



KLIC-DI VRV

KNX Interface

Variable Refrigerant Volume

ZN1CL-KLIC-DI



Program version: 1.4

Manual edition: a

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DOCUMENT UPDATES

| Versión | Modificaciones | Página(s) |
|---------|---|-----------|
| 1.4a | Changes since version 1.3 of the application program: <ul style="list-style-type: none"> Solved bug that caused occasional communication interruption at the start-up. | - |
| | Revision of the explanation about the activation of the Temperature Limitation feature. | 17 |
| | Additional explanation on the concept of the “master of mode”. | 20 |
| | New section 3.2.8 <u>Indoor temperature sending time</u> , for further detail about this function. | 22 |
| | Explanation on the non-cyclic behaviour of the step control. | 24 |
| | General revision and update of the table of correspondences between the error codes sent to the bus and the specific error codes of the machine. | 27 |
| | General improvement of this English version of the manual – texts and minor issues. | - |

1. INTRODUCTION

1.1. KLIC-DI

KLIC-DI is an interface that allows a bidirectional communication between a KNX domotic system and **commercial and industrial** air-conditioning units, through two possible application programs:

- KLIC-DI VRV, for industrial A/C systems with variable refrigerant volume.
- KLIC-DI SKY, for other comercial A/C systems.

Because of this **bidirectional** communication, the air conditioning unit can be controlled in the same manner as through its own controls, while the real status of the air-conditioning unit is monitored and periodically sent to the KNX bus to inform other devices.



Figure 1.1. KLLIC-DI interface

In case of having a wired remote control also connected to the same communication bus of the unit, KLIC-DI will communicate with this remote control in a bidirectional manner, one acting as a master control and the other one as a slave control. It is important to verify that KLIC-DI and the wired remote control are configured as different types of control. This way, the control acting as a slave will update its status when it is ordered by the master, and will notify the master whenever there are status changes in the slave control itself.

KLIC-DI includes the following features, among others:

- Bidirectional control over industrial and commercial A/C units.
- Control the entire functionality of the air-conditioning unit. Error management handles the specific A/C unit error codes as well as any communication errors that may arise.
- LED indicator that allows monitoring the bidirectional traffic flow.

1.2. INSTALLATION

Figure 1.2 shows the element scheme of KLIC-DI.

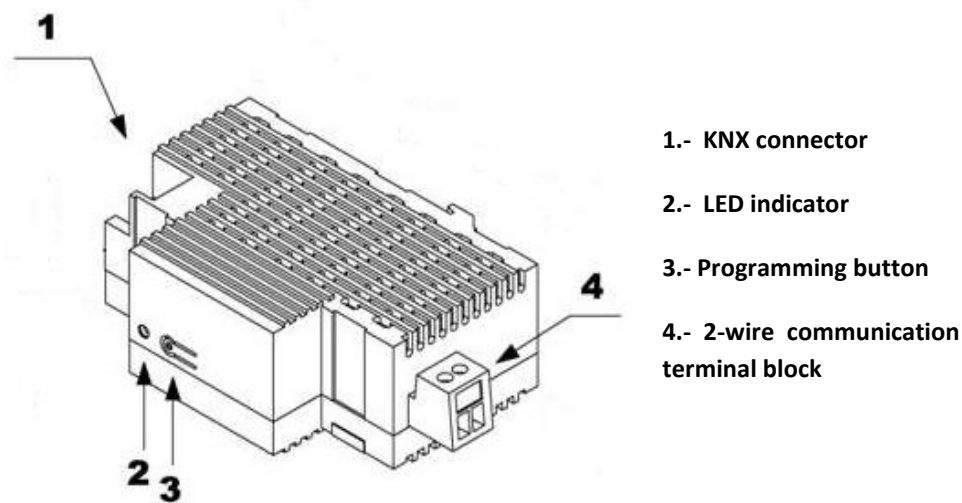


Figure 1.2. KLIC-DI. Element scheme

The KLIC-DI interface connects to the KNX bus via the corresponding terminals (1). On the other hand, this device is connected to the internal PCB of the A/C unit (P1/P2 connectors), using a 2-wire cable. See figure 1.3.

Note: *If the wired remote control is also being used, it is necessary to make sure that the wired remote control is under the Slave mode if KLIC-DI is going to be configured as a Master control. And vice versa: if KLIC-DI is configured as a Slave, the wired remote control should be the Master.*

Once the device is provided with power supply from the KNX bus, both the physical address and the KLIC-DI Variable Refrigerant Volume application program can be downloaded.

This device does not need any additional external power since it is powered through the KNX bus.

The functionality of the main elements of the interface is explained below:

🌐 **Programming button (3):** a short press on this button sets the actuator into the programming mode, while the associated LED lights (2) turn red. If this button is held while plugging the device into the KNX bus, KLIC-DI goes into the secure mode.

🌐 **LED indicator (2):** light indicator that shows the status of KLIC-DI. Besides lighting in red when the device is under the programming mode, this LED may also light in blue and green, indicating the status of the bidirectional communication between the KNX bus and the A/C unit, resulting to be useful during the installation process. Next, the meaning of every LED color:

- **Red (still):** KLIC-DI is under programming mode.
- **Red (blinking):** KLIC-DI is under secure mode (the LED blinks red every 0.5 seconds).
- **Green (still):** failure in the external power supply of KLIC-DI (KLIC-DI is not connected to the A/C unit, and/or the A/C unit is not connected to the power line).
- **Green (blinking):** communication from the A/C unit to KLIC-DI.
- **Blue (blinking):** communication from KLIC-DI to the A/C unit.

🌐 **Communication cable:** a 2-wire cable that will connect to KLIC-DI (through the provided terminal block (4)) at one end, and directly to the P1/P2 connectors of the PCB of the internal unit (or of the wired remote control) at the other end.

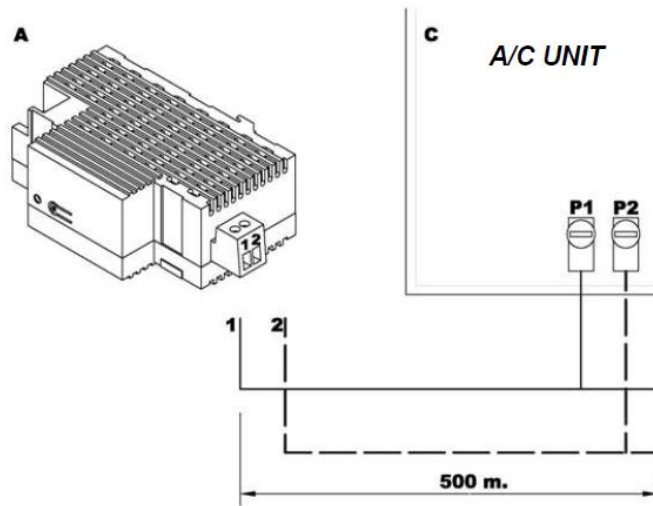


Figure 1.3. Connecting KLIC-DI to the P1/P2 bus

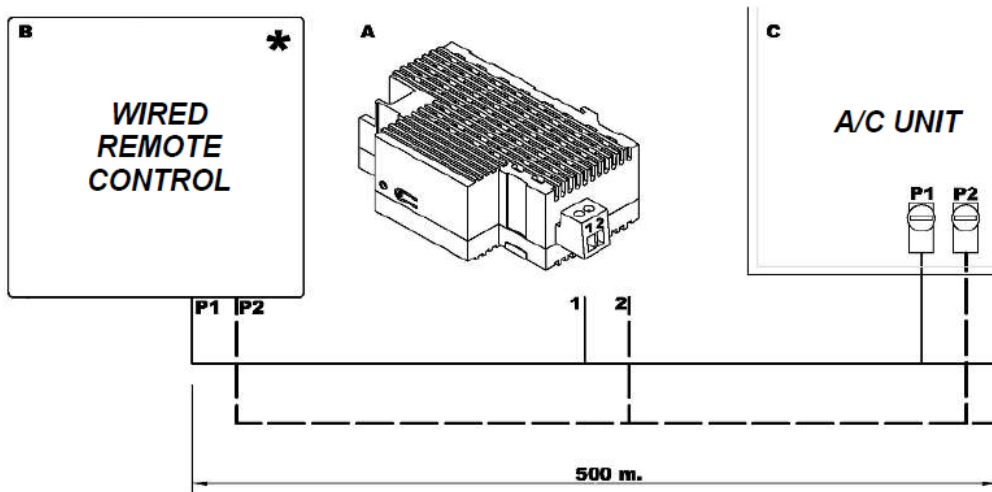


Figure 1.4. Connecting KLIC-DI to the P1/P2 bus with wired remote control

| Diagram legend | |
|----------------|---|
| A | KLIC-DI |
| B | Wired remote control |
| C | A/C unit |
| P1-P2 | Connection base of the A/C unit |
| 1-2 | Zennio terminal block connection |
| * | The wired remote control must operate in the opposite mode to that of KLIC-DI |

To obtain detailed information about the technical features of KLIC-DI, as well as security and installation information, please read the interface **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-DI **Installation Note**, also available in the same web site.






2. CONFIGURATION



2.1. BASIC CONTROL

With KLIC-DI, an air-conditioning unit can be monitored and controlled the same way it would be with the infrared remote control provided with it.


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


-  **ON/OFF** switch of the air-conditioning unit
-  **Setpoint Temperature.** Between 16 and 32°C.
-  **Operating mode:** Heat, Cool, Fan and Dry.
-  **Fan speed:** 2 or 3 levels available (depending on the available levels of the A/C unit).
-  **Swing** (if available): swinging or still position (5 different positions available).


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


2.2. ADVANCED FUNCTIONALITIES

Apart from basic control functions over the air-conditioning system, KLIC-DI offers other advanced functionalities that provide added value to the wired remote control.

 **Scene configuration:** allows establishing a specific parameter combination in order to generate a determined climate ambient in the room. KLIC-DI allows configuring up to 4 different scenes.

 **Auto OFF:** allows an automatic and temporary switch-off of the machine (after a pre-established delay, if parameterized) if a status change in the communication object associated to it takes place. A typical application of this functionality is linking a window sensor to the auto switch-off object, which will allow switching the machine off while the window is open.

 **Temperature limitation:** setpoint temperatures of air conditioning systems with variable refrigerant volume are by default limited to the range 16-32°C. This parameter allows configuring custom temperature ranges in ETS for modes Heat and Cool, provided that the custom values stay within the original range. In case of receiving a temperature command from the KNX bus with a value exceeding the configured range, the temperature value sent to the machine will be the corresponding limit value.

 **Indoor temperature and Reference temperature:** Variable Refrigerant Volume a/c units include several sensors for measuring the temperature at different internal points.

The **Indoor temperature** is the internally measured value that, together with the **Reference temperature**, is used for controlling the modes Auto-Cool and Auto-Heat of the A/C machine.

The **Reference temperature** is the actual ambient temperature of the room to be acclimatized. It is necessary to provide the machine with this value through the corresponding communication object, which is highly recommended to be linked to a temperature sensor (installed in the room) that periodically updates the temperature value.


Modes Auto-Heat and Auto-Cool can be controlled in three different manners from A/C units:

1. The machine receives the Reference Temperature and, basing on a pre-configured hysteresis, it determines the corresponding auto mode.
2. The machine receives the Indoor Temperature and, basing on a pre-configured hysteresis, it determines the corresponding auto mode.

3. The machine establishes the auto mode according to the average between the Reference Temperature and the Indoor Temperature.

The temperature value used by the machine to switch between modes Auto-Cool and Auto-Heat depends on the configuration established in the A/C unit itself. In all the above cases, this value is compared to the setpoint temperature so that if the setpoint temperature is higher, the Auto-Heat mode is established; and if the setpoint temperature is lower than this value, the Auto-Cool mode is established.

Take into account: *It is highly recommended to link the Reference Temperature to a temperature sensor that periodically monitors the real temperature of the room, because it may happen that the pre-configuration of the unit is unknown, causing a wrong behaviour of the Auto mode. The Reference Temperature has a default value of 25°C.*


 **Error management:** this functionality allows sending messages to the KNX bus informing about errors. Error management handles both external errors from the A/C unit itself and those that may arise in the KLIC-DI – A/C unit communication process.

Apart from informing about the occurrence of possible errors it is also possible to configure the sending of the error type. In case of internal errors, the numerical code associated to the error type is shown in Table 2.1.


| Error Number | Type of Internal Error |
|--------------|--|
| 1 | Data reception failed (inadequate speed, parity, etc.) |
| 2 | Communication time exceeded (Time Out) |
| 3 | Incorrect checksum |
| 4 | Incorrect response from the machine |

Table 2.1. Internal Error Types

Regarding the numerical code that is sent in the event of external errors, it should be looked up in the user manual of the installed air-conditioning system, according to [Annex II. Correspondence with A/C Unit Error Codes.](#)

 **Initial configuration:** this functionality allows establishing initial values 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.

It is also possible to send the initial values to the KNX bus after the start-up.

 **Type of control:** it is important to consider the type of control (Master or Slave) with which KLIC-DI is going to be configured.

The Master control in the installation will be in charge of the communication with the machine and it will retransmit the instructions and the status from the machine to the slave control, in case it exists. However, both controls will be able to configure all the functionality of the machine.

This feature allows connecting to the same installation both the KLIC-DI interface and the wired remote control of the A/C unit, after selecting the desired master/slave configuration (avoiding that both are configured with the same type of control: it is not possible to have two masters and two slaves).

In case of having both controls configured as Masters, the screen of the A/C unit control will show the error code "88" and the error code "U5" will be as well sent to the bus.

Note: *When the wired control is switched from one mode to another (M / S), it is necessary to force a power interruption, so the wired control reboots under the new mode.*

Important: *The **BRC1E51A7** wired control can only operate as a Master control. In case of using this model in the installation, it is necessary to configure KLIC-DI as a Slave control.*

2.3. CONTROL FROM THE IR REMOTE

KLIC-DI incorporates by design an infrared receiver, located next to the LED indicator. This makes the installation process of the device easier, since it is possible to use the Zennio IR remote control (see Figure 2.1) to check that the control over the A/C machine is carried out properly.

Note: In order to send the corresponding orders from the IR remote control to the interface, **it is necessary to have the LED indicator lighting (in red).**

The action that each button of the remote control performs is shown in Figure 2.1.

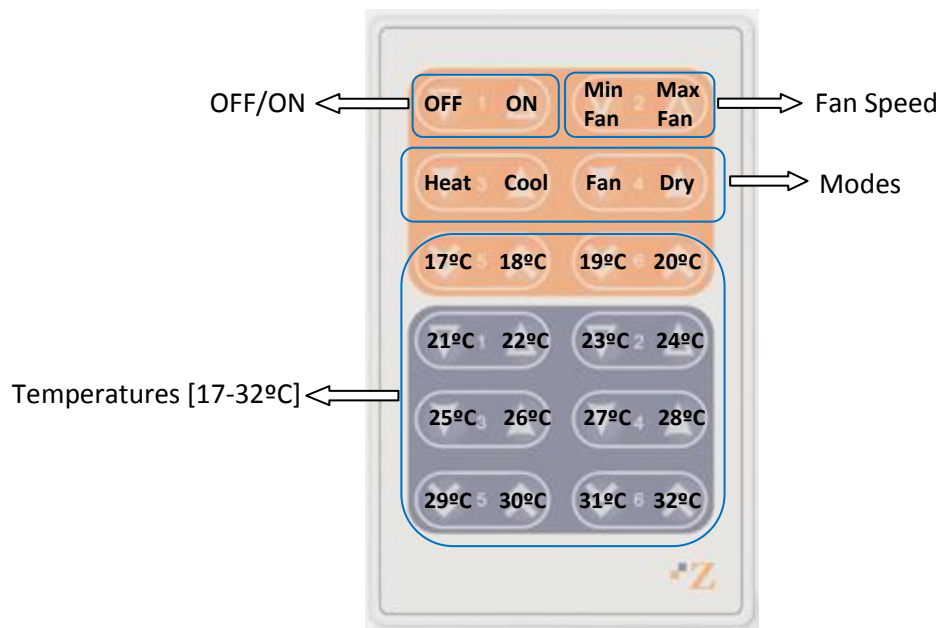


Figure 2.1. pressing zones in the IR remote

3. ETS PARAMETERIZATION

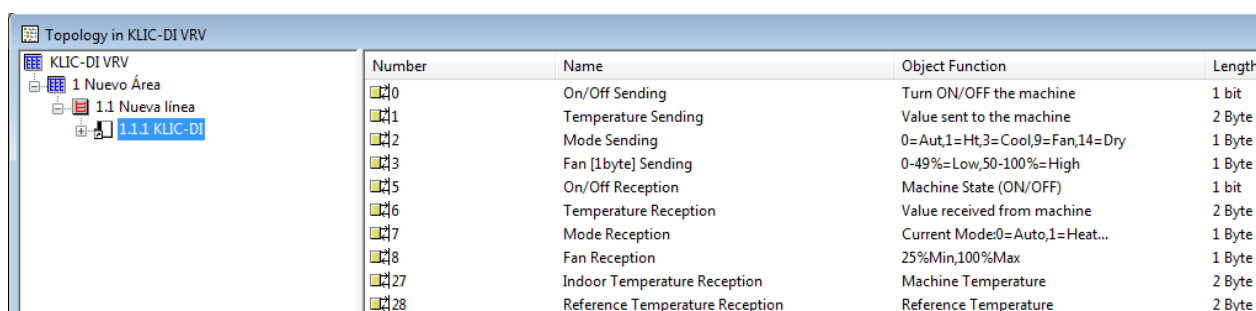
To begin with the parameterization process of the KLIC-DI interface it is necessary, once the ETS program has been opened, to import the database of the product (**KLIC-DI VRV** application program).

Next, the device should be added to the project where desired. And then, one right-click on the device will permit selecting "Edit parameters", in order to start the configuration.

In the following sections a detailed explanation is provided about each of the different functionalities of the device in ETS.

3.1. DEFAULT CONFIGURATION

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



| Number | Name | Object Function | Length |
|--------|---------------------------------|--------------------------------|--------|
| 0 | On/Off Sending | Turn ON/OFF the machine | 1 bit |
| 1 | Temperature Sending | Value sent to the machine | 2 Byte |
| 2 | Mode Sending | 0=Aut,1=Ht,3=Cool,9=Fan,14=Dry | 1 Byte |
| 3 | Fan [1byte] Sending | 0-49%=Low,50-100%=High | 1 Byte |
| 5 | On/Off Reception | Machine State (ON/OFF) | 1 bit |
| 6 | Temperature Reception | Value received from machine | 2 Byte |
| 7 | Mode Reception | Current Mode:0=Auto,1=Heat... | 1 Byte |
| 8 | Fan Reception | 25%Min,100%Max | 1 Byte |
| 27 | Indoor Temperature Reception | Machine Temperature | 2 Byte |
| 28 | Reference Temperature Reception | Reference Temperature | 2 Byte |

Figure 3.1. Default topology

The default topology window (see Figure 3.1) contains the communication objects associated to the sending and reception of the orders for basic control of the A/C unit: ON/OFF, Temperature, Mode and Fan.

When entering the parameter edition for the first time, the following window will be shown.

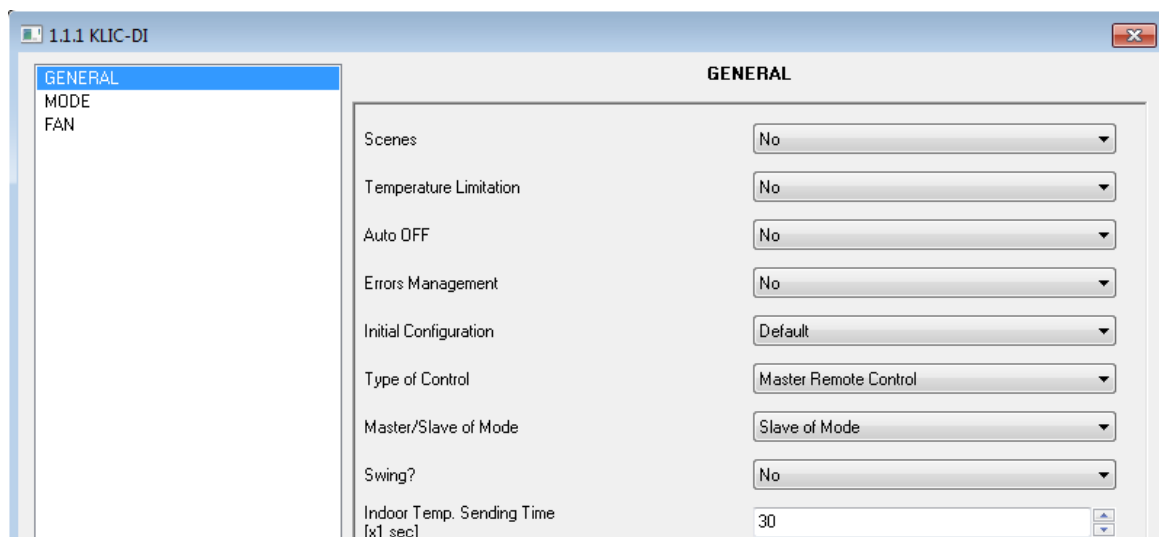





Figure 3.2. Configuration screen by default

As seen in figure 3.2, the configuration screen shows three 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 parameter window it is possible to enable the advanced functionalities (Scenes, Temperature limitation, Auto OFF, Error management and Initial configuration), which are disabled by default. All these advanced functionalities are explained in detail in the following sections.

When the desired functionalities are enabled through their drop-down boxes, the left menu will show a new tab for the configuration window, while the related communication objects will also be enabled.

From the General window it is possible to configure the desired **type of control** for KLIC-DI: Master or Slave remote control; the enabling or not of the **slats (swing)**; and the **Indoor Temperature sending time**, which allows carrying out a periodical sending of the indoor temperature measured by the machine, unless the value does not change.

3.2.1. SCENES

After enabling this functionality, the left menu will include the option Scenes, where to enable and parametrize each of the 4 available scenes. The scene number to be run will be sent (decreased by 1) to the KNX bus through the “Scenes” object, enabled for this purpose.

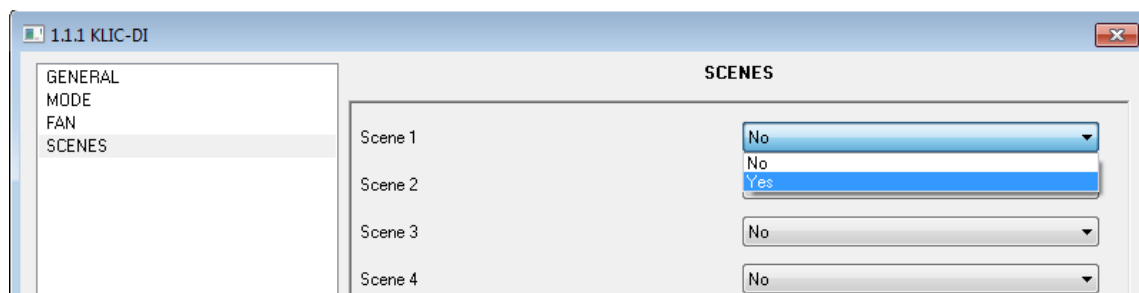



Figure 3.3. Scenes configuration window

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

 **Scene number.** Indicates the scene number (from 1 to 64) on whose reception (through the “Scenes” object, decreased by one) the corresponding configured orders will be sent to the A/C machine. The available orders are:

- **ON/OFF.** Possibility to set the A/C machine status: No change, OFF or ON.
- **Temperature.** No change, or new temperature value (from 16°C to 32°C).
- **Mode.** No change, Heat, Dry, Fan or Cool.
- **Fan.** No change, minimum or maximum.
- **Swing.** No change, Swing or Fix Position (5 different specific positions are available).

An example of scene configuration is shown in figure 3.4.

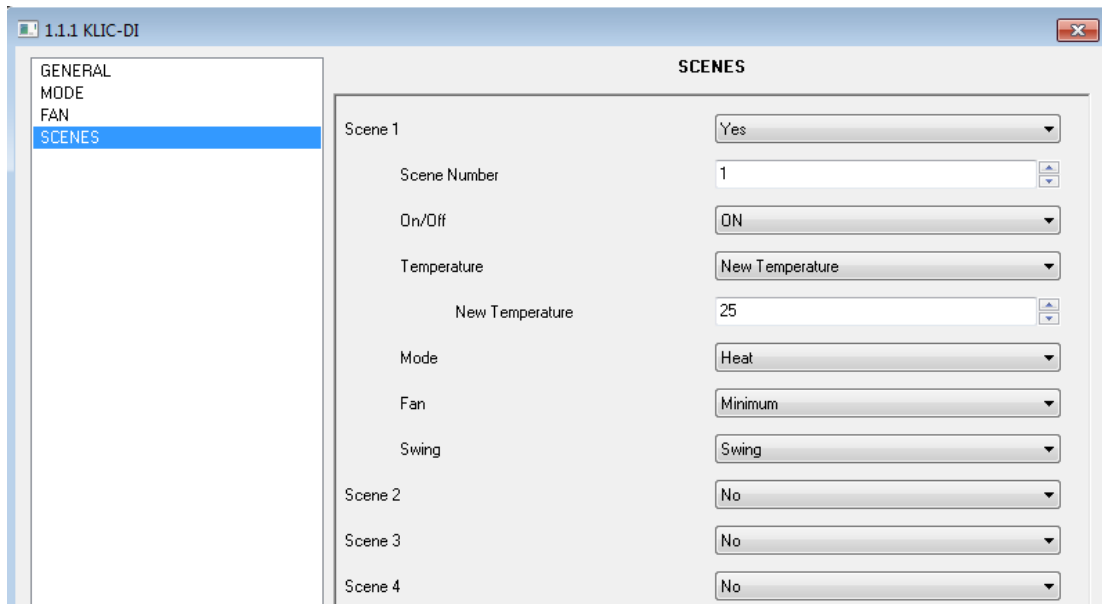


Figure 3.4. Scene configuration example (Scene 1)

3.2.2. TEMPERATURE LIMITATION

The A/C unit limits setpoint temperatures to the 16°C-32°C range, causing that other values are ignored. Nevertheless, KLIC-DI offers the possibility of establishing new temperature limits if they are within the A/C unit predefined limits (please, check the A/C unit manual).

Temperature limits can be customized for the two modes with associated temperatures: Cool and Heat.

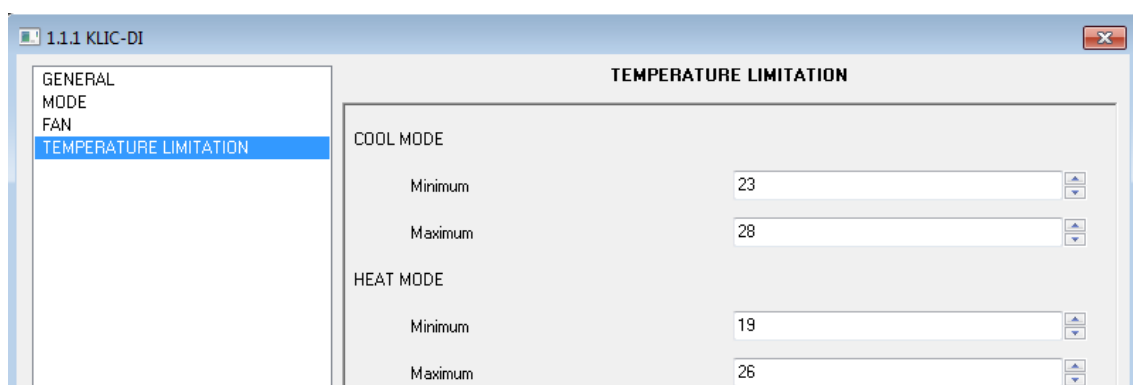


Figure 3.5. Temperature limitation configuration

To make KLIC-DI aware of these customized limits, the specific communication object "Temperature Limitation" must be set to "1". To control the machine back with the predefined temperature limitations, the mentioned object needs to have value "0".

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

Note: When custom temperature limits are configured in ETS, this functionality is automatically enabled by default ("Temperature Limitation" acquires the value "1") and it will be the personalized ranges that will control the unit behaviour when it switches on.


3.2.3. AUTO OFF

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



Figure 3.6. Auto OFF configuration

The only configurable parameter is:

-  **Delay for Auto-OFF:** sets the time, in seconds, KLIC-DI waits before automatically switching the A/C machine off.

Once the A/C machine has been automatically switched off, any ON order will be ignored until the object "Auto-OFF" acquires the value "0".

3.2.4. ERROR MANAGEMENT

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

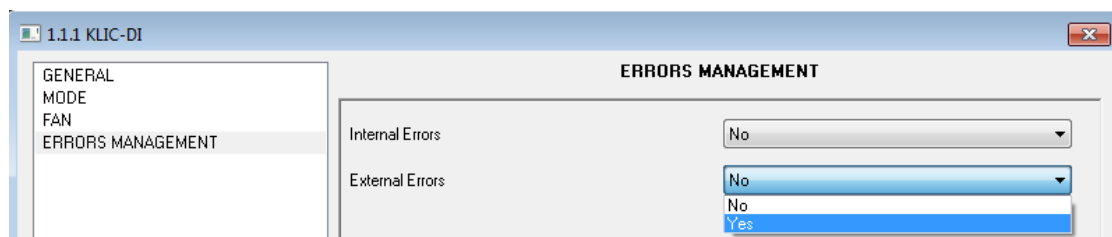


Figure 3.7. Errors management configuration window

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

- **Internal errors:** when enabled, two new communication objects appear: "Internal error" (1 bit), and "Type of internal error" (1 byte). The first one indicates if an internal error has occurred (value "1") or not (value "0"). The second object indicates the specific code that identifies the error (a numerical value between 1 and 4. See [Table 2.1: Internal Error Types](#)).

- **External errors:** when enabled, two new communication objects appear: "External Error" and "Type of external error". The first one indicates if an external error has occurred (value "1") or not (value "0"). The second object indicates the specific code that identifies the error (see the specific manual of the A/C unit installed as well as [Annex II. Correspondence with A/C Unit Error Codes](#)).

3.2.5. INITIAL CONFIGURATION

This functionality allows setting an initial status for the very first switch-on of the A/C machine and for power interruption recoveries. This status can be the default or a custom status. If the latter is selected, the window in figure 3.8 be displayed.

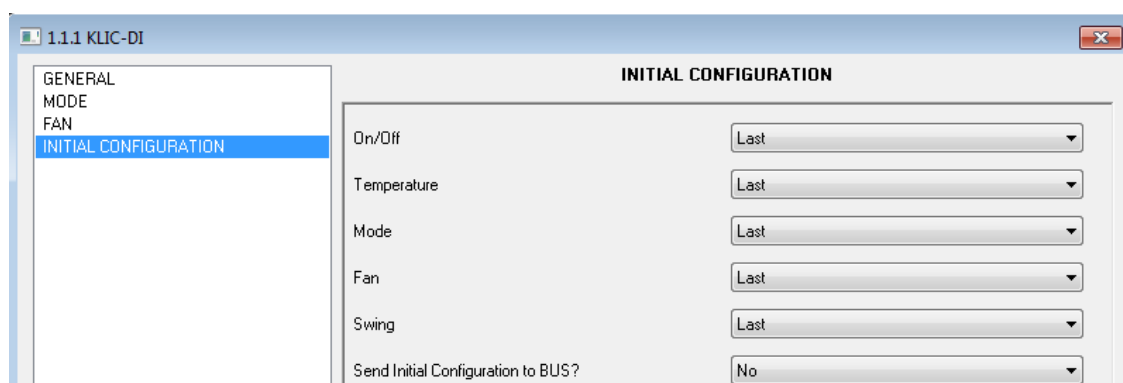


Figure 3.8. Initial configuration window

The variables than can be initialized are:

- **ON/OFF:** last (the status the machine had before the power failure; on the very first switch-on, this will be assumed to be OFF), ON or OFF.
- **Temperature:** Last or custom (a new field appears to set the custom initial temperature, between 16°C and 32°C).
- **Mode:** Last, Heat, Dry, Fan or Cool.
- **Fan:** Last, minimum or maximum.
- **Swing:** Last, Swing or Fix Position (5 different specific positions are available).

Moreover, the initial statuses can be sent to the bus when they are applied:

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

3.2.6. TYPE OF CONTROL

The control type of the KLIC-DI interface is also parameterized from the General window. This can be **Master Remote Control** or **Slave Remote Control**. This allows including within the same installation both a KLIC-DI interface and the original wired remote control of the A/C unit; it is important to avoid setting both devices to the same mode.

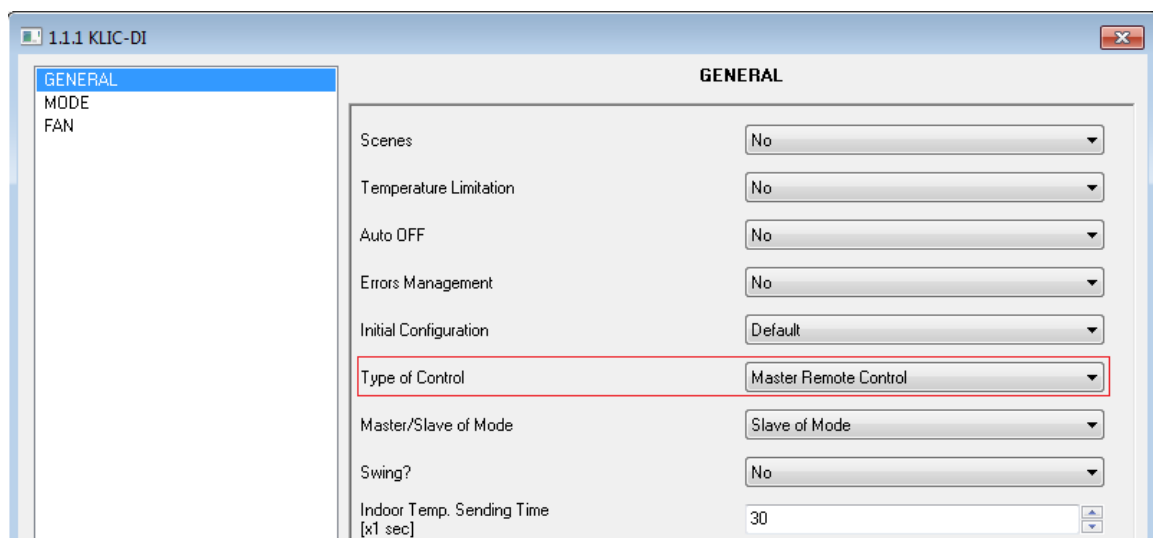


Figure 3.9. Type of control: master or slave

When the option **Master remote control** is selected, the drop-down box "Master/Slave of Mode" will also be displayed, because only after configuring KLIC-DI as the Master can it also be configured as the Master of Mode.

The concept of the “master of mode” originates from the possibility of having several groups of internal units within the same network (e.g., one per floor in the building), all of them connected to a unique external unit (or BSV box), so it will only be possible to heat or cool the liquid transported to all the indoor machines. Consequently, **only one main mode (Cool or Heat) is permitted at the same time, and, hence, only one “master of mode” internal unit**, which will be the only capable of switching to another mode. Any other internal machine (and their controls of the Master type) should work as a “slave of mode” and will be restricted by the master of mode for mode switches.

The parameter **Master/Slave of mode** allows configuring KLIC-DI as Master or Slave of mode. When the device is configured as the **Master of mode**, all system modes can be activated from KLIC-DI. However, when the device is configured as a **Slave of mode**, only the Fan mode is available, apart from the mode currently configured in the device acting as the Master of mode control (Cool or Heat) and of Dry, in case of being Cool the current mode.

Table 3.1 shows the modes that can be selected in the device acting as a Slave of mode depending on the mode configured in the Master of mode.

| Mode configured in the Master of Mode | Configurable modes from the Slave of mode |
|---------------------------------------|---|
| Heat | Heat and Fan |
| Cool | Cool, Fan and Dry |
| Fan | Fan |

Table 3.1. Modes in the slave of mode depending on those of the master of mode.

Note: *When KLIC-DI is configured as the master of mode, the wired remote controls of the A/C unit cannot be used to set additional masters of mode.*

3.2.7. SWING

Through this parameter, it is possible to select whether to permit controlling the slats of the A/C machine or not.

Note: Before continuing with the parameterization, make sure that, according to the user manual, the specific A/C model to be controlled includes slats (swing). If it does not permit this function, an inadequate parameterization may result in an incorrect control of the system performance.

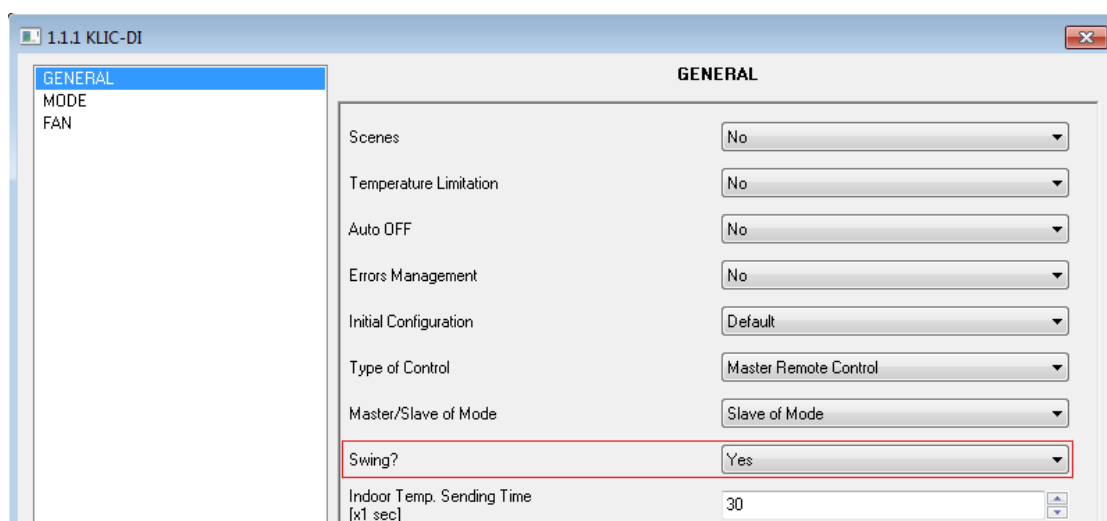


Figure 3.10. Swing

5 still positions are available for the slats, as well as constant movement or swing halt.

When this option is enabled ("Yes"), two 1-byte communication objects appear: "Swing [1 byte] Sending" and "Swing [1 byte] Reception" as well as two more 1-bit objects: "Swing sending" and "Swing [1 bit] reception". All of them allow controlling and showing the slats status at any time. Particularly:

- 🌐 The 1-bit object "Swing sending" permits controlling the slat position as follows:
 - **Sending the value "0"**: if the slats are in a still position, they move to the next upper position. In case of being under the swing mode, the slats change to the last still position they had before entering in swing mode.
 - **Sending the value "1"**: the slats start to move in the swing mode.

Object "Swing [1 bit] reception" will indicate the slats status: swing (value "1") or still position (value "0").

- 🌐 The 1-byte object "Swing [1 byte] sending" allows setting the slats position in terms of percentage, according to Table 3.2.

The status object ("Swing [1 byte] reception") indicates the slats current status, in percentage.

| Value of the "Swing [1 byte] Sending" object | Number of the position | Value of the "Swing [1 byte] Reception" object |
|--|------------------------|--|
| 0% | Position 1 | 0% |
| 1-20% | Position 2 | 20% |
| 21-40% | Position 3 | 40% |
| 41-60% | Position 4 | 60% |
| 61-80% | Position 5 | 80% |
| 81-100% | Swing | 100% |

Table 3.2. Value of the "Swing [1 byte]" object

Note: Due to the internal behaviour of the A/C unit, if position number 3 or higher is selected while in the Cool mode, the A/C unit will not respond to the command, in order to prevent a cold air flow directing to a particular point of the room where a person may be standing. Because of an analogous reasoning, positions 1 and 2 will be ignored by the A/C unit while in the Heat mode, to prevent hot air accumulation in the upper part of the room.

3.2.8. INDOOR TEMPERATURE SENDING TIME

The "Indoor Temp. Sending Time [x1 sec]" parameter permits defining a period, between 30 and 255 seconds, for cyclically send the indoor temperatura obtained by KLIC-DI from the A/C machine itself during the internal communication process. This value will be sent to the KNX bus through the "Internal Temperature (Status)" object. Note that it will not be sent unless the value is different from the last sent, and that in the event of non having a built-in sensor in the machine for performing this measure, abnormal values may be sent.

3.3. MODE WINDOW

As seen in [Section 3.1. Default Configuration](#), the Mode specific window allows configuring some features related to the operating mode of the A/C machine.

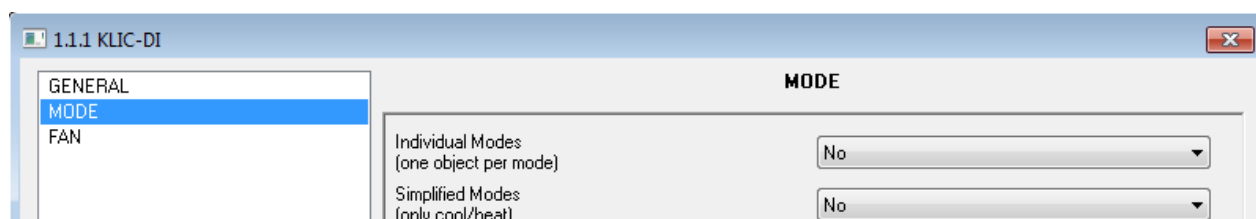


Figure 3.11. Mode window

Individual modes: when this option is selected, 8 new 1-bit communication objects will be deployed. Four of them are associated to sending each of the available modes (Cool, Fan, Heat and Dry) while the other 4 objects refer to the reception from the A/C machine of the status of every mode.

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

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

Moreover, objects "Mode Sending" and "Mode Reception" (1 byte each) are available for use by default.

If the **Individual modes** option is activated, the operating mode of the A/C machine will be modifiable by writing the value "1" through the communication object associated to the desired individual mode. Moreover, the KNX bus will also be informed about the currently active mode, through the "Mode Reception" object and through the 1-bit reception object of the specific mode currently active.

Simplified modes: enabling this option activates the "Simplified Mode" 1-bit object. This object allows switching from the Cool and the Heat modes by respectively sending the value "0" or "1" through the object. There is no status object associated to this control object.

3.4. FAN WINDOW

This window configures several features related to the fan speed (or the volume of the air flow) of the A/C machine.



Figure 3.12. Fan window

Number of levels: allows specifying the number of fan levels permitted by the A/C unit, which may be **2 or 3 levels**. The air speed is related to two 1-byte objects: "Fan [1 Byte]"

Sending" and "Fan Reception", for controlling and showing the fan speed, respectively. The control object ("Fan Sending") reflects this speed in percentage. This value will be interpolated so that it fits the available amount of levels, as it can be seen next. The status object ("Fan Reception") will show the current fan speed, according to the interpolated percentages.

- **2 levels:** The fan speed percentages will be interpolated as shown in Table 3.3.


| Initial Speed Percentage | Interpolated Speed Percentage | Level |
|--------------------------|-------------------------------|---------|
| 0-49% | 25% | Minimum |
| 50-100% | 100% | Maximum |

Table 3.3. Fan speed percentages for 2 levels

- **3 levels:** The fan speed percentages will be interpolated as shown in Table 3.4.

| Initial Speed Percentage | Interpolated Speed Percentage | Level |
|--------------------------|-------------------------------|---------|
| 0-32% | 25% | Minimum |
| 33-65% | 50% | Medium |
| 66-100% | 100% | Maximum |

Table 3.4. Fan speed percentages for 3 levels

 **Step control:** enabling of this feature ("Yes") enables the 1-bit object "Fan [1 bit] Sending", which allows increasing (by sending the value "1") or decreasing (value "0") the fan speed in one level (for example, under a three-level parameterization and in the minimum level of fan speed, the value "1" sent via the "Fan [1 bit] Sending" object will cause that the fan speed level changes to "medium").

The step control is **non-cyclical**. This means that, being in the Minimum level (0%), any order to decrease the level will be ignored by the unit, which will maintain the same air level unless an order to increase it is received. Analogously, when the speed level is at its maximum (100%), it will not change until a decrease order is received.

ANNEX I. COMMUNICATION OBJECTS

| SECTION | NUMBER | SIZE | IN/OUT | FLAGS | VALUES | | | NAME | DESCRIPTION |
|---------|--------|---------|--------|-------|---------|------------------|-------|------------------------|---|
| | | | | | RANGE | 1st TIME | RESET | | |
| GENERAL | 0 | 1 bit | I | W | 0/1 | 0 | Last | ON/OFF Sending | Turn ON/OFF the machine |
| | 1 | 2 bytes | I | W | 16-32°C | 25°C | Last | Temperature Sending | Value sent to the machine |
| | 2 | 1 byte | I | W | 0-255 | Cool (3) | Last | Mode Sending | 0=Aut;1=Heat;3=Cool;9=Fan;14=Dry |
| | 3 | 1 byte | I | W | 0-100% | 0 | Last | Fan [1 byte] Sending | 0-49%=Low, 50-100%=High → For 2 levels 0-32%Min,33-65%Med,>65%Max → For 3 levels |
| | 4 | 1 bit | I | W | 0/1 | 0 | Last | Swing sending | 0=Among fixed pos.,1=Motion |
| | 5 | 1 bit | O | RT | 0/1 | Status dependant | Last | ON/OFF Reception | Machine state (ON/OFF) |
| | 6 | 2 bytes | O | RT | 16-32°C | Status dependant | Last | Temperature Reception | Value received from the machine |
| | 7 | 1 byte | O | RT | 0-255 | Status dependant | Last | Mode reception | Actual mode: 0=Aut;1=Heat;3=Cool;9=Fan;14=Dry |
| | 8 | 1 byte | O | RT | 0-100% | Status dependant | Last | Fan Reception | 25%Min,100%Max → For 2 levels 25%Min,50%Med,100%Max → For 3 levels |
| | 9 | 1 byte | O | RT | 0-100% | Status dependant | Last | Swing [1 byte] Sending | 0-80%=Fixed Pos.,100%=Motion |
| MODE | 10 | 1 bit | I | WT | 0/1 | 0 | Last | Cool mode sending | 1=Set Cool Mode; 0=Nothing |
| | 11 | 1 bit | I | WT | 0/1 | 0 | Last | Heat mode sending | 1=Set Heat Mode; 0=Nothing |
| | 12 | 1 bit | I | WT | 0/1 | 0 | Last | Fan mode sending | 1=Set Fan Mode; 0=Nothing |
| | 13 | 1 bit | I | WT | 0/1 | 0 | Last | Dry mode sending | 1=Set Dry Mode; 0=Nothing |
| | 14 | 1 bit | I | W | 0/1 | 0 | Last | Simplified Mode | 0=Cool; 1=Heat |

| SECTION | NUMBER | SIZE | IN/OUT | FLAGS | VALUES | | | NAME | DESCRIPTION |
|------------------------|--------|---------|--------|-------|-----------|-----------------------------|-----------------------------|---------------------------------|--|
| | | | | | RANGE | 1st TIME | RESET | | |
| MODE | 15 | 1 bit | ○ | RT | 0/1 | 0 | Last | Cool mode reception | 1=Cool mode enabled; 0=Disabled |
| | 16 | 1 bit | ○ | RT | 0/1 | 0 | Last | Heat mode reception | 1=Heat mode enabled; 0=Disabled |
| | 17 | 1 bit | ○ | RT | 0/1 | 0 | Last | Fan mode reception | 1=Fan mode enabled; 0=Disabled |
| | 18 | 1 bit | ○ | RT | 0/1 | 0 | Last | Dry mode reception | 1=Dry mode enabled; 0=Disabled |
| FAN | 19 | 1 bit | I | W | 0/1 | 0 | Indifferent | Fan [1 bit] Sending | 0=Down; 1=Up |
| SCENES | 20 | 1 byte | I | W | 0-63 | Indifferent | Indifferent | Scenes | Set Scene "value" |
| TEMPERATURE LIMITATION | 21 | 1 bit | I | W | 0/1 | 0 | Last | Temperature limitation | 0=Disable; 1=Enable |
| AUTO OFF | 22 | 1 bit | I | W | 0/1 | 0 | Last | Auto-OFF | 0=Disable; 1=Enable |
| ERRORS MANAGEMENT | 23 | 1 bit | ○ | RT | 0/1 | Connection status dependant | Connection status dependant | Internal error | 0=No Error; 1=Error |
| | 24 | 1 byte | ○ | RT | 1-4 | Error type dependant | Error type dependant | Type of Internal Error | 1=Recep.Err, 2=TimeOut, 3=Checksum, 4=Resp.Err |
| | 25 | 1 bit | ○ | RT | 0/1 | Machine status dependant | Machine status dependant | External error | 0=No Error; 1=Error |
| | 26 | 1 byte | ○ | RT | 0-255 | Error type dependant | Error type dependant | Type of External Error | Check errors table |
| TEMPERATURES RECEPTION | 27 | 2 bytes | ○ | RT | 0-120.0°C | Machine type dependant | Last | Indoor temperature reception | Machine temperature |
| | 28 | 2 bytes | I | WU | 0-120.0°C | 25°C | Last | Reference temperature reception | Reference temperature: |
| SWING | 29 | 1 byte | I | WU | 0-100% | 0 | Last | Swing [1 byte] Sending | 0-80%=Fixed Pos.;100%=Mot. |
| | 30 | 1 bit | ○ | RT | 0/1 | 0 | Last | Swing [1 bit] Reception | 0=Fixed Position; 1=Motion |

ANNEX II. CORRESPONDENCE WITH A/C UNIT ERROR CODES

Correspondence between the error codes sent to the KNX bus by KLIC-DI and the error codes of the A/C units themselves:

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



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