

Operating instructions A-1999



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Malfunctions

If the safety elements are triggered, the cause must be determined and remedial action taken. The electric air heater may only be switched on again once all fault factors have been eliminated. Work on the heat exchanger and the associated electrical installation may only be carried out by a qualified electrician.



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Disposal

To ensure safe and environmentally friendly disposal of the electric air heater, the appliance parts must be separated as far as possible, sorted by material and recycled. The appliances are completely asbestos-free and do not have to be declared in accordance with the RoHS and REACH regulations.

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Manufacturer

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EC - Declaration of Conformity
 on request

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Certificate KEMA KEUR
 on request

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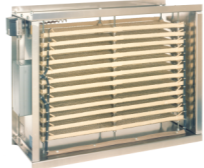



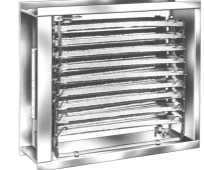
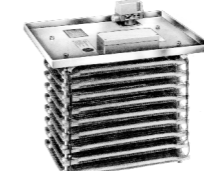


Data sheet and wiring diagram
 Appendix I + II

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ELECTRIC AIR HEATER with ENGELS-HEIZGITTER® in 'LOW-TEMPERATURE VERSION'



ENGELNORM®		Universal – Standard	Type E 0,5 - E 20 Type EL 6 - EL 20 Type L 1 - L 20	0,50 - 20 kW 6,00 - 20 kW 0,75 - 100 kW
ENGELCANAL®		Profile frame 20 mm	Type ELP 1 – ELP 36	Duct connection 1,0 – 36 kW
ENGELVARI-O®		Collar DN 100 - 400	Type ELR 0,5 - ELR 12	Round pipe connection 0,25 - 12 (24) kW
ENGELCANAL®		Special designs	Type E-HR 5 Type E-HR 5/S	Duct connection 0,25 - 750 kW (per unit)
ENGELCOMPACT®		Special designs	Type E-HR 6 Type E-HR 6/S	Device installation 0,25 - 750 kW (per unit)
ENGELSPECIAL®		Special designs	Type E-HR 7 Type E-HR 7/S	Duct connection 0,25 - 36 kW
ENGELTHERM®		ETDL control system	Type ETDL 3 / 230 Type ETDL 9 / 400 Type ETDL 16 / 400 Type ETDL 25 / 400	Integrated stepless temperature control with 0-10 V control 0,25 - 25 kW
ENGELTHYROTEMP		TRS control system	Type TRS 400 / 12 Type TRS 400 / 20 Type TRS 400 / 30 Type TRS 400 / 60	Temperature control and control cabinet with 100% stepless electronic thyristor control 3,0 - 60 kW

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über 100 Jahre
ENGELS
 Safety with intelligent technology
ENGELS AIR HEATERS
 - the better solutions-

GG 6.2024/250



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Note on the use of controls and regulators

In principle, the output of the electric air heater can be controlled or regulated on site by splitting it into several switching stages. The safety elements must always be integrated into the control circuit of the heating contactors. In order to achieve an even more precise temperature accuracy of the control, the air heaters can also be equipped for single-stage operation at the factory. Control can then be continuously variable using thyristors (flow valves). With VAV systems (variable volume flow) or demand-dependent fan control (e.g. FU operation), the volume flow must not fall below the minimum air volume of the electric air heater, as otherwise overheating with damage or even destruction of the heat exchanger cannot be ruled out. Therefore, observe the permissible operating temperature (air inlet and outlet temperature) of the air heater when parameterising the control. For integrated capacity control with the ENGELTHERM® ETDL control system, please also observe the associated documentation.



Note on the manufacturer's declaration in accordance with Machinery Directive 2006/42/EC

The final machine or system, in which the electric air heaters are installed as components, may only be put into operation after all protection requirements for the entire system have been fulfilled. The requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC must also be implemented and complied with

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Maintenance

Maintenance in the conventional sense is generally not required as there are no wearing parts or moving parts. The following work may only be carried out by a qualified electrician. For all work on the electric air heater, the electrical system must first be de-energised and secured against being switched on again in accordance with DIN / VDE 0105.

- Check the connection screws of the terminals and earthing points regularly for tightness and retighten if necessary.
- Check the cables of the supply lines and internal wiring to ensure that the insulation is in a functionally safe condition.
- Check heating elements for thermal overload.
- Remove coarse soiling and foreign bodies.

Cleaning can be carried out as required, e.g. with oil-free compressed air. Never use aqueous cleaning agents or mechanical aids (brushes etc.) to remove contamination from the heating conductor wire. This can lead to short circuits or earth faults during subsequent operation.

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Repair

The specifications already mentioned under points 3.3 and 4 must be observed. All work on the heat exchanger may only be carried out by a qualified electrician.

It is recommended that you contact the manufacturer if a heating coil is damaged.

When enquiring about the replacement of old appliances in your system, please always provide us with **all** the data from the rating plate on the appliance.



3.3 Electrical connection



The electrical connection may only be carried out by a qualified electrician. Particular attention must be paid to VDE 0100 / DIN 57100 and the safety measures specified in our information No. S 20.

Before connecting, check that the operating voltage specified on the rating plate corresponds to the existing mains voltage. The connection must only be made in accordance with the enclosed connection diagram (see appendix).

The electric air heater must be protected by at least two independent temperature-limiting devices and an additional air flow monitor.

All metal parts such as the duct housing and terminal box must be included in the potential equalisation. The protective conductors (PE) must be connected to the terminals provided for this purpose.

4 Commissioning



Commissioning may only be carried out with the nominal air flow rate!

All information on low surface temperature (low-temperature design) refers exclusively to the intended operating state. The prescribed adequate safety measures must be provided for possible malfunctions, e.g. failure of the air flow.

The heat exchanger may only be switched on depending on the available nominal air volume. The minimum air volume must not be undercut. The power supply to the heat exchanger must always be interrupted independently and without delay when each of the safety elements responds.



System interlocking

The installation of safety temperature limiters and temperature monitors as well as air flow monitors and their electrical interlocking in the control circuit must be ensured on site. It is essential to observe the specifications in Information S 20 points 1 - 3.

Reheating of the air heater does not occur so that it can be switched off synchronised with the fan.

Risk of fire and explosion

The medium to be heated must not contain any flammable or explosive gases, as the appliances are not EX-protected.

Furthermore, all valid regulations for the operation and use of electric air heaters must be observed, such as EN / IEC / VDE / DIN / TUV / EVU and accident prevention regulations, as well as national building regulations.



1 Safety

1.1 Safety and user instructions

ENGELS electric air heaters in low-temperature design are built in accordance with the state of the art and recognised safety standards and applicable guidelines and bear the corresponding KEMA KEUR test mark. However, improper use can result in hazards:

- Injury to the operator or third parties
- Functional impairment or damage to the air heater
- Damage to property

All persons involved in the installation, commissioning, operation, maintenance and servicing of the electric heat exchanger must

- be appropriately qualified
- strictly observe these operating instructions and all documents supplied

The electric air heater may only be used

- for its intended use
- in a technically safe condition

In the event of faults that could impair safety, a qualified electrician must always be consulted.

1.2 Meaning of the symbols and warnings



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 comply may result in serious injury or damage to property.



Risk of burns

The heating elements have surface temperatures above 60°C in nominal operation. Depending on the design of the appliance, the housing of the air heater may have a surface temperature of over 60°C during operation.



Important note

*on operational safety and proper handling of the system.
Failure to observe this can lead to malfunctions and failure of the system.*

1.3 Intended use

The electric air heater is intended exclusively for heating flowing, dust-free air and non-flammable, non-aggressive and non-explosive gases. Any other use or use beyond this is considered improper use. The manufacturer is not liable for any resulting damage. Any other use is only permitted after approval by the manufacturer.

Intended use also includes

- Observing all instructions in this operating manual
- observing the relevant standards, directives and accident prevention regulations.

Modifications and alterations to the electric heat exchanger are prohibited for safety reasons. Maintenance and repair work may only be carried out by specialised personnel.

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1.4 Sources of danger



The heating elements and connection terminals are live during operation and must not be touched. Work on the heat exchanger may only be carried out by a qualified electrician.



The heating elements have surface temperatures above 60°C in nominal operation. Heating elements may only be touched after they have been de-energised and have cooled down for at least 5 minutes to cool down.



Fire hazard due to high surface temperatures
If the air flow and the safety devices (temperature monitor and / or safety temperature limiter) fail at the same time, the electric air heater and its surroundings may dangerously overheat. According to VDE 0100 / DIN 57100 - Part 420, two independent temperature-limiting devices (e.g. TW and STB) and air flow monitoring are therefore prescribed.



The electric air heater can be damaged by penetrating moisture and foreign bodies (e.g. drilling chips during installation). This can lead to short circuits or earth faults.

1.5 Safety measures at the installation site



Safety devices that are sold and installed by the manufacturer are only mechanically integrated into the air heater and must be electrically connected on site in accordance with the operating instructions and the applicable regulations. The adjustment of the temperatures and flow rates of the safety devices for the intended operation must be carried out on site in accordance with the relevant operating instructions.



A sufficient safety distance must be maintained from flammable materials in the immediate vicinity of the air heater.



The electric air heater may only be put into operation after all safety-relevant preliminary work has been carried out and checked.
The nominal air volume must flow through the appliance.

The protection against accidental contact of all active parts must be checked and established on site, both electrically and thermally. It must be ensured that persons cannot touch the heating elements or other live parts either directly or indirectly.

1.6 Safety equipment



The warning sign on the appliance indicates hazards due to electrical voltage. Work may only be carried out by a qualified electrician.



The electric air heater must be protected by at least two independent temperature-limiting devices and an additional air flow monitor.
Please also observe the applicable state building regulations and the M-LüAR.

The safety devices must be integrated into the supply line of the electric air heater in such a way that all heating elements are switched off immediately and automatically (voltage disconnection) if impermissible temperatures are reached.

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2 Technical data

The technical data can be found in the corresponding data sheet and on the rating plate. Before connecting, check that the operating voltage specified on the rating plate matches the existing mains voltage. The connection must only be made in accordance with the enclosed connection diagram.

The manufacturer accepts no liability for on-site changes to the power ratings and wiring. For the dimensioning of the conductor cross-section and fuse protection of the supply lines, a purely ohmic load of the heating resistors must be used, (inrush current = rated current). The supply lines must be dimensioned and fused in accordance with VDE guidelines and local electricity supply company regulations. This also protects the heating coil.

3 Installation

3.1 Transport / storage

On receipt of the consignment, check that it is complete and correct and inspect the packaging and appliances for possible damage. Have the carrier record any damage in writing. Store the devices in their original packaging in a dust-free and dry place with a non-aggressive atmosphere. The immersion heater must be protected from moisture ingress.

3.2 Assembly

Before installation, check that the electric air heater has no visible damage, particularly to the internal wiring and connection terminals. The relevant regulations must be observed when installing ducts and devices. Particular attention must be paid to adequate protection against contact and foreign bodies. As the heating grilles can only be manufactured with protection class IP 00, a higher protection class in accordance with DIN 40050 can only be achieved by professional installation. With sealed duct installation and appropriate device installation (opening only with tools), with sufficient distance to the air outlet or other accessible system parts, the degree of protection increases to at least IP 43. The terminal boxes we use offer at least degree of protection IP 43, IP 65 is also possible on request. Only use suitable metric cable glands.

Do not allow drilling chips to fall into the devices during installation!

Easy installation due to low weight. Can also be installed close to the motor or filter and in suspended ceilings without any problems. However, installation must be carried out in such a way that no water can enter the heat exchanger. For this reason, it should be installed in front of coolers, humidifiers and scrubbers or at a sufficient distance from these components. Ensure good accessibility and removal options for maintenance and inspection.

Installation position

The installation position can be selected as required, unless otherwise specified by the manufacturer. However, the temperature monitor or limiter must always be at the top so that convection causes the safety devices to respond quickly in the event of a fault. If the air is routed vertically, an additional safety temperature limiter must be installed above the electric air heater.