



# boss

The complete range for mobile-ready local supervision

**Connected** Efficiency

# Supervisors for medium and large sites

with built-in Wi-Fi, accessible from all mobile devices

## boss range

- Completely browsable from mobile devices, from commissioning to daily access for system maintenance;
- Built-in Wi-Fi to create a network and allow the supervisor to be accessed from the user's devices without requiring other network infrastructure.



### Energy saving & system optimisation

Algorithms for analysis and comparison, developed exploiting CAREL's experience, to facilitate and guide users in optimising energy consumption.



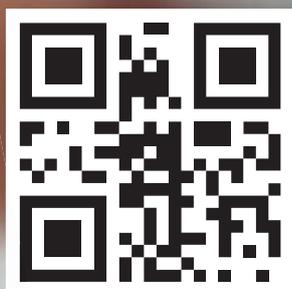
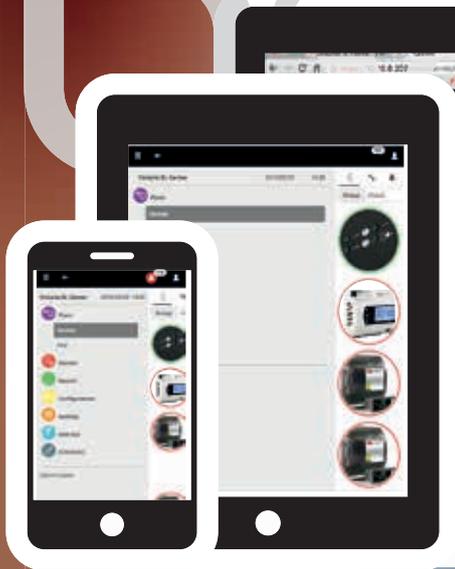
### Secure data & browsing

HTTPS protocol for secure data transfer over the web from boss to an external device. Customised operating system to guarantee system reliability.



### Intuitive & customisable interface

All the information is available to the user in just a few simple clicks, including system configuration and device management.



## boss always in your pocket

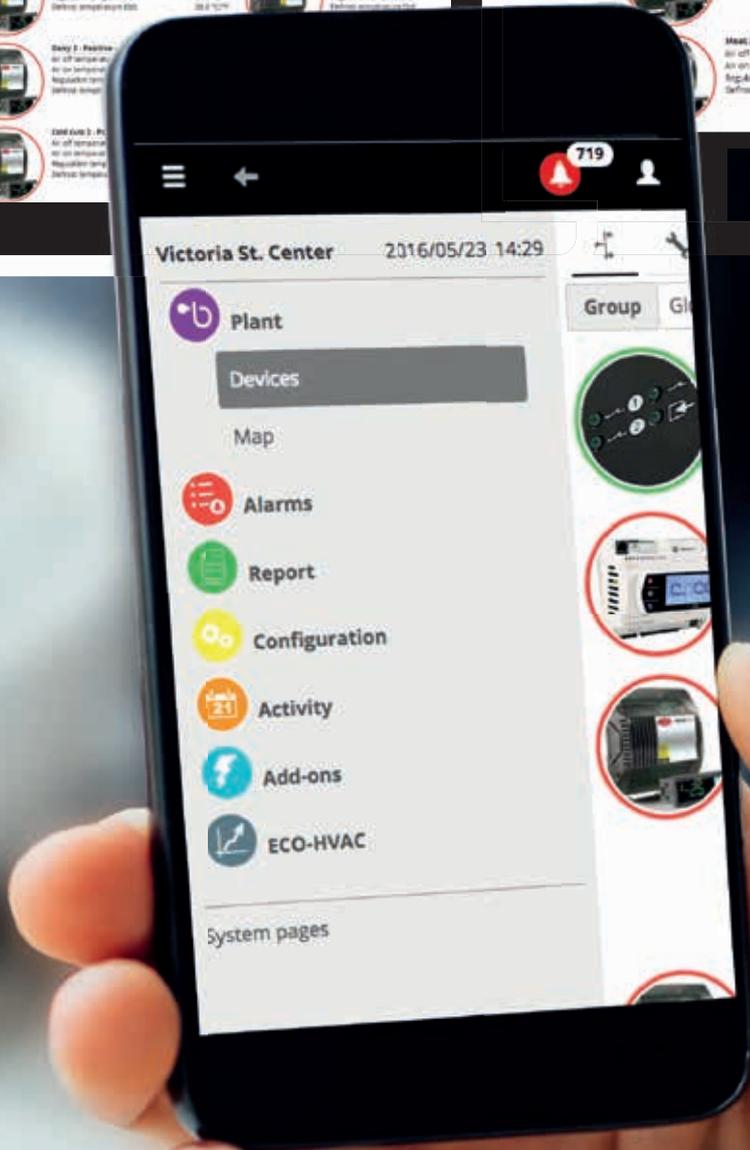
Responsive web pages offer the possibility to access all boss pages for both programming and everyday operations using mobile devices. The graphics automatically to the device they are displayed on (computers with different screen resolutions, tablets, smartphones), minimising the need for the user to resize the pages and scroll the contents.

## centralised management

boss permits automatic data and alarm synchronisation with RemotePRO, so as to keep the situation on all connected systems under control from just one interface. Centralised system management also increases reliability, through alarm analysis and scheduling of service. It also allows increased energy efficiency by comparing energy consumption and performance between the different sites and identifying possible cost reduction actions.

## remote service

Access to typical operating system functions, such as printer driver installation, copying files, etc. is also available via a web interface, another first for a supervisory system. This means that remote service operations can be performed by authorised personnel without needing to travel on site, as is required with other supervisory systems.



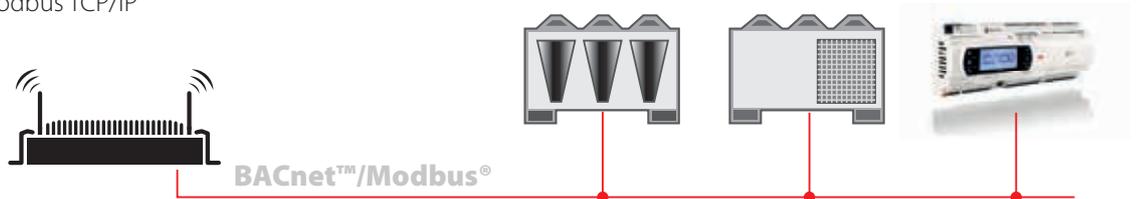
# Protocols and connectivity

For the first time ever on a CAREL supervisor, boss introduces the BACnet™ protocol, the leading protocol in HVAC supervision applications.

## Integration of third party devices

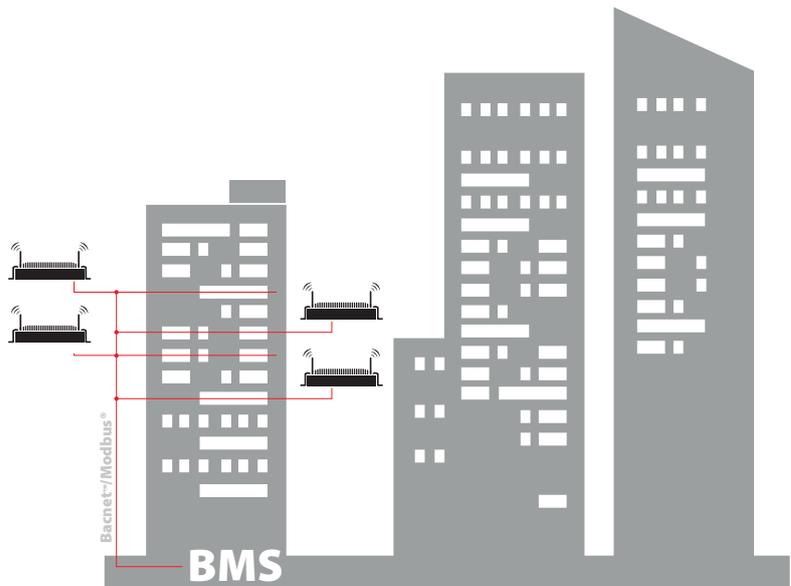
This new feature significantly increases the possibility to integrate third party devices. The BACnet™ Master protocol is available in both MS/TP (RS485) and TCP/IP modes, and together with the Modbus RS485 and Modbus TCP/IP

protocols, these too available on boss, offers the possibility to interact with the widest range of devices in the HVAC/R sector.



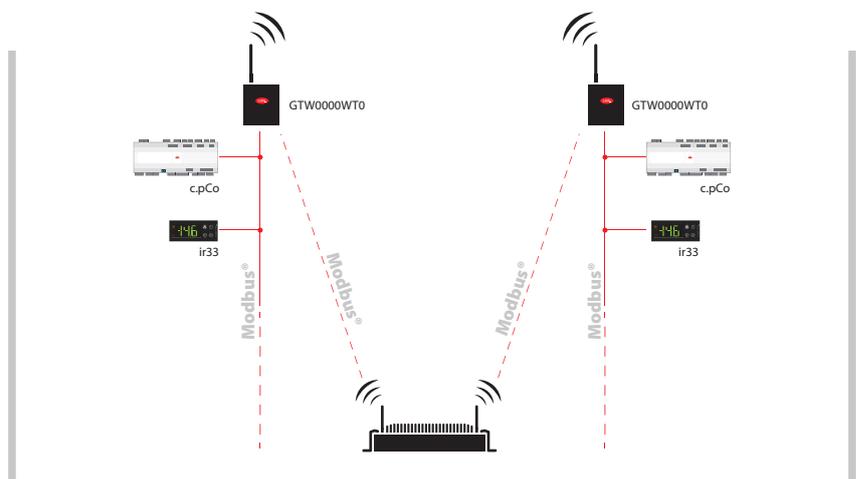
## BMS integration

In addition to Master mode, the BACnet™ protocol is also available on boss in TCP/IP Slave mode, allowing boss to be integrated into a higher-level BMS, sharing the values of interest for overall building management (e.g. unit status, alarm status, ON/OFF controls,...)



## Wireless field connectivity

If Modbus RTU devices cannot be connected directly to the boss/ boss-mini RS485 network due to installation constraints, these can be integrated into the boss system via its Wi-Fi network, using the WiFi-Modbus gateways (GTW0000WT0). Nonetheless, when a wired connection is available, this is the preferred option due to its reliability.



# System optimisation functions

## KPI Performance index



Allows users to analyse the thermodynamic behaviour of the individual units connected to boss, defining for each, or

for groups of units, the minimum and maximum operating thresholds for different variables, creating dashboards to identify which units are operating outside of the optimum conditions.

## ENERGY Consumption control and management



Allows users to monitor system energy consumption using graphs and reports, and then implement actions

aimed at reducing waste or fixing any faults highlighted.

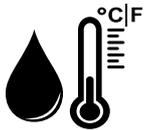
## FLOATING SUCTION Optimised suction pressure



This is used to optimise - in real time - the compressor rack working set point, thus reducing power consumption,

by analysing the duty cycle of the connected cabinets. Based on cabinet cooling demand, the plug-in increases or decreases the compressor rack set point.

## DEW POINT BROADCAST Share the dew point



This is used to optimise activation of the anti-sweat heaters on the refrigeration units connected to boss,

and consequently reduce power consumption. Connected to a room temperature and humidity probe, boss calculates the dew point in the area and sends the value to the entire network of connected units.

## SAFE RESTORE Safe compressor rack restart



This is used to manage safe and optimum compressor rack restart following a fault, in the event of specific compressor

rack conditions putting all the connected refrigeration units in safety mode.

## PARAMETER CONTROL Parameter control



This is used to monitor all fundamental parameter setting actions on the units connected to the supervisor, for

example the set point, performed either using boss or directly on the unit, and then activate restore logic, sending alerts when such occur.

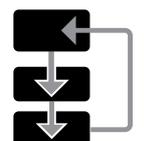
## LOGICAL DEVICE/GROUND Logical devices & logical variables



This is used to create new "virtual" variables and devices on boss, and then manage these as if they were real

variables or devices, created based on physical variables on the existing network devices.

## ALGORITHM PRO Customised logic



This is used to create additional customised logic using the Java programming language, so as to increase interaction

between boss and the connected devices.

## HVAC SMART START Optimised air-conditioning ON/OFF



This is used to optimise activation, shutdown and set point change on HVAC units based on the ambient

information acquired by boss, such as inside and outside temperature, system inertia, occupancy and air quality.

## GEO - LIGHTING Optimised management of lights based on outside light



This is used to optimise switch-on and switch-off of outdoor lights based on site

latitude and longitude, thus knowing the time when the sun rises and sets.

## SMART HIGH PURGE Optimised free cooling on HVAC units



The air-conditioning system can be started before sunrise using calculations based on system enthalpy

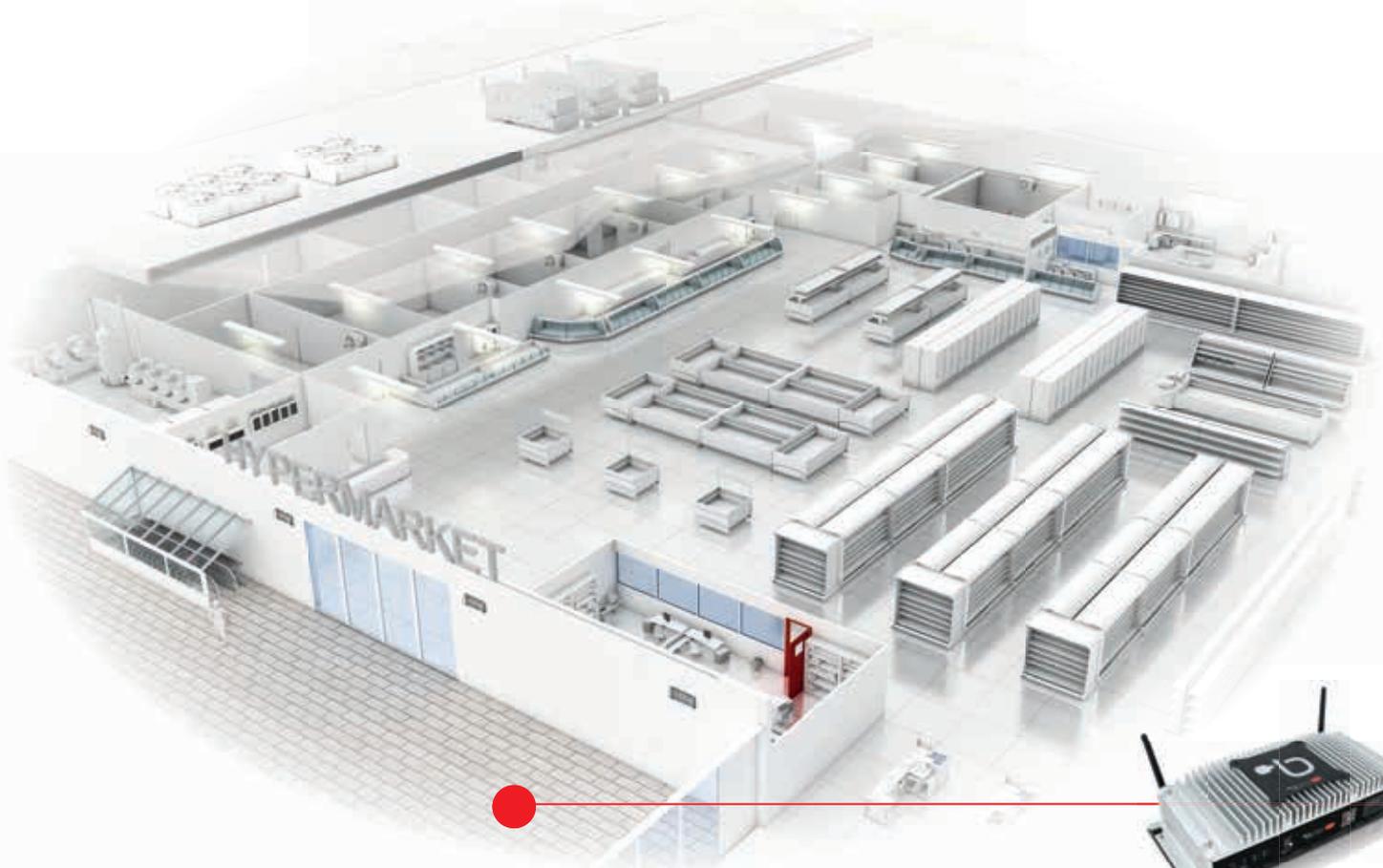
(inside and outside), so as to fully exploit free cooling.

## USAGE BALANCER Optimised unit capacity management

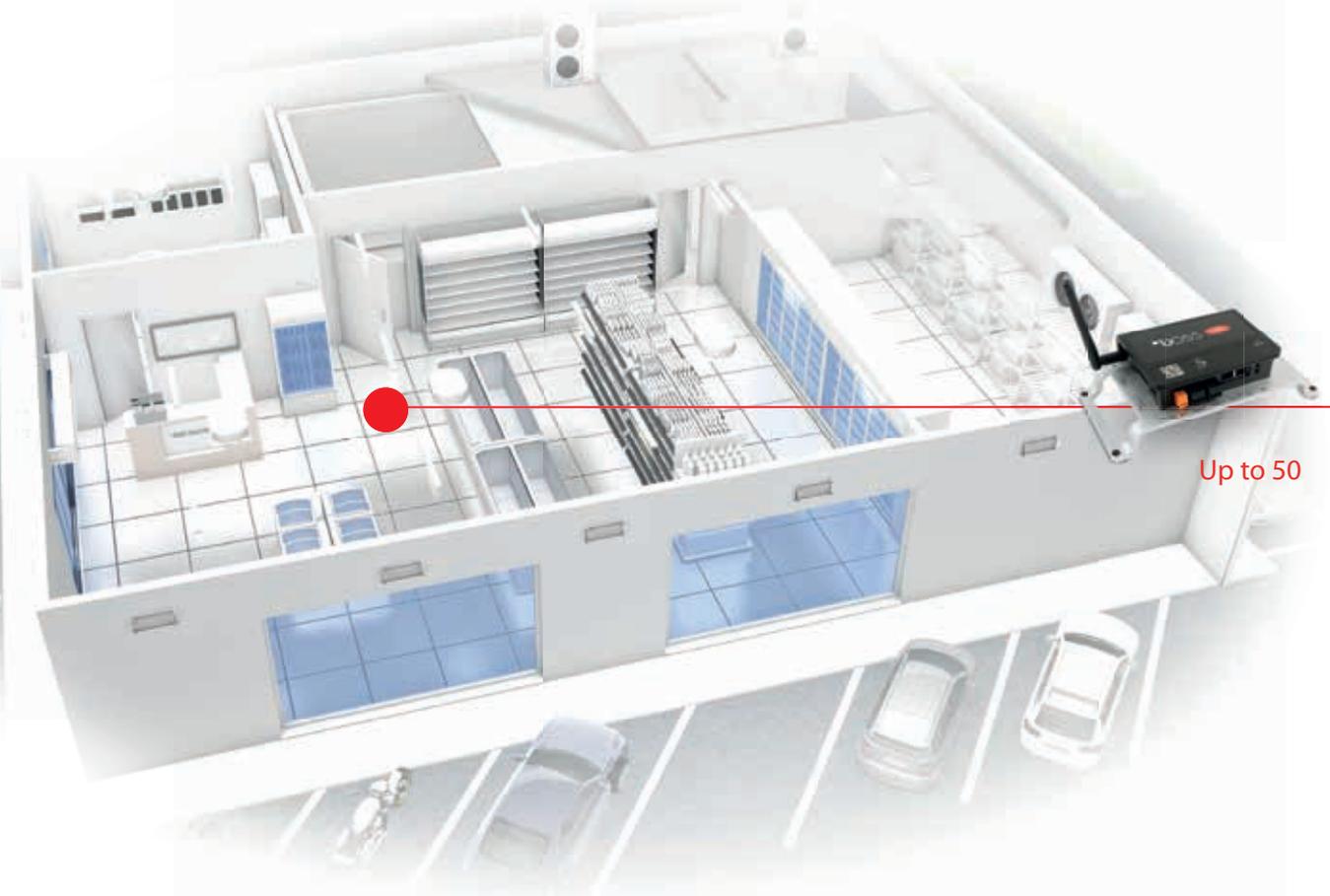


By reading the room temperature and humidity probes, the average values can be calculated so as to determine the actual

capacity required and optimise and balance the operating cycles of the various units installed (\*\*)



Up to 300



Up to 50

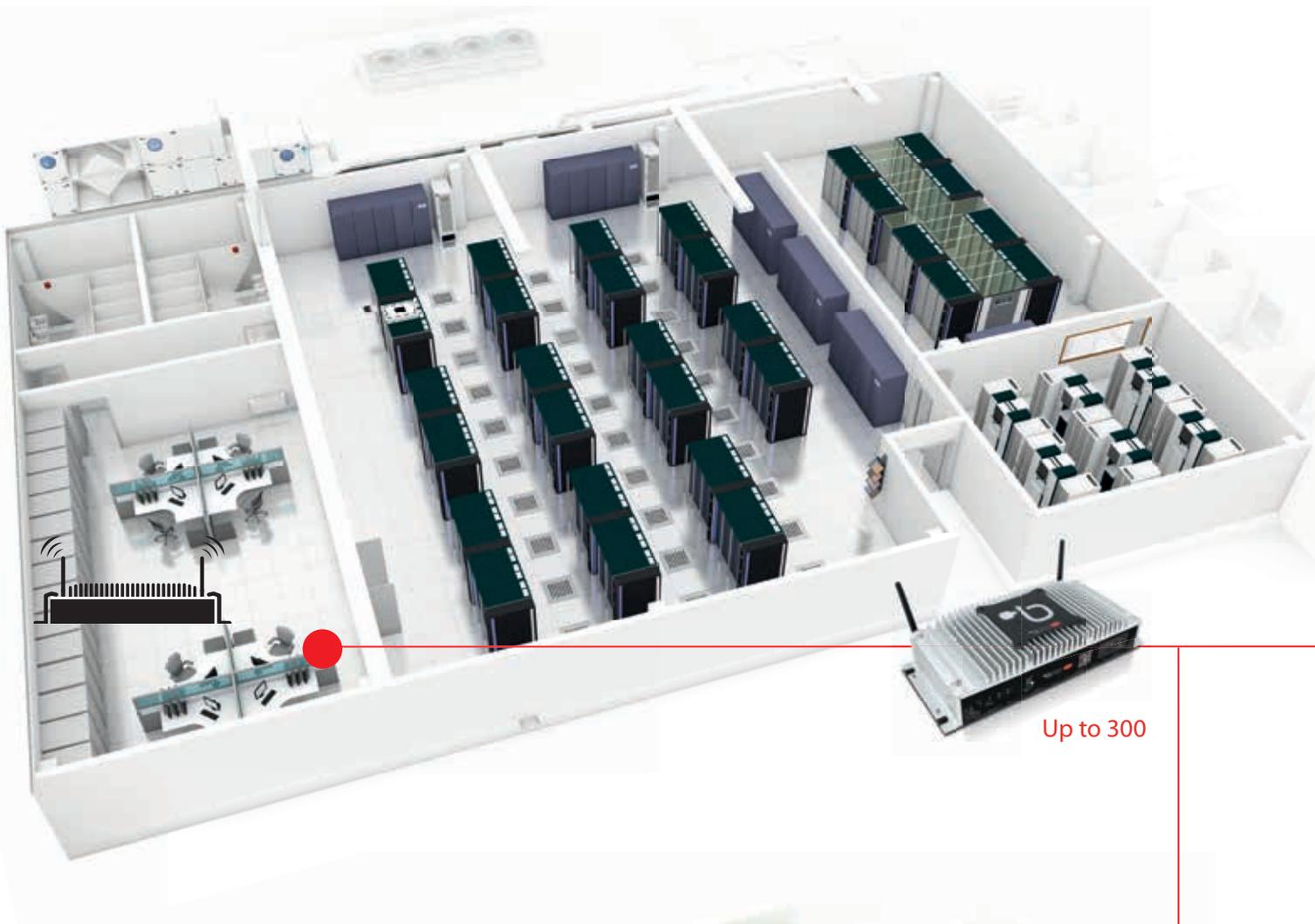
# Refrigeration applications

## Optimisation of retail systems

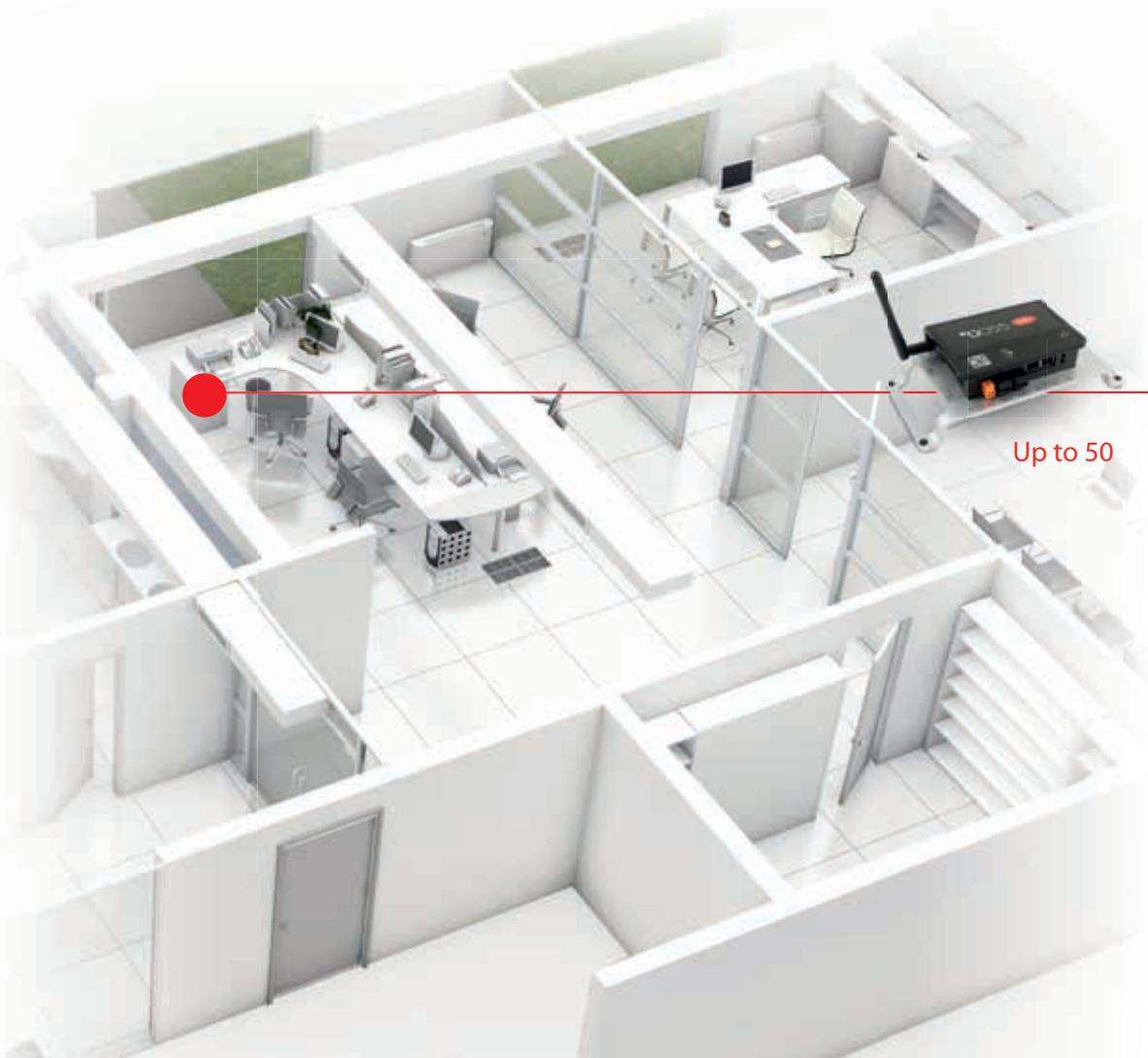
In addition to all the functions of a standard supervisor, boss all includes functions for managing refrigeration units and interaction between units, meaning not only is the system controlled, but also optimised in terms of thermodynamic performance and energy consumption.

CAREL's extensive and in-depth knowledge of these applications has also led to the development of user interfaces that are configured based on the type of user (i.e. installer, maintenance personnel, system manager) and the type of use, so as ensure simpler and faster commissioning.





Up to 300



Up to 50

# Air-conditioning applications

## Optimisation of HVAC systems

Extensive configurability, customisation of maps and the introduction of new protocols, above all BACnet, as well as the possibility to communicate with other devices via Ethernet, make boss ideal for HVAC applications.

The supervisor can also interface with other BMS systems, for example in large buildings where the main BMS manages those systems that are not included among the functions handled by boss (security, fire safety,...).

In this case, boss manages the HVAC systems, providing specific data that create added value for the end customer, and then sharing with the main BMS only the information needed to understand system status.





## Customised graphics

User interfaces that can be customised according to the way in which information is managed by different users

With the c.web tool, system status and the main variables relating to each controller can be represented using customised graphics. Indeed c.web offers several powerful features, such as the creation of vectorial images that can adapt to all screen sizes on both desktop and mobile devices without losing resolution, the possibility to develop customised animated widgets in just a few clicks, and the reusability of graphic libraries developed for one project inside another.



## The same hardware is suitable for all applications

The absence of an internal fan and heat dissipation ensured by a robust aluminium casing mean boss can be installed in many different environments, even industrial environments in which conditions are unfavourable.



Desktop

Wall-mounted

DIN rail

## Code produit

P/N	Description	Maximum number of devices controlled/variables logged
BMEST**RS0	boss-mini Monitoring System Standard Capacity - Headless	30/300
BMEST**RE0	boss-mini Monitoring System Standard Capacity - Headless	50/500
BMEST**LE0	boss-mini Monitoring System Extended Capacity - Wi-Fi / Video Output	50/500
BMHST**XS0	boss Monitoring System Standard Capacity	100/1500
BMHST**XE0	boss Monitoring System Extended Capacity	300/3500

## Code accessoires

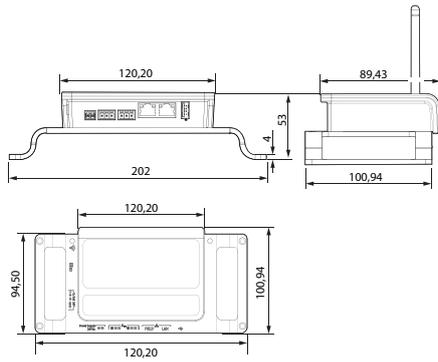
P/N	Description
BMEST01P00	Credit for 1 Plug-in for boss-mini
BMEST03P00	Credit for 3 Plug-ins for boss-mini
BMESTDNA0K	DIN rail mounting bracket kit for boss-mini
BMESTPWA00	Power supply for boss-mini, multi-country plug - 110-230Vac / 24Vdc
PGTA00TRF0	Power supply for boss-mini DIN rail - 110-230Vac / 24Vdc
BMESTRLA00	boss-mini relay expansion module
BMHST01P00	Credit for 1 Plug-in for boss
BMHST03P00	Credit for 3 Plug-ins for boss
BMHST05P00	Credit for 5 Plug-ins for boss
BMHSTDNA0K	DIN rail mounting bracket kit for boss
BMHSTMDA00	UMTS modem for sending SMS for boss / boss-mini

## Functionality

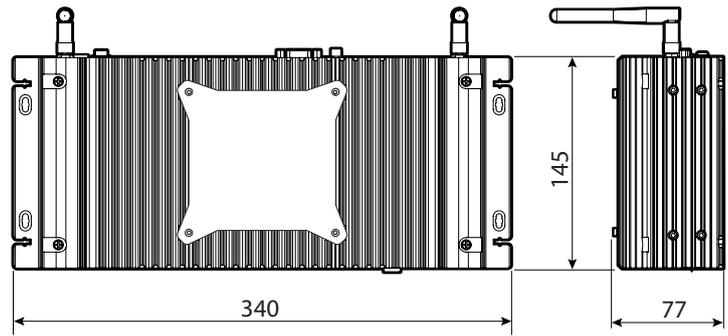
	Functions	BMHST**XE0 / BMHST**XS0	BMEST**LE0	BMEST**RS0 / BMEST**RE
HARDWARE	Integrated Wi-Fi connectivity to mobile devices	YES	YES	NO
	Video output	YES: VGA / Display Port	YES: micro HDMI	NO
	Double Ethernet port (separation of LAN / Internet connections)	Yes		
	Integrated backup memory expansion	YES with uSD memory	YES with SD memory	
	Embedded RS485 ports	2 opto-isolated	1 opto-isolated, 1 not opto-isolated	
	Integrated digital input	YES	NO	
	Temporary IP address reset button	NO	YES	
	Integrated digital outputs	3 relays with changeover contacts	3 voltage outputs @ +24Vdc	
	USB host ports	6 (2 front and 4 rear)	1	
	Status LED	8 at front (on/off, alarm, 2 RS485 ports, 3 relays, digital input)	2 at front (on/off, alarm)	
	Possibility to connect an external UMTS modem to send SMS messages	Yes		
	Power supply	100-240 V~ 50-60 Hz (power supply module input)	24Vdc	
	Operating temperature	from 5 to 45 °C		

SOFTWARE	All pages responsive	Yes		
	Graphic customisation with HTML5 / SVG technology	YES (using c.web tool)		
	Web connection with encrypted protocol (HTTPS)	Yes		
	Third-party device integration	YES (using device creator tool)		
	Minimum variable sampling time	5 sec	30 sec	
	Modbus RTU Master protocol	Yes		
	Modbus TCP/IP Master protocol	Yes		
	Data synchronisation with RemotePRO	YES (cost 1 plug-in credit)		
	BACnet Master Protocol (MSTP and TCP/IP)	YES (cost 1 plug-in credit)		
	BACnet Slave Protocol (TCP/IP)	YES (cost 1 plug-in credit)		
	Modbus RTU or TCP/IP Slave protocol	YES (cost 1 plug-in credit)		
	XML Slave protocol (*) (**)	YES (cost 1 plug-in credit)		
	Custom logic development by customer	YES (cost 1 plug-in credit)		
	Logical devices / logical variables	YES (cost 1 plug-in credit)		
	Performance index	YES (cost 1 plug-in credit)		
	Energy consumption control and management	YES (cost 1 plug-in credit)		
	Suction pressure optimisation	YES (cost 1 plug-in credit)		
	Parameter control	YES (cost 1 plug-in credit)		
	Compressor rack safe restart	YES (cost 1 plug-in credit)		
	Dew point broadcast	YES (cost 1 plug-in credit)		
	HVAC unit free cooling optimisation	YES (cost 1 plug-in credit)		
	Air-conditioning on/off optimisation	YES (cost 1 plug-in credit)		
	Optimised lighting management based on outside light	YES (cost 1 plug-in credit)		
	Optimised unit capacity management	YES (cost 1 plug-in credit)		
	Threshold notification	YES (cost 1 plug-in credit)		
	Maximum number of extra functions that can be enabled (plug-ins)	20	3	
Send email	Yes			
Send instant messages (Telegram)	Yes			
Send SMS	Yes			
Manual and/or automatic reports in CSV and PDF format	Yes			
Scheduled activity management	Yes			

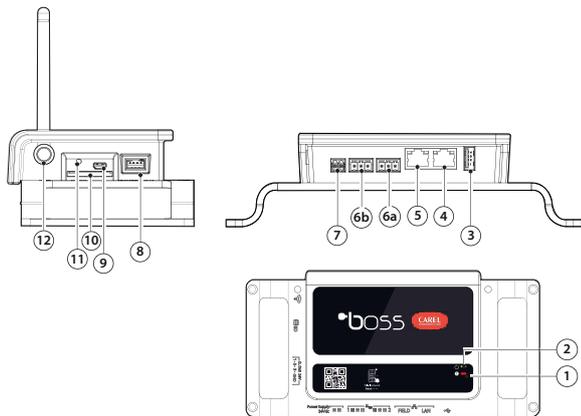
# Dimensions and key



boss mini

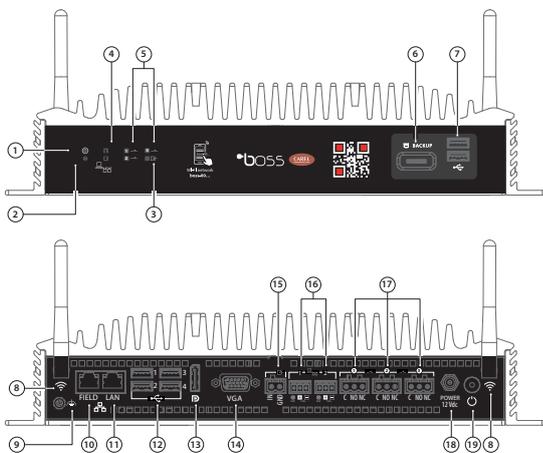


boss



### Key

- |                                     |                                |
|-------------------------------------|--------------------------------|
| 1. Alarm status LED                 | 10. SD port                    |
| 2. ON/OFF status LED                | 11. Temporary IP enable button |
| 3. USB host port                    | 12. wi-fi antenna              |
| 4. LAN Ethernet                     |                                |
| 5. FIELD Ethernet                   |                                |
| 6a: RS485 Serial non opto-isolated  |                                |
| 6b: RS485 Serial opto-isolated      |                                |
| 7. Power supply                     |                                |
| 8. Digital outputs +24Vdc (1, 2, 3) |                                |
| 9. µHDMI port                       |                                |



### Key

- |                               |                             |
|-------------------------------|-----------------------------|
| 1. ON/OFF status LED          | 11. LAN Ethernet            |
| 2. Alarm status LED           | 12. USB ports (1, 2, 3, 4)  |
| 3. Digital input status LED   | 13. Display port            |
| 4. RS485 status LED (1, 2)    | 14. VGA port                |
| 5. relay status LED (1, 2, 3) | 15. Digital inputs          |
| 6. µSD port                   | 16. RS485 line (1, 2)       |
| 7. USB ports (1, 2)           | 17. Relay outputs (1, 2, 3) |
| 8. Two antennas               | 18. Power supply            |
| 9. Earth                      | 19. ON/OFF button           |
| 10. FIELD Ethernet            |                             |

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