

WATER ANALYSIS TECHNOLOGY

PRONOVA
Analysentechnik GmbH & Co. KG

Development
Production
Sales
Service

Electrodes and Sensors
portable and stationary Equipment
Analysis Equipment
Accessories



PRODUCT CATALOGUE

Ion selective electrodes



TECHNICAL SPECIFICATIONS:

Measuring range:	NH ₄ ⁺ : 0,2 to 18,000 mg/l
	Br ⁻ : 0,5 to 79,000 mg/l
	Ca ²⁺ : 0,1 to 40,000 mg/l
	Cl ⁻ : 1 to 35,000 mg/l
	CN ⁻ : 0,03 to 2,600 mg/l
	F ⁻ : 0,02 to 20,000 mg/l
	K ⁺ : 0,4 to 39,100 mg/l
	J ⁻ : 0,1 to 10,000 mg/l
	Cu ²⁺ : 0,1 to 6000 mg/l
	Na ⁺ : 5 to 20,000 mg/l
	NO ₃ ⁻ : 0,4 to 60,000 mg/l
	NO ₂ ⁻ : 5 bis 5.000 mg/l
	Ag ⁺ : 0,1 to 10,000 mg/l
	S ²⁻ : 0,03 to 3,200 mg/l

Shaft material: plastics (black)

Dimension (length x ø): 145 x 12 mm

Immersion dept: 120 mm

Customer designs and connectors on request

Ion selective electrodes (ISE) allow the determination of the ion activity or ion concentration in a liquid, irrespective of its colour or its turbidity. The measurement itself works by immersing an ion-selective electrode and a reference electrode (preferred silver/silver chloride electrodes) into the solution of interest and measuring the cell voltage.

Silver/silver chloride and saturated Calomel electrodes are preferably used as reference electrodes.

A DC voltage measurement instrument with input resistance >10¹⁰ Ohm can be used as measuring device for all measurements.

High-resolution pH-measurement amplifiers with mV-function like the Ionometer ISE 40 are perfectly suited for this purpose.

Combination Electrodes

40183xxx	Ammonium NH ₄ ⁺
40184xxx	Bromide, Br ⁻
40188xxx	Calcium, Ca ²⁺
40182xxx	Chloride, Cl ⁻
40189xxx	Copper Cu ²⁺
40190xxx	Fluoride, F ⁻
40194xxx	Iodide-/Cyanide, J ⁻ /CN ⁻
40180xxx	Nitrate, NO ₃ ⁻
40181xxx	Nitrite, NO ₂ ⁻
40185xxx	Potassium, K ⁺
40187xxx	Silber-/Sulfide, Ag ⁺ /S ²⁻
40192xxx	Sodium, Na ⁺

The ion selective electrodes are preferably used for particular anions or cations in watery or mixed organic-watery solutions.

Depending on the ion type/electrode certain ideal pH-values should be adjusted (see data sheet of the electrodes).

ART.-NR.

Single electrodes

40118xxx	Ammonium selective electrode, NH ₄ ⁺
40100xxx	Bromide selective electrode, Br ⁻
40102xxx	Calcium selective electrode, Ca ²⁺
40104xxx	Chloride selective electrode, Cl ⁻
40110xxx	Fluoride selective electrode, F ⁻
40106xxx	Iodide-/Cyanide selektive elektrode, J ⁻ /CN ⁻
40134xxx	Potassium selective electrode, K ⁺
40112xxx	Cupric selective electrode, Cu ²⁺
40136xxx	Sodium selektive Elektrode, Na ⁺
40114xxx	Nitrate selective electrode, NO ₃ ⁻
40138xxx	Nitrite selektive elektrode, NO ₂ ⁻
40116xxx	Silver-/Sulfide selective electrode, Ag ⁺ /S

ACCESSORIES

40xxx100	1 m sealed cable without connector
40xxx101	1 m sealed cable with BNC connector (plug)
40xxx103	1m sealed cable and special connector for ISE 40
40xxx005	PG 13.5" industrial connector
40xxx006	S7 lab connector

ELECTRODES AND SENSORS

Gas sensitive electrodes



For the determination of dissolved oxygen according to the Clark-principle and carbon dioxide according to the Severinghouse-principle in water irrespective of colour or turbidity.

Applications:

Food industry, Water management, Environment analytic, Biotechnology

Carbondioxide-electrode:

The carbondioxide-electrode with an integrated temperature sensor measures the dissolved carbondioxide in water and operates on the principle of Severinghausen. The electrode is a glass electrode provided with a CO₂-permeable membrane. Between the platinum electrode and the reference. Because of the diffusion of CO₂ through the membrane the pH value is changing and indicates the CO₂ concentration.

TECHNICAL SPECIFICATIONS:

CO₂ electrode	
Measurement range:	0 to 3,000 mg/l
Measurement technique:	Severinghaus
Accuracy:	± 4 % of the measured value
Configuration time (20 °C):	< 4 min (90% of the measured value)
Configuration time (10 °C):	< 8 min (90 % of the measured value)
Interfering ions:	SO ₃ ²⁻ , S ²⁻
Temperature:	0 to +50 °C
Membrane:	Teflon
Working electrode:	Glass electrode with membrane
Reference electrode:	Ag/AgCl
Temperature sensor:	NTC or PF
Shaft material:	Plastic (black), stainless steel
Dimensions (Length x dimension):	173 mm x 18 mm
	Immersion depth: 120 mm

Art. No.

ACCESSORIES

40xxx100	1 m sealed cable without connector
40xxx101	1 m sealed cable with BNC connector (plug)
40xxx005	PG 13.5" industrial connector
40xxx006	S7 lab connector

Oxygen-electrode:

The oxygen-electrode with an integrated temperature sensor measures the dissolved oxygen in water and operates on the principle of CLARK. The electrode is a platinum electrode provided with a O₂-permeable membrane. Between the platinum electrode and the reference electrode (Ag/AgCl) a constant polarization voltage is applied. Because of the diffusion of O₂ through the membrane a current is measured which is proportional to oxygen concentration.

TECHNICAL SPECIFICATIONS:

O₂ electrode	
Measurement range:	0.1 to 20 mg/l, 0 to 200 % saturation level
Measuring principle:	CLARK
Precision:	< ± 1 % measured data
Temperature:	0 to +50 °C
Setting time:	10 to 15 s (90 % of the measured value)
Membrane:	Teflon
Shaft material:	plastics (black)
Dimension (length x ø):	145 mm x 12 mm immersion depth > 40 to 120 mm

Art. No.

40140xxx	Oxygen-electrode, O ₂
40140xxx	Carbondioxide-electrode, CO ₂

Conductivity measuring cells

Conductive two- or four- electrode cells for measuring the electrolytic conductivity of the solution (the salt content).

2-electrode conductivity cell



K=1.0 40162005 K=0.6 40161105 K=0.8 40165100 K=0.6 40160100

4-wire conductivity electrodes



K=0.475 40173100 K=0.475 40170100

The 4-electrode Conductivity cell consists of four electrodes (two voltage and two current electrodes) made of a special carbon with an integrated temperature sensor.

The current electrodes supply the necessary current for the measurement. With the voltage electrodes, the voltage drop is determined in the test solution and the conductivity is calculated.

Applications:

Chemicals, Laboratory, Food industry, Water management, Environment analytic

Advantages:

- Interfering polarization resistances are not included in the measurement
- Low dependence of the measured results on the contamination level of electrode
- No influence of cable length for large conductivities

TECHNICAL SPECIFICATIONS:

2-electrode conductivity cell	
Measurement range:	20 mS/cm
Electrode:	graphite
Temperature sensor:	NTC or PF
Application temperature:	0 to 50 °C
Shaft material:	plastics
4-electrode conductivity cell	
Measurement range:	200 mS/cm
Precision:	+/- 1,5 % of measured value
Electrode:	graphite
Temperature sensor:	NTC or PF
Application temperature:	0 to 50 °C
Shaft material:	plastics

Art. No.

2-electrode conductivity cell

40160xxx	2-electrode conductivity cell (145 mm x Ø15 mm, black)
40161xxx	2-electrode conductivity cell (50 mm x Ø12 mm, black)
40162xxx	2-electrode conductivity cell (145 mm x Ø12 mm, black)
40165xxx	2-electrode conductivity cell (145 mm x Ø22 mm, grey)

4-electrode conductivity cell

40170xxx	4-electrode conductivity cell (145 mm x Ø15 mm, black)
40173xxx	4-electrode conductivity cell with integrated electronics (145 mm x Ø22 mm, grey)

PORTABLE LIQUID MEASUREMENTS

Accessories

Flow cell

for the online monitoring chemical parameters at bypass



Immersion housings

for measurements in milraces, channels or basins. If necessary model in combination with standing column and transverse cantilever



Flow housings

flow through housings is used for insertion of electrodes/sensors if the measuring medium comes in a pipe



Submersible housing

for measurement under the surface or high depths



Art. No.

45AD222	Flow through housing with tangential flow (2/3 electrode ports, PVC, DN15, max. 6 bar, max 60 °C)
45AD82 45AD92	Angle seat flow through housing (1 electrode port, PVC, DN20/25, max. 50 °C)
45AD94	Slanted seat flow-through (1 electrode port, stainless steel, DN20, max. 6 bar, max. 150 °C)
45AT324	Submersible housing
45ETXX	Immersion housing (max. 4 electrode ports, straight/angling, PVC or PP or stainless steel, max. length 3 m)
45STWD Q24	standing column with transverse cantilever
Others available on request	

TM 40, TM 40 CO₂, LF 40, AM 40, ISE 40



Measures pH, redox, ion concentrations, conductivity and dissolved gases

These measuring devices offer the advantages of a mobile field unit together with the precision and comfort of a laboratory instrument: with high measurement accuracy, a multifunction graphic display, integrated data logger and heavy-duty IP65 housing.

The important GLP functions – such as date/time, primary measured value, secondary measured value (including the physical units), temperature and device number – are transmitted and recorded in the data file.

The **TM 40** features automatic temperature compensation for pH measurements and manual temperature input when measuring without a temperature sensor. Either manual or automatic two-point calibration is available for the calibration.

TECHNICAL SPECIFICATIONS:

Measurement range:	
TM 40	pH: 0 to 14; -1,999 to 1,999 mV;
TM 40 CO₂	0.1 bis 3,000 mg/l;
ISE 40	0.1 mg/l to 100 g/l
LF 40	LF: 0 to 200 µS/cm; 0 to 2,000 µS/cm;
	0 to 20 mS/cm; 0 to 500 mS/cm;
	automatic measuring range switch-over;
	TDS: 0 to 200 mg/l; 0 to 2,000 mg/l;
	0 to 20 g/l; 0 to 500 g/l;
	Salinity: 0 to 70 g/kg;
AM 40	O ₂ : 0 to 200 %; 0 to 20 mg/l

Resolution:	
TM 40	0.01 pH; 1 mV
ISE 40 / TM 40 CO₂	0.1 mg/l
LF 40	0.1 µS; 1 µS; 0.01 mS; 0.1 mS
AM 40	1 %; 0.01 mg/l, Temperature: 0.1 °C
Accuracy:	
TM 40	± 0.02 pH; ± 1 mV
LF 40	± 1% to 200 mS
AM 40	± 1 %; ± 0.01 mg/l
Display:	graphic LCD, 128 x 64 pixels, back-lit
Communication:	USB, electrical/galvanic isolation
Data logger:	4,000 data records
Power supply:	three AA batteries, IEC R6, LR6, 1.5V
Degree of protection:	IP65
Dimensions and weight:	200 x 95 x 40 mm, approx. 290 g

The measuring device can also be used to measure the redox potential or ISE potential relative to the standard hydrogen electrode, in accordance with DIN 38404.

Art. No.	
45TM40	TM 40 Set
45ISE40	ISE 40 Set
45TM40CO₂	TM 40 CO₂ Set
45LF40	LF 40 Set
45AM40	AM 40 Set
Each measuring device is delivered in a set with probe/electrode, solutions and spare parts (AM 40) in a case.	

The **ISE 40** takes temperature-compensated measurements of ion concentrations across a wide range of concentrations.

The **TM 40 CO₂** enables dissolved carbon dioxide to be measured in an aqueous solution.

The **LF 40** is perfectly suited for checking electrical conductivity, salinity and temperature in surface waters, waste water and during waste water treatment.

The **AM 40** is ideal for checking oxygen content in surface waters, waste water and during waste water treatment. The measuring device, in communication with the sensor, simultaneously detects the mass concentration of the dissolved oxygen in mg/l, the oxygen saturation index (% saturation) and the temperature.

LABORATORY CONTROLLER

LM 3000



Measures pH, redox, ion concentrations, conductivity and dissolved gases

The LM 3000 multi-parameter laboratory controller has a modular bus structure; it provides excellent functionality, maximum operational reliability, outstanding ease of use, and a wide range of customized configuration options.

The LM 3000 offers a complete system solution whenever several electrochemical quality parameters need to be detected on-line in a laboratory setting, and where these measurements need to be transmitted and evaluated very reliably.

TECHNICAL SPECIFICATIONS:

Auxiliary power:	24 VDC desktop power supply unit, voltage cut-off switch on the device
Ambient temperature:	0 to +40°C
Display:	Graphic touchscreen display 320 x 240 pixels, 256 colours, backlit
Menu languages:	German, English
Data transfer:	Ethernet interface, USB interface for PC connection, serial RS-232 interface
Control outputs:	4 potential-free relay outputs; resistive load of I ≤ 1 A, U ≤ 24 V DC for limit or alarm function; one relay with timer function (washing contact; time interval is adjustable from 1 to 9,999 hours)
Data storage:	built-in data logger for 100,000 values, including date and time, finite / ring storage, 48-hr data recorder
Log book:	approx. 200 activities, including date and time
Housing:	Aluminium console housing IP40/DIN EN 60529
Connections:	BNC, Banana, 8-pin DIN, BK, USB, Ethernet
Measuring modules:	four internal measuring modules; can be combined as needed; galvanic-isolated inputs; storing of calibration data; sensor monitoring using adjustable limit ranges; manual and automatic temperature compensation;
Controller module:	PID 3000, standard signal module 4 x 0(4) to 20 mA
GLP:	GLP functions (data recording)

Art. No.	
45LM 3000	Multi-parameter controller base unit
Measuring module for pH, conductivity, ISE etc.: available on request	

The main functional units of the LM 3000 multi-parameter laboratory measurement system are:

- The LM 3000 multi-parameter laboratory base unit with power supply, touchscreen display (backlit 5.7", 320 x 240 pixels, with full-text menu navigation) 4 potential-free (floating) relay outputs, data logger and logbook, various digital interfaces such as RS232, USB and Ethernet
- Internal measuring modules (max. 4)
- PC-based visualization program
- Sensors
- Optional sampler, up to 72 samples depending on type (e.g. TW Alpha plus)
- Optional Titronic 500 dosage system
- Optional stirrer



MV 4000 transmitter series



Measuring amplifier

This series of transmitters is suitable for inexpensive measurements of one or more process variables. The transmitters are very versatile and easy to use. Calibrations are easy to carry out directly at the transmitter. The MV 4000 has an additional display which facilitates the control of measured values, calibrations, and also enables each transmitter to be used as an independent measuring instrument.

TECHNICAL SPECIFICATIONS:

Parameters:	1 x pH, redox, conductivity, O ₂ , ISE (NH ₄ , NO ₃ , K, Cl, F, etc.)
Display:	LCD
Analogue outputs:	2 x 0(4) to 20 mA, or 0 to 5 VDC
Control outputs:	1 x normally open contact: max. 125 VAC, 60 VDC, 30 VA
Interface:	USB
Power supply:	15 to 24 VAC/DC, approx. 1.5 VA
Housing:	Plastic for top-hat rail mounting DIN EN 50022-35
Protection degree:	IP40 (EN 60529)
Dimensions:	45 x 99 x 114.5 mm

Art. No.	
45MV4010	pH transmitter 0-14 pH
45MV4020	Conductivity transmitter 0 to 20 mS/cm
45MV4016	ISE transmitter NH ₄ , NO ₃ etc.
45MV4015	Redox transmitter ± 2,000 mV
45MV4030	O ₂ transmitter 0 to 20 mg/l
	Others available on request

KM 3000



KM 3000 multi-parameter measuring system

The KM 3000 multi-parameter controller has a modular bus structure; it provides excellent functionality, maximum operational reliability, outstanding ease, and a wide range of customized configuration options. The KM 3000 offers a complete system solution for any application where multiple parameters need to be detected on-line, and where these measurements need to be transmitted and evaluated very reliably. It also is capable of documenting and controlling processes.

TECHNICAL SPECIFICATIONS:

Parameters:	max. of 16: pH, redox, conductivity, CO ₂ , O ₂ , ISE (NH ₄ , NO ₃ , K, Cl, F, etc.)
Display:	5.7" touchscreen
Data logger:	Approx. 100,000 parameter sets
Analogue outputs:	4 x 0(4) to 20 mA
Relay outputs:	4 x potential-free outputs, max. 3 A, 250 VAC
Interface:	USB, RS285, RS485
Power supply:	115/230 VAC, 48 to 63 Hz or 15 to 30 VAC/DC
Housing:	Wall mount, in aluminium
Protection degree:	IP65 (EN 60529)
Dimensions:	240 x 240 x 120 mm



Art. No.	
45KM3000	Multi-parameter controller base unit
45MVM2210	pH measuring module 0 to 14 pH, without electrode
45MVM2216	ISE measuring module NH ₄ , NO ₃ , etc., without electrode
45MVM2220	Conductivity transmitter 0 to 20 mS / cm, without electrode
45GSM3000	GSM/GPRS modem
	Others available on request

MV 50xx series



MV 50xx single-channel measuring transducer

The MV 50XX series of measuring transducers is perfect for taking stationary measurements directly at the measuring point in the open field. The measuring transducer is simple and intuitive to use. It also maintains the essential functionality with maximum operational reliability and safety. Each MV 50XX features a large OLED display and plain-text menu navigation. The software also enables you to configure, calibrate, view and record measured values at your PC using a standard USB port.

- Areas of use:
- Water treatment
 - Water-quality monitoring systems
 - Process monitoring
 - Process control

- Special features:
- Cost-effective measurement of process variables
 - Easy to use (plain text menus)
 - Simultaneous temperature measurements and compensation
 - 2 scalable analogue outputs and 2 relay outputs
 - USB interface and PC software
 - Firmware update via USB
 - IP65 field housing

TECHNICAL SPECIFICATIONS:

Parameters:	1 x pH, redox, conductivity, CO ₂ , O ₂ , ISE (NH ₄ , NO ₃ , K, Cl, F, etc.)
Display:	graphic OLED, 128 x 64 pixels with plain text menu
Data logger:	4.000 parameter sets
Analogue outputs:	2 x 0(4) to 20 mA, or 0 to 5 V
Control outputs:	2 limit switch contacts, CO contact, max. 250 V AC / 5 A; PID controller, bi-directional (pulse length or analogue controller)
Interface:	USB (optional RS-232)
Power supply:	100 to 240 V AC, 18 to 36 V DC
Housing:	Aluminium housing for wall mount
Protection degree:	IP65
Dimensions:	160 x 130 x 70 mm

Art. No.	
45MV5010	pH measuring transducer 0 to 14 pH
45MV5020	LF measuring transducer 0 to 20 mS/cm
45MV5016	ISE measuring transducer NH ₄ , NO ₃ etc.
45MV5030	O ₂ measuring transducer 0 to 20 mg/l
45MV5050	CO ₂ measuring transducer 0 to 3,000 mg/l



PRONOVA

GAS ANALYSIS EQUIPMENT
BIOGAS ANALYSIS EQUIPMENT
 WATER ANALYSIS EQUIPMENT
AGRICULTURAL EQUIPMENT

APPLICATION	Type of electrode	NH ₄ -ion	Br ⁻ -ion	Ca-ion	Cl ⁻ -ion	I/CN ⁻ -ion	F ⁻ -ion	Cu-ion	K ⁻ -ion	Na-ion	NO ₃ ⁻ -ion	Ag/S ⁻ -ion	O ₂ (dissolved)	CO ₂ (dissolved)
		Glass and ceramics industries				x			x					
Geology and Mining				x	x									
Cement industry					x									
Petroleum products (Sulfide, Mercaptane)												x		
Basic and laboratory chemicals				x	x	x	x	x	x	x		x		
Papier- und Cellulosebrei												x		
Metallurgy (Silver alloys)						x	x	x				x		
Photo industry (Fixing baths)			x		x							x		
Galvanic baths						x	x	x				x		
Steam and power generation (Boiler feed water, Flue gases)		x		x	x	x	x				x	x		x
Environmental protection				x	x	x	x	x			x	x	x	x
Fertilizers		x		x	x				x	x	x			
Plants and feed products											x			
Drinking, ground and surface water				x	x		x				x	x	x	x
Soil extracts and slurries			x	x	x		x				x	x	x	x
Water and waste water, sewage treatment plants		x			x	x	x				x	x	x	
Pharmaceuticals						x	x							
Clinical Medicine				x	x		x		x	x				
Spirits, wine, beer and tobacco products					x		x				x		x	x
Jams, fruit and vegetable juices					x		x				x			
Fresh vegetables, canned vegetables, baby food				x	x						x			
Meat and fish products					x	x	x				x			
pasta products					x									
Milk and dairy products				x	x	x	x							
School and education (analyte. chemistry)				x	x	x	x				x	x	x	x



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