Woodchip boiler

POWERCHIP / POWERCORN 50 Special

Planning and installation
Please read through this documentation carefully.

It is intended as a reference document and contains important information on the design, safety, operation, maintenance and care of your heating system.

We are always looking to improve our products and documentation. Any ideas and suggestions you may have will be gratefully received.

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It is important that you pay particular attention to the safety issues highlighted in the text by these symbols.

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Subject to printing errors and technical amendments.
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1 Introduction

1.1 Safety instructions

GUNTAMATIC heating systems represent state-of-the-art technology and meet all applicable safety regulations. Incorrect installation can endanger life and limb. Heating boilers are combustion systems and are potentially dangerous if handled incorrectly. Installation, commissioning and servicing must, therefore, only be carried out by adequately qualified technicians observing all regulations and the manufacturer's instructions.

1.2 Guarantee and liability

The manufacturer's guarantee is subject to correct installation and commissioning of the heating system. Defects and damage caused by incorrect installation, commissioning or operation are not covered by the guarantee. To ensure that the system functions as intended, the manufacturer's instructions must be followed. Furthermore, only genuine replacement parts or parts explicitly approved by the manufacturer may be fitted to the system.

1.3 Commissioning

Commissioning of the boiler must be carried out by an authorised GUNTAMATIC specialist or other qualified persons. They will check whether the system has been installed according to the plans, adjust the system settings as required and explain to the system operator how to use the heating system.

1.4 Site requirements

When establishing the site requirements, it is absolutely essential to take account of the locally applicable planning, building and implementation regulations and the dimensional specifications in the fitting guidelines, installation examples and technical data. Compliance with the locally applicable regulations and the correct implementation of the measures required on site are solely the responsibility of the system owner and are a requirement of the manufacturer's guarantee. GUNTAMATIC provides no guarantee of any kind for any type of site work. Without making any claims as to completeness or non-applicability of official requirements, we recommend the following specifications based on the Austrian Guidelines pr TRVB H 118:
2 Planning

2.1 Fire safety

The fire security introductions are obligatory needed on the construction place.

The Compliance from counties or states fire security law is obligatory and stands higher than the GUNTAMATIC fire security instruction.

Austria  
State legislation of the federal states  
Technical Directive on Preventative Fire Safety (pr TRVB H118)

Germany  
Standard boiler regulations (M-FeuVO)  
Hessen and Saarland – in these states §16 FeuVO Hessen applies

Switzerland  
Fire safety regulations [www.vkf.ch](http://www.vkf.ch)

Any other exporting countries  
Any fire safety office

You have to follow your specific country fire safety rules obligatory. Your country safety rules are higher than our GUNTAMATIC minimum rules.

If there are no specific fire security rules in your country, you have to follow the GUNTAMATIC introductions.
2.2 Minimum fire safety requirements

**Boiler room**

Floor of concrete construction, either bare or tiled. All materials for floor, walls and ceiling must be fire-resistant to F60/REI60 rating.

**Boiler rooms door:** The Boiler room’s door also might close single handed and it has to be possible to close off the door. Connecting doors to the fuel storeroom must also be Class T30/Ei30-C fire doors, self-closing and lockable. There must be no direct connection to rooms in which flammable gases or liquids are stored.

**Sprinkler:** Connected to the outfeed unit there must be a sprinkler device set to trip at 55°C. With storeroom volumes up to 50 m³, this is used instead of the temperature monitor. When the sprinkler is triggered, the sloping outfeed auger enclosure – which also serves as a burn-back inhibiting device – is completely flooded. The quantity of water required to do so is at least 20 litres. If the temperature drops back below 55°C, the flooding is stopped.

![The sprinkler system must be connected on all systems regardless of local regulations!]

**Fuel storeroom**

The same minimum fire safety requirements apply as for the boiler room.

**Storeroom doors/hatches:** Storeroom doors/hatches must be fire safe to Class T30/Ei30-C, self-closing and lockable. There must be a warning sign carrying the message “Do not enter when feeder system is running” attached to the storeroom door/hatch.

> 50 m³  **TÜB - Temperature monitor:** If it is possible to store 50 m³ of fuel or more, a temperature monitor connected to a warning device must be installed in the fuel storeroom at the point where the fuel conveyor exits the fuel store and enters the boiler room. The warning device must be triggered when the temperature exceeds 70°C. Because of the sprinkler system, the temperature monitor on the outfeed auger is not required for storerooms with a capacity of less than 50 m³.

> 50 m³  **HLE - Manual fire extinguisher:** If 50 m³ of fuel or more can be stored, a manually operated fire extinguishing facility must be installed. It must be protected against freezing and connected to a pressurised water pipe (DN20 conduit). The discharge point must be located directly above where the fuel outfeed channel exits the storeroom. The fire extinguishing facility must be identified by a sign carrying the inscription “Fuel storeroom fire extinguisher”.

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**Remark:** The text above is a translation of content from the original document. The translation may not be perfect, and there may be errors in the translation. The original document provides the most accurate and up-to-date information.
**SLE - Automatic fire extinguishing facility:**
For storage rooms in farm building it is possible to dispense with a F90 / REI90 cladding for fuel storage and if the fire compartment is less than 500 sq meters. The fuel but separately (wooden planking) must be stored on other goods. If furthermore a firewall to a residential wing before, so an automatic extinguishing device (SLE) is also required. This extinguishing equipment must be connected either directly to a pressurized water supply or to a water-supply container. The amount of water to need three times the volume of the loading device shall be not less than 20 liters.

**Inspection covers:** There must be a lockable F90-class inspection hatch above the fuel out feed channel.

**Services area:** For storerooms in the services area, it is possible to dispense with F90/REI90 jacketing of the fuel store. The fuel must be stored separately (wooden boarding) from other materials and the fire containment zone must be less than 500 m².

**Filler pipes:** Filler pipes through rooms where there is a fire risk must be provided with Class F90/REI90 cladding.
### 2.3 Boiler room requirements

#### Minimum room height

<table>
<thead>
<tr>
<th>PH 30 / 50 / 50 S</th>
<th>ideal solution</th>
<th>H 225 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 75 / 100</td>
<td>ideal solution</td>
<td>H 240 cm</td>
</tr>
</tbody>
</table>

1) = Mindestraumhöhe bei abgeschraubtem Wärmetauscherdeckel

#### Minimum room size

| PH 30 / 50 | B 240 cm x T 230 cm (H 240 cm) |
| PH 75 / 100 / 50 S | B 270 cm x T 230 cm (H 240 cm) |

2) = The room with boiler’s bodies front seeing from behind

#### Clear access opening

| PH 30 / 50 | ideal | B 120 cm x H 185 cm |
| PH 75 / 100 / 50 S | ideal | B 195 cm x H 210 cm (H 185 cm) |

5) = Contribution from the ready constructed boiler on the pallet

#### Combustion air supply

The pressure in the boiler room must not be less than 3 Pa (0.3 mm H₂O). The air vents for boiler rooms must have a clear, net cross-sectional area of at least 200 cm² and must not be sealable. With combustion boiler systems with a fuel heat output upwards of 50 kW, the net, clear cross-sectional area must be increased to at least 5 cm² per kW rated output according to the combustion air requirement of the boiler system. The air supply ducting must connect directly to the outside and if the ducting passes through other rooms, it must be jacketed to Class F90/REI90. On the outside of the building, air vents must be covered by a protective grille with a mesh size of > 5 mm. The supply of combustion air should, if possible, enter at floor level in order to prevent cooling of the boiler room.

#### Electrical installation

The lighting and the electrical wiring in the boiler room must be permanently installed. There must be a clearly marked emergency off switch in an easily accessible position outside the boiler room, close to the boiler-room door.

The line connector 400 VAC, 50 Hz, 13 A is needed.

#### Fire extinguisher

A hand-held fire extinguisher (6kg gross weight, EN3) must be mounted outside the boiler room near the boiler-room door.

#### Protection against freezing

The boiler room, pipes carrying water and any district heating pipes must be protected against freezing.
**Installation site**

You have to plan the furnace in the near of the chimney to avoid a long flue pipe.

A → Integration version of Energy saving draft regulator with Ex flap and with fire tube respect the local fire security rules- dust information possible

B → BEHIND distance

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Minimum</th>
<th>Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 cm</td>
<td>60 cm</td>
<td>50 cm without Ash suction system</td>
</tr>
<tr>
<td>70 cm</td>
<td>60 cm</td>
<td>50 cm with Ash suction system</td>
</tr>
</tbody>
</table>

C → The discharge for overheating

D → Line Connector 400V 13A

E → Drain

F → Sparger complex

G → flue wet non- sensitive chamotte-flue advised

H → installation variant energy-saving damper with explosion damper in the flue Ca. 50 cm under the flue – please follow the local laws

I → LEFT distance

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 cm</td>
<td>40 cm</td>
</tr>
</tbody>
</table>

J → fire extinguisher 6 kg filling weight EN3

K → escape switcher

L → fireproof door T30 / EI30-C lockable and self depended

M → RIGHT distance

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 cm</td>
<td>40 cm</td>
</tr>
</tbody>
</table>

N → HLE manual release arc control device

O → Mauerdurchbruch Höhe 70 cm / Breite 45 cm

P → AHEAD distance

<table>
<thead>
<tr>
<th>Ideal</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 cm</td>
<td>80 cm</td>
</tr>
</tbody>
</table>

Q → Air combustion supply

R → TÜB Warning device for to heaters spiral’s temperature
2.4 Flue requirements

Use heat-insulated fireclay flues that are insensitive to damp. The flue gas temperature can be less than 100°C.

The system must only be connected to the flue if the flue meets the legal requirements and the technical specifications. The flue must be matched to the boiler output and dimensioned in accordance with DIN 4705. In order to be able to accurately dimension the flue, the calculations must be based on the flue gas figures. When designing new flues, high thermal insulation chimneys (DIN 18160 T1 heat transmission resistance group I) or suitable fireclay flues that are insusceptible to damp and have general building regulation approval should be used. It is advisable to involve those responsible for approving the flue system early on in the planning phase.

Flue height
The minimum flue height is 5 - 10 m depending on boiler output. The flue must terminate at least 0.5 m above the highest part of the building. In the case of flat rooves, the flue must terminate at least 1.5m above the surface of the roof.

Flue diameter
The flue hast to adjust on the fire power. The following datas are approximate values and could be used for planning. We recommend to calculate the flue by a professional.

| Flue dimensioning data | Dimension the flue for rated output! (Averaged figures with used heat exchanger) |

**Rated output:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Flue gas</th>
<th>CO₂</th>
<th>Mass flow rate</th>
<th>Required draught</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 30</td>
<td>180°C</td>
<td>12.5%</td>
<td>0.025 kg/s</td>
<td>15 Pascal</td>
</tr>
<tr>
<td>PH 50</td>
<td>190°C</td>
<td>13.0%</td>
<td>0.040 kg/s</td>
<td>15 Pascal</td>
</tr>
<tr>
<td>PC 50-S</td>
<td>185°C</td>
<td>12.5%</td>
<td>0.040 kg/s</td>
<td>15 Pascal</td>
</tr>
<tr>
<td>PH 75</td>
<td>180°C</td>
<td>12.5%</td>
<td>0.065 kg/s</td>
<td>15 Pascal</td>
</tr>
<tr>
<td>PH100</td>
<td>195°C</td>
<td>12.5%</td>
<td>0.082 kg/s</td>
<td>15 Pascal</td>
</tr>
</tbody>
</table>

**Sub-maximum output:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Flue gas</th>
<th>CO₂</th>
<th>Mass flow rate</th>
<th>Required draught</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 30</td>
<td>130°C</td>
<td>9.5%</td>
<td>0.010 kg/s</td>
<td>2 Pascal</td>
</tr>
<tr>
<td>PH 50</td>
<td>145°C</td>
<td>10.0%</td>
<td>0.015 kg/s</td>
<td>2 Pascal</td>
</tr>
<tr>
<td>PC 50-S</td>
<td>140°C</td>
<td>9.5%</td>
<td>0.015 kg/s</td>
<td>2 Pascal</td>
</tr>
<tr>
<td>PH 75</td>
<td>140°C</td>
<td>9.5%</td>
<td>0.020 kg/s</td>
<td>2 Pascal</td>
</tr>
<tr>
<td>PH100</td>
<td>150°C</td>
<td>10.5%</td>
<td>0.025 kg/s</td>
<td>2 Pascal</td>
</tr>
</tbody>
</table>
### Fitting an energy-saving flue draught regulator/pressure-surge compensator (Class RE) is absolutely imperative.

The flue draught should not differ by more than +/- 3 pascals from the figure specified in the flue dimensioning data. If the flue draught cannot be reduced to the required figure, either a larger draught regulator should be fitted or an additional flue baffle fitted between the flue and the draught regulator.

**Purpose**
- To ventilate the flue when the system is not in operation
- To compensate for pressure surges
- To regulate and limit the flue draught

**Fitting requirement**
The energy-saving flue draught regulator must be fitted in accordance with the local regulations, preferably in the flue approx. 0.5 m below the point where the flue connecting pipe joins or alternatively in the flue connecting pipe close to its junction with the flue.

**Flue draught setting**
- Adjusting the flue draught is only of any use at outside temperatures below +5 °C.
- The system must have been in operation for at least an hour
- Ensure there is sufficient demand for heat for the boiler to be run at rated output for at least 15 minutes
- Measure the flue draught between the boiler and the flue draught regulator (distance of measuring point from boiler ideally 3 x flue diameter from connection between boiler and flue connecting pipe).

---

### Too much flue draught

May cause the flue gas temperature to increase and accelerate combustion as a result. Poor boiler output adjustability, increased dust discharge and malfunctions can result.

### Too little flue draught

Performance problems, incomplete combustion and malfunctions when operating below rated output can result.
2.6 Fuel store requirements

Please note: the specific national rules for your fuel store (for example ÖNORM M7137, VDI 3464...) are strictly adhered blindly

**Annual demand for fuel store**

The fuel store should be able to pick up the stock for a year. Per 1 kw building heat is expected with the following annual fuel demand:

→ per 1 kW/Year ca. 2,00 m³ = ca. 550 kg beech
→ per 1 kW/Year ca. 2,50 m³ = ca. 500 kg spruce
→ per 1 kW/Year ca. 0,65 m³ = ca. 450 kg Pellets
→ per 1 kW/Year ca. 0,75 m³ = ca. 550 kg Energycorn
→ per 1 kW/Year ca. 4,30 m³ = ca. 470 kg Miscanthus

**Fuel store arrangement**

You have to built your Storeroom in a quadratic frame, to use the filling spiral optimally.

**Fuel store air sparging**

To avoid an high perilous Co² concentration you have to lift the store and Broiler room. The opening for the lifting might discharge into the atmosphere. There must be an air change between the Storeroom and the ambient atmosphere. If the natural thermal isn’t enough you have to take technical measures.

If the filling stubs (the openings) discharges not into the atmosphere you have to lift it with another lifting opening, you have to be careful, that there is no rainwater into the storeroom from the filling opening. The construction site from the permeable to air storage container might have a port in to the atmosphere. A ventilator shifts from 200cm² is enough.

**Up to 30 t storage volume** the requirement is prepossessed, if:

- The filling stub (opening) is leading into atmosphere for minimum 2 caps with an air inlet
- The diameter from 2 ventilation pipes is per pipe minimum 90 mm
- The ventilator shift from the exhaust port from both Ventilation pipes from 2 m minimum 40 cm² and must be higher then a length from 2 me but minimum 60 cm².

INFO: The whole ventilation shift from 2 caps from our filling sets is 60 cm².

**Over 30 t storage volume** the requirements

- a combination between natural and manual lifting, based on a Co² Sensor. If there is no natural lifting you have to install forced ventilation- in case of a high Co² Concentration ventilation is lifting automatically.
Storeroom filling
The hackchips are delivered by a tip truck. A fired drive at your house to the storeroom is needed, if it’s possible. Ideally the storeroom is on the external wall and is reachable and reliable form the gate. To avoid damages on the agitator during insertion of the hack chips, you shall fill the storeroom with a front loader. The filling opening should be 30 up to 40 cm minimum higher than the deepest point of the springroom. If the fuel storage room is pneumatic filled through a pump carrage. In this kind of filling you have to care if there is a dustproff operation.

Access doors/hatches
Above-ground fuel stores must be provided with a door or hatch that opens outwards. So that the fuel cannot run out if the fuel store is opened by mistake, the inside of the access door/hatch opening must be covered with boarding (which must be removable from the outside). During to the risk of injury when the system is in operation, access doors/hatches must be lockable and kept locked when the system is in operation. There must be a warning sign carrying the message "Do not enter when feeder system is running" attached to the access door/hatch.

Electric Installation
Electronic installation in the fuel stores are not allowed
Filler couplings must be single ended.

Structural requirements
The enclosing walls must be capable of withstanding the possible static loads created by the fuel and the pressure when filling the fuel store.

Damp-proofing
The fuel must be protected against contact with water or damp floors/walls. The storeroom must remain dry all year round. If there is a risk of temporarily damp walls, fitting a back-ventilated facing to the walls and lining them with wooden material may be required.

Doors
Aboveground fuel stores must be accessible via a door (lockable) of at least 1,80 m² cross-section to the outside, inside and planked removable from the outside, so that the fuel can not fall out when erroneous opening the door.

floor planking
For operation with heating corn or pellets, a ground-planking or a concrete floor is absolutely necessary. If it is only running by hack chips, dry wood chips may be introduced instead of the soil.
**Ceiling agitator**  The drive motor and the necessary electrical installations must be installed outside of the storage room. A lockable emergency stop switch with motor protection must be installed in the immediate vicinity of the charging slot switches, which interrupts the power supply of the auger when opening the door, secured. The filling shaft must be secured with a grating.

**wall breakthrough**  The following measure table shows the measure for positioning from the wall breakthrough. The measures apply to the serial production.  

serial production = discharge unity + 0,55 m hutch and agitator

**Measure wall breakthrough**

<table>
<thead>
<tr>
<th></th>
<th>Measure A</th>
<th>Measure B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,5 m</td>
<td>50 cm</td>
<td>37 cm</td>
</tr>
<tr>
<td>2,0 m</td>
<td>50 cm</td>
<td>41 cm</td>
</tr>
<tr>
<td>2,5 m</td>
<td>50 cm</td>
<td>44 cm</td>
</tr>
<tr>
<td>3,0 m</td>
<td>50 cm</td>
<td>47 cm</td>
</tr>
<tr>
<td>3,5 m</td>
<td>50 cm</td>
<td>50 cm</td>
</tr>
<tr>
<td>4,0 m</td>
<td>50 cm</td>
<td>53 cm</td>
</tr>
<tr>
<td>4,5 m</td>
<td>50 cm</td>
<td>54 cm</td>
</tr>
<tr>
<td>5,0 m</td>
<td>50 cm</td>
<td>55 cm</td>
</tr>
</tbody>
</table>
For working with Pellets oder Energy corn is a own filling set needed. (please have a look at the price list).

**Example 1**  The storage filling occurs through a gate.
The maximal length of feed with the agitator is 7 meter.

**Example 2**  The storage filling occurs with a ceiling filling spiral through a shaft.
*Deliverable ceiling filling spirals are available in following sizes: 3 m, 4 m, 5 m, 6 m or 7 m. The maximal length of holding included the agitator is 7 m.*

**Example 3**  The storage filling occurs through a shift in the storage room ceiling.
The maximal length of holding included the agitator is 7 m.
Example 4  The boilers charging occurs with a horizontal installed agitator. 
A draft shaft extension is needed. (please have a look on the price list) 
The maximal length of holding included the agitator is 7 m.

Example 5  The boilers charging occurs with a horizontal installed agitator. 
A in the length shortened downpipe is need. (Please have a look on the price list). 
The maximal length of holding included the agitator is 7 m.

Example 6  The boilers charging occurs with an additional feeder spiral. 
A operation set and some spiral’s trags are needed. (Please have a look on the price list). 
The maximal length of feeder spiral included operation set might have a 7 m length. 
The maximal length of holding included the agitator is 7 m.
Optional there is a automatic ash vacuum system. The accumulated ash will go through the firing build Feedsystem and flexible metal tube in a big removable ash ton. The deashing is automatically.

Retrofit the system

It’s possible to retrofit the ash vacuum suction system, if the minimum difference between the wall and the system is 60 cm.

---

**Construction side:**

If possible, you have the opportunity to plan the ash ton at a ground level beside the boiler’s body. Basic requirement for the construction is a good lifting through the installation site. The ash ton must have a 25 cm minimum difference to inflammable materials. You have to be a look that there is no inflammable ground.

**Not permitted construction side for an ash ton:**

- in an garage
- in the atmosphere in living rooms;
- in storerooms with inflammable materials or gases;
Permitted Construction places for the ash ton:

- in the boiler room

- in an secondary room

Hauling of a suction pipe through fire zones

A → wall penetration with Rockwool pipes spiral clamp;
B → wall penetration with boiled Steel pipe;
C → fire security clamps 54 – 60; (maximal 1 m difference)
D → flexible suction metal tube (minimum 10 cm difference)
E → not inflammable mad
The heating circle rule is optional offered. You can decide between a MKR set or a wall mounted MK 261 set.

- per construction 3 controlled by atmospheric condition rules possible
- per construction could be activated on the MKR Set boiler
- pro Machine there are 3 remote control möglich;
- per heatingcircle one analogue room unit possible

Exceptions at five sensors are buffer management

Please note the information in section 5. sensors buffer management of chapter 7.1 and buffermanagement HP0 !

Set-MKR Following functions could be activated:

- Heatingcircle  
  - Warmwater-Memory

- Heatingcircle 0 optional available .........  
  - Pumpenheizkreis
  - Zusatz Warmwasser-Speicher
  - Externes Heizgerät

- Heatingcircle 1 optional available.......  
  - Pumpenheizkreis
  - gemischter Heizkreis

- Heatingcircle 2 optional available.......  
  - Pumpenheizkreis
  - gemischter Heizkreis

wall mounted model set-MK261 Following functions could be active:

- Heatingcircle WW  
  - Warmwater-memory

- Heatingcircle 0 optional ..................  
  - Pumpingheatingcircle
  - 1) third mixed heatingcircle

- Heatingcircle 1 optional ..................  
  - Pumpingheatingcircle
  - Mixed heatingcircle

- Heatingcircle 2 optional ..................  
  - Pumpingheatingcircle
  - Mixed heatingcircle

- Trunk link optional.......................  
  - Feeder pump (ZUP)
  - Dumping device pump (PUP)
  - Cargo pump (LAP)
  - 2) extension (ERW)
  - 3) third mixed heatingcircle

- Addition optional.........................  
  - Additional warmwater memory
  - External heatingcircle
  - 4) third mixed heatingcircle

INFOBOX

1) the third mixed heatingcircle could be activated, if the functions trunk link and addition are not used.
2) through „ERW“ function a heating circle controller with trunk blink can be assigned an other heating circle controller
3) if the function „third mixed heatingcircle“ is activated, the trunk blink functions are not available.
4) if the „third mixed heatingcircle“ is activated, the additional functions are not available.
Sketch:
3 Construction

3.1 Delivery

The boiler system is delivered packed in a wooden crate wrapped in foil. Please check that the delivery is complete according to the delivery note and in perfect condition.

**Deficiencies**

Please make a note of the deficiencies identified directly on the delivery note and contact the supplier, heating installer or our Customer Service.

3.2 Carrying to installation site

The system is delivered on a wooden pallet and can be lifted and carried to the installation site using a pallet truck.

**Carrying in dismantled**

The boiler body can be dismantled into parts for carrying in. If that is done, a person authorised by GUNTAMATIC must be consulted.

3.3 Positioning and aligning the boiler

Keep to the minimum wall clearances specified by the system planner and manufacturer. If important details are missing, please refer to the planning documentation or ask our Technical Support. Position the system as close as possible to the flue to avoid having a long flue connecting pipe. The system must be accessible from the left or right side.

**Clearance at back**

<table>
<thead>
<tr>
<th></th>
<th>ideal</th>
<th>70 cm minimum</th>
</tr>
</thead>
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<tr>
<td></td>
<td>possible</td>
<td>50 cm (without auto ash extraction system)</td>
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<tr>
<td></td>
<td></td>
<td>60 cm (with auto ash extraction system)</td>
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**Clearance on left**

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<thead>
<tr>
<th></th>
<th>ideal</th>
<th>70 cm minimum</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>possible</td>
<td>40 cm</td>
</tr>
</tbody>
</table>

**Clearance on right**

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<th>ideal</th>
<th>70 cm minimum</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>possible</td>
<td>40 cm</td>
</tr>
</tbody>
</table>

**Clearance at front**

<table>
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<th>100 cm minimum</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>possible</td>
<td>80 cm</td>
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</table>

**Floor clearance**

<table>
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<th></th>
<th>ideal</th>
<th>3.5 cm minimum</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>possible</td>
<td>8 cm</td>
</tr>
</tbody>
</table>

**Set the boiler at a slant**

Unscrew the rear adjustable feet slightly further so that the boiler is slightly *higher at the rear*. That will allow the air inside the boiler to escape easily when the system is filled.
3.4 Fuel out feed installation

1. Set the boiler in accordance with the required minimum wall-distances in the boiler room place so that sufficient maintenance space around the boiler, see Sketch.1, exist. Align the boiler by means of adjustable feet to the rear is slightly inclined upwards so that existing in the heat exchanger air can escape easily at the plant filling. Please note, that the auger feed system has to be constructed right and just like in sketch 2., um ca. 90° nach vor oder zurück geschwenkt werden kann.

2. The storage room should be arranged only slightly lower than the boiler room. The maximum possible inclinations of the discharge screw can be seen in the clip values in sketch 2. With the optional chute extension, see sketch 3, up to 18° tilt are achieved. In disassembled stoker seal the inlet (A) Sketch 4 insert between stoker unit and Flange and screw with 4 pieces M08 x 30 hexagon bolts, snap rings and nuts. The support foot (B) sketch.4. Unscrew the stoker unit, so that the stoker unit is relieved. The cable Ignition, TK5, level-tongue, fire engine, Stoker sensor, actuator G1 and A1 connect drive.

3. Put the propulsive unit (C) Sketch 4 to the Stoker unit and turn it in direction of the storeroom.

4. Pre assemble the needed Spiraltrogs on the ground. Construct the in serial delivered troppiece (F, look at Sketch 4) in the wall breakthrough. Screw the single troppieces with M08 x 30 hexagon screw, screw it hard Safety disk with a locknut and crush. Stick the spirals piece that the spiral’s lead (G, Sketch 4) is running without a crush or a break. At least you have to stick the pre assembled Feed spiral on the drive unit.

5. Construct the agitator (H), look at picture 4 on the Feed spiral and have a look if the Spirals lead (G) is running without a break and a pille.
6. The agitator is turning in clockwise direction, look at Sketch 5. The spring arm has to be constructed, that the longest are in counterpart position. The spring arms have to run 15 to 20 mm above the drawing spiral (look at Sketch 9). Please don’t fix the screws (J, Sketch 9) on the spring arm. The feet (K, Sketch 9) on the agitator has to attitude, that the longest spring and is running 3 to 4 cm over the ground (look at L, Sketch 9).

7. Fix the unit air tight with screws M10 x 100/140 mm (look at M, Sketch 9) with the Stoker unity. Construct the drive unit always straight. Look at Sketch 6.

8. Place the agitator in the middle, that the spring arm has a few cm space to the store room’s wall. The agitator on the store room’s ground has to screw tightly.

9. Shore the Feed spiral in the store room with the delivered stanchion below the wall breakthrough- the maximum distance between the stanchions is 120 cm. The stanchions have to be on the flanges or on angel brackets. To avoid the sound transmission you have to put it under an attenuated mad. You have to attitude the stanchions in high, that there is enough space for the spiral. You have to screw tightly the stanchion. (Look at Sketch 7)

10. The wall breakthrough below (N, Sketch 9). For the closing of the Feeding spiral you have to close it with the delivered cover plate and with rock wool. For perforation you have to cobble the cover plate.

11. You have to screw the bottom plate with M8 x 16 screws tightly (look at Sketch 8) and you have to insert the bottom plate below. (look at O, Sketch 9)

12. The seperation (P) from the inspection opening (look at picture 7) is sited by manufacture. This measure prohibits the uncontrolled spread from flui into the heatingroom. You have to construct a 40 cm feed spiral which has a wall distance from 40 cm and got a breadth with 80 cm. You have to construct also a plank slat in a 20 degree angel. The construction has to fixed satisfactoired and has to get fixed enough on the underside.
13. The temperature monitoring (TÜB) may be omitted on the drive unit (Sprinkler 55 °C) to 50 m³ storage volume due to the sprinkler device. In stockroom volume greater than 50 cubic meters, the temperature monitoring (segmental) is also installed on the sprinkler system to the propulsion unit in the area of the wall and the opening of a warning device such as ruled at-a-bugle. Also from 50 m³ storage volume is a manually triggered from the boiler room, extinguishing device (HLE), connected to a pressurized water line and executed as empty piping DN20, directly to the passage of space Sweep channel opening out in the fuel storage installed. The extinguishing equipment must be marked with a sign "erase fuel storage room".

14. When wood chips operating a slanted floor is not mandatory. With grain or pellet operation, however, a sloping floor should be installed. Sloping floors made of wood or cement could be constructed on site. With wood floors slant the boarding of 3 cm thick planed boards or paste board is finished. The sub-structure of 10 x 10 cm timber construction, according to Fig.11. customize. The supports must be on concrete or metal sheets. The distance between the spring arms to sloping floor must be 15-20 mm. With sloping floor of concrete 2-3 cm away from the worm trough.
15. The parallellings installation with revisons opening must be performed like written. In the store room there is a installade partition (P), look at sketch 7, prohibits at opening of revisionsquery an uncontrolled spread of stored fuel.

- The Feedspiral has filled out with rockwoll, look at (Q) picture 12

- The cover plate (R) inside and outside installed (look at picture 12)

- fix the cover plate (S)- look at picture 12

- Cut the rockwollblock (T) on size of store rooms opening (look at picture 13)

- The stonewallblock (T), like in picture 13 is delivered seperately with a hexagon screw between revisionsopening (U) and Revisionsbelowside (V) delivered and installed.

- Put the installed inspection cover (W) and srew it with wing locknuts.
3.5 Plumbing connections

POWERCHIP 30 - 50 / POWERCORN 50-Special

A → Sensor for temp. relief valve, 1/2"
B → Temperature-relief heat exchanger 3/4"
C → Heating return, 5/4"
D → Heating flow, 5/4"
E → External thermostat, 1/2"

POWERCHIP 75 - 100

A → Sensor for temp. relief valve, 1/2"
B → Temperature-relief heat exchanger 3/4"
C → Heating flow, 2"
D → Heating return, 2"
E → External thermostat, 1/2"
Temperature-relief heat exchanger  The maximum permissible operating temperature of the boiler is 110°C. In order to prevent the maximum allowable operating temperature being exceeded, connection of a temperature-relief valve conforming to Austrian standard ÖNORM 8131 and DIN 4751 and with a response temperature of 95°C is required. The supply pressure must be at least 2 bar but no more than 6 bar.

POWERCHIP 20/30 – 40/50 / POWERCORN 50-Special

A → Cold water supply  
B → Sensor for temp. relief valve, 1/2"  
C → Temp. relief valve, 95°C

POWERCHIP 75 - 100

A → Cold water supply  
B → Sensor for temp. relief valve, 1/2"  
C → Temp. relief valve, 95°C

Thermal store  Installing a thermal store is not necessary as the boiler is operated by a modulating control system and the system can be quickly shut down. However, if the required continuous heat output in the summer months is below 10 kW for systems up to 50 kW, or 22 kW for systems upwards of 50 kW, combination with a thermal store is necessary for reasons of efficiency.

When you put the program „OUT“, the antifreeze function has to be secured, if the heating system is built with a manual thermostat.
Return boost
The boiler return temperature must be at least 55°C and must be held at the required level by a bypass pump between the boiler flow and return pipes. If a thermal store is connected, the boiler return temperature must similarly be at least 55°C, which must be ensured by a return boost (cross-over valve) set as shown in the plumbing diagram. If this requirement is not complied with, there is an increased risk of corrosion and guarantee entitlement will be lost as a result. Connect the return boost set precisely as specified in our plumbing diagrams.

The dimensioning of the return boost pump (set) is designed for the arrangements shown in GUNTAMATIC plumbing diagrams. If additional components such as heat meters are incorporated in the system plumbing, or if the overall thermal store pipe run (flow and return) is more than 30 m, re-dimensioning of the boiler charging pump (HP0) may be necessary.

Sludge separator with magnetite
Magnetite and the sludge separator in the Heating water could become a problem for energysaver pumps. By installing a properly sized and applied sludge separator with a magnet can remedied cost efficiently.

Either old pipes could be meant

Expansion vessel
The boiler operates in a sealed heating system and must be provided with an expansion vessel for pressure compensation. To calculate the expansion volume, the volume of the system when cold must be known. Please select the expansion vessel on the basis of the manufacturer's specifications. The expansion volume of the system is calculated as follows:

System volume x Expansion factor x Additional allowance factor
- Expansion factor for wood-fuel boilers = 0.03
- Additional allowance factor = 3.0 for systems under 30 kW
- Additional allowance factor = 2.0 for 30-150 kW systems

Example calculation: 2500 litres x 0.03 x 3 = 225 litres

Pump selection
The choice of pump must be made by the installer or building technology planner on the basis of the friction data, the pipe cross-sectional area and the required delivery pressure for the piping system planned.

Plastic piping
If plastic piping for underfloor heating or district heating pipes are connected, they must be protected against excessive temperatures by using a limiting thermostat for the circulation pumps.

Danger of overheating
Faulty operation, wrong fill or disturbance could be lead to overheating. To avoid disturbance you have to install additional fuse protections for maximum process water and fuses for heatingcircle temperatures.
3.6 Filling and bleeding the system

| Water quality | The water quality of hot water systems with flow temperatures of max. 100 °C is subject to VDI 2035. According to VDI 2035 Part 1, "Avoiding damage to hot water systems", which comply with EN12828, the first-fill and replenishment water, must be conditioned (preferably softened) if the following overall hardness limits [°dH] according to total heat output (kW) are exceeded:
|                | • < 50kW: if °dH > 16.8
|                | • 50 to 200 kW: if °dH > 11.2
|                | • 200 to 500 kW: if °dH > 8.4
|                | • > 500kW: if °dH > 0.11

| Water heater | If a water heater is also used in addition to the GUNTAMATIC boiler, it should be filled according to the installation instructions for it.

| Construction flushing | Before charging you have to flush the system. When you do this, it’s the best opportunity to clean magnetite and rust sludge from the pipe system.

| Filling the system | • Match the pressure of the system when cold to the air charge pressure of the expansion vessel.
|                    | • Check the operating pressure on the pressure gauge.

| Bleeding the system | • Switch off and bleed circulation pumps.
|                    | • Bleed boiler by opening the bleed valve on the boiler and allowing air to escape until water runs out.
|                    | • Bleed radiator heating system (if present) by opening the bleed valve on every radiator and allowing air to escape until water runs out.
|                    | • Bleed underfloor heating system (if present) by opening each heating circuit and flushing through thoroughly until there are no more air bubbles in the heating circuit pipes.
|                    | • Important: perform sequence in the correct order! Start bleeding in the cellar or on the ground floor and finish in the attic.
|                    | • Check the system operating pressure on the pressure gauge and add more water if necessary.
|                    | • Restart circulation pumps.

| Please note the guidelines on "Corrosion and boiler protection in heating and domestic water systems"!

| Only systems that have been properly bled guarantee effective conveyance of heat.
3.7 Connecting the flue

The boiler is connected to the flue by means of a flue connecting pipe which must be gas-tight and insulated between the heating boiler and the chimney.

**Flue connecting pipe**

→ **The following diameters should be used:**

- **PH 30 - 50** \( \varnothing = 150 \text{ mm} \)
- **PH 75 – 100 / PC 50-S** \( \varnothing = 180 \text{ mm} \)

→ **Flue connecting pipes longer than 4 m or with more than 3 bends:**

- **PH 30 - 50** \( \varnothing = 160 \text{ mm} \)
- **PC 50-S** \( \varnothing = 200 \text{ mm} \)
- **PH 75 – 100** \( \varnothing = 220 - 250 \text{ mm} \)

The hole in the wall for connecting the flue pipe must be lined with a built-in double-skinned lining tube or fireproof material. The flue connecting pipe must rise upwards from the boiler to the flue at an angle of at least 6° and be connected with gas-tight joints. An inspection cover must be provided for cleaning the flue connecting pipe.

A → **Flue connecting pipe, min. gradient 6°**

B → **Flue connecting pipe insulation**

C → **Flue draught regulator/pressure-surge compensator in flue**

(Preferred fitting arrangement)

D → **Alternatively: Flue draught regulator in flue connecting pipe**

(As close as possible to junction with the flue)

- The flue connecting pipe must be gas-tight
- An energy-saving flue draught regulator with pressure-surge compensator (Class RE) must be fitted
- Insulate the flue connecting pipe
- Do not brick in the flue connecting pipe (noise transmission)
- The flue connecting pipe must not extend into the flue
The electrical connections to the boiler system on site may only be made by an approved electrical installer observing all the applicable regulations. In addition, it is essential that electrical system components are protected against damage from heat radiation.

All boiler system internal wiring is wired up at the factory ready for use. The work required on site by the electrical installer consists only of connecting the mains power and wiring up and connecting the system components such as thermal store, CAN bus, heating circuit pumps, mixer valve motors, etc.

Opening switch panel
- open the right cover panel (A);
- solve the lock screw (B)
- raise the control cover (C) and hang it below;
- the platine with the connecting plug under accessible positions

Mains power supply
400 VAC, 50 Hz, 13 A fuse (surge arrester recommend)

The mains power must be connected by means of the standard non-reversible power socket on the rear panel of the boiler. It must possible to isolate the system entirely from the mains without opening the switch panel cover, e.g. by means of an automatic circuit-breaker.

Emergency off switch
According to prTRVB H 118, it must be possible to switch off the system using an emergency off switch fitted outside the boiler room near to the boiler room door. The burner must then shut down but the heating controller and all safety equipment must remain functional. Connected to the boiler enabling switch, terminals 22/23 on the boiler circuit board (see electrical wiring diagram).
### Cabling
- **Feeder**: 5 x 1.5 mm²
- **Sensor**: 2 x 1 mm²
- **Room stat**: 2 x 1 mm²
- **CAN-Bus**: 2 x 2 x 0.5 mm² (twisted pair, shielded)

For low voltage (sensors…) and high voltage, the cable duct on the boiler, is needed.

### Surge protection
Where CAN bus cables run between different buildings, the earthing conductors of the buildings must be connected to each other for potential equalisation purposes. If the earthing conductors cannot be interconnected, a 10 mm ring earth must be laid along with the CAN bus cable in the ground. The earthing conductors and ring earth must then be connected to one another.

![Surge protection diagram](diagram.png)

### Wiring CAN bus
**linear wiring**: (you have to prefer this kind of wiring)

The connection is rewire linear, further cabling the CAN bus, for example, from the operating unit to the wall unit and the wall-mounted unit to the remote unity.

**wirring radial:**

The connection is radial wiring, means the CAN bus, for example, from the operating unit to the wall unit and the space station. The total length of the CAN bus connection must not exceed 100 m in this case.

The terminals +/− and H / L connect each twisted pair.

### Boiler cascade
Up to four heating boilers can be operated in a cascade system (sequential control system) and must be connected in-line via a CAN bus. **The CAN bus lead must be wired without connecting the + terminal.**

### Earthing
The entire system is to be joined to the earth circuit conductor via the connected piping system according to the regulations.

**Earthing**

![Earthing diagram](diagram.png)

When connecting the earth circuit conductor pay particular attention to keeping the connecting runs as short as possible.

### Cabel non tensioned
To avoid defects or errors all cables strain relieved

### Emergency power supply
Only use regulated generators.
4.1 Heating system electrical connections

**Mains connection**
- 400 VAC, 50 Hz, 13 A fuse

**Standard specifications**
- Boiler control panel (BCE)
- Boiler circuit board (230 VAC)
- Router module (400 VAC)
- Fault signal output (24VDC 200mA)
- Safety temperature limiter (STL)
- Boiler sensor (KVT20 Ω)
- Flue gas temperature sensor (thermocouple)
- Oxygen sensor (12V DC)
- Flue draught fan (230V AC)
- Grate cleaner motor (230V AC)
- TKS 1 (firebox and ash box door switch, 24VDC)
- TKS 2 (fuel outfeed monitor)
- Stoker drive motor G1 (400V AC)
- Outfeed drive motor A1 (400 VAC)
- Outfeed drive motor A2 (400 VAC – for feeder auger)
- Stoker sensor (PT1000 Ω)
- Fire safety flap (24V DC)
- Ignition fan (230V AC)
- Boiler enabling switch (emergency off)
- HP0 output (230 VAC)
- Reflux mixers (230 VAC)

**Optional equipment**
- Pump outputs (230 VAC)
- Mixer valve outputs (230 VAC)
- sensor entrance (KVT 20 Ω)
- anlalog equipment for furnace
- Digital remote station

<table>
<thead>
<tr>
<th>Temperature</th>
<th>KVT20 Ohm (Ω)</th>
<th>Temperature</th>
<th>PT1000 Ohm (Ω)</th>
</tr>
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<tbody>
<tr>
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<td>1000 Ω</td>
</tr>
<tr>
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<td>100°C</td>
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</tr>
</tbody>
</table>
5 Final checks

Final checks
- After completing installation of the system, check again that all joints and pipes are properly tightened and not leaking.
- Check that all covers are fitted and secured.
- Check that the fitting of all connections (water, flue, electrical, ...) has been done correctly.
- Check that all required safety signs and instructions are attached and hand over all documentation (operating and installation instructions) for the system.
- Check that all electrical connections have been properly wired before connecting the system to the power supply.
- Clean the system and clear up the installation site.
- Always leave the boiler room clean.

Initial commissioning
Commissioning must only be carried out by GUNTAMATIC or a qualified specialist. The precondition is that the flue technician, heating installer and electrician have cleared the system for operation. The authorised GUNTAMATIC specialist will carry out the following work during commissioning:
- Check the entire system
- Check the electrical functions
- Adjust the programmer to the system
- Commission the system
- Explain to the user how the system functions and how to operate and clean it
- Record the details of the customer and the system and complete the commissioning log

Any deficiencies identified must be recorded in writing and rectified within the following 4 weeks in order to maintain guarantee entitlement.

The fully completed commissioning checklist must be sent to GUNTAMATIC immediately as otherwise the guarantee will be void.

These installation instructions should not be destroyed after commissioning but kept permanently with the system together with the operating instructions.
The heater equates Class 3/ EN 303-5. The original certification report is deposited at the manufacture, Public Police and Fire safety rules have to be respected.

- **ÖNORM / DIN EN 303-5**
  Heaters for pillar fuel, automatic and manual sanded up to 300 KW. Terms, requirements, and checkups.

- **ÖNORM / DIN EN 12828**
  Heaters for pillar fuel, automatic and manual sanded up to 300 kw, terms, requirements, checkups and marking

- **ÖNORM / DIN EN 12831**
  Heating for Buildings; method for calculating usual heating board

- **ÖNORM M 7137**
  Requirements on the Pelletstorage at the private customer.

- **ÖNORM M 7510**
  Guideline for the review from central heaters

- **ÖNORM H 5195-1** (Austria)
  Prevention from damage through nest and Store origin with working temperature.

- **VDI 2035** (Germany)
  Avoidance from damages in Water heating systems

- **SWKI 97-1** (Suisse)
  Chalk and Rust Prevention in Waterheaters

- **TRVB H 118** (in Austria for automatic sended Machines)
  technical heating fire safety rule

- **DIN 1988**
  Technical Rules for drinking water installation

- **DIN 4751 Teil 1-4**
  Safety engineering equipment for water heaters

- **Swiss decrees for aircleening**

- **Swiss decrees with smallfiremachines**

- **VKF Fire security thermaltechnical construction** (Suisse)

- **SIA 384** (Swiss)
2 Sensor – Backup Memory

- **Attitude „Part-Charging“**
  The buffermanagement is charged in the top art. ON and OFF Switching temperatures could be attitude with buffermanagement.

- **Attitude „FULL-Charging“**
  The buffermanagement is charged in the below art. ON and OFF Switching temperatures could be attitude with buffermanagement.

5 Sensor – Backup Memory

**PLEASE NOTE:**

The buffer sensor additionally required T5, T6 and T7 must be connected to the boiler board or on a wall unit on the terminals of the analogue space devices. It can be programmed for heating circuits therefore this controller no analogue room device RFF. Alternatively, use digital space stations RS or an additional wall mounted set-MKR261 for connecting the analogue room sensor RFF.

- **Attitude „part load border“**
  The buffer storage tank is loaded up to the adjusted maximum part load limit at full boiler output. Once this limit is reached, the boiler output is reduced so much by the buffer management that this charge state of the buffer can be kept as long as possible and thus restart the plant are as far as possible avoided.
HP0 mode = Z-pump

off 50 kW boiler output - High-/ lower temperature construction

Attention: In case of very low (less than 30%) decrease of performance like for example a low energy or a passive house and for oversizing, we advice you to install a backup memory.

Diagram no. PH-01-15

Electrical connections as per operating and installation instructions

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S60-051
6. Room stat as per price list
7. GSM module S15-002
8. Branch control valve plumber
9. Fault indicator lamp plumber

Important: follow wiring diagram!

* Heating circuit 0 can be used with a fixed-setting controller for low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

![Diagram of HP0 mode and electrical connections]
off 50 kW boiler output
High-/ lower temperature construction with backup memory PSF

Diagram no.  PH-02-15
Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. Thermal store PSF as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA50 A H39-021
9. Fault indicator lamp plumber

Important: follow wiring diagram!

10. Option: flange and heat exchanger as per price list
11. 2 Thermal store sensor S70-003
12. Option: Secondary return unit 045-250

HP0 mode = B-pump
off 50 kW boiler output
High-/lower temperature construction with backup memory PS

Diagram no. PH-03-15
Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA50 A H39-021
9. Fault indicator lamp plumber
10. Thermal store PS as per price list
11. 2 Thermal store sensor S70-003

Important: follow wiring diagram!
off 50 kW boiler output
High-/lower temperature construction with backup memory PSF and inventory boiler.

Diagram no.  PH-04-15

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or.
Heating circuit 0 can be room-temperature controlled using a room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. Thermal store PSF as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA50 A H39-021
9. Fault indicator lamp plumber
10. Option: Secondary return unit 045-250
11. 2 Thermal store sensor S70-003
12. Flue gas monitor, RGT 80°C H00-801
13. difference scheme TAD 13 S35-101
14. Return boost set RA50 TA H39-022

TAD13 mode = Prog. 4
HP0 mode = B-pump
off 50 kW boiler output - High-/ lower temperature construction with with trunk blink.

Attention: In some cases very low power consumption (<30%) such as at a very low energy or passive house, as well as over-dimensioning, we recommend installing a buffer!

Diagram no. PH-05-15

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA50 A H39-021
9. Fault indicator lamp plumber
10. Flow equaliser plumber
11. District heating pipe plumber

Important: follow wiring diagram!
**off 50 kW boiler output**

High-/ lower temperature construction with backup memory with trunk blink.

**Diagram no. PH-06-15**

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA50 A H39-021
9. Fault indicator lamp plumber
10. Thermal store PS as per price list
11. District heating pipe plumber
12. 2 Thermal store sensor S70-003

**Important: follow wiring diagram!**

HP0 mode = B-pump
**Diagram no. PH-07-15**

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

---

**HP0 mode = Z-pump**

- **Attention:** In some cases very low power consumption (<30%) such as at a very low energy or passive house, as well as over-dimensioning, we recommend you to install a buffer!

---

**GUNTAMATIC**

- Off 50 kW boiler output - High-/ lower temperature construction

---

**Diagram no. PH-07-15**

Electrical connections as per operating and installation instructions

1. Powerchip - as per price list
2. Flue draught regulator RE - as per price list
3. Outside temp. based controller set MKR - S30-031
4. DHW cylinder ECO - as per price list
5. Mixer valve positioner motor - S50-501
6. Room stat - as per price list
7. GSM module - S15-002
8. Branch control valve - plumber
9. Fault indicator lamp - plumber

Important: follow wiring diagram!
**Diagram no. PH-08-15**

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or heating circuit 0 can be room-temperature controlled using a room stat for a radiator heating system.

---

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. Thermal store PSF as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA100 A H39-023
9. Fault indicator lamp plumber
10. Option: flange and heat exchanger as per price list
11. 2 Thermal store sensor S70-003
12. Option: Secondary return unit 045-250

**Important: follow wiring diagram!**
off 50 kW boiler output
High-/lower temperature construction with backup memory PS

Diagram no. PH-09-15
Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA100 A H39-023
9. Fault indicator lamp plumber

Important: follow wiring diagram!
10. Thermal store PS as per price list
11. 2 Thermal store sensor S70-003

HP0 mode = B-pump
off 50 kW boiler output - High-/ lower temperature construction with trunk blink

Attention: In some cases very low power consumption (<30%) such as at a very low energy or passive house, as well as over-dimensioning, we recommend you to install a buffer!

Diagram no. PH-11-15

Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using a room stat for a radiator heating system.
from 50 kW
High-/ lower temperature construction with backup memory PS and trunk blink

Diagram no.  PH-12-15
Electrical connections as per operating and installation instructions

* Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or Heating circuit 0 can be room-temperature controlled using an room stat for a radiator heating system.

1. Powerchip as per price list
2. Flue draught regulator RE as per price list
3. Outside temp. based controller set MKR S30-031
4. DHW cylinder ECO as per price list
5. Mixer valve positioner motor S50-501
6. Room stat as per price list
7. GSM module S15-002
8. Return boost set RA100 A H39-023
9. Fault indicator lamp plumber
10. Thermal store PS as per price list
11. District heating pipe plumber
12. 2 Thermal store sensor S70-003

Important: follow wiring diagram!
Objekt supply for maximal 3 buildings
trunkblink functions ZUP, LAP oder PUP

Site 1 / Diagram no. PH-13-15

Electrical connections as per operating and installation instructions

- Line connector 400 VAC / 13 A;
- per System just one Sensor;
  (if possible on the boiler)
- per System 3 Wall mounted Set-MK261 possible;
- per System 3 digital Remotestationens possible;
- per Heatingcircle one analoge Remot unit possible.

Heatingrooms opportunities

<table>
<thead>
<tr>
<th>HP0 mode = B-pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZUP / LAP</td>
</tr>
<tr>
<td>ZUP / LAP</td>
</tr>
<tr>
<td>ZUP / LAP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HP0 mode = Z-pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZUP / PUP</td>
</tr>
<tr>
<td>ZUP / PUP</td>
</tr>
<tr>
<td>ZUP / PUP</td>
</tr>
</tbody>
</table>
**Diagram no. PH-14-15**

Electrical connections as per operating and installation instructions

- Line connector per construction 400 VAC / 13 A;
- connect the system linear with CAN BUS (lead the wiring without);
- per System 3 mounted system Set-MK261 possible;
- per System 3 digital mounted system possible;
- per Heatingcircle a analogue wall mounted unity possible; (Exceptions on 5 Feeler buffermanagement)
- at cascades <150 kW could 3" T-Pipes and the 3" Bufferconnection dispensed (2");

1. Firing Powerchip as Pricelist
2. Flue draught regulator RE with Ex-Clap as Pricelist
3. GSM-Modul S15-002
4. recirculationincreasinggroup as Pricelist
5. Buffermemory PS as Pricelist
6. Outdoorsensor S70-001 required on every System without atmospheric Conditions, with additional above the limit of TOFF Temperature;
7. Buffermemory sensorm S70-003
8. Alertlamp (circuit diagram beachten) by client
Cascad circuit for 4 Firing

Site 1 / Diagram no. PH-15-15

Electrical connections as per operating and installation instructions

- Line connector per construction 400 VAC / 13 A;
- per System 3 mounted system Set-MK261 possible;
- per System 3 digital mounted system possible;
- per Heatingcircle a analogues wall mounted unity possible; (Exceptions on 5 Feeler buffermanagement)
- the written dimensions for the backup memory, pipes on T pipes refers to a Cascade with 400 KW and in maximum 2 x 25 m pipe length for buffer forward motion.

1. Firing Powerchip look at Pricelist
2. Flue draught regulator RE with Ex-Clap S15-002
3. GSM-Modul
4. recirculationincreasinggroup look at Pricelist
5. Buffermemory PS look at Pricelist
6. Outdoorsensor S70-001
7. Backup memory sensor S70-003
   Advice: alertlamp 5 Sensors per System - minimum 2 per System required
8. alertlamp (important) by client

HP0 mode = B-pump
Electrical connections as per operating and installation instructions

- Order every backup memory with 2 pieces with 3 muffs.
- the written dimensions for the backup memory, pipes on T pipes refers to a Cascade
  with 400 KW and in maximum 2 x 25 m pipe length for buffer forward motion.
## 8 Technical data

### 8.1 POWERCHIP 20/30 and POWERCHIP 40/50

<table>
<thead>
<tr>
<th>Type</th>
<th>POWERCHIP 20/30</th>
<th>POWERCHIP 40/50</th>
<th>EN 14961-4</th>
<th>EN 14961-2</th>
<th>ÖNORM M7139</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>Woodchips P16B and P45A *</td>
<td>Woodchips P16B oder P45A *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pellets EN Plus A1 oder A2</td>
<td>Pellets EN Plus A1 oder A2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grain Fuel **</td>
<td>Grain Fuel **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miscanthus **</td>
<td>Miscanthus **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler output Woodchips</td>
<td>7 – 30</td>
<td>12 – 49</td>
<td>kW</td>
<td>kW</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Pellets</td>
<td>7 – 30</td>
<td>12 – 49</td>
<td>kW</td>
<td>kW</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Grain Fuel</td>
<td>maximum 25</td>
<td>maximum 25</td>
<td>kW</td>
<td>kW</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Miscanthus</td>
<td>maximum 25</td>
<td>maximum 25</td>
<td>kW</td>
<td>kW</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler temperature</td>
<td>60 – 80</td>
<td>60 – 80</td>
<td>°C</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Return temperature</td>
<td>&gt; 55</td>
<td>&gt; 55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required flue draught</td>
<td>2 - 15</td>
<td>2 - 15</td>
<td>Pascal</td>
<td>Pascal</td>
<td>Pascal</td>
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<tr>
<td>Water capacity</td>
<td>128</td>
<td>147</td>
<td>litres</td>
<td>litres</td>
<td></td>
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<td>Operating pressure</td>
<td>max. 3</td>
<td>max. 3</td>
<td>bar</td>
<td>bar</td>
<td></td>
</tr>
<tr>
<td>A - Flue connecting pipe dia</td>
<td>150</td>
<td>150</td>
<td>mm</td>
<td>inch</td>
<td>inch</td>
</tr>
<tr>
<td>B - Flow</td>
<td>5/4</td>
<td>5/4</td>
<td>inch</td>
<td>inch</td>
<td></td>
</tr>
<tr>
<td>C - Return</td>
<td>5/4</td>
<td>5/4</td>
<td>inch</td>
<td>inch</td>
<td></td>
</tr>
<tr>
<td>D - Temp.-relief heat exchanger</td>
<td>3/4</td>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E - Drain</td>
<td>1/2</td>
<td>1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water system resistance</td>
<td>2570</td>
<td>4257</td>
<td>kg/h</td>
<td>kg/h</td>
<td>mbar</td>
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<tr>
<td>Temperatur difference 10K</td>
<td>19,6</td>
<td>27,7</td>
<td>mbar</td>
<td>mbar</td>
<td></td>
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<tr>
<td>Water system resistance</td>
<td>1290</td>
<td>2128</td>
<td>kg/h</td>
<td>kg/h</td>
<td>mbar</td>
</tr>
<tr>
<td>Temperatur difference 20K</td>
<td>11,2</td>
<td>6,2</td>
<td>mbar</td>
<td>mbar</td>
<td></td>
</tr>
<tr>
<td>Ash pan, grate</td>
<td>60</td>
<td>60</td>
<td>litres</td>
<td>litres</td>
<td></td>
</tr>
<tr>
<td>Ash pan, “heat exchanger”</td>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall weight</td>
<td>550</td>
<td>585</td>
<td>kg</td>
<td>kg</td>
<td></td>
</tr>
<tr>
<td>Weight of bottom box</td>
<td>340</td>
<td>340</td>
<td>kg</td>
<td>kg</td>
<td></td>
</tr>
<tr>
<td>Weight of heat exchanger</td>
<td>180</td>
<td>215</td>
<td>kg</td>
<td>kg</td>
<td></td>
</tr>
<tr>
<td>Weight of stoker unit</td>
<td>75</td>
<td>75</td>
<td>kg</td>
<td>kg</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>400 VAC / 13A</td>
<td>400 VAC / 13A</td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

* burning from P45A (G50) hackchips just with excellent hackchips

** with additional equipment, not ideal for your type full — check opportunities with Country and emissionslaw;
8.2 POWERCHIP 75 and POWERCHIP 100

<table>
<thead>
<tr>
<th>Type</th>
<th>POWERCHIP 75</th>
<th>POWERCHIP 100</th>
<th>Emissionslaw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>Woodchips P16B and P45A * &lt;br&gt;Pellets EN Plus A1 oder A2 &lt;br&gt;Grain Fuel ** &lt;br&gt;Miscanthus **</td>
<td>Woodchips P16B oder P45A * &lt;br&gt;Pellets EN Plus A1 oder A2 &lt;br&gt;Grain Fuel ** &lt;br&gt;Miscanthus **</td>
<td>EN 14961-4 &lt;br&gt;EN 14961-2 &lt;br&gt;ÖNORM M7139</td>
</tr>
<tr>
<td>Boiler output Woodchips</td>
<td>22 – 75</td>
<td>22 – 99/101</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Pellets</td>
<td>22 – 75</td>
<td>22 – 99/101</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Grain Fuel</td>
<td>maximum 70 (mit Additiv)</td>
<td>maximum 70 (mit Additiv)</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler output Miscanthus</td>
<td>maximum 60</td>
<td>maximum 60</td>
<td>kW</td>
</tr>
<tr>
<td>Boiler temperature</td>
<td>60 – 80</td>
<td>60 – 80</td>
<td>°C</td>
</tr>
<tr>
<td>Return temperature</td>
<td>&gt; 55</td>
<td>&gt; 55</td>
<td>°C</td>
</tr>
<tr>
<td>Required flue draught</td>
<td>2 - 15</td>
<td>2 - 15</td>
<td>Pascal</td>
</tr>
<tr>
<td>Water capacity</td>
<td>256 max. 3</td>
<td>256 max. 3</td>
<td>litres</td>
</tr>
<tr>
<td>Operating pressure</td>
<td></td>
<td></td>
<td>bar</td>
</tr>
<tr>
<td>A - Flue connecting pipe dia</td>
<td>180</td>
<td>180</td>
<td>mm</td>
</tr>
<tr>
<td>B - Flow</td>
<td>2</td>
<td>2</td>
<td>inch</td>
</tr>
<tr>
<td>C - Return</td>
<td>2</td>
<td>2</td>
<td>inch</td>
</tr>
<tr>
<td>D - Temp.-relief heat exchanger</td>
<td>3/4</td>
<td>3/4</td>
<td>inch</td>
</tr>
<tr>
<td>E – Drain</td>
<td>1/2</td>
<td>1/2</td>
<td>inch</td>
</tr>
<tr>
<td>Water system resistance</td>
<td>6450 4,3</td>
<td>8490 6,2</td>
<td>kg/h</td>
</tr>
<tr>
<td>Temperatur difference 10K</td>
<td></td>
<td></td>
<td>mbar</td>
</tr>
<tr>
<td>Water system resistance</td>
<td>3250 1,8</td>
<td>4240 2,5</td>
<td>kg/h</td>
</tr>
<tr>
<td>Temperatur difference 20K</td>
<td></td>
<td></td>
<td>mbar</td>
</tr>
<tr>
<td>Ash pan, grate</td>
<td>80 12</td>
<td>80 12</td>
<td>litres</td>
</tr>
<tr>
<td>Ash pan, &quot;heat exchanger&quot;</td>
<td></td>
<td></td>
<td>litres</td>
</tr>
<tr>
<td>Overall weight</td>
<td>865 430 405 75</td>
<td>865 430 405 75</td>
<td>kg  kg  kg  kg</td>
</tr>
<tr>
<td>Weight of bottom box</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of heat exchanger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of stoker unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>400 VAC / 13A</td>
<td>400 VAC / 13A</td>
<td></td>
</tr>
</tbody>
</table>

* burning from P45A (G50) hackchips just with excellent hackchips
** with additional equipment, not ideal for your type full – check opportunities with Country and emissionslaw
## 8.3 POWERCORN 50 Special

<table>
<thead>
<tr>
<th>Type</th>
<th>POWERCORN 50 Special</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel</strong></td>
<td>Woodchips P16B and P45A * &lt;/br&gt; Pellets EN Plus A1 oder A2 &lt;/br&gt; Grain Fuel ** &lt;/br&gt; Miscanthus **</td>
</tr>
<tr>
<td>Boiler output Woodchips</td>
<td>12 – 49 kW</td>
</tr>
<tr>
<td>Boiler output Pellets</td>
<td>12 – 49 kW</td>
</tr>
<tr>
<td>Boiler output Grain Fuel</td>
<td>maximum 40 kW</td>
</tr>
<tr>
<td>Boiler output Miscanthus</td>
<td>maximum 40 kW</td>
</tr>
<tr>
<td>Boiler temperature</td>
<td>60 – 80 °C</td>
</tr>
<tr>
<td>Return temperature</td>
<td>&gt; 55 °C</td>
</tr>
<tr>
<td>Required flue draught</td>
<td>2 - 15 Pascal</td>
</tr>
<tr>
<td>Water capacity</td>
<td>147 litres</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>max. 3 bar</td>
</tr>
<tr>
<td>A - Flue connecting pipe dia</td>
<td>180 mm</td>
</tr>
<tr>
<td>B - Flow</td>
<td>5/4 inch</td>
</tr>
<tr>
<td>C - Return</td>
<td>5/4 inch</td>
</tr>
<tr>
<td>D - Temp.-relief heat exchanger</td>
<td>3/4&quot; inch</td>
</tr>
<tr>
<td>E - Drain</td>
<td>1/2&quot; inch</td>
</tr>
<tr>
<td>Water system resistance</td>
<td>4240 kg/h</td>
</tr>
<tr>
<td>Temperatur difference 10K</td>
<td>24,7 mbar</td>
</tr>
<tr>
<td>Water system resistance</td>
<td>2120 kg/h</td>
</tr>
<tr>
<td>Temperatur difference 20K</td>
<td>6,2 mbar</td>
</tr>
<tr>
<td>Ash pan, grate</td>
<td>80 litres</td>
</tr>
<tr>
<td>Ash pan, &quot;heat exchanger&quot;</td>
<td>12 litres</td>
</tr>
<tr>
<td>Overall weight</td>
<td>667 kg</td>
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<tr>
<td>Weight of bottom box</td>
<td>410 kg</td>
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<tr>
<td>Weight of heat exchanger</td>
<td>227 kg</td>
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<tr>
<td>Weight of stoker unit</td>
<td>75 kg</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 VAC / 13A</td>
</tr>
</tbody>
</table>

* burning from P45A (G50) hackchips just with excellent hackchips
** with additional equipment, not ideal for your type full — check opportunity with Country and emissions law;
8.4 FEED

VIEW FROM ABOVE

DELIVERY STATUS
- bestehend aus Feed unit (AE), Wallpiece (WS) und Agitator (RW);
- maximum length (GL) of feedspiral = 7 m;

Dumping height:
- Hackchips max. 5,0 m
- Pellets max. 2,5 m
- Energycorn max. 2,5 m
- Miscanthus max. 5,0 m

<table>
<thead>
<tr>
<th>Ø agitator</th>
<th>Unit of holding (AE)</th>
<th>Cellar piece (WS)</th>
<th>Rührwerk (RW)</th>
<th>total length (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,5 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>75 cm</td>
<td>203 cm</td>
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<tr>
<td>2,0 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>100 cm</td>
<td>228 cm</td>
</tr>
<tr>
<td>2,5 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>125 cm</td>
<td>253 cm</td>
</tr>
<tr>
<td>3,0 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>150 cm</td>
<td>278 cm</td>
</tr>
<tr>
<td>3,5 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>175 cm</td>
<td>303 cm</td>
</tr>
<tr>
<td>4,0 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>200 cm</td>
<td>328 cm</td>
</tr>
<tr>
<td>4,5 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>225 cm</td>
<td>353 cm</td>
</tr>
<tr>
<td>5,0 m</td>
<td>73 cm</td>
<td>55 cm</td>
<td>250 cm</td>
<td>378 cm</td>
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</table>

Spiral’s extension

<table>
<thead>
<tr>
<th>Trogspiral</th>
<th>Length</th>
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<tr>
<td>TS 1</td>
<td>22 cm</td>
</tr>
<tr>
<td>TS 2</td>
<td>55 cm</td>
</tr>
<tr>
<td>TS 3</td>
<td>110 cm</td>
</tr>
<tr>
<td>TS 4</td>
<td>220 cm</td>
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<tr>
<td>TS 5</td>
<td>297 cm</td>
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</table>
DUMPIRON:

<table>
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<tr>
<th>Ø Agitator</th>
<th>64 cm</th>
<th>92 cm</th>
<th>120 cm</th>
<th>147 cm</th>
<th>172 cm</th>
<th>197 cm</th>
<th>225 cm</th>
<th>250 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,5 m</td>
<td>4 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,0 m</td>
<td>2 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,5 m</td>
<td>2 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,0 m</td>
<td>2 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,5 m</td>
<td>1 off</td>
<td>1 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,0 m</td>
<td>1 off</td>
<td>1 off</td>
<td>2 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,5 m</td>
<td>1 off</td>
<td>1 off</td>
<td>2 off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,0 m</td>
<td>1 off</td>
<td>1 off</td>
<td>1 off</td>
<td>1 off</td>
<td>1 off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HANDOVERSET FOR FEED SPIRAL:

- existing a Connecting plug (AE) and hardcoverstation (ÜB);
- Trogsprints (TS1-5) in Table Spirals extensions;
- maximum total length (GL) = 7 m;

DROP SHAFT EXTENSION:

- necessary with Agitator construction in the storeroom;
- deeper storeroom → spiral’s angel possible till 18°;
**DOWNPIPE up 3 m height:**

- presented over downpipe (OF), below downpipe (UF) and Bride to screw

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**8.5 Ceiling filling spiral**

- bestehend aus drive motor, Befüllschnecke(n), Lagerplatte und Halterung(en);
- just for construction for store room’s cellar;
- der Antriebsmotor muss außerhalb des Lagers montiert werden;