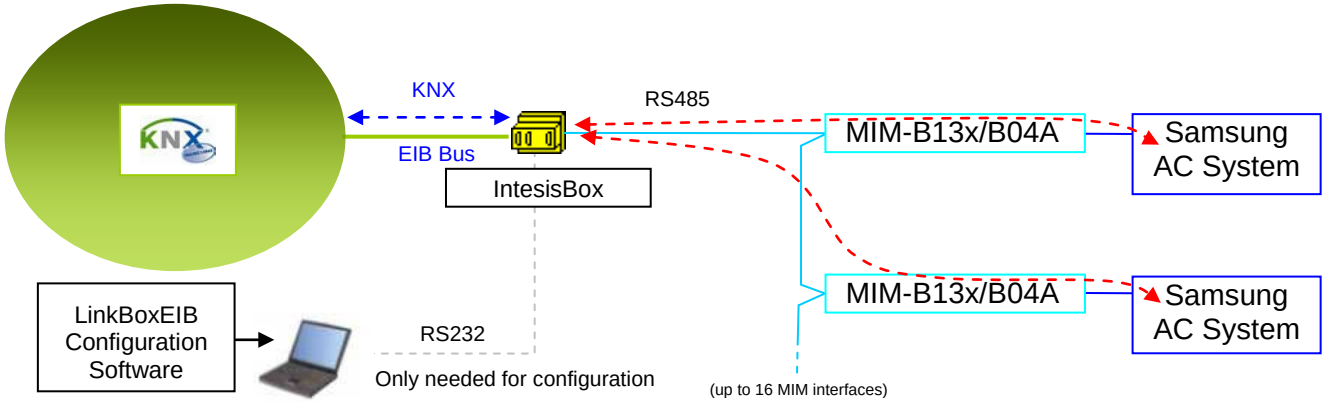
IntesisBox®

KNX – SAMSUNG Air Conditioning

Gateway for integration of Samsung air conditioners into KNX control systems.

Integrate Samsung Air Conditioners into KNX.



This integration requires the Samsung AC system being equipped with the Samsung MIM-B13A, MIM-B13B, MIM-B13D or MIM-B04A RS485 interface. This interface from Samsung offers the signals of Samsung AC system on an RS485 protocol. Each MIM interface is connected to a single outdoor unit, allowing access to all indoor units connected to it (up to 64 indoor units). Samsung AC's system supports up to 16 outdoor units – all of them (and their respective indoor units) can be integrated with IntesisBox, allowing a maximum of 4 indoor units (SM-AC-KNX-4), 8 indoor units (SM-AC-KNX-8), 16 indoor units (SM-AC-KNX-16), 64 indoor units (SM-AC-KNX-64) or 128 indoor units (SM-AC-KNX-128) to be integrated (one MIM per outdoor unit is required). MIM-B04A, MIM-B13A, MIM-B13B and MIM-B13D are supplied by Samsung. Contact your nearest Samsung AC Systems distributor for details.

The RS485 interface of IntesisBox

IntesisBox® can *talk* to up to 16 MIM interfaces using Samsung's RS485 protocol and offers the signals of all indoor units connected each of them through its KNX EIB interface, allowing up to 4 indoor units (SM-AC-KNX-4), 8 indoor units (SM-AC-KNX-8), 16 indoor units (SM-AC-KNX-16), 64 indoor units (SM-AC-KNX-64) or 128 indoor units (SM-AC-KNX-128) to be integrated into KNX.

The KNX interface of IntesisBox

IntesisBox simulates a KNX device and acts as if it was one more device into the KNX system. The IntesisBox's KNX interface connects directly to the EIB bus and is opto-isolated from the rest of the internal electronics.

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, a Demo project for integration of several MIM devices is also installed, using this demo project makes the engineering needed for this integration easy and quick, almost plug&play.*

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IntesisBox capacity

Element	Capacity	Notes
Number of MIM interfaces / Samsung outdoor units	16	Maximum number of MIM interfaces that a Samsung AC system supports (each MIM interface needs to be connected to a single outdoor unit).
Number of indoor units	128 *	Maximum number AC indoor units that can be controlled.
Number of KNX Groups	4000	Maximum number of KNX Groups that can be used in IntesisBox.
Number of listening addresses per object.	255	Maximum number of listening addresses that can be associated to an object.

* There are different models of *IntesisBox KNX – SAMSUNG AC* with different capacity. The table above shows the capacity for the top model (with maximum capacity).

Their order codes are:

- Model supporting up to 4 indoor units. *Ref.: SM-AC-KNX-4*
- Model supporting up to 8 indoor units. *Ref.: SM-AC-KNX-8*
- Model supporting up to 16 indoor units. *Ref.: SM-AC-KNX-16*
- Model supporting up to 64 indoor units. *Ref.: SM-AC-KNX-64*
- Model supporting up to 128 indoor units. *Ref.: SM-AC-KNX-128*

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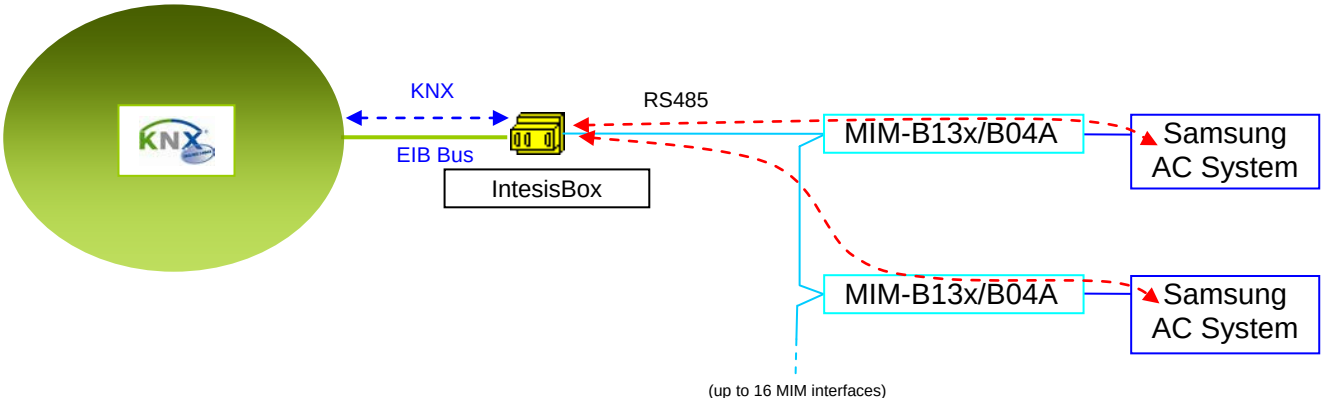
Sample applications

Integration of any Samsung Air Conditioning system equipped with MIM interfaces into KNX control systems.

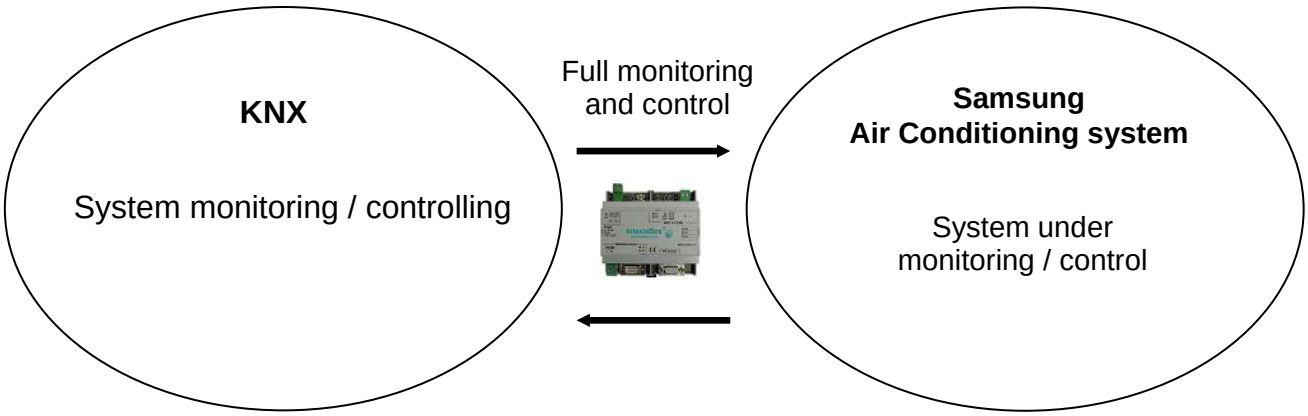


KNX control system:

- Building Automation.
- Home Automation.
- …

Any Samsung AC System equipped with MIM interface(s):

- MIM-B04A (provides support for 48 indoor units – DVM, Mini DVM (R22) and CAC series)
- MIM-B13A/B13B/B13D (provides support for 64 indoor units – DVM PLUS II/III, DVM PLUS II/III HR, FJM, Super FJM, Mini DVM (R410A) and ERV series).
- Each MIM interface is connected to a single outdoor unit.
- A single system can have up to 16 MIMs (outdoor units)



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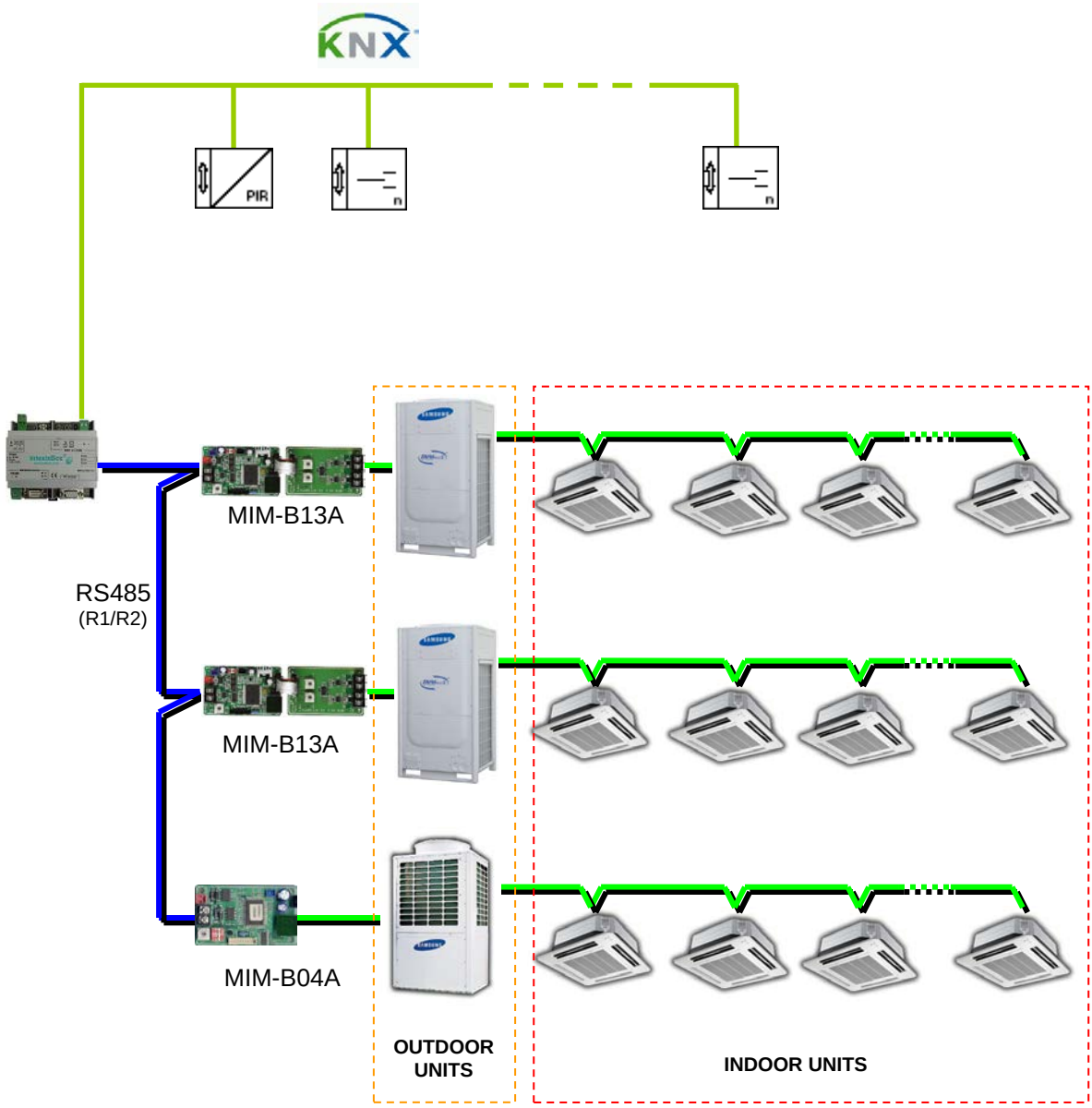
Typical application

Full monitoring and control of a Samsung AC System from KNX.



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KNX/EIB interface of IntesisBox

General	
Max. Number of Samsung MIM interfaces	Up to 16 MIM interfaces can be supported. There are five different versions of IntesisBox, supporting a maximum of 128, 64, 16, 8 or 4 indoor units respectively.
Virtual signals	• One communication error virtual signal per every single MIM in the system • One communication error virtual signal per every indoor unit attached to the MIM interface. All these virtual signals are available from KNX.
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 block.
Configuration parameters	• Physical address.
Interactivity with KNX/EIB system	• All signals per indoor unit and functionalities offered by the MIM interface are directly available from KNX. • When IntesisBox starts up, or after a KNX bus reset detection, all the current values read from the AC system will be sent to KNX. *Configurable individually per point.* • Any change detected in Samsung AC system (i.e. Ambient Temperature of an indoor unit) is immediately transmitted to KNX. *Configurable individually per point.* • Any point's value can be updated with a read request sent to KNX when IntesisBox starts up or after a KNX bus reset detection (i.e. Temperature Set Point). *Configurable individually per point.* • Multiple KNX group addresses can actuate on the same IntesisBox's point. • Mode, Fan Speed and Air Direction of each indoor unit can be monitored/controlled from KNX using objects of type EIS 10 (8-bit counter) (i.e. writing the value corresponding to the Mode desired: 0, 1, 2, 3…), or also using simpler objects of type EIS 1 (1-bit Switching) (i.e. one different object per each possible Mode: Cool, Heat…).
Points	
Parameters configurable per point	AC system related fields. • MIM interface address: Address of the MIM interface the point relates to. • Indoor unit main address: Main Address of the indoor unit the point relates to. KNX/EIB related fields. • Group address (in format P/I/S or P/S). *Is the sending group address.* • Listening addresses (in format P/I/S or P/S separated by comma). IntesisBox will listen for KNX write requests of these listening addresses, when received then it will act as if they where for the sending group address defined. This can be useful to translate actions to the Samsung AC system coming from different KNX commands, for example from an individual start/stop button and also from a general start/stop button • R. Specifies if the point accepts read requests from KNX. • W. Specifies if the point accepts write requests from KNX. • T. Specifies if a write request will be sent to KNX when the point's value changes. • U. Specifies if a read request will be sent to KNX to get the current value when the IntesisBox starts up or after a KNX bus reset detection.
KNX EIS (Datapoints)	Each point has a predefined and fixed KNX EIS associated according to the type of signal in the air conditioner.

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Available Signals from KNX for each Samsung AC indoor unit.

Property	EIS type	Signal type (R/W)	Description / Status	
On / Off	1 – Switching (1bit)	R/W	**Start/Stop AC/ERV Unit** 0 – OFF, 1 – ON	
Mode	14 – Counter (8bit)	R/W	**AC Mode** 0 – COOL, 1 – HEAT, 2 – DRY, 3 – FAN, 4 – AUTO ***Mode (ERV unit)*** *0 – AUTO, 1 – HEAT RECOVERY VENTILATION, 2 – AIR CLEANING, 3 – SLEEP, 4 – NORMAL OPERATION*	
Mode::Cool	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	Only one of these objects will be read / written to "1" at the same time (all objects will be updated on bus upon a Mode change)
Mode::Heat	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
Mode::Dry	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
Mode::Fan	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
Mode::Auto	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
Auto Mode	14 – Counter (8bit)	R	**AC Operating Mode** (when mode is Auto) 0 – AUTO COOLING, 1 – AUTO HEATING *(This parameter is not applicable for ERV units)*	
AutoMode::Cooling	1 – Switching (1bit)	R	0 – Inactive, 1 – Active	Only one of these objects will be read to "1" at the same time (all objects will be updated on bus upon an Auto Mode change)
AutoMode::Heating	1 – Switching (1bit)	R	0 – Inactive, 1 – Active	
Setpoint Temperature	EIS 5 – Float (2byte)	R/W	**Temperature Set Point** (only integer numbers allowed) 18..30 ºC (heat mode) 16..30 ºC (any other mode) *(This parameter is not applicable for ERV units)*	
Ambient Temperature	EIS 5 – Float (2byte)	R	**Ambient Temperature** (only integer numbers) Read: -55ºC to 200ºC *(This parameter is not applicable for ERV units)*	
Fan Direction	14 – Counter (8bit)	R/W	**Air output direction** 0 – Stop, 1 – Up/Down, 2 – Left/Right, 3 – Both *(This parameter is not applicable for ERV units)*	
FanDirection::U/D	1 – Switching (1bit)	R/W	0 – Inactive, 1 - Active	
FanDirection::L/R	1 – Switching (1bit)	R/W	0 – Inactive, 1 - Active	
Fan Speed	14 – Counter (8bit)	R/W	**AC Fan Speed** 0 – AUTO, 1 – LOW, 2 – MID, 3 – HIGH ***Fan Speed (ERV unit)*** *Read/Write: 0 – TURBO, 2 – MID, 3 – HIGH*	
FanSpeed::Auto	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	Only one of these objects will be set / read to "1" at the same time (all objects will be updated on bus upon a Mode change)
FanSpeed::Low	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
FanSpeed::Mid	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
FanSpeed::High	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
Remote Restriction	1 – Switching (1bit)	R/W	**Remote Control Enablement / Disablement** 0 – Remote control enabled, 1 – Remote control disabled	

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Property	EIS type	Signal type (R/W)	Description / Status
Error Sign	1 – Switching (1bit)	R/W	**Error Code / Communication error with the Indoor Unit** 0 – No error present, 1 – Error code present, or communication error with the indoor unit
Error Code	10 – Counter (16bit)	R/W	**Error Code** 000 – No error, 100 to 999 – Indoor unit error code
Filter Alarm	1 – Switching (1bit)	R/W	**Filter Alarm Status** 0 – No alarm, 1 – Filter alarm present
Filter Alarm Reset	1 – Switching (1bit)	R/W	**Filter Alarm Reset** Write: 1 – Filter alarm reset

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RS485/MIM interface of IntesisBox

RS485/MIM interface	
Device type	Master
Configuration Parameters on IntesisBox	For each Indoor Unit to be integrated: • Descriptive name. • MIM Address (0..15) for this indoor unit • Main Address

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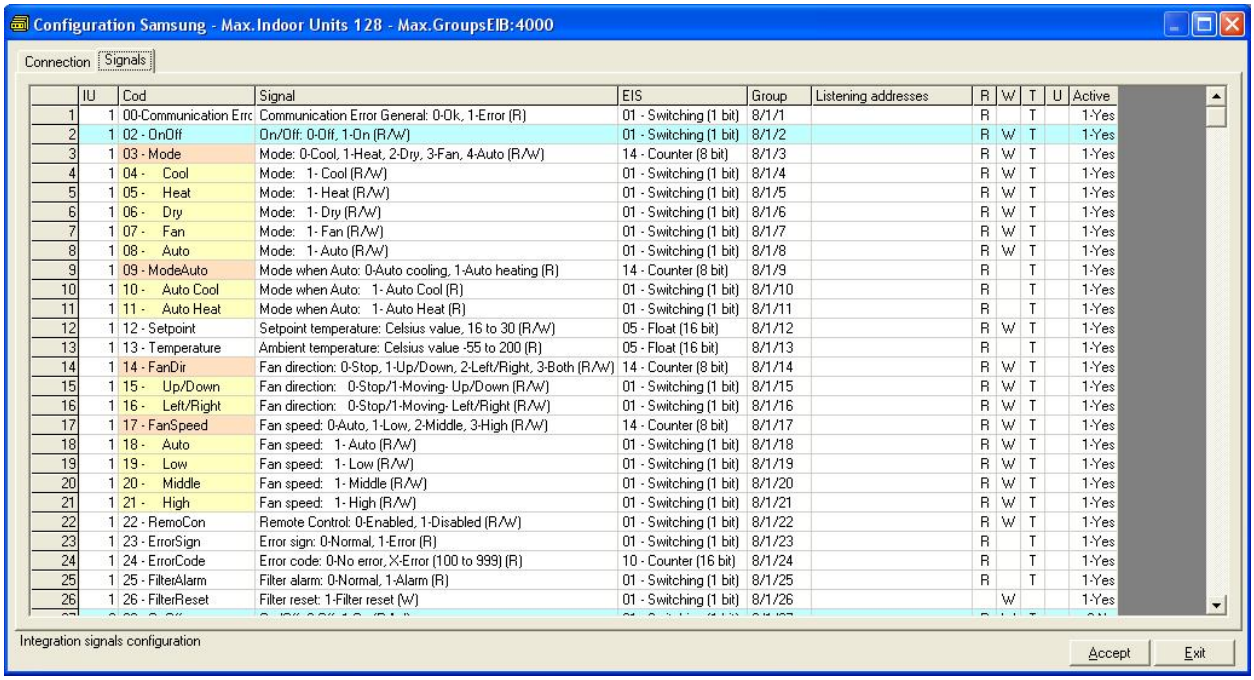
Configuration tool

LinkBoxEIB	• Visual engineering tool, easy of use, for IntesisBox's configuration and monitoring compatible with Microsoft Windows operating systems, supplied with the purchase of IntesisBox. • Multi-window tool allowing to monitor simultaneously the communication activity with both protocols (systems), real time values for all the points allowing to modify any value (very useful for test purposes), console window showing debug and operation status messages, and configuration windows to configure all IntesisBox's parameters and points. • Point's 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 IntesisBox's parameters and points while in off-line (not connected to the IntesisBox). • Connection to the IntesisBox for download the configuration and monitoring by using serial COM port of the PC (serial cable also supplied). • Allows configuring all the external protocols available for IntesisBox® KNX series. • Upgrades for this software tool available free of charge whenever a new version or feature is available. • 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.



	IU	Cod	Signal	EIS	Group	Listening addresses	R	W	T	U	Active
1	1	00-Communication Erro	Communication Error General: 0-Ok, 1-Error (R)	01 - Switching (1 bit)	8/1/1		R		T		1-Yes
2	1	02 - OnOff	On/Off: 0-Off, 1-On (R/W)	01 - Switching (1 bit)	8/1/2		R	W	T		1-Yes
3	1	03 - Mode	Mode: 0-Cool, 1-Heat, 2-Dry, 3-Fan, 4-Auto (R/W)	14 - Counter (8 bit)	8/1/3		R	W	T		1-Yes
4	1	04 - Cool	Mode: 1- Cool (R/W)	01 - Switching (1 bit)	8/1/4		R	W	T		1-Yes
5	1	05 - Heat	Mode: 1- Heat (R/W)	01 - Switching (1 bit)	8/1/5		R	W	T		1-Yes
6	1	06 - Dry	Mode: 1- Dry (R/W)	01 - Switching (1 bit)	8/1/6		R	W	T		1-Yes
7	1	07 - Fan	Mode: 1- Fan (R/W)	01 - Switching (1 bit)	8/1/7		R	W	T		1-Yes
8	1	08 - Auto	Mode: 1- Auto (R/W)	01 - Switching (1 bit)	8/1/8		R	W	T		1-Yes
9	1	09 - ModeAuto	Mode when Auto: 0-Auto cooling, 1-Auto heating (R)	14 - Counter (8 bit)	8/1/9		R		T		1-Yes
10	1	10 - Auto Cool	Mode when Auto: 1- Auto Cool (R)	01 - Switching (1 bit)	8/1/10		R		T		1-Yes
11	1	11 - Auto Heat	Mode when Auto: 1- Auto Heat (R)	01 - Switching (1 bit)	8/1/11		R		T		1-Yes
12	1	12 - Setpoint	Setpoint temperature: Celsius value, 16 to 30 (R/W)	05 - Float (16 bit)	8/1/12		R	W	T		1-Yes
13	1	13 - Temperature	Ambient temperature: Celsius value -55 to 200 (R)	05 - Float (16 bit)	8/1/13		R		T		1-Yes
14	1	14 - FanDir	Fan direction: 0-Stop, 1-Up/Down, 2-Left/Right, 3-Both (R/W)	14 - Counter (8 bit)	8/1/14		R	W	T		1-Yes
15	1	15 - Up/Down	Fan direction: 0-Stop/1-Moving- Up/Down (R/W)	01 - Switching (1 bit)	8/1/15		R	W	T		1-Yes
16	1	16 - Left/Right	Fan direction: 0-Stop/1-Moving- Left/Right (R/W)	01 - Switching (1 bit)	8/1/16		R	W	T		1-Yes
17	1	17 - FanSpeed	Fan speed: 0-Auto, 1-Low, 2-Middle, 3-High (R/W)	14 - Counter (8 bit)	8/1/17		R	W	T		1-Yes
18	1	18 - Auto	Fan speed: 1- Auto (R/W)	01 - Switching (1 bit)	8/1/18		R	W	T		1-Yes
19	1	19 - Low	Fan speed: 1- Low (R/W)	01 - Switching (1 bit)	8/1/19		R	W	T		1-Yes
20	1	20 - Middle	Fan speed: 1- Middle (R/W)	01 - Switching (1 bit)	8/1/20		R	W	T		1-Yes
21	1	21 - High	Fan speed: 1- High (R/W)	01 - Switching (1 bit)	8/1/21		R	W	T		1-Yes
22	1	22 - RemoCon	Remote Control: 0-Enabled, 1-Disabled (R/W)	01 - Switching (1 bit)	8/1/22		R	W	T		1-Yes
23	1	23 - ErrorSign	Error sign: 0-Normal, 1-Error (R)	01 - Switching (1 bit)	8/1/23		R		T		1-Yes
24	1	24 - ErrorCode	Error code: 0-No error, X-Error (100 to 999) (R)	10 - Counter (16 bit)	8/1/24		R		T		1-Yes
25	1	25 - FilterAlarm	Filter alarm: 0-Normal, 1-Alarm (R)	01 - Switching (1 bit)	8/1/25		R		T		1-Yes
26	1	26 - FilterReset	Filter reset: 1-Filter reset (W)	01 - Switching (1 bit)	8/1/26			W			1-Yes

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Technical characteristics

Envelope	Plastic type PC (UL 94 V-0). Size: 107mm x 105mm x 58mm.
Color	Grey. RAL 7035.
Power	9 to 30VDC +/-10% 1.4W. 24VAC +/-10% 1.4VA. Power connector is a 2 pole plug-in screw terminal block.
Mounting options	Wall DIN rail EN60715 TH35.
KNX (EIB) port	1 x KNX TP1 (EIB) opto-isolated (Plug-in screw terminal block 2 poles)
RS485 MIM port	1 x RS485 connector (Plug-in screw terminal block 2 poles)
LED indicators	1 x Power. 2 x KNX port activity (Tx, Rx). 2 x RS485 port (Tx, Rx). 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 range	-40°C to +70°C
Operational humidity range	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 Along with the device it is also supplied a standard DB9 male - DB9 female 1.8 m. cable for configuring and monitoring the device using a PC via serial COM port. The configuration software, compatible with MS Windows® operating systems, is also supplied.

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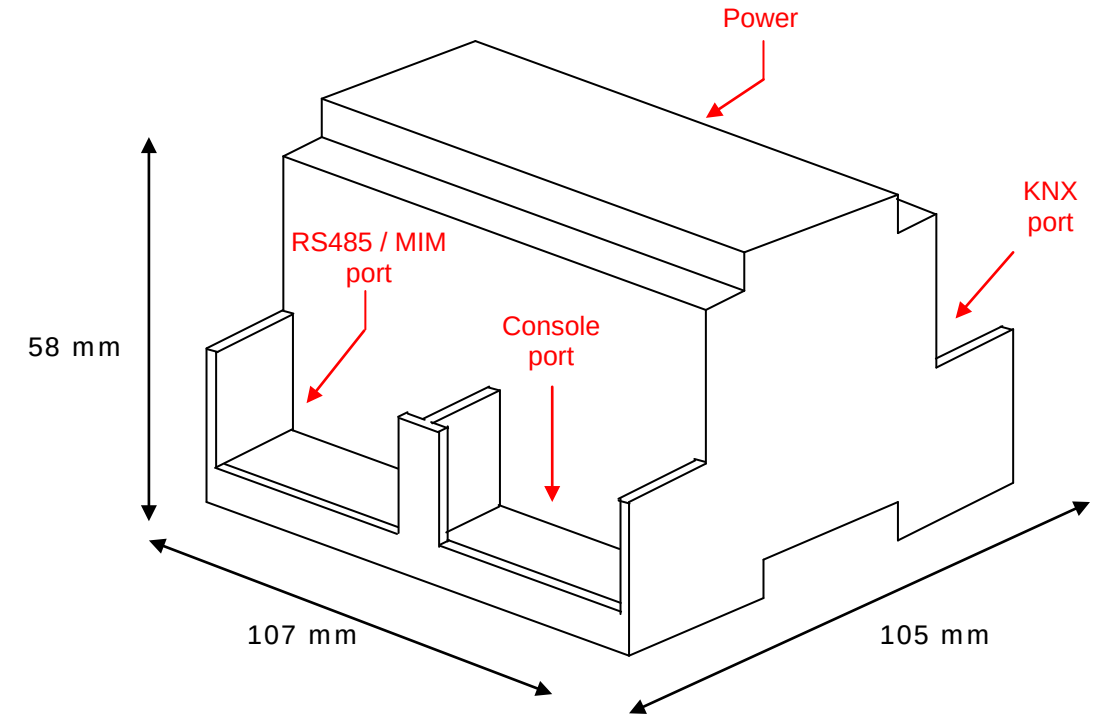
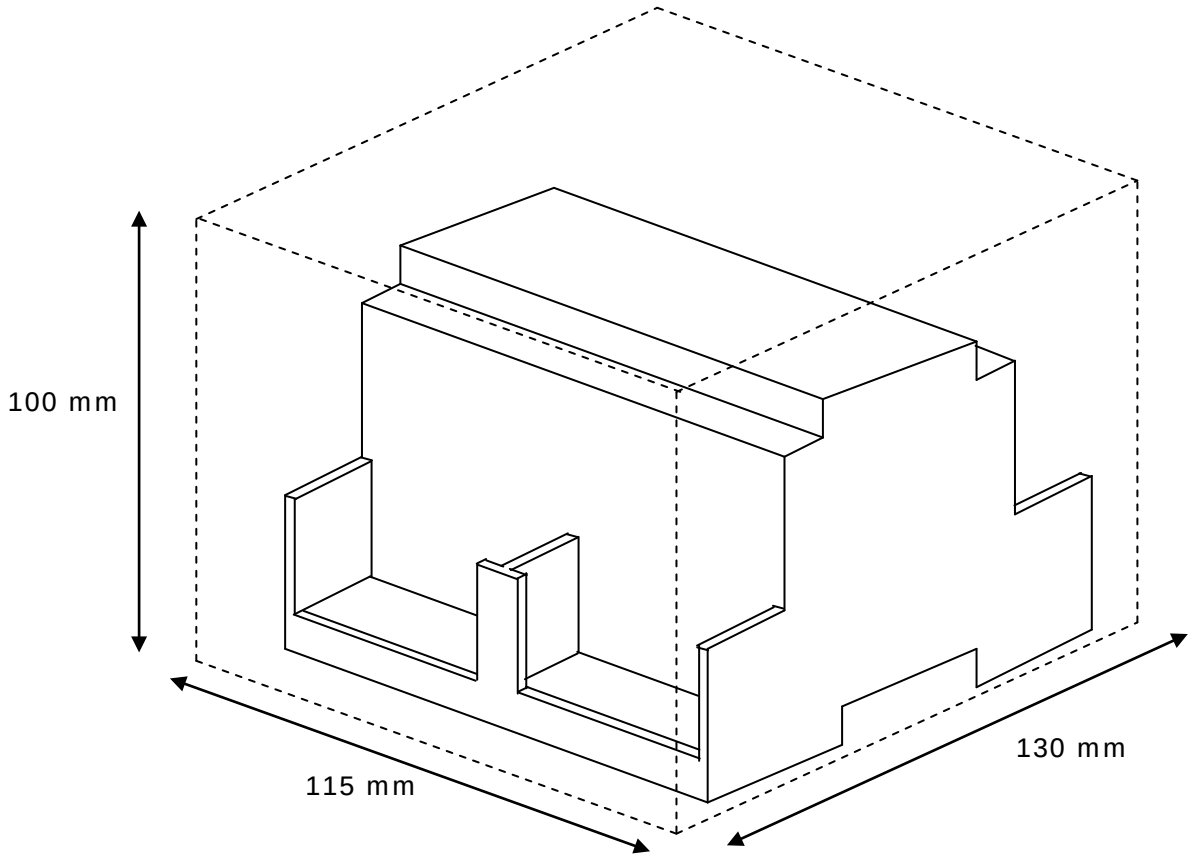
Dimensions



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



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