



WATER TREATMENT SECTOR

Modernization of a Water Treatment Plant Control System and Digitalization of the Distribution Network Telecontrol System

Implementation of a modern unified visualization and control system for both the Water Treatment Plant and the subsequent Distribution Network, using atvise® and Matrikon®.

INTEGRATOR : **dateando**
| | | | |

Project

The project is divided into two parts: on one hand, modernization of the water treatment plant's visualization and control system, with automation and a SCADA system from Omron; and on the other hand, implementation of a telecontrol system for the subsequent distribution network of treated water.

Solution

Data acquisition from Omron automation of the water treatment plant via Matrikon[®], telemetry system for the distribution network using data loggers plus Sofrel OPC UA server, and integration of a unified visualization and control platform with atvise[®] SCADA.

Integrator Partner



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dateando is a company specialized in assisting companies and public organizations in making decisions to optimize their operations through data acquisition, logging, and visualization. They unify, derive, and analyze data using techniques such as Machine Learning or Business Intelligence.

End User

Water Treatment Plant:
La Rioja, Spain



Goals

- ii Integrate two different systems into a single supervisory platform: on one side, process control system for water treatment controlled by an Omron PLC, and on the other side, distribution/supply network utilizing data loggers from Sofrel.
- ii Implement a state-of-the-art software tool with specialized user-friendly graphics to display extensive information in a compact space.
- ii Enable system monitoring from mobile devices and tablets.
- ii Modernize the reporting system.

Main Challenges

- ii Implement a solution within a tight budget.
- ii Achieve a mutual understanding between the client's requirements and dateando's capabilities with a more modern system.
- ii Demonstrate to the end client the benefits of adopting modern and flexible solutions that would allow them to move away from obsolete tools and enter an era of more informed and efficient decision-making.
- ii Extract variables from the control PLC easily and automatically.





Results

- ii Customer experienced the effectiveness and power of the proposed system through a specialized demonstration of atvise®. Using specific data from their installation and supported by dateando's deep industry knowledge, the capabilities of the water sector graphic libraries were highlighted, offering a precise and personalized view of their needs.
- ii atvise® provides the end client with an advanced solution even within their budget limitations, achieving maximum value for money.
- ii The solution has an extended lifecycle being supported by atvise® software, which is built with the OPC UA industrial standard and pure web technology for visualization. This ensures that the solution remains relevant and updated in the long term, guaranteeing investment sustainability.
- ii Significant improvement in data representation and analysis through the creation of modern and intuitive charts and reports using the atvise® Reporting tool.
- ii Optimization of real-time monitoring from any device such as mobile phones or tablets.

Background

Customer had two separate systems in place: a SCADA system for water treatment and a data logger-based system for water supply network.

The SCADA system for water treatment, which used Omron hardware for control, needed modernization as it had reached obsolescence. Additionally, to streamline management of the facility, there was a need to integrate both systems.

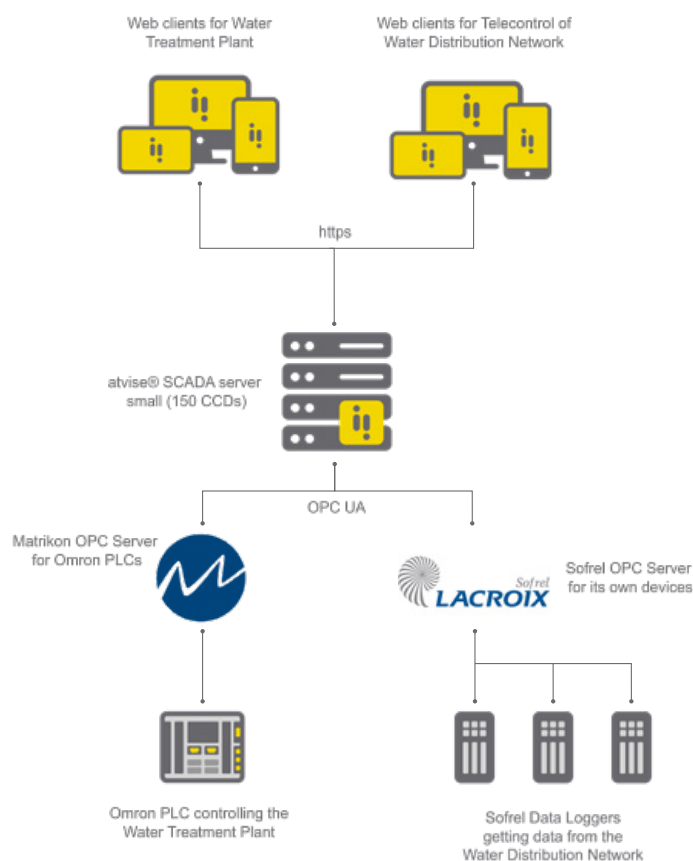
For the water distribution network, the existing equipment required periodic human visits for verification and manual data collection. This prompted the need for a telecontrol system to automatically send periodic data from Sofrel data loggers to the control station.

Reports were generated using CSV files, which are common for data storage but can be cumbersome for analysis due to limitations in structure, data cleanliness, and manual manipulation.

Solution

ii Data acquisition and integration

For the modernization of the supervision and control system, atvise® was implemented as the SCADA system that controls the two locations. With the Matrikon® OPC server for Omron, signals from the Omron PLC were integrated. And for the data loggers, Sofrel's own OPC server was used. Both data acquisition solutions deliver the data to atvise® via the OPC UA standard.



All these signals are sent to the supervision and control platform, so there are 2 OPC UA servers and a single client, which is atvise®: **the solution chosen by the end user.**

After the installation and configuration of these three pieces of software, dateando proceeded to integrate the data into atvise®, **applying accurate cybersecurity measures to the communications network.**

According to Gabriel Viscarret, project director of dateando: "tags import of variables with the Matrikon® driver was exceptional, done in very little time and very simple, it was almost automatic. The Matrikon® OPC server allowed a considerable saving in working hours".

As for system requirements, all the software was installed on a single server with Windows, i7 processor and 16GB RAM.

Data Exploitation

Initial visualization requirements were not high. However, with dateando's expertise in data analysis and the high graphic capabilities of atvise®, the resulting visualization applications provided a more organized, clean, concise, and above all, intuitive view of both the treatment stage and the remote control of the distribution.

"Having a quick visualization of the entire plant, managing incidents more swiftly, and, above all, understanding sensitive information such as water consumption through intuitive histograms, has significantly changed their way of working for the better."

- Gabriel Viscarret, director of dateando.



For report creation, Excel Reporting tool from atvise® was used. Some reports are automatically generated and sent to the facility manager.

And for security, atvise® Access Control was applied to create different user profiles such as administrators, supervisors, and managers, among others, each of them with more or less restricted access levels and permissions.

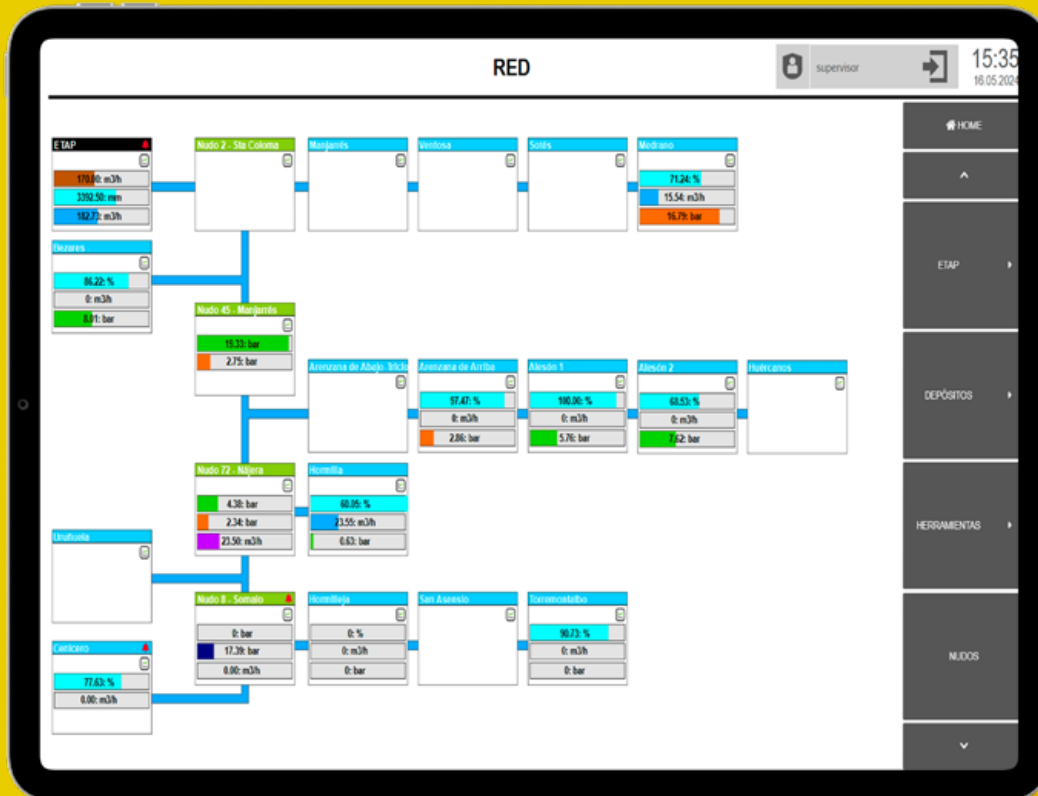
"Information shown by atvise® is exceptionally convenient and concise, allowing us to capture all the details at a glance. This ease of use has transformed our way of analyzing data, providing us with a clear and quick overview of the situation at hand."

- Technicians of the Water Treatment Plant.

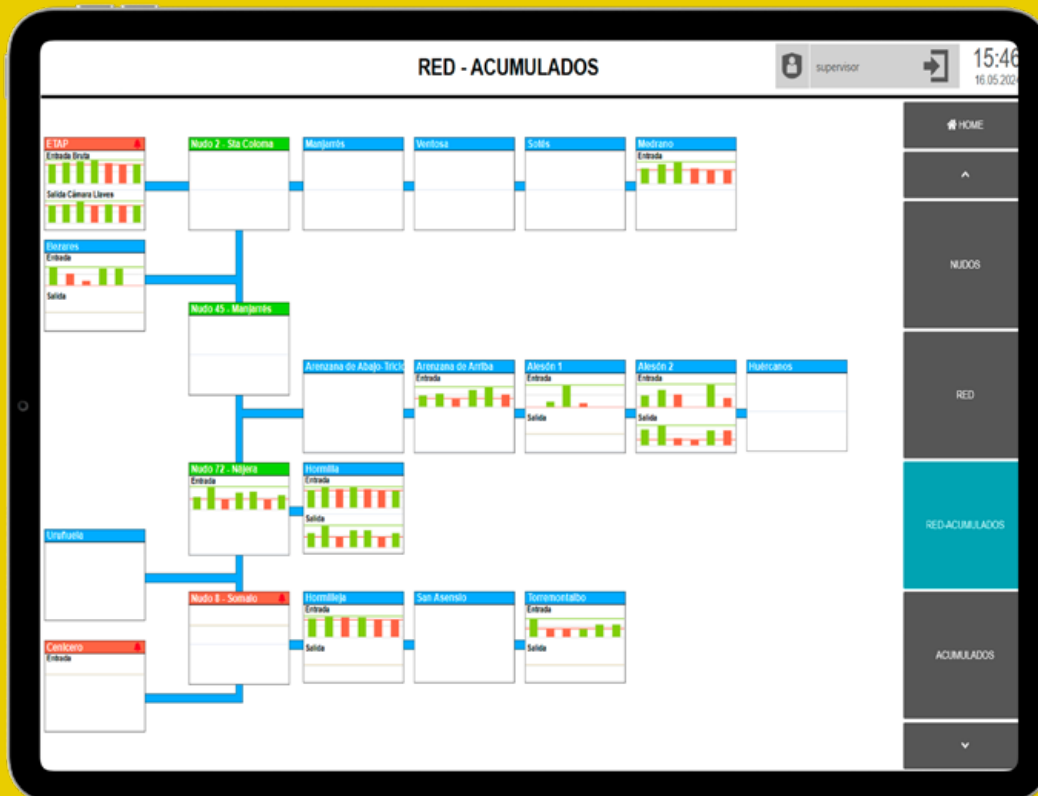
Software:

-  atvise® SCADA small (150 CCDs), including atvise® Elements objects library and Highcharts advanced charts.
-  Matrikon® OPC Server for Omron
-  Sofrel OPC UA Server

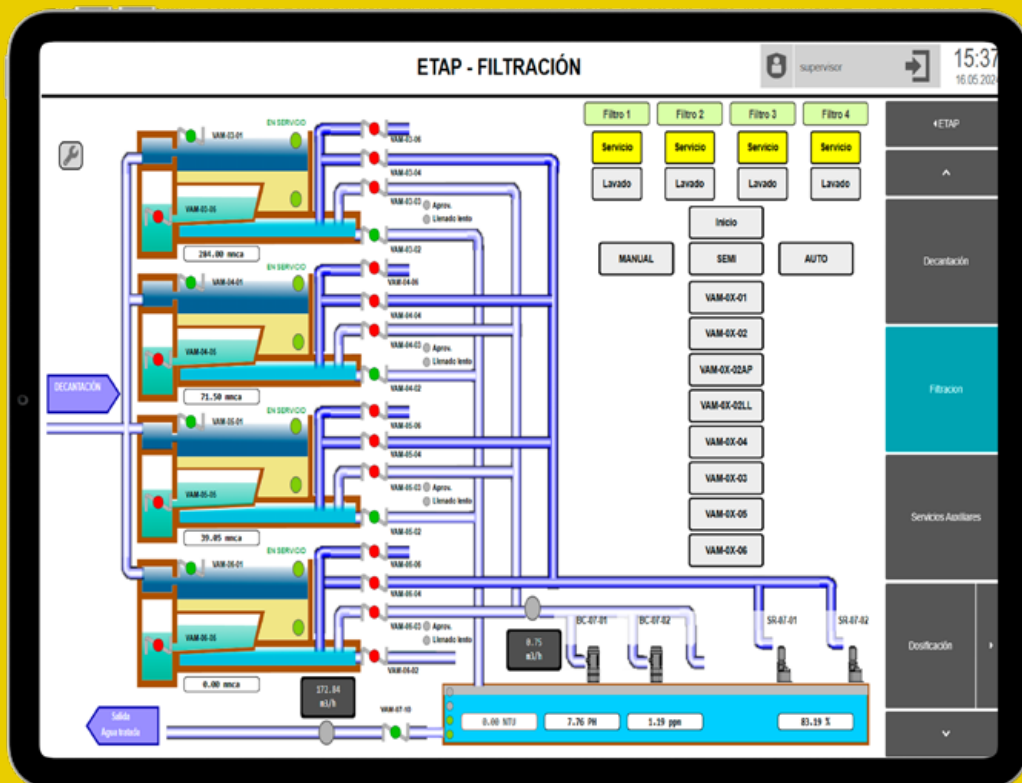
General overview



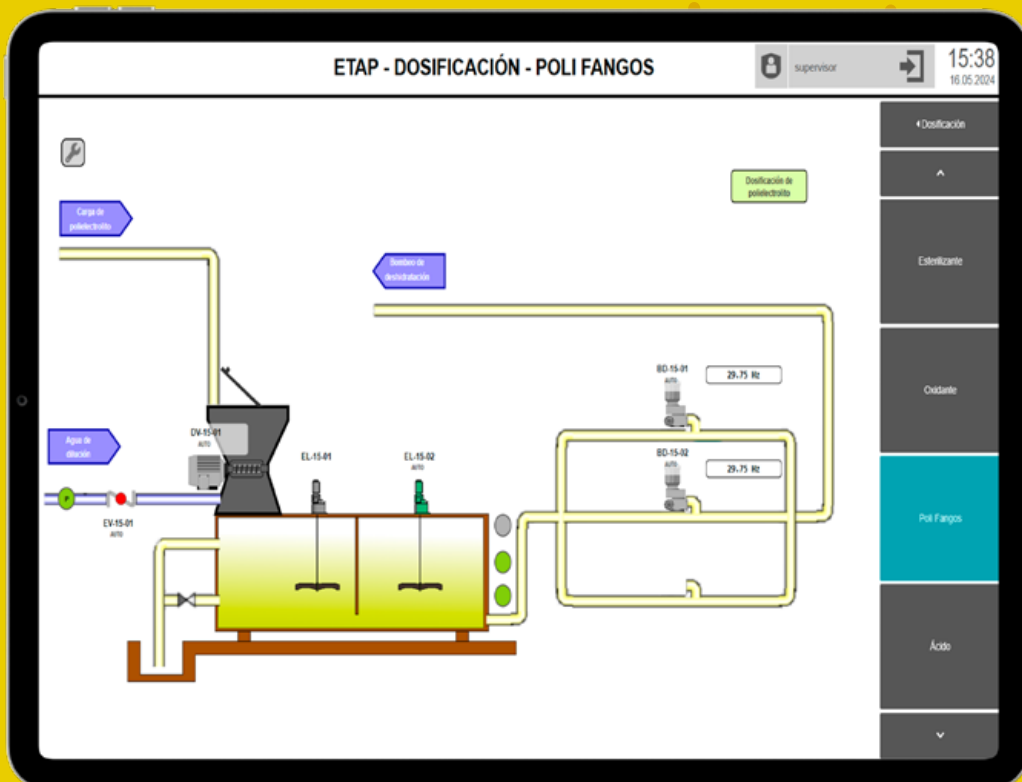
General overview showing accumulated consumption in the last 7 days



ii Filtering system



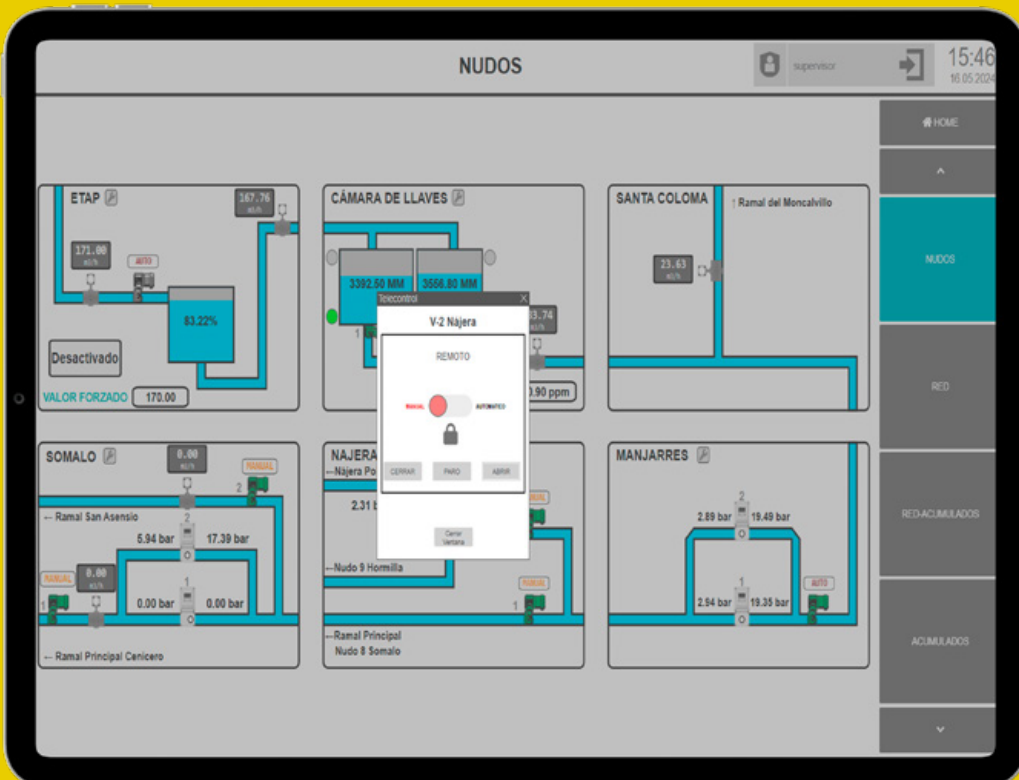
ii Reagents dosification



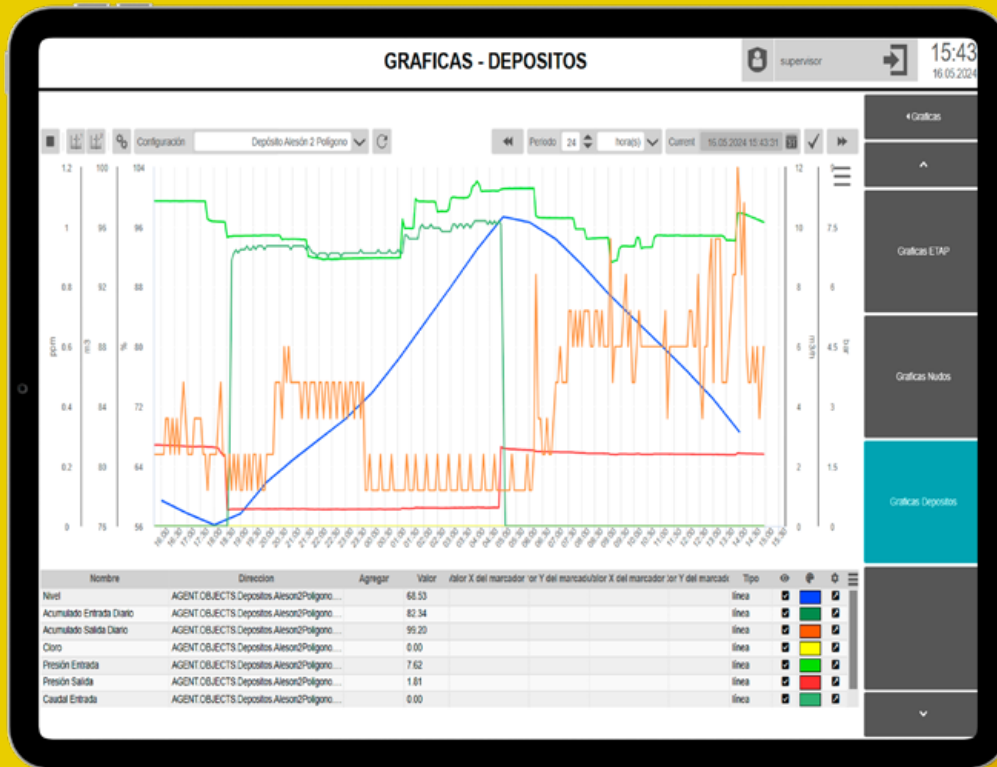
Remote tank widgets



Telecontrol elements



ii Tank trends



ii SMS alarming

The screenshot shows a tablet interface for 'ETAP - ALARMAS SMS'. At the top, it displays 'supervisor' and the time '15:39' on '16.05.2024'. The main section is titled 'Alarma SMS' and contains the following settings and status:

	Consigna	Actual		Consigna	Actual
Filtro señal corte alimentación:	1.00	0 10/s	Cloro alto agua filtrada:	2.00	1.16 ppm
Turbidez alla agua tratada:	0.60	0 NTU	Cloro bajo agua filtrada:	0.50	ppm
Nivel bajo-alto en deposito 1:	2500.00	mm	Cloro alto cámara de llaves:	1.30	0.89 ppm
Nivel bajo-alto en deposito 2:	5000.00	mm	Cloro bajo cámara de llaves:	0.50	ppm
Caudal entrada bajo:	50.00	170 m3/h			

Below the alarm settings, there are two sections:

- Envío SMS:** Includes fields for 'Número de teléfono 1' and 'Número de teléfono 2' (both with 'SI' status), 'Hora envío SMS' (20), and 'Minuto envío SMS' (10).
- Depósitos cámara de llaves:** Shows two tanks with levels: Tank 1 at 3407.20 MM (status: Activado) and Tank 2 at 3558.40 MM (status: Activado).

The screenshot shows a tablet interface for a financial reporting system. The main content area displays a table titled "Informe Depositos Caudales" with columns for "Categoría", "Fecha", "Monto", "Saldo", and "Monto". The table is divided into sections for "Reservas" (Reserves) and "Normales" (Normal), each with "Caudal Entrada (M/LN)" and "Caudal Salida (M/LN)" sub-sections. The interface includes a sidebar on the right with navigation options like "Alarmas", "Informes", "Alarmas Historicas", and "Informe Acumulados". At the top, there are filters for "Área del Informe" (set to "Debitos") and "Tipo de Informe" (set to "Caudales"). Below the filters are date pickers for "Desde:" and "Hasta:" with a "Generar Informe" button. At the bottom of the main area are "Generar PDF" and "Descargar PDF" buttons. The top of the screen shows the title "INFORMES", a user profile for "supervisor", and the time "15:46" on "16.05.2024".

atvise® SCADA

SCADA SOFTWARE FOR INDUSTRY 4.0

The first HMI SCADA software built on Industry 4.0 fundamental basis: Pure Web Technology and OPC UA.

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Responsive Design



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Multiplatform



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