



Device integration manual on Modbus RTU

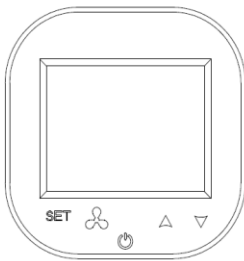
1. Outputs



Podłączanie BMS (kable)	
B	RS 485 B (white wire)
A	RS 485 A (red wire)

Lista zaciskowa	
Ao	wyjście analogowe
GND	masa wyjścia analogowego
TS	External temp. Sensor
TS	External temp. Sensor

L	230 V AC L
N	230 V AC N
H	Heating
C	Cooling



A	B
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Red wire

White wire

L	N	C	H	X	Ao	GND	TS	TS
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2. Data blocks used by the device

2.1. Memory registers

Variable - Holding register	Adress		Application for	
	For PDU		HMI VOLCANO EC	HMI WING EC
	Dec	Hex		
Thermostat read temperature from build-in sensor (read only in °C)	1	0x0001	Yes	Yes
Thermostat read temperature from external sensor (read only in °C)	2	0x0002	Yes	Yes
Target temperature settings (°C)	3	0x0003	Yes	Yes
Set low temperature limit value (°C)	4	0x0004	Yes	Yes
Set high temperature limit value (°C)	5	0x0005	Yes	Yes
Temperature sensor calibration	6	0x0006	Yes	Yes
Hysteresis of differential adjuster	7	0x0007	Yes	Yes
Thermostat read temperature from build-in sensor (read only in °F)	8	0x0008	Yes	Yes

Thermostat read temperature from external sensor (read only in °F)	9	0x0009	Yes	Yes
Target temperature settings (°F)	10	0x0010	Yes	Yes
Dynamic fan speed regulation	11	0x0011	Yes	No
Heating mode	12	0x0012	Yes	Yes
Fan speed settings (for Volcano units)	13	0x0013	Yes	No
Manual change of output signal value for the fan	14	0x0014	Yes	No
Backlight time	15	0x0015	Yes	Yes
Turning ON/OFF	16	0x0016	Yes	Yes
Screen lock	17	0x0017	Yes	Yes
Anti-freeze mode temperature	18	0x0018	Yes	No
Selection of sensor type	19	0x0019	Yes	No
Time mode	20	0x0020	Yes	Yes
Time settings (minutes and seconds)	21	0x0021	Yes	Yes
Time settings (houers and days)	22	0x0022	Yes	Yes
Units setting (celcius/farenheit)	23	0x0023	Yes	Yes
Temperature sensor status	24	0x0024	Yes	Yes
Door status	25	0x0025	No	Yes
Set speed for WING units	26	0x0026	No	Yes
Set heating level for WING E units	27	0x0027	No	Yes
Set mode of operation for WING units	28	0x0028	No	Yes
Set fan delay shutdown time for WING units	29	0x0029	No	Yes
Set coolspeed for WING units	30	0x0030	No	Yes
Set first speed value for WING units	31	0x0031	No	Yes
Set second speed value for WING units	32	0x0032	No	Yes
Set third speed value for WING units	33	0x0033	No	Yes
Set value for door optimum function for WING units	34	0x0034	No	Yes
Set door sensor working logic for WING units	35	0x0035	No	Yes
Set heating mode	36	0x0036	Yes	Yes
Set delay door close time	37	0x0037	No	Yes

* registers of single record (one message must include a record of only one register)

Tabela 1: Memory register type data block organization.

Caution !!! Data readout recommended not more often than every 1000ms. Timeout at 1000ms. Shortening the timeout is possible, however, requires tests (if the conditions on the object allow). Do not use values below 500ms.

Save data: Do not save data cyclically (e.g. every 1 sec), save data only when the parameter value changes

Caution !!! Recording registers with addresses from 0 to 3 must contain a record of only one variable. For example, to set the rate of MODBUS transmission, the parity mode and device address must send three separate messages. The attempt to record two or three registers at the same time leads to an error message.

Attempt to record a number beyond the allowable values leads to an error message!

Dec 1 - Thermostat read temperature from build-in sensor (read only in °C)

–a register containing information on the current temperature of the room in which the device is located. The current temperature is measured for the thermostat built in the controller. The register contains information about temperature in °C.

Dec 2 - Thermostat read temperature from external sensor (read only in °C)

–a register containing information on the current temperature of the room in which the device is located. The current temperature is measured for the external temperature sensor. The register contains information about temperature in °C.

Dec 3 - Target temperature settings (°C)

– a variable specifying the currently set target temperature. Allowed values for a variable in the range from reg. Dec 4 to reg. Dec 5 .

Dec 4 - Set low temperature limit value (°C)

– a variable specifying the minimum temperature that can be set in the reg. Dec 3.

Allowed values for °C (low byte):

- for a variable within a range from 5 to 15.

Allowed values for °F (high byte):

- for a variable within a range from 41 to 59 (41*256.....59*256)

Dec 5 - Set high temperature limit value (°C)

– a variable specifying the maximum temperature that can be set in reg. Dec 3.

Allowed values for °C (low byte):

- for a variable within a range from 16 to 40.

Allowed values for °F (high byte):

- for a variable within a range from 60 to 104 (60*256.....104*256)

Dec 6 - Temperature sensor calibration

– a register allowing the setting of correction values for temperatures read from a built-in or external sensor NTC10K. Allowed values:

- High byte for [°C]:

for a variable within a range 0-36. Values with the step of 0.5. Values corresponding from the range 0-36 as follows: -9°C=>0*256, -8.5°C=>1*256...0°C=>18*256...+9°C=>36*256

- Low byte for [°F]:

for a variable within a range 0-29. Values with the step of 1. Values corresponding from the range 0-36 as follows: -14°F=>0,-13°F=>1...+14°F=>29

Dec 7 - Hysteresis of differential adjuster

-Register allowing setting the correction value for temperatures read from the in-built NTC10K sensor

Allowed values:

Register value	Respond
0,5	0,5°C
1	1°C or 1°F
2	2°C or 2°F
4	4°F

Dec 8 - Thermostat read temperature from build-in sensor (read only in °F)

– a register containing information on the current temperature of the room in which the device is located. The current temperature is measured for the thermostat built in the controller. The register contains information about temperature in °F. Value visible only when the controller is set to work based on °F.

Dec 9 - Thermostat read temperature from external sensor (read only in °F)

– a register containing information on the current temperature of the room in which the device is located. The current temperature is measured for the external temperature sensor. The register contains information about temperature in °F. Value visible only when the controller is set to work based on °F.

Dec 10 - Target temperature settings (°F)

– the variable determining the currently set target temperature. Allowed values for a variable within a range from reg. „Set low temperature limit value (°F)” to reg. „Set high temperature limit value (°F)” .

Dec 11 - Dynamic fan speed regulation

– a variable that determines the dynamic increase of the fan speed. Allowed values for a variable from 1 to 3 with step of 1.

Dec 12 - Heating mode

-variable that allows to set allowable device operating conditions. Acceptable values for the variable:

VOLCANO:

Register value (High byte)	Work mode
0 [0*256]	Cooling
256 [1*256]	Heating
512 [2*256]	Ventilation
768 [3*256]	Cooling+Ventliation
1024 [4*256]	Heating+Ventilation
1280 [5*256]	Auto

The availability of the specific operating variants depends on the setting of A3 function in the controller.

WING:

Register value (Low byte)	Work mode
0	Heating
1	Ventilation
2	Heating+Ventilation

Dec 13 - Fan speed settings (for Volcano units)

– a variable that determines the percentage of fan performance in the range from 0 to 100%. Entering a value from 0 - 14 will not start the unit. Allowed values for the variable from 0 to 100. Attempt to record a number beyond the allowable values leads to an error message. Value 255 will turn ON the auto mode.

Dec 14 - Manual change of output signal value for the fan

– a variable that allows to set an additional constant value added to the voltage exposed to the analogue output assigned to the fan. Allowable values for the variable fall within the range from 0 to 4 (0[V] - 4[V]).

Dec 15 - Backlight time

– a variable determining the value of the display backlighting time in the range from 5 to 600 (5[sec.]-600[sec.]). Value 0 will keep backlight all the time.

Dec 16 - Turning ON/OFF

– an output to turn the device on and off (simulation of pressing the power button). Acceptable values for the variable:

Register value	Mode
0	OFF
1	ON

Dec 17 - Screen lock

– a variable that allows you to lock the controller display. Acceptable values for the variable:

Register value	Respond
0	Locking disabled
256	Locking possible by the controller
257	Controller locked

Dec 18 - Anti-freeze mode temperature

– a variable specifying the currently set frost protection temperature. Acceptable values for the variable:

Register value	Respond
0	OFF
1	5°
2	6°
3	7°
4	8°
5	9°
6	10°

Dec 19 - Selection of sensor type

– a variable that allows the choice of thermostat operation between built-in thermostat and external NTC temperature sensor modes. Acceptable values for the variable:

Register value	Mode
0	Build-in sensor
1	External sensor

- input of value 1 when the external sensor is not connected to the HMI will display an error message E2 on the controller display.

Dec 20 - Time mode

– a variable that allows you to choose the format of the displayed clock between 12-hour and 24-hour formats. The change only applies to the format displayed on the controller panel. Acceptable values for the variable:

Register value	Clock format
0	12h
1	24h

Dec 21 - Time settings (minutes and seconds)

– a variable specifying the currently set minutes (low byte) and seconds (high byte).
Example record for 5 minutes and 30 seconds: $5+30*256=7685$

Dec 22 - Time settings (hours and days)

– a variable specifying the currently set hours (high byte) and days of the week (low byte).
Example record for Friday 10AM: $5+10*256=2570$.

Dec 23 – Units setting (celcius/fahrenheit)

a variable that allows the choice of an unit between degrees of celsius and degrees of fahrenheit.
Acceptable values for the variable:

Register value	Unit
0	Celcius
1	Fahrenheit

– changing the above register will change the B0 function in the controller

Dec 24 - Temperature sensor status (read only)

– a register containing information on the status of the built-in temperature sensor.

Register value	Mode
0	Normal
1 (low byte)	Sensor is fault
256 (high byte)	Load ON

Dec 25 - Door sensor status (read only)

– binary input for door sensor activity status. Acceptable values for the variable:

Register value	Mode
0	Door closed
1	Door open

– status depends on the senspr logic set in the controller normally open or normally close. If the logic changes, the reading is reversed.

Dec 26 - Set speed for WING units

– a variable that determines the currently set fan speed. Acceptable values for the variable

Register value	Speed
0	OFF
1	Speed I
2	Speed II
3	Speed III

Dec 27 - Set heating level for WING E units

– a variable specifying the currently set heating level for the WING E units. Acceptable values for the variable:

Register value	Level	Voltage at the controller contact
0	OFF	OFF
1	I level	H1
2	II level	H2
3	III level	H1 and H2

Dec 28 - Set mode of operation for WING units

– a variable specifying the currently set operating mode for WING units. Acceptable values for the variable:

Register value	Mode
0	Room mode
1	Door mode
2	Door+room mode

Dec 29 - Set fan delay shutdown time for WING units

– a variable specifying the currently set time, given in seconds, of the fan shutdown delay. Allowed values for a variable from 30 to 200.

Dec 30 - Set coolspeed for WING units

– a variable that determines the currently set value of the fan speed during shutdown. Allowed values for a variable from 45 to 100. The numerical values correspond to a percentage of the full speed, e.g. 45 = 45% of the maximum speed.

Dec 31 - Set Speed 1 value for WING units

– a variable specifying the currently set fan speed value assigned to the first gear. Allowed values for a variable between 15 and 80. The numerical values correspond to a percentage of the full speed, e.g. 45 = 45% of the maximum speed. Attempt to record a number beyond the allowable values leads to an error message.

Dec 32 - Set speed 2 value for WING units

– a variable specifying the currently set value of the fan speed assigned to the second gear. Allowed values for a variable from 15 to 90. The numerical values correspond to a percentage of the full speed, e.g. 45 = 45% of the maximum speed. Attempt to record a number beyond the allowable values leads to an error message

Dec 33 - Set speed 3 value for WING units

– a variable specifying the currently set fan speed value assigned to the third gear. Allowed values for a variable from 15 to 100. The numerical values correspond to a percentage of the full speed, e.g. 45 = 45% of the maximum speed. Attempt to record a number beyond the allowable values leads to an error message.

Dec 34 - Set value for door optimum function for WING units

– a variable specifying how many gears the fan capacity will be increased when the door is opened. Allowed values for a variable from 0 to 3. Attempt to record a number beyond the allowable values leads to an error message.

Dec 35 - Set door sensor working logic for WING units

– a variable that defines the logic of the door sensor. You can choose between NO (normally open) and NC (normally closed). Allowed values according to the table below. Attempt to record a number beyond the allowable values leads to an error message.

Register value	Mode
0	NO
1	NC

Dec 36 - Set heating mode

– a variable for setting the permitted operating modes of the devices. Allowed values according to the tables below.

For Volcano units:

Register value (high byte)	Mode
0	Cooling
256	Heating
512	Cooling/Heating Auto
768	Ventilation

For WING units:

Register value (low byte)	Mode
0	Heating
1	Ventilation
2	Heating + ventilation

For 2021 series of the controllers:

For Volcano units:

Register value (low byte)	Mode
0	Cooling
1	Heating
2	Cooling/Heating Auto
3	Ventilation

For WING units:

Register value (low byte)	Mode
0	Heating
1	Ventilation
2	Heating + ventilation

Dec 37 - Set delay door close time

– a variable specifying the currently set time, given in seconds, of the delay for switching off the heating when the door is closed. Allowed values for the variable from 0 to 90. Attempt to record a number beyond the allowable values leads to an error message.

– a variable specifying the currently set day of the week. Allowed values for the variable from 1 to 7. The values correspond to the following day of the week