Woodchip boiler

PRO

Planning and Installation

PRO-A-00-00-00-01-IADE

DE-B31-012-V03-1013

GUNTAMATIC

Information on this documentation

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.

GUNTAMATIC Heiztechnik GmbH

Bruck 7

A-4722 PEUERBACH

Tel: 0043 (0) 7276 / 2441-0

Fax: 0043 (0) 7276 / 3031

E-mail: office@guntamatic.com

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

Subject to printing errors and technical amendments.

Contents

1 Introduction

PRO-01-00-00-00-01-IADE

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

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:

1.5 Quality management

QM for wood-fired heating systems

Experts from Switzerland, Germany and Austria have drawn up a joint set of quality standards for wood-fired heating systems. The aim is to ensure that the required quality standards are specified and tested in projects involving several different companies.

Information:	**Austria**:	www.qmholzheizwerke.at www.qm-heizwerke.at www.umweltfoerderung.at
	Germany:	www.qmholzheizwerke.de
	Switzerland:	www.qmholzheizwerke.ch www.holzenergie.ch

2 Planning and installation

PRO-02-00-00-00-01-IADE

2.1 Fire safety

Important

The fire safety requirements applicable at the installation site of the heating system must be observed.

Compliance with those requirements is subject only to verification by the operator. Verification during commissioning is not provided for.

National regulations

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)

Other export countries:
Relevant fire safety authority

Recommendation

Compliance with the applicable local fire safety regulations is compulsory and takes precedence over the GUNTAMATIC minimum fire safety requirements. Where there are no specific local fire safety requirements in force, the GUNTAMATIC minimum fire safety requirements should be precisely followed.

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 rating.

Boiler room door: boiler rooms should not be generally accessible. At the entrance to a boiler room there should be clearly visible signs indicating the purpose of the room, that access is prohibited for unauthorised persons, that no smoking is allowed and naked flames are forbidden. The boiler room door must be a Class T30 fire door which opens in the direction of escape, is self-closing and lockable. Connecting doors to the fuel storeroom must also be Class T30 fire doors, self-closing and lockable. There must be no direct connection to rooms in which highly flammable or easily combustible materials are stored (e.g. garage).

Boiler room windows: windows which constitute a risk of fire cross-over must be fire-inhibiting.

Combustion air supply: an adequate supply of combustion air to the boiler from outside must be provided.

Sprinklers: connected to the outfeed unit there must be a sprinkler device set to trip at 55°C. When the sprinkler is triggered, the outfeed auger enclosure is completely flooded. The quantity of water required to do so is at least 20 litres.

Note

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, 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.

Inspection covers: there must be a lockable F90-class inspection hatch above the fuel outfeed channel.

Filler pipes: filler pipes through rooms where there is a fire risk must be provided with Class F90 cladding.

Safety systems

In Austria various safety systems are required according to prTRVB H118 (Technical Directive on Preventative Fire Safety) depending on the system design, heat output, fuel type and fuel store size.

Woodchip

Burn-back prevention device (fire safety flap)
Back-ignition prevention device (fire safety flap)
Automatic fire extinguishing facility sprinkler
Burn-back inhibiting facility (sloping fuel auger)
Flame monitor in boiler room (photo sensor)
Temperature monitor in the fuel storeroom/bunker

A temperature monitor connected to a visual and audible warning device must be installed at the point where the fuel auger exits the fuel store and enters the boiler room. The warning device must be triggered when the temperature exceeds 70°C.

Safety equipment to be provided on site:

Manually operated fire extinguishing facility

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 auger exits the storeroom. The fire extinguishing facility must be identified by a sign carrying the inscription "**Fuel storeroom fire extinguisher**".

Pellets

Burn-back prevention device (fire safety flap)
Burn-back inhibiting facility (sloping fuel auger)

For heating systems with a heat output > 150kW or fuel storerooms > 50m³, differences from this directive in the form of special designs are permissible if they provide at least the same degree of fire safety as required by this directive (prTRVB h118).

Any differences are to be examined by a testing agency and documented in an inspection report.

2.2 Boiler room requirements

Combustion air supply

The pressure in the boiler room must not be less than 3 Pa (0.3 mm H_2O). The air vents for boiler rooms where the fuel heat output is 50 kW or more must have a clear, net cross-sectional area of at least 5 cm² per kW of rated output. 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. 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. For every heating system there must be a clearly marked lockable heating master switch and an emergency off switch in an easily accessible position outside the boiler room, close to the boiler-room door.

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.

Minimum room size

1 module	min. L*	270 x W* 330 cm	(accessible on left-hand side)
	min. L*	270 x W* 430 cm	(accessible on one side and at rear)
2 modules	min. L*	540 x W* 330 cm	(each module accessible on left-hand side)
	min. L*	440 x W* 430 cm	(modules accessible on one side and from rear)

L * = Boiler room length from left to right – boiler(s) viewed from the front
W * = Boiler room width from front to back – boiler(s) viewed from the side

Minimum room height

H 250 cm (ideally 280cm)

Clear access opening

W 150 cm x H 230 cm (boiler delivered pre-assembled on pallet)
W 125 cm x H 200 cm (boiler delivered in multiple sections)
W 90 cm x H 200 cm (all attached components must be removed)

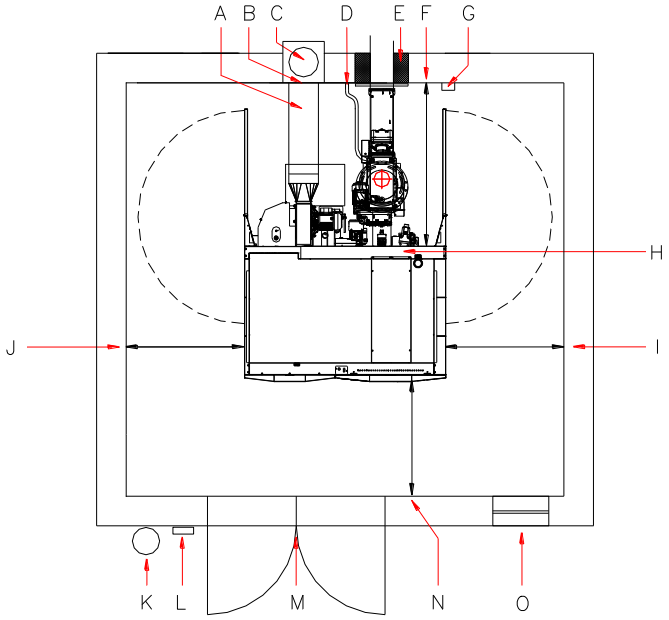
Dimensions w/o packing

Heat exchanger	L 160 x W 90 x H 200 cm
Base box	L 160 x W 90 x H 70 cm

(all attached components must be removed)

Installation site

Plan for positioning the module(s) as close as possible to the flue to avoid having a long flue connecting pipe. For servicing purposes and for emptying the ash box, the module should ideally be accessible from the left or from the rear left. Should it be necessary due to the circumstances of the site to position the module with its left side against the wall, it is not possible to empty the ash box. With this configuration, the automatic ash extraction system has to be installed. In the case of cascade systems with multiple modules, the use of an automatic ash extraction system is generally advisable.



A → Installation option with draught regulator/pressure-surge compensator in flue connecting pipe
(As close as possible to junction with flue – observe local regulations – possibility of dust generation)

B → Installation option with flue draught regulator/pressure-surge compensator in flue
(Approx. 50cm below junction with flue – observe local regulations)

C → Flue (fireclay flue that is insusceptible to damp recommended)

D → Water connection for sprinkler device set to trip at 55°C (must be connected)

E → Wall aperture (height 70 mm, width 45 mm)

F → Clearance at rear 1.3m possible (if clearance at left is at least 1m)
→ 2.3m if clearance at left is less than 1m or if several modules are placed adjacent to one another

G → Drain for safety valves and temperature relief valve

H → Mains power connection

I → Clearance at right 0cm possible (if clearance at left and at rear is at least 1m)
→ 1m if clearance at left is less than 1m

J → Clearance at left 0cm possible (if clearance at right and at rear is at least 1m)
→ 1m if clearance at right is less than 1m

K → Fire extinguisher (6 kg gross weight to EN3)

L Emergency off switch

M → Fire door (Class T30 lockable and self-closing)

N Wall clearance at front at least 1 m

O → Combustion air inlet (5 cm² per kW output)

2.3 Flue requirements

The flue must be matched to the system in order to ensure economical and trouble-free operation.

Important

Use only heat-insulated fireclay flues that are insensitive to damp.

The flue gas temperature may be less than 100°C when the boiler is operating at less than max. output.

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) or suitable **fireclay flues** that are insusceptible to damp and have general building regulation approval should be used.

If two or more heating modules are to be connected to a flue, the flue inspector concerned should always be consulted beforehand. If the flue inspector has no concerns, the flue must be dimensioned and executed according to the legal requirements and the technical specifications based on a calculation by the flue manufacturer.

Note It is always 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 1.5 m above the surface of the roof.

Flue diameter

The flue must be matched to the boiler output. The following details are guide figures and can be used for planning purposes. However, we recommend that the flue dimensions are calculated precisely by an expert.

PRO 175/250	eff. height over	6 m	**D=250 mm**
	eff. height under	6 m	**D=300 mm**

Flue dimensioning data

Dimension the flue for rated output.
(Averaged figures with used heat exchanger)

Rated output

Type	Flue gas temp.	CO_2	Mass flow rate	Required draught
PRO 175	150°C	12.0%	0.144 kg/s	10 pascals
PRO 250	180°C	12.0%	0.194 kg/s	10 pascals

Sub-maximum output

Type	Flue gas temp.	CO_2	Mass flow rate	Required draught
PRO 175	110°C	10.0%	0.051 kg/s	2 pascals
PRO 250	130°C	10.0%	0.051 kg/s	2 pascals

2.4 Fuel store requirements

Estimating annual requirement

Calculation is based on the following annual fuel requirements per kilowatt of building heat demand:

→ Approx. 2.00 m³	Hardwood woodchips	(m³ per kW/year)
→ Approx. 2.50 m³	Softwood woodchips	(m³ per kW/year)
→ Approx. 0.65 m³	Pellets	(m³ per kW/year)

Storeroom configuration

The storeroom should ideally be square in order to achieve the best possible utilisation by the agitator.

Storeroom ventilation

Storerooms and bunkers/hoppers must be ventilated to prevent the build-up of potentially fatal concentrations of CO. The air vents must connect to the outside and ensure that there is circulation of air between the storeroom and the outside. If the natural convection is insufficient, adequate technical means must be provided.

If the filler pipes do not open to the outside, ventilation via a separate air vent must be provided. Measures must be taken to ensure that rainwater cannot enter the storeroom through the air vents.

Rooms containing fuel storage hoppers made of air-permeable fabric must have an air vent opening to the outside.

An air vent cross-sectional area of 200 cm² is sufficient.

For storerooms up to 30 t capacity, the requirements are satisfied if:

- the filler pipes open to the outside; ventilation can be by means of vented filler caps;
- the diameter of the vent pipes is at least 90 mm;
- the net clear cross-sectional area of the air vents in the case of filler/vent pipes up to 2m in length is at least 40 cm² and for pipes over 2m long at least 60 cm²; 2x filler cap = 60 cm²;

For storerooms over 30 t capacity, the requirements are satisfied if:

- either a combination of natural and mechanically assisted ventilation based on CO sensing is used or a state-of-the-art forced ventilation system for elimination of the CO hazard is installed.

Storeroom filling

Woodchips are usually delivered by a tipper lorry. A surfaced access to the storeroom is required. Ideally, the storeroom should be located on the outside wall and filled through a door. To prevent damage to the agitator when the woodchips are being shovelled into the storeroom by a front loader, the bottom edge of the filler door should be at least 30 - 40 cm above the lowest point of the agitator arms. If the fuel storeroom is filled by a tanker truck using a compressed-air delivery system, the filler pipes must be earthed. With this method of filling, make sure the storeroom is dust-sealed.

Access doors/boarding

Above-ground fuel stores must be provided with a lockable door or hatch (outward-opening) with an opening area of at least 1.80 m². 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). Due 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. Attached to the access door there must be a warning sign indicating the dangers of entering the storeroom and offering safety guidance.

Electrical installations

Agitator

Electrical equipment is prohibited in the fuel storeroom.

Overhead filler auger

The drive motor and the necessary electrics must be installed outside the storeroom.

Filler set

The filler pipes must be earthed.

At least 2 filler pipes must be installed. Minimum separation 0.5m – maximum separation 1.5m

Structural requirements

The enclosing walls must be capable of withstanding the possible static loads created by the stored 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.

Floor boarding

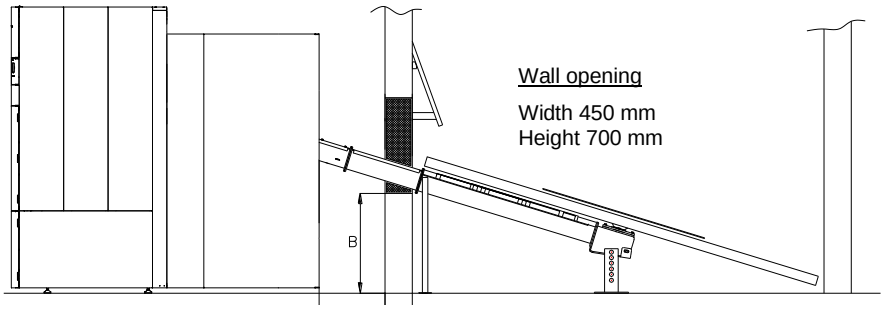
If fuelling the system with pellets, a boarded or concrete floor is absolutely essential. If the system is to be fuelled exclusively with woodchips, the floor can be covered with dry logs instead of boards.

Filler auger

The drive motor and the necessary electrics must be installed outside the storeroom. A lockable emergency off switch with motor cut-out function must be installed in the immediate vicinity of the filler shaft. Storeroom doors must be provided with a door switch which cuts off the power supply to the filler auger when the door is opened. The filler shaft must be covered by a grate.

Wall opening

The tables of dimensions below detail the measurements for positioning the wall opening according to the length of the auger.



Note

All agitator fuel outfeed systems are supplied with a fuel outfeed unit, an auger trough and the relevant agitator.

Standard outfeed system:

Agitator	Dimension A	Dimension B
3.0 m	Approx. 49 cm	Approx. 73 cm
3.5 m	Approx. 49 cm	Approx. 76 cm
4.0 m	Approx. 49 cm	Approx. 79 cm
4.5 m	Approx. 49 cm	Approx. 82 cm
5.0 m	Approx. 49 cm	Approx. 85 cm

Standard outfeed system + additional 55cm auger trough:

Agitator	Dimension A	Dimension B
3.0 m	Approx. 102 cm	Approx. 62 cm
3.5 m	Approx. 102 cm	Approx. 65 cm
4.0 m	Approx. 102 cm	Approx. 68 cm
4.5 m	Approx. 102 cm	Approx. 71 cm
5.0 m	Approx. 102 cm	Approx. 74 cm

Standard outfeed system + additional 110cm auger trough:

Agitator	Dimension A	Dimension B
3.0 m	Approx. 156 cm	Approx. 53 cm
3.5 m	Approx. 156 cm	Approx. 56 cm
4.0 m	Approx. 156 cm	Approx. 59 cm
4.5 m	Approx. 156 cm	Approx. 62 cm
5.0 m	Approx. 156 cm	Approx. 65 cm

Standard outfeed system + additional 220cm auger trough:

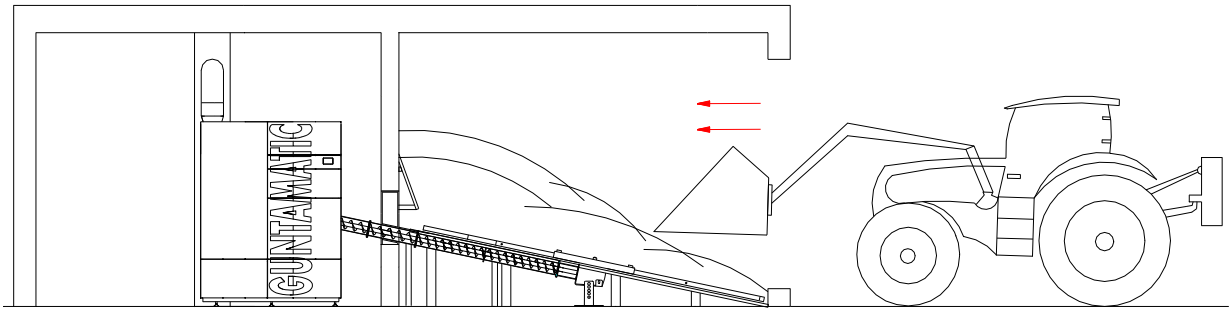
Agitator	Dimension A	Dimension B
3.0 m	Approx. 265 cm	Approx. 42 cm
3.5 m	Approx. 265 cm	Approx. 45 cm
4.0 m	Approx. 265 cm	Approx. 48 cm
4.5 m	Approx. 265 cm	Approx. 51 cm
5.0 m	Approx. 265 cm	Approx. 54 cm

2.5 Planning examples for the fuel store

Important → For systems fuelled by pellets, filler connections must also be provided.

Planning example 1

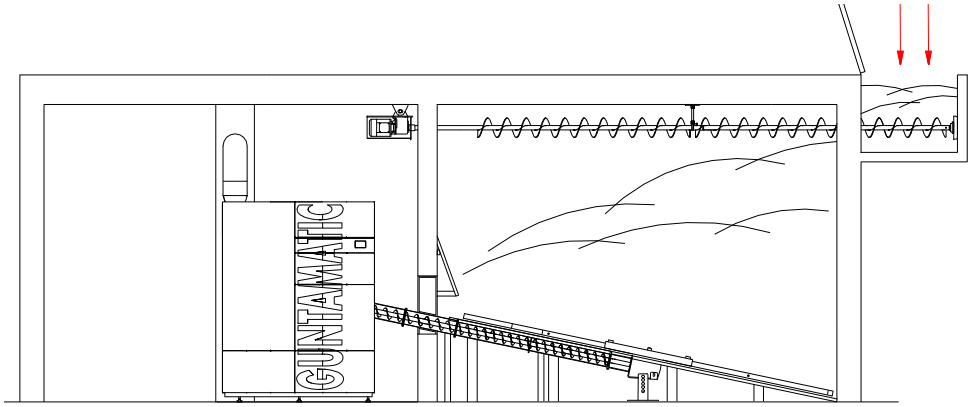
The storeroom is alongside or behind the boiler room and can be filled through a door by a front loader. The maximum length of the outfeed system including agitator is 7 m.



Planning example 2

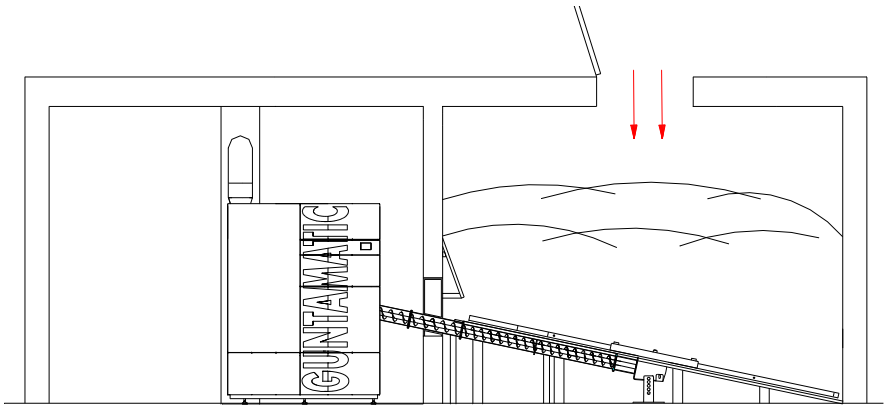
The storeroom is alongside or behind the boiler room and is filled by an overhead filler auger from a filler shaft. Available filler auger lengths: 3 m, 4 m, 5 m, 6 m or 7 m

(non extendable).



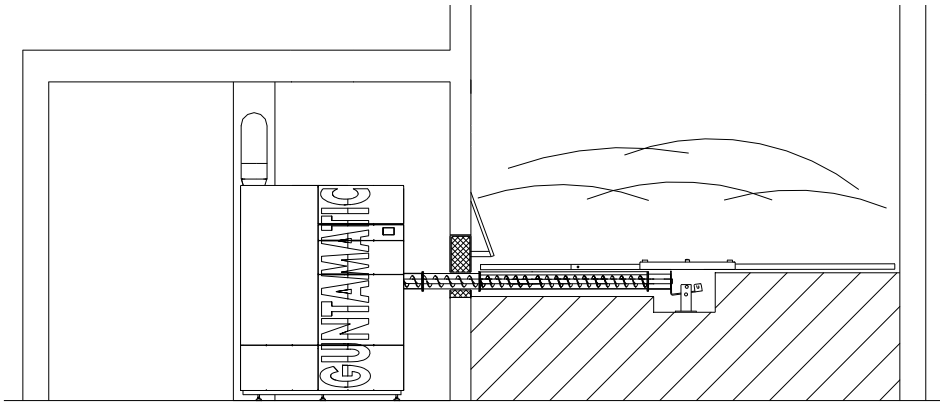
Planning example 3

The storeroom is alongside or behind the boiler room and the fuel is brought in via a shaft in the storeroom ceiling. The maximum length of the outfeed system is 7 m.



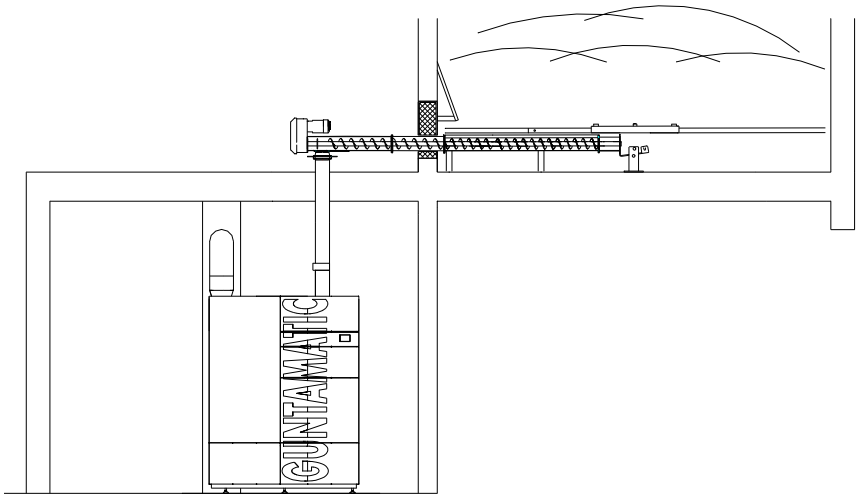
Planning example 4

The storeroom is alongside or behind the boiler room. The fuel outfeed from the storeroom is via a horizontally mounted agitator.



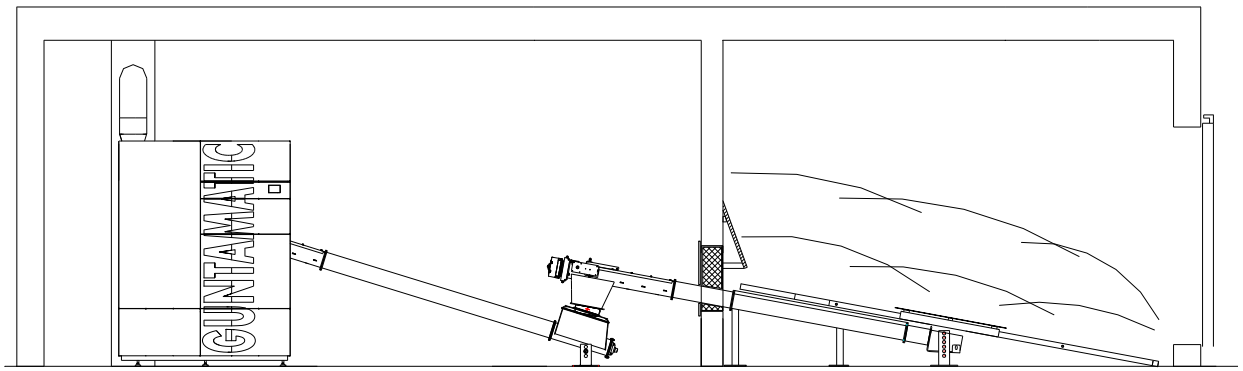
Planning example 5

The storeroom is above the boiler room. The fuel is carried via a downpipe through the ceiling to the boiler.



Planning example 6

Outfeed system with transfer unit and feeder auger. The maximum length of the feeder auger is 7 m.



2.6 Delivery

The boiler system is delivered packed in multiple sections 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.

2.7 Carrying to installation site

The individual system components are delivered on wooden pallets and can be lifted and carried to the installation site using a pallet truck.

2.8 Positioning and aligning the boiler

Keep to the minimum wall clearances specified by the system planner and manufacturer. If important details are missing, please 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 left
→ 0cm possible if clearance at right and at rear is at least 1m
→ 1m if clearance at right is less than 1m

Clearance at right
→ 0cm possible if clearance at left and at rear is at least 1m
→ 1m if clearance at left is less than 1m

Clearance at front
→ at least 1 m

Clearance at rear
→ 0cm possible if clearance at left is at least 1m
→ 1m if clearance at left is less than 1m or if several modules are placed adjacent to one another

Floor clearance Set the clearance between the boiler base and the floor to the required minimum of 35 mm by unscrewing the adjustable feet on the boiler base.

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.

2.9 Plumbing connections

A → Temperature-relief heat exchanger, ¾"

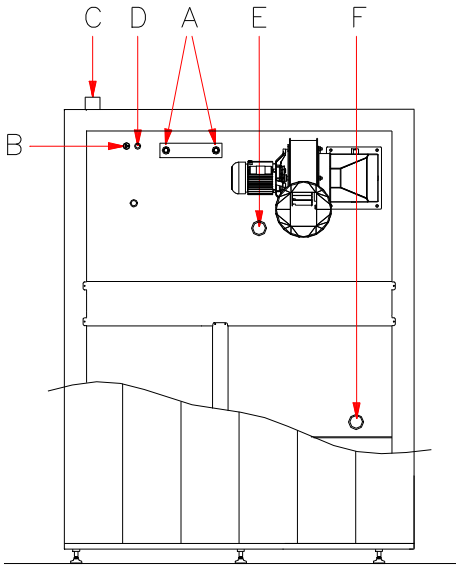
B → Boiler sensor, STL

C → Heating flow, 2"

D → Sensor for temp. relief valve, ½"

E → Heating return, 2" (run pipe upwards)

F → Drain, 2"



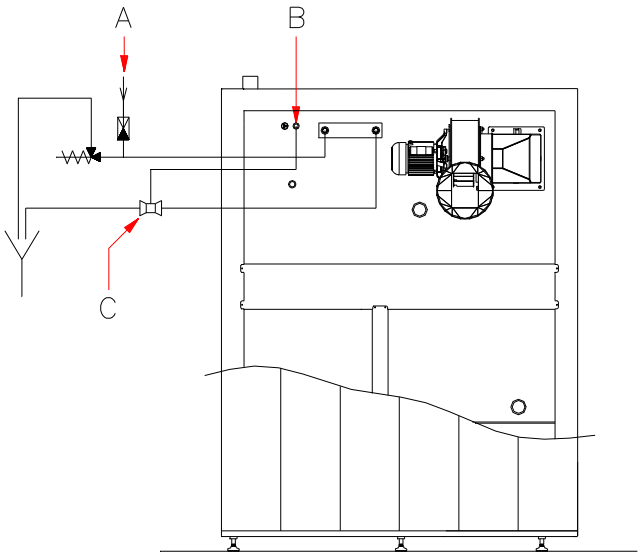
Temperature-relief heat exchanger

The maximum permissible boiler operating temperature 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.

A → Cold water supply for Temperature-relief heat exchanger

B → Sensor for temp. relief valve, ½"

C → Temp. relief valve, 95°C



Thermal store

Installing a thermal store is absolutely imperative as it helps to balance the load within the system so that the boiler can be operated with a substantial degree of modulation. In larger systems with multiple modules, a sufficiently large thermal store must be used in order to balance out heating load spikes and to assist sequential boiler control. The minimum thermal store size is stated on the plumbing diagram in each case.

Note

If 5-sensor thermal store management is activated, it is imperative that a return mixer valve controlled by the boiler controller is used.

Important Compliance with Stage 2 BIMSCHV (Germany) requires a thermal store capacity of at least 20 litres/kW.

Return boost

The boiler return temperature must be at least 55°C and must be guaranteed by a return boost set as per the system 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.

Important

The dimensioning of the return boost set is designed for the configurations 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 25 m, re-dimensioning of the boiler charging pump (HP0) may be necessary.

Important Use the 2" piping shown in the plumbing diagrams as a minimum or large-sized components with the lowest possible flow resistances.

Expansion vessel

The boiler operates in a sealed heating system and must be provided with an automatic pressure maintenance system or 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 is calculated as follows:

System volume x Expansion factor x Additional allowance factor

- Expansion factor for wood-fired boilers = 0.03
- Additional allowance factor = 1.5 for systems over 150 kW

Example calculation: 10,000 litres x 0.03 x 1.5 = 450 litres

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.

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.

2.10 Filling and bleeding the system

The system is filled with water from the domestic supply. Please note the guidelines on "Corrosion and boiler protection in heating and domestic water systems".

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: with circulating flow heaters, 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.

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.

Only systems that have been properly bled guarantee effective conveyance of heat.

2.11 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 (insulation thickness 50 mm).

Flue connecting pipe

The following diameters should be used:

- PRO 175/250 dia. = 250 mm

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

- PRO 175/250 dia. = 300 mm

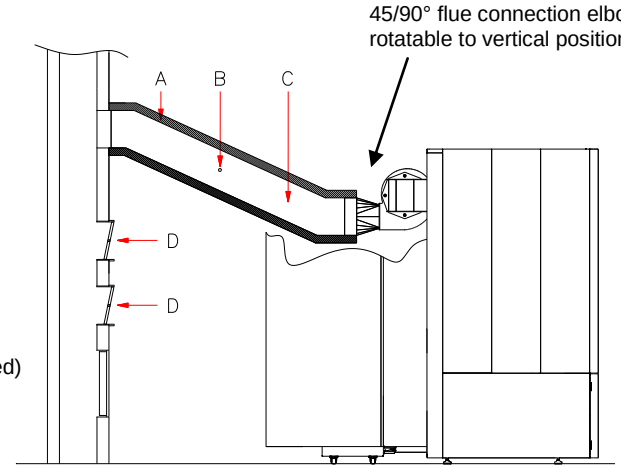
The hole in the wall for connecting the flue pipe must be lined with a built-in double-skinned lining tube or fireproof material. The flue connecting pipe must rise upwards from the boiler to the flue at an angle of at least 6° and be connected with gas-tight joints. An inspection cover must be provided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

A → Insulation (at least 50 mm thick)

B → Testing point for flue draught
(Distance from boiler = at least 3 x dia. of flue connecting pipe)

C → Flue connecting pipe (min. gradient 6°)

D → Flue draught regulator in flue (install 2 if required)
(Preferred fitting arrangement)



Note

- The flue connecting pipe must be gas-tight
- A flue draught regulator with pressure-surge compensator 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

2.12 Energy-saving flue draught regulator/pressure-surge compensator

Fitting an energy-saving flue draught regulator/pressure-surge compensator is absolutely imperative.

Fit 2 if necessary!

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).

Flue draught

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 draught regulator installed.

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.

2.13 Automatic ash extraction system

The information below is provided primarily for system planning purposes. Full details of installing the automatic ash extraction system are provided in the separate installation and operating instructions supplied with the system.

An optional automatic ash extraction system is available. The extraction system is built into the boiler and conveys the accumulated ash via flexible metal vacuum pipes (maximum length of 20 m vacuum pipe and 20 m air return pipe) to a large-capacity wheeled ash bin. Ash removal is fully automatic.

Retrofitting

The automatic ash extraction system can also be retrofitted at a later date.

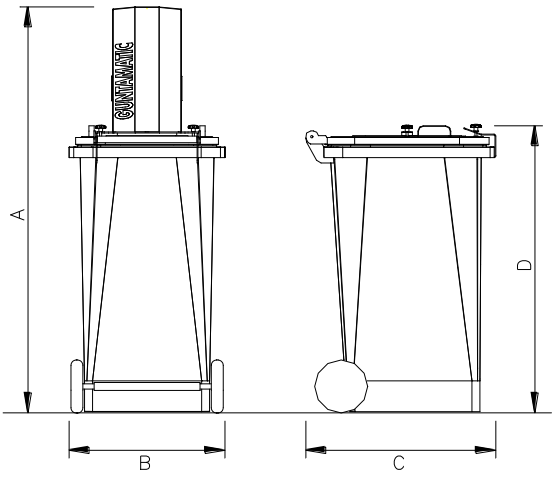
Ash bin dimensions

A → 1530 mm

B → 590 mm

C → 720 mm

D → 1070 mm



Siting the ash bin

If possible, plan for placing the ash bin at ground level in the boiler room near the boiler. A fundamental requirement for the siting of the ash bin is good ventilation of the room in which it is placed. The ash bin must be sited permanently with a minimum clearance of 25 cm from combustible materials and on a non-combustible base that extends at least 5 cm beyond the bin on all sides.

Locations where the ash bin must not be installed

→ Garages

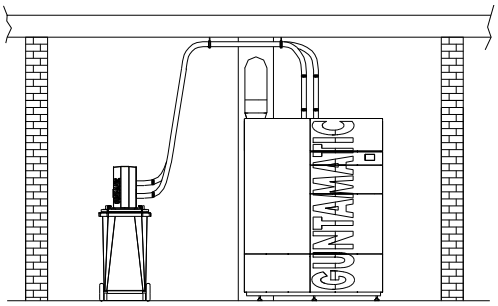
→ Outdoors (unless protected from frost and ventilated)

→ Rooms used for living purposes

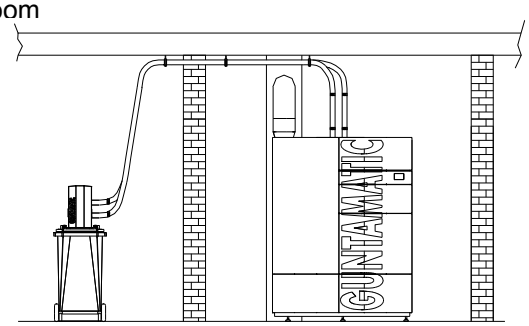
→ Storerooms for flammable liquids and gases

Locations where the ash bin may be installed

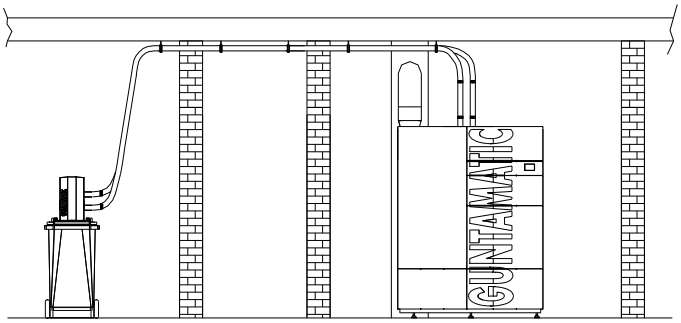
→ In the boiler room



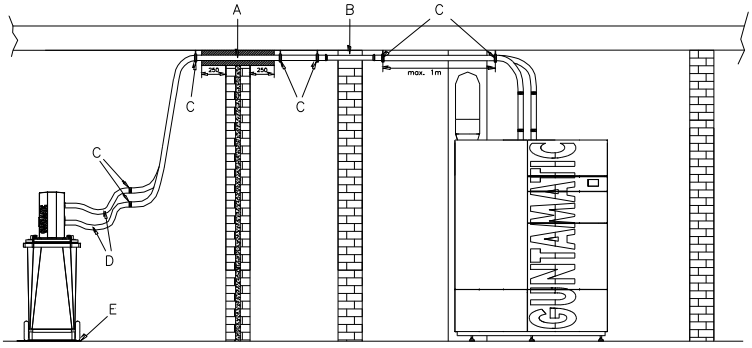
→ In an adjoining room



→ In a room separated by an adjoining room



Vacuum pipe routing through fire containment zones



A → Passage through wall using mineral wool sleeves

B → Passage through wall using steel tube built into wall

C → Fireproof pipe bracket 54-60 ZUS (maximum spacing 1 m)

D → Metal vacuum hoses (spacing at least 10 cm)

E → Non-combustible base

2.14 Fuel outfeed installation

2.14.1 AGITATOR system

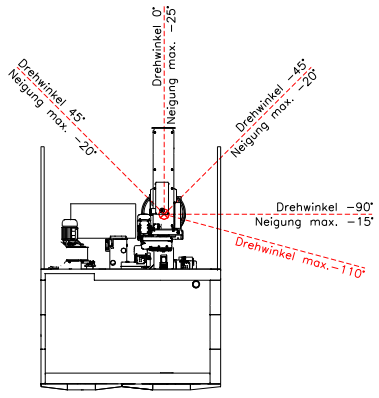


Fig. 1

1.) Erect the boiler in the boiler room with the required minimum wall clearances, setting the adjustable feet so that the boiler is slightly higher at the rear so that the air inside the boiler can escape when the system is filled.

2.) When setting up the boiler, be aware that the fuel auger is mounted on the right-hand side of the boiler (viewed from above) and the auger can only be set at an angle of approx. 0° to 45° or 0 to -90° (max. 110°) (see Fig. 1).

3.) The storeroom should not be significantly lower down than the boiler room (no more than 20 - 30 cm). The maximum possible inclination angles for the outfeed auger are shown in Fig. 1. If the fuel auger slopes steeply downwards, the storeroom should be adapted to the slope of the agitator.

4.) With the stoker unit removed, insert the inlet seal (A, Fig. 4) between the stoker unit and boiler flange and secure with 6 M08x25 hexagon-head bolts, flat washers, spring washers and nuts. Unscrew the foot (B, Fig. 4) on the stoker unit to take the weight of the stoker unit. Connect the electrical leads for the ignition fan, fire safety flap motor, stoker sensor, fill-level sensor, drive motor G1 and drive motor A1.

5.) Place the drive unit (C, Fig. 4) on the stoker unit and turn it towards the storeroom. The drive unit ball should form an airtight seal with the rubber seal (D, Fig. 4) of the stoker unit.

6.) Pre-assemble the required conveyor trough sections (0.22 m, 0.55 m, 1.10 m, 2.20 m or 2.97 m) on the floor. Always fit the 0.55 m trough section supplied as standard (E, Fig. 4) in the area where the auger passes through the wall. Screw the individual trough sections firmly together using M08x30 hexagon-head bolts, washers and nuts (joins should be flush on the inside). Join the individual auger sections together so that the auger slope is even and continuous (F, Fig. 4). Then connect the pre-assembled outfeed auger to the drive unit (C, Fig. 4).

7.) Connect the agitator (G, Fig. 4) to the outfeed auger, making sure that the auger slope is even and continuous (F, Fig. 4). Then screw the auger trough sections firmly together.

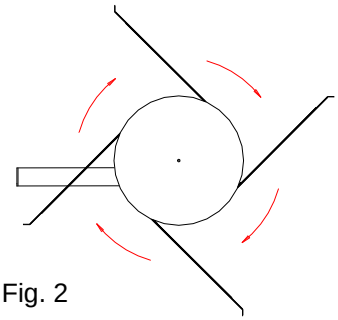


Fig. 2

8.) Fit the spring arms to the agitator. The agitator rotates clockwise (Fig. 2). Fit the longest arms opposite one another. The spring arms (I, Fig. 4) must be 15-20 mm above the outfeed auger at the point where they pass over it. Do not tighten the bolts (H, Fig. 4) on the spring arms. The agitator feet (J, Fig. 4) must be adjusted so that the longest arm is 3-4 cm clear of the floor at its lowest point (K, Fig. 4).

9.) Screw the drive unit to the stoker unit using the fixing screws (L, Fig. 4) (M10x100 and M10x140mm mm) making sure it forms an airtight seal.

10.) Place the agitator centrally in the storeroom so that the spring arms clear the storeroom walls by a few centimetres. Firmly secure the agitator to the storeroom floor using masonry screws and wall plugs.

11.) Using the legs supplied (V), support the outfeed auger in the storeroom at the mid-point of the auger and where it exits the storeroom (Fig. 6)

(Legs should not be more than 120 cm apart).

Position the feet so that they cannot move lengthways. The legs should rest against the flanges/support brackets of the auger. Place sound insulating material underneath to prevent noise transmission. Adjust the legs vertically so that the auger is resting firmly on them. Firmly secure the legs to the storeroom floor using masonry screws and wall plugs.

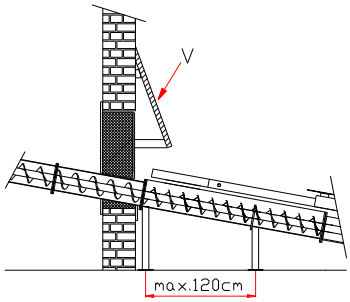


Fig. 3

12.) Seal the hole in the wall (M, Fig. 4, dimensions H 700 x W 450 mm) around the outfeed auger with mineral wool and cover the gap on both sides of the wall with the cover plates supplied. If necessary, break out the perforations in the cover plates.

14.) If the boiler is to be run on woodchips, a sloping storeroom floor is not absolutely imperative. If it is to run on pellets, a sloping storeroom floor must be constructed.

- Use planed timber boards (larch) or blockboard panels 3 cm thick
- Rest the boards/panels on the lip of the outfeed auger. A supporting substructure as shown in Fig. 6 should be constructed at the rear of the agitator.

15.) The boarding (V, Fig. 3) over the inspection hatch must be provided on site and prevents uncontrolled spillage of the fuel into the boiler room. A sloping board 3 cm thick and 80 cm wide must be fitted at an angle of approx. 20°, 40 cm above the outfeed auger and 40 cm from the storeroom wall. The structure must be adequately fixed and adequately supported underneath.

Important → The auger drive unit must form a 100% airtight seal with the fuel chute. The rubber seal must completely seal the ball joint. Fix the drive unit securely with the screws supplied.

16.) Connected to the outfeed unit there must be a sprinkler device set to trip at 55°C. When the sprinkler is triggered, the outfeed auger enclosure is completely flooded. The quantity of water required to do so is at least 20 litres. A temperature monitor connected to a visual and audible warning device must be installed in the area where the fuel auger passes through the wall. If 50 m³ of fuel or more can be stored, a manually operated fire extinguishing facility (HLE) 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 duct exits the storeroom. The fire extinguishing facility must be identified by a sign carrying the inscription "Fuel storeroom fire extinguisher".

Fig. 4 **Installation of boiler, fuel auger and agitator**

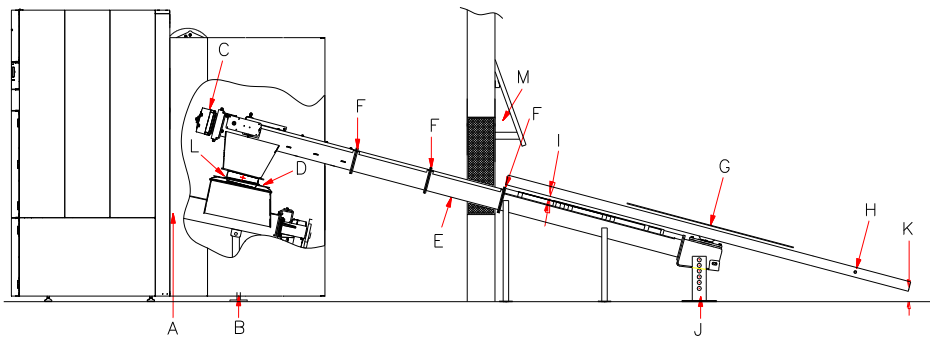


Fig. 5 **Installation of safety systems**

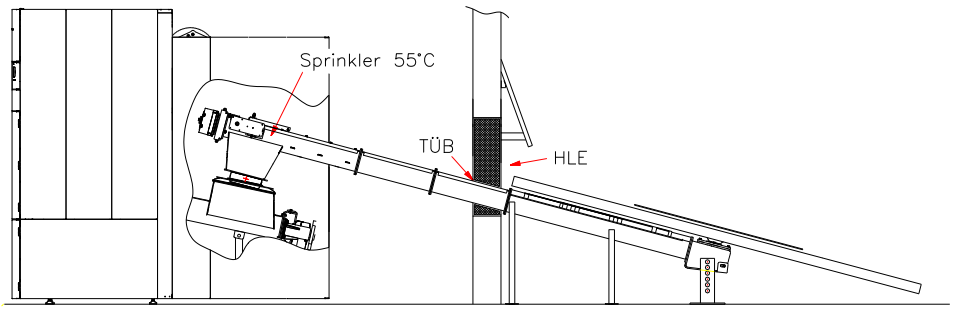


Fig. 6 **Installation of sloping floor, emergency off switch, air vents, fire extinguisher, wall opening, safety systems**

Sloping floors made of wood or concrete must be provided on site. If made of wood, the sloping floor should be constructed of timber boards (larch) or blockboard panels 3 cm thick; the substructure of 10 x 10 cm battens should be as shown in Fig. 6. The posts must stand on concrete or metal plates. The clearance between the agitator arms and the sloping floor must be 15 - 20 mm. With concrete sloping floors, the auger channel clearance should be 2-3 cm.

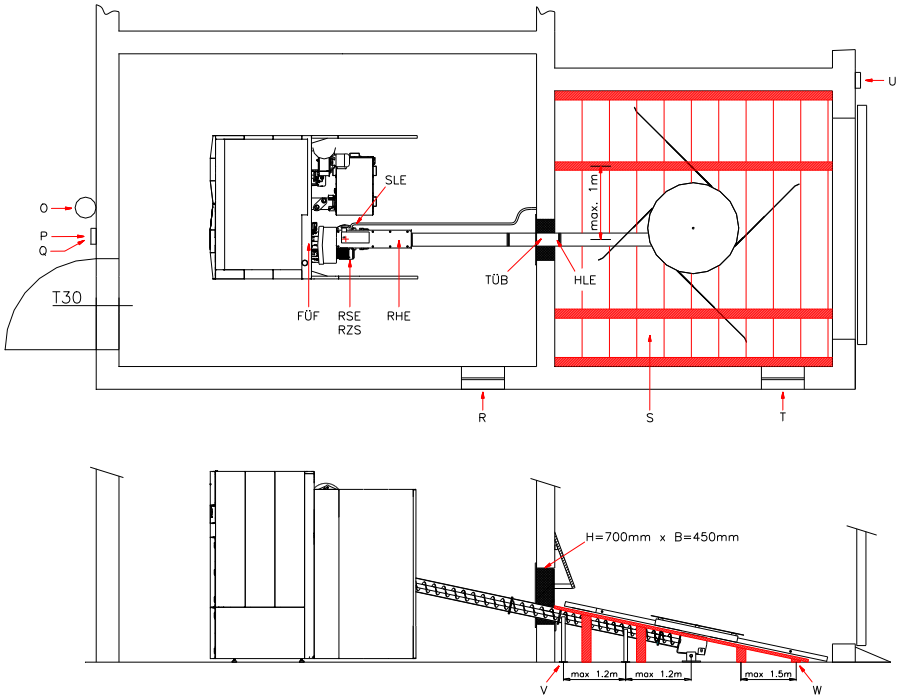


Fig. 6

O → Fire extinguisher (6 kg) adjacent to boiler room door

P → Heating system master switch (lockable)

Q → Heating system emergency off switch

R → Air vent min. size 5 cm² per kW

S → Sloping floor made of wood or concrete

T → Storeroom air vent

U → Storeroom safety switch (lockable)

V → Supports for outfeed auger

W → Supports for sloping wooden floor

Inspection hatch construction

The construction of the inspection hatch and the associated wall lining should be carried out as described below and will enable access to the storeroom for the purposes of removing any objects that may be jammed in the auger before the enclosed section of the auger trough. The hatch canopy constructed as per Fig. 5 prevents the stored fuel spilling out when the inspection hatch is opened.

Fig. 10

Fig. 11

Fig. 12

1.) Pack the gap at the sides and below the outfeed auger (A) with mineral wool (B).

2.) Fit the cover plates supplied (C) on the inside and outside.

3.) Fix the top edge of the lining (D) in the wall flush with the cover plates.

4.) Cut a section of mineral wool (E) to size to fit the hatch opening.

5.) Insert the mineral wool (E) between the cover plate (F) and the inspection hatch rear panel (G) as shown in Fig. 11 using the hexagon-head bolts supplied.

6.) Fit the inspection hatch cover (H) and secure with wing nuts.

3 Outside-temperature based controller

PRO-03-00-00-00-01-IADE

⚠ Only one of the options "Network system control" **or** "Heating system control" can be activated. ⚠

Network system control

Network system control is outside-temperature based and integrated in every system. Heating water can be delivered to various heating network components via supply or district heating pipes by means of "network system pumps" or "network system pumps with network mixer valves". A maximum of 3 network system pumps or 2 network mixer valves with 2 twin pumps each can be operated. Depending on the system configuration, "supplementary function" (ZU) outputs can be also used to control up to 2 hot water cylinders and a peak load boiler.

Key:

NKP 0 = Network sys. pump 0
NKP 1 = Network sys. pump 1
NKP 1a = Network sys. twin pump 1a
NKP 1b = Network sys. twin pump 1b
MI 1 = Network mixer valve 1
NKP 2 = Network sys. pump 2
NKP 2a = Network sys. twin pump 2a
NKP 2b = Network sys. twin pump 2b
MI 2 = Network mixer valve 2
SLP = Hot water cylinder
ZU → WWP = Supp. HW cylinder
ZU → EXTERN = Peak load boiler

Configuration variations	NKP 0 NKP 1b **ZU**	NKP 1 (a)	MI 1	NKP 2 (a)	MI 2	SLP NKP 2b
Pumped network system 0 Pumped network system 1 Pumped network system 2 Hot water cylinder 0	Diagram no. PRO-01-02-01					
	●	●		●		●
Pumped network system 1 Pumped network system 2 Hot water cylinder 0 X = Optional item	X	●		●		●
Network system 1 **mixer-valve system with twin pump** Network system 2 **mixer-valve system with twin pump**	Diagram no. PRO-01-02-02					
	●	●	●	●	●	●
Network system 1 **mixer-valve system** Network system 2 **mixer-valve system with twin pump** X = Optional item	X	●	●	●	●	●
Network system 1 **mixer-valve system** Network system 2 **mixer-valve system** Hot water cylinder 0 X = Optional item	X	●	●	●	●	●

Heating system control (max. 3 MK261 wall controller sets per boiler possible)

One DHW cylinder, one pumped heating circuit and 2 mixer-valve circuits can be controlled. Selecting the "*Supplementary*" option allows heat to be requested from a 2nd DHW cylinder or a peak load boiler per wall controller. The option "*District heating mode*" allows the district heating functions CP or TSP to be selected.

Note If the "*Supplementary*" and "*District heating*" functions are not used, Heating circuit 0 can be used in each case as a third mixer-valve heating circuit.

Key:

HKP 0 = Heating circuit pump 0
HKP 1 = Heating circuit pump 1
HKP 2 = Heating circuit pump 2
MI 1 = Mixer valve 1
MI 2 = Mixer valve 2
ZU → MI 0 = Mixer valve 0 (CLOSED Command)
ZU → WWP = Supp. HW cylinder
ZU → EXTERN = Peak load boiler
FL → MI 0 = Mixer valve 0 (OPEN command)
FL → LAP = District heating function
FL → PUP = District heating function
FL → ERW = Heating circuit extension

Configuration variations	**ZU**	**FL**	SLP	HKP 0	HKP 1	MI 1	HKP 2	MI 2
Heating circuit 0 **pumped circuit** Heating circuit 1 **mixer-valve circuit** Heating circuit 2 **mixer-valve circuit** Hot water cylinder 0 X = Optional item	X	X	●	●	●	●	●	●
Heating circuit 0 **mixer-valve circuit** Heating circuit 1 **mixer-valve circuit** Heating circuit 2 **mixer-valve circuit** Hot water cylinder 0	●	●	●	●	●	●	●	●

4 Electrical connections

PRO-03-00-00-00-01-IADE

4.1 Heating system electrical connections

Mains connection: 400V, 50Hz, 20A (surge protector recommended)

Standard specifications:

- **BCE** Boiler control panel
- **KP** Boiler circuit board (230VAC)
- **TPM** Conveyor module (400VAC)
- **SMA** Fault signal output (24VDC 200mA)
- **STB** Safety temperature limiter
- **T1** Boiler sensor (KVT20)
- **STF** Stoker sensor (PT1000)
- **RGT** Flue gas sensor (thermocouple)
- **T-WTR** Cleaner sensor (thermocouple)
- **FW** Combustion chamber photo sensor
- **Rein-Pos** Door switch, cleaning position (15VDC)
- **TKS 1** Combustion chamber door monitor (24VDC)
- **TKS-Box** Ash box monitor (230VAC)
- **Lambda** Oxygen sensor (12VDC)
- **LFK** Air flap (24VDC)
- **BSK** Fire safety flap (24VDC)
- Inputs for up to 5 thermal store sensors (KFT20)
- **A3** Ash extractor motor (230VAC)
- **A3 Hall** (speed monitor)
- **Rein** Cleaner motor (230VAC)
- **SZ** Flue draught fan (230VAC)
- **SZ Hall** (speed monitor)
- **Rost** Grate motor (230VAC)
- **Rost Hall** (speed monitor)
- **A1 FÜS** Fill level (conveyor monitor)
- **A1** Auger motor (400VAC)
- **G1** Stoker motor (400VAC)
- **ZG** Ignition fan (230VAC)
- **HP0** Boiler charging pump (230VAC)
- **RLM** Return mixer valve (230VAC)
- **RLF** Return sensor (KVT20)
- **SI-LR** Storeroom safety switch (230VAC)
- **KFR** Boiler enabling switch (230VAC)

Optional equipment:

- **VF** Flow temp. sensor (KVT20)
- **RF** Return temp. sensor (KVT20)
- **SF** Cylinder sensor (KVT20)
- **AF** Outside temp. sensor (KVT20)
- **NKP** Network system pumps (230VAC)
- **HKP** Heating circuit pumps (230VAC)
- **MI** Mixer valve (230VAC)
- **A4** Ash extractor fan (230VAC)
- **ATF** Ash bin sensor (KVT20)
- **TKS-AT** Ash bin monitor
- **A2** Feed auger (400VAC)
- **NKFR** Network system clearance (0-10V)

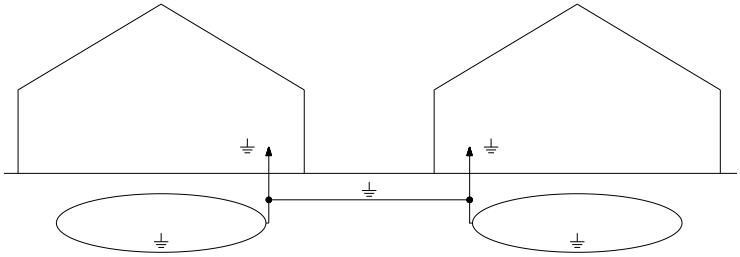
Resistances:

Temperature	KVT20	Temperature	PT1000
-16°C	1.434 kΩ	0°C	1.000 kΩ
-8°C	1.537 kΩ	10°C	1.039 kΩ
0°C	1.644 kΩ	30°C	1.117 kΩ
10°C	1.783 kΩ	40°C	1.155 kΩ
20°C	1.928 kΩ	50°C	1.194 kΩ
30°C	2.078 kΩ	60°C	1.232 kΩ
40°C	2.234 kΩ	70°C	1.271 kΩ
50°C	2.395 kΩ	80°C	1.309 kΩ
60°C	2.563 kΩ	100°C	1.385 kΩ
70°C	2.735 kΩ	125°C	1.480 kΩ

4.2 Wiring requirements

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.



Sensor

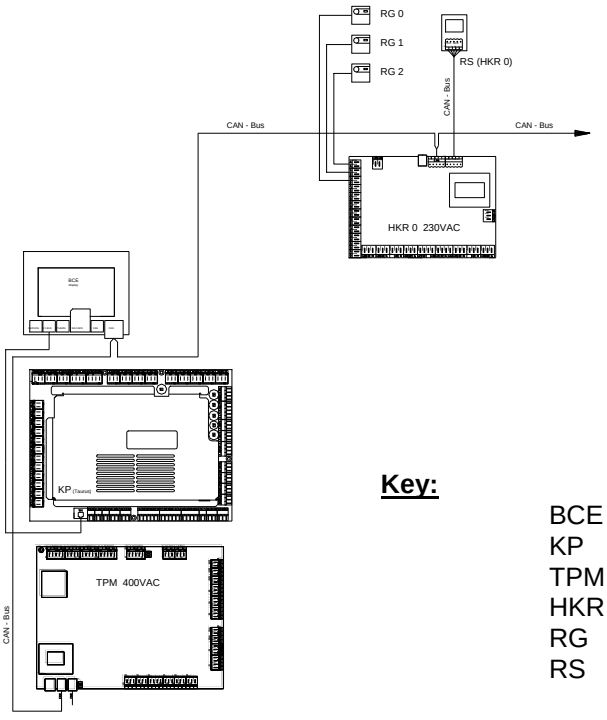
2 x 1mm²

Analogue room stat RFF

2 x 1mm²

CAN bus connecting cable

2 x 2 x 0.5 mm² twisted pair, shielded



More outside-temp. based controllers can be connected via CAN bus

Key:

BCE → Control panel
KP → Boiler PCB
TPM → Router module
HKR → Heating circuit controller
RG → Analogue room stat
RS → Digital room controller

Wiring CAN bus in line

Whenever possible, always wire the CAN bus "in line", i.e. from the display and control unit to heating circuit controller 0 then from there to heating circuit controller 1, and so on. If wired in a star pattern, the overall length of the CAN bus must not exceed 100 metres. Wire the CAN bus +/- and H/L connections with twisted-pair cable in each case.

4.3 Electrical connections

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.

Mains connection

400V, 50Hz, 20A (surge protector recommended)

The mains power must be connected by means of the standard non-reversible power socket on the rear panel of the boiler. It must be possible to isolate the system entirely from the mains – either by means of the master switch outside the boiler room door, an automatic circuit-breaker in the control cabinet or the power plug on the rear of the boiler – without opening the switch panel cover.

Pay attention to correct connection of phases!

Master switch (heating system)

The heating system must be capable of being fully isolated from the mains power supply by means of a master switch mounted outside the boiler room door which can be secured in the 0/OFF position by locking and removing the key so as to prevent it being switched on by unauthorised persons.

Emergency off switch (heating system)

According to prTRVB H 118, it must be possible to switch off the system using an emergency off switch fitted outside 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.

Safety switch (storeroom)

The agitator must be capable of being switched off by means of a safety switch mounted outside the boiler room door which can be secured in the 0/OFF position by locking and removing the key so as to prevent it being switched on by unauthorised persons.

Opening switch panel

Before the switch panel is opened, the boiler must be completely isolated from the power supply. **The system must not be live.**

Caution: If the boiler is only switched off at the power switch, numerous components remain connected to the power supply.

The switch panel must not be opened in those circumstances.

- Release the switch panel catch and lift open the controller cover panel and secure it.
- The circuit boards with the associated connectors and fuses (see electrical wiring diagram) are located underneath it in an easily accessible position.
- The appropriate cable ducts must be used when connecting electrical leads.

Network system controller

The outside-temperature based network system controller is integrated in the boiler circuit board of the system. To prevent overload by powerful pumps or mixer valves, all outputs used must be connected via coupling relays.

Outside-temperature based controller

The MK-261 wall controller set outside-temperature based heating circuit controller is mounted on a wall and connected to the boiler control panel via a CAN bus. To prevent overload by powerful pumps or mixer valves, it is advisable to connect all outputs used via coupling relays. Operation and configuration of the controller is via the control panel on the boiler.

MK261 wall controller set (max. 3 MK261 wall controller sets per boiler possible)

With an MK261 wall controller set it is possible to control one DHW cylinder, one pumped heating circuit and 2 mixer-valve heating circuits. Selecting the "*Supplementary*" option allows heat to be requested from a 2nd DHW cylinder or a peak load boiler per wall controller using the cascade function. The option "*District heating mode*" allows the district heating functions CP or TSP to be selected.

Note

If the "*Supplementary*" and "*District heating*" functions are not used on the wall controller, Heating circuit 0 can be used in each case as a third mixer-valve heating circuit connected to the wall controller.

Connect the MK261 wall controller set to the power supply at terminal H35 and to the control panel via the CAN bus.

Analogue room stat

Each room stat should be connected internally at terminals 1 and 2 and to the relevant input on the heating circuit controller.

Digital room controller

The room controller must be connected via CAN bus to the boiler control panel or the MK261 wall controller set.

3rd mixer-valve heating circuit

Heating circuit 0 can only be used as a mixer-valve heating circuit if the "*Supplementary*" and "*District heating*" functions are not activated on the wall controller. The mixer valve must be connected to terminals H25 and H26 and the heating circuit pump to terminal H33 on the wall controller.

2nd DHW cylinder

Can be activated on the boiler or on the MKR261 wall controller set.

With the network system controller on the boiler, the function "*Supplementary*" (WWP) can be used to connect the 2nd cylinder charging pump to terminal H33 and the 2nd cylinder sensor (ZSF) to terminals H15/H16.

On the MK261 wall controller set the "*Supplementary 0, 1 or 2*" (WWP) function can be used to connect the 2nd cylinder charging pump to terminal H25 and the 2nd cylinder sensor (ZSF) to terminals H15/H16.

Peak load boiler

Can be activated on the boiler or on the MKR261 wall controller set.

With the network system controller on the boiler, the "*Supplementary*" (EXTERNAL) function can be used to connect a peak load boiler to terminal H33.

On the MK261 wall controller set the "*Supplementary 0, 1 or 2*" (EXTERNAL) function can be used to connect a peak load boiler to terminal H25.

Network system pumps

Connection of network system pumps (NKP0-NKP2).

NKP0 = Terminal H33 / NKP1 = Terminal H28 / NKP2 = Terminal H27

Network system pumps with mixer valves

Connect the network system pumps (NKP1a/b-NKP2a/b) to the following terminals.

NKP1a = Terminal H28 / NKP1b = Terminal H33
NKP2a = Terminal H27 / NKP2b = Terminal H34

Connect the mixer valves (MI1-MI2) to the following terminals.

MI1 = Terminal H31-H32 / MI2 = Terminal H29-H30

Connect the return temperature sensors (RF1 and RF2) to the following terminals.

RF1 = Terminal H15-H16 / RF2 = Terminal H13-H14

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.**

Pay special attention to the section "Wiring requirements, Wiring CAN bus in line".

2-sensor thermal store management

Can be activated on the boiler circuit board.

On the boiler circuit board the thermal store lower sensor (T2) must be connected to terminals 31/32 and the thermal store upper sensor (T3) to terminals 33/34.

On the wall controller the thermal store lower sensor (T2) must be connected to terminals H17/H18 and the thermal store upper sensor (T3) to terminals H19/H20.

5-sensor thermal store management

Can be activated on the boiler circuit board.

Three additional thermal store sensors can be connected to terminals H1/H2 (T5), H3/H4 (T6) and H5/H6 (T7).

Note If those inputs are used for 5-sensor thermal store management, the heating circuits can continue to be used without room thermostats.

Note 5-sensor thermal store management is only usable for thermal store HP0.

Surge protection

We recommend the installation of a power surge protector in the building's consumer unit.

Pay special attention to the section "Wiring requirements, Surge protection".

Earthing

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

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

Emergency power supply

Only use regulated generators.

5 Final checks/Commissioning

BS-04-00-00-00-01-IADE

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

Important → 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 check-list must be sent to GUNTAMATIC immediately as otherwise the guarantee will be void.

Important → These installation instructions should not be destroyed after commissioning but kept permanently with the system together with the operating instructions.

6 Standards/Regulations

BS-05-00-00-00-02-IADE

The heating appliance is designed in accordance with Class 3 to EN 303-5 and the Agreement of the Austrian Federal States according to Art. 15a BVG relating to safety measures for small combustion heating systems and energy saving. The original type approval certificates are available for inspection at the manufacturer's offices. When connecting the boiler, the following generally applicable standards and safety regulations must be followed in addition to the local fire safety and building control requirements:

- **ÖNORM/DIN EN 303-5**
  Boilers for solid fuels, manually and automatically stoked, with outputs up to 300 kW;
  Terms, requirements, tests and identification;
- **ÖNORM/DIN EN 12828**
  Heating systems inside buildings; planning hot-water circulation heating systems
- **ÖNORM/DIN EN 12831**
  Heating systems inside buildings; procedures for calculating rated heat input;
- **ÖNORM M 7137**
  Requirements for pellet storage by the end user;
- **ÖNORM M 7510**
  Guidelines for the inspection of central heating systems
- **ÖNORM H 5195-1** (Austria)
  Preventing damage from corrosion and scale formation in hot-water circulation heating systems with operating temperatures up to 100°C;
- **VDI 2035** (Germany)
  Preventing damage in hot-water circulation heating systems; corrosion from heating-system water;
- **SWKI 97-1** (Switzerland)
  Limescale and corrosion-proofing in heating systems;
- **TRVB H 118** (for automatically stoked systems in Austria)
  Technical directive on preventative fire safety;
- **DIN 1988**
  Technical regulations for household-water installations (TRWI);
- **DIN 4751 Part 1-4**
  Safety systems for heating systems;
- Swiss Clean Air Regulations (LRV)
- Swiss Regulations on Small Combustion Heating Systems
- VKF Fire Safety Directive for Heating Systems (Switzerland)
- SIA 384 (Switzerland)

PRO175/250 minimum thermal store capacity 4,000 litres
for on-site heating circuit control

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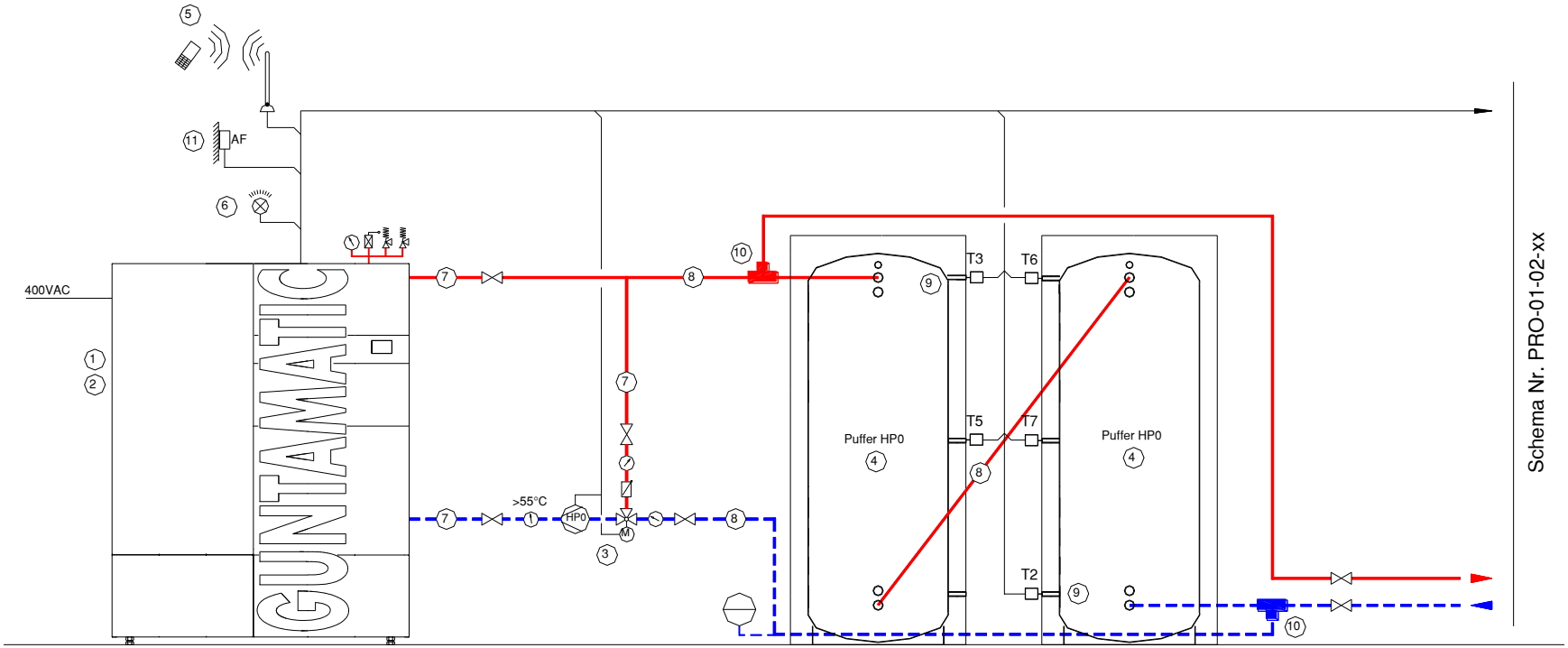
Diagram no. PRO-01-01

Electrical connections as per operating and installation instructions

Note:
If network system controller is used, heating system controller cannot be activated.

1.	PRO 175/250 (1 module)	As price list
2.	Flue draught regulator RE (size to suit flue diameter)	As price list
3.	Return boost set	
	Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12)	Not supplied
	Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE)	Not supplied
4.	Thermal store Akkutherm 2000/2PS	As price list
5.	GSM module	Art. no.: S15-002
6.	Fault indicator lamp **Important: follow wiring diagram!**	Not supplied
7.	Pipe size 2"	Not supplied
8.	If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe	Not supplied
9.	Order 5 thermal store sensors	Art. no.: S70-003
10.	T-joints, minimum size 4"	Not supplied
11.	For network system control order outside temp. sensor	Art. no.: S70-001



PRO 350/425/500 minimum thermal store capacity 10,000 litres
for on-site heating circuit control

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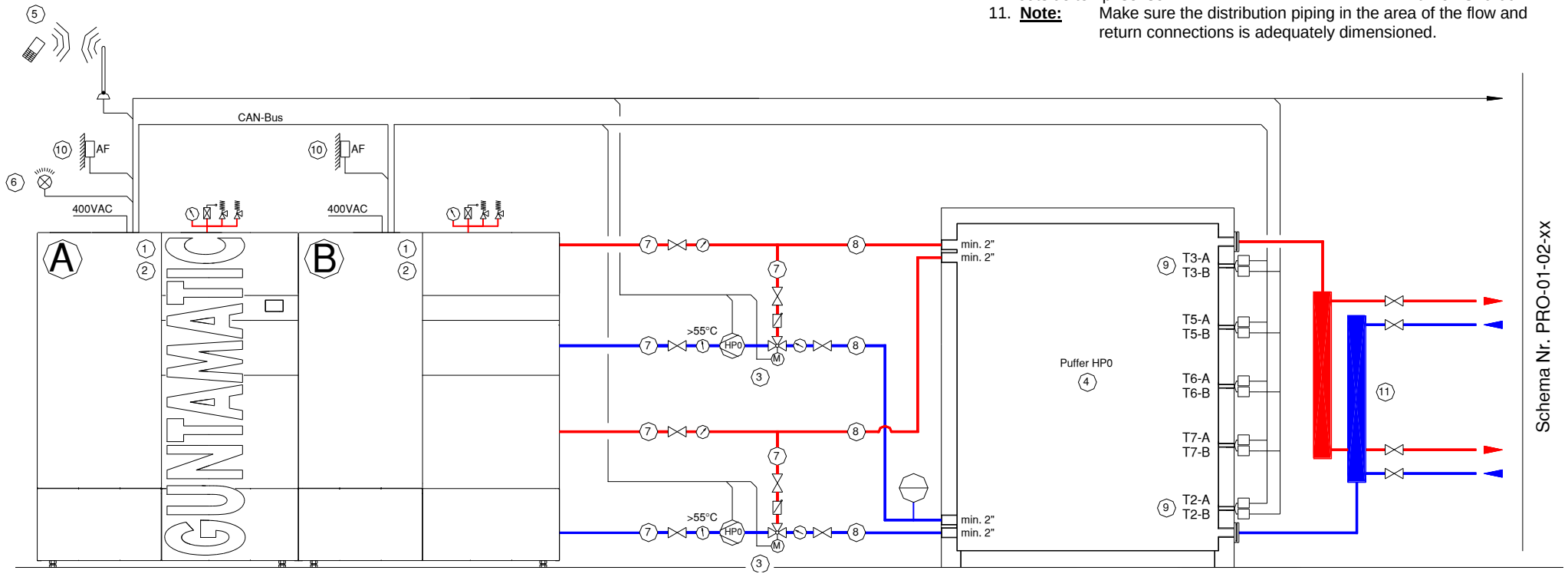
Diagram no. PRO-01-02

Electrical connections as per operating and installation instructions

Note:
If network system controller is used, heating system controller cannot be activated.

1. PRO 350/425/500 (2 modules) — As price list
2. Flue draught regulator RE (size to suit flue diameter) — As price list
3. Return boost set
   - Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12) — Not supplied
   - Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE) — Not supplied
4. Thermal store min. capacity 10,000 litres — Not supplied
5. GSM module — Art. no.: S15-002
6. Fault indicator lamp **Important: follow wiring diagram!** — Not supplied
7. Pipe size 2" — Not supplied
8. If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe — Not supplied
9. Order 5 thermal store sensors per module — Art. no.: S70-003
10. For network system control order outside temp. sensor — Art. no.: S70-001
11. **Note:** Make sure the distribution piping in the area of the flow and return connections is adequately dimensioned.



PRO
Function of network system pump
max. 3 network system pumps possible

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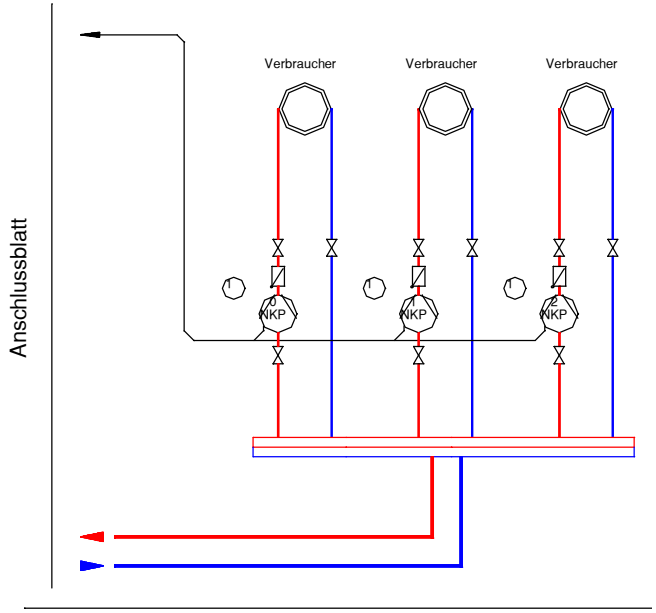
Diagram no. PRO-01-02-01

Electrical connections as per operating and installation instructions

1. Network system pumps 0-2 — Not supplied
2. Order outside temp. sensor — Art. no.: S70-001



Information:

- Each network system pump can be timer-controlled by its own timer programme and also controlled on the basis of outside temperature by means of the functions Night OFF OT and OT Off.
- Network system 1 and Network system 2 can also be operated by means of mixer valves.
- A DHW cylinder can be charged.
- If Network system 0 is not used, the "*Supplementary*" function can be used to control a 2nd DHW cylinder or a peak load boiler.
- 0-10 volt input for network system pumps ON/OFF

Note:
The network system pumps can be switched ON/OFF via a 0-10 volt input.

PRO
Function of network system pump with mixer valve
max. 4 network system pumps and 2 mixer valves possible

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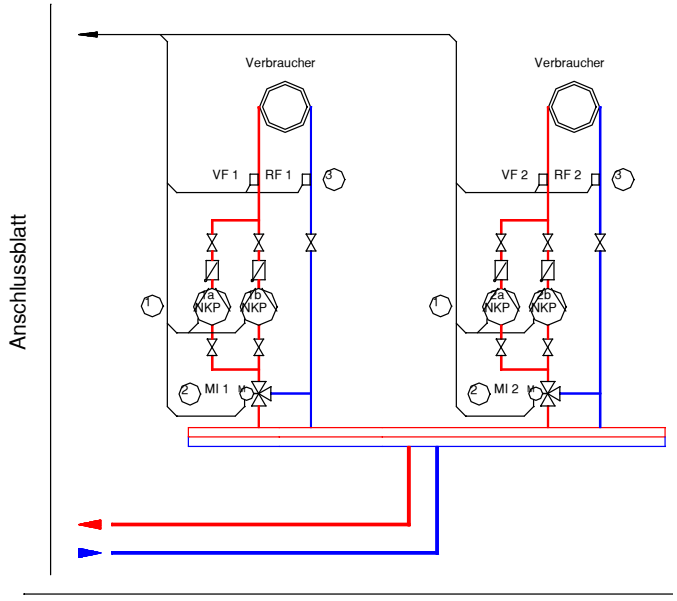
Diagram no. PRO-01-02-02

Electrical connections as per operating and installation instructions

1.	Network system pumps 1a/1b and 2a/2b	Not supplied
2.	Mixer valves 1-2	Not supplied
3.	2 sensors per network system required	Art. no.: S70-002
4.	Order outside temp. sensor	Art. no.: S70-001



Information:

- Each network system can be timer-controlled by its own timer programme and also controlled on the basis of outside temperature by means of the functions Night OFF OT and OT Off.
- Each network system can be assigned a second network pump which can be automatically activated to boost the delivery rate according to the spread between network flow and return temperatures.
- If Network system 1 is operated with only 1 network system pump, the "*Supplementary*" function can be used to control a DHW cylinder (HWP) or a peak load boiler (EXTERNAL).
- 0-10 volt input for network system ON/OFF

Note:
The network systems can be switched ON/OFF via a 0-10 volt input.

PRO 175/250 minimum thermal store capacity 4,000 litres
with heating circuit controller – no district heating
max. 9 mixer-valve circuits and 3 DHW cylinders

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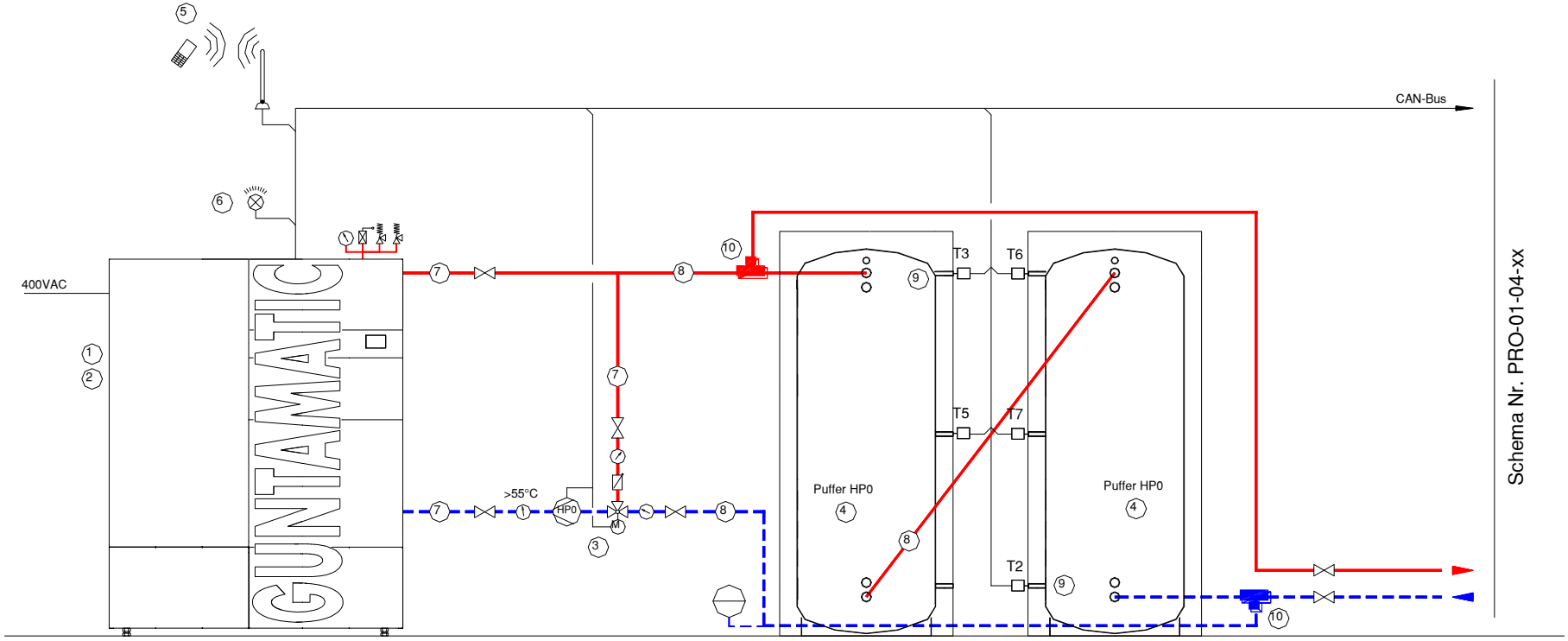
Diagram no. PRO-01-03

Electrical connections as per operating and installation instructions

1.	175/250 (1 module)	As price list
2.	Flue draught regulator RE (size to suit flue diameter)	As price list
3.	Return boost set	
	Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12)	Not supplied
	Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE)	Not supplied
4.	Thermal store Akkutherm 2000/2PS	As price list
5.	GSM module	Art. no.: S15-002
6.	Fault indicator lamp **Important: follow wiring diagram!**	Not supplied
7.	Pipe size 2"	Not supplied
8.	If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe	Not supplied
9.	Order 5 thermal store sensors	Art. no.: S70-003
10.	T-joints, minimum size 4"	Not supplied



PRO 350/425/500 minimum thermal store capacity 4,000 litres
with heating circuit controller – no district heating
max. 18 mixer-valve circuits and 6 DHW cylinders

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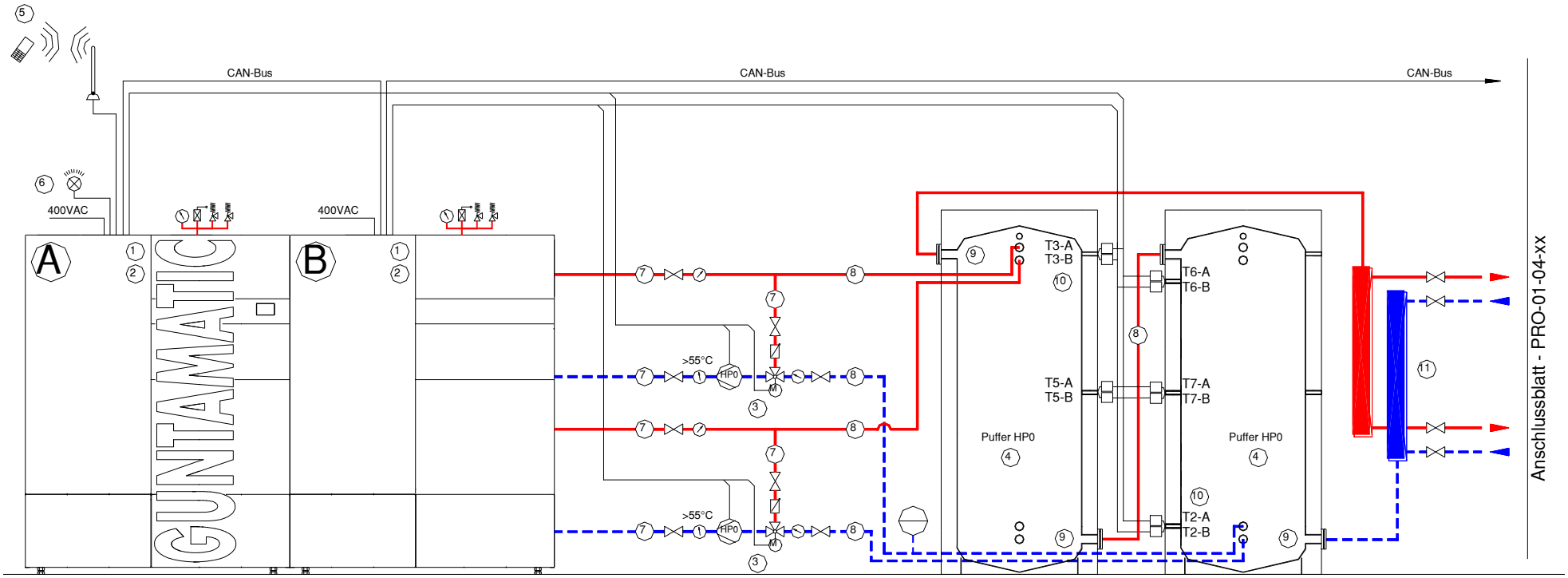
Diagram no. PRO-01-04

Electrical connections as per operating and installation instructions

1. PRO 350/425/500 (2 modules) — As price list
2. Flue draught regulator RE (size to suit flue diameter) — As price list
3. Return boost set
   - Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12) — Not supplied
   - Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE) — Not supplied
4. Thermal store AK2000/2PS — As price list
5. GSM module — Art. no.: S15-002
6. Fault indicator lamp **Important: follow wiring diagram!** — Not supplied
7. Pipe size 2" — Not supplied
8. If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe — Not supplied
9. Order 2 special flanges, DN80 (3"), per thermal store — As price list
10. Order 5 thermal store sensors per module — Art. no.: S70-003
11. **Note:** Make sure the distribution piping in the area of the flow and return connections is adequately dimensioned.



PRO
Outside-temperature based controller
max. 3 heating circuit controllers per boiler possible

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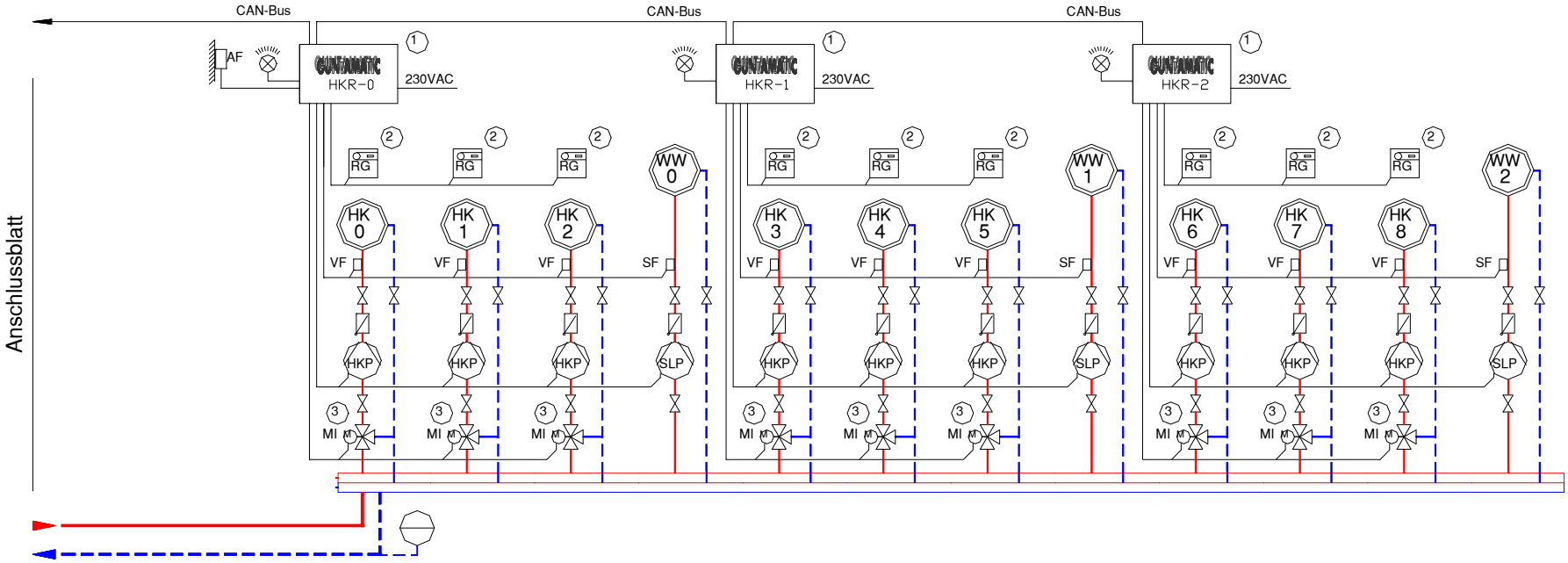
Diagram no. PRO-01-04-01

Electrical connections as per operating and installation instructions

1. Outside temp. based wall controller set MKR261 Art. no.: S30-030
   Caution: observe the maximum load capacity of the wall controller.
2. Analogue room stat Art. no.: S70-006
   Digital room controller Art. no.: S60-004
3. Mixer-valve motor Art. no.: S50-501

Information:

- Always connect outside temp. sensor (AF) to HKR-0
- A maximum of 3 MK261 wall controller sets can be connected to each boiler (A, B, ...); the heating circuit controllers are then designated HKR-A0, HKR-B1, etc., for example.
- One analogue room stat (RFF) can be connected to each heating circuit.
- A maximum of 3 digital room controllers (RS) can be connected to each boiler.



PRO 175/250 minimum thermal store capacity 4,000 litres
Building supply using heating circuit controller and district heating
max. 3 buildings – max. 3 heating circuit controllers per boiler possible

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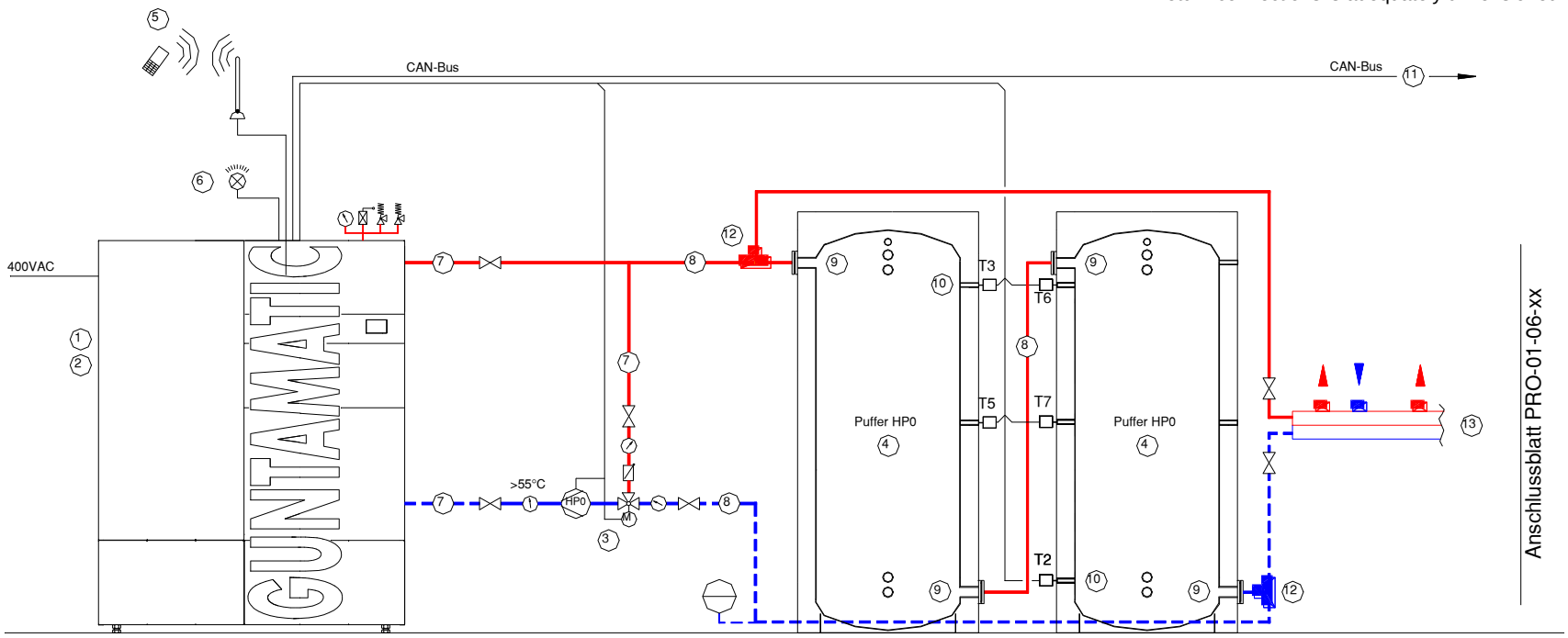
Diagram no. PRO-01-05

Electrical connections as per operating and installation instructions

1. PRO 175/250 (1 module) — As price list
2. Flue draught regulator RE (size to suit flue diameter) — As price list
3. Return boost set
   - Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12) — Not supplied
   - Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE) — Not supplied
4. Thermal store AK2000/2PS — As price list
5. GSM module — Art. no.: S15-002
6. Fault indicator lamp **Important: follow wiring diagram!** — Not supplied
7. Pipe size 2" — Not supplied
8. If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe — Not supplied
9. Order 2 special flanges, DN80 (3"), per thermal store — As price list
10. Order 5 thermal store sensors per module — Art. no.: S70-003
11. **Important:** always wire the CAN bus "in line"; if wired in a star pattern, the maximum cable length is 100 m
12. T-joints, minimum size 4"
13. **Note:** Make sure the distribution piping in the area of the flow and return connections is adequately dimensioned.



HP0 setting = Thermal store pump

PRO 350/425/500 minimum thermal store capacity 4,000 litres
Building supply using heating circuit controller and district heating
max. 6 buildings – max. 3 heating circuit controllers per boiler possible

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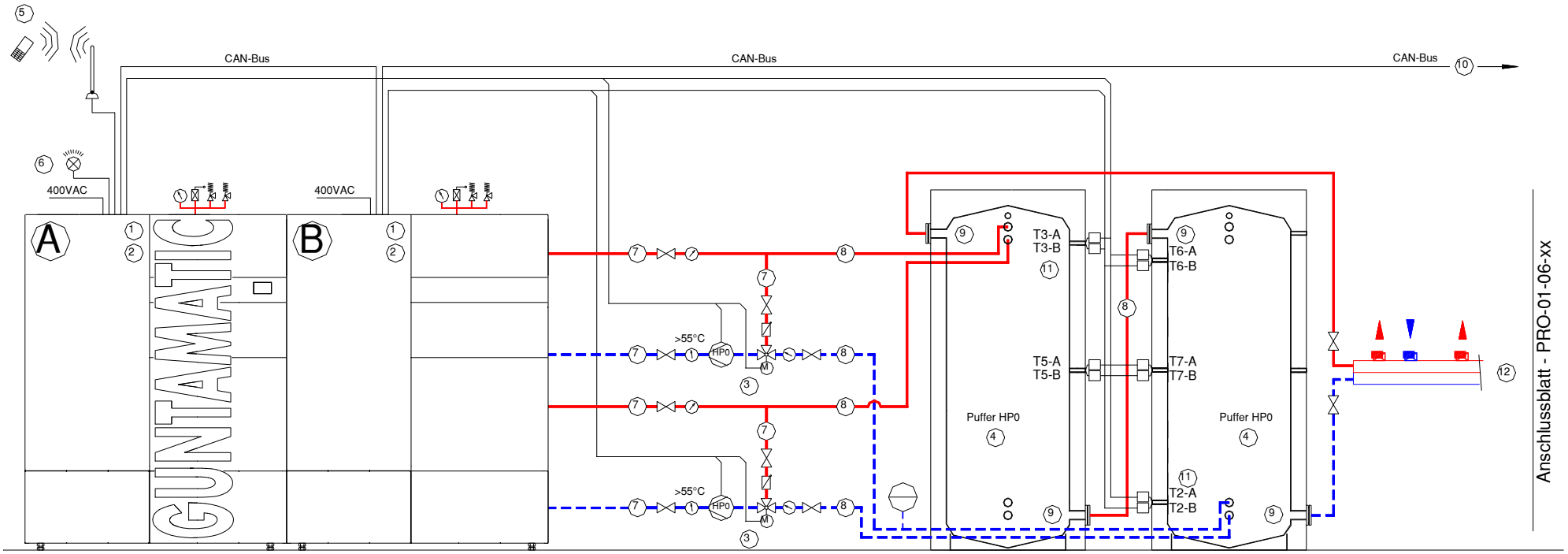
Diagram no. PRO-01-06

Electrical connections as per operating and installation instructions

1. PRO 350/425/500 (2 modules) — As price list
2. Flue draught regulator RE (size to suit flue diameter) — As price list
3. Return boost set
   - Pump HP0 - 230V (e.g. Wilo-Stratos 50/1-12) — Not supplied
   - Mixer valve - 2" (DN50), Kvs>=60 (e.g. ESBE) — Not supplied
4. Thermal store AK2000/2PS — As price list
5. GSM module — Art. no.: S15-002
6. Fault indicator lamp **Important: follow wiring diagram!** — Not supplied
7. Pipe size 2" — Not supplied
8. If pipe length exceeds 2 x 25m for thermal store flow and return, use 3" pipe — Not supplied
9. Order 2 special flanges, DN80 (3"), per thermal store — As price list
10. **Important:** always wire the CAN bus "in line"; if wired in a star pattern, the maximum cable length is 100 m
11. Order 5 sensors per module — Art. no.: 70-003
12. **Note:** Make sure the distribution piping in the area of the flow and return connections is adequately dimensioned.



PRO
Building supply using heating circuit controller and district heating function FP
max. 3 heating circuit controllers per boiler possible

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Diagram no. PRO-01-06-01

Electrical connections as per operating and installation instructions

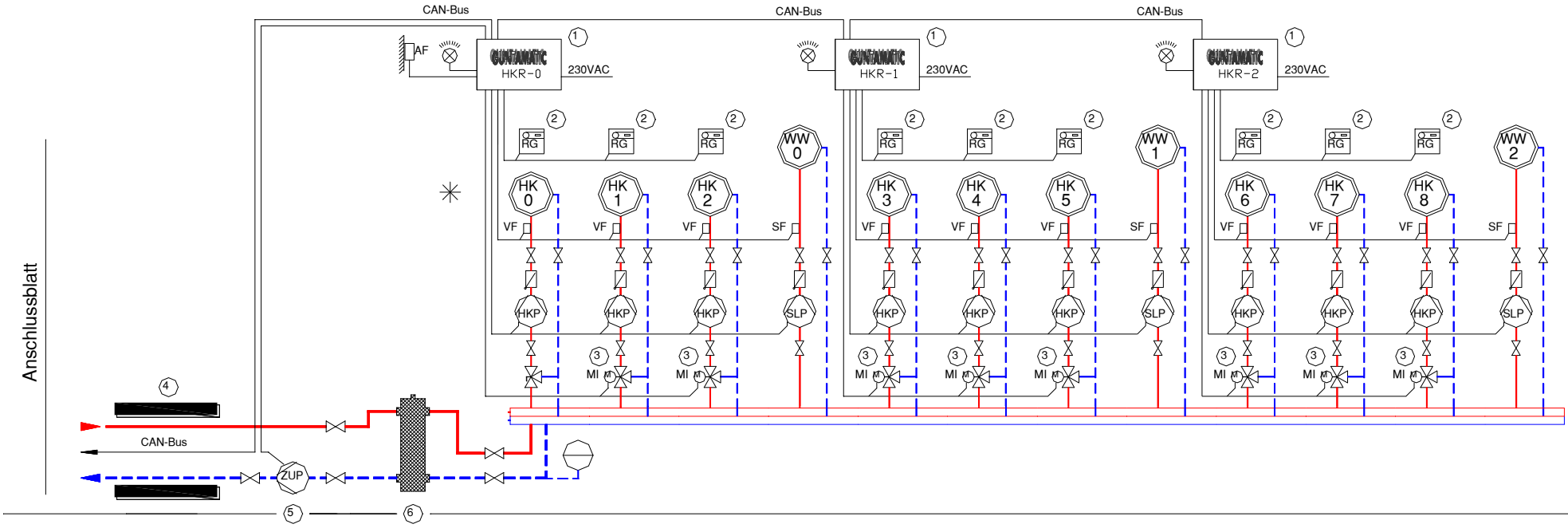
1. Outside temp. based wall controller set MKR261 Art. no.: S30-030
   Caution: observe the maximum load capacity of the wall controller.
2. Analogue room stat Art. no.: S70-006
   Digital room controller Art. no.: S60-004
3. Mixer-valve motor Art no.: S50-501
4. District heating pipe and dimensioning Not supplied
5. Pump and dimensioning Not supplied
   Caution: observe the maximum load capacity of the output.
6. Flow equaliser and dimensioning Not supplied

Information:

- Always connect outside temp. sensor (AF) to HKR-0 – configure HKR-1 and HKR-2 without outside temp. sensor; in the case of multiple boilers, an outside temp. sensor must be connected to each of HKR-A0, HKR-B0, etc.
- Each heating circuit controller with district heating function activated can be extended by two additional heating circuit controllers using the function ERW (max. 3 heating circuit controllers per boiler).

Caution:

- If the district heating function (FP, CP, …) is used on a heating circuit controller, heating circuit 0 can only be operated as a pumped circuit without mixer valve.
- Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or can be room-temperature controlled using a room stat for a radiator heating system.



PRO
Building supply using heating circuit controller and district heating function FP
max. 3 heating circuit controllers per boiler possible

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Diagram no. PRO-01-06-02

Electrical connections as per operating and installation instructions

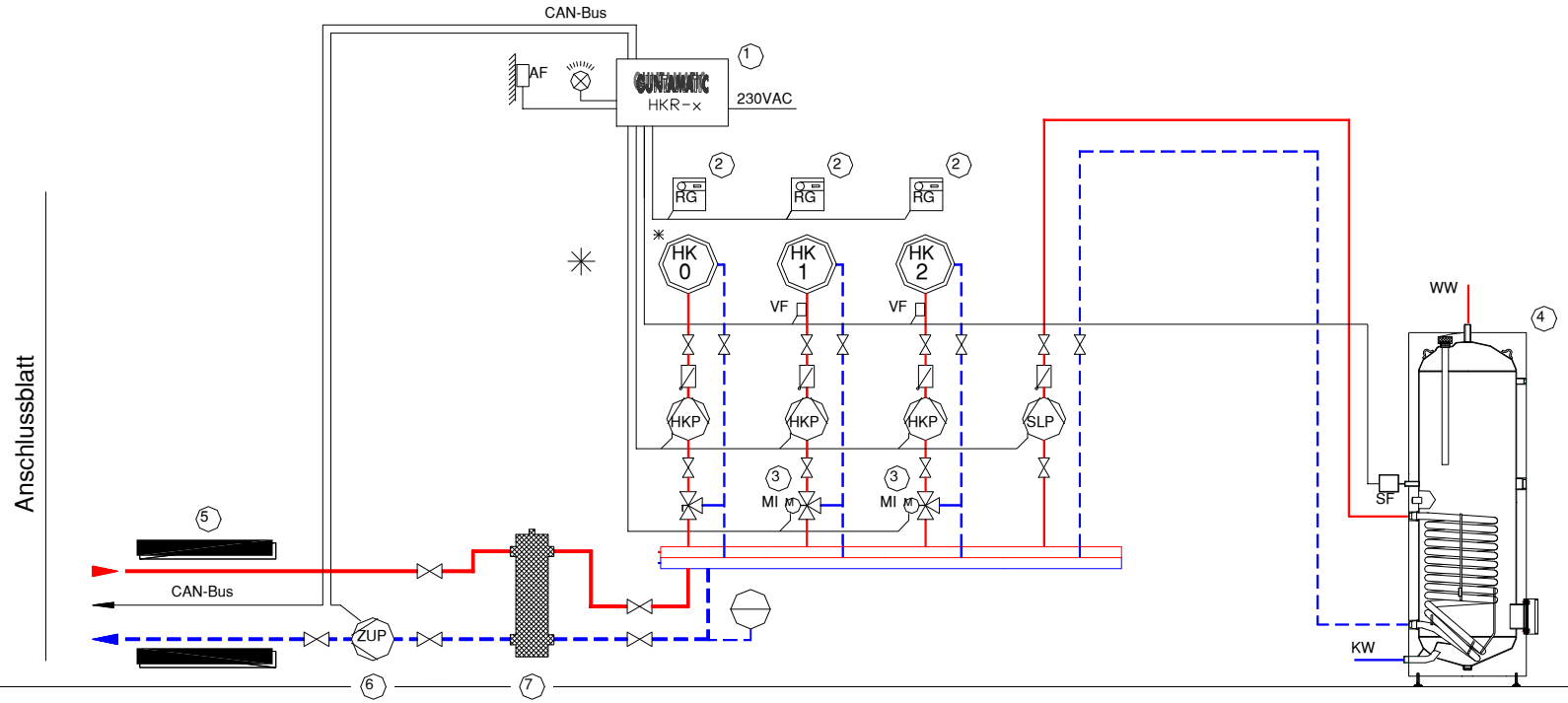
1. Outside temp. based wall controller set MKR261 Art. no.: S30-030
   Caution: observe the maximum load capacity of the wall controller.
2. Analogue room stat Art. no.: S70-006
   Digital room controller Art. no.: S60-004
3. Mixer-valve motor Art no.: S50-501
4. DHW cylinder ECO As price list
5. District heating pipe and dimensioning Not supplied
6. Pump and dimensioning Not supplied
   Caution: observe the maximum load capacity of the output.
7. Flow equaliser and dimensioning Not supplied

Information:

- Always connect outside temp. sensor (AF) to HKR-0 – configure HKR-1 and HKR-2 without outside temp. sensor; in the case of multiple boilers, an outside temp. sensor must be connected to each of HKR-A0, HKR-B0, etc.

Caution:

- If the district heating function (FP, CP, …) is used on a heating circuit controller, heating circuit 0 can only be operated as a pumped circuit without mixer valve.
- Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or can be room-temperature controlled using a room stat for a radiator heating system.



PRO
Building supply using heating circuit controller and district heating function CP
max. 3 heating circuit controllers per boiler possible

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Diagram no. PRO-01-06-03

Electrical connections as per operating and installation instructions

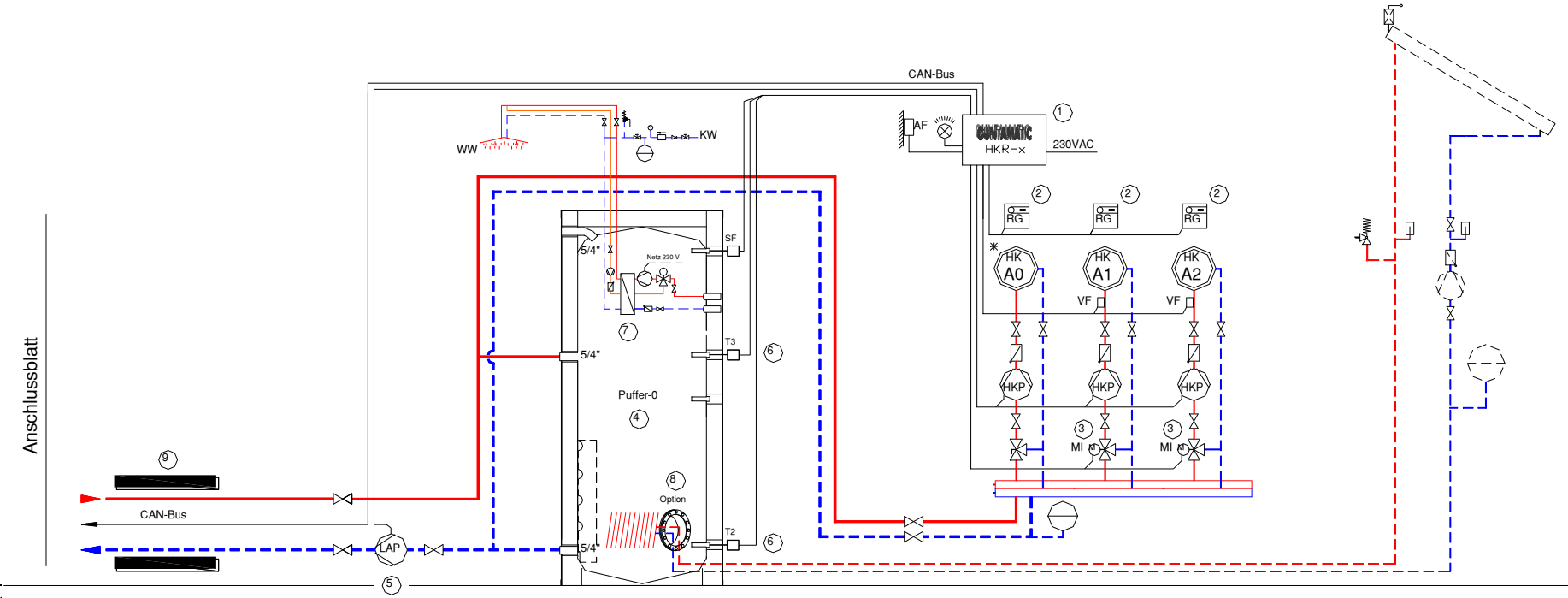
1. Outside temp. based wall controller set MKR261 Art. no.: S30-030
   Caution: observe the maximum load capacity of the wall controller.
2. Analogue room stat Art. no.: S70-006
   Digital room controller Art. no.: S60-004
3. Mixer-valve motor Art no.: S50-501
4. Thermal store PSF As price list
5. Pump and dimensioning Not supplied
   Caution: observe the maximum load capacity of the output.
6. Order 2 thermal store sensors Art. no.: S70-003
7. **Option**: Secondary return pump Art. no.: 045-250
8. **Option**: 12-hole flange and heat exchanger As price list
9. District heating pipe and dimensioning Not supplied

Information:

- Always connect outside temp. sensor (AF) to HKR-0 – configure HKR-1 and HKR-2 without outside temp. sensor; in the case of multiple boilers, an outside temp. sensor must be connected to each of HKR-A0, HKR-B0, etc.

Caution:

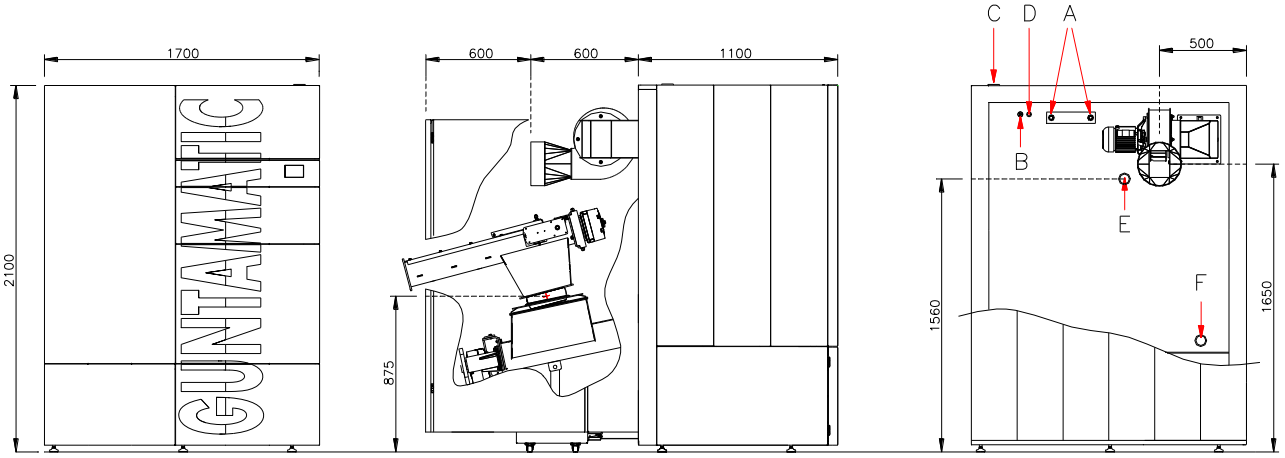
- If the district heating function (FP, CP, …) is used on a heating circuit controller, heating circuit 0 can only be operated as a pumped circuit without mixer valve.
- Heating circuit 0 can be used with a fixed-setting controller for a low-temperature heating system or can be room-temperature controlled using a room stat for a radiator heating system.



8 Technical data

PRO-08-00-00-00-01-IADE

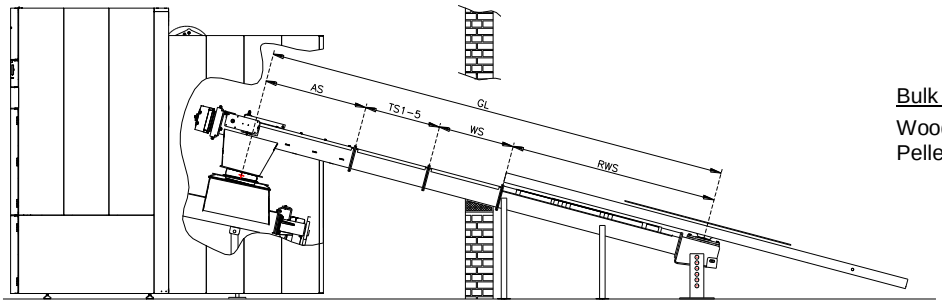
8.1 PRO



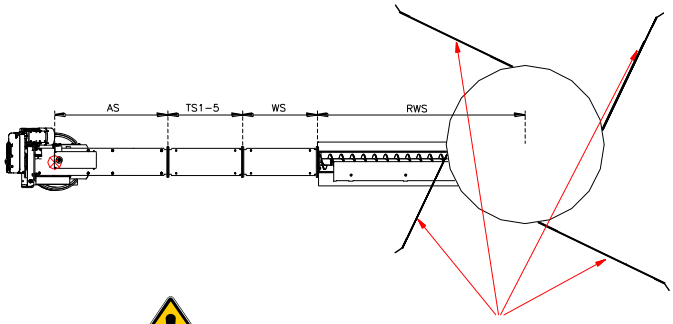
	Type PRO 175 Type PRO 250	Set PRO 350 Set PRO 425 Set PRO 500	Set PRO 600 Set PRO 750	Set PRO 850 Set PRO 1000	
PRO fuel	Woodchips grade G30 and G50 (ÖNORM M7133) Wood pellets grade ENplus A1 and A2 (EN 14961-2)				
PRO 175 boiler output PRO 250 boiler output	188 199.5*/250**	Total output is combined output of the modules concerned			kW
Required flue draught Boiler temperature Return temperature	10 60 - 85 55	10 60 - 85 55	10 60 - 85 55	10 60 - 85 55	Pa °C °C
Water capacity (total) Operating pressure	600 max. 3	1200 max. 3	1800 max. 3	2400 max. 3	litres bar
PRO 175 Water system resistance Temperature difference 20K	Flow rate 8084 Temp. 16.9 Diff. pressure 20.7	- - -	- - -	- - -	kg/h °C mbar
PRO 175 Water system resistance Temperature difference 10K	Flow rate 16168 Temp. 16.9 Diff. pressure 80.3	- - -	- - -	- - -	kg/h °C mbar
PRO 250 Water system resistance Temperature difference 20K	Flow rate 10750 Temp. 18.3 Diff. pressure 36.7	- - -	- - -	- - -	kg/h °C mbar
PRO 250 Water system resistance Temperature difference 10K	Flow rate 21500 Temp. 18.1 Diff. pressure 142.6	- - -	- - -	- - -	kg/h °C mbar
Ash capacity	max. 240	max. 480	max. 720	max. 960	litres
Flue connecting pipe dia.	250	2 x 250	3 x 250	4 x 250	mm
A = Temp.-relief heat exch. B = Boiler sensor, STL C = Flow D = Sensor for item A E = Return F = Drain	3/4“ - 2“ 1/2“ 2“ 2“	- - - - - -	- - - - - -	- - - - - -	Inches Inches Inches Inches Inches Inches
Overall weight Weight of bottom box Weight of heat exchanger Weight of stoker unit Weight of drive unit Weight per m of outfeed auger	Approx. 2200 Approx. 600 Approx. 1000 Approx. 100 Approx. 75 Approx. 26	Approx. 4400 - - - - -	Approx. 6600 - - - - -	Approx. 8800 - - - - -	kg kg kg kg kg kg
Temperature-relief heat exchanger	Yes	Yes	Yes	Yes	
Power supply	400 V 20 A	400 V 20 A	400 V 20 A	400 V 20 A	

* Specified rated output for module output < 400 kW / ** maximum possible boiler output

8.2 Agitator fuel outfeed system



Bulk storage height:
Woodchips → max. 5.0 m
Pellets → max. 2.5 m



AS = Outfeed section
TS = Trough section
WS = Wall section
RWS = Agitator section
GL = Overall length

The securing screws must not be tightened.

Note As delivered, every system includes an outfeed section (AS), a wall section (WS) and an agitator section (RWS). The outfeed auger can be extended to a maximum length (GL) of 7 m by inserting one or more trough sections (TS1-5).

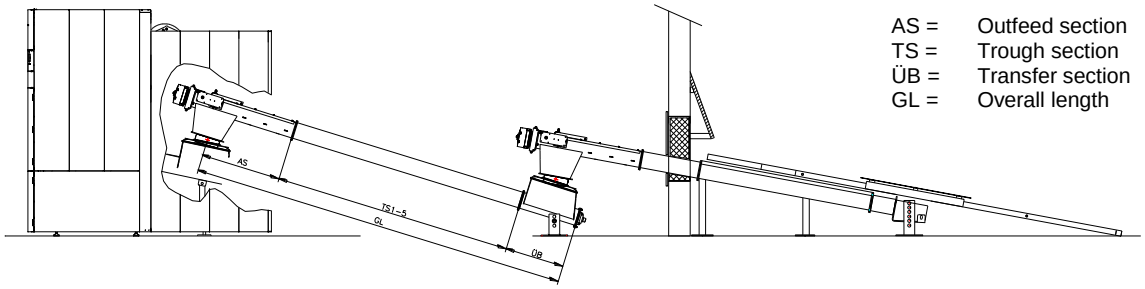
The wall section (WS) must always be fitted where the auger passes through the wall.

Agitator dia.	AS	WS	RWS	GL	Remarks	Trough	Length
3.0 m agitator	730 mm	550 mm	1500 mm	2780 mm	Basic	TS1	220 mm
3.5 m agitator	730 mm	550 mm	1750 mm	3030 mm	Basic	TS2	550 mm
4.0 m agitator	730 mm	550 mm	2000 mm	3280 mm	Basic	TS3	1100 mm
4.5 m agitator	730 mm	550 mm	2250 mm	3530 mm	Basic	TS4	2200 mm
5.0 m agitator	730 mm	550 mm	2500 mm	3780 mm	Basic	TS5	2970 mm

Important Always fit the longest agitator arms opposite one another. The securing screws on the agitator spring arms (see illustration above) must not be fully tightened. Fit the agitator arms so that they clear the outfeed auger by approx. 15-20 mm.

Agitator arm	250 cm	225 cm	197 cm	172 cm	147 cm	120 cm	92 cm	64 cm
3.0 m agitator					2 off	2 off		
3.5 m agitator				2 off	1 off	1 off		
4.0 m agitator			2 off	1 off	1 off			
4.5 m agitator		2 off		1 off	1 off			
5.0 m agitator	1 off	1 off		1 off	1 off			

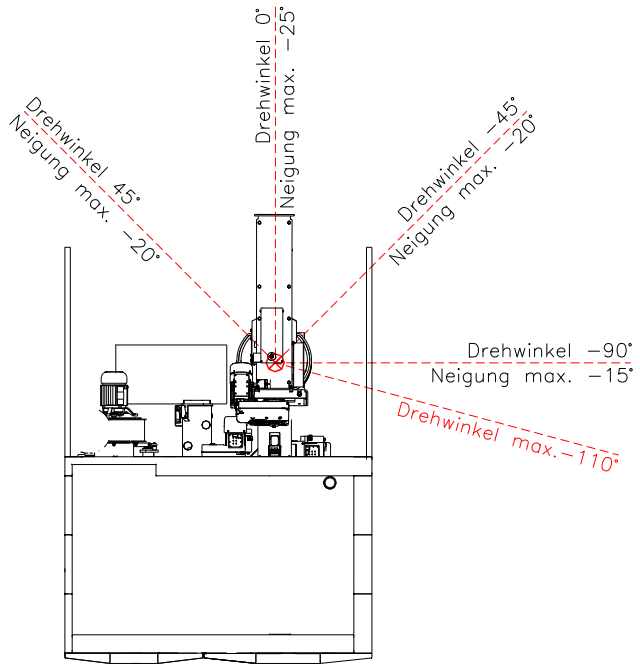
8.3 Fuel outfeed with feeder auger



Important The overall length (GL) of the feeder auger = max. 7 m.

	Description	Length
AS	Outfeed unit	730 mm
TS1	Auger trough inc. auger	220 mm
TS2	Auger trough inc. auger	550 mm
TS3	Auger trough inc. auger	1100 mm
TS4	Auger trough inc. auger	2200 mm
TS5	Auger trough inc. auger	2970 mm
ÜB	Transfer unit inc. auger	570 mm

8.4 Rotation and inclination angle of A1 outfeed system



GUNTAMATIC

GUNTAMATIC Heiztechnik GmbH
A – 4722 PEUERBACH Bruck 7
Tel: 0043 (0) 7276 / 2441-0
Fax: 0043 (0)7276 / 3031
E-mail: office@guntamatic.com