

# Putting fish welfare first

## Real-time monitoring for optimal conditions



The Visp Fishing Association in Switzerland was founded in 1920 and is the oldest in the Upper Valais region. With roughly 600 members, it combines traditional fishing culture with modern technology. The association's on-site fish farm raises over 125,000 juvenile fish annually and plays an important role in water conservation.

*"Endress+Hauser's professional, integrated solution was the clear choice: Everything ran smoothly, from field testing the Liquiline Edge Module to final installation. The documentation, software and overall package are reliable. The system delivers substantial savings in terms of time and effort."*

Marco Burkhalter,  
Fish Farm Maintenance Manager  
Visp District Sport Fishing Association



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Nestled between the mountains and water: The Visp Fishing Association facility

**Fluctuating oxygen levels in the water can have fatal consequences: fish growth is inhibited, diseases spread, and entire populations die. Warm water and high consumption increase the risk, making reliable monitoring an absolute must.**

### The challenge

A stable oxygen content is crucial for the survival of the fish. If the value falls below 4 mg/l, the first fish will die after just 30 minutes. Oxygen saturation largely depends on the water temperature: at ideal temperatures of between 7 and 8 °C, oxygen supply is guaranteed, but the warmer the water, the less oxygen it can absorb. Precise control is essential. Sufficient water must be supplied to stabilize the oxygen level, but not so much as to increase costs and resource consumption unnecessarily. Furthermore, temperature changes, varying feeding intervals, and biological processes cause constant fluctuations.

Static bodies of water such as lakes are particularly critical, as they warm up faster and can absorb less oxygen. Sensors are used for precise control as they monitor oxygen levels continuously.

Incorrect measurements or delayed adjustments quickly lead to oversupply or undersupply, resulting in high costs or massive losses. A single error can have fatal consequences. Structural challenges further complicate the work, including limited government funding, staff shortages due to reliance on volunteers, and the high level of monitoring required with limited resources.



Convenient installation and seamless integration: The Liquiline Edge Module is space-saving and communicates independently of fieldbus technology



#### Did you know?

Switzerland relies on fish farming to safeguard regional supplies and promote sustainable nutrition. As natural fish stocks are increasingly endangered, controlled breeding helps to relieve the pressure on wild populations and support their conservation. Modern recirculation systems save water, reduce emissions, and protect animal welfare.

#### Process

The Liquiline Edge Module CYY7 ensures reliable monitoring of the oxygen content. It is integrated into the transmitter and transfers the measured values directly to Netilion, the cloud-based IIoT ecosystem, where real-time data are available. This ensures continuous monitoring of the water quality throughout the entire process.

- 1 Fish farming starts with the incubation of eggs in incubators. After hatching, the larvae remain in the hatchery until they reach a size of about 4 cm. During this phase, regulating temperature and oxygen levels, and maintaining strict hygiene standards are crucial for healthy growth and survival. Oxygen and temperature measurements are performed using mobile measuring instruments such as the Liquiline Mobile CML18. Digital Memosens technology guarantees reliable data transmission, even in wet environments.
- 2 This is followed by the tank phase, which lasts around one year. The juvenile fish are reared in indoor tanks, where they grow to a size of up to 14 cm. The water quality is monitored continuously. Permanently installed transmitters play a central role here, processing the signals from the oxygen sensors and making data available via fieldbus interfaces. This allows the values to be integrated directly into a control system.
- 3 Once they reach a size of approximately 14 cm, the fish are transferred to outdoor tanks. There are five such tanks available, each fitted with an Oxymax COS61D device. These optical oxygen sensors operate according to a light-based measuring principle, are low-maintenance and calibrated. Thanks to Memosens technology, digital signal transmission is contactless, ensuring maximum process safety. The sensors are connected via two Liquiline CM444 transmitters, which guarantee unique identification of each tank and allow the measured values to be accessed remotely at any time.
- 4 The final phase is stocking the waters. According to Swiss law, only fish measuring at least 24 cm in length may be released back into the wild. The fish are released into all waters managed by the association, including the Rhône, the Vispa and its tributaries up to Zermatt, as well as the Mattmark reservoir in the Saas Valley. The fish are carried in water tanks with an additional oxygen supply during transportation.

## Our solution

The combination of the Liquiline Edge Module and Netilion cloud platform offers a modern, high-performance solution for continuous monitoring of critical water parameters in fish farming. Because the Memosens sensors are directly connected to the Liquiline Edge Module, all relevant measured values such as oxygen, pH value and temperature are always available in real time.

*"The system is easy to operate and works reliably both on a laptop and smartphone. This allows us to keep an eye on the values at all times and from anywhere."*

Marco Burkhalter, Fish Farm Maintenance Manager  
Visp District Sport Fishing Association

Automated data acquisition eliminates the need for manual measurement and documentation, which was time-consuming and error-prone. Continuous monitoring ensures a high level of process safety, as critical situations such as oxygen deficiency are detected immediately before fish die. Data are not only saved by the Netilion cloud platform, but also transferred to a customer-specific application via an interface, where they are combined with other parameters such as the position of the sun, feed quantity, and fish stock. This creates an intelligent control system that optimizes resource use and reduces costs. This solution is unique thanks to the easy commissioning, user-friendly operation, and reliable data transmission.



Connection to Netilion: The device continuously transfers data from the measuring point to Netilion, the cloud-based IIoT ecosystem

*"Previously, we had to measure oxygen manually, record everything on paper and transfer the data later. Often, the values were already out of date by the time we could react and that posed a real risk to the fish. Now, we can see everything live and in real time, which means we can intervene immediately at any point."*

Marco Burkhalter, Fish Farm Maintenance Manager  
Visp District Sport Fishing Association

## Products

- Liquiline Edge Module CYY7
- Liquiline CM444
- Liquiline Mobile CML18
- Oxymax COS61D
- Memosens CPS11E
- Flexdip CYH112
- Kit COSxx protective cage, fish farming

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