IntesisBox®

KNX – Mitsubishi Heavy Industries AC

Gateway for integration of Mitsubishi Heavy Indsutries (MHI) Air Conditioners with KNX control systems.

1. Main Features

- Direct connection to KNX TP-1 (EIB) bus.
- Direct connection to MHI indoor unit's Superlink network connector.
- Simple configuration using the software LinkBoxEIB supplied with the purchase of IntesisBox® with no additional cost.
- Integrates MHI Air Conditioners in your KNX projects.
- Two models available:
  - Ref. MH-AC-KNX-48, supporting up to 48 indoor units.
  - Ref. MH-AC-KNX-128, supporting up to 128 indoor units.

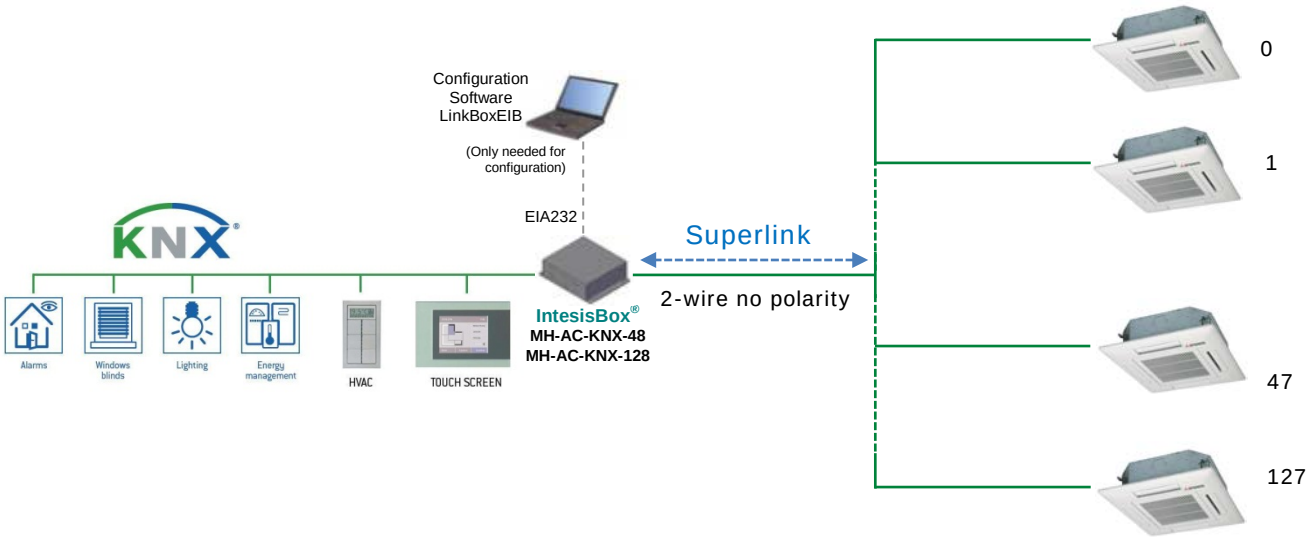
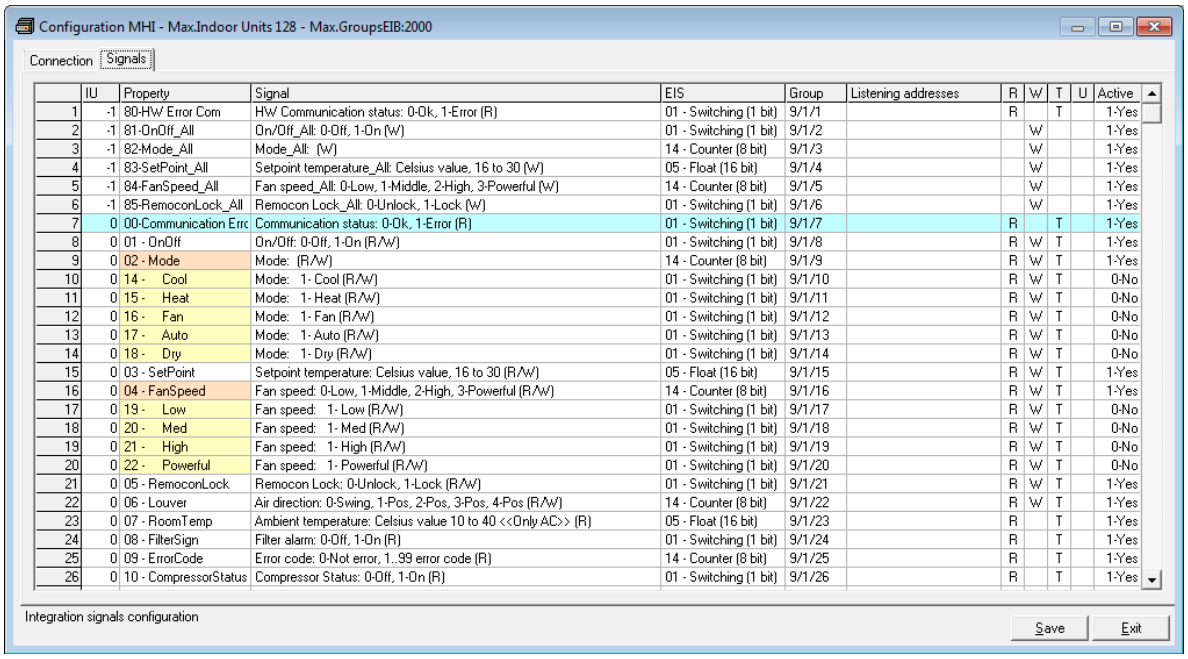


Figure 1.1 Typical System integration using the *IntesisBox® KNX – MHI AC*

2. Configuration Software: LinkBoxEIB

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	Property	Signal	EIS	Group	Listening addresses	R	W	T	U	Active
1	-1	80-HW Error Com	HW Communication status: 0-Ok, 1-Error (R)	01 - Switching (1 bit)	9/1/1		R		T		1-Yes
2	-1	81-OnOff_All	On/Off_All: 0-Off, 1-On (W)	01 - Switching (1 bit)	9/1/2			W			1-Yes
3	-1	82-Mode_All	Mode_All: (W)	14 - Counter (8 bit)	9/1/3			W			1-Yes
4	-1	83-SetPoint_All	Setpoint temperature_All: Celsius value, 16 to 30 (W)	05 - Float (16 bit)	9/1/4			W			1-Yes
5	-1	84-FanSpeed_All	Fan speed_All: 0-Low, 1-Middle, 2-High, 3-Powerful (W)	14 - Counter (8 bit)	9/1/5			W			1-Yes
6	-1	85-RemoconLock_All	Remocon Lock_All: 0-Unlock, 1-Lock (W)	01 - Switching (1 bit)	9/1/6			W			1-Yes
7	0	00-Communication Erro	Communication status: 0-Ok, 1-Error (R)	01 - Switching (1 bit)	9/1/7		R		T		1-Yes
8	0	01 - OnOff	On/Off: 0-Off, 1-On (R/W)	01 - Switching (1 bit)	9/1/8		R	W	T		1-Yes
9	0	02 - Mode	Mode: (R/W)	14 - Counter (8 bit)	9/1/9		R	W	T		1-Yes
10	0	14 - Cool	Mode: 1- Cool (R/W)	01 - Switching (1 bit)	9/1/10		R	W	T		0-No
11	0	15 - Heat	Mode: 1- Heat (R/W)	01 - Switching (1 bit)	9/1/11		R	W	T		0-No
12	0	16 - Fan	Mode: 1- Fan (R/W)	01 - Switching (1 bit)	9/1/12		R	W	T		0-No
13	0	17 - Auto	Mode: 1- Auto (R/W)	01 - Switching (1 bit)	9/1/13		R	W	T		0-No
14	0	18 - Dry	Mode: 1- Dry (R/W)	01 - Switching (1 bit)	9/1/14		R	W	T		0-No
15	0	03 - SetPoint	Setpoint temperature: Celsius value, 16 to 30 (R/W)	05 - Float (16 bit)	9/1/15		R	W	T		1-Yes
16	0	04 - FanSpeed	Fan speed: 0-Low, 1-Middle, 2-High, 3-Powerful (R/W)	14 - Counter (8 bit)	9/1/16		R	W	T		1-Yes
17	0	19 - Low	Fan speed: 1- Low (R/W)	01 - Switching (1 bit)	9/1/17		R	W	T		0-No
18	0	20 - Med	Fan speed: 1- Med (R/W)	01 - Switching (1 bit)	9/1/18		R	W	T		0-No
19	0	21 - High	Fan speed: 1- High (R/W)	01 - Switching (1 bit)	9/1/19		R	W	T		0-No
20	0	22 - Powerful	Fan speed: 1- Powerful (R/W)	01 - Switching (1 bit)	9/1/20		R	W	T		0-No
21	0	05 - RemoconLock	Remocon Lock: 0-Unlock, 1-Lock (R/W)	01 - Switching (1 bit)	9/1/21		R	W	T		1-Yes
22	0	06 - Louver	Air direction: 0-Swing, 1-Pos, 2-Pos, 3-Pos, 4-Pos (R/W)	14 - Counter (8 bit)	9/1/22		R	W	T		1-Yes
23	0	07 - RoomTemp	Ambient temperature: Celsius value 10 to 40 <<Only AC>> (R)	05 - Float (16 bit)	9/1/23		R		T		1-Yes
24	0	08 - FilterSign	Filter alarm: 0-Off, 1-On (R)	01 - Switching (1 bit)	9/1/24		R		T		1-Yes
25	0	09 - ErrorCode	Error code: 0-Not error, 1..99 error code (R)	14 - Counter (8 bit)	9/1/25		R		T		1-Yes
26	0	10 - CompressorStatus	Compressor Status: 0-Off, 1-On (R)	01 - Switching (1 bit)	9/1/26		R		T		1-Yes

Figure 2.1 LinkBoxEIB configuration view

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3. Mitsibushi Heavy Indsutries to KNX integration

3.1 Controlling units one-by-one:

Property	EIS type	Signal type (R/W)	Description / Status	
Communication Error	1 – Switching (1bit)	R	**Communication Status** 0 – Communication OK, 1 – Communication ERROR	
OnOff	1 – Switching (1bit)	R/W	**Indoor Unit On/Off** 0 – Off, 1 – On	
Mode	14 – Counter (8bit)	R/W	**Operation Mode** 0 – Auto, 1 – Heat, 2 – Cool, 3 – Fan, 4 – Dry	
	DPT 20.105 (8bit)	R/W	**Operation Mode** 0 – Auto, 1 – Heat, 3 – Cool, 9 – Fan, 14 – Dry	
	DPT 1.100 (1bit)	R/W	**Operation Mode** 0 – Cool, 1 – Heat	
Mode::Cool	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)
Mode::Heat	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	
Mode::Dry	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
SetPoint	5 – Float (2byte)	R/W	**Set Point Temperature** (only integer numbers allowed) 16..30 ºC	
Fan Speed	14 – Counter (8bit)	R/W	**Fan Speed** 0 – Low, 1 – Medium, 2 – High, 3 – Powerful	
FanSpeed::Low	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::Mid	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
FanSpeed::High	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
FanSpeed::Powerful	1 – Switching (1bit)	R/W	0 – Inactive, 1 – Active	
RemoConLock	1 – Switching (1bit)	R/W	**Remote Controller Lock / Unlock** 0 – Remote Controller Locked, 1 – Remote Controller Unloked	
Louver	14 – Counter (8bit)	R/W	**Louver Control**[1] 0 – Swing, 1 – Pos1, 2 – Pos2, 3 – Pos3, 4 – Pos4	
Room Temp	5 – Float (2byte)	R	**Ambient Temperature (only integer numbers)** Read: 10ºC to 40ºC	
Filter Sign	1 – Switching (1bit)	R	**Filter Sign Status** 0 – Off, 1 - On	
ErrorCode	10 – Counter (16bit)	R	**Error Code** 0 – No Error, 1..99 – Error Code[2]	
CompressorStatus	1 – Switching (1bit)	R	**Compressor Status** 0 – Off, 1 - On	
FilterSignReset	1 – Switching (1bit)	W	**Filter Sign Reset** 1 – Clear Filter Alarm (When reading always 0)	
RemoConErrorReset	1 – Switching (1bit)	W	**Remote Controller Error Reset** 1 – Clear Filter Alarm (When reading always 0)	
ThermoOnOff	1 – Switching (1bit)	R	**Thermo On/Off Status (Inverter Type Only)** 0 – Off, 1 - On	

[1] During transition between positions, ***Swing*** signal will turn on indicating the Louver is moving

[2] See list of indoor unit error codes and their meaning in the User Manual

3.2 Controlling all units at a time:

Property	EIS type	Signal type (R/W)	Description / Status	
HW Error Com	1 – Switching (1bit)	R	**HW Communication Status** 0 – Communication OK, 1 – Communication ERROR	
OnOff_All	1 – Switching (1bit)	R/W	**Indoor Unit On/Off** 0 – Off, 1 – On	
Mode_All	14 – Counter (8bit)	R/W	**Operation Mode** 0 – Auto, 1 – Heat, 2 – Cool, 3 – Fan, 4 – Dry	
	DPT 20.105 (8bit)	R/W	**Operation Mode** 0 – Auto, 1 – Heat, 3 – Cool, 9 – Fan, 14 – Dry	
	DPT 1.100 (1bit)	R/W	**Operation Mode** 0 – Cool, 1 – Heat	
Mode_All::Cool	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)
Mode_All::Heat	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
Mode_All::Fan	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
Mode_All::Auto	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
SetPoint_All	5 – Float (2byte)	R/W	**Set Point Temperature** (only integer numbers allowed) 16..30 ºC	
Fan Speed_All	14 – Counter (8bit)	R/W	**Fan Speed** 0 – Low, 1 – Medium, 2 – High, 3 – Powerful	
FanSpeed_All::Low	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_All::Mid	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
FanSpeed_All::High	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
FanSpeed_All::Powerful	1 – Switching (1bit)	R/W	0–Inactive, 1–Active	
RemoconLock_All	1 – Switching (1bit)	W	**Remote Controller Lock/Unlock** 0 – Unlock, 1 - Lock	

4. Technical characteristics

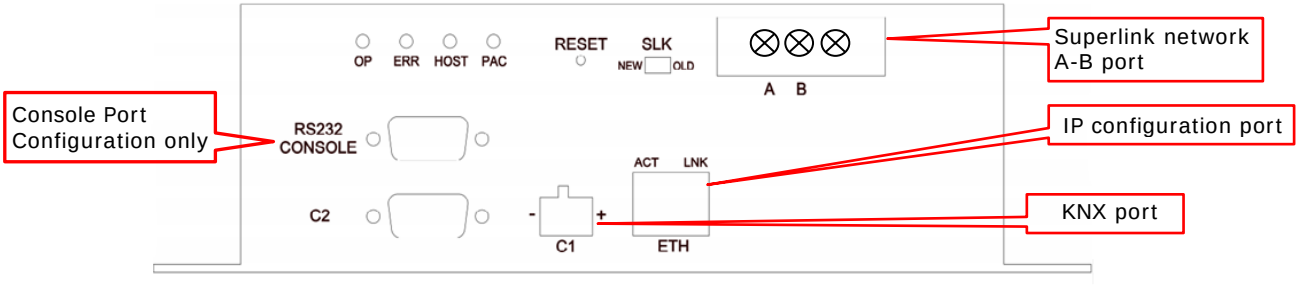

Figure 4.1 IntesisBox® KNX – MHI AC front view

Enclosure	Industrial sheet metal. Size: 215mm x 167mm x 61mm. Weight: 2025gr
Color	Gray metalized.
Power	100 to 240VAC~ 50 to 60Hz 5W max. Power connector: C14 (male) [1]
Terminal wiring (for low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.75mm^2... 1.25mm^2 2 cores: 0.75mm^2... 1.25mm^2 3 cores: not permitted
Mounting	Wall (see Figure 5.3)
KNX port	1 x KNX TP1 (EIB) opto-isolated (Plug-in screw terminal block 2 poles)
A-B port	1 x SuperLink® connector (Plug-in screw terminal block 2 poles “A” “B”). SELV
ETH port	1 x Ethernet 10Base-T (RJ45)
LED indicators	4 x MHI Interface (OP, ERR, HOST, PAC) 2 x Ethernet port link and activity (LNK, ACT)
Push buttons	1 x Reset Device
Selectors	1 x SLK selector
Console port	EIA232. (DB9 female DCE). SELV
Configuration	Via console port. [2]
Firmware	Allows upgrades via console port.
Operational temperature range	0°C to +40°C
Operational humidity range	5% to 95%, non condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Norms and standards	CE conformity to EMC directive (2004/108/EC) and Low-voltage directive (2006/95/EC) EN 61000-6-2 EN 61000-6-3 EN 60950-1 EN 50491-3

[1] A power cable with conector C14 male 1,6 meters long is supplied with the device.

[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.

5. Dimensions

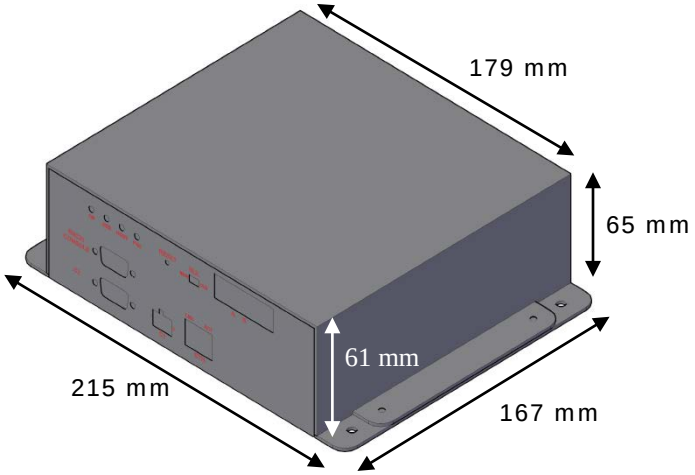

Figure 5.1 External dimensions – Perspective view

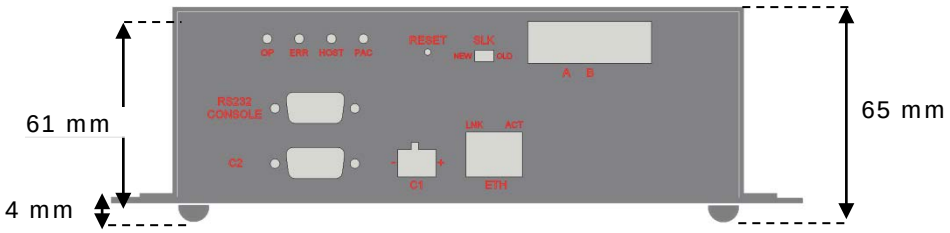

Figure 5.2 External dimensions – Front view

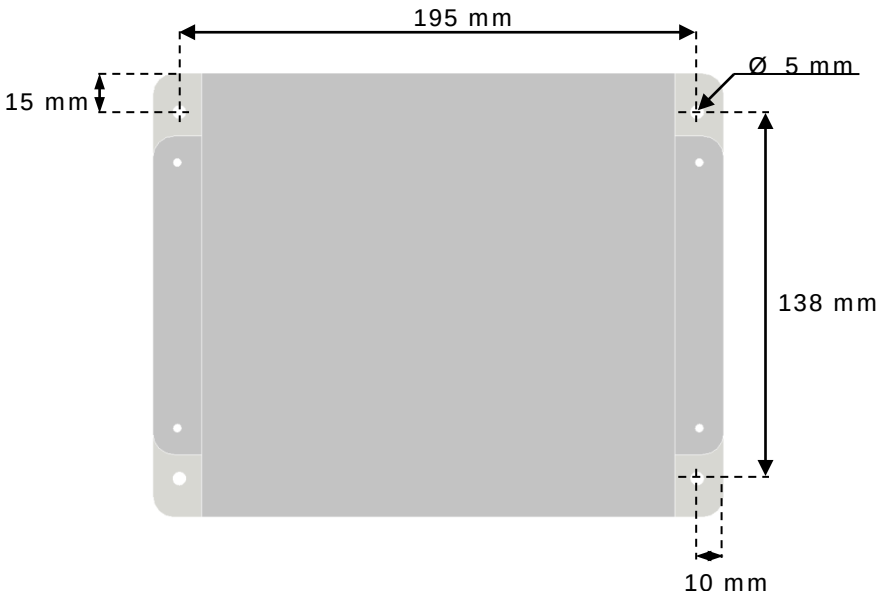

Figure 5.3 Top view (screw holes size and spacers)