

Retrofit Automation Solutions

## Sustainable Automation.

Retrofitting a cheese processing plant during running production.

A reference for JAG Jakob Ltd Process Technology.





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## When a retrofit is the best fit. A sustainable system change.

Crema AG is one of Switzerland's most important milk processors. Located in Fribourg, the company has been producing high-quality dairy products for more than 90 years.

But recently, the cheesemaker was increasingly confronted with downtimes. The reason for this was not the production equipment itself – which worked flawlessly in terms of mechanics – but the associated control system. The latter had clearly reached the end of its service life. Components were failing with growing frequency, and the procurement of replacement parts posed a significant challenge.

### Sustainable thinking

While some providers might have dismantled the plant and moved production to a new facility, Crema was dedicated to avoiding a waste of re-

sources. They got in touch with JAG, and found a partner on the same wavelength. Together, we developed a sustainable solution step by step.

This involved replacing the outdated control system with a modern automation solution, which would allow Crema both to keep its plant and make it fit for future requirements such as restrictions in food regulations or Industry 4.0 applications.

### No production downtime

We began programming the automation solution in April 2017 and were able to test it on the plant by November – meaning the entire retrofit project was completed before the end of the year. The system change took place smoothly and did not impede, disrupt or otherwise negatively affect running production.

### PUBLISHER

**JAG Jakob Ltd**  
Industriestrasse 20  
CH-2555 Brügg  
T +41 (0)32 374 30 30  
F +41 (0)32 374 30 31  
jagpt@jag.ch  
www.jag.ch







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## The challenges of a complete system change. Initial situation and requirements.

The purpose of this retrofit project was defined in close collaboration with Cremo AG and did not seem to pose any fundamental difficulties for the JAG team. But the devil was in the detail when it came to some of the requirements.





#### **Switch during running production**

Shutting down cheese production for several days? Out of the question! The switch to the new automation solution needed to be accomplished with as little impact on running production as possible. This was one of the biggest challenges of the project.

#### **Reusing old elements**

There was no budget for additional investment in replacement parts, meaning the new automation solution needed to be able to operate existing, still-functioning equipment impeccably.

#### **Less work for the cheesemaker**

Even industrial cheesemaking requires some manual intervention. For one thing, milk as a raw material is subject to seasonal and regional variations. At the same time, there is no way of automating a cheesemaker's intuitive understanding of their product. This meant that the automation system needed to offer the cheesemaker simple, guided intervention options.

#### **Documentation and process tracking**

Finally, the new automation solution needed to fully document every product batch and guarantee seamless tracking through automatic coding of every single cheese wheel.

## The switch to the new automation solution. System change with the help of switch modules.

Every retrofit project enters a crucial phase when the automation software programmed for a given plant needs to be tested under real-world conditions. Depending on the plant, the trial operation is subject to time-related, space-related or organisational restrictions.

### Switching between old and new

At Crema's cheesemaking plant, the biggest challenge for JAG was time, as it could only conduct the many necessary test runs during normal production breaks at night and on a few non-production days. In order to fully exploit these limited time windows, we developed our own switch modules that we could integrate into the plant during running production.

The switch modules allowed us to trigger field elements from the old control system or from the new automation solution as desired. The switch

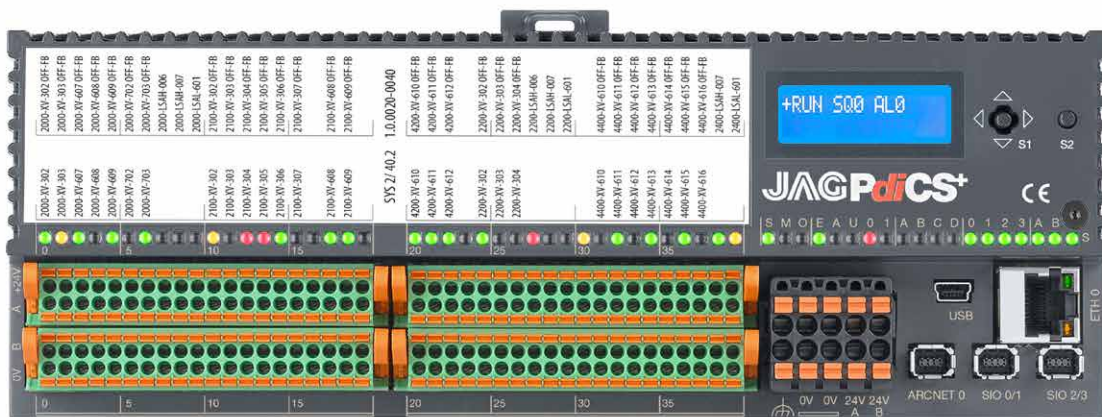
procedure barely lasted 10 minutes. This enabled us to thoroughly test the new JAG PdiCS control system within just a few weeks without disrupting the cheesemaker's production.

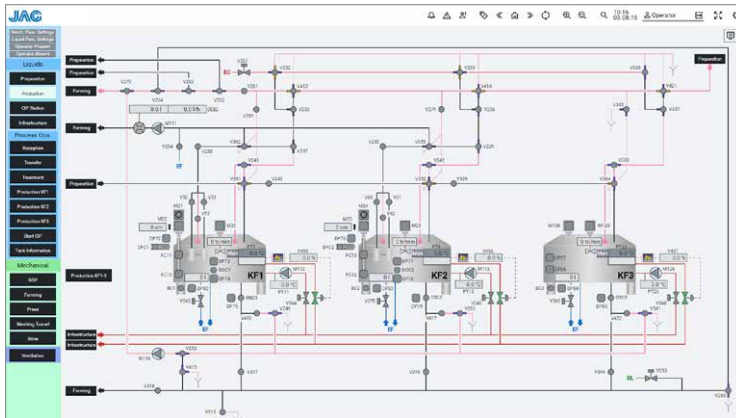
### Ongoing functionality

The integrated switch modules continue to work past the testing phase, allowing continued use of field elements from the old system. As long as these remain functional, there is no need to replace them.

### JAG PdiCS

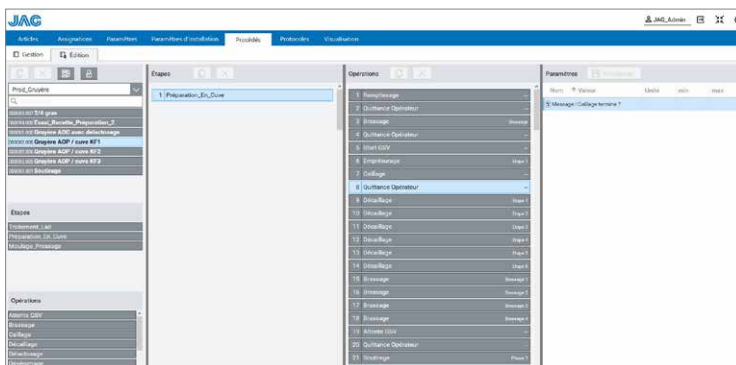
The heart of the new automation solution is the JAG PdiCS control system, which regulates all automated processes and keeps the number of required manual interventions to a minimum. JAG PdiCS is constantly being developed further, and also benefited from this particular retrofit project.





### Navigation and operation

The intuitive user interface guides operators through all the process steps and makes it very easy for the cheesemaker to adjust the parameters manually if needed. The process values, shown in a graph, offer a complete overview of the plant at all times.



### Recipe for success

Different types of cheeses and product variations can be produced on the same plant using different recipes. The cheesemaker is able to easily manage existing recipes and create new ones using a straightforward process.

Date	Signal	StepName	Operation	Text
14.07.2018 18:01:00	OK	102	Arrêt évacuation E305	
14.07.2018 18:01:00	OK	215	Set point régulation vau	
14.07.2018 18:01:00	OK	102	Unmélange viderie E305	
14.07.2018 18:01:00	OK	215	Sauvegarde des E305 du Su	
14.07.2018 18:01:00	Transport	214	Arrêt vau	
14.07.2018 18:01:00	OK	215	Stop vau	
14.07.2018 18:01:00	Working	102	Stop évacuation	
14.07.2018 18:01:00	Working	102	Working vau-000 (terminal)	31 800 - 31 800
14.07.2018 18:01:00	Working	102	Arrêt vau balance	
14.07.2018 18:01:00	Working	222	Démarrage dosage produ	
14.07.2018 18:01:00	OK	116	Evacue	
14.07.2018 18:01:00	Working	222	Démarrage vau balance	
14.07.2018 18:01:00	Working	102	Stop	
14.07.2018 18:01:00	Working	215	Tape avec sauvegar	
14.07.2018 18:01:00	Transport	214	Démarrage vau	
14.07.2018 18:01:00	Working	222	Arrêt vau balance	
14.07.2018 18:01:00	OK	215	Stop évacuation	
14.07.2018 18:01:00	Working	222	Démarrage vau balance	
14.07.2018 18:01:00	Working	102	Stop	
14.07.2018 18:01:00	Working	215	Tape avec sauvegar	
14.07.2018 18:01:00	Working	215	Installation de vau	

### Traceability

The new automation solution seamlessly generates manufacturing certificates for each wheel of cheese. These documents record the origin of the raw materials and all the applied process parameters fully automatically.







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## Teamwork and expertise. The secret of our success.

Like all other segments of the food manufacturing industry, behind cheese production lies complex technology and an in-depth knowledge of physical, biological and biomechanical production factors.

Our team collaborated closely with specialists from Crema AG to determine all the important production parameters, from the preparation of the delivered milk to details regarding time-controlled temperature management, through to the transfer of the cheese wheels to the ripening room.

### Fit for retrofit!

Our team combines skills and expertise from all areas of process technology in order to sustainably modernise an existing plant by retrofitting its control system:

- » Development of control software
- » Development and construction of automation components
- » Development of automation concepts for complex manufacturing processes
- » Implementation of automation solutions for complex manufacturing processes
- » Planning and construction of control cabinets
- » Planning and assembly of electrical equipment for processing and production plants
- » Planning and execution of upgrades and modifications within tight time frames



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## A comprehensive modernisation shift.

### Advantages and added value.

The system change to a modern automation software was completed without impeding the cheesemaker's operations or disrupting food production. This was of key importance to Cremo, and our team rose impressively to the challenge. By creating a system that enabled parallel operation of the old and new control systems, our team met 100% of our customer's needs for the retrofit project.

The new automation solution lowers the time and effort associated with maintenance and improves plant efficiency. In addition, operation is intuitive thanks to touchscreens and graphic interfaces. While the production equipment might be getting on in years, it feels like new.

In addition to these perks, the following benefits deserve to be highlighted:

#### Lower investment costs

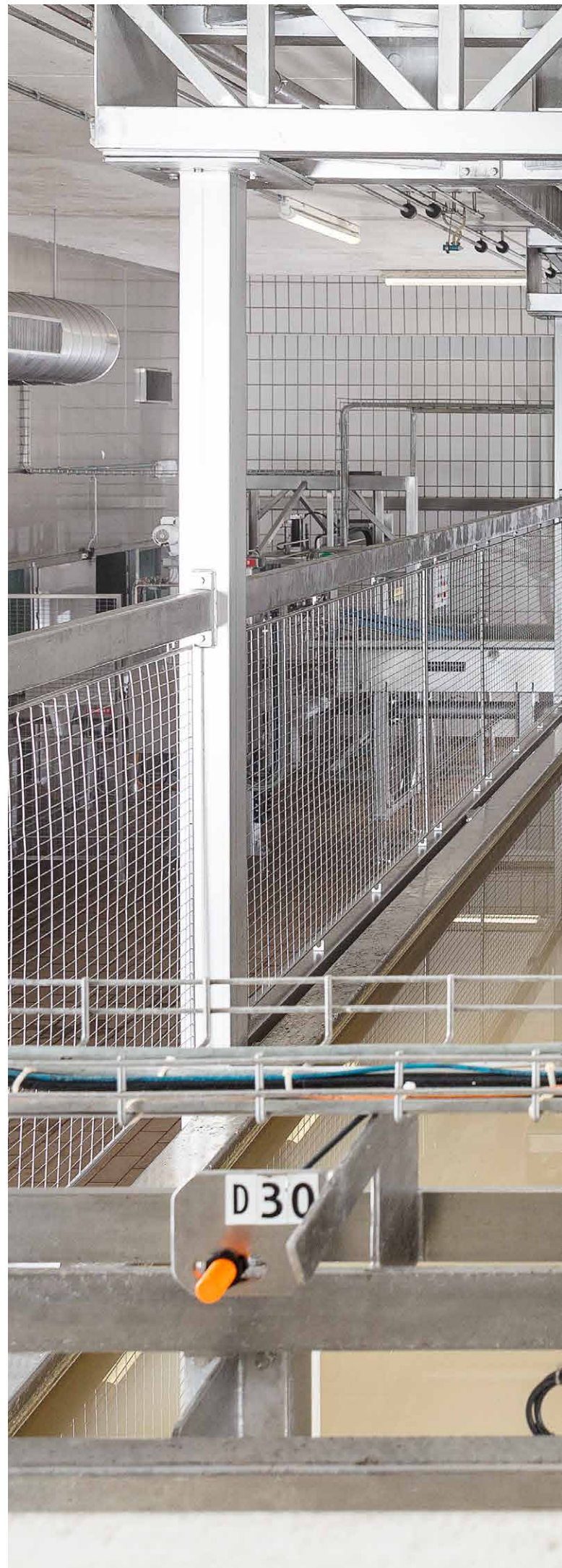
The new automation solution allows further operation of old field elements. This way, they can be gradually replaced over the coming years.

#### Lower installation efforts

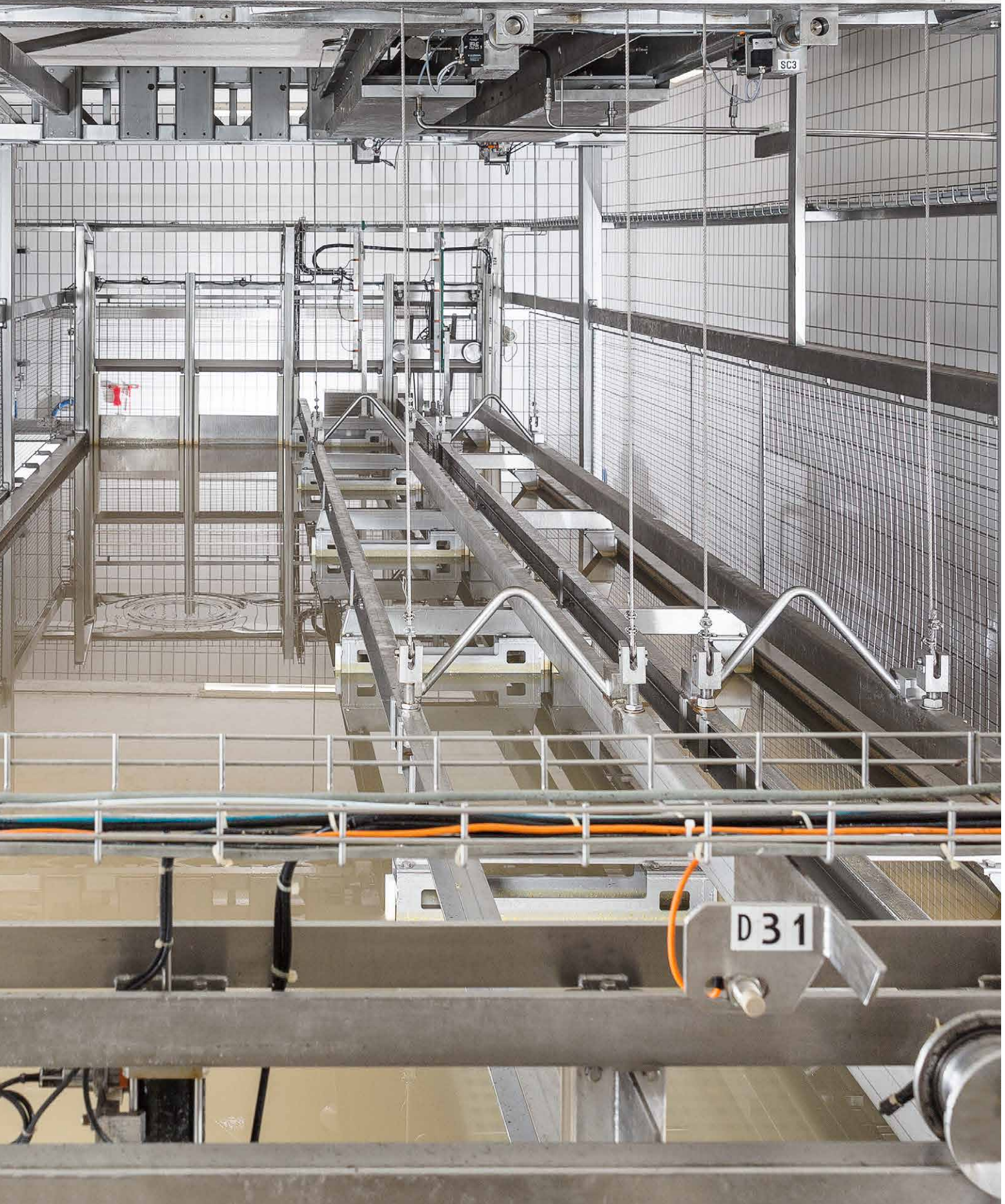
The existing field wiring between the terminals and the field elements can largely continue to be used.

#### Can be upgraded to Industry 4.0

The new automation solution can also be upgraded. The network connection and interfaces for data exchange with third-party software such as ERP also generate added value. As a result, this retrofit project is already setting the course for the future: the integration of the production plant into a modern ICT environment (Industry 4.0).









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**JAG Jakob AG**

Industriestrasse 20  
CH-2555 Brügg  
T +41 (0)32 374 30 30  
jagpt@jag.ch  
www.jag.ch

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**JAG Jakob SA**

Rue de la Roche-de-Mars 12  
CH-2900 Porrentruy  
T +41 (0)32 374 34 34  
jagpt@jag.ch  
www.jag.ch

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**JAG Process Solutions PTY LTD**

420 Victoria Street  
Brunswick VIC-3056  
Australia  
T +61 (0)37 068 58 78  
info@jag-ps.com.au  
www.jag-ps.com.au