

Technology and planning

KWB PELLETFIRE PLUS

Pellet heating system

*We provide
energy
for life!*



valid as of March 2015

KWB PELLETFIRE PLUS

Pellet heating system 45–135 kW

The robust pellet heating system for economical heating

www.kwb.net

clean **EFFICIENCY**
Combustion technology

Valuable Partnership



More than 2,000 installers and more than 60,000 customers put their trust in us by deciding in favour of a KWB partnership. This "valuable asset" is also an integral component of our company philosophy and the basis of our business relationships. In addition, KWB focuses on appreciation, reliability and a large amount of responsibility vis-à-vis our environment and future generations. This I guarantee personally and this is also symbolised by KWB's trademark: the tree of life.

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KWB stands for power and heat from biomass and is **synonymous** with innovative biomass heating systems. It developed, for example, the first wood chip heating system with a fully automatically cleaning heat exchanger. In 2006, the largest private research and development centre for biomass in Europe was established at the company's main location in Austria. What else speaks for a partnership?

97% of our customers recommend KWB to others

According to recent customer surveys, 97 % of all KWB customers recommend the company KWB and its products to others. Satisfied customers are the highest praise for a company – a priceless token of trust!

Safety because of our award-winning service

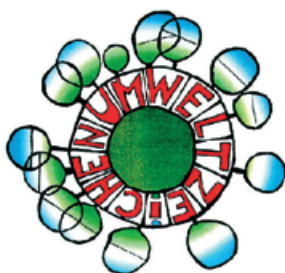
Availability, flexibility and proximity to our customers are customer service requirements that must be met. KWB's own factory customer service exceeds these expectations and has received several related awards.

Noticeable benefits through product development

When working on the further development of the KWB product line, our main focus is on the tangible and noticeable benefits for the partner and end customer with a high functional safety, whilst giving a high-quality, robust high-tech product.

Time savings through effortless comfort

Thanks to our close partnership with installers and design companies, a large amount of valuable experience contributes to the product development and guarantees the highest possible installation and operating comfort, which helps save what is most valuable to us: time.



ROBUST ALL-ROUNDER

The large power range of 45 to 135 kW combined with fuel flexibility makes it possible to deploy the new KWB Pelletfire Plus pellet heating system in larger single family homes, commercial facilities including smaller district heating networks.

CFD-optimised silicon carbide combustion chamber

Low emissions thanks to optimised exhaust gas routing and high combustion temperatures.

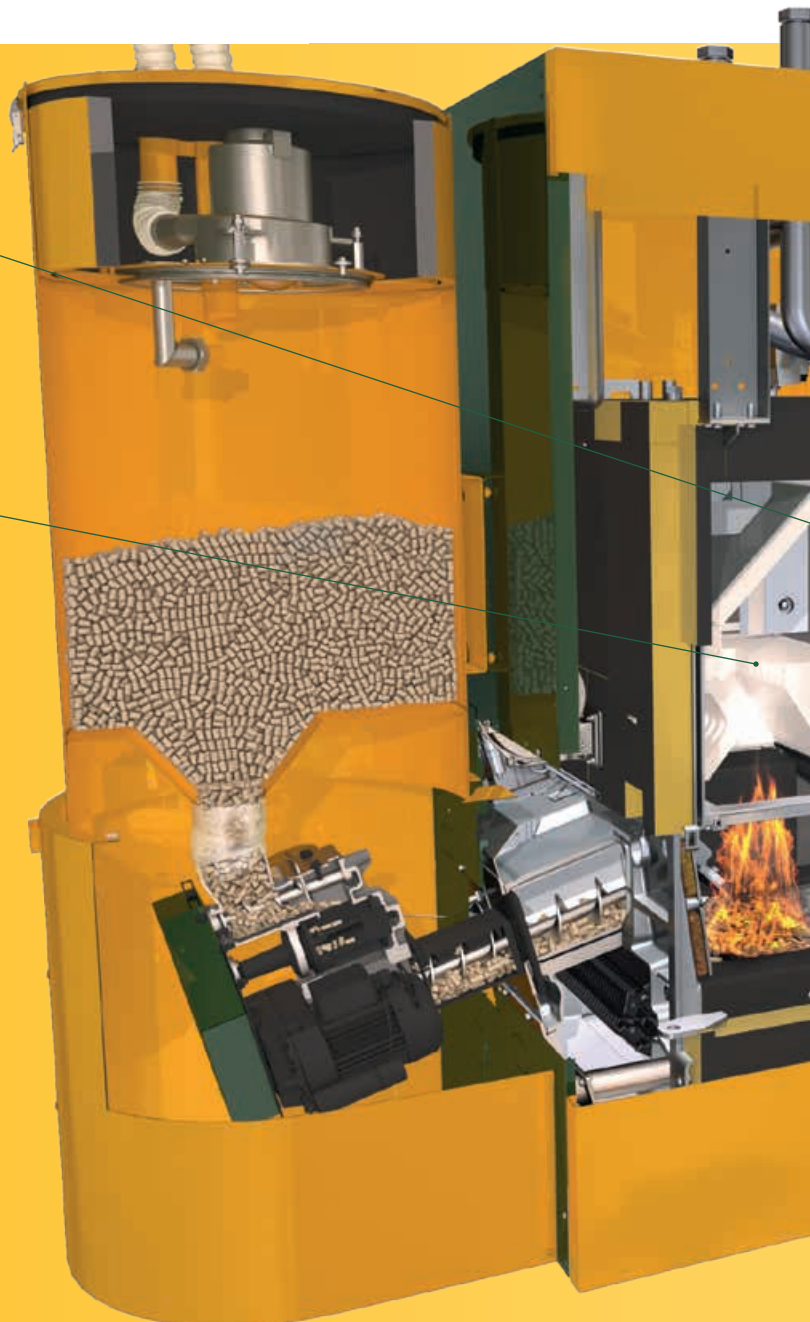
CFD-optimised nozzle geometry and arrangement

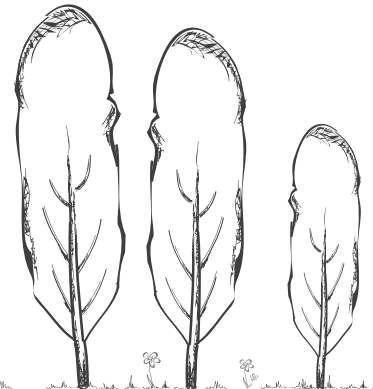
Full wood gas combustion thanks to optimal turbulence and a long retention period



High efficiency combustion

Complete and almost emission-free combustion through special geometries and materials





Return flow boost

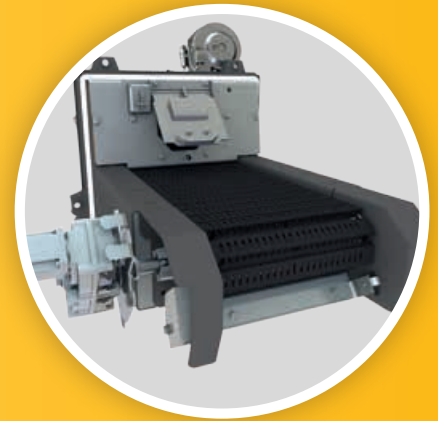
Optimised hydraulics aligned with the system

KWB Comfort 3 Control

2-button control with dial and an easy to understand graphic display

Automatic ash removal

Into a convenient ash container with integrated fill level monitoring



Clean combustion

Stress free combustion thanks to a variable rotary grate speed and air supply



High efficiency turbulators

Optimal heat exchange with low exhaust gas temperatures and a consistently high efficiency coefficient

Combustion system

Crawler burner with high alloy and self cleaning cast rotary grate elements



KWB CRAWLER BURNER

*The new KWB Crawler burner¹ is the centrepiece of the new KWB Pelletfire Plus pellet heating system. Thanks to its **fuel flexibility** and its **automatic adjustment to changing fuel qualities**. The KWB Crawler burner¹ is a true **all-rounder**, which is well-equipped to deal with **wood pellets** and **agricultural fuels**². Suitable for wood pellets according to quality A1 pursuant to ISO 17225-2.*

optimised fuel feed geometry

An even fuel bed and fully filled rotary grate ensure the highest burnout quality

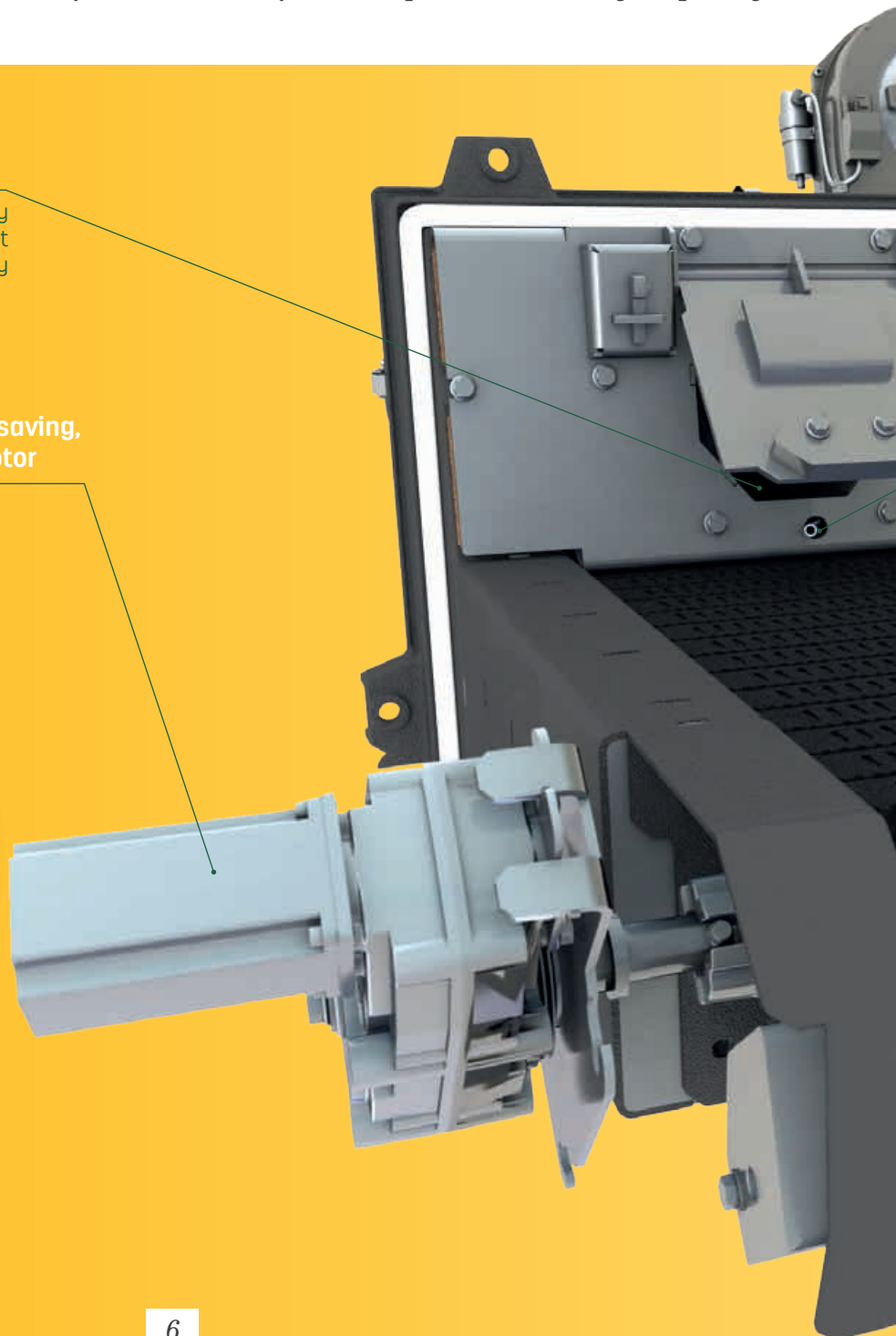
Drive containing a power saving, intelligent multi phase motor

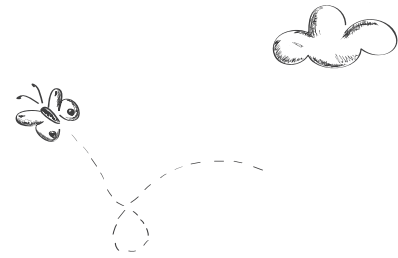
Proven automotive technology



Self-cleaning rotary grate elements

From high alloy cast





Power saving high efficiency ignition

Extremely short ignition times thanks to a ceramic ignition element and a quicker igniter recognition



Stress free combustion

Quiet fuel bed thanks to an even and slow rotary grate speed for lowest emissions



Fuel Recognition Plus*

Highest fuel utilisation despite changing fuel quality thanks to the combustion control's automatic adjustment (rotary grate speed and air supply)

¹ patent application has been submitted ² depending on local legal permission

OUR ADVANTAGES

*clean*EFFICIENCY TECHNOLOGY



Clean and efficient through a twice controlled combustion

While the broadband lambda probe in the burnout control ensures minimum emissions, a full fuel utilisation is ensured by the highly sensitive temperature sensor in the burnout control.



Clean and efficient thanks to a highly efficient combustion

The combustion room design, which was optimised with a computer-aided simulation, is perfectly supported by the high temperature silicon carbide lining and thus achieves excellent combustion conditions with the lowest emissions.



An all-rounder with respect to pellet fuels

The KWB Crawler burner enables to operate on wood pellets as well as pelletized agricultural fuels¹.



Efficient due to a high efficiency factor

The proven high efficiency turbulators from the KWB product family guarantee an optimal heat exchange through which they reach a consistently high efficiency coefficient both in partial load as well as nominal load.

YOUR BENEFITS

KWB PELLETFIRE PLUS PELLET HEATING SYSTEM



Space saving

The new KWB Pelletfire Plus impresses thanks to the various space-saving installation options and can even be placed directly in wall corners or in rooms with very low ceilings.



Minimum power consumption

Thanks to intelligent drive motors whose power consumption depends on the load, it was possible to reduce the energy consumption of the new pellet heating system to a minimum.



Easy planning and installation

It is very easy to transport the heating system into any type of heating room thanks to the delivery process and because it can be quickly disassembled into modules. The fuel feed can occur either from the left or the right and can be determined on site.



Installation- and service-friendly

The easy access to specific inspection points and the effortless replacement of individual modules makes the service personnel's work significantly easier. In addition, a start up assistant leads the operator quickly and actively through the commissioning process.

cleanEFFICIENCY

COMBUSTION TECHNOLOGY

CLEANEFFICIENCY is a label that we give to KWB heating systems **which** are built to achieve lower emission values, highest efficiency and use very little fuel and energy and were specifically optimised to provide a perfect interaction of construction and control elements.

cleanEFFICIENCY sums up in one word the technology package developed by the KWB Innovation Centre that achieves higher efficiency, lower emissions and maximum comfort.

Thanks to KWB's many years of expertise, the KWB biomass heating systems with *cleanEFFICIENCY* was further perfected in a comprehensive system, which makes it synonymous with modern high-tech biomass heating systems. The differences between KWB biomass heating systems having *cleanEFFICIENCY* included and regular models are evident in clearly visible technical and geometrical measures as well as fine-tuning and subtle differences imperceptible at first glance.

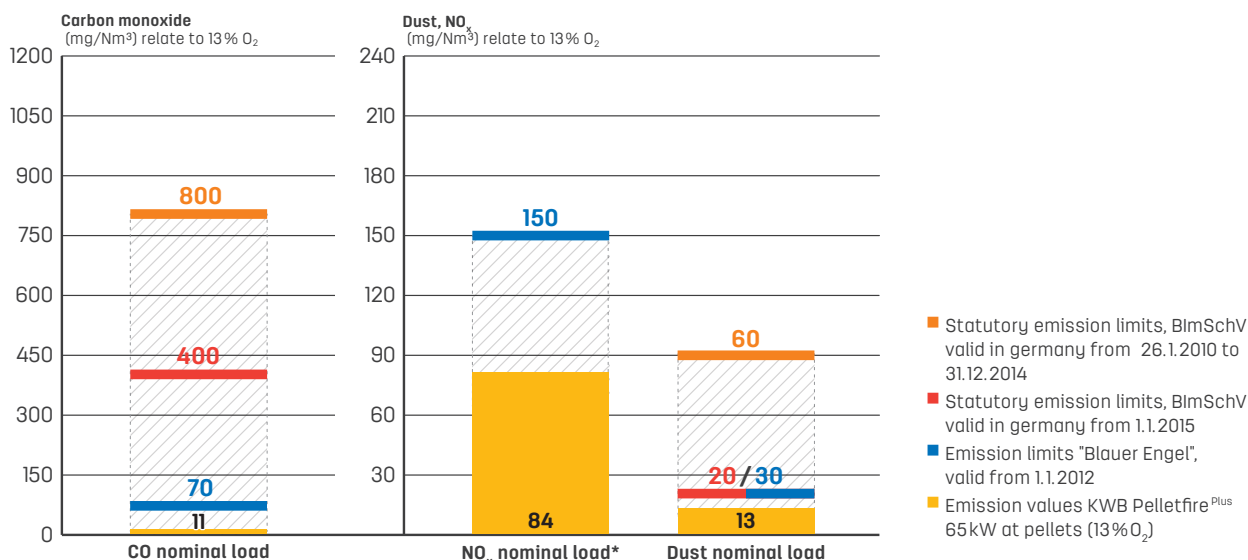
cleanEFFICIENCY is also a response to a looming climate change as a result of increasing environmental burdens. It is a future-oriented technology that offers a further decrease of pollutant emissions with consistently efficient heating performance with the highest levels of efficiency and maximum comfort. The *cleanEFFICIENCY* technology makes an enormous contribution in this respect.

As a visible result, the heating systems remain significantly below the limit values for emissions and are at the limit of what is technically measurable. This applies to both the partial load and nominal load.

- ✓ Lowest emission values
- ✓ Maximum efficiency

- ✓ Fuel and power saving technology
- ✓ Perfectly aligned comprehensive system

Emission testing at nominal load



The technology enables emissions at the boarder to be recognized at part load as well as nominal load.
 * The Bundesimmissionsschutz-Verordnung Germany does not give limits for oxides of nitrogen.



KWB COMFORT 3

THE COMFORTABLE CONTROL

EASY OPERATION

KWB Comfort 3 Microprocessor control system

KWB Comfort 3 is a modular system that is used to operate and regulate KWB bio-mass heating systems.

All adjustments can be executed using the 2-button control unit together with a dial on the innovative, easy to understand graphic display. It is also easy to configure the parameters for boiler, heating circuit, DHWC and buffer tank by using the logically structured menu system. The control unit fully automatically and infinitely variable adjusts boiler output according

to heat demand from standby to full load. The control concept ensures optimum combustion conditions, lowest emissions and maximum economic efficiency.

In addition to regulating the burner, it also provides comprehensive heat management – from a single family house to a district heating network. As a modular, expandable system, the KWB Comfort 3 makes it possible to control up to 32 heating circuits, 16 buffer tanks and 16 DHWCs.

It is also possible to link several digital or analogue remote-control devices.

The control unit consists of the following components:



Master board

Contains all inputs/outputs for boiler control, incl. sensors and terminal strip for external connections. The master board also includes the activation for one DHWC and one buffer tank with two temperature sensors.



Boiler control unit

This module is used to operate and regulate the boiler and for heat management purposes.



Heating circuit expansion module

Controls a max. of 2 heating circuits, one DHWC and one buffer tank (with 2 sensors) per module. Operation and monitoring are carried out using the boiler control unit or optionally using digital remote control devices.



Analogue remote control unit

Easy operation for one heating circuit with room sensor, respectively, consisting of a dial for adjusting the desired room temperature by $\pm 5^{\circ}\text{C}$ and a 4-position slide switch for selecting the heating program: automatic mode, lower mode, frost protection mode or day operation.



Digital remote control unit

Makes it possible to control one or more heating circuits with room sensor and to configure and monitor the heating circuit, DHWC and buffer tank management from the living room.



KWB Comfort Solar

The KWB Comfort Solar control system controls the heating system such that the free of charge solar energy is optimally routed into the buffer tank. In addition to functionality and design, the solar control system features an easy-to-use and self-explanatory user interface. A convenient commissioning wizard is available to the heating engineer.

KWB Comfort SMS

You can query the current operating status and actively control the heating system using your mobile phone (e.g. holiday program, party operation).

In addition to switching the heating system on and off, the operator can query current operating modes or make adjustments to the heating circuits, DHWC, buffer tanks, etc. In addition, alarm messages are sent

to the mobile phone. The sender receives acknowledgement of commands that have been executed through a reply by text message (SMS). The generation of commands and queries is simplified through the use of text message (SMS) templates that can be transmitted to the respective mobile phone by the KWB Comfort 3. KWB Comfort SMS is available in German, English, Italian, French, Spanish and Slovenian.



KWB Comfort Visio

KWB Comfort Visio is an additional component of the KWB Comfort series for visualisation, remote monitoring and remote control of your KWB heating system via your PC.

The conceptualisation of the KWB Comfort Visio with respect to project design and commissioning is truly revolutionary: connect and switch on, that's all it needs – the KWB Comfort Visio automatically adjusts to the heating system. KWB Comfort Visio is available in English and German.

Monitoring and operation

The KWB Comfort Visio displays operating values of boiler, heating circuits, DHWCs and buffer tanks. The

visualisation interface displays all configuration parameters of the heating system where they can be adjusted. In addition, the KWB Comfort Visio offers a comprehensive alarm management system, consisting of alarm statistics and log, as well as an extensive help system for the specific alarms.

Archiving

When using a computer on site, it is possible to use the comprehensive data recording and evaluation options of the KWB Comfort Visio.

Remote maintenance

The heating system can be accessed from any location via modem. It is thus possible to monitor the heating system and intervene if necessary. This makes it also possible for the KWB customer service to remotely maintain the customer's heating system.



Option 1: Visualization PC near the system



Option 2: No PC near the system

KWB Comfort InterCom

The KWB Comfort InterCom is an interface that facilitates the data exchange between the KWB Comfort control and external systems.

As, for example, higher level control or regulation systems or building automation systems. The data

exchange takes place by means of a serial connection, network connection or analogue modem connection. All boiler operating status parameters as well as individual alarms can be read out on the KWB Comfort control system. In addition, the external system can modify several parameters in the KWB Comfort control system.

PELLET STORAGE & C

SOLUTIONS FOR EVERY ROOM LAYOUT

Aside from the construction of modern pellet heating systems, KWB possesses extensive expertise with respect to the optimal storage and conveyance of pellets to the heating system. It is possible to equip almost every storage room with KWBs flexible and diverse storage options

Storage room adjacent to boiler room

Heating system
Storage room



Pellet Stirrer Plus
with elbow screw

p. 16-17



Conveyor screw
with elbow screw

p. 18-19



KWB Pellet Big Bag
with elbow worm

p. 20

Storage room at a distance from the heating room

Heating system
Storage room



Pellet Stirrer Plus
with suction conveyor

p. 22-23



Conveyor screw
with suction conveyor

p. 24-25



KWB sampling probes
with suction conveyor

p. 26-27



KWB Pellet Big Bag
with suction conveyor

p. 21

CONVEYOR SYSTEMS

Storage room outside the building



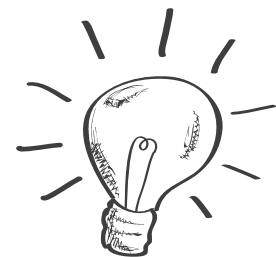
Vacuum conveyor
for a buried tank

p. 28



KWB Pellet Big Bag
with suction conveyor

p. 21



Fuel consumption and storage room size for pellets

kW	Fuel Consumption	Storage room with inclined floor**		Storage room without inclined floor	
	Consumption per year (kg/a)	Storage room volume (m ³)	Storage room floor space* (m ²)	Storage room volume (m ³)	Storage room floor space* (m ²)
45	17,100	40.5	16.2	33.8	13.5
55	20,900	49.5	19.8	41.3	16.5
65	24,700	58.5	23.4	48.8	19.5
75	28,500	67.5	27.0	56.3	22.5
95	36,100	85.5	34.2	71.3	28.5
115	43,700	103.5	41.4	86.3	34.5
135	51,300	121.5	48.6	101.3	40.5

Annual consumption factor: approx. 380 kg per kW heating load (with an optimal heating system model and good pellet quality); storage room size factor for annual fuel requirement with inclined floor: 0.9 m³ per kW heating load; storage room size factor for annual fuel requirement without inclined floor: 0.75 m³ per kW heating load; assumption: 1,500 full load hours, 650 kg/m³ bulk density pellets; *room height 2.5 m; calculation with average losses

** Angle approx. 35°

PELLET STIRRER PLUS WITH ELBOW SCREW

The Pellet Stirrer Plus consists of the stirrer, the gear unit and a conveyor screw, which can be custom-shortened on site.

The great advantage offered by this conveyor system is maximum capacity utilisation of the storage room volume. This also means that inclined floor construction is not required. Planning and installation efforts are reduced to a minimum for the tradesman.

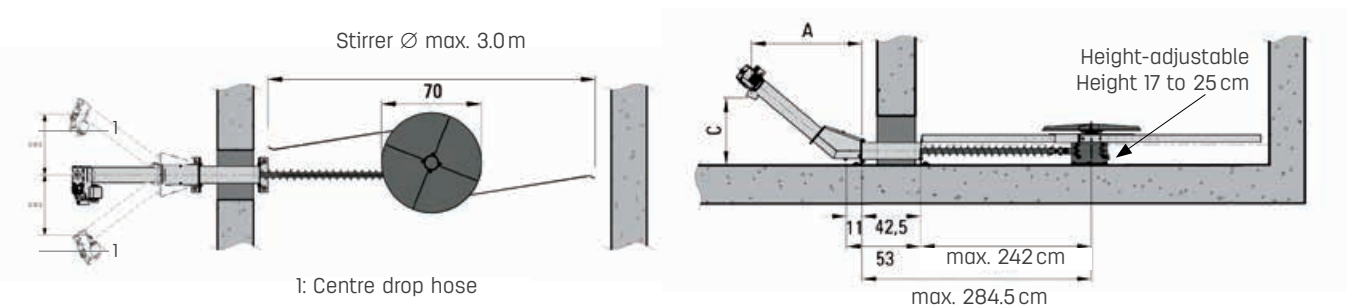
The Pellet Stirrer Plus can be combined with the pellet elbow screw, consisting of an ascending screw and screw extensions. This extractor variant is suitable for square, round, as well as rectangular storage rooms that are situated next to the boiler room.



✓ Storage room cleaning only required every 10 years

✓ Extremely quiet operation

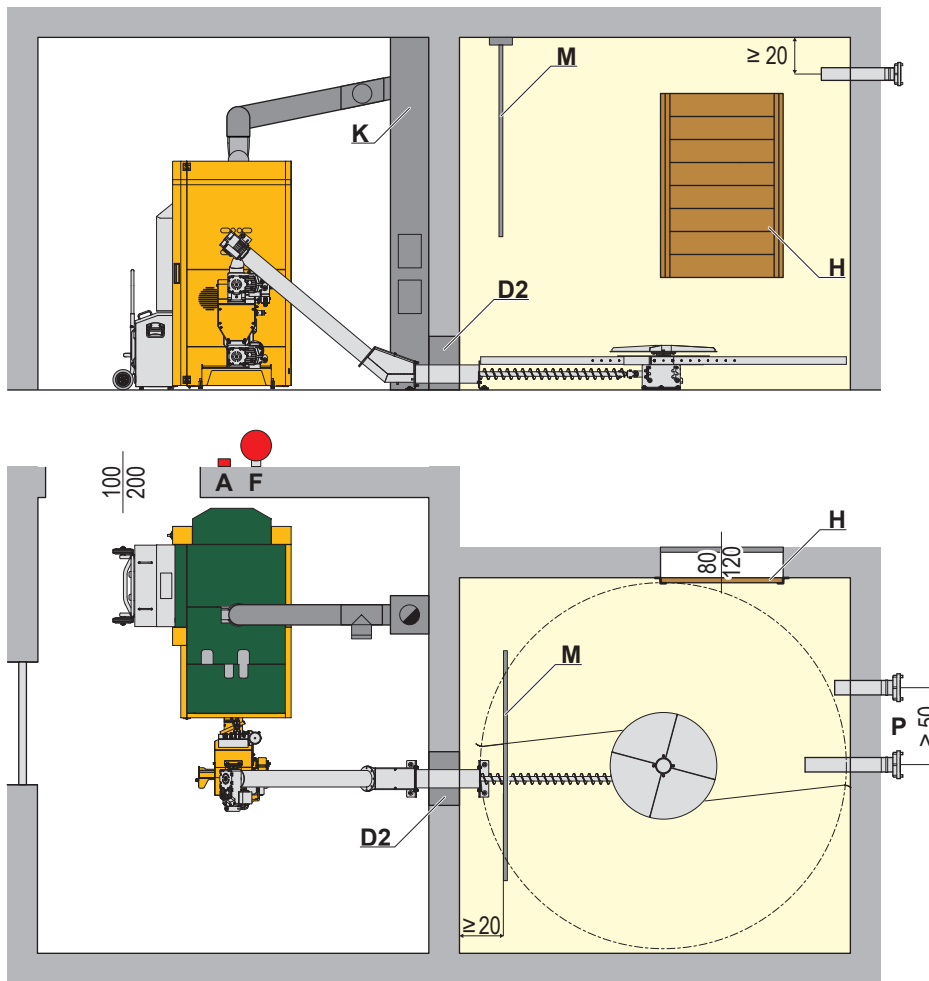
✓ Best possible storage room utilisation



Ascending screw with axial deviation B depending on the storage room lowering

Storage room lowering	Ascending screw 3	Ascending screw 4
		A = 101.0cm, C = 67.9cm
0cm	B = 0-27cm	B = 0-46,5cm
5cm	B = 0-8cm	B = 0-44,5cm
10cm		B = 0-36cm
15cm		B = 0-23cm

Storage room adjacent to or above heating room possible



Scale 1:50

Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!
D2	Wall duct 35x35 cm: seal after installation, channel must be acoustically decoupled
F	Fire extinguisher
H	Protective door boards for pressure relief
K	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap

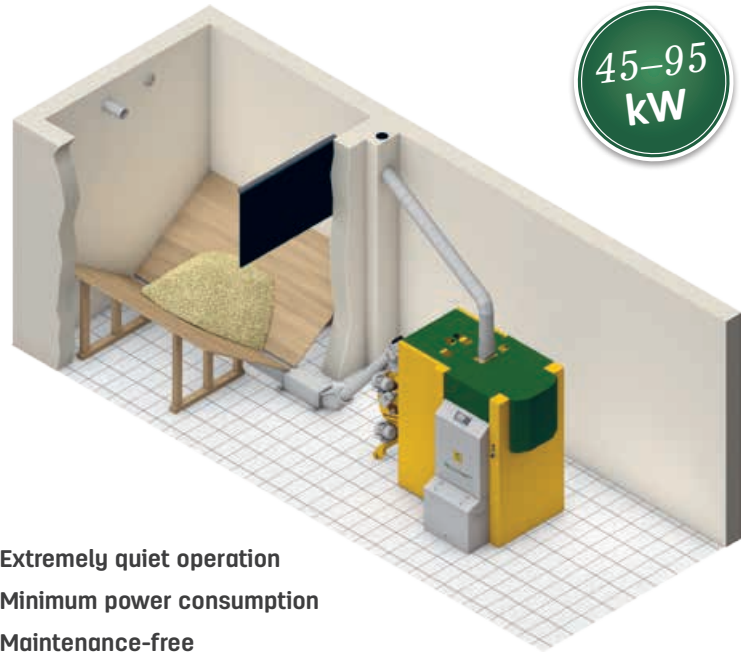
M	Ricochet protection mat
P	<p>Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle ≥ 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥ 50 cm from the side walls and ≥ 20 cm from the ceiling.</p>

Note	<ul style="list-style-type: none"> Provide ventilation for heating room of ≥ 400 cm². Mount the drives outside the storage room. Take the ceiling load / static loads into account! Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials!
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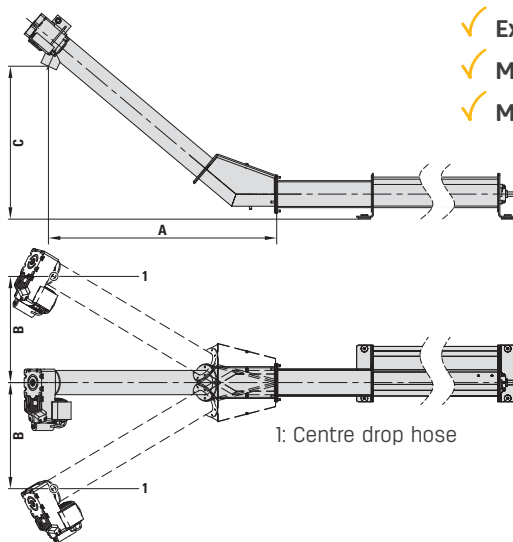
CONVEYOR SCREW WITH ELBOW SCREW

The conveyor screw in combination with an elbow screw is the ideal solution for an oblong storage room, situated next to the heating room.

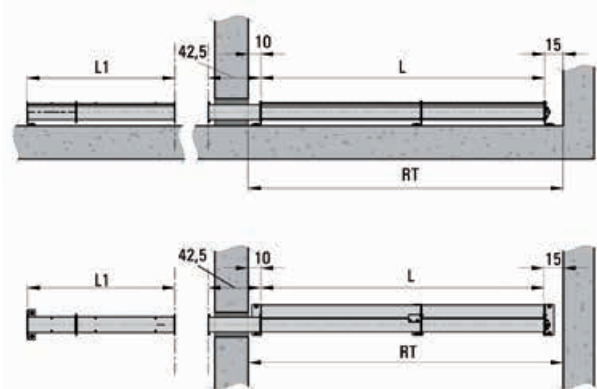
The conveyor screw is available in various lengths and can be combined with an ascending screw and conveyor screw extensions if necessary. For storage rooms that are above the heating room, the conveyor screw is also available in a drop hose design. The extremely quiet conveyor system is maintenance-free, absolutely reliable, and requires minimum power.



Conveyor screw and extension



- ✓ Extremely quiet operation
- ✓ Minimum power consumption
- ✓ Maintenance-free



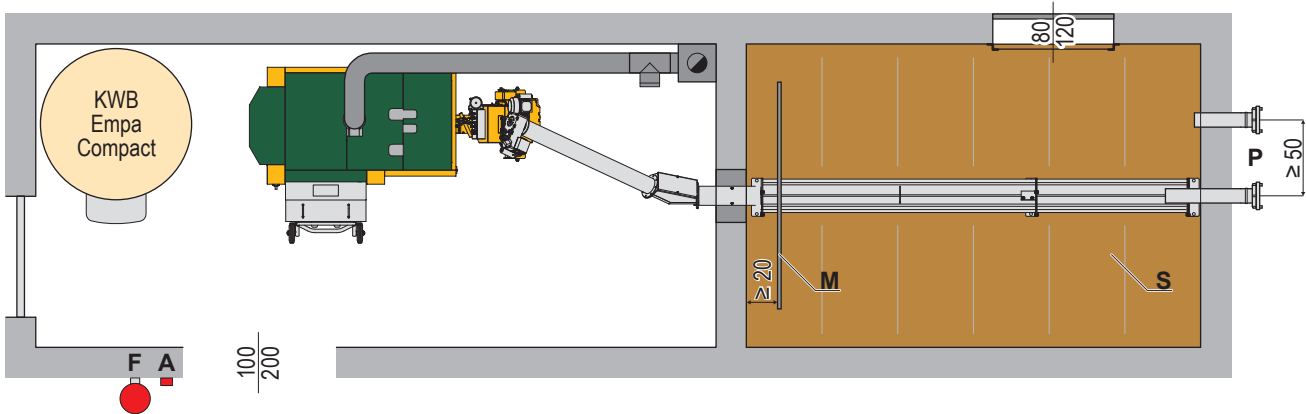
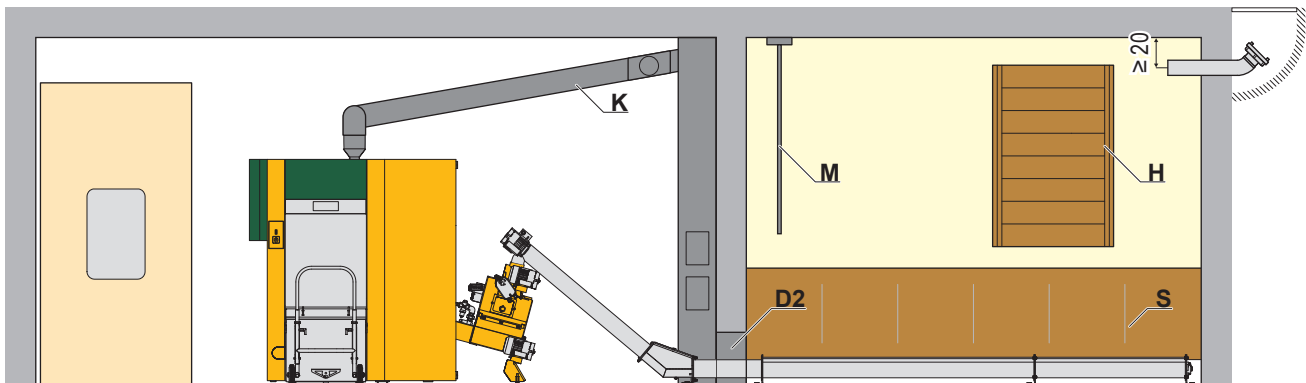
Ascending screw with axial deviation B depending on the storage room lowering

Storage room lowering	Ascending screw 3	Ascending screw 4
	A = 101.0cm, C = 67.9cm	A = 116.0cm, C = 80.8cm
0cm	B = 0-27cm	B = 0-46,5cm
5cm	B = 0-8cm	B = 0-44,5cm
10cm		B = 0-36cm
15cm		B = 0-23cm

Conveyor screw	Room depth
L	Min. room depth
130 cm	155 cm
180 cm	205 cm
230 cm	255 cm
260 cm	285 cm
280 cm	305 cm
310 cm	335 cm
360 cm	385 cm
460 cm	485 cm
490 cm	515 cm
540 cm	565 cm

Extension
L1
40 cm
80 cm
120 cm
160 cm
200 cm
240 cm

Storage room adjacent to or above heating room possible



Scale 1:50

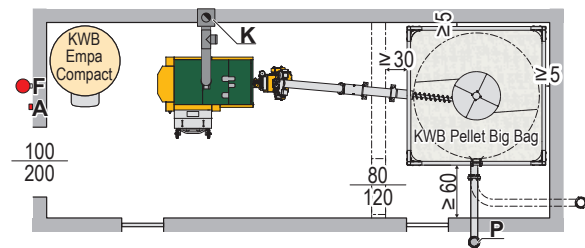
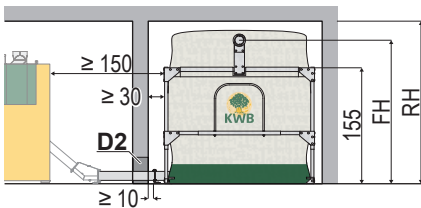
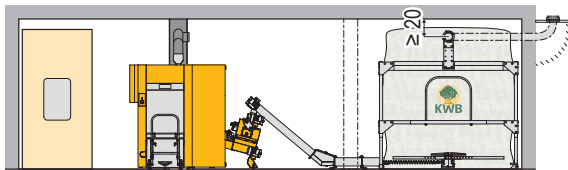
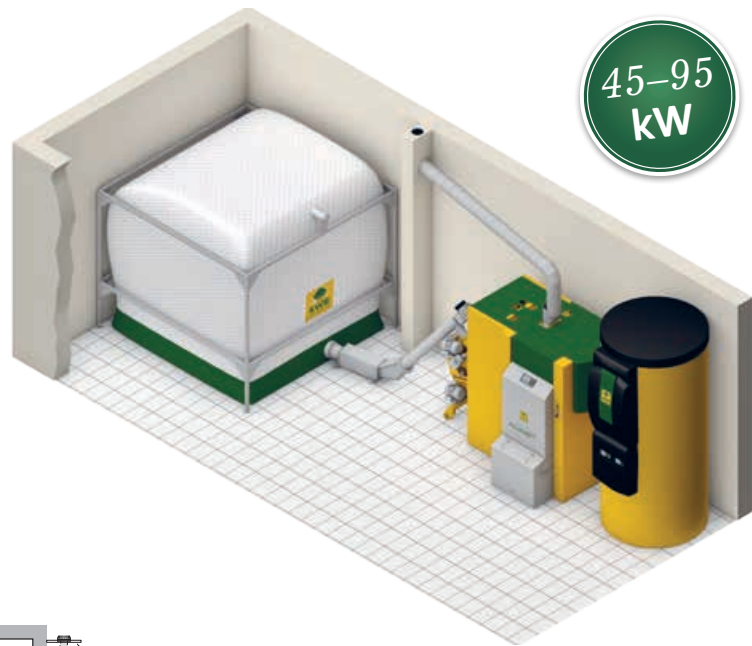
Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!	M	Ricochet protection mat
D2	Wall duct 35x35 cm: seal after installation, channel must be acoustically decoupled		Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle ≥ 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥ 50 cm from the side walls and ≥ 20 cm from the ceiling.
F	Fire extinguisher	P	
H	Protective door boards for pressure relief	S	Inclined floor
K	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap 		
Note	<ul style="list-style-type: none"> Provide ventilation for heating room of ≥ 400 cm². Mount the drives outside the storage room. Take the ceiling load / static loads into account! Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials! 		

KWB PELLETT BIG BAG WITH ELBO

The Pellet Stirrer Plus extracts the fuel from the KWB Pellet Big Bag and transports it to the heating system in combination with an elbow screw.

The KWB Pellet Big Bag primarily scores points because of its optimal space utilisation. Standard sizes of 2.2 to 10.5 tons fill content are available for selection; they are made of dust-proof, anti-static fabric that is supported by a galvanised metal frame. If a certain minimum distance to the heating system is adhered to, the Big Bag can be set up directly in the heating room (depending on the local fire-safety regulations), in the storage room, or even outdoors, if it is protected against weather.



KWB Pellet Big Bag – Technical specifications

Length x width	Size:	[m]	2.0x2.0m	2.5x2.5m	3.0x3.0m
Fill quantity* (max.):	Injection connector below	[t]	< 3.9t	< 6.5t	< 9.3t
Fill quantity* (max.):	Injection connector above	[t]	< 4.1t	< 6.9t	< 10.5t
Fill height **	FH:	[cm]	162 cm or 177 cm or 192 cm		
Room height (min.)	RH:	[cm]	Fill height + ≥ 20 cm		
Fill openings	Quantity	Pc.	1 pc.	2 pcs.	2 pcs.
Fill distance	FD:	[cm]	-	100 cm	140 cm

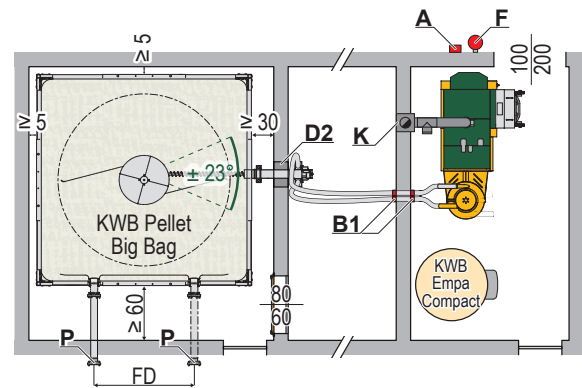
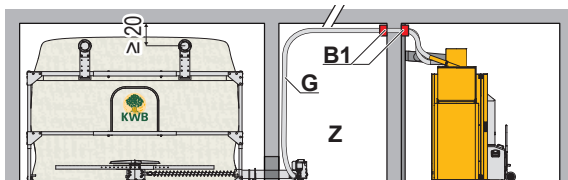
* Tank capacity depends on: filling technique, pellet characteristics, available space, container size and height of the injection connectors! ** Fill height is dependent on the position of the injection connectors. Depending on the locally applicable fire safety regulations, the KWB Pellet Big Bag can be set up directly in the heating room if a specified minimum distance to the heating system is maintained. If appropriately protected against weather influences the Big Bag can be set up outdoors. Local fire safety regulations must be strictly complied with. The Big Bag does not require any air extraction – the air escapes through the fabric and via a window or vent (at least 400 cm²) to the outside. Structural characteristics of the place of installation: dry, horizontal, smooth, clean, able to carry maximum load – at least 1.500 kg/m²)

W SCREW/SUCTION CONVEYOR

The Pellet Stirrer Plus extracts the fuel from the KWB Pellet Big Bag and transports it to the heating system in combination with a suction conveyor.



- ✓ Very high degree of space utilisation
- ✓ Possible to set up outdoors if protected from the weather
- ✓ Available in four different sizes



Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!
B1	Fire protection sleeve suction hose $\varnothing 6$ cm, drill hole $\varnothing 7$ cm, respectively – seal after installation
D2	Wall duct 35x35 cm: seal after installation, channel must be acoustically decoupled
F	Fire extinguisher
	Hose routing
	<ul style="list-style-type: none"> • Max. total conveyor length: 25 m • Max. conveyor height without step: 3 m
G	<ul style="list-style-type: none"> • Max. total conveyor height with step: 5 m – install step at least at 3 m height difference • Put hoses horizontally for at least 1 m per step • All conveyor hose bend radii at least 40 cm

K	<ul style="list-style-type: none"> • Keep access to the chimney free: at least 60 cm • Model of smoke tube and chimney according to the "Technical specifications" table • Install energy-saving damper with blowback flap
P	Pellet injection connector: 1 or 2 injection connectors (depending on size of the KWB Pellet Big Bag) – suction is not required
Z	Gap

Note	<ul style="list-style-type: none"> • Provide ventilation of the heating room of ≥ 400 cm². • Mount the drives outside the storage room. • Take the ceiling load / static loads into account! • Strictly comply with local fire safety regulations and other regulations! • Maintain the legally prescribed distances to flammable materials!
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PELLET STIRRER PLUS WITH SUCTION CONVEYOR

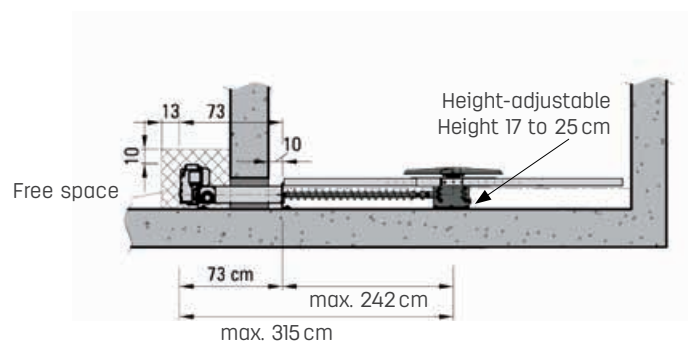
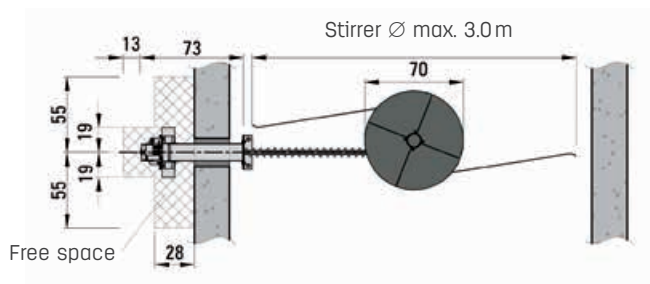
The Pellet Stirrer Plus consists of the stirrer, the gear unit and a conveyor screw which can be custom-shortened on site.

The great advantage offered by this conveyor system is maximum capacity utilisation of the storage room volume. This also means that inclined floor construction is not required. Planning and installation efforts are reduced to a minimum for the tradesman.

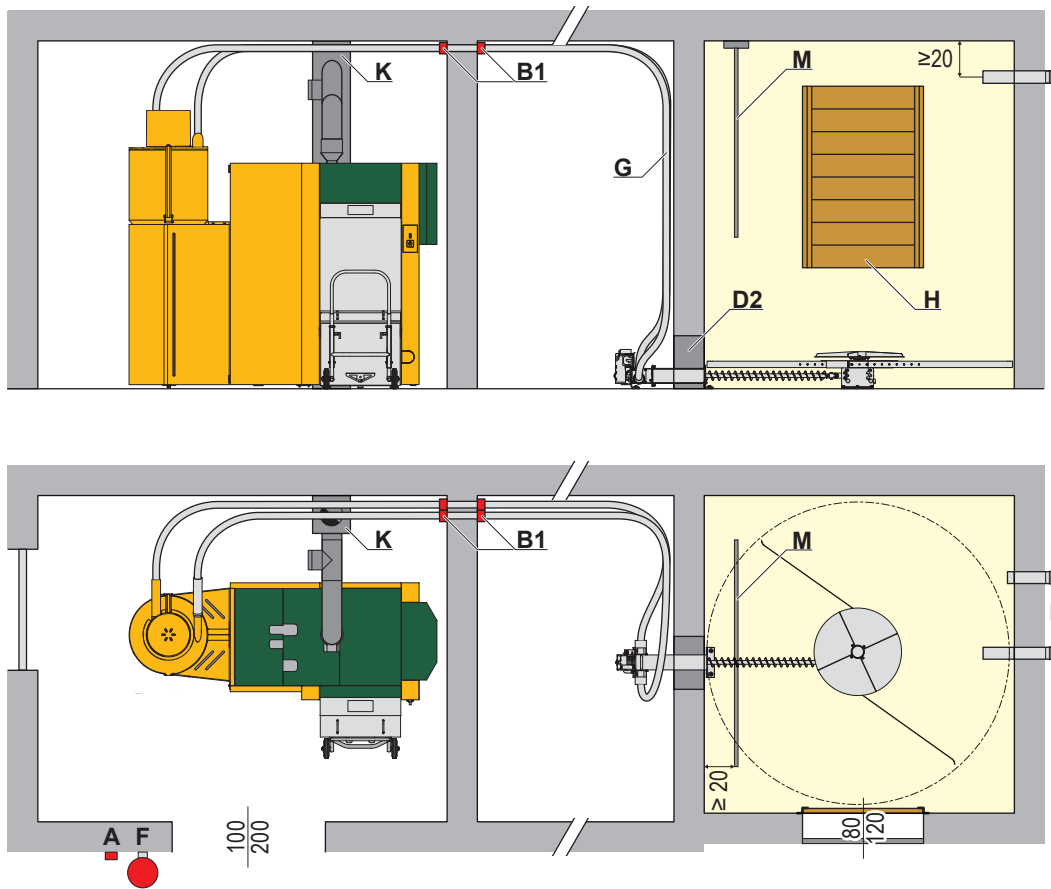
The Pellet Stirrer Plus in combination with the suction conveyor is particularly well suited for storage rooms that are further away from the heating room. It is thereby possible to realize suction lengths of 25 m and height differences of up to 5 m. Thanks to the acoustical optimisation of the suction conveyor system as well as generously-dimensioned storage container the system operates very quietly.



- ✓ Best possible storage room utilisation
- ✓ Minimal planning and installation effort
- ✓ Storage room cleaning only required every 10 years



Storage room adjacent to, above or below the heating room possible



Scale 1:50

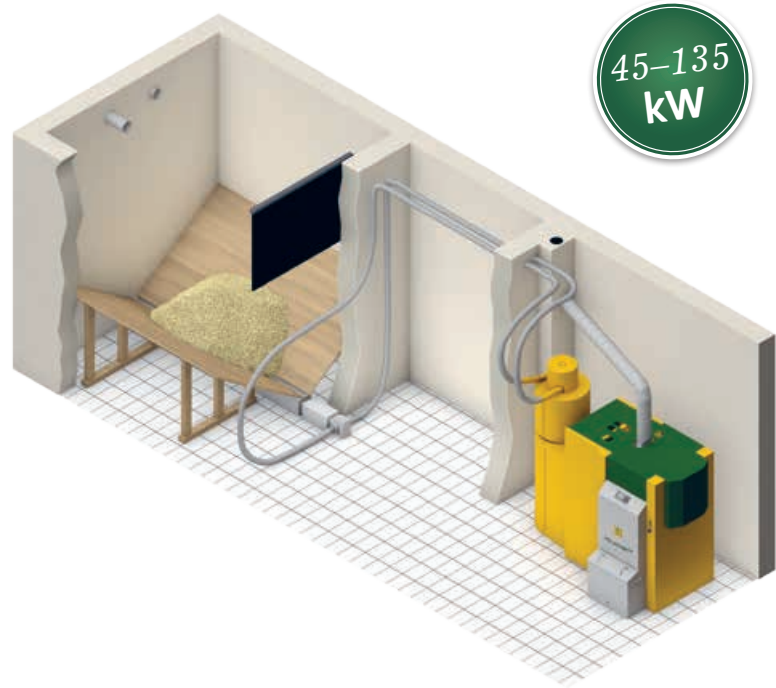
Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap
B1	Fire protection sleeve suction hose \varnothing 6 cm, drill hole \varnothing 7 cm, respectively – seal after installation	
D2	Wall duct 35x35 cm: seal after installation, channel must be acoustically decoupled	M Ricochet protection mat Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle \geq 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached \geq 50 cm from the side walls and \geq 20 cm from the ceiling.
F	Fire extinguisher	
G	Hose routing <ul style="list-style-type: none"> Max. total conveyor length: 25 m Max. delivery height without step 3 m Max. conveyor height with step: 5 m – install step at least at 3 m height difference Arrange hoses horizontally for at least 1 m per step All conveyor hose bend radii at least 40 cm 	
H	Protective door boards for pressure relief	P
Note	<ul style="list-style-type: none"> Provide ventilation of heating room of \geq 400 cm² Mount the drives outside of the storage room Take the ceiling load / static loads into account! Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials! 	

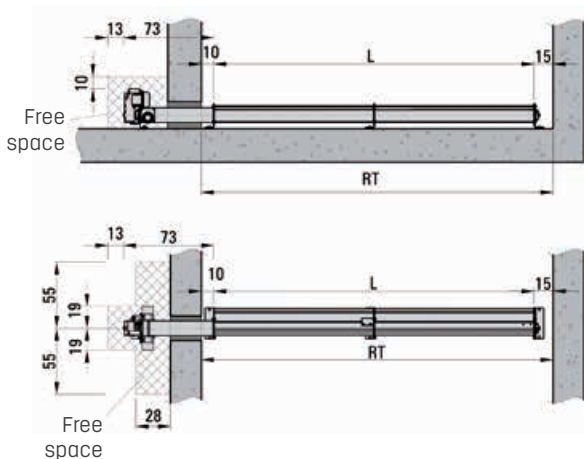
CONVEYOR SCREW WITH SUCTION CONVEYOR

The suction conveyor system consists of a suction turbine, storage tank, suction and return air hose and the modular, expandable conveyor screw.

It is particularly well suited for storage rooms that are further away from the heating room, as well as for storage rooms adjacent to, above, or below the heating room. With this variant pellets are extracted from the storage room via a conveyor screw and transported into the storage container through suction pressure from the suction turbine via a suction hose. It is thereby possible to realize suction lengths of 25 m and height differences of up to 5 m. The system is absolutely reliable and very quiet when operating due to sound-technical measures.



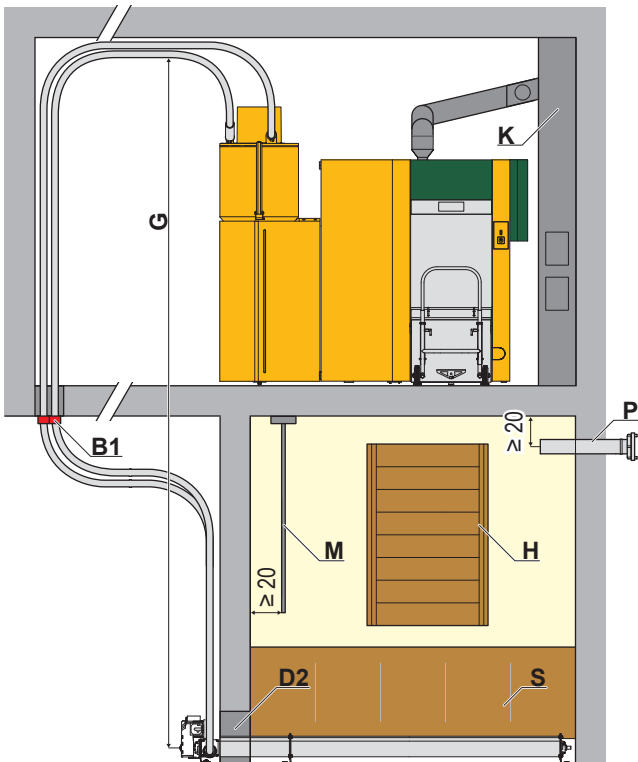
- ✓ Ideal for storage room systems which are not situated on the same level as the heating room
- ✓ Ideal for rectangular storage rooms
- ✓ Suction length of up to 25m possible



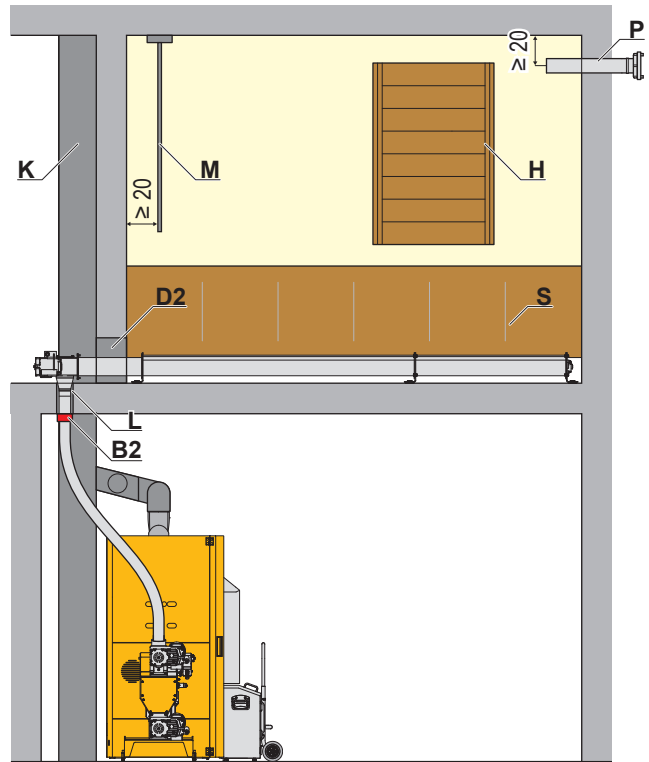
Conveyor screw	Room depth
L	Min. room depth
130 cm	155 cm
180 cm	205 cm
230 cm	255 cm
260 cm	285 cm
280 cm	305 cm
310 cm	335 cm
360 cm	385 cm
460 cm	485 cm
490 cm	515 cm
540 cm	565 cm

SOLUTIONS FOR SPECIAL STORAGE ROOM SITUATIONS

Conveyor screw with suction conveyor



Conveyor screw with drop hose model



Scale 1:50

Legend

B1	Fire protection suction hoses \varnothing 6 cm, drill hole \varnothing 7 cm, respectively, seal after installation, channel must be acoustically decoupled
B2	Fire safety sleeve drop hose \varnothing 7.5 cm
D2	Wall duct 35x35 cm: seal after installation, channel must be acoustically decoupled
G	Hose routing <ul style="list-style-type: none"> • Max. total conveyor length: 25 m • Max. delivery height without step 3 m • Max. conveyor height with step: 5 m – install step at least at 3 m height difference • Arrange hoses horizontally for at least 1 m per step • All conveyor hose bend radii at least 40 cm
H	Protective door boards for pressure relief

K	<ul style="list-style-type: none"> • Keep access to the chimney free: at least 60 cm • Model of smoke tube and chimney according to the "Technical specifications" table • Install energy-saving damper with blowback flap
L	Ceiling duct \varnothing 10 cm: seal after installation, channel must be acoustically decoupled
M	Ricochet protection mat
P	Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle \geq 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached \geq 50 cm from the side walls and \geq 20 cm from the ceiling.
S	Inclined floor

Note	<ul style="list-style-type: none"> • Provide ventilation of the heating room of \geq 400 cm². • Mount the drives outside the storage room. • Take the ceiling load / static loads into account! • Strictly comply with local fire safety regulations and other regulations! • Maintain the legally prescribed distances to flammable materials!
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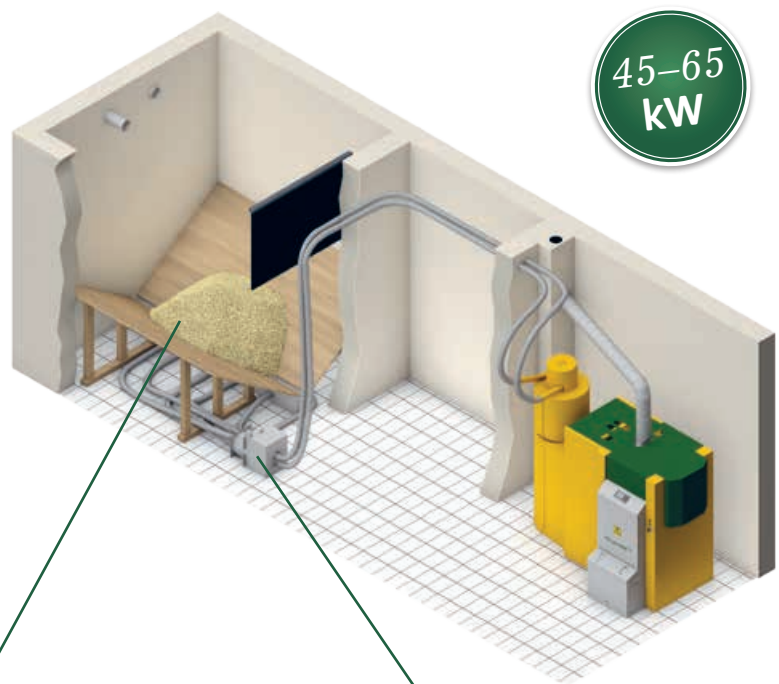
KWB SAMPLE PROBES WITH SUCTION CONVEYOR

The conveyor system consists of a switchover unit with 2 integrated fire protection sleeves and 3 sample probes, which are placed in the storage room and connected to the switchover unit via suction and return hoses.

The switchover to pellet removal between the 3 sample probes takes place automatically. The pellets are extracted by the suction turbine via a suction hose and placed in the storage container.

This system is especially well-suited for oblong storage rooms next to, above or below the heating room and distinguishes itself through its flexible use, low planning expenditures and easy installation.

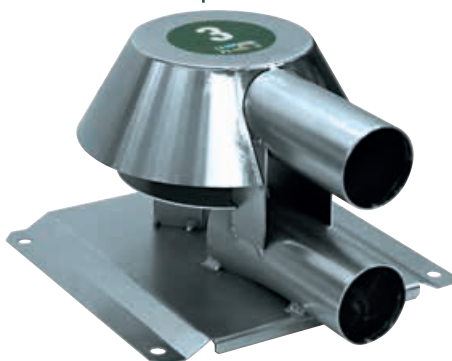
- ✓ Flexible utilisation and easily installed with very low planning expenditures
- ✓ No moving pellet suction tubes in the heating and storage room – thus low space requirements
- ✓ Reliable pellet extraction based on special probe geometry



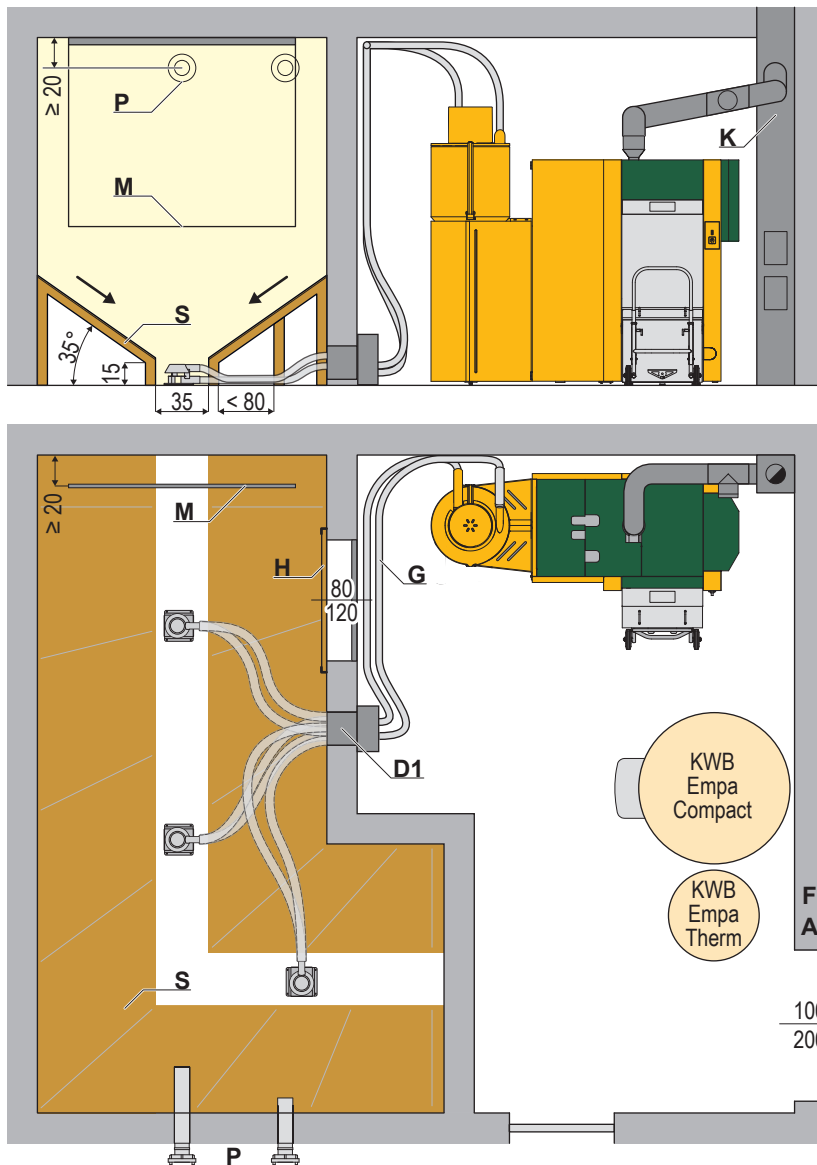
Switchover unit: automatic switchover of the sampling probes



KWB sample probes: optimal safety thanks to 3 separate removal points in the storage room



Storage room adjacent to, above or below the heating room possible



Scale 1:50

Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!
D1	Wall duct \varnothing 25 cm, middle axis: upper edge of floor + 14 cm, distance to other construction parts \geq 35 cm from the middle axis. The wall duct must be free of hollow spaces and should have a smooth and clean finish.
F	Fire extinguisher
G	Hose routing <ul style="list-style-type: none"> • Max. conveyor length from sample probes to KWB Pelletfire Plus: 25 m • Max. delivery height without step 3 m • Max. conveyor height with step: 5 m – install step at least at 3 m height difference • Arrange hoses horizontally for at least 1 m per step • All conveyor hose bend radii at least 40 cm
H	Protective door boards for pressure relief

K	<ul style="list-style-type: none"> • Keep access to the chimney free: at least 60 cm • Model of smoke tube and chimney according to the "Technical specifications" table • Install energy-saving damper with blowback flap
M	Ricochet protection mat
P	Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle \geq 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached \geq 50 cm from the side walls and \geq 20 cm from the ceiling.
S	Inclined floor

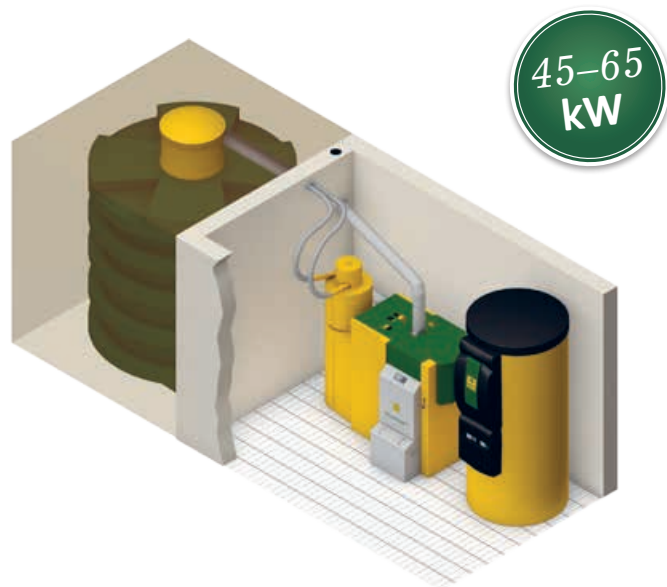
Note	<ul style="list-style-type: none"> • Provide ventilation of heating room of \geq 400 cm² • Mount the drives outside the storage room. • Take the ceiling load / static loads into account! • Strictly comply with local fire safety regulations and other regulations! • Maintain the legally prescribed distances to flammable materials!
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SUCTION CONVEYOR FOR BURIED TANK

If there is no space at all for a storage room inside a building, it is possible to install a buried tank in the garden, from which the pellets are transported to the KWB Pelletfire Plus via a suction system.

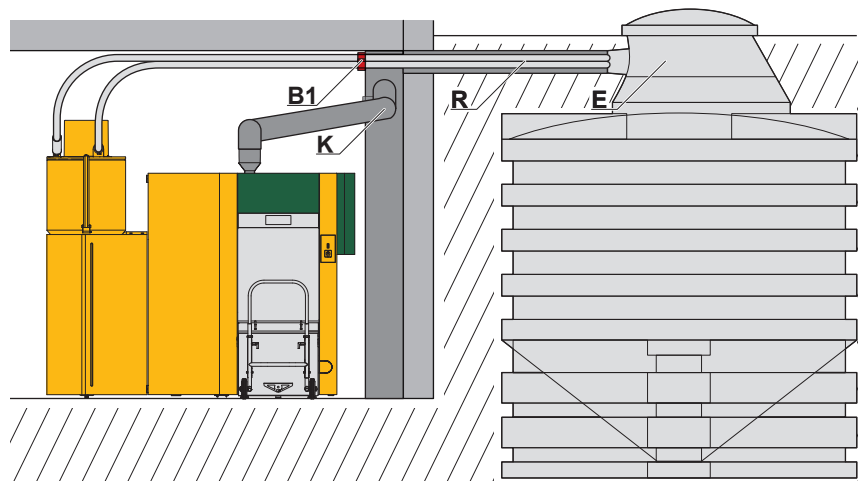
The buried tank itself, as well as extraction from the buried tank, is not included in the KWB product line. KWB recommends the Geotank system by Geoplast:

Kunststofftechnik GmbH,
A-2604 Theresienfeld,
Bahnstraße 45,
www.pelletstank.com.



- ✓ Requires no storage space inside a building
- ✓ Easy maintenance
- ✓ Not visible from the outside

Scale 1:50



Legend

B1	Fire protection suction hoses $\varnothing 6$ cm, drill hole $\varnothing 7$ cm, respectively, seal after installation	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap
R	A protective conduit ($\varnothing 15$ or 20 cm) for the underground installation of the suction hoses must be provided and laid by the customer. The protective pipe and the wall opening are to be sealed tight to the outside.	
E	Buried tank	
Note	<ul style="list-style-type: none"> Provide ventilation of the heating room of ≥ 400 cm². Take the ceiling load / static loads into account! Install drives outside the storage room Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials! 	

FOR LARGE STORAGE ROOMS

The large power range of 45 to 135 kW makes it possible to deploy the new KWB Pelletfire Plus pellet heating system in larger single family homes, commercial facilities including smaller district heating networks.



Heating system in separate boiler house
KWB Pelletfire Plus twin boiler installation with common stirrer and two conveying channels;

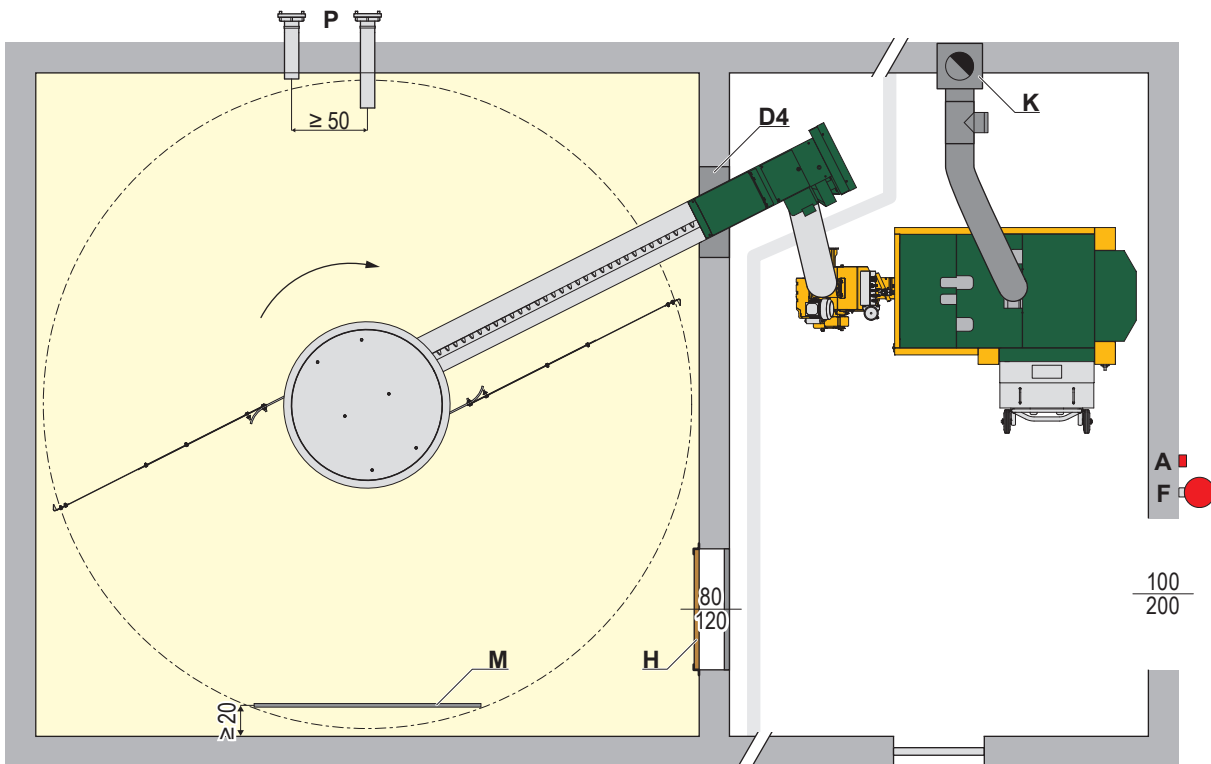
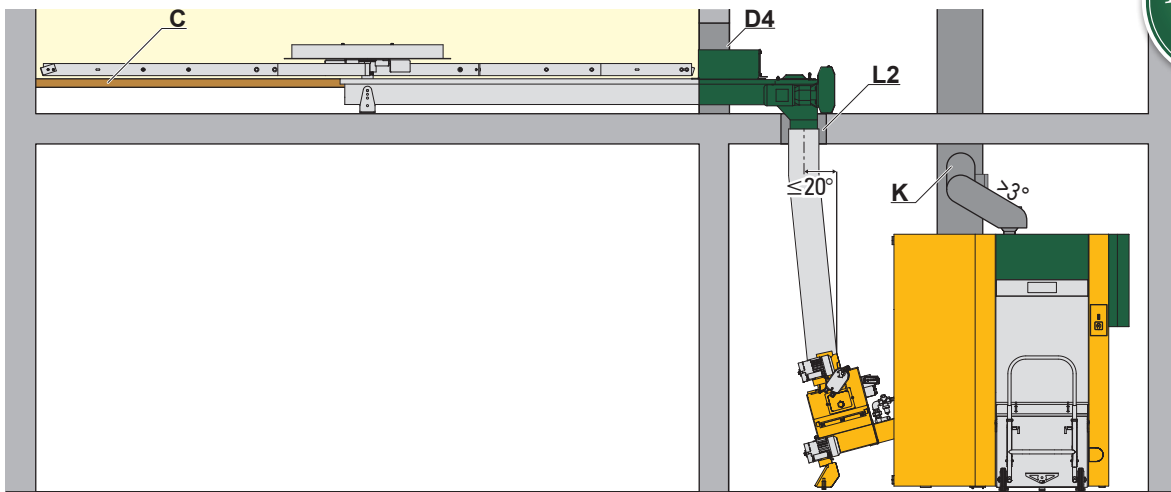


Heating system in the basement of a building
KWB Pelletfire Plus with Pellet Stirrer Plus with suction conveyor

STORAGE ROOM ABOVE HEATING ROOM

Stirrer with conveyor channel and fall pipe connection

45-135
kW



Scale 1:50

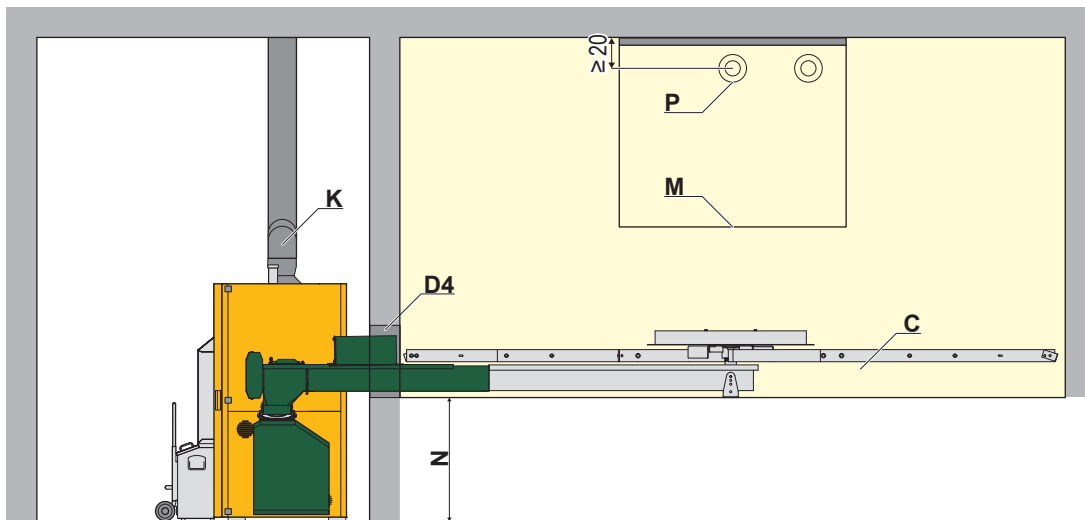
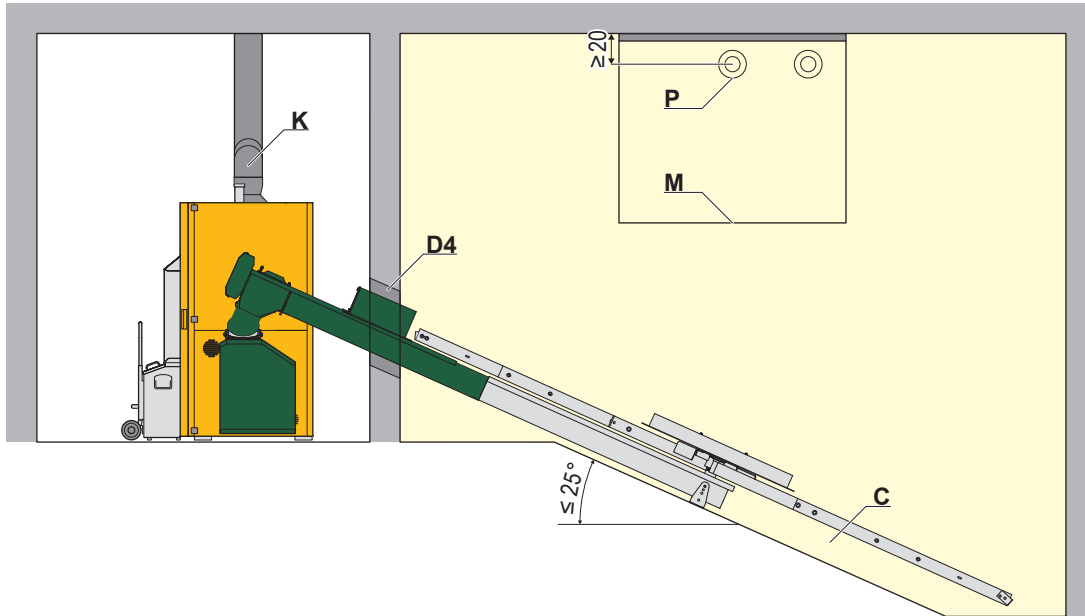
Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!	L2	Ceiling duct 15×15 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)
C	False floor optional – it is possible to install the conveyor channel in a recess in the floor. (Rear ventilator and acoustic decoupling are recommended)	M	Ricochet protection mat
D4	Wall duct 60×60 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)	K	Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle ≥ 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥ 50 cm from the side walls and ≥ 20 cm from the ceiling.
F	Fire extinguisher	P	
H	Hatch: protective door boards for pressure relief <ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm 		
K	Model of smoke tube and chimney according to the "Technical specifications" table <ul style="list-style-type: none"> Install energy-saving damper with blowback flap 		

STORAGE ROOM ADJACENT TO HEATING ROOM

45–135
kW

Stirrer with conveyor channel and direct connection



Scale 1:50

Legend

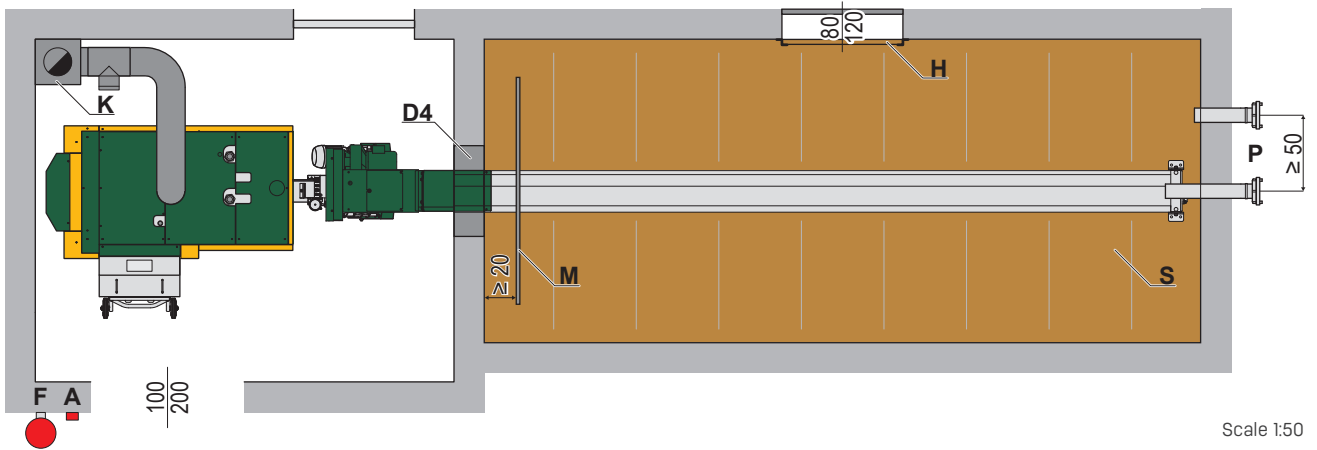
D4	Wall duct 60×60 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)
C	False floor optional – it is possible to install the conveyor channel in a recess in the floor. (Rear ventilation recommended)
K	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap
M	Ricochet protection mat

N	Type MF2 S 45-135 kW: 70 cm
P	<p>Ventilated filling nozzles (injection & suction nozzles)</p> <p>Place the injection connector in the middle of the room and the suction nozzle ≥ 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥ 50 cm from the side walls and ≥ 20 cm from the ceiling.</p>

Note	<ul style="list-style-type: none"> Provide ventilation of the heating room of ≥ 400 cm². Take the ceiling load / static loads into account! Install drives outside the storage room 	<ul style="list-style-type: none"> Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials!
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OBLONG STORAGE ROOMS

Conveyor channel with direct connection without stirrer



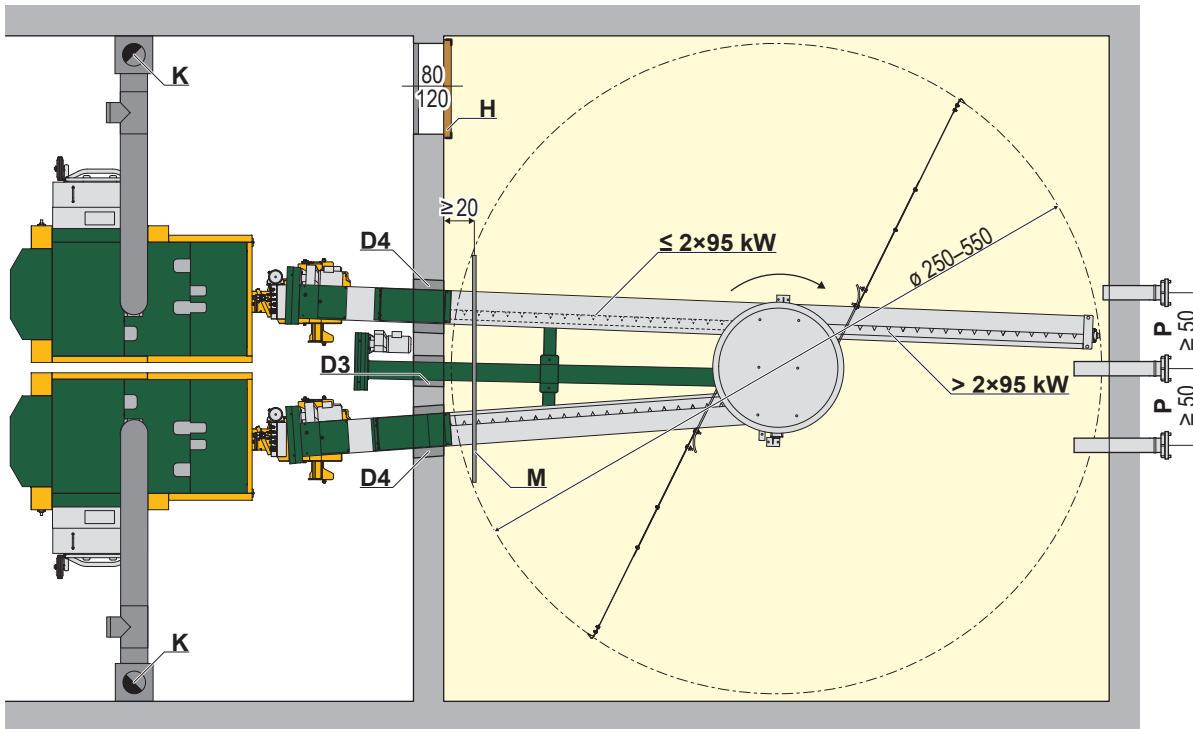
Legend

A	Emergency stop switch: Boiler NOT de-energised, but combustion stopped – heat dissipation continues!
D4	Wall duct 60×60 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)
F	Fire extinguisher
H	Hatch: protective door boards for pressure relief
K	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap
M	Ricochet protection mat
P	Ventilated filling nozzles (injection & suction nozzles) Place the injection connector in the middle of the room and the suction nozzle ≥ 50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥ 50 cm from the side walls and ≥ 20 cm from the ceiling.
S	Inclined floor
Note	<ul style="list-style-type: none"> Provide ventilation of the heating room of ≥ 400 cm². Take the ceiling load / static loads into account! Install drives outside the storage room Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials!

CONVEYOR SYSTEM FOR DOUBLE HEATING SYSTEMS

45–135
kW

Stirrer with y-shaped conveyor channel and direct connection



Scale 1:50

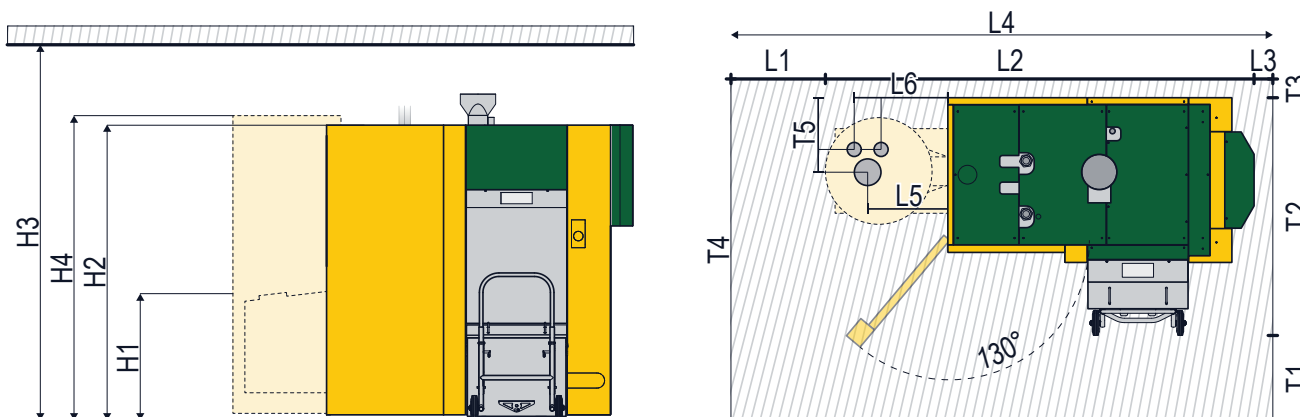
Legend

D3	Wall duct 50×50 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)
D4	Wall duct 60×60 cm; seal after installation; the channel must be acoustically decoupled (at least 2 cm acoustic insulation)
H	Hatch: protective door boards for pressure relief
K	<ul style="list-style-type: none"> Keep access to the chimney free: at least 60 cm Model of smoke tube and chimney according to the "Technical specifications" table Install energy-saving damper with blowback flap

M	Ricochet protection mat
P	<p>Ventilated filling nozzles (injection & suction nozzles)</p> <p>Place the injection connector in the middle of the room and the suction nozzle ≥50 cm to the side of the injection connector in the direction of the storage room door. The suction nozzle should always be cut as short as possible inside, almost flush with the wall (it must still be possible to mount the earthing clamp!). Both nozzles should be attached ≥50 cm from the side walls and ≥20 cm from the ceiling.</p>

Note	<ul style="list-style-type: none"> Provide ventilation of the heating room of ≥400 cm². Take the ceiling load / static loads into account! Install drives outside the storage room Strictly comply with local fire safety regulations and other regulations! Maintain the legally prescribed distances to flammable materials!
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INSTALLATION DIMENSIONS

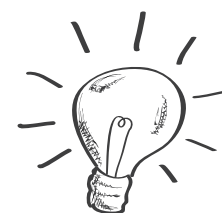


[cm]		45-65 kW		70-95 kW		100-135 kW	
		S	GS	S	GS	S	GS
H1	Medium height of the dropping edge	62	–	62	–	62	–
H2	Height KWB Pelletfire Plus	159	159	167	167	167	167
H3	Minimum room height	200	200	208	208	210	210
	Minimum room height - Exhaust gas pipe above heat exchanger	210	210	220	220	230	230
H4	Connection height vacuum hopper	–	175	–	175	–	175
L1	Free space	20	10	20	10	20	10
L2	Heating system length	194	212	210	228	223	240
L3	Free space	6	6	6	6	6	6
L4	Minimum room length	>220	>228	>236	>244	>249	>256
L5	Distance between the boiler casing and the connection point of the cellular wheel sluice wood pellets	39	–	39	–	39	–
L6	Distance between the boiler casing and the connection point of hose 1/ hose 2	–	38 / 46	–	38 / 46	–	38 / 46
T1	Free space	40	40	40	40	40	40
T2	Heating system depth	123	123	134	134	134	134
T3	Free space	6	6	6	6	6	6
T4	Minimum room depth	>169	>169	>180	>180	>180	>180
T5	Distance between the boiler casing and the connection point of the feeding system	36	25	42	30	42	30

S ... KWB Pelletfire Plus Type MF2 S

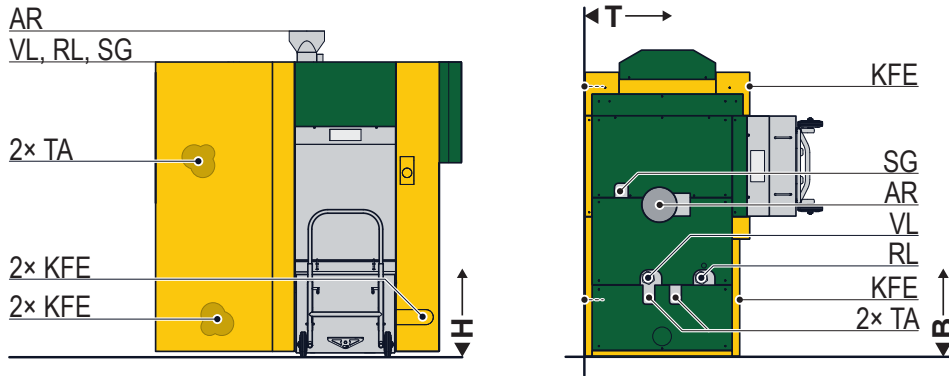
GS ... KWB Pelletfire Plus Type MF2 GS

KWB Pelletfire Plus	Largest part of boiler as delivered	Largest part of boiler after deconstruction	Largest part pre-assembled
Type MF2 S / GS 45-65kW	70 x 153	70 x 106	74 x 166
Type MF2 S / GS 70-135kW	80 x 161	80 x 125	85 x 180



Information regarding hydraulics requirements can be downloaded at www.kwb.net.

CONNECTING DIMENSIONS

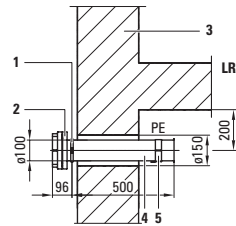


Legend	Connection dimensions	45-65 kW	70-95 kW	100-135 kW		
AR	Exhaust gas pipe	Ø 15 H: 166 B: 72 T: 37	Ø 18 H: 185 B: 85 T: 42	Ø 20 H: 175 B: 85 T: 42		
	Exhaust gas pipe incl. bend	H: 184	H: 192	H: 192		
	Exhaust gas pipe incl. bend above heat exchanger	H: 196	H: 206	H: 215		
VL	Forward flow	Ø 32 G 5/4" H: 157 B: 44 T: 32	Ø 50, G 2" H: 180 B: 44 T: 36	Ø 50, G 2" H: 180 B: 44 T: 36		
		RL	Return flow	Ø 32 G 5/4" H: 157 B: 44 T: 56	Ø 50, G 2" H: 180 B: 44 T: 65	Ø 50, G 2" H: 180 B: 44 T: 65
				SG	Safety group	Ø R 1" H: 157 B: 72 T: 17
TA	Thermal safety valve – inflow					Ø R 1/2" H: 107 B: 29 T: 42
		TA	Thermal safety valve – discharge			Ø R 1/2" H: 107 B: 29 T: 32
				KFE	Connecting height boiler filling and emptying	Ø Rp 1/2" H: 22 & 23 B: 35 & 124 T: 61 & 67

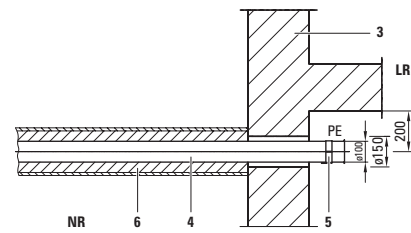
H ... Height T ... Depth B ... Width

Pellet injection connector Installation example

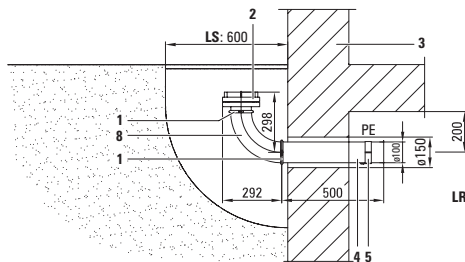
Standard variant



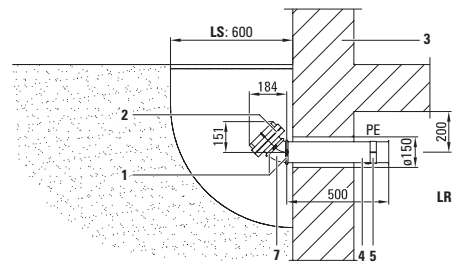
If there is a duct through other rooms



Variant for light shaft 90°



Variant for light shaft 45°



Legend

1	Tension ring: connect conductive!	7	Pipe bend 45°
2	Hose coupling system Storz "A" NW 110 with blind coupling. In the heating room or garage the coupling must be executed with removable REI90 cover!	8	Pipe bend 90°
3	Masonry	PE	Potential Earth
4	Steel pipe	LS	Light shaft
5	Earthing clamp: remove paint and ensure conductive connection!	LR	Fuel storage room
6	Fireproof sheathing EI 90, e.g.: 50 mm rock wool + 15 mm fire protection plate	NR	Adjacent room

TECHNICAL SPECIFICATIONS

MF2 S / MF2 GS	Unit	45 ¹	50 ¹	55 ¹	65 ¹	70 ¹	75 ¹	95 ¹	100 ²	108 ¹	115 ¹	135
Rated power	kW	45	49,5	55	65	69,5	75	95	99 / 101	108	115	135
Partial load	kW	13,5	14,9	16,5	19,5	20,9	22,5	28,5	30,0	32,4	34,5	40,5
Boiler efficiency at rated power	%	95,0	94,8	94,7	94,4	94,3	94,1	94,0	94,0	94,1	94,1	94,1
Boiler efficiency at partial load	%	93,7	93,8	94,0	94,2	94,4	94,5	94,4	94,4	94,3	94,2	94,0
Fuel thermal output at rated power	kW	47,4	52,2	58,1	68,9	73,7	79,7	101,1	106,3	114,8	122,2	143,5
Fuel thermal output at partial load	kW	14,4	15,8	17,6	20,7	22,1	23,8	30,2	31,8	34,4	36,6	43,1
Boiler class according to EN 303-5:2012	-	5	5	5	5	5	5	5	5	5	5	5
Water side												
Water content	l	155	135	135	135	165	165	165	195	195	195	195
Water connection, forward/return flow (internal thread) without return-flow boost device	Inch	5/4	5/4	5/4	5/4	2	2	2	2	2	2	2
	mm	31,8	31,8	31,8	31,8	50,1	50,1	50,1	50,1	50,1	50,1	50,1
	DN	32	32	32	32	50	50	50	50	50	50	50
Water connection, forward/return flow (internal thread) with return-flow boost device	Inch	5/4	5/4	5/4	5/4	6/4	6/4	6/4	2	2	2	2
	mm	31,8	31,8	31,8	31,8	38,1	38,1	38,1	50,1	50,1	50,1	50,1
	DN	32	32	32	32	40	40	40	50	50	50	50
Water connection for filling and/or emptying (internal thread)	inch mm	3/4 19,05	3/4 19,06	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05	3/4 19,05
Water connection for thermal safety valve (external thread)	Inch mm	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7	1/2 12,7
Thermal safety valve: pressure	bar	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6	2-6
Thermal safety valve: required cold water temperature	°C	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Water-side resistance at 10 K	mbar	195,4	242,1	293,7	412	76,7	88,3	142,5	158,0	174,4	209,6	289,6
	Pa	19540	24210	29370	41200	7670	8830	14250	15800	17440	20960	28960
Water-side resistance at 20 K	mbar	47,2	58,7	71,4	100,6	18,6	21,5	34,8	38,7	42,7	51,4	71,3
	Pa	4720	5870	7140	10060	1860	2150	3480	3870	4270	5140	7130
Boiler-entry temperature	°C	55-70	55-70	55-70	55-70	55-70	55-70	55-70	55-70	55-70	55-70	55-70
Working temperature/operating temperature	°C	90	90	90	90	90	90	90	90	90	90	90
Maximum permitted temperature	°C	110	110	110	110	110	110	110	110	110	110	110
Max. operating pressure	bar	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
Exhaust-gas side (for chimney calculation)												
Combustion chamber temperature	°C	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100	900-1100
Combustion chamber pressure	mbar	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5	-0,5...-5
	Pa	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50	-5...-50
Required draft at rated power	mbar	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
	Pa	5	5	5	5	5	5	5	5	5	5	5
Required draft at partial load	mbar	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03
	Pa	3	3	3	3	3	3	3	3	3	3	3
Suction required: yes	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Exhaust-gas temperature at rated power	°C	140	140	140	140	140	140	140	140	140	140	140
Exhaust-gas temp. Partial load	°C	100	100	100	100	100	100	100	100	100	100	100
Exhaust-gas mass flow at rated power	kg/s	0,030	0,033	0,037	0,044	0,047	0,051	0,064	0,068	0,071	0,078	0,091
Exhaust-gas mass flow at partial load	kg/s	0,011	0,012	0,013	0,016	0,017	0,018	0,023	0,024	0,026	0,028	0,033
Exhaust-gas mass flow at rated power	kg/h	109,5	120,4	133,8	158,1	169,1	182,4	231,1	243,2	255,4	279,7	328,4
Exhaust-gas mass flow at partial load	kg/h	39,6	43,6	48,4	57,2	61,2	66,0	83,6	88,0	92,4	101,2	118,8
Exhaust-gas volume at rated power	Nm³/h	84,4	92,9	103,2	121,9	130,4	140,7	178,2	187,6	197,0	215,7	253,3
Exhaust-gas volume at partial load	Nm³/h	30,6	33,7	37,4	44,2	47,3	51,0	64,6	68,0	71,4	78,2	91,8
Incline of the exhaust-gas pipe	°	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3	≥ 3
Connection height exhaust-gas pipe	mm	1735	1735	1735	1735	1830	1830	1830	1830	1830	1830	1830
Exhaust-gas pipe diameter	mm	150	150	150	150	180	180	180	200	200	200	200
Chimney diameter (approx. values)	mm	180	180	180	180	200	200	200	220	220	220	220
Chimney design: Moisture-resistant	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fuel: Pellets of pure wood in accordance with ISO 17225-2												
Calorific value	MJ/kg	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19	16,5-19
Density	kg/m³	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600	≥ 600
Water content (M10)	% by weight	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
Ash content	% by weight	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7	≤ 0,7
Length	mm	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40	3,15-40
Diameter ⁴	mm	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089	D06, D089
Dust proportion before loading	% by weight	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
Raw material: pure wood, bark content <15 %	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ash												
Ash container volume	l	70	70	70	70	70	70	70	70	70	70	70
Ash container filled	kg	80	80	80	80	80	80	80	80	80	80	80
Ash removal system	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Electrical system												
Connection: CEE 5-pole 400 V _{AC} 3-pole 230 V _{AC}	-	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A	50 Hz 13 A
Connected power MF2 S	W	829	829	829	829	887	887	887	887	887	887	887

MF2 S / MF2 GS	Unit	45 ¹	50 ¹	55 ¹	65 ¹	70 ¹	75 ¹	95 ¹	100 ²	108 ¹	115 ¹	135
Suction conveyor type MF2 GS												
Max. suction length	m	25	25	25	25	25	25	25	25	25	25	25
Max. suction head	m	5	5	5	5	5	5	5	5	5	5	5
Contents storage container for type MF2 GS	l	135	135	135	135	135	135	135	135	135	135	135
Weights												
Water jacket	kg	300	340	340	340	360	360	360	450	450	450	450
Boiler body	kg	265	265	265	265	320	320	320	320	320	320	320
Boiler weight MF2 S	kg	822	862	862	862	1002	1002	1002	1102	1102	1102	1102
Boiler weight MF2 GS	kg	877	917	917	917	1057	1057	1057	1157	1157	1157	1157
Emissions according to test report												
Test report no.	-	13-UW/Wels-EX-344/5-8										
Noise emissions (EN 15036-1)												
Normal operating noise at rated power	dB(A)	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70
Ref. 10 % O₂ dry (EN303-5)												
CO at rated power	mg/Nm ³	9	10	12	15	17	18	17	15	13	12	< 4
CO at partial load	mg/Nm ³	32	30	27	22	20	14	22	24	28	31	40
NO _x at rated power	mg/Nm ³	125	122	120	115	112	110	114	117	121	124	134
NO _x at partial load	mg/Nm ³	97	98	98	98	99	99	100	100	101	101	102
OGC at rated power	mg/Nm ³	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 3
OGC at partial load	mg/Nm ³	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 3
Dust at rated power	mg/Nm ³	19	19	18	18	18	17	17	17	18	18	18
Dust at partial load	mg/Nm ³	14	14	13	13	13	12	13	13	13	13	14
Ref. 11 % O₂ dry												
CO at rated power	mg/Nm ³	8	9	11	14	15	16	15	14	12	11	< 4
CO at partial load	mg/Nm ³	29	27	25	20	18	13	20	22	25	28	36
NO _x at rated power	mg/Nm ³	114	111	109	105	102	100	104	106	110	113	121
NO _x at partial load	mg/Nm ³	88	89	89	89	90	90	91	91	92	92	93
OGC at rated power	mg/Nm ³	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 2
OGC at partial load	mg/Nm ³	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 3
Dust at rated power	mg/Nm ³	17	17	16	16	16	15	15	15	16	16	16
Dust at partial load	mg/Nm ³	13	13	12	12	12	11	12	12	12	12	12
Ref. 13 % O₂ dry												
CO at rated power	mg/Nm ³	7	7	9	11	12	13	12	11	9	9	< 3
CO at partial load	mg/Nm ³	23	22	20	16	15	10	16	17	20	23	29
NO _x at rated power	mg/Nm ³	91	89	87	84	81	80	83	85	88	90	97
NO _x at partial load	mg/Nm ³	71	71	71	71	72	72	73	73	73	73	74
OGC at rated power	mg/Nm ³	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 2
OGC at partial load	mg/Nm ³	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Dust at rated power	mg/Nm ³	14	14	13	13	13	12	12	12	13	13	13
Dust at partial load	mg/Nm ³	10	10	9	9	9	9	9	9	9	9	10
PPBT ³	mg/Nm ³	15	15	14	14	14	14	14	14	14	14	14
In accordance with § 15a-BVG Austria												
CO at rated power	mg/MJ	3	4	5	7	8	9	8	7	6	5	< 2
CO at partial load	mg/MJ	17	16	14	12	11	9	11	12	14	16	20
NO _x at rated power	mg/MJ	70	67	65	60	58	55	57	58	60	61	66
NO _x at partial load	mg/MJ	48	48	48	49	49	49	49	49	50	50	50
OGC at rated power	mg/MJ	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 1
OGC at partial load	mg/MJ	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dust at rated power	mg/MJ	9	9	9	8	8	8	8	8	9	9	9
Dust at partial load	mg/MJ	7	7	6	6	6	5	6	6	6	6	7

20.01.2015

- 1 ... Drawing inspection
 - 2 ... Typification variants
 - 3 ... PPBT = PP (dust) + 42% OGC according to Conto Termico 28.12.2012
 - 4 ... Depends on the conveyor system
- mg/Nm³ ... milligram per standard cubic meter (Nm³ - standard cubic meter under 1013 hectopascal at 0 °C)

GENERAL CONSTRUCTIONAL CONDITIONS

Note

Always observe the local statutory submission, construction and execution regulations that apply to you as a KWB system user! You can obtain these regulations, for example, from the architect or competent authorities. Adherence to and verification of the local statutory regulations is a precondition for our guarantee and warranties and for your insurance coverage. KWB does not accept any liability, nor does it offer any warranties for any type of constructional measures. Proper execution of constructional measures is the sole responsibility of the system owner. As a biomass heating system user, you may be entitled to receive specific regional subsidies. Inquire promptly about time limits and procedures for handling subsidy applications. Comply with the dimension specifications in the installation examples and technical specifications. Without laying claim to an exhaustive treatment of the issue at hand and without suspension of any conditions imposed by the authorities, based on the Austrian Directive TRVB H 118 and ÖKL technical bulletins No. 56 and No. 66, we recommend the configuration described below.

Boiler room

Concrete flooring, plain or tiled; height-adjustable system feet can be used to compensate minor irregularities. All materials for floors, walls, ceilings must be fire resistant in REI90*; the heating room door (see boiler dimensions table for moving the boiler into the room) as fire door (EI₂-30-C*) must open in escape direction and close automatically, the connection door to the fuel storage room must be an automatically closing fire door (EI₂-30-C*). Heating room window non-opening E30*; non-closing intake air opening 5 cm² per kW rated power of heating system, but no less than 400 cm². If the boiler output is > 60 kW, it is necessary to integrate one ventilation opening near the floor and another ventilation opening near the ceiling; the supply air ducting must be routed directly into the open; if it crosses other rooms, the air duct must feature an REI90* envelope; a protective grille with a mesh width of < 5 mm must be fitted on the outside of ventilation openings into the open. Permanently installed lighting and electrical supply to the heating system; light and labelled emergency stop switch of the heating system in an easily accessible location outside the boiler room in the vicinity of the boiler room door. A portable fire extinguisher (6 kg filling weight, EN3 standard) must be installed outside the heating room near the heating room door. The heating room as well as water lines and district heating pipes must be frost-resistant. There must

be no storage of inflammable materials in the heating room outside the boiler system, storage container or hopper; no direct connection to rooms where inflammable gases or liquids (garage) are stored. Comply with the local installation regulations.

Fuel storage room

The structural requirements for the heating room also apply to the fuel storage room. The stirrer is installed in the middle of the storage room and is fastened to the concrete floor with anchor bolts. A rear ventilated false floor/ inclined floor should be installed at the same level as the top edge of the fuel extractor. The wall duct (width 60 cm, height 60 cm) for the screw channel between the storage room and heating room should be partitioned such that it is fireproof (e.g. with mineral wool). If a pumping car is used to fill the fuel storage room with wood chips or pellets, it is necessary to mount hose couplings and pipelines (to be earthed) which are available from KWB. If this filling method is chosen, dust proof sealing of the fuel storage room is required. The escaping air is removed through a second earthed pipeline and hose coupling, or it is blown off into the open air after having passed through a filtering section. Suction removal or filtration of the transport air is the responsibility of the fuel supplier. The walls, windows and doors must withstand the overpressure created during the filling process. In the event of bulk fuel storage, no electrical installations are permissible in the fuel storage room since they pose an ignition hazard. KWB biomass heating systems are supplied with all the necessary fire-protection equipment included. Depending on the local installation situation, type of fuel and amount of storage, a manually triggered fire extinguisher and/or the built in fire extinguisher may have to be connected to a pressurised water line. The fire extinguisher with manual release featuring a frost-proof connection (from the heating room) is to be fitted at least ¾' or as DN20 directly above the conduit of the fuel-extractor channel leading into the fuel storage room in the form of empty piping. The shut-off device which is to be installed in the boiler room must be marked with the following sign "Fire extinguisher fuel storage room". Additional statutory safety and acceptance conditions apply to storage rooms and silos that are continuously suction-fed with shavings or sanding dust. If you have any questions, please contact your KWB factory representative. Above ground fuel stores must be accessible to the outside by means of a door measuring >>

* in accordance with ÖNORM EN 13501

at least 1.80 m² across, which should be planked to prevent the fuel from trickling outside should the door be opened by mistake. The planking should be removable from the outside. An inspection opening (REI90*) must be installed above the fuel extractor channel. Please refer to the installation examples.

Ventilation in the pellet storage room

The storage rooms and storage containers must be ventilated according to ÖNORM M7137 to prevent an increased CO concentration. The vents in storage rooms with a capacity up to 30 tons must lead to the outside. This is ensured by ventilated filling nozzles (available from KWB) that lead to the open air. Filling nozzles that do not lead to the open air must not be ventilated! In this case, ventilation must be ensured through a separate ventilation opening in the storage room (ventilation cross section $\geq 200 \text{ cm}^2$). This ventilation opening must be configured such that no dust can escape during the air-injection process and that the ventilation is operational after the filling of the storage (and not covered by pellets, for example). Care must be taken to ensure that no rainwater can penetrate into the pellet storage via the ventilation openings. To remove the risk of a carbon monoxide build up in storage rooms with a capacity of more than 30 tons, one of the following two options must be selected:

- A work organisation system that is combined with a natural or mechanical ventilation based on carbon monoxide sensors, or
- A state of the art forced ventilation system

Chimney

Due to the high boiler efficiency, the chimney design should be resistant to moisture. A moisture resistant chimney design means that there will be no moisture penetration or damage to the brickwork although the temperature level in the exhaust gas path is permanently below the exhaust gas dew point (see DIN 18160)! The approximate values for the chimney diameter are stated in the specifications. These apply to the respective size of the system based on the average structural conditions, meaning: effective chimney height 8–10 m, 1.5 m smoke tube length, 2 segment bends at 90° each, 1 contraction, 1 T connection at 90°. Comply with the specifications in the cross-section diagrams provided by the chimney manufacturer. If conditions differ or are less favourable in terms of space, it is necessary to carry out a chimney calculation according to DIN 13384. 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 your chimney sweep during the planning phase as he is the one who will have to issue the acceptance certificate for the exhaust gas system.

Installing the heating system

Setting up the heating system

To be performed exclusively by qualified, trained personnel of KWB or KWB associates. Licensed heating and electrical installers must connect the heating system to the chimney, water and electrical system; this must be verified for numerous reasons, e.g. in order to be eligible for subsidies.

Smoke tube connection on the chimney

If not already required by local regulations, we recommend that a draft limiter and a blowback flap be built into the smoke tube, or chimney side wall, and arranged in such a manner as to exclude any danger to persons. Keep the smoke tube as short as possible. The smoke tube must be insulated and connected, and should at least ascend slightly towards the chimney, preferably with an inclination of less than 45°. The smoke tube should be thermally insulated and feature suitable, easily accessible cleaning openings. The chimney connection should be 20 mm larger than the smoke tube diameter. In this way, it is possible to integrate a suitable acoustic transmission decoupler between the smoke tube and the chimney. The KWB system is by default equipped with an induced draught fan.

Water connection

When using pellets, the return flow inlet temperature into the boiler must be at least 50°C otherwise there is an increased risk of corrosion, which also has the effect of voiding the guarantee and warranty. To increase the temperature of the return flow, the boiler control unit can drive a mixing controller or a mixing pump. Suitable fittings to increase the return flow temperature are available from KWB. With the exception of cases where the return flow temperature is maintained by a mixing pump, the heating system must feature a pressureless distribution system (switch, distributor, load-balancing tank, buffer, thermal regulator, etc.) and a safety group that complies with the relevant regulations (e.g. according to ÖNORM EN 12828 or, EN 303). KWB recommends the installation of an intelligent buffer tank storage when installing a biomass heating system, which can be considered the energy centre of the heating system. As a result, the owner saves on heating costs due to lower fuel consumption, increases the annual efficiency coefficient as well as the profitability of the heating system and ensures perfect system solutions and lower emissions. The reason for this is that the heating system is focused on the coldest time of the year, this type of performance, however, is rarely needed and, especially in transition periods, barely utilised. This leads to frequent burner starts, which has a negative effect on fuel consumption and the entire service life of the heating system. The effect is comparable to the stop-and-go traffic on the road. As a rule, a pellet heating system, however, does not need a buffer storage tank, we recommend it, however, for the aforementioned reasons. In exceptional cases, however, a buffer or load balancing storage tank is required:

- Oversizing: When the rated boiler output exceeds the entire building heat requirements by 50%, you will need a buffer storage tank (this is often the case when buildings are enlarged or in case of low energy houses. In the event of such dimensioning, a large portion of the operating time the boiler will run under the boiler's smallest modulation degree. When using the buffer storage tank, the boiler can be operated in the preferred load range.
- Very small heating loads in summer / during transition periods, e.g. when only the bathroom is heated in summer/the transition period, the operation of only one or two heating units during transition periods in summer in a heating network without block charge, ...
- If parts of the heat dissipation system are frequently switched off or in the event of a high passive solar contribution
- In case of large demand for warm water, e.g. hotels, showers in sports facilities, large multi-family houses
- To cover peak periods in the morning, e.g. in production facilities, schools
- After integration of a solar power heating system or a log-wood boiler
- Multi-boiler systems (boiler master-and-slave circuits)

Your installer can advise you specifically with regard to the water connection! Components of acoustically-insulated water connections must be impermeable to oxygen, otherwise there is an increased risk of corrosion, which also has the effect of voiding the warranty. If plastic pipes for floor heating systems or district heating pipes are connected, it is necessary to integrate a limiting thermostat for the boiler circuit pumps to provide additional protection against excessive temperatures. With respect to the condition of the boiler water, VDI 2035 and ÖNORM H 5195 T1 and T2 must be unconditionally complied with, otherwise there is a risk of corrosion, which may void the warranty. In terms of corrosion on the one hand you must not get oxygen brought in the system on the other hand take care on the electrical conductivity of the heating water. To prevent deposits caused by chalk and corrosion sludge we recommend installing a dirt separator in the return flow as well as a microbubble resorber in the forward flow.

Electrical connections KWB Pelletfire Plus

The entire system internal wiring is done in the factory or is set up plug-ready by the installation personnel. On site, only a licensed electrical installation company should execute the mains connection and the boiler-external cabling, and in the case of a network, the bus cabling of the heating circuit expansion modules and for the room control units.

Required connections to be provided by customer:

- Mains connection: single-phase connection 230 V_{AC}, supply 3-pole (L/N/PE), surge arrester 13 A, Typ C
- CEE socket supply 5-pole (L1/L2/L3/N/PE), with fault current protection switch and overvoltage arrester for the

house distribution board (recommended as lightning protection), 400 V_{AC} line protection switch 13A, type C

- Danger switch "emergency stop" (230 V_{AC}, cable cross section at least 1.5 mm²)
- If using KWB Comfort SMS: outlet 230 V_{AC}
- If using fuel extractor modules: per module 1 CEE socket 5-pole (L1/L2/L3/N/PE), 400 V_{AC}

Outputs:

Floating contacts with max. 2 A switched current, 230 V_{AC}

- Fault warning output.
Combined fault warning contact (e.g. for remote warning through telephone dialling).
 - Fault 1: NC contact to indicate faults.
 - Fault 2: NO contact to indicate faults.
- Power (the following options are also possible as alternatives):
NO, configurable for.
 - Burner operation display (modulation between partial load and nominal load).
 - Boiler master-and-slave circuit to request a second boiler.
 - Fuel extractor for common stirrer drive.
- Smoke extractor.
 - NO contact for activating an external smoke extractor.
 - The boiler is released by the controller of the external smoke extractor via external 1 (floating contact).

Inputs:

24 V_{DC} supply to connect floating contacts.

- External 1: To switch on the boiler (e. g. when using a smoke extractor).
If this input is not used, it must be short-circuited.
- External 2: Multifunction input.
 - Heating to desired 2: To request the boiler with the second boiler temperature desired temperature or as a request contact for external third-party controls (request duration should be at least 30 minutes).
 - For holiday remote control (does not work with external boiler request).
- Emergency stop switch:
Connection of the emergency stop switch (in accordance with applicable regulation TRVB H 118)

KWB Power Converter

A KWB Power Converter is necessary to be able to operate KWB Pelletfire Plus heating systems in 230V-networks.

The KWB Power Converter is only suitable for the KWB Multifire with max. 1 conveyor system motor. The KWB Power Converter is pre-wired internally, but must be connected to >>

* in accordance with ÖNORM EN 13501

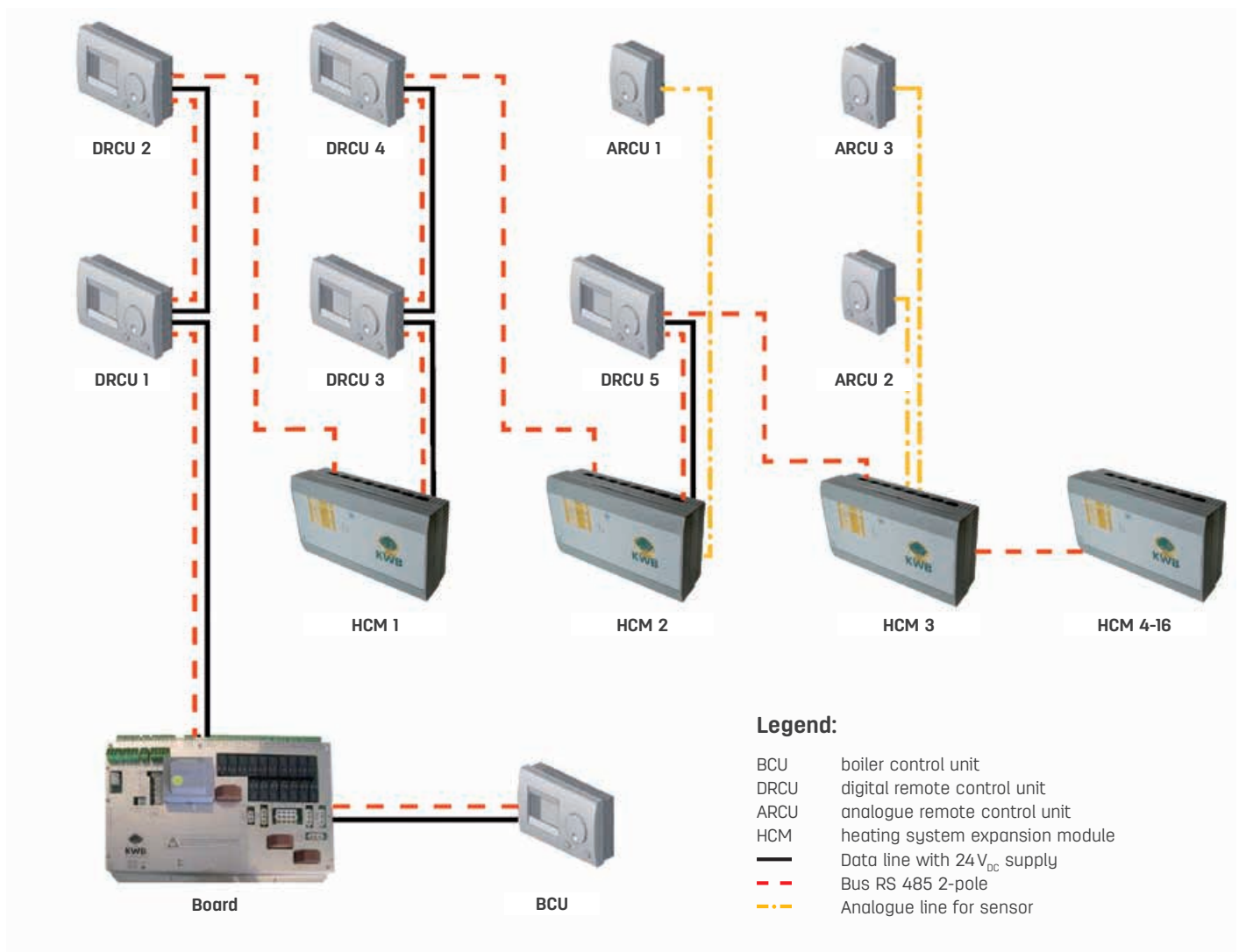
the boiler and the mains during installation.

Consisting of:

- Switch box for wall mounting
- 3 frequency converters (main drive motor, heating exchange motor and conveyor system motor)
- Activation electronics

Bus system – conditions

- Bus cable: CAT.5e, S/FTP; 4 × 2 × AWG 24, maximum length 850m, for underground installation: CAT.5e, 4 × 2 × 0.5 mm².
- Laid out in a separate conduit (not together with 230/400V_{AC}).
- Network stations in one line (no branches, no ring).
- If the boiler control unit in the room is used, it is necessary to install an empty base with bus connector CAT.5e (not possible in combination with the KWB Comfort SMS).
- Max. 2 digital remote control units after a heating circuit expansion module or heating-system master board are supplied with voltage. Each heating circuit module must be powered with 230V and 50Hz mains voltage for the heating circuit module itself and for any connected DRCUs, pumps and mixer servomotors.
- For each heating circuit, an analogue remote control unit (no bus station) can be used independent of the bus stations. Wiring is the same as for a room sensor.



GUARANTEES AND WARRANTIES

From warranty
too full
guarantee

OUR STANDARDS



Statutory warranty



Heat exchanger guarantee



Spare part delivery guarantee

ADDITIONAL PACKAGES



Maintenance agreement

- ✓ 3 year guarantee
- ✓ We will remind you annually
- ✓ Cost saving as compared to individual maintenance



Guarantee Pass

- ✓ 6 year guarantee
- ✓ On all spare/wearing parts
- ✓ Service during replacement of spare/wearing parts free of charge as part of maintenance



The carefree package

- ✓ Calculable fixed costs
- ✓ The all inclusive package

KWB THE BIOMASS HEATING SYSTEM

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