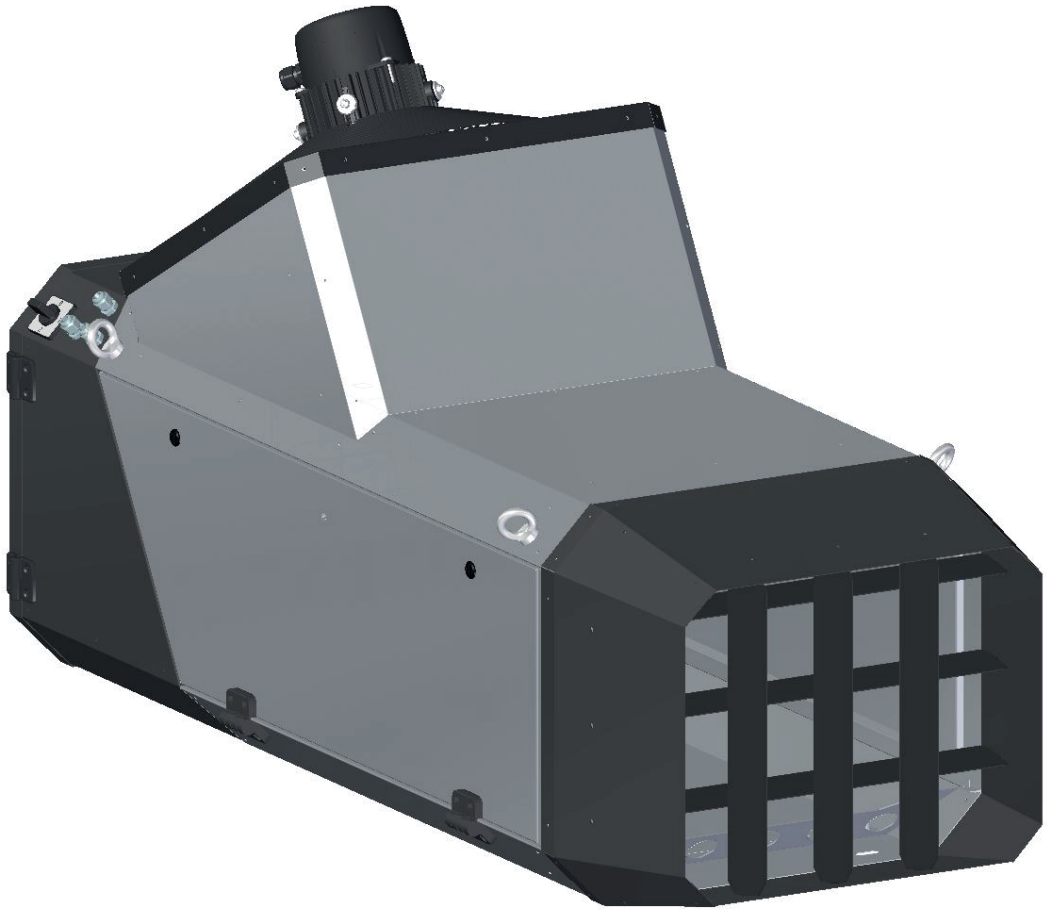


Installation manual

Air heater

Type DX-EH

CE

EN - v2.2 / 12-2023

ORIGINAL INSTRUCTIONS

Contents

1. Introduction

This manual is intended for the 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:

WARNING! The fan will run for a few minutes after a heating cycle to cool the appliance down in stand-by mode. DO NOT disconnect the appliance from the mains power before the fan has stopped, to prevent damage!

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.

2.2. 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.

CAUTION! Do NOT cover de heater when it is in use!

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 at least after every breeding cycle, and in case of heavy soiling, also during the 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 IPX4D classification.

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

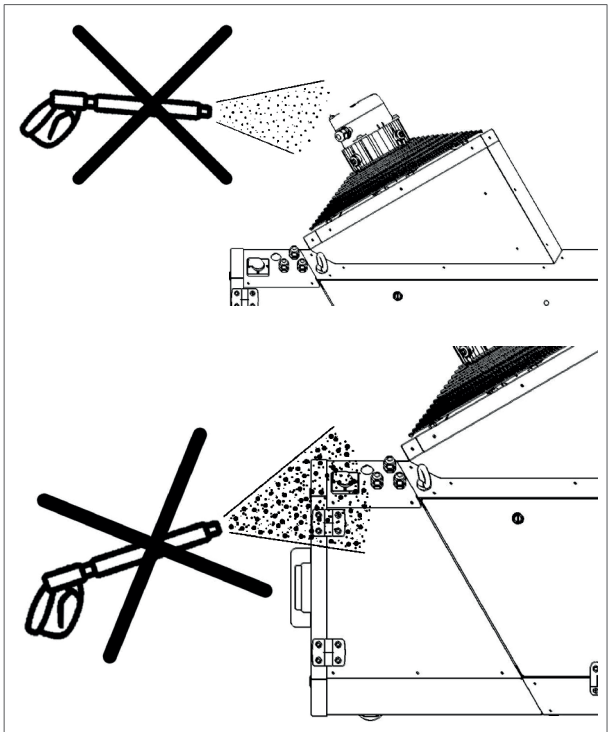


Figure 1 - Do not use a pressure washer for electronics

2.4. Children and vulnerable users

WARNING! Children aged from 3 years and less than 8 years shall only switch on/off the appliance provided that it has been placed or installed in its intended normal operating position and they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children aged from 3 years and less than 8 years shall not plug in, regulate and clean the appliance or perform user maintenance.

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.

CAUTION! Some parts of this product can become very hot and cause burns. Particular attention has to be given where children and vulnerable people are present.

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 DX-EH
		DX-EH40
Heat output (max.)	kW	39.6
Heat output (min.)	kW	19.8
Nominal power	kW	39.8
Stand-by electrical power consumption	kW	0.004
Current per phase (max.) (3F)	A	59.0
Current per phase (min.)	A	22.9 (L1)
Air output (max.)	m^3/h	3500
Throw horizontal (max.)	m	40
Electrical connection (50 Hz)	V	400 V (3F + N)
Sound level (at 5 m)	dBA	62
Weight	kg	65

3.2. Dimensions

The dimensions of this air heater can be found in figure 2.

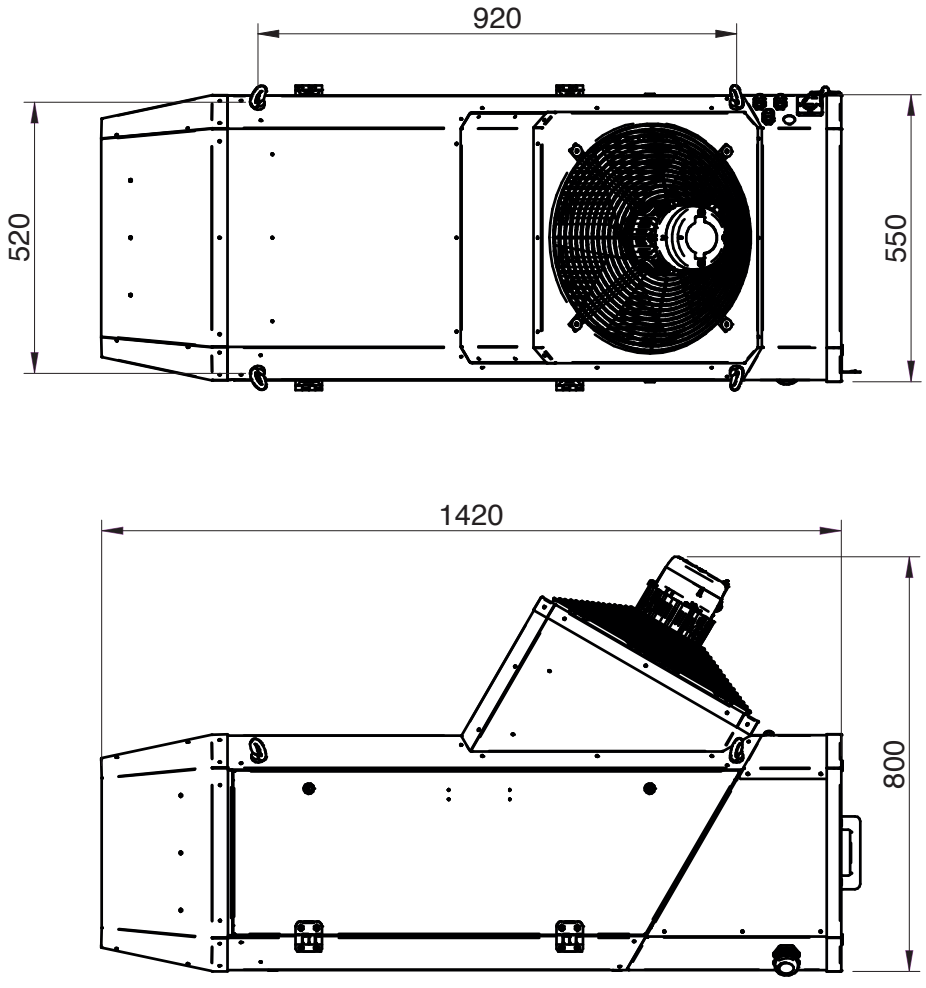


Figure 2 - Dimensions of the DX-EH

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 such as the electrical supply.

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 voltage 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 Electrical installation regulations and or other local regulations that may apply.

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 3).
- 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.

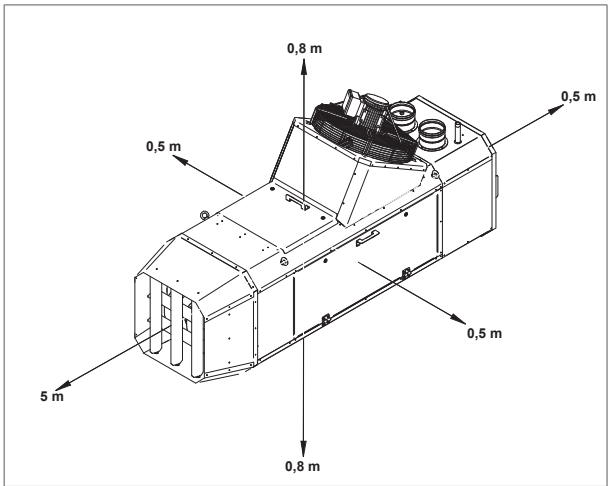


Figure 3 - Minimum clearances around the air heater

4.2.1. Orientation

- Install the heater horizontally without an inclination (figure 4).

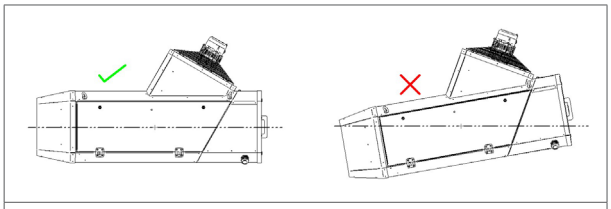


Figure 4 - A correct and incorrect horizontal orientation

4.3. Electrical connection

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

4.3.1. Power supply

The air heater requires an earthed 3-phase power supply of 400 V / AC + neutral, with 230 V between the phases and the neutral. The control circuit is a two wire low voltage bus communication.

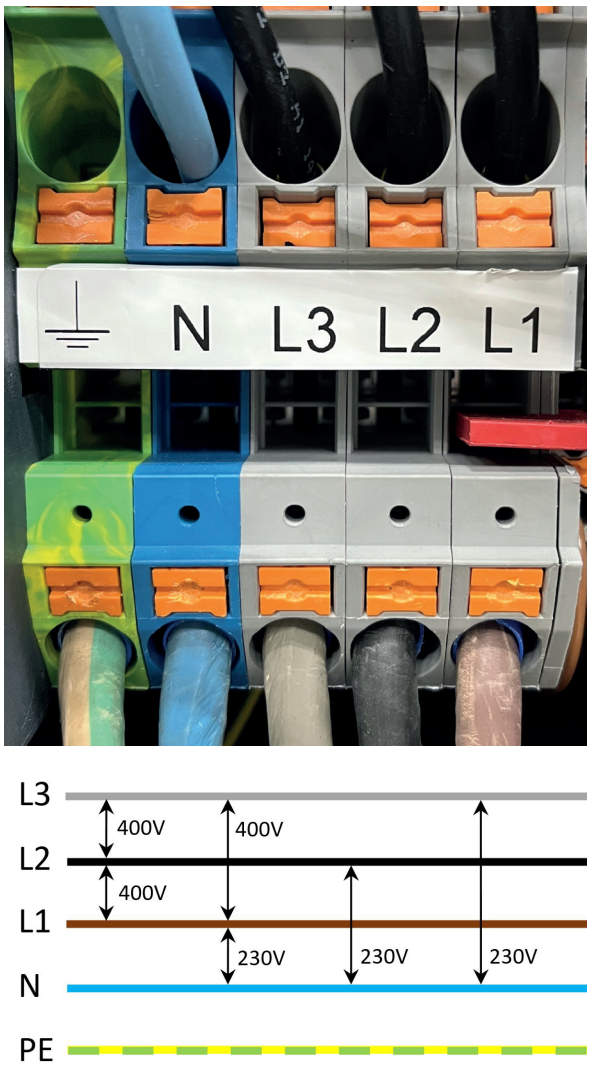


Figure 5 - The air heater's connection clamps

- The heater must be electrically isolated during servicing. For the installation, use an isolation switch in the fixed wiring with a minimum contact opening gap of 3 mm, a power plug or a non-switched fuse spur, to provide full disconnection of all poles of the supply under overvoltage category III. See the electrical wiring diagram in §9..

4.3.2. Fuse

One fuse is present on the air heater's control board (see the electrical wiring diagram in §9.).

The fuse for the motor is located on the terminal block.

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

4.4. Room thermostat

The air heater can be controlled in the following ways:

- by an ON/OFF signal;
- through a bus communication system with an external interface;
- 0 - 10 V control (optional), see §4.4.6.;
- modbus control (optional), see §4.4.7..

4.4.1. 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 §9.). 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^2.
  - 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.

4.4.2. 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 6 or the electrical wiring diagram in §9.).
2. Set the S1 and J14 switches on the control unit as follows (figure 7 / 8):
   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.

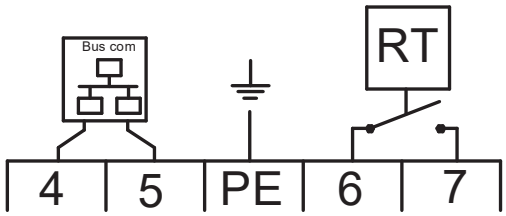


Figure 6 - Bus communication connection

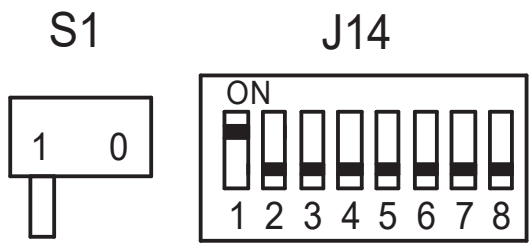


Figure 7 - Positions of the S1 and J14 switches

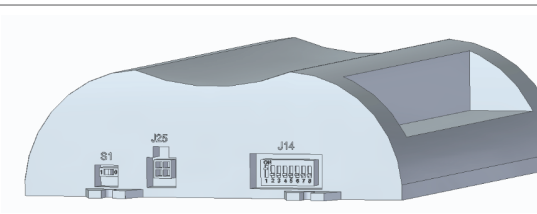


Figure 8 - Location of the S1 and J14 switches

4.4.3. 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 9):

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.

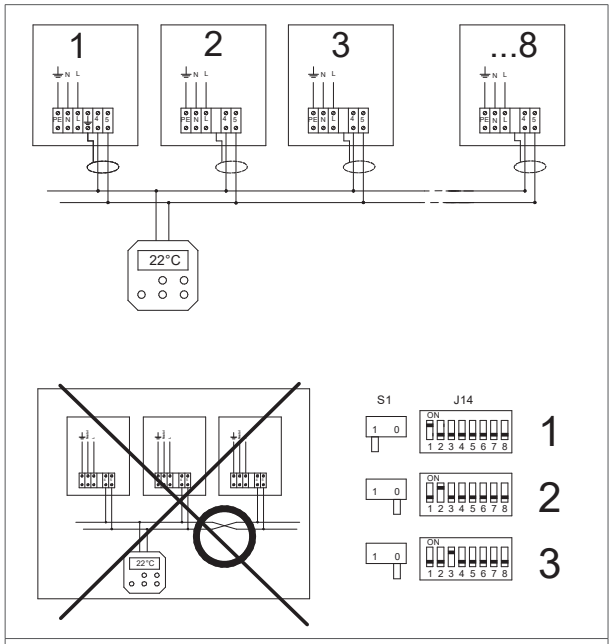


Figure 9 - Connection of multiple air heaters to a modulating room thermostat

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 10):
   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.

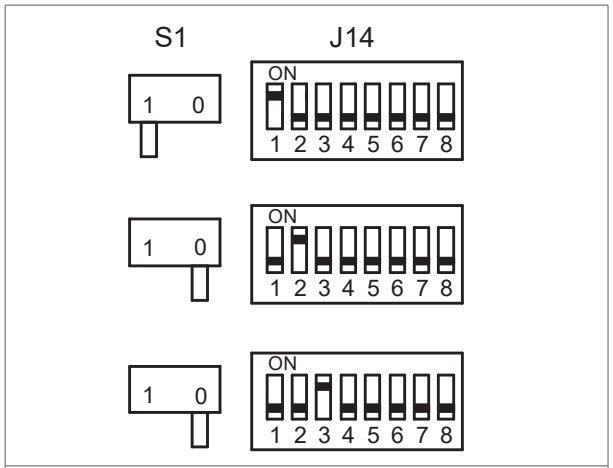


Figure 10 - Positions of the S1 and J14 switches for the first three air heaters in a system

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.

4.4.4. 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 11 or the electrical wiring diagram in §9.). This is a 24 V connection for the thermostat signal.

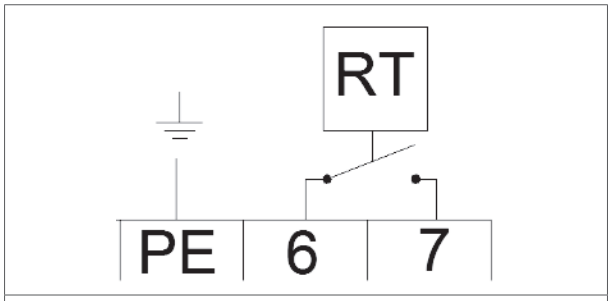


Figure 11 - ON/OFF thermostat connection

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.

4.4.5. ON/OFF 230 V thermostat installation (optional)

To connect the air heater to an ON/OFF room thermostat with a 230 V output, do the following:

- Check if the special 230 V thermostat input kit is mounted on the heater; terminals 8 and 9 should be available.

If so:

- Connect the 230 V signal of the external thermostat to terminals 8 and 9 (see figure 12). The terminals 6 and 7 should have been connected to the relay of the thermostat kit (see figure 11 or the electrical wiring diagram in §9.).

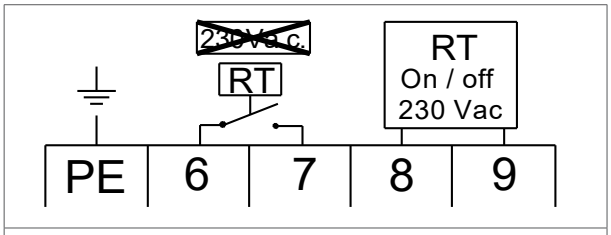


Figure 12 - ON/OFF 230 V thermostat connection

WARNING! The thermostat terminals 6 and 7 are only suited for an ON/OFF thermostat with a potential-free contact (see §4.4.4.). Connecting a 230 V thermostat signal to these terminals will cause irreparable damage to the electronics in the heater.

If not:

- Order the 230 V thermostat input kit (GA3925) and follow the instructions included in the kit.

4.4.6. 0 - 10 V control (optional)

To control the air heater with a 0 - 10 V signal, install the optional 0 - 10 V connection set GA5906.

4.4.7. Modbus control (optional)

To control the air heater with modbus, install the optional modbus connection set GA5903.

5. Operating the air heater

5.1. Minimum heating time

The heater will always heat for a minimum of 10 seconds, even if the heat demand stops. After this, the unit continues to ventilate for approximately 2-3 minutes.

5.2. Summer ventilation

The fan can be set to run in the summer. Follow the instructions in the user manual of the special Room thermostat. The heater also has a ventilation mode (§6.2.).

5.3. Overheating protection

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

5.3.1. 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) (display: A07).Step 2: Heating cycle stop, followed by an automatic restart when cooled down (display: E05 / E36).
- Step 3: Heating cylce 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, remotely with the special room thermostat or by using the red button on the air heater. Press the red button to switch off the light.

5.4. 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. Commissioning the air heater

6.1. 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. 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.

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

6.1.1. First use – thermostat

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

- Put the thermostat in the highest position.
  or
- Create an external heat demand via Modbus.
  or
- Create an external heat demand via 0 - 10 V.
  or
- Create an external heat demand by short-circuiting the RT contact, terminals 6 and 7 (see §4.4.4.).
  The start sequence is always the same.

The air heater will burn for the minimal heating time (see §5.1. for more information).

6.2. Manual function switch

The air heater can be manually controlled with a function switch.

No.	Function	Symbol	Description
0	Standby		The heater is off and the air heater does not accept incoming heat demands. The fan will run immediately after a heating cycle.
1	Auto		The air heater is ready for use and starts at once after receiving an external heat demand.
2	Heat		The air heater will heat continuously, regardless of external heat demands.
3	Fan		The fan runs continuously and the air heater will not accept incomming heat demands.

7. Troubleshooting

If the air heater malfunctions, first check if the problem is caused by external circumstances (e.g. no supply power or external heat demand). 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 and the signals of the red error light/reset button. Do not react too soon.

7.1. Volatile lock outs

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

NOTICE The reset button is located next to the manual function switch. This reset button will not light up during normal function or in stand-by mode, red in case of an error.

The error codes below can only be read with the remote status reader GD3202 or with the Modbus interface GA5904.

Display	Error type	Description	Case #
L-0	Internal error	Internal error	13
L-1	Internal error	Error in relay or wiring	16
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-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

7.2. 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	Relay error	Relay switched on when it should not be.	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	

7.3. 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-07	Overheating	Heat exchange sensor is almost overheated	3

7.4. Instructions

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

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.

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

- 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 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 control board.

Case 16: Safety relay error.

1. Isolate the electrical supply.
2. Check if one of the relays got stuck when it was switched. If so:
   - Replace the relays.
3. Reenergise the appliance.
4. Check if any of the relays switches on at once (too soon). If so:
   - Replace the control board.

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.

8. 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.

8.1. Preparation

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

1. Set the thermostat to the lowest setting.
2. Wait until the fan stops running (2 - 3 minutes).
3. Turn off the power supply to the air heater using the maintenance switch.

CAUTION! The heater must be electrically isolated during servicing.

Water can be used to clean the air heater.

CAUTION! Only the heat exchanger can be cleaned with a pressure washer. Do not use a pressure washer on the following parts:

- The big fan motor on top of the air heater.
- The electronics housing.
- The temperature sensor in the front part of the air heater.

8.2. 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 heating elements.
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
   - Heating elements
   - Temperature sensor
   - Vane switch
5. Check if the wiring, nuts and bolts are properly secured and tightened.

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 §7. if any errors occur.

8.3. Extensive maintenance in poultry sheds

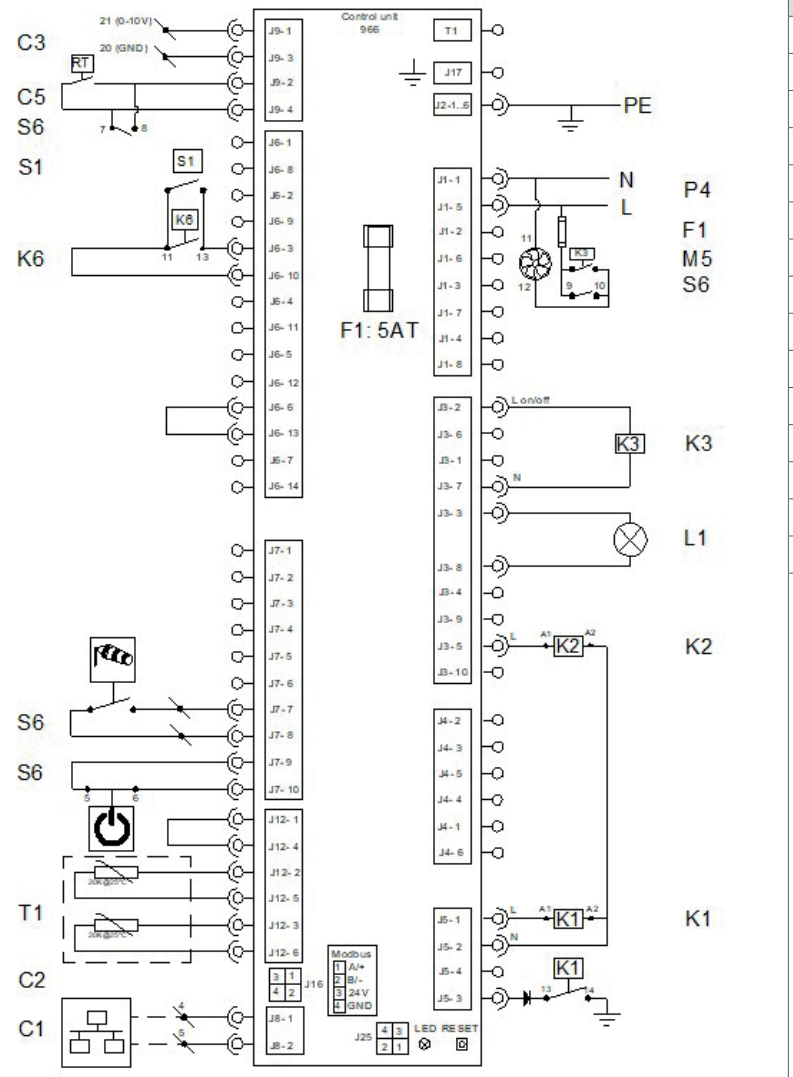
WARNING! Air heaters that are used in poultry sheds must be cleaned and inspected after every clean-out, before disinfection and the spreading of sawdust on the floor.

CAUTION! The heat exchanger can be cleaned with a pressure washer. Do not use a pressure washer to clean parts that contain electronics, such as the electric motor or the machine cover.

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.
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 heating elements (see §8.2.).
5. Switch on the air heater and let it heat for a while. This burns off any remaining dust particles.
6. Stop the heating process.
7. Cover the air heater when it is fully cooled off. This protects it from dirt or dust.
8. Make sure the air heater is electrically isolated.
9. Disinfect the poultry shed and spread the sawdust.
10. Remove the cover from the air heater. The heater is ready to be used.

9. Electrical wiring diagram

A complete electrical wiring diagram is shown in figure 13. The connections that are most important to the installation process are shown in figure 14.



No.	Connection type
C1	Bus communication
C2	Modbus (optional)
C3	0 - 10 V (optional)
C5	ON/OFF thermostat
F1	Glass fuse (5 x 20 mm 5AT)
K1	Low power relay
K2	High power relay
K3	Fan relay
K6	Reset relay (optional)
L1	Error light
M5	System fan
P4	Power supply (230 V~)
S1	Reset button
S6	Selector switch
T1	Temperature sensor elements

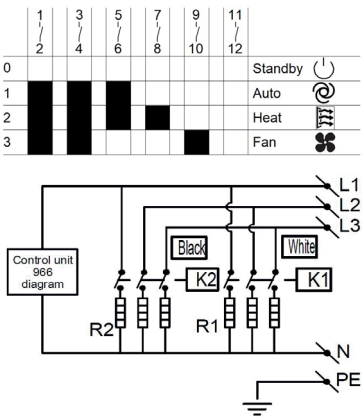


Figure 13 - Electrical wiring diagram DX-EH

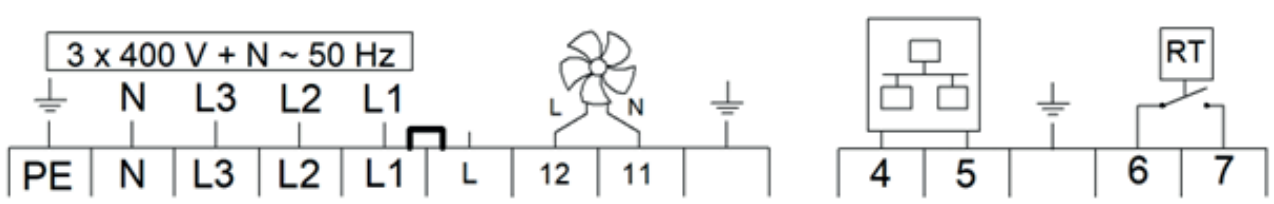


Figure 14 - Main connections for installation

10. Exploded view and spare parts

The parts of the air heater are shown in an exploded view in figure 15. The table below describes each part and shows the correct article number for a replacement part.

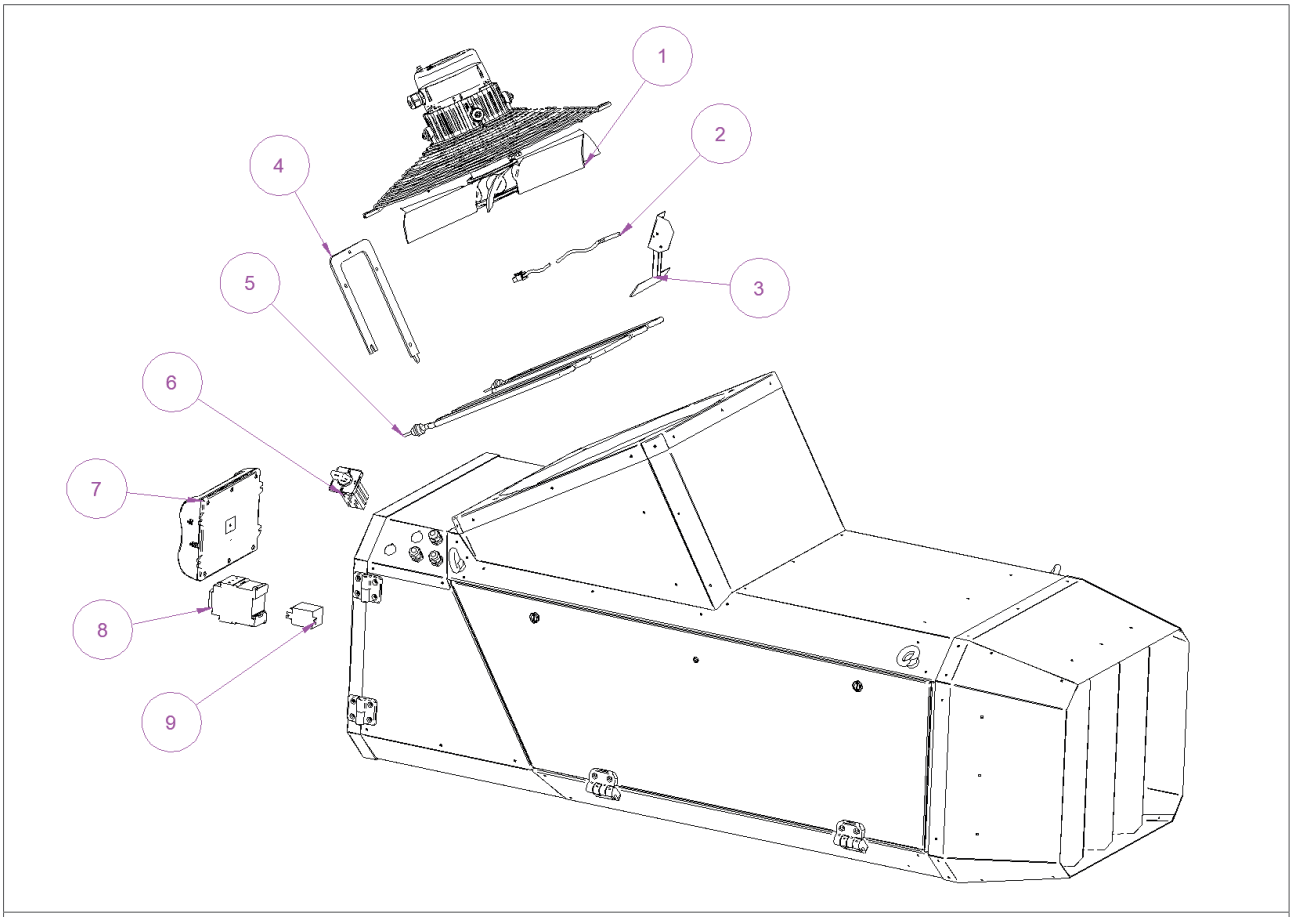


Figure 15 - Exploded view of the DX-EH

No.	Description	DX-EH40
1	System fan	GD4223
1	Fan blade	IP4216
2	Heating element sensor	GY3933
3	Vane switch set DX-EH	GD3411
4	Gasket set DX-EH	GD6740
5	Heating element 3.3 kW	IE2512
6	Selector switch	IB5285
7	Main board DX-EH	GE5904
8	Heating elements relay 25 A	IE5202
9	Fan relay	IK5200

11. Disposal and recycling

	The meaning of the symbol on the material, its accessory or packaging indicates that this product shall not be treated as household 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 potential hazards 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 household waste.

12. Declaration of conformity

Winterwarm Heating Solutions B.V.
Olden Goorweg 1
7108 AE, Winterswijk
The Netherlands
Declares that air heater type:

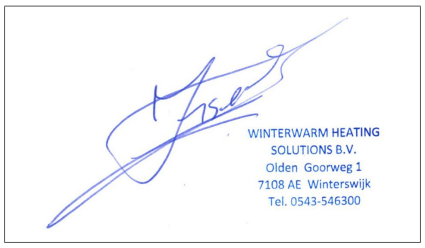
- DX-EH40

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

- 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, May 1st 2023



Ir. M. Fiselier
Technical director