

INDUSTRIAL pH and ORP meters

pH-meters of **pH-41xx** series are designed for potentiometric analysis of liquids in a variety of industries. A special group of analyzers is designed for use in nuclear power plants (NPP) and nuclear industry facilities.

pH-meter is a measuring transducer complete with an electrode system (ES). The measuring transducer consists of a primary transducer (PT) and a measuring instrument (MI).

PT design includes a sensor (combination pH electrode, ES) and an electronic unit, where the sensor signals amplification and conversion is performed.

PT can be placed away from the MI, in which the power circuits and output signals generation diagrams are located. The distance between the PT and MI can reach several hundreds meters.

PT can operate independently, without the MI. In this case, they are called **transmitter**.

In terms of design, the pH-electrode is mounted on the work facility by means of a holder.

pH meters are provided with all the elements, required for a modern instrument - digital display, alarm system, measured data transmission to a PC.

pH-meters have a high input impedance, which allowing them to work with a wide range electrodes.

The input signals equipotential protection increases noise immunity and stability of readings.

pH-4101 is a pH-meter, transmitter, which can be used in the measuring systems upon availability of galvanically isolated inputs and 24 VDC power supply units. The transmitter provides pH measuring within the specified range and the measured values conversion in a uniform analogue signal of 4 ... 20 mA or their transmission via RS485 interface.

pH-4110 is a pH meter, consisting of a primary transducer in a separate enclosure and a measuring instrument. The pH-meter carries out a remote pH (ORP) and temperature measurement, provides data visualization, archive, interface. Calibration with buffer solutions is performed in a measuring instrument in a semi-automatic mode. This do not require to open the primary transducer electronic unit.

pH-4121 is a pH-meter consisting of a primary transducer (PT) and a measuring instrument (MI). The primary transducer can be removed from the measuring instrument to a distance of 600 m. Normally, a primary transducer is equipped with holders - a special item, designed to provide a structural mounting of electrodes on a controlled facility: pipe, tank or reservoir. A holder and a combination electrode shall be chosen by the customer. The primary transducer electronic unit is to be mounted in an enclosure, made of aluminum alloy or stainless steel.

The instrument calibration with buffer solutions is provided the primary transducer, where a combination electrode is actually located. A standard thermal resistance thermometer **Pt100**, which may be a part of the combination electrode, shall be used for thermal compensation. The pH-meter is provided with two uniform analog output signals or a RS-485 interface, as well as two discrete output signals.

pH-4122 is a two-channel pH-meter, which consists of two primary transducers in various enclosures and two-channel measuring instrument with a graphical display, archive, interface, analog and discrete output signals. Each channel calibration with buffer solutions is provided in the primary transducers.



pH-meters

pH-4131 is a single-unit pH-meter delivered complete with hydraulic panel **HP4131**. pH-meter has a user-friendly interface, easy to operate and maintain. A user-friendly menu allows to manage easily the pH-meter functions: measurement, calibration, viewing of the accumulated information archive. Availability of the RS-485 interface with a Modbus RTU communication protocol allows to use a pH-meter as a part of various Scada systems.



pH-4122.I is a two-channel pH (ORP) meter without PT, wall-mounted. In addition to measure values pH-meter is also measures the flow liquid.



pH-4121.NP is designed for use in severe environmental conditions, namely on seismic resistance, climatic conditions, radiation resistance, difficult situation for electromagnetic compatibility (EMC), panel-mounted.



pH-4122.NP is two channel device, designed for use in severe environmental conditions, namely on seismic resistance, climatic conditions, radiation resistance, difficult situation for electromagnetic compatibility (EMC), wall-mounted.

Summary table of the main technical data of pH-meters

Description	pH-4101 (Ex)	pH-4110 / ORP	pH-4121	pH-4121.NP pH-meter for nuclear power plants	pH-4122(Ex)	pH-4131 / ORP
Quantity of measuring channels	1	1	1	1	1, 2	1
Measuring ranges and errors ¹⁾	measuring range pH: (0... 14) pH, basic error: ± 0.05 pH temperature measuring range (0... 130)°C, basic error: ± 0.05 °C					
Communication line length	max. 4 m (to ES)	max. 600 m (from PT to MI)	max. 600 m (from PT to MI)	max. 800 m (from PT to MI)	max. 600 m (from PT to MI)	max. 4 m (to ES)
Output signals	0...5, 0...20, 4...20 (mA) or RS-485 Modbus RTU;	0...5, 0...20, 4...20 (mA); RS-485 Modbus RTU; 2 relays	0...5, 0...20, 4...20 (mA); 2 relays or RS-485 Modbus RTU; 2 relays	0...5, 0...20, 4...20 (mA); 2 relays (optional)	0...5, 0...20, 4...20 (mA); RS-485 Modbus RTU; 4 relays;	0...5, 0...20, 4...20 (mA); RS-485 Modbus RTU; 2 relays;
U power supply/ P consumption	=(12...36) V, 80 mA / 3VA	~(100..240) V, (50..60) Hz / 10 VA	~(100..240) V, (50..60) Hz / 7 VA	~(100..240) V, (50..60) Hz / 7 VA	~(100..240) V, (50..60) Hz / 10 VA	~(100..240) V, (50..60) Hz / 10 VA
Wall-mount enclosure MI, ABS plastic	-	170x190x95mm, IP65	-	-	170x190x95mm, IP65	170x190x95mm, IP65
Panel enclosure, MI, aluminum alloy	-	-	48x96x120	48x96x120	96x96x120, IP54 (on the front panel)	-
PT housing (see note)	D, S, I	D, S	D, S	S	S,I	-
Temperature and pressure of the environment to be analyzed	see electrodes characteristics					
Display, archive	digital, 4 digits	digital, graphics, archive	digital, 4 digits	digital, 4 digits	digital, graphics, archive	digital, graphics, archive
Features	Marking of the explosion protection for PT in the "I" enclosure: 1ExdIIBT6X	Can control the electrode cleaning system ES calibration table in the MI	ES calibration table in the MI	Resistance to climatic factors: B4; Quality class: K4; Interference resistance design group - IV according to GOST 32137	Marking of explosion protection for PT in the "I" enclosure: 1ExdIIBT6 X Can work with one or two PT Can control the electrode cleaning system ES calibration table in the PT	May be completed with a hydraulic panel HP-4131 Can control the electrode cleaning system

Notes: case "D" - aluminum alloy, IP65; case "S" - stainless steel, IP65; case "I" - aluminium alloy with indication, IP65, 1ExdIIBT6; MI – measuring instrument; PT — primary transducer; ES- electrode system.

Summary table of the main technical data of pH-meters

Description	pH-4122.I industrial two channel pH/ORP meter	pH-4122.NP pH-meter for nuclear power plants				
Quantity of measuring channels	1,2	1,2				
Measuring ranges and errors ¹⁾	measuring range pH: (0... 14) pH, basic error: ± 0.05 pH temperature measuring range (0... 130)°C, basic error: ± 0.05 °C					
Communication line length	max. 4 m (to ES)	max. 600 m (from PT to MI)				
Output signals	0...5, 0...20, 4...20 (mA); RS-485 Modbus RTU; 8 Relay (with DoM-8.2);	0...5, 0...20, 4...20 (mA); RS-485 Modbus RTU; 4 relays;				
U power/ P (demand)	~(100..240) V, (50..60) Hz / 10 VA	~(100..240) V, (50..60) Hz / 10 VA				
Hinged enclosure MI, ABS plastic	170x190x95mm, IP65	170x190x95mm, IP65				
Panel enclosure, MI, aluminum alloy	-					
PT (see note)	-	S,I				
Temperature and pressure of the environment to be analyzed	see electrodes characteristics					
Display, archive	digital, graphics, archive	digital, graphics, archive				
Features	ES calibration table in the MI	ES calibration table in the PT				

Notes: case “D” - aluminum alloy, IP65; case “S” - stainless steel, IP65; case “I” - aluminium alloy with indication, IP65, IExdIIBT6; MI – measuring instrument; PT — primary transducer; ES- electrode system.