IntesisBox® KNX
Digitally Addressable Lighting Interface (DALI)

User Manual

Intesis
Member of the HMS group

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Gateway for integration of DALI devices into KNX TP-1 home and building automation systems.

Order code:

IBKNXDAL0640000, 64 DALI ballasts (1 DALI channel)

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1   Description

1.1   *Introduction*

This document describes the integration of DALI lighting ballasts into KNX TP-1 home automation systems using the IntesisBox KNX to DALI communication gateway*.*

The aim of this integration is to monitor and control DALI lighting ballasts, remotely, from a KNX home automation system, as if it was a part of the own KNX installation and vice-versa.

In current version of the device, following DALI device types are supported:

- DALI Fluorescent lights (DALI type 0)
- Emergency lights (DALI type 1)
- LED modules (DALI type 6)

All of them, regardless of its type, will be referred as 'ballasts', 'DALI devices' and 'ECGs' (Electronic Control Gears) indistinctively throughout the document.

Up to 64 DALI lighting devices can be fitted in a single DALI channel, and therefore controlled and monitored from IntesisBox.

IntesisBox needs to be configured using IntesisBox MAPS software configuration tool. In the software, KNX and DALI lighting ballast parameters must be configured and downloaded to the IntesisBox.

This document assumes the user is familiar with KNX and DALI technologies and technical terms.

> **NOTE:** There may be differences in the implementation of DALI among different ballasts and manufacturers. IntesisBox is compatible with Ballasts implementing the DALI standard and certified under the DiiA guidelines for testing and certification. Use only DALI devices having the DALI logo with IntesisBox.
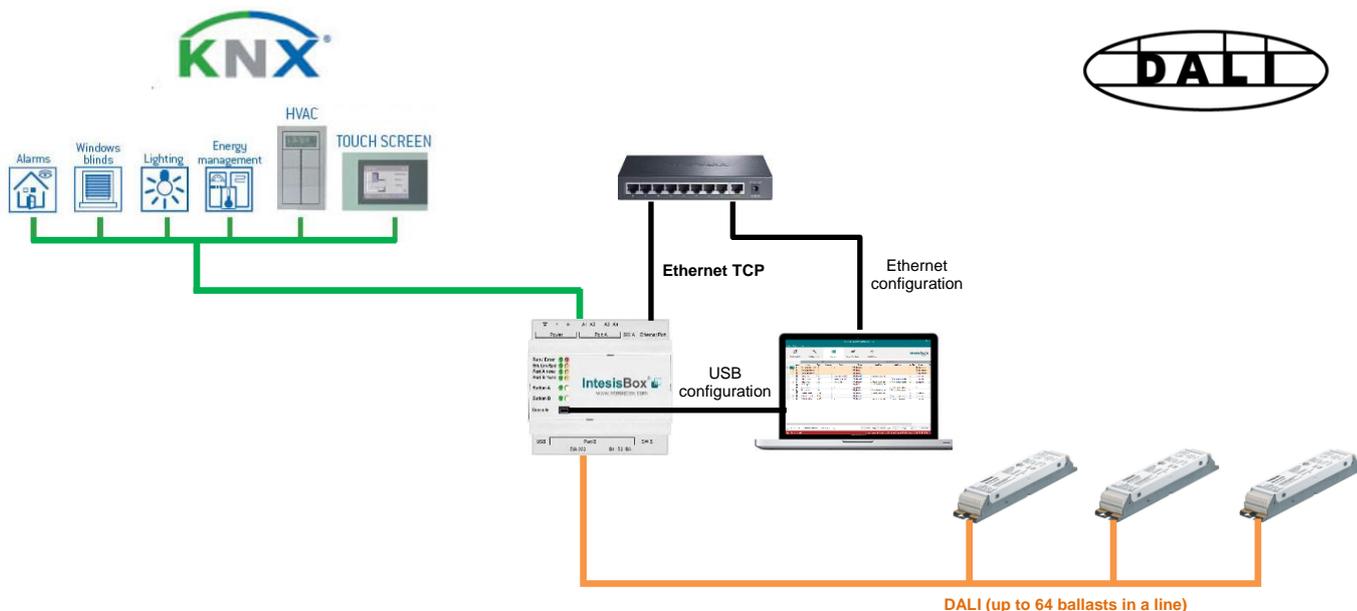
Integration of DALI into KNX TP-1 home or building automation system

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1.2 *Functionality*

IntesisBox® continuously polls (reads) all the signals of the DALI lighting ballasts in each line and maintains the updated values to be served in KNX.

Each of the mentioned DALI point is associated to a *KNX group address*, with this, the DALI system is seen as *one more KNX device* from the KNX system point of view, with the same configuration and operation characteristics

When a change in any DALI point occurs, a write telegram is sent to the KNX bus, of the associated *KNX Group.* See details in section 4.

When a telegram is received from the KNX bus, of a *KNX Group address* associated to a DALI point, a message is sent immediately to the corresponding DALI lighting ballast device to perform the corresponding action.

In the continuous polling process of the DALI channel, if there is no answer, it is indicated with a virtual signal of communication error for this ballast in its line.

The KNX physical address address and all relative KNX group addresses must be set in the MAPS configuration tool.

From the configuration tool, it is also possible to scan each DALI channel for available ballasts, add them in configuration, and configure its individual parameters (short address, preset levels, scenes, etc), according to their device type (fluorescent light, emergency light, LED module).

1.3 *Gateway's capacity*

IntesisBox capacity is listed below:

Element	Max.	Notes
Number of DALI channels	1	Number of independent DALI channels
Number DALI lighting devices per line	64	64 DALI lighting devices are supported per line
Max number of KNX variables per DALI device	61	Number of available signals will vary according to device type
Max number of KNX variables per DALI group	16	Number of available signals will vary according to device type
Max number of variables per LINE	4176	16 broadcast signals + 16 signals/DALI group + 61 signals/DALI device

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2 KNX interface

In this section, a common description for all IntesisBox KNX series gateways is given, from the point of view of KNX system which is called from now on *internal system*. The DALI system is also called from now on *external system*.

2.1 *Description*

IntesisBox KNX connects directly to the KNX TP-1 (EIB) bus and behaves as one more device into the KNX system, with the same configuration and operational characteristics as other KNX devices.

Internally, the circuit part connected to the KNX bus is opto-isolated from the rest of the electronics.

IntesisBox-KNX receives, manages and sends all the telegrams related to its configuration to the KNX bus.

On receiving telegrams of KNX Groups associated to internal datapoints, the corresponding messages are sent to the external system (DALI) to maintain both systems synchronised in every moment.

When a change in a signal of the external system is detected, a telegram is sent to the KNX bus (of the associated KNX group) to maintain both systems synchronised in every moment.

The status of the KNX bus is checked continuously and, if a bus drops down is detected, due to a failure in the bus power supply for example, when the KNX bus is restored again, IntesisBox will retransmit the status of all the KNX groups marked as *"T" Transmit*. Also *Updates* for the groups marked as *"U"* will be performed on corresponding Group Address. The behaviour of each individual point into IntesisBox is determined by the flags configured for the point. See details in section below.

2.2 *Points definition*

Every internal datapoint to define has the following KNX properties:

Property	Description
Description	Descriptive information about the Communication Object or Signal.
Signal	Signal's Description. Only for informative purposes, allows identifying the signal comfortably.
DPT	It is the KNX data type used to code the signal's value. It will depend on the type of signal associated in the external system in every case. In some integrations, it is selectable, in others it is fixed due to the intrinsic characteristics of the signal.
Group	It is the KNX group to which the point is associated. It is also the group to which the read (R), write (W), transmit (T) and update (U) flags are applied. Is the sending group.
Listening addresses	They are the addresses that will actuate on the point, apart of the main Group address.
R	Read. If this flag is activated, read telegrams of this group address will be accepted.
Ri	Read. If this flag is activated, the object will be read on initialization.
W	Write. If this flag is activated, write telegrams of this group address will be accepted.
T	Transmit. If this flag is activated, when the point's value changes, due to a change in the external system, a write telegram of the group address will be sent to the KNX bus.
U	Update. If this flag is activated, on IntesisBox start-up or after a KNX bus reset detection, objects will be updated from KNX.
Active	If activated, the point will be active in IntesisBox, if not, the behaviour will be as if the point is not defined. This allows deactivating points without the need of delete them for possible future use.

These properties are common for all IntesisBox KNX series gateways. Although each integration may have specific properties according to the type of signals of the external system.

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2.3 KNX Comunication Objects

2.3.1 Single DALI device signals

There are up to 94 signals for each DALI device or ballast.

Supported signals vary according to device type, configured through IntesisBox MAPS.
Following abbreviations are done in the table:

- FL: Fluorescent light (device type 0)
- EML: Emergency light (device type 1)
- LED: LED module (device type 6)

FLAGS:

If marked with a **black** "**x**", it will be enabled by default and couldn't be disabled.
If marked with **red** "**x**", column will be disabled by default but could be enabled by user.
If marked with **blue** "**x**", column will be enabled by default but could be disabled by user.

TOPIC	Ballast / Device Type			NAME	LEN	DATAPOINT TYPE		FLAGS					FUNCTION
	FL	EML	LED			DPT_NAME	DPT_ID	U	T	Ri	W	R	
COMM ERR	x	x	x	Ballast / Lamp Failure	1 bit	DPT_Alarm	1.005		T			R	0-OK 1-Ballast / Lamp Failure
	x	x	x	Update All ECG Status		DPT_Switch	1.001	U	T	Ri	W	R	0-Update Finished 1-Trigger Update
	x	x	x	Ballast Status	1 byte	Unsigned Value	5.x		T			R	b7-PwrCycle b6-MissShAdd b5-ResetSt b4-FadeRun b3-BallLimErr b2-LampPwrOn b1-LampFail b0-BallFail
	x	x	x	Actual Level	1 byte	DPT_Scaling	5.001		T			R	0 to 100 %

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	x	x	x	Device Type	1 byte	Unsigned Value	5.x	T		R	0-Fluorescent 1-Emergency 2 Discharge 3-Halogen 4-Incandescent 5-Digital signal 6-LED 7-Switching 8-Colour Control
	x	x	x	Physical Minimum Level	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
	x	x	x	Min Level	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
	x	x	x	Max Level	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
	x	x	x	Power On Level	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
	x	x	x	System Failure Level	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
	x	x	x	Fade Time	1 byte	Unsigned Value	5.x	T		R	0 to 15
	x	x	x	Fade Rate	1 byte	Unsigned Value	5.x	T		R	1 to 15
	x	x	x	Arc Power Level	1 byte	DPT_Scaling	5.001	U	Ri	W R	0 to 100 %
	x	x	x	Arc Power Off / On	1 bit	DPT_Switch	1.001	U	Ri	W R	0-Off; 1-100 %
	x	x	x	Step Down / Up	1 bit	DPT_Step	1.007	U	Ri	W R	0-Step Down, 1-Step Up
	x	x	x	Recall Min Level	1 bit	DPT_Start	1.010	U	Ri	W R	1-Recall Min Level
	x	x	x	Recall Max Level	1 bit	DPT_Start	1.010	U	Ri	W R	1-Recall Max Level
	x	x	x	Go to Scene	1 byte	Unsigned Value	5.x	U	Ri	W R	0 to 15

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	x	x	x	Store Current Level as Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Clear/Remove Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Add to DALI Group	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Remove from DALI Group	1 byte	Unsigned Value	5.x	U		Ri	W	R	1 to 15
	x	x	x	Set Fade Time	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 100 %
	x	x	x	Set Fade Rate	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 100 %
	x	x	x	Set Min Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set Max Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
				Set Power-on Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x			Set System-failure Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
		x		Failure Status	1 byte	Unsigned Value	5.x		T			R	b7-FunctFail b6-DurFail b5-DurTestDelay b4-FunctTestDelay b3-EmLampFail b2-BattFail b1-BattDurFail b0-CircFail

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		x		Emergency Mode	1 byte	Unsigned Value	5.x	T		R	b7-HardSwOn b6-HardInhibit b5-DurTestProg b4-FunctTestProg b3-ExtdEmMode b2-EmMode b1-NormMode b0-RestMode
		x		Emergency Status	1 byte	Unsigned Value	5.x	T		R	b7-PhysicSel b6-Ident b5-DurTestPend b4-FunctTestPend b3-BattFull b2-DurTestDone b1-FunctTestDone b0-InhibitMode
		x		Emergency Battery Charge	1 byte	DPT_Scaling	5.001	T		R	0 to 100 %
		x		Next Function Test	2 bytes	Signed Value	8.x	T		R	0 to 16384 hours
		x		Next Duration Test	2 bytes	Signed Value	8.x	T		R	0 to 16384 hours
		x		Function Test Interval	1 byte	Unsigned Value	5.x	T		R	0-Disabled, 1 to 255 days
		x		Duration Test Interval	1 byte	Unsigned Value	5.x	T		R	0-Disabled, 1 to 97 weeks
		x		Test Execution Timeout	1 byte	Unsigned Value	5.x	T		R	0 to 255 days
		x		Prolong Time	1 byte	Unsigned Value	5.x	T		R	0 to 127,5 minutes
		x		Duration Test Result	2 bytes	Signed Value	8.x	T		R	0 to 510 minutes
		x		Lamp Total Operation Time	2 bytes	Signed Value	8.x	T		R	0 to 1016 hours

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		x		Emergency Level	1 byte	DPT_Scaling	5.001		T			R	0 to 100 %
		x		Emergency Min Level	1 byte	DPT_Scaling	5.001		T			R	0 to 100 %
		x		Emergency Max Level	1 byte	DPT_Scaling	5.001		T			R	0 to 100 %
		x		Rated Duration	2 bytes	Signed Value	8.x		T			R	0 to 510 minutes
		x		Features	1 byte	Unsigned Value	5.x		T			R	b7-RelightRestSup b6-PhysicSelSup b5-HardInSup b4-AdjsEmLvl b3-AutoTestCap b2-SwitchMainCG b1-MainCG b0-IntegralEmCG
		x		Lamp Emergency Time	1 byte	Unsigned Value	5.x		T			R	0 to 254 hours
		x		Rest	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Extinguish Lamp
		x		Inhibit	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Start Inhibit mode
		x		Re-Light/Reset Inhibit	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Cancel Inhibit Mode
		x		Start Function Test	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Start Function Test
		x		Start Duration Test	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Start Duration Test
		x		Stop Test	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Stop Function/Duration Test
		x		Reset Function Test Done Flag	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Reset Function Flag
		x		Reset Duration Test Done Flag	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Reset Duration Flag
		x		Reset Lamp Time	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Lamp Emergency Time Reset

				Name	Size	Type	DPT						Range
		x		Store Test Execution Timeout	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 255 days
		x		Store Prolong Time	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 127,5 minutes
		x		Store Function Test Interval	1 byte	Unsigned Value	5.x	U		Ri	W	R	0-Disabled 1 to 255 days
		x		Store Duration Test Interval	1 byte	Unsigned Value	5.x	U		Ri	W	R	0-Disabled, 1 to 97 weeks
		x		Store Emergency Level	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 100 %
			x	Failure Status	1 byte	Unsigned Value	5.x		T			R	b7-RefMeasurFail b6-ThermLightLvl b5-ThermShut b4-CurrProtAct b3-LoadInc b2-LoadDec b1-OpenC b0-ShortC
			x	Gear Type	1 byte	Unsigned Value	5.x		T			R	b3-dcSuppPoss b2-acSuppPoss b1-LEDModInt b0-LEDPowerSInt
			x	Dimming Curve	1 bit	Binary Value	1.x		T			R	0-Standard Logarithmic Dim Curve 1-Linear Dim Curve
			x	Possible Operating Modes	1 byte	Unsigned Value	5.x		T			R	b3-HighCurrPulMod b2-OutCurrContr b1-AMModePoss b0-PWMModePoss

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		x	Features	1 byte	Unsigned Value	5.x	T			R	b7-PhysicSelSupp b6-LightLvlRedReq b5-ThermShutReq b4-CurrProtActReq b3-LoadIncReq b2-LoadDecReq b1-OpenCQ b0-ShortCQ
		x	Reference Running	1 bit	DPT_Bool	1.002	T			R	0-No, 1-Yes
		x	Current Protector	1 bit	DPT_Enable	1.003	T			R	0-Disabled, 1-Enabled
		x	Operating Mode	1 byte	Unsigned Value	5.x	T			R	b4-NonLogDimCurveAct b3-HighCurrPulModeAct b2-OutCurrContr b1-AMModeAct b0-PWMModeAct
		x	Fast Fade Time	1 byte	Unsigned Value	5.x	T			R	0 to 27
		x	Min Fast Fade Time	1 byte	Unsigned Value	5.x	T			R	0 to 27
		x	Reference System Power	1 bit	DPT_Start	1.010	U	Ri	W	R	1-Trigger DALI Power Referencing
		x	Enable/Disable Current Protector	1 bit	DPT_Enable	1.003	U	Ri	W	R	0-Disable 1-Enable
		x	Select Dimming Curve	1 bit	Binary Value	1.x	U	Ri	W	R	0-Standard Logarithmic Dim Curve 1-Linear Dim Curve
		x	Store Fast Fade Time	1 byte	Unsigned Value	5.x	U	Ri	W	R	0 to 27

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2.3.2 DALI groups' signals

DALI supports group addressing of ballasts. Up to 16 groups can be defined in a DALI channel. In IntesisBox, there are up to 16 signals for each DALI group.

Supported signals vary according to device type, configured through IntesisBox MAPS.
Following abbreviations are done in the table:

- FL: Fluorescent light (device type 0)
- EML: Emergency light (device type 1)
- LED: LED module (device type 6)

FLAGS:

If marked with a **black** "**x**" will be enabled by default and couldn't be disabled.
If marked with **red** "**x**", column will be disabled by default but could be enabled by user.
If marked with **blue** "**x**", column will be enabled by default but could be disabled by user.

TOPIC	FL	EML	LED	NAME	LEN	DPT_NAME	DPT_ID	U	T	Ri	W	R	FUNCTION
COMM ERR	x	x	x	Arc Power Level	1 bit	DPT_Alarm	1.005	U		Ri	W	R	0 to 100 %
	x	x	x	Arc Power Off / On	1 bit	DPT_Switch	1.001	U		Ri	W	R	0-Off; 1-100 %
	x	x	x	Step Down / Up	1 bit	DPT_Step	1.007	U		Ri	W	R	0-Step Down 1-Step Up
	x	x	x	Recall Min Level	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Recall Min Level
	x	x	x	Recall Max Level	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Recall Max Level
	x	x	x	Go to Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Store Current Level as Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Clear/Remove Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Set Fade Time	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Set Fade Rate	1 byte	Unsigned Value	5.x	U		Ri	W	R	1 to 15

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	x	x	x	Set Min Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set Max Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set Power-on Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set System-failure Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %

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2.3.3 Broadcast signals

Broadcast signals allow to control all ballasts in the same line from an individual signal.

Supported signals vary according to device type, configured through IntesisBox MAPS.
Following abbreviations are done in the table:

- FL: Fluorescent light (device type 0)
- EML: Emergency light (device type 1)
- LED: LED module (device type 6)

FLAGS:

If marked with a **black** "**x**" will be enabled by default and couldn't be disabled.
If marked with **red** "**x**", column will be disabled by default but could be enabled by user.
If marked with **blue** "**x**", column will be enabled by default but could be disabled by user.

TOPIC	FL	EML	LED	NAME	LEN	DPT_NAME	DPT_ID	U	T	Ri	W	R	FUNCTION
COMM ERR	x	x	x	Arc Power Level	1 bit	DPT_Alarm	1.005	U		Ri	W	R	0 to 100 %
	x	x	x	Arc Power Off / On	1 bit	DPT_Switch	1.001	U		Ri	W	R	0-Off; 1-100 %
	x	x	x	Step Down / Up	1 bit	DPT_Step	1.007	U		Ri	W	R	0-Step Down 1-Step Up
	x	x	x	Recall Min Level	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Recall Min Level
	x	x	x	Recall Max Level	1 bit	DPT_Start	1.010	U		Ri	W	R	1-Recall Max Level
	x	x	x	Go to Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Store Current Level as Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Clear/Remove Scene	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Set Fade Time	1 byte	Unsigned Value	5.x	U		Ri	W	R	0 to 15
	x	x	x	Set Fade Rate	1 byte	Unsigned Value	5.x	U		Ri	W	R	1 to 15

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	x	x	x	Set Min Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set Max Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set Power-on Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %
	x	x	x	Set System-failure Level	1 byte	DPT_Scaling	5.001	U		Ri	W	R	0 to 100 %

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3   Connections

Find below information regarding the IntesisBox connections available.
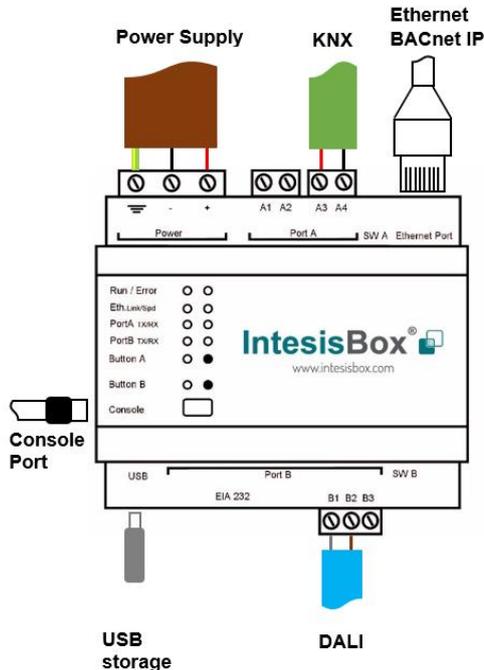
Power Supply
Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

If using DC power supply:
Respect polarity applied of terminals (+) and (-). Be sure the voltage applied is within the range admitted (check table below). The power supply can be connected to earth but only through the negative terminal, never through the positive terminal.

Ethernet
Connect the cable coming from the IP network to the connector ETH of the gateway. Use an Ethernet CAT5 cable. If communicating through the LAN of the building, contact the network administrator and make sure traffic on the port used is allowed through all the LAN path (check the gateway user manual for more information). Default IP is 192.168.100.246. DHCP is enabled by default.

PortA / KNX
Connect the KNX TP1 bus to connectors A3 (+) and A4 (-) of gateway's PortA. Respect the polarity.

PortB / DALI
Connect the DALI bus to connectors A4 (+), A3 (-) of gateway's PortA. IntesisBox provides 16VDC (+/-2%) DALI voltage to the bus.

Console Port
Connect a mini-type B USB cable from your computer to the gateway to allow communication between the Configuration Software and the gateway. Remember that Ethernet connection is also allowed. Check the user manual for more information.

USB
Connect a USB storage device (not a HDD) if required. Check the user manual for more information.

Ensure proper space for all connectors when mounted (see section 6).

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3.1   *Powering the device*

A power supply working with any of the voltage range allowed is needed (check section 0). Once connected the RUN led (Figure above) will turn on.

WARNING! In order to avoid earth loops that can damage the gateway and/or any other equipment connected to it, we strongly recommend:

- The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
- The use of AC power supplies only if they are floating and not powering any other device.

3.2   *Connection to DALI channel.*

Connect + and – terminals of the DALI bus of your DALI channel to IntesisBox' DALI port. Bus has polarity, but most DALI ballasts are polarity insensitive.

Having your DALI channel powered up, you can perform a quick DALI connectivity test by pressing Port B button:

- When pressing Port B button, a broadcast command that will toggle the ballasts between 100% and 0% level will be sent.
- After 30s timeout of not pressing the button, ballasts will return back to its original level.

DALI commands coming from KNX will continue to be executed while doing this test.

3.3   *Connection to KNX*

Connect the communication cable coming from the KNX bus to the PortA (Figure above) of IntesisBox.

In case there is no response from the KNX installation or KNX devices to the telegrams sent by the IntesisBox, check that they are operative and reachable from the KNX installation used by IntesisBox.

Check as well if there is a line coupler that it is not filtering the telegrams from/to the IntesisBox.

3.4   *Connection to PC (Configuration tool)*

This action allows the user to have access to configuration and monitoring of the device. Two methods to connect to the PC can be used:

- **Ethernet**: Using the Ethernet port of the IntesisBox.

- **USB cable**: To connect the device to the PC, the USB cable supplied should be plugged to the USB Console port.

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4   Set-up process and troubleshooting

4.1   *Pre-requisites*

It is necessary to have the KNX system (specific KNX power supply and bus) operative and properly connected to the corresponding port of the gateway. It is also required to have a DALI installation connected to the gateway, in its respective dali port.

Connectors, connection cables, PC for the usage of the Configuration Tool and other auxiliary material, if needed, are not supplied by Intesis for this standard integration.

Items supplied with this product for this integration are:

- IntesisBox gateway.
- Link to download the configuration tool.
- USB Console cable to communicate with IntesisBox.
- Product documentation.

4.2   *IntesisBox MAPS. Configuration & monitoring tool for IntesisBox*

4.2.1   Introduction

IntesisBox MAPS is a Windows® compatible software developed specifically to monitor and configure IntesisBox new generation gateways.

The installation procedure and main functions are explained in the *IntesisBox MAPS User Manual*. This document can be downloaded from the link indicated in the installation sheet supplied with the IntesisBox device or in the product website at www.intesisbox.com

In this section, only the specific case of DALI to KNX will be covered.

Please check the IntesisBox MAPS user manual for specific information about the different parameters and how to configure them.

4.2.2   Connection

To configure the IntesisBox connection parameters press on the **Connection** button in the *menu bar*.
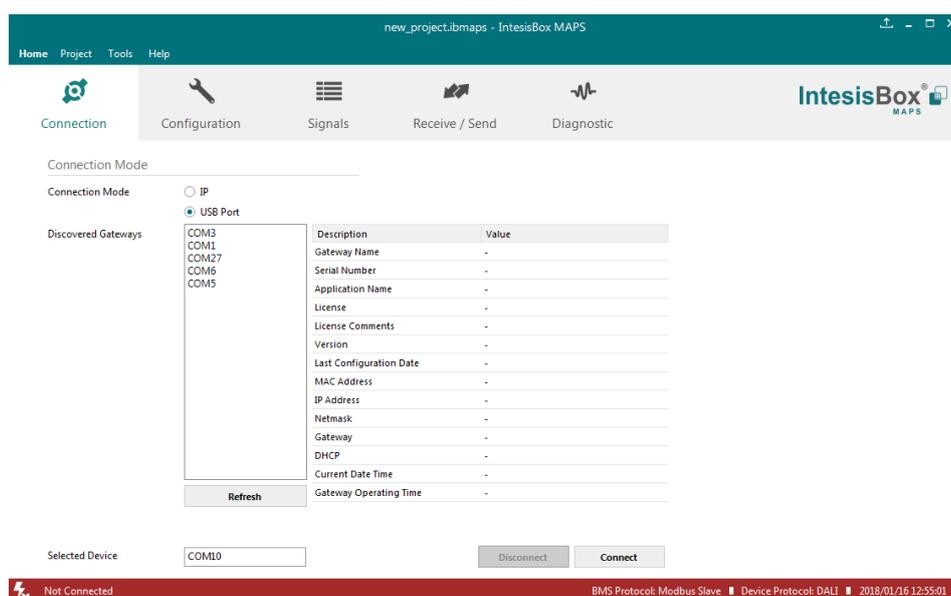
Figure 4.1 MAPS connection

4.2.3 Configuration tab

Select the **Configuration** tab to configure the connection parameters. Three subsets of information are shown in this window: General (Gateway general parameters), KNX (KNX interface configuration) and DALI (DALI channel and DALI devices configuration).
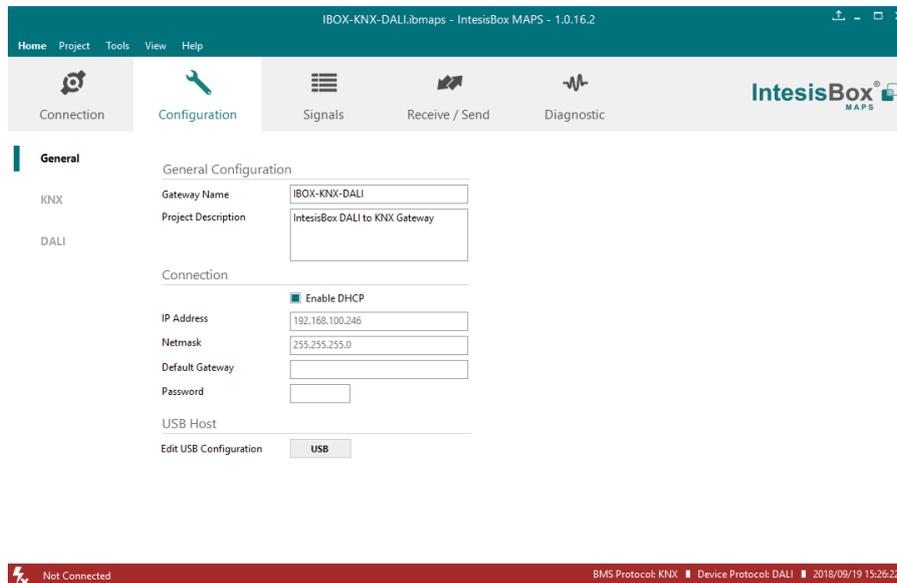
Figure 4.2 IntesisBox MAPS configuration tab

General, *KNX* and *DALI* tabs are explained in IntesisBox MAPS user manual for IntesisBox KNX Server Series.

4.2.4 Signals

All available registers, its corresponding description and other main parmaters are listed in the signals tab.
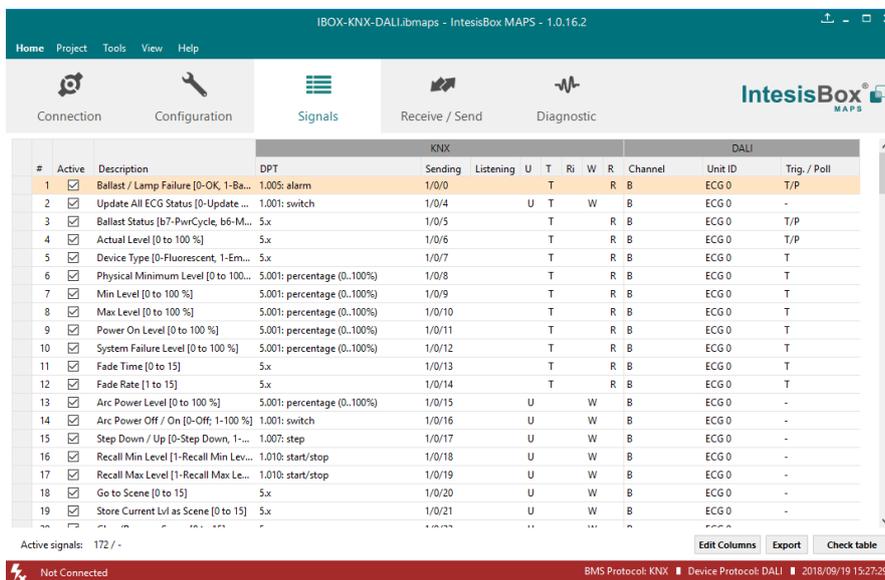
Figure 4.3 IntesisBox MAPS Signals tab

4.2.5 Sending the configuration to IntesisBox

When the configuration is finished, follow the steps to program the gateway.

1.- Click on **Save** button to save the project to the project folder on your hard disk (more information in IntesisBox MAPS User Manual).

2.- You will be prompted to generate the configuration file to be sent to the gateway.
a.- If **Yes** is selected, the file containing the configuration for the gateway will be generated and saved also into the project folder.

b.- If **NO** is selected, remember that the binary file with the project needs to be generated before the IntesisBox starts to work as expected.

3.- Press the **Send File** button to send the binary file to the IntesisBox device. The process of file transmission can be monitored in the IntesisBox Communication Console window. IntesisBox will reboot automatically once the new configuration is loaded.
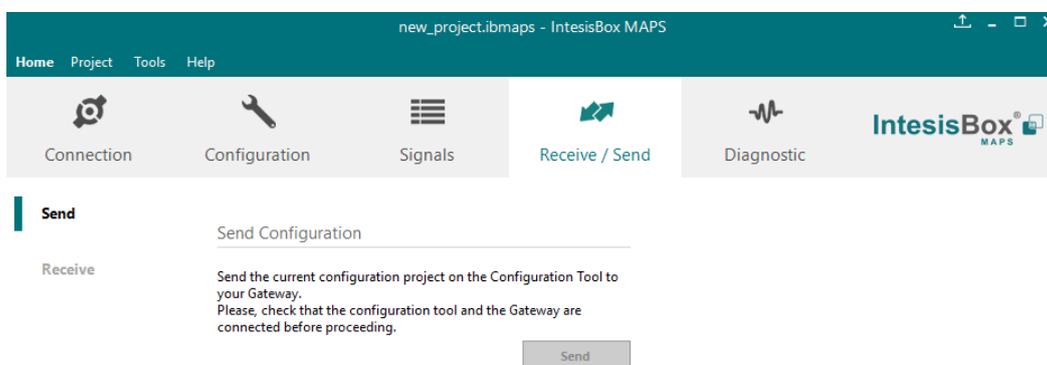
Figure 4.4 IntesisBox MAPS Receive/Send tab

After any configuration change, do not forget to send the configuration file to the IntesisBox using the button "Send".

4.2.6 Diagnostic

To help integrators in the commissioning tasks and troubleshooting, the Configuration Tool offers some specific tools and viewers.

In order to start using the diagnostic tools, the connection with the Gateway must be stablished.

The Diagnostic section is composed by two main parts: Tools and Viewers.

- **Tools**
  Use the tools section to check the current hardware status of the box, log communications into compressed files to be sent to the support, change the Diagnostic panels' view or send commands to the gateway.

- **Viewers**
  In order to check the current status, viewer for the Internal and External protocols are available. It is also available a generic Console viewer for general information about communications and the gateway status. Finally, a Signals Viewer to simulate the BMS behavior or to check the current values in the system.

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Figure 4.5 Diagnostic

More information about the Diagnostic section can be found in IntesisBox MAPS user manual for IntesisBox KNX Series.

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4.3 *Set-up procedure*

1. Install IntesisBox MAPS on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.

2. Install IntesisBox in the desired installation site. Installation can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground is recommended).

3. Connect the communication cable coming from the KNX bus to the port marked as Port A of IntesisBox (More details in section 0).

4. Connect the communication cable coming from DALI network to the port marked as Port B of IntesisBox (More details in section 0).

5. Power up IntesisBox. The supply voltage is 24 Vdc. Take care of the polarity of the supply voltage applied.

   WARNING! In order to avoid earth loops that can damage IntesisBox and/or any other equipment connected to it, we strongly recommend:

   - The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.

6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of IntesisBox (More details in section 0).

   If you want to connect using USB, connect the USB cable from the laptop PC to the port marked as Console of IntesisBox (More details in section 0).

7. Open IntesisBox MAPS, create a new project for KNX and select the IBOX-KNX-DALI-Template project.

8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained in section 4.2.5 .

9. Visit the Diagnostic section, enable COMMS and check that there is communication activity, some TX frames and some other RX frames. This means that the communication with the Centralized Controller and KNX installation is OK. In case there is no communication activity between IntesisBox and the Centralized Controller and/or KNX devices, check that those are operative: check the communication cable used to connect all devices, the physical address, the group addresses and any other communication parameter.

Figure **4.6** Enable COMMS

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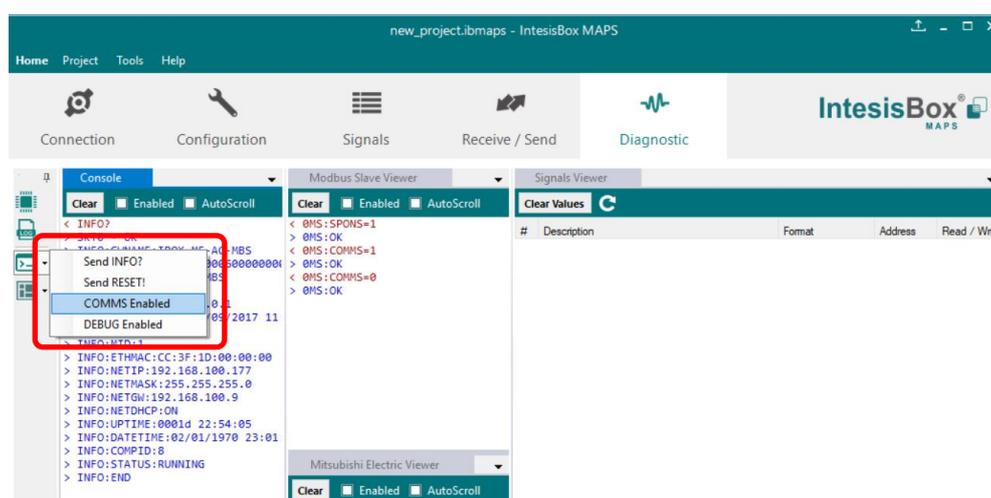
5 Electrical & Mechanical Features

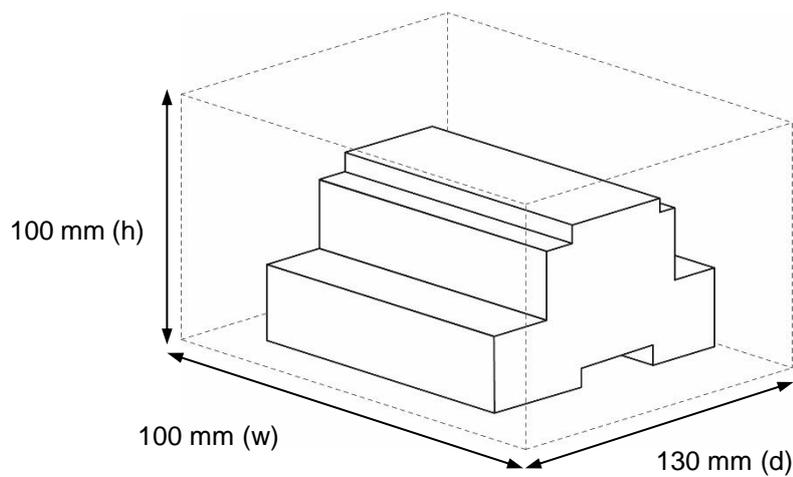|			
Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035	**Battery**	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Mounting	Wall. DIN rail EN60715 TH35.	**Console Port**	Mini Type-B USB 2.0 compliant 1500VDC isolation

Terminal Wiring
(for power supply and low-voltage signals)
	Per terminal: solid wires or stranded wires (twisted or with ferrule)
	  1 core: 0.5mm^2… 2.5mm^2
	  2 cores: 0.5mm^2… 1.5mm^2
	  3 cores: not permitted
	If cables are more than 3.05 meters long, Class 2 cable is required.
		USB port	Type-A USB 2.0 compliant
			Only for USB flash storage device
			(USB pen drive)
			Power consumption limited to 150mA
			(HDD connection not allowed)

Power	1 x Plug-in screw terminal block (3 poles)
	  Positive, Negative, Earth
	  24VDC
		Push Button	Button A: Check the user manual
			Button B: Check the user manual

		Operation Temperature	0°C to +60°C
Ethernet	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity	**Operational Humidity**	5 to 95%, no condensation

Port A	1 x KNX TP-1 Plug-in screw terminal block orange (2 poles)
	  2500VDC isolation from other ports
	  KNX power consumption: 5mA
	  Voltage rating: 29VDC
	1 x Plug-in screw terminal block green (2 poles)
	  Reserved for future use
		Protection	IP20 (IEC60529)

		LED Indicators	10 x On board LED indicators
			  1 x Error LED
			  1 x Power LED
			  2 x Ethernet Link/Speed
			  2 x Port A TX/RX
			  2 x Port B TX/RX
			  1 x Button A indicator
			  1 x Button B indicator

Switch A (SWA)	1 x DIP-Switch for serial EIA485 configuration: Reserved for future use		

PORT B	1 x Serial EIA232 (SUB-D9 male connector)
	  Reserved for future use
	1 x Serial EIA485 Plug-in screw terminal block (3 poles)
	  B1, B2
	  1500VDC isolation from other ports
	  DALI power consumption: 240mA
	  Voltage rating: 16VDC
	   (except PORT B: EIA232)		

Switch B (SWB)	1 x DIP-Switch for serial EIA485 configuration: Reserved for future use		

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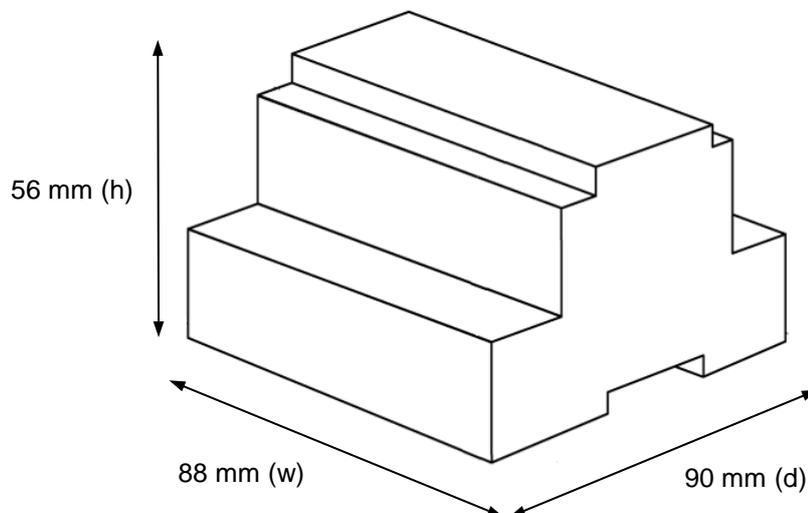
Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections

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Annex A – Quick setup and commissioning of a DALI network

This section provides a brief summary on commissioning a DALI channel using MAPS software tool. The process of commissioning involves:

- Scanning the existing ballasts (ECGs) in the DALI network
- Identifying their physical location
- Obtaining or setting up ECG short addresses
- Obtaining or editing ECG configuration parameters (preset levels, scenes, groups addressing…)

In that process, using MAPS, two workflows are possible for the commissioning:

1. "ECG declaration first": First declaring or instantiating in MAPS the envisaged (planned) ballasts in the installation, setting up values for all their configuration parameters, and then scanning the network for existing ballasts. Process finalizes with assignation and download of planned configuration parameters (including short addresses) with existing ballasts in the installation.

2. "Existing ECG scan first": Aternatively, and more common, it is possible to scan first the DALI network for existing ballasts, obtain their existing configuration (which will be default/factory if the ballasts are new), then change these parameters to match the desired ones (short address, preset levels, scenes…) and load the ballasts with the new configuration.

Typically, "Existing ECG scan first" method will be used when all commissioning is done in the installation itself, as it starts with a DALI bus scan. "ECG declaration first" allows to do some work in advance, defining the configuration parameters for the ballasts before accessing the actual installation. It is possible to understand the "ECG declaration first" as a previous step that can (but not must) be done before effectively scanning the network for ballasts ("Existing ECG scan first"), in order to advance configuration work (definition of preset levels, DALI groups, scene values, …).

It is perfectly possible to mix the two methods. This is, configure a certain number of ballasts declaring them in MAPS ("ECG declaration first"), and once in the installation, assign their parameters to existing ballasts. Whenever more ballasts are installed, they can be added by scanning them in the network ("Existing ECG scan first") and changing its configuration parameters to match the desired ones (without previous instantiation of them in MAPS).

6.1 *Create project*

You will need to create a new project, to do so, select 'Create New project' in MAPS start screen, and choose the appropriate template:
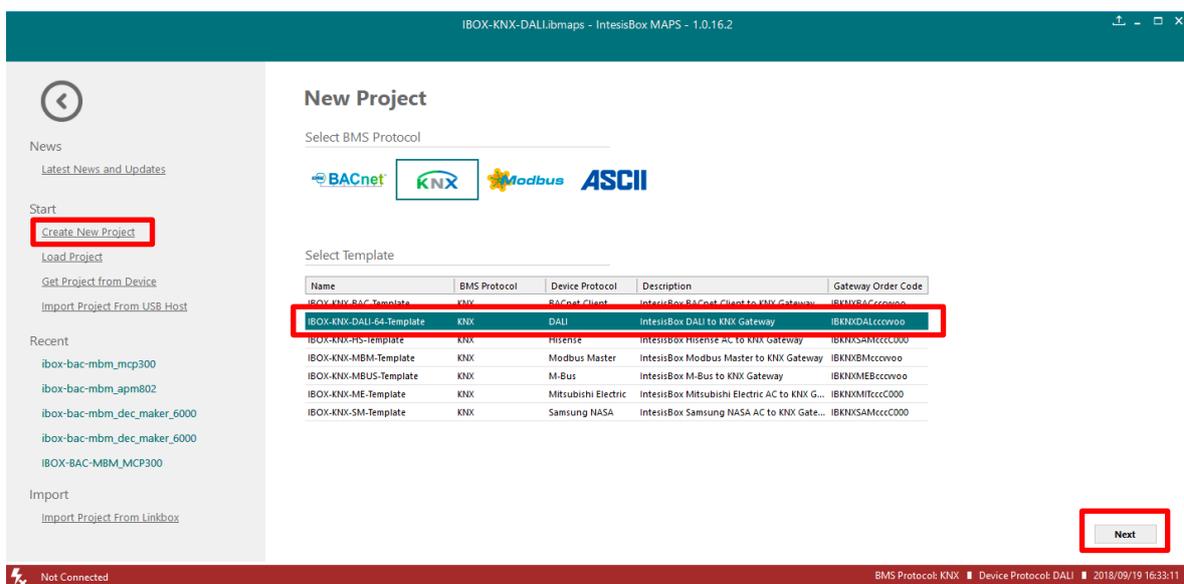

Figure **A.1** New project creation

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6.2 *ECG declaration in project*

Once new project has been created, ballasts can be added to the configured project, without the need of scanning them in bus.

As mentioned above, this allows defining its configuration parameters (preset values, groups, scenes, …) before having actual access to the installation.

To do so, go to the 'Configuration' tab of IntesisBox, and select the 'DALI' section.

In it, choose the channel where you want to instantiate the ballasts (A or B are possible in case of having the product version supporting 2 DALI channels).
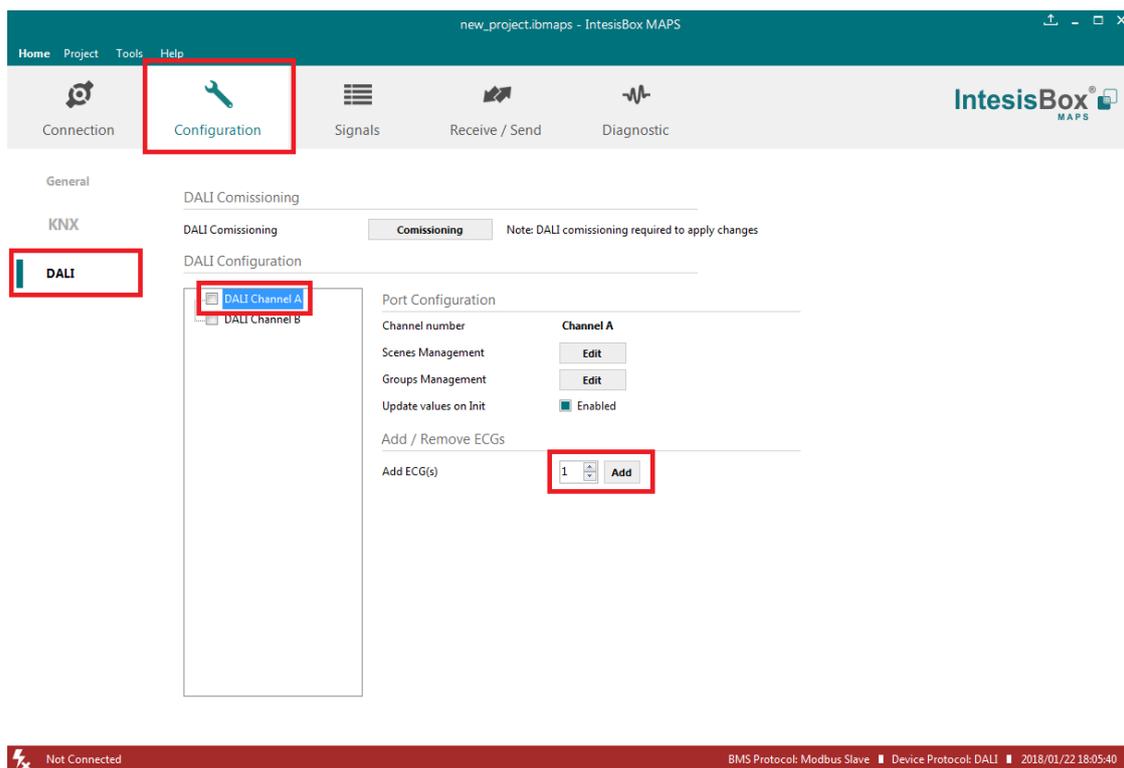
Figure **A.2** DALI ECGs instantiation

With suitable DALI channel selected, enter in 'Add ECG(s)' field the number of ballasts/ECGs to instantiate, and click button Add.

Number of desired devices will appear:

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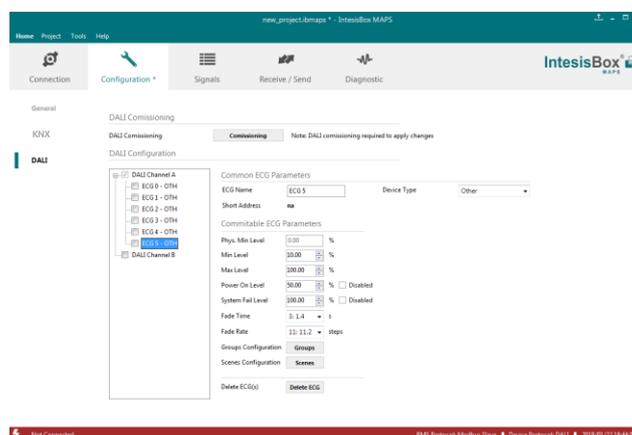
Figure **A.3** Instantiation of DALI ECGs

If too many ECGs have been instantiated, they can be deleted by selecting them, and pressing button 'Delete ECG(s)'. Multiple selection is also possible.
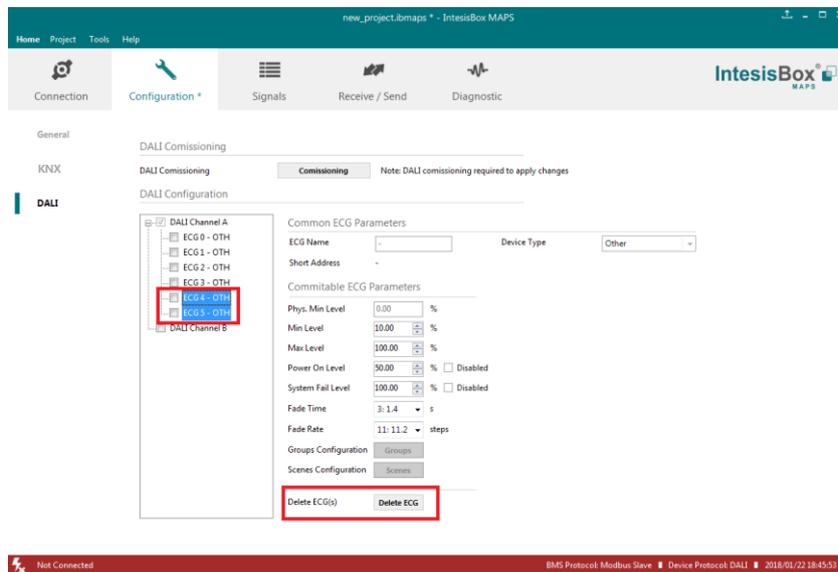
Figure **A.4** Deleting DALI ECGs

Finally, for all ballasts in configuration, you will need to define:

- **ECG Name** (optional): Name to ease its identification in the network
- **Device type**: It's important that this field is suitably chosen and according to existing ballast in the network (device type 0: Fluorescent Light, device type 1: Emergency Light, device type 6: LED module or 'Other' (default) if none of the above matches the device type).
- **Commitable ECG Parameters**: This includes all preset values for the ballasts (min level, max level, power on level, etc), as well as group assignation and scene configuration.

6.3 *Scan and commissioning of ECGs*

First you need to get MAPS connected to the IntesisBox device. To do so, go to 'Connection' tab of MAPS. There, select appropriate connection mode (IP or USB). Select your device from the list of scanned devices (IP) or suitable COM port (USB).
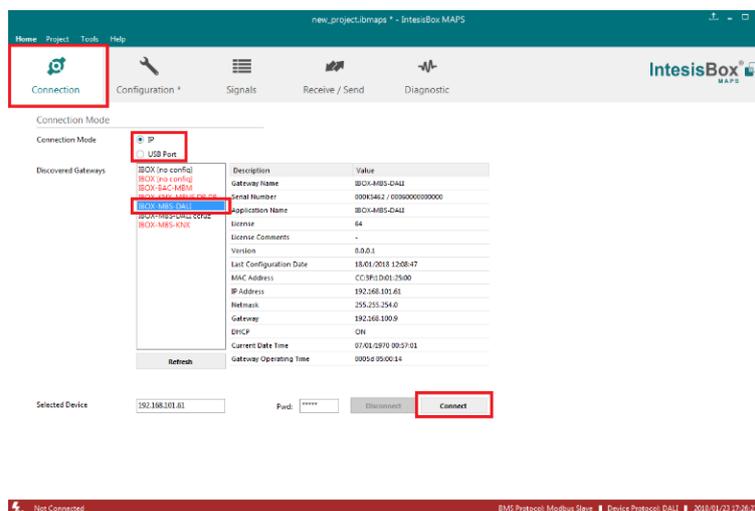
Figure **A.5** Connecting MAPS to the IntesisBox

Finally, click on button 'Connect' in order to establish connection. Bar at the bottom in MAPS main window will become green, switching from 'Not Connected' to 'Connected'.

Now go back to 'Configuration' tab of MAPS, and click on button 'Commissioning':
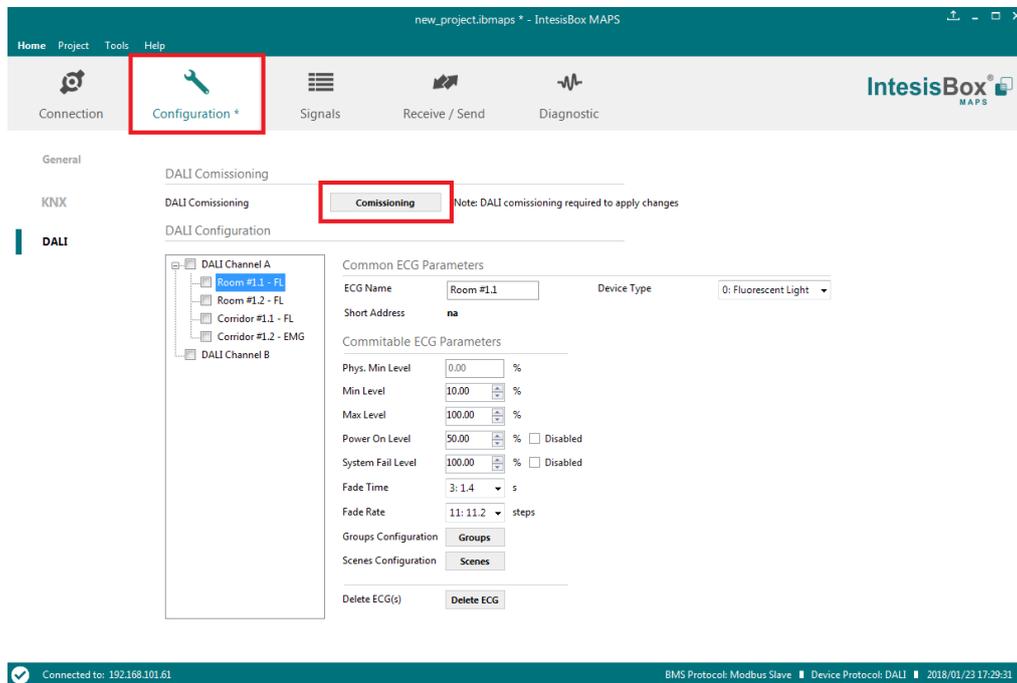
Figure **A.6** DALI commissioning button
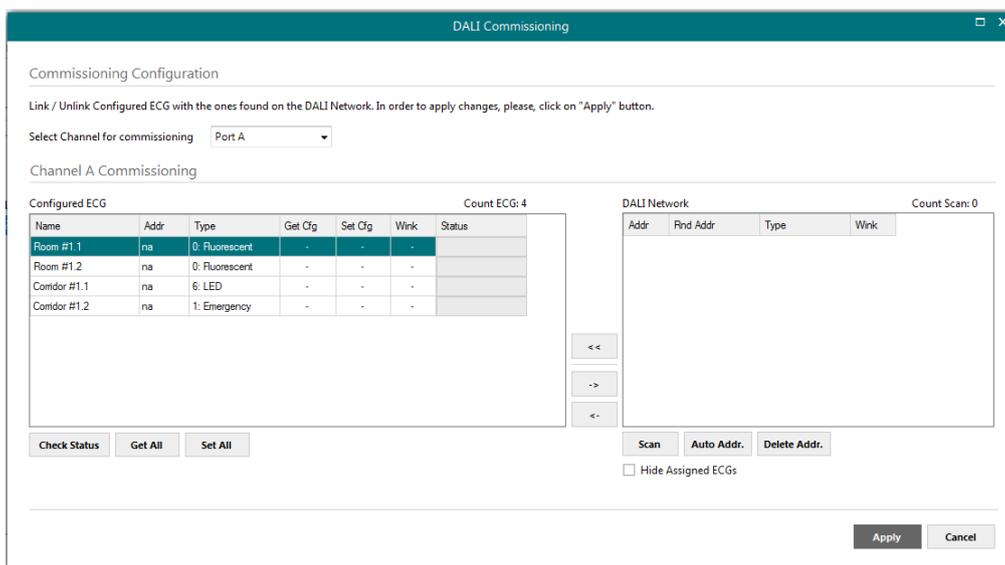
Commissioning window will appear:

Figure **A.7** DALI commissioning window

If having product version / template project supporting 2 DALI channels, channel to commission must be selected between 'Port A' (top of the device) or 'Port B' (bottom of the device). In case of version supporting single DALI channel, no selection is possible.

Also, if ballasts have been added to the configuration (see previos section 'ECG declaration in project') a list of ballasts will appear in Configured ECG.

There is also a 'DALI network' area that will show DALI scan results, empty by now.

In order to start a DALI network scan, select suitable DALI channel (if applicable) and then click on button 'Scan':
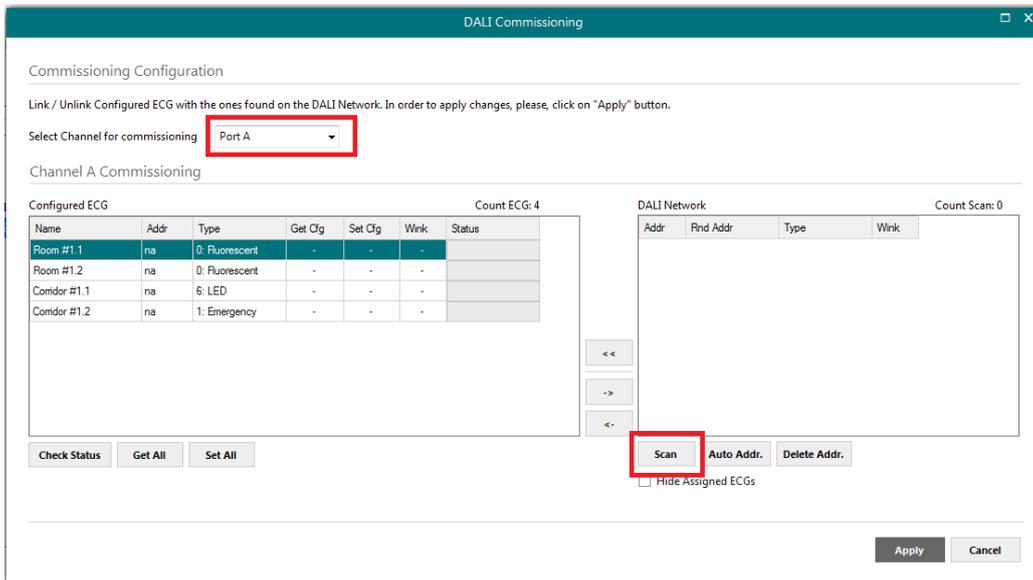
Figure **A.8** Starting DALI scan process

New ballasts will appear in the 'DALI Network' area, as soon as they are scanned. Network scan might take from several seconds up to a few minutes, depending on number of ballasts to scan.

Field 'Addr' in list of 'DALI Network' will indicate 'na' if ballast has no associated group address (typical for new ballasts/factory settings) or a 0..63 value for its short address if device has already been given a short address.
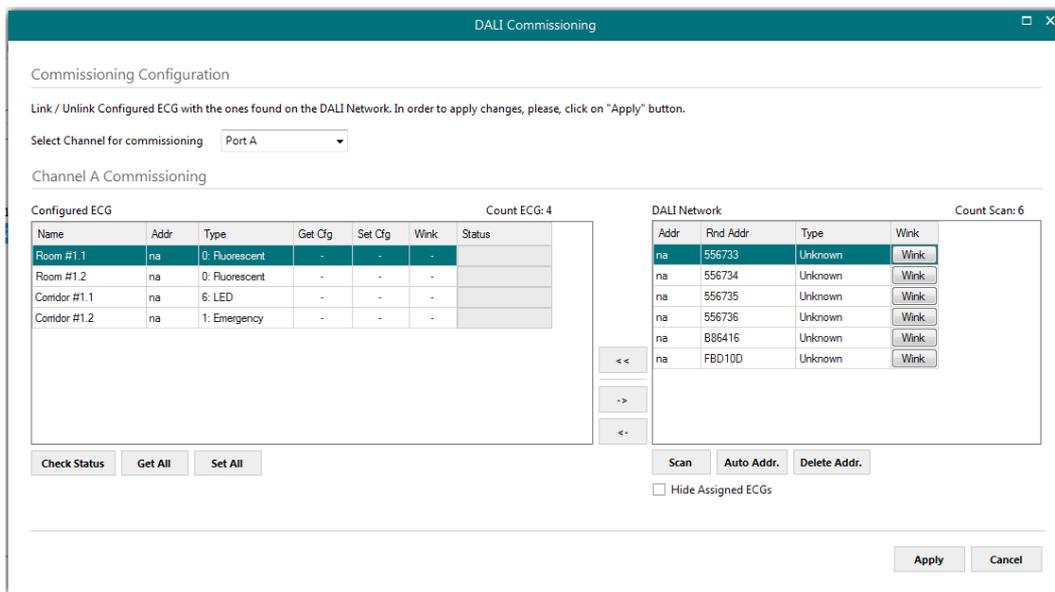
Figure **A.9** Example of scan results

After scan is done, total number of found ballasts will be shown in 'Scanned ECGs:' label, below the 'DALI Network' section, at the right.

Next step is associating a short address between 0 to 63 to each found ballast. To do so, following options are possible:

1. Identify the ballast in the installation with the Wink button (it will set it to MAX level for a while), and then double click in short address field of the ballast in DALI Network window, and assign it an address 0..63.
2. Use the Auto Addr. Button to automatically assign a correlative address to each ballast.

Address of each ballast can be deleted at any time, using button Delete Addr. Multiple selection is possible (using Shift and Control keys together with mouse-clicks).
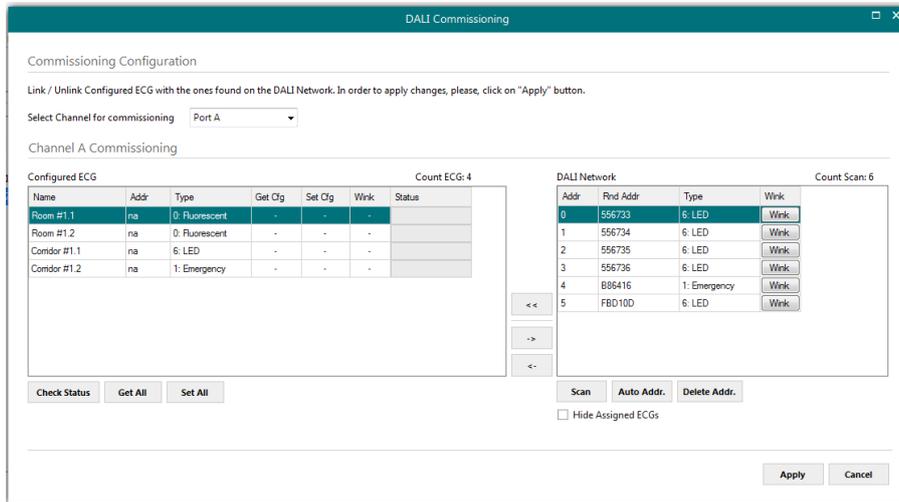

Figure **A.10** Shot address association

Once each ballast has a short address, 'Wink' functionality in "DALI Network' window is available for each ballast. Wink functionality sets the ballast at maximum and minum level during a certain timeout, allowing to identify the physical location of the ballast in the installation. After identifying it in the installation, change in short address might be desired. It can be done again by using button 'Chg Addr.'.

After address association, ballasts can be added in config. There is two ways for doing that:

-   Button '<<': Selected ballast or ballasts in 'DALI Network' window will be added as a new ballast in 'Configured ECG' window. It allows multiple selection of ballasts from DALI Network window (using 'shift' or 'control' keys).
-   Button '<-': Selected ballast in 'DALI Network' window will be associated to existing/configured ballast in 'Configured ECG' window.
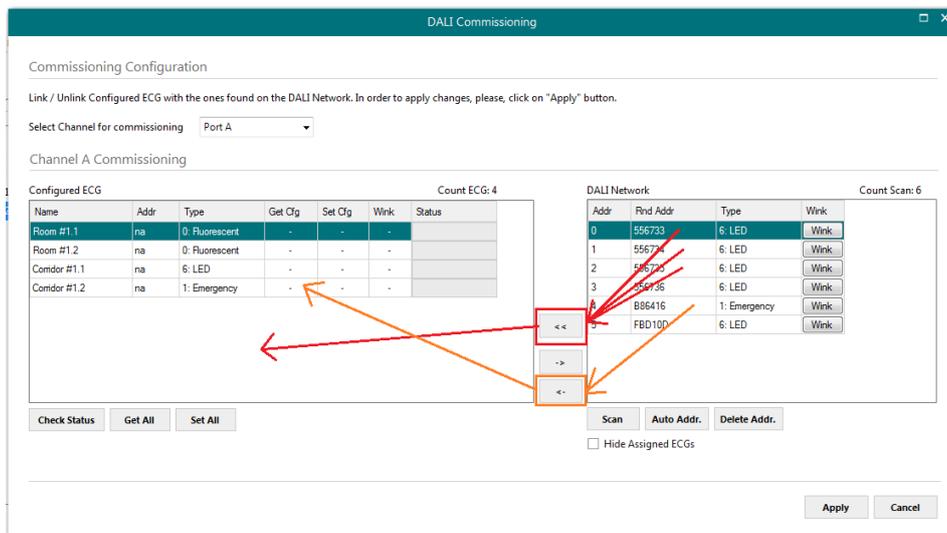

Figure **A.11** Functionality of '<<' and '<-' buttons

In Figure's example, we'll associate LED ballasts with short addres 0, 1 and 2 and Emergency light with short address 5 to existing ballasts (with '<-' button), and add ballasts from short addresses 3 and 4 as new ballasts in the configuration.
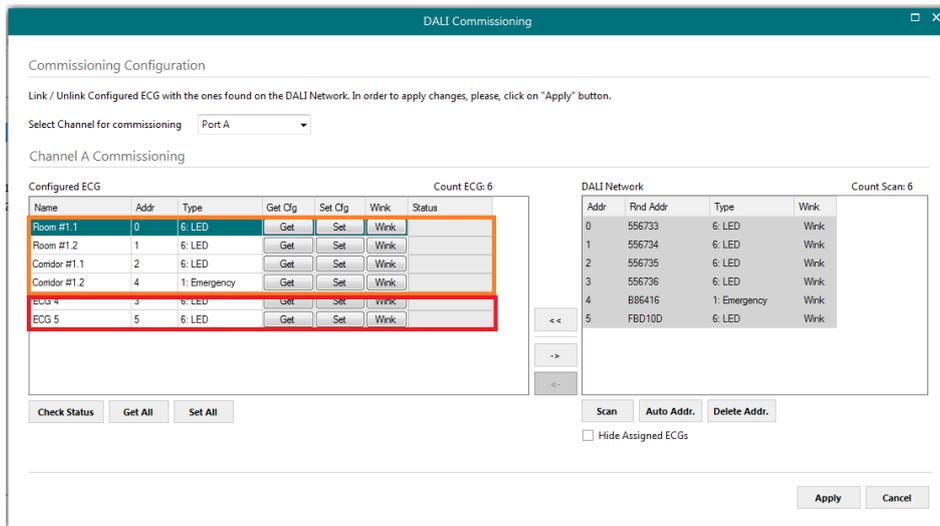

Figure **A.12** Result after moving scanned ballasts to 'Configured ECG window'

Figure above shows the result. Now configured ECG's contains actual ballasts in the installation, each with its own short addres. At this point, it's possible to:

- **Remove the ballast from configuration** (button '->'). This will move them back to 'DALI Network' area.
- **Wink the ballast to identify it in the installation** (button 'Wink', on each ECG).
- **Get the ballast configuration parameters** (button 'Get' on each ECG, or 'Get All' below the window). Warning, getting the configuration of a ballast will overwrite all configured parameters in MAPS config for that ballast (preset levels, group addressing, scenes, …)
- **Set the ballast configuration parameters for each ballast** (button 'Set' on each ECG, or 'Set All' below the window).
- **Check status** for each ballast (if it's online, if it reports failure, etc).

Finally, pressing button 'Apply' will apply all changes to actual configuration in MAPS, and close the window.

Keep in mind that process done at window DALI commissioning changes configuration of parameters in DALI network, but it's still necessary to configure further parameters in IntesisBox and sending configuration file to IntesisBox using 'Send/Receive' tab of configuration section.

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