquid ..... <1,6 MPa under (T<+95°C); <0,6 MPa under (95°C<T<+120°C);
Sensor type ..... flowing or submersible
Degree of protection against water and dust according to GOST 14254 (Rus) IP65
Climatic version in accordance with GOST 15150 (Rus): ..... T=(-40..+50) °C
PT is resistant to mold fungi
Seismic resistance ..... Category II for NP-031-01 (**Rus**)
Resistanse to electromagnetic influence ..... IV by GOST 32137 (**Rus**), criterion A
Resistance to radiation:
- absorbed dose rate of the sensor ..... max $1{,}3 \cdot 10^5$ Gy
- The electronic block of PT is resistant to the effect of the integral absorbed dose of ionizing radiation ..... max 150 Gy

Stability to mechanical influences in accordance with GOST 12997 (Rus) V2

Weight:
- electronic unit PT ..... 3,5 kg
- sensor with a depth of immersion of 400 mm ..... 1,0 kg

1) Upper measuring limit for contact submercible sensors 100 mS / cm;
2) The upper limit of the temperature of the analyzed liquid is determined depending on the specific medium.
3) The reference temperature of termocompensation(° C) and the temperature coefficient (% / ° C) are set programmatically.

MEASURING INSTRUMENT

Quantity of measuring channels 1, 2
Parameters being measured in every channel ..... SEC and temperature
Communication line length from the PT to MI ..... max 1000 m
Measuring range (according to analogue output signal) ..... set programmatically
Indicator type ..... LCD graphics
Output signals:
-direct current analogue, proportional to the measuring ranges of SEC and temperature galvanically isolated from the input signals ..... (0…5), (0…20) mA or (4…20) mA
-digital interface ..... RS-485, ModBus RTU data communications protocol
-discrete, programmable, actuation according to SEC or temperature set points ..... four relay with switching contacts, ~240V, 3A
Archiving interval ..... programmable from 1 sec to 5 min
Archiving time ..... from 4.4 hours to 55 days
Power supply ..... ~(100..240) V, (50..60)Hz
Power consumption ..... max 15 VA
Material of MI enclosure ..... ABS plastic
Dust and water protection MI enclosures IP65
Climatic version ..... T=(+5..+50)°C
Resistance to mechanical influences in accordance with GOST R 52931 (**Rus**) V2
Weight ..... max 1 kg

OVERALL AND MOUNTING DIMENSIONS

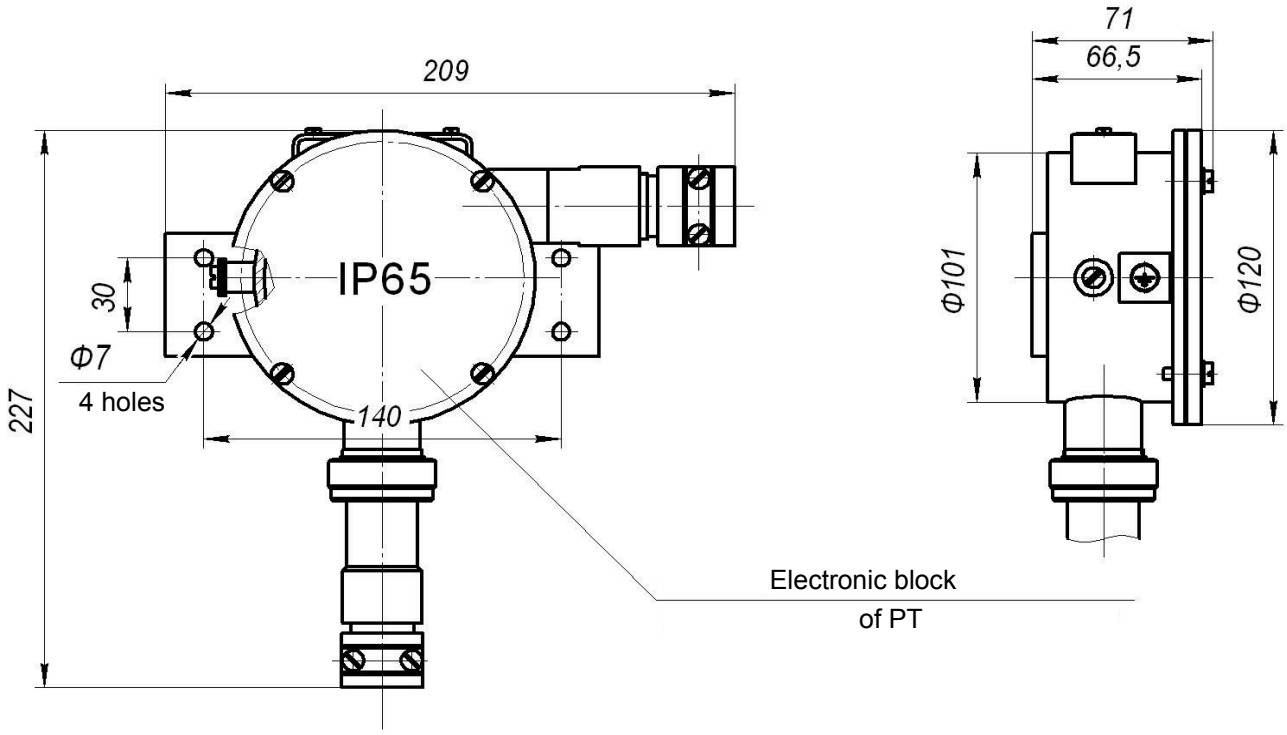

Figure 1. Single-channel electronics unit of the primary transducer

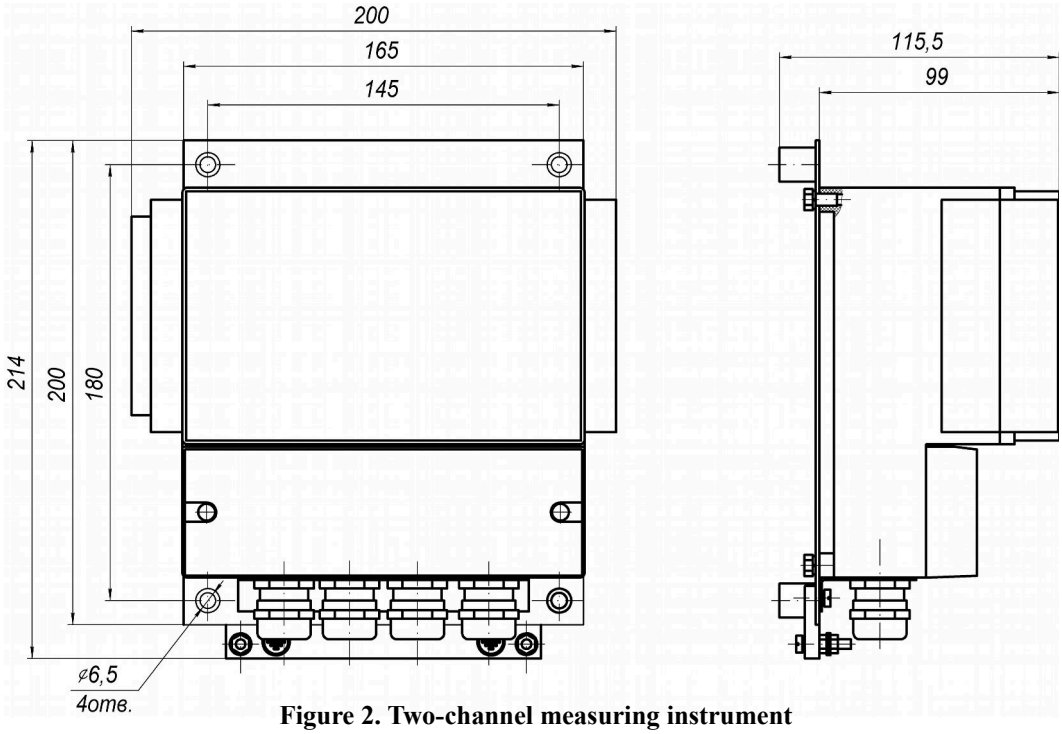

Figure 2. Two-channel measuring instrument

WIRING DIAGRAMM

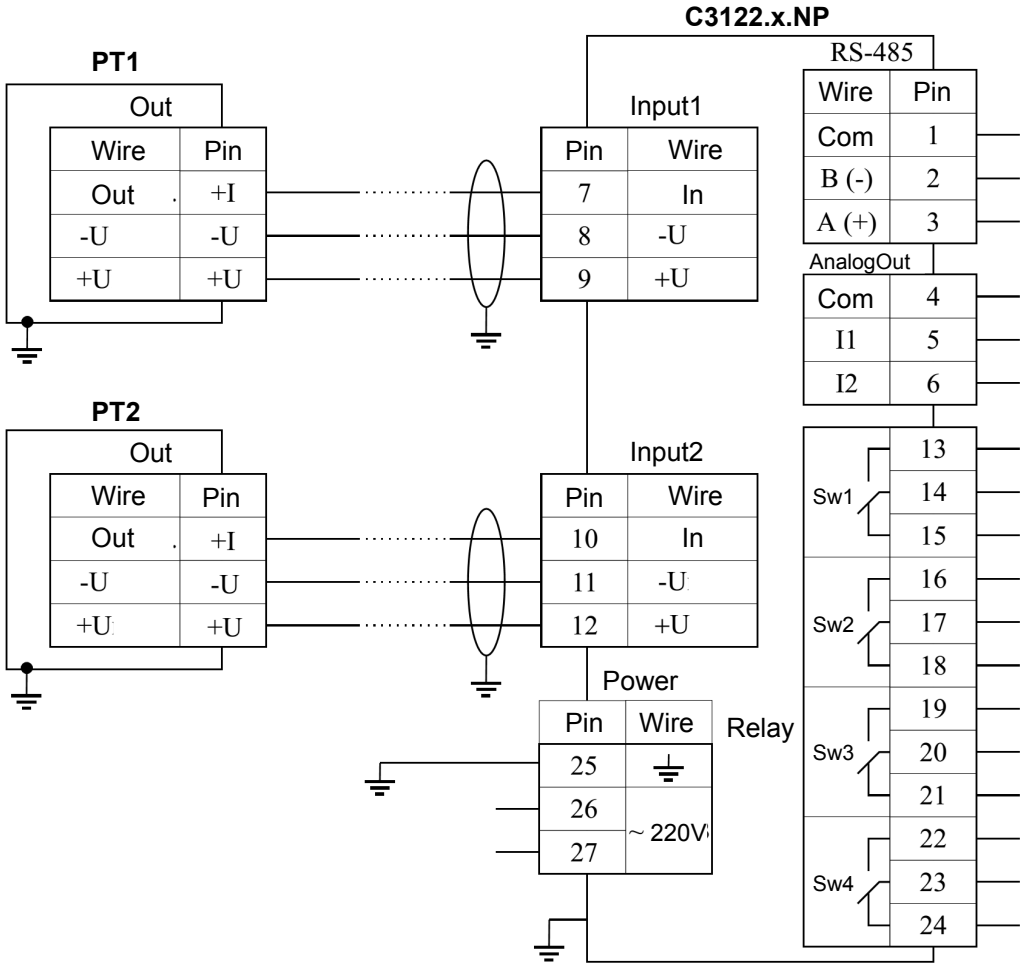

Figure 3. Connection of primary transducers to a wall-mounted MI

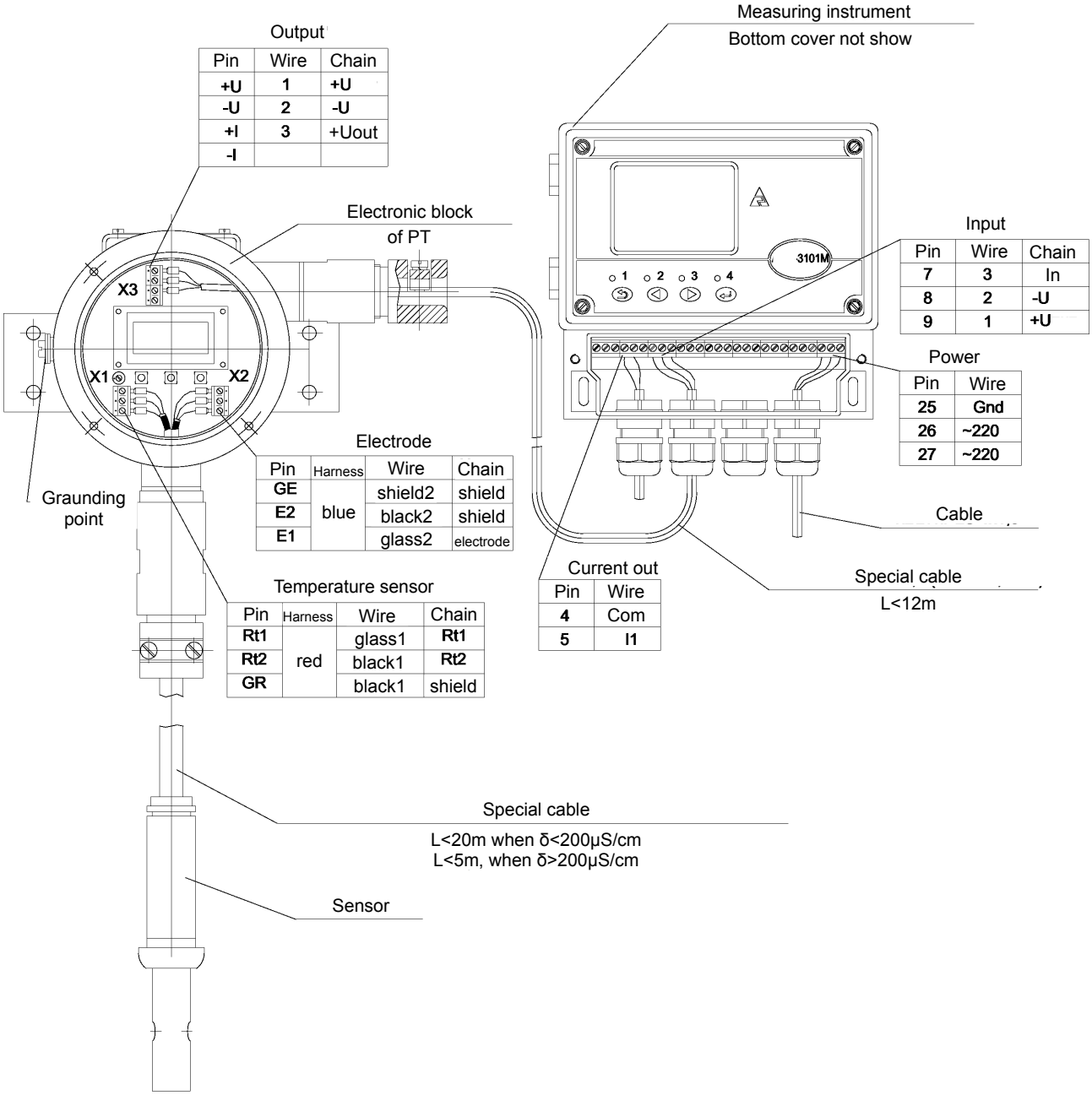

Figure 4. Cable connections of the conductometer C-3122.1.NP.S with single-channel primary transducer with split electronic pert and sensor

ORDER EXAMPLE

«Conductometer C-3122.1.NP in the complete set:

- two-channel wall-mounted measuring instrument;

- 1 measuring channel: primary transducer C-3122.1.NP.S.s200.C.00, measuring ranges (0...1); (0...10); (0...100); (0..1000) µS/cm, Housing material of the electronic unit of the PT – SS321,sensor – submersible (submersible part is 200mm), contact sensor, without Ex.
Operating measuring range 0..100 µS/cm. The output signal 4 ... 20 mA; Reference temperature of termocompensation 25 °C;Material of sensor is SS904, temperature of liquid is 55^{O}C, pressure of liquid is 0,8MPa. Lenght of cable between MI and PT – 300m. Lenght of cable between sensor and electronic unit of PT – 15m.

- 2 measuring channel: primary transducer C-3122.2.NP.S.s100.C.00, measuring ranges (0...1); (0...10); (0...100); (0..1000) mS/cm, Housing material of the electronic unit of the PT – SS321, sensor – submersible (submersible part is 100mm), contact sensor, without Ex.
Operating measuring range 0..100 mS/cm. The output signal 4 ... 20 mA; Reference temperature of termocompensation 25 °C;Material of sensor is SS904, temperature of liquid is 55^{O}C, pressure of liquid is 0,8MPa. Lenght of cable between MI and PT – 300m. Lenght of cable between sensor and electronic unit of PT – 5m.

When ordering the device with the separated electronic part and the sensor of the primary transducer, please, additionally write the length of the cable between them, but not more than 20 m.
When ordering, in addition to the order code, please, specify measurement range, temperature of liquid, pressure of liquid, analog output parameters.

Note: when ordering, it is necessary to use the order codes, given in the description of the device C-3101M.