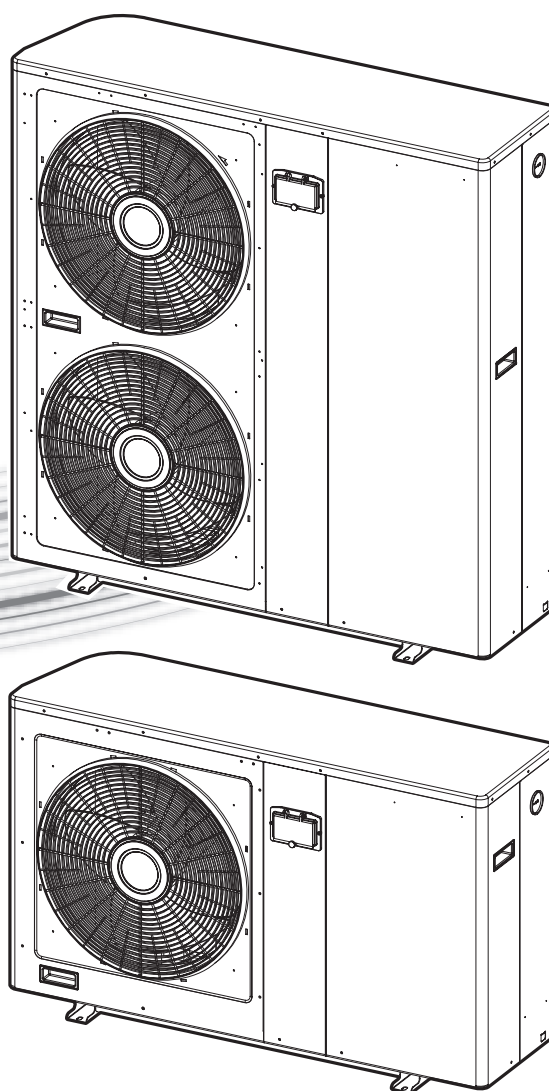


BAXI

Installation, Servicing & Maintenance Instructions



Ambiflo™ Heat Pump System 7kW to 10.5kW Inclusive

Air to Water Heat Pump
for
Outdoor Installation

Safe Manual Handling

General

The following advice should be adhered to, from when first handling the Ambiflo™ Heat Pump Range to the final stages of installation, and also during maintenance.

Most injuries as a result of inappropriate handling and lifting are to the back, but all other parts of the body are vulnerable, particularly shoulders, arms and hands. Health & Safety is the responsibility of EVERYONE.

This Baxi Ambiflo™ Heat Pump unit is not suitable for a one-man lift. Do not attempt to lift this unit without the appropriate equipment and/or assistance.

Do not handle or lift unless you feel physically able.

Wear appropriate Personal Protection Equipment e.g. protective gloves, safety footwear etc.

Important: These instructions do not replace the separate instructions for individual components and accessories, which should be read in conjunction with these instructions.

Preparation

Co-ordinate movements - know where, and when, you are both going.

Minimise the number of times needed to move the Ambiflo™ Heat Pump - plan ahead.

Always ensure when handling or lifting the route is clear and unobstructed. If possible avoid steps, wet or slippery surfaces, unlit areas etc.

Technique

When handling or lifting always use safe techniques - keep your back straight, bend your knees. Don't twist - move your feet, avoid bending forwards and sideways and keep the load as close to your body as possible.

Where possible transport the Heat Pump / Ambiflo™ Parts using a sack truck or other suitable lifting equipment.

Remember

The circumstances of each installation are different. Always assess the risks associated with handling and lifting according to the individual conditions.

If at any time when installing Ambiflo™ Components you feel that you may have injured yourself STOP. DO NOT 'work through' the pain - you may cause further injury.

IF IN ANY DOUBT DO NOT HANDLE OR LIFT AMBIFLO™ COMPONENTS - OBTAIN ADVICE OR ASSISTANCE BEFORE PROCEEDING

CE Marking

This product is CE marked and conforms to the essential requirements of the following Directives:

- Low voltage no. 73/23 EEC, modified 93/68 EEC.
- Electromagnetic Compatibility no. 89/336 EEC, modified 92/31 and 93/68 EEC.

Electrical equipment is in accordance with standard EN 60 335-2-40

The following standards and directives should also be considered when installing this unit.
Current Wiring Regulations BS 7671

HVAC TR/30 Guide to good practice - Heat pumps

BS EN 15450: 2007 Heating systems in buildings - Design of heat pump heating systems

EC Regulation No 842/2006 on certain fluorinated greenhouse gases: Supplementary guidance for stationary refrigeration air conditioning and heat pumps

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The Company Secretary, Baxi Heating UK Ltd, The Wyvern Business Park, Stanier Way, Derby, DE21 6BF.

Full acknowledgement of author and source must be given.

WARNING: Any person who does any unauthorised act in relation to a copyright work may be liable to criminal prosecution and civil claims for damages.

Legislation

Information regarding the refrigerant used in this appliance (R410A)

NOTE: Any work requiring access to the refrigerant circuit must only be carried out by a refrigerant competent engineer.

R 410 A is a high-pressure refrigerant (+ 50% in relation to R 22 and R 407 C). Compressors approved for operation with this fluid are filled beforehand with polyalcohol oil. Contrary to mineral oil, it is very hygroscopic: it absorbs the humidity of the ambient air very quickly. This can modify its lubricant properties and will lead to serious damage to the compressor. Refrigerant material can be hazardous. Contact Baxi Technical Enquiries 0844 871 1568 for further information.

Maintenance Instructions

1. Never add oil to the appliance; the compressor is filled with polyalcohol oil, a special oil which cannot tolerate the presence of other oils.

2. Instruments used for the following:

- filling,
- pressure measurements,
- emptying under vacuum,
- recovering the fluid,

must be compatible with and only used for R410A fluid.

NOTE: the pressure taps of the refrigerating circuit are 5/16 SAE (1/2-20- UNF)

3. In the case of a new charge:

- the charge must be undertaken in liquid phase,
- use a balance and a dip pipe type R 410A cylinder,
- charge the weight of R410A as per the value indicated on the unit's identification plate.

4. In case of leakage, do not complete the charge: recover the remaining refrigerant for recycling and perform a total charge. Recovery, recycling or the destruction of the fluid must be done in compliance with the laws in force in the country concerned.

5. If the refrigerant circuit is opened, you must:

- avoid the entry of air into the circuit as much as possible,
- replace or install a drier,
- perform the "vacuum operation" at a minimum level of 0.3 mbar (static).



ISO 9001
FM 00866

In order to reduce the number of fatalities and major accidents attributable to working at height, the Health and Safety Executive has introduced comprehensive regulations and guidance that should be followed by all businesses working at height.

We consider in the following paragraphs some of the main features of the regulations and guidance. This is, however, only a limited summary and it is recommended that all businesses planning on undertaking air source heat pump heating installations obtain a copy of the regulations and guidance issued by the Health and Safety Executive and carefully consider the contents.

The regulations and guidance state that you are required to carry out a risk assessment for all work conducted at height and to put in place arrangements for:

- Eliminating or minimising risks from work at height.
- Safe systems of work for organising and performing work at height.
- Safe systems for selecting suitable work equipment.
- Safe systems for protecting people from the consequences of work at height.

The regulations and guidance highlight a hierarchy for safe work at height:

- **Avoid** the risk by not working at height if practicable.
- **Prevent** falls. Where it is not reasonably practicable to avoid work at height, you are required to take suitable and sufficient steps to prevent the risk of a fall including selecting the most suitable work equipment (in accordance with the regulations).
- **Mitigate** the consequences of a fall; where the risk of a person or object falling still remains, take suitable and sufficient measures to minimise the distance and consequences of any fall.

Collective protection measures, such as guard rails on scaffold, should be given priority over personal protection measures, such as safety harnesses.

Within the regulations' framework, you are required to:

- 1) Assess the risk to help you decide how to work safely.
- 2) Follow the hierarchy for safe work at height (i.e. avoid, prevent and mitigate).
- 3) Plan and organise your work properly, taking account of weather conditions and the possibility of emergencies.
- 4) Make sure those working at height are competent.
- 5) Make use of appropriate work equipment.
- 6) Manage the risks from working on or around fragile surfaces and from falling objects.
- 7) Inspect and maintain the work equipment to be used and inspect the place where the work will be carried out for both access and egress.

When preparing to install an air source heat pump heating system, it is required that you perform a risk assessment in relation to work at height and plan how you will organise your work, taking into account the site, the weather conditions and the experience and competence of colleagues or contractors who may be working at height with you.

The HSE has published a number of very useful free publications that advise how to undertake risk assessments.

Two of these that you should obtain are:

Five Steps to Risk Assessment.

A Guide to Risk Assessment Requirements.

The five steps outlined in the HSE leaflet are:

Step 1: Look for the hazards

This will mean looking at the site and identifying significant hazards. For example, avoid fragile surfaces and hazardous areas where the Heat Pump may be mounted. Do not work on uneven ground and avoid obstructions where access to the Heat Pump may be required. Always fix ladders and platforms securely before commencing work.

Step 2: Decide who may be harmed and how.

This might mean considering the particular risks that young workers or trainees might face and thinking about the residents of the household or visitors who could be hurt by your activities.

Step 3: Evaluate the risks and decide which precautions should be made. You should consider how likely it is that each hazard will cause harm, decide which precautions you might take and then assess, after you have taken those precautions, whether the remaining risk will be high, medium or low. Where you identify remaining risks, you should consider which further action you could take to control the risks so that harm is unlikely.

Step 4: Record your findings

If you have fewer than five employees you do not need to write anything down, though it is useful to keep a written record of what you have done. If you employ five or more people you must record the significant findings of your assessment. You must also tell your employees about your findings. You need to be able to show that a proper check was made, that you considered who might be affected, that you dealt with all the obvious significant hazards, that the precautions you propose are reasonable and that the remaining risk is low.

Step 5: Review your assessment if necessary

Each air source heat pump heating installation may bring its own challenges and present its own particular hazards. You should therefore be careful not to rely on a "standard" risk assessment for installing an air source heat pump heating system in a house, but review the particular hazards for each new situation. The issue of work equipment must be considered, but at the preparation stage you should consider where scaffold or other access equipment might be positioned and look out for any obvious obstacles to this, such as a conservatory or porch.

In addition to the risks associated with work at height, you should also consider the risks associated with moving the air source heat pump into position, using electric drills and using blow lamps or blow torches for soldering. This is not an exclusive list and so you should consider all aspects of the proposed installation to assess whether there are additional risks that need to be taken into account.

Your Ambiflo™ Heat Pump pack contains the following items.

	Ambiflo™ 75 plus heater pack	Ambiflo™ 90 plus heater pack	Ambiflo™ 105 plus heater pack	Ambiflo™ 75 plus buffer pack	Ambiflo™ 90 plus buffer pack	Ambiflo™ 105 plus buffer pack
Code number	5131492	5131493	5131494	5131495	5131533	5131534
Ambiflo™ 75	■			■		
Ambiflo™ 90		■			■	
Ambiflo™ 105			■			■
Electric heater 5kW*	■	■	■	■	■	■
Water temperature sensor	■	■	■	■	■	■
Connections kit 3/4"	■	■		■	■	
Flexible hoses 3/4"	■	■		■	■	
Connections kit 1"			■			■
Flexible hoses 1"			■			■
Direct buffer vessel 100 litres				■	■	■
Balancing valve	■	■	■	■	■	■
Literature pack	■	■	■	■	■	■

Fig. 1

* The 5kW Electrical heater is supplied complete with the Aquaset controller, outdoor sensor and water temperature sensor (fitted).

1. The Baxi Ambiflo™ system includes a one year parts and labour guarantee. The buffer vessel, where fitted, comes with a 2 year parts warranty. The cylinder's stainless shell has a 25 year warranty.

2. The labour guarantee is subject to the installation and commissioning of the unit being carried out in accordance with the manufacturer's instructions.

3. In accordance with building regulations, installation must be carried out by an installer who has successfully completed the Baxi Ambiflo™ training course.

4. Baxi offer a set up and test service for this product. This can be arranged by telephoning 0844 871 1568 to book the visit. Further details regarding commissioning can be found in the Commissioning booklet General Information section. We aim to process your request within 7 days of receipt.

IMPORTANT:- The terms of the Baxi Ambiflo™ warranty require the installation is set up and checked by one of our heateam engineers. This service is chargeable and can be arranged, via the telephone, directly with heateam. Please have the serial number of the Baxi Ambiflo™ available when booking this service.

The Baxi Ambiflo™ warranty is predicated on the completion of the following:-

- Registration of the product with heateam
- Installation by an individual who has successfully completed the Baxi Ambiflo™ training course
- Completion of a suitable commissioning document which must be left on site for the end users records
- Set up and check of the product by heateam or its approved agent
- Use of a suitable dirt separator and / or use of a magnetic cleaning device on all applications
- If necessary, provision of safe access by the homeowner or relevant organisation to any parts of the unit mounted above two metres in accordance with the latest HSE Working at Height regulations

ACCESSORIES

Description	Part No
Electrical Heater 5kW Module	5131502
Flexible Hose Kit 1"	5131507
Flexible Hose Kit 3/4"	5131504
Current Limiter	5132431
230V Controls Relay Board	5132432
Buffer 100 Litres	5131537
Buffer 35 Litres	5131503
Guard - Ambiflo™ 75 & 90	5134518
Guard - Ambiflo™ 105	5134519
Wall Mounted Brackets	5134517
Heater Module Connection Kit 3/4"	5131500
Heater Module Connection Kit 1"	5131508
2 Circuit/1 Mixer Module	5132426
2 Zone/2 Mixer Module	5132427
Remote Service Control (WM)	5131497
Room Sensor	5132429
Outdoor Sensor	5131498
Dirt Separator	5133750
Ambilfo™ 75	5131535
Ambilfo™ 90	5131536
Ambilfo™ 105	5131501

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This booklet contains information regarding the installation, service and maintenance of the Baxi Ambiflo™ Heat Pump System. The following system components have their own independent instruction booklets, which should be referred to as necessary.

1. Commissioning the Ambiflo™ Heat pump and system
2. Baxi Ambiflo™ 5kW Electrical heater

The User's instructions are also in a separate document and should be left with the householder for their reference.

Fault finding and alarm error codes are contained within the commissioning booklet.

1.0 Introduction

1.1 Supply Conditions

1. Please check all items and examine for damage. If damage has occurred please contact your merchant.

1.2 Recommendation

1. Prior to all servicing or other actions on the equipment, installation, commissioning, operation, or maintenance, the personnel in charge of these operations must become familiar with these instructions and recommendations provided in the installation manual.
 2. The personnel responsible for receiving the unit must conduct a visual inspection in order to identify all damage to which the unit may have been subjected during transport.
 3. The unit must be installed, commissioned, maintained and repaired in accordance with the manufacturer's instructions. All work must be carried out in compliance with the requirements of all directives, laws and regulations and in accordance with standard trade practices.
 4. The pipework contained in and around this unit contains fluids at high temperatures and pressures. Under no circumstances should these pipes be used as a step as they may rupture and cause serious damage or burns.
-

1.3 General Description

1. The Baxi Ambiflo™ air source heat pump is an outdoor heat only unit, intended for central heating. It is a one-piece heat pump with closed and pre-charged refrigeration circuit.
 2. The Baxi Ambiflo™ is available in a choice of three outputs: 7.5KW, 9.0KW and 10.5KW at typical outside temperatures at 7°C and radiators at 45°C.
 3. Each model is offered as part of System Packs containing heat pump, auxiliary 5KW electric heater, flexible hoses, programmable room thermostat and outdoor sensor. The systems are purpose designed to optimise comfort and efficiency. Room and outdoor temperature compensation is used to optimise flow and return temperatures. The system also intelligently controls any operation of the 5kW electric heater during defrost or extreme low outdoor temperature. Defrost is achieved efficiently by reverse cycle at the refrigerator circuit.
 4. **IMPORTANT:** Accurate sizing of the radiators is the responsibility of the installer. Please size correctly for the lower average system temperature. Please do not oversize as this can lead to overheating problems.
 5. Baxi recommends that a high quality, low energy circulating pump is used in conjunction with this system.
 6. These units are 230V 50Hz single phase appliances. Before carrying out any operation, check that the voltage indicated on the unit corresponds to the mains voltage.
 7. This heat pump is intended solely for the heating of premises.
-

1.3 General Description (cont)

8. A 100 amp incoming fuse to the property is recommended for installation. A current limiter is available for applications where a 100 amp fuse is not available. Please refer to Section 4.0 for further details.

9. Certain applications may require the use of a relay box. Please refer to the Section 4.0 for further details.

10. A buffer vessel may also be required. Please refer to Section 3.7 for details.

11. This unit is CE marked. However, a risk assessment **MUST** be carried out prior to installation regarding access to the unit. Consideration should be given to safety (moving parts, electrical cable, pipework, etc.) and security (vandalism, theft) with respect to the household and neighbourhood. Please refer to Health and Safety Information Section for details of risk assessments.

12. Wall mounting brackets are available for this unit. Please see the accessories list for details.

NOTE: When considering wall mounting as a siting option please refer to the warranty terms and conditions regarding servicing, maintenance and repair of the unit prior to doing so.

13. Noise level should also be considered when siting the unit. Your Local Authority may enforce a maximum permissible noise level, measured at neighbouring properties. For information on calculation maximum or permissible noise levels, please call Baxi on 0844 871 1568.

14. The anti-vibration pads and in-line strainer are supplied inside the heat pump front panel. Please remove this installation kit prior to commencing work. Please refer to Fig. 2 for access to the kit.

15. A Dirt Separator is available as an accessory for this unit. This must be fitted on any water circuit where radiators are used. Please refer to Figs. 6 and 7 (Section 3.5 and 3.6) for details. Failure to fit this filter will affect your warranty.

1.4 Guarding

1. This unit contains electrical components and moving parts. These components, and the surrounding system pipework, operate at high temperatures. Where young children or animals are concerned, Baxi recommend a barrier or guard to avoid tampering. The guard must be of a suitable design and not restrict the air flow through the unit. **A risk assessment MUST be carried out prior to installing the unit.**

NOTE: A guard is available from Baxi as an accessory if required.

Part number 5134518 – Guard Ambiflo™ 75 & 90.

Part number 5134519 – Guard Ambiflo™ 105.

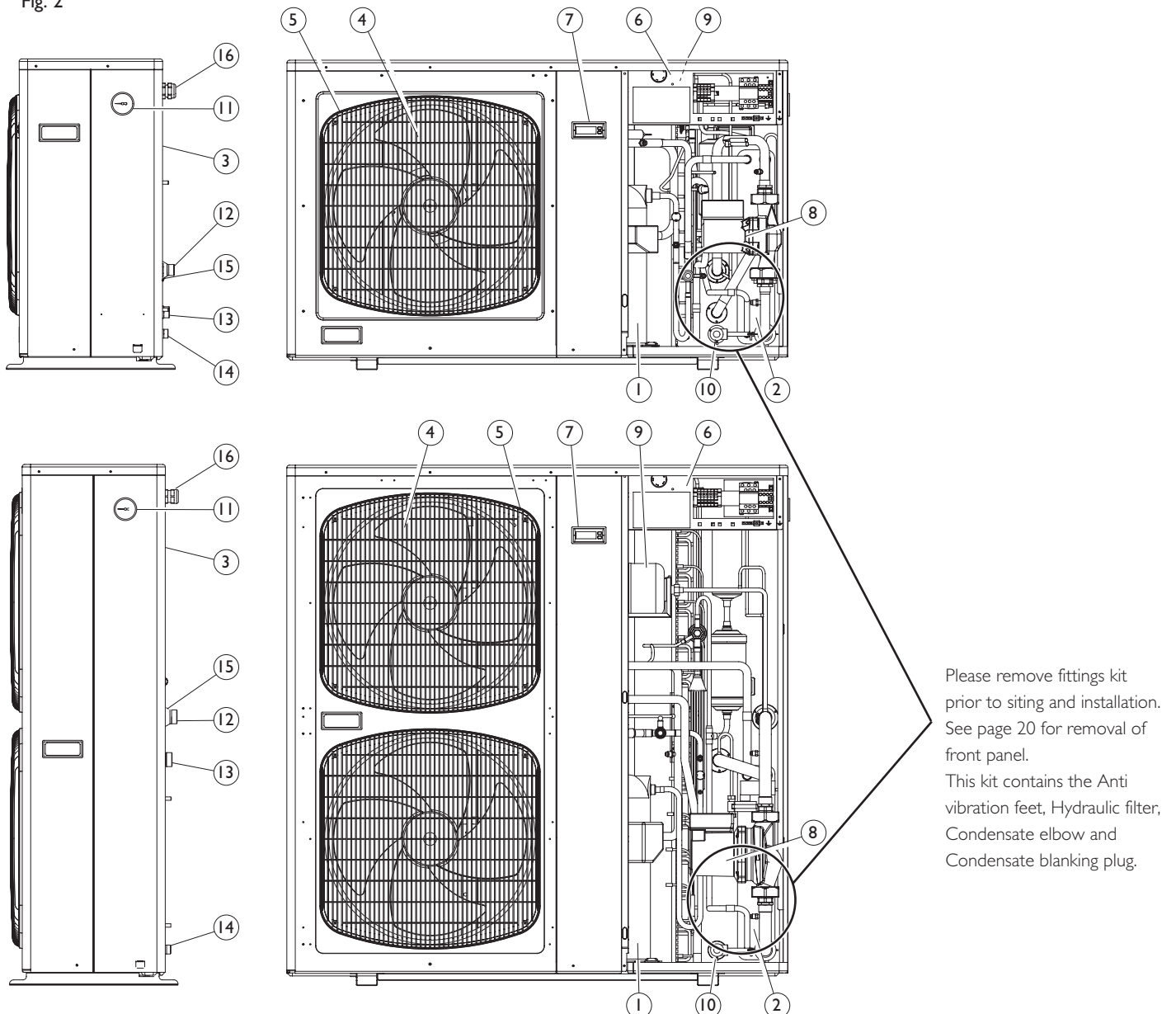
2. See Fig. 16 for the orientation of the guard and please refer to the separate instructions for fixing details and clearances required.

2.1 Layout

The Baxi Ambiflo™ air source heat pump unit includes an integral circulation pump (3 speed to optimise comfort and efficiency), small expansion vessel, pressure gauge and pressure relief valve. An additional expansion vessel may be required.

1. Sound-proofed hermetic compressor.
2. Plate water heat exchanger.
3. "Plate-Fin" air heat exchanger.
4. Fan.
5. Fan protection grille.
6. Electrical box.
7. Baxi Ambiflo™ Heat Pump control unit.
8. Circulating pump.
9. Expansion tank.
10. Safety valve.
11. Pressure gauge.
12. Heat pump return (Inlet).
13. Heat pump flow (Outlet).
14. Filling / drainage of the water circuit.
15. Air vent.
16. Glands for mains cable inlet.

Fig. 2



3.1 System Hydraulics

1. It is essential that the Baxi Ambiflo™ Heat Pump be installed correctly to the relevant system design (Figs. 3 to 7). The installation must comply with one of the systems shown or the terms and conditions of the warranty will be invalidated.
2. Please refer to the commissioning instructions supplied with this unit for the parameter settings for the system diagrams shown.
3. Where radiators are used, the dirt separator must be fitted as shown in the hydraulic system diagrams (see Figs. 6 and 7 for relevant system). Failure to do this will affect your warranty. Where the Baxi Ambiflo™ Heat Pump is fitted to an existing system it is essential to power flush the system prior to installing the unit and fitting the dirt separator.
4. Where Isolation Valves are used on the hydraulic system (Figs. 3 to 7) it is essential that these are full bore valves to minimise the system resistance.
5. It is important that the internal bore of the pipework used between the Ambiflo™ Heat Pump and the buffer is at least equal to, or ideally larger than the internal bore of the pipework supplied. This will allow reduced pump speeds and help to minimise system running costs.

IMPORTANT: We do not recommend use of the Baxi Ambiflo™ with existing conventional radiators unless it can be demonstrated that the heat output from these radiators at the lower average system temperature can provide the necessary level of comfort (e.g. 20°C room) under load conditions (0°-3°C outside).

It is very important not to oversize the radiator system for maximum return temperatures of 45°C, as this can result in room temperatures higher than required. If this is the case, then contact your installer to re-parameter your maximum system water temperature to compensate.

We do not recommend the use of the Baxi Ambiflo™ for preheating domestic hot water using conventional cylinders.

The Baxi Ambiflo™ heat pump is designed for average system temperatures between 25°C and 50°C. Suitable heat emitters include:

- Low temperature panel radiators.
- Skirting radiators.
- Fan convactor radiators.
- Underflow arrays.
- Oversize high temperature panel radiators.



3.3 Residential System 'Ambiflo™ Heat pump & Heater module' Variant A - 1 Zone floor

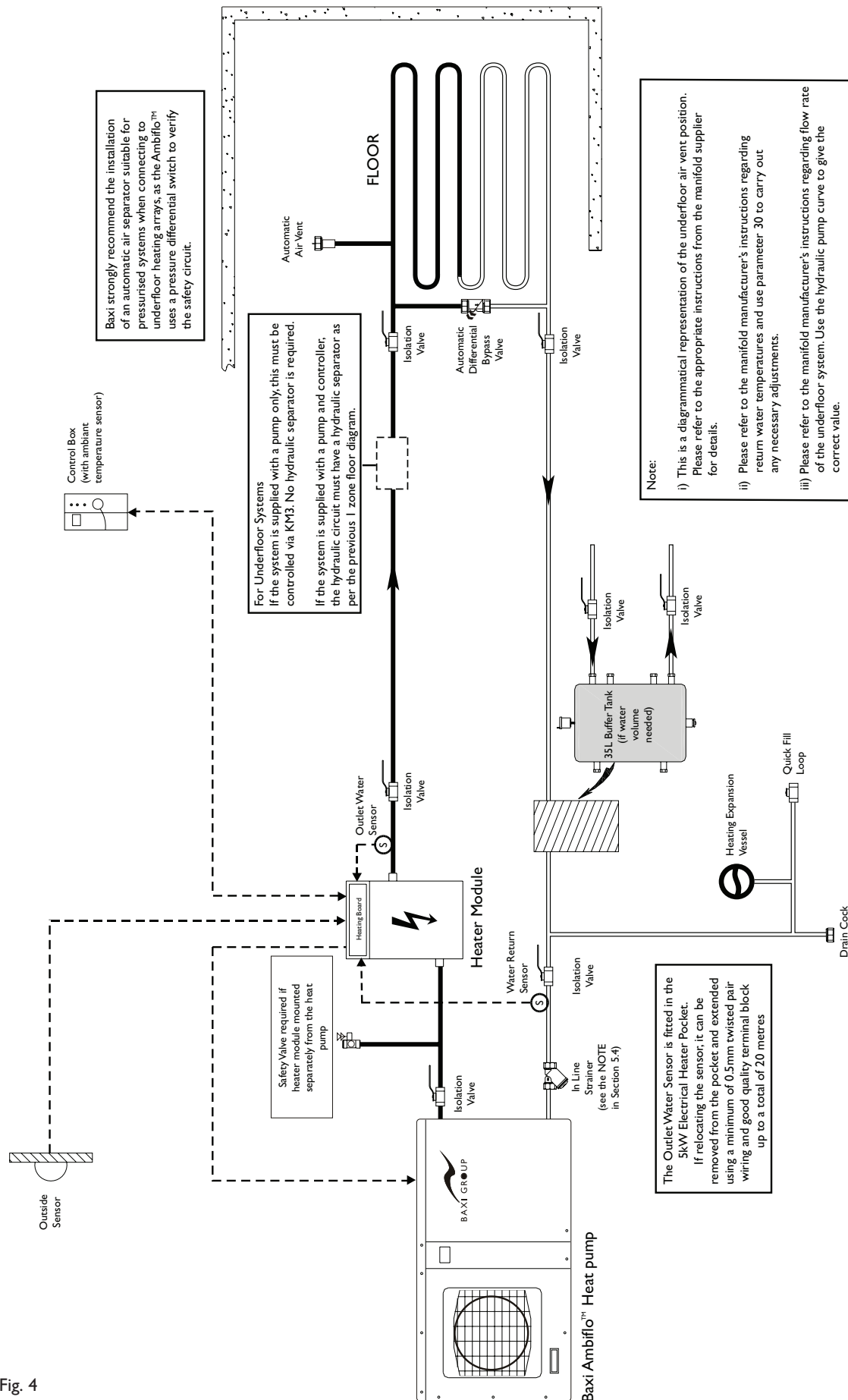
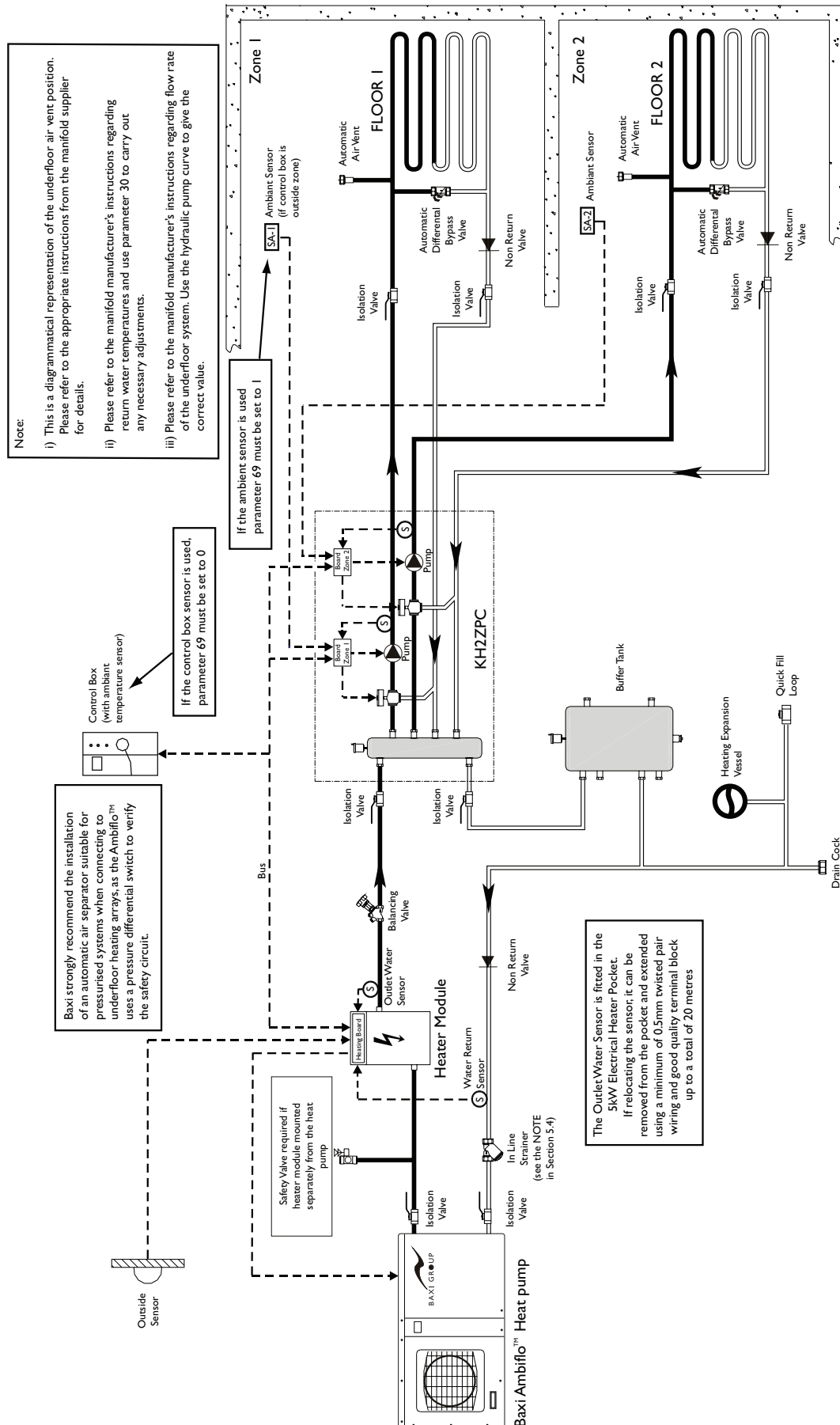


Fig. 4

3.4 Residential System 'Ambiflo™ Heat pump & Heater module' 2 Zones floor



3.5 Residential System 'Ambiflo™ Heat pump & Heater module' | Zone floor + | Zone Radiator

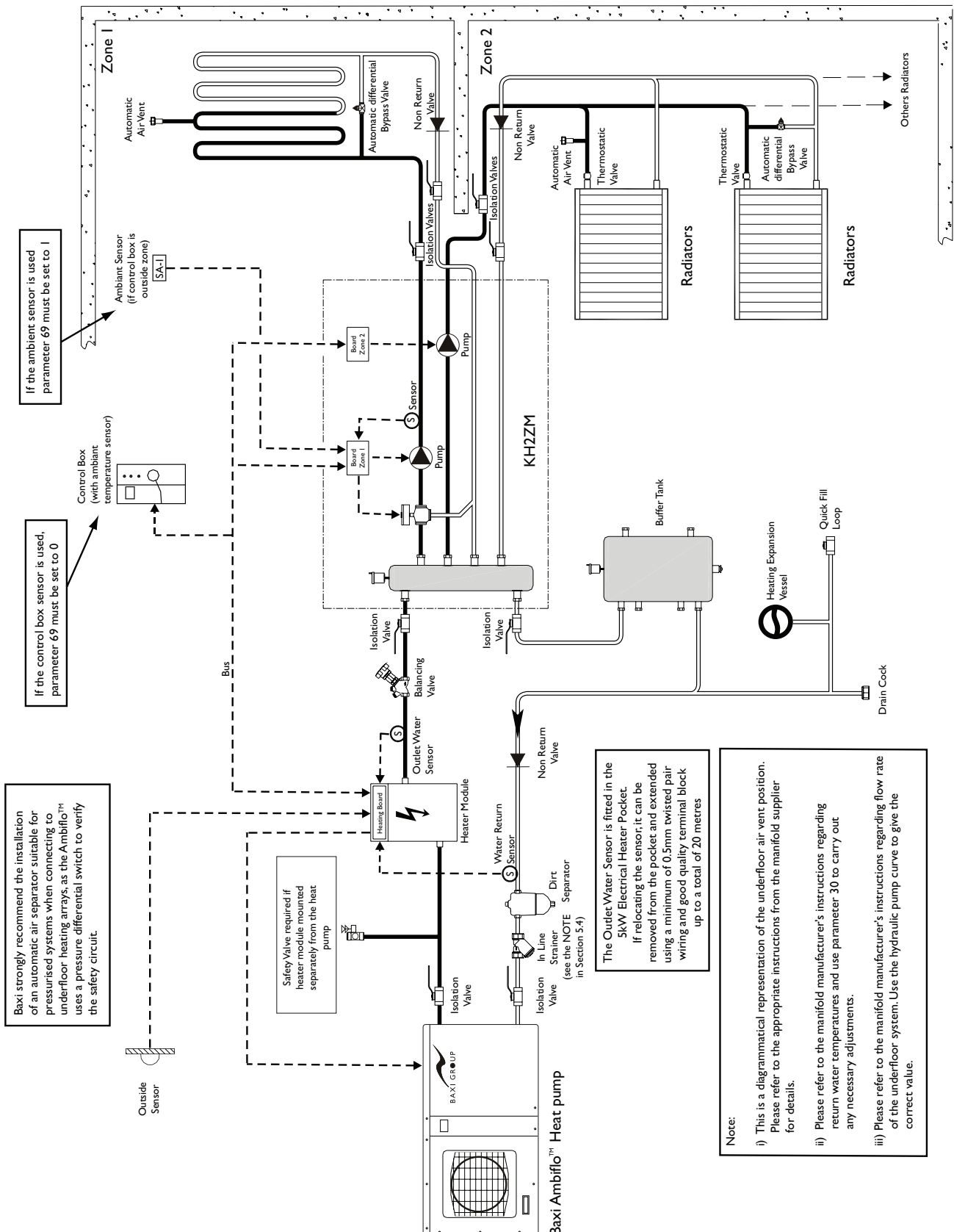


Fig. 6

3.6 Residential System 'Ambiflo™ Heat pump & Heater module' | Zone Radiators

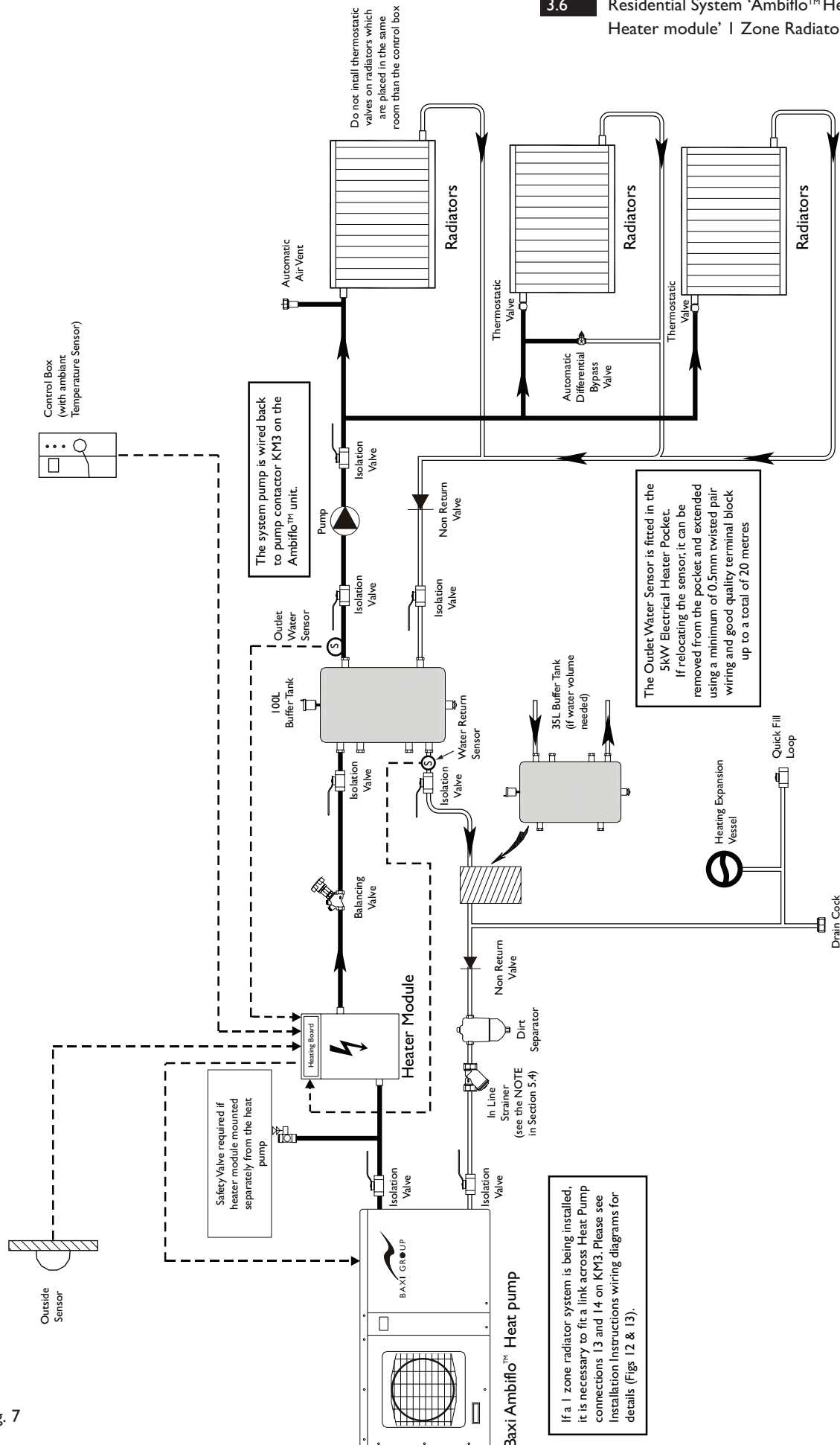


Fig. 7

3.0 System Hydraulics

3.7 Buffer Vessel

Comparison of 9kW system heat loss against time for various total volumes

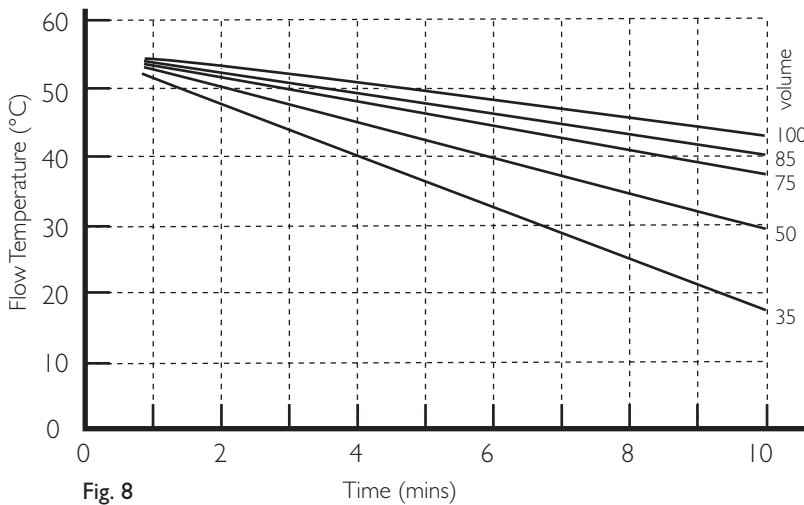


Fig. 8

Model(s)	Description	Baxi Code No.
Baxi Ambiflo™ 75	System kit & buffer pack	5131495
Baxi Ambiflo™ 90	System kit & buffer pack	5131533
Baxi Ambiflo™ 105	System kit & buffer pack	5131534
Baxi Ambiflo™ 75,90 & 105	Buffer 100 litres	5131537
Baxi Ambiflo™ 75,90 & 105	Buffer 35 litres	5131503

Fig. 9

Baxi recommendations:					
Underfloor	Radiators	Valves	System Volume less than (litres)	buffer	Volume (litres)
N	Y	closed	70	Y	100
Y	N	open	200	Y	100

Fig. 10

1. A Buffer Vessel must be fitted if the minimum water volume in the heating system is below the following volumes:

Ambiflo™ 75 system: Minimum water content = 50 Litres, with all valves which can automatically close in the system closed, i.e. Thermostatic Radiator valves or Proportional valves,

Ambiflo™ 90 system: Minimum water content = 70 Litres, as above,

Ambiflo™ 105 system: Minimum water content = 90 Litres, as above.

2. The heat loss from the 100 litre buffer vessel meets the basic CHES insulation standards. The buffer will lose an average of 1.1kW over a 24-hour period.

3. Please refer to the guidelines & recommendation below.

4. Baxi recommend the use of a 100 litre buffer as a general solution for all installations. This is available either as part of a full system or as an accessory (Fig. 9).

5. The average UK air temperature in the winter months is 4°C, with relatively high humidity levels. In normal operation these conditions cause the Baxi Ambiflo™ Evaporator coil to freeze up periodically. Under these circumstances the fan is switched off and the heat pump circuit reversed to enable the defrost phase. Without a buffer, the energy required for defrosting the unit is taken from the heating circuit, which could lead to a reduced room temperature for short periods. Where a buffer vessel is used, the energy required to defrost the unit is drawn from the buffer and helps to prevent the room temperature dropping unnecessarily. This also avoids unnecessary use of the 5kW electric heater which would give an increase in electrical consumption. For these reasons, operation without a buffer vessel is not recommended.

6. When the Baxi Ambiflo™ Heat Pump is used in conjunction with Underfloor heating emitters, they are of considerably greater thermal mass than the other heat emitters such as radiators. Because it takes much longer to raise the floor temperature at initial start up, (although once operating it will stay at the correct temperature for longer due to thermal mass), there is a problem if the whole floor area is opened up to the heat pump on initial start up. The high heat losses into a cold floor will prevent the heating medium reaching the correct operating temperature and ultimately could cause the heat pump to frost up severely. To overcome this problem the best solution is to fit a thermal buffer between the heat pump and the heating system so that the heat pump is raising the temperature within the buffer and not directly within the floor. In addition the heating systems should be split into a number of zones to allow for variations in heat load and to improve start up at the commissioning stage.

7. In low load conditions, the installation of a buffer can eliminate short cycling, which is where the heat generated during the minimum run time for the heating appliance cannot be absorbed by the heating system, maybe due to closure of the thermostatic radiator valves. This effectively increases the run time of the heat pump and aids longevity and reliability of the system.

4.0 Electrical

4.1 Baxi Ambiflo™ Programmable room sensor.

1. This is a Baxi System solution using the controls supplied, where no other time or temperature controls are used.

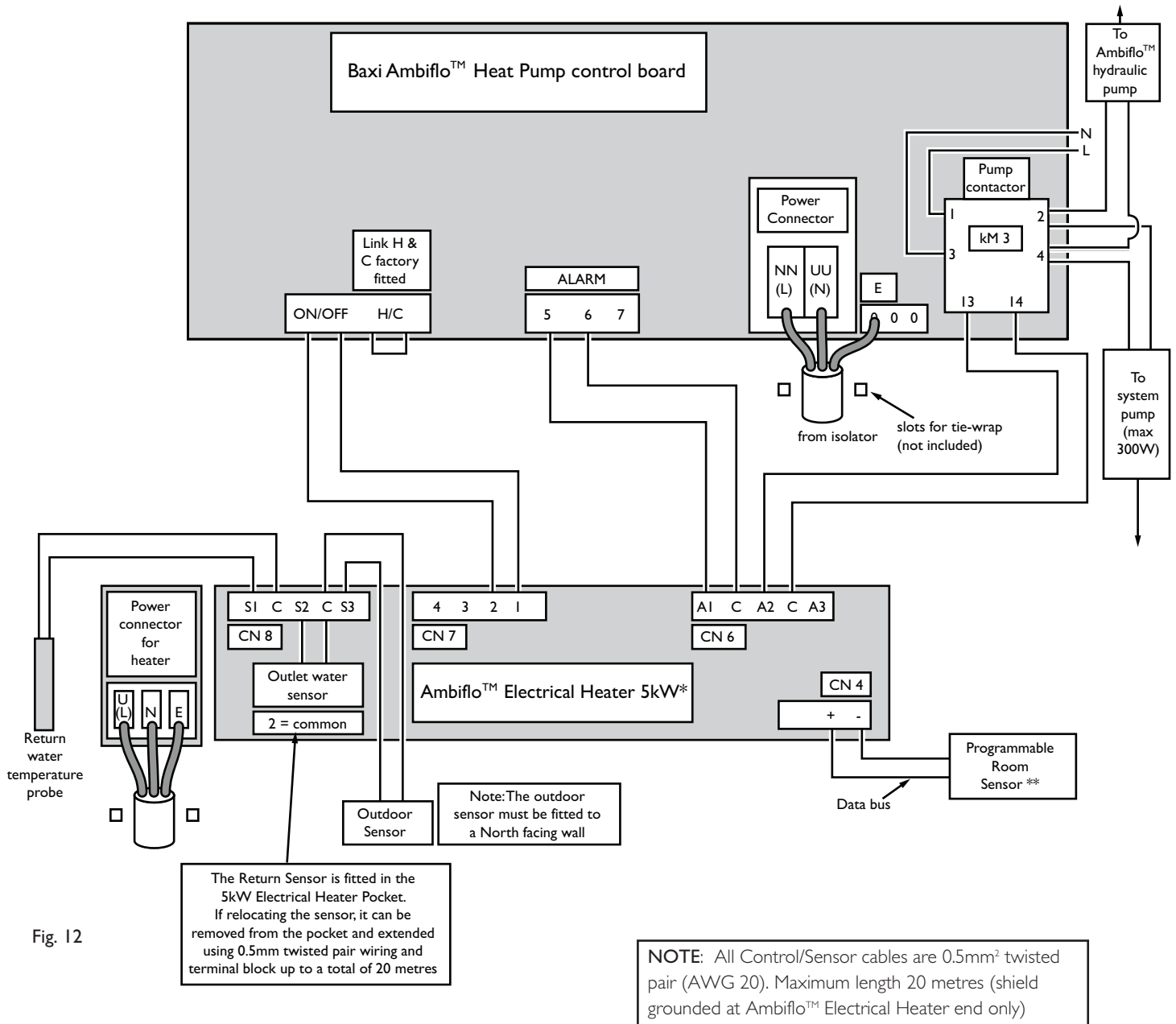


Fig. 12

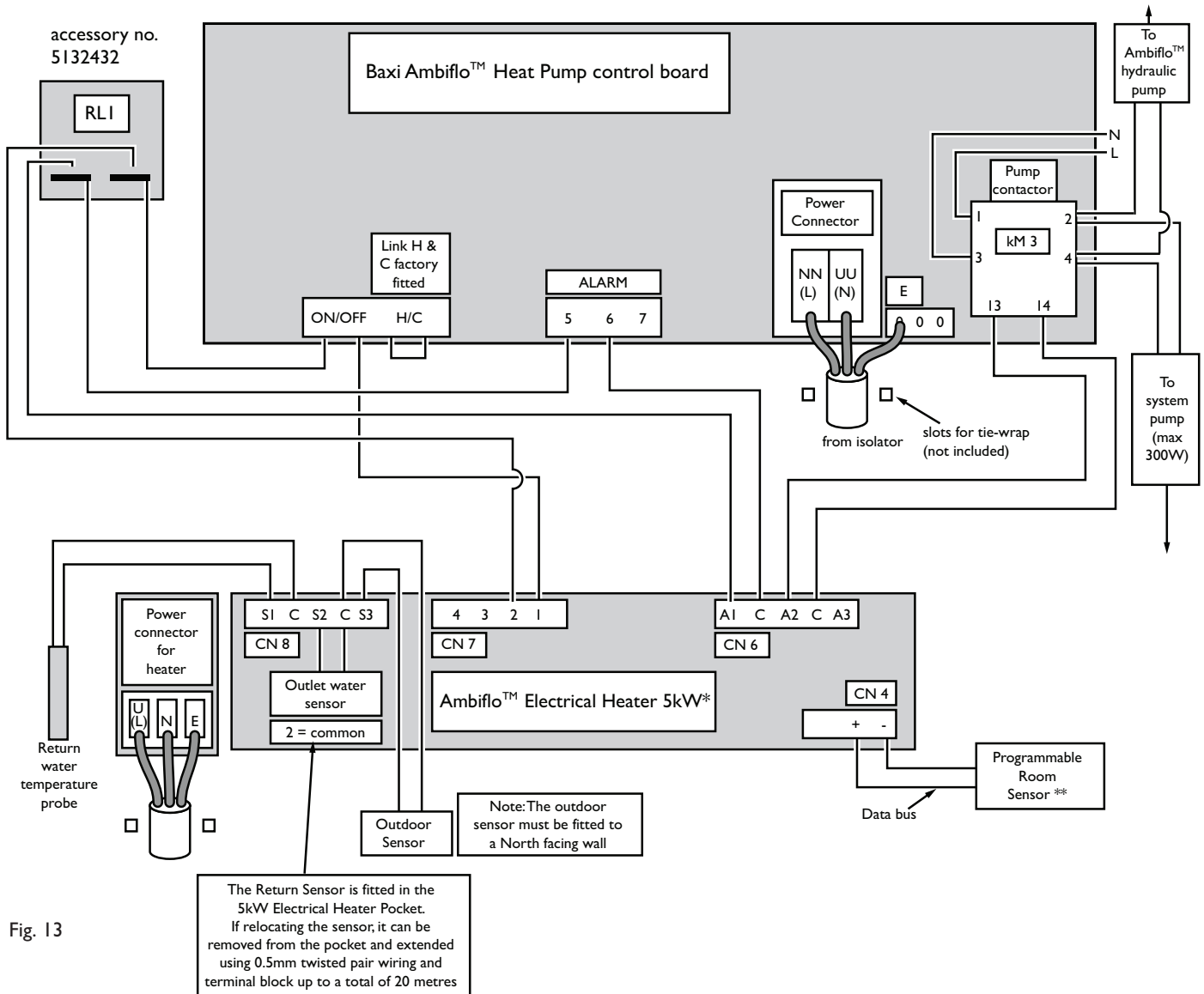
* Please note the 5kW Electrical Heater has separate instructions. Please refer to these for details of the unit and its siting requirements as this can be fitted either to the rear of the Baxi Ambiflo™ Heat Pump unit, or sited remotely. Kits are available to hydraulically and electrically connect the 5kW Electrical Heater to the Ambiflo™ Heat Pump unit. Please refer to the accessory list on page 5 for kit details and Fig 1 for details of the kits available for each Ambiflo™ model.

4.0 Electrical

4.2 Baxi Ambiflo™ Programmable room sensor with relay

I. This system is where other set back controllers for time, temperature or system controls are used. This system can indirectly control other system pumps.

Important: Alternative controls **must** feature a reduced or set back room temperature setting.



* Please note the 5kW Electrical Heater has separate instructions. Please refer to these for details of the unit and its siting requirements as this can be fitted either to the rear of the Baxi Ambiflo™ Heat Pump unit, or sited remotely. Kits are available to hydraulically and electrically connect the 5kW Electrical Heater to the Ambiflo™ Heat Pump unit. Please refer to the accessory list on page 5 for kit details and Fig. I for details of the kits available for each Ambiflo™ model.

** The Baxi Programmable Room Sensor must be placed in a secure, tamper proof location where the temperature does not exceed 25°C. Keep away from sunlight, windows and other heat sources. The unit needs to be accessible for servicing and should be sited for easy viewing. Please refer to the separate 5kW Electrical Heater instructions for further details.

NOTE: All Control/Sensor cables are 0.5mm² twisted pair (AWG 20). Maximum length 20 metres (shield grounded at Ambiflo™ Electrical Heater end only)

4.3 Control Cables from the 5kW Electrical Heater Module

1. The wiring of the 5kW electrical heater contacts must not be routed near power cables in order to avoid electromagnetic disturbances. Use shielded cable with twisted pairs (shielding grounded on the 5kW electrical heater side only) - min 0.5mm² CSA (Equivalent to AWG 20) 230V Insulation Rated Cable.

2. When extended wire lengths are required between the 5kW Heater and the Heat Pump Unit Baxi recommends the use of colour coded wiring to reduce the risk of wrongly made connections.

4.4 Main Incoming Fuse

1. This appliance is designed to be fitted to a 100A incoming fuse.

2. A free upgrade service is available from your local utility company where the infrastructure will support this. Please contact your regional supplier for further information. Your electricity utility bill will give a helpline number.

4.5 Electrical Diversity

1. This appliance is designed to be fitted to a 100A incoming fuse. This fuse is fitted to main cable incoming to the house and the rating (a number) is given on the side.

2. If the incoming fuse is not rated at 100A contact your power network provider who will be able to upgrade your fuse (Section 4.4 paragraph 2) where this is not possible see Section 4.5 paragraph 5.

3. Baxi recommends, a suitably qualified and competent electrician should undertake the task of electrically connecting the Ambiflo™ Heat Pump.

4. Baxi recommend that a diversity of load assessment must be carried as suggested by IEE to be within the best practice guide lines. The current demand of the house is determined by adding the current demands of all points of utilisation and where appropriate making allowance for diversity. A note should be made of the power of any electrical items such as electrical showers, electrical cooker etc. to assist in diversity calculations.

5. A current limiter is available as an accessory (Part No. 5132431). In most cases it has been found not to be required, however if required it can be fitted where the diversity and / or incoming fuse rating would not be sufficient in normal cases. The current sensing accessory will monitor the incoming current to the consumer unit and at a predetermined level will reduce the current required by the Ambiflo™ Heat Pump to a maximum 15A (this must be assumed for diversity to be 100%).

	Usage	Diversity Allowable
1	Lighting	66 % of total current demand (see note *)
2	Cooking appliances	10 amps + 30% of full load of cooking appliance if in excess of 10 amp, add an additional 5 amp if socket and outlet incorporated in control unit
3	Water heaters (instantaneous type)	100% of the largest load appliance and 100% of 2nd then 25% of full load of any remaining appliances
4	Water heater thermostatically controlled (Immersion heater)	No diversity allowed
5	Floor warming installations	No diversity allowed
6	Thermal storage or space heating installations	No diversity allowed
7	Socket-outlets	100% of amps required for the largest load then 40% of all other uses (see note **)

NOTE: This is an example and a competent electrical engineer should produce their own calculation based on the latest editions of all regulations.

* consider for discharge lighting power factor, control gear losses, etc ...

** items below 5VA such as shaver points, bell transformer, etc ... can be ignored.

Fig. 14

Example calculations,

System loads	Diversity applied
Lighting 4A	Lighting 2.4A
Cooker 16A	Cooker 14.8A
Shower 26A	Shower 26A
Immersion heater 11A	Immersion heater 11A
Socket outlet 13A, 13A, 6A, 4A, 6A, 2A, 13A, (33A)	Socket outlet 30.6A

Fig. 15

Total for circuit 84.8A

In the above example, the air source heat pump and 5kW electrical heater is 18A with diversity calculation; the consumer unit is rated at 100A thus the total load would be under the 100A incoming fuse rating and consumer unit rating.

5.0 Installation

5.1 Site Requirement

1. This unit can be wall-mounted using the brackets specified in the accessories section on page 5. It is recommended that the unit is installed less than 2 metres from the ground because of service and repair requirements. Suitable fixings should be considered relative to the wall structure and weight of the unit. Ensure that the anti-vibration pads are fitted when wall mounting this unit.

2. In all cases, where the 5kW heater is attached to the Ambiflo™ unit, a minimum clearance distance of 0.25m is required (Fig. 16 - dimension A) between the unit and the nearest obstacle.

NOTE: It is not possible to install the electrical heater to the rear of this unit when wall mounting.

3. Select the location for the unit on the basis of the following criteria:

- The unit must be installed outside in a well ventilated area.
- The unit must not be installed near the following:
 - sources of heat.
 - combustible materials.
 - return/air intake of an adjacent building.
- It is necessary to ensure that adequate clearance around the unit is provided (Fig. 16).
- The installation must be as simple as possible to aid maintenance.
- The unit must be fixed on a hard base and must be protected from risks of flooding.
- We recommend that the apparatus be raised 100 mm off the ground using blocks in order to connect a condensate drain pipe (as required).
- Use the anti-vibration mountings supplied (within the removable panel). Ensure these are not overcompressed when tightening and that a minimum amount of bolt shows after fitting (approx. 12mm).
- The blown air must not be directed towards surrounding windows.
- Vibrations and noise must not be transmitted to any nearby buildings.
- Avoid siting the unit in any area where there is a possibility of the fan guards becoming blocked, eg. under or near to deciduous trees. Ensure there is adequate ventilation around the unit to avoid the airflow being restricted. Consider the potential for problems caused by corrosive atmospheres, other extractor fans nearby and any area where strong winds may impair the performance of the unit.
- Noise levels should also be considered when siting the unit. Your Local Authority may enforce a maximum permissible noise level, measured at neighbouring properties. For information on calculation maximum or permissible noise levels, please call Baxi on 0844 871 1568.
- The outdoor sensor must be fitted to a north facing wall.

5.2 Guarding

1. **This unit contains electrical components and moving parts.**

These components, and the surrounding system pipework, operate at high temperatures. Where young children or animals are concerned, Baxi recommend a barrier or guard to avoid tampering. The guard must be of a suitable design and not restrict the air flow through the unit. **A risk assessment MUST be carried out prior to installing the unit.**

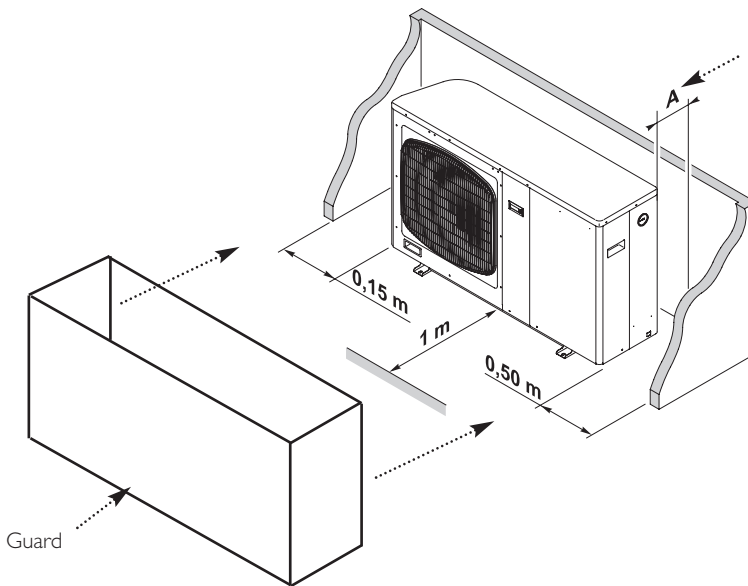
NOTE: A guard is available from Baxi as an accessory if required.

Part number 5134518 – Guard Ambiflo™ 75 & 90.

Part number 5134519 – Guard Ambiflo™ 105.

2. See Fig. 16 for the orientation of the guard and please refer to the separate instructions for fixing details and clearances required.

NOTE: It is possible to fit the 5kW Electrical heater to the rear of this unit. The heater can be fitted within Dimension A - no additional clearance is required. Dimension A must be a minimum 0.25m.



Model	A (m)*
75	0.15
90	0.15
105	0.25

* This dimension does not account for the following cases:

- Installation of the hydraulic filter with shut-off valves positioned behind the unit: provide 0.30m.
- Installation of a heater unit behind the unit: provide 0.25m.

Fig. 16

5.0 Installation

5.3 Drainage of Condensate

FAILURE TO REMOVE THE CONDENSATE CORRECTLY FROM THE APPLIANCE MAY RESULT IN NUISANCE DRIPPING OR A SLIP HAZARD.

The water that condenses during the normal operation of this appliance is not acidic and can be discharged by one of the following termination methods:

- i) to a rainwater drain, gully or water butt.
- ii) to a purpose made soakaway around the base of the unit.

Typically, this unit could generate up to 2 litres of condensate per hour, depending on environmental conditions.

The condensate drain must be fitted in such a way as to allow an unrestricted path away from the unit. Ensure that the drain has a suitable fall to prevent standing water being left in the base tray. Keep the discharge drain as short as possible. Where longer pipe runs are used, Baxi recommends increasing the diameter of the pipe to reduce the risk of blockage or freezing. Any exposed pipe work must be protected against freezing with weatherproof insulation.

The base of the Ambiflo™ Heat Pump has two drainage holes. Fit the splined elbow (supplied) to the drainage hole in the outer case base panel directly beneath the fan (Fig 17). It is important to fit the elbow to the left hand hole beneath the fan as the heating element is fitted at this end of the unit and this will help prevent freezing. Plug the remaining right hand hole with the grommet provided. The Heat Pump must be positioned horizontally to ensure correct discharge of condensate.

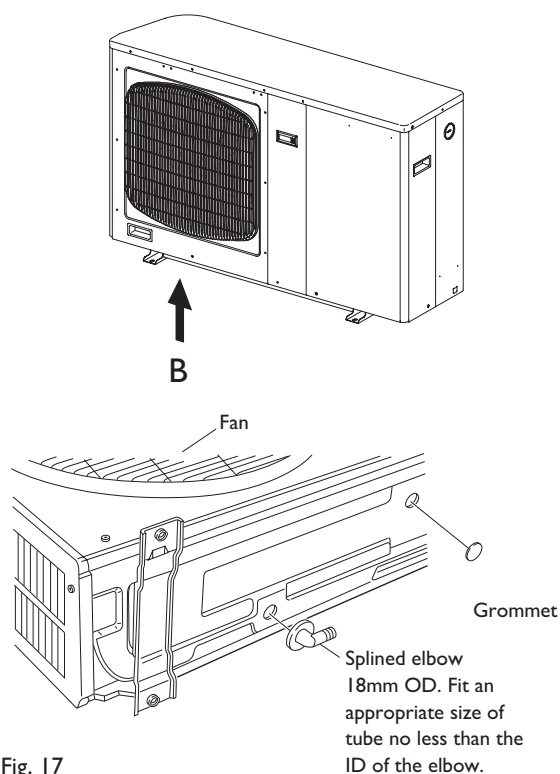


Fig. 17

VIEW IN THE DIRECTION OF B

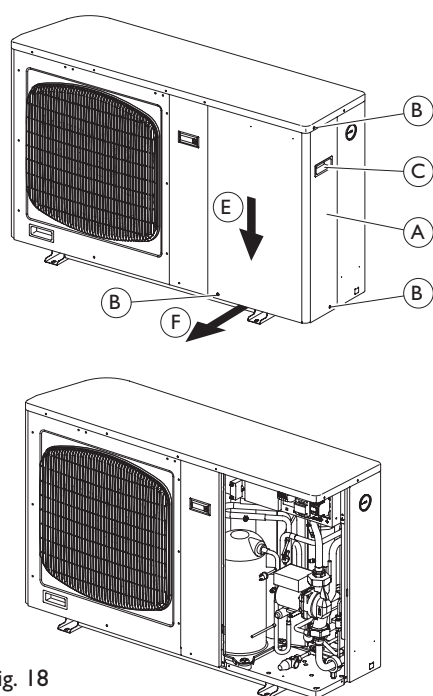


Fig. 18

5.4 Hydraulic Connection

1. Please refer to the relevant system diagram in Section 3.0 for full details of the system being installed.

2. Connect the flexible lines supplied with the Baxi Ambiflo™ kit to the corresponding connection to prevent the transmission of vibration noise to the system pipework.

NOTE: When installing the in-line strainer, it is important that the drain point is installed facing downwards for cleaning access.

3. Install all the components and accessories as required as shown on the relevant hydraulic system diagram.

4. The supplied fibre washers **MUST** be used to connect the flexible lines.

5. The flexible lines must not be kinked when fitted.

6. Install a shut off valve if a fill/drainage connection is used.

7. Fill and pressurise the system to 3 bar to test the installation for leaks prior to connecting to the Baxi Ambiflo™ Heat Pump.

NOTE: Baxi strongly recommend that all the system pipework is flushed at the isolation valves prior to connecting the Baxi Ambiflo™ flexible lines to prevent blockage of the Heat Exchanger and In-line Strainer.

8. The anti-vibration pads and in-line strainer are supplied inside the heat pump front panel. Please ensure these parts are removed prior to commencing this installation. See Fig. 18 for access to the kit.

5.5 Initial Preparation (Electrical Connection Points)

To remove side panel (A) :

- remove the 3 retaining screws (B). **NOTE: Please take care when removing these screws. The 3 retaining screws (B) are earth bonding screws and MUST be replaced with the same screw. Failure to do this will invalidate your warranty.**
- lower the panel (E) using the handle (C).
- pull the lower part of the panel towards you (F).

Rating Table

Model	Baxi Ambiflo™ 75	Baxi Ambiflo™ 90	Baxi Ambiflo™ 105	5kW Electrical heater
Voltage (v/Phase/Hz)	230/1/50	230/1/50	230/1/50	230/1/50
Nominal current (A)	12.4	15	16.7	22
Maximum current (A)	14	8.2	21.3	-
Starting current (A)	40	33	34	-
Protection rating (A)	16	16	32	32
Via Breaker class	C	C	C	B

Fig. 19

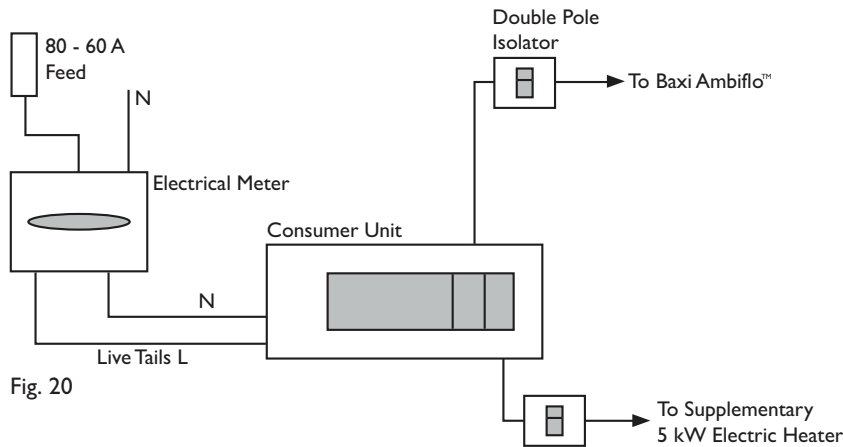


Fig. 20

Example of Common Installation of Ambiflo™ System Supply Method

Please refer to Fig. 19 above for details of fuse ratings and class of breaker required.

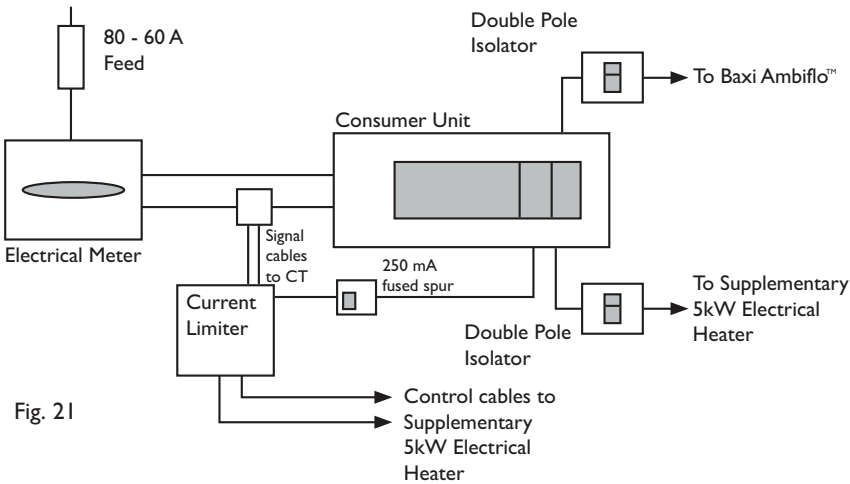


Fig. 21

Installation with Current Limiter Option

The commissioning details for the Baxi Ambiflo™ Heat Pump are given in the separate booklet supplied with this unit. Please see page 4 of these installation instructions for details of the commissioning service offered by Baxi.

The system should be fully power flushed prior to filling and commissioning to maintain the product warranty.

After filling the unit and pressurising it, check that the system pressure is maintained and no air locks or leaks are apparent.

NOTE: The guarantee is subject to the unit being installed and commissioned in accordance with the manufacturer's instructions.

5.0 Installation

5.6 Electrical Connection

NOTE: Only a suitably qualified and competent electrician should electrically connect this unit.

1. The acceptable voltage variation is $\pm 10\%$ during operation.

Do not carry out an insulation test on this unit. The insulation test should only be carried out on the cabling in the system.

5.7 Cable size

NOTE: Please calculate the correct cable size for this installation, failure to do this could lead to a FIRE RISK or a waste of materials and associated costs.

1. After designing circuits it is necessary to check compliance with the requirements of part 4 BS 7671 and the limitations are achieved.
2. The electrical connection conduits must be fixed and supported in accordance with local regulations.
3. Use the cable clamps at the rear of the unit and route the wires under the electric panel at the level of the terminal strips. Use the cable support supplied for incoming cable below power connection point.
4. The electrical installation must comply with the standards and regulations applicable where the unit is being installed.
5. Baxi recommend the use of rodent proof cable or conduit for all externally routed wiring.

Example: The Baxi Ambiflo™ heat pump is 20m from the consumer unit, the cable is mounted enclosed in a thermal wall, the calculations point to a 10 mm² cable to support the air sourced heat pump. If this is mounted on a wall etc... the calculations will allow an 8 mm² cable.

5.8 Power Supply

1. The power supply must come from an isolation and electric protection device (not supplied) in accordance with existing regulations.
2. The installation must be protected by a double-pole circuit-breaker (not included). See the rating table (Fig. 19).

NOTE: The unit is designed to be connected to a power supply having a TT neutral regime (neutral to ground) or T.N.S regime.

Power Supply Cable

3. The compressor start-up current for the Baxi Ambiflo™ Heat Pump is between 33A and 40A. This is a transitory current that falls to between 12A and 16A in normal running mode dependant on model.
4. Make the electrical connections to the terminal board as per the electrical diagrams (Figs. 20 and 21).
5. After the electrical wiring is complete, check the earth impedance for compliance with the wiring regulations.

6.1 Ambiflo™ 75, 90, 105

HEATING

Heating Capacity (Gross)

75 model	kW	7.25
90 model	kW	9.24
105 model	kW	10.65

Nominal Power Consumption (Net)

75 model	kW	2.65
90 model	kW	3.19
105 model	kW	3.62

Performance Factor (COP)

Flow/Return 40/45° C	(Net)	(Gross)
75 model	2.72	2.83
90 model	2.85	2.96
105 model	2.90	3.10

Flow/Return 30/35° C

70 model	3.33	3.53
90 model	3.4	3.53
105 model	3.66	3.89

Power Consumption (Max)

75 model	kW	3.27
90 model	kW	4.00
105 model	kW	4.70

Current Consumption (Max)

75 model	A	14.60
90 model	A	18.20
105 model	A	21.30

Nominal Water Flow

75 model	m³/h	1.24
90 model	m³/h	1.58
105 model	m³/h	1.87

75 model	10⁻⁴ m³/s	3.30
90 model	10⁻⁴ m³/s	4.40
105 model	10⁻⁴ m³/s	5.20

Available Pressure

75 model	kPa	58.00
90 model	kPa	47.00
105 model	kPa	66.00

NOMINAL OPERATING CONDITIONS

Heating

Outside air temperature (dry)	+ 7° C
Outside air temperature (humid)	+ 6° C
Water outlet temperature	+ 45° C

Outer Case Dimensions

75 / 90 model	Height	735mm
	Depth	340mm
	Width	1190mm

105 model	Height	1235mm
	Depth	340mm
	Width	1190mm

Weights

	75 / 90 model
Installation Lift Weight	98kg
Packaged Carton	110kg

	105 model
Installation Lift Weight	128kg
Packaged Carton	141kg

Please refer to page 2 for advice on lifting these units.

Expansion Tank (Fitted)

Charge pressure	1.5 bar
Capacity	2 litres

Safety Valve

Pressure	3 bar
----------	-------

Pressure Gauge

0 to 6 bar

Water System Pressure

1.5 bar

Recommended mains Incoming Fuse Rating

100 Amps

Mains Power Supply

Power supply	230V/1/50Hz
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Equipment Protection Index

IP 24

Hermetic Compressor

with thermal protection	Scroll
Sound insulation cover	
Power Supply	230V/1/50Hz
Start up current	

	(75)	(90)	(105)
A	40	33	34

Sound Levels (10 metres Open Field)

Sound power level			
	(75)	(90)	(105)
dB-A	65	65	67
Sound pressure level			
dB-A	37	37	39

Direct Drive Propeller Fan Motor

with thermal protection, horizontal blowing

	(75)	(90)	(105)
	1	1	2

Total Air Flow

m³/h	2.800	2.800	5.000
m³/s	0.833	0.833	1.667

Power Input

kW	0.140	0.140	0.280
----	-------	-------	-------

Current

A	0.7	0.7	1.4
---	-----	-----	-----

Propeller Diameter

460 mm

Power Supply

230V/1/50Hz

Rotation Speed

770 rpm

Water Exchanger

Plate type stainless steel water treatment section

Expansion System

Expansion Vessel

Water Capacity

	(75)	(90)	(105)
litres	0.84	0.84	1.05

R410A Refrigerant

Total Charge

	(75)	(90)	(105)
kg	2.05	2.1	3.5

Circulating Pump

Current

	(75)	(90)	(105)
A	0.8	0.8	1

Power Input

kW	0.16	0.16	0.24
----	------	------	------

Power Supply

230V/1/50Hz

Hydraulic System

Male Connection

	(75)	(90)	(105)
Inlet	3/4"	3/4"	1"
Outlet	3/4"	3/4"	1"

Water Capacity

	(75)	(90)	(105)
litres	2.6	2.6	2.8

Water flow rate detection pressure differential cut-out

Water filter supplied, uninstalled

6.0 Technical Data

6.1 Ambiflo™ 75, 90, 105 (cont)

Water Volume in System

Minimum water volume (**) before Buffer required

models	(75)	(90)	(105)
litres	50	70	90

(**) If the water volume of the system is below the minimum, a buffer tank must be installed

Part No 5131503 (35 litres)

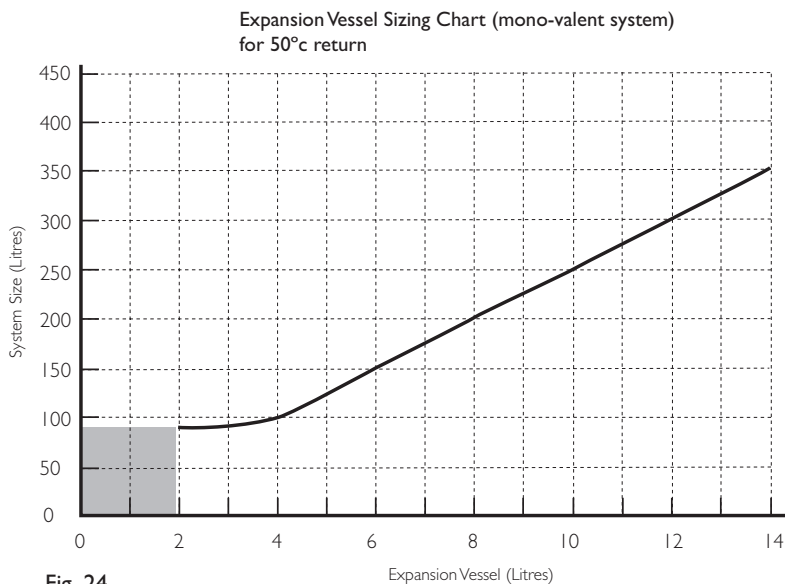
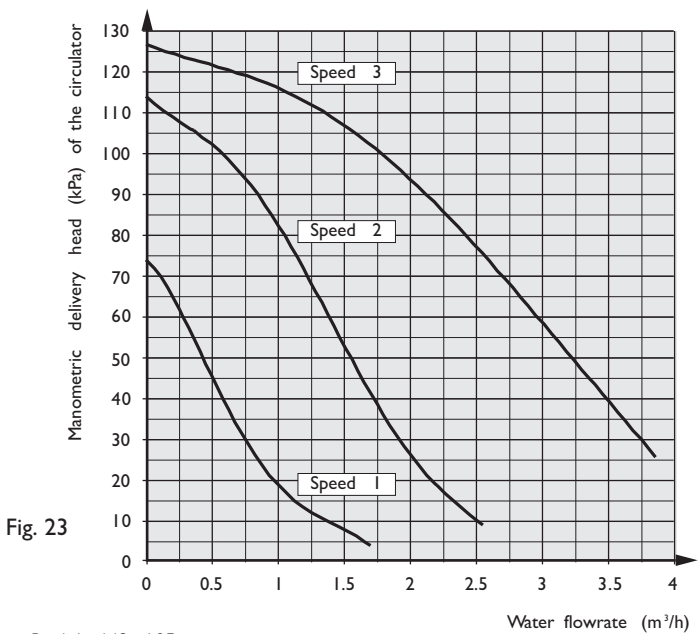
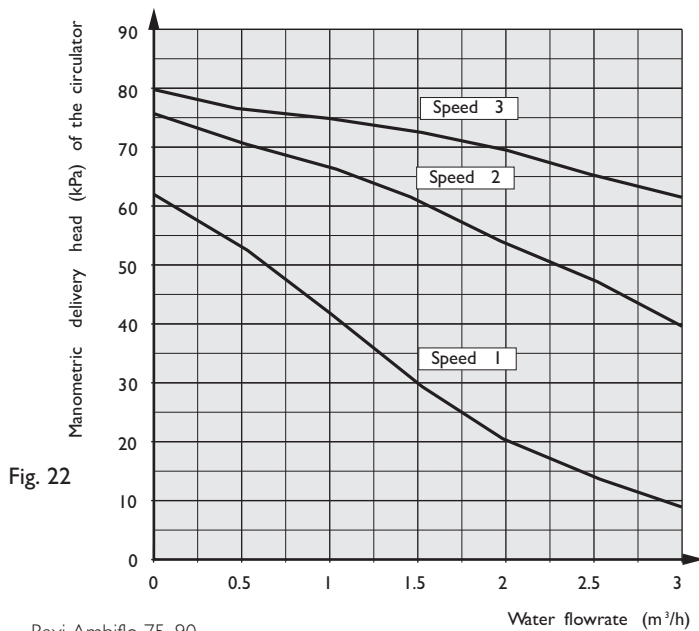
Part No 5131537 (100 litres)

If the water volume of the system is above 90 litres an additional expansion vessel is required. See Fig. 24.

System Expansion Vessel

The Baxi Ambiflo™ Heat Pump has a 2 litre expansion vessel contained within the unit. This 2 litre expansion is adequate on systems that contain up to 90 litres of fluid within the complete system. Larger systems will require an additional expansion vessel.

Failure to ensure the minimum size of expansion vessel can result in premature failure of the expansion vessel and associated system components.



6.2 Pressure Curves for Refrigerants

The graphs below show the maximum achievable flow temperatures relative to the incoming air temperature.

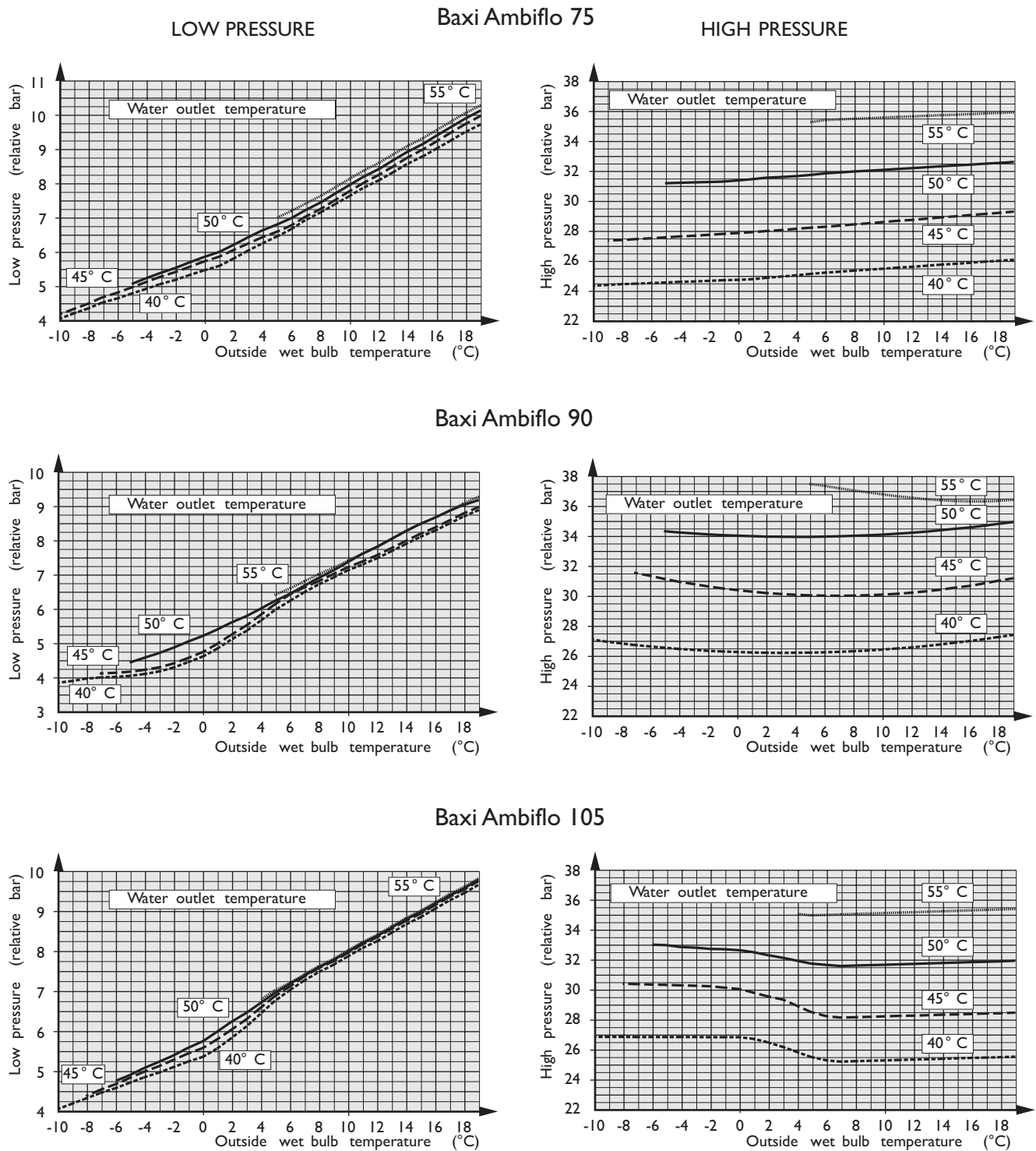


Fig. 25

7.1 Information

1. If work needs to be carried out on the refrigeration circuit, please read the following before commencing work:-

Information regarding the refrigerant used in this appliance (R410A)

NOTE: Any work requiring access to the refrigerant circuit must only be carried out by a refrigerant competent engineer.

R 410 A is a high-pressure refrigerant (+ 50% in relation to R 22 and R 407 C). Compressors approved for operation with this fluid are filled beforehand with polyalcohol oil. Contrary to mineral oil, it is very hygroscopic: it absorbs the humidity of the ambient air very quickly. This can modify its lubricant properties and will lead to serious damage to the compressor. Refrigerant material can be hazardous.

Contact Baxi Technical Enquiries 0844 871 1568 for further information.

Maintenance Instructions

1. Never add oil to the appliance; the compressor is filled with polyalcohol oil, a special oil which cannot tolerate the presence of other oils.

2. Instruments used for the following:

- filling,
- pressure measurements,
- emptying under vacuum,
- recovering the fluid,

Must be compatible with and only used for the R410A fluid.

NOTE: the pressure taps of the refrigerating circuit are 5/16 SAE (1/2-20- UNF).

3. In the case of a new charge:

- the charge must be undertaken in liquid phase,
- use a balance and a dip pipe type R 410A cylinder,
- charge the weight of R410A as per the value indicated on the unit's identification plate.

4. In case of leakage, do not complete the charge: recover the remaining refrigerant for recycling and perform a total charge. Recovery, recycling or the destruction of the fluid must be done in compliance with the laws in force in the country concerned.

5. If the refrigerant circuit is opened, you must:

- avoid the entry of air into the circuit as much as possible,
- replace or install a drier,
- perform the "vacuum operation" at a minimum level of 0.3 mbar (static).

Carry out the following operations at least once a year (the frequency depends on the installation and operating conditions):

- check for any visible signs of damage.
- check for leaks on the refrigerating circuit.
- check for traces of corrosion or oil stains around the refrigerating components.
- inspect the composition and the condition of the coolant and check that it does not contain traces of refrigerating fluid.
- remove debris from the evaporator and clean. Do not jet wash.
- check the operating instructions and points.
- check the safety devices: particularly check that the high and low-pressure controllers are properly connected on the refrigerating circuit and that they disengage the electrical circuit if triggered.
- remove dust from the electrical equipment cabinet.
- check that the electrical connections are secure.
- check the earth connection (via an electrical test meter).
- check the hydraulic circuit (clean the filter, water quality, etc..).
- ensure no ingress of water into the controller.
- check for any mechanical wear on the fan.
- check the tightness and fit of the securing bolts.
- check for any signs of corrosion.
- check the general condition of the cabinet.
- check that the fan guards are in place.
- check the pH of the system water during servicing to determine whether inhibitor is present. Ensure nothing is in the system that can promote galvanic action.
- check that all system safety devices are functioning correctly.

IMPORTANT NOTE:

Before carrying out any work on this unit, ensure that unauthorised access is prevented. The unit must be switched off and isolated, and also locked off if possible. Also check the discharge of the compressor capacitor.

NOTE: Any maintenance of the refrigerant circuit must only be carried out by a refrigerant competent engineer. Prior to all maintenance and service on the refrigeration circuit it is advisable to wait a few minutes after shutdown of the unit before connecting temperature or pressure sensors. Equipment such as the compressor and piping may reach high temperatures, and the high pressures involved may lead to serious burns. Please allow sufficient time for these to cool down.

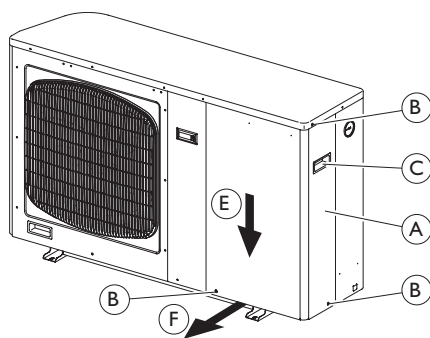
7.2 Maintenance

1. All equipment must be properly maintained in order to provide optimum performance over time. Poor maintenance can result in the cancellation of the product guarantee. Depending on the product, maintenance operations consist in the cleaning of filters (air, water), internal and external exchangers, casings, and the cleaning and protection of the condensate area. Treating odours and the disinfection of room surfaces and volumes also contributes to the cleanliness of the air breathed by users.

2. After carrying out any maintenance ensure that all component parts are reassembled in reverse order and correctly fitted. Pay particular attention to the earth screws (B) that secure the outer panels (See Fig. 26).

7.3 Generator Shut-Down During Winter

- Drain the unit and disconnect the power supply.
- Unit full of water and power on: as the unit is equipped with an antifreeze device which actuates the water circulating pump when the temperature drops below zero, it is imperative that water can circulate between the Air Source Heat Pump and the Buffer Vessel.



See Section 5.5 to remove panels

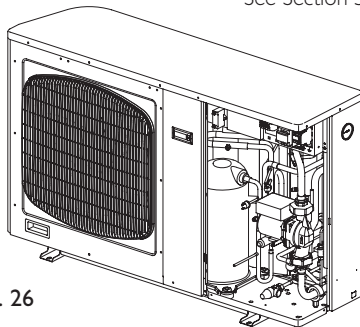


Fig. 26

7.4 Service and Maintenance

1. All maintenance and servicing operations on the refrigerating circuit must be conducted in accordance with standard trade practices and safety rules: recovery of the refrigerant, inert shielded (nitrogen) brazing, etc ... All brazing operations must be conducted by qualified welders.
2. For equipment loaded with R410A, refer to the specific instructions at the beginning of the this section.
3. This unit is equipped with pressurised equipment, for example piping.
4. Use only genuine parts listed in the spare parts list for replacing defective refrigeration components.
5. Pipes may only be replaced by copper tubing in compliance with standard EN 12735-1.
6. Leak detection, in the case of pressure testing:
 - Never use oxygen or dry air, as the risk of fire or explosion is present.
 - Use dehydrated nitrogen or a nitrogen and refrigerant mix indicated on the manufacturer's plate.
 - For units equipped with pressure gauges, the test pressure must not exceed the gauges' maximum allowable pressure rating.
7. For high pressure circuit pipes made with copper tubing having a diameter = or > 1 5/8", the supplier will be requested to submit a certificate 2.1 in accordance with standard EN 10204, which will be filed in the installation's technical file.
8. The following conditions will result in the cancellation of CE marking compliance, which shall fall under the liability of the individual who carried out these modifications -
 - a) Parts replacement with anything other than genuine Baxi spares.
 - b) Modifications of any sort to the refrigerating circuit.
 - c) Replacement of refrigerant by a fluid other than that indicated in the instructions.
 - d) Use of the unit outside the application limits defined in the documentation.
9. The technical information, relative to the safety requirements of the various applicable directives, is indicated on the manufacturer's plate of the unit.

All descriptions and illustrations provided in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet. All goods are sold subject to our standard Conditions of Sale which are available on request.

BAXI

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