



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Memosens saves money

Memosens technology makes new cost-cutting calibration cycles possible

Memosens innovative sensor technology together with Liquiline, the latest transmitter platform, make up the most innovative measuring point system in analytical measuring technology. Its ability to store data directly in the sensor significantly reduces the costs of servicing pH measuring points.

Initially our customers only asked us for pH measuring points that would be independent of rain, snow and moisture. And for sensors that could be easily calibrated, regenerated and cleaned. The features demanded of the new generation in pH measurement by comparison with conventional pH measurement systems were that they should be easy to handle and use while showing great flexibility in respect of maintenance and service.

The revolutionary Memosens technology for analytical sensors is the response to these customer requests we have been hearing for years. Together with the new Liquiline transmitter, it makes up the most modern and reliable measuring system currently available on the market. The new calibration philosophy, only possible now as a result of these innovations, is the most significant stand-out feature of the new Memosens technology. It comes with an enormous potential for cost savings for the user.

Endress+Hauser 

People for Process Automation

Memosens technology wins friends thanks to three outstanding characteristics:

1. Inductive power and signal transmission

The inductive, and hence contactless, connection between the sensor and cable using a simple bayonet lock makes the sensor independent of environmental influences. All the currently conceivable problems with moisture, rain, snow, corrosion, ground loops are thus finally resolved.

2. Digital signals for interference-free transmission over long distances

Bidirectional, digital communication between sensor and transmitter or PLC on the basis of defined signal levels resolves all the problems previously experienced in respect of cable and high impedance and signal transmission suffering interference. Also with faults induced by other electrical installations. This means that transmission circuits of up to about 200m between sensor and transmitter are now possible.

3. Integrated micro-controller implementing an innovative maintenance strategy

A micro-controller system with RAM data memory is built into the sensor. It records all current process and measuring data and logs the sensor's data history. This makes it possible to carry out all the servicing operations concerning the sensor such as calibration and adjustment, regeneration and cleaning in the measuring laboratory and all that remains to be done on site is to swap over pre-calibrated sensors. It is just this point that shows the huge advantage of Memosens sensors in future cost savings.

Costs are saved quite simply because of the innovative servicing concept

Let us assume that a customer in the chemical industry decides to refit a medium-sized installation of 20 pH measuring points: a comparison of acquisition costs and ongoing calibration costs in the old analog technology with all its problems with the innovative Memosens technology yields the results shown in table 1 and figure 1: the acquisition costs for conventional pH measuring technology and the innovative Memosens technology are roughly equal. In the case of Memosens technology only a small sum is required for the laboratory equipment consisting of the QM tool, data management and interface to Memosens sensors as a one-off cost which will be recovered in a short time. If we further assume that the 20 pH measuring points have to be calibrated on average 30 times a month. A specialist is required on site to calibrate a conventional pH measuring point (hourly rate approximately €120), and he will take about 30 minutes to do the calibration. The

Before

Outdoor

- Sensor replacement
- Cleaning
- Regeneration
- Calibration



New maintenance strategy thanks to Memosens


Today: with Memosens

Outdoor

- Sensor replacement

Indoor

- Cleaning
- Regeneration
- Calibration



Acquisition costs (one-off)				
	Conventional measuring point		Memosens measuring point	
Transmitter, cable, pH sensor		€ 1,500		€ 1,500
Laboratory workstation	not possible		Bench-top instrument, cable, data tool	€ 3,000
Number of measuring points	20		20	
Calibration costs	conventional		Memosens	
Total cost of acquisition		€ 30,000		€ 33,000

Maintenance costs for a measuring point (hourly rates: specialist € 120, maintenance man € 60)				
	Conventional measuring point		Memosens measuring point	
Calibration in laboratory by specialist personnel	not possible		10 minutes	€ 20
Calibration on site by specialist personnel	30 minutes	€ 60	not necessary	
Sensor replacement on site by maintenance man	not necessary		10 minutes	€ 10
Number of calibrations per month	30		30	
Costs of calibration per month	30 x € 60	€ 1,800	30 x € 30	€ 900
Costs of calibration per year	12 x € 1,800	€ 21,600	12 x € 900	€ 10,800

Table 1: Costs for 20 measuring points and 30 calibrations per month

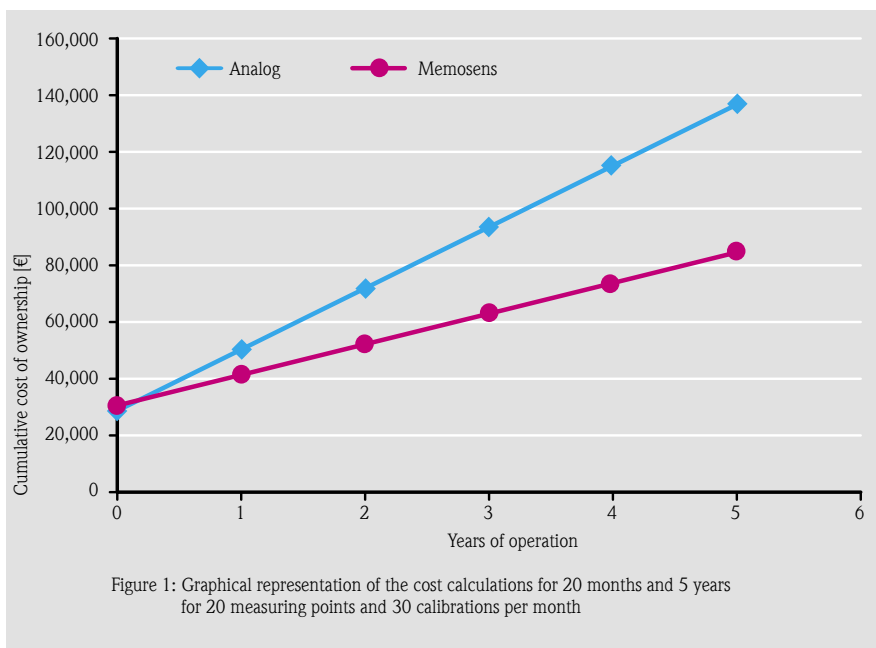


Figure 1: Graphical representation of the cost calculations for 20 months and 5 years for 20 measuring points and 30 calibrations per month

sensor in a Memosens measuring point, on the other hand, can be replaced by a non-specialist (hourly rate approximately €60) in just ten minutes on average. Subsequent calibration in the laboratory by the specialist (hourly rate approximately €120) also takes ten minutes. The time savings are clear to see.

Table 2 and figure 2 show the savings for the case of a small installation of 10 measuring points and an average of 20 calibrations per month.

It is clear that, because of the operation times and because personnel with differing levels of training are required for the new calibration cycle for Memosens sensor alone, the service costs for a pH measurement will roughly halve in future. Even in small and simple installations (a few measuring points and a few calibrations each month), the additional investment for



the Memosens laboratory equipment will pay for itself after no more than about half a year. These results speak for themselves. We should stress that there are further benefits of Memosens technology to be taken into account in addition to this consideration of costs:

- Up to 40 % longer service life of the Memosens sensors
- Fewer calibration cycles as a result of extended sensor service life
- General reduction in process downtimes as non-specialized personnel can replace the sensors 24 hours a day
- More precise process control as a result of more precise calibration in the laboratory under reproducible conditions
- “Predictive maintenance” as an integral part of sensor technology and hence improved asset management

Were these benefits to be incorporated into the consideration of costs, servicing costs would be further reduced by a considerable amount.

In summary, the servicing costs for measuring points using the new generation of sensors are clearly less by comparison with conventional measuring points in which the familiar problems remain.

Acquisition costs (one-off)				
	Conventional measuring point		Memosens measuring point	
Transmitter, cable, pH sensor		€ 1,500		€ 1,500
Laboratory workstation	not possible		Bench-top instrument, cable, data tool	€ 3,000
Number of measuring points	10		10	
Calibration costs	conventional		Memosens	
Total cost of acquisition		€ 15,000		€ 18,000

Maintenance costs for a measuring point (hourly rates: specialist € 120, maintenance man € 60)				
	Conventional measuring point		Memosens measuring point	
Calibration in laboratory by specialist personnel	not possible		10 minutes	€ 20
Calibration on site by specialist personnel	30 minutes	€ 60	not necessary	
Sensor replacement on site by maintenance man	not necessary		10 minutes	€ 10
Number of calibrations per month	10		10	
Costs of calibration per month	10 x € 60	€ 600	10 x € 30	€ 300
Costs of calibration per year	12 x € 600	€ 7,200	12 x € 300	€ 3,600

Table 2: Costs for 10 measuring points and 10 calibrations per month

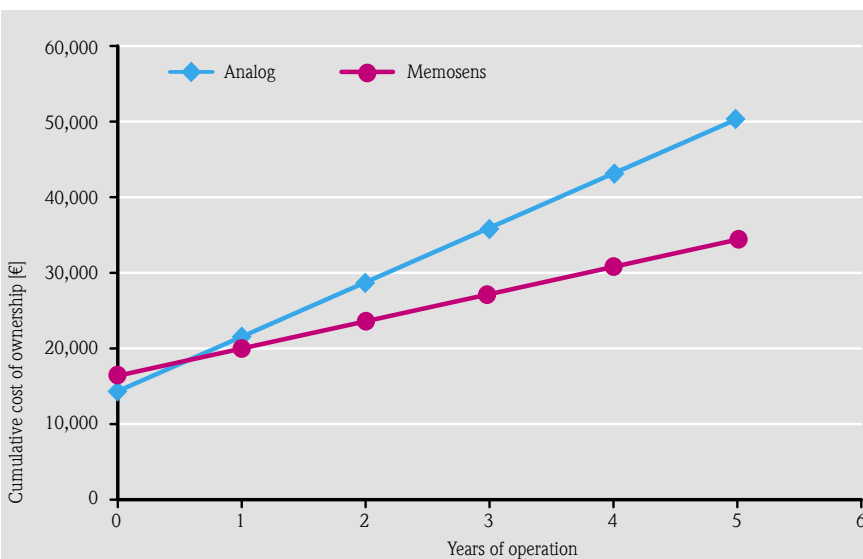


Figure 2: Graphical representation of the cost calculations for 20 months and 5 years for 10 measuring points and 10 calibrations per month



1	Sensor delivery	Booking in to Asset Management System <ul style="list-style-type: none"> ■ Serial number ■ Sensor model etc.
2	Initial set-up	<ul style="list-style-type: none"> ■ Downloading sensor data ■ Allocation of a tag number ■ Initial calibration with date/time
3	Installation in the process	<ul style="list-style-type: none"> ■ Sensor synchronizes with transmitter ■ Sensor measures and stores data ■ Sensor calculates "Advanced diagnostics"
4	Recalibration	<ul style="list-style-type: none"> ■ Sensor cleaning ■ Regeneration ■ Calibration

Logistics for Memosens sensors

Calibration cycle for Memosens sensors

The simplicity of the logistics of using Memosens sensors is just as impressive as the cost calculations relating to calibration. This consists essentially of the four steps shown above.

Because of the clear structure of the logistics and the ease of use of the sensors, further costs savings may be possible in respect of inventory holding and the labor effort.

Memosens and Liquiline roadmap

The Memosens roadmap is predetermined by reason of the uniqueness of the system: initially, Memosens technology will be applied to all of Endress+Hauser's analytical sensors: already available today are sensors for pH/Redox, ISFET, dissolved oxygen and conductivity, those for chlorine, turbidity, optical sensors, a nitrate probe and for further parameters will soon be launched.

Memosens sensors paired with all usual fieldbuses and in conjunction with wireless and Internet technologies will continue to enhance applications in all industries. Seen in this light, Memosens technology opens up previously unheard of new perspectives in process instrumentation. And this is true for physical, optical and chemical parameters.

Summary

The generations-long striving for safety and ease-of-use in analytical metering has been ideally resolved with innovative Memosens technology. Memosens sensors will offer custom solutions at the highest levels of operation and functionality in future in all industries such as chemicals, pharmaceuticals, biotechnology, foodstuffs, water and wastewater, pulp and paper and energy. They will save our customers significant costs because of their universal applicability in the process and their innovative servicing concepts.

In addition, this innovative technology will make a further decisive contribution in respect of ecological and economic management to process technology operations. Improvements in the conservation of resources and energy, and in protecting people, the environment and the plant are clearly recognizable.

Many people are probably not yet aware of the full bandwidth of options offered by Memosens technology and we will only slowly learn how to exploit the new technology to the full once we gain experience with practical applications.

One thing is, however, already clear - the future in all applications around the world belongs to Memosens sensors.

Dr. Wolfgang Babel

