**Abbreviations and Definitions**

**BMS: Building Management System**

**BAS: Building Automation System**

**CMD: Control and Monitoring Dashboard**

**RCU: Report and Control Unit**

**CU: Control Unit**

**SSi: Sensor/Stimulator Interface**

**SA: Stimulators and Actuators**

**SD: Sensors and Detectors**

**RCi: Report/Control Interface**

**RCC: Report and Control Center**

**SS: Sensors and Stimulators**

**RCCi: Report and Control Center Interface**

**BMS** or **BAS** offers a scalable range of building management and intelligent building solutions and services which increase energy efficiency and reduce operational risk in user’s facility.

The **BMS** is composed of the following building blocks:

* **CMD** for monitoring and managing facility’s physical properties such as temperature, air pressure, noise and light level, humidity, etc. **CMD’s** functions can be accessed through a web interface or a mobile application.
* **RCU** is a customizable system component to monitor facility’s behavior and report its changes automatically to **RCC** and the customer. **RCU** may command the **SA**s depending on the logic programmed in **CU**. The customization and programming the logic within the **CU** is realized based on project requirements.
* **RCC** communicates with **RCU** via a link between **RCi** and **RCCi** in orderto collect and process the data received for the purpose of storing and reporting. It also hands over the instruction received from customer to be executed by **RCU**.
* **Sensors/Detectors** send the data received from detecting subsystems to **RCU**.
* **Stimulators/Actuators** alter system’s behavior based on the instructions sent by **RCU**.

**System Components Description**

* **RCU** is the processing unit for collecting information and dispatching of the received instructions**.** It is the entry point of customer’s facility and comprises two interfaces ( **SSi** and **RCi** ) and **CU**. The **RCU** receives information from all the active sensors and may send command to active actuators or stimulators to alter the behavior of the system. The **SSi** is used to collect information detected by sensors and may be used to send command to **AS** for altering the behavior of the system in accordance with the customer’s requirements. The **RCi** is used to send report(s) to the costumer or the **RCC** and may receive instruction(s) to change the system behavior directly by the system user.
* **CU** is a programmable element of the system which receives the collected data from **SD**s and may act upon obtaining them to change the system behavior by instructing the **SA**s based on the logic programmed in its memory. Realization of control unit’s logic depends on customer requirements. The algorithms and control logics programmed in control unit can act independently of the user which will result in an automated control process.
* **SSi** provides a connection point between **RCU** and **SA**s and **SDs**. Physical properties of customer’s facility will be detected by **SD**s and received by **RCU** through **SSi**. Once a change in system has been perceived the **CU** will process and may instruct the **SA**s based on the programmed logic.
* **RCi** is the interface to **RCU** for instructing the **CU** to execute a command or to send the collected changes in facility’s properties by **RCU** towards **RCC**. The **RCi** can be reached via different communication links. The three means of communication can be categorized as follows:
  + **SMS** which can be implemented by adding a GSM module to **RCU**
  + **Internet Connection** which can be utilized by employing web protocols over a standard internet or intranet connection.
  + **WiFi**

Each of the three above mentioned methods can be implemented by adding the required communication module to **RCU**.

**System Functionality and Overview**

Changes in system functionality can be categorized into two groups, manual and automated. The criterion for manual and automated changes has to be characterized by project requirements prior to system implementation. Altering the behavior of the implemented system can either be triggered automatically upon receiving an instruction from control logic within the **RCU** or it may be instructed by the user connected to **CMD**.

A manual change shall be instructed by system user and will be executed through the **RCU** after being logged and stored in **RCC**’s database. It may overwrite the automated control logic depending on specified conditions. However, an automated change in system behavior shall be initiated by implemented logic within the **RCU** based on the collected information from **SD**s and the programmed logic. Automated changes don’t need the system user consent during the triggering and execution; however system user can suppress the trigger and order the system to proceed. The condition for suppressing a trigger has to be implemented and programmed in **CU**’s logic in advance.

If **RCU** notices a change in physical properties of the facility based on the data received from **SDs**, it determines the type of response and decides whether the customer is to be informed or the existing logic can regulate the situation.

In case the customer is to decide, the **RCU** assembles an event report and sends it to **RCC** in order to inform the customer. Upon receiving the event report, **RCC** will extract the data within the report and adds it to the database. Subsequently, **RCC** informs the customer by a notification and waits to be instructed. If the instruction doesn’t arrive in time the default logic will be employed. The time limit, type of event and such has to be realized based on system requirements.

Customer can be informed by a push notification received on its **CMD** interface and may instruct the system to change. The interface might be an application installed on a smart phone or a cell phone with active SMS service. Also, **CMD** interface can be reached through a web browser.