KWB MULTIFIRE

Wood chip and wood pellet heating system

Robust all-rounder for economical heating

KWB
The Biomass Heating System

Technology and planning

Wood chip and wood pellet heating system KWB Multifire 15 – 100 kW

We provide energy for life!

Biomass - Fuel of the future

Save 50% on heating costs *Anyone who wants to save heating costs in the long run will change to renewable wood fuel. The prices for wood have been stable for years and are largely independent of the world market prices for oil and natural gas.*

Secure supply instead of bottleneck *Wood grows – also geographically. Across Europe, forests and with them the available quantity of renewable wood fuel are steadily on the increase. Each year, more wood grows in the forests than can be used. Therefore, there will be sufficient quantities of renewable wood fuel in the long term. An additional safeguard are energy woods such as willow and poplar, which grow in areas used for agriculture.*

Protect the climate *Heating with renewable wood fuel is CO_2-neutral. This means that when wood is burned, only as much CO_2 is released into the atmosphere as a tree has absorbed during its lifetime. The decision in favour of renewable wood fuel is also one in favour of climate protection.*

More than 60,000 customers in Europe

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 continuous goal is to offer manufacturing quality that surpasses the industry average – so that you can 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. At KWB, we demand quality, which is why we can offer the best guarantees with confidence:

- 3 years warranty on all biomass heating systems if a maintenance contract is concluded.
- 8 years warranty on the heat exchanger if a functioning return temperature control is installed.
- 15 years guarantee on spare-parts availability.

Award-winning

KWB stands for the highest quality. The numerous awards we have received confirm that we are on the right path and we will continue to pursue this consistently.

Quality management

Safety management

Blue Angel eco-label for KWB Easyfire

Green Power (Ökostrom) customer

Eco-label Austria

Member of the Climate Alliance

Conformance with EC directives

Wieselburg

Emissions and efficiency test

KWB Multifire Wood-chip and pellet heating system

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. Wood chips, G30, W30, in accordance with ÖNORM M7133 or B1, P16B, in accordance with EN14961-1, and wood pellets with a diameter of 6 mm or 8 mm according to ÖNORM M7135 or DIN Plus as well as wood pellets of quality levels A1 and A2 according to EN14961-1 can be used. Wood pellets of A2 quality class have **not been approved for the types USV GS and USV D with pellet extraction.** (DM 8mm are **not approved** for the following extractors: elbow conveyor, conveyor screw with suction conveyor)

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.

Economical

Minimum power consumption, maximum convenience

- Generously dimensioned ash container with four rollers and ash compaction with fill level monitoring for a comfortable emptying only every two to ten weeks.
- Long life expectancy and minimised electricity costs of the conveyor system through a stable fuel hopper with automatic fill level monitoring.

Multi-Talented

KWB firing technology

- Burner plate cleaning KWB MultiFlex for different fuel qualities.
- Reliable in the event of ash-rich wood fuels that tend to produce slag.
- Optimal burning conditions thanks to the broadband lambda sensor and negative pressure control.

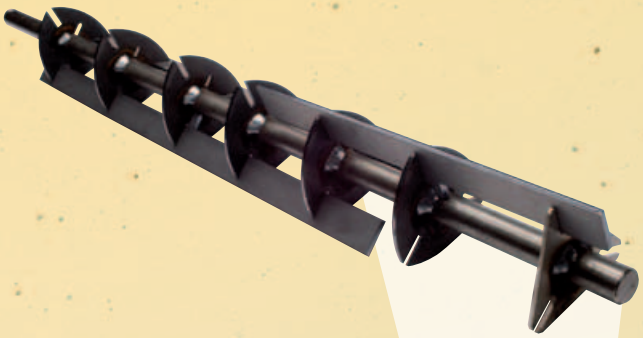
Unique

patented heat exchanger cleaning

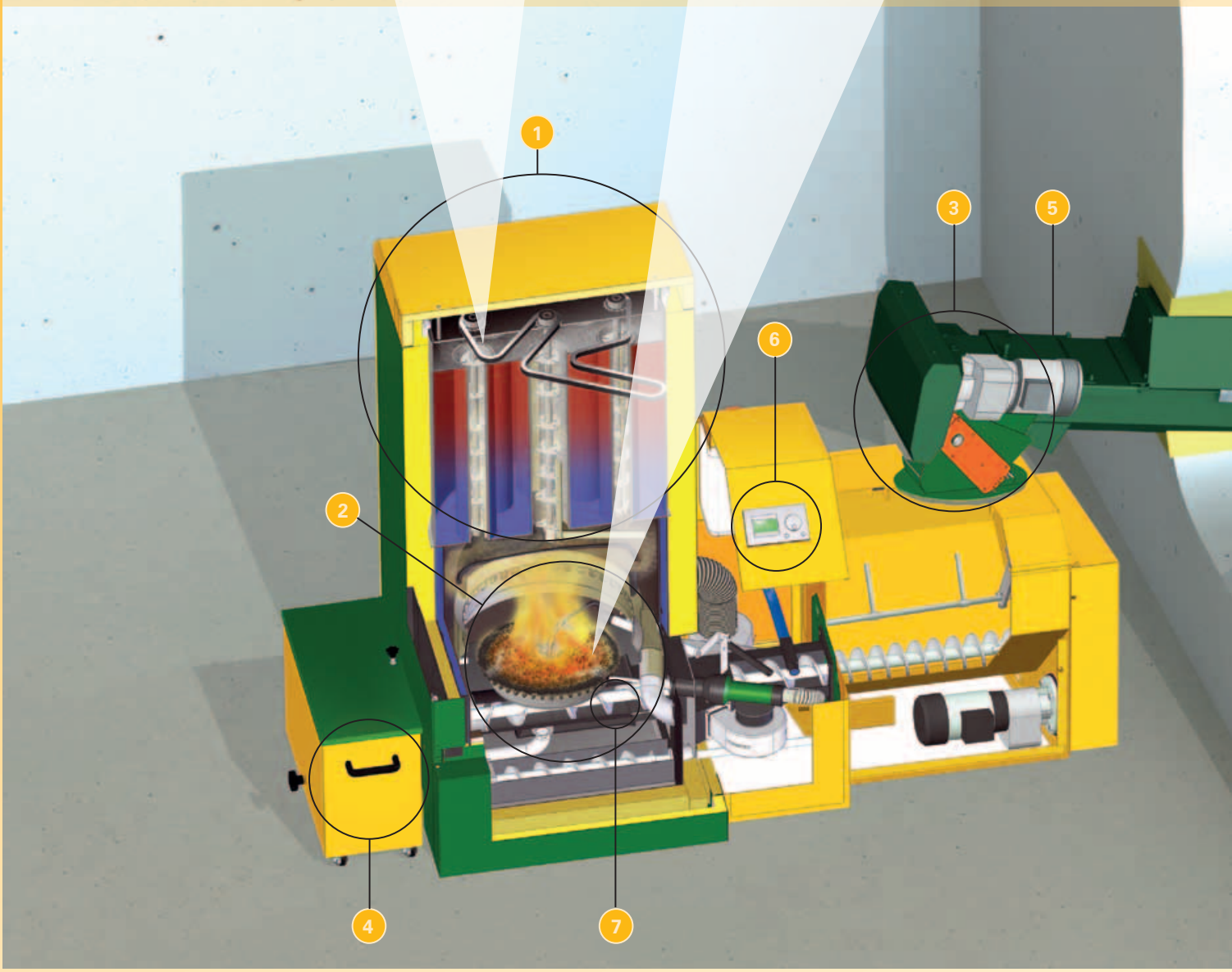
- Consistently highly efficient thanks to special turbulators.
- Optimal heat exchange through improved cleaning and reduction in flow loss.

Robust all-rounder for economical heating

Patented special turbulators

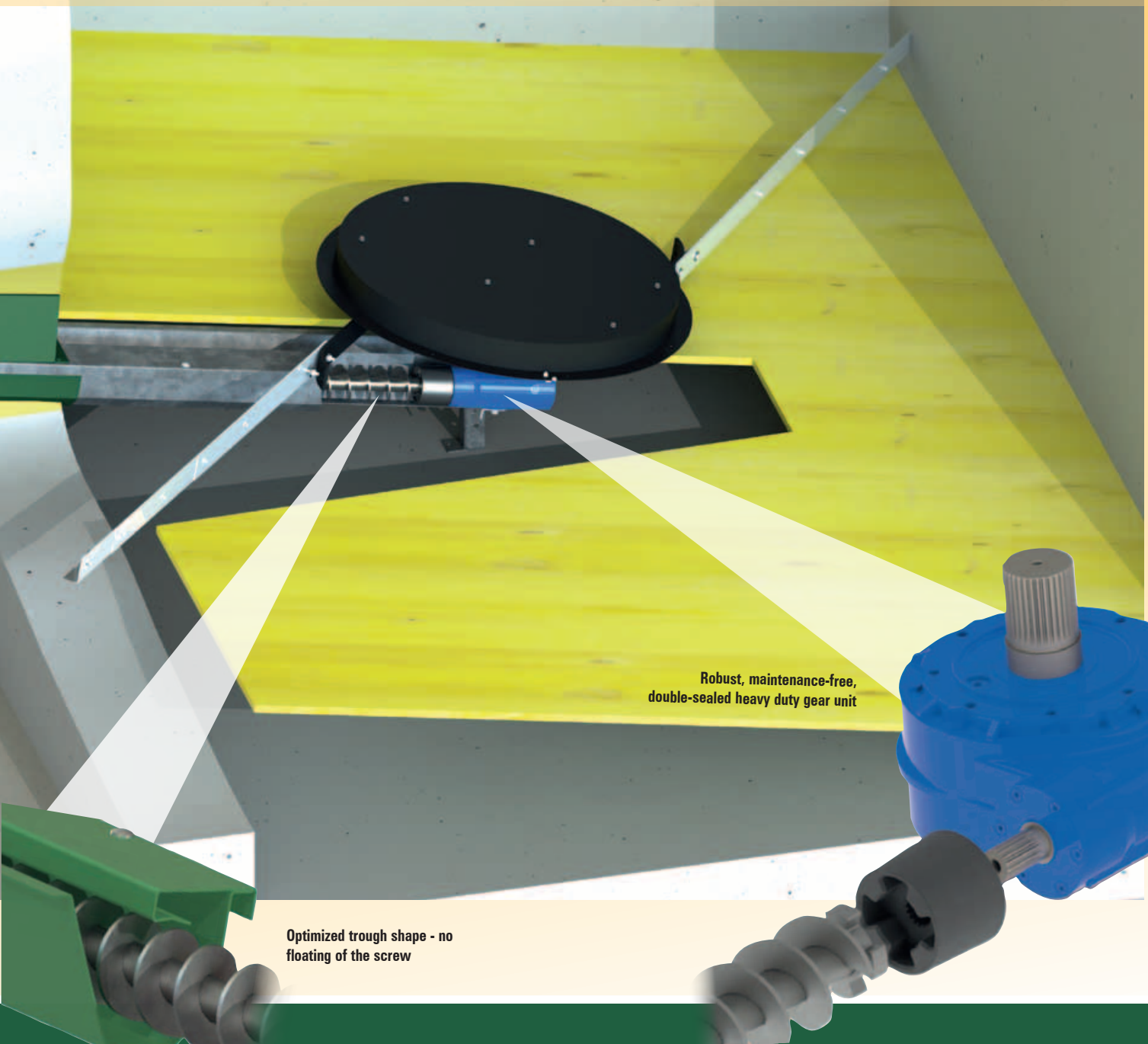


Burner cup with KWB MultiFlex burner plate cleaning



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

1. **Heat exchangers:** Upright, automatic dedusting heat exchanger with patented special turbulators
2. **Combustion system:** Underfeed gasifier, MultiFlex burner plate cleaning, 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, mobile ash box
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



Robust, maintenance-free, double-sealed heavy duty gear unit

Optimized trough shape - no floating of the screw

KWB Comfort control system

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, lowest 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.

The control unit consists of the following components:

1. **Base 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**: 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**: Easy operation for a heating circuit with room sensor consisting of a 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 features an easy-to-use and self-explanatory user interface. A convenient commissioning wizard is available for the heating engineer.

Boiler control unit

Heating circuit expansion module

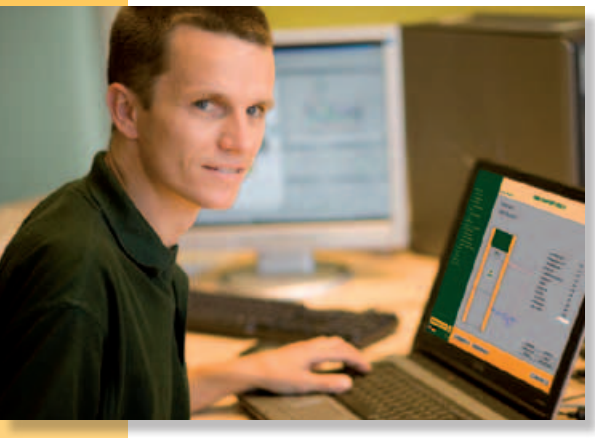
Analogue remote control unit

KWB Comfort Solar

KWB Comfort SMS

Use your own mobile phone to query the actual operating states and actively control your heating system (e.g. 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 acknowledgement 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 an additional 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 regard 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

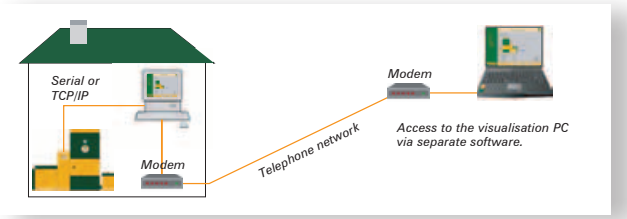
Operating values of boiler, heating circuits, DHWCs and buffer tanks can be displayed with the KWB Comfort Visio. All the configuration parameters of the heating system are displayed and can be changed on the visualisation interface. In addition, KWB Comfort Visio offers a comprehensive alarm management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

Archiving

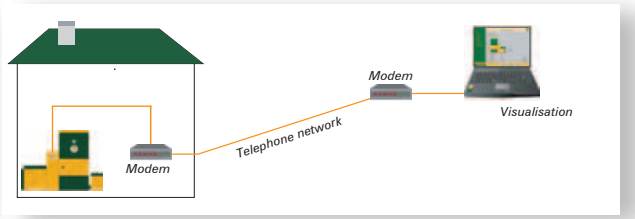
When using a local computer, the comprehensive data recording and evaluation options of the KWB Comfort Visio can be used.

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.



Option 1: Visualization PC near the system



Option 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 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 can be modified by the external system in the KWB Comfort control system.

KWB Multifire installation examples

Stirrer and ascending screw with upward transfer

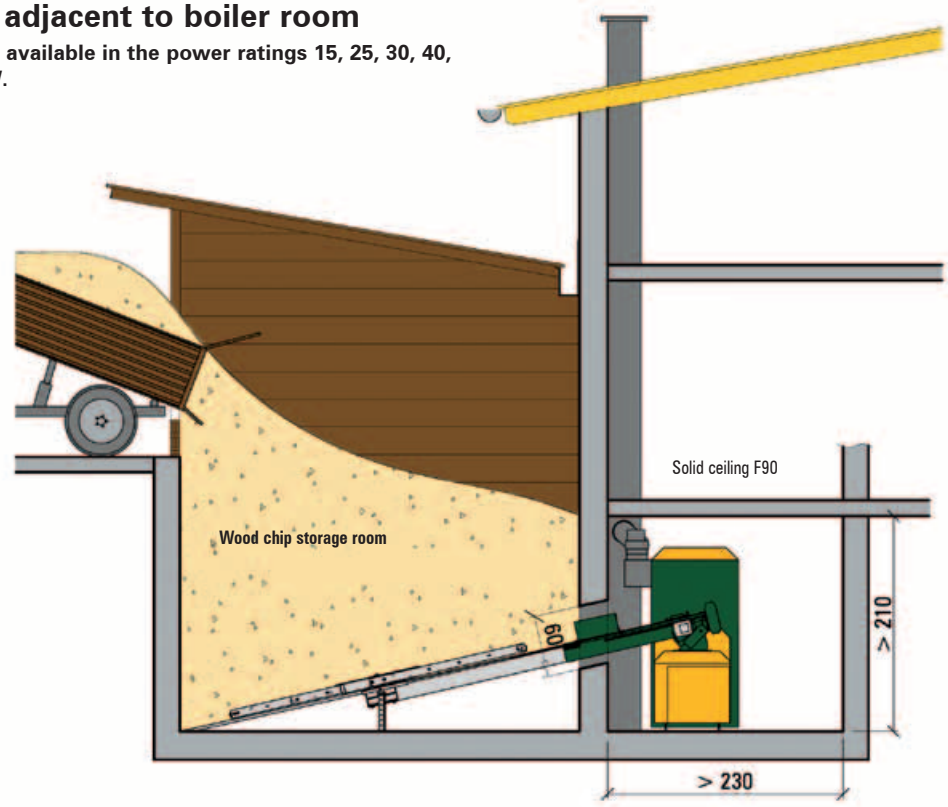
Stirrer in standard version

Type USV ZI 40-60 kW with stirrer

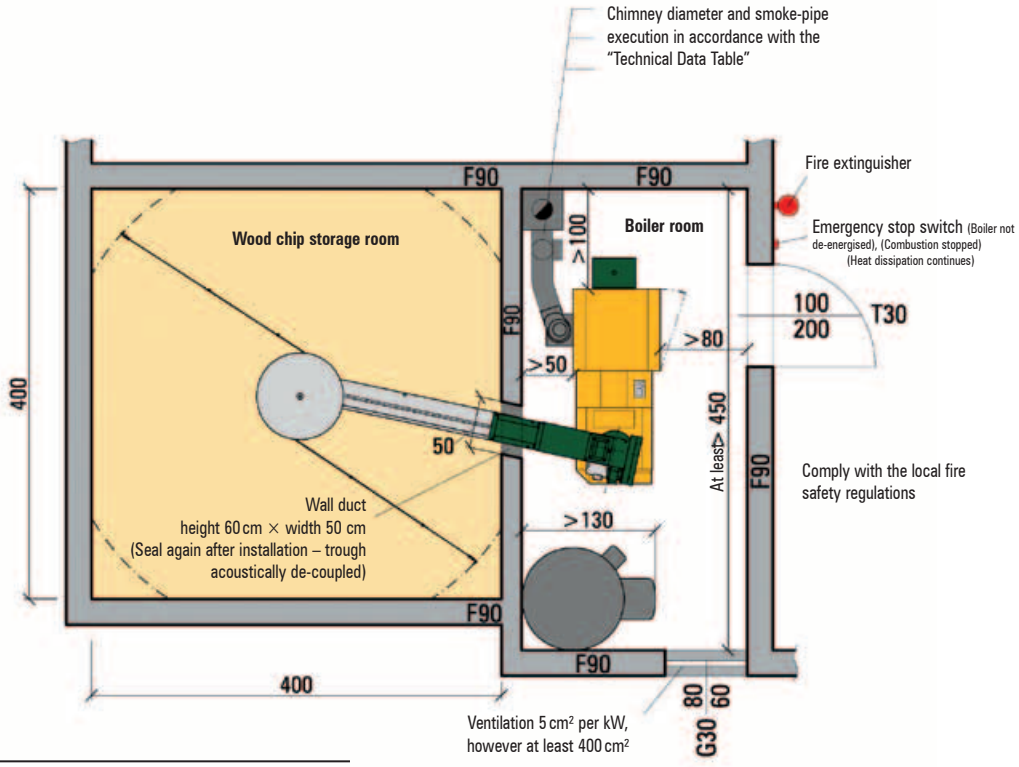
Storage room adjacent to boiler room

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

Outline



Ground plan



F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI_2 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.

KWB Multifire installation examples

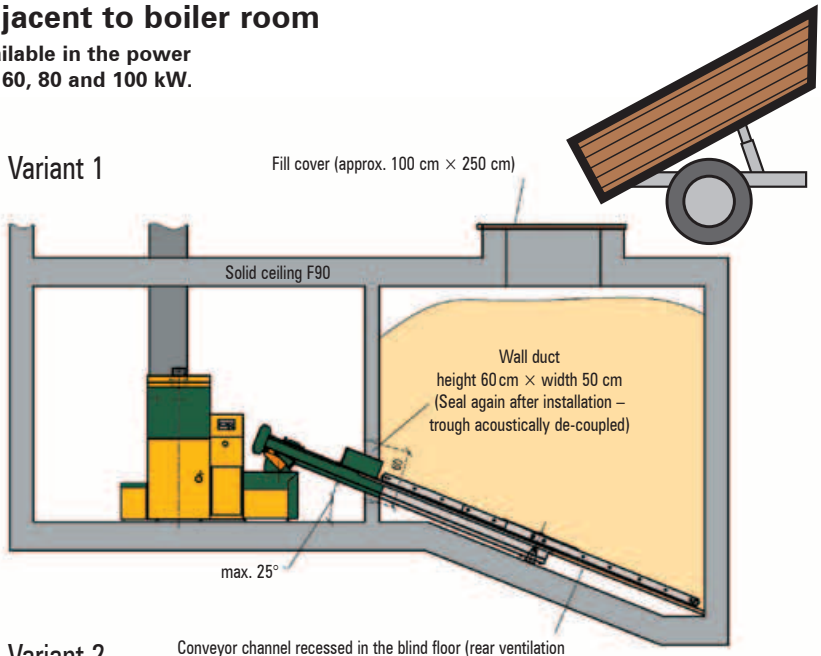
Type USV D 15-25 kW with stirrer

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.

Variant 1

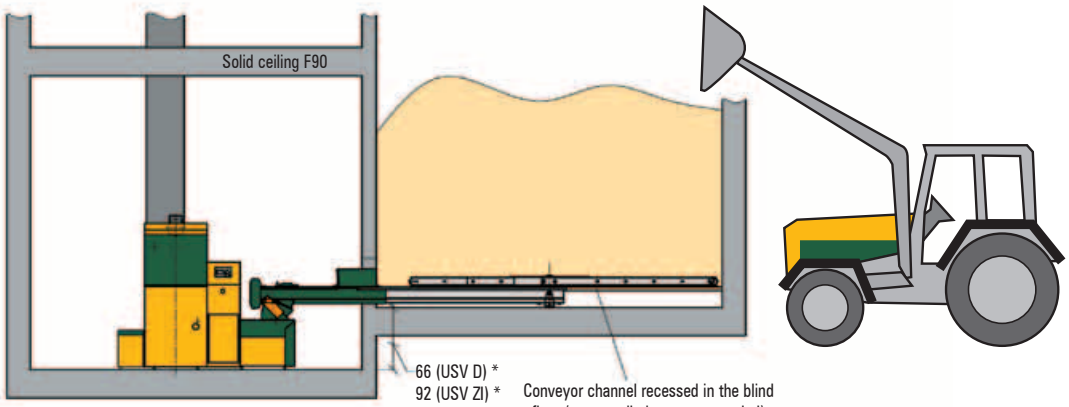
Outline



Variant 2

Conveyor channel recessed in the blind floor (rear ventilation recommended)

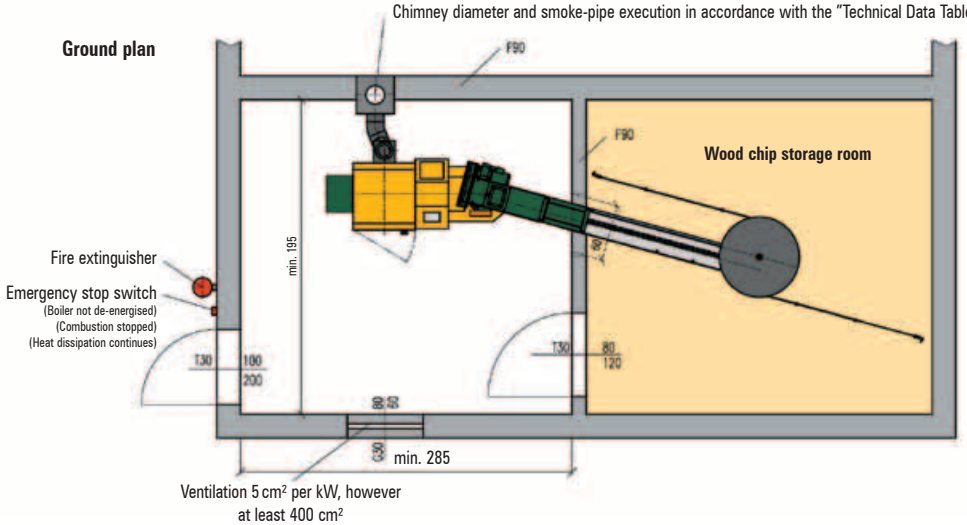
Outline



*Conveying trough can be recessed into the ground (see page 9 in this regard)

Recess depth: 22 cm
Upper edge of concrete: 88 cm (USV D), 114 cm (USV ZI)

Ground plan



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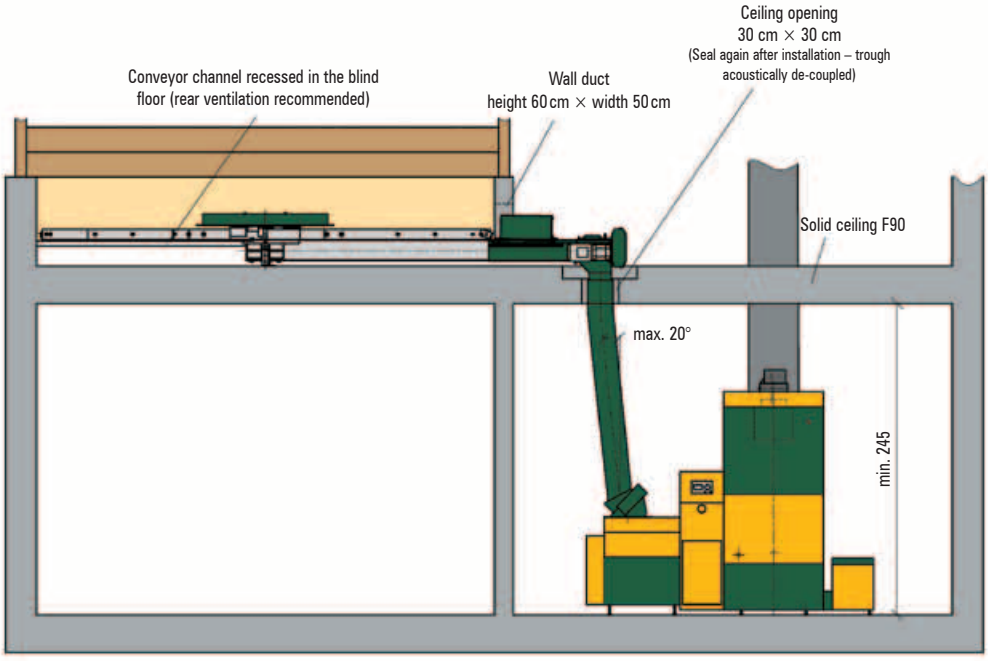
T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

Type USV ZI 80-100 kW with stirrer

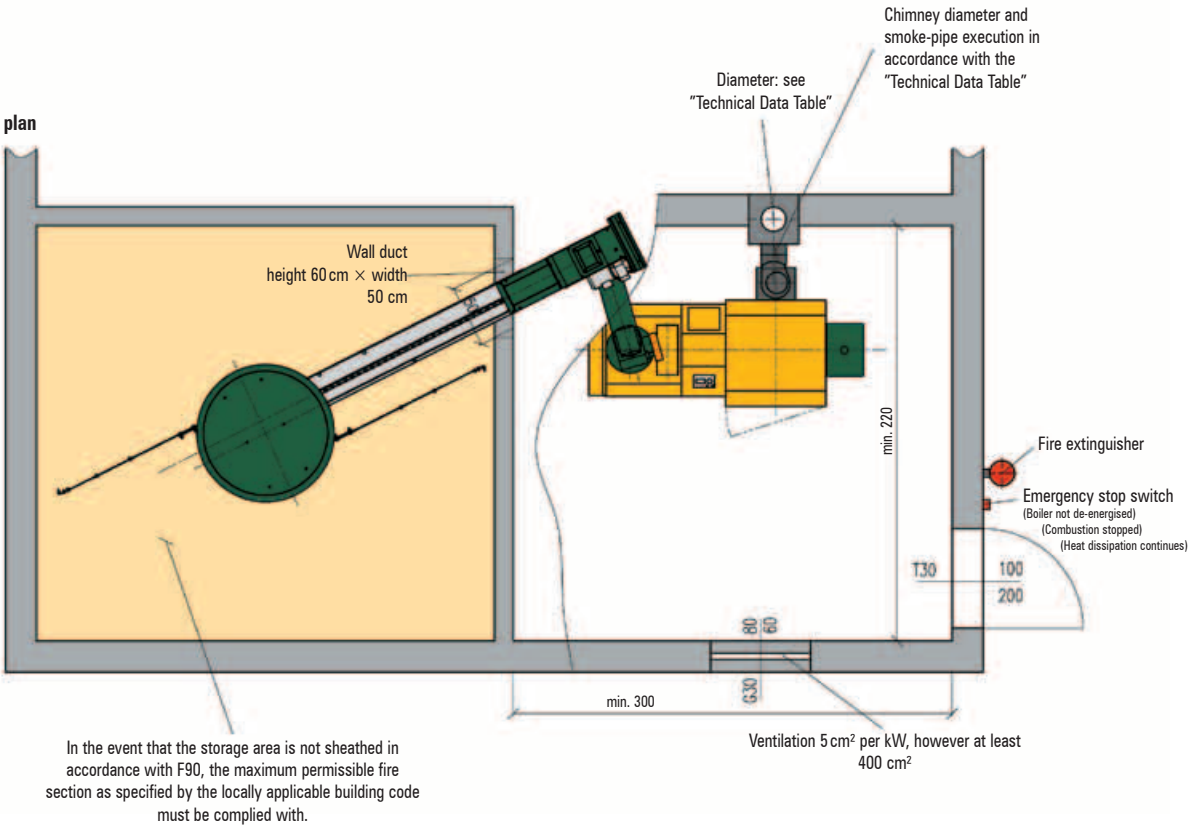
Storage room above the boiler room

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

Outline



Ground plan



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T30 in accordance with ÖNORM B 3800, EI_2 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.

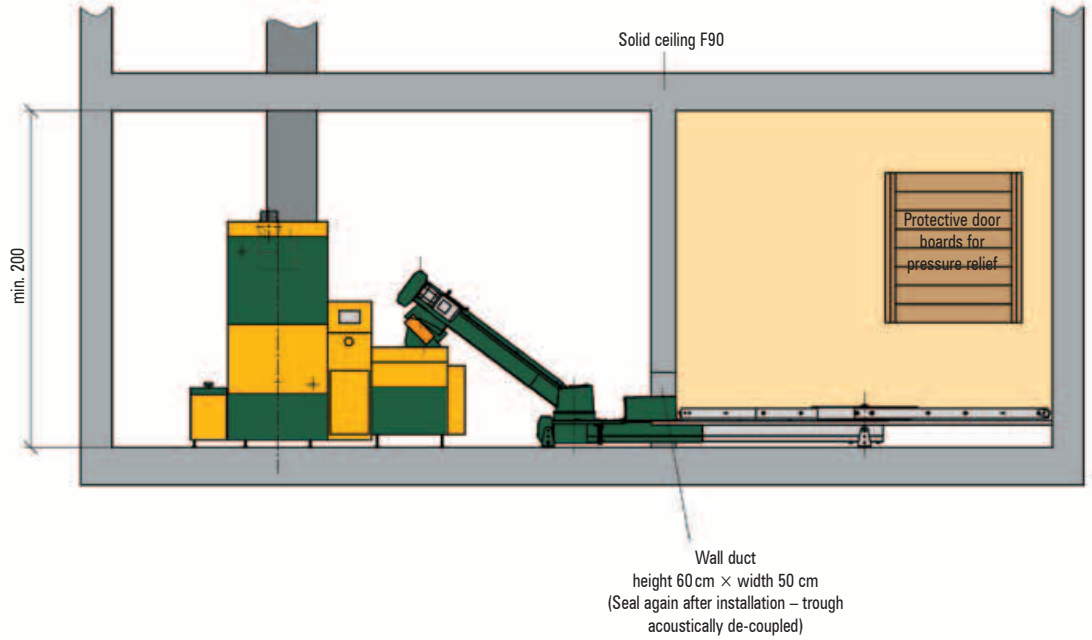
KWB Multifire installation examples

Type USV ZI 30-60 kW with stirrer and ascending screw with upward transfer

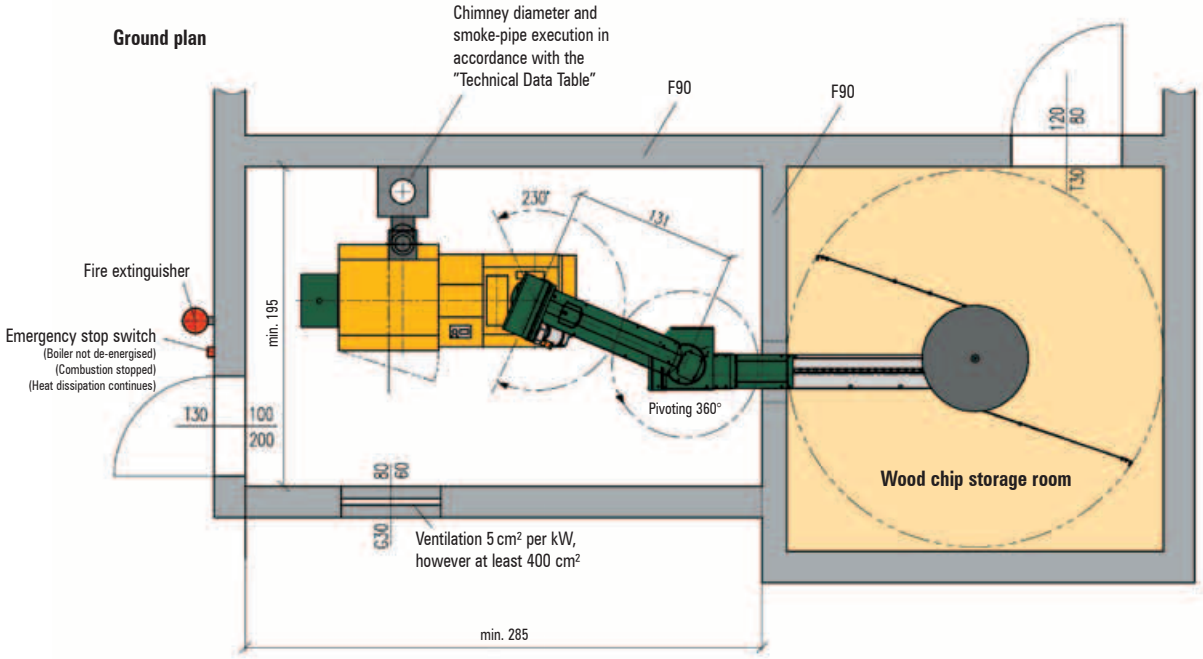
Storage room adjacent to boiler room

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

Outline



Ground plan



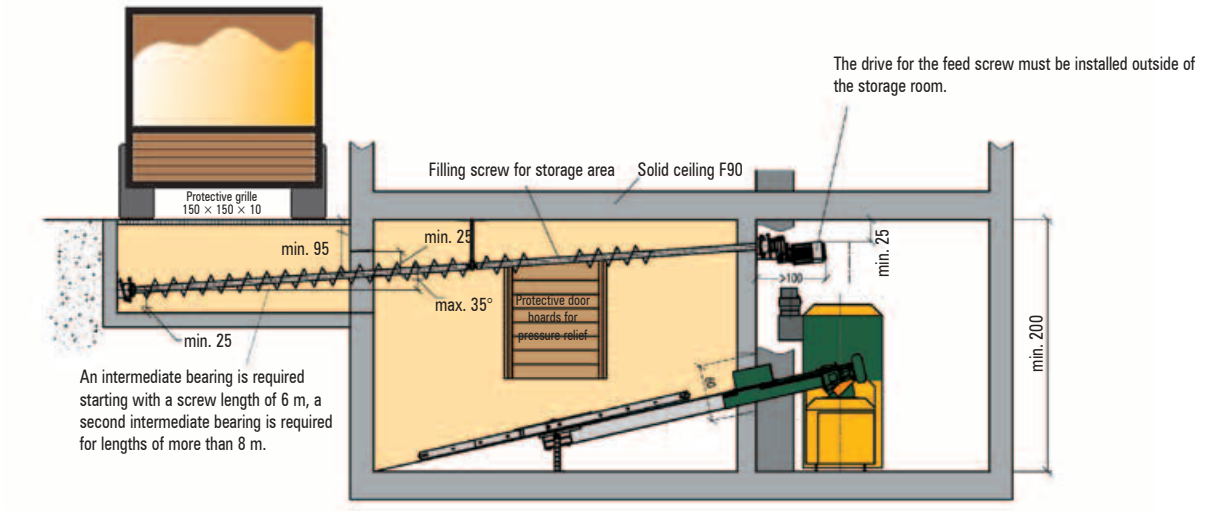
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI$_2$ 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

Type USV ZI 30-60 kW with stirrer and filling screw for storage area

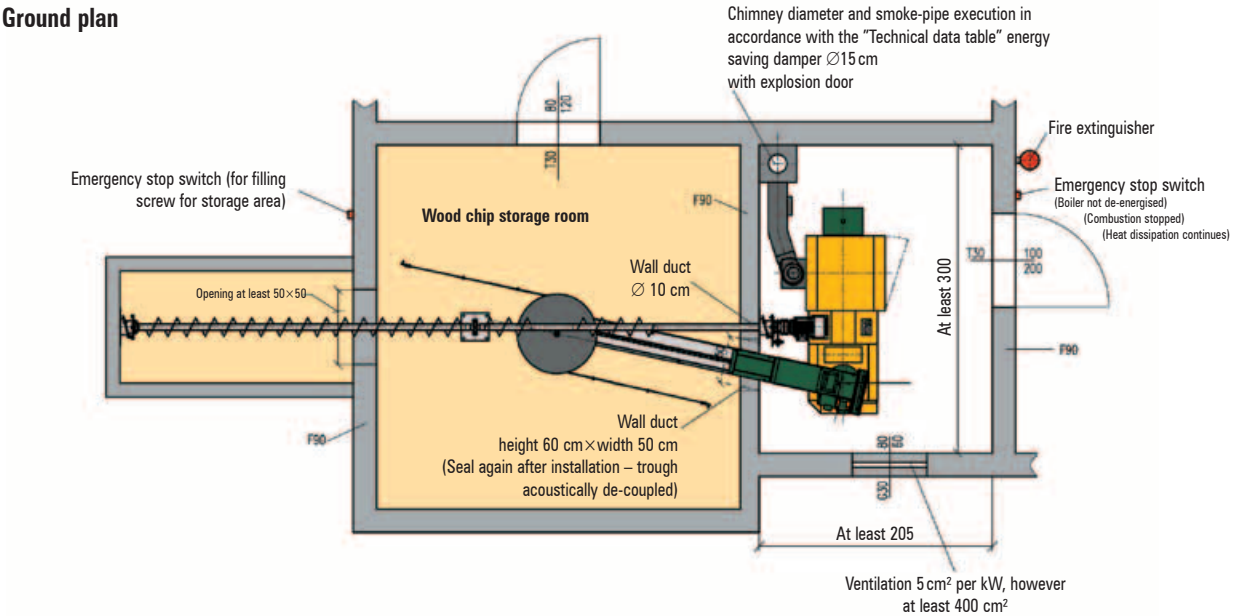
Storage room adjacent to boiler room

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

Outline



Ground plan



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T30 in accordance with ÖNORM B 3800, EI_2 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.

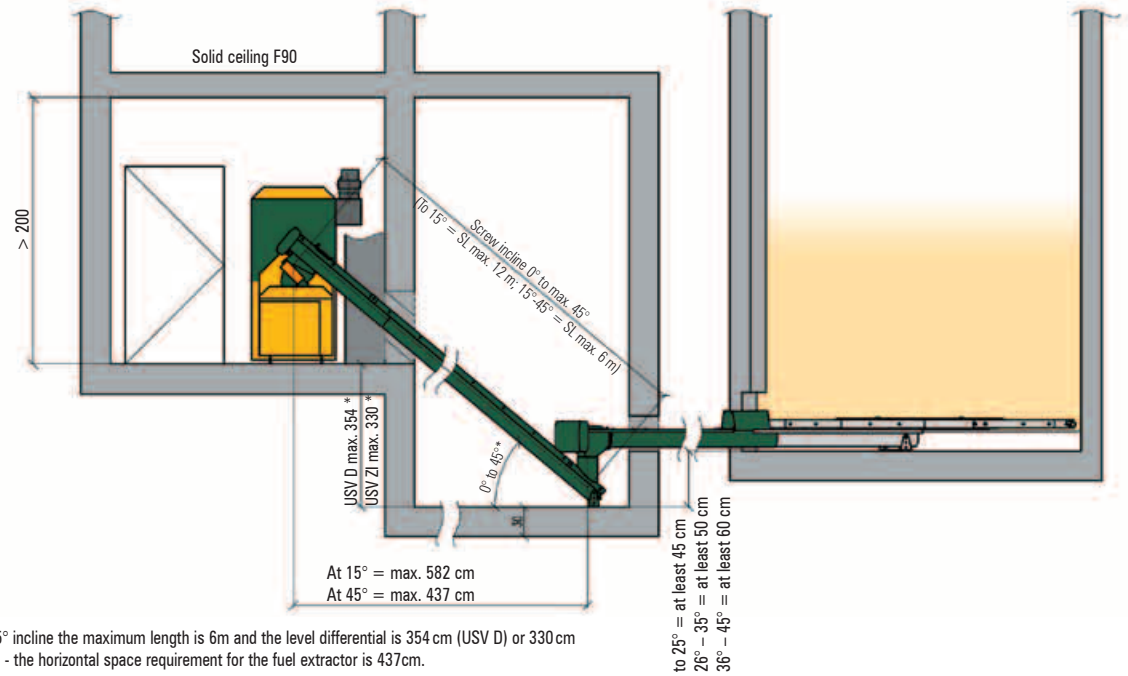
KWB Multifire installation examples

Type USV ZI 30-60 kW with stirrer and ascending screw with downward transfer

Storage room below the boiler room

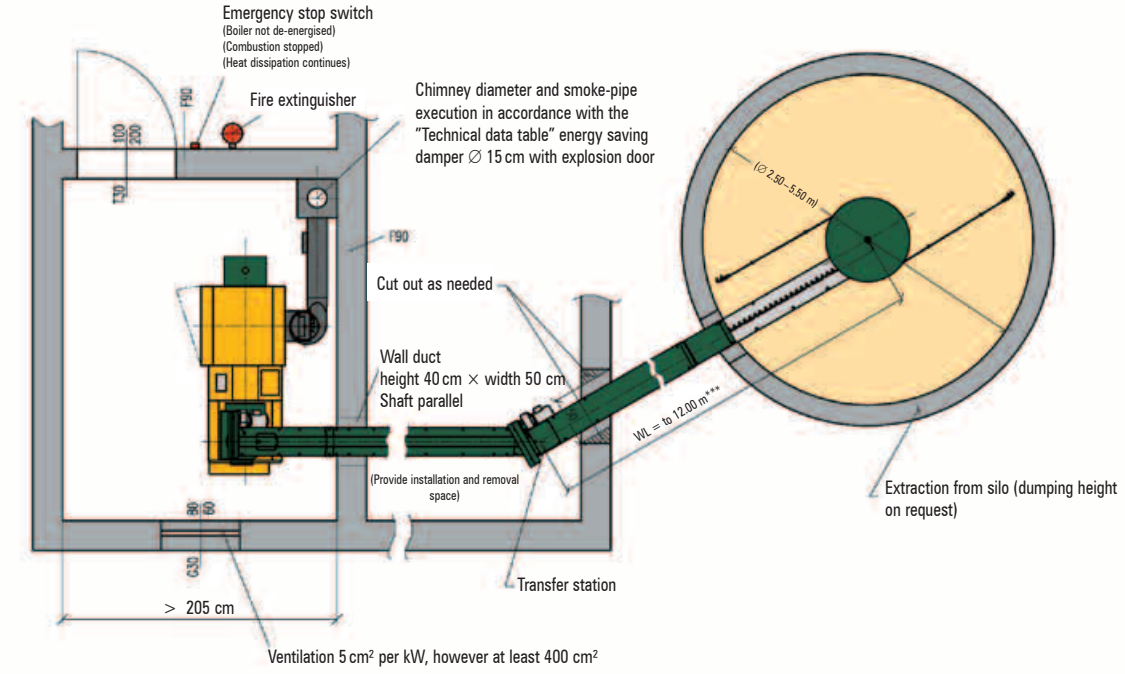
The version shown is available in the power ratings 15, 25, 30, 40, 50, 60, 80 and 100 kW.

Outline



*At a 45° incline the maximum length is 6m and the level differential is 354 cm (USV D) or 330 cm (USV ZI) - the horizontal space requirement for the fuel extractor is 437cm.

Ground plan



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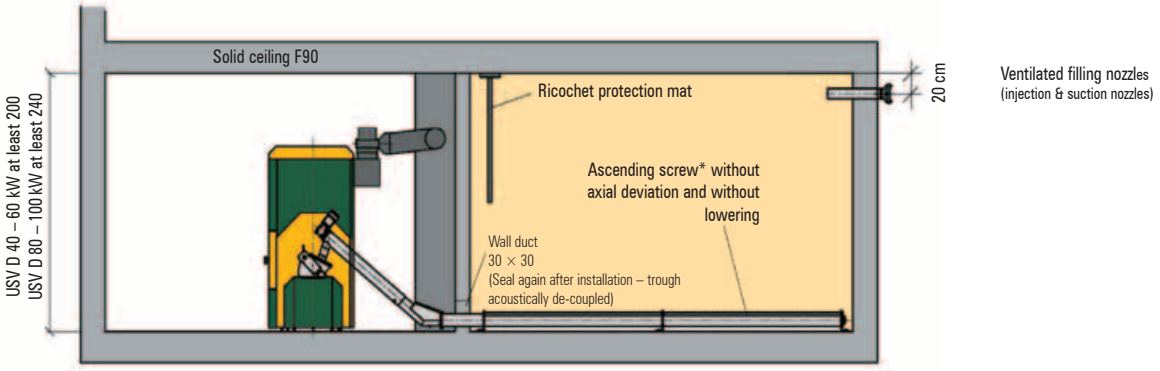
T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

Type USV D 40-100 kW with conveyor screw and elbow screw

Storage room adjacent to boiler room

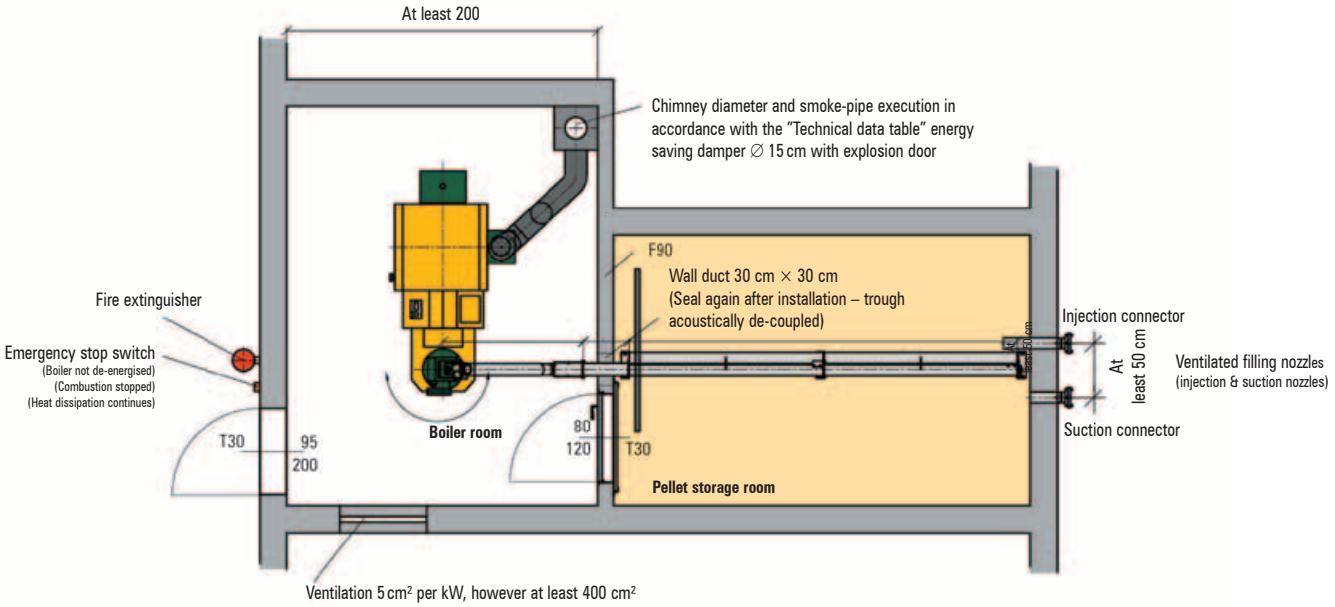
The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.

Outline



* See the table on page 10 for dimensions.

Ground plan



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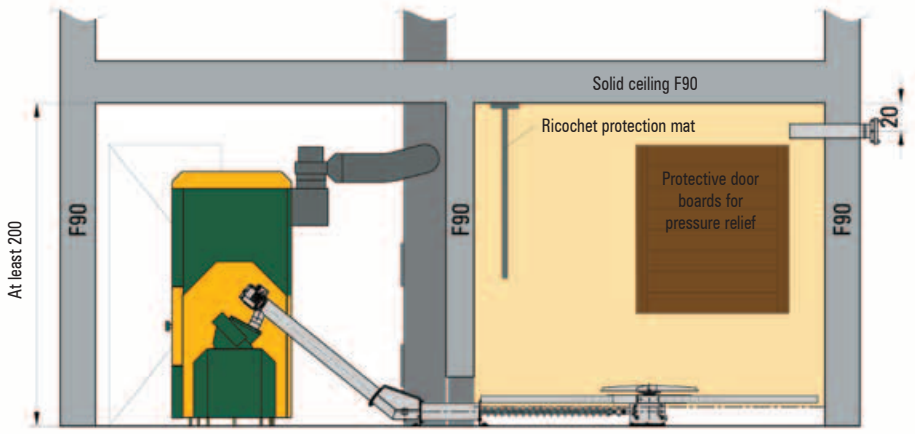
T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

KWB Multifire installation examples

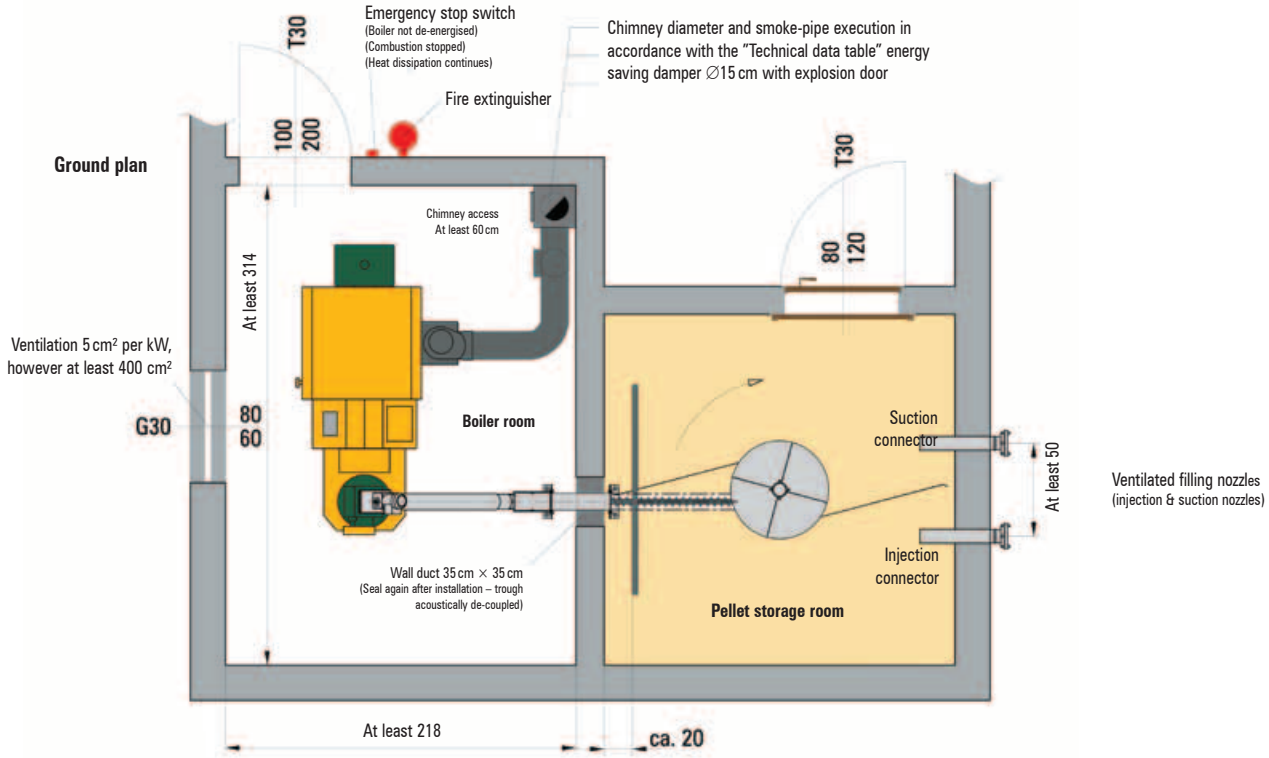
Type USV D 40-60 kW with Pellet Stirrer Plus and elbow screw

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

Outline



Ground plan



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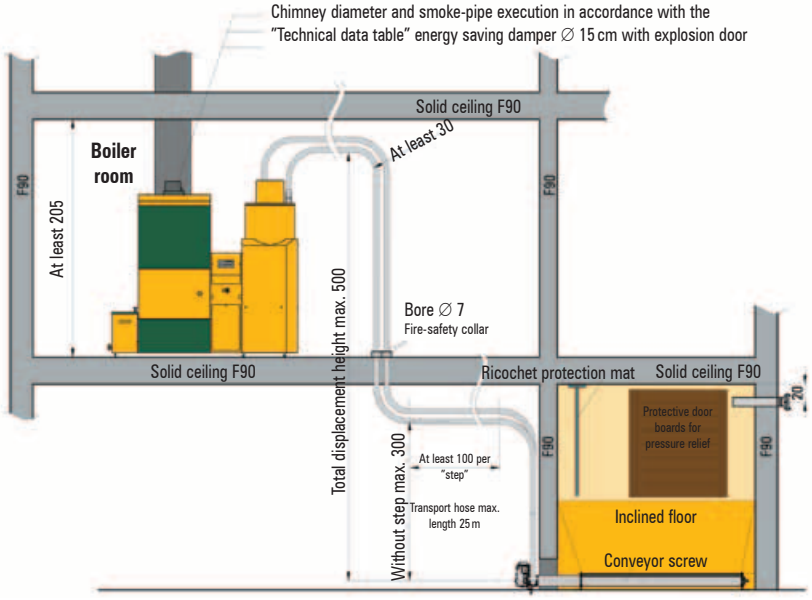
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

Type USV GS 40-60 kW with conveyor screw and suction conveyor

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

Outline

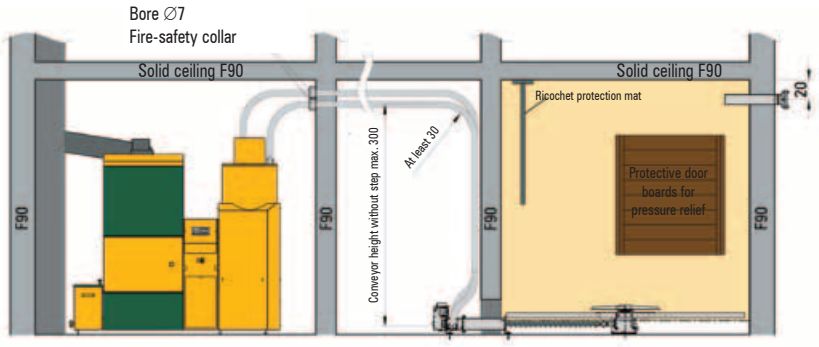


Wall duct 35x35 (seal after installation – trough acoustically decoupled).

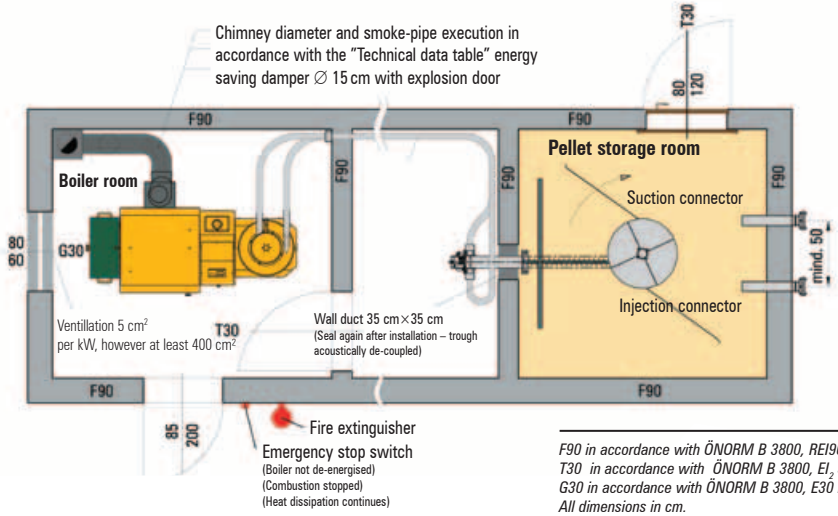
Type USV GS 40-60 kW with Pellet Stirrer Plus and Suction Conveyor

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

Outline



Ground plan



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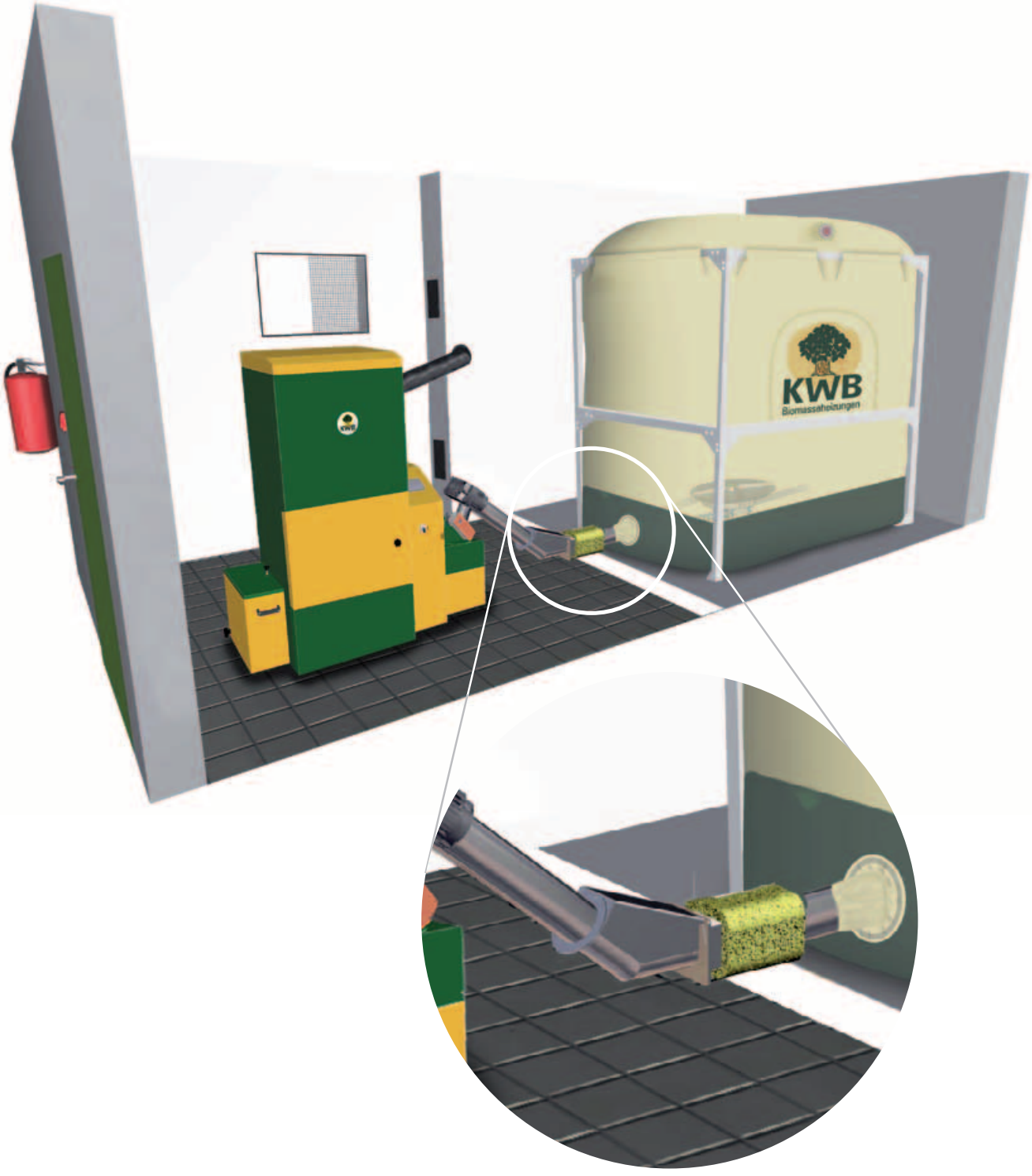
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

KWB Pellet Big Bag and elbow screw

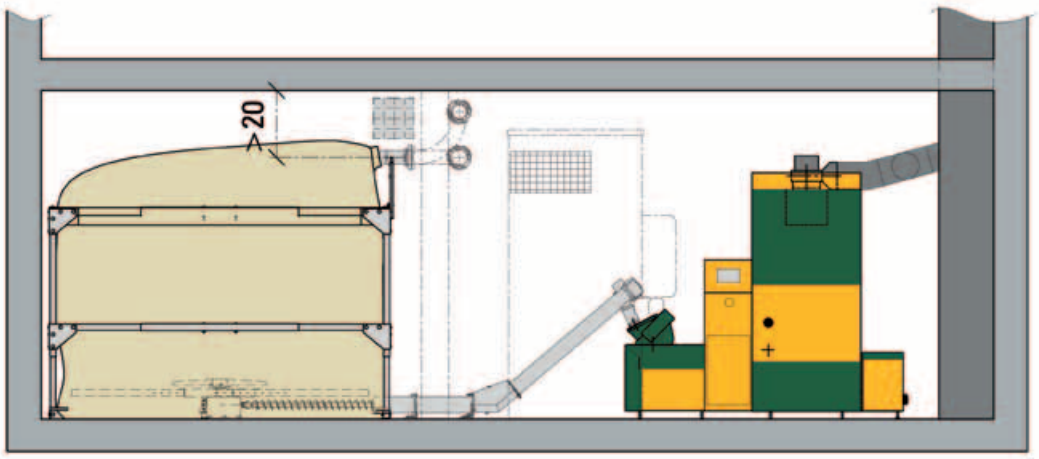


Type USV D 40-60kW with KWB Pellet Big Bag and elbow screw

Storage room adjacent to boiler room

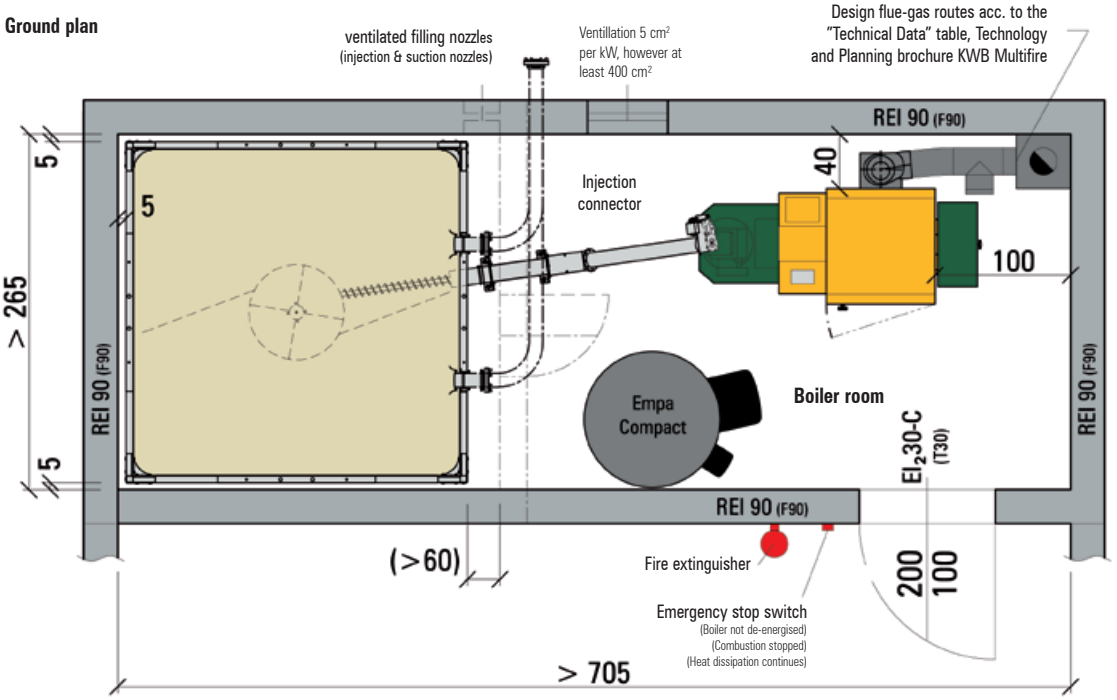
The version shown is available in the power ratings 40, 50, 60, 80 and 100 kW.

Outline



Comply with the local fire safety regulations

Ground plan



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T30 in accordance with ÖNORM B 3800, EI_2 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.

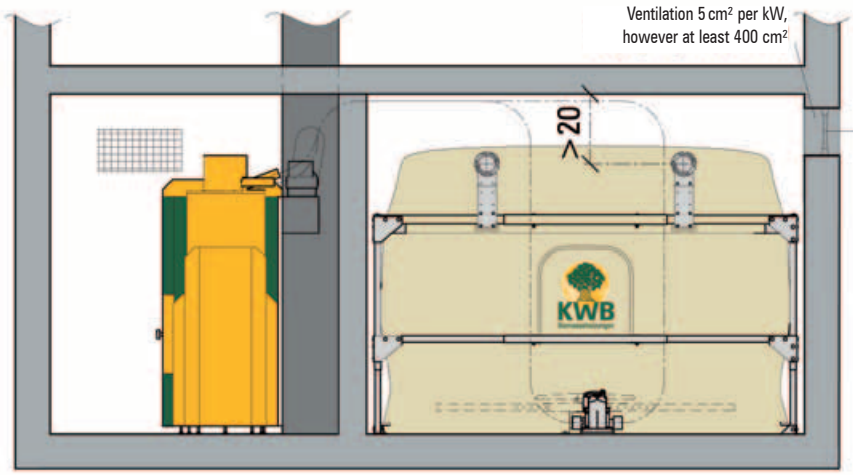
KWB Pellet Big Bag and suction conveyor

Type USV GS 40-60 kW with KWB Pellet Big Bag and suction conveyor

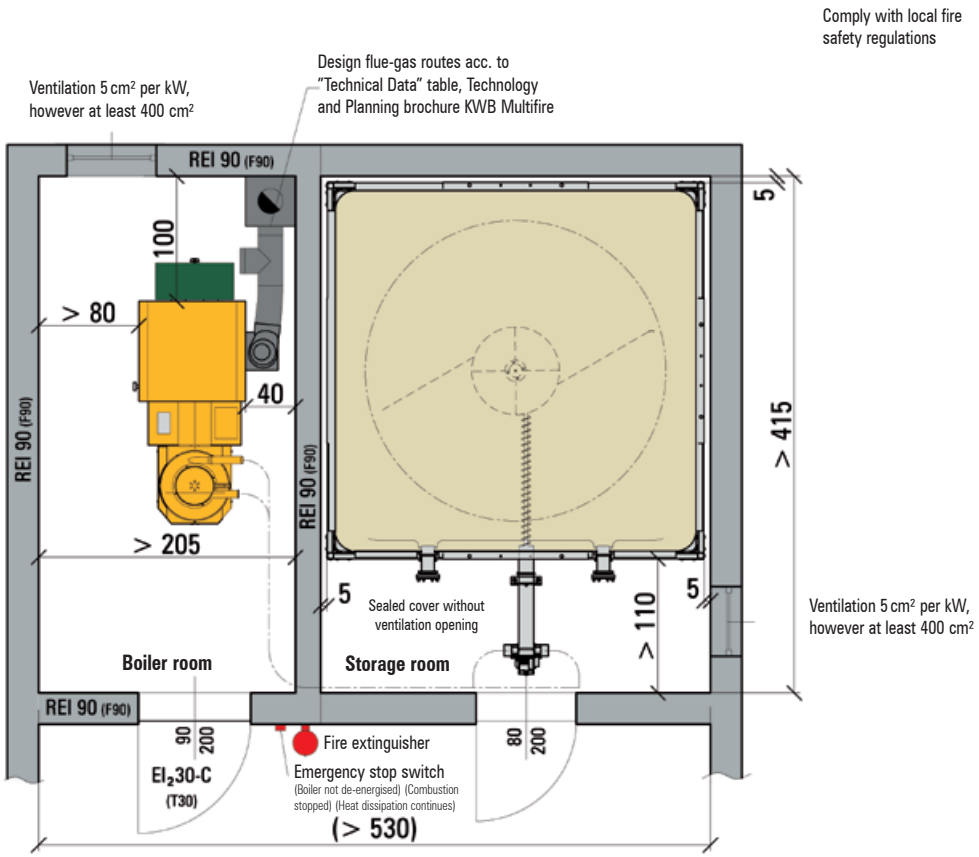
Storage room adjacent to boiler room

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, EI_2 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.

KWB Multifire installation examples

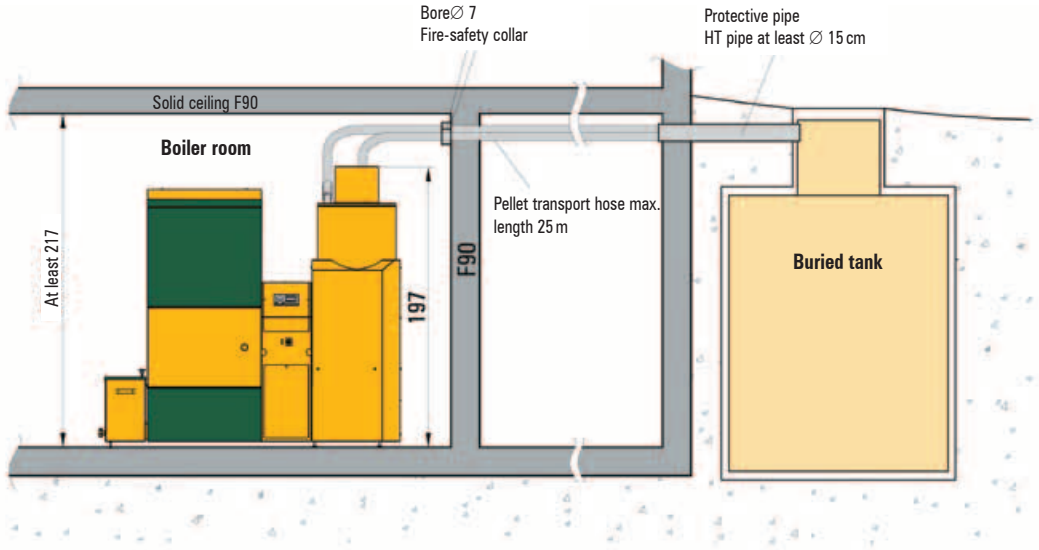
Type USV GS 40-60 kW with buried tank and suction conveyor

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

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 a suction system. The buried tank itself as well as extraction from the buried tank are not included in the KWB product line. KWB recommends the Geotank system from Geoplast Kunststofftechnik GmbH, A-2604 Theresienfeld, Bahnstr. 45, www.pelletstank.com.

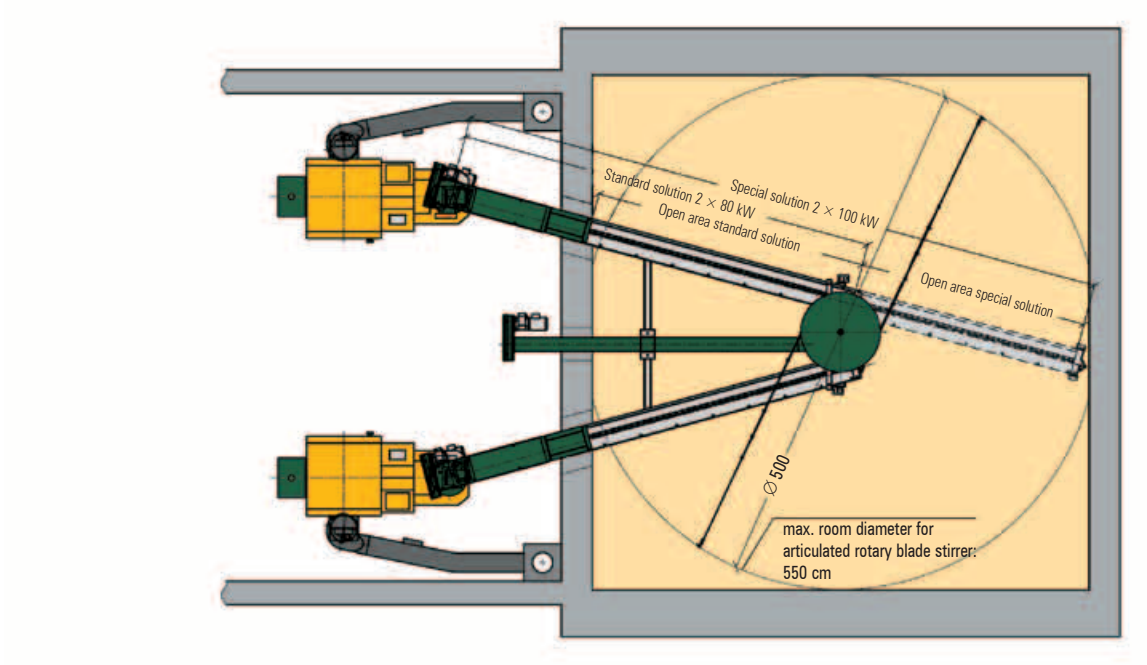
Symbol photo

Outline

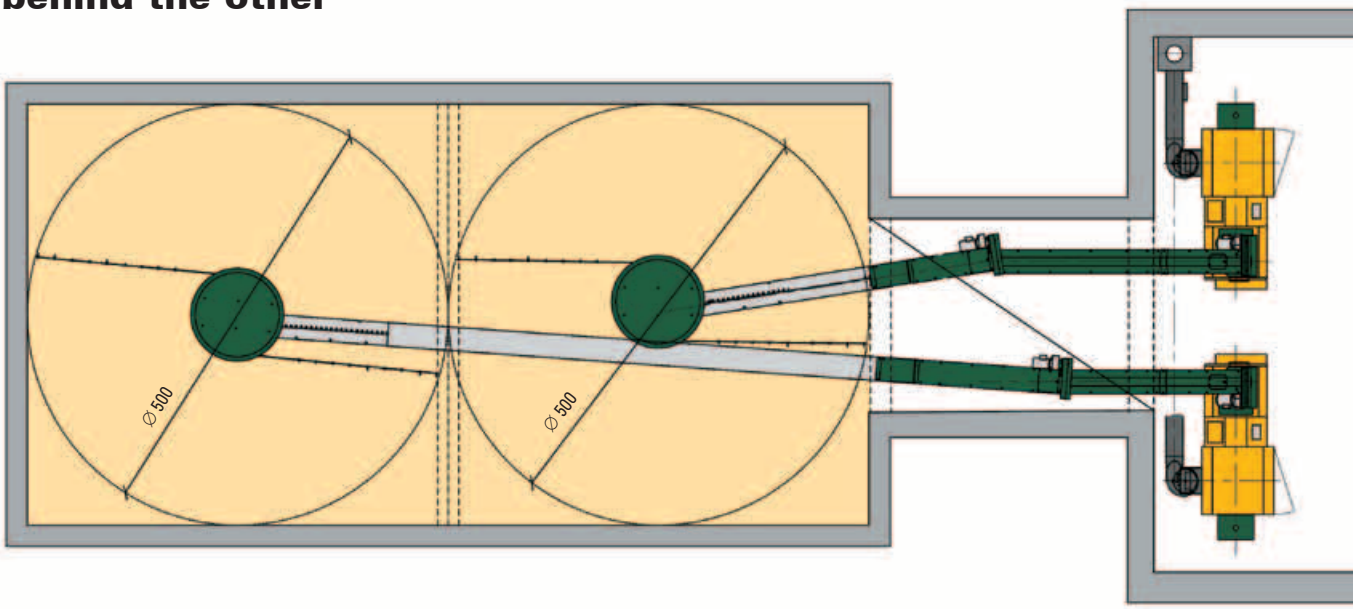


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI$_2$ 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

Special solution: Dual boiler system with one stirrer



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

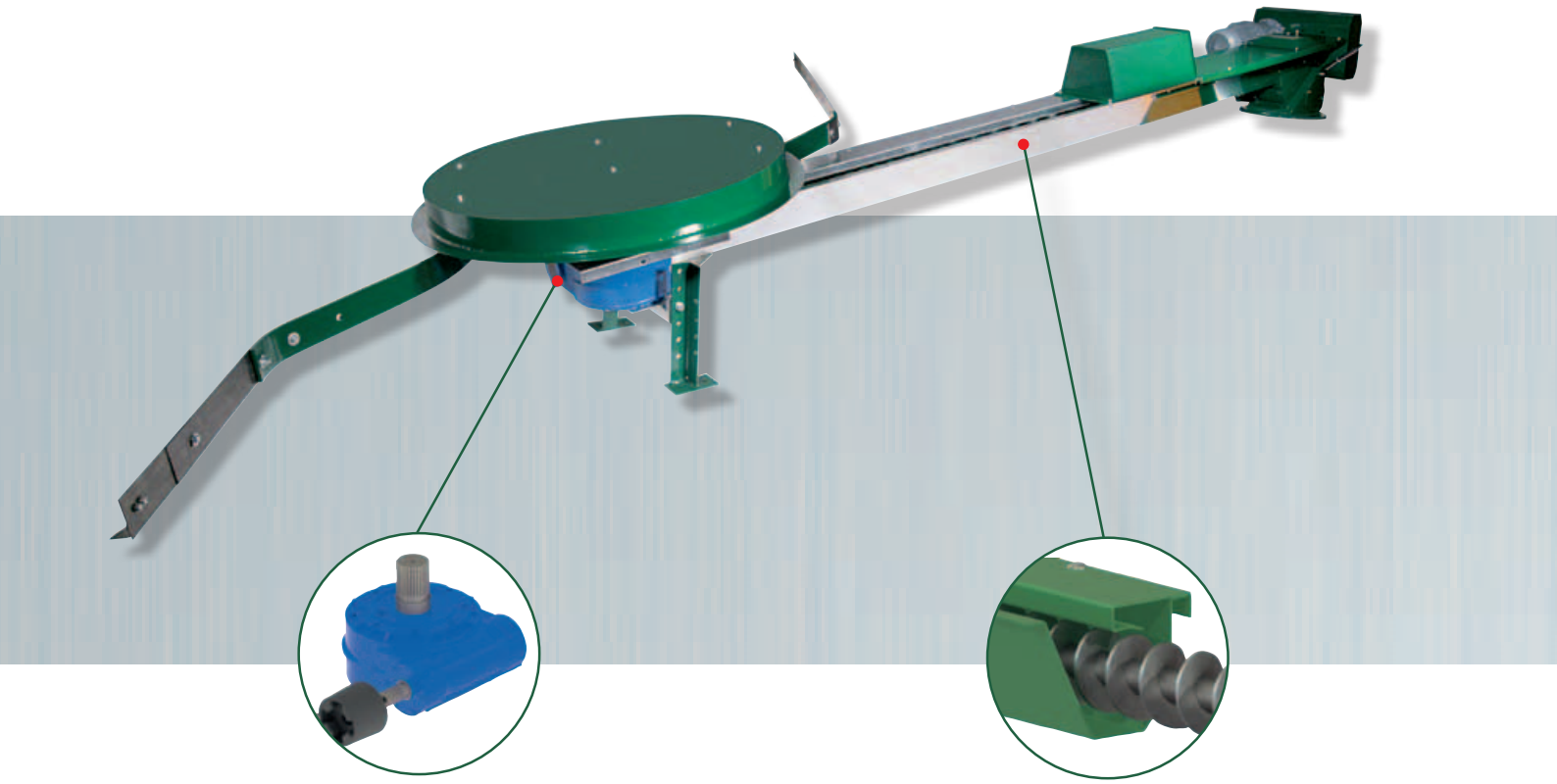


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501
All dimensions in cm.

KWB conveyor systems

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 situated above the level of the boiler room, at the same level, or even below the level of the boiler room (please see KWB installation examples starting on page 10).

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 with diameters of 6 mm and 8 mm in accordance with ÖNORM M7135 or DIN Plus as well as wood pellets of quality class A1 and A2 according to EN14961-1.



KWB
heavy-duty gear unit

KWB trough with
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.

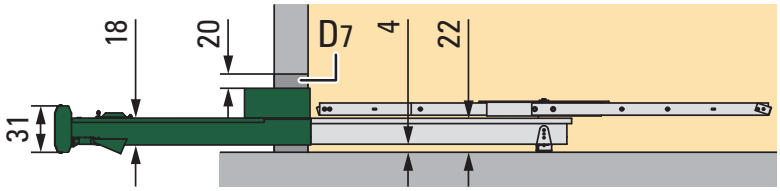
Convenient and individual

- **Efficient emptying** of the bunker even with larger stirrer diameters due to a uniform contact force of the articulated-blade rotary stirrer over the entire diameter.
- **Complete use** of storage room space possible due to different ascending-screw implementations. **Screw length made to customer requirements** (lengths of over 12 m on request).
- **Low power consumption** by preventing mechanical resistance.

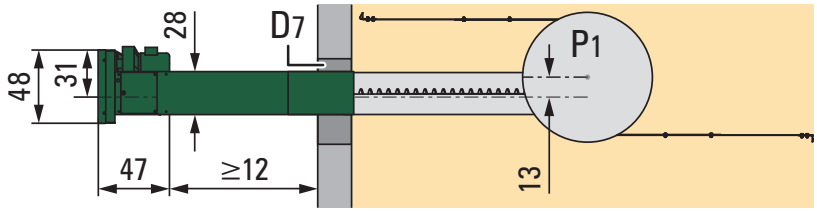
Floor-level rotary-blade stirrer

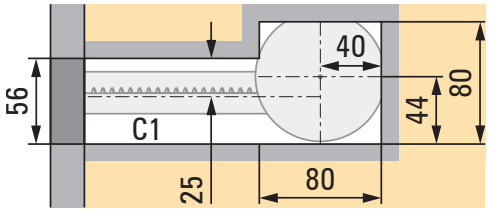
The floor-level rotary-blade stirrer is available in two different designs depending on requirements: As a spring-blade rotary stirrer (stirrer diameter: from 2.5 to 4.0 m) and as articulated rotary-blade stirrer (from 4.0 to 5.5 m stirrer diameter).

Outline



Ground plan





Cutouts for the floor (if the fuel extractor is installed in the floor).

Legend

C1	It must be possible to dismantle the inclined floor or false floor 30 cm around the trough!
D7	Wall duct 56 x 60 cm: Seal after installation and acoustically decouple trough.

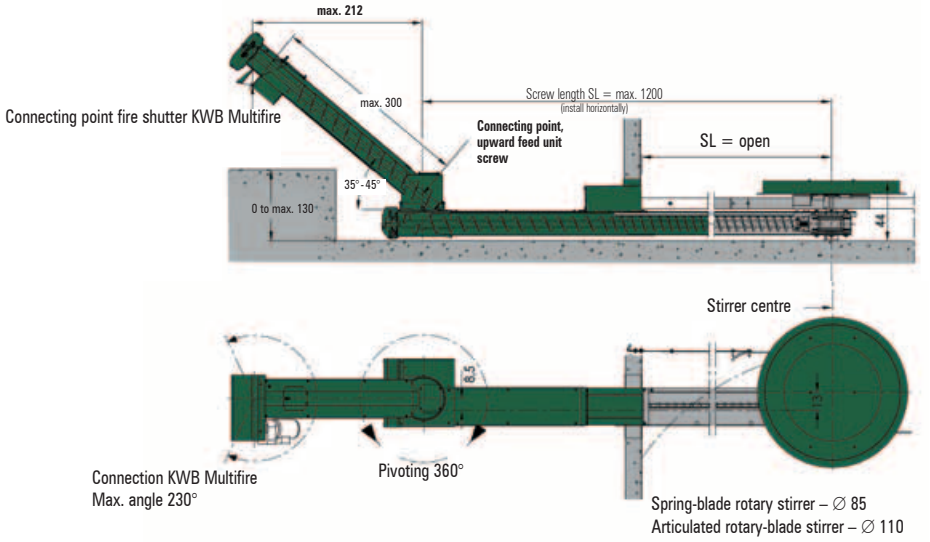
P1	Diameter of the stirrer cover plate: Spring-blade rotary stirrer: ∅ 85 cm, articulated-blade rotary stirrer: ∅ 110 cm. Diameter of the stirrer: Spring-blade rotary stirrer: ∅ 2.5 m, 3.0 m, 3.5 m, 4.0 m (4.5 m only for pellets), articulated-blade rotary stirrer: ∅ 4.0 m, 4.5 m, 5.0 m, 5.5 m.

All dimensions in cm. D: WidthxHeight.

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: ascending screw with upward transfer and ascending screw with downward transfer.

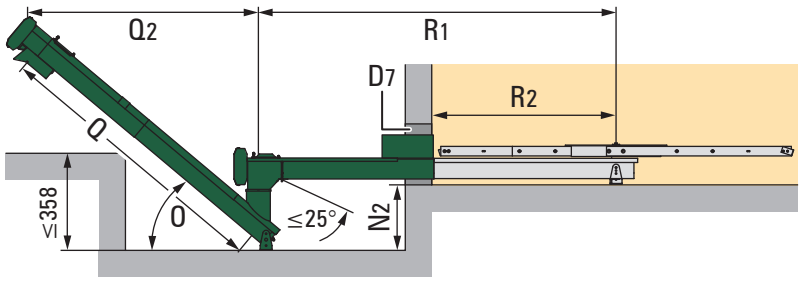
Ascending screw with upward transfer (possible to 100 kW for wood chips, and to 150 kW for pellets)



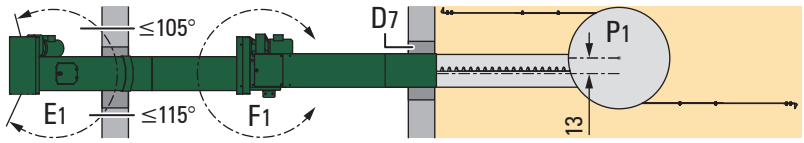
The sloping floor or blind floor should be installed along the fuel extractor trough.

Ascending screw with downward transfer

Outline



Ground plan



Legend

D7	Wall duct 56 x 60 cm: Seal after installation and acoustically decouple trough.
E1	Pivot range (connection to the fire shutter).
F1	Free rotation.
N2	Trough depth: 0°–25°: ≥45 cm, 26°-35°: ≥50 cm, 36°–45°: ≥60 cm.
0	Gradient: 0°–≤45°.

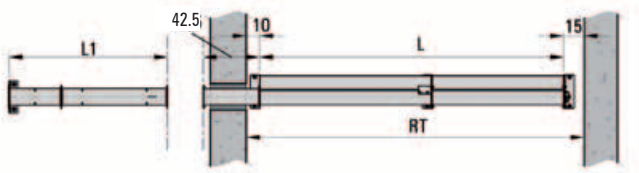
P1	Diameter of the stirrer cover plate: Spring-blade rotary stirrer: ∅ 85 cm, articulated-blade rotary stirrer: ∅ 110 cm. Diameter of the stirrer: Spring-blade rotary stirrer: ∅ 2.5 m, 3.0 m, 3.5 m, 4.0 m (4.5 m only for pellets), articulated-blade rotary stirrer: ∅ 4.0 m, 4.5 m, 5.0 m, 5.5 m.
Q	Screw length (from the connection point: head piece drop shaft to fire shutter): **130–150 kW**: Up to 15°: ≤12 m; 15°–45°: ≤6 m; **240–300 kW**: Up to 15°: ≤10 m; 15°–40°: ≤5 m.
Q2	15°: ≤582 cm, 45°: ≤1162 cm.
R1	Screw length: Up to 15°: ≤12 m; 15°–25°: ≤6 m.
R2	Screw length open.

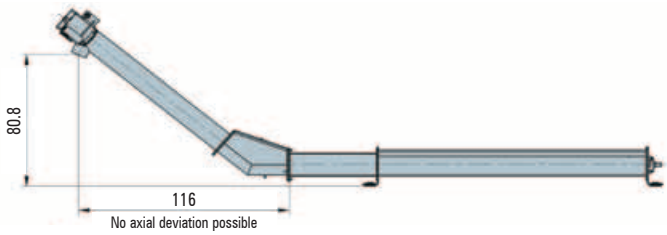
KWB Multifire with pellet operation

The lower-cost conveyor systems from the pellet fuel extractor product line can be used for the KWB Multifire's pure pellet operation. This unit can be modularly expanded and consists of a conveyor screw or Pellet Stirrer Plus, which can be combined with an 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

Type USV D



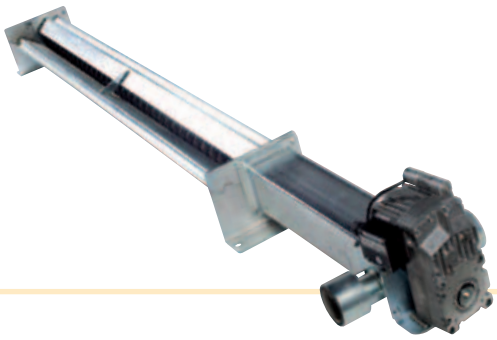


conveyor screw

Conveyor screw, L = 1,300 mm, room depth at least 1,550 mm
Conveyor screw, L = 1,800 mm, room depth at least 2,050 mm
Conveyor screw, L = 2,300 mm, room depth at least 2,550 mm
Conveyor screw, L = 2,600 mm, room depth at least 2,850 mm
Conveyor screw, L = 2,800 mm, room depth at least 3,050 mm
Conveyor screw, L = 3,100 mm, room depth at least 3,350 mm
Conveyor screw, L = 3,600 mm, room depth at least 3,850 mm
Conveyor screw, L = 4,600 mm, room depth at least 4,850 mm
Conveyor screw, L = 4,900 mm, room depth at least 5,150 mm
Conveyor screw, L = 5,400 mm, room depth at least 5,650 mm

Conveyor trough extension

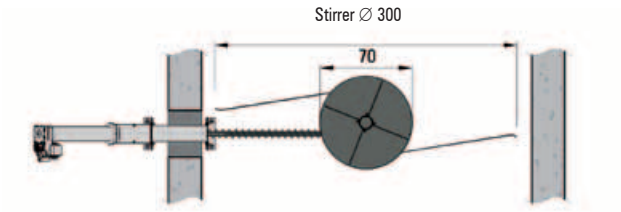
Conveyor screw extension L1 = 400 mm
Conveyor screw extension L1 = 800 mm
Conveyor screw extension L1 = 1,200 mm
Conveyor screw extension L1 = 1,600 mm
Conveyor screw extension L1 = 2,000 mm
Conveyor screw extension L1 = 2,400 mm

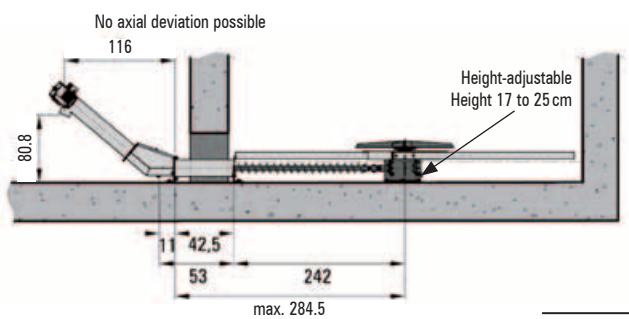


Combination, Pellet Stirrer Plus and ascending screw with KWB Multifire

Type USV D

The Pellet Stirrer Plus consists of the stirrer, the gear unit and a screw. If the boiler room is adjacent to the storage 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 an inclined 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.





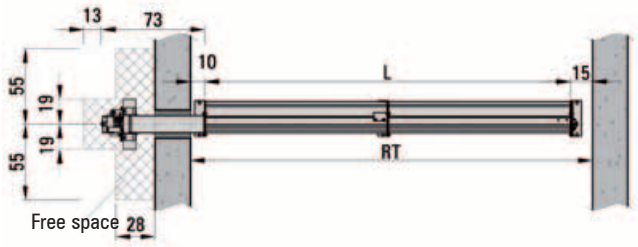
All dimensions in cm.

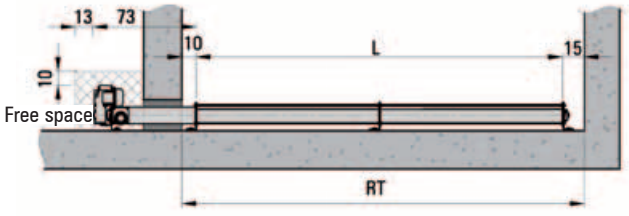
Combination suction conveyor with KWB Multifire

The KWB Multifire with suction conveyor (type 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 an acoustically insulated hood.

Combination, pellet conveyor screw and suction conveyor with KWB Multifire

Type USV GS



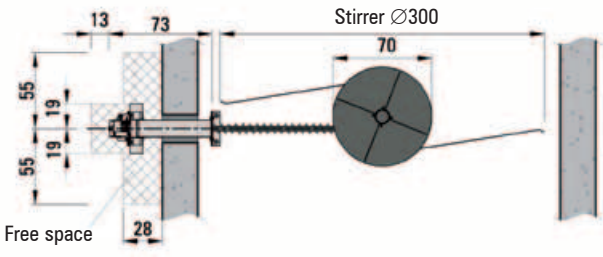


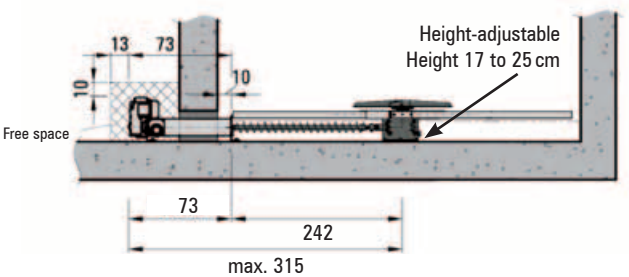
conveyor screw

Conveyor screw, L = 1,300 mm, room depth at least 1,550 mm
Conveyor screw, L = 1,800 mm, room depth at least 2,050 mm
Conveyor screw, L = 2,300 mm, room depth at least 2,550 mm
Conveyor screw, L = 2,600 mm, room depth at least 2,850 mm
Conveyor screw, L = 2,800 mm, room depth at least 3,050 mm
Conveyor screw, L = 3,100 mm, room depth at least 3,350 mm
Conveyor screw, L = 3,600 mm, room depth at least 3,850 mm
Conveyor screw, L = 4,600 mm, room depth at least 4,850 mm
Conveyor screw, L = 4,900 mm, room depth at least 5,150 mm
Conveyor screw, L = 5,400 mm, room depth at least 5,650 mm

Combination Pellet Stirrer Plus and suction conveyor with KWB Multifire

Type USV GS



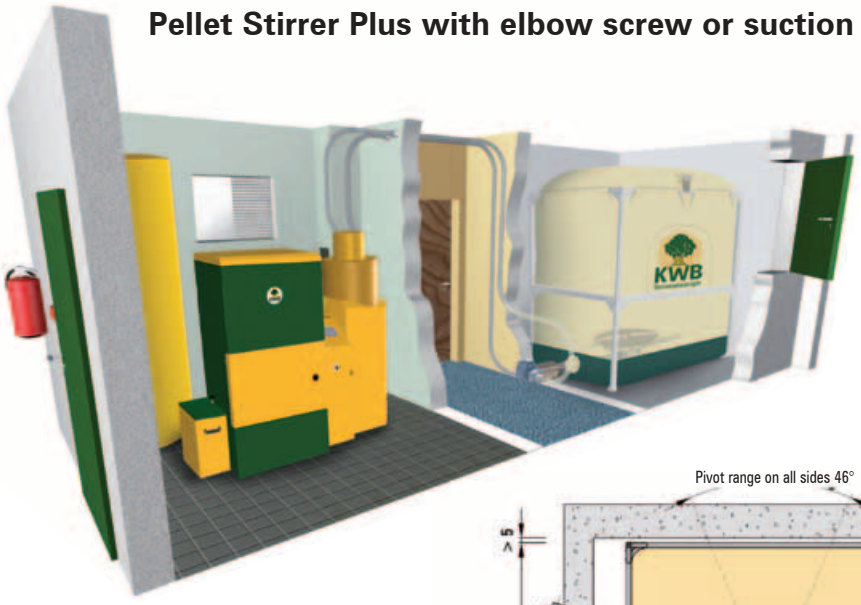


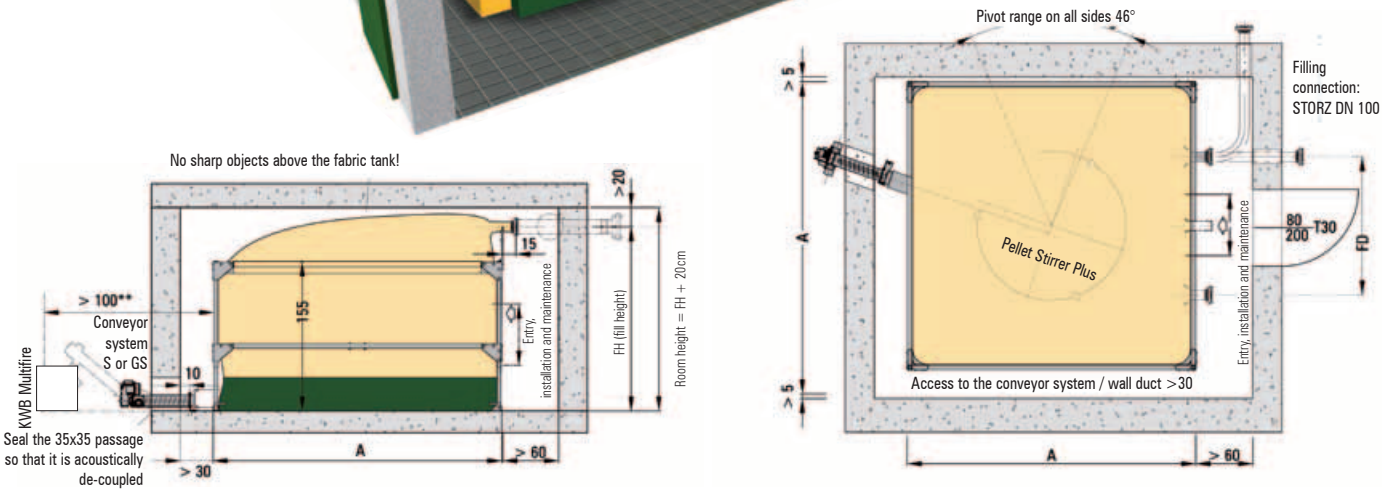
All dimensions in cm.

Combination, KWB Pellet Big Bag with KWB Multifire

Type 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 field of conveyor and storage technology with the new 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 scores points in particular 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. In order to maintain 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:**	**[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.):	Injection connector below	[t]	< 2.2 t	< 3.9 t	< 6.5 t	< 9.3
Fill quantity* (max.):	Injection connector above	[t]	< 2.3 t	< 4.1 t	< 6.9 t	< 10.5 t
Fill height	**FH:**	**[cm]**	162 or 177 or 192			
Room height (min.)	**RH:**	**[cm]**	FH + > 20 cm			
Fill openings	Quantity	**Pc.**	1 pc.	1 pc.	2 pc.	2 pc.
Fill distance	**FD:**	**[cm]**	–	–	100 cm	140 cm

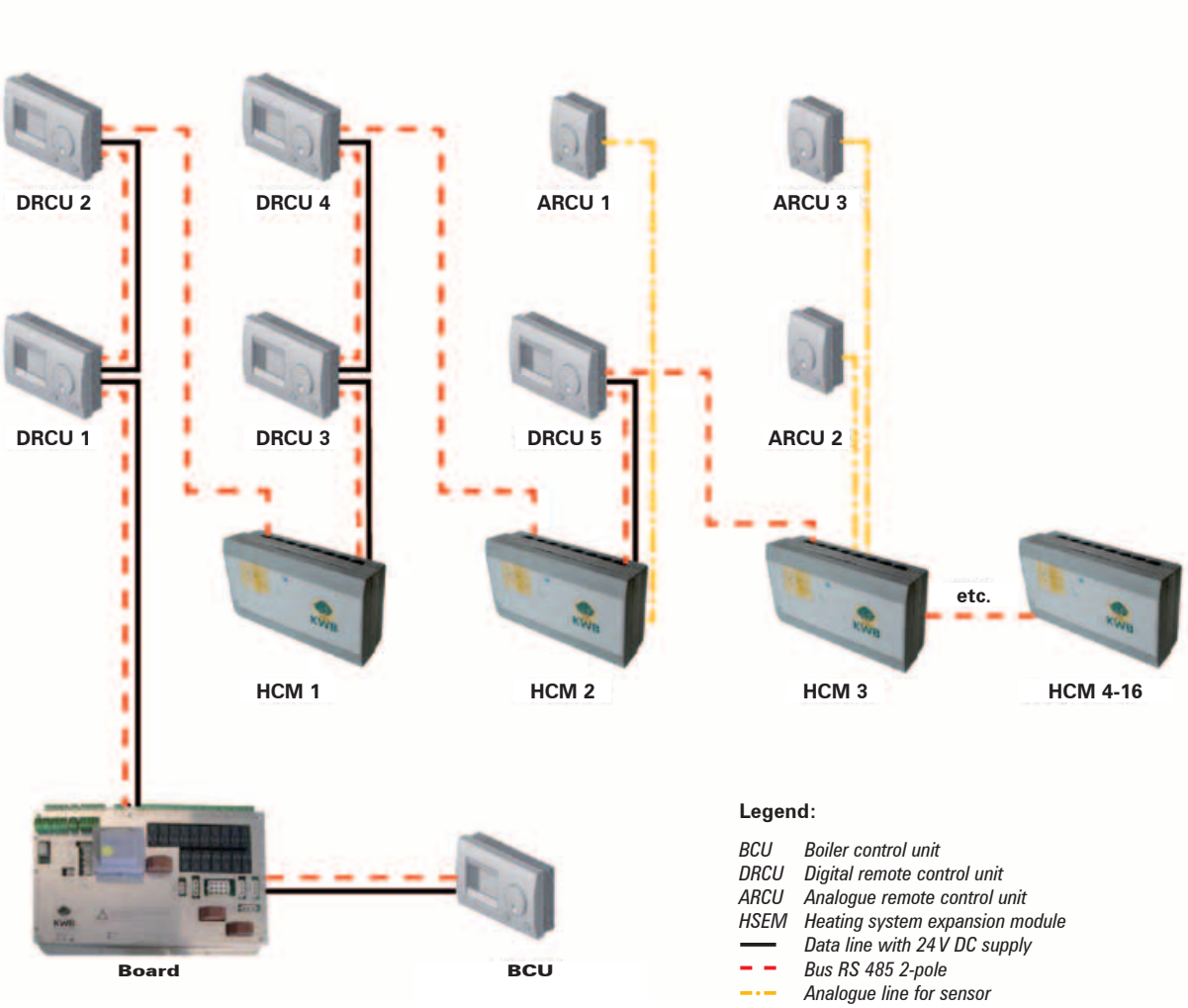
* *The capacity depends on: Filling technique, pellet characteristics, available space, container size, and height of the injection connector!*

** *Depending on the locally applicable fire safety regulations, the KWB Pellet Big Bag can be set up directly in the boiler room if a specified minimum distance to the boiler is maintained. If appropriately protected against weather influences, the fabric tank can be set up outdoors. Local fire safety regulations must be strictly complied with.*

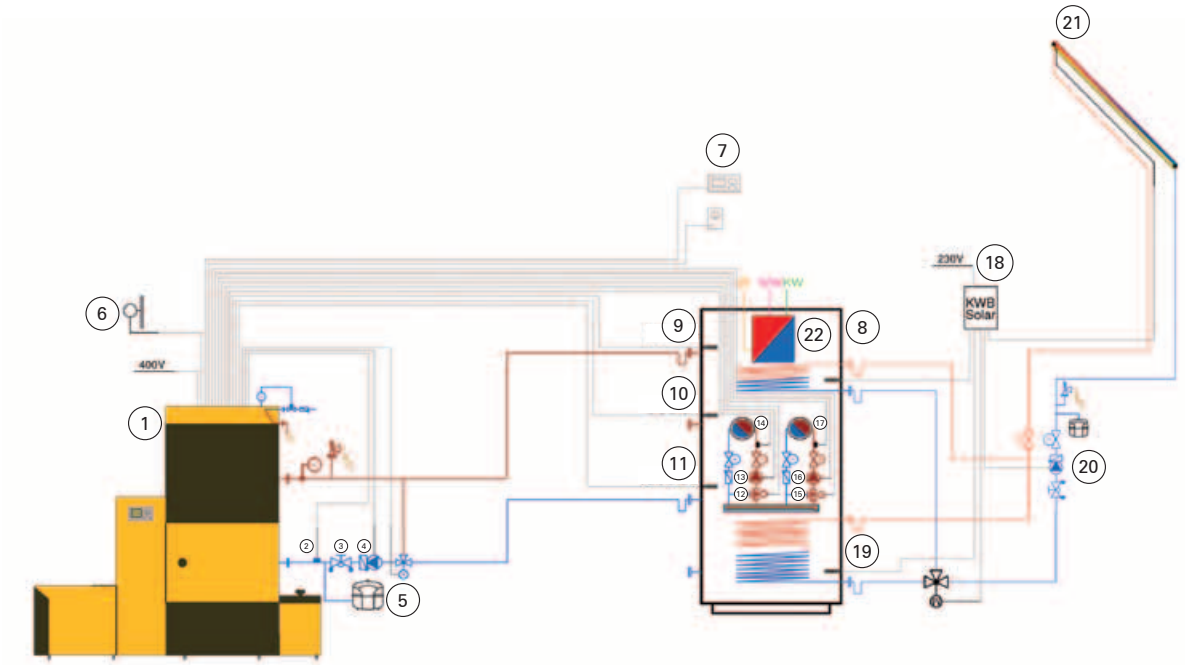
The KWB Pellet Big Bag does not require any extraction – the air escapes through the fabric and via a window or vent (at least 400 cm²) to the outside. Structural characteristics of the place of installation: dry, even, horizontal, smooth, clean, able to carry maximum load - at least 1.500 kg/m²).

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.
- Laid 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 are supplied with voltage. Each heating circuit module must be powered with 230 V and 50 Hz 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.



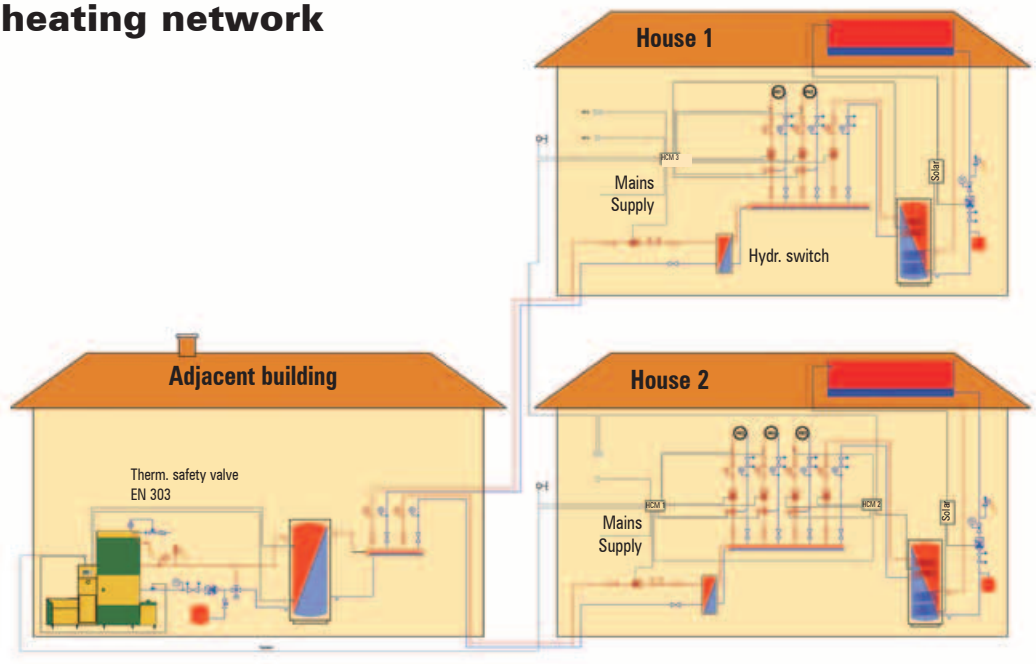
Implementation recommendation: KWB Multifire with KWB EmpaCompact stratification storage tank



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

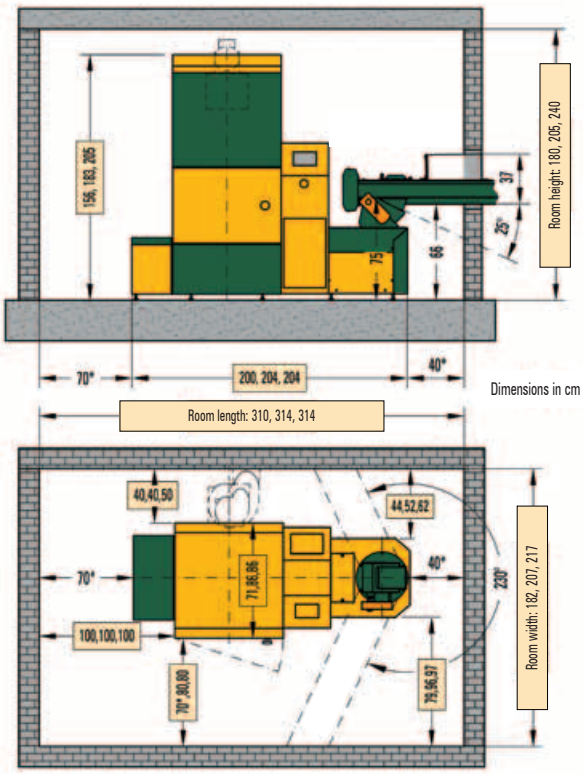
HC = Heating Circuit

Implementation recommendation: District heating network



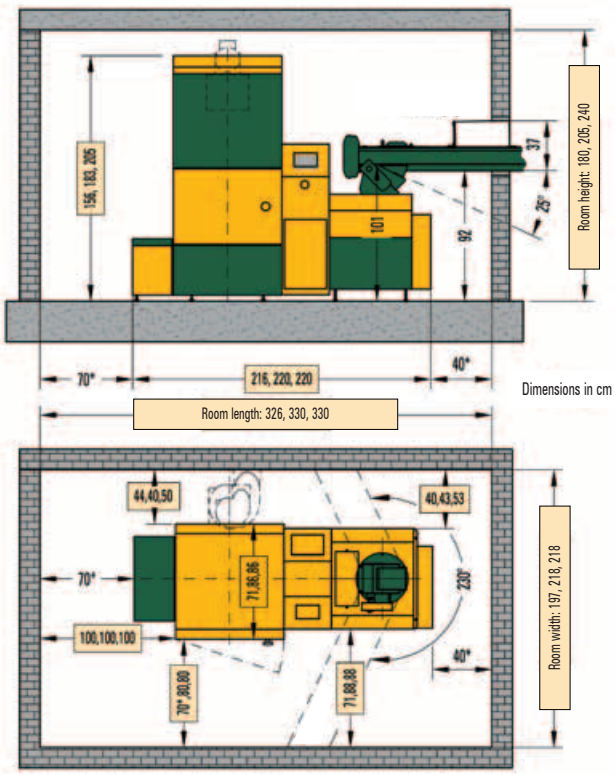
Installation dimensions

Type USV D



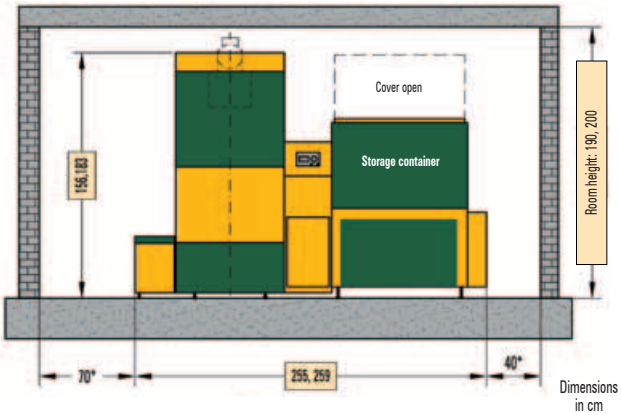
Dimensions in cm

Type USV ZI

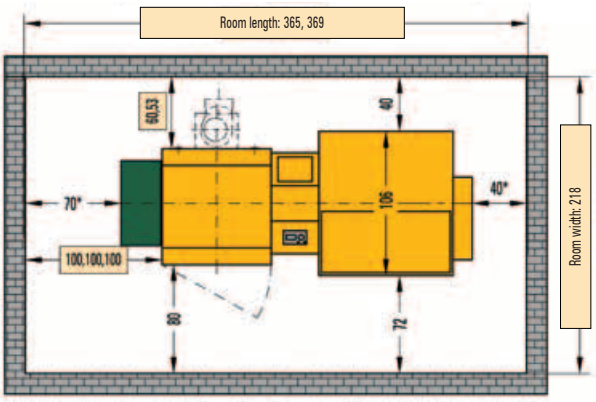


Dimensions in cm

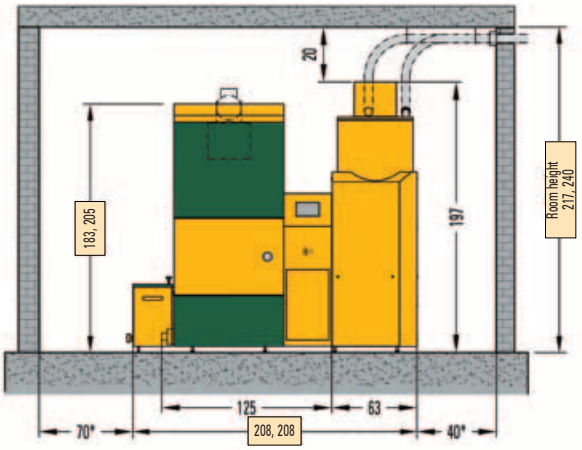
Type USP V

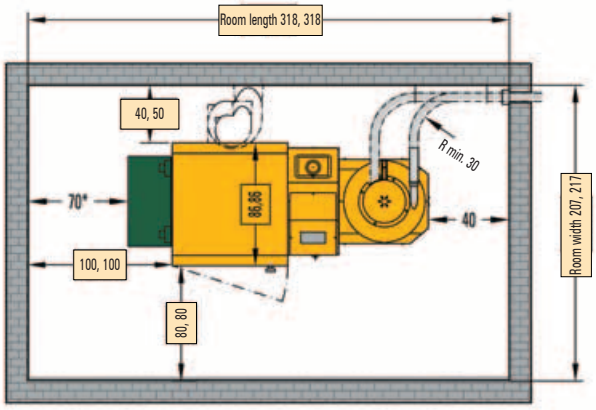


Dimensions in cm



Type 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 framed dimensions in the drawing to the left represent the different sizes.

Type USV D / USV ZI
Dimensions 1: 15 – 25 kW
Dimensions 2: 30 – 60 kW
Dimensions 3: 80 – 100 kW

Type USV GS
Dimensions 1: 40 – 60 kW
Dimensions 2: 80 – 100 kW

Type USP V
Dimensions 1: 15 – 25 kW
Dimensions 2: 30 – 40 kW

The distance specifications are minimum dimensions!
* The specified minimum dimensions must be maintained to ensure that the rear of the boiler is accessible.

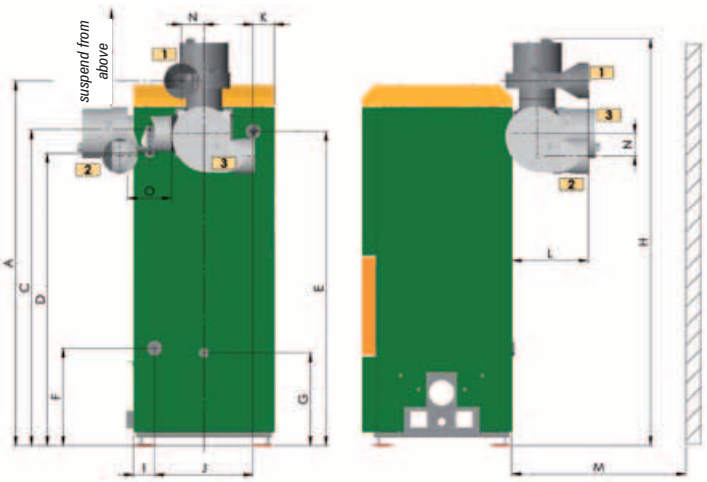
The conveyor trough or ascending trough must be within the specified angle (max. 230° horizontal, 25°incline, 45° incline for ascending screws).

Boiler dimensions for boiler Installation in cm

Boiler dimensions for boiler installation in cm		
Type	**Non-dismantled**	**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 dimensions

Vertical dimensions			**USV 15 / 25**		**USV 30 / 40 / 50 / 60**		**USV 80 / 100**	
			Dimensions	**∅**	**Dimensions**	**∅**	**Dimensions**	**∅**
A	**Smoke pipe (built-in variant 1)**	**[mm]**	1,534	150 mm	1,794	180 mm	2,070	200 mm
	Smoke pipe (built-in variant 2+3)	**[mm]**	1,307	150 mm	1,543	180 mm	1,644	200 mm
C	**Admission, thermal safety valve**	**[mm]**	1,322	½"	1,569	½"	1,793	½"
D	**Discharge, thermal safety valve**	**[mm]**	1,188	½"	1,435	½"	1,659	½"
E	**Heating system forward flow**	**[mm]**	1,321	¾"	1,569	2"	1,784	2"
F	**Heating system return flow**	**[mm]**	520	¾"	544	2"	554	2"
G	**Emptying**	**[mm]**	500	½"	518	¾"	528	¾"
H	**Total height for smoke pipe connection variant 1**	**[mm]**	1,662	—	1,967	—	2,310	—
Horizontal dimensions			**USV 15 / 25**		**USV 30 / 40 / 50 / 60**		**USV 80 / 100**	
			Dimensions	**∅**	**Dimensions**	**∅**	**Dimensions**	**∅**
I	**Clearance**	**[mm]**	100	—	119.5	—	120	—
J	**Clearance**	**[mm]**	460	—	560	—	560	—
K	**Clearance**	**[mm]**	100	—	120.5	—	120	—
L	**Clearance, smoke pipe connection, install variant 1 and 2**	**[mm]**	325	—	359	—	433	—
	Clearance, smoke pipe connection install variant 3	**[mm]**	333	—	242	—	258	—
M	**Minimum clearance to the chimney wall install variant 1 and 2**	**[mm]**	400	—	400	—	500	—
	Minimum clearance to the chimney wall install variant 3	**[mm]**	540	—	500	—	700	—
N	**Clearance, fan axis–smoke pipe axis install variant 1**	**[mm]**	0	—	19	—	128	—
	Clearance, fan axis–smoke pipe axis install variant 2 and 3	**[mm]**	0	—	19	—	128	—
O	**Smoke pipe extension (not included in scope of delivery)**	**[mm]**	—	—	> 250	180	> 250	200 mm



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

1 *Install variant*
- *Induced draught at smoke box, top.*

2 *Install variant*
- *Induced draught at smoke box, side.*

3 *Install variant*
- *Induced draught at smoke box, rear.*

Fuel consumption and storage room

Fuel consumption and storage room size

Fuel consumption and storage room size - wood chips

Heating load of the building [kW]	Consumption per year* [m³/a]	Storage room size for annual requirement* [m³/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 M7133.

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.

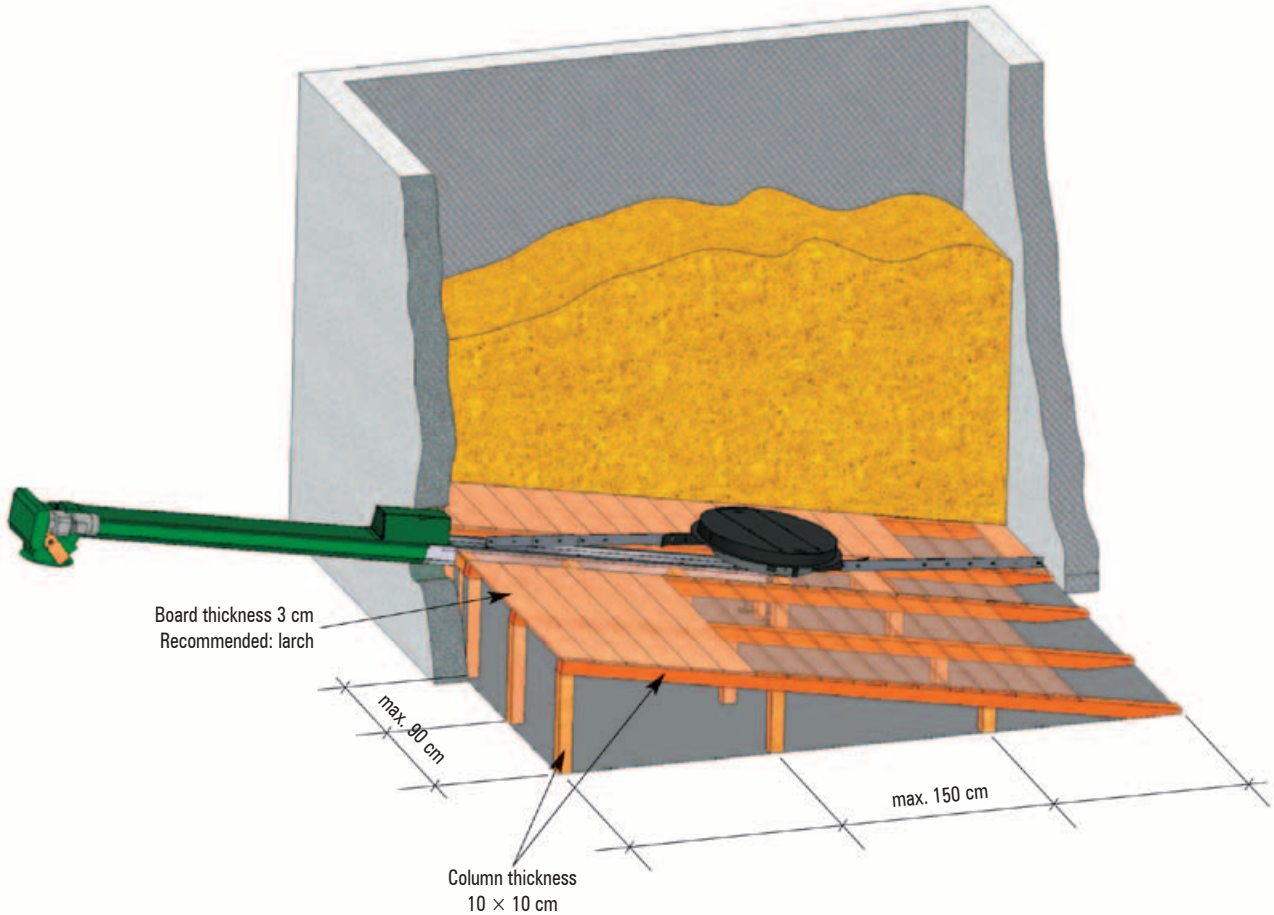
Fuel consumption and storage room size - pellets

Heating load of the building [kW]	Annual consumption [kg/a]	Storage room size for annual requirement [m³/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.

View with false floor



Technical data - wood chip operation

Designation	Unit	15	25	30*	40	50*/**	50*	60*	80	100**
Rated power	kW	15,0	25,0	30,0	40,0	49,5	50,0	60,0	80,0	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
Boiler class according to EN 303-5	–					3				
Water side										
Water content	l	63	63	158	158	128	128	128	167	167
Water connection, forward/return flow (internal thread)	Inch | mm	5/4 | 31,75	5/4 | 31,75	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08
Water connection, forward/return flow (internal thread)	DN	32	32	50	50	50	50	50	50	50
Water connection for thermal safety valve (external thread)	Inch | mm					1/2 | 1,27				
Thermal safety valve: pressure	bar					2–6				
Water-side resistance at 10 K	mbar	1,4	8,1	9,2	11,5	19,4	19,4	27,3	43,1	64,0
Water-side resistance at 20 K	mbar	0,4	2,1	2,4	3,0	5,0	5,0	6,9	10,8	16,0
Boiler-entry temperature	°C					55–70				
Maximum temperature of forward flow	°C					90				
Max. operating pressure	bar					3,5				
Exhaust-gas side (for chimney calculation)										
Combustion chamber temperature	°C					900–1100				
Combustion chamber pressure	mbar					-0,01				
Required draft at 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	0,1/0,08	0,15/0,1
Suction required: yes	–					✓				
Exhaust-gas temperature at rated power	°C					160				
Exhaust-gas temp. Partial load	°C	90	90	90	90	90	90	90	90	100
Exhaust-gas mass flow at rated power	kg/s	0,013	0,021	0,025	0,033	0,041	0,042	0,050	0,067	0,074
Exhaust-gas mass flow at partial load	kg/s	0,004	0,007	0,008	0,011	0,014	0,014	0,017	0,023	0,026
Exhaust-gas volume at rated power	Nm^3/h	35,3	58,8	70,5	94	116,3	117,5	141	188	209
Exhaust- gas volume at partial load	Nm^3/h	11,8	18,8	22,7	30,6	38,4	38,8	47	63,5	72,6
Connection height exhaust-gas pipe, variant induced draught at smoke box, top	mm	1534	1534	1794	1794	1794	1794	1794	2070	2070
Connection height exhaust-gas pipe, variant induced draught at smoke box, side/rear	mm	1307	1307	1543	1543	1543	1543	1543	1644	1644
Exhaust-gas pipe diameter	mm	150	150	180	180	180	180	180	200	200
Incline of the exhaust-gas pipe	°					≥3				
Chimney diameter (approx. values)	mm	150	150	180	180	180	180	180	200	220
Chimney design: Moisture-resistant	–					✓				
Fuel: Wood chips, EN 14961-4										
Maximum water content	% by weight					0,33				
Maximum moisture	% by weight					0,5				
Maximum fuel size	–					P16B				
Ash										
Ash container volume	l					65				
Ash container filled	kg					75				
Ash removal system: yes	–					✓				
Electrical system										
Connection: CEE 5-pole						400 V_{AC}, 50 Hz / 13 A				
Connected power USV V	W	1621	1732	1824	1824	–	–	–	–	–
Connected power USV D, USV ZI	W	1621–2379	1621–2379	1824–2582	1824–2582	2382–2582	2382–2582	2382–2582	2502–2702	2524–2724
Weights										
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	1035	1042

Legend see page 38

Technical data - wood chip operation

Designation	Unit	15	25	30*	40	50*/**	50*	60*	80	100**
Emissions according to test report		**FJ - BLT**	**FJ - BLT**	**FJ - BLT**	**FJ - BLT**		**FJ - BLT**	**FJ - BLT**	**FJ - BLT**	**FJ - BLT**
Test report no.	–	BLT-034/99	BLT-026/05	***	BLT-017/06	BLT-1010/09	***	***	BLT-018/06	BLT-020,019/06
O_2 content rated power	Vol.-%	7,5	7,3	7,2	7,1	7,2	7,2	7,3	7,4	6,2
O_2 content partial load	Vol.-%	12,6	12,0	12,3	13,0	12,4	12,4	11,8	10,5	10,0
CO_2 content rated power	Vol.-%	13,1	13,1	13,2	13,4	13,3	13,3	13,2	13,0	14,3
CO_2 content partial load	Vol.-%	8,0	10,0	9,2	7,7	8,2	8,3	8,9	10,0	10,5
Ref. 10 % O_2 dry (EN303-5)										
CO at rated power	mg/Nm³	100,0	25,0	93,7	231,0	215,3	214,5	198,0	165,0	19,0
CO at partial load	mg/Nm³	913,0	311,0	317,7	331,0	274,5	271,5	212,0	93,0	92,0
NO_x at rated power	mg/Nm³	187,0	173,0	180,7	196,0	199,6	199,8	203,5	211,0	203,0
NO_x at partial load	mg/Nm³	–	–	–	228,0	218,5	218,0	208,0	188,0	–
OGC at rated power	mg/Nm³	2,0	2,0	3,3	6,0	6,0	6,0	6,0	6,0	<1
OGC at partial load	mg/Nm³	10,0	9,0	9,0	9,0	7,3	7,3	5,5	2,0	1,0
Dust at rated power	mg/Nm³	40,0	24,0	24,0	24,0	25,2	25,3	26,5	29,0	31,0
Dust at partial load	mg/Nm³	–	23,0	18,7	10,0	11,9	12,0	14,0	18,0	ng
Ref. 11 % O_2 dry										
CO at rated power	mg/Nm³	90,9	22,7	85,2	210,0	195,8	195,0	180,0	150,0	17,3
CO at partial load	mg/Nm³	830,0	282,7	288,8	300,9	249,5	246,8	192,7	84,5	83,6
NO_x at rated power	mg/Nm³	170,0	157,3	164,2	178,2	181,4	181,6	185,0	191,8	184,5
NO_x at partial load	mg/Nm³	–	–	–	207,3	198,6	198,2	189,1	170,9	–
OGC at rated power	mg/Nm³	1,8	1,8	3,0	5,5	5,5	5,5	5,5	5,5	<1
OGC at partial load	mg/Nm³	9,1	8,2	8,2	8,2	6,7	6,6	5,0	1,8	0,9
Dust at rated power	mg/Nm³	36,4	21,8	21,8	21,8	22,9	23,0	24,1	26,4	28,2
Dust at partial load	mg/Nm³	–	20,9	17,0	9,1	10,8	10,9	12,7	16,4	–
Ref. 13 % O_2 dry (Wieselburg)										
CO at rated power	mg/Nm³	73,0	18,0	68,0	168,0	156,6	156,0	144,0	120,0	14,0
CO at partial load	mg/Nm³	664,0	226,0	231,0	241,0	199,9	197,8	154,5	68,0	67,0
NO_x at rated power	mg/Nm³	136,0	126,0	131,3	142,0	144,9	145,0	148,0	154,0	148,0
NO_x at partial load	mg/Nm³	–	–	–	166,0	159,1	158,8	151,5	137,0	–
OGC at rated power	mg/Nm³	1,0	1,0	2,0	4,0	4,0	4,0	4,0	4,0	<1
OGC at partial load	mg/Nm³	7,0	7,0	7,0	7,0	5,8	5,8	4,5	2,0	<1
Dust at rated power	mg/Nm³	29,0	18,0	17,3	18,0	18,7	18,8	19,5	21,0	23,0
Dust at partial load	mg/Nm³	–	17,0	13,7	7,0	8,4	8,5	10,0	13,0	–
In accordance with § 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	–	–	–	118,0	113,0	112,8	107,5	97,0	–
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	–	11,0	9,0	5,0	6,0	6,0	7,0	9,0	–

* … Drawing inspection

** … Typification variants

*** … Values interpolated for intermediate sizes

**** … ≤M25: 99 kW; M30: 94 kW

***** … Measured values for the additional power requirement are understood to include KWB stirrer extractors incl. standard trough

FJ-BLT ... Franciso Josephinum Wieselburg Biomass Logistic Technology

mg/Nm³ ... milligram per standard cubic meter (Nm³ - standard cubic meter under 1013 hectopascal at 0 °C)

Technical data - pellet operation

Designation	Unit	25	30*	40	50*/**	50*	60*	80	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
Boiler class according to EN 303-5	–	3							
Water side									
Water content	l	63	158	158	128	128	128	167	167
Water connection, forward/return flow (internal thread)	inch | mm	5/4 | 31,75	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08	2 | 50,08
Water connection, forward/return flow (internal thread)	DN	32	50	50	50	50	50	50	50
Thermal safety valve: pressure	bar	2–6							
Thermal safety valve DM	inch | mm	1/2 | 1,27							
Water-side resistance at 10 K	mbar	8,1	9,2	11,5	19,4	19,4	27,3	43,1	64,0
Water-side resistance at 20 K	mbar	2,1	2,4	3,0	5,0	5,0	6,9	10,8	16,0
Boiler-entry temperature	°C	55–70							
Maximum temperature of forward flow	°C	90							
Max. operating pressure	bar	3,5							
Exhaust-gas side (for chimney calculation)									
Combustion chamber temperature	°C	900–1100							
Combustion chamber pressure	mbar	-0,01							
Required draft at 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
Suction required: yes	–	✓							
Exhaust-gas temperature at rated power	°C	160							
Exhaust-gas temp. Partial load	°C	90	90	90	90	90	90	90	100
Exhaust-gas mass flow at rated power	kg/s	0,02	0,03	0,03	0,04	0,04	0,05	0,07	0,07
Exhaust-gas mass flow at partial load	kg/s	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,03
Exhaust-gas volume at rated power	Nm³/h	58,8	70,5	94,0	116,3	117,5	141,0	188,0	209,0
Exhaust- gas volume at partial load	Nm³/h	18,8	22,7	30,6	38,4	38,8	47,0	63,5	72,6
Connection height exhaust-gas pipe, variant induced draught at smoke box, top	mm	1534	1794	1794	1794	1794	1794	2070	2070
Connection height exhaust-gas pipe, variant induced draught at smoke box, side/rear	mm	1307	1543	1543	1543	1543	1543	1644	1644
Exhaust-gas pipe diameter	mm	150	180	180	180	180	180	200	200
Incline of the exhaust-gas pipe	°	≥3							
Chimney diameter (approx. values)	mm	150	180	180	180	180	180	200	220
Chimney design: Moisture-resistant	–	✓							
Fuel: Pellets of pure wood in accordance with EN 14961-2									
Calorific value	MJ/kg	16,5							
Density	kg/m³	≥600							
Water content	% by weight	≤10							
Ash content	% by weight	≤0,7							
Length	mm	3,15–40							
Diameter	mm	6±1							
Dust proportion before loading	% by weight	≤1							
Raw material: pure wood, bark content <15 %	–	✓							
Ash									
Ash container volume	l	65							
Ash container filled	kg	75							
Ash removal system: yes	–	✓							
Electrical System									
Connection: CEE 5-pole	–	400 V_{AC}, 50 Hz / 13 A							
Unit switch and main switch: present	–	✓							
Connected power USV V	W	1621	1732	1824	1824	–	–	–	–
Connected power USV D, ZI	W	2179–2379	2290–2490	2382–2582	2382–2582	2382–2582	2382–2582	2502–2702	2524–2724
Connected power USV GS	W	–	–	3795	3795	3795	3795	3915	3937
Weights									
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	1035	1042
Boiler weight USV GS	kg	–	–	805	868	868	868	1090	1097

Legend see page 40

Technical data - pellet operation

Designation	Unit	25	30*	40	50*/**	50*	60*	80	100**
Emissions according to test report		**FJ-BLT**		**FJ-BLT**	**FJ-BLT**			**FJ-BLT**	**FJ-BLT**
Test report no.	–	BLT-025/05	***	BLT-021/06	BLT-1010 /09	***	***	BLT-022/06	BLT-024, 023/06
O_2 content rated power	Vol.-%	6,1	6,4	7,1	7,0	7,0	7,0	6,8	6,7
O_2 content partial load	Vol.-%	8,7	10,4	13,8	12,8	12,7	11,7	9,5	10,0
CO_2 content rated power	Vol.-%	14,3	14,0	13,4	13,4	13,5	13,5	13,6	13,8
CO_2 content partial load	Vol.-%	11,8	10,2	6,9	7,9	7,9	9,0	11,0	10,8
Ref. 10 % O_2 dry (EN303-5)									
CO at rated power	mg/Nm³	26,0	52,0	104,0	91,4	90,8	77,5	51,0	7,0
CO at partial load	mg/Nm³	139,0	184,7	276,0	236,8	234,8	193,5	111,0	62,0
NO_x at rated power	mg/Nm³	115,0	132,3	167,0	175,1	175,5	184,0	201,0	184,0
NO_x at partial load	mg/Nm³	–	–	156,0	161,5	161,8	167,5	179,0	–
OGC at rated power	mg/Nm³	1,0	1,3	2,0	1,8	1,8	1,5	1,0	<1
OGC at partial load	mg/Nm³	3,0	4,3	7,0	5,6	5,5	4,0	1,0	1,0
Dust at rated power	mg/Nm³	37,0	33,3	26,0	25,8	25,8	25,5	25,0	26,0
Dust at partial load	mg/Nm³	32,0	40,0	56,0	53,6	53,5	51,0	46,0	–
Ref. 11 % O_2 dry									
CO at rated power	mg/Nm³	23,6	47,3	94,5	83,1	82,5	70,5	46,4	6,4
CO at partial load	mg/Nm³	126,4	167,9	250,9	215,3	213,4	175,9	100,9	56,4
NO_x at rated power	mg/Nm³	104,5	120,3	151,8	159,2	159,5	167,3	182,7	167,3
NO_x at partial load	mg/Nm³	–	–	141,8	146,8	147,0	152,3	162,7	–
OGC at rated power	mg/Nm³	0,9	1,2	1,8	1,6	1,6	1,4	0,9	<1
OGC at partial load	mg/Nm³	2,7	3,9	6,4	5,1	5,0	3,6	0,9	0,9
Dust at rated power	mg/Nm³	33,6	30,3	23,6	23,4	23,4	23,2	22,7	23,6
Dust at partial load	mg/Nm³	29,1	36,4	50,9	48,8	48,6	46,4	41,8	–
Ref. 13 % O_2 dry (FJ-BLT)									
CO at rated power	mg/Nm³	19,0	38,0	76,0	66,7	66,3	56,5	37,0	5,0
CO at partial load	mg/Nm³	101,0	134,0	200,0	171,7	170,3	140,5	81,0	45,0
NO_x at rated power	mg/Nm³	83,0	96,0	122,0	127,7	128,0	134,0	146,0	134,0
NO_x at partial load	mg/Nm³	–	–	113,0	117,0	117,3	121,5	130,0	–
OGC at rated power	mg/Nm³	1,0	1,3	2,0	1,8	1,8	1,5	1,0	<1
OGC at partial load	mg/Nm³	2,0	3,0	5,0	4,1	4,0	3,0	1,0	<1
Dust at rated power	mg/Nm³	27,0	24,3	19,0	18,8	18,8	18,5	18,0	19,0
Dust at partial load	mg/Nm³	23,0	29,0	41,0	39,3	39,3	37,5	34,0	–
In accordance with § 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
NO_x at rated power	mg/MJ	56,0	64,0	80,0	83,8	84,0	88,0	96,0	87,0
NO_x at partial load	mg/MJ	–	–	74,0	76,6	76,8	79,5	85,0	–
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	–

* … Drawing inspection

** … Typification variants

*** … Values interpolated for intermediate sizes

***** … Measured values for the additional power requirement are understood to include KWB stirrer extractors incl. standard trough

FJ-BLT ... Franciso Josephinum Wieselburg Biomass Logistic Technology

mg/Nm³ ... milligram per standard cubic meter (Nm³ - standard cubic meter under 1013 hectopascal at 0 °C)

Parameters for boiler circuit pump and return flow temperature increase

	Volume flow V - recommended return flow temperature increase set / return flow temperature increase group from KWB product line*											
Spread ΔT across the boiler	**10**				**15**				**20**			
Recommendation		**Return flow temperature - boost set**		**Return flow temperature boost group**		**Return flow temperature - boost set**		**Return flow temperature boost group**		**Return flow temperature - boost set**		**Return flow temperature boost group**
Boiler output	V	Article number	Kvs | Pressure loss across the completely open valve	Article number	V	Article number	Kvs | Pressure loss across the completely open valve	Article number	V	Article number	Kvs | Pressure loss across the completely open valve	Article number
[kW]	[m³/h]		[m³/h] | [mbar]		[m³/h]		[m³/h] | [mbar]		[m³/h]		[m³/h] | [mbar]	
15	1.29	–	–	24-2000346	0.86	–	–	24-2000346	0.64	–	–	24-2000346
25	2.15	24-2000343	12 | 32	24-2000347	1.43	–	–	24-2000346	1.07	–	–	24-2000346
30	2.58	24-2000343	12 | 46	24-2000347	1.72	24-2000343	12 | 21	24-2000347	1.29	–	–	24-2000346
40	3.44	24-2000344	18 | 36	–	2.29	24-2000343	12 | 36	24-2000347	1.72	24-2000343	12 | 21	24-2000347
50	4.30	24-2000345	24 | 32	–	2.86	24-2000343	12 | 57	–	2.15	24-2000343	12 | 32	24-2000347
60	5.16	24-2000345	24 | 46	–	3.44	24-2000344	18 | 36	–	2.58	24-2000343	12 | 46	24-2000347
80	6.87	24-2000264	40 | 30	–	4.58	24-2000345	24 | 36	–	3.44	24-2000344	18 | 36	–
100	8.59	24-2000264	40 | 46	–	5.73	24-2000345	24 | 57	–	4.30	24-2000345	24 | 32	–

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

Note – general constructional conditions

Always comply with 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 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 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 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 cm^2 per kW rated power of heating system, but no less than at least 400 cm^2. 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 to the outside. 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 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 local installation regulations.

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 false floor/inclined floor should be installed at the same level as the top edge of the fuel extractor. The wall duct (width 50 cm, height 60 cm) for the screw trough between storage room and boiler room should be partitioned in a fireproof way (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). These 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. 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 as DN20 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 that is to be installed in the boiler room must be marked with the following sign: "Fire extinguisher - fuel storage room". A fire extinguisher with manual release must be installed in storage systems containing 50 to 200 m^3 of wood chips for systems up to and including 400 kW. If such a fuel-storage room is built onto fire-resistant parts without openings, it is not necessary to enclose it with F90*[1] sheathing/execution. 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 m^2. Fuel must be stored separately from other goods (e.g. by means of wooden planking). A manual-release extinguisher and an integrated extinguishing system must be installed. In the case of storing up to (and including) 200 m^3 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 stored quantities greater than 200 m^3, both (a manual-release extinguisher and an integrated 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 of at least 1.80 m cross section, and be planked to prevent the fuel from trickling outside should the door be opened by mistake. The planking should be removable from outside. An inspection opening, F90*[1]must be installed above the fuel extractor trough. Please refer to the installation examples.

Ventilation storage room

The storage rooms and storage containers must be ventilated according to ÖNORM M 7137 to prevent an increased CO concentration. The ventilation openings must lead outside the building into the open. 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 ≥ 200 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.

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 (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 constructional conditions, meaning: effective chimney height 8-10m, 1.5 m smoke pipe 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. 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.

Installing the heating system

Setting up the heating system

To be performed exclusively by qualified, trained personnel of KWB or KWB associates. The heating 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 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 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 as 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 by default equipped with a negative-pressure controlled induced draught fan.

Water connection

When using wood chips, the return-flow inlet temperature into the boiler must be at least 55 °C, when using pellets at least 50 °C, otherwise there is an increased risk of corrosion, 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. according to 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 and ÖNORM H 5195 T1 and T2 must be unconditionally complied with, 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.

Required connections to be provided by customer:

- 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 mm^2).
- 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}.

*1 F90 in accordance with ÖNORM B3800, REI90 in accordance with ÖNORM EN 13501
*2 T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
*3 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN13501

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 sensor, and 1 x 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 and 1x 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 and 1x forward flow temperature sensor, and 2 x outdoor temperature sensor)*.

Optional

- heating system expansion module with sensor set (2 x forward flow temperature sensors, 1 x DHWC sensor, 2 x buffer tank sensors and 1 x outdoor temperature sensor)*, the integration of a second boiler is possible for the manual heating expansion module (backup boiler), this requires a sensor for the second boiler (diving or contact sensor).
- Analogue and digital room control units with room temperature sensor.
- Plug-in module 1 for types USV D, USV ZI and USV V with 1 heating circuit and sensor set (1x forward flow temperature sensor) and activation of a 2. boiler, which is standard for type USV GS, for activation suction conveyance and activation of a 2. 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 mixers**
- Order option: 2 heating circuits.
  - 1 boiler circuit pump**
  - 1 DHWC pump**
  - 1 return-flow mixer***
  - 2 heating-circuit pumps**
  - 2 heating circuit mixers**
- Order option: Heating circuit expansion module.
  - 1 supply pump**
  - 1 DHWC pump**
  - 2 heating-circuit pumps**
  - 2 heating circuit mixers**

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 prTRVB H 118.

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

** *Pump connection: 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 must have a power requirement of 3 W.

*** *Mixer motor connection: 230 V_{AC}, open/off/closed (three-step).*

KWB The Biomass Heating System

KWB Austria

KWB – Kraft und Wärme aus Biomasse GmbH

Industriestraße 235, A-8321 St. Margarethen/Raab
Tel. +43 3115 6116-0, Fax +43 3115 6116-4
office@kwb.at, **www.kwb.at**

KWB Germany

KWB Deutschland – Kraft und Wärme aus Biomasse GmbH
www.kwbheizung.de

Branch office, South
Königsberger Straße 46, D-86690 Mertingen
Tel.:+49 9078-9682-0, Fax:+49 9078-9682-7999
office-sued@kwbheizung.de

Branch office, Southwest
Schloß Weitenburg 7, D-72181 Starzach
Tel.:+49 7457-9480-0, Fax:+49 7457-9480-5999
office-suedwest@kwbheizung.de

Branch office, Central
Friedenbachstrasse 9, D-35781 Weilburg
Tel.:+49 6471-91262-0, Fax:+49 6471-91262-3999
office-mitte@kwbheizung.de

Branch office, West
Hansestraße 41, D-48165 Münster
Tel.:+49 2501-44039-00, Fax:+49 2501-44039-4999
office-west@kwbheizung.de

KWB France

KWB France S.A.R.L.,
F-68000 COLMAR, 13 rue Curie
Tel.: 33 3 89 21 69 65, Fax: +33 3 89 21 69 83
contact@kwb-france.fr, www.kwb-france.fr

KWB Italy

KWB Italia GmbH
T.A. Edisonstraße 15, 39100 Bozen (BZ)
Tel.: +39 471 05 33 33, Fax: +39 471 05 33 34
info@kwb.it, www.kwb.it

KWB Slovenia

KWB, moč in toplota iz biomase d.o.o.
Vrečerjeva 14, SI-3310 Žalec
Tel.: +386 3 839 30 80, Fax: +386 3 839 30 84
info@kwb.si, www.kwb.si

Additional national representation

Switzerland
Jenni Energietechnik AG
Lochbachstraße 22, CH-3414 Oberburg bei Burgdorf
Tel.: +41 34 420 30 00, Fax: +41 34 420 30 01
info@jenni.ch

Energie Service Sàrl
CH-1464 Chêné-Pâquier/VD, Mobil: +41 (0) 79 4092990
Tel.: +41 24 430-1616, Fax: +41 24 430-1943
jurg-anken@energie-service.ch

Belgium
Ökotech Belux GmbH
Halenfeld 12a, B-4771 Amel
Tel.: +32 80 571 98-7, Fax: +32 80 571 98-8
info@oekotech.be

Spain
HC Ingeniería y Biomasa, S.L.
C/ San Quintín 10, 2º Izda, 28013 Madrid
Tel.: +34 91 548 30 25
info@hcib.es, www.hcib.es, www.kwb.es

Chile
Energíadelsur
Carretera Gral. San Martín 9340 - P, Quilicura, Santiago
Tel.: +(56) 2 376 5071, Fax: +(56) 2 443 5421, Mobil: +(56) 9 9822 5780
michael.schmidt@energiadelsur.com, www.energiadelsur.com

Ireland
Original Heating Ltd.
67 Culmore Road, BT48 8JE L`Derry, Northern Ireland
Tel.: +44 28 71353108, Fax: +44 28 71350970
info@originalheating.com, www.originalheating.com

Technical Energy Solutions Ltd.
Four Piers, Cregg, Carrick on Suir, County Tipperary
Tel.: +353 51 833282, Fax: +353 51 641122
info@tes.ie, www.tes.ie

Great Britain

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