

Automated tradition

The company “Leksands Knäckebröd” was founded in 1920 and has been family-owned since then, today in the 4th generation.

Sensors support the crisp bread production in Sweden

What is the most typical Swedish product? It does not take long to give the answer: crisp bread. In the little town of Leksand in Central Sweden, there is Sweden’s largest producer of the traditional round crisp bread. Also involved: ifm as the automation specialist.

While the recipes are still the same after about 100 years, the production process is completely different now. Production is automated according to the latest state-of-the-art technology. To ensure that the systems run smoothly, different sensors monitor the production process – from the supply of the ingredients to the dispatch area.

Capacitive sensors detect the flour through the walls of the pipes.

Typical of Leksands’ crisp bread: the round shape with a hole in the middle.

Peter Joon, Managing Director at Leksands Knäckebröd: “We use many sensors since this is a very modern production and a highly automated process. Since we have a very high productivity of 99.6 %, we need sensors we can trust and which are of high quality. Today we use many sensors from ifm. They are of high quality and function very well with our products.”

Lars Ohlner, Automation Engineer at Leksands Knäckebröd adds, “We use products from ifm because they are easy to configure and which are cost effective; they simply function reliably. We mainly use photoelectric and





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capacitive sensors and some flow sensors. This should ensure a high degree of automation, good automation and a reliable process.”

Some particularly innovative sensors as example:

■ Capacitive sensors

The main ingredients of crisp bread are rye meal and finely ground rye and wheat flour. They are supplied to the mixing tools via various pipes.

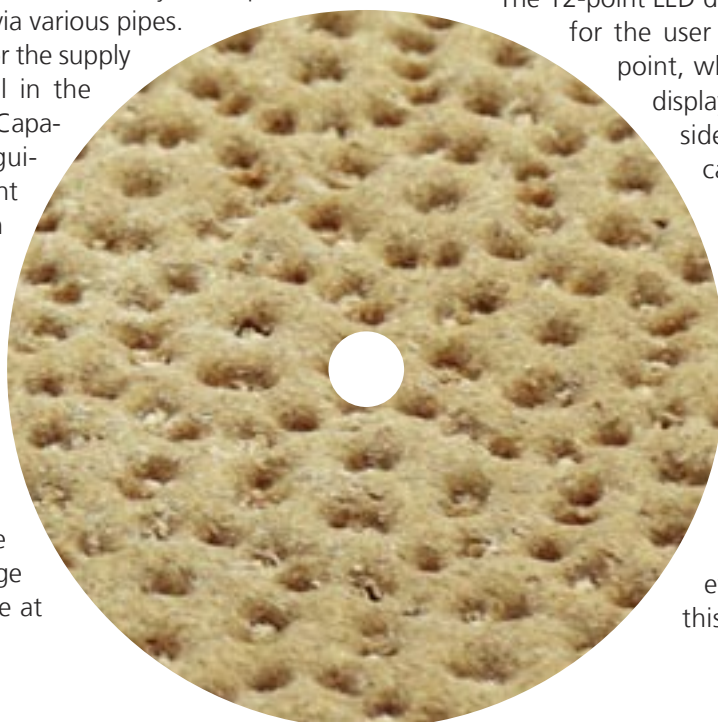
Capacitive sensors monitor the supply at the pipes or the level in the temporary storage tanks. Capacitive sensors are distinguished by detecting different materials, even through the tank wall, unless they are of metal. If a pipe is no longer completely filled with flour, the capacitive sensor detects this state and sends a switching signal to the controller.

Often, several capacitive sensors are used on storage tanks or silos, for example at

the very top, to signal a possible overflow in time or at the very bottom of the silo to signal a critical empty state. Potentiometers are used to adjust the sensors after installation. The switch point is adjusted depending on the wall thickness of the pipe and the type of the medium to be detected. The new KI6000 sensors from ifm are to be set particularly precisely. Since they have a unique LED signal display for the perfect switch point setting.

The 12-point LED display makes it much easier for the user to set the optimal switch point, which is in the centre of the display. The green LEDs on either side of the switch point indicate the reliability of the switch point. Deposits, material changes etc. are directly displayed on the sensor and the user can readjust perfectly the switch point as needed. That means that an imminent error can be detected in good time and avoided.

If help is needed with the effects of process changes this is much easier to explain



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and rectify with the clear switch-point visualisation. Over the phone the user can describe the LED behaviour and a support engineer can easily advise corrective measures.

By using non-contact potentiometers, the new units have the high protection rating IP 69K and are perfectly suited for medium temperatures up to 110 °C. Moreover, different functions such as PNP/NPN or NC/NO can be selected. The ifm sensors are equipped with IO-Link and prepare the user optimally for Industry 4.0.

■ O6 photoelectric sensor

Diffuse reflection sensors are installed at various places in production. They monitor the flow of material on conveyor belts. These are, for example, individual slices of crisp bread but also completely packed products in the dispatch area.

In most cases, they use the ifm diffuse reflection sensors of type O6 at Lecksands Knäckebröd.

Their optical performance is excellent. They are distinguished by a particularly noise-immune background suppression while the range of up to 200 mm is independent of the object colour. This is important since the crisp bread slices have a different surface depending on the type and recipes.

Even in the event of vapour, dust and highly reflective environments the automatic sensitivity compensation

Distance measurement for position detection across longer distances: O1D with time of flight technology.



The ifm O6-series diffuse reflection sensors monitor the flow of material.

guarantees a reliable function. The clean round light spot in the operating area ensures a consistent light distribution in the light cone. Scattered light around the light spot is avoided. The compact O6 WetLine is perfectly sealed. The two setting potentiometers are fitted with a double seal. Front pane and potentiometer are embedded flush to allow residue-free cleaning. These compact powerful units from ifm can also be supplied as through-beam and retro-reflective systems.

The particularly resistant stainless steel housing with protection rating IP 68 / IP 69K ensures reliable use even

The amount of water for dough production is precisely detected by means of magnetic-inductive flow meters.





under severe conditions and ensures an extremely long life time. The O6 sensors are now also available as versions with IO-Link. Via this interface, the range, sensitivity, light-on / dark-on modes, switching delay or deactivation of the operating elements can, for example, be set remotely.

■ O1D distance sensor

When position detection across longer distances is of importance, the O1D distance sensor is a cost-effective and also very precise problem solver. Thanks to laser beam and time of flight measurement, it provides reliable and precise distance measurement with a long range of up to 10 m. It is ideal for applications with background suppression.

Thanks to the innovative on-chip time-of-flight process with PMD technology, the detection is independent of

*100 years of Swedish tradition:
Leksands are Sweden's largest producers of crisp bread.*



the object colour or its surface, e.g. mat or shiny. O1D is insensitive to extraneous light up to 100,000 lux and remains unaffected even if direct sunlight hits the sensor or object thus operating reliably and accurately at all times. The user can choose switching outputs, analogue outputs or IO-Link for data provision.

■ MID flow sensor

Besides the grain, water is an elementary part of the crisp bread dough. In the field of dough production, a magnetic-inductive flow meter from ifm is used.

These units feature high accuracy, measurement dynamics and repeatability. They are suited for conductive media as from 20 $\mu\text{S}/\text{cm}$. The 4-digit alphanumeric LED display is highly visible. Besides the volumetric flow, the units also measure temperatures from $-10 \dots 70 \text{ }^\circ\text{C}$. Furthermore, an additional measuring point is no longer needed thanks to the integrated temperature monitoring. The robust compact housing, use of resistant materials and pressure rating up to 16 bar allow flexible use.

Using the IO-technology, process values are not only available via the analogue output but also digitally. Conversion losses during measured value transmission are a thing of the past. Saving all sensor parameters not only allows an easy replacement of sensors but also a simple and quick configuration and remote parameter setting. The user is well prepared for Industry 4.0 with the new IO-Link functionality.

■ Continuing with ifm in the future

At Leksands, they have been using the reliable and long-life sensors from ifm for a long time. No wonder that you can find ifm sensors which are older than 25 years in some places in the plant. Also in the future, they want to tackle new challenges in automation with ifm as their partner.

Peter Joon: *"For the future we have to develop sensors that can perceive the different colours of the bread and their shades. ifm is part of the development of these sensors. We have created a new area which is based mainly on ifm products and which has proved its worth so that we will further develop our future areas with sensors from ifm."*

He concludes, *"ifm is our first choice when it comes to sensors because they have the products we need."*