Charger Low NOx Gas Fired Water Heater with Spark Ignition

Models:
CHL 275 G CE
CHL 375 G CE
CHL 550 G CE
IMPORTANT INFORMATION
These instructions must be read and understood before installing, commissioning, operating or maintaining the equipment.
Preface

Copyright

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Lochinvar Ltd. reserves the right to modify specifications in this manual.

Trademarks

Brand names in this manual are registered trademarks of their respective owners.

Warranty

Refer to the appendix Warranty (see 11.7) for the warranty provisions.

Liability

User

Lochinvar accepts no liability when the water heater is not used correctly and requires the user to:

• Read this manual carefully and obey the instructions.
• Ask your installation engineer for advise about the use of the water heater.
• Make sure that the service and maintenance activities are done by a qualified engineer.
• Store the manual, in good condition, near the water heater.

Installation engineer

Lochinvar accepts no liability when the water heater is not used correctly and requires the installation engineer to:

• Read this manual carefully and obey the instructions.
• Make sure that the entire water heater installation complies with the applicable regulations (on page 4).
• Make sure that the water heater is tested before the installation is taken into use.
• Explain the correct use to the user.
• Notify the user when service and maintenance activities are necessary.
• Make sure that you hand over all applicable manuals.
Supplier

The CHL water heater is designed in accordance with the applicable regulations. The water heater is delivered with the CE-marking and all necessary documentation to obey these regulations. See the compliance section, (on page 4)

Lochinvar accepts no liability for claims from third parties when:
- The instructions for the correct installation of the water heater are not obeyed.
- The instructions for the correct use of the water heater are not obeyed.
- The water heater did not have maintenance on the correct maintenance interval.

For more information, refer to the General Terms of Sales. These are available on request, free of charge.

We believe that this manual provides you with accurate and complete descriptions of all relevant components. If you, nonetheless find errors or inaccuracies in this manual, please inform Lochinvar. This helps us to further improve our documentation.

Compliance

To safely produce domestic hot water, the design and construction of the CHL water heaters is in accordance with:
- the European Regulations 2016/426 on appliances burning gaseous fuels (GAR).
- the European Standard for Gas–fired storage water heaters for the production of domestic hot water (EN89).
- The European ECO-Design Directive.
- The European Energy Labeling Directive

Refer to the appendix Declaration of conformity.

Regulations

It is law that all gas appliances are installed by competent persons, in accordance with The Gas Safety (Installation and Use) Regulations 1998. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that this law is complied with. The installation of the equipment MUST be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, I.E.E. Regulations and the bylaws of the local water undertaking.

In addition, the installation should follow the relevant guidance offered in the following documents. It is not practical to list all relevant information due to continuous changes but emphasis is placed on the following documents, as failure to comply with the guidance given will almost certainly result in an unsatisfactory installation:
- British Standards (BS), especially:
  - BS 5440-2 - Installation and maintenance of flues and ventilation for gas appliances
  - BS 6644 - Installation and maintenance of gas-fired hot water boilers
- Institute of Gas Engineers and Managers (IGEM) Publications
- CIBSE Guides
- Clean Air Act
- H.S.E Guidance

Note

Manufacturer’s notes must not be taken in any way as overriding statutory obligations.

Contact information

In the event of problems with your gas, electricity or water supply connections or when you have any comments or questions, please contact your (energy/water) supplier.
About this manual

Scope
This manual gives information about safe and correct use of the water heater and how installation, maintenance and service activities have to be done correctly. You must obey the instructions in this manual.

Caution
Read this manual carefully before you start the water heater. It can cause personal injury and damage to the water heater when you do not read the manual and/or do not obey the instructions.

The purpose of this manual is to:
• describe the working principles and layout of the water heater
• explain the safety devices
• highlight possible hazards
• describe the use of the water heater
• describe the installation, service and maintenance of the water heater

This manual has two parts:
• An User part that describes the correct usage of the water heater.
• An Installation, Maintenance and Service part, that describes the correct installation and maintenance procedures.

Target group
The information in this manual applies to three target groups:
• users
• installation engineers
• service and maintenance engineers

The User part is intended for the (end) users. The Installation, Maintenance and Service part is intended for the installation engineers and the service and maintenance engineers.

Notation conventions
This manual uses the following text conventions:
• Numbers between parentheses e.g. (1), refer to elements in a figure that are described by the text.
• Cross-references to sections, tables, figures etc. are underlined and written as (see "..."). In the digital version, the cross-references function as hyperlinks that can be used to navigate through the manual by clicking on them. Example: Safety (see 2).

This manual contains the following text styles/symbols for situations that may endanger users/engineers, cause damage to equipment or need special attention:

Note
A note gives more information on a topic.
Caution
Obey the caution instructions to prevent damage of the water heater.

Warning
Obey the warning instructions to prevent danger of personal injury, and serious damage to the water heater.

Document identification

<table>
<thead>
<tr>
<th>Article number</th>
<th>Language</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>0313395</td>
<td>EN</td>
<td>1.4</td>
</tr>
</tbody>
</table>
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>3</td>
</tr>
<tr>
<td>Copyright</td>
<td>3</td>
</tr>
<tr>
<td>Trademarks</td>
<td>3</td>
</tr>
<tr>
<td>Warranty</td>
<td>3</td>
</tr>
<tr>
<td>Liability</td>
<td>3</td>
</tr>
<tr>
<td>Compliance</td>
<td>4</td>
</tr>
<tr>
<td>Regulations</td>
<td>4</td>
</tr>
<tr>
<td>Contact information</td>
<td>4</td>
</tr>
<tr>
<td>About this manual</td>
<td>5</td>
</tr>
<tr>
<td>Scope</td>
<td>5</td>
</tr>
<tr>
<td>Target group</td>
<td>5</td>
</tr>
<tr>
<td>Notation conventions</td>
<td>5</td>
</tr>
<tr>
<td>Document identification</td>
<td>6</td>
</tr>
<tr>
<td>User part</td>
<td>11</td>
</tr>
<tr>
<td>1 Introduction</td>
<td>13</td>
</tr>
<tr>
<td>2 Safety</td>
<td>15</td>
</tr>
<tr>
<td>3 Interface</td>
<td>17</td>
</tr>
<tr>
<td>3.1 Operator interface</td>
<td>17</td>
</tr>
<tr>
<td>3.1.1 Control Switch</td>
<td>17</td>
</tr>
<tr>
<td>3.1.2 Temperature control knob</td>
<td>17</td>
</tr>
<tr>
<td>3.1.3 LCD display</td>
<td>18</td>
</tr>
<tr>
<td>3.2 Status of the water heater</td>
<td>18</td>
</tr>
<tr>
<td>3.2.1 Operating modes</td>
<td>18</td>
</tr>
<tr>
<td>3.2.2 Error conditions</td>
<td>19</td>
</tr>
<tr>
<td>4 Use</td>
<td>21</td>
</tr>
<tr>
<td>4.1 Turn on the water heater</td>
<td>21</td>
</tr>
<tr>
<td>4.1.1 Switch to ON mode</td>
<td>21</td>
</tr>
<tr>
<td>4.1.2 Set the water temperature</td>
<td>21</td>
</tr>
</tbody>
</table>
8.7.1 Preparation..................................................................................40
8.7.2 Mains power...............................................................................42
8.7.3 Additional error signal (optional)..................................................42
8.7.4 Finalization..................................................................................42
8.8 Commissioning...............................................................................43
8.8.1 Filling.........................................................................................43
8.8.2 Gas supply pressure........................................................................43
8.8.3 Burner pressure...........................................................................44
8.8.4 Air pressure differential.................................................................45
8.8.5 Turn on the water heater..............................................................45
8.9 Decommissioning............................................................................45
8.9.1 Turn off the water heater..............................................................45
8.9.2 Draining.......................................................................................45

9 Maintenance....................................................................................47
9.1 Performance check...........................................................................47
9.2 Preparation.....................................................................................48
9.3 Water-side maintenance.................................................................48
9.3.1 Inspect the anode.......................................................................48
9.3.2 Inspect the inlet security group...................................................49
9.3.3 Descale the tank..........................................................................49
9.4 Gas-side maintenance......................................................................50
9.4.1 Clean the burner.........................................................................50
9.4.2 Check the pilot burner.................................................................52
9.4.3 Clean the combustion chamber..................................................52
9.4.4 Assemble the burner....................................................................52
9.5 Finalization.......................................................................................52

10 Troubleshooting...............................................................................53
10.1 Errors and warnings......................................................................53
10.1.1 General errors...........................................................................53
10.1.2 Displayed errors........................................................................54

11 Appendices.....................................................................................61
11.1 Technical details...........................................................................61
11.2 Dimensions....................................................................................62
11.3 Gas details.....................................................................................65
11.4 Energy labeling...............................................................................66
11.5 Electrical wiring diagram...............................................................67
11.6 Declaration of conformity...............................................................69
11.7 Warranty.........................................................................................70
User part
1 Introduction

The CHL water heater stores and heats water for sanitary purposes. Cold water enters the bottom of the tank through the water inlet (1). The heated water leaves the tank at the top through the hot water outlet (2). To operate the water heater, the operator interface (3) and control switch (4) are used.

*Fig. CHL water heater*

1. Water inlet
2. Water outlet
3. Operator interface
4. Control switch
2 Safety

Lochinvar cannot be held responsible for damages or injuries which can be lead back to:

• Failure to follow the instructions provided in this manual.
• Carelessness during use or maintenance of the water heater.

Every user must study the user part of this manual and must follow the instructions in this part of the manual strictly. Do not change the sequence of the described actions. This manual must be available for the user and service engineer at all times.

Warning
If you smell gas:

• Shut off the mains gas supply valve!
• Avoid causing sparks! Do not use any electrical equipment or switch, i.e. no telephones, plugs or bells!
• No naked flames! No smoking!
• Open windows and doors!
• Warn occupants and leave the building!
• After leaving the building, alert the gas distribution company or your installation engineer.

Caution
Do not store or use chemical substances in the room where the water heater is installed because of the risk of explosion and corrosion of the water heater. Some propellants, bleaching agents and degreasing agents etc. disperse of explosive vapors and/or cause accelerated corrosion. If the water heater is used in a room where such substances are stored or used, the warranty will be void.

Caution
Installation, maintenance and service may only by carried out by a qualified engineer.

Caution
The water heater is not intended for use by persons (incl. children under the age of 16) with reduced physical, sensory or mental capacities, or who lack the necessary experience or knowledge. When the person responsible for their safety is supervising or has explained how the water heater should be used, these persons can use the water heater.

Caution
This water heater is not intended to be used by children under the age of 16. Always supervise children, and make sure that they do not play with the water heater.

Note
Regular maintenance extends the service life of the water heater. To determine the correct service interval, the service and maintenance engineer must do a check on both the water and gas side of the water heater three months after installation. Based on this check, the best service interval can be determined.
3 Interface

3.1 Operator interface

The operator interface consists of:
- a control switch (see 3.1.1) on the left side of the water heater.
- a temperature control knob (see 3.1.2) on the front of the water heater.
- a LCD display (see 3.1.3) to view the status of the water heater and to view errors.

![Operator interface diagram]

3.1.1 Control Switch

With the control switch you can turn the water heater on I or off O.

**Warning**
The power of the water heater stays on when the control switch is set to O.

3.1.2 Temperature control knob

With the temperature control knob you can set the desired water temperature (see 4.1.2) of the water heater.

When the water heater is switched on, you can use the temperature control knob to set the water heater in the **OFF mode** or in the **ON mode**:
- Turn the temperature control knob clockwise to ignite the main burner (**ON mode**).
- Turn the temperature control knob anticlockwise to shutdown the main burner (**OFF mode**).
- Turn the temperature control knob completely anticlockwise to reset the water heater.
3.1.3 LCD display

The LCD display shows 3 different symbols at the bottom side of the display and 4 characters in the center of the display. The characters represent a temperature or an error code.

Fig. LCD display

3.1.3.1 Symbols on the display

The symbols on the display give visual information about the status of the water heater.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heat demand present</td>
</tr>
<tr>
<td></td>
<td>Water heater in operation</td>
</tr>
<tr>
<td></td>
<td>Display shows a temperature</td>
</tr>
</tbody>
</table>

3.2 Status of the water heater

During operation, the display shows the status of the water heater.

3.2.1 Operating modes

The CHL has 2 operating modes:

- **OFF mode** (see 3.2.1.1)
- **ON mode** (see 3.2.1.2)

3.2.1.1 OFF mode

In the **OFF mode** the water heater is de-activated. The temperature control knob is set at the frost symbol between reset and 40 °C. The pilot flame is activated.

In the **OFF mode** the water heater is de-activated. The display shows the characters OFF.

Fig. OFF mode display

To prevent that the water in the water heater freezes, the frost protection is activated when the water heater is in **OFF mode**. The frost protection starts when the temperature of the water drops below 5°C. The display shows the characters Fr followed by the actual temperature. The water heater will heat the water to 20°C and then turns back to **OFF mode**.

Fig. Frost protection is activated
3.2.1.2 ON mode

In the ON mode the water heater continuously responds to the heat demand. The temperature control knob is set between 40 and 80 °C. The pilot flame is activated and ignites the main burners when there is a heat demand.

When the water heater is heating the water, the display on the operator interface alternately shows two different temperatures. The first shows the actual temperature, the second shows the setpoint temperature.

When the water heater is not heating the water, only the actual temperature is shown. The symbols Heat demand and In operation will not be shown.

3.2.2 Error conditions

If there is an error, the display shows an error code. Error codes always have one letter and two digits.

Note
When the display shows an error, try to reset the water heater. Contact your service and maintenance engineer or supplier when the water heater does not restart or when the display shows the error again.
4 Use

4.1 Turn on the water heater

4.1.1 Switch to ON mode

To start the water heater:
1. Make sure the water heater connects to the mains power supply.
2. Set the control switch at the left side of the water heater (see 1) to I.

Note
It is possible that the water heater starts immediately when you turn on the water heater.

Note
If necessary, set the water temperature (see 4.1.2).

4.1.2 Set the water temperature

Turn the temperature control knob to set the water temperature.

4.2 Turn off the water heater

4.2.1 Turn off for a short period

To turn off the water heater for less than 2 months:
1. Turn the temperature control knob anticlockwise to set the water heater in OFF mode.
2. Wait until the fan stops working.
3. Set the control switch at the left side of the water heater to 0.

Warning
The power of the water heater stays on when the control switch is set to 0.

Note
If the water heater is in OFF mode for more than 2 months and no water is drained, air bubbles may be formed in the water heater. This can lead to air in the water pipes.

4.2.2 Isolate from the mains

To isolate the water heater from the mains:
1. Turn the temperature control knob anticlockwise to set the water heater in OFF mode.
2. Wait until the fan stops working.
3. Set the control switch to 0.
4. Disconnect the water heater from the mains by turning the isolator.
4.2.3 Turn off for a long period

When the water heater needs to be turned off for more than 2 months, contact your service and maintenance engineer to decommission the water heater.
Installation, Maintenance and Service part
5 Introduction

5.1 About the water heater

The CHL water heater is intended for heating water for sanitary purposes.

The CHL is a gas–fired storage water heater. The flue gasses transfer their heat to the water through an heat exchanger. The water heater has an open flue gas discharge connection.

5.2 Working principle

Cold water enters the bottom of the tank through the water inlet (1). A heat exchanger (2) transfers the heat from the flue gasses to the water and the hot water leaves the tank through the water outlet (3) at the top of the tank. The tank of the water heater has to be completely filled during operation. The tank at least must remain under mains water supply pressure at any time. Fresh cold water is immediately added when hot water is drawn from the water heater. A temperature sensor measures the water temperature.

*Fig. CHL water heater*

1. Water inlet
2. Heat exchanger
3. Water outlet
When the temperature is too low, the water heater starts a operating cycle:

1. The controller detects a "heat demand".
2. The fan starts pre-purging.
3. The air proving switch closes when the air pressure differential is sufficient.
4. The spark plug is activated.
5. The gas valve opens and the pilot flame is ignited.
6. After flame detection the main valve opens and the main burners are ignited.
7. The water heater heats the water in the tank.
8. When the water temperature reaches the setpoint, the heat demand ends and the controller stops the operating cycle.
9. The fan starts post-purging.

The operating cycle starts again when a new heat demand is detected.
6 Safety

6.1 Safety instructions

For safety instructions on the use of the water heater, refer to Safety (see 2) in the User part of this manual.

**Warning**
Installation, maintenance and service must be carried out by a qualified engineer in compliance with the general and local regulations imposed by the gas and water supply companies and the fire brigade. The appliance may only be installed in a room that complies with the requirements stated in national and local ventilation regulations (on page 4).

**Warning**
Leave the water heater electrically isolated until you are ready to commission it.

**Caution**
The water heater may only be moved in an upright position. After unpacking, make sure that the water heater is not damaged.

**Caution**
Use of an incorrect roof flue terminal can cause the water heater to malfunction.

**Caution**
Make sure that the diameter of the gas supply pipe is large enough to supply sufficient capacity to the water heater.

**Caution**
Fill the water heater completely before use. Dry firing will damage the water heater.

**Caution**
After installation, maintenance or service, always check that the appliance is gas tight and make sure that the gas supply pressure, the burner pressure and the air pressure are correct. If the gas supply pressure is not correct, contact your mains gas supply company. Do not use the water heater.

**Danger**
Never deactivate the T.R.S.. Backdraft of flue gas can lead to a dangerous situation.

**Caution**
To prevent that you damage the components of the water heater, make sure that it completely stopped operation before you isolate the water heater from the mains. Wait 1 minute after you switch the water heater to OFF mode.
6.2 Instructions on the water heater

The water heater has some safety instructions on its cover:

- The text "Read the installation instructions before installing the appliance".
- The text "Read the user instructions before putting the appliance into operation".

Also the packaging has some safety instructions:

- The text "Read the installation instructions before installing the appliance".
- The text "Read the user instructions before putting the appliance into operation".
- The text "The appliance may only be installed in a room that meets the required ventilation regulations".
- Some safety pictograms:

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="CE" /></td>
<td>CE approved</td>
</tr>
<tr>
<td><img src="image" alt="this way up" /></td>
<td>this way up</td>
</tr>
<tr>
<td><img src="image" alt="fragile" /></td>
<td>fragile</td>
</tr>
<tr>
<td><img src="image" alt="keep dry" /></td>
<td>keep dry</td>
</tr>
<tr>
<td><img src="image" alt="maximum stacking height is 2" /></td>
<td>maximum stacking height is 2</td>
</tr>
</tbody>
</table>
6.3 Safety devices

Fig. Safety devices

<table>
<thead>
<tr>
<th>Safety devices of the water heater:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas control valve (1)</strong></td>
<td>The gas control valve controls the gas supply to the burner.</td>
</tr>
<tr>
<td><strong>Temperature sensors (2)</strong></td>
<td>The water heater controls the water temperature using two temperature sensors. When the water temperature is too high (&gt; 88 ºC), the water heater shows a blocking error because this is the maximum temperature. When the water temperature decreases to &lt; 80 ºC, the blocking error is removed.</td>
</tr>
<tr>
<td><strong>Safety thermostat (3)</strong></td>
<td>The safety thermostat makes sure that the gas supply is shut off when the water temperature is too high (&gt; 95 ºC), for safety. The water heater shows a lock-out error. Turn the temperature control knob completely anticlockwise to reset the water heater when the water temperature is decreased to &lt; 80 ºC.</td>
</tr>
<tr>
<td><strong>T.R.S. (Thermal Reflux Safeguard) (4)</strong></td>
<td>The T.R.S. detects the presence of returning flue gases on the draught diverter. The T.R.S. detects an increase of temperature in the edge of the draft diverter. When the temperature becomes too high, the gas supply is closed.</td>
</tr>
<tr>
<td><strong>Air proving switch (5)</strong></td>
<td>The air proving switch checks the air flow during post-purging, when the water heater is in operation and during pre-purging. This guarantees that there is sufficient air supply.</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Igniter/Flame probe (6)</strong></td>
<td>The igniter/flame probe ignites the pilot burner and detects if there is a flame.</td>
</tr>
</tbody>
</table>

### Safety devices of the installation:

<table>
<thead>
<tr>
<th><strong>Inlet security group</strong></th>
<th>An inlet security group has a stop valve, a non return valve and a pressure relief valve. The inlet security group prevents excessive pressure in the tank and back flow of expansion water into the cold water main supply.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure-reducing valve</strong></td>
<td>The pressure-reducing valve reduces the water mains pressure, if necessary.</td>
</tr>
<tr>
<td><strong>Temperature and pressure relief valve (T&amp;P valve) (1)</strong></td>
<td>The T&amp;P valve prevents excessive pressure and temperature in the tank.</td>
</tr>
</tbody>
</table>

1- All water heaters have a T&P valve connection.
6.4 Environmental aspects

6.4.1 Recycling

The packaging material is environmentally friendly, recyclable and relatively easy to discard.

6.4.2 Disposal

Old end-of-life appliances contain materials that need to be recycled. When you discard devices at the end of their service life, you must obey local legislation related to waste disposal.

Never discard your old device together with regular waste. Put the device into a municipal waste collection depot for electrical and electronic equipment. If necessary, ask your supplier or your service and maintenance engineer for advice.
7 Water heater

7.1 Structure of the water heater

The water heater has the following main components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller (10)</td>
<td>The controller monitors and manages all internal processes of the water heater for a safe operation.</td>
</tr>
<tr>
<td>Operator interface (9)</td>
<td>To control the water heater and to verify the status, the operator interface has a temperature control knob and a 4-character display. Refer to Operator interface (see 3.1).</td>
</tr>
<tr>
<td>Tank (3)</td>
<td>The water is stored and heated up in the tank.</td>
</tr>
<tr>
<td>Burner (8)</td>
<td>At the burner the air and gas mixture are ignited to heat up the water.</td>
</tr>
</tbody>
</table>

![Components water heater](image)

1. Combustion chamber
2. Temperature sensors
3. Tank
4. Heat exchanger
5. Fan
6. Pilot burner
7. Igniter/Flame probe
8. Burner
9. Operator interface
10. Controller
11. Gas control valve
12. Drain valve
8 Installation

**Warning**
The installation must be done by a qualified person, in compliance with general and local applicable regulations (on page 4).

**Caution**
The water heater may not be used in rooms where chemical substances are stored or used because of the risk of explosion and corrosion of the water heater. Some propellants, bleaching agents and degreasing agents etc. disperse of explosive vapors and/or cause accelerated corrosion. If the water heater is used in a room where such substances are stored or used, the warranty will be void.

For more safety instructions, refer to Safety instructions (see 6.1).

8.1 Packaging
Lochinvar recommends to unpack the water heater at or near its intended location. Remove the packaging material carefully to prevent damage to the water heater.

8.2 Conditions
The water heater must be installed, separated from living area's, with adequate ventilation and a suitable flue gas discharge (BS5440–2–2009, BS6644–2011 and IGEM/UP/10 Edition 4).

8.2.1 Ambient conditions
The installation site must be frost-free. If necessary, adjust the installation site to keep it frost-free.

Make sure that the ambient conditions are correct to prevent malfunction of the electronics in the water heater.

<table>
<thead>
<tr>
<th>Air humidity and ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air humidity</td>
</tr>
<tr>
<td>Ambient temperature</td>
</tr>
</tbody>
</table>

8.2.2 Maximum floor load
Refer to the building construction engineer and the general specifications in the appendices (see 11) to make sure that the maximum floor load is sufficient for the weight of the water heater.
8.2.3 Water composition

The water must comply with the regulations for drinking water for human consumption.

<table>
<thead>
<tr>
<th>Water composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water hardness</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
</tr>
<tr>
<td>Acidity (pH value)</td>
</tr>
</tbody>
</table>

**Note**

Water quality may adversely affect the efficiency, performance and lifetime of the water heater, refer to Warranty (on page 3). If water specifications differ from the specifications in the table a water treatment specialist should be consulted.

8.2.4 Working clearances

Make sure that there is sufficient clearance to access the water heater:

- 100 cm in front of the water heater (AA).
- 50 cm at the left and right side of the water heater (BB).
- 100 cm at the top of the water heater.

**Fig. Working clearances**
8.3 Installation diagram

Fig. Installation diagram

1. Pressure reducing valve (mandatory if the mains water pressure is too high)
2. T&P valve (optional)
3. Stop valve (recommended)
4. Non-return valve
5. Circulation pump (optional)
6. Shunt pump
7. Drain valve
8. Manual gas valve
9. Service stop valve
10. Temperature gauge (optional)
11. Draw-off point
12. Expansion valve
13. Expansion vessel
14. Cold water supply
15. Hot water outlet
16. Circulation pipe (optional)
17. Gas supply

Note
Use this installation diagram when you:

- install the water connections (see 8.4)
- install the gas connection (see 8.5)
- fill the water heater (see 8.8.1)
- drain the water heater (see 8.9.2)

8.4 Water connections

8.4.1 Cold water connection

Install the cold water connection:
1. Install an approved stop valve (4), as required by the applicable regulations (on page 4).
2. Install an approved pressure reducing valve (1) to prevent that the pressure in the cold water supply pipe exceeds the maximum working pressure of the tank, 8 bar. Refer to the Technical details.
3. Install a non-return valve (5).
4. Install an expansion valve (15).
5. Connect the overflow connection of the expansion valve, to an open waste water pipe.
6. Install an expansion vessel (16).

8.4.2 Hot water connection

Note
Insulate long hot water pipes to prevent unnecessary energy loss.
Install the hot water connection:
1. Install a stop valve (11) in the hot water outlet pipe for service reasons.
2. If applicable, install a temperature gauge (12).
3. Install a T&P valve (3).

8.4.3 Circulation connection

Install a circulation system when an immediate flow of hot water at draw-off points is required. This improves comfort and reduces water wastage.

**Note**
Use the drain valve connection (9) as a connection of the circulation pipe on the water heater.

**Note**
Make sure that the circulation pump has the correct capacity for the length and resistance of the circulation system.

Install a circulation pump:
1. Install a circulation pump (6).
2. Install a non-return valve (5) after the circulation pump to make sure that the direction of circulation is guaranteed.
3. Install a stop valve (4) before the circulation pump.
4. Install a stop valve (4) after the non-return valve.
5. Connect the circulation pipe to the drain valve (9).

8.4.4 Drain valve

Install the drain valve:
1. Fasten the drain valve (9) in the connection in the front of the water heater.
2. Place the cap over the connection to make it watertight.

8.5 Gas connection

**Caution**
Make sure that the gas supply pipe has the correct diameter and length to supply sufficient capacity to the water heater.

**Caution**
Make sure that the gas supply pipe is clean. Contamination in the pipe can cause damage to the gas control valve, during operation.

**Caution**
Install a manual gas valve on a spot accessible for the user.

Install the gas connection:
1. Install the manual gas valve (10) in the gas supply pipe.
2. Make sure that the gas pipe is clean before use. If necessary, remove the contamination from the pipe.
4. Install the gas supply pipe to the gas control valve.
5. Make sure that there are no gas leaks.
8.6 Flue gas discharge

Caution
It is not allowed to make changes to the flue gas discharge or to apply casings on it.

Install the flue gas discharge:
1. Make sure that there is a draught diverter installed on top of the water heater (see 8.6.1).
2. Connect the T.R.S. (see 8.6.2).
3. Install the discharge pipe (see 8.6.3).

8.6.1 Draught diverter

On delivery a draught diverter is installed on top of the water heater.

For the correct installation to the discharge pipe, it can be necessary to replace the draught diverter with another one. Please contact your supplier for advice. You can order one of the following alternative draught diverters.

<table>
<thead>
<tr>
<th>Lochinvar Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHL 275</td>
</tr>
<tr>
<td>Default</td>
</tr>
<tr>
<td>Alternative 1</td>
</tr>
<tr>
<td>Alternative 2</td>
</tr>
</tbody>
</table>

Fig. Default draught diverter

Fig. Draught diverter alternative 1
8.6.2 **T.R.S. (Thermal Reflux Safeguard)**

The T.R.S. (Thermal Reflux Safeguard) is pre-installed on the draught diverter and connected to the water heater.

8.6.3 **Discharge pipe**

Install a vertical discharge pipe directly on top of the draught diverter. This pipe must have at least 50 cm of length before the first bent.

**Note**

Make sure that the discharge pipe is protected against corrosion and has at least the same diameter of the draught diverter.

8.7 **Electrical connections**

**Warning**

Leave the water heater electrically isolated until you are ready to commission it.

8.7.1 **Preparation**

Remove the cover of the water heater to make the electrical section and the terminal block visible:

1. Use a screw driver to remove three screws at the left side (1) and three screws on the right side (2) of the cover.
2. Take the cover from the water heater (3).

3. Disconnect the plug (4) from the display board at the inside of the cover.
4. Use a screw driver to remove the screw at the left side of the control cover (5).

5. Hinge the control cover to the front (6) and remove it carefully from the water heater (7).
6. Use a screw driver to remove the screws at the left side panel (8).

7. Move the left side panel to the left (9) until it is positioned horizontally.
The mains power and optional electrical connections have to be connected to the terminal block of the controller, refer to Structure of the water heater (see 7.1).

**Fig. Terminal block**

1. Cable gland
2. Electrical connection
3. Connection additional error signal

### 8.7.2 Mains power

**Note**
The water heater is supplied without a power cable and isolator. Use a power cable with cores of at least 3 x 0,75 mm² and an overvoltage category III, double–pole isolator with a contact gap of at least 3 mm. The double–pole isolator must be incorporated in the fixed wiring in accordance with the wiring rules.

Connect the water heater to the mains power supply:
1. Pull the power cable through the cable gland.
2. Connect the mains neutral core to N, the mains live core to L and the mains earth core to A.
3. Connect the power cable to the double pole isolator.
4. Secure the power cable in the cable gland.

**Note**
The length of the mains earth core, that is connected to the electrical connection, must be longer than the core of the mains neutral and live.

### 8.7.3 Additional error signal (optional)

The appliance has a 230V ac output that is switched when an error is detected. This can be used to signal errors, for example with a bulb. A 230V circuit can be switched directly. Other voltages require a relay.

1. Pull the cables through the cable gland.
2. Connect the neutral core (N) to X1 and live core (L) to X2 on the terminal block (see 11.5).
3. Secure the cables in the cable gland.

### 8.7.4 Finalization

When all connections are made, install the covers on the water heater:
1. Place the left side panel vertically and use a screw driver to tighten the screws on the bottom side.
2. Place the control cover back:
   a) Place the hook at the front in the correct position.
   b) Hinge the cover backwards to place it in the correct position.
   c) Use a screw driver to tighten the screw on the left side of the control cover.
3. Connect the plug at the inside to the display board.
4. Place the cover back.
5. Use a screw driver to tighten the three screws at the left side and the three screws on the right side of the cover.

8.8 Commissioning

To commission the water heater:
1. Fill the water heater (see 8.8.1).
2. Check the gas supply pressure (see 8.8.2).
3. Check the burner pressure (see 8.8.3).
4. Check the air pressure (see 8.8.4).
5. Turn on the water heater (see 8.8.5).

8.8.1 Filling

Refer to the installation diagram when you fill the water heater:
1. Open the stop valve (11) in the hot water supply pipe.
2. If applicable, open the stop valves (4) of the circulation pipe (C).
3. Make sure that the drain valve (9) is closed.
4. Open the nearest hot water draw-off point (14).
5. Open the stop valve (4) of the cold water supply pipe (A). Cold water flows into the water heater.
6. Fill the water heater until a full water jet flows from the nearest draw-off point. The water heater is completely full.
7. Open all draw-off points to bleed the entire installation of air. The water heater is now under water supply pressure.
8. Make sure that no water comes out of the expansion valve (15) or the T&P valve (3). If water comes out:
   - Examine if the water supply pressure is greater than the specified value in the Technical details. If necessary, install a pressure reducing valve (1).
   - Examine if the expansion valve in the protected cold supply set-up is installed correctly and is not defect. If necessary, replace the expansion valve.

8.8.2 Gas supply pressure

Check the gas supply pressure:
1. Loosen the sealing screw (2) of the test nipple by a few turns.

   **Note**
   Do not completely loosen the sealing screw, it can be difficult to retighten it.

2. Open the gas supply to vent the gas pipes through the test nipple.
3. Connect a pressure gauge to the test nipple as soon as you smell gas.
4. Turn on the water heater (see 4.1).
5. If necessary, create a heat demand:
   - Use a hot water draw-off point to tap water, or
   - Raise the setpoint of the water temperature, refer to Set the water temperature (see 4.1.2).
6. Wait about 1 minute.
7. Use the pressure gauge to read the supply pressure and compare it with the value from the appendix Gas details.

   **Note**
   Consult the mains gas supply company if the supply pressure is not correct. Take the water heater out of service until the supply pressure is correct, refer to section Decommissioning (see 8.9).

8. Set the control switch on the front of the water heater to 0 to turn off the water heater (see 4.2).
9. Shut off the gas supply.
10. Disconnect the pressure gauge.
11. Tighten the sealing screw in the test nipple.

**Fig. Gas supply pressure**

8.8.3 **Burner pressure**

Make sure that the burner pressure is set correctly.

Check the burner pressure:
1. Remove the sealing screw of the test nipple (1).
2. Connect a pressure gauge to the test nipple.
3. Turn on the water heater (see 4.1).
4. If necessary, create a heat demand:
   - Use a hot water draw-off point to tap water, or
   - Use the temperature control knob to raise the setpoint of the water temperature (see 4.1.2).
5. Wait about 1 minute.
6. Use the pressure gauge to read the burner pressure and compare it with the value from the appendix Gas details (see 11.3).
7. If necessary, correct the burner pressure with the pressure adjustment screw (2). Turn the screw anticlockwise to decrease the burner pressure or clockwise to increase the burner pressure.
8. Turn the water heater off (see 4.2).
9. Disconnect the pressure gauge.
10. Replace the sealing screw and tighten it on the test nipple.

**Fig. Burner pressure**
8.8.4 Air pressure differential

Check the air pressure across the air pressure switch:

1. Remove the cover from the water heater (see 8.7.1).
   Leave the control cover on the water heater.
2. Pull the pressure gauge hose through the right side of the water heater housing (1).
3. Disconnect the hose (2) of the air pressure switch (3) and use a T-piece to connect this side of the hose to the - of the pressure gauge.
4. Connect the remaining port of the T-piece to the air proving switch.
5. Place the cover back (see 8.7.4).
6. Turn on the water heater (see 4.1).
7. Wait about 1 minute.
8. Use the pressure gauge to read the air pressure differential and compare it with the value from the table (see 11.1).

**Note**

When the air pressure differential is not correct, refer to Displayed errors (see 10.1.2), error LDS with code F03.

9. Turn the water heater off (see 4.2).
10. Disconnect the pressure gauge.
11. Remove the T-piece.
12. Reconnect the hose to the air proving switch.

---

8.8.5 Turn on the water heater

Refer to the procedure in the user part to Turn on the water heater (see 4.1).

8.9 Decommissioning

To decommission the water heater:

1. Turn off the water heater (see 8.9.1)
2. Drain the water heater (see 8.9.2)

8.9.1 Turn off the water heater

Refer to the procedure in the user part to Turn off the water heater (see 4.2) and isolate the water heater from the mains power supply.

8.9.2 Draining

Refer to the installation diagram when you drain the water heater:

1. Close the manual gas valve (10).
2. If applicable, close the service stop valve (11) in the hot water pipe.
3. Close the stop valve (10).
4. Open the drain valve (9).
5. Aerate the entire installation of air until the water heater is completely drained.
The water heater needs maintenance at least once a year. The maintenance interval is determined by the water quality, the average burning time each day and the set water temperature.

To determine the correct interval, Lochinvar recommends to do a system check on both the water and the gas side, three months after installation.

**Note**
Do maintenance to maintain an effective and efficient transfer of heat to the water. This significantly increases the service life of the water heater.

**Note**
When needed, spare parts can be ordered. To be sure that you receive the correct spare parts, look at the data plate for the full serial number, the water heater model, and the used gas category. Use this information when you order the spare parts.

Do the following maintenance activities:
- Performance check (see 9.1)
- Water side maintenance (see 9.3)
- Gas side maintenance (see 9.4)
- Finalization (see 9.5).

**Note**
For maintenance purposes, a special gasket and mounting set must be ordered at your supplier. This kit contains the necessary gaskets, bolts and washers. Look at the data plate for the correct ordering information.

### 9.1 Performance check

Check if the performance of all components is correct:

1. Make sure that the water heater operates the operating cycle correctly.
2. If applicable, make sure that the T&P valve operates correctly.
   - Open the T&P valve pressure relief and make sure that water spurt out.
   - **Warning**
     - Hot water can come out of the T&P valve.
3. Make sure the pressure relief connection of the inlet security group operates correctly.
   - Open this pressure relief and make sure that water spurt out.
4. Remove the covers from the water heater, refer to Installation (see 8.7.1).
5. Make sure that there are no leaks in the flue gas discharge.
6. Make sure the gas supply pressure is correct, refer to Gas supply pressure (see 8.8.2).
7. Make sure the burner pressure is correct, refer to Burner pressure (see 8.8.3).
8. Make sure the air pressure is correct, refer to Air pressure (see 8.8.4).
9.2 Preparation
Isolate the water heater from the mains before you start maintenance tasks.

9.3 Water-side maintenance
To do water side maintenance:
- Inspect the anode (see 9.3.1)
- Inspect the inlet security group (see 9.3.2)
- Descale the tank

9.3.1 Inspect the anode
The life cycle of the anode is determined by the quality and the quantity of the water that flows through the water heater. Inspect the anode at least once a year to make sure that the tank is protected against corrosion.

To inspect the anode:
1. Close the cold water supply.
2. Open the nearest hot water tap to reduce the water pressure in the water heater.
3. Disconnect the discharge pipe.
4. Remove the draught diverter.
5. Use a screw driver to remove the screws from the top cover.
6. Remove the top cover.
7. Remove the inner cover.
8. Remove the four anodes (1).

9. Inspect the diameter of the anode. When the diameter of the anode is less than 8.4 mm somewhere along the length of the anode, replace the anode.

Note
If the anode needs to be replaced, always use an anode of the same type. Please refer to the type and the serial number on the data plate.

10. Place the anode in the water heater.
11. Use a wrench to fasten the anode. Make sure that the connection is watertight.

Note
Never install an anode isolated from the metal tank.

12. Replace the inner cover.
13. Replace the isolation.
14. Replace the top cover.
15. Install the draught diverter please refer to the installation instructions delivered with the draught diverter.
16. Reconnect the discharge pipe.

9.3.2 Inspect the inlet security group

To inspect the inlet security group:
1. Check if the cold water supply is open. If not, open the cold water supply.
2. Open the relief valve of the inlet security group and make sure that the water flows out with a full jet of water.
3. Close the relief valve.
4. Check if the water is drained through the tundish. If not, remove the blockage.
5. Check the water flow again by opening the relief valve.

9.3.3 Descale the tank

Note
Hard water may cause the formation of limescale, which will reduce the operating efficiency and may cause early product failure. Failure of the water heater due to limescale or other deposits would not be classed as manufacturing defect and as such would not be covered under the terms of the warranty (on page 3).

To descale and clean the tank:
1. Decommission the water heater (see 8.9).
2. Loosen the two screws (1) to remove the cover plate on side of the tank (2).

3. Push the isolating material aside to see the cleaning opening.
4. Loosen the 6 bolts (3).

5. Remove the cleaning opening cover (4).
6. Remove the gasket (5).
7. Inspect the tank (6) and remove the loose scale deposits and contamination:
   a) Remove the scale and contamination by hand.
   b) If necessary use a descaling agent to remove the scale and contamination from
      the tank. Contact Lochinvar for advice on what descaling agent to use.
8. Replace the gasket.
9. Close the cleaning opening.
10. Use a torque wrench to tighten the bolts with a maximal torque of 50 Nm to prevent
    damage to the tank.
11. Put the isolating material in place.
12. Put the cover plate in place and tighten the two screws.
13. Fill the water heater (see 8.8.1).

9.4 Gas-side maintenance

Do gas side maintenance when the water heater does not operate correctly, the air
pressure is not correct and/or the burner pressure is not correct.

To do gas side maintenance:
- Clean the burner (see 9.4.1)
- Check the pilot burner (see 9.4.2)
- Clean the combustion chamber (see 9.4.3)

9.4.1 Clean the burner

Caution
Be careful, the burner can be hot

Caution
Always replace the gaskets after removal of the burner. Look at the data plate for the
correct ordering information.

Note
Mind the ground cable!

Remove the burner:
1. Close the manual gas valve, refer to Installation diagram (see 8.3).
2. Place a screw driver through the air inlet opening on the right side of the housing (1) to loosen the screw (2) at the inside of the housing.

3. Remove the four nuts (3).

4. Carefully pull the complete burner assembly out of the water heater.

*Fig. Remove the burner assembly*

Use a brush to remove all contamination from the burner.
9.4.2 Check the pilot burner

Make sure that the pilot burner is in a good condition:
1. Remove contamination from the igniter and the pilot burner.
2. Make sure that the distance between the igniter and the pilot burner is between 0.26 cm and 0.40 cm.

Fig. Distance between igniter and pilot burner

9.4.3 Clean the combustion chamber

If necessary, remove the contamination in the combustion chamber (1) by hand.

9.4.4 Assemble the burner

Assemble the burner again when the main burner, the pilot burner and the combustion chamber are cleaned.

Note

Before reassembly replace the gasket, bolts and washers. You must order a special gasket and mounting set at your supplier. Look at the data plate for the correct ordering information.

Refer to the figures in Clean the burner (see 9.4.1) to assemble the burner:
1. Carefully place the burner assembly into the water heater.
2. Tighten the burner assembly with the four nuts.
   a) Tighten the two nuts on the right side by hand.
   b) Tighten the two nuts on the left side by hand.
   c) Fully tighten the two nuts on the right side.
   d) Fully tighten the two nuts on the left side.
3. Use a screw driver through the air inlet opening on the right side of the housing to replace the screw at the inside of the housing.
4. Open the gas control valve, refer to Installation diagram (see 8.3).

9.5 Finalization

When all maintenance activities are done:
1. Fill the water heater (see 8.8.1).
2. Make sure the gas supply pressure is correct, refer to Gas supply pressure (see 8.8.2).
3. Make sure the burner pressure is correct, refer to Burner pressure (see 8.8.3).
4. Make sure the air pressure is correct, refer to Air pressure differential (see 8.8.4).
5. Turn on the water heater (see 4.1).
10 Troubleshooting

10.1 Errors and warnings

The water heater can have two different kinds of errors:

- General errors (see 10.1.1), which are not displayed
- Displayed errors (see 10.1.2), which are divided in two different groups:
  - Lock out errors: when the cause is removed, you can reset the error to resume operation. The displayed code and the back-light of the display blink.
  - Blocking errors: when the cause is removed, the error resets automatically to resume operation. The code is displayed continuously and the back-light of the display blinks.

10.1.1 General errors

Note
For the coding of the connections, refer to the Electrical wiring diagram.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas smell</td>
<td>There is a gas leak</td>
<td>- Close the mains gas valve at once.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Do not operate any switches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- No naked flames.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ventilate the boiler room.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Immediately contact your installation engineer or your local gas company.</td>
</tr>
<tr>
<td>The display is off</td>
<td>The water heater is off.</td>
<td>Turn on the water heater (see 4.1).</td>
</tr>
<tr>
<td></td>
<td>There is no supply voltage.</td>
<td>Make sure that:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- the control switch is set to I.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- the isolator is in ON position.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- there is power on the isolator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- there is power to the electrical connector block.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The measured voltage must be 230 VAC (-15%, +10%).</td>
</tr>
<tr>
<td></td>
<td>Defective fuse(s)</td>
<td>Replace the fuse(s).</td>
</tr>
<tr>
<td>Water leakage</td>
<td>There is a leakage from a threaded water connection.</td>
<td>Tighten the threaded connection.</td>
</tr>
<tr>
<td></td>
<td>There is a leakage from another nearby water heater or pipe segment.</td>
<td>Trace the leakage.</td>
</tr>
<tr>
<td></td>
<td>There is a leakage from the water heater tank.</td>
<td>Contact the supplier of your water heater.</td>
</tr>
</tbody>
</table>
**Explosive ignition**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>The gas supply pressure is incorrect.</td>
<td>Check the gas supply pressure, refer to <strong>Gas supply pressure</strong> (see 8.8.2).</td>
<td></td>
</tr>
<tr>
<td>The burner pressure is incorrect.</td>
<td>Check the burner pressure, refer to <strong>Burner pressure</strong> (see 8.8.3).</td>
<td></td>
</tr>
<tr>
<td>The burner is contaminated.</td>
<td>Clean the burner, refer to <strong>Gas-side maintenance</strong> (see 9.4).</td>
<td></td>
</tr>
</tbody>
</table>

**Insufficient or no hot water**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>The water heater is off.</td>
<td>Turn on the water heater (see 4.1).</td>
<td></td>
</tr>
<tr>
<td>There is no supply voltage.</td>
<td>Make sure that:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- the control switch is set to <strong>I</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- the isolator is in <strong>ON</strong> position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- there is power on the isolator.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- there is power to the electrical connector block.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The measured voltage must be <strong>230 V AC</strong> (-15%, +10%).</td>
<td></td>
</tr>
<tr>
<td>The hot water supply is used up.</td>
<td>Reduce the hot water consumption. Wait until the water heater heats up.</td>
<td></td>
</tr>
<tr>
<td>The controller is in the <strong>OFF mode</strong>.</td>
<td>Set the controller in the <strong>ON mode</strong> (see 4.1.1).</td>
<td></td>
</tr>
<tr>
<td>The temperature (<strong>T&lt;sub&gt;set&lt;/sub&gt;</strong>) is set too low.</td>
<td>Set the temperature (<strong>T&lt;sub&gt;set&lt;/sub&gt;</strong>) to a higher value (see 4.1.2).</td>
<td></td>
</tr>
</tbody>
</table>

### 10.1.2 Displayed errors

**Note**

For the coding of the connections, refer to the Electrical wiring diagram.

**Note**

Contact your service and maintenance engineer if the error persists.

<table>
<thead>
<tr>
<th>Code and description</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E02 (lock out error)</strong></td>
<td>Internal error from the controller.</td>
<td>Reset the controller.</td>
</tr>
<tr>
<td>Control error</td>
<td></td>
<td>If the error reappears, replace the controller.</td>
</tr>
<tr>
<td><strong>E03 (blocking error)</strong></td>
<td>More than 5 resets detected in a 15 minutes.</td>
<td>Wait for the error to disappear (maximal 1 hour).</td>
</tr>
<tr>
<td>Control error</td>
<td></td>
<td>If the error does not disappear, replace the controller</td>
</tr>
<tr>
<td><strong>E04 (blocking error)</strong></td>
<td>The temperature in the tank is above 88ºC.</td>
<td>- Tap off water, so the temperature drops in the water heater.</td>
</tr>
<tr>
<td>Temperature error</td>
<td></td>
<td>- Make sure that there is no scale on the temperature sensor. If necessary, replace the sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the temperature is below 80ºC, the error is reset automatically.</td>
</tr>
<tr>
<td>Code and description</td>
<td>Cause</td>
<td>Measure</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| **E04 (lock out error)**  
Flue gas error | The flue gas sensors have a difference of > 10K. during a period longer than 1 minute. | Make sure that the sensor wiring is connected and not damaged. Reset the controller.  
If necessary replace the sensor and/or wiring if the error reappears. |
| **E05 (lock out error)**  
Control error | Control was in a blocking error for at least 20 hours. | - Reset the controller.  
If the error reappears:  
- Find the cause of the blocking error.  
- Remove the cause and reset the controller.  
If the error reappears, replace the controller. |
| **E06 (blocking error)**  
Flue gas error | The temperature of the flue gas is above 70ºC. | Make sure that there are no blockages in the chimney flue pipe.  
After 10 minutes, the error is reset automatically, when the temperature is below 70ºC. |
| **F02 (lock out error)**  
Fan error  
Fan does not run on correct speed | Damaged or disconnected wiring. | - Make sure that the wiring between the fan and the controller is connected and not damaged.  
- If necessary, replace the wiring. Reset the controller when the wiring is reconnected  
Contaminated or blocked fan.  
- Make sure that the motor and/or rotor of the fan are not dirty or blocked.  
- If necessary remove the dirt and/or blockage.  
- Reset the controller.  
- Make sure that the rotor of the fan can rotate freely and reset the controller.  
Due to a drop in supply voltage, the fan will not run at the correct speed.  
- Make sure that the supply voltage is correct and reset the controller.  
The measured voltage must be 230 V<sub>AC</sub> (-15%, +10%)  
- Contact your maintenance and service engineer when the supply voltage is not correct.  
Defective motor and/or rotor.  
- Make sure that the motor and/or rotor are not defective and reset the controller.  
- Replace the fan when the motor and/or rotor are defective and reset the controller. |
<table>
<thead>
<tr>
<th>Code and description</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
</table>
| F03 (lock out error) | Damaged wiring/closed circuit. | - Make sure that the wiring, between the air proving switch and the control, is connected and not damaged.  
- If necessary replace the wires or reconnect the wires. Reset the controller, when wires are replaced or reconnected. |
| Air proving switch error |  |  |
| Switch is closed when fan is not running. |  |  |
| Air proving switch defect. |  | - Make sure that the air proving switch works properly.  
- If necessary, replace the air proving switch.  
- When the air proving switch is replaced and reconnected, reset the controller. |
<table>
<thead>
<tr>
<th>Code and description</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F03 (lock out error)</strong>&lt;br&gt;Air proving switch error</td>
<td>Switch is not closed when fan is running.</td>
<td>Fan is not running.</td>
</tr>
<tr>
<td></td>
<td>Hose is damaged.</td>
<td>Make sure that the hose, between the air proving switch and the fan is not damaged and reset the controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary replace the hose.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the hose is replaced and reconnected, reset the controller.</td>
</tr>
<tr>
<td></td>
<td>Wiring is damaged.</td>
<td>Make sure that the wiring, between the air proving switch and the control, is connected and not damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, replace the wires or reconnect the wires.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the wires are replaced or reconnected, reset the controller.</td>
</tr>
<tr>
<td></td>
<td>Air proving switch defect.</td>
<td>Make sure that the air proving switch works properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, replace the air proving switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the air proving switch is replaced and reconnected, reset the controller.</td>
</tr>
<tr>
<td></td>
<td>Leakage of air between fan and the restriction plate.</td>
<td>Check the gasket between the fan and the restriction plate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, replace the gasket.</td>
</tr>
<tr>
<td></td>
<td>Incorrect restriction plate on the fan.</td>
<td>Make sure that the restriction plate has the correct diameter (see 11.3).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, replace the restriction plate.</td>
</tr>
<tr>
<td></td>
<td>Not enough pressure differential across the air proving switch, due to:</td>
<td>Check, after each fix, if the error reappears. If the error reappears continue in finding the cause.</td>
</tr>
<tr>
<td></td>
<td>- dirty burner</td>
<td>Measure the pressure differential across the air proving switch, refer to Air pressure differential (see 8.8.4).</td>
</tr>
<tr>
<td></td>
<td>- blocked heat exchanger</td>
<td>Burner:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make sure that the the burner is clean.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measure the pressure differential across the air proving switch again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heat exchanger:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the pressure differential is insufficient, clean the heat exchanger.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measure the pressure differential across the air proving switch again.</td>
</tr>
<tr>
<td>Code and description</td>
<td>Cause</td>
<td>Measure</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>F04 (lock out error) Ignition error</strong>&lt;br&gt;Five unsuccessful ignition attempts.</td>
<td>No gas.</td>
<td>- Make sure that the main gas supply valve is open. If necessary, open the valve.&lt;br&gt;- Make sure that the manual gas supply valve, before the gas control valve, is open. If necessary, open the valve.&lt;br&gt;- Make sure that the gas supply pressure to the gas control valve is correct, refer to <strong>Gas supply pressure</strong> (see 8.8.2).&lt;br&gt;&lt;br&gt;Air in the gas pipes.</td>
</tr>
<tr>
<td></td>
<td>Defect in the ignition/ionisation circuit.</td>
<td>- Check the pilot burner (see 9.4.2).&lt;br&gt;- Make sure that the wiring of the igniter is not damaged.&lt;br&gt;If necessary, replace the igniter.</td>
</tr>
<tr>
<td></td>
<td>Ceramic part of the igniter/flame probe is broken or cracked.</td>
<td>- Make sure that the ceramic part of the igniter/flame probe is not broken or cracked.&lt;br&gt;- If necessary, replace the igniter/flame probe.</td>
</tr>
<tr>
<td></td>
<td>Supply voltage too low.</td>
<td>- Make sure that the supply voltage on the controller is correct.&lt;br&gt;- If the supply voltage is below the stated tolerance and the error persists, contact your maintenance and service engineer.</td>
</tr>
<tr>
<td><strong>F05 (lock out error) Flame error</strong>&lt;br&gt;Too many flame failures are detected</td>
<td>No sufficient gas supply.</td>
<td>Make sure that the gas supply pressure is correct.&lt;br&gt;Air in the gas pipes.</td>
</tr>
<tr>
<td></td>
<td>Not enough air supply.</td>
<td>Make sure that the ventilation is according to the <strong>local requirements</strong> (see 8.2).</td>
</tr>
<tr>
<td></td>
<td>Defect in the ignition/ionisation circuit.</td>
<td>- Check the pilot burner (see 9.4.2).&lt;br&gt;- Make sure that the wiring of the igniter is not damaged.&lt;br&gt;If necessary, replace the igniter.</td>
</tr>
<tr>
<td></td>
<td>Ceramic part of the igniter/flame probe is broken or cracked.</td>
<td>- Make sure that the ceramic part of the igniter/flame probe is not broken or cracked.&lt;br&gt;- If necessary, replace the igniter/flame probe.</td>
</tr>
<tr>
<td></td>
<td>Supply voltage too low.</td>
<td>- Make sure that the supply voltage on the controller is correct.&lt;br&gt;- If the supply voltage is below the stated tolerance and the error persists, contact your maintenance and service engineer.</td>
</tr>
<tr>
<td><strong>F08 (lock out error) Ionization error</strong>&lt;br&gt;Ionization measured before the gas control valve was opened</td>
<td>False flame signal.</td>
<td>- Reset the controller.&lt;br&gt;- If error appears again, replace the controller and/or the gas control valve.</td>
</tr>
<tr>
<td>Code and description</td>
<td>Cause</td>
<td>Measure</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>F09</strong> (lock out error)</td>
<td>Temperature error</td>
<td>Temperature, in the tank is above the 95ºC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- See measure of error E01.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the wiring between 2 and 8 and 4 and 11 of X13 is connected and not damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If necessary, replace or reconnect the wiring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When the wiring is reconnected, reset the controller.</td>
</tr>
<tr>
<td><strong>F10</strong> (lock out error)</td>
<td>Air proving switch error</td>
<td>Air pressure switch is opened, during burning, 5 times in one heating cycle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See measure of error F03, excluding the measure &quot;The fan is not running&quot;.</td>
</tr>
<tr>
<td><strong>F12</strong> (lock out error)</td>
<td>Flue gas error</td>
<td>More than four E06 errors within 1 hour and/or within the same warming up attempt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that there are no blockages in the chimney flue pipe. If necessary remove any blockages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the chimney flue pipe is according the requirements. If necessary, adjust the chimney flue pipe configuration.</td>
</tr>
<tr>
<td><strong>F19</strong> (blocking error)</td>
<td>Supply voltage error</td>
<td>Three unsuccessful ignition attempts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is not enough supply voltage during 60 seconds. The measured voltage between live and neutral must be 230 V(<em>{AC}) (-15%, +10%). The supply voltage between live and earth must be between 110 V(</em>{AC}) and 230 V(_{AC}) (-15%, +10%).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the supply voltage on the controller is correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If the supply voltage is above or below the stated tolerance and the error persists, contact your maintenance and service engineer.</td>
</tr>
<tr>
<td><strong>F21</strong> (lock out error)</td>
<td>Gas valve error</td>
<td>Feedback signal of the main valve is not correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Damaged wiring/open circuit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the wiring between the air proving switch and the control is connected and not damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If necessary, replace or reconnect the wiring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When the wiring is replaced or reconnected, reset the controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gas valve or controller defect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Check the burner pressure (see 8.8.3) to make sure that the main valve opens.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If necessary, replace the gas valve.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When the gas valve is replaced, reset the controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If the error reappears, replace the controller.</td>
</tr>
<tr>
<td><strong>S01</strong> (blocking error)</td>
<td>Sensor error</td>
<td>Open circuit from the bottom tank temperature sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor not (correctly) connected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the connector is connected to X13 (4 and 11).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the wire is connected to the sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Damaged wiring and/or defective sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace the wiring and/or sensor.</td>
</tr>
<tr>
<td><strong>S02</strong> (blocking error)</td>
<td>Sensor error</td>
<td>Open circuit from the top tank temperature sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor is not (correctly) connected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the connector is connected to X13 (2 and 8).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Make sure that the wire is connected to the sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Damaged wiring and/or defective sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace the wiring and/or sensor.</td>
</tr>
<tr>
<td>Code and description</td>
<td>Cause</td>
<td>Measure</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| **S04** (lock out error) Sensor error | Open circuit from flue gas sensor 1 | Sensor is not (correctly) connected. | - Make sure that the connector is connected to X13 (5 and 12).  
- Make sure that the wire is connected to the sensor.  
Damaged wiring and/or defective sensor. | Replace the wiring and/or sensor. |
| **S05** (lock out error) Sensor error | Open circuit from flue gas sensor 2 | Sensor is not (correctly) connected. | - Make sure that the connector is connected to X13 (6 and 13).  
- Make sure that the wire is connected to the sensor.  
Damaged wiring and/or defective sensor. | Replace the wiring and/or sensor. |
| **S11** (blocking error) Sensor error | Short circuit of the bottom tank temperature sensor | Short circuit in the sensor circuit. | Replace the wiring and/or sensor. |
| **S12** (blocking error) Sensor error | Short circuit of the top tank temperature sensor | Short circuit in the sensor circuit. | Replace the wiring and/or sensor. |
| **S14** (lock out error) Sensor error | Short circuit in flue gas sensor 1 | Short circuit in the sensor circuit. | Replace the wiring and/or sensor. |
| **S15** (lock out error) Sensor error | Short circuit in flue gas sensor 2 | Short circuit in the sensor circuit. | Replace the wiring and/or sensor. |
## 11 Appendices

### 11.1 Technical details

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>L</td>
<td>294</td>
<td>351</td>
<td>328</td>
</tr>
<tr>
<td>Empty Weight</td>
<td>kg</td>
<td>245</td>
<td>272</td>
<td>308</td>
</tr>
<tr>
<td>Maximum floor load</td>
<td>kg</td>
<td>533</td>
<td>616</td>
<td>630</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>kPa (bar)</td>
<td>800 (8)</td>
<td>800 (8)</td>
<td>800 (8)</td>
</tr>
<tr>
<td>Control thermostat - adjustment range</td>
<td>°C</td>
<td>40-80</td>
<td>40-80</td>
<td>40-80</td>
</tr>
<tr>
<td>Control thermostat - default value</td>
<td>°C</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Hysteresis upwards - adjustment range</td>
<td>°C</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hysteresis upwards - default value</td>
<td>°C</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hysteresis downwards - adjustment range</td>
<td>°C</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hysteresis downwards - default value</td>
<td>°C</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Number of (electrical) anodes</td>
<td></td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Fan operating speed</td>
<td>rpm</td>
<td>3300</td>
<td>3300</td>
<td>3300</td>
</tr>
<tr>
<td>Minimum measured air pressure</td>
<td>Pa</td>
<td>&gt;300</td>
<td>&gt;300</td>
<td>&gt;300</td>
</tr>
<tr>
<td>differential across the pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setpoint pressure switch</td>
<td>Pa</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Heating time ΔT = 45 °C</td>
<td>min.</td>
<td>19</td>
<td>17</td>
<td>12</td>
</tr>
</tbody>
</table>
### Electrical

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical power consumption (peak)</td>
<td>W</td>
<td>110</td>
<td>120</td>
<td>130</td>
</tr>
<tr>
<td>Electrical power consumption (nominal)</td>
<td>W</td>
<td>65</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Electrical power consumption (standby)</td>
<td>W</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Supply voltage / Main frequency</td>
<td>VAC / Hz</td>
<td>230 (-15%, +10%) / 50 (+/- 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

#### Dimensions water heater with default draught diverter

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Height</td>
<td>mm</td>
<td>1740</td>
<td>1995</td>
<td>1965</td>
</tr>
<tr>
<td>D</td>
<td>Width</td>
<td>mm</td>
<td>705</td>
<td>705</td>
<td>705</td>
</tr>
<tr>
<td>E1</td>
<td>Depth</td>
<td>mm</td>
<td>605</td>
<td>605</td>
<td>605</td>
</tr>
<tr>
<td>E2</td>
<td>Depth</td>
<td>mm</td>
<td>355</td>
<td>355</td>
<td>355</td>
</tr>
<tr>
<td></td>
<td>Depth (E1 + E2)</td>
<td>mm</td>
<td>960</td>
<td>960</td>
<td>960</td>
</tr>
<tr>
<td>G</td>
<td>Flue gas outlet</td>
<td>mm</td>
<td>150</td>
<td>180</td>
<td>200</td>
</tr>
</tbody>
</table>

#### Dimensions water heater with alternative 1 draught diverter

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Height</td>
<td>mm</td>
<td>1675</td>
<td>1880</td>
<td>1950</td>
</tr>
<tr>
<td>D</td>
<td>Width</td>
<td>mm</td>
<td>705</td>
<td>705</td>
<td>705</td>
</tr>
<tr>
<td>E1</td>
<td>Depth</td>
<td>mm</td>
<td>605</td>
<td>605</td>
<td>605</td>
</tr>
<tr>
<td>E2</td>
<td>Depth</td>
<td>mm</td>
<td>695</td>
<td>695</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td>Depth (E1 + E2)</td>
<td>mm</td>
<td>1300</td>
<td>1300</td>
<td>1355</td>
</tr>
<tr>
<td>G</td>
<td>Flue gas outlet</td>
<td>mm</td>
<td>150</td>
<td>180</td>
<td>225 (^1)</td>
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</tbody>
</table>

#### Dimensions water heater with alternative 2 draught diverter

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Height</td>
<td>mm</td>
<td>1750</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>D</td>
<td>Width</td>
<td>mm</td>
<td>705</td>
<td>705</td>
<td>705</td>
</tr>
<tr>
<td>E1</td>
<td>Depth</td>
<td>mm</td>
<td>605</td>
<td>605</td>
<td>605</td>
</tr>
<tr>
<td>E2</td>
<td>Depth</td>
<td>mm</td>
<td>610</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td>Depth (E1 + E2)</td>
<td>mm</td>
<td>1215</td>
<td>1355</td>
<td>1355</td>
</tr>
<tr>
<td>G</td>
<td>Flue gas outlet</td>
<td>mm</td>
<td>150</td>
<td>180</td>
<td>225 (^1)</td>
</tr>
</tbody>
</table>

1. Use an adapter Ø225-250 mm to connect the flue gas outlet to the water heater. This adapter can be ordered at your supplier.
<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cold water supply connection (male)</td>
<td>-</td>
<td>R 1 1/2</td>
<td>R 1 1/2</td>
<td>R 1 1/2</td>
</tr>
<tr>
<td>2</td>
<td>Hot water outlet connection (female)</td>
<td>-</td>
<td>R 1 1/2</td>
<td>R 1 1/2</td>
<td>R 1 1/2</td>
</tr>
<tr>
<td>3</td>
<td>Gas control valve connection (male)</td>
<td>-</td>
<td>Rp 3/4</td>
<td>Rp 3/4</td>
<td>Rp 3/4</td>
</tr>
<tr>
<td>4</td>
<td>Drain valve connection (female)</td>
<td>-</td>
<td>1&quot; NPT</td>
<td>1&quot; NPT</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>5</td>
<td>T&amp;P-valve connection (female)</td>
<td>-</td>
<td>3/4&quot; NPT</td>
<td>1&quot; NPT</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>6</td>
<td>Cleaning/inspection opening</td>
<td>mm</td>
<td>95x70</td>
<td>95x70</td>
<td>95x70</td>
</tr>
</tbody>
</table>
Fig. Dimensions water heater

Fig. Default draught diverter

Fig. Draught diverter alternative 1

Fig. Draught diverter alternative 2
# 11.3 Gas details

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas category 2H - G20</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter of the orifices</td>
<td>mm</td>
<td>3,150</td>
<td>2,819</td>
<td>3,607</td>
</tr>
<tr>
<td>Diameter of the orifice restrictor</td>
<td>mm</td>
<td>26,9</td>
<td>23,2</td>
<td>19,1</td>
</tr>
<tr>
<td>Diameter of the fan restrictor</td>
<td>mm</td>
<td>43,2</td>
<td>52,1</td>
<td>82,6</td>
</tr>
<tr>
<td>Nominal Load (lower value)</td>
<td>kW</td>
<td>54,0</td>
<td>73,0</td>
<td>99,0</td>
</tr>
<tr>
<td>Nominal Load (gross)</td>
<td>kW</td>
<td>60,0</td>
<td>81,1</td>
<td>109,9</td>
</tr>
<tr>
<td>Nominal output</td>
<td>kW</td>
<td>49,1</td>
<td>66,4</td>
<td>89,9</td>
</tr>
<tr>
<td>Gas consumption (1)</td>
<td>m³/h</td>
<td>5,7</td>
<td>7,7</td>
<td>10,5</td>
</tr>
<tr>
<td>Supply pressure</td>
<td>mbar</td>
<td>20,0</td>
<td>20,0</td>
<td>20</td>
</tr>
<tr>
<td>Burner pressure</td>
<td>mbar</td>
<td>7,0</td>
<td>6,7</td>
<td>6,5</td>
</tr>
<tr>
<td>CO₂ (2)</td>
<td>vol%</td>
<td>5,9 ± 1,0 (default)</td>
<td>4,9 ± 1,0 (default)</td>
<td>5,6 ± 1,0 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,3 ± 1,0 (alt. 1)</td>
<td>5,9 ± 1,0 (alt. 1)</td>
<td>4,9 ± 1,0 (alt. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7,3 ± 1,0 (alt. 2)</td>
<td>6,3 ± 1,0 (alt. 2)</td>
<td>6,2 ± 1,0 (alt. 2)</td>
</tr>
<tr>
<td>O₂ (2)</td>
<td>vol%</td>
<td>10,4 ± 1,8 (default)</td>
<td>12,2 ± 1,8 (default)</td>
<td>10,9 ± 1,8 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,7 ± 1,8 (alt. 1)</td>
<td>10,4 ± 1,8 (alt. 1)</td>
<td>12,2 ± 1,8 (alt. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7,9 ± 1,8 (alt. 2)</td>
<td>9,7 ± 1,8 (alt. 2)</td>
<td>9,8 ± 1,8 (alt. 2)</td>
</tr>
<tr>
<td>NOₓ emission</td>
<td>mg/kWh GCV</td>
<td>45</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Mass flow rate flue gases (nominal load) (2)</td>
<td>kg/h</td>
<td>145 (default)</td>
<td>234 (default)</td>
<td>279 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>136 (alt. 1)</td>
<td>196 (alt. 1)</td>
<td>317 (alt. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>118 (alt. 2)</td>
<td>184 (alt. 2)</td>
<td>253 (alt. 2)</td>
</tr>
<tr>
<td>Mass flow rate flue gases (minimal load) (2)</td>
<td>kg/h</td>
<td>145 (default)</td>
<td>234 (default)</td>
<td>279 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>136 (alt. 1)</td>
<td>196 (alt. 1)</td>
<td>317 (alt. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>118 (alt. 2)</td>
<td>184 (alt. 2)</td>
<td>253 (alt. 2)</td>
</tr>
<tr>
<td>Flue gas temperature (nominal load) (2)</td>
<td>°C</td>
<td>161 (default)</td>
<td>172 (default)</td>
<td>158 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>126 (alt. 1)</td>
<td>97 (alt. 1)</td>
<td>85 (alt. 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>133 (alt. 2)</td>
<td>129 (alt. 2)</td>
<td>131 (alt. 2)</td>
</tr>
</tbody>
</table>

1 - Based on 1013.25 mbar and 15°C.
2 - This value is different for the different draught diverters. Make sure you have the correct article number, refer to Draught diverter (see 8.6.1).
### 11.4 Energy labeling

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>CHL 275</th>
<th>CHL 375</th>
<th>CHL 550</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Declared load profile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load profile</td>
<td>XXL</td>
<td>XXL</td>
<td>3XL</td>
<td></td>
</tr>
<tr>
<td>Energy efficiency class (Energy label)</td>
<td>B</td>
<td>B</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Energy efficiency %</td>
<td>66</td>
<td>66</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Daily electricity consumption kWh</td>
<td>0,105</td>
<td>0,105</td>
<td>0,123</td>
<td></td>
</tr>
<tr>
<td>Daily fuel consumption kWh GCV</td>
<td>36,748</td>
<td>37,135</td>
<td>65,315</td>
<td></td>
</tr>
<tr>
<td>Mixed water 40 °C (V40) l</td>
<td>¥</td>
<td>¥</td>
<td>762</td>
<td></td>
</tr>
<tr>
<td><strong>Additional load profile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load profile</td>
<td>-</td>
<td>3XL</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Energy efficiency class (Energy label)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Energy efficiency %</td>
<td>-</td>
<td>71</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Daily electricity consumption kWh</td>
<td>-</td>
<td>0,129</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Daily fuel consumption kWh GCV</td>
<td>-</td>
<td>65,809</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mixed water 40 °C (V40) l</td>
<td>-</td>
<td>570</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
11.5 Electrical wiring diagram

Fig. Electrical wiring diagram
**Cable colors**
1. Brown
2. Blue
3. Green/Yellow
4. Black
5. White
6. Red
7. Grey
8. Green
9. Orange

**Terminal block connections**
A. Earth
N. Neutral
L. Phase input
X1. Additional error signal
X2. Additional error signal

**Components**
A. Control
B. Pilot burner
C. Display
D. Temperature sensor (flue gas)
E1. Temperature sensor (T1 - top of tank)
E2. Safety thermostat
F. Temperature sensor (T2 - bottom of tank)
G. Pressure switch
H. Control switch
J1. Fan (PWM control)
J2. Fan (power supply)
K. Gas valve
M. Line filter
P. Additional error signal (0.8A)
Q. Main switch
R. Earth connection housing
F1. Fuse (T3, 15AL-250V)
F2. Fuse (T3, 15AL-250V)
Declaration of conformity

Lochinvar Limited
7 Lombard Way
The MXL Centre
Banbury - United Kingdom

hereby declares that the following products:

Product description: Commercial Gas Fired Water Heater
Product family name: Charger Low NOx
Product models: CHL 275, CHL 375, CHL 550

on the assumption that the installation instructions have been followed are complaint to:

- Gas Appliance Regulations (GAR) - 2016/426
  - EN 89:2015
- Low Voltage Directive (LVD) - 2006/95/EG
  - EN 60335-1:2012
- Electromagnetic Compatibility Directive (EMC) - 2004/108/EG
  - EN 55014-1:2017
  - EN 55014-2:2015
  - EN 61000-3-2:2014
  - EN 61000-3-3:2013
- Pressure Equipment Directive (PED) - 2014/68/EG
  - Based on Art. 4, Sub 3. (PS < 10 bar, pressure vessel for non-hazardous fluids)
- ECO Design Directive (EoP) - 2009/125/EG
  - Commission regulation No. 814/2013 based on notices 2014/C - 207/03
- Energy Labelling Directive - 2010/30/EG
  - Commission regulation No. 812/2013

as stated in the EC type-examination report, 180700637, by KIWA Gastec Certification b.v., The Netherlands.

Company: Lochinvar Limited
Date: April 1, 2019
Signature: E. van Driel
Managing Director
11.7 Warranty

Article 1: General warranty
If within 1 (one) year of the invoice date or commissioning date of a water heater supplied by Lochinvar Ltd., following verification, and at the sole discretion of Lochinvar Ltd., an assembly or part (with exclusion of the tank) proves to be defective or fails to function correctly due to manufacturing and/or material defects, then Lochinvar Ltd. shall repair or replace this assembly or part.

Article 2: Tank warranty
If, after inspection and at the sole discretion of Lochinvar, the glass-lined steel tank of a water heater supplied by Lochinvar proves within 3 (three) years of the original installation date to be leaking due to rust or corrosion occurring on the water side, then Lochinvar shall offer to replace the defective water heater with an entirely new water heater of equivalent size and quality. The warranty period given on the replacement water heater shall be equal to the remaining warranty period of the original water heater that was supplied. Notwithstanding that stated earlier in this article, in the event that unfiltered or softened water is used, or allowed to stand in the water heater, the warranty shall be reduced to one year from the original installation date.

Article 3: Conditions for Installation and Use
The warranty set out in Articles 1 and 2 will apply solely under the following conditions:
• The water heater is installed under strict adherence to Lochinvar installation instructions for the specific model, and the relevant government and local authority installation and building codes, rules and regulations in force at the time of installation.
• The water heater remains installed at the original site of installation.
• The water heater is used exclusively with drinking water, which at all times can freely circulate (a separately installed heat exchanger is mandatory for heating saline water or corrosive water).
• The tank is safeguarded against harmful scaling and lime build-up by means of periodic maintenance.
• The water temperatures in the heater do not exceed the maximum setting of the thermostats, which form a part of the water heater.
• The water pressure and/or heat load do not exceed the maximum values stated on the water heater rating plate.
• The water heater is installed in a non-corrosive atmosphere or environment.
• The water heater is connected to a protected cold water supply arrangement, which is approved by the relevant authority; with sufficient capacity for this purpose; supplying a water pressure not greater than the working pressure stated on the water heater; and where applicable by a likewise approved temperature and pressure relief valve; fitted in accordance with installation instructions of Lochinvar applying to the specific model of water heater, and further in compliance with the government and local authority installation and building codes, rules and regulations.

Article 4: Exclusion
The warranty set out in articles 1 and 2 will not apply in the event of:
• damage to the water heater caused by an external factor;
• misuse, neglect (including frost damage), modification and incorrect and/or unauthorized use of the water heater;
• contaminants or other substances having been allowed to enter the tank;
• any attempts at repair to a defective water heater other than by an approved service engineer.
• damage caused by lack of maintenance and / or excessive amounts of scale inside the unit.
Article 5: Scope of the warranty
The obligations of Lochinvar Ltd. pursuant to the specified warranty are limited to free delivery from the warehouse of the replacement assemblies, parts or water heater, respectively. Labor, installation and any other costs associated with the replacement will not be accepted by Lochinvar Ltd.

Article 6: Claims
A claim on grounds of the specified warranty must be submitted to the dealer from whom the water heater was purchased, or to another authorized dealer of Lochinvar Ltd.. Inspection of the water heater as referred to in articles 1 and 2 shall take place in one of the laboratories of Lochinvar Ltd.

Article 7: Obligations of Lochinvar Ltd.
Lochinvar Ltd. grants no other warranty or guarantee over its water heaters nor the (assemblies or parts of) water heaters supplied for replacement, other than the warranty expressly set out in these conditions. Under the terms of the supplied warranty, Lochinvar Ltd. is not liable for damage to persons or property caused by (assemblies or parts, or the glass-lined steel tank of) a (replacement) water heater that it has supplied.
# Index

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch to ON mode</td>
<td>21</td>
</tr>
<tr>
<td>Environmental aspects</td>
<td>31</td>
</tr>
<tr>
<td>Errors and warnings</td>
<td>53</td>
</tr>
<tr>
<td>Fitting</td>
<td>43</td>
</tr>
<tr>
<td>Finalization</td>
<td>42, 52</td>
</tr>
<tr>
<td>Flue gas discharge</td>
<td>39</td>
</tr>
<tr>
<td>Checking the pilot burner</td>
<td>52</td>
</tr>
<tr>
<td>Circulation connection</td>
<td>38</td>
</tr>
<tr>
<td>Clean the burner</td>
<td>50</td>
</tr>
<tr>
<td>Clean the combustion chamber</td>
<td>52</td>
</tr>
<tr>
<td>Cold water connection</td>
<td>37</td>
</tr>
<tr>
<td>Commissioning</td>
<td>43</td>
</tr>
<tr>
<td>Compliance</td>
<td>4</td>
</tr>
<tr>
<td>Conditions</td>
<td>35</td>
</tr>
<tr>
<td>Contact information</td>
<td>4</td>
</tr>
<tr>
<td>Control Switch</td>
<td>17</td>
</tr>
<tr>
<td>Copyright</td>
<td>3</td>
</tr>
<tr>
<td>Declaration of conformity</td>
<td>69</td>
</tr>
<tr>
<td>Decommissioning</td>
<td>45</td>
</tr>
<tr>
<td>Descale the tank</td>
<td>49</td>
</tr>
<tr>
<td>Dimensions</td>
<td>62</td>
</tr>
<tr>
<td>Discharge pipe</td>
<td>40</td>
</tr>
<tr>
<td>Displayed errors</td>
<td>54</td>
</tr>
<tr>
<td>Disposal</td>
<td>31</td>
</tr>
<tr>
<td>Document identification</td>
<td>6</td>
</tr>
<tr>
<td>Drain valve</td>
<td>38</td>
</tr>
<tr>
<td>Draining</td>
<td>45</td>
</tr>
<tr>
<td>Draught diverter</td>
<td>39</td>
</tr>
<tr>
<td>Electrical connections</td>
<td>40</td>
</tr>
<tr>
<td>Electrical wiring diagram</td>
<td>67</td>
</tr>
<tr>
<td>Energy labeling</td>
<td>66</td>
</tr>
<tr>
<td>Liability</td>
<td>3</td>
</tr>
<tr>
<td>Mains power</td>
<td>42</td>
</tr>
<tr>
<td>Maintenance</td>
<td>47</td>
</tr>
<tr>
<td>Maximum floor load</td>
<td>35</td>
</tr>
<tr>
<td>Notation conventions</td>
<td>5</td>
</tr>
</tbody>
</table>

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