



## Perfect Extrusion

### Location:

Großostheim/ Aschaffenburg,  
Germany

### Segment:

MOEM

### Problem:

control technology – vegetable cold storage warehouses

### Solution:

SmartWire-DT with CANopen gateways, HMI-PLC XV152, Miniature circuit-breakers, PKZ M motor-protective circuit-breakers and DIL M contactors with tool-less plug connectors, XI/ON

### Results:

Several demanding functions on the extruder production line can be connected via SmartWire-DT. The switchboard has a slim and clear layout

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*Thanks to SmartWire-DT and the CANopen gateway we have considerably reduced wiring effort*

*Harald Schick, IVK Schaltanlagen und Systemtechnik*

### Background

Plastic extrusion normally involves a continuous process over multiple stages. The basic raw materials are metered into a heated screw. One or two counter rotating or corotating screw shafts mix and melt the basic material and the additive homogeneously. The melt is finally fed out via a nozzle. Polymers and compounds are normally used, together with the additional ground material and additive. This results in continuous lengths of material with the cross section of the nozzle. Walter Pirrung, a company based in Großostheim near Aschaffenburg, supplies innovative extruders for plastics, and the company is well-known throughout Germany for its customer-driven new developments in extrusions materials. The Forchheim-based company IVK Schaltanlagen und Systemtechnik GmbH & Co. KG plans, designs and installs the switchboards required for this. For the technically challenging Pirrung extruders this is no trivial task. Thanks to SmartWire-DT from Eaton, the previously huge wiring effort could be significantly reduced. The I/O interface is

now also considerably less time consuming.

### Challenges

Depending on two process principles, extruders are either processing or compounding extruders. The first type shapes chemical and/or physical material whilst the second type modifies it. In Germany, the Großostheim-based Walter Pirrung company is no longer an insider tip when it comes to customer-driven plastics extrusion. Whether for metering, supplying the quantity, mixing, discharging, cooling and cutting, or exhaust air extraction and energy recycling, and also for cleaning, maintenance or repair – all these steps require a high level of technical know-how.

However, every Pirrung extruder, in fact the entire Pirrung Compounding line, is not only a masterpiece in itself but also only provides reliable and safe operation in conjunction with mechanical and electronic components. For this Walter Pirrung relies on the expertise of IVK Schaltanlagen und Systemtechnik GmbH & Co. KG, Forchheim. This company has been active

in the market for 17 years and stands out from its competitors with its design and development skills. IVK uses Eaton's SmartWire-DT connection and communication technology for building the panels for Walter Pirrung. Harald Schick, technical manager at IVK, explained the reason: "The cabling effort on similar projects proved to be extremely time consuming. On the current project, the extruder, we use SmartWire-DT to connect the PLC, an HMI-PLC XV152 from Eaton. The XV152 touch panel is used to provide the visualization and operation, whilst the PLC integrated in the device also acts as the CANopen master. We use five CANopen gateways, and all contactors and motor-protective circuit-breakers are connected to SmartWire-DT – and that is basically all that is required." Harald Schick adds: "Around 60 PKZM motor-protective circuit-breakers were used with a plug connection to 3 kW DILM contactors. The auxiliary contacts are connected to the SmartWire-DT. All interface nodes receive their signals in real-time.

This also applies to the metering drives which are controlled by frequency inverters and are networked via CANopen. The core of the extruder is a 200 kW water-cooled three-phase asynchronous motor which is also controlled by a frequency inverter likewise via CANopen."

The compounding system is part assembled and supplied to customers. The system is commissioned on site by IVK. Harald Schick highlights a special feature: "This extruder can be operated without any problem, and all individual components of the system are perfectly matched up and controlled by a central PLC. Whilst all the processes are running in Automatic mode, all SmartWire-DT slaves can be switched on and off manually in Manual mode." The extruder and its heating zones are first heated in the production line for about 30 minutes (variable between 250° to 400° at an accuracy of up to +/-1°). The metering system is then engaged and the discharged continuous length is fed to the cooling bath and finally to the granulator.

## Solution

PKE motor starter combinations with SmartWire-DT enable users to ensure integration in the automation world: The PKE-SWD-32 modular COM interface also provides the actual current flow of the PKE as well as different signalling functions such as diagnostics, status and overload signals. All process-relevant data is transferred directly to the controller and is made available to the entire plant. The data transparency thus created increases the efficiency and operational reliability of the drives in the area of the motor-protective circuit-breaker. Users can therefore increase system availability, reduce the wiring in the control circuit and save time-consuming troubleshooting during commissioning and maintenance. The central PLC or a control system are always provided with up-to-date and precise diagnostics data, and tripping and overload values can also be set for motor protection. A virtually system-immanent manipulation protection with SmartWire-DT ensures a high level of safety.

## Results

Harald Schick, technical manager at IVK, summarizes: "Several demanding functions on the extruder production line can be connected via SmartWire-DT. Thanks to SmartWire-DT and the CANopen gateway we have considerably reduced wiring effort and were also able to significantly reduce the number of I/Os. The switchboard now has a really slim, spacious and clear layout. We are known by our customers for fast response times – and we are no longer slowed down by the cabling of the switchboard. For us SmartWire-DT is a connection and communication technology with a real value addition."



SmartWire-DT in operation: The powerful communication and wiring system reduces the mounting and wiring requirement by up to 60% and also enables a clear and spacious switchboard layout.