

SIEMENS



Desigo CC Compact for Building Automation Specification Texts

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1 System description

1.1 Management level

1.1.1 Management level requirements

General

All information comes together at the management level. The management level is the graphical, interactive interface for the operator to the automation station and the integrated plants and plant parts.

The operator can display, query, process, save, or print any plant information via the peripheral units at the management level. System operation must be based on a simplified approach. The plants are displayed in synoptic images and the values and states are presented and displayed dynamically.

Specified products: Siemens / Desigo CC Compact or similar.

System openness

The control system supports standard protocols used in building technology, including BACnet, OPC DA (Data Access), Modbus, and S7.

Specified product: Siemens / Desigo CC Compact or similar

Exchange of data to external system via web services

The exchange of data (values, events, and trend data) between other building systems, corporate applications, or other supplemental services, must be supported via web services.

Specified product: Siemens / Desigo CC Compact or similar

Data exchange via various subsystems

If several subsystems are used, various data must be exchanged between the automation level (outside temperature, demand and coordination signals, etc.).

Specified products: Siemens / Desigo CC Compact or similar

System-wide self-monitoring

The system must be capable of monitoring running applications, printers, and all connected subsystems. The system must report an event in case of an exceptional state.

Specified product: Siemens / Desigo CC Compact or similar

System analysis

Detailed analysis on system and user activities must be available in chronological order.

Specified product: Siemens / Desigo CC Compact or similar

SCADA platform

The management station must be based on a SCADA platform that is compatible with the BACnet B-AWS profile. It must permit integration of any building installation including HVAC and lighting.

Specified product: Siemens / Desigo CC Compact or similar

Operating system for building automation and control system

All data servers, operator stations, etc., for the BAC system must be compatible with the most current, generally available Windows 64-bit operating system. As a result, the current version of

Windows (at least 6 months after release by Microsoft) as well as a minimum of the last Version is supported. Modifications to the customer network must be possible. The BACS system must therefore be installable on any common PC and offer a multitasking environment where a user can run multiple applications simultaneously.

Specified product: Siemens / Desigo CC Compact or similar

Long term storage

The system must be able to store and archive data for a period of more than 10 years, allowing as an option segregation of stored data in different groups that can be tuned individually with different recording frequencies. Remounting of offline archived data must also be allowed.

Specified product: Siemens / Desigo CC Compact or similar

Help functions

The software includes an online help, context sensitive as well as indexed, a glossary, and can be searched by terms or sentences.

Specified product: Siemens / Desigo CC Compact or similar

System up-to-dateness

Product lifecycle

The system provider must offer a transparent product lifecycle to ensure the required consistency. All equipment offered for this project must be contained in the current product portfolio.

The existing system environment must allow for easy and smooth integration of devices and extensions.

Specified product: Siemens / Desigo CC Compact or similar

System continuity

Products used must have a label for a global standard that ensures inaction with products from various manufacturers. Products with these labels can also be combined if manufactured at intervals of more than 10 years.

Specified product: Siemens / Desigo CC Compact or similar

Hardware requirements

Embedded Hardware

Special purpose embedded hardware is required for small and / or mid-sized sites. The hardware and software environment must fulfil the following definition:

- Type: Embedded
- Processor: Intel Celeron N2930, Intel Atom E3827, Intel Celeron 4CJ1900
- Memory: 8GB
- Hard disk: 100GB SSD
- Network Card: Gigabit speed
- Graphics Card: Onboard graphics adapter with integrated processor

Minimum Software environment:

- Win10 IOT Enterprise 2016 LTSC
- Microsoft SQL Server 2014 – Express Edition

Network Requirements:

- Local network
- Single subnet

- 100 Mbps up/down
- Support Wake on LAN

Defined range

- 1 server

Max number of objects = 10,000

Specified product: SIMATIC Nanobox IPC227E

Standard Hardware

Small-Medium system (up to three clients)

One client/server system is required for small and mid-sized sites. The hardware and software environment must fulfill the following definition:

- Type: Workstation Tower
- Processor: Core i5 high-end (for example Intel Core i5 4690K), Core i7 mid-range (for example Intel Core i7)
- Memory: 16GB
- Hard disk: 1 TB (for example Western Digital Red)
- Network card: Gigabit speed
- Graphics card: Onboard graphics adapter (for example Intel 4600HD), or Mid-range graphics card (for example GeForce GT 730, AMD Radeon, Radeon R7 250)

Recommended software environment

- Windows 7 Professional, Service Pack 1, 64 bit
- Windows 10 Professional, 64 bit
- Windows Server 2012 R2 or 2016
- Microsoft SQL Server 2012, SQL Server 2014, SQL Server 2016 (Express, Standard or Enterprise)

Network requirements

- Local network
- Single subnet
- 100 Mbps up/down
- Latency less than 10 ms

Defined range

- 1 server
- Max number of objects = 25,000 (according to HW Category)

1.1.2 User profiles

User privileges

The building automation and control system must allow engineers to define, change, or delete predefined configurations as per their user privileges.

Specified products: Siemens / Desigo CC Compact or similar

Simplified Operator Interface (Lite UI)

The building automation and control system must allow operators to efficiently maneuver the controlled equipment. The navigation within system applications and components is achieved by thumbnail icons and via grouping of functionalities.

A simplified operator interface is assigned to system users. The interface can be applied to more

than one user. The following functionalities must be by default available for the system Operator:

- Managing of System Events (alarm management)
- Operate the installation via graphic application
- Navigate via thumbnails
- Time Scheduler
- Trend Viewer
- Log Viewer
- Report Application
- Document Viewer
- Remote Notifications

The operating interface shall include workflow-based documentation that helps the operator to manipulate the management station. The document shall be provided in PDF format.

Specified products: Siemens / Desigo CC Compact or similar.

1.1.3 Graphics

General

Operating interface to CAD system

The user interface must allow users access to various system schematics and floor plans using graphical depictions, menu selections, and data point assignments. The graphics software must also permit the import of CAD symbols (DWG, DXF format) or scanned images for use in the system.

Specified product: Siemens / Desigo CC Compact or similar

Operating messages

Operating messages must be able to be displayed and evaluated on the management level. Graphics must be able to display data point states that are overwritten by a local priority switch. This on data points that were developed to supplying by local override.

Specified product: Siemens / Desigo CC Compact or similar

Full graphics mode

A fully graphics-based management level with ergonomic and freely scalable images must be available. The system must be developed to operating, monitor, optimize, and log all connected subsystems in real time.

Specified product: Siemens / Desigo CC Compact or similar

Graphics generation

Based on their user rights, operators must be able to add, delete, and edit system graphics and state texts for digital data points from the standard user interface without external or special tools.

Specified product: Siemens / Desigo CC Compact or similar

Navigation

Graphic displays must include the ability to dynamically zoom and switch among various layers with different information. For efficient navigation in clients and smart devices, the system must provide thumbnail based navigation for the operator (click once) when the Simplified User Interface is being used.

Specified product: Siemens / Desigo CC Compact or similar

In graphics commanding

The system must offer graphic objects which can be used to command or control the system. At a minimum, sliders, buttons, text boxes, dropdown lists and radio buttons must be included

Specified product: Siemens / Desigo CC Compact or similar

Visualize the quality state in the plant graphics

A violation of energy efficiency limit values for measured values of primary plants (e.g. centralized air handling, energy generation) must also be displayed in the plant graphic directly on the application components or function. The parameters for monitoring, evaluating and forming the quality state can be set directly in the plant graphic based on read and write access rights.

Specified products: Siemens / Desigo CC Compact or similar

Pictures

Graphic symbols and standards

Plant graphics must meet the ergonomic needs of the operator. The displayed graphic symbols must correspond to the generally valid standard for HVAC symbols (DIN EN 62424 (VDE0810-24)) and ASHRAE guidelines. The symbols must be supported as 2 and 3 dimensional graphics. The ability is required to create colored floor displays and system diagrams for each mechanical facility including AHU, chilled water plants, hot water boiler systems, and room operator units. Associated print outs of standardized plant images must be added to the bid.

Specified product: Siemens / Desigo CC Compact or similar

Object-oriented graphics

The building automation and control system must offer dynamic, high-resolution graphics. The graphics must be object-oriented. Each symbol must be able to display several states in the same, consistent format.

At the same time, several views must be able to be open concurrently, and all views must be updated dynamically.

Specified products: Siemens / Desigo CC Compact or similar

Continuous update and display

Measured values, setpoints, user settings, and alarms must be displayed immediately and continuously. State changes must be indicated via symbol, e.g. using animation or changing the color, in general, however, graphic presentation, or text.

Specified products: Siemens / Desigo CC Compact or similar

1.1.4 Scheduler programs

General

Management via central scheduler programs

Operate all scheduler programs online from the management level to achieve consistent, transparent operation of all integrated systems and subsystems.

Specified products: Siemens / Desigo CC Compact or similar

Scheduler programs

The system must offer the ability to operate schedulers on subsystems as well as support management station-based time scheduling.

Each currently used plant image must offer user-friendly scheduler operation.

Specified product: Siemens / Desigo CC Compact or similar

Scheduling and override

Providing calendar type formats to simplify time and data planning and override building operation is required. Time definitions must be located on the PC workstation and building controller/subsystem to ensure scheduling, even if the PC is offline. Providing the following operations at a minimum:

- Comprehensive support of all BACnet objects for scheduler, calendar, and commands.
- Daily and weekly schedules
- Ability to compile multiple data points into a logical command group to simplify scheduling (e.g. Building 1 Lighting Group)
- Ability to plan at least 10 years in advance.
- Provide filters for schedulers by name, time, frequency, and schedule.
- Provide sorting schedulers by name and schedule type.

Specified product: Siemens / Desigo CC Compact or similar

Scheduler program types

Customized scheduler program

The user can customize the schedule defining the operating mode for each plant. Switching times are defined via weekly schedule. Overriding recurring weekly schedules via local or global exceptions as well as operation via any operator unit must be possible.

Specified products: Siemens / Desigo CC Compact or similar

Customized calendar

Local or global calendar exceptions must be able to override the plant-specific weekly scheduler program. Equal calendars must be assigned priority over each other. Calendar operation must be possible via all operator units.

Specified products: Siemens / Desigo CC Compact or similar

1.1.5 Building automation and control system operation

Multiple, concurrent users

Multiple users (up to 3) must be able to work concurrently on various workspaces on the building automation and control system for efficient and comprehensive work. Plants must simultaneously be analyzed and e.g. monitored or operated via a remote station.

Specified products: Siemens / Desigo CC Compact or similar

Security

The management station integrates a portfolio of products, solutions, systems and services that includes security functions that support the secure operation of plants, systems, machines and networks. In the field of Building Technologies, this includes building automation and control, 3rd party devices, and other systems.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement, and continuously maintain a holistic, state-of-the-art security concept.

The end user shall take responsibility for preventing unauthorized access to plants, systems, machines and networks which should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures

(e.g. firewalls and/or network segmentation) are in place.

Additionally, the supplier shall provide guidance and consultation on how to implement security measures in the management level and embed protection mechanisms to prevent unauthorized accessing.

Specified products: Siemens / Desigo CC Compact or similar

Access Protection

Multiple users must be able to maintain and operate efficiently the plant. For security reasons, passwords must be assigned to authorized users, to guarantee transparency for tracking or authorization purposes. At least two user groups are predefined by default, and different rights must be assignable:

- Engineer (Engineering of the System)
- Operator (Operating of the System)

Specified products: Siemens / Desigo CC Compact or similar

Windows authentication

The building automation and control system password management must meet the customer's IT guidelines. In other words, the customer's corporate standards, also apply to the BAC system. Therefore, password management and the associated properties must comply with standard Windows log on and verify the operator on each workstation.

Specified product: Siemens / Desigo CC Compact or similar

Operating functions

Central setpoint shift

The setpoints in the rooms must be adjustable and shiftable for effective and clear room operation for the rooms as an entity and individually via the building automation and control system.

Specified product: Siemens / Desigo System or similar

1.1.6 Alarm handling

General

Alarm function

The automation station contains an image of the physical data points. Each data point must be alarmable. Parameterization via operator units must be possible. The alarms either do not require acknowledgement, i.e. they come and go without acknowledgement, or must be acknowledged or reset and acknowledged.

Specified product: Siemens / Desigo System or similar

Alarm message

Alarms from the automation station must be displayed on the operator units within 1 second. Alarms must be acknowledged, or acknowledged and reset, dependent on access rights. Delay times (e.g. feedback supervision, triggering of differential pressure monitor, filter) must be changeable via operator units.

Specified product: Siemens / Desigo System or similar

Alarm suppression

Lower priority messages, undesired reactions from objects or entire plants must be capable of being suppressed during commissioning, plant servicing or automation station start up.

Specified product: Siemens / Desigo System or similar

Alarm generation

Message handling

The building management system must support alarms generated at the automation level (substations).

Specified product: Siemens / Desigo CC Compact or similar

Alarm routing

Media independent formats

Current alarms may need to be routed independent of media at certain times to a central service (printer, email, SMS, pagers, and mobile apps). The number of data points that can be configured for remote messaging of alarm conditions. The number of remote devices that may receive system messages may not be limited. The system must support the sending of encrypted e-mails.

Specified product: Siemens / Desigo CC Compact or similar

Alarm message escalation list

The system must be able to send messages to individuals, or a group of people, and various messages to different remote devices by message priority. It must also be able to send to an escalation list, so that a message is sent to a second device if there is no response from the first device after a configurable time.

Specified product: Siemens / Desigo CC Compact or similar

Acknowledgment

Operator units for acknowledgement

All alarms (alarms and faults, errors) must be acknowledgeable after issue of individual rights from all connected workstations. For tracking reason, a time stamp and assignment (based on user account) is required.

This includes:

- Local acknowledgement (control cabinet, automation station)
- Management level
- Remote operating equipment

Specified products: Siemens / Desigo CC Compact or similar

Alarm display

Color display

Incoming alarms must be colored for quick and easy interpretation. Both order and state as well as alarm priority must be recognizable. The alarm window must be displayed as per operator needs.

Specified products: Siemens / Desigo CC Compact or similar

Alarm message content

The message texts must contain all information necessary to allocate and resolve the error. This includes at least the following attributes:

- Clear text.
- Control cabinet name
- Plant name
- Priority
- Timestamp

- Time.
- Status (acknowledged, unacknowledged).

Specified products: Siemens / Desigo CC Compact or similar

Filter alarms

The building automation and control system must offer alarm filtering. Filtering must be possible by alarm lists or priorities. Alarms are displayed in popup windows.

Specified products: Siemens / Desigo CC Compact or similar

1.1.7 Event management

Event routing and sorting

Event messages can be displayed on each workstation in a table application and must include the following information: Name, value, event time and date, state, priority, acknowledge information, and alarm counter. The system must also be able to send out an acoustic message appropriate to the event category.

Specified product: Siemens / Desigo CC Compact or similar

Event message

Event messages can be displayed on each workstation in a table application and must include the following information on each event: Name, value, event time and date, state, priority, acknowledge information, and alarm counter. Each event must also be able to send out an acoustic message appropriate to the event category.

Specified product: Siemens / Desigo CC Compact or similar

Event acknowledgement

The user can acknowledge each event directly from the list, suppress the acoustic notification, print or delete it. The interface must also have an option to deleted active, acknowledged events until it is reset to the normal state. The user must be able to navigate to information associated with a data point.

Specified product: Siemens / Desigo CC Compact or similar

Event treatment

The system must provide multiple alarm-handling options. These are to be configured in alignment the standard operating procedures.

Fast Treatment

The user must be able to acknowledge each event directly from the event list, suppress the acoustic notification, print or delete it. The interface must also have an option to deleted active, acknowledged events until it is reset to the normal state. The user must also be able to navigate to information associated with a data point.

Investigative Treatment

From the event list, operators shall have the ability to quickly focus on the source of the event, and all information (recent history, schedules, and so on.) related to the event source.

Specified product: Siemens / Desigo CC Compact or similar

1.1.8 Report generation

Reports

Report generation

The system must allow generation of customized or predefined reports, to provide important plant data at any time. The reports must be printable and exportable as a PDF file. The data must be able to be edited in other programs (Microsoft Excel or Microsoft Access) for further analysis.

Specified product: Siemens / Desigo CC Compact or similar

Standard report templates

Template to generate detailed reports at little effort. At least three different report templates must be available.

- Reports to record alarm and fault states
- Reports to record logbook entries
- Reports to record plant and control cabinet states.
- List of all current data points in an override state
- List of all disabled data points
- List of alarm strategy definitions
- Overall data point report
- Data point trend data listing
- Initial value report
- User activity report
- Event history report

Specified product: Siemens / Desigo CC Compact or similar

Customized report templates

The system must permit generated, specific reports as well as individual report templates that may include graphics and trend views.

Specified product: Siemens / Desigo CC Compact or similar

1.1.9 Remote operation

Operating options

Via web browser

User must be able to remotely operate and engineer plants regardless of location. Of course, this openness cannot place the plant security at risk. The client must run on a browser as a full trust client application.

Specified product: Siemens / Desigo CC Compact or similar

Desktop Installed client

User must be able to remotely operate and engineer plants regardless of location. Of course, this openness cannot place the plant security at risk. The client must operate as a fully installed software installation, locked with a desktop and prevents in this manner software from being minimized or hidden by other applications.

Specified product: Siemens / Desigo CC Compact or similar

Via App

User must be able to remotely monitor and control the connected system via a smartphone or tablet App for Android and iOS. The app must allow to view and manage the events. A secure network connection between the System and the App must be established. The App must be intuitive and easy to operate without the need to reconfigure the system.

Specified product: Siemens / Desigo CC Compact or similar

1.1.10 Trend data

Analyses

Simultaneous, multiple trends

Multiple trend views must be possible simultaneously to provide a comprehensive plant overview. Standard plants from small to medium complexity (as in this project) require a simultaneous display of up to 10 trend curves on the current page view to assess the plants. Multiple trend curves must thus be recorded at the same time.

Specified products: Siemens / Desigo CC Compact or similar

Record history data, trend

Vital data points and setpoints must be saved for each building services plant. The polling time is oriented to the signal type, i.e. analog values are recorded cyclically while digital or multistate values are recorded by event.

Specified products: Siemens / Desigo CC Compact or similar

Intermediate storage of history data

Trend data are collected in the automation station and transferred to the management level after a specific time has expired or specific number of data has been recorded. Trend data may not be lost if the management station is unavailable temporarily.

Specified products: Siemens / Desigo CC Compact or similar

Trend comparison

The system must offer a time adjusted trend view to run analysis of changed conditions at various times.

Specified product: Siemens / Desigo CC Compact or similar

1.2 Connectivity

1.2.1 General

Interfaces

The building automation and control system must be scalable to ensure long-term operation and provide all standard interfaces commonly available on today's market.

Specified product: Siemens / Desigo System or similar

Integrate Third-party devices via OPC

The OPC Foundation must test and certify the system, which must be able to integrate and edit OPC data, and yet supply real time OPC data as an OPC server. System processing must include alarming, trend, scheduler, reporting, and be able to communicate with other devices.

The system must support the OPC specification:

- OPC DA (Data Access)

Specified product: Siemens / Desigo CC Compact or similar

Integrate via Modbus TCP

The management station must support communication to Modbus TCP/IP devices and sub systems directly from the management station.

Specified product: Siemens / Desigo CC Compact or similar

Integrate Simatic Devices

The management station must support native integration of Simatic Devices (S7 300/400/1200/1500)

Specified product: Siemens / Desigo CC Compact or similar

1.2.2 Standard BACnet / AMEV

DIN EN ISO 16484-5 / AMEV

AMEV (Management station) AMEV Profile MBE-A and MBE-B

The management stations must meet AMEV profiles MBE-A and MBE-B as per AMEV guideline "BACnet 2011" V1.1.

Specified products: Siemens / Desigo Insight, Desigo CC Compact or similar

B-AWS (management station)

The required management stations match the BACnet profile B-AWS (advanced management station) as per BTL Listing and ANSI / ASHRE 135 guidelines. They must also support BACnet data points and BACnet personal safety security zone functionality. The BACnet protocol revision must be at least 13.

Specified product: Siemens / Desigo CC Compact or similar

1.2.3 Scalability and System Lifecycle

Scalability

Since the needs of any building can change anytime, the system must be able to support more advanced configurations, and therefore able to be upgraded in order to cover further requirements such as:

- Advanced reporting
- Power and Energy management
- Distributed system architectures
- Logics and macros
- Additional disciplines (e.g. Danger Management, Pharma Compliance etc.)
- Unlimited clients

The upgrade process shall be simple and ensure the minimum possible migration time.

Specified product: Siemens / Desigo CC or similar

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