xylem
Lab Solutions

8

Titration

TITRATION ELECTRODES

SI Analytics

a xylem brand

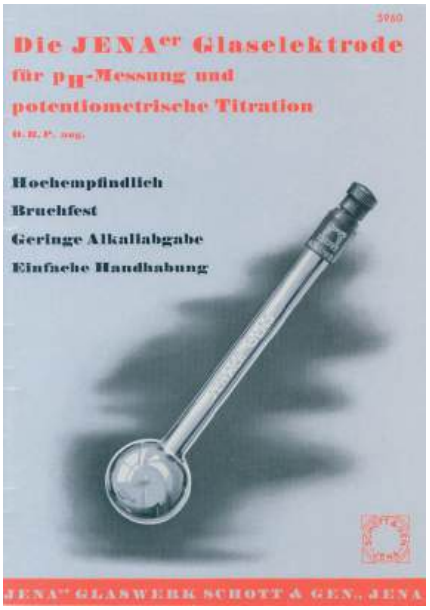
8. Titration electrodes and accessories

No two titrations are alike. Different compositions, temperatures, conductivities, and viscosities of samples and different measurement conditions make for a million of different applications. The correct electrode for the titration application is of crucial importance for the correctness and reproducibility of the results. To help you choose the right electrode, we have put together the appropriate electrodes for the most important applications.

The pH electrode is a very important part of the system as it comes in direct contact with the sample and provides the measurement signal.

For more than 85 years, the brand SI Analytics is dedicated to the development and manufacturing of glass electrodes.

It all started with a patent on pH electrodes in the thirties – today it is a range of several hundred different sensors for all imaginable applications.



Our first instruction booklet appeared in 1938. In those days, the electrochemical pH measuring and the potentiometric titration still needed to be explained.

Selection table titration electrodes

Titration	Details	Electrode type	Order no.
Aqueous acid base-titrations	General titration of acid and bases; total acid in beverages and foods; Kjeldahl (Only low-maintenance pH electrodes)	A 7780	285101260
		A 7780 NTC30 DIN N	285101290
		A 7780 1M-DIN-ID	285130200
		A 7780 IDS	285101080
	General, demanding samples, Acid and base capacity, Electroplating baths	N 62	285100034
		A 162 2M-DIN-ID	285130275
		A 162 IDS	285100120
		SCPpH-A120MF	285101300
		SCPpHT-A170MF-3M-DIN-N	285101320
		SCPpHT-A170MF-3M-IDS	285101310
	Low ionic media	N 64	285100059
	Small sample quantities	N 5900 A	285105135
		SCPpH-MIC-AMF	285101330
		SCPpHT-MIC-AMF-3M-DIN-N	285101335
		SCPpHT-MIC-AMF-3M-IDS	285101345

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Non-aqueous acid base-titrations	Acid and base numbers in oils (TAN/TBN) in general	N 6480 eth	285092329
	OH number, NCO number, FFA, saponification number	N 6480 eth	285092329
	Acid number in aviation fuels (ASTM D3242)	OptiLine 6	285221300
	Titrations in perchloric acid/glacial acetic acid, epoxy number	N 6480 eis	285092337
		N 6480 eth	285092329
	Acid number in insulating oils IEC 62021	N 64	285100059
Precipitation titrations	Chloride in general, chloride/NaCl („salt“) in food (titrations with silver nitrate)	AgCl 62	285102413
		AgCl 62 RG	285102100
		Ag 62 IDS	285102150
	Cyanide, bromide, iodide (titrations with silver nitrate)	Ag 6280	285102343
		Ag 62 RG	285102090
		Ag 62 IDS	285102150
	Mercaptans and hydrogen sulfide (titrations with silver nitrate)	AgS 62 RG	285102110
		Ag 1100 + A 1180	285103607 + 1057997
	Fluoride with lanthanum nitrate	F 1100 PLH + Referenzelektrode	285216295
	Surfactants (anionic, cationic and non-ionic surfactants)	TEN 1100 + Referenzelektrode	285096980
Redox titrations	General redox titrations, iodometry, permanganometry, cerimetry	Pt 62	285102019
		Pt 62 RG	285102070
		Pt 62 RG IDS	285102140
	Iodine value, peroxide value	Pt 62	285102019
		Pt 61	285102002
		Pt 62 RG	285102070
		Pt 62 RG IDS	285102140
	COD	Pt 61	285102002
	COD with sample changer	PT 5901	285105065
	Dead stop (SO_2, Bromine value…) general	Pt 1200	285103512
	Dead stop (SO_2, Bromine value…) with autosampler/titration vessels	Pt 1400	285103537
	Volumetric KF titration	KF 1100	285102030
	Volumetric KF titration with sample changer	KF 1150	285102060
	KF coulometry	KF 1150	285102060
Complexometric titrations	Total hardness (sum of alkaline earths Ca, Mg...)	Cu 1100 PLH + reference electrode	285216273
	Calcium and magnesium/calcium and magnesium hardness	Ca 1100 PLH + reference electrode	285216268
	Copper, aluminum, zinc, and other metals	Cu 1100 PLH + reference electrode	285216273
	All complexometric titrations	OptiLine 6	285221300
Photometic titrations (general)	All titrations for color change in aqueous and non-aqueous media	OptiLine 6	285221300
Reference electrodes		B 2920 B 3920	1070046 1070075

Care, maintenance, service, cleaning, and storage of ti

Electrode	pH combination electrodes with aqueous liquid electrolyte and platinum diaphragm	pH combination electrodes with gel electrolyte and ceramic diaphragm	pH combination electrodes with non-aqueous electrolytes and ground-joint diaphragm
Electrode type	N 62 A 162 2M-DIN-ID A 162 IDS SCPpH-A120MF SCPpHT-A170MF-3M-DIN-N SCPpHT-A170MF-3M-IDS N 5900 A SCPpH-MIC-AMF SCPpHT-MIC-AMF-3M-DIN-N SCPpHT-MIC-AMF-3M-IDS	A 7780 A 7780 NTC30 DIN N A 7780 1M-DIN-ID A 7780 IDS	N 6480 eth N 6480 ETH 2M-DIN-ID N 6480 eis
			
Electrolyte refilling solution	KCl 3 mol/l (L 3008, L 3004, L 300)	N/A	LiCl/Ethanol L 5034, LiCl/ acetic acid L 5014
Storage	In electrolyte or storage solution. Storage between 0 - 40 °C	In electrolyte or storage solution. Storage between 0 - 40 °C	In electrolyte solution. Storage between 0 - 40 °C
Storage solution	L 9114	L 9114 or electrolyte solution	Electrolyte solution
Cleaning instructions	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water Carefully lift the ground joint and allow electrolyte to run out.
Miscellaneous	Carefully wipe off deposits on the glass membrane with a damp cloth.		Always remove silicone transport lock before use.

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tration electrodes

Pt/Ag titration electrodes with pH glass electrode as reference system (RG)	Pt/Ag combination electrodes with aqueous liquid electrolyte and platinum diaphragm	Pt double platinum electrodes	ISE and other electrodes
Ag 62 RG AgCl 62 RG AgS 62 RG Ag 62 IDS	AgCl 62 Ag 62 IDS Ag 62 IDS Pt 62 Pt 61 Pt 5901	Pt 1200 Pt 1400 KF 1100 KF 1150	TEN 1100 Ca 1100 PLH Cu 1100 PLH F 1100 PLH
			
N/A	Pt electrodes: KCl 3 mol/l (L 3008, L 3004, L 300)	N/A	N/A
In water. Storage between 0 – 40 °C	Ag electrodes: KNO_3 2 mol/l + 10^{-3} mol/l KCl (L 2114). In electrolyte solution. Storage between 0 - 40 °C	Dry	Dry. Storage between 0 – 40 °C
Distilled or deionized water	Electrolyte solution	N/A	N/A
Carefully wipe off deposits on the glass membrane with a damp cloth. Rinse fats/oils with alcohol or water containing detergent. Remove proteins with a hydrochloric acid pepsin solution. Then always rinse with distilled/deionized water.	Wipe off deposits on the metal sensor with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution or strong acid. Blank Ag and Pt electrodes can also be cleaned with an abrasive agent. Afterwards, always rinse with distilled/deionized water.	Wipe off deposits on the metal sensor with a damp cloth. Rinse fats/oils with alcohol, suitable >solvent or water containing dishwashing detergent. Remove proteins with a hydrochloric acid pepsin solution or strong acid. The Pt pins can also be cleaned with an abrasive agent. Afterwards, always rinse with distilled/deionized water.	Clean the electrodes with PVC membrane (TEN, Ca 1100) with aqueous solution.
Never grind the metal sensor ring.			Never clean the TEN 1100 and Ca 1100 PLH with alcoholic solution.

IDS sensors

New features

SI Anayltics's IDS Intelligent, Digital Sensors technology for the standard parameters pH, conductivity and dissolved oxygen consists of two components, Digital sensors and matching field or benchtop meters. This new processing of the measured values no longer takes place in the device, exclusively in the sensor so that every sensor has its own data base when connected.

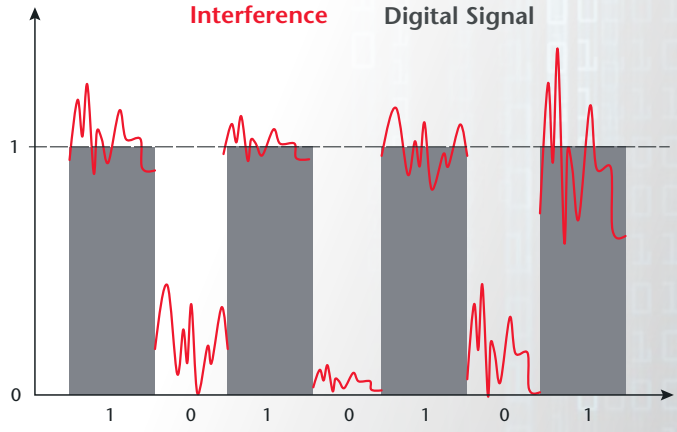
Built on the basic sensor of the BlueLine and ScienceLine series that have proven themselves tens of thousands of times over, the IDS sensors have added precision and reliability and cover almost any application.

I intelligent:

IDS sensors are intelligent. They log into the device automatically, submit their name, serial number, calibration status and history as well as all parameters.

D digital:

IDS sensors transform the sensitive measuring signals in the sensor head into digital signals and transmit them to the output device without interference and errors.



S sensor:

IDS sensors are based on proven and continuously developed sensors by SI Analytics. They cover almost any lab application, like pH, conductivity or dissolved oxygen measurements.

Xylem Analytics Germany
also offers
field meters with IDS

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Xylem Analytics Germany
also offers
laboratory meters with IDS

Cond

pH

O_2

O_2

pH

Cond

Electrodes

IDS Sensors

IDS („Intelligent and Digital Sensors“) combines proven measuring technology with new advantages. Based on established electrochemical SI Analytics sensors, but equipped with state-of-the-art measuring electronics. IDS save the serial number and calibration data in the sensor. However, IDS also process measuring signals directly and thus improve the data quality. This also allows a current evaluation of the sensor quality by means of the QSC (Quality Sensor Control) function.

IDS combine proven technology with new advantages.

- High-quality, highly developed sensor technology combined with state-of-the-art measuring electronics.
- IDS have saved the serial number and calibration history – error-free and therefore immediately ready for use.
- Current evaluation of the sensor quality for IDS pH electrodes thanks to QSC (Quality Sensor Control).
- IDS conductivity measurement: Two sensors to cover all applications.

Benefits of ID Sensors

- **Higher accuracy than traditional analog sensors**
- **Resistant against environmental influences**
- **QSC takes the guess work out of the determining the health of your sensor**
- **Effortless capture and storage of your sensors latest calibration data**
- **Highest possible operator comfort and measuring precision**

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INTELLIGENT
DIGITAL
SENSORS

ScienceLine – The proven high-end laboratory electrodes

In research and development, manufacturing and quality control, our ScienceLine electrodes have become standard for the most demanding measurement tasks. Each electrode has an individual serial number and pH-metal combination electrodes are supplied with a quality certificate, better making documentation simple and better traceable.

We have kept on improving the glass membrane shapes and types to make the electrodes even more robust, durable and easier to clean. Furthermore, they achieve stable measurement values even faster.

Typical examples:

- pH electrodes with a length of up to 600 mm for measurements in very deep vessels
- The N 6003 electrodes allows pH measurements even in NMR tubes or other small sample vessels. The A 157 is a micro electrode with an integrated temperature sensor with a 5 mm in diameter.
- For more demanding media, choose among different junctions and membrane glasses. For measurements in samples of low ionic strength there is a choice between e.g., the N 64 and the types A 164. Those feature a ground joint junction, and the A 164 offers a temperature sensor.
- A wide selection of separate reference and glass electrodes completes the offering.
- Our ScienceLine electrodes ensure high measurement accuracy and stability and long service life, but are highly adaptable to your measurement tasks. We can offer you a range of electrodes with unmatched versatility and quality.

Benefits ScienceLine electrodes

- **Proven high-end electrodes for demanding measurement tasks**
- **Double junction Silamid® reference system for fast and stable acquiring of measured values and for longer electrode life**
- **Utmost versatility of pH electrodes is achieved by a large selection of junctions, membrane glass types and shapes, shaft lengths and diameters, ground joints, plug connections and integrated temperature sensors**
- **Each pH and metal combination electrode comes with individual serial number and quality certificate**
- **Large selection of separate glass and reference electrodes, metal combination electrodes, conductivity sensors, ion selective electrodes and ammonia, sodium and oxygen sensors**

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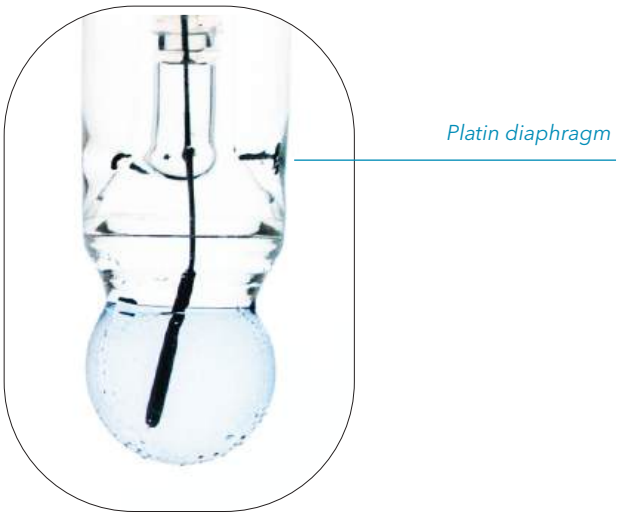
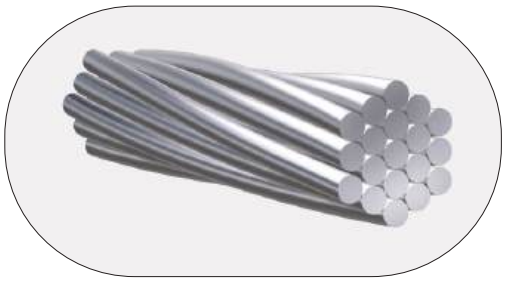
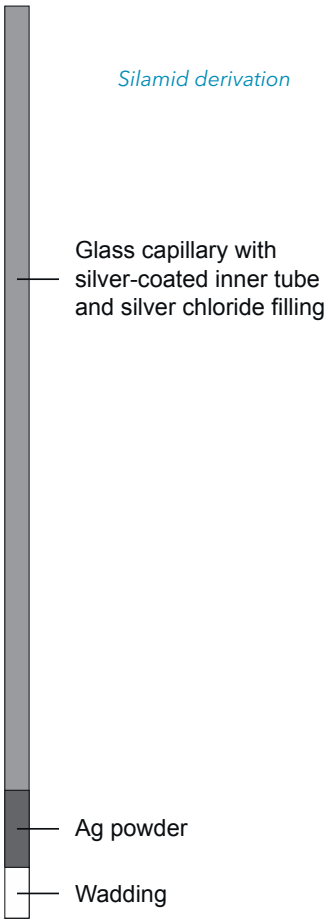
Platin diaphragm

A perfect all-rounder for basically any application is the platinum diaphragm. A plurality of platinum wires are twisted and fused together. The outflow channels between the wires have constant dimensions. This provides, e.g., compared to the ceramic diaphragm, a pulsation-free discharge and therefore reliable measured values as well as even better self-cleaning.







Silamid reference system

The more stable display of the measured value with Science Line electrodes, as well as their longer life are due to their Silamid reference system.

In contrast to the silver/silver chloride reference system of the BlueLine series, the ScienceLine employs. The ScienceLine employs a double junction design where the inner tube is coated with silver which provides for a very stable electrode. Hence, the stability of the potential is much higher.

Benefits of Silamid reference system

- **The silamid reference is a closed dissipating element in which a glass tube is coated with silver and filled with silver**
- **Compared to a silver chlorinated silver wire, the potential setting area is significantly increased**
- **The watt plug is an inner second diaphragm**
- **Electrodes with a silamid reference therefore have an even longer lifetime compared to electrodes with Ag/AgCl wire as well as an even more stable and reliable measurement**

ScienceLine pH combination electrodes

pH combination electrodes with plug head and fixed cable

Reference system:	Silamid®
Shaft material:	glass
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l (except N 6250: KCl 4.2 mol/l, A 7780 and L 7780: gel electrolyte, L 8280: Referid® electrolyte)
Membrane shape:	sphere
pH range:	0 to 14
Connection cable for plug head:	e.g., L 1 A (See also page with connection cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug

N 61	*N 64*	*N 65*	*N 6980*	*A 7780*
N 52 A	*N 6480 eis*	*H 65*		
N 52 BNC	*N 6480 eth*	*N 6580*		
N 61 eis	*N 6480 eth*			
N 62	*2 M DIN ID*			
N 6180				
N 6280				

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Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH glass	Temp. range [°C]	Connection	Remarks
285101260	A 7780	120	12	3 x ceramic	A	–5 to +80	plug head	gel electrolyte
285100494	N 52 A	120	12	platinum	A	–5 to +100	DIN plug2)	
285105451	N 52 BNC	120	12	platinum	A	–5 to +100	BNC plug2)	
285100001	N 61	170	12	platinum	A	–5 to +100	plug head	
285100018	N 6180	170	12	ceramic	A	–5 to +100	plug head	
285092661	N 61eis	170	12	3 x platinum	A	+10 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285100034	N 62	120	12	platinum	A	–5 to +100	plug head	
285100042	N 6280	120	12	ceramic	A	–5 to +100	plug head	
285100059	N 64	170	12	ground joint	A	–5 to +100	plug head	
285092337	N 6480 eis	170	12	ground joint	A	+10 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285092329	N 6480 eth	170	12	ground joint	A	0 to +40	plug head	electrolyte L 5014, Ag/AgCl ref.
285092340	N 6480 eth 2 M-DIN ID	170	12	ground joint	A	1 to +40	DIN plug	ID function
285100067	N 65	103[1)]	10	platinum	A	–5 to +100	plug head	standard taper NS 14.5
285102516	N 6580	103[1)]	10	ceramic	A	–5 to +100	plug head	standard taper NS 14.5
285101709	N 6980	103[1)]	10	ground joint	A	–5 to +100	plug head	standard taper NS 14.5

[1)] Length from upper end of standard taper
[2)] with 1 m fixed cable

ScienceLine pH combination electrodes with temperature sensor

pH combination electrodes with temperature sensor

Reference system:	Silamid®
Shaft material:	glass
Diameter:	12 mm
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l
Temperature sensor:	Pt 1000
Membrane shape:	sphere
pH range:	0 to 14
Connection cable:	
for SMEK-plug head:	e.g., LS 1 ANN (See also page with connecti-on cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for tem-perature sen-sor

N 1051 A
N 1051 BNC
N 1052 A
N 1052 BNC

A 161 1M DIN ID
A 161 1M BNC ID
A 161 IDS
A 162 2M DIN ID
A 162 IDS

A 164 1M DIN ID
A 164 1M BNC ID

A7780 NTC30
A 7780 1M DIN ID
A 7780 1M BNC ID
A 7780 IDS

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Order No.	Type No.	Length L [mm]	Junction	pH glass	Temp. range [°C]	Connection	Remarks
285130250	A 161 1M-BNC-ID	170	platinum	A	–5 to +100	BNC[1]- + 4-mm plug	ID function
285130240	A 161 1M-DIN-ID	170	platinum	A	–5 to +100	DIN[1]- + 4-mm plug	ID function
285100090	A 161 IDS	170	platinum	A	–5 to +100	IDS plug	IDS function
285130275	A 162 2M-DIN-ID	120	platinum	A	–5 to +100	DIN[1]- + 4-mm plug	DS function
285100120	A 162 IDS	120	platinum	A	–5 to +100	IDS plug	IDS function
285130290	A 164 1M-BNC-ID	170	ground joint	A	–5 to +100	BNC[1]- + 4-mm plug	ID function
285130280	A 164 1M-DIN-ID	170	ground joint	A	–5 to +100	DIN[1]- + 4-mm plug	ID function
285130210	A 7780 1M-BNC-ID	120	3 x ceramic	A	–5 to +80	BNC[1] + 4-mm plug	ID function
285130200	A 7780 1M-DIN-ID	120	3 x ceramic	A	–5 to +80	DIN[1] + 4-mm plug	ID function
285101080	A 7780 IDS	120	3 x ceramic	A	–5 to +80	IDS plug	IDS function
285130290	A 7780 NTC30 DIN-N	120	3 x ceramic	A	–5 to +80	DIN[1] + 4-mm plug	for portable Knick pH Meter
285100510	N 1051 A	170	platinum	A	–5 to +100	IDS plug	IDS function
285100500	N 1051 BNC	170	platinum	A	–5 to +100	BNC[1] + 4-mm plug	
1054512	N 1052 A	120	platinum	A	–5 to +100	DIN[1] + 4-mm plug	
285100380	N 1052 BNC	120	platinum	A	–5 to +100	BNC[1] + 4-mm plug	

[1] with 1 m fixed cable

ScienceLine micro combination electrodes

pH combination electrodes with temperature sensor

Reference system:	Silamid®
Shaft material:	glass
Diameter:	12 mm
Zero point:	pH = 7.0 ± 0.3
Electrolyte:	KCl 3 mol/l
Temperature sensor:	Pt 1000
Membrane shape:	sphere
pH range:	0 to 14
Connection cable:	
for SMEK-plug head:	e.g., LS 1 ANN (See also page with connecti-on cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for tempe-rature sensor

A 157 1M BNC ID
A 157 1M DIN ID
A 157 IDS

N 5900 A
N 5901
N 5904

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Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH glass	Membrane shape	Temp. range [°C]	Range [pH]	Connection	Remarks
285100080	A 157 IDS	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	IDS plug	IDS function
285130160	A 157 1M-DIN-ID[1)]	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	DIN plug[3)]	ID function
285130170	A 157 1M-BNC-ID[1)]	70/130	12/5	platinum	A	cylindrical	–5 to +100	0 to 14	BNC plug[3)]	ID function
285105135	N 5900 A	96[2)]	5	platinum	A	spherical	–5 to +100	0 to 14	DIN plug[3)]	Ag/AgCl ref.
285105846	N 5901	160[2)]	6	platinum	A	spherical	–5 to +100	0 to 14	plug head	Ag/AgCl ref.
285105879	N 5904	200[2)]	6	platinum	A	spherical	–5 to +100	0 to 14	plug head	Ag/AgCl ref.

[1)] with integrated temperature sensor Pt 1000
[2)] Length from upper end of standard taper (Standard taper NS 7.5)
[3)] with 1 m fixed cable

ScienceLine Metal combination electrodes

Metal combination electrodes with Silver/Silverchloride reference system, plug head and connection cable

Temp. range:	–5 to + 100 °C (except Pt 6140: + 10 to + 40 °C)
Ref. system:	Silamid®
Shaft material:	glass
Electrolyte:	KCl 3 mol/l (See also remarks)
Connection cable:	
for plug head:	e.g., L 1 A (See also page with connection cables)
fixed cable:	1 m long, with plug A acc. to DIN 19262 or with BNC plug

AgCl 62
AgCl 6280
AgCl 65
Ag 42 A
Ag 6180
Ag 62 IDS

Pt 61
Pt 6180
Pt 62
Pt 6280
Pt 6580

Pt 6880
Pt 6980

Pt 62 RG
Ag 62 RG
AgCl 62 RG
AgS 62 RG
Pt 62 RG
IDS

Pt 8280

Pt 5900 A
Pt 5900 BNC
Pt 5901

Metal Reference electrodes with pH glass membrane reference system and plug head for titrations

Temp. range:	-5 to + 100 °C
Reference system:	pH glass membrane Type A
Shaft material:	glass
Length:	120 mm
Diameter:	12 mm
Connection cable	
for plug head:	z.B. L 1 A

(please refer to the page “connection cables”)

Ag 6280
Ag 6580
Au 6280

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Order No.	Type No.	Length L [mm]	Junction	Ø [mm]	Sensor Metal, shape	Connection	Remarks
285102208	Ag 6180	170	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102150	Ag 62 IDS	120	platinum	12	Ag, cap, 5 mm Ø	plug head	IDS
285102090	Ag 62 RG	120	–	12	Pt bearing – silver coated,		
285102343	Ag 6280	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102216	Ag 6580	1031)	ceramic	10	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102100	AgCl 62 RG	120	–	12	Pt bearing – silver coated, chlorinated, ring, 6 mm Ø	plug head	
285102413	AgCl 62[3)]	120	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102351	AgCl 6280[3)]	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
1061051	AgCl 65[3)]	1031)	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102110	AgS 62 RG	120	–	12	Pt bearing – silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102121	Au 6280	120	ceramic	12	Au, pole, 2 mm Ø	plug head	
285105192	Pt 5900 A	962)	platinum	5	Pt, pole, 1 mm Ø	DIN plug[4)]	Ag/AgCl ref.
285105702	Pt 5900 BNC	962)	platinum	5	Pt, pole, 1 mm Ø	BNC plug[4)]	Ag/AgCl ref.
285105065	Pt 5901	1602)	platinum	5	Pt, pole, 1 mm Ø	plug head	
285102002	Pt 61	170	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102232	Pt 6180	170	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102019	Pt 62	120	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102070	Pt 62 RG	120	–	12	Pt, ring, 6 mm Ø	plug head	
285102140	Pt 62 RG IDS	120	–	12	Pt, ring, 6 mm Ø	plug head	IDS
285102249	Pt 6280	120	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102257	Pt 6580	1031)	ceramic	10	Pt, pole, 1 mm Ø	plug head	
285100075	Pt 6880	120	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102265	Pt 6980	170	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102281	Pt 8280	120	KPG®	12	Pt, round, 6 mm Ø	plug head	electrolyte Referid®
285102110	AgS 62 RG	120	–	12	Pt bearing – silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102070	Pt 62 RG	120	–	12	Pt, ring, 6 mm Ø	plug head	

[1)] Length from upper end of standard taper; standard taper NS 14.5
[2)] Length from upper end of standard taper; standard taper NS 7.5
[3)] Sensor coated with AgCl
[4)] with 1 m fixed cable

ScienceLine Single electrodes: pH glass and metal electrodes

ScienceLine single electrodes

pH glass electrodes

Reference system: Silamid®
Shaft material: glass, 12 mm Ø
Zero point: pH = 7.0 ± 0.3
Membrane shape: sphere
Connection cable: e.g., L 1 A

Metal electrodes

Shaft material: glass, 12 mm Ø
(See remarks)

A 1180
H 1180

Ag 1100

KF 1100
KF1150

Pt 1400
Pt 1200

Pt 1800

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Order No.	Type No.	Length L [mm]	pH glass	Range [pH]	Temp.-range [°C]	Remarks
1057997	A 1180[1]	120	H	0 to 14	0 to +80	plug head
285103212	H 1180	120	H	0 to 14	10 to +100	plug head

Order No.	Type No.	Length L [mm]	Sensor Metal	Sensor shape	Temp. range [°C]	Remarks
285103607	Ag 1100	120	Ag	cap, 4 mm Ø	–5 to +100	plug head, cable e.g., L 1 A
285102030	KF 1100	96[1]	Pt[2]	2 pole, 1 mm Ø	–30 to +135	shaft 5 mm Ø, standard taper NS 7.5, fixed cable, 2 x 4-mm plug
285102060	KF 1150	116[1]	Pt[2]	2 pole, 1 mm Ø	–30 to +135	shaft 5 mm Ø, standard taper NS 7.5, fixed cable, 2 x 4-mm plug
285103512	Pt 1200	120	Pt[2]	2 pole, 1 mm Ø	–30 to +135	plug head, cable e.g., L 1 NN
285103537	Pt 1400	103[1]	Pt[2]	2 pole, 1 mm Ø	–30 to +135	shaft 10 mm Ø, standard taper NS 14.5, cable e.g., L 1 NN
285103553	Pt 1800	120	Pt	ring, 6 mm Ø	–30 to +135	plug head, cable e.g., L 1 A

[1] Length from upper end of standard taper

[2] Double platinum electrode

ScienceLine single electrodes: Reference electrodes

Reference electrodes

Shaft material:	glass
Electrolyte depending on reference system:	
Ag/AgCl:	KCl 3 mol/l, e.g., L 300
Calomel:	KCl 4.2 mol/l, e.g., L 420
Hg/Hg_2SO_4:	K_2SO_4 0.6 mol/l, e.g., L 1254
pH range:	0 to 14
Connection cable:	e.g., L 1N

B 2220+ | *B 2420+* | *B 2820+ B 2920+* | *B 3420+ B 3520+ B 3610+* | *B 3920+*

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Order No.	Type No.	Length L [mm]	Ø [mm]	Temp. range [°C]	Junction	Reference system	Remarks
1069994	B 2220 +	120	12	–5 to + 100	platinum	Ag / AgCl	double electrolyte system
1070028	B 2420 +	120	12	–5 to + 100	ground joint	Ag / AgCl	
1070044	B 2820 +	120	12	–5 to + 100	ceramic	Ag / AgCl	
1070046	B 2920 +	120	12	–5 to + 100	platinum	Ag / AgCl	
1070070	B 3420 +	103[1)]	10	–5 to + 100	ceramic	Ag / AgCl	standard taper NS 14.5
1070073	B 3520 +	103[1)]	10	–5 to + 100	platinum	Ag / AgCl	standard taper NS 14.5
1070074	B 3610 +	103[1)]	10	+ 15 to + 40	ceramic	Hg/Hg_2SO_4	standard taper NS 14.5
1070075	B 3920 +	103[1)]	10	–5 to + 100	ground joint	Ag / AgCl	double electrolyte system, standard taper NS 14.5

[1)] Length from upper end of standard taper

ScienceLine conductivity cells with fixed cable

Conductivity measuring cells with fixed cable

Temperature sensor: NTC 30 kΩ

LF 313 T IDS

LF 413 T IDS
LF 413 T3M IDS

LF 413T 3M Fork IDS

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Order No.	Type No.	Length L [mm]	Ø [mm]	Sensor	Cell const. ~ [cm^{-1}]	Temp. range [°C]	Meas. range[1)] [µS/cm] . . . [mS/cm]	Remarks
285202430	LF 313 T IDS	120	12	Stainless steel	0.1	–5 to +100	0 to 0.2	Ultrapure water conductivity cell **with** flow-through vessel, stainless steel shaft, cable 1.5 m, IDS function
285202410	LF 413 T-IDS	120	15.3	4 x Graphite	0.475	–5 to +80	1 to 2,000	Plastic shaft, 1.5 m cable, IDS function
285202420	LF 435 T 3M IDS	120	15.3	4 x Graphite	0.475	–5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function
285106290	LF 413 T 3M FORK IDS	120	15.3	4 x Graphite	0.47	–5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function

1) Outside the recommended ranges measuring errors > 10 % can occur with these conductivity measuring cells.

ScienceLine sensors for ammonia, sodium, oxygen and ion-selective indicator electrodes

Ammonia combination electrode with plug head

Shaft material:	plastic, 12 mm Ø
Connection cable:	e.g., L 1 A

Sodium combination electrode with plug head

Reference system:	Silamid®
Shaft material:	glass, 12 mm Ø
Zero point:	pNa = 2.0
Membrane shape:	sphere
Connection cable:	e.g., L 1 A

ISE measuring cells

Shaft material:	plastic
Length:	120 mm
Fixed cable:	1 m long, with DIN plug

ISE combination electrodes with plug head

Shaft material:	plastic
Length:	120 mm

NH 1100 *Na 61* *TEN 1100 PLH* *Cu 1100 PLH* *Ca 1100 PLH* *F 1100 PLH* *F 60* *Cl 60* *NO 60* *K 60* *CA 60* *CN 60* *AG-S 60* *I 60* *BR 60* *CU 60*

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Order No.	Type No.	Length L [mm]	Temp. [°C]	Measuring range [mg/l]	Remarks
285102808	NH 1100	120	0 … +50	0,1 … 1.000	Membranmodul austauschbar

Order No.	Type No.	Length L [mm]	Junction	Membrane Glass	Temp. range [°C]	Meas. range [pNa]	Remarks
285100026	Na 61	170	platinum	Na	-10 to +80	0 to 6	electrolyte KCl 3 mol/l, aqueous solution NaCl 0.1 mol/l

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285216268	Ca 1100 PLH	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285216273	Cu 1100 PLH	Copper	0 to +80	2 to 6	0.0006 to 6,400
285216295	F 1100 PLH	Fluoride	0 to +80	5 to 7	0.02 to saturated
285096980	TEN 1100 PLH	Lead	0 to +80	2 to 11	

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285130400	AG-S 60	Sulfide / silver	0 to +80	2 to 12	0.003 to 32,000 / 0.1 to 108,000
285130420	BR 60	Bromide	0 to +80	1 to 12	0.4 to 79,000
285130380	CA 60	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285130350	Cl 60	Chloride	0 to +80	2 to 12	2 to 35,000
285130390	CN 60	Cyanide	0 to +80	0 to 14	0.2 to 260
285130430	CU 60	Copper	0 to +80	2 to 6	0.0006 to 6400
285130340	F 60	Fluoride	0 to +80	5 to 7	0.02 to saturated
285130410	I 60	Iodide	0 to +80	0 to 14	0.006 to 127,000
285130370	K 60	Potassium	0 to +40	2 to 12	0.04 to 39,000
285130360	NO 60	Nitrate	0 to +40	2.5 to 11	0.4 to 62,000

[1] Other cable lengths available on request

Resistance thermometers

Resistance thermometers with 1 m fixed cable

Resistance thermometer with coaxial plug head

W 5780 NN

W 5790 NN
W 5791 NN

W 5980 NN

W 2180-KOAX

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Resistance thermometers with mit 1 m fixed cable

Order No.	Type No.	Lenght L [mm]	Ø [mm]	Sensor	Temp. range [°C]	Shaft material	Connection plug
285105221	W 5780 NN	120	6	Pt 1.000	–30 … +135	glass	2 x 4 mm Ø
285105254	W 5790 NN	120	4	Pt 1.000	–30 … +135	stainless steel	2 x 4 mm Ø
285105262	W 5791 NN	170	4	Pt 1.000	–30 … +135	stainless steel	2 x 4 mm Ø
285105287	W 5980 NN	96[1)]	5 NS 7,5	Pt 1.000	–30 … +135	glass	2 x 4 mm Ø

[1)] length from upper end of standard taper

Resistance thermometers with coaxial plug heads

Order No.	Type No.	Length L [mm]	Ø [mm]	Sensor	Temp. range [°C]	Shaft material
285119030	W 2180-KOAX	120	12	Pt 1.000	–30 … +135	glass

ScienceLine plus Electrodes

This new line from SI-Analytics provides edge-cutting advantages for precision measurement in all kind of samples. All pH electrodes of the ScienceLine Plus series have a double reference with silver-ion trap. This allows universal use even in protein or sulfide containing samples. The inner reference is a maintenance free encapsulated gel system, the outer bridge electrolyte consists of the proven 3 mol/l KCl. This electrolyte can easily be replaced by other bridge electrolytes. Depending on the model ScienceLine Plus has ceramic or platinum wire junctions for the best contact to the sample.

Common characteristics:

- Silamid®-reference system with silver ion barrier and double electrolyte
- Temperature range: -5 to 100 °C
- 0 to 14 pH
- Glass shaft
- Electrolyte: KCl 3mol/l

SCPpH-A120MF *SCPpHT-MIC-AMF* *SCPpHT-A170MF*

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Type no.	Order no.	Length	Ø [mm]	Junction	pH glass	Membrane shape	Sensor function	Temperature sensor	Connection
SCPpH-A120MF	285101300	120 mm	12	Pt	A	Sphere	pH		Plug head
SCPpH-H170MF	285101305	170 mm	12	Pt	H	Sphere	pH		Plug Head
SCPpHT-A170MF-3M-IDS [1]	285101310	170 mm	12	Pt	A	Sphere	pH + temp.	NTC 30 kΩ	Digital plug
SCPpHT-A170MF-3M-DIN-N [1]	285101320	170 mm	12	Pt	A	Sphere	pH + temp.	Pt 1000	DIN + banana plug
SCPpHT-H170MF-3M-DIN-N [1]	285101325	170 mm	12	Pt	H	Sphere	pH + temp.	Pt 1000	DIN + banana plug
SCPpH-MIC-AMF [2]	285101330	70/130 mm	12/5	Pt	A	Cylindrical	pH		Plug head
SCPpHT-MIC-AMF-3M-DIN-N [1] [2]	285101335	70/130 mm	12/5	Pt	A	Cylindrical	pH + temp.	Pt 1000	DIN + banana plug
SCPpHT-MIC-AMF-3M-IDS [1] [2]	285101345	70/130 mm	12/5	Pt	A	Cylindrical	pH + temp.	NTC 30 kΩ	Digital plug

[1] With 3 m fixed cable
[2] Micro-electrode

SCPpH-A120MF

- With universal A glass for standard samples, or with H glass, also suitable for strongly basic media
- With plug head for connecting suitable cables
- 170 mm shaft length for the H glass version

SCPpHT-MIC-AMF

- It has an extra-long shaft (5 mm diameter) and built-in temperature sensor, available also as IDS model.
- Plug head variant for customized connections
- Models with DIN and IDS connectors

The SCPpHT family with automatic temperature compensation:

The SCPpHT electrodes are pH electrodes with 170 mm shaft length and built-in temperature sensor Pt1000 resp. NTC 30 kOhm (IDS). They have 3 m fixed cable with different connectors (DIN with 4 mm banana plug or IDS-connector). The last one allows the use of devices with IDS input for storing calibration data and automatic electrode data transfer.

- A glass model for universal application (DIN or IDS connector)
- H glass model also for strongly alkaline samples (DIN plug)

OptiLine 6 for photometric titrations

Many titration applications and methods, e.g., N Ph. Eur or USP prescribe the use of an indicator for the titration end point. There are also methods that explicitly require the use of a photometric sensor.

The OptiLine 6 is a photometric sensor that can be used like any other sensor. Thanks to the additional analog BNC / DIN connection, it can be connected to any titrator or even a pH meter with an appropriate measuring input. The power supply is included in the USB hub, which is in the scope of delivery.

OptiLine 6

Benefits OptiLine

- **6 wavelengths over a wide range: 470, 520, 570, 590, 605 and 625**
- **The wavelengths are adjustable via TitroLine® 7XXX1)**
- **100% resistant against solvents due to shaft made out of titanium. This makes a very wide range of applications possible**
- **Very compact. Fits into each standard titration clamp/-head.**
- **Easy to clean. Simply rinse with solvent and / or water**

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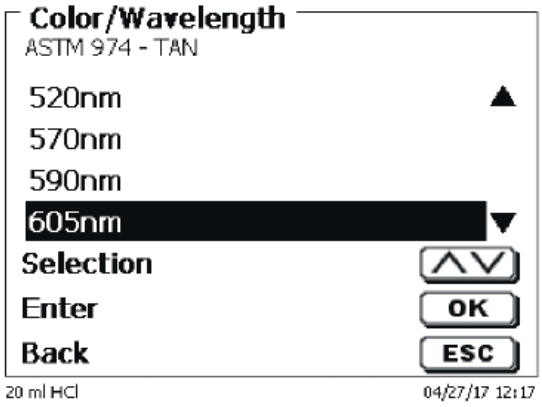

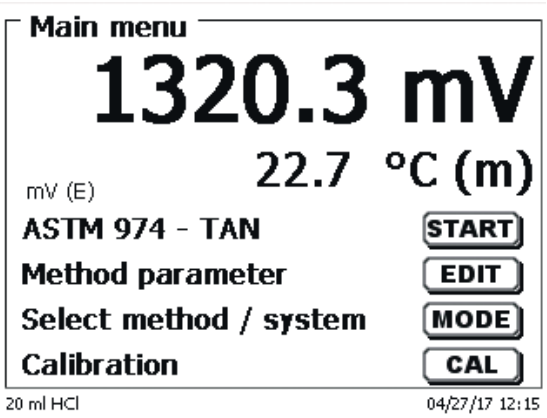

The OptiLine 6 is connected to the titrator TitroLine® 7000, 7750 and 7800 via the USB connector. The sensor is supplied with current and detected as a digital sensor. This allows the setting of the wavelengths and other parameters such as the intensity via the titrator or the TitriSoft software within the titration method.

Typical applications for the OptiLine 6:

- Titrations according to PH.Eur. and USP, which require the use of an indicator
- Titration of Chondroitin sulfate-sodium according to Ph.Eur. and USP
- Determination of the carboxyl end groups in PET (non-aqueous titration)
- TAN/TBN according to ASTM D974 (non-aqueous titration)
- Titration of sulfate (indicator Thorin)
- Determination of Ca/Mg and total hardness. All other complexometric titrations can be carried out as well

Ordering information OptiLine 6

Order no.	Type no.	Length L [mm]	Measuring range [mV]	Other features
285221300	OptiLine 6	132	0 … 2.000	Selectable wavelengths

Technical Data OptiLine 6

Shaft diameter	12 mm
Shaft length:	132 mm
Minimum immersion depth:	25 mm
Shaft material:	Titanium
Cable:	fixed, 2 m
Connections:	USB-plug A, BNC-plug with BNC-DIN-adapter
Power supply:	via USB
Measuring range:	0 – 2000 mV
Temperature range:	0 – 50 °C
pH-range:	0 - 14
Adjustable wavelength (nm):	470, 520, 570, 590, 605 and 625

Buffer and electrolyte Solutions

Buffer solutions in the unique double-end ampoules offer a particularly high degree of reliability and measuring accuracy.

The exactness of the pH measurement is mainly dependent on the accuracy of calibration. This again highly depends on the reliability of the buffer.

Hermetically sealed in the glass ampoule and sterilized with hot steam, same as a pharmaceutical product, the buffer solutions free of preservation agent have an extremely long shelf life and guarantee continuously error-free characteristics.

The ampoules can be easily opened at the breaking point. Tools are not required. Since refilling is not possible, you are always ensured of maximum calibration reliability.

Standard buffer solutions according to DIN 19 266

Hot steam sterilized for longer stability, no preservation agents used.

Order No.	Type No.	pH value at 25 °C	Contents
285137977	L 4791	1.68	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138246	L 4794	4.01	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138254	L 4796	6.87	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138262	L 4799	9.18	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138402	L 4790	4.01 / 6.87	2 x 30 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285137985	L 4797	1.68 / 6.87 / 9.18	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138238	L 4798	4.01 / 6.87 / 9.18	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138279	L 4893 / Set	4.01 / 6.87	2 x 9 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate, with electrolyte solution L 3008
Order No.	Type No.	pH value at 25 °C	Contents
285137841	L 168	1.68	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285137677	L 1684	1.68	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138098	L 401	4.01	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138008	L 4014	4.01	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138102	L 687	6.87	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138016	L 6874	6.87	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138119	L 918	9.18	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138024	L 9184	9.18	250 ml in DURAN® glass bottle, with manufacturer's certificate

* 20 ml volume = ~17 ml content

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Benefits of Ampoules

- **Highest measurement reliability**
- **Extremely long storage times, thanks to hot-steam sterilization**
- **No preservative agents**
- **Maximize calibration reliability**

Technical buffer solutions

Hot steam sterilized for longer stability, no preservation agents used.

Order No.	Type No.	pH value at 25 °C	Contents
285138213	L 4694	4.00	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138221	L 4697	7.00	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138205	L 4691	10.01	60 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138398	L 4690	4.00/7.00	2 x 30 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138192	L 4698	4.00/7.00/10.01	3 x 20 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate
285138632	L 4895/Set	4.00/7.00	2 x 9 FIOLAX® ampoules à 20 ml*, with manufacturer's certificate, with electrolyte solution L 3008,

Order No.	Type No.	pH value at 25 °C	Contents
285138727	L 400	4.00	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138032	L 4004	4.00	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138735	L 700	7.00	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138049	L 7004	7.00	250 ml in DURAN® glass bottle, with manufacturer's certificate
285138719	L 100	10.01	1,000 ml in DURAN® glass bottle, with manufacturer's certificate
285138057	L 1004	10.01	250 ml in DURAN® glass bottle, with manufacturer's certificate

* 20 ml volume = ~17 ml content

Buffer and electrolyte solutions

Technical buffer solutions

Color-coded, in plastic bottles

Order No.	Type No.	pH value at 25 °C	Contents
285139156	LC 4004 K	4.01	250 ml in PE bottle
285139189	LC 7004 K	7.00	250 ml in PE bottle
285139218	LC 1004 K	10.01	250 ml in PE bottle

Electrolyte solutions, aqueous

for reference electrodes, as electrolyte bridges and for storage

Order No.	Type No.	Description	Contents
285136956	L 101	potassium chloride solution 1 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138649	L 1254	potassium sulfate solution 0.6 mol/l	250 ml in DURAN® glass bottle
285138151	L 200	low temperature electrolyte (–30 °C)	1,000 ml in DURAN® glass bottle
285138365	L 2004	low temperature electrolyte (–30 °C)	250 ml in DURAN® glass bottle
285138349	L 2114	2 mol/l KNO_3 + 0.001 mol/l KCl for Ag combination electrodes	250 ml in DURAN® glass bottle
285136923	L 2214	2 mol/l KNO_3 + 0.001 mol/l KCl for Ag combination electrodes, thickened	250 ml in DURAN® glass bottle
285138332	L 2224	potassium chloride solution 2 mol/l	250 ml in DURAN® glass bottle
285138554	L 300	potassium chloride solution 3 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138427	L 3004	potassium chloride solution 3 mol/l	250 ml in DURAN® glass bottle, sterilized
285138505	L 3008	potassium chloride solution 3 mol/l	50 ml in PE bottle
285138419	L 3014	potassium chloride solution 3 mol/l, Ag/AgCl saturated	250 ml in DURAN® glass bottle
285138468	L 310	potassium chloride solution 2 mol/l, gel for sterilizable electrodes	1,000 ml in DURAN® glass bottle
285138484	L 3104	potassium chloride solution 2 mol/l, gel for sterilizable electrodes	250 ml in DURAN® glass bottle
285138702	L 320 K	potassium chloride solution 2 mol/l, gel for Ag_2S electrodes	1,000 ml in DURAN® glass bottle
285138143	L 350	potassium chloride solution 3.5 mol/l	1,000 ml in DURAN® glass bottle, sterilized
285138127	L 3504	potassium chloride solution 3.5 mol/l	250 ml in DURAN® glass bottle, sterilized
285138587	L 420	potassium chloride solution 4.2 mol/l	1,000 ml in DURAN® glass bottle
285138608	L 4204	potassium chloride solution 4.2 mol/l	250 ml in DURAN® glass bottle
285138590	L 911	storage electrolyte solution, sterilized	1,000 ml in DURAN® glass bottle
285138560	L 9114	storage electrolyte solution, sterilized	250 ml in DURAN® glass bottle

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Electrolyte solutions, organic

for measurements in organic solutions for reference electrodes and as electrolyte bridges

Order No.	Type No.	Description	Contents
285138324	L 5014	LiCl saturated in glacial acetic acid	250 ml in DURAN® glass bottle
285138308	L 5034	LiCl 1,5 mol/l in ethanol	250 ml in DURAN® glass bottle

Solutions for oxygen measurements

Order No.	Type No.	Description	Contents
285138513	L 6708	electrolyte for oxygen electrodes OX 1100 / OX 1100 + / OX 1101	50 ml in PE bottle
285126606	OX 920	electrolyte for oxygen electrodes 9009 / 61	50 ml in PE bottle
285126614	OX 921	cleaning solution for oxygen electrodes 9009 / 6130 ml in PE bottle	
285138287	OX 060	zero point solution for oxygen electrodes OX 1100 / OX 1100 +	60 FIOLAX® ampoules à 20 ml volume = ~17 ml content

Solutions for ammonia measurements

Order No.	Type No.	Description	Contents
285137344	L 6408	electrolyte for ammonia combination electrodes	50 ml in PE bottle

Buffer and electrolyte solutions

Solutions and accessories for conductivity measurements

Order No.	Type No.	Description	Contents
285126503	LF 990	test solution KCl 0.001 mol/l (147 µS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126511	LF 991	test solution KCl 0.01 mol/l (1.41 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126528	LF 992	test solution KCl 0.1 mol/l (12.9 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126293	LF 995	test solutions KCl 0.01 / 0.1 / 1 mol/l (1.41 / 12.9 / 112 mS/cm)	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285126166	LF 1000 / Set	same as LF 999 / set, in addition platinizing vessel and cable B 1 N	3 x 6 FIOLAX® ampoules à 20 ml*, with manufacturer certificate
285136907	LF 1024	test solution KCl 0.01 mol/l (1.41 mS/cm)	250 ml in PE bottle
285126530	LF CSKC13	test solution KCl 1.3 µS/cm (maximum shelf life: unopened three months, opened six hours)	250 ml in PE bottle
285126540	LF CSKC5	test solution KCl 5.0 µS/cm, (maximum shelf life: six months)	500 ml in PE bottle

* 20 ml volume = ~17 ml content

ORP electrode solutions

Order No.	Type No.	Redox voltage Pt/Calomel (KCl sat.)	Pt/Ag/AgCl (KCl 3 mol/l)	Contents
285138373	L 4619	180 mV	220 mV	60 FIOLAX® ampoules à 20 ml*, acc. to DIN 38 404-C6
285138357	L 4643	430 mV	470 mV	60 FIOLAX® ampoules à 20 ml*,
285138381	L 4660	600 mV	640 mV	60 FIOLAX® ampoules à 20 ml*
285138784	L 4648	180, 430, 600 mV	220, 470, 640 mV	3 x 20 FIOLAX® ampoules à 20 ml*
285138184	L 430	430 mV	470 mV	1,000 ml in DURAN® glass bottle
285138168	L 4304	430 mV	470 mV	250 ml in DURAN® glass bottle

* 20 ml volume = ~17 ml content

Cleaning solutions for combination electrodes and reference electrodes

Order No.	Type No.	Description	Contents
285138538	L 510	pepsin / hydrochloric acid solution	1,000 ml in DURAN® glass bottle
285138295	L 5104	pepsin / hydrochloric acid solution	250 ml in DURAN® glass bottle

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Accessories for Electrodes

Order No.	Type No.	Description
285126482	NH 928	electrolyte for ammonia electrodes in 50 ml plastic bottle, 3 membrane modules
285126499	NH 995	membrane module set: 3 membrane modules, 3 caps
285215229	TZ 1520	taper adapter NS 14.5 of PTFE for electrodes with Ø 12 mm shaft
285123136	Z 451	measuring and storage vessel with sleeve NS 7.5/16
285123170	Z 453	electrode vessel for storing electrodes with Ø 12 mm shaft
285123152	Z 461	measuring and storage vessel with sleeve NS 14.5/23
285123185	Z 472	watering cap for electrodes with Ø 12 mm shaft

Z 453

Connection cables

1) Electrode socket/plug

Coaxial plug for pH, redox, ammonia and sodium combination electrodes, pH and redox single electrodes as well as reference electrodes in Plus series.

L Socket

2) Instrument connector/plug

A (DIN 19 262)

BNC

N - Banana

Order No.	Type No.	1) Electrode socket/plug	2) Instrument connector/plug	Cable length and type
285121916	B 1 N	reference electrode plug (B)	Banana plug (N)	1 m single conductor cable
285122456	L 1 A	electrode plug (L)	DIN instrument plug (A)	1 m coax. cable
285122497	L 1 BNC	electrode plug (L)	BNC instrument plug	1 m coax. cable
285122550	L 2 N	electrode plug (L)	Banana plug (N)	2 m coax. cable
285122457	L 1 N	electrode plug (L)	Banana plug (N)	1 m coax. cable
285122489	L 1 NN	electrode plug (L)	2 x banana plug (N)	1 m coax. cable
285122464	L 2 A	electrode plug (L)	DIN instrument plug (A)	2 m coax. cable
285122448	L 2 NN	electrode plug (L)	2 x 4 mm banana plug (N)	2 m coax. cable

Please ask for more plug and cable combinations.