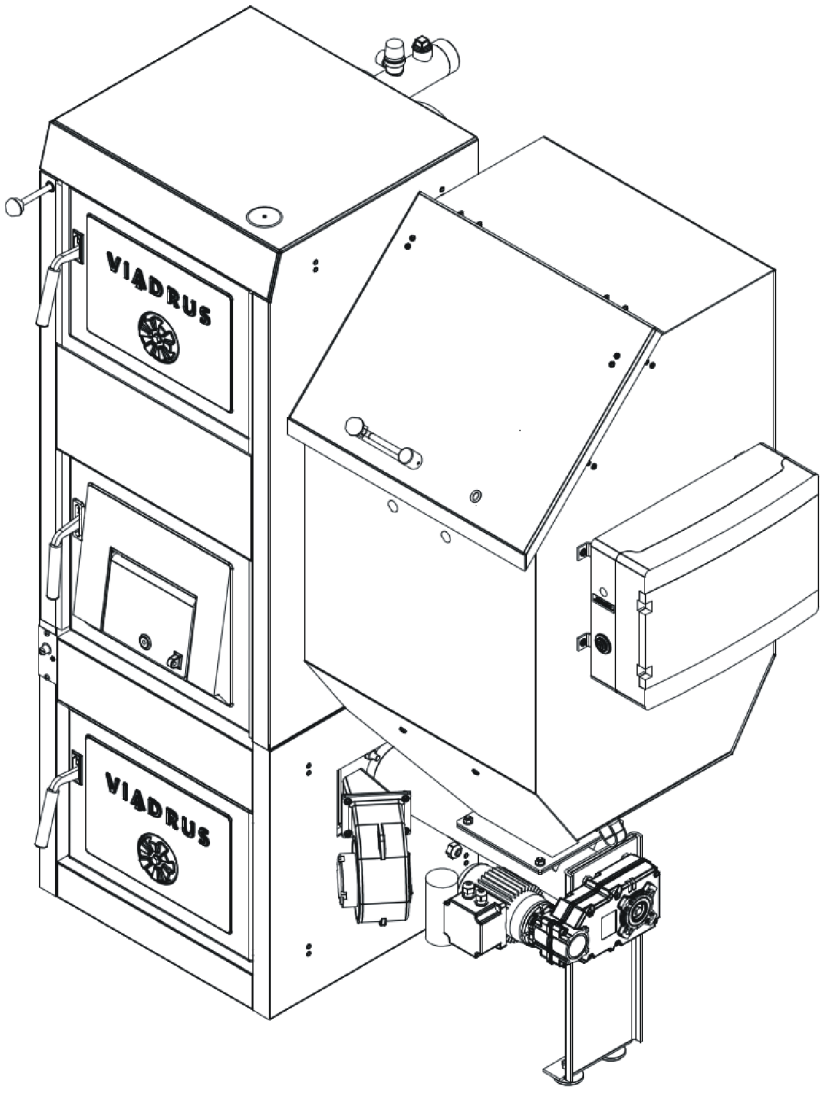
VIADRUS

VULCANUS

MANUAL FOR BOILER OPERATION AND INSTALLATION



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Dear customer,
We thank you that you have bought VULCANUS automatic solid fuel boiler and thus having shown your confidence in VIADRUS a.s..
For you to get used to a correct way of handling your new product from the beginning, please read at first this manual for usage (mainly chapter no. 6 – Boiler operation by user, chapter no. 7 – Important cautions and chapter no. 8 – Maintenance). Please follow the bellow stated information at once – and respect the producer´s, eventually assembly company´s which installed the boiler, instructions to be provided a longterm failure-free boiler operation to your satisfaction.

1. Boiler usage and advantages

The hot-water automatic boiler VULCANUS for solid fuel is designated first of all for heating the houses, weekend houses, small premises, ect.

Boiler advantages:

- automatic boiler operation, equithermal control
- possibility of HW heating
- mechanical fuel fedd from inbuilt reservoir
- simple, time non-consuming boiler attendance and maintenance
- low operating costs
- high efficiency

2. Boiler technical data

Tab. no. 1 Boiler dimensions, technical parameters

Size		**4 sect.**	**5 sect.**	**6 sect.**	**7 sect.**
Boiler weight					
- small reservoir	kg	465	517	569	621
- large reservoir	kg	496	547	598	649
Water space volume	dm^3	60	71,9	83,8	95,8
Diameter of smoke socket	mm	156			
Fuel reservoir capacity – small	dm^3	269			
Fuel reservoir capacity – large	dm^3	528			
Boiler dimensions (including small fuel reservoir): width x depth x height	mm	See fig. no. 1			
Boiler dimensions (including large fuel reservoir): width x depth x height	mm	See fig. no. 1			
Filling hole dimensions – small reservoir	mm	422 x 545			
Filling hole dimensions – large reservoir	mm	422 x 1210			
Boiler degree acc. to EN 303 - 5	-	3			
Working water overpressure	bar (kPa)	2,5 (250)			
Testing water overpressure	bar (kPa)	5 (500)			
Recommended operating temperature of heating water	°C	50 – 85	65 – 85		
Minimum return water temperature	°C	45	50		
Boiler hydraulic loss	mbar	0,72	0,96	1,32	1,59
Noise level	dB	Doesn´t exceed level 65 dB (A)			
Chimney draught	mbar	0,15 – 0,20		0,20 – 0,25	
Boiler connections – heating water	Js	G 2”			
– return water	Js	G 2”			
Connecting voltage		1/N/PE 230 V AC 50 Hz TN - S			
Electric input	W	100			
Electric coverage		IP 44			

Tab. no. 2a) Thermal technical parameters of the boiler during combustion of brown coal

Size		4 sect.	5 sect.	6 sect.	7 sect.
Nominal output	kW	20	25	30	35
Regulated output	kW	6 - 20	7,5 - 25	9 - 30	10,5 - 35
Fuel consumption at nominal output	$kg.h^{-1}$	4,5	5,6	6,65	7,65
Fuel consumption at minimum output	$kg.h^{-1}$	1,4	1,7	2,02	2,32
Fuel consumption in upkeep regime	$kg.h^{-1}$	0,1	0,1	0,1	0,1
Fuel value	$MJ.kg^{-1}$	19,17	19,17	19,17	19,17
Burning time at nominal output – small reservoir	h	36 h 15 min	29 h 10 min	24 h 30 min	21 h 15 min
Burning time at nominal output – large reservoir	h	71 h 30 min	57 h 20 min	48 h 15 min	42 h
Efficiency	%	up to 83,1	up to 85	up to 87	up to 89
Flue gas temperature	°C	116 – 197	100 – 180	90 – 170	90 – 165
Flue gas mass flow at outlet	$kg.s^{-1}$	0,008 – 0,018	0,008 – 0,020	0,009 – 0,022	0,010 – 0,024

Tab. no. 2b) Thermal technical parameters of the boiler during combustion of black coal

Size		4 sect.	5 sect.	6 sect.	7 sect.
Nominal output	kW	20	25	30	35
Regulated output	kW	6 - 20	7,5 - 25	9 - 30	10,5 - 35
Fuel consumption at nominal output	$kg.h^{-1}$	3,4	4,21	5	5,8
Fuel consumption at minimum output	$kg.h^{-1}$	1,03	1,28	1,52	1,76
Fuel consumption in upkeep regime	$kg.h^{-1}$	0,13	0,13	0,13	0,13
Fuel value	$MJ.kg^{-1}$	25,1	25,1	25,1	25,1
Burning time at nominal output – small reservoir	h	45 h 10 min	36 h 30 min	30 h 35 min	26 h 25 min
Burning time at nominal output – large reservoir	h	88 h 40 min	71 h 35 min	60 h 15 min	52 h
Efficiency	%	up to 84,2	up to 85	up to 86	up to 87
Flue gas temperature	°C	111 – 196	90 – 170	80 – 165	80 – 160
Flue gas mass flow at outlet	$kg.s^{-1}$	0,06 – 0,015	0,007 – 0,016	0,008 – 0,018	0,009 – 0,02

Tab. no. 2c) Thermal technical parameters of the boiler during combustion of wood pellets

Size		4 sect.	5 sect.	6 sect.	7 sect.
Nominal output	kW	20	25	30	35
Regulated output	kW	6 - 20	7,5 - 25	9 - 30	10,5 - 35
Fuel consumption at nominal output	$kg.h^{-1}$	4,85	6,06	7,26	8,47
Fuel consumption at minimum output	$kg.h^{-1}$	1,5	1,84	2,21	2,57
Fuel consumption in upkeep regime	$kg.h^{-1}$	0,35	0,35	0,35	0,35
Fuel value	$MJ.kg^{-1}$	17	17	17	17
Burning time at nominal output – small reservoir	h	27 h 10 min	21 h 45 min	18 h 10 min	15 h 30 min
Burning time at nominal output – large reservoir	h	53 h 20 min	42 h 40 min	35 h 35 min	30 h 30 min
Efficiency	%	up to 87,3	up to 87,4	up to 87,5	up to 87,5
Flue gas temperature	°C	95 – 175	90 – 165	80 – 160	80 – 155
Flue gas mass flow at outlet	$kg.s^{-1}$	0,006 – 0,016	0,008 – 0,0017	0,008 – 0,0018	0,009 – 0,022

! Important notice:

The above mentioned values vary according to the type, quality and moisture of the fuel used. Therefore there may be necessary corrections at setting of feeding time (proportion of fuel feeding and fuel afterburning time). For example, if there occur the sliver parts of fuel on the fire grate and in the ash pan, it is evident, that the speed of feeding is higher than the speed of afterburning, in this case it is necessary to decrease the feeding cycle.

Specified fuel parameters – *fuel which was tested by SZÚ:*

- Water content — max. 12 % (hard coal, wood pellets), max. 20 % (lignite)
- Volatile combustible content — 28 - 40 %
- Ash deformation temperature by melting — > 1150 °C
- Low agglutinating power
- Low creeping

Tab. no. 3 Specified fuel

Fuel	Sort of fuel	Granularity [mm]	Fuel value [MJ.kg^{-1}]
Hard coal	Peas	10 – 25	21 – 28,5
Lignite	Nub 2	10 – 25	16,5 – 19,5
	Nub 3	10 – 16	16,5 – 19,5
Biomass	Wood pellets	Ø 6 - 8	15 – 19

Tab. no. 4 Specified fuel – lignite (Automatic operation)

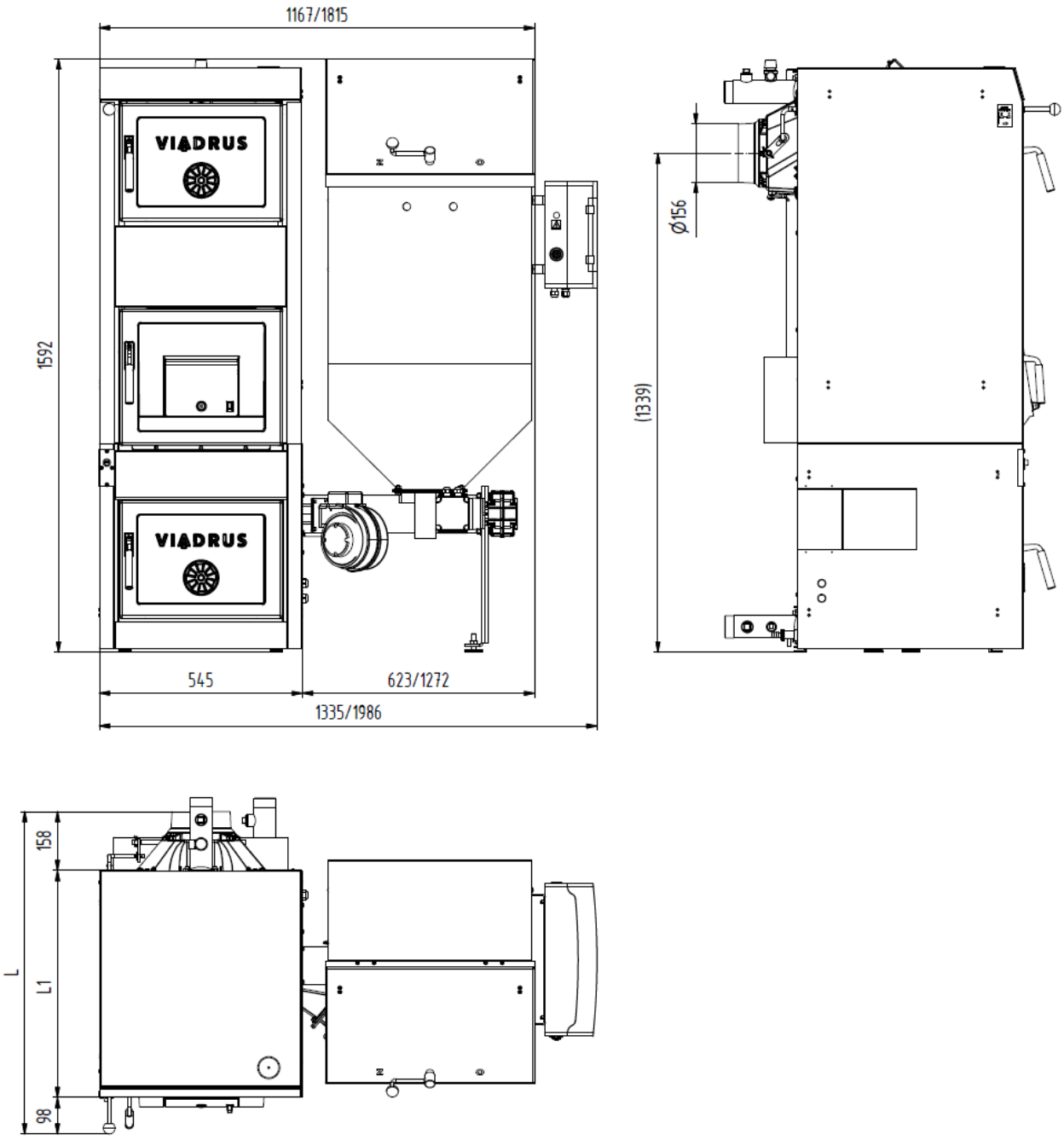
Fuel	Granularity [mm]	Fuel value [MJ.kg^{-1}]	Ash content [%]	water content [%]	sulphur content [%]	Specific sulphur content [g/MJ]	Tar content in dry matter [%]	Tar content in combustible matter [%]
Screened lignite – nub 2	10 - 25	17,6	9,8 (in anhydrous condition)	max. 20	0,77	0,44	15,1	15,71

The pellets must comply at least with on of the following directions or standards:

- Direction no. 14-2000 MŽP ČR
- DIN 517 31
- ÖNORM M 7135

Specified pellets granularity: between 6 and 8 mm
Maximum fuel water content. 12%.
Ash content max. 1,5 %

WARNING! A poor quality of fuel can markedly negatively affect the boiler output and emission parameters

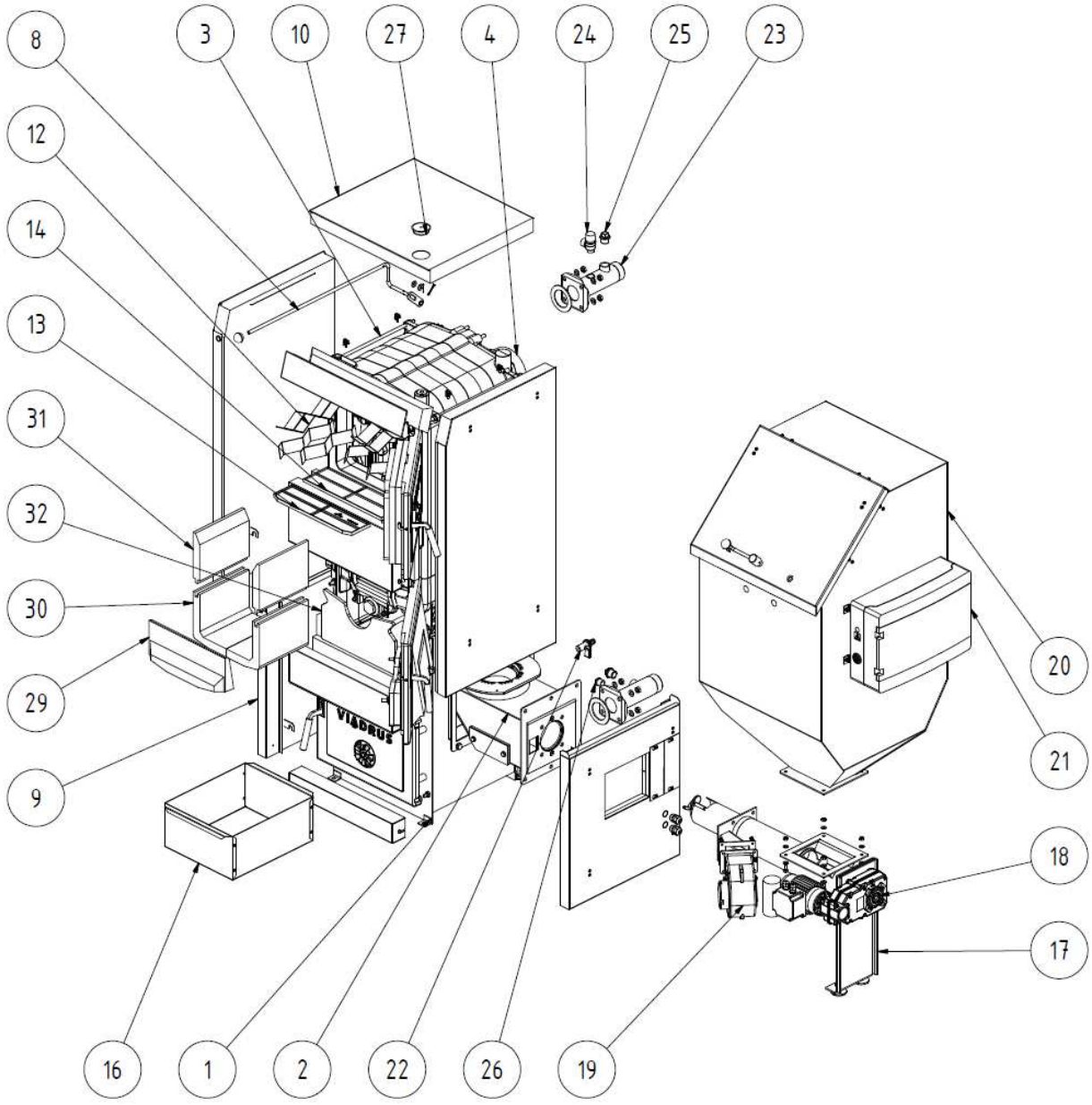


Length	4	5	6	7
L [mm]	754	865	976	1087
L1 [mm]	498	609	720	831

Fig. no. 1 Main dimensions of boiler (right version)
(dimensions after the slash apply to the variant with a large reservoir)

3. Description

3.1 Boiler construction



1. Basement
2. Burner
3. Boiler drum
4. Smoke adapter
5. Cleaning door
6. Cleaning door
7. Ash-pan door
8. Smoke control draw rod
9. Basement shell
10. Boiler drum shell incl. ash-pan
11. Safety thermostat
12. Turbulators
13. Partition of the combustion chamber front
14. Partition of the combustion chamber
15. Deflector
16. Ash-pan
17. Fuel feeder
18. Geared engine
19. Ventilator
20. Fuel reservoir
21. Service board
22. Filling and drain taps G ½“
23. Heating a return water flanges
24. Safety valve
25. Stopper with male thread Js 1 / 2 "
26. Stopper of boiler Js 1 / 2 "
27. Stopper of keg Ø 52.5 mm
28. Hook
29. Ceramics front
30. Ceramics lower
31. Fireclay top plate
32. Insulation back

Fig. no. 2a) Main parts of boiler

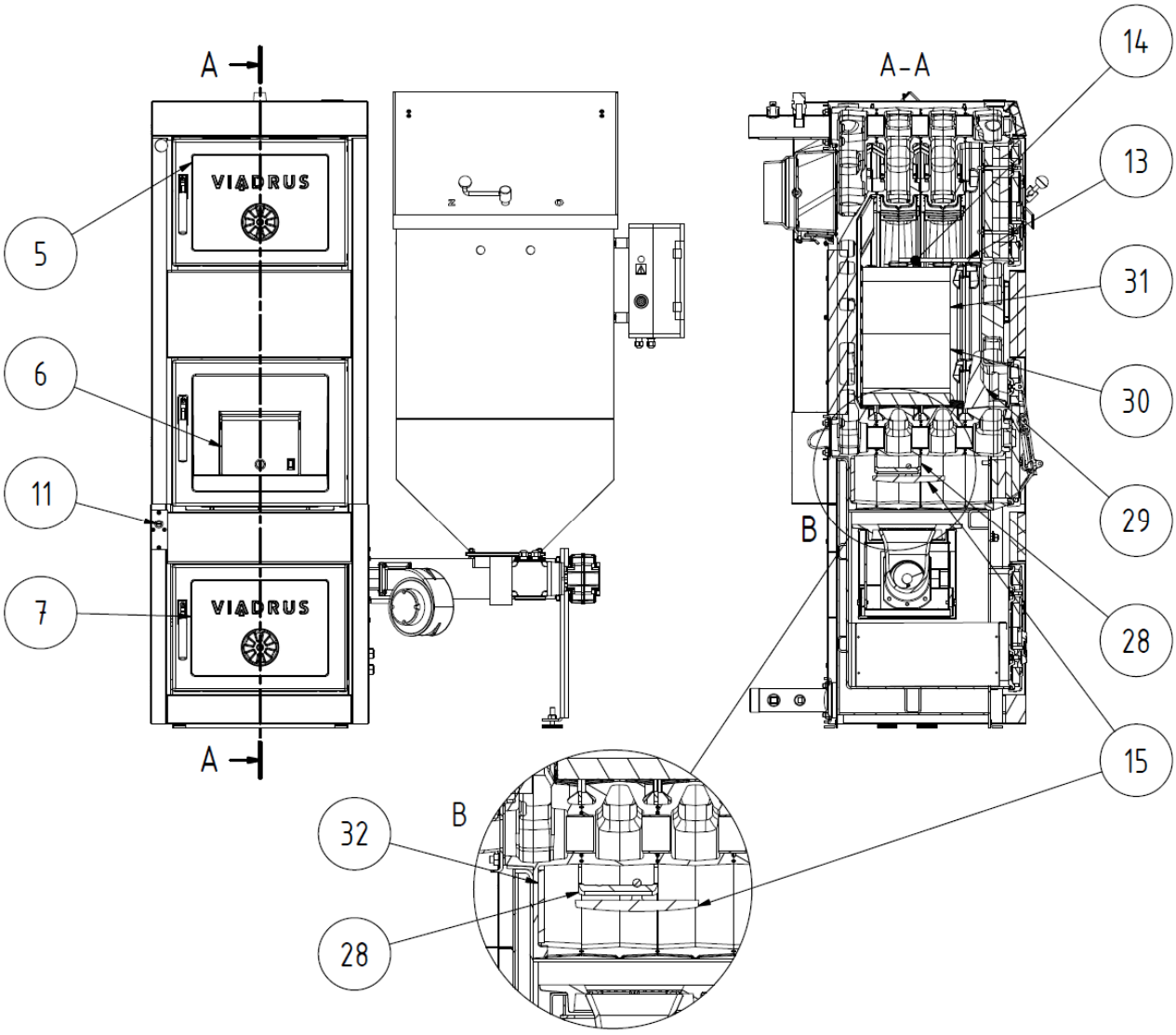
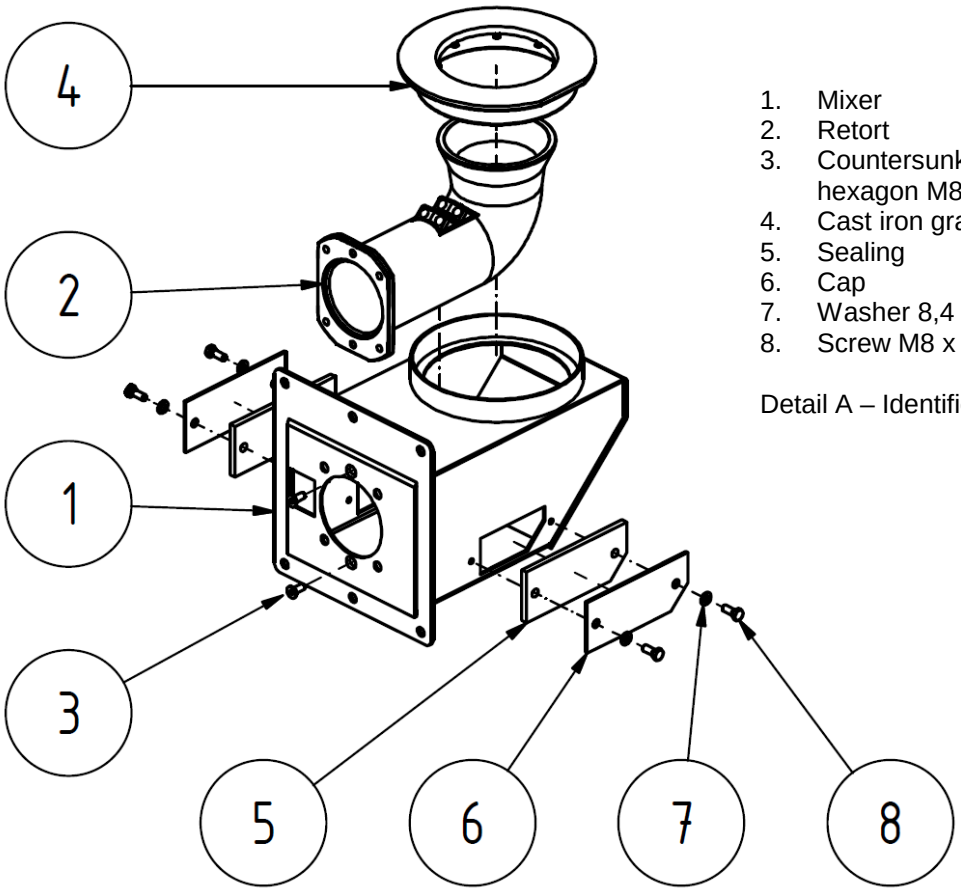


Fig. no. 2b) Main parts of boiler

The pressure parts of boiler correspond to the strength requirements according to:
EN 303-5 Heating boilers – Part 5: Heating boilers for solid fuele, hand and automatically stocked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

The cast iron body positioned on the basement welded of steel sheets is the core part of the boiler. The boiler drum consists of sections connected by means of pressed-on boiler inserts of 56 mm diameter and secured by anchor bolts. The sections form the combustion space, water space and convective part. Heating water inlet and outlet are situated at the rear of the boiler by means of two flanges 2" for connection to the heating system. The temafast Ø 60 x 48 x 2 mm sealing is between the boiler and flange.
The rear boiler section has the smoke adapter and heating water flange in the upper part and the return water flange is in the lower part of the basement. The cleaning door and ash-pan door are fastened to the front section. The folding grate is positioned behind the cleaning door (6).
Under the cast iron body there is positioned the burner with mixer (see. Fig. no. 3) that consists of cast iron grate and retort. We use 4 types of cast-iron grates with regard to the size of the boiler and fuel used. The various types of grates are marked with an identification symbol, see Figure 3 - a detail In table No. 5 there is shown the assignment of individual types of grates to a given boiler and fuel type..
The fuel is fed from the reservoir through the feed screw emptying into retort on the cast iron grate.
The ash-pan drawer is under the combustion chamber. Next to the boiler there is positioned the fuel reservoir that empties into fuel feed screw.
Ventilator for combustion air is positioned behind the fuel reservoir and is connected to the burner. Ventilator has the modulation control by SAPHIR regulator depending on the required output.
All components (boiler drum, basement) are insulated by means of health non-detrimental mineral insulation that reduces the heat transmission losses.
The high-quality komaxit spray is used for boiler shell colour treatment.
The boiler is made in left & right design.



1. Mixer
2. Retort
3. Countersunk screw with internal hexagon M8 x 20
4. Cast iron grate
5. Sealing
6. Cap
7. Washer 8,4
8. Screw M8 x 20

Detail A – Identification symbol

Fig. no. 3 Burner with mixer

Tab. No. 5 Assignment of the type of grate according to size of boiler and type of fuel

Marking of the grate (identification symbol)	Number of boiler sections and type of fuel				
	4 sections	**4 sections**	**5 sections**	**6 a 7 sections**	**6 a 7 sections**
	black coal brown coal	**pellets**	**black coal brown coal pellets**	**pellets**	**black coal brown coal**
no identification symbol	**x**				
1 identification symbol					**x**
2 identification symbols				**x**	
3 identification symbols		**x**	**x**		

4. Positioning and installation

4.1 Rules and regulations

A solid fuel boiler can only be installed by a firm holding a valid concession for boiler installation and maintenance.
A project according to the valid regulations must be prepared for the installation.
The heating system must be filled with water, that meets the ČSN 07 7401 requirements, especially its harness must not exceed the required parameters.

Recommended values		
Hardness	mmol/l	1
Ca^{2+}	mmol/l	0,3
Concentration of total Fe + Mn	mg/l	(0,3)*

*) recommended value

WARNING!!! The use of anti-freeze mixture is not recommended by the manufacturer.

In case the two-way safety device has responded to refill with water not conforming to ČSN 07 7401 it is necessary to treat the water in the system so that it again conforms to this standard.

a) to the heating system

ČSN 06 0310	Heating systems in buildings – Designing and installation
ČSN 06 0830	Heating systems in buildings – protecting device
ČSN 07 7401	Water and steam for thermal energy equipments with working pressure up to 8 MPa
EN 303-5	Heating boilers – Part 5: Heating boilers for solid fuele, hand and automatically stocked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

b) to the chimney

ČSN 73 4201	Chimneys and flue gas ducting– designing, implementation and connection of fuel consumers.

c) regarding the fire regulations

ČSN 06 1008	Fire safety of heat installations.
EN 13501-1 + A1	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests.

d) to the electrical network

ČSN 33 0165	Electrical regulations; marking the leading wires by colours or digits; implementing regulations
ČSN 33 1500	Electrical regulations; revision of electrical equipments
ČSN 33 2000-3	Electrical regulations; electrical equipments Part 3: Setting the basic characteristics.
ČSN 33 2000-4-41	Electrical equipments: part 4: Safety chap. 41: Protection against electric shock
ČSN 33 2000-5-51 ed. 2	Electrical regulations: Electrical equipments construction
ČSN 33 2130	Electrical regulations: Internal electricity distribution
ČSN 33 2180	Electrical regulations: Connection of electric instruments and appliances
ČSN 34 0350	Electrical regulations: Regulations for flexible cords and cord lines
EN 60 079-10	Electrical regulations: Regulations for electrical equipments at the places with explosion hazard with flammable gases and vapours.
EN 60 252-1	Capacitors for AC motors – Part 1: In general – Design, testing, dimensioning – Safety requirements – Instructions for installation and operation.
EN 60 335-1 ed.2	Electric appliances for household and similar purposes – Safety – Part 1: General requirements
EN 60 335-2-102	Electric appliances for household and similar purposes – Safety – Part 2-102: Special demands on appliances containing the electric connections and burning the gas, oil and solid fuels
EN 60 445 ed. 3	Basic and safety principles for man – machine interface, marking and identification
EN 60 446	Basic and safety principles of machinery operation - Marking the leading wires with colours or digits
EN 61000 – 6 – 3	EMC – Part 6 – 3: Basic standards – Emissions – residaytial, commercial and light industry environment.
EN 61000 -3 – 2	EMC - Part 3 – 2: Limits – Limits for harmonic currents emissions (device with input phase current up to 16 A inclusive).
EN 61000 – 3 –3	EMC – Part 3 - Limits - section 3: Specifies the limitation of voltage fluctuation and flicker in low-voltage supply systems for equipment with a rated input current greater than 16 A.

e) to the system of HWS heating

ČSN 06 0320	Heating systems in buildings – Hot water preparation – Designing and planning
ČSN 06 0830	Heating systems in buildings – Safety devices.
ČSN 73 6660	House water plumbing

4.2 Positioning possibilities

The boiler is equipped with the movable mains supply and plug. Boiler according to EN 60 335–1 ed. 2 Art. 7.12.4 must be positioned in such a way that the plug is accessible.
The installation of the boiler must comply with all requirements of ČSN 06 1008.

Boiler positioning with regard to the fire regulations:

1. Positioning on the floor made of incombustible material
   - The boiler can be installed on a fireproof and thermally instulating bottom which exceeds the boiler platform by 20 mm on the sides.
     - If the boiler is installed in a cellar, we recommend to install it on a minimum 50 mm high retaining wall (bedding). The boiler must be installed straight, any possible inequalities of retaining wall are eliminated by means of adjustable foot (see Figure No. 13)..

2. Safety distance from the combustible materials
   - when installing and operating the boiler it is necessary to keep a safety distance of 200 mm from the materials of combustibility grade A1, A2, B and C (D);
   - for easily combustible materials of combustibility grade E (F), which quickly burn and burn themselves even after removal of ignition source (such as paper, cardboard, asphalt and tar paper, wood and wood-fiber boards, plastics, floor coverings) the safe distance has to be doubled, i.e. to 400 mm;
   - safe distance should be doubled as bulb where the grade of reaction to fire has not been proved.

Tab. no. 6 Grade of reaction to fire

Grade of reaction to fire	Examples of building materials and products included in the reaction to fire (Extract from EN 13 501-1 + A1)
A1 – incombustible	Granite, sandstone, concrete, bricks, ceramic tiles, mortars, fireproof plasters, …
A2 – combustible with difficulty	acumin, izumin, heraklit, lignos, boards and basalt felt, fibreglass boards,...
B – hardly combustible	Beech and oak wood, hobrex boards, plywood, werzalit, umakart, sirkolit,...
C (D) – medium combustible	Pinewood, larch, whitewood, chipboard and cork boards, rubber flooring,...
E (F) – easily combustible	Asphaltboard, fibreboards, cellulose materials, polyurethane, polystyrene, polyethylene, PVC,…

Boiler positioning with regard to the necessary handling space:

- Basic environment AA5 / AB5 according to ČSN 33 2000-3
- In front of the boiler there must be left a minimum handling area of 1000 mm
- The minimum distance between the rear part of boiler and wall 400 mm.
- On the side of fuel reservoir there must be left min. space 800 mm in case of screw feed removal
- Minimum distance from the left side wall 100 mm
- Above the boiler in min. 450 mm.

Boiler positioning with regard to electricity network:

- The boiler must be placed so that the plug in socket (230V/50Hz) is always accessible.

Fuel positioning:

- **For the right burning in the boiler it is necessary to use the dry fuel.** The producer recommends to store the fuel in the cellar area or at least under the shelter.
- It is interdicted to store the fuel behind the boiler or next to the boiler within a distance smaller than 400 mm,
- The producer recommends to keep the distance between the boiler and fuel min. 1 000 mm, or to store the fuel in a different room that where the boiler is installed.

It must be ensured the continuous air supply into the room, where the boiler is installed for burning and eventual ventilation

Air consumption of VULCANUS boiler:

Number of section		4	5	6	7
air consumption	[$m^3.h^{-1}$]	60	75	90	110

CAUTION: When connecting the boiler to the heating system there must be installed a drain tap in the lowest point and as near as possible to the boiler.

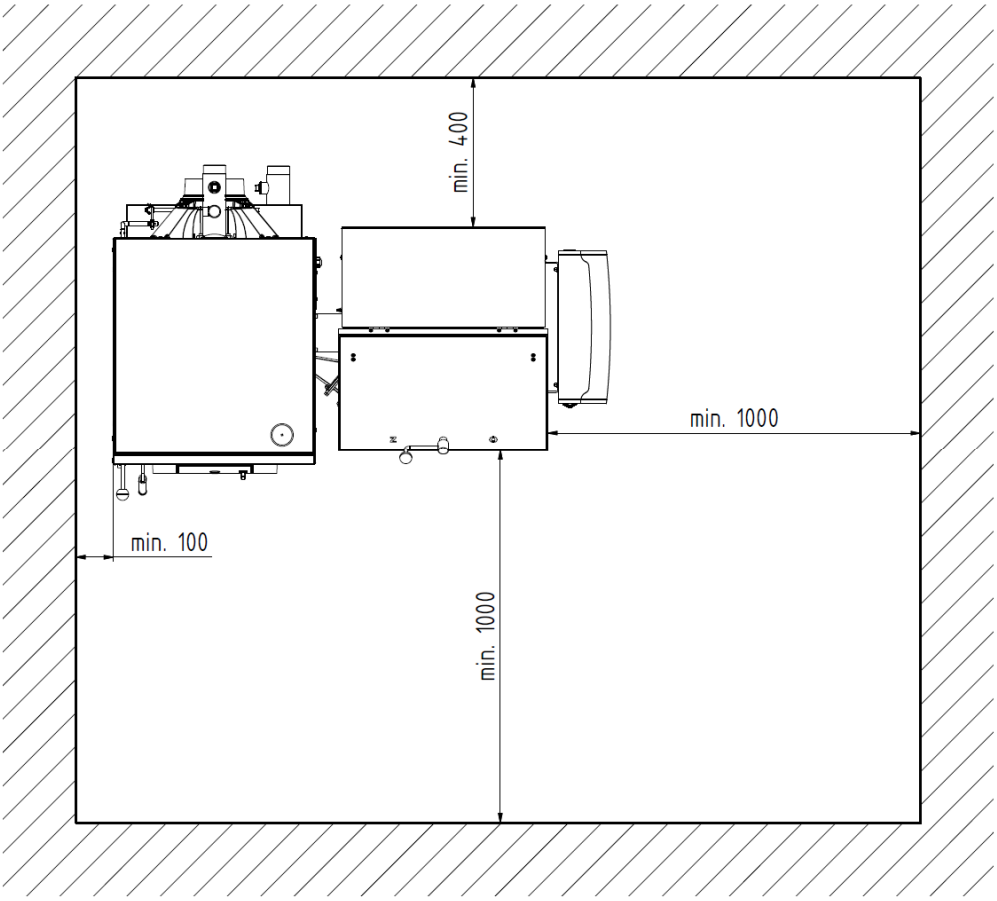


Fig. no. 4 VULCANUS boiler positioning in the boiler room

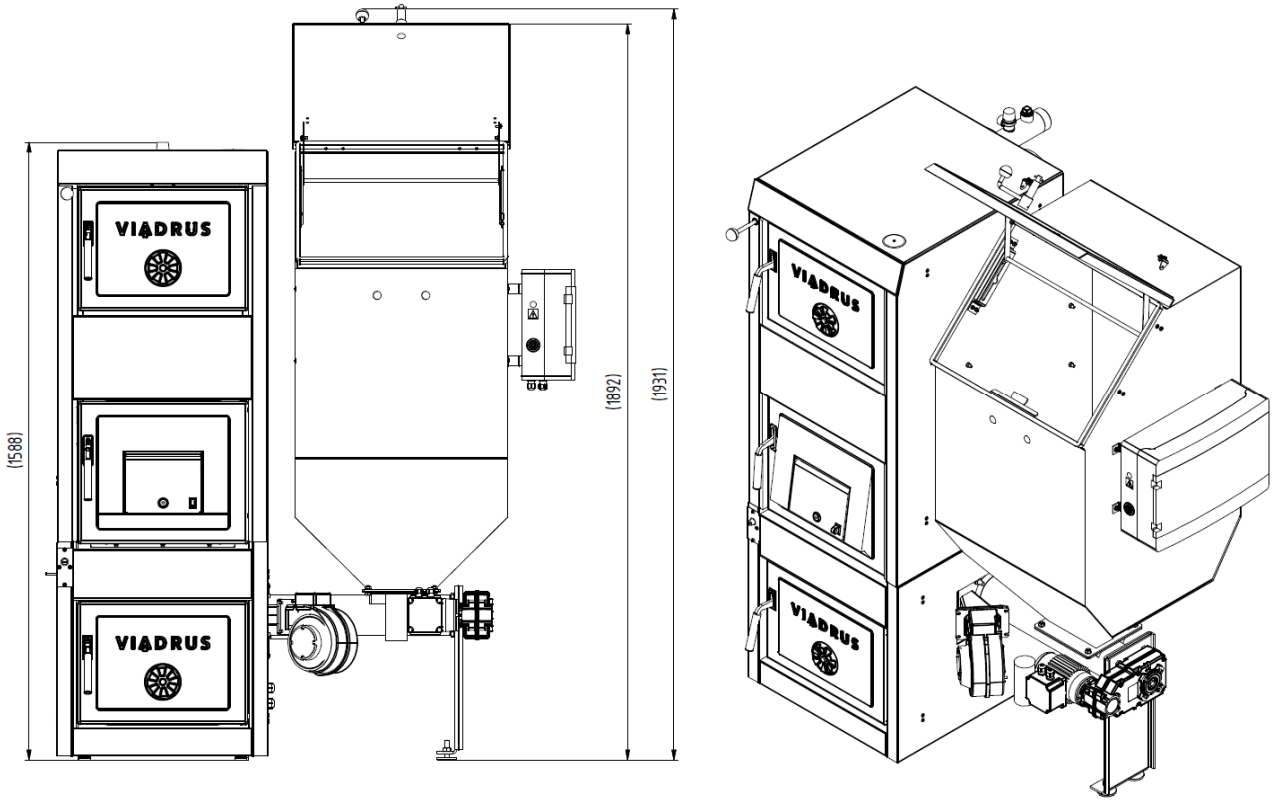


Fig. no. 5 VULCANUS boiler (the right version with a small reservoir) with the open fuel reservoir

4.3 Hydraulic connection diagram

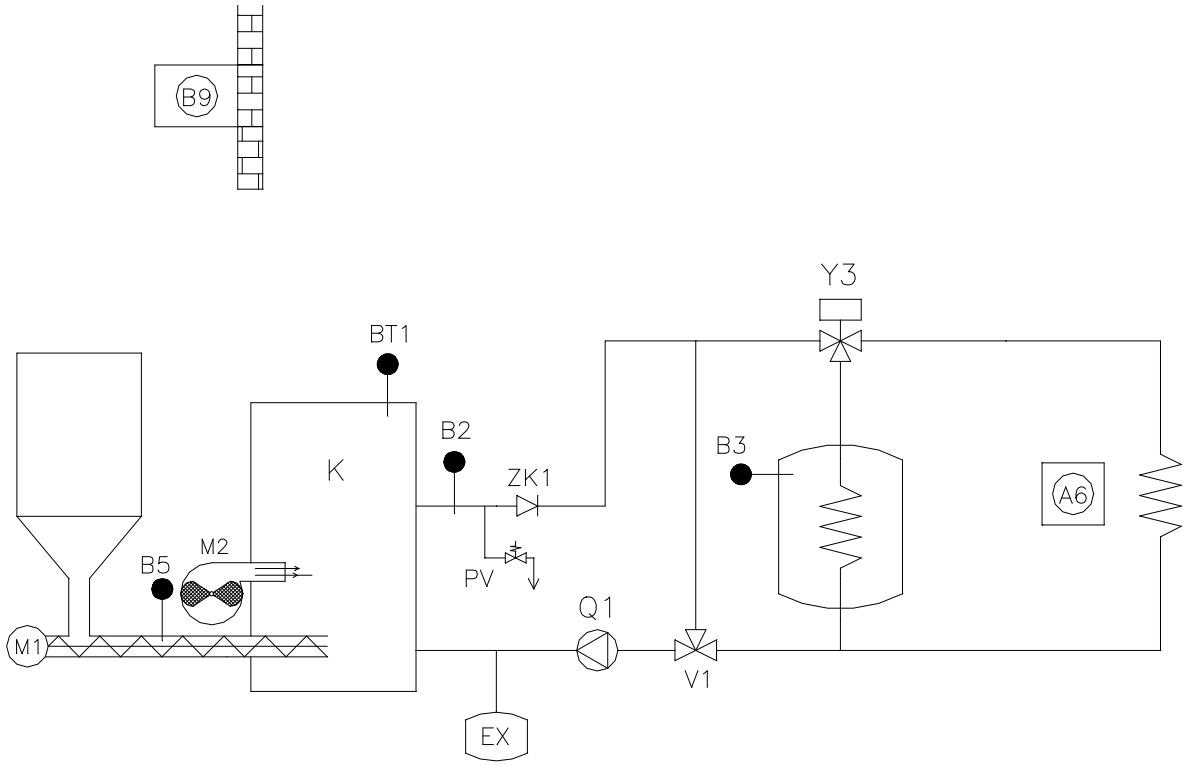


Fig. no. 6 Hydraulic diagram with HW preparation– Pump heating circuit

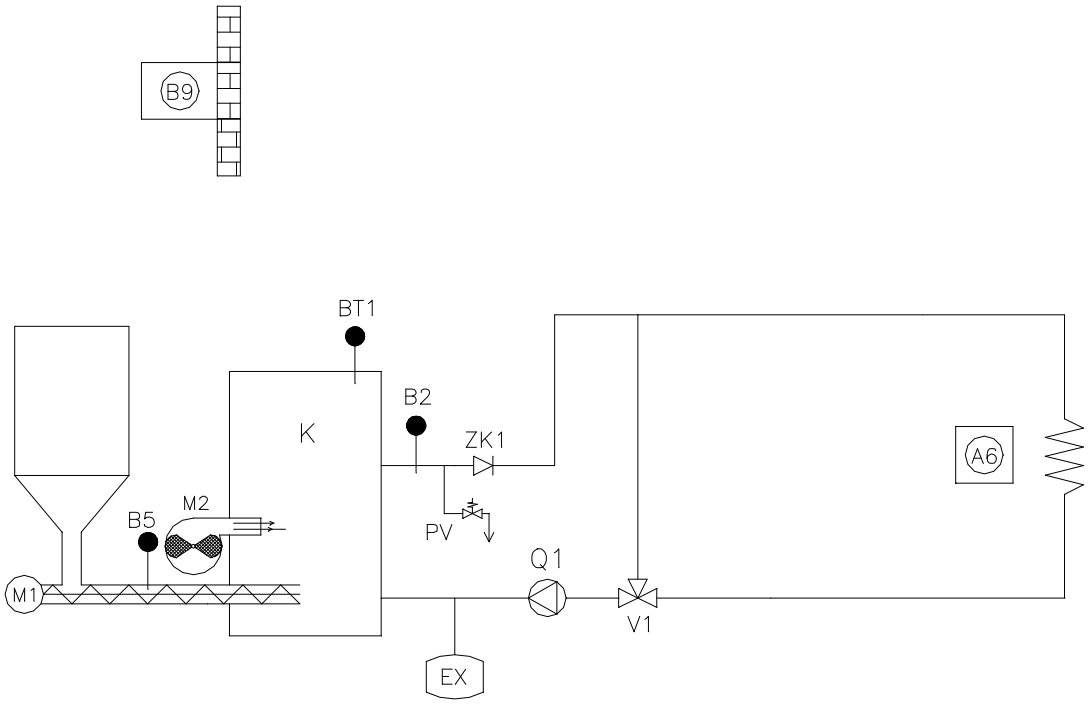


Fig. no. 7 Hydraulic diagram without HW preparation– Pump heating circuit

Legend to Fig. no. 6 and 7:

A6	QAA 88 device	M1	Fuel feeder motor
BT1	Safety thermostat	M2	Air fanmotor
B2	Boiler outlet temperature sensor	PV	Safety valve
B3	HW temperature sensor	Q1	Boiler primary circuit pump
B5	Fuel feeder temperature sensor	Y3	HW heating three-way valve
B9	Outside temperature sensor	V1	Thermostatic valve
EX	Expansion vessel	ZK	Clack valve

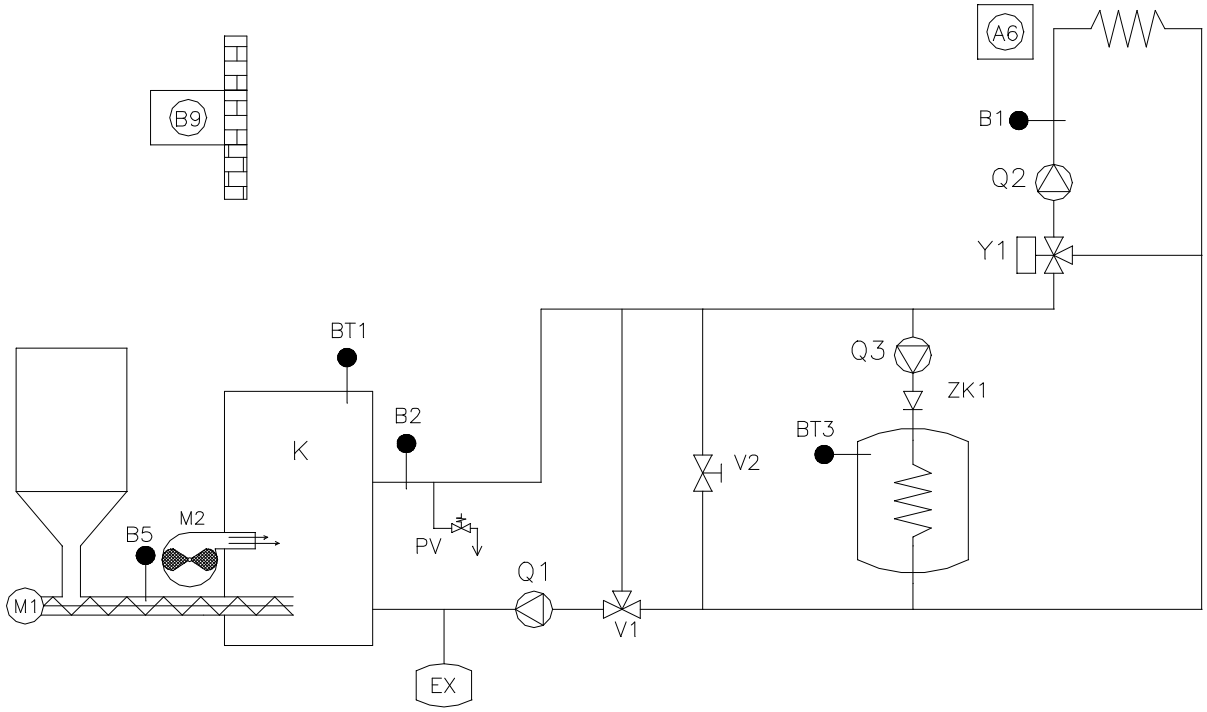


Fig. no. 8 Hydraulic diagram with HW preparation– Mixing heating circuit

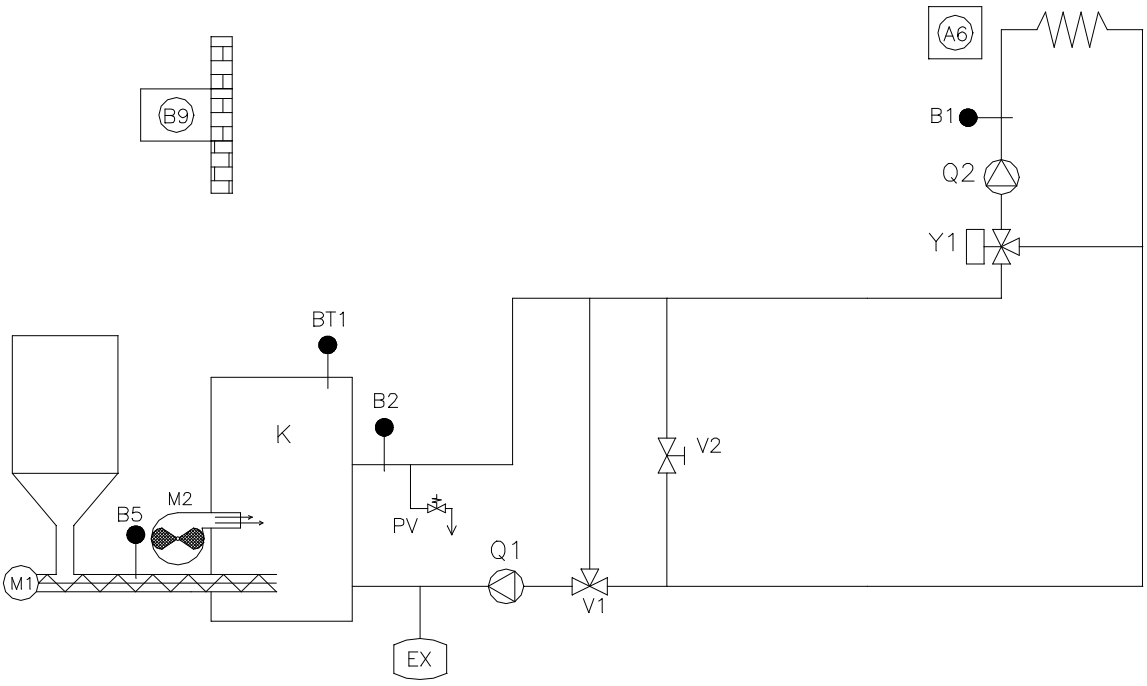


Fig. no. 9 Hydraulic diagram without HW preparation– Mixing heating circuit

Legend to figures no. 8 and 9:

A6	QAA 88 device
BT1	Safety thermostat
BT3	Thermostat HW
B1	Heating branch temperature sensor
B2	Boiler outlet temperature sensor
B5	Fuel feeder temperature sensor
B9	Outside temperature sensor
EX	Expansion vessel
M1	Fuel feeder motor
M2	Air fan motor
PV	Safety valve
Q1	Boiler primary circuit pump
Q2	Heating circuit pump
Q3	HW charging pump
Y1	Heating circuit three-way mixing valve drive
V1	Thermostatic valve
V2	Stop valve
ZK1	Clack valve

Note:
Select the dimension of shorting pipe with stop valve V2 up to the half of other piping dimension. Shorting pipe is necessary. In case the thermostatic valve V1 is only closed through the boiler and mixing valve Y1 is open to the heating circuit the heating circuit with the heating circuit pump will be secured through this shorting pipe.

Sensor cables can anyhow be shortened or prolonged provided following principles are observed:

- do not cut the sensor cable in the distance shorter than 0,5 m from the jacket;
- cable sensor prolongation by more than 10 m is not recommended;
- CMSM – H 2 x 0,5 mm cable is recommended for cable prolongation;
- Cable connection in case of prolongation is to be done very carefully. Ensure the conductive joint when you shorten or prolong the cable.

Note to the three-way valve V4044C (V4044F) made by Honeywell:
Connection AB –heating water outlet from boiler
Connection A – outlet to the water heater
Connection B – outlet to the heating circuit

Note to the three-way mixing valve VBI31.20 with drive SQK34.00 (Siemens):
After the connection of the three-way mixing valve it is necessary to check whether the valve opens in case heating is required. If it be to the contrary revert the phases L (Y1) and L1 (Y2). It is also important to observe the correct hydraulic connection of three-way mixing valve according to the enclosed manual.

Recommendation for the check!
Select the value 4 in P 20 parameter which means boiler manual operation. At this type of operation HMI ACX84.910 ALG service unit displays the word Wood.
Three-way mixing valve must open up to maximum into the heating circuit.

Floor heating

Floor heating can be used in mixing heating circuit. Following parameters have to be set:

- Parameter P 21 – Slope of heating curve to the value 0,8,
- Parameter P 76 – Minimum temperature of heating circuit (can be reduced to the value of 20 °C),
- Parameter P 77 – Maximum temperature of heating circuit max. 40 °C.

In case of superfluous heat withdrawal into the heating circuit the temperature will be mixed to the maximum set temperature of the heating circuit.

Note: In case of radiators and floor heating combination the floor heating must have its own regulation including the three-way mixing valve.

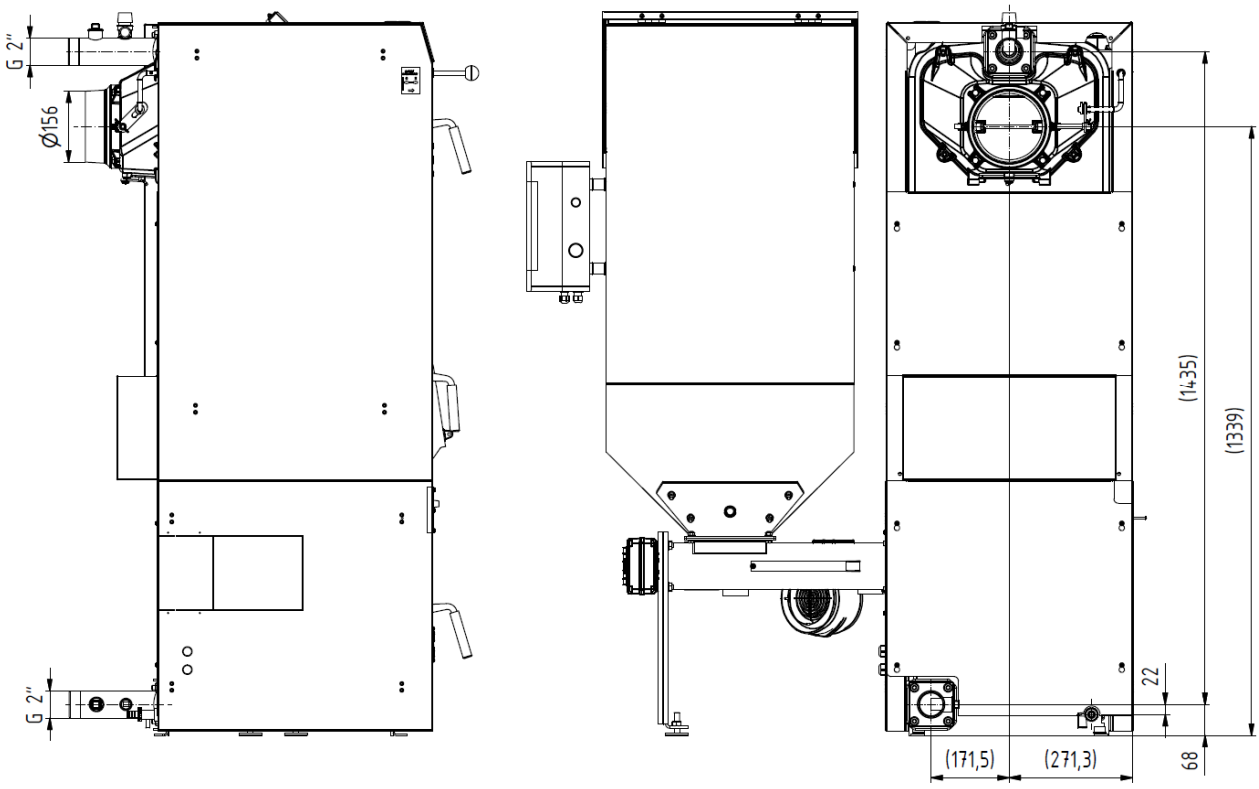


Fig. no. 10 Connecting dimensions of boiler

5. Boiler installation

5.1 Delivery and accessories

VIADRUS HERCULES DUO boiler based on the order is delivered in such a way that the complete boiler drum including the basement is put on the pallet and packed boiler shell is gripped at the side of it. The accessories are put inside the boiler drum and are accessible after opening the cleaning door. The fuel reservoir (depending on the requirement small – 269 dm^3 or large – 528 dm^3) including the fuel feeder set is put on another pallet. The boiler is packed in transport package and must not be tipped over during the transport.

Standard boiler delivery:

- boiler drum with basement
- fuel feeder set
- fuel reservoir
- service board SIMBOX WP 8GB1 373-3 – set incl. electric pack
- QAA 88 device
- ventilator
- connector for fan plug + socket
- round head screw and cross-recessed screw M6 x 16 (4 pc) for ventilator gripping to the feeder flange washer 6,4 (4 pc) to ventilator gripping to the feeder flange
- nut M6 (4 pc) to ventilator gripping to the feeder flange
- Safety thermostat
- round head screw and cross-recessed screw M4 x 6 (2 pc) for safety thermostat gripping
- boiler drum shell
- connection accessories for boiler drum shell (spring clip – 4 pc, junction stud – 4 pc, screw ST4,8 x 13 – 10 pc)
- basement shell
- connection accessories for basement shell (screw ST 4,2 x 9,5 – 4 pc, screw ST 4,8 x 13 – 8pc)
- connection accessories for basement shell gripping to the basement (washer 8,4 – 4 pc, nut M8 – 4 pc)
- ash-pan
- boiler mastic – tube 310 ml
- bushings PG 13,5 (2 pc)
- bushings PG 11 (2 pc)
- stud bolt M10 x 30 (4 pc) and washers 10 (4 pc) for gripping the fuel feeder set to the basement
- hexagon head screws M8 x 20 (4 pc) and washers 8 (4 pc) for gripping the fuel reservoir to the fuel feeder
- filling and drain tap Js 1/2“ (1 pc)
- plug Js 6/4“ blind (1 pc)
- sealing ϕ 60 x 48 x 2 (1 pc)
- hook (1 pc)
- deflector (1 pc)
- ceramics into the boiler drum (5 pcs)
- partitions of the combustion chamber (4 sections - 2 pcs, 5 sections - 3 pcs, 6 sections - 4 pcs, 7 sections - 5 pcs)
- turbulators (8 pcs)
- draw rod with hanaccording to for smoke flap control (1 pc)
- grommet HEYCO (2 pc)
- label for smoke flap control (1 pc)
- flange of heating and return water 2“ (2 pc)
- sealing ϕ 90 x 60 x 3 (2 pc)
- handling key (1 pc)
- cleaning tools (hook, brush with hanaccording to, tang, dowel 8 mm – 2 pc, straight threaded rivet 5x60 – 2 pc)
- siseal 10 g
- thermostatic valve BVTS (Danfoss) or TS 130 (Honeywell) or STS 20 (Watts)
- cast iron grate (see tab. no. 5)
- boiler sensor QAZ 36.526/109
- sensor against fuel fire penetration QAZ 36.526/109
- outside sensor QAC 34/101 (necessary for the full and basic version for equithermal control)
- thermostatic valve (filling valve) - series VTC312 (external thread) made by ESBE (minimum temperature of return water is 45 ^{o}C) (ord. code: 5100 15 00) - for 4 sect.
- thermostatic valve (filling valve) - series VTC512 (external thread) made by ESBE (minimum temperature of return water is 45 ^{o}C) (ord. code: 5100 15 00) - for 5 - 7 sect.

- sticker - LED for the safety thermostat signalization
- boiler operation and installation manual, a guarantee list is its part
- list of contract service organization

Obligatory accessories for mixing heating circuit (not included in the delivery):

- Heating branch sensor QAD 36/101 (Siemens)
- Three-way mixing valve VBI31.20 with drive SQK34.00 (Siemens) for 4 - 6 sect.
- Three-way mixing valve VBI31.25 with drive SQK34.00 (Siemens) for 7 sect.
- Water heater thermostat type: 7K1.6R326.00A (capillary length: 1000 mm, range: 0 - 60 oC) (in case boiler will be used for HW heating)

Obligatory accessories for pump heating circuit (not included in the delivery):

- Hot water sensor QAZ36.526/109 (in case boiler will be used for HW heating) (Siemens)
- Three-way valve V4044F (in case boiler will be used for HW heating) (Honeywell). – in this case only the phase, working and protective conductors will be connected. Note: also V4044C valve can be used.

Obligatory accessories (not included in the delivery):

- Safety valve (1 pc) according to the maximum boiler operating overpressure (see tab. no. 1)

Optional:

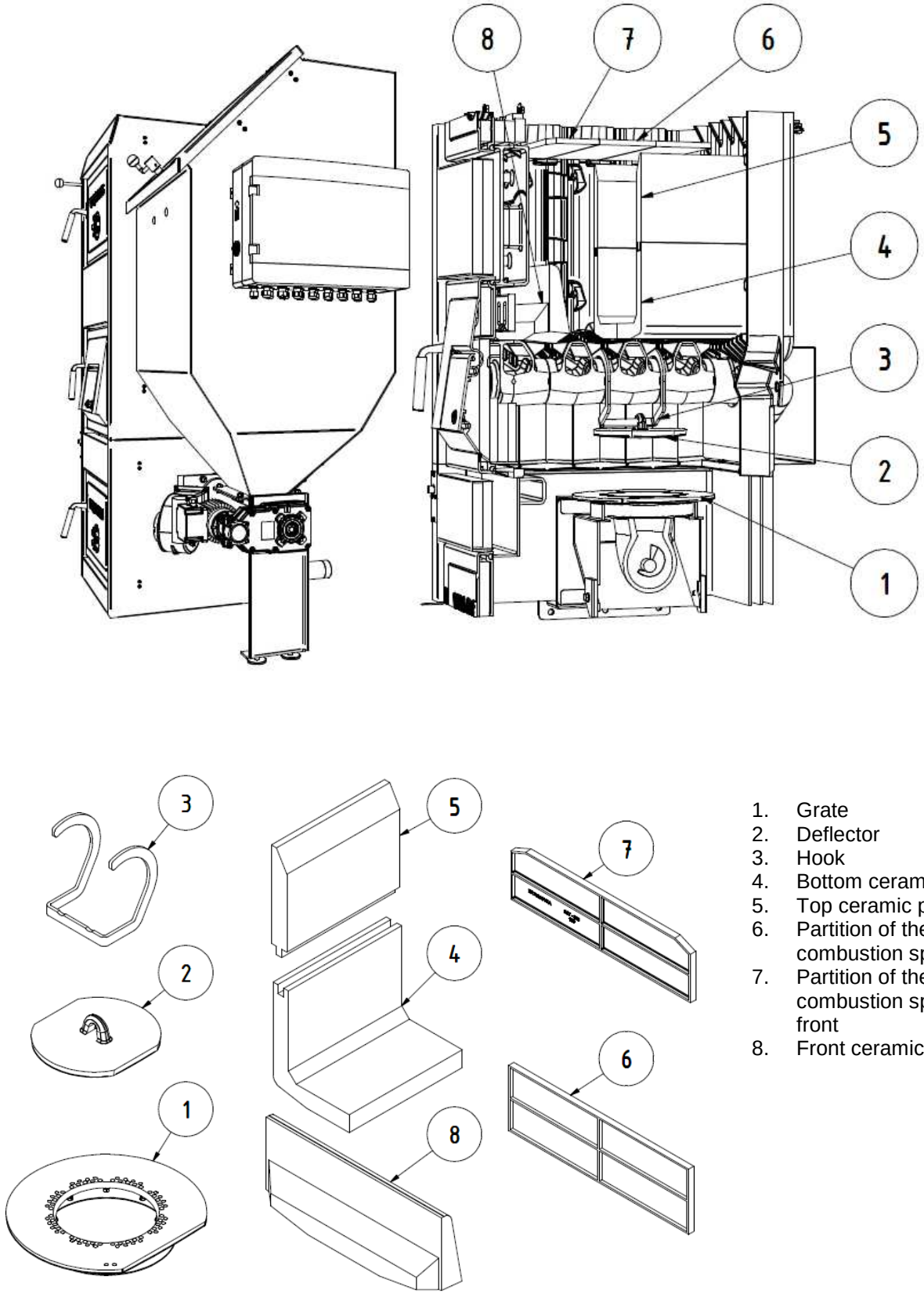
- HMI (ACX84.910/ALG) service unit for Saphir regulator operation – Siemens
- Circuit pump UPS 25-40
- Water heater (see the VIADRUS a.s. offer)

The optional boiler equipment is not included in the boiler standard price.

5.2 Installation procedure

5.2.1 Installation of boiler drum with the basement

1. Position the boiler drum with basement on the substructure (pad) into the horizontal position.
2. Insert the sealing between the heating water flange and boiler, then mount by means of four screws to the boiler (follow the boiler-room dispositions). By welding connect the heating water outlet with the heating system.
3. Insert the sealing between the return water flange and boiler, then mount by means of four screws to the boiler. By welding connect the lower return water outlet with the heating system.
4. Mount the drain valve into the hole at the rear of the basement.
5. Put the stove-pipe on the smoke adapter and insert into chimney hole. The stove-pipe diameter is 160 mm.
6. Blind the threaded hole JS 6/4“ in the front section with plug JS 6/4“. Put the sealing under the plug.
7. It is recommended to install shut-off valves before and after the pump with a filter, for reason of cleansing the strainer of filter or replacement of pump.
8. Open the cleaning door (see Figure No. 2 - Item 6) and hang hook with deflector so that the center of the deflector is above the center of the burner grate (see Figure No. 11).
9. Open the cleaning door (see Figure No. 2a - Item 5) and insert 8 turbulators (see Figure No. 2a - Item 12), 5 pieces of ceramics (see Figure No. 11) and partitions of the combustion space (see Figure No. 11).



1. Grate
2. Deflector
3. Hook
4. Bottom ceramics
5. Top ceramic plate
6. Partition of the combustion space
7. Partition of the combustion space-front
8. Front ceramics

Fig.No. 11 Location of components and ceramics inside the boiler

5.2.2 Shells assembly

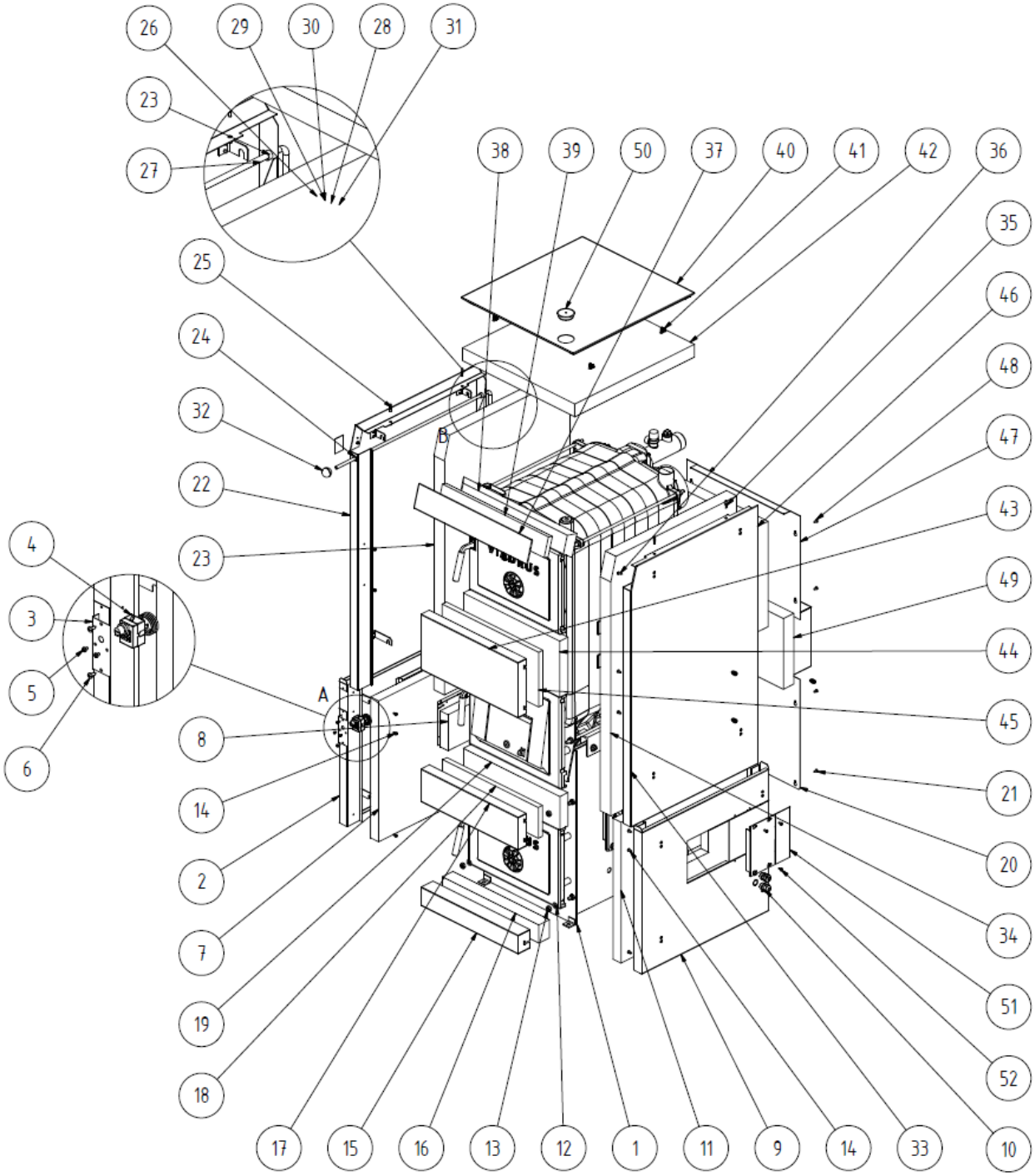


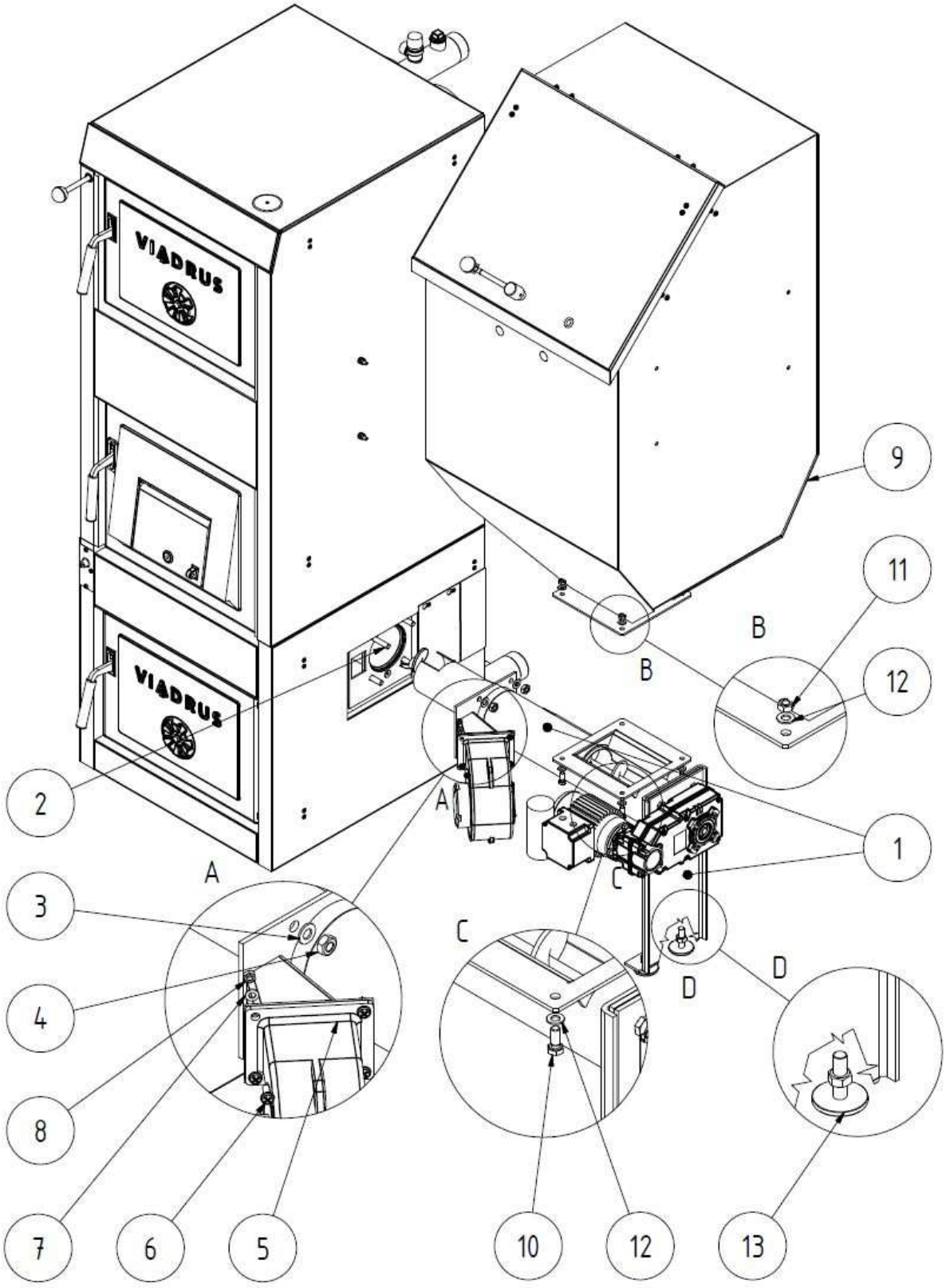
Fig. no. 12 Boiler shell

Legend to Fig.No. 12:

1. Boiler drum with basement
2. Left side part of basement shell
3. Safety thermostat holder
4. Safety thermostat
5. Screw M4 x 6 (2 pcs)
6. Screw ST 4,8 x 13 (2 pcs)
7. Insulation of left side part of basement shell
8. Insulation into cut-out
9. Right side part of basement shell
10. Bushing PG 13,5 (2 pcs)
11. Insulation of left side part of basement shell
12. Washer 8,4 (4 pcs)
13. Nut M8 (4 pcs)
14. Screw ST 4,8 x 13 (4 pcs)
15. Front lower part of shell
16. Front lower part of the shell insulation
17. Front upper part of shell
18. Front upper part of the shell insulation (sibral)
19. Front upper part of the shell insulation (rotaflex)
20. Rear lower part of shell
21. Screw ST 4,2 x 9,5 (4 pc)
22. Left side part of the shell
23. Side part of the shell insulation
24. Grommet Heyco
25. Junction stud (2 pc)
26. Washer 10,5 (1 pc)
27. Draw rod of smoke control
28. Control mechanism lever
29. Washer 10,5 (1 pc)
30. Plug ∅3 x 25 (1 pc)
31. Lock 2,5 x 32 (1 pc)
32. Bakelite ball
33. Right side part of the shell
34. Side part of the shell insulation
35. Junction stud (2 pcs)
36. Screw ST 4,8 x 13 (6 pcs)
37. Face
38. Face insulation (rotaflex)
39. Face insulation (sibral)
40. Upper part of the shell
41. Spring clip (4 pcs)
42. Upper part of the shell insulation
43. Front part of the shell
44. Front part of the shell insulation (rotaflex)
45. Front part of the shell insulation (sibral)
46. Rear part of the shell upper insulation
47. Rear part of the shell
48. Screw ST 4,8 x 13
49. Rear part of the shell insulation
50. Stopper of keg Ø 52.5 mm
51. Cover
52. Screw ST 4,8 x 13 (4 pcs)

1. Remove the shell from the cardboard package.
2. Mount the relevant connection accessories on the steel sheet components according to Fig. no. 12.
3. Jacket the **VULCANUS** boiler according to Fig. no. 12.
4. Screw the safety thermostat (2 pc screw M4 x 6) to the safety thermostat holder. Screw the holder with the safety thermostat to the left shell of basement (2 pc screw ST 4,8 x 13) – see detail A. (Note: lead the safety thermostat capillary between the shell and insulation). The electric connection of safety thermostat is done before jacketing the boiler. The cable goes in the bushing through the side part of the basement shell depending on the design either in the left or right part of basement shell. The boiler output temperature sensor must be positioned in the boiler basin across the bushing in the side part of the basement shell (depending on the right or left design) also before the boiler jacketing.
5. Mount the left and right side part of basement shell incl. insulation. Depending on the left or right design selection break out the steel sheet for feeder connection. Screw the cover by means of 4 screws ST 4.8 x 13 to a part of the cut out hole. Grip the side parts to the basement by means of M8 nuts and 8,4 washers (only to the front part of the basement).
6. Mount the front parts of basement shell incl. insulation (upper and lower) and screw the rear part of basement shell to the side parts of basement shell.
7. Mount the left and right side part of shell incl. insulation to the anchor screws (screw the junction studs into both side parts of shells and mount the HEYCO bushings in the left shell).
8. Pull the smoke control draw rod through the left side part of the shell and secure by a plug. Mount the smoke control lever on the draw rod and secure by means of 2 pc washers and plugs. Connect the smoke control lever with smoke adapter flap and secure with a lock; the screw the bakelite ball
9. Stick the label for signalling the smoke flap on the left-hand side part of the shell at the point of smoke control draw rod.
10. Mount the front part of the shell incl. insulation.
11. Screw the rear part of the shell to the side parts.
12. Seat the face with insulation on the side parts.
13. Insert the spring clips into the upper part of shell with insulation and mount on junction studs of shell side parts.

5.2.3 Fuel reservoir assembly



1. Fuel feeder
2. Stud bolt M10 x 30 (4 pcs)
3. Washer 10,5 (4 pcs)
4. Nut M10
5. Ventilator
6. Screw M6 x 16 (4 pcs)
7. Washer 6,4 (4 pcs)
8. Nut M6 (4 pcs)
9. Fuel reservoir
10. Screw M8 x 20 (4 pcs)
11. Nut M8 (4 pcs)
12. Washer 8,4 (8 pcs)
13. Adjustable foot (2 pcs)

Fig. no. 13 Fuel reservoir and feeder assembly

Screw on the adjustable legs of the the fuel feeder assembly, see Fig.No. 13 - Detail D.
Apply sealant onto the base of boiler , then mount the fuel feeder assembly to the base of the boiler and tighten. Thus we have ensured a precise position of the fuel feeder assembly perpendicularly to the boiler base. Loose the adjustable legs so that they sit on the floor. Apply sealant to the flange for the fan on the the fuel feeder assembly. Then mount the fan.
Apply sealant to the fuel feeder assembly at the point of sitting surface of the fuel tank. Settle the fuel tank and tighten the screws.

ATTENTION!!! **Before the fuel reservoir is loaded with fuel it is necessary to check the free rotation of fuel feed screw.**

5.2.4 Mounting of the service board to the fuel reservoir

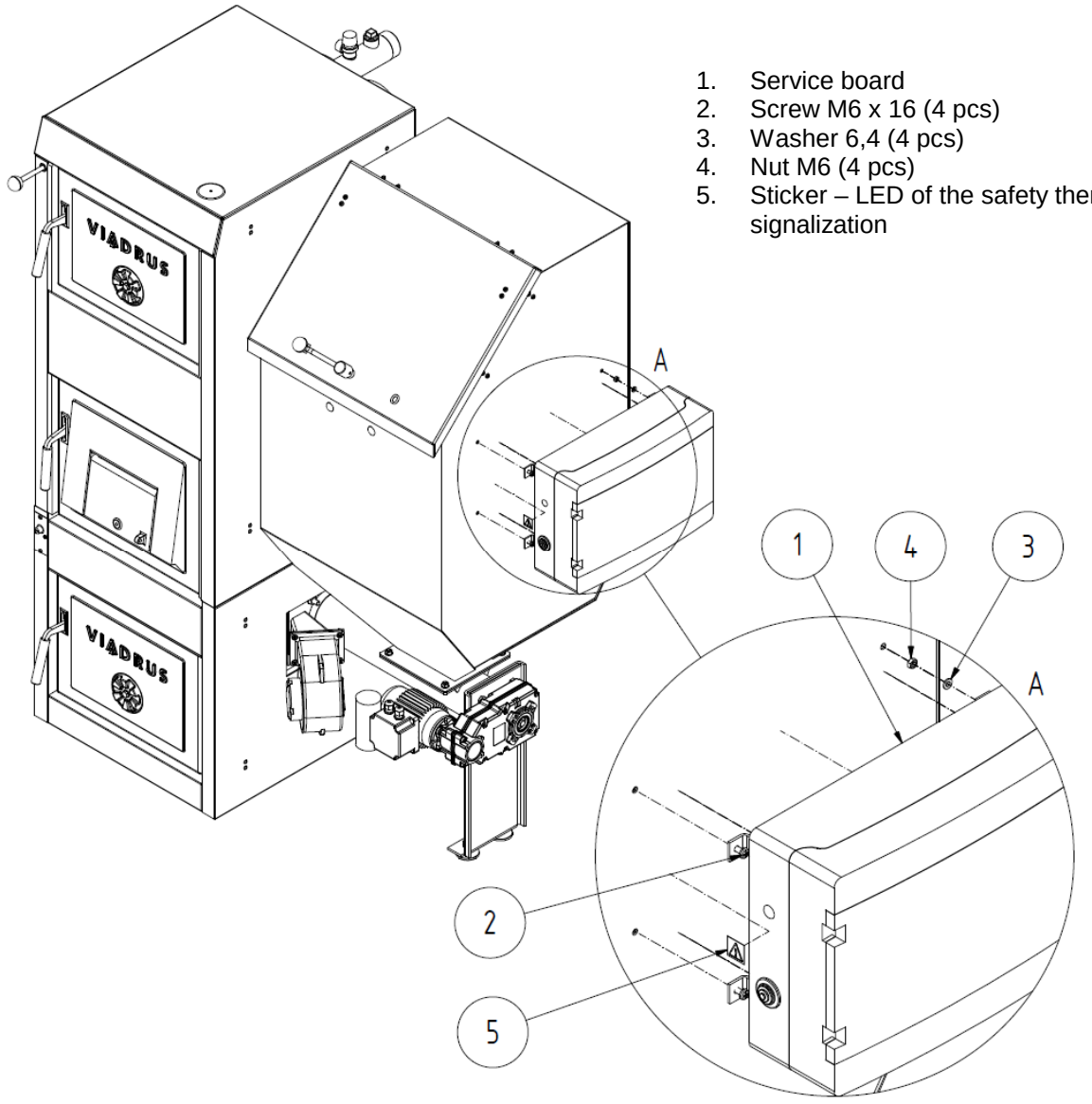


Fig. no. 14 Mounting of the service board to the fuel reservoir

1. Screw the service board to the side of fuel reservoir.
2. Carry out the wiring system according to diagram in chap. 5.2.8.
3. To stick the sticker – LED of the safety thermostat signalization (5) on the switchboard (1).

5.2.5 Mounting of cleaning tools

The ordinary assembly tools and leather gloves are to be used for mounting and demounting of the brush and spike on tang (if it is included in the delivery).

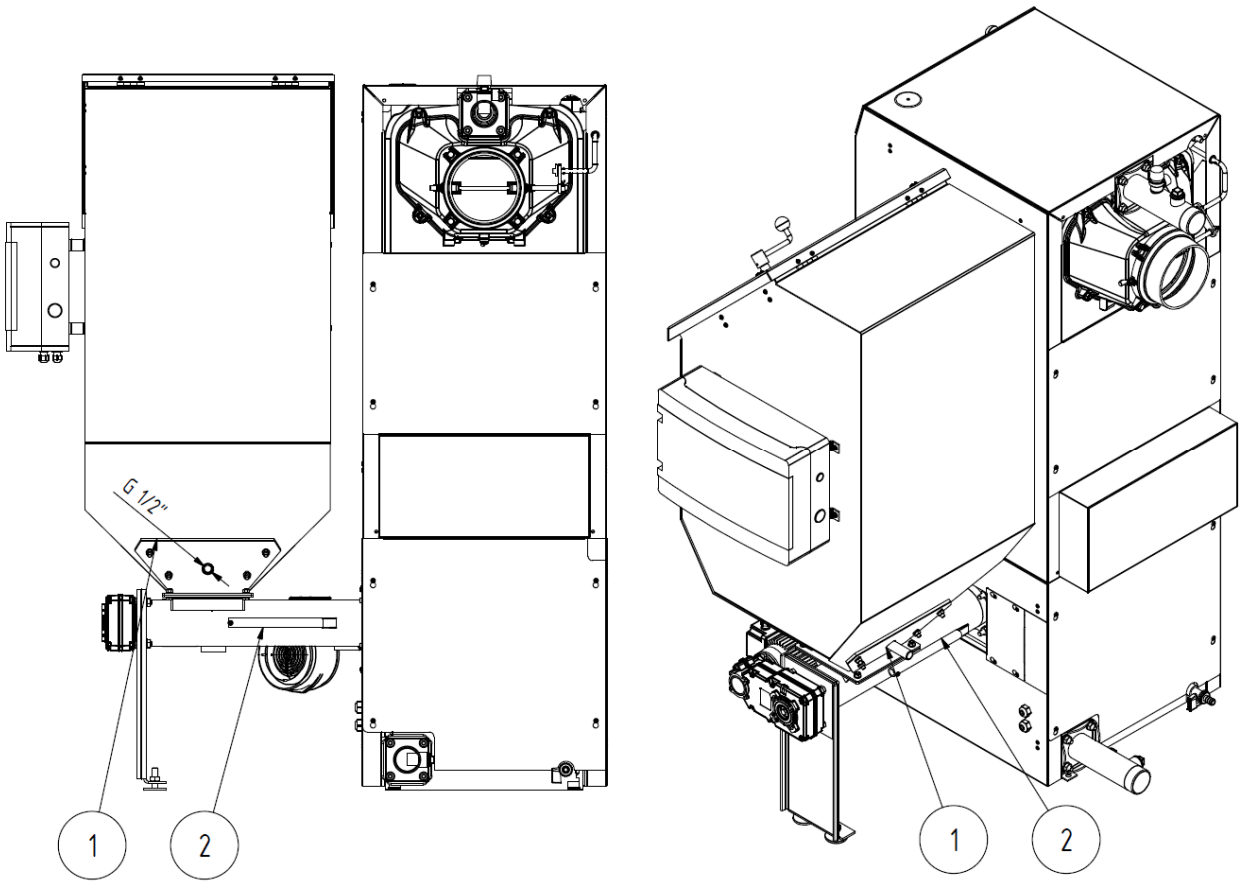
5.2.6 Assembly of the emergency fire extinguishing equipment

In the cleaning hole cover there is a pipe for water inlet with 1/2“ connection that serves for BVTS valve or TS 130 or STS 20 interconnection. The interconnection can be carried out by means of flexible(stainless) hose. On the ground of possible disassembly it must regard the demountable connection of valve with the pipe in the cleaning hole cover. The valve sensor is to be positioned in the sensor holder that is on the fuel feeder.

Note: The valve sensor is to be positioned in the sensor holder without the valve basin that is included in the delivery.

The function of the emergency fire extinguishing equipment :

In case of fire penetration to the feeder (temperature on the feeder reaches 95 ^{o}C), TS 130 (STS 20) valve switches on the cold water supply to the hopper and the burning fuel is extinguished; then the water supply is stopped. Then it is necessary to dismantle the engine with the worm shaft and stainless insert and clean them. It is followed by the reassembly. Check the valve: if it still lets water into the reservoir replace the valve.



1. Clearing opening cover
2. Sensor holder

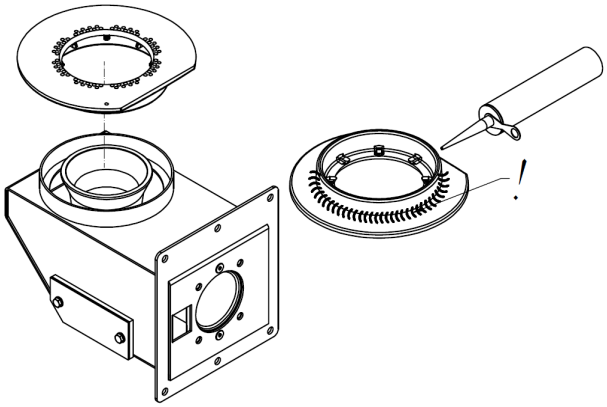
Fig. no. 15 Assembly of the emergency fire extinguishing equipment

5.2.7 Boiler conversion from right-hand design to the left-hand design

Boiler conversion after delivery before installation:

- We remove the grate and pull out the burner with mixer from the basement (the connection accessories are as follows: 6 pc screw M10 x 30, 12 pc washer a 10,5, 6 pc nut M10).
  - Unscrew the the blind flange, insulation, holder (bracket) of insulation from the left side of the base (see Fig.No. 17 - detail B) and install them on the right side (the connecting material is as follows: 4 screws M10 x 30, 8 pc washer 10,5 , 4 pc nut M10). Remove the old sealant. It is necessary to seal by means of sealant the metal plates between the base and holder of insulation and between the holder (bracket) of insulation and the blind flange.We apply mastic to the burner with mixer flange and we put the burner into the basement from the left-hand side and screw it (the connection accessories are as follows: 6 pc screw M10 x 30, 12 pc washer 10,5, 6 pc nut M10).
  - We remove the old mastic from the grate. We apply a reasonable quantity of new mastic to the bearing surfaces and we mount the grate in the burner. *(Note: In case of a 4 sectional boiler size the*

cutting off of the grate must be always toward the back wall at the frontal view into the boiler. In case of 5 - 7 sectional boiler size the cutting off of the grate must always be directed to entry to the fuel feeder.)

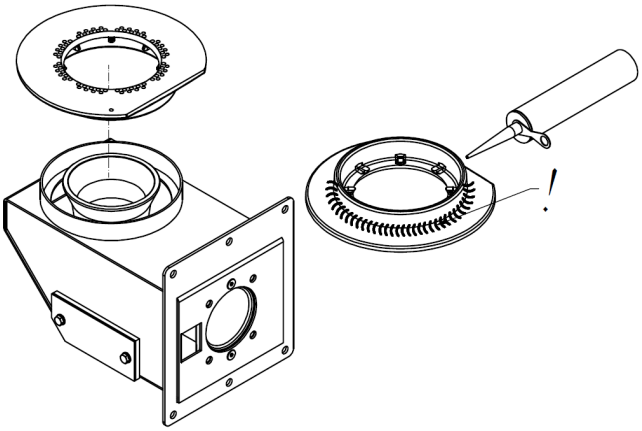


Apply boiler mastic to the point marked and put the grate on the retort with mixer. It is necessary to ensure the tightness between the burner and grate.

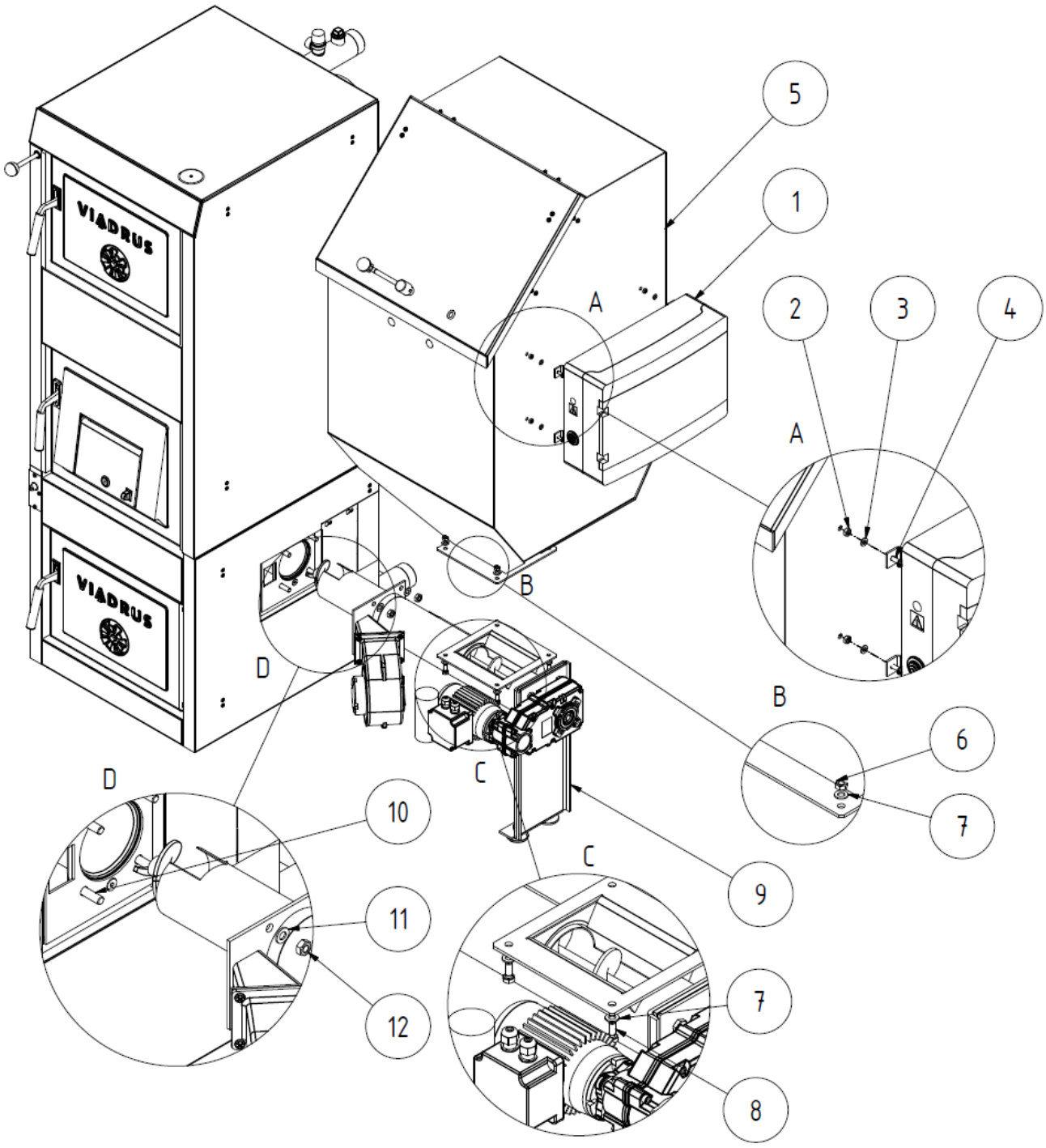
– Then we proceed according to chap. 5.2.

Conversion of already installed boiler:

– We let the boiler burn out.
– We disconnect the boiler from mains
– We disconnect the geared motor, ventilator (we disconnect the connector), boiler primary pump, safety thermostat from regulator and we pull out the sensor against fire penetration from the basin and outlet sensor from the boiler basin, we disconnect the outside sensor and QAA 88 device. Depending on the used pump or mixing heating circuit we disconnect the HW sensor with three-way valve or thermostat with HW pump, HC pump with mixing valve and heating circuit sensor.
– We disconnect the emergency fire extinguishing equipment.
– First of all we empty the reservoir. We dismantle the fuel reservoir from the fuel feeder (the connection accessories are as follows: 4 pc screw M8 x 20, 4 pc washer 8,4 and 4 pc nut M8).
– We disconnect the fuel feeder from the boiler basement (the connection accessories are as follows: 4 pc screw M10 x 20, 4 pc washer 10,5).
– We remove the boiler shell.
– We remove the grate and pull out the burner with mixer from the basement (the connection accessories are as follows: 6 pc screw M10 x 30, 12 pc washer 10,5, 6 pc nut M10).
– Unscrew the the blind flange, insulation, holder (bracket) of insulation from the left side of the base (see Fig.No. 17 - detail B) and install them on the right side (the connecting material is as follows: 4 screws M10 x 30, 8 pc washer 10,5 , 4 pc nut M10). Remove the old sealant. It is necessary to seal by means of sealant the metal plates between the base and holder of insulation and between the holder (bracket) of insulation and the blind flange
– We apply mastic to the burner with mixer flange and we put the burner into the basement from the left-hand side and screw it (the connection accessories are as follows: 6 pc screw M10 x 30, 12 pc washer 10,5, 6 pc nut M10).
– We remove the old mastic from the grate. We apply a reasonable quantity of new mastic to the bearing surfaces and we mount the grate in the burner. *(Note: In case of a 4 sectional boiler size the cutting off of the grate must be always toward the back wall at the frontal view into the boiler. In case of 5 - 7 sectional boiler size the cutting off of the grate must always be directed to entry to the fuel feeder.)*

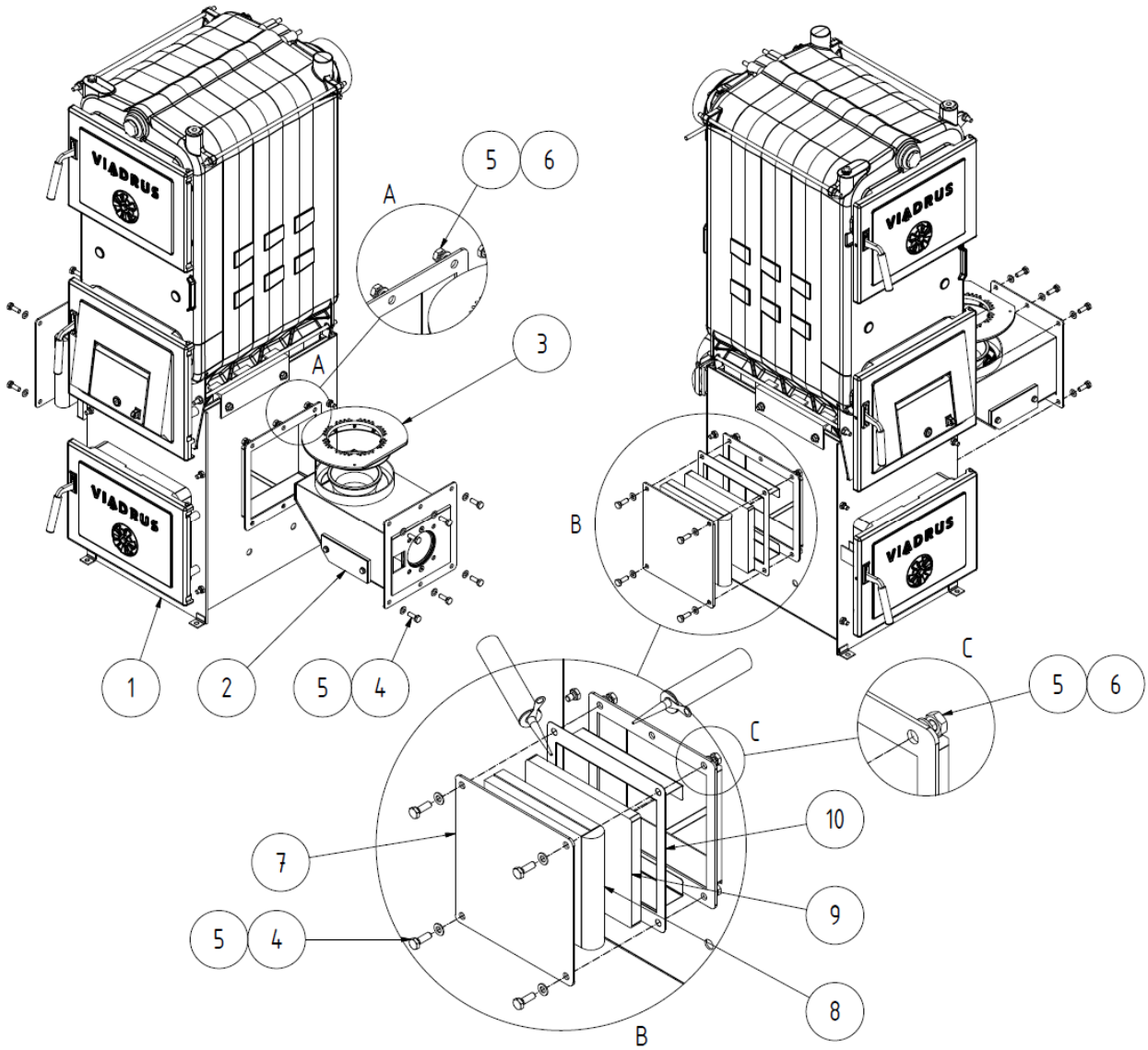


Apply boiler mastic to the point marked and put the grate on the retort with mixer. It is necessary to ensure the tightness between the burner and grate.



1. Service board
2. Nut M6 (4 pcs)
3. Washer 6,4 (4 pcs)
4. Screw M6 x 16 (4 pcs)
5. Fuel reservoir
6. Nut M8 (4 pcs)
7. Washer 8,4 (8 pcs)
8. Screw M8 x 20 (4 pcs)
9. Fuel feeder
10. Screw M10 x 20 (4 pcs)
11. Washer 10,5 (4 pcs)

Fig. no. 16 Boiler conversion from the right-hand to left-hand design- fuel reservoir and feeder disconnection



1. Basement
2. Burner
3. Grate
4. Screw M10 x 30 (6 pcs)
5. Washer 10,5 (16 pcs)
6. Nut M10 (10 pcs)
7. Blind flange
8. Insulation (sibral board)
9. Insulation of the opening otvoru (sibral mat)
10. Holder (bracket) of insulation

Fig. no. 17 Boiler conversion from the right-hand to left-hand design – dismantling of burner and blind flange

- On the left side part of the jacket of the base cut out a metal plate for the connection of the feeder.
- Transfer the insulation from the left lateral part of the jacket of the base into a slot in the right lateral part of the jacket of the base..
- We jacket the boiler (see chap. 5.2.2).
- We apply mastic to the fuel feeder flange and connect it to the boiler basement (the connection accessories are as follows: 4 pc screw M10 x 20, 4 pc washer 10,5). We turn the motor in such a way that it is in the rear when viewing the boiler from the front.
- We remove the old sealant from the flange of the fuel feeder and we apply a reasonable amount of a new sealant to the seating surface. Then we connect the fuel feeder with the fuel reservoir (connecting material is as follows: 4 screws M8 x 20, 4 pcs washer 8.4 and 4 pcs nut M8).
- We connect the emergency fire-extinguishing equipment.
- We connect the service board incl. consoles to the fuel reservoir.
- We reconnect the components (in case the conversion was done already after the primary installation the length of cables must be trimmed as need may be).

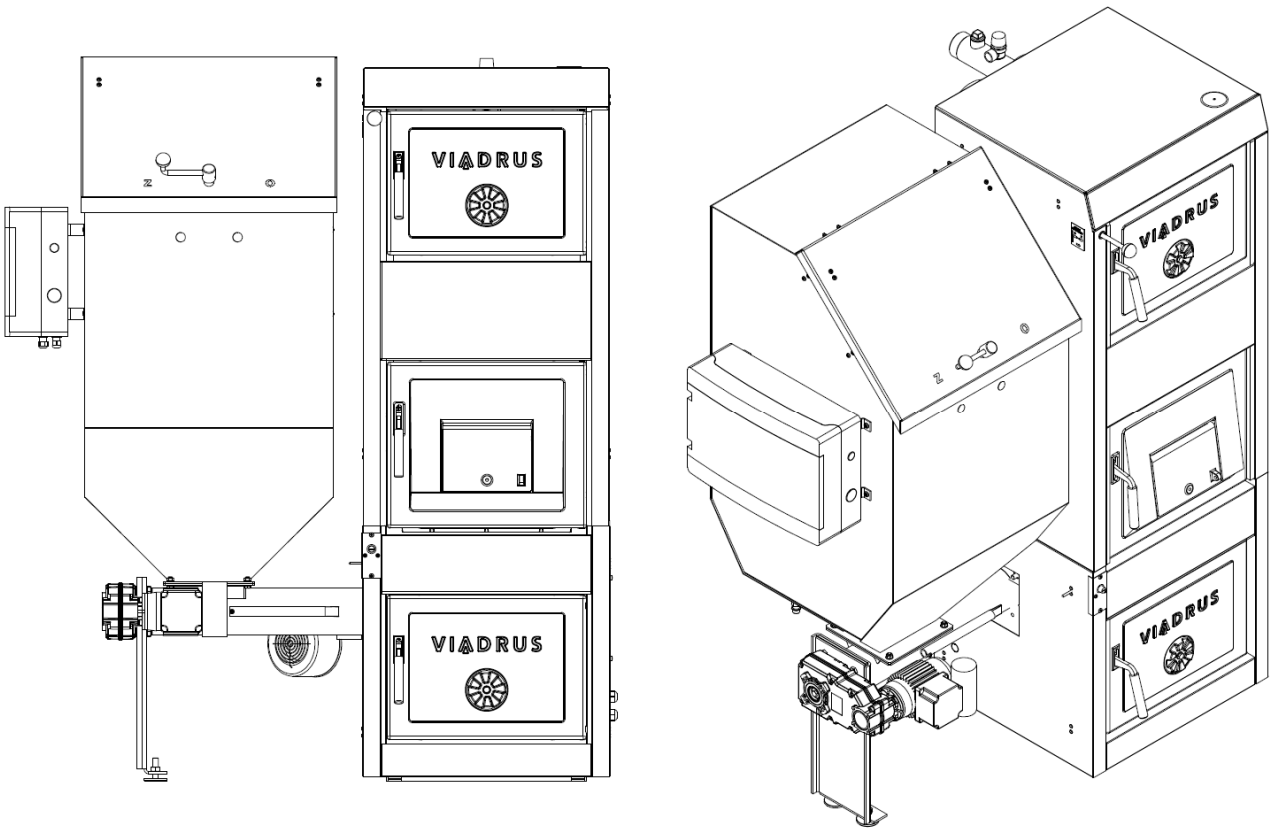
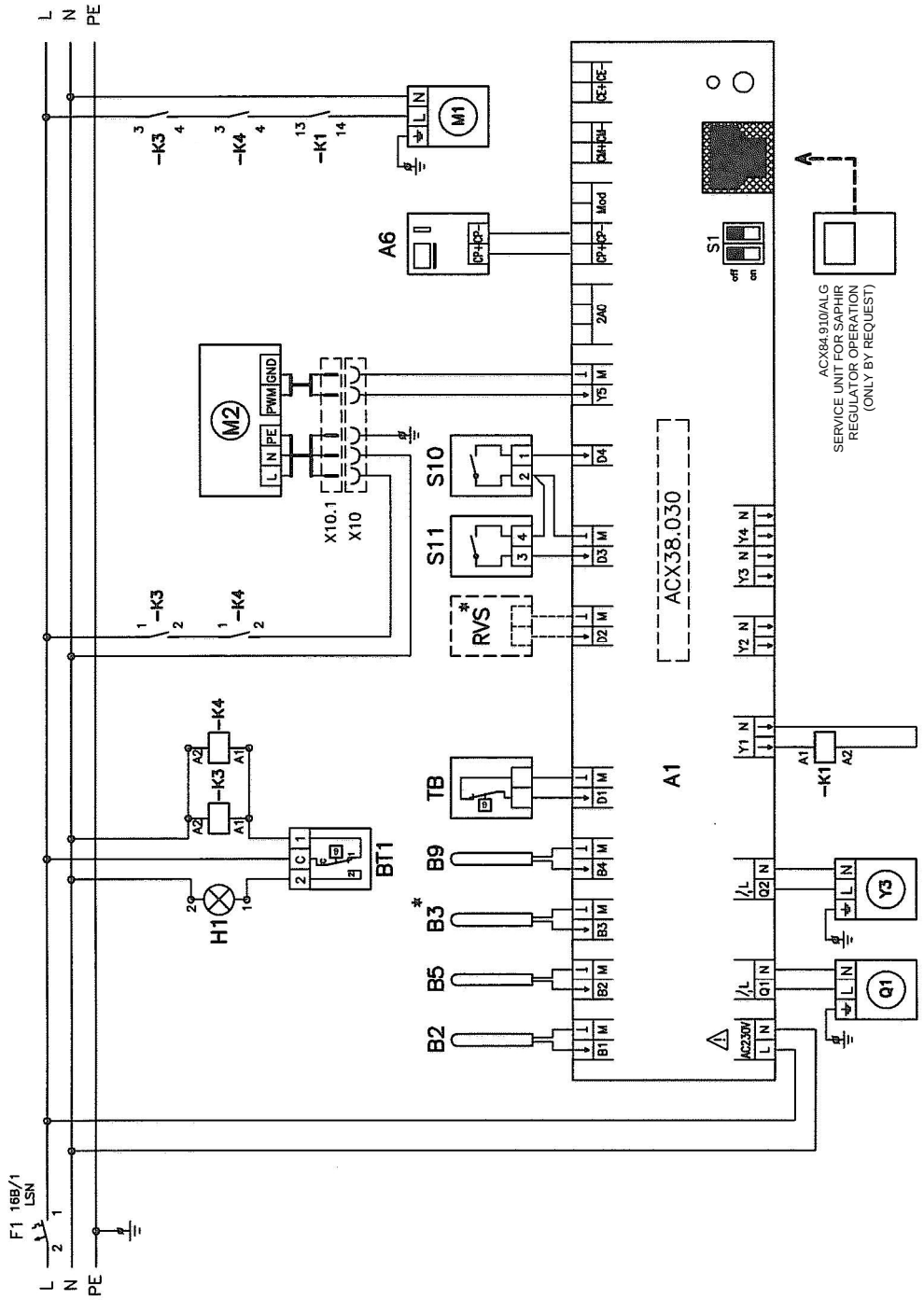


Fig. no. 18 VULCANUS boiler (left-hand design)

5.2.8 Wiring diagram



F1	Single-phase circuit breaker 16A	M1	Fuel feeder motor
A1	Regulator Siemens ACX 38.030	M2	Air fan motor
B2	Boiler output temperature sensor QAZ 36.526/109	X10	Ventilator socket
B3	Temperature sensor HW QAZ 36.526/109	X10.1	Ventilator plug
A6	QAA 88 device	Q1	Boiler primary circuit pump
B5	Fuel feeder temperature sensor QAZ 36.526/109	Y3	HW three-way valve
B9	Outside temperature sensor QAC 34/101	S1	Regulator system reverser
TB	Motor thermal protection	S10	Manual fuel move key
BT1	Safety thermostat	S11	Fan manual start key
H1	Safety thermostat signalling	*	RVS – see chap. Superior control
K1	Fuel feeder motor relay		
K3, K4	Relay of the safety circuit		

Fig. no. 19 Elementary wiring diagram– Pump heating circuit

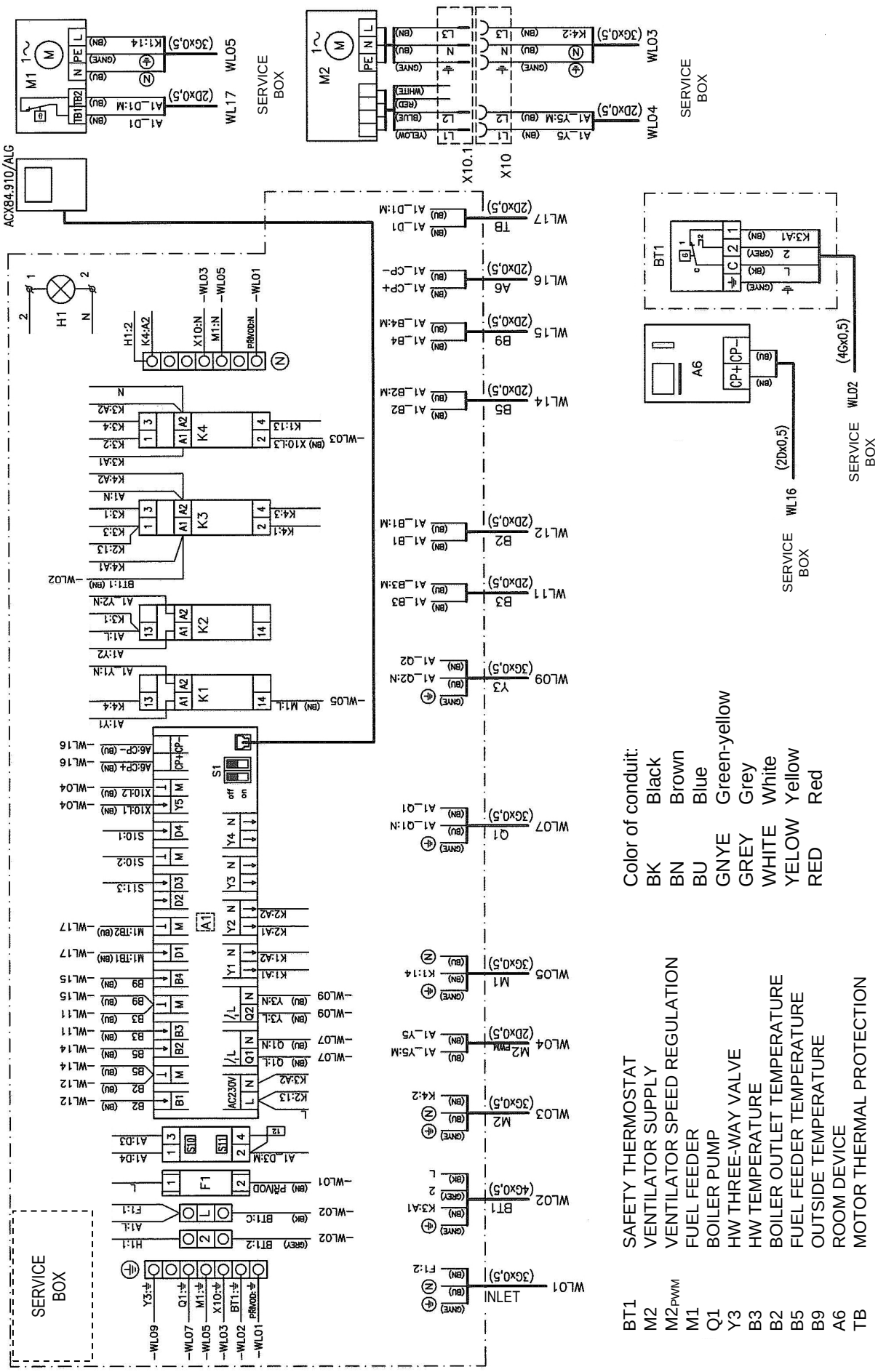
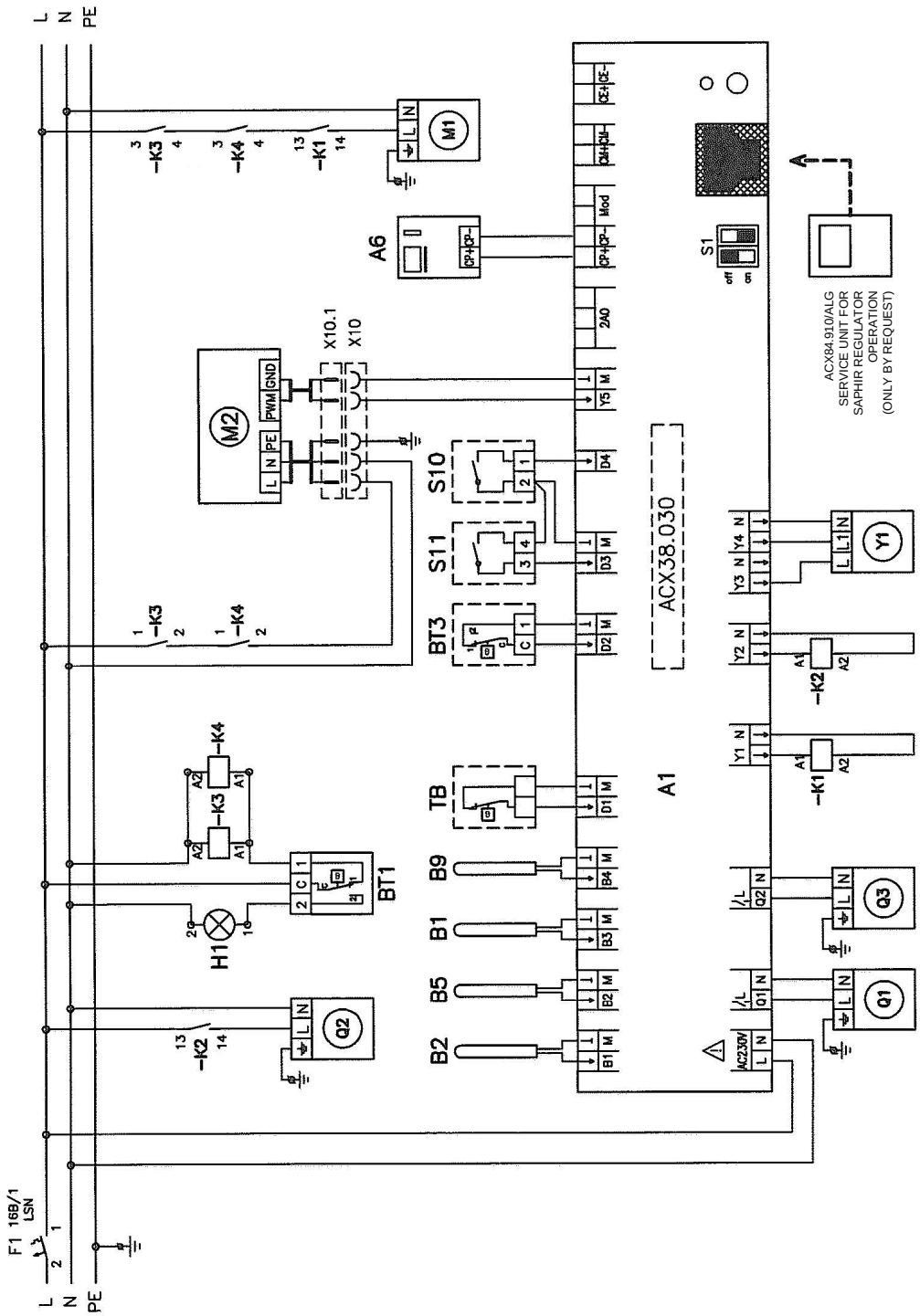


Fig. no.20 Connection diagram– Pump heating circuit



F1	Single-phase circuit breaker 16A	K3, K4	Relay of the safety circuit
A1	Regulator Siemens ACX 38.030	M1	Fuel feeder motor
B1	Heating branch temperature sensor QAD 36/101	M2	Air fan motor
B2	Boiler output temperature sensor QAZ 36.526/109	X10	Air fan motor socket
A6	QAA88 device	X10.1	Ventilator plug
B5	Fuel feeder temperature sensor QAZ 36.526/109	Q1	Boiler primary circuit pump
B9	Outside temperature sensor QAC 34/101	Q2	Heating circuit pump
TB	Motor thermal protection	Q3	HW charging pump
BT1	Safety thermostat	S1	Regulator system reverser
BT3	HW thermostat	S10	Manual fuel move key
H1	Safety thermostat signalling	S11	Ventilator manual start key
K1	Fuel feeder motor relay	Y1	Drive of heating circuit three-way valve
K2	Heating branch pump relay		

Fig. no. 21 Elementary wiring diagram – Mixing heating circuit

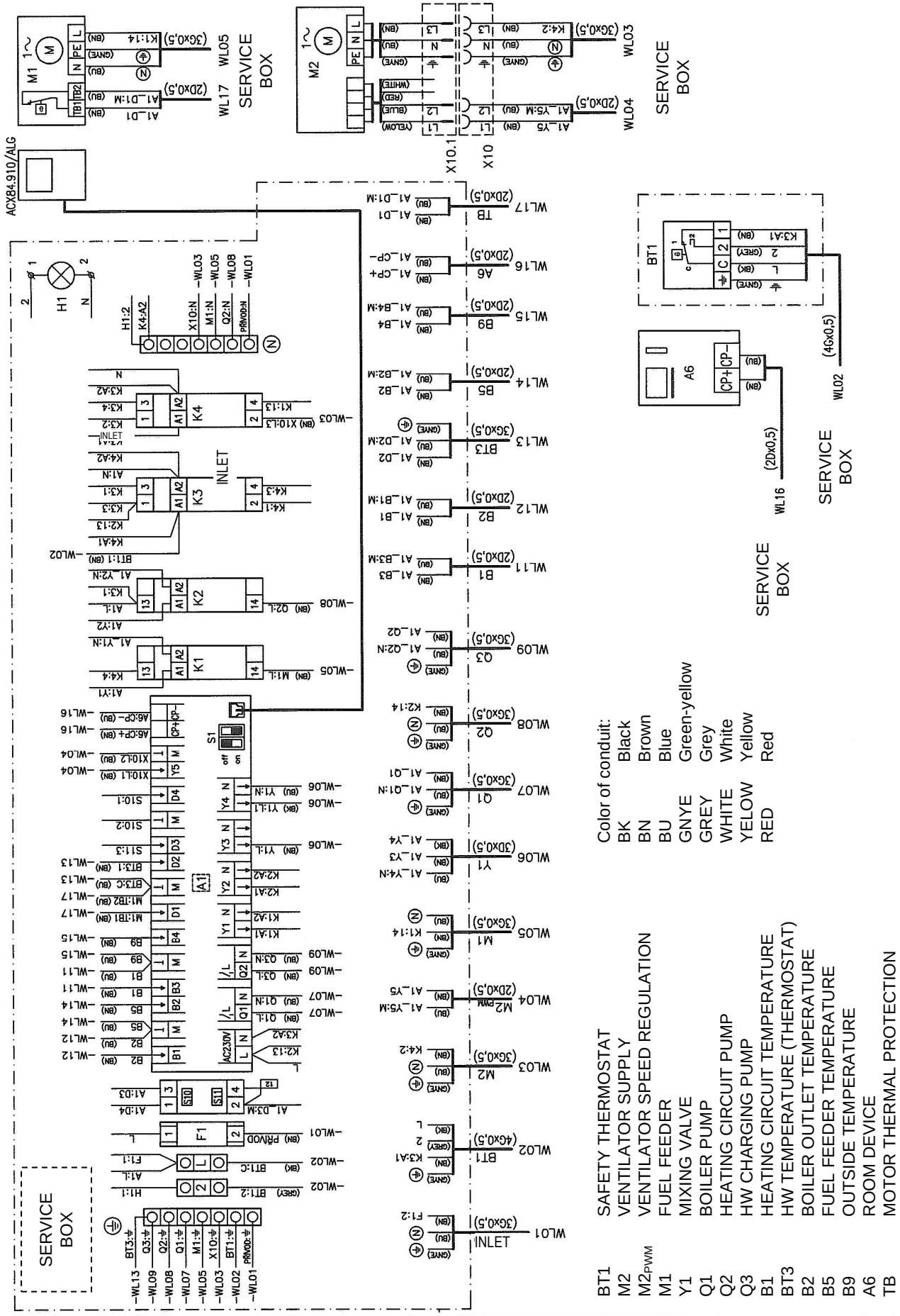


Fig. no. 22 Connection diagram – Mixing heating circuit

6. Boiler operation by user

6.1 Control, regulation and security elements

6.1.1 Saphir regulator

SAPHIR ACX 38 is the regulator destined for solid fuel boiler control, heating circuit control and hot water preparation by means of external reservoir control. The regulator is equipped with boiler sensor, hot water sensor or hot water thermostat (depending on the pump or mixing heating circuit), heating branch sensor (mixing heating circuit), sensor against the fire penetration and outside sensor. The regulator co-operates with **QAA 88 device** that can be used as space device or boiler display.

The regulator is equipped with two software regimes (pump or mixing heating circuit) that can be switched over by means of system reverser of S1 regulator. The regulator system reverser is installed in the regulator in its right-hand lower part.

A. Pump heating circuit

The right-hand segment of S1 switch is in position **off**.

- **heating circuit (HC)** – at the pump heating circuit there is not used the three-way mixing valve SQK 34. If the outside sensor is installed the boiler operation is controlled equithermally. The heating water temperature varies in the range of setting from the min. boiler temperature to the max heating circuit temperature. If the outside sensor is not installed (it must be deactivated) the boiler operation is controlled by the space device. In case of outside sensor fault the boiler heats to the fixed temperature (set by manufacturer to 70 ^{o}C).
- **warm water (HW)** – HW preparation is solved by means of HW sensor, three-way valve and HW external reservoir. In case of HW preparation the boiler temperature is increased (set by manufacturer to 15 ^{o}C) against the desired warm water temperature.
- **boiler**
  - **a) automatic regime** – the boiler is controlled by the heat requirement (heating branch, warm water and min. boiler temperature). The boiler output is given by the current heat requirement modulated in the sphere of output range. The ventilator output is controlled by the change in revolutions and the fuel quantity is allocated adequately to the air volume. The boiler temperature increase against the heating branch desired temperature is 5°C (set by the manufacturer).
  - **b) attenuation regime** – after the requirement for heat has ceased the boiler goes over to the attenuation regime. The minimum boiler temperature is kept in the attenuation regime.
- **Boiler pump** – the pump is switched on when 55°C has been reached (set by the manufacturer). The pump is switched off when the temperature has dropped by 5°C against the setting by the manufacturer. In the attenuation regime the pump is switched on at the temperature 70 °C and switched off when the temperature has dropped by 5°C.
- **boiler antifreeze protection**- it depends on the actual water temperature in the boiler. In case the water temperature in the boiler has dropped below 5°C the boiler pump will switch on.

B. Mixing heating circuit

The right-hand segment of S1 switch is in position **on**.

- **heating circuit (HC)** – at the mixing heating circuit there is used the three-way mixing valve SQK 34. If the outside sensor is installed the boiler is controlled equithermally. The heating water temperature varies in the range of setting from the min. heating circuit temperature to the maximum set heating circuit temperature. The three-way mixing valve is mixing the heating water to the desired temperature. If the outside sensor is not installed (it must be deactivated) the boiler operation is controlled by the space device. In case of outside sensor fault the boiler heats to the fixed temperature (set by manufacturer to 70 ^{o}C).
- **warm water (HW)** – HW preparation is solved by means of HW thermostat, charging pump and HW external reservoir. In case of HW preparation the boiler temperature is increased (set by manufacturer to 15 ^{o}C) against the desired warm water temperature. The temperature set on the reservoir thermostat must correspond to the set desired temperature in the table of parameters. HW pump is switched on by the requirement for warm water. After the requirement for warm water has ceased the pump is in slowing-down regime. If the boiler temperature drops at least by 3°C against the desired HW temperature plus the increase (set by manufacturer to 15 ^{o}C) HW pump will not operate. If this limitation is active then HC pump will not operate either.
- **boiler**
  - **a) automatic regime** – boiler is controlled by the heat requirement (heating branch, warm water and minimum boiler temperature). The boiler output is given by the actual heat requirement modulated in the sphere of output range. The ventilator output is controlled by the change in revolutions and

the fuel quantity is allocated adequately to the air volume. The boiler temperature increase against the heating branch desired temperature is 5 °C (set by the manufacturer).

b) attenuation regime – after the requirement for heat has ceased the boiler goes over to the attenuation regime. The minimum boiler temperature is kept in the attenuation regime.

- **Boiler pump** – the pump is switched on when 55 °C has been reached (set by the manufacturer). The pump is switched off when the temperature has dropped by 5 °C against the setting by the manufacturer. In the attenuation regime the pump is switched on at the temperature 70 °C and switched off when the temperature has dropped by 5 °C.
- **heating branch pump** – is switched on together with the requirement for heat. After the requirement for warm water has ceased the pump will be in slowing-down regime
- **boiler antifreeze protection**- it depends on the actual water temperature in the boiler. In case the water temperature in the boiler has dropped below 5°C the boiler pump will switch on.

In order to save the regulator safety functions the boiler shouldn't be disconnected from mains.
In case of boiler disconnection from mains time in regulator might stop and consequently the time regimes will switch incorrectly. Then the boiler minimum temperature is not kept and in an extreme case (boiler near an open window in winter season, boiler fault) boiler and heating circuit could freeze up. At the switched off boiler (but not disconnected from mains) the antifreeze protection is active by means of pumps.
In an extreme case also the fuel fire penetration into reservoir (pellets used the fuel) can occur. At the switched off boiler (but not disconnected from mains) the protection against fuel fire penetration into reservoir is active. In case of a long-term electricity outage pellets should be removed from the burner in order to prevent their fire penetration to the reservoir. In this way we prevent the burning fuel from being poured with water (which is the function of emergency fire extinguishing system – see chap. 5.2.6) and we are spared of complicated removal of soaked pellets from the fuel feeder

Boiler (cursor is above symbol ⏻), heating circuit (parameter P 40) or HW preparation (parameter P 42) can be switched of by means of QAA 88 device

Pump heating circuit – configuration

Boiler equipment	***Type of operation***
Necessary boiler accessories	

Note: The equithermal control at the pump heating circuit is possible in the range from minimum set boiler temperature to maximum set heating circuit temperature.

• QAA 88 device – space unit • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control with space effect**
• Three-way valve V4044C (only in case boiler is used for HW heating) • Warm water sensor QAZ36 (only in case boiler is used for HW heating)	

• QAA 88 device – boiler unit • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control without space effect**
• Three-way valve V4044C (only in case boiler is used for HW heating) • Warm water sensor QAZ36 (only in case boiler is used for HW heating)	

• QAA 88 device – space unit • Outside sensorQAC34/101 – is not used • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Space control**
• Three-way valve V4044C (only in case boiler is used for HW heating) • Warm water sensorQAZ36 (only in case boiler is used for HW heating)	

• QAA 88 device – space unit • HMI Service unit for Saphir regulator operation(ACX84.910/ALG) – only by request • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control with space effect**
• Three-way valve V4044C (only in case boiler is used for HW heating.) • Warm water sensor QAZ36 (only in case boiler is used for HW heating)	

• QAA 88 device – space unit • HMI service unit for Saphir regulator operation (ACX84.910/ALG) – only by request • Outside sensor QAC34/101 – is not used • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Space control**
• Three-way valve V4044C (only in case boiler is used for HW heating.) • Warm water sensor QAZ36 (only in case boiler is used for HW heating)	

• HMI service unit for Saphir regulator operation (ACX84.910/ALG) – only by request • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control without space effect**
• Three-way valve V4044C (only in case boiler is used for HW heating) • Warm water sensor QAZ36 (only in case boiler is used for HW heating)	

Mixing heating circuit – configuration

Boiler equipment	***Type of operation***
Necessary boiler accessories	

• QAA 88 device – space unit • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control with space effect**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating.)	

• QAA 88 device – boiler unit • Outside sensor QAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control without space effect**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating)	

• QAA 88 device – space unit • Outside sensor QAC34/101 – is not used • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Space control**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating.)	

• QAA 88 device – space unit • HMI service unit for Saphir regulator operation (ACX84.910/ALG) – only by request • Outside sensorQAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control with space effect**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating)	

• QAA 88 device – space unit • HMI Service unit for Saphir regulator operation (ACX84.910/ALG) – only by request • Outside sensorQAC34/101 – is not used • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Space control**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating)	

• HMI Service unit for Saphir regulator operation (ACX84.910/ALG) – only by request • Outside sensorQAC34/101 • Thermostatic valve (Filling valve) - series VTC312 (external thread) or VTC 512	**Equithermal control without space effect**
• Three-way mixing valve VBI31.20 with drive SQK34.00 • Heating branch sensor QAD36/101 • Water heater thermostat type: 7K1.6R326.00A (only in case boiler is used for HW heating)	

Note:
In case the equithermal control is without space effect we must suitably set P 21 parameter. If there is not reached the desired P 103 (P 106 and P 109) space temperature we must increase the slope of heating curve. Correct setting of heating curve slope is done by the end user. The changes do not become evidayt immediately, but with regard to the equipment adaptability and various buildings inertia they become evidayt after some time which might make several days.
The heating curve can be tuned by the parallel shift (parameter P 19). By increasing the value we increase the desired heating circuit temperature thus we increase the temperature in the space. The parallel shift parameter shifts the whole heating curve. The heating curve slope parameter only changes the slope of the curve.

6.1.2 Safety thermostat

The safety thermostat is mounted on the left-hand side part of basement shell and it serves for boiler shutdown in case the safety temperature has been exceeded. The safety thermostat must be set to 100 °C temperature i.e. to the temperature higher than the set maximum boiler temperature (90 ^{o}C). After the safety thermostat switch-off the safety thermostat signal lamp will light up. The fuel feeder and ventilator will stop. The safety thermostat de-blocking must be done manually – after the cover dismantling and then pressing the trap.
In case of safety thermostat repeated switch-offs it is necessary to put the boiler out of service and find the reason of boiler repeated overheating. After the safety thermostat switch-off the primary pump (or HC pump) is still working.

6.1.3 Temperature sensor on the fuel feeder

If the temperature set in P26 parameter appears on the temperature sensor the fuel feed will be accelerated in order to move the burning fuel to the burner. Once the temperature has dropped below the set value the boiler will come back into the original regime. This security only functions in case the boiler is supplied with electricity. If the feeder temperature hasn't dropped within 7 minutes (preset value) the feeder will be shut down.

6.1.4 Emergency fire-extinguishing system

In case of fuel fire penetration into the feeder (95 ^{o}C temperature reached on the feeder) the BVTS (TS 130, STS 20) valve opens the water inlet into the hopper in order to extinguish the burning fuel; once the temperature on sensor has dropped by 6°C the water inlet will be closed.

6.1.5 Forced withdrawal of superfluous heat

6.1.5.1 Forced withdrawal of superfluous boiler heat

In case the boiler temperature has exceeded 90 °C so called forced withdrawal of the superfluous heat into the heating circuit will start. The fan and feeder are not active. In case the temperature is lower than the current desired boiler temperature the boiler comes back into actual automatic regime (in case the boiler temperature has reached 100 °C and the safety thermostat has been blocked the thermostat must be manually de-blocked).

Mixing heating circuit
Forced withdrawal of the superfluous heat is activated in case the outlet boiler temperature 90 ^{o}C has been exceeded. The outlet boiler temperature by means of three-way mixing valve will be reduced to the maximum heating circuit temperature (80 ^{o}C – parameter P 77).

6.1.5.2 Forced withdrawal of superfluous water heater heat

If the temperature in water heater has exceeded 80 ^{o}C the forced withdrawal of the superfluous heat into the heating circuit will start (only in case of pump heating circuit).

6.2 SAPHIR regulator parameters

In he next tables there are listed parameters that can be changed by means of QAA 88 device. The way of displaying and changing the parameters is described in chap. 6.3.1.

Note:
HW – warm water
HC – heating circuit

Tab. no. 7 Parameters – Mixing heating circuit

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 1	Current outside temperature	[°C]	-	-20 … 50	0,1
P 2	Current boiler temperature	[°C]	-	5 … 100	0,1
P 3	Current heating circuit temperature	[°C]	-	5 … 100	0,1
P 4	Desired heating circuit temperature	[°C]	-	0 … 80	0,1
P 6	Desired boiler temperature in case of HW heating	[°C]	-	0 … 75	1
P 7	Current warm water thermostat status		-	0 … 1	1
P 8	Current feeder temperature	[°C]	-	5 … 100	0,1
P 9	Current space temperature	[°C]	-	0 … 40	0,1
P 10	Current position of three-way mixing valve	[%]	-	0 … 100	0,1
P 11	Desired boiler temperature	[°C]	-	20 … 85	0,1
P 12	Current ventilator output	[%]	-	0 … 100	0,1
P 15	Faults		-	0 … 15	
P 19	Parallel shift in the heating curve	[°C]	0	-10 … 10	1
P 20	Fuel type		1	1 … 3	1
P 21	Slope of heating curve		1,5	0,1 … 4	0,1
P 22	Ventilator output when making fire	[%]	50	1 … 100	1
P 23	Minimum boiler temperature 4 sect./5 – 7 sect.	[°C]	50/60	20 … 70	0,1
P 24	Type of requirement (auto/fixed)		0	0 … 1	1
P 25	Boiler hysteresis	[°]	3	1 … 5	0,1
P 26	Maximum feeder temperature	[°C]	90	85 … 95	1
P 27	Boiler heating deficiency	[min.]	30	10 … 60	1
P 28	QAA position		2	1 … 2	1
P 40	Heating circuit off/on		1	0 … 1	1
P 41	Boiler temperature increase from the heating circuit	[°C]	5	0 … 20	1
P 42	Warm water off/on		1	0 … 1	1
P 43	Boiler temperature increase from HW	[°C]	15	5 … 20	1
P 50	Boiler primary pump man/auto		1	0 … 1	1
P 51	Boiler primary pump off/on		-	0 … 1	1
P 52	Boiler primary pump slowing-down	[min.]	5	0 … 60	1
P 53	Boiler primary pump switch-on temperature	[°C]	55	20 … 60	1
P 54	Day of boiler primary pump spinning		5	0 … 8	1
P 55	Heating circuit pump man/auto		1	0 … 1	1
P 56	Heating circuit pump off/on		-	0 … 1	1
P 57	Heating circuit pump slowing-down	[min.]	3	0 … 60	1
P 58	Day of heating circuit pump spinning		5	0 … 8	1
P 59	Warm water pump man/auto		1	0 … 1	1
P 60	Warm water pump off/on		-	0 … 1	1
P 61	Warm water pump slowing-down	[min.]	3	0 … 10	1
P 62	Day of warm water pump spinning		5	0 … 8	1
P 70	Outside temperature reset		0	0 … 1	1
P 71	Space hysteresis	[°C]	0,5	0,1 … 5	0,1
P 72	Space effect	[%]	20	0 … 100	1
P 76	Minimum heating circuit temperature	[°C]	30	20 … 50	1
P 77	Maximum heating circuit temperature	[°C]	80	30 … 90	1
P 80	Building constant	[h]	10	1 … 50	1
P 81	Temperature ECO	[°C]	-3	-5 … 5	1
P 82	ECO automatics passive/active		-	0 … 1	1
P 83	Temperature summer/winter	[°C]	17	8 … 35	1
P 84	Constant summer/winter	[h]	50	1 … 100	1
P 85	Current status summer/winter		-	0 … 1	1
P 86	Heating system		3	0 … 3	1
P 87	HC antifreeze protection off/on		1	0 … 1	1
P 88	Servo overruntime	[s]	120	10 … 1800	1
P 100	Setting the day of time schedule for HC		1	0 … 7	1
P 101	First HC period switched on	[h:min.]	6:00	0:00 … 23:59	1 min.
P 102	First HC period switched off	[h:min.]	22:00	0:00 … 23:59	1 min.
P 103	Desired space temperature in the first period	[°C]	21	10 … 30	0,1

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 104	Second period HC switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 105	Second period HC switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 106	Desired space temperature in the second period	[°C]	21	10 … 30	0,1
P 107	Third period HC switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 108	Third period HC switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 109	Desired space temperature in the third period	[°C]	20	10 … 30	0,1
P 110	Time schedule reset HC		0	0 … 1	1
P 111	Desired space temperature in attenuation	[°C]	19	5 … 25	0,1
P 120	Setting the day of time schedule for HW		1	0 … 7	1
P 121	First period HW switched on	[h:min.]	6:00	0:00 … 23:59	1 min.
P 122	First period HW switched off	[h:min.]	22:00	0:00 … 23:59	1 min.
P 123	Desired temperature HW in the first period	[°C]	60	10 … 65	1
P 124	Second period HW switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 125	Second period HW switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 126	Desired temperature HW in the second period	[°C]	55	10 … 65	1
P 127	Third period HW switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 128	Third period HW switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 129	Desired temperature HW in the third period	[°C]	50	10 … 65	1
P 131	HW Time schedule reset		0	0 … 1	1
P 140	Feeder runtime	[s]	5	3 … 10	0,1
P 150	Feeder X1 lignite	[%]	0	0	0
P 151	Feeder Y1 lignite – 4 sect.	[s]	77	55 … 95	1
	Feeder Y1 lignite – 5 sect.	[s]	68	50 … 95	1
	Feeder Y1 lignite – 6 sect.	[s]	47	30 … 80	1
	Feeder Y1 lignite – 7 sect.	[s]	45	25 … 75	1
P 152	Feeder X2 lignite	[%]	33	33	0
P 153	Feeder Y2 lignite – 4 sect.	[s]	41	28 … 65	1
	Feeder Y2 lignite – 5 sect.	[s]	38	20 … 70	1
	Feeder Y2 lignite – 6 sect.	[s]	26	15 … 60	1
	Feeder Y2 lignite – 7 sect.	[s]	23	12 … 50	1
P 154	Feeder X3 lignite	[%]	66	66	0
P 155	Feeder Y3 lignite – 4 sect.	[s]	27	21 … 55	1
	Feeder Y3 lignite – 5 sect.	[s]	25	10 … 55	1
	Feeder Y3 lignite – 6 sect.	[s]	18	5 … 55	1
	Feeder Y3 lignite – 7 sect.	[s]	15	5 … 50	1
P 156	Feeder X4 lignite	[%]	100	100	0
P 157	Feeder Y4 lignite – 4 sect.	[s]	19	15 … 45	1
	Feeder Y4 lignite – 5 sect.	[s]	15	5 … 45	1
	Feeder Y4 lignite – 6 sect.	[s]	12	5 … 45	1
	Feeder Y4 lignite – 7 sect.	[s]	10	5 … 45	1
P 158	Feeder runtime in the attenuation – lignite	[s]	10	3 … 20	1
P 159	Standstill time(delay) feeder in the attenuation – lignite	[min]	40	10 … 240	1
P 160	Ventilator X1 lignite	[%]	0	0	0
P 161	Ventilator Y1 lignite – 4 sect.	[%]	26	15 … 45	1
	Ventilator Y1 lignite – 5 sect.	[%]	27	15 … 50	1
	Ventilator Y1 lignite – 6 sect.	[%]	26	15 … 50	1
	Ventilator Y1 lignite – 7 sect.	[%]	35	15 … 60	1
P 162	Ventilator X2 lignite	[%]	33	33	0
P 163	Ventilator Y2 lignite – 4 sect.	[%]	33	25 … 50	1
	Ventilator Y2 lignite – 5 sect.	[%]	32	20 … 50	1
	Ventilator Y2 lignite – 6 sect.	[%]	31	20 … 55	1
	Ventilator Y2 lignite – 7 sect.	[%]	43	20 … 70	1
P 164	Ventilator X3 lignite	[%]	66	66	0
P 165	Ventilator Y3 lignite – 4 sect.	[%]	40	25 … 68	1
	Ventilator Y3 lignite – 5 sect.	[%]	39	25 … 70	1
	Ventilator Y3 lignite – 6 sect.	[%]	38	25 … 75	1
	Ventilator Y3 lignite – 7 sect.	[%]	63	25 … 90	1
P 166	Ventilator X4 lignite	[%]	100	100	0

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 167	Ventilator Y4 lignite – 4 sect.	[%]	52	40 … 70	1
	Ventilator Y4 lignite – 5 sect.	[%]	48	30 … 80	1
	Ventilator Y4 lignite – 6 sect.	[%]	47	30 … 85	1
	Ventilator Y4 lignite – 7 sect.	[%]	78	30 … 95	1
P 168	Ventilator slowing-down in the attenuation regime– lignite	[s]	90	5 … 200	1
P 169	Ventilator output in the attenuation – lignite	[%]	50	10 … 100	1
P 170	Feeder X1 hard coal	[%]	0	0	0
P 171	Feeder Y1 hard coal – 4 sect.	[s]	107	70 … 130	1
	Feeder Y1 hard coal – 5 sect.	[s]	90	50 … 140	1
	Feeder Y1 hard coal – 6 sect.	[s]	75	40 … 140	1
	Feeder Y1 hard coal – 7 sect.	[s]	60	30 … 140	1
P 172	Feeder X2 hard coal	[%]	33	33	0
P 173	Feeder Y2 hard coal – 4 sect.	[s]	59	32 … 90	1
	Feeder Y2 hard coal – 5 sect.	[s]	54	30 … 90	1
	Feeder Y2 hard coal – 6 sect.	[s]	48	25 … 90	1
	Feeder Y2 hard coal – 7 sect.	[s]	36	20 … 90	1
P 174	Feeder X3 hard coal	[%]	66	66	0
P 175	Feeder Y3 hard coal	[s]	42	27 … 67	1
P 175	Feeder Y3 hard coal – 4 sect.	[s]	37	20 … 90	1
	Feeder Y3 hard coal – 5 sect.	[s]	31	15 … 90	1
	Feeder Y3 hard coal – 6 sect.	[s]	20	10 … 90	1
	Feeder Y3 hard coal – 7 sect.	[s]	100	100	0
P 176	Feeder X4 hard coal	[%]	31	23 … 60	1
P 177	Feeder Y4 hard coal – 4 sect.	[s]	26	15 … 90	1
	Feeder Y4 hard coal – 5 sect.	[s]	20	10 … 90	1
	Feeder Y4 hard coal – 6 sect.	[s]	14	8 … 90	1
	Feeder Y4 hard coal – 7 sect.	[s]	10	3 … 20	1
P 178	Feeder runtime in the attenuation – hard coal	[s]	40	10 … 240	1
P 179	Standstill time(delay) feeder in the attenuation – hard coal	[min.]	0	0	0
P 200	Ventilator X1 hard coal	[%]	16	15 … 53	1
P 201	Ventilator Y1 hard coal – 4 sect.	[%]	17	5 … 60	1
	Ventilator Y1 hard coal – 5 sect.	[%]	16	5 … 60	1
	Ventilator Y1 hard coal – 6 sect.	[%]	28	5 … 80	1
	Ventilator Y1 hard coal – 7 sect.	[%]	33	33	0
P 202	Ventilator X2 hard coal	[%]	22	18 … 59	1
P 203	Ventilator Y2 hard coal – 4 sect.	[%]	21	5 … 80	1
	Ventilator Y2 hard coal – 5 sect.	[%]	20	5 … 80	1
	Ventilator Y2 hard coal – 6 sect.	[%]	38	5 … 90	1
	Ventilator Y2 hard coal – 7 sect.	[%]	66	66	0
P 204	Ventilator X3 hard coal	[%]	38	20 … 80	1
P 205	Ventilator Y3 hard coal – 4 sect.	[%]	37	15 … 80	1
	Ventilator Y3 hard coal – 5 sect.	[%]	36	15 … 80	1
	Ventilator Y3 hard coal – 6 sect.	[%]	50	20 … 90	1
	Ventilator Y3 hard coal – 7 sect.	[%]	100	100	0
P 206	Ventilator X4 hard coal	[%]	51	30 … 90	1
P 207	Ventilator Y4 hard coal – 4 sect.	[%]	48	30 … 90	1
	Ventilator Y4 hard coal – 5 sect.	[%]	47	30 … 90	1
	Ventilator Y4 hard coal – 6 sect.	[%]	64	30 … 90	1
	Ventilator Y4 hard coal – 7 sect.	[%]	90	5 … 200	1
P 208	Ventilator slowing-down in the attenuation regime– hard coal	[s]	50	10 … 100	1
P 209	Ventilator output in the attenuation – hard coal	[%]	0	0	0
P 210	Feeder X1 pellets	[%]	58	48 … 70	1
P 211	Feeder Y1 pellets – 4 sect.	[s]	50	20 … 80	1
	Feeder Y1 pellets – 5 sect.	[s]	43	20 … 80	1
	Feeder Y1 pellets – 6 sect.	[s]	36	15 … 80	1
	Feeder Y1 pellets – 7 sect.	[s]	33	33	0
P 212	Feeder X2 pellets	[%]	28	18 … 40	1

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 213	Feeder Y2 pellets – 4 sect.	[s]	25	15 … 70	1
	Feeder Y2 pellets – 5 sect.	[s]	21	15 … 70	1
	Feeder Y2 pellets – 6 sect.	[s]	18	15 … 70	1
	Feeder Y2 pellets – 7 sect.	[s]	66	66	0
P 214	Feeder X3 pellets	[%]	18	8 … 30	1
P 215	Feeder Y3 pellets – 4 sect.	[s]	16	8 … 50	1
	Feeder Y3 pellets – 5 sect.	[s]	14	8 … 50	1
	Feeder Y3 pellets – 6 sect.	[s]	12	8 … 50	1
	Feeder Y3 pellets – 7 sect.	[s]	100	100	0
P 216	Feeder X4 pellets	[%]	14	4 … 26	1
P 217	Feeder Y4 pellets – 4 sect.	[s]	12	5 … 50	1
	Feeder Y4 pellets – 5 sect.	[s]	10	5 … 50	1
	Feeder Y4 pellets – 6 sect.	[s]	8	5 … 50	1
	Feeder Y4 pellets – 7 sect.	[s]	15	13 … 20	1
P 218	Feeder runtime in the attenuation – pellets	[s]	10	5 … 15	1
P 219	Standstill time(delay) feeder in the attenuation – pellets	[min.]	0	0	0
P 220	Ventilator X1 pellets	[%]	6	4 … 15	1
P 221	Ventilator Y1 pellets – 4 sect.	[%]	10	5 … 50	1
	Ventilator Y1 pellets – 5 sect.	[%]	14	5 … 50	1
	Ventilator Y1 pellets – 6 sect.	[%]	20	5 … 60	1
	Ventilator Y1 pellets – 7 sect.	[%]	33	33	0
P 222	Ventilator X2 pellets	[%]	16	10 … 25	1
P 223	Ventilator Y2 pellets – 4 sect.	[%]	22	5 … 60	1
	Ventilator Y2 pellets – 5 sect.	[%]	24	5 … 60	1
	Ventilator Y2 pellets – 6 sect.	[%]	35	5 … 70	1
	Ventilator Y2 pellets – 7 sect.	[%]	66	66	0
P 224	Ventilator X3 pellets	[%]	26	18 … 40	1
P 225	Ventilator Y3 pellets – 4 sect.	[%]	38	10 … 70	1
	Ventilator Y3 pellets – 5 sect.	[%]	42	10 … 70	1
	Ventilator Y3 pellets – 6 sect.	[%]	48	10 … 80	1
	Ventilator Y3 pellets – 7 sect.	[%]	100	100	0
P 226	Ventilator X4 pellets	[%]	35	25 … 45	1
P 227	Ventilator Y4 pellets – 4 sect.	[%]	42	30 … 60	1
	Ventilator Y4 pellets – 5 sect.	[%]	48	35 … 75	1
	Ventilator Y4 pellets – 6 sect.	[%]	60	40 … 85	1
	Ventilator Y4 pellets – 7 sect.	[%]	3	1 … 60	1
P 228	Ventilator slowing-down in the attenuation regime– pellets	[s]	100	50 … 100	1
P 229	Ventilator output in the attenuation – pellets	[%]	0	0 … 1	1
P 232	Outside sensor deactivation		-	-20 … 50	0,1
P 233	Diagnostics HC		-	-	-
P 234	Diagnostics boiler		-	-	-
P 235	Restoration of manufacturer’s setting		0	0 … 1	1
P 238	Year		-	2000 - 2050	1
P 239	Date		-	01.01. – 31. 12.	Day
P 240	Time		-	00:00 – 23:59	Minute

Tab. no. 8 Parameters – Pump heating circuit

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 1	Current outside temperature	[°C]	-	-20 … 50	0,1
P 2	Current boiler temperature	[°C]	-	5 … 100	0,1
P 4	Desired heating circuit temperature	[°C]	-	0 … 80	0,1
P 5	Current temperature HW	[°C]	-	5 … 100	0,1
P 6	Desired boiler temperature in case of HW heating	[°C]	-	0 … 75	1
P 8	Current feeder temperature	[°C]	-	5 … 100	0,1
P 9	Current space temperature	[°C]	-	0 … 40	0,1
P 11	Desired boiler temperature	[°C]	-	20 … 85	0,1
P 12	Current ventilator output	[%]	-	0 … 100	0,1
P 15	Faults		-	0 … 15	
P 19	Parallel shift in the heating curve	[°C]	0	-10 … 10	1
P 20	Fuel type		1	1 … 3	1
P 21	Slope of heating curve		1,5	0,1 … 4	0,1
P 22	Ventilator output when making fire	[%]	50	1 … 100	1
P 23	Minimum boiler temperature 4 sect./5 – 7 sect.	[°C]	50/60	20 … 70	0,1
P 24	Type of requirement (auto/fixed/RVS)		0	0 … 2	1
P 25	Boiler hysteresis	[°C]	3	1 … 5	0,1
P 26	Maximum feeder temperature	[°C]	90	85 … 95	1
P 27	Boiler heating deficiency	[min.]	30	10 … 60	1
P 28	QAA position		2	1 … 2	1
P 40	Heating circuit off/on		1	0 … 1	1
P 41	Boiler temperature increase from the heating circuit	[°C]	5	0 … 20	1
P 42	Warm water off/on		1	0 … 1	1
P 43	Boiler temperature increase from HW	[°C]	15	5 … 20	1
P 50	Boiler primary pump man/auto		1	0 … 1	1
P 51	Boiler primary pump off/on		-	0 … 1	1
P 52	Boiler primary pump slowing-down	[min.]	5	0 … 60	1
P 53	Boiler primary pump switch-on temperature	[°C]	55	20 … 60	1
P 54	Day of boiler primary pump spinning		5	0 … 8	1
P 65	Three-way valve HW man/auto		1	0 … 1	1
P 66	Current status of three-way valve HW		-	0 … 1	1
P 67	HW three-way valve slowing-down	[min.]	3	0 … 10	1
P 70	Outside temperature reset		0	0 … 1	1
P 71	Space hysteresis	[°C]	0,5	0,1 … 5	0,1
P 72	Space effect	[%]	20	0 … 100	1
P 76	Minimum heating circuit temperature	[°C]	30	20 … 50	1
P 77	Maximum heating circuit temperature	[°C]	80	30 … 90	1
P 80	Building constant	[h]	10	1 … 50	1
P 81	Temperature ECO	[°C]	-3	-5 … 5	1
P 82	ECO automatics passive/active		-	0 … 1	1
P 83	Temperature summer/winter	[°C]	17	8 … 35	1
P 84	Constant summer/winter	[h]	50	1 … 100	1
P 85	Current status summer/winter		-	0 … 1	1
P 86	Heating system		3	0 … 3	1
P 100	Setting the day of time schedule for HC		1	0 … 7	1
P 101	First HC period switched on	[h:min.]	6:00	0:00 … 23:59	1 min.
P 102	First HC period switched off	[h:min.]	22:00	0:00 … 23:59	1 min.
P 103	Desired space temperature in the first period	[°C]	21	10 … 30	0,1
P 104	Second period HC switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 105	Second period HC switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 106	Desired space temperature in the second period	[°C]	21	10 … 30	0,1
P 107	Third period HC switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 108	Third period HC switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 109	Desired space temperature in the third period	[°C]	20	10 … 30	0,1
P 110	Time schedule reset HC		0	0 … 1	1

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 111	Desired space temperature in attenuation	[°C]	19	5 … 25	0,1
P 120	Setting the day of time schedule for HW		1	0 … 7	1
P 121	First period HW switched on	[h:min.]	6:00	0:00 … 23:59	1 min.
P 122	First period HW switched off	[h:min.]	22:00	0:00 … 23:59	1 min.
P 123	Desired temperature HW in the first period	[°C]	60	10 … 65	1
P 124	Second period HW switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 125	Second period HW switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 126	Desired temperature HW in the second period	[°C]	55	10 … 65	1
P 127	Third period HW switched on	[h:min.]	23:59	0:00 … 23:59	1 min.
P 128	Third period HW switched off	[h:min.]	23:59	0:00 … 23:59	1 min.
P 129	Desired temperature HW in the third period	[°C]	50	10 … 65	1
P 130	Hysteresis HW	[°C]	4	1 … 10	1
P 131	Time schedule reset HW		0	0 … 1	1
P 140	Feeder runtime	[s]	5	3 … 10	0,1
P 150	Feeder X1 lignite	[%]	0	0	0
P 151	Feeder Y1 lignite – 4 sect.	[s]	77	55 … 95	1
	Feeder Y1 lignite – 5 sect.	[s]	68	50 … 95	1
	Feeder Y1 lignite – 6 sect.	[s]	47	30 … 80	1
	Feeder Y1 lignite – 7 sect.	[s]	45	25 … 75	1
P 152	Feeder X2 lignite	[%]	33	33	0
P 153	Feeder Y2 lignite – 4 sect.	[s]	41	28 … 65	1
	Feeder Y2 lignite – 5 sect.	[s]	38	20 … 70	1
	Feeder Y2 lignite – 6 sect.	[s]	26	15 … 60	1
	Feeder Y2 lignite – 7 sect.	[s]	23	12 … 50	1
P 154	Feeder X3 lignite	[%]	66	66	0
P 155	Feeder Y3 lignite – 4 sect.	[s]	27	21 … 55	1
	Feeder Y3 lignite – 5 sect.	[s]	25	10 … 55	1
	Feeder Y3 lignite – 6 sect.	[s]	18	5 … 55	1
	Feeder Y3 lignite – 7 sect.	[s]	15	5 … 50	1
P 156	Feeder X4 lignite	[%]	100	100	0
P 157	Feeder Y4 lignite – 4 sect.	[s]	19	15 … 45	1
	Feeder Y4 lignite – 5 sect.	[s]	15	5 … 45	1
	Feeder Y4 lignite – 6 sect.	[s]	12	5 … 45	1
	Feeder Y4 lignite – 7 sect.	[s]	10	5 … 45	1
P 158	Feeder runtime in the attenuation – lignite	[s]	10	3 … 20	1
P 159	Standstill time(delay) feeder in the attenuation – lignite	[min]	40	10 … 240	1
P 160	Ventilator X1 lignite	[%]	0	0	0
P 161	Ventilator Y1 lignite – 4 sect.	[%]	26	15 … 45	1
	Ventilator Y1 lignite – 5 sect.	[%]	27	15 … 50	1
	Ventilator Y1 lignite – 6 sect.	[%]	26	15 … 50	1
	Ventilator Y1 lignite – 7 sect.	[%]	35	15 … 60	1
P 162	Ventilator X2 lignite	[%]	33	33	0
P 163	Ventilator Y2 lignite – 4 sect.	[%]	33	25 … 50	1
	Ventilator Y2 lignite – 5 sect.	[%]	32	20 … 50	1
	Ventilator Y2 lignite – 6 sect.	[%]	31	20 … 55	1
	Ventilator Y2 lignite – 7 sect.	[%]	43	20 … 70	1
P 164	Ventilator X3 lignite	[%]	66	66	0
P 165	Ventilator Y3 lignite – 4 sect.	[%]	40	25 … 68	1
	Ventilator Y3 lignite – 5 sect.	[%]	39	25 … 70	1
	Ventilator Y3 lignite – 6 sect.	[%]	38	25 … 75	1
	Ventilator Y3 lignite – 7 sect.	[%]	63	25 … 90	1
P 166	Ventilator X4 lignite	[%]	100	100	0
P 167	Ventilator Y4 lignite – 4 sect.	[%]	52	40 … 70	1
	Ventilator Y4 lignite – 5 sect.	[%]	48	30 … 80	1
	Ventilator Y4 lignite – 6 sect.	[%]	47	30 … 85	1
	Ventilator Y4 lignite – 7 sect.	[%]	78	30 … 95	1
P 168	Ventilator slowing-down in the attenuation regime– lignite	[s]	90	5 … 200	1
P 169	Ventilator output in the attenuation – lignite	[%]	50	10 … 100	1
P 170	Feeder X1 hard coal	[%]	0	0	0

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 171	Feeder Y1 hard coal – 4 sect.	[s]	107	70 … 130	1
	Feeder Y1 hard coal – 5 sect.	[s]	90	50 … 140	1
	Feeder Y1 hard coal – 6 sect.	[s]	75	40 … 140	1
	Feeder Y1 hard coal – 7 sect.	[s]	60	30 … 140	1
P 172	Feeder X2 hard coal	[%]	33	33	0
P 173	Feeder Y2 hard coal – 4 sect.	[s]	59	32 … 90	1
	Feeder Y2 hard coal – 5 sect.	[s]	54	30 … 90	1
	Feeder Y2 hard coal – 6 sect.	[s]	48	25 … 90	1
	Feeder Y2 hard coal – 7 sect.	[s]	36	20 … 90	1
P 174	Feeder X3 hard coal	[%]	66	66	0
P 175	Feeder Y3 hard coal – 4 sect.	[s]	42	27 … 67	1
	Feeder Y3 hard coal – 5 sect.	[s]	37	20 … 90	1
	Feeder Y3 hard coal – 6 sect.	[s]	31	15 … 90	1
	Feeder Y3 hard coal – 7 sect.	[s]	20	10 … 90	1
P 176	Feeder X4 hard coal	[%]	100	100	0
P 177	Feeder Y4 hard coal – 4 sect.	[s]	31	23 … 60	1
	Feeder Y4 hard coal – 5 sect.	[s]	26	15 … 90	1
	Feeder Y4 hard coal – 6 sect.	[s]	20	10 … 90	1
	Feeder Y4 hard coal – 7 sect.	[s]	14	8 … 90	1
P 178	Feeder runtime in the attenuation – hard coal	[s]	10	3 … 20	1
P 179	Standstill time(delay) feeder in the attenuation – hard coal	[min.]	40	10 … 240	1
P 200	Ventilator X1 hard coal	[%]	0	0	0
P 201	Ventilator Y1 hard coal – 4 sect.	[%]	16	15 … 53	1
	Ventilator Y1 hard coal – 5 sect.	[%]	17	5 … 60	1
	Ventilator Y1 hard coal – 6 sect.	[%]	16	5 … 60	1
	Ventilator Y1 hard coal – 7 sect.	[%]	28	5 … 80	1
P 202	Ventilator X2 hard coal	[%]	33	33	0
P 203	Ventilator Y2 hard coal – 4 sect.	[%]	22	18 … 59	1
	Ventilator Y2 hard coal – 5 sect.	[%]	21	5 … 80	1
	Ventilator Y2 hard coal – 6 sect.	[%]	20	5 … 80	1
	Ventilator Y2 hard coal – 7 sect.	[%]	38	5 … 90	1
P 204	Ventilator X3 hard coal	[%]	66	66	0
P 205	Ventilator Y3 hard coal – 4 sect.	[%]	38	20 … 80	1
	Ventilator Y3 hard coal – 5 sect.	[%]	37	15 … 80	1
	Ventilator Y3 hard coal – 6 sect.	[%]	36	15 … 80	1
	Ventilator Y3 hard coal – 7 sect.	[%]	50	20 … 90	1
P 206	Ventilator X4 hard coal	[%]	100	100	0
P 207	Ventilator Y4 hard coal – 4 sect.	[%]	51	30 … 90	1
	Ventilator Y4 hard coal – 5 sect.	[%]	48	30 … 90	1
	Ventilator Y4 hard coal – 6 sect.	[%]	47	30 … 90	1
	Ventilator Y4 hard coal – 7 sect.	[%]	64	30 … 90	1
P 208	Ventilator slowing-down in the attenuation regime– hard coal	[s]	90	5 … 200	1
P 209	Ventilator output in the attenuation – hard coal	[%]	50	10 … 100	1
P 210	Feeder X1 pellets	[%]	0	0	0
P 211	Feeder Y1 pellets – 4 sect.	[s]	58	48 … 70	1
	Feeder Y1 pellets – 5 sect.	[s]	50	20 … 80	1
	Feeder Y1 pellets – 6 sect.	[s]	43	20 … 80	1
	Feeder Y1 pellets – 7 sect.	[s]	36	15 … 80	1
P 212	Feeder X2 pellets	[%]	33	33	0
P 213	Feeder Y2 pellets – 4 sect.	[s]	28	18 … 40	1
	Feeder Y2 pellets – 5 sect.	[s]	25	15 … 70	1
	Feeder Y2 pellets – 6 sect.	[s]	21	15 … 70	1
	Feeder Y2 pellets – 7 sect.	[s]	18	15 … 70	1
P 214	Feeder X3 pellets	[%]	66	66	0
P 215	Feeder Y3 pellets – 4 sect.	[s]	18	8 … 30	1
	Feeder Y3 pellets – 5 sect.	[s]	16	8 … 50	1
	Feeder Y3 pellets – 6 sect.	[s]	14	8 … 50	1
	Feeder Y3 pellets – 7 sect.	[s]	12	8 … 50	1

Parameter	Description	Units	Set by the manufacturer	Range	Resolution
P 216	Feeder X4 pellets	[%]	100	100	0
P 217	Feeder Y4 pellets – 4 sect.	[s]	14	4 … 26	1
	Feeder Y4 pellets – 5 sect.	[s]	12	5 … 50	1
	Feeder Y4 pellets – 6 sect.	[s]	10	5 … 50	1
	Feeder Y4 pellets – 7 sect.	[s]	8	5 … 50	1
P 218	Feeder runtime in the attenuation – pellets	[s]	15	13 … 20	1
P 219	Standstill time(delay) feeder in the attenuation – pellets	[min.]	10	5 … 15	1
P 220	Ventilator X1 pellets	[%]	0	0	0
P 221	Ventilator Y1 pellets – 4 sect.	[%]	6	4 … 15	1
	Ventilator Y1 pellets – 5 sect.	[%]	10	5 … 50	1
	Ventilator Y1 pellets – 6 sect.	[%]	14	5 … 50	1
	Ventilator Y1 pellets – 7 sect.	[%]	20	5 … 60	1
P 222	Ventilator X2 pellets	[%]	33	33	0
P 223	Ventilator Y2 pellets – 4 sect.	[%]	16	10 … 25	1
	Ventilator Y2 pellets – 5 sect.	[%]	22	5 … 60	1
	Ventilator Y2 pellets – 6 sect.	[%]	24	5 … 60	1
	Ventilator Y2 pellets – 7 sect.	[%]	35	5 … 70	1
P 224	Ventilator X3 pellets	[%]	66	66	0
P 225	Ventilator Y3 pellets – 4 sect.	[%]	26	18 … 40	1
	Ventilator Y3 pellets – 5 sect.	[%]	38	10 … 70	1
	Ventilator Y3 pellets – 6 sect.	[%]	42	10 … 70	1
	Ventilator Y3 pellets – 7 sect.	[%]	48	10 … 80	1
P 226	Ventilator X4 pellets	[%]	100	100	0
P 227	Ventilator Y4 pellets – 4 sect.	[%]	35	25 … 45	1
	Ventilator Y4 pellets – 5 sect.	[%]	42	30 … 60	1
	Ventilator Y4 pellets – 6 sect.	[%]	48	35 … 75	1
	Ventilator Y4 pellets – 7 sect.	[%]	60	40 … 85	1
P 228	Ventilator slowing-down in the attenuation regime– pellets	[s]	3	1 … 60	1
P 229	Ventilator output in the attenuation – pellets	[%]	100	50 … 100	1
P 231	Superior control OFF/ON		0	0 … 1	1
P 232	Outside sensor deactivation		1	0 … 1	1
P 233	Diagnostics HC		-	-	-
P 234	Diagnostics boiler		-	-	-
P 235	Restoration of manufacturer's setting		0	0 … 1	1
P 238	Year		-	2000 - 2050	1
P 239	Date		-	01.01. – 31. 12.	Day
P 240	Time		-	00:00 – 23:59	Minute

6.2.1 Description of SAPHIR regulator parameters

P 1	**Current outside temperature**	**[°C]**
	Current outside temperature displayed. The lowest displayed value of outside temperature is -20 °C.	
P 2	**Current boiler temperature**	**[°C]**
	Current boiler outlet temperature displayed.	
P 3	**Current heating circuit temperature**	**[°C]**
	Current heating circuit temperature displayed	
P 4	**Desired heating circuit temperature**	**[°C]**
	Current desired heating circuit temperature displayed	
P 5	**Current temperature HW**	**[°C]**
	Current HW temperature displayed	
P 6	**Desired boiler temperature in case of HW heating**	**[°C]**
	Current desired boiler outlet temperature in case of water demand on heating displayed	
P 7	**Current warm water thermostat status**	**[°C]**
	Current HW thermostat status displayed	
P 8	**Current feeder temperature**	**[°C]**
	Current feeder temperature displayed	
P 9	**Current space temperature**	**[°C]**
	Current space temperature displayed	
P 10	**Current position of three-way mixing valve**	**[%]**
	Current position of three-way mixing valve displayed	
P 11	**Desired boiler temperature**	**[°C]**
	Current desired boiler outlet temperature displayed	
P 12	**Current ventilator output**	**[%]**
	Current ventilator output displayed	
P 15	**Faults**	
	Current boiler fault displayed. Description of individual faults see tab. no. 9. In case 0 is on the line no fault is detected.	
P 19	**Parallel shift in the heating curve**	**[°C]**
	By increasing the value the parallel shift in heating curve will occur (parameter P 21) thus the desired heating water temperature will be increased	
P 20	**Fuel type**	
	Selection of required fuel (value 1, 2, 3) **1** – lignite **2** – hard coal **3** – wood pellets	
P 21	**Slope of heating curve**	
	The value in this parameter shows the preset curve for heating of the heating circuit. The value depends on many factors. The correct value must be found out.	
P 22	**Ventilator output when making fire**	**[%]**
	Setting of desired ventilator output when making fire depending on the type of used fuel. Recommended values: - lignite and hard coal 40 - 50 % - wood pellets 20 %	
P 23	**Minimum boiler temperature**	**[°C]**
	Setting of minimum boiler temperature. The manufacturer insists on min. 50 °C (for 4 sect.) and 60 °C (for 5 - 7 sect.). boiler temperature. This minimum boiler temperature is maintained in all regimes.	

P 24	**Type of requirement (auto/fixed)**	
	Setting of the type of requirement for heating: By default there is used the **auto – value 0 type of requirement.** The boiler will heat automatically to the calculated desired water temperature. It is possible to use the **fixed – value 1 type of requirement**. The boiler will heat to the fixedly set outlet water temperature. The temperature set by the manufacturer is 70 °C. By keys (+ up, - down) of QAA 88 device we can increase or reduce the temperature set by the manufacturer by 15 °C. But QAA 88 device display shows the current space temperature if the QAA 88 device is as the space unit. Note: In case of boiler operation to fixed temperature the automatic summer/winter switching –over is always active. The fixed operation is only suitable in case the boiler is used as the source of heat. Boiler fixed operation is automatically activated in case of outside sensor fault or its disconnection. The use of auto type of requirement is recommended by the manufacturer. **Type of requirement RVS - value 2.** The boiler will continue in heating to the outlet temperature of water 70 ° C (i.e. the fixed set temperature) in case of requirement that will come from the superior control - see. Chap. 6.9.	
P 25	**Boiler hysteresis**	**[°C]**
	The boiler outlet temperature (modulation zone) can be exceeded by the value set in this parameter..	
P 26	**Maximum feeder temperature**	**[°C]**
	Setting of feeder maximum temperature: Once this temperature has been reached on the fuel feeder sensor the feeder starts to move fuel at the accelerated pace (shift 20 s, delay 10 s) until the temperature has dropped below the set value. In case the feeder temperature has not dropped within 7 minutes (fixedly set software value) the feeder will shut down. Manufacturer recommends the value set by him to be retained.	
P 27	**Boiler heating deficiency**	**[min.]**
	If 40 °C boiler temperature hasn't been reached within the time set in this parameter the fault message „4" - boiler extinction followed by boiler shut down will occur. Note: The boiler display is flickering and the fault number is displayed by parameter P 15.	
P 28	**QAA position**	
	Setting whether we use AQQ 88 device as the space unit (value 2) or the boiler unit (value 1) 1. **boiler unit** – it is assumed that the device is positioned directly at the boiler. The current boiler temperature is displayed on the display and the control is purely equithermal without space effect. By the keys (arrow + up, - down) we correct the desired current boiler temperature. 2. **space unit -** the device is positioned in the space (reference room). The current space temperature is displayed on the display and the control is equithermal with the space effect. By the keys (arrow + up, - down) we change the desired space temperature in the range ± 3 °C from the temperature set on line no. 103, 106 and 109. This change applies till the next time change. The same applies to the attenuation temperature. Note: If the device is positioned in the space, but we select the Boiler unit setting then instead of space temperature the boiler temperature will be displayed on the display and the space effect will not be taken into account. Heating is purely equithermal without space effect.	
P 40	**Heating circuit off/on**	
	By this parameter we can switch off heating of the heating circuit including the pump of heating circuit and three-way mixing valve if it is used in the application. Value 0 – Switched off Value 1 – Switched on	
P 41	**Boiler temperature increase from the heating circuit**	**[°C]**
	Setting of boiler temperature increase from currently desired heating circuit temperature Note: This value set by the manufacturer can be reduced to approx. 1 – 2 °C if the three-way mixing valve is installed in such distance from the boiler that no outlet water temperature losses into the space occur.	
P 42	**Warm water off/on**	
	By this parameter we can switch off warm water heating incl. the warm water pump (warm water three-way valve) according to the used application. Value 0 – Switched off Value 1 – Switched on	
P 43	**Boiler temperature increase from HW**	**[°C]**
	Settting of boiler temperature increase from currently desired warm water temperature.	

P 50	**Boiler primary pump man/auto**	
	Setting of the pump control type. Man – manual pump run, Auto – automatic pump run according to current requirements. Value 0 – Man Value 1 – Auto	
P 51	**Boiler primary pump off/on**	
	Primary pump switched on in case we have selected value 0 – Man on the line no.50. Value 0 – Switched off Value 1 – Switched on Note: In case value 0 is selected in parameter P 50 it is necessary to select here the value 1. If it be to the contrary the pump will not be active.	
P 52	**Boiler primary pump slowing-down**	**[min.]**
	We select boiler pump slowing-down on this line.	
P 53	**Boiler primary pump switch-on temperature**	**[°C]**
	Once this set boiler temperature has been achieved the boiler primary pump will switch on. The pump will switch off once the temperature has dropped by 5 °C below the temperature set for pump switching-on.	
P 54	**Day of boiler primary pump spinning**	
	On the determined day the pump spinning will be done at 12:00 h for 30 sec. Value 1 - 7 – corresponds to days from Monday to Sunday Value 0 – primary pump spinning is not active Value 8 – primary pump spinning is active every day Note: If at this time the pump is working the function is not active	
P 55	**Heating circuit pump man/auto**	
	Setting of pump control type. Man – pump manual run, Auto – pump automatic run according to current requirements. Value 0 – Man Value 1 – Auto	
P 56	**Heating circuit pump off/on**	
	Circuit pump switched on in case we have selected value 0 – Man on the line no. 55. Value 0 – Switched off Value 1 – Switched on Note: In case value 0 is selected in parameter P 55 it is necessary to select here the value 1. If it be to the contrary the pump will not be active.	
P 57	**Heating circuit pump slowing-down**	**[min.]**
	We select heating circuit pump slowing-down on this line.	
P 58	**Day of heating circuit pump spinning**	
	On the determined day the pump spinning will be done at 12:00 h for 30 sec. Value 1 - 7 – corresponds to days from Monday to Sunday Value 0 – TO pump spinning is not active Value 8 – TO pump spinning is active every day Note: If at this time the pump is working the function is not active	
P 59	**Warm water pump man/auto**	
	Setting of type of pump control; Man –pump manual run, Auto – pump automatic run according to the current requirements. Value 0 – Man Value 1 – Auto Attention! The value 0 is only designed for HW pump service testing. The permanent setting of pump manual run can result in water heater chilling. Therefore keep the set value1.	
P 60	**Warm water pump off/on**	
	Warm water pump switched on in case we have selected value 0 – Man on the line no. 59. Value 0 – Switched off Value 1 – Switched on Note: In case the value 0 is selected in P 59 parameter it is necessary to select here the value 1. If it be to the contrary the pump will not be active.	
P 61	**Warm water pump slowing-down**	**[min.]**
	We select warm water pump slowing-down on this line	

P 62	**Day of warm water pump spinning**	
	On the determined day the pump spinning will be done at 12:00 h for 30 sec. Value 1 - 7 – corresponds to days from Monday to Sunday Value 0 – TV pump spinning is not active Value 8 – TV pump spinning is active every day Note: If at this time the pump is working the function is not active	
P 65	**Three-way HW valve man/auto**	
	Setting of type of HW three-way valve control: Man –valve into HW circuit permanently open Auto – automatic three-way valve reversing according to requirement. Value 0 – Man Value 1 – Auto **ATTENTION! Value 0 is only designed for valve functionality service testing.**	
P 66	**Current status of HW three-way valve**	
	Display of current status of HW three-way valve In case the value 0 is selected in P 65 parameter we activate the three-way valve in this P 66 parameter by selecting the value 1.	
P 67	**HW three-way valve slowing-down**	**[min.]**
	Over this set period HW three-way valve is kept open into HW circuit when the desired HW temperature has been reached. If the boiler temperature after the HW preparation completion is higher than HW desired temperature plus 5 °C the boiler slowing-down into HW circuit is active and is followed by HW three-way valve slowing-down. If after the HW preparation completion the boiler temperature is not higher than HW desired temperature HW plus 5 °C the slowing-down into from boiler is not active, but HW three-way valve slowing-down starts immediately.	
P 70	**Outside temperature reset**	
	By this parameter activation we will set the outside temperature values to zero. Thenceforth the regulator starts to count new outside temperature values. Value 1 – activates zeroing	
P 71	**Space hysteresis**	**[°C]**
	Setting the value of space temperature excess; only after the space desired temperature incl. the value increase set in this parameter has been reached the boiler operation into the heating circuit will be shut down. The boiler operation into the heating circuit will restart after the space temperature has dropped to the space desired temperature.	
P 72	**Space effect**	**[%]**
	By setting this parameter we correct the equithermal control by the space effect. The higher is the set value the more the space effect is taken into account. Note: Setting 100 % regards the pure space control. Note: This parameter is active in case the QAA 88 device is selected as the space unit (line no. 28 value 2) and the outside sensor is used.	
P 76	**Minimum heating circuit temperature**	**[°C]**
	Setting the minimum desired temperature for heating circuit. Note: The minimum boiler temperature is taken as the minimum heating circuit temperature in case of the version without three-way mixing valve.	
P 77	**Maximum heating circuit temperature**	**[°C]**
	Setting of maximum desired temperature for heating circuit.	
P 80	**Building constant**	**[h]**
	Heating is influenced by setting this parameter. The linkage of building temperatures responses to changing outside temperature depending on current building structure is taken into account by this parameter. Value 0, 1 – wood structure (setting the value 1 is recommended by the manufacturer) Value 1, 2 or 3 – panel buildings (setting the value 3 is recommended by the manufacturer 3) Value 10 – brickwork buildings	
P 81	**ECO temperature**	**[°C]**
	The heating circuit requirement is directly influenced by setting this value. Heating is blocked in case the difference between the current desired space temperature and attenuated outside temperature is lower than the value set in this parameter. The line 82 shows whether this function is active Note: This function does not count with current outside temperature.	

P 82	**ECO automatics passive/active**	
	ECO function image. Value 0 – passive (the function is not active it means heating isn't blocked) Value 1 – active (the function is active it means heating is blocked)	
P 83	**Summer/winter temperature**	**[°C]**
	Setting the outside temperature at which the heating circuit requirement will be ignored. Note: The evaluation on the basis of average outside temperatures.	
P 84	**Summer/winter constant**	**[h]**
	By setting this value we determine the time for calculation of average outside temperature in connection with line no. 83.	
P 85	**Summer/winter current status**	
	Summer/winter current status image. Value 0 – winter (the function is not active it means heating isn't blocked) Value 1 – summer (the function is active it means heating is blocked)	
P 86	**Heating system**	
	Setting the type of heating bodies. Value 0 – floor heating Value 1 – convectors Value 2 – plate radiators Value 3 – cast iron radiators	
P 87	**HC antifreeze protection off/on**	
	Setting the heating circuit antifreeze protection on the basis of outside temperature If the outside temperature is+1,5 °C and higher the heating circuit pump only will slow down after the requirement for heating has ceased. If the outside temperature is in the range from +1,5 to -4 °C the heating circuit pump will be switched on every 6 hours for the period of 10 minutes. If the outside temperature is in the range from -4 °C and lower the heating circuit pump will be permanently switched on. Pump switch-off hysteresis is 0,5 °C. Value 0 – function isn't active Value 1 – function is active Keeping the function activated is recommended by the manufacturer.	
P 88	**Servo overrun time**	**[s]**
	This value depends on the used three-way mixing valve of the heating branch and it is taken from the catalogue sheet. If you use three-way valve SQK 34 then the correct value is already set.	
P 100	**Setting the day of time schedule for HC**	
	Setting the day of week required for setting the individual heating periods Value 1 - 7 – corresponds to the days from Monday to Sunday, we set it separately every day Value 0 – setting all days at once	
P 101	**First HC period switched on**	**[h:min.]**
	Setting the time of switching-on the first period for HC heating Note: It isn't necessary to use the second and third period	
P 102	**First HC period switched off**	**[h:min.]**
	Setting the switching-off time of the first period for HC heating	
P 103	**Desired space temperature in the first period**	**[°C]**
	Setting the desired space temperature in the first HC period	
P 104	**Second HC period switched on**	**[h:min.]**
	Setting the switching-on time of the second period for HC heating	
P 105	**Second HC period switched off**	**[h:min.]**
	Setting the switching-off time of the second period for HC heating	
P 106	**Desired space temperature in the second period**	**[°C]**
	Setting the desired space temperature in the second HC period	
P 107	**Third HC period switched on**	**[h:min.]**
	Setting the switching-on time of the third period for HC heating	
P 108	**Third period HC switched off**	**[h:min.]**
	Setting the switching-off time of the third period for HC heating	

P 109	**Desired space temperature in the third period**	**[°C]**
	Setting the desired space temperature in the third HC period	
P 110	**HC time schedule reset**	
	By this parameter activation the time regime is reset into manufacturer's setting. Value 1 – activation	
P 111	**Desired space temperature in attenuation**	**[°C]**
	Setting the desired space temperature at the time outside the time period	
P 120	**Setting the day of time schedule for HW**	
	Setting the day of the week required for setting the individual HW heating periods Value from1 to 7 – corresponds to days from Monday to Sunday and we set it separately every day Value 0 – setting all days at once	
P 121	**First period HW switched on**	**[h:min.]**
	Setting the time of switching-on the first period for HW heating Note: It isn't necessary to use the second and third period	
P 122	**First period HW switched off**	**[h:min.]**
	Setting the time of switching-off the first period for HW heating	
P 123	**Desired HW temperature in the first period**	**[°C]**
	Setting the desired HW temperature in the first period Note: In application with HW thermostat the value must correspond to the temperature set on HW thermostat.	
P 124	**Second period HW switched on**	**[h:min.]**
	Setting the time of switching –on the second period for HW heating	
P 125	**Second period HW switched off**	**[h:min.]**
	Setting the time of switching -off the second period for HW heating	
P 126	**Desired HW temperature in the second period**	**[°C]**
	Setting the desired HW temperature in the second period Note: In application with HW thermostat the value must correspond to the temperature set on HW thermostat.	
P 127	**Third period HW switched on**	**[h:min.]**
	Setting the time of switching –on the third period for HW heating	
P 128	**Third period HW switched off**	**[h:min.]**
	Setting the time of switching –off the third period for HW heating	
P 129	**Desired HW temperature in the third period**	**[°C]**
	Setting the desired HW temperature in the third period Note: In application with HW thermostat the value must correspond to the temperature set on HW thermostat.	
P 130	**HW Hysteresis**	**[°C]**
	This value relates to the desired HW temperature. In case the HW temperature has dropped by this value below the HW set desired value HW heating will start again.	
P 131	**HW time schedule reset**	
	By this parameter activation the time regime returns to the manufacturer's setting Value 1 – activation	
P 140	**Feeder runtime**	**[s]**
	Feeder runtime in automatic regime	
P 150	**Feeder X1 lignite**	**[%]**
	It regards the percentage value of output. The value 0 represents the min. output and the feeder standstill time of parameter 151 is assigned to this value Note: This parameter cannot be changed	
P 151	**Feeder Y1 lignite**	**[s]**
	Setting the feeder standstill time for HU fuel relating to 0% output	

P 152	**Feeder X2 lignite**	**[%]**
	It regards the percentage value of output. The value 33 represents the 33% output and the feeder standstill time of parameter 153 is assigned to this value. Note: This parameter cannot be changed	
P 153	**Feeder Y2 lignite (HU)**	**[s]**
	Setting the feeder standstill time for HU fuel relating to 33% output	
P 154	**Feeder X3 lignite**	**[%]**
	It regards the percentage value of output. The value 33 represents the 66% output and the feeder standstill time of parameter 155 is assigned to this value Note: This parameter cannot be changed	
P 155	**Feeder Y3 lignite**	**[s]**
	Setting the feeder standstill time for HU fuel relating to 66% output	
P 156	**Feeder X4 lignite**	**[%]**
	It regards the percentage value of output. The value 33 represents the 100 % output and the feeder standstill time of parameter 157 is assigned to this value. Note: This parameter cannot be changed	
P 157	**Feeder Y4 lignite**	**[s]**
	Setting the feeder standstill time for HU fuel relating to 100% output	
P 158	**Feeder runtime in the attenuation – lignite**	**[s]**
	Setting the feeder runtime in the attenuation regime for HU fuel	
P 159	**Standstill time(delay) of feeder in the attenuation – lignite**	**[min.]**
	Standstill of feed screw in the attenuation regime for HU fuel	
P 160	**Ventilator X1 lignite**	**[%]**
	It regards the percentage value of ventilator output. The value 0 represents min. ventilator output and the actual ventilator output of parameter 161 is assigned to this value. Note: This parameter cannot be changed	
P 161	**Ventilator Y1 lignite**	**[%]**
	Setting the actual ventilator output for HU fuel relating to 0% ventilator output	
P 162	**Ventilator X2 lignite**	**[%]**
	It regards the percentage value of ventilator output The value 33 represents 33% ventilator output and the actual ventilator output of parameter 163 is assigned to this value. Note: This parameter cannot be changed	
P 163	**Ventilator Y2 lignite**	**[%]**
	Setting the actual ventilator output for HU fuel relating to 33% ventilator output	
P 164	**Ventilator X3 lignite**	**[%]**
	It regards the percentage value of ventilator output The value 66 represents 66% ventilator output and the actual ventilator output of parameter 165 is assigned to this value. Note: This parameter cannot be changed	
P 165	**Ventilator Y3 lignite**	**[%]**
	Setting the actual ventilator output for HU fuel relating to 66% ventilator output	
P 166	**Ventilator X4 lignite**	**[%]**
	It regards the percentage value of ventilator output The value 100 represents 100% ventilator output and the actual ventilator output of parameter 167 is assigned to this value. Note: This parameter cannot be changed	
P 167	**Ventilator Y4 lignite**	**[%]**
	Setting the actual ventilator output for HU relating to 100% ventilator output	
P 168	**Ventilator slowing-down in the attenuation regime– lignite**	**[s]**
	Setting the ventilator slowing-down in the attenuation regime against the feeder runtime in the attenuation regime	
P 169	**Ventilator output in the attenuation regime– lignite**	**[%]**
	Setting the ventilator output in the attenuation regime	
P 170	**Feeder X1 hard coal**	**[%]**
	It regards the percentage value of output. The value 0 represents min. output and feeder standstill time of parameter 171 is assigned to this value. Note: This parameter cannot be changed	

P 171	**Feeder Y1 hard coal(ČU)**	**[s]**
	Setting the feeder standstill time for ČU fuel relating to 0% output	
P 172	**Feeder X2 hard coal**	**[%]**
	It regards the percentage value of output. Value 33 represents 33% output and feeder standstill time of parameter 173 is assigned to this value. Note: This parameter cannot be changed	
P 173	**Feeder Y2 hard coal**	**[s]**
	Setting the feeder standstill time for ČU fuel relating to 33% output	
P 174	**Feeder X3 hard coal**	**[%]**
	It regards the percentage value of output. The value 66 represents 66% output and feeder standstill time of parameter 175 is assigned to this value. Note: This parameter cannot be changed	
P 175	**Feeder Y3 hard coal**	**[s]**
	Setting the feeder standstill time for ČU as the fuel relating to 66% output	
P 176	**Feeder X4 hard coal**	**[%]**
	It regards the percentage value of output. The value 100 represents 100% output and feeder standstill time of parameter 177 is assigned to this value. Note: This parameter cannot be changed	
P 177	**Feeder Y4 hard coal**	**[s]**
	Setting the feeder standstill time for ČU as the fuel relating to 100% output	
P 178	**Feeder runtime in the attenuation regime– hard coal**	**[s]**
	Setting the feeder runtime in the attenuation regime for ČU as the fuel	
P 179	**Standstill time(delay) of feeder in the attenuation – hard coal**	**[min.]**
	Standstill time of the feed screw in the attenuation regime for ČU as the fuel	
P 200	**Ventilator X1 hard coal**	**[%]**
	It regards the percentage value of ventilator output The value 0 represents min. ventilator output and actual ventilator output of parameter 201 is assigned to this value. Note: This parameter cannot be changed	
P 201	**Ventilator Y1 hard coal**	**[%]**
	Setting the actual ventilator output for ČU as the fuel relating to 0% ventilator output	
P 202	**Ventilator X2 hard coal**	**[%]**
	It regards the percentage value of ventilator output The value 33 represents 33% ventilator output and actual ventilator output of parameter 203 is assigned to this value.Note: This parameter cannot be changed	
P 203	**Ventilator Y2 hard coal**	**[%]**
	Setting the actual ventilator output for ČU as the fuel relating to 33% ventilator output	
P 204	**Ventilator X3 hard coal**	**[%]**
	It regards the percentage value of ventilator output The value 66 represents 66% ventilator output and actual ventilator output of parameter 205 is assigned to this value. Note: This parameter cannot be changed	
P 205	**Ventilator Y3 hard coal**	**[%]**
	Setting the actual ventilator output for ČU as the fuel relating to 66% ventilator output	
P 206	**Ventilator X4 hard coal**	**[%]**
	It regards the percentage value of ventilator output The value 100 represents 100% ventilator and actual ventilator output of parameter 207 is assigned to this value.Note: This parameter cannot be changed	
P 207	**Ventilator Y4 hard coal**	**[%]**
	Setting the actual ventilator output for ČU as the fuel relating to 100% ventilator output	
P 208	**Ventilator slowing-down in the attenuation regime– hard coal**	**[s]**
	Setting the ventilator slowing-down in the attenuation regime against the feeder runtime in the attenuation regime	
P 209	**Ventilator output in the attenuation regime – hard coal**	**[%]**
	Setting the ventilator output in the attenuation regime	

P 210	**Feeder X1 pellets**	**[%]**
	It regards the percentage value of output. The value 0 represents min. output and feeder standstill time of parameter 211 is assigned to this value.Note: This parameter cannot be changed	
P 211	**Feeder Y1 pellets**	**[s]**
	Setting the feeder standstill time for pellets as the fuel relating to 0% output	
P 212	**Feeder X2 pellets**	**[%]**
	It regards the percentage value of output. The value 33 represents 33% output and feeder standstill time of parameter 213 is assigned to this value.Note: This parameter cannot be changed	
P 213	**Feeder Y2 pellets**	**[s]**
	Setting the feeder standstill time for pellets as the fuel relating to 33% output	
P 214	**Feeder X3 pellets**	**[%]**
	It regards the percentage value of output. Value 66 represents 66% output and feeder standstill time of parameter 215 is assigned to this value. Note: This parameter cannot be changed	
P 215	**Feeder Y3 pellets**	**[s]**
	Setting the feeder standstill time for pellets as the fuel relating to 66% output	
P 216	**Feeder X4 pellets**	**[%]**
	It regards the percentage value of output. Value 100 represents 100% output and feeder standstill time of parameter 21 is assigned to this value 7. Note: This parameter cannot be changed	
P 217	**Feeder Y4 pellets**	**[s]**
	Setting the feeder standstill time for pellets as the fuel relating to 100% output	
P 218	**Feeder runtime in the attenuation – pellets**	**[s]**
	Setting the feeder runtime in the attenuation regime for pellets as the fuel	
P 219	**Standstill time(delay) of feeder in the attenuation – pellets**	**[min.]**
	Standstill time of the feed screw in the attenuation regime for pellets as the fuel	
P 220	**Ventilator X1 pellets**	**[%]**
	It regards the percentage value of ventilator output The value 0 represents min. ventilator output and the actual ventilator output of parameter 221 is assigned to this value. Note: This parameter cannot be changed	
P 221	**Ventilator Y1 pellets**	**[%]**
	Setting the actual ventilator output for pellets as the fuel relating to 0% ventilator output	
P 222	**Ventilator X2 pellets**	**[%]**
	It regards the percentage value of ventilator output Value 33 represents 33% ventilator output and the actual ventilator output of parameter 223 is assigned to this value. Note: This parameter cannot be changed	
P 223	**Ventilator Y2 pellets**	**[%]**
	Setting the actual ventilator output for pellets as the fuel relating to 33% ventilator output	
P 224	**Ventilator X3 pellets**	**[%]**
	It regards the percentage value of ventilator output Value 66 represents 66% ventilator output and the actual ventilator output of parameter 225 is assigned to this value at parameter 225. Note: This parameter cannot be changed	
P 225	**Ventilator Y3 pellets**	**[%]**
	Setting the actual ventilator output for pellets as the fuel relating to 66% ventilator output	
P 226	**Ventilator X4 pellets**	**[%]**
	It regards the percentage value of ventilator output Value 100 represents 100% ventilator output and the actual ventilator output of parameter 227 is assigned to this value. Note: This parameter cannot be changed	
P 227	**Ventilator Y4 pellets**	**[%]**
	Setting the actual ventilator output for pellets as the fuel relating to 100% ventilator output	

P 228	**Ventilator slowing-down in the attenuation regime– pellets**	**[s]**
	Setting the ventilator slowing-down in the attenuation regime against the feeder runtime in the attenuation regime	
P 229	**Ventilator output in the attenuation – pellets**	**[%]**
	Setting the ventilator output in the attenuation regime	
P 232	**Outside sensor deactivation**	
	The value 0 – outside sensor deactivation; this deactivation can only be used in case the QAA 88 device is as the space unit and then it regards the pure space control. The value 1 – active outside sensor Note: The use of the outside sensor is recommended by the manufacturer	
P 233	**HC Diagnostics**	
	The represented value serves for service purposes and current HC status idenfification.	
P 234	**Boiler diagnostics**	
	The represented value serves for service purposes and current boilerstatus idenfification..	
P 235	**Restoration of manufacturer´s setting**	
	The value 1 – activates the parameter and the manufacturer's setting is restored.	
P 238	**Year**	
	Settting the current year	
P 239	**Date**	
	Settting the current date	
P 240	**Time**	
	Settting the current time	

6.3 QAA 88 device

The space or output water current temperature is displayed on the display during the operation depending on the use of this device (parameter P 28). The value is displayed in resolution 0,5 ^{o}C. By pressing the key **plus** or **minus** the desired temperature is displayed.
The displaying cursor is in the lower part of the display and it displays the current status of the device and ventilator. In case the cursor is above ⏻ symbol (ON – OFF) the heat requirement is ignored (ventilator and feeder do not run and other control and a security elements are active). The device is switched on by means of right-hand key ESC. The cursor jumps above the symbol (description) Auto.

Fig. no. 23 QAA 88 device

Then the cursor moves according to the boiler current status. Small ventilator symbol represents 0 – 33 % ⏻ Auto ventilator output, the middle-sized ventilator symbol represents 33 - 66 % ventilator output and big ventilator symbol 66 - 100 % ventilator output. On the left –hand side part of display the cursor is displayed in case of demand on heating , besides the boiler minimum temperature when making fire and in boiler fixed run. The cursor flickers during the warm water heating.
In case of the manual regime –the ventilator run (pressing the blue key) the QAA 88 device display will flicker. It does not regard any fault. The value „0" is in P 15 parameter. The ventilator run in manual regime will be terminated by pressing the blue key again and the display stops flickering.

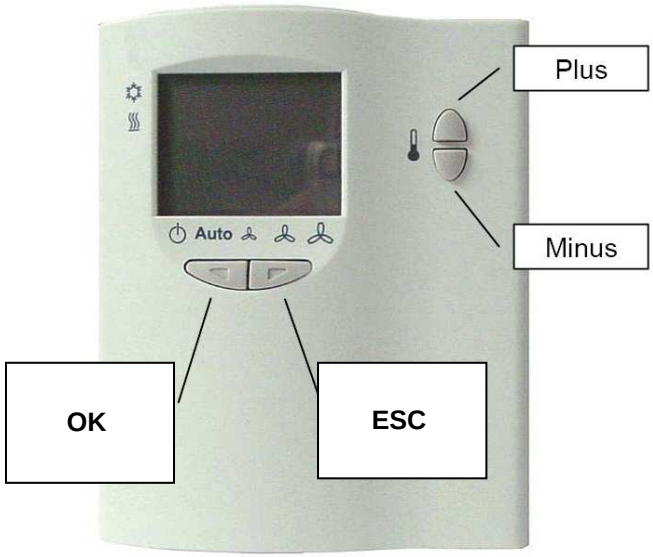


Fig. no. 24 Description of device QAA 88

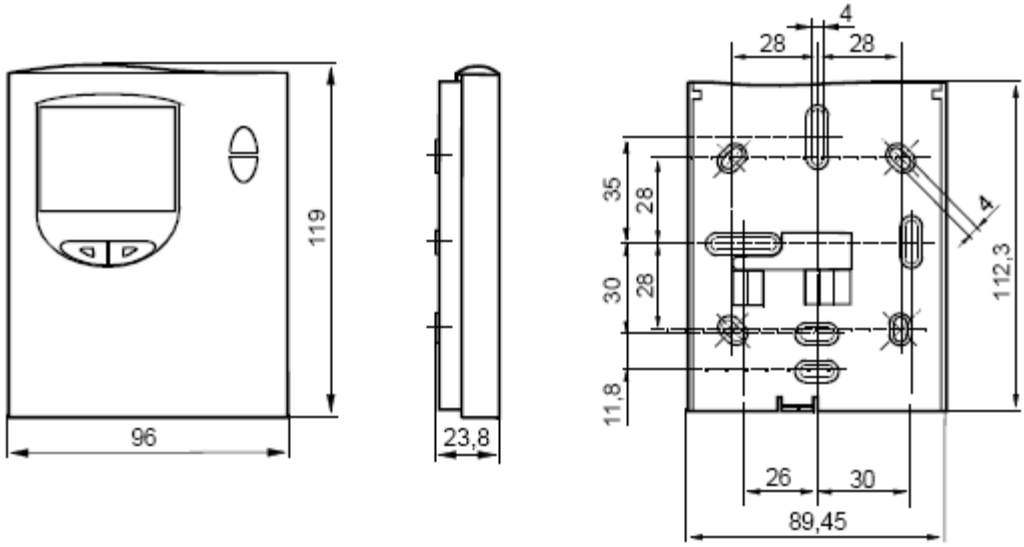


Fig. no. 25 Connecting dimensions of device QAA 88

6.3.1 Parameters setting and displaying

Parameters setting

If you want to change parameters take following steps:

- Press simultaneously the keys **OK, ESC** and **– minus** – blank display will appear.
- Press 2x key **– minus** and n0 appears on the display.
- Press 2x key **+ plus** and n3 appears on the display.
- Confirm with key **OK.**
- **P** appears on the display and after approx. 2 sec. the digit **1** is displayed**.**
- By the key **OK** the parameter value is displayed.
- By the key **+ plus** or **– minus** the displayed value can be changed.
- By the key **OK** confirm the changed value.
- By the key **ESC** leave the parameter without any change
- Select the next parameter by the key **+ plus** or **– minus** and repeat the whole procedure.

Attention!
After the completion of making changes in parameters always check whether QAA 88 device is switched on (cursor is above the Auto symbol).

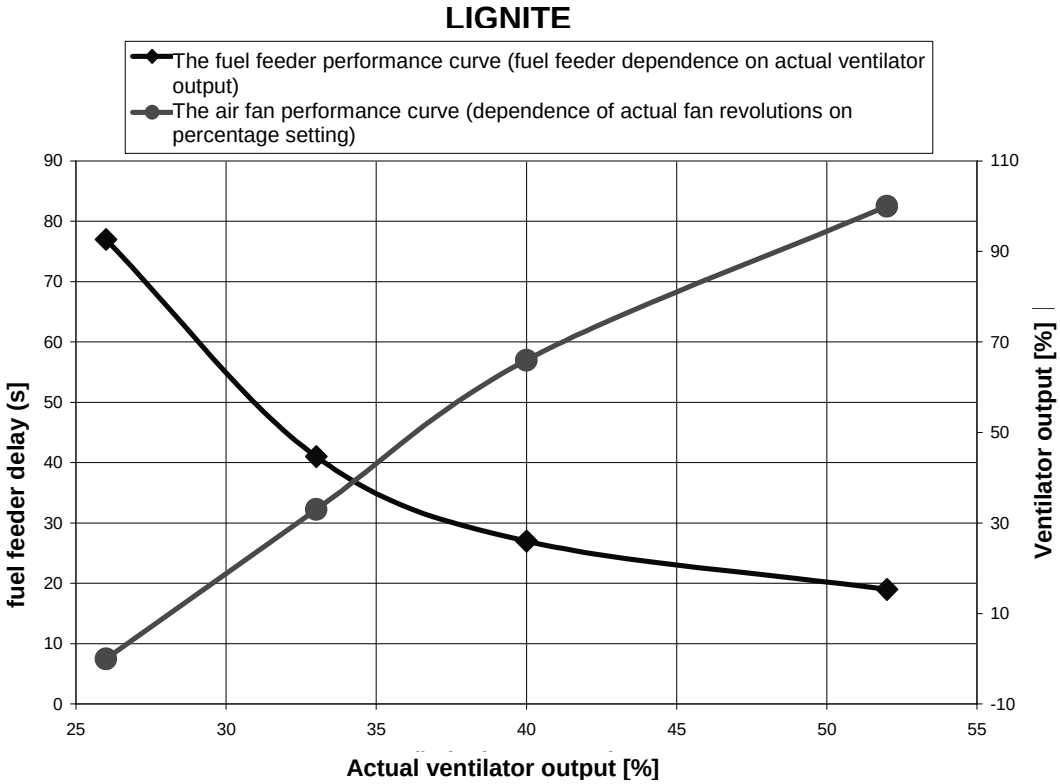
Parameters displaying

If you only want to display the set parameters without the possibility to make any change take following steps:

- Press simultaneously the keys **OK, ESC** a **– minus** – blank display will appear.
- Press 2x key **– minus** and n0 appears on the display.
- Press 1x key **+ plus** and n2 appears on the display.
- Confirm with **OK** key.
- **d1** appears on the display and after approx. 2 sec. the digit **1** is displayed
- By the key **OK** the parameter value is displayed
- By the key **OK** or **ESC** leave the parameter without any change
- Select the next parameter by the key **+ plus** or **– minus** and repeat the whole procedure.

If during setting, changing or viewing the parameters the key is not pressed for 3 minutes the QAA 88 device will return to the introductory display.

6.3.1.1 Fuel feeder and ventilator performance curve – lignite – 4 sect. boiler size

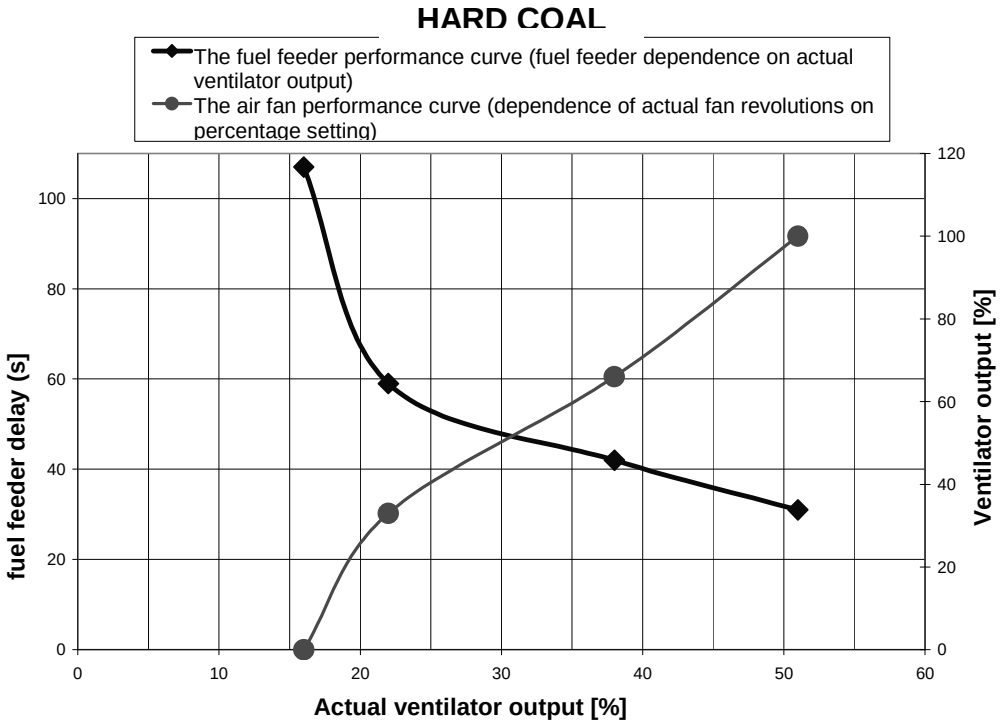


where:

77 s…is Feeder Y1 lignite – parameter no. 151
41 s…is Feeder Y2 lignite – parameter no. 153
27 s…is Feeder Y3 lignite – parameter no. 155
19 s…is Feeder Y4 lignite – parameter no. 157

26 %…is Ventilator Y1 lignite – parameter no. 161
33 %…is Ventilator Y2 lignite – parameter no. 163
40 %…is Ventilator Y3 lignite – parameter no. 165
52 %…is Ventilator Y4 lignite – parameter no. 167

6.3.1.2 Fuel feeder and ventilator performance curve – hard coal – 4 sect. boiler size

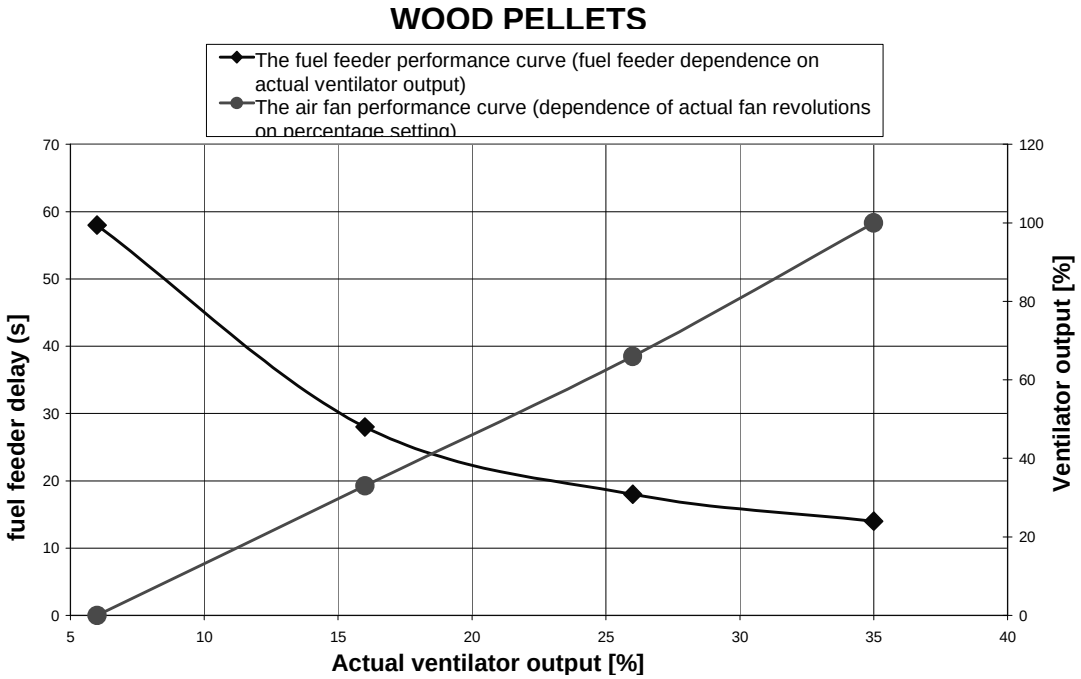


where:

107 s…is Feeder Y1 hard coal – parameter no. 171
59 s….is Feeder Y2 hard coal – parameter no. 173
42 s…is Feeder Y3 hard coal – parameter no. 175
31 s….is Feeder Y4 hard coal – parameter no. 177

16 %.is Ventilator Y1 hard coal – parameter no. 201
22 % is Ventilator Y2 hard coal – parameter no. 203
38 % is Ventilator Y3 hard coal – parameter no. 205
51 % is Ventilator Y4 hard coal – parameter no. 207

6.3.1.3 Fuel feeder and ventilator performance curve – wood pellets – 4 sect. boiler size



where:

58 s….is Feeder Y1 pellets – parameter no. 211
28 s….is Feeder Y2 pellets – parameter no. 213
18 s….is Feeder Y3 pellets – parameter no. 215
14 s….is Feeder Y4 pellets – parameter no. 217

6 %….is Ventilator Y1 pellets – parameter no. 221
16 %…is Ventilator Y2 pellets – parameter no. 223
26 %…is Ventilator Y3 pellets – parameter no. 225
35 %…is Ventilator Y4 pellets – parameter no. 227

The feeder runtime is given by P 140 parameter and it applies to all fuels. The change in fuel is selected by P 20 parameter. The delays and percentage outputs are already preset.

6.3.2 Faults

The faults are displayed by flickering display of QAA 88 device. Current fault number is displayed in P 15 parameter. In case more faults occur simultaneously first of all the fault with higher number will be displayed.

The non-reversible fault 4 must be quitted after its elimination which is done on the introductory display of QAA device (i.e. leave P 15 parameter of the device up to the introductory display) by the simultaneous pressing of keys (+arrow up,- arrow down) for the period of approx. 3 sec. Display flickering will disappear. The reversible faults disappear automatically after their elimination.

In case of fault 10 - of heating branch sensor (only in case of mixing heating circuit) the three-way mixing valve closes. As the temporary variant (before we replace the sensor) we can select the boiler operation at the fixed temperature (P 24 parameter) plus the heating branch three-way mixing valve switch-over to **MAN** position. We select setting of heating branch three-way mixing valve manually. After the fault elimination we again select the automatic boiler operation and we switch over the three-way mixing valve back to **AUTO** position. Until the heating branch sensor is replaced the fault is signalled on QAA 88 device.

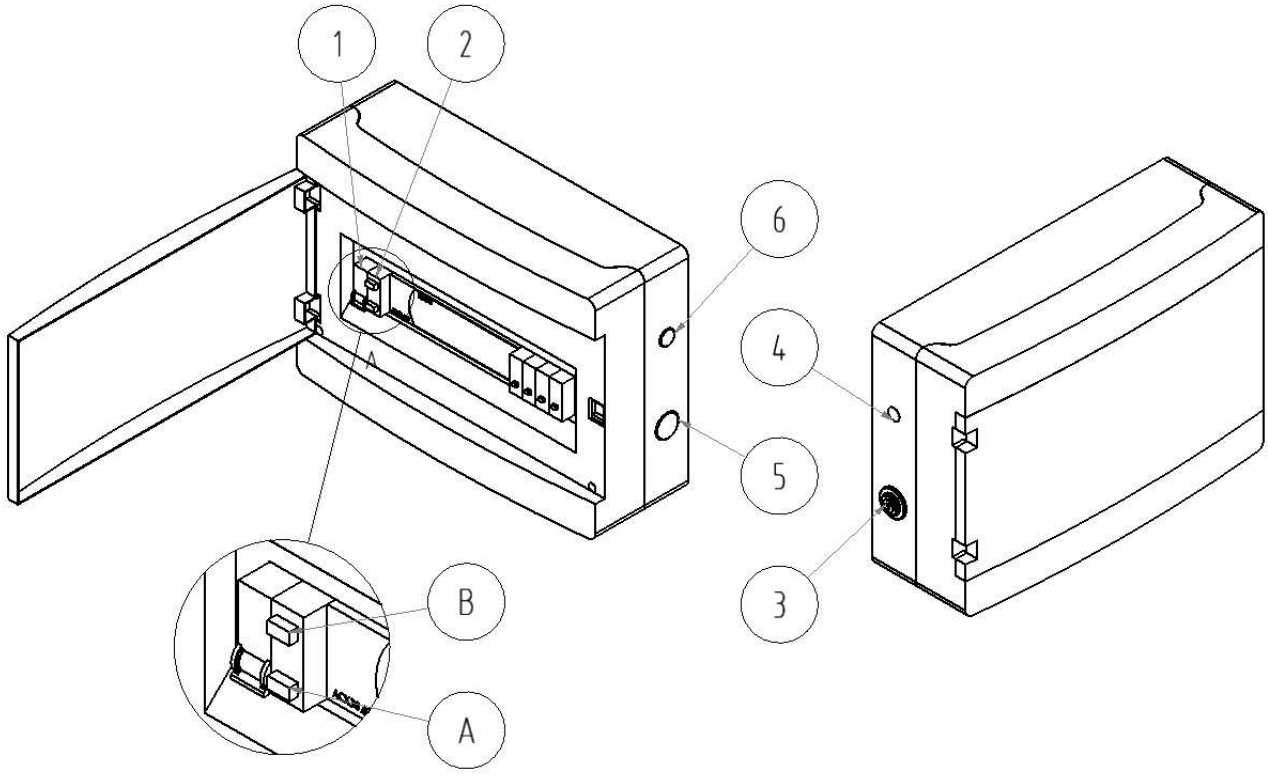
In case of fault 1 i.e. exceeding of max. boiler temperature the boiler might be shut down through the safety thermostat set to approx. 100 °C. This fault is non-reversible and it is necessary to de-block the safety thermostat after the boiler has cooled down. The de-blocking button is found under the black plastic cover.

Tab. no. 9 Faults

Image	Sensor	Fault description	Boiler response
1	**B2**	Exceeding of safety temperature (max. boiler value)	Boiler shut-down. The pumps are still working. The three-way valve opens and water is withdrawn into the heating system.
2	**B5**	Exceeding of fuel feeder temperature	Fuel feed according to the set algorithm so that the burning fuel is returned into the burner.
3	**Motor heating protection**	Exceeding of fuel feeder motor winding temperature	Boiler shut-down. The primary pump is still working. After the winding has cooled down and the heating protection has re-switched put the boiler into operation.
4	**B2**	Extinction of boiler. The outlet temperature in a given time interval does not grow. The absence of fuel, feeder blockage etc. might be the reasons.	Boiler shut-down. The protection against fuel fire penetration is active
7	**B3**	Overheating of warm water in HW reservoir	End of HW heating. Three-way valve turns to HC.
8	**B1**	HC overheating	HC heating and HC pump shut-down.
9	**-**	Time validity. If absence of voltage on regulator is longer than approx. 3 days counting of time (date, time) will stop. It is necessary to set current time a date.	Boiler heats to the set temperature in the first period on Monday.

FAULT MESSAGES IN CASE OF SHORT CIRCUIT OR SENSORS DISCONNECTION			
10	**B1**	Heating branch temperature	HC heating shut-down
11	**B2**	Boiler outlet temperature	Boiler operation shut-down. The protection against fuel fire penetration is active. Primary pump is active.
12	**B3**	HW reservoir temperature	HW heating shut-down
13	**B5**	Feeder reservoir temperature	Boiler operation shut-down.
14	**B9**	Outside temperature	Boiler operation to the fixed temperature.
15	**A6**	Room device	Boiler heats to the latest desired temperature.

6.4 Service board



1 – Circuit breaker (circuit breaker B16 1P)
2 – Two-button station (note: green and blue backlighting)
3 – Cable gland ABB (thermoplastic)
4 – Safety thermostat signal lamp (orange)
5 – Dummy plug 28,0 (colour: white)
6 – Dummy plug 14,3 (colour: white)

A – Two-button station backlighting blue – ventilator activation when making fire
B – Two-button station backlighting green –feeder activation when making fire

Fig. no. 26 Service board

6.5 Checking activities before commissioning

Before the boiler is put into operation it is necessary to check:

a) Filling the heating system with water

Water for filling the boiler and heating system must be clear and colourless, without any suspended substances, oil and chemically aggressive substances. Its hardness must comply with ČSN 07 7401 and in case of dissatisfactory hardness the water must be trated. Even a multiply heating of water with an exceeded harness does not prevent the salts from segregation on the exchanger walls. By precipitation of 1 mm calcacite at a given point the heat transfer from metal to water is reduced by 10 %.

The heating systems with an open expansion tank allow a direct contact between the heating water and the atmosphere. During the heating season the expanding water in the reservoir absorbs the oxygen which increases the corrosive effects and at the same time lot of water evaporates. Only the water treated to the values according to ČSN 07 7401 can be used for refilling. The heating system must be thoroughly flushed out in order to wash out all impurities.

During the heating season it is necessary to keep a constant water volume in the heating system. When refilling the water in the heating system it is necessary to make sure that no air is sucked into the system. The water from boiler and the heating system must never be discharged or be taken for use except the emergency cases like the repairs, ect. The water discharge and new water filling operations increase the danger of corrosion and the scale formation.

If it is necessary to refill water in the heating system, we only do it when the boiler has cooled down so that the exchanger cannot be damaged.

b) Heating system tightness

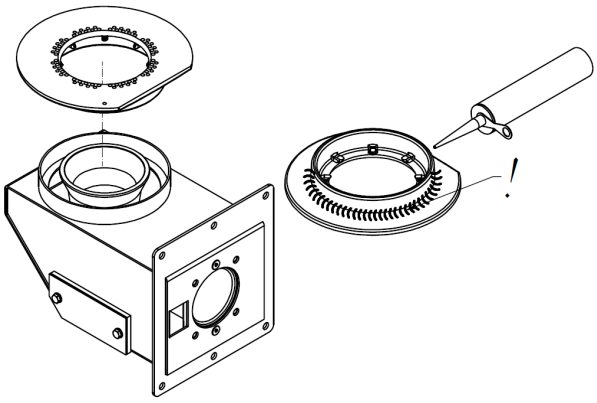
c) Connection to the chimney – must be approved by a chimney-sweepers´ organization

d) Burner tightness

Connect the equipment to the mains (insert the plug into socket). Put the main switch (circuit breaker) in the service box into the 1 position. By starting the ventilator (by pressing the blue button) in the service box the burner tightness is checked. All air must flow into the combustion are in a retort and boiler grate. The check must be focused on the seating faces:

- Of the fan in the mouthpiece
- Around the burner cleaning opening

Of boiler grate with the burner. If any leakages appear, the fire grate must be taken out, the old boiler mastic must be removed from the seating faces and an adequate quantity of new mastic must be applied to them and the fire grate must be installed back into the burner. *(*Note: In case of a 4 sectional boiler size the cutting off of the grate must be always toward the back wall at the frontal view into the boiler. In case of 5 - 7 sectional boiler size the cutting off of the grate must always be directed to entry to the fuel feeder.)



To the point marked apply the boiler cement and lay up the grate. It is necessary to ensure the tightness between the burner and the grate.

-

Repeat the check.

By pressing the blue button again the ventilator is switched off. If you do not switch off the ventilator it will be switched off automatically after 15 minutes (unless there is some requirement from QAA 88 device).

e) Connection to the electricity network

The boiler is connected through a movable connection by means of a plug standardized socket 230 V/50 Hz/10 A. The protection against electric shock muset be ensured according to ČSN 33 2000 - 4 - 41.

f) Open the water inlet into valve BVTS or TS 130 or STS 20

g) Check the opening of chimney flap

The installation and heating test completion must be recorded in the „Guarantee certificate“.

6.6 Setting of parameters before the equipment start-up

Parameters necessary for equipment start-up

Before you make a fire you must set following parameters:

Parameter	Description	Units	Set by the manufacturer
P 20	Fuel type		1
P 238	Year		-
P 239	Date		-
P 240	Time		-

These parameters are necessary for equipment start-up and other parameters can be modified as need may be or after the discussion with the technician.

Setting P 238 – 240 parameters is important for the boiler operation in time regimes. If the supply outage lasts longer than approx. 3 days (it depends on the number of regulator operating hours) set current time a date after the supply restoration.

Note:
We recommend checking the time periods for warm water and heating circuit (see table no. 7 and 8). These parameters can be modified by customer as need may bet. Three time periods can be used.

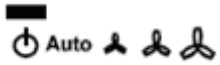
Parameters modification according to the type of heated building

Parameter	Description	Units	Set by the manufacturer
P 80	Building constant	[**h**]	10
P 86	Heating system		3

In case HW heating is not used set 0 at P 42 parameter. HW heating will be ignored also in case of connected HW sensor. HW sensor fault will not be signalled.

6.7 Boiler commissioning

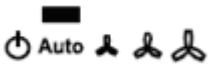
1. Making fire in the boiler.
   - Connect the equipment to the mains (insert plug into the socket).
   - Put the main switch (circuit breaker) in the service box into the 1 position.
   - Check whether QAA 88 device is switched off or switch it off by means of OK key; cursor will move into ON/OFF position. QAA 88 device will be switched off.

   - Check setting of parameters see chap. 6.6.
   - On the pressure gauge check volume of water in heating system.
   - Open the stop valves between boiler and heating system.
   - Check the pumps functionality (mechanical spinning, then according to parameters: primary pump (P 50, P 51), pump HC (P 55, P 56), pump HW (P 59, P 60)).
   - Clean the burner and ash-pan drawer (in case fire isn't made for the first time). Ash-pan door during fire making and boiler operation must be permanently closed.
   - Fill the fuel reservoir with specified fuel and then close the reservoir carefully in order to prevent possible air intake into the burner through the feeder.
   - By pressing the green button on the service box put the fuel feeder for fuel feed to burner manually into operation. Fuel must be supplied approx. 2 cm under the edge of the cast iron grate. In case twe start with an empty fuel feeder the fuel transport to burner will last 6 – 6,5 min. After 6 minutes the feed screw is automatically switched off and if required then by pressing the green button again it is put into operation. By pressing the green button again the fuel feeder is switched off.
   - Put the kindling e.g. paper, wood chips, PEPO, solid alcohol etc. on the fuel.
   - Ignite and let flare up.
   - Shovel a small volume of specified fuel to the burning kindling.
   - Close the door and switch on the ventilator by means of blue button in the service box (the ventilator run is signalled by flickering cursor above the ventilator symbol). Through the door the fuel flaring can be checked. As necessary the ventilator can be switched off by pressing the blue button and if it be to the contrary the ventilator is automatically switched off after 15 minutes. When making fire the

ventilator is set to 50 % nominal ventilator output (set by the manufacturer). In case the fuel has changed for wood pellets this output must be set to 20 % (parameter P 22).

- Maintain a sufficient height of fuel during making fire.
- If after 15 minutes the fuel is sufficiently flaring switch on QAA 88 device by pressing the right-hand key ESC and cursor will move into Auto position



- If after 15 minutes the fuel does not flare up sufficiently switch on the ventilator again for the necessary period of time and then switch on QAA 88 device by the right-hand key ESC; the cursor will move into Auto position
- Now the boiler is in the automatic regime.
- **WARNING! If before the QAA 88 device turning–on the ventilator is still switched on in the manual regime, (display of QAA 88 device is flickering i.e. 15 minutes have not elapsed since pressing the blue button) switch off the ventilator by means of blue button and only then switch on the QAA 88 device.**

2. Check again the boiler tightness.
3. Do the stoking test according to the relevant standards (see the Guarantee certificate)
4. Make the user acquainted with operation.
5. Make a note in the Guarantee certificate.

Assembly determining and heat proving must be noted in the „Letter of Guaranty".

Operation

Check of shape of flame (fuel: brown coal)

The shape of flame gives us information about the correct setting of boiler to the rated output. You are advised to check it with each purchase of a new coal:

- When checking the shape of flame, make sure that the boiler is set to the rated output (the QAA device 88, line P 12 - Displayed Value **100**) - see. Chap. 6. 2 If this value is lower, set a fixed boiler operation (line P 24 - choose the value of **1** (transfer to fixed set temperature of 70 ° C). Check the setting on the line P 12.
- Figure No. 27 shows the optimal shape of the flame for the rated boiler output in case brown coal used as the fuel.
- Figure No. 28 shows the awkward shape of the flame, which is caused by incorrect setting of the combustion air. It is necessary to **reduce** the amount of combustion air (parameter P 167, or P165, P163, P161).
- Air control is effective only if the grid is properly centred and sealed.

Note: When setting we try as much as possible achieve the optimal shape of the flame, see. Figure No. 27

Fig.No. 27 Optimal shape of the flame

Fig.No. 28 Awkward shape of the flame

6.8 HMI (ACX84.910/ALG) service unit for Saphir regulator operation

HMI (ACX84.910/ALG) service unit for Saphir regulator operation in combination with QAA 88 device can be used as display of boiler. This unit has a separate service manual.
The preservation of left segment of S1 switch in off position is the condition of HMI unit connection.

6.9 Superior control

The manufacturer recommends the superior control of Siemens series RVS (RVS 43,345 + additional modules), because for its use has been already processed the design documentation of VIADRUS.

In the case of using the superior control is necessary to do the following:

- For electrical connection of the superior control is used the input D2 on the controller Saphir
- The right segment of the switch S1 **must be in position off** 

.
- On the line P 24 of device QAA 88 select the value 2.
- On the operating unit HMI the superior control shall be activated in Menu Boiler / Type of Requirement by selecting the function RVS. In the Menu Boiler / RVS is signalled the current state of the superior control (ON / OFF).
- The boiler must remain in the status **Auto** (device QAA 88 – see Fig. No. 24).
- Due to the forced exhaust of excess heat must be connected the sensor from the superior control at the output from the boiler (see Design documents VIADRUS).

Reaction of the boiler

The boiler becomes only a source of heat in case of using the superior control. In the manufacturer the outlet temperature of boiler was set to 70 ° C. This temperature can be changed by pressing the buttons Plus and Minus in the range ± 15 °C (device QAA 88 - see Fig. No.24). The regimes of time, heating of water and control of heating circuit are not active. Parameters relating to the regimes of time, heating of water and heating of the heating circuit will not be displayed on the device QAA 88 and on the operating unit HMI and only the setting of parameters for the boiler remains active (e.g. fan, feeder and pump of boiler).
If the requirement from the superior control is active, then the value 1 is displayed on the line P 231of the device QAA 88.
If the requirement from the superior control is not active, then the value 0 is displayed on the line P 231of the device QAA 88 and at the same time there is not displayed the desired outlet temperature of boiler (after pressing the button Plus and Minus - the device QAA 88 - see. Figure 24)

7. IMPORTANT CAUTIONS

- **The boiler only can be used for the purpose that it is destined for.**
- **The boiler can only be operated by adults who are acquainted with this operation manual. It is not permitted to leave the children unattended by adults at the boiler being in operation.**
- **The boiler is not destined for the use by persons (incl. children) whose physical, sensual or mental disability or lack of experience and knowledge prevent them from a safe use of the appliance unless they are supervised or if they were not instructed on the use of appliance by a person responsible for their safety.**
- **Children should be supervised in order to ensure that they do not play with the appliance.**
- **If there occurs a danger of combustible vapours or gases development and penetration into boiler room or at the works with a temporary fire or explosion risk (gluing the floorings, painting works using the combustible paints, etc.) the boiler must be in time before these works initiation put out of operation.**
- **When transporting the fuel into the combustion space before firing check visually the volume of fuel in the retort, don't put your hand into the boiler furnace. There is a danger of an injury caused by rotating worm shaft.**
- **It is forbidden to use the flammable liquids for firing the VULCANUS boiler.**
- **During the operation of VULCANUS boiler it is forbidden to overheat it in any way.**
- **It is forbidden to put any objects made of flammable materials on the boiler and within a distance smaller than the safe distance from it.**
- **It is forbidden to keep any flammable materials within minimum 1500 mm distance from boiler when clearing the ashes from it. The ashes must be put aside into inflammable vessels with cover.**

- **Having finished the heating season the boiler including the smoke flue must be thoroughly cleaned. The boiler must be kept clean and dry.**
- **It is forbidden to interfere with construction and boiler electric installation.**
- **In case the two-way safety device has responded to refill with water not conforming to ČSN 07 7401 it is necessary to treat the water in the system so that it again conforms to this standard.**
- **It is necessary to install a safety valve for maximum overpressure of 250 kPa (2,5 bar) on the system and its dimension must correspond to the rated boiler output. The safety valve must be located directly behind the boiler. Any stop valve must not be located between the safety valve and boiler. If you have any questions, please contact our contractual assembly firm and service organizations.**
- **WARNING! A poor quality of fuel can markedly negatively affect the boiler output and emission parameters**
- **During assembly, installation and operation of the appliance it is necessary to comply with standards that apply in the relevant country of destination.**

If you fail to meet these conditions you cannot requisite the guarantee repairs.

8. Maintenance

1.) It is necessary to refill the fuel in time. When only a small volume of fuel is left in the reservoir it must be refilled immediately. **Mind out that you close properly the fuel reservoir cover afterwards!**

2.) If the boiler is properly adjusted the fuel is fully burnt out once it has reached the edges of the combustion grate. The ashes and cinder fall into the ash tray. In time of an average output the ash-tray must be cleaned every other day (the protective gloves must be used). Occasionally a piece of cinder sticks between the edge of combustion grate and the boiler wall. Then it must be removed by means of a poker.

3.) In time of a continuous operation it is recommended to clean once a month the convection surface of boiler drum. (lamellas, combustion chamber side walls etc.). The heat transfer surfaces are getting choked which can substantially influence the heat transfer thus the boiler efficiency. These areas are accessible after dismantling the cover of the smoke adapter. **When burning the pellets the fuel gets agglomerated in the retort. Therefore this cake must be mechanically removed once a month otherwise the screw movement stops.** It is necessary to clean the mixer. The mixer choke deteriorates the combustion air flow into the burner. Minimally one hour before the cleaning process the boiler must de shut down.

4.) Then we recommend to do occasionally an **external** cleaning of the engine with the tansmission and fan. (**The operator must not remove the cover from ventilator neither interfere in any other way with these units. It can only be done by a qualified service worker.**) A dry brush is to be used for cleaning. The boiler during the cleaning process must be disconnected from the electricity supply.

5.) If the pieces of stone, metal or wood occur in the fuel the feeding screw, it can get blocked. If this situation happens and the engine is overheated and stopped the boiler must be switched off and the obstacle removed.
CAUTION: Before you carry out this operation you must make sure that the boiler is disconnected from the electricity supply(it is unplugged).

6.) Because a slight overpressure develops in the combustion chamber with ventilator in operation it is necessary to mind a perfect tightness of boiler (the combustion chamber door, ash-pan door, mixer cleaning opening, fuel reservoir cover etc.) The fuel reservoir tightness is given first of all by closing its cover properly by means of a pivot cap and undamaged rubber sealing of the seating faces.

7.) If there occurs the emergency condition (the electric supply voltage failure for a longer time, ect.) and the fuel burns to the fuel hopper, owing to the temperature increase the valve TS 130 (BVTS, STS20) responds and the fuel is smothered.

8.) Regularly once a month clean the boiler walls inside the fireplace, boiler smoke draughts and smoke adapter (by means of a brush at cooled down boiler the temperature of which does not exceed 40 ^{o}C). The cleaning cover in the lower part of the smoke adapter serves for ash removal. When dismantling the cleaning cover the screw of securing swivel must be loosened to avoid its damage. After the smoke adapter has been cleaned we mount back the cleaning cover whereas we are particular about the tightness between the cleaning cover and smoke adapter.

9. Instructions for product disposal after its service life

VIADRUS a.s. is a contracting partner of the firm EKO–KOM a. s. with the client number EK–F00060715. The packages comply with EN 13427.

We recommend to dispose the packages in the following way:

- plastic foil, cardboard cover, use a salvage point
- metal strapping tape, use a salvage point
- wooden base, is designated for a single usage and no longer can be used as a product. Its disposal is subject to Act. 477/2001 Sb. a 185/2001 Coll.as amended.

Whereas the boiler is constructed from common materials, we recommend to dispose the individual parts as follows:

- the heat exchanger (grey cast-iron), use a junk
- distribution pipes, shells, use a junk.
- other metal parts, use a junk
- insulation material ROTAFLEX, through a firm engaged in waste collection and disposal.

In case that the product has lost its serviceability, you can use the back collection service (if this is introduced). If the originator has declared that it is the waste and it will be handled according to the legislative provisions valid in the particular country.

10. Guarantee and liability for defects

VIADRUS a.s. provides the guarantee:

– For boilers 24 months after the boiler putting into operation, but maximum 30 months after the date it was dispatched from the manufacturing factory.
– For boiler drum 5 years after the date its dispatch from the manufacturing factory.

The user is obliged to entrust the installation to the professional **assembly firm** and a commissioning and fault rectification exceeding the frame of chap. 6 and 8 to a **contractual service organization accredited by the boiler manufacturer** VIADRUS a.s., otherwise the guarantee for a boiler proper function does not apply
If the boiler is operated according to the instructions mentioned in this “Operation and installation manual”, the boiler does not require any special technical interference of service.
The „Quality and completeness certificate of VULCANUS boiler” serfes after its filling as a “Guarantee certificate”.

A regular boiler maintenance, according to chap. 8. must be done by its user.

In case of non-performance of mentioned instructions, the guarantee provided by manufacturer, won´t be admitted.

Every notification of fault must be conveyed immediately after its detection, always in writing or via the telephonic advice.

The guarantee does not apply to

- **faults caused by improper assembly and improper attendance of the product and faults caused by improper maintenance see chap. 8**
- **faults and damage caused by failure to observe water quality in heating system see chap. no. 4.1 and 6.5 or by using the anti-freeze mixture**
- **faults caused by failure to observe instructions stated in this manual**
- **product damage arised during the tansport or other mechanical demage**
- **faults caused by rought storage**
- **faults caused by boiler operation with unspecified fuel (see. tab. 3 and 4)**

The producer reserves the right make changes related to the product innovations, which must not be mentioned in this manual.

Information for customer

Packaging edentification	Assessment reference
PE Plastic sacks, folie, corrugaled board, iron and plastic fix line	

Identification od principál materials used. Paper, Polyethylene, iron, wood

Part 1: Summary of assessment

Standard/Report	Assessment requirement	Claim	Note
1.1 Prevention by source reduction		YES	
1.2 Heavy metals and	ensure below maximum permitted levels for components (CR 13695-1:2000)	YES	
1.3 Other noxious/hazardous substances	ensure in compliance with (CR 13695-2:2002, EN 13428:2000)	YES	
2 Reuse	ensure reusability in all terms of the standard for the functional packaging unit (EN 13429:2000)	NO	
3.1 Recovery by material recycling	ensure recyclability in all term sof the standard for the functional packaging unit (EN 13430:2000)	YES	
3.2 Recovery in the form of energy	ensure that calorific gain is achievable for the functional packaging unit (EN 13431:2000)	YES	Iron - NO
3.3 Recovery by composting	ensure compost ability in all terms of the standard for the functional packaging unit (EN 13432:2000)	NO	

NOTE Conformity with EN 13427 requires affirmative responses to sections 1.1; 1.2; 1.3 and to at least one of 3.1; 3.2; 3.3. In addition, where a claim of reuse is made section 2 should also record affirmative responses.

Part 2: Statement of conformity

In the light of the assessment results recorded in part I above, this packaging is claimed to comply with the requirements of EN 13427:2000.

VIADRUS a.s.
Bezručova 300
735 81 Bohumín

Guarantee certificate and Quality and completeness certificate for VULCANUS boiler

Boiler serial number .....…… Boiler output .....

User (Surname, name) ……..

Adress (street, town, postcode) ……..

Telephone/Fax ……..

Boiler complies with requirements
EN 303-5 Heating boilers – Part 5: Heating boilers for solid fuele, hand and automatically stocked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

VIADRUS a.s. provides the guarantee:
- For boilers 24 months after the boiler putting into operation, but maximum 30 months after the date it was dispatched from the manufacturing factory.
- For boiler drum 5 years after the date its dispatch from the manufacturing factory.

Adjustment according to the operation and installation manual will be carried by a contracting service organization.
The completeness including the standard accessories and the output adjustment according to the "Operation and installation manual" guarantees the manufacturer by the contracting service organization.
The guarantee certificate isn´t valid without having been filled in.

Measured values	Numeric value
Chimney draught (mbar)	
Flue gases temperature (°C)	

The user declares that:
- the boiler boiler adjusted by the qualified assembly firm didn´t show out any fault during the testing:
- Received the "Operation and installation manual" with properly filled Guaratee certificate and Quality certificate
- Has beed acquainted with the boiler operation and maintenance

……..	……..	……..
Manufacture date	Manufacturer's stamp	Controlled by (signature)
……..	……..	……..
Date of installation	Installation company (stamp, signature)	User's signature
……..	……..	……..
Date of putting into operation	Contractual service organization (stamp, signature)	User's signature

Annex to the guarantee certificate for customer- the user

Record of accomplished guarantee and post-guarantee repairs and regular product checks			
Record date	**Carried out activity**	**Contracting service organization stamp, signature)**	**Customer´s signature**

Intended service organization

VIADRUS a.s.
Bezručova 300
735 81 Bohumín

Guarantee certificate and Quality and completeness certificate for VULCANUS boiler

Boiler serial number .....…… Boiler output .....

User (Surname, name) ……..

Adress (street, town, postcode) ……..

Telephone/Fax ……..

Boiler complies with requirements
EN 303-5 Heating boilers – Part 5: Heating boilers for solid fuele, hand and automatically stocked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

VIADRUS a.s. provides the guarantee:
- For boilers 24 months after the boiler putting into operation, but maximum 30 months after the date it was dispatched from the manufacturing factory.
- For boiler drum 5 years after the date its dispatch from the manufacturing factory.

Adjustment according to the operation and installation manual will be carried by a contracting service organization.
The completeness including the standard accessories and the output adjustment according to the "Operation and installation manual" guarantees the manufacturer by the contracting service organization.
The guarantee certificate isn´t valid without having been filled in.

Measured values	Numeric value
Chimney draught (mbar)	
Flue gases temperature (°C)	

The user declares that:
- the boiler boiler adjusted by the qualified assembly firm didn´t show out any fault during the testing:
- Received the "Operation and installation manual" with properly filled Guaratee certificate and Quality certificate
- Has beed acquainted with the boiler operation and maintenance

……..	……..	……..
Manufacture date	Manufacturer's stamp	Controlled by (signature)
……..	……..	……..
Date of installation	Installation company (stamp, signature)	User's signature
……..	……..	……..
Date of putting into operation	Contractual service organization (stamp, signature)	User's signature

VIADRUS a.s.
Bezručova 300
735 81 Bohumín

Guarantee certificate and Quality and completeness certificate for VULCANUS boiler

Boiler serial number .....…… Boiler output .....

User (Surname, name) ……..

Adress (street, town, postcode) ……..

Telephone/Fax ……..

Boiler complies with requirements
EN 303-5 Heating boilers – Part 5: Heating boilers for solid fuele, hand and automatically stocked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

VIADRUS a.s. provides the guarantee:
- For boilers 24 months after the boiler putting into operation, but maximum 30 months after the date it was dispatched from the manufacturing factory.
- For boiler drum 5 years after the date its dispatch from the manufacturing factory.

Adjustment according to the operation and installation manual will be carried by a contracting service organization.
The completeness including the standard accessories and the output adjustment according to the "Operation and installation manual" guarantees the manufacturer by the contracting service organization.
The guarantee certificate isn´t valid without having been filled in.

Measured values	Numeric value
Chimney draught (mbar)	
Flue gases temperature (°C)	

The user declares that:
- the boiler boiler adjusted by the qualified assembly firm didn´t show out any fault during the testing:
- Received the "Operation and installation manual" with properly filled Guaratee certificate and Quality certificate
- Has beed acquainted with the boiler operation and maintenance

……..	……..	……..
Manufacture date	Manufacturer's stamp	Controlled by (signature)
……..	……..	……..
Date of installation	Installation company (stamp, signature)	User's signature
……..	……..	……..
Date of putting into operation	Contractual service organization (stamp, signature)	User's signature

VIADRUS

VIADRUS a.s.
Bezručova 300 / 735 81 Bohumín / CZ
Tel.: + 420 596 083 050 / Fax: + 420 596 082 822
www.viadrus.cz / info@viadrus.cz