



ENGELS - ELECTRIC AIR HEATERS

Information No. S 20

Safety Measures

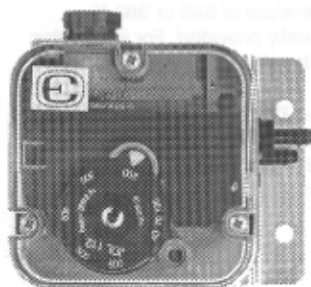
Engels electric air heaters, Engelnorm®, Engelman®, Engelvair-o®, Engelcompact® and Engelspecial® are high-quality components for modern heating, air conditioning and ventilating systems. They have been manufactured according to the latest functional and qualitative requirements and provide optimal service.

To ensure correct and safe operation, however, be sure to follow the prescribed safety measures, as unprofessional use or disturbed operating conditions (e.g. absence of air flow) can generally cause electric heat exchangers to attain such high temperatures as to pose a danger of fire, even with low temperature versions in an undisturbed, proper operating condition.

The necessary safety measures have been prescribed as compulsory by the VDE regulations (temperature monitoring/limiting), VOB regulations (air flow monitoring), as well as legal building and fire regulations, official regulations, e.g. TÜV, DIN, trade boards, employer's liability insurance association and special ordinances, such as building inspection guidelines on fire protection requirements for ventilating systems, and must be observed.

1. Locking of System

Electric air heaters must always be electrically locked from the ventilator, so that the air heater can only be switched on when the ventilator is operating (e.g. acc. to circuit diagram overleaf). This dependence also ensures that the air heater will be cut off should the ventilator malfunction. As this safety switch could remain inoperative in case of a mechanical malfunction, e.g. tearing of the V-belt, additional safety measures, described below, must be maintained



ENGELAIR®
air flow monitor ZB 154

ENGELAIR®

2nd volume monitoring

Reg. acc. to VOB 3.2.3.4./DIN 18379

VDE 0100/DIN 57100 - Part 420

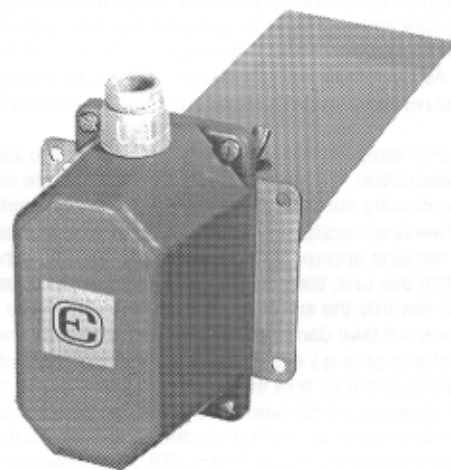
Building Inspection Guideline version of Jan. 84

IEC Standard 364-4-42

Besides the above-mentioned malfunction, soiled filters or closed fresh air or fire protection covers may also prevent the pre-determined volume of air flow from being attained. Monitoring is especially important even for continuously adjustable ventilators, to ensure that the min. air speed (approx. 1.5 - 2 m/s) required for the air heater is maintained.

Various unit systems may be used for monitoring. Our product line includes both mechanically operating models (type ZB 141) and electronic units (type ELW 170), all of which are equipped with a potential-free change-over switch that must be switched as a control contact in the auxiliary circuit in front of the heater power protection and at the same time can be used as a malfunction indicator (exact description in catalogue). The electrical circuiting possibilities are shown on the overleaf as connection diagrams.

Because of its many advantages, we recommend using type ELW 170 or type ELW 180.

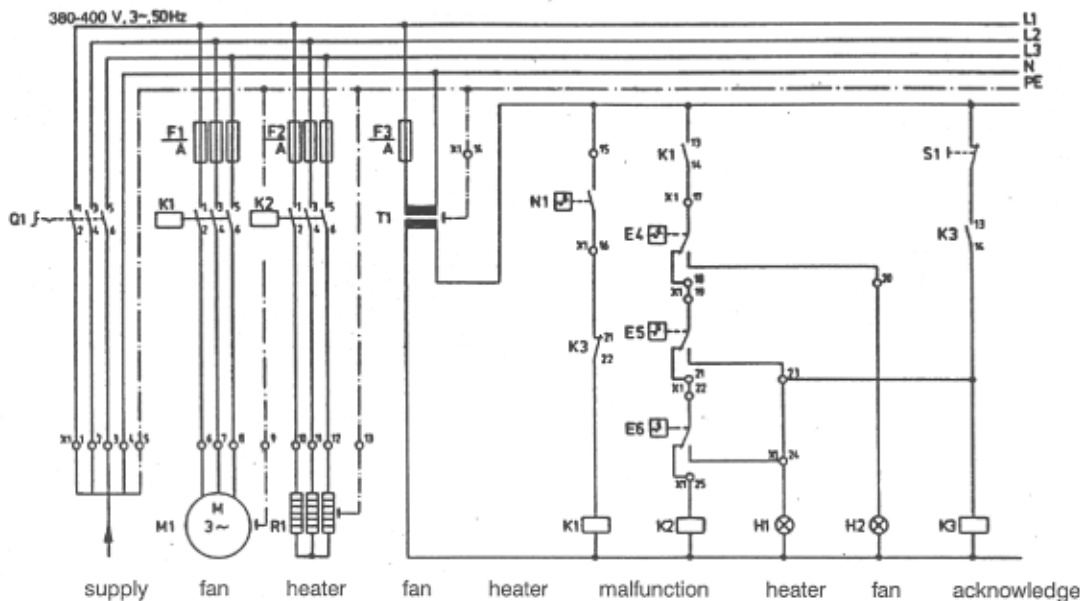


ENGELAIR®
air flow monitor ZB 141

The latest VDE regulation 0100/DIN 57100, part 420 (Nov. 91) stipulates use of two independent temperature-limiting devices (e.g. TR and STB) in addition to air flow monitoring for fan heating systems. Moreover, heating may be put in operation only after the prescribed air flow rate is attained. According to the „Building Inspection Guidelines“, which have priority, however, at least one overheating protection device must be provided for as a safety temperature limiter (max. 383 K) (e.g. our type ZB 123).

Given its many advantages, we recommend unit type STBW 225. TÜV-tested acc. to DIN 3440.

Connection diagram with integrated safety modules



N1 = temperature regulator
E4 = current monitor
E5 = temperature monitor

E6 = temperature monitor/safety temperature limiter
S1 = interference switch
H1 = heater malfunction display
H2 = fan malfunction display

3. Engelcontrol®

temperature limiting/monitoring

(reg. acc. to VDE/DIN 57100, VDI 3803, VOB 3.2.3.4).

As a supplement to the measures already described above, a temperature limiting/monitoring device must always be provided as added protection against possible overheating of the air heater. As electric air heaters always involve low-time constants, only fast-responding units should be used for monitoring.

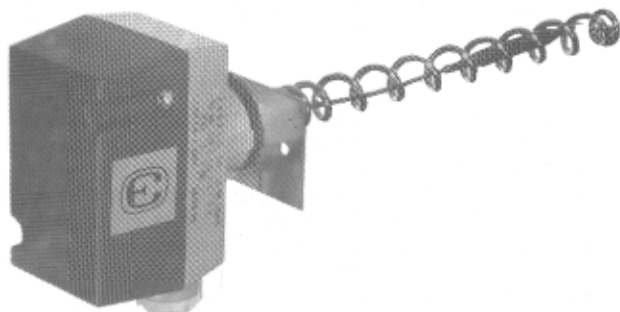
To this end, temperature monitors TW, e.g. our type ZB 111 (for exact description, see catalogue EL 2020, p. 10) are usually installed directly above in the duct over the heating grids (in case of service installation, please ensure that the capillary sensor remains approx. 20 mm away from the upper heating grid). With this unit, the desired cut-off temperature (usually oriented towards the surrounding components, as the air heater itself does not take damage, even with briefly occurring temperatures of (e.g.) 423 K) can be set and in case of a malfunction in the air flow the cut-off will occur above the set value. Following a drop below the set value, this unit switches back on automatically, so that electrical locking should be structurally provided. According to VDI 3803, however, a safety temperature limiter must always be used as a second unit (e.g. type ZB 123, or type STBW 225 as a dual unit). The setting should preferably be chosen in the range 343 - 373 K. At low air speeds or higher blow-out temperatures, the max. setting of 373 - 383 K may also be necessary.

Alternatively, temperature limiters - our type ZB 121 (=STB) - can also be used. This type also has a switch-on lock and must be released by pressing a button, after removal of the cover, exactly as with units type STBW 225 and ZB 123.

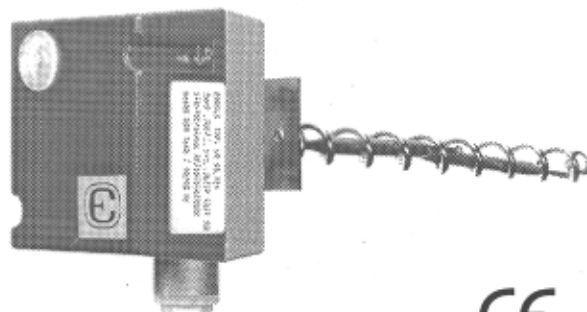
When using temperature limiters and safety temperature limiters, note that later accessibility must also be ensured. In addition, during adjustment (temperature limiting value) it must be remembered that the temperature monitor is set approx. 5 K lower than the safety temperature limiter.

We install in all Engelcompact air heaters of series E-HR 6 a standard temperature monitor type ZB 01 (version A 3/K) (for exact description, see catalogue 2020, p. 31). This is a bi-metal monitor, pre-set at a cut-off temperature of 348 or 363 K. Electrical locking must be structurally provided. For installation in your unit, at 10-20 cm behind the electric air heater in the direction of flow, we recommend the additional installation of the safety temperature limiter type ZB 123.

As the above-mentioned safety measures remain ineffective should the heating protection „stick“, in this case an additional temperature monitor must perform the forced turn-on of the fan while signalling the malfunction.



ENGELCONTROL®
Temperature monitor ZB 111



ENGELCONTROL®
Safety temperature limiter type STBW 225

