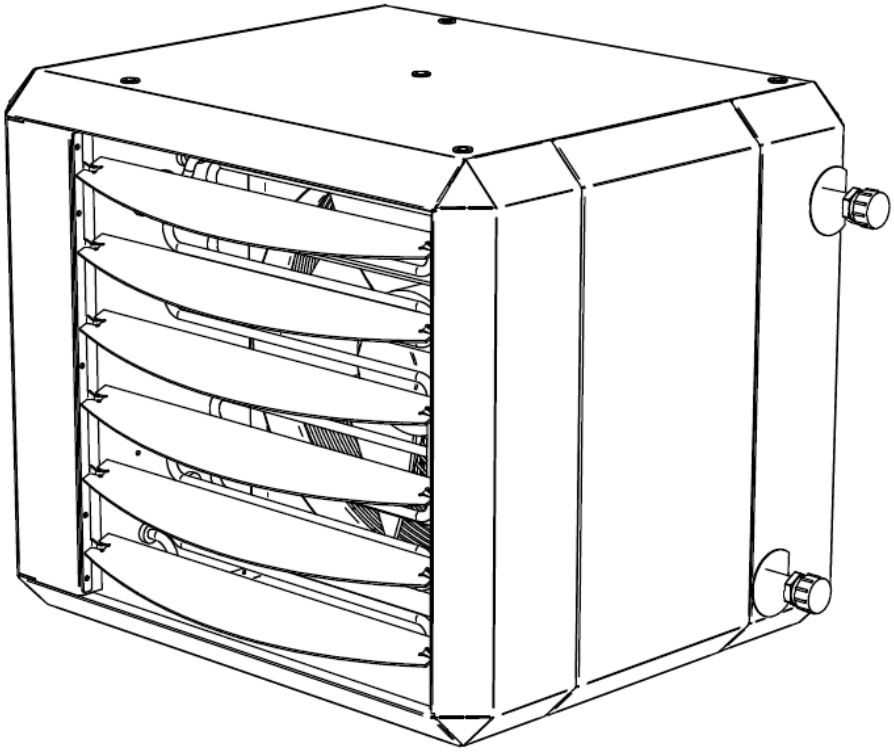


INSTALLATION MANUAL

AIR HEATER

TYPE QSE

CE

QSE - en - v1.0 - 09 / 2023

Content

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! Do not use the air heater in a very dusty environment. Dust may accumulate and cause a defect of the heater. This is also the case for the room thermostat.

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 35°C. Higher temperatures cause the internal components to degrade much faster.

Restrictions in use:

Operating pressure : max. 5 bar.

Water temperature (risk of freezing!) : max. 100°C; min 4°C.

Environmenral temperature (risk of freezing!) : max. 40°C; min 4°C.

WARNING! In case of freezing, the copper tubes of the heat exchanger might get damaged, causing the heat esxchanger to leak. This is not covered by the warranty!

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.

2.3 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.

2.3.1 Protection from water (IP class)

WARNING! Never use water when cleaning electrical parts.

This air heater is not waterproof and has an IP00B classification.

WARNING! Do not expose the air heater to rain, spray or dripping water.

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 specifications QSE

Technical specification	Unit	QSE6 + 10
Total power	kW	16
Maximum vermogen warmtepomp (*)	kW	6
Maximum vermogen Booster	kW	10
Koelvermogen (**)	kW	3.4
Air output (max.)	m^3/h	1850
Type heat pump		HPX06A
Throw horizontal (max.)	m	15
Electrical connection (50 Hz)	V	400 V (3F + N)
Current per phase (max.) (3 ph.)	A	15.5
Current per phase (max.) (1 ph.)	A	44
Current per phase (min.)	A	11,9 (L1)
Dimensions	mm	570x490x515
Weight	kg	45
Water connection	G”	1”
Water volume	L	2
Sound level (at 5 m)	dBA	35 - 54
Modulating EC fan		Yes

3.2 Dimensions

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

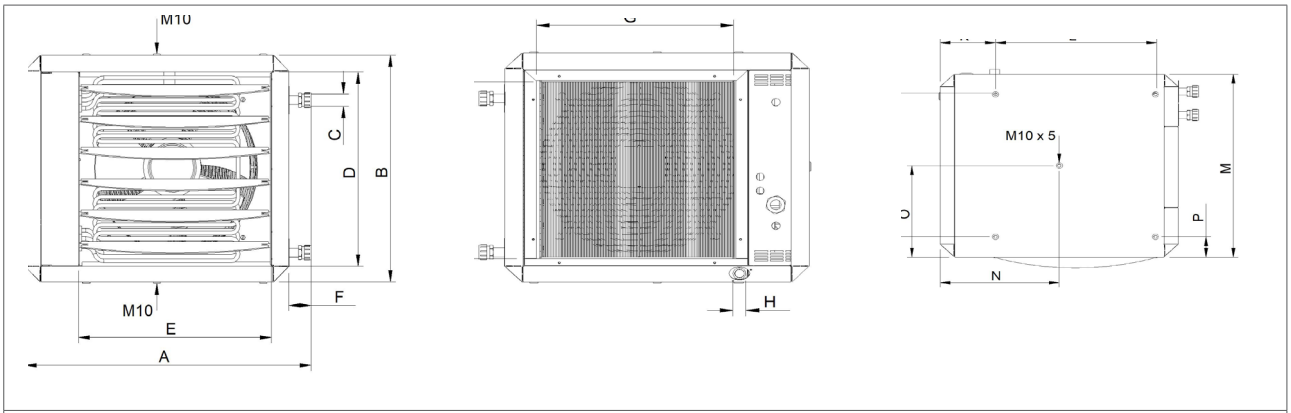


Figure 1 - Dimensions of the QSE6 + 10

Model(s)	QSE6 + 10
A	590
B	490
C	1”
D	420
E	430
F	50
G	385
H	1/2”

Model(s)	QSE6 + 10
I	380
J	390
K	135
L	395
M	500
N	295
O	250
P	55

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 (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 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 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.

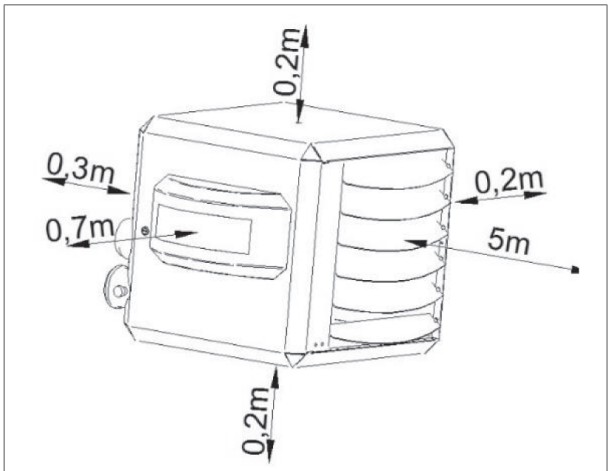


Figure 2 - Minimum clearances around the air heater

4.2.1 Suspension

Depending on the model of your air heater, the following type of wall support can be used:

Model(s)	Wall support	Art. Nr.
EH5 - EH40	Wall support	GA8610

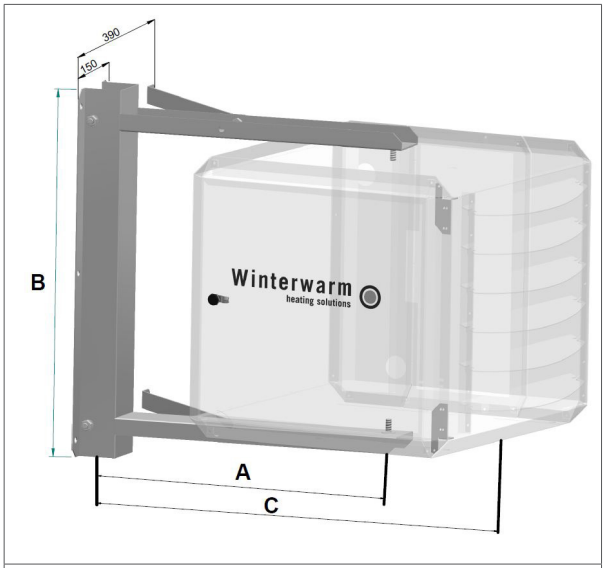


Figure 3 - Wall support

Model(s)	A	B	C
QSE6 + 10	550	640	805

The air heater is equipped with threaded M10 sockets to suspend the unit.

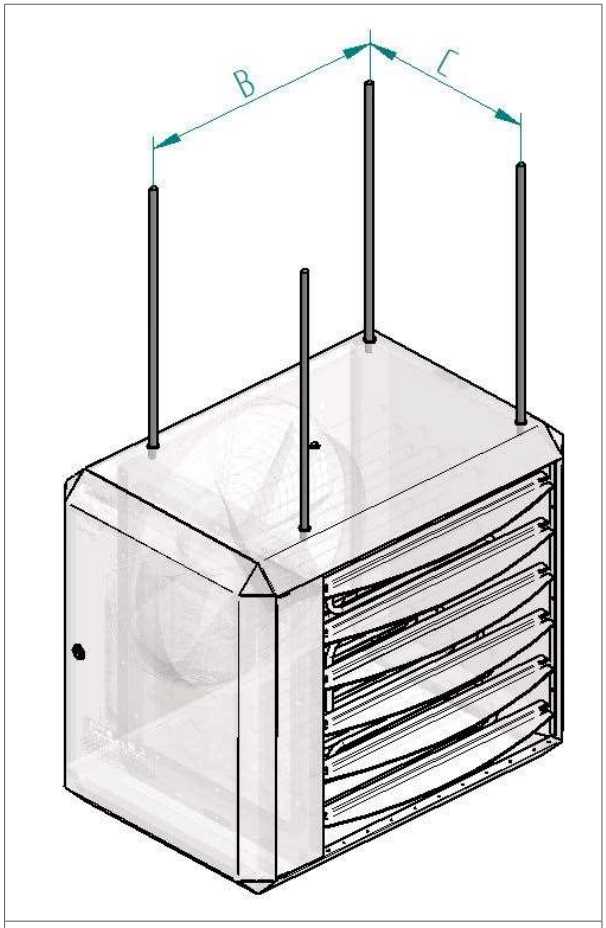


Figure 6 - Vertical suspension

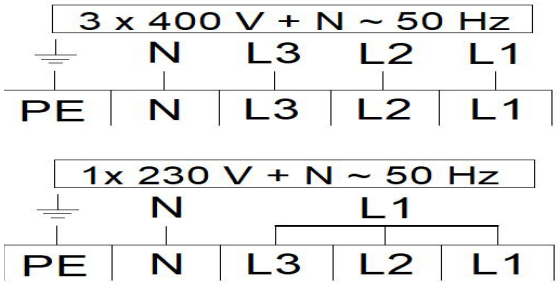
4.3 Electrical connection

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 power supply of 400 V/ AC (Three phase).

A supply of 230 V/AC + Neutral (1 Phase) is optioanl and can be established by using the bridges supplied with the heater.



The control circuit is a four wire low voltage bus communication., over Modbus RTU

Figure 7 - The air heater's connection clamps

4.3.2 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).

4.4 Room thermostat

The heater can only be controlled with one of the following thermostats:

- **Smart Controller**: a modbus thermostat with touch control, suitable for hybrid air heaters.
- **A building management system (BMS)** with Modbus communication.

WARNING! Never use a room thermostat to interrupt the electric power supply to the heater.

NOTICE This air heater cannot be controlled with a simple ON/OFF thermostat.

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 four 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 ..
  - Minimum dimensions: 4 x Ø0.34 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 0.34 mm^2 will result in a poor signal.

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

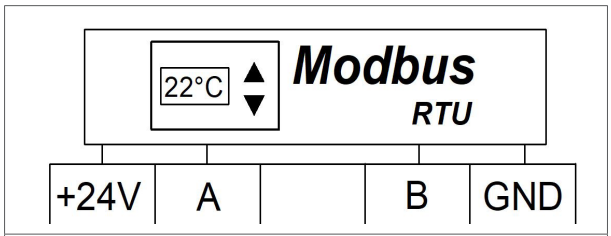


Figure 8 - Modbus connection

4.4.2 Installation of multiple appliances on one single Smart Controller of Building Management System

One single Smart Controller of Building management System (BMS) can conytrol multiple hybrid heaters.

Consult the user manual of the Smart Controller for further information.

4.5 Heat pump

NOTICE Make sure that a heat pump is connected with the right power output corresponding to the hybrid heater.

Use the same cable as specified in clause 4.4. for the connection between the heat pump and hybrid heater.

CAUTION! Do not mix the connection to the heat pump with the thermostat connection mentioned above. This will damage the heat pump.

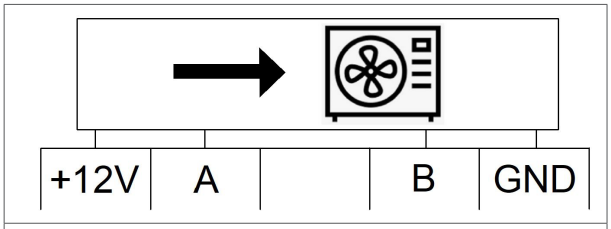


Figure 9 - Connection for heat pump in hybrid heater

The heat pump has a similar connection inside. The connections of the wires have to correspond for a proper communication.

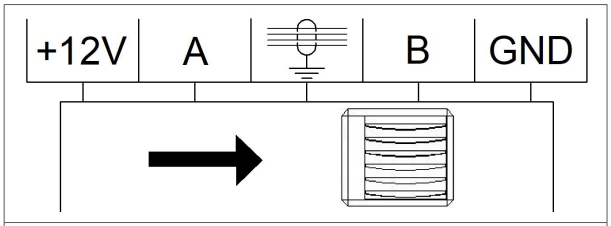


Figure 10 - Connection for hybrid heater in heat pump

4.6 Condensate drain hybrid heater

The condensate drain at the rear side is connected to a condensate collecter below the heat exchanger. If the lower outlet temperatures of the heat exchanger are not set lower than 15°C, no condensate will be formed. With lower temperatures the change of condensate increase and a drainage hose may be imstalled in these cases.

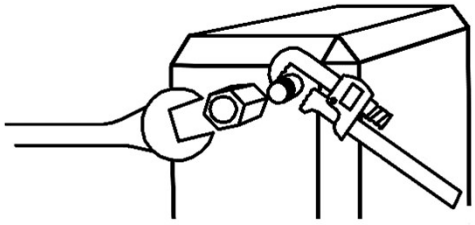
4.7 Water connections hybrid heater

The water connections for supply and return (both 1“) are marked with a blue and red label. If return and supply are exchanged, the heat output will be decreased.

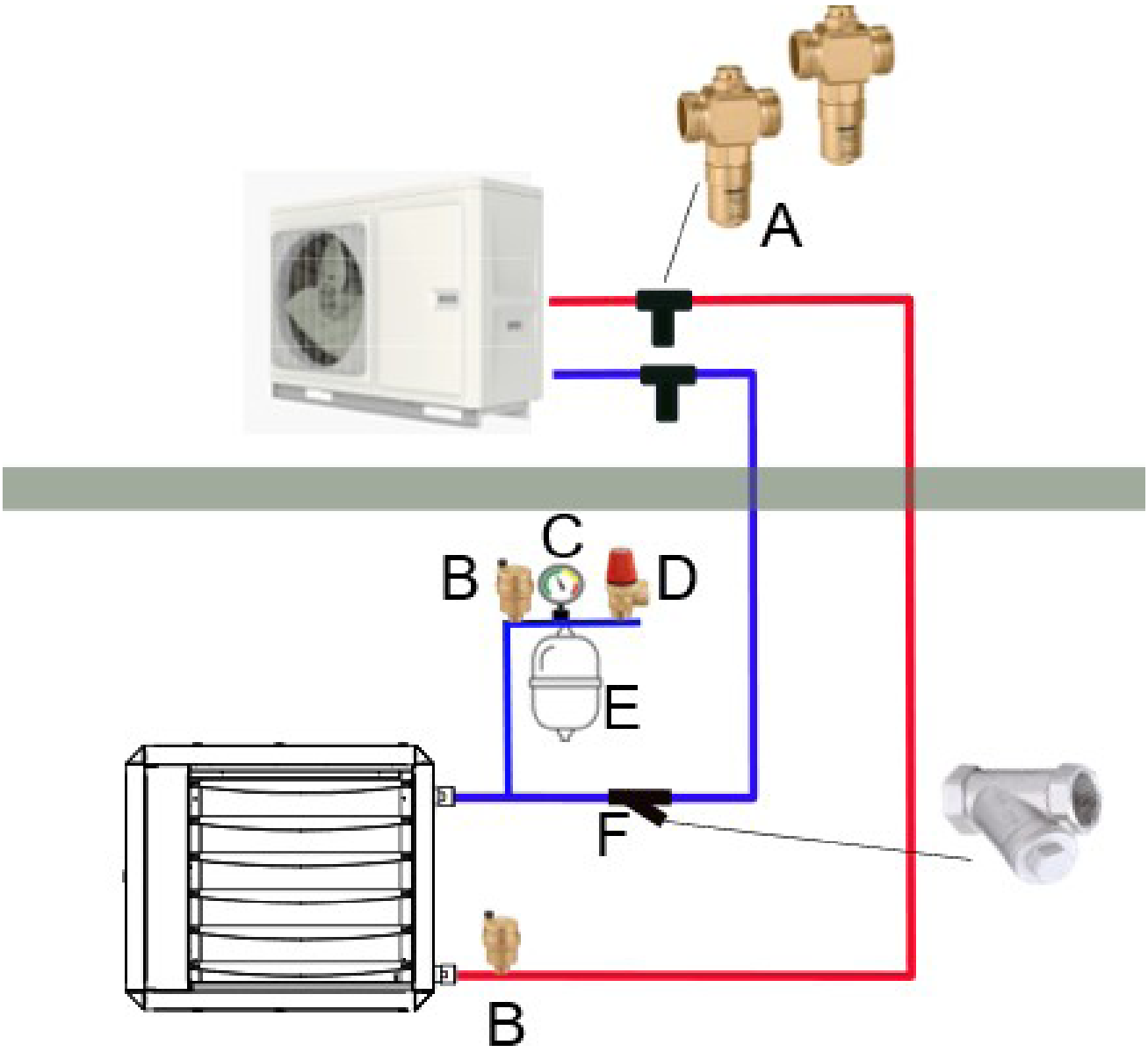
The hybrid heater has no venting for the water circuit incorporated. These have to be installed in the water supply and return

CAUTION! Avoid mechanical stress on the supply and return connection. The heat exchanger may be damaged and will start leaking because of mechanical stress.

Use a wrench to support the connections while installing the fittings to avoid damage. Internal welds may become loose if too much force is applied!



Water piping instalation diagram. For details, consult the manual of the heat pump.



A) Anti freeze valve (2x near heat pump, not included)
B) Automatic venting valve (2x on supply AND return, not included)
C) Pressure gauge (not included)
D) Expansion valve (not included)
E) Expansion vessel (not included)
F) Filter (included)

5 Operating the air heater

5.1 Minimum operating time

The heater will always run for a minimum of 30 seconds, even if the heat demand stops. With an MTC thermostat this minimum time is 10 seconds. This is to avoid large amount of starts and stops.

After this, the fan will run for 2 - 3 minutes to cool down, depending on the temperature.

When the cooling time has passed, a new heat request will be granted.

5.2 Delta-T-regulation

The air heater can function as a de-stratification fan. This is called delta-T regulation and it is done via the Smart Controller, with a temperate measurement sensor that is located on the air heater.

The system fan is activated when the temperature-difference between the sensor on the heater (the delta-T NTC sensor) and the sensor in the Smart Controller is bigger than 8°C (standard factory setting). This procedure ensures an even distribution of temperature throughout the building, thus acting as a fully automatic de-stratification fan.

5.2.1 Switch off delta-T-regulation

Delta-T regulation can be switched off when it is not desired (e.g. when it causes discomfort). This can be done in the **Settings** menu on the Smart Controller. See the user manual of the special Smart Controller for more information.

NOTICE Delta-T regulation is automatically switched off when the delta-T sensor (sensor terminal J6) is disconnected.

5.3 Summer ventilation

The fan can be set to run in the summer. Follow the instructions in the user manual of the Smart Controller.

5.4 Overheating protection

The air heater's heat exchanger is protected from excessive temperatures.

5.4.1 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 (thermostat display).
- Step 3: Burner stop, followed by a Lock Out. A manual reset is required. (thermostat display).

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

6 Commissioning the air heater

6.1 Adjusting the settings

Prior to packaging, the safety and functioning of each air heater is checked in detail.

In general, the heater does not need to be adjusted after installation. It is only necessary to perform a functional check.

6.2 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. 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.

6.2.1 First use – Modbus

To commission the air heater via the Smart Controller or the Building Management System, do the following:

- Create a heat-request. The hybrid air heater will activate the heat pump first. After the heat pump has started, the water will start to circulate and the fan of the hybrid heater will start.
- When the heat request remains active, and the difference between the set temperature and the actual temperature is large enough, the electric booster will start after a while too. The air heater will burn for the minimal firing time (see §5.1. for more information).

7 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. Do not react too soon.

The error codes below, refer to the gas booster of the hybrid air heater. The error codes of the connected heat pump are visible in the Smart Controller too. Consult the manual of the heat pump for details.

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 underneath the LED of the control board. This LED will light up green during normal function or in stand-by mode, red in case of an error.

Display	Error type	Description	Case #
L-0	Internal error	Internal error	13
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-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	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	

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 burner control unit.

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 burner control unit.

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. Turn off the power supply to the air heater using the maintenance switch.

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

CAUTION! The heater must be electrically isolated during servicing.

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
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.

A complete electrical wiring diagram is shown in figure 14. The connections that are most important to the installation process are shown in figure 15.

9. Electrical wiring diagram

A complete electrical wiring diagram is shown in figure 14.

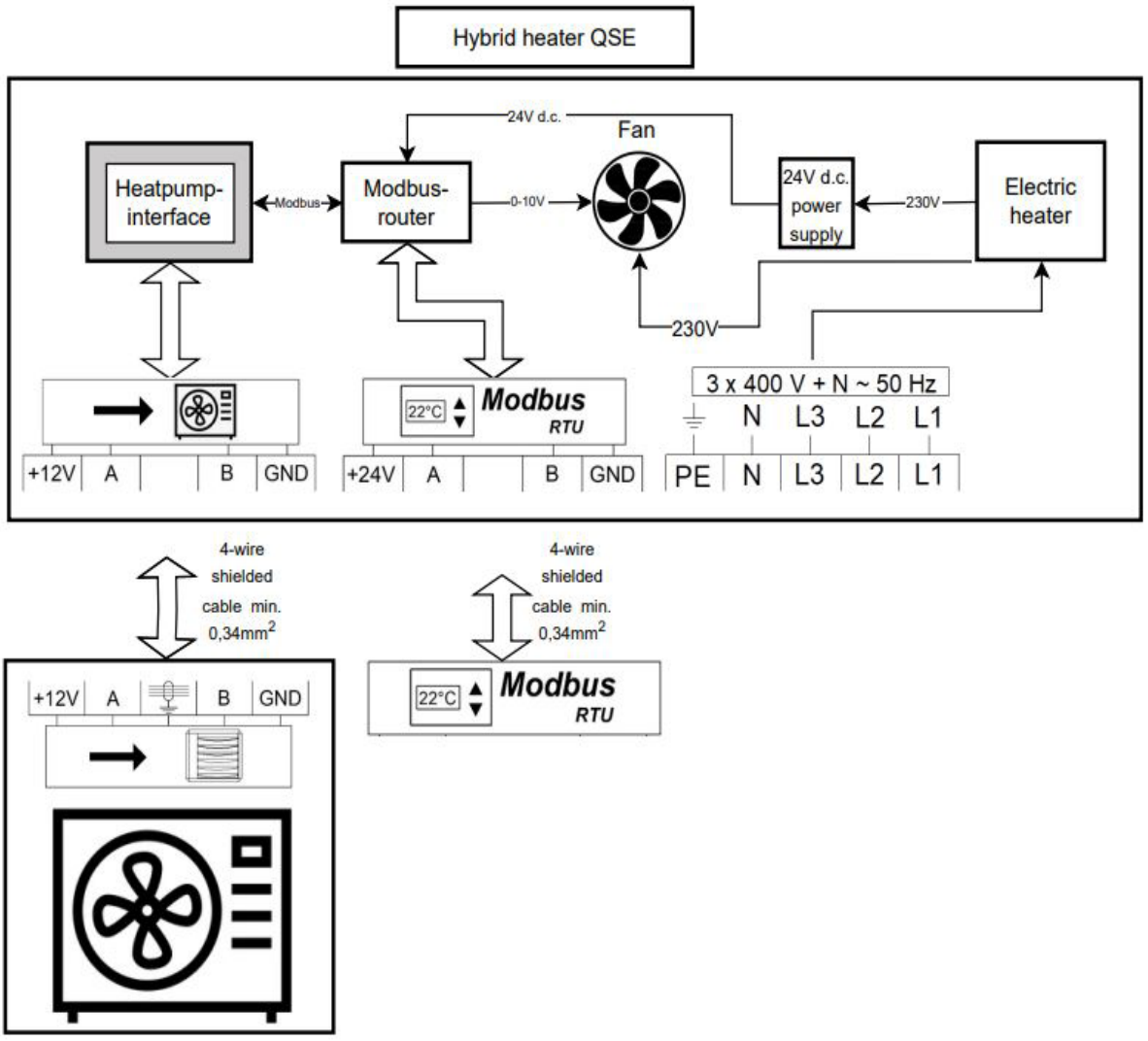
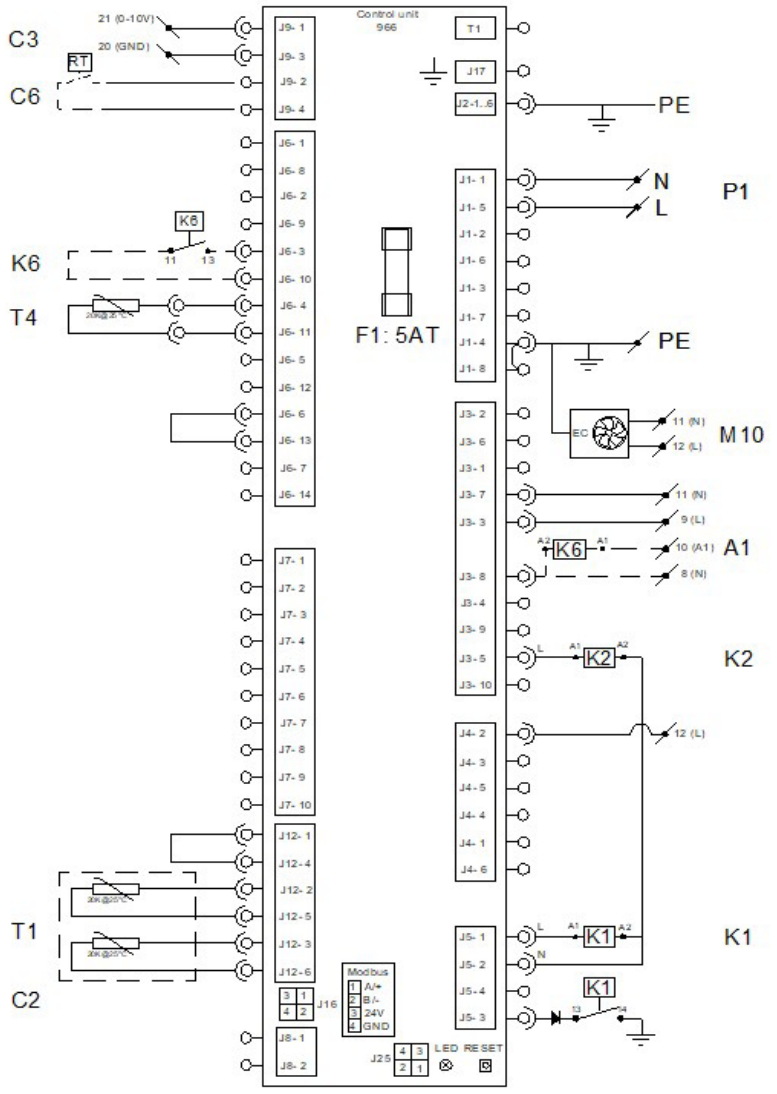


Figure 14 - Electrical wiring diagram QSE



No.	Connection type
A1	Alarm output 230V (optional)
C2	Modbus
C3	0-10V (option)
C5	ON/OFF thermostat (optional)
K1	Relay low
K2	Relay high
K6	Reset relay (optional)
M10	Modulated EC system fan
P1	Power supply (230 V)
T1	Heat exchanger sensor
T4	Temperature sensor (delta-T)

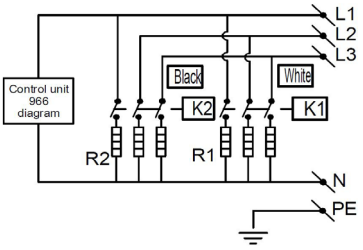


Figure 15 - Electrical wiring diagram EH

9 Exploded view and spare parts

The parts of the air heater are shown in an exploded view in figure 16. The table below describes each part and shows the correct article number for a replacement part.

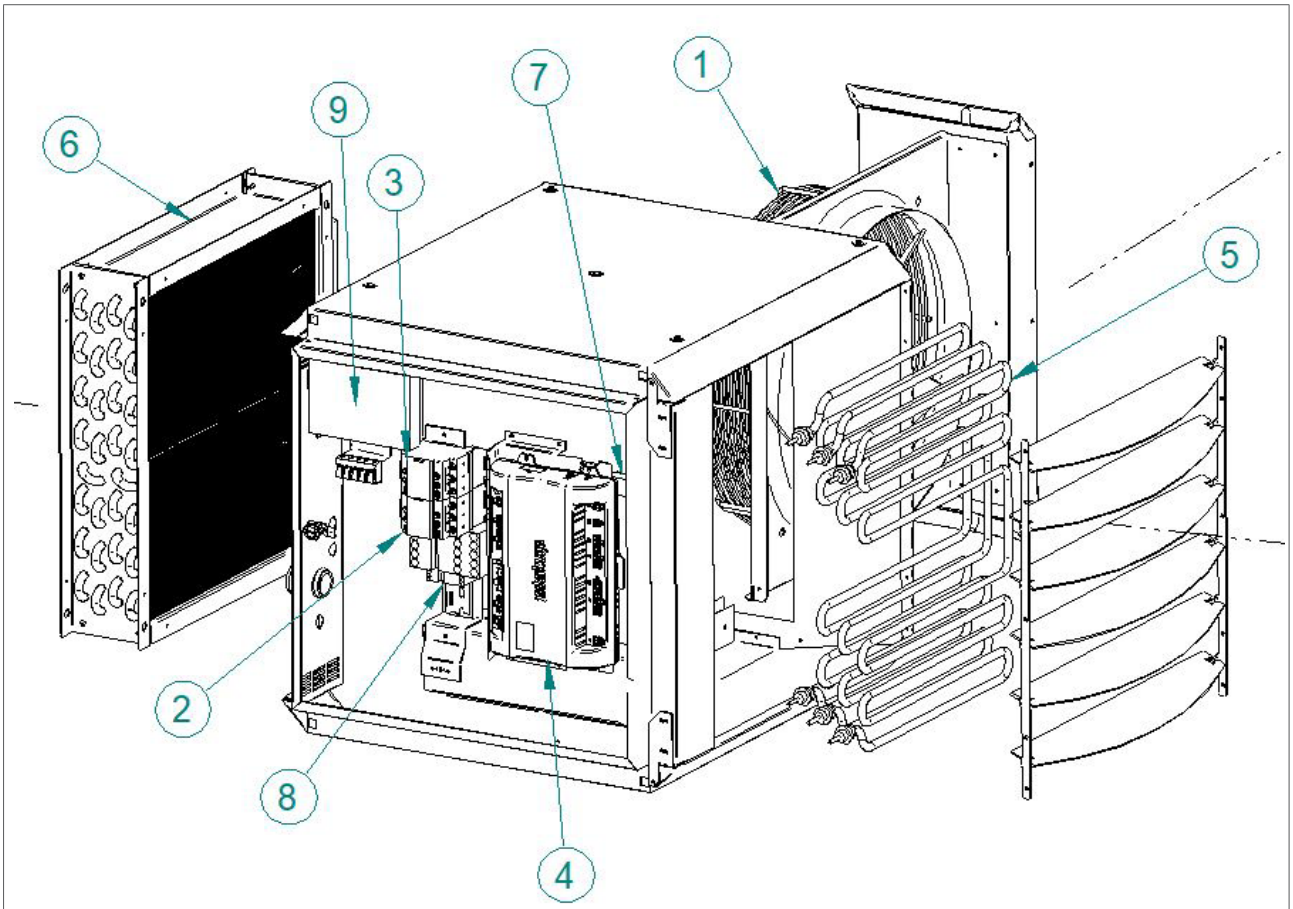


Figure 16 - Exploded view of the QSE

No.	Description	QSE6 + 10
1	System fan (EC)	GX4223
2	Relay	IE5201
3	Relay	IE5201
4	Burner control unit	GE5903
5	Heating element 3.3 kW	IE2512
6	Heat exchanger	IH4212
7	Modbus controller	IW8010
8	Power supply 24V	IW8022
9	Heat pump interface	IW8024
	Heat exchanger sensor	GE3900
	Delta-T sensor	GY3931

10 Disposal and recycling

	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.

11 Declaration of conformity

Winterwarm Heating Solutions B.V.

Olden Goorweg 1

7108 EA, Winterswijk

The Netherlands

Declares that air heater types:

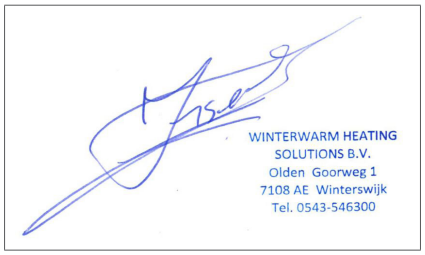
- QSE6 + 10

Are 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, June 15th 2023



Ir. M. Fiselier

Technical director