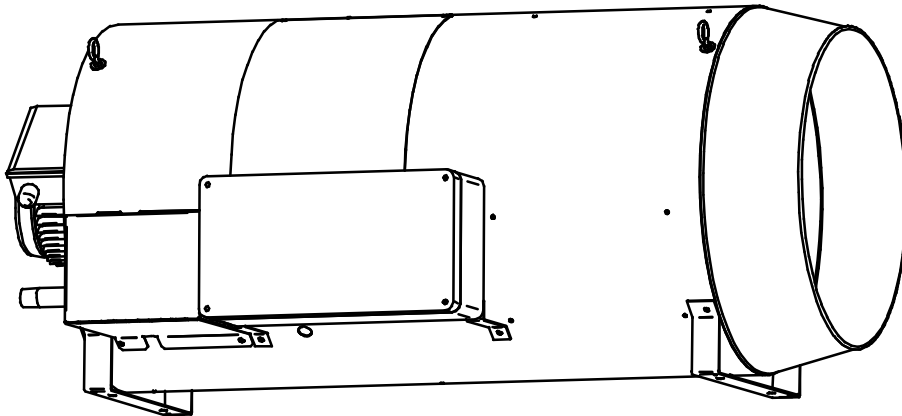
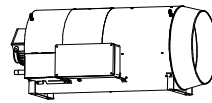


**Instruction manual**

**DXA Heater**

**Ver GB 503f**



YOU MUST READ THIS DOCUMENT BEFORE COMMENCING INSTALLATION.  
INSTRUCT THE USER ONCE TAKEN INTO USE AND KEEP THIS DOCUMENT  
NEAR THE APPLIANCE

Date: 20-03-2013  
Version: GB 503f  
Appliances for GB  
Natural gas, Propane, Butane, LPG

## Foreword

This installation and user manual is intended mainly for the gas, oil and electrical fitter. It also provides instructions for the user and for the maintenance of the air heater. To use this air heater in a safe and effective way, it is strictly essential that this manual is used correctly.

<b>Contents:</b>	<b>Page</b>
<b>1 ABOUT THIS MANUAL</b>	<b>3</b>
1.1 GUARANTY	3
<b>2 SAFETY INSTRUCTIONS AND PRECAUTIONS</b>	<b>3</b>
2.1 KEY TO SYMBOLS	3
2.2 SYMBOLS ON THE APPLIANCE	3
2.3 WARNINGS	3
2.4 PRE-CHECK.	4
2.5 SAFETY PRECAUTIONS	4
2.6 WATER AND CHEMICAL SUBSTANCES	5
2.7 USE IN A GREENHOUSE	5
2.8 USE IN A POULTRY SHED	5
<b>3 INTRODUCTION DXA HEATER</b>	<b>5</b>
<b>4 INSTALLATION</b>	<b>6</b>
4.1 MOUNTING THE HEATER	6
4.2 GAS CONNECTION	6
4.3 ELECTRICITY SUPPLY	7
4.4 INTERFACE UNIT;	9
4.5 CHECKS BEFORE TAKEN INTO OPERATION	9
<b>5 FUNCTION OF THE HEATER</b>	<b>9</b>
5.1 FUNCTION RESET/SERVICE BUTTON ON THE HEATER	9
5.2 HEAT DEMAND	10
5.3 DELAYED START	10
5.4 VENTILATION	10
5.5 TEMPERATURE LIMITER	10
5.6 AIR TRANSPORT, VANE SWITCH	10
5.7 MINIMUM GAS PRESSURE SWITCH	11
5.8 DESCRIPTION HEATER CONTROL HC	11
5.9 GAS CIRCUIT	12
5.10 MEASURING AND ADJUSTING THE BURNER PRESSURE	12
<b>6 MAINTAINING THE HEATER</b>	<b>13</b>
6.1 GENERAL MAINTENANCE	13
6.2 EXTENSIVE MAINTENANCE IN A POULTRY SHED	14
6.3 CLEANING THE BURNER UNIT	14
6.4 CHANGING GAS TYPE	15
6.5 SPARE PARTS	16
<b>7 PROBLEM SOLVING</b>	<b>17</b>
7.1 GENERAL	17
7.2 ERROR CODES	17
<b>8 WIRING DIAGRAMS</b>	<b>19</b>
8.1 HEATER WITH RELAY IN THERMOSTAT CIRCUIT.	19
8.2 HEATER WITH NO RELAY FOR THERMOSTAT	20
<b>9 SPECIFICATIONS</b>	<b>21</b>
9.1 DXA HEATER 75	21
9.2 DXA HEATER 100	22
9.3 DXA HEATER 120	23

## 1 About this manual

In this manual you will find information on the DX Heater. One section of this is intended to enable the user of the DX Heater to operate the appliance in a sensible and safe way. Another section is intended to enable the fitter or service technician to fit, set up and maintain the DX Heater, and to detect and resolve any malfunctions quickly and effectively.



This manual makes regular mention of a fitter or service technician. This refers to a qualified fitter or service technician who is trained in the fitting, malfunction-free operation and maintenance of the DX Heater. He is also competent to carry out work on a heater.

### 1.1 Guaranty

Guaranty is only valid when the appliances are used and or installed according to this manual.

## 2 Safety instructions and precautions

Always read the entire manual so that you are familiar with all the safety instructions and precautions.

### 2.1 Key to symbols



Safety warning: warning of danger of physical injury or (direct) damage to product, animals or the environment.



Warning



Information



Tip

### 2.2 Symbols on the appliance



Warning which refers to the manual for information on the component on or next to which the warning is positioned.



Warning of the potential hazard of electric shock.



Safety grounding

### 2.3 Warnings

Keep this manual in a safe place near the heater so that you can consult the manual whenever necessary



Incorrect use of the heater can result in physical injury. Therefore, follow the instruction below carefully:

- Avoid physical contact with the motor or other hot parts of the heater.
- Do not touch live parts of the heater.
- Keep body parts, loose items of clothing, jewellery or hair away from rotating fan blades or other moving parts of the heater.
- Do not place articles in front or nearby the heater because this can cause fire hazard.



The following conditions can lead to damage to the heater:

- • Incorrect transportation or storage of the heater;
- • Errors in the assembly of (parts of) the heater;
- • Excessively high or low oil pressure;
- • Excessively high or low ambient temperature;
- • Wear, ageing and metal fatigue in components of the heater.
- • Moisture: the heater has IPX4D protection grade.

## 2.4 Pre-check.



Before unpacking and installation, please check (i.e. on the data badges) if the heater corresponds to the order and if it is suitable for the local present provisions (gas type, gas pressure, electrical supply etc.)

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

The installation of the air heater must be in accordance with the relevant requirements of the Gas Safety Regulations (for example in GB; The Institute of Gas Engineers IGE UP-1 and 2), Building Regulations and the IIE Regulations also incorporating the gas safety (installation and use) regulations. Other national and/or local regulations may apply (the Local Authority, Fire Officer and Insurers)



The competent installer must make sure the heater operates correctly and must instruct the user about the safe operation of the heater.

This heater takes its combustion air from within the room in which it is located, the necessary ventilation requirements must be followed for gas safety regulations.

The heater should not be installed in areas containing corrosive or explosive vapours. Please consult your supplier; otherwise the guarantee will become invalidated.

Make sure that the warm air can be blown out freely. There should absolutely be no (possibility of) materials within 5m from the front of the heater.

The heater has been tested in detail on safety and correct operating settings before leaving the factory. It has been adjusted for the type of gas that is stated on the data badge. Should there be any doubt, please contact your supplier.

## 2.5 Safety precautions

If the distance between hot flue gas coming from the outlet cover and people or animals is too short, this may pose a danger to them. In addition, the heater is started automatically, which may pose a risk to people or animals in the vicinity of the heater. Therefore, you should always observe the prescribed minimum distances between the heater and people, animals and crops (refer to Mounting the heater)



O<sub>2</sub> is used during gas combustion and converted, amongst others, to CO<sub>2</sub>. Too much CO<sub>2</sub> in the air may be harmful to people, animals and crops. Therefore, you should always ensure sufficient fresh air can enter the space where the heater has been placed, e.g. by way of open windows or a separate fresh air intake. When the CO<sub>2</sub> concentration is too high, the heater will not function properly. There may be incomplete combustion. (Danger of Carbon Monoxide CO) The CO<sub>2</sub> concentration may not exceed 1%. Minimal ventilation requirements 1000m<sup>3</sup>/h for each 100kW installed power.

Observe the following precautions when using the heater:

- Only start the heater if access panels and protective grill have been fitted.
- Have the heater checked and serviced once a year by a service technician.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- Children may only be present in the space where the heater has been placed if supervised by an adult.
- Ensure the socket outlet is located within a 2 m radius of the heater and that the plug can be removed easily and quickly from the socket outlet.
- Leave the plug in the socket outlet even if you are not using the heater. This prevents condensation of the print circuit board; this may lead to heater damage and/or malfunctions.
- Make sure the mains cable does not get damaged. Replace a damaged cable immediately.

- Do not connect the heater to an air duct, as this has a negative effect on the performance of the heater.
- Due to the presence of CO<sub>2</sub> and the noise levels produced, you must obtain permission from the safety and health service before taking a heater into use that is to be placed
- Minimal ventilation requirements 1000m<sup>3</sup>/h for each 100kW installed power.
- In case of a malfunction, ensure the heater is free of electricity by removing the plug from the socket outlet, in order to prevent damage to the heater.



## **2.6 Water and chemical substances**

Observe the following measures if water or chemical substances that could be dangerous to people, animals, and/or crops are used in the space where the heater has been placed:

- Switch off the heater.
- Make sure the heater cannot be started automatically by removing the plug from the socket outlet.
- Close the gas tap.
- Cover the heater.

## **2.7 Use in a greenhouse**



Observe the following additional measures when using the heater in a greenhouse:

- The CO<sub>2</sub> level should not exceed 1% (10,000 ppm).
- In completely enclosed greenhouses there must be at least 100 m<sup>3</sup> fresh air per m<sup>3</sup> of gas and external atmospheric protection. Or Minimal ventilation requirements 1000m<sup>3</sup>/h for each 100kW installed power.
- There must be at least two openings in the space to ensure adequate circulation of air if no artificial ventilation is present.
- Use the heater preferably in combination with one or more exhaust fans and a CO<sub>2</sub> meter
- Do not use any sulphurous fuels in the space where the heater has been placed, as these contain high amounts of sulphur that could be harmful.

## **2.8 Use in a poultry shed**



When cleaning and disinfecting a poultry shed in which a heater has been placed, or when spreading sawdust, the following precautions should be taken. Failure to take these precautions will give rise to a risk of explosion or fire.

Take the following into account when using the heater in a poultry shed:

- The CO<sub>2</sub> content must not exceed 0.3% (3,000 ppm).
- If no artificial ventilation is provided, there must be at least two openings in the space to ensure sufficient circulation of air.
- Cover or remove the heater when cleaning or disinfecting the poultry shed.
- When spreading sawdust the heater must be covered to prevent sawdust particles from entering the heater and creating a fire hazard. Also make sure that the heater cannot be started automatically by removing the plug from the socket outlet. Also close the gas valve.
- Clean the heater after every poultry shed clean-out to prevent the heater from becoming dirty.
- Do not use water when cleaning the heater

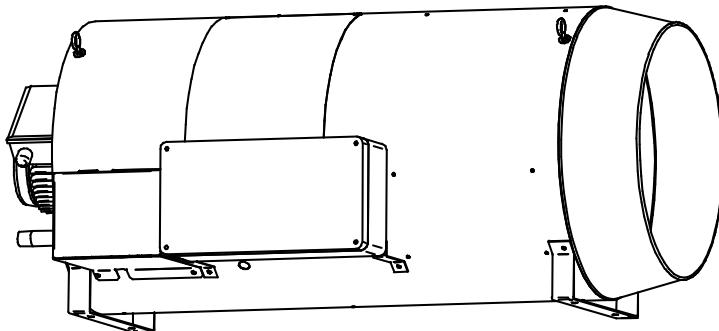
# **3 Introduction DXA heater**

The DX Heater is a direct fired heater designed specifically for greenhouses and poultry sheds. The device is placed in the enclosed space itself, which means that the heater displaces air only and uses a small amount of energy to warm and ventilate the space. The large air capacity and the unique shape of the heater also ensure that the device can distribute the air within the space in the best possible manner.

The heater's design is aimed at straightforward installation, maintenance and safe use. Ignition and combustion for example are controlled automatically and parts are easily accessible for cleaning and maintenance.

The heater can be ordered for different gas types and fuel settings:

- Natural gas
- Propane, Butane and LPG
- Paraffin and Diesel



## 4 Installation



Read the chapter on Safety instructions and precautions first and observe all warnings and precautions. Follow all instructions in this chapter explicitly.



Only skilled installers or service technicians are permitted to install the heater.

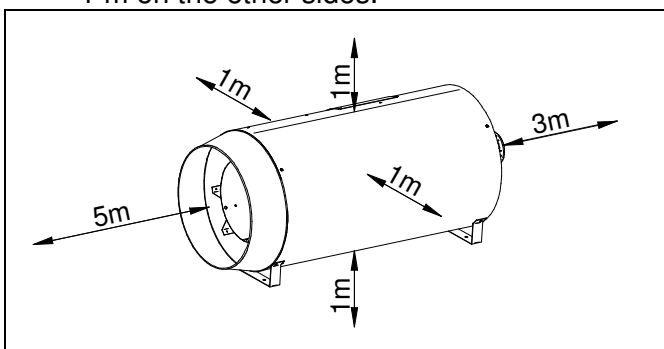
### 4.1 Mounting the heater



Mount the heater in a sturdy manner, taking into account the dynamic load and the weight of the appliance (refer to Specifications ).

Take the following into account when installing the heater:

- Attach chains to the four hook eyes and suspend the heater.
- Make sure the heater is positioned horizontally otherwise it will not operate (properly).
- Do not connect the heater to an air duct, as this has a negative effect on its performance.
- Take into account the minimal distances between the heater and people, animals and crops:
  - 5 m on the outlet side;
  - 3 m on the inlet side;
  - 1 m on the other sides.



The same minimum distances apply between the heater and walls, glass and other objects, with the exception of the outlet side. The minimum distance on this side must be equal to the throw that the heater is capable of producing. This depends on the type of heater (refer to Specifications ).

### 4.2 Gas connection



To connect the heater to the gas network, your supplier can supply a gas connection set that consists of a ball plug valve, (reducing) nipples, gas filter, gas pressure regulator and gas hose. A set is available for every type of gas.

Keep the following in mind when connecting the heater to the gas network.

The gas supply line has to meet the national valid requirements and possibly the local requirements of the building inspector, police or fire brigade. (For example in GB it must comply with Gas Engineers publication UP-1 and UP-2 together with BS 6891.)

A manual isolation valve in the supply line must be placed within reach of the heater, and all gas lines must be mounted without any mechanical tension.

When testing the supply lines with pressures above 60 mbar, this manual valve at the heater must be closed.

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

The burner pressure is pre-adjusted (see technical details). The burner pressure can be measured on the P-out measure point on the gas valve.



There is a kit available for changing the gas type. (from natural gas to propane / butane or vice versa) The gas nozzle has to be exchanged and the burner pressure readjusted. Look into the specifications for the exact adjustments. Instructions can be found in this manual.

### **4.3 Electricity supply**

#### **4.3.1 230Vac supply**



The installation must comply with local and national requirements, (as well as IEE regulations). The unit heater is delivered completely internally wired. Where controls of any type are to be added (e.g. room thermostat), the relevant wiring diagrams must be followed. Never use a room thermostat to interrupt the electrical supply to the heater!



The supply is 230Vac 50Hz with earth. When the supply voltage is lower than 195V and higher than 255V the correct functioning of the heater is not guaranteed.

A mains cable including plug is supplied with the heater. The wires of the cable must be connected to the clamps in the connection box. Make sure you do not damage the mains cable. Replace a damaged cable immediately.

When the heater is connected without a plug, make provisions to completely isolate the heater for maintenance purposes. This can be an isolation switch (min. 3mm contact opening gap).

The switch should not interrupt earth.

Ensure the plug or switch is located within a 2 m radius of the heater and the plug can be removed easily and quickly from the socket

#### **4.3.2 Thermostat connection**

The heater can be controlled in various ways. It can be controlled by a simple ON / OFF signal, but it can also be controlled by an external print.

#### **4.3.3 Thermostat cable**

In all cases the communication between the heater and the thermostat is based on a two wire, low-voltage connection. (see also electrical wiring diagram).



Cable specification: signal cable, 1x2x0,8 (shielded and twisted)

Maximum length 200m.

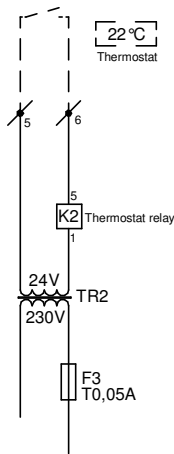
If the chosen cable is too thin, the signal will be too weak and heater will not work. If the cable is not shielded and twisted the signal might become disturbed in an EMC unfriendly environment. Keep the thermostat cable separated from mains cables. Connect the earth shield of the cable only to the earth terminal in the heater.

If these guidelines are not followed it may result in malfunction of the installation or worse, it could damage the thermostat or the electronics in the heater.

#### **4.3.4 Simple ON / OFF contact with thermostat relay in heater**

(standard configuration see schematic P002 version D)

The heater can optional be supplied with an 24V transformer in the thermostat circuit.



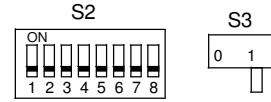
This transformer switches a relay for the on/off signal in the heater. This option is made when there are long leads to the main control panel. The heater will only react on the heat demand. Remote reset or the ventilation signal can only be made on the heater itself.

Every heater has to be switched by a **separate** low voltage ON/OFF contact in the control room

**Do not connect more than 1 heater to each other.**

The following (Standard) settings on the main board in the heater have to be actual.

- The S2 micro switches on the main board have to be set to OFF, see example.
- The switch S3 has to be set to 1.
- The thermostat has to be connected to the clamps 5 and 6 in the



heater.

(Any changes too these switches must be performed with the power off, otherwise any changes made will not take effect. )

#### 4.3.5 Simple ON / OFF contact with NO thermostat relay in heater

**Not the standard configuration** (see schematic P002 version C)

The heater can be connected to a potential free ON/OFF contact.

The thermostat wires need to free of EMC related issues.

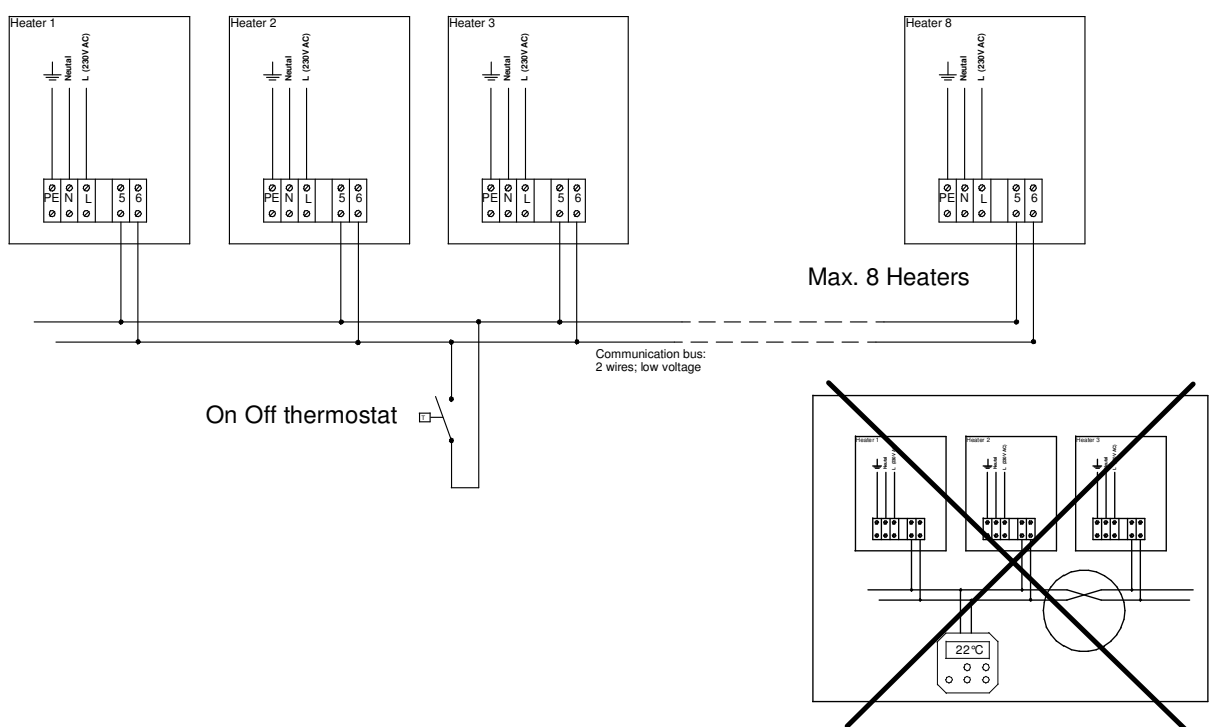
The heater will only react on the heat demand. Remote reset or the ventilation signal can only be made on the heater itself.

The following (Standard) settings on the main board in the heater have to be actual.

- The S2 micro switches on the main board have to be set to OFF, see example.
- The switch S3 has to be set to 1.
- The thermostat has to be connected to the clamps 5 and 6 in the heater.
- In the case that more than 1 heater is connected to 1 thermostat, do not exchange clamp 5 with clamp 6 between the heaters. This will result in permanent burning of the heaters.



Any changes too these switches must be performed with the power off, otherwise any changes made will not take effect.





#### 4.4 Interface Unit;

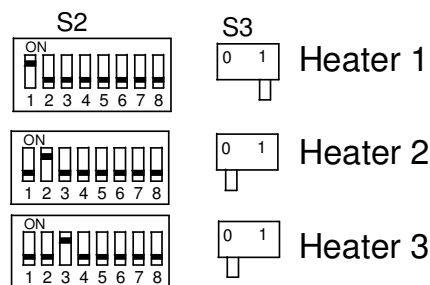
Special designed module to connect the heaters to external climate computers. This unit has connections for Burner ON / OFF, Ventilation, Reset function in case of faults and some outputs are available (faults for example) The unit can control up to 8 heaters.

When this unit is used the settings in the heater have to change.

Each heater needs its own unique number to recognise the heater by the room thermostat. The number of the heater can be set by the micro switch S2 on the heater control in the heater. The number at the upper position of the switch is the given number for that heater. Make sure that each heater has its own unique number. If more than one heater has the same number the system does not work.

Any changes to these switches must be performed with the power off, otherwise any changes made will not take effect.

The switch S3 has to be set to 0 (off)



It is possible you may have the incorrect settings with the system still working! However if this is the case, you will ultimately damage the equipment. So every care should be taken to ensure the switches are set correctly!

#### 4.5 Checks before taken into operation

Perform the following checks before taking the heater into operation.

- Wiring, Ensure the heater is free of electricity by removing the plug from the socket outlet. Now check that the connection is OK and that the wiring is connected properly.
- Gas soundness, Open the gas valve and check if the heater is gas-tight, using a leak detector spray for example.
- Supply voltage; check if the supply voltage is sufficient.
- Transport and combustion air flow, Check if the transport and combustion air exhaust is free from any obstacles. In this way, you will prevent the heater from continuing to operate while the air exhaust is blocked.
- Burner pressure, The heater will not operate if the burner pressure is too high or too low; refer to Measuring the burner pressure
- Flame detection, Flame detection is by means of ionisation. The ionisation probe is placed inside the flame. When the flame does not touch the pen or the probe is polluted the heater will not function.
- CO-value and CO<sub>2</sub>-readings in the combustion air too high a level of CO and/or CO<sub>2</sub> in an enclosed space can be harmful to people, animals and crops. You should therefore always verify that the CO value and the CO<sub>2</sub> content in the flue gas comply with the requirements; refer to Measuring combustion values
- General heater operation.

## 5 Function of the heater

### 5.1 Function Reset/service button on the heater



On the control panel on the heater there is a reset/service button. This button has several functions:

When the button is pushed for 5 seconds (b in the display) the heater will start to burn. When the button is pushed again for 2 seconds the heater will stop. The heater will remain in the burn mode for maximal 24 hour. Every hour the heater will perform a safety shutdown and will automatically restart.

Instruction manual DXA heater



When the button is pushed for 7 seconds (F in the display) the heater will start to ventilate (without burning). The heater will stop to ventilate when the button is pushed again for 2 seconds.

When the heater is in error, it can be reset by pushing this button once.

## 5.2 Heat demand



The heat demand can be generated by means of the room thermostat or manually by pushing the function button on the heater.

If there is heat demand, the following cycle will start:

1. **Internal checks:** The heater performs several checks before there happens anything.
2. **Gas pressure check.** The heater will check if the minimum gas pressure switch is closed. If not the heater will generate an E7 error. This error resets itself when the gas pressure is back.
3. **Pre purge:** The electronic circuit board acknowledges the heat-demand and the fan will start running for 15 seconds. (Display print → 1)
4. **Ignition:** After 15 seconds of pre purge, the electrode will spark for max. 5 seconds, the gas valve is opened and the gas air mixture will ignite. (Display print → 2)
5. **Burn:** When the flame is detected (Display print → b) the unit will go into burn mode.
6. **End of heat demand:** When the heat demand ends, the burner will switch off and the system fan will continue to run for ca. 1 minute in order to cool the unit down (Display print → P).

The unit will try to ignite 5 times before lockout on flame fault.

In the case of flame failure during operation, the heater will attempt one restart.

When the heater is in lockout you see in the display intermittent A1. On the display of the room thermostat you see failure 1.



Every hour the heater performs a safety shut down. After this shutdown the heater will restart automatically.

## 5.3 Delayed start



Often more than one heater are connected to one control unit. When all the units are starting on at the same time, a pressure drop in the gas supply can occur. This may result in some heaters not starting. To prevent this there is a random waiting time before the heater starts. In this manner the pressure drop in the gas supply stays to a minimum.

## 5.4 Ventilation



By means of the optional external interface board, the fan in the heater can start without the burning from the heater. The symbol F will be displayed on the heater.

The fan can also be operated manually by pushing the function button twice.

This manual ventilation setting will remain maximum 24 hour.

## 5.5 Temperature limiter



The temperature from the combustion chamber is measured by a NTC sensor. When the temperature from this sensor becomes too high the heater will stop burning. (Display E / 1) The heater will start if the sensor is cooled again.

When the temperature becomes much too hot the heater will stop, and will be locked. The heater will only start after a manual reset. (Display A / 2).

## 5.6 Air transport, vane switch



In the air stream inside the heater a vane switch is mounted. When the fan is running this switch should be made. If not, Error E8. The heater will perform a retry for 5 times. When the vane switch is still not closed the heater will lock with error A8 and has to be reset manually.

When during one heat demand the vane switch opens more than 5 times the heater will also stop. Error A8.

When the heater is in standby and the vane switch is closed, the heater will give error E8 until the switch is open again.

### 5.7 Minimum gas pressure switch

The gas supply pressure during standby and operation should be between certain values. For natural gas it should be between 17 and 30 mbar and for propane it should be between 25 and 57 mbar.

When the supply pressure is too low, the heater will not operate and will generate an error E7. The setting from the pressure switch is shown in the specifications.



Attention, this is a safety issue. When the pressure becomes too low the safe combustion becomes an issue. The combustion gasses may become harmful for man, animals and crop.

It is normal that during the start of the heater the pressure drops a bit. The heater will not react on this. Only when before and during burning the pressure is stays to low for a longer period the heater will stop, and automatically restart when the pressure is available again.

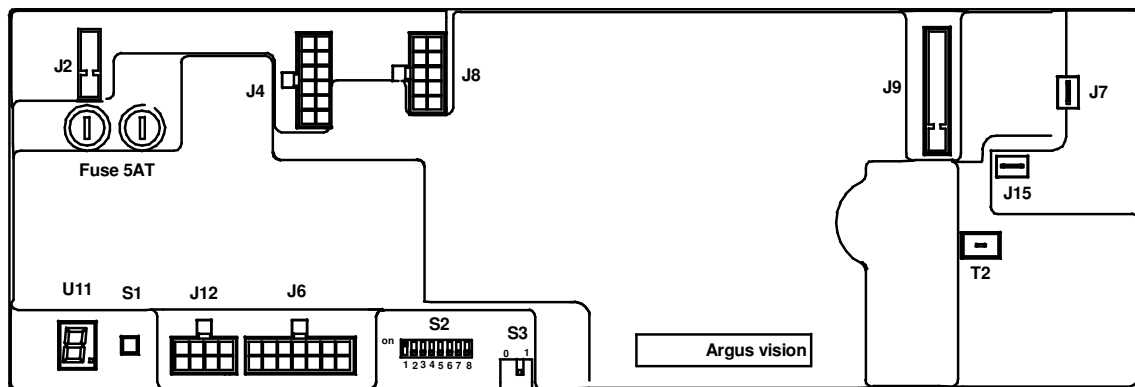
### 5.8 Description heater control HC

The heater control HC controls the unit and communicates with the room thermostat.

Functions integrated in the heater control HC are:

- Two wire communication with room thermostat
- ionisation flame guard on burner
- controlling the gas valve
- guarding the temperature of the heat exchanger
- LED signals status of heater, heat demand: green, failure: red
- Status of heater on 8 segment display on heater control HC
- reset of heater
- service mode function

#### Lay-out print board



**J2** Main power connection 230V

**J4** Connection for gas valve and the N for system fan relay

**J6** Connection for room thermostat, appliance recognition

**J7** Earth burner

**J8** Fuse for system fan relay and ignition transformer

**J9** Not used

**J12** Connections for Temperature sensors, vane switch and gas pressure switch

**J15** Ionisation

**F1 & F2** Fuses 2x 5AT

**U11** Status display

**S1** Reset service button

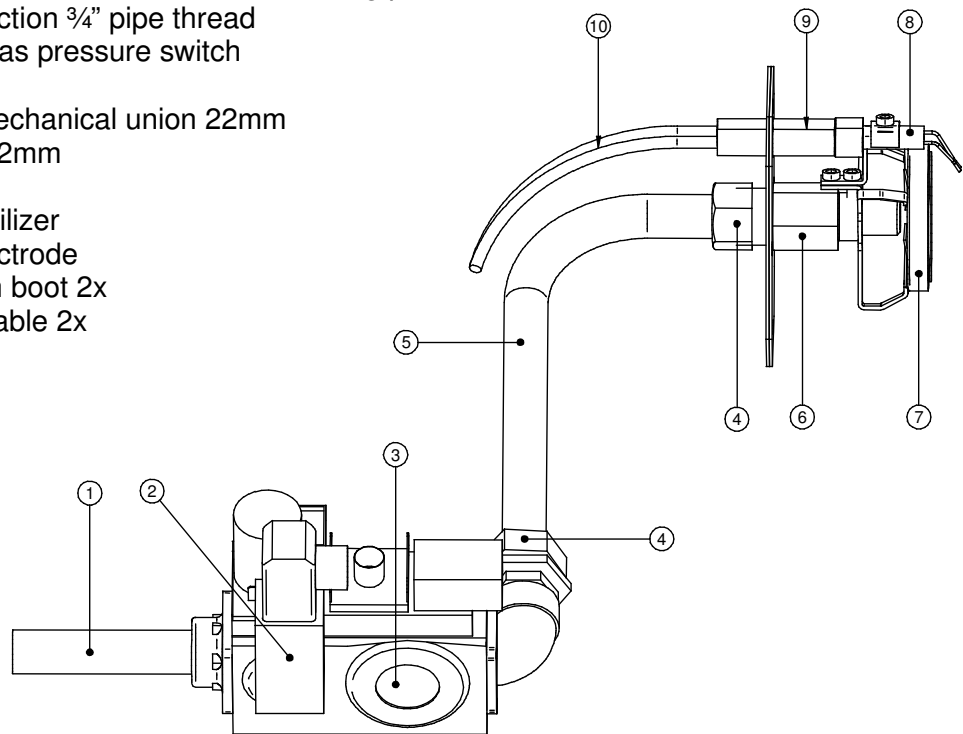
**S2** Micro switch heater no. Standard all on OFF

**S3** Power supply thermostat standard S3 op 1  
**T2** not used

### 5.9 Gas circuit

The gas circuit from the DXA has the following parts:

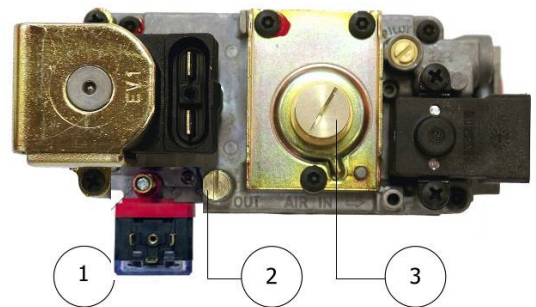
1. Gas connection  $\frac{3}{4}$ " pipe thread
2. Minimum gas pressure switch
3. Gas valve
4. Nut with mechanical union 22mm
5. Gas pipe 22mm
6. Nozzle
7. Flame stabilizer
8. Ignition electrode
9. Connection boot 2x
10. Ignition cable 2x



### 5.10 Measuring and adjusting the burner pressure

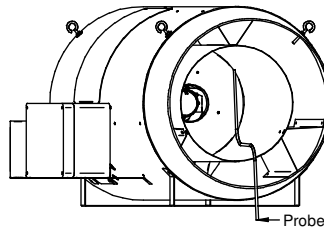
Right on the measuring point (1) the minimum gas pressure switch is mounted.

- (1) Measuring point gas supply pressure
- (2) Measuring point burner pressure
- (3) Adjusting the burner pressure



1. Switch off the heater.
2. Unscrew and remove the screw of the measuring nipple (2).
3. Connect a pressure gauge to the measuring nipple.
4. Switch on the heater and start heating manually by pressing the button on the operating panel.
5. Check whether the burner pressure is equal to the nominal burner pressure for the corresponding heater type (refer to Specifications).
6. Record the measured value as a reference for the next measurement.
7. If the burner pressure does not correspond with the specified value:
  - a. Turn the adjusting screw (3) either to the right or the left until the specified value is indicated on the gauge.
  - b. Check the burner pressure again following the steps outlined above.
8. Switch off the heater and allow the heater to cool.
9. Remove the pressure gauge and retighten the screw of the measuring nipple (2).

## Measuring combustion values



Heater with probe

### **CO<sub>2</sub> percentage (approximate)**

Nominal CO<sub>2</sub> percentage (airtime 20 °C)

Gas type	DXA 75	DXA 100	DXA 120
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%

1. Switch off the heater.
2. Place the probe (1) on the heater (refer to figure DX Heater with probe) and connect the (calibrated) flue gas analysis equipment.
3. Switch on the heater and start heating manually by pressing the button on the operating panel.
4. Allow the heater to heat for about 5 minutes.
5. Measure the CO value.
6. Measure the CO<sub>2</sub> percentage in the flue gas.
7. Record the CO value reading and the CO<sub>2</sub> percentage as a reference for the next measurement.
8. If the CO value exceeds 15 ppm, or if the CO<sub>2</sub> percentage does not correspond to the specified percentage, refer to the CO<sub>2</sub> percentages (average ambient temperature 20 °C)
  - a. Check CO<sub>2</sub> percentage if deviates by more than 1 %, check the burner pressure air inlet openings of the system fan.
  - b. Measure the burner pressure; refer to Measuring the burner pressure.
  - c. Check whether the gas pipe diameter (gas pressure to low).
  - d. Check the CO value and the CO<sub>2</sub> percentage again following the steps outlined above.
9. Switch off the heater.

Allow the heater to cool down and then remove the probe and the flue gas analysis equipment

## **6 Maintaining the heater**

It is recommended to have the heater checked and serviced by a service technician every year to guarantee reliable and safe operation. Heaters used in poultry sheds must be serviced more often and more extensively due to high levels of dust and dirt in these types of spaces.

### **6.1 General maintenance**



The heater must be free of electricity during servicing. Remove the plug from the socket outlet. Do not use water when cleaning the unit.

Perform the following activities during general maintenance:

- Open the body access panel and especially clean the body, fan blades, fan motors, vane switch, maximum thermostat and swirl ring.
- Grease any parts and bolts that are loosened regularly for maintenance.
- Check whether the wiring, nuts and bolts are all properly tightened.
- Open the gas valve and check whether the heater and the gas hose are gas-tight.

## 6.2 Extensive maintenance in a poultry shed



The heater must be free of electricity during servicing. Remove the plug from the socket outlet. Do not use water when cleaning the heater.

Clean and check heaters used in poultry sheds after every shed clean-out and before spreading sawdust. To do this, carry out the following actions:

1. Use compressed air to blow the parts clean, especially the inside and outside of the body, fan blades, fan motor, vane switch and the maximum thermostat.
2. Remove all dust from the motor as the layer of dust acts as insulation, which can cause the motor to overheat.
3. Use a brush to remove any caked on dust.
4. Clean the burner unit (refer to Cleaning the burner unit).
5. Put the Power back on and let the heater heat for a while so that if any dust particles have remained behind, they are now burnt.
6. Stop heating and cover the heater once it has fully cooled off.
7. Make sure the heater is free of electricity by removing the plug from the socket outlet.
8. Disinfect the poultry shed and spread the sawdust.
9. Remove the cover from the heater.



To ensure the instructions below are carried out safely, it is recommended having these carried out exclusively by a service technician.

Perform the following checks after cleaning the heater:

- Open the gas valve and check whether the gas hose is gas-tight.
- If the heater has been moved, check whether the gas hoses are connected properly. Connections that slip off or that are improperly mounted can create a fire hazard.
- Check that the wiring is properly secured.

Finally, carry out all the checks that are performed during heater installation (refer to Performing checks :

1. Measure the burner pressure;
2. Measure combustion values;
3. General heater operation.

Place and close the access panels once you have completed all checks. The heater may now be used again.

## 6.3 Cleaning the burner unit

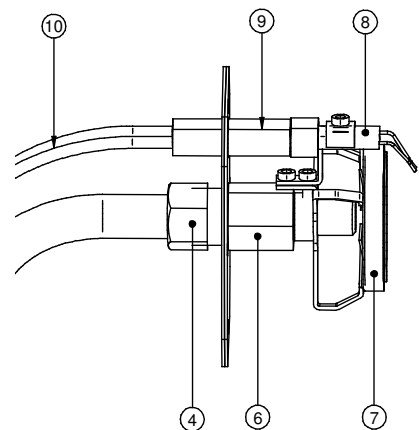


The burner unit can easily be removed out of the heater.

- Open the inspection hatch
- Remove the gas pipe by unscrewing the 2 nuts with mechanical union 22mm.
- Remove the 2 connecting boots from the ignition electrode by pulling gently at the cables.
- Unscrew the 4 nuts where the burner unit connects to the air inlet.
- Take the burner unit out the heater

The burner unit has the following parts:

- 4 Nut with mechanical union 22mm
- 5 Gas pipe 22mm
- 6 Nozzle
- 7 Flame stabilizer
- 8 Ignition electrode
- 9 Connection boot 2x
- 10 Ignition cable 2x



Clean the various parts with a soft brush ,a cloth or compressed air.  
Pay attention to dirt building up on the stabilizer and the ignition pen.  
The distance between the electrodes should be 3 mm.

#### 6.4 Changing gas type



The heater is suited for different types of gas, natural gas or propane / Butane.  
To change from natural gas to propane or butane (or vice versa) the nozzle (6) has to be changed.



To ensure the instructions below are carried out safely, it is recommended having these carried out exclusively by a service technician.

- Open the inspection hatch
- Remove the gas pipe by unscrewing the 2 nuts with mechanical union 22mm.
- Remove the 2 connecting boots from the ignition electrode by pulling gently at the cables.
- Unscrew the 4 nuts where the burner unit connects to the air inlet.
- Take the burner unit out the heater

Disassemble the burner unit:

- Remove the stabilizer (7) from the Nozzle (6)
- Remove the flange from the nozzle by unscrewing the nut from the nozzle.

Take the new injector and assemble everything again.

Look at the table with the technical details in the back of this manual for the proper diameters from the nozzles and the right burner pressure.

When everything is assembled again, make the following checks:

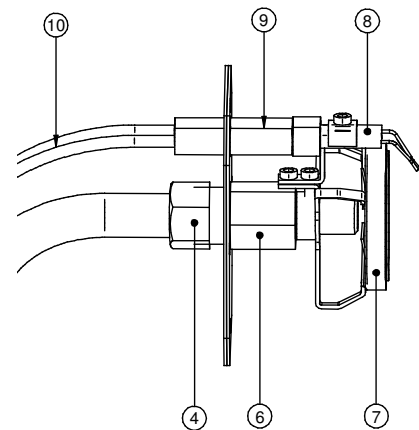
Perform the following checks after cleaning the heater:

- Open the gas valve and check whether the gas hose is gas-tight.
- If the heater has been moved, check whether the gas hoses are connected properly.  
Connections that slip off or that are improperly mounted can create a fire hazard.
- Check that the wiring is properly secured.

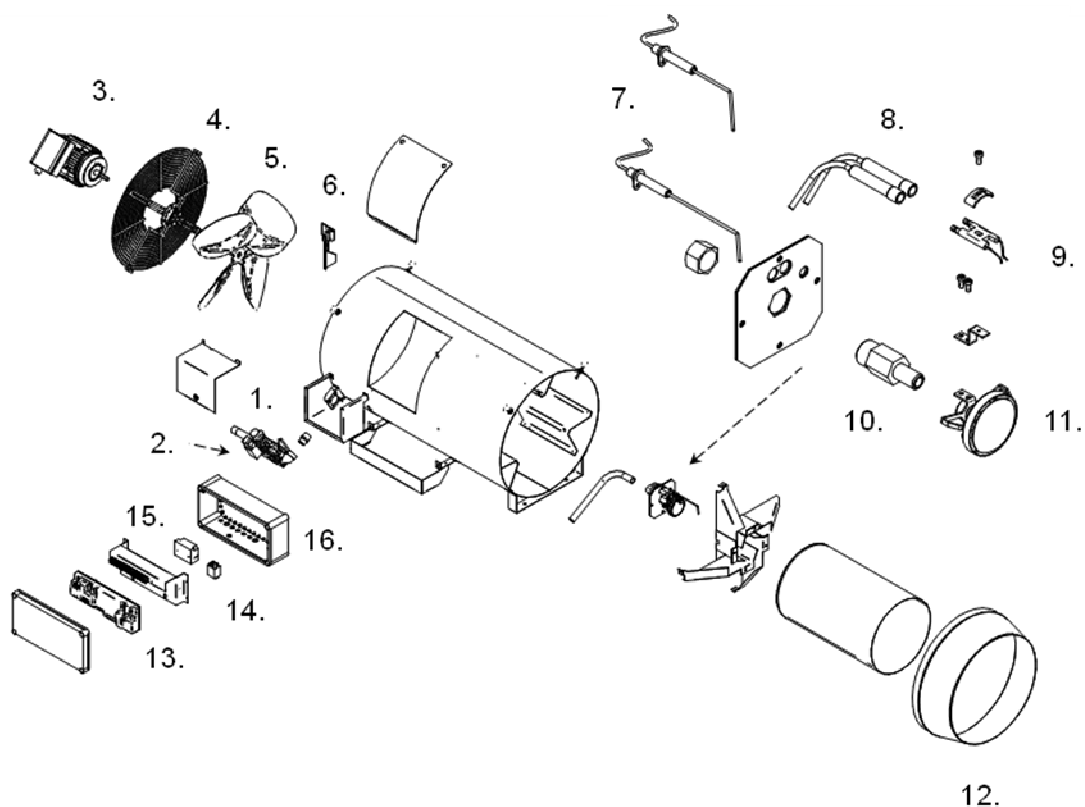
Finally, carry out all the checks that are performed during heater installation (refer to Performing checks :

1. Measure the burner pressure;
2. Measure combustion values;
3. General heater operation.

Place and close the access panels once you have completed all checks. The heater may now be used again.



## 6.5 Spare Parts



Name	75	100	120
1. Gas valve	IP200713	IP200713	IP200713
2. Minimum Gas pressure switch	GD3416	GD3416	GD3416
3. Fan motor	IP4806	IP4806	IP4806
4. Fan guard	GD4300	GD4300	GD4300
5. Fan blade	IK4217	IK4217	IK.4212
6. Vane switch assembly	GD3407	GD3407	GD3408
7. Ionisation electrode set	GD3391	GD3393	GD3393
8. Ignition cable set	GD3400	GD3400	GD3400
9. Ignition electrode	IP200665	IP200665	IP200665
10. Natural gas conversion kit	GD3434	GD3436	GD3438
Propane conversion kit	GD3424	GD3426	GD3428
11. Burner stabilizer	GD3412	GD3412	GD3412
12. C cone	GD2810	GD2810	GD2810
13. Control unit	IP.5906	IP5906	IP5906
14. Fan relay	IK5200	IK5200	IK5200
15. Ignition transformer set	GD3404	GD3404	GD3404
16. Control box	GD4820	GD4820	GD4820
Temperature sensor set DXA	GD3420	GD3420	GD3420
Wire boom 230V	IP5914	IP5910	IP5910
Wire boom 24V DXA	IP5916	IP5916	IP5916
Sevice / Reset button	GD3500	GD3500	GD3500



## 7 Problem solving

### 7.1 General

When it turns out that the problem is **not** caused by the external circumstances (i.e. no electric supply power or no gas), please take the following instructions into account. Please remember the built in waiting times of the heater (do not react too soon!) and the code on the display on the electronic circuit board.

To simplify the investigation of the failing heater please check first:

- the fuses as well as the wires and plugs in the heater for possible loose contacts.
- Use first the service-button to put the heater in run mode, try later the room thermostat.

### 7.2 Error codes

**Volatile lock out** : Can only be reset by hand

<b>A/0</b> Blinking	Internal failure	Defective print board
<b>A/1</b> Blinking	No flame	Within 5 sec flame, then flame failure: Cause 1 No flame: Cause 2
<b>A/2</b> Blinking	Exchanger too hot	Heater stops because the temperature of the heat exchanger is too high: Cause 3
<b>A/3</b> Blinking	Sensor error	Temperature sensor on heat exchanger error: Cause 4
<b>A/4</b> Blinking	Too many flame failures	Too many flame failures on ionization: Cause 1, 5
<b>A/5</b> Blinking	Internal error	Too many problems with power supply. Try other Fuse if possible. Control unit defective, change control unit.
<b>A/6</b> Blinking	Internal error	Too many problems with power supply. Try other Fuse if possible. Control unit defective, change control unit.
<b>A/7</b> Blinking	Flame	Flame detection when there should not be a flame
<b>A/8</b> Blinking	Vane switch / Fan	Fan does not run: Cause 6 Fan runs: Cause 7

**Non volatile lockout:** will disappear when the error is cleared.

<b>E/0</b> Blinking	Internal defect	Defective print board
<b>E/1</b> Blinking	1st temperature safety	Heater stops because the temperature of the heat exchanger is too high. When the heater is cooled down, the heater will restart: Cause 3
<b>E/2</b> Blinking	Selection resistance	Heater recognition does not work: Cause 8
<b>E/3</b> Blinking	Selection resistance	Heater recognition does not work: Cause 8
<b>E/7</b> Blinking	Gas pressure switch	Gas supply pressure too low, check gas supply pressure.
<b>E/8</b> Blinking	Fan / Vane switch	Fan does not run: Cause 6 Fan runs: Cause 7
<b>E/9</b> Blinking	Reset error	Too many switches on reset button: Cause 9

---

**Cause 1:** Within 5 sec flame, then flames failure.

- The flame is not detected. Check the ignition cable and electrode. (cable resistance 1K ohm)
- The heater has electrically a poor earth.
- The print board is defective.

**Cause 2:**

- There is not enough gas pressure.
- The burner pressure is too low, adjust the gas valve
- The gas valve does not open, check during ignition on 230V on the valve.
- Check whether the ignition electrode sparks, replace cable, electrode

**Cause 3:** Heat exchanger too hot

- Check if the system fan blows enough air.
- Check the setting of the gas valve, the heater may be overloaded.

**Cause 4:** Temperature sensor on heat exchanger error.

- The sensor has internally 2 sensors. These differ too much. Measure the resistance from each sensor, the resistance should be 20K at 25° en 25K at 20°. If the measured values differ too much, replace sensor.
- Rotate the sensor ¼ turn, so that the contact point is different on the sensor housing.

**Cause 5:** Too many flame failures while burning

- Bad earth connection on the heater
- Burner pressure fluctuates, is too low.
- CO2 concentration is too high (lack of oxygen)

**Cause 6:** System Fan is not running

- The vane switch is not in the rest position at start.
- The Fan has no power or is blocked.

**Cause 7:** System fan runs

- Check if the fan is dirty
- Check if the vane switch can move freely
- Check the wiring from the vane switch
- Check if the heater is extremely dirty
- Check if the supply voltage to the heater is sufficient

**Case 8:** Selection resistance error

- Check the appliance recognition part, replace if necessary

**Case 9:** Reset button error

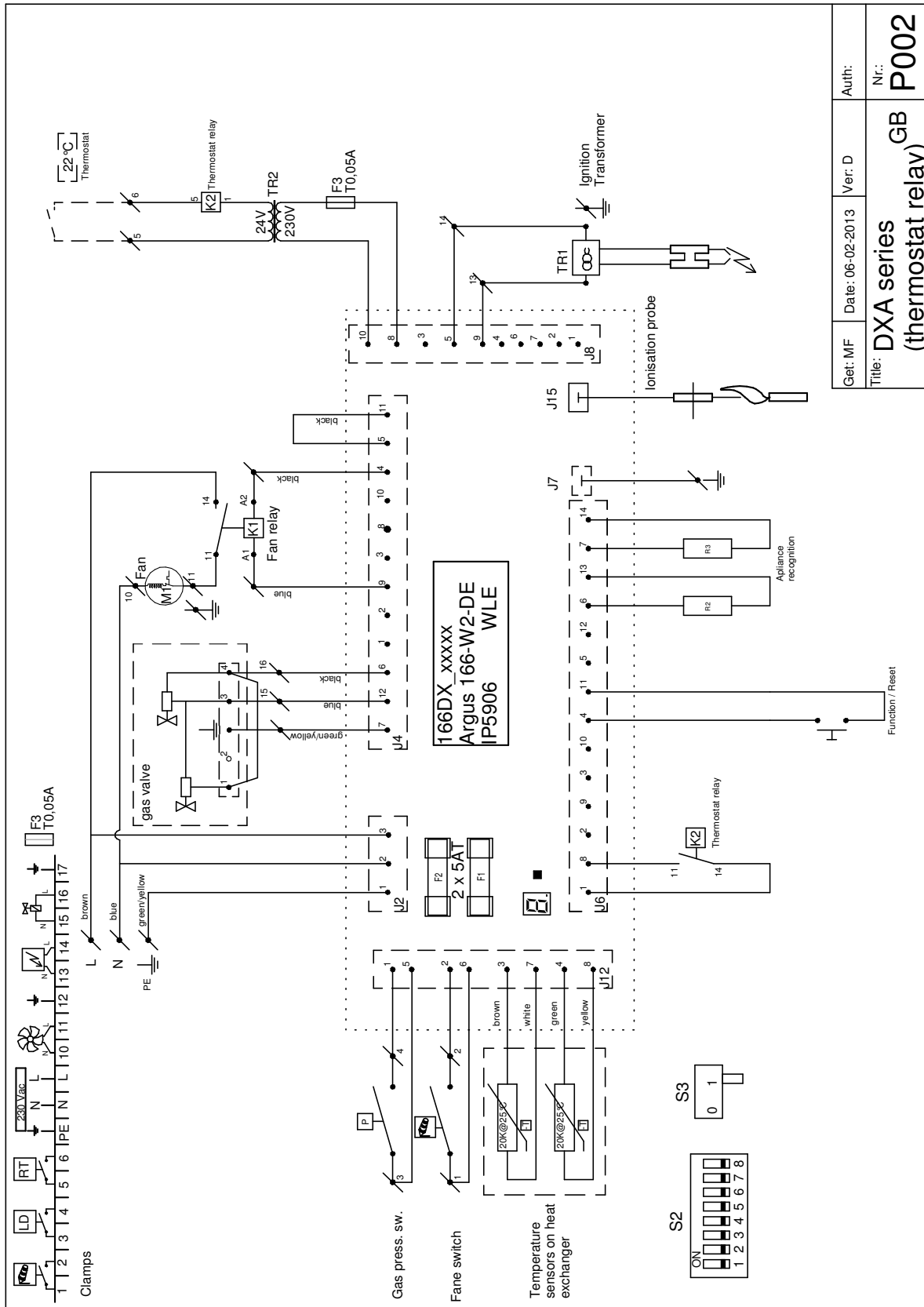
- Too many switches on reset button in a short period of time. These error will disappear after some time, or if the main power is disconnected for a while.

**Heater starts but other problems.**

- a) Check the heater by firing it up with the service button. Push it one time and the heater fires up, push it again and the heater stops. If the button is pushed twice shortly after each other, the system Fan will run. Push it again and the heater stops. Try to operate the heater with another room thermostat.

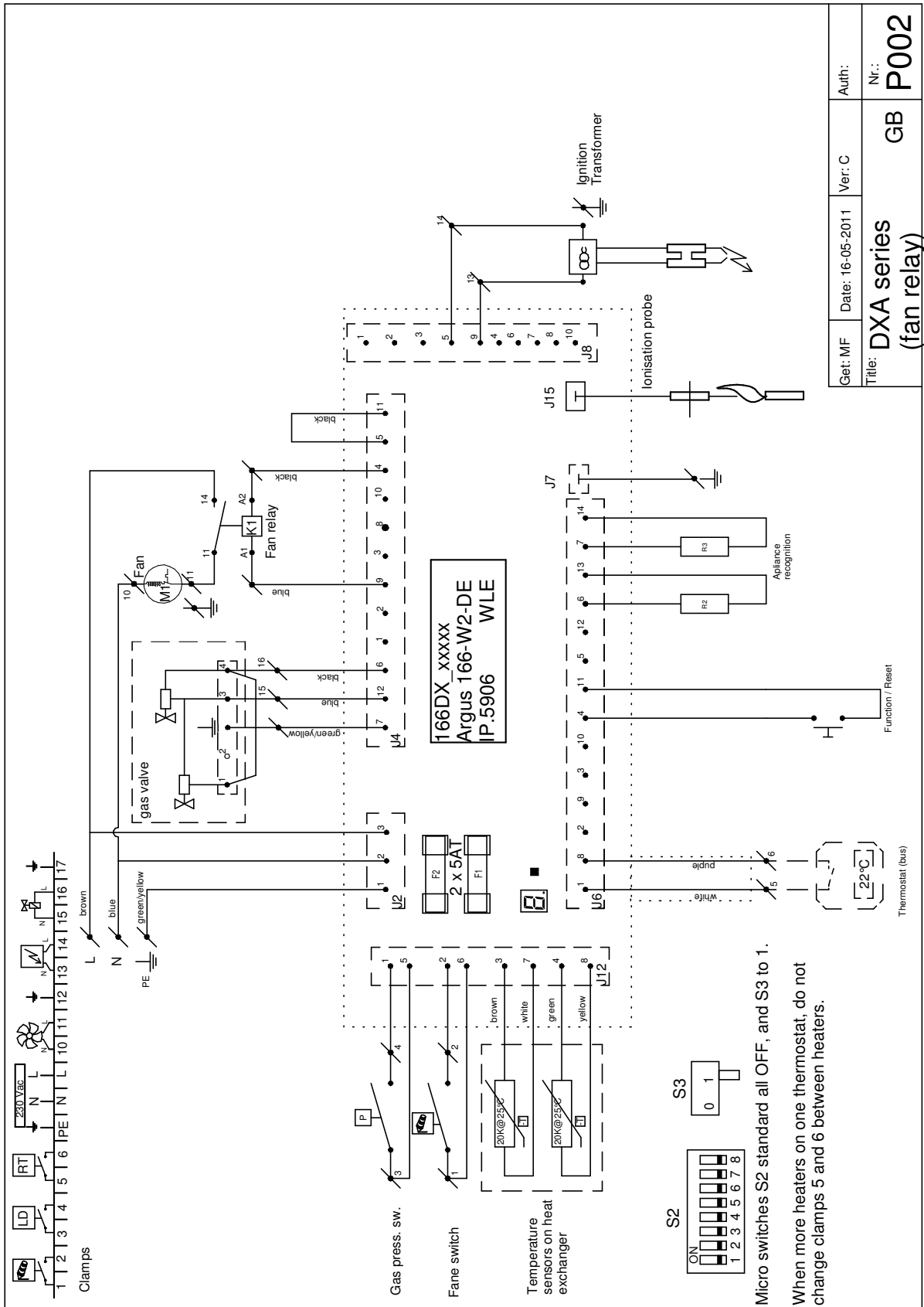
# 8 Wiring diagrams

## 8.1 Heater with relay in thermostat circuit.



Get: MF	Date: 06-02-2013	Ver: D	Auth:
Title: DXA series GB P002 (thermostat relay)			Nr.:

## 8.2 Heater with no relay for thermostat



Get: MF	Date: 16-05-2011	Ver: C	Auth:
Title: DXA series (fan relay)			Nr.: P002
			GB

## 9 Specifications

### 9.1 DXA Heater 75

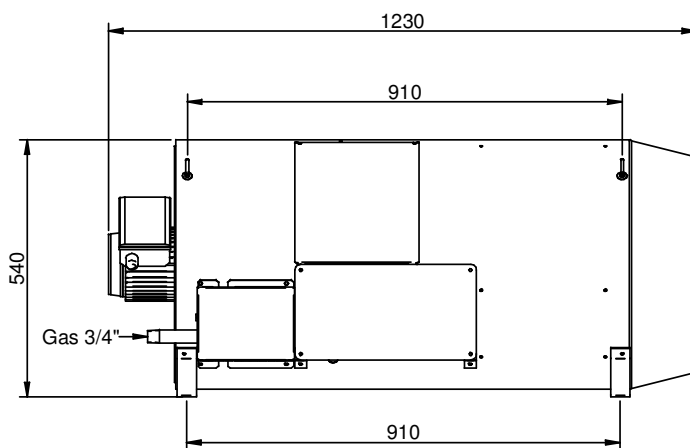
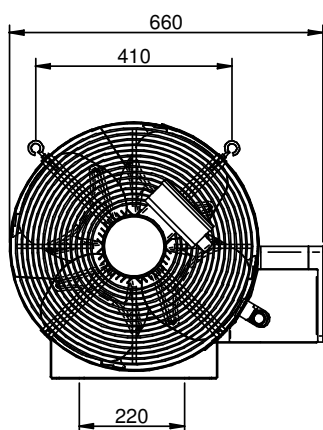
General	G20	G25	G30	G31
Nominal input Qn(Hi) is output	75 kW	75 kW	75 kW	75 kW
Air volume	6000 m <sup>3</sup> /h	6000 m <sup>3</sup> /h	6000 m <sup>3</sup> /h	6000 m <sup>3</sup> /h
Throw	40 m	40 m	40 m	40 m
weight	40 kg	40 kg	40 kg	40 kg
Dimensions (b x d x h)	650 x 1200 x 530 mm	650 x 1200 x 530 mm	650 x 1200 x 530 mm	650 x 1200 x 530 mm
Permissible ambient temperature	0 - 45 °C	0 - 45 °C	0 - 45 °C	0 - 45 °C
Noise level	79 dB(A)	79 dB(A)	79 dB(A)	79 dB(A)
Fan diam / angle.	Ø 508 mm / 20°	Ø 508 mm / 20°	Ø 508 mm / 20°	Ø 508 mm / 20°
RPM Fan	1400 rpm	1400 rpm	1400 rpm	1400 rpm

CE-marking	
norm(s) against which the heater has been tested	EN 12669 (safety of hot air blowers) EN 60335-1; 2002 EN 60335-2-102; 2006 EN 55014 and EN-IEC 61000 (EMC) EN-IEC 60529 (IP code) EN-IEC 61558 (safety of transformers, power supply units and similar)
guidelines the heater complies with	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC Gas Appliances Directive 90/396/EEC
CE declaration	Upon request

Safety settings	
minimum gas pressure switch	15 mbar
maximum thermostat (NTC)	110 °C

Gas	G20	G25	G30	G31
nominal gas consumption	7.9 m <sup>3</sup> /h	8,9 m <sup>3</sup> /h	10,2 l/h 6,0 kg/h	11,7 l/h 5,9 kg/h
nominal gas supply pressure	20 mbar	25 mbar	30 / 50 mbar	30 / 37 / 50 mbar
Appliance category	II2EL3P	II2L3P	II2L3B/P	II2L3P
minimum gas supply pressure	17 mbar	18 mbar	20 mbar	25 mbar
maximum gas supply pressure	25 mbar	30 mbar	57,5 mbar	57,5 mbar
nominal burner pressure	8,0 mbar	11,5 mbar	10,0 mbar	13,0 mbar
gas pipe diameter	3/4"	3/4"	3/4"	3/4"
nozzle diameter	8.5 mm	8.5 mm	5,85 mm	5,85 mm

Electricity	
mains voltage	230 V
Frequency	50 Hz
maximum current requirement	2.8 A
Rated power	550 W



## 9.2 DXA Heater 100

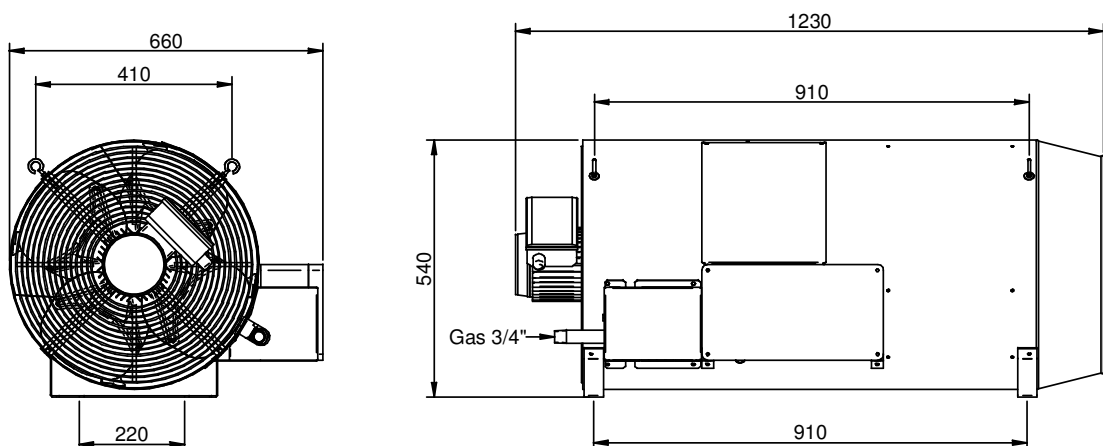
General	G20	G25	G30	G31
Nominal input Qn(Hi) is output	100 kW	100 kW	100 kW	100 kW
Air volume	6,000 m <sup>3</sup> /h	6,000 m <sup>3</sup> /h	6,000 m <sup>3</sup> /h	6,000 m <sup>3</sup> /h
Throw	40 m	40 m	40 m	40 m
weight	40 kg	40 kg	40 kg	40 kg
Dimensions (b x d x h)	650 x 1200 x 530 mm	650 x 1200 x 530 mm	650 x 1200 x 530 mm	650 x 1200 x 530 mm
Permissible ambient temperature	0 - 45 °C	0 - 45 °C	0 - 45 °C	0 - 45 °C
Noise level	79 dB(A)	79 dB(A)	79 dB(A)	79 dB(A)
Fan diam / angle.	Ø 508 mm / 20°	Ø 508 mm / 20°	Ø 508 mm / 20°	Ø 508 mm / 20°
RPM Fan	1400 rpm	1400 rpm	1400 rpm	1400 rpm

CE-marking	
norm(s) against which the heater has been tested	EN 12669 (safety of hot air blowers) EN 60335-1; 2002 EN 60335-2-102; 2006 EN 55014 and EN-IEC 61000 (EMC) EN-IEC 60529 (IP code) EN-IEC 61558 (safety of transformers, power supply units and similar)
guidelines the heater complies with	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC Gas Appliances Directive 90/396/EEC
CE declaration	Upon request

Safety settings				
minimum gas pressure switch	15 mbar	17 mbar	15 mbar	15 mbar
maximum thermostat (NTC)	110 °C			

Gas	G20	G25	G30	G31
nominal gas consumption	10,5 m <sup>3</sup> /h	11,8 m <sup>3</sup> /h	13,6 l/h 8,0 kg/h	15,6 l/h 7,9 kg/h
nominal gas supply pressure	20 mbar	20 / 25 mbar	30 / 50 mbar	30 / 37 / 50 mbar
Appliance category	II2EL3P	II2L3P	II2L3B/P	II2L3P
minimum gas supply pressure	17 mbar	18 mbar	20 mbar	25 mbar
maximum gas supply pressure	25 mbar	30 mbar	57,5 mbar	57,5 mbar
nominal burner pressure	7,0 mbar	10,0 mbar	10,0 mbar	13,0 mbar
gas pipe diameter	3/4"	3/4"	3/4"	3/4"
nozzle diameter	10,5 mm	10,5 mm	6,85 mm	6,85 mm

Electricity	
mains voltage	230 V
Frequency	50 Hz
maximum current requirement	2.8 A
Rated power	550 W



### 9.3 DXA Heater 120

General	G20	G25	G30	G31
Nominal input Qn(Hi) is output	120 kW	120 kW	120 kW	120 kW
Air volume	7,000 m <sup>3</sup> /h	7,000 m <sup>3</sup> /h	7,000 m <sup>3</sup> /h	7,000 m <sup>3</sup> /h
Throw	45 m	45 m	45 m	45 m
weight	45 kg	45 kg	45 kg	45 kg
Dimensions (b x d x h)	650 x 1235 x 530 mm	650 x 1235 x 530 mm	650 x 1235 x 530 mm	650 x 1235 x 530 mm
Permissible ambient temperature	0 - 45 °C	0 - 45 °C	0 - 45 °C	0 - 45 °C
Noise level	81 dB(A)	81 dB(A)	81 dB(A)	81 dB(A)
Fan diam / angle.	Ø 508 mm / 26°	Ø 508 mm / 26°	Ø 508 mm / 26°	Ø 508 mm / 26°
RPM Fan	1420 rpm	1420 rpm	1420 rpm	1420 rpm

CE-marking	
norm(s) against which the heater has been tested	EN 12669 (safety of hot air blowers) EN 60335-1; 2002 EN 60335-2-102; 2006 EN 55014 and EN-IEC 61000 (EMC) EN-IEC 60529 (IP code) EN-IEC 61558 (safety of transformers, power supply units and similar)
guidelines the heater complies with	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC Gas Appliances Directive 90/396/EEC
CE declaration	Upon request

Safety settings				
minimum gas pressure switch	15 mbar	17 mbar	15 mbar	15 mbar
maximum thermostat (NTC)	110 °C			

Gas	G20	G25	G30	G31
nominal gas consumption	12,6 m <sup>3</sup> /h	14,2 m <sup>3</sup> /h	16,3 l/h 9,5 kg/h	18,7 l/h 9,5 kg/h
nominal gas supply pressure	20 mbar	20 / 25 mbar	30 / 50 mbar	30 / 37 / 50 mbar
Appliance category	II2EL3P	II2L3P	II2L3P/B	II2L3P
minimum gas supply pressure	17 mbar	18 mbar	20 mbar	25 mbar
maximum gas supply pressure	25 mbar	30 mbar	57,5 mbar	57,5 mbar
nominal burner pressure	7,0 mbar	10,0 mbar	8,8 mbar	12,0 mbar
gas pipe diameter	3/4"	3/4"	3/4"	3/4"
nozzle diameter	12,0 mm	12,0 mm	7,8 mm	7,8 mm

Electricity	
mains voltage	230 V
Frequency	50 Hz
maximum current requirement	3,8 A
Rated power	800 W

