CLR: PROBLEM SOLVING IN ELECTROCHEMICAL ANALYSIS

ELECTRODES PRODUCT CATALOGUE

CLR Electrode Line:
Sensors of
pH,
ORP,
Temperature

This catalogue only includes the electrodes line. We also design and manufacture:

Linea VOC
Chambers for VOC emission test according to ISO 16000-9, GEV Emicode, UNI 717-1
Chambers for test or conditioning in controlled atmosphere

ISE: series of ion selective electrodes, supplied c/w laboratory instruments and industrial , microprocessor based, instruments.

Antimony probes for the measure of pH; sensors for through flow and immersion installation, sensors for direct installation in pipelines; supplied c/w industrial microprocessor based instruments.

Conductivity line: conductivity cells for laboratory use and for industrial applications, suitable for through flow and immersion installations and sensors for direct installation in closed pipelines and tanks. Supplied c/w laboratory instruments, portable instruments and industrial microprocessor based, instruments.

Selective analysers for oxidising substances: series of high selectivity, high reliability analysers for the measure of chlorine, chlorine dioxide, chlorites, ozone, peracetic acid, hydrogen peroxide, bromine, permanganate and other oxidisers, at high and low concentrations .

Selective analysers for reducing substances: series of high selectivity, high reliability analysers for the measure of metabisulfite, sulphur dioxide, bisulphites and other reducing substances at high and low concentrations.

Oxygen analysers: series of sensors for laboratory applications supplied c/w laboratory or portable instruments; series of sensors for industrial applications, suitable for immersion installation and direct installation in tanks and pipelines; supplied c/w industrial, microprocessor based, instruments.

Turbidity analysers: series of sensors for through flow installation. immersion installation and direct installation into pipelines, supplied c/w industrial, microprocessor based, instruments.

Laboratory Line: electrodes, cells and instruments for laboratory use.

Portable analysers: portable sensors and instruments for on site analysis of pH, ORP, conductivity and oxygen

Aquamaster: multiparametric analyser with data logger capability and radio frequency data transmission.

To have some more information on our production pls visit our web site
www.clritalia.com
or ask our complete product catalogue on CD-ROM.

TABLE OF CONTENTS

NOTES:
1. Measures indicated in the present Catalogue are indicative.
2. CLR reserves the right to make modifications without giving previous notice.

Introduction

Company Profile

CLR Srl has been established in October 1987 by two people, each of them with twenty years long experience in the manufacturing of electrodes for electrochemical measures.
Further experience gained in these years allowed CLR to develop, for measuring membrane, some glass with innovative characteristics. A controlled manufacturing process has been organised in order to obtain electrodes of high quality.
During its life CLR has maintained its own distinctive peculiarity of being an innovative company, oriented to Customer satisfaction and product quality and for this purpose has been successfully certified ISO9001:2008.
CLR capacity of improvement is due both to the professional contribute of its technicians to R&D and to the constant co-operation with qualified consultant and National Research Boards.

CLR is a reference for Customers because, being able to supply a wide range of electrodes and to manufacture customised sensors, can supply the proper sensor for each application.
CLR electrodes are used in a wide range of markets: laboratories, research, university, water&waste, food and beverage industry, chemical and petrochemical industry, pulp and paper industry, galvanic & electrochemical industry, agricultural, environmental.
In this perspective we have developed a positive co-operation with our customers, also thanks to our technical department, that is always available to find proper solutions to any application problem.
Keeping this aim always present in our minds we have been able to develop many innovative products and to gain a good leadership in domestic market.

Our product line

- Simple and combined pH electrodes, for laboratory and industrial applications, for high pressures, high and low temperatures, for semisolid substances, for low conductivity samples; reference electrodes for non acqueous solutions
- Electrodes for haemogasanalysis
- Electrodes for high temperature applications (up to 130°C)
- Electrodes for low temperature applications (0 to –30°C)
- Antimony pH electrodes
- Simple and combined ORP electrodes (platinum , gold, silver and others)
- AgCl, calomel, $HgSO_4$, HgO, thallium chloride reference electrodes
- Conductivity cells for industrial and laboratory applications, with platinum, graphite, SS 316 electrodes, working up to 500 bar and 500 °C; Ex executions
- Polarographic laboratory and industrial cells for dissolved oxygen measurements
- Industrial cells for chlorine measure
- Industrial cells for specific oxidising substances measures
- Industrial cells for specific reducing substances measures
- True corrosion rate monitors suitable to operate up to 250 °C and 150 bar
- SS 316 probes for electrode insertion in pressurised vessels
- Immersion and through flow electrode fitting, with mechanical or chemical automatic cleaning systems; same suitable for Zone 0 also
- R&D of innovative sensors for new chemical processes
- On site hypochlorite generators
- Electrochemical equipment for water depuration

Choosing the best pH or ORP electrode for each application

APPLICATION	RECOMMENDED ELECTRODE pH Mod.101 ORP Mod.201
Aqueous solutions	Series -L, series -P or series -GEL electrodes
Cosmetic material, creams	Sharp shaped glass membrane electrodes (-A), c/w or w/o double junction, increased area porous diaphragm
Emulsions	Series -L, series -V or series -N electrodes, c/w or w/ o salt bridge, c/w or w/o increased area porous diaphragm, or c/w annular diaphragm
Sludge	Series -V or -N electrodes, c/w salt bridge and increased area porous diaphragm or synthetic annular diaphragm
Meats, vegetables, fruits	Series -A electrodes, ∅6 mm body with increased area porous diaphragm
Defluxion liquids	Series -GEL or -L electrodes, body with PTFE NS12 or NS6 conic fitting
Aqueous solutions with hydrofluoric acid	Electrode Mod.101F and 101SF, probe Series Sb0 antimony probes
Chemicals for photography	Series -L electrodes, with or w/o salt bridge
Small volume of liquids	Series -L electrodes, with NS6 PTFE conic fitting
Diaries, cheese	Series -D electrodes. ∅6 mm body, c/w salt bridge
Low conductivity solutions	Series –D or –ND electrodes
Milk, yogurt	Series -L , -X or -V electrodes, c/w salt bridge
Non aqueous solutions	Series -L , -V or N electrodes, c/w synthetic annular diaphragm; 301AgN reference electrodes
Surfaces (paper, leaves, skin)	Series -D electrodes
Industrial wastewater	Series -V, -N or -GEL electrodes Series SI0P, SI0Q probes with separate electrodes
Solutions with proteic matter	Series -L , -V , -N or -X electrodes, c/w salt bridge
Solutions with sulphides	Series L- or -V electrodes, c/w salt bridge or separated electrodes (calomel type reference)
Low temperature solutions	Any electrode with position # 3 of the code = 1
Highly fouling solutions	Series AP, series N electrodes, increased area porous diaphragm Series SI0P, SI0Q probes with separate electrodes

Require the help of our Technical Department to select the best suitable electrode for Your application.
We can also respond to Your specific needs manufacturing special electrodes suitable for any single application.
Contact us at tel.+39 (0)295328005, FAX +39 (0)2 95320020 or via E-mail at clrnet@tin.it

Order Code Breakdown

Pos.	1	2	3	4	5	6	7	8	9	10
	x01	x	x	x	x	x	x	x	x	x
Electrode group	x01									
Electrode type										
Various choices		x								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
ONLY FOR 201 AND S201: Metal										
Reserved				Z						
Gold				A						
Silver				B						
Platinum				C						
Platinum, annular				D						
For 101: Integral temperature sensor										
Not included				Z						
Pt100 sensor				A						
Pt1000 sensor				B						
ONLY for 301 industrial reference electrodes:										
Type of internal reference										
Internal reference Ag/AgCl				A						
Internal reference Hg/Hg_2Cl_2				B						
Internal reference Hg/HgO				C						
Internal reference $Hg/HgSO_4$				D						
Internal reference Hg/TlCl				E						
Reference version										
Standard					0					
Salt bridge, same salt					1					
Salt bridge, external electrolyte KCl					2					
Salt bridge, external electrolyte KCl gel					4					
Salt bridge, external electrolyte KNO_3					5					
Salt bridge, external electrolyte NaCl					6					
Salt bridge, external electrolyte KCl solid gel					7					
Specifica electrolyte for 301AgN reference electrode					8					
Liquid junction version										
Reserved						Z				
Standard, ∅ 1 mm ceramic diaphragm						A				
Increased area porous diaphragm						B				
Annular synthetic diaphragm						C				
Without prorous diaphragm						D				
Electrode body version										
Standard (∅12 mm, 120 mm length)							0			
PTFE conic fitting NS12							1			
PTFE conic fitting NS6							2			
Body ∅ 6 mm							3			
Body ∅ 4 mm							4			

Pos.	1	2	3	4	5	6	7	8	9	10
	x01	x	x	x	x	x	x	x	x	x
Cable or connector										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
Screw connector								F		
Screw connector, PG13.5								M		
SS head with flange, integral cable, 5 m length								Q		
Ex head ½" integral cable								R		
Ex head ½" threaded connector								S		
Ex head ½" NPT integral cable								T		
Ex head ½"NPT threaded connector								U		
Female connector ∅4 mm								V		
Special execution								Z		
Plugs										
No plug									0	
BNC coaxial									1	
DIN standard, coaxial									2	
LEMO coaxial									3	
Coaxial ∅ 12 mm (for Amel Polymetron Metrohm instruments)									4	
Coaxial american type (for Orion Beckman Corinig instruments)									5	
Coaxial for Radiometer instruments									6	
Banana type, ∅ 4 mm									7	
Banana type, ∅ 2 mm									8	
Silicone rubber sheath length (for 101N, 101ND, 201N, 201ND)										
Reserved										A
For 1000 mm probes										B
For 1500 mm probes										C
For 2000 mm probes										D
For probes longer than 2000 mm										Z

Order code breakdown is common for all types of electrodes.

Pos.1 code indicates the group of electrodes:

Pos.1 = 301 reference electrodes
Pos.1 = S101 simple pH measuring electrodes
Pos.1 = 101 combined pH measuring electrodes
Pos.1 = S201 simple ORP measuring electrodes
Pos.1 = 201 combined ORP electrodes

Code of Pos.2 indicates type of electrode and foreseen application; details on the meaning of this code can be found in following sections of this Catalogue (1.0, 2.0 and 3.0)

Pos.3 code allows to select the electrodes that can be used in low and in high temperature applications:

Pos.3 = 0 the electrode can be used inside the temperature limits stated in the electrode description
Pos.3 = 1 a special electrolyte allows the use of the electrodes in the 0÷ -30°C temperature range.
Pos.3 = 2 the electrodes can be used in the 0÷ +130°C temperature range.

Pos.4 code indicates:
for ORP electrodes, S201 and 201: the metal composing the measuring element,
for the pH electrodes (101): the integral temperature sensor,
for the industrial reference electrodes (301) the type of internal reference electrode

For 201 and S201 selection is: gold (Pos.4 = A), silver (Pos.4 = B), platinum (Pos.4 = C) and platinum, annular (Pos.4 = D).

For 101 selection is: integral sensor temperature sensor not included (Pos.4=Z), integral temperature sensor Pt100 (Pos.4 = A) integral temperature sensor Pt1000 (Pos.4 = B).

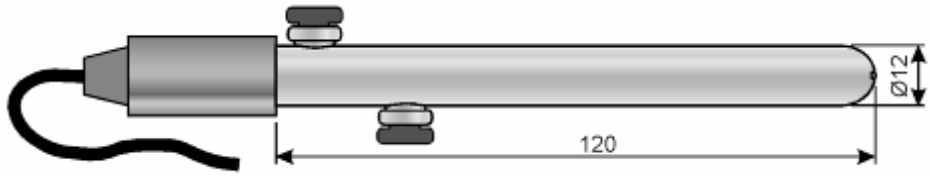
For 301 selection is: internal reference silver-silver chloride, Ag/AgCl (Pos.4=A), internal reference calomel, Hg/Hg_2Cl_2 (Pos.4=B), internal reference mercury-mercury oxide, Hg/HgO (Pos.4=C), internal reference mercury-mercury sulphate, $Hg/HgSO_4$ (Pos.4=D), internal reference mercury-thallium chloride, Hg/TlCl (Pos.4=E).

Pos.5 code indicates the type of reference (simple or with salt bridge) and is not selectable on simple pH and simple ORP measuring electrodes; for these electrodes the code is fixed to 0.

Salt bridge allows the use of these electrodes in fluids containing poisoning substances, where conventional references would be rapidly destroyed. The reference electrode is separated from process fluid through a salt bridge. Pos.5 = 4, 5 and 6 are salt bridge references where the external electrolyte is made with a salt different from the salt used for the inner electrolyte.

Pos.5 = 0 standard
Pos.5 = 0 salt bridge with external electrolyte made with the same salt of the internal electrolyte
Pos.5 = 2 salt bridge with external electrolyte made of KCl.
Pos.5 = 4 salt bridge with external electrolyte made of KCl gel
Pos.5 = 5 salt bridge with external electrolyte made of KNO_3
Pos.5 = 6 salt bridge with external electrolyte made of NaCl
Pos.5 = 7 salt bridge with external electrolyte made of KCl solid gel (ONLY for 101X and 201X)
Pos.5 = 8 specific electrolyte for 301AgN reference electrode

e.g.Salt bridge laboratory reference electrode, standard body 12 mm diameter 120 mm length.

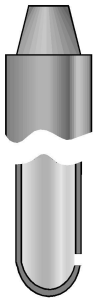


Pos.6 code indicates the type of liquid junction (diaphragm); this code is fixed to 0 for simple pH and simple ORP measuring electrodes.

Pos.6 = A Standard, single ceramic diaphragm , 1 mm diameter
Pos.6 = B Increased area porous diaphragm
Pos.6 = C Annular synthetic diaphragm
Pos.6 = D without porous diaprhagm

Pos.6 = A E.g. Reference electrode with standard version liquid junction, ceramic porous diaphragm Ø1 mm

These pH, ORP and reference electrodes are suitable for all common applications.



Pos.6 = B E.g. Reference electrode with increased area porous diaphragm
These pH, ORP and reference electrodes can be used for measures in fouling processes, in very thick substances, in emulsions.

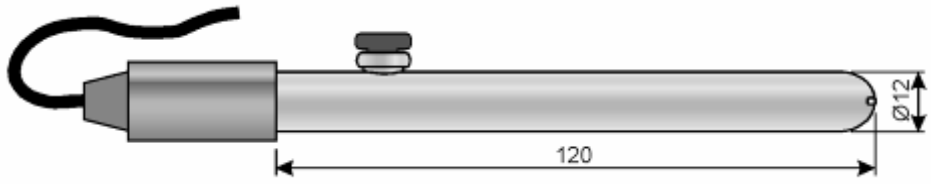
Pos.6 = C E.g. reference electrode with synthetic annular diaphragm
These pH, ORP and reference electrodes are suitable for measures in sludge and in non-aqueous solutions.

Pos.6 = A E.g. pH electrode without porous diaprhagm (101X)
The porous diaphragm is a small hole in the glass so the solid gel reference electrolyte is in direct contact with the solution under measure. (ONLY for 101X and 201X)

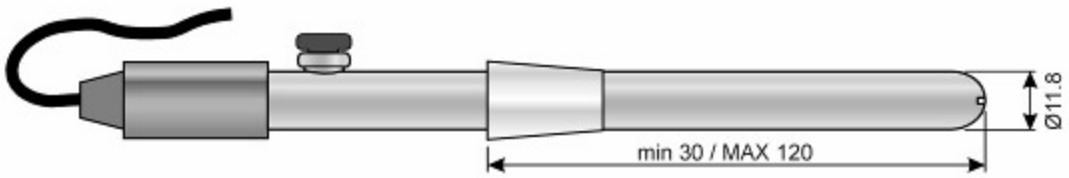
Pos.7 code indicates the electrode body conformation; it is fixed to 0 for industrial electrodes.
Allowed selections are:

Pos.7 = 0 Standard
Pos.7 = 1 PTFE conic fitting NS12
Pos.7 = 2 PTFE conic fitting NS6
Pos.7 = 3 6 mm diameter body
Pos.7 = 4 6 mm diameter body (not allowed for combined pH electrodes)

E.g. Pos.7 = 0
E.g. Reference electrode for laboratory applications with standard body Ø12, Mod.301xxx0A0xxA

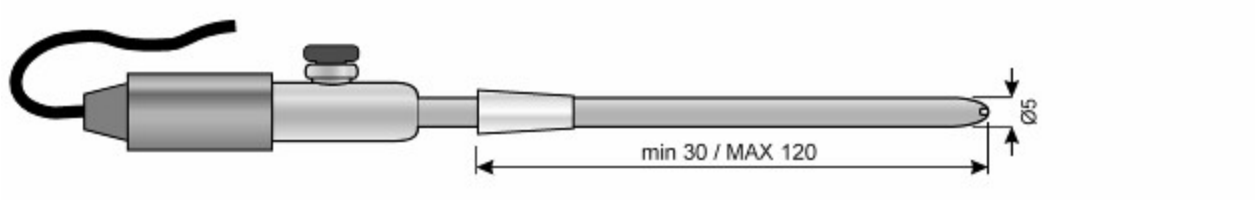


E.g. Pos.7 = 1



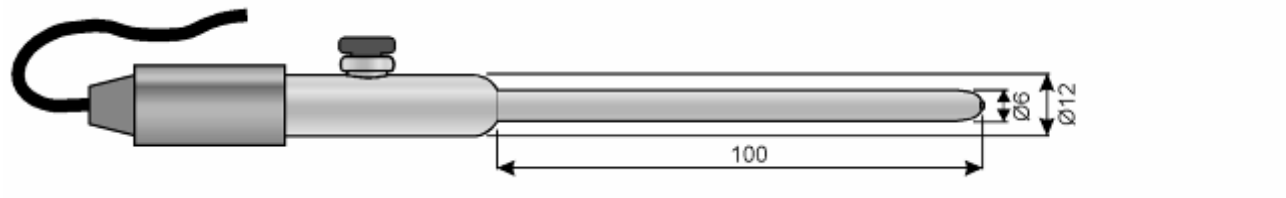
E.g. Reference electrode for laboratory applications with PTFE conic fitting NS12, Mod.301xxx0A1xxA
Electrodes with PTFE conic fitting, NS12. The conic fitting can be positioned along the electrode body. Suitable for the installation into through-flow cells ∅ 12 mm, Mod.D/16 (standard version) or Mod.D/16/T with temperature control system. Typical application is also the insertion into glass titration flasks.

E.g. Pos.7 = 2
E.g. Reference electrode for laboratory applications with PTFE conic fitting NS6, Mod.301xxx0A2xxA

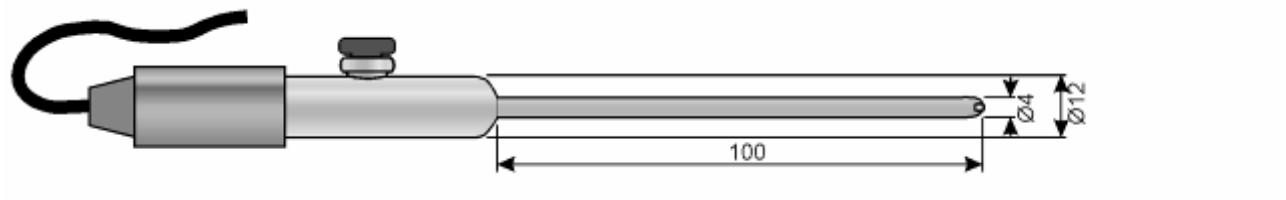


Electrodes with PTFE conic fitting, NS6 The conic fitting can be positioned along the electrode body. Suitable for the installation into through-flow cells ∅ 6 mm, Mod.D/16 (standard version) or Mod.D/16/T with temperature control system. Typical application is also the insertion into glass titration flasks and glass tubes.

E.g. Pos.7 = 3
E.g. Reference electrode for laboratory applications with ∅ 6 mm body, Mod.301xxx0A3xxA
Electrodes with ∅ 6 mm body



E.g. Pos.7 = 4
E.g. Reference electrode for laboratory applications ∅ 4 mm body, Mod.301xxx0A4xxA



Electrode with ∅ 4 mm body
For measures on small samples, directly into the tubes.

Pos.8 code indicates the cable or connector selection.
available versions are as follows:

Pos.8 = A Integral cable 1 m length
Pos.8 = B Integral cable 5 m length
Pos.8 = D Integral cable 10 m length
Pos.8 = E Integral cable 15 m length
Pos.8 = F Screw connector
Pos.8 = M Screw connector, PG13.5
Pos.8 = Q SS head with flange, integral cable, 5 m length
Pos.8 = R Ex head with sealed cable, ½"
Pos.8 = S Ex head with screwed connector, ½"
Pos.8 = T Ex head with sealed cable, ½" NPT
Pos.8 = U Ex head with screwed connector, ½" NPT
Pos.8 = V Female connector, , ∅ 4 mm
Pos.8 = Z Special execution

Not all these options are available on all models. Refer to each order code breakdown.
Various versions are detailed in Sect.6.0 of the present Catalogue.

Pos.9 code indicates the plugs for the connection instrument side.
Following plugs are available for the connection to the instrument:

Pos.9 = 0 No plug
Pos.9 = 1 BNC, coaxial, mounted
Pos.9 = 2 DIN standard, coaxial, mounted
Pos.9 = 3 LEMO coaxial
Pos.9 = 4 Coaxial ∅ 12 mm (for Amel Polymetron Metrohm instruments)
Pos.9 = 5 Coaxial, american type (for Orion Beckman Corning instruments)
Pos.9 = 6 Coaxial for Radiometer instruments
Pos.9 = 7 Banana type ∅ 4 mm
Pos.9 = 8 Banana type ∅ 2 mm

Not all these options are available on all models. Refer to each order code breakdown.
Refer to Sect.6.0 of this Catalogue for further information.

Pos.10 code indicates the length of the silicone rubber sheath for 101N, 10ND, 201N, 201ND electrodes
For all other models the code is fixed to A.

Pos.10 = A No silicone rubber sheath
Pos.10 = B for 1000 mm probes
Pos.10 = C for 1500 mm probes
Pos.10 = D for 2000 mm probes
Pos.10 = Z for probes longer than 2000 mm S

Electrolyte solutions, buffer solution
Refer to Sect.6.0 of the present Catalogue for the selection of refilling electrolyte solutions and buffer calibration solutions.


0306 1214

1.0 REFERENCE ELECTRODES

Reference electrode

Reference electrode function is to provide the fixed potential needed to compare the potential produced by measuring electrode, that is varying according to the concentration of the species under measure (H^+ ion for pH, oxidiser/reducer ratio for ORP,specific ion for ISE) .
More common reference electrodes are:
Silver: Ag/AgCl in KCl solution, (it is the most commonly used, can operate up to 130 °C)
Calomel: Hg/Hg_2Cl_2 in KCl solution (very good stability, high resistance against poisoning; can operate up to 50 °C)
Thallium chloride:Hg/TlCl in KCl solution (can operate up to 135 °C)
The reference solution (electrolyte) is in contact with the sample through the porous diaphragm (liquid junction) in order to achieve electrical continuity with the measuring electrode through the sample.
The electrolyte must always have a positive hydraulic head on the porous diaphragm, so that any pollution of the electrolyte itself is avoided and the diaphragm is kept clean (when porous diaphragm becomes fouled the measure is no more reliable).
Some expedients allow to increase the small flow of electrolyte out of the porous diaphragm: e.g. a reservoir can be installed in an position higher than the electrode so that it can give the positive hydraulic head on the diaphragm, while it also guarantees a good electrolyte reserve for long operating periods without refilling needs.
Another solution is the use of a salt bridge that is a chamber filled with an electrolyte solution and separated form the sample through a porous diaphragm. The reference electrode is immersed into the solution and in contact with it through its porous diaphragm. In this way the external electrolyte protects the reference electrode from any contamination.
This is the same principle of operation of the salt bridge electrodes.

Mod. 301AgN reference electrode has been developed for application in non acqueous solutions.

Pos.1 = 301 Laboratory reference electrodes

Order code breakdown

	301	x	x	Z	x	x	x	x	x	A
Laboratory reference electrode	301									
Reference type										
Silver Chloride - Ag/AgCl		L								
Calomel – Hg/Hg_2Cl_2		C								
Mercuric oxide – Hg/HgO		HGO								
Mercuric sulphate $Hg/HgSO_4$		HGS								
Thallium Chloride – Hg/TlCl		TH								
Silver Nitrate - $AgNO_3$ (Note 2)		AgN								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Fixed code				Z						
Reference version										
Standard/Standard					0					
Salt bridge, same salt					1					
Salt bridge, external salt KCl					2					
Salt bridge, external salt KCl gel					4					
Salt bridge, external salt KNO_3					5					
Salt bridge, external salt NaCl					6					
Specific electrolyte for 301AgN electrode					8					
Diaphragm version										
Reserved						Z				
Standard, 1 mm ceramic diaphragm						A				
Increased area porous diaphragm						B				
Annular synthetic diaphragm						C				
Electrode body version										
Standard (∅12 mm, 120 mm length)							0			
PTFE conic fitting NS12							1			
PTFE conic fitting, NS6							2			
Body diameter 6 mm							3			
Body diameter 4 mm							4			
Cable and connector (Note 1)										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
Screw connector, S7								F		
Screw connector, S7, PG13,5								M		
SS head with flange, integral cable, 5 m length								Q		
Female connector ∅ 4 mm								V		
Special execution								Z		

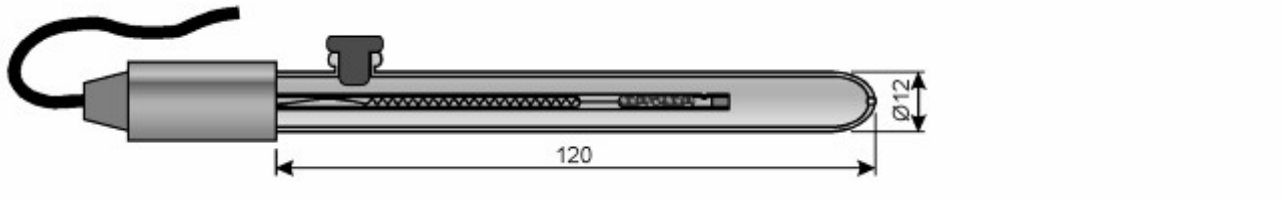
301	x	x	Z	x	x	x	x	x	A

Plug	
No plug	0
BNC coaxial plug, mounted	1
DIN standard coaxial plug	2
LEMO coaxial	3
Coaxial ∅ 12 mm	4
Coaxial american type	5
Coaxial for Radiometer instruments	6
Banana type ∅ 4 mm	7
Banana type ∅ 2 mm	8
Fixed Code	A

Note 1 : we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Note 2: for electrodes with acetonitrile - for application in non acqueous solutions

Reference electrode for laboratory applications, standard version, Mod.301



<u>Laboratory reference electrode: Pos.2 REFERENCE TYPE</u>

All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.301L
Laboratory reference electrode, Ag/AgCl, electrolyte: 3.3 M KCl , saturated with AgCl
The lateral spout allows to refill the electrolyte.
Applications: all standard laboratory uses.
Operating temperature limits: 0÷100 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301C
Laboratory reference electrode, calomel Hg/Hg_2Cl_2, electrolyte: saturated KCl solution.
The lateral spout allows to refill the electrolyte.
Applications: all those measures where high accuracy and high stability are required.
Operating temperature limits: 0÷50 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301HGO
Laboratory reference electrode Hg/HgO, electrolyte: saturated KOH solution.
The lateral spout allows to refill the electrolyte.
Operating temperature limits: 0÷50 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301HGS
Laboratory reference electrode, $Hg/HgSO_4$, electrolyte: saturated K_2SO_4 solution.
The lateral spout allows to refill the electrolyte.
Operating temperature limits: 0÷50 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301TH
Laboratory reference electrode, Hg/TICl, electrolyte: saturated KCl solution.
The lateral spout allows to refill the electrolyte.
Applications: all standard laboratory uses.
Operating temperature limits: 0÷100 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301AgN
Laboratory reference electrode, $Ag/AgNO_3$ reference, electrolyte: acetonitrile based solution or other according to application.
The lateral spout allows to refill the electrolyte.
Applications: laboratory use with non acqueous solutions.
Operating temperature limits: 0÷50 °C.
Operating pressure limits: maximum allowed immersion depth is 1 cm under the electrolyte level.

Mod.301/S: series of special electrodes designed and manufactured according to specific customer needs. contact our Technical Dept.

Pos.1 = 301 Industrial reference electrodes

Order code breakdown

	301	x	x	Z	0	x	x	x	x	A
Industrial reference electrodes	301									
Reference type										
Spout for electrolyte connection		I								
Gel filled		GEL								
Solid reference		BB								
Plastic body		P								
Plastic body, lateral filling hole		PB								
With electr. res. lateral spout 90°		KCl								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Type of internal reference										
Internal reference Ag/AgCl				A						
Internal reference Hg/Hg_2Cl_2				B						
Internal reference Hg/HgO				C						
Internal reference $Hg/HgSO_4$				D						
Internal reference Hg/TlCl				E						
Reference version										
Standard/Standard					0					
Salt bridge, same salt					1					
Salt bridge external salt KCl					2					
Salt bridge external salt KCl gel					4					
Salt bridge external salt KNO_3					5					
Salt bridge external salt NaCl					6					
Diaphragm version										
Reserved						Z				
Standard, ∅ 1mm ceramic diaphragm						A				
Increased area porous diaphragm						B				
Synthetic annular diaphragm						C				
Fixed code							0			

301	x	x	Z	0	x	x	x	x	A

Cable and connector (Note 2)	
Integral cable, 1 m length	A
Integral cable, 5 m length	C
Integral cable, 10 m length	D
Integral cable, 15 m length	E
Screw connector S7 (Note 1)	F
PG13.5 screwed connector,S7 (Note 1)	M
SS head with flange, integral cable, 5 m length	Q
Ex head with sealed cable, ½”	R
Ex head with S7 screw connection, ½”	S
Ex head with sealed cable, ½” NPT	T
Ex head with S7 screw connection, ½” NPT	U
Special execution	Z

Plug	
No plug	0
BNC, coaxial mounted	1
DIN standard, coaxial, mounted	2
Banana type, ∅ 4 mm	7

Fixed Code	A

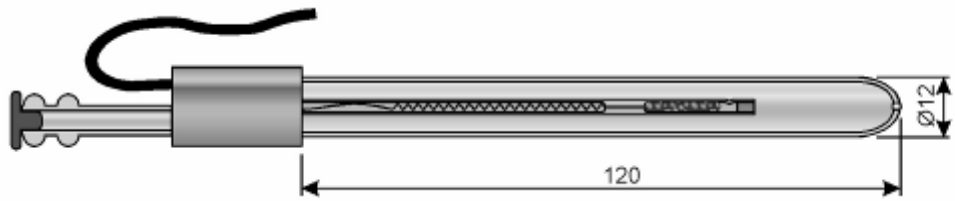
Note 1: Not available for Pos.2 = I

Note 2 : we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Industrial reference electrodes: Pos.2 REFERENCE TYPE

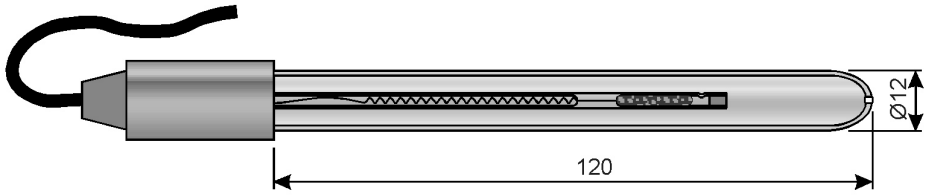
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.301I



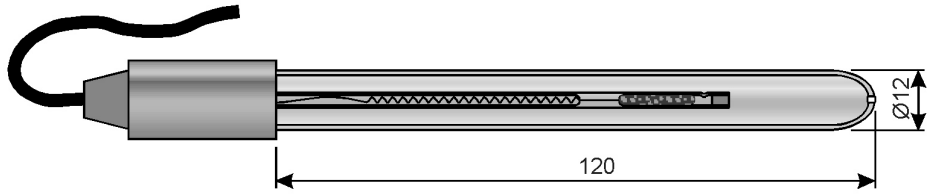
Industrial reference electrode; Ag/AgCl, electrolyte 3.3 M KCl solution, saturated with AgCl.
Glass spout for electrolyte refilling from electrolyte reservoir.
Suitable to be installed in immersion probes Mod.SI0A and SI0B, Mod.SI0G and SI0H and Mod.SI0I and in through flow probes Mod.D0A, D0C, D0D and Mod.D0E.
Operating temperature limits: 0÷100 °C
Operating pressure limits: immersion depth depends upon the height of installation of the electrolyte reservoir.

Mod.301GEL



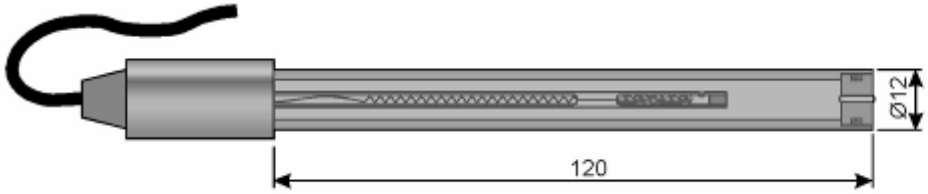
Industrial reference electrode; Ag/AgCl, KCl gel electrolyte.
No electrolyte refilling is required (low maintenance electrode).
Suitable to be installed in immersion probes Mod.SI0A, SI0B, Mod.SI0G and SI0H and in through flow probes Mod.D0A, D0C, D0D.
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.301BB



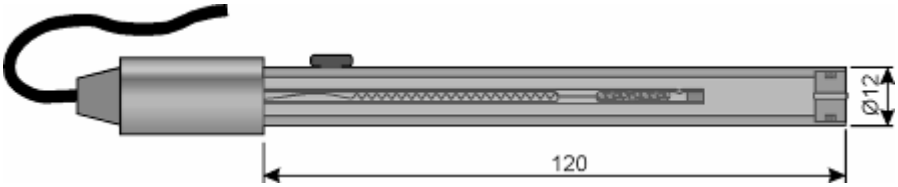
Industrial reference electrode, Ag/AgCl, solid KCl electrolyte.
No electrolyte refilling is required. Low maintenance electrode.
Solid electrolyte allows the use of this electrode with high temperatures and pressures.
Suitable to be installed in closed pipelines.
Operating temperature limits: 0÷110 °C
Operating pressure limits: 6 bar @ 20°C, atmospheric pressure @ 110°C

Mod.301P



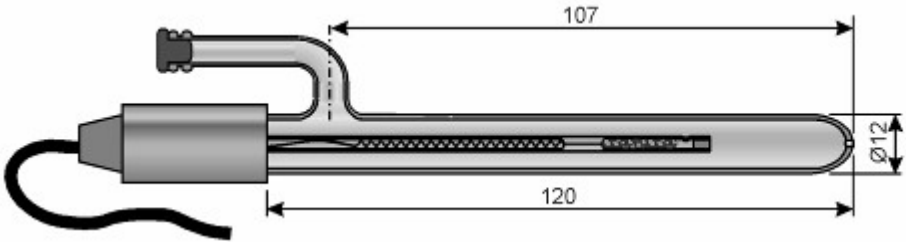
Industrial reference electrode, plastic body. Reference element Ag/AgCl, with gel KCl electrolyte.
No electrolyte refilling is required. Low maintenance electrode. Synthetic liquid junction.
This electrode is very sturdy, it is therefore indicated for the use with portable instruments. The plastic body makes it the electrode of choice also for use in solutions containing hydrofluoric acid.
Operating temperature limits: 0÷50 °C
Operating pressure limits:1 bar

Mod.301PB



Industrial reference electrode, plastic body, lateral refilling hole. Reference element Ag/AgCl, with liquid KCl electrolyte. Low maintenance electrode. Synthetic liquid junction.
This electrode is very sturdy, it is therefore indicated for the use with portable instruments. The plastic body makes it the electrode of choice also for use in solutions containing hydrofluoric acid.
Operating temperature limits: 0÷50 °C
Operating pressure limits:1 bar

Mod.301KCl



Industrial reference electrode; Ag/AgCl, electrolyte 3.3 M KCl solution, saturated with AgCl.
Glass latera spout (90°) for electrolyte refilling from electrolyte reservoir.
Operating temperature limits: 0÷100 °C
Operating pressure limits: immersion depth depends upon the height of installation of the electrolyte reservoir.

All the electrodes described here above are available with internal reference electrode in calomel, mercuric oxide, mercuric sulphate, thallium chloride, refer to codes indicated in the code number breakdown.
Temperature limits for different reference types are those indicated in the introduction to this section.

Mod.301S/ : series of special reference electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

Special Reference Electrodes:

Mod.301Sb:

Reference electrode for probes with salt bridges. Reference element: Ag/AgCl with KCl gel.
Body diameter is 6 mm the electrode includes integral cable , 3 m, with sealed sheath in silicone rubber.
Operating temperature limits: 0÷100 °C
Operating pressure limits: 5 bar
Typical applications: to be installed in Mod.Sb0 probes and in Mod.SI0P, SI0Q probes.

Mod.301Sb-C:

Reference electrode for probes with salt bridges. Reference element: calomel, Hg/Hg_2Cl_2 with KCl gel.
Body diameter is 6 mm the electrode includes integral cable , 3 m, with sealed sheath in silicone rubber.
Operating temperature limits: 0÷50 °C
Operating pressure limits: 5 bar
Typical applications: to be installed in Mod.Sb0 probes and in Mod.SI0P, SI0Q probes.


101-V-DG-SM
BG11 0112 4650

2.0 pH MEASURING ELECTRODES

Simple pH measuring electrodes

The element which is sensitive to pH variation (variation of H^+ concentration) is the glass membrane.
This membrane is made of special glass that, when immersed into a solution, gives rise to the formation of a gel layer able to exchange hydrogen ions with the surrounding solution.
Keeping the conditions inside the measuring electrode constant the potential of the glass membrane changes with the concentration of H^+ in the solution where it is immersed.
The glass electrode is therefore filled with a solution having a fixed composition and a constant pH value and includes an inner electrode (usually a silver wire covered with AgCl) that can detect the potential of the glass membrane.
This potential is compared with the fixed potential of the reference electrode and gives rise to a voltage which is proportional to the pH of the sample solution.

Combined pH electrodes

Combined pH electrodes include, in the same rod, measuring electrode and reference electrode, with the characteristics described above.

Our pH electrodes are also available, where indicated, with integral temperature sensor.

Pos.1 = S101 pH Simple pH measuring electrodes

Order code breakdown

	S101	x	x	Z	0	Z	x	x	x	A
Simple pH measuring electrodes	S101									
Type of pH electrode										
Spherical membrane		B								
Domed membrane		L								
Flat membrane		AP								
Plastic body		P								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Fixed code				Z						
Fixed code					0					
Fixed code						Z				
Electrode body version										
Standard (∅12 mm, 120 mm length)							0			
PTFE conic fitting NS12							1			
PTFE conic fitting NS6 (Note 1)							2			
Body diameter 6 mm (Note 1)							3			
Body diameter 4 mm (Note 1)							4			
Cable and connector (Note 2)										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
S7 Screw connector								F		
S7 Screw connector, PG13,5								M		
SS head with flange, integral cable, 5 m length								Q		
Ex head with sealed cable, ½”								R		
Ex head with S7 screw connection, ½”								S		
Ex head with sealed cable, ½” NPT								T		
Ex head with S7 screw connection, ½” NPT								U		
Special execution								Z		
Plug										
No plug									0	
BNC coaxial									1	
DIN standard coaxial plug									2	
LEMO coaxial									3	
Coaxial ∅ 12 mm									4	
Coaxial american type									5	
Coaxial for Radiometer instruments									6	
Fixed Code										A

These electrodes are to be used in combination with the proper reference electrode as selected in Sect. 1.0 of the present Catalogue.

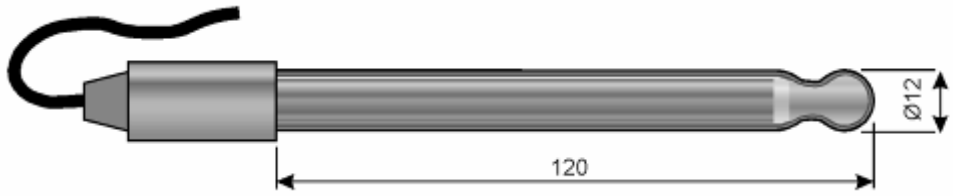
Note 1: Not available for Pos.2 = AP

Note 2 : we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Simple pH measuring electrodes: Pos.2 TYPE OF pH ELECTRODE

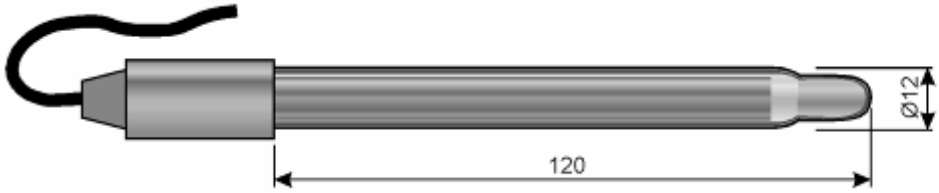
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.S101B



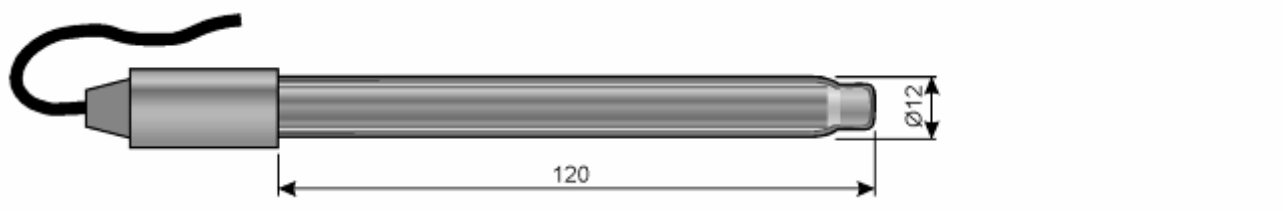
simple pH measuring electrode for laboratory applications; spherical membrane; to be used in combination with reference electrodes. Suitable for all common laboratory and industrial applications.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: -5÷120 °C
Operating pressure limits: 6 bar @ 20°C, atmospheric @ 120°C

Mod.S101L



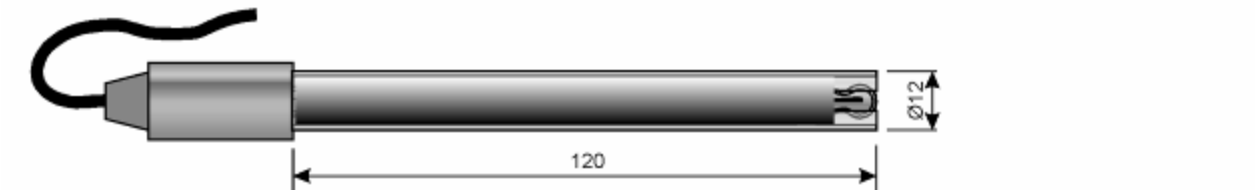
simple pH measuring electrode for laboratory applications, domed membrane; to be used in combination with reference electrodes. Suitable for all common laboratory and industrial applications. Rugged membrane.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: -5÷120 °C
Operating pressure limits: 6 bar @ 20°C, atmospheric @ 120°C

Mod.S101AP



simple pH measuring electrode with flat membrane to be used in combination with a reference electrode series 301/I. Designed for the use in probes with mechanical self cleaning system, Mod.SI0I, Mod.D0E.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 250 MΩ @ 25°C
Operating temperature limits: 0÷80 °C
Operating pressure limits: respect limits indicated for the reference electrode in use and for the probe in which the electrode is installed.

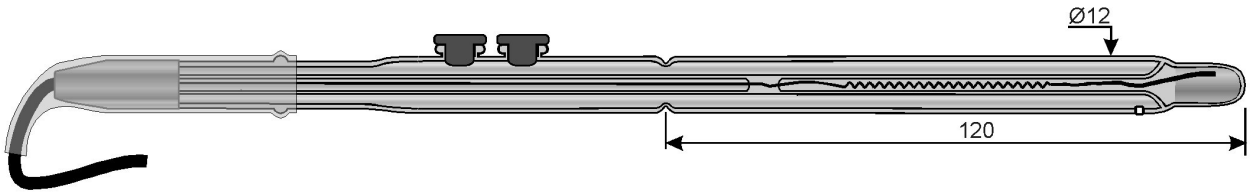
Mod.S101P



Simple pH measuring electrode for laboratory applications; plastic body. Sturdy execution, suitable for the use with portable instruments.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.S101S/ : series of special pH measuring electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

Mod.102N Simple pH measuring electrode, with porous diaphragm; to be used in conjunction with a separate reference electrode in probes SI0P and SI0Q which body can be totally filled of electrolyte



Simple pH electrode with porous diaphragm, for industrial applications; lateral holes for electrolyte refilling; domed membrane. Suitable for installation in Mod.SI0P and SI0Q probes, which body is completely filled of electrolyte, with separate reference electrode (Mod.301Sb).
Due to its special configuration this electrode is only available with integral cable; the integral cable is completely sealed into a silicone rubber sheath (9x6).
Suitable to work in highly poisoning samples.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: depending upon electrolyte level inside the probe body.

Order Code Breakdown

	102	N	0	Z	0	x	0	x	0	x
Industrial combined pH electrode	102									
Type of pH electrode										
Simple pH electrode with porous diaphragm, for probes with body filled of electrolyte solut.		N								
Use at low/high temperature										
Not suitable Fixed code			0							
Integral temperature sensor										
Not included				Z						
Reference version										
Standard, fixed code					0					
Porous diaphragm version										
Increased area porous diaphragm						B				
Synthetic annular diaphragm						C				
Fixed code							0			
Cable and connector										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
Plug										
No plug, fixed code									0	
Silicone hose length										
for probe length 1000 mm										A
for probe length 1500 mm										B
for probe length 2000 mm										C
Special execution										Z

COMBINED pH ELECTRODES

Pos.1 = 101 Laboratory combined electrodes for pH

Order code breakdown

	101	x	x	x	x	x	x	x	x	A
Laboratory combined pH electrodes	101									
Type of pH electrode										
Domed membrane		L								
Sharp shaped membrane		A								
Spheric membrane		B								
Plastic body		P								
Plastic body, lateral filling hole		PB								
For flat surfaces, for low conduct. liquids		D								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷–30°C			1							
Suitable for 0°C ÷+130°C			2							
Integral temperature sensor										
Not included				Z						
Pt100 sensor included				A						
Pt1000 sensor included				B						
Reference version										
Standard					0					
Salt bridge, external salt KCl					2					
Salt bridge, external salt KCl gel					4					
Salt bridge, external salt KNO_3					5					
Salt bridge, external salt NaCl					6					
Porous diaphragm version										
Reserved						Z				
Standard, ∅ 1 mm ceramic diaphragm (Note 1)						A				
Increased area porous diaphragm (Note 1)						B				
Annular synthetic diaphragm						C				
Electrode body version										
Standard (∅12 mm, 120 mm length)							0			
PTFE conic fitting NS12							1			
PTFE conic fitting NS6							2			
Body ∅ 6 mm							3			
Cable and connector (Note 3)										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
S7 Screw connector								F		
S7 Screw connector, PG13.5								M		
SS head with flange, integral cable, 5 m length								Q		
Special execution								Z		

	101	x	x	0	x	x	x	x	x	A
Plugs										
No plug									0	
BNC coaxial mounted									1	
DIN standard, coaxial, mounted									2	
LEMO coaxial									3	
Coaxial ∅ 12 mm									4	
Coaxial, american type									5	
Coaxial for Radiometer instruments									6	
Fixed Code										A

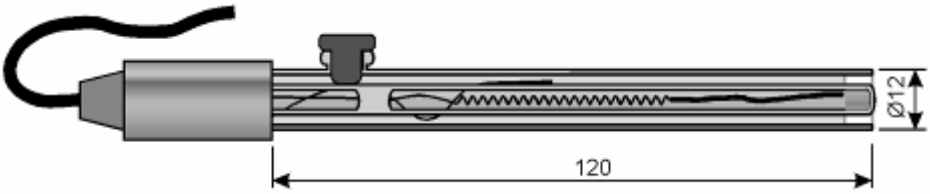
Note 1: Not selectable for Pos.2 = D

Note 3: we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Combined laboratory pH electrodes: Pos.2 TYPE OF ELECTRODE

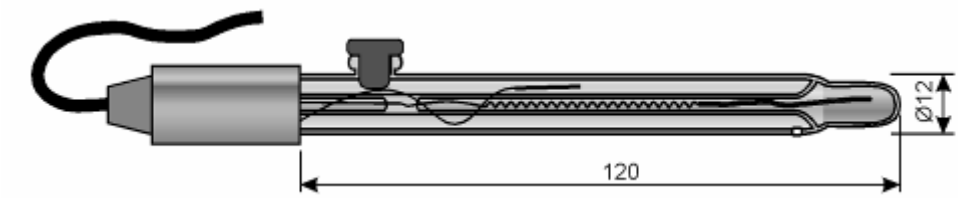
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.101D



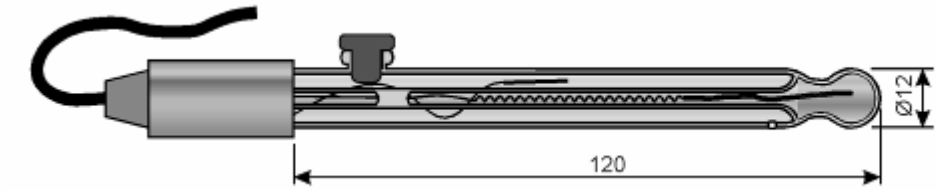
Combined pH electrode for laboratory applications; flat membrane and annular diaphragm concentric to the glass membrane, that assures good contact with the measured surface and avoids errors and instability of the measure.
Designed to measure on flat surfaces and in low conductivity liquids (< 5 μS).
The liquid junction is an annular diaphragm concentric to the membrane; the membrane is located at the same level of the diaphragm.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution saturated with AgCl
Diaphragm: annular, concentric to the glass membrane and placed on the same level.
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 5÷60 °C
Operating pressure limits: atmospheric

Mod.101L



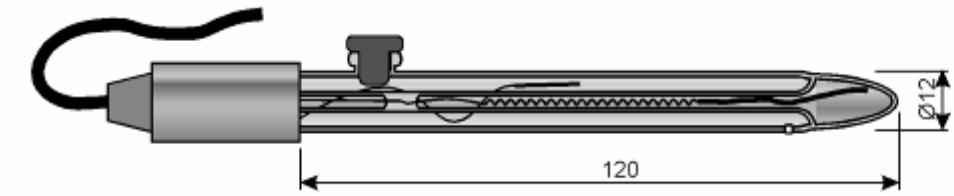
Combined pH electrode for laboratory applications; sturdy domed membrane.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution, saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: atmospheric

Mod.101B



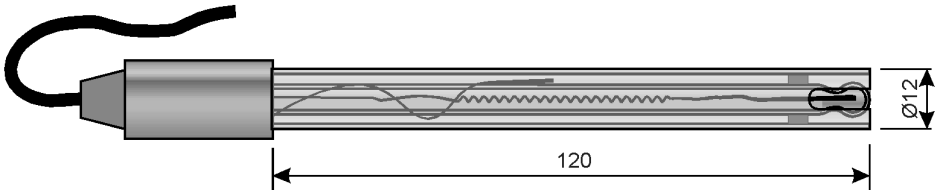
Combined pH electrode for laboratory applications; sturdy spherical membrane.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution, saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: atmospheric

Mod.101A



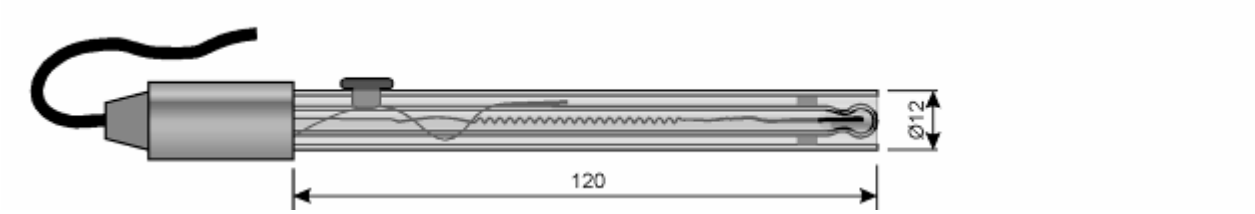
Combined pH electrode for laboratory applications; sharp shaped membrane, suitable to measure in semisolid and very thick substances.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution, saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 300 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: atmospheric

Mod.101P



Combined pH electrode for laboratory applications; plastic body, gel electrolyte, no need for electrolyte refill. Sturdy execution, suitable for the use with portable instruments. Synthetic liquid junction.
Reference: Ag/AgCl
Electrolyte: KCl gel
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.101PB



Combined pH electrode for laboratory applications; plastic body, lateral hole for electrolyte refilling.
The sturdy execution makes it suitable for the use with portable instruments. Synthetic liquid junction.
Reference: Ag/AgCl
Electrolyte: KCl solution
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.101S/ : series of special combined pH electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

Pos.1 = 101 Industrial combined pH electrodes

Order code breakdown

	101	x	x	x	x	x	0	x	x	x
Industrial combined pH electrode	101									
Type of pH electrode										
With KCl reserve and refilling spout		V								
KCl reserve,refilling spout; low conduct. sol		VD								
For probes with body filled of KCl solution		N								
Probes filled KCl solut. low conduct. water		ND								
Sealed, gel filled		GEL								
Sealed, solid gel filled		BB								
Solid gel filled, w/o porous diaphragm		X								
With KCl reserve and 90° refilling spout		KCl								
For installation in SI/HPT probe		HPT								
For installation in Mod.SI/EST probes		EST								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Integral temperature sensor										
Not included				Z						
Pt100 sensor included				A						
Pt1000 sensor included				B						
Reference version										
Standard (NOT for 101X)					0					
Salt bridge, external salt KCl					2					
Salt bridge, external salt KCl gel					4					
Salt bridge, external salt KNO_3					5					
Salt bridge, external salt NaCl					6					
Salt bridge, external salt KCl solid gel (ONLY for 101X)										
Porous diaphragm version										
Reserved						Z				
Standard (ceramic diaphragm ∅ 1mm)						A				
Increased area porous diaphragm						B				
Synthetic annular diaphragm						C				
Without porous diaphragm (ONLY for 101X)						D				
Fixed code							0			

101	x	x	Z	x	x	0	x	x	x

Cable and connector (Note 2)	
Integral cable, 1 m length	A
Integral cable, 5 m length	C
Integral cable, 10 m length	D
\Integral cable, 15 m length	E
S7 Screw connector (Note 1)	F
S7 Screw connector, PG13. 5 (Note 1)	M
SS head with flange, integral cable, 5 m length	Q
Ex head with sealed cable, ½”	R
Ex head with S7 screw connection, ½”	S
Ex head with sealed cable, ½” NPT	T
Ex head with S7 screw connection, ½” NPT	U
Special execution	Z

Plug	
No plug	0
BNC, coaxial, mounted	1
DIN standard coaxial, mounted	2

Silicone rubber sheath length (for 101N, 101ND, 201N, 201ND)	
Reserved	A
For 1000 mm probes	B
For 1500 mm probes	C
For 2000 mm probes	D
For probes longer than 2000 mm	Z

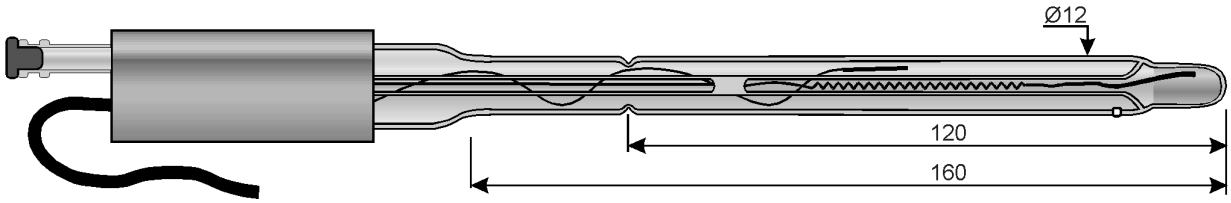
Note 1: Not available for Pos.2 = V, VD, N, N

Note 2: we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Combined pH electrodes for industrial applications: Pos.2 TYPE of electrode

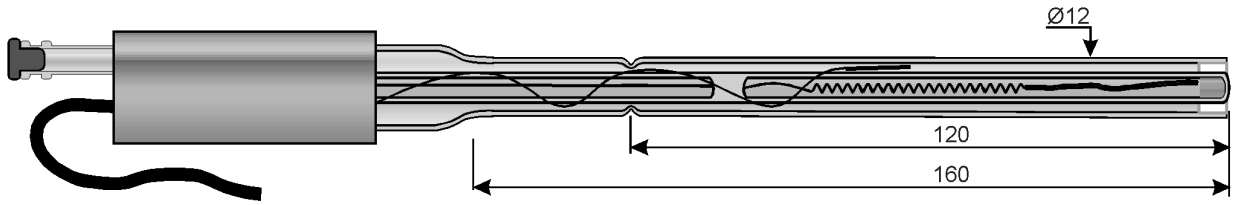
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.101V



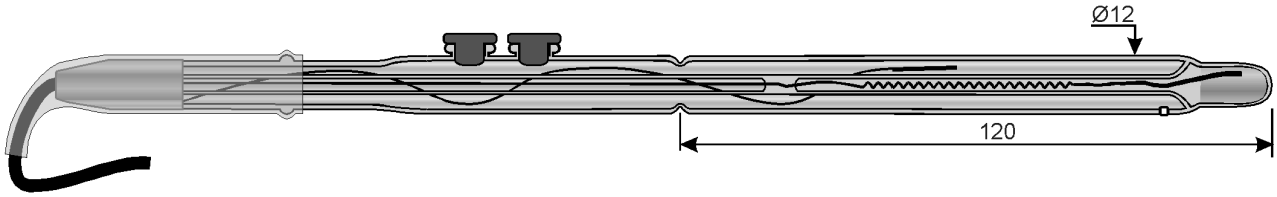
Combined pH electrode for industrial applications: an upper spout allows the connection to the electrolyte reservoir.
Domed membrane.
Suitable to be installed into the Mod.SI0A and SI0B and into the Mod.D0A immersion probe with electrolyte reservoir above the probe.
This electrode is only available with integral cable, length to be selected according model number breakdown.
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operative pressure limits: depend upon the hydraulic head of the electrolyte reservoir on the probe.

Mod.101VD



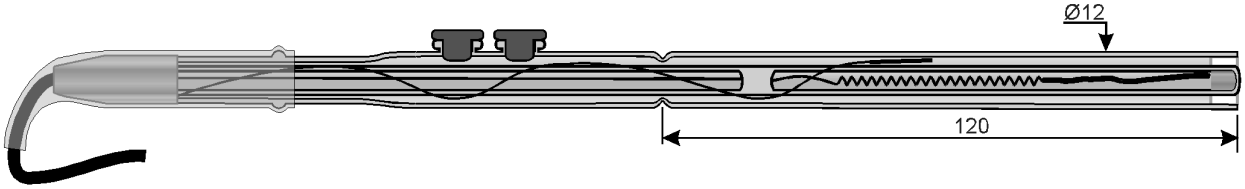
Combined pH electrode for industrial applications. An upper spout allows the connection to the electrolyte reservoir.
Specific membrane and liquid junction configuration make this electrode suitable for the measure in low conductivity solutions (< 5 μS).
Suitable to be installed into the Mod.SI0A and SI0B and into the Mod.D0A immersion probe with electrolyte reservoir above the probe.
This electrode is only available with integral cable, length to be selected according model number breakdown.
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operative pressure limits: depending upon the hydraulic head of the electrolyte reservoir on the probe.

Mod.101N



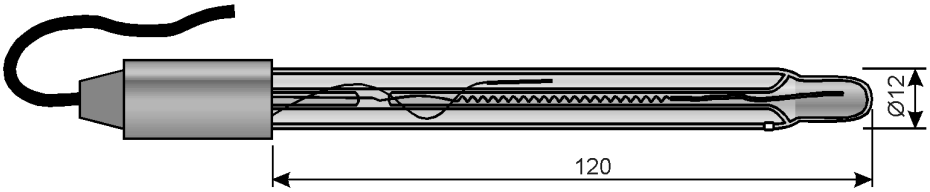
Combined pH electrode for industrial applications; lateral holes for electrolyte refilling; domed membrane.
Suitable for installation in Mod.SI0C and SI0D probes, which body is completely filled of electrolyte.
Due to its special configuration this electrode is only available with integral cable, completely sealed into a silicone rubber sheath (9x6).
Electrolyte: 3.3 M KCl solution, saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: depending upon electrolyte level inside the probe body.

Mod.101ND



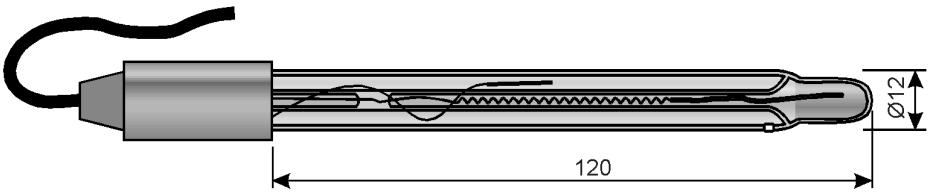
Combined pH electrode for industrial applications; lateral holes for electrolyte refilling.
Special membrane and liquid junction configuration make this electrode suitable for measures in low conductivity solutions (< 5 μS).
Suitable for installation in Mod.SI0C and SI0D probes, which body is completely filled of electrolyte.
Due to the special configuration this electrode is only available with integral cable, completely sealed into a silicone rubber sheath (9x6).
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution, saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operating pressure limits: depending upon electrolyte level inside the probe body.

Mod.101GEL



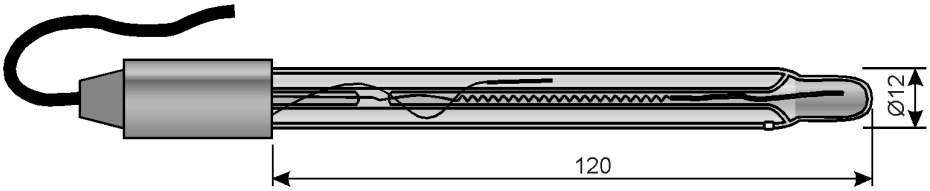
Combined pH electrode for industrial applications, gel electrolyte, domed membrane.
Suitable to be inserted into Mod.SI0A, SI0B, SI0G, SI0H immersion probes and into Mod.D0A, D0C and D0D through flow probes.
No electrolyte refilling is required. It is an electrode of universal application suitable for water with good conductivity and free of large amounts of fouling substances.
Reference: Ag/AgCl
Electrolyte: KCl gel
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar.

Mod.101BB



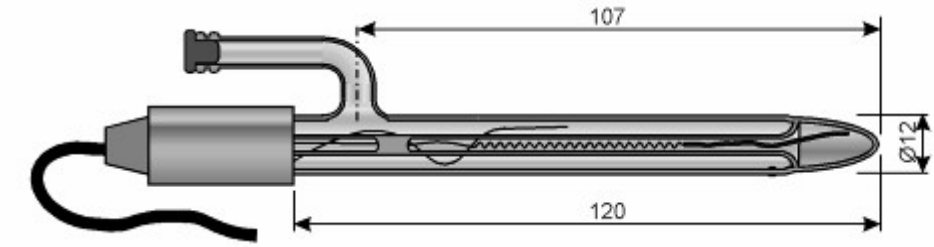
Combined pH electrode for industrial applications with solid electrolyte. Domed membrane.
The electrode can withstand pressure up to 6 bar @ 20°C. Suitable for direct insertion into pipelines.
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: KCl, solid
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 600 MΩ @ 25°C
Operating temperature limits: 0÷110 °C
Operating pressure limits: 6 bar @ 20°C and atmospheric @ 100°C.

Mod.101X



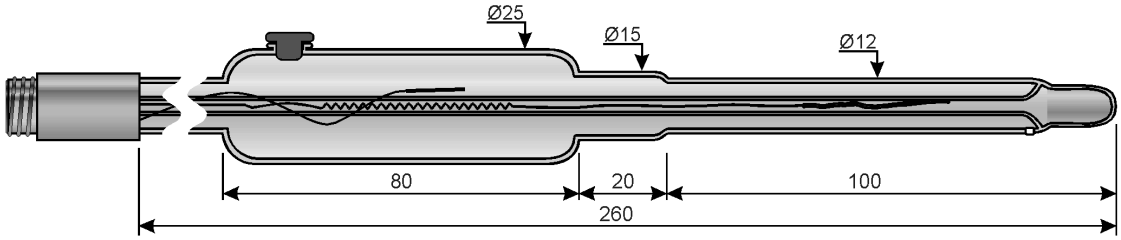
Combined pH electrode for industrial applications, solid gel electrolyte, dual junction, no porous diaphragm, domed membrane.
Suitable for the use in samples containing substances that can deposit on the porous diaphragm.
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: internal electrolyte KCl gel; esternal electrolyte solid KCl gel
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 150 MΩ @ 25°C
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar.

Mod.101KCl



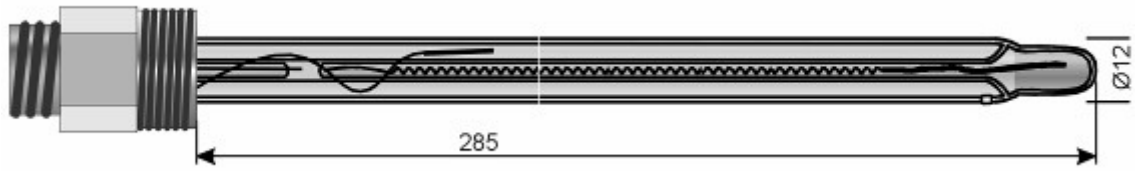
Combined pH electrode for industrial applications: A lateral spout (90°) spout allows the connection to the electrolyte reservoir. Domed membrane.
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 200 MΩ @ 25°C
Operating temperature limits: 0÷100 °C
Operative pressure limits: depend upon the hydraulic head of the electrolyte reservoir on the probe.

Mod.101HPT



Combined pH electrode for industrial applications: suitable for the installation into pressurizable probes SI/ HPT. This electrode can withstand high pressure and temperatures, can be steam sterilised in line.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution saturated with AgCl
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 400 MΩ @ 25°C
Operating temperature limits: 0÷130 °C
Operating pressure limits: 10 bar @ 25°C, 2 bar @ 130°C

Mod.101EST

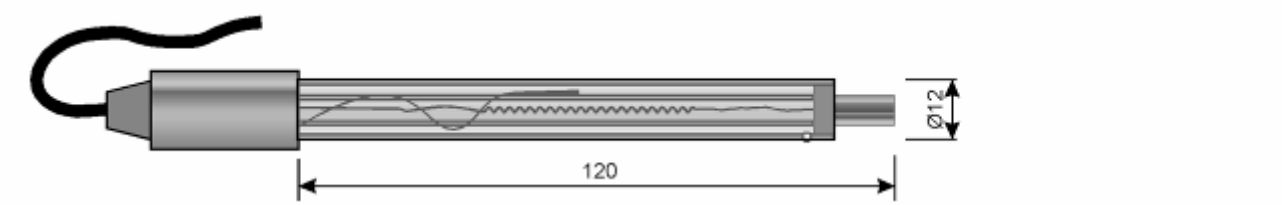


Combined pH electrode for industrial applications. Solid electrolyte. Domed membrane. This electrode can withstand pressures up to 6 bar @ 20°C. It is suitable to be inserted into the retractable probe Mod.SI/EST, for the use in fermenters, reactors etc. S7 connector c/w PG13,5 threads.
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: KCl, solid
Measuring range: 0÷14 pH
Zero point: 7.0 pH ±0.5 pH
Membrane resistance: 300 MΩ @ 25°C
Operating temperature limits: 0÷110 °C
Operating pressure limits: 6 bar @ 20°C and atmospheric @ 100°C.

Mod.101S/ : series of special combined pH electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

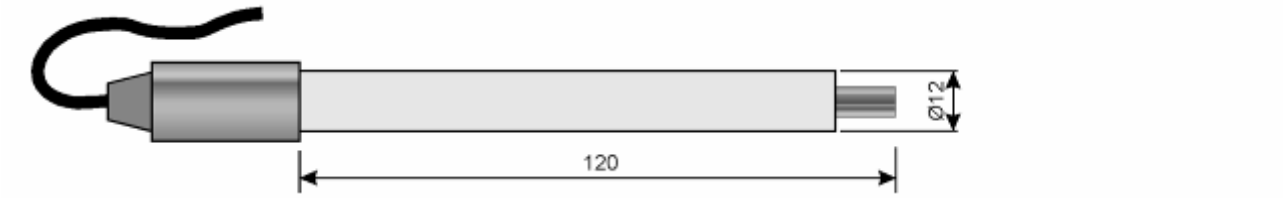
ELECTRODES FOR SPECIAL APPLICATIONS

Mod.101F



Combined pH electrode for application in solutions containing hydrofluoric acid.
Plastic body and antimony measuring electrode.
Reference: Ag/AgCl
Electrolyte: KCl gel
Measuring range: 1÷12 pH
Zero point: 1.0 pH ±1.0 pH
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.S101F



Simple pH electrode for application in solutions containing hydrofluoric acid. Antimony measuring electrode.
Plastic body.
To be used in connection with the reference electrode Mod.301Px00xxxx, with plastic body.
Measuring range: 1÷12 pH
Zero point: 1.0 pH ±1.0 pH
Operating temperature limits: 0÷80 °C
Operating pressure limits: 1 bar

Haemogasanalysis

Series of pH electrodes designed and manufactured upon request for the application on specific haemogasanalysis equipment. Contact our Technical Dept. for further details.


101/S-031
BH12 0204
201/GEL-I
0204 1092

3.0 ORP MEASURING ELECTRODES (Pt – Au –Ag)

Simple ORP measuring electrode

Sensitive electrode used to measure ORP is usually a noble metal (Au Ag or Pt).
The tendency of a solution to exchange (loose or gain) electrons is detected by these metals as a potential that, when compared to the potential of the reference electrode, gives a voltage that is defined as the ORP value of the solution.
More common reference electrode is the Ag/AgCl in KCl solution.
The gold (Au) measuring electrode is to be preferred in oxidant solutions, while the platinum (Pt) measuring electrode is suitable for application in solutions containing chlorides and in processes with reducing substances. The annular Pt electrode is the best choice for processes with high concentrations of reducing or oxidising substances.
Typical applications for ORP measure are the treatments of process waters including cyanides, chromates, nitrites and the control of chlorine addition in swimming pools (usually together with pH and residual chlorine measurement).

Combined electrodes for ORP measurement

Combined electrodes for ORP measurements include, in a single rod, measuring electrode and reference electrode, with the characteristics described above.

Pos.1 = S 201 Simple ORP electrodes (Au – Pt – Ag)

Order code breakdown

	S201	**x**	**0**	**x**	**0**	**Z**	**x**	**x**	**x**	**A**
Simple ORP measuring electrode	S201									
Type of ORP electrode										
Spherical metal, ∅ 2,5 mm or annular Pt		LI								
Flat metal		AP								
Plastic body		P								
2 Pt electrodes for Karl Fischer measures		KF								
Special execution		S/								
Fixed code			0							
Metal										
Reserved				Z						
Gold (Nota 3)				A						
Silver (Nota 3)				B						
Platinum				C						
Platinum, annular (Nota 3)				D						
Fixed code					0					
Fixed code						Z				
Electrode body version										
Standard (∅12 mm, 120 mm length)							0			
PTFE conic fitting NS12(Note 1)							1			
PTFE conic fitting NS6(Note 1) (Note 3)							2			
Body ∅ 6 mm (Note 1) (Note 3)							3			
Body ∅ 4 mm (Note 1) (Note 3)							4			
Cable and connector (Note 2)										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
S7 Screw connector								F		
S7 Screw connector, PG13.5								M		
SS head with flange, integral cable, 5 m length								Q		
Ex head with sealed cable, ½"								R		
Ex head with S7 screw connection, ½"								S		
Ex head with sealed cable, ½" NPT								T		
Ex head with S7 screw connection, ½" NPT								U		
Female connector ∅ 4 mm								V		
Special execution								Z		
Plug										
No plug									0	
BNC coaxial									1	
DIN standard, coaxial									2	
LEMO coaxial									3	
Coaxial ∅ 12 mm									4	
Coaxial, american type									5	
Coaxial for Radiometer instruments									6	
Fixed Code										A

These electrodes are to be used in connection with the proper reference electrode selected in Sect.1.0 of the present Catalogue.

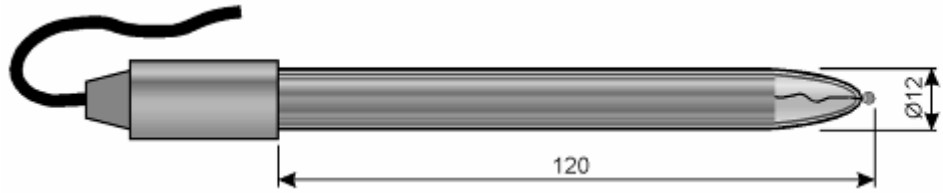
Refer to Sect.4.0 Electrodes for special applications for the description of Mod.S201KF0C0Zxxx electrode for Karl Fischer analysis.

Note 1: not available for Pos.2 = AP
Note 2: we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.
Note 3: not available for Mod.S201KF.

Simple ORP electrodes: Pos.2 TYPE OF ORP ELECTRODE

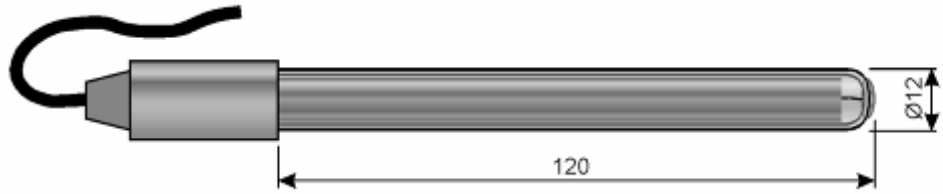
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.S201LI



Simple ORP measuring electrode. Spherical metal, ∅2.5 mm or annular platinum electrode.
Suitable to common laboratory and industrial applications.
Measuring range: -2000÷ +2000 mV
Operating temperature limits: -30÷120°C°C
Operating pressure limits: 6 bar @ 20°C, atmospheric @ 120°C

Mod.S201AP



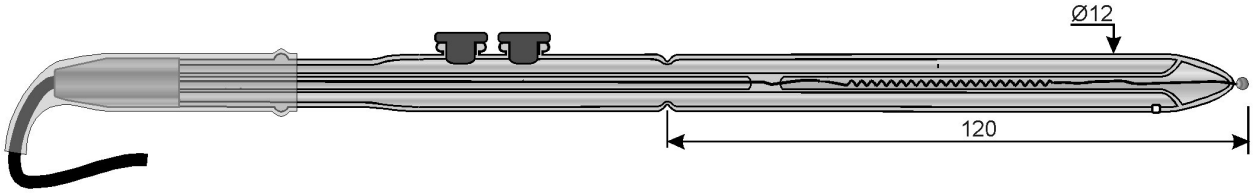
Simple ORP measuring electrode. Flat metal. This electrode is designed for the use into probes complete with mechanical self-cleaning systems (Mod.SI0I immersion probe, Mod.D0E through flow probe).
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: -30÷120 °C
Operating pressure limits: refer to limits given to the probe in which the electrode is installed.

Mod.S201P

Simple ORP measuring electrode. Plastic body. Sturdy execution, suitable for the use with portable instruments.
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar.

Mod.S201/S: series of special simple ORP electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

Mod.202N Simple ORP measuring electrode, with porous diaphragm; to be used in conjunction with a separate reference electrode in probes SI0P and SI0Q which body can be totally filled of electrolyte



Simple ORP electrode with porous diaphragm for industrial applications, lateral holes for electrolyte refilling. Suitable for the insertion into probes with Mod.SI0P and SI0Q, which body can be completely filled with electrolyte, and using separate reference electrode. Long operating periods without refilling requirements. Suitable for highlyn poisoning samples. Due to its application this electrode is only available with integral cable. The cable is sealed into a silicone rubber sheath (9x6).
Measuring range: -2000÷ +2000 mV
Operating temperature limits: 0÷100 °C
Operating pressure limits: electrolyte level inside the probe.

Order Code Breakdown

	202	**x**	**x**	**x**	**x**	**x**	**0**	**x**	**x**	**x**
Simple ORP electr., industrial use, for probes with body filled with electrolyte, separate ref. electrode	202									
Simple ORP electr. for SI0P - SI0Q		N								
Use at low/high temperature										
Not suitable, Fixed Code			0							
Metal										
Reserved				Z						
Gold				A						
Silver				B						
Platinum				C						
Annular platinum				D						
Reference version										
Standard. Fixed code					0					
Diaphragm version										
Increasea area porous diaphragm						B				
Annular sysnthetic diaphragm						C				
Fixed code							0			
Cable and connector										
Integral cable, length 1 m								A		
Integral cable, length 5 m								C		
Integral cable, length 10 m								D		
Integrale cable, length 15 m								E		
Plug										
No plug, fixed code									0	
Silicone sheath length										
for probe length 1000 mm										A
for probe length 1500 mm										B
for probe length 2000 mm										C
Special execution										Z

COMBINED ORP ELECTRODES, Au – Pt – Ag

Pos.1 = 201 Combined electrodes for ORP laboratory measurements

Order code breakdown

	201	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**A**
Laboratory combined ORP electrodes	201									
Type of combined ORP electrode										
Laboratory, with refilling spout		L								
Plastic body		P								
Plastic body, lateral refilling hole		PB								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Metal										
Reserved				Z						
Gold				A						
Silver				B						
Platinum				C						
Platinum, annular				D						
Reference version										
Standard					0					
Salt bridge, external salt KCl					2					
Salt bridge, external salt KCl gel					4					
Salt bridge, external salt KNO_3					5					
Salt bridge, external salt NaCl					6					
Porous diaphragm version										
Reserved						Z				
Standard (ceramic diaphragm ∅ 1mm)						A				
Increased area porous diaphragm						B				
Annular synthetic diaphragm						C				
Electrode body version										
Standard (∅ 12 mm, 120 mm length)							0			
PTFE conic fitting NS 12							1			
PTFE conic fitting NS 6 (Note 2)							2			
Body 6 mm ∅ (Note 2)							3			
Body 4 mm ∅ (Note 2)							4			
Cable and connector (Note 1)										
Integral cable, 1 m length								A		
Integral cable, 5 m length								C		
Integral cable, 10 m length								D		
Integral cable, 15 m length								E		
S7 Screw connector								F		
S7 Screw connector PG13.5								M		
SS head with flange, integral cable, 5 m length								Q		
Special								Z		

	201	x	x	x	x	x	x	x	x	A
Plug										
No plug									0	
BNC coaxial, mounted									1	
DIN standard coaxial, mounted									2	
LEMO coaxial									3	
Coaxial ∅ 12 mm									4	
Coaxial, american type									5	
Coaxial for Radiometer instruments									6	
Fixed Code										A

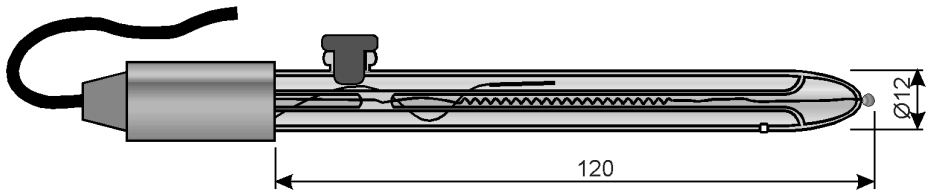
Note 1 : we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Note 2 : not available for 201P and 201PB

Combined ORP measuring electrodes for laboratory applications: Pos.2 TYPE OF ORP ELECTRODE

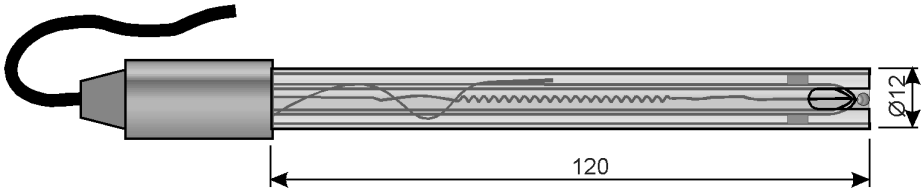
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.201L



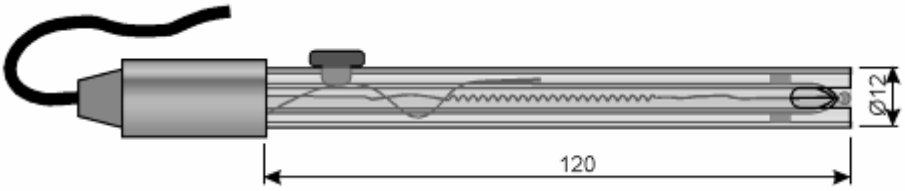
Combined ORP electrode, suitable for all common laboratory applications.
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution, saturated with AgCl
Measuring range : -2000 ÷ +2000 mV
Operating temperature limits: 0÷100 °C
Operating pressure limits: atmospheric

Mod.201P



Combined ORP electrode, for laboratory applications, gel electrolyte. Plastic body.
This electrode is sturdy and suitable for the use with portable instruments.
No electrolyte refilling is required. Synthetic liquid junction.
Reference: Ag/AgCl
Electrolyte: KCl gel
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷50°C °C
Operating pressure limits: 1 bar

Mod.201PBxxZxxx



Combined ORP electrode, for laboratory applications. Plastic body with lateral refilling hole.
This electrode is sturdy and suitable for the use with portable instruments. Synthetic liquid junction.
Reference: Ag/AgCl
Electrolyte: KCl solution
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷50°C °C
Operating pressure limits: 1 bar

Mod.201/S: series of special combined ORP electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

Pos.1 = 201 Combined industrial electrode for ORP measurement

Order code breakdown

	201	x	x	x	x	x	0	x	x	x
Combined industrial ORP electrode	201									
Type of ORP combined electrode										
With KCl reserve and refilling spout		V								
KCl res., refilling sp., low conduct. water		VD								
For probes with body filled of KCl solution		N								
For probes filled w.KCl sol. low cond.water		ND								
Sealed, gel filled		GEL								
Sealed, solid gel filled		BB								
Solid gel filling, w/o porous diaphragm		X								
With KCl reserve and lateral spout, 90°		KCl								
Installation in SI/HPT probe		HPT								
For installation in Mod.SI/EST probes		EST								
Special execution		S/								
Use at low/high temperature										
Not suitable			0							
Suitable for 0°C ÷ –30°C			1							
Suitable for 0°C ÷ +130°C			2							
Metal										
Reserved				Z						
Gold				A						
Silver				B						
Platinum				C						
Platinum, annular				D						
Reference version										
Standard (NOT for 201X)					0					
Salt bridge, external salt KCl					2					
Salt bridge, external salt KCl gel					4					
Salt bridge, external salt KNO_3					5					
Salt bridge, external salt NaCl					6					
Salt bridge, external salt solid KCl (ONLY for 201X)					7					
Diaphragm version										
Reserved						Z				
Standard (ceramic diaphragm ∅ 1 mm)						A				
Increased area porous diaphragm						B				
Annular synthetic diaphragm						C				
Without porous diaphragm (ONLY for 201X)						D				
Fixed code							0			

201	x	x	x	x	x	0	x	x	x

Cable and connector (Note 2)	
Integral cable, 1 m length	A
Integral cable, 5 m length	C
Integral cable, 10 m length	D
Integral cable, 15 m length	E
S7 Screw connector (Note 1)	F
S7 Screw connector PG13.5 (Note 1)	M
SS head with flange, integral cable, 5 m length	Q
Ex head with sealed cable, ½”	R
Ex head with S7 screw connection, ½”	S
Ex head with sealed cable, ½” NPT	T
Ex head with S7 screw connection, ½” NPT	U
Special execution	Z

Plug	
No plug	0
BNC coaxial	1
DIN standard coaxial	2

Silicone rubber sheath length (for 101N, 101ND, 201N, 201ND)	
Reserved	A
For 1000 mm probes	B
For 1500 mm probes	C
For 2000 mm probes	D
For probes longer than 2000 mm	Z

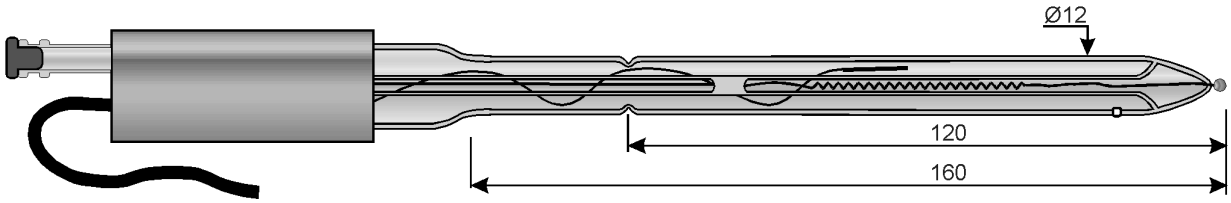
Note 1: not available for Pos.2 = V, VD, N, ND

Note 2: we can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Combined ORP electrodes for industrial applications: Pos.2 TYPE OF ELECTRODE

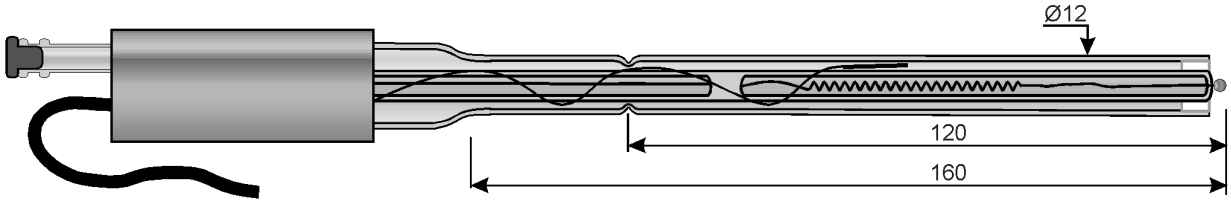
All the electrodes described hereafter, when not otherwise specified, are available with the options indicated in the order code breakdown; the description of these options is given in the introduction of the present Catalogue.

Mod.201V



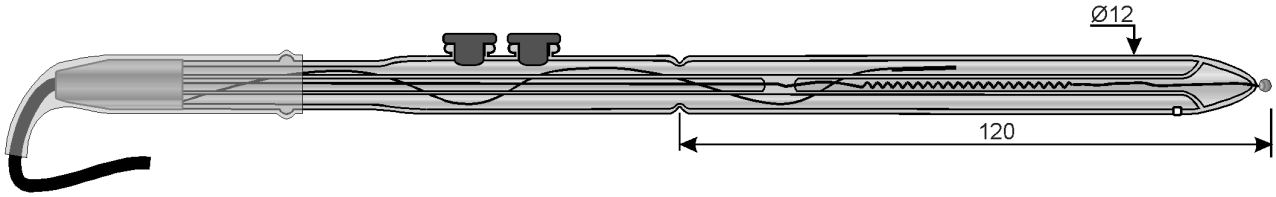
Combined ORP electrode for industrial applications, with spout for the connection to the electrolyte reservoir.
Suitable to be installed into Mod.SI0A and SI0B immersion probe, or in Mod.D0A through flow probe with electrolyte reservoir over the probe.
This electrode is only available with integral cable, length according to order code breakdown.
Reference: Ag/AgCl
Electrolyte :3.3 M KCl solution saturated with AgCl
Measuring range: -2000 ÷+2000 mV
Operating temperature limits: 0÷100. °C
Operating pressure limits: hydraulic head of the electrolyte reservoir when present.

Mod.201VD



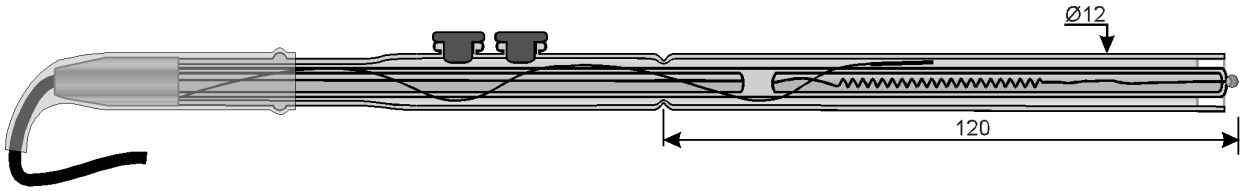
Combined ORP electrode for industrial applications, with spout for the connection to the electrolyte reservoir.
Membrane and liquid junction are designed to make this electrode suitable to the use in low conductivity liquids (< 5 μS).
Suitable to be installed into Mod.SI0A and SI0B immersion probe, or in Mod.D0A through flow probe with electrolyte reservoir over the probe.
This electrode is only available with integral cable, length according to order code breakdown.
Reference: Ag/AgCl
Electrolyte :3.3 M KCl solution saturated with AgCl
Measuring range: -2000 ÷+2000 mV
Operating temperature limits: 0÷100. °C
Operating pressure limits: hydraulic head of the electrolyte reservoir when present.

Mod.201N



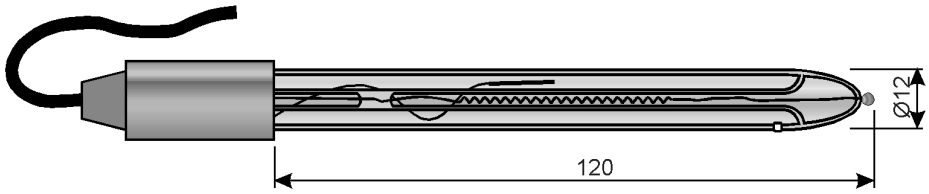
Combined ORP electrode for industrial applications, lateral holes for electrolyte refilling.
Suitable for the insertion into probes which body can be completely filled with electrolyte , like the Mod.SI0C and SI0D immersion probes.
This assures long operating periods without refilling requirements.
Due to its application this electrode is only available with integral cable, that is sealed into a silicone rubber sheath (9x6).
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution saturated with AgCl
Measuring range: -2000÷ +2000 mV
Operating temperature limits: 0÷100 °C
Operating pressure limits: electrolyte level inside the probe.

Mod.201ND



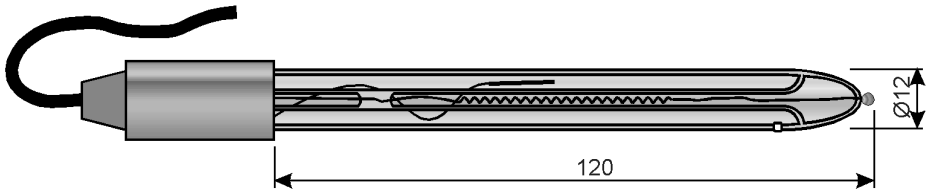
Combined ORP electrode for industrial applications, lateral holes for electrolyte refilling.
Membrane and liquid junction are designed to make this electrode suitable to the use in low conductivity liquids (< 5 μS).
Suitable for the insertion into probes which body can be completely filled with electrolyte , like the Mod.SI0C and SI0D immersion probes.
This assures long operating periods without refilling requirements.
Due to its application this electrode is only available with integral cable, that is sealed into a silicone rubber sheath (9x6).
Reference: Ag/AgCl
Electrolyte: 3.3 M KCl solution saturated with AgCl
Measuring range: -2000÷ +2000 mV
operating temperature limits: 0÷100 °C
Operating pressure limits: electrolyte level inside the probe.

Mod.201GEL



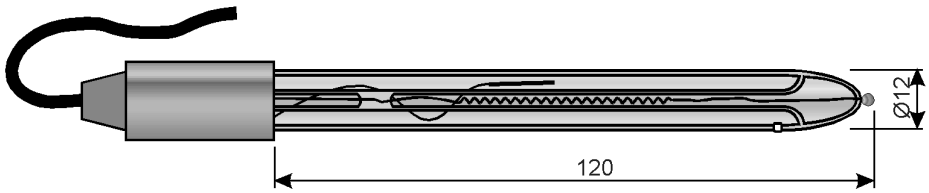
Combined ORP electrode for industrial applications, gel electrolyte.
Suitable for the installation in immersion probes Mod.SI0A, SI0B, SI0G, SI0H and in through flow probes Mod.D0A, D0C, D0D.
No electrolyte refilling is required.
This electrode is suitable for all common applications in solutions with good conductivity and free of large amounts of fouling substances.
Reference: Ag/AgCl
Electrolyte: KCl gel
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.201BB



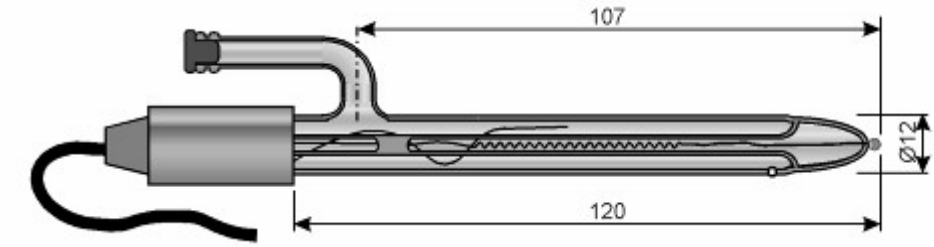
Combined ORP electrode for industrial applications, with solid electrolyte. This electrode can withstand pressures up to 6 bar @ 20°C and atmospheric @ 100°C.
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: KCl , solid
Measuring electrode:-2000 ÷ +2000 mV
Operating temperature limits: 0÷110 °C
Operating pressure limits: 6 bar @ 20°C atmospheric @ 100°C.

Mod.201X



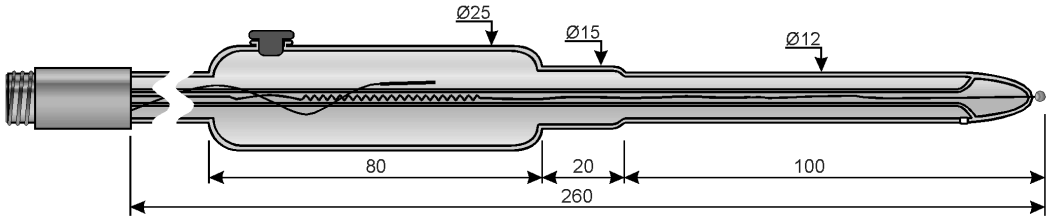
Combined ORP electrode for industrial applications, solid gel electrolyte, salt bridge, without porous diaphragm.
Suitable for the use in samples containing substances that can deposit on the porous diaphragm.
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: internal electrolyte KCl gel; external electrolyte solid KCl gel.
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷50 °C
Operating pressure limits: 1 bar

Mod.201KCl



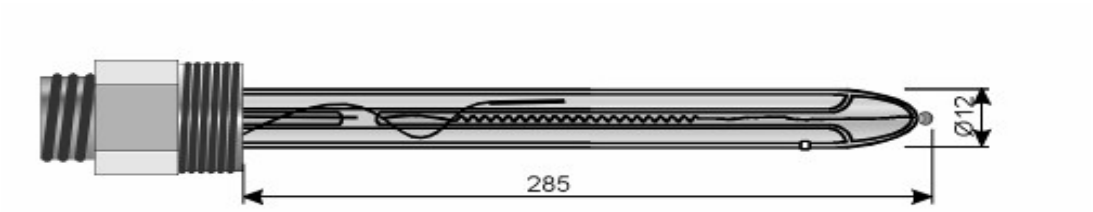
Combined ORP electrode for industrial applications, with lateral spout, 90°, for the connection to the electrolyte reservoir.
This electrode is not available with screw connector , with PG13.5 connector.
Reference: Ag/AgCl
Electrolyte :3.3 M KCl solution saturated with AgCl
Measuring range: -2000 ÷+2000 mV
Operating temperature limits: 0÷100. °C
Operating pressure limits: hydraulic head of the electrolyte reservoir when present.

Mod.201HPT



Combined ORP electrode for industrial applications; designed to be installed into Mod.SI/HPT pressurizable probe.
This electrode can withstand high temperatures and is steam sterilizable in line.
Reference: Ag/AgCl
Electrolyte: 3,3 M KCl solution, saturated with AgCl
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷130°C °C
Operating pressure limits: 10 bar @ 25°C, 2 bar @ 130°C

Mod.201ESTxxxx0Qx

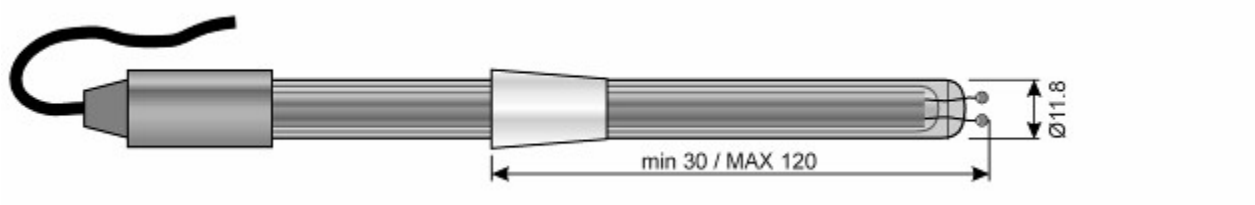


Combined ORP electrode for industrial applications, with solid electrolyte. This electrode can withstand pressures up to 6 bar @ 20°C. It is designed to be installed into Mod.SI/EST retractable probe, for the installation in fermenters, reactors etc.
SS head with flange, integral cable, 5 m length
No electrolyte refilling is required.
Reference: Ag/AgCl
Electrolyte: KCl solid
Measuring range: -2000 ÷ +2000 mV
Operating temperature limits: 0÷100 °C
Operating pressure limits: 6 bar a 25°C, atmospheric @ 100°C

Mod.201/S: series of special combined ORP electrodes designed and manufactured according to specific customer needs. Contact our Technical Dept.

4.0 ELECTRODES FOR SPECIAL APPLICATIONS

Mod.201KF Electrodes for Karl Fischer titration



Includes two platinum electrodes and is designed for laboratory polarographic and amperometric determinations. Typical application is the use for Karl Fischer titrations.
The body includes frosted glass conic fitting NS12.

The electrode is available with the following cables/connectors:
integral cable, 1 m (standard)
integral cable, 5 m
integral cable, 10 m
integral cable, 15 m
screwed connector

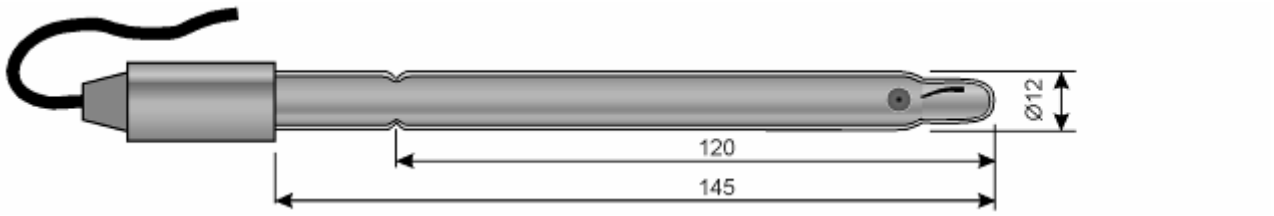
The electrode is available with the following plugs for the connection to the instrument:
Banana ∅ 4 (standard)
BNC coaxial
DIN standard, coaxial
LEMO coaxial
Coaxial for -Polymetron-Metrohm instruments
Coaxial for Orion-Beckman-Corning instruments
For Radiometer instruments

Specify cable/connector and plug at order.

Operating temperature limits: -30÷120 °C
Operating pressure limits: atmospheric

Refer to Section 3.0 ORP electrodes, order code breakdown for simple ORP electrodes, to find order code for Karl Fischer electrode.

Special Electrodes: Mod.1201: simple electrode for contemporary measurement of pH and ORP



Simple electrode which includes in the same body the pH measuring element and the ORP sensing element. The electrode is available in the version suitable for laboratory applications and in the industrial application version.

ORP measuring electrode: platinum or gold (specify at order)
pH measuring electrode: domed glass membrane
Recommended reference electrode: for laboratory applications: Mod.301L;
for industrial applications: Mod.301I
ORP measuring range:-2000÷+2000 mV
pH measuring range pH: 0÷14.0 pH
Operating temperature limits: -5÷100 °C

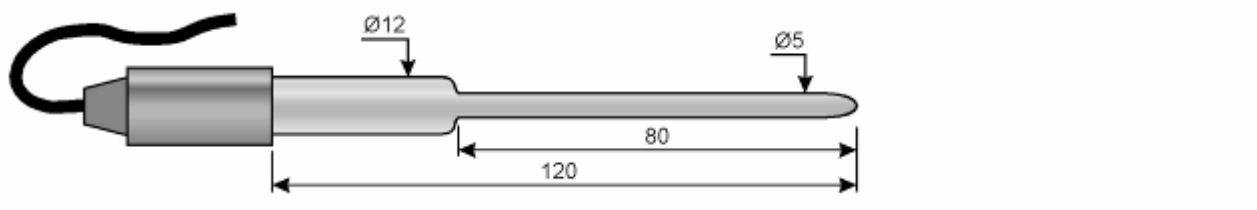
5.0 TEMPERATURE SENSORS

Order Code Breakdown

Temperature sensor	**T0**	**x**	**x**	**x**	**x**	**x**	**x**
Pt100 temperature sensor		A					
Pt1000 temperature sensor		B					
TC100 temperature sensor		C					
Special execution		Z					
Body: material, shape and dimensions (Fig.1)							
Reserved			0				
AISI 316 SS body, ∅ 5 mm			1				
Glass body, ∅ 12 mm			2				
AISI 316 SS body, ∅ 3 mm			3				
AISI 316 SS body, ∅ 12 mm			4				
Glass body, ∅ 6 mm			5				
Special execution			9				
Number of temperature sensors in the same body							
Reserved				A			
1 sensor				B			
2 sensors, identical				C			
Special execution (eg.2 different sensors- to be specified -)				Z			
Process connections							
Reserved					0		
PG 13,5 threaded connections					1		
½" Gas threaded connections					2		
Cable and connector							
Reserved						Y	
Integral cable, 1 m (standard for lab application)						A	
Integral cable, 5 m (standard for industrial use)						B	
Integral cable, 10 m						C	
Integral cable, 15 m						D	
S7 screw connector						E	
S7 screw connectro c/w PG 13,5 process conn.						F	
SS head c/w flange and integral cable, 1 m						G	
SS head c/w flange and integral cable, 5 m						H	
SS head c/w flange and integral cable, 10 m						I	
SS head c/w flange and integral cable, 15 m						L	
Special execution						Z	
Connector on instrument side							
None							0
Jack ∅ 2 mm CN/11-2							1
Jack ∅ 4 mm CN/11-4							2
Banana ∅ 2 mm							3
Banana ∅ 4 mm							4
7 poles connector for HD 2336 CN/13 (bench top pH meter)							5
Special execution							9

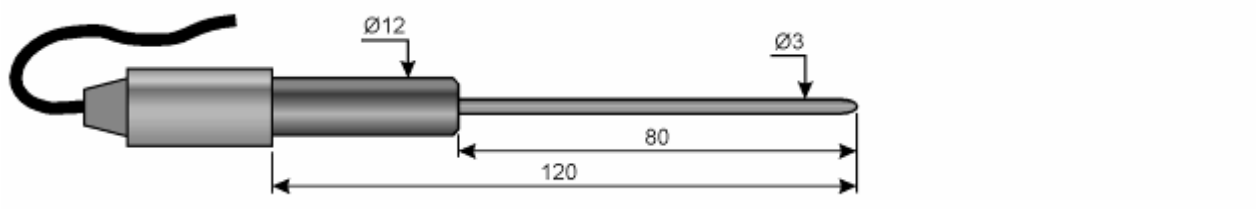
T0A2Bxxx Temperature sensor Pt100, glass body Ø 12 mm

T0C2Bxxx Temperature sensor TC100, glass body Ø 12 mm



T0A1Bxxx Temperature sensor Pt100, SS body Ø 3 mm

T0C1Bxxx Temperature sensor TC100, SS body Ø 3 mm



These sensors are available with the options included in the order code breakdown.

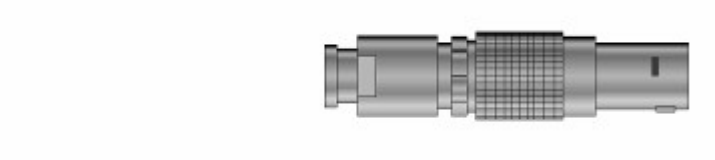
6.0 ACCESSORIES FOR ELECTRODES

Cables, connectors and plugs

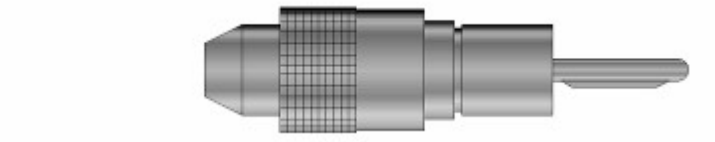
CN/1 Coaxial BNC plug

CN/2 Coaxial DIN plug

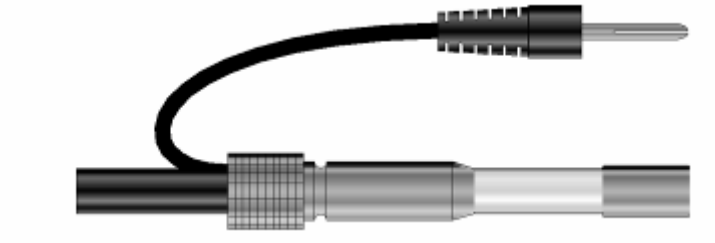
CN/3 Coaxial LEMO plug



CN/4 Coaxial plug, ∅ 12 mm (for Amel-Polymetron-Metrohm instruments)



CN/5 Coaxial plug american type (for Orion-Beckman-Corning instruments)



CN/6 Coaxial plug (RADIOMETER)

CN/7 Banana plug, Ø 4 mm

CN/8 Banana plug, Ø 2 mm

CN/11 JACK Connector (CN/11-2: 2 mm diameter; CN/11-4: 4 mm diameter)

Cables for electrodes

CV/3,5 Shielded cable for electrodes, ∅ 3.5 mm

CV/5 Shielded cable for electrodes, ∅ 5 mm

CV/405 4 cores cable 4x0.5

CV/405 SCH 4 cores cable 4x0.5, shielded

CV/205 2 poles cable 2x0.5, not shielded, external diam. 6 mm, for temperature sensors with fixed cable

CV/5-2SCH Dual shield cable, Ø 7 mm

CV/7025-SCH Shielded cable, 7 cores

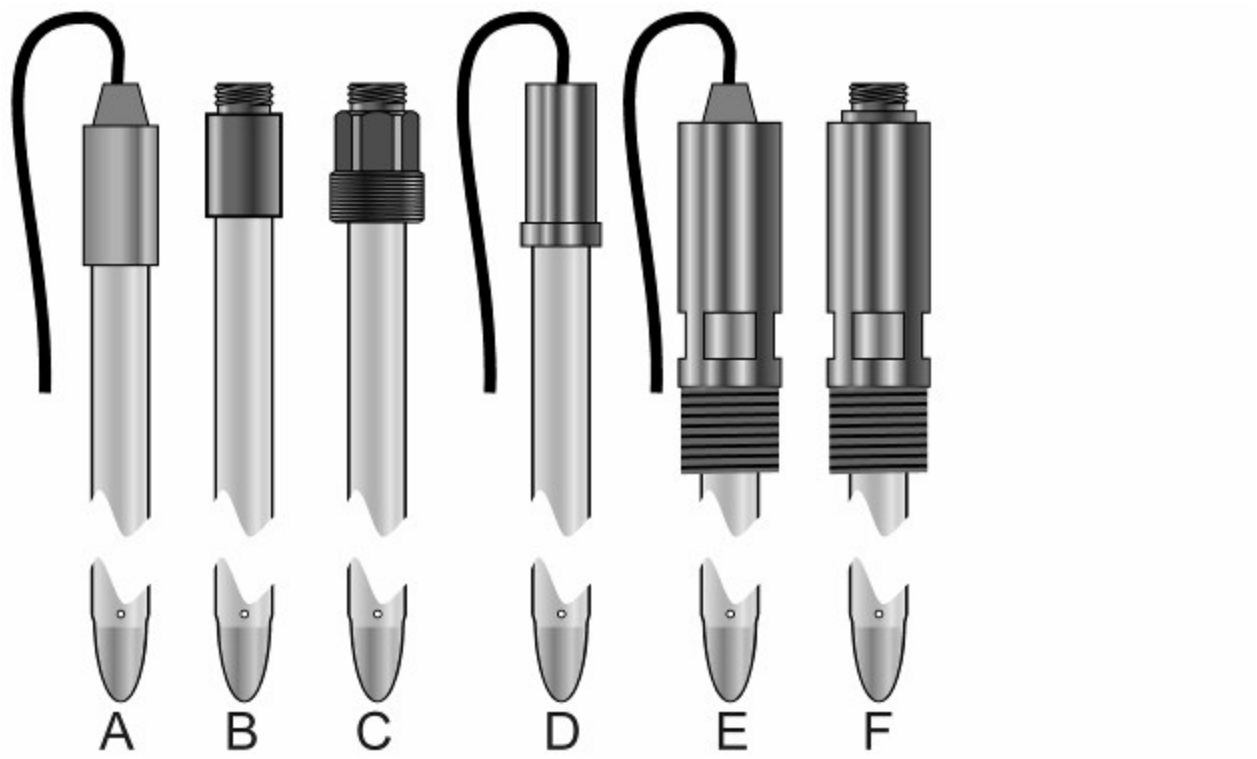
CV/S7-1 shielded cable, ∅ 5 mm, length 1 m, c/w S7 connector on electrode side
CV/S7-5 shielded cable, ∅ 5 mm, length 5 m, c/w S7 connector on electrode side
CV/S7-10 shielded cable, ∅ 5 mm, length 10 m, c/w S7 connector on electrode side
CV/S7-15 shielded cable, ∅ 5 mm, length 15 m, c/w S7 connector on electrode side
CV/S7-20 shielded cable, ∅ 5 mm, length 20 m, c/w S7 connector on electrode side
CV/S7-25 shielded cable, ∅ 5 mm, length 25 m, c/w S7 connector on electrode side

CV/S7-1-CN1 shielded cable, ∅ 5 mm, length 1 m, c/w S7 connector on electrode side and BNC connector on instrument side
CV/S7-5-CN1 shielded cable, ∅ 5 mm, length 5 m, c/w S7 connector on electrode side and BNC connector on instrument side
CV/S7-10-CN1 shielded cable, ∅ 5 mm, length 10 m, c/w S7 connector on electrode side and BNC connector on instrument side
CV/S7-15-CN1 shielded cable, ∅ 5 mm, length 15 m, c/w S7 connector on electrode side and BNC connector on instrument side
CV/S7-20-CN1 shielded cable, ∅ 5 mm, length 20 m, c/w S7 connector on electrode side and BNC connector on instrument side
CV/S7-25-CN1 shielded cable, ∅ 5 mm, length 25 m, c/w S7 connector on electrode side and BNC connector on instrument side

Connectors for electrodes

CN/10 Connector cable side for electrodes with S7 screw connector. This connector is to be mounted on the cable, electrode side; on the instrument side the cable can mount one of the above mentioned connectors for instrument.
See also the code breakdown on the following page.

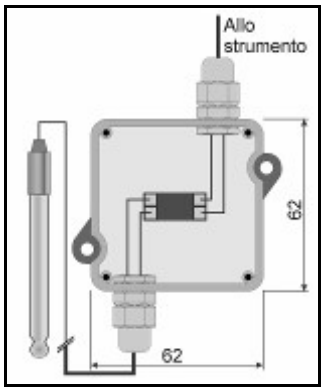
Connectors on the electrodes



A = integral cable, different lengths
B = S7 screw connector
C = S7 screw connector, PG 13,5 threaded process connection
D = SS head c/w flange
E =Ex head with integral cable, threaded process connection, ½" or ½" NPT
F = Ex head with S7 screw connection, threaded process connection, ½" or ½" NPT ½"

We can supply PG 13,5 and ½" GAS mobile threaded connectors that can be mounted on electrodes bodies and on integral heads for direct process installation.

Preamplifier for pH and ORP electrodes

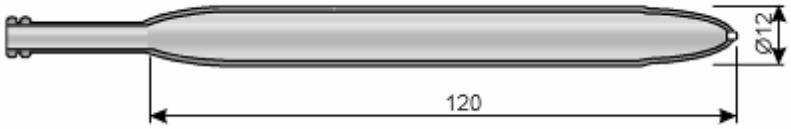


An impedance adapter for the preamplification of the signal generated by pH and ORP electrodes is optionally available. Refer to Data Sheet DS S/IC

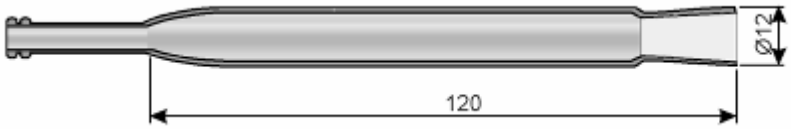
The impedance adapter Mod.S/IC is mounted into a sealed junction box and can so connected to separate pH or ORP electrodes or to combined pH or ORP electrodes.

Salt bridges, reservoirs fittings

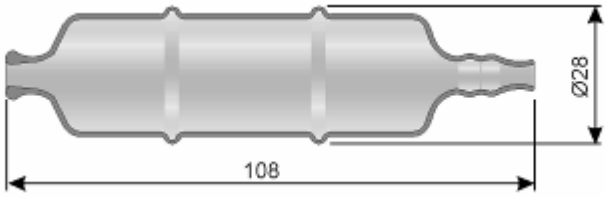
301/PS Salt bridge



301/PS-CS Salt bridge with frosted glass conic diaphragm

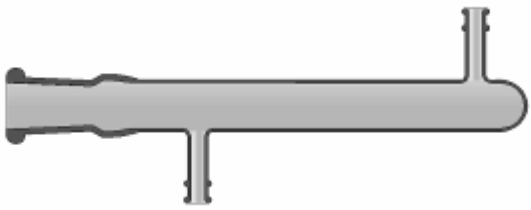


123/28 KCl reservoir for electrodes type 101V

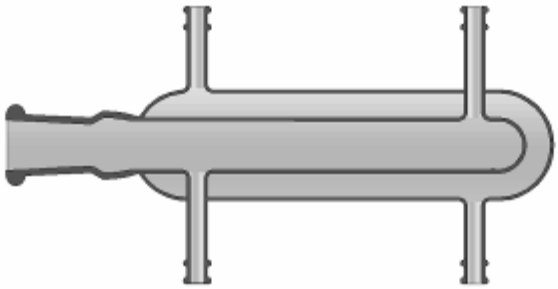


123/6x9 silicone hose 6x9

D/16 Glass through flow cell with NS 12 fitting



D/16/T Glass through flow cell with NS 12 fitting with thermostatic bath



Calibration solutions

T/101-1A	pH 1.00 Buffer solution	bottle 250 cc
T/101-1B	pH 1.00 buffer solution	bottle 500 cc
T/101-1C	pH 1.00 buffer solution	bottle 1.000 cc
T/101-4A	pH 4.00 buffer solution	bottle 250 cc
T/101-4B	pH 4.00 buffer solution	bottle 500 cc
T/101-4C	pH 4.00 buffer solution	bottle 1.000 cc
T/101-7A	pH 7.00 buffer solution	bottle 250 cc
T/101-7B	pH 7.00 buffer solution	bottle 500 cc
T/101-7C	pH 7.00 buffer solution	bottle 1.000 cc
T/101-9A	pH 9.00 buffer solution	bottle 250 cc
T/101-9B	pH 9.00 buffer solution	bottle 500 cc
T/101-9C	pH 9.00 buffer solution	bottle 1.000 cc
T/101-10A	pH 10.00 buffer solution	bottle 250 cc
T/101-10B	pH 10.00 buffer solution	bottle 500 cc
T/101-10C	pH 10.00 buffer solution	bottle 1.000 cc
T/201-468A	ORP buffer solution, 468 mV	bottle 250 cc
T/201-220A	ORP buffer sol.220/250 mV	bottle 250 cc

Electrolyte and filling solutions

E/123-1A	Electrolyte KCl 3,3 M sat. Ag/Cl	bottle 250 cc
E/123-1B	Electrolyte KCl 3,3 M sat. Ag/Cl	bottle 500 cc
E/123-1C	Electrolyte KCl 3,3 M sat. Ag/Cl	bottle 1.000 cc
E/123-2A	Saturated KCl electrolyte	bottle 250 cc
E/123-2B	Saturated KCl electrolyte	bottle 500 cc
E/123-2C	Saturated KCl electrolyte	bottle 1.000 cc
E/123-3A	Saturated KNO_3 electrolyte	bottle 250 cc
E/123-3B	Saturated KNO_3 electrolyte	bottle 500 cc
E/123-3C	Saturated KNO_3 electrolyte	bottle 1.000 cc
E/123-1A-4	Electrolyte KCl 3,3 M gel, sat. Ag/Cl	bottle 250 cc
E/123-1B-4	Electrolyte KCl 3,3 M gel, sat. Ag/Cl	bottle 500 cc
E/123-1C-4	Electrolyte KCl 3,3 M gel, sat. Ag/Cl	bottle 1.000 cc
E/123-1A-10	Electrolyte KCl 3,3 M solid gel, sat. Ag/Cl	bottle 250 cc
E/123-1B-10	Electrolyte KCl 3,3 M solid gel, sat. Ag/Cl	bottle 500 cc
E/123-1C-10	Electrolyte KCl 3,3 M solid gel, sat. Ag/Cl	bottle 1.000 cc

One of the main issues of our Company has always been the capability to solve application problems for our Customers.

Our technical department can always support the Customer in operating the best choice for a certain application and, when required, we can design and manufacture new products matching specific applications.

Our long-term in-filed experience has been developed thanks to the attention that we have always posed into co-operating with our customers.

This Catalogue only includes the Electrodes Line.

To have some more information on our product lines pls visit our web site
www.clritalia.com
or ask for our complete technical catalogue on CD-ROM.

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