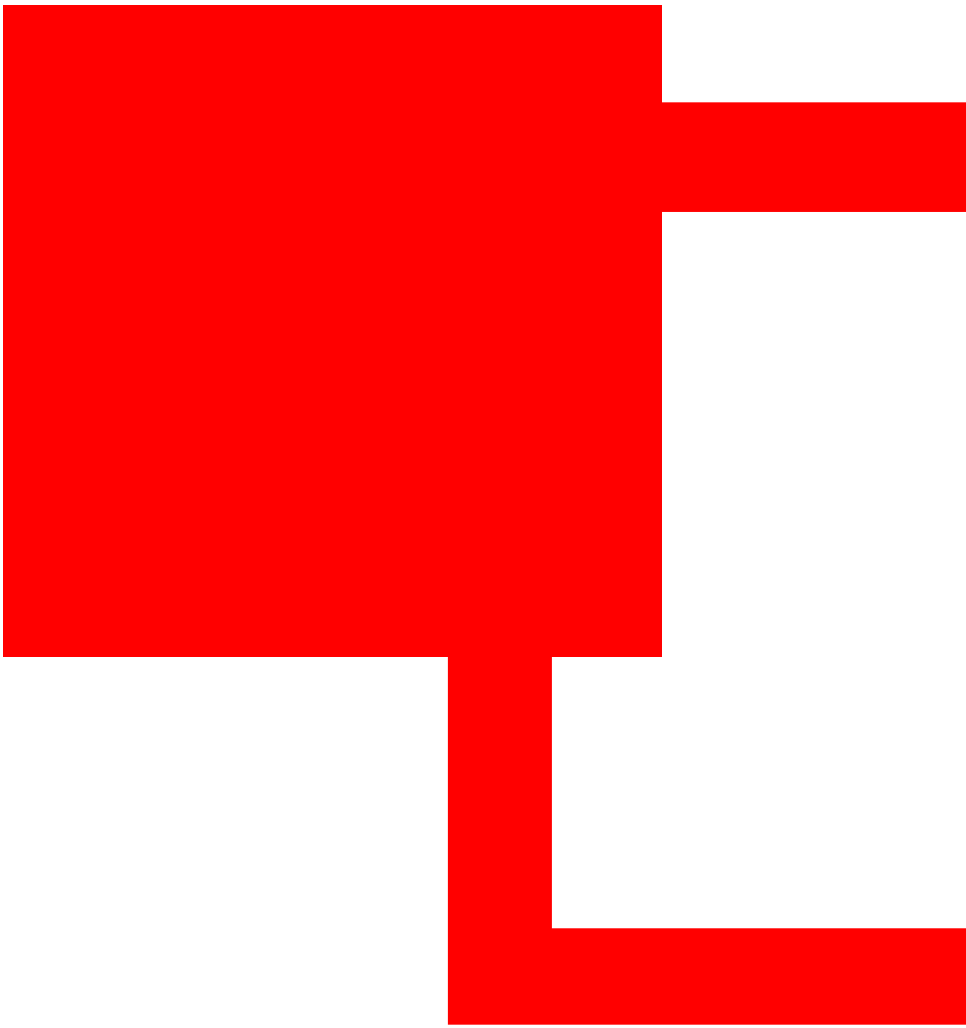
PRODUCT CATALOGUE | 2019



ANALYTICAL INSTRUMENTS

VZOR

for power engineering and ecology

The company reserves the right to make changes into the products design without their performance degradation.
All information provided in the catalogue is of advisory / introductory character.

PRODUCT OVERVIEW

VZOR LLC – is a Russian enterprise, specializing in engineering, manufacturing and supply of water environment monitoring instruments.
The company has 25-year-experience at the instrumentation market.

Up-to-date range includes portable and on-line instruments and support equipment:

- Dissolved oxygen meters
- Dissolved hydrogen meters
- Conductivity- and salinity-meters
- Conductivity- and concentration-meters
- Sodium analyzers
- Ion-exchange columns
- High purity water modules
- Sample conditioning units
- Skids for accommodation of analyzers and sample conditioning units

The area of priority is manufacturing of instrumentation and support equipment for thermal and nuclear power plants.

VZOR LLC offers its customers comprehensive service:

Design and research

Packaged supply of instruments, accessory equipment, hardware and software systems

Automatic control systems arrangement

Mounting, supervising installation, commissioning and start-up, service support

Organization of chemical-engineering monitoring

oxygen meters

MARK ® 302 M

MARK ® 303 M

MARK ® 3010

MARK ® 2010

MARK ® 409 T

MARK ® 409 A

portable dissolved oxygen meter MARK® 302 M

Dissolved oxygen concentration (DOC) and aqueous solutions temperature measuring. BOD evaluation. Laboratory and field applications.

| NEW Sensor |

Convenience and accuracy of measurement |
Automatic temperature and barometric pressure compensation.
Automatic calibration against atmospheric oxygen.

Three measurement modes |
DOC, ppm
DOC, saturation %.
Temperature, °C.

Easy calibration against air |

Maintenance minimum |
Membrane replacement max. once per year. Sensor storage in the air.

Long-term sensor |
Lifetime of the senor is min. 10 years.

High-contrast LCD |

Low power consumption |
Up to 600 hours of uninterrupted operation, powered by set of AA batteries.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
DOC, ppm	0–20	0,001	±(0,05 + 4%*A)
DOC, saturation %	0–200	0,1	±(0,6 + 4%*A)
Temperature, °C	0–50	0,1	±0,3
			A – measured value

	Converting unit	Sensor
Dimensions, mm	85*155*35	⌀ 16*142 ⌀ 10*110 [1]
Weight, g	300	50
		[1] immersible section for BOD vial

Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	0–50
Water flow rate across the sensor membrane, cm/sec, min	5
Pressure, MPa, max	0,3

ORDERING DATA

basic kit

Converting unit

DO sensor with 1,5 m cable

Electrolyte

A kit of chemical agents for preparation of null-solution

DO sensor spare parts kit

2 batteries, type AA

Operation manual

optionally

Cable up to 20 m

Power supply unit

Rechargeable batteries, type AA

portable dissolved oxygen meter MARK® 303 M

Dissolved oxygen concentration (DOC) and aqueous solutions temperature measuring.
BOD evaluation. Laboratory and field applications.

| NEW Sensor |

Convenience and accuracy of measurement |
Automatic temperature and barometric pressure compensation.
Automatic calibration against atmospheric oxygen.

IP65 | Dust and moisture protected.

Scratchpad | Up to 500 records.

USB port and related software | Creation and management of data archive at PC.

Backlit graphical LCD | Convenient indication format, handling ease.

Easy calibration against air |

Maintenance minimum | Membrane replacement max. once per year. Sensor storage in the air.

Long-term sensor | Lifetime of the senor is min. 10 years.

Low power consumption | Up to 600 hours of uninterrupted operation, powered by set of AA batteries.

Designed for field measurements | DOC monitoring at the depth of up to 20 m.

Self-check | Additional assurance of the instrument precised operation.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
DOC, ppm	0–20	0,0001	±(0,05 + 4%*A)
DOC, saturation %	0–200	0,01	±(0,6 + 4%*A)
Temperature, °C	0–50	0,1	±0,3
			A – measured value

	Converting unit	Sensor
Dimensions, mm	65*130*28	⌀ 16*142 ⌀ 10*110 [1]
Weight, g	120	50
		[1] immersible section for BOD vial
Port	USB	
Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)	

environment requirements

Temperature, °C	0–50
Water flow rate across the sensor membrane, cm/sec, min	5
Pressure, MPa, max	0,3

ORDERING DATA

basic kit

Converting unit

DO sensor with 5 m cable

Electrolyte

A kit of chemical agents for preparation of null-solution

DO sensor spare parts kit

2 batteries, type AA

PC communication cable

Operation manual

optionally

Cable up to 20 m

Power supply unit

Rechargeable batteries, type AA

portable dissolved oxygen meter MARK® 3010

Dissolved oxygen concentration and temperature of aqueous mediums, including deairated ones measurement.

Chemistry monitoring at power engineering facilites.

Convenience and accuracy of measurement |
Measurement accuracy ±(0,001+1% of measured value), ppm.
Ability to work at small flow rates (min. 20 ml/min).
Air calibration max. once a month.
Routine maintenance once per year.
General unit for direct attachment to the process.

NEW high-stable sensor |
High reaction speed.
Sealed ultra strong water-repellent membrane.
Increased mechanical resistance of the construction.

High-contrast OLED indicator |

Durable aluminum case IP65 |
Dust and moisture protected.

Built-in durable battery $LiFePO_4$ |
Min. 1000 cycles of charge / discharge.

Carrying strap |

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
DOC, ppm	0–10	0,0001	±(0,001 + 1%*A)
Temperature, °C	0–70	0,1	±0,3
			A – measured value

	Converting unit	Sensor with a flow-through chamber
Dimensions, mm	120*85*80	⌀ 60*121
Weight, g	500	350

environment requirements

Temperature, °C	0–70
Water flow rate, dm^3/min, min	0,02–1,5

ORDERING DATA

basic kit

Converting unit

DO sensor with 1,5 m cable

Flow-through chamber

DO sensor spare parts kit

Electrolyte

A kit of chemical agents for null-solution preparation

Power supply unit with a charger

Operation manual

portable gas analyzer MARK® 2010

Occasional monitoring of oxygen share by volume in different gases (hydrogen, natural gas, boiler exhaust gases, nitrogen, argon, helium and others).

Control of hydrogen purity in a generator stator coolant circuit; oxygen monitoring in boiler gas lines during steam raising, at electrolysis units, at working areas etc.

| NEW PRODUCT |

Stable operation of the oxygen sensor in hydrogen ambient |
Ability to work at small gas flow rates (20 ml/min)
Measuring in dry and wet media
Automatic temperature and barometric pressure compensation.

Unique patented sensor design |
High reaction rate.
Increased mechanical resistance of the construction.
Sealed ultra-strong water-repellent membrane.

Routine maintenance once per year |
Calibration against atmospheric oxygen max. once per month.
Easy and quick membrane replacement.

High-contrast LED indicator |

Durable aluminium case IP65 |
Dust and moisture protected.

Built-in durable LiFePO4 accumulator |
At least 1000 cycles of charge / discharge.

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
Oxygen share by volume, %	0–3 3–25	0,001 0,01	±(0,01 + 4%*A)
Temperature, °C	0–70	0,1	±0,3
			A – measured value
	Converting unit		
Dimensions, mm	120*85*80		
Weight, g	500		

environment requirements

Temperature, °C	0–70
Sample flow rate, dm^3/min, min	0,02
Pressure, MPa, max	0,2

ORDERING DATA

basic kit

Converting unit

Oxygen sensor

Spare parts kit for the sensor

Power supply unit with a charger

Operation manual

dual-channel on-line dissolved oxygen meter MARK® 409 T

Measuring of dissolved oxygen concentration and temperature of aqueous mediums, including deairated ones.

Continuous monitoring of chemical water treatment at thermal power and nuclear power industry objects.

Convenience and accuracy of measurement |
Measurement accuracy ±(0,001+3,5% of measured value), ppm.
Ability to work at small flow rates (min. 25 ml/min). Routine maintenance once per year.

High-stable sensor | High reaction speed.
Sealed ultra strong water-repellent membrane membrane.
The increased mechanical resistance of the construction.

2 channels | Programmable measuring ranges for each channel.
Independent measurements in two points.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 100 m.

Communication with external devices | Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. Communication protocol MODBUS RTU.

Hydraulic panel HP 409 T |
Possibility of placement the measurement system at the sole panel. Stainles conductive lines.
Regular maintenance and sensor calibration – without flow interruption.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy	
DOC, ppm	0–10	0,0001	±(0,001 + 3,5%*A)	
Temperature, °C	0–70	0,1	±0,3	
			A – measured value	
	Converting unit		Hydraulic panel	
Mounting	Wall	Panel	HP 409 T/1	HP 409 T/2
Dimensions, mm	266*170*95	252*146*115	280*410*110	280*730*110
Weight, kg	2,60	2,60	3,30	4,40
Power supply	220 V or 36 V, 50 Hz/10 V · A			

environment requirements

Temperature, °C	0–70
Water flow rate, dm^3/min, min	0,1–1,5
Pressure, MPa, max	0,1

ORDERING DATA

basic kit

Converting unit
DO sensor
Hydraulic panel
DO sensor spare parts kit
Electrolyte
Operation manual

optionally

DO sensor for the second channel
Hydraulic panel for the second channel
Extension cable up to 99 m
A kit of chemical agents for null-solution preparation

www.vzornn.com

dual-channel on-line dissolved oxygen meter MARK® 409 A

Continuous measurement of dissolved oxygen concentration (DOC) and temperature of aqueous solutions with excessive hydrostatic pressure up to 20 MPa.

| NEW PRODUCT |

Patented unique sensor design |

Stable operation at hydrostatic pressure changes |

Permissible short-term (up to 5 min) pressure overload – (hydraulic shock) – up to 40 MPa |

Easy and quick membrane replacement |

Dry state storage is acceptable |

Calibration interval – 1 month |

Communication with external devices | Galvanic isolated current outputs 0–5/4–20/0–20 mA. RS 485 port. Communication protocol MODBUS RTU.

Programmable setpoints with dry contacts outlet |

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
DOC, ppm	0–10 [1]	0,001	±(0,001+3%*A)
Temperature, °C	0–70	0,1	±0,3
	[1] programmable		A – measured value
	Converting unit		Sensor
Mounting	Wall	Panel	
Dimensions, mm	252*146*115	266*170*95	⌀ 110*192
Weight, kg	2,60	2,60	1,0
Power supply	220 V or 36 V, 50 Hz /10 V · A		

environment requirements

Temperature, °C	15–50
Analyzed water flow rate through the chamber, dm^3/min	0,1–0,5
Pressure, MPa, max	20

ORDERING DATA

basic kit

Converting unit
Oxygen sensor
Calibration device
DO sensor spare parts kit
Electrolyte
Operation manual

optionally

Oxygen sensor for the second channel
Hydraulic panel
Flow-through chamber
Extension cable up to 95 m

hydrogen meters

MARK ® 501

MARK ® 509

MARK ® 509 A

portable dissolved hydrogen meter MARK® 501

Dissolved hydrogen concentration (including low-level) and temperature of water and aqueous solutions measurement.

Automatic temperature and barometric pressure compensation |

3 measuring modes |
DH concentration, ppb. Volume concentration, %. Temperature, °C.

Long-lived sensor |
Lifetime of the hydrogen sensor is min. 10 years.

High-contrast LCD |

Low power consumption |
Battery lifespan up to 2000 hours of uninterrupted operation.

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
DH concentration, ppb	0–2000	0,1	±(1,0 + 3,5%*A)
Volume concentration, %	0–100	0,1	±(0,06 + 3,5%*A)
Temperature, °C	0–50	0,1	±0,3
			A – measured value

	Converting unit	Sensor
Dimensions, mm	84*160*38	⌀ 30*135
Weight, g	300	100

Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	5–50
Water flow rate through the chamber, dm^3/min	0,07–0,6

ORDERING DATA

basic kit

Converting unit

DH sensor

Flow-through chamber

Electrolyte

DH sensor spare parts kit

Calibrator

2 batteries, type AA

Operation manual

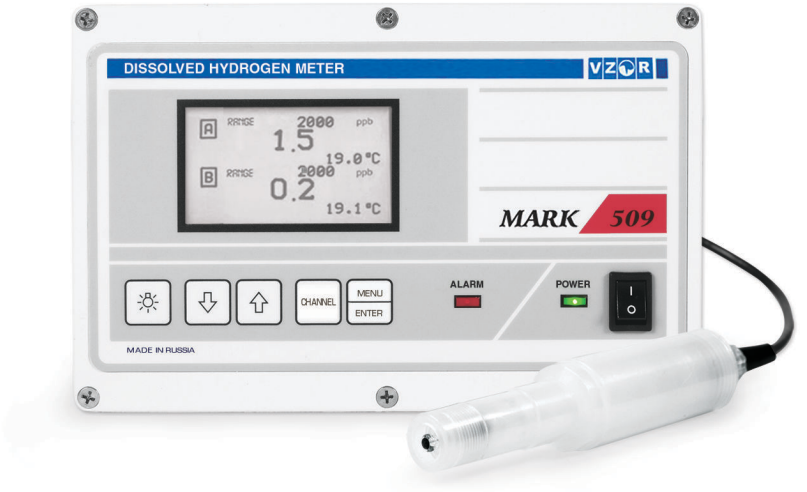
optionally

Power supply unit

Rechargeable batteries, type AA

dual-channel on-line dissolved hydrogen meter MARK® 509

Continuous measurements of dissolved hydrogen concentration (including low-level concentrations) and temperature of water and aqueous solutions.



2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Dual automatic temperature and barometric pressure compensation.

Long-lived sensor |
Lifetime of the hydrogen sensor is min. 10 years.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. Programmable setpoints for each channel.

Durable aluminum case IP65 |
Dust and moisture protected.

Backlit graphical LCD |
Easy input of all parameters by keypad.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
DH concentration, ppb	0–2000 [1]	0,001	±(3 + 4%*A)
Temperature, °C	0–70	0,1	±0,3
	[1] programmable		A – measured value
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	
Weight, kg	2,60	2,60	
Power supply	220 V or 36 V, 50 Hz /10 V · A		

environment requirements

Temperature, °C	0–70
Analyzed water flow rate through the flow-stabilizing module, dm^3/min	0,07–5
Analyzed water flow rate at the hydraulic panel input, dm^3/min	0,08–5

Hydraulic panel provides stabilization, filtration, indication of the sample flow and temperature protection
Hydraulic panel HP 409 is recommended for use with a large number of impurities, primarily of iron oxides

ORDERING DATA

basic kit

Converting unit
DH sensor with 5 m cable
DH sensor spare parts kit
Calibrator
Electrolyte
Hydraulic panel or flow-stabilizing module
Operation manual

optionally

DH sensor for the second channel
Hydraulic panel or flow-stabilizing module for the second channel
Extension cable up to 95 m

dual-channel on-line dissolved hydrogen meter MARK® 509 A

Continuous measurement of dissolved hydrogen concentration (DHC) and temperature of aqueous solutions with excessive hydrostatic pressure up to 20 MPa.

Patented unique sensor design |

Stable operation at hydrostatic pressure changes |

Permissible short-term (up to 5 min) pressure overload – (hydraulic shock) – up to 40 MPa |

Easy and quick membrane replacement |

Dry state storage is acceptable |

Calibration interval – 6 months |

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. Communication protocol MODBUS RTU.

Programmable setpoints with dry contacts outlet |

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
DH concentration, ppb	0–20000 [1]	0,1	±(10+3%*C)
Temperature, °C	0–70	0,1	±0,3
	[1] programmable		C – measured value
	Converting unit		Sensor
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	⌀ 110*192
Weight, kg	2,60	2,60	1,0
Power supply	220 V or 36 V, 50 Hz /10 V · A		

environment requirements

Temperature, °C	15–50
Analyzed water flow rate through the chamber, dm^3/min	0,1–0,5
Pressure, MPa, max	20

ORDERING DATA

basic kit

Converting unit
DH sensor
Calibration device
DH sensor spare parts kit
Electrolyte

optionally

Hydrogen sensor for the second channel
Hydraulic panel
Flow-through chamber
Extension cable up to 95 m

conductivity meters

MARK ® 603/1

MARK ® 603

MARK ® 602

MARK ® 602 LD

MARK ® 602 T

MARK ® 1102

portable conductivity meter MARK® 603/1

Conductivity (absolute and adjusted to 25 °C), salinity and temperature of water and aqueous solutions measurement.

Scratchpad |
Up to 500 records.

Stainless steel dip sensor requires no calibration |
Sensor design ensures cell constant stability.

Backlit graphical LCD |
Easy input of all parameters by keypad.

IP65 |
Dust and moisture protected.

Low power consumption |
Battery lifespan up to 600 hours of uninterrupted operation.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
Conductivity, µS/cm	0–20000	0,001	±(0,05 + 2,5%*æ)
Salinity, mg/L	0–10000	0,001	±(0,06 + 3%*C)
Temperature, °C	0–75	0,1	±0,3
			æ, C – measured values

	Converting unit	Sensor
Dimensions, mm	65*130*28	⌀ 15*130
Weight, g	120	80

Port	USB
Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	0–75

ORDERING DATA

basic kit

Converting unit
Sensor with 1 m cable
2 batteries, type AA
Operation manual

optionally

Power supply unit
Rechargeable batteries, type AA
PC communication cable
Adjustment cables

portable conductivity meter MARK® 603

Conductivity (absolute and adjusted to 25 °C), salinity and temperature of water, including low-level conductivity in ultrapure water measurement.

Dual automatic temperature compensation for high purity water, selectable linear coefficient of temperature compensation |

Stainless steel flow-dip sensor requires no calibration |

Scratchpad | Up to 500 records.

Self-check |

Ion-exchange column with a switch of sample current |

USB port and related software | The ability to create and manage archive data on a PC.

Backlit graphical LCD | Easy input of all parameters by keypad.

IP65 | Dust and moisture protected.

Low power consumption | Battery lifespan up to 600 hours of uninterrupted operation.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
Conductivity, µS/cm	0–2000 [1] 0–20000 [2]	0,001	±(0,003 + 1,5%*æ) ±(0,05 + 1,5%*æ)
Salinity, mg/L	0–1000 [1] 0–10000 [2]	0,001	±(0,004 + 2%C) ±(0,06 + 2%C)
Temperature, °C	0–75	0,1	±0,3
	[1] with sensor CS 015, [2] with sensor CS 15		æ, C – measured values

	Converting unit	Sensor CS 015	Sensor CS 15
Dimensions, mm	65*130*28	⌀ 15*130	⌀ 15*160
Weight, g	120	80	110

Port	USB
Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	0–75
Water flow rate through the chamber, dm^3/min	0,1–1

ORDERING DATA

basic kit

Converting unit
Sensor CS 015 or CS 15
Flow-through chamber
2 batteries, type AA
PC communication cable
Operation manual

optionally

Sensor CS 015 or CS 15 with flow-through chamber
Ion-exchange column IEC 603
Bearing panel
Power supply unit
Rechargeable batteries, type AA

dual-channel on-line conductivity meter MARK® 602

Continuous measurement of conductivity (absolute and adjusted to 25 °C) and salinity of water and aqueous solutions, including deionized and high purity water environmets.

2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Dual automatic temperature compensation.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. Programmable setpoints for each channel.

Durable aluminum case IP65 |
Dust and moisture protected.

Backlit graphical LCD |
Easy input of all parameters by keypad.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
Conductivity, µS/cm	0–2000 [1] 0–20000 [2]	0,0001	±(0,004 + 2%*æ) ±(0,03 + 2%*æ)
Salinity, mg/L	0–1000 [1] 0–10000 [2]	0,0001	±(0,003 + 2,5%*C) ±(0,03 + 2,5%*C)
	[1] with sensor CS 025 C, [2] with sensor CS 2 C		æ, C – measured values

	Converting unit		Sensor
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	115*108*30
Weight, kg	2,60	2,60	0,30

Power supply	220 V or 36 V, 50 Hz /10 V · A

environment requirements

Temperature, °C	5–50
Sample flow rate, dm^3/min	0,05–0,5 (without hydraulic panel) 0,05–5 (with hydraulic panel)
Pressure, MPa, max	0,1

Absence of agents forming nonconductive films and residues on metal surfaces

ORDERING DATA

basic kit

Converting unit

Conductivity sensor CS 025 C or CS 2 C with 5 m cable

Operation manual

optionally

Conductivity sensor CS 025 C or CS 2 C for the second channel

Connecting cable up to 100 m

Hydraulic panel

dual-channel on-line conductivity meter MARK® 602 LD

Continuous measurement of conductivity (absolute and adjusted to 25 °C) and salinity of water and aqueous solutions, including deionized and high purity water.

2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Dual automatic temperature compensation, selectable linear coefficient of compensation.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. Programmable setpoints for each channel.

Durable aluminum case IP65 |
Dust and moisture protected.

Backlit graphical LCD |
Easy input of all parameters by keypad.

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
Conductivity, µS/cm	0–200 [1]	0,0001	±(0,001 + 2%*æ)
Salinity, mg/L	0–100 [1]	0,0001	±(0,001 + 2,5%*C)
	[1] programmable		æ, C – measured values
	Converting unit		Sensor
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	⌀ 41*135
Weight, kg	2,60	2,60	1,0
Power supply	220 V or 36 V, 50 Hz /10 V · A		

environment requirements

Temperature, °C	5–50
The medium rate perpendicular to the sensor axis, cm/sec, min	5
Pressure, MPa, max	1,0

Absence of agents forming nonconductive films and residues on metal surfaces

ORDERING DATA

basic kit

Converting unit

Conductivity sensor with 5 m cable

Operation manual

optionally

Conductivity sensor for the second channel

Connecting cable up to 100 m

Hydraulic panel

Flow-through chamber

Kit for in-line mounting

dual-channel on-line conductivity meter MARK® 602 T

Continuous measurement of conductivity (absolute and adjusted to 20 °C and 25 °C), salinity, specific electrical resistance (adjusted to 20 °C and 25 °C) and temperature of water and aqueous solutions, including deionized and high purity water.

2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Temperature up to 130 °C, pressure up to 1,6 MPa.
Dual automatic temperature compensation, within 0–100 °C.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 1000 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol. 3 «dry» contact relays in each channel.

Durable aluminum case IP65 | Dust and moisture protected.

Backlit graphical LCD | Easy input of all parameters by keypad.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy	
Conductivity, μS/cm	0–2000 [1] 0–20000 [2]	0,0001	±(0,001 + 2%*æ) ±(0,03 + 2%*æ)	
Salinity, mg/L	0–1000 [1] 0–10000 [2]	0,0001	±(0,001 + 2,5%*C) ±(0,03 + 2,5%*C)	
Specific electrical resistance, κOhm*cm	0,5–100000 [1] 0,05–1000 [2]	0,001	±(0,005+2%*R) ±(0,0005+2%*R)	
Temperature, °C	0–130	0,1	±0,3	
	[1] with sensor CS 003 T, [2] with sensor CS 3 T		æ, C, R – measured values	
	Converting unit		Sensor	
Mounting	Wall	Panel	CS 003 T	CS 3 T
Dimensions, mm	266*170*95	252*146*115	⌀ 41*130	⌀ 41*183
Weight, kg	2,60	2,60	0,70	1,0
Power supply	220 V or 36 V, 50 Hz /14 V · A			

environment requirements

Temperature, °C	0–100
The medium rate perpendicular to the sensor axis, cm/sec, min	5
Pressure, MPa, max	1,6

Absence of agents forming nonconductive films and residues on metal surfaces

ORDERING DATA

basic kit

Converting unit

Sensor unit comprised of:
– amplifier unit
– conductivity sensor CS 003 T
or CS 3 T with 5 m cable

Operation manual

optionally

Sensor unit for the second channel

Flow sensor

Extention cable up to 1000 m

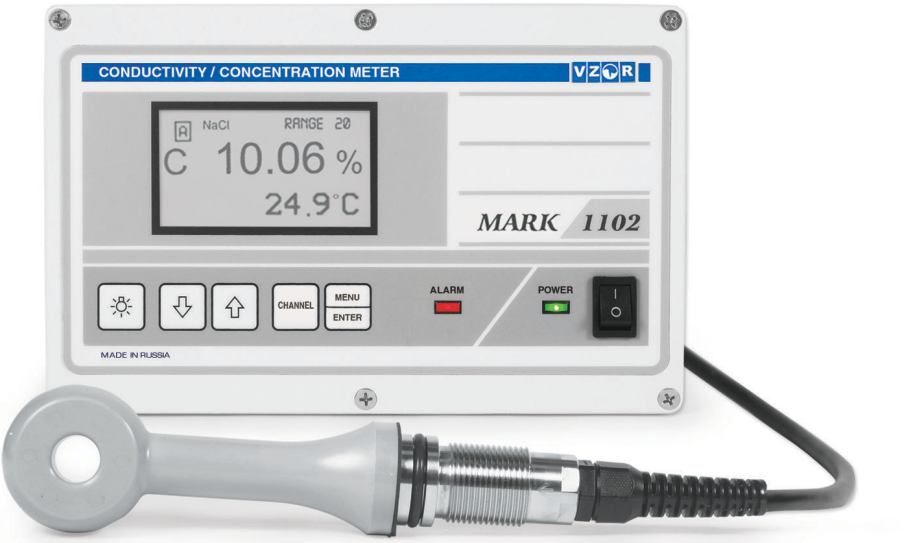
Flow-through chamber

In-line mounting kit

Mounting panel

dual-channel on-line conductivity | concentration meter MARK® 1102

Continuous measurements of conductivity (absolute and adjusted to 25 °C), temperature and concentration of aqueous solutions (NaCl, NaOH, HNO_3, H_2SO_4, HCl).



Contactless inductive sensor resistant to aggressive environments |

2 channels |
Programmable ranges of measurements for each channel.
Independent measurements in two points.

Possibility of placing the converting unit on the remote distance from the sampling point |
Up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol. Programmable setpoints for each channel.

Durable aluminum case IP65 |
Dust and moisture protected.

Backlit graphical LCD |
Easy input of all parameters by keypad.

Various types of installation (dip, flow, in-line) |

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
Conductivity, mS/cm	0–1000	0,1	±(1 + 4%*æ)
Concentration, %			
NaCl, HNO_3, H_2SO_4	0–15	0,01	±(0,03 + 4%*C)
NaOH, HCl	0–10		
Temperature, °C	0–70	0,1	±0,5
			æ, C – measured values
	Converting unit		Sensor
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	250*47*36
Weight, kg	2,60	2,60	0,50
Power supply	220 or 36 V, 50 Hz /10 V · A		

environment requirements

Temperature, °C	0–70
Pressure, MPa, max	0,8

ORDERING DATA

basic kit

Converting unit

Sensor unit with 5 m cable

Operation manual

optionally

Sensor unit for the second channel

Connecting cable up to 100 m

Dip mounting kit

Flow mounting kit

In-line mounting kit

pH-meters

MARK ® 901

MARK ® 903

MARK ® 904

MARK ® 902

MARK ® 902 LD

MARK ® 9010

portable pH meter MARK® 901

pH, mV and temperature of water and aqueous solutions measurement.

Convenience and accuracy of measurement |
Automatic temperature compensation.
Two-buffers calibration, buffer auto recognition.

3 measuring modes |
pH. mV. Temperature, °C.

Wide choice of pH electrodes types |

High-contrast LCD |

Protective case for electrodes for safe measuring, storage and transportation |

Low power consumption |
Battery lifespan up to 2000 hours of uninterrupted operation.

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
pH	0–15 [1]	0,01	±0,02 [1]
mV	-1000/+1000 [1]	1	±2 [1]
Temperature, °C	0–100 [1]	0,1	±0,3
	[1] for converting unit		

	Converting unit
Dimensions, mm	85*170*35
Weight, g	300
Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	according to applied pH-electrodes type

ORDERING DATA

basic kit

Converting unit with a temperature sensor

Combined electrode or separate electrodes

2 batteries, type AA

Operation manual

optionally

Protective case

pH electrodes at customer's option

Power supply unit

Rechargeable batteries, type AA

portable pH meter MARK® 903

pH, mV and temperature of water and aqueous solutions measurement.

IP65 |
Dust and moisture protected.

Convenience and accuracy of measurement |
Automatic temperature compensation.
Two-buffers calibration, buffer auto recognition.

Self-check |

Scratchpad |
Up to 500 records.

USB port and related software |
The ability to create and manage archive data on PC.

Backlit graphical LCD |
Easy input of all parameters by keypad.

Protective case for electrodes for safe measuring, store and transportation |

Low power consumption |
Battery lifespan up to 600 hours of uninterrupted operation.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
pH	0–15 [1]	0,001	±0,02 [1]
mV	-1000/+1000 [1]	0,1	±0,5 [1]
Temperature, °C	0–100 [1]	0,1	±0,3
	[1] for converting unit		

	Converting unit
Dimensions, mm	65*140*28
Weight, g	120

Port	USB
Power supply	2 batteries, type AA 2 rechargeable batteries, type AA 220 V mains supply (via the power supply unit)

environment requirements

Temperature, °C	according to applied pH-electrodes type

ORDERING DATA

basic kit

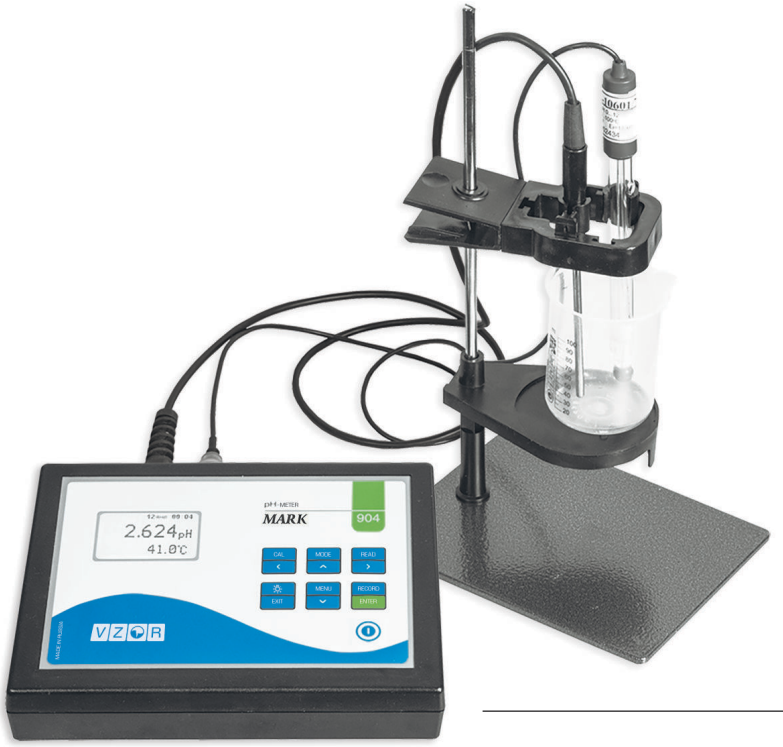
Converting unit with a temperature sensor
Combined electrode
2 batteries, type AA
PC communication cable
Operation manual

optionally

Protective case
pH electrodes at customer's option
Power supply unit
Rechargeable batteries, type AA

benchtop pH-meter MARK® 904

Laboratory monitoring of aqueous media hydrogen ion activity (pH, pH_{25}), mV and temperature.



Convenience and accuracy of measurement |
Automatic temperature compensation.
Two-buffers calibration, buffer auto recognition.

Self-check |

Non-volatile scratchpad |
Up to 500 records.

USB port and related software |
Creation and management of data archive at PC.

Backlit graphical LCD |
Convenient indication format, handling ease.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
pH	0–15 [1]	0,001	±0,02 [1]
mV	-1000/+1000	0,1	±1
Temperature, °C	0–70	0,1	±0,3
	[1] for the converting unit		

	Converting unit
Dimensions, mm	220*200*60
Weight, kg	0,50

Port	USB
Power supply	2 rechargeable batteries, type AA mains supply (via the power supply unit)

ORDERING DATA

basic kit

Converting unit with a temperature sensor and USB cable

Combined glass electrode or separate electrodes

Power supply unit

optionally

Electrode holder

pH electrodes at customer's option

dual-channel on-line pH meter MARK® 902

Continuous measurements of pH (absolute and adjusted to 25 °C), mV and temperature of water and aqueous solutions at power engineering facilities.

2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Automatic thermal compensation.
Two-buffers calibration, buffer auto recognition.

General line-dip «active» sensor unit |
Digital communication channel of the sensor with the converting unit – up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol.
Programmable setpoints for each channel.

Durable aluminum case IP65 |
Dust and moisture protected.

Backlit graphical LCD |
Easy input of all parameters by keypad.

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
pH	0–15 [1]	0,001	±0,02 [1]
mV	-1000/+1000 [1]	1	±2 [1]
Temperature, °C	0–50 [1]	0,1	±0,3
	[1] for converting unit		
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	
Weight, kg	2,60	2,60	
Power supply	220 V or 36 V, 50 Hz/10 V · A		

environment requirements

Water and water solutions free of fluoric-hydrogen acid or its salts and agents forming sediments or films on the electrode surface		
Temperature, °C	according to applied electrodes type	
Water flow rate through hydraulic panel, dm^3/min		0,1–2

ORDERING DATA

basic kit

Converting unit

Sensor unit comprised of:
– amplifier unit
– temperature sensor
– electrodes

5 m cable

Hydraulic panel

Operation manual

optionally

Sensor unit for the second channel

Hydraulic panel for the second channel

Connecting cable up to 100 m

pH electrodes at customer's option

dual-channel on-line pH meter MARK® 902 LD

Continuous in-line measurements of pH and temperature of water and aqueous solutions.

2 channels |
Programmable ranges of measurements for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Two-buffers calibration, buffer auto recognition.

General line-dip «active» sensor unit |
Digital communication channel of the sensor with the converting unit – up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol.
Programmable setpoints for each channel.

Durable aluminum case IP65 | Dust and moisture protected.

Backlit graphical LCD | Easy input of all parameters by keypad.

WARRANTY

12

months

specification

	Measuring range	Resolution	Accuracy
pH	0–15 [1]	0,01	±0,02 [1]
Temperature, °C	0–100 [1]	0,1	±0,3
	[1] for converting unit		
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	
Weight, kg	2,60	2,60	
Power supply	220 V or 36 V, 50 Hz/10 V · A		

environment requirements

Water and water solutions free from fluoric-hydrogen acid or its salts and agents forming sediments or films on the electrode surface	
Temperature, °C	5–50
Pressure, MPa, max	according to applied electrodes type

ORDERING DATA

basic kit

Converting unit

Sensor unit comprised of:
– amplifier unit
– temperature sensor
– electrode

5 m cable

Operation manual

Optionally

Sensor unit for the second channel

Connecting cable up to 100 m

In-line mounting kit

pH electrodes at customer's option

on-line pH meter MARK® 9010

Measuring of hydrogen ions activity (pH, pH_{25}) of high purity water (including water with adjusted conductivity 0,055 μS/cm) and alkaline water, containing ammonia and amines.
Chemical water treatment monitoring at power industry objects.

New patented way of measuring, which does not require calibration.
Absence of elements degrading in «high purity» water.

Intelligent algorithms of data operation.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol.
Programmable «dry» contacts relays (6 pcs).

Durable aluminium case IP65 |
Dust and moisture protected.
The sole protecting case, uniting the secondary converter and hydraulic part.

Graphical touch screen 5.7'', 65535 colours, 640*480 pixels screen resolution |

WARRANTY
12
months

specification

	Measuring range	Resolution	Accuracy
pH	5,6–7,00 7–7,30 7,30–10	0,001	±0,05 ±0,15 ±0,05
Conductivity, µS/cm	0–30	0,0001	±(0,003 + 2%*æ)
Temperature, °C	0–50	0,1	±0,3
			æ – measured value

	Measuring module
Dimensions, mm	295*880*140
Weight, kg	10
Power supply	220 V, 50 Hz/10 V· A

environment requirements

Conductivity, µS/cm, max	1,0 [1] 30,0 [2]
Temperature, °C	5–50
Sample flow rate, dm^3/min	0,2–0,5

[1] for high-purity water, [2] for alkaline water containing ammonia and amines

ORDERING DATA

basic kit

Measuring module
Power supply unit
Kit of chemical agents
Spare parts kit
Operation manual

sodium analyzers

MARK ® 1002

dual-channel on-line sodium analyzer MARK® 1002

Continuous measurement of sodium concentration as C_{Na} (or pNa) and temperature for high purity water environments.

2 channels |
Programmable measuring ranges for each channel.
Independent measurements in two points.

Convenience and accuracy of measurement, minimum maintenance |
Measuring range from 0,01 C_{Na}. Measurement accuracy 5%.
Long inter-calibration period (up to 6 months). Dual automatic temperature compensation.
Automatic batching device of the alkalizing reagent. Absence of KCl flask.

1 solution calibration | If necessary, 3-point-calibration is possible.

«Active» sensor unit | Sensor cable length up to 100 m.

Communication with external devices |
Galvanic isolated current outputs 0–5/4–20/0–20 mA.
RS 485 port. MODBUS RTU protocol. Programmable setpoints for each channel.

WARRANTY
12
months

specification

		Measuring range	Resolution	Accuracy
C_{Na}, ppb	MARK 1002	0,7–1000 1000–3000 [1]	0,1	±(0,15 + 5%*C_{Na}) ±0,3*C_{Na}
	MARK 1002 T	0,01–1000	0,01	±(0,03 + 5%*C_{Na})
pNa	MARK 1002	4,36–7,52 4,06–7,52 [1]	0,01	
	MARK 1002 T	4,66–9,36	0,01	
Temperature, °C		0–50	0,1	±0,3

[1] only for MARK® 1002 P

	Converting unit		Hydraulic panel
Mounting	Wall	Panel	
Dimensions, mm	266*170*95	252*146*115	300*650*200
Weight, kg	2,60	2,60	5,0
Power supply	220 V or 36 V, 50 Hz /10 V · A		24 V

environment requirements

Conductivity, µS/cm, max	C_{Na} < 1000 ppb C_{Na} 1000–3000 ppb	5,5 16,5
Temperature, °C	10–50	
Sample flow rate, dm^3/min	0,05–3	
Temperature of ambient air, °C	5–50	

ORDERING DATA

basic kit

Converting unit

Hydraulic panel HP 1002 or HP 1002 T with power supply unit

5 m cable

Operation manual

optionally

Hydraulic panel and power supply unit for the second channel

Connecting cable up to 100 m

Sample collecting kit

support equipment

MARK ® 01 MK

HTU 290 / HTU 145

HP 409 / HP 409 T

HP 602

HP 902

HP 1002

MARK ® 3101

IEC D / d / L

sample conditioning unit MARK® 01 MK

Cooling, restriction, filtration and regulation of the sample flow rate.
Temperature, pressure and sample flow rate indication.
Cooling water temperature, pressure and flow rate indication (optionally).
Sample conditioning for water chemistry monitoring instruments at power engineering facilities.

Continuous monitoring of the sample parameters and data transfer via digital and current outputs.

Sample stable pressure maintaining.

Alarm sound and automatic shut off the sample in case of the regime violation.

Temperature and pressure setpoints for the sample automatic shut-off.

Blowdown valve of the control line.

Compact stainless steel panel 350*944 mm.

One-way service.

Easy-clean dismountable heat-transfer unit.

WARRANTY
12
months

specification

Sample parameters	Version MARK 01 MK/					
	7/40	7/250	7/560	32/40	32/250	32/560
Sample temperature at the sample conditioning unit input, max, °C	40	250	560	40	250	560
Sample temperature at the additional heat-transfer unit output, max, °C	–	–	250	–	–	250
Sample pressure at the sample conditioning unit input, max, MPa (kg/cm^2)	7			32		
Sample pressure at the sample conditioning unit output, max, MPa	0,3					
Sample temperature at the sample conditioning unit output, max, °C	50					
Sample flow rate range, dm^3/h	0–60					
Weight, kg, max	14	24	31	14	24	31
Power supply	220 V, 50 Hz /50 V · A via power supply 24 V					

ORDERING DATA

basic kit

Version	MARK 01 MK/					
	7/40	7/250	7/560	32/40	32/250	32/560
Control unit MARK 01 MK	•	•	•	•	•	•
In-gate and blowdown valve	•	•	•	•	•	•
High / low pressure regulating valve	•	•	•	•	•	•
Main heat-transfer unit		•	•		•	•
Electric driven shutdown valve	•	•	•	•	•	•
Pressure control unit	•	•	•	•	•	•
Flow meter	•	•	•	•	•	•
Filter	•	•	•	•	•	•
Power supply unit	•	•	•	•	•	•
Additional heat transfer unit			•			•

optionally

Cooling water rate indicator
Cooling water thermometer / manometer
Reserve coil for the main / additional heat-transfer unit

heat transfer unit
HTU 290 / HTU 145

Applied at industrial processes of NPPs and TPPs, steam boiler stations and other facilities for cooling of sample, supplied to automatic and manual instrumentation.

Easy-clean dismountable construction.

Durable materials:

– coil is made of 316SS steel,

– housing is made of 304 (or 12X18H10T) steel.

Compression fittings for sampling lines connection without welding.

Special threeway ball valve for supply / drain of cooling water;
adjusting valve, providing cooling water flow rate change through HTU.

WARRANTY

12

months

specification

Sample parameters	HTU 290	HTU 145
Sample pressure at the sample conditioning unit inlet, MPa, max	32	32
Sample temperature at the HTU, C, max	560	560
HTU nominal area, m^2, max.	0,290	0,145
Sample flow rate through HTU, dm^3/h, max aqueous sample steam sample	 100 60	 100 60
Housing inner diameter, mm, max	102	80
Coil inner diameter, mm, max	4	4
Overall dimensions, mm, max	130*560*175	110*560*150
Weight, kg, max	9,50	6,10

cooling water requirements

Pressure at the inlet, MPa	from 0.3 to 1,0	from 0.3 to 1,0
Temperature, °C at the inlet, max at the outlet, max	 35 60	 35 60
Cooling water flow rate, dm^3/h, max	2100	2100

ORDERING DATA

basic kit

Heat transfer unit

optionally

Spare parts kit

Mounting parts kit

hydraulic panel
HP 409 / HP 602

Water flow stabilization.

Iron oxide, mechanical admixture removal / H-cation exchange of sample.

Sample flow indication.

Emergency shutoff of sample supply.

HP 409 T

Regulating valve of the sample flow rate.

Analyzer calibration without sample flow interruption.

HP 409

HP 409 T/2

HP 602

specification

	HP 409	HP 409 T/1	HP 409 T/2	HP 602
Analyzed water temperature, °C	In accordance with sensor requirements			
Sample flow rate, dm^3/min	0,08–5	0,3–1,5	0,3–1,5	0,05–5
Emergency shutoff of sample supply, °C	90±5	–	–	90±5
Dimensions, mm	280*380*140	280*400*110	280*720*110	280*720*115
Weight, kg	2,5	3,3	4,4	6,0

hydraulic panel
HP 902

Water flow stabilization.

Emergency shutoff of sample supply.

HP 1002

Automatic precision batching
of the alkalizing element.

Alkalizing reagent rate minimization.

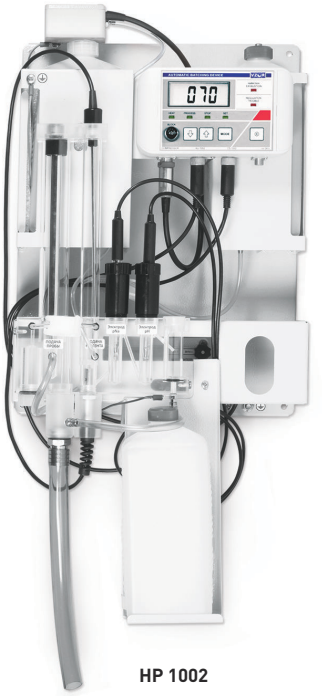
Batching system diagnostics.

Water flow stabilization.

Sample flow display.

Mechanical admixture filtration.

HP 902



HP 1002

specification

	HP 902	HP 1002
Analyzed water temperature, °C	In accordance with sensor requirements	
Sample flow rate, dm^3/min	0,1–2	0,05–3
Emergency shutoff of sample supply, °C	90±5	–
Dimensions, mm	240*390*90	300*650*200
Weight, kg	4,0	5,0

high purity water modules
MARK® 3101

Preparation of high purity water (incl. analytical purposes).

WARRANTY
12
months

Optimum output 30 dm³/h.

Air deflation valves.

Stainless steel filters.

ion-exchange columns
IEC D / d / L

Designed to be filled with ion-exchange resins or filtering materials.

Preliminary preparation of the analyzed water sample, including H-cation exchange, high purity water getting, mechanical filtration.

Transparent case of the column
Allows to estimate the filler's state.

Stainless steel filter
Does not get blind.
Does not allow the resin wash-out.
Ensures flow linear rate – min. 25 m/h.

TABLE OF THE COLUMN VERSION'S DIMENSIONS

D	20	30	40	50	60	70	80	90	100
d	16	24	32	44	50	62	72	82	92
L	from 190 to 950								

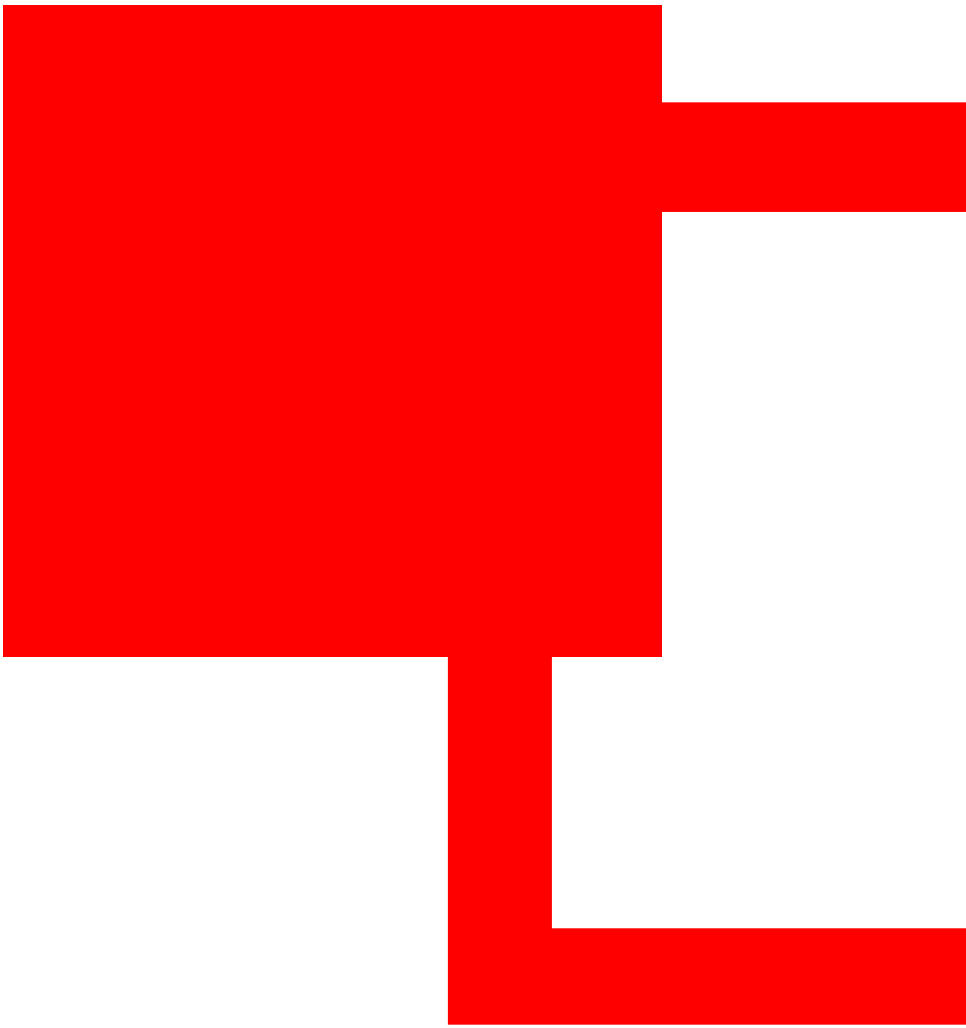
D / d / L – outer / inner diameter / length, mm

APPLICATION

Right choice of instruments is a key condition of successful solution for any practical issue. The present table will help you to choose the instrument, corresponding to your requirements. The instruments are designed for particular tasks solution, wich allows you not to overpay for other models generality.

	LABORATORY AND FIELD MEASUREMENTS. INDUSTRIAL PROCESS WATER, SURFACE AND WASTE WATER MONITORING		CHEMISTRY MONITORING AT POWER ENGINEERING FACILITIES	
	periodic	continuous	periodic	continuous
DISSOLVED OXYGEN METER	MARK® 302 M MARK® 303 M		MARK® 3010 MARK® 2010	MARK® 409 T MARK® 409 A
DISSOLVED HYDROGEN METER			MARK® 501	MARK® 501 MARK® 509 MARK® 509 A
CONDUCTIVITY | SALINITY	MARK® 603/1	MARK® 602 T	MARK® 603	MARK® 602 MARK® 602 LD MARK® 602 T
CONCENTRATION METER		MARK® 1102		MARK® 1102
pH METER	MARK® 901 MARK® 903 MARK® 904	MARK® 902 LD	MARK® 901 MARK® 903	MARK® 902 MARK® 902 LD MARK® 9010
SODIUM ANALYZER			MARK® 1002 MARK® 1002 T with a sample collecting kit	MARK® 1002 MARK® 1002 T

PRODUCT CATALOGUE | 2019



ANALYTICAL INSTRUMENTS

VZOR

for power engineering and ecology