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GO!

Automation with LOGO!
and SIMATIC S7-1200

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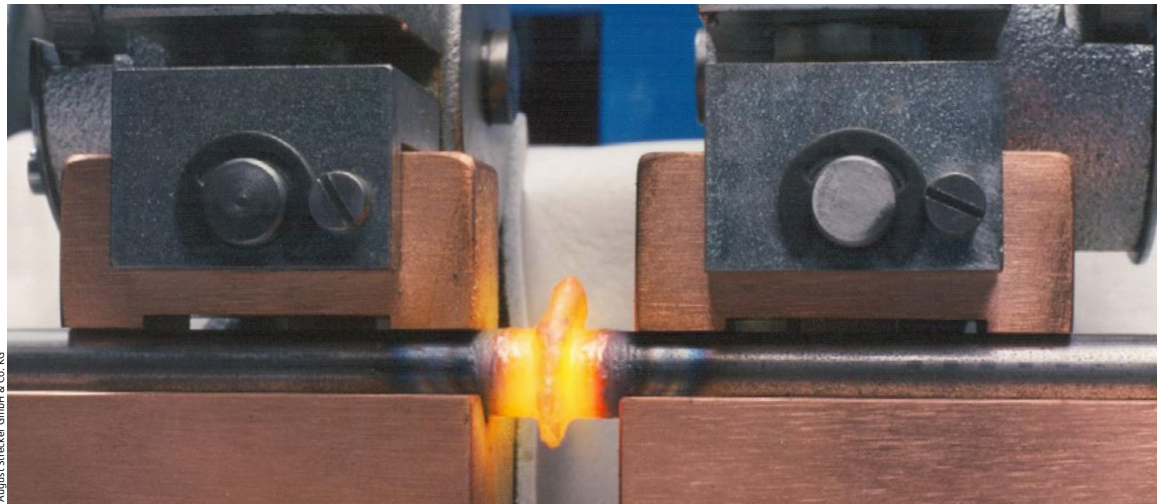
Happy Birthday, LOGO!

When LOGO! was first launched back in 1996, there was nothing comparable in the automation field. There was a world of difference between a control system featuring auxiliary relays, contactors, and time switches, and PLC automation. LOGO! set about closing the gap – as the prototype of a new device class. Logic operation instead of complex wiring was the watchword. The core element of this development was a software program that made it easy for users in industry and skilled trades to handle the new kinds of switching and control, combined with the reliability of the devices, led to adoption all over the world.

Electricians and engineers quickly recognized the potential of the logic modules and began using LOGO! to implement smart applications in single machines, plant installations, and entire buildings. Other vendors leaped on the universal microcontroller bandwagon too, however, and launched similar devices onto the market. But the classic original

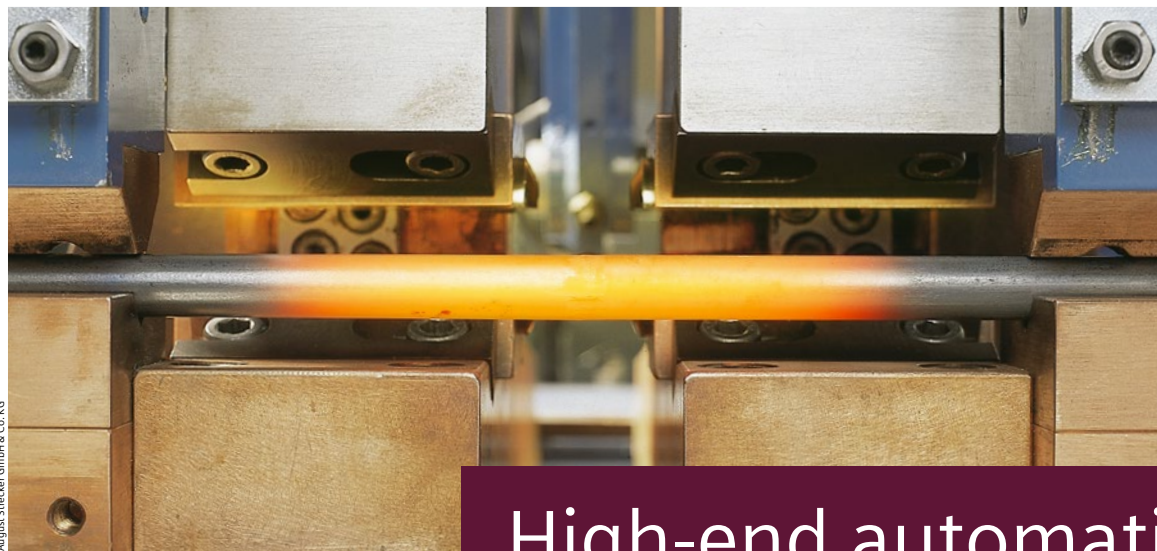
always retained a strong position and is now fit for the future too. Thanks to integrated interfaces and expansion options, what was once a stand-alone switching unit now “talks” to other automation systems, via Industrial Ethernet or KNX, and – now in its ninth generation – is keeping pace with the latest developments through state-of-the-art technologies such as WLAN, GPS, and SMS. In the following pages, users from the very beginnings as well as LOGO! newcomers present applications in a wide variety of fields, and our know-how tip demonstrates how a clear overview of signal routes can be retained even in complex programs.

The Simatic S7-1200 controller family has likewise been updated. Wherever the availability of a machine or plant is vital to cost-effective operation, the new Siplus CMS1200 condition monitoring system – for the first time integrated into the controller – permits targeted servicing and maintenance. It helps avoid unwanted stoppages and enables users to always stay one step ahead.



August Strecker GmbH & Co. KG

The company from Limburg, Germany, has been relying on Siemens logic modules for its butt-welding machines since 1996



August Strecker GmbH & Co. KG

High-end automation

LOGO!: Research and development is fundamental to the philosophy of August Strecker GmbH. Flexible control is vital in ensuring that production machinery operates efficiently. That is why the electric welding machine manufacturer has been relying on LOGO! for 20 years.

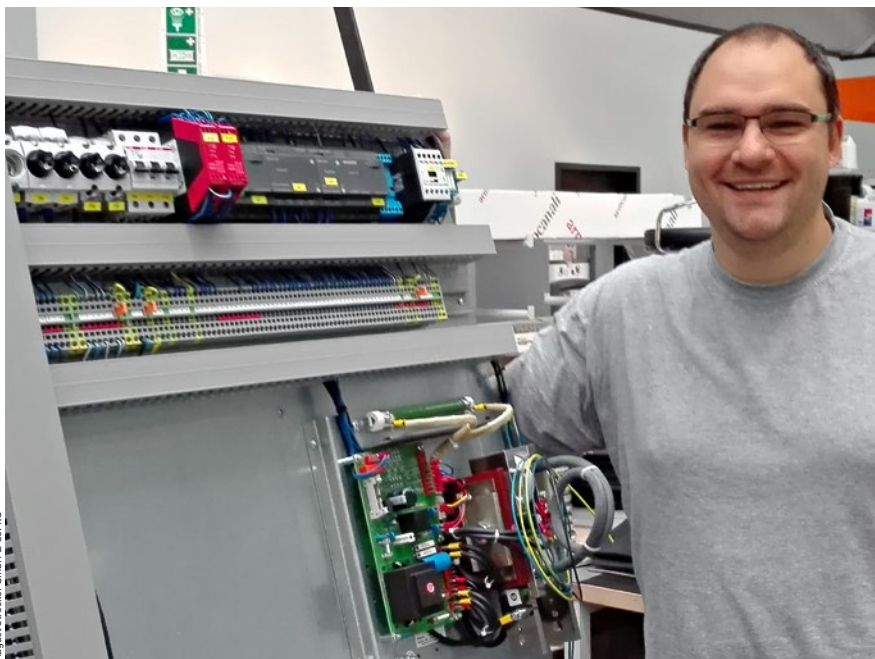
“My predecessor recognized the potential of LOGO! and used it to map frequently used relay control detail functions,” recalls Thorsten Ketterer of August Strecker GmbH & Co. KG. “That included various time functions, such as an on or off delay.” The company from Limburg, Germany, has been relying on Siemens logic modules for its butt-welding machines since the first version of LOGO! was launched back in 1996.

“To stay competitive, we have to respond rapidly to trends and developments,” explains Ketterer, who has been working in the company’s tech-

nical department since 2007. “That means we need flexible and efficient technology to keep continually advancing our machinery.” That is where LOGO! comes into play. Up until 1996, Strecker used a control system with contactor control. Applying the new technology saved lots of space, as the new logic controller is much smaller and more compact than the units previously used. More importantly, says Ketterer, “the advance represented a leap from connection-based programming to programmable logic control. That provided us with a great degree of flexibility.”

»The advance represented a leap from connection-based programming to programmable logic control. That provided us with a great degree of flexibility.«

Thorsten Ketterer, August Strecker GmbH & Co. KG



August Strecker GmbH & Co. KG

Thorsten Ketterer from the technical department of August Strecker GmbH

Improved operating safety

“What pushed us to switch more and more to LOGO! from 1996 onward was a new generation heading up the business,” Ketterer recounts. Since that time, the logic control has been the cornerstone of the company’s machine control systems. “We implement the complete machine sequence in it.” The operation of a cable welding machine, for example, can be precisely controlled just by using a foot switch. If the machine operator makes a mistake, the cycle is immediately aborted and must be restarted from the beginning.

LOGO! controls the pneumatic fixing of the wire ends into the left and right side clamps prior to welding. When the operator presses the foot switch, the cable end is fed through to the

stop limit. “The foot switch has to be pressed again within three seconds to clamp the cable ends firmly in place,” Ketterer explains. Then the welding operation starts. A potentiometer transmits the programmed welding time to the analog input of the LOGO! controller. When the time has elapsed, the power is automatically shut off. During the cooling phase – likewise signaled via the potentiometer – the compression cylinder is depressurized. The clamps open, and the compression mechanism returns to its home position – again time-controlled by LOGO! The machine is then ready for the next welding operation. “This configuration improves operating safety, because it prevents unintentional closing of the clamps,” says Ketterer. “The preselected time can be adapted to prevailing conditions at any time.”

Innovations and developments

In 2008 August Strecker GmbH made another major leap forward. “After the next generation had taken over the business, we began expanding into global markets,” says Ketterer. “Thanks to LOGO! 6.” That new generation played a major role in the development. “We pushed ahead with innovations and developments all across our machinery portfolio.” For the first time, LOGO! served as a standalone control, mapping the complete machine sequence.

“The revolution in LOGO! 6 was the external display, which is easy to connect by plug and play,” Ketterer reports. It has made the machines much more user-friendly to operate. The Ethernet port in LOGO! 8 will in the future enable more and more machines to be equipped with an operator control panel. ■

For more information on
“20 years of LOGO!”
watch our video at:
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August Strecker GmbH & Co. KG

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Design engineer Bernd Hollwedel, of POLO Filter-Technik Bremen GmbH in northern Germany, is delighted by LOGO!



POLO Filter-Technik Bremen GmbH

“An outstanding technical development period”

LOGO!: In machinery manufacturing, filter systems are a key means of complying with environmental regulations. These systems need high-performance control systems in order to operate efficiently, which is why POLO Filter-Technik Bremen GmbH from northern Germany has been relying on the logic modules from Siemens for almost 20 years.

»A key new benefit was global access via web server. As a result, we are able to deploy our service staff more efficiently, meaning they visit customers at exactly the right time and only when needed.«

Bernd Hollwedel, Design Engineer,
POLO Filter-Technik Bremen GmbH



POLO Filter-Technik Bremen GmbH

LOGO! controls the pre- and post-running of the flush pump to clean the endless tape of the POLO filters, as well as the one-time actuation of the filter tape and flush pump

“LOGO! now permits distributed configuration of control components from the central cooling lubricant supply system,” reports Bernd Hollwedel of POLO Filter-Technik Bremen GmbH, which produces filters and filter systems for cooling lubricants such as oils, water, emulsions, and other liquid media. The company has been using the compact Siemens control system since 1997 – just one year after the launch of the first generation of the logic module.

A completely new control system

Shortly after the company began using the logic module, POLO design engineer Benno Lucka developed a completely new control system based on the first LOGO! 230RC model. The logic module proved to be the perfect solution for the continuous filters made by the specialist in cooling systems for machine tools, primarily to handle the complex timing control of the system. LOGO! handled the clock generator functions for the fine-holed endless tape, which had to be moved both based on the fill level of the filter chamber and independently every half-hour. In parallel, the logic module controlled the pre- and post-running of the flush pump to clean the endless tape. It also controlled the one-time actuation of the filter tape and flush pump at the end of each shift. During plant shutdown times, LOGO! moved the conveyor chain for 30 minutes every four hours.

This solution represented a major leap forward compared to the previously standard approach featuring three time relays, two clock generators, a time switch, and multiple auxiliary contactors. Thanks to the interchangeability of the program modules, the new control system was not only much more flexible but also much more compact and less expensive.

Updated states and values at all times

Another major step for POLO came in 2004 with the launch of the sixth-generation logic module, LOGO! 0BA5. “It was then possible to implement twice as many functions in somewhat smaller cabinets,” recalls Hollwedel, who has been a design engineer at POLO since late 2007. Only the most important functions then had to be wired into the cabinet. “One of the biggest innovations was that the user saw all messages in plain text and immediately knew what was going on.”

But the greatest innovation of all came in 2014 with the launch of LOGO! 8. Hollwedel says: “A key new benefit was global access via web server.” This means both POLO and its customers can monitor the complete systems from wherever they may be and identify where and when maintenance procedures are required. “As a result, we are able to deploy our service staff more efficiently, meaning they visit customers at exactly the right time and only when needed,” Hollwedel concludes.

The web server allows different users – engineers, production planners, maintenance personnel, and utility companies – to access updated system states and values at all times.

Less wiring

In addition, connectivity via new or preinstalled networks means much less cost and effort are involved in installing wiring between single controllers and a central system control. The island-style single controllers also reduce the amount of space needed for the main central system control.

“It’s been an outstanding technical development period,” maintains Hollwedel. “We look forward to the next 20 years with LOGO!” ■

**For more information on
“20 years of LOGO!”
watch our video at:
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POLO Filter-Technik Bremen GmbH

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Adventurebox Karlsruhe / Ulli Decker

A new kind of adventure

LOGO!: Visitors to Adventurebox Karlsruhe in southern Germany can take on assignments in the style of Indiana Jones or James Bond without risking life and limb. And without noticing that LOGO! 8 is a key component in delivering their adventure fun.



Adventurebox Karlsruhe in Germany combines movie-style storytelling and matching decor, enhanced by outdoor missions, to create a fun and exciting leisure experience. LOGO! makes the games technically possible. All the rooms are fully automated by a total of eight logic modules

The six players on the “Project Vakium” mission are watching a short film briefing them on their challenge when an alarm sounds from the room next door – triggered by a LOGO! logic module. The team members must then grab their equipment boxes and set off on their mission: a mad scientist has found a dangerous, unstable element, and the group has one hour to find it and secure it. “The first thing the players have to do is disable the alarm,” explains the center’s general manager Christoph Krummel. “They do that using cables with crocodile clips on the ends from their equipment box to jumper broken connections on a total of three alarm boxes. The logic module then cuts the alarm, and the players can move on to their next task.”

In addition to “Project Vakium,” Adventurebox Karlsruhe features two other missions: one involving the search for a “Fifth Element” and the other – titled “Impossible” – relating to stolen artworks. The principle underlying these so-called live escape games, which have been growing in popularity in a number of cities over the last few years, is a collaborative one: a group of players is locked in a room and has one hour to complete a number of tasks and solve

a series of interactive puzzles together in order to get out. Adventurebox Karlsruhe enriches the experience with movie-style storytelling and matching decor, enhanced by outdoor missions around downtown Karlsruhe.

Learning by doing

“My business partner, Sebastian Bayer, had seen something similar while on vacation and told me about it,” Krummel recalls. “We were already running a climbing center, so we were familiar with the leisure industry. It’s a sector we enjoy working in, so we quickly decided to launch a live escape game here in Karlsruhe.”

But the first question was how to make the games work technically. A friend of the pair who was training to become an electrical engineer told them about LOGO! during one of their weekly meet-ups at a local bar. “I do have some technical skills, and I did once start a course in engineering, but it’s not something I pursued,” the 31-year-old entrepreneur explains. “So a key factor in my decision was that – after a brief introduction to the basic functionality – the LOGO! software’s graphical user interface and simulation options enabled me to learn by doing. >



Adventurebox Karlsruhe / Uli Decker

»We have not had a single technical problem relating to LOGO!«

Christoph Krummel,
General Manager, Adventurebox Karlsruhe

I have to think up front about where I'm going to lay the cables and what sensors I'm going to use, but after that I can use LOGO! Soft Comfort to configure when and for how long I want a sensor to trip, and I don't need any special programming skills to do it." Other key factors were the easy modular expandability of the control system, the wide-ranging application options it offered, and its use of industry standards: "Ultimately, we made our set-up large-scale, expandable, and future-proof."

After Krummel performed initial testing with the LOGO! 0BA7 series in his garage at home, the new version of LOGO! 8 came out at just the right time: "It allowed me to interconnect up to three controllers per room via the integrated Ethernet port in master/slave mode using network cables, linking each to a dedicated external text display in our control center – without having to worry about the maximum distance from the LOGO! as was previously the case." The company usually employs casual student workers in the control center to monitor the gaming areas via video cameras. In addition, the LOGO! TDE enables them to identify which sensor was last tripped in which room, for example, based on text messages that are easily understood even by nontechnical staff. "That means they always know which task each group is about to undertake, and they can provide assistance by walkie-talkie if necessary," explains Krummel.

Rooms fully automated

All the rooms are fully automated by a total of eight LOGO! 8 12/24 RCE logic modules, each with four DM 8 12/24R expansion modules on digital sensors – from laser light barriers, to rain sensors and magnetic valves, to window contacts. Two LOGO AM2 RTD expan-

sion modules are used to connect PT100/PT1000 temperature sensors. The "Fifth Element" mission, for example, is initially all about the four elements of earth, water, air, and fire. The players must place a heat pad on an aluminum surface inside a shaft, beneath which the temperature sensor is located. "When a certain temperature is reached, the LOGO! opens a magnetic lock," says Krummel, "and the players are presented with the fire element in the form of a dropping wooden stake with a fire symbol on it."

Untiringly creative, Krummel is continually discovering new ideas based on LOGO! functions. For a player-group ranking system, for example, he is looking to make use of the LOGO! 8 data logging and time switch functionality. And soon the center might also be implementing remote communications via its own mobile network. The Karlsruhe center is currently planning a larger installation. "A camera surveillance system covering 20 or even 30 rooms would be too costly, but mobile staff could be alerted via SMS text message if a sensor is not tripping or is faulty," says Krummel. But he also does not rule out the possibility that a Simatic S7-1200 controller might prove advantageous for such a major project.

"LOGO! is the ideal interface between hobby and industry; it's the perfect niche product for us," he concludes. "While there are cheaper microcontrollers, the LOGO! logic module is capable of much more and offers a longer service life. Since opening in July 2015, we have not had a single technical problem relating to LOGO!" ■

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Easy signal tracking with LOGO! 8

In testing large programs, a problem frequently encountered is: Where are the signals coming from? And where are they going? LOGO! Soft Comfort provides an improved overview in a variety of ways.

The following briefly describes how LOGO! 8 can be used to track incoming and outgoing signals. Thanks to the intuitive user interface, they can be clearly depicted graphically and assigned comments.



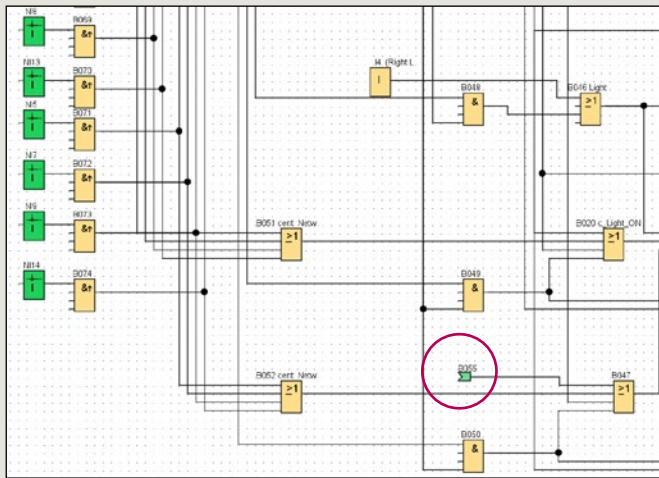


Figure 1

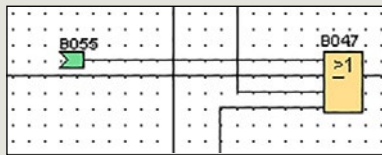


Figure 2

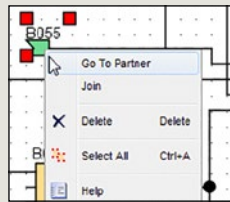


Figure 3

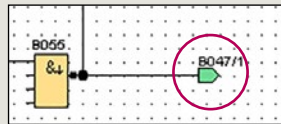


Figure 4



Figure 5



Figure 6

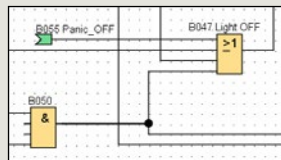


Figure 7

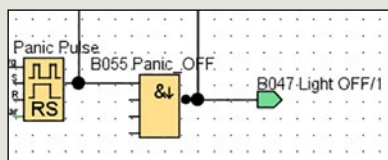


Figure 8

Let's first take a look at the broken connection before block B047 (Figure 1).

The signal comes from block B056 on the same page, otherwise the page would also be indicated in the identifier – for example, 5/B055 if the block were on page 5 of the diagram. But what kind of signal is it?

If you right-click on the icon B055, a window will appear. Choose "Go To Partner" ... (Figures 2 and 3)

... and the software will automatically take you to the source of the signal (Figure 4). Once there, you need to get oriented and recognize the signal's function.

There is an easy way to get a quicker overview: give the function blocks at the connections in question a name in the block properties (Figures 5 and 6).

It then looks like this (Figures 7 and 8).

You immediately get an indication of what the signal means – provided you've assigned a relevant name.

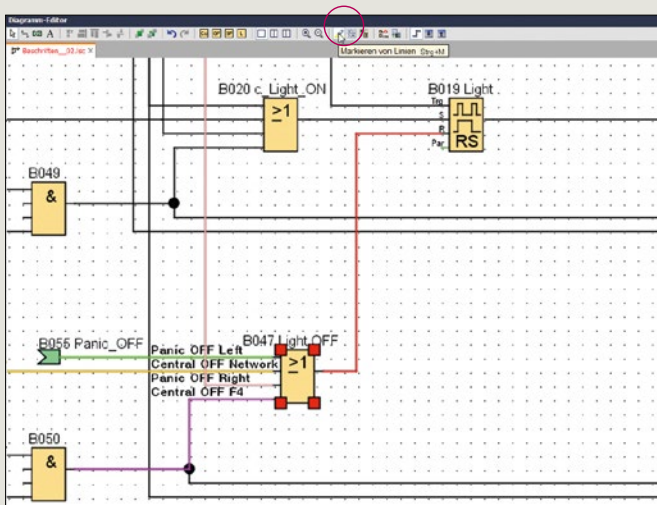


Figure 9

For easy signal tracking over longer distances, you can color the connecting lines in the program. Click on “Highlight the line symbol” to do so.

Selected lines will then be shown in color, and you can also track them across multiple pages.

When you select a function block, all the connections to it are displayed in different colors (Figure 9).

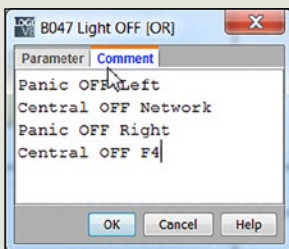


Figure 10

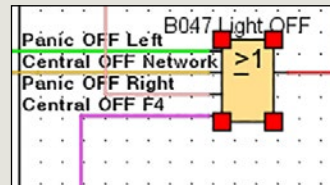


Figure 11

You can also easily label the connections to a function block. Again, there are different ways of doing it. I personally use the comments field in the block properties (Figure 10).

I then move the comment in front of the block and adjust the type size so that the label fits precisely between the incoming lines.

So, without any great effort, I always have the information in front of the block, even if I have to move it (Figure 11).

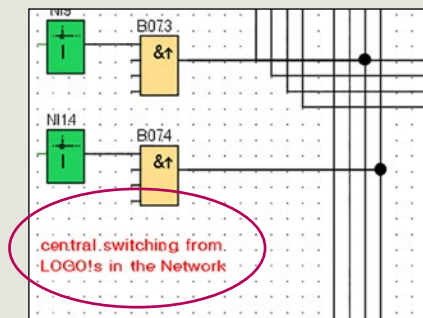


Figure 12

If you want to add general explanatory notes, the best way to do so is with a text block (Figure 12). You can adjust the type size, font, and color in virtually any way you want.

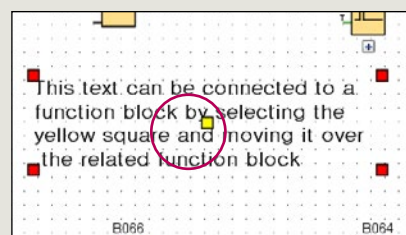


Figure 13

You can also link a text block to a function block or connection symbol. To do so, move the yellow square over the related block. It will then also be moved around the diagram with the symbol (Figure 13).



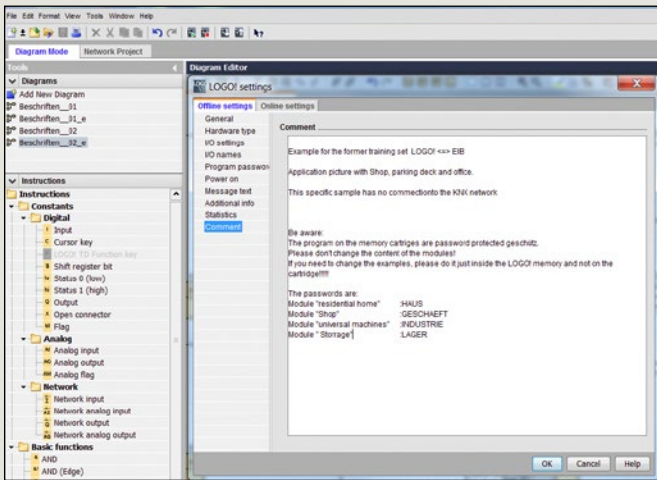


Figure 14

By choosing "File => Properties => Comment" from the menu, you can also add more details to the general function description of the program and, for example, provide a service technician with instructions for servicing (Figure 14).

That is also very helpful when you need to modify a complex program after a lengthy period of time.

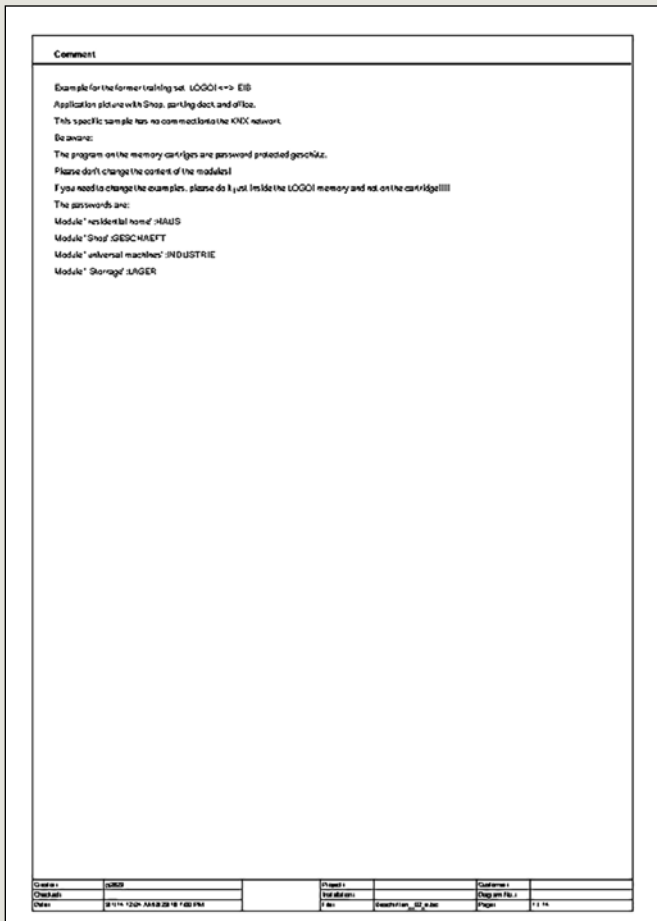


Figure 15

When you print the project out, this comment will be on a separate page, as a kind of cover sheet (Figure 15).

This gives you a very simple way to better document a program and make your life easier.



Ch. Heidemans

Old and new cleverly combined

The location within a water conservation area necessitates special monitoring of this pumping station in Wismar

Simatic S7-1200: The water industry often uses telecontrol applications for process automation. This requires special communications protocols as well as hardware components and transmission networks. In Wismar, Germany, a new Simatic S7-1200 controller generation with a CP 1243-8 IRC communications processor has been seamlessly integrated into the existing telecontrol system.

The municipal utility of Wismar on the Baltic Sea, EVB, also handles the town's sewage. EVB operates a treatment plant and numerous external plants as well as managing more than 300 kilometers of sewer line, with some 40 connected pumping stations. Of those, six are connected by

Siemens telecontrol systems to the treatment plant's process control system for centralized monitoring purposes. They also transmit malfunction alerts and operational data. One of the pumping stations is located within a water conservation area. Any overflow of the sewage shaft would be

>

particularly critical there, so every malfunction alert must be investigated immediately. In its request for tender to upgrade the station's aged electrical systems, EVB also stipulated the use of state-of-the-art control technology.

Upgrade of a tried-and-tested system

EVB awarded the contract to Actemium H&F GmbH, based in Kavelstorf. The contractor has a long-standing business relationship with EVB, so its engineers are very familiar with the automation and control systems in Wismar. The telecontrol technology that connects the other pumping stations to the control system had proven itself over many years. Simatic S7-300 controllers with corresponding communication modules in the substations communicate using the Sinaut ST7 protocol with a Simatic S7-400 controller at the control center. For data transfer, EVB employs conventional dial-up networks as well as linking over the Internet using the GPRS (General Packet Radio Service) mobile communications standard.

A state-of-the-art Simatic S7-1200 controller in conjunction with a Simatic touch panel handles the control and local operation of the pumping station. When the new generation of controllers was launched, Siemens initially opted to use the internationally standardized IEC 60870-5-104 transfer protocol. The widespread use of Sinaut ST7 and the resultant need for customers to protect their investments led Siemens to develop the CP 1243-8 IRC (Industrial Remote Communication) communications processor, which enables telecontrol applications to be implemented based on the Sinaut ST7 protocol, linking the Simatic S7-1200 controllers as low-cost remote substations to an ST7 control station. For these (telecontrol) connections, external industrial routers can be connected to the communications processor's Industrial Ethernet port, and plug-in expansion modules can be used. To enhance system avail-



The sewage collected in the shaft is safely transported to the central treatment plant by two redundant pumps. Automation systems from Siemens transmit operational data and malfunction alerts

»Now we get differentiated malfunction alerts and know exactly what's wrong. We can then take action in line with the information received.«

Uwe Albrecht, Head of Instrumentation and Control and Automation, EVB

ability, multichannel redundancy and alert functions (such as by e-mail) are provided. The integrated firewall (stateful inspection) and VPN (virtual private network) support with IPsec ensure data security and access protection.

Pioneering work makes it all possible
Actemium H&F's specialists engineered both the controller and the panel using the TIA Portal engineering framework, where they configured the hardware and the data points. The project team configured the ST7 connection using the Sinaut engineering software. Relevant control data can be easily selected in Step 7 and assigned transfer parameters via a user-friendly menu. The connection-specific Sinaut parameters are then sent to TIA Portal by way of a transfer file in the form of system data blocks (.sdb files).

The communication between the substation and the Sinaut control center takes place via IP-based Industrial Ethernet. Because the transfer processes use the mobile communications network in combination with the Internet, Actemium H&F

employed Scalance devices from Siemens to achieve the necessary data security. The Scalance M874-2 router, for example, features security functions such as IPsec (VPN) and a dedicated firewall. The connection via a VPN ensures that only authenticated network stations can communicate with each other. Data access is protected against hacking and attempted manipulation by means of secure encryption and verification of data integrity.

More transparency – fewer service calls

After a four-month planning and development phase, the modernized pumping station was connected to the control system. The previously used Telenot box, which reported all fault states as nonspecific malfunctions, was decommissioned. Uwe Albrecht, EVB's head of instrumentation and control and automation, is delighted with the new system: "Previously, a message sent through the old system simply meant that something was wrong somewhere. So a service technician had to go to the station and see what had happened. Now we get differentiated malfunction alerts

»We have ensured that our customer now receives operational data and analog values cyclically from the pumping station – fill levels, currents, pump running times, and so forth – directly at the control center.«

Dr. Ronald Scheel,
Head of Automation Software,
Actemium H&F

and know exactly what's wrong. We can then take action in line with the information received."

In addition to malfunction alerts, all relevant operational data are also visualized and archived on the server. The fully automated data time-stamping even in the Simatic S7-1200 controller ensures correct transfer of the archive entries. "We have ensured that our customer now receives operational data and analog values cyclically from the pumping station – fill levels, currents, pump running times, and so forth – directly at the control center," reports Dr. Ronald Scheel, head of automation software at Actemium H&F. "We take immediate action in response to malfunction alerts from the minimum and maximum monitors and the dry-running protection system." Albrecht adds: "The normal operational data, such as the pump currents, are also of enormous importance to us, because based on them we can see the status of the pumps and plan appropriate maintenance procedures."

The EVB team members are highly satisfied with the Siemens products used in Wismar. The Simatic S7-1200 controller in combination with the CP 1243-8 IRC communications processor allowed them to retain the existing Sinaut system. In addition to protecting the company's investment, data collection is also improved: instead of a nonspecific malfunction report, the pumping station in the water conservation area now sends differentiated malfunction alerts. This enhances operational safety as well as reducing service labor and travel costs. ■

Note on industrial security:

Appropriate security measures (e.g., network segmentation) must be taken to ensure secure operation of the system. More information about industrial security can be found on the Internet at siemens.com/industrialsecurity.



A comprehensive automation solution to help protect investments: the Simatic S7-1200 controller was seamlessly integrated into the existing telecontrol system via the CP 1243-8 IRC communications processor (far left of photo)

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A stable boy called Simatic

Simatic S7-1200: Villiger Technik GmbH, based in Niederrohrdorf in the Swiss canton of Aargau, manufactures extractors that remove manure from livestock sheds and transport it through a sophisticated suction pipe system to a collection point. The company recently carried out the largest project of this kind in South Korea, for a luxury stud farm near Seoul housing more than 100 racehorses.

CEO Bruno Villiger was astonished when he got the call from South Korea, asking him to install a manure removal system at a new luxury stud farm. Villiger is an expert in such systems, having installed around 50 of them in Switzerland and elsewhere in Europe. Now his reputation had spread through the World Wide Web to the Far East. Villiger initially had doubts. He thought the project was too big and much too far away. But then he was thrilled by the challenge. He arranged for the plans to be sent over and set about devising a solution. This is how the system works: Each horse stall has an extractor station in the corner. The extractor station is a hole in the floor with a cover over it. A pipe runs from the extractor station to the manure collection point. When mucking out, the employees open the cover in the floor and shovel the manure toward the extractor station. The system's strong suction power immediately sucks the manure into the piping. A turbine is used to generate a vacuum that draws the horse manure through the underground pipe to the

Shiny bright corridors, thanks to Simatic S7-1200. A luxury stud farm near Seoul uses an extractor system to suction manure directly out of the horse stalls



collection point, from where it can be transported away. An automatic rake spreads the manure evenly until the collecting tank is full. The challenge posed by the installation in South Korea was the scale of the site. The difficulty lay in maintaining the high suction power over the long distances of up to 200 m through a pipeline system more than 600 m in overall length.

Intelligent regulator system

For this extensive manure removal system, a new turbine with exceptionally high suction power was specially developed. Villiger also installed a regulator system that adapts the vacuum as required, depending on how far away a stall is or how much manure needs to be transported. When all the covers are closed and there is nothing in the pipes, the motors are shut down. One advantage of this is that the horses are not alarmed when the piping system cover inside the box is opened. The built-in sensors also detect whether a cover is still open or whether a blockage might

be forming in a pipe. If a blockage is impending, the suction is automatically increased to prevent it.

Technology working together

The four specially developed turbines that deliver the suction power are controlled by four Simatic S7-1200 programmable logic controllers. Each station in the system is driven by Simogear gear motors with Sinamics G120 frequency inverters. This combination can be used for any conveying challenge and also offers easy installation, fast start-up, and high levels of user-friendliness. The compact Simotics 1LE low-voltage motors feature an optimum design, which results in minimal rotor losses and excellent starting and switching response. The complete system can be monitored and operated via a KPT400 Basic Panel. The system can also be serviced remotely – a practical benefit that means the team in Niederrohrdorf is able to ensure smooth running in Korea. “I use Siemens products because I am impressed by their quality, and the components work smoothly together. For this project in South Korea, the international availability of service and parts is, of course, another key benefit,” says Villiger. “Siemens also provides us with outstanding after-sales service. They answer queries quickly and professionally, and solutions are devised jointly.”

South Korean precision

The Korean customer could not wait to get started once he had seen the plans. “He wanted me to travel to Seoul straight away,” Villiger recalls. “The earliest I could go was in two weeks’ time, but that was much too late for him.” After some debate, Villiger’s son – a software developer responsible for programming the systems, among other roles within the business – flew out. Shortly thereafter, a container arrived from South Korea to ship the approximately 600 m of piping and the extractors. Everything was planned in full in Switzerland, assembled, welded together, and chamfered according to precise specifications. The complete system was installed and programmed in South Korea. Bruno Villiger was impressed by the professional precision and speed with which the installation work was carried out on-site. When he and his son arrived to lay the piping system, everything had already been measured in detail, marked out, and excavated. On the construction site as in the stud farm generally, only the best of the best was good enough. The stall floors shine in elegant white; the straw and sand – like the horses themselves – originate from Europe. ■

➤ [siemens.com/s7-1200](https://www.siemens.com/s7-1200)

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The system measures a range of variables at defined points

Equipment in top condition

Simatic S7-1200: With the Siplus CMS1200 condition monitoring system forming part of the Simatic S7-1200 automation system, the monitoring of critical mechanical components is now for the first time integrated directly into a Simatic controller.

This solution provides a direct view of the current status of equipment such as fans in a paint shop or pumps in a chemical plant. In the event of any irregularities, detailed information, such as the trend in a measured variable over time, provides an estimate of how long safe operation can be maintained and enables the correct decisions to be made quickly. Any irregularities in a plant can also be cross-checked directly against the condition of the surrounding components – for example, to see whether a rise in temperature indicates that a bearing is running hot.

The new solution is a major step toward the digital factory, which will in the future connect all the links along the value chain – machines, products, and people. Mechanical

equipment condition data have now for the first time been integrated directly into this data stream via a controller. If a component shows signs of fatigue, for example, the materials management system can automatically check whether there is a spare in stock. The continuously collected data can also be exported to a centralized platform such as Sinalytics, the technology platform on which all Siemens digital services are bundled.

Predictive maintenance instead of fixed intervals

The CMS1200 condition monitoring system records vibration and speed at defined points by way of the SM 1281 module. Up to 28 vibration sensors per S7-1200 CPU can be connected, enabling multiple drivetrains to be moni-

tored. Mathematical analyses process the data so that any malfunction – such as an imbalance, bearing damage, resonance, or misalignment – is detected as soon as it occurs. These analyses, and the trend plots, are an integrated part of the SM 1281. No separate analytical software is required.

The system monitors components whose failure might result in the shutdown of a machine. These components include turbines in conventional and wind power plants as well as motors, pumps, and fans in industrial machinery. Rather than checking at fixed intervals, the system can detect incorrect loading or material fatigue of critical components at an early stage and estimate its ongoing progression, allowing the operator to specify the best time to carry out maintenance.

Industry is increasingly turning to condition monitoring in order to avoid unexpected shutdowns and reduce maintenance costs. The technology offers a further benefit in the course of digitalization: the data collected can be linked to other data along the process chain and evaluated in a wide variety of ways, enabling optimization of the plant or production process. Whereas condition monitoring systems were previously isolated maintenance units, their integration into Simatic S7-1200 allows condition data to be easily linked to production or logistics data.

Interface to centralized data services

The Siplus CMS1200 is designed so that external experts can be consulted as and when required. On command, the system will record raw data from individual sensors for a specific period and transfer the data to the experts via FTP (File Transfer Protocol) for further analysis. Routine condition data can also be transmitted over the Internet from the controller or directly from the CMS1200 to a centralized platform. This means companies can engage service providers to carry out intelligent maintenance of their machinery, for example. This data export also offers the possibility to leverage a much larger data resource: using smart data technologies, experts are able to identify patterns and correlations in the overall data population that can provide valuable information to enhance the productivity of individual machines. ■

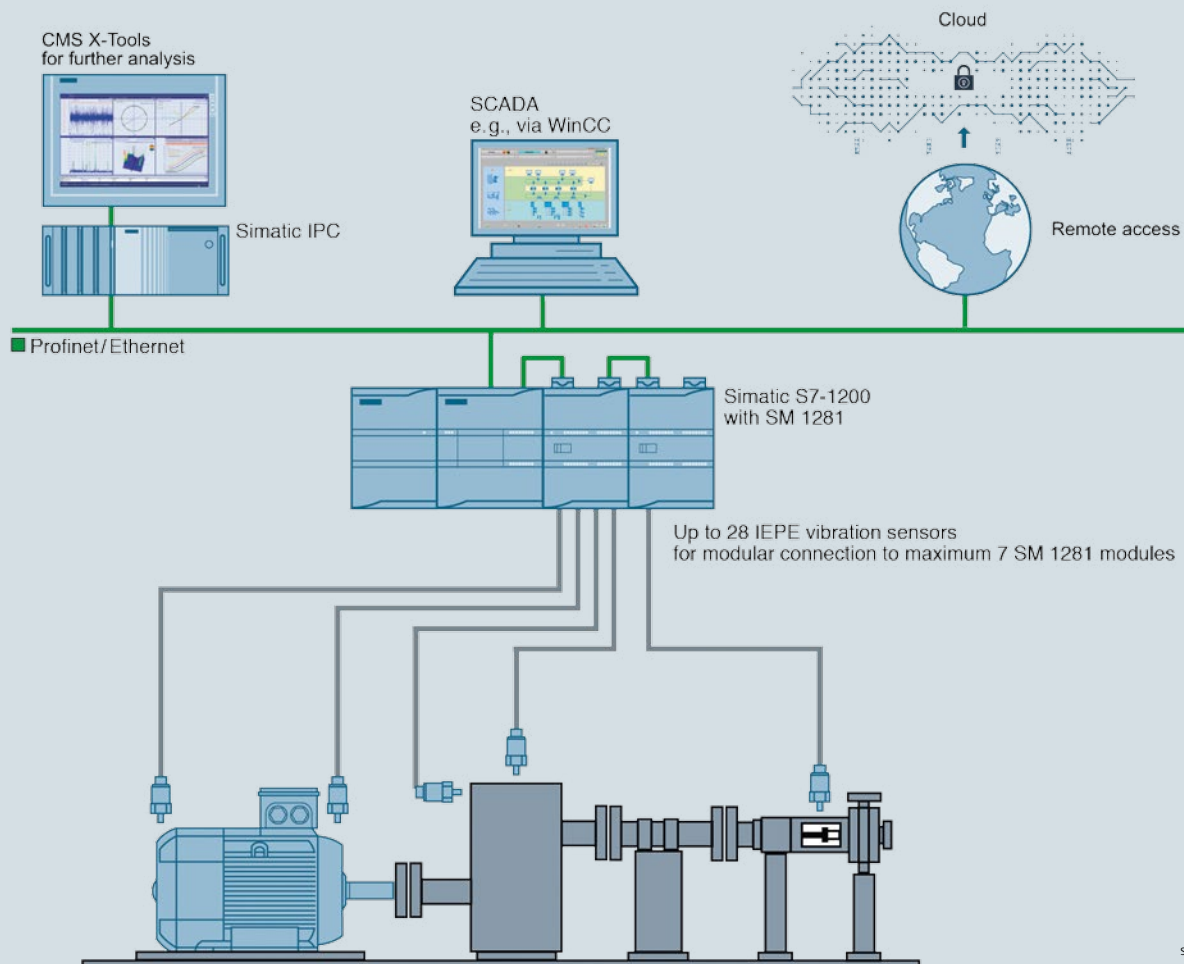
Note on industrial security:

Appropriate security measures (e.g., network segmentation) must be taken to ensure secure operation of the system. More information about industrial security can be found on the Internet at siemens.com/industrialsecurity.

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Sample plant configuration with Siplus CMS1200



LOGO!

Flexible and user-friendly

Version 8 of LOGO!, the intelligent logic module for small-scale automation projects, offers lots of new features. As one example, the microcontroller can now also be used outside at temperatures below 0°C and down to -20°C. As every LOGO! 8 base unit incorporates the Modbus TCP/IP communications protocol, the unit can now be integrated even more flexibly into existing infrastructure. Additionally, with appropriate configuration/activation the times of all LOGO! and standard NTP devices can be automatically synchronized, with LOGO! capable of acting as both client and server. With the LOGO! Access Tool, process values can now be exported directly to an Excel worksheet or saved to a PC log file during live operation.

The new LOGO! Soft Comfort V8.1 software program, as previously, provides users with easy operation in stand-alone mode, simple configuration in network mode, and problem-free migration of programs from predecessor versions. Additionally, three programs can be displayed adjacent to each other, with signals being dragged and dropped from one program to another. Matching the new hardware, LOGO! Soft Comfort V8.1 supports Modbus TCP/IP connections in graph and network mode, as well as simple configuration of date and time synchronization via NTP. ■

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NEW FEATURES

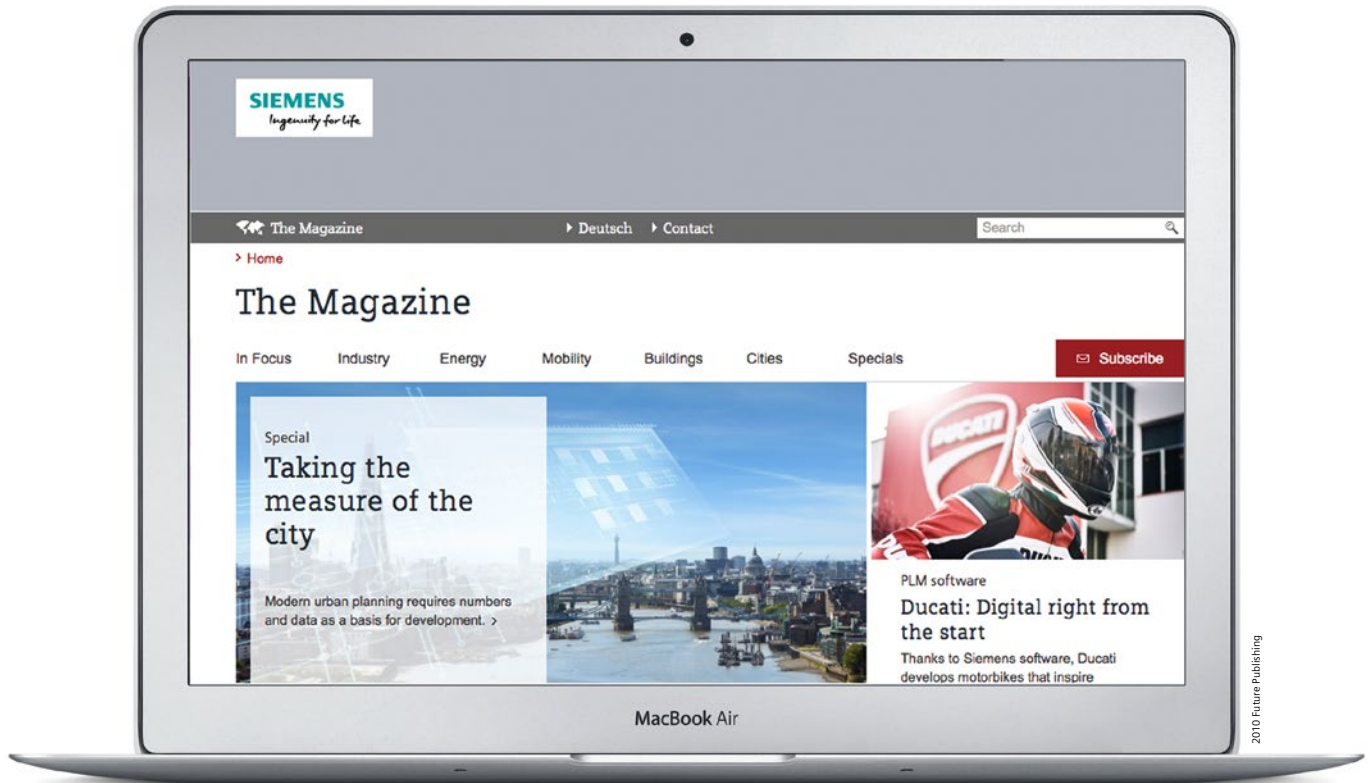
- Expanded temperature range of -20°C to +55°C with no condensation
- Integrated Modbus TCP/IP communications with LOGO! as client or server
- Automatic date and time synchronization via NTP
- LOGO! Soft Comfort V8.1 software program with new function blocks to convert floating-point values into integers and vice versa, reset function for shift register, additional sorting functions, and a larger area for bar charts in message text
- Save and evaluate data with the LOGO! Access Tool



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