PRODUCT MANUAL

ITR830-004 MITSUBISHI HEAVY INDUSTRIES AC-KNX GATEWAY

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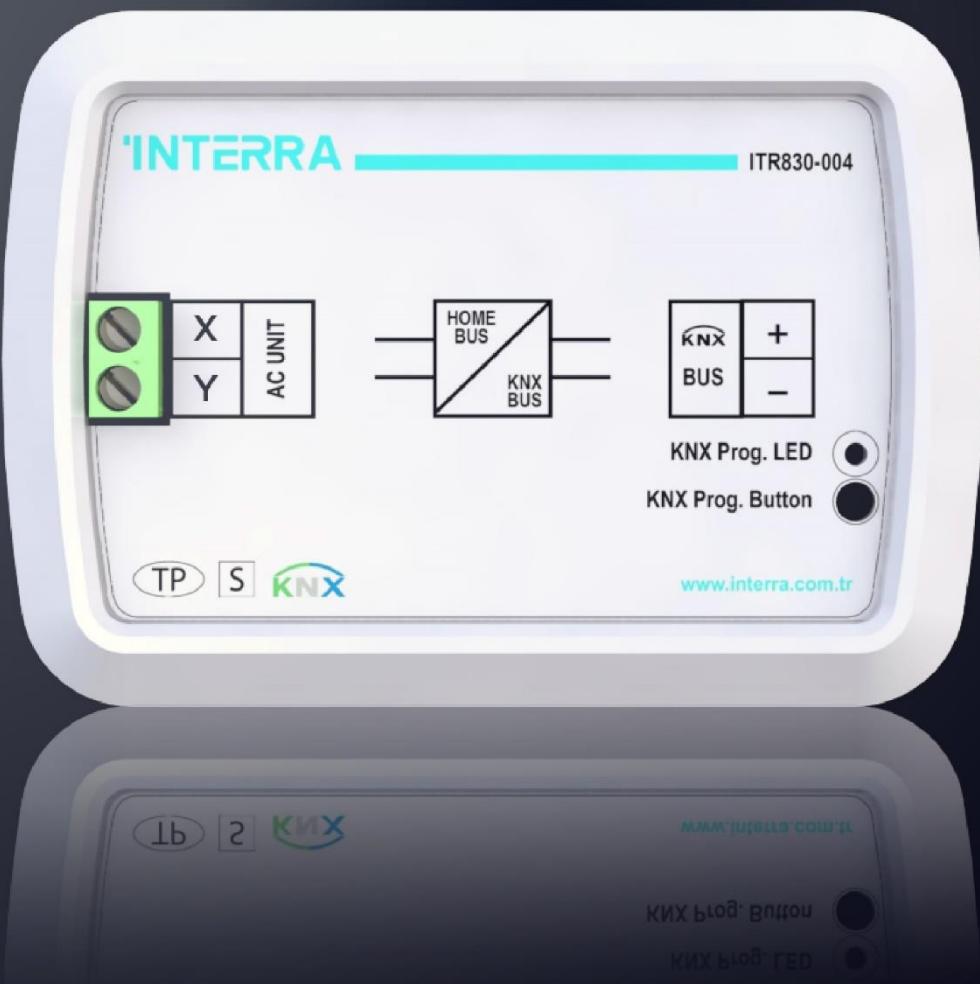
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TABLE OF CONTENTS

1. CONTENT OF THE DOCUMENT

This document contains Interra brandmark's ITR830-004 – Mitsubishi Heavy Industries AC - KNX Gateway coded devices' electronic and all essential feature information for programming these products. In each subtitle is explained about the characteristics of the device. Modifications of the product and special change requests are only allowed in coordination with product management.

2. PRODUCT DESCRIPTION

ITR830-004 is a air conditioner gateway that used for monitoring and control all the functioning parameters of Mitsubishi Heavy Industries air conditioners via KNX bus line. Mitsubishi Heavy Industries AC - KNX Gateway is compatible with models in FD & VRF types categorized in compatibility list sold by Mitsubishi Heavy Industries.

Mitsubishi Heavy Industries AC - KNX Gateway has easy installation feature and can be installed inside the own AC indoor unit or a proper location away from the air conditioner, it connects one side directly to the electronic circuit of the AC indoor unit and in the other side directly to the KNX bus so, Mitsubishi Heavy Gateway provides bidirectional communication between KNX bus and HBS bus.

- ➢ X / Y HBS bus connections can be made up to 350 meters away. The bus terminal which connects the AC indoor unit and the wired remote controller.

- ➢ Up to 5 different modes available to determine the operating mode such as; auto, heat, cool, fan, dry.

- ➢ ITR830-004 have 4 logic gates to carry out logic functions with 3 different gate types such as AND, OR & XOR.

- ➢ With 4 different special modes, desired applications can be made. These modes are : Energy Saver mode, Power Saver mode, Winter mode and Summer mode.

- ➢ ITR830-004 have 8 converter gates with 1 input and 1 output. Each input has 8 different data types and each output has 4 different outputs.

- ➢ Up to 5 scenes can be saved and executed from KNX, fixing the desired combination of ON/OFF, Operation Mode, Setpoint Temperature, Fan Level control, Vane Position control and Remote Controller Lock in any moment by using a simple switching with KNX bus telegram.

- ➢ Mitsubishi Heavy FD & VRF type AC Indoor unit can be controlled simultaneously by the remote controller of the AC unit and Mitsubishi Heavy Gateway.

- ➢ Mitsubishi Heavy FD & VRF AC indoor unit monitoring from KNX, including monitoring of AC unit's state of internal variables, running working hours counter (E.g. for filter maintenance control), and error indication and error code.

- ➢ 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.

- ➢ Special functions for high level monitoring; window contact, working hours counter, standby and timer function.

2.1. TECHNICAL INFORMATION

The following table shows the technical information of the Mitsubishi Heavy Gateway.

Device	ITR830-004
Power Supply	EIB Power Supply
Power Consumption	5 mA(*)
Push Buttons	1 x KNX Programming Button
LED Indicators	1 x KNX Programming LED
Type of Protection	IP 20
Mode of Commissioning	S-Mode
Temperature Range	Operation (-10℃...70℃) Storage (-25℃...100℃)
Maximum Air Humidity	< 90 RH
Flammability	Non-flammable Product
Color	Light Grey
Dimensions	88x62x27 mm (WxHxD)
Certification	KNX Certified
Configuration	Configuration with ETS

Special Note
(*) : This feature will be changed in second version of the device.

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2.2. CONNECTION DIAGRAM & FEATURES

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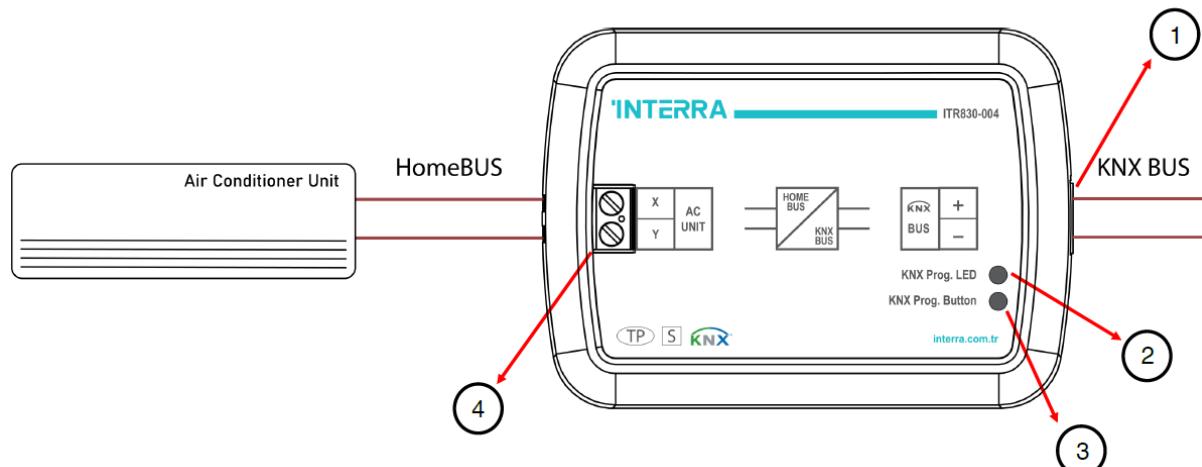

Figure 1 : Connection Diagram of Mitsubishi Heavy FD & VRF AC-KNX Gateway

Number	Feature
1	KNX Connector
2	Programming LED
3	Programming Button
4	AC Indoor Unit Connection

Recommended
Interface should be installed inside the air conditioning indoor unit. Due to the connection length up to 350 meter, Mitsubishi Heavy Gateway can also be installed at proper location outside the air conditioner.

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ITR830-004 Mitsubishi Heavy FD & VRF AC-KNX Gateway can be connected directly to the X-Y Home bus terminal of the AC indoor unit. Nothing need to do in ETS software. Following figure shows the Mitsubishi Heavy Gateway connection without remote controller.
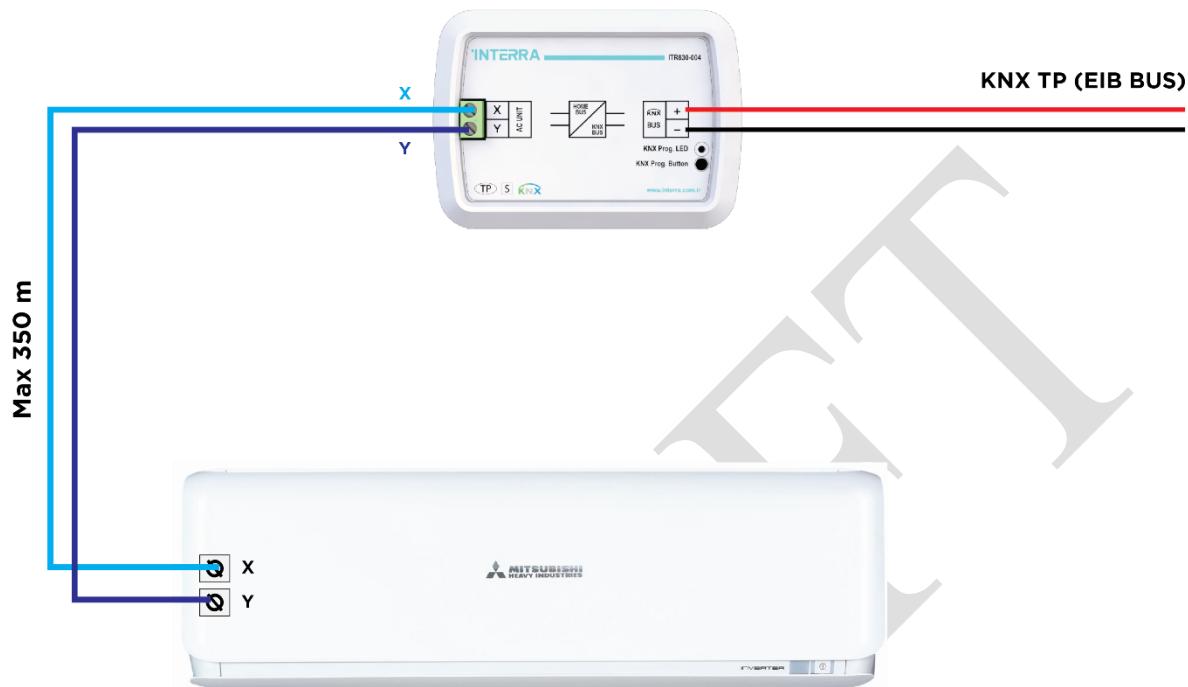
Figure 2 : Mitsubishi Heavy Gateway Connection Diagram without Remote Controller

ITR830-004 Mitsubishi Heavy FD & VRF AC-KNX Gateway can be connected together with Mitsubishi Heavy Remote Controller to the X-Y Home bus terminal of the AC indoor unit. In this case, the remote controller unit must be selected as Master in the Mitsubishi Heavy FD & VRF AC-KNX Gateway ETS configuration. Following figure shows the Mitsubishi Heavy FD & VRF AC-KNX Gateway connection with remote controller.

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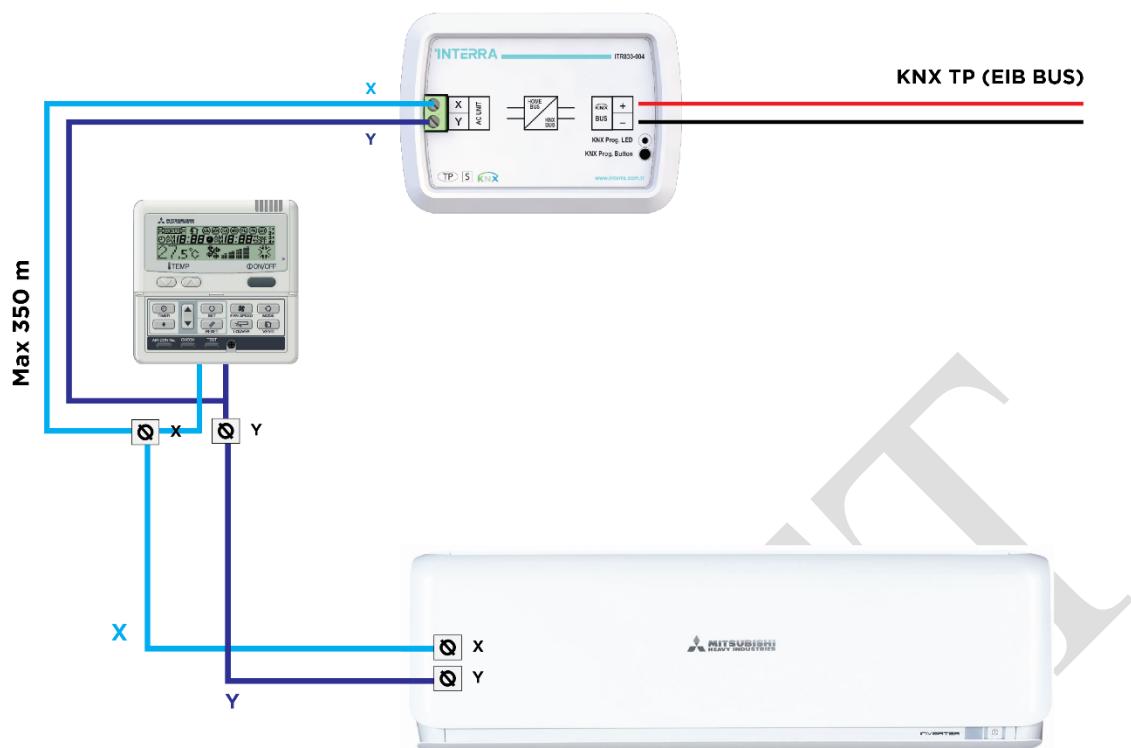
Figure 3 : Mitsubishi Heavy Gateway Connection Diagram with Mitsubishi Heavy Remote Controller

Commissioning Instructions
-> First, disconnect the Air Conditioner from mains power. -> Then, disconnect the power supply of the EIB bus. -> Install the interface and connect it to X-Y connector in any point of the bus. The X-Y bus is the -> bus that connects the AC indoor unit and the wired remote controller -> Connect the KNX bus to the KNX connector of the interface according to polarity. -> Reconnect the AC indoor unit to mains power and power supply to the KNX bus.

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2.3 DIMENSIONS

All values given in the device dimensions are millimetres.
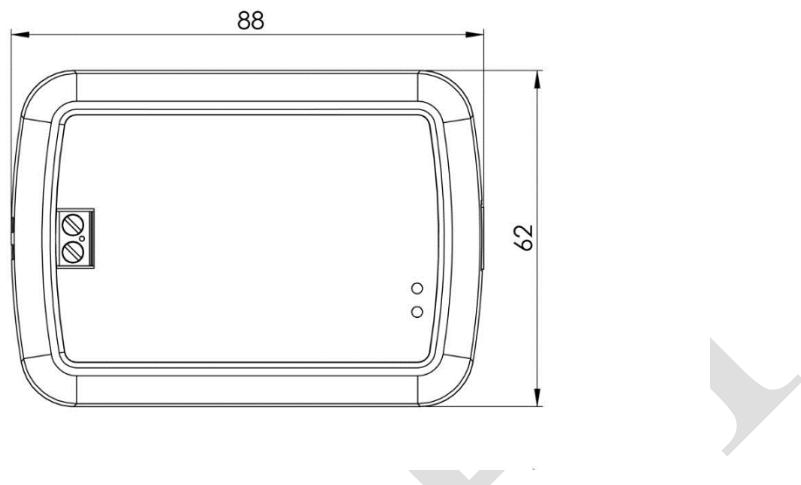
Figure 4 : Dimensions of Mitsubishi Heavy FD & VRF AC-KNX Gateway from top view
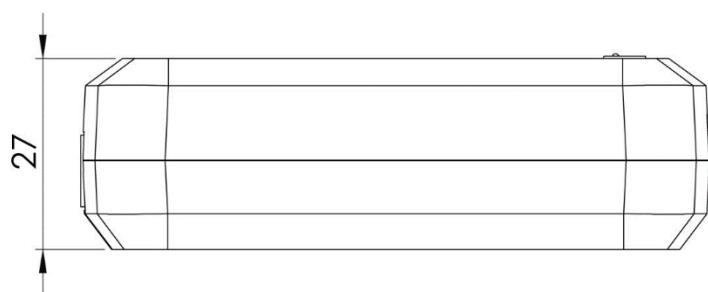
Figure 5 : Dimensions of Mitsubishi Heavy FD & VRF AC-KNX Gateway from side view

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3. ETS PARAMETERS & DESCRIPTIONS

In this chapter, the ETS parameters of ITR830-004 – Mitsubishi Heavy FD & VRF AC-KNX Gateway device are described using the parameter pages and options. The parameter pages features are dynamic structures which means further parameters and parameter pages are enabled depending on the configuration and function of the groups.

In this section, detailed description of the functional features of the device is given. All the parameters of the device are explained under the relevant headings.

In the ETS parameter configuration pages, each of the parameters have got a default parameter value. This default values are written in bold.

- E.g. : > Setpoint shifting   ●**via parameter**   via communication object

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

In the following sections there is a detailed explanation about each of the different functionalities of Mitsubishi Heavy FD & VRF AC-KNX Gateway in ETS.

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3.1. GENERAL PAGE

When the ITR830-004 Mitsubishi Heavy Gateway is attached to the project from the ETS program, a configuration setting must be made primarily before loading. When entering the "GENERAL" in the parameter page, the configuration screen will be appeared shown below. Global parameter settings for the whole device are made in this window. From the general configuration window, the different advanced functionalities of the Mitsubishi Heavy Gateway can be enabled such as Module alive beacon, Setting the working condition of remote controller, Behaviour after bus voltage failure, device control locking, Errors Management, Initial Configuration.

Fig 6 : General Configuration Parameter Page

5.1.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Module alive beacon	This feature is used to determine whether the Mitsubishi Heavy Gateway is operating. With the enabling of the module alive beacon parameter whether the device is working correctly can be known. The value true is sent with a preconfigured period via the group object. The receipt of this telegram periodically means that the device is working properly.	**Disabled** Enabled

> Module alive beacon interval(sec)	This parameter, is used to determine the time period of the module alive beacon sending data. (i) Where the KNX bus line communication is intensive, it is more accurate to select the bigger time period. Otherwise, even communication breaks may occur.	**1…65535**
Remote Controller Connected (if set to "yes", Remote Controller must be master)	This parameter, is used to determine whether the Mitsubishi Heavy Gateway and the air conditioner remote controller are used together. If the remote control is to be used, the controller must be selected as master.	**No** Yes
> Scene selection	This parameter, is used to determine the appropriate scene from 5 scene that can be created. The selected scene conditions are applied to the air conditioner and it works under these conditions during the KNX bus line power failure.	**Scene 1,** Scene 2, Scene 3, Scene 4, Scene 5
Behaviour after bus voltage failure	This parameter, is used to determine the action that will be taken by the gateway when the KNX bus voltage failure is recovered. If there is a power interruption or until the KNX energy comes back up, one of the following options can be applied. **No Reaction/Last State:** The air conditioner unit retains its last condition after the power failure. **Off:** The air conditioner will be switched off. **Scene:** The scene with the desired conditions from 5 different scenes can be sent to the air conditioner unit. In this case, the air conditioner unit operates under these conditions after KNX bus line power failure.	**No reaction – Last state** Scene Off
> Scene selection	This parameter, is used to determine the appropriate scene from 5 scene that can be created. The selected scene conditions are applied to the air conditioner and it works under these conditions after the KNX bus power failure.	**Scene 1,** Scene 2, Scene 3, Scene 4, Scene 5
Feedback at startup	This parameter, is used to get some status information of the air conditioning unit when the Mitsubishi Heavy Gateway is started to operate. These information can be used for these purposes such as : monitoring the air conditioner from a	**Disabled** Enabled

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	control centre, triggering different scenarios to operate in the KNX infrastructure etc. The following describes which status information can be observed. Feedback Climate On/Off Feedback Operating Mode Feedback Individual Mode Auto & Heat & Cool & Fan & Dry Feedback Fan Speed Enumerated Feedback Vanes Position Enumerated Feedback Setpoint Temperature	
> Feedback at startup time delay(sec)	This parameter, is used to set delay between the start-up and the sending of the feedback telegrams to the KNX bus line. ⓘ If the value is selected as '0', the feedbacks will be sent to KNX bus line immediately without no waiting.	0…255
Send feedback periodically	This parameter, is used to send feedback of the related objects periodically according to selected time. The objects are listed in "**Feedback at startup**" parameter that is described above.	**Disabled** 5sec, 10sec, 30sec, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h, 12h, 24h
Device Control Locking	This parameter, is used to lock the Mitsubishi Heavy Gateway via device control locking communication object. The device is blocked and it can no longer be controlled via any telegram. The device remains the previous status before locking until the locking is deactivated. It must be taken into consideration that the device after the locking will take the last value received through the bus even though this value has been received during the locking time. **Lock on Value 0:** The Gateway will be locked when the value 0 is sent. **Lock on Value 1:** The Gateway will be locked when the value 1 is sent.	**Disabled** Lock on Value 0 Lock on Value 1

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Error code (2-byte)	This parameter, is used to detect and identify the faults that come from the air conditioner via 2-byte value. Each error code has a different meaning so, all of the error code descriptions are listed please check Appendix B section in this document.	Disabled Enabled

3.2. LOGIC GATE

This parameter page is used to make the logical relationships between inputs & output.

Up to 4 logic gates can be used with the gateway. In addition, each logic gate allows the use of up to 4 inputs. The standard logic operations AND, OR and XOR are available.

The status of the output of logic gates can be shown normally or inverted. This configuration can be applied via the parameter "Output behaviour" and when it is parameterized as inverted, the status of the output is shown inverted.

Through the parameter "Send status on", the type of feedback can be defined. The gateway allows sending the result of logic gates when the conversely logic output is changed or when one of the logic inputs is modified. Additionally, it is possible to define a cyclic sending of the feedback which permits getting information about the output status periodically.

The logic output can operate with previously configured delays. The logic output takes the values ON and OFF with delays. Depending of the switch delay parameters configuration, it is possible to set an ON delay (TON), an OFF delay (TOFF) or both at the same time.
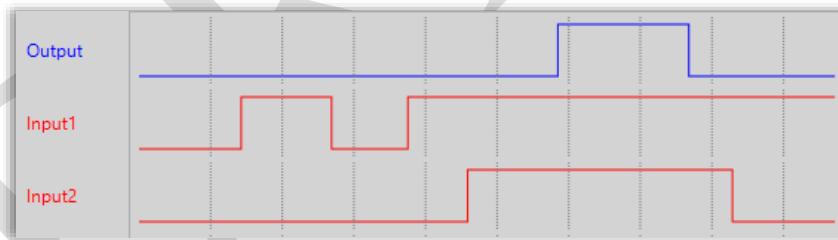

Fig 7 : Logic Gate with Delays

Special Notes
The number of logical gates can be selected up to 4. Since the characteristics of each gate are the same so, only the Logic 1 is described.
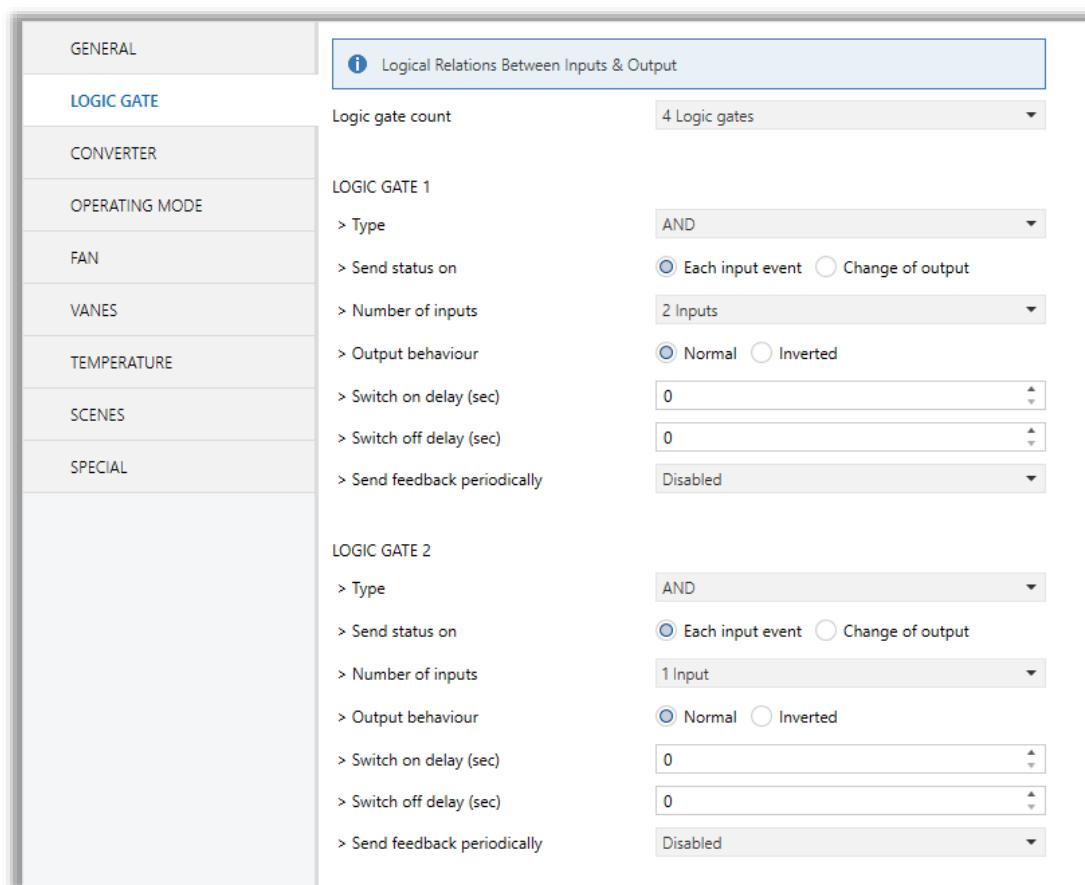
Fig 8 : Logic Gate Configuration Parameter Page

5.2.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Logic Gate Count	This parameter, is used to specify the number of logic gates which are used to write logical functions. Up to 4 different logic gates can be used simultaneously.	**No logic gate** 1 Logic gate 2 Logic gates 3 Logic gates 4 logic gates
LOGIC GATE 1		
> Type	This parameter, is used to specify the type of logical gate to be used. There are 3 different logical gate types, AND, OR and XOR. Each logical gate generates a false or true value at its output as a logical association result.	**AND** OR XOR

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> Send status on	This parameter, is used to specify how the status of the output will be sent. **Each Input Event:** Output status will be sent when any logic input is received. **Change of Output:** Output status will be sent when the logic output is changed.	**Each input event** Change of output
> Number of inputs	This parameter, is used to specify the number of inputs for the logical gate.	**1 input** 2 inputs 3 inputs 4 inputs
> Output behaviour	This parameter defines the behaviour of the logic output. **Normal:** The status of the output is sent without any modification. **Inverted:** If the value is true, the false value will be sent as status value for the output or vice versa.	**Normal** Inverted
> Switch on delay (sec)	This parameter is used to set a delay time for output behaviour. The output takes the value ON when real time reaches the configured time in this parameter.	**0…255**
> Switch off delay (sec)	This parameter is used to set a delay time for output behaviour. The output takes the value OFF when real time reaches the configured time in this parameter.	**0…255**
> Send feedback periodically	This parameter, is used to send feedback of the related objects periodically according to selected time. The objects are listed in "**Feedback at startup**" parameter that is described in "GENERAL" parameter page above.	**Disabled** 5sec, 10sec, 30sec, 1min, 5min, 10min, 20min, 30min, 40min, 50min, 1h, 2h, 3h, 4h, 5h, 6h, 12h, 24h

| Special Notes |
|---|
| The number of logical gates can be selected up to 4. Since the characteristics of each gate are the same, only one is described. |

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3.3. CONVERTER

The main parameter settings of Converter Parameter page is made in this page. Various control options for the Converters are enabled from this page.

Converters are used to convert the output to configured type value depending on the input value. There are 8 different types of data input which can be converted to 4 different data values.

Moreover, if the input is selected as 1 byte or 2 byte, you can also make the four arithmetical operations(plus, minus, multiply, divide). Some examples are shown below :

Ex 1:	Ex 2:
Input type: 1 byte, 154	Input type: 1 byte, 215
Calculation: Plus	Calculation: Minus
Calculation value: 7	Calculation value: 51
Output type: 1 byte	Output type: 1 byte
Output = 154 : 7	Output = 215 - 51
Output = 22	Output = 164
Ex 3:	Ex 4:
Input type: 2 byte, 862	Input type: 2 byte, 46342
Calculation: Multiply	Calculation: Divide
Calculation value: 49	Calculation value: 986
Output type: 2 byte	Output type: 2 byte
Output = 862 x 49	Output = 46342 : 986
Output = 42238	Output = 47

Special Notes

The number of Converters can be selected up to 8. Since the characteristics of each gate are the same, only one is described.

Fig 9 : Converter Configuration Parameter Page

3.3.1. Parameters List

PARAMETERS	DESCRIPTIONS	VALUES
Converter gate count	This parameter, is used to determine the number of converter gates. Each converter gate can be set independently.	No converter gate 1 Converter gate 2 Converter gate 3 Converter gate 4 Converter gate 5 Converter gate 6 Converter gate 7 Converter gate 8 Converter gate
CONVERTER 1		

| > Input type | This parameter, is used to specify the type of input value for the converter input. There are 8 different input values for each converter.

When the input type is configured as 1-byte or 2- byte logic, the output data type is set as 1 bit. If the input value is non-zero, the output value will be 1. Otherwise, it will be zero. | 1 Bit

2 Bit

1 Byte

2 Byte

1 Byte Logic

2 Byte Logic

1 Byte Threshold

2 Byte Threshold |
|---|---|---|
| > Input value | This parameter, is used set the value of the converter input. Several value types can be selected and these possible values are described below.

Input type is 1 Bit : If the input type is selected as 1 bit, values are between 0-1.

Input type is 2 Bit : If the input type is selected as 2 bit, values are between 0-3.

Input type is 1 Byte : If the input type is selected as 1 byte, values are between 0-255.

Input type is 2 Byte : If the input type is selected as 2 byte, values are between 0-65536.

Input type is 1 Byte logic : If the input type is selected as 1 byte logic, values are between 0-255.

Input type is 2 Byte logic : If the input type is selected as 2 byte logic, values are between 0-65536.

Input type is 1 Byte Threshold : If the input type is selected as 1 byte threshold, values are between 0-255.

Input type is 2 Byte Threshold : If the input type is selected as 2 byte threshold, values are between 0-65536. | 0…1

0…3

0…255

0…65535 |
| Calculation | This parameter is used to perform a mathematical operation with the input value. | Disabled

Plus |

	Disabled: Calculation value is disabled. Input value is converted to output value without a mathematical operation.

Plus: The calculation value is summed with the input value.

Minus: The calculation value is subtracted from the input value

Multiply: Input value and calculation value are multiplied and the result is applied to the output value.

Divide: The input value is divided by the calculation value and the result is applied to the output value. | Minus

Multiply

Divide |
| **Calculation Value** | This parameter, is used to specify the value to be processed along with the input value. This value type is same as the output value type. | 0…255

0…65535 |
| **Lower Limit** | This parameter, is used to set the lower limit value of the threshold for the input when the input is configured as 1 byte or 2 byte threshold. | 0…255

0…65535 |
| **Higher Limit** | This parameter, is used to set the higher limit value of the threshold for the input when the input is configured as 1 byte or 2 byte threshold. | 0…255

0…65535 |
| **Output type** | This parameter, is used to specify the type of output value for the converter output. There are 4 different output values for each converter. | **1 Bit**

2 Bit

1 Byte

2 Byte |
| **Output value** | This parameter, is used set the value of the converter output. Several value types can be selected and these possible values are described below.

Output type is 1 Bit : If the input type is selected as 1 bit, values are between 0-1.

Output type is 2 Bit : If the input type is selected as 2 bit, values are between 0-3. | **0…1**

0…3

0…255

0…65535 |

	Output type is 1 Byte : If the input type is selected as 1 byte, values are between 0-255. Output type is 2 Byte : If the input type is selected as 2 byte, values are between 0-65536.	

3.4. OPERATING MODE

In this section, all of the parameters are corresponding to different mode properties and communication objects. Some parameters of related objects and their tasks are described below.

➢ Operating Mode Heat/Cool object (1 bit) : The operating mode of the air conditioner can be selected as heating mode or cooling mode with this 1 bit object.

➢ Operating mode +/- object (1 bit) : Using with this object 5 different operating mode can be selected. The selection can be made with 1 bit values. Switching between the modes is done according to the following condition :
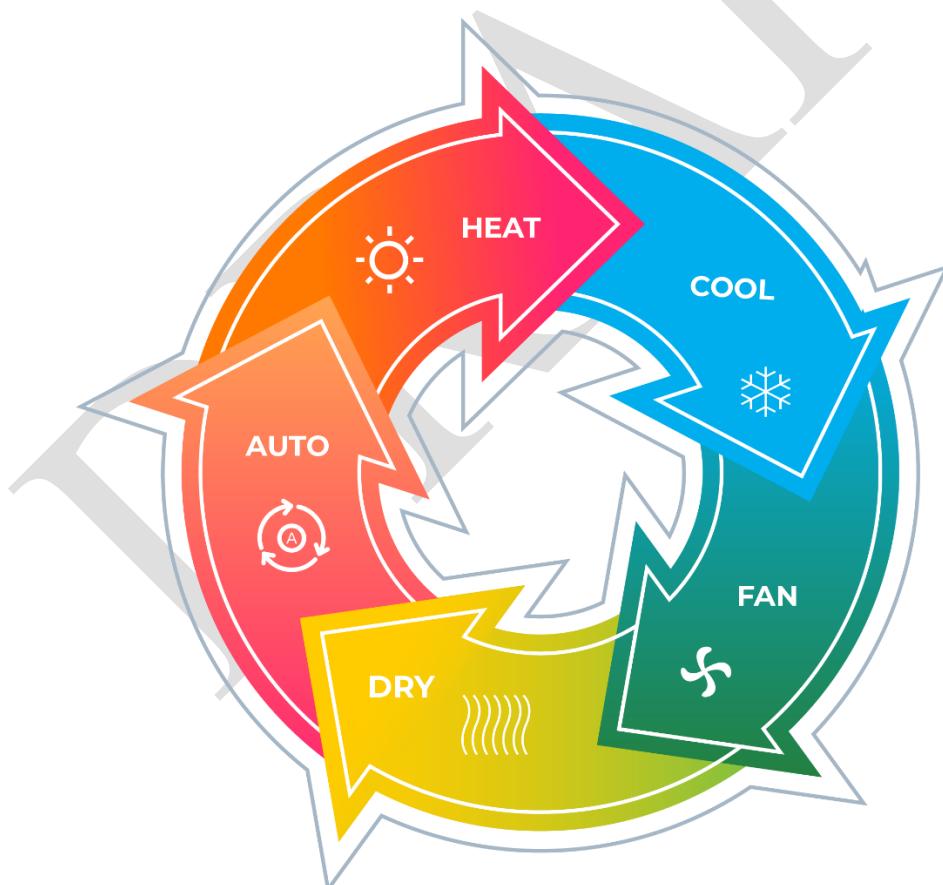

Fig 10 : Operating Modes Sequences at clockwise

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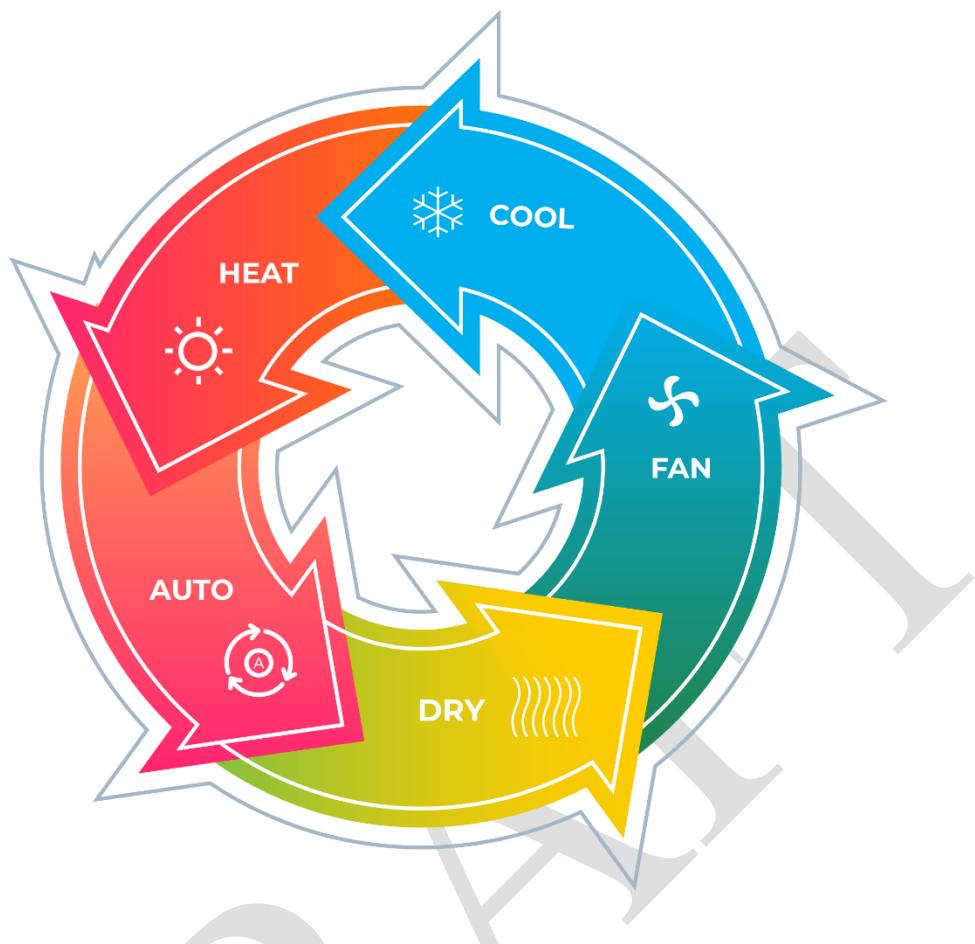
Fig 11 : Operating Modes Sequences at clockwise

➢ Operating Mode Individual objects (1-bit): The operating mode can be modified by sending value 1 to the desired mode object.

➢ Operating Mode: The operating mode can be modified with these values that are shown in the table below:

OPERATING MODE	VALUE
AUTO	0
HEAT	1
COOL	3
FAN	9
DRY	14

➢ Operating Mode Percent Value Objects: Via this 1 byte objects the indoor unit can be controlled via percentage values in order to provide compatibility with the thermostat that use this data type. By using this object, there are two different options:

➢ Priority to "Operating mode Heat/Cool" : <u>Disabled</u>

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When the priority of "Operating mode Heat/Cool" is disabled, it does not matter what is the current mode of the indoor unit, the percentage values can switch the mode and activate the indoor unit in the following way:

- If the object "Heating Mode Percent Value" takes a value greater to 0, the indoor unit will be switched ON in HEAT mode. The value 0 will switch off the air condition.

- If the object "Cooling Mode Percent Value" takes a value greater to 0, the indoor unit will be switched ON in COOL mode. The value 0 will switch off the air condition.

Special Notes
When the priority is disabled and the air condition unit is working as FAN, AUTO or DRY modes, a new value to the objects "Heating/Cooling Mode Percent Value" or "Operating Mode Heat/Cool" will change the mode to HEAT or COOL.

➢ Priority to "Operating mode Heat/Cool" : <u>Enabled</u>

When the priority is enabled, the operating mode defined cannot be modified by the percentage value objects and the behaviour will be as follow:

Actual operating mode as HEAT;

- If the object "Heating Mode Percent Value" takes a value greater than 0, the indoor unit will be switched ON. The value 0 will switch off the air condition.

- Any data received via the object "Cooling Mode Percent Value" will not be taken into consideration.

Actual operating mode as COOL;

- If the object "Cooling Mode Percent Value" takes a value greater than 0, the indoor unit will be switched ON. The value 0 will switch off the air condition.

- Any data received via the object "Heating Mode Percent Value" will not be taken into consideration.

Special Notes
When the priority is enabled and the air condition unit is working as FAN, AUTO or DRY modes, a new value to the objects "Heating/Cooling Mode Percent Value" will not be taken into consideration. Only a new value to the object "Operating Mode Heat/Cool" will change the mode to HEAT or COOL.

Special Notes	
🐞	Any modification on all above objects will be advised in the following feedback objects: Feedback Operating Mode Heat/Cool Feedback Individual Mode Auto Feedback Individual Mode Heat Feedback Individual Mode Cool Feedback Individual Mode Fan Feedback Individual Mode Dry Feedback Operating Mode Feedback Operating Mode Text

In this parameter configuration page, there are also some different special modes for operating the air conditioner. These 4 different modes are described below respectively.

Energy Saver Mode : The energy saver mode can be applied via the object "Energy Saver Mode". This mode can be configured to work during a period or during the "stop" value is received. Via the parameter or via communication object "Timer" period can be set. If the timer is disabled, the "Energy Saver Mode" will be finished at the following actions:

➢ The object "Energy Saver Mode" receives the "stop" value, the mode will stop and the previous state will be recovered at this moment.

➢ A new value for fan, mode or set point is received via KNX, the Energy Saver Mode will stop and the new value will be applied at this moment.

If the timer is enabled, the energy saver mode will be finished at below situation or once the time is elapsed. Then the previous state will be recovered. The timer can always be re-triggerable by sending the start value to the object "Energy Saver Mode".

The timer, variation of the set point and the fan speed to be applied during the energy saver mode can be selected via parameter or via communication object. With this last option, the user could modify the values any time as required.

Special Notes	
🐞	If the timer, set point shifting or fan speed values are modified via their respective objects ("Energy Saver Mode Timer Duration", "Energy Saver Mode Setpoint Shifting" and "Energy Saver Mode Fan Speed") while the energy saver mode is active, the new values will be directly applied.

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Power Saver Mode : The power saver mode can be applied via the object ". This mode can be configured to work during a period or during the "stop" value is received. Via the parameter "Timer" period can be selected. If the timer is disabled, the "Power Saver Mode" will be finished at the following actions:

➢ The object "Power Saver Mode" receives the "stop" value, the mode will stop and the previous state will be recovered at this moment.

➢ A new value for fan, mode or set point is received via KNX, the Power Saver Mode will stop and the new value will be applied at this moment.

If the timer is enabled, the energy saver mode will be finished at below situation or once the time is elapsed. Then the previous state will be recovered. The timer can always be re-triggerable by sending the start value to the object "Power Saver Mode".

The timer, variation of the set point and the fan speed to be applied during the energy saver mode can be selected via parameter or via communication object. With this last option, the user could modify the values any time as required.

Special Notes
If the timer, set point shifting or fan speed values are modified via their respective objects ("Power Saver Mode Timer Duration", "Power Saver Mode Setpoint Shifting" and "Power Saver Mode Fan Speed") while the energy saver mode is active, the new values will be directly applied.

Winter Mode : The winter mode can be applied via the object "Winter Mode". If the winter mode is applied while the operating is mode is COOL, the mode will be automatically changed to HEAT mode and the unit indoor will switch on.

This mode can be configured to work during a period or during the "stop" value is received. Via the parameter "Timer for winter mode" this can be selected. If the timer is disabled, the winter mode will be finished once the object "Winter Mode" receives the "stop" value. At this moment the mode will stop and the previous state will be recovered.

If the timer is enabled, the winter mode will be finished at bellow action or once the time is elapsed. Then the previous state will be recovered.

➢ A new value for fan, mode or set point is received via KNX or remote control will be directly applied and then the winter mode will be disabled. However, the previous status will be recovered and the air condition will remain the winter mode values applied.

The timer, set point and the fan speed to be applied during the winter mode can be selected via parameter or via communication object. With this last option, the user could modify the values every time as required.

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Special Notes
If the timer, set point or fan speed values are modified via their respective objects ("Winter Mode Timer Duration", "Winter Mode Setpoint Shifting" and "Winter Mode Fan Speed") while the winter mode is active, the new values will be directly applied.

Summer Mode : The summer mode can be applied via the object "Summer Mode". If the summer mode is applied while the operating is mode is HEAT, the mode will be automatically changed to COOL mode and the unit indoor will switch on.

This mode can be configured to work during a period or during the "stop" value is received. Via the parameter "Timer for summer mode" this can be selected. If the timer is disabled, the "Summer Mode" will be finished once the object "Summer Mode" receives the "stop" value. At this moment the mode will stop and the previous state will be recovered.

If the timer is enabled, the summer mode will be finished at below action or once the time is elapsed. Then the previous state will be recovered.

> ➢ A new value for fan, mode or set point is received via KNX or remote control will be directly applied and then the winter mode will be disable. However, the previous status will be recovered and the air condition will remain the winter mode values applied.

The timer, set point and the fan speed to be applied during the winter mode can be selected via parameter or via communication object. With this last option, the user could modify the values every time as required.

Special Notes
If the timer, set point or fan speed values are modified via their respective objects ("Summer Mode Timer Duration", "Summer Mode Setpoint Shifting" and "Summer Mode Fan Speed") while the summer mode is active, the new values will be directly applied.

All parameters described in this section are set on the operating mode parameter page. The operating mode parameter page is shown below:
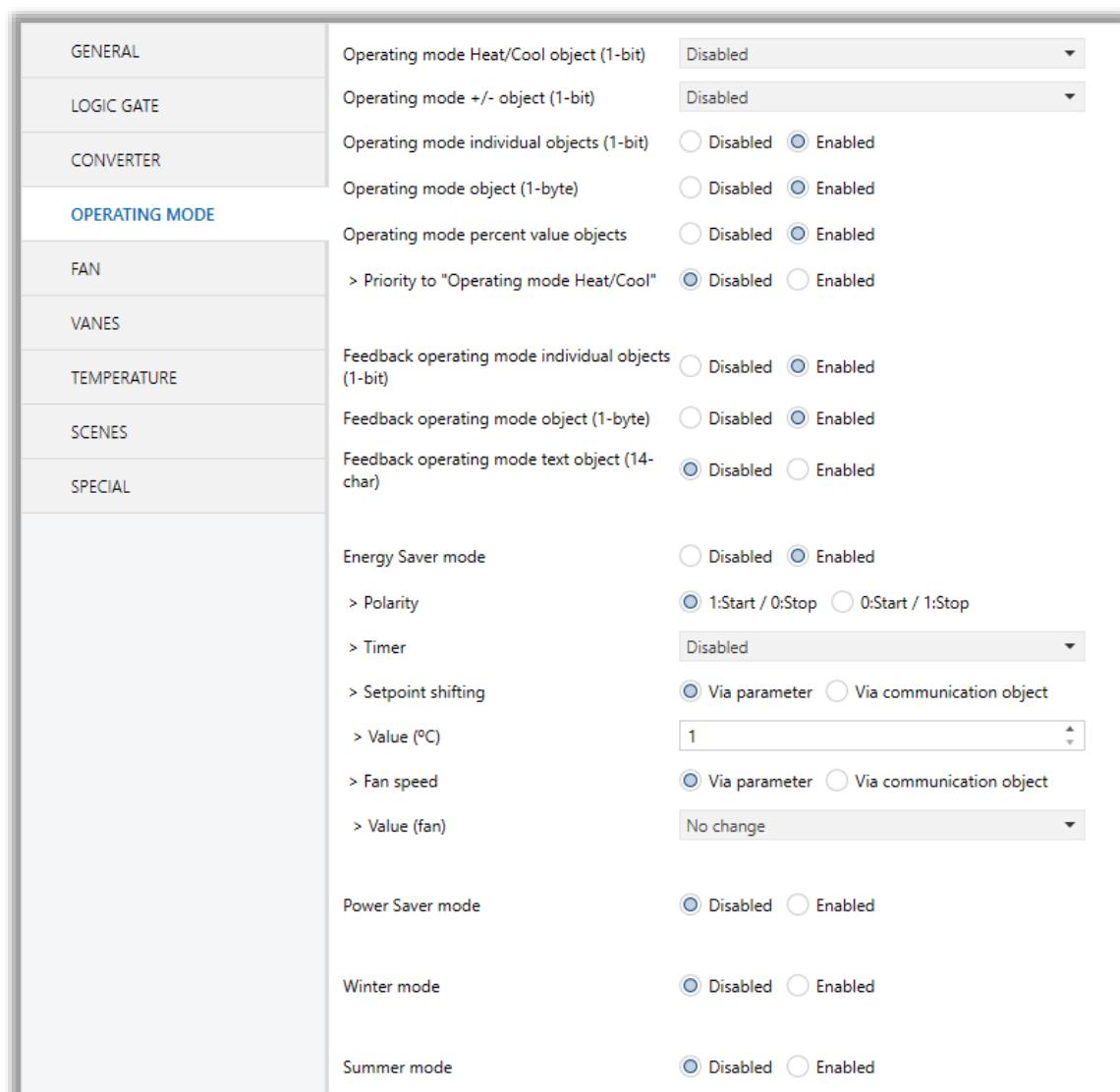
Fig 12 : Operating Mode Parameter Page

Special Notes	
🐞	All of the parameters of energy saver mode in the above parameter page image are the same for winter, power saver and summer mode. When these modes are activated, the parameters will be appeared.

3.4.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Operating mode Heat/Cool object (1-bit)	This parameter, is used to enable or disable the operating mode heat/cool and its feedback objects. **1:Heat/0:Cool :** If value 1 is sent via related object, air conditioner switches to heat mode. **0:Heat/1:Cool :** If value 1 is sent via related object, air conditioner switches to cool mode.	**Disabled** 1:Heat/0:Cool 0:Heat/1:Cool
Operating mode +/- object (1-bit)	This parameter, is used to enable or disable the operating mode +/- object. **1:Increase/0:Decrease:** If the value 1 is sent, the modes switch according to following sequence Auto->Heat->Cool->Fan->Dry **0:Up/1:Down:** If the value 0 is sent, the modes switch according to following sequence Auto->Heat->Cool->Fan->Dry	**Disabled** 1:Increase/0:Decrease 0:Up/1:Down
Operating mode individual objects (1-bit)	This parameter, is used to enable the operating modes' individual objects. These objects are : ->Individual Mode Heat ->Individual Mode Cool ->Individual Mode Auto ->Individual Mode Fan ->Individual Mode Dry	**Disabled** Enabled
Operating mode object (1-byte)	This parameter, is used to enable or disable operating mode object. Via this object, if the specified values are sent to corresponding mode the operating mode is switched to that mode.	**Disabled** Enabled
Operating mode percent value objects	This parameter, is used to enable the percent value objects of heating mode and cooling mode.	**Disabled** Enabled
> Priority to "Operating mode Heat/Cool"	This parameter, is used to enable or disable the giving priority to operating mode Heat/Cool.	**Disabled** Enabled

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Feedback operating mode individual objects (1-bit)	This parameter, is used to enable or disable the feedback objects of individual operating mode objects. If this parameter is enabled, all of the individual feedback objects of operating modes are visible.	**Disabled** Enabled
Feedback operating mode object (1-byte)	This parameter, is used to enable or disable the 1 byte feedback object of the operating mode. According to special values, the operating mode can be easily detected.	**Disabled** Enabled
Feedback operating mode text object (14-char)	This parameter, is used to enable or disable the feedback operating text mode objects.	**Disabled** Enabled
-> Text for mode AUTO	This parameter, is used type a special name for operating mode AUTO feedback text object.	-
-> Text for mode HEAT	This parameter, is used type a special name for operating mode HEAT feedback text object.	-
-> Text for mode COOL	This parameter, is used type a special name for operating mode COOL feedback text object.	-
-> Text for mode FAN	This parameter, is used type a special name for operating mode FAN feedback text object.	-
-> Text for mode DRY	This parameter, is used type a special name for operating mode DRY feedback text object.	-
Energy Saver		
Energy Saver mode	This parameter, is used to enable or disable the energy saver mode.	**Disabled** Enabled
> Polarity	This parameter, is used to specify the polarity of the energy saver mode for enabling it according to this configuration. **1:Start/0:Stop:** If the value 1 is sent, energy saver mode will be started. **0:Start/1:Stop:** If the value 0 is sent, energy saver mode will be started.	**1:Start/0:Stop** 0:Start/1:Stop

> Timer	This parameter, is used to set a timer for energy saver mode with 1 byte value. **Via parameter:** Timer interval value will be set via this parameter page. **Via communication object:** Timer interval value will be set via communication object.	**Disabled** Via parameter Via communication object
> Interval (min)	This parameter, is used to specify the timer interval value via parameter.	**0…255**
> Setpoint	This parameter, is used to select the setpoint shifting method. **Via parameter:** The setpoint will be determined according to parameter value **Via communication object:** The setpoint will be determined via communication object value.	**Via parameter** Via communication object
> Value (℃)	This parameter, is used to specify the setpoint shifting value via parameter.	**1…4**
> Fan speed	This parameter, is used to specify the fan speed value when the air conditioner switches to energy saver mode.	**Via parameter** Via communication object
> Value (fan)	This parameter, is used to select the fan speed levels from the parameter list.	**No change** Auto Fan 1 Fan 2 Fan 3
Power Saver		
Power Saver mode	This parameter, is used to enable or disable the power saver mode.	**Disabled** Enabled
> Polarity	This parameter, is used to specify the polarity of the power saver mode for enabling it according to this configuration. **1:Start/0:Stop:** If the value 1 is sent, power saver mode will be started. **0:Start/1:Stop:** If the value 0 is sent, power saver mode will be started.	**1:Start/0:Stop** 0:Start/1:Stop

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> Timer	This parameter, is used to set a timer for power saver mode with 1 byte value. **Via parameter:** Timer interval value will be set via this parameter page. **Via communication object:** Timer interval value will be set via communication object.	**Disabled** Via parameter Via communication object
> Interval (min)	This parameter, is used to specify the timer interval value via parameter.	**0…255**
> Setpoint	This parameter, is used to select the setpoint shifting method. **Via parameter:** The setpoint will be determined according to parameter value **Via communication object:** The setpoint will be determined via communication object value.	**Via parameter** Via communication object
> Value (℃)	This parameter, is used to specify the setpoint shifting value via parameter.	**1…4**
> Fan speed	This parameter, is used to specify the fan speed value when the air conditioner switches to power saver mode.	**Via parameter** Via communication object
> Value (fan)	This parameter, is used to select the fan speed levels from the parameter list.	**No change** Auto Fan 1 Fan 2 Fan 3 Fan 4
Winter		
Winter mode	This parameter, is used to enable or disable the winter mode.	**Disabled** Enabled
> Polarity	This parameter, is used to specify the polarity of the winter mode for enabling it according to this configuration. **1:Start/0:Stop:** If the value 1 is sent, winter mode will be started. **0:Start/1:Stop:** If the value 0 is sent, winter mode will be started.	**1:Start/0:Stop** 0:Start/1:Stop

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> Timer	This parameter, is used to set a timer for winter mode with 1 byte value. **Via parameter:** Timer interval value will be set via this parameter page. **Via communication object:** Timer interval value will be set via communication object.	**Disabled** Via parameter Via communication object
> Interval (min)	This parameter, is used to specify the timer interval value via parameter.	**0…255**
> Setpoint shifting	This parameter, is used to select the setpoint shifting method. **Via parameter:** The setpoint will be shifted according to parameter value **Via communication object:** The setpoint will be shifted via communication object value.	**Via parameter** Via communication object
> Value (℃)	This parameter, is used to specify the setpoint shifting value via parameter.	16…**18**…30
> Fan speed	This parameter, is used to specify the fan speed value when the air conditioner switches to winter mode.	**Via parameter** Via communication object
> Value (fan)	This parameter, is used to select the fan speed levels from the parameter list.	**No change** Auto Fan 1 Fan 2 Fan 3 Fan 4
Summer		
Summer mode	This parameter, is used to enable or disable the summer mode.	**Disabled** Enabled
> Polarity	This parameter, is used to specify the polarity of the summer mode for enabling it according to this configuration. **1:Start/0:Stop:** If the value 1 is sent, summer mode will be started. **0:Start/1:Stop:** If the value 0 is sent, summer mode will be started.	**1:Start/0:Stop** 0:Start/1:Stop

> Timer	This parameter, is used to set a timer for summer mode with 1 byte value. **Via parameter:** Timer interval value will be set via this parameter page. **Via communication object:** Timer interval value will be set via communication object.	**Disabled** Via parameter Via communication object
> Interval (min)	This parameter, is used to specify the timer interval value via parameter.	**0…255**
> Setpoint shifting	This parameter, is used to select the setpoint shifting method. **Via parameter:** The setpoint will be shifted according to parameter value **Via communication object:** The setpoint will be shifted via communication object value.	**Via parameter** Via communication object
> Value (℃)	This parameter, is used to specify the setpoint shifting value via parameter.	16…**18**…30
> Fan speed	This parameter, is used to specify the fan speed value when the air conditioner switches to summer mode.	**Via parameter** Via communication object
> Value (fan)	This parameter, is used to select the fan speed levels from the parameter list.	**No change** Auto Fan 1 Fan 2 Fan 3 Fan 4

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3.5. FAN

In this parameter page, the parameter "Fan mode available" defines if the fan mode is available in the indoor unit. If this parameter is set to "No", all the fan parameters and objects are hidden. All the parameters in this section are related with the Fan Speed properties and communication objects.

Fig 13 : FAN Configuration Parameter Page

Once the fan mode is enabled, the number of available fan levels in the indoor unit should be defined via the parameter "Number of fan level".

Special Notes
Please, do not forget to read the documentation of your indoor unit to check how many fan speeds are available.

Fan Level Control:

The fan level can be set via some different methods:

➢ Fan level can be selected by sending 1 bit values. While using this method the following sequences are applied

- If fan level is selected as 4 and loop the sequence parameter is enabled, the changeovers between the fan levels like the following figure. With the fan speed +/- object value 1 or value 0 can be send to switch between the modes sequentially.
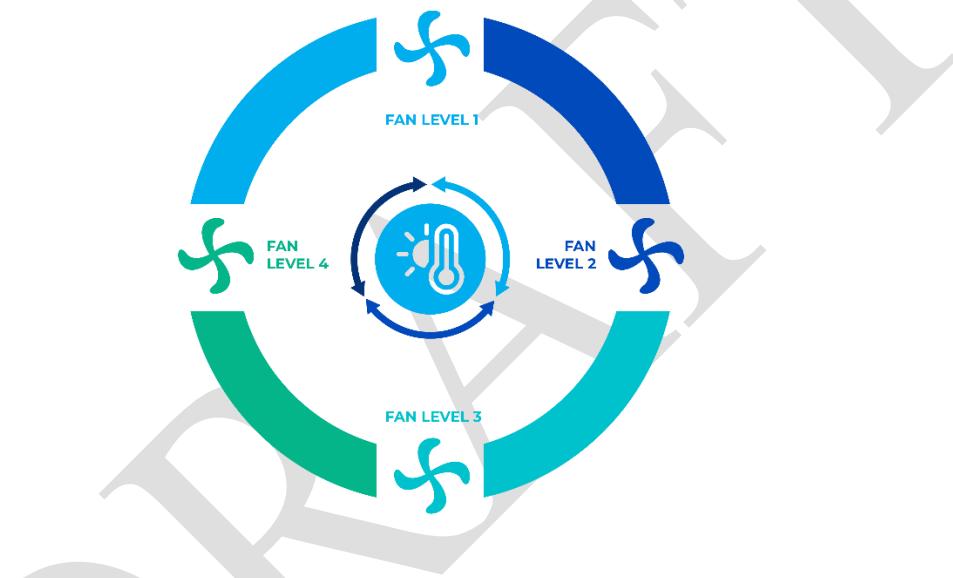
Fig 14 : 4 Fan Levels with Loop Representation

- If fan level is selected as 3 and loop the sequence parameter is enabled, the changeovers between the fan levels like the following figure. With the fan speed +/- object value 1 or value 0 can be send to switch between the modes sequentially.

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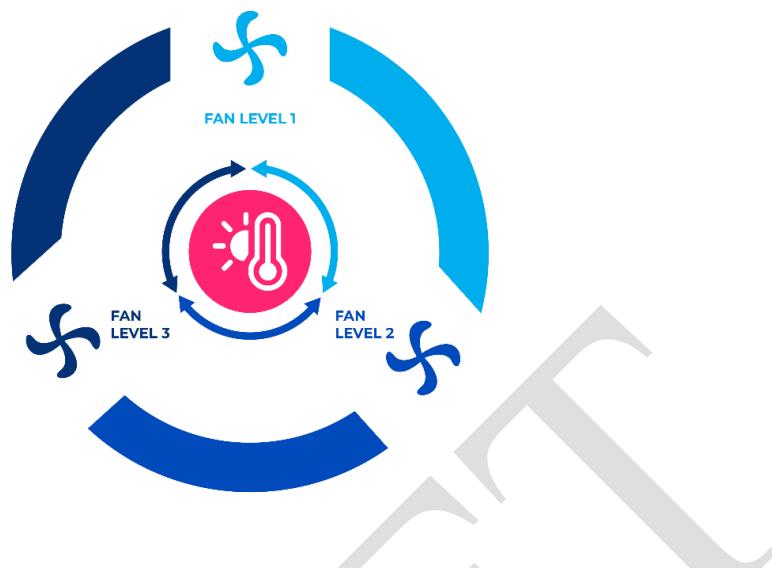
Fig 15 : 3 Fan Levels with Loop Representation

- If fan level is selected as 2 and loop the sequence parameter is enabled, the changeovers between the fan levels like the following figure. With the fan speed +/- object value 1 or value 0 can be send to switch between the modes sequentially.

Fig 16 : 2 Fan Levels with Loop Representation

- ❖ Fan speeds can be activated via percentage values. The thresholding values for each fan speed are set in the parameters "Fan (1, 2, 3, 4) lower limit".

- ❖ Fan speed can be activated by sending the numbers of each speed 1,2, 3 or 4.

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Special Notes	
🐞	If a value greater than 4 or the value 0 is received, this data will be discarded and the fan will remain in the current speed.

Special Notes	
🐞	Any modification on all above objects will be advised in the following feedback objects: Feedback Fan Speed Enumerated Feedback Individual Fan Speed 1, Feedback Individual Fan speed 2, Feedback Individual Fan speed 3, Feedback Individual Fan speed 4. Feedback Fan Speed Text

3.5.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Fan mode available	This parameter, is used to enable or disable the fan mode.	**No** Yes
Number of fan level	This parameter, is used to select the fan level of the air conditioner.	2…**3**…4
Fan level control +/- object (1-bit)	This parameter, is used to enable or disable the fan level control +/- object. **1:Increase/0:Decrease:** If the value 1 is sent, the fan levels switch according to following sequence Fan Level 1-> Fan Level 2->Fan Level 3->Fan Level 4 **0:Up/1:Down:** If the value 1 is sent, the fan levels switch according to following sequence Fan Level 4->Fan Level 3->Fan Level 2->Fan Level 1	**Disabled** 0:Up/1:Down 1:Increase/0:Decrease
> Loop the sequence	This parameter, is used to enable or disable the fan level sequence repeating considering the selected parameter polarity.	**No** Yes

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Fan level control individual objects (1-bit)	This parameter, is used to enable or disable the fan level control individual objects. For each fan speed level there is an individual fan speed object. These objects are: Individual Fan Speed 1 Individual Fan Speed 2 Individual Fan Speed 3 Individual Fan Speed 4	**Disabled** Enabled
Fan level control & feedback objects (1-byte)	This parameter, is used to determine the fan level control type with 1 byte communication objects **Scaling:** Via scaling object, according to threshold defined in parameters fan speed will be determined. **Enumerated:** Via enumerated object, if value 1 is sent fan level will be fan speed 1. Likewise, value 2 causes fan speed 2, value 3 causes fan speed 3 and value 4 causes fan speed 4.	**Disabled** Scaling Enumerated
> Fan 1 lower limit (%)	This parameter, is used to set the lower limit 1 fan level threshold value to compare with the received value from KNX bus line. After compare, the corresponding fan speed will be chosen.	0…**1**…100
> Fan 2 lower limit (%)	This parameter, is used to set the lower limit 2 fan level threshold value to compare with the received value from KNX bus line. After compare, the corresponding fan speed will be chosen.	0…**30**…100
> Fan 3 lower limit (%)	This parameter, is used to set the lower limit 3 fan level threshold value to compare with the received value from KNX bus line. After compare, the corresponding fan speed will be chosen.	0…**60**…100
> Fan 4 lower limit (%)	This parameter, is used to set the lower limit 4 fan level threshold value to compare with the received value from KNX bus line. After compare, the corresponding fan speed will be chosen.	0…**90**…100
Feedback Fan level individual objects (1-bit)	This parameter, is used to enable or disable the individual fan level objects.	**Disabled** Enabled
Feedback fan level text object (14-char)	This parameter, is used to enable or disable the feedback fan level text object.	**Disabled** Enabled

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-> Text for fan speed 1	This parameter, is used type a special name for fan speed 1 .	FAN 1
-> Text for fan speed 2	This parameter, is used type a special name for fan speed 2.	FAN 2
-> Text for fan speed 3	This parameter, is used type a special name for fan speed 3.	FAN 3
-> Text for fan speed 4	This parameter, is used type a special name for fan speed 4.	FAN 4

3.6. VANES

In this parameter page, all the parameters are related with the Vanes properties and communication objects. The parameter "Vanes control available" defines if the vanes control is available in the indoor unit. If this parameter is set to "No", all the vanes parameters and objects are hidden.

Fig 17 : Vanes Configuration Parameter Page

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Once the vane control is enabled, the number of available positions in the indoor unit should be defined via the parameter "Available vanes positions". Besides the parameter "AUTO vanes mode available" defines if the AUTO vanes mode is available.

Vanes Control:

The vanes position can be set via some different methods:

➢ Vane position can be controlled by sending 1 bit values. While using this method the following sequence is applied :

Loop the sequence: Yes		Loop the sequence: No	
Up (Value 0) Increase (Value 1)	Down (Value 1) Decrease (Value 0)	Up (Value 0) Increase (Value 1)	Down (Value 1) Decrease (Value 0)

- — — — — — — — — — AUTO mode is available
- — — — — — — — — — POS 3 is available
- — — — — — — — — — POS 4 is available
- — — — — — — — — — POS 5 is available
- — — — — — — — — — SWING is available
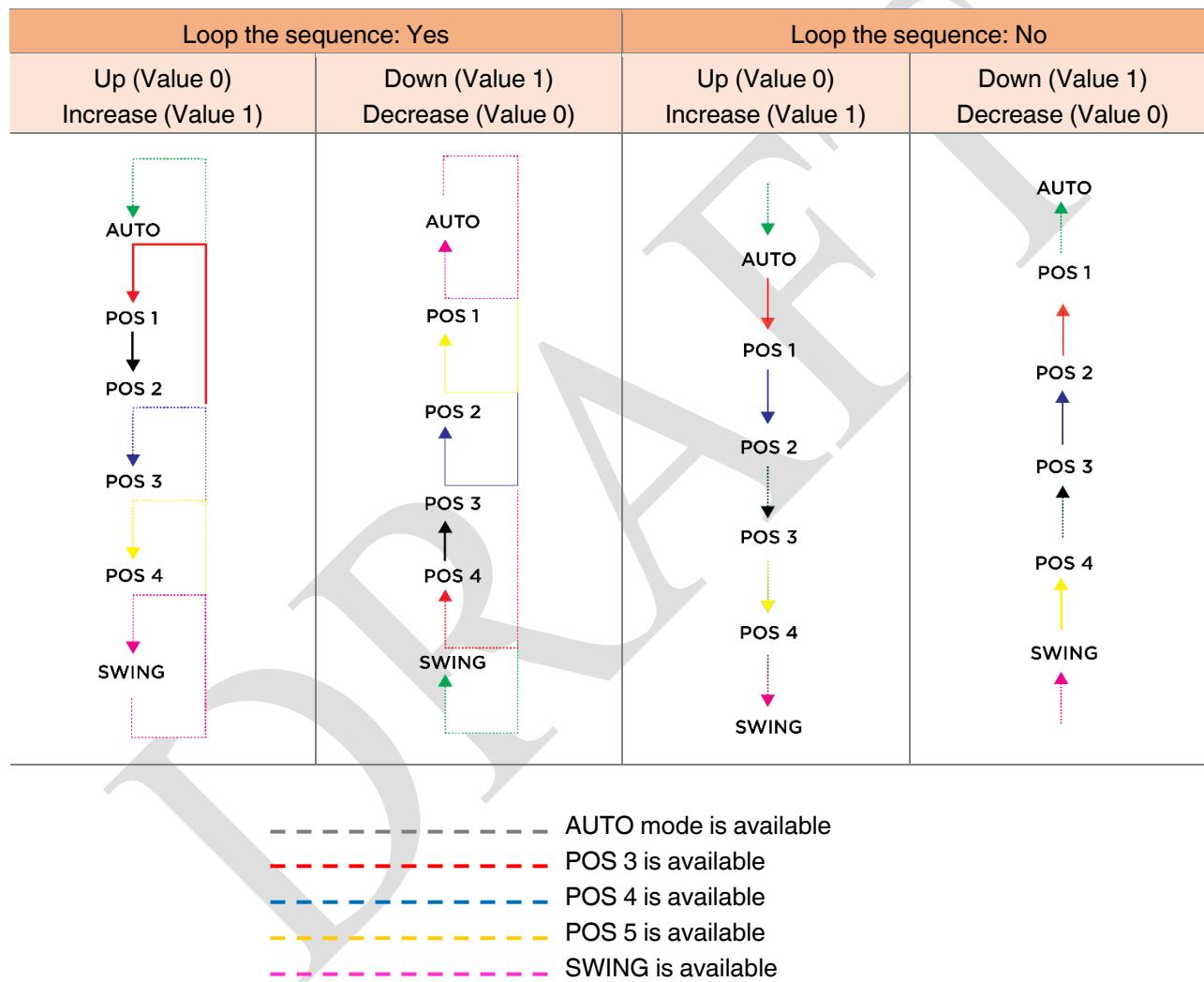
➢ Vane positions can be controlled via percentage values. The thresholding values for each position are set in the parameters "Vanes position (1, 2, 3, 4) lower limit".

➢ Vane positions can be control by sending the numbers of each position: 1, 2, 3 or 4.

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Special Notes	
	If a value greater than 4 or the value 0 is received, this data will be discarded and the vanes will remain in the current position.

Special Notes	
	Any modification on all above objects will be advised in the following feedback objects: Feedback Vanes Position Percent / Enumerated Feedback Vanes Position Manual/Auto, Feedback Vanes Position 1, Feedback Vanes Position 2, Feedback Vanes Position 3, Feedback Vanes Position 4, and Feedback Vanes Swing. Feedback Vanes Position Text.

3.6.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Vanes control available	This parameter, is used to enable or disable the vanes control function. If this parameter is selected as yes, all of the vanes parameters will be visible.	No Yes
Available vanes positions	This parameter, is used to select the vanes positions. Vane position value should be select correctly according to the indoor unit.	3…4
Vanes control +/- objects (1-bit)	This parameter, is used to enable the vanes control object to change the desired vane position. 1:Increase/0:Decrease: If the value 1 is sent, the vane position switches according to following sequence Auto->Pos 1->Pos 2->Pos 3->Pos 4. 0:Up/1:Down: If the value 1 is sent, the vane position switches according to following sequence Auto->Pos 1->Pos 2->Pos 3->Pos 4.	Disabled 1:Increase/0:Decrease 0:Up/1:Down
> Include SWING vanes mode in the sequence	This parameter, is used to include the SWING function to the vane position sequence. If vanes	No

	position is selected as 4, SWING feature will comes from after the pos 4 in the sequence.	Yes
> Loop the sequence	This parameter, is used to control the sequence in a loop. According to vanes position +/- object configuration polarity, the sequence will be repeated.	**No** Yes
Vanes control individual objects (1-bit)	This parameter, is used to enable or disable the individual vanes control objects. When a '1' value is sent to related individual object, the vanes position is set to the corresponding object position. If this object is "vane set position 2" and 1 value is sent, the vane position will be position 2.	**Disabled** Enabled
Vanes control & feedback objects (1-byte)	This parameter, is used to determine the vanes control type with 1 byte communication objects. This parameter also enables the corresponding feedback objects. **Scaling:** Via scaling object, according to threshold defined in parameters vane position will be determined. **Enumerated:** Via enumerated object, if value 1 is sent vane position will be position 1. Likewise, value 2 causes vane position 2 and value 3 causes vane position 3 and so on.	**Disabled** Scaling Enumerated
> Vanes position 1 lower limit	This parameter, is used to specify the vane position 1 lower limit.	0...**1**…100
> Vanes position 2 lower limit	This parameter, is used to specify the vane position 2 lower limit.	0...**30**…100
> Vanes position 3 lower limit	This parameter, is used to specify the vane position 3 lower limit.	0...**60**…100
> Vanes position 4 lower limit	This parameter, is used to specify the vane position 4 lower limit.	0...**90**…100
Feedback vanes control individual objects (1-bit)	This parameter, is used to enable or disable the individual fan level objects.	**Disabled** Enabled

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Feedback vanes control text objects (14-char)	This parameter, is used to enable or disable the feedback vanes text object.	**Disabled** Enabled
> Text for vanes SWING	This parameter, is used type a special name for SWING function. Text can be up to 14 character.	**SWING**
> Text for vanes Position 1	This parameter, is used type a special name for vane position 1. Text can be up to 14 character.	**POSITION 1**
> Text for vanes Position 2	This parameter, is used type a special name for vane position 2. Text can be up to 14 character.	**POSITION 2**
> Text for vanes Position 3	This parameter, is used type a special name for vane position 3. Text can be up to 14 character.	**POSITION 3**
> Text for vanes Position 4	This parameter, is used type a special name for vane position 4. Text can be up to 14 character.	**POSITION 4**

3.7. TEMPERATURE

In this section, all of the parameters are corresponding to setpoint temperature, AC unit ambient temperature. Some parameters of related objects and their tasks are described in this part.

Ambient Temperature:

The air conditioner internal unit can display the temperature information via the "Feedback Indoor Temperature" object. However it is also possible to receive the measurement of the measured ambient temperature from KNX by enabling the parameter "Ambient temperature received from KNX".

If this option is enable, it is necessary to do an adjustment in the setpoint to be sent to the indoor unit. The result of the following calculation is sent to the air condition:

"Feedback Setpoint Temperature" = Feedback Indoor Temp – (KNX Ambient Temp – Setpoint Temp)

Special Notes
The values of the air condition internal temperature and setpoint can be sent to the bus on change and/or periodically. By choosing periodically the period of sending can be defined from 1 to 255 seconds.

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Setpoint Temperature:

Via the parameter "Limits for setpoint control" it is possible to enable a range for the setpoint to be modified. By enabling this option, the minimum and maximum set points available to send via KNX will be defined in the parameters "Setpoint lower limit" and "Setpoint higher limit". By disabling this option, per default the lower and higher limits will be limits of air condition unit.

Via the object "Setpoint Temperature -/+" the setpoint temperature can be modified via a 1 bit object as follow:

- By sending "Up" (Value 0) or "Increase" (Value 1): The setpoint temperature will be increased by steps of 1ºC until air condition unit limit or defined higher limit value.

- By sending "Down" (Value 1) or "Decrease" (Value 0): The setpoint temperature will be decreased by steps of 1ºC until the air condition unit lower limit value.

In the following figure, Temperature configuration parameter page is shown.

Fig 18 : Temperature Configuration Parameter Page

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3.7.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Ambient temperature received from KNX	This parameter enables the ambient temperature reception from KNX bus.	**Disabled** Enabled
Sending of AC internal temperature	This parameter enables the sending of internal temperature value information. **Disabled:** Temperature information is not sent. **Periodically:** Temperature information is sent periodically. **On change:** Temperature information is sent when there is 1K change in the temperature value. **Periodically and on change**: Temperature information is sent periodically and this information is sent when there is 0.5K change in the temperature value.	**Disabled** Periodically On change Periodically and on change
> Period of sending (sec)	This parameter sets the sending period of the internal temperature value in seconds.	**1…255**
Sending of AC setpoint temperature	This parameter enables the sending of internal temperature value information. **Periodically:** Temperature information is sent periodically. **On change:** Temperature information is sent when there is 1K change in the temperature value. **Periodically and on change**: Temperature information is sent periodically and this information is sent when there is 1K change in the temperature value.	**Periodically** On change Periodically and on change
> Period of sending (sec)	This parameter sets the sending period of the setpoint temperature value in seconds.	**1…255**

Setpoint control +/- object (1-bit)	This parameter enables to change the desired temperature value as +/- with 1 bit object.	**Disabled** 1:Increase/0:Decrease 0:Up/1:down
Limits for setpoint control	This parameter enables limits for the setpoint temperature value.	**Disabled** Enabled
> Setpoint lower limit	This parameter activates lower limit for the setpoint temperature value.	16…**18**…30
> Setpoint higher limit	This parameter activates higher limit for the setpoint temperature value.	16…**18**…30

3.8. SCENES

In this parameter page, up to 5 different scenarios can be configured. Each scene functions are identical and the configuration of each scene permits:

- ➢ Number of scenes (Between 1-64) can be assigned.

- ➢ The air condition unit's on/off values can be set.

- ➢ The air condition unit's AC mode can be configured.

- ➢ Fan levels of the related scene can be specified.

- ➢ Vane positions of the related scene can be specified.

- ➢ The setpoint temperature can be set of the scene.

- ➢ The scene can be stored by enabling the storage function.

- ➢ Delay time can be specified for starting the scene.

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Fig 19 : Scenes Configuration Parameter Page

Via the object "Scene", telegrams which contents the call or store functions of a scene are sent. Up to 1...64 scenario numbers can be selected for 5 scenarios via a single group address. The scenario number telegram must match the pre-configured scenario number in the parameters.

The scene number (1-64), is used to recall the scene via the corresponding object. For storage the scene, the value sent via the object "Scene" must be 128+scene number. The recall of each scene can be delayed whether a time delay has been previously defined in the parameter window.

Special Notes
After ETS programming, the scene values parameterized for the output concerned will be overwritten into the gateway. It means that any change made by the user will be deleted. Therefore, it is important, before any maintenance, to know the previous scene configuration and whether the user wants to keep operating with that configuration.

3.8.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Scene 1 . . Scene 5	This parameter, is used to enable or disable the related scenario.	**Disabled** Enabled
> Number	This parameter, is used to specify the scene number of the corresponding scene.	1…64
> AC On/Off	This parameter, is used to determine the on/off status of the air condition unit for the selected scenario.	**On** Off Not Involved
> AC Mode	This parameter, is used to specify the mode of air condition unit for the selected scenario.	**Auto** Heat Cool Fan Dry Not Involved
> AC Fan level	This parameter, is used to specify the fan level of air condition unit for the selected scenario.	**Fan 1** Fan 2 Fan 3 Fan 4 Not Involved
> AC Vanes position	This parameter, is used to specify the vane positions of air condition unit for the selected scenario.	Pos 1 **Pos 2** Pos 3 Pos 4 Swing Not Involved
> AC Setpoint temperature	This parameter, is used to specify the setpoint temperature of the selected scenario.	**Not Involved** 16℃…30℃
> Storage function	This parameter, is used to save the selected scenario.	**Disabled** Enabled

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> Delay (sec)	This parameter, is used to set a delay time for starting the selected scene.	0…255
> Activation object (1-bit)	This parameter, is used to enable or disable the activation object to activate the scenario.	Disabled Enabled

3.9. SPECIAL

In this section, special functionalities of the Mitsu & VRV AC KNX Gateway are described. The gateway has 4 different functions for special purposes. Each of them are explained in separate subtitles below :

Working Hours Counter : This function is used to know air conditioner's operating hour as "ON" position. When the "ON" status of air condition unit is counted during one hour, object value increasing "1K". Counter is available to create an alert in order to warn the user after desired time later. The counter can be reset via "Reset Hours Counter" object.

Window Contact : This function is used for window contacts to determine the operation type when the window contacts are open or close. When the "window is open" information is received, it is possible to switch off the air condition unit or activate any predefined scene. However, it is possible to specify a delay time for operation type to be started or to restrict the On / Off action of the air condition unit. After incoming "window contacts are closed" information, behaviour of air condition unit can be selected as one of predefined scenario, OFF or previous state of this function.

Standby Function : This function is used to activate the standby modes for the air condition unit to determine operation type for the standby modes. During standby function, it is possible to make setpoint shifting, activate any predefined scene or switch off the air condition unit. However, it is possible to specify delay time for operation type to be started or to reject modifications for the air condition unit during standby function. After incoming standby function stop information, behaviour of air condition unit can be selected as one of scenario, off or previous state. Additionally, secondary standby function is available and same parameters and object are valid for secondary standby function.

Timer Function : Timer function switches off the air condition unit after defined time. Polarity and durations can be determined via sub parameters of this function. Timer function is also retriggerable and when timer retrigger is enabled, timer restart itself for counting for switch off the air condition unit.
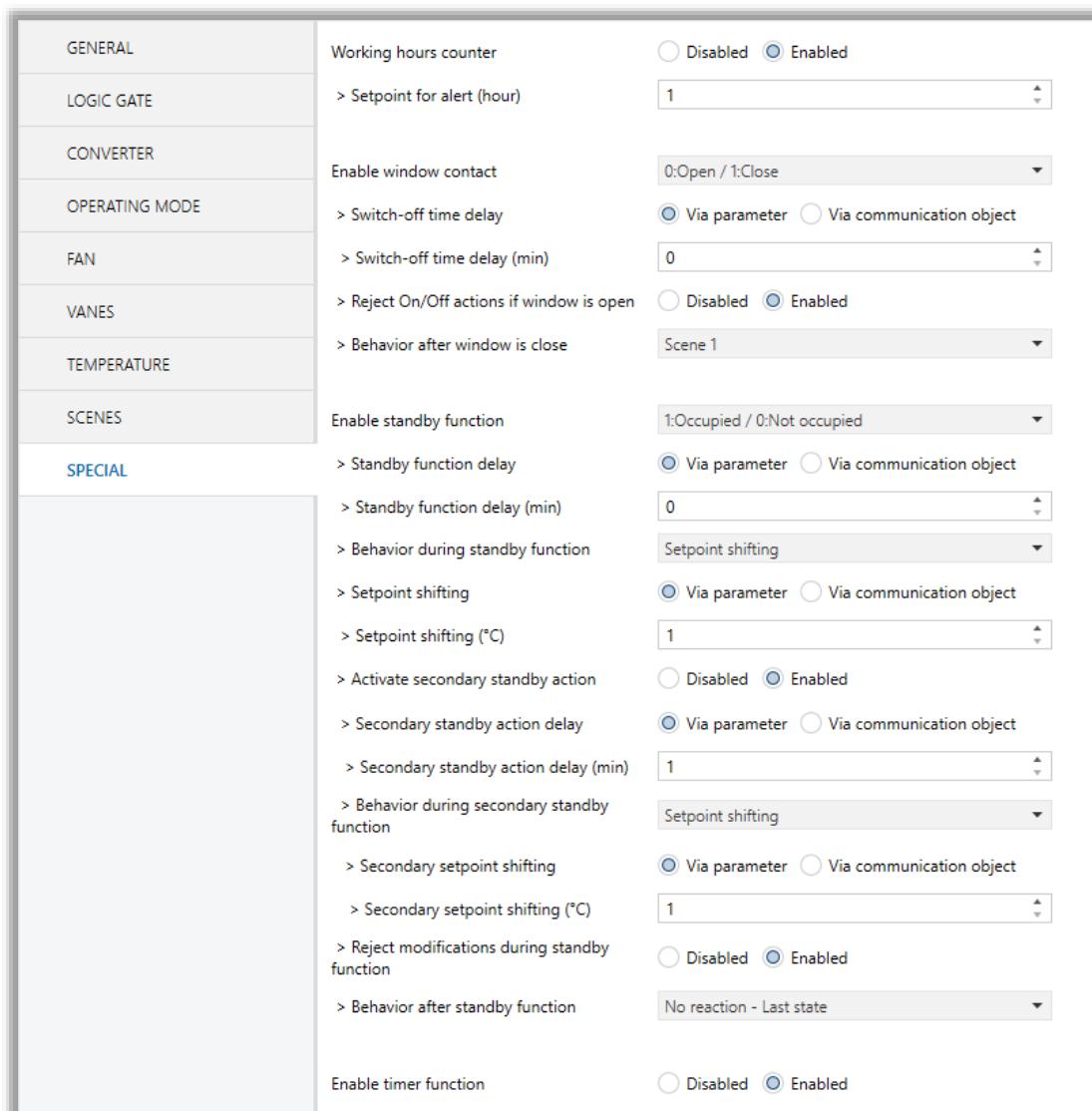
Fig 20 : Special Configuration Parameter Page

3.9.1. Parameters List

PARAMETERS	DESCRIPTION	VALUES
Working hours counter	This parameter, is used to enable or disable the working hours counter function.	**Disabled** Enabled
> Setpoint for alert (hour)	This parameter, is used to set a setpoint alarm point for working hours counter of the air conditioner unit.	1…65535

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Enable window contact	This parameter, is used to enable or disable the air conditioner unit's window contact function.	**Disabled** 0:Open/1:Close 1:Open/0:Close
> Switch-off time delay	This parameter, is used to specify the switch-off time delay that is sent via parameter or communication object.	**Via parameter** Via communication object
> Switch-off time delay (min)	This parameter, is used to set delay time in minutes to switch off the air conditioner.	0…255
> Reject On/Off actions if window is open	This parameter, is used to reject on & off actions of the air conditioner unit's when the window is opened.	**Disabled** Enabled
> Behaviour after window is close	This parameter, is used to specify the behaviour after window is closed. For instance, one of the configured scenarios can operated, the conditioner unit is turned off or last state is maintained.	**No reaction – Last state** Off Scene 1 Scene 2 Scene 3 Scene 4 Scene 5
Enable standby function	This parameter, is used to enable or disable the standby function. According to occupied or not occupied status, configurations can be made.	**Disabled** 1:Occupied/0:Not occupied 1:Start/0:Stop
> Standby function delay	This parameter, is used to specify the standby function delay that is sent via parameter or communication object.	**Via parameter** Via communication object
> Standby function delay (min)	This parameter, is used to set a delay time in minutes for standby function.	0…255

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> Behaviour during standby function	This parameter, is used to configure the behaviour during standby function. For instance, one of the configured scenarios can operated, the conditioner unit is turned off or last state is maintained.	Setpoint shifting Off Scene 1 Scene 2 Scene 3 Scene 4 Scene 5
> Setpoint shifting	This parameter, is used to specify the setpoint shifting that is sent via parameter or communication object.	Via parameter Via communication object
> Setpoint shifting (℃)	This parameter, is used to set the setpoint shifting temperature value.	1…4
> Activate secondary standby action	This parameter, is used to enable or disable the secondary standby function.	Disabled Enabled
> Secondary standby action delay	This parameter, is used to specify the secondary standby action delay that is sent via parameter or communication object.	Via parameter Via communication object
> Secondary standby action delay (min)	This parameter, is used to specify the secondary standby action delay in minutes.	1…255
> Behaviour during secondary standby function	This parameter, is used to configure the behaviour during secondary standby function. For instance, one of the configured scenarios can operated, the conditioner unit is turned off or last state is maintained.	Setpoint shifting Off Scene 1 Scene 2 Scene 3 Scene 4 Scene 5
> Secondary setpoint shifting	This parameter, is used to set the secondary setpoint shifting temperature value.	Via parameter Via communication object
> Secondary setpoint shifting (℃)	This parameter, is used to set the secondary setpoint shifting temperature value.	1…4
> Reject modifications during standby function	This parameter, is used to enable or disable the reject modifications during standby function. If this parameter is enabled, no modifications can be allowed in standby mode.	Disabled Enabled

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> Behaviour after standby function	This parameter, is used to configure the behaviour during standby function. For instance, one of the configured scenarios can operated, the conditioner unit is turned off or last state is maintained.	No reaction – Last state Off Scene 1 Scene 2 Scene 3 Scene 4 Scene 5
Enable timer function	This parameter, is used to enable or disable the timer function.	Disabled Enabled
> Polarity	This parameter, is used to specify the polarity of enabling command the timer function.	1:Start/0:Stop 0:Start/1:Stop
> Timer duration	This parameter, is used to specify the timer duration that is sent via parameter or communication object.	Via parameter Via communication object
> Timer duration (min)	This parameter, is used to set delay time in minutes for timer function.	1…65535
> Timer retriggerable	This parameter, is used to restart the timer.	No Yes

4. ETS OBJECTS LIST & DESCRIPTIONS

The Interra Mitsubishi Heavy FD & VRF AC KNX Gateway can communicate via the KNX bus line. In this section, the group objects of the Interra Mitsubishi Heavy Gateway are described.

ETS group objects are divided 10 main parts, and these are :

- ❖ **General** - General group objects for the Mitsubishi Heavy Gateway.

- ❖ **Logic Gate** - These objects are related with logic gate parameters.

- ❖ **Converter** - These objects are related with converter parameters.

- ❖ **Operating Mode** - These objects are related with operating mode parameters.

- ❖ **Fan** - These objects are related with fan parameters.

- ❖ **Vanes** - These objects are related with vanes parameters.

- ❖ **Temperature** - These objects are related with temperature parameters.

- ❖ **Scenes**- These objects are related with scenes parameters.

- ❖ **Special** - These objects are related with special functions.

Special Note
Due to the flexible ETS configurations feature, some group objects are dynamic and they are only visible if the related parameters are activated in the application program.

All of the group objects of Interra Mitsubishi Heavy Industries FD & VRF AC KNX Gateway are listed below. You can quickly browse through this table to get the functional capabilities of Interra Mitsubishi Heavy Gateway.

The detailed functions of group objects are described in different topics.

4.1. GENERAL OBJECTS

This section describes the "general" group objects and their properties. General group objects, as the name suggests, indicate the general characteristics of the Mitsubishi Heavy Gateway.

Object Name	Function	Type	Flags
Alive Beacon	1:True/0:False	1 bit	CRT

This object, is used to monitor the presence of the device on the KNX bus line regularly. However, monitoring telegram can be sent cyclically on the KNX bus line. This object is appeared only "Module Alive Beacon" parameter is enabled.

Climate On/Off	1:On/0:Off	1 bit	CWT

This object, is used to turn the Gateway on or off. Also, this object is visible permanently. If you associate the desired group address, Gateway can be controlled with On and Off.

Feedback Climate On/Off	1:On/0:Off	1 bit	CRT

This object, is used to check the status of the air conditioner unit. Also, this object is visible permanently. If you associate the desired group address, Gateway's ON and OFF status can be monitored.

Setpoint Temperature	Temperature (Celsius)	2 bytes	CWT

This object, is used to set the air conditioner unit's temperature. Also, this object is visible permanently. The temperature can be set to desired value and then the air conditioner works according to this value.

Feedback Setpoint Temperature	Temperature (Celsius)	2 bytes	CRT

This object, is used to check the status of the air conditioner's setpoint temperature. Also, this object is visible permanently. If you associate the desired group address, Gateway's setpoint temperature can be monitored.

Feedback Indoor Temperature	Temperature (Celsius)	2 bytes	CRT

This object, is used to check the status of the air conditioner unit's indoor temperature. Also, this object is visible permanently. If you associate the desired group address, Gateway's indoor temperature can be monitored.

Feedback Error Alarm	1:Alarm/0:No Alarm	1 bit	CRT

This object, is used to check the status of the air conditioner unit's error alarm. Also, this object is visible permanently. If there is an error alarm and a group address is associated with corresponding object, the alarm can be monitored.

Feedback Error Code	Error Code Information	2 bytes	CRT

This object, is used to give information about the error codes. This functionality allows sending messages to the KNX bus informing about errors. Errors management handles air conditioner unit error codes as well as any communication errors that may arise. For more detailed information check the section APPENDIX.

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Device Control Locking	1:Enabled / 0:Disabled	1 bit	CRT
	0:Enabled / 1:Disabled		

This object, is used to lock the gateway device. When a "1" value is sent to this communication object, the gateway is locked. If a value sent to gateway via its communication objects, all values are ignored. For unlocking the gateway, a "0" value must be sent.

4.2. LOGIC GATE OBJECTS

This section describes the "Logic Gate" group objects and their properties. Logic Gate group objects, as the name suggests, indicate the logical operations can be made with Mitsubishi Heavy Gateway.

Object Name	Function	Type	Flags
Logic 1	Input 1 – Logic Input	1 bit	CRWT
	Input 2 – Logic Input		
	Input 3 – Logic Input		
	Input 4 – Logic Input		

This object is used to set the inputs of the logical gate to be used. Logical associations can be made over 1-bit values. The result is obtained according to the type of logical gate selected.

Logic 1	Output – Logic Output	1 bit	CRT

This object, is used to obtain the result of the logical gate to be used. The output value of the logical gate is 1 bit. The result is obtained according to the type of logical gate selected.

Special Notes
This is a fully compatible KNX device which must be configured and setup using standard KNX tool ETS. Up to 4 different logic gates can be selected. Each logic gates can be set independently.

4.2. CONVERTER OBJECTS

This section describes the "Converter" group objects and their properties. Converter group objects are used to make mathematical operations and data converting from different types. Up to 8 different converters can be configured.

Object Name	Function	Type	Flags
Converter 1	Input (1-Bit) – Converter Input	1 bit	CRWT
	Input (2-Bit) – Converter Input	2 bit	
	Input (1-Byte) – Converter Input	1 byte	
	Input (2-Byte) – Converter Input	2 byte	

This object, is used to set the converter inputs to be used. The conversion processes can be made via 1 bit, 2bit, 1 byte and 2 byte values. The result is obtained according to the input type of the selected converter.

Object Name	Function	Type	Flags
Converter 1	Input (1-Bit) – Converter Output	1 bit	CRWT
	Input (2-Bit) – Converter Output	2 bit	
	Input (1-Byte) – Converter Output	1 byte	
	Input (2-Byte) – Converter Output	2 byte	

This object, is used to obtain the result of the converter to be used. The output value of the converter can be 1 bit, 2 bit, 1 byte and 2 bytes. The result is obtained according to the configuration of the selected converter.

4.3. OPERATING MODE OBJECTS

This section describes the "Operating Mode" group objects and their properties. Heat, cool, dry, auto and fan mode communication objects are described. Also, simple heating-cooling mode and summer, winter, energy saver and power saver mode objects are clarified.

Object Name	Function	Type	Flags
Operating Mode	0:Aut/1:Hea/3:Coo/9:Fan/14:Dry	1 byte	CWT

This object, is used to set the operating modes of the air conditioner. You can select AUTO with 0, HEAT with 1, COOL with 3, FAN with 9, and DRY with 14.

Object Name	Function	Type	Flags
Feedback Operating Mode	0:Aut/1:Hea/3:Coo/9:Fan/14:Dry	1 byte	CRT

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This object, is used to monitor the status of operating modes of the air conditioner. With value 0 the status is AUTO, with value 1 the status is HEAT, with value 3 status is COOL, with value 9 the status is FAN and with value 14 the status is DRY can be understand.

Operating Mode Heat/Cool	1:Heat/0:Cool 0:Heat/1:Cool	1 bit	CWT

This object, is used to set the operating mode of the air conditioner unit. When selecting this option, the related 1 bit object will be enabled. It allows establishing the desired mode: Cool mode, writing the value "0" in the object and Heat mode, writing the value "1" or vice versa.

Feedback Operating Mode Heat/Cool	1:Heat/0:Cool 0:Heat/1:Cool	1 bit	CRT

This object, is used to check the operating mode of the air conditioner unit.

Heating Mode Percent Value	0%:Off/1%-100%: On+Heat	1 byte	CWT

This object, is used to change operating mode to heat via incoming percentage value. It also provides compatibility with KNX thermostats that control the demand of heating or cooling by using percentage values. In these thermostats, the percentage demand is meant to be applied on a fluid valve of the heating / cooling system. If a non zero value is received (>0%) the indoor unit will switch on to Heat mode.

Cooling Mode Percent Value	0%:Off/1%-100%:On+Cool	1 byte	CWT

This object, is used to change operating mode to cool via incoming percentage value. It also provides compatibility with KNX thermostats that control the demand of heating or cooling by using percentage values. In these thermostats, the percentage demand is meant to be applied on a fluid valve of the heating / cooling system. If a non zero value is received (>0%) the indoor unit will switch on to Cool mode.

Individual Mode Auto	1:Set Mode Auto/0:Nothing	1 bit	CWT

This object, is used to change the air conditioner's operating mode to auto mode via 1 bit object individually. If the value 1 is sent over the 1-bit value, the air conditioning unit will switch to automatic mode.

Feedback Individual Mode Auto	1:Auto	1 bit	CRT

This object, is used to monitor the air condition unit status individually. If value 1 is received from this object, the operating mode is auto.

Individual Mode Heat	1:Set Mode Heat/0:Nothing	1 bit	CWT

This object, is used to change the air conditioner's operating mode to heat mode via 1 bit object individually. If the value 1 is sent over the 1-bit value, the air conditioning unit will switch to heat mode.

Feedback Individual Mode Heat	1:Heat	1 bit	CRT

This object, is used to monitor the air condition unit status individually. If value 1 is received from this object, the operating mode is heat.

Individual Mode Cool	1:Set Mode Cool/0:Nothing	1 bit	CWT

This object, is used to change the air conditioner's operating mode to cool mode via 1 bit object individually. If the value 1 is sent over the 1-bit value, the air conditioning unit will switch to cool mode.

Feedback Individual Mode Cool	1:Cool	1 bit	CRT

This object, is used to monitor the air condition unit status individually. If value 1 is received from this object, the operating mode is cool.

Individual Mode Fan	1:Set Mode Heat/0:Nothing	1 bit	CWT

This object, is used to change the air conditioner's operating mode to fan mode via 1 bit object individually. If the value 1 is sent over the 1-bit value, the air conditioning unit will switch to fan mode.

Feedback Individual Mode Fan	1:Fan	1 bit	CRT

This object, is used to monitor the air condition unit status individually. If value 1 is received from this object, the operating mode is fan.

Individual Mode Dry	1:Set Mode Dry/0:Nothing	1 bit	CWT

This object, is used to change the air conditioner's operating mode to dry mode via 1 bit object individually. If the value 1 is sent over the 1-bit value, the air conditioning unit will switch to dry mode.

Feedback Individual Mode Dry	1:Dry	1 bit	CRT

This object, is used to monitor the air condition unit status individually. If value 1 is received from this object, the operating mode is dry.

Operating Mode +/-	1:Increase/0:Decrease	1 bit	CWT

This object, changes between operating modes as +/- via 1 bit value. This object is used to switch between the operating modes of the air conditioning unit in a loop. If a continuous value is sent in the increasing direction, it follows the following sequence and returns to the beginning when reaches last mode.

1:Increase : auto->heat->cool->fan->dry

0:Decrease : dry -> fan -> cool -> heat -> auto

Operating Mode +/-	0:Up/1:Down	1 bit	CWT

This object, changes between operating modes as +/- via 1 bit value. This object is used to switch between the operating modes of the air conditioning unit in a loop. If a continuous value is sent in the increasing direction, it follows the following sequence and returns to the beginning when reaches last mode.

0:Up : auto->heat->cool->fan->dry

1:Down : dry -> fan -> cool -> heat -> auto

Feedback Operating Mode Text	Operating Mode Text	14 bytes	CRT

This object is used to monitor the operation mode of the air conditioning unit in text format via the KNX bus line. Naming can be made for each operating mode with a length of 14 bytes.

Energy Saver Mode	1:Start/0:Stop	1 bit	CWT

This object, is used to initiate energy saver mode. If a value of 1 is sent over this object, energy mode starts, and a value of 0 stops.

Feedback Energy Saver Mode	1:Start/0:Stop	1 bit	CWT

This object is used to determine if the air conditioner unit is in energy saver mode.

Energy Saver Mode Time Duration	0-255 min	1 byte	CWT

This object is used to determine how long the air conditioner unit stays in energy saver mode. Up to 255 minutes can be set with 1 byte value.

Energy Saver Mode Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to determine the shifting value for making setpoint temperature setting. The values between 1-4 can be selected for shifting.

Energy Save Mode Fan Speed	1:Fan1/2:Fan2/3:Fan3	1 byte	CWT

This object, is used to determine the fan speed for energy saver mode. A value of 1 for fan speed 1, 2 for fan speed 2, and 3 for fan speed 3 must be sent.

Power Saver Mode	1:Start/0:Stop	1 bit	CWT

This object, is used to initiate power saver mode. If a value of 1 is sent over this object, power mode starts, and a value of 0 stops.

Feedback Power Saver Mode	1:Start/0:Stop	1 bit	CWT

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This object is used to determine if the air conditioner unit is in power saver mode.

Power Saver Time Duration	0-255 min	1 byte	CWT

This object is used to determine how long the air conditioner unit stays in power saver mode. Up to 255 minutes can be set with 1 byte value.

Power Saver Mode Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to determine the shifting value for making setpoint temperature setting of power saver mode. The values between 1-4 can be selected for shifting.

Power Saver Mode Fan Speed	1:Fan1/2:Fan2/3:Fan3	1 byte	CWT

This object, is used to determine the fan speed for power saver mode. A value of 1 for fan speed 1, 2 for fan speed 2, and 3 for fan speed 3 must be sent.

Winter Mode	1:Start/0:Stop	1 bit	CWT

This object, is used to initiate winter mode. If a value of 1 is sent over this object, winter mode starts, and a value of 0 stops.

Feedback Winter Mode	1:Start/0:Stop	1 bit	CWT

This object is used to determine if the air conditioner unit is in winter mode.

Winter Mode Time Duration	0-255 min	1 byte	CWT

This object is used to determine how long the air conditioner unit stays in winter mode. Up to 255 minutes can be set with 1 byte value.

Winter Mode Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to determine the shifting value for making setpoint temperature setting of winter mode. The values between 1-4 can be selected for shifting.

Winter Mode Fan Speed	1:Fan1/2:Fan2/3:Fan3	1 byte	CWT

This object, is used to determine the fan speed for winter mode. A value of 1 for fan speed 1, 2 for fan speed 2, and 3 for fan speed 3 must be sent.

Summer Mode	1:Start/0:Stop	1 bit	CWT

This object, is used to initiate summer mode. If a value of 1 is sent over this object, summer mode starts, and a value of 0 stops.

Feedback Summer Mode	1:Start/0:Stop	1 bit	CWT

This object is used to determine if the air conditioner unit is in summer mode.

Summer Mode Time Duration	0-255 min	1 byte	CWT

This object is used to determine how long the air conditioner unit stays in summer mode. Up to 255 minutes can be set with 1 byte value.

Summer Mode Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to determine the shifting value for making setpoint temperature setting of summer mode. The values between 1-4 can be selected for shifting.

Summer Mode Fan Speed	1:Fan1/2:Fan2/3:Fan3	1 byte	CWT

This object, is used to determine the fan speed for summer mode. A value of 1 for fan speed 1, 2 for fan speed 2, and 3 for fan speed 3 must be sent.

4.4. FAN GROUP OBJECTS

In this section, fan group objects and their properties are described.

Object Name	Function	Type	Flags
Fan Speed Percent	Threshold defined in parameter	1 byte	CWT

This object, is used to set fan speeds in percentages. 3 different fan speeds can be configured according to the specified threshold values. For example, select Fan 1 lower limit is 30% and fan 2 lower limit is 55%. If 25% value is sent over this object, fan speed will be fan1, if 45% value is sent, fan speed will be fan2.

Fan Speed Enumerated	1:Speed1…4:Speed4	1 byte	CWT

This object, is used to determine the fan speed by selecting between 1-3 values. For example, if value 1 is sent, fan speed will be fan 1.

Feedback Fan Speed Enumerated	1:Speed1…4:Speed4	1 byte	CRT

This object, is used to receive current fan speed in between 1-3 value.

Fan Speed Auto/Manual	1:Auto/0:Manual	1 bit	CWT

This object, is used to determine the fan speed control with auto or manual mode. If value 1 is sent, the auto mode will be activated. On contrary, If value 0 is sent, the manual mode will be activated.

Feedback Fan Speed Auto/Manual	1:Auto/0:Manual	1 bit	CRT

This object, is used to receive current fan speed status of air conditioner unit as auto or manual.

Individual Fan Speed 1	1:Set Fan Speed 1/0:Nothing	1 bit	CWT

This object, is used to select fan speed 1 by individually. If a value 1 is sent, the fan speed will be fan 1.

Individual Fan Speed 2	1:Set Fan Speed 2/0:Nothing	1 bit	CWT

This object, is used to select fan speed 2 by individually. If a value 1 is sent, the fan speed will be fan 2.

Individual Fan Speed 3	1:Set Fan Speed 3/0:Nothing	1 bit	CWT

This object, is used to select fan speed 3 by individually. If a value 1 is sent, the fan speed will be fan 3.

Individual Fan Speed 4	1:Set Fan Speed 4/0:Nothing	1 bit	CWT

This object, is used to select fan speed 4 by individually. If a value 1 is sent, the fan speed will be fan 4.

Feedback Individual Fan Speed 1	1:Fan Speed 1	1 bit	CRT

This object, is used to monitor the fan speed 1 of the air conditioner.

Feedback Individual Fan Speed 2	1:Fan Speed 2	1 bit	CRT

This object, is used to monitor the fan speed 2 of the air conditioner.

Feedback Individual Fan Speed 3	1:Fan Speed 3	1 bit	CRT

This object, is used to monitor the fan speed 3 of the air conditioner.

Feedback Individual Fan Speed 4	1:Fan Speed 4	1 bit	CRT

This object, is used to monitor the fan speed 4 of the air conditioner.

Fan Speed +/-	1:Increase/0:Decrease	1 bit	CWT

This object, is used to change between fan speed levels with a 1 bit value. If a continuous value is sent in the increasing direction, it follows the following sequence. Additionally, if the "Loop the sequence" parameter is activated, increasing or decreasing that returns the mode to the beginning when it reaches last mode.

1:Increase : auto->fan speed 1->fan speed 2->fan speed 3->fan speed 4

0:Decrease : Fan speed 4->fan speed 3->fan speed 2-> fan speed 1->auto

Fan Speed +/-	0:Up/1:Down	1 bit	CWT

This object, is used to change between fan speed levels with a 1 bit value. If a continuous value is sent in the increasing direction, it follows the following sequence. Additionally, if the "Loop the sequence" parameter is activated, increasing or decreasing that returns the mode to the beginning when it reaches last mode.

1:Up : auto->fan speed 1->fan speed 2->fan speed 3->fan speed 4

0:Down : Fan speed 4->fan speed 3->fan speed 2-> fan speed 1->auto

Feedback Fan Speed Text	Fan Speed Text	14 bytes	CRT

This object, is used to receive the air conditioner unit's fan speed status via text format. For each fan speed status(auto, fan speed1, fan speed2, fan speed3, fan speed4) up to 14 bytes allowed to determine the name of the fan speeds.

4.6. VANES GROUP OBJECTS

In this section, vane group objects and their properties are described.

Object Name	Function	Type	Flags
Vane Position Percent	Threshold defined in parameter	1 byte	CWT

This object, is used to set vane positions in percentages. At least 4 different fan speeds can be configured according to the specified threshold values. For example, select vane position 1 lower limit is 24% and vane position 2 lower limit is 48%. If 15% value is sent over this object, vane position will be position 1, if 39% value is sent, vane position will be position 2.

Vane Position Enumerated	1:Pos1…4:Pos4	1 byte	CWT

This object, is used to determine the vane position by selecting between 1-4 or 1-5 values. For example, available vane positions are 5 and if value 3 is sent, the vane position will be position 3.

Feedback Vane Position Enumerated	1:Pos1…4:Pos4	1 byte	CRT

This object, is used to receive current vane position in between 1-5 value.

Vane Set Position 1	1:Set Position 1/0:Nothing	1 bit	CWT

This object, is used to select vane position 1 by individually. If a value 1 is sent, the vane position will be position 1.

Vane Set Position 2	1:Set Position 2/0:Nothing	1 bit	CWT

This object, is used to select vane position 2 by individually. If a value 1 is sent, the vane position will be position 2.

Vane Set Position 3	1:Set Position 3/0:Nothing	1 bit	CWT

This object, is used to select vane position 3 by individually. If a value 1 is sent, the vane position will be position 3.

Vane Set Position 4	1:Set Position 4/0:Nothing	1 bit	CWT

This object, is used to select vane position 4 by individually. If a value 1 is sent, the vane position will be position 4.

Feedback Vanes Set Position 1	1:Position 1	1 bit	CRT

This object, is used to monitor the vane position 1 of the air conditioner.

Feedback Vanes Set Position 2	1:Position 2	1 bit	CRT

This object, is used to monitor the vane position 2 of the air conditioner.

Feedback Vanes Set Position 3	1:Position 3	1 bit	CRT

This object, is used to monitor the vane position 3 of the air conditioner.

Feedback Vanes Set Position 4	1:Position 4	1 bit	CRT

This object, is used to monitor the vane position 4 of the air conditioner.

Vanes Set Swing	1:Swing/0:Off	1 bit	CWT

This object, is used to enable the swing function for the vanes. If a value 1 is sent, the vanes will start to swinging. After vanes started swinging, if value 0 is sent, the vanes will stop the swinging.

Feedback Vanes Swing	1:Swing/0:Off	1 bit	CWT

This object, is used to receive information about the vanes are swinging or not.

Vane Position +/-	1:Increase/0:Decrease	1 bit	CWT

This object, is used to change between vane position levels with a 1 bit value. If a continuous value is sent in the increasing direction, it follows the following sequence. Additionally, if the "Loop the sequence" parameter is activated, increasing or decreasing that returns the mode to the beginning when it reaches last mode.

1:Increase : pos 1->pos 2->pos 3->pos 4->SWING

0:Decrease : SWING->pos 4->pos 3->pos 2->pos 1			
Vane Position +/-	0:Up/1:Down	1 bit	CWT

This object, is used to change between vane position levels with a 1 bit value. If a continuous value is sent in the increasing direction, it follows the following sequence. Additionally, if the "Loop the sequence" parameter is activated, increasing or decreasing that returns the mode to the beginning when it reaches last mode.

0:Up : pos 1->pos 2->pos 3->pos 4->SWING

1:Down : SWING->pos 4->pos 3->pos 2->pos 1

Feedback Vanes Position Text	Vanes Position Text	14 bytes	CRT

This object, is used to receive the air conditioner unit's van position status via text format. For each vane position status(auto, pos1, pos2, pos3, pos4, SWING) up to 14 bytes allowed to determine the name of the vane positions.

4.7. TEMPERATURE GROUP OBJECTS

In this section, temperature group objects and their properties are described.

Object Name	Function	Type	Flags
Setpoint Temperature	Temperature(Celsius)	2 byte	CWT

This object, is used to modify the setpoint temperature to be sent to the AC indoor unit according to the desired value.

Feedback Setpoint Temperature	Temperature(Celsius)	2 byte	CRT

This object, is used to monitor the air conditioner unit setpoint temperature from the KNX bus line.

Setpoint Temperature +/-	1:Increase/0:Decrease	1 bit	CWT

This object, is used to change the setpoint temperature with increasing or decreasing by 1 bit value. If a continuous value is sent in the increasing direction, it is increased up to highest temperature value. Likewise, If a continuous value is sent in the decreasing direction, it is decreased up to lowest temperature value.

Setpoint Temperature +/-	0:Up/1:Down	2 bytes	CWT

This object, is used to change the setpoint temperature with increasing or decreasing by 1 bit value. If a continuous value is sent in the increasing direction, it is increased up to highest temperature value. Likewise, If a continuous value is sent in the decreasing direction, it is decreased up to lowest temperature value.

KNX Ambient Temperature	Temperature (Celsius)	2 bytes	CRWT

This object, is used to receive the KNX ambient temperature from KNX bus line. If the received temperature value from KNX is sent with same value from Feedback Indoor Temperature, setpoint temperature can be assigned from KNX bus line. This option only works when the Mitsubishi Heavy Gateway operates in master mode.

Feedback Indoor Temperature	Temperature (Celsius)	2 bytes	CRT

This object, is used to read the indoor temperature from the air conditioner internal unit.

4.8. SCENE GROUP OBJECTS

In this section, scene group objects and their properties are described.

Object Name	Function	Type	Flags
Scene	1-64:Run/128+Scene:Storage	1 byte	CWT

This object, is used to execute or store a scenario with specified scenario number. According to KNX scenario numbers could be between 1-64. If a scenario wanted to be stored, the scenario number + 128 value must be sent. Also, this object is always visible.

Scene 1…5 Run	1:Run Scene/0:Nothing	1 bit	CWT

This object, is used to run the associated scenario number 1 to 5. These scenario numbers are listed in the scene parameter page.

Scene 1…5 Storage	1:Storage Scene/0:Nothing	1 bit	CWT

This object, is used to record the current status of the air conditioner unit to desired scenario from 1 to 5. The desired scenario number (e.g. 68) can be assigned to these scenes.

Feedback Current Scene	1-64:Current Scene	1 byte	CRT

This object, is used to view the current scene of the air conditioner unit. Scene values can be monitored from the KNX bus line. According to KNX standards scene values should be between 1-64.

4.9. SPECIAL GROUP OBJECTS

In this section, special functions group objects and their properties are described.

Object Name	Function	Type	Flags
Feedback Working Hours Counter	Working Hours Counter	2 byte	CRT

This object, is used to detect the air conditioner's operating hour in working mode. When the air conditioner starts to work, working hours counter starts to count the value.

Object Name	Function	Type	Flags
Feedback Working Hours Alert	1:Alarm/0:No Alarm	1 bit	CRT

This object, is used to view the air conditioner unit's alert status when the specified working hours operation period ends. Counter creates an alert in order to warn the user.

Object Name	Function	Type	Flags
Reset Hours Counter	1:Reset/0:Nothing	1 bit	CWT

This object, is used to reset the counted hours by working hours counter function. If a value 1 is sent via this object, the working hours counter will be reset.

Object Name	Function	Type	Flags
Window Contact Status	0:Open/1:Close 1:Open/0:Close	1 bit	CRWT

This object, is used to receive status of the window contact. It can be configured which value to which it means from the parameter page.

Object Name	Function	Type	Flags
Window Switch-Off Delay	0-255 min	1 byte	CWT

This object, is used to switch off the air condition unit according to delay time in minutes by 1 byte value.

Object Name	Function	Type	Flags
Standby Function	1:Occupied/0:Not Occupied 1:Start/0:Stop	1 bit	CWT

This object, is used to control the standby function of the air conditioner unit. The object also can be parameterized as start/stop or occupied/not occupied.

Object Name	Function	Type	Flags
Feedback Standby Function	1:Occupied/0:Not Occupied 1:Start/0:Stop	1 bit	CRT

This object, is used to view the air condition unit's standby function status.

Object Name	Function	Type	Flags
Standby Function Delay	0-255 min	1 byte	CWT

This object, is used to set the delay time of air conditioner unit's standby function.

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Standby Function Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to set the setpoint shifting of the air conditioner unit's standby function.

Standby Function Secondary Delay	0-255 min	1 byte	CWT

This object, is used to set the delay time of air conditioner unit's secondary standby function.

Standby Function Secondary Setpoint Shifting	Temperature (Celsius)	2 bytes	CWT

This object, is used to set the setpoint shifting of the air conditioner unit's secondary standby function.

Timer Function	1:Start/0:Stop 0:Start/1:Stop	1 bit	CWT

This object, is used to control the timer function of the air conditioner unit. The start and stop operations can be determined with which value will be used. Value 1 can be start function or stop according to settings.

Feedback Timer Function	1:Start/0:Stop 0:Start/1:Stop	1 bit	CRT

This object, is used to view the timer function status of the air conditioner unit.

Timer Duration	1-65535 min	2 bytes	CWT

This object, is used to specify the time duration of the timer function. From 1 to 65535 min can be used as a duration value.

APPENDIX

Error Code KNX	Error Code in Remote Controller Unit	Error Definition
0	N/A	No active error
1	E1	Remote controller communication error
2	E2	Duplicated indoor unit address
3	E3	Outdoor unit signal line error
5	E5	Communication error during operation
6	E6	Indoor heat exchanger temperature thermistor anomaly
7	E7	Indoor return air temperature thermistor anomaly
8	E8	Heating overload operation
9	E9	Drain trouble
10	E10	Excessive number of indoor units (more than 17) by controlling one remote controller
12	E12	Address setting error by mixed setting method
14	E14	Communication error between master and slave indoor units
16	E16	Indoor fan motor anomaly
19	E19	Indoor unit operation check, drain motor check setting error
28	E28	Remote controller temperature thermistor anomaly
30	E30	Unmatched connection of indoor and outdoor unit
31	E31	Duplicated outdoor unit address No.
32	E32	Open L3 Phase on power supply at primary side
33	E33	Inverter primary current error
35	E35	Cooling overload operation
36	E36	Discharge pipe temperature error
37	E37	Outdoor heat exchanger temperature thermistor anomaly
38	E38	Outdoor/Ambient air temperature thermistor anomaly
39	E39	Discharge pipe temperature thermistor anomaly
40	E40	High pressure error

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41	E41	Power transistor overheat
42	E42	Current cut
43	E43	Excessive number of indoor units connected, excessive total capacity of connection
45	E45	Communication error between inverter PCB and outdoor control PCB
46	E46	Mixed address setting methods coexistent in same network
47	E47	Inverter over-current error
48	E48	Outdoor DC fan motor anomaly
49	E49	Low pressure anomaly
51	E51	Inverter anomaly
53	E53	Suction pipe temperature thermistor anomaly
54	E54	High/Low pressure sensor anomaly
55	E55	Underneath temperature thermistor anomaly
56	E56	Power transistor temperature thermistor anomaly
57	E57	Insufficient in refrigerant amount or detection of service valve closure
58	E58	Anomalous compressor by loss of synchronism
59	E59	Compressor startup failure
60	E60	Rotor position detection failure / Anomalous compressor rotor lock
61	E61	Communication error between the master unit and slave units
63	E63	Emergency stop
65532	N/A	Initialization process
65535	N/A	Communication error between INKNXMHI001R000 and AC unit / Remote controller

Special Notes
If you encounter an error code not listed in this table, please contact your nearest Mitsubishi Heavy Industries technical service.

ITR830-004 – Mitsubishi Heavy Industries AC - KNX Gateway

Product Manual

CONTACT INFORMATION

THE INTERRA WEB SITE

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