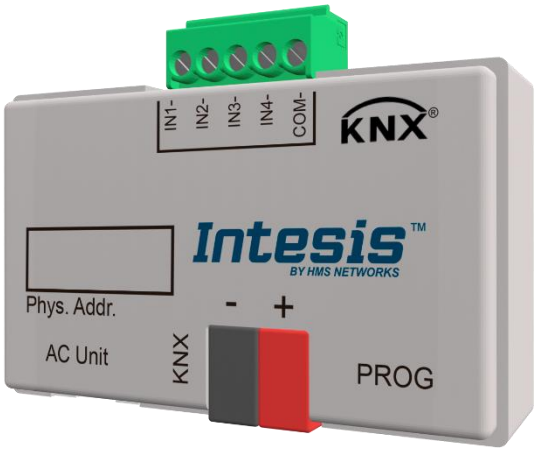
Gateway for integration of Fujitsu air conditioners into KNX TP-1 (EIB) control systems

Compatible with RAC and VRF systems commercialized by Fujitsu

Application's Program Version: 1.0

USER MANUAL

Issue date: 10/2020 r1.0 ENGLISH



Important User Information

Disclaimer

The information in this document is for informational purposes only. Please inform HMS Industrial Networks of any inaccuracies or omissions found in this document. HMS Industrial Networks disclaims any responsibility or liability for any errors that may appear in this document.

HMS Industrial Networks reserves the right to modify its products in line with its policy of continuous product development. The information in this document shall therefore not be construed as a commitment on the part of HMS Industrial Networks and is subject to change without notice. HMS Industrial Networks makes no commitment to update or keep current the information in this document.

The data, examples and illustrations found in this document are included for illustrative purposes and are only intended to help improve understanding of the functionality and handling of the product. In view of the wide range of possible applications of the product, and because of the many variables and requirements associated with any particular implementation, HMS Industrial Networks cannot assume responsibility or liability for actual use based on the data, examples or illustrations included in this document nor for any damages incurred during installation of the product. Those responsible for the use of the product must acquire sufficient knowledge in order to ensure that the product is used correctly in their specific application and that the application meets all performance and safety requirements including any applicable laws, regulations, codes and standards. Further, HMS Industrial Networks will under no circumstances assume liability or responsibility for any problems that may arise as a result from the use of undocumented features or functional side effects found outside the documented scope of the product. The effects caused by any direct or indirect use of such aspects of the product are undefined and may include e.g. compatibility issues and stability issues.

Gateway for integration of Fujitsu air conditioners into KNX TP-1 (EIB) control systems.

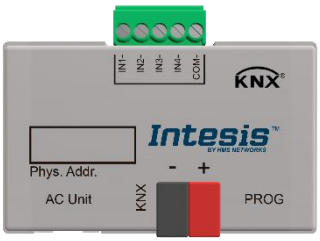
Compatible with RAC and VRF systems commercialized by Fujitsu.

Application's Program Version: 1.0

ORDER CODE	LEGACY ORDER CODE
INKNXFGL001I000	-

INDEX

1. Presentation



INKNXFGL001I000 allows a complete and natural integration of Fujitsu air conditioners with KNX control systems.

Compatible with RAC and VRF models commercialized by Fujitsu.

Main features:

- Reduced dimensions, quick installation.
- Multiple objects for control and status (bit, byte…) with KNX standard datapoint types.
- Up to 4 binary inputs with internal link to functionalities or other purposes.
- Status objects for every control available.
- Control of the AC unit based in the ambient temperature read by the own AC unit, or in the ambient temperature read by any KNX thermostat.
- AC unit can be controlled simultaneously by the IR remote control of the AC unit and by KNX.
- Setpoint temperature limits can be modified in real time.
- Up to 10 timed scenes can be saved and executed from KNX, fixing the desired combination of Operation Mode, Setpoint temperature, Fan Speed, Vane Position and Remote Controller Lock in any moment by using a simple switching.
- Advanced AC functionality: power mode, eco mode, sleep, additional heat & cool signals.
- Smart AC integration: occupancy function, window contact.
- Total Control and Monitoring of the AC unit from KNX, including monitoring of AC unit's state of internal variables, running hours counter (for filter maintenance control), and error indication and error code.

2. Connection

The interface includes a connection cable for the direct connection to the internal control board of the AC indoor unit.

- Connection of the interface to the AC indoor unit:

Disconnect mains power from the AC unit. Open the front cover of the indoor unit in order to have access to the internal control board. In the control board locate the socket connector marked as:

CN65

Using the cable included with the interface, insert one of its connectors, the one installed in the shortest uncovered part, into the socket of the INKNXFGL001I000 marked as **AC Unit**, and the other connector, the one in the largest uncovered part, into the socket **CN65** of the AC unit's control board. Fix the INKNXFGL001I000 inside or outside the AC indoor unit depending on your needs, remember that INKNXFGL001I000 must be also connected to the KNX bus. Close the AC indoor unit's front cover again.

⚠ ***Important***: Do not modify the length of the cable supplied with the interface, it may affect to the correct operation of the interface

- Connection of the interface to the KNX bus:

Disconnect power of the KNX bus. Connect the interface to the KNX TP-1 (EIB) bus using the KNX standard connector (red/grey) of the interface, respect polarity. Reconnect power of the KNX bus.

- Connections diagram:

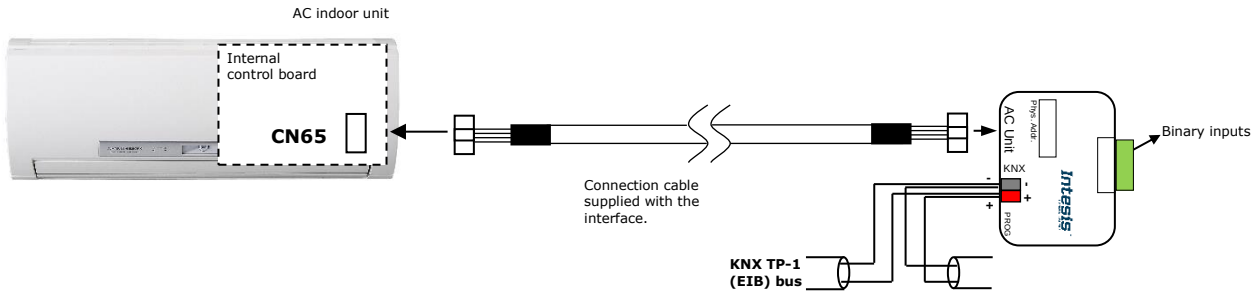


Figure 2.1 Connection diagram

3. Configuration and setup

This is a fully compatible KNX device which must be configured and setup using standard KNX tool ETS.

ETS database for this device can be downloaded from:

https://www.intesis.com/products/ac-interfaces/knx-gateways/fujitsu-rac-vrf-knx

⚠ ***Important**: Do not forget to select the correct settings of AC indoor unit being connected to the INKNXFGL001I000. This is in "Parameters" of the device in ETS.*

4. ETS Parameters

In this section we will describe all the ETS parameters available for the product. To check the communication objects available go to **8 APPENDIX A – COMMUNICATION OBJECTS TABLE**.

Consider that KNX objects are grouped in different folders to make easier finding the right objects. All objects are included inside the folder were the setting is located. For instance, heartbeat objects are included in GENERAL folder as Heartbeat parameter is included inside GENERAL menu. It applies for all settings except for the Use ambient temperature from KNX as, as temperature objects, they are included inside TEMPERATURE folder.

4.1 General dialog

The first section we find in the ETS database is the general section:

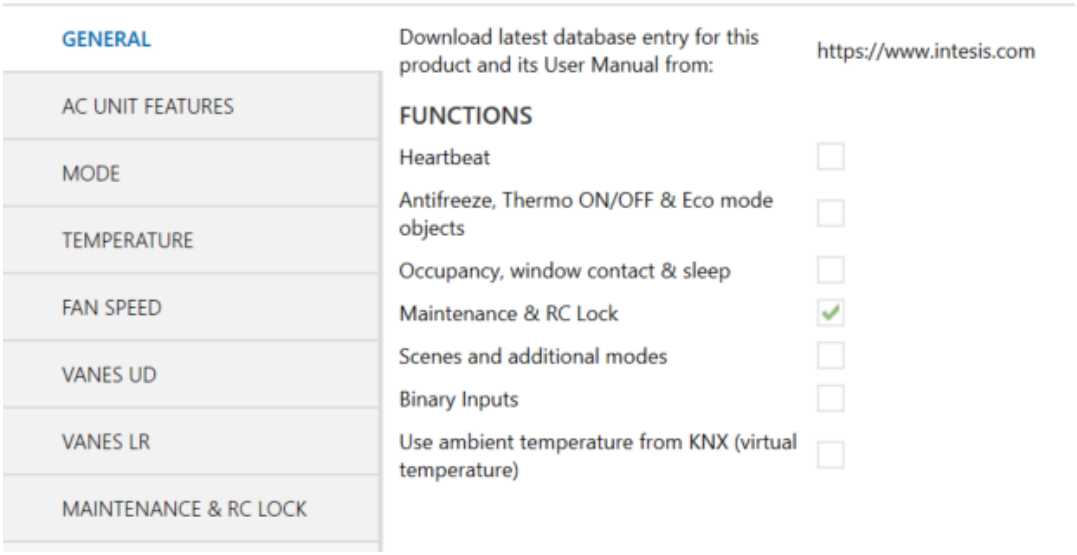


Figure 4-1 General parameters section

At the top of the section we can see an installation scheme. This is a wiring scheme indicating the port connection. To carry on with the interface connection, follow the instructions available in **2 CONNECTION**.

Inside this parameter's dialog is possible to activate or deactivate the following functions:

4.1.1 Heartbeat

Activating this parameter will enable a new status object to periodically notify "device is alive" in a 1-bit signal to the KNX bus. It is possible to define the notification period between 1 and 255 minutes.

The value of the bit notification is 1.

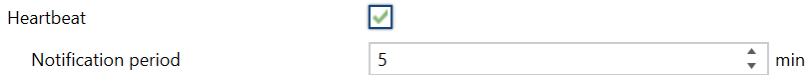


Figure 4-2 Heartbeat parameters

4.1.2 Antifreeze, Thermo ON/OFF & Eco mode objects

Activating this setting will provide new control & status objects to activate and deactivate these functions for the Fujitsu AC unit.

4.1.3 Occupancy, window contact & sleep

Activating this checkbox will show new configuration menus: *WINDOW CONTACT*, *OCCUPANCY* and *SLEEP.*

See **4.7 WINDOW CONTACT**, **4.8 OCCUPANCY** and **4.9 SLEEP** for more information.

4.1.4 Maintenance & RC lock

Activating this checkbox will show a new configuration menu *MAINTENANCE & RC LOCK.*

See **4.10 MAINTENANCE & RC LOCK** for more information.

4.1.5 Scenes and additional modes

Activating this checkbox will show a new configuration menu *SCENES & ADDITIONAL MODES.*

See **4.11 SCENES & ADDITIONAL MODES** for more information.

4.1.6 Binary inputs

Activating this checkbox will show a new configuration menu *BINARY INPUTS.*

See **4.12 BINARY INPUTS** for more information.

4.1.7 Use temperature from KNX (Virtual Temperature)

Activate this parameter to use a KNX temperature probe sensor (normally in KNX thermostat) to be used as a reference temperature for the AC control loop.

Consider that virtual temperature modifies the user desired setpoint temperature, normally the one set in the KNX thermostat located in the room, to the best setpoint in the AC to get the user desired response in AC unit. For this reason, virtual temperature function cannot be used in parallel with a different AC control as IR, wired RC nor centralized control if these controls imply varying the AC setpoint.

Activating this function will provide us different objects (in ETS, find them in TEMPERATURE folder). We will add a description of all the temperature objects in this table, including those which are permanently available:

Available	Object name	Function
Always	Control_Setpoint_Temperature	Control object to receive the user setpoint temperature for the AC unit.
When using VT	Control_KNX_Ambient_Temperature	This control object is offered to receive the ambient temperature measured on KNX, usually from KNX thermostat
Always	Status_Setpoint_Temperature	Status object that reports the current real setpoint set in the AC unit.
When using VT	Status_User_Setpoint_Temperature (for KNX thermostat feedback)	This status object is provided to report the user setpoint temperature received in object Control_Setpoint_Temperature. When Virtual Temperature is active, this is the feedback for the KNX thermostat.
Always	Status_AC_Reference_Temperature*	Status object that reports the ambient temperature that the AC unit is measuring. Usually, measured in the return path.
When using VT	Status_ON/OFF_Virtual_Temperature	This binary status object indicates if the virtual temperature function is active or not.

*Considerations for *Status_AC_Reference_Temperature* object:

#1 Fujitsu General cannot guarantee the *Status_AC_Reference_Temperature* object value is consistently equal to the current actual room temperature.
#2 The *Status_AC_Reference_Temperature* is only allowed for displaying, it cannot be used for controlling other equipment.

So, basically, it is possible to perform two different controls regarding the ambient temperature in use for the AC unit control:

Ambient temperature took from the own AC unit (checkbox not active):

In this case, the user sets the temperature setpoint in ***Control_Setpoint_Temperature*** object and can use the object ***Status_Setpoint_Temperature*** for the KNX thermostat feedback. In addition, when AC setpoint is modified from a different control (IR or wired RC, centralized controller, etc.), this object will be updated with the new setpoint temperature set by the user.

Object ***Status_AC_Reference_Temperature*** reports the ambient temperature in use by the AC unit, which is measured by the AC system. Depending on the installation, may be the temperature of the return path probe or the temperature measured in the wired remote controller. This object must be used only for informative reasons.

Ambient temperature provided from KNX thermostat, Virtual Temperature (checkbox active):

As in the previous case, the user sets the temperature setpoint in ***Control_Setpoint_Temperature*** object but, now, this temperature is not directly sent to the AC; the Intesis interface will adapt this temperature to take into consideration the room temperature measured by the KNX temperature probe, which is received in object ***Control_KNX_Ambient_Temperature.***

Again ***Status_AC_Reference_Temperature*** has the same behaviour than in the previous case.

So Virtual Temperature considers all these three temperatures:

- The KNX user setpoint temperature (***Control_Setpoint_Temperature***)
- The KNX ambient temperature (***Control_KNX_Ambient_Temperature***)
- The AC return temperature (***Status_AC_Reference_Temperature***)

to calculate the appropriate setpoint temperature for the AC unit.
This calculated setpoint temperature is provided to KNX in object ***Status_Setpoint_Temperature***, which always reports the real setpoint in AC unit, in other words, the setpoint the AC is using at any time.

On the other hand, the user unaltered setpoint temperature, the one that the user set in the KNX thermostat and received by the interface in ***Control_Setpoint_Temperature*** object, is provided in object ***Status_User_Setpoint_Temperature (for KNX thermostat feedback)***, which should be used as a feedback for the KNX thermostat. Remember that Virtual Temperature must remain not visible for the end user.

Finally, we can now if Virtual Temperature is active or not using ***Status_ON/OFF_Virtual_Temperature***, which will help us to identify if the setpoint temperature is being modified by this function or not.

We can see the Virtual Temperature in this example:

Given the current situation:

- The KNX user setpoint temperature (***Control_Setpoint_Temperature***) = 25ºC
- The KNX ambient temperature (***Control_KNX_Ambient_Temperature***) = 21ºC
- The AC return temperature (***Status_AC_Reference_Temperature***) = 23ºC

The interface will do the following:
1st: Translating the setpoint temperature desired by the user into a temperature difference. To do this, we know in the room there are two temperatures:

- The KNX user setpoint temperature (***Control_Setpoint_Temperature***) = 25ºC
- The KNX ambient temperature (***Control_KNX_Ambient_Temperature***) = 21ºC

So basically, the user desires 4 degrees over the current temperature in the room.

2nd: transferring the room temperature difference to AC unit. To do this, now the interface considers the temperature measured in the AC system:

- The AC return temperature (***Status_AC_Reference_Temperature***) = 23ºC

And applies the previous temperature difference over this temperature so the real setpoint in AC unit is:

23ºC + 4ºC = 27ºC (4 degrees **over** the current temperature measured by the AC unit).

Let's suppose than after a few minutes, the situation changes to the following one:

- The KNX user setpoint temperature (***Control_Setpoint_Temperature***) = 25ºC
- The KNX ambient temperature (***Control_KNX_Ambient_Temperature***) = 22ºC
- The AC return temperature (***Status_AC_Reference_Temperature***) = 23ºC

So now, in the room there are 3ºC degrees difference (25ºC-22ºC) and that is applied to the AC unit setpoint, sending 26ºC now (23ºC + 3ºC). This is permanently updated by the interface and will stop when the desired user setpoint temperature and the temperature measured in the room by the KNX thermostat are very close and then the difference is null.

In this example we considered the AC is working in heating mode, but the process is the same for the AC working in cooling mode.

All this process can be translated into the following formula to calculate the appropriate setpoint temperature for the AC unit:

"Real AC Setp. Temp." = "AC Ambient Temp" - ("KNX Ambient Temp." - "KNX Setp. Temp.")

4.2 AC unit features

This section must be configured according to the AC capabilities or features.
Depending on the AC unit connected to the interface, it might be possible that the unit doesn't have all the operation modes, fan speeds, vanes up/down or vanes left/right positions available and these limits must be transfer to the KNX configuration.
There are two ways to retrieve this information from the AC to set the configuration in the KNX interface:

1. Using the AC manufacturer original documentation. This way, it will be possible to know the real capabilities and features of the AC unit by reading the AC manufacturer documentation.
2. When the integration involves an AC unit that has been previously installed, using the original AC manuals is not an easy task so instead is possible to use the original AC

remote controller and check the different settings available in the wired or infrared remote controller for:

a. Operation mode (AUTO/HEAT/COOL/FAN/DRY)
b. Fan speed (AUTO/QUIET/LOW/MED-LOW/MED/MED-HIGH/HIGH)
c. VANES U/D (if available/SWING/1 to 4 positions)
d. VANES L/R (if available/SWING/1 to 5 positions)

⚠ The configuration done in this section will affect to the communication objects available and will vary the ranges or values available. Let's see different examples:

Disabling HEAT available will not show the 1-bit HEAT mode control/status communication object and setting HEAT in 1-byte operation mode object will have no effect over the AC unit.
Configuring 3 fan speeds (independent to which are enabled) will show only 3 1-bit object to control and get the status of the fan speed and also will vary the different ranges for the 1-byte communication object for the control and the status of the fan speed, adapting the communication object to control 3 fan speeds.

Find all fan speeds, vanes U/D and vanes L/R ranges and values available in 1byte objects in **7 FAN SPEED, VANES U/D & L/R VALUES ACCORDING TO AC UNIT FEATURES**.

4.3 Mode

In this menu is possible to set all the settings regarding to the operation mode:

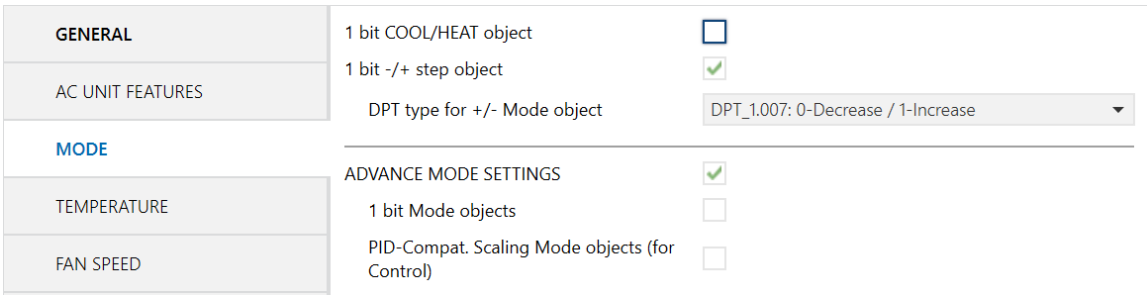


Figure 4-3 Mode parameters

- **1 bit COOL/HEAT object**: this setting enables a 1-bit communication object to change between cool (0) and heat (1).
- **1 bit –/+ step object**: this setting enables a 1-bit communication object to change along the different operation modes available. It is possible to set the polarity of the object:
  - **DPT 1.007**: 0-DECREASE / 1-INCREASE
  - **DPT 1.008**: 0-UP / 1-DOWN
  - **Both** (to enable both objects at the same time)

  The sequence followed when using this object is shown below:

- Up / Increase
- Down / Decrease

ADVANCE MODE SETTINGS:

- **1-bit Mode objects**: it will enable control and status communication objects for the different modes available in the AC unit.

- **PID-compat. Scaling Mode objects (for control)**: this setting enables two different communication objects to make the AC unit compatible with traditional thermostats, normally intended for fancoil, underfloor or radiators systems. Controlling the AC unit with these objects doesn't require to use the ON/OFF and the operation mode objects at the same time.

4.4 Temperature

In this menu it is possible to set all the settings regarding to the temperature:

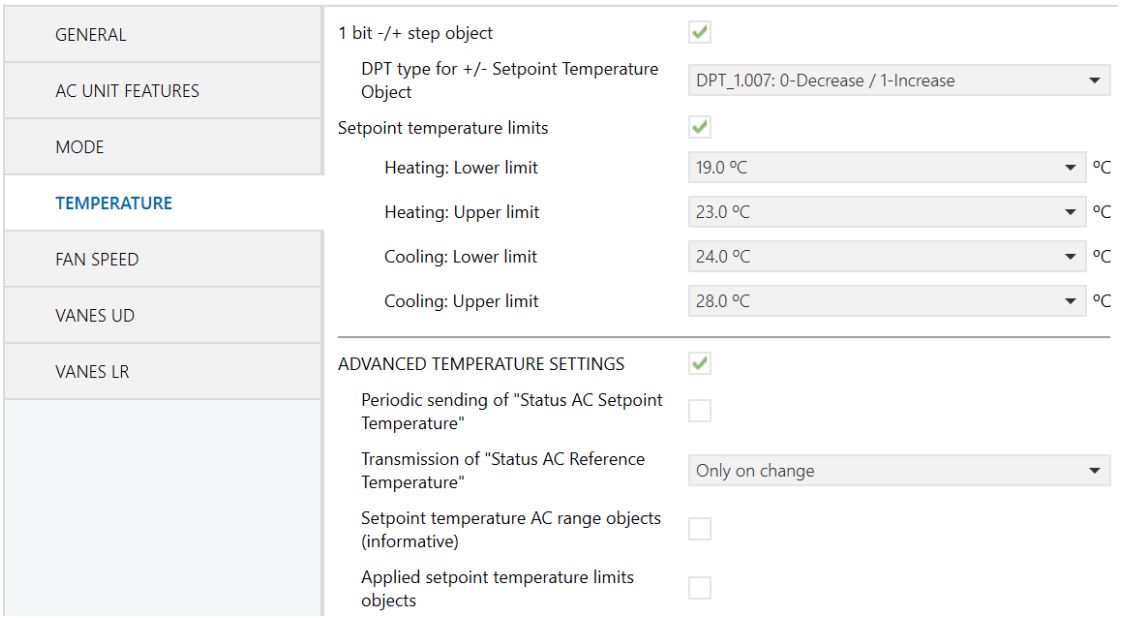


Figure 4-4 Temperature parameters

- **1 bit –/+ step object**: this setting enables a 1-bit communication object to change the temperature setpoint by increasing/decreasing the current temperature value. It is possible to set the polarity of the object:
  - **DPT 1.007**: 0-DECREASE / 1-INCREASE
  - **DPT 1.008**: 0-UP / 1-DOWN
  - **Both** (to enable both objects at the same time)
- **Setpoint temperature limits**: this setting allows to limit the setpoint temperature. It can be defined in the parameters section and will make available communication objects to change the limits in real time.

ADVANCED TEMPERATURE SETTINGS

- **Periodic sending of "Status AC Setpoint Temperature"**: this setting allows to set a periodical sending of the status setpoint temperature between 10 to 3600s.
- **Transmission of "Status AC Reference Temperature"**: it sets a periodical sending for the Status_AC_Reference_Temperature object. Three options:
  - **Only cyclically** and is possible to set between 10 and 3600 seconds.
  - **Oncly on change.**
  - **Both,** with again the option of setting the sending period for the cyclical sending.
- **Setpoint temperature AC range objects (informative):** it enables two new communication objects: Status_Min/Max_AC_Range_Setpoint_Temperature. These objects inform us about the maximum and minimum setpoint temperature allowed by the AC unit.
- **Applied setpoint temperature limits objects:** it enables two status objects Status_Min/Max_Applied_Setpoint_Temperature which report the setpoint temperature limits currently in use. Basically, these objects report the more restrictive temperature limits between the Setpoint temperature AC range, and the Setpoint Temperature Limits set configured or set by the user.

4.5 Fan Speed

In this menu is possible to set all the settings regarding to the fan speed:

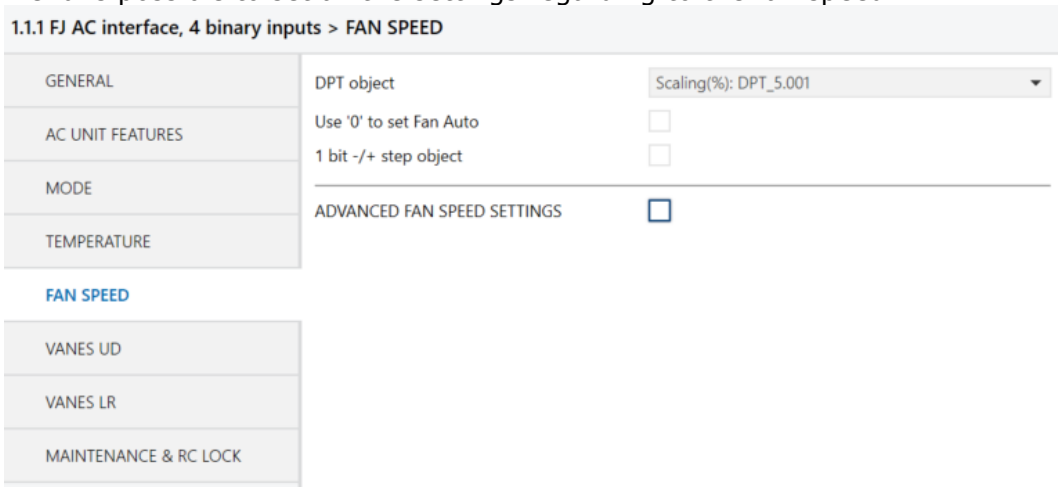


Figure 4-5 Fan speed parameters

- **DPT object**: it sets the DPT object between the followings:
  - **Scaling (%)** DPT: 5.001.
  - **Enumerated** DPT: 5.010/5.100
  - **Both:** to make both objects available at the same time.
- Use "0" to set Fan Auto: by activating this checkbox, receiving 0 in the previous 1 byte objects will set the FAN SPEED AUTO.
- **1 bit –/+ step object**: this setting enables a 1-bit communication object to change the fan speed by increasing/decreasing the current fan speed. Is possible to set the polarity of the object:
  - **DPT 1.007**: 0-DECREASE / 1-INCREASE
  - **DPT 1.008**: 0-UP / 1-DOWN
  - **Both** (to enable both objects at the same time)

ADVANCE FAN SPEED SETTINGS:

- **1-bit Fan Speed objects**: it will enable control and status communication objects for the different fan speeds available in the AC unit.

4.6 Vanes UD & vanes LR

In these menus is possible to set all the settings regarding to the vanes UD and LR settings. The settings available are the same for both type of vanes:

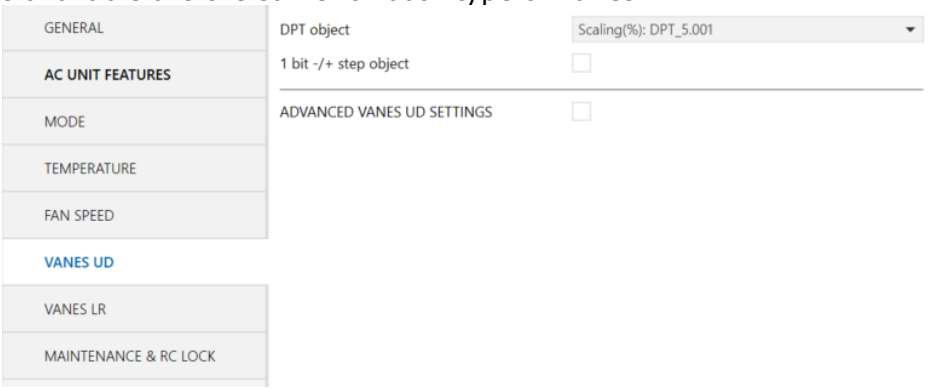


Figure 4-6 Vanes UD parameters

- **DPT object**: it sets the DPT object between the followings:
  - **Scaling (%)** DPT: 5.001.
  - **Enumerated** DPT: 5.010.
  - **Both:** to make both objects available at the same time.

- **1 bit –/+ step object**: this setting enables a 1-bit communication object to change the vanes position by increasing/decreasing the current position. Is possible to set the polarity of the object:
  - **DPT 1.007**: 0-DECREASE / 1-INCREASE
  - **DPT 1.008**: 0-UP / 1-DOWN
  - **Both** (to enable both objects at the same time)

ADVANCE VANES UD/LR SETTINGS:

- **1-bit Vanes UD/LR objects**: it enables control and status communication objects for the different vanes UD/LR available in the AC unit.

4.7 Window contact

Window contact menu is activated in **4.1.3 OCCUPANCY, WINDOW CONTACT & SLEEP**. Activating this function will show the following parameters:

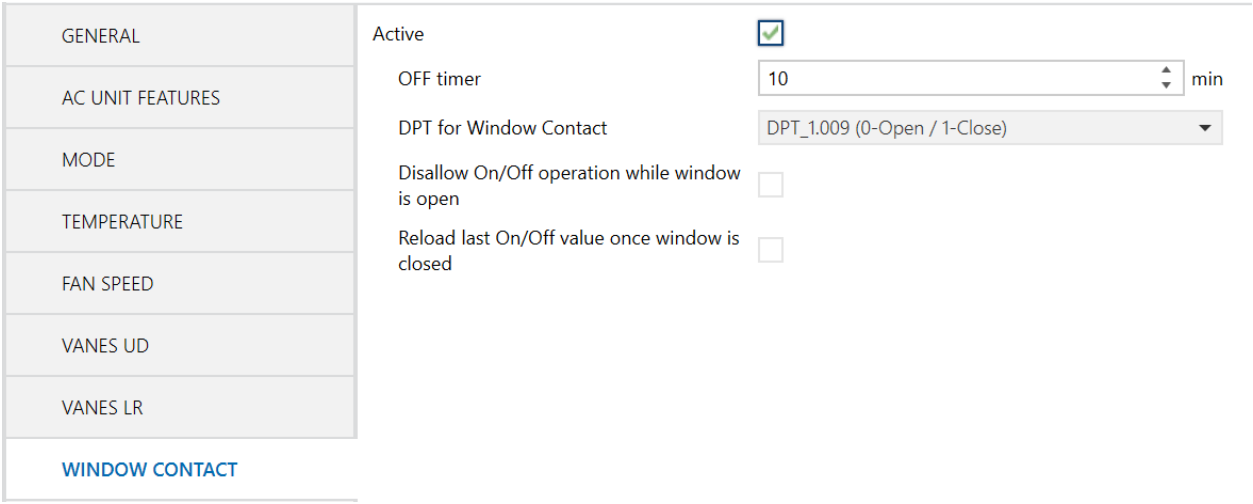


Figure 4-7 Window contact parameters

OFF timer defines the time between closing the window and performing the defined action. It can be set between 0 and 255 minutes.

DPT for Window contact defines the window open/close values:

- DPT 1.009 uses 0 OPEN | 1 CLOSE
- DPT 1.019 uses 0 CLOSE | 1 OPEN

It is possible to enable both objects at the same time.

Disallow On/Off operation while window contact is open will ignore any "ON" command received while the window is open.

Reload last On/Off value once window is closed will recover the previous on/off status of the AC unit once the user closes the window. It is possible to set the maximum period to recover the on/off status between 0 (always recover) and 65535 minutes. This timer starts when the window is open.

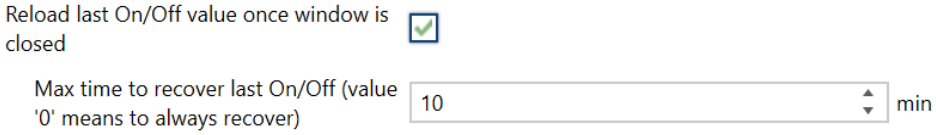


Figure 4-8 Reload last value settings

4.8 Occupancy

Occupancy menu is activated in **4.1.3 OCCUPANCY, WINDOW CONTACT & SLEEP**.

Activating this function will show the following parameters:

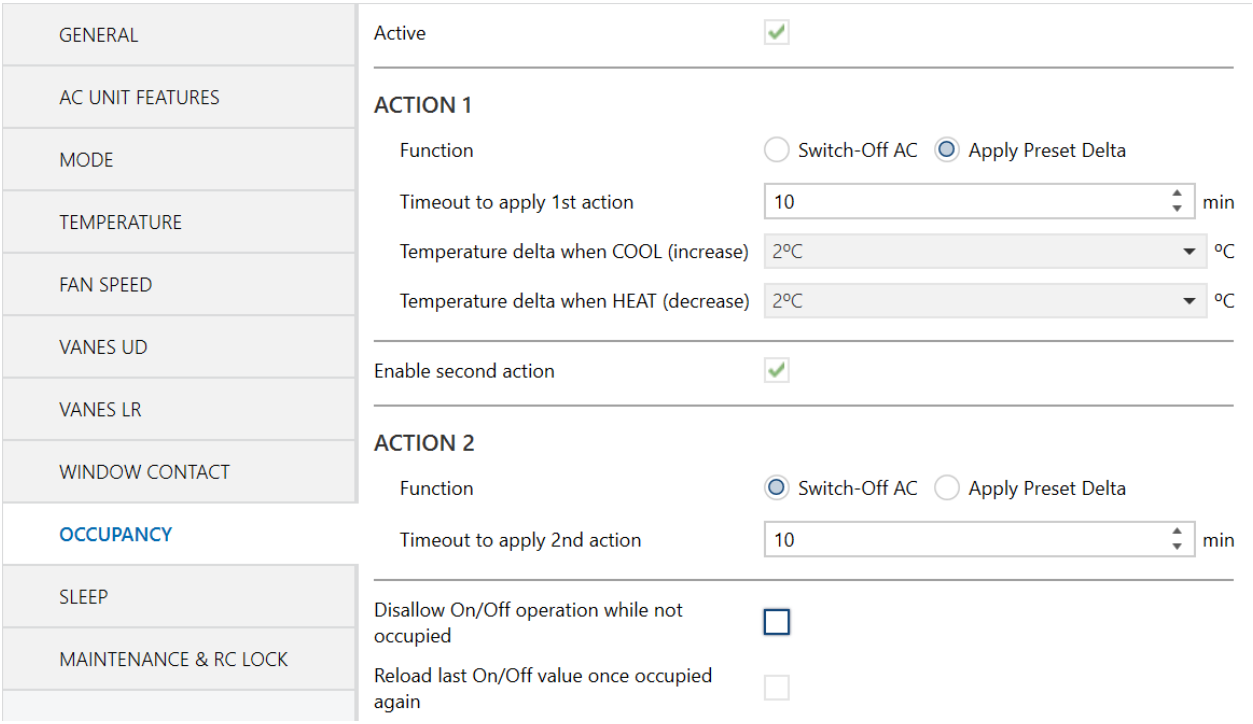


Figure 4-9 Occupancy parameters

ACTION 1
It is possible to define the first action here. The first action can be chosen between Switch-Off AC and Apply Preset Delta.

The next parameter sets the timeout to apply the first action between 0 and 255 minutes.

Finally, set the temperature delta to relax the setpoint temperature for COOL (increase) and HEAT (decrease).

ACTION 2
If the first action was selected as Apply Preset Delta, it is possible to define a secondary action. The timeout of the second action will start after the first timeout lasts. All its parameters are the same than ACTION 1.

Disallow On/Off operation while not occupied will ignore any "ON" command received while the room is not occupied.

Reload last On/Off value once occupied again will recover the previous on/off status of the AC unit once the room is occupied again. It is possible to set the maximum period to recover the on/off status between 0 (always recover) and 65535 minutes. This timer starts when the room is empty.

4.9 Sleep

Sleep menu is activated in **4.1.3 OCCUPANCY, WINDOW CONTACT & SLEEP**.
Activating this function will show the following parameter:

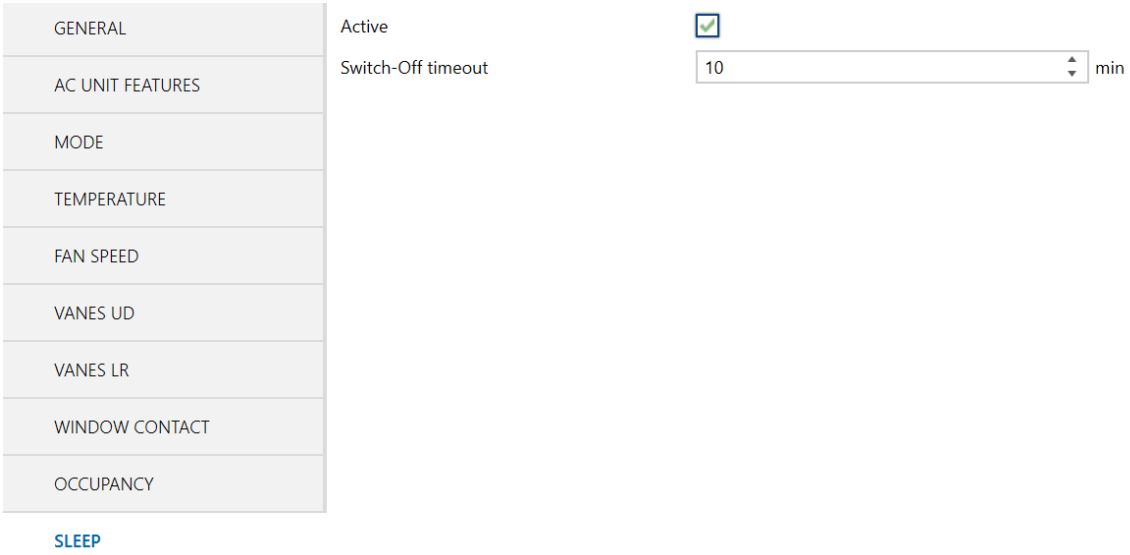


Figure 4-10 Sleep parameters

Switch-Off timeout is the time to switch off the AC unit. It is possible to define this number between 0 and 255 minutes.

4.10 Maintenance & RC lock

Maintenance & RC lock menu is activated in **4.1.4 MAINTENANCE & RC LOCK**.
Activating this function will show the following parameter:

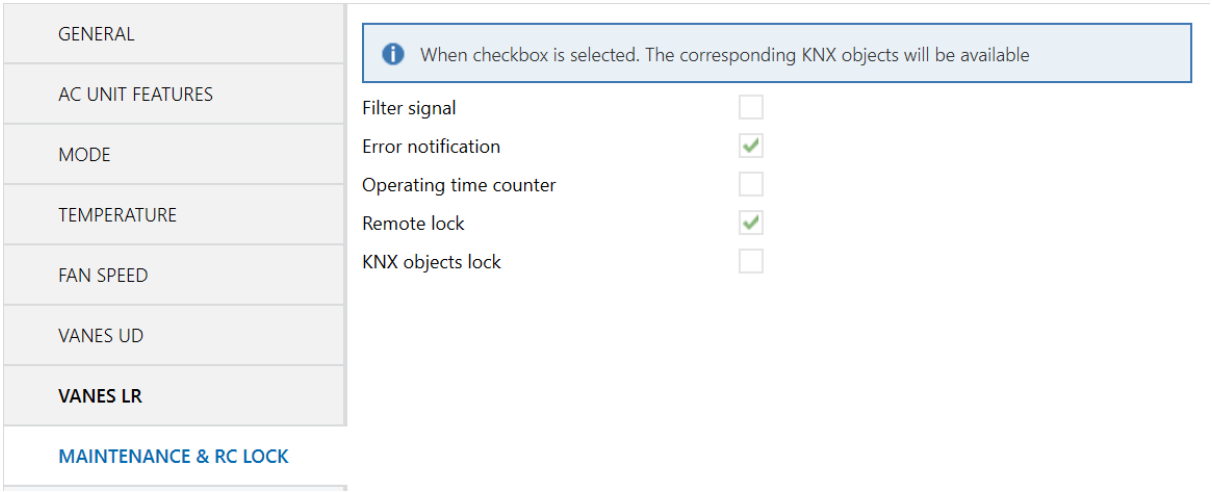


Figure 4-11 Maintenance & RC lock parameters

The functions we will find in this menu are the following:

4.10.1 Filter signal

This checkbox activates the filter signal communication objects for control and status.

4.10.2 Error notification

This checkbox activates the error communication objects. We can find different error objects:

- 1bit status object to report if there is an error in the system.
- 2bytes status object which reports the error code.
- 14bytes status object character string type with the error code.

4.10.3 Operating time counter

This checkbox activates the operating time communication objects for control and status:

- 2bytes control object to set the starting operating time hours.
- 4bytes control object to set the starting operating time seconds.
- 2bytes status object which is periodically updated with the operating time hours.
- 4bytes status object which is periodically updated with the operating time seconds.

Both status objects are periodically updated every new hour.

4.10.4 Remote lock

This checkbox activates the remote lock objects for control and status.
Consider that locking the remote control means that:

- No control is available from the AC wired remote controller. In this case, a padlock icon should be visible in the AC wired remote controller.
- Sometimes is not possible to use the AC lock (no padlock icon over the AC wired remote controller) or an infrared remote controller is in use. In this case, any action performed from the remote controllers will be overwritten from the gateway to hold the status according to the KNX side.

4.10.5 KNX control lock

This checkbox activates the KNX control lock objects for control and status.
Locking the KNX control objects means ignoring any action received from the KNX side to the following control objects:

- ON/OFF
- MODE
- FAN SPEED
- SETPOINT TEMPERATURE
- VANE POSITION UD
- VANE POSITION LR
- KNX AMBIENT TEMPERATURE
- ANTIFREEZE OPERATION
- THERMOSTAT ON/OFF
- ECO MODE

4.11 Scenes & additional modes

Scenes & additional modes menu is activated in **4.1.5 SCENES AND ADDITIONAL MODES.**
In this section it is necessary to define the number of scenes or functions. Once the number of scenes plus functions is defined, it is possible to set the scene number and a description text.

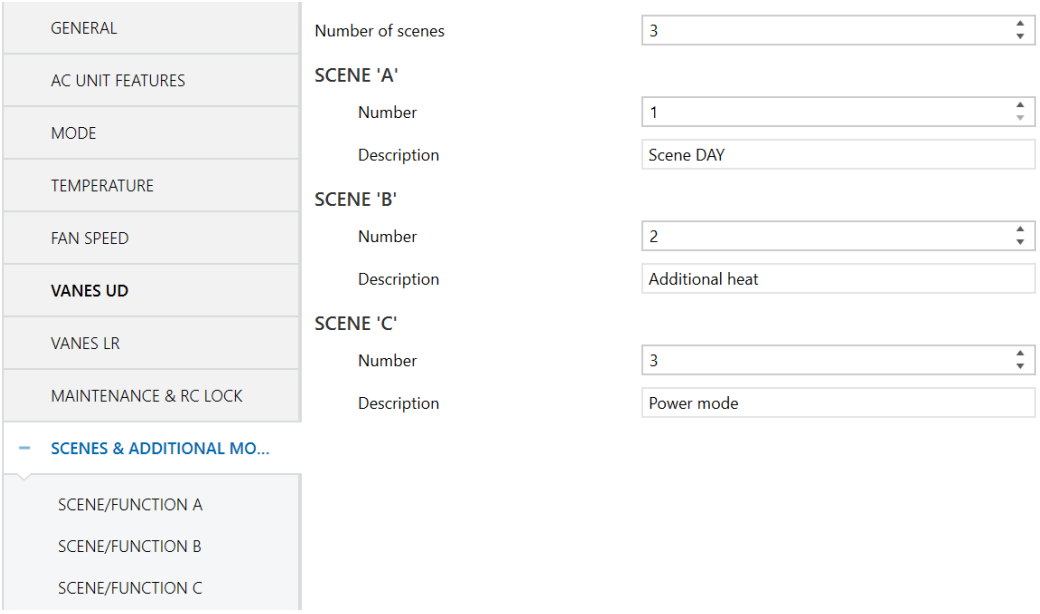


Figure 4-12 Scene & additional modes parameters

The first thing is to set the number of scenes and additional functions that will be in use for the project. The additional functions available are:

- Power mode
- Eco mode
- Additional heat
- Additional cool

After setting de number of scene or functions, set the scene number and description, we can continue to set he different scenes/functions parameters.

4.11.1 Scene/function A to F

It is possible to define different settings here:

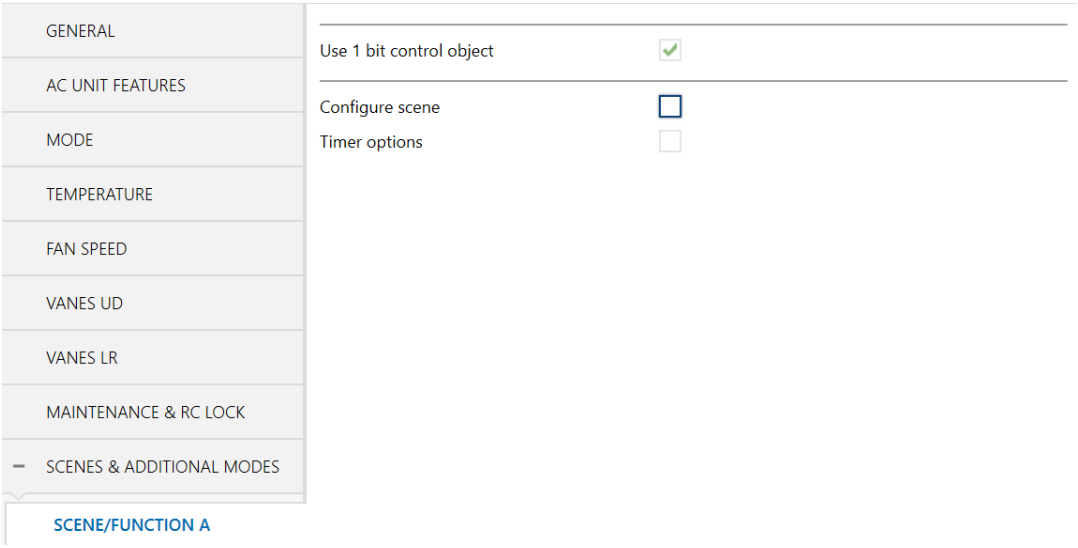


Figure 4-13 Scene/function A to F

4.11.1.1 Use 1bit control object

This setting will enable 1bit object to execute the function or scene.

4.11.1.2 Configure function

When this setting is not activated, the function can be stored in runtime modifiable via communication objects.
When this setting is activated, the configured scene or function is fixed and cannot be changed in real time.
The settings that can be modified via scene are the following ones:

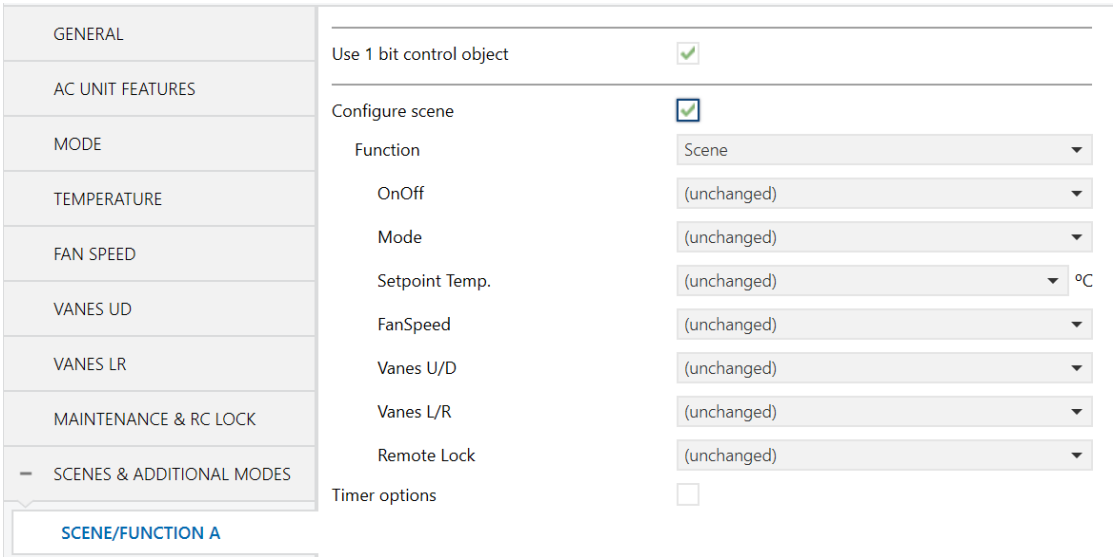


Figure 4-14 Configure scene parameters

Apart of selecting a scene, it is possible to configure different functions which are Power mode, Eco mode, additional heat and additional cool.

Power mode

It is possible to set a power mode function and define the fan speed and the temperature delta increase or decrease.

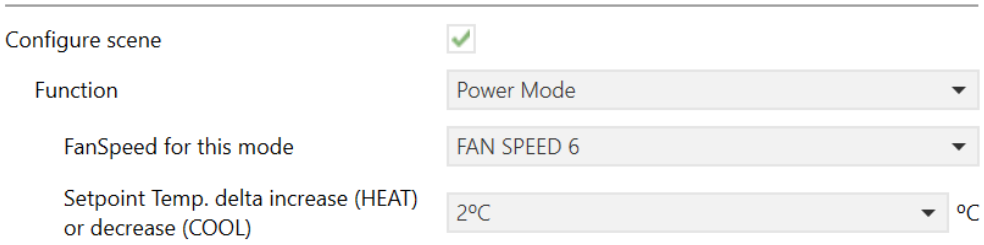


Figure 4-15 Power mode parameters

Eco mode

It is possible to set an eco-mode function and define the fan speed and the temperature delta relax decrease or increase.

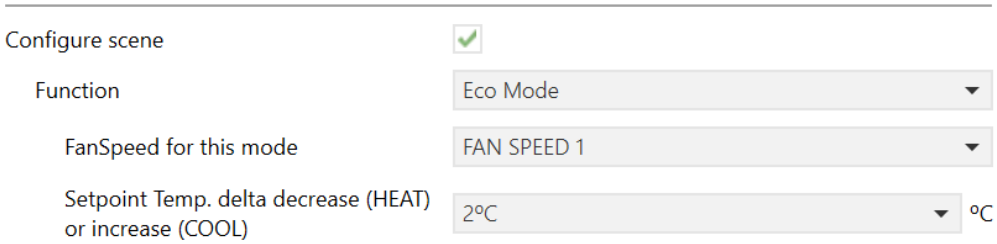


Figure 4-16 Eco mode parameters

Additional heat

It is possible to configure an additional heat function and define the setpoint and fan speed for the additional heat mode.

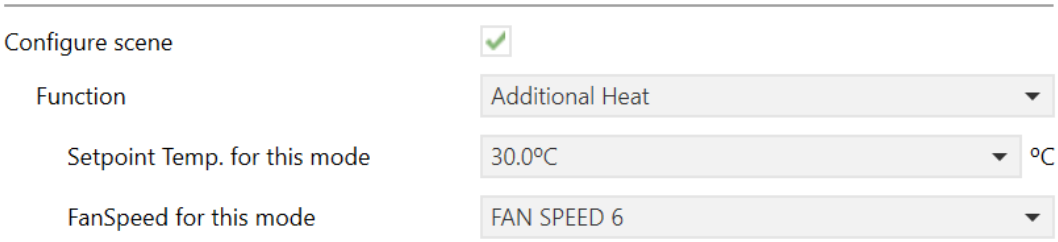


Figure 4-17 Additional heat parameters

Additional cool

It is possible to configure an additional cool function and define the setpoint and fan speed for the additional heat mode.

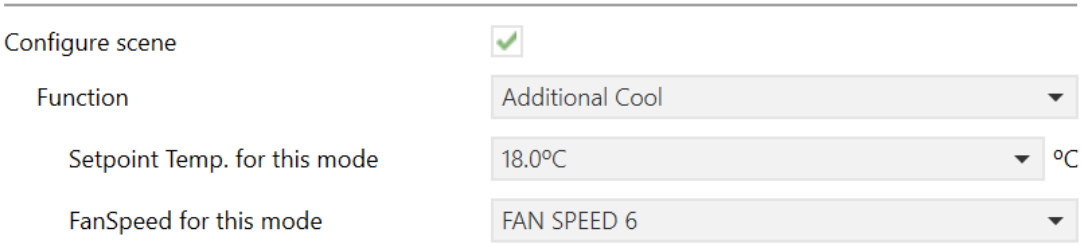


Figure 4-58 Additional cool parameters

4.11.1.3 Timer options

In addition to these settings, is possible to set two different timers which affects to the scene execution:

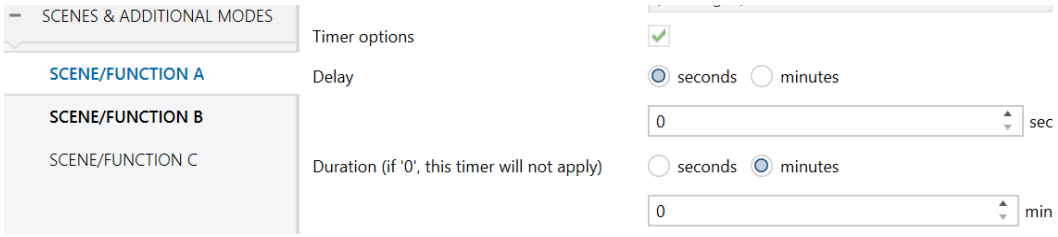


Figure 4-19 Function timer options parameters

- **Delay** is the time which lasts between the execute scene command and the execution of the scene. Setting 0 in this delay means imminent execution -not delayed-.
- **Duration** is the time while the scene will be executed. Once the duration time expires, the AC will recover the previous status. Setting 0 in this time means endless, a permanent change when the scene is executed.

4.12 Binary inputs

Binary inputs menu is activated in **4.1.6 BINARY INPUTS.**
The first thing is activating the binary inputs from 1 to 4 which will be used in the project:

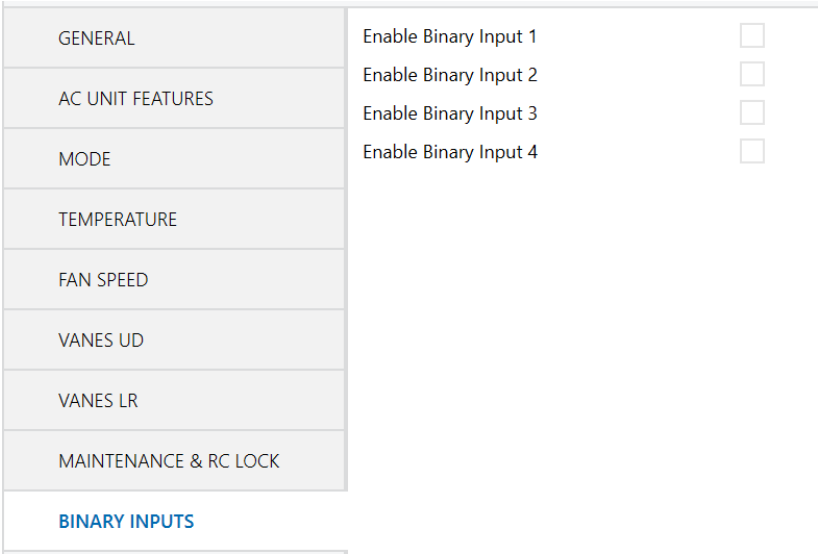


Figure 4-20 Binary inputs parameters

Activating any input will show the object *Status_Input x Active* which reports the physical binary status (loop close/open) at any time. This object remains active regardless the binary input configuration.

Moving to the parameters of one binary input, the settings available are the following:

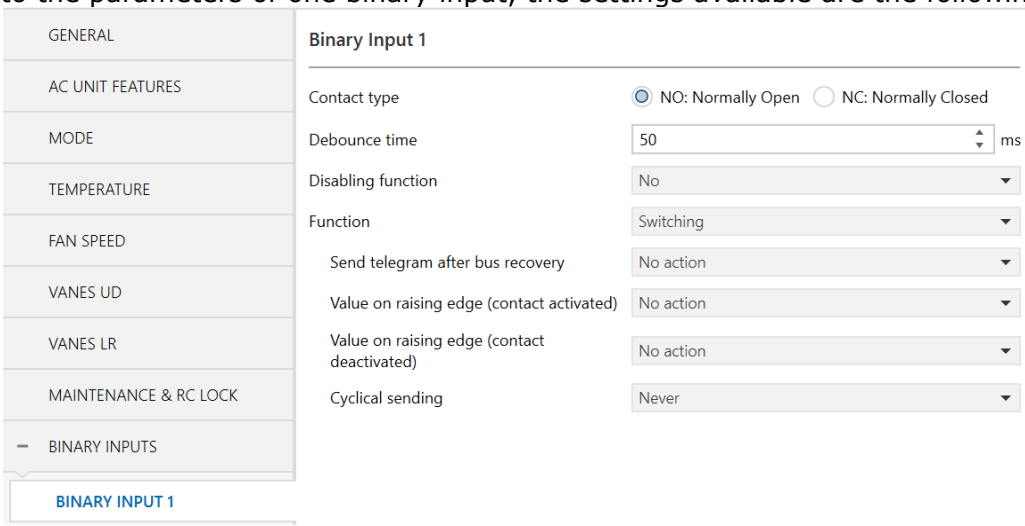


Figure 4-21 Binary input X parameters

4.12.1 Contact type

This parameter set the type of the binary input between Normally open or Normally closed.

4.12.2 Debounce time

This parameter sets the debounce time (in milliseconds) that will be applied to the input.

4.12.3 Disabling function

This parameter shows/hides the control and status disabling communication objects. These objects can disable the input. It is possible to set the polarity of the object.

- DPT 1.002 uses 0 ENABLE | 1 DISABLE
- DPT 1.003 uses 0 DISABLE | 1 ENABLE

4.12.4 Function

This parameter sets the function of the binary input between:

- Switching
- Dimming
- Shutter/Blind
- Value
- Function/scene (internal)
- Occupancy (internal)
- Window Contact (internal)

4.12.4.1 Switching

The parameters for a switch are:

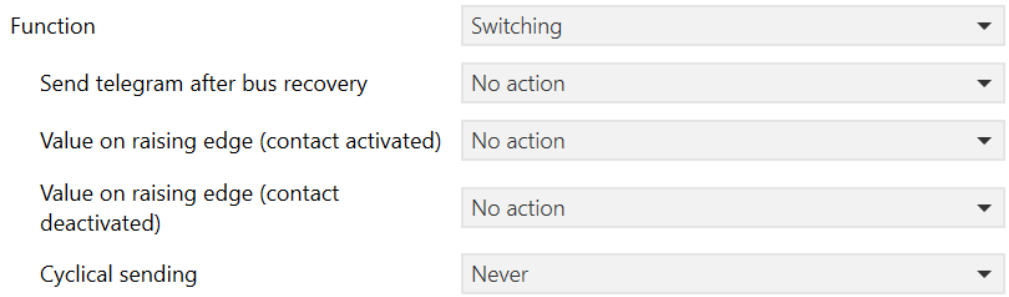
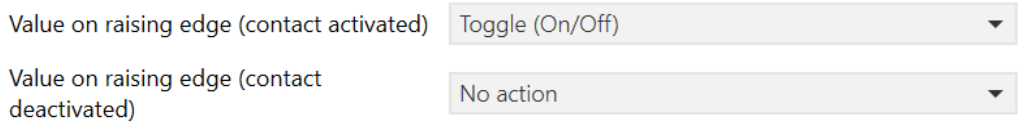


Figure 4-22 Switch parameters

- **Send telegram after bus recovery:** This parameter allows to update the input status after a KNX bus recovery, and the type of telegram sent. It is also possible to set a delay for the telegram sending between 0 to 255 seconds. The actions are:
  - On
  - Off
  - Current status
  - No action
- **Value on raising edge (contact activated)** and **value on falling edge (contact deactivated)**: these settings define the behavior of the input between:
  - On
  - Off
  - Toggle (On/Off)
  - No action

To configure a push button with a toggle function (on/off switching) simply configure one of the two actions as a toggle (On/Off) and do not define a action for the other. For example:



- **Cyclical sending:** it is possible to set a cyclical sending of the value to the KNX bus, between 1 to 65535 seconds. It is possible to choose between these settings:
  - When output value is On
  - When output value is Off
  - Always
  - Never

4.12.4.2 Dimming

The parameters for a dimmer input are:

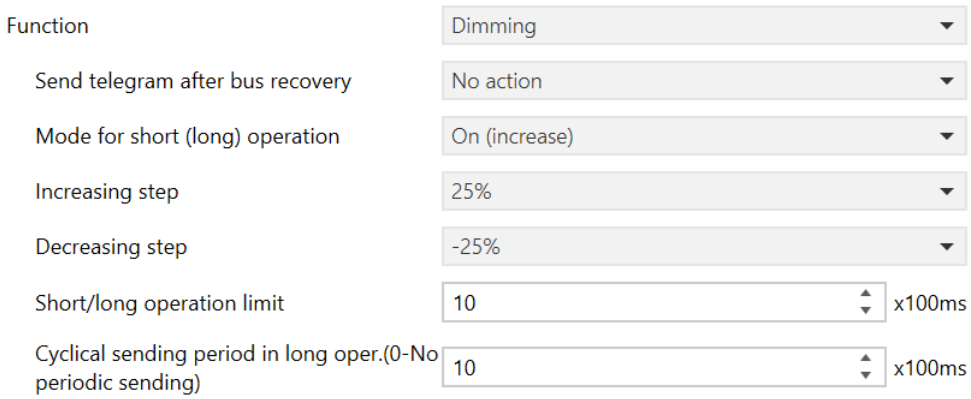


Figure 4-63 Dimming parameters

- **Send telegram after bus recovery:** This parameter allows to update the input status after a KNX bus recovery, and the type of telegram sent. It is also possible to set a delay for the telegram sending between 0 to 255 seconds. The actions are:
  - On
  - Off
  - No action
- **Dimming action:** This parameter sets the dimmer function between:
  - On (short) + increase (long)
  - Off (short) + decrease (long)
  - Toggle: On/Off (short) + increase/decrease (long)
- **Increasing /decreasing step**: this setting defines the step for the long dimmer operation. The steps available are:
  - 1,56%
  - 3,13%
  - 6,25%
  - 12,50%
  - 25%
  - 50%
  - 100%
- **Short/long operation limit**: this setting defines the time to distinguish between the short and long actions. It is possible to set between 1 to 255 (x100ms).
- **Cyclical sending period in ling operation (0-No periodic sending)**: it defines the periodicity of the relative dimming action (long press). It is possible to set a value between 1 to 255 (x100ms). Setting 0 means no periodical sending.

4.12.4.3 Shutter/blind

The parameters for a shutter/blind input are:

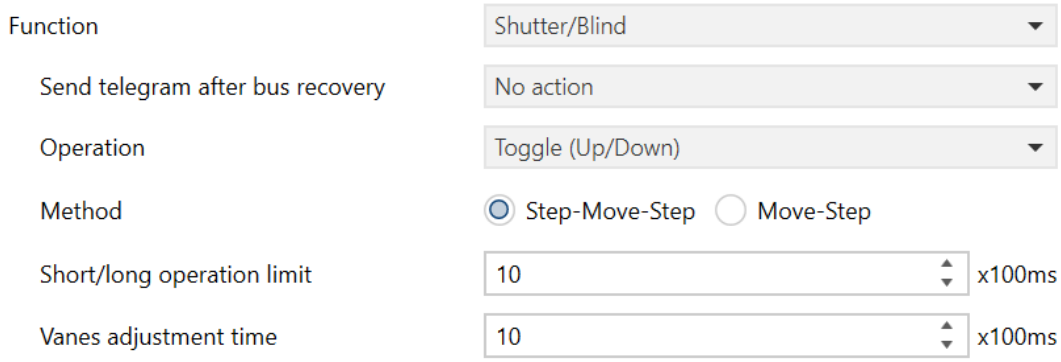


Figure 4-74 Shutter/blind parameters

- **Send telegram after bus recovery:** This parameter allows to update the input status after a KNX bus recovery, and the type of telegram sent. It is also possible to set a delay for the telegram sending between 0 to 255 seconds. The actions are:
  - Move up
  - Move down
  - No action
- **Operation:** This parameter sets the shutter/blind function between:
  - Up
  - Down
  - Toggle (up/down)
- **Method**: this parameter sets the method for the shutter/blind control between:
  - Step-move-step
  - Move-step
- **Short/long operation limit**: this setting defines the time to distinguish between the short and long actions. It is possible to set between 1 to 255 (x100ms).
- **Vanes adjustment time**: it defines the vanes timer for the vanes. It is possible to set a time between 1 to 255 (x100 ms).

4.12.4.4 Value

The parameters for a value input are:

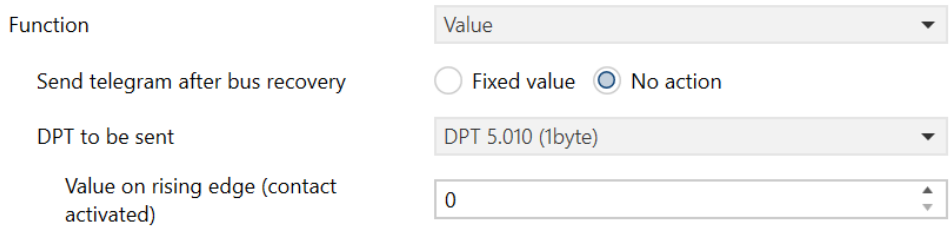


Figure 4-25 Value parameters

- **Send telegram after bus recovery:** This parameter allows to update the input status after a KNX bus recovery, and the type of telegram sent. It is also possible to set a delay for the telegram sending between 0 to 255 seconds. The actions are:
  - Fixed value
  - No action
- **DPT to be sent:** This parameter defines the DPT to send using this function. The different options are:
  - DPT 5.010 (1byte):
  - DPT 7.001 (2bytes)
  - DPT 8.001 (2bytes)
  - DPT 9.001 (2bytes)
  - DPT 12.001 (4bytes)
- **Value on rising edge (contact activated):** This parameter defines the value to send depending on the DPT selected in the previous setting. The different rages are:
  - DPT 5.010 (1byte): 0 - 255
  - DPT 7.001 (2bytes): 0 - 65535
  - DPT 8.001 (2bytes): -32768 - 32767
  - DPT 9.001 (2bytes): -2730 - 32767
  - DPT 12.001 (4bytes): 0 - 4294967295

4.12.4.5 Function/scene (internal)

The parameters for a function/scene (internal) input are:

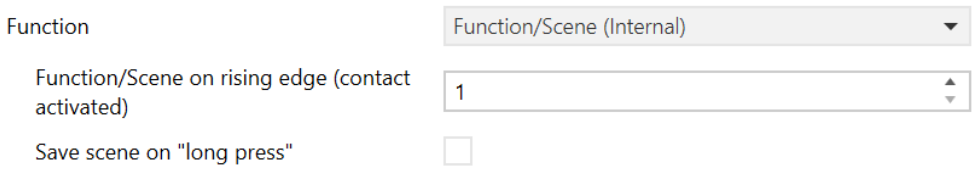


Figure 4-26 Function/scene (internal) parameters

Configuring the input as function/scene (internal) will internally link the input action to a configured function/scene. Consider that the function must be configured to apply the action configured in the scene.
The parameters are:

- **Function/Scene on rising edge (contact activated):** This parameter defines the function/scene number to link the input.
- **Save scene on long press:** if the function/scene can be stored from the KNX side, activating this checkbox will allow sending the correspondent saving telegram with a long press. In addition, it is possible to define the time to distinguish between the short (execute function/scene) and the long (saving function/scene) actions.

4.12.4.6 Occupancy (internal)

There are no specific parameters for the occupancy (internal) input configuration.

This will directly link the action of the input to the occupancy function previously configured in the device. Take in consideration the contact type connected to the input:

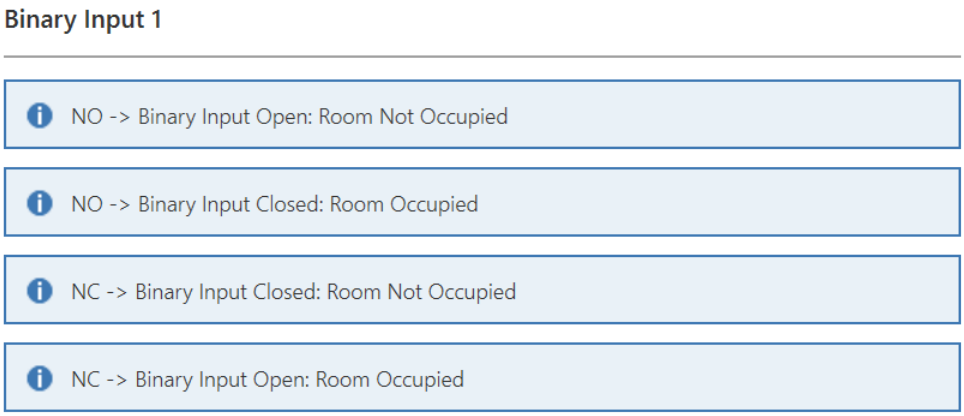


Figure 4-27 Contact type for occupancy

4.12.4.7 Window contact (internal)

There are no specific parameters for the window (internal) input configuration.

This will directly link the action of the input to the window contact function previously configured in the device. Take in consideration the contact type connected to the input:

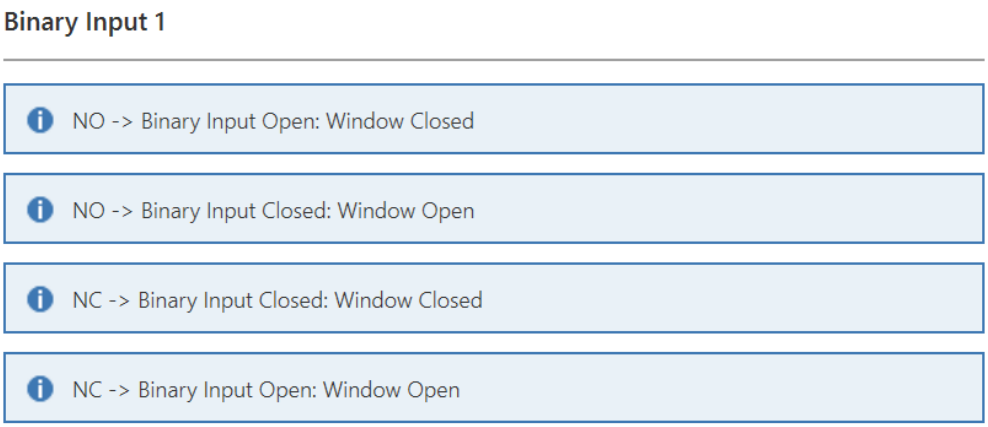
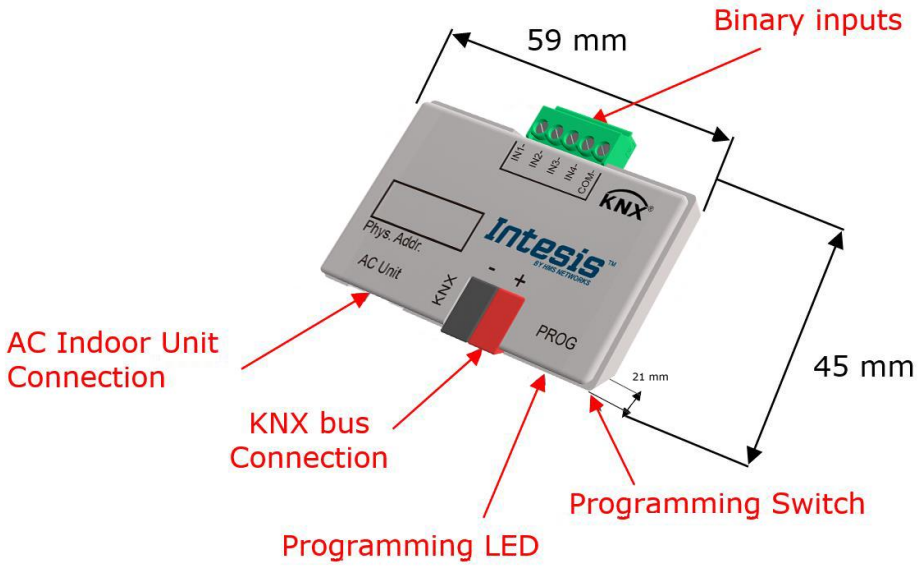


Figure 4-28 Contact type for window contact

5. Specifications

Encloruse	Plastic, type PC (UL 94 V-0) Net dimensions (lxwxh): 59 x 45 x 21 mm / 2.3" x 1.8" x 0.8" Color: Pure white RAL 9010	Operation Temperature	0ºC to +70ºC
Weight	35 g.	Stock Temperature	-20ºC to +85ºC
EIB TP port	1 x EIB TP connector (29 DCV). It is mandatory to respect the bus polarity. 20 mA consumption.	Operational Humidity	5% to 95% RH, non-condensing
AC unit port	1 x AC connector. 3mA/12DCV or 6mA/5DCV consumption	Stock Humidity	<95% RH, non-condensing
X4 inputs port	1 x 5 slots connector for free potential inputs (dry inputs): 4 x input slots 1 x GND slot	Isolation voltage	1500 VDC between ACX and EIB TP port
Button	1 x button – Programming mode	Isolation resistance	1000 MΩ
LED indicators	1 x LED - Programing status	Protection	IP20 (IEC60529)



6. AC Unit Types compatibility.

A list of Fujitsu indoor unit models compatible with INKNXFGL001I000 and their available features can be found in:

https://intesis.com/docs/compatibilities/inxxxfgl001i000_compatibility

Error Codes

6.1 RAC and VRF J-II / V-II / VR-II series

Error	System	Error Description
00	**RAC** Inverter and Non Inverter	Wired remote controller error
01		Indoor signal error
02		Indoor room temperature sensor error
03		Indoor room temperature sensor error
04		Indoor heat exchanger temperature sensor (middle) error
05		Indoor heat exchanger temperature sensor (middle) error
06		Outdoor heat exchanger temperature sensor (outlet) error
07		Outdoor heat exchanger temperature sensor (outlet) error
08		Power voltage error
09		Float switch operated
0A		Outdoor temperature sensor error
0b		Outdoor temperature sensor error
0C		Outdoor discharge pipe temperature sensor error
0d		Outdoor discharge pipe temperature sensor error
0E		Heat sink thermistor (Inverter) error
0F		Discharge temperature error
11		Indoor unit EEPROM error
12		Indoor fan error
13		Indoor signal error
14		Outdoor EEPROM error
15		Compressor temperature sensor error
16		Pressure switch abnormal, Pressure sensor error
17		IPM protection
18		CT error
19		Active filter error
		INV voltage protection
1A		Compressor location error
1b		Outdoor fan error
1C		Outdoor unit computer communication error
1d		2-way valve temperature sensor error
1E		3-way valve temperature sensor error
1F		Connected indoor unit error
20		Indoor MANUAL AUTO switch error
21		reverse VDD permanent stop protection
22		VDD permanent stop protection
24		Excessive high pressure protection on cooling
25		P.F.C. circuit error
26		Indoor signal error
27		Indoor signal error
28		Indoor heat exchanger temperature sensor (inlet) error
29		Outdoor heat exchanger temperature sensor (middle) error
2A		Power supply frequency detection error
2b		Compressor temperature error
2C		4-way valve error
2d		Heat sink thermistor P.F.C. error
2E		Indoor unit damper error
		Inverter error
2F		Low pressure error
30		Refrigerant circuit address set-up error

Error	System	Error Description
31	**RAC** Inverter and Non Inverter	Master unit, Slave unit set-up error
32		Connected the indoor number set-up error
33		P.F.C. printed circuit board error
34		Indoor fan 2 error
35		Control box thermistor error
36		Indoor unit CT error
37		Indoor fan motor 1 driving circuit error
38		Indoor fan motor 2 driving circuit error
11	**RAC** Inverter Models G series **VRF** J-II/V-II/VR-II Series	Serial communication error between indoor/outdoor units
12		Remote controller communication error
13		Communication error between outdoor units
14		Network communication error
15		Scan error
16		Peripheral unit communication error
17		Electricity charge apportionment error
21		Indoor unit initial setting error
22		Indoor unit capacity abnormal
23		Incompatible series connection error
24		Connection unit number error
25		Connection pipe length error
26		Indoor unit address setting error
27		Master/slave unit setting error
28		Other setting error
29		Connection unit number error in wired remote controller system
31		Indoor unit power supply abnormal
32		Indoor unit main PCB error
33		Indoor unit display PCB error
34		Power relay error
35		Indoor unit manual auto switch error
36		Heater relay error
37		Indoor unit transmission PCB error
38		Network convertor PCB error
39		Indoor unit power supply circuit error
3A		Indoor unit communication circuit (wired remote controller) error
41		Indoor unit room temp. thermistor error
42		Indoor unit heat ex. temp. thermistor error
43		Humidity sensor error
44		Light sensor error
45		Gas sensor error
46		Float sensor error
47		Water temperature sensor error
48		Warm water flow rate sensor error
49		Heater sensor error
51		Indoor unit fan motor 1 error
52		Indoor unit coil (expansion valve) error
53		Indoor unit water drain abnormal
54		Air cleaning function error
55		Filter cleaning function error
56		Water circulation pump error
57		Indoor unit damper error

Error	System	Error Description
58		Indoor unit intake grille position error
59		Indoor unit fan motor 2 error
5U		Indoor unit miscellaneous error
61		Outdoor unit power supply abnormal
62		Outdoor unit main PCB error
63		Outdoor unit inverter PCB error
64		Outdoor unit active filter/PFC circuit error
65		Outdoor unit IPM error
66		Convertor distinction error
67		Outdoor unit power short interruption error (protective operation)
68		Outdoor unit magnetic relay error
69		Outdoor unit transmission PCB error
6A		Outdoor unit display PCB error
71		Outdoor unit discharge temp. thermistor error
72		Outdoor unit compressor temp. thermistor error
73		Outdoor unit heat ex. temp. thermistor error
74		Outside air temp. thermistor error
75		Outdoor unit suction gas temp. thermistor error
76		Outdoor unit operating valve thermistor error
77		Outdoor unit heat sink temp. thermistor error
78		Expansion valve temperature sensor error
81		Receiver liquid level detection sensor error
82		Outdoor unit sub-cool heat ex. gas temp. thermistor error
83		Outdoor unit liquid pipe temp. thermistor error
84	**RAC**	Outdoor unit current sensor error
85	Inverter	Fan motor current sensor error
86	Models G	Outdoor unit pressure sensor error
87	series	Oil sensor error
91		Outdoor unit compressor 1 error
92		Outdoor unit compressor 2 error
93	**VRF**	Outdoor unit compressor start up error
94	J-II/V-II/VR-II	Outdoor unit trip detection
95	Series	Outdoor unit compressor motor control error
96		Open loop error (Field-weakening relevant)
97		Outdoor unit fan motor 1 error
98		Outdoor unit fan motor 2 error
99		Outdoor unit 4-way valve error
9A		Outdoor unit coil (expansion valve) error
9U		Outdoor unit miscellaneous error
A1		Outdoor unit discharge temperature 1 error
A2		Outdoor unit discharge temperature 2 error
A3		Outdoor unit compressor temperature error
A4		Outdoor unit pressure error 1
A5		Outdoor unit pressure error 2
A6		Outdoor unit heat exchanger temperature error
A7		Suction temperature abnormal
A8		Poor refrigerant circulation
A9		Current overload error
AA		Outdoor unit special operation error
AC		Ambient temperature error
AF		Out of the possible operation range
AJ		Freeze protection operated
C1		Peripheral unit main PCB error

Error	System	Error Description
C2	**RAC** Inverter Models G series	Peripheral unit transmission PCB error
C3		Peripheral unit PCB 1 error
C4		PCB 2 error
C5		PCB 3 error
C6		PCB 4 error
C7		PCB 5 error
C8		Peripheral unit input device error
C9		Display device error
CA		EEPROM error
CC		Peripheral unit sensor error
CF	**VRF** J-II/V-II/VR-II Series	Peripheral unit external connector error (USB memory)
CJ		Other parts error
F1		System tool software error
F2		System tool adaptor error
F3		System tool interface error
F4		System tool environment error
J1		RB unit error
J2		Branch boxes error
J3		Total heat exchanging, ventilation unit error
J4		Domestic hot water unit error
J5		Zone control interface error

6.2 VRF V / S / J Series

Error	System	Error Description
00	**VRF** V / S / J Series	No Error
02		Model information Error
04		Power frequency Error
06		EEPROM access Error
07		EEPROM deletion Error
09		Room sensor Error
0A		Heat Ex. Middle Sensor Error
0b		Heat Ex. Inlet sensor Error
0C		Heat Ex. Outlet sensor Error
0d		Blower temperature thermistor Error
11		Drain Error
12		Room temperature Error
13		Indoor fan motor Error
18		Standard wired remote Error
		Standard wired token Error
1F		Network communication Error
20		Node setting error
21		Communication Error between Main PCB & Transmission PCB
32		Outdoor unit Error

In case you detect an error code not listed, contact your nearest Fujitsu technical support service for more information on the error meaning.

7. Fan speed, vanes U/D & L/R values according to AC unit features

7.1 1-byte FAN SPEED objects according to the number of fan speeds available*.

1 FAN SPEED:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
SPEED 1	0,3%** – 100%	SPEED 1	1

2 FAN SPEEDS:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
Speed 1	0,3% – 75%	Speed 1	1
Speed 2	75% - 100%	Speed 2	2

3 FAN SPEEDS:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
Speed 1	0,3% – 50%	Speed 1	1
Speed 2	50% - 83,33%	Speed 2	2
Speed 3	83,33% - 100%	Speed 3	3

4 FAN SPEEDS:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
Speed 1	0,3% – 37,5%	Speed 1	1
Speed 2	37,5% - 62,5%	Speed 2	2
Speed 3	62,5% - 87,5%	Speed 3	3
Speed 4	87,5% - 100%	Speed 4	4

5 FAN SPEEDS:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
Speed 1	0,3% - 30%	Speed 1	1
Speed 2	30% - 50%	Speed 2	2
Speed 3	50% - 70%	Speed 3	3
Speed 4	70% - 90%	Speed 4	4
Speed 5	90% - 100%	Speed 5	5

6 FAN SPEEDS:

Scaling object		Enumerated object	
Fan speed	**Range in object**	**Fan speed**	**Value in object**
Speed 1	0,3% - 25%	Speed 1	1
Speed 2	25% - 41,67%	Speed 2	2
Speed 3	41,67% - 58,33%	Speed 3	3
Speed 4	58,33% - 75%	Speed 4	4
Speed 5	75% - 91,67%	Speed 5	5
Speed 6	91,67% - 100%	Speed 6	6

*Number of fan speeds is the number of fan speeds active in AC UNIT FEATURES. The specific AC fan speed active is not relevant -only the total activated-.

**Is was considered that the parameter *Use "0" to set Fan Auto* is active. If that were not the case, 0% sets the lowest fan speed

7.2 1-byte VANES U/D objects according to the number of vanes U/D positions available*.

1 VANE POSITION:

Scaling object		Enumerated object	
Vane U/D position	**Range in object**	**Vane U/D position**	**Value in object**
Position 1	0% – 100%	Position 1	1

2 VANE U/D POSITIONS:

Scaling object		Enumerated object	
Vane U/D position	**Range in object**	**Vane U/D position**	**Value in object**
Position 1	0% – 75%	Position 1	1
Position 2	75% - 100%	Position 2	2

3 VANE U/D POSITIONS:

Scaling object		Enumerated object	
Vane U/D position	**Range in object**	**Vane U/D position**	**Value in object**
Position 1	0% – 50%	Position 1	1
Position 2	50% - 83,33%	Position 2	2
Position 3	83,33% - 100%	Position 3	3

4 VANE U/D POSITIONS:

Scaling object		Enumerated object	
Vane U/D position	**Range in object**	**Vane U/D position**	**Value in object**
Position 1	0% – 37,5%	Position 1	1
Position 2	37,5% - 62,5%	Position 2	2
Position 3	62,5% - 87,5%	Position 3	3
Position 4	87,5% - 100%	Position 4	4

*Number of vane U/D positions is the number of vanes U/D positions active in AC UNIT FEATURES.

7.3 1-byte VANES L/R objects according to the number of vanes L/R positions available*.

1 VANE POSITION:

Scaling object	
Vane L/R position	**Range in object**
Position 1	0% – 100%

Enumerated object	
Vane L/R position	**Value in object**
Position 1	1

2 VANE L/R POSITIONS:

Scaling object	
Vane L/R position	**Range in object**
Position 1	0% – 75%
Position 2	75% - 100%

Enumerated object	
Vane L/R position	**Value in object**
Position 1	1
Position 2	2

3 VANE L/R POSITIONS:

Scaling object	
Vane L/R position	**Range in object**
Position 1	0% – 50%
Position 2	50% - 83,33%
Position 3	83,33% - 100%

Enumerated object	
Vane L/R position	**Value in object**
Position 1	1
Position 2	2
Position 3	3

4 VANE L/R POSITIONS:

Scaling object	
Vane L/R position	**Range in object**
Position 1	0% – 37,5%
Position 2	37,5% - 62,5%
Position 3	62,5% - 87,5%
Position 4	87,5% - 100%

Enumerated object	
Vane L/R position	**Value in object**
Position 1	1
Position 2	2
Position 3	3
Position 4	4

5 VANE L/R POSITIONS:

Scaling object	
Vane L/R position	**Range in object**
Position 1	0% - 30%
Position 2	30% - 50%
Position 3	50% - 70%
Position 4	70% - 90%
Position 5	90% - 100%

Enumerated object	
Vane L/R position	**Value in object**
Position 1	1
Position 2	2
Position 3	3
Position 4	4
Position 5	5

*Number of vane L/R positions is the number of vanes L/R positions active in AC UNIT FEATURES.

8. Appendix A – Communication Objects Table

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
GENERAL	ON/OFF	0	Control_On/Off	1 bit	DPT_Switch	1.001	R	W		U	0 - Off; 1-On
		88	Status_On/Off				R		T		
	HEARBEAT	146	Status_Heartbeat	1 bit	DPT_state	1.011	R		T		1 - Active
	NATIVE ECO MODE	64	Control_Native_Eco_Mode	1 bit	DPT_Switch	1.001	R	W		U	0 - Off; 1-On
		142	Status_Native_Eco_Mode				R		T		
	ANTI FREEZE	65	Control_Antifreeze	1 bit	DPT_Switch	1.001	R	W		U	0 - Off; 1-On
		143	Status_Antifreeze				R		T		
	EXTERNAL THERMO	66	Control_External_Thermo	1 bit	DPT_Switch	1.001	R	W		U	0 - Off; 1-On
		144	Status_External_Thermo				R		T		
MODE	1 BYTE MODE	2	Control_Mode	1 byte	DPT_HVACContrMode	20.105	R	W		U	0 - Auto; 1 - Heat; 3 - Cool; 9 - Fan; 14 - Dry
		89	Status_Mode				R		T		
	HEAT/ COOL	3	Control_Mode Cool/Heat	1 bit	DPT_Heat/Cool	1.100	R	W		U	0 - Cool; 1 - Heat
		90	Status_Mode Cool/Heat				R		T		
	1 BIT OBJECTS	6	Control_Mode Auto	1 bit	DPT_Bool	1.002	R	W		U	1 - Auto
		91	Status_Mode Auto				R		T		
		7	Control_ Mode Heat	1 bit	DPT_Bool	1.002	R	W		U	1 - Heat
		92	Status_Mode Heat				R		T		
		8	Control_ Mode Cool	1 bit	DPT_Bool	1.002	R	W		U	1 - Cool
		93	Status_Mode Cool				R		T		
		9	Control_ Mode Fan	1 bit	DPT_Bool	1.002	R	W		U	1 - Fan
		94	Status_Mode Fan				R		T		
		10	Control_ Mode Dry	1 bit	DPT_Bool	1.002	R	W		U	1 - Dry
		95	Status_Mode Dry				R		T		
	ON/OFF + MODE	4	Control_Mode_Cool_On	1 byte	DPT_percentage	5.001	R	W		U	0 – OFF; 0,1% - 100%; ON + COOL

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
	ON/OFF & MODE	5	Control_Mode_Heat_On	1 byte	DPT_percentage	5.001	R	W		U	0 – OFF; 0,1% - 100%; ON + HEAT
	MODE + / -	11	Control_ Mode_Dec_Inc	1 bit	DPT_Step	1.007	R	W		U	0 - Decrease; 1 – Increase
		12	Control_ Mode_Up_Down		DPT_UpDown	1.008	R		T		0 - Up; 1 - Down
TEMPERATURE	SETPOINT	45	Control_Setpoint_ Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		123	Status_Setpoint_ Temperature				R		T		
	TEMP. + / -	46	Control_Setpoint_ Temperature_Dec_Inc	1 bit	DPT_Step	1.007	R	W		U	0 - Decrease; 1 – Increase
		47	Control_Setpoint_ Temperature_Up_Down		DPT_UpDown	1.008	R	W		U	0 - Up; 1 - Down
	AC RETURN	125	Status_AC_Reference_ Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
	VIRTUAL TEMP.	48	Control_KNX_Ambient_ Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		122	Status_User_Setpoint_ Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		124	Status_ON/OFF_Virtual_ Temperature	1 bit	DPT_State	1.011	R		T		0 – Inactive; 1 – Active
	TEMP. LIMIT	49	Control_Limit_Min_Cool_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		50	Control_Limit_Max_Cool_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		51	Control_Limit_Min_Heat_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		52	Control_Limit_Max_Heat_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R	W		U	x - ºC
		130	Status_Limit_Min_Cool_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		131	Status_Limit_Max_Cool_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		132	Status_Limit_Min_Heat_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		133	Status_Limit_Max_Heat_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
	AC RANGE	126	Status_Min_AC_Range_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		127	Status_Max_AC_Range_ Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
TEMPERATURE	APPLIED TEMP. LIMIT	128	Status_Min_Applied_Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
		129	Status_Max_Applied_Setpoint_Temperature	2 bytes	DPT_Temperature	9.001	R		T		x - ºC
FAN SPEED	1 BYTE FAN SPEED	13	Control_ Fan Speed_Scaling	1 byte	DPT_Scaling	5.001	R	W		U	(0 – Fan Auto); [100 · (n + 0,5)/N]%
		14	Control_Fan Speed_Enumerated		DPT_Enumerated	5.010	R	W		U	(0 – Fan Auto); 1 - Speed 1; 2 - Speed 2; 3 Speed 3; 4 - Speed 4, 5 – Speed 5, 6- Speed 6
		96	Status_ Fan Speed_Scaling	1 byte	DPT_Scaling	5.001	R		T		(0 – Fan Auto); [100 · (n + 0,5)/N]%
		97	Status _Fan Speed_Enumerated		DPT_Enumerated	5.010	R		T		(0 – Fan Auto); 1 - Speed 1; 2 - Speed 2; 3 Speed 3; 4 - Speed 4, 5 – Speed 5, 6- Speed 6
	1bit MAN/ AUTO	15	Control_ Fan Speed Manual/Auto	1 bit	DPT_Bool	1.002	R	W		U	0 - Manual; 1 - Auto
		98	Status_ Fan Speed Manual/Auto				R		T		
	1bit OBJECTS	16	Control_ Fan Speed 1	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 1
		17	Control_ Fan Speed 2	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 2
		18	Control_ Fan Speed 3	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 3
		19	Control_ Fan Speed 4	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 4
		20	Control_ Fan Speed 5	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 5
		21	Control_ Fan Speed 6	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Fan Speed 6
		99	Status_ Fan Speed 1	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 1 active
		100	Status_ Fan Speed 2	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 2 active
		101	Status_ Fan Speed 3	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 3 active
		102	Status_ Fan Speed 4	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 4 active
		103	Status_ Fan Speed 5	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 5 active
		104	Status_ Fan Speed 6	1 bit	DPT_Bool	1.002	R		T		1 – Fan Speed 6 active
	FAN SPEED + / -	22	Control_Fan_Speed_Dec_Inc	1 bit	DPT_Step	1.007	R	W		U	0 - Decrease; 1 – Increase
		23	Control_ Fan_Speed_Up_Down		DPT_UpDown	1.008	R		T		0 - Up; 1 - Down
VANES U-D	1 BYTE OBJECTS	24	Control_ Vanes_U/D _Scaling	1 byte	DPT_Scaling	5.001	R	W		U	[100 · (n + 0,5)/N]%
		25	Control_ Vanes_U/D _Enumerated		DPT_Enumerated	5.010	R	W		U	Position values: 1…N

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
VANES U-D	1 BYTE OBJECTS	105	Status_ Vanes_U/D _Scaling	1 byte	DPT_Scaling	5.001	R		T		[100 · (n + 0,5)/N]%
		106	Status _Vanes_U/D _Enumerated		DPT_Enumerated	5.010	R		T		Position values: 1…N
	1bit OBJECTS	27	Control_ Position 1	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 1
		28	Control_ Position 2	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 2
		29	Control_ Position 3	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 3
		30	Control_ Position 4	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 4
		108	Status_ Position 1	1 bit	DPT_Bool	1.002	R		T		1 – Position 1 active
		109	Status_ Position 2	1 bit	DPT_Bool	1.002	R		T		1 – Position 2 active
		110	Status_ Position 3	1 bit	DPT_Bool	1.002	R		T		1 – Position 3 active
		111	Status_ Position 4	1 bit	DPT_Bool	1.002	R		T		1 – Position 4 active
	1 bit SWING	31	Control_ Vanes U_D_ Swing	1 bit	DPT_Bool	1.002	R	W		U	1 – Set vanes U/D Swing
		112	Status_ Vanes U_D_ Swing				R		T		1 – Vanes U/D swing active
	VANES U/D + / -	32	Control_Vanes U_D_ Dec_Inc	1 bit	DPT_Step	1.007	R	W		U	0 - Decrease; 1 – Increase
		33	Control_ Vanes U_D_ Up_Down		DPT_UpDown	1.008	R		T		0 - Up; 1 - Down
VANES L-R	1 BYTE OBJECTS	34	Control_ Vanes_L/R _Scaling	1 byte	DPT_Scaling	5.001	R	W		U	[100 · (n + 0,5)/N]%
		35	Control_ Vanes_L/R _Enumerated		DPT_Enumerated	5.010	R	W		U	Position values: 1…N
		113	Status_ Vanes_L/R _Scaling		DPT_Scaling	5.001	R		T		[100 · (n + 0,5)/N]%
		114	Status _Vanes_L/R _Enumerated		DPT_Enumerated	5.010	R		T		Position values: 1…N
	1bit OBJECTS	37	Control_ Position 1	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 1
		38	Control_ Position 2	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 2
		39	Control_ Position 3	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 3
		40	Control_ Position 4	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 4
		41	Control_ Position 5	1 bit	DPT_Bool	1.002	R	W		U	1 – Set Position 5

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
	1bit OBJECTS	116	Status_ Position 1	1 bit	DPT_Bool	1.002	R		T		1 – Position 1 active
VANES L/R		117	Status_ Position 2	1 bit	DPT_Bool	1.002	R		T		1 – Position 2 active
		118	Status_ Position 3	1 bit	DPT_Bool	1.002	R		T		1 – Position 3 active
		119	Status_ Position 4	1 bit	DPT_Bool	1.002	R		T		1 – Position 4 active
		120	Status_ Position 5	1 bit	DPT_Bool	1.002	R		T		1 – Position 5 active
	1 bit SWING	42	Control_ Vanes L/R_ Swing	1 bit	DPT_Bool	1.002	R	W		U	1 – Set vanes L/R Swing
		121	Status_ Vanes L/R_ Swing				R		T		1 – Vanes L/R swing active
	VANES L/R + / -	43	Control_Vanes L/R_ Dec_Inc	1 bit	DPT_Step	1.007	R	W		U	0 - Decrease; 1 – Increase
		44	Control_ Vanes L/R_ Up_Down		DPT_UpDown	1.008	R		T		0 - Up; 1 - Down
OCCUPANCY	ENABLING	59	Control_ Occupancy_ Enable	1 bit	DPT_Enable	1.003	R	W		U	0 – Disable; 1 - Enable
		147	Status_ Occupancy_ Enabled				R		T		
	TRIGGER (INPUT)	60	Control_ Occupancy_Input	1 bit	DPT_Occupancy	1.018	R	W		U	0 – Not occupied; 1 - Occupied
		149	Status_ Occupancy_ Sensor				R		T		
	MODE	148	Status_ Occupancy_Mode	1 byte	DPT_Occupied	20.003	R		T		0 – Occupied; 1 – Standby; 2 – Not occupied
	ON/OFF LOCKING	150	Status_ Occupancy_OnOff Locked	1 bit	DPT_Bool	1.002	R		T		0 – Unlocked; 1 – Force off
	STEP_5	151	Status_ Occupancy_ Step5	1 byte	DPT_ 8 bit unsigned value	5.*	R		T		0 – Occupied; 1 – Tout1; 2 – Tout2; 3 – Not Occupied
OCCUPANCY	ENABLING	56	Control_ Window_Contact_ Enable	1 bit	DPT_Enable	1.003	R	W		U	0 – Disable; 1 - Enable
		152	Status_ Window_Contact_ Enabled				R		T		
	TRIGGER (INPUT)	57	Control_ Window_Contact_Input	1 bit	DPT_Open/close	1.009	R	W		U	0 – Open; 1 - Close
		153	Status_ Window_Contact_ Sensor				R		T		
		58	Control_ Window_Contact_Input		DPT_Window/door	1.019	R	W		U	0 – Close; 1 – Open
		154	Status_ Window_Contact_ Sensor				R		T		
	ON/OFF LOCKING	155	Status_ Window_ Contact_OnOff Locked	1 bit	DPT_Bool	1.002	R		T		0 – Unlocked; 1 – Force off

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
	STEP_5	**151**	Status_ Window_Contact_ Step5	1 byte	DPT_ 8 bit unsigned value	5.*	R		T		0 – Occupied; 1 – Tout1; 3 – Not Occupied
SLEEP	**TRIGGER (INPUT)**	**61**	Control_Sleep_timeout	1 bit	DPT_Start/Stop	1.010	R	W		U	0 – Stop; 1 - Start
MAINT. & RC LOCK	**TIME COUNTER**	**53**	Control_ OnTimeCounterHours	2 byte	DPT_Time(h)	7.007	R	W		U	Number of operating hours
		137	Status_ OnTimeCounterHours				R		T		
		54	Control_ OnTimeCounterSeconds	4 bytes	DPT_Time lag (s)	13.100	R	W		U	Number of operating seconds
		138	Status_ OnTimeCounterSeconds				R		T		
	FILTER	**55**	Control_Reset_Filter	1 bit	DPT_Reset	1.015	R	W		U	1 – Reset filter signal
		139	Status_Filter_Status		DPT_Alarm	1.005	R		T		0 – No Alarm; 1 -Alarm
	AC REMOTE LOCK	**62**	Control_ Lock_Remote_Controller	1 bit	DPT_Bool	1.002	R	W		U	0 – Unlocked; 1 – Lock
		140	Status_ Lock_Remote_Controller				R		T		
	KNX LOCK	**63**	Control_Lock_KNX_ Control_Objects	1 bit	DPT_Bool	1.002	R	W		U	0 – Unlocked; 1 – Lock
		141	Status_Lock_KNX_ Control_Objects				R		T		
	ERROR NOTIFICATION	**134**	Status_ Alarm	1 bit	DPT_Alarm	1.005	R		T		0 – No Alarm; 1 -Alarm
		135	Status_ Alarm_Code	2 bytes	DPT_2bytes signed value	8.*	R		T		*See user manual
		136	Status_ Alarm_Text	14 bytes	DPT_Char_string	16.001	R		T		
SCENES	**COMMON OBJECTS**	**67**	Control_Execute_Save_ Scene_Function	1 byte	DPT_Scene_control	18.001	R	W		U	0…63 – Execute Function/Scene 1…64; 128…191 – Save Scene 1…64
		78	Control_Cancel_ Scene_Function	1 byte	DPT_Scene number	17.001	R	W		U	0…63 – Cancel Function/Scene 1…64
		79	Control_Cancel_ All_Scenes_Functions	1 bit	DPT_Bool	1.002	R	W		U	1 – Cancel all functions/scenes
		145	Status_Current_Scene_ Function	1 byte	DPT_Scene number	17.001	R		T		0…63 – Function/Scene 1…64; 255 – No function/scene
	INDIVI-DUAL	**68**	Control_Execute_Function _A	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		69	Control_Execute_Function _B	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		70	Control_Execute_Function _C	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
	INDIVI-DUAL	71	Control_Execute_Function_D	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		72	Control_Execute_Function_E	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		73	Control_Execute_Function_F	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		74	Control_Execute_Function_G	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		75	Control_Execute_Function_H	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		76	Control_Execute_Function_I	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
		77	Control_Execute_Function_J	1 bit	DPT_Bool	1.002	R	W		U	1 - Execute Scene
BINARY INPUTS	ACTIVE OBJECTS	159	Status_ Input 1 is active	1 bit	DPT_State	1.011	R		T		0 – Inactive; 1 - Active
		172	Status_ Input 2 is active	1 bit	DPT_State	1.011	R		T		0 – Inactive; 1 – Active
		185	Status_ Input 3 is active	1 bit	DPT_State	1.011	R		T		0 – Inactive; 1 – Active
		198	Status_ Input 4 is active	1 bit	DPT_State	1.011	R		T		0 – Inactive; 1 - Active
	SWITCH	164	Status_ Input 1 Switching	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		177	Status_ Input 2 Switching	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		190	Status_ Input 3 Switching	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		203	Status_ Input 4 Switching	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
	DIMMING	160	Status_ Input 1 Dimming On/Off	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		161	Status_ Input 1 Dimming Step	4 bits	DPT_Dimming	3.007	R		T		0 – Decrease; 1 - Increase
		173	Status_ Input 2 Dimming On/Off	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		174	Status_ Input 2 Dimming Step	4 bits	DPT_Dimming	3.007	R		T		0 – Decrease; 1 - Increase
		186	Status_ Input 3 Dimming On/Off	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		187	Status_ Input 3 Dimming Step	4 bits	DPT_Dimming	3.007	R		T		0 – Decrease; 1 - Increase
		199	Status_ Input 4 Dimming On/Off	1 bit	DPT_Switch	1.001	R		T		0 – Off; 1 - On
		200	Status_ Input 4 Dimming Step	4 bits	DPT_Dimming	3.007	R		T		0 – Decrease; 1 - Increase

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
	SHUTTER/ BLIND	162	Status_ Input 1 Shut_Blind Move	1 bit	DPT_Up/Down	1.008	R		T		0 – Move Up; 1 – Move Down
		163	Status_ Input 1 Shut_Blind Step	1 bit	DPT_Step	1.007	R		T		0 – Step Up; 1 – Step Down
		175	Status_ Input 2 Shut_Blind Move	1 bit	DPT_Up/Down	1.008	R		T		0 – Move Up; 1 – Move Down
		176	Status_ Input 2 Shut_Blind Step	1 bit	DPT_Step	1.007	R		T		0 – Step Up; 1 – Step Down
BINARY INPUTS		188	Status_ Input 3 Shut_Blind Move	1 bit	DPT_Up/Down	1.008	R		T		0 – Move Up; 1 – Move Down
		189	Status_ Input 3 Shut_Blind Step	1 bit	DPT_Step	1.007	R		T		0 – Step Up; 1 – Step Down
		201	Status_ Input 4 Shut_Blind Move	1 bit	DPT_Up/Down	1.008	R		T		0 – Move Up; 1 – Move Down
		202	Status_ Input 4 Shut_Blind Step	1 bit	DPT_Step	1.007	R		T		0 – Step Up; 1 – Step Down
	VALUE 1 byte	166	Status_ Input 1 Value	1 byte	DPT_Counter pulses	5.010	R		T		1-byte unsigned value
		179	Status_ Input 2 Value	1 byte	DPT_Counter pulses	5.010	R		T		1-byte unsigned value
		192	Status_ Input 3 Value	1 byte	DPT_Counter pulses	5.010	R		T		1-byte unsigned value
		205	Status_ Input 4 Value	1 byte	DPT_Counter pulses	5.010	R		T		1-byte unsigned value
	VALUE 2 bytes UNSIGNED	167	Status_ Input 1 Value	2 bytes	DPT_pulses	7.001	R		T		2-bytes unsigned value
		180	Status_ Input 2 Value	2 bytes	DPT_pulses	7.001	R		T		2-bytes unsigned value
		193	Status_ Input 3 Value	2 bytes	DPT_pulses	7.001	R		T		2-bytes unsigned value
		206	Status_ Input 4 Value	2 bytes	DPT_pulses	7.001	R		T		2-bytes unsigned value
	VALUE 2 bytes SIGNED	168	Status_ Input 1 Value	2 bytes	DPT_pulses difference	8.001	R		T		2-bytes signed value
		181	Status_ Input 2 Value	2 bytes	DPT_pulses difference	8.001	R		T		2-bytes signed value
		194	Status_ Input 3 Value	2 bytes	DPT_pulses difference	8.001	R		T		2-bytes signed value
		207	Status_ Input 4 Value	2 bytes	DPT_pulses difference	8.001	R		T		2-bytes signed value
	VALUE 2 bytes TEMP.	189	Status_ Input 1 Value	2 bytes	DPT_Temperature	9.001	R		T		Temperature (ºC)
		182	Status_ Input 2 Value	2 bytes	DPT_Temperature	9.001	R		T		Temperature (ºC)
		195	Status_ Input 3 Value	2 bytes	DPT_Temperature	9.001	R		T		Temperature (ºC)
		208	Status_ Input 4 Value	2 bytes	DPT_Temperature	9.001	R		T		Temperature (ºC)

GROUP	SUBGROUP	OBJECT NUMBER	NAME	LENGTH	DATAPOINT TYPE		FLAGS				FUNCTION
					DPT_NAME	DPT-ID	R	W	T	U	
BINARY INPUTS	**VALUE 4 bytes UNSIGNED**	**165**	Status_ Input 1 Value	4 bytes	DPT_Counter pulses (unsigned)	12.001	R		T		4-bytes unsigned value
		178	Status_ Input 2 Value	4 bytes	DPT_Counter pulses (unsigned)	12.001	R		T		4-bytes unsigned value
		191	Status_ Input 3 Value	4 bytes	DPT_Counter pulses (unsigned)	12.001	R		T		4-bytes unsigned value
		204	Status_ Input 4 Value	4 bytes	DPT_Counter pulses (unsigned)	12.001	R		T		4-bytes unsigned value