

HRQ-2ZONE-125/-160/-200/-250



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1. Main information

1.1. System description

The SmartAIR air distribution system is based on the HRQ-2ZONE zoning T-connector, which divides the supply ventilation into zones based on the current demand. The communication between the T-connector and the HRV unit is wireless, therefore the T-connector may be installed separately from the air handling unit.

The dampers installed in the T-connector enable a precise (up to 1 m³/h), smooth division of fresh air between individual zones based on the current demand. A symmetrical design of the T-connector ensures an equal air distribution with minimum resistance. The ventilation demand calculation is based on the CO₂ concentration in individual zones. Why ventilate empty rooms? If the household members are not in their bedrooms during the day, the ventilation there is reduced to a minimum. Only the minimum airflow rate remains.

A standard method of air division is to split the supplied air into a day zone (living room, day rooms, office) and a night zone (bedrooms, children's rooms). The CO₂ concentration sensors (at least one per zone) constantly monitor the presence of household members and the air quality, sending a signal about the required ventilation in a given zone when necessary. The unit control is fully automatic and does not require user activity. In addition, if only one of the zones is being ventilated, the T-connector sends information to the air handling unit to proportionally reduce the airflow rate, thus significantly reducing the power consumption costs.

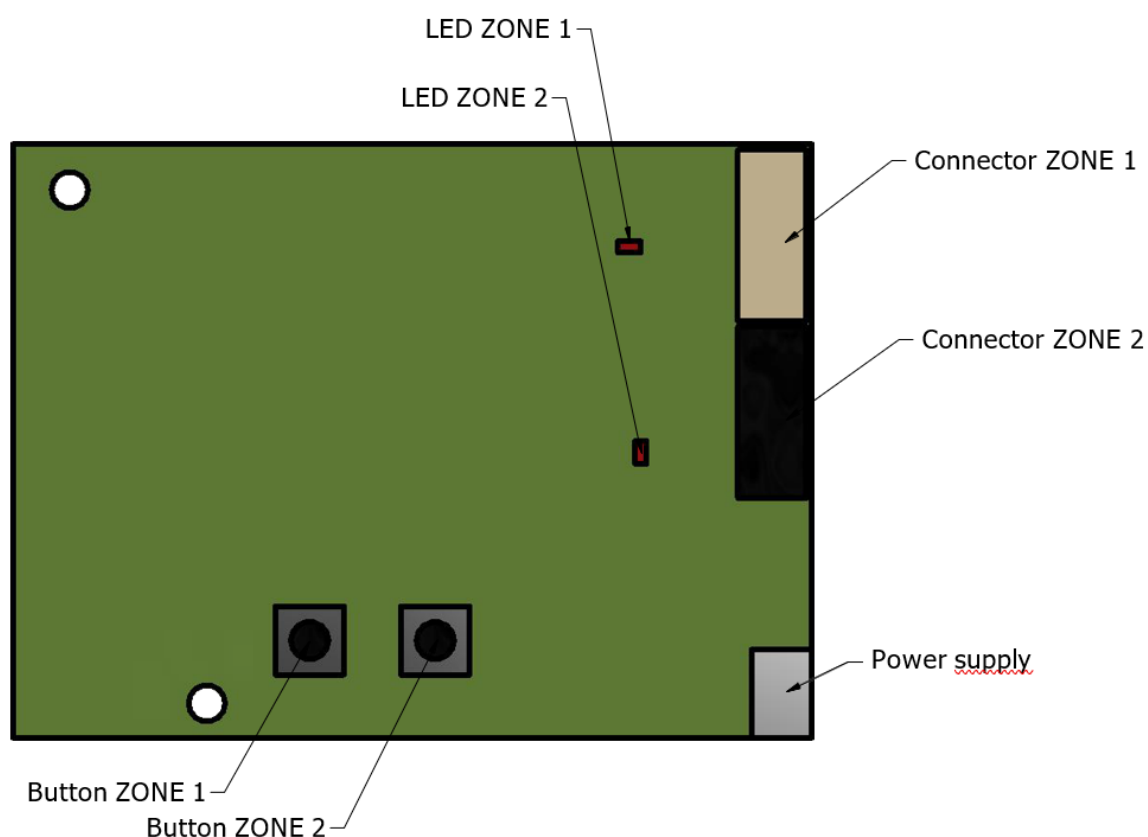
1.2. System components

The full SmartAIR kit includes:

- HRU-PremAIR-CF, HRU-SlimAIR-CF HRV unit with Constant Flow control system;
- HRQ-2ZONE-125/-160/-200/-250 zoning T-connector;
- the HRQ-SENS-CO₂ wireless CO₂ sensor or the HRQ-SENS-I-CO₂ flush-mounted CO₂ sensor (at least two are needed, one per zone);

Index	Connectors diameters	Dimensions (length. X width X height) [mm]	Insulation type	Power supply
HRQ-2ZONE-125	Ø125mm	550 x 400 x 175	Rubber 19mm	230V
HRQ-2ZONE-160	Ø160mm	560 x 460 x 200	Rubber 19mm	230V
HRQ-2ZONE-200	Ø200mm	610 x 530 x 250	Rubber 19mm	230V
HRQ-2ZONE-250	Ø250mm	750 x 610 x 290	Rubber 19mm	230V
HRQ-SENS-CO ₂	-	100 x 100 x 25	On-wall model	230V
HRQ-SENS-I-CO ₂	-	50 x 50 x 30	Flush-mounted model	230V

1.3. Diagram of the zoning T-connector control panel with the description:



1.4. Communication with control panel

Buton function:	Press duration:
Pressed briefly	Pressing the button continuously for 1 second
Pressed long	Pressing the button continuously for 3 seconds

The current zone status is displayed on the board as presented in the following table:

LED indication:	Message description:
■	Normal mode (idle) without demand reading from RH, CO2 sensors
■ ■	RH mode active. The highest ventilation demand (1)
■ ■ ■	External CO2 sensor active, having the highest ventilation demand.
■ ■ ■ ■	Manual mode active
■	Dumper drive error (2)
■ ■	Communication error with the HRV unit control panel (1)

	Communication error with CO2 sensor (2)
	T-connector not connected to the HRV unit (1)
	The zone has no active CO2 sensor available
	The HRV unit control panel error

(1) The status is being displayed in both zones.

(2) The message is displayed only if the VMS (CO2 sensor) communication with the zoning T-connector is faulty or no VMS is associated with the zone.

To change menu options, press and hold one or both keys on the zoning T-connector's control panel. Releasing the menu button(s) calls up a corresponding menu as shown in the following table:

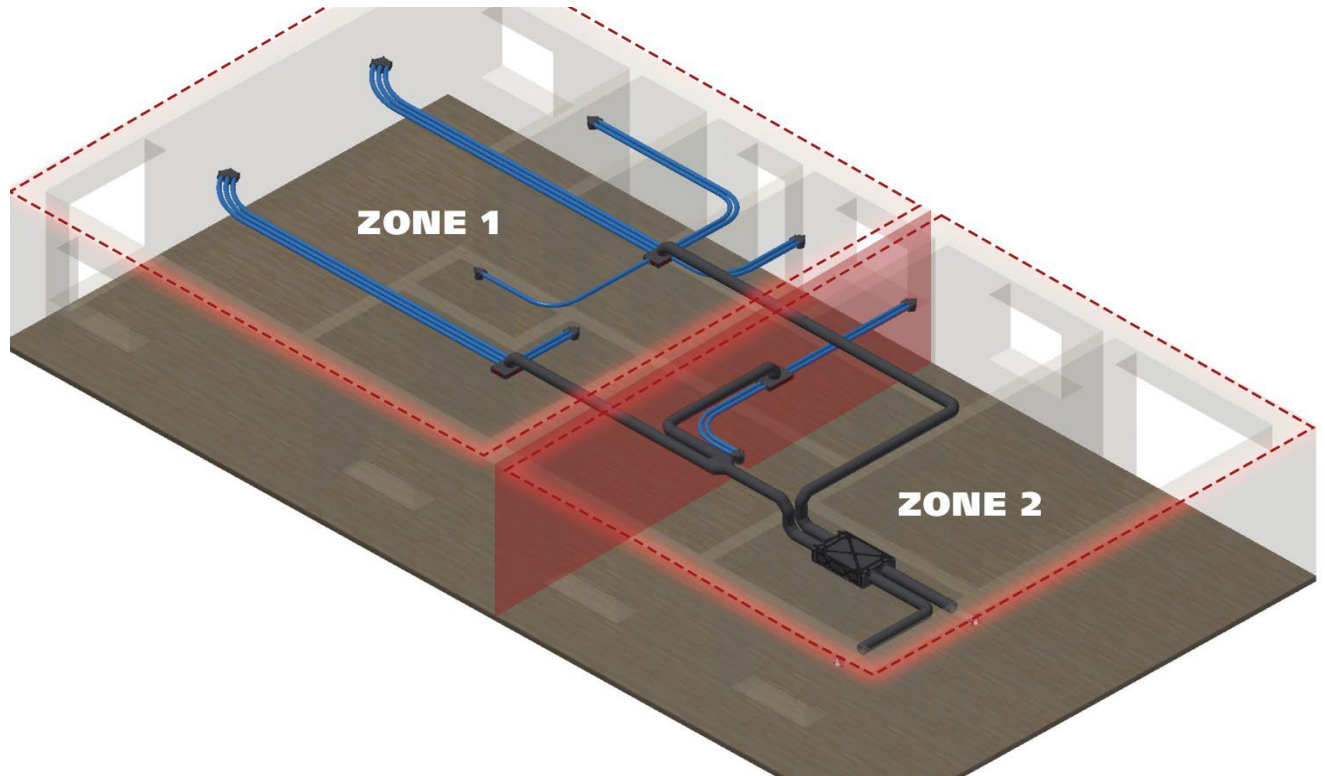
Zone 1 button	Zone 2 button	Zone 1 LED indication	Zone 2 LED indication	Upon release of the button, the following menu becomes active
Pressed	Not pressed		Status	Status menu
			Status	Binding mode zone 1
Not pressed	Pressed		Status	Startup mode zone 1
		Status		Status menu
		Status		Binding mode zone 2
Pressed	Pressed	Status		Startup mode zone 2
				Status menu
				The HRV unit control panel binding mode
				Flow ratio setting (1)
				oning factor settings
				Menu reset

(1) Flow ratio setting menu

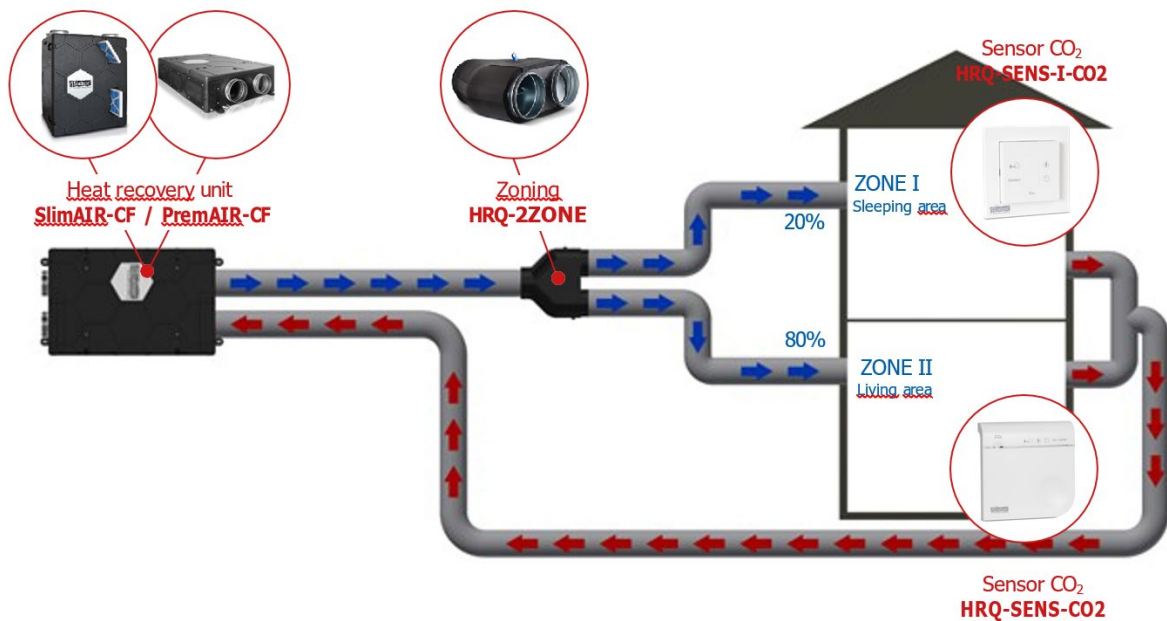
1.5. Example installation diagram

Example of the model of the domestic ventilation system divided into zones:

- Zone 1 – day zone
- Zone 2 – night zone



* The zoning system shown is only an example. The building can be divided into any zone taking into account the guidelines of the mechanical ventilation project.



1.6. Zonal ventilation air demand calculator

Contact your account manager to access an Excel spreadsheet that calculates ventilation air requirements in zones and simulates various operating conditions.

The following link redirects to the Excel spreadsheet with a calculator for the ventilation air demand in the zones, simulating different operating conditions.

Polish	English	Wartość/Value	
Ustawienia rekuperatora	VMD Settings / Status		
Całkowity przepływ powietrza	Maximum Capacity	350	m ³ /h
Tryb standby	Away	0%	
Tryb poza domem	Low	15%	
Tryb w domu	Medium	50%	
Tryb w domu	High	70%	
Offset trybu auto	Auto offset	10%	
Minimalne zapotrzebowanie na wentylację	Lower limit auto	10%	
Aktywny bieg dla trybu auto/uruchamiania	Mode for auto / Commissioning	High	

Ustawienia trójnika strefującego	VMZ settings / status	Wartość/Value	
Ilość stref	Number of zones	2	
Współczynnik strefowania	Reduction Factor	0,7	
Współczynnik przepływu strefy 1	Ratio Zone 1	50%	
Współczynnik przepływu strefy 2	Ratio Zone 2	50%	
Minimalne otwarcie zaworu	Minimal valve position	10%	
Tryb nocny	Night level	Medium	
Aktywny tryb pracy	System mode	Auto	

Czujnik CO ₂	VMS	Zapotrzebowanie/Demand	Przepływ/Flow	Procent/Percentage
Strefa 1	Zone 1	0%	17,5	5,0%
Strefa 2	Zone 2	100%	175,0	50,0%

Całkowity przepływ powietrza	System Capacity	350,0	m ³ /h
Przepływ powietrza w strefie 1	Zone 1 capacity	175,0	m ³ /h
Przepływ powietrza w strefie 2	Zone 2 capacity	175,0	m ³ /h



Wynikowe wartości ustawień trójnika strefującego	VMZ Calculated values		
Otwarcie przepustnicy 1	Valve Position 1	10,0%	
Przepływ w strefie 1	Expected flow valve 1	17,5	m ³ /h
Otwarcie przepustnicy 2	Valve Position 2	100,0%	
Przepływ w strefie 2	Expected flow valve 2	175,0	m ³ /h
Procentowe zapotrzebowanie rekuperatora	VMD demand	55,0%	
Zapotrzebowanie rekuperatora	VMD flow	192,5	m ³ /h

polskie nazwy	Polish names
angielskie nazwy	English names
wartości do zmiany	changeable values
wartości obliczone	calculated values

2. Principle of system operation

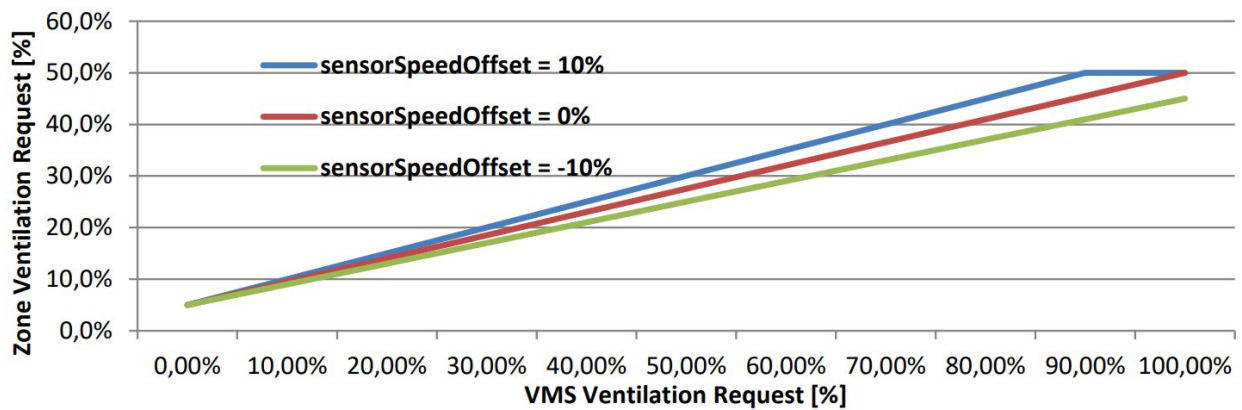
2.1. Automatic mode (AUTO)

You can activate the automatic mode by pressing the Eco or Comfort button on both CO₂ sensors in both zones.

Both dampers should be fully open when the mode is enabled.

Both dampers should be in the open position if the ventilation demand in the individual zones is the same. If more than one CO₂ sensor is connected to the zone (maximum number of sensors connected to the zone: 20), the ventilation demand will be based on the readings from a sensor with the highest CO₂ concentration for at least 10 minutes, or until higher CO₂ concentration reading occur in another sensor within the same zone. If the CO₂ concentration reading on the currently operated CO₂ sensor increases, the ventilation demand in the zone will be immediately calibrated, and the 10-minute counter will restart its operation.

If the ventilation demand in the individual zones varies, the zone with the higher demand will be fully open, and the zone with the lower demand will be partially closed. If the ventilation demand in individual zones is negligible or null, the valve of a given zone will be almost completely closed. The valve will be left slightly open at 10% for hygienic purposes. In the automatic mode, in which the unit is controlled by the readings from the CO₂ sensors, the calculation of the ventilation demand in a given zone is based on the following:



Manual adjustment of the ventilation airflow rate (for example, rising it due to a sudden increase in the number of people in the residential area) can be carried out by overriding the AUTO mode using a controller connected directly to the HRV unit, which will stop the automatic operation of the zoning T-connector. In this situation, both valves will fully open. The system will return to automatic mode operation after 24h.

It is possible to set one zone in automatic mode and the other in manual mode (according to the percentage setpoint of a given airflow rate). To do this, change the AUTO setpoint to the required airflow rate using a CO2 sensor connected to the zone.

2.2. Manual mode and semi-automatic mode (the so-called night-time mode):

The user can choose the operation modes of the system (manual, semi-automatic) via sensors.

- Manual mode

Pressing the AWAY button manually on any sensor (Zone 1 or Zone 2) switches the system to the manual mode with a 30% setpoint (the default setpoint can be changed by a technician). Pressing the TIMER button manually on any sensor (Zone 1 or Zone 2) switches the system to the manual mode with a 70% setpoint (the default setpoint can be changed by a technician) for 30 minutes.

To return to the AUTO mode, press Eco or Comfort button.

- Semi-automatic mode, Night-time mode

Pressing the HOME button on a sensor sets the given zone in manual mode with a 50% setpoint, while the other zone will still continue its operation in the AUTO mode.

A relative humidity sensor (indoor or room HRQ-...-SENS-RH) can be installed in the ventilation system (to the air handling unit, not to the zone). When the humidity level rises, the ventilation demand for both zones will increase, forcing a higher airflow rate to remove excessive humidity.

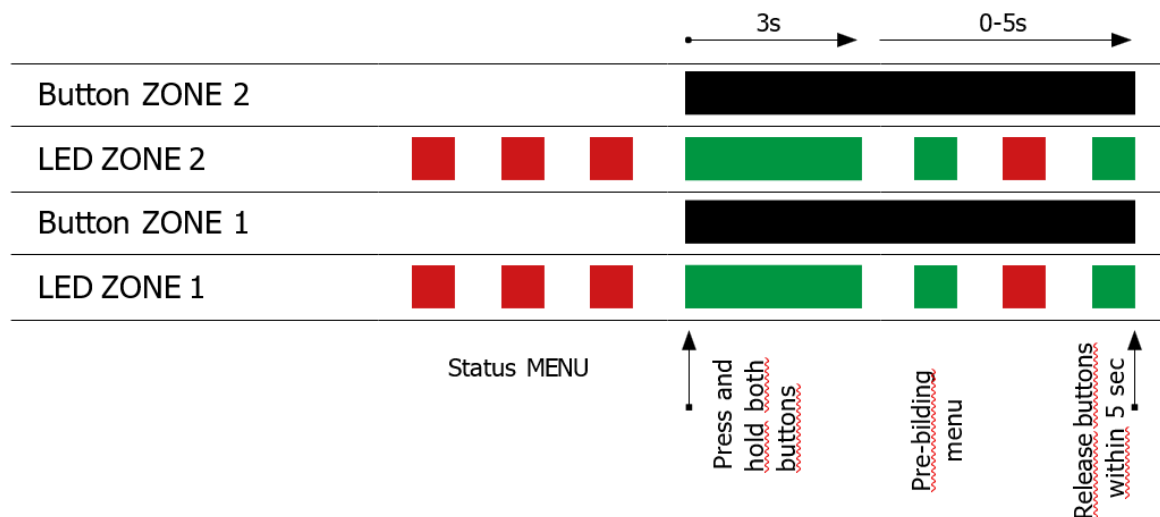
3. Installation manual of the zoning T-connector and pairing with the ALNOR HRU unit

In the following manual, we will use the below markings:

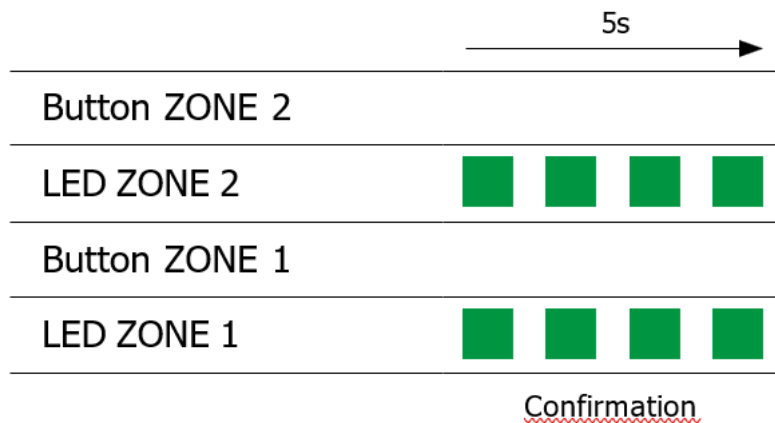
Description	Symbol
LED continuously lit (e.g. green)	
LED flashing (e.g. green)	
Long pressing of the button	
Brief pressing of the button	

3.1. Connection of the zoning T-connector with the HRU unit control panel

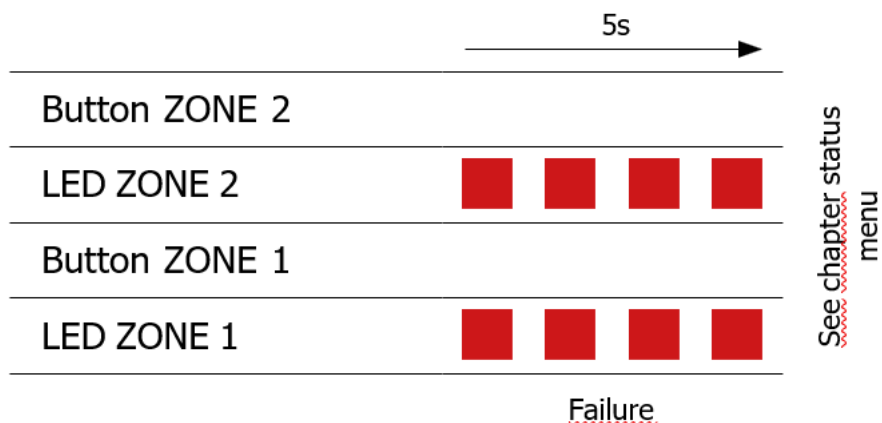
Before first commissioning, both LEDs will blink red for 4 times, indicating „T-connector not connected to the HRU unit“. To pair the HRU unit with the zoning T-connector, switch the HRU unit to the binding mode (after reset, the unit switches to the binding mode for 10 minutes automatically). The LED green, continuous light on the HRU unit control panel should be on. Next, do the following:



Binding accepted:



Binding failed:



3.2. Connection of the external CO2 sensor with the zoning T-connector

Before sensors are binded, both LEDs will blink red for 5 times, indicating „The zone has no active CO2 sensor available“. The zoning T-connector must be in the binding mode (first 10 minutes of operation since the power reset) to bind it with the CO2 sensor.

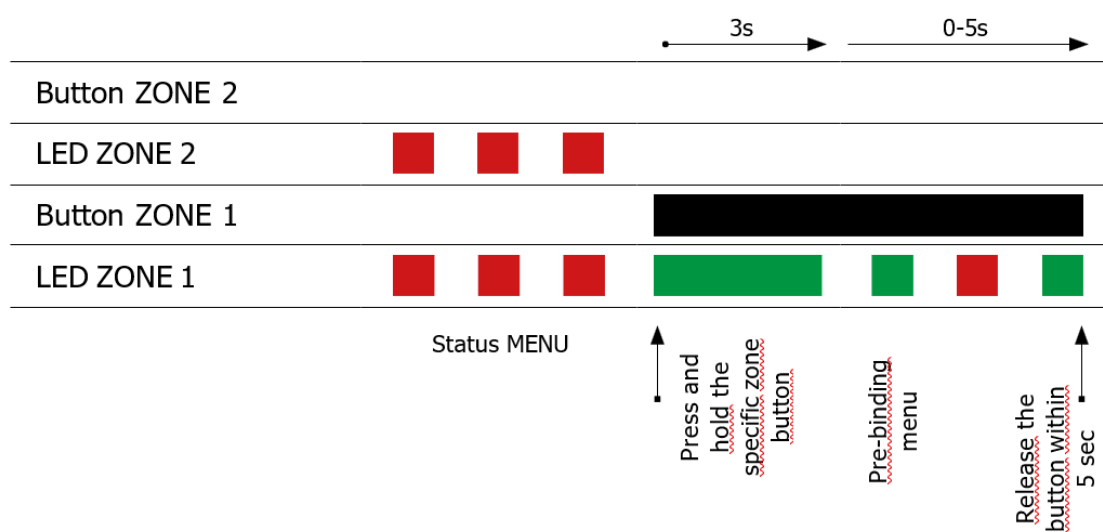
a.The binding mode should be initiated by the CO2 sensor (move to the last available airflow rate and hold the capacitive button on the sensor until the white LED lights up, then confirm the initiation of the binding by pressing the capacitive button once).



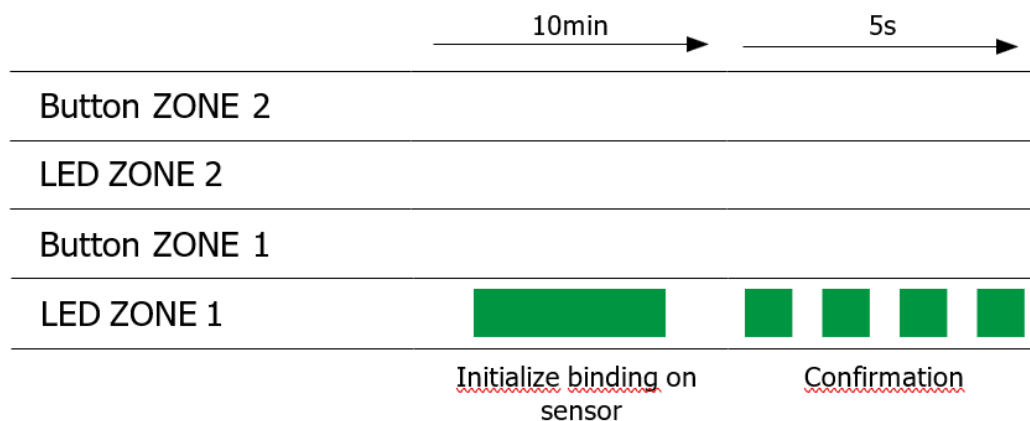
WARNING!

Note that the HRV unit cannot be in the binding mode, as the CO2 sensor could connect directly to the HRV unit instead of the zoning T-connector.

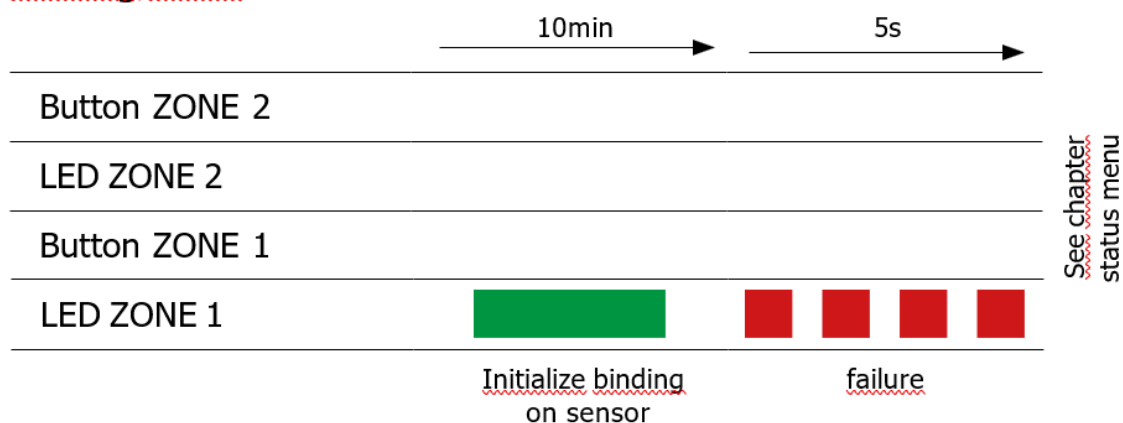
Zone specific binding mode (sensor CO2):



Binding accepted:



Binding failed:



WARNING!

Repeat the above procedure for the second zone and the second sensor.

Further commissioning steps can also be performed using the Service Program. This will shorten the time and make setup easier.

Contact your ALNOR Ventilation Systems account manager to access the Service Program.

3.3. Default settings HRQ-2ZONE

If you want to restore the values of individual TAGs to their factory version after making changes, complete them according to the following table:

Name of the setpoint	Description	Value
Low	Triggered by the AWAY button on CO2 sensor	30%
Medium	Triggered by the HOME button on CO2 sensor	50%
High	Triggered by the TIMER button on CO2 sensor	70%
Auto offset	The value in % added to the CO2 sensor demand is used to adjust the ventilation performance	0%
Low limit auto	Minimum damper opening when the sensor does not send a demand	10%
Mode for auto / commissioning	Maximum performance in the auto mode / setpoint for the startup mode	High
Night level	Performance of the semi-automatic mode	Medium
Ratio Zone 1	The ratio of the zones in %	50%
Ratio Zone 2	The ratio of the zones in %	50%
Zoning factor	Zoning factor	1

3.4. Flow ratio setting

In the flow ratio setting menu, we can manually change the percentage ratio of the airstream throughout individual zones. The division should follow the ventilation design of a given building. In addition to the manual adjustment, we can modify the flow ratio using the Service Program.

By default, the flow is divided into a 50/50 ratio.

LED 1	LED 2	Flow ratio for zone 1	Flow ratio for zone 2
		50%	50%
		45%	55%
		40%	60%
-		35%	65%
-		30%	70%
-		25%	75%
	-	75%	25%
	-	70%	30%

		-	65%	35%
			60%	40%
			55%	45%

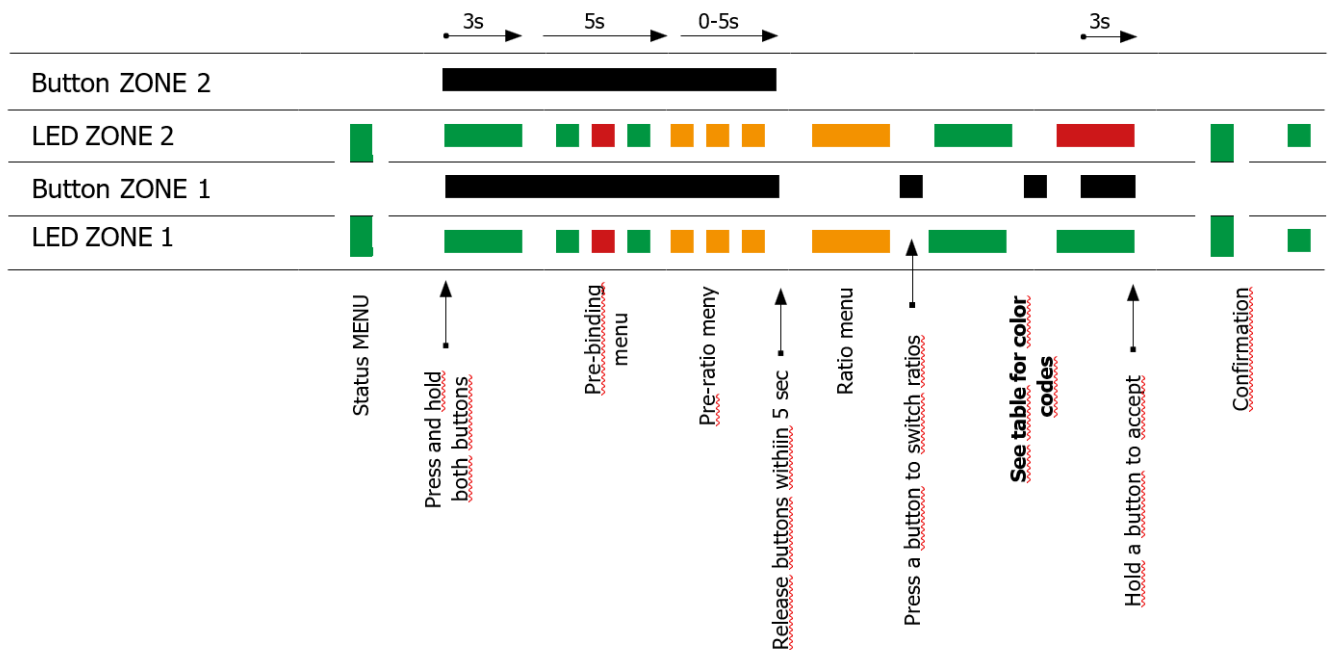
Pressing the key briefly – next setting

Pressing the key long – confirmation of the new setting and return to the status menu

Examples of the flow ratio settings:

Description	Flow rate	Flow ratio
Maximum airflow for zone 1	210 m3/h	60%
Maximum airflow for zone 2	140 m3/h	40%
Total airflow according to the ventilation design	350 m3/h	100%

To set the flow ratio, perform the following: Note that the ratio is set using the Button 1



3.5. Adjustment of individual zones following the ventilation design

During the initial startup using the Alnor Zone system, we can adjust individual valves in the zones following the flow rates determined by the design engineer.

Air is divided into the zones as per the design demand after presetting the flow ratio. The next step is to set specific airflow values of the valves (diffusers) in individual rooms.

When one zone enters the startup mode, the other zone shuts automatically, and the unit flow rate is limited to the value required by the (started up) zone.

The valves (diffusers) should be adjusted starting from the furthest valve relative to the unit.

When the adjustment of the first zone is accomplished, confirm the settings and proceed to the second zone. For the second zone, proceed similarly as in the first zone. When the adjustment of the air supply zones is accomplished, we can adjust the exhaust zone.

Example calculation of the startup mode:

Default HRV unit flow rate: **350**m³/h Zoning factor: **0,7**

Flow ratio for zone 1: **60%**

Flow ratio for zone 2: **40%**

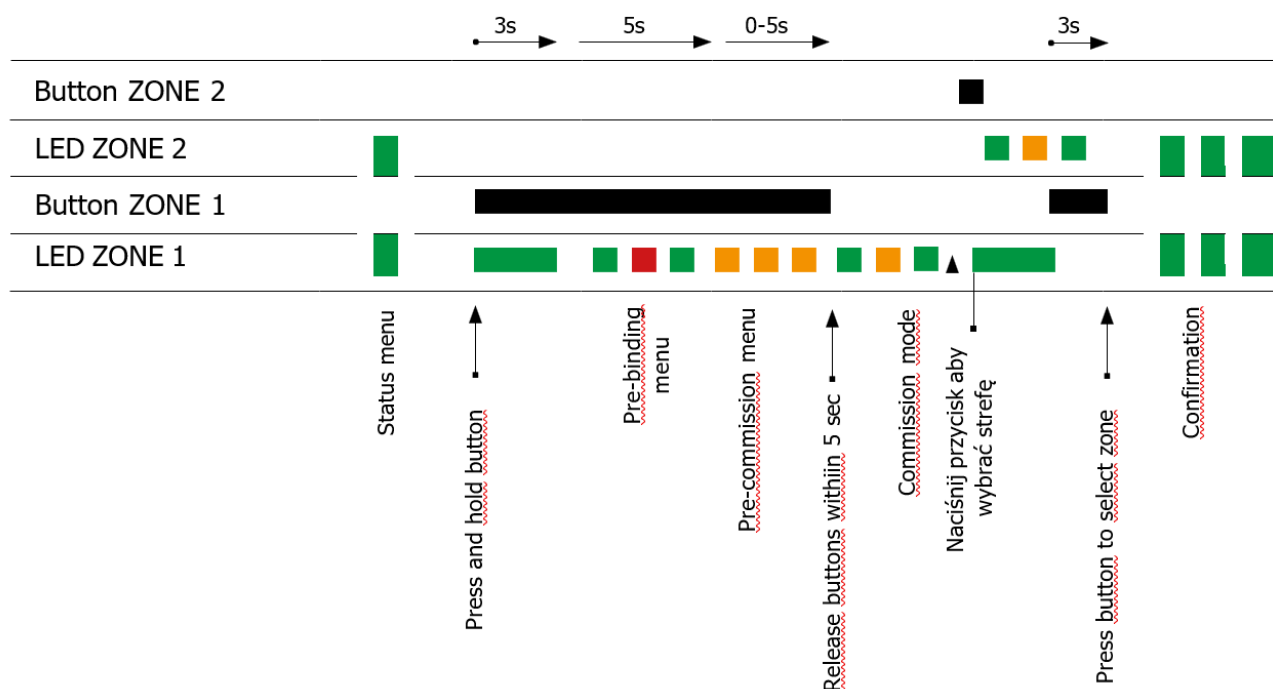
HRV unit default flow rate during startup mode (Home+): **70%**

Air flow through zone 1 in startup mode: $(100/0,7) * 60% * 70% \approx 60% \text{ (210m}^3\text{/h)}$

Air flow through zone 1 in startup mode: $(100/0,7) * 40% * 70% = 40% \text{ (140m}^3\text{/h)}$

The adjustments can be made by entering the startup mode as follows:

Commission zones:



You can alternately adjust both zones by switching between Button 1 or Button 2 by entering the startup mode once:

Button:	Action:	Reaction:
Zone 1	Pressed briefly	Supply zone 1 adjustment
Zone 2	Pressed briefly	Supply zone 2 adjustment

Zone 1 and Zone 2	Pressed briefly	Exhaust zone adjustment
Zone 1 or Zone 2	Pressed long	Exit adjustment menu

3.6. Zoning factor settings (optional)

If you want to further limit a total performance of the air handling unit by setting specific factor to the zoning, you can do that. You can limit the maximum unit output to 70% by setting the proper zoning ratio. The adjustment of the Service Program ranges from 70% to 100%. The manual setting of this ratio allows only 0.7 or 1 values.

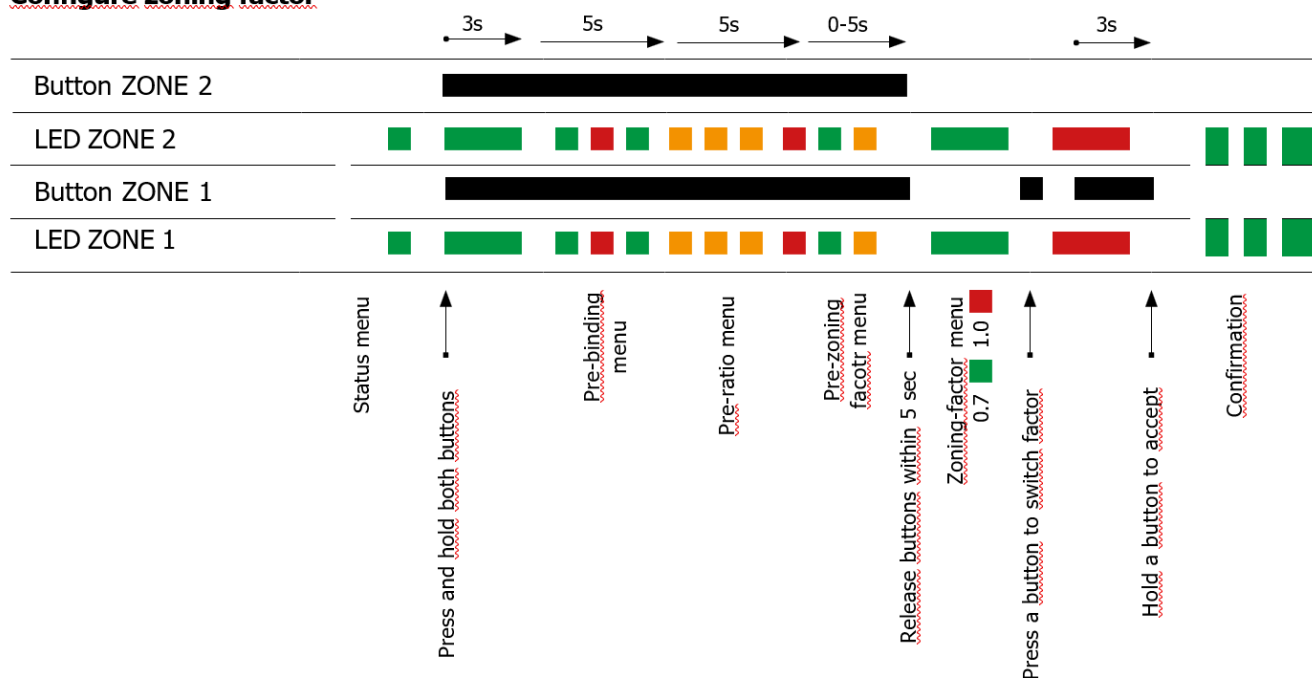
The logic of this solution is as follows. If the residents stay either in a residential zone or in a sleeping zone, it is possible to limit the output of the unit using zone ventilation. In this case, there is no need to maintain excessive ventilation levels in both zones simultaneously.

By default, the zoning factor is set to 1

Zoning factor	Maximum HRV unit output
0,7	100%
0,8	90%
0,9	80%
1	70%

To change the zoning factor settings, perform the following:

Configure zoning factor



3.7. Reset to factory settings

The control panel of the zoning T-connector can be reset. The T-connector factory settings are restored during reset. All associated CO2 sensors and the HRV unit are being disconnected.

To reset the zoning T-connector, proceed as follows:

Reset:

