

savic-net™

for Integrated Building Management Systems

General

The savic-net™ for Integrated Building Management Systems (hereinafter referred to as savic-net for IBMS) integrates various sub systems by open communication protocols like BACnet, Modbus™ and OPC. Various information of alarm data, maintenance data and energy data is uniformly managed by a common window and operation.

- Building Management System
(hereinafter, abbreviated as "BMS")
- Electrical System
- Fire Alarm System
- Security System
- Public Address System
- Car Park System

The Facility Management function supports building maintenance and energy management to improve both efficiency and quality of maintenance operations.

[Alarm Management]

If any alarm of sub systems occurs, the savic-net™ for IBMS automatically processes the alarm. The savic-net™ for IBMS notifies the alarm via buzzer sounds. It shall display the latest alarm and brink indicators.

[Maintenance Management]

For asset management, tenant service and facility management, the information about managed facilities is managed as a database. The database is used for the following purposes.

- Status confirmation of equipment fault and repair
- Awareness of proper maintenance cycle
- Awareness of stocked spare items and delivery situation
- Report confirmation of succession matters from predecessors
- Extension running request of equipment
- Booking request of facilities
- Registration of questions and service requests about facilities

[Energy Management]

For energy management, point data of digital points, analog points, and totalized points are automatically collected from sub systems via savic-net FX Building Management System and saved as a database. The database is totaled for the respective periods for daily, monthly, yearly, year unit reports to illustrate energy consumption and operating status in graphs and graph data.

Trademark Information:

savic-net is a trademark of Azbil Corporation in Japan and in other countries.

BACnet is a registered trademark of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Excel, Internet Explorer, Microsoft, Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.

Modbus is a trademark and the property of Schneider Electric SE, its subsidiaries, and affiliated companies.

Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual nearby for quick reference.

Restrictions on Use

This product was developed, designed, and manufactured for general air conditioning use.

Do not use the product in a situation where human life may be at risk or for nuclear applications in radiation controlled areas. If you wish to use the product in a radiation controlled area, please contact Azbil Corporation.


Particularly when the product is used in the following applications where safety is required, implementation of fail-safe design, redundant design, regular maintenance, etc., should be considered in order to use the product safely and reliably.

- Safety devices for protecting the human body
- Start/stop control devices for transportation machines
- Aeronautical/aerospace machines

For system design, application design, instructions for use, or product applications, please contact Azbil Corporation.



Azbil Corporation bears no responsibility for any result, or lack of result, deriving from the customer's use of the product.


■ **Caution**




 **CAUTION** Alerts users that improper handling may cause minor injury or material loss.

■ **Sign**

Instructs users to carry out a specific obligatory action to prevent possible danger.

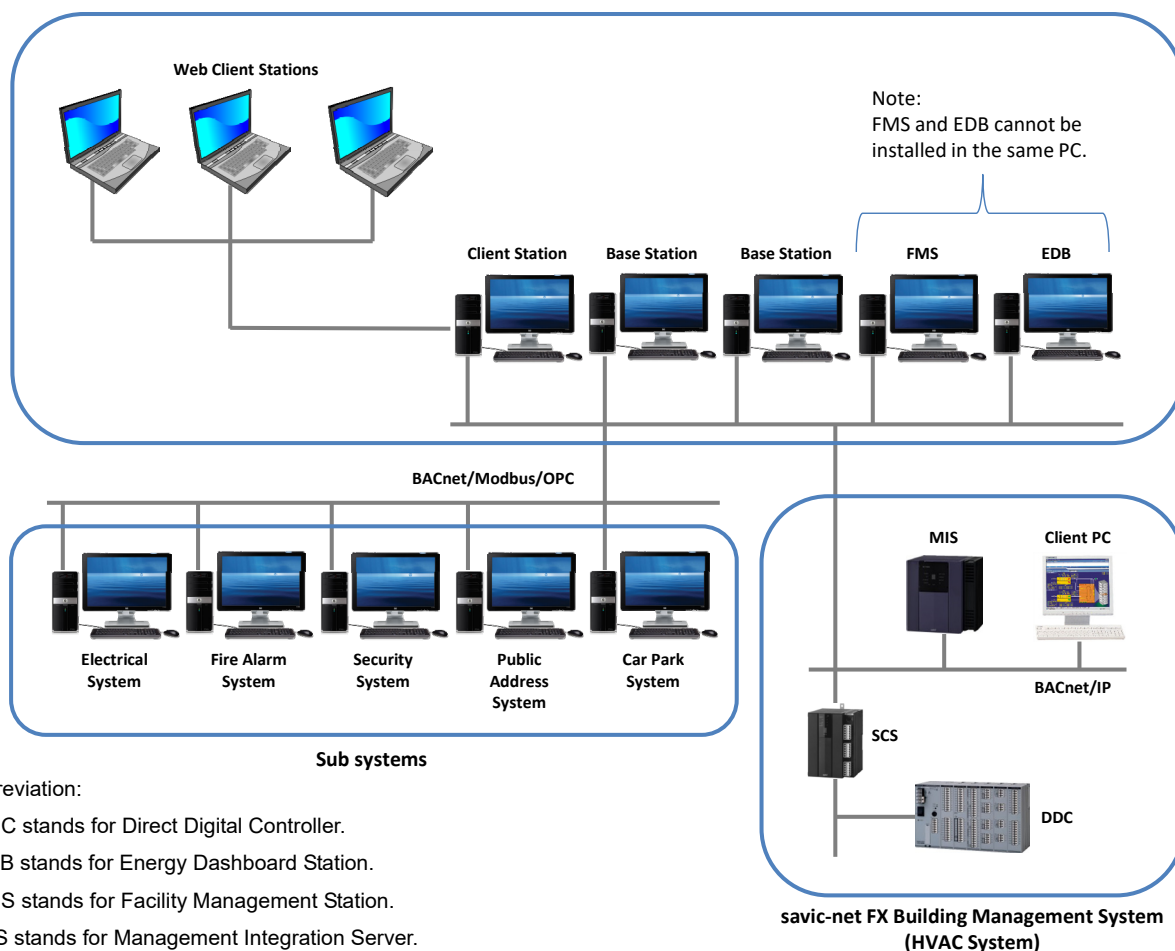
 The symbol inside  graphically indicates the actual action to be carried out.
(For example, the sign on the left indicates general instructions.)

 **CAUTION**

-  • Installation must be performed by qualified personnel in accordance with all applicable safety standards.
-  • Use the product under the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications.
Failure to do so might cause fire or device failure.
-  • Use the product within the rated operating ranges as listed in the specifications.
Failure to do so might cause device failure.

System Configuration

savic-net™ for Integrated Building Management Systems



Abbreviation:

- DDC stands for Direct Digital Controller.
- EDB stands for Energy Dashboard Station.
- FMS stands for Facility Management Station.
- MIS stands for Management Integration Server.
- SCS stands for System Core Server.

Table 1 Devices Comprising savic-net for IBMS

Item	Description
Base Station	The Base Station consists of all the supervisory and control functions including inter-node messaging with direct access to the industrial equipment. <ul style="list-style-type: none"> ▪ Graphic ▪ Alarm & Event Management ▪ Historical Trending & Log ▪ Communication Driver (BACnet / Modbus / OPC)
Client Station	The Client Station consists of all the supervisory and control functions including internode messaging but without any direct access to the industrial equipment (no communication protocols).
Web Client Station	The Web Client Station is a Remote Control and Monitoring station using a simple Web browser.
Facility Management Station	The Facility Management Station consists of the data management function for asset, facility and energy. For efficient facility maintenance, it does a data processing and analytical processing.
Energy Dashboard Station	Energy Dashboard (hereafter, EDB) is software that can show the energy consumption trend for a whole building on a large screen. It can visualize the energy data, fetching meter readings from the FMS and converting them into graphs so that users can quickly grasp the trend. Furthermore, it can show not only current data but also old data for comparative analysis.

System Integration

The savic-net for IBMS supports various communication protocols for the subsystem integration.

- BACnet/IP
- Modbus
- OPC

Functions

The savic-net for IBMS includes the application software for management, monitoring, and controls.

■ User Management

The access to the savic-net for IBMS is secured by IDs and passwords. User Management function is the one that manages the passwords and user IDs. Manager can define the access rights of both browsing and operation for each function and the point operation level according to the user ID.

■ Log Output

Records and displays all the operating logs carried out by user in list. Items to be recorded and displayed are:

- Date (YYYY/MM/DD) at the time of operation
- Time (hours, minutes, and seconds) at the time of operation
- User ID

■ Graphic

Displays the status of each facility targeted for management in graphic formats such as floor plan, cross section and schematic diagram. User is able to perform the equipment's ON/OFF operation and setpoint change operation.

A dynamic element placed on a static element of equipment or floor indicates the status of a point by changing the color of the symbol or displaying the numerical value of analog/totalizer point. The types of dynamic elements (points + screen transition) are shown below:

- Digital color change
- Digital shape change
- Analog numerical value display
- Animation
- Graphic display selection
- Screen call
- Screen transition
- Picture scanner read display

■ Alarm

If any alarm occurs, the savic-net for IBMS automatically processes the alarm. The system notifies the alarm via buzzer sounds. The system shall display the latest alarm and brink indicators. The following alarm events are available.

<Points>

- Alarm input
- Unmatched command (Failure of start/stop of start/stop points, status - unmatched)
- Analog high/low limit alarm

<System>

- Component alarm
- Power failure alarm, fire alarm

■ Alarm Notification via E-mail or SMS

Alarms are notified to the PC or mobile terminal of building manager through E-mail or Short Message Service. Alarm notification supports alarm confirmation operation in places far away from the client PC.

■ Trending

Trending function graphically displays time-series variation in measured point data such as power and temperature, time series changes of power operation status (ON/OFF), and totalized data are stored for a fixed period of time and displayed on trend graph (broken line) and bar graph (bar graph/laminated graph).

■ Report

The daily report of measured values and totalized values are prepared.

■ Time Program Control

Automatically starts or stops the equipment at the preset time.

■ Facility Management

The Facility Management function supports building operation and management work using the database. It has equipment data related to building equipment management or measurement data which comes from BMS. Those data are stored in the database for a long term.

Also, it has a graphic display function, a summarizing and analyzing function, a history record management function and a taking over function. With those functions, "Visualization" of the energy use tendency, the efficiency improvement of the management operation, and the improvement of the management quality can be achieved.

Table 2 Facility Management Functions

Function	Description
Asset management (Max. 3,000 equipment devices) (Max. 50 spec items / equipment) (Max. 1,500 repair records) (Summarized data for 15 fiscal years)	Categorizes the facility equipment in the building in terms of function group (electricity, air conditioning, plumbing, etc.) and controls the maintenance information (installed location, service life, etc.), the capacity of equipment, etc. by implementing database.
Fault management (Max. 15,000 records) (Summarized data for 3 fiscal years)	Manages the results of patrol checking, scheduled checking, and the actions for complaints, troubles reported from the regular maintenance work, and the minor repairs for which facility is not specified, by implementing in database. In addition, in order to understand the trend of troubles and to reduce the troubles, summarizes and analyzes the history data.
Maintenance Schedule Management (Max. 1,000 work items) (3 fiscal years to be managed)	Manages the yearly work schedule for regular inspection, and supports creation of the monthly work schedule based on the planned month, to manage the work reports by inputting the work records. In addition to the regular inspection plan, the plan of repair work caused by unexpected failures can be registered.
Inventory management (Max. 300 items) (Max. 15,000 receiving/shipping histories) (Summarized data for 5 fiscal years)	Manages the number of inventory for the parts of facility (V-belt, filters, etc.) or lamps by registering the number of received and shipped parts to output the usage list by the type of items, and provides the basic data of the inventory management for assessing the budget for the next fiscal year. And, manages the inventory by counting the incoming and outgoing goods.
Labor management (Max. 300 contract points)	Manages the contact point information of the facility equipment maker, construction company, distributor, maintenance company, etc. and the vendors consigned for the various works by the asset management.
Report preparation support (Daily data: Max. 1 year) (Monthly data: Max. 2 years)	In order to utilize the information and to improve the work efficiency, generates the business journal that is used to report the regular work retrieving the information from the history records of maintenance and trouble, repair history records, inventory management records, energy management record.* ¹ And, by outputting the information managed by the regular facility management functions by month, supports creation of regular work reports.
Actual Runtime Management (optional) (Max 3,000 pieces of equipment) (10 maintenance items) (Max 5 years of monthly data)	Comparing the operation log (operating time or connection count) of the facility equipment with the defined target control values, the function serves to check on whether the log data meets the target values for ensuring a better management. It helps users create Actual Runtime Yearly Report, summing up monthly operating analysis.
Alarm Data Management (optional) (Max 3,000 pieces of equipment) (Max 5 years of data or 30,000 alarm events)	The function collects the alarm data from BMS and compiles the alarm events by category, such as facility and equipment, which then can be shown in a graph form so that users can see the alarm trend and quickly figure out which equipment needs a high degree of maintenance.
Meter Reading (optional) (Max 3,000 meters: 1,500 actual meters + 1,500 logical meters) (Max 50 meter types) (Max 400 tenants)	The function serves to automatically collect meter reads, such as electricity, water, and gas, every month from the meters, which are installed for each tenant in order to invoice tenants individually, and calculate their monthly consumption. It can also detect abnormal meter readings by comparing the current consumption with the previous consumption or the consumption collected in the corresponding month of the previous year.

Function	Description
Charge Calculation* ² (optional) (Max 400 tenants) (50 expense items)	Collecting data of each tenant (each meter) consumption from the Meter Reading database, the function calculates service charges, such as electric bill, gas bill, and water bill, using the formula: the basic rate + the amount of tenant's consumption x the price-per-unit rate. With this function, the fixed charges, such as rent and common area charges, and other expenses that are manually entered by operators can also be included, which can ultimately be converted into billing reports for each tenant in print-ready form (for the international A4 paper).
Extension Management (optional)	With the web screen of client PC, tenants of the building can extend the time of operating air conditioners, lighting, etc. in the specified area. Also, they can confirm the list under being applied by themselves. The function can be applied to the devices controlled by SCS.
Facility Booking (optional)	With the web screen of client PC, tenants of the building can book a meeting room and the accessories confirming the vacant facilities. The function serves to confirm the facilities use fee while booking the facilities. After using the facilities, it calculates the actual facilities use fee. Also, it changes the rate of GST and manages the payment status of each tenant.
Help Desk (optional)	With the web screen of client PC, tenants of the building can register questions and service requests related to the facilities. The registration notification e-mail will be sent to the operators if a new service request is registered. Each request can be linked to the existing trouble history by the operator's operation. The tenant can confirm the processing status and receive the notification of the action completion.
CSV file output	Using the setting data, collection data, and operation data of the FMS, generates the CSV files freely. There is sample CSV file definition table for the products. You can change the design and create the desired CSV files. Downloads the CSV file output by the FMS server.

*¹ It is necessary to have a separate "energy management function" to use the energy management data. If there is no energy management function, the energy data required for creating the report will have to be entered manually.

*² For the Charge Calculation, please make an agreement with the building owner (those who are in charge of billing) on the billing plan and division of responsibilities.

Note:

If the management plan does not exist for the building when the FMS is installed, which is often the case for new buildings, please prepare the plan based on the standard FMS functions. As to existing buildings, which usually have their own management plans, please talk with the building owner to make sure both parties agree on the existing building management plan.

Table 3 Energy Management Functions

Function	Description
Energy Management (optional) (Max. 5,000 points: Total of actual, manual input, logical, filter points, Actual points is limited up to 2,500 points.) (Daily report data: 4 years including current year (10-minute data of digital and analog points are also stored.)) (Monthly / Yearly / Year unit report data: 15 years including current year) (Max. 600 graphs: 300 graphs for standard setting, 300 graphs for user setting)	Enables to understand the long term trend of energy consumption in a building so that you judge the energy saving operation is being carried out as intended or energy is consumed properly. Also, displays the trend of energy consumption on graphs.
Energy Dashboard (optional)	The function serves to show the energy consumption trend for a whole building on a big screen. It can visualize the energy data, fetching meter readings from the FMS and converting them into graphs so that users can quickly grasp the trend. It can show not only current data but also old data for comparative analysis. The Energy Dashboard offers graph views, including Representative screen (the multiple graphs view) and various Individual screens (the single graph view), which appear one after another in the slide show. Users can stop the slide show and have one of these view screens keep showing.

Specifications of Energy Management Functions

Functions

Item	Specification
Register of Setup Information	Registers point setting, calculation information, and graph information.
Collection and processing of data	Collects time series data, processes the data into daily, monthly, and yearly reports, and saves them.
Actual point	Collects time series point data of digital points, analog points, and totaled points from BMS.
Manual input point	Composes points by manually inputting data of the points except actual points. (Note that 10-minute data cannot be manually input.)
Logical point	Processes collected actual point data into logical point.
Filter point	Filters collected actual point data by time zone or status points and creates filter point.
Display of graph/graph data	Creates graphs of specified points in preset graph settings and displays the graphs.
Indication of standard line	Sets 2 standard values respectively for right and left vertical axes of time-series graphs (trend, bar, stacked bar).
Save of graphs	Outputs displayed graphs into a file in PNG format.
Save of graph data	Outputs displayed graph data into a file in CSV format.
User menu setting	Creates user graph menu composed of the graphs selected by user from the registered graphs.

Data collection

Item	Specification
Target points	Digital, analog, totaled points: Total of 300 points (Manual input, logical, and filter points are included.)
Collection cycle	Automatic: 1 collection/hour

Data type

Item	Specification
Digital point	Status*, operating time, connection count
Analog point	Reading*, average, maximum, minimum
Totalized point	Deviation, reading

* 10 minute data of status/reading point is stored.

Data processing

Item	Specification
Logical operation	<ul style="list-style-type: none"> • Four arithmetic operation (e.g., used for addition/subtraction of consumption, unit conversion) • Operation based on period coefficient set for every month (e.g., used for cost conversion) • Conditional operation (e.g., used for withdrawing data only in cooling mode by using cooling/heating decision point.) • Functional operation (used for absolute operation to calculate energy based on temperature difference, for value conversion from analog data to totalized data, for enthalpy operation to calculate analytical data, etc.)
Filtering	Interlock filtering (e.g., used for withdrawing necessary data by filtering with a specified time zone, status point, etc.)

Graphs

Item	Specification
Graph types	<ul style="list-style-type: none"> • Time-series graphs: Trend, bar, stacked bar, bar and trend combination, stacked bar and trend combination • Analytical graphs: Pie, scatter, histogram, status

Graph Samples

Time-series graphs

001-010-001 / Secondary Pump VVV Effect

Term 1: Aug 2008

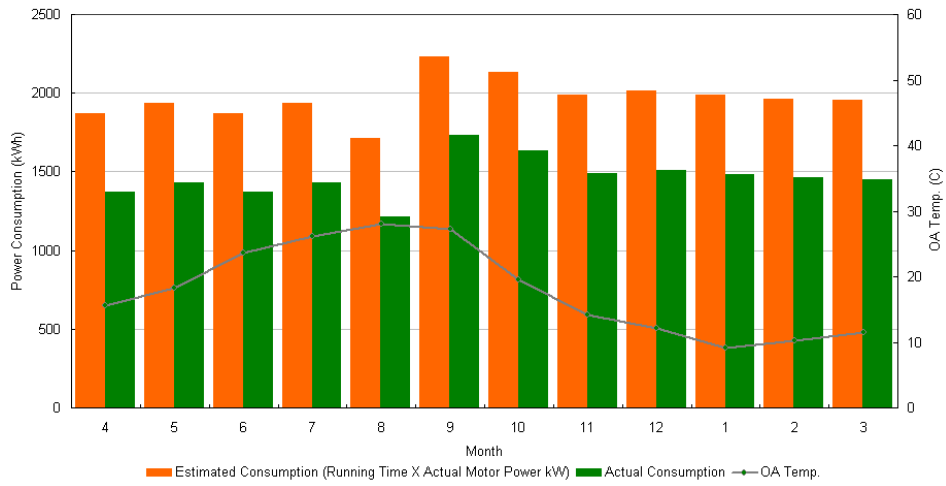


Figure 1. Time-series graph sample: Bar and trend combination

001-002-001 / Individual Power Consumption Trend

Term 1: 20XX

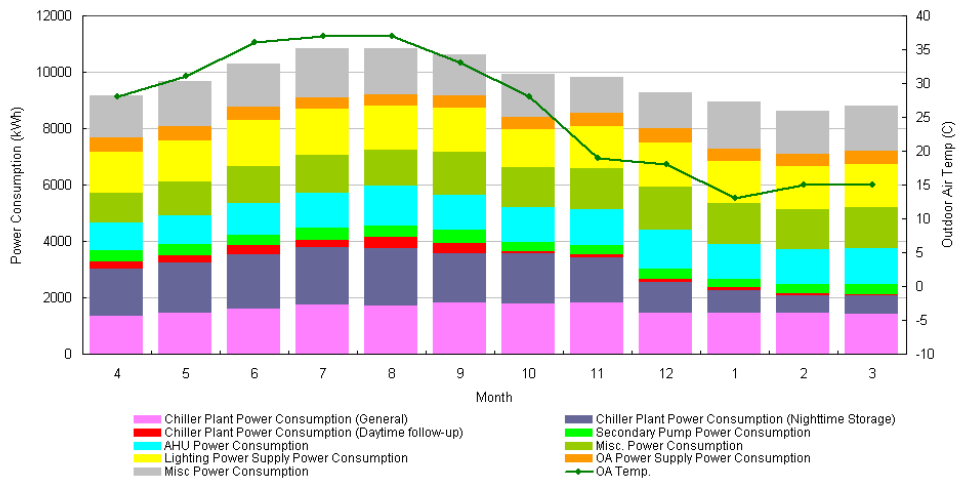


Figure 2. Time-series graph sample: Stacked bar and trend combination (1)

001-001-005 / CO2 Emission

Term 1: 2008

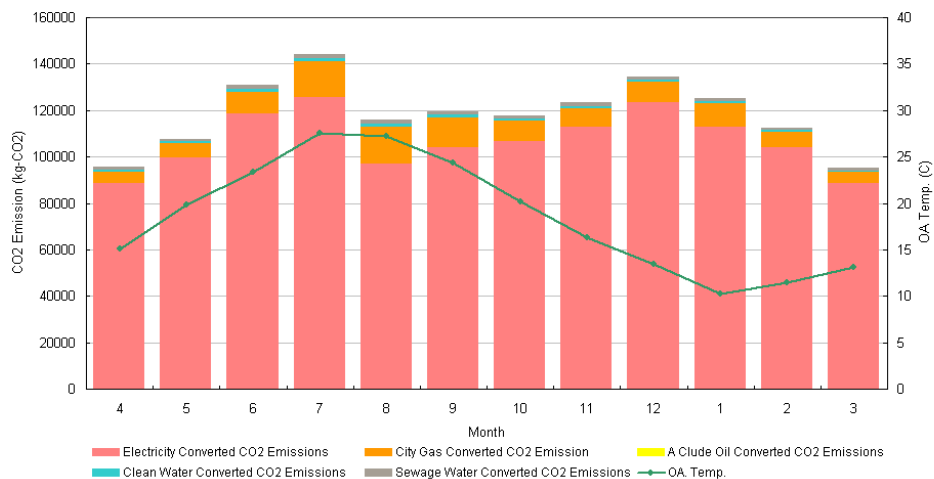


Figure 3. Time-series graph sample: Stacked bar and trend combination (2)

001-005-014 / Chiller Runtime Transition

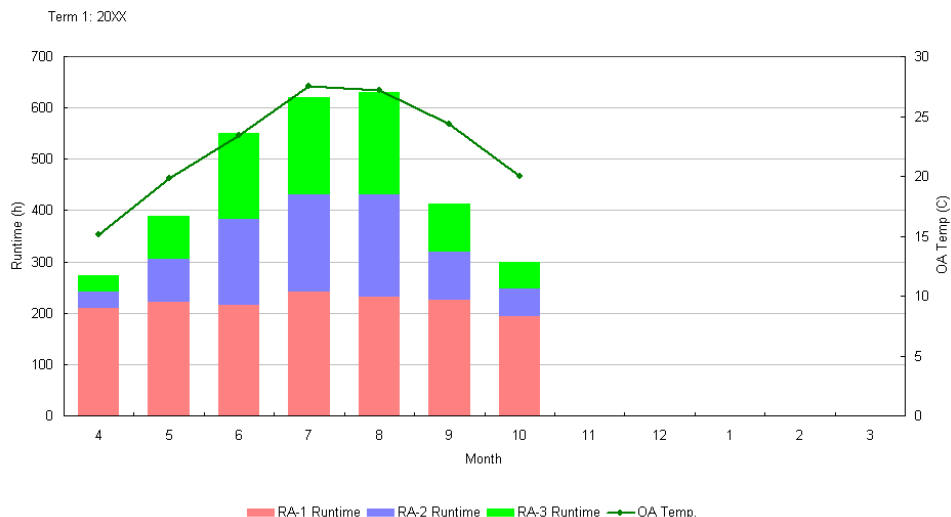


Figure 4. Time-series graph sample: Stacked bar and trend combination (3)

Analytical graphs

001-003-001 / Power Consumption Ratio per Division (Pie)

Term 1: 20XX

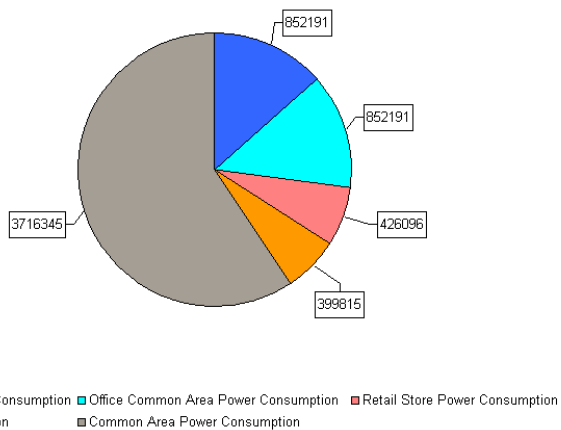


Figure 5. Analytical graph sample: Pie chart

001-005-011 / Chiller Plant System COP - Energy Correlation

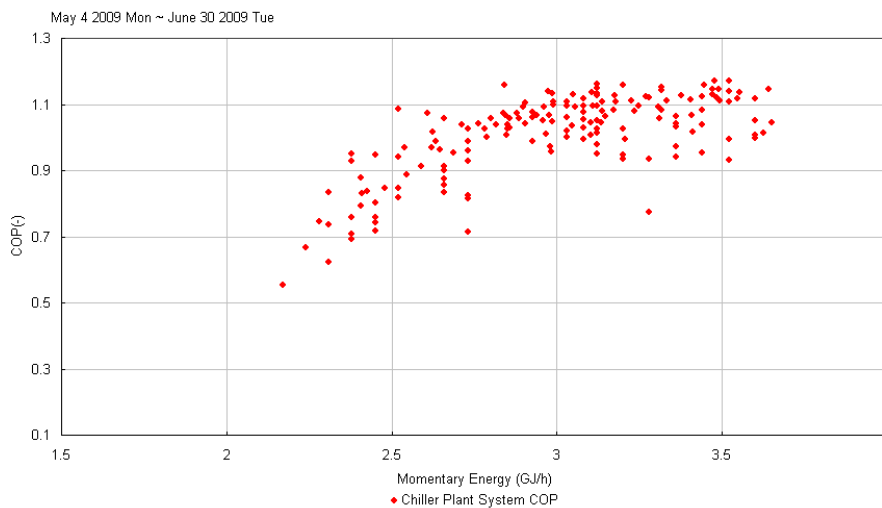


Figure 6. Analytical graph sample: Scatter (1)

001-011-001 / Room Temp and Humi Management per Floor

*** Pink Line: Target by ES Law. Blue Flame: Bldg Mgmt Law Area ***

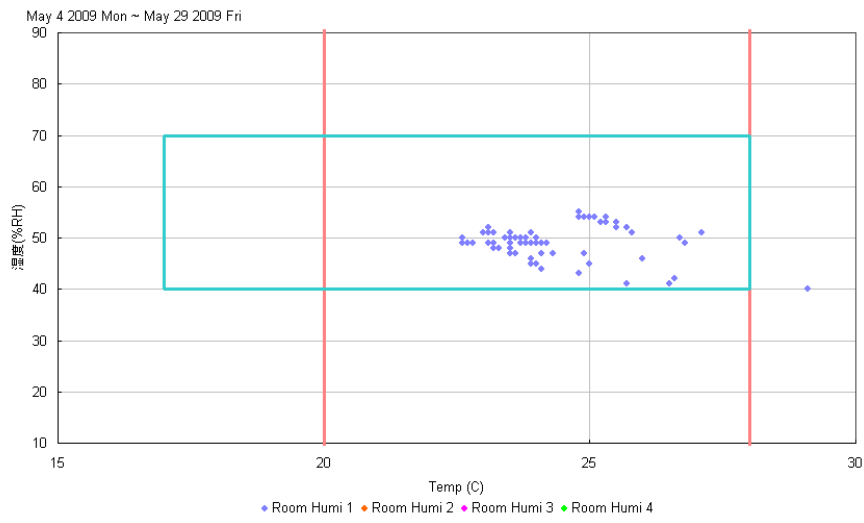


Figure 7. Analytical graph sample: Scatter (2)

001-012-001 / Frequency Management for Room Temp Setpoint per Floor

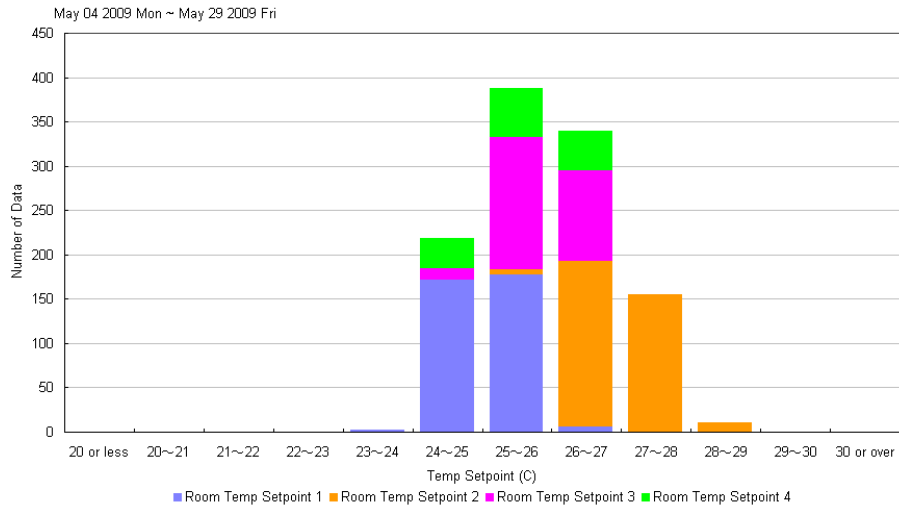


Figure 8. Analytical graph sample: Histogram

Table 4 Specifications of FMS Components - Server PC

Items	Specifications
Operating System	<p>Qualified and fully operational:</p> <ul style="list-style-type: none"> ● Microsoft Windows 10 Pro 64-bit (tested version 19H1) ● Microsoft Windows Server 2012 R2 * <ul style="list-style-type: none"> ➢ Windows Server 2012 R2 is applied to multiple web-clients system. The following functions are used by multiple tenants. So, Windows Server 2012 R2 must be selected when those functions are installed. <ul style="list-style-type: none"> - Extension Management - Facility Booking - Help Desk
Web Browser	<ul style="list-style-type: none"> ● Microsoft Internet Explorer 11 (version 11.0.9600.17031 or later) ● Google Chrome version 50 or later <p>* It can be used only for the tenant management functions (Extension Management, Facility Booking, and Help Desk).</p>
Excel	Microsoft Excel 2019 32-bit
SQL Server	Microsoft SQL Server 2008 (used with Windows Server 2012 R2)
Recommended minimum PC configuration	<ul style="list-style-type: none"> ● Recommended PC Platform: Latest model of Dell Optiplex (in case of using Windows 10 Pro 64-bit). * Please contact your Azbil Corporation sales representative to know the recommended PC platform in case of using Windows Server 2012 R2. ● CPU: Intel Core i5-3570 Processor or faster ● Main memory: 4 GB or more ● Hard disk drive (HDD): 500 GB or more ● DVD-R Drive ● USB port: 4 ports and above ● Optional: RAID card *, Additional network card <p>* Recommended model for RAID card: ARC-1110 (Areca Technology Corporation) http://www.areca.com.tw/products/pcix.htm</p> <ul style="list-style-type: none"> ● UPS: It's required to protect HDD of PC and can be shared with other systems.

Table 5 Specifications of FMS Components - Client PC

Items	Specifications
Operating System	<ul style="list-style-type: none"> ● Windows 7, 32-bit or 64-bit ● Windows 8.1, 32-bit or 64-bit ● Windows 10 Pro, 32-bit or 64-bit (tested version 19H1)
Web Browser	<ul style="list-style-type: none"> ● Microsoft Internet Explorer 9 * It is used with Windows 7. ● Microsoft Internet Explorer 11 (version 11.0.9600.17031 or later) * It is used with Windows 7, Windows 8.1, or Windows 10. ● Google Chrome version 50 or later * It can be used only for the tenant management functions (Extension Management, Facility Booking, and Help Desk).
Excel	Microsoft Excel 2019 32-bit
PDF Reader	Adobe Reader 11.0.09
Processor	Intel(R) Core 2 Duo, 3.0 GHz or faster
Main memory	4 GB or more
Display resolution	WXGA (1600x900) or more

Table 6 Specifications of EDB Components

Items	Specifications
Operating System	Microsoft Windows 10 Pro 64-bit (tested version 19H1)
Recommended PC platform	Dell Optiplex latest model
Processor	Intel(R) Core i5-3570 Processor or faster
Main memory	4 GB or more
HDD	500 GB or more
USB	4 ports or more
Monitor Resolution	1280 x 1024 or more, 1366 x 768 or more, 1920 x 1080 recommended

Table 7 FMS Basic Software Licenses

Model No.	Product Name
B S Y 4 7 2 0 0 0 0 0 3 0	FMS Maintenance Management Software License * English version, Chinese Simplified version and Korean version * Note: Maintenance Management Software License is used as a basic function of FMS, except when you use only Energy Management Software License.
B S Y 4 7 2 0 0 0 0 0 9	FMS Energy Management Software License * English version, Chinese Simplified version and Korean version * Note: Energy Management Software License can be used without Maintenance Management Software License.
	1 100 graphs
	2 200 graphs
	3 300 graphs
	4 400 graphs
	5 500 graphs
	6 600 graphs

FMS: Facility Management Station

Table 8 FMS Optional Software Licenses

Model No.	Product Name
B S Y 4 7 2 0 0 0 0 0 4 0	FMS Actual Runtime Management Software License * English version only
B S Y 4 7 2 0 0 0 0 0 5 0	FMS Alarm Data Management Software License * English version only
B S Y 4 7 2 0 0 0 0 0 6 0	FMS Meter Reading Software License * English version only
B S Y 4 7 2 0 0 0 0 0 7 0	FMS Charge Calculation Software License * English version only * Note: FMS Charge Calculation Software License is used with Meter Reading Software License.
B S Y 4 7 2 0 0 0 0 0 8 0	FMS Billing Software License * English version only * Note: FMS Billing Software License is used with Meter Reading Software License and Charge Calculation Software License.
B S Y 4 7 2 0 0 0 0 1 2 0	FMS Help Desk Software License * English version only
B S Y 4 7 2 0 0 0 0 1 3 0	FMS Facility Booking Software License * English version only
B S Y 4 7 2 0 0 0 0 1 4 0	FMS Extension Management Software License * English version only

Table 9 FMS Installation Kits

Model No.	Product Name
8 3 1 7 2 8 9 8 -	FMS Installation Kit WITH key protection
1 3 1	English version supporting Windows 10 Pro 64-bit
5 2 1	English version supporting Windows server 2012 R2

Model No.	Product Name
8 3 1 7 2 8 9 8 -	FMS Installation Kit WITHOUT key protection * Note: No USB protect keys
1 3 9	English version supporting Windows 10 Pro 64-bit
5 2 9	English version supporting Windows server 2012 R2

Table 10 Energy Dashboard Software License

Model No.	Product Name
B S Y 4 7 2 0 0 0 0 7 0 0	EDB Software License * Note: EDB Software License is used with Energy Management Software License.

Table 11 EDB Installation Kits

Model No.	Product Name
8 3 1 7 2 6 3 2 -	EDB Installation Kit
1 1 1	English version supporting Windows 10 Pro 64-bit WITH key protection
1 1 9	English version supporting Windows 10 Pro 64-bit WITHOUT key protection

EDB: Energy Dashboard



Specifications are subject to change without notice.

Azbil Corporation
Building Systems Company

<https://www.azbil.com/>