

# ECMF8-DM | HVAC CONTROLLER FOR EC FANS / VFD

Mounting and operating instructions



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## SAFETY AND PRECAUTIONS

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Read all the information, the datasheet, Modbus map, 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

ECMF8-DM is a fan speed controller with Modbus RTU communication, two analogue / modulating / digital inputs, two tacho inputs and two analogue / modulating outputs for connecting EC fan(s) or a VFD. The device can be used for single or dual ventilation control according to one or more sensor measurements or according to downloadable application specific firmware (solutions) like destratification in warehouses, air curtain control, etc.

## ARTICLE CODES

Article code	Built-in internet gateway
ECMF8-AO-DM	No

## INTENDED AREA OF USE

- Control of 1 or 2 (groups of) EC fans
- For indoor use only
- Demand based ventilation control
- Application specific solutions

## TECHNICAL DATA

- Analogue/modulating/digital inputs x 2: 0–10 VDC / 0–20 mA / 0–100% PWM / Digital Input ON / OFF (1 / 0)
- Digital inputs logic levels
  - ▶ 0 (0–0,8 VDC)
  - ▶ 1 (2–12 VDC)
- Analogue / modulating outputs x 2 (max. load 200 Ω): 0–10 VDC / 0–20 mA / 0–100% PWM
- Supply voltage (Us): 85–264 VAC / 50–60 Hz
- Integrated power supply for external sensors: 24 VDC (Imax 750 mA)
- RGB LED on the cover for status indication
- Protection standard: IP54 (according to EN 60529)
- Storage temperature conditions: -10–60 °C
- Operating ambient conditions:
  - ▶ Temperature: -10–40 °C
  - ▶ Rel. humidity: 5–95 % rH (non-condensing)

## STANDARDS

- Low Voltage Directive 2014/35/EC CE
  - ▶ EN 60529:1991 Degrees of protection provided by enclosures (IP Code) Amendment AC:1993 to EN 60529
  - ▶ EN 60730-1:2011 Automatic electrical controls for household and similar use - Part 1: General requirements
  - ▶ EN 62311:2008 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)
  - ▶ EN 60950-1:2006 Information technology equipment - Safety - Part 1: General requirements Amendments AC:2011, A11:2009, A12:2011, A1:2010 and A2:2013 to EN 60950-1

- EMC Directive 2014/30/EU
  - ▶ EN 60730-1:2011 Automatic electrical controls for household and similar use - Part 1: General requirements
  - ▶ EN 61000-6-2:2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments Amendment AC:2005 to EN 61000-6-2
  - ▶ EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
  - ▶ EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
  - ▶ EN 55011:2009 Industrial, scientific and medical equipment - Radiofrequency disturbance characteristics - Limits and methods of measurement Amendment A1:2010 to EN 55011
  - ▶ EN 55024:2010 Information technology equipment - Immunity characteristics - Limits and methods of measurement
- RoHS Directive 2011/65/EU
  - ▶ EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
- ETSI EN 301 489-1 V2.1.1 (2017-02) Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1:
  - ▶ Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
- ETSI EN 301 489-17 V3.1.1 (2017-02) Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17:
  - ▶ Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

## WIRING AND CONNECTIONS

Wiring and connections		
<b>L</b>	Supply voltage, line	
<b>N</b>	Supply voltage, neutral	
<b>Ain1, Ain2</b>	Analogue / modulating / digital inputs	
<b>GND</b>	Analogue inputs, ground	
<b>Tin 1, Tin 2</b>	Tacho inputs	
<b>GND</b>	Tacho inputs, ground	
<b>Aout 1, Aout 2</b>	Analogue / modulating outputs	
<b>GND</b>	Analogue / modulating outputs, ground	
<b>RJ45 socket</b>	To connect the slave devices, PoM (Data + Power supply)	
<b>GND</b>	Ground signal for the Modbus slave devices	
<b>/B</b>	Modbus RTU, signal /B	
<b>A</b>	Modbus RTU, signal A	
<b>+24 VDC</b>	+24 VDC power supply for the Modbus slave devices	
<b>Connections</b>	Cable cross section L, N terminals	max. 2,5 mm <sup>2</sup>
	Cable cross section other terminals	max. 1,5 mm <sup>2</sup>
	Cable gland clamping range	3–6 mm

## MOUNTING INSTRUCTIONS IN STEPS

Before you start mounting the unit read carefully “**Safety and Precautions**”. Choose a smooth surface for installation (a wall, panel, etc.).

### Follow these steps:

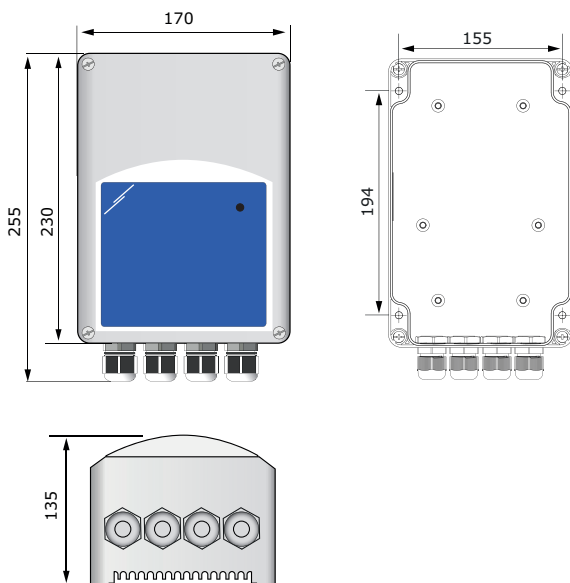
1. Make sure that the controller is switched off.
2. Unscrew the front cover and open the enclosure. Mind the wires that connect the LEDs with the printed circuit board.
3. Fix the unit to the wall or panel using the provided screws and dowels. Mind the correct mounting position and unit mounting dimensions (see **Fig. 1 Mounting dimensions** and **Fig. 2 Mounting position**).
4. Insert the cables through the cable glands and do the wiring according to the wiring diagram (see **Table 1**) while adhering to the information from section “**Wiring and connections**” above.
  - 4.1 Connect the power supply line (terminals L and N).
  - 4.2 If applicable, connect the analogue / modulating inputs (terminals Ain1 & GND / Ain2 & GND) to an external potentiometer or HVAC sensor with an analogue / modulating output (0–10 VDC / 0–20 mA / PWM / digital (0 or 1)).
  - 4.3 If applicable, connect the tacho inputs (if the connected motor features tacho, these are used for feedback and control).
  - 4.4 Connect the analogue output(s) (Aout1, GND & Aout2). The controller can be used to control one or two motors simultaneously, so only one or both of these outputs can be connected, depending on your application.
  - 4.5 If applicable, connect the Modbus RTU communication cables.
  - 4.6 Connect HVAC sensors, potentiometers or other slave devices to the RJ45 socket and/or Power over Modbus (PoM) terminal block (see **Fig. 3**).

### ATTENTION

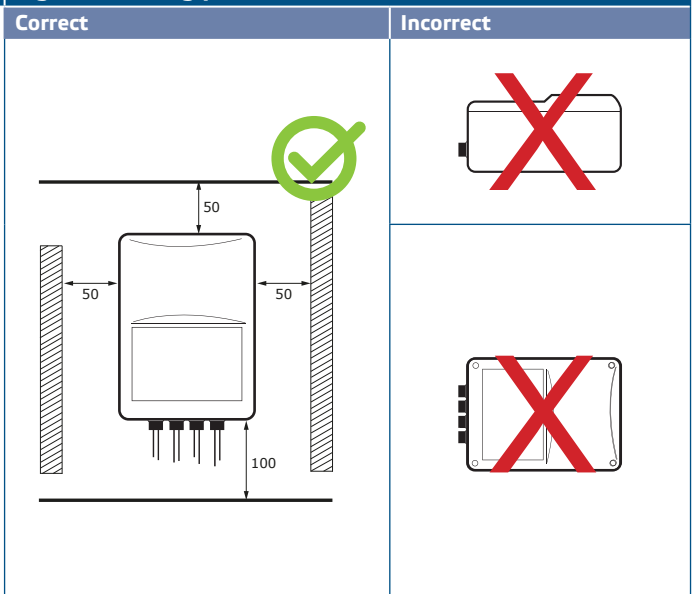
*Do not connect an external 24 VDC power supply to ECMF8 - this will cause permanent damage. Modbus RTU communication can be connected via the RJ45 socket, via the terminal block or via both.*

5. Put back the cover and secure it with the screws. Tighten the cable glands.
6. Switch ON the main supply after all connections are done and checked.
7. Connect your installation to SenteraWeb and download the required application specific firmware.

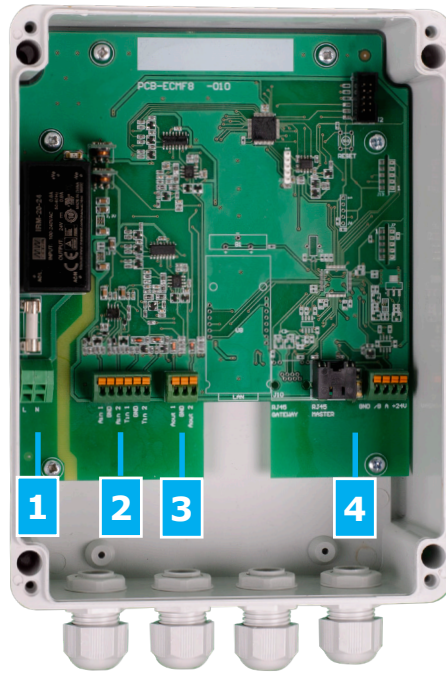
**Fig. 1 Mounting dimensions**







**Fig. 2 Mounting position**



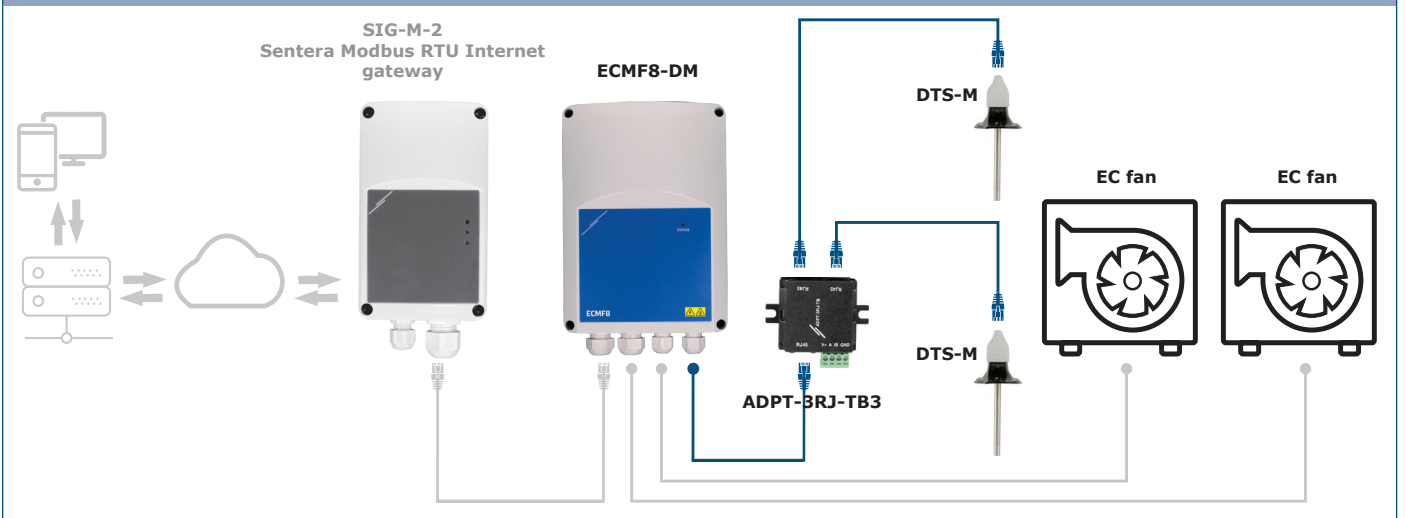
**Table 1 Legend**



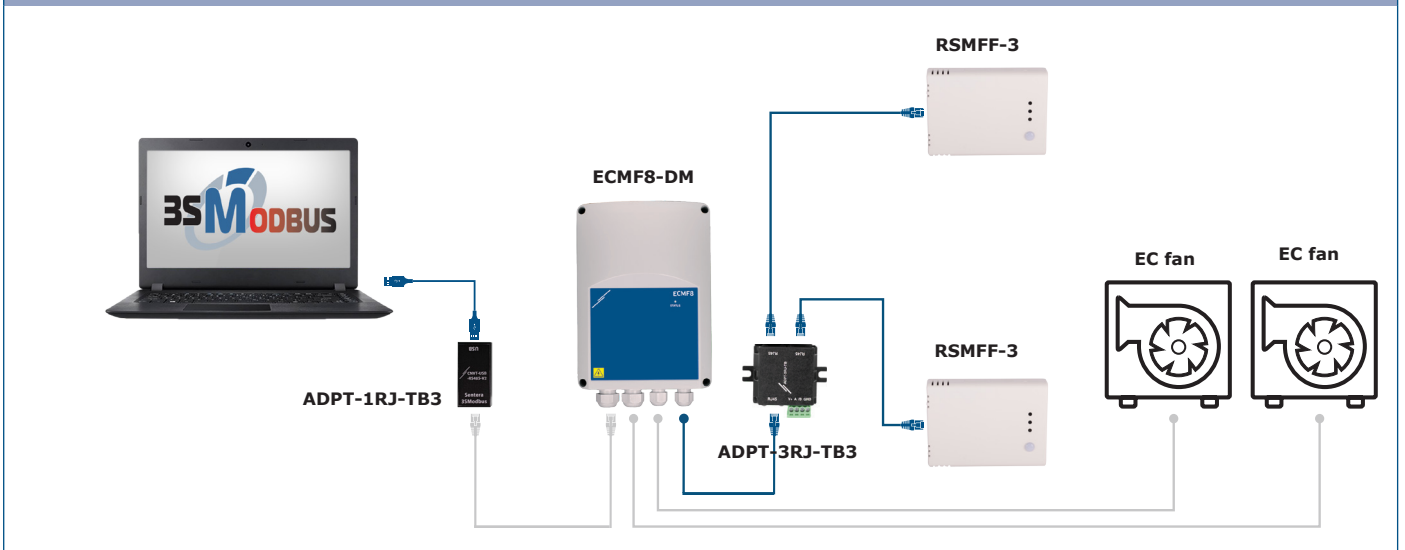
1 - Terminal block power supply	
2 - Terminal block analogue/modulating inputs and Tacho inputs	
3 - Terminal block analogue/modulating outputs	
4 - RJ45 socket and terminal block PoM	 <p data-bbox="699 1312 1490 1429">To connect HVAC sensors, potentiometers or other slave devices. Do not connect an external 24 VDC power supply to ECMF8 - this will cause permanent damage. Modbus RTU communication can be connected via the RJ45 socket, via the terminal block or via both.</p>

**Fig. 3 Application example**

**Application example: ECMF8 + DTS sensor, connected to SenteraWeb using Sentera gateway**



Application example: ECMF8 + Room sensor, 3SModbus control



**ATTENTION**

*This controller requires application specific firmware. This firmware can be downloaded via [www.senteraweb.eu](http://www.senteraweb.eu)*

**Download and Install Sentera Solution Firmware**

The ECMF8 controller requires application dedicated firmware, which can be downloaded from the Sentera website: Select your application via [www.sentera.eu/en/solutions](http://www.sentera.eu/en/solutions).

First, connect all required products including the Sentera internet gateway. Then connect your installation to [www.senteraweb.eu](http://www.senteraweb.eu). Enter the solution code and click "Link to solution" to download the selected firmware into the connected devices. After the download there is the possibility to use the installation stand alone or to keep the internet gateway connected.

## VERIFICATION OF INSTALLATION

After connecting the unit to the main supply, the green LED on its cover should light up to indicate that the controller is supplied. For status indication, see **Table 2**.

Green	Normal operation
Blinking Yellow	Off level activated for input 1, 2 or both.
Blinking Red	Communication with external sensors is lost.

**Safe operation depends on proper installation. Before start up, ensure the following:**

- The main supply is connected correctly.
- Do not short-circuit the terminals or the input and output wiring.
- During operation, the unit must be closed.
- Switch ON the main supply after all connections are done and checked.
- If the unit does not work according to the instructions, the wiring connections and settings need to be checked.

**ATTENTION**

*Disconnect main power supply before all servicing and maintenance. High voltage on the internal circuit!*



## 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.