



BOSCH

Installation and Operating manual

Information on flue gas routing Ø100/150

Condens 5000W

ZBR 70-3 | ZBR 100-3

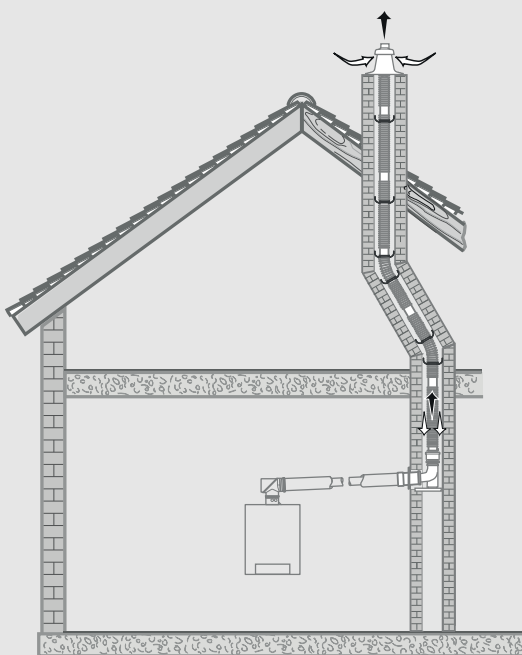


Table of contents

1	Explanation of symbols and safety instructions	2
1.1	Explanation of symbols	2
1.2	General safety instructions	2
2	Usage	3
2.1	General information	3
2.2	Heating appliances	3
2.3	Combination with flue duct kits	4
3	Installation instructions	4
3.1	General Information	4
3.2	Vertical flue gas routing	4
3.2.1	Installation location and balanced flue	4
3.2.2	Arrangement of inspection apertures	4
3.2.3	Flue terminal positions	5
3.3	Opening apertures	5
3.4	Adapter bi-tube	5
3.5	Individual pipe connection	6
3.6	Combustion air/flue on the façade	6
3.7	Cascade	6
4	Installed dimensions	6
4.1	Vertical air/flue gas routing	6
4.2	Horizontal air/flue gas routing	7
5	Flue lengths	7
5.1	General information	7
5.2	Calculating flue lengths based on the example of C33(x)	8
5.2.1	Installation analysis	8
5.2.2	Determining the parameters	8
5.3	Installation options	9
5.3.1	Flue systems for open flue operation	9
5.3.2	Flue gas systems for balanced flue operation	11

1 Explanation of symbols and safety instructions

1.1 Explanation of symbols

Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimising danger are not taken.

The following signal words are defined and can be used in this document:



DANGER:

DANGER indicates that severe or life-threatening personal injury will occur.



WARNING:

WARNING indicates that severe to life-threatening personal injury may occur.



CAUTION:

CAUTION indicates that minor to medium personal injury may occur.

NOTICE:

NOTICE indicates that material damage may occur.

Important information



The info symbol indicates important information where there is no risk to people or property.

Additional symbols

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document
•	a list entry
–	a list entry (second level)

Table 1

1.2 General safety instructions

⚠ Notes for the target group

These installation instructions are intended for gas, plumbing, heating and electrical contractors. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including danger to life.

- ▶ Read the installation instructions (heat source, heating controller, etc.) before installation.
- ▶ Observe the safety instructions and warnings.
- ▶ Observe national and regional regulations, technical rules and guidelines.
- ▶ Record all work carried out.

Determined use

The product may only be used in a domestic situation for the heating of central heating water and for DHW heating in closed-loop DHW and heating systems.

Any other use is considered inappropriate. Any damage that may result from misuse is excluded from liability.

If you smell gas

A gas leak could potentially cause an explosion. If you smell gas, observe the following rules.

- ▶ Prevent flames or sparks:
 - Do not smoke, do not use a lighter or strike matches.
 - Do not operate any electrical switches or unplug any equipment.
 - Do not use the telephone or ring doorbells.
- ▶ Turn off the gas supply at the main shut-off valve or at the gas meter.
- ▶ Open windows and doors.
- ▶ Warn your neighbours and leave the building.
- ▶ Prevent anyone from entering the building.
- ▶ Move well away from the building: call the emergency services and the gas supplier.

Danger to life from poisoning by flue gas

There is a danger to life from escaping flue gas.

- ▶ Ensure that flues and gaskets are not damaged.

Risk to life from poisoning by flue gas due to inadequate combustion

There is a risk to life from escaping flue gas. If flues are damaged or leaking, observe the following rules.

- ▶ Close off the fuel supply.
- ▶ Open windows and doors.
- ▶ If necessary, warn your neighbours and leave the building.
- ▶ Prevent anyone from entering the building.
- ▶ Rectify any damage to the flue immediately.
- ▶ Ensure that there is an adequate combustion air supply.
- ▶ Do not cover or reduce the size of ventilation apertures in doors, windows and walls.
- ▶ Ensure that there is an adequate combustion air supply, including for any heat sources, which have been installed at a later date, e.g. if there are extractor fans, kitchen fans or air conditioning units with an air discharge outside.
- ▶ Never operate the product if there is an insufficient combustion air supply.

Installation, commissioning and maintenance

Installation, commissioning and maintenance must only be carried out by an approved contractor.

- ▶ Carry out a gas tightness test after completing work on gas-carrying components.
- ▶ In the case of open flue operation: Ensure that the installation location meets the ventilation requirements.
- ▶ Only use original spares.

Electrical work

Electrical work must only be carried out by contractors qualified in electrical installation.

Before starting electrical work:

- ▶ Isolate all poles of the mains voltage and secure against reconnection.
- ▶ Using suitable means, test that the mains voltage is disconnected.
- ▶ Also observe the connection diagrams of other system components.

Handover to the user

When handing over, instruct the user how to operate the heating system and inform the user about its operating conditions.

- ▶ Explain how to operate the heating system and draw the user's attention to any safety relevant action
- ▶ Explain that conversions and repairs must only be carried out by a competent person.
- ▶ Point out the need for inspections and maintenance for safe and environmentally-compatible operation.
- ▶ Leave the installation instructions and the operating instructions with the user for safekeeping.

2 Usage

2.1 General information

Before installing the appliance and flue gas routing, consult the responsible building authorities and district flue gas inspector to establish whether there are any objections.

The flue duct kit is a component of the CE-approved system. Therefore, only genuine flue duct kits may be used.

The permissible maximum balanced flue line is depends on the appliance and the number of deflections in the balanced flue. For calculation, see chapter 5 from page 7.

2.2 Heating appliances

Device type	Prod. ID.
Condens 5000W ZBR 70-3/100-3	CE 0063 CO 3391

Table 2

The listed boilers are tested and approved in accordance with the Australian Standard AS4552.

2.3 Combination with flue duct kits

The following flue gas accessories can be used:

- Flue accessories, concentric pipe Ø 100/150 mm
- Flue accessories, single pipe Ø 100 mm
- Flue gas accessories, separate pipe Ø 100-100 mm

For additional information and original flue accessory part numbers, see the current price list.

3 Installation instructions

NOTICE:

Do not use an unlined masonry chimney as the flue for this appliance.

3.1 General Information

Due to the appliance certification, only use flue systems and accessories that are offered by the manufacturer for open and balanced flue mode.



Observe all standards and directives applicable to the installation and operation of this heating system in the country in which it is used.

An installer and/or the system user must ensure that all applicable standards and safety regulations have been satisfied for the entire system.

- ▶ Follow installation instructions for the flue accessories.
- ▶ Route horizontal flues with 3° gradient (= 5.2 %, 5.2 cm per metre) in the flow direction of the flue gas.
- ▶ Insulate the combustion air line in humid rooms.
- ▶ Install the inspection apertures so that they are easily accessible.
- ▶ When installing cylinders, take their dimensions into consideration when installing flue accessories.
- ▶ Before installing the flue accessories, slightly grease gaskets on the female connections with solvent-free grease (e.g. petroleum jelly).
- ▶ If installing the flue/combustion air pipe, always push the flue accessories as far as possible into the female connections.

Open flue

In open flue venting systems, the combustion air is removed from the installation location in which the appliances installed. In such cases, observe the special regulations for the installation room and open flue operation. The appliance may only be set up in rooms in which sufficient combustion air is available.

Never operate the appliance in rooms that are permanently occupied.

The necessary cross-sections for the ventilation openings to the outside:

	with 1 opening	with 2 openings
ZBR 70-3	≥ 190 cm ²	≥ 95 cm ²
ZBR 100-3	≥ 250 cm ²	≥ 125 cm ²

Table 3 Vents

Balanced flue

Balanced flue gas systems take combustion air for the appliance from outside the house. The flue gas is routed to the outside. The appliance casing is designed to be gas-tight and represents part of the combustion air supply. For balanced flue operation, it is therefore imperative that the appliance door is always closed when the appliance is operational.

3.2 Vertical flue gas routing

3.2.1 Installation location and balanced flue

The following regulations must be observed:

- Installation of the device in a room where only the roof structure is located above the ceiling:
 - If a fire rating is required for the ceiling, then the balanced flue must have the same fire rating between the top edge of the ceiling and the roof skin, and must be made from non-flammable materials.
 - If no fire rating is required for the ceiling, then the balanced flue must be routed through a duct made from non-flammable, solid materials or a metal protective pipe (mechanical protection) running from the top edge of the ceiling to the roof skin.
- If the balanced flue bridges floors in a multi-storey building, then the balanced flue outside the boiler room must be routed through a duct with a fire rating of at least 90 minutes and, in buildings of low height, of at least 30 minutes.

3.2.2 Arrangement of inspection apertures

- The lower inspection aperture in the vertical flue section may be arranged as follows:
 - In the vertical flue section of the flue system immediately above the introduction of the connection piece
 - or**
 - In the side of the connection piece no more than 0.3 m away from the deflection in the vertical section of the flue system
 - or**
 - In the face of the straight joint, no more than 1 m away from the deflection in the vertical flue section.
- Flue systems that cannot be cleaned from the terminal must provide an additional top inspection aperture up to 5 m below the terminal. Vertical sections of the flue that indicate a slope greater than 30° between the axis and the vertical require inspection apertures at a distance of not greater than 0.3 m from the kink.
- The upper inspection aperture can be omitted in vertical sections, provided that:
 - The vertical flue section will only be run at a slope once up to 30°
 - and**
 - the lower inspection aperture is located no further than 15 m from the terminal.
- Install the inspection apertures so that they are easily accessible.

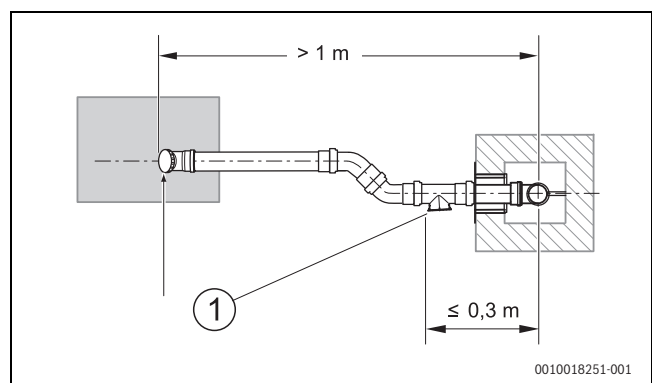


Fig. 1 Arrangement of the inspection aperture

[1] inspection aperture

3.2.3 Flue terminal positions

NOTICE:

- ▶ Install a fire proof board if installing on combustible surfaces.
- ▶ The location of the flue terminal must comply with the clearances shown on this page. If you are unsure about clearances not indicated here, in general refer to AS/NZS5601 or your local authority. In Western Australia refer to SECWA rules and regulations.
- ▶ All measurements are the minimum clearances required.
- ▶ Terminals must be positioned to avoid combustion products entering the building.



The fixing method must be sufficient to hold the weight of the boiler.

- ▶ Use as a guide only. Refer to AS/NZS5601 or local gas fitting rules for specific locations.

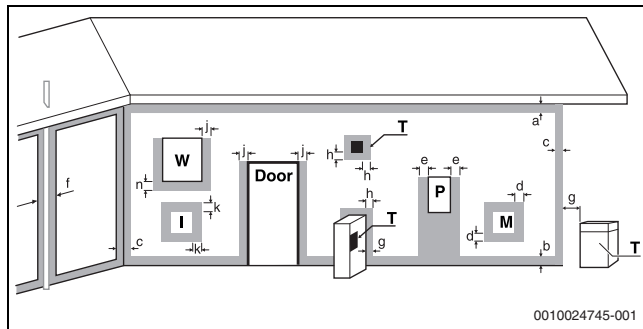


Fig. 2 Flue terminal positions

- [I] Mechanic air inlet
- [M] Gas meter
- [P] Electricity meter or fuse box
- [T] Flue terminal
- [W] Window
- [] Shaded area indicates prohibited area

Ref.	Item	Min. clearances [mm]
a	Below eaves, balconies and other projections (Appliances over 50Mj/h)	300
b	From the ground, above a balcony or other surface	300
c	From a return wall or external corner	300
d	From a gas meter	1,000
e	from an electricity meter or fusebox/breaker panel	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure or obstruction facing a flue terminal	500
h	From any other flue terminal, cowl or combustion air intake	300
j	Horizontally from any opening window, door, non-mechanical air inlet or other opening into a building with the exception of sub-floor ventilation	1,500
k	From a mechanical air inlet including a spa blower	1,000
n	Vertically below an opening window, non-mechanical air inlet or other opening into a building with the exception of sub-floor ventilation	1,500

Table 4 Minimum clearances

3.3 Opening apertures

If the openings for the flue system are next to each other, you must take measures to prevent flue gases being drawn in again. You must keep to the requirements of AS/NZS5601 (in particular those relating to design of the openings), as well as to the regulations relating to general building regulation approval for the system.

In addition, rainwater must not get into the ventilation air pipe.

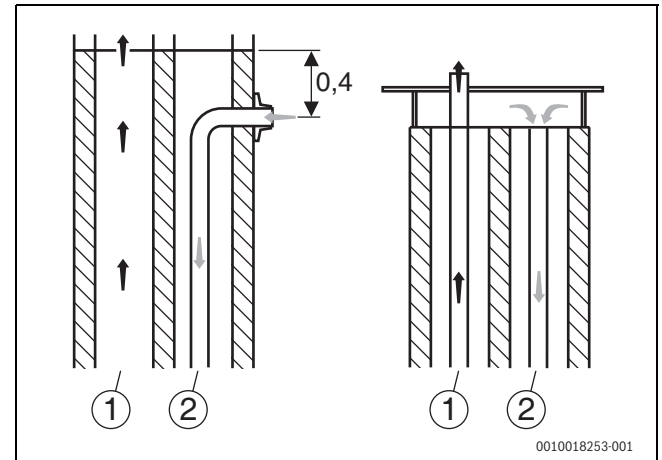


Fig. 3 Examples of the design of the opening apertures (dimensions in mm)

- [1] Flue gas
- [2] Supply air

Please speak to your local flue gas authority should you have any questions regarding the design of the opening apertures.



Incorrectly designed opening apertures can lead to increased emissions and burner faults.

3.4 Adapter bi-tube

The flue gas connection on the top of the device is ready for installation of concentric pipework Ø 100/150.

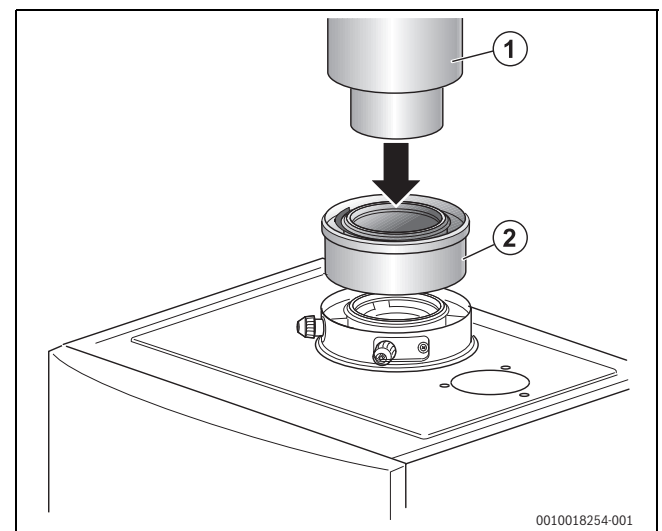


Fig. 4 Concentric pipe (sealed combustion)

- [1] Concentric pipe DN 100/150
- [2] Connection adapter 100/150

3.5 Individual pipe connection

The combustion air intake is through an open flue and is fed directly to the device.

Preparation for open flue operation (type B₂₃)

In the case of open flue operation, a ventilation air grill [2] must be used. This prevents dirt falling from above entering the device.

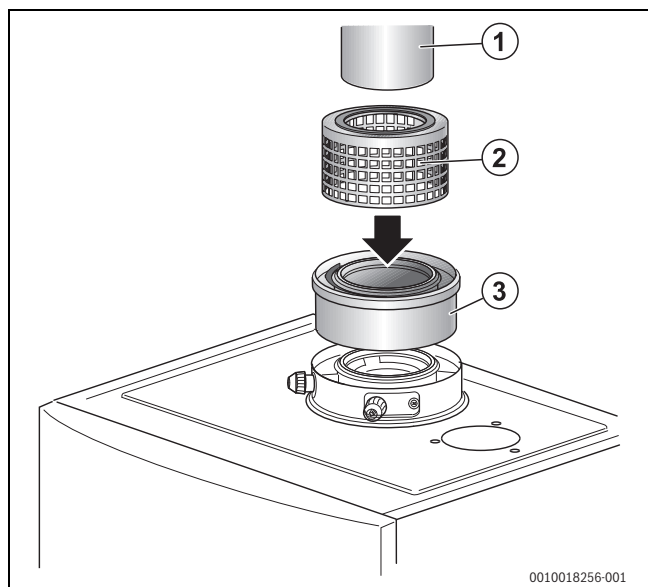


Fig. 5 Individual pipe connection (open flue)

- [1] Flue gas guide pipe Ø 100
- [2] Ventilation air grille DN150
- [3] Connection adapter Ø 100/150

3.6 Combustion air/flue on the façade

The combustion air inlet is on the outside behind the supply air tee. The combustion air tee must be at least 30 cm above ground level to draw in the combustion air at the level of the wall duct. Where this condition cannot be met, the combustion air can alternatively be drawn in via a concentric ventilation air connector that must be installed in the air/flue gas line on the wall.

Allow for inspection apertures in accordance with regulations.

3.7 Cascade

Flue gas cascade systems are available for the device upon request.

4 Installed dimensions

4.1 Vertical air/flue gas routing

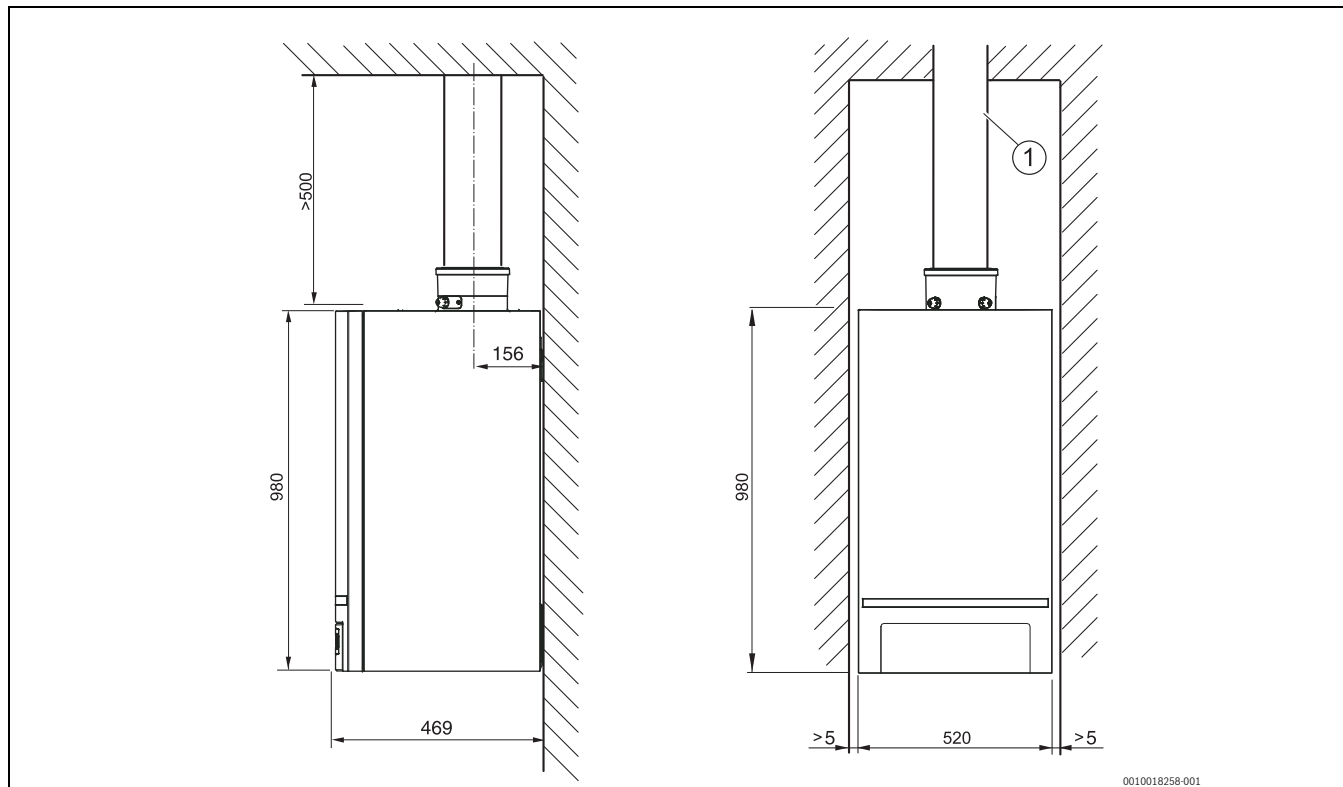
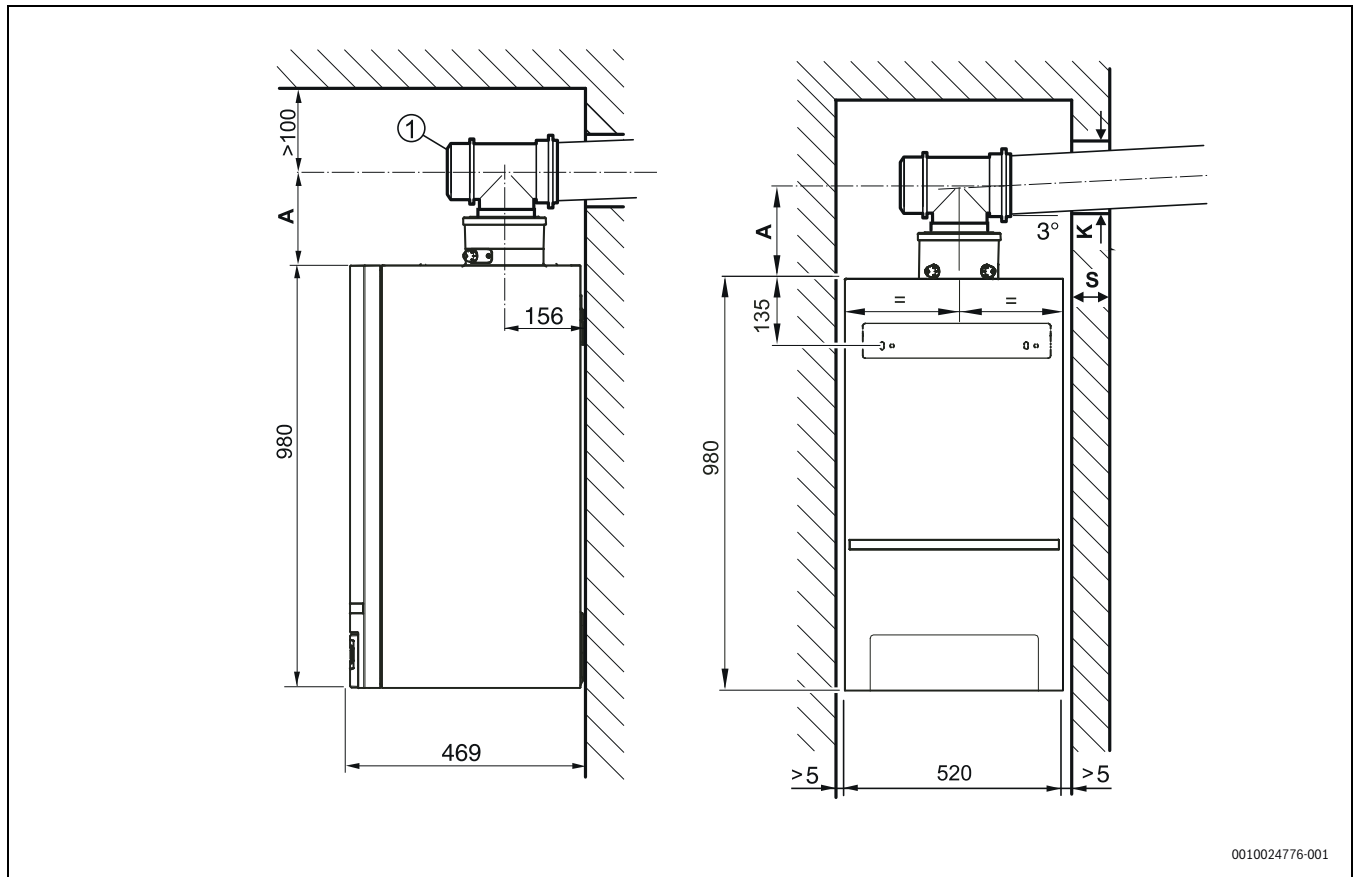


Fig. 6 Fitted dimensions

- [1] Vertical air/flue gas routing (Ø 100/150 mm)

4.2 Horizontal air/flue gas routing



0010024776-001

Fig. 7 Fitted dimensions (in mm)

Item 1 at:	Clearance A [mm]	
	Ø 100/150	Ø 100
T section	210 mm	472 mm ¹⁾ (372 mm) ²⁾

- 1) Dimension including ventilation air grille
2) The tee can be shortened by 100 mm

Table 5



To drain the condensate:

- Route horizontal flues with 3° gradient (= 5.2 %, 5.2 cm per metre) in the flow direction of the flue gas.

Wall thickness S	Wall penetration K	
	Ø 100/150	Ø 100
15 - 24	180 mm	130 mm
24 - 33	185 mm	135 mm
33 - 42	190 mm	140 mm
42 - 50	195 mm	145 mm

Table 6

5 Flue lengths

5.1 General information



The pictures of the systems in this manual are only schematically represented. More details can be found in the accessory documentation.

The devices are fitted with a fan that transports the flue gases into the flue. Pressure drops inside the flue decelerate the flue gases. Consequently, flues must not exceed a specific length to ensure the flue gases are securely propelled to the outside. This length is the maximum permissible flue length L depends on the device, the flue gas routing and flue pipe routing. The actual overall length of the pipe must be less than the maximum permissible flue length. Pressure losses are greater in deflections than in straight pipes. An equivalent pipe length is therefore assigned to bends that is greater than their physical length.

For each elbow, the indicated permissible flue length L decreases by the equivalent length indicated for each elbow (calculated length). The elbow or the tee on the device and the support bends inside the duct have been taken into consideration in the maximum permissible flue length L and do not have to be subtracted.

5.2 Calculating flue lengths based on the example of $C_{33(x)}$

5.2.1 Installation analysis

Determine the following from the given installation situation:

- Method of routing the flue:
(in this example: inside a duct)
- Flue gas routing
(in this example: $C_{33(x)}$)
- Wall mounted gas condensing boiler
(in this example: Condens 5000W ZBR 100-3)
- Number of 87° deflections in the vent pipe
(in this example: 2)
- Number of 15°, 30° and 45° deflections in the vent pipe
(in this example: 0)

5.2.2 Determining the parameters

- From the following tables (→ section 5.3.2), determine the following values depending on the flue gas routing, device and gas pipe diameter:
 - maximum permissible flue length L
 - equivalent pipe length of deviations $L1 + L2$.

Example

(fig. 8)

The following values result for the Condens 5000W ZBR 100-3 from table 8:

- $L (L1 + L2) = 15 \text{ m}$
- calculated link length for 87° deflections: 2 m.

An equivalent overall pipe length of 4 m results from the example with 2 x 87° elbows. This reduces the maximum permissible flue length to (15 m - 4 m).

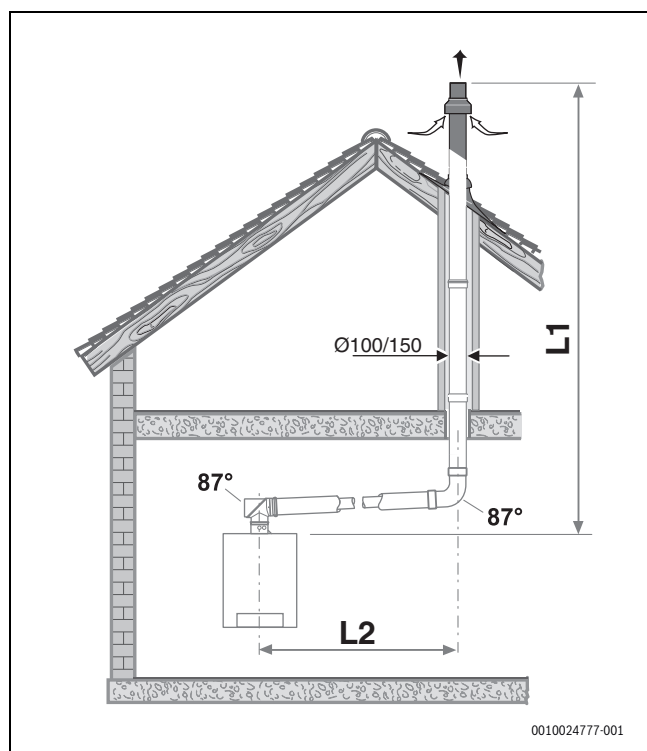


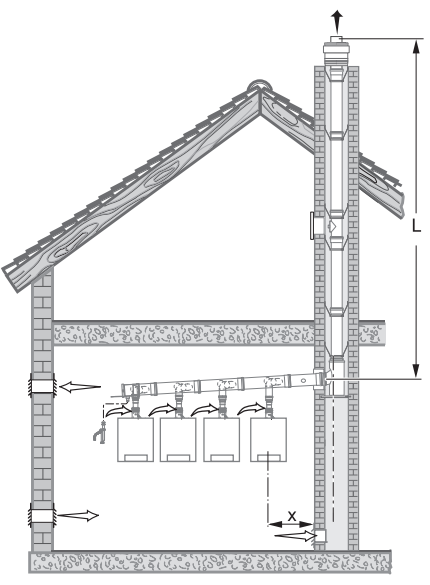


Fig. 8 Example of flue lengths

5.3 Installation options

The following table gives the options for open and balanced flue system installation in accordance with the permitted types of installation for the devices Condens 5000W ZBR 70-3/100-3.

5.3.1 Flue systems for open flue operation

Description		Schematic illustration		Device type ZBR-3	L[m]	Calculated links	
Design type	Description					 [m]	 [m]
B ₂₃	Flue gas cascade (negative pressure) Multiple flue gas routing via a rear-ventilated flue pipe in the duct.	 0010018264-001	Necessary flue diameter		(L min) -L		
	with 2 devices		DN 160	70 100	(4)-50 (9)-28	-	
	with 3 devices		DN 200	70 100	(2)-50 (2)-50	-	
	with 4 devices		DN 200	70	(8)-50	-	
			DN 250	70 100	(3)-50 (3)-50	-	
	with 5 devices		DN 250	70 100	(6)-50 (11)-50	-	
			DN 315	70 100	(3)-50 (3)-50	-	
	with 6 devices		DN 250	70	(16)-50	-	
			DN 315	70 100	(4)-50 (6)-50	-	
	with 7 devices		DN 315	70	(7)-50	-	
				100	(11)-50	-	
	with 8 devices		DN 315	70	(11)-50 (25)-50	-	
			DN 315	70	(19)-50	-	



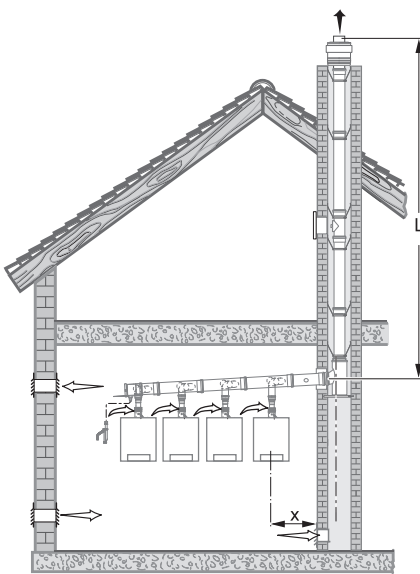
Description		Schematic illustration		Device type ZBR-3	L[m]	Calculated links	
Design type	Description					 [m]	 [m]
B ₂₃	Flue gas cascade (positive pressure) Multiple flue gas routing via a rear-ventilated flue pipe in the duct.		Necessary flue diameter				
	with 2 devices		DN 110	70	6	-	
	with 3 devices		DN 125	70	24	-	
				100	14	-	
			DN 160	70	50	-	
				100	50	-	
	with 4 devices		DN 160	70	47	-	
				100	30	-	
			DN 200	70	50	-	
				100	50	-	
	with 5 devices	DN 160	70	15	-		
			100	6	-		
		DN 200	70	50	-		
			100	50	-		
	with 6 devices	DN 200	70	50	-		
			100	34	-		
		DN 250	100	50	-		
		with 7 devices	DN 200	70	28	-	
			100	12	-		
	DN 250		70	50	-		
			100	50	-		
	with 8 devices	DN 200	70	10	-		
		100	50	-			
DN 250		70	50	-			
		100	50	-			
with 8 devices	DN 250	70	50	-			
		100	49	-			
	DN 315	100	50	-			

Table 7 Installation options

[L] maximum permissible total pipe length

5.3.2 Flue gas systems for balanced flue operation



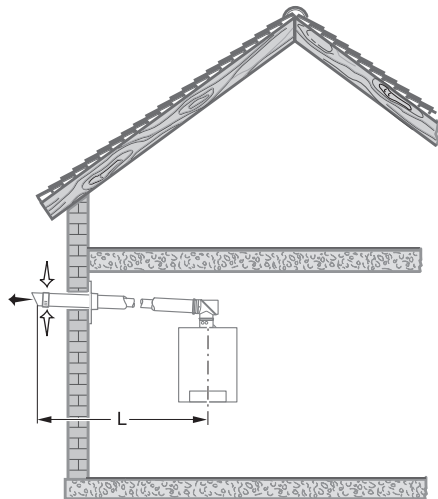
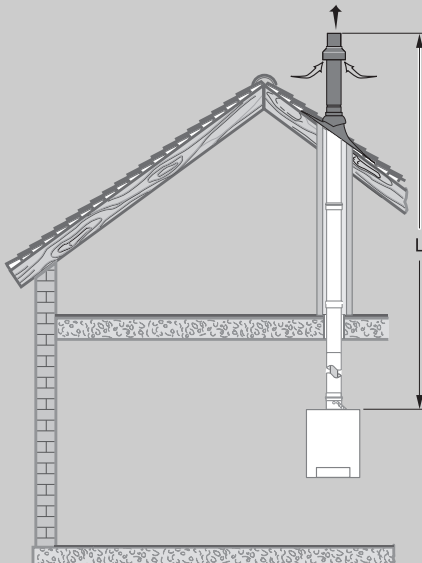
Description		Schematic illustration		Device type ZBR-3	L[m]	Calculated links	
Design type	Description					 87 [m]	 15-45 [m]
C _{13(x)}	Flue system in the concentric pipe horizontal through the façade. Openings close to each other in the same pressures zone.	 0010018265-001		70 100	15 14	2	1
C _{33(x)}	Flue system in a concentric pipe vertical above the roof. Openings close to each other in the same pressures zone.	 0010018266-001	Duct Ø 190 mm □ 180 mm	70 100	16 15	2	1

Table 8 Installation options

[L] maximum permissible total pipe length

Robert Bosch (Australia) Pty Ltd
Thermotechnology Division
1555 Centre Road
Clayton Victoria 3168

Australia
Phone: 1300 30 70 37
Fax: 1300 30 70 38
www.bosch-climate.com.au

New Zealand
Phone: 0800 54 33 52
Fax: 0800 54 33 55
www.bosch-climate.co.nz