

# Shutting It

**Valve specialist VAG has further developed its HYsec hydraulic brake and lift units – Turck's TBEN-L multiprotocol modules with a field logic controller and the TX513 HMI/PLC were used here to considerably reduce the installation effort required and optimize operation – even via remote maintenance**

Water is one of the most important commodities of our planet. Its protection and treatment through water works, pumping stations and sewage plants is therefore all the more critical, and is something that valve manufacturer VAG fully understands. The company's range of products includes gate valves, butterfly valves, Howell-Bunger® discharge valves and many other valve types. Several users in the water management sector rely on VAG. The traditional company was founded in 1872 and has continuously grown since then. Today, the valve and fittings specialist is a solution supplier focusing on the latest manufacturing technology in water and drainage systems, in industry, in power stations and also in dams. They are therefore

always looking out for new solutions for the future requirements of customers.

VAG also achieved this kind of improvement in the connection and operation capabilities of its HYsec hydraulic brake and lift unit. This basically has the function of a butterfly valve and thus guarantees the fast opening and closing of the pipe. The unit consists of three main components: the hydraulic power unit or pump, the hydraulic cylinder and the weight. Depending on the design, the hydraulic unit has its own or an externally controlled oil circuit.

HYsec is used in the hydropower sectors, for example in dams and turbine power stations, where they are used to protect the pipelines. If a pipe bursts,

Premier at the IFAT fair: The enhanced hydraulic brake and lift unit from VAG is now considerably easier to install and operate



for example, a flow sensor measures the changed conditions in the pipe and sends a signal to the controller of the HYsec. The hydraulic power unit then no longer pumps oil into the hydraulic cylinder, which therefore depressurizes the plant. The hydraulic drop weight trips and closes the pipe to prevent the further outflow of water. Once the pipe burst is rectified, the pressure in the HYsec increases and the pump once more supplies the hydraulic cylinder with hydraulic fluid. This in turn lifts the drop weight, the valve opens and the water can flow again.

### Control cabinet needs too many cables

The HYsec was previously controlled via a control cabinet which required a large amount of cabling. Many customers wanted to be able to connect the sensors required for their plants via a terminal box. This involved the routing of additional copper cables from the terminal box to the control panel or to the next control cabinet. Depending on the size of the unit, between 18 to 30 cables were required per HYsec. Added to this was the fact that this system was not intelligent; the hydraulic brake and lift unit could not operate without an additional controller. "We always had a problem with the large number of cables. Customers also came to us and described how they had to route so many cables up to the HYsec. This was where we wanted to find a solution," Patrick Schenk, automation engineer at VAG explains the situation.

In order to reduce the mass of cables and achieve a more intelligent overall design, VAG looked for alternative control options. These needed to not only reduce the number of cables required, but also provide the ability in future to control several hydraulic brake and lift units via an HMI (human machine interface). Previously, each HYsec required its own HMI, which was not only difficult to operate but was also considerably more expensive than the new solution.

### TBEN-L block I/O module provides the answer

VAG found the solution in Turck's TBEN-L multiprotocol module. The block I/O module with IP67 protection can be fitted directly on the HYsec, and thanks to the ARGEE integrated web-based programming environment, does not require any additional controller. This means that the customer no longer requires any more control cabinets, which considerably reduces the number of cables needed. The operator can also control several hydraulic brake and lift units simultaneously via a single controller and Turck's TBEN-L.

Each HYsec here is provided with a TBEN-L module, which is connected to the central controller via a single Profinet Ethernet cable. This saves money and time, while enabling the customer to control all HYsecs with one single controller. Another benefit is the compatibility of the TBEN-L multiprotocol module with controllers of other manufacturers via Profinet, EtherNet/IP or Modbus TCP. "Many customers use Siemens controllers. The ability of Turck's TBEN-L to be connected to a Siemens controller is thus a tremendous benefit," Schenk explains the decision to choose Turck.



Turck's intelligent TBEN-L5-16DXP I/O module with ARGEE field logic controller

The TBEN-L5-16DXP has 16 universal digital channels that can be used flexibly as inputs or outputs. The multiprotocol device automatically detects the protocol of the plant at startup. This means that any additional device programming by the operator is unnecessary.

### Easy programming with ARGEE

The ARGEE integrated programming software is a web-based programming environment that enables PLC functions to be programmed directly on the modules. In this way, simple control functions can be outsourced to the I/O modules, thus saving the resources of the central controller and the load on bus communication. The ARGEE programming environment is a simple web application. The user just requires a device with a web browser. Simple requirements – as also in this case – can be implemented fully autonomously on the block I/O modules.

## QUICK READ

The use of hydraulic brake and lift units previously required a large number of cables and control cabinets. Valve manufacturer VAG now has a single cable solution in the program that is easy to install. Turck's TBEN-L multiprotocol I/O module is mounted for this directly on the hydraulic brake and lift unit, thus saving the cables and control cabinets required. Thanks to the ARGEE integrated programming environment, an additional controller is also no longer required. A web server even enables remote maintenance of the plant in future.

“I had to get acquainted with ARGEE initially because it was completely new for me. However, once I had understood how it works, it was easy to use,” Schenk describes his experience. “Ultimately you just have to think a little about what you want the program to do, and it can be completed within a few days. This is relatively straightforward and ends up with an intelligent valve that is ready to use. The customer just has to install it, plug in the power supply connector and it’s up and running.”

ARGEE enables the customer to program the device quickly to specific requirements, such as closing times and pressures. In this way, any system can be adapted to customer requirements quickly and simply so that the customer just has to connect it to the grid and switch it on.

**Visualization via TX513-HMI**

The processes and error messages are visualized via Turck’s TX513 HMI. The human machine interface combines control, operating and monitoring functions in a Codesys V3 PLC with integrated visualization to form a fully-fledged control unit. Thanks to the number and flexibility of integrated interfaces, as well as the master and slave functions provided, the TX513 can communicate with any field devices or higher-level controllers. Each TX500 HMI therefore comes with a Profinet controller, EtherNet/IP scanner and a Modbus TCP as well as Modbus RTU master. The HMIs can also be run as slaves in both Modbus protocols.

When used in a hydropower station, the interaction between TBEN-L and TX513 would look something like this: If the flow speed inside the pipe increases or decreases, the TBEN-L provides the appropriate response and the event is visualized on the TX513. The



The TBEN-L I/O module and the TX513 HMI control and visualize the processes of the HYsec

via a web server. Customers thus receive a signal directly on their computers in the control center, even if the hydropower station is located far away from the town. In the event of a pipe burst, the operator can take action immediately and switch off the water pipes remotely. “Remote maintenance via a web server is one of the main topics for the future that I consider to be a real benefit,” Schenk explains.

**Outlook**

The plant with hydraulic brake and lift units can be given even greater intelligence through the use of different sensors. All the data collected from the flow

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Patrick Schenk | VAG GmbH

flow speed increases in the event of a pipe burst. The hydraulic brake and lift unit has to be tripped in order to prevent damage. Sensors in the pipe register the change and pass the signal directly on to the TBEN-L module. The I/O module sends a signal to the HYsec so that the drop weight closes the hydraulic brake and lift unit. A “Attention: pipe burst alarm” message appears on the HMI, in response to which the operator can also take action. This also enables the user to control the individual HYsecs individually or together at the same time.

**Remote maintenance possible via web**

The use of ARGEE and Codesys WebVisu also makes it possible in future to implement remote maintenance

and temperature sensors can thus be sent directly to the TBEN-L and visualized on the HMI. Turck offers a wide range of sensors for these kinds of applications. In combination with a cloud from VAG, the customer is provided with real-time data on the plant. “This simplifies the handling of the pipes enormously,” Schenk sums up in conclusion.

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