M4Knick

Sensors for Process Analytics

pH, ORP, Conductivity, and Oxygen

Memosens digital and analog sensors

MEMOSENS

Analytical Measurements Can Be Painful

We're Changing the Status Quo of Process Analytics

The following issues plague the industry:

- Regularly scheduled calibrations due to drift
- Calibrating sensors in less than ideal conditions — harsh weather, extreme temperatures, or at the worst possible time
- Sensor replacement is inconvenient and time consuming
- Sensor performance is not repeatable
- Unable to tell if the sensor is still good, so it is thrown away

These pains waste time, cost money, and compromise safety. The status quo is no longer acceptable. There is a better way, and it's called Memosens®.

MEMOSENS®

Memosens Digital Technology

Memosens® Sensor & Cable

Intelligent

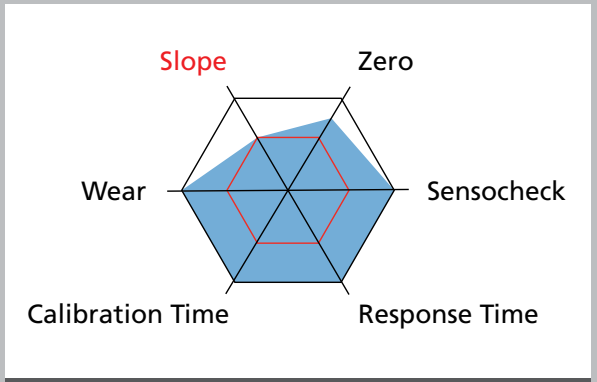
- Smart sensor allows calibration in the shop or lab
- Clear, comprehensive diagnostics with sensor diagram

Durable

- High temperature and pressure ratings
- Inductive, all plastic connection is resistant to moisture and corrosion

Easy

- No cable length restrictions or pre-amp required
- Junctions and extensions have no impact on signal quality
- No grounding issues
- Quick disconnect at the sensor head



Sensor Network Diagram

pH/ORP Sensors: Digital and Analog

SE 555 pH Sensor
The All-Around Solution

- No influence from moisture due to the inductive connection
- No signal interference with Memosens technology
- Pre-calibration in the shop or lab
- Integrated temperature detector
- Integrated sensor diagnostics
- CIP- and SIP-capable

Temperature Range: 32 ... 284°F (0 ... 140°C)
Design Pressure Range: -14.5 ... 87 psig (-1 ... 6 bar)
pH Measuring Range: 0 … 14
ORP Measuring Range: ± 1500 mV

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SE 554 pH Sensor
Suspended Solids Applications

- No signal interference with Memosens technology
- No influence from moisture due to the inductive connection
- Pre-calibration in the shop or lab
- Integrated sensor diagnostics
- Low maintenance, no refilling of electrolyte
- Integrated temperature detector
- Open junctions, no plugging

Temperature Range:
32 ... 266 °F (0 ... 130 °C)
Pressure Range:
0 ... 140 psig (0 ... 10 bar)
pH Measuring Range: 0 … 14
ORP Measuring Range: ± 1500 mV

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SE 558 pH Sensor
Media with Very Low Conductivity

- No signal interference with Memosens technology
- No influence from moisture due to the inductive connection
- Precalibration in the shop or lab
- Integrated sensor diagnostics
- Low maintenance, no refilling of electrolyte
- Integrated temperature detector
- 3 ceramic junctions
- KCl reservoir for prevention of leaching

Temperature Range:
23 … 212 °F (-5 … 100 °C)
Pressure Range:
Full vacuum … 43 psig (-1… 3 bar)
pH Measuring Range: 0 … 14

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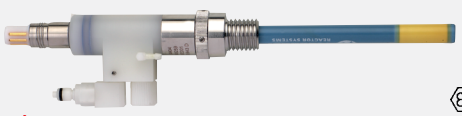
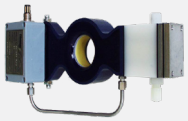
Model	Measured Value	Special Features & Applications	Memosens	Analog	Measuring Range	Temperature Rel. pressure
SE 515 	pH	Water, water treatment, surface water, drinking water	●		0 … 14 pH	23 … 176 °F (-5 … 80 °C) 0 … 58 psi (0 … 4 bar)
SE 546 	pH	ISFET glass-free sensor, hygienic and sterile applications, food industry, cosmetics	●		0 … 14 pH	5 …275 °F (–15 … 135 °C) 0 … 145 psi (0 … 10 bar)
SE 554 	pH pH & ORP	Industrial applications, dyes, precipitation reactions, suspended solids	●	●	0 … 14 pH	32 … 266 °F (0 … 130 °C) 0 … 140 psig (0 … 10 bar)
SE 555 	pH pH & ORP	Aggressive media, poisonous media, extreme pH values, fermentation	●	●	0 … 14 pH	32 … 284 °F (0 … 140 °C) -14.5 … 87 psig (-1 … 6 bar)
SE 557 	pH	Applications from ultrapure water to highly aggressive and plugging media Refillable liquid electrolyte For liquids below 10 µS/cm	●	●	0 … 14 pH	– 4 … 212 °F (– 20 … 100 °C), 275 °F (135 °C) hygienic -14.5 … 87 psi (-1 … 6 bar)
SE 558 	pH	Boiler feedwater, condensate, ultrapure water, WFI (water for injection), cooling water, low-conductivity media For liquids between 10 - 50 µS/cm	●	●	0 … 14 pH	23 … 212 °F (-5 … 100 °C) -14.5 … 43 psi (-1 … 3 bar)
SE 559 	pH	Wastewater, industrial water treatment Annular junction	●		0 … 14 pH	23 … 212 °F (-5 … 100 °C) 0 … 87 psi (0 … 6 bar)
SE 560 	pH	Applications from ultrapure water to highly aggressive and plugging media External refillable electrolyte reservoir For liquids below 10 µS/cm	●	●	0 … 14 pH	-4 … 212 °F -20 … 100 °C, (176 °F (80 °C) Analog) -14.5 … 43 psi -1 … 3 bar, (-14.5 … 7.2 psi (-1 … 0.5 bar) Analog)
SE 571 	pH	Water, water treatment, surface water, drinking water with high pressures and temperatures	●		0 … 14 pH	23 … 266 °F (–5 … 130 °C), 0 … 180 psi (0 … 12 bar)

Model	Measured Value	Special Features & Applications	Memosens	Analog	Measuring Range	Temperature Rel. pressure
SE 564 	ORP	Industrial applications, dyes, precipitation reactions, suspended solids	•	•	±1500 mV	32 … 266 °F (0 … 130 °C) 0 … 145 psi (0 … 10 bar)
SE 565 	ORP	Aggressive media, poisonous media, extreme pH values, fermentation	•		±1500 mV	32 ... 275 °F (0 ... 135 °C) -14.5 ... 87 psig (-1 ... 6 bar)
PL-H 93 	pH & ORP	High alkaline liquids	•		0 … 14	32 ... 275 °F (0 ... 135 °C) 0 … 180 psig (1 … 12 bar)
PL PETR 	pH & ORP	Simultaneous pH/ORP measurement, Industrial applications, dyes, precipitation reactions, suspended solids		•	0 … 14 ±1500 mV	32 … 266 °F (0 … 130 °C) 0 … 180 psig (1 … 12 bar)
Type 18 	pH	Chemical, fermentation, food & beverage, high temperatures, run dry Robust differential pH sensor,self-cleaning, single point calibration on process, Glasteel® technology		•	3 … 10	32 … 284°F (0 … 140°C) -14.5 … 215 psig (-1… 15 bar)
Type 40 	pH	Chemical, fermentation, high temperatures, high pressure, long insertion depths, run dry, Robust differential pH sensor, self-cleaning, single point calibration on process, Glasteel® technology		•	3 … 10	32 ... 285 °F (0 ... 140°C) -14.5 ... 600 psig (-1 ... 40 bar) Extended: Up to 1500 psi (103 bar)
Type 03 	pH/ORP	Long insertion depths, plugging media, run dry, high temperature Robust absolute pH sensor, self-cleaning, single point calibration on process, Glasteel® technology, electrolyte reservoir		•	Normal: 0 ... 10 Extended: 0 ... 14 ±1500 mV	32 ... 284 °F (0 ... 140 °C) -14.5 ... 130 psig (-1 ... 9 bar)
Reiner 	pH/ORP	Plugging media, run dry, high temperature Robust absolute pH sensor, self-cleaning, single point calibration on process, Glasteel® technology, electrolyte reservoir		•	Normal: 0 ... 10 Extended: -2 ... 14 ±1500 mV	32 ... 284 °F (0 ... 140 °C) -14.5 ... 87 psig (-1 ... 6 bar)
Ring 	pH/ORP	Flow-through style, non-intrusive Available in both Type 40 differential and Type 03 absolute		•	Consult Factory	Consult Factory

Dissolved Oxygen Sensors: Digital and Analog

SE 706 Dissolved Oxygen Sensor

High Resolution Sensor: CIP, SIP, and Autoclavable

- Special membrane with steel mesh and PTFE coating
- Reliable signal stability and simple maintenance
- Designed for operation in hazardous locations
- Available in Memosens digital technology
- Hygienic design is easy to clean
- High resolution of 6 ppb

Temperature Range: 32 ... 176 °F (0 ... 80 °C)
Pressure Range: -11 … 72 psi (0.2 … 6 bar)
Measuring Range: pO2 < 1200 mbar

Model	Special Features & Applications	Memosens	Digital	Analog	Measuring range (detection limit)	Temperature Rel. Pressure
SE 706 	Biotechnology, pharmaceutical industry, fermentation Amperometric membrane style sensor	●		●	0 ... 45 mg/l 6 ppb	31 … 176 °F (0 … 80 °C) -3 … 87 psi (0.2 … 6 bar)
SE 707 	Trace measurement applications, beverage filling (e.g. milk, beer) measurement in boiler feed water Amperometric membrane style sensor	●		●	0 ... 50 mg/l 1 ppb	31 … 176 °F (0 … 80 °C) -3 … 87 psi (0.2 … 6 bar)
SE 715 	Water, wastewater (e.g. aeration, clarifiers) Amperometric membrane style sensor	●			0 … 20 mg/l 20 ppb	23 … 113 °F (-5 … 45 °C) Max. 43 psi (3 bar)
SE 740 	Food, pharmaceutics, fermentation and process, condensate containing dissolved H_2 Optical oxygen sensor, no electrolyte required		●		0 … 25 mg/l 4 ppb	14 … 185 °F (-10 … 85 °C), during sterilization 284 °F (140 °C) -14.5 … 147 psi (-1 … 12 bar)

Conductivity Sensors: Digital and Analog

SE 605 Sensor

Coaxial Conductivity Sensor for Low-Conductivity Water

- No influence from moisture due to the inductive connection
- Easy to clean with detachable outer electrode
- Integrated temperature detector
- Large measuring range
- Calibration certificate

Temperature Range:
-4 … 275 °F (-20 … 135 °C)
Pressure Range:
Max. 362 psi (25 bar) 248 °F (120 °C)
Measuring Range:
0.04 ... 1,000 µS/cm

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SE 680 Toroidal Sensor

CIP Monitoring in Dairy, Pharma, and Food & Beverage

- Quick-reacting temperature detector
- Completely molded surface Ra ≤ 0.4 µm
- FDA-certified virgin PEEK, compact design
- Large measuring range
- Digital data transfer
- CIP- and SIP-capable

Temperature Range:
14 ... 257 °F (-10 ... 125 °C)
Pressure Range:
Max. 145 psi (10 bar)
Measuring Range:
0.002 ... 2000 mS/cm

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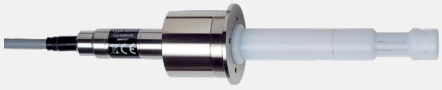
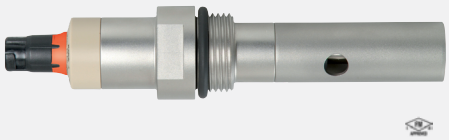
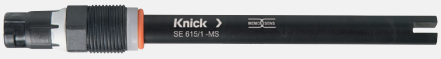
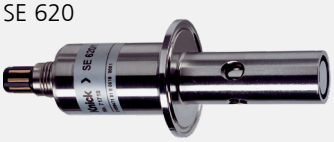
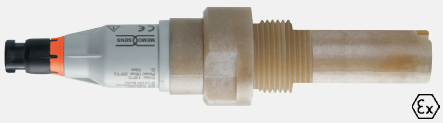
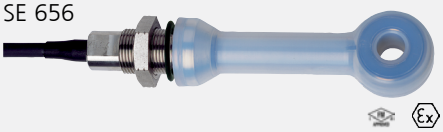
Model	Special Features & Applications	Memosens	Analog	Measuring range	Temperature Rel. Pressure
SE 600 	Condenser monitoring, also for heavily polluted/fibrous media, pulp production 4 electrode measuring principle, compact design, large measuring range		•	0.0005 ... 600 mS/cm	Max. 410 °F (210 °C) Max.363 psi (25 bar)
SE 603 	Pure water up to high conductivities; highly corrosive processes, oxidizing and heavily polluted media, leakage monitoring 4 electrode measuring principle, compact design, large measuring range		•	0.0005 ... 600 mS/cm	Max. 248 °F (120 °C) Max.174 psi (12 bar)
SE 604 	Boiler feed water, feed water, cooling water, water vapor cycle, pure water, condenser monitoring 2 electrode, stainless steel coaxial design		•	0.001 ... 1000 µS/cm	-22 … 248 °F (-30 … 120 °C) Max.362 psi (25 bar)
		•		0.001 ... 500 µS/cm	-4 … 248 °F (-20 … 120 °C) Max.362 psi (25 bar)

Model	Special Features & Applications	Memosens	Digital	Analog	Measuring Range	Temperature Rel. Pressure
SE 605 	Robust 2-electrode sensor, for precise and reliable measurement of low and very low conductivities, particularly in ultrapure water. 1" NPT	●			0.04 ... 1,000 µS/cm	-14 … 248 °F (-10 … 120 °C) Max. 362 psi (25 bar) 248 °F (120 °C)
SE 605H 	Ultrapure water, WFI (water for injection), pharmaceutical and food and beverage industry, biotechnology Hygenic, electropolished sensor design	●			0.001 ... 1,000 µS/cm	-4 … 275 °F (-20 … 135 °C) Ingold: Max. 362 psi (25 bar) Triclamp: Max. 145 psi (10 bar)
SE 610 	Drinking water, industrial water, surface water Compact sensor design			●	0.1 ... 1000 µS/cm	50 ... 194 °F (10 ... 90 °C) 87 psi (6 bar) @ 77 °F (25 °C)
SE 615 	Water and wastewater treatment Compatible with static and retractable holders	●			0.01 ... 20 mS/cm	23 ... 176 °F (-5 ... 80 °C) Max. 58 psi (4 bar)
SE 620 	Pure and ultrapure water, WFI (water for injection), food & beverage, ion exchangers, reverse osmosis plants Hygenic sensor design			●	0.001 ... 50 µS/cm	-4 … 275 °F (-20 … 135 °C) Max. 232 psi (16 bar) @ 77 °F (25 °C)
SE 630 	Water, polluted wastewater, process solutions with medium conductivities, also corrosive media 2 electrode, PES sensor body			●	0.005 ... 50 mS/cm	-4… 275 °F (-20 … 135 °C) Max. 232 psi (16 bar) @ 68 °F (20 °C)
		●			0.01 ... 20 mS/cm	
SE 655 	Concentration measurement of acids and bases, fouling media, salt spring, heavily polluted wastewaters, cooling water blowdown Large measuring range, PEEK sensor body	●		●	0.002 ... 2000 mS/cm	-4 … 257 °F (-20 … 125 °C) Max. 290 psi (20 bar)
SE 656 	Measurement of highly concentrated acids and bases, hydrofluoric acid, nitric acid, concentrated sulfuric acid, oleum, strongly oxidizing media Large measuring range, PFA sensor body			●	0.002 ... 2000 mS/cm	-4 … 257 °F (-20 … 125 °C) Max. 232 psi (16 bar)
SE 670 	Fresh water and wastewater treatment, monitoring of salts and alkaline solutions, general concentration monitoring, caustic treatment, washers, rinsing processes		●		0.02 ... 2000 mS/cm	32 … 140 °F (0 … 60 °C) Max. 145 psi (10 bar) @ 68 °F (20 °C)
SE 680 	Electroplating, CIP monitoring in the beverage industry, breweries, bottling plants, pharmaceutics, monitoring concentrations of salt solutions, alkalis and acids	●			0.002 ... 2000 mS/cm	14 … 257 °F (-10 … 125 °C) Max. 145 psi (10 bar)

Memosens System Overview

The Complete Digital Solution

Integrated smart sensor technology — from the sensor to the analyzer: Measuring systems with Memosens® technology guarantee reliability and performance at the highest level.

Sensor Management — **Sensors & Fittings** — **Instruments**

MemoSuite Basic

MemoSuite Advanced

Portavo
Memosens mobile

pH/ORP

Conductivity

Memosens

Protos
Modular process analysis system

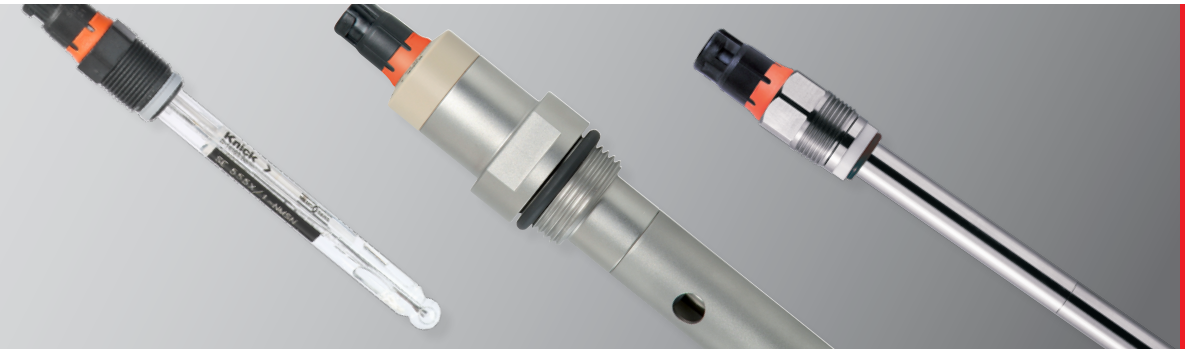
Stratos Series
Intuative process analyzers

MemoRail
Compact digital analyzers

Fittings
Static, retractable, and immersion holders. Flow-through vessels

Oxygen

M4Knick



Sensors

Instruments

Sensor Management

Fittings and Hardware

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