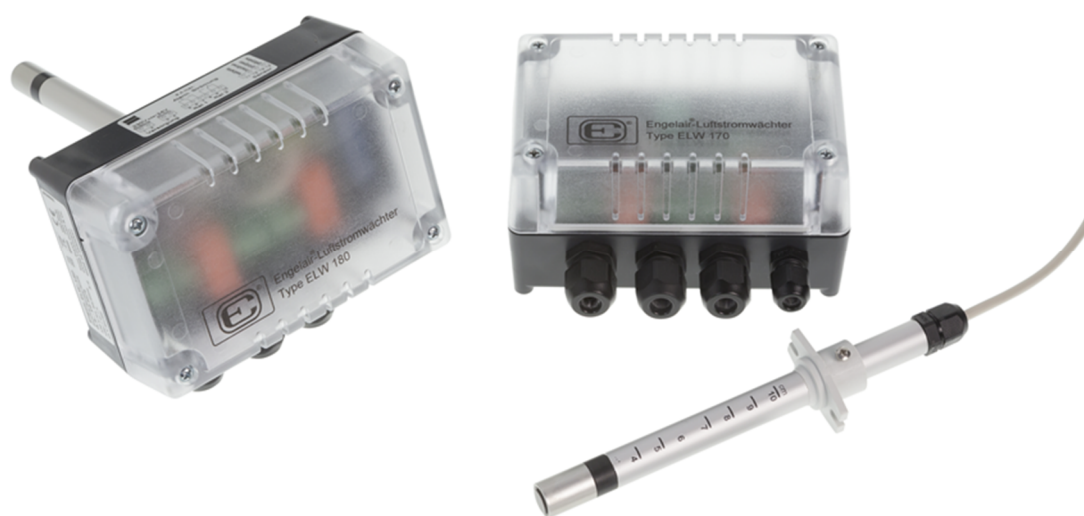


ENGELAIR®
AIR FLOW MONITORING
Monitors types ELW 170 and ELW 180
for electric air heaters
in air conditioning and ventilating systems



Notes relating to instructions

Please read these operating instructions carefully and note the relevant country-specific standards, safety requirements and accident prevention specifications. The mounting instructions form part of the device and must be retained for its entire life.

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The following warning notices are used in these instructions:



Immediate danger from electrical voltage and current

Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in death or serious bodily injuries.



Possible danger

Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in minor or light bodily injuries and/or substantial property damage.

1. Safety information



Mounting, electric installation, start-up and maintenance of the airflow monitor may only be undertaken by a qualified electrician. The directions provided in these instructions must be understood, noted and followed. The electrician is responsible for correctly connecting the device in accordance with the electric wiring diagrams. The device requires no maintenance.

The housing may be opened to be connected to the electricity supply and to set parameters. There are hazardous circuits inside the housing. The airflow monitor may only be operated by staff who have been authorised and trained to do so by the system operator. The applicable standards and directives should be observed. The EMC directives must be ensured for the entire system.

2. Proper use

The airflow monitors ELW 170 and ELW 180 are only intended for commercial use.

The devices are used for the following purposes:

- To evaluate airflows and the resultant generation of switching statuses.
- For monitoring off fans or butterfly valves
- For use in conjunction with DDC systems
- For flow –dependent monitoring of humidifiers and electric heating coils in accordance with DIN VDE 0100-420 (Oct. 2019). Please also observe our information S 20.

Proper use also includes the following points:

- The directions provided in these instructions must be noted and followed.
- The technical limit values (see Chapter 6 “Technical data”) must be observed.
- The sensor should only be used to measure air.
- The devices are not suitable for use in areas at risk of explosion or pressurised areas.

The manufacturer accepts no liability for damage resulting from the device not being used properly, unauthorised modifications to the device, failure to observe these instructions and deployment of staff who are not qualified. The manufacturer’s guarantee also ceases to apply in such instances.

3. Standards and directives

The device complies with the following requirements:

- 2014/30/EU EMC directive
- 2014/35/EU Low Voltage Directive
- EN 61326-1:2013 General EMC requirements
- EN 61326-2-3:2013 Immunity for residential, commercial and light-industrial environments
- DIN EN 60947-5-1 Low-voltage switchgear and controlgear
- EN 50581:2012 Restriction of hazardous substances

4. Structure of the measurement system

The measurement system comprises the sensor and control unit. The measurement system is available in two different designs:

- ELW 170 for wall mounting (sensor is connected using a cable)
- ELW 180 for duct mounting (sensor is permanently connected to the control unit)

Sensor and control unit are calibrated independently and, in the version for wall mounting, can be replaced with identical devices at any time. Sensors and control devices are not compatible with the foreign ELW line.

5. Principle of operation

The airflow monitor works in line with the calorimetric measuring principle where the amount of heat removed by the airflow is measured and converted into the switching value. In order to do this, the sensor contains a heating element and 2 temperature sensors. A microcontroller controls the heating and measures differences in temperature. On the basis of stored calibration curves, it calculates the speed of airflow and transfers the value to the control unit in a serial manner. Here another microcontroller determines the switching behaviour of the two relays from the setpoint values for the controller.

6. Mounting and installation



Before the device is mounted, ensure that it is not displaying signs of any physical damage or damage caused by moisture, which may have come about due to improper transport or storage.

The housing protection category is IP65. Ensure that the housing remains free of deposits and moisture. The terminals and connection cables should be checked regularly to ensure they are secure and must be free of vibrations.

The ambient temperature limits stated in the technical data should be observed.

6.1 Mounting

ELW 170: The device is mounted on a level base using suitable screws (not included in scope of delivery). The device can be mounted in any position.

ELW 180: The device is mounted on the duct using the mounting flange included in scope.

6.2 Connecting to the electricity

The rated voltage (mains) and other key electrical data are stated on the device's type plate and in chapter 9 "Technical data". The cable cross-section for auxiliary energy (mains) and the main fuse used must be matched to one another according to the standards and specifications applicable locally.

The 2x2-pin terminal block for the rated voltage and the two 3-pin terminal blocks for the potential-free relay contacts are designed for cable cross-sections up to 2.5 mm².

The 2x2-pin terminal block for the sensor contacting is sized in accordance with requirements for smaller cable-cross-sections up to 1 mm².

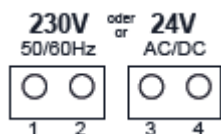
6.2.1 Connecting to the auxiliary energy supply



Alternatively, the devices can be operated with a mains voltage of 100-240 VAC 50/60 Hz or a low voltage of 24 V \pm 10 % AC/DC.

Two pairs of terminals 1/2 and 3/4 are provided for this purpose and must not be interconnected at the same time.

All work associated with connecting to the auxiliary energy supply may only be undertaken when de-energised.



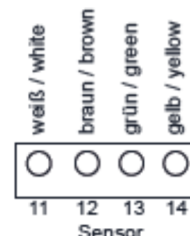
The mains voltage is connected to terminals 1 and 2.
The 24 V low voltage is connected to terminals 3 and 4.

Observe the limit values for the auxiliary energy feed-in (refer to technical data for details). The upstream fusing element should be sized in accordance with generally applicable standards and directives. Once the cables have been installed and while the system is de-energised, the cover for the terminals and electronics should be fitted.

6.2.2 Sensor connection



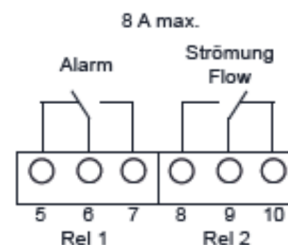
The sensor cable carries a DC voltage of 24 V and two serial signals should therefore be routed using the shortest path possible. In the version for duct mounting, the sensor is permanently integrated in the housing ex factory and connected to the control unit. There is no need for the user to make any connections. In the version for wall mounting, when routing the cable, try to avoid proximity to larger electrical machines and switching elements which cause stray fields, switching pulses and inductions. The maximum permitted sensor cable length is 30 m. Ensure that the four cables are connected correctly so that the Sensor or control electronics are not damaged.



6.2.3 Connecting the switching

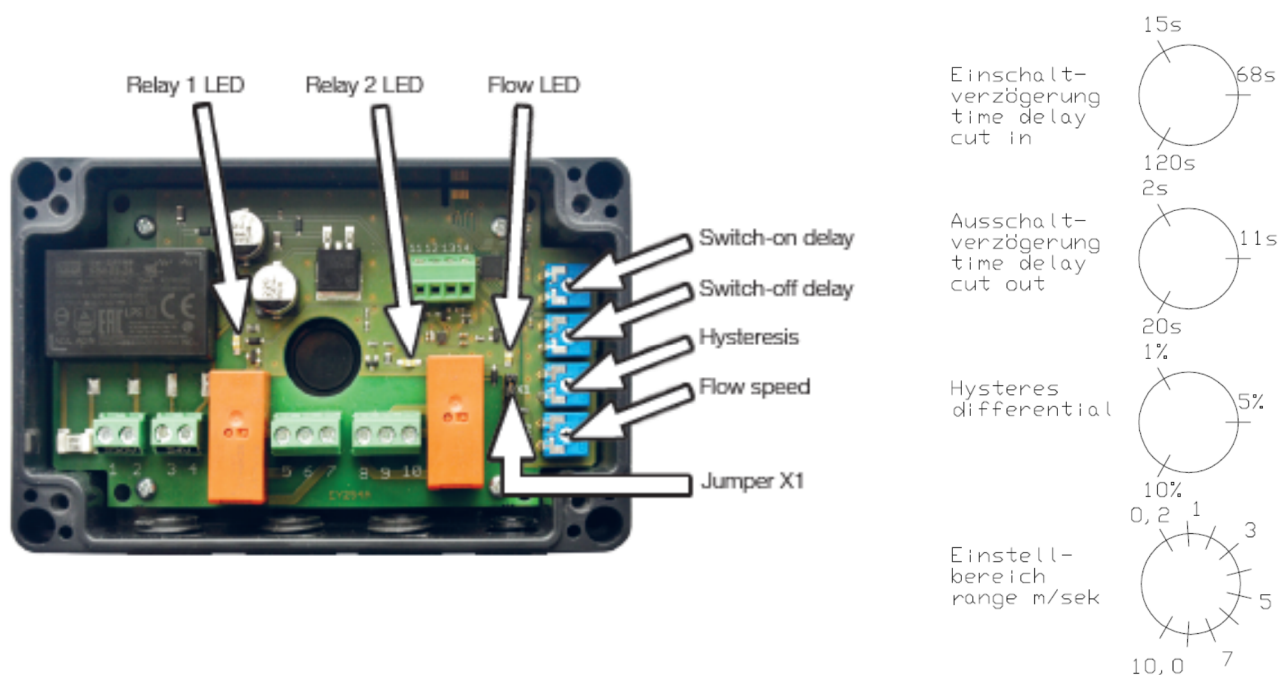


The ELW 170 / 180 is fitted with two potential-free relay outputs which can be interconnected as make or break contacts depending on use (two-way contact). Refer to technical data for switching capacity. The consumer should be fused in accordance with the specified standards and directives. All work associated with the terminals may only be undertaken when de-energised.



7. Operating functions and elements

Parameters for the device functions are set using controls in the control device. A small screwdriver is needed to operate the speed controller.



7.1 Operating mode auto restart

The relays have the following function:

REL1 (contacts 5, 6, 7): Alarm function without interlock
REL2 (contacts 8, 9, 10): Flow monitoring

Once the operating voltage has been applied and the desired flow speed has built up after the start delay (constants see technical data), relay 2 energises (contacts 8/9 close) and the downstream unit is released. This therefore prevents harmful heating / humidification without air removal. If the necessary air speed isn't reached after the start delay, relay 1 switches to alarm contact 6/7. A drop in flow below the set value during operation occurs once the switch-off delay has passed.

Contacts 8/9 are opened (heating off) and contacts 6/7 are closed at the same time (alarm). Both relays are not interlocked in this state. When the flow is detected again, the measuring cycle starts automatically without the device having to be disconnected from the power supply (stand-by mode).

7.2 Function of the setting potentiometers

Four potentiometers can be used to influence the device's switching behaviour. They are located on the right-hand side of the PCB and have the functions described below, working from top to bottom.

7.2.1 "Switch-on delay" speed controller

Allows the switch-on delay to be set to between 15 and 120 seconds.
Factory setting 15 seconds.

7.2.2 "Switch-off delay" speed controller

Allows the switch-off delay to be set to between 2 and 20 seconds.
Factory setting 2 seconds.

7.2.3 "Hysteresis" speed controller

Allows the hysteresis to be set to between 1 and 10% of the measuring range. Hysteresis prevents the output from being switched repeatedly if the measurement moves around the set switching point.
Factory setting 1%.

7.2.4 "Flow speed" speed controller

This speed controller is used to set the flow speed (0,2...10m/s). Should the speed fall below the flow speed, a switching process is triggered. The "Flow" LED can be used to judge whether the current flow value is above or below the set switching value.
Factory setting 1.5 m/s.

LED off = flow < set value
LED on = flow > set value

7.3 Display elements

Three LEDs are provided as display elements. Their functions are explained below.

7.3.1. "Relay 1" and "Relay 2" LEDs

These two LEDs indicate the switching state of the two associated relays.

LED on = relay energised

LED off = relay deactivated

The circuit diagram provided on the housing shows the relay when deactivated.

7.3.2. "Flow" LED

Used to set the flow speed and check function. During normal operation, this LED goes out as soon as the flow speed falls below the set value. The LED's behaviour depends on the set flow speed and hysteresis, not however on the switch-on and switch-off delay, which only influence the switching state of the relays. Flashing of the LEDs indicates that there is a faulty connection between the sensor and control unit.

8. Start-up

The following points have to be noted when starting up:

8.1. Checks before switching on the auxiliary energy

Before starting up the device, check whether

- the wiring has been produced correctly as shown in the wiring diagram,
- the auxiliary energy corresponds to the details on the type plate,
- the ambient conditions match the details in the technical data.

8.2. Checks after switching on the auxiliary energy

After switching on the auxiliary energy, check whether

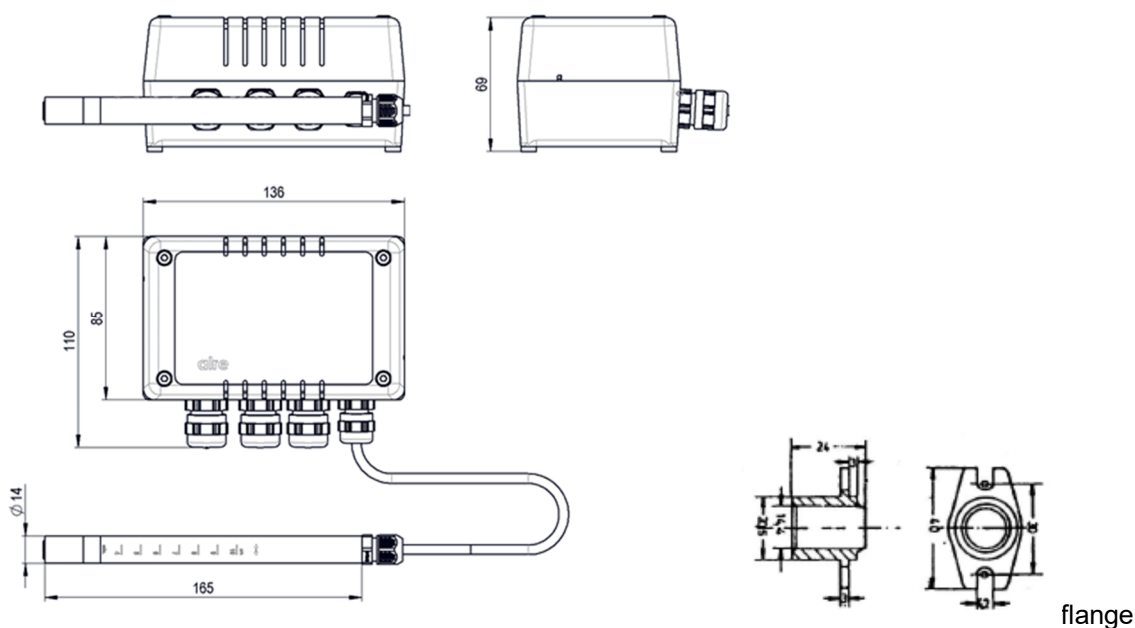
- the desired functions are set at jumpers and speed controllers.

9. Technical data

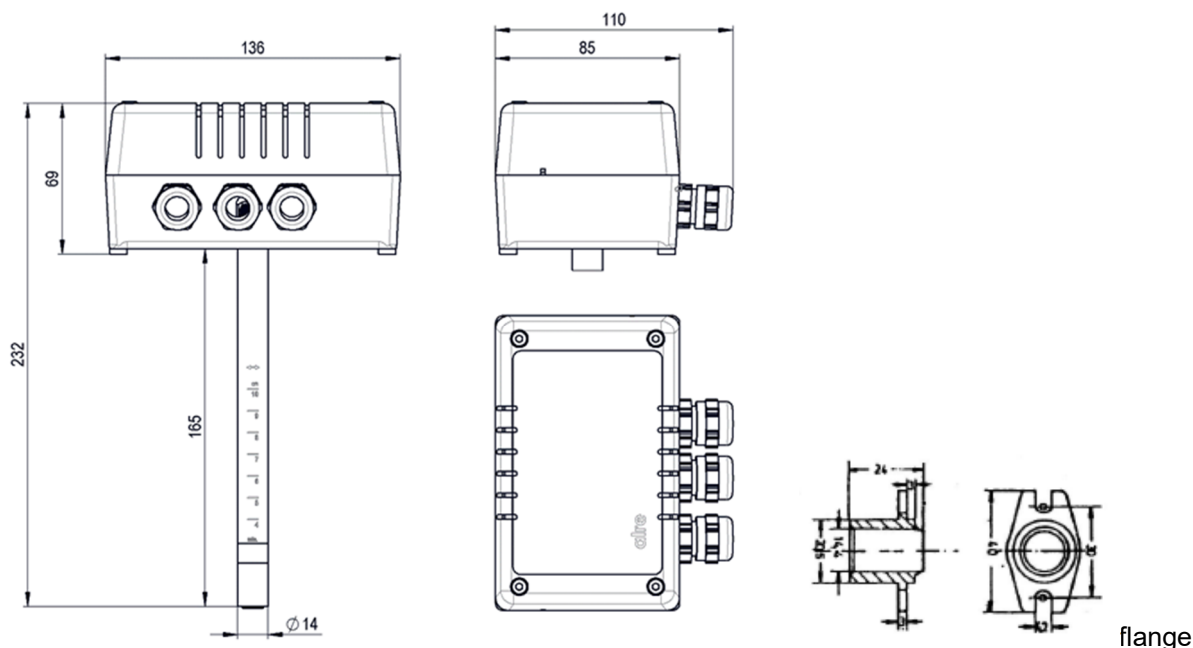
Rated voltage:	100-240V AC or 24V \pm 10% AC/DC
Rated consumption:	< 3 VA
Contact:	2 two-way contacts, potential-free
Switching voltage:	max. 250 V AC
Switching current:	max. 8 A
Electric connection:	2.5 mm ² (sensor 1.0 mm ²), screw terminals, 3 x M16 (1 x M12)
Protection class:	II
Type of protection:	IP65 housing / IP54 sensor, EN 60529
Flow speed:	0.2 ... 10 m/s (wearer appealing in the range of 0.2 – 1.0 m/s)
Start delay:	15 ... 120 seconds
Ambient temperature range:	housing 0° ... +50°C / sensor -20° ... +90°C
Transport and storage temperature:	-10 ... +75 °C
Relative air humidity:	< 95 %
Condensation:	permitted (outside only)
Overvoltage category (control unit):	4000 V
Degree of contamination:	2
Material:	Housing cover polycarbonate, housing base ABS, sensor cable PVC, cable screw connection PA6, sensor housing aluminium with polyamide PA6

10. Dimensional drawing

ELW 170:



ELW 180:



11. Maintenance and servicing

Before starting up and then at adequate intervals, check the measurement system is fully functional. The intended effect should also be checked. If you want to clean the exterior of the device, ensure that the cleaning agent used doesn't attack the surface of the plastic housing and sensor aluminium. No liquid or powdery substance may enter the housing because this may cause serious damage to the electronics and result in life-threatening conditions.

12. Transporting / storing device

When transporting, be gentle on the housing packaging and do not distort it. The device should be stored in line with the ambient conditions specified in the technical data.

13. Disposal

When disposing of device, be sure to separate the materials and recycle the device components. The statutory specifications and directives applicable at the time should be observed.

14. Liability

We determined the technical data provided in an inspection and test environment suited to this task and this data only presents the agreed properties on this basis. The purchaser / customer is responsible for checking the suitability of the use or usage intended by the purchaser / customer under the specific conditions of use; we do not accept any liability for this. We reserve the right to amendments.