HDE and HDE-CO Circular Duct Electric Heater

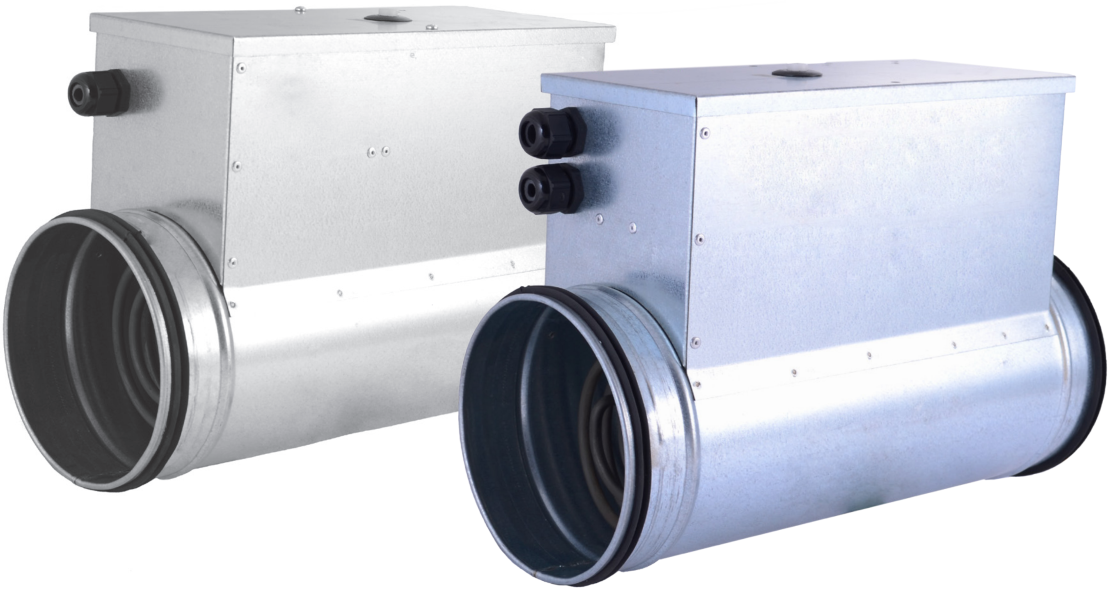

Fig. 1. General view of HDE and HDE-CO circular duct electric heaters

Introduction

When designing a heating system, the crucial thing is to choose an appropriate method to perform this task. There are a lot of heating methods and devices available on the market, e.g. water heaters, electric heaters, air curtains, heat pumps, etc. Very often the both the simplest and a very effective solution is the choice of an electric heater. Every building is equipped with an electrical system, therefore we avoid problems with connecting the electric heater. What's more, this choice has additional advantages, which include easy control and adjustment, and quick heating of premises available all year round. Therefore, to meet expectations of designers and installers, the Alnor Systemy Wentylacji Sp. z o.o. company enriched its offer by adding HDE and HDE-CO circular duct electric heaters.

Purpose

HDE and HDE-CO circular duct electric heaters are intended for installation in ventilation systems where it is necessary to raise the temperature of supply air or to maintain it at a constant level. They are designed to work with the duct fans. HDE and HDE-CO circular duct electric heaters can be used to heat air in shops, offices, homes, workshops, garages, warehouses, production halls, etc.

Construction

View of HDE and HDE-CO circular duct electric heaters is shown in Figure 2 below.

The HDE and HDE-CO circular duct electric heaters are made up of the following basic elements:

- Housing
- Connection box
- Heating elements
- Thermal protections
- Electric wires
- Electric terminals

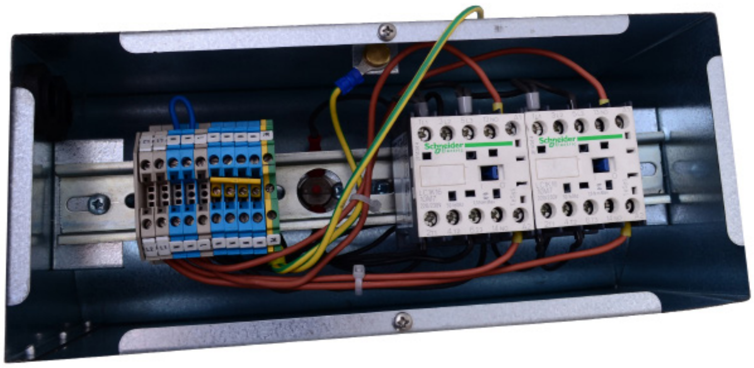

Fig. 2 Construction of HDE-CO circular duct electric heater

The housing of the HDE heater and the connection box are made of galvanized steel sheet. On both sides of the housing there are connector pipes for the ventilation system, equipped with an EPDM gasket. The range consists of 6 sizes for diameters of connector pipes ranging from 100mm to 250mm. Heating elements (Fig.3) are made of stainless steel. The special, spiral-like shape of the heating elements allows for uniform heating of passing air. Depending on the power of the HDE heater, the number of heating elements ranges from 1 to 4. In the connection box there are electric wires, electric terminals and thermal protections . All HDE heaters have two thermal protections . The first is an automatic thermostat; the other is a manual thermostat. All HDE heaters are designed for single-phase 230V power supply. The HDE and HDE-CO circular duct electric heaters are additionally fitted with one or two contactors through which it is possible to easily control the heaters via another device such as a recuperator. The number of contactors depends on heating power of a heater. Two contactors allow for gradual switching on of heating elements, that is the first contactor switches on two heating elements and in the case of not enough heating power, the other contactor switches on other two heating elements .

Fig. 3 Heating elements of HDE-CO circular duct electric heater

Procedure

After feeding the HDE circular duct electric heater, and in the case of the HDO-CO circular duct electric heaters after receiving a control signal, e.g. from an external temperature controller of a thermostat-type, or from an external device, e.g. a recuperator, contactors switch to the conduction state, and heating elements heat up to set temperature. The value of this temperature is dependent on the speed and efficiency of air flow in the ventilation duct in which HDE or HDE-CO circular duct electric heaters are mounted. A correctly selected HDE or HDE-CO circular duct electric heaters guarantee increasing the supply air temperature or maintaining it at a constant level, up to a maximum permissible value of +40°C. In the case of exceedance of the permissible air temperature level, the first protection is an automatic thermostat - it switches on when the temperature reaches the level of +60°C. After lowering the temperature to an appropriate level, the heater switches on automatically. The second, manual thermostat operates when the temperature rises to 90°C. Upon activation of the second thermostat, manual device reset (Fig.4) is required to restart it.

Fig. 4 Manual device reset

Parameters

The most important parameter of both electric and water heaters is their heating capacity. This is because it influences the efficiency of heating air in a given room. To determine the heating capacity, we need to know, among others, the value of temperature difference by which air is to be heated, as well as the size of air flow. On this basis, adequate power of the heater is to be selected. To facilitate correct selection, the data sheet includes a graph showing the dependency between the efficiency, the difference in temperature and the heat capacity. On its basis, you can easily and correctly choose a HDE or HDE-CO circular duct electric heater.

Installation

HDE and HDE-CO circular duct electric heaters are made in a way that allows them to be directly connected to ventilation ducts. HDE and HDE-CO circular duct electric heaters installed with a system of ducts and circular fittings by Alnor constitute a complete system that meets the highest requirements. The factory-mounted gasket on the HDE circular duct electric heater ensures proper positioning in the duct. This allows for proper installation without the risk of leakage. HDE and HDE-CO circular duct electric heaters can be installed as initial or secondary heaters, e.g. in ventilation systems equipped with a recuperator. In the case of installation as an initial heater between the external air intake and the recuperator inlet, it performs the anti-freezing function. As a secondary heater, it is mounted behind the recuperator fresh air outlet. HDE and HDE-CO circular duct electric heaters can also be installed as zone heaters for heating selected zones in a given room.

Controlling and Accessories

The effectiveness and efficiency of a system equipped with a HDE or HDE-CO circular duct electric heater can be improved by using appropriate additional controlling elements. Alnor Systemy Wentylacji Sp. z o.o. offers the following accessories for HDE circular duct electric heaters:

- External ON/OFF temperature controller with a built-in sensor:

Fig. 5 Room thermostat R31

Article specifications R31	
On/off button	-
Summer/winter switch	-

Product specifications	
Weight	128 g
Ambient humidity	10…90 % RH (without condensing)
Protection class	IP20
Casing	ABS, fireproof in accordance with UL94 V-0, white
Mounting	Wall
Temperature range	5...30°C
Ambient temperature	50°C
Dimensions	80 x 80 x 44mm
Storage temperature	0…50°C
Contact	NO/NC 250 V AC 16 (2,5) A

- External duct temperature sensor:

Fig. 6 Duct sensor TG-K300

Article specifications TG-K300	
Temperature range	-30...+30 °C

Product specifications	
Sensor element	NTC, 15...10 kΩ.
Time constant	38 s
Diameter	9 mm
Insertion length	15…130mm
Cable length	1,5 m
Protection class	IP20

- External temperature controller of PULSER type with a built-in sensor:

Fig. 7 Electric heating controller

Article specifications PULSER	
Mounting	Wall
Protection class	IP30

Product specifications	
Supply voltage	200...415 V AC, 50...60 Hz, 1- or 2-phase, automatic adaptation
Ambient temperature	Max. 30°C
P-band	20 K (rapid temperature changes) 1,5 K (slow temperature changes)
I-time	6 min (rapid temperature chan-ges)
Sensor	One main sensor or two main sensors (only PULSER-M)
Setpoint	0...30°C
Night setback	0...10K
Output (load)	16 A (min. 1 A) 1-phase max. 3.6 kW) 2-phase max. 6.4 kW

and the following accessories for HDE-CO circular duct electric heaters:
- External ON/OFF temperature controller with a built-in sensor (Fig.5)
- HRU-MinistAir-W-450

Advantages

- Easy and quick installation
- Easy and simple controlling
- Availability throughout the year
- No need to designate extra space, e.g. for a boiler room
- Eco-friendliness - no production of exhaust
- No possibility of flooding the building