Modulating, condensing gas absorption heat pump, using aerothermal renewable energy and natural gas for heating and buffer tank domestic hot water production

K18 Simplygas
Modulating, condensing gas absorption heat pump, using aerothermal renewable energy and natural gas for heating and buffer tank domestic hot water production

Nominal heat output 18,9 kW
DISPOSAL
The appliance and all its accessories must be disposed of separately in accordance with the regulations in force.

Use of the WEEE symbol (Waste Electrical and Electronic Equipment) indicates that this product cannot be disposed of as household waste. Proper disposal of this product helps to prevent potential negative consequences for the environment and human health.

Revision: F
Code: D-LBR687

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I. INTRODUCTION

This Manual is an integral part of the K18 Simplygas unit and must be handed to the end user together with the appliance.

I.1 RECIPIENTS

This Manual is intended for:
- End user, for appropriate and safe use of the appliance.
- Qualified installer, for correct appliance installation.
- Planner, for specific information on the appliance.

II. SYMBOLS AND DEFINITIONS

II.1 KEY TO SYMBOLS

DANGER

WARNING

NOTE

PROCEDURE

REFERENCE (to other document)

II.2 TERMS AND DEFINITIONS

Appliance/Unit = equivalent terms, both used to designate the gas powered absorption heat pump.

TAC = Technical Assistance Centre authorised by Robur.

External request = generic control device (e.g. thermostat, timer or any other system) equipped with a voltage-free NO contact and used as control to start/stop the unit.

Ambient chronothermostat OCD507 = control device to control a K18 Simplygas appliance.

OQLT021 system controller = control system to control a K18 Simplygas appliance, one or more heating circuits and DHW production.

GUE (Gas Utilization Efficiency) = efficiency index of gas heat pumps, equal to the ratio between the thermal energy produced and the energy of the fuel used (relative to LCV, lower calorific value).

First start-up = appliance commissioning operation which may only and exclusively be carried out by a TAC.

GHP10 Board = electronic board on the unit, to control all functions and to provide interface with other devices and with the user.

III. WARNINGS

III.1 GENERAL AND SAFETY WARNINGS

Installer’s qualifications

Installation must exclusively be performed by a qualified firm and by qualified personnel, with specific knowledge on heating, cooling, electrical systems and gas appliances, in compliance with the laws in force in the Country of installation.

Declaration of conformity

Upon completing installation, the installing firm shall issue to the owner/client the appliance’s workmanlike conformity declaration, according to national/local regulations in force and the manufacturer’s instructions/provisions.

Misuse

The appliance must only be used for the purposes for which it has been designed. Any other use is deemed hazardous. Incorrect use may affect operation, duration and safety of the appliance. Adhere to the manufacturer’s instructions.

Use of the appliance by children

The device can be used by children over 8 years old, and by people with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, only if they are under surveillance or after they have received instructions regarding safe use of the appliance and understanding the dangers inherent in it. Children should not play with the appliance.

Hazardous situations

- Do not start the appliance in hazardous conditions, such as: gas smell, problems with the plumbing/electrical/gas system, parts of the appliance under water or damaged, malfunctioning, disabling or bypassing control and safety devices.
- In case of danger, request intervention by qualified personnel.
- In case of danger, switch off the electrical power and gas supplies only if this can be done in total safety.
- Do not entrust children, persons with physical, sensory or mental disabilities or persons with poor knowledge
and experience with use of the appliance.

**Gas component tightness**
- Before performing any operation on gas ducting components, close the gas valve.
- Upon completing any procedure, perform the tightness test according to regulations in force.

**Gas smell**
If you smell gas:
- Do not use electrical devices such as telephones, multimeters or other equipment that may cause sparks next to the appliance.
- Shut off the gas supply by turning the valve off.
- Disconnect electrical power supply by means of the external isolation switch in the power supply electrical panel.
- Use a telephone away from the appliance to ask for intervention from qualified personnel.

**Poisoning**
- Ensure the flue gas ducts are tightness and compliant with the regulations in force.
- Upon completing any procedure, ensure components are tightness.

**Moving parts**
The appliance contains moving parts.
- Do not remove guards during operation, and in any case prior to disconnecting the power supply.

**Burn hazard**
The appliance contains very hot parts.
- Do not open the appliance and do not touch internal components before the appliance has cooled down.
- Do not touch the flue gas exhaust before it has cooled down.

**Pressure vessels**
The appliance has a sealed circuit classified as pressure vessel, the tightness of which is tested by the manufacturer.
- Do not carry out any intervention on the sealed circuit or on the appliance’s valves.

**Water-ammonia solution**
The unit uses the ammonia-water absorption cycle. The water-ammonia solution is contained in the tightness circuit. The solution is harmful for health if it is ingested, inhaled or comes in contact with the skin.
- In the event of coolant leak keep away and disconnect the power and gas supply (only if it is possible to do so with no danger).
- Ask for TAC intervention.

**Electrocution hazard**
- Disconnect the electrical power supply before any operation on appliance components.
- For electrical connections exclusively use compliant components and according to the specifications provided by the manufacturer.
- Ensure the appliance cannot be accidentally switched back on.

**Earthing**
Electrical safety depends on effective earthing system, correctly connected to the appliance and installed according to the regulations in force.

**Distance from combustible or flammable materials**
- Do not deposit flammable materials (paper, diluents, paints, etc.) near the appliance.

**Limescale and corrosion**
Depending on the chemical/physical properties of the system water, limescale or corrosion may damage the appliance (Paragraph 3.8 p. 23).
- Check system sealing.
- Avoid frequent top-ups.

**Chloride concentration**
The concentration of chlorides or free chlorine in the system water must not exceed the values in Table 3.2 p. 23.

**Aggressive substances in the air**
Halogenated hydrocarbons containing chlorine and fluorine compounds cause corrosion. The air of the installation site must be free from aggressive substances.

**Acid flue gas condensate**
Discharge the acid condensate of combustion flue gas, as indicated in Paragraph 3.12 p. 24, in compliance with current exhaust regulations.

**Switching the appliance off**
Disconnecting the power supply while the appliance is running may cause permanent damage to internal components.
- Except in the event of danger, do not disconnect the power supply to switch off the appliance, but always and exclusively act through the provided control device (OQLT021, OCDS007, or external request).

**In the event of failure**
Operations on internal components and repairs may exclusively be carried out by a TAC, using only original parts.
- In the event of failure of the appliance and/or breakage of any component, do not attempt to repair and/or restore and immediately contact the TAC.

**Routine maintenance**
Proper maintenance assures the efficiency and good operation of the appliance over time.
- Maintenance must be performed according to the manufacturer’s instructions (see Chapter 7 p. 40) and in compliance with current regulations.
Warnings

- Appliance maintenance and repairs may only be entrusted to firms legally authorised to work on gas appliances and systems.
- Enter into a maintenance contract with an authorised specialised firm for routine maintenance and for servicing in case of need.
- Use only original parts.

 Decommissioning and disposal

If the appliance is to be disposed of, contact the manufacturer for its disposal.

 Keep the Manual

This Installation, use and maintenance manual must always accompany the appliance and must be handed to the new owner or installer in the event of sale or removal.

III.2 CONFORMITY

EU Directives and standards

The absorption heat pumps of the K18 series are certified as conforming to standard EN 12309 and comply with the essential requirements of the following Directives:

- 2016/426/EU "Gas Appliances Regulation" as amended and added.
- 811/2013/EU "Energy-Related Products regulation" as amended and added.
- 813/2013/EU "Ecodesign requirements regulation" as amended and added.

Furthermore, they comply with the requirements of the following standards:

- EN 677 Specific requirements for condensing boilers with nominal heat input up to 70 kW.
- EN 378 Refrigerating systems and heat pumps.

Other applicable provisions and standards

The design, installation, operation and maintenance of the systems shall be carried out in compliance with current applicable regulations, depending on the Country and location, and in accordance with the manufacturer’s instructions. In particular, regulations regarding the following shall be complied with:

- Gas systems and equipment.
- Electrical systems and equipment.
- Heating and air conditioning systems, and heat pumps.
- Environmental protection and combustion products exhaust.
- Fire safety and prevention.
- Any other applicable law, standard and regulation.

III.3 EXCLUSIONS OF LIABILITY AND WARRANTY

Any contractual or extra-contractual liability of the manufacturer for any damage caused by incorrect installation and/or improper use and/or failure to comply with regulations and with the manufacturer’s instructions shall be DISCLAIMED.

In particular, the warranty on the appliance may be rendered void by the following conditions:

- Incorrect installation.
- Misuse.
- Failure to comply with the manufacturer’s indications on installation, use and maintenance.
- Alteration or modification of the product or any part thereof.
- Extreme operational conditions or however outside of the operational ranges set forth by the manufacturer.
- Damages caused by external agents such as salts, chlorine, sulphur or other chemical substances contained in the installation water or present in the air of the installation site.
- Abnormal actions transmitted to the appliance by the plant or installation (mechanical stresses, pressure, vibrations, thermal expansion, electrical surges...).
- Accidental damages or due to force majeure.
1 FEATURES AND TECHNICAL DATA

1.1 FEATURES

1.1.1 Available range

A distinction must be made from the application perspective based on the type of service provided:

A. Systems for space heating only.

B. Systems for space heating and DHW production (Domestic Hot Water).

Systems for space heating and DHW production correspond to the EVO version. All K18 Simplygas appliances are available in the outdoor instalation version.

1.1.2 Operation

The K18 Simplygas heat pump is based on the thermodynamic water-ammonia absorption cycle (H₂O–NH₃), and produces hot water using outdoor air as a renewable energy source (cold source) and natural gas as primary energy. The thermodynamic cycle takes place within a hermetically sealed circuit, in welded construction, perfectly tight, factory-tested, which does not require any maintenance or coolant top-ups.

1.1.3 Mechanical and thermo-hydraulic components

- Steel sealed circuit, externally treated with epoxy paint.
- Sealed combustion chamber suitable for outdoor installations.
- Burner equipped with ignition and flame detection device, controlled by an electronic controller.
- Titanium stainless steel shell-and-tube water exchanger.
- Stainless steel, shell-and-tube recovery exchanger of flue gas latent heat.
- Air exchanger with finned coil, with steel pipe and aluminium fins.
- Automatic microprocessor-controlled finned coil defrosting valve.
- Standard supplied water pump.

1.1.4 Control and safety devices

- GHP10 electronic board with microprocessor, display and selection keys.
- Water flowmeter.
- Generator limit thermostat, with manual reset.
- Flue gas thermostat, with manual reset.
- Sealed circuit safety relief valve.
- Bypass valve, between high and low-pressure circuits.
- Flame control board.
- Double shutter electric gas valve.
- Antifreeze functions for hydraulic circuit.
- Condensate discharge sensor.

1.1.5 Controlling an optional auxiliary boiler (external)

A control system has been designed for the K18 Simplygas unit, called Armonia, which allows integration between the heat pump and an optional auxiliary boiler to be managed as optimally as possible in order to provide the best performance in terms of comfort and energy efficiency. Specifically, as shown in Figure 1.2 p. 8 below, various cases are possible:

A. Very low load: active auxiliary boiler in modulation and heat pump off (replacement at a particularly mild outdoor temperature).

B. Low load: active heat pump in modulation and auxiliary
boiler off.

C. Average/high load: active heat pump at full power and active auxiliary boiler in modulation (integration).

D. High load: maximum power for the operating condition to be reached quicker (integration).

E. Very high load: heat pump out of the operating limits and auxiliary boiler that autonomously covers the design load (replacement at low ambient temperature).

Figure 1.2 Armonia control system diagram

In the presence of a minimal thermal demand (scenario A), the minimum power of the heat pump could still be excessive in comparison to the demand. In this case it may be advantageous to use only the auxiliary boiler (replacement mode), if this has adequate modulation capacity.

In the presence of low thermal demand (scenario B), only the heat pump will be active in modulation mode, whereas the auxiliary boiler will be off.

As the thermal demand increases (scenario C), the heat pump reaches full power and, if the thermal load still cannot be fulfilled, it will activate the auxiliary boiler, which (if the specific model used allows it) will run in modulation mode. The heat pump will still remain active and at full power, and therefore the power of the auxiliary boiler will be added to that of the heat pump (integration mode).

When the thermal demand is high (scenario D), for example while the system reaches operating conditions, the heat pump and auxiliary boiler will run at maximum power, reducing the necessary time for the operating conditions to be reached and ensuring the optimal comfort even in harsher environmental conditions.

If the heating system design require the water temperature to be higher than the maximum that can be dispensed by the heat pump, in high thermal demand conditions (scenario E), the auxiliary boiler can be activated as its replacement. In this type of application the maximum thermal load of the building must be at most equal to the power of the auxiliary boiler and not to the sum of the power of the two appliances (replacement mode).

The auxiliary boiler can therefore be operated in four ways (see also Paragraph 5.3.6 p. 34):

- Inactive (the auxiliary boiler does not intervene in any way).
- Emergency (the auxiliary boiler is only activated when there is an alarm on the heat pump module).
- Integration (active auxiliary boiler as necessary for integration of the heat output of the heat pump module, scenarios B, C, and D).
- Integration and replacement (just like in the integration mode, with the addition that in particular environmental conditions, the heat pump can be deactivated and only the auxiliary boiler operates, scenarios A and E).
1.2 DIMENSIONS

Figure 1.3 Dimensions K18 Simplygas

A Water outlet connection Ø 3/4" M
B Water inlet connection Ø 3/4" M
C Electrical connection input
D Flue gas outlet Ø 80 mm
E Flue gas condensate and defrosting water drain Ø 20 mm
F Flue gas condensate and defrosting water discharge conveyor
G Gas connection Ø 1/2" M
H Burner ON green indicator lamp
I Transparent cover, which can be detached to access the user interface keys
J Reset/unlock button
### 1.3 COMPONENTS

*Figure 1.4 Left front view heat pump module internal components*

1. Fan
2. Flame sensor / ignition electrodes
3. PT1000 flue exhaust temperature probe
4. Limit thermostat
5. Defrosting valve
6. TA outdoor temperature probe
7. Teva evaporator temperature probe
8. Flow temperature probe
9. Components box
10. Circulation pump
Figure 1.5 Heat pump module internal components rear view

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Safety valve</td>
</tr>
<tr>
<td>2</td>
<td>Flowmeter</td>
</tr>
<tr>
<td>3</td>
<td>Heat pump module flue gas exhaust</td>
</tr>
<tr>
<td>4</td>
<td>Condensate discharge</td>
</tr>
<tr>
<td>5</td>
<td>Condensate level sensor</td>
</tr>
<tr>
<td>6</td>
<td>Water outlet connection Ø 3/4” M</td>
</tr>
<tr>
<td>7</td>
<td>Water inlet connection Ø 3/4” M</td>
</tr>
<tr>
<td>8</td>
<td>Return temperature probe</td>
</tr>
<tr>
<td>9</td>
<td>120 °C flue gas thermostat</td>
</tr>
</tbody>
</table>
Figure 1.6 RH front view heat pump module internal components

1 Gas valve
2 Combustion blower
3 Ignition transformer
4 Oil pump
5 TG generator temperature probe
6 Electrical panel
7 TGV probe
1.4 ELECTRICAL WIRING DIAGRAM

Figure 1.7 Heat pump module wiring diagram
1.5 ELECTRONIC BOARD

The appliance’s electrical panel contains:

▶ **GHP10 electronic board** with microprocessor, it controls the appliance and displays data, messages and operative codes. The appliance is monitored and programmed by interacting with the display and selection keys (Figure 1.8 p. 14). The display is accessible from the right side of the unit (detail I Figure 1.3 p. 9).

![Figure 1.8 GHP10 board display](image)

A Display  
B Left selection key  
C Right selection key  
D Enter / Access menu key  
E RS232 connector  
F Chimney sweep function for heat pump module

1.6 OPERATION MODE

The functioning mode of the appliance is set on modulating by default, that is the thermal power output is adapted to the thermal load.

For any modifications contact the installer or the TAC.

1.7 CONTROLS

1.7.1 Control device

The appliance may only work if it is connected to a control device, selected from:

1. **OQLT021 system controller** (optional)

2. **OCDS007 ambient chronothermostat** (optional)

3. **external request**

1.7.2 Control system (1) with OQLT021

The OQLT021 controller is able to control one K18 Simplygas unit, one or more heating circuits and DHW production.

**OQLT021 system controller**

The main functions are:

▶ Control of one K18 Simplygas unit with variable water setpoint according to heating curves and type of DHW function.

▶ Room comfort control by controlling two heating circuits, of which one optionally of mixed type, or zone valve control; control based on heating curves (one for each circuit) and optionally influence by the installed room unit/s.

▶ Buffer tank DHW production control (in dedicated preparation tank).

▶ Data display and parameters setting.

▶ Hourly programming on a weekly basis on two temperature levels (comfort, reduced).

▶ Anti-icing protection function.

▶ Absence periods programming.

▶ Diagnostics.

▶ Errors reset.

For additional details and diagrams see OQLT021 controller manual.

1.7.3 Control system (2) with OCDS007

The OCDS007 chronothermostat is able to control a single K18 Simplygas unit. In this case the water setpoint is either fixed or based on weather compensation, with a single heating curve which is directly controlled by the K18 Simplygas unit; as such, it can not be modified from the OCDS007 device.

**OCDS007 ambient chronothermostat**

The main functions are:

▶ Room timer thermostat for hourly programming on a weekly basis on various levels of room temperature.

▶ Interfacing with the K18 Simplygas unit through voltage-free request contact.

▶ Reporting on the display of the device of the possible alarm status of the K18 Simplygas unit.

For further information refer to OCDS007 manual.

1.7.4 Control system (3) with external request

The appliance may also be controlled via generic enable devices (e.g. thermostat, timer, button, contactor...) fitted with voltage-free NO contact.

This system allows for a control similar or equivalent to that of the system (2), depending on the type of request device used; also, in this case a water setpoint can be used, fixed or calculated according to the climatic curve managed by the unit. Using a commercially available device it is generally not possible
1.8 TECHNICAL CHARACTERISTICS

Following K18 Simplygas technical data apply also to K18 Simplygas EVO, unless otherwise expressly specified.

### Table 1.2 K18 Simplygas Technical data

<table>
<thead>
<tr>
<th>Heating mode</th>
<th>K18 Simplygas C1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seasonal space heating energy efficiency class (ErP)</strong></td>
<td></td>
</tr>
<tr>
<td>medium-temperature application (55 °C)</td>
<td>- A++</td>
</tr>
<tr>
<td>low-temperature application (35 °C)</td>
<td>- A+</td>
</tr>
<tr>
<td><strong>Heat output</strong></td>
<td></td>
</tr>
<tr>
<td>Outdoor temperature/Delivery temperature</td>
<td>A7W50 kW 17.6</td>
</tr>
<tr>
<td>A7W35 kW 18.9</td>
<td></td>
</tr>
<tr>
<td><strong>GUE efficiency</strong></td>
<td></td>
</tr>
<tr>
<td>Outdoor temperature/Delivery temperature</td>
<td>A7W50 % 157</td>
</tr>
<tr>
<td>A7W35 % 169</td>
<td></td>
</tr>
<tr>
<td><strong>Heat input</strong></td>
<td></td>
</tr>
<tr>
<td>nominal (1013 mbar - 15 °C) (1)</td>
<td>kW 11.4</td>
</tr>
<tr>
<td>real</td>
<td>kW 11.2</td>
</tr>
<tr>
<td><strong>Hot water delivery temperature</strong></td>
<td></td>
</tr>
<tr>
<td>maximum for heating</td>
<td>°C 65</td>
</tr>
<tr>
<td><strong>Hot water return temperature</strong></td>
<td></td>
</tr>
<tr>
<td>maximum for heating</td>
<td>°C 55</td>
</tr>
<tr>
<td>minimum temperature in continuous operation</td>
<td>°C 25 (2)</td>
</tr>
<tr>
<td><strong>Heating water flow</strong></td>
<td></td>
</tr>
<tr>
<td>nominal</td>
<td>l/h 1000</td>
</tr>
<tr>
<td>maximum</td>
<td>l/h 2000</td>
</tr>
<tr>
<td>minimum</td>
<td>l/h 400</td>
</tr>
<tr>
<td><strong>Ambient air temperature (dry bulb)</strong></td>
<td></td>
</tr>
<tr>
<td>maximum</td>
<td>°C</td>
</tr>
<tr>
<td>minimum</td>
<td>°C</td>
</tr>
</tbody>
</table>

| DHW mode |   |
| DHW delivery temperature | maximum for DHW °C 70 (3) |
| DHW inlet temperature | maximum for DHW °C 60 (3) |
| nominal heat output for DHW at 20 °C ambient | kW 18.9 (3) |
| specific capacity in continuous operation - Δt 30°C | l/min 30.0 (4) |

### Electrical specifications

| Power supply |   |
| voltage | V 230 |
| type | single-phase |
| frequency | Hz 50 |

### Electrical power absorption

| nominal | kW 0.35 |

### Degree of protection

| IP | - 25 |

### Installation data

| Gas consumption | G20 natural gas (nominal) m³/h 1,20 (5) |
| GPL G30/G31 (nominal) | kg/h 0.87 (6) |
| Water fitting | type - M |
| thread | M 3/4 |
| Gas connection | type - M |
| thread | M 1/2 (7) |
| Flue gas exhaust | diameter (Ø) mm 80 |
| residual head | Pa 70 |
| type of installation | - BS3P BS3P |
| NOx emission class | - 5 |

### Dimensions

| width | mm 1145 |
| depth | mm 721 (8) |
| height | mm 1333 |

### Weight

| in operation | kg 215 |

### sound pressure Lp at 5 metres (max)

| dB(A) | 43.0 (9) |

### sound pressure Lp at 5 metres (min)

| dB(A) | 40.0 (9) |

### maximum water pressure in operation

| bar | 4.0 |

### maximum condensation and defrosting water flow rate

| l/h | 13.5 |

### Water content inside the apparatus

| m³/h | 4000 |

(1) Relative to NCV (net calorific value).
(2) In transient operation, lower temperatures are allowed.
(3) Only for EVO version.
(4) Only for EVO version. 10 minute peak collection of domestic hot water. The exact value depends on the performance of the DHW buffer tank.
(5) PCI (G20) 34.02 MJ/m³ (15 °C - 1013 mbar).
(6) PCI (G30/G31) 46.34 MJ/kg (15 °C - 1013 mbar).
(7) It is possible to reduce gas pipe diameter to 3/8" , ensuring enough gas pressure to the appliance, considering pressure losses of entire gas supply pipe.
(8) Dimensions including flue gas discharge.
(9) Sound pressure values in free field, with directionality factor 2, obtained from the sound power value in compliance with standard EN ISO 9614. Sound power Lw 65 dB(A) at maximum ventilation, 62 dB(A) at minimum ventilation; sound power values detected in compliance with the intensity measurement methodology set forth by standard EN ISO 9614.
Transport and positioning

2

2.1 WARNINGS

Damage from transport or installation

The manufacturer shall not be liable for any damage during appliance transport and installation.

On-site inspection

- Upon arrival at the site, ensure there is no transport damage on packing, metal panels or finned coil.
- After removing the packing materials, ensure the appliance is intact and complete.

Packing

- Only remove the packing after placing the appliance on site.
- Do not leave parts of the packing within the reach of children (plastic, polystyrene, nails...) since they are potentially dangerous.

Weight

- The lifting equipment must be suitable for the load.
- Do not stand under suspended loads.

2.2 HANDLING

2.2.1 Handling and lifting

- Always handle the appliance in its packing, as delivered by the factory.
- Use slings to lift the appliance.
- Use to lifting beams to avoid damaging the outer panels, finned coil and defrosting water discharge (Figure 2.1 p. 17).
- It is possible to remove defrosting water and flue gas condensate discharge conveyor during handling to avoid damages (reference F Figure 1.3 p. 9) using screws; reassemble the discharge conveyor when handling is ended.
- Comply with safety regulations at the installation site.

Table 1.3 K18 Simplygas PED data

<table>
<thead>
<tr>
<th>Components under pressure</th>
<th>K18 Simplygas C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>generator</td>
<td>l 14,5</td>
</tr>
<tr>
<td>cooling volume transformer</td>
<td>l 3,0</td>
</tr>
<tr>
<td>absorber/condenser</td>
<td>l 2,2</td>
</tr>
<tr>
<td>cooling absorber solution</td>
<td>l 4,2</td>
</tr>
<tr>
<td>solution pump</td>
<td>l 2,8</td>
</tr>
<tr>
<td>test pressure (in air)</td>
<td>bar g 55</td>
</tr>
<tr>
<td>maximum pressure of the cooling circuit</td>
<td>bar g 32</td>
</tr>
<tr>
<td>filling ratio</td>
<td>kg of NH₃/l 0,161</td>
</tr>
<tr>
<td>fluid group</td>
<td>group 1⁺</td>
</tr>
</tbody>
</table>

Table 1.3 K18 Simplygas PED data
Transport and positioning

2

2.3 APPLIANCE POSITIONING

Do not install inside a room

- The appliance is type-approved for external installation.
- Do not install inside a room, not even if it has openings.
- In no event start the appliance inside a room.

K18 Simplygas unit ventilation

- The aerothermal appliance requires a large space, ventilated and free from obstacles, to enable smooth flow of air to the finned coil and free air extraction from the fan outlet, with no air recirculation.
- Incorrect ventilation may affect efficiency and cause damage to the appliance.

Figure 2.1 Instruction for lifting

In the event of handling with forklift or pallet truck, comply with the handling instructions shown on the packing.

Pay attention to the centre of gravity of the unit which is off its centre (Figure 2.2 p. 17).

Figure 2.2 Unit centre of gravity position

Figure 2.1 Instruction for lifting

Figure 2.2 Unit centre of gravity position

- The manufacturer shall not be liable for any incorrect choices of the place and setting of installation.

Limiting heat loss

- It is advisable to place the unit near the inlet of the water pipes in the building, minimising the external sections (adequately insulated), in order to avoid unnecessary heat loss.

2.3.1 Where to install the appliance

- The appliance may be installed at ground level, on a terrace or on a roof, compatibly with its dimensions and weight.
- It must be installed outside buildings, in an area of natural air circulation, outside the dripping path of drainpipes or similar. It does not require protection from weathering.
- No obstruction or overhanging structure (e.g. protruding roofs, canopies, balconies, ledges, trees, etc.) must interfere either with the air flow reaching the finned coil and leaving the front part of the appliance or with the fumes exhaust.
- The appliance’s flue gas exhaust must not be immediately close to openings or air intakes of buildings, and must comply with safety and environmental regulations.
- Do not install near the exhaust of flues, chimneys or hot polluted air. In order to work correctly, the appliance needs clean air.

2.3.2 Defrosting water drainage

In winter, it is normal for frost to form on the finned coil and for the appliance to perform defrosting cycles.

To prevent overflowing and damages provide for a drainage system connected to water discharge (reference E Figure 1.3 p. 9).

2.3.3 Acoustic issues

Pre-emptively assess the appliance’s sound effect in connection to the site, taking into account that building corners, enclosed courtyards, restricted spaces may amplify the acoustic impact due to the reverberation phenomenon.

2.4 MINIMUM CLEARANCE DISTANCES

2.4.1 Distances from combustible or flammable materials

- Keep the appliance away from combustible or flammable materials or components, in compliance with applicable regulations.

2.4.2 Clearances around the appliance

The minimum clearance distances shown in Figure 2.3 p. 18 (bar any stricter regulations) are required for safety, operation and maintenance.

An open area of at least 2.5 m must be guaranteed above the appliance so as to allow free air circulation, as shown in Figure 2.4 p. 18.
2.5 MOUNTING BASE

2.5.1 Mounting base constructive features
- Place the appliance on a levelled flat surface made of fireproof material and able to withstand its weight.

- In order to simplify maintenance operations even in case of adverse weather conditions (snow, heavy rain ...) it is suggested to install the unit at a height of about 300 mm from the ground.

2.5.2 Installation at ground level
- Failing a horizontal supporting base, make a flat and levelled concrete base, at least 100-150 mm larger than the appliance size per side.

2.5.3 Installation on terrace or roof
- The structure of the building must support the total weight of the appliance and the supporting base.
- If necessary, provide a maintenance walkway around the appliance.

2.5.4 Anti vibration mountings
Although the appliance’s vibrations are minimal, resonance phenomena might occur in roof or terrace installations.
- Use vibration damper supports (available as optional features).
- Also provide anti-vibration joints between the appliance and water and gas pipes.

3 HEATING ENGINEER

3.1 WARNINGS

- General warnings

  Read the warnings in Chapter III.1 p. 4, providing important information on regulations and on safety.

- Compliance with installation standards

  Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of:
  - heating systems
  - cooling systems
  - gas systems
  - flue gas exhaust
  - flue gas condensate discharge

- Installation must also comply with the manufacturer’s provisions.
3.2 HYDRAULIC SYSTEM

3.2.1 Primary and secondary heating circuit
The K18 Simplygas appliance can operate in plants with primary circuit only, or in plants with primary and secondary circuits with hydraulic separation: in the first case the water pump managed by the K18 Simplygas unit ensures water circulation also for the users; in the second case water circulation in heating circuits is ensured by dedicated water pumps.

With regard to the generation part, the layout must be set up as shown in Figure 3.1 for the K18 Simplygas C1 unit (refer to Figure 3.2 for the corresponding K18 Simplygas EVO version).

With regard to the heating distribution circuits, the solutions described in Figures 3.3, 3.4, 3.5 are possible.

3.2.2 Constant or variable water flow
The K18 Simplygas unit may operate with constant or variable water flow, according to electronic board settings (Paragraph 5.3.4). System and components must be designed and installed consistently.

3.2.3 Minimum water content
High thermal inertia is conducive to efficient appliance operation. Very short ON/OFF cycles are to be avoided. A buffer tank (input on the top and output on the bottom) is not strictly required but suggested in systems with low water content in the primary circuit to ensure a minimum load during the periods of medium to low thermal demand. It is recommended in systems where the system water flow can be significantly reduced, and therefore, in the presence of:
- 2-way zone valves
- thermostatic valves on radiators
- heating circuits with several zones
A capacity of 80/100 liters is usually adequate.

3.2.4 Hydraulic diagrams

3.2.4.1 K18 Simplygas hydraulic diagram

![K18 Simplygas C1 hydraulic diagram](image)

- **1** K18 Simplygas C1 heat pump
- **2** Enclosed modulating water pump, 40 kPa available head
- **3** Anti-vibration connection
- **4** Pressure gauge
- **5** Sludge filter
- **6** Shut-off valve
- **7** 3 bar safety valve
- **8** Expansion tank
- **9** GHP immersion temperature probe (standard) to be installed on heating circuit (see Paragraph 3.2.4.3)
- **10** Outdoor temperature probe (available as OSND007 optional)
- **11** Auxiliary boiler (optional)
- **12** Check valve (to be installed only in the presence of an auxiliary boiler)

A Gas connection
B Ambient chronothermostat (available as OCDS007 optional)
C Auxiliary boiler group (optional)
D Optional domestic hot water connection
E Optional domestic cold water connection
F Buffer tank group min 100 l (optional)
G Heating distribution circuit, to be carried out as described in Paragraph 3.2.4.3

The components enclosed in dotted rectangles are optional.
3.2.4.2 K18 Simplygas EVO hydraulic diagram

Figure 3.2 K18 Simplygas C1 EVO

1. K18 Simplygas C1 heat pump
2. Enclosed modulating water pump, 40 kPa available head
3. Anti-vibration connection
4. Pressure gauge
5. Sludge filter
6. Shut-off valve
7. 3 bar safety valve
8. Expansion tank
9. GHP immersion temperature probe (standard) to be installed on heating circuit (see Paragraph 3.2.4.3 p. 20)
10. 3-way diverting valve for heating/DHW management (available as OVLV007 optional)
11. DHW buffer tank, 200 or 300 liter, 3 or 4 sqm coil (available as optional OSRB012 or OSRB004)
12. Immersion temperature probe (available as OSND004 optional)
13. System controller (required optional OQLT021)
14. Outdoor temperature probe (standard with OQLT021)
15. Auxiliary boiler (optional)
16. Check valve (to be installed only in the presence of an auxiliary boiler)
17. GHP immersion temperature probe (only in the presence of an auxiliary boiler, available as OSND004 optional)
18. Advanced room unit (optional supplied as per standard with OQLT021, to be placed, preferably, in a heated room)

A Gas connection
B Auxiliary boiler group (optional)
C Buffer tank group min 100 l (optional)
D Heating distribution circuit, to be carried out as described in Paragraph 3.2.4.3 p. 20

The components enclosed in dotted rectangles are optional.

3.2.4.3 Heating distribution

Figure 3.3 Heating distribution 01 - direct

1. GHP immersion temperature probe (standard)
2. Radiator

A Connection to K18 unit (GHP plant water temperature probe)

Direct heating distribution with single zone (system with primary water circuit only).
Heating distribution with two zones controlled by 2-way valves (system with primary water circuit only).

**Figure 3.4 Heating distribution 02 - system controller with two 2-way zone valves**

1. GHP immersion temperature probe (standard)
2. Bypass section with overpressure valve calibrated to open only when both valves (3) are closed
3. 2-way valve
4. Radiator
5. System controller (required optional OQLT021)
6. Advanced room unit (standard)
7. Advanced room unit (available as optional ODSP050) or basic room unit (available as optional ODSP004)
   - A Connection to K18 unit (GHP plant water temperature probe)
   - B Connection to K18 unit (heating service request). See system controller manual
   - C Outdoor temperature probe connection
   - D DHW buffer tank immersion temperature probe connection (if present)
   - E DHW/space heating 3-way diverter valve connection (if present)

Heating distribution with two zones controlled by 2-way valves (system with primary water circuit only).

**Figure 3.5 Heating distribution 03 - system controller with a mixed heating circuit and a direct one**

1. GHP immersion temperature probe (standard)
2. Decoupling of primary/secondary circuits (large cross-section pipe with T-connections or a hydraulic separator)
3. Shut-off valve
4. Zone mixing valve
5. Zone circulating pump (available as OPMP009/OPMP004 optional)
6. Immersion temperature probe (available as OSND004 optional)
7. Underfloor heating panel
8. Radiator
9. System controller (required optional OQLT021)
10. Advanced room unit (standard)
11. Advanced room unit (available as optional ODSP050) or basic room unit (available as optional ODSP004)
   - A Connection to K18 unit (GHP plant water temperature probe)
   - B Connection to K18 unit (heating service request). See system controller manual
   - C Outdoor temperature probe connection
   - D DHW buffer tank immersion temperature probe connection (if present)
   - E DHW/space heating 3-way diverter valve connection (if present)

Heating distribution with up to two heating circuits, one of which is optionally mixed and one not mixed (system with primary and secondary water circuits).

### 3.3 HYDRAULIC CONNECTIONS

#### 3.3.1 Plumbing fittings

on the left, at the bottom, connection plate (Figure 1.3 p. 9).
3.3.2 Hydraulic pipes, materials and features
► Use pipes for heating/cooling systems, protected from weathering, insulated for thermal dispersion.

Pipe cleaning
► Before connecting the appliance, accurately wash the water and gas piping and any other system component, removing any residue.

3.3.3 Minimum components of heating plumbing circuit
Always provide, near the appliance:
► on water piping, both output and input (m/r)
  ■ 2 antivibration joints on water fittings
  ■ 2 isolation ball valves
► on the input water piping (r)
  ■ 1 separator filter (preferably magnetic)
  ■ 1 pressure gauge
► on the output water piping (m)
  ■ 1 safety valve (3 bar)
  ■ 1 adequately sized expansion tank

The K18 Simplygas appliance is equipped with remote temperature probe (GHP), to be installed by the installer on the delivery pipe to the plant, after optional primary/secondary separation or buffer tank (reference 1 Figure 3.3 p. 20, 3.4 p. 21, 3.5 p. 21).

Furthermore, in the case of the K18 Simplygas EVO unit and in the presence of the auxiliary boiler, a second temperature probe (GHP') must be installed upstream of the 3-way diverter valve, as shown in Figure 3.2 p. 20 (detail 17).

Insert GHP remote water temperature probe and, if required, GHP' temperature probe, in dedicated thermowells immersed in water flow, using thermal paste to ensure proper heating transfer.

Refer to Paragraph 4.8 p. 28 for details concerning the electrical connection of the water temperature probe.

3.4 WATER CIRCULATION PUMP
K18 Simplygas appliances are equipped with a variable flow circulation pump. For pump data, refer to Table 1.2 p. 15.

3.5 ANTIFREEZE FUNCTION

3.5.1 Active antifreeze self-protection
The appliance is equipped with an active antifreeze self-protection system to prevent icing. The anti-icing function (activated by default) automatically starts the primary circulation pump and, if required, the burner too, when the outside temperature approaches zero.

Electrical and gas continuity
The active antifreeze self-protection is only effective if the power and gas supplies are assured. Otherwise, antifreeze liquid might be required.

3.6 WINTER KIT (OKBT015)
The use of the optional OKBT015 winter kit protects the condensate drain tray from freezing.
It consists of a heating cable, an antifreeze thermostat, and the relative electrical wiring.

3.7 ANTIFREEZE LIQUID

Precautions with glycol
The manufacturer disclaims any liability for any damage caused by improper glycol use.
► Always check product suitability and its expiry date with the glycol supplier. Periodically check the product's preservation state.
► Do not use car-grade antifreeze liquid (without inhibitors), nor zinc-coated piping and fittings (incompatible with glycol).
► Glycol modifies the physical properties of water (density, viscosity, specific heat...). Size the piping, circulation pump and thermal generators accordingly.
► With automatic system water filling, a periodic check of the glycol content is required.

With high glycol percentage (> 20...30%)
If the glycol percentage is ≥30% (for ethylene glycol) or ≥20% (for propylene glycol) the TAC must be alerted before first start-up.

When producing DHW by DHW buffer tank, use propylene glycol only.

3.7.1 Type of antifreeze glycol
Inhibited type glycol is recommended to prevent oxidation phenomena.

3.7.2 Glycol effects
The Table 3.1 p. 22 shows, indicatively, the effects of using a glycol depending on its %.

Table 3.1 Technical data for filling the hydraulic circuit

<table>
<thead>
<tr>
<th>Glycol %</th>
<th>Water-glycol mixture freezing temperature</th>
<th>Percentage of increase in pressure drops</th>
<th>Loss of efficiency of unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-3 °C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>-5 °C</td>
<td>6,0%</td>
<td>0,5%</td>
</tr>
<tr>
<td>20</td>
<td>-8 °C</td>
<td>8,0%</td>
<td>1,0%</td>
</tr>
<tr>
<td>25</td>
<td>-12 °C</td>
<td>10,0%</td>
<td>2,0%</td>
</tr>
<tr>
<td>30</td>
<td>-15 °C</td>
<td>12,0%</td>
<td>2,5%</td>
</tr>
<tr>
<td>35</td>
<td>-20 °C</td>
<td>14,0%</td>
<td>3,0%</td>
</tr>
<tr>
<td>40</td>
<td>-25 °C</td>
<td>16,0%</td>
<td>4,0%</td>
</tr>
</tbody>
</table>
3.8 SYSTEM WATER QUALITY

Responsibility of the user/operator/installer

The installer, operator and user must assure system water quality (Table 3.2 p. 23). Failure to comply with the manufacturer’s guidelines may affect operation, integrity and life of the appliance, voiding the warranty.

3.8.1 System water characteristics

Free chlorine or water hardness may damage the appliance. Adhere to the chemical-physical parameters in Table 3.2 p. 23 and the regulations on water treatment for residential and industrial heating systems.

Table 3.2 Chemical and physical parameters of water

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Measurement unit</th>
<th>Required value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>/</td>
<td>&gt; 7 (1)</td>
</tr>
<tr>
<td>Chlorides</td>
<td>mg/l</td>
<td>&lt; 125 (2)</td>
</tr>
<tr>
<td>Total hardness (CaCO₃)</td>
<td>°f</td>
<td>&lt; 15</td>
</tr>
<tr>
<td>Iron</td>
<td>mg/kg</td>
<td>&lt; 0.5 (3)</td>
</tr>
<tr>
<td>Copper</td>
<td>mg/kg</td>
<td>&lt; 0.1 (3)</td>
</tr>
<tr>
<td>Aluminium</td>
<td>mg/l</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Langelier’s index</td>
<td>/</td>
<td>0-0.4</td>
</tr>
</tbody>
</table>

Harmful substances

Free chlorine | mg/l | < 0.2 (3)
Fluorides     | mg/l | < 1
Sulphides     | ABSENT

1 With aluminium or light alloys radiators, pH must also be lower than 8 (in compliance with applicable rules)
2 Value referred to the maximum water temperature of 80 °C
3 In compliance with applicable rules

3.8.2 Water topping up

The chemical-physical properties of the system’s water may alter over time, resulting in poor operation or excessive topping up.

► Ensure there are no leaks in the installation.
► Periodically check the chemical-physical parameters of the water, particularly in case of automatic topping up.

Chemical conditioning and washing

Water treatment/conditioning or system washing carried out carelessly may result in risks for the appliance, the system, the environment and health.

► Contact specialised firms or professionals for water treatment or system washing.
► Check compatibility of treatment or washing products with operating conditions.
► Do not use aggressive substances for stainless steel or copper.
► Do not leave washing residues.

Table 3.3 Gas network pressure

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I₂HBP</td>
<td>AL, BG, CY, CZ, DK, EE, FI, GR, HR, IT, LT, MK, NO, RO, SE, SI, SK, TR, AT, CH</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>I₂HBP</td>
<td>AL, BG, CZ, ES, GB, HR, IE, IT, LT, MK, PT, SI, SK, TR, RO</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>I₂ELL3BP</td>
<td>DE</td>
<td>20</td>
<td>20</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>I₂EAP</td>
<td>FR</td>
<td>20</td>
<td>25</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

3.9 SYSTEM FILLING

After completing all water, electrical and gas connections:

1. Pressurise (at least 1.5 bar) and vent the hydraulic circuit.
2. Make sure that the unit is energized.
3. Send an operating request to the unit for a few seconds. The circulating pump will be immediately activated.
4. Remove the request before the burner is activated. The circulating pump will continue to circulate the water for the post-circulation time.
5. Check and clean the filter on the inlet pipe.
6. Repeat items 1, 2 and 3 until the pressure has stabilised (at least 1.5 bar).

3.10 FUEL GAS SUPPLY

3.10.1 Gas connection

► 1/2" M on the left, at the bottom, connection plate (Figure 1.3 p. 9).

It is possible to reduce gas pipe diameter to 3/8", ensuring enough gas pressure to the appliance (see Table 3.3 p. 23), considering pressure losses of entire gas supply pipe.

► Install an anti-vibration connection between the appliance and the gas piping.

3.10.2 Mandatory shut-off valve

► Provide a gas shut-off valve (manual) on the gas supply line, next to the appliance, to isolate it when required.
► Perform connection in compliance with applicable regulations.

3.10.3 Gas pipes sizing

The gas pipes must not cause excessive pressure drops and, consequently, insufficient gas pressure for the appliance.

3.10.4 Supply gas pressure

This appliance is equipped for a maximum gas supply pressure of 50 mbar.

The appliance’s gas supply pressure, both static and dynamic, must comply with Table 3.3 p. 23, with tolerance ± 15%.

Non compliant gas pressure (Table 3.3 p. 23) may damage the appliance and be hazardous.
3.10.5 Vertical pipes and condensate
► Vertical gas pipes must be fitted with siphon and discharge of the condensate that may form inside the pipe.
► If necessary, insulate the piping.

3.10.6 LPG pressure reducers
With LPG the following must be installed:
► A first stage pressure reducer, close to the liquid gas tank.
► A second stage pressure reducer, close to the appliance.

3.11 COMBUSTION PRODUCTS EXHAUST

Compliance with standards
The appliance is approved for connection to a combustion products exhaust duct for the types shown in Table 1.2 p. 15.

3.11.1 Flue gas exhaust connection
► Ø 80 mm (with gasket), on the rear, at the top (Figure 1.3 p. 9).
The appliance is supplied with flue gas exhaust kit, to be fitted by the installer.

How to install the flue gas exhaust kit
1. Remove the cover applied to the flue gas exhaust.
2. Fit the terminal onto the collar on the flue gas exhaust.

The cover prevents water and/or foreign bodies entering the appliance before the exhaust kit is installed. The cover should thus be removed only when actually installing the exhaust kit on the appliance.

3.11.2 Possible flue
The fumes exhaust may be wall-mounted, but it can also be easily conveyed over the ridge of the roof because the residual head allows the ducts to be extended by some tens meters, if the local regulations require this.

Table 3.4 Characteristics of K18 Simplygas combustion products

<table>
<thead>
<tr>
<th>CO₂ percentage in fumes</th>
<th>K18 Simplygas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal heat input</td>
<td></td>
</tr>
<tr>
<td>G20 %</td>
<td>9.0 (1)</td>
</tr>
<tr>
<td>G30 %</td>
<td>10.5 (2)</td>
</tr>
<tr>
<td>G31 %</td>
<td>10.0 (3)</td>
</tr>
<tr>
<td>Flue temperature</td>
<td></td>
</tr>
<tr>
<td>G20 °C</td>
<td>60.0</td>
</tr>
<tr>
<td>G30 °C</td>
<td>60.0</td>
</tr>
<tr>
<td>G31 °C</td>
<td>60.0</td>
</tr>
<tr>
<td>Fumes flow rate</td>
<td></td>
</tr>
<tr>
<td>G20 kg/h</td>
<td>19</td>
</tr>
<tr>
<td>G30 kg/h</td>
<td>19</td>
</tr>
<tr>
<td>G31 kg/h</td>
<td>21</td>
</tr>
<tr>
<td>Installation data</td>
<td></td>
</tr>
<tr>
<td>type of installation</td>
<td>B23P, B53P</td>
</tr>
<tr>
<td>Flue gas exhaust</td>
<td></td>
</tr>
<tr>
<td>diameter (Ø) mm</td>
<td>80</td>
</tr>
<tr>
<td>residual head Pa</td>
<td>70</td>
</tr>
</tbody>
</table>

► The flue must be designed, sized, tested and constructed by a skilled form, with materials and components complying with the regulations in force in the country of installation.
► Always provide a socket for flue gas analysis, in an accessible position.

In case of flue gas discharge to the roof, use a Tee at the base of the vertical pipe, with proper condensate drain, provided with siphon, to be connected to a suitable discharge manifold.

3.12 FLUE GAS CONDENSATE DISCHARGE
The K18 Simplygas unit is a condensing appliance and therefore produces condensation water from combustion flue gases.

Condensate acidity and exhaust regulations
The flue gas condensate contains aggressive acid substances. Refer to applicable regulations in force for condensate exhaust and disposal.
► If required, install an acidity neutraliser of adequate capacity.

Do not use gutters to discharge the condensate
Do not discharge the fume condensate in gutters, due to the risk of materials corrosion and ice formation.

3.12.1 Flue gas condensate connection
The connection for flue gas condensate discharge is located on
the rear of the appliance (reference E in Figure 1.3 p. 9).

▶ The condensate discharge pipe must be connected to a suitable discharge manifold.
▶ The junction between the pipe and the manifold must remain visible.
▶ If the condensate drain is routed indoor, a suitable siphon needs to be installed on the pipe.
▶ The connection of the discharge to the sewerage system must be made at atmospheric pressure, i.e. by dripping into a siphoned container connected to the sewerage system.

3.12.2 Flue gas condensate discharge manifold

To make the condensate drain manifolds:

▶ Size the ducts for maximum capacity (maximum condensation and defrosting water flow rate) (Table 1.2 p. 15).
▶ Use plastic materials resistant to acidity pH 3-5.
▶ Provide for min. 1% slope, i.e. 1 cm for each m of the length (otherwise a booster pump is required).
▶ Prevent icing.
▶ Dilute, if possible, with domestic waste water (e.g. bathrooms, washing machines, dish washers...), basic and neutralising.

In the first few minutes of unit operation, that is in conditions of low condensate production, imperceptible steam or combustion gas might escape the condensate exhaust, which are not harmful either for machine operation or for the materials used for condensate exhaust.

3.13 DEFROSTING WATER DRAINAGE

Defrosting

In winter, frost may form on the finned coil and the appliance performs defrosting cycles.

The defrosting water drain is located below the finned coil itself (see reference E in Figure 1.3 p. 9).

Prevent the condensate and defrost water drain from freezing by using a heating cable (available as OKBT015 optional) to protect the conveyor tray and installed piping.

4 ELECTRICAL INSTALLER

4.1 WARNINGS

General warnings

Read the warnings in Chapter III p. 4, providing important information on regulations and on safety.

Compliance with installation standards

Installation must comply with applicable regulations in force, based on the installation Country and site, in matters of safety, design, implementation and maintenance of electrical systems.

Installation must also comply with the manufacturer’s provisions.

Live components

After placing the appliance in the final position, and prior to making electrical connections, ensure not to work on live components.

Earthing

The appliance must be connected to an effective earthing system, installed in compliance with regulations in force.

It is forbidden to use gas pipes as earthing.

Cable segregation

Keep power cables physically separate from signal ones.

Do not use the power supply switch to turn the appliance on/off

Never use the external isolation switch (GS) to turn the appliance on and off, since it may be damaged in the long run (occasional blackouts are tolerated).

To turn the appliance on and off, exclusively use the suitably provided control device.

4.2 ELECTRICAL SYSTEMS

Electrical connections provide:

A. Power supply (Paragraph 4.3 p. 26).
B. Control system (Paragraph 4.4 p. 26).
C. Alarm indicator lamp (if there is no optional system controller, Paragraph 4.6 p. 28).
D. Unit error reset remote (if there is no optional system controller, Paragraph 4.7 p. 28).
E. Temperature probes (if there is no system controller: Paragraph 4.8 p. 28; if there is a system controller, example always with a K18 Simplygas EVO type unit, which are provided as per standard: installation manual of the system controller).
F. Auxiliary boiler (if present, Paragraph 4.9 p. 29).
Figure 4.1 Terminal block for electrical connections of K18 unit

1. Control system connection (see Paragraph 4.4 p. 26)
2. Modbus connection to RS485 port for optional monitoring
3. GHP temperature sensor connection (see Paragraph 4.8 p. 28)
4. GHP temperature sensor connection (see Paragraph 4.8 p. 28)
5. Connections of optional auxiliary boiler (see Paragraph 4.9 p. 29)
6. Power supply connection (see Paragraph 4.3 p. 26)
7. Earth connections for signal cable shielding

How to make connections

All electrical connections must be made in the connection terminal block located near the electrical panel:

1. Ensure the appliance is not live.
2. Remove the appliance’s lower front panel (placed under the fan).
3. Remove the cap of the hole for electrical connection (see reference C Figure 1.3 p. 9) and fit a suitable cable gland in order to:
   - Properly protect the cable insulation from abrasion.
   - Properly protect cables against mechanical stresses on the wiring terminals and liquid penetration (at least the protection index IP 25 declared for the unit must be guaranteed).

The unused holes for cables passage must remain covered by caps.

4. Insert cables through cable gland.
5. Identify the appropriate connection terminals.
6. Make the connections.
7. Replace the lower front panel.

4.3 ELECTRICAL POWER SUPPLY

4.3.1 Power supply line

Provide (by the installer) a protected single phase line (230 V 1-N 50 Hz) with:
- 1 three-pole cable type FG7(O)R 3Gx1.5
- 1 4 A magnetothermic breaker with differential protection

The switches must also provide disconnector capability, with min contact opening 4 mm.

How to connect the power supply

To connect the three-pole power supply cable (Figure 4.2 p. 26):

1. Access the connection terminal block according to Procedure 4.2 p. 25.
2. Connect the three wires to the terminal block (TER) as shown in Figure 4.2 p. 26.
3. Provide the earth lead-in wire longer than live ones (last to be torn in the event of accidental pulling).

Figure 4.2 Appliance power supply wiring diagram - Unit connection to power supply network (230V 1N - 50 Hz)

L  Phase
N  Neutral
Components NOT SUPPLIED:
GS  4A magnetothermic breaker with differential protection

4.4 CONTROL SYSTEM

4.4.1 Control systems, options (1) (2) (3)

Three separate control systems are provided, each with specific features, components and diagrams:
- System (1), with **OQLT021 controller**.
- System (2), with **chronothermostat OCDS007**.
- System (3), with an **external request**.

4.4.2 OQLT021 controller (optional)

System (1) see also Paragraph 1.7.2 p. 14.
4. How to connect the OQLT021 controller

Connection of OQLT021 controller is made on the wiring terminal block located in the electrical panel inside the unit.

1. Access the electrical board of the appliance according to the Procedure 4.2 p. 25.
2. Refer to the OQLT021 controller Installation manual for the actual wiring instructions.

4.4.3 OCDS007 Ambient chronothermostat (optional)

System (2) see also Paragraph 1.7.3 p. 14.

4. How to connect the OCDS007 chronothermostat

Connection of OCDS007 is made on the wiring terminal block located in the electrical panel inside the unit.

1. Access the electrical board of the appliance according to the Procedure 4.2 p. 25.
2. Refer to the OQLT021 controller Installation manual for the actual wiring instructions.
3. Use shielded cable 2x0.75 mm² (or 4x0.75 mm² if the alarm indication signal is included), connecting the shield to one of the ground terminals provided on the appliance electrical panel.
4. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

4.4.4 External request

System (3), see also Paragraph 1.7.4 p. 14.

It is required to arrange:

- Request device (e.g. thermostat, clock, button, ...) fitted with a voltage-free NO contact.

How to connect the external request

Connection of external request is effected on the terminal block located in the electrical panel inside the unit.

1. Access the electrical board of the appliance according to the Procedure 4.2 p. 25.
2. Connect the voltage free contact of the external device, through two conductor wires, to terminals COM and REQ (respectively: common and heating request) of the internal terminal block (Figure 4.5 p. 27).
3. Use shielded cable 2x0.75 mm², connecting the shield to one of the ground terminals provided on the appliance electrical panel.
4. The connection cable must be kept separate from mains voltage cables.

The signal is SELV (Safety Extra Low Voltage). The voltage-free contact of the external device that gives the request must have double or reinforced insulation with respect to line voltage parts.

The cable may not be longer than 30 metres.

---

**Figure 4.3 Connection diagram (Request signal) to OCDS007 chronothermostat**

**Figure 4.4 Connection diagram (alarm indication signal) to OCDS007 chronothermostat**

**Figure 4.5 Wiring diagram, external enable connection**

- COM   Common
- REQ   Heating request
- CS    External request
- Components NOT SUPPLIED:
4.5 WATER CIRCULATION PUMP
The K18 Simplygas C1 version is equipped with an enclosed variable flow circulation pump.

4.6 ALARM INDICATOR LAMP
This paragraph is not applicable in case of use of system controller OQLT021 or of chronothermostat OCD5007.

It is possible to connect a lamp indicating an appliance’s alarm to the electrical panel inside the appliance. To connect the alarm indicator lamp, follow the instructions below.

1. Access the connection terminal block according to Procedure 4.2 p. 25.
2. The cable required to connect the lamp must be shielded 2x0,75 mm².
3. Cut a suitable length of cable.
4. Connect the cable to terminals AL and AL.
5. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

Figure 4.6 Alarm indicator lamp connection wiring diagram

4.7 REMOTE THE BOARD ERROR RESET
This paragraph is not applicable in case of use of OQLT021 system controller.

The board error reset may be remoted by connecting a dedicated button to the terminal block in the electrical panel inside the appliance. Connect the button as instructed below.

1. Access the connection terminal block according to Procedure 4.2 p. 25.
2. The cable required to connect the reset button must be shielded 2x0,75 mm².
3. Cut a suitable length of cable.
4. Connect the cable to terminals COM and RES.
5. The connection cable must be kept separate from mains voltage cables.

The cable may not be longer than 30 metres.

Figure 4.7 Board error reset connection wiring diagram

4.8 TEMPERATURE PROBES
It is possible to connect one or two temperature probes, AUX PROBE 1 and/or AUX PROBE 2 to control specific functions described in Paragraph 5.3.5 p. 34.

The following instructions to electrical connection of temperature probes do not apply if the OQLT021 system controller is used (e.g. for the K18 Simplygas EVO units). In the presence of this controller, follow the connection instructions of the temperature probes provided in the relevant installation manual.

4.8.1 GHP immersion temperature probe
The GHP probe supplied must be installed on the heating distribution circuit, downstream of any primary/secondary decoupling or the optional buffer tank (see detail 1 Figures 3.3 p. 20, 3.4 p. 21, 3.5 p. 21). This probe must be connected to the AUX PROBE 1 input as shown in Figure 4.8 p. 29.

4.8.2 Outdoor temperature probe
The outdoor temperature probe (available as OSND007 optional) must be connected to AUX PROBE 2 input, as shown in Figure 4.8 p. 29.

With reference to Paragraph 1.7 p. 14, this probe is
recommended for applications in which control type (2) or (3) is used together with adjustment based on climatic curve.

**Figure 4.8** Temperature probes connection to K18 unit

A  Unit terminal block detail  
GHP  Water delivery temperature probe NTC 10k Beta 3977 (supplied as standard with K18 Simplygas unit)  
EXT.T  Air temperature probe NTC 10k Beta 3977 (optional OSND007)  
NOTES  Use shielded cable:  
2x0,5 mm² up to 40 m  
2x0,75 mm² up to 60 m  
2x1,0 mm² up to 80 m  
2x1,5 mm² up to 120 m  
Connect the shield to a ground terminal on the K18 unit’s terminal block

### 4.9 HOW TO CONNECT AN AUXILIARY HEAT GENERATOR

The K18 Simplygas appliance can control an auxiliary heat generator (typically a boiler) which can be operated either as an emergency only generator or as an integration (peak) generator. For further information refer to Paragraph 5.3.6 p. 34. The auxiliary boiler can be controlled:

- By means of a simple ON/OFF request (provided by the ON/OFF AUX BOILER contact).
- By means of a 0-10 V signal (0-10V AUX BOILER) which can both provide the request signal and communicate the desired water temperature setpoint.
- Optionally, if required by the specific auxiliary boiler, by means of the ON/OFF contact to control switching on and off and simultaneously the 0-10 V signal for water setpoint communication only.

If available, you can also connect the alarm signalling output of the auxiliary boiler to a specific input of the terminal block of the K18 Simplygas unit.

The output available on the auxiliary boiler must be a voltage-free contact and be suitable for SELV type signals (i.e. safety extra-low voltage), and therefore, it must have double insulation in comparison to parts powered by the mains.

The auxiliary boiler integration and replacement operating mode requires the availability and the actual connection of the alarm signalling.

If the alarm signalling is not actually connected and available, when the control system requests the heat pump replacement with the auxiliary boiler (under the integration and replacement operating mode), the control system will not be able to reactivate the heat pump as the alarm status of the auxiliary boiler itself will not be known.

For the description of integration and replacement operating mode see Paragraph 1.1.5 p. 7 and 5.3.6 p. 34.

After consulting the documentation of the heat generator to be used, connect the ON / OFF contact and/or 0-10 V signal and/or the alarm indicator, respectively, as shown in Figure 4.9 p. 29.

**Figure 4.9** ON/OFF request connection, optional 0-10 V output (temperature setpoint) and optional alarm signal for the auxiliary boiler on the unit terminal block

A  K18 Simplygas unit terminal block detail  
B  Auxiliary boiler  
C  ON/OFF contact request (2x0.75 mm² cable)  
D  0-10 V input for setpoint acquisition (*)  
E  Alarm signalling output (mandatory SELV voltage-free contact) (*)  

(*) (optional); shielded cable 2x0.75 mm²

### 4.10 WINTER KIT (OKBT015)

The use of the optional OKBT015 winter kit protects the condensate drain tray from freezing.

It consists of a heating cable, an antifreeze thermostat, and the relative electrical wiring.

For installation follow the instructions on the instruction sheet enclosed with the kit. Following Figure 4.10 p. 30 shows the winter kit wiring diagram.
5 FIRST START-UP

First start-up entails checking/setting up the combustion parameters and may exclusively be carried out by a Robur TAC. NEITHER the user NOR the installation technician is authorised to perform such operations, under penalty of voiding the warranty.

The installer is obliged to carry out preliminary checks described in Paragraph 5.1 p. 30.

5.1 PRELIMINARY CHECKS

Paragraph dedicated to the installer.

5.1.1 Preliminary checks for first start-up

Upon completing installation, before contacting the TAC the installer must check:

- Water, electrical and gas systems suitable for the required capacities and equipped with all safety and control devices required by the regulations in force.
- Absence of leaks in the water and gas systems.
- Type of gas for which the appliance is designed (natural gas).
- Supply gas pressure complying with the values of Table 3.3 p. 23, with max tolerance ±15%.
- Power supply mains complying with the appliance’s rating plate data.
- Appliance correctly installed, according to the manufacturer’s instructions.
- System installed in a workmanlike manner, according to national and local regulations.

5.1.2 Abnormal or hazardous installation situations

Should any abnormal or hazardous installation situations be found, the TAC shall not perform first start-up and the appliance shall not be commissioned.

These situations may be:

- Appliance installed inside a room.
- Failed compliance with minimum clearances.
- Insufficient distance from combustible or flammable materials.
- Conditions that do not warrant access and maintenance in safety.

- Appliance switched on/off with the main switch, instead of the provided control device (OQLT021, OCD5007, or external request).
- Appliance defects or faults caused during transport or installation.
- Gas smell.
- Non-compliant mains gas pressure.
- Non-compliant flue gas exhaust.
- All situations that may involve operation abnormalities or are potentially hazardous.

5.1.3 Non-compliant system and corrective actions

Should the TAC find any non conformities, the user/installer is bound to perform any corrective procedures required by the TAC.

After performing the remedial actions (the installer’s responsibility), if the TAC deems that safety and conformity conditions are in place, first start-up may be effected.

5.2 COMBUSTION PARAMETERS CHECK

Paragraph reserved exclusively to TACs.

Figure 5.1 p. 32.

1. If the appliance is running, switch it off with the applicable control system (OQLT021, OCD5007, external request).
2. Remove the cap over the offset adjustment screw (C).
3. Screw in completely the throttle adjustment screw (D).
4. Screw in completely the offset adjustment screw (C).
5. Unscrew the throttle adjustment screw (D) as indicated in Table 5.1 p. 31.
6. Unscrew the offset adjustment screw (C) as indicated in Table 5.1 p. 31.
7. Press the key on the user interface of the unit (detail B of Figure 1.8 p. 14) for 5 seconds to activate the chimney sweep function at minimum power.
8. The display shows the letters “CS.LO” (chimney sweep low power), alternating with the flashing message “UAIt” (wait) which indicates that the machine is not yet ready for the reading.
9. Once an approximate time ranging between 5 and 8 minutes elapses, the flashing message becomes ":GO:" to indicate that the combustion control can be implemented.
10. Ensure the CO₂ value is between values indicated in column "Minimal heat input" of Table 5.1 p. 31. Otherwise set CO₂ percentage reading by acting on the offset adjustment screw.
11. Press the key on the user interface again for 5 seconds to activate the chimney sweep function at maximum power.
12. The display shows the letters "CS.HI" (chimney sweep high power), alternating once again with the flashing message "UAIt" (wait) which indicates that the machine is not yet ready for the reading.
13. After a short while, the flashing message becomes ":GO:" again to indicate that the combustion control at maximum power can be implemented.
14. Ensure the CO₂ value is between values indicated in column "Nominal heat input" of Table 5.1 p. 31.

If the check is successful:
15. Press the key on the user interface again for 5 seconds to deactivate the chimney sweep function and complete the procedure.

If the check is not successful:
16. Set CO₂ percentage reading by acting on the throttle adjustment screw.
17. Press the key on the user interface again for 5 seconds to deactivate the chimney sweep function.
18. Repeat steps 7 to 10 to reactivate the chimney sweep function at minimum capacity; verify once again and if necessary, correct the CO₂ value in these conditions by actuating the offset adjustment screw.
19. Press the key on the user interface again for 5 seconds to activate the chimney sweep function at maximum capacity, and then again for 5 seconds to deactivate it and complete the procedure.

To ensure the chimney sweep function is executed properly, there must be adequate thermal load, otherwise the appliance could reach the maximum limit of the delivery and/or return temperature and then stop.

The following may be necessary to provide adequate thermal load, depending on the system characteristics:
- Activate any pumps or zone valves of the water distribution circuit.
- Fully open the manual or thermostatic valves, mounted on the radiators.
- Activate the ventilation of the fan coils and increase the setting of any thermostat placed on them.

Table 5.2 p. 31 shows the messages that can appear on the display while the chimney sweep function is running, the relative meaning and the optional actions required.

Limit the time you use the chimney sweep function to the minimum actually required.

The system automatically interrupts chimney sweep function after 20 minutes from activation.

If the required CO₂ settings cannot be reached, contact Robur.

Table 5.1 Gas valve setting table for heat pump module

<table>
<thead>
<tr>
<th>Gas</th>
<th>Gas network pressure</th>
<th>Screw pre-adjustment</th>
<th>Offset pressure</th>
<th>CO₂ percentage in fumes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Throttle</td>
<td>Offset</td>
<td>minimum</td>
</tr>
<tr>
<td>Type</td>
<td>mbar</td>
<td>turns</td>
<td>turns</td>
<td>Pa</td>
</tr>
<tr>
<td>G20</td>
<td>See Table 3.3 p. 23</td>
<td>-6 ¾</td>
<td>-3</td>
<td>-10</td>
</tr>
</tbody>
</table>

Table 5.2 Display messages for chimney sweep function

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS.LO / UAlt</td>
<td>Chimney sweep function is active at minimum capacity and the flame is not lit or lit at a different capacity than required.</td>
<td>Deactivate the function by pressing the key for 5 seconds and then increase the thermal load before reactivating the function.</td>
</tr>
<tr>
<td>CS.LO / <em>GO</em></td>
<td>Chimney sweep function is active at minimum capacity and the flame is lit at the required capacity.</td>
<td>Run CO₂ reading (minimum capacity).</td>
</tr>
<tr>
<td>CS.HI / UAlt</td>
<td>Chimney sweep function is active at maximum capacity and the flame is not lit or lit at a different capacity than required.</td>
<td>Wait.</td>
</tr>
<tr>
<td>CS.HI / <em>GO</em></td>
<td>Chimney sweep function is active at maximum capacity and the flame is lit at the required capacity.</td>
<td>Run CO₂ reading (maximum capacity).</td>
</tr>
<tr>
<td>HI.t</td>
<td>The appliance has switched off because the maximum operating temperature of the delivery and/or return water was exceeded.</td>
<td>Deactivate the function by pressing the key for 5 seconds and then increase the thermal load before reactivating the function.</td>
</tr>
<tr>
<td>Err.</td>
<td>The appliance switched off due to a fault (Warning or Error).</td>
<td>Deactivate the function by pressing the key for 5 seconds and then intervene according to the operating codes shown on the display, while referring to Section 8.1. If the problem is resolved, reactivate the function.</td>
</tr>
<tr>
<td>Cod.x (x = 0, 1, ..)</td>
<td>The appliance is temporarily running a special cycle that requires specific control of the power that is not compatible with the execution of the chimney sweep function.</td>
<td>In the rare event of one of these codes appearing, deactivate the function by pressing the key for 5 seconds and then contact Robur.</td>
</tr>
</tbody>
</table>
5.3 Setting Parameters for First Start-up

Paragraph reserved exclusively to TACs.

The instructions on the use of the GHP10 electronic board concern the firmware version 1.014.

For the use of GHP 10 electronic board and related menu, see Chapter 6 p. 36.

Table 5.3 Menu 4 GHP10 board parameters for startup

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Do not modify</th>
<th>Description</th>
<th>Setting</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td></td>
<td>Activation period of auxiliary boiler request controlled in ON/OFF</td>
<td>from 1 to 15 minutes</td>
<td>4</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>Temperature measurement unit</td>
<td>0. °C 1. °F</td>
<td>0</td>
</tr>
<tr>
<td>47</td>
<td></td>
<td>IF20 electronic board usage</td>
<td>0. Siemens controller (OQLT017) 1. generic controller 2. Siemens controller (OQLT021 or OQLT019)</td>
<td>1</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>Building time constant</td>
<td>from 0 to 50 hours</td>
<td>10</td>
</tr>
<tr>
<td>49</td>
<td></td>
<td>Auxiliary boiler installation type</td>
<td>0. not installed 1. hydraulic installation in parallel to K18, 0-10 V control 2. hydraulic installation in parallel to K18, ON/OFF control</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>Auxiliary boiler purpose for space heating</td>
<td>0. none (not active) 1. emergency (active only if K18 in alarm) 2. integration 3. integration and replacement</td>
<td>3</td>
</tr>
<tr>
<td>51</td>
<td></td>
<td>Auxiliary boiler purpose in DHW mode</td>
<td>0. none (not active) 1. emergency (active only if K18 in alarm) 2. integration 3. replacement (K18 does not produce DHW) 4. integration and replacement</td>
<td>4</td>
</tr>
<tr>
<td>52</td>
<td></td>
<td>Auxiliary boiler 0-10 V output temperature setpoint corresponding to 0 V</td>
<td>from 0 °C to 120 °C</td>
<td>0</td>
</tr>
<tr>
<td>53</td>
<td></td>
<td>Auxiliary boiler 0-10 V output temperature setpoint corresponding to 10 V</td>
<td>from 0 °C to 120 °C</td>
<td>80</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>Min auxiliary boiler 0-10 V output temperature setpoint for min ON (used for activation of circulating pump only)</td>
<td>from 0 °C to 120 °C</td>
<td>0</td>
</tr>
<tr>
<td>55</td>
<td></td>
<td>Auxiliary boiler alarm input management</td>
<td>0. unavailable (disabled) 1. normally open 2. normally closed</td>
<td>0</td>
</tr>
<tr>
<td>56</td>
<td></td>
<td>Idle time for automatic oil pump priming cycle activation</td>
<td>from 0 to 99 days 0. function disabled</td>
<td>10</td>
</tr>
<tr>
<td>156</td>
<td></td>
<td>Auxiliary boiler locking time for space heating</td>
<td>from 0 to 600 minutes</td>
<td>40</td>
</tr>
<tr>
<td>157</td>
<td></td>
<td>Auxiliary boiler locking time in DHW mode</td>
<td>from 0 to 600 minutes</td>
<td>20</td>
</tr>
<tr>
<td>163</td>
<td></td>
<td>Heating antifreeze function activated</td>
<td>0. not active 1. active</td>
<td>1</td>
</tr>
<tr>
<td>174</td>
<td></td>
<td>Modulation of circulation pump in space heating mode activated</td>
<td>0. not active 1. active</td>
<td>1</td>
</tr>
<tr>
<td>175</td>
<td></td>
<td>Do not modify - OFF drive voltage for heating circulation pump</td>
<td>from 0 V to 10 V</td>
<td>0.7</td>
</tr>
<tr>
<td>176 (1)</td>
<td></td>
<td>ON drive voltage for circulation pump in space heating mode</td>
<td>from 0 V to 10 V</td>
<td>10</td>
</tr>
</tbody>
</table>
### 5.3.1 Settings depending on the control system type

- If the OQLT021 or OQLT019 system controller is used, set parameter 47 to 2.
- If the previously supplied OQLT017 system controller is used, set parameter 47 to 0.
- For other control systems, set parameter 47 to 1.

### 5.3.2 Settings depending on glycol presence

Before doing these settings, read warnings in Paragraphs 3.5 p. 22 and 3.7 p. 22.

- If has been added in the primary water circuit glycol, set parameter 182 to 1; additionally, the anti-icing function can be disabled by setting parameter 163 to 0.
- If glycol has not been added, set parameter 182 to 0 and make sure that parameter 163 is set to 1; also, keep the unit connected to power supply and to gas network, in order to allow anti-icing function activation.

### 5.3.3 Operating mode setting (ON/OFF or modulating)

Before doing this setting, it is strongly suggested to contact Robur technical support.
**First start-up**

The operating mode is MODULATING by default. To set the unit in ON/OFF mode, set parameter 181 to 0.

### 5.3.4 Settings depending on the primary circuit water pump type

The pump of K18 Simplygas C1 units is normally controlled by the appliance in variable flow rate mode, both in space heating and DHW service, with the objective to keep constant temperature differential (10 K default for both services) between water return and delivery in the whole range of the unit heat output; this regulation mode is appropriate for most of the applications. However it is possible:

- To modify temperature differential value required for space heating and/or DHW service, by setting respectively parameters 178 and 184. Before doing this, it is strongly suggested to contact Robur technical support.
- To modify the lower limit of water pump flow rate, by setting parameter 200. This can be necessary to problems correct low or nothing water circulation (possibly, only in some parts of the plant) when the pump is controlled by the system at a low flow rate.
- To set fixed flow rate pump operation, for space heating and/or DHW service:
  - Space heating service: set parameter 174 to 0, then set parameter 176 from 3 (minimum flow rate) to 10 (maximum flow rate).
  - DHW service: perform same settings as above, modifying parameters 183 and 177 respectively.

It is always possible to show the actual flow rate value measured by the appliance flowmeter. To do this, enter menu 0 and select parameter 24: the value shown is expressed in liters/hour.

DHW service is available only with system controller OQLT021, OQLT019 or OQLT017.

### 5.3.5 Settings depending on the installed temperature probes

With OQLT021, OQLT019 system controller or with previously supplied OQLT017 system controller

Follow the instructions provided in the system controller installation manual.

With other control systems (OCD007 chronothermostat or generic external request)

- Referring to Figure 3.1 p. 19 and 3.2 p. 20, connect the GHP probe to AUX PROBE 1 clamp (see Paragraph 4.8 p. 28) and set parameter 210 to 1 (probe for space heating regulation).
- If weather compensation is activated (see Paragraph 6.5.1 p. 38), the installation of an outdoor temperature probe EXT. (Optional OSND007) is recommended; install this probe in North facing, protected by direct sunlight and far from heat sources (windows, discharges, ecc.) and connect it to clamp AUX PROBE 2 (see Paragraph 4.8 p. 28); set parameter 209 to 2 (outdoor temperature probe). If this probe is not installed weather compensation will be based on the value provided by outdoor temperature probe onboard unit, significantly less accurate.

### 5.3.6 Settings depending on auxiliary heat source presence

With previously supplied OQLT017 system controller

In this case, the auxiliary boiler is managed by the system controller.

Set parameter 49 to 0 (auxiliary boiler not installed or not controlled by the K18 unit) and operate as described in the installation manual of the OQLT017 system controller.

With other control systems (OQLT021 or OQLT019 system controller, chronothermostat or generic external request)

To activate the control of an auxiliary boiler set parameter 49 to:

1. for auxiliary boiler controlled by 0-10 V signal
2. for auxiliary boiler controlled by ON/OFF signal

- With reference to the possible functions of the auxiliary boiler for the space heating service (see Paragraph 1.1.5 p. 7 and further on in this Paragraph), set parameter 50 to:
  1. for emergency mode
  2. for integration mode
  3. (default value) for integration and replacement mode

- In the presence of the DHW service (only with the OQLT021 or OQLT019 system controller), with reference to the possible functions of the auxiliary boiler for this service (see also further on in this Paragraph), set parameter 51 to:
  1. to exclude the auxiliary boiler from operating on the DHW service (DHW produced exclusively with the K18 unit)
  2. for the emergency mode (activation of the auxiliary boiler only in case of an alarm on K18 unit)
  3. for the integration mode (activation of the auxiliary boiler in addition to the K18 unit, when necessary)
  4. for replacement mode (DHW produced only with auxiliary boiler)

- (default value) for the integration and replacement mode (activation of the auxiliary boiler in addition and, in certain conditions, in replacement of the K18 unit)

- Referring to Paragraph 4.9 p. 29, if auxiliary boiler is controlled by 0-10 V signal to communicate required setpoint (parameter 49 set to 1), it is necessary to configure the 0-10V AUX BOILER output voltage / temperature curve, in order to match the one required by the auxiliary boiler; this information must be available in the documentation provided by the auxiliary boiler manufacturer. Proceed as follows:
  1. Set parameter 52 to the temperature value which must correspond to 0 V output.
  2. Set parameter 53 to the temperature value which must correspond to 10 V output.
  3. If the 0-10 V signal is also used as request signal (second case described in Paragraph 4.9 p. 29), parameter 54 must also be set to the temperature that corresponds to the minimum switch-on level of the auxiliary boiler; if this value can be varied from the configuration of the parameters of the auxiliary boiler, it must be set to the lowest possible value, and then set parameter 54 of the K18 unit accordingly.

Through this setting, the K18 unit requests a “dummy” service on the auxiliary boiler, providing the minimum setpoint value when only the water pump of the auxiliary boiler must be switched on.

If, on the other hand, the 0-10 V signal is only used to communicate the setpoint value, while the service request is activated from the ON/OFF request (third case described in Paragraph 4.9 p. 29), leave parameter 54 set to its default value (0 °C).
With reference to Paragraph 4.9 p. 29, if the auxiliary boiler is only controlled from the ON/OFF request, parameter 41 must be adequately configured. In order to do this:

1. Obtain the switch-off delay of auxiliary boiler circulating pump with respect to the switch-off of the heat source (in the case of a boiler: burner switch-off) by referring to the documentation of the auxiliary boiler or alternatively, verifying experimentally; generally, this delay lasts a few minutes.
2. Set parameter 41 to the next lower value (for example, if the switch-off delay is 3 minutes, set parameter 41 to 2).

Through this setting, the K18 unit briefly activates the ON/OFF request, according to the timing set in parameter 41, when only the circulating pump of the auxiliary boiler must be switched on.

With reference to Paragraph 4.9 p. 29, if the auxiliary boiler can provide an alarm signal if the boiler itself is unavailable (for this purpose, refer to the documentation provided by the manufacturer of the auxiliary boiler), this signal can be controlled by setting parameter 55 to:

1. if the alarm signal of the auxiliary boiler is normally open (NO);
2. if the alarm signal of the auxiliary boiler is normally closed (NC);

The availability and actual connection and configuration of the auxiliary boiler alarm signal is necessary for the integration and replacement operating mode of the auxiliary boiler to be used (parameter 50 set to 3 and/or parameter 51 set to 4).

The setpoint value communicated by 0-10 V signal to the auxiliary boiler can be increased by a constant boost value with respect to the actual system setpoint. This is sometimes useful to guarantee that the outlet manifold can actually reach the setpoint, even despite water mixing occurring on the secondary circuit. If required, set parameter 203 to the desired boost value. It is recommended to limit the boost value to that which is strictly needed.

It is possible to inhibit auxiliary boiler operation in integration mode for space heating service (not for DHW service) above a set outdoor temperature threshold.

1. To use this function, set parameter 185 to the desired outdoor temperature threshold value.
2. To disable this function, set parameter 185 to maximum value (40°C).

Even when inhibited by the above function, the auxiliary boiler remains active for the emergency function.

The function uses the filtered value with a constant time of 30' with respect to the instantaneous value as the outdoor temperature.

Integration and replacement mode on space heating service

If the control mode of the auxiliary boiler is integration and replacement (parameter 50 set to 3 by default), the system uses certain replacement criteria of the heat pump for the space heating service, using only the auxiliary boiler. The replacement criteria can be modified or inhibited by using certain parameters.

1. Replacement at low outdoor temperature: the heat pump is replaced with the auxiliary boiler if the outdoor temperature drops below a given value. This criterion is particularly useful when the system requires a particularly high delivery temperature (which exceeds also the operating limits of the heat pump) when the outdoor temperature is very low.
   - To use this feature, set the threshold value of the outdoor temperature in parameter 217.
   - To deactivate the replacement function, set parameter 217 to the minimum value allowed (-30 °C, default value).
2. Replacement at high outdoor temperature: the heat pump is replaced with the auxiliary boiler if the outdoor temperature rises above a given value. This criterion is particularly useful in systems with low water content and low energy demand with respect to the power of the heat pump.
   - To use this feature, set the threshold value of the outdoor temperature in parameter 218.
   - To deactivate the replacement function, set parameter 218 to the maximum value allowed (40 °C, default value).

Even these two replacement functions use the filtered value of the outdoor temperature.

3. Replacement on heat pump limit thermostating condition: the heat pump is replaced with the auxiliary boiler if the delivery and/or return temperature of the heat pump exceeds the permissible operating limits (see Table 1.2 p. 15). Every 25' the system verifies whether the heat pump can be reactivated. This function can be modified or deactivated from parameter 187.
   - To use this function, set parameter 187 to a value other than 0.0; a high value makes it less likely for the heat pump to be reactivated, thereby ensuring more stable system operation; a low value favours the reactivation of the heat pump but makes it more likely for the limit thermostating condition to reoccur.
   - To deactivate the replacement function, set parameter 187 to the minimum value allowed (0.0 K).
   - The function is active by default and the value is set to 3.0 K.

Integration and replacement mode on DHW service

If the control mode of the auxiliary boiler is integration and replacement (parameter 51 set to 4 by default), the system uses certain replacement criteria of the heat pump for the DHW service, similarly to that for the space heating service. The criteria used are those described in points 1 and 3 for the space heating service and therefore, replacement at low outdoor temperature (depending on parameter 217) and replacement on limit thermostating condition (depending on parameter 187). On the other hand, no criterion of replacement at high outdoor temperature is used.

5.3.7 Settings depending on water setpoint mode for the space heating service

With OQLT021, OQLT019 system controller or with previously supplied OQLT017 system controller

Follow the instructions provided in the OQLT017 system controller installation manual (for example, to set the heating curves, which are directly managed by such controller).

With other control systems (OCDS007 chronothermostat or generic external request)

It is possible to set the K18 Simplygas appliance to provide the space heating service using a fixed water setpoint, or a variable
Normal operation

This section is for the end user.

6.1 WARNINGS

General warnings

Prior to using the appliance carefully read the warnings in Chapter III.1 p. 4, providing important information on regulations and on safety.

First start-up by TAC

First start-up may exclusively be carried out by a Robur TAC (Chapter 5 p. 30).

Never power the appliance off while it is running

NEVER power the appliance off while it is running (except in the event of danger, Chapter III.1 p. 4), since the appliance or system might be damaged.

6.2 SWITCH ON AND OFF

Routine switching on/off

The appliance may be exclusively switched on/off using proper control device (OQLT021, OCDS007 or external request).

Do not switch on/off with the power supply switch

Do not switch the appliance on/off with the power supply switch. This may be harmful and dangerous for the appliance and for the system.

Checks before switching on

Before switching on the appliance, ensure that:
- gas valve open
- appliance electrical power supply (main switch GS ON, Figure 4.2 p. 26)
- OQLT021 or OCDS007 power supply (if present)
- water circuit ready and filled

6.2.1 How to switch on/off

If the appliance is controlled by the OQLT021 controller (system 1, see Paragraph 1.7 p. 14), refer to the relevant manual.

thermostat or by external request (e.g. thermostat, clock, button, .. with voltage-free NO contact), (systems (2) and (3) see Paragraph 1.7 p. 14), the appliance is switched on/off by the ON/OFF positions of the external control device. After switching on with the control, in normal operating conditions, the appliance starts/stops automatically according to the user’s thermal needs, supplying hot water at the programmed temperature.

Although the external request is in the “ON” position, this does not mean the appliance will start immediately, but it will only start when there are actual service demands.

6.3 MESSAGES ON THE DISPLAY

6.3.1 4 digit display

The GHP10 board of the appliance (Paragraph 1.5 p. 14) is equipped with a 4-digit display (detail A Figure 1.8 p. 14), visible through the sight glass (reference I Figure 1.3 p. 9).

When the appliance is powered, all the LEDs switch on for 3 sec, then the central hyphens of the four digits are switched on, and lastly the GHP10 board name is displayed in two subsequent stages (GHP during the first stage and 10 during the second).

After 5 sec, the appliance is ready to operate.

6.3.2 Signals in normal operation

During normal operation, water temperature values alternate on the display: output, input and the difference between the two.

6.3.3 Events reporting

In case one or more events occur, the display shows up the three event types, indicated by first green character:
- “I” for information
- “u” for warning
- “E” for errors

The other three red digits represent a numeric event code. Info events are shown steadily while warnings and errors blink. The display rotates after the values of the outlet water temperature, the inlet and the difference between them. If multiple events are active, they are shown in sequence, ordered by increasing code number.

If warning or error events are active, the left green symbol, shown together with water temperature data, blinks.

If it is a permanent error or warning the appliance stops. For details about information, errors and warnings codes see Tables 8.1 p. 41 and 8.2 p. 41.
6.3.4 Menu navigation

Once the menu list has been accessed (see Paragraph 6.4 p. 37), the display shows:

- First green digit on the left indicates menu number (e.g. “0.”, “1.”, “2.”, “3.”).
- The last three red digits on the right indicate a parameter code or value, among those included in the selected menu (e.g. “0.”, “6.”, “20.”, “161.”).

(e.g. menu + parameter “1._6”, “2._20”, “3.161”).

6.4 ON-BOARD ELECTRONIC CONTROLS – MENUS AND PARAMETERS OF THE GHP10 BOARD

6.4.1 Selection keys

One of the following actions may be done with the GHP10 board selection keys (references B, C and D in Figure 1.8 p. 14):

- Enter the menu list (by pressing the key the first time).
- Scroll the menu list, or a series of parameters in a menu (by pressing keys ).
- Select a menu or a parameter (pressing the key ).
- Edit and confirm the setting of a parameter (pressing keys and and confirming with key ).
- Execute a command (pressing key ).
- Exit a menu and go back to the higher level by selecting the letter “E” which is displayed at the end of the menu list or of a series of parameters in a menu.

The letter “E” is displayed at the end a menu parameters list, and indicates the exit to go back to the higher level by pressing .

6.4.2 Menus and parameters

The menus may be display only (functional data or parameters), display and setting (parameters) or control (reset).

- Display menus: menu “0” and menu “1”.
- Command menu: menu “2” to execute error reset command (Paragraph 6.6 p. 39).
- Visualization and setting menu (for the user): menu “3” to display or set certain system parameters (eg. water temperature setpoint); the settings are initialised by the TAC up on first start-up; the Table 6.1 shows parameters in menu 3.
- Visualization and setting menu (to be exclusively used by the installer and TAC): menu “4.” (for the installer) “5.” and “6.” (for the TAC). They are password protected. These are specific sections, exclusively intended for qualified personnel (installer or TAC). For information see the Service manual.

How to access the menus and parameters

Before Starting:
1. Power supply switch “ON”.
2. Display of the GHP10 board showing in sequence the detected water temperature data (if the appliance is in normal operation), and eventually the flashing warning and error codes (if the appliance is in failure).

To access the menus and parameters of the GHP10 board, proceed as follows (see also Figure 1.8 p. 14):

1. Remove the display transparent cover (detail 1 Figure 1.3 p. 9) by removing the four fixing screws.
2. Press the key once to display the menus: the first menu is displayed, “0.” (= menu 0).
3. Press the key to scroll down and display the other/subsequent menus; the menu numbers will be displayed in order, “1.”, “2.”, “3.”, “4.” or “E” (= exit).
4. Select the menu of interest (e.g. display “2.” = menu 2) by pressing the key; the first parameter code will be displayed, in order in the menu (e.g. display “2._21” = parameter 21 in menu 2).
5. Press the key to scroll down the other parameters in the menu; the codes will be displayed in order (e.g. display “2._21”, “2._26” = parameters 21, ... 26 in menu 2), or letter “E” (= exit) at the end of the list.
6. Edit the parameter of interest by pressing key ; the display will show the current parameter value (blinking) or, for a command menu, a blinking code (eg. “rEr1” for the board error reset command).
7. Press the key to reconfirm the figure; or use and keys to modify the figure, and press at the end to confirm or set the new figure; if however, it is a matter of controlling an appliance operation, press the key to execute it.
8. To exit a parameter menu or the menu list and go back to the higher level, press the until displaying the letter “E” for exit, then press the key again.
9. The water temperature values alternate again on the display: output, input and the difference between them.
10. Fit the display transparent cover.

Table 6.1 Menu 3 parameters (for the user) of GHP10 board

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Setting</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>Temperature display format</td>
<td>0. °C 1. °F</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>Building time constant</td>
<td>from 0 to 50 hours</td>
<td>10</td>
</tr>
<tr>
<td>163</td>
<td>Antifreeze function</td>
<td>0. not active 1. active</td>
<td>1</td>
</tr>
<tr>
<td>198</td>
<td>Fan noise reduction</td>
<td>0. not active 1. active</td>
<td>0</td>
</tr>
<tr>
<td>225 (1)</td>
<td>Setpoint source</td>
<td>0. Fixed setpoint 1. Heating curve</td>
<td>1</td>
</tr>
<tr>
<td>226 (1) (2)</td>
<td>Fixed setpoint in heating operation</td>
<td>The minimum and maximum values depend on what has been set in the installation stage.</td>
<td></td>
</tr>
<tr>
<td>228 (1) (3)</td>
<td>Heating curve slope</td>
<td>from 10 to 400</td>
<td>75</td>
</tr>
<tr>
<td>229 (1) (3)</td>
<td>Heating curve offset</td>
<td>from -5 K to +5 K</td>
<td>0</td>
</tr>
<tr>
<td>230 (1) (3)</td>
<td>Room setpoint with heating curve</td>
<td>from 0 °C to 60 °C</td>
<td>20</td>
</tr>
</tbody>
</table>

(1) If the unit is connected to the system controller (optional) this parameter is ignored.
(2) This parameter is ignored if parameter 225 is set to 1.
(3) This parameter is ignored if parameter 225 is set to 0.
6.5 MODIFYING SETTINGS

Do not modify complex settings

Specific technical and system knowledge is required for complex settings. Contact a TAC.

The settings described in this section does not apply when using the OQLT021, OQLT019 or previously supplied OQLT017 system controller. Refer to the system controller installation manual for detailed instructions about its settings.

6.5.1 How to modify the heating curve

This kind of regulation is active if parameter 225 (menu 3) is set to value 1 (default).

The heating curve makes it possible to change the system’s outlet water temperature according to the measured outdoor temperature and to the internal ambient set point temperature. Depending on the type of installation, especially on the type of exchangers (radiators, fan coils, floor radiators etc.) and the features of the building, a specific curve will be used, selected from the family of heating curves. Furthermore, upon changing the internal room set point temperature, the curve actually used will be automatically modified.

The family of heating curves is shown in Figure 6.1 p. 39 and the curve to be used is chosen by specifying the value of parameter 228 in menu 3 which indicates the curve slope. The curve defined in this way refers to an internal ambient setpoint temperature of 20 °C (68 °F). If the setpoint temperature is different, the system automatically adapts the curve used.

To set the adequate heating curve operate as specified below:

1. Set the flow water temperature according to the expected minimum outdoor temperature (for instance: Twater = 60 °C when Toutside = -10 °C).
2. Using the chart in Figure 6.1 p. 39, select the curve that meets the above requirement (in the specific case curve with slope 1.5).
3. Multiply the slope of the selected curve by 100 and set the figure thus obtained in menu 3 parameter 228 (in the example set parameter 228 to value 150).

If no curve passes through the established point, select an intermediate figure between those of the curves immediately above or immediately below this point. Indicatively, a system that uses floor radiant heat exchangers will use “low” slope figures, a fan coil system will use “medium” figures and a system with radiators “high” figures.

4. Ensure parameter 229 (heating curve offset) of menu 3 is set at 0.
5. Set parameter 230 (room setpoint with climatic curve) of menu 3 to the desired value (default setting 20 °C).

Unit operation is based on the heating curve ONLY if the setting of parameter 225 (menu 3) is at 1 (default setting - see Table 5.3 p. 32).

If the slope of the selected curve is not correct the following cases may occur, to be assessed during early operation of the system:

▶ Ambient temperature lower when outdoor temperature is lower: in this case, the slope of the curve is not sufficient, it is needed to set a higher value for parameter 228, indicating the slope of the curve.
▶ Internal ambient temperature is higher when the outdoor temperature is lower: in this case the curve slope is excessive, a lower figure must be set for parameter 228 indicating curve slope.

If however the slope is correct (stable internal ambient temperature when the outside temperature changes), but the internal temperature does not match the set point one, the following cases may occur:

▶ Internal ambient temperature is always higher than the setpoint: in this case one must act on the Offset parameter of the heating curve, setting a negative figure equal to the internal temperature deviation from the setpoint; for instance, if the setpoint is 22 °C and the actual internal temperature is 24 °C, set the Offset parameter (parameter 229) to -2 °C.
▶ Internal ambient temperature is always lower than the setpoint: in this case a positive figure must be set for the Offset parameter of the heating curve; for instance, if the setpoint is 20 °C and the actual internal temperature is 19 °C, set the Offset parameter (parameter 229) to 1 °C.
6.5.2 How to raise/lower the water temperature setpoint (fixed setpoint)

The water temperature set-point establishes the outlet temperature to the system (water output from the appliance), or inlet from the system (water input in the appliance). The temperature is pre-set by the TAC upon first start-up. The water set point is set on outlet by default.

Fixed setpoint regulation is used if parameter 225 is set to 0.

In general, regulation based on heating curve, described in Paragraph 6.5.1 p. 38, provides better results in terms of comfort and efficiency. Contact Robur technical Support before changing the regulation mode.

To raise/lower the water temperature setpoint, proceed as follows (also see Paragraph 6.4 p. 37):

1. Access menu 3 parameter 225 (= setpoint origin) with keys and ; set parameter 225 to 0 (fixed setpoint - see Table 6.1 p. 37).
2. Set parameter 226 (fixed setpoint in heating operation) to the desired temperature setting.
3. Exit menu 3 by pressing the key until displaying the letter “E” for exit, then press the key.
4. The water temperature values alternate again on the display: output, input and the difference between them.

6.6 RESTARTING A LOCKED-DOWN UNIT

6.6.1 Fault signals on the display

In the event of locked-down appliance, an operational code flashes on the display (first green figure on the left, letter “u” = warning or “E” = error).

To restart the appliance you must know and perform the procedure concerning the issue signalled and identified by the code (Paragraph 8.1 p. 41).

▶ Only act if you are familiar with the issue and with the procedure (technical expertise and professional qualifications might be required).

▶ If you do not know the code, the problem, or the procedure, or you do not have sufficient skills, and in any case of doubt, contact the TAC.

6.6.2 Locked-down appliance

An external intervention (reset or repair) is required due to an appliance fault or problem with the system.

▶ A reset may be enough for a temporary and provisional fault.

▶ For a fault or breakdown, alert the maintenance technician or TAC.

6.6.3 Reset

There are three options for resetting a fault:

1. If the appliance is connected to the OQLT021 or OQLT019 controller, or to the previously supplied OQLT017 controller, you may act through the control device, as described in the relevant manual.
2. If a remote reset button has been provided (Paragraph 4.7 p. 28) act directly on the button.
3. Act on unlock/reset button under unit display (reference J Figure 1.3 p. 9).

6.7 EFFICIENCY

For increased appliance efficiency:

▶ Keep the finned coil clean.

▶ Set the maximum water temperature and climatic curve at the actual installation requirement.

▶ Reduce repeated switch-ons to the minimum (low loads).

▶ Program appliance activation for actual periods of use.

▶ Keep water and air filters on plumbing and ventilation systems clean.
7 MAINTENANCE

7.1 WARNINGS

Correct maintenance prevents problems, assures efficiency and keeps running costs low.

Maintenance operations described herein may exclusively be performed by the TAC or skilled maintenance technician.

Any operation on internal components may exclusively be performed by the TAC.

Before performing any operation, switch off the appliance by means of the control device and wait for the end of the shutdown cycle, then disconnect power and gas supply, by acting on the electrical disconnector and gas valve.

The efficiency checks and every other "check and maintenance operation" (see Tables 7.1 p. 40 and 7.2 p. 40) must be performed with a frequency according to current regulations or, if more restrictive, according to the provisions set forth by the manufacturer, installer or TAC.

Responsibility for efficiency checks, to be carried out for the aims of restricting energy consumption, lies with the system manager.

Environmental or operational heavy conditions

In environmental or operational conditions particularly heavy (for example: heavy-duty use of the appliance, salty environment, etc.), maintenance and cleaning operations must be more frequent.

7.2 PRE-EMPTIVE MAINTENANCE

For pre-emptive maintenance, comply with the recommendations in Table 7.1.

Table 7.1 Guidelines for the preventive maintenance operations

<table>
<thead>
<tr>
<th>Guidelines for the preventive maintenance operations</th>
<th>K18 Simplygas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check of the unit</td>
<td></td>
</tr>
<tr>
<td>visually check of the general condition of the unit and of its finned coil</td>
<td>✓ (1)</td>
</tr>
<tr>
<td>check the correct operation of the device used for monitoring the water flow</td>
<td>✓</td>
</tr>
<tr>
<td>check the % value of CO₂</td>
<td>✓</td>
</tr>
<tr>
<td>check that the condensate discharge is clean (if necessary, frequency of the maintenance operation must be increased)</td>
<td>✓</td>
</tr>
<tr>
<td>replace the belts after 6 years or 12,000 hours of operation</td>
<td>✓</td>
</tr>
</tbody>
</table>

(1) It is suggested to clean the finned coil once every 4 years (optimal frequency of the cleaning operation is in any case strongly affected by the installation site). Avoid excessively aggressive cleaning of the finned coil (e.g. high-pressure washer).

7.3 SCHEDULED ROUTINE MAINTENANCE

For scheduled routine maintenance, perform the operations in Table 7.2, at least once every 2 years.

Table 7.2 Scheduled routine maintenance

<table>
<thead>
<tr>
<th>Ordinary scheduled maintenance</th>
<th>K18 Simplygas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check of the unit</td>
<td></td>
</tr>
<tr>
<td>clean the combustion chamber</td>
<td>✓ (1)</td>
</tr>
<tr>
<td>clean the burner</td>
<td>✓ (1)</td>
</tr>
<tr>
<td>clean the ignition and flame sensor electrodes</td>
<td>✓</td>
</tr>
<tr>
<td>check that the condensate discharge is clean</td>
<td>✓</td>
</tr>
</tbody>
</table>

(1) Only in case the analysis of combustion products is non-compliant.

7.4 PERIODS OF INACTIVITY

Avoid emptying the installation

Emptying the system may cause damage due to corrosion of the water pipes.

Deactivate the system in winter

Should you intend to stop the appliance in the winter season, ensure at least one of the following conditions:

1. antifreeze function active (Paragraph 3.5 p. 22)
2. sufficient anti-icing glycol (Paragraph 3.7 p. 22)

7.4.1 Prolonged periods of inactivity

Should you foresee to leave the appliance inactive for a long period of time, disconnect it from the electrical and gas mains. These operations must be performed by qualified personnel.

How to deactivate the appliance for long periods of time

1. Switch the appliance off (Paragraph 6.2 p. 36).
2. Only when the appliance is completely off, power it off...
3. Close the gas valve.
4. If necessary, add water with glycol (if the appliance is disconnected from the power and gas mains, the active anti-icing protection is missing, Paragraph 3.5 p. 22).

How to reactivate the appliance after long periods of inactivity

Before reactivating the appliance, the operator/maintenance technician of the system must first of all:

- Check whether any maintenance operations are required (contact the TAC; see Paragraphs 7.2 p. 40 and 7.3 p. 40).
- Check content and quality of the water in the system, and if necessary top it up (Paragraphs 3.9 p. 23, 3.8 p. 23 and 3.7 p. 22).
- Ensure the flue gas exhaust duct is not obstructed, and that the condensate drain is clean.

After completing the above checks:

1. Open the gas valve and ensure there are no leaks; should gas smell be noticed, close the gas valve again, do not switch any electrical devices on and request intervention by qualified personnel.
2. Power on with the main power supply switch (GS, Figure 4.2 p. 26).
3. Switch on the appliance using the provided control device (OQLT021, OCDS007 or external request, Paragraph 4.4 p. 26).

7.5 TEMPORARY STOP COMMAND OF THE FAN

During some maintenance operations the air flow from the fan may be annoying for the operator.

It is possible to stop temporarily the fan by acting on the GHP10 board as follows:

2. Press button: display shows the blinking code “OFan”.
3. To stop the fan press again button

To enable the fan operation again:

1. Access menu 2 and select Parameter “_28”, display must show “2._28” (refer to procedure Paragraph 6.4 p. 37).
2. Press button: display shows the blinking code “IFan”.
3. Press again button

To exit the menu 2 and return to the main screen:

1. Press button until the rightmost digit shows letter “E” (Exit), then press button.
2. Press again button until the leftmost shows letter “E” (Exit), then press button

Limit the time you use this function to the minimum effectively needed. The system cancels the fan stop automatically after 15 minutes.

8 DIAGNOSTICS

8.1 BOARD CODES

Table 8.1 Informative codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Info (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>405</td>
<td>Outdoor temperature exceeding operational limits</td>
<td>The code is reset automatically when the triggering condition ceases.</td>
</tr>
<tr>
<td>406</td>
<td>Outdoor temperature below operational limits</td>
<td>The code is reset automatically when the triggering condition ceases.</td>
</tr>
<tr>
<td>430</td>
<td>Generator protection cycle activated</td>
<td>The event indicates the activation of the protection cycle in case of high flue temperature.</td>
</tr>
<tr>
<td>435</td>
<td>Gas valve antifreeze function activated</td>
<td>It is activated when the anti icing cycle starts and it is stopped when the anti icing cycle ends.</td>
</tr>
<tr>
<td>452</td>
<td>Defrosting cycle activated</td>
<td>The code clears automatically when execution of defrosting ends.</td>
</tr>
<tr>
<td>457</td>
<td>Generator anti condensation cycle activated</td>
<td>The anti-condensation cycle ensures that once the flame is turned on, it stays on until the conditions that guarantee the absence of condensation occur.</td>
</tr>
<tr>
<td>458</td>
<td>Service request filtering activation</td>
<td>The message appears when there are too frequent requests for activation, and so the appliance establishes a minimum turn-on and turn-off time before switching off or on again.</td>
</tr>
<tr>
<td>459</td>
<td>Possible flue obstruction</td>
<td>The control informs that, after flame ignition , the temperature measured by the flue probe is not the expected one; this could be due to a possible flue discharge duct obstruction.</td>
</tr>
<tr>
<td>462</td>
<td>Pre-ignition phase</td>
<td>The event indicates that the unit is performing the pre-ignition cycle.</td>
</tr>
<tr>
<td>479</td>
<td>Heating antifreeze function activated</td>
<td>The code clears automatically when antifreeze function execution ends.</td>
</tr>
</tbody>
</table>

Table 8.2 Operative codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Warning (u)</th>
<th>Error (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Limit thermostat trip</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>402</td>
<td>Flue gas thermostat trip</td>
<td>Contact the TAC.</td>
<td></td>
</tr>
<tr>
<td>407</td>
<td>High generator temperature</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Warning (u)</td>
<td>Error (E)</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>408</td>
<td>Flame controller error</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>410</td>
<td>Low hot water flow</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>Check and clean water filters on the system. Check for air in the system. Check water flow pump. Power cycle the appliance. The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>411</td>
<td>Insufficient rotation of oil pump</td>
<td>Reset occurs automatically 20 minutes after the code is generated.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>412</td>
<td>Flame controller lockout</td>
<td>Reset is automatic up to 4 attempts (in about 5 minutes).</td>
<td>Check gas supply. If the code persists or in case of doubt, contact the TAC. The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39.</td>
</tr>
<tr>
<td>413</td>
<td>Flame controller communication error</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>414</td>
<td>Flame controller not compatible</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>415</td>
<td>Flame controller parameters error</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>416</td>
<td>Hot water delivery temperature probe fault</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>417</td>
<td>Hot water inlet temperature probe fault</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>420</td>
<td>Generator temperature probe fault</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>424</td>
<td>Flue gas temperature probe fault</td>
<td>Reset is automatic up to 5 attempts.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>425</td>
<td>Clogged condensate drain</td>
<td>NA</td>
<td>Check and clean condensate discharge. Reset is automatic when the triggering condition ceases. It is also possible to make the reset following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>426</td>
<td>Generator fins temperature probe fault</td>
<td>Reset is automatic up to 5 attempts.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>430</td>
<td>High flue gas or generator fins temperature</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>435</td>
<td>Gas valve temperature probe fault</td>
<td>Reset is automatic when the the functioning probe is restored.</td>
<td>NA</td>
</tr>
<tr>
<td>436</td>
<td>Blower fault</td>
<td>Reset occurs automatically 20 minutes after the code is generated.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>438</td>
<td>Internal flame controller error</td>
<td>Reset occurs automatically 10 seconds after the code is generated.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>439</td>
<td>Fan fault</td>
<td>The system tries to resolve the fault once, if not successful, warning 461 is generated.</td>
<td>NA</td>
</tr>
<tr>
<td>441</td>
<td>Parasitic flame lockout</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. If the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Warning (u)</td>
<td>Error (E)</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>442</td>
<td>Flame loss</td>
<td>Reset occurs automatically 10 seconds after the code is generated.</td>
<td>NA</td>
</tr>
<tr>
<td>443</td>
<td>Flame controller communication error</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39 if the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>444</td>
<td>Evaporator temperature probe fault</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39 if the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>446</td>
<td>High hot water inlet temperature</td>
<td>Check configuration of other heat generators on the system. Ensure the secondary circuit pump is working. Ensure the exchange terminals are active. Check any bypasses between outlet and inlet. Reset is automatic and occurs if the generating condition ceases with circulating pump on or 20 minutes after the code is generated with circulating pump off.</td>
<td>NA</td>
</tr>
<tr>
<td>447</td>
<td>Hot water inlet temperature below operational limits</td>
<td>Reset occurs automatically when the generating cause resolves or 430 seconds after the code is generated.</td>
<td>Reset is automatic when the triggering condition ceases. If the code shows up again or in case of doubt contact the TAC.</td>
</tr>
<tr>
<td>448</td>
<td>High hot water differential temperature</td>
<td>Check cleanliness of water filters. Check water flow. Reset occurs automatically 20 minutes after the code is generated.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39 if the code shows up again or in case of doubt contact the TAC.</td>
</tr>
<tr>
<td>460</td>
<td>Defrosting valve has failed to open</td>
<td>Non-blocking event. Reset is automatic, however, it is advisable to contact the TAC.</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39. Contact the TAC.</td>
</tr>
<tr>
<td>461</td>
<td>Fan fault</td>
<td>Generated as a result of a failed attempt are restoring warning 439, it is resumed once the generating cause is resolved. If the code persists, contact the authorized TAC.</td>
<td>NA</td>
</tr>
<tr>
<td>463</td>
<td>Oil pump priming cycle activated</td>
<td>The priming cycle lasts 30' if activated manually or 10 minutes if activated automatically. Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
<tr>
<td>473</td>
<td>Manifold probe fault (connected to AUX 2)</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
<tr>
<td>474</td>
<td>Manifold probe fault (connected to AUX 1)</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
<tr>
<td>478</td>
<td>High hot water delivery temperature</td>
<td>Check cleanliness of water filters. Check water flow. Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
<tr>
<td>480</td>
<td>Incomplete functional parameters</td>
<td>Contact the TAC.</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>481</td>
<td>Invalid bank 1 parameters</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>482</td>
<td>Invalid bank 2 parameters</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>485</td>
<td>Invalid module type configuration parameters</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>486</td>
<td>ROM board fault</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>487</td>
<td>pRAM board fault</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>488</td>
<td>xRAM board fault</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>489</td>
<td>Registers board fault</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>490</td>
<td>Outdoor temperature probe fault</td>
<td>NA</td>
<td>The reset may be done following one of procedures shown in Paragraph 6.6.3 p. 39 if the code persists, shows up again or in case of doubt, contact the TAC.</td>
</tr>
<tr>
<td>491</td>
<td>Electronic board fault</td>
<td>NA</td>
<td>Contact the TAC.</td>
</tr>
<tr>
<td>492</td>
<td>Weather probe fault (connected to AUX 1)</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
<tr>
<td>493</td>
<td>Weather probe fault (connected to AUX 2)</td>
<td>Reset is automatic when the triggering condition ceases.</td>
<td>NA</td>
</tr>
</tbody>
</table>
### 8.2 WATER PUMP ALARM CODES

Table 8.3 Water pump alarm codes

<table>
<thead>
<tr>
<th>LED</th>
<th>Meaning</th>
<th>Operational status</th>
<th>Cause</th>
<th>Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady green light</td>
<td>Pump ON</td>
<td>Pump runs according to setup</td>
<td>Normal operation</td>
<td>---</td>
</tr>
<tr>
<td>Fast blinking green light</td>
<td>---</td>
<td>Pump in standby</td>
<td>Normal operation</td>
<td>---</td>
</tr>
<tr>
<td>Alternately blinking between green and red light</td>
<td>Pump ready but not running</td>
<td>Pump will start as soon as the error is cleared</td>
<td>Undervoltage $U_{&lt;160}$ V or overvoltage $U_{&gt;253}$ V Check power supply voltage $195$ V $&lt;U&lt;253$ V</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air bubbles in water circuit Disconnect PWM connector until LED turns into permanent green light, then reconnect PWM connector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Over temperature of the module Motor temperature too high Check fluid temperature and ambient temperature</td>
<td></td>
</tr>
<tr>
<td>Blinking red light</td>
<td>Pump out of order</td>
<td>Pump blocked</td>
<td>Pump does not restart autonomously</td>
<td>Replace the pump</td>
</tr>
<tr>
<td>OFF</td>
<td>No power supply</td>
<td>No voltage on electronics</td>
<td>The pump is not connected to the power output supplied by the control electronics of the appliance</td>
<td>Check cable connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LED failure</td>
<td>Check if pump is actually running</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Failure of electronics</td>
<td>Replace the pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The control electronics of the appliance do not activate the power output of the pump although there is a service request</td>
<td>If the power output of the pump does not supply voltage, check the cabling of the electrical panel; if no fault is found, try replacing the GHP10 board</td>
</tr>
</tbody>
</table>
9

APPENDICES

9.1 PRODUCT FICHE

Figure 9.1

Table 8

Technical parameters for heat pump space heaters and heat pump combination heaters

<table>
<thead>
<tr>
<th>Model(s):</th>
<th>K18 Simplygas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-to-water heat pump:</td>
<td>yes</td>
</tr>
<tr>
<td>Water-to-water heat pump:</td>
<td>no</td>
</tr>
<tr>
<td>Brine-to-water heat pump:</td>
<td>no</td>
</tr>
<tr>
<td>Low-temperature heat pump:</td>
<td>no</td>
</tr>
<tr>
<td>Equipped with a supplementary heater:</td>
<td>no</td>
</tr>
<tr>
<td>Heat pump combination heater:</td>
<td>no</td>
</tr>
</tbody>
</table>

Parameters shall be declared for medium-temperature application.

Parameters shall be declared for average, colder and warmer climate conditions.

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heat output (*)</td>
<td>$P_{\text{rated}}$</td>
<td>14.3</td>
<td>kW</td>
</tr>
<tr>
<td>Seasonal space heating energy efficiency</td>
<td>$\eta_s$</td>
<td>126</td>
<td>%</td>
</tr>
</tbody>
</table>

AVERAGE CLIMATE CONDITIONS

<table>
<thead>
<tr>
<th>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature $T_j$</th>
<th>$P_{\text{th}}$</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_j = -7 °C$</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>$T_j = +2 °C$</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>$T_j = +7 °C$</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>$T_j = +12 °C$</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>$T_j = \text{bivalent temperature}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Annual energy consumption $Q_{\text{HE}}$ 84 GJ

COLDER CLIMATE CONDITIONS

<table>
<thead>
<tr>
<th>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature $T_j$</th>
<th>$P_{\text{th}}$</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_j = -7 °C$</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>$T_j = +2 °C$</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>$T_j = +7 °C$</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>$T_j = +12 °C$</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>$T_j = \text{bivalent temperature}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For air-to-water heat pumps: $P_{\text{th}}$ 11.2 kW

Annual energy consumption $Q_{\text{HE}}$ 102 GJ

WARMER CLIMATE CONDITIONS

<table>
<thead>
<tr>
<th>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature $T_j$</th>
<th>$P_{\text{th}}$</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_j = +2 °C$</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>$T_j = +7 °C$</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>$T_j = +12 °C$</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>$T_j = \text{bivalent temperature}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Annual energy consumption $Q_{\text{HE}}$ 64 GJ

Bivalent temperature $T_{\text{biv}}$ $\leq T_{\text{designh}}$ °C

| Seasonal space heating energy efficiency | $\eta_s$ | 119 | % |

For air-to-water heat pumps: $P_{\text{th}}$ 17.4 kW

Annual energy consumption $Q_{\text{HE}}$ 64 GJ

Power consumption in modes other than active mode

| Off mode | $P_{\text{OFF}}$ | 0.000 | kW |
| Thermostat-off mode | $P_{\text{TO}}$ | 0.015 | kW |
| Standby mode | $P_{\text{ST}}$ | 0.005 | kW |
| Crankcase heater mode | $P_{\text{CK}}$ | - | kW |

Supplementary heater

Rated heat output $P_{\text{sup}}$ - kW

Type of energy input monovalent

Other items

<table>
<thead>
<tr>
<th>Capacity control</th>
<th>variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound power level, indoors/outdoors</td>
<td>$L_{\text{WA}}$ - 65 dB</td>
</tr>
</tbody>
</table>

For air-to-water heat pumps: Rated air flow rate, outdoors 4000 m³/h

For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger - m³/h

Contact details

Robur SPA, Via Parigi 4/6, I-24040 Zingonia (BG)

Additional information required by COMMISSION REGULATION (EU) No 813/2013, Table 2:

| Emissions of nitrogen oxides | $NO_x$ | 32 | mg/kWh |

(*) For heat pump space heaters and heat pump combination heaters, the rated heat output $P_{\text{rated}}$ is equal to the design load for heating $P_{\text{designh}}$, and the rated heat output of a supplementary heater $P_{\text{sup}}$ is equal to the supplementary capacity for heating $sup(T_j)$. 
Robur mission

Robur is dedicated to dynamic progression in research, development and promotion of safe, environmentally-friendly, energy-efficiency products, through the commitment and caring of its employees and partners.