

Smart HVAC and Sanitary technology thanks to state-of-the-art bus technology at Sälipark in Olten (CH)

Saving - even before commissioning

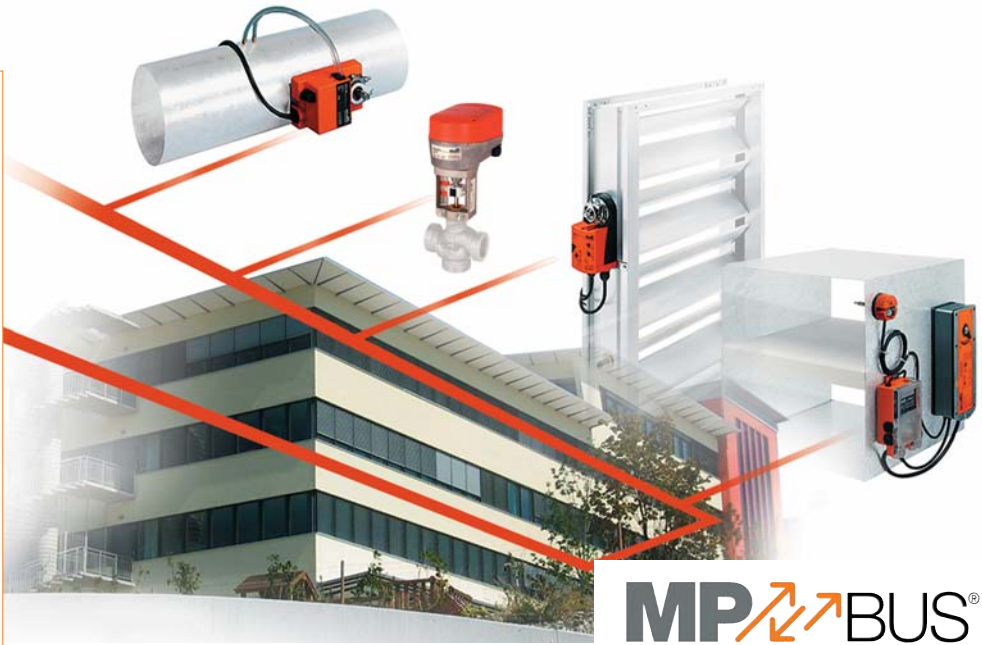


Fredi Kneubühler
Measurement and
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“The planning of the Sälipark energy concept started with the familiar wishes: great comfort, low energy use, economically and ecologically optimised, flexible and designed for different concepts of mall, shop, storage and office air conditioning. Relatively high investments in comparison to the attainable rental income were a logical consequence.”

The Belimo innovation of the MP bus technology for rotary actuators made it possible to achieve considerable savings, with costs, time expenditure and space requirements. In this way, the numbers of cables and terminals were reduced. The amazingly simple, reliable installation that is suitable for construction sites and (almost) without installation regulations brought enormous time savings, and installations and control cabinets (SGK) needed considerably less space.

The MP bus therefore solves an old problem without creating new needs - with the exception of the desire to use it more often.”



The Sälipark 2000 in Olten (CH), a multi-functional center, was opened in 2003. The commissioned planners worked hard to realise a modern yet economical building technology and automation. As a consequence, state-of-the-art bus technology was used to control the damper and valve actuators. That paid for itself even before commissioning.

The building automation concept was clear: During planning, attention was to be paid to comfort and energy efficiency as well as to minimizing the total costs. The air conditioning of the offices and shops takes place via a static base load heating and ventilation systems with variable amounts of air per shop or

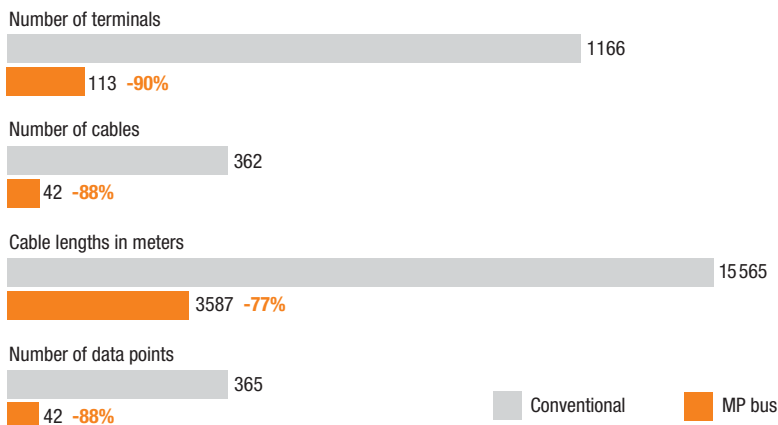
office floor. The amounts of air are adjusted by VAV controllers based on the room temperature. Heat is produced with two condensing gas boilers, cold with two directly cooled chilled water units.

Enormous savings potential: MP bus technology from Belimo

The commissioned measurement and control planner, Fredi Kneubühler from the company Minerplan, recognized the advantages of the new multi-point (MP) bus technology from Belimo: “We wanted to take complete advantage of the giant savings potential from reducing the installation - while simultaneously increasing the functionality.”

Until then, each actuator and each sensor had to be connected from the control cabinet with a separate cable, thus resulting in a star-shaped line topology. Thanks to the MP bus technology, it is now possible to connect up to eight actuators and one sensor at each one of the actuators (switching contact or analog sensor) – to a single cable. Digitally transferring the data of several addressable devices over one cable makes it possible. In Sälipark Olten, the MP-technology was used for damper actuators, VAV controllers and valves as well as for fire dampers and multi-sensors (see table on page 3).

The enormous advantages of bus communication are particularly evident in a building with large dimensions such as in Sälipark: The opposite chart shows the massive savings in cables and terminals in comparison to conventional technology.



Massive savings in Sälipark Olten thanks to MP bus technology

Flat cable, high rationalisation

In addition to the massive savings in installation materials, this also results in considerable rationalization in planning and installation - enabled by the special flat cable developed by Woertz (details on page 3).

The connection cables of the drives and sensors can be connected with special connectors that ensure reliable contact with the ribbon cable, without stripping or screw connection work having to be done. Thanks to the addressing of the MP components, these communicate reliably and bidirectionally with the control components. Fredi Kneubühler sees this as the future: "It is not for nothing that different leading DDC/PLC manufacturers have already introduced interfaces for the MP bus into the market."

More than just control: Building management

The building automation with DDC controllers controls all the HVAC and sanitary systems. However, it does more than that: Further tasks of the building management system include detection, processing and saving of fault messages as well as relevant energy consumption. In addition to the HVAC systems, the lighting of the common areas, the release times of the doors and elevators and the alarm and fault detection are detected and controlled via the same system. The system affects the electrical units via interfaces with higher-level commands such as group movement commands for blinds, time commands for electrical doors etc. The building automation with Pro-MoS NT as a building management system also allows a largely personnel-free operation, for example through the automatic release of the doors.

System integrator programs in a familiar environment

In Sälipark, DDC controllers (PCD2) from Saia Burgess AG with an MP bus interface are used. In the entire building, only six control cabinets were installed for the HVAC and two for the building control system. To the system integrator, the data points of the Belimo actuators and sensors connected to the MP bus appear the same as "normal" inputs and outputs on the engineering tool of the PCD2. This makes the system integrator's work considerably easier, since this person can create a building-specific application in the usual way.

The higher-level networking of the DDC controllers on the top network control level is done with the Saia@S Bus and via Ethernet. The systems can be operated with only two

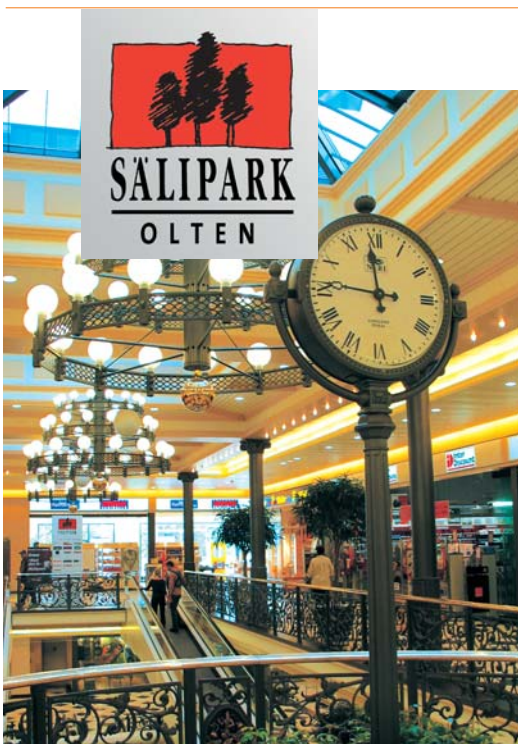


Programmable logic controller PLC of the PCD2 series with MP interface from SAIA-Burgess: building automation with the latest technology

PC's on site. An additional PC with limited rights is integrated for the ventilation systems of the leased technical college.

Remote maintenance up to the actuator and sensor level

The caretaker and system integrator can directly access the systems via a modem connection. Since the VAV-Compact controllers from Belimo, which control the VAV units, are directly integrated in the system in a bus-capable way via the MP bus, the system integrator can adjust the operating volume of the VAV units through remote control if needed - he or she is therefore spared a visit to the systems.

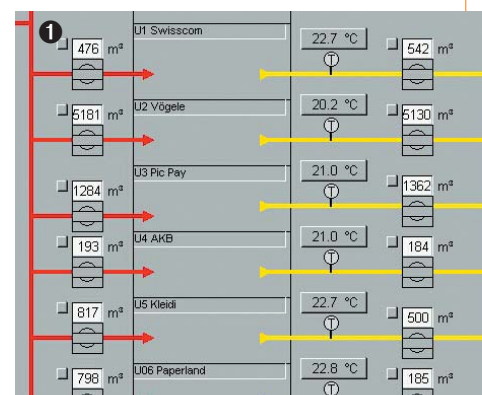


Sälipark Olten (CH) - A shopping and air conditioning experience

The building of Sälipark Olten was realised in only one and a half years after the building permit was issued. The result is a shopping center that supplements the offers of the existing Sälipark. A shopping and adventure place was deliberately created that stands out from surrounding retail shopping centers as a result of its extraordinary ambiance.

"Consumption - service - education - health" is the mixture. In addition to the 18 shops (from drugstore to discounter, from travel agency to hairdresser's), one also finds a medical center with a dialysis station and a clinic for eye and plastic surgery as well as classrooms of the Solothurn Nordwestschweiz college.

A very bright and safe parking garage receives the customers, who reach the elegant mall with comfortable escalators. A lot of visitors do not know this any more: Up until the last century, there was a foundry on these premises. All design elements were developed together with a foundry expert to connect the modern center with the past. This creates an aura of rustic luxury in the spacious mall.



The practical side

People involved in the project experienced many advantages with the MP bus:

- A significantly shorter commissioning time per data point
- No more mixing up the connection of the actuators in the control cabinets since they are automatically identified by software, i.e. via the MP bus address
- The same holds true for the sensors connected to the actuators, since a spatial relationship between actuator and sensor is clearly visible on the system
- As a result of the uniform connections of the bus users, the number of possible fault sources is reduced – regardless of the connected damper and valve actuators, VAV controllers and sensors
- A significant reduction in the time expended per actuator and sensor connection point when the multi-bus ribbon cable is used instead of conventional branch connectors
- Remote-control access of the integrator from his or her office to the system PC, for example to adjust Vmin. and Vmax. of the VAV units
- Simplified extension of the system: An electrician can, for example, install an additional sensor and connect it to the nearest MFT2 actuator, and the integrator can activate this from his or her office: this eliminates the cabling expense, among other things

Devices that are integrated via 42 MP bus lines at Sälipark Olten:

Device:	Number
Fire damper actuators	82
VAV controllers	74
Damper actuators	25
Valve actuators	51
MP multi-sensors	12
Passive and active sensors (connected via the actuators)	92
Total integrated MP devices	336

The bus future has begun

“The more intelligent bus technology becomes established with its potential for minimising costs while maximising functionality, the more frequently buildings can be built with a higher standard of equipment” Kneubühler sees for the future, “this is an advantage for users, who enjoy more comfort, and for builders and operators, who profit from more efficient maintenance.”

This requires all people involved to think beyond individual systems, however. When HVAC/building automation planners and system integrators, electrical planners and installers work together efficiently, a win/win situation is created for all those involved.

Source: Richard Staub, Elektrotechnik 11/03 www.bus-house.ch

Belimo MP bus technology at a glance

MP BUS

MP stands for **Multi Point**. The MP bus is the Belimo master/slave bus. Up to 8 slaves can be connected to a master unit. MFT2 damper actuators, MFT2 valve actuators and VAV-Compact controllers. Advantages include considerably reduced wiring expenses, a clearer arrangement, substantially higher functionality and cost savings as well. Up to eight MFT2 actuators can be controlled by an MP master via the MP bus. MP masters are PLC or DDC controllers with MP interface or Belimo “gateways” to fieldbus systems such as LonWorks or EIB/Konnex.

Sensor connection: One conventional sensor such as for example a temperature or moisture sensor or a switch can be connected per MFT2 actuator. The analog signals of the sensors are digitized via the MFT2 actuators and transferred to the MP master via the MP bus. In this way, conventional sensors can be made directly MP-, EIB/Konnex- or LonWorks-capable. The MP I/O module UST-3 makes it possible to directly connect additional sensors via the MP bus or to operate devices that require conventional control. (For details on MP bus technology, see www.belimo.ch)



Efficient installation: Ribbon cable

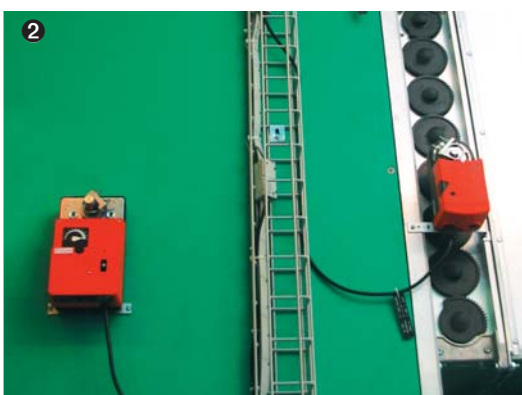
The wiring of an MP bus system does not require either special cables or terminating resistors. The multi-bus ribbon cable from Woertz is just the right thing for efficient installation, however. The connection between the Woertz ribbon cable and the round cable for MFT2 actuators, for which a patent application has been filed, allows an efficient, interference-free wiring. The preassembly can be done in the factory and saves time and money. The final assembly at the construction site is done with a simple click on any point of the ribbon cable.

MP bus line topologies

There are no limitations for the line topology. Star-shaped, ring-shaped, tree-shaped or mixed forms are permitted.

Key elements of the MP bus technology (from left to right):

- 1 Actual value displays of the air volumes for VAV controllers as well as the corresponding temperatures, shown in the building management system. Easily realizable through direct digital access to the VAV controllers and temperature sensors via MP bus
- 2 Air conditioning plant: damper actuators and sensors on the MP bus
- 3 4 VAV controllers, damper actuators, valve actuators and sensors on a common MP ribbon cable line





Key people for the MP bus installation in Sälipark Olten (CH), from left to right: Thomas Heini, System Integrator, Renergy; Markus Keel, Product Manager, Belimo; Fredi Kneubühler, Measurement and Control Planner, Minerplan



Roland Studer,
Director of Service
Real Estate,
Sälipark Olten

Three questions for Roland Studer:

To be honest, how did you react when you first heard about the concept of the MP bus technology for controlling the valve and damper actuators?

"Actually, I was a bit skeptical at first. The concept seemed to be almost too easy to be true. However, when I heard about the success with the five objects that had already been realized with the MP bus, I could not say anything more against it. On the contrary!"

Can you give us any concrete numbers on the effective savings as a result of the MP bus solution?

"Without divulging any company secrets, I can mention the following cost savings in comparison to a conventional installation: over CHF 11 000,00 for equipment, around CHF 60 000,00 for installations and another approx. CHF 5000,00 for commissioning. MP bus technology allows us to save 16% of the total sum of the measurement and control and electrical costs!"

Sälipark Olten has been in operation since March 26, 2003. How has the whole energy concept stood up, and how satisfied are you with the MP bus control of the rotary actuators?

"The specifications comprise a number of different concepts: individual air conditioning in the shops, single-room control in offices, ground water heating pump, ground water cooling and thermoactive building systems (component conditioning). The entire energy concept has optimally stood the test - naturally the MP bus technology as well. All the involved people, planners, integrators and Belimo deserve congratulations for this."

MFT2 actuators from Belimo with MP bus

Actuators with Multi-Functional Technology

At first glance, the MFT2 actuators do not differ much from conventional types: They are just as easy to install, wire up and operate. The main differences lie under the housing:

A digital control system with integral MP bus gives the actuators a communications capability together with a whole range of extra functions. MFT2 actuators allow a wide variety of system components such as air control dampers, VAV units, fire dampers, globe valves and sensors to be linked together at very low cost and to be economically integrated in the building and room automation.

Up to eight MFT2 actuators can be coupled together via the MP bus and connected to a DDC controller with MP bus interface (e.g. SAIA PCD2) or via a gateway to a LonWorks® or EIB/Konnex network (gateway for LonWorks = UK24LON, gateway for EIB/KNX = UK24EIB). One conventional

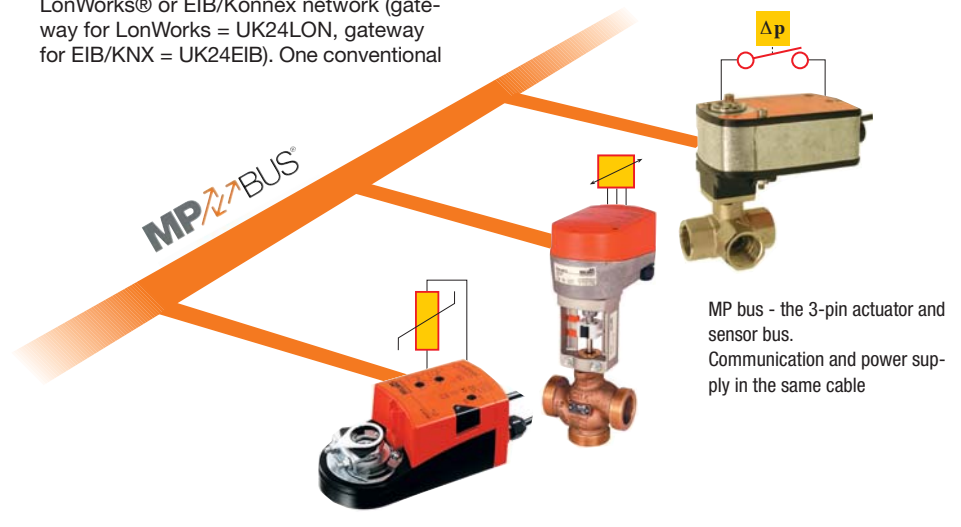
sensor such as e.g. a temperature or moisture sensor or a switch can be connected per MFT2 actuator. The MFT2 technology digitalizes the analog signals of the sensors and integrates them into the Belimo MP bus via the actuator cable.

The MFT2 actuators not only receive commands but also transmit detailed information, for example the actual damper position, the state of the actuators etc, to the top network control level.

To sum up: The MP bus technology enormously reduces the cabling effort and simultaneously increases the functionality.

The Belimo Group

Belimo is a worldwide leading supplier for innovative electrical actuator solutions in the field of heating, ventilation and air conditioning systems. Their headquarters are in Hinwil, Switzerland. The Group achieved a sales turnover of around CHF 240 million in fiscal year 2003 and employs a workforce of over 700. Belimo is represented in 60 countries worldwide. For further information on the company and its products, visit the website at: www.belimo.ch



For more detailed information, please contact your Belimo representative:

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