KLIC-DD

KNX – Residential A/C Unit Interface

ZN1CL-KLIC-DD

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

www.zennio.com

USER MANUAL

CONTENIDO

DOCUMENT UPDATES

Version	Changes	Page(s)
[1.5]_c	Minor text corrections.	-
[1.5]_b	Enlarging the explanation of the Advanced Climate Management.	-
	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.

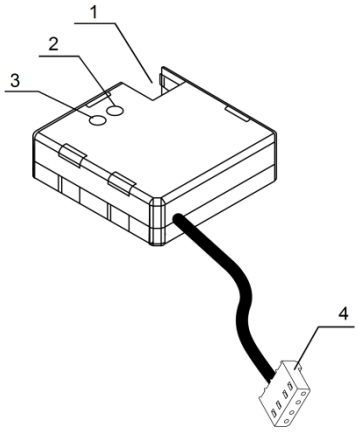
1.2 INSTALLATION

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.



1.- KNX connector

2.- LED indicator

3.- Programming button

4.- S21 communication cable

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 de 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 1ºC 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

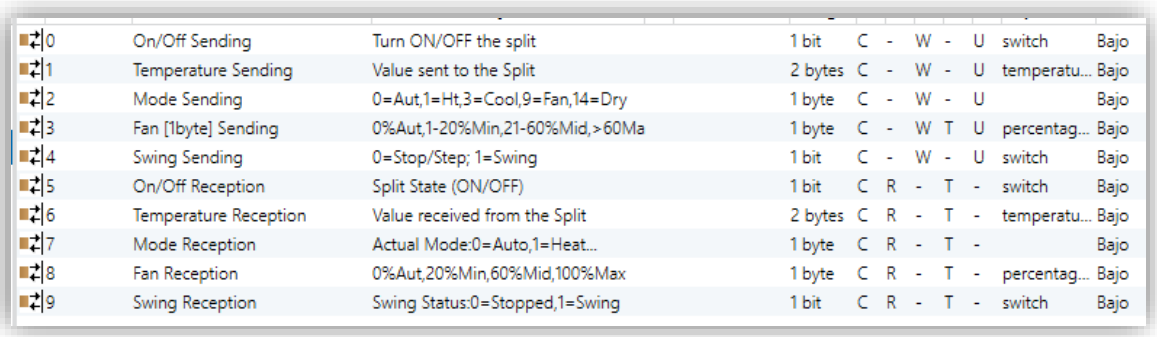
For starting to parameterize the KLIC-DD interface it is necessary, once the ETS program has been opened, importing the data base of the product (version 1.5 of the application program).

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:

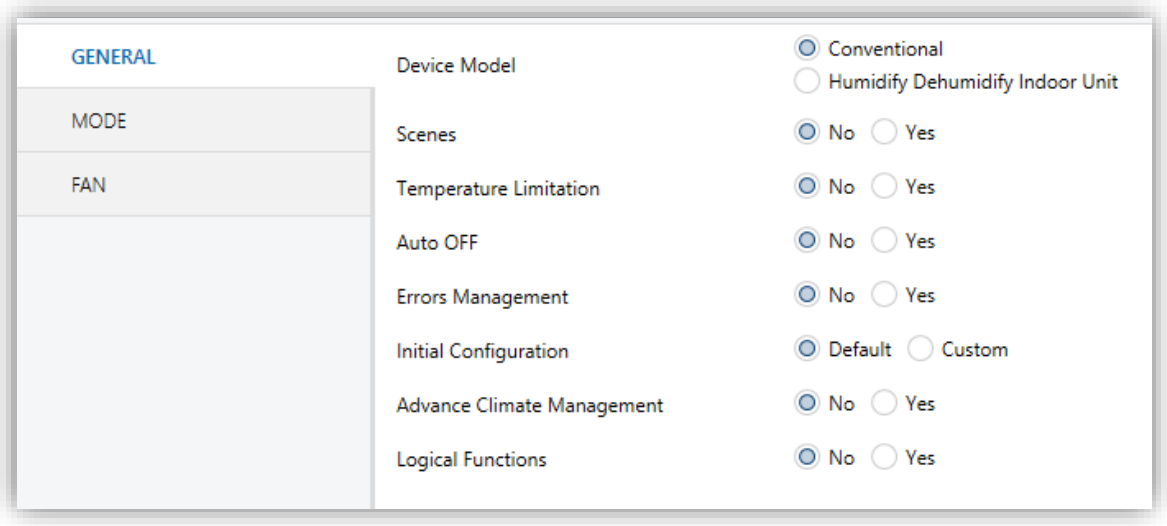


Figure 4. Configuration screen by default.

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".

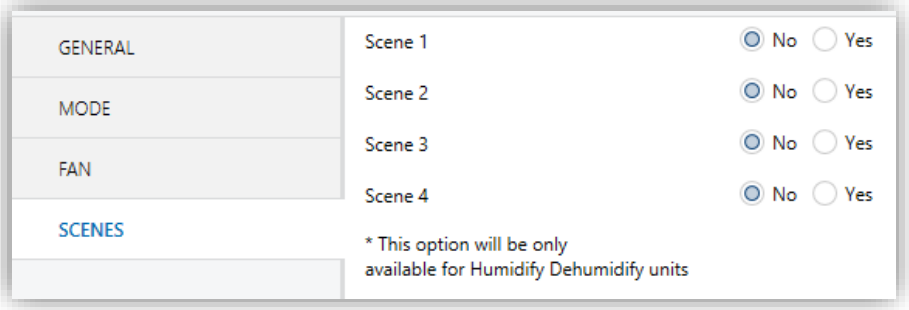


Figure 5. Scenes configuration window.

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 18ºC to 30ºC).
- **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.

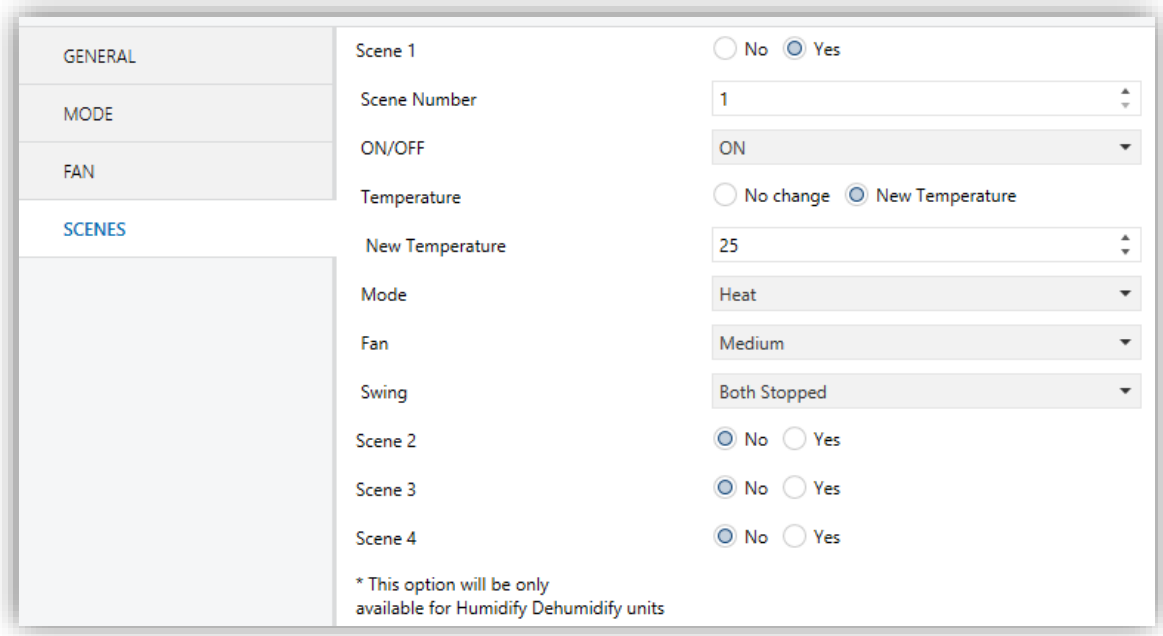


Figure 6. Scene configuration example (Scene 1).

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, llok up the A/C unit manual).

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

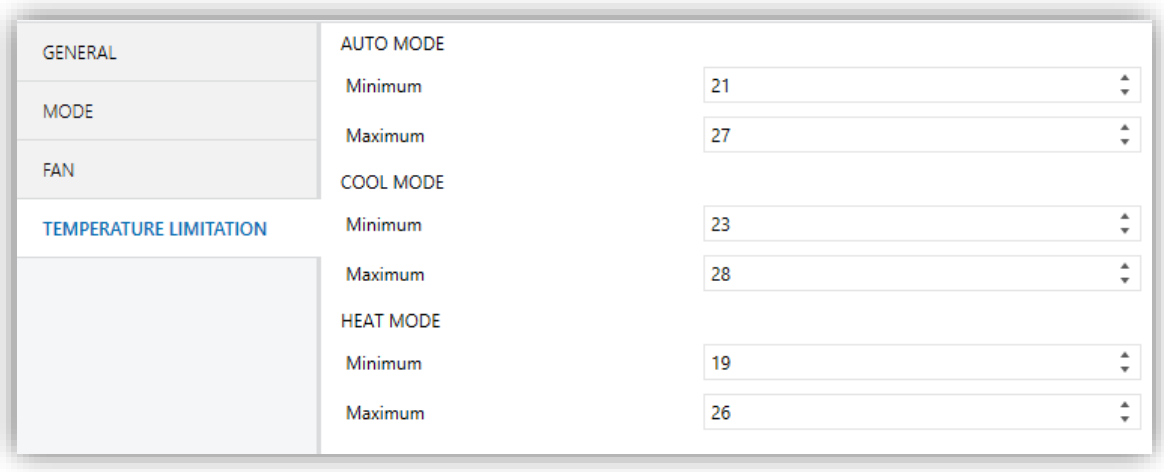


Figure 7: Temperature limitation configuration.

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").

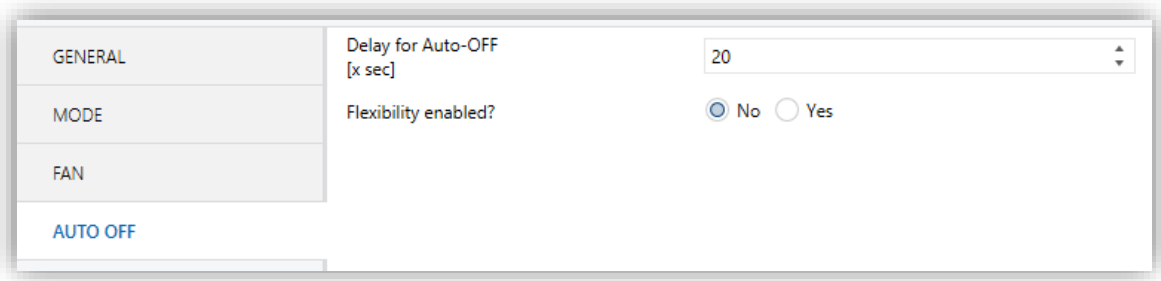


Figure 8. Auto OFF configuration.

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).

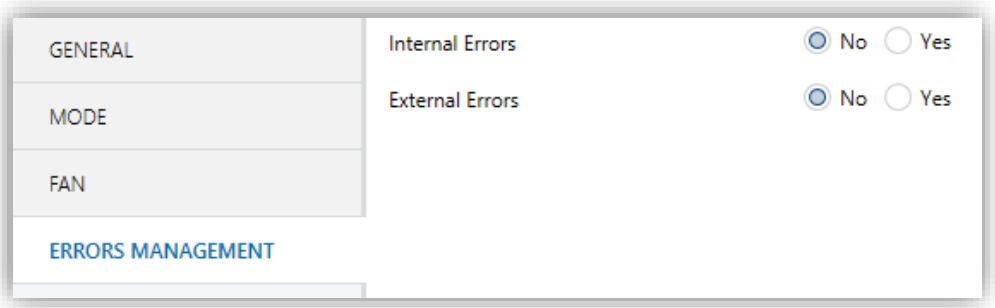


Figure 9. Errors management configuration window.

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 1. Type of Internal Error.).

- **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.

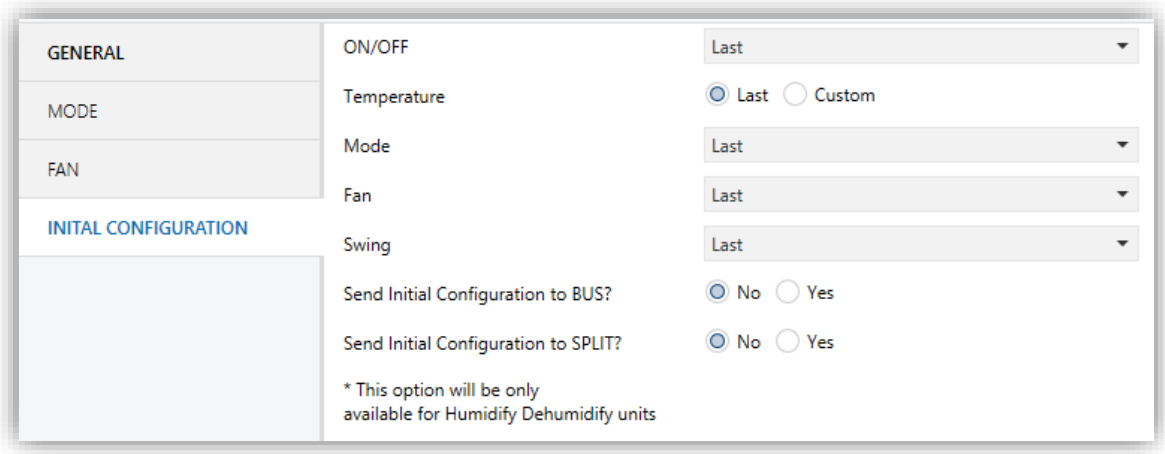


Figure 10. Initial configuration window.

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.

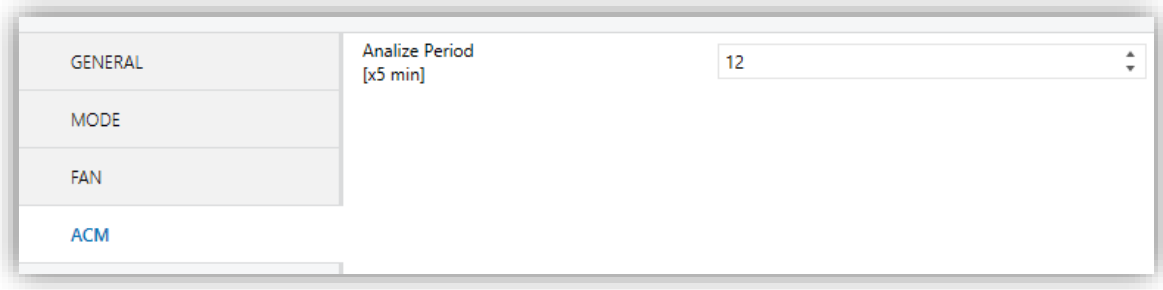


Figure 11. Advance climate management.

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 1ºC variation), KLIC-DD continues monitoring.
- If the ambient temperature is stable during the analyze period (maximum variation 1ºC), 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 1ºC, 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 22ºC during the analyze period and setpoint is equal to 25ºC, the “Modified Temperature” that will be sent to the A/C machine is:* $25 + (25 - 22) = 28$*ºC.*

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

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

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

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

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 module makes it possible to perform numeric and binary operations to incoming values received from KNX bus, and to send the results through other communication objects specifically enabled for this purpose.

KLIC-DD can implement up to **5 different and independent functions**, each of them entirely customisable and consisting in **up to 4 consecutive operations each one.**

The execution of each function can depend on a configurable condition, which will be evaluated every time the function is triggered through specific, parameterizable communication objects. The result after executing the operations of the function can also be evaluated according to certain **conditions** and afterwards sent (or not) to the KNX bus, which can be done every time the function is executed, periodically or only when the results differs from the last one.

Please refer to the "**Logic Functions**" user manual (available within the KLIC-DD product section at the Zennio homepage: www.zennio.com) for detailed information about the functionality and the configuration of the related parameters.

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.

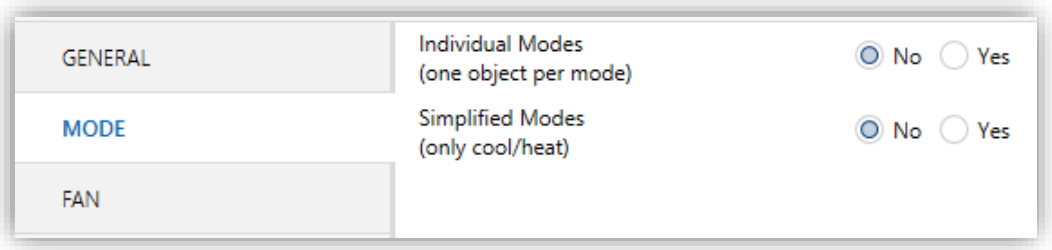


Figure 12. Mode window.

- **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.

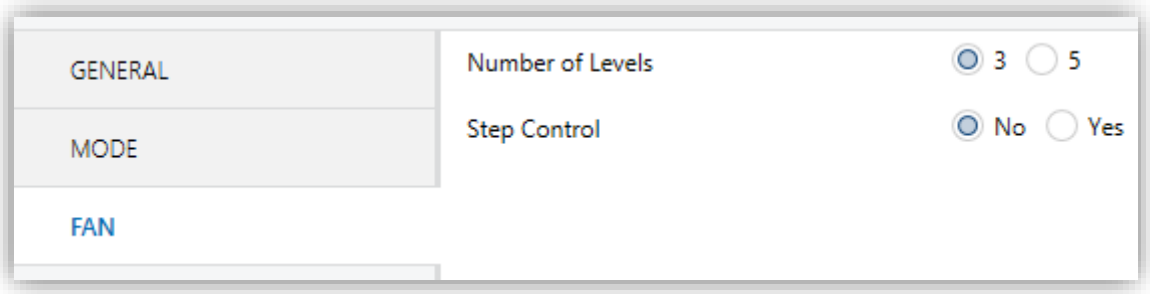


Figure 13. Fan window.

- **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 sped, 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	16ºC – 32ºC 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%Au,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	16ºC – 32ºC 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	C T - W U	DPT_Switch	0/1	Fan Mode Sending	1=Set Fan Mode;0=Nothing
14	1 Bit	I	C T - W U	DPT_Switch	0/1	Dry Mode Sending	1=Set Dry Mode;0=Nothing
15	1 Bit	I	C - - W U	DPT_Heat_Cool	0/1	Simplified Mode	0=Cool; 1=Heat
16	1 Bit	O	C T R - -	DPT_Switch	0/1	Auto Mode Reception	1=Auto Mode Enabled;0=Disabled
17	1 Bit	O	C T R - -	DPT_Switch	0/1	Cool Mode Reception	1=Cool Mode Enabled;0=Disabled
18	1 Bit	O	C T R - -	DPT_Switch	0/1	Heat Mode Reception	1=Heat Mode Enabled;0=Disabled
19	1 Bit	O	C T R - -	DPT_Switch	0/1	Fan Mode Reception	1=Fan Mode Enabled;0=Disabled
20	1 Bit	O	C T R - -	DPT_Switch	0/1	Dry Mode Reception	1=Dry Mode Enabled;0=Disabled
21	1 Bit	I	C - - W U	DPT_Step	0/1	Fan [1 bit] Sending	0=Down;1=Up
22	1 Byte	I	C - - W U	DPT_SceneControl	0-63; 128-191	Scenes	Set Scene "Value"
23	1 Bit	I/O	C T R W U	DPT_Switch	0/1	Temperature Limitation	0=Disable;1=Enable
24	1 Bit	I	C - - W U	DPT_Switch	0/1	Auto-OFF	0=Disable;1=Enable
25	1 Bit	O	C T R - -	DPT_Switch	0/1	Internal Error	0=No Error; 1=Error
26	1 Byte	O	C T R - -	-	1-4	Type of Internal Error	1=Recep.Err,2=TimeOut,3=Che...
27	1 Bit	O	C T R - -	DPT_Switch	0/1	External Error	0=No Error; 1=Error
28	1 Byte	O	C T R - -	-	0-255	Type of External Error	Check Errors Table
29	1 Bit	I	C - - W U	DPT_Switch	0/1	Humidify Mode Sending	1=Enable Mode,0=Ignore
30	1 Bit	O	C T R - -	DPT_Bool	0/1	Humidify Mode Reception	0=Disabled,1=Enabled
31	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	Humidify Level Reception	0=Off,25=Low,50=Med,75=Hi...
32	1 Bit	I	C - - W U	DPT_Switch	0/1	Humidify Level Step Sending	0=Down,1=Up
33	1 Bit	I	C - - W U	DPT_Switch	0/1	Extra Swing Sending	0=Stop,1=Move
34	1 Bit	O	C T R - -	DPT_Switch	0/1	Extra Swing Reception	0=Stopped,1=Movement
35	2 Bytes	I	C - - W U	DPT_Value_Temp	16ºC – 32ºC	Ambient Temperature	Temperature from KNX
36	2 Bytes	O	C T R - -	DPT_Value_Temp	16ºC – 32ºC	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
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	0A
11	0H
12	0C
13	0J
14	0E
15	0F
16	A0
17	A1
18	A2
19	A3
20	A4
21	A5
22	A6
23	A7
24	A8
25	A9

Bus	Code
26	AA
27	AH
28	AC
29	AJ
30	AE
31	AF
32	C0
33	C1
34	C2
35	C3
36	C4
37	C5
38	C6
39	C7
40	C8
41	C9
42	CA
43	CH
44	CC
45	CJ
46	CE
47	CF
48	E0
49	E1
50	E2

Bus	Code
51	E3
52	E4
53	E5
54	E6
55	E7
56	E8
57	E9
58	EA
59	EH
60	EC
61	EJ
62	EE
63	EF
64	H0
65	H1
66	H2
67	H3
68	H4
69	H5
70	H6
71	H7
72	H8
73	H9
74	HA
75	HH

Bus	Code
76	HC
77	HJ
78	HE
79	HF
80	F0
81	F1
82	F2
83	F3
84	F4
85	F5
86	F6
87	F7
88	F8
89	F9
90	FA
91	FH
92	FC
93	FJ
94	FE
95	FF
96	J0
97	J1
98	J2
99	J3
100	J4

Bus	Code
101	J5
102	J6
103	J7
104	J8
105	J9
106	JA
107	JH
108	JC
109	JJ
110	JE
111	JF
112	L0
113	L1
114	L2
115	L3
116	L4
117	L5
118	L6
119	L7
120	L8
121	L9
122	LA
123	LH
124	LC
125	LJ

Bus	Code
126	LE
127	LF
128	P0
129	P1
130	P2
131	P3
132	P4
133	P5
134	P6
135	P7
136	P8
137	P9
138	PA
139	PH
140	PC
141	PJ
142	PE
143	PF
144	U0
145	U1
146	U2
147	U3
148	U4
149	U5
150	U6

Bus	Code
151	U7
152	U8
153	U9
154	UA
155	UH
156	UC
157	UJ
158	UE
159	UF
160	M0
161	M1
162	M2
163	M3
164	M4
165	M5
166	M6
167	M7
168	M8
169	M9
170	MA
171	MH
172	MC
173	MJ
174	ME
175	MF

Bus	Code
176	30
177	31
178	32
179	33
180	34
181	35
182	36
183	37
184	38
185	39
186	3A
187	3H
188	3C
189	3J
190	3E
191	3F
192	40
193	41
194	42
195	43
196	44
197	45
198	46
199	47
200	48

Bus	Code
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

Bus	Code
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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