



KLIC-DD

KNX – Residential A/C Unit Interface

ZN1CL-KLIC-DD

Application program version: [1.5]
User manual edition: [1.5]_b

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DOCUMENT UPDATES

Version	Changes	Page(s)
[1.5]_b	Enlarging the explanation of the Advanced Climate Management.	9, 18-20
	Template actualization	-
	Minor text corrections.	-

1 INTRODUCTION

1.1 KLIC-DD

KLIC-DD is a Zennio interface that allows **bidirectional** communication between a KNX domotic system and residential air-conditioning units.

Due to its bidirectional communication, the air conditioning unit can be controlled in the same way as using a remote control and the real status of the air-conditioning unit is checked and sent to the KNX bus for its monitoring.

KLIC-DD combines the following features in the same device:

- **Bidirectional** communication with A/C units through port S21.
- Control over the main functionalities of the A/C unit: ON/OFF, Temperature, Mode, Fan and Swing.
- Errors control and identification (it handles A/C unit error codes as well as any communication errors that may arise).
- LED indicator that allows monitoring the bidirectional traffic flow (see section 1.2).
- **5 multi operational logical functions** module.



Figure 1. KLIC-DD interface.

1.2 INSTALLATION

KLIC-DD interface connects to the KNX bus via the bus connecting terminals (1).

On the other hand, this device is connected to the internal unit PCB, using a special 5-wire cable with S21 connectors provided in the original device packaging (4).

Once the device is provided with power supply from the KNX bus, both the physical address and the associated application program can be downloaded.

In the Figure 2, the elements scheme of KLIC-DD is shown.

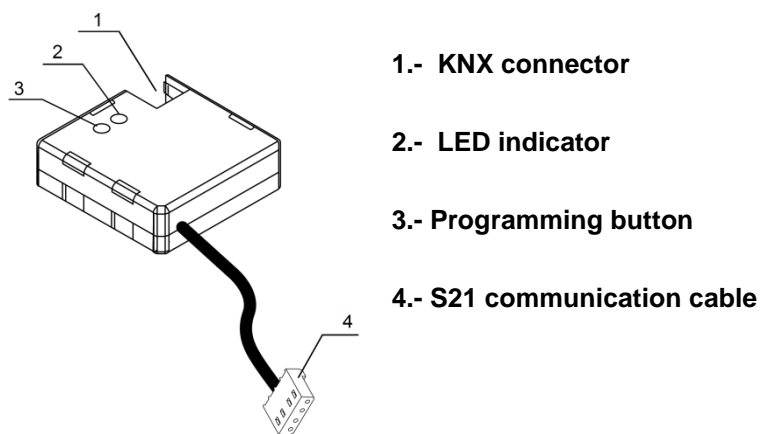


Figure 2. KLIC-DD Elements scheme.

It is described below the functionality of its main elements:

- **Programming button (3):** a short press on this button set the device in programming mode, and the associated LED (2) lights red. If this button is held while plugging the device into the KNX bus, KLIC-DD goes into secure mode.
- **LED indicator (2):** luminous signal that indicates the working state of KLIC-DD. Besides lighting red when the device is in programming mode, this LED will also light blue and green, thus indicating the status of the bidirectional communication between KNX and the A/C unit, resulting very useful in the installation process. Next, the meaning of each LED color is explained:
 - **Fixed red:** KLIC-DD is in programming mode.

- **Blinking red:** KLIC-DD is in secure mode (the LED blinks red every 0.5 seconds).
 - **Blinking green:** communication data from A/C unit to KLIC-DD.
 - **Blinking blue:** communication data from KLIC-DD to A/C unit.
- **Communication cable:** 5-wire cable to connect KLIC-DD to the PCB board (S21) of the inner unit of the A/C unit.

To obtain more detailed information about the technical features of KLIC-DD, as well as security and installation information, please read the controller Datasheet, included in the original package of the device and also available at <http://www.zennio.com>.

It is also recommended to consult the KLIC-DD Installation Note, available in the same web site.

2 CONFIGURATION

2.1 BASIC CONTROL

With KLIC-DD, the air-conditioning unit can be monitored and controlled the same way it is done with the infrared remote control provided with it.

By means of the KNX bus, the following basic functionalities of the air conditioning unit can be controlled:

- **ON/OFF**
- **Setpoint Temperature**
- **Operating mode:** Auto, Heat, Cool, Fan and Dry.
- **Fan Speed:** 3 or 5 speed levels configuration, besides the automatic speed (check out the available levels in the A/C unit)
- **Swing:** swing or stopped

These functionalities have associated a machine status, which is periodically sent to KLIC-DD. When KLIC-DD receives a status different from the previous one from the machine, it updates the status of the corresponding parameter in the KNX bus.

2.2 ADVANCED FUNCTIONALITIES

Besides the basic control over the air-conditioning system, KLIC-DD offers other advanced functionalities that give an added value to the remote control:

- **Scenes configuration:** allows establishing a specific parameters combination and its synchronized sending to the machine, in order to generate a specific climate ambient in the room. KLIC-DD allows configuring up to 4 different scenes.

- **Temperature limitation:** A/C units are limited in temperature for each operating mode by default. This functionality allows configuring custom temperature ranges, via parameter, in such way that the setpoint temperature will remain in that range. In case of receiving from the KNX bus a temperature command with a value out of the configured limits, the temperature value sent to the machine will be the corresponding limit value.
- **Auto OFF:** allows an automatic and temporary switch off of the machine (after an established delay, if parameterized) if a status change in the communication object associated to it takes place. Moreover, it has an option called "Flexibility enabled" that allows, if it is enabled, reactivating the unit although it is in the auto off.

An example of this functionality could be the use of a window sensor, associated to the auto switch off, which allows switching off the machine if the window is opened.

- **Errors management:** this functionality allows sending messages to the KNX bus informing about errors. Errors management handles A/C unit error codes as well as any communication errors that may arise.

Besides informing about the apparition of possible errors it can be also configured the sending of the error type. In case of internal errors, the numerical code associated to the error type is shown in Table 1.

Regarding the numerical code associated to the type of external errors, please look up the manual of the installed air-conditioning system.

Error Number	Type of Internal Error
1	Problems with the data reception (speed, parity, etc.)
2	Communication waiting time exceeded (Time Out)
3	Incorrect checksum
4	Incorrect response from the machine

Table 1. Type of Internal Error.

- **Initial configuration:** this functionality allows establishing an initial value for the A/C unit statuses after installing the system or after recovering from a power failure. The statuses that may be configured are: ON/OFF, temperature, mode, fan and swing of the machine.

This initial configuration can be sent both to the KNX bus and to the A/C unit.

- **Advanced Climate Management:** it allows modifying the setpoint temperature to be sent to the A/C unit according to the current temperature of the room to climate (temperature measured by an external sensor, as the touch panel **InZennio Z38i**). The advanced climate management is useful when the temperature measured by the external sensor is different than the measured by the A/C unit. The reference for the user is the temperature of the external sensor and, sometimes, it does not reach the setpoint temperature.

This functionality consists on a periodical analysis of the difference between the current temperature and the setpoint temperature. If KLIC-DD detects a more than 1°C difference between them, it will readjust the setpoint temperature value adding it the difference with current temperature. KLIC-DD keeps a memory of these possible deviations, in order to apply them again after a reset, change of mode, etc.

- **Logical functions:** KLIC-DD allows enabling and configuring up to 5 different logical functions. Please read section 3.2.8 for further information.

3 ETS PARAMETERIZACION

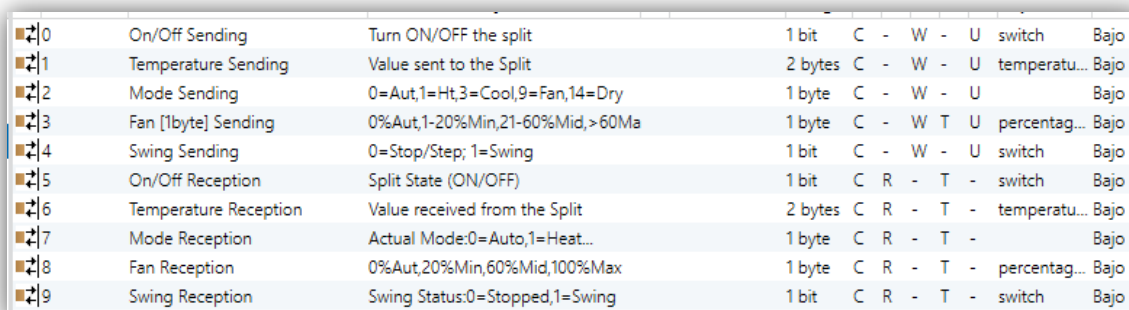
For starting to parameterize the KLIC-DD interface it is necessary, once the ETS program has been opened, importing the data base of the product (version 1.5 of the application program).

Next, the device is added to the project. The configuration process begins by entering the Parameters tab of the device.

In the following sections there is a detailed explanation about each of the different functionalities of KLIC-DD in ETS.

3.1 DEFAULT CONFIGURATION

This section shows the default configuration from which the device parameterization starts.

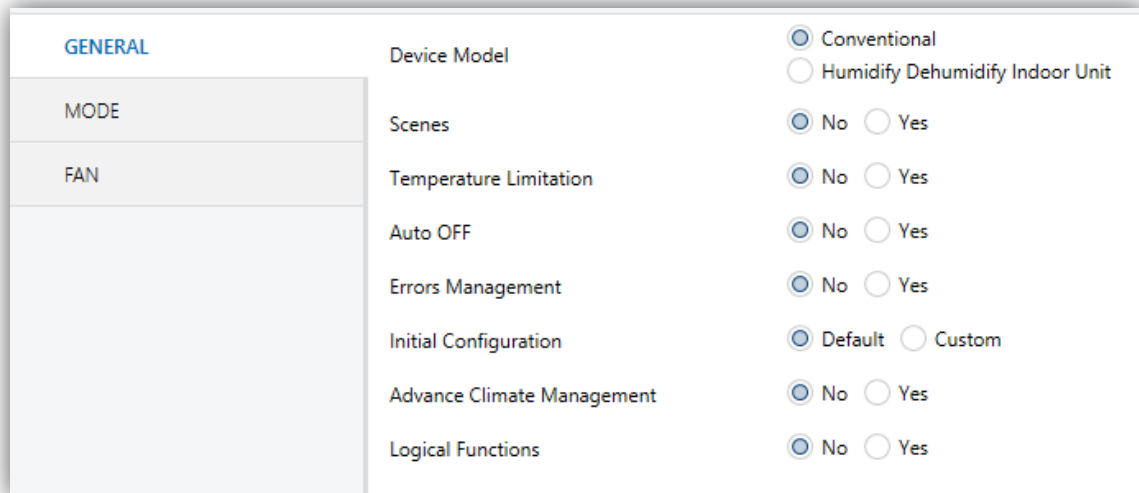


0	On/Off Sending	Turn ON/OFF the split	1 bit	C	-	W	-	U	switch	Bajo
1	Temperature Sending	Value sent to the Split	2 bytes	C	-	W	-	U	temperatu...	Bajo
2	Mode Sending	0=Aut,1=Ht,3=Cool,9=Fan,14=Dry	1 byte	C	-	W	-	U		Bajo
3	Fan [1byte] Sending	0%Aut,1-20%Min,21-60%Mid,>60Ma	1 byte	C	-	W	T	U	percentag...	Bajo
4	Swing Sending	0=Stop/Step; 1=Swing	1 bit	C	-	W	-	U	switch	Bajo
5	On/Off Reception	Split State (ON/OFF)	1 bit	C	R	-	T	-	switch	Bajo
6	Temperature Reception	Value received from the Split	2 bytes	C	R	-	T	-	temperatu...	Bajo
7	Mode Reception	Actual Mode:0=Auto,1=Heat...	1 byte	C	R	-	T	-		Bajo
8	Fan Reception	0%Aut,20%Min,60%Mid,100%Max	1 byte	C	R	-	T	-	percentag...	Bajo
9	Swing Reception	Swing Status:0=Stopped,1=Swing	1 bit	C	R	-	T	-	switch	Bajo

Figure 3. Default topology in KLIC-DD.

In the default topology window (see Figure 3) appear the communication objects associated to the sending and reception of the orders for basic control of the A/C unit: ON/OFF, Temperature, Mode, Fan and Swing.

When entering for the first time to the parameters edition of KLIC-DD, the following window will be shown:



GENERAL	Device Model	<input checked="" type="radio"/> Conventional <input type="radio"/> Humidify Dehumidify Indoor Unit
MODE	Scenes	<input checked="" type="radio"/> No <input type="radio"/> Yes
FAN	Temperature Limitation	<input checked="" type="radio"/> No <input type="radio"/> Yes
	Auto OFF	<input checked="" type="radio"/> No <input type="radio"/> Yes
	Errors Management	<input checked="" type="radio"/> No <input type="radio"/> Yes
	Initial Configuration	<input checked="" type="radio"/> Default <input type="radio"/> Custom
	Advance Climate Management	<input checked="" type="radio"/> No <input type="radio"/> Yes
	Logical Functions	<input checked="" type="radio"/> No <input type="radio"/> Yes

Figure 4. Configuration screen by default.

As it can be seen in Figure 4, the configuration screen has 3 main windows:

- **General:** to individually enable each of the advanced functionalities of the A/C machine.
- **Mode:** to configure features related to the operating mode of the A/C machine.
- **Fan:** to configure features related to the fan speed of the A/C machine.

3.2 GENERAL WINDOW

From the general configuration window the different advanced functionalities of the A/C unit can be enabled (Scenes, Temperature Limitation, Auto OFF, Errors Management, Initial Configuration, Advance Climate Management and Logical Functions), as well as the A/C unit model to control (conventional or Humidify Dehumidify Indoor Unit). All these advanced functionalities are explained in detail in the following sections.

3.2.1 DEVICE MODEL

This option allows selecting the A/C model to control, choosing between: Conventional model or Humidify Dehumidify Indoor Unit.

The conventional model includes all the A/C residential machines compatible with the KLIC-DD interface.

If the second option is chosen, it will appear several communication objects related to the specific functionality of this A/C model. Moreover, during all the parameterization, several options with regard to this model will be shown (named in ETS as **Humidify Dehumidify Indoor Unit*).

3.2.2 SCENES

After enabling this functionality, it will appear in the left menu the option Scenes, where to enable and parameterise each of the 4 available scenes. The scene to be run will be sent to the KNX bus through the object, enabled for this aim: "Scenes".

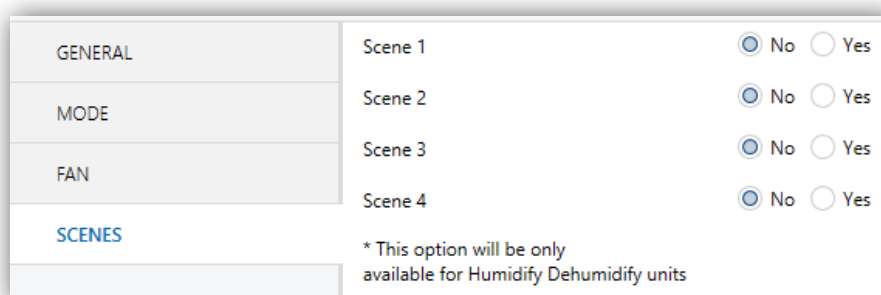


Figure 5. Scenes configuration window.

For every enabled scene, the parameters that may be configured are the following:

- **Scene number.** It indicates the scene number (from 1 to 64) to which the corresponding configured orders will be sent to the A/C machine.
- **ON/OFF.** Possibility to choose the A/C machine status: No change, OFF or ON.
- **Temperature.** No change or sending of a new temperature value (from 18°C to 30°C).
- **Mode.** No change, auto, heat, dry, fan, cool or humidify (only for Humidify Dehumidify models).
- **Fan.** No change, auto, minimum, medium, maximum.
- **Swing.** No change, both stopped, normal swing. And the options for Humidify Dehumidify Indoor Units: Extra swing or both swing.

In the Figure 6, an example of scene configuration is shown.

The screenshot shows a web-based configuration interface for a Zennio KLIC-DD device. On the left, there is a sidebar with tabs: GENERAL, MODE, FAN, and SCENES. The SCENES tab is selected. The main area displays the configuration for Scene 1. At the top, there is a toggle for 'Scene 1' with 'No' and 'Yes' radio buttons, where 'Yes' is selected. Below this, the following parameters are configured for Scene 1:

- Scene Number: 1 (dropdown menu)
- ON/OFF: ON (dropdown menu)
- Temperature: No change (radio button) and New Temperature (radio button, selected)
- New Temperature: 25 (input field)
- Mode: Heat (dropdown menu)
- Fan: Medium (dropdown menu)
- Swing: Both Stopped (dropdown menu)

Below these settings, there are three rows for Scene 2, Scene 3, and Scene 4, each with 'No' and 'Yes' radio buttons. For all three scenes, 'No' is selected. At the bottom, a note states: '* This option will be only available for Humidify Dehumidify units'.

Figure 6. Scene configuration example (Scene 1).

3.2.3 TEMPERATURE LIMITATION

The air conditioning unit has defined upper and lower temperature limits that cannot be exceeded. Nevertheless, KLIC-DD offers the possibility of establishing new temperature limits if they are specified within the A/C unit predefined limits (please, look up the A/C unit manual).

Temperature limits can be customized for the three modes that have a temperature associated: Auto, Cool and Heat.

GENERAL	AUTO MODE	
MODE	Minimum	21
	Maximum	27
FAN	COOL MODE	
TEMPERATURE LIMITATION	Minimum	23
	Maximum	28
	HEAT MODE	
	Minimum	19
	Maximum	26

Figure 7: Temperature limitation configuration.

For these limits to be taken into account, it will be necessary to explicitly enable the temperature limitation, by sending the value "1" through the specific communication object "Temperature Limitation". To control the machine using its predefined temperature limitations, it is necessary to send the value "0" through the same object.

Once established the new temperature limits for every mode and enabled the functionality, when a value out of the range is sent from the KNX bus, the value that will be sent to the A/C unit will be the corresponding temperature limit and this new temperature will be notified, through the object "Temperature sending".

Note: When configuring in ETS the temperature limitation, this functionality is automatically enabled by default and the personalized ranges will control the unit performance when it switches on.

3.2.4 AUTO OFF

This option allows switching off the A/C machine temporarily if a status change (from value "0" to value "1") in the associated communication object happens ("Auto-OFF").

GENERAL	Delay for Auto-OFF [x sec]	20
MODE	Flexibility enabled?	<input checked="" type="radio"/> No <input type="radio"/> Yes
FAN		
AUTO OFF		

Figure 8. Auto OFF configuration.

The following parameters can be configured:

- **Delay for Auto-OFF:** to establish the time, in seconds, KLIC-DD waits before automatically switching off the A/C machine.
- **Flexibility enabled?:** when enabling this parameter ("Yes"), it will be possible to restore the unit control although it is in auto off mode: ("Auto-OFF"=1). If this option is disabled, the unit cannot be controlled after an auto-off order and it will remain inactive until the object "Auto-OFF" has the value "0".

3.2.5 ERRORS MANAGEMENT

The errors management window allows enabling sending messages to the bus indicating any error that may arise: internal errors of the communication between KLIC-DD and the A/C unit, or external errors (errors in the own A/C unit).

GENERAL	Internal Errors	<input checked="" type="radio"/> No <input type="radio"/> Yes
MODE	External Errors	<input checked="" type="radio"/> No <input type="radio"/> Yes
FAN		
ERRORS MANAGEMENT		

Figure 9. Errors management configuration window.

The detection of internal, external or both types of errors can be enabled:

- **Internal errors:** when enabling this option, two new communication objects appear: "Internal error", 1-bit object and "Type of internal error", 1-byte object. The first one indicates if an internal error has occurred (value "1": there is an error, value "0": there is not). The second object indicates the code that identifies the error (numerical value between 1 and 4. See [Table 2.1: Type of Internal Errors](#)).
- **External errors:** when enabling this option, two new communication objects appear: "External Error" and "Type of external error". The first one indicates if an external error has occurred (value "1": there is an error, value "0": there is not). The second object indicates the code that identifies the error (see the specific manual of the A/C unit installed).

3.2.6 START-UP CONFIGURATION

This functionality allows configuring the initial statuses of the A/C machine after the installation or a power failure. This configuration can be default or custom. If a custom configuration is chosen, the window of the Figure 10 will be shown.

GENERAL	ON/OFF	Last
MODE	Temperature	<input checked="" type="radio"/> Last <input type="radio"/> Custom
FAN	Mode	Last
INITIAL CONFIGURATION	Fan	Last
	Swing	Last
	Send Initial Configuration to BUS?	<input checked="" type="radio"/> No <input type="radio"/> Yes
	Send Initial Configuration to SPLIT?	<input checked="" type="radio"/> No <input type="radio"/> Yes
	* This option will be only available for Humidify Dehumidify units	

Figure 10. Initial configuration window.

The variables than can be initialized are the following:

- **ON/OFF:** last (the status the machine had before the power failure; after the first installation, this status will be OFF), ON or OFF.
- **Temperature:** Last or custom (a new field appears to establish the new initial temperature).

- **Mode:** Last, auto, heat, dry, fan, cool or humidify (only for Humidify Dehumidify models).
- **Fan:** Last, auto, minimum, medium or maximum.
- **Swing:** Last, both stopped, normal swing. And the options for Humidify Dehumidify Indoor Units: Extra swing or both swing.

Moreover, it can be configured the sending of the statuses to the KNX bus and/or to the A/C split and when they must be carried out:

- **Send initial configuration to BUS?:** If this sending is enabled ("Yes"), a new field will appear next: "Delay", where to configure the time, in seconds, KLIC-DD delays the sending of the statuses to the KNX bus.
- **Send initial configuration to SPLIT?:** If this sending is enabled ("Yes"), a new field will appear next: "**Delay**", where to configure the time, in seconds, KLIC-DD delays the sending of the statuses to the A/C machine.

Note: *It is highly recommended to establish a delay for the initial configuration sending to split of at least 1 minute, in order to leave the machine enough time for recovering itself after a power failure. It is also recommended to establish a higher delay for the initial configuration sending to the Bus than for the Split. If not, the values could be sent to the bus twice: the first one, due to the initial statuses sending to the Bus and other due to a response to the initial configuration to the Split from the split itself.*

3.2.7 ADVANCED CLIMATE MANAGEMENT

This functionality allows modifying the setpoint temperature sent to the A/C machine, with regard to the real temperature of the room to be climate, measured by an external KNX sensor.

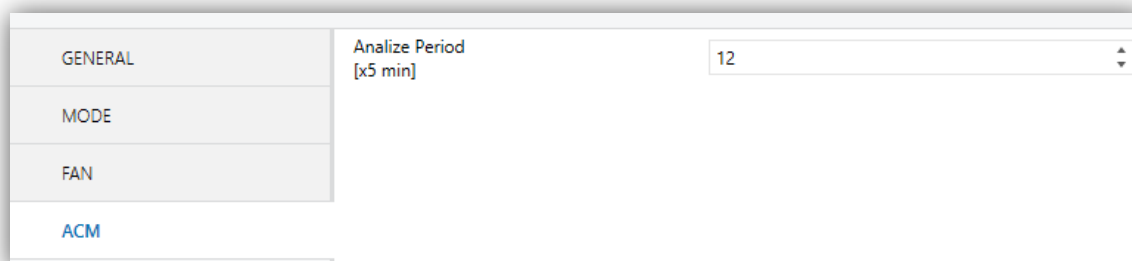


Figure 11. Advance climate management.

The real temperature monitoring is carried out in some periods of time. This analyse period is configured in the ACM window (Advance Climate Management) in the **Analyze Period** field, where the monitoring period should be set in minutes, depending on the particular conditions of the installation where the A/C unit is located. It is possible to set periods between 15 and 240 minutes (take into account that the value set in the field "Analyze period" is internally multiplied by 5, so the allowed range of values is [3-48]).

When enabling this option, two communication objects appear (2-bytes each): "Ambient Temperature" and "Modified Temperature". The first one receives the value of the current temperature of the room (this value must be periodically sent by an external KNX sensor). The second object indicates the setpoint temperature that is sent to the machine, modified according to the original as indicated next.

The behaviour of this functionality is as follows:

- If the ambient temperature is not stable during the analyze period (more than 1°C variation), KLIC-DD continues monitoring.
- If the ambient temperature is stable during the analyze period (maximum variation 1°C), KLIC-DD considers that this is the temperature that the indoor unit will reach with the current setpoint. In this case, this temperature is compared with the setpoint temperature and, if there is a difference greater than 1°C, the setpoint temperature is adjusted by calculating a new modified

setpoint temperature. The new setpoint is sent through the communication object “Modified temperature”. The calculation of the new modified temperature is obtained applying the next formula:

- After download or after a user setpoint change (first calculation):

$$T_{mod.} = T + (T - T_{room})$$

- Once the first calculation is done, to achieve a more precise adjustment:

$$T_{mod.} = \frac{T + T_{mod. previous}}{2} + \left(\frac{T + T_{mod. previous}}{2} - T_{room} \right)$$

Where “ $T_{mod.}$ ” is the modified temperature; “ T ”, user setpoint; “ T_{room} ”, room temperature sent by an external sensor and “ $T_{mod previous}$ ”, the previous modified temperature calculated.

Important: Since room temperature is used in modified temperature calculation, this value must be periodically received in order to have an appropriated behaviour of the advanced climate management.

Examples:

- *Setpoint upper than room temperature: if the current room temperature stays constant to 22°C during the analyze period and setpoint is equal to 25°C, the “Modified Temperature” that will be sent to the A/C machine is: $25 + (25 - 22) = 28^\circ\text{C}$.*

If during the next analyze period, the room temperature has not reached user setpoint yet, and stays constant to 23°C, the “Modified Temperature” that will be sent to the A/C machine is: $\frac{25+28}{2} + \left(\frac{25+28}{2} - 23 \right) = 28,5^\circ\text{C}$

A new modified temperature will be successively calculated until room temperature does not differ from user setpoint more than 1°C.

- *Setpoint lower than room temperature: if the current room temperature stays constant to 26°C during the analyze period and setpoint is equal to 24°C, the “Modified Temperature” that will be sent to the A/C machine is: $24 + (24 - 26) = 22^\circ\text{C}$.*

Modified temperature will be successively recalculated until room temperature does not differ from user setpoint more than 1°C.

It is advisable not to show the object “**Modified Temperature**” as indicator since this advanced climate management must be transparent to the user. For this reason, the object “**Temperature Reception**” always indicates the temperature sent through the “**Temperature Sending**” object.

3.2.8 LOGICAL FUNCTIONS

This section in KLIC-DD is meant to perform binary logic operations with incoming data from the KNX bus, to send the result through other communication objects specifically enabled in the actuator for this operation.

LOGICAL FUNCTIONS SELECTION:	
- FUNCTION 1	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
- FUNCTION 2	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
- FUNCTION 3	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
- FUNCTION 4	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
- FUNCTION 5	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled
TOTAL DATA ENTRY OBJECTS:	
- 1bit	0
- 1byte	0
- 2bytes	0

Figure 12. Logical functions window.

Up to 5 different logical functions can be enabled, independent of each other, which can carry out **up to 4 operations** each. To use any of them, it is necessary to enable them in the configuration window shown in the Figure 12.

The specific communication objects for logical functions can be 1-bit, 1-byte or 2-bytes. It is necessary to indicate how many of them are needed to implement the enabled functions.

To obtain detailed information about the use of logical functions, please read the specific section "Logical Functions" in the user's manual of Zennio actuators, such as ACTinBOX MAX6 or ACTinBOX QUATRO.

3.3 MODE WINDOW

As seen in section 3.1. Default configuration, the specific Mode window allows configuring featured regarding to the operating mode of the A/C machine.

GENERAL	Individual Modes (one object per mode)	<input checked="" type="radio"/> No <input type="radio"/> Yes
MODE	Simplified Modes (only cool/heat)	<input checked="" type="radio"/> No <input type="radio"/> Yes
FAN		

Figure 13. Mode window.

- **Individual modes:** when selecting this option, 10 new 1-bit communication objects will be shown. 5 of them are associated to the sending of each of the available modes (Auto, Cool, Fan, Heat and Dry) and the other 5 objects, to the reception from the A/C machine of the status of every mode.

The objects associated with the sending are: "Auto Mode Sending", "Cool Mode Sending", "Fan Mode Sending", "Heat Mode Sending" and "Dry Mode Sending".

The objects associated to the reception are: "Auto Mode Reception", "Cool Mode Reception", "Fan Mode Reception", "Heat Mode Reception" and "Dry Mode Reception".

Moreover, the objects "Mode Sending" and "Mode Reception" (1-byte each and available by default) may be used.

If the option Individual modes is activated, the operating mode of the A/C machine can be modified (by writing the value "1" through the sending object associated to the desired individual mode). Moreover, the current mode will be also sent to the KNX bus, through the object "Mode Reception" and with the 1-bit reception object of the individual current mode.

- **Simplified modes:** when selecting this option, the 1-bit object "Simplified Mode" will be enabled. It allows establishing the desired mode: Cool mode, writing the value "0" in the object, or Heat mode, writing the value "1". For this control object there is no status object associated.

3.4 FAN WINDOW

In this window it can be configured several features related to the fan speed of the A/C machine.

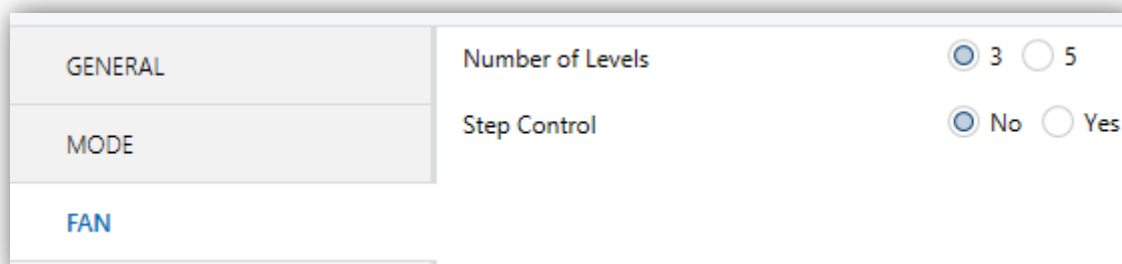


Figure 14. Fan window.

- **Number of levels:** this option allows configuring the number of fan levels the A/C unit has. These may be 3 or 5 levels. The fan speed has associated two 1-byte objects: "Fan [1 Byte] Sending" and "Fan Reception", for controlling and indicating the fan speed when requested. The control object ("Fan Sending") records the fan speed in percentage. This value will be interpolated in such a way that corresponds to the selected number of levels, as it can be seen next. The status object ("Fan Reception") will show the current fan speed, according to the interpolated percentages.
- **3 levels:** The fan speed percentages will be interpolated as shown in Table 2.

Initial Speed Percentage	Interpolated Speed Percentage	Level
0%	0%	Auto
1-20%	20%	Minimum
21-60%	60%	Medium
61-100%	100%	Maximum

Table 2. Fan speed percentages for 3 levels.

- **5 levels:** The fan speed percentages will be interpolated as shown in Table 3.

Initial Speed Percentage	Interpolated Speed Percentage	Level
0%	0%	Auto
1-20%	20%	Minimum
21-40%	40%	Minimum-Medium
41-60%	60%	Medium
61-80%	80%	Medium-Maximum
81-100%	100%	Maximum

Table 3. Fan speed percentages for 5 levels.

- **Step control:** the selection of this option ("Yes") enables the 1-bit object "Fan [1 bit] Sending" that allows increasing (sending the value "1") or decreasing (value "0") the fan speed in one level (for example, for 3 levels, in the minimum level of fan speed, the value "1" is sent via the object "Fan [1 bit] Sending", the fan speed level will go to medium).

The step control is **not cyclical**. This means that, being in the Auto level (0%), when decreasing the fan speed level, the A/C machine will stay in the auto mode until the speed level is increased. The same way, when the speed level is in the maximum level (100%), the machine will remain in this level until receiving an order to decrease the speed.

ANNEX I. COMMUNICATION OBJECTS

- “Functional range” shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data Type (DPT)	Functional Range	Name	Function
0	1 Bit	I	C - - W U	DPT_Switch	0/1	On/Off Sending	Turn ON/OFF the split
1	2 Bytes	I	C - - W U	DPT_Value_Temp	16°C – 32°C or ac. to param.	Temperature Sending	Value sent to the Split
2	1 Byte	I	C - - W U	DPT_HVACContrMode	0 = Auto 1 = Heat 3 = Cool 9 = Fan 14 = Dry	Mode Sending	0=Aut,1=Ht,3=Cool,9=Fan,14=Dry
3	1 Byte	I	C - - W U	DPT_Scaling	0% - 100%	Fan [1byte] Sending	0%Aut,1-20%Mi,21-40%Mi/Mid,... (5 levels)
	1 Byte	I	C T - W U	DPT_Scaling	0% - 100%	Fan [1byte] Sending	0%Aut,1-20%Min,21-60%Mid,>60Ma (3 levels)
4	1 Bit	I	C - - W U	DPT_Switch	0/1	Swing Sending	0=Stop/Step; 1=Swing
5	1 Bit	O	C T R - -	DPT_Switch	0/1	On/Off Reception	Split State (ON/OFF)
6	2 Bytes	O	C T R - -	DPT_Value_Temp	16°C – 32°C or ac. to param.	Temperature Reception	Value received from the Split
7	1 Byte	O	C T R - -	DPT_HVACContrMode	0 = Auto 1 = Heat 3 = Cool 9 = Fan 14 = Dry	Mode Reception	Actual Mode:0=Auto,1=Heat...
8	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	Fan Reception	0%Aut,20%Min,60%Mid,100%Max (3 levels)
	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	Fan Reception	0%Aut,20%Mi,40%Mi/Mid,60%Mid.. (5 levels)
9	1 Bit	O	C T R - -	DPT_Switch	0/1	Swing Reception	Swing Status:0=Stopped,1=Swing
10	1 Bit	I	C T - W U	DPT_Switch	0/1	Auto Mode Sending	1=Set Auto Mode;0=Nothing
11	1 Bit	I	C T - W U	DPT_Switch	0/1	Cool Mode Sending	1=Set Cool Mode;0=Nothing
12	1 Bit	I	C T - W U	DPT_Switch	0/1	Heat Mode Sending	1=Set Heat Mode;0=Nothing

13	1 Bit	I	CT-WU	DPT_Switch	0/1	Fan Mode Sending	1=Set Fan Mode;0=Nothing
14	1 Bit	I	CT-WU	DPT_Switch	0/1	Dry Mode Sending	1=Set Dry Mode;0=Nothing
15	1 Bit	I	C--WU	DPT_Heat_Cool	0/1	Simplified Mode	0=Cool; 1=Heat
16	1 Bit	O	CTR--	DPT_Switch	0/1	Auto Mode Reception	1=Auto Mode Enabled;0=Disabled
17	1 Bit	O	CTR--	DPT_Switch	0/1	Cool Mode Reception	1=Cool Mode Enabled;0=Disabled
18	1 Bit	O	CTR--	DPT_Switch	0/1	Heat Mode Reception	1=Heat Mode Enabled;0=Disabled
19	1 Bit	O	CTR--	DPT_Switch	0/1	Fan Mode Reception	1=Fan Mode Enabled;0=Disabled
20	1 Bit	O	CTR--	DPT_Switch	0/1	Dry Mode Reception	1=Dry Mode Enabled;0=Disabled
21	1 Bit	I	C--WU	DPT_Step	0/1	Fan [1 bit] Sending	0=Down;1=Up
22	1 Byte	I	C--WU	DPT_SceneControl	0-63; 128-191	Scenes	Set Scene "Value"
23	1 Bit	I/O	CTRWU	DPT_Switch	0/1	Temperature Limitation	0=Disable;1=Enable
24	1 Bit	I	C--WU	DPT_Switch	0/1	Auto-OFF	0=Disable;1=Enable
25	1 Bit	O	CTR--	DPT_Switch	0/1	Internal Error	0=No Error; 1=Error
26	1 Byte	O	CTR--	-	1-4	Type of Internal Error	1=Recep.Err,2=TimeOut,3=Che...
27	1 Bit	O	CTR--	DPT_Switch	0/1	External Error	0=No Error; 1=Error
28	1 Byte	O	CTR--	-	0-255	Type of External Error	Check Errors Table
29	1 Bit	I	C--WU	DPT_Switch	0/1	Humidify Mode Sending	1=Enable Mode,0=Ignore
30	1 Bit	O	CTR--	DPT_Bool	0/1	Humidify Mode Reception	0=Disabled,1=Enabled
31	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	Humidify Level Reception	0=Off,25=Low,50=Med,75=Hi...
32	1 Bit	I	C--WU	DPT_Switch	0/1	Humidify Level Step Sending	0=Down,1=Up
33	1 Bit	I	C--WU	DPT_Switch	0/1	Extra Swing Sending	0=Stop,1=Move
34	1 Bit	O	CTR--	DPT_Switch	0/1	Extra Swing Reception	0=Stopped,1=Movement
35	2 Bytes	I	C--WU	DPT_Value_Temp	16°C - 32°C	Ambient Temperature	Temperature from KNX
36	2 Bytes	O	CTR--	DPT_Value_Temp	16°C - 32°C	Modified Temperature	Real Temp. Sent to Machine
37	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 1	Binary Data Entry (0/1)
38	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 2	Binary Data Entry (0/1)
39	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 3	Binary Data Entry (0/1)
40	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 4	Binary Data Entry (0/1)
41	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 5	Binary Data Entry (0/1)
42	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 6	Binary Data Entry (0/1)
43	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 7	Binary Data Entry (0/1)
44	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 8	Binary Data Entry (0/1)
45	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 9	Binary Data Entry (0/1)
46	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 10	Binary Data Entry (0/1)
47	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 11	Binary Data Entry (0/1)
48	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 12	Binary Data Entry (0/1)
49	1 Bit	I	C--W-	DPT_Bool	0/1	[LF] (1 bit) Data Entry 13	Binary Data Entry (0/1)

50	1 Bit	I	C - - W -	DPT_Bool	0/1	[LF] (1 bit) Data Entry 14	Binary Data Entry (0/1)
51	1 Bit	I	C - - W -	DPT_Bool	0/1	[LF] (1 bit) Data Entry 15	Binary Data Entry (0/1)
52	1 Bit	I	C - - W -	DPT_Bool	0/1	[LF] (1 bit) Data Entry 16	Binary Data Entry (0/1)
53	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 1	1 byte Data Entry (0-255)
54	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 2	1 byte Data Entry (0-255)
55	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 3	1 byte Data Entry (0-255)
56	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 4	1 byte Data Entry (0-255)
57	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 5	1 byte Data Entry (0-255)
58	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 6	1 byte Data Entry (0-255)
59	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 7	1 byte Data Entry (0-255)
60	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry 8	1 byte Data Entry (0-255)
61	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 1	2 bytes Data Entry
62	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 2	2 bytes Data Entry
63	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 3	2 bytes Data Entry
64	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 4	2 bytes Data Entry
65	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 5	2 bytes Data Entry
66	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 6	2 bytes Data Entry
67	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 7	2 bytes Data Entry
68	2 Bytes	I	C - - W -	DPT_Value_2_Count	0 - FFFF	[LF] (2 bytes) Data Entry 8	2 bytes Data Entry
69	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function 1 RESULT (1 bit)	FUNCTION 1 Result
70	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function 2 RESULT (1 bit)	FUNCTION 2 Result
71	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function 3 RESULT (1 bit)	FUNCTION 3 Result
72	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function 4 RESULT (1 bit)	FUNCTION 4 Result
73	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function 5 RESULT (1 bit)	FUNCTION 5 Result
74	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function 1 RESULT (1 byte)	FUNCTION 1 Result
75	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function 2 RESULT (1 byte)	FUNCTION 2 Result
76	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function 3 RESULT (1 byte)	FUNCTION 3 Result
77	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function 4 RESULT (1 byte)	FUNCTION 4 Result
78	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function 5 RESULT (1 byte)	FUNCTION 5 Result
79	2 Bytes	O	C T R - -	DPT_Value_2_Count	0 - FFFF	[LF] Function 1 RESULT (2 bytes)	FUNCTION 1 Result
80	2 Bytes	O	C T R - -	DPT_Value_2_Count	0 - FFFF	[LF] Function 2 RESULT (2 bytes)	FUNCTION 2 Result
81	2 Bytes	O	C T R - -	DPT_Value_2_Count	0 - FFFF	[LF] Function 3 RESULT (2 bytes)	FUNCTION 3 Result
82	2 Bytes	O	C T R - -	DPT_Value_2_Count	0 - FFFF	[LF] Function 4 RESULT (2 bytes)	FUNCTION 4 Result
83	2 Bytes	O	C T R - -	DPT_Value_2_Count	0 - FFFF	[LF] Function 5 RESULT (2 bytes)	FUNCTION 5 Result

ANNEX II. CORRESPONDENCE WITH A/C UNIT ERROR CODES

Correspondence between the error codes (in decimal form) sent to the KNX bus by KLIC-DD and the error codes of the A/C units themselves.

Bus	Code	Bus	Code	Bus	Code	Bus	Code	Bus	Code	Bus	Code	Bus	Code	Bus	Code
1	1	26	AA	51	E3	76	HC	101	J5	126	LE	151	U7	176	30
2	2	27	AH	52	E4	77	HJ	102	J6	127	LF	152	U8	177	31
3	3	28	AC	53	E5	78	HE	103	J7	128	P0	153	U9	178	32
4	4	29	AJ	54	E6	79	HF	104	J8	129	P1	154	UA	179	33
5	5	30	AE	55	E7	80	F0	105	J9	130	P2	155	UH	180	34
6	6	31	AF	56	E8	81	F1	106	JA	131	P3	156	UC	181	35
7	7	32	C0	57	E9	82	F2	107	JH	132	P4	157	UJ	182	36
8	8	33	C1	58	EA	83	F3	108	JC	133	P5	158	UE	183	37
9	9	34	C2	59	EH	84	F4	109	JJ	134	P6	159	UF	184	38
10	0A	35	C3	60	EC	85	F5	110	JE	135	P7	160	M0	185	39
11	0H	36	C4	61	EJ	86	F6	111	JF	136	P8	161	M1	186	3A
12	0C	37	C5	62	EE	87	F7	112	L0	137	P9	162	M2	187	3H
13	0J	38	C6	63	EF	88	F8	113	L1	138	PA	163	M3	188	3C
14	0E	39	C7	64	H0	89	F9	114	L2	139	PH	164	M4	189	3J
15	0F	40	C8	65	H1	90	FA	115	L3	140	PC	165	M5	190	3E
16	A0	41	C9	66	H2	91	FH	116	L4	141	PJ	166	M6	191	3F
17	A1	42	CA	67	H3	92	FC	117	L5	142	PE	167	M7	192	40
18	A2	43	CH	68	H4	93	FJ	118	L6	143	PF	168	M8	193	41
19	A3	44	CC	69	H5	94	FE	119	L7	144	U0	169	M9	194	42
20	A4	45	CJ	70	H6	95	FF	120	L8	145	U1	170	MA	195	43
21	A5	46	CE	71	H7	96	J0	121	L9	146	U2	171	MH	196	44
22	A6	47	CF	72	H8	97	J1	122	LA	147	U3	172	MC	197	45
23	A7	48	E0	73	H9	98	J2	123	LH	148	U4	173	MJ	198	46
24	A8	49	E1	74	HA	99	J3	124	LC	149	U5	174	ME	199	47
25	A9	50	E2	75	HH	100	J4	125	LJ	150	U6	175	MF	200	48
														201	49
														202	4A
														203	4H
														204	4C
														205	4J
														206	4E
														207	4F
														208	50
														209	51
														210	52
														211	53
														212	54
														213	55
														214	56
														215	57
														216	58
														217	59
														218	5A
														219	5H
														220	5C
														221	5J
														222	5E
														223	5F
														224	60
														225	61
														226	62
														227	63
														228	64
														229	65
														230	66
														231	67
														232	68
														233	69
														234	6A
														235	6H
														236	6C
														237	6J
														238	6E
														239	6F

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Zennio Avance y Tecnología S.L.

C/ Río Jarama, 132. Nave P-8.11
45007 Toledo (Spain).

Tel. +34 925 232 002.

www.zennio.com
info@zennio.com



RoHS