

System functions



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System functions

Desigo – the innovative system for highest efficiency and safety in the building

Desigo™ is a modern building management system for a full breadth of application support ensuring that facilities remain comfortable, productive, and achieve optimal energy and equipment performance. On top Desigo offers full integration of fire safety, and security systems.

With system functions such as event management (events and alarms), time scheduling and trend logging, combined with advanced control functions, Desigo is a highly versatile asset in a building. Innovative Web technology, powerful databases and open communication make Desigo a financially wise investment in the future. It is scalable from small to large buildings and optimized for single as well as multiple disciplines.

Desigo is consistent in its support of open communication, making it easy to connect a wide variety of building services systems on the basis of standard open data interfaces:

- BACnet™ from room automation to the management level
- Modbus, OPC client & server, MS/TP, M-bus and other interfaces for universal connection of third-party devices and systems
- Ethernet TCP/IP network protocol including IP device monitoring via SNMP
- ONVIF standard for network camera (IP video camera) systems

One system for every requirement



As an integration platform, the management station Desigo CC™ is designed for a simultaneous connection to multiple systems and use by multiple operators, each with their unique focus. With Desigo you can be assured of optimal system performance of building automation and fire life safety applications. All building functions – including lighting, power, video, and danger and energy management – can be integrated.

The workflow-oriented user interface of Desigo CC provides the same look, feel and operation to all connected subsystems from small single-user systems to large multi-user installations. This brings integration to the next level, a unification where tasks are not differentiated by the subsystem. Desigo CC unifies workflows and user interfaces for supervisory tasks such as commanding, event handling, reporting, and scheduling.

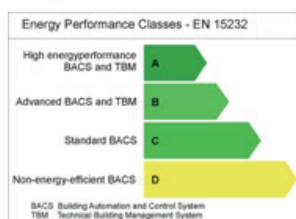
A unique, extensible object modeling approach allows Desigo CC to normalize information brought in through any interface, and to provide the same look, feel and operation through a common set of applications, without concern for the source of the data.

Investment protection over the building's entire life-cycle

With its flexible range of automation stations and operator units, Desigo is ideally suited for projects of all sizes and for all types of buildings. Consistent compatibility protects investment over decades and throughout the entire building life-cycle. Desigo integrates existing automation systems Visonik, Unigyr, Integral or Simatic seamlessly and carries them forward into the future. Changes in use, system extension and retrofit projects can all be handled in gradual stages.

Existing installations and Desigo components such as the management station Desigo Insight are fully supported and can be supplemented with products and features of the latest generation.

Highest degree of energy efficiency



For building automation, the tested Desigo plant applications comply with European standard EN 15232 in the highest energy performance classes. Their use, for example, can reduce energy costs for volume flow control of ventilation plants up to 30% compared to constant air volume control. In addition, a number of Desigo room applications are already eu.bac-certified.



The high level of overall Desigo system functionality is the prerequisite for eu.bac system certification. Also, a number of Desigo room automation products have eu.bac product certification. The combination of both certifications ensures the highest level of energy efficiency in the building.



Desigo offers monitoring functions by means of comprehensive indication of the efficiency status in a building. The Green Leaf symbol indicates unnecessary energy consumption in the building to room users. The room users can ensure interactively the highest possible building efficiency.

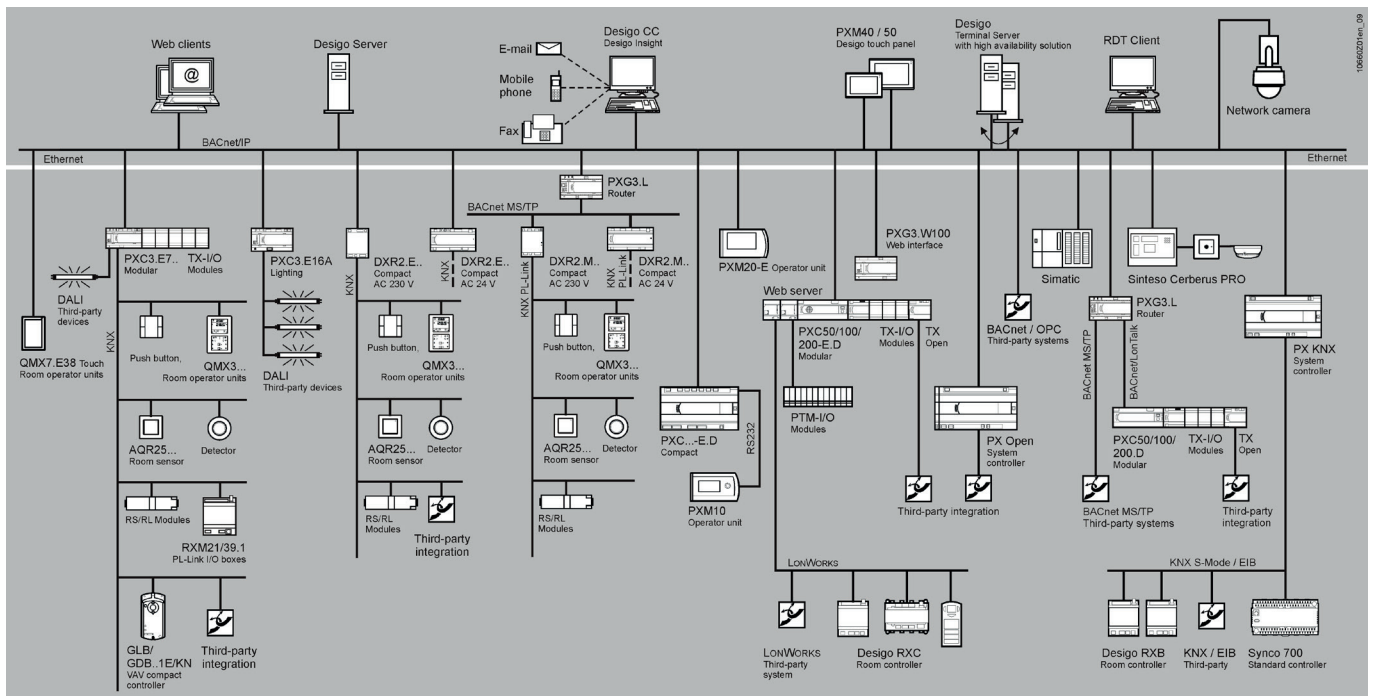
The Designo system can be subdivided into two levels:

- Management level
- Automation level

The automation level forms the interface to the field level and includes room automation as well. By virtue of distributed intelligence, each of these levels operates both autonomously and in a network.

The principal Designo system components for building automation

- Designo management station allows monitoring of the entire system from a central location. Designo CC is the perfect tool for superimposed operation and monitoring, graphics-based display of the process, automatic event and alarm distribution providing a wide range of information and reporting capabilities
- Designo PX automation range for control, operation and monitoring of primary plants. Designo Touch and Web can operate the plant via touch panel or Web client
- Designo TX-I/O modules, which provide the interface to the devices at the field level, the sensors and actuators
- Designo Total Room Automation (TRA) is an open and programmable room automation product range covering lighting, shading, and HVAC and allowing for individually tailored room solutions at a high level of energy efficiency
- Compact and proven Designo room automation system RX for autonomous comfort control in individual rooms
- Designo Open for the integration of a wide variety of plants and protocols at all system levels



Designo system topology

One of the key benefits of Designo is its scope for gradual extensions, from the smallest systems to large, geographically distributed systems with multiple disciplines.

System functions

System functions for building automation

Facility managers and room users of the Desigo system have a versatile range of tools at their disposal, offering convenient access to the system and the plant.

Operation and monitoring

Operator station

- The Desigo management station is designed to provide a single, easy-to-use point of access to the entire installation used in your facility. Desigo CC provides multiple client/server options that allow full operation and configuration from anywhere.
- Desigo Touch and Web operate and monitor the Desigo PX automation level using a standard Web browser (HTML5 technology) on various hardware platforms (e.g. tablets, notebooks/PCs, smartphones)

Room operator unit

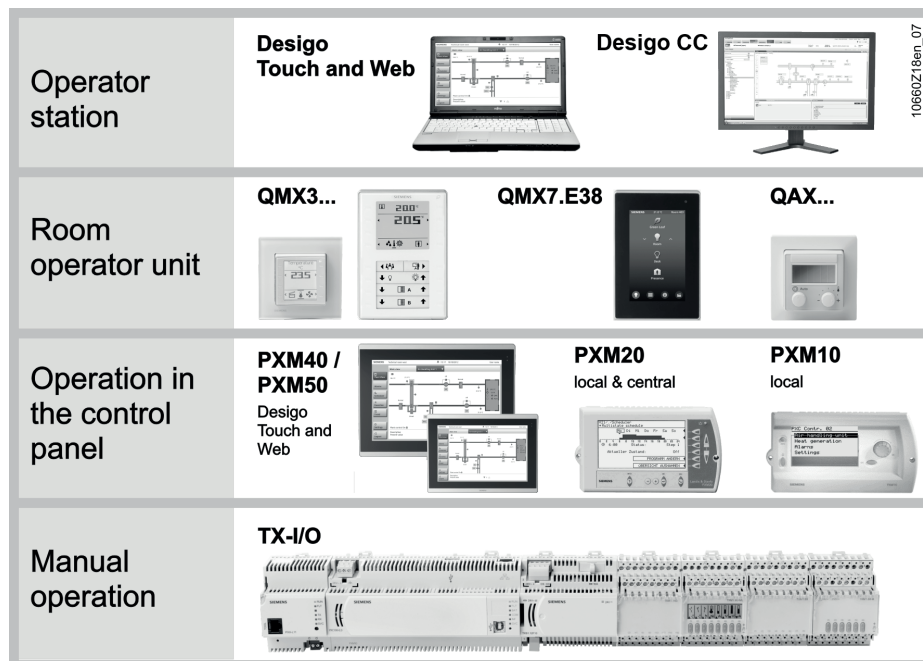
- The QMX room operator unit with optional Green Leaf symbol offers users functionality precisely matched to need
- QAX.. with or without display and operating element offers functionality matched to the specific needs of the user and the elegant QAX devices support both KNX and LONWORKS communications as well as wireless EnOcean technology

Plant operation

- The Desigo touch panels PXM40 (10 inch) and PXM50 (15 inch) to operate and monitor the Desigo PX automation level with graphical display, optimized to intuitive finger operation
- The user-friendly, graphics-based PXM10 operator unit facilitates full local operation of the Desigo PX automation stations
- The PXM20 network-compatible graphics-based operator unit presents Desigo PX plant and system information in an easy-to-understand format with a clear-text commentary

Manual operation

- The Desigo TX-I/O modules include facilities for manual/emergency operation of plants and for the display of operating states



Desigo operating levels

Fully integrated trend data processing allows effortless evaluation and analysis of real-time (online) data and (offline) historical data. The trend feature facilitates the monitoring and fine-tuning of the plant. In the Desigo system, this feature is implemented in the form of Trendlog and TrendlogMultiple objects, in compliance with the BACnet standard.

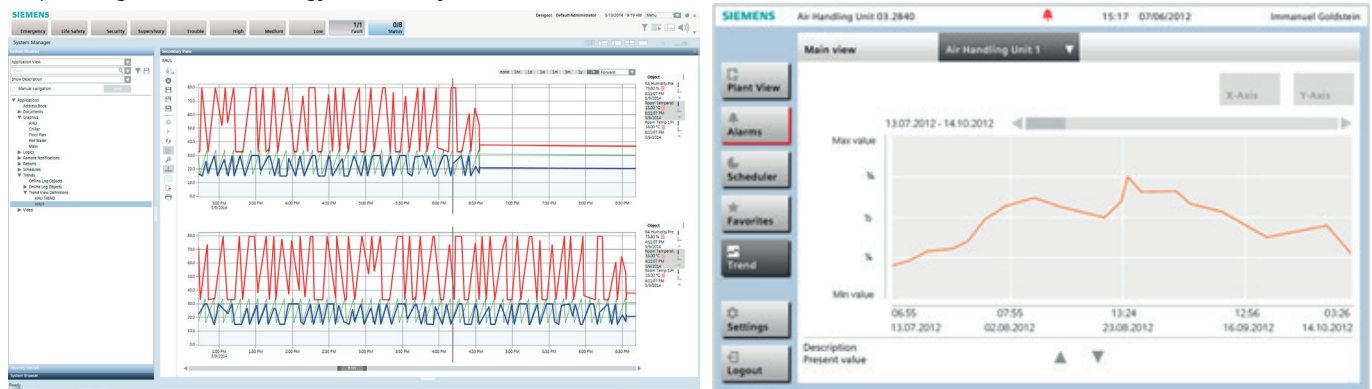
Trend logging options

- Continuous logging
- Single run
- Logging over a specified period

Sampling options

- Polling
- COV polling (Change of Value)
- Event-driven polling

Trend graphs can be displayed on the Desigo management station. In addition, the touch panels PXM40/PXM50 and operator units PXM20 as well as PX-Web can display Desigo PX trend graphs. The management station Desigo CC allows clear trend comparison e.g. to help finding the cause of energy inefficiency.



Trend viewer on the management station Desigo CC and on the touch panels PXM40/PXM50

Online trend features

- Real-time display of process data
- Based on changes in the value of a data point (COVs) or on periodic sampling by Trend Viewer (times can be configured)

Offline trend features

- Offline data display – no permanent connection required
- Longer periods of time (days, months)
- Data acquisition in the automation system
- Data are uploaded to the management level at regular intervals or as needed

System functions

Event management

One of the most important functions of a system is automatic alarming in the event of faults in building services plants. The management of events and alarms (generation, display and handling) must be simple, efficient and consistent at all levels of the system. Desigo uses the BACnet alarm functions and supports the following three types of alarms with up to 256 alarm priority levels:

- Basic alarm (for alarms not requiring user interaction)
- Simple alarms (for alarms requiring acknowledgment)
- Extended alarms (alarms requiring acknowledgement and reset)

Event messages

When an event or alarms occurs, it is automatically detected, registered and transferred to operator units such as the touch panels PXM40/PXM50, the PXM20, or to the management station. Informative messages are also transmitted to remote devices such as mobile phones, printers, PCs or via SMS and e-mail. The management station further separates messages in a customized manner so that each user receives only those events and alarms that correspond to his/her level of responsibility.

The event lists of Desigo CC provide a view of all pending and time-stamped events and alarms in order of their importance at a glance and permit guided processing (assisted treatment). Operators are alerted to incoming and pending messages with the event bar and audible and visual signals.

Event	Source	Count	Comment	Information	Event State	Event Status	Event Time	Location
Device Return	BG FC20 Panel 1	4			Unprocessed	Clear	20120912 20:54:19	Management - Administration
Low Limit	MEC10_RM100_RMTMP [RM 100 RMT...				Waiting for Condition	Active	20120912 12:21:56	Management - Administration
Device Return	BG FC20 Panel 1	4			Unprocessed	Clear	20120912 20:54:19	Management - Administration
Low Limit	MEC10_RM100_EE1_FLOATINGLIMIT				Waiting for Condition	Active	20120912 12:21:56	Logikhaus MEC10/BM00/B01
Low Limit	My Description2				Waiting for Condition	Active	20120912 12:22:01	Logikhaus Local_ID
Low Limit	RoomTempAlarm				Waiting for Condition	Active	20120912 12:22:01	Logikhaus Local_ID
Low Limit	MEC10_RM100_EE2_OUTOFFRANGE				Waiting for Condition	Active	20120912 12:22:01	Logikhaus MEC10/BM00/B02
Low Limit	MBC05_LAO PT (EE_1_216879)				Waiting for Condition	Active	20120912 20:54:19	Design CC - Field Network - BNCNet Network 1
Trouble IN (Fault)	Power supply superv_6 batt_charger				Ready to be closed	Active	20120912 20:54:19	Design CC - Field Network - BNCNet Network 1
Trouble IN (Fault)	Power supply superv_6 batt_charger				Ready to be closed	Active	20120912 20:54:19	Design CC - Field Network - BNCNet Network 1
Trouble IN (Fault)	NODE 2 MAIN MOTHER BOARD				Ready to be closed	Active	20120912 19:41:15	Management - Administration
Trouble IN (Fault)	NODE 1 MAIN MOTHER BOARD				Ready to be closed	Active	20120912 19:41:15	Management - Administration

Alarms for example on touch panels PXM40/PXM50 and the event list of Desigo CC

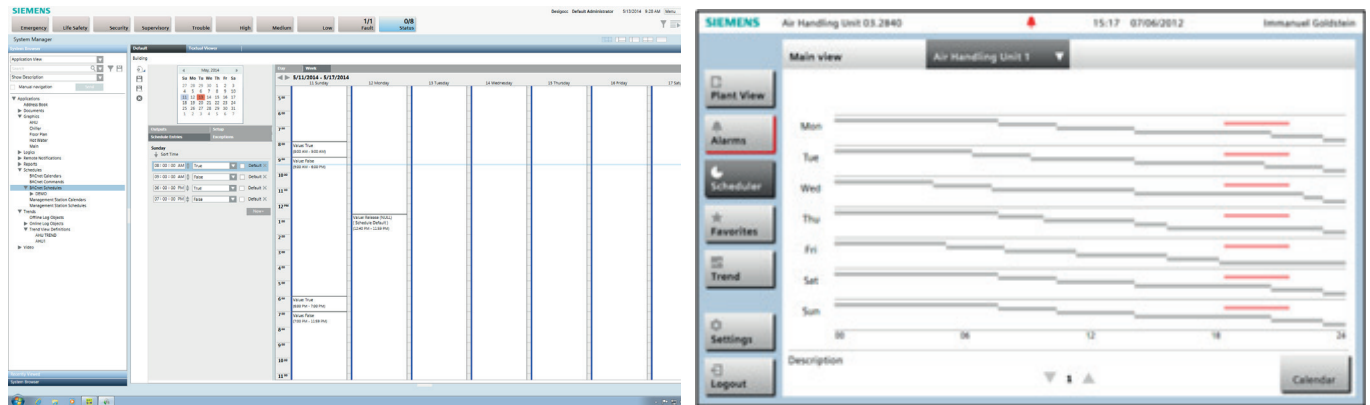
Remote Notification with assisted treatment

Messages are transferred on the basis of time of day, priority and/or plant type, using a truly powerful remote notification system at the management station. This ensures the uninterrupted routing of events and alarms, irrespective of whether or not there is an operator sitting at the management station. From the event list or event bar, operators can quickly open the assisted treatment in order to perform operating procedures which help ensure a fast and correct response even in critical alarm situations.

One of the basic functions of a system is time control of procedures and processes and ensuring energy-efficient operation.

Scheduler programs ensure that the heating and lighting are switched off automatically at the end of the workday, that the temperature in the building is reduced at night, and that the plant is not kept running for longer than necessary. They can also be used to switch off the air conditioning in certain rooms during holidays.

Using standard BACnet functions, the BACnet scheduler programs can be operated system-wide from the user-friendly touch panels PXM40/PXM50, the operator units PXM20 and PX-Web as well as from the Desigo management station.



Scheduler program on the management station Desigo CC and on touch panels PXM40/PXM50

Schedules and calendars are stored in the Desigo PX automation station, so that in the event of a network or PC failure, the automation level can continue to operate autonomously. For connected subsystems that do not support scheduling the management station perform this function.

System functions

Access rights

Access rights can be used to filter information from the plant and system based on the individual requirements of a user. The caretaker or service engineer, for example, only has access to information important to him. A distinction can also be made between read access and write access.

Freely-definable access rights

Only authorized personnel are granted access to the system via the operator units. When a user enters a user name and password, the system verifies the associated access rights and enables access to the relevant plant. Read and write access rights can be defined in detail, right down to individual information points.

The following access classes are supported in the Desigo system:

- Internal, service and standard service
- Administration and experts
- Standard and customer

Predefined user profiles

To ensure the right level of event management support for users of the management station Desigo CC in any situation, Desigo CC workstation and/or users can be easily assigned to predefined profiles supporting casual, intermediate, or dedicated event management notification.

Efficient plant overview

For simple and efficient plant overview, the Desigo touch panels PXM40/PXM50 can display the most important plant values on an overview page, even without logging on.

Increasing building efficiency/saving energy

Thanks to sophisticated monitoring functions, Desigo provides comprehensive indication of the efficiency status in the building. The RoomOptiControl function of Desigo TRA automatically detects unnecessary energy consumption in the room. This is indicated to the room user via a change of color of the Green Leaf symbol from green to red on the QMX3 room operator unit. When pressing the symbol, room control resumes energy-optimized operation. Then, the Green Leaf symbol will again return to green.



The Green Leaf symbol on the QMX3 and QMX7.E38 operator units

1 System functions

Communication – network

Communication standards specially developed for building systems

Compliant devices can be interconnected at low cost using the BACnet (Building Automation and Control network) open communication protocol. The worldwide BACnet standard was developed specifically for the needs of building services.

Desigo CC is an open management station built on a proven SCADA technology and supports a variety of open system protocols and IT standards. Thanks to the support of the BACnet Life Safety objects, simple and secure connection to fire detection systems such as Sinteso FS20 or Cerberus PRO to Desigo is possible without problems.

BACnet, KNX and LonWorks

For the exchange of information among its own system components, Desigo uses for building automation three standard protocols, recognized worldwide: BACnet, KNX (EIB) and LonWorks. Desigo uses the BACnet communication protocol to exchange information between the individual Desigo PX automation stations and the Desigo TRA room automation stations on the one hand, and to the Desigo management station on the other.

Desigo uses IP, LonTalk or MS/TP as the transport medium.

Furthermore, Desigo supports integration of BACnet/MSTP subsystems. The PXG3 router provides transparent BACnet traffic between the MSTP and IP network (BACnet/IPv4 as well as BACnet/IPv6) and, optionally, to LonTalk as an addition.

The integrated KNX connection on Desigo TRAs room automation station PXC3 and DXR permits direct integration of both devices with the KNX PL-Link as well as KNX S-Mode in Desigo TRA. Communication between room automation stations and field devices with KNX PL-Link is optimized within the framework of the KNX standard for available plug-and-play functionality including automatic device recognition. Desigo Tools parameterize devices with the KNX PL-Link; the KNX commissioning software (ETS) is not required. A broad selection of Siemens field devices, including room operator units, buttons, motion detectors, or VAV compact controllers support the KNX PL-Link.

Also, the Desigo RX room automation product range communicates per LONMARK standard or KNX S-Mode (EIB).

BACnet certification

All Desigo PX and TRA BACnet servers as well as the Desigo management station were submitted to the BACnet Interest Group Europe (BIG-EU) for compliance testing based on the BACnet standard DIN EN ISO 16484-5 and successfully certified. A well-known testing institution conducted the comprehensive testing.



The management, automation, and room automation stations are all implemented as full BACnet nodes. BACnet is integrated directly without the need for any special data conversion.

The Desigo PX automation stations satisfy the B-BC profile (BACnet Building Controller). Desigo CC and Desigo Insight satisfy the B-AWS profile (BACnet advanced workstation). The Desigo TRA room automation stations support a BACnet object's scope (BACnet B-ASC profile) adjusted to room automation.

Web Services

Using RESTful technology, Desigo CC provides alarm, object and time series data via web based services to supervision management stations or other 3rd party external applications.

AMEV guideline

Open communication between various systems using a common automation and operating concept are key functions for energy-saving and reliable plant operation. As a consequence, Desigo meets in full the AMEV guideline V1.2 with the following profiles:

- Desigo management: AMEV profiles MBE-A and MBE-B
- Desigo PX: AMEV profiles AS-A and AS-B

OPC Foundation Certification

The Desigo CC management station is designed as an open platform and supports various open standard communication protocols and IT standards such as OPC client and server for the OLE process control or ONVIF standard for IP-based video surveillance.

OPC is the interoperability standard for the secure and reliable exchange of data in the automation space and in other industries. Desigo CC has been certified by the OPC Foundation meaning it has been tested and has passed independent OPC testing. The benefits of using OPC certified products include faster configuration and start-up with fewer support calls, proven reliability and interoperability, minimal integration risks and an investment in quality.



MODBUS IP

Desigo CC support the MODBUS communication protocol, allowing for example a seamless integration of power meters at the management level.

DALI, EnOcean

DALI, EnOcean, and KNX devices turn the PXC3 room automation stations of Desigo TRA into a complete solution for the room. The optional DALI bus of the room automation stations allow for simple integration of different lamps and luminaires. DALI (Digital Addressable Lighting Interface) is a worldwide standard that applies specifically to lighting control at cost-efficient two-wire technology and integrated power supply.

Self-powered EnOcean radio technology offers wireless connection of field devices based on extremely energy-saving technology. The operating energy required by the devices is taken directly from the environment. The wireless room units QAX9..4 can be used via EnOcean/LONWORKS or EnOcean/KNX gateway with Desigo TRA or RX.

S7 Protocol

Desigo CC integrates S7-300 and S7-400 natively, allowing the use of all standard workflows for also these Siemens devices.

Client/server options

The management station Desigo CC offers flexible client-server architecture for building automation and fire protection applications. It supports the configurations of small single-user systems to large multi-user installations. Desigo CC can be fully installed on a computer, with full client and server functionality. Additional clients (dedicated with browser as well as Windows desktop application) can be easily added.

Desigo Touch and Web

Desigo Touch and Web permits operation and monitoring of the Desigo PX automation level using the Desigo touch panels PXM40 and PXM50, as well as via standard Web browser (HTML5 technology) on various hardware platforms (e.g. tablets, notebooks/PCs, smartphones). The BACnet/IP Web interface PXG3.W100 supports flexible and remote access to the BACS via LAN/W-LAN connections in a straightforward manner."

IT security

The protection against unauthorized or malicious access to building services systems and installations is becoming increasingly important. Desigo CC, as modern management station takes this into account and meets security level SL1 according to ISA-99/IEC 62443. This includes securely handling of passwords with appropriate key strength and authorized system access only to elements (menus, buttons, etc.) to which the user has at least read access.

Connection of legacy systems

Desigo is compatible with the legacy automation systems Unigyr, Visonik, Integral or Simatic and allows their seamless integration. Changes in use, system extension and retrofit projects can all be handled in gradual stages. For example, previously installed PTM-I/O modules of Unigyr or Visonik can be connected directly to modular Desigo PXC..D automation stations. Existing actuators and sensors can continue to be used that way.

