

# RDCZ

## RESIDENTIAL FAN SPEED CONTROLLER

Mounting and operating instructions



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## SAFETY AND PRECAUTIONS



Read all the information, the datasheet, Modbus maps, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using, or maintaining this product.



For safety and licensing (CE) reasons, unauthorised conversion and /or modifications of the product are inadmissible.



The product should not be exposed to abnormal conditions, such as: extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.



All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.



Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.



Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.



Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.



In case there are any questions that are not answered, please contact your technical support or consult a professional.

## PRODUCT DESCRIPTION

The RDCZ series are residential HVAC controllers used to control AC fans or voltage controllable motors in HVAC applications. They feature a wide supply voltage range 110–230 VAC / 50–60 Hz and a variable control output signal between an adjustable minimum and maximum level. The controller can work in 2 modes. In Automatic mode it is a demand-based controller with adjustable setpoint that can be connected to a broad range of Sentera sensors. In Manual mode, the RDCZ works as a full-featured triac controller. The settings are easily adjustable either via the 3-button interface equipped with a 7-Segment LED display, via our 3SModbus software application or via the Sensistant configurator.

## ARTICLE CODES

Code	Supply	Enclosure
RDCZ9-15-WH	110–230 VAC ±10 % /	white-ivory (ASA LURAN 757, RAL 9010)
RDCZ9-15-BK	50–60 Hz	anthracite (ABS- copolymer, RAL 7021)

## INTENDED AREA OF USE

- Manual control for HVAC applications
- HVAC applications for improved comfort and energy saving
- For indoor use only

## TECHNICAL DATA

- Supply voltage, Us: 110–230 VAC ±10 % / 50–60 Hz
- Inrush current:
  - ▶ Max. 15 A (110 VAC)
  - ▶ Max. 25 A (230 VAC)
- No-load power:
  - ▶ 110 VAC / 60 Hz < 0,9 W
  - ▶ 230 VAC / 50 Hz < 2,3 W
- Regulated output: 30–100 % Us
- Minimum load: 100 mA
- Maximum load: Imax. 1,5 A
- Minimum output voltage, Umin: 30–65 % Us
- Maximum output voltage, Umax: 75–100 % Us
- Start-up value: 30–100% Us
- Start-up duration: 2–10 seconds
- 7-segment LED display and 3-button keyboard interface
- Enclosure:
  - ▶ External: IP54 (according to EN 60529)
  - ▶ Internal: IP44 (according to EN 60529)
- Operating ambient conditions:
  - ▶ temperature: -10–40 °C
  - ▶ rel. humidity: 5–80 % rH (non-condensing)
- Storage temperature: -20–50 °C

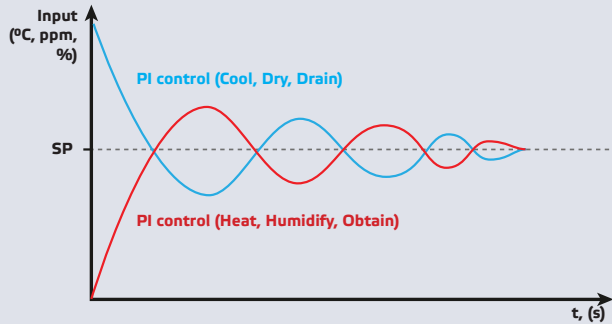
## STANDARDS

- Low Voltage Directive 2014/35/EC
- EMC Directive 2014/30/EC: EN 61000-6-2: 2005/AC:2005, EN 61000-6-3:2007/A1:2011/AC:2012, EN 61326-2-3:2013
- WEEE Directive 2012/19/EC
- RoHs Directive 2011/65/EC

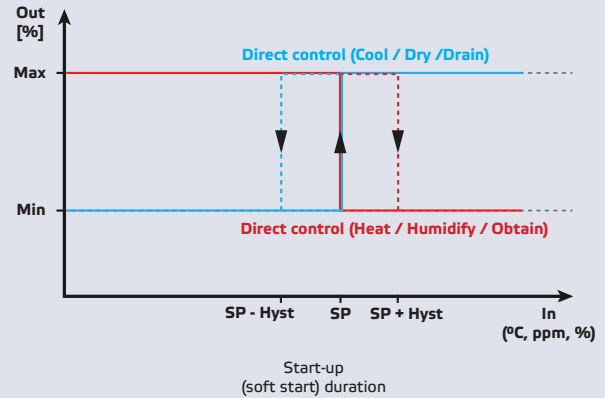


## OPERATIONAL DIAGRAMS

### Automatic mode

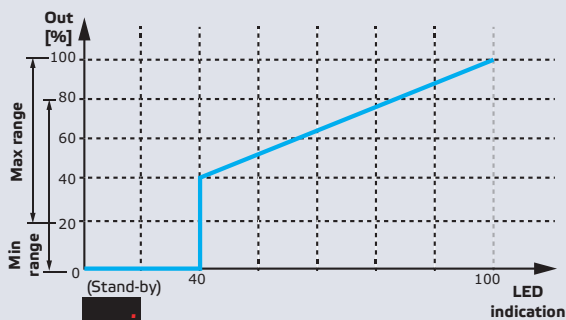


\* PI control can require adjustment of parameters, depending on the local circumstances.

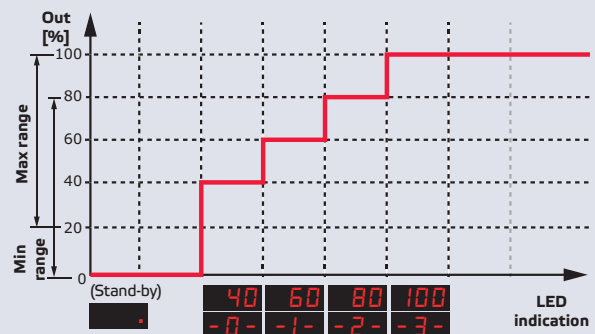


### Manual mode

#### Stepless operational diagram



#### 4 steps operational diagram



## WIRING AND CONNECTIONS

L	Power supply, line (110–230 VAC ±10 % / 50–60 Hz)
N	Power supply, neutral (110–230 VAC ±10 % / 50–60 Hz)
	Regulated output to motor, I <sub>max</sub> 1,5 A
	Regulated output to a single-phase AC motor
A	Modbus RTU (RS485) signal A
/B	Modbus RTU (RS485) signal /B
Connections	Cable cross section: max. 2,5 mm <sup>2</sup>

## MOUNTING INSTRUCTIONS IN STEPS

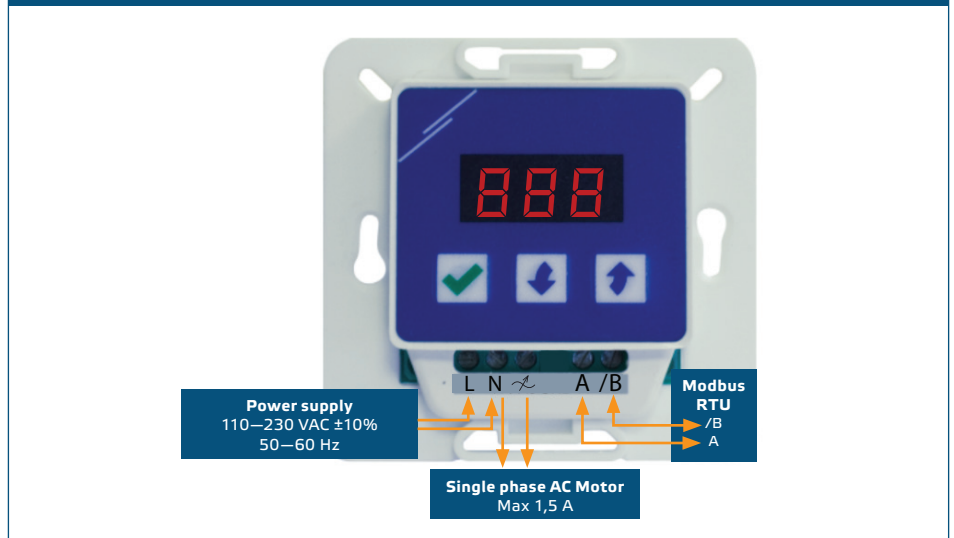
Before you start mounting the unit read carefully “**Safety and Precautions**”. Then proceed with the following steps:

#### For inset mounting

1. Disconnect the power supply.
2. Remove the frame cover of the enclosure and take the RDCZ controller out, so that it can be easily connected.

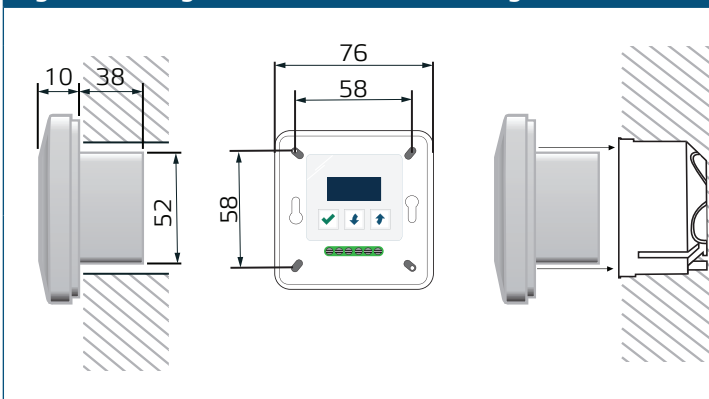
- Do the wiring according to the wiring diagram (see **Fig. 1**).

**Fig. 1 Wiring and connections**

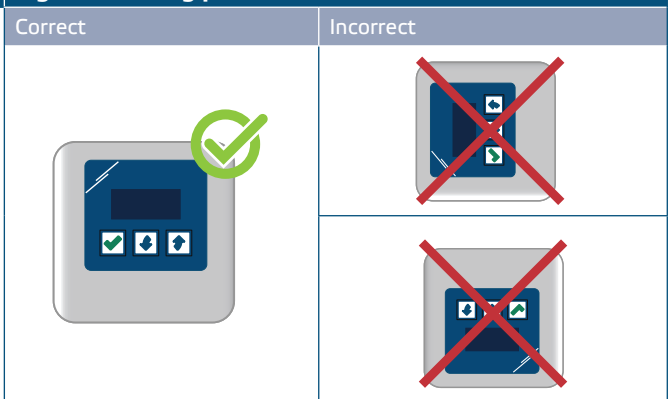


- Mount the internal enclosure into the wall by inserting suitable connecting elements into the openings. Mind the correct position and mounting dimensions shown in **Fig. 2** and **Fig. 3**.

**Fig. 2 Mounting dimensions - inset mounting**



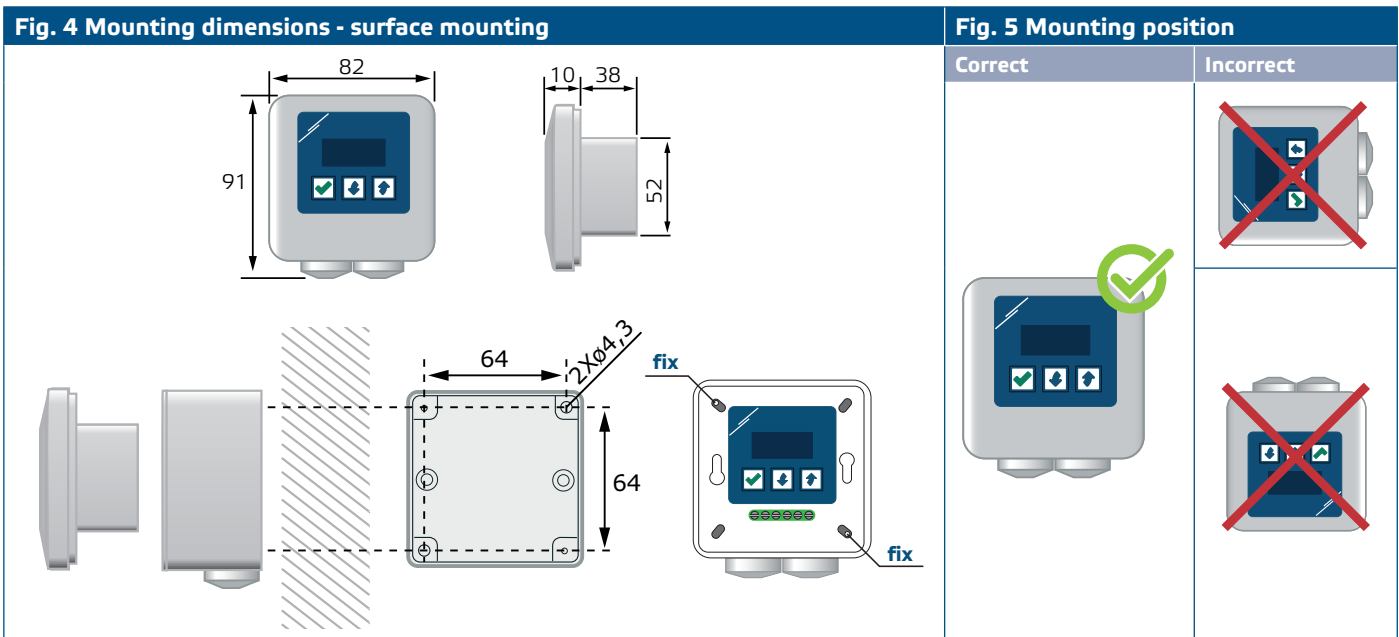
**Fig. 3 Mounting position**



- Put back the frame cover of the enclosure.
- Switch on the power supply.
- Customise the factory settings to the desired ones via the 3-button interface, the 3SModbus software or via the Sensistant.

**For surface mounting**

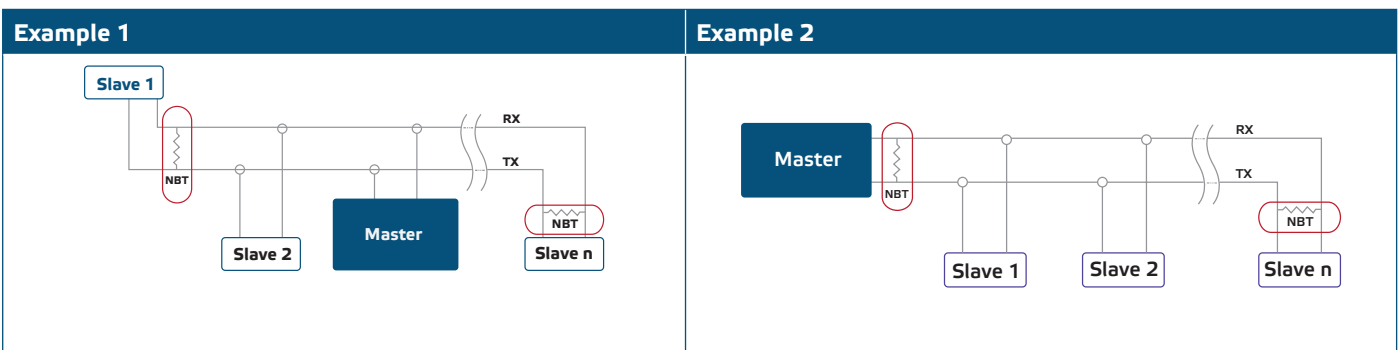
- Disconnect the power supply.
- Remove the frame cover of the enclosure.
- Take out the internal enclosure.
- Mount the external enclosure to the wall using the delivered dowels and screws. Mind the correct position and mounting dimensions shown in **Fig. 4** and **Fig. 5**.
- Insert the connecting cables through the grommets of the unit.



6. Do the wiring according to the wiring diagram (see Fig. 1) using the information from section "Wiring and connections".
7. Put the internal enclosure into the external one and fix it using the delivered screws and washers. (Fig. 4).
8. Put back the frame cover of the enclosure.
9. Switch on the power supply.
10. Customise the factory settings to the desired ones via the 3-button interface, the 3SModbus software or Sensistant.

**Optional settings**

If your unit is the first or the last unit on the Modbus RTU network (see Example 1 and Example 2), enable the NBT resistor via 3SModbus or the menu of the controller. If your device is not an end device, leave the NBT disabled (default Modbus setting).



## OPERATING INSTRUCTIONS

**Choosing the operating mode**

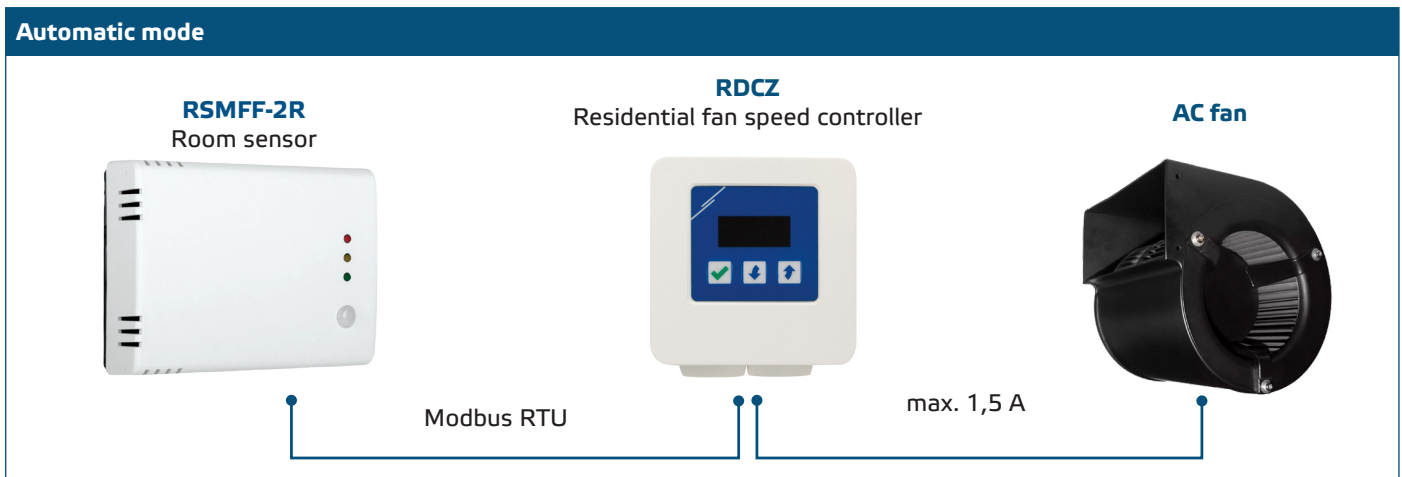
To choose the desired operating mode, press the up and down buttons simultaneously in order to access the Setup mode. The decimal point after the values indicates that the unit is in Setup Mode.

The display shows "RUN". To change the run mode, press the button. Use the up and down buttons to select "1" for automatic mode or "0" - for manual mode.

To save the selected mode press for 4 seconds. The display will show "888" for a few seconds to indicate that the value is stored in the memory. Press the up and down buttons simultaneously again in order to exit the Setup mode.

■ **AUTOMATIC MODE:**

In **Automatic mode** the RDCZ is a "master" device, i.e. it needs to be connected to a sensor via Modbus RTU in order to operate and control the environment based on the information received by the sensor. If no sensor is connected, the display will show "...". The sensor needs a few seconds in order to take samples from the environment.



► **Adjustment of parameters:**

If necessary, some parameters, such as setpoints, can be adjusted. To do so, you can either use the 3-button interface to enter the menu mode (see *MENU STRUCTURE* below), use the free downloadable 3SModbus software to enter the Modbus registers from a computer (see Modbus registers maps), or use the Sensistant configurator.

► **Operating the RDCZ in automatic mode:**

The RDCZ can be switched on and off by pressing and holding the button for 4 seconds. The decimal point on the display indicates that the unit is in Stand-by mode.

When the RDCZ is operational, you can toggle the display between the value measured by the sensor and the output value (percentage) by pressing the button.

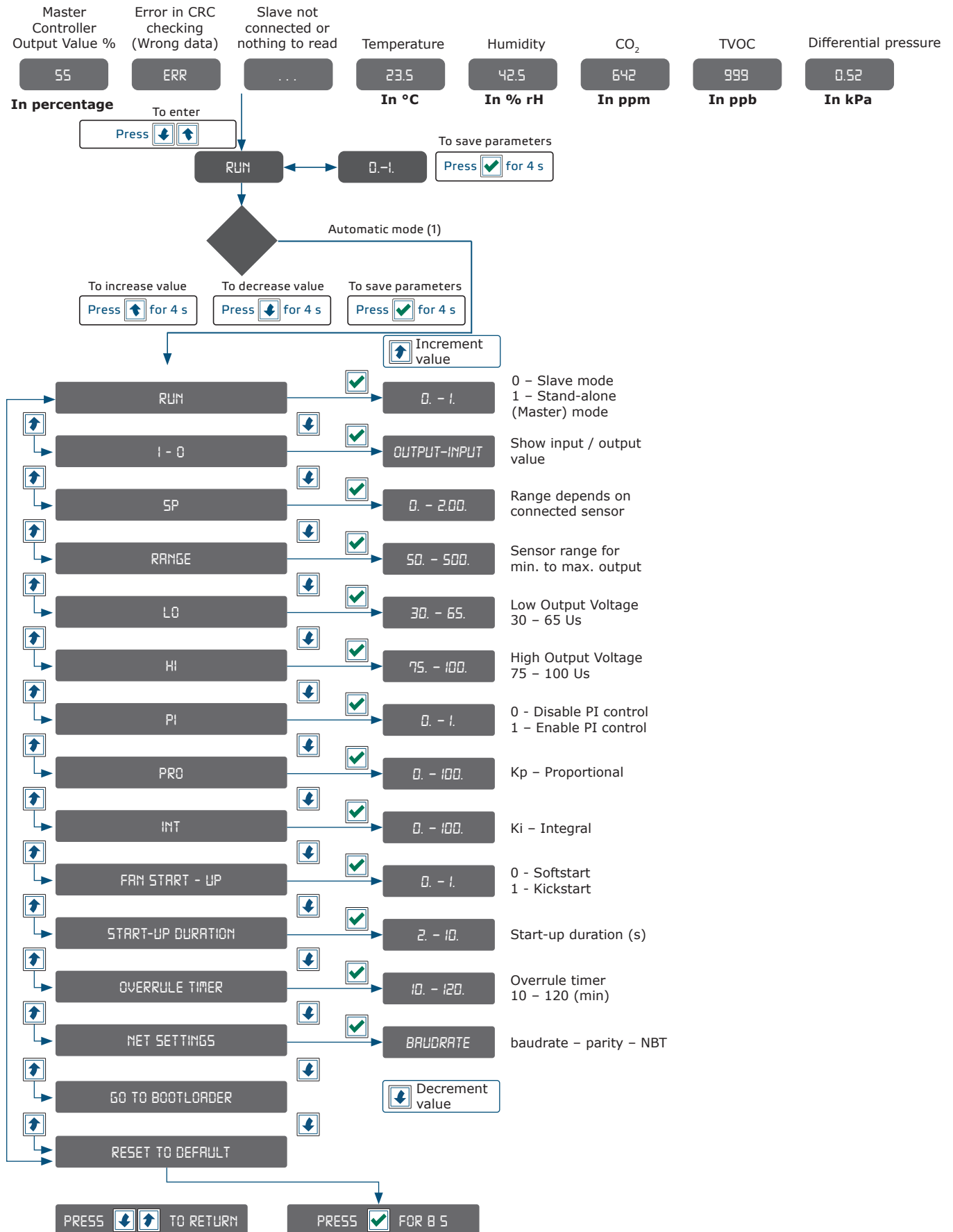
The automatic output for RDCZ (to obtain the installed setpoint), can be temporarily overruled by pressing and holding the up button for 4 seconds (See **Fig. 6 Overrule mode** below). You can now manually adjust the output to the desired level. After a predefined period of time (from 10 to 120 minutes), the RDCZ returns to automatic mode. The setting of this duration is only accessible via Modbus RTU. The I-O adjustable parameter should be set to "Output".

**Fig. 6 Overrule mode**



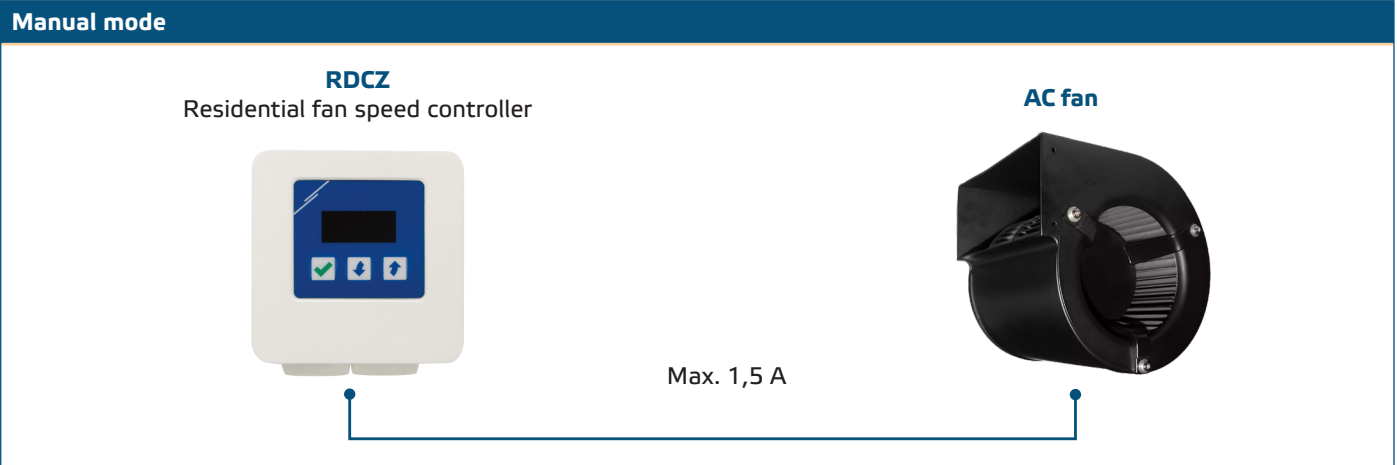


## MENU STRUCTURE - AUTOMATIC MODE



■ **MANUAL MODE:**


In **Manual mode**, the RDCZ operates as a full-featured manual controller for AC fans. The output value increases / decreases in the range between the min. and max. settings (or 0). See the operational diagram. The output can be stepless or divided into 2–10 equal steps.






► **Adjustment of parameters:**

If necessary, some parameters, such as the number of steps, can be adjusted. To do so, you can either use the 3-button interface to enter the menu mode (see *MENU STRUCTURE* below), use the free downloadable 3SModbus software to enter the Modbus registers from a computer (see Modbus registers maps) or use the Sensistant configurator.

► **Operating the RDCZ in manual mode:**

The RDCZ can be switched on and off by pressing and holding the  button for 4 seconds. The decimal point on the display indicates that the unit is in Stand-by mode.

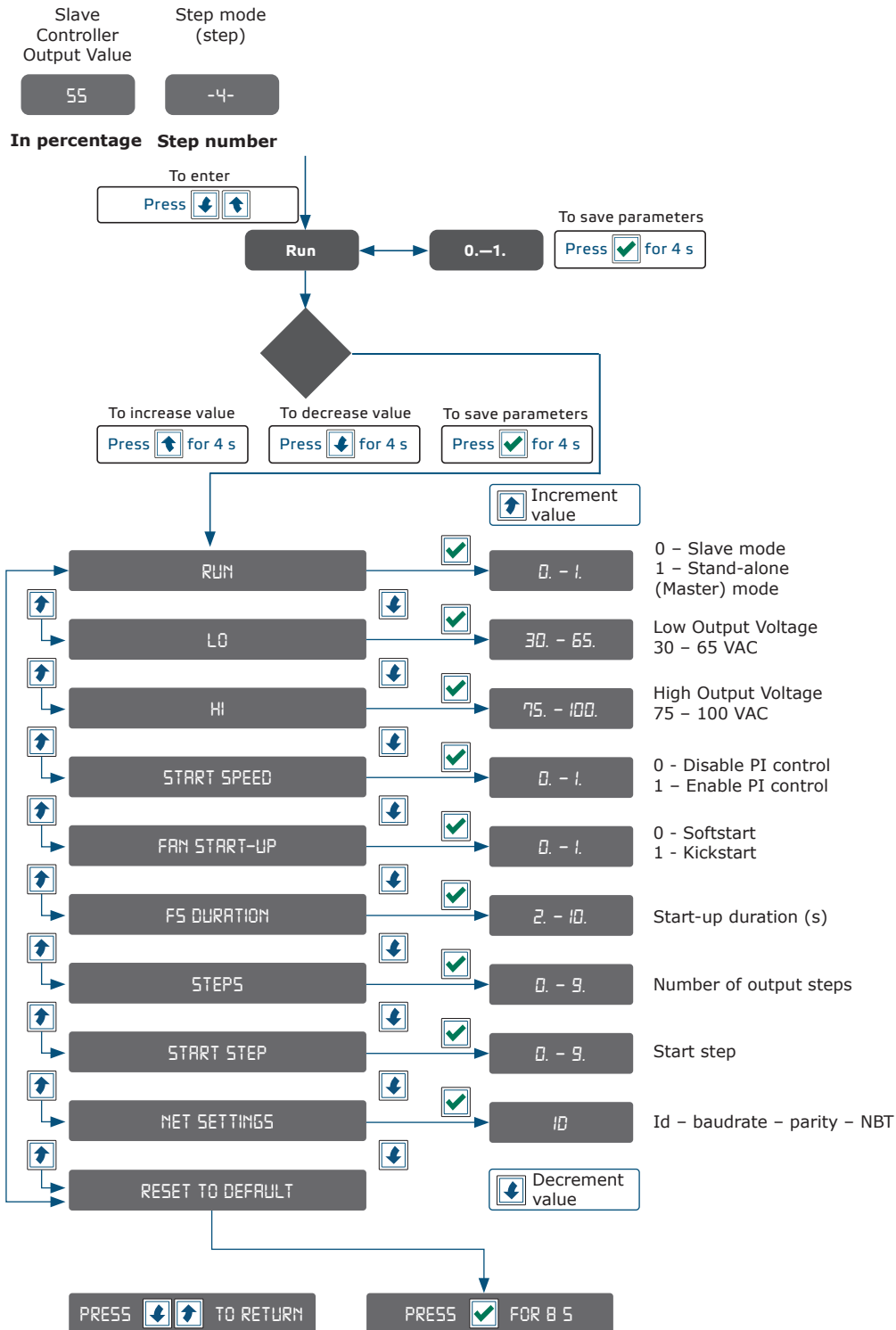
To increase the output value or step, use the up  button. To decrease the output value or step, press the down  button.

When the number of steps is > 0, you can toggle the display between the number of steps and the output value (percentage) by pressing the  button.








 **NOTE**

*In manual mode, the RDCZ is a "slave" device. This means that eventually the output value can be overridden by a Building Management System.*

## MENU STRUCTURE - MANUAL MODE





## 7-SEGMENT DISPLAY INDICATION

Indication	Description
 888	Digits Output value, menu items and settings
	A decimal point Stand-by mode
	Blinking digits Parameter saving or unit reset
	1–100 Output value in working mode
	Digits with a point Parameter value in setting mode
	Indication of output steps Toggled with output value by pressing 

## VERIFICATION OF INSTALLATION INSTRUCTIONS

When you first switch on the mains supply, the display will show “888” for 2 seconds. Then, “20” will appear and the connected AC motor will run at minimum speed.

If this is not the case, check the connections.

Press and hold the up  button until you reach the maximum output value ‘100’. The AC motor will run at maximum speed. Press the  button for 4 seconds until the display shows a decimal point ‘.’. The RDCZ is now in Stand-by mode, the output is 0, and the motor will stop.

If this is not the case, check the connections.

**Fig. 7 Start-up indication**



## TRANSPORT AND STORAGE

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Avoid shocks and extreme conditions; stock in original packing.

## WARRANTY AND RESTRICTIONS

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Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

## MAINTENANCE

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In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.