

## Compact control system replaces PLCs Comfortable, more efficient integration of package units using AC 700F

AC 700F controller with direct S700 I/O



The AC 700F controller increases the scalability of the compact control system Freelance 800F towards very small applications with only a few I/Os and closes the gap between PLCs (programmable logic controllers) and complex process control systems. It is suitable for smallest applications with about 10 to 250 I/Os per controller and thus opens up additional application areas for the Freelance 800F control system, which is suitable for both small and also medium-sized projects with several thousand signals. Comfortable, advanced functions of control systems are now also available for very small applications – and all at a very reasonable price. The AC 700F controller offers a large number of advantages compared to a standard PLC with visualization from third-party vendors. The projects on the following pages show these advantages and the various application areas for the AC 700F controller.

Thanks to the compact control system Freelance 800F and its AC 700F controller it is now possible for smaller automation solutions, which to date have been dominated by PLCs, to benefit from the advantages of process control systems, particularly in the process industry. There is a wide range of use in many industries including chemicals, petrochemicals, oil and gas, metals, cement production, glass production, etc.

The AC 700F controller can be integrated into existing Freelance 800F systems in the same way as the AC 800F controller. In contrast to PLCs, the AC 700F controller offers all of the advantages of the compact control system. Important for engineering and maintenance: A single engineering tool for all tasks: Control Builder F.

DigiVis, the visualization tool, makes operation easy, structured and intuitive. Pre-engineered components such as faceplates, module diagnostics, event lists, the alarm line, trend displays and automatically generated SFC (Sequential Function Chart) displays play a key role in this regard. The use of predefined, field proven libraries including faceplates significantly eases the transparency, readability and adaptability of the application and substantially increases security. The advanced diagnostic options and improved alarm handling allows cost cutting in the operation and maintenance phase and asset availability can be enhanced. This substantially increases the economic efficiency of the entire plant.

# Project: System for extracting natural substances, AlzChem GmbH, Trostberg, Germany

## Industry: Chemicals

AlzChem GmbH in Trostberg, a subsidiary of Evonik Industries AG, produces specialty chemicals products with a wide range of uses. These chemicals are used, for example, in the production of crop protection products, pigments, dyes, pharmaceuticals and polymers.

In the past, an inverted filter centrifuge in a system for extracting natural substances was PLC-controlled at AlzChem GmbH. The program code for the PLC, a standard program from the manufacturer, was not transparent and needed specialists to make changes. The program was not intuitive and diagnostic analyses were only available to a very limited extent. In order to simplify programming and to optimize the process control, AlzChem thus decided to use the AC 700F controller. This replaced the PLC and was integrated into the existing Freelance 800F system without any problems.

This offers several advantages for AlzChem: The use of one single engineering tool to configure the entire system simplifies engineering and saves a significant amount of time during commissioning. After transferring the program the system is easy to understand and maintenance is simpler.

During the operating and maintenance phase, the wide range of diagnostic options (sequence control-, hardware -, interlock diagnostics), the intuitive graphical user interface and mature alarm and report management allow costs to be cut. This reduces downtime of the application and cuts maintenance

expenditures. All this improves the efficiency of the entire system and the slightly higher acquisition costs compared to a PLC amortize within a very short time.

Hartmut Rohner, Head of Electrical Systems, Instrumentation and Control at AlzChem, is particularly impressed by the simple and clear handling of the AC 700F controller and the Freelance 800F system. "It is easy for anyone to learn how to operate the software and hardware. In contrast, it was practically impossible to understand the standard program supplied by the manufacturer together with the centrifuge." Mr. Rohner also sees clear advantages over other systems when it comes to maintenance and faultfinding. Whereas with other manufacturers faultfinding is only possible using a handheld device in the field, Freelance 800F provides extensive analysis options right in the control room. "Now I look at the status and can see straight away where the error is. That is not possible that simply in other systems." This makes fault finding and maintenance substantially easier.



# Project: Converter for platinum extraction, Northam Platinum, Johannesburg, South Africa

## Industry: Metal production

Northam Platinum Ltd. is based in Johannesburg, South Africa, and mines and produces precious metals. Convertors are used to extract platinum from ore. These convertors are driven using electrical motors. Until now, a PLC controlled the motors' direct motor starters. This operating mode was not reliable and efficient enough for Northam, as the motors thus operate constantly at full output. That reduces the lifespan of the components and causes higher repair and maintenance costs to increase.

When the application was modernized and converted to frequency converters to increase energy efficiency, the outdated PLCs were to be replaced. Customer requirements were a more compact controller, an improved presentation of alarms and results and an excellent cost/benefits ratio.

Northam opted for the new AC 700F controller when replacing PLCs for the convertors. Northam has been using the Freelance 800F system to control its smelting furnaces and other applications for many years and is convinced by the systems performance.

One AC 700F controller now regulates one variable-speed drive. The motor output can be adjusted at any time to the current operating requirements of the application, as frequency converters can be simply driven by the controller. The adjustment allows up to 50% of energy savings and processes can

be better controlled. The increase in efficiency resulting from the intelligent speed control can be used in two ways: to increase productivity or to keep production stable while simultaneously reducing energy consumption.

Integration of the AC 700F controller into the existing Freelance 800F system and the easy engineering with just one engineering tool, "Control Builder F" simplify commissioning and maintaining of the entire application. The configuration is particularly simple as the visualization is also created with Control Builder F. Separate tools for programming the PLCs and to create operator images are no longer needed. Technicians now only need to handle a uniform engineering tool system wide. Production data and information such as signal descriptions, current and historical data, reports and detailed status information can be recorded over several years in the information management tool PGIM 800F.

As a result of its positive experience, Northam will modernize additional convertors and other small plants using the AC 700F controller in the near future.



# Project: Solid fuel boiler to produce hot water and steam, Osby Parca, Sweden (Manufacturer of boilers, Process OEM) Industry: Energy and steam production

Osby Parca produces high-performance boilers for hot water and steam. The product range spans from electric boilers with 36 kW through to oil boilers with 16 MW. Osby Parca offers a wide variety of solutions: for solid fuels, steam, gas, oil, electricity and heat recycling, flue gas cleaning and biomass systems. These boilers are delivered to both small customers and key accounts - from sole proprietors for pipe installations to industrial customers and distance heating plants.

In order to control the fully-automated solid fuel boiler Osby PB2, Osby Parca has been using ABB's compact Freelance 800F control system for several years. This boiler, with output of 350 to 3000 kW is used to burn dry wood fuels such as pellets and briquettes. The control adjusts the combustion to the current load to ensure that there is a constant inlet temperature. Sensors and actuators regulate the draught in the firing plant, the movement of the grate and the fuel supply. Adjusting the draught in the firing plant controls the amount of air for the combustion process. This allows continuous control across the entire range of outputs. The combination of the boiler and the control system allowed Osby Parca to win several projects and it has equipped various power plants in Sweden.

The Osby P500 model is a solid-fuel boiler for burning dry wooden fuels such as pellets, briquettes, peat and wood chips. The product range comprises four boilers with output

of 100 - 1000 kW. In the past, Osby Parca used a PLC to control these boilers, as process control technology with comprehensive features was too expensive for the smaller models. In the majority of cases, the boilers were independent sub-sections of a total plant and as a result they were controlled as a "standalone solution". That is why many users often decided to use the lowest-priced hardware/software solution when selecting the automation systems to be used.

This clearly shows the advantages offered by the great scalability of the Freelance 800F system together with the new AC 700F controller. Osby Parca can now use the wide-ranging advantages offered by Freelance 800F at a price similar to PLC + SCADA systems when controlling the smaller boilers. Compared to PLC + SCADA, a process control system offers more functionality, for example automatically generated diagnostic information and alarms as well as easy and fast online optimizations of applications.

In addition, simplified remote diagnostics in central control rooms is possible, as the control technology automatically generates system alarms and system diagnostics, which are available using PC technology.

Osby Parca is very pleased: "The AC 700F Controller combines the functionality of a control system with the price level of a PLC with a visualization solution. The uniform tool for configuring the controller and the operator station with automatically generated faceplates (operator windows) saves time for engineering and commissioning. Time can also be saved in ongoing operation and for maintaining the application thanks to advanced diagnostics opportunities and improved alarm handling. This cuts installation costs and significantly increases the plant's economic efficiency."

Osby Parca is convinced of the opportunities offered by the Freelance 800F control system and in future it will fit even more boilers with AC 700F and AC 800F controllers.



# Project: Pneumatic conveyor system for aluminum oxide powder, Sasol, Brunsbüttel, Germany

## Industry: Chemicals

At Sasol in Brunsbüttel the AC 700F controller has been installed to control a pneumatic conveyor system for aluminum oxide powder. This system was controlled using a PLC in the past. Sasol is a convinced, long-standing user of the compact control system Freelance 800F and thus decided to use the AC 700F Controller when replacing the PLCs. Customer requirements were the transfer of the existing application into the new controller, the subsequent optimization of process control through the use of diagnostic features and short setup and installation times.

In addition, the system was to be configured by one of the customer's application engineers, who had never worked with the Freelance 800F system before. After a short training period and with ABB's support during the start-up phase, it was possible to successfully put the project in operation in the shortest timeframe. The easy-to-learn and intuitive configuration of Freelance 800F was the crucial factor for Sasol when they chose the control system.

Thanks to the compact footprint of the AC 700F controller, the old PLC control could be exchanged without having to modify the control cabinets - even the existing wiring in the control cabinet remained unchanged. This allowed considerable advantages to be gained in respect of operation and fault diagnostics but with minimal outlay. The main advantages of the compact Freelance 800F system compared to a PLC solution are the simple configuration, operating the plant from the control room and the possibility of remote access for maintenance work.

A touch screen operator station replaces the switches and lights at the control cabinet formerly used as operation elements. This makes it easier for plant operators to control the equipment locally and also allows all of the other systems connected to the process control system to be used.

At Sasol, other outdated control cabinets are to be modernized with the new AC 700F controller in the near future.



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