



INSTALLATION MANUAL

# AIR HEATER

## TYPE DXA



# Content

<b>1 Introduction</b>	<b>3</b>	<b>7 Commissioning the air heater</b>	<b>13</b>
1.1 Symbols used in this manual	3	7.1 Adjusting the settings	13
1.2 Warranty	3	7.2 Commissioning the air heater	13
<b>2 Safety instructions</b>	<b>3</b>	<b>8 Combustion settings</b>	<b>15</b>
2.1 Installation	3	8.1 Adjusting the burner settings	15
2.2 Use	3	8.2 Converting to another gas type	16
2.3 Maintenance & Cleaning	4	<b>9 Troubleshooting</b>	<b>17</b>
2.4 Children and vulnerable users	4	9.1 Volatile lock outs	17
<b>3 Technical specifications</b>	<b>5</b>	9.2 Temporary errors	17
3.1 Performance	5	9.3 Warnings	17
3.2 Gas types	5	9.4 Instructions	18
3.3 Dimensions	7	9.5 Further troubleshooting	19
<b>4 Installation</b>	<b>8</b>	<b>10 Maintenance</b>	<b>19</b>
4.1 Preparation	8	10.1 Preparation	19
4.2 Positioning the air heater	8	10.2 Basic maintenance	19
4.3 Gas type & connection	8	10.3 Maintenance of the burner unit	19
4.4 Electrical connection	9	10.4 Extensive maintenance in poultry sheds	20
4.5 Room thermostat	9	<b>11 Electrical wiring diagram</b>	<b>21</b>
<b>5 Flue systems</b>	<b>11</b>	<b>12 Exploded view and spare parts</b>	<b>22</b>
<b>6 Operating the air heater</b>	<b>12</b>	<b>12 Disposal &amp; recycling</b>	<b>23</b>
6.1 Burner cycle	12	<b>13 Declaration of conformity</b>	<b>23</b>
6.2 Minimum firing time	12		
6.3 Summer ventilation	12		
6.4 Overheating protection	12		
6.5 Air passage check	12		
6.6 Gas supply pressure	12		

# 1 Introduction

This manual is intended for the gas, electrical and mechanical installer.

This document gives instructions on how to use and maintain the air heater. It is most important to follow the instructions in this document for safe operation of this air heater.

It is important to read this document before starting the installation process. Store this document close to the air heater for quick reference.

## 1.1 Symbols used in this manual

**DANGER!** Indicates a dangerous situation that would lead to death or severe injury.

**WARNING!** Indicates a potentially dangerous situation that could lead to death, severe injury or serious product damage.

**CAUTION!** Indicates a potentially dangerous situation that could lead to injury or product damage.

**NOTICE** Indicates important information that is not directly related to safety.

## 1.2 Warranty

**NOTICE** Using, installing or maintaining this air heater in any other way than described in this manual may cause damage that voids the warranty.

**NOTICE** Failing to follow the safety instructions in this manual can lead to damage to the air heater or the installation and void the warranty.

# 2 Safety instructions

Always follow the safety instructions in this chapter when installing, using or performing maintenance on this air heater:

## 2.1 Installation

**CAUTION!** This air heater must be installed and maintained by an authorized, qualified and competent installer, using calibrated equipment.

**NOTICE** This air heater must be installed and maintained in accordance with this manual, national and local building regulations and local health and safety regulations.

### 2.1.1 Protection against dust

**CAUTION!** Cover the air heater while spreading sawdust on the floor. This prevents large amounts of dust from accumulating on the heater.

**CAUTION!** The air heater can be used in a dusty environment (e.g. a poultry shed) if they are cleaned and maintained more frequently.

### 2.1.2 Temperature

**CAUTION!** Do not install the heater in places where the temperature can rise above 40°C. Higher temperatures cause the internal components to degrade much faster.

### 2.1.3 Corrosive vapours

**WARNING!** Do not install the air heater in areas that contain any corrosive or explosive vapours. Corrosive vapours (e.g. containing Chlorine) that are sucked into the air intake will cause corrosion of the heat exchanger and a leakage of condensate and flue gas. This is also the case for the room thermostat.

## 2.2 Use

**CAUTION!** Make sure the area around the air heater is dry when performing maintenance on the air heater.

**CAUTION!** Always close the doors and inspection hatches of the air heater, except when adjusting and checking the appliance.

### 2.2.1 Maximum CO<sub>2</sub> concentrations

This air heater uses oxygen from the surrounding air for the combustion process. CO<sub>2</sub> is formed and emitted as a result. Too much CO<sub>2</sub> in the air may be harmful to people, animals and crops.

**DANGER!** Never allow the CO<sub>2</sub> concentration to rise above the values shown in the table below!

	Maximum CO <sub>2</sub> concentration	
Poultry shed	1%	10,000 ppm
Greenhouse	0.3%	3,000 ppm

**DANGER!** This air heater may emit carbon monoxide (CO) when the oxygen level in the surrounding air is too low. Carbon monoxide is extremely dangerous. Ensure sufficient ventilation to prevent this from happening.

**WARNING!** The minimal ventilation requirements for a room in which this air heater is installed is 1000 m<sup>3</sup>/h for each 100 kW of installed power.

## 2.3 Maintenance & Cleaning

Frequent maintenance and cleaning of the air heater is necessary to ensure safe and proper operation. Failure to do so could lead to damage to the heater or its surroundings and void the warranty.

**CAUTION!** Air heaters installed in a dusty and/or wet environment must be maintained and cleaned more frequently.

**CAUTION!** Air heaters installed in poultry sheds must be maintained and cleaned after every breeding cycle.

### 2.3.1 Protection from water (IP class)

**WARNING!** Never use water when cleaning electrical parts.

This air heater is protected against splash water and has an IPX4B classification.

**WARNING!** Do not use a pressure washer to clean parts that contain electronics, such as the electric motor or the machine cover.

### 2.3.2 Disinfecting fluids

**CAUTION!** Some aggressive disinfection fluids can damage the heater. When using such fluids, cover the heater while disinfecting the shed.

## 2.4 Children and vulnerable users

**WARNING!** This air heater can be used by children aged 8 years and above and by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, if they are supervised or instructed concerning use of the appliance in a safe way and understand the hazards involved.

**WARNING!** Children shall not play with the air heater.

**WARNING!** Children shall not clean and maintain this air heater without supervision.

# 3 Technical specifications

## 3.1 Performance

Technical specification	Unit	Type DXA v4.1		
		DXA75	DXA100	DXA120
Net nominal heat input	kW	75.0	99.8	120
Heat output	kW	75.0	99.8	120
Air output	m <sup>3</sup> /h	6000	6000	7000
Throw horizontal	m	40	40	45
Gas connection	G"	3/4"	3/4"	3/4"
Electrical connection (50 Hz)	V	230	230	230
Electrical power consumption	kW	0.55	0.55	0.8
Stand-by electrical power consumption	kW	0.004	0.004	0.004
Electrical current (max.)	A	2.8	2.8	3.8
Protection class	-	IPX4D		
Pressure switch point	mbar	15	15	15
Sound level (at 8 m)	dBA	79	79	81
Thermostat connection	-	2-wire low voltage communication bus or ON/OFF		
Weight	kg	40	40	45

## 3.2 Gas types

### 3.2.1 Natural gas G20

Specification	Unit	Natural gas G20		
Nominal supply pressure	mbar	20		
Supply pressure (min. - max.)	mbar	17-25		
Gas category	-	II <sub>2</sub> H <sub>3</sub> B/P DE: II <sub>2</sub> ELL <sub>3</sub> B/P BE: I <sub>2</sub> Er FR: II <sub>2</sub> Er <sub>3</sub> B/P NL: II <sub>2</sub> EK <sub>3</sub> B/P		
Pressure switch point	mbar	15		
Class	-	A3		
Specification	Unit	DXA75	DXA100	DXA120
Gas consumption	m <sup>3</sup> /h	7.9	10.5	12.6
Burner injectors	n x Ømm	1x 8.5	1x 10.5	1x 12.0
Burner pressure	mbar	8.0	7.0	7.0

### 3.2.2 Natural gas G25

Specification	Unit	Natural gas G25.3 (NL) Natural gas G25 (BE/DE/FR)		
Nominal supply pressure	mbar	25		
Supply pressure (min. - max.)	mbar	20-30		
Gas category	-	NL: II <sub>2</sub> EK <sub>3</sub> B/P DE: II <sub>2</sub> ELL <sub>3</sub> B/P BE: I <sub>2</sub> Er FR: II <sub>2</sub> Er <sub>3</sub> B/P		
Class	-	A3		
Specification	Unit	DXA75	DXA100	DXA120
Gas consumption	m <sup>3</sup> /h	8.9	11.8	14.2
Burner injectors	n x Ømm	1x 8.5	1x 10.5	1x 12.0
Burner pressure	mbar	11.5	9.5	10.0

### 3.2.3 Butane / LPG G30

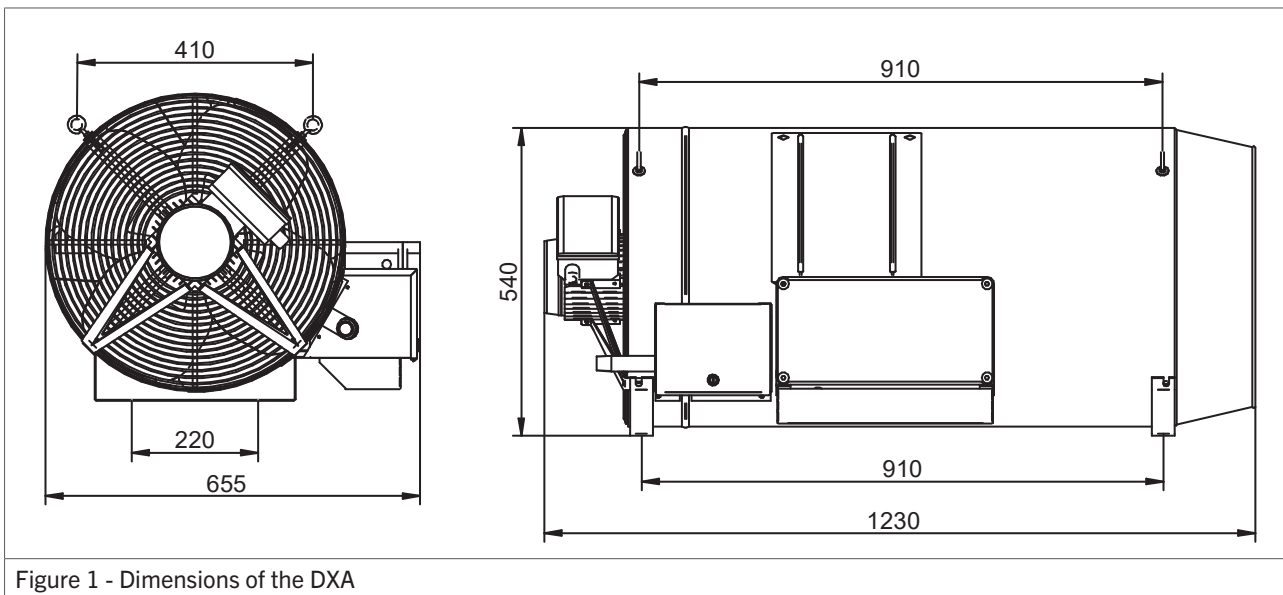
Specification	Unit	Butane / LPG G30		
Nominal supply pressure	mbar	30 / 50		
Supply pressure (min. - max.)	mbar	20-50		
Gas category	-	II <sub>2</sub> H <sub>3</sub> P B/P NL: II <sub>2</sub> EK <sub>3</sub> B/P DE: II <sub>2</sub> ELL <sub>3</sub> B/P BE: I <sub>3</sub> B/P FR: II <sub>2</sub> Er <sub>3</sub> B/P PL: II <sub>2</sub> ELwL <sub>3</sub> B/P		
Class	-	A3		
Specification	Unit	DXA75	DXA100	DXA120
Gas consumption	kg/h	6.0	8.0	9.5
Burner injectors	n x Ømm	1x 5.85	1x 6.85	1x 7.8
Burner pressure	mbar	10.0	10.0	8.8

### 3.2.4 Propane G31

Specification	Unit	Propane G31		
Nominal supply pressure	mbar	30 / 50		
Supply pressure (min. - max.)	mbar	20-50		
Gas category	-	II <sub>2</sub> H <sub>3</sub> P B/P NL: II <sub>2</sub> EK <sub>3</sub> B/P DE: II <sub>2</sub> ELL <sub>3</sub> B/P BE: I <sub>3</sub> B/P FR: II <sub>2</sub> Er <sub>3</sub> P PL: II <sub>2</sub> ELwLs <sub>3</sub> B/P		
Class	-	A3		
Specification	Unit	DXA75	DXA100	DXA120
Gas consumption	kg/h	5.9	7.9	9.5
Burner injectors	n x Ømm	1x 5.85	1x 6.85	1x 7.8
Burner pressure	mbar	13.0	13.0	12.0

### 3.3 Dimensions

The dimensions of this air heater can be found in figure 1.



# 4 Installation

## 4.1 Preparation

Before installation, please use the data badge to check:

- if the heater is in accordance with the order;
- if the heater is suitable for the local present provisions (gas type, gas pressure, electrical supply etc.)

Before leaving the factory, the air heater has been tested for safety and has been set to the operating settings. It has been configured for the type of gas that is stated on the data badge. Should there be any doubt about the settings that apply to your situation, please contact your supplier.

### 4.1.1 Standards

**NOTICE** The installation must comply with all applicable local and national standards.

**NOTICE** The air heater must be installed in accordance with the relevant requirements of the Gas Safety regulations, Electrical installation regulations and or other local regulations that may apply.

**For United Kingdom only:**

**NOTICE** The air heater must be installed in accordance with the relevant requirements of the Gas Safety regulations, Electrical installation regulations and or other local regulations that may apply (e.g. The Institute of Gas Engineers IGE UP-1 and 2, BS6230, BS5440 building regulations and the IIE regulations that incorporate the gas safety regulations).

## 4.2 Positioning the air heater

Keep the following requirements in mind when choosing a location to install your air heater:

**WARNING!** Never install an air heater close to flammable materials.

- Keep sufficient distance between the heater and any obstructions. This is both for safety reasons and to allow access for service and maintenance (figure 2).
- Make sure the air flow to and from the heater is free from obstacles at least 5 metres in front of the heater. Also make sure the air intake is free from obstacles.
- Make sure enough space remains to open the door of the air heater.

- Make sure the wall can support the air heater.

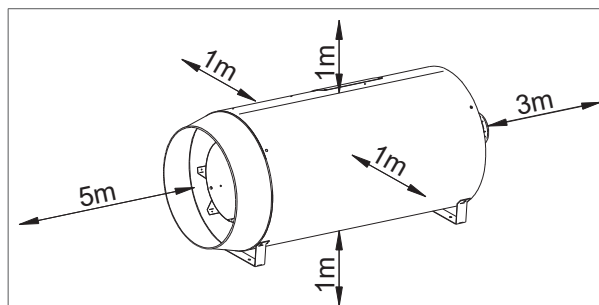


Figure 2 - Minimum clearances around the air heater

### 4.2.1 Orientation

- Install the heater horizontally without an inclination (figure 3).

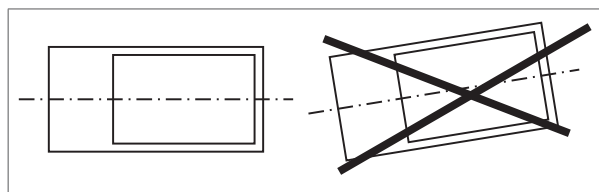


Figure 3 - A correct and incorrect horizontal orientation

## 4.3 Gas type & connection

The unit is suited for natural gas, propane or butane (LPG).

The specific gas type that a heater is set up for can be found on the packaging labels and on the heater badge. The heater can be converted to another gas type. Contact your supplier for more information.

The working and standing supply pressure must be a minimum of 17 mbar, and a maximum of 50 mbar, measured at the inlet pressure nipple of the gas control in the heater.

**NOTICE** The supply line's manual isolation valve must be placed within reach of the heater.

**NOTICE** All gas supply lines must be mounted without any mechanical tension.

**NOTICE** Always clean the inside of a gas supply line before connecting it to the air heater. Place a gas filter in the supply line when needed.

**CAUTION!** When using pressures above 60 mbar to test the supply lines, always close the manual isolation valve of the air heater.



## For United Kingdom only:

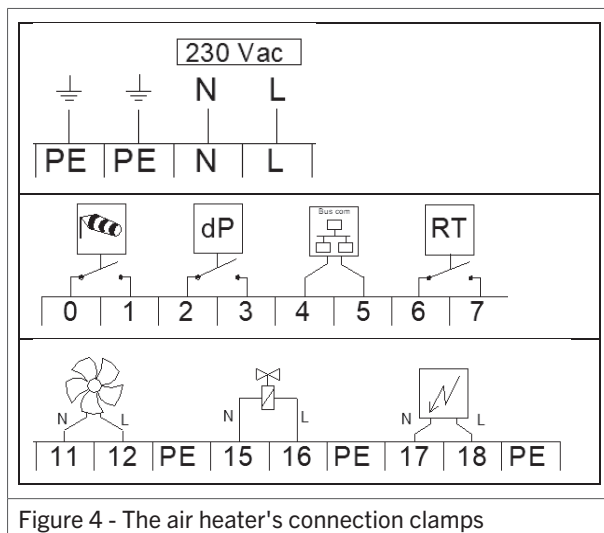
The supply line for gas must comply with the Gas Engineers publications UP-1 and UP-2, as well as with BS 6891.

## 4.4 Electrical connection

The electrical installation must comply with local and national requirements as well as IEE regulations.

### 4.4.1 Power supply

The air heater requires an earthed power supply of 230 V/ AC. A supply of 400 V/AC + Neutral is optional. The control circuit is a two wire low voltage bus communication.



A supply cord with a connection plug is supplied with the air heater.

**NOTICE** Make sure you do not damage the supply cord. A damaged cable needs to be replaced by a qualified person immediately.

### 4.4.2 Fuse

One fuse is present on the air heater's control board (see the electrical wiring diagram in §11).

- When replacing this fuse, always use one of the same type (5AT).

## 4.5 Room thermostat

The air heater can be controlled in two ways:

- by an ON/OFF signal;
- through a bus communication system with an external interface.

### 4.5.1 Installation requirements

Following these requirements when placing the thermostat to ensure the heater functions correctly:

- Make sure that air can circulate around the thermostat.
- Make sure the sun does not shine directly upon the thermostat.
- Do not place the thermostat on a cold wall.
- Place the thermostat on an inner wall free from draught.
- Never place the thermostat within the throw of the heater.
- Never mount the thermostat near the aerials of internal communication networks. These emit radiation that can disturb the thermostat. Keep several meters distance.

In all cases, the communication between the heater and the thermostat is based on a two wire, low-voltage connection. (see the electrical wiring diagram in §11). Follow these instructions to prevent malfunction of the installation and damage to the thermostat or air heater:

- Use a cable with the following specifications:
  - Signal cable.
  - Shielded and twisted.
  - Minimum dimensions: 1 x 2 x Ø0,8 mm<sup>2</sup>.
  - Maximum length: 200 m.

**CAUTION!** Keep the thermostat cable separated from the mains cables.

**CAUTION!** Connect the cable's earth shield only to the earth terminal inside the air heater. Do not connect the other end of the cable's earth shield.

**NOTICE** A cable with a thickness of less than 0.8 mm will result in a poor signal.

**NOTICE** A cable that is not shielded and twisted may result in a disturbed communication in an EMC-unfriendly environment.

### 4.5.2 Bus communication system installation

To connect the air heater to a bus communication system, do the following:

1. Connect the two control wires to terminals 4 and 5 (see figure 5 or the electrical wiring diagram in §11).
2. Set the S1 and J14 switches on the control unit as follows (figure 6/7):
  - a. Set S1 to 1.
  - b. Set J14 to 1.

**NOTICE** The air heater must be switched off when setting the switches. Otherwise the settings will have no effect.

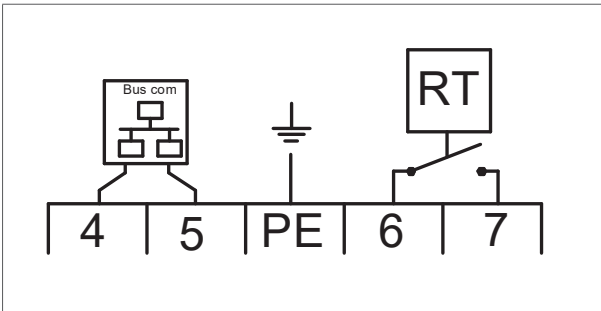


Figure 5 - Bus communication connection

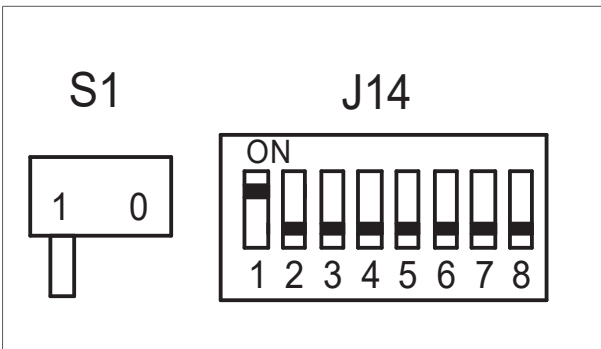


Figure 6 - Positions of the S1 and J14 switches

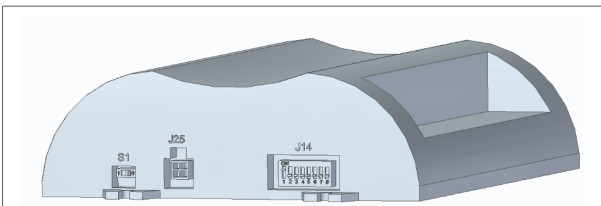


Figure 7 - Location of the S1 and J14 switches

#### 4.5.3 Installation of multiple heaters on one control unit

An MTC or MTS room thermostat, or interface module can control up to 8 air heaters. To connect the air heaters, do the following (figure 8):

**NOTICE** This functionality does not apply to an ON/OFF thermostat.

1. Connect the two wires of the thermostat to terminals 4 and 5 of the first air heater.
2. Connect the first air heater to the second air heater.
3. Repeat for each subsequent air heater.

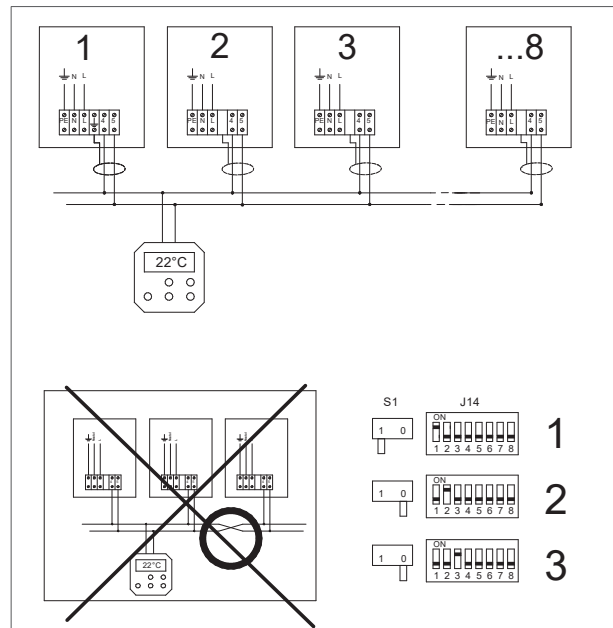


Figure 8 - Connection of multiple air heaters to a modulating room thermostat

Each air heater needs an unique number to be recognised by the room thermostat. This number can be set with the J14 switch on the control unit of each air heater:

1. Set the S1 and J14 switches on the control unit as follows (figure 9):
  - a. Set the S1 switch of the first air heater to 1.
  - b. Set the S1 switch of the other air heaters to 0.
  - c. Set the J14 switch of the first air heater to 1.
  - d. Set the J14 switch of the second air heater to 2, etc.

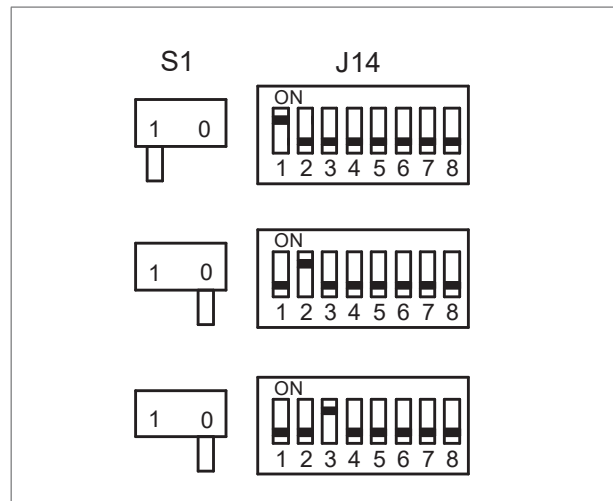


Figure 9 - Positions of the S1 and J14 switches for the first three air heaters in a system

**NOTICE** If the J14 switch of more than one air heater is set to the same number, the system will not work.

**NOTICE** The air heater must be switched off when setting the switches. Otherwise the settings will have no effect.

#### 4.5.4 ON/OFF thermostat installation

To connect the air heater to an ON/OFF room thermostat, do the following:

- Connect the two thermostat wires to terminal 6 and 7 (see figure 10 or the electrical wiring diagram in §11). This is a 24 V connection for the thermostat signal.

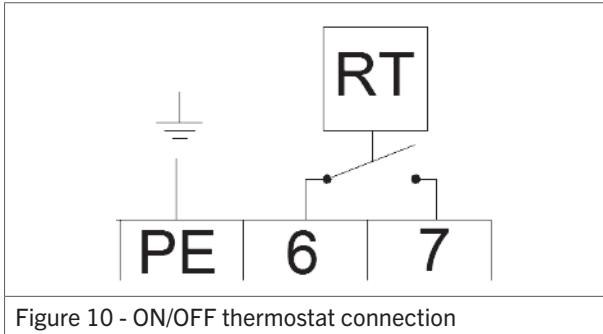


Figure 10 - ON/OFF thermostat connection

**NOTICE** Never combine these connections with the terminals 6 and 7 of other air heaters.

**NOTICE** Always use separate relays for each air heater.

**NOTICE** Do not connect an external power source to these terminals. These terminals need a dry contact.

## 5 Flue systems

This air heater uses oxygen from the surrounding air for the combustion process. CO<sub>2</sub> is formed and emitted as a result. Too much CO<sub>2</sub> in the air may be harmful to people, animals and crops.

**DANGER!** Never allow the CO<sub>2</sub> concentration to rise above the values shown in the table below!

	Maximum CO <sub>2</sub> concentration	
Poultry shed	1%	10,000 ppm
Greenhouse	0.3%	3,000 ppm

**DANGER!** This air heater may emit carbon monoxide (CO) when the oxygen level in the surrounding air is too low. Carbon monoxide is extremely dangerous. Ensure sufficient ventilation to prevent this from happening.

**WARNING!** The minimal ventilation requirements for a room in which this air heater is installed is 1000 m<sup>3</sup>/h for each 100 kW of installed power.

# 6 Operating the air heater

## 6.1 Burner cycle

The air heater's display shows the current status of the burner cycle (figure 11).

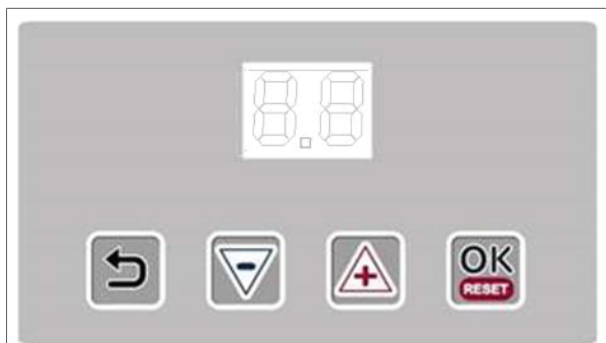


Figure 11 - Display of the air heater

Display	Status	Description
0	Stand-by	Waiting for heat demand.
1	Reset	Software reset.
3	Pre-check	Zero position check pressure switch.
4	Pre-purge	30 seconds of pre ventilation by the combustion fan. The pressure switch is checked.  15 seconds of pre-ventilation by the fan. The pressure switch is checked.
5	Pre-ignition	Ignition without opening the gas valve.
6	Ignition	5 seconds of ignition. The gas valve opens.
7	Flame check	The air heater checks if the flame is present.
8	Burn	The heater fires up and burns.
9	Minimum	Before the flame stops, the burner will modulate to minimum power.
10	Burner off	The gas valve closes. The flame stops.
11	Post purge	Burner fan purges with fresh air.  System fan cools the heat exchanger.

## 6.2 Minimum firing time

The heater will always fire for a minimum of 15 seconds, even if the heat demand stops. This is to avoid a large amount of start and stops.

**NOTICE** The heater will try to ignite 2 times before it stops and gives an error.

## 6.3 Summer ventilation

The fan can be set to run in the summer. Follow the instructions in the user manual of the special Room thermostat.

## 6.4 Overheating protection

The air heater's heat exchanger and flue system are both protected from excessive temperatures.

### 6.4.1 Heat exchanger

An NTC sensor is located near (or on) the heat exchanger. This sensor monitors the heat exchanger temperature.

If the heat exchanger becomes too hot, this sensor will cause the heating process to stop. Depending on the temperature, the air heater performs the following actions:

- Step 1: Power reduction (when possible).
- Step 2: Burner stop, followed by an automatic restart when cooled down (display: E05 / E36).
- Step 3: Burner stop, followed by a Lock Out. A manual reset is required. (display L15).

**NOTICE** A manual reset can be done on the electronic circuit board or remotely with the special Room thermostat.

## 6.5 Air passage check

The air heater is equipped with a vane switch to check the passage of air through the heater. If the air passage is too low, the heater will stop. Error L-14 will be shown on the display.

## 6.6 Gas supply pressure

The gas supply pressure during stand-by and operation should be between certain values, depending on the gas type:

Natural gas: between 17 and 30 mbar.

Propane & Butane: between 25 and 57 mbar.

When the supply pressure is too low, the heater will not work. Error A-09 will be shown on the display. The setting from the pressure switch is shown in the technical specifications (chapter 3).

**WARNING!** When the supply pressure is too low, the combustion gasses may become harmful for humans, as well as animals and crops.

**NOTICE** When multiple heaters start at the same time, the gas pressure may drop. When the gas pressure restores, the heater will automatically restart.

Gas type	Unit	Gas supply pressure	
		Minimum value	Maximum value
Natural gas	mbar	17	30
Propane & Butane	mbar	25	57

## 7 Commissioning the air heater

### 7.1 Adjusting the settings

Prior to packaging, the safety and functioning of each air heater is checked in detail. It is also set to the right combustion efficiency.

In general, the heater does not need to be adjusted after installation. It is only necessary to perform a functional check and to obtain a flue gas analysis and record it for later reference.

**CAUTION!** Use only calibrated instruments to adjust the air heater.

**CAUTION!** Never carelessly turn the adjuster screws.

**NOTICE** Adjusting the control without a supporting flue gas analysis voids the warranty.

Only adjust the burner pressures if they differ more than 0,5 mbar from its setting.

### 7.2 Commissioning the air heater

Once the unit is installed according to this manual, the unit can be commissioned. To do so, follow these instructions:

1. Make sure the gas supply pipe is clean, gas tight and free from air.
2. Switch on the electric supply with the maintenance switch.

You are now able to observe the first start-up and become familiar with the functioning of the heater.

**NOTICE** If the gas line is not purged correctly, the heater will attempt to start twice before going into a lock-out condition. In this case, manual reset is necessary.

1. Instruct the end user of the about a safe use of the air heater:
  - a. The presence of gas
  - b. The location of the manual gas valve
2. Instruct the end user about the operation of the heater:
  - a. Lock-out indication
  - b. Reset
3. Instruct end user about the necessary maintenance.
4. Leave this manual with the end user.

#### 7.2.1 First use – thermostat

To commission the air heater via the room thermostat, do the following:

- Put the thermostat in the highest position. The start sequence is always the same.

The air heater will burn for the minimal firing time (see §3.1 for more information).

#### 7.2.2 First use - display

To commission the air heater via the display's manual test mode, do the following:

**NOTICE** The display's manual test mode will only work for maximum 10 minutes.

1. Press and hold the **Return** and (–) button for a few seconds (figure 12). The display will alternate between Lo and St. This means the heater will start up in Low fire.
2. Press the (+) and (–) buttons to toggle between Low and High fire (figure 12).

3. Press the (-) button until 0 is displayed to exit the service. The air heater will always cool down the heat exchanger for several minutes.

The test mode will automatically end after 10 minutes.

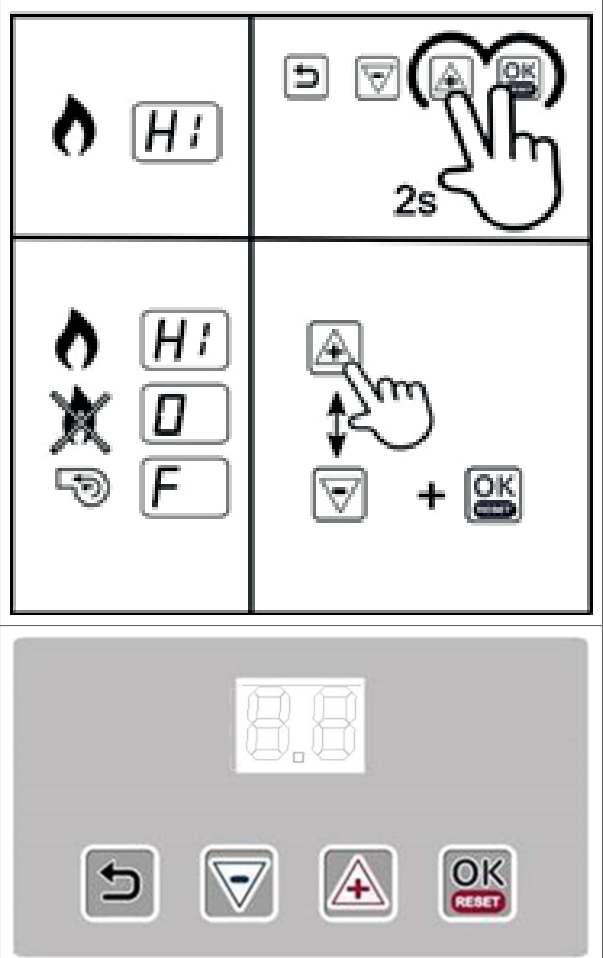


Figure 12 - Using the display

# 8 Combustion settings

In principle, it is not necessary to adjust the control shortly after commissioning the air heater. When the control does have to be adjusted after a period of use or after installing a new heater, this must be done by a qualified person using calibrated equipment.

**DANGER!** A poor adjustment can lead to overheating of the air heater and/or production of toxic carbon monoxide.

## 8.1 Adjusting the burner settings

The flow of gas to the burner is controlled with a gas valve. The valve must be set to the correct burner pressure. The minimum gas pressure switch is mounted on the right side of the measuring point (figure 13).

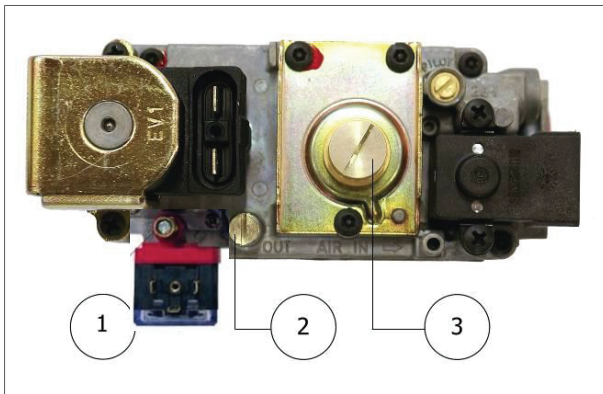


Figure 13 - Main parts of the gas valve

1	Measuring point of gas supply pressure.
2	Measuring point of burner pressure.
3	Adjuster screw for burner pressure.

To adjust the burner pressure, do the following:

1. Switch off the air heater.
2. Connect the pressure meter to the measuring point (figure 13 - 2).
3. Switch on the air heater and start heating.
4. Check whether the burner pressure is equal to the nominal burner pressure for this air heater (see §3.1 - Technical specifications).
5. Record the measured value as a reference for the next measurement.
6. If the burner pressure does not correspond with the specified value, turn the adjuster screw (figure 13 - 3) to the specified value.

### 8.1.1 Measuring the CO<sub>2</sub> values

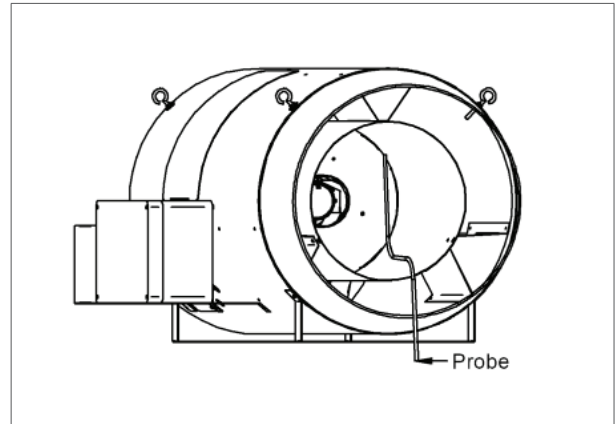


Figure 14 - Measuring combustion values with a probe

To measure the CO and CO<sub>2</sub> values, do the following:

1. Switch on the air heater and allow it to heat for about 5 minutes.
2. Measure the CO value.
3. Measure the CO<sub>2</sub> percentage in the flue gas.
4. Record the CO and the CO<sub>2</sub> values as a reference for the next measurement.
5. If the CO value exceeds 15 ppm:

or

If the CO<sub>2</sub> value does not correspond to the specified percentage (table 1):

- a. Check the burner pressure air inlet opening of the system fan to see if the CO<sub>2</sub> value deviates by more than 1%.
- b. Measure the burner pressure (figure 13 - 2).
- c. Check whether the gas pipe diameter is too small (gas pressure too low).
- d. Repeat steps 2 till 4.

Table 1 shows the approximate nominal CO<sub>2</sub> percentages for the models (air temperature 20°C):

Gas type	Nominal CO <sub>2</sub> percentage		
	DXA75	DXA100	DXA120
High calorific gas (G20)	7.5%	7.5%	7.5%
Low calorific gas (G25)	7.7%	7.7%	7.7%
Butane (G30)	8.5%	8.5%	8.5%
Propane (G31)	8.5%	8.5%	8.5%
LPG	8.0%	8.0%	8.0%

Table 1 - CO<sub>2</sub> values per gas type and heater model

## 8.2 Converting to another gas type

To change the gas type of the heater, the gas injector has to be changed (figure 15 - 6).

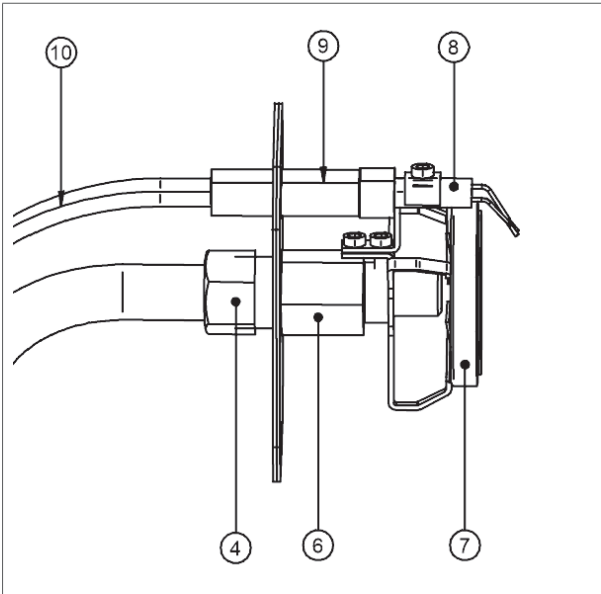


Figure 15 - The head of the burner unit

**CAUTION!** For safety reasons, the manufacturer recommends that the air heater is converted to another gas type only by the manufacturer, its representative or a qualified service technician. Contact your supplier for more information.

To change the gas injector, do the following:

1. Open the inspection hatch.
2. Remove the gas pipe by unscrewing the compression fitting (figure 15 - 4).

3. Remove the two connecting boots (figure 15 - 9) from the ignition electrode by gently pulling at the cables.
4. Unscrew the four nuts that connect the burner unit to the air inlet.
5. Remove the burner unit from the air heater.
6. Disassemble the burner unit:
  - a. Remove the stabilizer (figure 15 - 7) from the injector (figure 15 - 6).
  - b. Remove the flange from the injector by unscrewing the injector's nut.
7. Install the new injector.
8. Reassemble the burner unit.
9. Select the correct injector diameter and burner pressure (see §3.2).
10. Change the labels on the air heater with ones that have the correct values for the new gas type.
11. When the air heater has been reassembled and cleaned, perform the following checks:
  - a. Open the manual gas valve and check if the gas supply line does not leak.
  - b. If the heater has been moved, check if the supply lines are connected properly.

**WARNING!** Gas supply lines that are not connected properly can slip off and create a fire hazard.

- c. Check if the wiring is secured properly.
12. Perform all checks that are performed during the installation of the air heater (see §4):
    - a. Measure the burner pressure.
    - b. Measure the combustion values.
    - c. Check the general heater operation.



# 9 Troubleshooting

If the air heater malfunctions, first check if the problem is caused by external circumstances (e.g. no supply power). If the problem is not caused by external circumstances, use the tables and instructions in this chapter to fix the air heater.

**NOTICE** Please remember the built in waiting times of the air heater; the signals of the LED's and the code on the display. Do not react too soon.

## 9.1 Volatile lock outs

The table below describes the volatile lock outs that can occur. These can only be reset by hand.

Display	Error type	Description	Case #
L-0	Internal error	Internal error	13
L-1	Ignition error	Flame lasts only 5 seconds after ignition	1
		No flame after ignition	2
L-2 and 3	Internal error	Internal error	13
L-4	E-error	E-error for more than 24 hours	12
L-8 to 12	Internal error	Internal error	13
L-15	Overheating	Heat exchange sensor is overheated	3
L-17 to 19	Internal error	Internal error	13
L-20	Flame error	Flame detected after closing the gas valve	15
L-21	Flame error	Flame detected before closing the gas valve	16
L-22	Flame error	Flame failure during burning	5
L-25	Sensor error	Heat exchange sensor failure	4
L-27 to 31	Internal error	Internal error	13
L-32	Sensor error	Heat exchange sensor failure	4
L-33 to 38	Internal error	Internal error	13
L-13 and 39	Vane switch error	Vane switch is closed while fan isn't running	17
L-14, 40 and 41	Vane switch error	Vane switch does not close when the fan should run	18
L-43	Overheating	Heat exchange sensor is overheated too often	3

## 9.2 Temporary errors

The table below describes the temporary errors that can occur. These will disappear automatically after the cause has been resolved.

Display	Error type	Description	Case #
E-00 to 04	Internal error	Internal error	13
E-05	Overheating	Heat exchange sensor is overheated	3
E-06 to 13	Internal error	Internal error	13
E-14	Flame error	Flame detected when there shouldn't be one	16
E-15 to 20	Internal error	Internal error	13
E-21 and 22	Heat exchanger sensor error	Heat exchanger sensor not detected	4
E-27 and 28	Heat exchanger sensor error	Heat exchanger sensor short-circuit	4
E-34	Reset button error	Too many reset actions in a short timespan	9
E-36	Overheating	Heat exchange sensor is overheated	3
E-38 and 39	Heat exchanger sensor error	Heat exchanger sensor not detected	4
E-47 and 48	Heat exchanger sensor error	Heat exchange sensor short-circuit	4
E-49 to 64	Internal error	Internal error	13
E-65	Voltage too low	Supply voltage is too low for over 1 minute	
E-66	Voltage too high	Supply voltage is too high for over 1 minute	
E-67	Pressure switch error	Too many pressure switch errors	11
E-69	Configuration error	Heater configuration error	19

## 9.3 Warnings

The table below describes the temporary warnings that can occur. The heater may still be working, or stops until the cause has been resolved.

Display	Error type	Description	Case #
A-02	Configuration error	Heater configuration error	19
A-07	Overheating	Heat exchange sensor is almost overheated	3
A-09	Gas pressure	There is not enough gas pressure.	

## 9.4 Instructions

After identifying the problem, use the Case number to find the possible cause in this paragraph.

**Case 1:** Flame lasts only 5 seconds after ignition.

- The flame is not detected:
  - Check the ignition/ionisation cable and the electrode. The cable should have a resistance of 1 kΩ.
- The air heater is not earthed properly.
- Appliance has been connected to a floating power grid (230V between phases without neutral). Connect an isolating transformer or order serviceset GA4010.
- The circuit board is defective.

**Case 2:** No flame after ignition.

- There is not enough gas pressure.
- The gas mixture is too poor:
  - Adjust the gas valve (see §8.1).
- The gas valve does not open:
  - During ignition, check for a 230 V voltage on the valve.
- Check if the ignition electrode sparks. If not:
  - Check the cable and electrode and replace them when damaged.
  - Check the burner control unit and replace it when it does not give a spark output.
- Check the ignition transformer

**Case 3:** Heat exchange sensor or flue sensor is overheated.

- Check if the connectors J12 and J6 are plugged in correctly and if the connection J12[1-4] (optional overheating protection) is closed.
- Check if the system fan supplies enough air.
- Check the settings of the gas valve. The heater may be overfired. If so:
  - Adjust the burner pressure.

**Case 4:** Heat exchange sensor or flue sensor not detected, or short circuit.

L-25 refers to the heat exchange sensor. L-26 refers to the flue sensor, if applicable.

- The heat exchange sensor consists of two internal sensors. The readings of these sensors may differ too much:
  - Measure the resistance of each sensor. The resistance should be 20 kΩ at 25 °C and 25 kΩ at 20 °C.
  - If the measured values differ too much, replace the sensor.

**Case 5:** Too many flame failures while burning.

- The gas supply is not constant. This results in a drop in gas supply pressure while burning and causes the flame to extinguish.
  - Check the gas supply pressure while the heater is burning.

- Recirculation of flue gas. Due to a problem with the flue terminal the flue gas is sucked back into the air inlet. This results into a lack of oxygen and causes the flame to stop.
  - Check the flue system and fresh air supply. Only certified, original parts should be used.

**Case 9:** Too many reset actions in a short timespan.

- This error will disappear after some time or if the main power is disconnected for a while.

**Case 12:** E-error for more than 24 hours.

- Switch the air heater off and on and check the error code.

**Case 13:** Internal error.

- Isolate the electrical supply and reenergise. If this does not help:
  - Replace the burner control unit.

**Case 15:** Flame detected after closing the gas valve.

- Check if the gas valve closes too slow. If so:
  - Replace the gas valve.
- Check if the ionisation electrode is wet. If so:
  - Dry, clean or replace the electrode.

**Case 16:** Flame detected before opening the gas valve.

- Check if there really is a flame before ignition. If so:
  - Replace the gas valve.
- Check if the ionisation electrode is wet. If so:
  - Dry, clean or replace the electrode.

**Case 17:** Vane switch is closed while fan isn't running

- Check if the vane switch is stuck and cannot go into the rest position. If so:
  - Clean or replace the vane switch.

**Case 18:** Vane switch does not close when the fan should run

- Check if the fan runs. If so:
  - Check if the vane switch is stuck and cannot go into closed position. If so:
    - Clean or replace the vane switch.
- If the fan does not run, check if the fan motor is powered. If not:
  - Replace the fan motor or the capacitor.

**Case 19:** Heater configuration error

- The heater does not know which program to run, due to a mismatch between the burner control unit and the display. If so:
  - Contact your supplier.

## 9.5 Further troubleshooting

When the air heater does start but shows a different problem than described above, check if the following problems apply.

### 9.5.1 Explosive ignition and/or frequent flame failures

- Check if the gas control settings are correct (see §3.2). A correct CO<sub>2</sub> value is important for a proper ignition.
- Check the ignition cable. It should have a resistance of 1 kΩ.
- Check the position of the ignition electrode. The spark has to be formed between the two electrodes, not between the electrode and the burner.

# 10 Maintenance

**CAUTION!** The air heater must be inspected and cleaned once a year by a qualified installer with sufficient knowledge about the device.

**CAUTION!** Sufficient maintenance is critical in circumstances such as high humidity, dust, high switching on/off frequency, etc.

## 10.1 Preparation

Before performing maintenance on an air heater that is already installed, do the following:

1. Set the thermostat to the lowest setting.
2. Close the manual gas valve.
3. Turn off the power supply to the air heater using the maintenance switch.

**CAUTION!** Always check for gas leaks after working on the air heater.

**CAUTION!** Do not use water when cleaning the air heater.

**CAUTION!** The heater must be electrically isolated during servicing.

## 10.2 Basic maintenance

To perform basic maintenance on the air heater, do the following:

**CAUTION!** When cleaning parts of the air heater, use a dry cloth, brush, compressed air or a vacuum cleaner. Never use a steel brush.

1. Inspect the outside of the heat exchanger.
2. Clean the fan guard on the outside of the heater. Clean the fan blades if required.
3. Open the access panel.

4. Clean the inside of the air heater. Focus on the following parts:
  - Body
  - Fan blades and motor
  - Heat exchanger
  - Temperature sensor
  - Vane switch (if present)
5. Check if the wiring, nuts and bolts are properly secured and tightened.
6. Grease any parts and bolts that are regularly loosened for maintenance.
7. Open the manual gas valve in the supply line and check if the supply lines are air tight, do not leak and do not contain air.

Some checks can only be performed when the heater is running. Do the following:

1. Reconnect the air heater to the power supply.
2. Switch on the air heater.
3. Check if the heater operates without problems. See chapter if any errors occur.
4. Check the air heater's combustion efficiency. If necessary:
  - Adjust the burner settings (see §8.1).

## 10.3 Maintenance of the burner unit

The burner unit is an important part of the air heater and requires special maintenance.

To perform maintenance on the burner unit, it must first be removed from the air heater:

1. Open the inspection hatch.
2. Remove the gas pipe by unscrewing the compression fitting (figure 16 - 4).
3. Remove the two connecting boots (figure 16 - 9) from the ignition electrode by gently pulling at the cables.

4. Unscrew the four nuts that connect the burner unit to the air inlet.
5. Remove the burner unit from the air heater.

**WARNING!** Do not use a pressure washer to clean parts that contain electronics, such as the electric motor or the machine cover.

The burner consists of the following parts (figure 16):

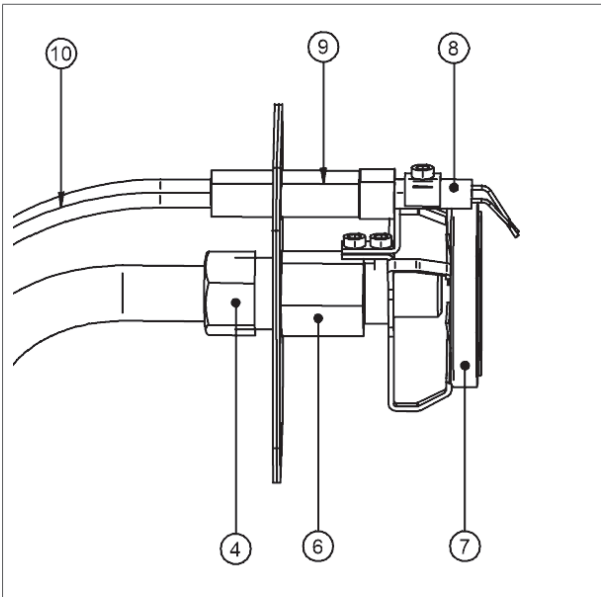


Figure 16 - Parts of the burner unit

4	Compression fitting (22 mm)	7	Flame stabilizer	9	Connection boot (x2)
6	Injector	8	Ignition electrode	10	Ignition cable (x2)

To clean the burner unit, do the following:

1. Clean the various parts with a soft brush, a cloth or compressed air.
2. Pay extra attention to dirt building up on the stabilizer and the ignition electrode.

1. Use compressed air or a soft brush to clean the remaining parts from the air heater. Focus on the following parts:
  - a. The inside and outside of the body.
  - b. The fan blades and motor.
  - c. The temperature sensor.
  - d. The vane switch.
2. Remove all dust from the motor. Accumulated dust acts as insulation and can cause the motor to overheat.
3. Use a brush to remove any baked on dust.
4. Clean the burner unit (see §10).
5. Open the gas valve.
6. Check if the gas supply line does not leak.
7. If the heater has been moved, check if the supply lines are connected properly.
8. Check if the wiring is secured properly.
9. Switch on the air heater and let it heat for a while. This burns off any remaining dust particles.
10. Stop the heating process.
11. Cover the air heater when it is fully cooled off. This protects it from dirt or dust.
12. Make sure the air heater is electrically isolated.
13. Disinfect the poultry shed and spread the sawdust.
14. Remove the cover from the air heater. The heater is ready to be used.

## 10.4 Extensive maintenance in poultry sheds

# 11 Electrical wiring diagram

A complete electrical wiring diagram is shown in figure 17. The connections that are most important to the installation process are shown in figure 18.

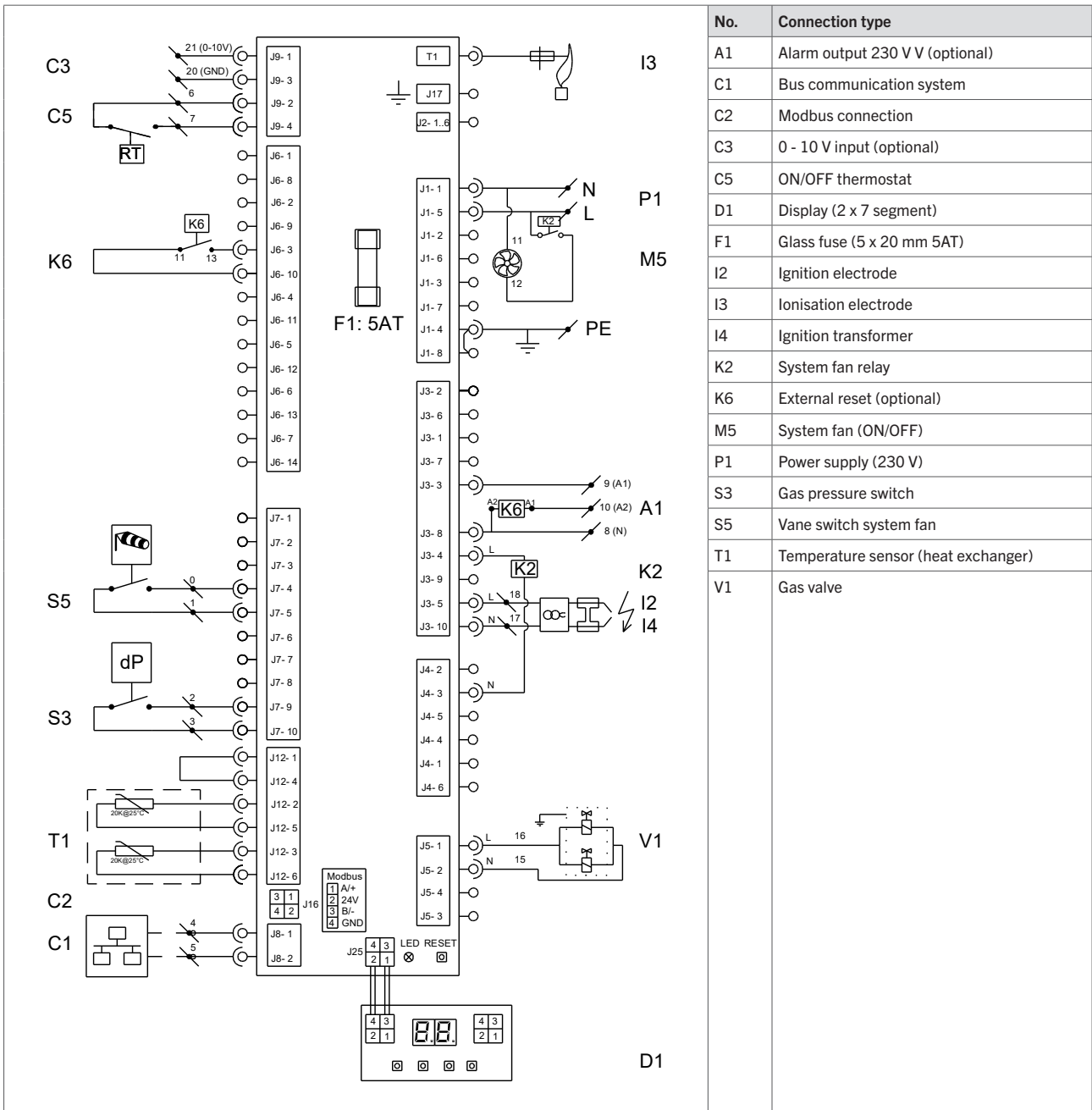


Figure 17 - Electrical wiring diagram

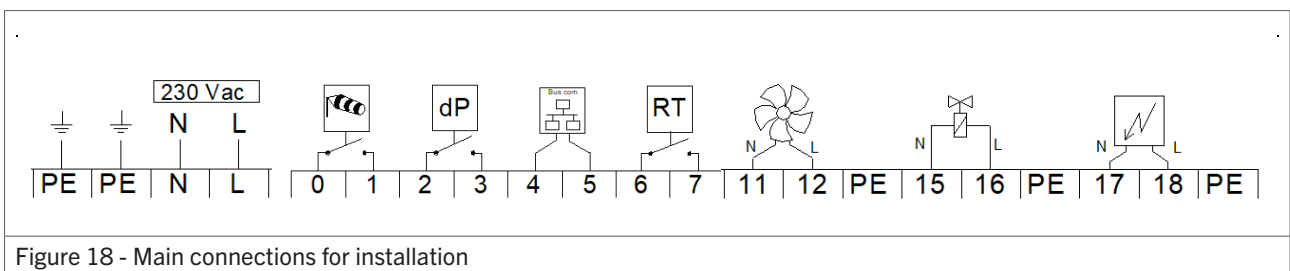


Figure 18 - Main connections for installation

# 12 Exploded view and spare parts

The parts of the air heater are shown in an exploded view in figure 19. The table below describes each part and shows the correct article number for a replacement part.

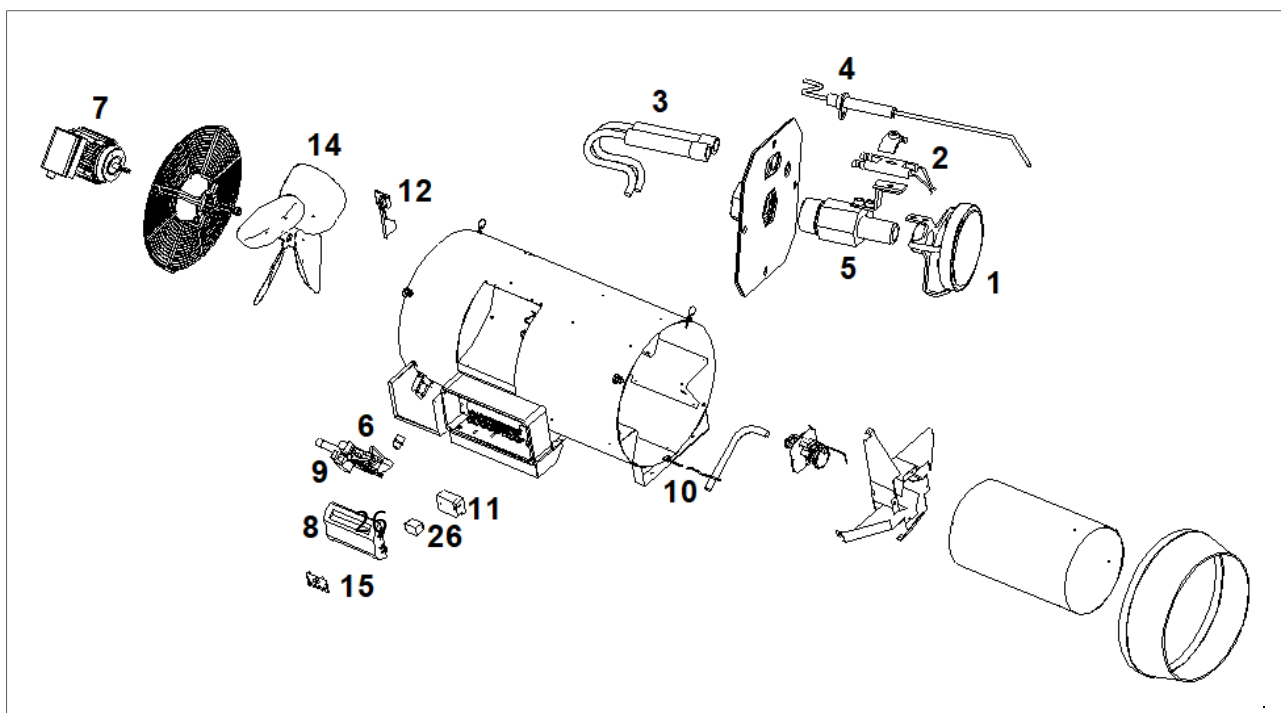



Figure 19 - Exploded view of the DXA

No.	Description	DXA75	DXA100	DXA120
1	Flame stabilizer	GD3412	GD3412	GD3412
2	Ignition electrode	GD200665	GD200665	GD200665
3	Ignition cable	GD3400	GD3400	GD3400
4	Ionisation electrode	GD3391	GD3393	GD3393
5a	Gas injector set Natural gas	GD3434	GD3436	GD3438
5b	Gas injector set Propane gas	GD3424	GD3426	GD3428
6	Gas valve	GD200713	GD200713	GD200713
7	System fan	GD4305	GD4305	GD4305
8	Burner control unit (EBM966)	GY5901	GY5901	GY5901
9	Gas pressure switch	GD3930	GD3930	GD3930
10	Temperature sensor (heat exchanger)	GY3933	GY3933	GY3933
11	Ignition transformer	GD3404	GD3404	GD3404
12	Vane switch	GD3407	GD3407	GD3408
14	Fan blade	IK4217	IK4217	IK4212
15	Display print	GY5902	GY5902	GY5902
26	Fan relay	IK5200	IK5200	IK5200

# 13 Disposal & recycling

	<p>The meaning of the symbol on the material, its accessory or packaging indicates that this product shall not be treated as regular waste. Please, dispose of this equipment at your applicable collection point for the recycling of electrical and electronic equipments waste. In the European Union and Other European countries which there are separate collection systems for used electrical and electronic product. By ensuring the correct disposal of this product, you will help prevent potentially hazardous to the environment and to human health, which could otherwise be caused by unsuitable waste handling of this product. The recycling of materials will help conserve natural resources. Please do not therefore dispose of your old electrical and electronic equipment with your regular waste.</p>
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# 14 Declaration of conformity

Winterwarm Heating Solutions B.V.

Industrieweg 8

7102 DZ, Winterswijk

The Netherlands

Declares that air heater types:

- DXA75, DXA100 and DXA120
  - CE PIN: 0063BU3035

Are in accordance with the essential requirements of the relevant EU directives, being:

- 2016/426/EU (GAR) relating to appliances burning gaseous fuels
- 2014/35/EU (LVD) relating to the electric safety of appliances
- 2014/30/EU (EMC) relating to electromagnetic compatibility of appliances
- 2006/42/EG (MD) relating to the safety of machinery

Goods should be installed and used in accordance with our instructions and with the applicable local and international rules. Installation should be done by an authorized, qualified and competent installer.

Winterswijk, July 1<sup>st</sup> 2019



Ir. M. Fiselier

Manager Research and Development

