YZP 480...495: SAUTER Vision Center

Central building management and visualisation of decentralised installations

SAUTER Vision Center (SVC) is a web-based building management and integration platform in the HTML5 standard for running and visualising the building operation. SVC is suitable for both single buildings and entire real estate parks or distributed premises. Typical areas of use are office complexes, business parks, college and industrial campuses, airports, railway stations, hospitals or internationally distributed branch networks. The modular concept allows the software to be extended precisely to meet the customer requirements of every installation. Therefore, SVC gathers all of the data for the entire building and energy management and makes it available to the user from anywhere at all times.

In the energy monitoring, meters and other information can be mapped, thus making daily, weekly, monthly and yearly consumption from the plants, buildings and properties automatically available. Specific energy widgets, KPIs and energy labels and other dashboard widgets are used to display the energy values and consumption.
With version 7, a powerful building analytics and energy management module (AEM) is integrated in SVC, which already contains all the energy monitoring functions. In addition, with chart types such as scatter and carpet plots, but also SANKEY and histogram displays with calculations of the Gaussian distribution, analytic tools are available to carry out energy inspections, to optimise systems in transition phases such as spring and autumn, for example, and thus to meet energy and CO_2 reduction requirements, as demanded for companies in the context of certifications in accordance with ISO 50001.
The additional online analytics integrated in the AEM enables immediate information in dashboards as KPIs (traffic lights, circular or linear gauge etc.) or alarm messages in the event of abnormal plant operation. In this way, deviations from operating patterns and setpoints, as well as oscillations, are detected automatically and in real time.
The maintenance module for SVC is used for optimum planning and efficient performance of service and facility management tasks. Here, support is also provided by plant asset management, the definition of maintenance intervals and the automatic triggering of maintenance cycles based on building management information.
With energy monitoring, energy management and the building analytics and maintenance modules, SVC provides comprehensive information and tools to ensure continuous and constantly optimised and thus efficient and sustainable plant and building operation.

Thanks to SVC's simple and intuitive operation, starting, planning and changing predefined building automation procedures is easy with the scenario manager. This allows users with PC skills to set rooms, for example, to Comfort or ECO mode at precise times, and to plan and log them via calendar views.

For the integration of different equipment systems, SVC supports the manufacturer-independent BACnet standard, as well as connection to OPC UA servers, for integrating different protocols in the building automation. Thus, SVC is the first building and energy management system (BEMS) certified with a cross-platform profile B-XAWS 1.18. SVC supports device profiles B-AWS, B-ALWS, B-ACCWS and thus profile B-XAWS. As of SVC 7.1, the BACnet/SC protocol is also supported. It enables the encryption of the data traffic based on certificates. Ideally, this ensures a secure connection from local sites via BACnet/SC routers to Vision Services (SVC in the cloud) with full BACnet functionality.
In addition to the OPC UA client, operation as an OPC UA server is also implemented. An IoT client is also integrated that supports the connection of room controllers and automation stations via MQTT. TLS encryption ensures secure communication from decentralised automation stations, e.g. to connect SAUTER ecos or modulo 6 stations via the internet with an SVC located in the cloud.
Direct connection of moduWeb Vision via web services and SAUTER novaNet plants via OPC is available for comprehensive support of the integration options. This makes it possible to connect existing systems when converting to the new generation of building management software without having to replace the existing automation level.
SVC sends alarms directly via e-mail or SMS to mobile phones according to the responsibilities assigned. With its many user-defined settings and customisable dashboards, SVC guarantees maximum user convenience.

SVC can be deployed in virtual IT environments and uses Microsoft SQL databases. These modern architectures and infrastructures enable topics such as high availability, redundancy via cluster systems and corresponding load assignments (load balancing) to be implemented and used.[1)] For optimum integration of the user structures of a company, it is possible to connect SVC to an existing LDAP server that additionally supports the latest communication types (LDAP signing & channel binding).

Overview of types

SVC licences and options

Type	Description
YZP480F000	Provision of all codes in a single ticket
YZP480F098	Latest SVC version on a USB stick
YZP480F200	Basic licence for 500 addresses with maintenance
YZP481F200	Additional 100 objects with maintenance
YZP481F210	Additional 1000 objects with maintenance
YZP481F220	Additional 10000 objects with maintenance
YZP481F230	Additional 25000 objects with maintenance
YZP482F101	Termination of the software maintenance
YZP482F210	Resumption of the software maintenance
YZP483F300	novaNet connection (YZP487F201 is a prerequisite)
YZP484F200	Licence key for VM
YZP484F310	Migration Manager for SVC from nP32 and nPO
YZP484F400	Vision Center Studio
YZP485F201	Energy monitoring with maintenance
YZP485F203	Analytics and energy management with maintenance
YZP485F210	Maintenance module with software maintenance
YZP485F220	Scenario manager with software maintenance
YZP485F230	Touch Panel server with 5 clients
YZP485F231	Touch Panel with 5 additional clients
YZP486F205	Upgrade from energy monitoring to analytics and energy management
YZP487F201	OPC UA client for SVC with maintenance
YZP487F203	OPC UA server with maintenance
YZP487F205	SVC MQTT client with maintenance (price per MQTT broker connection)
0900360001	Hardlock (dongle) for VM

Dashboard

- Individual creation of dashboards as the starting page in the operation of the installation, or as an overview page for key figures and graphics for various installations, buildings or combined premises.
- Energy dashboard in combination with the SVC energy monitoring module or with the analytics and energy management module with various key figures and graphics for the current and historical consumption display.
- The integration of the energy monitoring and energy and analytics solutions into the building management makes it possible to display real-time values. Many widgets relating to buildings and energy allow the user to display individual information.

The dashboard contains layout templates and is equipped with various widgets. The layout automatically adapts to the size of the screen or device (responsive design) and the individual widgets can be freely arranged using drag & drop.

Room automation

- Visual display of rooms and related room segments, as well as information on the temperature, air quality, lighting, window blinds etc.

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1) *Scalable via MS SQL Express up to SQL Enterprise depending on the specified properties, virtual IT environments and high-availability VMware & SQL Enterprise.*

- Flexible assignment of the individual room segments and the related changes to the room automation configuration using drag & drop. This enables room sizes, from open-plan offices to various large offices, to be adjusted according to requirements for one or many employees.
- These functions are made possible by the native integration of the following SAUTER room automation devices:
  - ecos504 (BACnet/IP)
  - ecos505 (BACnet/IP)
  - ecos500 (BACnet/IP)
  - ecos311 (BACnet MS/TP)

Touch-panel

The plant can be operated using a touch device. This device displays images and enables the navigation. The actions that can be started from the images, such as the Object Information Board, are used to interact with the plant. Security is provided by login information and the kiosk mode of the touch device.

Scenario manager

The scenario manager enables the easy starting, planning and changing of predefined command procedures. This makes it possible to set rooms, for example, to Comfort or ECO mode at precise times according to user requirements.
For more information, see the section *Description of operation*.

Service and facility management maintenance module

- Module for planning of servicing and maintenance schedules and for operational documentation
- Recording of plant devices with additional information
- Definition of maintenance plans
- Definition of criteria for automatic triggering of a maintenance order
- Recording and documentation of the maintenance operation using a complete ticketing system

For more information, see the section *Description of operation*.

HTML 5: Location- and platform-independent

- Can be used with any operating system on smartphones, tablets or desktop PCs without setting up inconvenient plug-ins.
- “Responsive design” enables optimum display on devices with various resolutions.

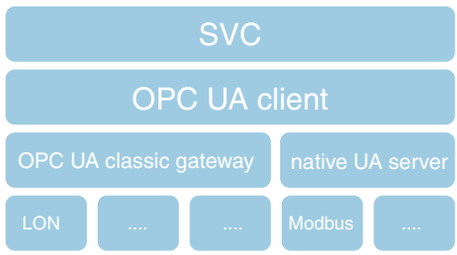
Integration options

- BACnet/SC (Secure Connect) for encrypted data transfer, e.g. to Vision Services in the SAUTER Cloud
- Native BACnet client (B-XAWS 1.18 certified)
- OPC UA client and OPC UA server

- SAUTER MQTT driver
- OPC DA via UA/DA gateway (gateway supplied)
- SAUTER novaNet

OPC UA client

- The basic precondition for connecting different protocols and thus for integrating existing systems and manufacturers which do not support the BACnet standard.
- SVC is a Windows service. The OPC UA/DA gateway included in the OPC client can be run as either a Windows service or an independent application.



Technical requirements for SVC servers

Processor	Intel i7 (from 10th generation), 3.4 GHz or higher. SVC supports multi-processor architectures, processors and chipsets that use Hyper-Threading technology
RAM	At least 16 GB
Hard disk	500 GB/SSD technology (recommended 1 TB)
Graphic resolution	No requirements
TCP/IP configuration	The IP address can be permanently or dynamically allocated by a DHCP server
Operating systems	Multilingual, 64-bit: Windows 2016 Server, Windows 2019 Server, Windows 2022 Server, Windows 10, Windows 11
SQL database	MS SQL 2019 and MS SQL 2016. Both the Standard and Enterprise versions can be used. MS SQL 2019 Express is included in the scope of delivery.
Internet browser	Microsoft Edge, Mozilla Firefox, Google Chrome
Graphic resolution for operating devices	1920 × 1080 or higher

Notes

We explicitly recommend installing SVC on a computer that is only used for technical building management (hardware or virtual machine).

If used by more than five users at the same time, the RAM must be expanded.

When MS SQL Standard or Enterprise is being used, the MS licence model must be followed. The product information includes the settings that belong to the current version.

Description of operation

General project information

All users have the option to define and bookmark their own views such as lists, graphs and tables in the form of documents. All templates and documents can be exported via the web interface (CSV, PDF).

Multiple languages:

- All users can select their own language
- German, English and French are available in the menu functions of the SVC program as standard, and other languages are available on request

User rights:

- Users receive project-specific rights by being assigned freely definable roles
- Assignment of rights in relation to the SVC objects
- Mandatory change of password at first login
- Increased password security with minimum specifications for length and special characters can be selected

- Specifications for validity period and reusability of passwords already used
- Support of UTF8 character sets

All properties of the BACnet objects can be displayed on the visualisation image of the system (BACnet). For each object, it is possible to display various icons or satellite buttons which enable the following actions:

- Displaying the active BACnet priority
- Button for resetting the BACnet 8 priority (switching to automatic mode)
- Icon showing the current object status (BACnet status flags)
- Calling the Object Information Board (OIB); here all information is available centrally, for example BACnet properties of the object in detail, direct links to images, charts and other documents, alarm overview, notes, time programmes and stored documents (PDF, MS formats) for the object as well as the quick chart view. It is possible to select the start tab based on the calling context
- Links to a quick chart
- Links to the time programme of the object

Images can be displayed during operation on an internet browser (standard or mobile), without having to install a plug-in.

BACnet driver

SVC is a native BACnet-oriented management level for the building automation. Other BACnet-specific and technical communication details are compiled in the standardised SAUTER BACnet PICs of SVC.

SVC is certified according to B-XAWS 1.18. This cross-domain certification includes support for several BACnet profiles, including BACnet Advanced Operator Workstation (B-AWS), BACnet Advanced Life Safety Workstation (B-ALSWS), BACnet Advanced Access Control Workstation (B-AACWS), BACnet Operator Workstation (B-OWS), BACnet Operator Display (B-OD).

BACnet Secure Connect (SC)

SVC natively supports the new BACnet/SC protocol. Secured by certificates, BACnet/SC simplifies the network configuration and greatly increases the global security level. Based on a “publish and talk” principle, the communication is managed by a hub. In addition, a fallback hub is automatically activated if the primary hub fails.

A BACnet router and a hub (both in the SAUTER portfolio) must be added to the on-site topology.

MQTT driver

SVC has a native MQTT driver. This driver enables communication with ecos504 and modulo 6 devices. It uses the MQTT protocol with TLS 1.2 and manages the certificate. A driver is intended for communication with a single broker.

Management console

The management console is a central web program of the SVC application for the following management tasks:

- Project management
- Licence management
- System maintenance management
- Access to log files
- Definition of a commissioning phase that allows data to be deleted when the phase is completed

Data retention – limited data storage

It is possible to keep only a certain amount of data in SVC. For example, audit trail, alarms and events, as well as historical values, can be deleted from the system. The time period and the type of data to be retained can be easily defined.

Alarm and notification management

SVC manages all process-specific alarms, such as BACnet, MQTT or OPC messages, as well as SVC-specific alarms and system messages. The alarm lists can be individually adapted and personalised.

Notifications can be sent via e-mail, SMS[2)] or to a printer.

Alarm events can generate and transfer complete reports.

[2)] *A modem is required for sending the SMS messages*

Alarms can also be visualised in plant schematics, object lists, alarm lists, in the menu bar and via pop-ups.
A comment can be added when acknowledging and resetting alarms. For FDA-certified plants, the acknowledgement and resetting of alarms must be accompanied by a comment and/or a re-login by the user.

Alarm types
The following alarm types are available:
- System alarms generated by the building management system
- Alarms generated by the connected substations
- Alarms generated by SVC objects, e.g. by the energy monitoring object
- Multiple alarms can be grouped together as collective alarms

Alarm lists
The alarm lists can be fully and easily filtered:
- Filter by alarm type (system, bus etc.)
- Filter by alarm priority
- Filter by notification class
- Filter by BACnet object or object of every other connected bus
- Intelligent, automatic filter depending on variable, dynamic parameters
- Automatic filter by image. This makes it possible to create an alarm list for a particular department or building with just a few clicks

Without any other configuration, alarm lists automatically contain the following data:
- Current data of the selected filter
- Historical data of the selected filter
- Statistical data connected to the alarm events (top 5, frequency)

Depending on the rights of the user, the following functions can be activated from all alarm lists:
- Acknowledge all types of status changes if necessary
- Add comments
- Display alarm details
- Display historical data of an alarm
- Display statistics for a specific alarm

Display via Object Information Board (OIB):
- All information of the OIB is used incl. quick chart, notes and the display of help documents

Actions
For each alarm, it is possible to generate the following actions:
- Send a configurable e-mail with alarm information
- Send configurable SMS messages with alarm information directly via a GSM or UMTS modem (without an external provider)
- Send predefined reports without any restrictions, so that information is available not only on the consequences of alarms, but also on the causes
- Continuous printout of various alarms on printers

Collective alarm
A collective alarm can be defined to combine the status of a building, floor or plant in a single alarm. This collective alarm is treated like an SVC alarm and benefits from all functions of an alarm. In addition, the acknowledgement of this alarm can acknowledge the active alarms of the group via a propagation command.
Alarms statistics are automatically calculated and generated for each alarm.

Status information / manual operation
Within plants it is important to know which objects and plants are in manual mode, for example. To realise this function, the manual mode (PA 8) must be monitored. In addition, the BACnet properties “Overridden” and “Out of Service” are queried so that comprehensive status information is available.
This “Status Information” module available from SVC 7.1 allows the user to create a list of objects that they want to monitor.

Audit trail
User actions are recorded in the audit trail with the date, user name, IP, action description and values.
Audit trail lists can be individually adapted.
Audit trail documents can be signed with a digital signature.
Program calls or links to other applications are recorded in the audit trail.

Charts
Charts can be individually adapted.
Three different chart modes can be set:
- Real-time (only for quick chart)
- Historical
- Comparison of different time ranges

The following standard charts can be selected:
- Line
- Step line
- Bar
- Pie
- Combinations of the above types
- Dedicated charts (available in the energy monitoring module and the analytics and energy management module)

Multiple layouts are available for the arrangement of the chart widgets. Up to 16 series (objects) can be displayed in a widget. Each widget can display the objects as a chart or a table.
The quick chart function can be called directly from lists and plant images without additional configuration. In addition, a quick chart can be converted to a standard chart with a single click.
Charts and/or tables can be manually exported as PDF and CSV files. All documents can be used in a report.

Time programmes and calendars
The BACnet-optimised time and calendar functions are visualised intuitively. BACnet time programme and calendar objects can be read, changed and written to the BACnet stations.
A master calendar can be defined to control multiple calendars in devices. In this way, changes to the master calendar can be transferred centrally to all linked calendars.
The novaNet time programme can be integrated directly so that time programme and calendar objects can be read, changed and written to novaNet stations.
Objects that are connected to OPC can be managed and controlled via the internal SVC time programme.
Exceptions of the date, time period or calendar type can be used.
The interface makes it quick and easy to switch to a graphical or list view of the time programmes.
Weekly and exception days can be displayed in graphical and list views via the interface.
For BACnet time programmes, the “time values” are shown in the graphical and list views. Depending on the user rights, it is possible to change all basic configurations in connection with the “schedule object”, e.g. “schedule default” or write priority.
A master time programme can be defined to link multiple scheduler objects. In this way, changes to the master time programme can be transferred centrally to all linked scheduler objects.

Reports
Reports can be generated as follows:
- Manually
- Automatically in conjunction with a calendar
- At the beginning or end of an alarm

When creating reports, it is possible to do the following:
- Print the report out on a printer connected to the system at the time it is generated
- Having generated a report, send it by e-mail to pre-defined persons
- Constant availability via the web interface for downloading

When downloading reports, it is possible to select one or more simultaneously and then download them together in a single ZIP file.
System documents can be selected as part of a report.
The reports exported by email or saved in the system memory are non-editable PDF documents.

Energy monitoring module (EMM)

The EMM allows you to display and calculate consumption values, and it displays both real-time and historical values through direct integration in SVC. To be compatible with energy metering technology, the consumption calculation uses different aggregation modes such as integration, sum, original sum, difference etc.

In the dashboard, various key figures are displayed in the form of energy-specific widgets and energy labels. The following views are available in the monitoring document:

- Calendar, graphical and table views
- Line, bar or pie chart
- Numeric display

In addition to the chart types available in SVC, stacked bar charts and pie charts with multiple objects are available to display energy consumption both individually and as totals in these chart forms. On the overview page of all meters and formulas – in the data management – you have direct access to the following functions:

- Correct values
- Delete values
- Assign offset when changing meters
- Start a recalculation, e.g. after correction of values. Corrections are made individually and for a previously selected area
- Import values and correct larger time ranges via CSV file import
- Task management module for an overview of various calculations

Other functions of EMM:

- Definition, storage and display of meters
  - Manual input
  - File import
  - BMS objects
- Based on meter values, hourly, daily, weekly, monthly and yearly consumption values are calculated, saved and displayed automatically
- Missing data is estimated using various algorithms
- Definition of alarm criteria for consumption values and dedicated alarm notifications
- Plausibility check, based on freely definable conditions
- Automatic, definable reactions to implausible values
- “Energy Provider” mode for processing data from energy providers
- Export of data for use in external systems (CSV, PDF, manually and automatically by e-mail)
- Recording and monitoring energy consumption
- Definition of limit values for notification
- Display of comparative charts for definable periods
- Mathematical calculations (basic operators; logical and advanced operators)
- Units module

Analytics and Energy Management (AEM)

The Analytics and Energy Management module enables comprehensive analyses of the building behaviour. The functions show the quality of the control and the energy losses, and display critical information in a simple form. In addition, real-time calculations trigger alarms that enable a quick response. It allows the use of analytic functions, special chart types, and advanced calculation operators. It includes all functions of the Energy Monitoring Module (EMM). The following chart types are also available in the AEM:

- SANKEY (flow chart)
- Carpet plot
- Scatter plot
- Histogram
- Comparison chart with X-axis labels in weekdays, calendar weeks, months and years. Various groupings of bars or line views with a click.

Formulas with analytics functions and logical operators:

- Logical operators: AND, OR, NOR, XOR
- DEVIATION() (monitor signal deviation)
- COHERENCE() (operating pattern deviation monitoring)
- Oscillation detection (count the limit value violations over a predefined period)

A new energy navigation that can be set by the user enables the categorisation of the information. It allows the sorting of data into areas such as electricity, water consumption or, for example, locations and rental areas.

Notice
With its functions, the AEM module supports company and building certifications according to standards such as ISO 50001, BREEAM, HQE, Minergie or LEED.
With calculations of energy consumption, comparison of values, reports and the presentation of KPIs defined in the ISO 50000 family, this information can be used as the basis for a company certification or an energy audit (ISO 50002).

Scenario manager
The building management system contains an optional scenario manager integrated into the main system. The module enables the system operator to configure sequential command procedures. This makes it possible to set rooms, for example, to Comfort or ECO mode at precise times according to user requirements.
The starting, planning and changing of scenarios or command procedures is carried out directly in the Building and Energy Management System (BEMS) and requires only basic PC skills.
The following functions are ensured:
- Starting, planning, stopping and changing of scenarios
- Calendar overview of the planned or implemented scenarios
- Overview (history) with execution times and status information as well as detailed information in a separate log file
- Configuration of scenarios or command sequences for an event date
- The command times can be set between 24 hours before (preparation time) or 24 hours after the event
- Scenario modes such as ECO, Comfort or Normal can be freely defined
- SVC objects, incl. BACnet and novaNet objects, as well as MQTT topics, can be commanded
- All writable BACnet and SVC properties can be commanded in scenarios
- A priority can be assigned to the individual modes in scenarios
- A scenario can be stopped in the event of a fault

Maintenance module
The building management system contains an optional maintenance module integrated into the main system that provides information to be used in servicing and facility management. The information provided relates to the servicing planning, servicing work and preventive maintenance.
An integrated ticketing system enables the management of maintenance work in real time.
Basic functions of the maintenance module:
- Recording of devices and equipment and their properties
- Definition of maintenance intervals
- Definition of criteria for automatic triggering of maintenance
- Recording and documentation of the maintenance work
- Servicing work list with status information and file attachments

The definition of the plant devices enables a complete description relating to the product, e.g. the manufacturer, item numbers and technical data. This data is assigned to a maintenance plan. The creation of a maintenance plan defines the different actions to be carried out. Additionally, documents such as work instructions, test procedures, data sheets and other information can be stored. The triggering of maintenance tasks and maintenance intervals, as well as preventive service calls, can be defined. The definition is based on device alarms, time intervals, recurrence of alarm events and summarised and calculated information from this.

Vision Center Studio
Vision Center Studio is the engineering application for the SVC server that is used to add objects and extend or change images. Third-party devices can also be added to the visualisation structure via the integrated BACnet browser, OPC UA browser or MQTT browser.
It is intended to be used for small changes and extensions after commissioning, to enable trained SAUTER partners to also make their own modifications.

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