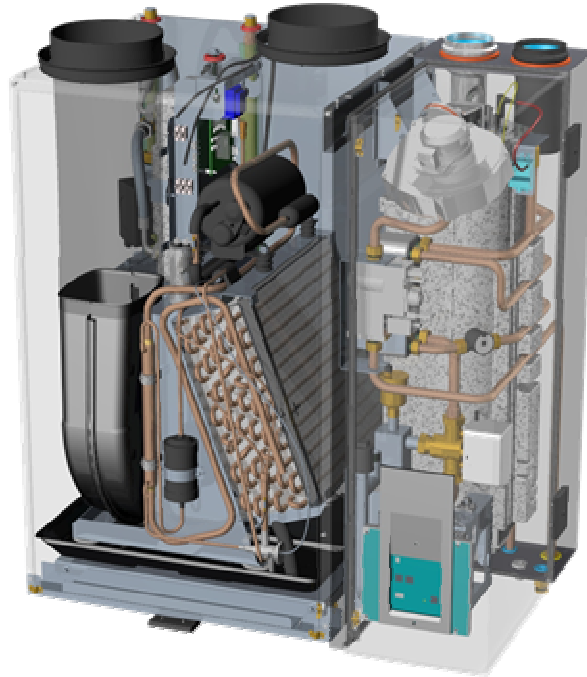


Atmos



CombinAir



Installation Instructions

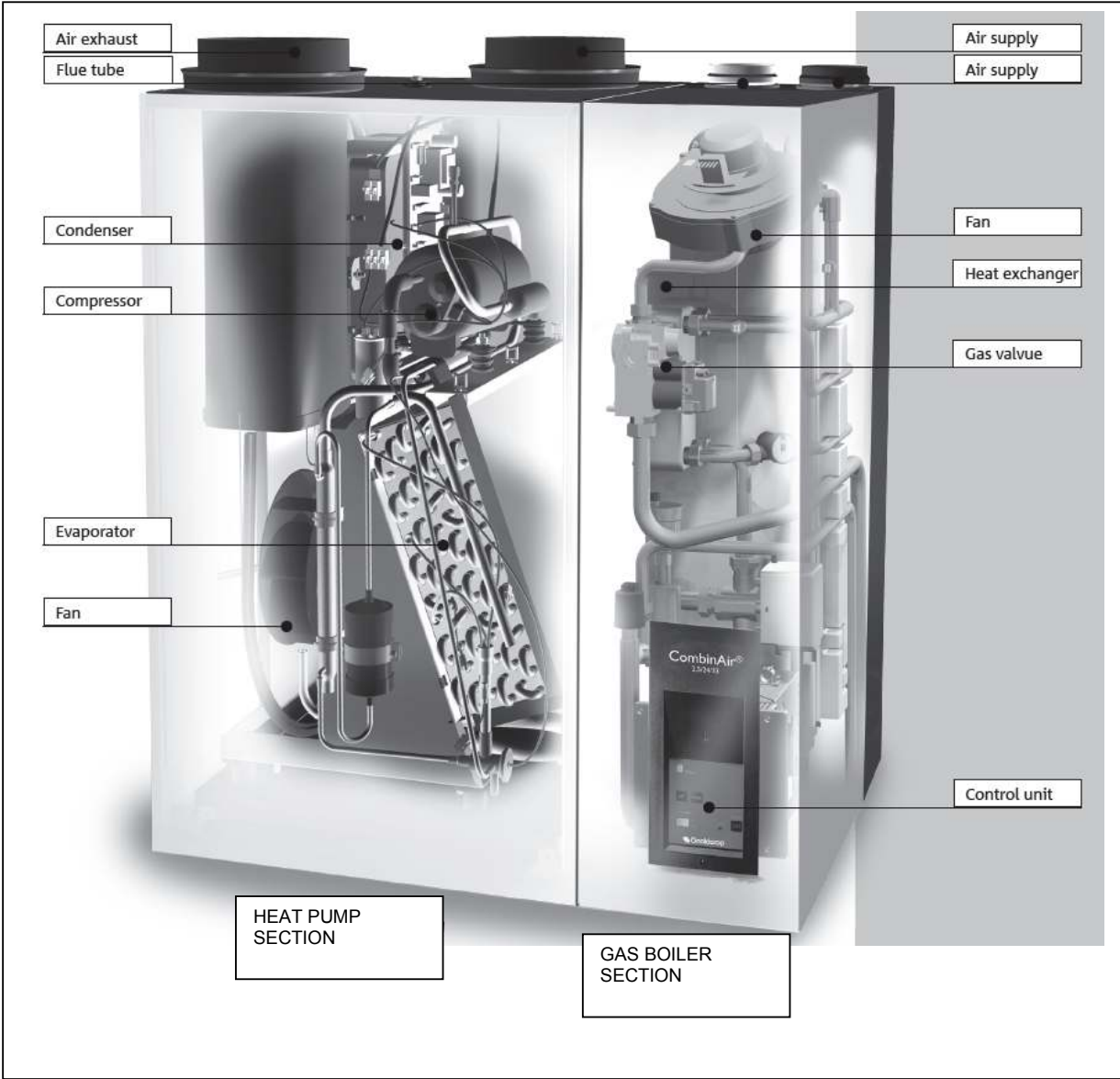
Atmos Heating Systems
West March
Daventry
Northants, NN11 4SA
Tel: 01327 871990
Fax: 01327 871905
e-mail: sales@atmos.uk.com
internet: www.atmos.uk.com

Issue 04.09.09
(revised)

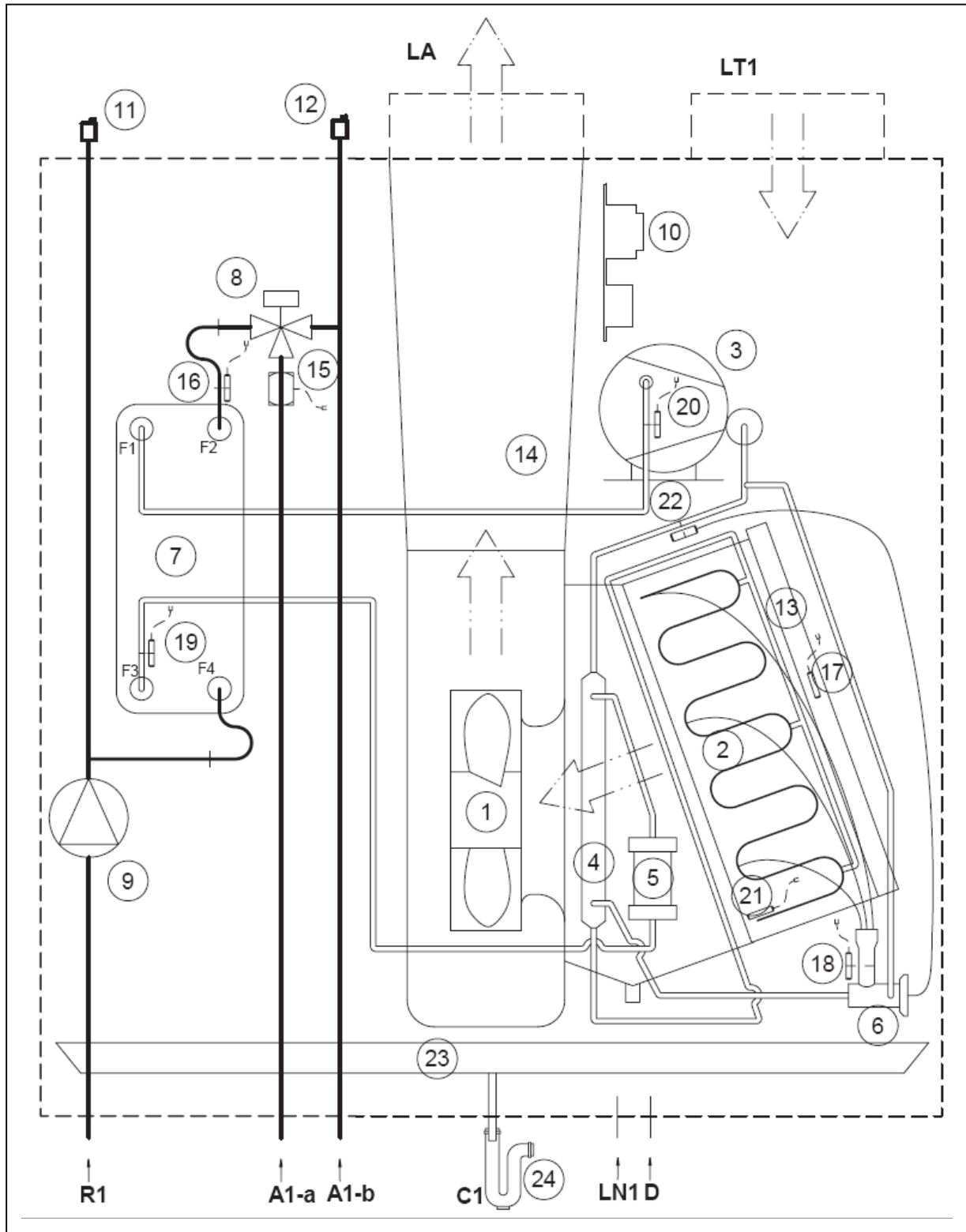
TABLE OF CONTENTS

INTERIOR OF THE ATMOS COMBINAIR	3
CROSS SECTION OF THE ATMOS COMBINAIR	4
COMPONENTS HEAT PUMP SECTION	5
COMPONENTS GAS BOILER SECTION	7
INTRODUCTION	8
1 SAFETY	8
2 INSTALLATION INSTRUCTIONS	8
3 OPERATION AND CONSTRUCTION	9
3.1 CONSTRUCTION OF THE APPLIANCE	9
3.2 OPERATION OF THE APPLIANCE	12
3.3 OPERATION	13
4 COMBINAIR INSTALLATION	16
4.1 DELIVERY	16
4.1.1 UNPACKING THE HEAT PUMP SECTION	16
4.1.2 UNPACKING THE GAS BOILER SECTION	18
4.2 MOUNTING THE CENTRAL HEATING BOILER	18
4.2.1 DIMENSIONS & INSTALLATION SPACE	19
4.2.2 MOUNTING THE COMBINAIR	21
4.3 CONNECTING THE UPPER SIDE	22
4.3.1 AIR SUPPLY & EXHAUST FOR HEAT PUMP SECTION	22
4.3.2 FLUE TUBE & AIR SUPPLY FOR GAS BOILER	24
4.4 CONNECTING THE UNDERSIDE	26
4.4.1 CONNECTING THE CENTRAL HEATING CIRCUIT	26
4.4.1.1 SINGLE ZONE CONNECTION	26
4.4.1.2 TWO ZONES CONNECTION	27
4.4.2 CONNECTING ACCESSORIES	28
4.4.3 CONNECTING THE MAINS WATER SUPPLY	29
4.4.4 CONNECTING THE GAS SUPPLY	29
4.4.5 CONNECTING THE CONDENSATE DISCHARGE	30
4.5 ELECTRICAL CONNECTIONS	31
4.5.1 CONNECTING THE HEAT PUMP	31
4.5.2 CONNECTING THE EXTERNAL SENSOR	32
4.5.3 CONNECTING THE ON /OFF ROOM THERMOSTAT(S)	32
4.5.4 CONNECTING TO FUSED SPUR AND PROGRAMMER	33
4.5.5 ELECTRICAL DIAGRAMS	33
5 COMMISIONING	35
5.1 FILLING AND VENTING THE APPLIANCE	35
5.2 STARTING THE APPLIANCE	36
5.3 APPLIANCE SETTINGS	38
6 DECOMMISSIONING	39
6.1 TAKING OUT OF SERVICE	39
6.2 DRAINING THE APPLIANCE	39
6.3 DISPOSING OF THE APPLIANCE	39
7 INSPECTION & MAINTENANCE	40
7.1 ANNUAL COMBINAIR INSPECTION	40
7.1.1 INSPECTION OF THE GAS BOILER SECTION	40
7.1.2 INSPECTION OF THE HEAT PUMP SECTION	42
7.2 COMBINAIR MAINTENANCE	43
7.2.1 GAS BOILER SECTION MAINTENANCE	43
7.2.2 MAINTENANCE OF THE HEAT PUMP SECTION	44
8 MALFUNCTIONS	45
9 WARRANTY	47
10 TECHNICAL DATA	49

INTERIOR OF THE ATMOS COMBINAIR



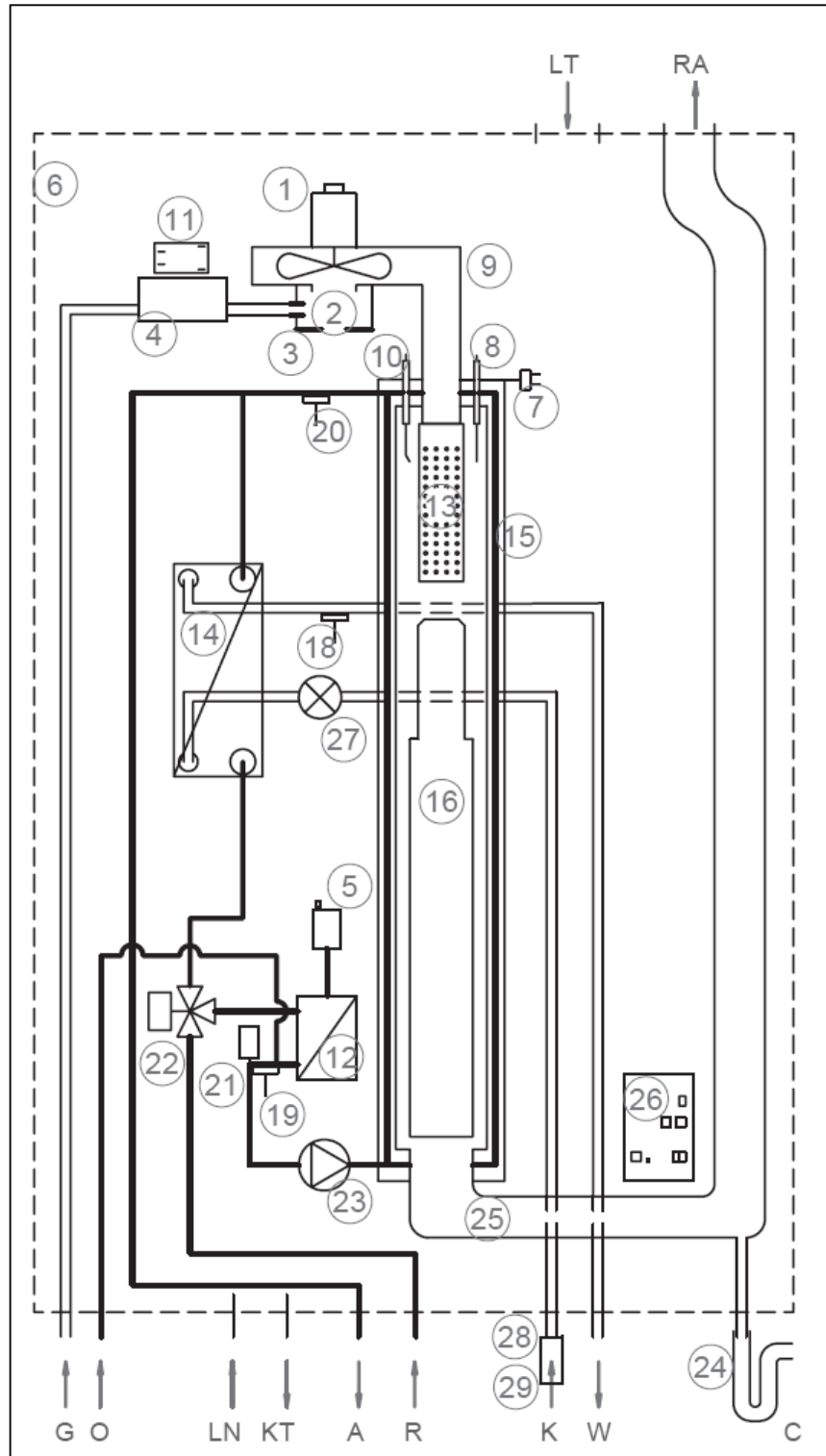
CROSS SECTION OF THE ATMOS COMBINAIR



THE HEAT PUMP SECTION

COMPONENTS HEAT PUMP SECTION

Heat pump section	
1	Fan
2	Evaporator
3	Compressor
4	Intermediate cooler
5	Filter drier
6	Expansion valve
7	Condenser
8	Three-way valve
9	Central heating pump
10	Control unit
11	Automatic air vent CH heating return
12	Automatic air vent CH heating supply
13	Filter
14	Exhaust connection
15	Clip sensor for heat pump 1
16	Clip sensor for heat pump 2
17	Clip sensor for air supply
18	Clip sensor for evaporator (in)
19	Clip sensor for condenser (out)
20	Clip sensor for compressed gas
21	Clip sensor for evaporator
22	Expansion sensor
23	Leakage tray
24	Siphon
LA	Exhaust connection
LT1	Air supply connection
A1-a	Central heating flow connection
A1-b	Central heating flow connection
R1	Central heating return connection
C1	Condenser drain
D	Data cable
LN1	Electrical supply cable



THE GAS BOILER SECTION

COMPONENTS GAS BOILER SECTION

Gas boiler section	
1	Fan
2	Gas/air mixing chamber
3	Gas nozzle
4	Gas regulator
5	Automatic air vent
6	Housing
7	Maximum thermostat
8	Ionisation electrode
9	Inlet casting
10	Ignition electrode
11	Ignition transformer
12	Air separator
13	Burner
14	Heat exchanger
15	Heat exchanger
16	Flue baffle
17	Insulation scales
18	Hot water temperature sensor
19	CH return temperature sensor
20	CH flow temperature sensor
21	CH water pressure sensor
22	Three-way valve
23	Central heating pump
24	Siphon
25	Exhaust casting
26	Control unit
27	Flow sensor
28	Flow limiter
29	Inlet combination
RA	Flue tube connection
LT2	Air supply connection
A2	Central heating flow connection
R2	Central heating return connection
W	Hot water connection
K	Cold water connection
C2	Condensate drain
O	Connection for expansion vessel
G	Gas connection
KT	Room thermostat connection
LN	Electric supply cable

INTRODUCTION

Please read these instructions thoroughly before starting the installation.

Please hand these instructions back to the user after completing the installation and the commissioning of the appliance, and then instruct the user on the following points:

- the operation of the appliance
- the controls
- starting up (commissioning), filling and venting
- taking out of service (decommissioning) and draining
- annual inspection and maintenance
- dealing with malfunctions

Request that the user keeps these CombinAir installation instructions safe, inside the appliance, so they are easy to locate in the event of malfunctioning.

1 SAFETY

All safety instructions given in this handbook must be carefully followed.

Apart from the safety instructions in this handbook, attention must also be given to the safety instructions issued by the building regulations, the utilities and the local authorities.

All safety devices in the appliance and the safety instructions given in this handbook form the conditions for using this appliance. Both the owner and the qualified installation engineer are ultimately responsible for the safe operation of this appliance.

Because of the considerations of safety, it is not permitted to make modification to the appliance for whatever reason.

2 INSTALLATION INSTRUCTIONS

As either owner and/or installation engineer, you are responsible for the complete heating and hot water appliance installation and should ensure that everything has been done in accordance with all the current standards and (safety) instructions.

The installation engineer does not require knowledge of refrigeration because in the event of the malfunctioning of the heat pump system, that section of the appliance can be disconnected and replaced with a completely new unit.

3 OPERATION AND CONSTRUCTION

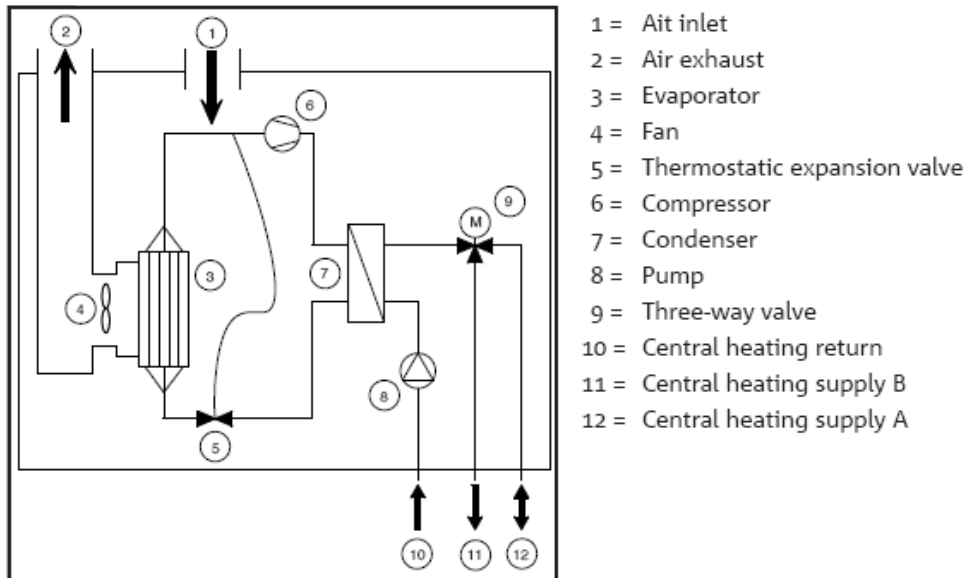
The Atmos CombinAir comprises of an electrically driven heat pump and a modulating gas-fired central heating boiler. The CombinAir appliance is completely sealed. The unit is housed inside a plate steel casing. It is designed in such a way that the heat pump section is completely airtight. Via a fan, air is drawn in from the outside through an evaporator and then blown back outside again. The casing around the heat pump section can easily be removed and the complete heat pump assembly can be simply extracted from the front. The gas boiler section has a fan that sucks in air from outside for the combustion process, and then blows the flue gases back outside again. The casing around the gas boiler section can also be easily removed, making the boiler very accessible.

3.1 CONSTRUCTION OF THE APPLIANCE

- **The heat pump section**

The heat pump section consists principally of the following parts:

- An electrically driven fan
- An evaporator
- An electrically driven compressor
- A condenser
- A thermostatic expansion valve
- An electrically driven pump
- A three-way valve



The heat pump is located in a sealed system in which refrigerant (R-407C) is circulated. A fan draws in air from outside. This air flows through an evaporator thereby warming up the refrigerant which then evaporates. The cooled air is then blown back outside. The warm, gaseous refrigerant is then drawn into the compressor. Both the pressure and temperature of the refrigerant are raised. The pressurized refrigerant is pushed through the condenser where it transfers its heat to the central heating water. At this point the refrigerant condenses. The liquid refrigerant flows through the

thermostatic expansion valve to the evaporator, where the pressure and the temperature are lowered. The heated central heating water is then directed to either the house, or to the central heating boiler, depending on the position of the three-way valve.

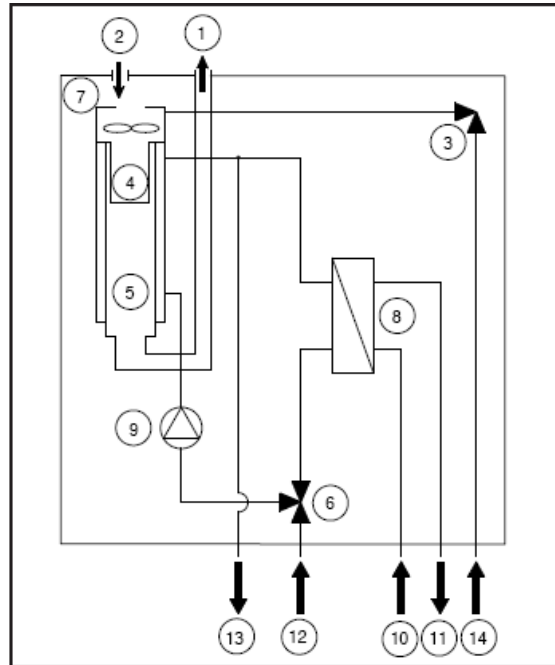
• **The gas boiler section**

The gas boiler section consists principally of the following parts:

- An electrically driven fan
- A gas valve
- A gas burner
- A heat exchanger
- An electrically driven pump
- A three-way valve

The gas boiler section is a sealed system. The fan draws in outside air to the gas regulation valve ensuring that the correct quantity of gas is added to it. The gas and air are mixed in a mixing chamber, ensuring complete combustion in the burner. The hot flue gases are lead through a heat exchanger where the heat is transferred to the central heating water flowing through it. The flue gases cool down so much that they condense. The cooled flue gases are then lead outside via the exhaust – the condensation is lead away to the drainage system. The heated central heating water is then directed to either the house, or to the heat-exchanger (for heating the hot water system), depending on the position of the three-way valve.

- 1 = Flue tube
- 2 = Air supply
- 3 = Gas regulator valve
- 4 = Burner
- 5 = Heat exchanger
- 6 = Three-way valve
- 7 = Fan
- 8 = Heat exchanger
- 9 = Pump
- 10 = Cold water
- 11 = Hot water
- 12 = Central heating return
- 13 = Central heating supply
- 14 = Gas supply



- **High Temperature and Low Temperature Heating**

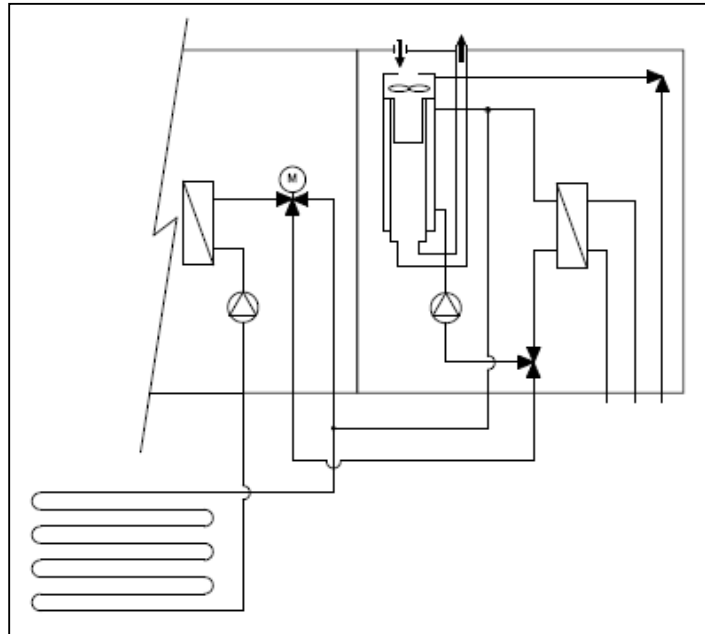
The CombinAir consists of two sections: a heat pump section and a gas boiler section. The heat pump section has a relatively low capacity and is designed to cope with the “basic load” in the home. It is endeavored to heat the home using only the heat pump section as it is more efficient. The gas boiler only comes into action when the heating requirement cannot be met by the heat pump alone. The boiler also supplies the hot water.

The heat pump section is suitable for Low Temperature Heating (LTH). With higher output temperatures, the efficiency reduces as does the yield from the heat pump, resulting in even lower efficiency. The appliance can be used in two ways.

- **single zone (low temperature)**

When the appliance is used for a single zone, both sections of the appliance are linked in series.

The optimum flow temperature is approximately 35°C with a return temperature of around 25°C.

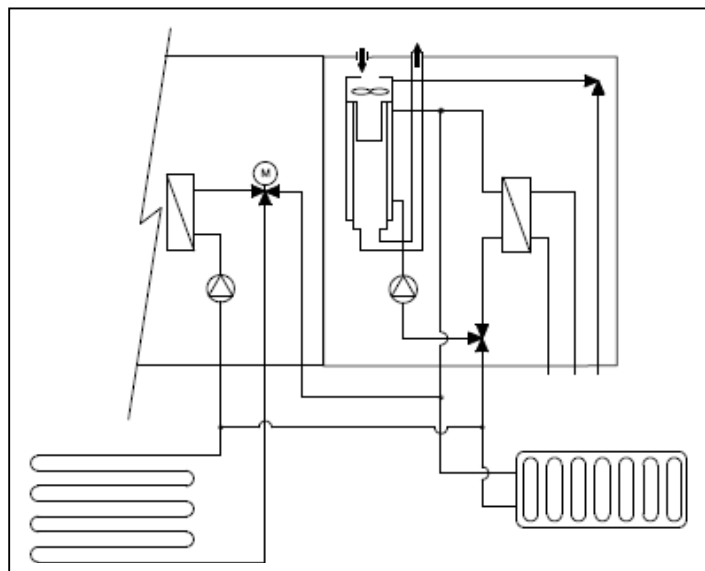


- **two zones (one low temperature zone and one high temperature zone)**

When the appliance is used for two separate zones, both sections of the appliance are linked in parallel.

The optimum flow temperature for the low temperature zone is around 35°C with a return temperature of around 25°C.

The optimum flow temperature for the high temperature zone is around 60°C with a return temperature of around 40°C.



3.2 OPERATION OF THE APPLIANCE

The CombinAir operates via two control units that are connected via a communication cable. The operation of both sections of the appliance is optimised through communication between both control units. The CombinAir cannot work without this communication link! This operation of the CombinAir ensures a reliable supply of heating for both the central heating and the hot water system. This means in practice that the operation is influenced by the environment (outside temperatures, desired room temperatures, etc) and does not immediately malfunction because of negative environmental influences, but instead adjusts itself, or even stops operating.

Below is a description of the functioning of the CombinAir in normal use and under normal conditions. Exceptions to these and protection of the CombinAir are described in chapter 'Malfunctions' (chapter 8).

• No heating required

The CombinAir carries out a self-test after connecting the power supply. During this self-test, the pumps and fans run to ensure that they have not become stuck in any way. In periods when there is no demand for heating, this self-test is carried out every 24 hours.

• Weather-dependent control

The CombinAir makes use of a weather-dependent control (WDC). Using an external temperature sensor, the target temperature for the central heating water is determined according to the outside temperature and the room thermostat setting for the required room temperature. The pump is switched on a number of times every hour to check whether the temperature of the central heating water is high enough to heat the home. The WDC then assesses whether the CombinAir should supply heat. If the exterior temperature is high enough the pump will not be switched on.

Central heating

When the WDC or a room thermostat requires it, the CombinAir will supply heat for the central heating system. The manner in which the heat is supplied, depends on the way the appliance is connected.

• single zone (low temperature)

When there is a demand for heat, initially only the heat pump will respond. The central heating water is therefore not pumped through the gas boiler section. Only after a period when the heat pump cannot provide sufficient heating for the home, does the gas boiler come into action. The three-way valves in the appliance are set up in such a way that the central heating water first flows through the heat pump section, and then through the gas boiler section. The central heating water is preheated by the heat pump section and thereafter the temperature is brought up to the correct level by the gas boiler. Once the home is sufficiently warm, the gas boiler switches off again. The three-way valve in the heat pump section goes back to the starting position, so that the central heating water only circulates through the heat pump. The heat pump section continues to operate to keep the home at the correct temperature level.

• two zones (one low temperature zone and one high temperature zone)

Both zones can demand heating – this can occur independently of each other. The heat pump will start working as soon as there is demand for heat in the circuit that is directly connected to the heat pump section of the appliance. The gas boiler will start working as soon as there is demand for heat in the circuit that is directly connected to the gas boiler section of the appliance. It can happen that the heat pump section cannot supply sufficient heat for heating the low temperature zone. In this case the three-way valve in the heat pump opens slightly, so that the warmer central heating water from the other circuit is mixed with it. Once this zone is sufficiently warm, the three-way valve closes again. The heat pump section continues to operate to keep the home at the correct temperature level.

Sometimes, when the gas boiler comes into action when there is insufficient heat produced by the heat pump, it can occur that heat can be provided in a temperature zone that has not requested it – this is because it is directly connected to the low temperature circuit normally serviced by the heat pump!

• **Domestic hot water**

The appliance starts up as soon as the hot water tap is opened. The central heating water is pumped first through the primary heat exchanger which is heated by the gas-fired burner and then through the secondary heat exchanger. The tap water is heated in the secondary heat exchanger. The control unit measures and regulates the temperature of the hot water. The burner shuts down as soon as the hot water tap is closed. The appliance is fitted with a keep hot function in order to provide hot water as soon as possible. If the gas boiler cools off too much, the burner comes on and heats the water for a short period. This keep hot function can be turned off if desired, although this will lead to longer delays before the hot water reaches the desired temperature.

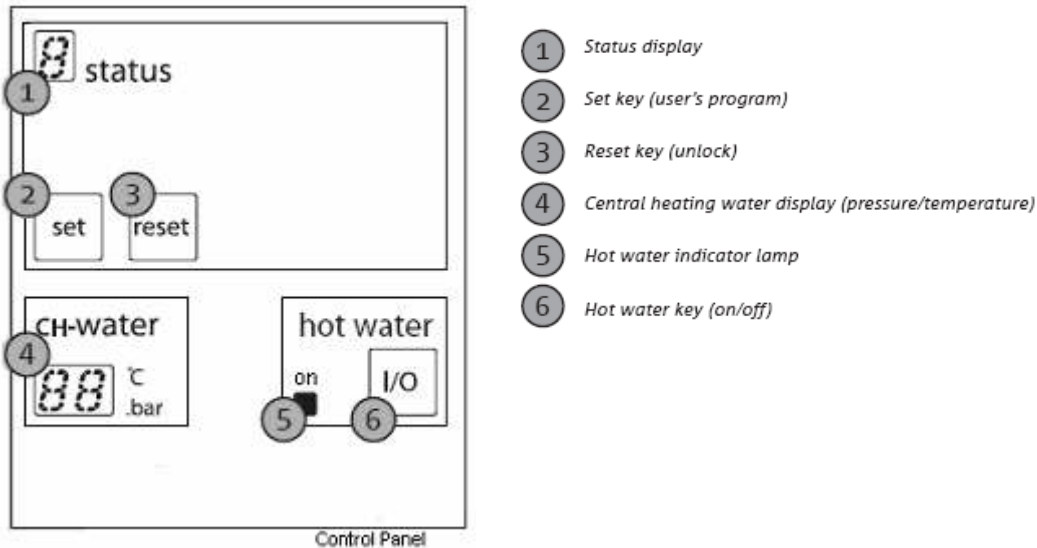
3.3 OPERATION

• **The room thermostat**

The CombinAir makes use of a Weather Dependent Control (WDC). Using an external temperature sensor, the target temperature for the central heating water is determined. The room thermostat adjusts the central heating water target temperature. With higher room temperature settings, the target temperature of the central heating water is a little higher.

• **The control panel**

The control panel is located on the front of the appliance. The control panel has two displays, a status display, and a central heating water display.



- ① Status display
- ② Set key (user's program)
- ③ Reset key (unlock)
- ④ Central heating water display (pressure/temperature)
- ⑤ Hot water indicator lamp
- ⑥ Hot water key (on/off)

1 = Status display:

The number in the status display indicates the status of the appliance. This could be a normal operational status, but could also be a warning, blockage or malfunctioning message. See the status messages table for the different status levels. See chapter "Malfunctions" for a list of possible messages.

2 = Settings key:

This key is used in the user's program to make certain changes.

3 = Reset key:

This key cancels the malfunction lockout and is also used for leaving the user's program.

4 = central heating water display:

In the standard setting this gives the water pressure reading in the heating circuit. It is possible to adjust the setting so that the water temperature in the heating circuit is displayed instead. The CH-water display also displays the settings (factory settings) whenever you are in the user's program.

5 = Hot water indicator lamp:

The indicator lamp indicates how the hot water heating is set. There are three positions:

- Indicator lamp on = hot water is on and the keep hot function is on (continuously).

In this position maximum comfort is provided (minimum waiting time).

- Indicator lamp flashes = eco position

In the eco position the keep hot function is off, thereby saving energy.

This can lead to longer waiting times for hot water.

- Indicator lamp off = hot water off

In this setting the appliance will not provide hot water.

6 = Hot water key:

The hot water settings can be selected with this key (on, off or eco). This key is also used to adjust the settings of the appliance in the user's program.

• Status message

The status message displays the actual operation of the CombinAir while it is working normally. The status display indicates the actual status of the gas boiler section of the appliance.

The status of the heat pump is not given. The table below illustrates the various status messages and what they mean.

STATUS MESSAGES	
0	Stand-by – no heat demand
1	Request for hot water
2	Request for space heating
1, 2.	As 1 and 2 but with burner operation
5.	Frost protection active
5	Purging period
6	Pre-purge period
7.	Ignition phase
8.	Self test (8.8. appears in the CH-water display and the hot water indication light is on)
≡	Anti-cycling active for gas boiler (alternating with 1 and 2)
-	Waiting period for heat pump active (alternating with 1 and 2)
⊙	Boiler pump overrun (four rotating segments)
⊙	System pump overrun (six rotating segments)
⌈	Malfunction code (alternating with 1 and 2)
L, C,	Malfunction code
HEAT PUMP MESSAGES	
⌈R, ⌈E, or ⌈⌈	Malfunction in heat pump

For the malfunction codes see the Maintenance Manual.

The gas boiler section's control unit is equipped with a user's program. With this it is possible to alter the indication on the central heating water display and get a read-out of the previous malfunction. To gain access to the user's menu, the following steps must be taken:

- Press the set key and hold it down until the code 'C' appears in the status display (approx 5 seconds).
- By pressing briefly on the set key, the user's program jumps to the next setting on the readout.
- By pressing briefly on the hot water key, the setting changes from the indicator on the central heating water display.
- The user's program is closed by pressing the reset key.

Five minutes after the last time it was used, the user's program automatically closes. Possible settings are given in the table below. The standard settings are also included.

OVERVIEW OF USER'S PROGRAM		
status display	central heating water display	Description
C	P.P	Central heating supply temperature
	0.0	Central heating pressure sensor not activ
	P,P**	Central heating pressure
	P.P.	MultiSolar heat content
F	P P	Serial no + last lock-out
G	P P	Serial no + last blockage
H	P P	Last heat pump lock-out
J	P P	Last heat pump blockage
L	P P	Last heat pump warning
S.	00	Non-standard setting
	!!**	Standard setting NL/B

* Only visible if the weather dependent control is used

** Standard setting

P P Value on display

4 COMBINAIR INSTALLATION

WARNING!

The appliance should only be installed by an approved installation engineer.

4.1 DELIVERY

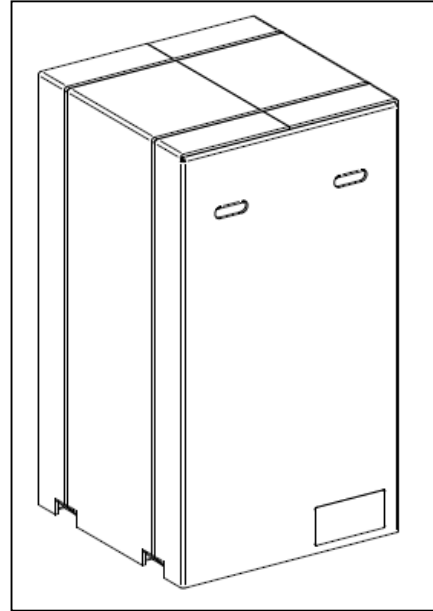
The Atmos CombinAir is delivered in two carton boxes:

- one box contains the heat pump section
- one box contains the gas boiler section

The heat pump section must always be **transported vertically**.

Inspect the appliance immediately after unpacking. We advise you to report immediately any damage that is found to the supplier.

The packaging material consists of corrugated cardboard, wood, polystyrene filler and can therefore be recycled. Do not deposit the packaging with waste material.



4.1.1 UNPACKING THE HEAT PUMP SECTION

The box containing the heat pump also contains all the associated installation parts. During unpacking, check whether all the parts are present and ensure that nothing is damaged.

WARNING!

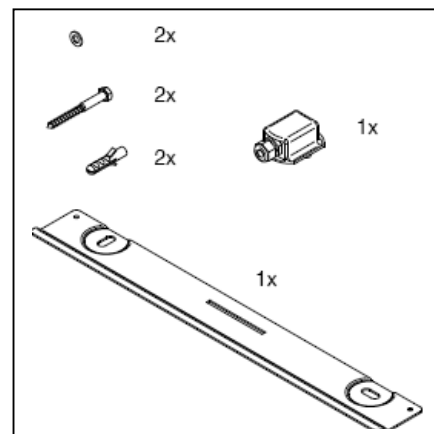
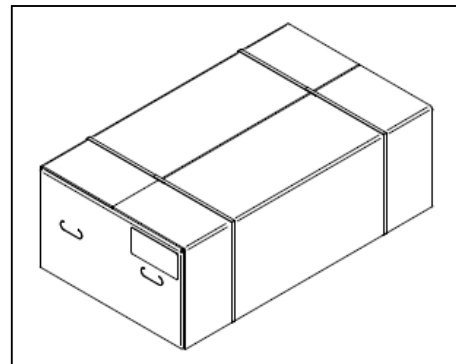
The heat pump must be kept Vertical during transportation

Unpacking the heat pump section:

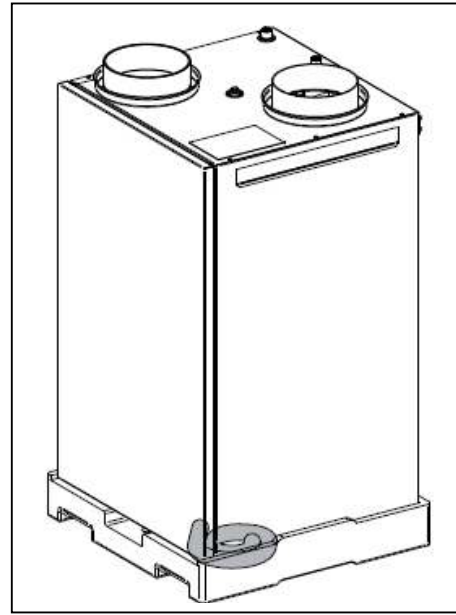
1. Always transport the heat pump **vertically**. Horizontal transportation or storage can damage the heat pump section.
2. Using a knife, cut the packing bands around the box and then pull it up over the appliance.
3. Remove the upper packaging material from the heat pump section and then pull out the accompanying installation parts.

In the upper transport tray you will find the following:

- Suspension bracket
- Fixing material - consisting of two wall plugs, two bolts and two washers
- Installation instructions
- External sensor

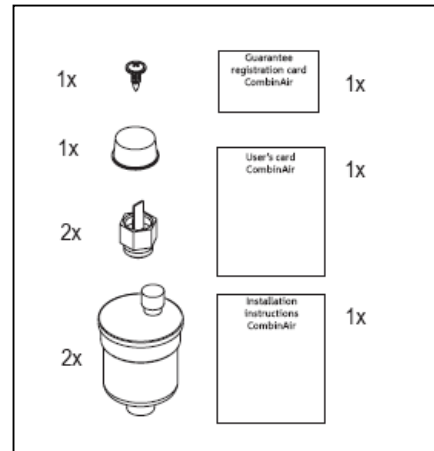


4. Leave the heat pump standing on the bottom packaging material. This is because the central heating pipes under the heat pump stick out and could be damaged were the heat pump to be laid on the ground without the packaging material under it. The bottom packaging material contains a flexible hose for the condensate drain, but this is only required after the heat pump has been installed.

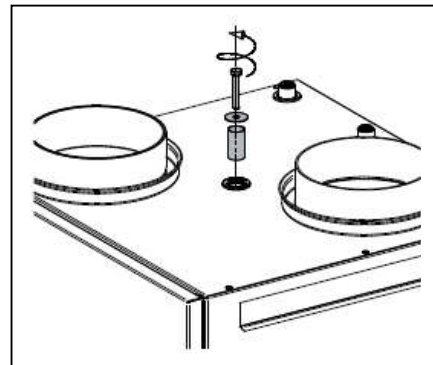


You will find the following items in the lower transport tray:

- Warranty registration card
- User's card
- Installation instructions
- Cap
- Locking screw for washer
- Automatic cut-off valves (2x)
- Automatic air vent (2x)



The heat pump section is equipped with a transporter tube which must be removed before commissioning the appliance.



4.1.2 UNPACKING THE GAS BOILER SECTION

The box containing the central heating section also contains all the associated installation parts. During unpacking, check whether all the parts are present and ensure that nothing is damaged.

- **Unpacking the central heating section**

1. Using a knife, cut the bands around the box, then pull it up over the central heating unit.

The box contains the following items:

- user's instructions for the inlet combination
- Check and packing lists for the CombinAir central heating unit

2. Remove the top packing material and take out the installation parts.

The upper part contains:

- 1 inlet combination

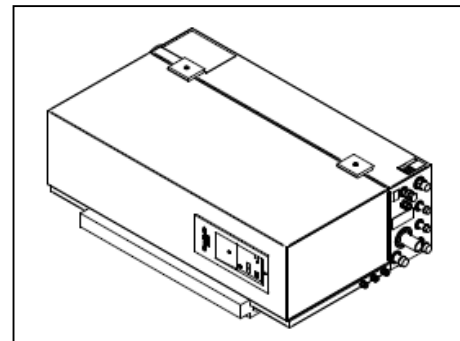
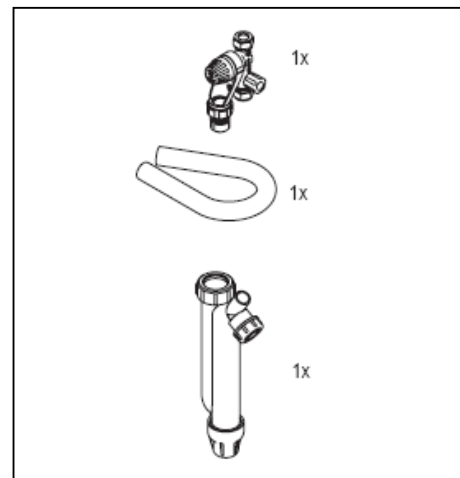
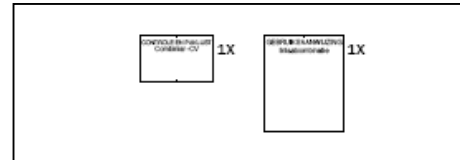
The lower part contains:

- 1 siphon
- 1 siphon pipe

3. Leave the appliance on the transportation tray in order to avoid damage.

ATTENTION!

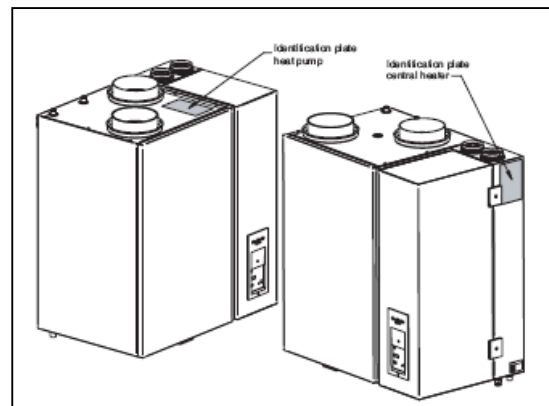
The central heating pipes in the appliance can contain residual water



4.2 MOUNTING THE CENTRAL HEATING BOILER

This chapter provides guidelines and instructions for connecting the gas, water, electricity, safety devices, regulators, control device, flue tube and both the air exhaust and supply pipes.

The type plate on top of the heat pump and the gas boiler sections state the model type and the most important specifications.

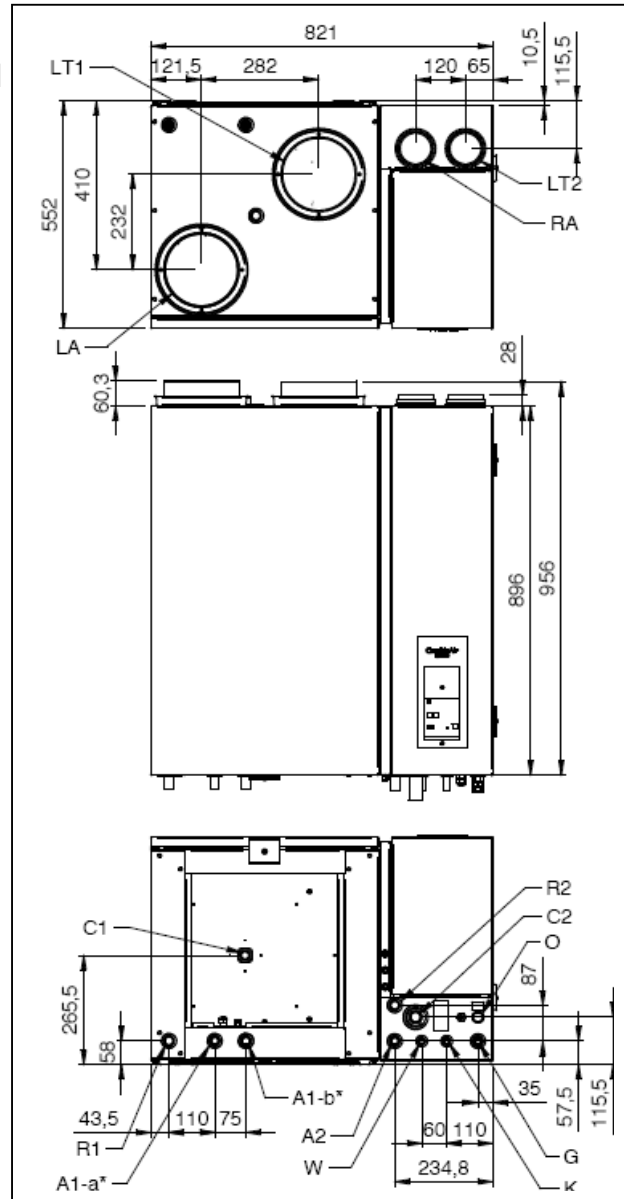


4.2.1 DIMENSIONS & INSTALLATION

Before mounting the appliance, you should determine the best place for locating. You should take account of maintenance work on the appliance after installation, and also the connections that are required. There should also be sufficient space between it and the walls, ceiling and floor. See the diagrams on this page and the next page.

Take account of the following when locating the appliance:

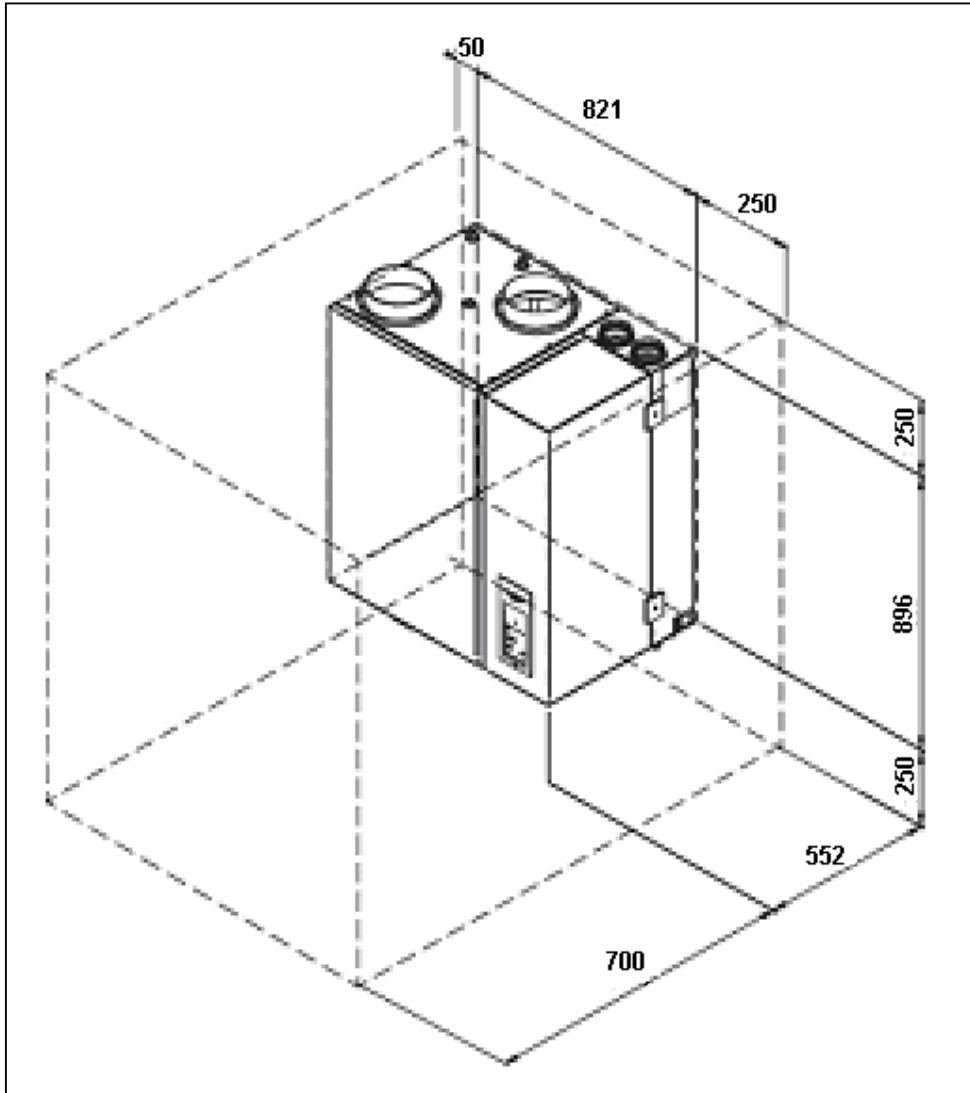
- Locate the appliance in a space where it cannot cause noise nuisance.
- Do **not** locate the appliance in a space containing highly inflammable materials.
- Locate the appliance in a frost-free space, or take measures to avoid the appliance freezing.
- Select a level wall.
- Select a wall that is strong enough to support a total of 120 kg (regulation > 200 kg/m²).
- The appliance must be mounted completely level.
- Take account of the appliance dimensions.
- Take account of possible Central Ventilation Units.
- Take account of the following connections:
 - o Air supply for both the central heating and the heat pump sections
 - o Exhaust for the heat pump section
 - o Flue tube for the central heating section
 - o Water supply
 - o Central heating piping
 - o Gas piping
 - o Condensation drain
 - o Expansion tank
 - o Double socket within one meter of cable outlet.



A1-a*	Central heating supply piping	Ø 22 mm
A1-b*	Central heating supply piping	Ø 22 mm
A2	Central heating supply piping	Ø 22 mm
C1	Condensate drain	Ø 37 mm flexible
C2	Condensate drain	Ø 32 mm
G	Gas connection	1/2" bspF
K	Cold water pipe	Ø 15 mm
LA	Air outlet	Ø 180 mm
LT1	Air intake	Ø 180 mm
LT2	Air intake	Ø 80 mm
R1	Central heating return pipe	Ø 22 mm
R2	Central heating return pipe	Ø 22 mm
RA	Flue tube connection	Ø 80 mm
W	Hot water pipe	Ø 15 mm
O	Connection for expansion tank/central heating pressure relief/filler-drain tap	Ø 15 mm
(* depends on the heating system selected)		

Apply the following distances:

- Minimum 250 mm at the top of the appliance for replacing burner.
- Minimum 50 mm on the left hand side for removing the casing.
- Minimum 250 mm on the right hand side for removing the casing.
- Minimum 250 mm underneath for removing the flue gas impeller.
- The front of the appliance must be accessible for servicing, etc.
- There should be a double wall socket at the bottom of the appliance within a radius of one meter.



4.2.2 MOUNTING THE COMBINAIR

The two sections of the appliance are mounted separately.

First of all the mounting bracket should be fitted. Hang the heat pump section on the bracket, and mount the gas boiler section onto the side of the heat pump section.

Fixing the mounting bracket:

1. Determine the location for the mounting bracket.
(Remember that the gas boiler is mounted on the right hand side of the heat pump see § 4.2.1.)
2. Determine the position of the two fixing holes, ensuring that they are completely level.
3. Drill holes using a masonry drill (approx 10 mm).
4. Use the plugs supplied.
5. Fix the mounting bracket using the bolts supplied.

Mounting the heat pump section:

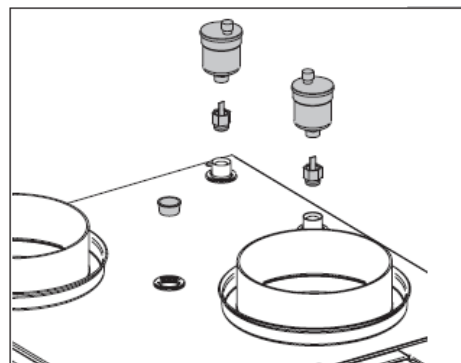
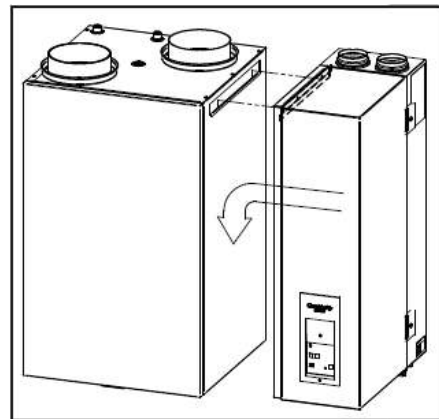
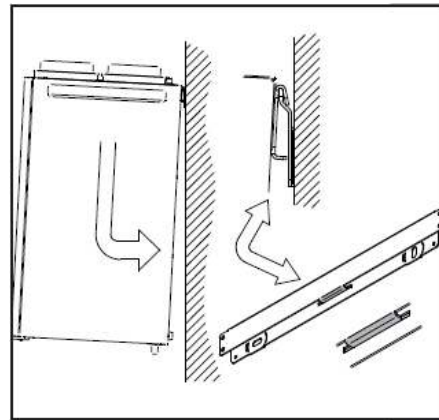
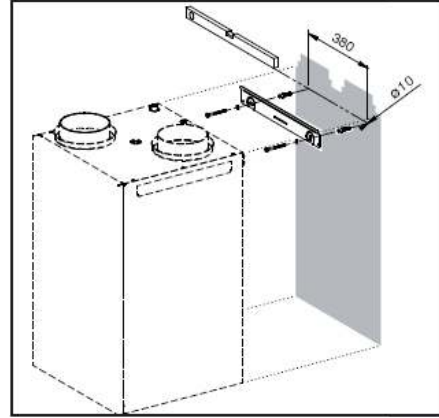
6. Hang the heat pump on the mounting bracket. It will be necessary to tilt the heat pump slightly in order for the curved edge of the bracket on the heat pump to slide into the groove on the mounting bracket.

Mounting the gas boiler section:

7. Hang the gas boiler on the side of the heat pump.

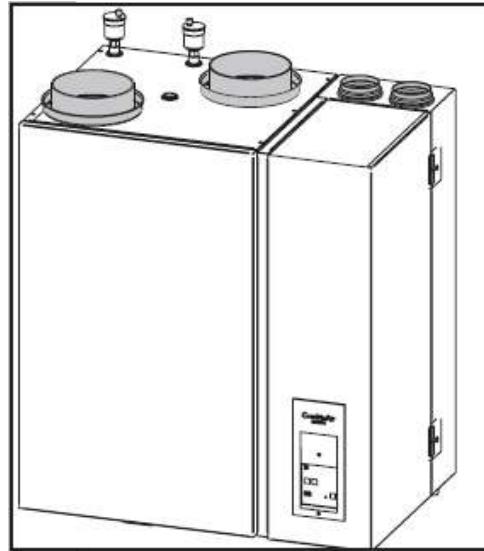
Locating the air vents:

8. Fit the automatic cut-off valves and air vents.
9. Position the caps.



4.3 CONNECTING THE UPPER SIDE

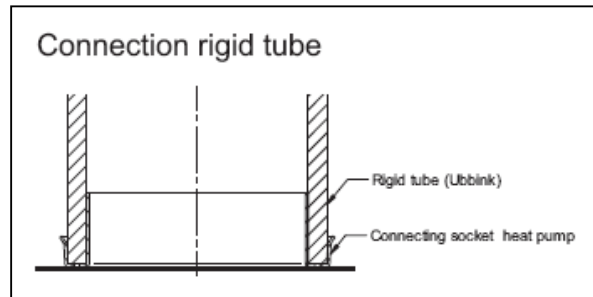
In the diagram adjacent to this, you can see the connection points on the appliance for the heat pump air supply and air exhaust, and the air supply and flue tube for the gas boiler. They are all located on top of the appliance.



4.3.1 AIR SUPPLY & EXHAUST FOR HEAT PUMP SECTION

In order to allow the heat pump section to function correctly, there has to be a connection to the air outside. The principle is that the heat pump draws in air from outside, then afterwards, blows it back outside again. This is done with ducting with an inside diameter of Ø 180mm. These ducts must be properly insulated to avoid condensation forming.

Atmos recommends Ubbink rigid tubing (insulated Ø 180mm ducting system)



The CombinAir must always have an MV box (mechanical ventilation) installed. An insulated T-piece made by Ubbink (see fig 1) can be used to install this. The roof duct must also be sufficiently heat insulated to avoid condensation forming.

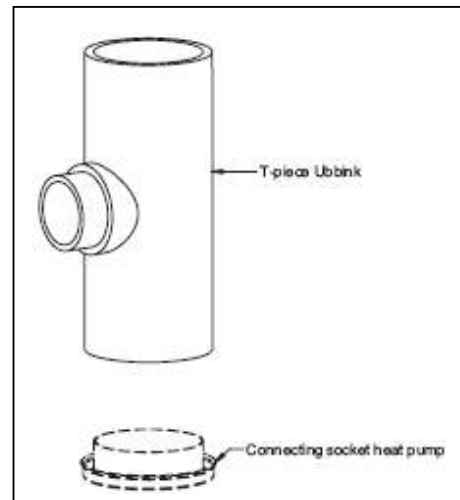


fig. 1

Check the length of the air supply and the air exhaust ducting for the heat pump section. The maximum allowable pressure drop in the ducting is 200 Pa with an air flow of 600 m³/h. If we consider a roof or wall terminal with a resistance of 65 Pa for the supply, and 12 Pa for the exhaust, then the overall ducting pressure drop is as follows:

200 Pa (max pressure drop Combinair) - 65 Pa (supply terminal) - 12 Pa (exhaust terminal) = 123 Pa

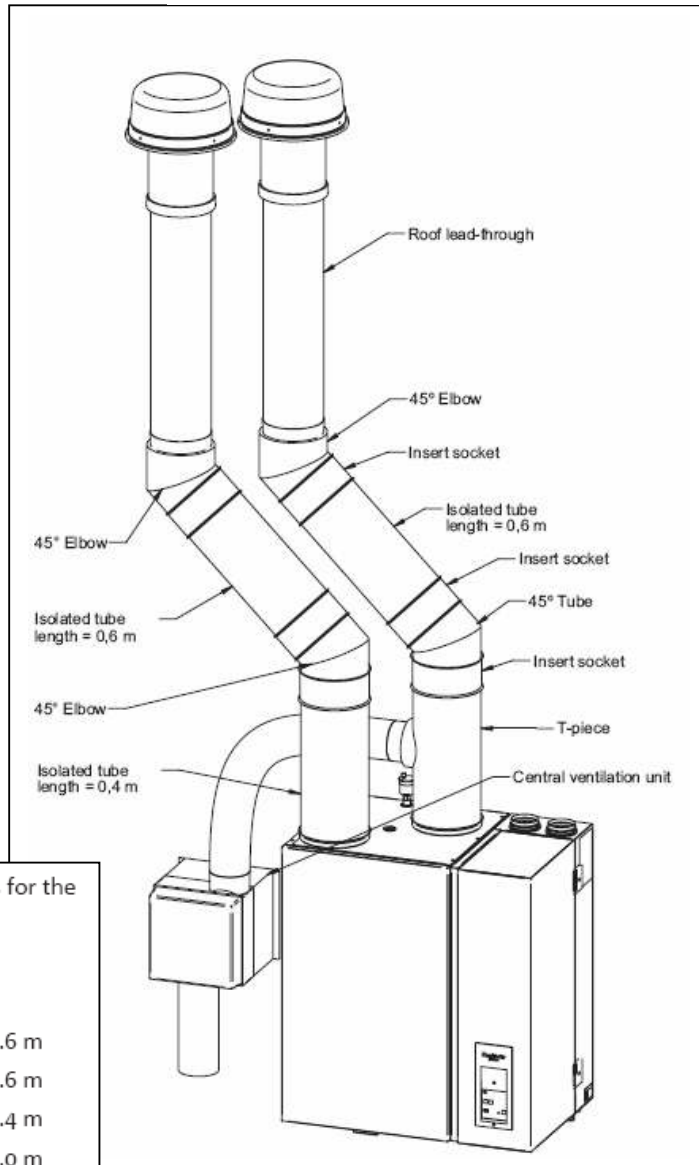
For an air flow of 600 m³/h this equates to a maximum total of 36 meters of rigid supply and exhaust ducting, with an interior diameter of Ø180 mm that can be connected to the installation.

The equivalent lengths calculated in meters for the various parts of the supply and exhaust system are given in table 1. Exceeding the maximum lengths will mean that the maximum volume of 600 m³/h will not be achieved, and the performance of the heat pump will be adversely affected.

The heat pump is set up for an average installation situation (see illustration). If the actual situation deviates greatly from this, please contact Atmos for further advice.

AIR SUPPLY & EXHAUST FOR HEAT PUMP SECTION		
Straight length of 1 m	Ø 180	1.0 m
T-piece	Ø 180	1.0 m
Bend of 90°	Ø 180	6.0 m
Bend of 45°	Ø 180	3.0 m
Bend 30°	Ø 180	1.5 m
Bend 15°	Ø 180	1.3 m

table 1



Checking length of supply and exhaust systems for the heat pump regarding maximum.	
Example of exhaust duct	
Straight length	0.6 m
	0.6 m
	0.4 m
T-piece	1.0 m
Bend of 45° (4 x 3.0 m)	12.0 m
	_____ +
Total	14.6 m
14.6 m < 36 m (max length)	
Supply & exhaust system satisfactory.	

4.3.2 FLUE TUBE & AIR SUPPLY FOR GAS BOILER

The connections for the air intake and flue tube (\varnothing 80 mm) are located on top of the appliance.

Connect the appliance to an approved flue system. See fig 2 for different flue options.

The flue system must be installed in accordance with BS5440:1 and the Building Regulations. **Horizontal flue pipe runs must always be installed with a minimum slope of 50 mm/meter towards the boiler.** This will prevent condensation from gathering in the flue pipe, and will also reduce the chance of icicles forming over horizontal pipe ends in the winter.

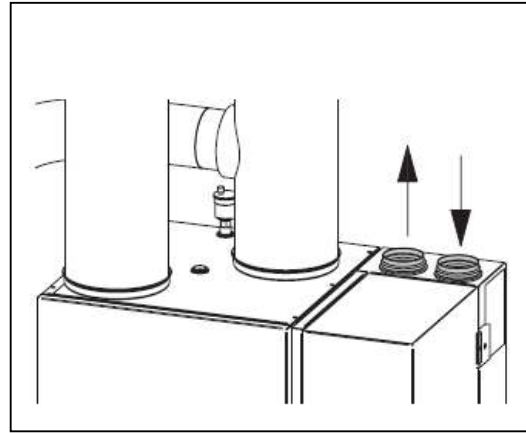
Twin pipe system (parallel system)

Check the length of the flue tube. The maximum length for 80mm flue tubes is 32 meters (at a pressure of 100 Pa). That is to say 32 meters for the air supply and 32 meters for the flue tube. The resistance of the universal wall or roof terminal has already been included in the calculation, and can be left out.

Concentric flue

The maximum length of a concentric flue system (\varnothing 80 / 125 mm) is 20 meters.

The resistance of the universal wall or roof terminal has already been taken into account.



ATTENTION!
If a plastic flue pipe more than three meters long is used, it is advisable to use a condensation separator located between the CombinAir unit and the flue pipe.

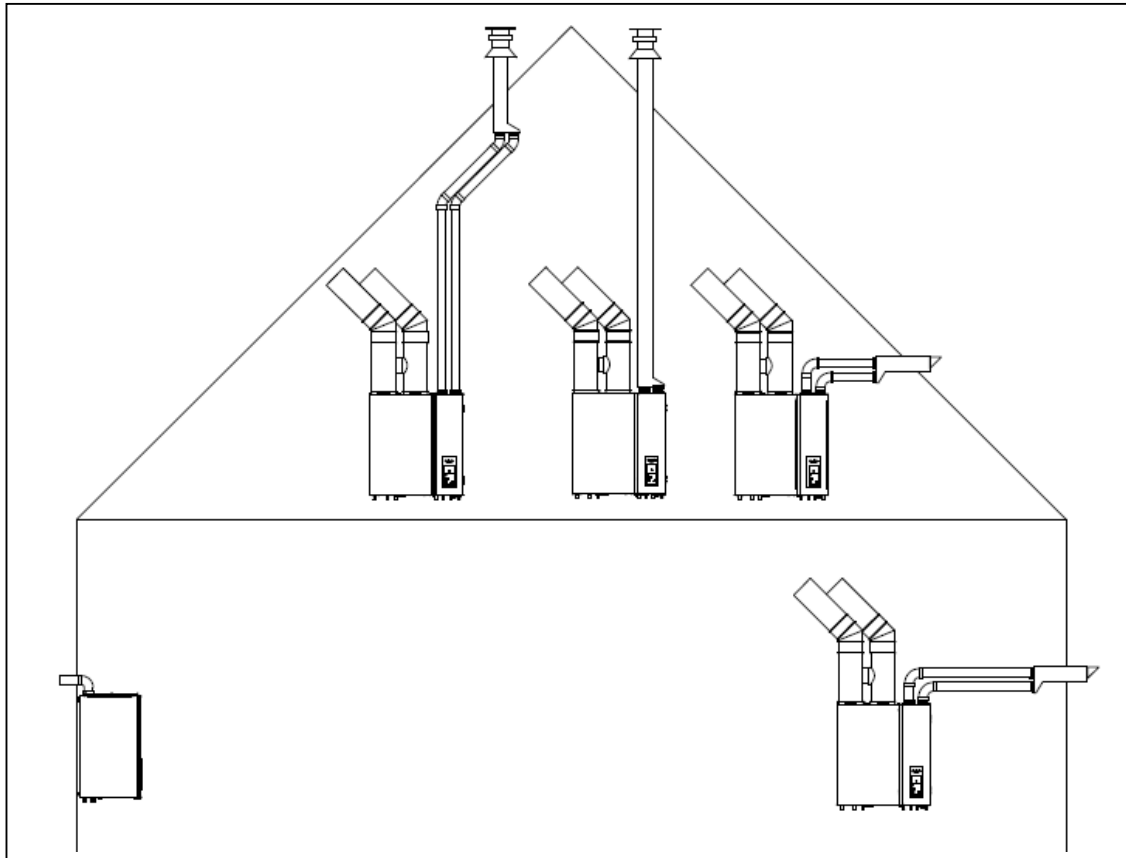


fig.2

The length for the individual parts of the flue tube is calculated in meters and given in the adjacent table (fig 3).

See fig 4 for an example calculation. The stated maximum system resistance must not be exceeded. Exceeding the maximum length will not cause malfunctioning, but it will reduce the capacity of the appliance. The regulator for the gas/air mixture always ensures optimal combustion.

NOTE!

- If a plastic flue pipe more than three meters long is used, it is advisable to use a condensate separator located between the CombinAir unit and the flue pipe.
- It is not permitted to discharge condensate into a rainwater pipe because of the danger of freezing. Do not discharge condensate into roof guttering in order to avoid damage.

Parallel System		
Straight length of 1 m	ø 80 mm	1.0 m
Bend of 90°	ø 80 mm	1.5 m
Bend of 45°	ø 80 mm	1.0 m
Taper		
	ø 80 - ø 90 mm	-1.0 m
Concentric system		
Straight length of 1 m	ø 80/125 mm	1.0 m
Bend of 45°	ø 80/125 mm	1.0 m
Bend of 90°	ø 80/125 mm	1.5 m
Adapter		
	2x80 - ø 80/125 mm	1.0 m

fig 3

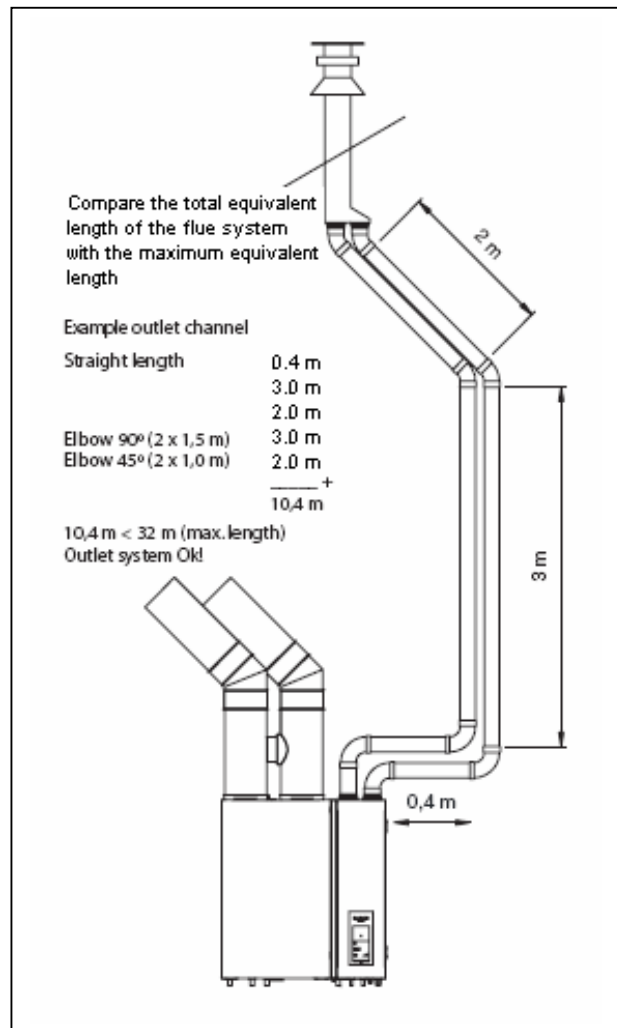


fig 4

4.4 CONNECTING THE UNDERSIDE

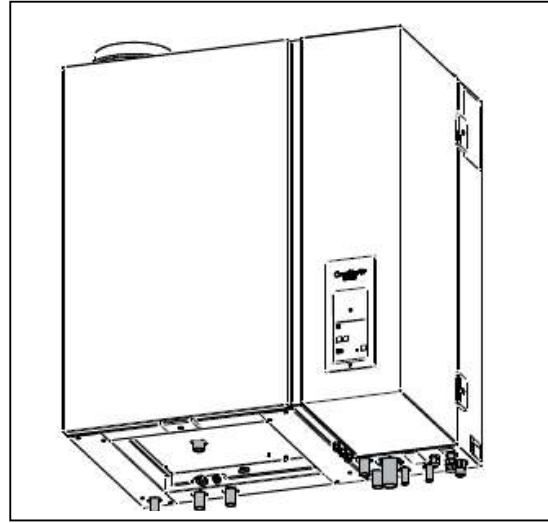
In the adjacent diagram, you can see the appliance connection points for the central heating circuit, the accessories, hot water circuit/DHW circuit, gas supply, condensation drain and the electrical connections. They are all located on the underside of the appliance.

4.4.1 CONNECTING THE CENTRAL HEATING CIRCUIT

The appliance can be connected in two ways depending on the central heating circuit. They include the two temperature zones system or the one temperature zone system. See chapter 3.2 (operation of the appliance) for an explanation of the two systems. The connection possibilities for both systems are explained in this chapter.

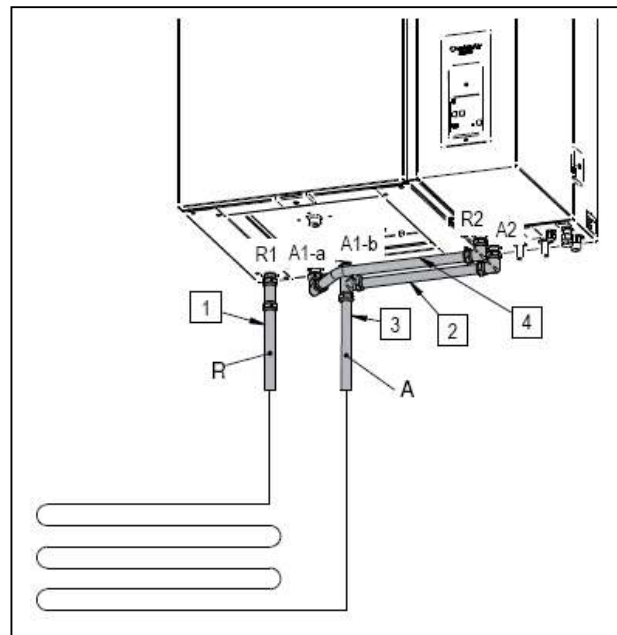
In order to avoid leaks and possible damage to the installation and the appliance, as well as being able to guarantee the life span of the system, the installation must be in accordance with the following requirements:

- The central heating installation should be neat and tidy.
- The central heating installation should be free of leaks and resistant against oxygen diffusion.
- To avoid corrosion in the system a suitable inhibitor should be added such as Sentinel X100.



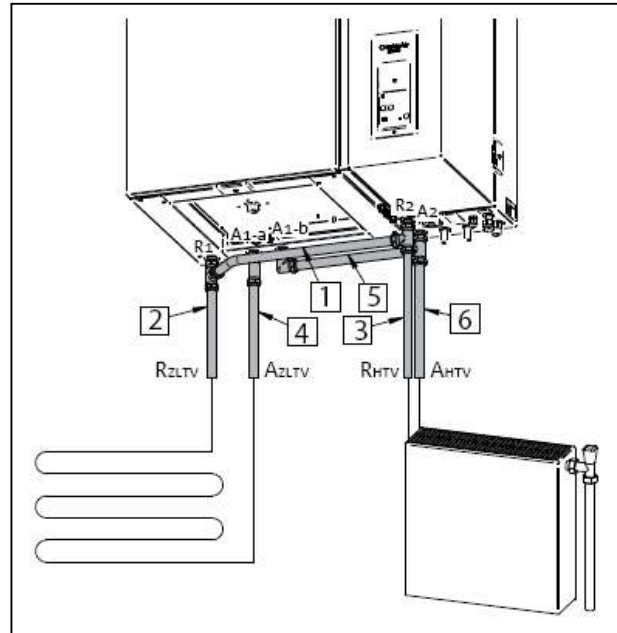
4.4.1.1 SINGLE ZONE CONNECTION

1. Connect the return pipe from the heating circuit [R] to the central heating return pipe [R1].
2. Connect a T-joint to the heat pump section (central heating flow, A1-b) and connect an elbow joint to the gas boiler section (central heating flow, A2). Connect a straight central heating pipe between both joints.
3. Connect the flow pipe for the heating circuit [A] to the T-joint on the heat pump section (central heating flow, A1-a).
4. Connect an elbow joint to the heat pump section (central heating flow, A1-a) and also connect an elbow joint to the gas boiler section (return, R2). Connect a curved central heating pipe between both joints.



4.4.1.2 TWO ZONES CONNECTION

1. Connect a T-joint to the heat pump section (central heating return, R1) and also a T joint to the gas boiler section (return, R2).
Connect the curved central heating pipe between the two T-joints.
2. Connect the ZLTV* return pipe from the low temperature heating circuit [RZLTV*1] to the T-joint on the heat pump section (central heating return, R1).
3. Connect the HTV*1 return pipe from the high temperature heating circuit [RHTV*2] to the T-joint on the gas boiler section (return, R2).
4. Connect the central heating flow pipe A1-a from the heat pump to the low temperature heating circuit [AZLTV*3].
5. Remove the red cap from the gas boiler section (central heating supply, A2). Connect an elbow joint to the heat pump section (central heating flow, A1-b) and connect a T joint to the central heating section (central heating flow, A2). Connect a central heating pipe between both joints.
6. Connect the flow pipe for the high temperature heating circuit [AHTV*4] to the T-joint on the gas boiler section (central heating supply, A2).



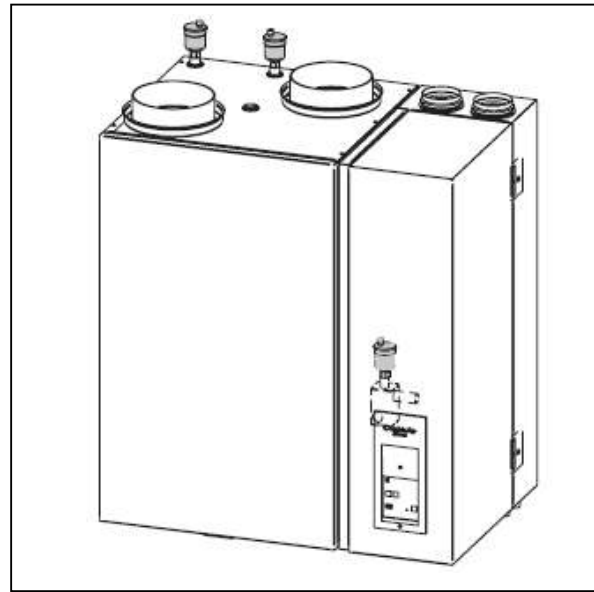
- * ZLTV = Zeer Lage Temperatuur Verwarming [low temperature heating]
- *1 HTV = Hoge Temperatuur Verwarming [high temperature heating]
- *2 RZLTV = Retour Zeer Lage Temperatuur Verwarming [low temperature heating return pipe]
- *3 AZLTV = Aanvoer Zeer Lage Temperatuur Verwarming [low temperature heating flow pipe]
- *4 AHTV = Aanvoer Hoge Temperatuur Verwarming [high temperature heating flow]

4.4.2 CONNECTING ACCESSORIES

The heat pump section has two automatic air vents located on the top of the appliance and the gas boiler section has an automatic air vent which is located inside the appliance. See the adjacent diagram.

There are a number of parts that are not included with the CombinAir, but are necessary for its proper functioning. These comprise an expansion vessel, a pressure relief valve, a filling loop and a pressure differential regulator valve, normally referred to as a by-pass valve.

The expansion vessel which stores water overflowing from the central heating system when the water expands due to temperature increase and also the pressure relief valve which acts as a pressure safety device should both be located near to the appliance. When all the radiators are fitted with thermostatic valves, it may be necessary to build in a by-pass valve that helps to guarantee minimum water circulation through the appliance.



Expansion vessel, pressure relief valve and filling loop:

The expansion vessel must be sized according to the total volume of the system.

Connect the expansion vessel and pressure relief valve to the central heating return pipe. The filling loop can be connected here as well.

No valve may be positioned between the expansion vessel and the CombinAir. Adjust the pressure relief valve setting to 3 bar. Connect the discharge pipe from the pressure relief valve to the waste system. Ensure that the discharge pipe has sufficient capacity.

By-pass valve:

In a high temperature central heating circuit a by-pass valve is needed. Connect the by-pass valve as far away as practical from the appliance but before any zone valve.

Use T-joints for this purpose and connect the by-pass valve in a connecting pipe of at least 22mm between the flow and return of the central heating pipes.

4.4.3 CONNECTING THE MAINS WATER SUPPLY

In areas of hard water (in excess of 200ppm), an approved water conditioner device must be fitted in the cold water supply to the appliance (in accordance with Building Regulations).

• **diameter of piping:**

Atmos advises the use of 15 mm diameter pipes. The connection points for the hot and cold water (ø 15 mm) can be found underneath the appliance. The cold water pipe (K) has a blue mark, and the hot water pipe (W) has a red marker.

• **Pipe work connections:**

1. Connect the cold water pipe on the boiler to the cold water supply using an isolation valve.
2. Connect the hot water pipe on the boiler to the domestic hot water system using a compression joint. The CombinAir does not have a means of adjusting the hot water temperature. Temperature adjustment for the hot water can be achieved by fitting a thermostatic mixer valve with a connection from the cold water supply.

The CombinAir can accept pre-heated water from a solar thermal installation. For pipe work connections refer to the solar thermal installation instructions.

4.4.4 CONNECTING THE GAS SUPPLY

Installation of gas appliances must be done by an approved Gas Safe engineer!

In order to avoid gas leaks and possible damage to the appliance, as well as avoiding dangerous situations, the gas pipe work must be installed properly and expertly, and the pipes and the quality of the gas must meet specific standards. The following requirements apply:

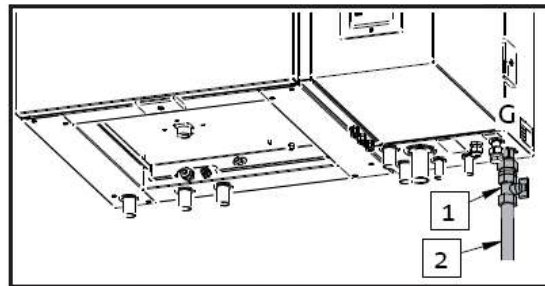
- Check that the type of gas and the pressure stated on the information plate on the appliance corresponds with the local supply.
- The gas pipes should be completely gas-tight.
- Ensure that the gas pipes are clean.
- Install the gas valve near the appliance.

• **Pipe diameter:**

Pipes with a minimum diameter of 22 mm should be used for the gas supply.

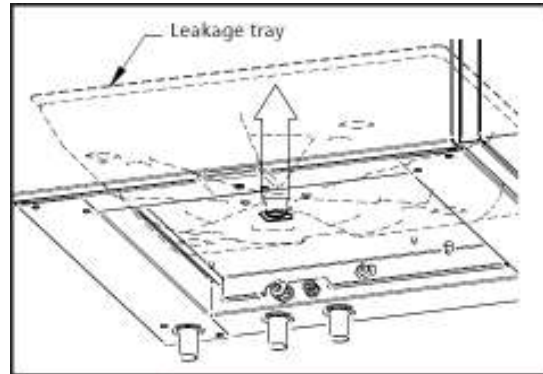
• **Gas pipe connection:**

1. Install the gas tap to the gas connection point [G]. Try to install the gas tap in the position shown.
2. Connect the domestic supply gas pipe to the tap.
3. Ensure that all the connections are completely gas-tight.

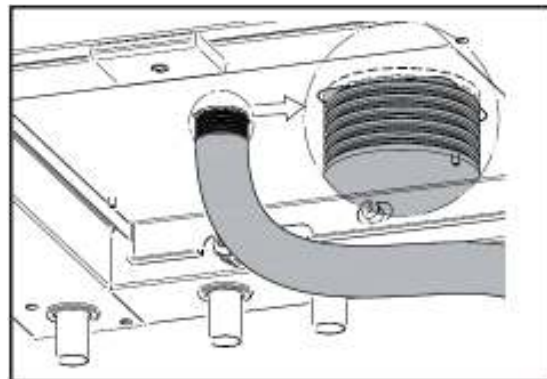


4.4.5 CONNECTING THE CONDENSATE DISCHARGE

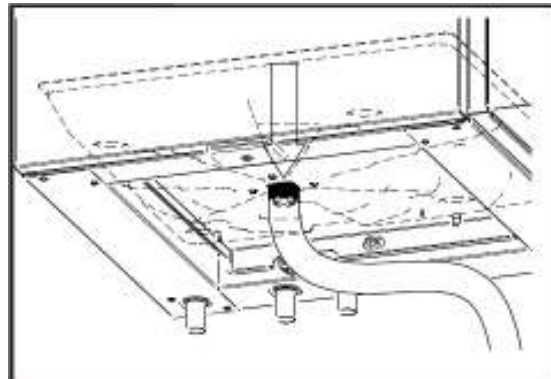
1. Push up the bulge in the leakage tray



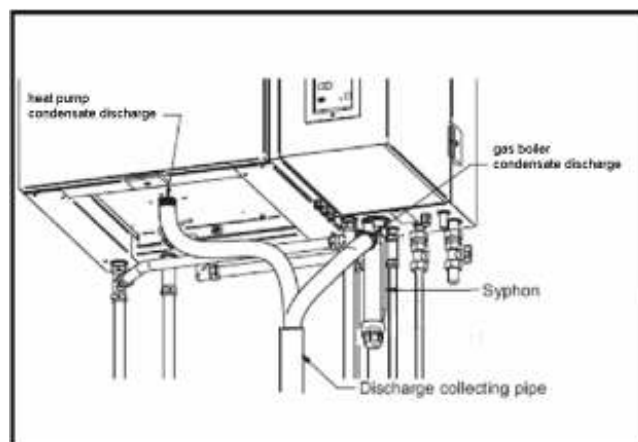
2. Mount the flexible pipe into the square hole. Drop the ridge in the metal plate.



3. Press back the leakage tray to its original position, so that the flexible pipe is held in place.



4. Connect the condensate discharge pipes into a domestic waste pipe.



4.5 ELECTRICAL CONNECTIONS

The Atmos CombinAir electrical wiring supplied is complete and should not be altered or adapted. Both the central heating and the heat pump sections are supplied with a cable.

4.5.1 CONNECTING THE HEAT PUMP

The CombinAir has two control units:

The heat pump part is fitted with a control unit that communicates with the control unit in the gas boiler section via a data cable. This cable (grey) comes out of the heat pump section and must be connected to the gas boiler section.

- Unscrew the two screws on the lid and remove the gas boiler section casing.
- Lead the cable from the heat pump section through the PG gland to underneath the gas boiler section.
- Connect the data cable to the “data” connector (below - right-hand connector – see fig 5a and fig 5b)

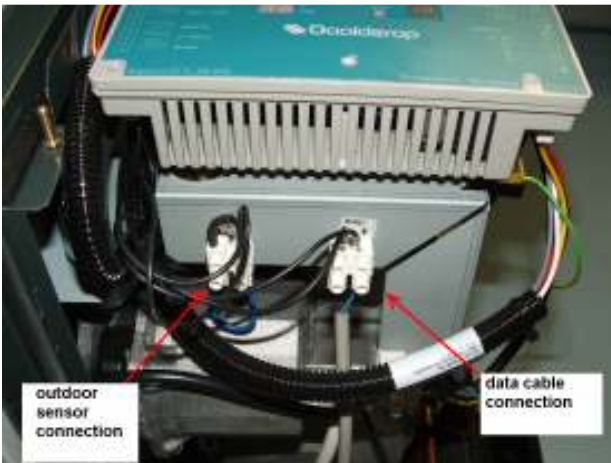
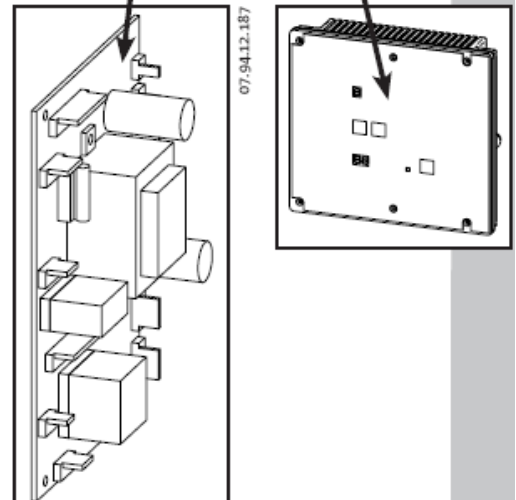
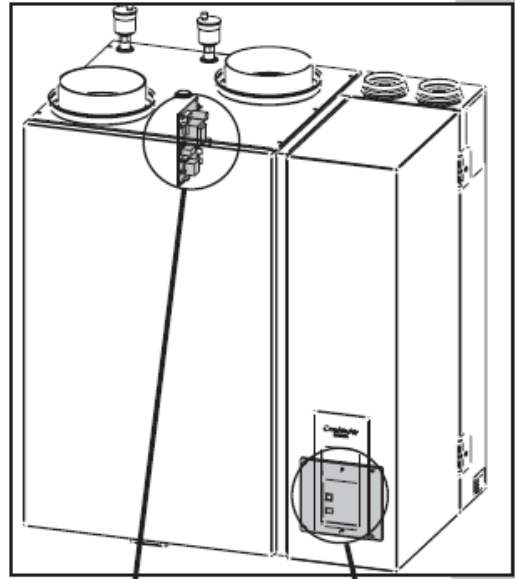


fig 5a

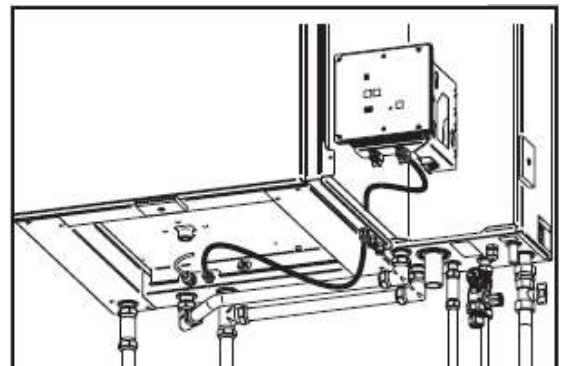


fig 5b

4.5.2 CONNECTING THE EXTERNAL SENSOR

The appliance only works when the external sensor is connected.

The external sensor is supplied inside a housing and does not include wiring. Use standard twin cable for the connecting wire.

Always mount the sensor with the cable opening at the bottom to avoid problems with moisture, and ensure that the lowest point of the cable outside the house is always lower than the hole in the wall. See the adjacent diagram.

Mount the external sensor preferably on a north facing wall. Do not locate the sensor where it can be influenced by heat coming from the sun's rays, the chimney, fan outlets or open windows.

Do it as follows:

- Determine the location, then drill a hole in the wall for the cable.
- Determine the exact location of the external sensor, ensuring that the cable has enough play.
- Pull the cable through the PG gland in the appliance and connect it to the connector for the outdoor sensor (below - left-hand, see figs 5a & 6).

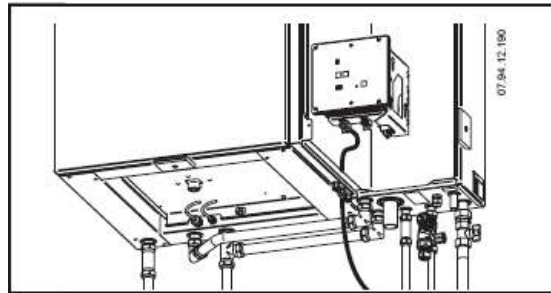
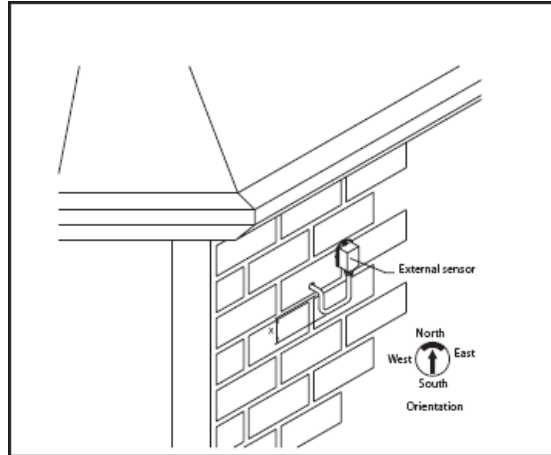


fig 6

4.5.3 CONNECTING THE ON /OFF ROOM THERMOSTAT(S)

Connect the wiring from the room thermostat to the 24 volts AC thermostat connection point (top left-hand connector) mounted on the frame behind the control unit. (See figs 7a and 7b)

Where applicable adjust the room thermostat heat accelerator to 0.12 amps. The maximum permissible resistance for the room thermostat circuit is 22 Ohms. When there is no demand for heat, the closed-circuit current with a clock thermostat may not be higher than 10mA.

It is advisable not to set the room thermostat lower than 15° C during the winter months.

Next to the room thermostat connection point there is a connection point for the second room thermostat to be used in the case of a two zone system (low temperature zone and high temperature zone). The thermostat for the high temperature zone must be connected to this second connection point. (See fig. 7b)

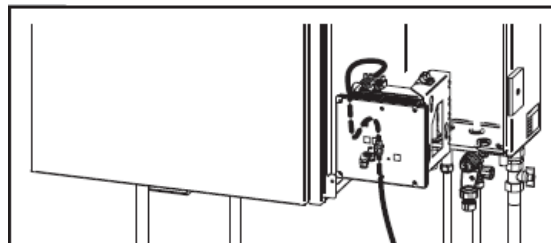


fig 7a

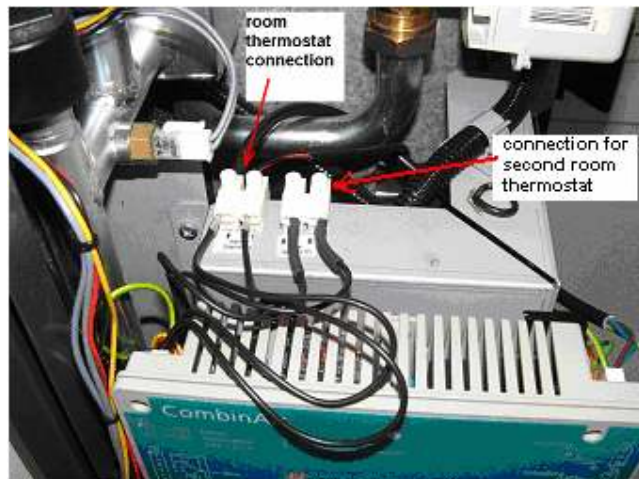


fig 7b

4.5.4 CONNECTING TO FUSED SPUR AND PROGRAMMER

Once everything has been connected, both mains cables can be connected to a double pole switched fused spur with 3 Amp fuse. The mains connection from the fused spur to the gas boiler must run via a timer or programmer. This is in order to satisfy building regulations which state that heating appliances should be timed so that they can be turned off at certain times, commonly at night. Turning off the gas boiler section will automatically cause the heat pump to shut down (after about one minute).

Please make sure the following color codes are being used:

Blue : Neutral

Brown : Live

Yellow/Green : Earth

Gas boiler section

If the Live and Neutral connections are the wrong way around, the control unit will block while displaying error message ‘L’ on the control panel. Switch the Neutral and Live connection in this case, and the appliance will then start up normally.

Connect the brown wire (Live) of the gas boiler mains cable to the switched live connection on the timer or programmer.

Heat pump section

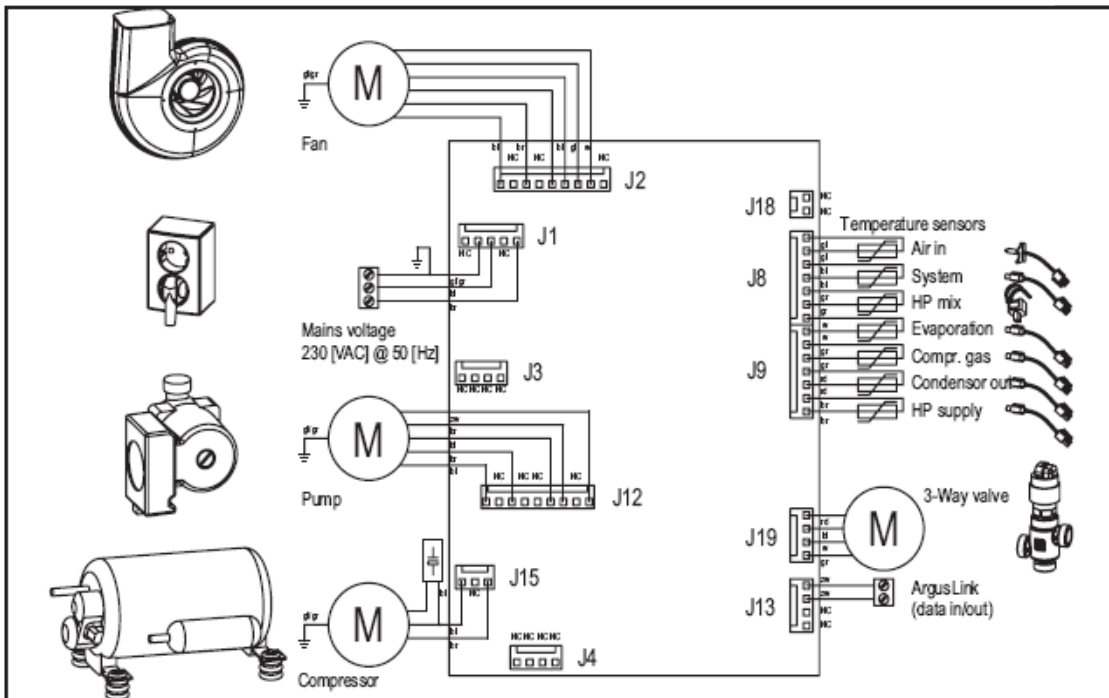
The software resets whenever the electricity to the heat pump section is cut off. The appliance then requires 10 minutes to restart.

4.5.5 ELECTRICAL DIAGRAMS

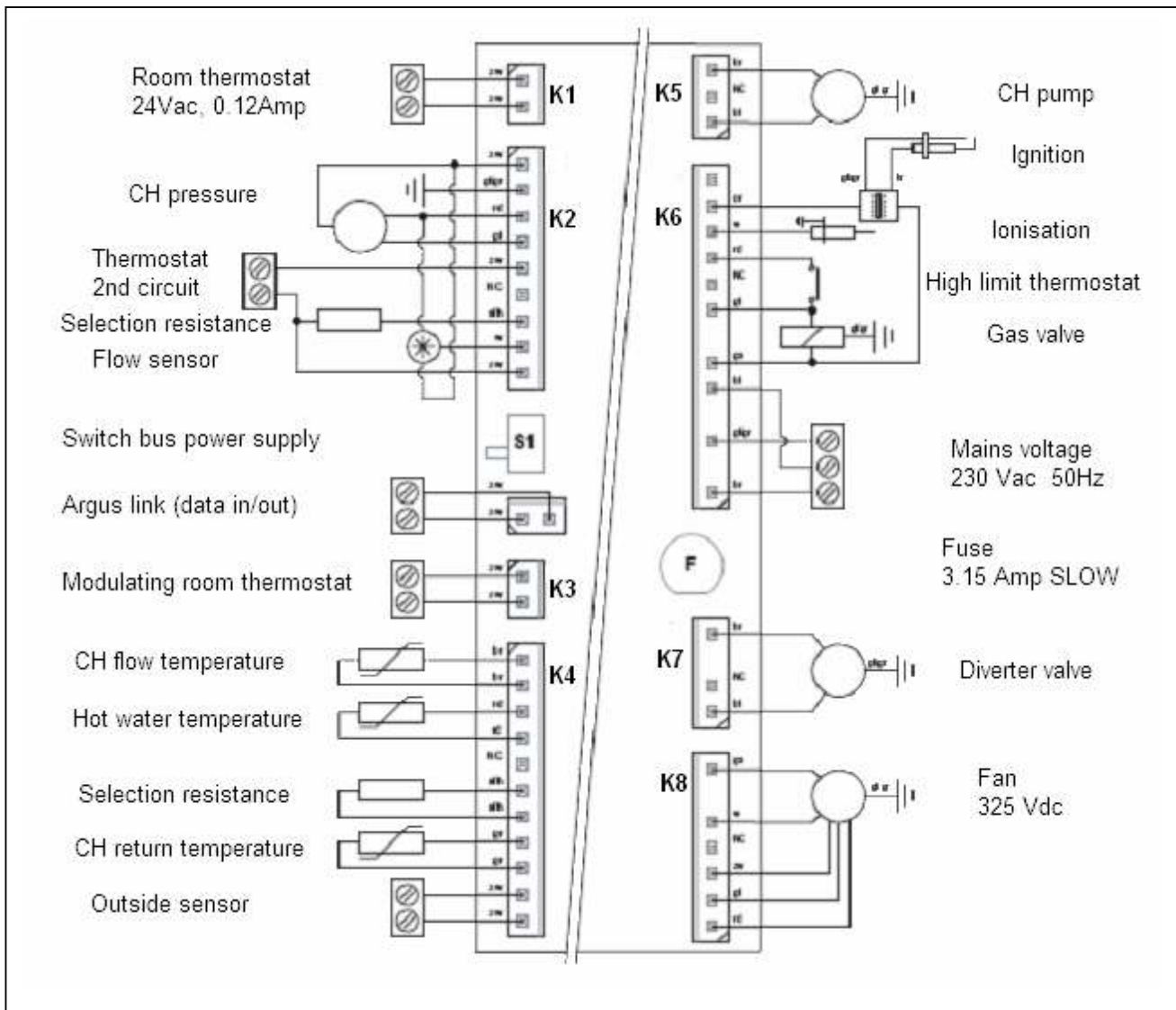
Electrical diagram of the heat pump section

The diagram below (drawing) displays the heat pump section control unit. To access the control unit, remove the casing in front of the heat pump section. The control unit lies in the uppermost part, above the compressor in the centre. Almost all the connections on the control unit are made in the factory and should not be altered. A power cable is already connected to screw connector ‘J1’ (mains).

Electrical diagram of the heat pump section:



Electrical diagram for the control unit of the gas boiler section:



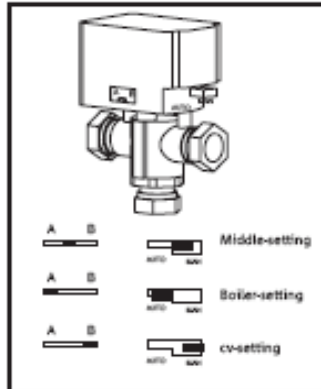
5 COMMISSIONING

This paragraph contains the procedure for commissioning the appliance.

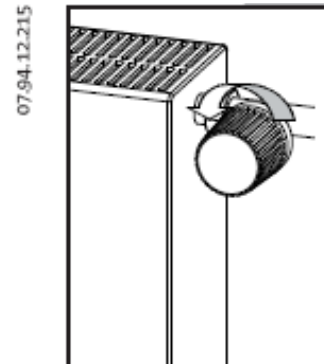
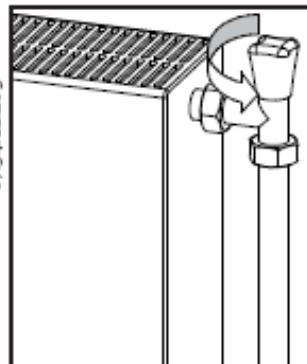
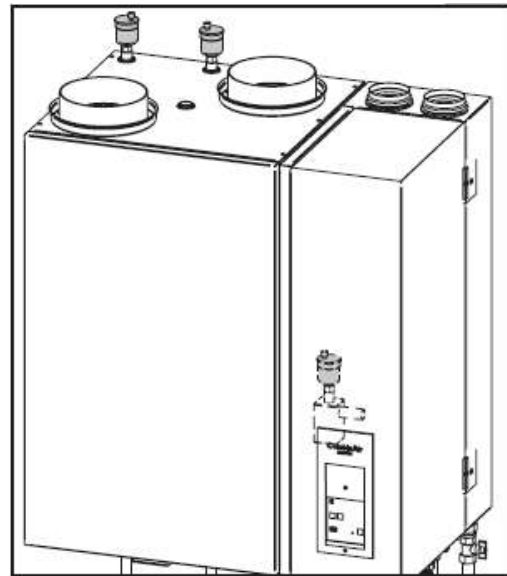
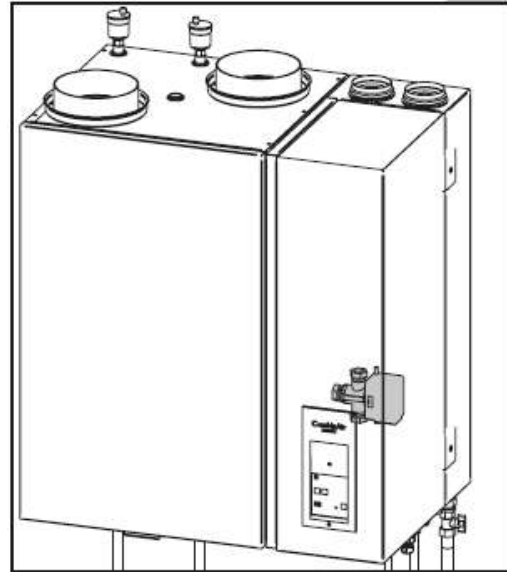
5.1 FILLING AND VENTING THE APPLIANCE

• **Filling the central heating circuit**

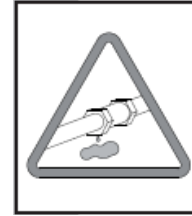
The appliance is supplied with a three-way valve set in mid position, making it easier to fill the system with water.



1. Open all the radiator valves in the central heating system fully. Open up the automatic air vents by loosening the caps.
2. Connect both the heat pump and gas boiler sections to the earthed mains spur.
3. Connect and open the filling loop.
4. Fill the appliance slowly up to a pressure of 2 bar (=200kPa). The operation of the appliance is blocked if the central heating pressure is less than 1 bar (=100kPa). The status display will indicate code 'C'. As soon as the central heating pressure rises above 1 bar (=100 kPa), the blockage is released. The three-way valve is then automatically released and the central heating pump starts to pump. Check whether the central heating pump is actually rotating and make it work with a screwdriver if necessary. The appliance is now ready for operation.



5. Vent the installation via the radiator air vents. If necessary, top up the installation with water at 2 bar pressure. It is advisable to check the pressure from time to time.
6. Check for water leaks.



For floor heating, follow the supplier's filling instructions.

• **Filling the hot water circuit**

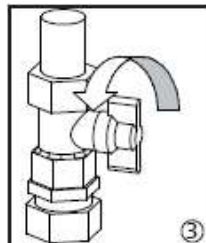
1. Close the isolation valve on the cold water inlet.
2. Open the main water supply tap and check for leaks.
3. Open the isolation valve on the cold water inlet.
4. Open the hot water taps so that air can escape from the pipes.
5. Wait until only water comes out of all the hot water taps. The hot water circuit is now filled and the hot water taps can be closed.
6. Check the pipes and joints for leaks.

5.2 STARTING THE APPLIANCE

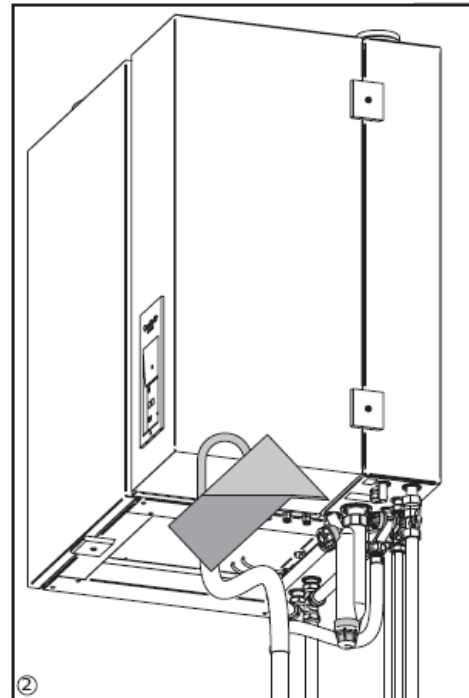
• **Starting the central heating operation**

Carry out the following when starting the gas boiler section.

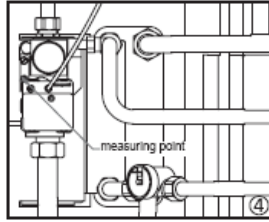
1. Check the water pressure in the central heating circuit. This should be approximately 2 bar (=200kPa). If the pressure is less than 0.5 bar (=50kPa), or higher than 3 bar (=300kPa), this will come up as a warning message on the status display. The letter 'C' appears in the display alternating with the working status of the appliance. See chapter 8. The appliance will only operate at minimum power when this warning is displayed.



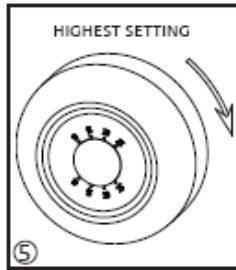
2. Check the condensate trap. This should be completely full.
3. Open the appliance gas tap.



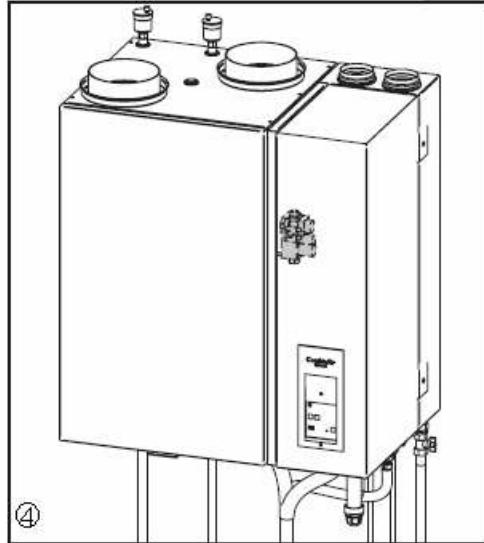
- If necessary vent the gas pipe via the measuring point for measuring gas pressure.



- Set the room thermostat at the highest setting.

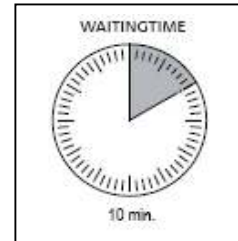


- Turn on the power supply.

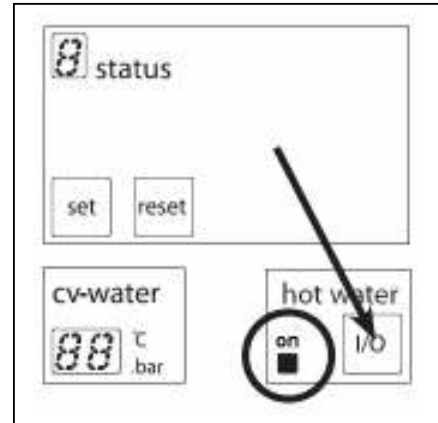


The heat pump will start up after 10 minutes.

Note: Whenever the power to the heat pump has been disconnected, restarting after replacing the mains plug takes approximately 10 minutes.



- Switch off the hot water function by pressing the hot water key on the control panel. The 'on' indicator lamp will go out.
- The appliance will now start (status message code '2'). If the hot water temperature is below 10°C, the frost protection is in operation and the appliance will initially bring the temperature to above 15°C (status message '3').
- If there is still air in the gas pipe, it is possible that the appliance will repeatedly try to ignite a few times. After three attempts to start, the flame error message is displayed (flashing code '3'). Release the control unit in that case by pressing on the reset key. The appliance will now initially burn on the lowest setting for three minutes and thereafter at the maximum load if the central heating water temperature is below 80°C. The appliance modulates between 80°C and 90°C. If the appliance does not light up after resetting three times, vent the gas pipe via the gas pressure measuring point.



- Now carry out the following actions in order to check whether the appliance is functioning properly:
 - visually inspect the flame
 - measure the gas pressure
 - measure the load
 - measure the CO₂ percentage in the flue gases, if you possess a CO₂ measuring device.

CombinAir Combustion settings for G20 gas		
	Low rate	High rate
Input (kW)	0.4 - 9.3	20.1 - 31.1
CO ₂ %	7.9 - 8.7	8.8 - 9.5
O ₂ %	5.35 - 6.8	3.9 - 5.1

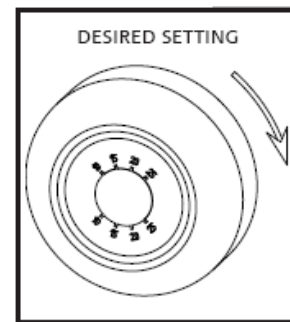
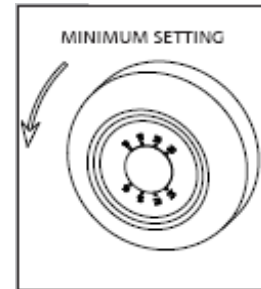
• **Measure the gas pressure**

Measure the gas pressure when operating at the highest setting. The gas pressure measuring point is located on the gas valve. The gas pressure at the highest setting should be at least 20 mbar. The burning pressure adjusting screw is preset in the factory. The burning pressure can only be measured using an accurate CO₂ measuring device.

• **Starting the hot water operation**

Carry out the following when starting the hot water operation.

1. Set the room thermostat to the minimum setting.
2. Turn on the hot water operation by pressing the hot water key. The 'on' indication lamp will light up. The three-way valve will be set to the hot water position and the water will then be heated (status message code '1').
3. Turn back the room thermostat to the desired setting.



The following codes can appear on the status display:

1. Request for hot water
2. Request for house heating
3. Request for hot water and house heating, priority for hot water
4. Request for hot water and house heating

5.3 APPLIANCE SETTINGS

The control parameter settings can be adjusted through the control unit as detailed in the document 'Commissioning and Settings of the CombinAir'.

The standard factory settings are shown in this document in bold print.

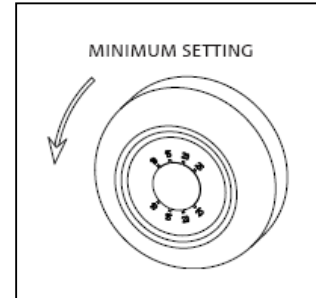
6 DECOMMISSIONING

6.1 TAKING OUT OF SERVICE

• Shutting down the central heating circuit

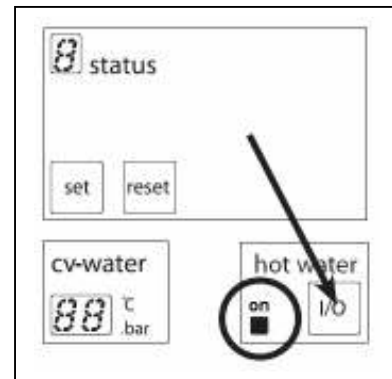
1. Leave power on.
2. Set the room thermostat to the minimum setting. The hot water will maintain the correct temperature.

It is advisable not to set the room thermostat lower than 15 °C during the winter months. To avoid the system freezing during the winter, it is advisable to open fully or even partly, each of the radiator valves.



• Shutting down the hot water circuit

1. Leave the power on.
2. Disconnect the hot water heating system by pressing the hot water key. The 'on' indicator lamp will go out (the frost protection comes on when the hot water temperature drops below 10 °C).



6.2 DRAINING THE APPLIANCE

• Draining the central heating circuit

1. Turn off power supply.
2. Put the three-way valve into the middle position by pushing the control knob until it locks.
3. Allow the system to drain off via the filler/ drain tap.

6.3 DISPOSING OF THE APPLIANCE

The Atmos CombinAir consists of a gas boiler section and a heat pump section. The gas boiler section is constructed from primary metals including copper, aluminum and steel. These materials can easily be separated and recycled at the end of the useful life of the appliance.

The heat pump section is filled with refrigerant. This section must be disposed of by a specialist organisation recognised for handling such materials. For this contact the local authority or the local scrap metal dealer.

7 INSPECTION & MAINTENANCE

The CombinAir is virtually maintenance-free. An inspection should be carried out once a year. Clean the outside of the boiler if necessary using a damp cloth with some cleaning product (no solutions). Any maintenance activities should be carried out by a recognised installation engineer or service company. Only use replacement parts supplied or recommended by Atmos.

7.1 ANNUAL COMBINAIR INSPECTION

7.1.1 INSPECTION OF THE GAS BOILER SECTION

Disconnected the power supply before removing the casing, There is a 230 volt AC feed to the gas valve, the three-way valve and the central heating pump, and to the fan there is a 325Vdc feed!

The annual inspection includes the following:

1. Check on the water pressure
2. Check the flue tube and the air supply for leakages
3. Visually inspect the burner flame
4. Measure the load (see type plate)
5. Measure the percentage of CO₂ in the flue gasses
6. Inspect the ionisation flow
7. Inspect the siphon

Take a note of the inspections and activities carried out and write them down on the service card provided.

1. Check the water pressure

The water pressure must be at least 0.8 bar. Fill the central heating system to a maximum of 2 bar.

2. Check the flue tube and the air supply for leakages

Check the joints and ducting of the flue tube and the air supply for leakages.

3. Visually inspect the burner flame

The burner flame should only be assessed after it has been burning for one minute in either the low or high position.

• Low position

From top to bottom of the burner it should show a blue flame (CO₂ = 8.4% to 8.8%) A completely red flame indicates that there is too much gas in relation to the air. This means too high a CO₂ percentage (> 8.8%). A completely dark blue flame indicates that there is too little gas in relation to the air. This means too low a CO₂ percentage (< 8.4%).

• High position

From top to bottom of the burner it should show a completely blue flame (CO₂ = 9.3% to 9.8%) The high setting is determined by the setting of the low position. Where the flame looks acceptable, the CO₂ measurements of the flue gases can be left out. If the flame does not look acceptable, then a CO₂ percentage test must be carried out on the flue gasses (see item 3 of the inspection).



4. Measuring load

Measure the period over which 28.2 litres (28.2 kW) of gas is used in the high position. The period measured should be 33 seconds. The period may deviate ± 6% (± 2 seconds). Note down the value measured on the service card inside the appliance. Compare the length of the period with the measurements taken on commissioning and/or the previous year’s inspection (see the service card inside the appliance). If the period falls outside of the tolerances, inspect the air supply and flue tube systems, plus check the appliance heat exchanger for contamination and clean it if necessary (see § 7.2.1).

Note: With flue tubes longer than 10m at Ø 80 mm the load is negatively influenced. The measured period will increase by approx 2%.

5. Measuring the CO2 content of the flue gasses

you require CO2 measuring equipment with an accuracy of < 0.2%, to check the flue gas CO2 content.

- a. Measure the CO2 percentage in the low position. The appliance will start at the higher capacity and thereafter burn for three minutes in the low position.
- b. it will be possible to measure the CO2 percentage after five minutes. The values measured should fall within the limits stated in fig 9.
- c. Note down the measured values on the service card inside the appliance. Compare these with the values that were measured on commissioning the appliance and/or at the previous inspections.
- d. Contact Atmos if there are large variations.

CombinAir Combustion settings for G20 gas		
	Low rate	High rate
Input (kW)	0.4 - 9.3	20.1 - 31.1
CO ₂ %	7.9 - 8.7	8.8 - 9.5
O ₂ %	5.35 - 6.8	3.9 - 5.1

fig 9

6. Inspect the ionisation flow

The burner ionisation flow can be read off the service program on the control unit. The ionisation flow should be greater than 42 for both low and high positions. The ionisation pin must be checked (see § 7.2.1) if there are deviations.

7. Inspect the siphon

Remove the siphon container under the appliance annually to check whether aluminium oxide has formed inside. If it is deposited there, this indicates that the heat exchanger should be cleaned (see § 7.2.1). Rinse the siphon out and also flush the waste pipe into which the condensate is discharged. This is to avoid sludge forming.

Note: Ensure all waste pipes carrying condensate have sufficient gradient in order to prevent clogging up. It is also advisable to clean out any accumulated aluminium oxide three months after installation. Most of the oxide in the flue tube is formed in this period.

7.1.2 INSPECTION OF THE HEAT PUMP SECTION

The annual inspection includes the following:

1. Visual inspection inside the casing
2. Inspection of the filter
3. Check the leakage tray and drain

1. Visual inspection inside the casing

Remove the front cover of the heat pump section. Inspect the inside of the appliance and assess whether it looks in good order. Check for any loose piping that may cause vibration, as well as signs of leaks, etc.

2. Inspection of the filter

The filter must be able to let sufficient flow through – remove the evaporator filter and hold it up to the light. If the filter is dirty, it can be rinsed with clean water. Squeeze out the excess water and replace.

3. Checking the leakage tray

The leakage tray must be checked for contamination and blockages. Check whether the drain is blocked and also check for leaks.

7.2 COMBINAIR MAINTENANCE

7.2.1 GAS BOILER SECTION MAINTENANCE

A large service includes the following:

1. Cleaning the exhaust casting
 2. Inspection of the burner unit
 3. Cleaning the heat exchanger
 4. Inspection of the air supply and flue gas systems
- Note down the inspections and maintenance work on the service record.

1. Cleaning the exhaust casting

- a. Remove the outlet casting and the flue baffle
- b. Inspect the outlet casting for contamination
- c. Clean as necessary

2. Inspection of the burner unit

Remove the burner from the appliance (fig 10).

Do it as follows:

- a. Unscrew the coupling nut from the gas nozzle assembly [1]
- b. Unscrew the three (M5) nuts on the inlet casting [2]
- c. Remove the electrical connections from the burner assembly
- d. Inspect the ignition electrode. The distance between the electrode and the burner must be 8.5 mm, and 4 mm between the electrodes and the earthing pin.
- e. Inspect the ionisation electrode. The distance between the pin and the burner must be 8.5 mm.
- f. Remove the burner from the inlet casting and inspect the burner's internal grill for contamination. Clean this if necessary with a soft brush or compressed air.

3. Heat exchanger

Inspect the heat exchanger from the upper side of the appliance. Clean the heat exchanger if it is dirty.

- Clean the ribbing of the heat exchanger with a brush.

NOTE!

It is strongly advised to wear a face mask with a P3 filter when carrying out activities on the heat exchanger.

NOTE!

Never use steel or brass brushes when cleaning the heat exchanger or the outlet casting assembly.

4. Air supply and flue tube systems

Clean as necessary.

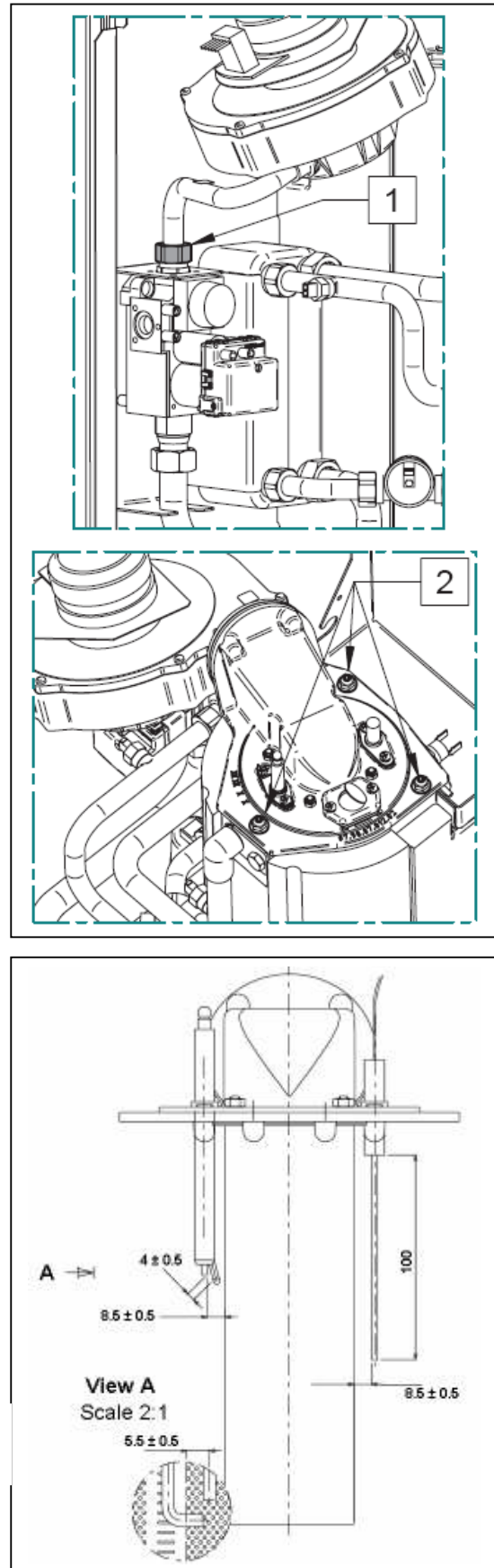


fig 10

7.2.2 MAINTENANCE OF THE HEAT PUMP SECTION

A large service includes the following:

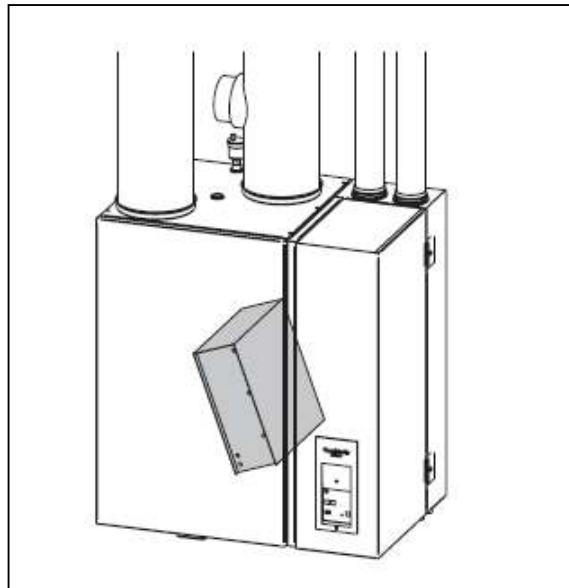
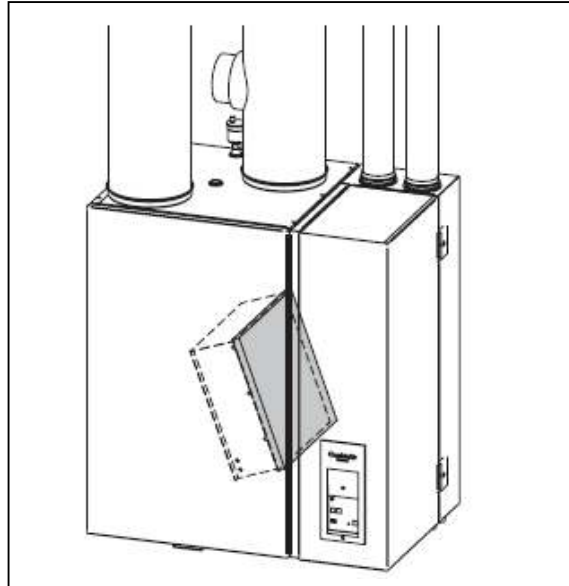
1. Cleaning the filter.
2. Cleaning the heat evaporator.

1. Cleaning the filter.

Remove the front cover of the heat pump section. The filter must be able to let through sufficient flow. Remove the evaporator filter and hold it up to the light. If the filter is dirty, it can be rinsed with clean water. Squeeze out the excess water and replace.

2. Cleaning the heat evaporator

Check whether the evaporator is clean enough – if there is a build-up of contamination, the plates can be cleaned by carefully spraying them with water. The rinsing water runs off to the drain via the leakage tray.



8 MALFUNCTIONS

The CombinAir controller can recognise and indicate a number of malfunctions. These malfunctions can exist both inside and outside the appliance – for example through leaks or blockages.

The CombinAir distinguishes three types of malfunctioning:

• **Warning**

When a warning occurs on the appliance, it remains functioning where possible. However, it is possible that the appliance cannot provide much, or indeed any heating for the house.

A warning message from the gas boiler section can be recognised by a letter that appears in the display every five (5) seconds for a period of one second, which replaces the normal status message. A warning message for the heat pump section can be recognised by the letters 'CC' and a malfunction code that is displayed alternately in the central heating water display on the control unit.

• **Blockages**

When a blockage occurs, the CombinAir will return to normal functioning after the cause of the blockage has been removed, without needing to press the reset key. The appliance will stop functioning while blocked, although the other appliance section will continue operating as normal. A blockage message for the gas boiler section is recognised by a permanently lit letter in the status display. A blockage message for the heat pump section can be recognised by the letters 'CE' and a malfunction code that is displayed alternately in the central heating water display on the control unit.

• **Lock-out**

After lock-out, it is possible for the appliance to carry on operating by pressing the reset key after the cause of the lock-out has been cleared. The appliance will stop functioning while locked-out, although the other appliance section will continue operating as normal. A lock-out message for the gas boiler section is recognised by a flashing letter in the status display.

A lock-out warning message for the heat pump section can be recognised by the letters 'CA' and a malfunction code that is displayed alternately in the central heating water display in the control unit.

HOW TO HANDLE A MALFUNCTION

Check the following:

- is there power to the appliance? See also status 'L'.
- Is at least one single radiator valve open?
- Is the room thermostat correctly set?
- Is the gas supply tap open?
- Is the central heating system pressure between 1 and 3 bar? See also status 'C'.
- Has the central heating installation been deaerated?
- Is the hot water heating system connected (the yellow hot water LED is lit or is flashing)?

Carry out the following if the appliance is properly connected:

- Press once or twice on the reset key. If the malfunction persists, try again after 15 seconds.
- If the appliance continues to malfunction, or the same malfunction continues to reoccur, please contact the installation engineer. Provide them with the following information:
 - Type of appliance
 - The malfunction code

WARNING!

Repairs to the sealed system of the heat pump may only be carried out by F gas registered engineers. When a fault occurs in the heat pump which cannot be rectified by the procedures described in this document, the heat pump must at all times be replaced.

Status code 'C'

If the letter 'C' appears in the status display (flashing or permanent), this means that the central heating pressure is incorrect. The water pressure is displayed on the central heating water display. If the pressure is less than 0.5 bar, then the appliance must be topped up. If the pressure is higher than 3 bar, then water should be drained off to lower the pressure (see chapter 5.1).

Status code 'L'

If the letter 'L' appears in the status display, this means the wiring on the power supply is wrong. Check connections are correct .

9 WARRANTY

Thank you for purchasing an Atmos appliance. Safety takes the highest priority at Atmos – our appliances are all developed and manufactured to the highest safety standards. If problems do arise with your Atmos appliance, please contact the approved installation engineer who originally installed the appliance. This warranty applies in addition to Atmos's existing legal warranty obligations. We advise you read these conditions carefully as well as the user's and installation instructions before contacting your approved installation engineer.

Do not forget to complete the enclosed warranty registration card and send it back to Atmos!

Validity

The warranty only applies in the following circumstances:

- Where the appliance is used and maintained in accordance with the user's and installation instructions
- If the Benchmark Checklist & Service Record has been completed.
- If the approved installation engineer has completed the warranty card and returned it to Atmos within eight (8) days of the installation;
- If component failure is found to be due to original manufacturing.
- when making a warranty claim the purchase invoice needs to be submitted, including indication of the date of purchase and the type and serial number of the appliance
- the appliance is fitted with a type and serial number plate

Warranty period

The installation date of the appliance that is recorded on the warranty registration card will become the starting date for the warranty period.

The Combinair warranty periods is as follows:

- One year parts and labour from the date of commissioning as per Benchmark certificate.
- For all parts excluding gas boiler heat exchanger – 2 years plus 3rd year at 50% of current list price (parts only) from the date of purchase invoice.
- Gas boiler heat exchanger – 5 years parts from date of purchase invoice.

Exceptions

1. The warranty is no longer valid in the following circumstances:
 - the appliance was not installed by an approved installation engineer
 - the CombinAir (heat pump section) has been installed or transported horizontally
 - the appliance has not been installed, used or maintained in accordance with the user's and installation instructions.
 - failure to fit an approved water conditioner device in an area of hard water (in excess of 200ppm).
 - failure to add a suitable inhibitor such as Sentinel X100.
2. Atmos is not liable for consequential loss such as loss of profits, water or fire damage.

3. Defects resulting from the following are not covered by the warranty:
- too high or the wrong voltage
 - use of the wrong type of gas
 - incorrect burning, incorrect venting or aerating, contaminated supply of combustion air
 - effects of aggressive fluids, vapours or gasses
 - effects of chemical additives to the appliance or the mains water supply
 - negligence, improper use or external force
 - force majeure or external causes, such as lightning, fire, natural disasters or interior or exterior corrosion
 - normal wear and tear

Warranty provision

- You must request warranty cover immediately after establishing the defect or reporting the malfunction to the approved installation engineer.
 - The approved installation engineer should report the request for warranty cover to Atmos within two working days after receiving the user's report.
- If your appliance does not function properly or is defective, we advise you to contact your approved installation engineer. For further questions that your approved installation engineer is unable to answer, please contact Atmos.

A full statement of the Atmos warranty is available on www.atmos.uk.com.

TECHNICAL DATA

CombinAir specifications

Connections:	
Combustion air intake and flue systems	Ø 80mm
Heat pump air intake and air outlet	Ø 180 mm inside
Cold and hot tap water	Ø 15 mm
Central heating flow and return	Ø 22 mm
Connection for expansion tank/central heating pressure relief/filler-drain tap	Ø 15 mm
Gas	½" BSPF
Condensate discharge	Ø 32 mm Ø 35 mm flexible
Electrics	230 volts / 50 Hz
Maximum working pressure for central heating	3 bar
Maximum working pressure for water supply	8 bar
Room thermostat (standard)	24 volts / 50 Hz
Anticipation	0.12 A

Dimensions & weight:	
Height	896 mm
Width	821 mm
Depth	552 mm
Weight gas boiler section	40 kg
Weight heat pump section	70 kg
Total weight	110kg

To avoid resonance, the CombinAir should be installed on a concrete/stone construction with a mass of at least 200 Kg/m², or on a special vibration-free mounting plate.

CombinAir specifications - gas boiler section (G20 gas)	
Appliance category	I2E-H
Appliance type	C13, C33, C43
	C53, C83, B23
	Condensing
Closed design	Air rinsing
Protection level	IPX4D
Operating pressure	1 – 3 bar
Gas consumption	0.8 – 3.3 m ³ /h
Flue gas temperature min / max	35°C / 120°C
ΔP flue system min / max	0 / 160 Pa
Diameter gas nozzle assembly / mixing chamber	5.9 / 28 mm
Nominal load central heating (upper level)	8.2 – 28.2 kW
Nominal load central heating (lower level)	7.7 – 25.6 kW
Nominal capacity at 50°C / 30°C	27.0 kW
Nominal capacity at 80°C / 60°C	24.5 kW
Maximum central heating nett efficiency (return 30°C – upper / lower)	98.85 % / 108.85 %
Seasonal efficiency	89.1% (Sedbuk B)
Content of gas boiler	2.1 litres
Setting for gas boiler	90°C
Maximum temperature central heating water	110°C
Nominal load DHW (upper level)	8.2 – 34.1 kW
Nominal load DHW (lower level)	7.6 – 31.0 kW
Nominal capacity of DHW	29 kW
Main supply	230 volts / 50 Hz / 115W
Heat exchanger insulation material	Polystyrene

CombinAir specifications – heat pump section	
Heat pump type (W/W, B/W, A, W)	A/W
Type of refrigerant	R-407 C
Consists of C2 – H2 – F4	C2 – H – F5 C2 – H2 – F2
Refrigerant quantity	0.99 kg
Maximum evaporation pressure	7.5 bar
Maximum condensation pressure	28.3 bar
Classification according to EN-NEN 378:2000	A1 (L1)
Nominal volume flow of evaporator [m ³ /h]	Air / 600 m ³ /h
Nominal volume flow of condenser [m ³ /h]	Water / 0.35 m ³ /h
Maximum working pressure of central heating water	3 bar
Mains supply	230volts AC / 50Hz
Fuses	3.15 Amp. Delay
Cos ϕ	0.96
Nominal current	2.75 Amps
Nominal energy use	600 W
Nominal output	2.5 kW

AIR TO WATER HEAT PUMP COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the heat pump and associated equipment as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____
 Address _____ Telephone Number _____
 Heat Pump Make and Model Atmos CombinAir
 Heat Pump Serial Number

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

 Commissioned by (print name) _____ Certified Operative Reg. No. [1]
 Company Name & Address _____ Commissioning Date _____
 Telephone No. _____
 Building Regulations Notification Number (if applicable) [2] _____

CONTROLS - SYSTEM AND HEAT PUMP Tick the appropriate boxes if applicable

1. Time & Temperature Control to Heating	Room Thermostat & Programmer/Timer <input type="checkbox"/>	Programmable Roomstat <input type="checkbox"/>	Load/Weather Compensation <input type="checkbox"/>	Optimum Start Control <input type="checkbox"/>
2. Time & Temperature Control to Hot Water			Cylinder Thermostat & Programmer/Timer <input type="checkbox"/>	Combined with Heat pump main controls <input type="checkbox"/>
3. Heating Zone Valves (including underfloor loops)			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
4. Hot Water Zone Valves			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
5. Thermostatic Radiator Valves			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
6. Heat Pump Safety Interlock [3]			Built In <input type="checkbox"/>	Provided <input type="checkbox"/>
7. Outdoor Sensor			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
8. Automatic Bypass System			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
9. Buffer Vessel Fitted	Yes <input type="checkbox"/> No <input type="checkbox"/>		If YES, Volume _____	Litres

ALL SYSTEMS

The heating system has been filled and pressure tested Yes
 Expansion vessel for heating is sized, fitted & charged in accordance with manufacturer's instructions Yes
 The heat pump is fitted on a solid/stable surface capable of taking its weight Yes
 The system has been flushed and cleaned in accordance with BS7593 and heat pump manufacturer's instructions Yes
 What system cleaner was used? _____
 What inhibitor was used? _____ Qty _____ litres
 Is the system adequately frost protected? Yes

OUTDOOR UNIT

Are all external pipeworks insulated? Yes
 Is the fan free from obstacles and operational? Yes
 Has suitable consideration been made for waste water discharge? Yes

CENTRAL HEATING MODE

Heating Flow Temperature _____ °C Heating Return Temperature _____ °C

DOMESTIC HOT WATER MODE Measure and Record

Is the heat pump connected to a hot water cylinder? Unvented Vented Thermal Store Not Connected
 Hot water has been checked at all outlets Yes Have Thermostatic Blending Valves been fitted? Yes Not required

ADDITIONAL SYSTEM INFORMATION

Additional heat sources connected: Gas Boiler Oil Boiler Electric Heater Solar Thermal Other _____

ALL INSTALLATIONS

The heating, hot water and ventilation systems complies with the appropriate Building Regulations Yes
 All electrical work complies with the appropriate Regulations Yes
 The heat pump and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes
 The operation of the heat pump and system controls have been demonstrated to the customer Yes
 The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm demonstration of equipment and receipt of appliance instructions)

Notes: [1] Installers should be members of an appropriate Competent Persons Scheme. [2] All installations in England and Wales must be notified to Local Area Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer. [3] May be required for systems covered by G3 Regulations



GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer Name _____ Telephone Number _____
 Address _____
 Boiler Make and Model _____
 Boiler Serial Number _____
 Commissioned by (print name) _____ Gas Safe Register Number _____
 Company Name _____ Telephone Number _____
 Company Address _____
 Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number (if applicable) _____

CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating	Room Thermostat and Programmer/Timer <input type="checkbox"/>	Programmable Room Thermostat <input type="checkbox"/>	Load/Weather Compensation <input type="checkbox"/>	Optimum Start Control <input type="checkbox"/>
Time and Temperature Control to Hot Water	Cylinder Thermostat and Programmer/Timer <input type="checkbox"/>		Combination Boiler <input type="checkbox"/>	
Heating Zone Valves			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
Hot Water Zone Valves			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
Thermostatic Radiator Valves			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
Automatic Bypass to System			Fitted <input type="checkbox"/>	Not Required <input type="checkbox"/>
Boiler Interlock				Provided <input type="checkbox"/>

ALL SYSTEMS

The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions. Yes

What system cleaner was used? _____

What inhibitor was used? _____ Quantity _____ litres

CENTRAL HEATING MODE Measure and Record:

Gas Rate _____ m³/hr OR _____ ft³/hr
 Burner Operating Pressure (if applicable) _____ mbar OR Gas Inlet Pressure _____ mbar
 Central Heating Flow Temperature _____ °C
 Central Heating Return Temperature _____ °C

COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes No

If yes, and if required by the manufacturer, has a water scale reducer been fitted? Yes No

What type of scale reducer has been fitted? _____

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate _____ m³/hr OR _____ ft³/hr
 Burner Operating Pressure (at maximum rate) _____ mbar OR Gas Inlet Pressure (at maximum rate) _____ mbar
 Cold Water Inlet Temperature _____ °C
 Hot water has been checked at all outlets. Yes Temperature _____ °C
 Water Flow Rate _____ l/min

CONDENSING BOILERS ONLY

The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5545/BS6798. Yes

If the condensate pipe terminates externally has the pipe diameter been increased and weatherproof insulation fitted? Yes

ALL INSTALLATIONS

If required by the manufacturer, record the following CO₂ _____ % OR CO _____ ppm OR CO/CO₂ Ratio _____

The heating and hot water system complies with the appropriate Building Regulations. Yes

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions. Yes

The operation of the boiler and system controls have been demonstrated to and understood by the customer. Yes

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer. Yes

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.



SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

SERVICE 1 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 2 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 3 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 4 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 5 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 6 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 7 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 8 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 9 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

SERVICE 10 Date

Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

Gas Safe Register Number _____

Comments _____

Signature _____

