



ENGELAIR®

AIR FLOW MONITORING

**Air flow monitor ELW 170 and ELW 180
for electric air heaters
in air conditioning and ventilation systems**



Notes on the instructions



Please read these operating instructions carefully and observe the relevant country-specific standards, safety regulations and accident prevention regulations. The installation instructions must be kept available for the entire service life of the appliance. Passing on and duplication of this document, utilisation and communication of its contents are prohibited unless expressly permitted. All rights reserved in the event of patent, utility model or design registration. The following warnings are used in this manual:



Immediate danger due to electrical voltage

Failure to observe this warning may result in serious injury, death or damage to property.

Possible danger

Failure to observe this warning may result in serious injury or damage to property.

1. Safety instructions



Assembly, electrical installation, commissioning and maintenance of the airflow monitor may only be carried out by a qualified electrician. The instructions in this manual must be understood, observed and followed. The electrician is responsible for ensuring that the appliance is connected correctly in accordance with the electrical connection diagrams. The appliance is maintenance-free.

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The housing may be opened for electrical connection and parameterisation. Hazardous electrical circuits are located inside the housing. The airflow monitor may only be operated by personnel who have been authorised and instructed by the system operator. The applicable standards and directives must be complied with. The EMC guidelines for the entire system must be ensured.

2. Intended use

The ELW 170 and ELW 180 airflow monitors are intended for commercial use only. The devices are used for the following purposes:

- For analysing air flows and the resulting generation of switching states.
 - For monitoring fans or control dampers
 - For flow-dependent monitoring of humidifiers and electrical heating registers
 - in accordance with DIN VDE 0100-420 (Oct. 2019). Please also note our information S 20 and 12/19.
 - For use in conjunction with DDC systems
- The following points are also part of the intended use:
- The ELW 170 and ELW 180 airflow monitors are intended for commercial use only. The devices are used for the following purposes: instructions in this manual must be observed and followed.
 - The technical limit values (see chapter 6 'Technical data') must be observed.
 - The sensor is to be used exclusively for measuring air
 - The devices are not suitable for use in potentially explosive or pressurised areas.

The manufacturer accepts no liability for any damage resulting from improper use, unauthorised modifications, failure to observe these instructions or use by unqualified personnel. The manufacturer's warranty is also void.

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 Residential/commercial interference immunity
- DIN EN 60947-5-1 Low-voltage switchgear and controlgear
- EN 50581:2012 Restriction of hazardous substances

4. Structure of the measuring system

The measuring system consists of the sensor and the control unit. The measuring system is available in two different versions are available:

- ELW 170 for wall mounting (sensor is connected using a cable)
 - ELW 180 for duct mounting (sensor is permanently connected to the control unit)
- The sensor and control unit are calibrated independently and can be replaced by identical devices at any time in the wall-mounted version. However, they are not compatible with the previous version.

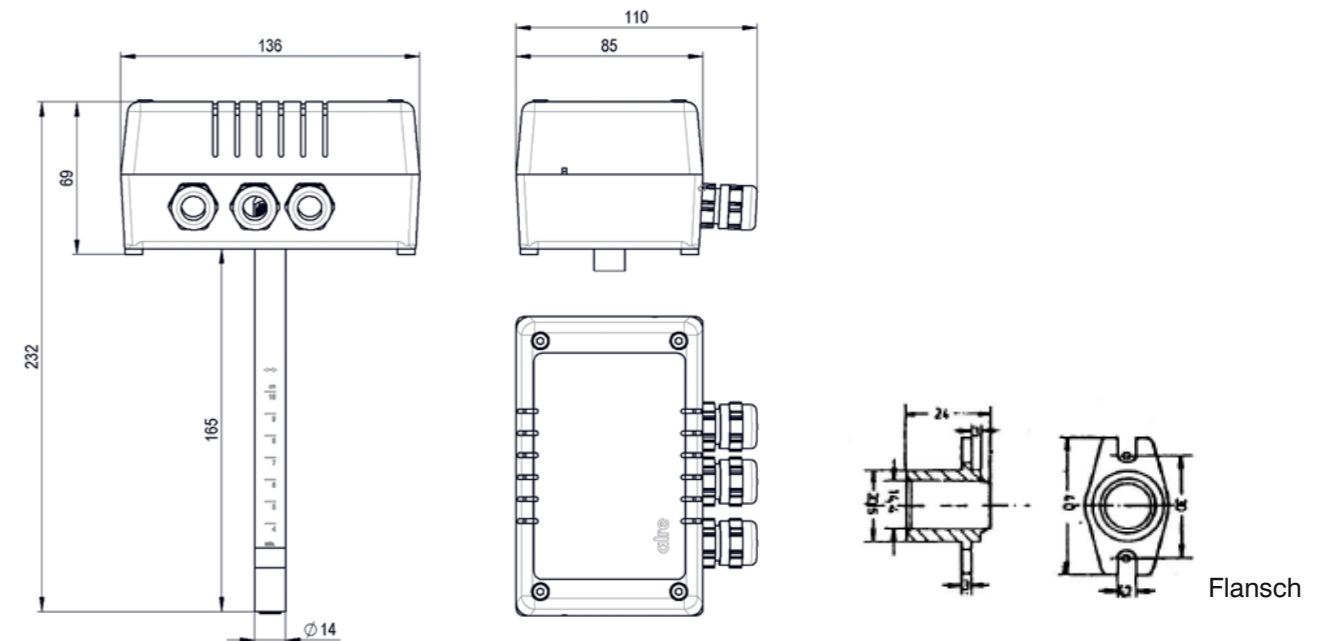
5. Functional principle

The air flow monitor works according to the calorimetric principle. The heat extraction by the air flow is measured and converted into the switching value. The sensor contains a heating element and two temperature sensors. A microcontroller controls the heating and measures the temperature differences. It calculates the air flow velocity from the stored calibration curves and transmits the value serially to the control unit. Here, another microcontroller determines the switching behaviour of the two relays from the default values of the setting controllers.

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ELW 180:



11. Maintenance and servicing

Before commissioning and at sufficient intervals, the measuring system must be checked for proper functioning. The intended effect must also be checked. If external cleaning is required, ensure that the cleaning agent used does not attack the surface of the plastic housing or the aluminium of the sensor. Do not allow any liquid or powdery agents to enter the housing, as this can cause serious damage to the electronics and life-threatening conditions.

12. Transporting / storing the device

During transport, ensure that the housing is packed carefully and without tension. The device must be stored in accordance with the ambient conditions specified in the technical data.

13. Disposal

When disposing of the device components, ensure that they are separated and recycled. The legal regulations and guidelines applicable at the time must be observed.

14. Warranty

The specified technical data were determined in a suitable test environment and only represent the agreed quality on this basis. The customer is responsible for checking the suitability for the purpose intended by the client / customer or the use under the specific conditions of use; we do not assume any warranty for this. Subject to alterations.

KUNO ENGELS Vertriebs-
GmbH
ELEKTROTECHNISCHE FABRIK UND WEBEREI

Hauptstraße 42
D-42799 Leichlingen

Telefon +49 (0)2174/ 7 90 00
Fax +49 (0)2174/ 790 010
E-mail: info@KunoEngels.de
Internet: www.KunoEngels.de

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8. Commissioning

The following points must be observed during commissioning:

8.1 Check before switching on the power supply

Before commissioning the appliance, check that

- the wiring has been carried out correctly according to the wiring diagram,
- the power supply corresponds to the specifications on the rating plate,
- the ambient conditions correspond to the specifications in the technical data.

8.2 Check after switching on the power supply

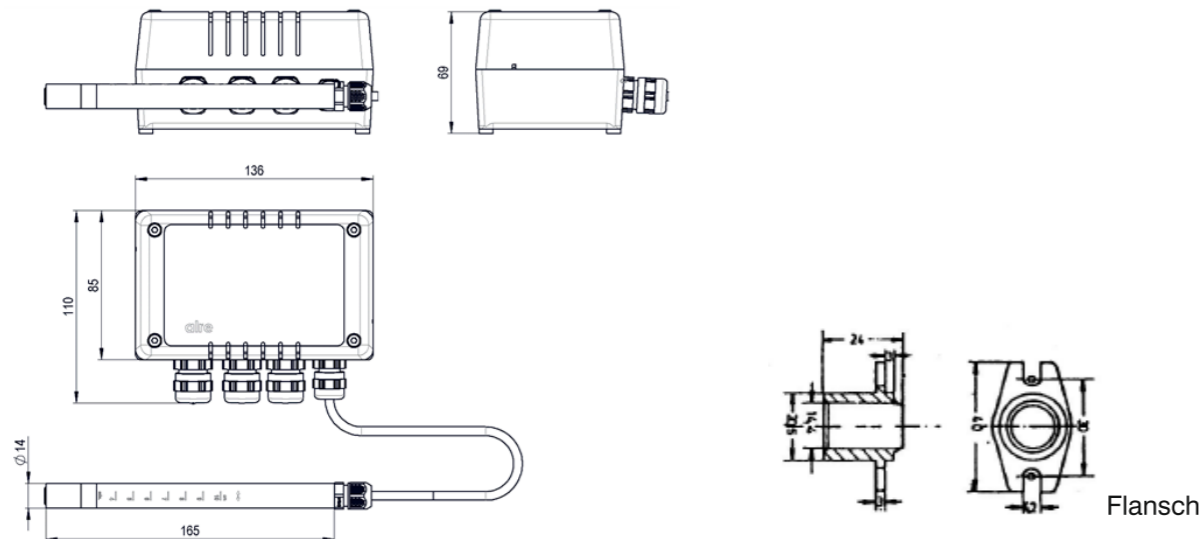
After switching on the power supply, check that the required functions are set on the rotary controls (potentiometers).

9. Technical data

Rated impulse voltage:	100-240V AC or 24V + 10% AC/DC
Power consumption:	< 3 VA
Contact switching voltage:	2 changeover contacts, potential-free, max. 250 VAC
Switching current:	max. 8 A
Electrical connection:	2.5 mm ² (sensor 1.0 mm ²), screw terminals, 3 x M16 (1 x M12)
Protection class:	II
Protection type:	IP65 housing / IP54 sensor, EN 60529
Flow velocity:	0,2 ... 10 m/s (slower response in the range 0.2 - 1.0 m/s)
Switch-on delay:	15 ... 120 seconds
Ambient temperature range:	Housing 0° ... +50°C / sensor -20° ... +90°C
Transport and storage temperature:	-10° ... +75 °C
Relative humidity:	< 95 %
Condensation:	Permissible (outdoor only)
Overvoltage category (device):	4000 V
Degree of soiling:	2
Material:	Polycarbonate housing cover, housing base ABS, sensor cable PVC, cable gland PA6, Sensor housing aluminium with polyamide PA6

10. Dimensional drawing

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6. Assembly and installation



Before installing the appliance, make sure that it is free of damage or moisture damage that may have been caused by improper transport or storage.

The housing protection class is IP65. It must be ensured that the housing remains free of deposits and moisture. The terminals and connection cables must be checked regularly to ensure that they are secure and free from vibrations.

The ambient temperature limits specified in the technical data must be observed.

6.1 Installation

ELW 170 Installation is carried out with suitable screws (not included in the scope of delivery) on a level surface. Installation is independent of the position. To avoid functional problems, the sensor cable extension should be as short as possible, max. approx. 30 m.

ELW 180 Installation is carried out on the duct using the mounting flange included in the scope of delivery. There must be no filters, louvre dampers or inspection openings between the air flow monitor and the electric air heater. The sensor must be 'fully' in the air flow. Avoid installation points where air pockets or air turbulence can form.

6.2 Electrical connections

The rated voltage (mains) and other electrical characteristics are specified on the rating plate of the appliance and under point 9 'Technical data'. The conductor cross-section of the power supply (mains) and the main fuse used must be matched to each other in accordance with national standards and regulations.

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

The 2x2-pole terminal block for contacting the sensor is designed for smaller cable cross-sections of up to 1 mm² cable cross-sections of up to 1 mm².

6.2.1 Power supply connection

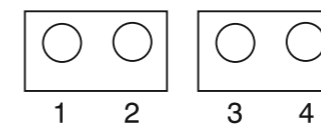


The devices can alternatively be operated with mains voltage 100-240 VAC 50/60 Hz or with extra-low voltage 24 V #10 % AC/DC.

Two pairs of terminals 1/2 and 3/4 are available for this purpose, which must not be connected at the same time.

All work in the area of the power supply connection may only be carried out when the system is de-energised.

230V ^{oder} 24V
50/60Hz ^{or} AC/DC



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

Observe the limit values for the auxiliary power supply (see technical data). The upstream fuse element must be dimensioned in accordance with the generally applicable standards and guidelines. The cover for the terminals and electronics must be fitted after the cables have been installed in a de-energised state. When using the device in DC voltage networks, please note that a high current flows at the moment of switch-on. This drops to its nominal value within the first 10 ms.

Please take this into account when using power supply units with electronic fuses.



6.2.2 Sensor connection



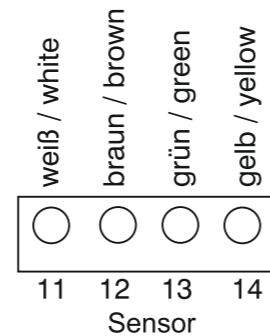
The sensor cable carries a direct voltage of 24 volts and two serial signals and must therefore be laid over the shortest possible distance.

In the version for duct mounting, the sensor is permanently integrated in the housing at the factory and connected to the control unit.

Connection by the user is not necessary.

In the wall-mounted version, cables should be routed as close as possible to large electrical machines and switching elements that cause stray fields, switching pulses and induction. The maximum permissible sensor cable length is up to 30 meters.

Ensure that the four cables are connected correctly to prevent damage to the sensor or the control electronics.

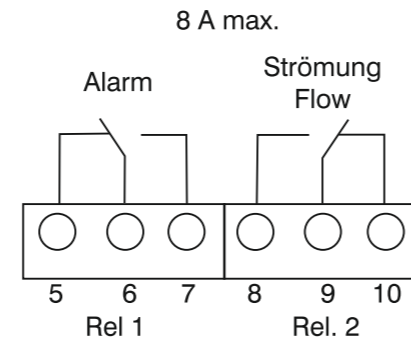


6.2.3 Connection of switching outputs



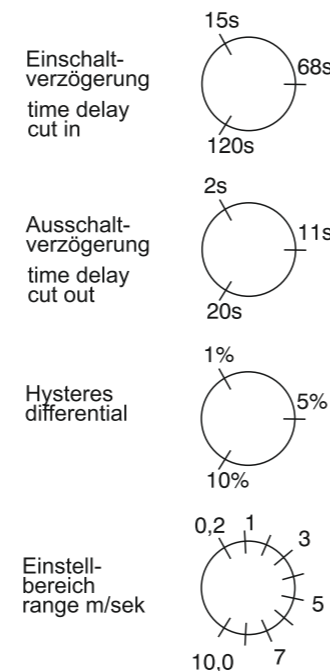
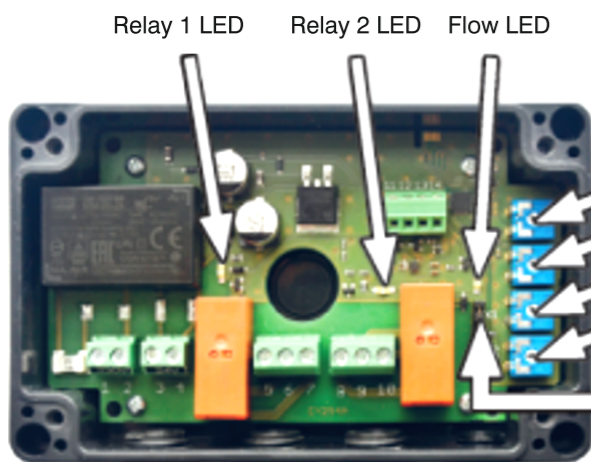
The ELW 170 / 180 is equipped with two potential-free relay outputs, which can be wired as normally closed or normally open contacts (changeover contacts) depending on the application; for switching capacity, see Technical data.

The load must be fused in accordance with the prescribed standards and directives.



7. Operating functions and elements

The functions of the device are parameterised via the operating elements in the control unit. A small screwdriver is required to operate the rotary controls (potentiometers).



7.1 Self-start operating mode

The relays have the following function:

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

After the operating voltage is applied and the desired flow rate is established after the switch-on delay (see technical data), relay 2 energises (contacts 8/9 close) and the downstream unit is enabled. This prevents harmful heating/humidification without air discharge. If the required air velocity is not reached after the switch-on delay, relay 1 switches to alarm contact 6/7. A drop in flow below the set value during

operation becomes effective after the switch-off delay has elapsed. 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, i.e. the measuring cycle starts automatically when the flow is detected again without the device having to be de-energised for recommissioning (stand-by mode)

7.2 Function of the setting potentiometers

The switching behaviour of the device can be influenced with the aid of 4 potentiometers. These are arranged on the right-hand side of the circuit board and have the following functions from top to bottom:

7.2.1 'Switch-on delay' rotary control

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

7.2.2 'Switch-off delay' rotary control

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

7.2.3 'Hysteresis' rotary control

Allows the hysteresis to be set between 1% and 10% of the measuring range. The hysteresis prevents repeated switching of the outputs if the measured value moves around the set switching point. Factory setting 1%.

7.2.4 'Flow rate' rotary control

This rotary control is used to set the flow velocity in the range of 0.2...10 m/s, below which a switching operation is to be 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 available as display elements, the function of which is explained below.

7.3.1 'Relay 1' and 'Relay 2' LEDs

These two LEDs each indicate the switching status of the two associated relays. LED on = relay energised
LED off = relay de-energised
The circuit diagram on the housing shows the relays in the de-energised state.

7.3.2 'Flow' LED

It is used to set the flow rate and to check the function. This LED goes out during normal operation as soon as the flow rate falls below the set value. The behaviour of the LED depends on the set flow rate and the hysteresis, but not on the switch-on and switch-off delay, which only affect the switching status of the relays. If the LED flashes, this indicates a faulty connection between the sensor and the control unit.