C-3101M.x.NP
Conductometer – concentration meter for nuclear power plants

Conductivity analyzer is a single channel measuring device which consists of a primary transducer (PT) and a measuring instrument (MI). The analyzer is developed on the basis of C-3101M and is designed for use in severe environmental conditions, as to seismic resistance, climatic conditions, radiation resistance, difficult situation for electromagnetic compatibility (EMC).

Application: nuclear power industry, as well as other industries that require a super reliable measuring of specific electric conductivity (SEC) or the concentration of aqueous solutions of salts, alkalis and acids.

For use in the radiation zone the sensor shall be removed from the PT electronic unit by means of a special cable (split design of the primary transducer).

The sensors design allows to use them to control SEC of high temperature liquids, for example, in the evaporating units.

PT enclosure is made of stainless steel, which enables to make its processing with decontamination fluids.

Conductivity analyzers are designed in two versions:

1) monoblock (Electronic unit is mounted on the sensor)

2) separate (Electronic unit 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 SPECIFICATION AND PARAMETERS

PRIMARY TRANSDUCER

Measuring range:
- C-3101M.1.NP ..... (0...1); (0...10); (0...100); (0..1000) µS/cm
- C-3101M.2.NP[1)] ..... (0...1); (0...10); (0...100); (0..1000) mS/cm
- C-3101M.K.NP ..... see order reference code for the instrument C-3101M

Basic accuracy
- for conductometers ..... 2,0 % (typ. 0,5 %);
- for concentration meters ..... max 5 % (discuss before order)

Temperature range of analysed liquid [2)] ..... (5...120)°C
Reference 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
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 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

Display ..... LED, four-digit, seven-segment
Display color ..... green or red
Output signal ..... (0...5) or (4...20) mA (according to order)
Input signal (signal from PT) ..... digital impulse current
Communication line between PT and MI is four-wire,
wire cross-section ..... at least 0.35 mm2
Communication line length ..... max 800 m
Power supply ..... ~(100..240) V, (50..60)Hz
Power consumption ..... max 15 VA
Climatic version of MI according GOST 15150 (Rus) ..... T=(+5..+50) °C
Resistance to mechanical influences in accordance with GOST 52931 (Rus) N2
Weight ..... max 0,7 kg

The measuring instrument has a double galvanic isolation between the input and output.

OVERALL AND MOUNTING DIMENSIONS

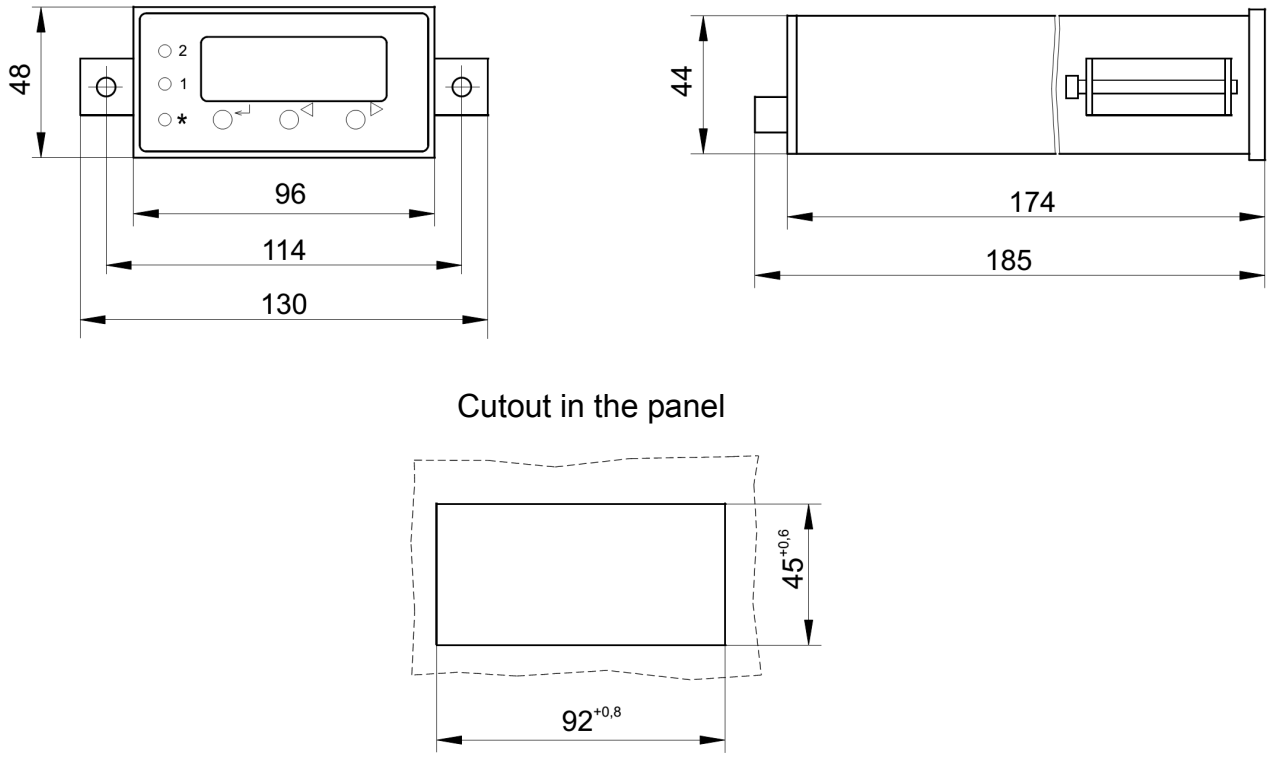
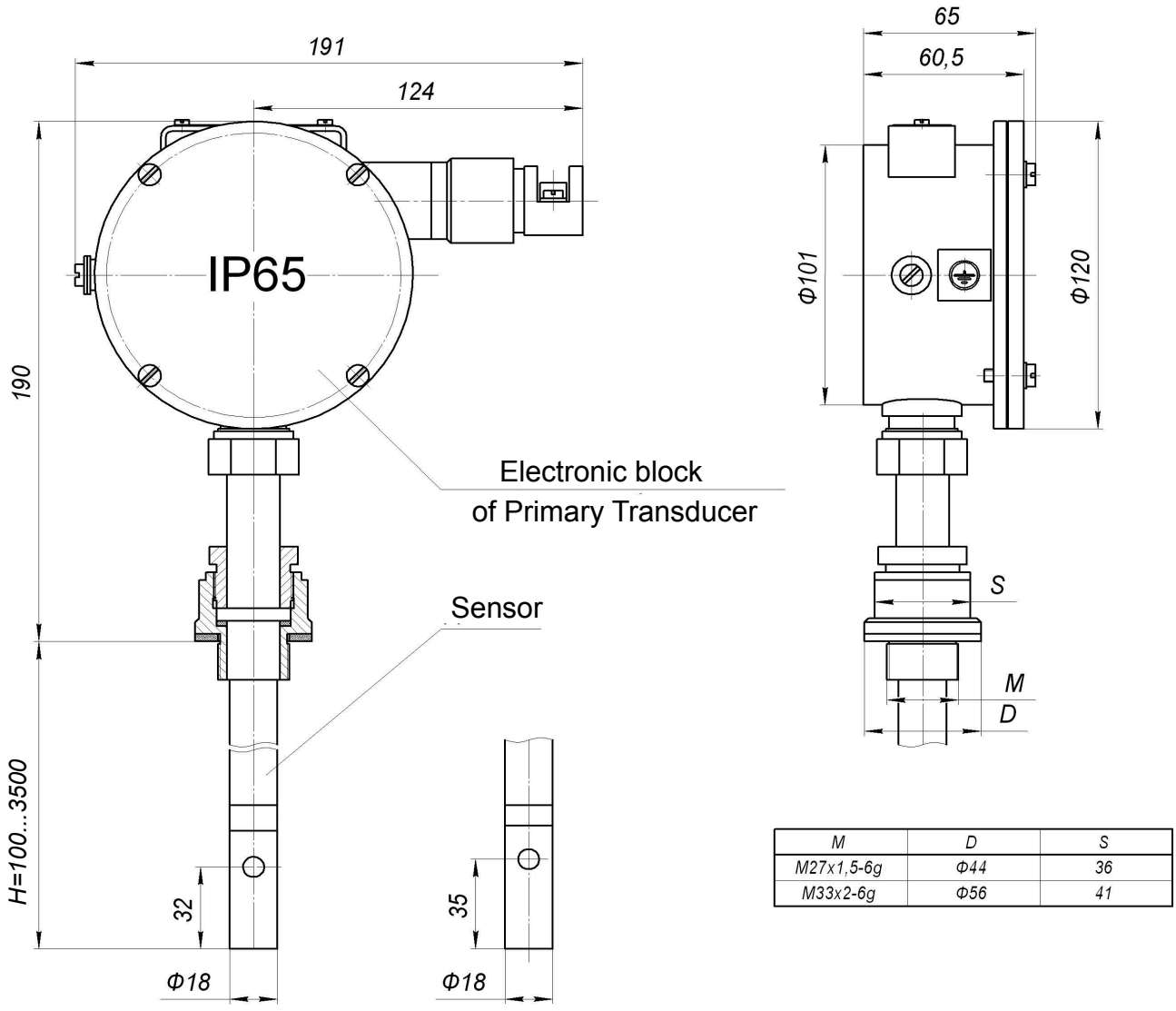
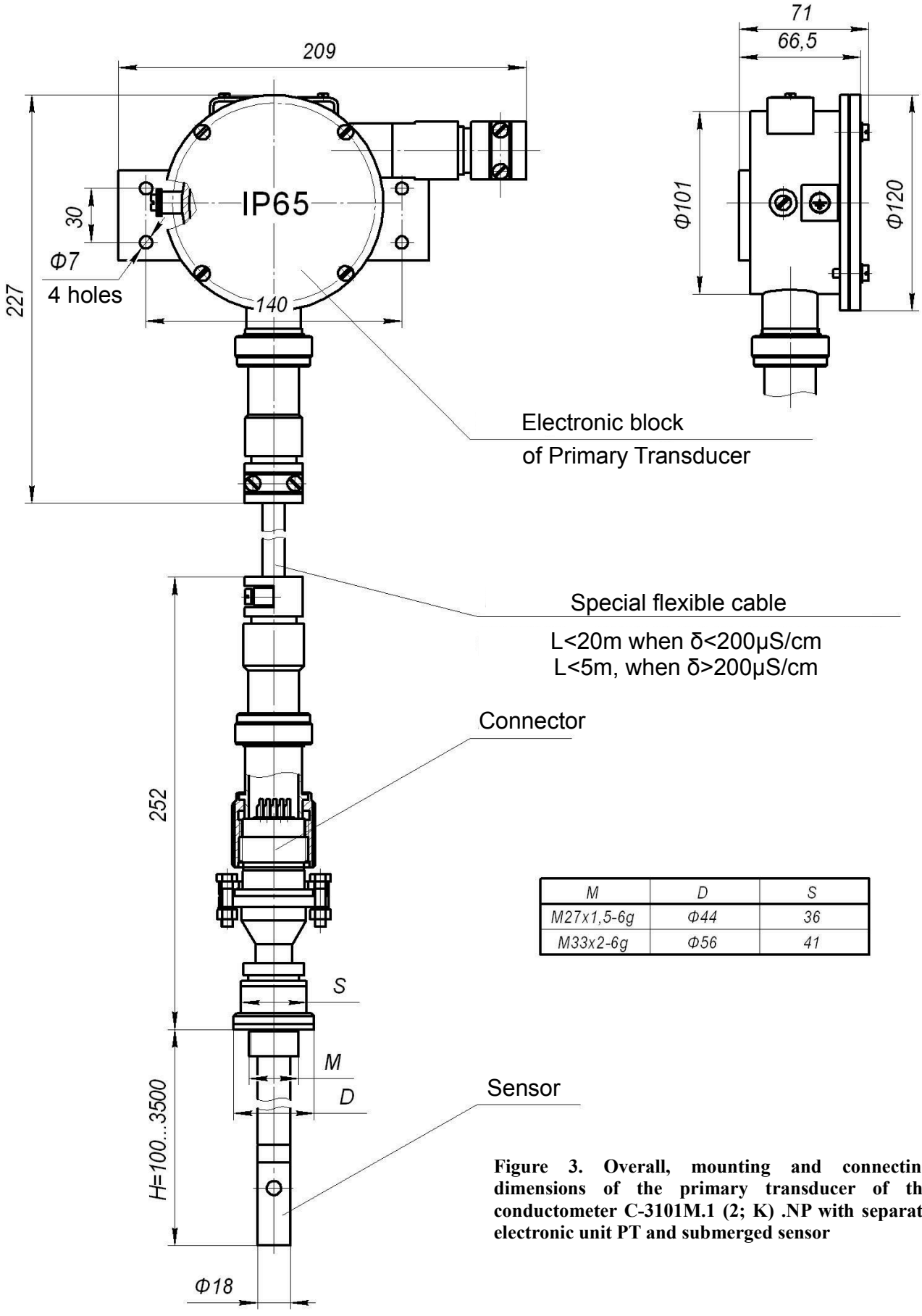


Figure 1. Measuring instrument



M	D	S
M27x1,5-6g	Ф44	36
M33x2-6g	Ф56	41

Figure 2. Overall, mounting and connecting dimensions of the monoblock primary transducer of the C-3101M.1 (2; K) .NP submersible type



M	D	S
M27x1,5-6g	Φ44	36
M33x2-6g	Φ56	41

Figure 3. Overall, mounting and connecting dimensions of the primary transducer of the conductometer C-3101M.1 (2; K) .NP with separate electronic unit PT and submerged sensor

SCHEMES OF CABLE CONNECTIONS

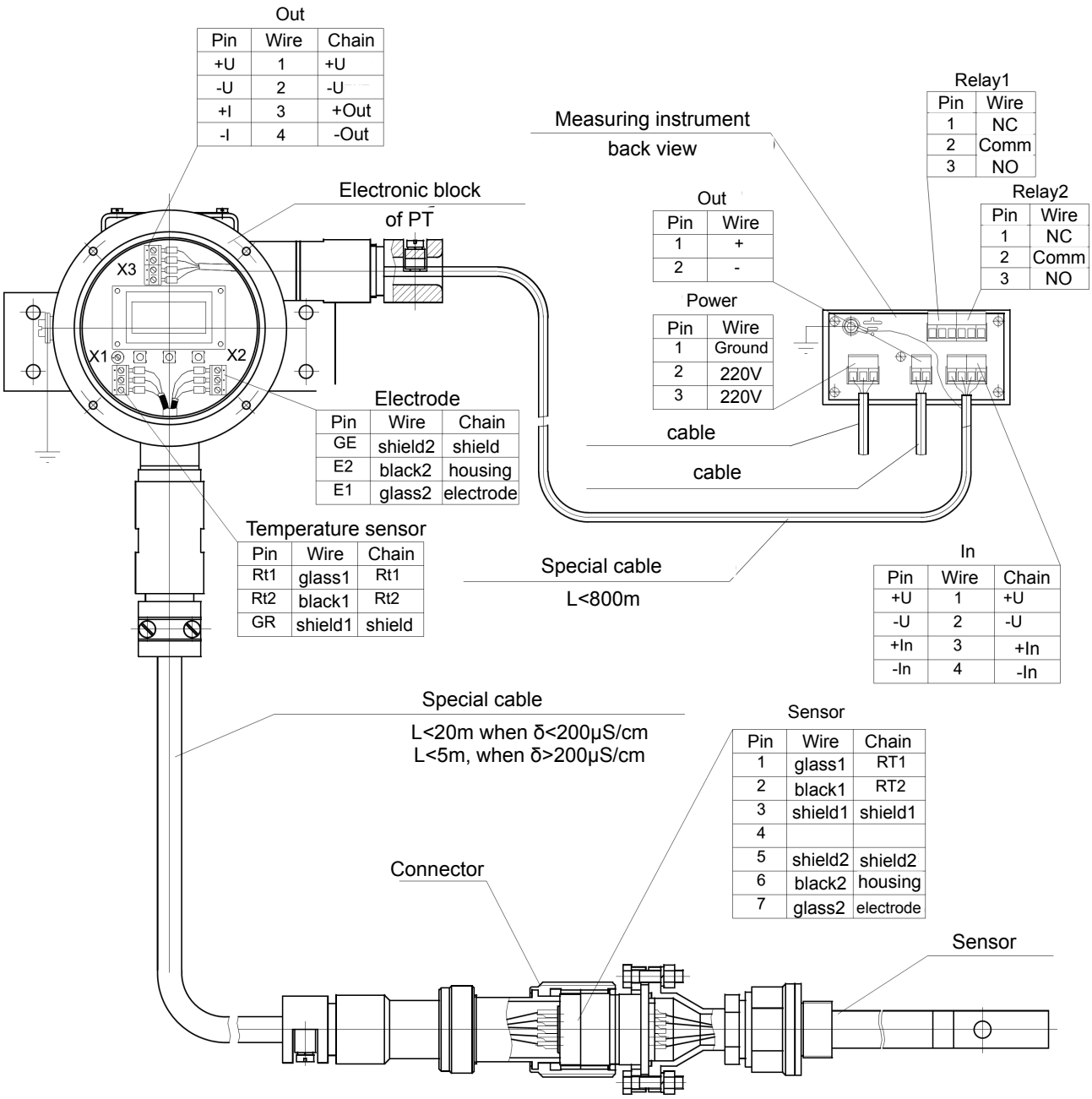


Figure 4. Cable connections of the conductometer C-3101M.1 (2; K) .NP with the separated electronic unit and the sensor of the primary transducer (variant MI with the electromagnetic relay)

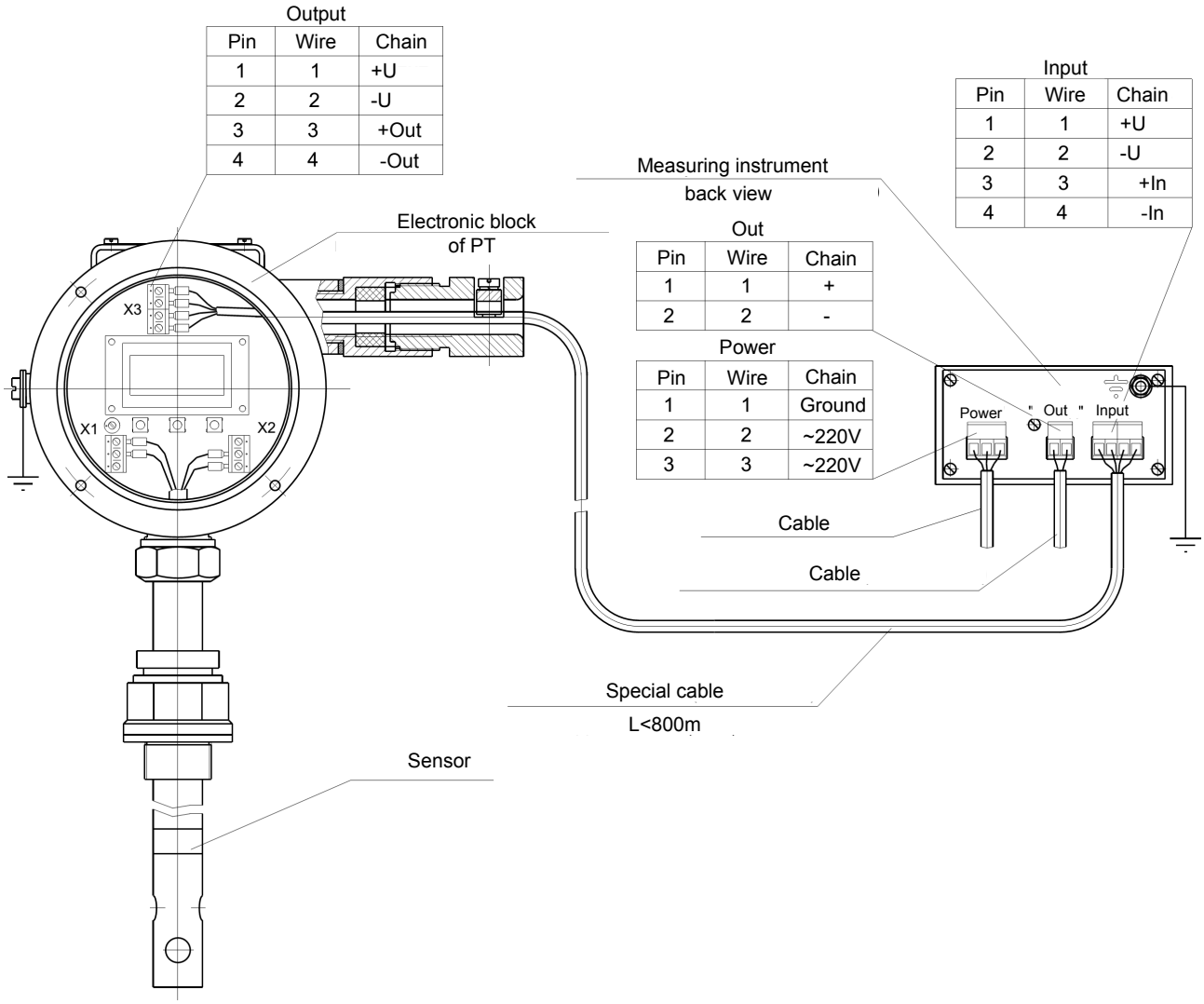


Figure 5. Cable connections of the conductometer C-3101M.1 (2; K) .NP with monoblock primary transducer (variant MI without relay)

ORDER EXAMPLE

"**C-3101M.1.NP.S.s400.C.00**" - the conductometer with raised reliability, primary transducer 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 400mm), contact sensor, without Ex.
Operating measuring range 0..200 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.

When ordering the analyzer with the separated electronic unit and the sensor of the primary converter, the length of the cable between them, must be lower than 20 m, it is additionally indicated.

When ordering, in addition to the order code, please ,write measuring range, reference temperature for termoconpensation, operating temperature of liquid, operating pressure of liquid, analog output signal parameters, the color of the MI indicator, the presence of a signaling relay.

When ordering the analyzer with index K (concentration meter), the normalized dependence of the SEC on the concentration of the solution must be discussed and coordinated between the customer and the manufacturer.

When ordering, it is recommended to specify the Figure from the catalog.