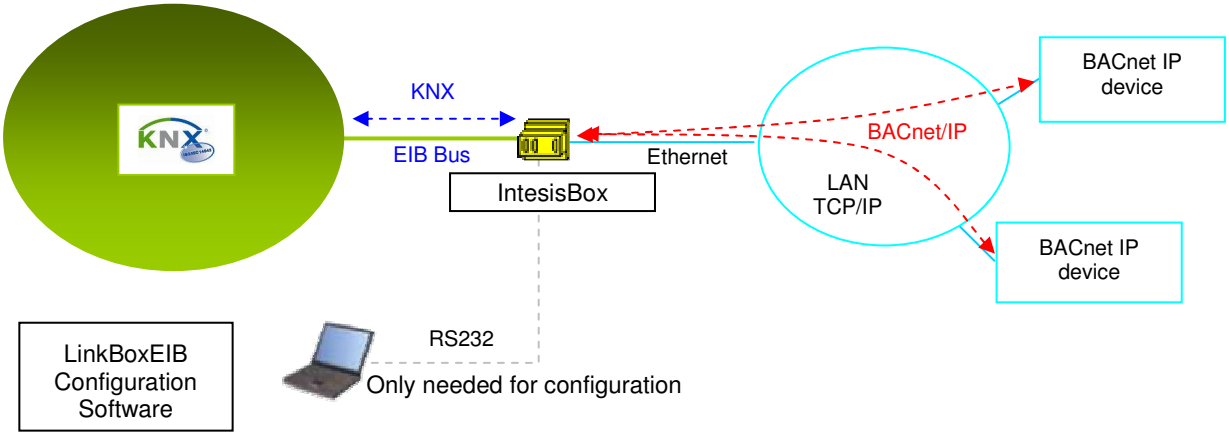
IntesisBox®
KNX - BACnet/IP Client

Gateway for integration of BACnet/IP devices into KNX control systems.

Integrate Daikin VRV Air Conditioners into your KNX system.

Daikin VRV system must be equipped with Daikin BACnet gateway DMS502B51 for this integration.



The BACnet side of IntesisBox

IntesisBox is a BACnet/IP client device allowing to read/write points of other BACnet/IP device(s) connected to a BACnet network, and offering these point's values through its KNX/EIB interface. BACnet interface of IntesisBox supports reading of other BACnet devices by continuous polling or by subscription requests (COV). ***Points of BACnet devices can be read/written from KNX.***

The KNX side of IntesisBox

IntesisBox simulates a KNX device and acts as if it was one more device into the KNX system. The IntesisBox's KNX EIB interface connects directly to the EIB bus and is opto-isolated from the rest of the internal electronics. Any point in IntesisBox can be configured individually for different functionality. ***To allow read requests, to allow write requests, to automatically send a write request to the KNX bus when its value changes, and to send a read request to the KNX bus when IntesisBox starts-up or after a bus reset.***

For each point, one main group address and different listening group addresses can be defined. This useful feature allows actions on the same internal point from multiple KNX group addresses.

The configuration of IntesisBox

IntesisBox KNX series are configured using *LinkBoxEIB,* a software tool for windows™ which is supplied along with the purchase of IntesisBox with no additional cost. ***With the standard installation of LinkBoxEIB, sample projects for integration of Daikin VRV Air Conditioners are also installed, using these sample projects makes the engineering needed for this integration easy and quick, almost plug&play.***

IntesisBox capacity

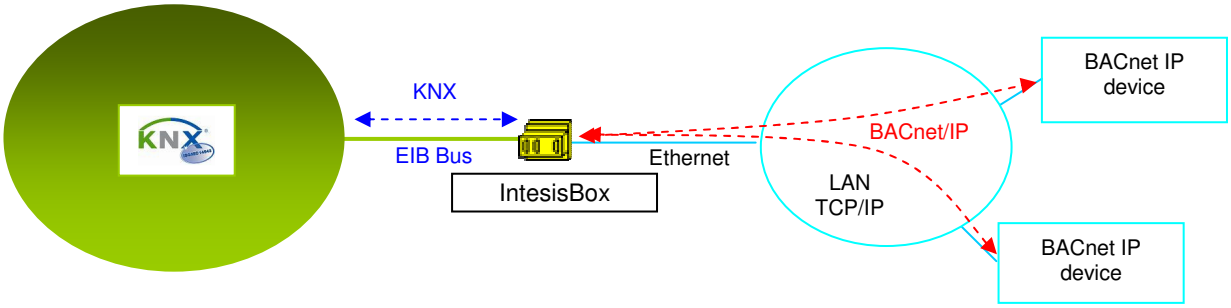
Element	Basic version	Extended version	Notes
Type of BACnet devices			Those supporting *BACnet ASHRAE 135 – 2001 Annex J - BACnet/IP protocol*, commonly referred as BACnet/IP.
BACnet points supported	500	4000	Maximum number of points that can be defined into IntesisBox.
BACnet IP devices supported	1	16	Maximum number of different BACnet/IP devices that can be defined into IntesisBox (to read/write points into them).

There are two different versions of *IntesisBox®-KNX BACnet IP Client* with different capacity every one of them.

- Basic version with capacity of 500 points and 1 BACnet/IP device. *Ref.: IBOX-KNX-BAC-A*
- Extended version with capacity of 4000 points and 16 BACnet/IP devices. *Ref.: IBOX-KNX-BAC-B*

Sample applications

Integration of any BACnet/IP device into KNX/EIB control systems.

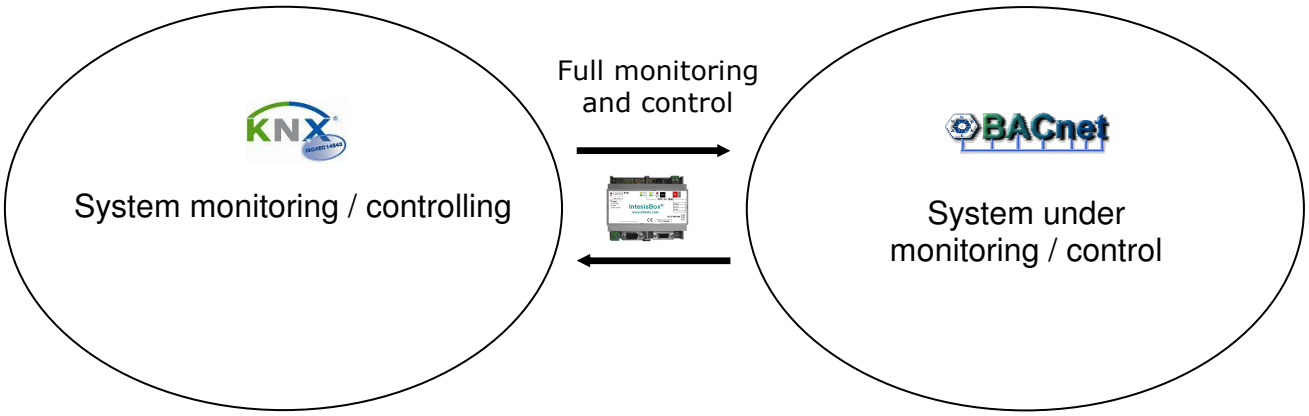


KNX control system:

- Building Automation.
- Home Automation.
- …

Typical BACnet devices or Systems equipped with BACnet interface:

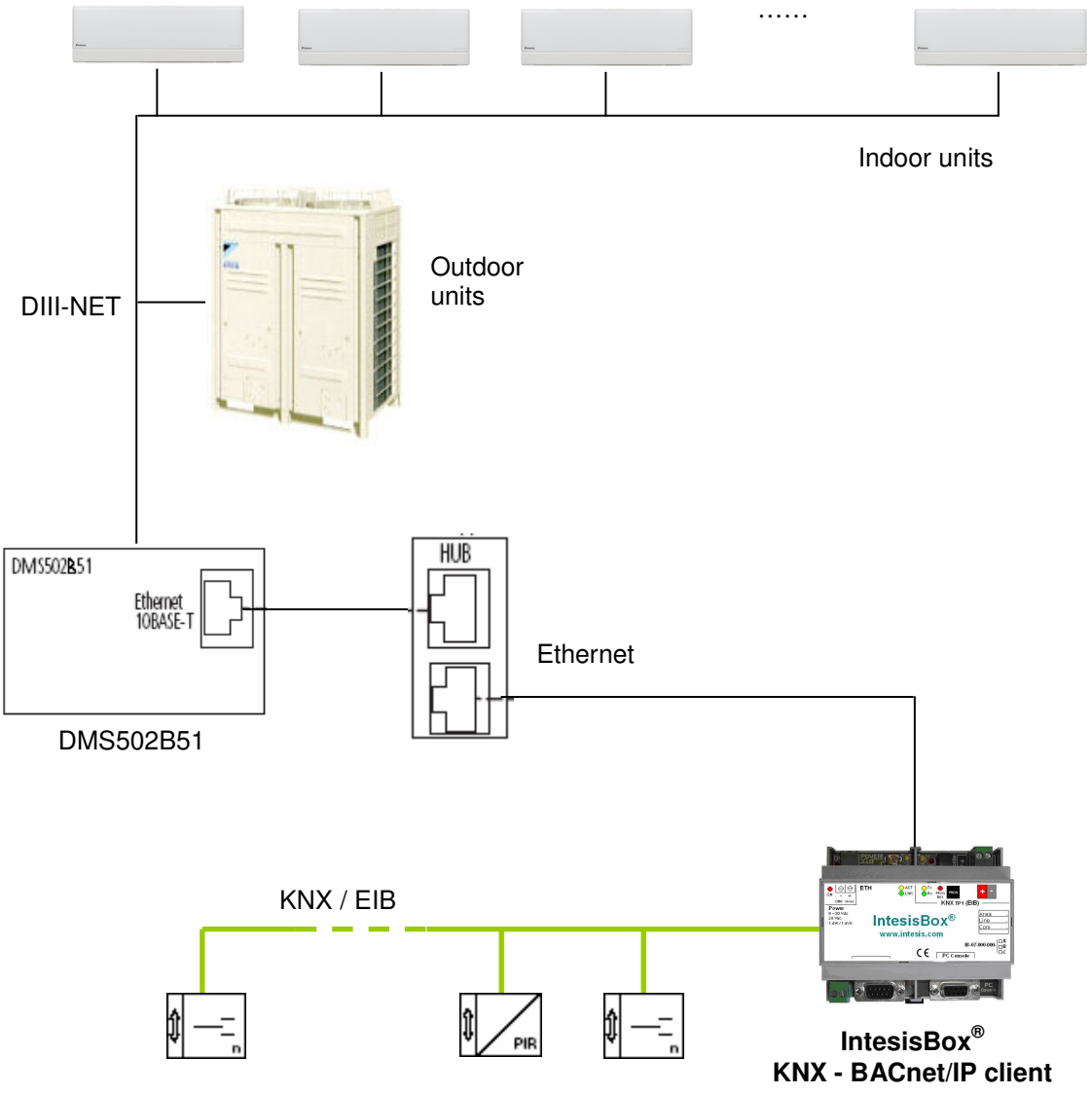
- Heaters.
- Air conditioners.
- HVAC control.
- Access control.
- …



Typical application

Integration of Daikin VRV Air Conditioning into KNX control systems.

For this integration, Daikin VRV Air Conditioning system must be equipped with Daikin BACnet gateway (model DMS502B51), this Daikin gateway is normally commissioned by Daikin technical personnel, contact your nearest Daikin distributor for details.



In the technical documentation of IntesisBox supplied with the device, extended details on how to configure IntesisBox for this application is provided.

Some sample projects for this application are provided with the standard installation of LinkBoxEIB, the software configuration tool for IntesisBox KNX series. These sample projects contain specific configuration to integrate Daikin VRV system, with these sample projects the configuration and commissioning of IntesisBox for this application becomes easy and quick, almost plug & play.

Signals available from KNX per each Daikin VRV group of indoor units.

Signal	Read/Write	Type of signal
1-StartStopCommand	W	Digital
2-StartStopStatus	R	Digital
3-Alarm	R	Digital
4-MalfunctionCode	R	Analog
5-AirConModeCommand	W	Analog
6-AirConModeStatus	R	Analog
7-AirFlowRateCommand	W	Analog
8-AirFlowRateStatus	R	Analog
9-RoomTemp	R	Analog
10-TempAdjust	R/W	Analog
11-FilterSign	R	Digital
12-FilterSignReset	R/W	Digital
13-RemoteControlStart	R/W	Digital
14-RemoteControlAirConModeSet	R/W	Digital
16-RemoteControlTempAdjust	R/W	Digital
20-CommunicationStatus	R	Digital
22-AirDirectionCommand	R/W	Analog
23-AirDirectionStatus	R	Analog
24-ForcedThermoOFFCommand	W	Digital
25-ForcedThermoOFFStatus	R	Digital
26-EnergyEfficiencyCommand	W	Digital
27-EnergyEfficiencyStatus	R	Digital
28-ThermoStatus	R	Digital
29-CompressorStatus	R	Digital
30-IndoorFanStatus	R	Digital
31-HeaterStatus	R	Digital

**64 main units can be controlled by the Daikin DMS502B51 gateway, up to 256 if equipped with optional DIII boards.*

** IntesisBox extended model can communicate with up to 16 BACnet IP devices (DMS502B51 gateways in this case) and supports up to 4000 points, this allows you for example to integrate with each IntesisBox extended model up to 256 AC indoor units using 15 points per unit. No limit of IntesisBoxes can be connected simultaneously to the Ethernet and KNX, so you can use more than one IntesisBox to integrate big Daikin VRV installations splitting Daikin gateways/points in more than one IntesisBox.*

KNX interface of IntesisBox

KNX/EIB interface	
Bus coupler	Internal KNX TP1 (EIB) opto-isolated bus coupler unit for direct connection to EIB bus. Connector: 2 poles plug-in screw terminal bloc.
Configuration parameters	• Physical address.
Interactivity with KNX/EIB system	• In the case of Daikin VRV integration, all the signals per VRV group and functionality offered by the DMS502B51 are available from KNX/EIB. • When the gateway starts up, or after an EIB bus reset detection, all the updated values read from BACnet system will be sent to KNX. *Configurable individually per point.* • Any change detected in BACnet system (i.e. Ambient Temperature of a VRV group) is immediately transmitted to KNX. *Configurable individually per point.* • Any point value can be updated with a read request sent to KNX system when the gateway starts up (i.e. Temperature Set Point). *Configurable individually per point.* • Multiple KNX group addresses can actuate on the same IntesisBox's point.
KNX EIS (Datapoints) supported	• Switching (1 bit). • Dimming (4 bits). • Float (16 bits). • Scaling (8 bits). • Drive Control (1 bit). • Priority (2 bits). • Float IEEE (32 bits). • Counter (16 bits). • Counter (32 bits). • Counter (8 bits). • ASCII char (8 bits).

BACnet interface of IntesisBox

BACnet interface	
Device type	Client
BACnet modes supported	BACnet/IP
Configuration parameters per BACnet device defined	• IP address. • BACnet port. • BACnet device number (device instance number). • Name.
Interactivity with BACnet system	• Point's Read/Write allowed. • Reading of BACnet points by Polling or Subscription requests (COV). *See BACnet interface specifications below for more details.*

Specifications

BACnet Conformance Class Supported: Class 3

BACnet Standard Application Services Supported:

	Initiate Requests	Executes Requests
ConfirmedCOVNotification		X
Subscribe COV	X	
UnconfirmedCOVNotification		X
ReadProperty	X	
WriteProperty	X	
Who-Is	X	
I-Am		X

Data Link Layer Option: BACnet IP, (Annex J)

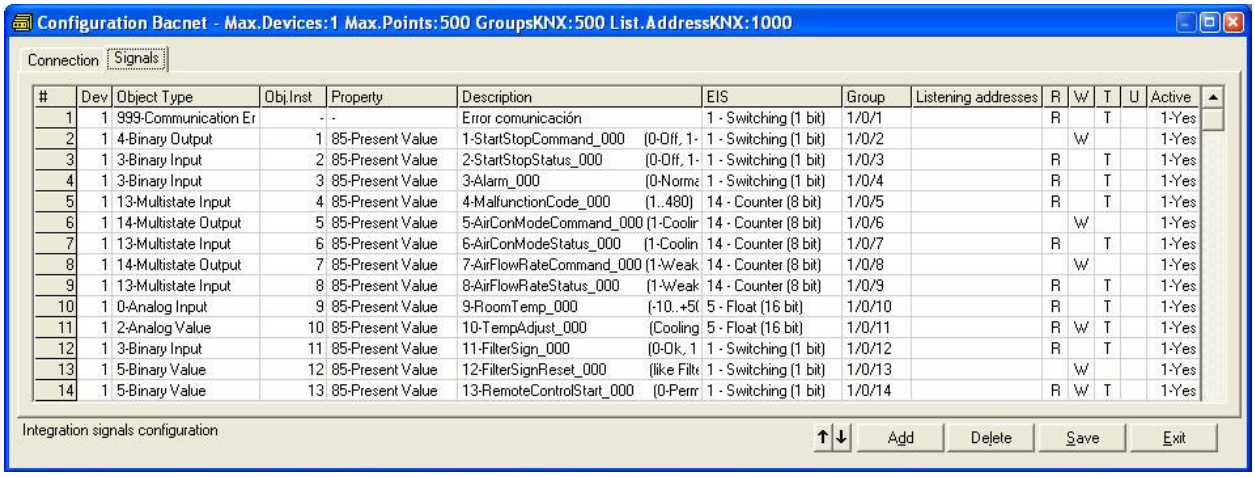
No Segmented Requests/Responses Supported

BACnet Standard Object Types Supported

Object Type	Property	Description
Analog Input	Present Value	Analog signal. i.e. Ambient temperature.
Analog Output	Present Value	Analog signal.
Analog Value	Present Value	Analog signal. i.e. Temperature set point value.
Binary Input	Present Value	Digital signal. i.e. ON/OFF status.
Binary Output	Present Value	Digital signal. i.e. ON/OFF command.
Binary Value	Present Value	Digital signal. i.e. ON/OFF status/command.
Multistate Input	Present Value	Multistate signal. i.e. Working mode status.
Multistate Output	Present Value	Multistate signal.
Multistate Value	Present Value	Multistate signal. i.e. Working mode command.

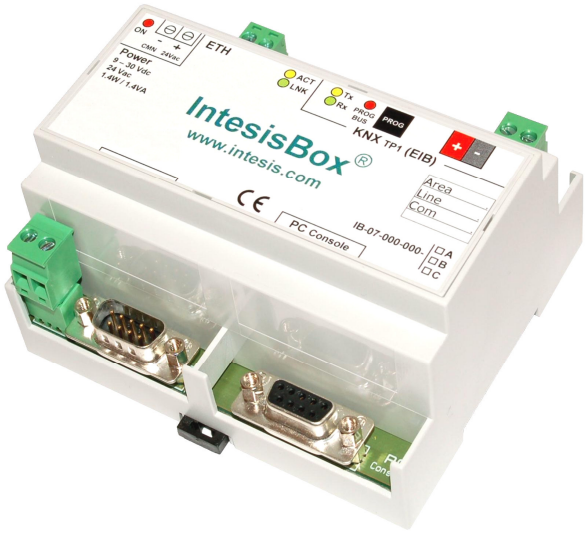
Configuration tool

LinkBoxEIB	• Visual engineering tool, easy of use, for gateway's configuration and supervision compatible with Microsoft Windows operating systems, supplied with the gateway free of charge. • Multi-window tool allowing to supervise simultaneously the communication activity with both protocols (systems), real time values for all the signals allowing to modify any value (very useful for test purposes), console window showing debug and working status messages, and configuration windows to configure all the gateway's parameters and signals. • Signals configuration in plain text files (tab separated) for easy and quick configuration using Microsoft Excel (very useful in projects with a lot of points). • Allows configuring the gateway's parameters and signals while in off-line (not connected to the gateway). • Connection to the gateway for download the configuration and supervision by using serial COM port of the PC (serial cable supplied with the gateway). • Allows configuring all the external protocols available for IntesisBox® KNX series. • Upgrades for this software tool available free of charge whenever a new protocol is added to the IntesisBox® KNX series. • Multi-project tool allowing having in the engineer's PC the configuration for all the sites with different IntesisBox® KNX series gateways. • Multi-language tool, all the language-dependent strings are in a plain text file (tab separated) for easy modification or addition of new languages. • A list of system commands is available to send to the gateway for debugging and adjust purposes (Reset, Date/time consultation/adjust, Firmware version request…).



#	Dev	Object Type	Obj.Inst	Property	Description	EIS	Group	Listening addresses	R	W	T	U	Active
1	1	999-Communication Er	-	-	Error comunicación	1 - Switching (1 bit)	1/0/1		R		T		1-Yes
2	1	4-Binary Output	1	85-Present Value	1-StartStopCommand_000 (0-Off, 1-	1 - Switching (1 bit)	1/0/2			W			1-Yes
3	1	3-Binary Input	2	85-Present Value	2-StartStopStatus_000 (0-Off, 1-	1 - Switching (1 bit)	1/0/3		R		T		1-Yes
4	1	3-Binary Input	3	85-Present Value	3-Alarm_000 (0-Norma	1 - Switching (1 bit)	1/0/4		R		T		1-Yes
5	1	13-Multistate Input	4	85-Present Value	4-MalfunctionCode_000 (1..480)	14 - Counter (8 bit)	1/0/5		R		T		1-Yes
6	1	14-Multistate Output	5	85-Present Value	5-AirConModeCommand_000 (1-Coolir	14 - Counter (8 bit)	1/0/6			W			1-Yes
7	1	13-Multistate Input	6	85-Present Value	6-AirConModeStatus_000 (1-Coolin	14 - Counter (8 bit)	1/0/7		R		T		1-Yes
8	1	14-Multistate Output	7	85-Present Value	7-AirFlowRateCommand_000 (1-Weak	14 - Counter (8 bit)	1/0/8			W			1-Yes
9	1	13-Multistate Input	8	85-Present Value	8-AirFlowRateStatus_000 (1-Weak	14 - Counter (8 bit)	1/0/9		R		T		1-Yes
10	1	0-Analog Input	9	85-Present Value	9-RoomTemp_000 (-10..+5(	5 - Float (16 bit)	1/0/10		R		T		1-Yes
11	1	2-Analog Value	10	85-Present Value	10-TempAdjust_000 (Cooling	5 - Float (16 bit)	1/0/11		R	W	T		1-Yes
12	1	3-Binary Input	11	85-Present Value	11-FilterSign_000 (0-Ok, 1	1 - Switching (1 bit)	1/0/12		R		T		1-Yes
13	1	5-Binary Value	12	85-Present Value	12-FilterSignReset_000 (like Filt	1 - Switching (1 bit)	1/0/13			W			1-Yes
14	1	5-Binary Value	13	85-Present Value	13-RemoteControlStart_000 (0-Perm	1 - Switching (1 bit)	1/0/14		R	W	T		1-Yes

Technical characteristics

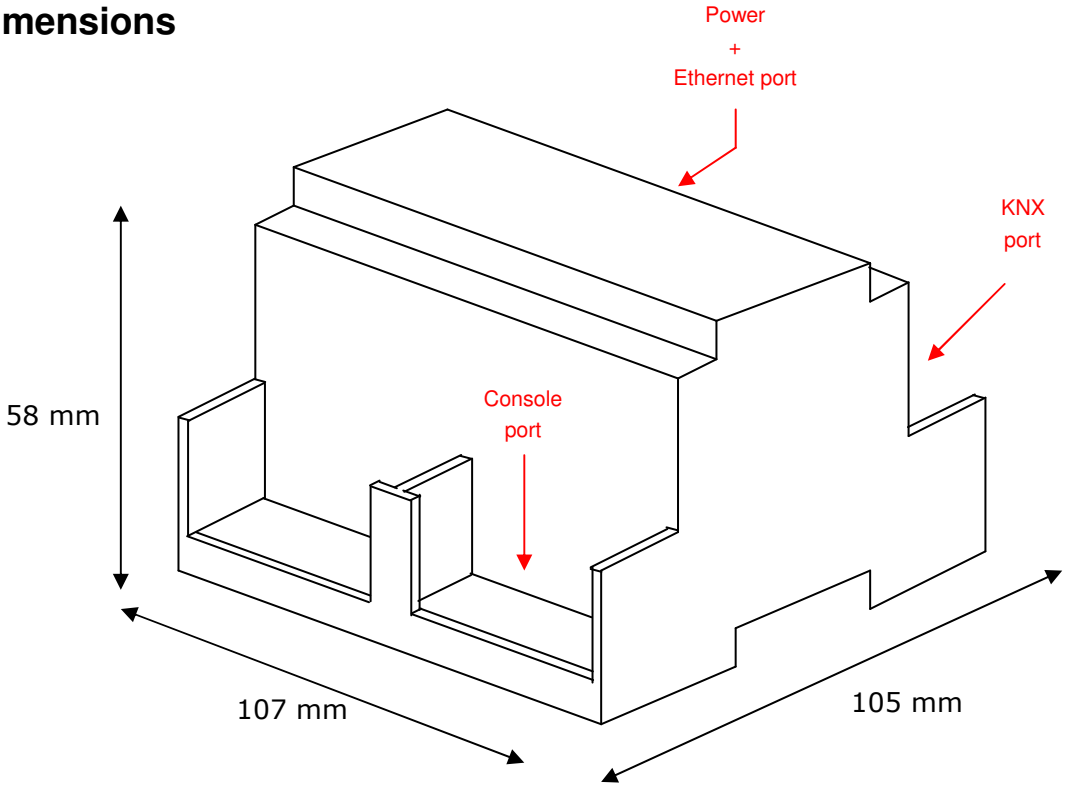


Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 107mm x 105mm x 58mm.
Color	Light Grey. RAL 7035.
Power	9 to 30Vdc +/-10% 1.4W. 24Vac +/-10% 1.4VA. Plug-in terminal bloc for power connection (2 poles).
Mounting	Surface. Wall. DIN rail EN60715 TH35.
KNX (EIB) port	1 x KNX TP1 (EIB) isolated (Plug-in screw terminal block 2 poles).
BACnet IP port	1 x Ethernet 10BT RJ45.
LED indicators	1 x Power. 2 x KNX port activity (Tx, Rx). 2 x Ethernet port (LNK, ACT). 1 x KNX programming/bus.[1]
Push buttons	1 x KNX programming.[1]
Console port	RS232. DB9 female connector (DCE).
Configuration	Via console port.[2]
Firmware	Allows upgrades via console port.
Operational temperature	-40ºC to +70ºC
Operational humidity	5% to 95%, non condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Certifications	CE

[1] Not operational for the moment, reserved for future use.

[2] Standard cable DB9male-DB9female 1,8 meters long is supplied with the device for connection to a PC COM port for configuring and monitoring the device. The configuration software, compatible with Windows® operating systems, is also supplied.

Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections