KLIC-DA LT

KNX/DAIKIN Altherma LT Gateway

ZN1CL-KLIC-DA

USER MANUAL

Application Program Version: [2.2]
User Manual Version: [2.2]_a

www.zennio.com

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[2.2]_a	**Changes in the application program**: • New object to notify malfunction code.	-
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[2.1]_a	**Changes in the application program**: • Code optimisation.	-
[2.0]_a	**Changes in the application program**: • Compatibility with newer (CB) models of the Altherma LT system. • Possibility of configuring a minimum period between transmissions of the status objects. • New energy consumption / production objects per circuit (only in CB systems).	-
[1.4]_a	**Changes in the application program**: • Code optimisation.	-
[1.3]_a	**Changes in the application program**: • Improvement in the interoperability with the Altherma LT system clock.	-
[1.2]_a	**Changes in the application program**: • Compatibility with additional Altherma LT systems.	-
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1 INTRODUCTION

1.1 KLIC-DA

KLIC-DA from Zennio is the ideal solution for the integration of Altherma climate systems into a KNX domotic environment.

As a **bidirectional KNX / Altherma interface**, KLIC-DA provides full communication between any KNX device (e.g., the InZennio Z41 touch screen from Zennio) and the Altherma system, which can therefore be controlled analogously as from the specific Altherma user interfaces. Moreover, any status updates and feedback received from the Altherma system will also be forwarded by KLIC-DA towards other KNX devices.

Figure 1. KLIC-DA

Daikin Altherma is an integral solution for climate control. Although mainly based on the **heat pump** technology, Altherma systems can optionally perform cooling as well, therefore providing the user with heating, air-conditioning and domestic hot water.

Depending on the structure of the system (e.g.: location of the external unit, integration or not of the hydrobox within the same unit, etc.) and on whether A/C is required or not, different Altherma systems are available.

1.1.1 KLIC-DA LT

The KLIC-DA LT application program provided by Zennio focuses on controlling **Altherma LT** (from *Low Temperature*) systems, in contrast to the **Altherma HT** (from *High Temperature*) systems.

An Altherma LT system consists of a series of elements (an external unit, a hydrobox, an internal unit, the user interfaces, etc.), and the specific "P1/P2" communication bus, which allows the user interfaces (typically, one acting as the ***main*** control and the other as an ***additional*** control) communicate to each other and to the Altherma LT system.

KLIC DA LT is compatible with **models CA and CB** of Altherma LT system hidrokit.

Note: *only the main interface interacts with the Altherma LT system. Any order from or to the additional interface will reach the main interface too*.

KLIC-DA LT is meant to **replace the aforementioned additional** interface, and thus to communicate only to the main interface and not to the Altherma LT system directly.

The main functions performed by the KLIC-DA LT application program are:

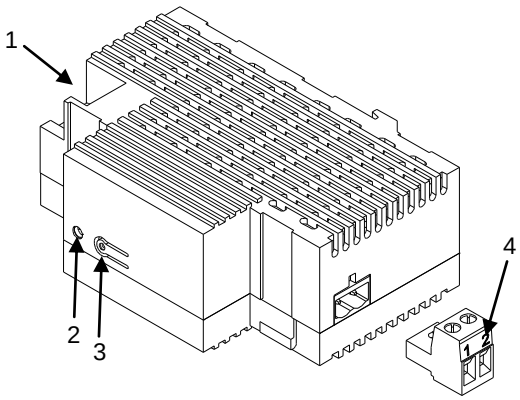
- Management of the **domestic hot-water** (DHW) system.
- Management of the **room climate** system (Leaving Water Method).
- **Error handling**.
- Simultaneous monitoring of **multiple indicators** (temperature setpoints, actuator states, sensors…) reported by the Altherma LT system.

On the other hand, Altherma LT systems feature three climate control methods:

- Control of the **leaving water temperature** (LWT),
- Control through a **user interface** configured as a thermostat,
- Control though an **external thermostat** (TH).

The KLIC-DA LT application program is only compatible with Altherma LT systems configured for an **LWT control**, and with **only one climate zone** (Altherma LT systems permit up to two climate zones with independent setpoint temperatures).

1.2 INSTALLATION



1.- KNX Connector

2.- Programming LED

3.- Programming Button

4.- Two-wire Communication Terminal

Figure 2. Element Diagram

KLIC-DA connects to the KNX bus via the corresponding built-in terminals (1). On the other hand, this device needs to be connected to the P1/P2 bus of the Altherma system (4) in substitution of the original *additional* user interface.

Once the device is being powered from the KNX bus, both the physical address and the KLIC-DA LT application program can be downloaded.

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

The functionality of the remaining elements is as follows:

- **Programming Button (3)**: a short press on this button will set the device into the programming mode, making the red component of the LED (2) indicator light up. If the button is held while plugging the device into the KNX bus, KLIC-DA will go into the **safe mode**, making the red colour of the LED blink intermittently.

- **LED Indicator (2)**: this three-colour (red, blue and green) light indicator reflects the current state of the device. Apart from showing whether the device is under the programming or safe modes, this LED will also react to any communication between KLIC-DA and the P1/P2 bus, which may be useful during the installation process. The meaning of the different colour components is explained next:

- **Red Component (still)**: KLIC-DA is under the programming mode.
- **Red Component (blinking)**: KLIC-DA is under the safe mode.
- **Green Component (still)**: KLIC-DA is not connected to the Altherma system, or the latter is disconnected from the power supply.
- **Green Component (blinking)**: transmission or data from the P1/P2 bus towards KLIC-DA.
- **Blue Component (blinking)**: transmission or data from KLIC-DA towards the P1/P2 bus.

Note: *each colour component works with independence of the others. Therefore, if for instance KLIC-DA is under the programming mode being the Altherma system disconnected, the effective colour will be orange (still), as the red and green components will be lighting (still)*.

- **Input Terminal for the Two-Wire Communication Cable (4)**: slot for the connection of the two-wire communication cable that will connect KLIC-DA to the Altherma P1/P2 bus.

A. Hydrobox Unit.
B. Main User Interface.
C. KLIC-DA.

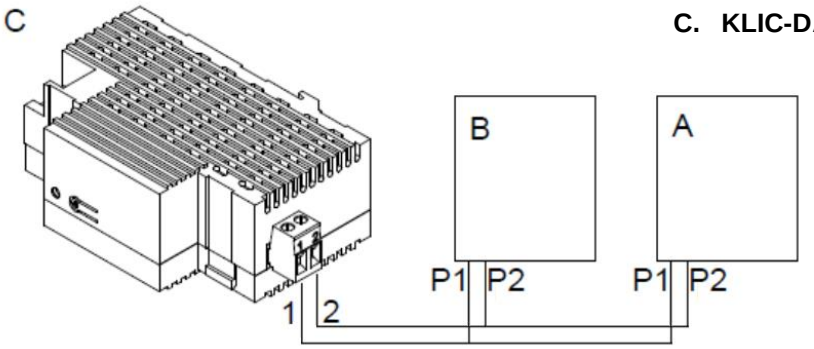


Figure 3. Connection to the P1/P2 bus

As stated in 1.1.1 and shown in Figure 3, KLIC-DA needs to be installed in substitution of the original additional user control, while the main user control needs to be configured as "**At Unit**" under "**User Interface Location**".

For detailed information about the technical features of KLIC-DA, as well as on security and installation procedures, please refer to the device **Datasheet**, bundled within the original packaging of the device and also available at http://www.zennio.com.

2 CONFIGURATION

As stated in section 1.1.1, the KLIC-DA LT application program is only compatible with Altherma LT systems running under an **LWT control**, and with **only one climate zone**.

The main functionality of KLIC-DA LT is listed next.

2.1 DOMESTIC HOT WATER MANAGEMENT (DHW)

In relation to this function, KLIC-DA LT permits controlling and monitoring:

- The **ON/OFF** state of the DHW function,
- The ON/OFF state of the **Buster** mode,
- The setpoint **temperature** of the DHW tank,

It can also report whether the DHW tank is currently under operation or not.

2.2 CLIMATE CONTROL MANAGEMENT

In relation to this function, KLIC-DA LT permits controlling and monitoring:

- The **ON/OFF** state of the climate function,
- The **Operation Mode** of the climate system,
- The setpoint **temperature** of the climate control,

It can also report whether the climate system is currently under operation or not.

2.3 ERROR HANDLING

KLIC-DA LT is able to report the following error events:

- **Duplicate additional user interface** (KLIC-DA is supposed to replace it),
- **Malfunction** of the Altherma LT system.

2.4 ADDITIONAL INDICATORS

KLIC-DA LT does monitor other information received from the Altherma LT system, and therefore is able to report it to the KNX bus:

- **Temperatures**: an external temperature or that of the DHW tank, the output water flow, the input water flow or of the refrigerant.
- **State of the actuators**: pump, compressor, backup heaters…
- **Additional information**: current water flow.
- **Energy**: total energy consumption to date, and total energy production to date. Additionally, for CB models it is also possible to monitor, independently, the energy consumption and the energy production of the cooling, heating and DHW circuits.

It possible to configure a minimum period between sendings of these status indicators.

2.5 START-UP

Both user interfaces in the Altherma LT system (i.e., the main control and the additional control) are powered from the P1/P2 bus. KLIC-DA, however, is powered from the KNX bus instead of the P1/P2 bus. Therefore, it may initialise at a different moment than the main control, so **it is advisable to restart the Altherma LT system after installing KLIC-DA** and downloading the application.

When bus power is provided to this device the start-up of the application program begins, which takes a few seconds. After that, an initial communication sequence (of about **three minutes' time**) with the main user interface takes place. Commands related to the DHW or to the climate control received during this process **will be ignored**, and their corresponding status objects will not be sent either. Nevertheless, KLIC-DA LT does send the status objects related to the additional information (temperatures, sensors, actuators and energy) whenever they change their value during this initialisation process.

Despite the above, in order to guarantee consistency between the actual status of the system and that of the communication objects sent to the KNX bus (**which will not lose their values after a power failure**), once KLIC-DA finishes the initialisation sequence and establishes communication with the main control, it will send the

appropriate commands so the Altherma LT system switches to the last status the domotic system is aware of.

This initialisation process can be summarised as the following steps:

1. After the aforementioned initialisation process has started, once KLIC-DA LT gets at least one valid frame from the Altherma LT system, it will send a **reset order** (which may have no effect if the Altherma system is already performing a restart).

2. During the restart of the Altherma LT system (~30 seconds), the main user control will show the word "**Busy**".

3. When the initialisation sequence ends, the Altherma LT system is set to **the last state** KLIC-DA LT was aware of prior to the power failure (or to the default values, on the first start-up).

The above sequence occurs whenever KLIC-DA LT starts up, or detects communication errors with the P1/P2 bus. It also takes place if a reset occurs in the main user control.

On the other hand, the KLIC-DA LT application program brings the option to **send all the status objects** to the KNX bus after a voltage recovery, in order to update other KNX devices. This will take place at the beginning of the three-minute initialisation process, just after the voltage recovery or at the end of the ETS download. The values being sent will correspond to the status KLIC-DA LT was aware of before the voltage recovery, or those assigned by default in the case of a start-up after an ETS download.

3 ETS PARAMETERISATION

To begin with the parameterisation process of the KLIC-DA interface it is necessary, after launching the ETS program, to import the database of the product (**KLIC-DA LT** application program).

Next, the device should be added to the project. 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 how to parameterise the different functionalities of the device in ETS.

3.1 DEFAULT CONFIGURATION

This section shows the default configuration the device configuration starts from. Note that no communication objects are enabled by default, so the device topology will show up empty.

Regarding the parameter window, only one main tab (“General”) is shown, containing one sub-tab called **Configuration**.

The following section describes all the parameters available under Configuration.

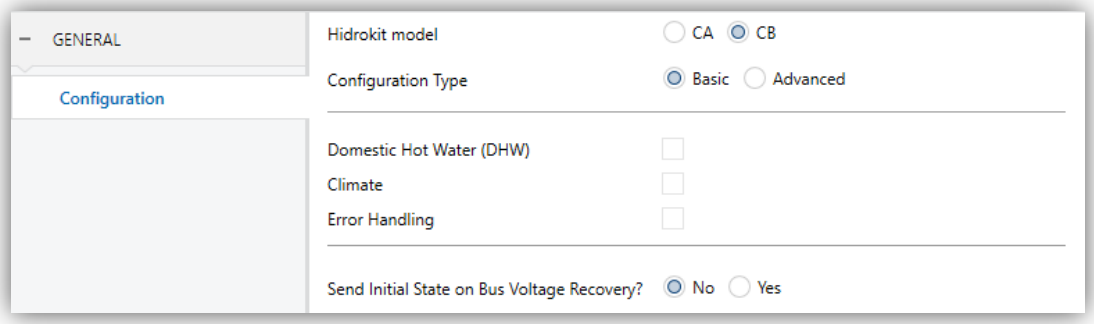


Figure 4. The "Configuration" parameter window, under "General".

3.1.1 CONFIGURATION

First of all, it is necessary to set the **Hidrokit model** type that will be controlled, which may be one of the following:

- **CB model**, selected by default.
- **CA model**.

Next, it is necessary to define the desired **Configuration Type**, which can be one of the following:

- **Basic**, selected by default. This mode permits enabling and making use of the following options:
  - **Domestic Hot Water (DHW)**, which enables or disables the DHW function. See section 3.1.1.1.
  - **Climate**, which enables or disables the room climate function. See section 3.1.1.2.
  - **Error Handling**, which enables or disables the error monitoring function. See section 3.1.1.3.
- **Advanced**. While all of the above will still remain available, this mode brings a few more options:

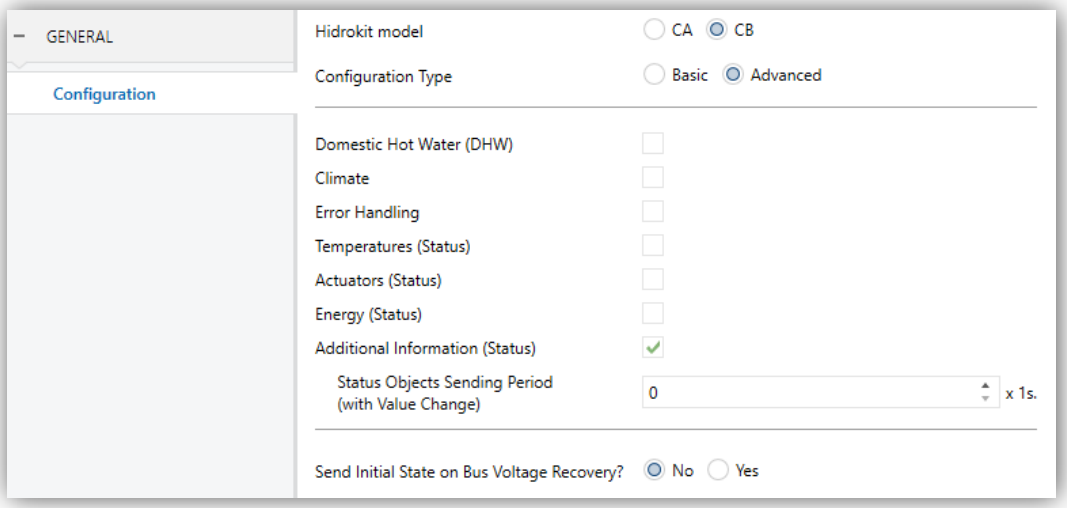


Figure 5. Advanced Configuration Type

- **Temperatures (Status)**, which enables or disables the supervision of various temperature indicators. See section 3.1.1.4

- **Actuators (Status)**, which enables or disables the supervision of various indicators related to the operational condition of the actuators (pump, compressor, etc.) in the Altherma LT system. See section 3.1.1.5.

- **Energy (Status)**, which enables or disables the supervision of various indicators related to the power consumption/production. See section 3.1.1.6

- **Additional Information (Status)**, which enables or disables the supervision of the water flow. See section 3.1.1.7

Whenever one of these objects is enabled, a new parameter called **Status Objects Sending Period (with Value Change)** will show up, making it possible to configure the period (0 to 120 seconds) between the consecutive sendings of these indicators. See Figure 5.

Depending on the Altherma LT system type being interfaced, the checkboxes of the required functions need to be marked. This will make some communication objects visible, as described in the following sections of this user manual.

One more parameter should be configured: **Send Status Objects on Bus Voltage Recovery?**, which may be set to one of the following:

- **No** (default): no objects will be sent to the KNX bus during the device start-up after a bus power failure or a download from ETS.

- **Yes**: the following objects will be sent to the KNX bus (to update other KNX devices) when the device starts up after a bus power failure, a download from ETS or after a reset of Altherma LT system:

  - [DHW] On/Off (Status).
  - [DHW] Booster mode On/Off (Status).
  - [DHW] Temperature (Status).
  - [DHW] Operating (Status).
  - [Climate] On/Off (Status).
  - [Climate] Operation Mode (Status).

- [Climate] Temperature (Status).
- [Climate] Operating (Status).
- [Temperatures] DHW Tank.
- [Temperatures] Outdoor Temperature.
- [Temperatures] Leaving Water.
- [Temperatures] Leaving Water (PHE).
- [Temperatures] Inlet Water.
- [Temperatures] Refrigerant.
- [Actuators] Pump.
- [Actuators] Compressor.
- [Actuators] BUH: Step 1.
- [Actuators] BUH: Step 2.
- [Energy] Consumption – Total.
- [Energy] Production – Total.
- [Addit. Info.] Flow rate.

Only for CB models:

- [Energy] Consumption – Climate: Cooling.
- [Energy] Consumption – Climate Heating.
- [Energy] Consumption – DHW.
- [Energy] Production – Climate: Cooling.
- [Energy] Production – Climate Heating.
- [Energy] Production – DHW.

It is possible to apply a certain delay (0 to 255 seconds) to the above sending once the device start-up is over. Therefore, a new parameter called **Sending Delay** will show if the above is set to "Yes".

Regarding the **start-up of the device**, it is advisable to read section 2.5, as it contains details on how the interaction between KLIC-DA LT and the Altherma LT system starts.

3.1.1.1 DOMESTIC HOT WATER

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available:

- **[DHW] On/Off**: one-bit object that will make KLIC-DA LT turn on the DHW function if a "1" is received from the KNX bus, while one "0" will make it turn the function off.

- **[DHW] Booster Mode On/Off**: one-bit object that will make KLIC-DA LT switch on the Booster mode of the DHW tank if a "1" is received from the KNX bus, while one "0" will make it turn this mode off.

  Note: *the commands to activate/deactivate the Booster mode are only sent if the DHW function is active*.

- **[DHW] Temperature**: two-byte object that sets the desired setpoint temperature for the DHW tank. In case the value received through this object exceeds the **maximum** temperature set in the main user interface, KLIC-DA LT will truncate it and send the Altherma LT system the maximum permitted setpoint. On the other hand, in case the value is under the **minimum** permitted value, the Altherma LT system itself will truncate it and apply the minimum setpoint value, notifying afterwards the effective change to KLIC-DA LT.

- **[DHW] On/Off (Status)**: one-bit object that reflects whether the DHW function is on (value "1") or off (value "0").

- **[DHW] Booster Mode On/Off (Status)**: one-bit object that reflects whether the Booster Mode is currently on (value "1") or off (value "0").

- **[DHW] Temperature (Status)**: two-byte object that reflects the current setpoint temperature of the DHW tank.

- **[DHW] Operating (Status)**: one-bit object that shows whether the Domestic Hot Water tank is in operation (value "1") or not (value "0"). Note that the tank will never be in operation if the DHW function itself has not been turned on.

Whenever the Altherma LT system notifies a status change, the corresponding **status object** will be automatically sent by KLIC-DA LT to the KNX bus.

3.1.1.2 CLIMATE

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available:

- **[Climate] On/Off**: one-bit object that will make KLIC-DA LT turn on the climate control function when a “1” is received from the KNX bus, while one “0” will make it turn the climate control function off.

- **[Climate] Operation Mode**: one-bit object that will make KLIC-DA LT switch the current operation mode of the climate system to **Cooling** (value “0”) or to **Heating** (value “1”).

  Note: *although available from the main user control, the “automatic” mode cannot be activated from KLIC-DA LT. If a mode switch order is received from the KNX bus, KLIC-DA LT will ensure that the automatic mode gets deactivated in the climate system.*

- **[Climate] Temperature**: two-byte object that sets the desired setpoint temperature for the climate system. In case the value received through this object exceeds the allowed setpoint range, the Altherma LT system itself will truncate it to the minimum or maximum values, notifying afterwards the effective change to KLIC-DA LT.

- **[Climate] On/Off (Status)**: one-bit object that reflects whether the climate system is currently on (value “1”) or off (value “0”).

- **[Climate] Operation Mode (Status)**: one-bit object that reflects the currently active operation mode (“0” = Cooling; “1” = Heating), no matter if the automatic mode has been set or not from the main user control.

- **[Climate] Temperature (Status)**: two-byte object that reflects the current setpoint temperature of the climate system.

- **[Climate] Operating (Status)**: one-bit object that shows whether the climate system is in operation (value “1”) or not (value “0”).

Whenever the Altherma LT system notifies a status change, the corresponding **status object** will be automatically sent by KLIC-DA LT to the KNX bus.

3.1.1.3 ERROR HANDLING

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available:

- **Communication Error**: one-bit object that reflects whether there are (value "1") or not (value "0") any errors in the communication with the P1/P2 bus. This type of error may be due to an interruption of the communication with the main user control (i.e., more than three seconds –after the initial communication sequence– with no reception of valid frames addressed to the additional control), or to the existence of multiple additional controls in the P1/P2 bus (KLIC-DA is supposed to replace the additional control).

  Note: *if two or more additional user controls are found to exist in the P1/P2 bus, KLIC-DA LT will report a communication error and will then require that the Altherma LT system is switched off prior to removing the unneeded additional control. Note that once it has been removed and the Altherma LT system is back on, it is also* ***necessary to restart KLIC-DA LT*** *to clear the communication error* and make it send the value "0" to the KNX bus.

- **Malfunction**: one-bit object that reflects whether Altherma LT itself has informed about a malfunction in the system (value "1"). When such situation is over, or if no malfunction has been reported by the Altherma LT system, this object will have the value "0".

- **Malfunction code**: 14-byte object to report the malfunction code that wired control provides when a malfunction takes place in Altherma LT system.

Whenever any of the above objects changes its value, KLIC-DA LT will automatically send it to the KNX bus.

Note: *in case of having a malfunction that prevents the measurement of the values which are visualized in wired control, these measurements will be displayed without a specific value ("--,-"). However, a high negative value will be received through the bus. Due to its inconsistency, implicitly notifies that a malfunction related with this measurement is taking place.*

3.1.1.4 TEMPERATURES (STATUS)

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available:

- **[Temperatures] DHW Tank**: two-byte object that reflects the current temperature of the DHW tank, as reported by the Altherma LT system.
- **[Temperatures] Inlet Water**: two-byte object that that reflects the current temperature of the inlet water flow, as reported by the Altherma LT system.
- **[Temperatures] Leaving Water**: two-byte object that reflects the current temperature of the leaving water flow, as reported by the Altherma LT system.
- **[Temperatures] Leaving Water (PHE)**: two-byte object that reflects the current temperature of the plate heat exchanger (PHE) leaving water flow, as reported by the Altherma LT system.
- **[Temperatures] Outdoor Temperature**: two-byte object that reflects the current outdoor temperature, as reported by the Altherma LT system.
- **[Temperatures] Refrigerant**: two-byte object that reflects the current temperature of the refrigerant, as reported by the Altherma LT system.

Whenever the Altherma LT system notifies a temperature change, KLIC-DA LT will automatically send the corresponding object to the KNX bus, meeting in any case the configuration of the minimum period between sendings.

3.1.1.5 ACTUATORS (STATUS)

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available:

- **[Actuators] BUH: Step 1**: one-bit object that reflects the status of the Backup Heater Step 1 (“1” = turned on; “0” = turned off).
- **[Actuators] BUH: Step 2**: one-bit object that reflects the status of the Backup Heater Step 2 (“1” = turned on; “0” = turned off).

- **[Actuators] Compressor**: one-bit object that reflects the status of the compressor ("1" = turned on; "0" = turned off).

- **[Actuators] Pump**: one-bit object that reflects the status of the pump ("1" = turned on; "0" = turned off).

Whenever the Altherma LT system notifies a change in the status of the above actuators, KLIC-DA LT will automatically send the corresponding object to the KNX bus, meeting in any case the configuration of the minimum period between sendings.

3.1.1.6 ENERGY (STATUS)

No additional parameter configuration is required for this function.

If enabled, the following communication objects will be available for both, CA models and CB models of the Altherma LT system:

- **[Energy] Consumption - Total**: four-byte object that reflects the total energy consumption (in kWh) till now, as reported by the Altherma LT system.

- **[Energy] Production - Total**: four-byte object that reflects the total energy production (in kWh) till now, as reported by the Altherma LT system.

Additionally, for the CB models the following communication objects will be available:

- **[Energy] Consumption – Climate: Cooling**: four-byte object that reflects the total energy consumption (in kWh) to date in the cooling circuit, as reported by the Altherma LT system.

- **[Energy] Consumption – Climate: Heating**: four-byte object that reflects the total energy consumption (in kWh) to date in the heating circuit, as reported by the Altherma LT system.

- **[Energy] Consumption – DHW**: four-byte object that reflects the total energy consumption (in kWh) to date in the DHW circuit, as reported by the Altherma LT system.

- **[Energy] Production – Climate: Cooling**: four-byte object that reflects the total energy production (in kWh) to date in the cooling circuit, as reported by the Altherma LT system.

- **[Energy] Production – Climate: Heating**: four-byte object that reflects the total energy production (in kWh) to date in the heating circuit, as reported by the Altherma LT system.

- **[Energy] Production – DHW**: four-byte object that reflects the total energy production (in kWh) to date in the DHW circuit, as reported by the Altherma LT system.

Whenever the Altherma LT system notifies a change in the status of the above indicators, KLIC-DA LT will automatically send the corresponding object to the KNX bus, meeting in any case the configuration of the minimum period between sendings.

Note: *these indicators are not updated when its status changes. In order to have these energy values updated, a request must be done from wired control of Altherma LT system.*

3.1.1.7 ADDITIONAL INFORMATION (STATUS)

No additional parameter configuration is required for this function. If enabled, the following communication object will be available:

- **[Addit. Info.] Flow Rate**: two-byte object that reflects the current water flow rate (in litres per hour, according to the KNX standard; note that the actual user interface of the Altherma LT system may use other units), as reported by the Altherma LT system.

Whenever the Altherma LT system notifies a change in the status of the above indicator, KLIC-DA LT will automatically send the corresponding object to the KNX bus, meeting in any case the configuration of the minimum period between sendings.

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 -	DPT_Switch	0/1	[DHW] On/Off	Turn On/Off DHW Tank
1	1 Bit	I	C - - W -	DPT_Switch	0/1	[DHW] Booster Mode On/Off	Turn On/Off DHW Tank Booster Mode
2	2 Bytes	I	C - - W -	DPT_Value_Temp	-273.0 - 670760.0	[DHW] Temperature	DHW Tank Setpoint Temperature
3	1 Bit	I	C - - W -	DPT_Switch	0/1	[Climate] On/Off	Turn On/Off Climate Control
4	1 Bit	I	C - - W -	DPT_Heat_Cool	0/1	[Climate] Operation Mode	Set: 0=Cooling; 1=Heating
5	2 Bytes	I	C - - W -	DPT_Value_Temp	-273.0 - 670760.0	[Climate] Temperature	Leaving Water Setpoint Temperature
6	1 Bit	O	C T R - -	DPT_Switch	0/1	[DHW] On/Off (Status)	Status of DHW Tank (On/Off)
7	1 Bit	O	C T R - -	DPT_Switch	0/1	[DHW] Booster Mode On/Off (Status)	Status of DHW Tank Booster Mode (On/Off)
8	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[DHW] Temperature (Status)	Current DHW Tank Setpoint Temperature
9	1 Bit	O	C T R - -	DPT_Bool	0/1	[DHW] Operating (Status)	0=Not Operating; 1=Operating
10	1 Bit	O	C T R - -	DPT_Switch	0/1	[Climate] On/Off (Status)	Status of Climate Control (On/Off)
11	1 Bit	O	C T R - -	DPT_Heat_Cool	0/1	[Climate] Operation Mode (Status)	Current Mode: 0=Cooling; 1=Heating
12	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Climate] Temperature (Status)	Current Leaving Water Setpoint Temperature
13	1 Bit	O	C T R - -	DPT_Bool	0/1	[Climate] Operating (Status)	0=Not Operating; 1=Operating
14	1 Bit	O	C T R - -	DPT_Alarm	0/1	Malfunction	0=No Malfunction; 1=Malfunction
15	14 Bytes	O	C T R - -	16.xxx		Malfunction Code	Malfunction Code
16	1 Bit	O	C T R - -	DPT_Alarm	0/1	Communication Error	0=No Error; 1=Error
17	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] DHW Tank	Current DHW Tank Temperature
18	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] Outdoor Temperature	Current Outdoor Temperature
19	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] Leaving Water	Current Leaving Water Temperature
20	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] Leaving Water (PHE)	Current Leaving Water (Plate Heat Exchanger) Temp.
21	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] Inlet Water	Current Inlet Water Temperature
22	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.0 - 670760.0	[Temperatures] Refrigerant	Current Refrigerant Temperature
23	1 Bit	O	C T R - -	DPT_Switch	0/1	[Actuators] Pump	Status of Pump (On/Off)
24	1 Bit	O	C T R - -	DPT_Switch	0/1	[Actuators] Compressor	Status of Compressor (On/Off)
25	1 Bit	O	C T R - -	DPT_Switch	0/1	[Actuators] BUH: Step 1	Status of BackUp Heater: Step 1 (On/Off)
26	1 Bit	O	C T R - -	DPT_Switch	0/1	[Actuators] BUH: Step 2	Status of BackUp Heater: Step 2 (On/Off)
27	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Consumption - Total	Electrical Energy Consumption to Date
28	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Consumption - Climate: Cooling	Electrical Energy Consumption to Date

29	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Consumption - Climate: Heating	Electrical Energy Consumption to Date
30	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Consumption - DHW	Electrical Energy Consumption to Date
31	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Production - Total	Energy Production to Date
32	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Production - Climate: Cooling	Energy Production to Date
33	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Production - Climate: Heating	Energy Production to Date
34	4 Bytes	O	C T R - -	DPT_ActiveEnergy_kWh	-2147483648 - 2147483647	[Energy] Production - DHW	Energy Production to Date
35	2 Bytes	O	C T R - -	DPT_Value_Volume_Flow	-671088.64 - 670760.96	[Addit. Info.] Flow Rate	Current Water Flow Rate

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