

At its plant based in Brunsbüttel, Germany, Sasol manufactures fatty alcohols and derivatives as well as special anorganic chemicals such as high-purity alumina



Field Communication with Added Value

Sasol's plant in Brunsbüttel, Germany, is optimizing its plant operations using Turck's remote I/O solution excom

When construction of Sasol plant in Brunsbüttel, Germany, began in 1962, no one was thinking about process control systems and remote I/Os. In its first years of operation, the plant, which at that time was built by the American oil company Conoco and DEA (Deutsche Erdöl-Aktiengesellschaft), produced fatty alcohols from petrochemical products. Aluminum oxide, among others, was created as a by-product from the production of fatty alcohol. The Brunsbüttel plant was able to market the powder – also known under the name alumina – so successfully that in 1983 a plant was installed that produced alumina from aluminum, separately from the fatty alcohol production.

For five years, the Brunsbüttel plant has been producing fatty alcohols and high-purity alumina under the umbrella of the South African company Sasol Ltd.

The company, which is headquartered in Johannesburg, employs about 30,000 workers and ranks among the most important industrial companies in South Africa. When it comes to fatty alcohols and alumina, Sasol ranks among the leading suppliers. Fatty alcohols, among other substances, are needed for the manufacture of creams, detergents and lipsticks; high-purity alumina perform important services, such as the desulphurization of crude oils or the exhaust gas purification as a carrier material for catalytic converters. Sasol Germany, the company's German subsidiary, employs about 530 workers at the Brunsbüttel plant and over 1,500 Germany-wide.

Process optimization

Continuous further development of products and processes is essential for Sasol's Brunsbüttel plant.



Jörg Brouwer, Sasol, is satisfied: "So far, working with Turck has been a very positive experience."



Ready to start: The fully installed excom station with redundant 230V power supply and fiber optic cable connector is ready to start up the plant.

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As part of the continuous plant optimizing process, remote I/O solutions are gradually replacing conventional wiring solutions at Sasol's Brunsbüttel plant. These solutions reduce not only wiring and documentation expenditure, but also increase plant capacity and create the foundation for more efficient plant operation using asset management and FDT/DTM.

This also applies to the EMSR department, which consists of electronics, measurement and control planning, the associated shops, a department for process data/information and management systems (PIMS), as well as advanced process control (APC). Five employees in the Process Control department look after all the process control systems in the Brunsbüttel plant. This primarily includes the Freelance and Melody ABB systems. The plant operators in the control rooms use the systems Operate IT and 800xA for visualization.

Until recently, Contronic P, an outdated ABB process control system, was used for alumina production. The Sasol specialists successfully replaced it as part of their continual process optimization and were able to migrate to Melody/800xA. Due to switching over to a modern process control system, additional equipment such as controllers, detectors,

etc., that were previously located in the switchboard panel of the control room, also had to be converted. Even older field devices and measurement equipment had to be replaced. Sasol connected the new devices using Turck's excom remote I/O solution. During this project alone, Turck retrofitted a total of ten control cabinets.

24V line redundant

The specialists at Sasol's Brunsbüttel plant have been impressed by the efficiency that Turck's modular remote I/O solution provides since the first excom stations were installed in 2005. In the meantime, remote I/Os from Turck, the Mülheim-based sensor, fieldbus and interface specialist, are working on almost every process control system at the Brunsbüttel plant to the full satisfaction of its operators.

“During our search for a remote I/O solution that met our requirements, excom was able to score points right from the first presentation with an unbeatable feature: We can operate this system in explosion-hazardous locations using 230 volts,” says Jörg Brouwer, manager of the Process Control Technology department, of the decision at that time in favor of the Turck system.

It sounds banal, but it is an essential criterion in everyday operations. Conventional remote I/Os require 24 volts. If this voltage is brought into the field over distances of 300 or 400 meters, it requires huge cable cross-sections in order to compensate for the increasing voltage drop with increasing cable length and, in the end, to be able to provide the necessary output. With the use of 230 volts directly on site, these problems are eliminated, conventional cable with normal cross-sections are completely sufficient for this purpose.



FDT/DTM forerunner

In addition, Turck was also able to score big with its rapid development of a DTM (Device Type Manager). Already in 2005, this complex “device driver” was available and considerably facilitated the con-

figuration and operation of the remote I/O. Turck supported and influenced the development of FDT/DTM technology right from the start, supporting the company’s claim that it ranks among the innovation leaders and market drivers in this field.

The FDT/DTM technology plays an important role in the field of plant design and construction, even if implementation is not quite as far along as originally planned. The FDT/DTM pilot project at Sasol’s Brunsbüttel plant is to migrate Contronic P to 800xA, the entire plant is now being built based on an asset management system. All remote I/Os connected to the system are supposed to be managed per FDT/DTM by the asset management system.

In order to integrate the remote I/Os into the individual plant components, technicians are using the Ethernet infrastructure from the process control systems, which had been built up extensively in the entire plant – separately from the office IT. To connect the Ethernet to the PROFIBUS cables from the remote I/Os, the xEPI Gateway from Trebing and Himstedt is used. Each PROFIBUS system is connected to the Ethernet using an xEPI. All devices that are located behind the gateway are configured, calibrated or diagnosed via the corresponding DTM.

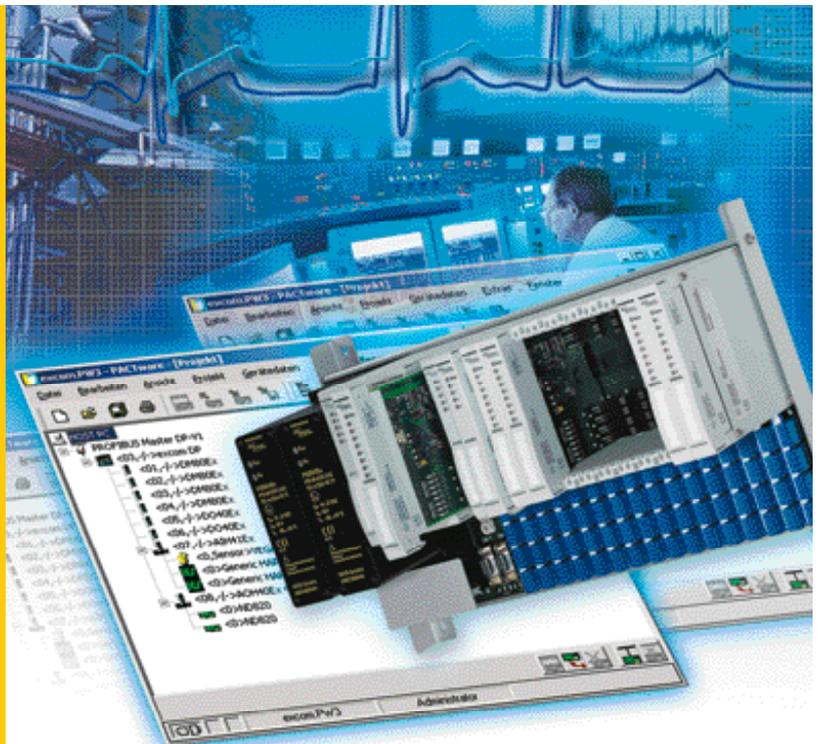
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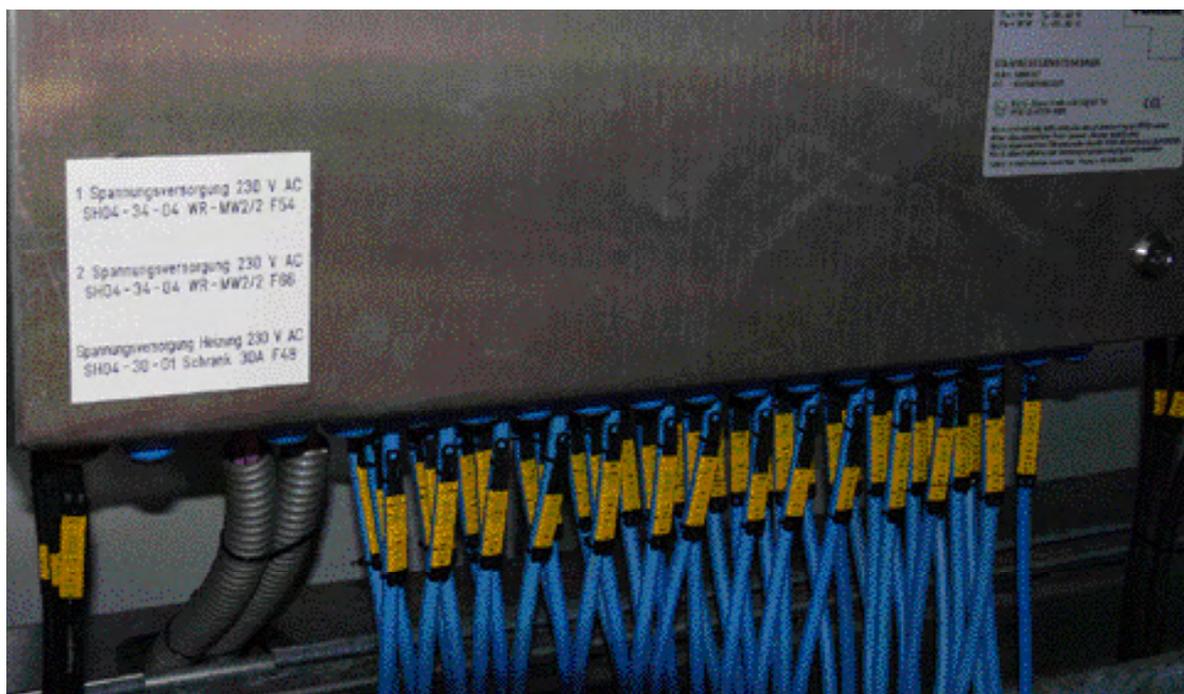
Jörg Brouwer, Sasol

An overview of excom

excom is a modular remote I/O system that facilitates installation and drastically reduces equipment costs. This flexible system provides:

- Inherently safe gateways for connecting to the PROFIBUS DP
- Power supply units: 24 VDC, 115/230 VAC
- High availability through optional redundant gateways and power supplies
- Consistent HART parameterization from the process control system to the field device
- 128 binary or 64 analog channels under a single PROFIBUS address, with cycle times < 20 ms
- Flexible binary I/O structure through programmable effective directions
- Automatic adjustment of the outputs to valve outputs in the 10...24 V range
- Active and passive analog I/O with= galvanic separation or HART consistency
- Temperature inputs for various heating elements, among them PT100 and NI100
- Fast counters for reactions in the ms range
- Exchange and expansion of all components during operation





User-friendly: A 230 V power supply is sufficient for excom. The time-consuming and – due to the required large cable diameter – expensive 24V cabling is not necessary any more

30 stations in use

Overall, Sasol has about 30 excom stations in use at the Brunsbüttel plant alone. The remote I/O system for explosion-hazardous locations offers bus-capable, decentralized input/output modules for connecting binary and analog, inherently safe field devices. The system's protection degree permits use in zones 1 and 2. The field current circuits are permitted for use up to and including zone 0.

Because many users of remote I/O systems benefit from the installation of a fieldbus structure, yet don't want to sacrifice availability, excom allows a completely redundant set-up. The power supply can be installed in 24 VDC or 230 VAC, with or

without a redundancy option. All modules – including the power supply units – can be replaced in zone 1 during operation. In addition to the increased availability, hot swapping and explosion-hazardous location protection, the system permits continuous HART parameterizing of field devices via the bus.

All stations or their inherently safe gateways with optional redundancy are connected to the higher-level bus system via the Turck fiber optic cable connector OC11Ex with PROFIBUS-DP. With it, excom connects to the process control system up to 128 binary or 64 analog field devices under a single bus address. All modules provide "Ex ia" interfaces to the process so that no further safety measures have to be taken. The binary I/O module offers one novelty: Pairwise, the channels can be configured as inputs or outputs. This means that excom is optimally compatible to the application, resulting in cost reductions.

Forum for Automation Engineers

Jörg Brouwer, responsible for process control systems at Sasol's Brunsbüttel plant has set up a forum for all questions concerning process control systems and automation. Under www.pls-forum.de, process and control and automation engineers and technicians can exchange ideas on process control system solutions as well as related topics such as fieldbus and remote I/O or asset management. Through this forum, Brouwer would like to make modern communications options more accessible to the automation world. Tips and tricks as well as information on manufacturer problems or snappy solutions are also in great demand.

Direct line to the company

For Sasol's plant operators, the technological benefits of the excom solution were enough reason to begin working with Turck. After a year and a half, there is an additional reason for satisfaction: "I know of only a few companies that offer such direct contact to technical support," explains Jörg Brouwer. "Regardless of whether we are dealing with alternative partial solutions, optimization devices or solving problems, we have never had to wait long for a solution thanks to the direct line to the 'right' Turck employees. This makes working together very pleasant."

Author



Stefan Kappel is key account manager for process automation at Hans Turck GmbH & Co. KG

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