

KWB Multifire

Wood-chip and pellet heating system



Available from your
KWB installer / heating
engineer



Technology and planning
Wood-chip and pellet heating system
KWB Multifire 15-100 kW

We provide energy for life!



Heating with biomass

When heating with wood you protect the environment, safeguard local jobs, and you are independent of the global market. As opposed to burning fossil fuels, no additional CO₂ is released when burning wood. Thus the use of wood makes a valuable contribution to the reduction of greenhouse gases and reduces global climate change.

Local energy resources: Wood chips

As a fuel wood chips offer the combination of regional value creation, cost-effective generation of heat, and the convenience of an automatic firing system in one. All types of natural recovered wood, e. g. storm-damaged wood, bark, branches, and even waste from carpenters' shops and joiner's workshops, are suitable for the production of wood chips. Wood chips are primarily produced and sold by local farmers who chip the wood after a drying phase of several months. Careful processing and drying enable optimal storage capability and trouble-free heating operation with small amounts of ash and low emissions.



Fuel of the future: Pellets

Pellets are manufactured of wood chips without synthetic additives and are constantly inspected for quality and safety by in-house and external controls. Pellets are environmentally friendly in production and use, create new jobs, and when they are burned the CO₂ content of the atmosphere remains the same. In addition, due to high energy content, convenient possibilities for delivery and storage, etc. pellets are the ideal fuel for automatic heating systems.



Rely on quality

All KWB heating systems are Austrian quality products and satisfy the strictest European standards, tests, and regulations. Internal and external quality assurance systems ensure the best workmanship and maximum functional reliability. Our constant goal is to offer manufacturing quality that surpasses the industry average – so that you can rely on us.

More security, guaranteed

At KWB, one of our top priorities is to ensure that our systems prove themselves optimally under all conditions. Whoever relies on quality, like KWB, can offer the best guarantees with confidence:

- **3 years guarantee on all biomass heating systems if a maintenance contract is concluded**
- **8 years guarantee on the heat exchanger if a working return-flow boost device is installed**
- **15 years guarantee on spare-parts availability.**

Award-winning

“KWB stands for the highest quality. The awards that we have won are confirmation of the path we are pursuing, and which we will consistently continue to pursue.”

 <p>Test result Good, Foundation for quality tests in Germany</p>	 <p>Test result Good, Foundation for quality tests in Austria</p>	<p>Quality management</p>  <p>EN ISO 9001 Zertifikat Nr. 20 100 9755 www.tuv.at</p>	 <p>53.086</p>	<p>Safety management</p>  <p>OHSAS 18001 Zertifikat Nr. 20 116 72002276 www.tuv.at</p>	 <p>Innovation prize 2004 for TDS Powerfire</p>	 <p>Energy Globe Styria 2004 for TDS Powerfire</p>
QUALITY				INNOVATION		

 <p>Blue Angel eco-label for KWB Easyfire</p>	 <p>Green Power (Ökostrom) customer</p>	 <p>Eco-label Austria</p>	 <p>Member of the Climate Alliance</p>	<p>Conformance with EC directives</p> 	<p>Emissions and efficiency test</p>  <p>Wieselburg</p>	<p>Environmental management</p>  <p>EN ISO 14001 Zertifikat Nr. 20 104 3133 www.tuv.at</p>
ENVIRONMENT						

KWB Multifire: System types

The KWB Multifire with rated power ranging from 15 to 100 kW is the optimal solution for supplying heat for single-family homes to larger buildings in the residential and public sector (e.g. agricultural buildings, schools, multi-story residential buildings, commercial buildings, etc.) as well as for district heating networks. The KWB Multifire system is characterised by flexible use of fuel. Wooden pellets of 6 mm or 8 mm diameter are suitable as fuel for the pellet heating system of KWB Easyfire (8 mm diameter pellets have not been cleared for the following fuel extractors: Elbow conveyor, conveyor worm with suction conveyor, fabric tank with worm extractor and buried tank with suction conveyor) in accordance with ÖNORM M7135 or DIN Plus as well as wooden pellets of A1 quality class in accordance with EN14961-1.



USV D
(15 – 100 kW)

With 10-litre hopper



The heating system is available as a left-orientation or right-orientation version



USV ZI
(15 – 100 kW)

With 200-litre hopper



The heating system is available as a left-orientation or right-orientation version



USV GS
(40 – 100 kW)

With 120 litre hopper

for pellet operation and suction conveyor



The heating system is available as a left-orientation or right-orientation version



USV V
(15 – 40 kW)

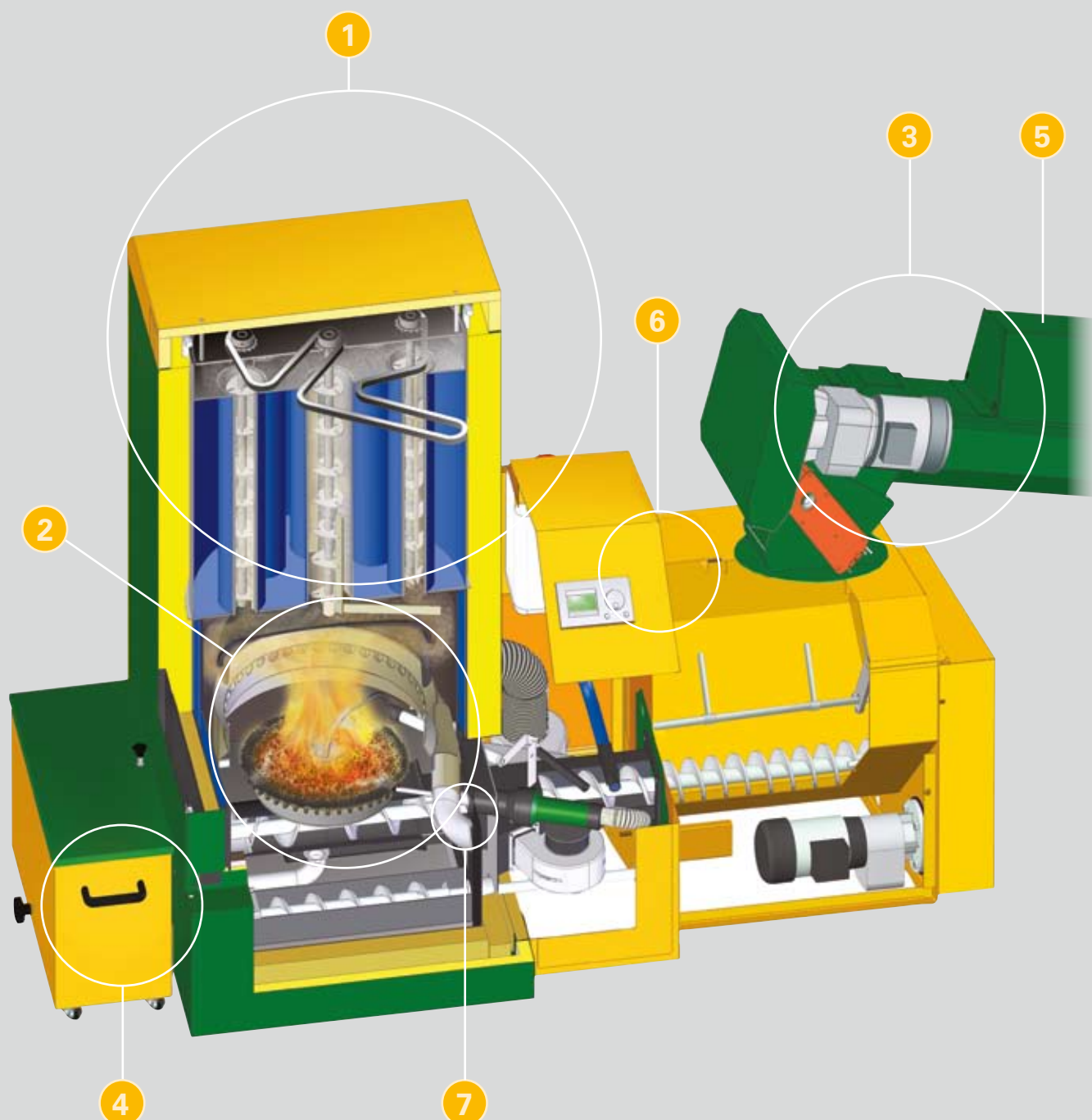
With 1,000 litre fuel storage container



The heating system is available as a left-orientation or right-orientation version

KWB Multifire 15, 25, 30, 40, 50, 60, 80 and 100 kW

1. **Heat exchanger:** Upright, automatic dedusting heat exchanger with special turbulators
2. **Combustion system:** Underfeed gasifier, ring nozzle burner, high-temperature bounce dome, turbulent burnout zone
3. **Fire shutter:** Gas-tight, burnback-proof, tested
4. **Ash removal system:** Automatic ash removal, ash compaction and fill level monitoring
5. **Fuel extractor:** Reliable conveyor technology for rigorous individual requirements
6. **Operating and control system KWB Comfort 3:** Innovative, easy-to-operate, automatic, and unique
7. **Stoker screw:** Stainless steel spirals with carbide coating



PROVEN

KWB firing technology

Learn from successful systems – with this perspective the well-designed and award-winning **control concept** of the KWB Powerfire series was also implemented in the KWB Multifire. The lambda control system in combination with a negative pressure regulating device ensures optimal combustion conditions and minimum emissions. This control system is supplemented with the proven **underfeed system with fuel quantity sensor** in the KWB Multifire. Starting with a boiler capacity of 30 kW the KWB Multifire also includes the **KWB MultiFlex** burner extension, i.e. the burner plate is equipped with an efficient cleaning mechanism. This makes the KWB Multifire even more reliable when using ash-rich wood fuels that tend to produce scoriae. This option ensures minimum customer-maintenance effort and maximum convenience.



ECONOMICAL

KWB heat exchangers with special turbulators

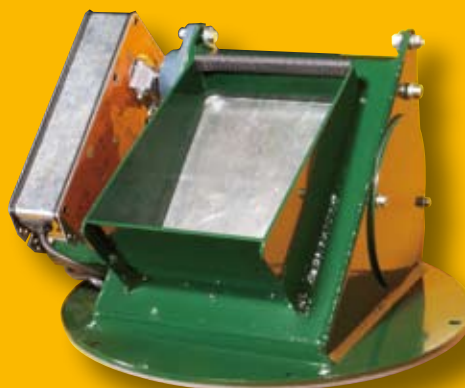
We have been able to enhance the proven automatic heat exchanger cleaning technology through development of new turbulators. These turbulators ensure an optimal exchange of heat due to the improved cleaning effect and a reduction in flow loss. The result is a **uniformly high level of efficiency** and maximum economy for the customer.



RELIABLE AND SAFE

KWB safety system

Our 3-stage safety concept consists of a fuel quantity sensor on the burn pot, an emergency extinguishing device in the underfeed trough, and a gas-tight closing fire shutter at the drop shaft point between fuel extractor and hopper. The fire shutter also functions in emergency situations, such as power cut – thus optimum safety is ensured.



INNOVATIVE

KWB Comfort 3 control unit

The **2-button control unit with dial** and **easy-to-understand graphic display** is a KWB innovation. A logically structured menu system shows users of KWB heating systems how to adjust all personal parameters for heating circuits, buffer tanks and DHWC, etc. Further advantages include controlling the heating system by means of SMS text messages with the **KWB Comfort SMS**



and visualisation and remote maintenance using the **KWB Comfort Visio**. The **KWB Comfort InterCom** is another new addition to the product line; it is an interface for data exchange between the KWB control system and external systems. With the **KWB Comfort Solar** control system, a solar heating system can also be regulated.



CONVENIENT

KWB ash-removal system

Two ash removal screws automatically transport the ashes from the combustion chamber into the attached ash container. The ash is compacted in the ash container – this makes **operation even more convenient** – the ash container only needs to be emptied every 2 to 10 weeks. An ash fill-level monitor prevents ashes from being pushed out of the container and ensures that the boiler room stays clean.



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UNIQUE

Minimum power consumption thanks to technically optimised operation

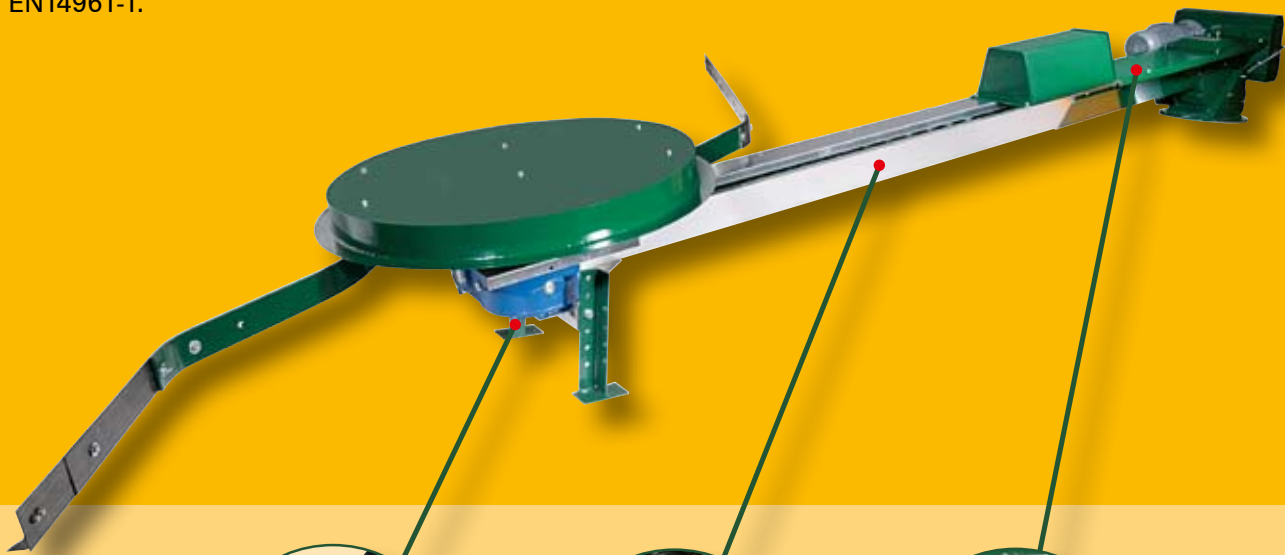
The hopper in its attractive and stable design is only available from KWB. A light barrier system in the container automatically regulates the fill level. The hopper **extends the service life** of the fuel extractor and **minimises power costs** because the conveyor system does not start up as often.



KWB conveyor systems: The optimum customer-specific solution

The KWB fuel-extractor system with floor-level stirrer (stirrer diameter: 2.5 to 5.5 m) and conveyor screw on a massive, hollow shaft supported by two bearings, is adapted to on-site conditions and tailored to the specific needs of the customer. Fuel storage rooms can be square, rectangular or round, and can be located above the boiler room level, at the same level, or even below the boiler room level (please see KWB installation examples starting on page 19).

The fuel extractor is suitable for wood chips to grain size G50 in accordance with ÖNORM M7133 or B1 P16B in accordance with EN14961-1 and for burning wood pellets diameter 6mm and 8mm in accordance with ÖNORM M7135 or DIN Plus as well as wood pellets of A1 and A2 quality class in accordance with EN14961-1.



KWB heavy-duty gear unit



KWB conveyor screw



*Section of
a KWB conveyor screw*

KWB fuel extractor – your advantages

Reliable, long service life

- **Long service life and high-level wear-resistance** of the screw thanks to stainless steel spirals in the feed area and a maintenance-free, double-sealed heavy-duty gear unit in trough form
- **No overfilling of the screw trough** due to progressively ascending spirals, asymmetric opening, and reverse travel screw
- **The screw is not buoyed upward** in the trough due to optimised trough shape

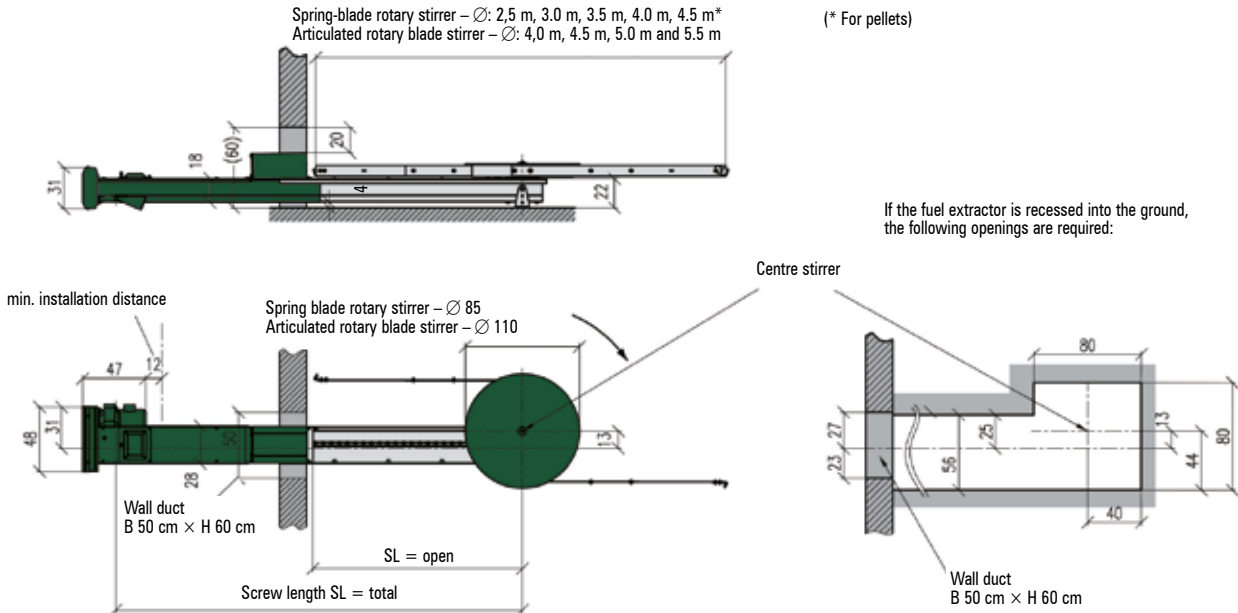
Convenient and individual

- **Efficient emptying** of the bunker even with larger stirrer diameters due to uniform contact force of the articulated-blade rotary stirrer over the entire diameter
- **Complete utilisation** of storage room space is possible due to different ascending-screw implementations.
Customer-specified screw length (lengths of over 12 m on request)
- **Low power consumption** by avoiding mechanical resistance

Conveyor systems: The optimal solution for every constructional situation

Floor-level rotary-blade stirrer

The floor-level rotary-blade stirrer is available in two different designs depending on requirements: As a spring-blade rotary stirrer (stirrer diameter: from 2.5 up to 4.0 m) and as an articulated rotary-blade stirrer (stirrer diameter: from 4.0 to 5.5 m stirrer diameter).

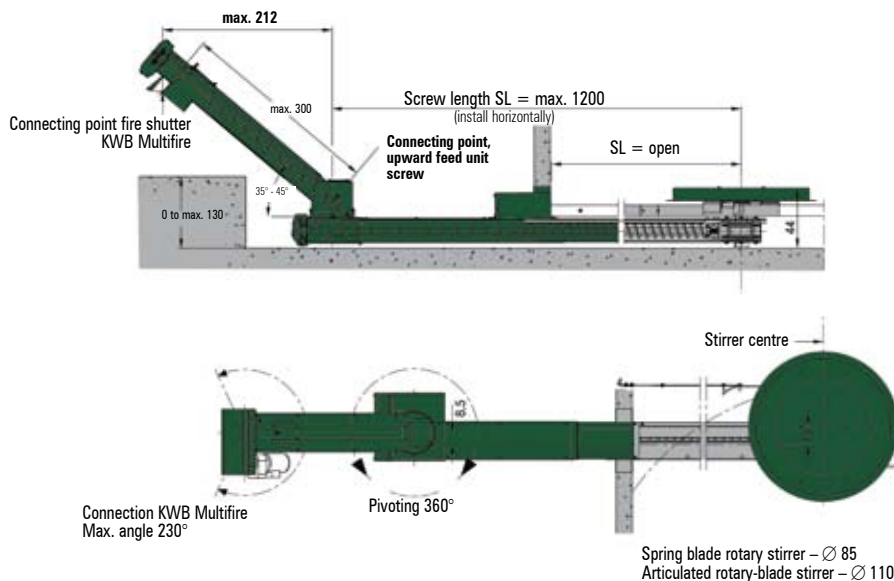


Ascending screws

For situations where there are level differences between storage room and boiler room, or for horizontal installation of the stirrer, there are two innovative ascending-screw variants available from KWB: the ascending screw with push interface connection, as well as the ascending screw with drop shaft.

Ascending screw with push interface connection

(Possible to 60 kW for wood chips, and to 150 kW for pellets)

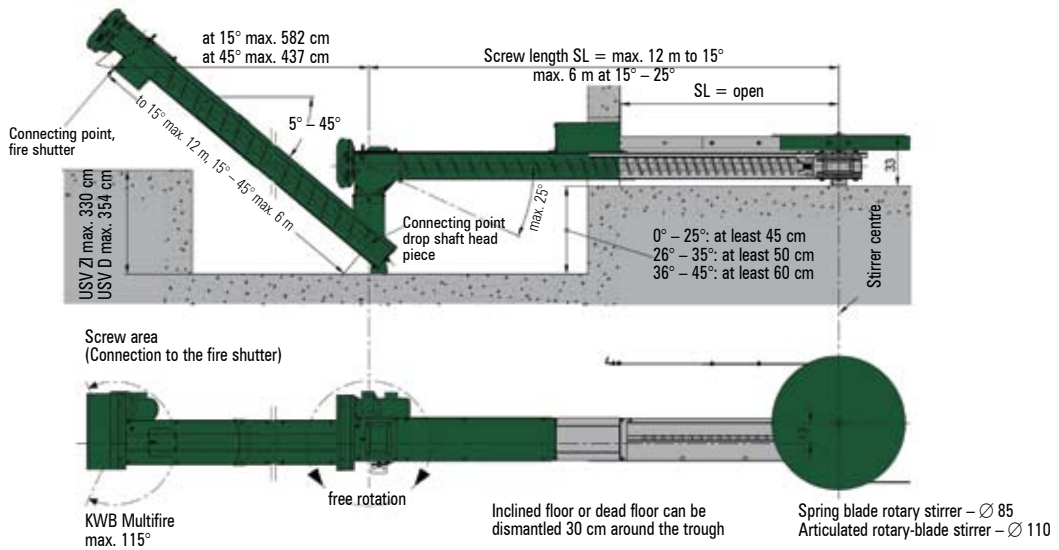


The sloping floor or dead floor must be executed so that it can be dismantled along the fuel extractor trough.

All dimensions in cm

Ascending screw with drop shaft

Outline
(cropped)



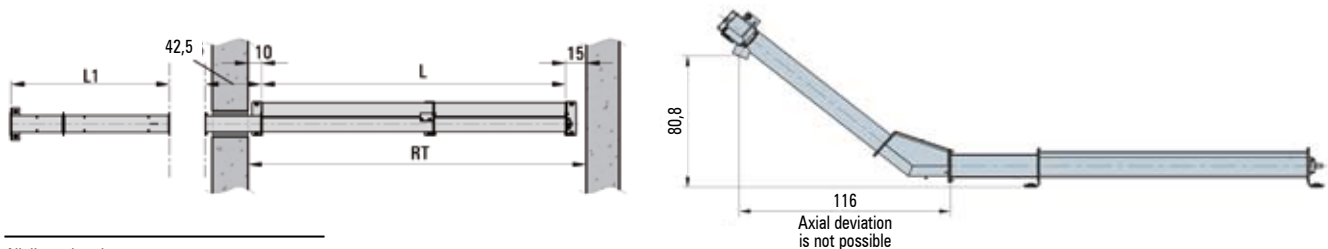
All dimensions in cm

KWB Multifire with pellet operation

For pure pellet KWB Multifire operation the lower-cost conveyor systems from the pellet fuel extractor product line can be used. This unit can be modularly extended and consists of conveyor screw or Pellet Stirrer Plus, which can be combined with ascending screw, conveyor trough extensions, or a suction conveyor. A drop hose design of the conveyor trough or of the Pellet Stirrer Plus is also possible.

Combination, pellet elbow screw with KWB Multifire

USV D



All dimensions in cm

Conveyor screw

Feed screw L = 1,300 mm, RD mind. 1,550 mm
 Feed screw L = 1,800 mm, RD mind. 2,050 mm
 Feed screw L = 2,300 mm, RD mind. 2,550 mm
 Feed screw L = 2,600 mm, RD mind. 2,850 mm
 Feed screw L = 2,800 mm, RD mind. 3,050 mm

Feed screw L = 3,100 mm, RD mind. 3,350 mm
 Feed screw L = 3,600 mm, RD mind. 3,850 mm
 Feed screw L = 4,600 mm, RD mind. 4,850 mm
 Feed screw L = 4,900 mm, RD mind. 5,150 mm
 Feed screw L = 5,400 mm, RD mind. 5,650 mm

Conveyor trough extension

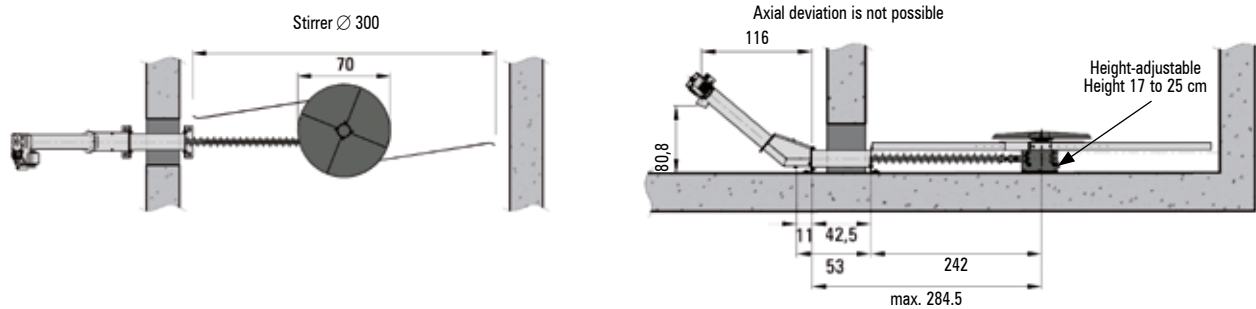
Conveyor trough extension L1 = 400 mm
 Conveyor trough extension L1 = 800 mm
 Conveyor trough extension L1 = 1,200 mm
 Conveyor trough extension L1 = 1,600 mm
 Conveyor trough extension L1 = 2,000 mm
 Conveyor trough extension L1 = 2,400 mm



Combination, Pellet Stirrer Plus and ascending screw with KWB Multifire

USV D

The Pellet Stirrer Plus consists of the stirrer, the gear unit, and a screw that is custom-shortened on site. If the boiler room is adjacent to the boiler room then the Pellet Stirrer Plus is combined with an ascending screw. For storage rooms that are above the boiler room the Pellet Stirrer Plus is also available in a drop hose design. The great advantages of this stirrer are that a slope floor construction is not required and the storage room volume can be ideally utilised. Planning and installation efforts are reduced to a minimum for the tradesman.

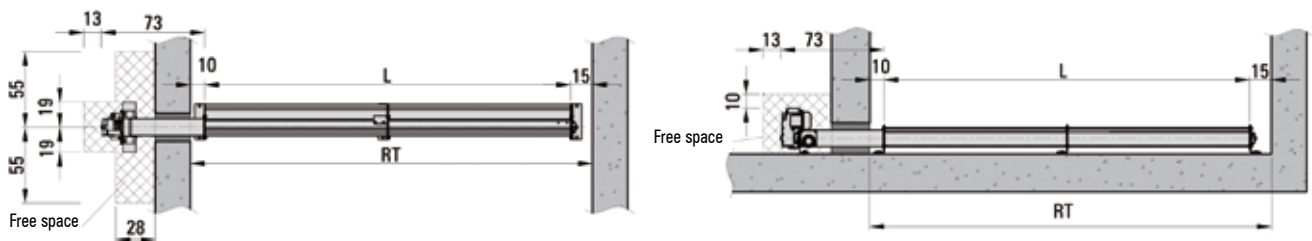


Combination KWB Multifire with pellet operation and suction conveyor

The KWB Multifire with suction conveyor (USV GS) can be combined with a storage room extractor system (pellet conveyor screw and Pellet Stirrer Plus), a fabric tank or with a buried tank. The suction conveyor consists of a storage container (fill volume approximately 120 litres), a suction turbine, and two suction hoses. The system is particularly well-suited for storage rooms that are further removed from the boiler room, as well as for storage rooms adjacent to, above, or below the boiler room. With this variant pellets are extracted from the storage room via screw or stirrer and transported by vacuum pressure from the vacuum turbine into the storage container via a suction hose. Suction hose lengths of 25 m are no problem in this regard. The system is absolutely reliable, offers low power consumption, and is extremely quiet in operation thanks to a acoustically insulated hood.

Combination, pellet conveyor screw and suction conveyor with KWB Multifire

USV GS



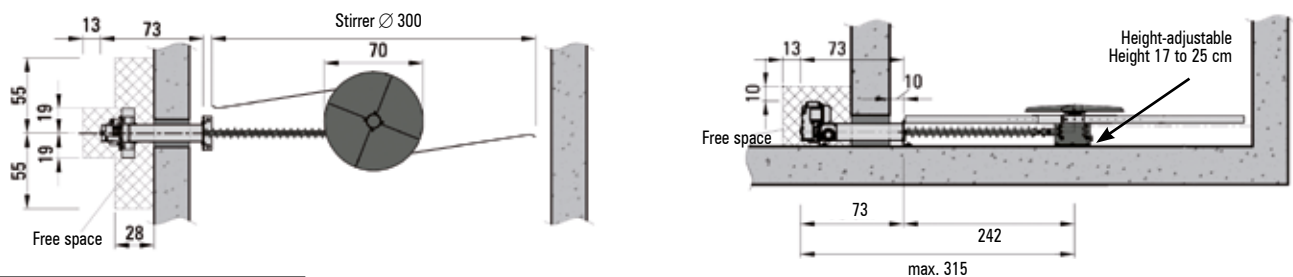
Conveyor screw

Feed screw L = 1,300 mm, RD mind. 1,550 mm
 Feed screw L = 1,800 mm, RD mind. 2,050 mm
 Feed screw L = 2,300 mm, RD mind. 2,550 mm
 Feed screw L = 2,600 mm, RD mind. 2,850 mm
 Feed screw L = 2,800 mm, RD mind. 3,050 mm

Feed screw L = 3,100 mm, RD mind. 3,350 mm
 Feed screw L = 3,600 mm, RD mind. 3,850 mm
 Feed screw L = 4,600 mm, RD mind. 4,850 mm
 Feed screw L = 4,900 mm, RD mind. 5,150 mm
 Feed screw L = 5,400 mm, RD mind. 5,650 mm

Combination Pellet Stirrer Plus and suction conveyor with KWB Multifire

USV GS



All dimensions in cm



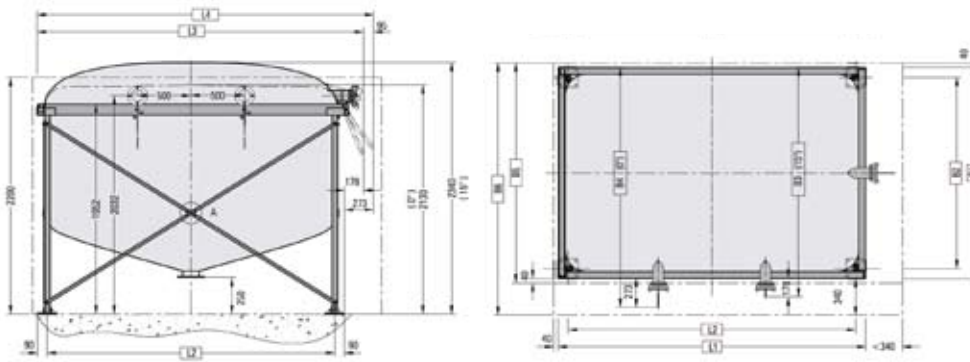
Combination, fabric tank with KWB Multifire

USV GS



The fabric tank is a cost-effective and flexible storage variant. Standard sizes of 3.2 to 5.4 tons fill content are available for selection; they are made of dust-proof, anti-static fabric that is supported by a metal frame. Fuel extraction from the fabric tank and transport to the heater is executed with an extractor unit and suction conveyor. The fabric tank can be set up either directly in the boiler room (maintaining a certain minimum distance to the boiler system) or in a separate room, which, given certain prerequisites, does not need to satisfy F90 or REI90 requirements. In any case the local fire safety regulations must be complied with. If appropriately protected

from weather influences, such as rain and wind, the fabric tank can even be set up outdoors.



Extractor unit for vacuum conveyor

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			Type						
			ZG3000	ZG3400	ZG3500	ZG4000	ZG4800	ZG5000	
Capacity		[t]	2.8–3.2	3.0–3.4	3.1–3.7	3.5–4.0	4.2–4.8	4.6–5.4	
Provided openings in the tank for attaching the fill nozzle(s)		[pc.]	1	1–2	1	1–3	1–3	1–2	
Two fill openings are necessary for filling on the long side for ZG5000, ZG4000 and ZG4800!									
Length dimensions	L1	Frame outer dimensions (length)	[mm]	1,970	2,270	2,270	2,870	2,870	2,870
	L2	Axial dimension floor plate (length)	[mm]	1,780	2,080	2,080	2,680	2,680	2,680
	L3	Max. length for fill nozzle 15°	[mm]	2,138	2,438	2,438	3,038	3,038	3,038
	L4	Max. length for fill nozzle 0°	[mm]	2,233	2,533	2,533	3,133	3,133	3,133
	L5	Min. room length	[mm]	2,350	2,650	2,650	3,250	3,250	3,250
Width dimensions	B1	Frame exterior dimensions (width)	[mm]	1,970	1,970	2,270	1,970	2,270	2,870
	B2	Axial dimension floor plate (width)	[mm]	1,780	1,780	2,080	1,780	2,080	2,680
	B3	Max. width for fill nozzle 15° long side	[mm]	2,138	2,138	2,438	2,138	2,438	3,038
	B4	Max. width for fill nozzle 0° long side	[mm]	2,233	2,233	2,533	2,233	2,533	3,133
	B5	Min. room width without nozzle long side	[mm]	2,050	2,050	2,350	2,050	2,350	2,950
	B6	Min. room width with nozzle long side	[mm]	2,350	2,350	2,650	2,350	2,650	3,250

Combination, buried tank with KWB Multifire

USV GS

If no space at all is available for a storage room inside a building, it is possible to install a buried tank, which is buried in the garden, and from which the pellets are transported to the KWB Multifire via 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 from Geoplast Kunststofftechnik GmbH, A-6204 Theresienfeld, Bahnstr. 45, www.pelletstank.com.

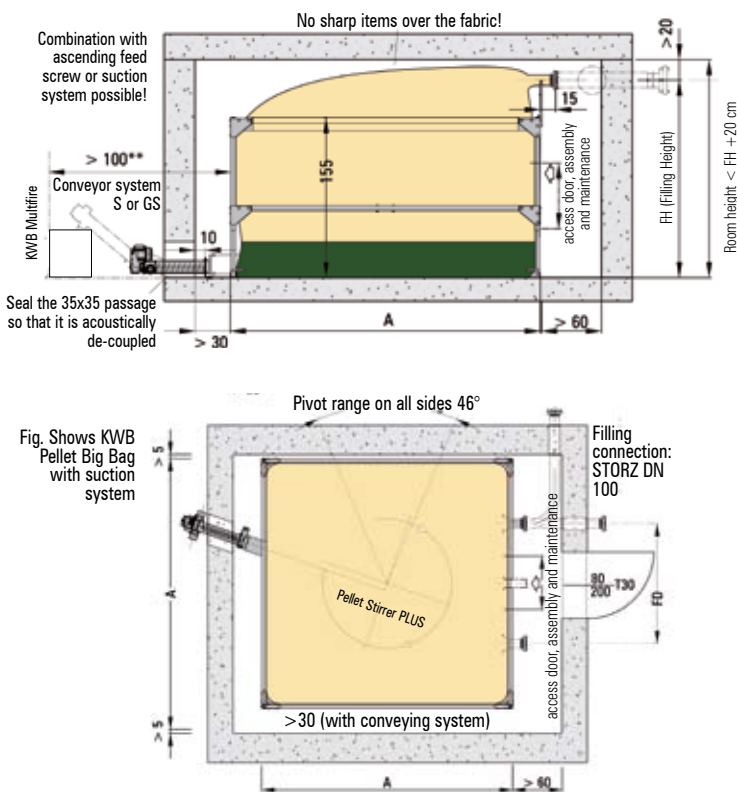




Combination, KWB Pellet Big Bag with KWB Multifire USV D or USV GS

Fuel extractor: Pellet Stirrer Plus with elbow screw or suction conveyor

KWB Biomass heating systems offers yet another confirmation of its competence in the area of conveyor and storage technology with the KWB Pellet Big Bag. The fuel is extracted from the KWB Pellet Big Bag and transported to the heating system with the Pellet Stirrer Plus in combination with the elbow screw (USV D) or suction conveyor (type USV GS). The KWB Pellet Big Bag particularly scores points with 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. Maintaining a specific minimum distance to the heating system, the KWB Pellet Big Bag can be set up in the boiler room (depending on the local fire-safety regulations), in the storage room, or it can be set up outdoors, if protected against weather.



Length x Width A:	A:	[m]	1,5 x 1,5 m	2,0 x 2,0 m	2,5 x 2,5 m	3,0 x 3,0 m
Fill quantity* (max.):	Bottom filling nozzle	[t]	< 2,2t	< 3,9t	< 6,5t	< 9,3
Fill quantity* (max.):	Top filling nozzle	[t]	< 2,3t	< 4,1t	< 6,9t	< 10,5t
Fill height	FH:	[cm]	162 or 177 or 192			
Room height (min.)	RH:	[cm]	FH + > 20cm			
Fill distance	Quantity	Pc.	1 Pc.	1 Pc.	2 Pc.	2 Pc.
Füll-Distanz	FD:	[cm]	-	-	100 cm	140 cm

* The capacity depends on: Fill technology, pellet characteristics, available space, container size and height of the injection connector!

** Local fire safety regulations must be strictly complied with – if required, the KWB Pellet Big Bag can be set up directly in the boiler room.

The KWB Pellet Big Bag can also be set up outdoors under suitable weather conditions.

The KWB Pellet Big Bag does not require any extraction - the air escapes through the fabric and it must be able to escape via a window or vent (at least 400 cm²) into the air.

Please ensure that the storage room can sustain the weight (pellet filling, KWB Pellet Big Bag, conveyor system, installation personnel...)!

KWB Comfort 3 microprocessor control system

KWB Comfort 3 is a modularly designed system that is used to operate and regulate the KWB biomass heating systems.

All adjustments can be made using the **2-button control unit** together with a **dial** on the innovative, easy-to-understand **graphic display**. Parameters for boiler, heating circuit, DHWC, and buffer tank can be easily configured using the logically structured menu system.

The control unit adjusts boiler output according to heat demand, fully automatically and infinitely variable from standby to full load. The control concept ensures optimum combustion conditions, minimum emissions, and maximum economic efficiency.

In addition to **regulating the burner**, it also provides comprehensive **heat management** – from a single-family home to a district heating network. As a modular, expandable system, the KWB Comfort enables control of up to 34 heating circuits, 17 buffer tanks and 17 DHWCs. It is also possible to link several digital or analogue remote-control devices — of course, all capable of being retrofitted.



Boiler control unit



Analogue remote control unit



Heating circuit expansion module



KWB Comfort Solar

The control unit consists of the following components:

- 1. 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.
- 2. Boiler control unit:** Another KWB innovation. This module is used to operate and regulate the boiler and for purposes of heat management. The boiler control unit can additionally be used as a data display, room thermometer and remote-control unit.
- 3. Analogue remote control unit:** Simple operation for a heating circuit with room sensor consisting of dial for adjusting the desired room temperature by ± 5 °C and a 4-position slide switch for selecting the heating program: automatic mode, lower mode, frost protection mode or day operation.
- 4. Digital remote control unit:** Enables operation of one or more heating circuits with room sensor as well as configuration and monitoring of heating circuit, DHWC and buffer tank management from the living room.
- 5. 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 by digital remote control devices.
- 6. KWB Comfort Solar:** Through the KWB Comfort Solar control system the heating system is controlled in such a manner that free-of-charge solar energy is optimally routed into the buffer tank. In addition to functionality and design the solar control system is primarily characterised by the self-explanatory user interface. A convenient commissioning wizard is available for the heating engineer.

KWB Comfort SMS

Use your own mobile phone to query the actual operating states and actively control your heating system (holiday program, party operation). In addition to switching the heating system on and off, actual operating states can be queried or adjustments can be made for heating circuits, DHWC, buffer tanks, etc. In addition alarm messages are sent to the mobile phone.

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



KWB Comfort Visio

KWB Comfort Visio is a new component of the KWB Comfort series for visualisation, remote monitoring and remote control of your KWB heating system via PC. The design of the KWB Comfort Visio is revolutionary with respect to project planning and commissioning. Attach it, switch it on, and you are on your way – the KWB Comfort Visio adapts itself automatically to your heating system. KWB Comfort Visio is available in English and German.

Monitoring and operation

Operating values of boiler, heating circuits, DHWCs and buffer tanks can be displayed with the KWB Comfort Visio.

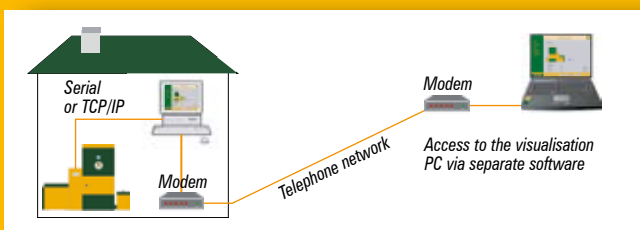
All the configuration parameters of the heating system are displayed and can be changed on the visualisation interface. In addition, KWB Comfort Visio offers a comprehensive alarm management system, consisting of alarm statistics and log, as well as an extensive help system for the specific alarms.

Archiving

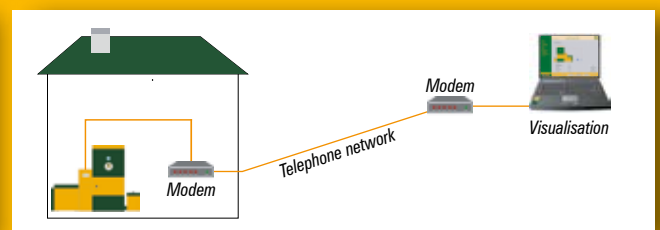
When using a local computer, the comprehensive data recording and evaluation possibilities of the KWB Comfort Visio can be used.

Remote maintenance

The heating system can be accessed from any location via modem. Thus the heating system can be monitored and you can intervene if necessary. This also allows KWB customer service to remotely maintain the customer's heating system.



Possibility 1: Visualization PC near the system



Possibility 2: No PC near the system

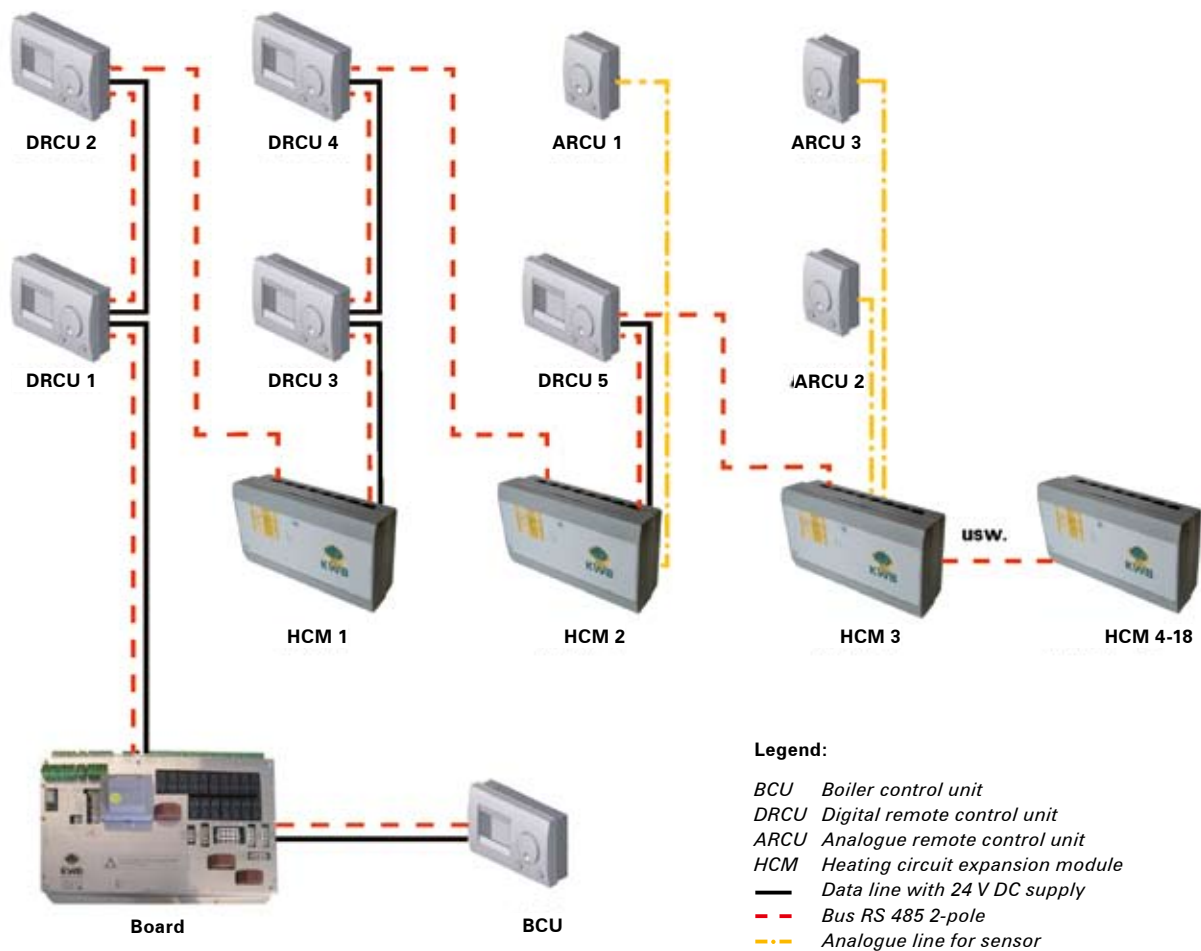
KWB Comfort InterCom

KWB Comfort InterCom is an interface for data exchange between the KWB Comfort control system and external systems, such as higher-level control or visualisation systems, central building control systems, etc. The data is exchanged via a serial connection, network connection, or analogue modem connection.

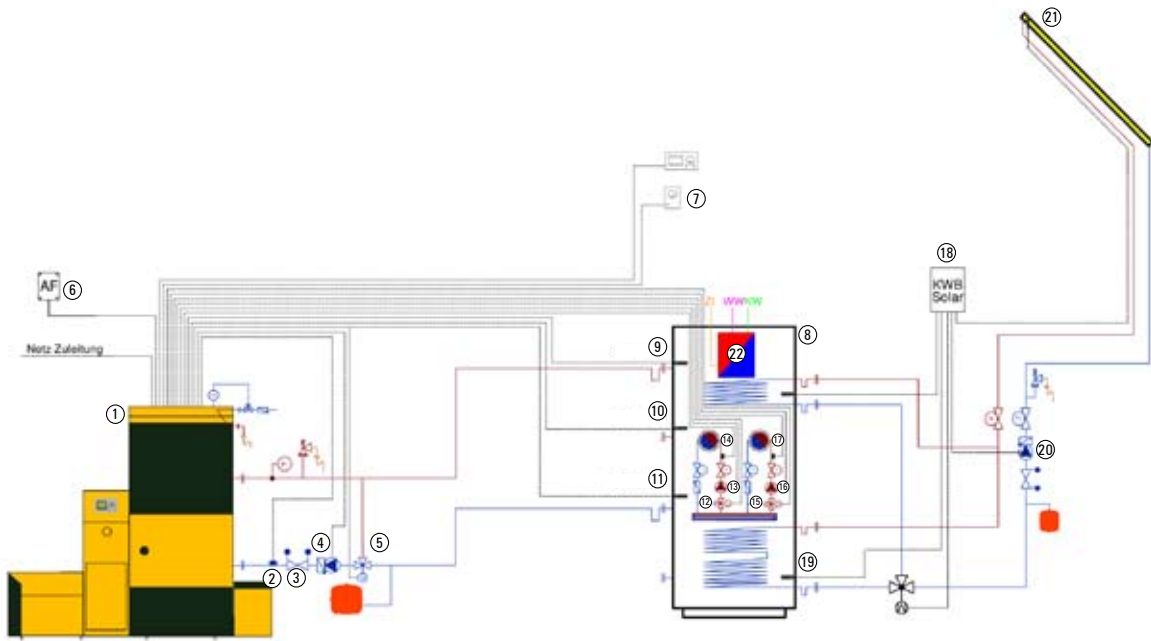
All boiler operating status parameters as well as individual alarms can be read out on the KWB Comfort control system. In addition several parameters such as "Switch system on/off" can be changed by external systems in the KWB Comfort control system.

Bus system – conditions

- Bus cable: CAT.5e, S/FTP; 4 × 2 × AWG 24, maximum length 850 m, for underground installation: CAT.5e, 4 × 2 × 0.5 mm²
- Lay out in a separate conduit (not together with 230/400 V 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 (with voltage supply). Each heating circuit module must be powered with 230 V 50 Hz mains voltage for the heating circuit module itself and for any connected digital remote control units, pumps and mixer servomotors.
- For each heating circuit, an analogue room control unit (no bus station) can be used independent of the bus stations. Wiring is the same as for a room sensor.

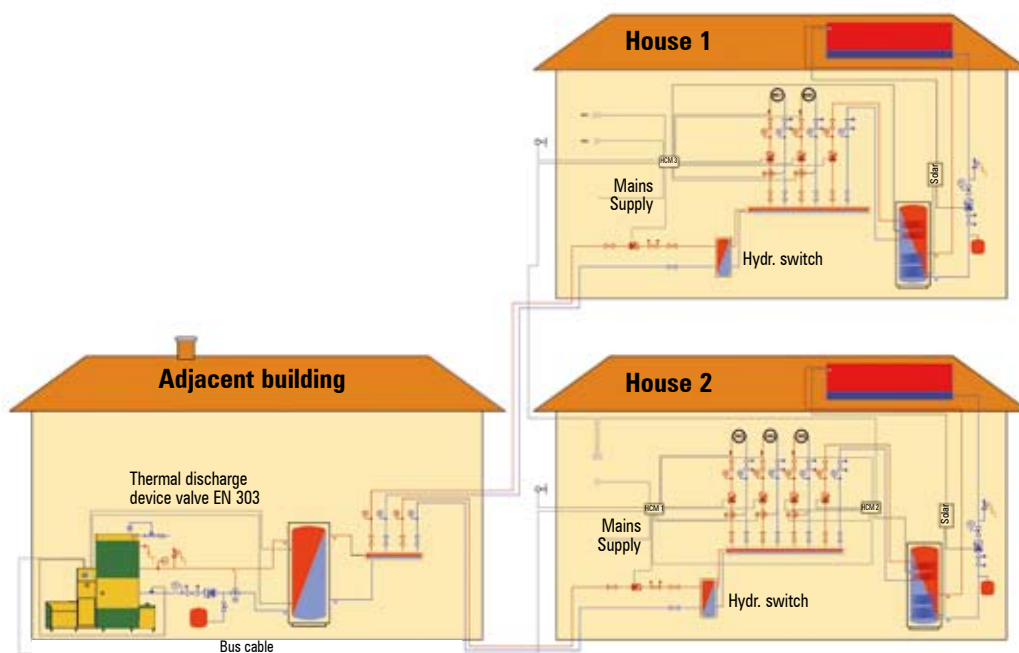


IMPLEMENTATION RECOMMENDATION: KWB Multifire with KWB EmpaCompact Solar



- | | | |
|---|-------------------------|------------------------------|
| 1 Boiler | 8 KWB EmpaCompact | 17 Flow sensor HC2 |
| 2 Return temperature sensor | 9 DHWC sensor | 18 KWB Comfort Solar |
| 3 Pipe regulating valve | 10 Buffer tank sensor 1 | 19 Buffer tank sensor, solar |
| 4 Pump of return temperature control
(calculate performance) | 11 Buffer tank sensor 2 | 20 Collector pump |
| 5 Constant return temperature control
or mixing valve with accurator | 12 Mixer HC1 | 21 Collector sensor |
| 6 Outdoor sensor | 13 Pump HC1 | 22 Fresh water module |
| 7 Remote control digital/analogue | 14 Flow sensor HC1 | |
| | 15 Mixer HC2 | |
| | 16 Pump HC2 | |

IMPLEMENTATION RECOMMENDATION: District heating network



Type USV ZI with stirrer and ascending screw with upward transfer



18

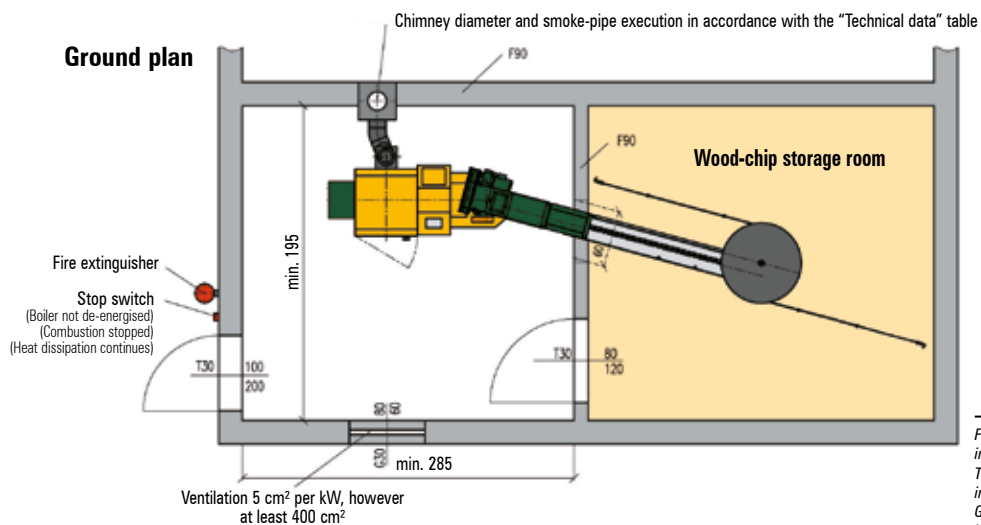
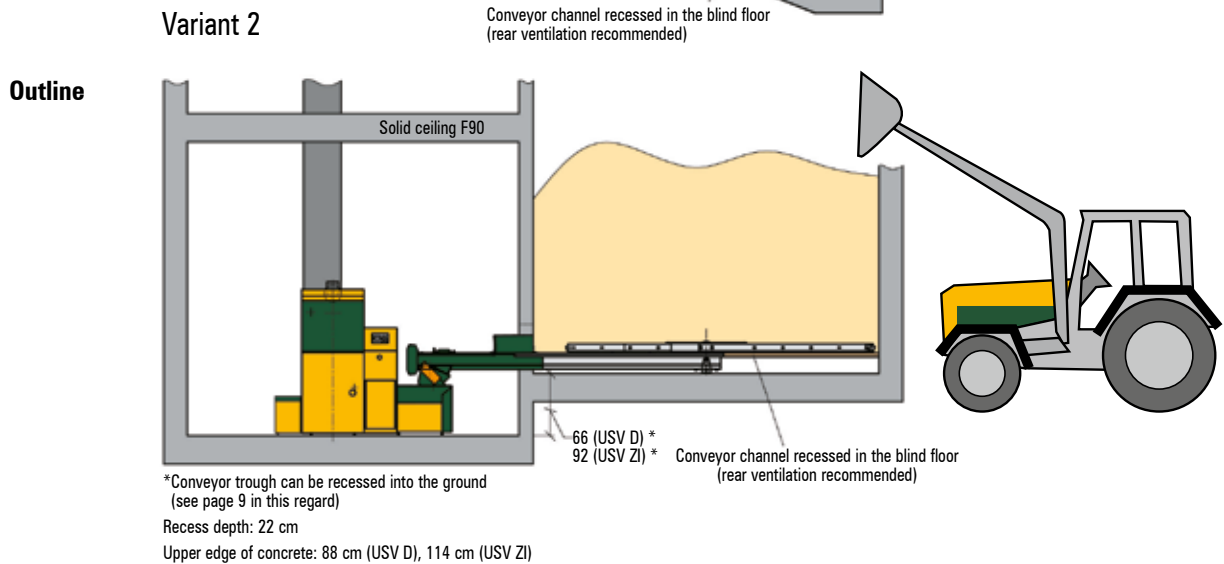
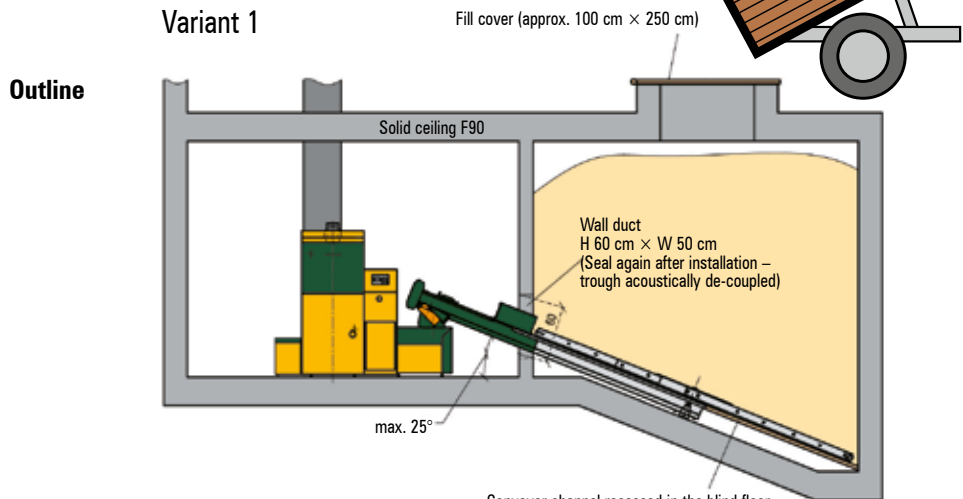
Type USV ZI with stirrer



USV D 15–25 kW with stirrer

Storage room adjacent to boiler room

The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.

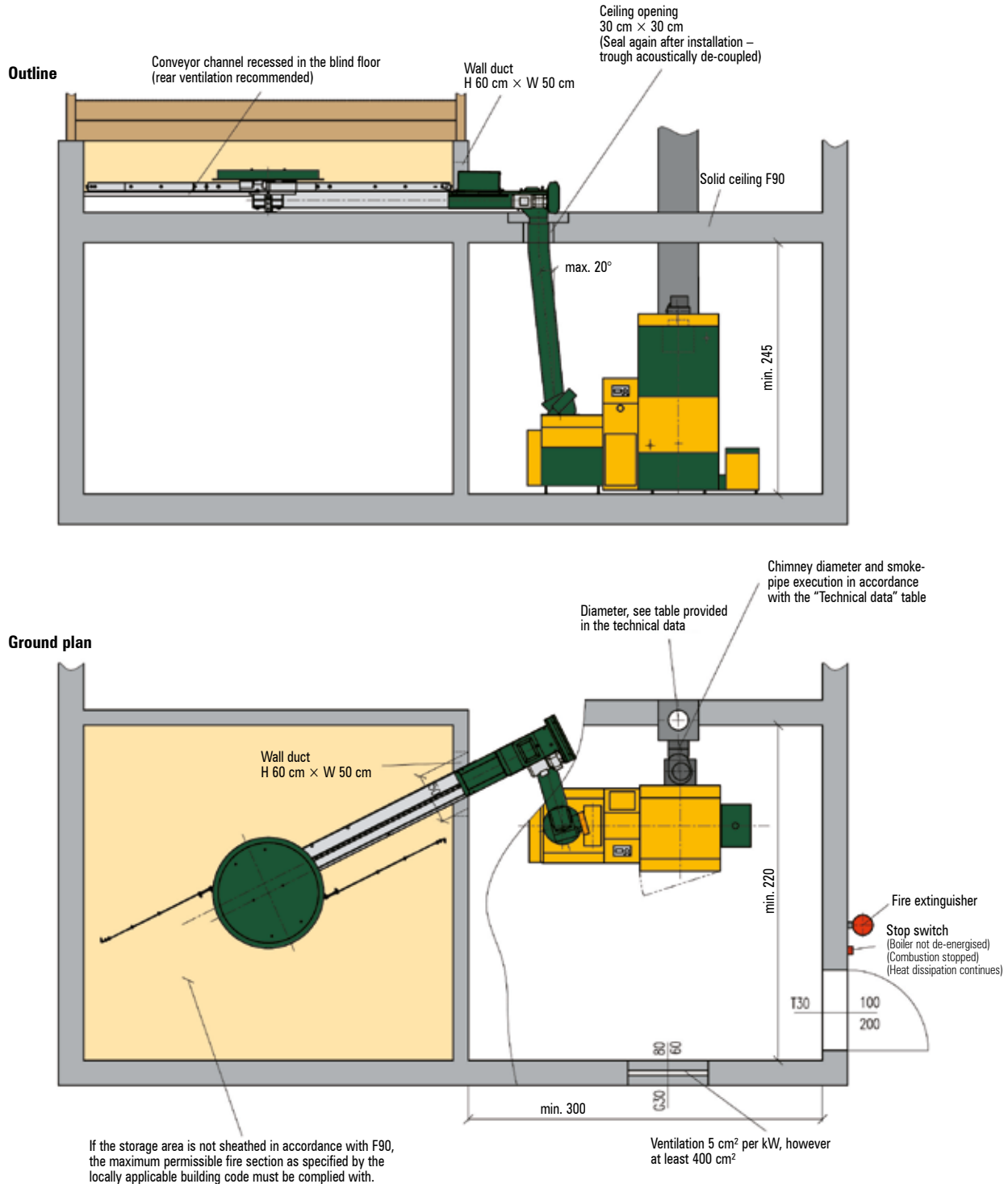


F90 in accordance with ÖNORM B 3800, REI90
in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI₂ 30-C
in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30
in accordance with ÖNORM EN 13501
All dimensions in cm

USV ZI 80 – 100 kW with stirrer

Storage room above the boiler room

The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.



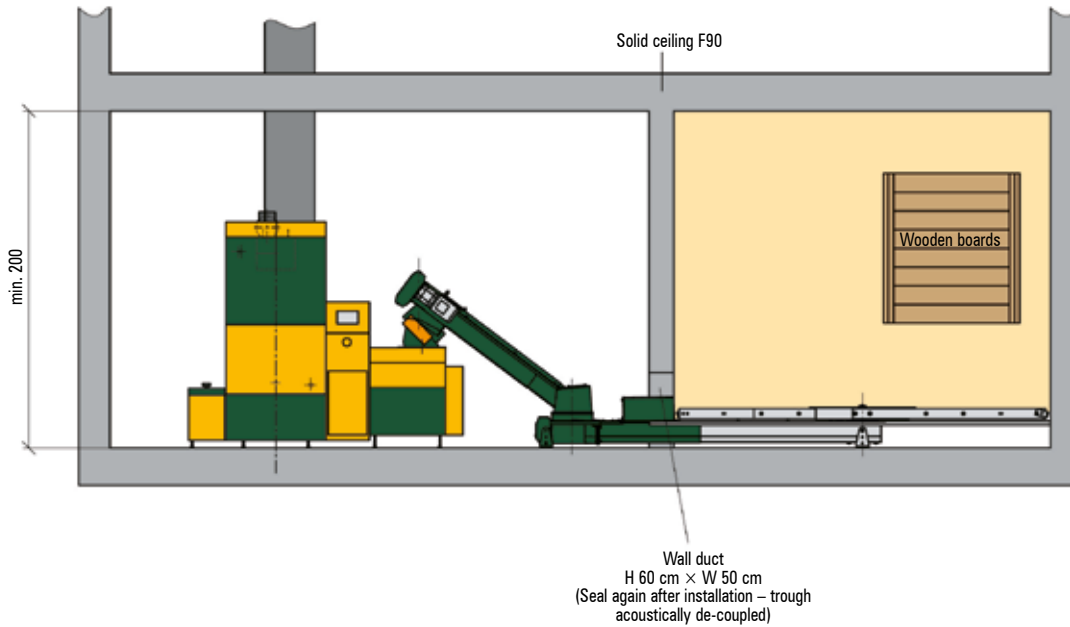
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

USV ZI 30–60 kW with stirrer and ascending screw with push interface connection

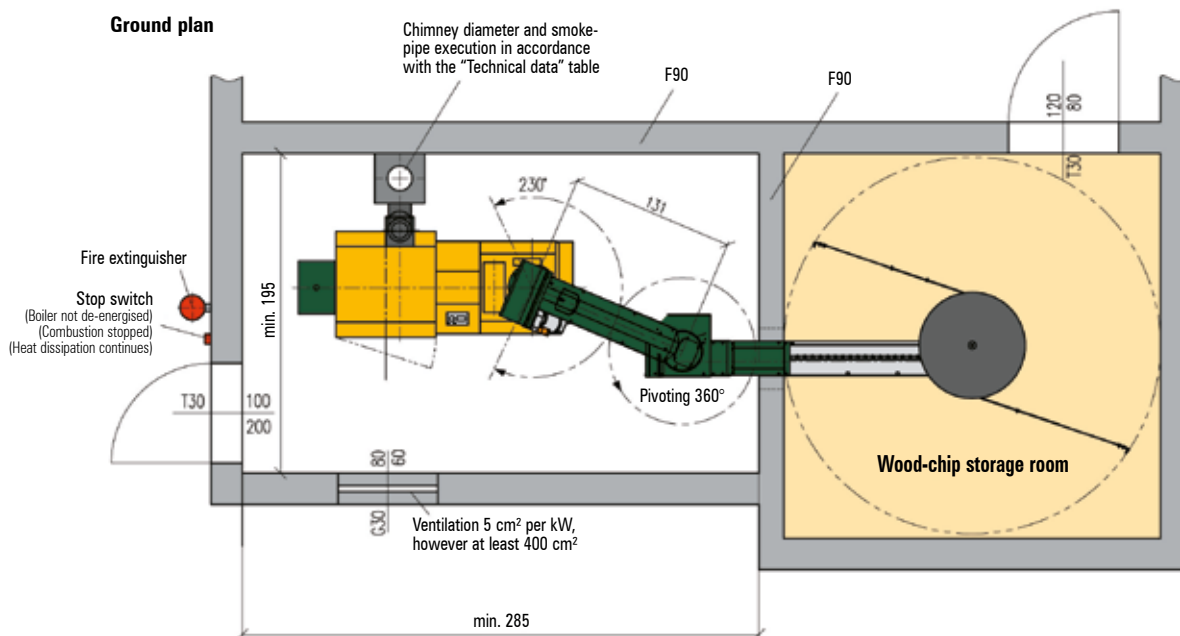
Storage room adjacent to boiler room

The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.

Outline



Ground plan



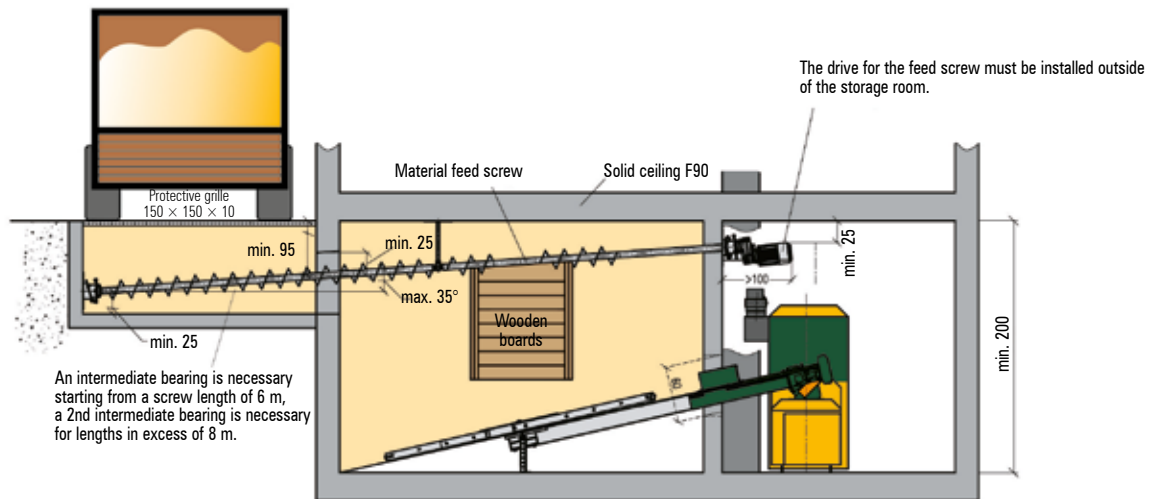
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂ 30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

USV ZI 30–60 kW with stirrer and bunker filling screw

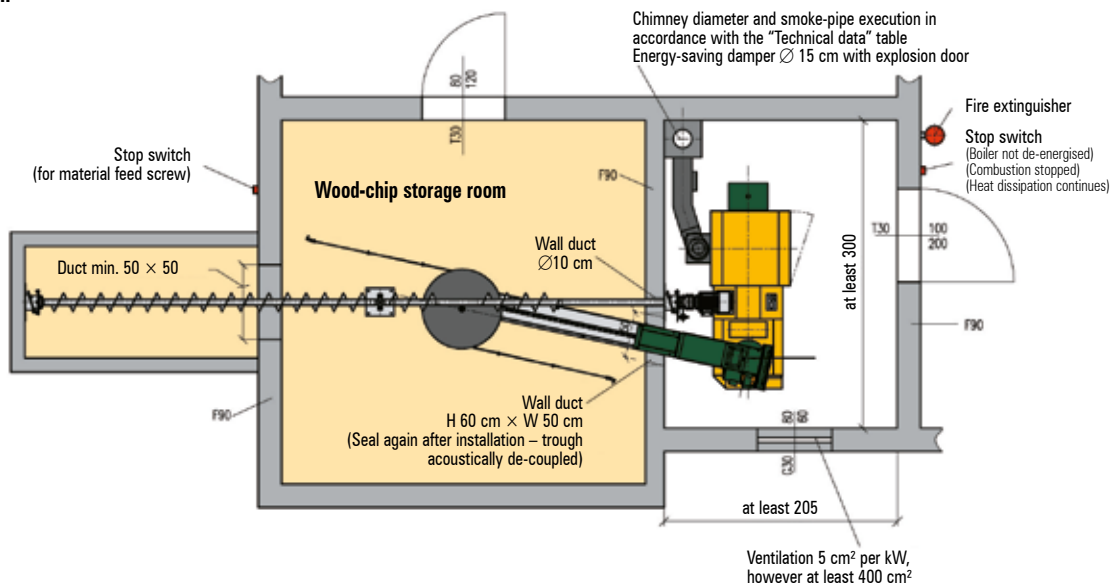
Storage room adjacent to boiler room

The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.

Outline



Ground plan

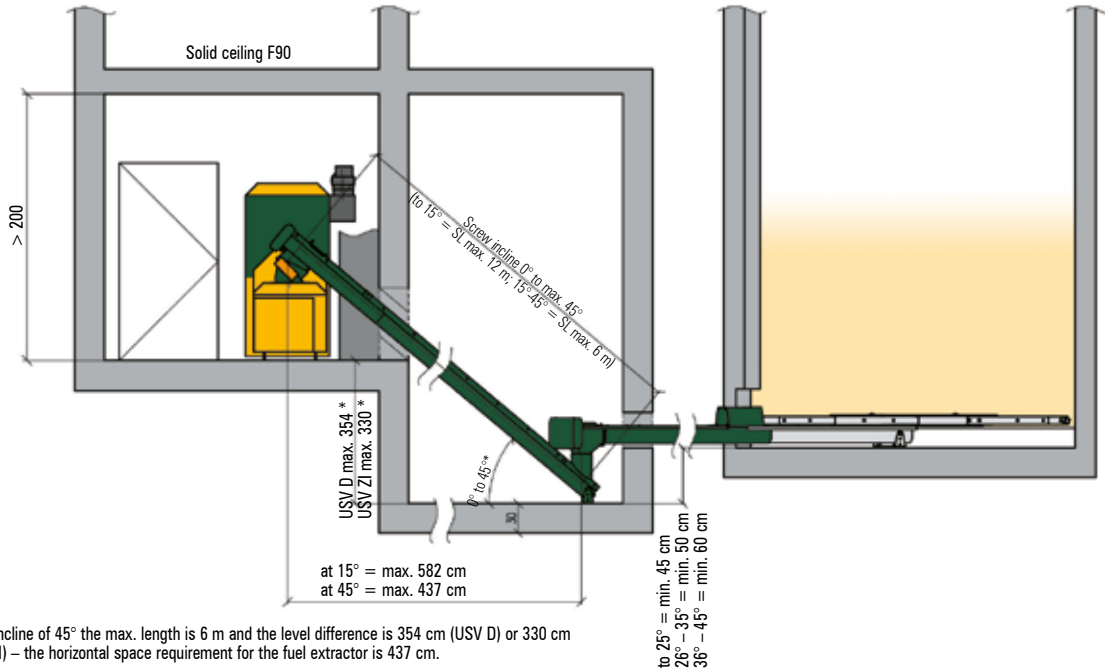


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

USV ZI 30–60 kW with stirrer and ascending screw with drop shaft Storage room below the boiler room

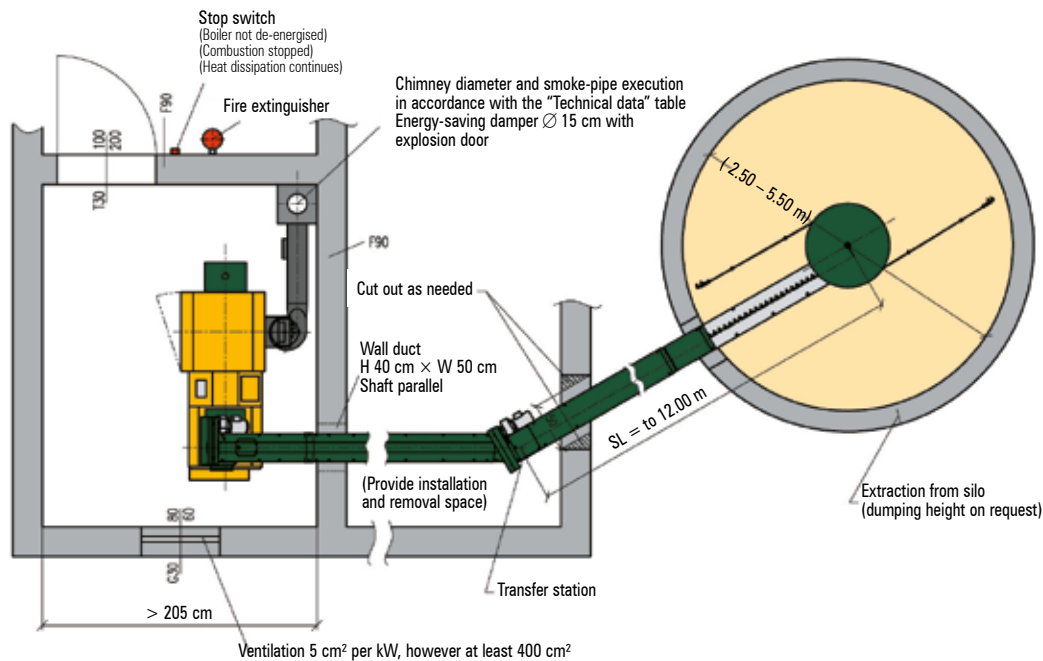
The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.

Outline



* At an incline of 45° the max. length is 6 m and the level difference is 354 cm (USV D) or 330 cm (USV ZI) – the horizontal space requirement for the fuel extractor is 437 cm.

Ground plan



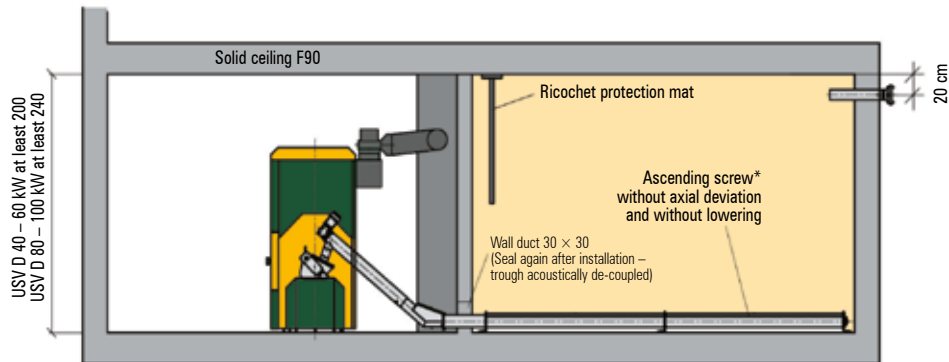
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI₂ 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm

USV D 40–100 kW with pellet elbow screw

Storage room adjacent to boiler room

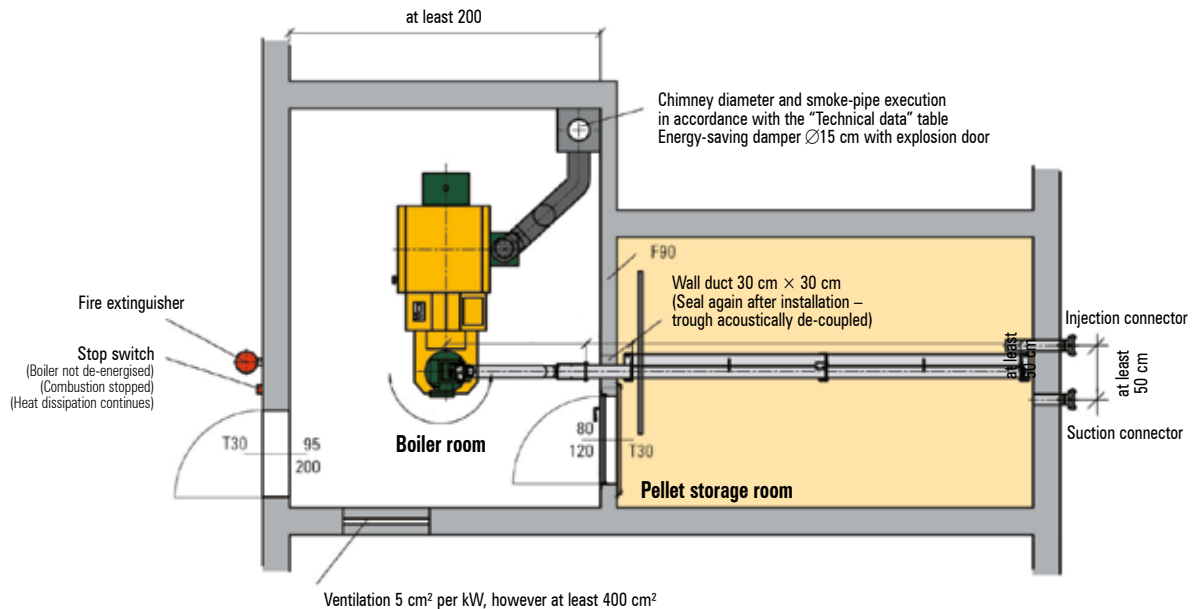
The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.

Outline



* Dimensions: See table on page 10

Ground plan

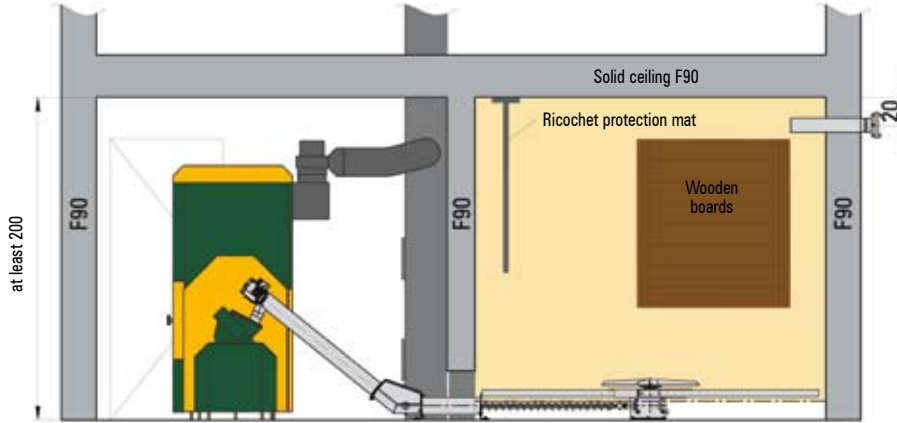


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

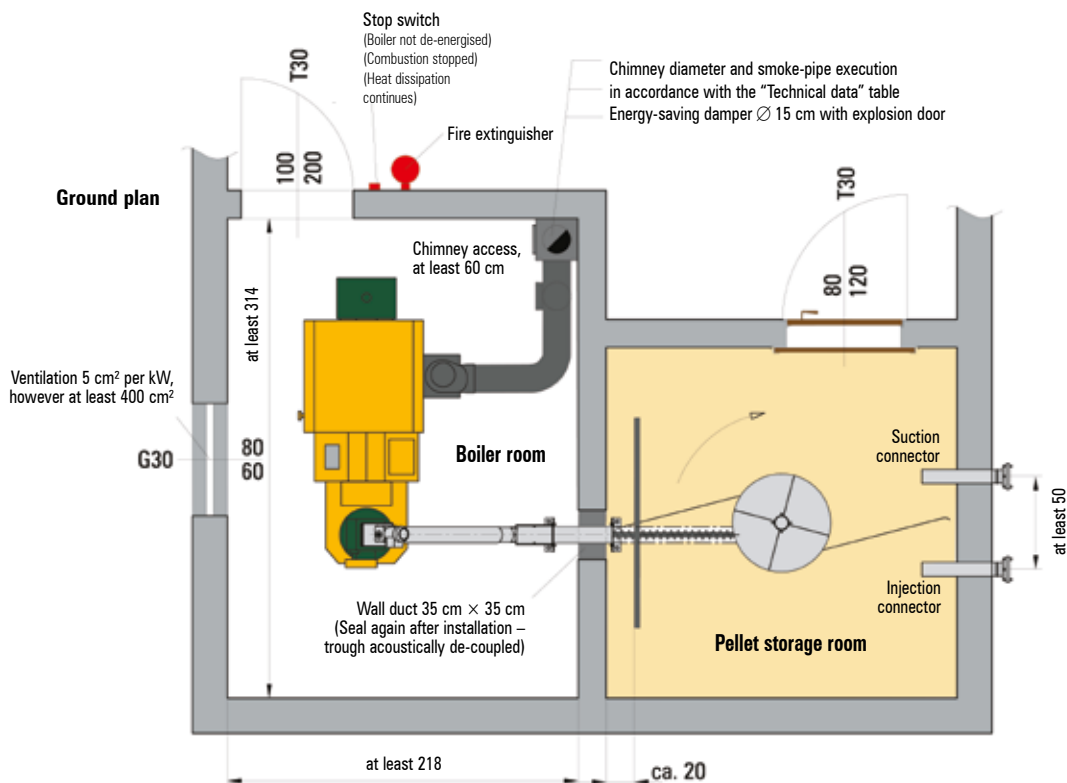
USV D 40–60 kW with Pellet Stirrer Plus and ascending screw

The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.

Outline



Ground plan

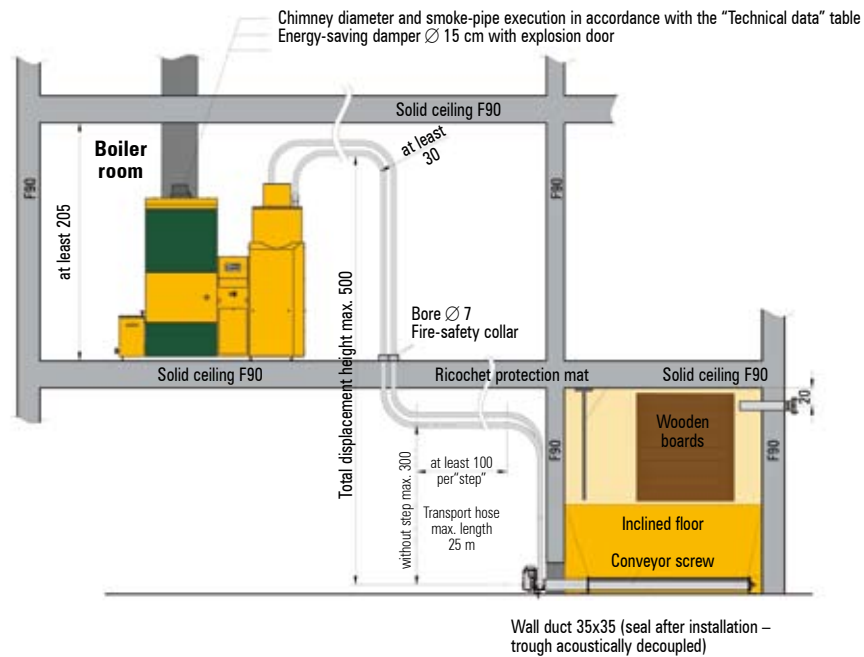


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

USV GS 40–60 kW with pellet conveyor screw and suction conveyor

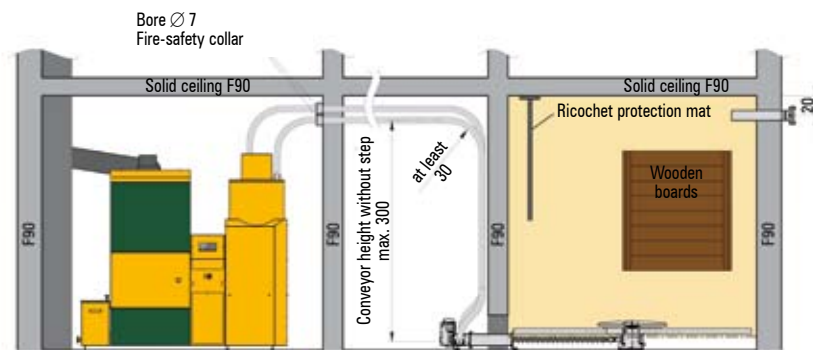
The versions shown are available in the power ratings 40, 50, 60, 80 and 100 kW.

Outline

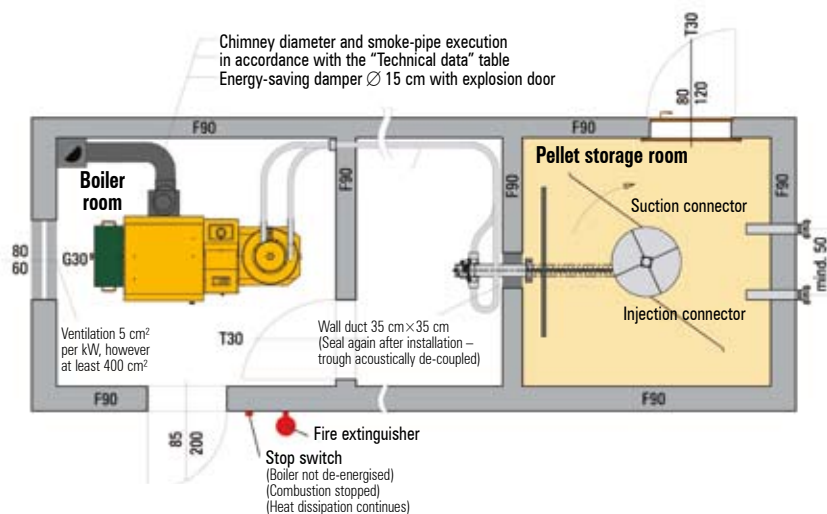


USV GS 40–60 kW with Pellet Stirrer Plus and suction conveyor

Outline

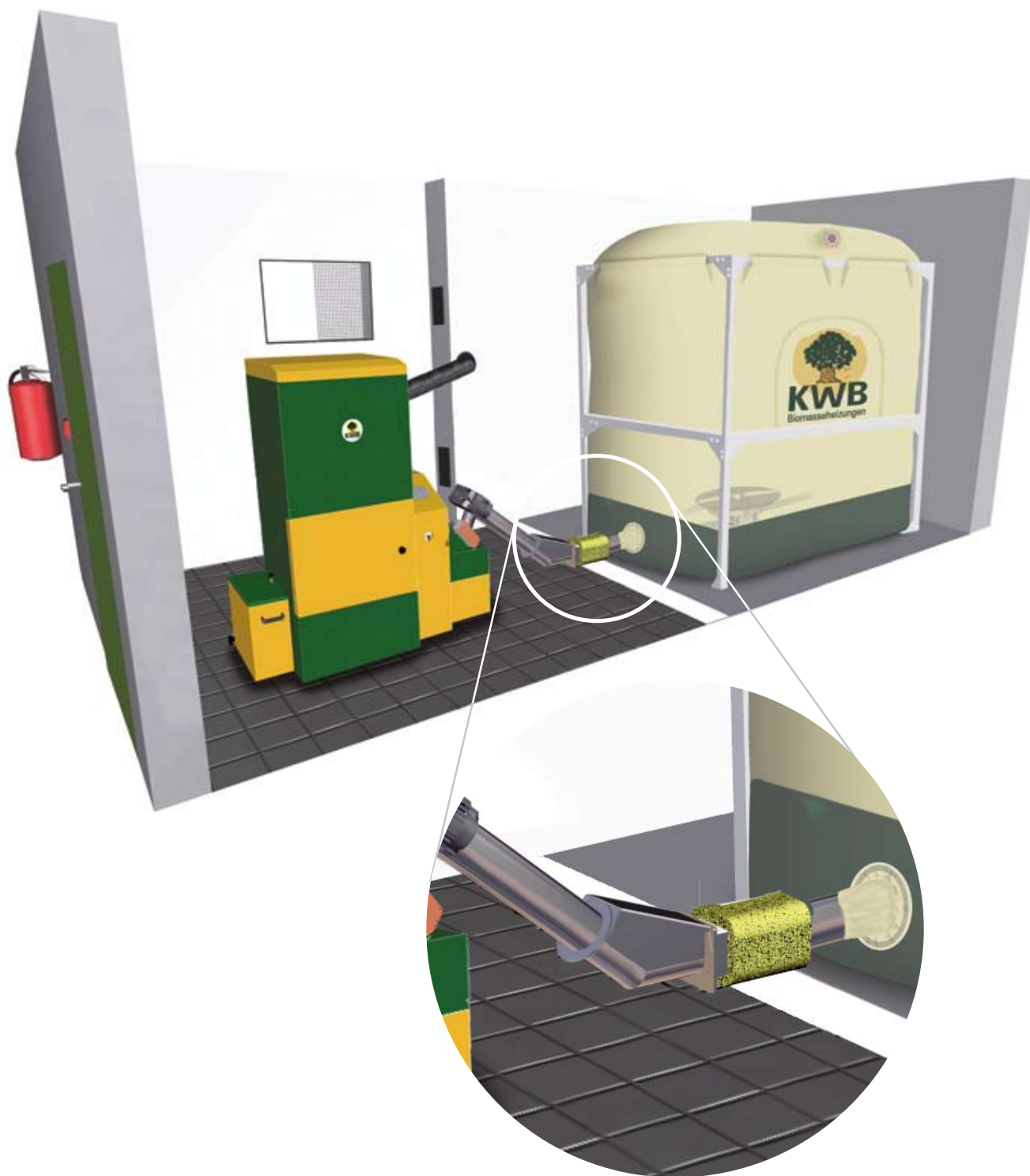


Ground plan



F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm

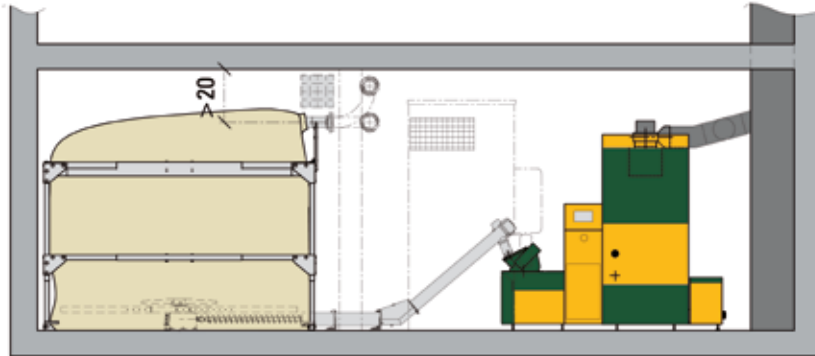
Type USV D with KWB Pellet Big Bag and elbow screw



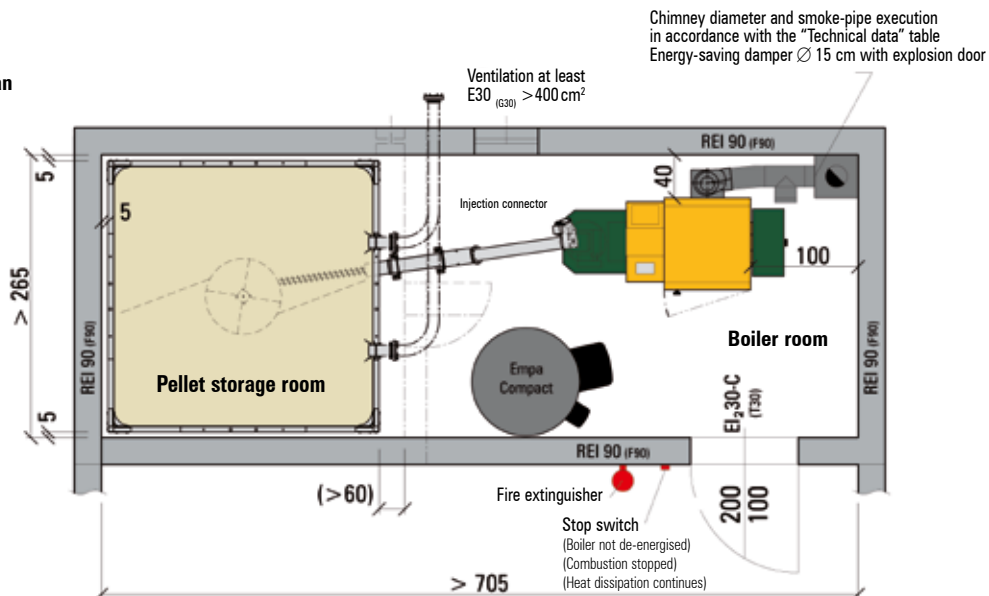
USV D 40-60 kW with KWB Pellet Big Bag 2525 and elbow screw

The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.
Storage room adjacent to boiler room.

Outline



Ground plan



F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI₂-30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm

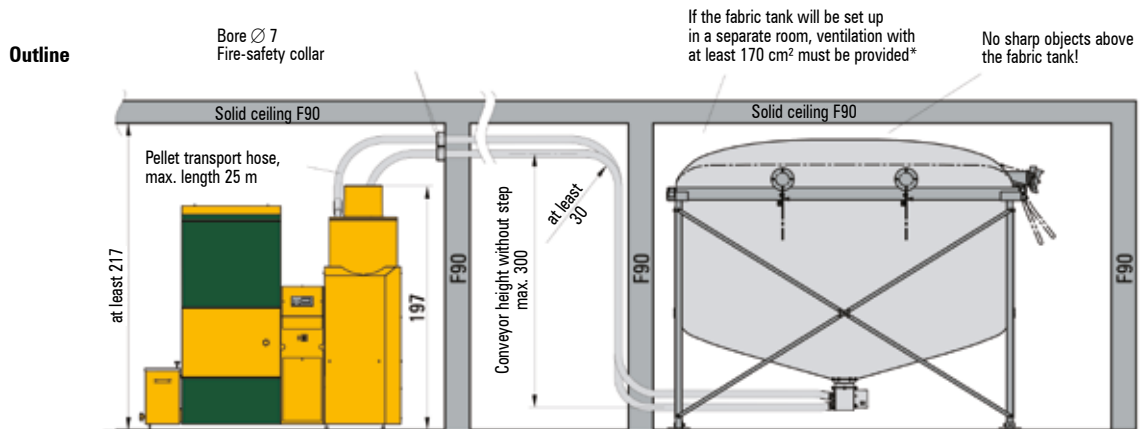
Type USV GS with KWB Pellet Big Bag and suction conveyor



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USV GS 40–60 kW with fabric tank and suction conveyor

The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.



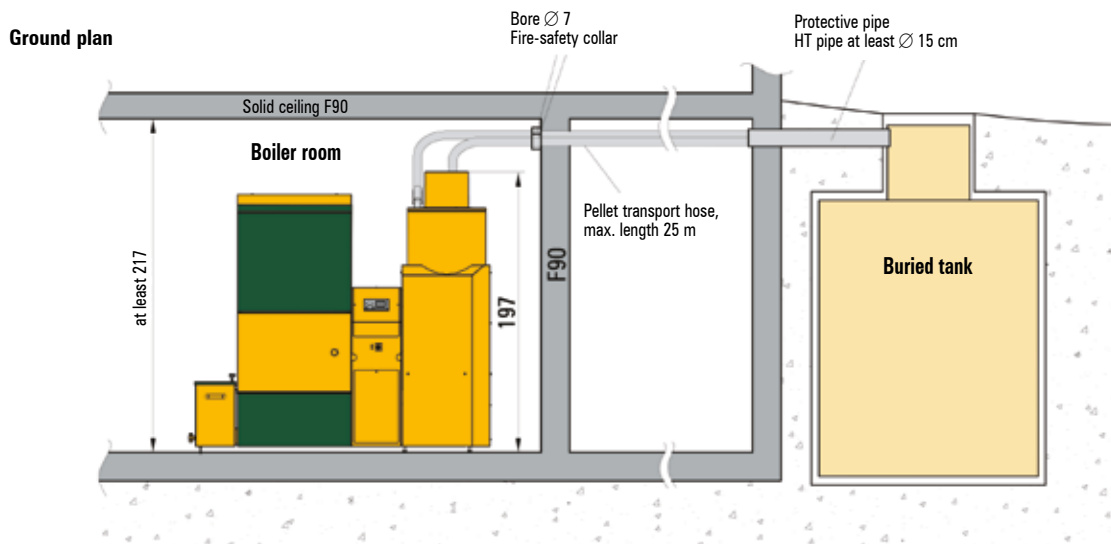
Hose routing

- Max. delivery height 5 m
- Max. delivery height without step 3 m
- At the latest after 3 m height differential 1 m route horizontally
- All conveyor hose bend radii at least 30 cm

* Local fire safety regulations and building regulations must be strictly complied with.

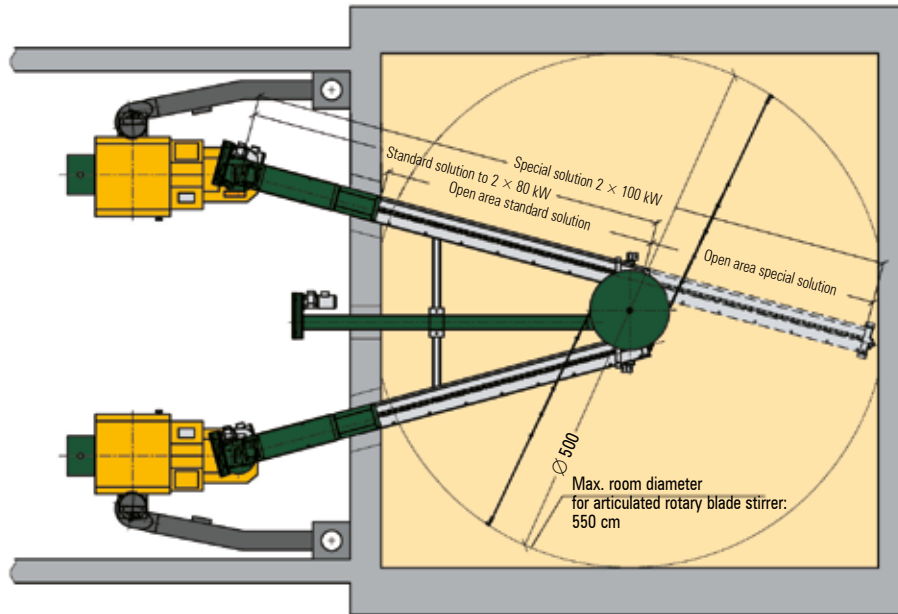
USV GS 40–60 kW with buried tank and suction conveyor

The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.

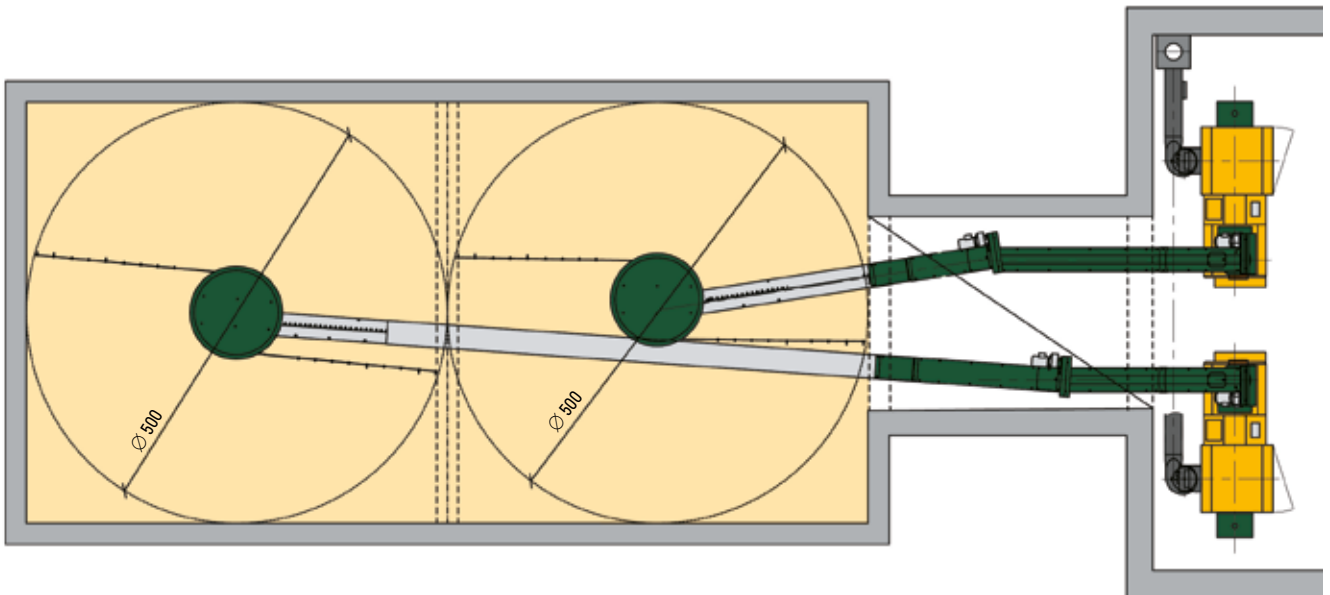


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI₂ 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm

Special solution: Dual boiler system with one stirrer

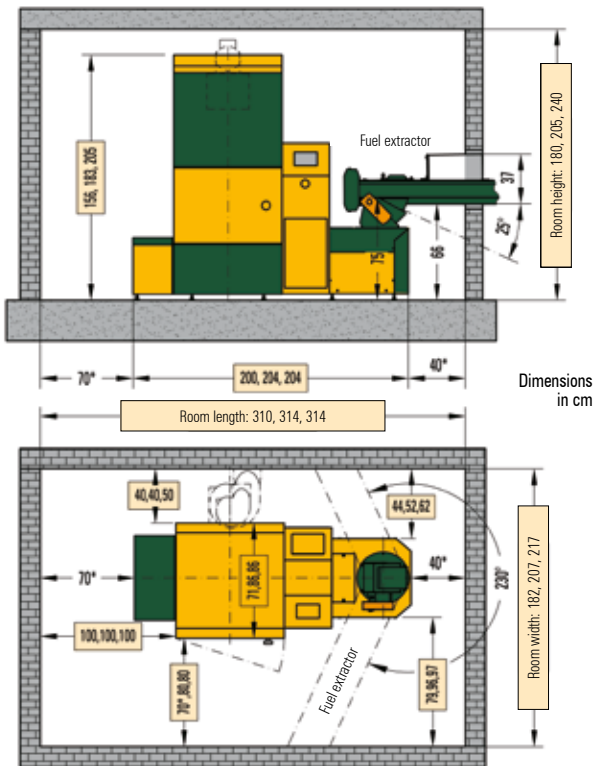


Special solution: Dual boiler system with stirrers arranged one behind the other

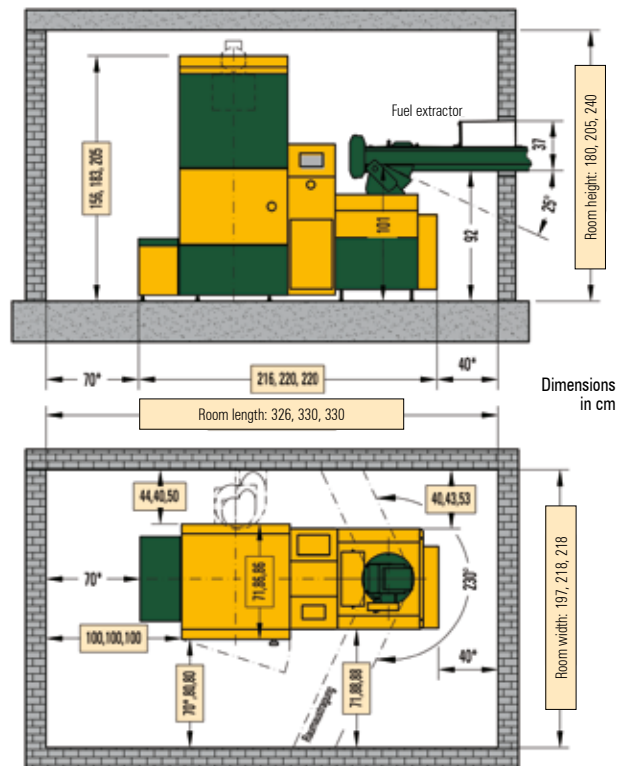


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
 T30 in accordance with ÖNORM B 3800, EI₂30-C in accordance with ÖNORM EN 13501
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
 All dimensions in cm

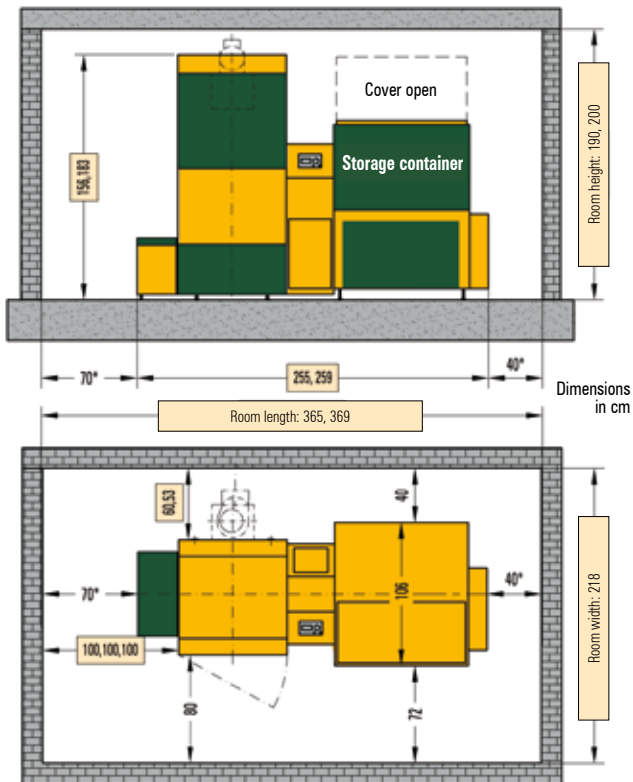
USV D



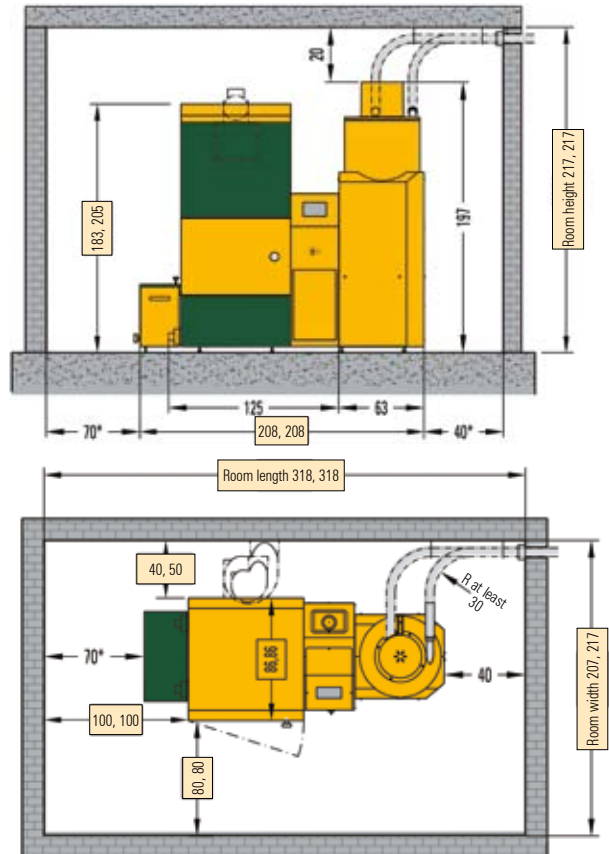
USV ZI



USV V



USV GS



All dimensions in cm

* The clearances to the wall must be 70 cm or 40 cm so that the rear of the boiler is accessible.

The boxed dimensions stand for the different construction sizes.

Type USV D / USV ZI

dimension 1: 15–25 kW
dimension 2: 30–60 kW
dimension 3: 80–100 kW

Type USV V

dimension 1: 15–25 kW
dimension 2: 30–40 kW

Type USV GS

dimension 1: 40–60 kW
dimension 2: 80–100 kW

Distance values are minimum dimensions!

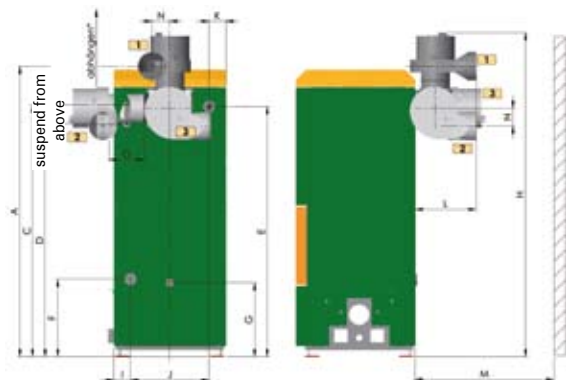
The fuel-extractor trough must be within the indicated angles (horizontally: max. 230°; gradient of max. 25°; gradient of max. 45° for ascending worms)

* To ensure that the back of the boiler is accessible; the stated minimum dimensions must be adhered to

Clear door widths and heights to get boiler through the door – in cm (W × H)		
boiler/type	boiler dismantled	not dismantled
USV V 15/25	105 x 157	65 x 104
USV V 30/40	105 x 183	72 x 131
USV D/ZI 15/25	80 x 157	65 x 104
USV D/ZI 30/40/50/60	88 x 183	72 x 131
USV D/ZI 80/100	89 x 203	72 x 149
USV GS 40/50/60	88 x 183	72 x 131
USV GS 80/100	89 x 207	72 x 149

Connection dimension

Vertical dimensions				USV 15 / 25		USV 30 / 40 / 50 / 60		USV 80 / 100	
				dimension	∅	dimension	∅	dimension	∅
A	Smoke pipe (installation option 1) Delivery date until 01.07.2010	[mm]	1.534	180 mm	1.794	200 mm	2.070	200 mm	
	Smoke pipe (installation options 2 and 3) Delivery date until 01.07.2010	[mm]	1.307	180 mm	1.543	200 mm	1.644	200 mm	
A	Smoke pipe (installation option 1) Delivery date beyond 01.07.2010	[mm]	1.534	150 mm	1.794	180 mm	2.070	200 mm	
	Smoke pipe (installation options 2 and 3) Delivery date beyond 01.07.2010	[mm]	1.307	150 mm	1.543	180 mm	1.644	200 mm	
C	Thermal regulator feed	[mm]	1.322	½"	1.569	½"	1.793	½"	
D	Thermal regulator discharge	[mm]	1.188	½"	1.435	½"	1.659	½"	
E	Heating circuit forward-flow	[mm]	1.321	¾"	1.569	2"	1.784	2"	
F	Heating circuit return-flow	[mm]	520	¾"	544	2"	554	2"	
G	Drain	[mm]	500	½"	518	¾"	528	¾"	
H	Total height for smoke pipe connection – Version 1	[mm]	1.662	—	1.967	—	2.310	—	
Horizontal dimensions				USV 15 / 25		USV 30 / 40 / 50 / 60		USV 80 / 100	
				dimension	∅	dimension	∅	dimension	∅
I	Space	[mm]	100	—	119,5	—	120	—	
J	Space	[mm]	460	—	560	—	560	—	
K	Space	[mm]	100	—	120,5	—	120	—	
L	Space for installation options 1 and 2	[mm]	325	—	359	—	433	—	
	Space for installation option 3	[mm]	333	—	242	—	258	—	
M	Minimum distance to chimney wall for installation options 1 and 2	[mm]	400	—	400	—	500	—	
	Minimum distance to chimney wall for installation option 3	[mm]	540	—	500	—	700	—	
N	Distance between ventilator axis and smoke pipe axis	[mm]	0	—	19	—	128	—	
	Distance between ventilator axis and smoke pipe axis options 2 and 3	[mm]	0	—	19	—	128	—	
O	Smoke pipe extension (not included in set) Delivery date until 01.07.2010	[mm]	—	—	> 250	200	> 250	200 mm	
O	Smoke pipe extension (not included in set) Delivery date beyond 01.07.2010	[mm]	—	—	> 250	180	> 250	200 mm	



* If the flue gas extractor for a USV 80/100 kW is installed in position „2“ then it must be suspended or supported.

Installation example 1

- flue tube connection bent up

Installation example 2

- flue tube connection lateral

Installation example 3

- flue tube connection bent backward

Fuel consumption and storage room size

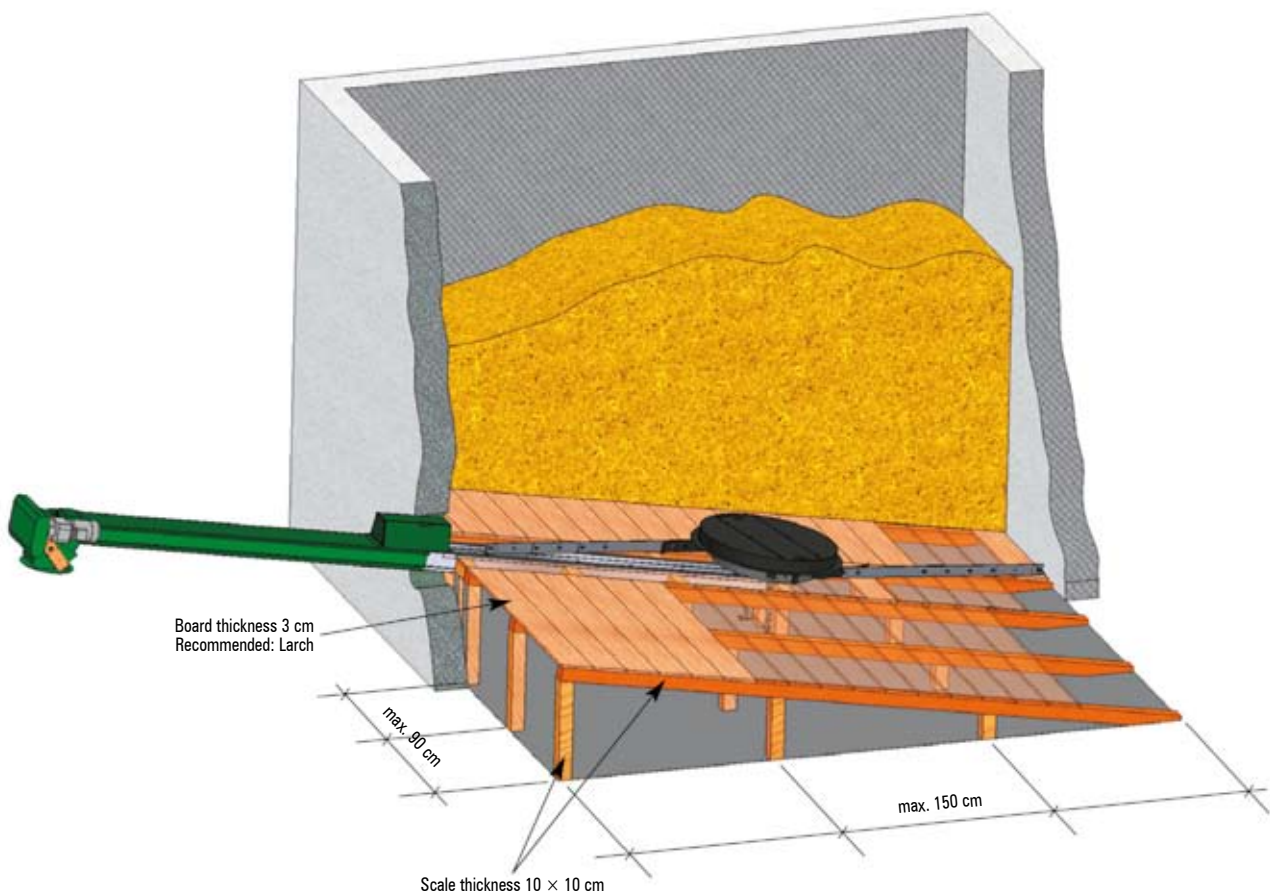
Fuel consumption and storage room size – wood chips		
Heating load of the building [kW]	Annual consumption* [m ³ /a]	Storage room size for annual requirement* [m ³ /a]
15	38	55.5
25	63	92.5
30	75	111.0
40	100	148.0
50	125	185.0
60	150	222.0
80	200	296.0
100	250	370.0

* Using wood chips with 25 % water content and size G30 according to ÖNORM M 7133
 Consumption factor per year: 2,5 m³ per kW heating load
 Factor storage room size for annual requirement 3,7 m³ per kW heating load

Fuel consumption and storage room size – pellets		
Heating load of the building [kW]	Annual consumption [kg/a]	Storage room size for annual requirement [m ³ /a]
15	6,000	13.5
25	10,000	22.5
30	12,000	27.0
40	16,000	36.0
50	20,000	45.0
60	24,000	54.0
80	32,000	72.0
100	40,000	90.0

Consumption factor per year: 400 kg per kW heating load
 Factor storage room size for annual requirement 0,9 m³ per kW heating load

Inclined floor view



Technical data – wood-chip operation

TYPE OF BOILER										
Output	Unit	USV 15	USV 25	USV 30 *	USV 40	USV 50 *,**	USV 50 *	USV 60 *	USV 80	USV 100 **
Rated power	kW	15	25	30	40	49,5	50	60	80	99/101****
Partial load	kW	5,0	7,1	8,6	11,5	14,1	14,2	17,0	22,4	27,6
Boiler efficiency at rated power	%	91,3	90,2	90,4	90,8	90,9	90,9	91,1	91,3	91,1
Boiler efficiency at partial load	%	87,7	89,1	90,1	92,2	92,2	92,2	92,2	92,2	92,6
Fuel thermal output at rated power	kW	16,4	29,0	34,8	46,3	55,6	56,1	66,0	85,6	113,9
Fuel thermal output at partial load	kW	5,7	8,0	9,5	12,5	15,3	15,5	18,4	24,3	29,9
Water side										
Water content	l	63	63	158	158	128,0	128	128	167	167
Water-connection diameter	Inches	5/4	5/4	2	2	2	2	2	2	2
Water-connection diameter	DN	32	32	50	50	50,0	50	50	50	50
Diameter of thermal regulator	Inches	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Water-side resistance at 10 K	mbar	1,4	8,1	9,2	11,5	19,4	19,4	27,3	43,1	64
Water-side resistance at 20 K	mbar	0,35	2,1	2,4	3,0	5,0	5,0	6,9	10,8	16
Boiler temperature	°C	65–90	65–90	65–90	65–90	65–90	65–90	65–90	65–90	65–90
Minimum boiler-entry temperature	°C	55	55	55	55	55	55	55	55	55
Max. operational pressure	bar	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
Test pressure	bar	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6
Flue-gas side										
Combustion chamber temperature	900–1100 °C									
Combustion chamber pressure	mbar	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01
Required draft at rated power / at partial load	mbar	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,15/0,1
Required induced draft		yes	yes	yes	yes	yes	yes	yes	yes	yes
Flue-gas temperature rated power (for chimney calculation)	°C	160	160	160	160	160	160	160	160	160
Flue-gas temperature partial load (for chimney calculation)	°C	90	90	90	90	90	90	90	90	100
Exhaust-gas mass flow at rated power	kg/h	45	75	90	120	148,5	150	180	240	268
Exhaust-gas mass flow at partial load	kg/h	15	24	29	39	49,5	50	60	81	93
Exhaust-gas volume at rated power	Nm³/h	35,3	58,8	70,5	94,0	116,3	117,5	141,0	188,0	209,0
Exhaust-gas volume at partial load	Nm³/h	11,8	18,8	22,7	30,6	38,4	38,8	47,0	63,5	72,6
Smoke-pipe diameter	mm	180	180	200	200	200	200	200	200	200
Chimney diameter (approx. value)	mm	180	180	200	200	200	200	200	220	250
Smoke-pipe diameter (beyond 01.07.2010)	mm	150	150	180	180	180	180	180	200	200
Chimney diameter (approx. value) (beyond 01.07.2010)	mm	150	150	180	180	180	180	180	200	220
Chimney connection height (way of Installation 1, p. 35)	mm	1.534	1.534	1.794	1.794	1.794	1.794	1.794	2.070	2.070
Chimney connection height (way of Installation 2+3, p. 35)	mm	1.307	1.307	1.543	1.543	1.543	1.543	1.543	1.644	1.644
Incline of the smoke pipe	°	3°	3°	3°	3°	3°	3°	3°	3°	3°
Chimney design	moisture-resistant									
Fuel										
wood chips, ÖNORM M 7133										
Maximum water content	0,33 kg/kg FS									
Maximum humidity	0,50 kg/kg TS									
Maximum fuel size acc. to ÖNORM	G30									
Ash										
Ash-container volume	l	65	65	65	65	65	65	65	65	65
Ash-removal system		yes	yes	yes	yes	yes	yes	yes	yes	yes
Electrical system Typ USV D, USV ZI, USV V										
Connection dimension	400 V – 5 pin – max. 13 A									
Connection dimension Achievement	W	1.621 - 2.379	1.621 - 2.379	1.824 - 2.582	1.824 - 2.582	2.382 - 2.582	2.382 - 2.582	2.382 - 2.582	2.502 - 2.702	2.524 – 2.724

FJ – BLT Francisco Josephinum Wieselburg – Biomass • Logistics • Technology
 mg/Nm³ Milligrams per standard cubic meter (1 Nm³ under 1013 mbar at 0 °C)
 nm not measured
 FS Fresh Substance
 DS Dry Substance

* Inspection of drawings
 ** Homologation versions
 *** Intermediate values interpolated
 **** If the flue gas extractor for a USV 80/100 kW is installed in position "2" then it must be suspended or supported.

Technical data – wood-chip operation

		TYPE OF BOILER								
Weight	Unit	USV 15	USV 25	USV 30 *	USV 40	USV 50*, **	USV 50 *	USV 60 *	USV 80	USV 100 **
Water jacket	kg	99	115	197	197	227	227	227	286	286
Boiler body	kg	125	142	238	238	268	268	268	327	327
Boiler weight USV V	kg	684	699	785	785	—	—	—	—	—
Boiler weight USV D	kg	528	556	705	705	768	768	768	990	997
Boiler weight USV ZI	kg	573	601	750	750	813	813	813	1.035	1.042
Emissions according to inspection report		FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT	FJ – BLT
Inspection report No.		BLT-034/99	BLT-026/05	***	BLT-017/06	***	***	***	BLT-018/06	BLT-020, 019/06
O ₂ content at rated power	vol%	7,5	7,3	7,2	7,1	7,2	7,2	7,3	7,4	6,2
O ₂ content at partial load	vol%	12,6	12,0	12,3	13,0	12,4	12,4	11,8	10,5	10,0
CO ₂ content at rated power	vol%	13,1	13,1	13,2	13,4	13,3	13,3	13,2	13,0	14,3
CO ₂ content at partial load	vol%	8,0	10,0	9,2	7,7	8,2	8,3	8,9	10,0	10,5
Reference 10% O ₂ dry (EN 303-5)										
CO at rated power	mg/Nm ³	100,0	25,0	93,7	231,0	215,3	214,5	198,0	165,0	19,0
CO at partial load	mg/Nm ³	913,0	311,0	317,7	331,0	274,5	271,5	212,0	93,0	92,0
NO _x at rated power	mg/Nm ³	187,0	173,0	180,7	196,0	199,6	199,8	203,5	211,0	203,0
NO _x at partial load	mg/Nm ³	n.m.	n.m.	n.m.	228,0	218,5	218,0	208,0	188,0	n.m.
OGC at rated power	mg/Nm ³	2,0	2,0	3,3	6,0	6,0	6,0	6,0	6,0	< 1
OGC at partial load	mg/Nm ³	10,0	9,0	9,0	9,0	7,3	7,3	5,5	2,0	1,0
Dust at rated power	mg/Nm ³	40,0	24,0	24,0	24,0	25,2	25,3	26,5	29,0	31,0
Dust at partial load	mg/Nm ³	n.m.	23,0	18,7	10,0	11,9	12,0	14,0	18,0	n.m.
Reference 13% O ₂ dry (Wieselburg)										
CO at rated power	mg/Nm ³	73,0	18,0	68,0	168,0	156,6	156,0	144,0	120,0	14,0
CO at partial load	mg/Nm ³	664,0	226,0	231,0	241,0	199,9	197,8	154,5	68,0	67,0
NO _x at rated power	mg/Nm ³	136,0	126,0	131,3	142,0	144,9	145,0	148,0	154,0	148,0
NO _x at partial load	mg/Nm ³	n.m.	n.m.	n.m.	166,0	159,1	158,8	151,5	137,0	n.m.
OGC at rated power	mg/Nm ³	1,0	1,0	2,0	4,0	4,0	4,0	4,0	4,0	< 1
OGC at partial load	mg/Nm ³	7,0	7,0	7,0	7,0	5,8	5,8	4,5	2,0	< 1
Dust at rated power	mg/Nm ³	29,0	18,0	17,3	18,0	18,7	18,8	19,5	21,0	23,0
Dust at partial load	mg/Nm ³	n.m.	17,0	13,7	7,0	8,4	8,5	10,0	13,0	n.m.
According to § 15a-BVG Austria										
CO at rated power	mg/MJ	49,0	12,0	47,3	118,0	110,2	109,8	101,5	85,0	9,0
CO at partial load	mg/MJ	439,0	153,0	159,3	172,0	142,6	141,0	110,0	48,0	45,0
NO _x at rated power	mg/MJ	102,0	85,0	90,0	100,0	101,9	102,0	104,0	108,0	100,0
NO _x at partial load	mg/MJ	n.m.	n.m.	n.m.	118,0	113,0	112,8	107,5	97,0	n.m.
OGC at rated power	mg/MJ	1,0	1,0	1,7	3,0	3,0	3,0	3,0	3,0	< 1
OGC at partial load	mg/MJ	5,0	5,0	5,0	5,0	4,1	4,0	3,0	1,0	< 1
Dust at rated power	mg/MJ	19,0	12,0	12,0	12,0	12,7	12,8	13,5	15,0	15,0
Dust at partial load	mg/MJ	n.m.	11,0	9,0	5,0	6,0	6,0	7,0	9,0	n.m.

FJ – BLT Francisco Josephinum Wieselburg – Biomass • Logistic • Technology

mg/Nm³ Milligramm pro Normkubikmeter (1 Nm³ unter 1013 mbar bei 0 °C)

n.m. nicht gemessen

FS Frischsubstanz

TS Trockensubstanz

* Inspection of drawings

** Homologation versions

*** Intermediate values interpolated

Technical data – pellet operation

TYP OF BOILER									
	Unit	USV 25	USV 30 *	USV 40	USV 50 *,**	USV 50 *	USV 60 *	USV 80	USV 100 **
Rated power	kW	25	30	40	49,5	50	60	82	99/101
Partial load	kW	7,4	8,7	11,3	14,4	14,6	17,85	24,4	29,7/30,3
Boiler efficiency at rated power	%	92,3	91,5	90,0	90,7	90,7	91,45	92,9	92
Boiler efficiency at partial load	%	90,1	89,9	89,5	90,0	90,0	90,5	91,5	92,2
Fuel thermal output at rated power	kW	28,6	34,6	46,7	56,2	56,7	66,6	86,5	112,9
Fuel thermal output at partial load	kW	8,2	9,7	12,6	15,9	16,1	19,65	26,7	30,5
Water side									
Water content	l	63	158	158	128	128	128	167	167
Water-connection diameter	Inches	5/4	2	2	2	2	2	2	2
Water-connection diameter	DN	32	50	50	50	50	50	50	50
Diameter of thermal regulator	Inches	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Water-side resistance at 10 K	mbar	8,1	9,2	11,5	19,4	19,4	27,3	43,1	64
Water-side resistance at 20 K	mbar	2,1	2,4	3,0	5,0	5,0	6,9	10,8	16
Boiler temperature	°C	65–90	65–90	65–90	65–90	65–90	65–90	65–90	65–90
Minimum boiler-entry temperature	°C	55	55	55	55	55	55	55	55
Max. operational pressure	bar	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
Test pressure	bar	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6
Flue-gas side									
Combustion chamber temperature		900–1100 °C							
Combustion chamber pressure	mbar	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01	–0,01
Draft requirement rated power/partial load	mbar	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,1/0,08	0,15/0,1
Induced draft required		yes	yes	yes	yes	yes	yes	yes	yes
Flue-gas temperature rated power (for chimney calculation)	°C	160	160	160	160	160	160	160	160
Flue-gas temperature partial load (for chimney calculation)	°C	90	90	90	90	90	90	90	100
Flue gas mass flow at rated power	kg/h	75	90	120	148,5	150	180	240	268
Flue gas mass flow at partial load	kg/h	24	29	39	49,5	50	60	81	93
Flue-gas volume at rated power	Nm ³ /h	58,8	70,5	94,0	116,3	117,5	141,0	188,0	209,0
Flue-gas volume at partial load	Nm ³ /h	18,8	22,7	30,6	38,4	38,8	47,0	63,5	72,6
Smoke-pipe diameter	mm	180	200	200	200	200	200	200	200
Chimney diameter (approx. values)	mm	180	200	200	200	200	200	220	250
Smoke-pipe diameter (beyond 01.07.2010)	mm	150	180	180	180	180	180	200	200
Chimney diameter (approx. values) (beyond 01.07.2010)	mm	150	180	180	180	180	180	200	220
Connection height smoke pipe (install variant 1, page 35)	mm	1.534	1.794	1.794	1.794	1.794	1.794	2.070	2.070
Connection height smoke pipe (install variant 2 + 3, page 35)	mm	1.307	1.543	1.543	1.543	1.543	1.543	1.644	1.644
Incline of the smoke pipe	°	3°	3°	3°	3°	3°	3°	3°	3°
Chimney design		moisture-resistant							
Fuel pellets made of pure wood according to ÖNORM M 7135 and DIN Plus									
Calorific value		17,6 MJ/kg							
Density		> 650 kg/m ³							
Water content		8–10 Gew%							
Ash content		< 0,5 Gew%							
Length		0,5–3 cm							
Diameter		0,5–0,6 cm							
Dust content on loading		< 1 Gew%							
Raw material		pure wood – bark content < 15% of total weight							
Ash									
Ash container volume	l	65	65	65	65	65	65	65	65
Ash removal system		yes	yes	yes	yes	yes	yes	yes	yes
Electrical system Typ USV D, USV ZI, stirrer									
Connection		400 V – 5 pin – max. 13 A							
Rated capacity	W	2179-2379	2290-2490	2382-2582	2382-2582	2382-2582	2382-2582	2502-2702	2524-2724
Electrical system Typ USV GS									
Rated capacity	W	3009	3120	3212	3212	3212	3212	3332	3354
Electrical system Typ USV V									
Rated capacity	W	1621	1732	1824	1824	–	–	–	–

Legend on the Page 40

Technical data – pellet operation

Weight	Unit	TYPE OF BOILER							
		USV 25	USV 30 *	USV 40	USV 50* ,**	USV 50 *	USV 60 *	USV 80	USV 100 **
Water jacket	kg	115	197	197	227	227	227	286	286
Boiler body	kg	142	238	238	268	268	268	327	327
Boiler weight USV V	kg	699	785	785	—	—	—	—	—
Boiler weight USV D	kg	556	705	705	768	768	768	990	997
Boiler weight USV ZI	kg	601	750	750	813	813	813	1.035	1.042
Boiler weight USV GS	kg	656	805	805	—	868	868	1.090	1.097
Emissions according to inspection report		FJ–BLT	FJ–BLT	FJ–BLT	FJ–BLT	FJ–BLT	FJ–BLT	FJ–BLT	FJ–BLT
Inspection report No.		BLT-025/05	***	BLT-021/06	***	***	***	BLT-022/06	BLT-024, 023/06
O ₂ content at rated power	vol%	6,1	6,4	7,1	7,0	7,0	7,0	6,8	6,7
O ₂ content at partial load	vol%	8,7	10,4	13,8	12,8	12,7	11,7	9,5	10,0
CO ₂ content at rated power	vol%	14,3	14,0	13,4	13,4	13,5	13,5	13,6	13,8
CO ₂ content at partial load	vol%	11,8	10,2	6,9	7,9	7,9	9,0	11,0	10,8
Reference 10% O ₂ dry (EN 303-5)									
CO at rated power	mg/Nm ³	26,0	52,0	104,0	91,4	90,8	77,5	51,0	7,0
CO at partial load	mg/Nm ³	139,0	184,7	276,0	236,8	234,8	193,5	111,0	62,0
NOx at rated power	mg/Nm ³	115,0	132,3	167,0	175,1	175,5	184,0	201,0	184,0
NOx at partial load	mg/Nm ³	n.m.	n.m.	156,0	161,5	161,8	167,5	179,0	n.m.
OGC at rated power	mg/Nm ³	1,0	1,3	2,0	1,8	1,8	1,5	1,0	< 1
OGC at partial load	mg/Nm ³	3,0	4,3	7,0	5,6	5,5	4,0	1,0	1,0
Dust at rated power	mg/Nm ³	37,0	33,3	26,0	25,8	25,8	25,5	25,0	26,0
Dust at partial load	mg/Nm ³	32,0	40,0	56,0	53,6	53,5	51,0	46,0	n.m.
Reference 13% O ₂ dry (FJ–BLT)									
CO at rated power	mg/Nm ³	19,0	38,0	76,0	66,7	66,3	56,5	37,0	5,0
CO at partial load	mg/Nm ³	101,0	134,0	200,0	171,7	170,3	140,5	81,0	45,0
NOx at rated power	mg/Nm ³	83,0	96,0	122,0	127,7	128,0	134,0	146,0	134,0
NOx at partial load	mg/Nm ³	n.m.	n.m.	113,0	117,0	117,3	121,5	130,0	n.m.
OGC at rated power	mg/Nm ³	1,0	1,3	2,0	1,8	1,8	1,5	1,0	< 1
OGC at partial load	mg/Nm ³	2,0	3,0	5,0	4,1	4,0	3,0	1,0	< 1
Dust at rated power	mg/Nm ³	27,0	24,3	19,0	18,8	18,8	18,5	18,0	19,0
Dust at partial load	mg/Nm ³	23,0	29,0	41,0	39,3	39,3	37,5	34,0	n.m.
According to § 15a-BVG Austria									
CO at rated power	mg/MJ	13,0	25,3	50,0	43,8	43,5	37,0	24,0	3,0
CO at partial load	mg/MJ	68,0	89,0	131,0	112,5	111,5	92,0	53,0	29,0
NOx at rated power	mg/MJ	56,0	64,0	80,0	83,8	84,0	88,0	96,0	87,0
NOx at partial load	mg/MJ	n.m.	n.m.	74,0	76,6	76,8	79,5	85,0	n.m.
OGC at rated power	mg/MJ	1,0	1,0	1,0	1,0	1,0	1,0	1,0	< 1
OGC at partial load	mg/MJ	2,0	2,3	3,0	2,5	2,5	2,0	1,0	< 1
Dust at rated power	mg/MJ	18,0	16,3	13,0	12,8	12,8	12,5	12,0	12,0
Dust at partial load	mg/MJ	15,0	19,0	27,0	25,8	25,8	24,5	22,0	n.m.

FJ – BLT Francisco Josephinum Wieselburg – Biomass • Logistics • Technology
 mg/Nm³ Milligrams per standard cubic meter (1 Nm³ under 1013 mbar at 0 °C)
 nm not measured
 FS Fresh Substance
 DS Dry Substance

* Inspection of drawings
 ** Homologation versions
 *** Intermediate values interpolated
 **** If the flue gas extractor for a USV 80/100 kW is installed in position "2" then it must be suspended or supported.

Note – general constructional conditions

Always comply with the local statutory submission, construction and execution regulations that apply to you as a KWB system user! You can obtain these regulations, for example, B. from the architect or responsible authorities. Adherence to and verification of the local statutory regulations is a condition for our warranties and for 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 bulletin 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 to be fire resistant F90*1; boiler room door (see table Boiler dimensions for installing the boiler) to be executed as an automatically closing fire door (T30*2) that opens in the direction of escape, connection door to the fuel storage room to be executed as an automatically closing fire door (T30*2). Boiler room window non-opening G30*3; non-closing intake air opening 5 cm² per kW rated power of the heating system, but not less than 400 cm². For boiler output > 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 F90*1 envelope; a protective grille with a mesh width < 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 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 boiler room near the boiler room door. The boiler room as well as water lines and district heating pipes must be frost-resistant. No storage of inflammable materials in the boiler 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 installation guidelines.

Fuel storage room

The constructional on-site requirements for the boiler 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 blind floor/inclined floor should be installed at the same level as the top edge of the fuel extractor. Partition off the wall duct (width 50 cm, height 60 cm) for the screw trough, between storage room and boiler room so that it is protected against fire (e. g. with rock 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). These are available from KWB. If this filling method is chosen, dustproof 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. No electrical installations are permissible in the fuel storage room since they pose a risk of ignition. KWB biomass boilers 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 boiler room) is to be fitted at least ¾" or DN directly above the conduit of the fuel-extractor trough 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". A fire extinguisher must be installed in storage systems containing 50 to 200 m³ of wood chips for systems up to and including 400 kW. If such a fuel-storage room is built on fire-resistant structural components without openings, it is not necessary to enclose it with F90*1 sheathing/design. In the case of wood-chip storage rooms in utility outbuildings with a fire wall facing the living quarters, an F90*1 design/sheathing of the fuel-storage room is not necessary if the fire section is smaller than 500 m². The fuel must be stored separately from other goods (e. g. by wooden planking). A manual-release extinguisher and an integrated extinguisher must be installed. When storing up to and including 200 m³ of other wood materials (with dust) in systems up to and including 400 kW, an integrated extinguisher must be installed in addition to a manual-release extinguisher. For systems greater than 400 kW or storage volumes greater than 200 m³ in every case both an integrated extinguisher and a manual release extinguisher are necessary (see TRVB H 118). 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 with at least a 1.80 m cross-section, and must be planked to prevent the fuel from pouring out should the door be opened by mistake. The planking should be removable from the outside. An inspection opening (F90*1) must be installed above the fuel extractor trough. Please refer to the installation examples.

*1 F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501

*2 T30 in accordance with ÖNORM B 3800, EI₂ 30-C in accordance with ÖNORM EN 13501

*3 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501

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 flue-gas path is permanently below the flue-gas dew point DIN 18160! The approximate values for the chimney diameter are stated in the specifications. They are valid for the applicable system size, given average constructional conditions, i.e.: Effective chimney height 8–10 m, 1.5 m smoke pipe length, 2 Segment bends each 90°, 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 EN 13384. A data entry sheet as an electronic form is available from KWB. 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 it is he who will have to issue the acceptance certificate for the flue gas system.

Installation of the boiler

Boiler set up

To be performed exclusively by qualified, trained personnel of KWB or KWB associates. The boiler system is assembled and installed ready to plug in, site conditions permitting, otherwise it is dismantled before installation and then assembled ready to plug in, in the boiler room. Licensed heating and electrical fitters must connect the boiler 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 pipe connection on the chimney

If not already required by local regulations, we recommend that a draft limiter and a detonation damper be built into the smoke pipe or chimney-side wall, and arranged in such a manner to exclude any danger to persons. Keep the smoke pipe as short as possible. The smoke pipe must be insulated and connected, and should at least ascend slightly towards the chimney, preferably with an inclination of less than 45°. The smoke pipe should be thermally insulated and feature suitable easily accessible cleaning openings. The chimney

connection should be 20 mm larger than the smoke pipe diameter. In this way, it is possible to integrate a suitable acoustic transmission decoupler between the smoke pipe and the chimney. The KWB system is equipped with a negative-pressure controlled induced-draft fan as standard.

Water connection

The return-flow inlet temperature into the boiler must be at least 55 °C, which also has the effect of voiding the warranty. To increase the temperature of the return flow, the boiler control unit can drive a mixing controller or a mixing pump. For systems to 60 kW the return flow boost can also be executed via a thermal control valve. 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. in accordance with ÖNORM EN 12828 or EN 303). A load-balancing tank or buffer tank is not required, but it is useful in some cases, for instance if a solar system or a unit load boiler is included or if there is a need to achieve a very low permanent heating output during the summer months. Consult your heating engineer for specific details! 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 or ÖNORM H 5195 T1 and T2 must be unconditionally adhered to, otherwise there is a risk of corrosion, which may void the warranty.

Electrical connections of the KWB Multifire system

The entire system-internal wiring is executed in the factory or is executed plug-ready by 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 digital room control units.

Key indicators for boiler circuit pumps, mixing valves and mixer to raise the return flow temperature

Minimum required volume flow V – recommended mixer valve sizes and mixer sizes from the KWB product line*									
Boiler output	10			15			20		
Boiler output	Volume flow	Recommended valve / mixer from the KWB product line: Kvs	Pressure loss across the completely open valve / mixer	Volume flow	Recommended valve / mixer from the KWB product line: Kvs	Pressure loss across the completely open valve / mixer	Volume flow	Recommended valve / mixer from the KWB product line: Kvs	Pressure loss across the completely open valve / mixer
[kW]	[m³/h]	[m³/h]	[mbar]	[m³/h]	[m³/h]	[mbar]	[m³/h]	[m³/h]	[mbar]
15	1,29	6,5	39	0,86	6,5	17	0,64	6,5	10
25	2,15	17	16	1,43	6,5	49	1,07	6,5	27
30	2,58	17	23	1,72	17	10	1,29	6,5	39
40	3,44	17	41	2,29	17	18	1,72	17	10
50	4,30	24	32	2,86	17	28	2,15	17	16
60	5,16	24	46	3,44	17	41	2,58	17	23
80	6,87	31	49	4,58	24	36	3,44	17	41
100	8,59	31	77	5,73	31	34	4,30	24	32

* Recommendation applies to standard conditions – Heat generator in the boiler room (Assumption: Pressure loss in variable quantity section or route: 50 mbar)

Required connections to be provided by customer:

- CEE. 5-pole socket (3L/N/PE), 400 VAC
- Type C lightning arrester at the distribution board of the house (recommended as lightning protection)
- Stop switch (230 V AC, cable cross-section at least 1.5 mm²)
- If using KWB Comfort SMS: 230 V AC socket.
- If using fuel extractor modules: Per module 1 CEE. 5-pole socket (3L/N/PE), 400 V AC

Scope of delivery includes:

- Order option: No heating circuit
 - Boiler I/O board without heating circuit
 - Boiler control unit with room temperature sensor
 - Temperature sensor set (1 x DHWC sensor, 2 x buffer tank sensors, and 1x return flow temperature sensor)*
- Order option: 1 heating circuit
 - Boiler I/O board with one heating circuit
 - Boiler control unit with room temperature sensor
 - Temperature sensor set (1 x DHWC sensor, 2 x buffer tank sensor, 1 x return flow, 1 x forward flow temperature sensor, and 1 x outdoor temperature sensor)*
- Order option: 2 heating circuits
 - Boiler I/O board with 2 heating circuits
 - Boiler control unit with room temperature sensor
 - Temperature sensor set (1 x DHWC sensor, 2 x buffer tank sensor, 1 x return flow, 2 x forward flow temperature sensor, and 1 x outdoor temperature sensor)*

Optional:

- Heating circuit expansion module with sensor set (2 x forward flow sensor, 1x DHWC sensor, 2 x buffer tank sensor, and 1 x outdoor temperature sensor)*
- Analogue and digital room control units with room temperature sensor
- Plug-in module 1 for USV D, USV ZI and USV V with 1 heating circuit with sensor set (1x forward flow temperature sensor) and activation of second boiler; for USV GS included standard for activation of suction head and activation of a second boiler.

The following devices can be connected:

- Order option: No heating circuit
 - 1 boiler circuit pump**
 - 1 DHWC pump**
 - 1 return-flow mixer***
- Order option: 1 heating circuit
 - 1 boiler circuit pump**
 - 1 DHWC pump**
 - 1 return-flow mixer***
 - 1 heating circuit pump**
 - 1 heating circuit mixer***
- Order option: 2 heating circuits
 - 1 boiler circuit pump**
 - 1 DHWC pump**
 - 1 return-flow mixer***
 - 2 heating-circuit pumps**
 - 2 heating circuit mixer***

- Order option: Heating circuit expansion module
 - 1 supply pump**
 - 1 DHWC pump**
 - 2 heating-circuit pumps**
 - 2 heating circuit mixer***

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:
For switching 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).
- Stop switch:
Connection of the stop switch in accordance with applicable prTRVB H 118

* DHWC and buffer tank sensor are pin sensors Ø 6 mm, outdoor temperature sensor with housing, all other sensors are clip-on temperature sensors

** Pump connection: 230 230 V AC, max. 200 W, speed-controlled output for boiler circuit pump (suitable for speed control of fixed-speed pumps).
If using three-phase boiler-circuit pumps 3 × 400 V, a motor protection system should be installed; the auxiliary coil of this protection system must have a power requirement of ≥ 3 W.
No speed regulation or adjustment is possible. Mixing circuit only permissible for return-flow boost

*** Mixer motor connection: 230 V AC, open/off/closed (three-step)



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