



MEINSBERG ELECTRODES

for Laboratory and Process



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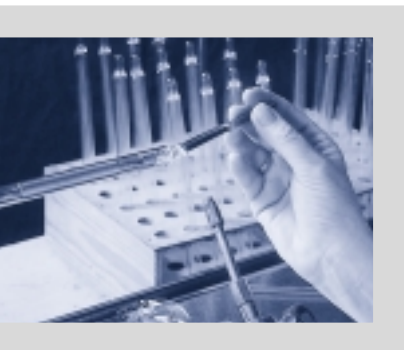
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MEINSBERG ELECTRODES FOR LABORATORY AND PROCESS

We develop and manufacture electrodes and sensors for measurement of **pH value, redox potential (ORP), conductivity, oxygen, carbon dioxide, temperature, chlorine and other water disinfects.**

Laboratory Electrodes fulfil all requirements for precise and accurate measurements in laboratory and field in connection with laboratory, pocket and field meters. Beyond that we offer a complete range of electrodes for the corrosion measurement technique.



Process Electrodes are unique specialists specifically designed to withstand the most extreme physical and chemical conditions in process applications for water technology, process chemistry, biotechnology, and food and pharma industry. These electrodes, tailored to specific applications, combine high quality, long life and stability with competitive price.

This catalogue presents our standard range of laboratory and process electrodes and sensors. Two reviews give a brief overview of the most usual applications and our recommendations in combination with measuring hints for selection of the “right” electrode or sensor to your specific application. We will gladly provide you with advice regarding other applications or deviating conditions.

MEINSBERG'S KNOW-HOW: COMBINATION ELECTRODES

The potentiometric pH and redox measurement is a measurement of the voltage between two single electrodes (half cells). The measurement electrode changes its potential in dependence on pH value or redox potential of the measured medium. The reference electrode generates a stable voltage against, nearly independent from the measured medium. In case of pH measurement the measurement electrode contains a special pH sensitive glass membrane. Usually a platinum electrode is used as measurement electrode in redox potential (ORP) measurements. The reference electrode is either filled with liquid (refillable) or gel (non-refillable) electrolyte. Stable reference systems with a special separated silver chloride reservoir are the basis for reliable long life pH and redox combination electrodes. The innovative gel or polymer electrolyte features low-maintenance, easy application and process integration. The diaphragm of the reference electrode secures the connection to the sample. High performance ceramic diaphragms, special large-sized ring-shaped sleeves or holes feature reliable liquid junctions.

The combination electrode contains a measurement and a reference electrode in a common unit.

The pH value of the measured medium as well as the electrode signal change according to its temperature. Only the simultaneous measurement of pH and sample temperature features automatic temperature compensation of the electrode signal and the comparison of measurement results.

Meinsberg pH Combination Electrodes with integrated temperature sensor result in substantially more precise pH measurements due to automatic temperature compensation and deliver more information because of the simultaneous measurement of pH and temperature.

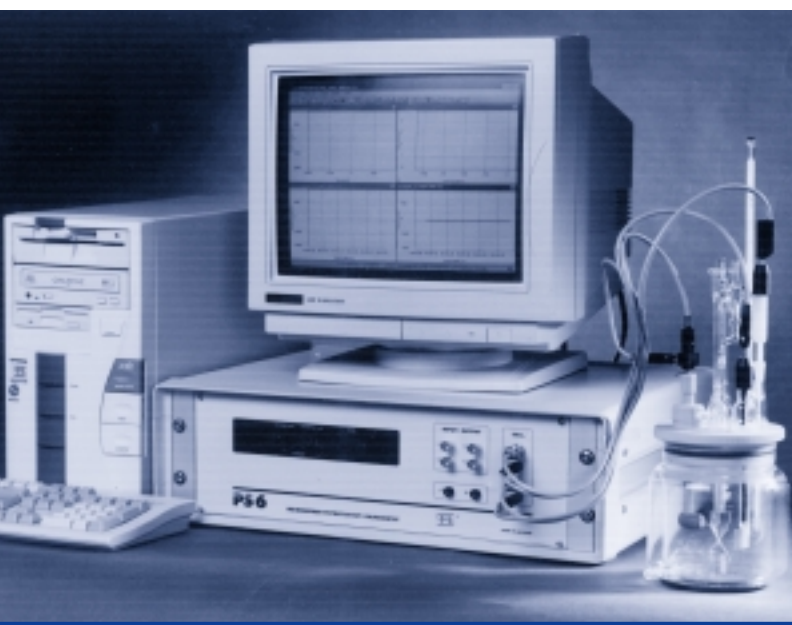
RELIABILITY BY QUALITY AND SPECIAL ELECTRODES

Long-term stable and reliable electrodes and sensors are the result of a lot of experiences, continuous development and high manufacturing quality. Each electrode has to fulfil the strong quality specifications of the final test before dispatch. Optimised pH sensitive glasses and diaphragms, specifically developed nearly maintenance free electrolytes, the specific construction and design as well as storage, operation, maintenance and process integration influence the live time of the electrodes / sensors and the reliability of the measurement.

We design and manufacture electrodes and sensors as reliable tools in accordance with the specific applications.

Regularly and correct calibration, adjustment and maintenance are important points for reliable measurements. The calibration delivers information about the actual specifications of the electrode/sensor and results in an adaptation of the measuring instrument to the specific parameters of the electrode. pH buffer solutions are used for determination of the actual parameters "isopotential point" and "electrode slope" of the pH electrode. The slope is the voltage of the pH electrode per pH unit. Today usual pH combination electrodes give an offset voltage of about 0 mV at pH 7 (isopotential point).

The accuracy of the measurement results depends on the regularly calibration and maintenance, the specific application and measuring conditions as well as the ageing of the electrode. Please ask for more information to select the optimal electrode for your application!



LABORATORY ELECTRODES

Application recommendations	pH	redox (ORP)
general aqueous solutions, dilute solutions	GA 151/SE 21 EGA 151 EGA 173 EGA 141	EMC 30
food, drinks	EGA 151 EGA 141	EMC 30
penetration measurements in meat, cheese etc.	EGA 181 EGA 184	
cooling water, raw water, wastewater	EGA 151 EGA 131 EGA 173	EMC 30 EMC 130
low ionic strength samples, suspensions, cosmetics, water-soluble lacquers	EGA 161 GA 151/SE 20	EMC 30
field use, aquarium water, surface water, swimming pools	EGA 131 EGA 133 EGA 141 EGA 142	EMC 130 EMC 133 EMC 134
small volumes	EGA 501 EGA 801	
rapidly changing temperatures, temperature compensated measurements	EGA 141 EGA 142 EGA 143	

SE 20 SE 21

Reference Electrodes



Reference electrodes with internal Ag/AgCl reference system are used in connection with single pH, redox or ion-selective measurement electrodes. Reference electrodes with electrolyte bridge are recommended especially for ion-selective measurements because of the possibility to use sample compatible bridge electrolytes.

-5 ... 80 deg C
glass shaft Ø 12 mm
refillable electrolyte sat. KCl

SE 20:
detachable sleeve junction,
shaft length 120 mm

SE 20/EB:
electrolyte bridge, ceramic diaphragm (inside),
shaft length 160 mm

SE 21:
ceramic diaphragm, shaft length 120 mm

SE 21/EB:
electrolyte bridge, ceramic diaphragm (inside
and outside), stem length 160 mm

SE 20, SE 21:
fixed cable 1 m, 4 mm banana plug
SE 20 L, SE 20/EB/L,
SE 21 L, SE 21/EB/L:
lab plug head S7-system

Reference Electrodes

SE 11 KE 11

These Ag/AgCl and calomel reference electrodes feature application in very small volumes and general laboratory use. Some of the electrodes are equipped with a standard taper NS 7 and enable application in closed vessels i.e. in corrosion measuring cells.

glass shaft Ø 5 mm
shaft length 155 mm
refillable electrolyte sat. KCl
ceramic diaphragm

SE 11:
-5 ... 80 deg C, Ag/AgCl

KE 11:
0 ... 60 deg C, Calomel

SE 11/NSK 7, KE 11/NSK 7:
electrode shaft equipped with a
NS-7 glass cone

SE 11, KE 11,
SE 11/NSK 7, KE 11/NSK 7:
4 mm socket plug head



GA 151

pH Glass Electrode



This glass-bodied screened pH sensing half cell must be used in conjunction with a reference electrode for general precision pH measurement.

-5 ... 80 deg C
pH 0 ... 14
isopotential point pH 7 Ag
glass shaft Ø 12 mm
shaft length 120 mm
cylinder membrane

GA 151:
fixed cable 1 m, German DIN plug
GA 151 L:
lab plug head S7-system

pH Combination Electrodes

EGA 151 EGA 173

These pH combination electrodes cover excellently all the usual measurement tasks performed in laboratories. The model EGA 173 features low maintenance because of the high stability gel matrix with embedded KCl and a large-sized ring-shaped glass sleeve junction.

-5 ... 80 deg C
pH 0 ... 14
glass shaft Ø 12 mm
shaft length 120 mm
cylinder membrane

EGA 151:
refillable electrolyte 3 M KCl,
ceramic diaphragm

EGA 173:
gel electrolyte (non-refillable),
ring-shaped sleeve junction

EGA 151, EGA 173:
fixed cable 1 m, German DIN plug
EGA 151 L, EGA 173 L:
lab plug head S7-system



EGA 131 EGA 133

pH Combination Electrodes



These pH combination electrodes are the ideal choice for student and rugged use especially in connection with pocket meters. The electrode EGA 133 features gel electrolyte for low maintenance and black plastic body.

-5 ... 80 deg C
pH 0 ... 14
PSU plastic shaft Ø 12 mm
shaft length 120 mm
2 ceramic diaphragms

EGA 131:
refillable electrolyte 3 M KCl,
transparent shaft,
ball membrane

EGA 133:
gel electrolyte (non-refillable),
black shaft,
cylinder membrane

EGA 131, EGA 133:
fixed cable 1 m, German DIN plug
EGA 131 L, EGA 133 L:
lab plug head S7-system

pH/Temperature Combination Electrodes

EGA 141 EGA 143

Integrated temperature sensor recommends these electrodes especially for temperature compensated measurements in laboratory even under difficult extraordinary conditions. Corresponding to your meter these electrodes are available with an integral platinum resistance sensor Pt 1000 or an NTC 30 kOhm (ATC probe).

-5 ... 80 deg C, pH 0 ... 14
glass shaft Ø 12 mm
shaft length 120 mm
cylinder membrane

EGA 141/Pt 1000:
refillable electrolyte 3 M KCl,
ceramic diaphragm, integrated Pt 1000

EGA 141/TFK:
refillable electrolyte 3 M KCl,
ceramic diaphragm, integrated NTC 30 kΩ

EGA 143/Pt 1000:
gel electrolyte (non-refillable), ring-shaped sleeve junction, integrated Pt 1000

EGA 143/TFK:
gel electrolyte (non-refillable), ring-shaped sleeve junction, integrated NTC 30 kΩ

EGA 141/..., EGA 143/... :
fixed cable 1 m, German DIN plug
and banana plug 4 mm



EGA 142

pH/Temperature Combination Electrode



This electrode with built-in temperature probe and rugged plastic shaft features temperature compensated pH measurements in connection with pocket meters. Corresponding to your meter these electrodes are available with an integral platinum resistance sensor Pt 1000 or an NTC 30 kOhm (ATC probe).

-5 ... 80 deg C
pH 0 ... 14
PSU plastic shaft Ø 12 mm
shaft length 120 mm
cylinder membrane
gel electrolyte (non-refillable)
2 ceramic diaphragms
EGA 142/Pt 1000:
integrated Pt 1000
EGA 142/TFK:
integrated NTC 30 kΩ

EGA 142/...:
fixed cable 1 m, German DIN plug
and banana plug 4 mm

pH

pH Combination Electrode

EGA 161

This pH combination electrode with detachable ground sleeve diaphragm eliminates nearly all measuring problems in samples with low ionic strength (i.e. drinking water), suspensions, protein containing media and partially aqueous samples. The reference electrode cartridge is filled with electrolyte solution (3 M KCl).

-5 ... 80 deg C
pH 0 ... 14
glass shaft Ø 12 mm
shaft length 120 mm
cylinder membrane
refillable electrolyte 3 M KCl
glass sleeve junction

EGA 161:
fixed cable 1 m, German DIN plug
EGA 161 L:
lab plug head S7-system



EGA 181 EGA 184

pH Combination Electrodes



These electrodes feature superior performance for piercing soft, moist samples such as meats, fruits or cheese.

The independence of the measurement from the position of the electrode is one prominent quality of the electrode EGA 184, especially recommended for routine quality check of meat.

0 ... 60 deg C

pH 2 ... 11

glass shaft Ø 12 / 6 mm

shaft length 120 mm

tip diameter 6 mm, 35 mm long

spear tip membrane

2 ceramic diaphragms

EGA 181:

refillable electrolyte 3 M KCl

EGA 184:

gel electrolyte (non-refillable)

EGA 181, EGA 184:

fixed cable 1 m, German DIN plug

EGA 181 L, EGA 184 L:

lab plug head S7-system

pH Combination Electrodes

EGA 501 EGA 801

These micro pH combination electrodes feature superior performance for measurements in small volume samples, test tubes and flasks.

0 ... 60 deg C

pH 2 ... 11

glass shaft Ø 8 / 6 mm

shaft length 100 mm

6 mm section is 30 mm long

refillable electrolyte 3 M KCl

2 ceramic diaphragms

EGA 501: ball membrane

EGA 801: spear membrane

EGA 501, EGA 801:

fixed cable 1 m, German DIN plug



EMC 30

Redox (ORP) Combination Electrode



This redox (ORP) combination electrode is used for measurement of reduction/oxidation potential and redox titration in general laboratory applications. The reference electrode cartridge is filled with electrolyte solution (3 M KCl). The platinum disc melted onto the glass increases mechanical stability and features minimal flow dependency.

-5 ... 80 deg C
Ag/AgCl reference system
glass shaft Ø 12 mm
shaft length 120 mm
platinum disc Ø 6 mm
refillable electrolyte 3 M KCl
ceramic diaphragm

EMC 30:
fixed cable 1 m, German DIN plug
EMC 30 L:
lab plug head S7-system

Redox (ORP) Combination Electrodes

EMC 130, 133, 134

These plastic-bodied redox (ORP) combination electrodes are the ideal choice for rugged use in general lab/field measurement especially with pocket meters. The electrodes EMC 133 and EMC 134 feature low maintenance because of the gel electrolyte.

-5 ... 80 deg C
Ag/AgCl reference system
PSU plastic shaft Ø 12 mm
shaft length 120 mm
ceramic diaphragms

EMC 130:
platinum disc Ø 6 mm,
refillable electrolyte 3 M KCl,
transparent shaft

EMC 133:
platinum disc Ø 6 mm,
gel electrolyte (non-refillable),
black shaft

EMC 134:
platinum rod Ø 0.8 mm,
gel electrolyte (non-refillable),
black shaft

EMC 130, EMC 133, EMC 134:
fixed cable 1 m, German DIN plug
EMC 130 L, EMC 133 L, EMC 134 L:
lab plug head S7-system



LTG 1 LTG 0,1

Conductivity Cells



These conductivity cells with two large parallel platinum sheets melted onto the glass feature identical dimensions like pH electrodes and a wide conductivity measurement range in conjunction with field and laboratory meters. Models LTG 1/23 and LTG 0,1/23 with integrated temperature sensor Pt 1000 enable automatic temperature compensation.

-5 ... 100 deg C

platinum electrodes

glass shaft Ø 12 mm

shaft length 120 mm

LTG 1/24:

cell constant about 1 cm¹, Pt platinized

LTG 1/23:

cell constant about 1 cm¹, integrated Pt 1000

LTG 0,1/24:

cell constant about 0.1 cm¹, Pt bright

LTG 0,1/23:

cell constant about 0.1 cm¹, integrated Pt 1000

LTG 1/24 L, LTG 0,1/24 L:

lab plug head S7-system

LTG 1/23 T, LTG 0,1/23 T:

fixed cable 2 m without connector

Temperature Sensor

Pt 1000

This temperature sensor is specifically designed for automatic temperature compensation of pH measurements or in connection with PC or laboratory multi parameter instrumentations. The glass shaft features high chemical resistant and dimensions identical to pH electrodes. The sensor contains a platinum resistor Pt 1000 in accordance with DIN IEC 751 class A.

-10 ... 100 deg C

glass shaft Ø 12 mm

shaft length 120 mm

Pt 1000:

fixed cable 1 m, 2 x banana plug 4 mm

Pt 1000 L:

lab plug head S7-system



KMZ 5

Corrosion Measuring Cell



In addition to the application of this complete measuring cell in conjunction with corrosion measuring systems the cell features ideal use for general measuring tasks in electrochemistry, research, education and quality assurance.

The double-walled cell container with tube connections is suitable for connection to a thermostat. The cell top enables a lot of possibilities for insertion of electrodes and connections with standard cones.

double-walled cell container
Ø about 130 mm
volume max. 250 ml
cell top Ø about 120 mm
max. 110 deg C

Standard insertion parts:

Platinum Counter Electrode 4 cm²
Reference Electrode KE 11 / NSK 7
Liquid Junction Tube
Intermediate Vessel
Gas in- and outlet
Specimen Holder (working electrode)
Thermometer (optional)
KPG stirrer (optional)

Connection Cables

Koax 3, 4, 5, 6

Connection cables are used for all leadless electrodes and sensors equipped with a Euro-Standard plug head S7- system. The plug head S7-system offers a clear advantage over fixed cable connections because the life of a cable is appreciably longer than those of a sensor. In addition the different versions of connection cables enable compatibility of the sensors and electrodes with pH/millivolt meters of all types world-wide.

low-noise coaxial cable
standard length 1 m, diameter about 3 mm
electrode connection:
plug head S7 connector

Koax 3, 5:

for pH glass electrodes, pH and redox combination electrodes

Koax 4:

for reference electrodes

Koax 6:

for temperature sensors and conductivity cells

Koax 3:

S7 plug / German DIN plug (DIN 19262)

Koax 4: S7 plug / banana plug 4 mm

Koax 5: S7 plug / BNC plug

Koax 6: S7 plug / 2 x banana plug 4 mm





PROCESS ELECTRODES

Application recommendations	pH	Redox (ORP)
general aqueous samples, dilute solutions	GA 151 / SE 21 GA 151 / SE 23 EGA 150 EGA 153 EGA 173	EMC 33 EMC 173
food, drinks	EGA 153 EGA 173	EMC 33 EMC 173
process water, raw water, wastewater, surface water	EGA 150 EGA 153 EGA 173 EGA 142 EGA 133 EGA 233 K/PI	EMC 33 EMC 34 EMC 173 EMC 133 EMC 233 K/PI
swimming pools	EGA 133 EGA 150	EMC 34 EMC 133 EMC 134
heavily polluted waste water, water treatment plants	EGA 173 EGA 143 EGA 233 K/PI	EMC 173 EMC 233 K/PI
electroplating	EGA 233 EGA 153 EGA 173	EMC 233
low ionic strength samples, drinking water, suspensions, water-soluble lacquers, boiler feed water	GA 151 / SE 20 EGA 161 EGA 173	EMC 173
process chemistry	EGP 150	
biotechnology, steam sterilisation (fermenters)	EGV 150	
rapidly changing temperatures, ATC	EGA 142 EGA 143	

SE 20, 21, 23

Reference Electrodes



Reference electrodes with internal Ag/AgCl reference system are used in connection with single pH, redox or ion-selective measurement electrodes. SE 23 features low maintenance, application without external pressure compensation and 3 ceramic diaphragms for minimal flow dependency.

-5 ... 80 deg C
glass shaft Ø 12 mm
immersion length 120 mm

SE 20:
refillable electrolyte sat. KCl,
detachable sleeve junction,
glass shaft with side-arm

SE 21:
refillable electrolyte sat. KCl,
ceramic diaphragm,
glass shaft with side-arm

SE 23:
gel electrolyte (non-refillable),
3 ceramic diaphragms,
max. 6 bar

SE 20 K, SE 21 K, SE 23 K:
fixed cable 5 m, without connector
SE 23 I:
PG 13.5 threaded plug head S7-system

pH Glass Electrode

GA 151

This glass-bodied screened pH sensing half cell must be used in conjunction with a reference electrode for general precision pH measurement. Special version with extra thick pH glass membrane features application in abrasive samples.

-5 ... 80 deg C
pH 0...14
max. 6 bar
isopotential point pH 7 Ag
glass shaft Ø 12 mm
immersion length 120 mm
cylinder membrane

GA 151 K:
fixed cable 5 m, without connector
GA 151 I:
PG 13.5 threaded plug head S7-system



EGA 150, 153, 173

pH Combination Electrodes



These pH combination electrodes feature low maintenance and easy process integration because of the high stability gel matrix electrolyte with embedded KCl. Different versions with one or several ceramic diaphragms and special large-sized ring-shaped glass sleeve junction make these electrodes to the ideal choice for process application even in heavily polluted waste water, sewage, swimming pool water treatment and electroplating.

-5 ... 80 deg C, pH 0 ... 14, max. 6 bar
glass shaft Ø 12 mm
immersion length 120 mm
cylinder membrane
gel electrolyte (non-refillable)
EGA 150: 1 ceramic diaphragm
EGA 153: 3 ceramic diaphragms
EGA 173: ring-shaped sleeve junction

EGA 150 K/PG,
EGA 153 K/PG,
EGA 173 K/PG:
fixed cable 5 m and hex nut PG 13.5
EGA 150 I,
EGA 153 I,
EGA 173 I:
PG 13.5 threaded plug head S7-system

pH Combination Electrodes

EGA 133 EGA 233

These electrodes with robust plastic shaft with integrated pH membrane protection combine low maintenance and rugged design for general process applications. The double-junction Ag/AgCl reference system of the electrode EGA 233 offers long-term stability even in heavily polluted mediums as well as in mediums containing harmful substances.

-5 ... 80 deg C
pH 0 ... 14
max. 6 bar
PSU shaft Ø 12 mm, black
immersion length 120 mm
cylinder membrane
gel electrolyte (non-refillable)
2 ceramic diaphragms
EGA 133:
Ag/AgCl reference cartridge
EGA 233:
double-junction reference system

EGA 133 I, EGA 233 I:
PG 13.5 threaded plug head S7-system



EGA 161

pH Combination Electrode



This pH combination electrode with detachable glass ground sleeve diaphragm and large low-resistant pH membrane glass eliminates nearly all measuring problems in samples with low ionic strength, like ultra clean water and drinking water. Connect the side arm to a 3 M KCl electrolyte reservoir and adjust the flow with the glass sleeve for optimal performance.

-5 ... 80 deg C
pH 0 ... 14
max. 0.5 bar, or higher with external pressure load,
glass shaft Ø 12 mm with side tube connector,
immersion length 120 mm
cylinder membrane
refillable electrolyte 3 M KCl
glass sleeve junction

EGA 161 K/PG:
fixed cable 5 m and hex nut PG 13.5
EGA 161 L/PG:
lab plug head S7-system and hex nut PG 13.5

pH Combination Electrodes

EGP 150 EGV 150

These pH combination electrodes feature low maintenance and easy process integration because of the special high stability polymer electrolyte with embedded KCl and increased long-term stability for continuous process applications even under extreme conditions. The electrode EGP 150 is recommended for process chemistry at high temperatures and extreme pH of the sample. The electrode EGV 150 is ideal for applications in biotechnology and pharma industry as well as for pilot and laboratory plants and features long life and stable calibration after sterilization or autoclavation.

max. 6 bar, glass shaft Ø 12 mm,
immersion length 120 mm,
cylinder membrane, polymer electrolyte (non-refillable), ceramic diaphragms

EGP 150:

extreme pH values and high temp.,
0...100 deg C, pH 0 ... 14

EGV 150:

steam sterilizable max. 135 deg C;
operation 0 ... 60 deg C, pH 2 ... 10

EGP 150 I, EGV 150 I:
PG 13.5 threaded plug head S7-system



EGA 142 EGA 143

pH/Temperature Combination Electrodes



Multipin screw plug heads SMEK and VarioPin with PG 13.5 thread enable mounting of these electrodes in standard probe assemblies and feature extremely robust and water-tight operation. Because of the built-in temperature sensor and the gel electrolyte these electrodes are recommended for temperature compensated pH measurements in industrial waste water treatment. EGA 142 features plastic bodied rugged design. The special large-sized diaphragm of the EGA 143 recommends this electrode even for heavily polluted water.

pH 0 ... 14, max. 6 bar
shaft Ø 12 mm, immersion length 120 mm
cylinder membrane
gel electrolyte (non-refillable)
built-in temperature probe Pt 1000
EGA 142: -5 ... 60 °C,
2 ceramic diaphragms, PSU shaft
EGA 143: -5 ... 80 °C,
ring-shaped sleeve junction, glass shaft

EGA 142 SMEK, EGA 143 SMEK:
PG 13.5 threaded SMEK plug head
EGA 142 VP, EGA 143 VP:
PG 13.5 threaded VarioPin plug head

pH/Redox (ORP) Combination Electrodes

PI-W

This nearly maintenance free process electrodes feature extremely rugged design, additional protection guard, fixed watertight cable connection, extremely long term stability and easy flow, immersion and submersion installation especially in water technology.

-5 ... 65 deg C
max. 6 bar
PVC shaft Ø about 27 mm
total length 150 mm
gel electrolyte (non-refillable)
2 ceramic diaphragms
double junction reference system
screw-in thread 3/4" NPT on both ends
EGA 233 K/PI:
pH combination electrode, pH 0 ... 14
EMC 233 K/PI:
redox (ORP) combination electrode;
platinum disc Ø 6 mm

EGA 233 K/PI, EMC 233 K/PI:
fixed cable (IP 67) standard length 5 m
without connector



pH ■ REDOX (ORP)

EMC 33,34 EMC 173

Redox (ORP) Combination Electrodes



These redox (ORP) combination electrodes with gel electrolyte, ceramic diaphragm or special large-sized ring-shaped glass sleeve junction are particularly directed towards applications involving the monitoring and control of industrial waste water, swimming pool water treatment and electroplating.

The platinum disc melted onto the glass features high mechanical stability and flow direction independent signals.

-5 ... 80 deg C, max. 6 bar
Ag/AgCl reference system
glass shaft Ø 12 mm
immersion length 120 mm
gel electrolyte (non-refillable)

EMC 33: ceramic diaphragm
platinum disc Ø 6 mm,

EMC 34: ceramic diaphragm
platinum rod Ø 0.8 mm

EMC 173: ring-shaped sleeve junction,
platinum disc Ø 6 mm,

EMC 33 K/PG, EMC 173 K/PG:
fixed cable 5 m and hex nut PG 13.5
EMC 33 I, EMC 34 I, EMC 173 I:
PG 13.5 threaded plug head S7-system

Redox (ORP) Combination Electrodes

EMC 133, 134, 233

These plastic-bodied redox (ORP) combination electrodes are the ideal choice for rugged use in general industrial measurements. The double-junction Ag/AgCl reference cartridge system of the electrode EMC 233 offers long-term stability even in heavily polluted mediums as well as in mediums containing harmful substances.

-5 ... 80 deg C
Ag/AgCl reference system
max. 6 bar
PSU shaft Ø 12 mm
immersion length 120 mm
gel electrolyte (non-refillable)
2 ceramic diaphragms

EMC 133: platinum disc Ø 6 mm

EMC 134: platinum rod Ø 0.8 mm

EMC 233: platinum disc Ø 6 mm,
double-junction reference system

EMC 133 I, EMC 134 I, EMC 233 I:
PG 13.5 threaded plug head S7-system



LTC 1

Conductivity Cell



This contamination-proof 2-electrode conductivity cell is ideal for general applications in waste water. The special graphite electrodes sealed in epoxy feature high mechanical stability, easy purification and low maintenance. A temperature sensor Pt 1000 with low response time is integrated in the cell LTC 1/23 for automatic temperature compensation.

-5 ... 80 °C

max. 6 bar

graphite electrodes

PSU shaft Ø 12 mm, black

immersion length 120 mm

LTC 1/24:

cell constant about 1 cm⁻¹

LTC 1/23:

cell constant about 1 cm⁻¹,

built-in Pt 1000

LTC 1/24 I:

PG 13.5 threaded plug head S7-system

LTC 1/23 K/PG:

fixed cable 5 m and hex nut PG 13.5

LTC 1/23 SMEK:

PG 13.5 threaded SMEK plug head,

connection cable K 18

Conductivity Cells

LTG 1 LTG 0,1

These conductivity glass-body cells with two large parallel platinum electrodes feature high precision for universal application, even in partly aqueous and highly aggressive media as well as in pure or drinking water. A temperature sensor Pt 1000 is integrated in the cells LTG 1/23 and LTG 0,1/23 for automatic temperature compensation.

-5 ... 100 deg C, max. 6 bar

glass shaft Ø 12 mm

immersion length 120 mm

platinum electrodes

LTG 1/24:

cell constant about 1 cm⁻¹, Pt platinized

LTG 1/23:

cell constant about 1 cm⁻¹, built-in Pt 1000

LTG 0,1/24:

cell constant about 0.1 cm⁻¹, Pt bright

LTG 0,1/23:

cell constant about 0.1 cm⁻¹,

built-in Pt 1000

LTG 1/24 I, LTG 0,1 I:

PG 13.5 threaded plug head S7-system

LTG 1/23 K/PG, LTG 0,1/23 K/PG:

fixed cable 5 m and hex nut PG 13.5

LTG 1/23 SMEK, LTG 0,1/23 SMEK:

PG 13.5 threaded SMEK plug head,

connection cable K 18



MF 41

Oxygen Sensor



This membrane covered amperometric oxygen sensor combines rugged design, identical dimensions to pH electrodes, integrated temperature sensor for automatic temperature compensation, high long-term stability and extremely low maintenance. Short response time, rugged multi-layer membrane, low flow sensitivity and short polarisation time make this sensor ideal for pilot and laboratory plants, water technology, pools and fish farms.

-5 ... 45 deg C
0 ... 20 mg O₂/l
max. 1 bar
PSU shaft Ø 12 mm
immersion length 120 mm
built-in Pt 1000
max. cable length 20 m

MF 41 K/PG:
fixed cable 5 m and hex nut PG 13.5
MF 41 SMEK:
PG 13.5 threaded SMEK plug head,
connection cable K 39

Oxygen Sensor

MF 39

MF 39 features low maintenance, robust mechanical construction with threaded plastic shaft and plug head-cable connection system, extremely foul-resistant and rugged multi-layer membrane, extended operation and minimal flow requirement.

This sensor is the ideal choice for monitoring and control of aeration in waste water treatment plants and results in high long-term stability and easy air calibration.

-5 ... 50 deg C
0 ... 60 mg O₂/l
max. 3 bar
PG 16 threaded plastic shaft Ø 18 mm
immersion length 120 mm
built-in Pt 1000
max. cable length 20 m

MF 39 SMEK:
SMEK plug head, connection cable K 39



Pt 100
Pt 1000

Temperature Sensors



These temperature sensors are specifically designed for automatic temperature compensation and temperature measurement in conjunction with electrochemical sensors. The dimensions are identical to those of pH electrodes and the sensors contain a platinum resistor in accordance with DIN IEC 751 class A. The model with MultiPin SMEK plug head with the cable K 18 in 3- or 4-wire connections reduces failures caused by the cable resistance especially if longer cable connections are requested.

-10 ... 100 deg C, max. 6 bar
glass shaft Ø 12 mm
immersion length 120 mm

Pt 100:

platinum resistance sensor Pt 100

Pt 1000:

platinum resistance sensor Pt 1000

Pt 100 K/PG, Pt 1000 K/PG:

fixed cable 5 m and hex nut PG 13.5

Pt 100 I, Pt 1000 I:

PG 13.5 threaded plug head S7-system

Pt 100 SMEK, Pt 1000 SMEK:

PG 13.5 threaded SMEK plug head,
connection cable K 18

Connection Cables

K 43, 50
51, 52

A significant benefit of plug head-cable connection systems is that cable installation has to be carried out only once and is therefore essentially permanent. These systems offer a clear cost advantage over standard fixed cable installations because the life of a cable is appreciably longer than those of a sensor. The multi wire and triaxial cables feature simultaneous measurement of several parameters i.e. pH and temperature.

standard lengths 2, 5, 10, 15 m,
diameter about 5 mm

K 18, K 39:

shielded rugged multi wire cable with
SMEK plug head cable connector

K 43, K 50, K 51, K 52:

low-noise coaxial measuring cable with
plug head S7 cable connector

K 54:

low-noise triaxial cable with SMEK plug head
cable connector for pH/Temp. electrodes

K 18, K 39, K 54:

SMEK plug /stripped tinned ends

K 43: S7 plug / stripped tinned ends

K 50:

S7 plug / German DIN plug (DIN 19262)

K 51: S7 plug / BNC plug

K 52: S7 plug on both ends



K 18,
39, 54



INSTRUCTIONS FOR USING pH AND REDOX ELECTRODES

Storage

All electrodes are supplied tested and ready for use. Unless advised to the contrary, electrodes should be stored within the protective cap filled with a 3 Mol solution of KCl. Storage temperature should be between 10 deg and 30 deg C, but never below -5 deg C. Should any KCl solution leak from the protective cap during storage or transit (usually seen as a white salt), then it may be easily removed by rinsing the electrode in water. The electrode will not be affected by this leakage.

Calibration

Carefully rinse electrodes with deionised/distilled water and remove air bubbles by shaking (as with a mercury clinical thermometer) before immersing into the buffer solution. Always rinse the electrode in deionised/distilled water before using other buffer solutions. Discard the buffer solution after use.

Please note that buffer solutions do have a finite shelf life.

If possible calibration buffer solutions should be at the normal working temperature.

Calibrate electrodes in accordance with the instrument's working manual.



Prior to despatch, every electrode, sensor and standard solution is individually tested. Standard solutions are controlled against reference standards to secure full traceability to international standards and scales. A quality certificate for each electrode, sensor and standard shows the compatibility with the rigid characteristic data at time of delivery. Please note all standard solutions have a limited shelf life and especially a limited life once opened. An expiry date is stamped on all solution bottles.

Ageing

All electrodes under go a natural ageing process caused by the exchange reactions of the glass membrane and the reference system.

This usually results in the electrode having a slow response time, decrease of slope, or changes of isopotential point.

Please note that even in storage, electrodes will still be subjected to the ageing process.

With refillable electrodes, always check that there is sufficient electrolyte solution.

The level of the reference electrolyte should be several cm higher than the level of the measuring medium.

Cleaning

pH and redox combination electrodes can be cleaned by rinsing in deionised/distilled water, and if necessary dried carefully with tissue paper.

The redox electrode's platinum disc or rod may be cleaned by wiping with tissue paper.

Protein contamination may be removed by soaking for 1 hour in cleaning solution (Pepsin/HCl).

After use in an oily or organic solution, the pH electrode should be cleaned by dipping into acetone or ethanol for a short period.

It may be possible to reverse the ageing process effects by immersing the membrane of the pH electrode in a re-conditioning solution (HCl, HF) for up to 2 minutes. (Note any protection regulations).

After cleaning or rejuvenation the electrode should be rinsed thoroughly in deionised/distilled water before soaking in 3 Mol KCl.

The electrode should always be recalibrated before further use.

Ensure that all electrical terminations and connections are kept clean and dry.

Cable Connectors



Banana plug 4 mm



BNC plug



German DIN plug (DIN 19262)

CABLE AND CONNECTOR CODES

MEINSBERG pH and redox (ORP) electrodes are equipped either with fixed low-noise measuring cable or with plug head connectors for laboratory and process applications. The international usual S7 connection system combined with plug-cable combinations is moisture proof and noise-free and ensures compatibility of the electrodes with all types of pH/millivolt instrumentation world-wide.

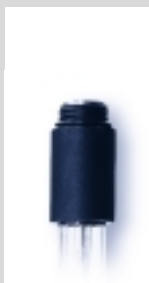
pH combination electrodes with integrated temperature sensor for laboratory use are available with a fixed low-noise triaxial cable fitted with a German DIN plug (or BNC plug) and a banana plug 4 mm.

Reference electrodes and temperature sensors for laboratory application are fitted with fixed cable and banana plug 4 mm or with a plug head socket for a banana plug 4 mm.

The triaxial cable equipped with the multipin plug head connector features simultaneous measurement of pH and temperature in conjunction with pH/temperature combination electrodes for process applications.

The connector construction of each electrode in this catalogue is signed by a connector code behind the order mark. On request and signed with .../BNC we deliver all our standard electrodes with BNC plug instead of German DIN plug. If other connectors are necessary please state plug or make and model of meter.

Connection cables for electrodes/sensors	Connector code	Example
fixed cable 1 m with German DIN plug or banana plug 4 mm (for reference electrodes and temperature sensors)	without sign	EGA 151
fixed cable 1 m with BNC plug or banana plug 4 mm (for reference electrodes and temperature sensors)	"/BNC"	EGA 151/BNC
fixed cable 2 m without connector	"T"	EGA 153 T
fixed cable 5 m without connector	"K"	EGA 153 K
fixed cable 5 m without connector and electrode /sensor shaft equipped with hex nut PG 13.5	"K/PG"	EGA 153 K/PG
Lab plug head S7-system Connection cables: Koax 3 / 4 / 5 / 6	"L"	EGA 151 L
Lab plug head S7-system and electrode /sensor shaft equipped with hex nut PG 13.5 Connection cables: K 43/ K 50/ K 51/ K 52	"L/PG"	EGA 161 L/PG
PG 13.5 threaded plug head S7-system Connection cables: K 43/ K 50/ K 51/ K 52	"I"	EGA 153 I
Multipin PG 13.5 threaded SMEK plug head pH electrodes: connection cable K 54 Conductivity cells, temperature sensors: connection cable K 18 Oxygen sensors: connection cable K 39	"SMEK"	EGA 143 SMEK



Lab plug head
S7-system



Electrode/
sensor shaft
equipped with
hex nut PG 13.5



PG 13.5
threaded
plug head
S7-system



PG 13.5
threaded
SMEK
plug head

STANDARD AND BUFFER SOLUTIONS

	Temp.	pH value			
	°C	A	C	D	F
NBS-Standard Buffer Solutions in accordance with DIN 19266 and NIST	0		4.010	6.984	9.464
	5	1.668	4.004	6.951	9.395
	10	1.670	4.000	6.923	9.332
	15	1.672	3.999	6.900	9.276
	20	1.675	4.001	6.881	9.225
	25	1.679	4.006	6.865	9.180
	30	1.683	4.012	6.853	9.139
	35	1.688	4.021	6.844	9.102
	38	1.691	4.027	6.840	9.081
	40	1.694	4.031	6.838	9.068
	45	1.700	4.043	6.834	9.038
	50	1.707	4.057	6.833	9.011
	55	1.715	4.071	6.934	8.985
	60	1.723	4.087	6.836	8.962

	Temp.	pH value		
	°C	TC	TD	TE
Industrial Buffer Solutions in accordance with DIN 19267	0	4.67	6.89	9.48
	10	4.66	6.84	9.37
	20	4.65	6.80	9.27
	25	4.65	6.79	9.23
	30	4.65	6.78	9.18
	40	4.66	6.76	9.09
	50	4.68	6.76	9.00
	60	4.70	6.76	8.92
	80	4.72	6.76	8.88

	Temp.	pH value		
	°C	4.0	7.0	10.0
Laboratory Buffer Solutions	0	4.01	7.13	10.65
	5	4.01	7.07	10.52
	10	4.00	7.05	10.39
	15	4.00	7.02	10.26
	20	4.00	7.00	10.13
	25	4.01	6.98	10.00
	30	4.01	6.98	9.87
	35	4.02	6.96	9.74
	40	4.03	6.95	9.61
	45	4.04	6.95	9.48
	50	4.06	6.95	9.35

	Temp.	pH value			U_A /mV	U_H /mV
	°C	pH value	U_A /mV	U_H /mV		
Redox Buffer Solution $U_H = 427$ mV; pH 7.0	10	7.06	245	462		
	15	7.04	236	450		
	20	7.02	228	439		
	25	7.00	220	427		
	30	6.98	212	415		
	35	6.96	204	404		
	40	6.95	195	391		
	50	6.95	178	366		
	60	6.96	160	340		

U_A : redox potential measured against an Ag/AgCl reference electrode 3 M KCl
 U_H : redox potential measured against a standard hydrogen electrode

	Temp.	Conductivity in mS/cm		
	°C	0.001 N	0.01 N	0.1 N
Conductivity Standard Solutions Electrical conductivity of KCl solutions	10		1.020	9.33
	15	0.118	1.147	10.48
	18	0.127	1.225	11.19
	19	0.130	1.251	11.43
	20	0.133	1.278	11.67
	21	0.136	1.305	11.91
	22	0.138	1.332	12.15
	23	0.141	1.359	12.39
	24	0.144	1.386	12.64
	25	0.147	1.413	12.88
	30	0.163	1.552	14.12

CUSTOMISED ELECTRODES AND OEM COMPONENTS

In addition to the wide range of standard sensors and electrodes, we develop and produce 'made-to-measure' electrodes even in small quantities. These electrodes / sensors have been developed and manufactured to meet exact customer specifications if a particular application problem cannot be solved using a standard electrode. We deliver our standard electrodes, specifically designed customised electrodes / sensors as well as electronic components, modules and meters as OEM products prepared for direct connection with your measurement and control systems. Special manuals, comprehensive technical data sheets, application reports and appropriate consultation are an integral part of our project support services.

Some examples of our successful customised and special products:

- Sensor Module for water monitoring in the Closed Equilibrated Biological Aquatic System for space research
- Carbon dioxide hand-held indicator ACO₂ with electrochemical sensor
- OEM pH and redox electrodes for swimming pool water treatment
- Oxygen/temperature sensors for control of aeration in composting plants
- Micro electrodes for medicine technique
- Conductivity meter for mastitis diagnosing in dairy farming



A COMPANY WITH TRADITION

In 1990 Sensortechnik Meinsberg arose from the Meinsberg research institute that was founded by Prof. Kurt Schwabe who developed one of the first pH glass electrodes. The facilities are located in Meinsberg near Waldheim in Saxony/Germany.

MEINSBERG ELECTRODES and electrochemical instrumentation made in Meinsberg have been appreciated for more than 50 years due to their high quality standard, custom-specific design and excellent cost efficiency. In addition Sensortechnik Meinsberg offers complete system solutions for monitoring and process control in analytical multi-parameter technique, from conception and detailed planning, delivery and assembly right through to the initial operational stage.

The innovative multi-disciplinary team of chemists, design engineers, technicians and glassblowers comprises extensive experience and high flexibility as sensor specialists. This guarantees solutions which are tailored to the specific requirements, in excellent quality and latest scientific research.

Many successful projects in the last few years have demonstrated the high efficiency of the company and the ability for realising complete system solutions.

- Cooling water and wastewater monitoring at Berlin Energy Plant
- Drinking water quality monitoring systems for Sosa, Muldenberg and Augsburg Water Works/Germany
- Instrumentation for the sewage treatment plant at Berlin-Schoenefeld Airport
- Water monitoring systems for the former uranium ore mines Koenigstein/Germany
- Drinking water quality monitoring systems for Seoul Metro Water Works/Korea



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