CONNECTIONS

KWB Classicfire

Type CF1.5 / CF2

Contents

Foreword

About this manual

This manual contains all the required information for connection by external certified technicians. The chapter sequence corresponds to the recommended workflow. For further queries please contact your sales partner or KWB Customer Service.

KWB – Kraft und Wärme aus Biomasse GmbH including its country representatives and authorised competence partners are hereinafter referred to as KWB.

Our objective is to constantly improve our products and manuals – we would therefore appreciate your feedback.

You can find all contact data on the KWB home page www.kwb.net

If you find any errors or mistakes, please let us know at: doku@kwb.at

Original manual – Subject to change. No responsibility accepted for errors and omissions!

Explanation of the formatting

Work steps

We use different symbols for the preconditions, the actual work steps and the result:

- ➥ Precondition
- ⇨ Work step
- ↳ Result

Page texts

The keywords to the left of the text column assist you in immediately recognising what the content of the text section is.

Cross references

A reference to another section of this document recognizable by the arrow and the page number in brackets. Example: About this manual [▶ 5]

Guarantee and Warranty

NOTE

Warranty

- ➥ The manufacturer's KWB warranty specifies proper installation and commissioning of the system as a prerequisite. Defects and damage due to improper installation, commissioning and operation are excluded from the warranty!
- ➲ The manufacturer's instructions must be complied with to ensure proper system function. Knowledge of the manuals is a prerequisite.
- ➲ Only original parts or parts that have been expressly approved by the manufacturer must be used.
- ➲ If something is not clear, please look it up in this manual or contact the KWB Customer Service.

Implementation advice

Notes on standards

The installation and commissioning of the system must be carried out in accordance with fire protection and building-code regulations. If not regulated otherwise on a national level, the following standards and regulations apply in their most recent version:

General standards for heating systems

EN 303-5	Heating boilers for solid fuels, manually and automatically stoked boilers, nominal heat output up to 500 kW
EN 12828	Heating systems in buildings - Design for water-based heating systems
EN 13384-1	Chimneys - Thermal and fluid dynamic calculation methods Part 1: Chimneys serving one heating appliance
ÖNORM H 5151	Design of central hot water heating system with or without hot water generation
ÖNORM M 7510-1	Directives for the inspection of central heating systems Part 1: General requirements and one-time inspections
ÖNORM M 7510-4	Directives for the inspection of central heating systems Part 4: Simple inspection of boiler systems for solid fuels

Standards for building code-related installations and safety-related equipment

ÖNORM H 5170	Heating system - Requirements to building and safety technology as well as fire and environmental protection
Switzerland	Compliance with Swiss Fire Protection Regulations (BSV 2015) of the Association of Canton Fire Insurances (VKF)
Germany	Compliance with the Firing Director and Fuel Storage of the German Federal States in accordance with the Ordinance on Firing Installations (FeuVO)

Standards for heating water generation

ÖNORM H 5195-1	Prevention of damage from corrosion and lime-scale formation in hot water heating systems with operating temperatures of up to 100°C (Austria)
VDI 2035	Prevention of damage in hot-water heating systems (Germany)
SWKI BT 102-01	Water quality for heating, steam, cooling and a/c systems (Switzerland)
UNI 8065	Technical standard regulating hot water generation. DM 26/06/2015 (Ministerial order with minimum requirements) Comply with provisions of the standard and the respective amendments.

Regulations and standards for permissible fuels

1st BImSchV	First ordinance of the German Federal Government for the execution of the German Federal Emission Protection Regulation (BImSchV) (Ordinance on Small and Medium Combustion Plants) – as promulgated on 26 January 2010, Federal Law Gazette (BGBl.) year 2010 part I no. 4
EN ISO 17225-3	Solid biofuels, fuel specifications and classes Part 3: Wood briquettes for non-industrial use
EN ISO 17225-5	Solid biofuels, fuel specifications and classes Part 5: Wood briquettes for non-industrial use

Heating system installation and approval

The boiler must be operated in a closed heating system. The installation is based on the following standards:

Note on standards

EN 12828 – Heating systems in buildings

Note: Every heating system must be approved!

The installation or conversion of a heating system must be reported to the supervisory authority (monitoring authority) and must be approved by the building authority:

- **Austria:** report to the building authority of the municipality / magistrate
- **Germany:** report to the chimney sweep/building authority

1 Safety

1.1 Please note

1.1.1 Gradation of the hazard statements

In this documentation, we will use warnings with the following hazard levels to indicate direct dangers and important safety regulations:

NOTE

General information

We use this representation to indicate and describe **important information**.

⚠ CAUTION

Incipient hazard

We use this symbol to indicate and describe **incipient hazards**. If the stated risks are **ignored**, **injuries, property damage and environmental damage** may result.

⚠ WARNING

Medium hazard

We use this representation to indicate and describe hazards. If this warning is **ignored**, **serious or fatal injuries** may result.

⚠ DANGER

Serious hazard

We use this representation to indicate and describe **serious hazards**. **If this warning is ignored, serious or fatal injuries result!**

1.1.2 General safety instructions

- **Do not alter the system in any way!**
- Close all provided covers before you place the system into operation!
- Unplug the connector before you perform any service or open the control!
- Always disconnect the power supply to the boiler and conveyor system (main switch) before you enter the fuel storage room.

NOTE

Proper installation by specialists

↪ The entire installation, integration and commissioning of the heating system may only be carried out by expert specialists of KWB or their partners.

➲ All the work must conform to the specifications stated in the KWB manuals and local regulations.

⇨ Only then are you eligible for any warranty claims.

1.1.3 Comply with the safety instructions

NOTE

Comply with the safety instructions

Your system has been tested for safety and satisfies the applicable standards, guidelines and regulations.

Failure to comply with the safety instructions or improper use poses the risk of material damage. In addition, you risk your health or your life!

1.1.4 Please read and follow the manual

NOTE

Please read the instructions carefully before installation or commissioning!

Compliance with the instructions and proper installation or commissioning is a prerequisite for a warranty provided by KWB.

➲ If you are unsure about anything, please refer to the instructions or contact the KWB customer service.

↳ You will find all instructions for our heating systems in the KWB PartnerNet: http://partnernet.kwb.net/

1.1.5 Qualification of the installation personnel

⚠ CAUTION

Assembly and installation by unqualified personnel may lead to material damage and injuries!

➥ The following applies for assembly and installation:

➲ Comply with the directions and notes in the instructions.

➲ Have the work on the system only carried out by personnel with appropriate technical skills.

Assembly, installation, commissioning and maintenance must only be carried out by qualified persons:

- Heating engineers / building services engineers
- Electrical installation engineer
- KWB Customer Service

The installation personnel must have read and understood the directions in the documentation.

1.1.6 Protective equipment of the assembly personnel

To the extent necessary or required by regulations, personal protective equipment must be used. Such obligations may also refer to the use of hazardous materials, for example, or the wearing of personal protective equipment.

During transport, installation and assembly:

- Suitable work clothes
- Protective gloves
- Safety footwear (at least protection class S1P)

1.2 Pictograms used

The following command, prohibition and warning signs are used in the documentation and/or at the boiler.

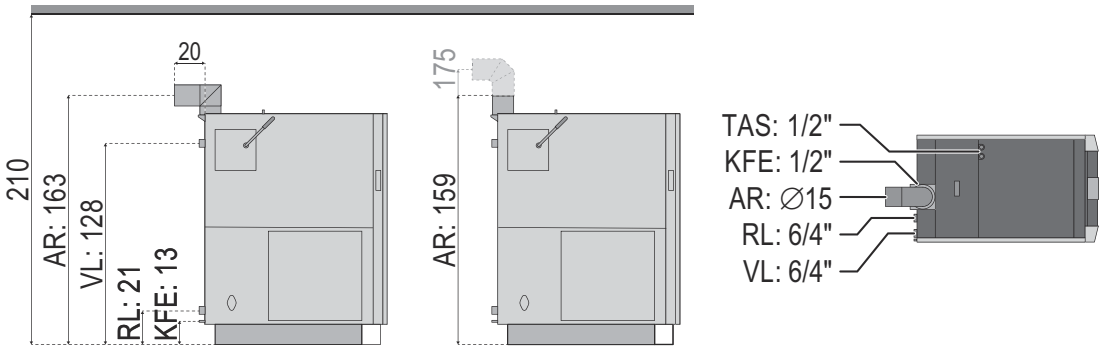
According to the Machine Directive, signs attached directly at the danger location of the boiler warn of direct dangers or signal safety-relevant behaviours. These stickers must not be removed or covered up.

Command sign (safety colour blue)			
	General command sign		Use mask
	Follow the instructions		Use a welding mask
	Use hearing protection		Disconnect from mains before maintenance and repair
	Use eye protection		Check barrier
	Earth before use		Keep closed
	Disconnect plug from the mains		Use gas detector
	Use foot protection		Continuous ventilation to the outside is required
	Use hand protection		Ventilation is required
	Use protective clothing		Entry only with a second person outside! In the event of an accident first call for help!
	Use face guard		Only certified technicians
	Use head protection		Only certified electricians

Prohibition sign (safety colour red)			
	General prohibition signs		No access for persons with pacemakers or implanted defibrillators
	Unauthorized access prohibited		Reaching in prohibited
	Smoking is prohibited		Stepping on the surface is prohibited
	No open flames; fire, open ignition sources and smoking are prohibited		

Warning signs (safety colour yellow)			
	General warning sign		Warning of automatic start-up
	Warning of explosive substances		Warning of danger of crushing
	Warning of obstructions on the ground		Warning of flammable substances
	Warning of danger of falling		Warning of sharp object
	Warning of low temperature / frost		Warning of hand injuries
	Warning of danger of slipping		Warning of rollers running in opposite direction
	Warning of electrical voltage		Warning of optical radiation
	Warning of suspended load		Warning of flammable materials
	Warning of hot surface		Warning of suffocation risk

2 Connection dimensions



[VL]	Connection forward flow 6/4"	[TAS]	Thermal discharge safety valve, outflow and inflow 1/2"
[RL]	Connection return flow 6/4"	[KFE]	Connection filling & emptying 1/2"
[AR]	Connection exhaust gas pipe 15 cm		

The tap for filling & emptying is NOT included in the scope of delivery!

3 Water

Important: The system and the boiler water must meet several requirements that reduce or prevent corrosion in the system for guarantee and warranty claims to remain valid.

Air-tight	⇨ The heating system must be configured as a closed circuit!
Standards	⇨ With respect to the condition of the fill water you must strictly comply with VDI 2035 and ÖNORM H 5195! (Italy: UNI 8065; Switzerland: SWKI BT 102-01)
Corrosion	⇨ Regarding corrosion, it is necessary to keep an eye on the water conductivity in addition to strictly keeping oxygen from entering into the system.
pH value	⇨ A pH-value between 8.2 and 10.0 should be targeted. If the heating water comes into contact with aluminium, a ph-value between 8.0 and 8.5 should be targeted.
Decoupling	⇨ Ensure the oxygen **im**permeability of the parts used for the acoustic transmission decoupler of the water connections!
Limiting thermostat	⇨ Protect plastic lines for underfloor heating or district heating pipes from excessive temperatures. Use a limiting thermostat for the circulation pumps.
Safety group	⇨ Always use a safety group.
Mud strainer	⇨ To prevent deposits caused by limescale and rust mud, we recommend the installation of a mud strainer in the return flow and a microbubble trap in the forward flow.

3.1 Combination with buffer storage tank

Comply with the regional specifications for the use of a buffer storage tank! Some subsidy policies require the installation of buffer tanks.

Tip: You can find information regarding individual subsidy policies on the KWB Homepage.

It has certain benefits if the heat generated by the log wood boiler is distributed to a buffer tank, e.g.

- Better fuel utilization
- Greater user friendliness with regard to refill intervals
- Largely independent of current heating needs
- Less soiling of boiler and exhaust gas unit

As the lowest continuous heat output of the boiler is greater than 30% of the rated heat output, we specify as boiler manufacturer that the KWB Classicfire log wood boiler (KWB Combifire) must always be connected to a buffer tank with sufficiently large storage volume pursuant to EN 303-5:2012, Chapter 4.4.6.

For some countries, there are recommendations for the storage volume which we list below. The specified values apply if the rated heat output of the boiler corresponds to the heat output requirements of the building and if a max. of 50% of the rated heat output can be distributed to the heated building in partial load operation.

The buffer tank volume can be calculated using the following formula pursuant to EN 303-5:2012:

$$V_{Sp} = 15T_B \times Q_N(1 - 0.3 \times Q_H/Q_{min})$$

V_{Sp}	Buffer tank volume in [l]
Q_N	Rated boiler output in [kW]
T_B	Combustion period of the boiler in [h]

Q_H	Heating load of the building in [kW]
Q_{min}	Lowest boiler output in [kW] [1)] $_{min}$

[1)] The lowest heat output of the boiler is the lowest value of the heat output range in the technical specifications. If the lowest heat output is provided, the rated heat output must be inserted ($Q_{min} = Q_N$)

General

	Unit	KWB Classicfire Type CF1.5	KWB Classicfire Type CF2
Minimum volume buffer tank:	[l]	1500	1800
Recommended buffer tank volume:	[l]	1800	2500

Austria

Due to applicable Austrian energy technology laws, based on Art. 15a B-VG of the "Agreement concerning safety measures relating to small-scale furnaces" (2012), the following applies:

No buffer tank is required for all manually stoked biomass boilers which were positively inspected for the emission limit values of the aforementioned agreement both at nominal load as well as at a partial load 50% below the nominal load!

Germany

The 1st BImSchV (Ordinance on Small and Medium Combustion Plants of 26 January 2010, BGBl. I p. 38) specifies a minimum water heat storage volume of 55 litres per kilowatt rated heat output, a water heat storage tank with a volume of twelve litres per litre fuel fill room is recommended.

Please contact your installer or the KWB Customer Service regarding the correct dimensions of the buffer tank and the line insulation (e.g. pursuant to ÖNORM M 7510 or Directive UZ37).

Switzerland

The Air Quality Control Regulation LRV Appendix 3 prescribes a minimum heat storage volume of 12 litres per litre fuel fill room. The volume must not exceed 55 litres per kW rated heat output.

3.2 Mounting the return flow boost

⚠ WARNING

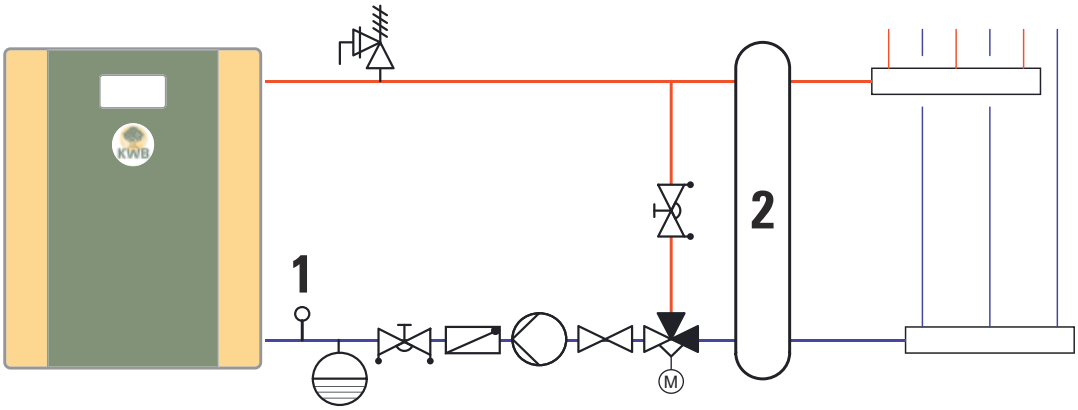
Unforeseeable consequences caused by improper work on the heating system

➲ Work on the heating system (boiler connection, buffer tank, heating circuits …) may only be performed by qualified experts!

External return flow boost

The planning and execution lies within the scope of responsibility of the installing heating system company; the heating system must in any case be provided with a buffer storage tank!

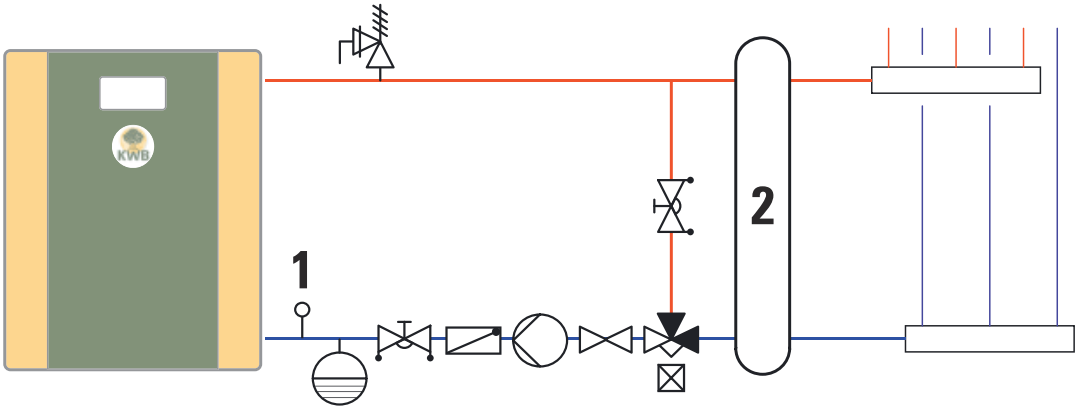
Motor mixing valve



1	Return flow sensor	2	Buffer

- Used when installing a buffer
- Return flow temperature at least 55 °C
- No distributor short-circuit

Thermal mixer valve



1	Sensor for return flow temperature	2	Buffer

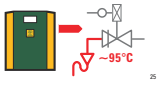
- Used when installing a buffer
- Configurable thermal valve 40–70°C: We normally recommend values between 50 and 60°C.
- No distributor short-circuit

3.3 Installing the thermal safety valve

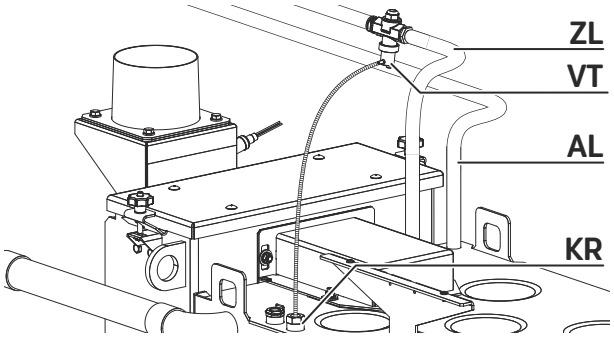
⚠ CAUTION

Risk of overheating - possible risks for people and system!

➲ You must comply with all specifications!



The thermal discharge safety valve triggers at a boiler temperature of 95 °C!



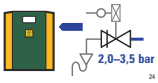
ZL	Inflow	VT	Valve
AL	Discharge	KR	Capillary tube

⇨ Install the thermal discharge safety valve as shown in the drawing.

⇨ Fasten the sensor at the edge of the immersion sleeve using the screw.

⇨ To keep the maintenance area for the heat exchanger unobstructed:
Run the pipes of the thermal discharge safety valve first to the outside on the right and only then to the rear.

⇨ Make sure that the inflow [ZL] is ≥10 cm higher than the discharge [AL].



➥ The cold water must have a pressure of 2-3.5 bar!

⇨ The piping system must be temperature-resistant!
Install a 90° bend and route the drain to the back.

⇨ The discharge into the channel must be safe: Hot steam may cause injuries and damage!

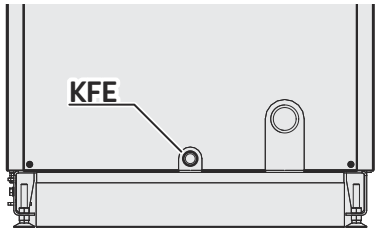
⇨ Install the piping such that it can be disassembled to ensure that subsequent maintenance and repair work is possible!

⇨ When installing the outlet ensure a >1% slope!

⇨ To prevent legionella growth, the thermal valve should be placed at least 100 mm above the drain.

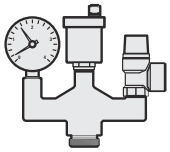
3.4 Installing filling/emptying connections

The KWB Classicfire has a ½" connection for the boiler filling or emptying [KFE] at the rear.



Note: The tap for filling & emptying is NOT included in the scope of delivery!

3.5 Installing the safety group (option)



The standard requires installation of a pressure control valve. KWB offers a safety group with automatic bleeder and pressure gauge (manometer).

⇨ Install the KWB safety group in the forward flow line.

Among other things, the safety group must be installed at the boiler or in direct vicinity to the boiler to make sure it is accessible and that there are NO shut-off devices between the boiler and the safety valve!

3.6 Ventilation

⇨ Only use high quality ventilation valves:
- in the boiler forward flow
- at the highest point of the distribution network **and**
- at the head of the buffer tank.

This will reduce the risk of corrosion **and** facilitates the bleeding of the system significantly!

3.7 Dimensioning the buffer-charging pump

During boost operation, a peak output of 38 kW is reached. Accordingly, the buffer charging pump must be adjusted to the peak output of 38 kW.

Spread via the boiler [K]	Boiler output boost operation [kW]
	38 kW
10	3.26
15	2.17
20	1.63

Table 1: Volume flow [m³/h]

Please see additional specifications in the **Technical data table** in the attachment to this document.

The specifications apply for average local conditions and must be checked by a qualified heating equipment technician. The pump selection is based on friction values and the delivery height in the planned pipe system.

3.8 Expansion tank dimensions

⚠ CAUTION

No effect if installed incorrectly

⮑ It must be impossible to close off the path between the expansion tank and heat source (boiler …)!

➲ The expansion tank must be installed in the boiler return flow – BEFORE the first valve!

System volume

Use a membrane type expansion tank for pressure compensation within the heating system pursuant to EN 13831. Calculate the dimensions in accordance with EN 12828 annex D; to give an idea regarding size: usually expansion tanks are used with a gross volume of approx. 10% of system volume.

KWB Classicfire
141 l

Table 2: Water content KWB Classicfire (litre)

These specifications are to be supplemented by the fill quantities of the heating system lines, radiators etc.!

3.9 Hydraulic diagrams

KWB offers an extensive selection of hydraulics schematics.

Note: This document is available for download in the KWB PartnerNet.

3.10 Fill water

NOTE

Please comply with: ÖNORM H 5195 + VDI 2035

KWB assumes ÖNORM H 5195-1 / -2 for the initial filling and subsequent filling. You must also comply with local requirements (e.g. VDI 2035 - in part, these are stricter)!

The water quality is a significant factor for the smooth operation of the heating system. Deposits caused by limescale and rust mud can block pumps, damage boilers, reduce flow volumes, cause corrosion and lead to poor efficiency.

We assume that the heating system possesses flushing nozzles for forward flow and return flow as well as a standard-compliant heating protection program ("BWT AQA therm" or equivalent).

Purging

NOTE! Purge the system twice before commissioning!

Ventilation

When refilling make-up water you must first bleed the refilling hose before connecting it to prevent air from entering the system.

System book

The system operator is responsible for maintaining a system book (see section Logs [▶ 20]), Forms). In this section, the respective steps are to be documented – from the planning to commissioning to maintenance.

3.10.1 Requirements for fill water

Limit values for fill-up or make-up water

	Austria	Germany	Switzerland
Total hardness	≤ 1.0 mmol/l	≤ 2.0 mmol/l	< 0.1 mmol/l
Conductivity	–	< 100 µS/cm	< 100 µS/cm
pH value	6.0 – 8.5	6.5 – 8.5	6.0 – 8.5
Chloride	< 30 mg/l	< 30 mg/l	< 30 mg/l

Additional requirements for Switzerland

The fill-up and make-up water must be demineralised (de-salted):

- As a result, the water will no longer contain any materials that might form deposits in the system.
- This way, the water is no longer electroconductive which prevents corrosion.
- Also, the process removes all neutral salts such as chlorides, sulphates and nitrates which attack corroding materials under certain conditions.

If part of the system water gets lost, e.g. due to repairs, the supplementary water must also be demineralised. It is not sufficient to soften the water. Before filling the systems, it is necessary to carry out a professional cleaning and purging of the heating system.

Check:

- After eight weeks, the ph-value of the water must be between 8.2 and 10.0. If the heating water comes into contact with aluminium, a ph-value between 8.0 and 8.5 should be targeted.
- Annually – the owner must log the readings

Limit values

The following limit values for fill water are intended to ensure the long-term reliable operation of hot water heating systems: The fill water should be low-salt and alkaline and not exceed a specific hardness.

Total heat generation capacity	mmol/l		°dH	
	ÖNORM[1]	VDI[2]	ÖNORM[1]	VDI[2]
Specific water content of the system < 20 l/kW				
≤ 50 kW	≤3	≤3	≤16.8	≤16.8
> 50 to ≤ 200 kW	≤2	≤2	≤11.2	≤11.2
> 200 to ≤ 600 kW	≤1	≤1.5	≤5.6	≤8.4
Specific water content of the system ≥ 20 l/kW, but < 50 l/kW				
≤ 50 kW	≤2	≤2	≤11.2	≤11.2
Specific water content of the system ≥ 50 l/kW				
≤ 50 kW	≤1	≤0.02	≤5.6	<0.11

Table 3: Highest permitted total hardness of the fill water for heating systems with a heat generation system with large water content (WBS > 0.3 l/kW)

mmol/l … SI unit sum alkaline earth | °dH … German degrees of hardness

[1] acc. to ÖNORM H 5195-1:2010

[2] acc. to VDI 2035

Test intervals

Condition	Intervals (ÖNORM)	Intervals (VDI)
Heating system with a water content <5000 l	2 years	1 year
Heating system with a water content ≥5000 l	1 year	
Work on the heating system (loss of water)	Additional test after 4-6 weeks in heating mode	

Tip: The standard provisions permit the use of completely decalcified water – this means you can save a considerable amount of calculation time by always calculating to a value of zero. Due to inaccuracies during the rinsing process, you will never actually reach a value of 0.0, but your calculations will always fall in a safe range!

3.10.1.1 Commissioning the heating system

Based on the requirements of ÖNORM H 5195-1:2010

- ⇨ Rinse the heating system with at least two times the quantity of the system water quantity.
- ⇨ Top up the system water quantity with appropriately prepared water.
- ⇨ Run the heating system for 72 hours at a minimum of 60 °C feed temperature immediately after this filling process.
  This will accelerate the exhaust process and prevent corrosion.
- ⇨ Hand over the "System and Test Log for Heating Water" (Appendix A) and the "Rinsing Log" (Appendix C) to the system operator.
  Include the product and safety data sheet if you added protective substances.
- ⇨ Tell the operator that the heating water should be checked after 4-6 weeks in heating mode!

3.10.2 Fill water with frost protection

⚠ CAUTION

Frost damage due to heating system failure

In a house with average insulation, the heating water can freeze within 5 days at low temperatures if the control system of an automatic heating system fails.

➲ Mix antifreeze into the heating system water according to the enclosed instructions or ensure regular checks!

Comply with: ÖNORM H 5195-2

➥ The water–antifreeze mixture has a lower thermal capacity and a higher flow resistance.

⇨ Increase the forward flow temperature by 1–2 °C in order to compensate for these changes. The heating curve can usually be left unchanged.

Tip: Place the heating system into operation at least once a week.

⚠ CAUTION

Risk of rust due to false water preparation

➲ If you use antifreeze in the fill water, the fill water must NO longer undergo osmotic treatment (desalting)!

3.10.3 Logs

You can find forms here:

- Maintenance instructions
- ÖNORM H 5195-1:2010 Appendix A and Appendix C
- VDI 2035 Appendix C and VDI 4708 sheet 1

3.10.3.1 Rinsing Log

Operator:		System type:	
Location (+building/block):		System name/object:	
Date:	Telephone:	Technician:	

Date	Junction No.	Room	Cleaning agent	System part	Rinsing start	Rinsing end	× O	Problem	Line designation	✓ O

Product & Safety sheet available:
Yes ☐ / No ☐

O = not completed × = clean ✓ = completed

3.10.3.2 System and Test Log for Heating Water

Operator:		Location (+building/block):	
System type:		Commissioning date:	
Total heat generation capacity:	kW	Water content of the system:	l
Heating capacity of the smallest heat generator:	kW	Specific water content of the system:	l/kW
Water content of the smallest heat generator:	l	Max. operating temperature:	°C
Heating system rinsing pursuant to EN 14336 completed:		Yes ☐ / No ☐	

Material (put check mark)	Steel	Stainless steel	Cast iron	Aluminium	Copper	Organic materials	Alloys
Heat generator							
Expansion container							
Armatures							
Pipework							
Heat emission							

Water meter reading at the filling spot BEFORE filling: Z =			m^3
Water meter reading at the filling spot AFTER filling: Z_{new} =			m^3
Volume / Fill quantity: $V = Z_{new} - Z$	m^3	Date:	
Completed emptying:		Date:	
Preparation after emptying:		Date:	

During first commissioning:

Parameters	Unit	Guidance values (VDI 2035)	Analysis values Fill water	Analyses values Heating water	Measuring processes
Total hardness	mmol/l (°dH)	See: Requirements for fill water [▶ 18]			Analytic ready-to-use test
pH value	—	8.2 to 10.0 [a)]			pH meter
Conductivity	µS/cm	<1500			
Iron	mg/l				Analytic ready-to-use test
Copper	mg/l				Analytic ready-to-use test
Aluminium	mg/l				—
Chloride	mg/l				Analytic ready-to-use test
Ammonium	mg/l				Analytic ready-to-use test

Parameters	Unit	Guidance values (VDI 2035)	Analysis values Fill water	Analyses values Heating water	Measuring processes
[a] For systems with Al or Al alloys: 8.2 to 8.5 (9.0)					
Comments:					

During maintenance and inspection:

Parameters	Unit	Guidance values (VDI 2035)	Analysis values Fill water	Analyses values Heating water	Measuring processes
Total hardness	mmol/l (°dH)	See: Requirements for fill water [▶ 18]			Analytic ready-to-use test
pH value	—	8.2 to 10.0 [a]			pH meter
Conductivity	µS/cm	<1500			
Iron	mg/l				Analytic ready-to-use test
Copper	mg/l				Analytic ready-to-use test
Aluminium	mg/l				—
Chloride	mg/l				Analytic ready-to-use test
Ammonium	mg/l				Analytic ready-to-use test
[a] For systems with Al or Al alloys: 8.2 to 8.5 (9.0)					
Comments:					

Additives: Type:	Manufacturer:	Supplier

Pressure			
* To determine by the planner pursuant to VDI 4708 sheet 1 ($>p_{a,min}$; $<p_{e,max}$).	System pressure	P_{AnI} =	bar
	Maximum final pressure *	$p_{e,\,max}$ =	bar (Ü)
For a membrane pressure expansion container	Gas pressure *	p_0 =	bar (Ü)
For pump or compressor pressure control	Set pressure system *	p_{set} =	bar (Ü) ± …… bar
Pressure control commissioned pursuant to manufacturer requirements:			Yes ☐ / No ☐

Actions required:	
Product & Safety sheets available: Yes ☐ / No ☐	Next inspection date:

Signature and stamp of the inspecting / commissioning company:

Date of the inspection:

3.11 Solar control

NOTE

Follow the manufacturer's instructions!

- ➲ Follow the manufacturer's instructions with respect to the installation and commissioning of the solar system.
- ➲ Follow the manufacturer's hazard and safety instructions.

Flushing and filling of the solar system

For safety reasons, filling must be carried out exclusively during times without sunlight or with covered collectors. Particularly in areas which experience frost, a 42% antifreeze-water mixture must be used. To protect the materials from excessive thermal loads, the filling and commissioning of the system should occur within a short time, but at most after 4 weeks. If this is not possible, the flat seals should be renewed before commissioning to prevent leaks.

Attention: If the antifreeze is not pre-mixed, it must be mixed with water before filling!

You must use the manufacturer-recommended antifreeze!

It is possible that collectors that have once been filled cannot be fully emptied. For this reason, collectors may even for pressure and function tests only be filled with the water/antifreeze mix when there is danger of frost. Alternatively, the pressure test can be performed with compressed air and leak locator spray.

Operating pressure

Observe the manufacturer-recommended maximum operating pressure.

Bleeding

The system must be bled:

- During commissioning (after filling)
- 4 weeks after commissioning
- If required (e.g. during faults)

⚠ WARNING

Risk of scalding from steam or hot heat transfer fluid!

- ➲ Only activate the bleed valve if the temperature of the heat transfer fluid < 60 °C. The collectors must not be hot when the system is emptied!
- ↳ Cover the collectors and, if possible, empty the system in the morning.

Check the heat transfer fluid

The heat transfer fluid must be checked every 2 years for frost protection and pH value.

- Check the frost protection with the antifreeze tester and replace or refill, if necessary! Setpoint approx. –25 °C to –30 °C depending on the climatic conditions.
- Check the pH-value with an indicator stick (setpoint approx. pH 7.5):
  Replace the heat transfer fluid if the limit ph-value of ≤ pH 7 is undershot.

Collector maintenance

Warranty claims only in connection with the supplier's original antifreeze and properly performed installation, commissioning and maintenance. Installation by a certified technician in strict adherence to the instruction description is required to justify the claim.

Mass flow rate

A specific flow rate of 30 l/m²h must be selected up to a collector field size of approx. 25 m² to ensure good collector performance.

3.11.1 Connections

This chapter illustrates various hydraulic options for implementing a thermal solar system.

The following illustrations are only meant to show principle of the schematics to understand the respective system hydraulics and are not intended to be complete. The control system does not replace any safety equipment. Depending on the use case, additional system and safety components, such as block valves, non-return valves, safety temperature limiters, scalding protection, etc., are required and must be included.

3.11.2 Hydraulic diagrams Solar

The hydraulics diagrams can be selected in Menu >> Basic settings >> Network settings >> Solar >> SOL 1 Solar >> Schema.

Four diagrams are available:

Description of the functions of the individual diagrams

Diagram 1 – simple solar circuit

The control system determines the temperature difference between the collector sensor and storage tank sensor. As soon as the difference is greater than or equals the specified value for the switch-on temperature differential, the pump is switched on and the storage tank is charged until the switch off temperature differential or the maximum storage tank temperature has been reached.

Diagram 2 – 2-zone switchover

The control system compares the temperatures of the collector sensor with the temperatures at sensor 2 (S20) and sensor 5 (S5) in the buffer storage tank.

If the measured temperature differences are greater than the specified values for the switch-on temperature differentials, the pump is activated and the respective storage tank section is charged via the valve (or 2nd pump) until the temperature reaches the specified storage tank maximum temperature. The switchover logic is set up so charging the upper storage tank area has priority.

Diagram 3 – 2-storage tank switchover (…with a second pump)

The control system compares the temperatures of the collector sensor and the lower temperatures of the two storage tanks.

If the measured temperature differences are greater than the specified values for the switch-on temperature differentials, the respective pump of the storage tank to be charged is activated and the respective storage tank is charged up to the specified maximum temperature. The switchover logic is set up so that charging storage tank 1 has priority.

Diagram 3 – 2-storage tank switchover (…with a switchover valve)

The control system compares the temperatures of the collector sensor and the lower temperatures of the two storage tanks.

If the measured temperature differences are greater than the specified values for the switch-on temperature differentials, the respective pump is activated and the respective storage tank is charged up to the specified maximum temperature using the valve. The switchover logic is set up so that charging storage tank 1 has priority.

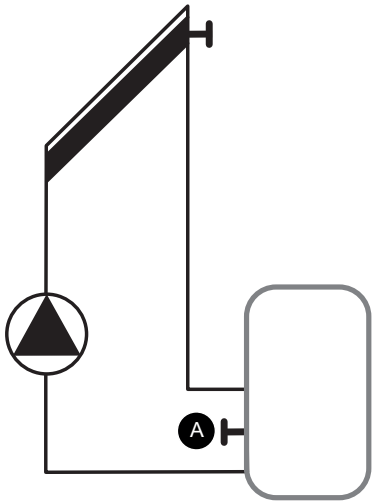
Diagram 4 – External heat exchanger

The control system determines the temperature difference between the collector sensor and storage tank sensor.

The primary pump is switched on as soon as the differential is greater than or equals the set value for the switch-on temperature differential. As soon as the temperature difference between forward flow sensor and storage tank sensor is greater than the specified value for the switch-on temperature differential, the secondary pump is switched on and the storage tank is charged until the switch off temperature differential or the maximum temperature of the storage tank has been reached.

3.11.2.1 Diagram 1

Single solar circuit (with buffer tank or DHWC)



Temperature sensor for	Buffer	Buffer 0	DHWC
[A] plug number	# 334	# 242	# 341

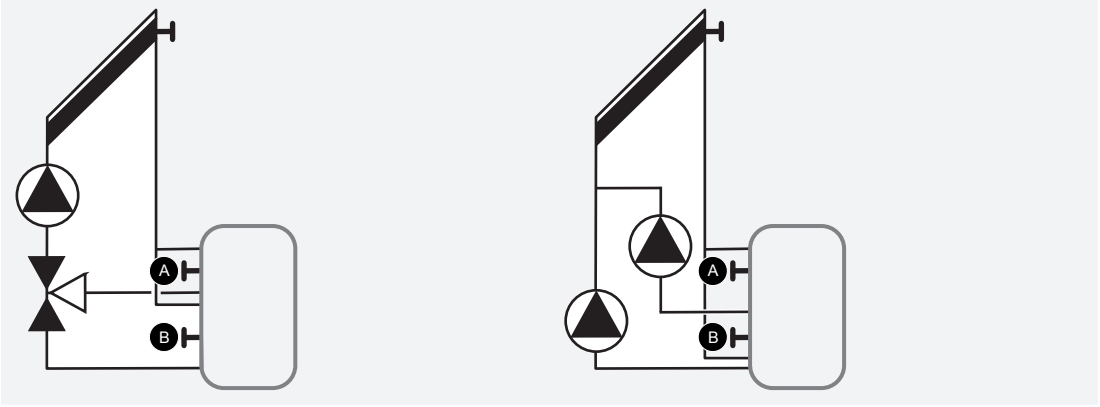
- Storage tank 1: Buffer | Buffer 0 | DHWC
  Select a buffer storage tank. A DHWC or buffer storage tank must be activated! If required, activate the buffer type (2.2 or 5.2) at which sensor 4 (S4) is used as switch-off sensor for the boiler. Only in this way it is possible to use the different sensors for the solar charging (S5) and the recharging by the boiler (S4). (Applies to every diagram)
- Pump 1 PWM signal: PWM1 | PWM2
- Heat quantity measurement: VFS 1-12l/m | VFS 2-40 l/m | Manually
- Sensor for HQM: VL sensor | Collector

3.11.2.2 Diagram 2

⇨ **2-zone switchover (buffer storage tank)**

⇨ …with a switchover valve

⇨ …with a second pump



Temperature sensor for	Buffer	Buffer 0
[A] plug number TOP	# 331	# 239
[B] plug number BOTTOM	# 334	# 242

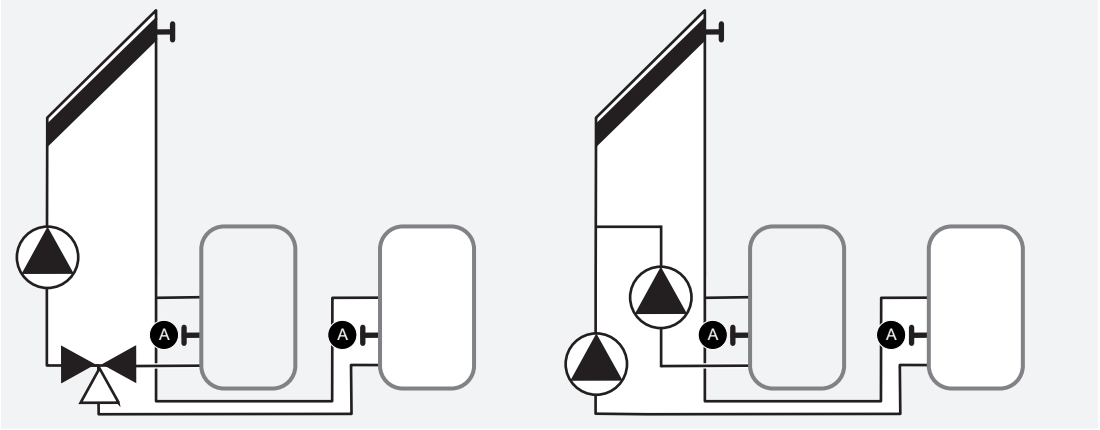
- Storage tank 1: Buffer | Buffer 0
  Select a buffer storage tank. A buffer storage tank must be activated! If required, activate the buffer type where sensor 4 (S4) is used as switch-off sensor for the boiler. It is primarily charged to sensor 2 (S2) on top.
- Switchover: Pump | Valve
  When switching using a valve, the output can be inverted.
- Invert valve: No | Yes
  If the valve is de-energized = storage tank 2, then invert valve by setting "yes".
- Pump 1 PWM signal: PWM1 | PWM2
- Heat quantity measurement: VFS 1-12l/m | VFS 2-40 l/m | Manually
- Sensor for HQM: VL sensor | Collector

3.11.2.3 Diagram 3

⇨ **2-storage tank switchover (buffer tank or DHWC)**

⇨ …with a switchover valve

⇨ …with a second pump



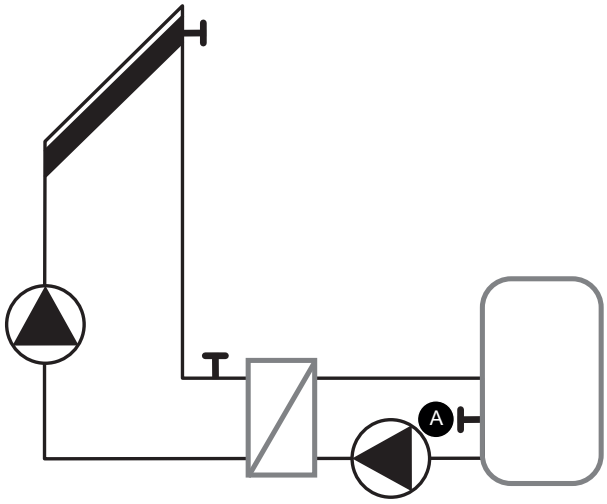
Temperature sensor for	Buffer	Buffer 0	DHWC
[A] plug number	# 334	# 242	# 341

Warning: The selection of storage tank 1 and storage tank 2 depends on the electrical connection of the pumps (valve). A subsequent change of the primary storage tank (storage tank 1) is not available without changing the electrical connection!

- Storage tank 1: **Buffer** | **Buffer 0** | **DHWC**
  Select a storage tank; this storage tank will function as the primary (priority) storage tank.
- Storage tank 2: **Buffer** | **Buffer 0** | **DHWC**
  Select a storage tank; this storage tank will function as the subordinate storage tank.
- Switchover: **Pump** | **Valve**
  Specifies how the switchover works between two storage tanks.
- Pump 1 PWM signal: **PWM1** | **PWM2**
  Specifies the pump type.
- Pump 2 PWM signal: **PWM1** | **PWM2**
  Specifies the pump type.
- Heat quantity measurement: **VFS 1-12l/m** | **VFS 2-40 l/m** | **Manually**
  Specifies how the heat quantity is measured.
- Sensor for HQM: **VL sensor** | **Collector**
  Specifies which sensor is to be used for recording the heat quantity measurement (HQM)
- Flow at 50%: **0.0lt/min**
  Enter flow during manual heat quantity measurement
- Flow at 100%: **0.0lt/min**
  Enter flow during manual heat quantity measurement

3.11.2.4 Diagram 4

External heat exchanger (buffer tank or DHWC)



Temperature sensor for	Buffer	Buffer 0	DHWC
[A] plug number	# 334	# 242	# 341

- Storage tank 1: **Buffer** | **Buffer 0** | **DHWC**
  Select a buffer storage tank.
- Pump 1 PWM signal: **PWM1** | **PWM2**
  Specifies the pump type.
- Pump 2 PWM signal: **PWM1** | **PWM2**
  Specifies the pump type.
- Heat quantity measurement: **VFS 1-12l/m** | **VFS 2-40 l/m** | **Manually**

Specifies how the heat quantity is measured.

- Sensor for HQM: VL sensor | Collector
  Specifies which sensor is to be used for recording the heat quantity measurement (HQM)
- Flow at 50%: 0.0lt/min
  Enter flow during manual heat quantity measurement
- Flow at 100%: 0.0lt/min
  Enter flow during manual heat quantity measurement

4 Electrical system

⚠ WARNING

Life-threatening electrical voltage

- ➲ The electrical installation may only be carried out by qualified specialists who have the required training and expertise!
- ➲ If required, shut down the system completely at the main switch.
- ➲ Unplug the mains plug before you start working on the system!
- ↳ Comply with applicable standards and regulations!

⚠ CAUTION

Quality of the electrical installation

- ➥ The applicable directives, particularly *EN 60204-1 Electrical equipment of machines – general requirements* must be complied with when performing the installation work.
- ➲ In addition, please ensure that there is no possibility of damage to electrical system components due to heat radiation!

NOTE

Possible damage because cabling has been installed too loosely

- ➲ Secure all cables in the cable duct with cable ties!
- ↳ You ensure electrotechnical safety with this kind of strain relief.

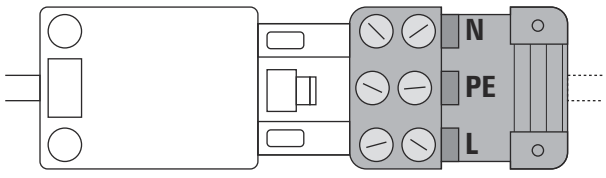
- ⇨ **Tip:** Always ensure the strain on the connection is relieved by always using a cable tie to connect two cables inside a cable housing that enter the cable housing through different openings.

4.1 Electrical connections - boiler

Establishing the mains connection

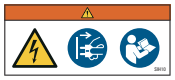
230 VAC
13 A C
05

The mains connection of the KWB Classicfire /KWB Combifire is provided via a pre-installed 3-pin plug-in connector on the rear wall of the boiler.



- ⇨ Open the prepared connector and connect the power supply according to the labelling (N, PE and L) to the connector!

Opening the boiler cover



- ➥ The connection of pumps, motor mixers and other heating system components may only be performed by companies licensed to install electrical equipment!
- ⇨ Carefully read the entire instruction manual before you unplug the connector and remove the boiler cover! Secure the system against being switched on again!
- ⇨ Place the cover on a stable surface to avoid scratches and other damage!

Connect the return flow boost

⇨ Place the sensor for the return flow temperature at an appropriate spot directly on the return flow.

⇨ Connect the sensor with plug-in slot 217 on the KWB Comfort 4 board:

217	2	2-pole connection sensor PT1000	Return flow temperature

4.2 Heating system electrical connections

4.2.1 Buffer storage tank

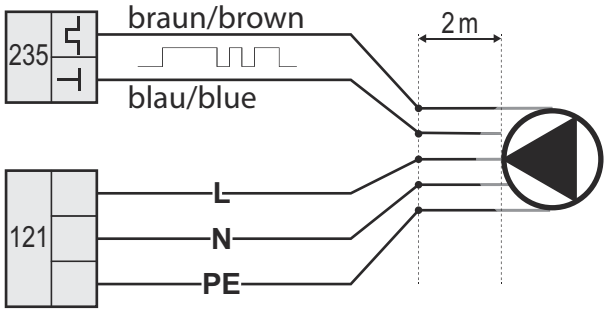
4.2.1.1 Charging the buffer storage tank directly from the boiler

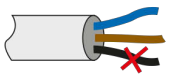
Pump

Connection to the Boiler signal module [KSM]:

We recommend using a pump with [PWM] speed control activation.

⇨ Install the buffer charging pump:





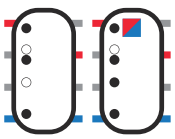
If an iPWM pump is installed, the third wire (black) is not be connected. This signal is not needed.

If using a pump without [PWM1] activation, the 235 plug is not connected.

Con-nector	Pins	Description	Function
121	3	3-pole supply 230 V_{AC}, max. 200 W	**Boiler circuit pump or buffer charging pump**
122	4	4-pin power supply 230 V_{AC}	**Quick charging valve**
235	2	2-pin connection, actuator	**Boiler circuit pump PWM1**

Sensors

The standard configuration requires 3 sensors (WITHOUT fresh water preparation) or 4 sensors (WITH fresh water preparation) for the buffer storage tank.



⇨ Use sensors S1–S2–S5 or S1–S3–S4–S5 depending on the buffer tank diagram.

⇨ Route the sensor such that you can subsequently change the sensor positions.
Allow for sufficient reserve cable!

Connection at the Boiler signal module [KSM]:

Note: The operation of a domestic hot water circulation pump is only possible if connecting to aHeat management module [WMM].

Con-nector	Pins	Description	Function

238	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 1**
239	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 2**
240	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 3**
241	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 4**
242	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 5**

Connection to the Heat management module [WMM]:

Con-nector	Pins	Description	Function
330	2	2-pole connection sensor PT1000	**Buffer storage tank 1 temperature**
331	2	2-pole connection sensor PT1000	**Buffer storage tank 2 temperature**
332	2	2-pole connection sensor PT1000	**Buffer storage tank 3 temperature**
333	2	2-pin connection sensor PT1000	**Buffer storage tank 4 temperature**
334	2	2-pole connection sensor PT1000	**Buffer storage tank 5 temperature**

4.2.1.2 Charging the buffer storage tank indirectly from the boiler

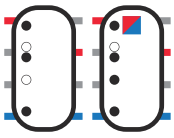
Connection at the Heat management module [WMM]:

Pump

⇨ Install the buffer charging pump:

306	3	3-pole power supply 230 V_{AC}	**Feeder pump/valve or buffer charging pump**

Sensors



The standard configuration requires 3 sensors (WITHOUT fresh water preparation) or 4 sensors (WITH fresh water preparation) for the buffer storage tank.

⇨ Use sensors S1–S2–S5 or S1–S3–S4–S5 depending on the buffer tank diagram.

⇨ Route the sensor such that you can subsequently change the sensor positions.
Allow for sufficient reserve cable!

330	2	2-pole connection sensor PT1000	**Buffer storage tank 1 temperature**
331	2	2-pole connection sensor PT1000	**Buffer storage tank 2 temperature**
332	2	2-pole connection sensor PT1000	**Buffer storage tank 3 temperature**
333	2	2-pin connection sensor PT1000	**Buffer storage tank 4 temperature**
334	2	2-pole connection sensor PT1000	**Buffer storage tank 5 temperature**

4.2.2 Heating circuit

Several installation steps are required to activate the heating circuit.

⇨ Install an outside temperature sensor on the building's northern side.

Con-nector	Pins	Description	Function
327	2	2-pole connection sensor PT1000	**Outside temperature**

⇨ Install a forward flow temperature sensor for each heating circuit at the respective forward flow.

337	2	2-pole connection sensor PT1000	**Forward flow temperature heating circuit 1**
338	2	2-pole connection sensor PT1000	**Forward flow temperature heating circuit 2**

⇨ Install the heating circuit pump including mixer motor:

309	4	4-pole power supply 230 V_{AC}	**Heating circuit 1 mixer**
310	3	3-pole power supply 230 V_{AC}	**Heating circuit 1 pump**
307	4	4-pole power supply 230 V_{AC}	**Heating circuit 2 mixer**
308	3	3-pole power supply 230 V_{AC}	**Heating circuit 2 pump**

Optional

Carry out the following installation steps only if required.

⇨ Install the control units in the living quarters:

362	7	7-pole bus connection	**Control unit 1**
363	7	7-pole bus connection	**Control unit 2** (is delivered bridged)

▪ Install one release contact or request contact:

322	2	2-pole digital input 24 V_{DC} Is delivered bridged.	**Release heating circuit 1**
323	2	2-pole digital input 24 V_{DC} Is delivered bridged.	**Release heating circuit 2**

4.2.3 Pumps/mixer (WMM)

Pumps

The respective Comfort 4 connections are suitable for energy-saving pumps ("category A").

Connector	**Pins**	**Description**	**Function**
301	3	3-pole supply 230 V_{AC}	**Pump/valve for secondary heating source / For boiler master-and-slave circuit: Fault duration - output**
302	3	3-pole supply 230 V_{AC}	**Solar pump 2** or **switchover valve**
303	3	3-pole supply 230 V_{AC}	**Solar pump**
304	3	3-pole power supply 230 V_{AC}	**Circulation pump**
305	3	3-pole supply 230 V_{AC}	**DHW pump / For boiler master-and-slave circuit: Fault interval - output**
306	3	3-pole power supply 230 V_{AC}	**Feeder pump/valve or buffer charging pump**
310	3	3-pole power supply 230 V_{AC}	**Heating circuit 1 pump**
308	3	3-pole power supply 230 V_{AC}	**Heating circuit 2 pump**

Mixer

309	4	4-pole power supply 230 V_{AC}	**Heating circuit 1 mixer**
307	4	4-pole power supply 230 V_{AC}	**Heating circuit 2 mixer**

4.2.4 Fault contact + multi-function outputs

Two (2) multi-function outputs (floating switch contacts) are available.

Multi-function output 1 (#125)

The following options are also possible as alternatives!
NO contact (in de-energized state as well as "main switch: Off", contact open) configurable for:

- Fault
  To display faults (can be configured as "NC" or "NO" contact)
- Automatic boiler
  As request contact for switching and/or requesting an automatic boiler.
- Burner operating display
  Output closed if the boiler is in operation
- Smoke extractor
  As request contact to switch an external smoke extractor or an air inlet flap

Con-nector	Pins	Description	Function
125	2	2-pole floating contact, max. 10 A	**Multi-function output 1**

Multi-function output 3 (#124):

NC contact (in de-energized state as well as "main switch: Off", contact closed) for:

- Fault

Con-nector	Pins	Description	Function
124	2	2-pole floating contact, max. 10 A	**Multi-function output 3**

4.2.5 External

NOTE! 24 VDC power supply to connect floating contacts!

External 1:

Connect external safety equipment here (low-water pressure switch ...) or an electric ignition request via an external control.

If this input is not used, it must be bridged.

Con-nector	Pins	Description	Function
230	2	2-pole digital input 24 V_{DC}	**Combustion release** ("External 1") (Is delivered bridged.)

4.2.6 DHWC

Several installation steps are required to activate the DHWC.

⇨ Install a temperature sensor at the storage tank:

Con-nector	Pins	Description	Function
328	2	2-pole connection sensor PT1000	**Temperature DHWC 1 / Only with boiler master-and-slave circuit: Temperature forward flow network**

⇨ Install a DHW pump:

305	3	3-pole supply 230 V_{AC}	**DHW pump / For boiler master-and-slave circuit: Fault interval - output**

4.2.7 Circulation

⇨ Install a circulation pump – If required, a push-button can send the external start signal to the pump:

Con-nector	Pins	Description	Function
304	3	3-pole power supply 230 V_{AC}	**Circulation pump**

Option ⇨ If required, install a return flow temperature sensor on the metal of the circulation return flow:

329	2	2-pole connection sensor PT1000	**Circulation temperature**
320	2	2-pole digital input 24 V_{DC}	**Circulation, push button**

4.2.8 Secondary heating source

Several installation steps are required to activate an additional heating source.

⇨ Install the pump or the valve for the secondary heating source:

Con-nector	Pins	Description	Function
301	3	3-pole supply 230 V_{AC}	**Pump/valve for secondary heating source / For boiler master-and-slave circuit: Fault duration - output**

⇨ Install a request contact if the secondary heating source is an automatic boiler:

311	2	2-pole floating contact, max. 10 A	**Secondary heating source request / For boiler master-and-slave circuit: Peak-load boiler request**

Option Optionally, you can also clip the exhaust gas thermostat to plug #230 ("Extern 1") if the secondary heating source is a manually filled boiler:

230	2	2-pole digital input 24 V_{DC}	**Combustion release** ("External 1") (Is delivered bridged.)

⇨ Install a temperature sensor for the secondary heating source:

342	2	2-pole connection sensor PT1000	**Secondary heating source temperature**

If a manually filled secondary heating source charges the buffer tank, you must always use sensor S5 for the differential charge.

4.2.9 Solar

4.2.9.1 Connection to the heat management module [WMM]

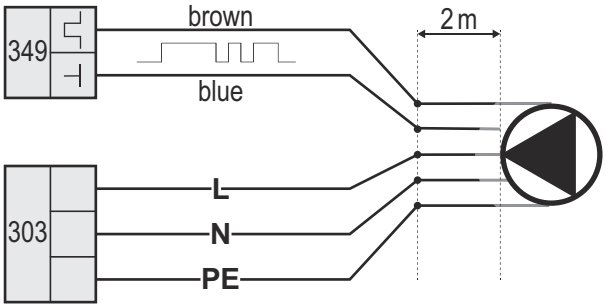
Attention: Solar control is only possible in the version Heat management module [WMM] with 2 heating circuits and the universal Heat management module! The storage tanks must be connected to the same Heat management module as the solar system (exception: buffer 0).

⇨ Install a temperature sensor at the collector.

⇨ The temperature sensor must be installed in the sensor sleeve closest to the collector field forward flow. To ensure optimum contact, the gap between sensor sleeve and sensor element must be filled with a suitable heat-conducting paste. When installing the sensor, only materials that can withstand the respective temperatures (up to 250 °C) must be used (sensor with silicone cable, contact paste, cable, sealing materials, insulation).

Connector	Pins	Description	Function
339	2	2-pin connection sensor PT1000	**Temperature, collector**

⇨ Install the collector pump.



⇨ If using a pump without [PWM] activation, the 349 plug is not connected.

⇨ **Attention:** If using a pump with [i-PWM] activation, the black wire is NOT used and must be insulated.

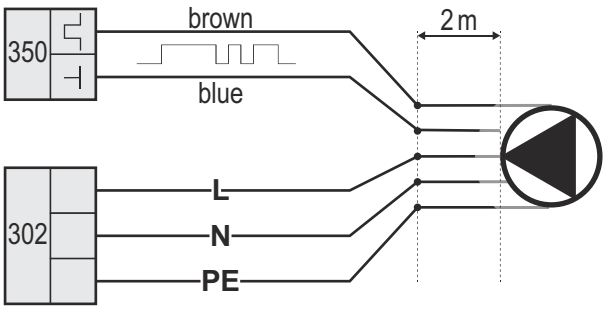
Connector	Pins	Description	Function
303	3	3-pole supply 230 V_{AC}	**Solar pump**
349	2	2-pole connection actuator	**Solar PWM signal pump 1**

Optional

⇨ If required (depending the used solar schematic diagram): Install collector pump 2.
Note: If required, the output can be inverted!

⇨ If using a pump without [PWM] activation, the 350 plug is not connected.

⇨ **Attention:** If using a pump with [i-PWM] activation, the black wire is NOT used and must be insulated.



Con-nector	Pins	Description	Function
302	3	3-pole supply 230 V_{AC}	**Solar pump 2** or **switchover valve**
350	2	2-pole connection actuator	**Solar PWM signal pump 2**

Optional

⇨ If required (depending the used solar schematic diagram): Install the switchover valve (instead of collector pump 2).

Con-nector	Pins	Description	Function
302	3	3-pole supply 230 V_{AC}	**Solar pump 2** or **switchover valve**

Optional

⇨ If required (depending the used solar schematic diagram): Install the solar temperature sensor in the lower area of the DHWC (at the level of the solar register).

⇨ Route the sensor such that you can subsequently change the sensor positions.

⇨ **Note:** Allow for sufficient reserve cable!

Con-nector	Pins	Description	Function
341	2	2-pole connection sensor PT1000	**Temperature DHWC 2 / Only with boiler master-and-slave circuit: Temperature return flow network**

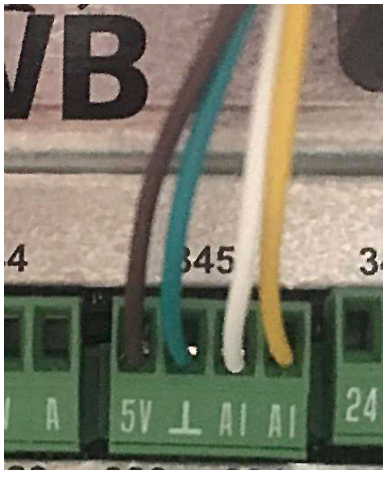
Optional

⇨ If required: Install the Vortex flow sensor in the return flow to count the heat quantity. (Diagram 4 – heat exchanger – in the primary circuit)

⇨ **Attention:** The maximum cable length between flow sensor and Heat management module [WMM] is 3 m!

⇨ **Note:** To avoid damage to the flow sensor due to the high flow rate and air pockets (air bubbles) when flushing the solar system, the Vortex flow sensor should be installed using a bypass line.

⇨ Remove the existing plug at the cable and connect the 4 wires as follows at plug 345 at the WMM Heat management module [WMM]:



Description of individual wires		
5V	brown	supply voltage
⊥	Green	Ground
AI	White	Flow signal
AI	Yellow	Temperature signal

Con-nector	Pins	Description	Function
345	4	4-pole connection	**Solar flow & temperature sensor (vor-tex) for heat quantity measurement**

Optional

⇨ If required: Install the forward flow temperature sensor of the heat quantity meter (close to the inlet to the storage tank to be charged).

⇨ **Note:** Plug 340 can be used either for the forward flow temperature sensor of the external heat exchanger and/or for the forward flow temperature sensor of the heat quantity meter.

Con-nector	Pins	Description	Function
340	2	2-pole connection sensor PT1000	**Temperature forward flow solar**

Optional

⇨ If required, (depending to the used solar schematics diagram) install the forward flow temper-ature sensor of the external heat exchanger close to the inlet to the heat exchanger. (primary)

⇨ **Note:** Plug 340 can be used either for the forward flow temperature sensor of the external heat exchanger and/or for the forward flow temperature sensor of the heat quantity meter.

Con-nector	Pins	Description	Function
340	2	2-pole connection sensor PT1000	**Temperature forward flow solar**

4.3 KWB Comfort 4 electrical connections

Modular

The KWB Comfort 4 control platform is a modularly designed bus system that is used to operate and regulate the KWB biomass heating systems.

The central element is the bus that connects almost all components with each other: The entire communication is processed via this bus, from the exchange of measuring data to the implemen-tation of user entries.

4.3.1 Equipotential bonding

⚠ CAUTION

Differences in voltage can damage the electronics and endanger your safety

➥ The equipotential bonding is important in order to prevent voltage differences between parts of the system.

➲ Connect the system as prescribed by regulations to the equipotential bonding strip via the connected pipe system.

4.3.2 Cabling

A network connects the components of the KWB Comfort 4 control system.

Boiler bus

The boiler bus connects ...

- Boiler power module
- Boiler signal module

House bus

The house bus connects ...

- Heat management module (Option)

Control unit bus

The control unit bus connects the WMM with max. 2 control units:

- Basic control unit
- Exclusive control unit

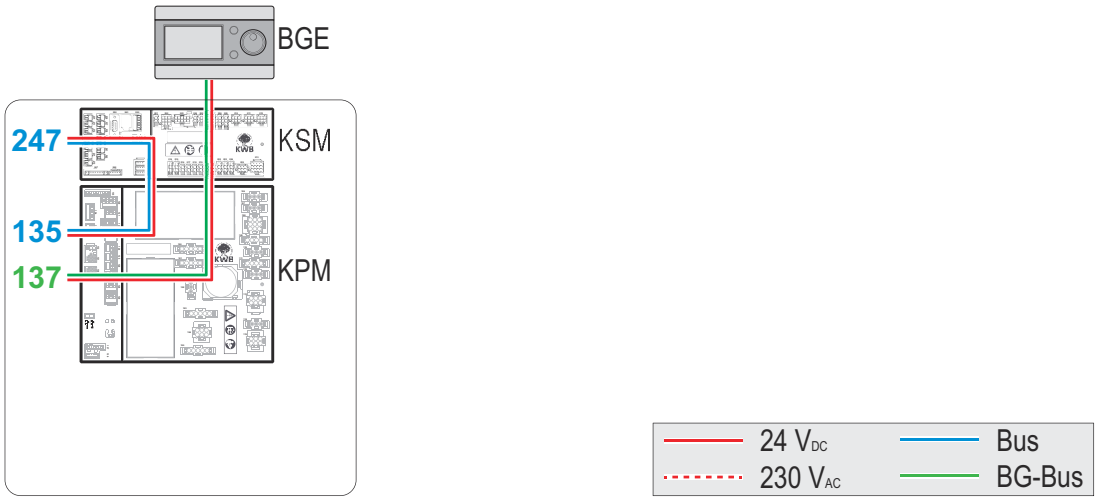
Exception: The control unit at the boiler is connected to the Boiler power module.

4.3.2.1 Network examples

WMM	Heat management module	KSM	Boiler signal module
KPM	Boiler power module	BGB	Basic control unit
BGE	Exclusive control unit	BGBS	Mounting base for Basic control unit
BGES	Mounting base for Exclusive control unit	Bus	Boiler bus and/or house bus
BG bus	Control unit bus		

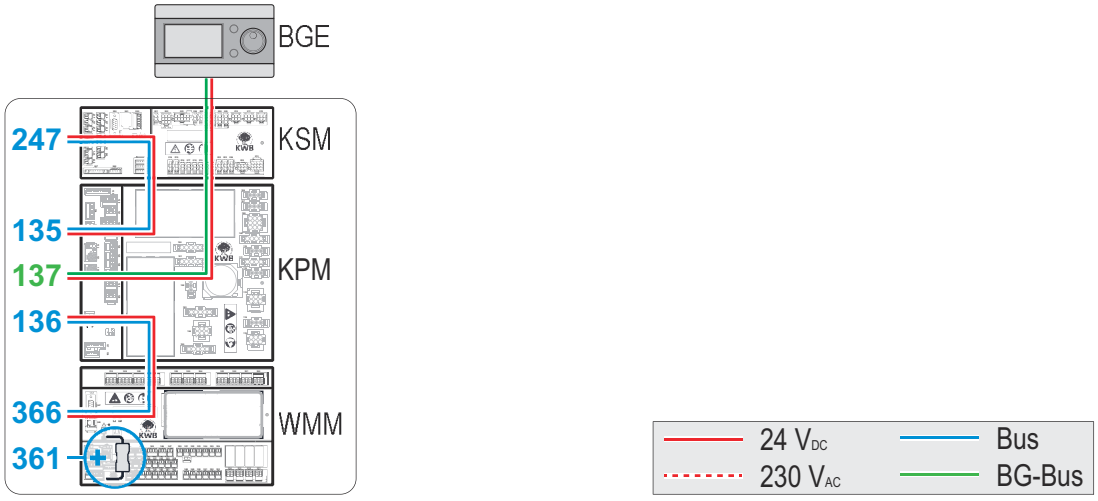
Note: The first operating device (Basic control unit or Exclusive control unit) must always be connected at input 362. The second operating device (is any) at input 363 (see Control unit cabling [▶ 47]).

Simplest network – WITHOUT heat management module

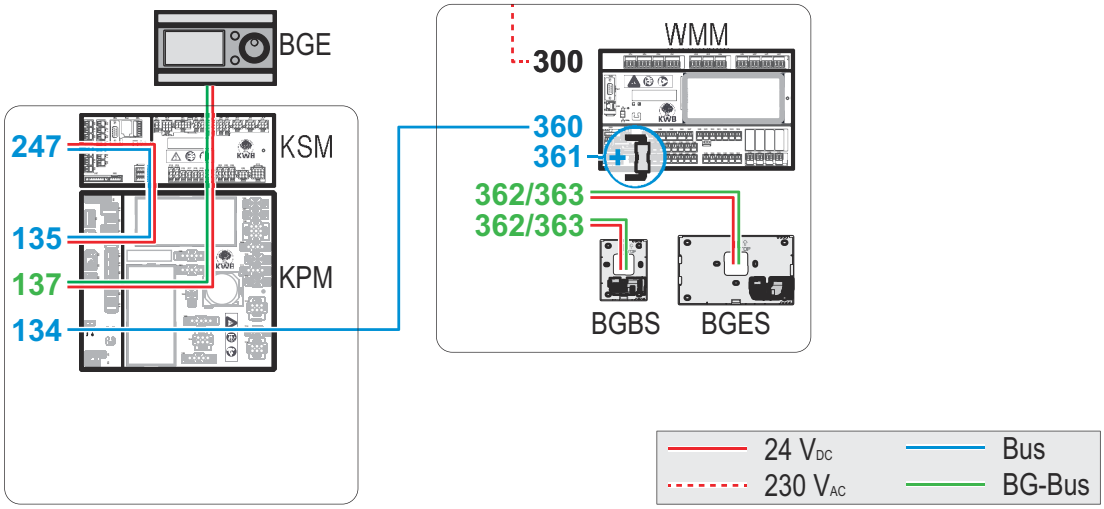


Network with 1x heat management module

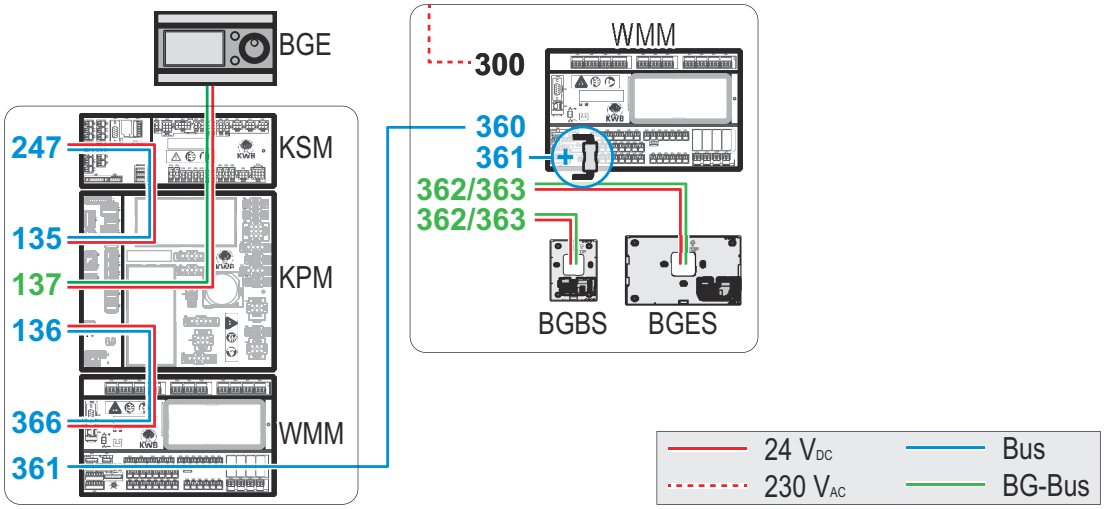
WMM in the boiler



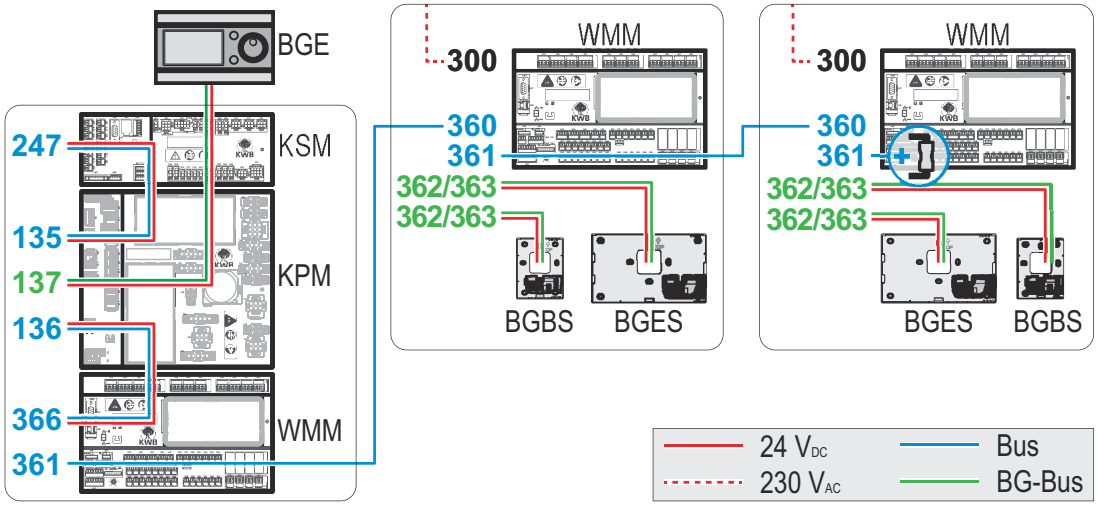
WMM external



Network with 2x heat management modules



Network with 3x heat management modules



Please also see

Control unit cabling [▸ 47]

4.3.2.2 Cable assignment

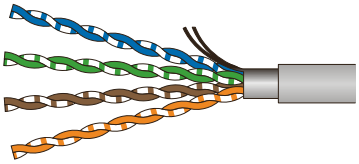
NOTE

The following must be observed with regard to the bus wiring!

- A Cat.5 cable can be used for the bus cabling if the total bus cabling length is less than 100 m.
- If the total length of the bus cabling amounts to more than 100 m, a CAN bus cable must be used. For bus lengths of **more than 100 m**, we recommend using a CAN bus cable of the type "UNITRONIC BUS DN THIN FD P pair number & AWG size: 1x2xAWG24 + 1x2xAWG22" (Art.No.: 2170345).

Cat.5 cable

⇨ Use a Cat.5 cable (twisted & screened/shielded) for the bus cabling.



blue	[CAN Ground]
Blue-white	Return flow *(only for unfavourable cabling)*
Green	Data transfer
Green-white	
brown	24 V_{DC} and GND **for control unit**
Brown-white	
black	Cable screening/shielding
Orange	Return flow *(only for unfavourable cabling)*
Orange-white	

Maximum length

With proper cabling using a Cat5 cable, the house bus will function up to a length of 100 meters.

- In this case, you will also have to count in the **return wires** used!
- The cable lengths to the **control units are NOT** included in the calculation!

CAN bus cable

⇨ Using of a CAN bus cable for the bus cabling.

	Colour	Description	Connection on
1	Blue (CAN high)	Data pair – data transmission	Green
2	White (CAN low)		Green-white
3	Silver	Cable screening/shielding	black

4	Red (not used)	Power pair – 24 V_{DC} and GND **for control unit**	-
5	Black (CAN ground)		blue

Maximum length

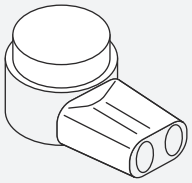
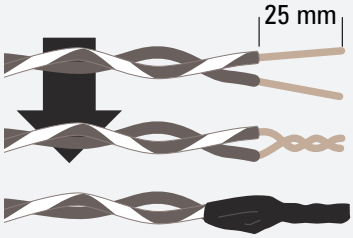
With proper cabling using a CAN bus cable, the house bus will function up to a length of 900 meters.

- In this case, you will also have to count in the **return wires** used!
- The cable lengths to the **control units are NOT** included in the calculation!

4.3.2.3 Connecting the cable

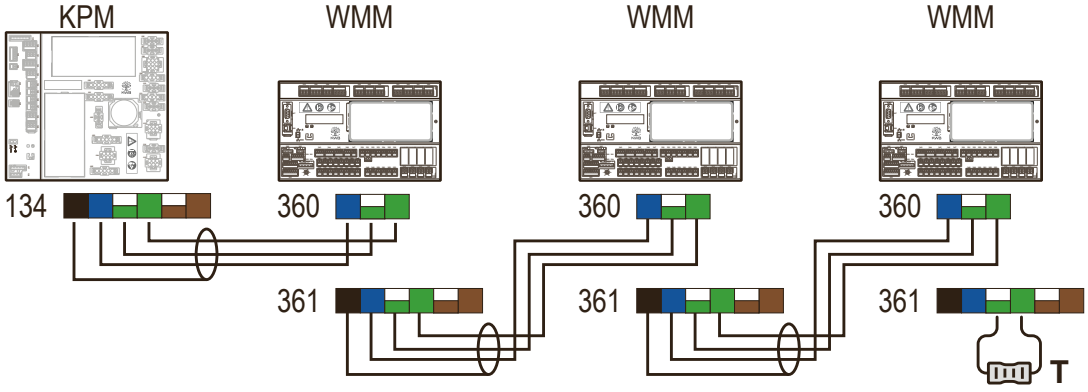
➥ Ensure optimally established contacts at the cable ends: Badly established contacts may result in unforeseen problems!

⇨ Use individual wire connectors or twist the Litz wires individually with one another.

CORRECT: Individual wire connectors	**CORRECT: Twist litz wires**	**INCORRECT: 230 V connection techniques**
		Note that all connection techniques intended for 230 V are NOT allowed. (terminal strips, push terminals, etc.)
(e.g. 3M Scotchlok) Insert Litz wires, crimp - done!	Strip litz wires 25 mm, twist, and insulate with shrink hose	

⇨ **Tip:** Always ensure that the connection has strain relief.

4.3.2.4 House bus cabling



KPM	Boiler power module	T	Terminating resistor
WMM	Heat management module		

Unfavourable cabling

In case of unfavourable cabling, the three unused litz wires of the Cat.5 cable (blue-white, orange-white and orange) can be used as return wires:

Note: This is not possible when using a CAN bus cable!

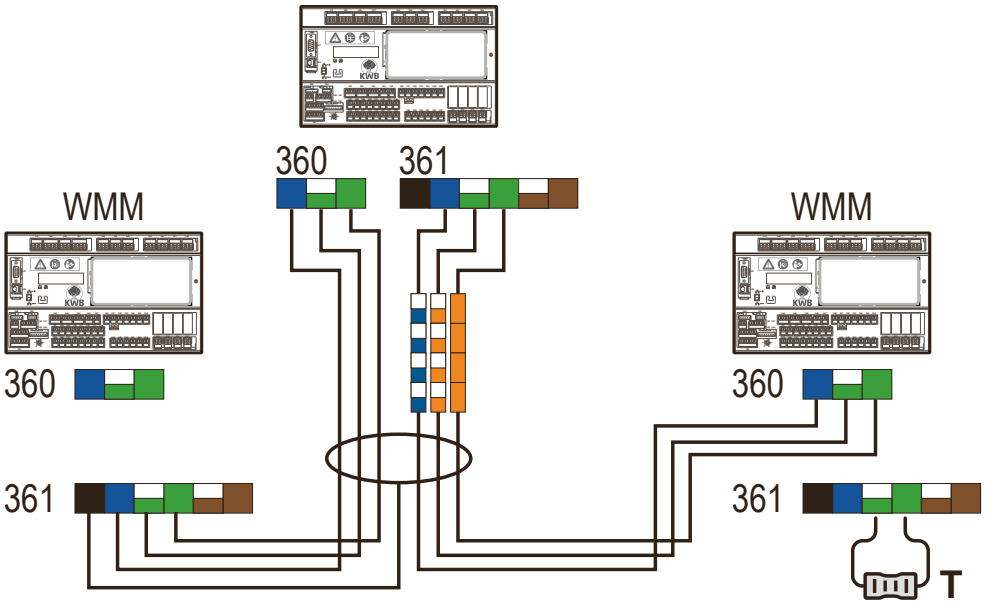


Fig. 1: Bus cabling with return wire (Cat.5 cable – up to a max. of 100 m)

4.3.2.5 Cabling lightning protection module (optional)

Surge voltage protection – lightning protection module (optional)

⇨ The optionally lightning protection module for the bus system is to be connected respectively (Art. No.: 13-2000454 – Instructions for the Lightning Protection Module).

4.3.2.6 Terminating resistor

To ensure that the data bus signals are not reflected at the end of the cabling (and thus disturb the detection of the next signals!), you must check the terminating resistor at the end of the house bus cabling ("terminate")!

➥ The terminating resistor is available on all Heat management module [WMM].

⇨ Remove all terminating resistors between the last Heat management module [WMM] and the Boiler power module [KPM].

⇨ Leave the terminating resistor only at the last Heat management module [WMM].
The terminating resistor connects the contacts green and green-white.

Warning: Do not install a terminating resistor with the control units!

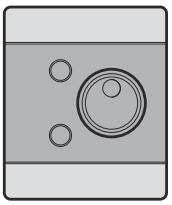
4.3.3 Control units

KWB Comfort 4 offers several options to control your heating system:

- The Basic control unit is a cost-effective, easy to use control frequent performed actions.
- The Exclusive control unit provides extensive control over the heating system.

With a maximum of 14 heating management modules and 2 control units per heating management module, the maximum number is 28 control units per bus. In addition, there are the directly connected BGEs in the Exclusive heat management modules.

4.3.3.1 Basic control unit [BGB]



You can change the settings for a heating circuit via the buttons and the dial.

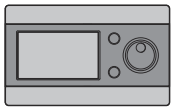
- Size: 103×122 mm
- For installation on the wall, the Basic control unit [BGB] is inserted in the supplied unit base [BGBS]. The room temperature sensor is integrated in the base.
- The LEDs light up green or red.
- The setpoint room temperature can be corrected by ±5°C via the dial.
- Two buttons permit switching between programs and enable theactivation of the DHW quick charge (heating DHW 1x).
- Every Basic control unit [BGB] comes with two designer covers in white and black; these can be installed without tools to replace the silver standard designer cover.

Bus — The module is connected to the WMM via the control unit bus.

Voltage — The power supply comes from the Heat management module via the Cat.5 cable (up to max. 100 m total length).

- One Basic control unit [BGB] is possible per heating circuit.

4.3.3.2 Exclusive control unit [BGE]



You can change the settings for boilers, heating circuits, buffer storage tanks and DHWC via the buttons and the dial or the 4.3" touch screen ("touch screen") ...

- Size: 200×122 mm
- A Exclusive control unit [BGE] must be available at the boiler or at the Heat management module Exclusive [WMM].
- To mount the Exclusive control unit [BGE] on a wall, it is inserted into a separately supplied control unit base [BGES]. The room temperature sensor is integrated in the base.
- The number of Exclusive control unit [BGE]s in the network is limited to 30.
- Every Exclusive control unit [BGE] has an SD card slot for software updates at the lower edge.
- Every external Exclusive control unit [BGE] comes with two designer covers in white and black; these can be installed without tools to replace the silver standard designer cover.

Bus — The module is connected to the WMM via the control unit bus.

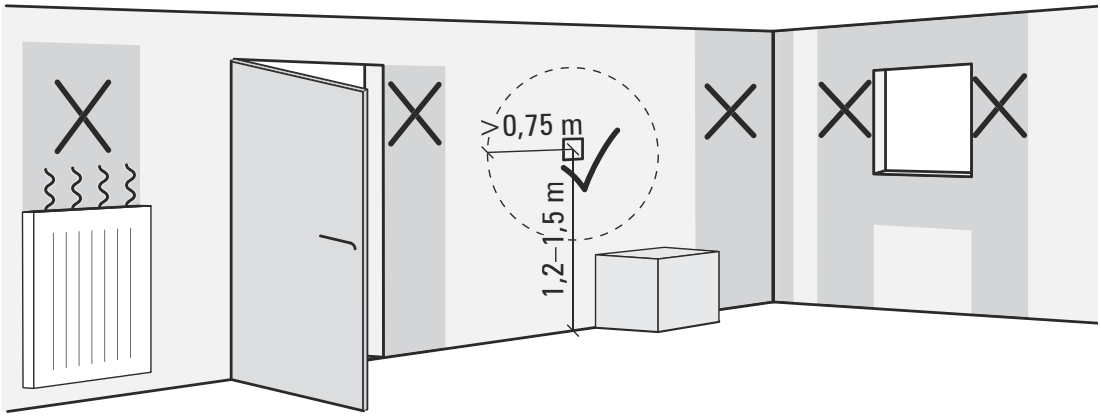
Voltage — The power supply comes from the Heat management module via the Cat.5 cable (up to max. 100 m total length).

In the room — The majority of the parameters are accessible, even if the Exclusive control unit [BGE] is used externally (e.g. in the living room) – Only the actuators cannot be controlled manually!

4.3.3.3 Correct positioning

The correct positioning of the control units is important if the temperature probes integrated in the control units are used for heating regulation.

If you use control units without temperature measuring, you can position the control units at any desired place in the living quarters.



Using control units with room temperature measuring

- ⇨ Use the coolest room that you spend time in during the day.
- ⇨ Install the control units at a height of 120–150 cm.
- ⇨ Make sure to leave a distance of 100 cm between the control units and doors and windows.
- ⇨ Avoid heating sources (heating units, chimneys, heating pipes in the wall, but also electronic devices such as TVs!) and direct sunlight (keep the position of the sun in winter in mind!).
- ⇨ Avoid positioning the unit in room corners, niches or shelves: There is not enough air circulation available!
- ⇨ Avoid uninsulated outer walls.
- ⇨ The control units must not be covered (e.g. by curtains).

Warning: No other sensor must be active in this room that might be able to influence the control: If the radiators contain thermostatic valves, they should always be fully open!

Optimum position

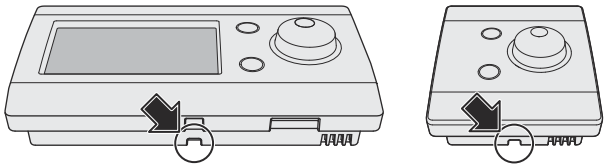
- ⇨ Install the control units at a free and unobstructed internal wall with 75 cm free space on each side to ensure that the integrated room temperature sensor is able to function properly!

On the wall

The unit base for the control unit must always mounted **on** the wall: An installation under the plaster would obstruct the function of the temperature sensor!

4.3.3.4 Open the control unit

Control units are clamped onto the mounting base without screws.

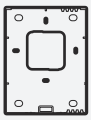
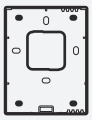
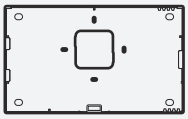
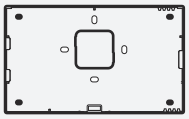


- ⇨ Use a pen to push into the recess on the lower side of the control unit to release the lock as illustrated in the picture.
- ⇨ NOTE! Please note when using the control unit that a short cable links the control unit to the mounting base!

4.3.3.5 Mount and connect

Base

- ⇨ Secure the mounting base with the 4 supplied screws.

On a socket installed under the plaster	With wall anchors
	
	
⇨ Secure the mounting base exactly aligned with the socket under the plaster.	⇨ Insert the wall anchors at the desired position of the control unit. ⇨ Screw the mounting base to the wall anchors.

Cable

⇨ Pull the Cat.5 cable (up to a max. length of 100 m) from the rear through the large opening in the mounting base.

⇨ Ensure that you have enough reserve cable before you fasten the Cat.5 cable with a cable binder at the mounting base.

⇨ Always seal the cable duct against draughts!
Only then you can be sure that the measured temperature will be accurate!

Control unit

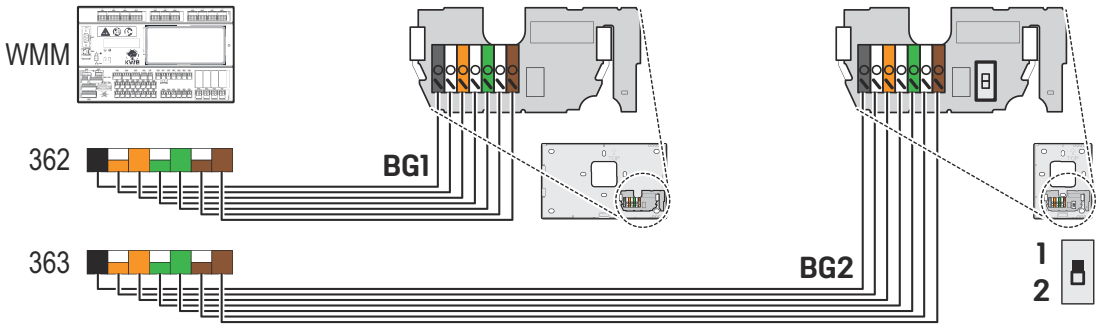
⇨ Connect the control unit with the mounting base.

⇨ Place the control unit – true to side – inclined from below at the two upper corners of the mounting base. Then, push the control unit's lower edge onto the mounting base: The control unit will make an audible noise when it snaps into place!

⇨ The control unit packaging contains the upper and lower lids in 2 additional covers. Insert the lids in the desired colours.

⇨ Only for Basic control unit:
In the control unit packaging you will find a removable card containing an explanation of symbols in several languages. Remove your desired language and place the strip in the lower lid.

4.3.3.6 Control unit cabling



WMM	Heat management module		
BG1	1. Control unit, e.g one Exclusive control unit	BG2	2. Control unit, e.g one Basic control unit

Terminating resistor

When cabling the control units, NO termination is required!

⇨ Use plug 362 for the first control unit that you connect to the Heat management module [WMM]!

⇨ If you use plug 363 for an additional control unit, you will first have to remove the existing bridges!

Only for Basic control unit [BGB]:

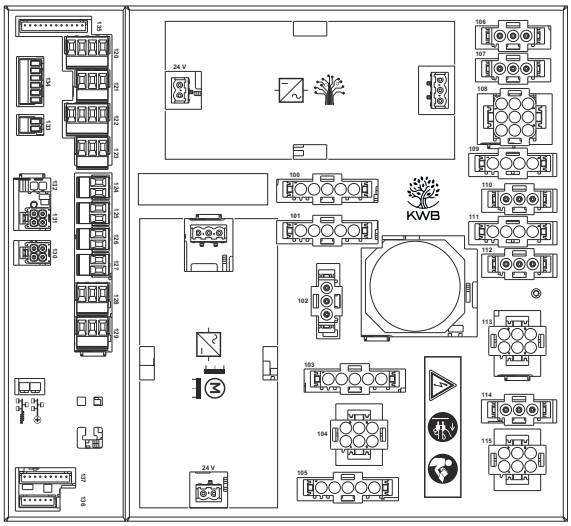
1
2

➥ The base for the Basic control unit [BGBS] contains a DIP switch which specifies the address for the Basic control unit [BGB].

⇨ When you connect two BGBs with a Heat management module [WMM], you must specify a unique address for every BGB (control unit Basic).

4.3.4 Boiler power module [KPM]

The boiler-dependent Boiler power module contains all required power connections for motors and actuators that use mains voltage (230/400 V_{AC}) as well as the safety switches.



The illustration shows a fully equipped circuit board. Individual connections might be missing depending on the usage. As a replacement part, the circuit board always comes fully equipped and the software detects the specific use and releases the required parts/interfaces.

Bus

The module is connected to other bus devices via the control unit bus.

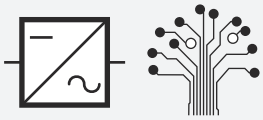
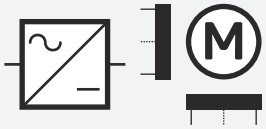
LED displays

The circuit board contains 2 LEDs that show the house bus status.

LED behaviour		
Flashing red	Adjusting the data rate	–
Flashes red 1x	CAN error	–
Red light (not flashing)	No bus, bus reset	CAN error
Flashing green	Waiting for the BGE connection	**OK** (CAN activity)
Green light	**OK**	No activity

Power supply units

The Boiler power module contains slots for two pluggable power supply units.

1. Power supply unit	2. Power supply unit
	
Always required.	Only required for the power supply of the KWB Multifire and KWB Pelletfire Plus multi-phase motors.

For an output voltage of 24 V_{DC}, the input voltage must be between 161 V_{AC} and 264 V_{AC} and the frequency between 45—63 Hz.

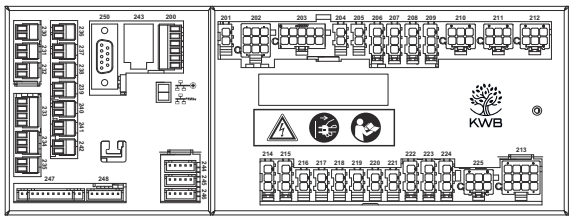
4.3.4.1 Plug at the KPM

Con-nector	Pins	Description	Function
100	5	3-pole power supply 230 V_{AC}	Boiler power supply (L1 to L3 bridged)
101	5	5-pin power supply 230 V_{AC}	Outgoing power supply for supplementary circuit board
106	3	1-pole (L) supply 230 V_{AC}	Ignition rod fan for log wood
107	3	2-pin (L+N) supply 230 V_{AC}	Ignition rod heating system
111	2	2-pin digital input 230 V_{DC}	Safety temperature limiter (STL)
113	6	6-pole supply 230 V_{AC}	Heat exchanger cleaning (1-2-3) and induced draught (4-5-6)
120	4	4-pole power supply 230 V_{AC}	**Mixer for return flow boost**
121	3	3-pole supply 230 V_{AC}, max. 200 W	**Boiler circuit pump or buffer charging pump**
122	4	4-pin power supply 230 V_{AC}	**Quick charging valve**
123	3	3-pole supply 230 V_{AC}	**Feeder pump/valve or buffer charging pump 0**
124	2	2-pole floating contact, max. 10 A	**Multi-function output 3**
125	2	2-pole floating contact, max. 10 A	**Multi-function output 1**
128	3	3-pole digital input 230 V_{DC} Is delivered bridged.	**Reserve safety input, e.g. for the low water pressure switch**
129	3	3-pole digital input 230 V_{DC}	**Emergency stop** ("emergency escape switch") (Must remain bridged for pure log wood operation!)
130	4	4-pin digital input 24 V_{DC}	Ash container switch removed (1-3) (bridged in the KWB Classicfire / KWB Classicfire type CF1)

131	4	4-pin digital input 24 V_{DC}	Sensor for overfill protection cover at the conveyor channel (must remain bridged in Easyfire, Combifire and Classicfire!)
132	2	2-pin digital input 24 V_{DC}	Temperature monitor fuel storage (TMFS) (must either remain bridged or must be used!)
133	2	2-pin digital input 24 V_{DC}	Reserve safety input
134	6	6-pole bus clamp	House bus [OUT]
135	12	12-pole bus flat connector	Boiler bus [OUT]
136	6	6-pole bus flat connector	Outgoing bus connection for supplementary circuit board
137	9	Bus flat connector (3 + 4 = unused. 9 = screen/shield.)	House bus [IN] + 24 V_{DC} control unit and boiler bus [IN] + 24 V_{DC} control unit Only to be used for the boiler control unit!

4.3.5 Boiler signal module [KSM]

The boiler-dependent Boiler signal module [KSM] contains the connections for all sensors (boiler, outside temperature, buffer storage tank, external) and offers a serial interface.



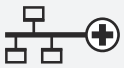
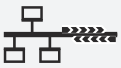
The illustration shows a fully equipped circuit board. Individual connections might be missing depending on the usage. As a replacement part, the circuit board always comes fully equipped and the software detects the specific use and releases the required parts/interfaces.

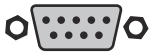
Voltage — The module receives its voltage (24 V_{DC}) from the Boiler power module [KPM].

Bus — The module is connected to the Boiler power module [KPM] via the boiler bus.

LED displays

The circuit board contains 2 LEDs that show the house bus status.

LED behaviour		
Flashing red	Adjusting the data rate	–
Flashes red 1x	CAN error	–
Red light (not flashing)	No bus, bus reset	CAN error
Flashing green	Waiting for the BGE connection	**OK** (CAN activity)
Green light	**OK**	No activity



Serial interface

The serial interface (RS232) is the basis for future expansions and various connections (e.g. GSM module). NO power supply has been integrated for connected components!

RJ12 socket

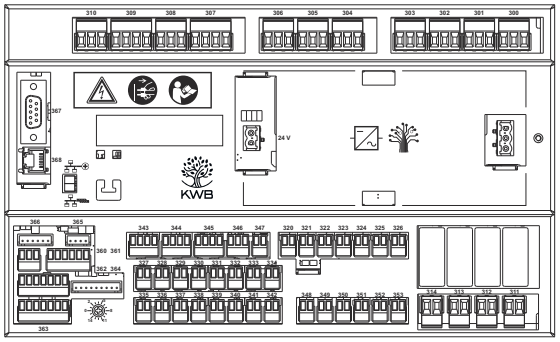
The 6-pole RJ12 sockets integrates an GSM module and supplies it with power.

4.3.5.1 Plug at the KSM

Con-nector	Pins	Description	Function
200	6	6-pole connection sensor	Lambda probe
205	2	2-pin connection sensor	Door contact
211	6	6-pin connection sensor	Induced draught, fan speed (4-5-6)
213	12	10-pole connection sensor & actuator	Primary air, air shutter: OPEN/CLOSED (1-5-9) and position (3-7-11). Secondary air, air shutter: OPEN/CLOSED (2-6-10) and position (4-8-12).
217	2	2-pole connection sensor PT1000	Return flow temperature
218	2	2-pole connection sensor PT1000	Boiler forward flow temperature
220	2	2-pole connection sensor type K	Flame temperature
230	2	2-pole digital input 24 V_{DC}	**Combustion release** ("External 1") (Is delivered bridged.)
235	2	2-pin connection, actuator	**Boiler circuit pump PWM1**
237	2	2-pole connection sensor PT1000	**Outside temperature**
238	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 1**
239	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 2**
240	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 3**
241	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 4**
242	2	2-pole connection sensor PT1000	**Buffer storage tank temperature 5**
243	6	RJ12 plug	Power supply 24 V_{DC} for GSM module
247	12	12-pole bus flat connector	Boiler bus [IN] from KPM (#135)
248	6	6-pole bus flat connector	Boiler bus [OUT]
250	9	D-SUB 9M plug	RS232 interface, e.g. for GSM module

4.3.6 Heat management module [WMM]

Comprises all heat management connections.



The illustration shows a fully equipped circuit board. Individual connections might be missing depending on the usage. As a replacement part, the circuit board always comes fully equipped and the software detects the specific use and releases the required parts/interfaces.

Voltage

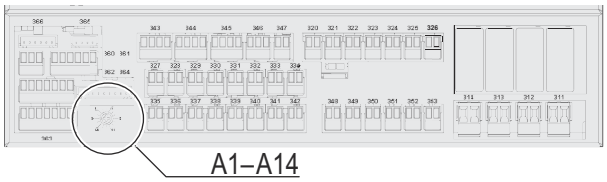
Board in the control box	Board in the multi-function enclosure
24 V_{DC} power supply by the Boiler power module:	Voltage supply 230 V_{AC} In this case, a power supply is required at the Heat management module

Bus

The module is connected to other bus devices via the control unit bus.

Board in the control box	Board in the multi-function enclosure
Bus connection through ribbon cable	Bus connection with Cat.5 cable (up to max. 100 m total length) or CAN bus cable (up to max. 900 m total length)

Node number



⇨ Use a unique node number for every module: Use a small screw driver to set the selector switch to a free node number.

- The number range for the Heat management module is A1 to A14.
- Maximally 14 heat management modules [WMM] maybe addressed per bus.

Versions

- Version with 1 heating circuit
  Enables control of 1 heating circuit with mixer control and pump activation, 1 buffer storage tank incl. activation of 1 buffer charging pump or activation of 1 supply pump (network pump), 1 DHWC, 1 circulation pump.
- Version with 2 heating circuits
  As described above, but for 2 heating circuits and the option to activate a second boiler and a solar system.

Scope of delivery

- 1 sensor for forward flow temperature
- 1 sensor for DHWC temperature
- 1 sensor for temperature in the circulation line
- 3 sensors for temperature in the buffer storage tank (4th and 5th sensor optionally possible)

The version with 2 heating circuits also contains ...

- 1 sensor for forward flow temperature
- 1 sensor for temperature in the second boiler

LED displays

The circuit board contains 2 LEDs that show the house bus status.

LED behaviour		
Flashing red	Adjusting the data rate	–
Flashes red 1x	CAN error	–
Red light (not flashing)	No bus, bus reset	CAN error
Flashing green	Waiting for the BGE connection	**OK** (CAN activity)
Green light	**OK**	No activity

Serial interface

The serial interface (RS232) is the basis for future expansions and various connections (e.g. GSM module). NO power supply has been integrated for connected components!

RJ12 socket

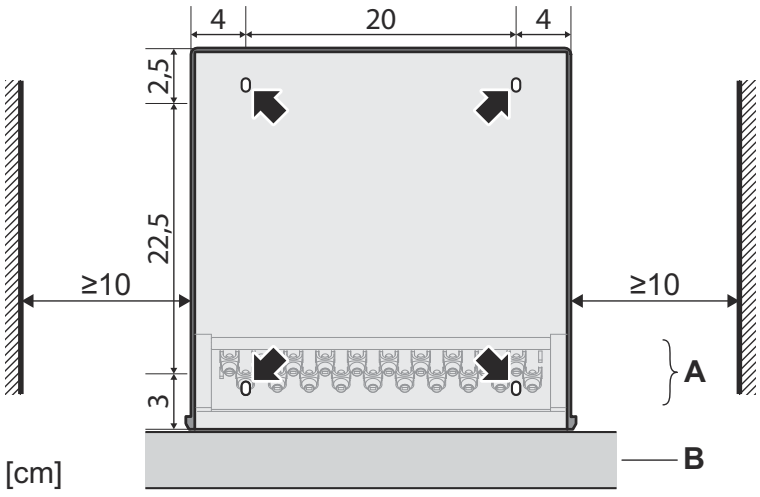
The 6-pole RJ12 sockets integrates an GSM module and supplies it with power.

4.3.6.1 Wall installation

Positioning the multi-function enclosure

Position the multi-function enclosure at a location where the connected sensors and actuators (pumps, mixers ...) will also be close by, e.g. at the heat distributor station of the respective building.

Mounting on the wall



A	Cable clamps	B	Cable duct (max. 40 mm deep)

➥ Leave a clearance of approximately 10 cm on both sides so that you can later loosen the side fastening of the cover with an appropriately short tool.

➥ Ideally, you should run the cables in the cable duct (e.g. 60x40 mm). Up to a depth of 40 mm, the cable duct can be installed directly at the multi-function enclosure without obstructing its operation.

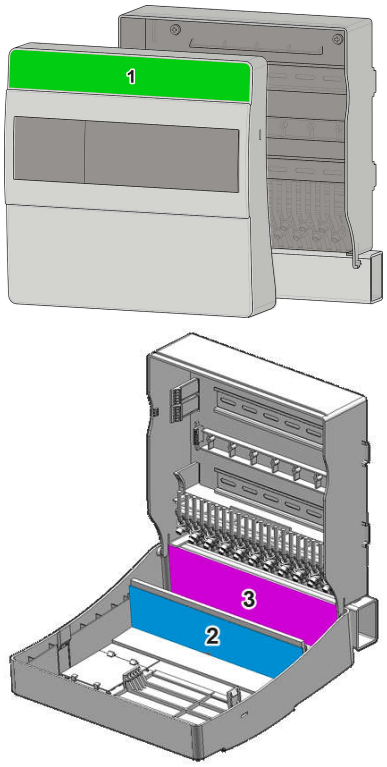
➥ The lower cup has 4 slotted holes.

⇨ Open the enclosure and remove the cover.

⇨ Position the lower tray at the intended wall position and mark the hole positions (see arrows in the illustration) with a pencil on the wall.

⇨ Fasten the lower tray in the desired position with the 4 included screws.

⇨ Attach three labels (stickers) to the Heat management module [WMM] as follows:



1	Cover, outer side – front top	Sticker with symbols
2	Cover, inside – in the middle	Sticker "Outputs 230 V_{AC} ≤ 200 W"
3	Cover inside – bottom	Sticker "Inputs PT1000 temperature sensors"

Note: Replace the cover of the Heat management module only during installation & commissioning (see section).

4.3.6.2 Connecting dimensions

Switching voltage	≤440 V_{AC} or 125 V_{DC}
Switching current	≤10 A
Switching power	≤2500 VA
Pumps	≤200 W (Category A)

Table 4: Max. permitted values: Total loads for all connections

4.3.6.3 Pulling in the cable

The multi-function enclosure offers 20 cable feedthroughs at its underside.

⇨ Thread the cables into the enclosure from below and fasten each cable at one cable clamp (1), respectively.

⇨ Ensure short cable paths, so select the cable feedthrough closest to the connector.

⇨ Keep the terminal compartment clear and avoid crossing wires and cables.

⇨ Always route signal and power supply cables separately!

⇨ Use the power cable in accordance with DIN VDE 0281-5 or local regulations.

⇨ Check the polarity of the connections.

Sensors

⇨ When connecting the sensors, there is no specified polarity; you only need to observe the correct connection in pairs.

Strain relief

⇨ To relieve the strain use a cable clamp for every cable.

4.3.6.4 Plug at the WMM

Connector	Pins	Description	Function
300	3	3-pole supply 230 V_{AC} (fuse rating 13A type B)	**supply voltage**
301	3	3-pole supply 230 V_{AC}	**Pump/valve for secondary heating source / For boiler master-and-slave circuit: Fault duration - output**
302	3	3-pole supply 230 V_{AC}	**Solar pump 2** or **switchover valve**
303	3	3-pole supply 230 V_{AC}	**Solar pump**
304	3	3-pole power supply 230 V_{AC}	**Circulation pump**
305	3	3-pole supply 230 V_{AC}	**DHW pump / For boiler master-and-slave circuit: Fault interval - output**
306	3	3-pole power supply 230 V_{AC}	**Feeder pump/valve or buffer charging pump**
307	4	4-pole power supply 230 V_{AC}	**Heating circuit 2 mixer**
308	3	3-pole power supply 230 V_{AC}	**Heating circuit 2 pump**
309	4	4-pole power supply 230 V_{AC}	**Heating circuit 1 mixer**
310	3	3-pole power supply 230 V_{AC}	**Heating circuit 1 pump**
311	2	2-pole floating contact, max. 10 A	**Secondary heating source request / For boiler master-and-slave circuit: Peak-load boiler request**
320	2	2-pole digital input 24 V_{DC}	**Circulation, push button**
322	2	2-pole digital input 24 V_{DC} Is delivered bridged.	**Release heating circuit 1**
323	2	2-pole digital input 24 V_{DC} Is delivered bridged.	**Release heating circuit 2**
327	2	2-pole connection sensor PT1000	**Outside temperature**
328	2	2-pole connection sensor PT1000	**Temperature DHWC 1 / Only with boiler master-and-slave circuit: Temperature forward flow network**
329	2	2-pole connection sensor PT1000	**Circulation temperature**

330	2	2-pole connection sensor PT1000	**Buffer storage tank 1 temperature**
331	2	2-pole connection sensor PT1000	**Buffer storage tank 2 temperature**
332	2	2-pole connection sensor PT1000	**Buffer storage tank 3 temperature**
333	2	2-pin connection sensor PT1000	**Buffer storage tank 4 temperature**
334	2	2-pole connection sensor PT1000	**Buffer storage tank 5 temperature**
335	2	2-pole connection sensor PT1000	**Room temperature heating circuit 1 analog**
336	2	2-pole connection sensor PT1000	**Room temperature heating circuit 2 analog**
337	2	2-pole connection sensor PT1000	**Forward flow temperature heating circuit 1**
338	2	2-pole connection sensor PT1000	**Forward flow temperature heating circuit 2**
339	2	2-pin connection sensor PT1000	**Temperature, collector**
340	2	2-pole connection sensor PT1000	**Temperature forward flow solar**
341	2	2-pole connection sensor PT1000	**Temperature DHWC 2 / Only with boiler master-and-slave circuit: Temperature return flow network**
342	2	2-pole connection sensor PT1000	**Secondary heating source temperature**
345	4	4-pole connection	**Solar flow & temperature sensor (vortex) for heat quantity measurement**
349	2	2-pole connection actuator	**Solar PWM signal pump 1**
350	2	2-pole connection actuator	**Solar PWM signal pump 2**
360	3	3-pole bus connection	**House bus [IN] (remains open if installed in the boiler)**
361	6	6-pole bus connection	**House bus [OUT]** Delivered terminated (120 Ω). Must be removed in case of bus extensions!
362	7	7-pole bus connection	**Control unit 1**
363	7	7-pole bus connection	**Control unit 2** (is delivered bridged)
364	9	9-pole flat connector	**Control unit 3** – Only for the control unit directly in the multi-function enclosure!
365	4	4-pole flat connector	**Connection to the LED row**
366	6	6-pole flat connector	**Input bus connection from the** Boiler power module **(#136)**
367	9	D-SUB 9M plug	**RS232 interface, e.g. for GSM module**
368	6	RJ12 plug	**Power supply 24 V_{DC} for GSM module**

4.3.6.5 Heat quantity meter KWB C4 M-bus module

The M-bus interface permits reading heat quantity meters via a C4 M-bus module into the KWB Comfort 4 control. The following types of heat quantity meters have been tested and approved by KWB:

- ⇨ AMess model S3
- ⇨ Kamstrup model 403W702AB
- ⇨ Sharky models 774 & 775
- ⇨ Siemens
  - ⇨ WS.5..
  - ⇨ WS.6..
  - ⇨ UH50..
  - ⇨ UH30..
  - ⇨ WS.8..
- ⇨ Danfoss SonoSafe 10

Cabling

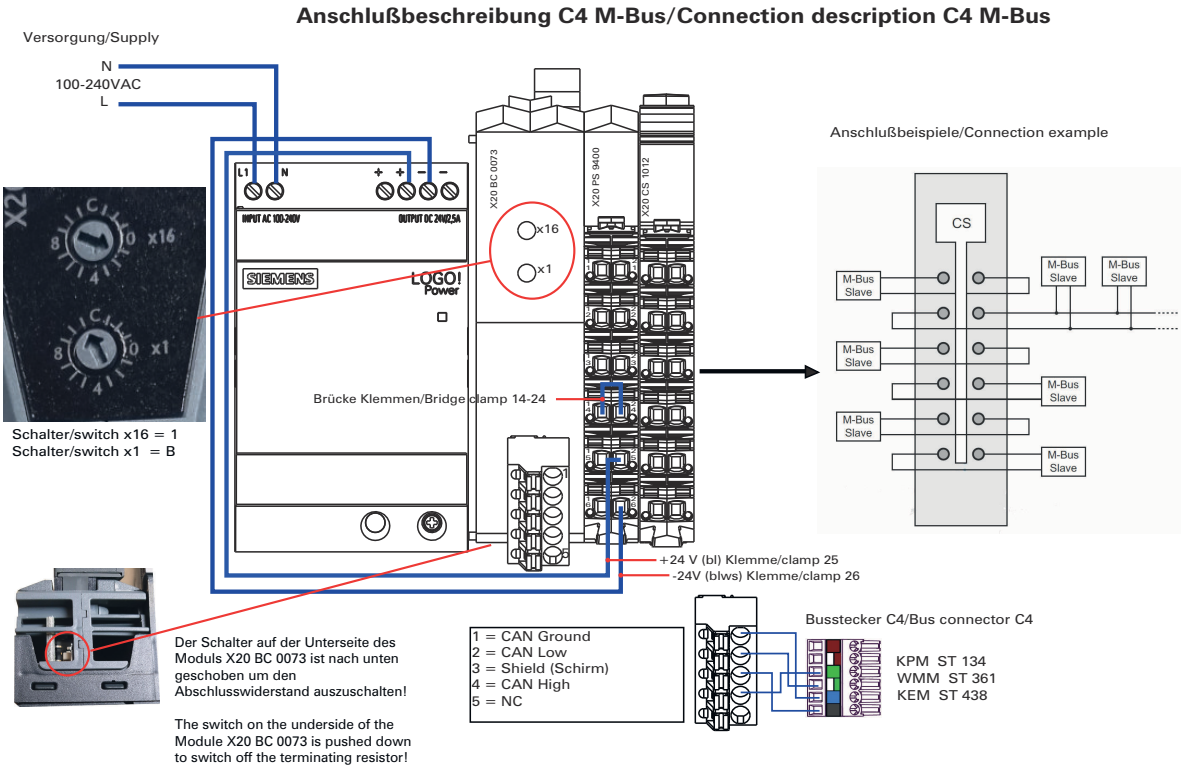
The KWB Comfort 4 M-Bus module (art. no.: 13-2000549) can be installed anywhere you prefer. It requires the following connections:

- Mains connection (230 V AC | 6A)
- Bus cabling to the Comfort 4 network (Cat 5e, as of 100 m CAN bus cable)

For this, see also sections Cable assignment and Terminating resistor.

M-bus cabling

- Cable type: J-Y(ST)Y (LG indoor cable)
- Maximum cable length: 850 m
- Laying type: linear



Please also see

- Cable assignment [▸ 42]
- Terminating resistor [▸ 44]

5 Chimney

5.1 Chimney requirements

Moisture-resistant according to DIN 18160

Due to the high boiler efficiency, the chimney design should be resistant to moisture. According to DIN 18160, these are chimney designs which prevent moisture penetration or damage to the brickwork, even though the temperature level in the exhaust path remains permanently below the exhaust gas dewpoint! Exceptions are only possible if the exhaust gas temperature is increased due to interventions in the device. However, boiler efficiency will be reduced by such a measure.

Chimney diameter

The approximate values for the chimney diameter are specified in the technical data table. They are valid for the applicable system size, given average constructional conditions. This means: Effective chimney height 8–10 m, 1.5 m exhaust pipe length, maximum 2 segment bends at 90° each, 1 contraction, 1 T-connection at 90°.

The cross-section diagrams provided by the chimney manufacturer can serve as a quick reference aid, if the site conditions are not less favourable than the conditions specified in the cross-section diagrams. If conditions differ or are less favourable, it is necessary to carry out a chimney calculation according to EN 13384-1. The boiler parameters required for the calculation are specified in the technical data table.

KWB provides an electronic data entry sheet for this purpose. Upon request, KWB will provide the chimney calculation based on the information provided on the form. This is a chargeable service.

The local expert for these issues is your responsible chimney sweep. It is advisable to involve the chimney sweep during the planning phase as he is the one who will have to issue the acceptance certificate for the exhaust gas system.

NOTE

Approval required!

The chimney must be approved by the chimney sweep!

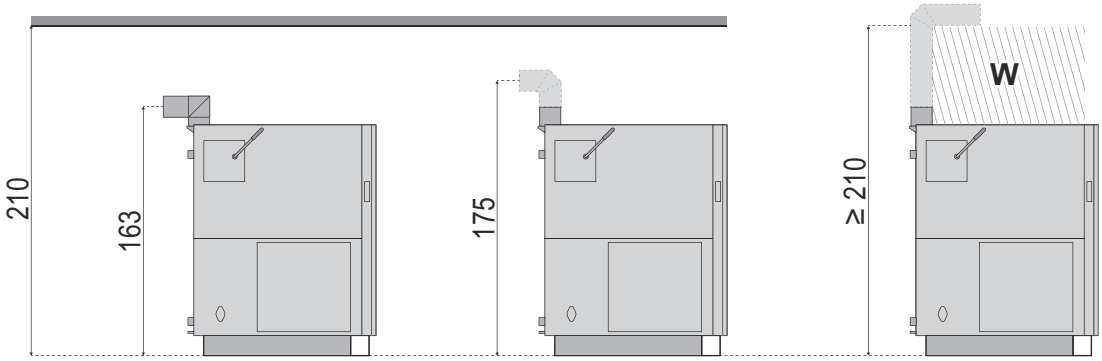
5.2 Connecting the exhaust pipe

The KWB system comes standard with an induced draught fan.

NOTE

Keep the maintenance area free!

- ➲ The distance from the upper edge of the boiler to the exhaust pipe depends on whether the exhaust pipe is installed above the heat exchanger or not.
- ➲ If the exhaust pipe to the chimney is installed above the heat exchanger, it is essential that you adhere to the specified clearance!
- ↳ Only if this is the case, the cleaning springs can be dismantled during maintenance, if required.



W	Keep the maintenance area free!

Chimney connection

The diameter of the chimney connection should be 20 mm larger than the exhaust gas pipe diameter at the boiler. This way, it is possible to integrate an acoustic transmission decoupler between the exhaust gas pipe and the chimney.

The exhaust gas pipe connection between boiler and chimney should be identical to the connection at the boiler.

- ⇨ Install a **draught limiter** and an **explosion damper** at the exhaust pipe or the chimney side wall.
  - ⇨ We recommend installing a draught limiter in the chimney under the exhaust pipe inlet as constant negative pressure is ensured at this spot.
- ⇨ Position both safety elements so that there is no chance of a risk to persons!

Exhaust pipe requirements:

- Pipe length as short as possible
- With a slight upward slope to the chimney connection (≥3°, ideal: 30-45°, max. 45°)
- Sealed and thermally insulated
- Equipped with easily accessible openings for cleaning

5.3 Multiple-use chimney

6 Appendix

Related documents

- Technical data sheet CF2 log wood (Resources/pdf/404010507.pdf)
- Declaration of conformity CF2 (Resources/pdf/9007199658757643.pdf)

Keyword index

T

U

V

W

KWB - Kraft und Wärme aus Biomasse GmbH
Industriestraße 235
8321 St. Margarethen an der Raab
+43 3115 6116-0
office@kwb.at | www.kwb.net

Original manual • Intex 4 • 2021-08 • EN

21-2001304