Series: MANAGER3000+

Version:

Function: Plant Room System Manager

CLIMAVENETA

A Group Company of
MITSUBISHI ELECTRIC

MANAGER3000+ - Plant Room System Manager

General description

The equipment manufacturer in accordance with the specifications contained herein shall supply a dedicated Plant Room System Manager (PRSM) for management and control of the plant room.
The PRSM ensures to control the plant room by managing and adjusting each component directly involved in the production and the distribution of the heating and the cooling energy, therefore involving units (chillers, heat pumps and 4-pipe units), pumping groups internal the units or external but directly controlled by the units themselves.
The PRSM shall perform the following functions:

- Management of the plant load based on the direct control of the internal resources of each individual unit (compressors, valves and water pumps)
- Management of unit's staging at full load operation by limiting the number of active units thus maximizing the electrical energy consumption deriving from the use of the active pumps
- Management of unit's staging at part load operation by distributing the plant load within the available units thus maximizing the electrical energy consumption deriving from each unit
- prioritization of free-cooling mode by opening the valves of each individual free-cooling chiller in order to exploit all the available surface area offered by the air-water coils before activating the mechanical operating mode (compressors activation)
- compressor run time balancing
- reduction of the compressor starts and stops for limiting the thermal and mechanical stresses of units and preventing damage due to continuous and sudden activation
- Stabilization of the plant by limiting the over-production of thermal energy
- In temperature-based variable flow circuit control, definition of the primary circuit pumps' flow rate based on the temperature difference measured across each individual unit's refrigerant-to-water heat exchanger (applicable only for variable flow pumps installed on the machine and controlled by them)
- In pressure-based variable flow circuit control, definition of the flow rate on primary circuit pumps based on the pressure difference detected on secondary circuits (applicable only in case of pumps directly controlled by the units or build-in the units)
- In pressure-based variable flow circuit control, adjustment of the by-pass valves in order to ensure the minimum water flow rate across each individual unit's refrigerant-to-water heat exchangers in order to prevent the risk of ice (cooling operating mode)
- Visualization of graphs charting the flow and return temperatures of chilled water and low temperature hot water primary circuits
- Native web server to allow local and remote accessibility to the PRSM from any computer via web browser
- Graphical user interface (GUI) based on HTML5 "responsive" technologies to allow ease of use from any smartphone and tablet
- Integrated hot-spot to allow direct accessibility to the PRSM via any smartphone and tablet device
- Availability of a dedicated and independent high-level interface (HLI) to connect the PRSM to a LAN network via TCP / IP protocol
- Availability of a dedicated and independent high-level interface (HLI) to connect the PRSM to a BAS / BMS building supervision system (optional on request)
- Notification of the presence of serious alarms by automatically sending e-mails to all user profiles (service to be configured)
  The e-mail message must contain the following information:
    - alarm code
    - alarm date and time
    - site of origin
- Access to PRSM on three (3) distinct levels
    - "User" read only
    - "Operator", reading and modification of main plant operating parameters
    - "Maintenance", reading and modifying of mail plant operating parameters, modifying the system settings

Software architecture and operational requirements

The PRSM shall operates over the Niagara4® framework on top of which a number of specialised software modules run for taking the full control of the plant room.The PRSM shall not require the installation of any special software on any PC to connect to or operate the system.

Chart
The PRSM shall display the graphs charting main operating figures of the plant.
The graphs shall be predefined and have the following characteristics:

- Acquisition and charting of flow and return common temperatures of the primary chilled water circuit for a period not less than 30 minutes
- Acquisition and charting of flow and return common temperatures of the primary low temperature hot water circuit for a period not less than 30 minutes
- Acquisition and charting for a period of not less than 30 minutes of the outdoor air temperature

System integration and network communication
The PRSM shall operates stand-alone or can be integrated into third-party building management and automation systems (BMS or BAS).
The PRSM shall support all following standard protocols and bus:

- ModBUS RTU over IEA RS-485,
- BacNET MS/TP,
- BacNET over IP.

Software specifications and requirements for PC
The PRSM shall operate over the Niagara AX Framework®.
The PRSM shall operate over a licence-free integrated web server that allows the local and remote “system” accessibility by using the most common web browser from any PC connected to the network without the need to install any additional third-party software.
The PRSM shall not require the installation of any special software on any PC to connect to or operate the system. Freely available plug-in software available from the Internet to enable the Java Runtime Environment to support the running of applets within a standard web browser is indeed allowable.
The minimum system requirements for the remote PC are:

- MS Windows® XP, MS Windows® Vista, MS Windows® 7, MS Windows® 8, MS Windows® 10
- Web browser (Mozilla Firefox®, Microsoft® Edge, Safari®, Google Chrome®)

Electrical and control panel
The PRSM shall be composed of a pre-assembled and factory tested hardware equipment in a free-standing industrial enclosure for indoor installation. The PRSM shall be connected to each individual unit, primary and secondary chilled and hot water pump groups (when applicable), to source-side pumps group (when applicable), to temperature sensors and to differential pressure transmitters installed in the plant room.
The PRSM shall be connected to the units by means of IEA RS-485 communication network operating on ModBUS RTU protocol for the acquisition of the main operating variables from each individual unit.
Epoxy painted stainless steel enclosure built in compliance with EN60204-1 and EC204-1 standards, complete with:

- electric panel ventilation
- external glass double door
- screw terminal blocks for control circuit lines
- Power supply 230Vac +/- 10% 50Hz 1P +N+PE
- Input current 0.65A
- Maximum power absorbed 150VA

System test and configuration
Tests carried out along the all productive process as imposed by the UNI EN ISO9001:2015 requirements.
The PRSM shall come in a pre-assembled hardware integrating the main control board as well as the expansion devices according the I/Os required for each specific installation.
The PRSM shall be pre-configured by associating any logical I/O line to the correspondent physical device in order to avoid any mistake in the system configuration according to the “design once apply many” execution criteria.

Certification, reference standard

- CE - Declaration of conformity certificate for the European Community
- Low Voltage directive 2014/35/CE, EN60204-1:2006+A1:2009+as amended
- Electromagnetic compatibility directive 2014/30/CE, EN 61000-6-4:2007+A1:2011 // EN61000-6-2:2005 +as amended
- UNI EN ISO9001:2015 regulation - Company´s Quality Management System Certification
- UNI EN ISO 14001:2015 regulation - Company´s Environmental Management System Certification
- OHSAS18001:2007 regulation - Company´s Health & Safety Management System certification
- IP66 international protection code, without any panel’s modification (N 62208/02:2012; EN 60 529; EN 61439-1)

- IK08 mechanical protection code, without any panel's modification (EN 62208/02:2012; EN 62 262; EN 61439-1)
- Operating temperature -10..45°C
- Storage temperature -20..60°C
- Operating & storage relative humidity 30..90% (non condensing)