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Automatic pellet boiler

SMART FIRE

OPERATING AND ASSEMBLY INSTRUCTIONS



SF 11 130 L



SF 11 / 15 / 22 / 31 / 41



SF 11 / 15 COMPACT



This manual should be kept by the user. In order to keep the warranty and long-lasting and safe boiler operation, it is essential to follow these instructions.

Commissioning, inspections and repairs during the warranty period may only be performed by the HKS LAZAR service.

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Dear User!

Thank you for choosing our product that has been designed and constructed to ensure reliable, comfortable operation and many benefits for its users.

Smart Fire boiler relates to advanced engineering device designed for use with clean, ecological fuel –pellet. The boiler has been designed and constructed with use of latest technology. Smart Fire boilers are provided with unique solutions that ensure very high efficiency and low emission.

To ensure comfortable and easy operation every Smart Fire boiler is fitted with:

- advanced controller that controls operation of boiler and central heating system;
- modern burner with automatic cleaning system;
- exchanger mechanical cleaning system;
- automatic igniter.

Thanks to above features Smart Fire boilers comply with the requirements for 5 Class laid down in EN 303-5-2012 Standard as well as strict requirements regarding emissions in Ecodesign.



Before operation, user shall firstly read carefully this manual and the attached controller user manual to ensure safe boiler operation. In case of doubts please do not hesitate to contact us.

Sincerely,
HKS Lazar Team

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1. General information

Smart Fire boiler is an advanced engineering pellet fired device for heat generation. Boiler is fitted with: temperature controller, exchanger cleaning system, modern stainless steel burner, burner automatic cleaning system and automatic igniter. The device ensures heating of building provided with central heating system and heating of domestic water in storage units (boilers). During delivery Smart Fire Series boiler is accompanied by:

- Installation and User Manual;
- Controller User Manual;
- Temperature sensors for central heating system – 3 items;
- Ash pan tray.

Smart Fire boilers relate to low-temperature devices that do not subject to registration in the local Office of Technical Inspection.

Solid fuel fired boilers designed for operation in closed loop shall comply with some technical requirements. Therefore following installation and before operation the user shall report thereof to the local Office of Technical Inspection.

2. Guidelines

Always follow all instructions and guidelines provided in this manual.

Works related to commissioning and first start-up, as well as any servicing shall be delivered by authorized service only.

During operation use fuel as specified in this manual. The boiler shall undergo regular maintenance as specified in this manual.

To ensure protection against *Legionella* bacteria always follow good practice applicable for heating installations. Failure to adhere to guidelines and instructions included in this manual voids the guarantee and relieves the manufacturer of liability for consequential damages.

3. Safety notes

Before operation user shall firstly read the following safety notes. Non-adherence to provided instructions, in particular the following safety notes may result in body injury, hazard for human health and life, damage of machine, system or building structure! Works related to assembly shall be delivered exclusively by qualified personnel who possesses experience, expertise using the appropriate tools. Any works shall be delivered pursuant to applicable regulations, standards and good building practice.

Boiler operation may follow only, if the boiler and the system is in good repair. Any failure, defect or abnormality during machine operation shall be immediately reported to competent service.

Before first operation, check shall be performed regarding water quantity in central heating system (a check shall be repeated on regular basis, at least every 6 months).

Do not open access holes during boiler operation, due to risk of gas and dust release and combustion or explosion.

Any unauthorized repairs and alterations are not allowed.

Before any works on the boiler, firstly put out the boiler and wait until it cools down, and then disconnect the boiler from power supply.

Regular checks shall be performed (at least once a month) regarding tightness of door and connection.

At least once a year the check shall be performed regarding performance of STB temperature limiter.

Boiler shall be installed only in spaces intended for that purpose, provided with required equipment and meeting relevant standards.

Spaces where boiler operation follows shall be provided with a plate warning against smoking and use of open flames. Boiler room shall be fitted with operative extinguisher.

Ventilation and air supply system of boiler room shall be operative and in conformance with relevant standards.

Boiler room shall be protected against access of unauthorized persons, in particular children.

Under any circumstances do not remove or shut down any measuring instrumentation and protective devices.

During boiler operation and ash removal, protective clothing and individual protection means are required: gloves, goggles, face mask and working clothing.

When hot water temperature is over 60°C always arrange for mixing with cold water to prevent risk of scalding.

Always provide bleeding appropriate for the boiler and the system.

Before fuel loading using the vehicle, firstly put out the boiler.

For repairs and replacement use original spare parts only.

4. Technical Data

Technical data: Smart Fire SF11 and SF15 boiler with: 150L, 240L and 400L dispenser

Parameter	Unit	Boiler Model	
		SF11	SF15
Class		Class 5 (maximum)	
Efficiency with nominal output	%	91.2%	92.0%
Nominal thermal power	kW	11	15
Thermal power range	kW	3.3 ÷ 11.0	4.5 ÷ 15.0
Burner automatic, mechanical cleaning		Yes	
Automatic burner		Yes	
Exchanger automatic cleaning		Option	
Hydraulic kit		Option	
Temperature thermostat		Yes	
Exhaust fan		Yes	
Stainless steel burner		Yes	
Rotary valve that protects the fuel in the pellet tank against fire		Yes	
Burner and cast iron valve that protects against fired fuel		Yes	
Fuel consumption at nominal output	kg/h	ca. 2.4	ca.3.3
Combustion time during continuous operation at nominal output – dispenser model	h	ca. 59 dispenser 240L	ca.43 dispenser 240L
Width Dispenser model -width	mm	150L - 885 240L - 1095 400L - 1325	150L - 885 240L - 1095 400L - 1325
Height Dispenser model - height	mm	150L - 1485 240L - 1485 400L - 1485	150L - 1485 240L - 1485 400L - 1485
Depth Dispenser model - depth	mm	150L - 770 240L - 770 400L - 855	150L - 770 240L - 770 400L - 855
Water volume	dm ³	37	
Flue outlet int/ext. diameter	mm	100/93	120/110
Supply and return connection	cal	1	
Boiler water flow resistance $\Delta T=10K$	mbar	4	11
Boiler water flow resistance $\Delta T=20K$	mbar	1	3
Maximum permitted water operating pressure * - depending on version	bar	1.5 / 3.0*	
Maximum permitted water test pressure * - depending on version	bar	2.5 / 5.0*	

Table No. 1. Dimensions and technical data of Smart Fire SF11 and SF15 boiler with: 100L, 240L and 400L dispenser.

Parameter	Unit	Boiler Model	
		SF11	SF15
Maximum boiler temperature	°C	85	
Recommended boiler temperature	°C	65 ÷ 80	
Return water min. temperature	°C	55	
Average flue temperature at max. output	°C	105	120
Average flue temperature at min. output	°C	55	55
Maximum recommended flue temperature	°C	180	
Flue mass volume flow at nominal output	g/s	7	10
Flue mass flow at min. output	g/s	3	3
CO emission at nominal output (for 10% O ₂)	mg/m ³	180	98
CO emission at min. output (for 10% O ₂)	mg/m ³	329	180
CO emission at nominal output (for 13% O ₂)	mg/m ³	133	71
CO emission at nominal output (for 13% O ₂)	mg/m ³	240	131
Chimney draft	Pa/mbar	1 ÷ 8 / 0.01 ÷ 0.08	
Noise level	dB	below 75	
Supply voltage		1 PEN ~ 50Hz 230V TN-S	
Insulation		IP 20	
Power consumption at nominal output	W	43	48
Power consumption at minimum output	W	20	28
Maximum power consumption – controller, fan, motoreducer	W	110	105
Power consumption – igniter	W	170	170
Power consumption - in stand-by mode	W	4	4
Ambient temperature	°C	15 ÷ 40	
Ambient relative humidity	%	10 ÷ 90 relative humidity without condensation	
Dispenser volume	dm ³	150 240 400	150 240 400
Ash pan capacity	dm ³	7	
Exhaust fan	model	AACO ST73M	Z-A RH15Z
Motoreducer	model	ABM 4.5	

Table No. 2. Dimensions and technical data of Smart Fire SF11 and SF15 boiler with: 150L, 240L and 400L dispenser.

4.2 Technical data: Smart Fire SF11 with: 130L dispenser

Parameter	Unit	Boiler Model
		SF11/130
Class		Class 5 (maximum)
Efficiency with nominal output	%	91.2%
Nominal thermal power	kW	11
Thermal power range	kW	3.3 ÷ 11.0
Burner automatic, mechanical cleaning		Yes
Automatic burner		Yes
Exchanger automatic cleaning		Yes
Hydraulic kit		Yes
Temperature thermostat		Yes
Exhaust fan		Yes
Stainless steel burner		Yes
Rotary valve that protects the fuel in the pellet tank against fire		Yes
Burner and cast iron valve that protects against fired fuel		Yes
Fuel consumption at nominal output	kg/h	ca. 2.4
Combustion time during continuous operation at nominal output – dispenser model	h	ca. 32 dispenser 130L
Width Dispenser model -width	mm	130L - 570
Height Dispenser model - height	mm	130L - 1640
Depth Dispenser model - depth	mm	130L - 930
Water volume	dm ³	37
Flue outlet int/ext. diameter	mm	100/93
Supply and return connection	cal	1
Boiler water flow resistance $\Delta T=10K$	mbar	4
Boiler water flow resistance $\Delta T=20K$	mbar	1
Maximum permitted water operating pressure * - depending on version	bar	1.5 / 3.0*
Maximum permitted water test pressure * - depending on version	bar	2.5 / 5.0*

Table No. 3. Dimensions and technical data of Smart Fire SF11 boiler with: 130L dispenser- for other parameters consult Table No. 2

4.3 Technical data: Smart Fire SF22 boiler

Parameter	Unit	Boiler Model
		SF22
Class		Class 5 (maximum)
Efficiency with nominal output	%	90.6%
Nominal thermal power	kW	22
Thermal power range	kW	6.6 ÷ 22.0
Burner automatic, mechanical cleaning		Yes
Automatic burner		Yes
Exchanger automatic cleaning		Option
Hydraulic kit		Option
Temperature thermostat		Yes
Exhaust fan		Yes
Stainless steel burner		Yes
Rotary valve that protects the fuel in the pellet tank against fire		Yes
Burner and cast iron valve that protects against fired fuel		Yes
Fuel consumption at nominal output	kg/h	ca. 4.9
Combustion time during continuous operation at nominal output – dispenser model	h	ca. 29 dispenser 240L
Width Dispenser model -width	mm	150L – 885 240L-1095 400L-1325
Height Dispenser model - height	mm	150L – 1485 240L-1485 400L-1485
Depth Dispenser model - depth	mm	150L – 770 240L-770 400L-855
Water volume	dm ³	49
Flue outlet int/ext. diameter	mm	120/110
Supply and return connection	cal	1
Boiler water flow resistance $\Delta T=10K$	mbar	30
Boiler water flow resistance $\Delta T=20K$	mbar	1
Maximum permitted water operating pressure * - depending on version	bar	1.5 / 3.0*
Maximum permitted water test pressure * - depending on version	bar	2.5 / 5.0*

Table No. 4. Dimensions and technical data of Smart Fire SF22 boiler.

Parameter	Unit	Boiler Model	
		SF22	
Maximum boiler temperature	°C	85	
Recommended boiler temperature	°C	65 ÷ 80	
Return water min. temperature	°C	55	
Average flue temperature at max. output	°C	130	
Average flue temperature at min. output	°C	60	
Maximum recommended flue temperature	°C	180	
Flue volume flow at nominal output	g/s	15	
Flue volume flow at min. output	g/s	5	
CO emission at nominal output (for 10% O ₂)	mg/m ³	114	
CO emission at min. output (for 10% O ₂)	mg/m ³	95	
CO emission at nominal output (for 13% O ₂)	mg/m ³	83	
CO emission at nominal output (for 13% O ₂)	mg/m ³	69	
Chimney draft	Pa/mbar	1÷8 / 0.01 ÷ 0.08	
Noise level	dB	below 75	
Supply voltage		1 PEN ~ 50Hz 230V TN-S	
Insulation		IP 20	
Power consumption at nominal output	W	85	
Power consumption at minimum output	W	38	
Maximum power consumption – controller, fan, motoreducer	W	145	
Power consumption – igniter	W	170	
Power consumption - in stand-by mode	W	4	
Ambient temperature	°C	15 ÷ 40	
Ambient relative humidity	%	10 ÷ 90 relative humidity without condensation	
Dispenser volume	dm ³	150 240 400	
Ash pan volume	dm ³	7	
Exhaust fan	model	Z-A RH15Z	Z-A RH18Z
Motoreducer	model	ABM 4.5	

Table No. 5. Dimensions and technical data of Smart Fire SF22 boiler.

4.4 Technical data: Smart Fire SF11 Compact and SF15 Compact boiler.

Parameter	Unit	Boiler Model	
		SF11 Compact	SF15 Compact
Class		Class 5 (maximum)	
Efficiency with nominal output	%	91.2%	92.0%
Nominal thermal power	kW	11	15
Thermal power range	kW	3.3 ÷ 11.0	4.5 ÷ 15.0
Burner automatic, mechanical cleaning		Yes	
Automatic burner		Yes	
Exchanger automatic cleaning		Option	
Hydraulic kit		Option	
Temperature thermostat		Yes	
Exhaust fan		Yes	
Stainless steel burner		Yes	
Rotary valve that protects the fuel in the pellet tank against fire		Yes	
Burner and cast iron valve that protects against fired fuel		Yes	
Fuel consumption at nominal output	kg/h	ca. 2.4	ca.3.3
Combustion time during continuous operation at nominal output – dispenser model	h	ca. 12 dispenser 50L	ca.9 dispenser 50L
Width Dispenser model -width	mm	50L - 815	50L - 815
Height Dispenser model - height	mm	50L - 1200	50L - 1200
Depth Dispenser model - depth	mm	50L - 795	50L - 795
Water volume	dm ³	37	
Flue outlet int/ext. diameter	mm	100/93	120/110
Supply and return connection	cal	1	
Boiler water flow resistance $\Delta T=10K$	mbar	4	11
Boiler water flow resistance $\Delta T=20K$	mbar	1	3
Maximum permitted water operating pressure * - depending on version	bar	1.5 / 3.0*	
Maximum permitted water test pressure * - depending on version	bar	2.5 / 5.0*	

Table No. 6. Dimensions and technical data of Smart Fire SF11 Compact and SF15 Compact boiler.

Parameter	Unit	Boiler Model	
		SF11 Compact	SF15 Compact
Maximum boiler temperature	°C	85	
Recommended boiler temperature	°C	65 ÷ 80	
Return water min. temperature	°C	55	
Average flue temperature at max. output	°C	105	120
Average flue temperature at min. output	°C	55	55
Maximum recommended flue temperature	°C	180	
Flue volume flow at nominal output	g/s	7	10
Flue volume flow at min. output	g/s	3	3
CO emission at nominal output (for 10% O ₂)	mg/m ³	180	98
CO emission at min. output (for 10% O ₂)	mg/m ³	329	180
CO emission at nominal output (for 13% O ₂)	mg/m ³	133	71
CO emission at nominal output (for 13% O ₂)	mg/m ³	240	131
Chimney draft	Pa/mbar	1 ÷ 8 / 0.01 ÷ 0.08	
Noise level	dB	below 75	
Supply voltage		1 PEN ~ 50Hz 230V TN-S	
Insulation		IP 20	
Power consumption at nominal output	W	40	45
Power consumption at minimum output	W	20	25
Maximum power consumption – controller, fan, motoreducer	W	115	115
Power consumption – igniter	W	300	300
Power consumption - in stand-by mode	W	3	3
Ambient temperature	°C	15 ÷ 40	
Ambient relative humidity	%	10 ÷ 90 relative humidity without condensation	
Dispenser volume	dm ³	50	
Ash pan capacity	dm ³	7	
Exhaust fan	model	AACO ST73M	Z-A RH15Z
Motoreducer	model	T3 S C9-150 5.3 T3 S C9-100 2.0	

Table No. 7. Dimensions and technical data of Smart Fire SF11 Compact and SF15 Compact boiler.

4.5 Technical data: Smart Fire SF31 and SF41 boiler

Parameter	Unit	Boiler Model	
		SF31	SF41
Class		Class 5 (maximum)	
Efficiency with nominal output	%	92.5%	91.0%
Nominal thermal power	kW	31	41
Thermal power range	kW	9.3 ÷ 31.0	12.3 ÷ 41.0
Burner automatic, mechanical cleaning		Yes	
Automatic burner		Yes	
Exchanger automatic cleaning		Option	
Hydraulic kit		Option	
Temperature thermostat		Yes	
Exhaust fan		Yes	
Stainless steel burner		Yes	
Rotary valve that protects the fuel in the pellet tank against fire		Yes	
Burner and cast iron valve that protects against fired fuel		Yes	
Fuel consumption at nominal output	kg/h	ca.6.9	ca.9.1
Combustion time during continuous operation at nominal output – dispenser model	h	ca. 21 dispenser 240L	ca.16 dispenser 240L
Width Dispenser model -width	mm	150L - 1015 240L - 1225 400L - 1455	150L - 1015 240L - 1225 400L - 1455
Height Dispenser model - height	mm	150L - 1485 240L - 1485 400L - 1485	150L - 1485 240L - 1485 400L - 1485
Depth Dispenser model - depth	mm	150L - 1030 240L - 1030 400L - 1030	150L - 1030 240L - 1030 400L - 1030
Water volume	dm ³	102	102
Flue outlet int/ext. diameter	mm	160/150	
Supply and return connection	cal	1	
Boiler water flow resistance $\Delta T=10K$	mbar	48	74
Boiler water flow resistance $\Delta T=20K$	mbar	12	18
Maximum permitted water operating pressure * - depending on version	bar	1.5 / 3.0*	
Maximum permitted water test pressure * - depending on version	bar	2.5 / 5.0*	

Table No. 8. Dimensions and technical data of Smart Fire SF31 and SF45 boiler.

Parameter	Unit	Boiler Model	
		SF31	SF41
Maximum boiler temperature	°C	85	
Recommended boiler temperature	°C	65 ÷ 80	
Return water min. temperature	°C	55	
Average flue temperature at max. output	°C	100	110
Average flue temperature at min. output	°C	60	65
Maximum recommended flue temperature	°C	180	
Flue volume flow at nominal output	g/s	23	31
Flue volume flow at min. output	g/s	10	11
CO emission at nominal output (for 10% O ₂)	mg/m ³	144	48
CO emission at min. output (for 10% O ₂)	mg/m ³	290	263
CO emission at nominal output (for 13% O ₂)	mg/m ³	105	35
CO emission at nominal output (for 13% O ₂)	mg/m ³	211	191
Chimney draft	Pa/mbar	5 ÷ 15 / 0.05 ÷ 0.15	
Noise level	dB	below 75	
Supply voltage		1 PEN ~ 50Hz 230V TN-S	
Insulation		IP 20	
Power consumption at nominal output	W	86	102
Power consumption at minimum output	W	34	36
Maximum power consumption – controller, fan, motoreducer	W	160	160
Power consumption – igniter	W	300	
Power consumption - in stand-by mode	W	4	
Ambient temperature	°C	15 ÷ 40	
Ambient relative humidity	%	10 ÷ 90 relative humidity without condensation	
Dispenser volume	dm ³	150 240 400	
Ash pan capacity	dm ³	14	
Exhaust fan	model	Z-A RH18Z	
Motoreducer	model	ABM 7.5	

Table No. 9. Dimensions and technical data of Smart Fire SF31 and SF41 boiler.

5. Design

Smart Fire boilers feature with compact construction that has common features in case of all models. Most assemblies are installed inside the casing what provides protection against external factors and mechanical damages.

5.1 Design of Smart Fire SF 11, SF 15 and SF 22 boiler

Figure No. 1 and Figure No. 2 demonstrates Smart Fire SF11, SF15 and SF22 boiler, its dimensions and connection to the central heating system and flue chimney. Figure No. 3, No. 4 and No. 4 include boiler diagram with the main assemblies.

Inside boiler casing there are two main assemblies: boiler body and fuel supply system. The boiler steel body includes the following components: combustion chamber, ash-pan chamber, heat exchanger and exhaust manifold.

The combustion chamber includes the stainless steel burner fitted with automatic cleaning system and automatic igniter that ensures automatic boiler ignition. The fuel is supplied to the burner from above thanks to gravitation, using the screw feeder fitted with the valve. Directly under the combustion chamber the ash-pan chamber is located where ash pan is installed to collect ash from the burner. The rear wall of ash pan chamber is provided with washout hole that enables cleaning of the lower part of heat exchanger.

Heat exchanger is divided with two vertical water trays that provide gallery for flow of exhaust gases. Exhaust gases generated during fuel combustion flow upwards through the first gallery to the second gallery that runs downwards to the lower part of exchanger. Next exhaust gases flow to the third gallery and to the top part of exchanger and then to exhaust manifold from which flow to the breeching. Exhaust gases flow through the heat exchanger is forced with the exhaust fan installed inside the exhaust manifold. Air volume delivered by the fan is controlled with the controller. Heat exchanger is fitted with mechanical cleaning system that also ensures swirls for exhaust gases also.

The washout hole provided with the flap located on the top of boiler body ensures access to the top part of heat exchanger, its vertical exhaust gas galleries and the cleaning system.

The second main assembly of the boiler relates to fuel supply system that is the integral part of fuel dispenser which comprises the part of boiler external casing. It consists of: fuel dispenser, fuel screw feeder along with the motoreducer and valve. Fuel is fed from the bottom part of dispenser with screw feeder that feeds the fuel to the valve separating the fuel in the supply system and dispenser from burner flame. After discharge from valve the fuel is fed directly to the burner inside the combustion chamber. The boiler body is connected to the fuel supply system with the screw feeder flange.

The front wall of boiler is provided with two masking grilles. Under the lower masking grille there is access door that ensures access to the combustion chamber and ash-pan chamber. The top masking grille comprises casing of boiler body. The front wall of fuel dispenser is fitted with the display of boiler controller that provides the user with information on boiler current status, operating parameters and allows boiler parameters setup.

Heating water inlet and outlet from the heat exchanger is located on boiler rear wall and is provided with outer threaded 1" stub pipe. The rear wall of boiler is provided also with exhaust breeching that discharges exhaust gases to the chimney. The breeching is provided with the exhaust gas temperature sensor and optionally available Lambda probe. The rear wall of boiler is provided with exhaust fan installed over the breeching.

The boiler is provided with adjustable feet. After assembly adjustable feet enable boiler levelling in case of uneven floor. Installed foot increase boiler height by 24mm plus available adjustment range. Adjustment range: 0 ÷ 10mm.

The outer casing and boiler body are insulated with mineral wool that protects against heat loss during boiler operation. Boiler casing is provided with powder-coated steel slabs.

Design of Smart Fire SF 11 boiler with 130L dispenser

Smart Fire SF11/130L boiler features with steel body analogical to design of Smart Fire SF11, SF15 and SF22. The evident difference relates to location of access door of combustion chamber and ash pan in relation to heat exchanger. In case of SF11, SF15 and SF22 boiler, the heat exchanger is located behind combustion chamber and ash pan, whereas in case of SF11/130L boiler, the access door has been moved by 90° in relation to the heat exchanger– in case of SF11/130L boiler, it is located on the side, to the left of access door. Moreover in this boiler the fuel dispenser is installed over the boiler body, instead of location to the right in case of SF11, SF15 and SF22 boiler what makes for narrow and high appearance.

Figure No. 6 demonstrate Smart Fire SF11 boilers along with dispenser, its dimensions and connection to the central heating system and flue chimney. Figure No. 7, No. 8 and No. 9 include boiler diagram with the main assemblies.

The boiler is provided with adjustable feet that enable boiler levelling in case of uneven floor. Installed feet increase boiler height - adjustment range: 0 ÷ 10mm.

5.2 Construction of Smart Fire SF 31 and SF 41 boiler

Smart Fire SF31 and SF41 boiler features with steel body analogical to design of SF11, SF15 and SF22 boiler. The evident difference relates to bigger heat exchanger that in case of SF31 and SF41 boiler is provided with four vertical water trays instead of two. Analogically as in case of SF11, SF15 and SF22 boiler, they provide three exhaust gas galleries that enable flow of exhaust gases. Figure No. 3, No. 4 and No. 5 include boiler diagram with the main assemblies.

Figure No. 10 and 11 demonstrate Smart Fire SF31 and SF41 boiler, its dimensions and connection to the central heating system and flue chimney.

Design of Smart Fire SF 11 COMPACT and SF 15 COMPACT boiler

Smart Fire SF11 COMPACT and SF15 COMPACT boiler feature with compact design comparing to Smart Fire SF11 and SF15 boiler, in spite of identical steel body. The difference relates to specially designed fuel supply system of compact construction. The fuel dispenser is provided with screw that feeds the fuel to the central part of bottom of the dispenser where it is fed to the valve separating from burner flame. After discharge from valve the fuel is fed directly to the burner inside the combustion chamber.

Figure No. 12 demonstrates Smart Fire SF11 COMPACT and SF15 COMPACT boiler, its dimensions and connection to the central heating system and flue chimney. If necessary extension of fuel dispenser is possible with the dedicated attachment– for dimensions of boiler with attachment please consult Figure No. 13. Figure No. 14 and No. 15 include boiler diagram with the main assemblies.

6. Fuel type.

Smart Fire boilers have been designed and constructed to ensure high efficiency operation with use of ecological granulated pellet. The pellet relates to high quality loose material that undergoes special processing including compacting and pressing to ensure improved properties and cylindrical build.

The fuel shall meet some fundamental requirements regarding granulated pressed wood:

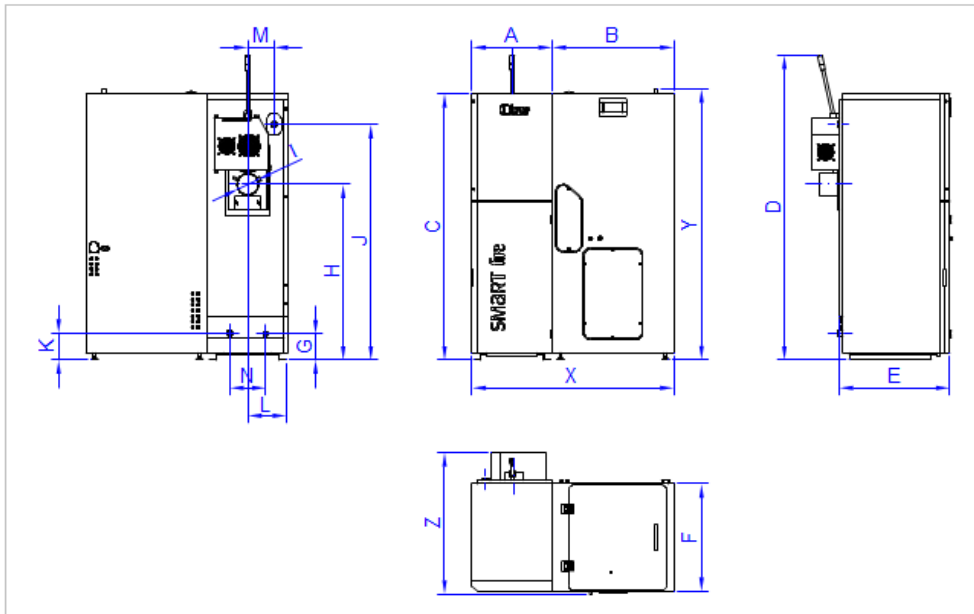
- Heating value over 17 MJ/kg;
- Moisture content max. 12%;
- Ash content max. 0.5%;

Moreover it is recommended that fuel meets some standards regarding granulated pellet. It applied in particular to the diameter of granulated material, calorific value and moisture content.

PELLET

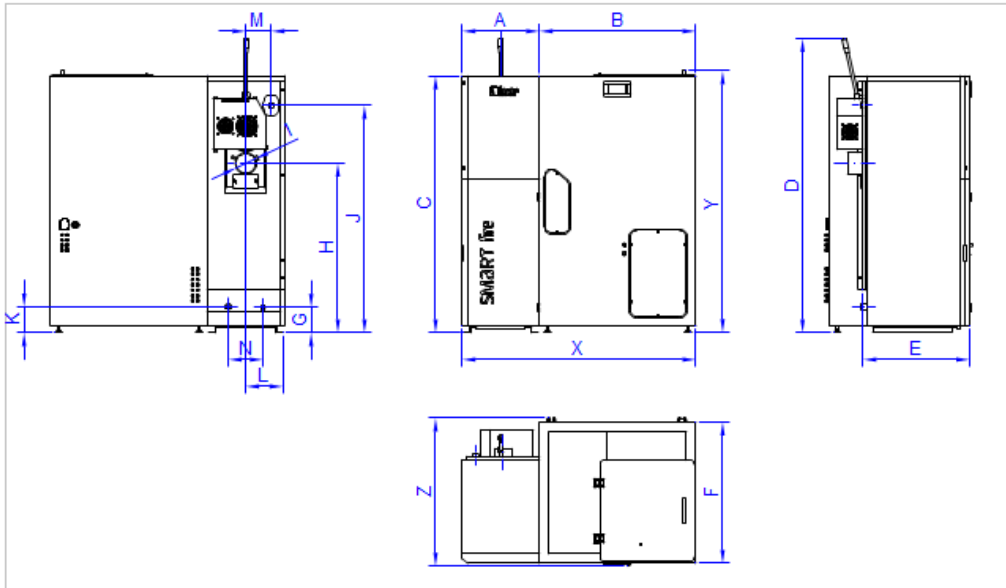
	Ö-Norm	DIN-Norm	DINplus
Calorific value	18 MJ/kg	18 MJ/kg	18 MJ/kg
Bulk density	1.12 kg/dm ³	1.0- 1.4 kg/dm ³	1.12 kg/dm ³
Moisture content	max. 10.0%	max. 12.0 %	max. 10.0%
Length	max. 5 x dia.	max. 50 mm	max. 5 x dia.
Diameter	6 mm	6 mm	6 mm
Ash content	max. 2.3%		max. 2.3%

Table No. 10. Standards and standardized fuel parameters



Dimensions:	Model					
	SF11/150L	SF11/240L	SF15/150L	SF15/240L	SF22/ 150L	SF22/240L
A:	440	440	440	440	440	440
B:	445	655	445	655	445	655
C:	1455	1455	1455	1455	1455	1455
D:	1630	1630	1630	1630	1660	1660
E:	600	600	600	600	600	600
F:	585	585	585	585	585	585
G:	155	155	155	155	155	155
H:	695	695	695	695	945	945
I:	100	100	120	120	120	120
J:	1025	1025	1025	1025	1275	1275
K:	160	160	160	160	160	160
L:	240	240	240	240	240	240
M:	145	145	145	145	145	145
N:	195	195	195	195	195	195
X - width	885	1095	885	1095	885	1095
Y - height	1485	1485	1485	1485	1485	1485
Z - depth	770	770	770	770	770	770

Figure No. 1. Dimensions of Smart Fire SF11, SF15 and SF22 boiler with 150L and 240L dispenser.



Dimension:	Model		
	SF11/400 L	SF15/400L	SF22/400L
A:	440	440	440
B:	885	885	885
C:	1455	1455	1455
D:	1630	1630	1660
E:	600	600	600
F:	790	790	790
G:	155	155	155
H:	695	695	645
I:	100	120	120
J:	1025	1025	1275
K:	160	160	160
L:	240	240	240
M:	145	145	145
N:	195	195	195
X - width	1325	1325	1325
Y - height	1485	1485	1485
Z - depth	855	855	855

Figure No. 2. Dimensions of Smart Fire SF11, SF15 and SF22 boiler with 400L dispenser.

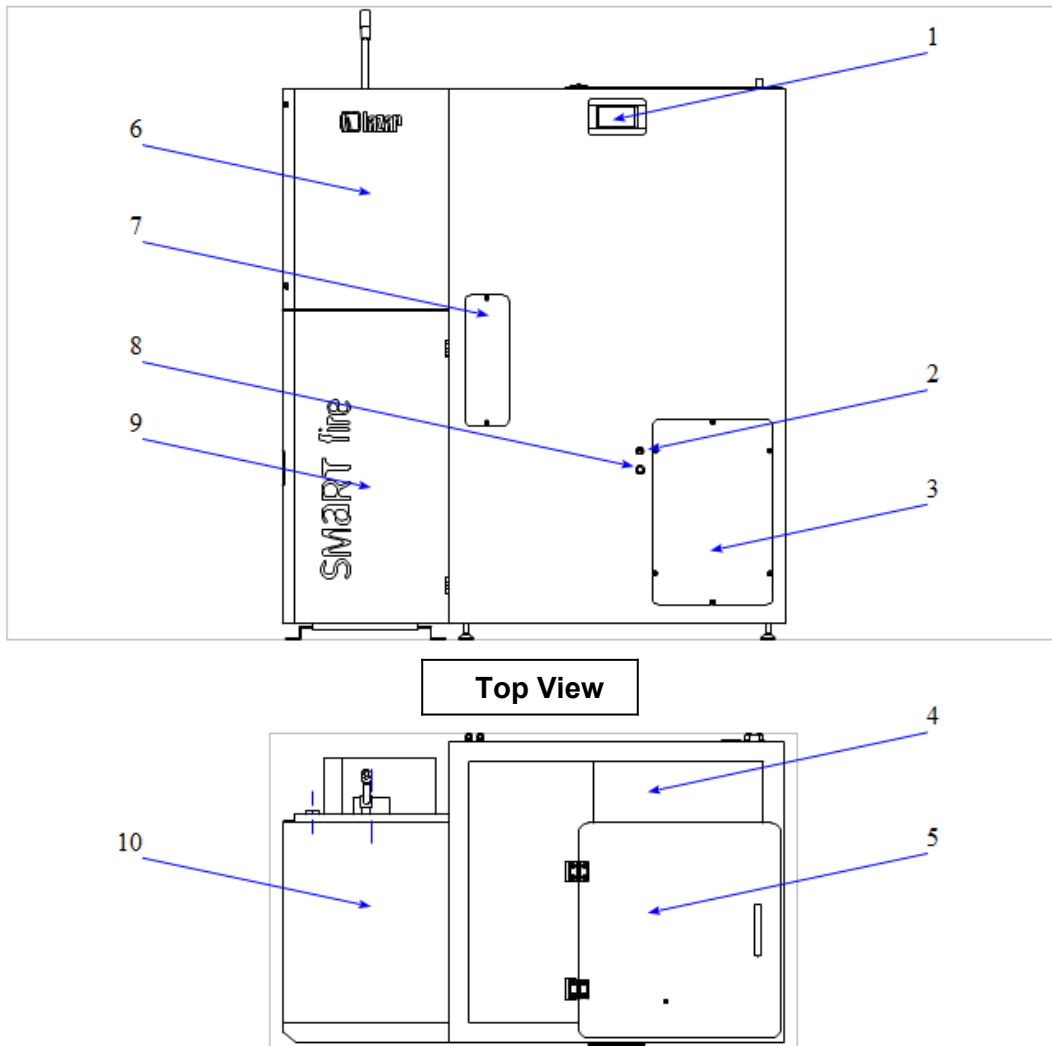


Figure No. 3. Smart Fire SF 11, SF15, SF22, SF31 and SF41 design diagram:

1-Touch screen panel; 2- Safety thermostat reset (with plastic cover); 3- Cover of controller access opening; 4- Fuel dispenser (applicable to 400L dispenser); 5- Fuel dispenser flap; 6- Exchanger masking grille; 7- Cover of valve and capacitive sensor access hole; 8 – Fuel supply system capacitive sensor interlock switch; 9 Boiler door masking grille; 10 Boiler exchanger body;

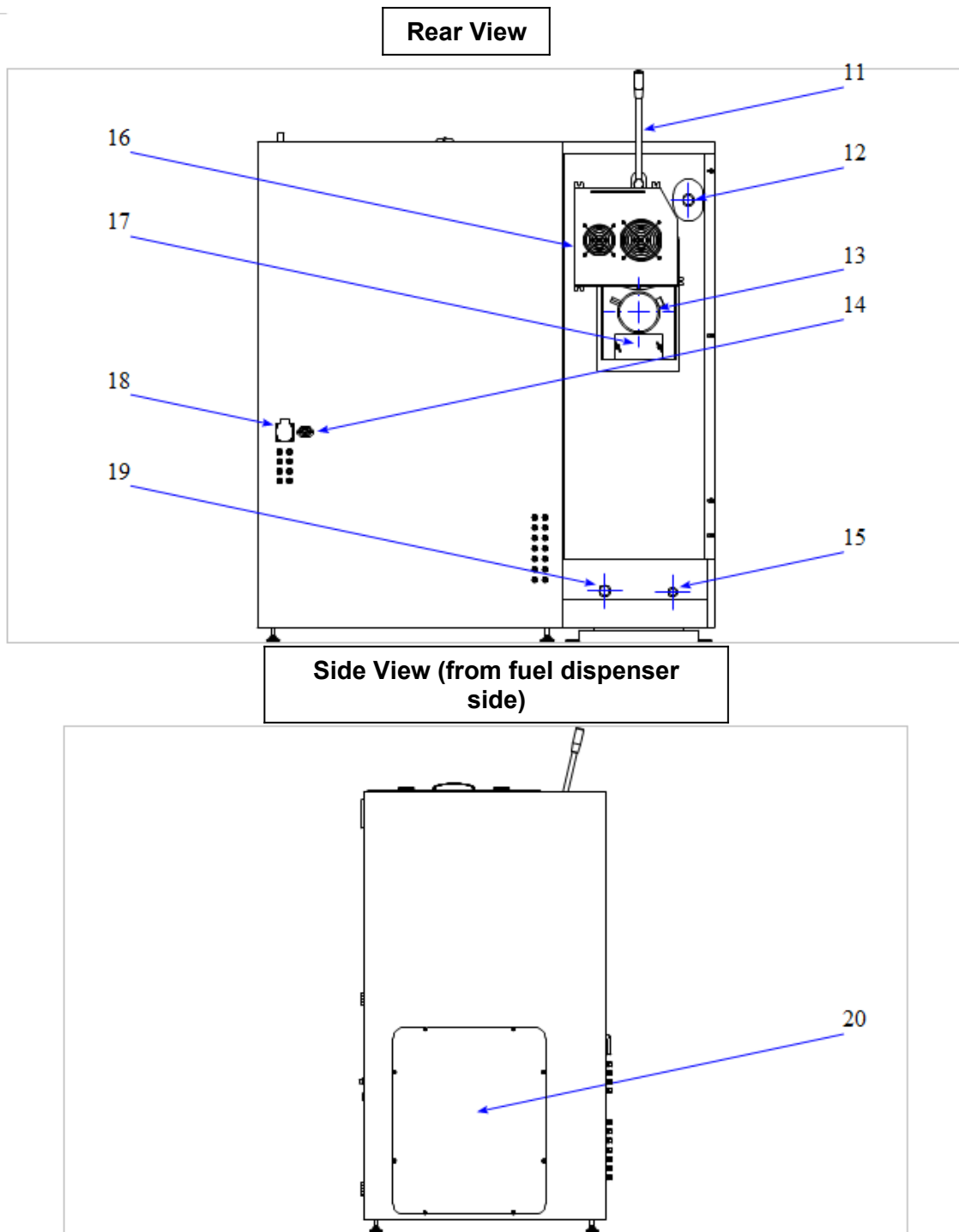


Figure No. 4 Smart Fire SF 11, SF15, SF22, SF31 and SF41 boiler design diagram

11- Exchanger cleaning system lever; 12- Heating water stub pipe; 13- Exhaust gas breeching with exhaust temperature sensor and Lambda probe (option); 14- Vacuum system limit switch socket; 15- Drainage stub pipe; 16- Exhaust fan casing; 17- Fumes manifold washout hole; 18- Vacuum system engine power socket; 19- Return water stub pipe; 20- Fuel dispenser access hole cover;

Front View (open masking grille)

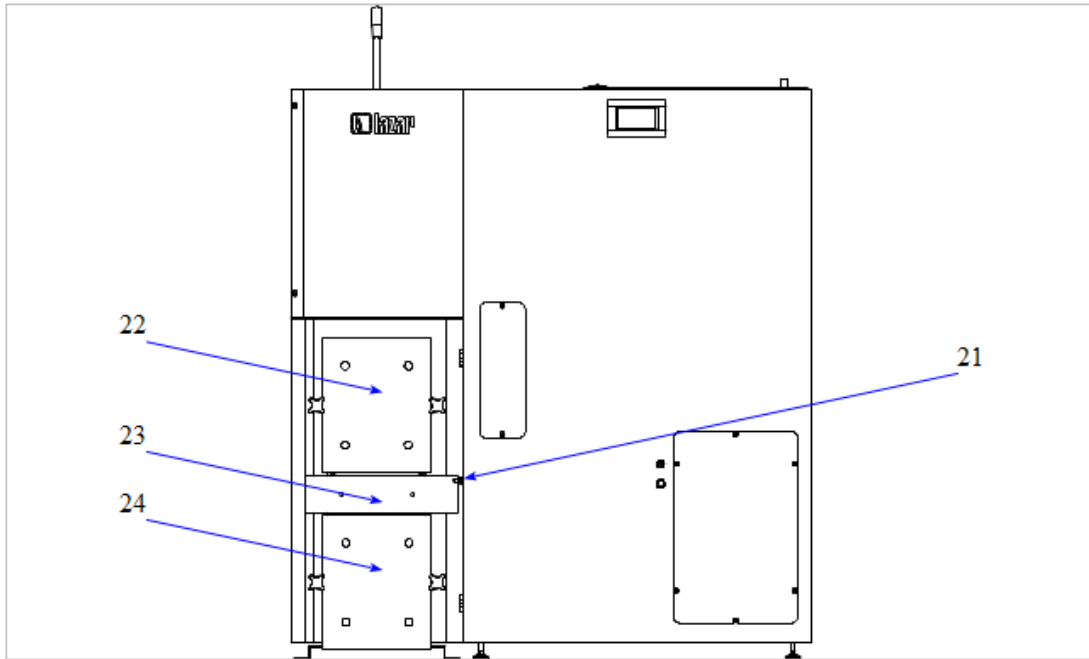
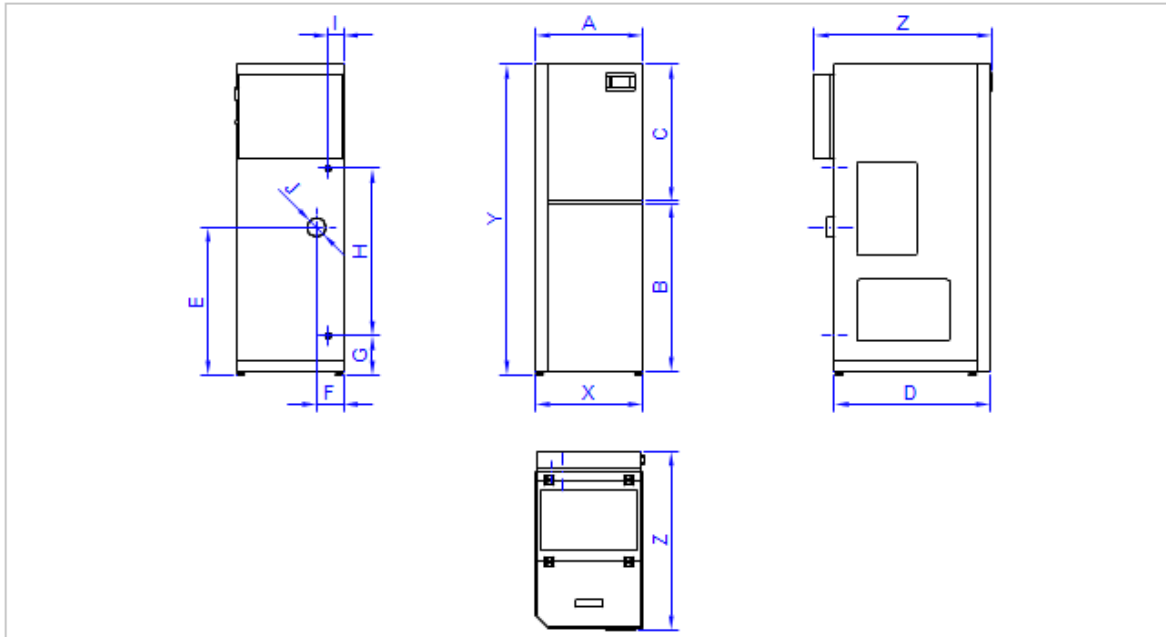


Figure No. 5 Smart Fire SF 11, SF15, SF22, SF31 and SF41 boiler design diagram

- 21- Boiler door masking grille limit switch; 22- Burner chamber door;*
- 23- Ceramic igniter and burner washout hole masking grille;*
- 24- Ash pan chamber door;*



Dimension:	Model
	SF11 / 130 L
A:	555
B:	870
C:	710
D:	810
E:	770
F:	130
G:	210
H:	865
I:	70
J:	100
X – width	570
Y – height	1640
Z - depth	930

Figure No. 6. Dimensions of Smart Fire SF11 boiler with: 130L dispenser.

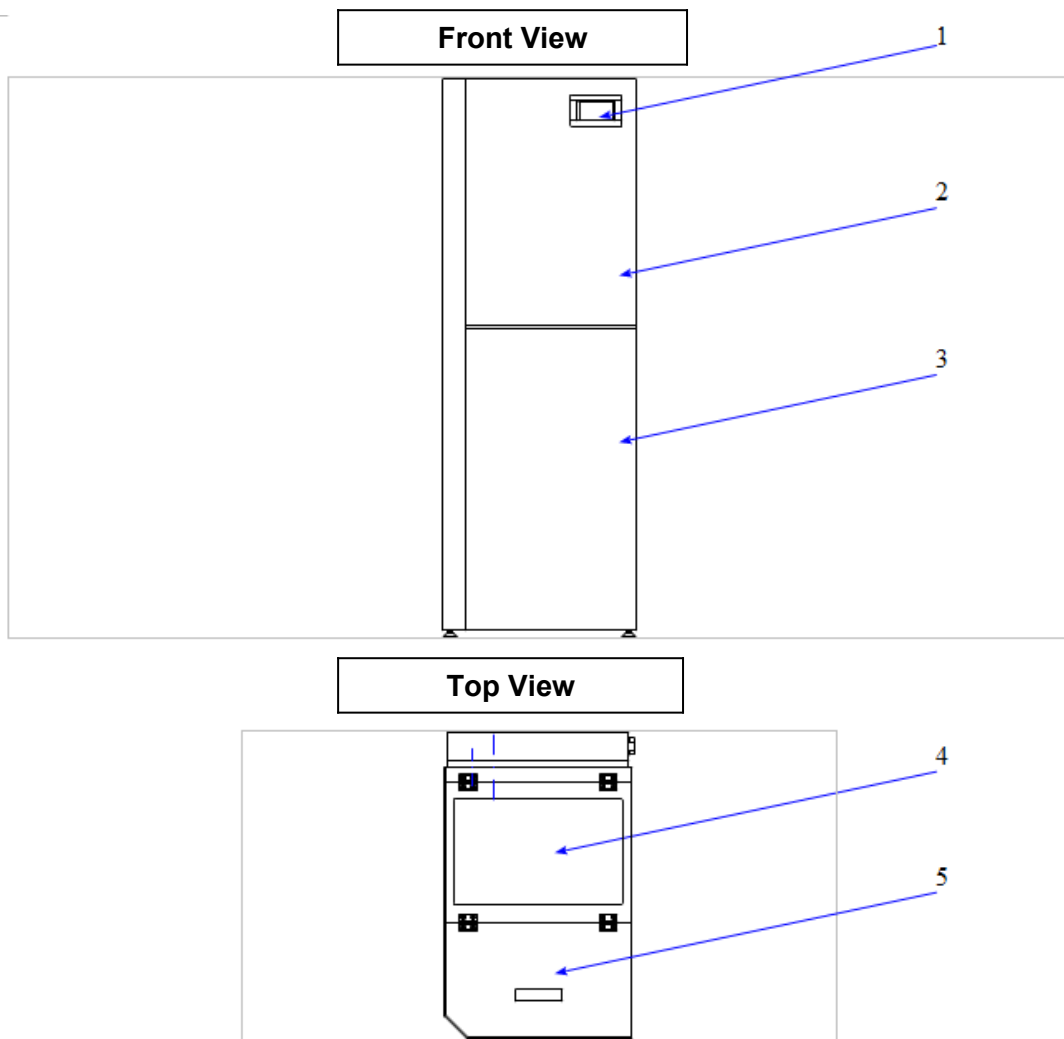
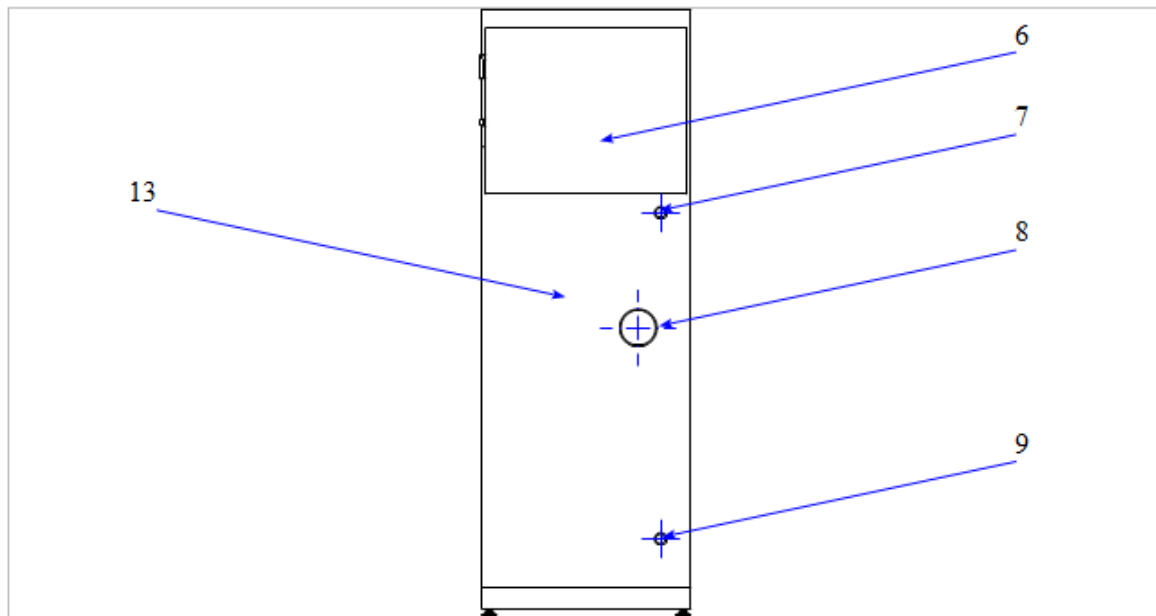


Fig. No. 7 Smart Fire SF11/130L boiler design diagram

*1-Touch screen panel; 2- Top masking grille; 3- Lower masking grille;
4- Access cover; 5- Fuel dispenser flap;*

Top View



Side View (from fuel dispenser side)

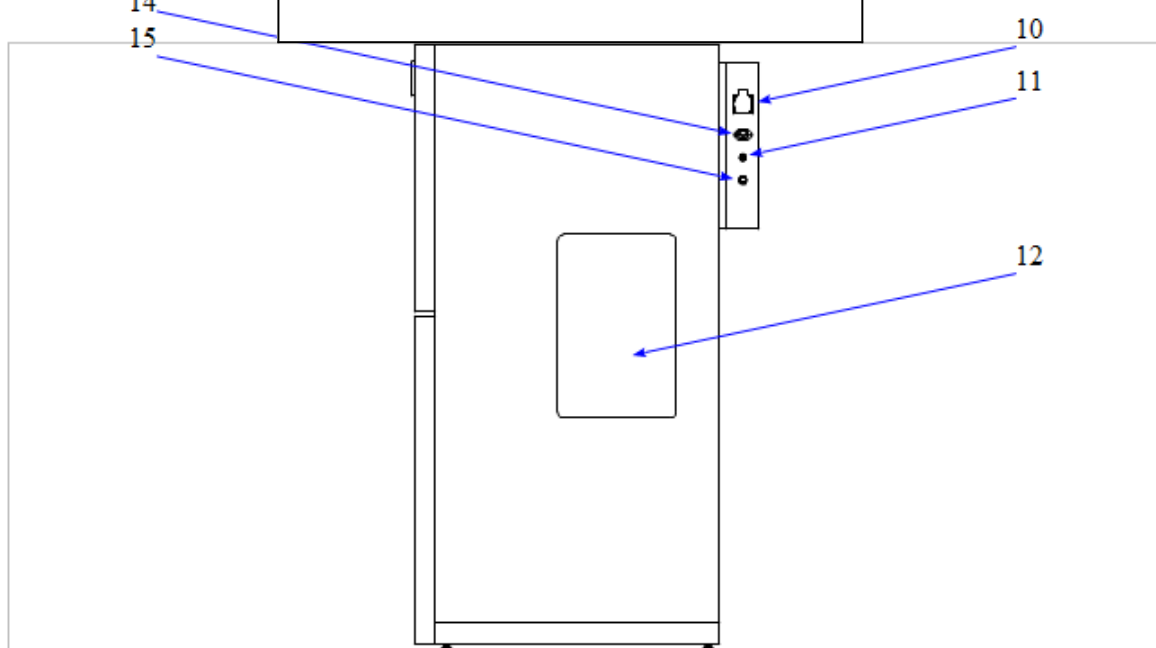


Figure No. 8 Smart Fire SF11/130L boiler diagram

6- Electric cabinet; 7- Inlet stub-pipe; 8- Exhaust breeching with exhaust temperature sensor and Lambda probe (option); 9 – Return water stub pipe; 10-Vacuum system engine power outlet; 11- Safety thermostat reset (under plastic cover); 12- Cover of valve and capacitive sensor access hole; 13- Rear masking grille; 14- Vacuum system limit switch socket; 15- Fuel supply system capacitive sensor interlock switch;

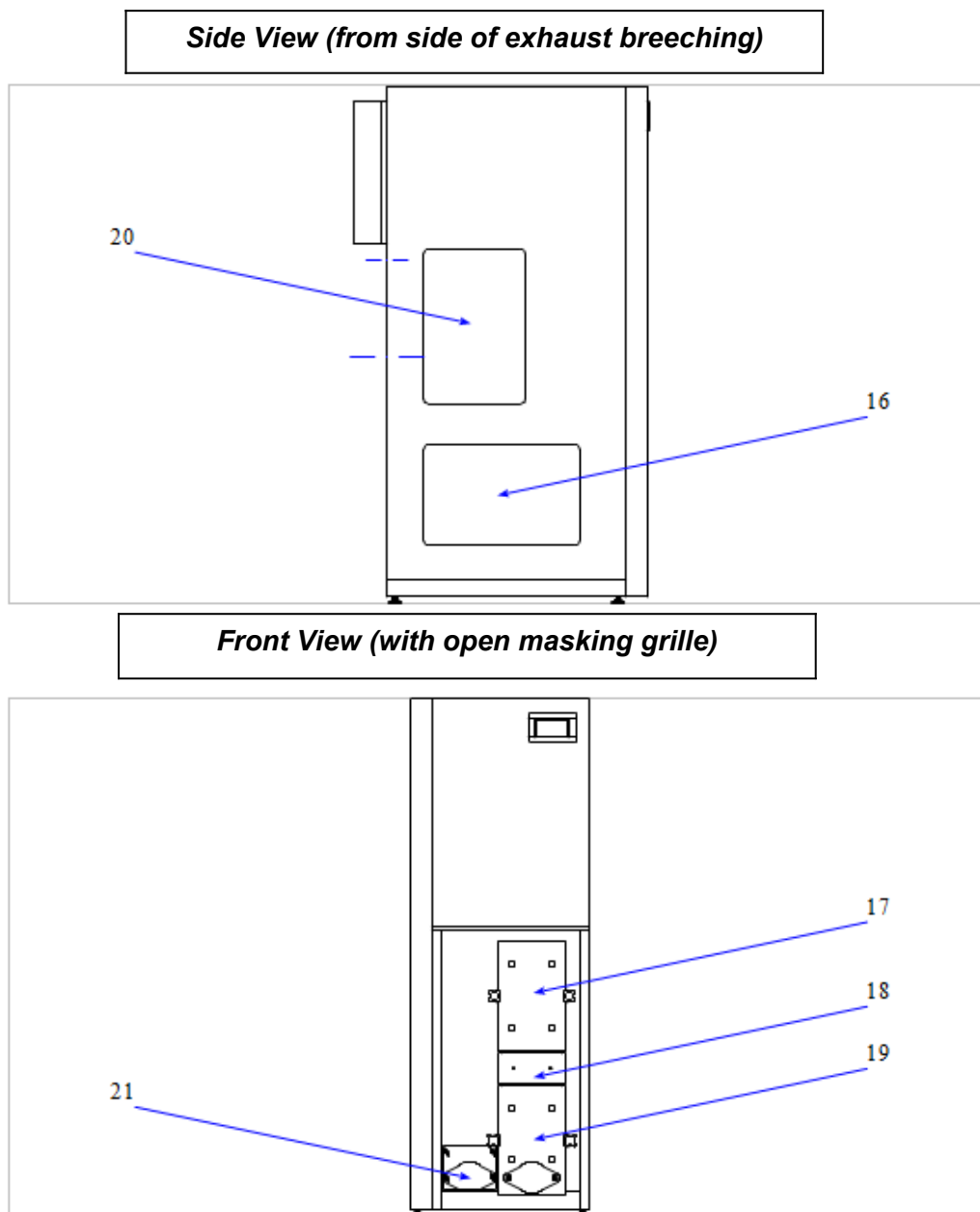
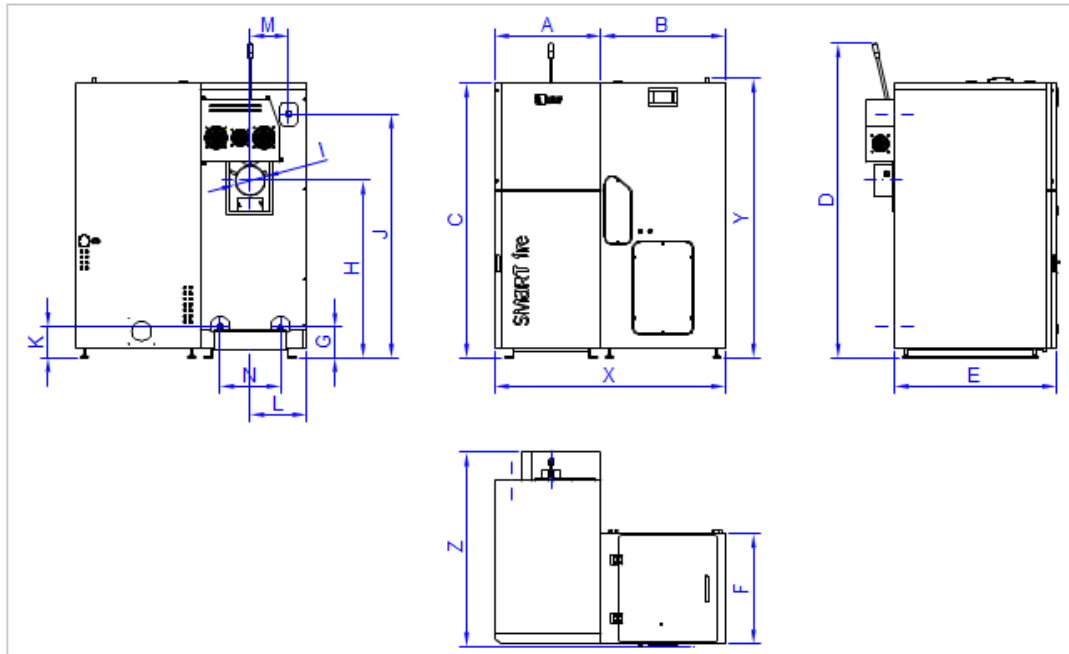


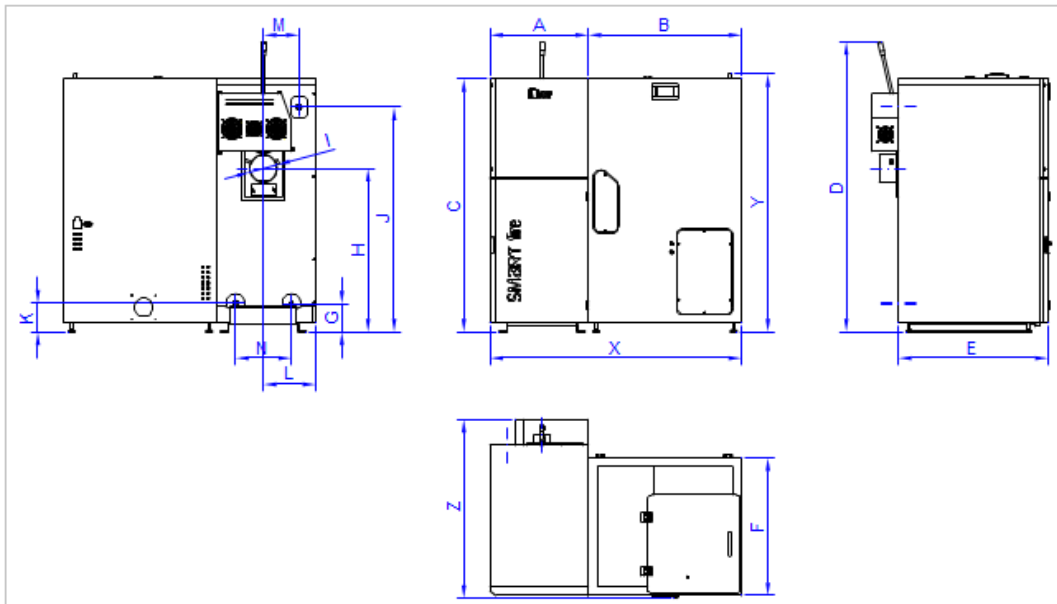
Figure No. 9 Smart Fire SF11/130L boiler diagram

16- Access opening cover; 17- Combustion chamber door; 18- Ceramic igniter and burner washout hole masking grille; 19- Ash pan chamber door; 20- Exhaust breeching access opening cover; 21- Heat exchanger lower part washout hole;



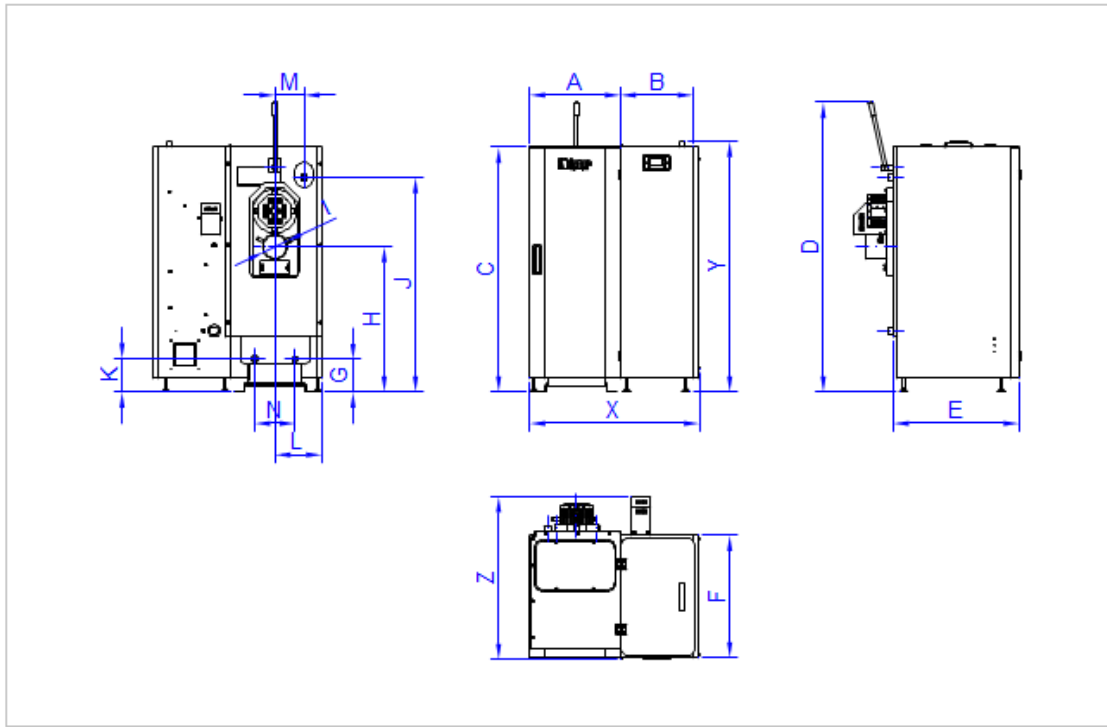
Dimension:	Model			
	SF31 / 150L	SF31 / 240L	SF41 / 150L	SF41 / 240L
A:	570	570	570	570
B:	445	655	445	655
C:	1455	1455	1455	1455
D:	1665	1665	1665	1665
E:	860	860	860	860
F:	585	585	585	585
G:	155	155	155	155
H:	930	930	930	930
I:	160	160	160	160
J:	1280	1280	1280	1280
K:	160	160	160	160
L:	300	300	300	300
M:	205	205	205	205
N:	320	320	320	320
X – width	1015	1225	1015	1225
Y – height	1485	1485	1485	1485
Z - depth	1030	1030	1030	1030

Figure No. 10. Dimensions of Smart Fire SF31 and SF41 boiler with: 150L and 240L dispenser.



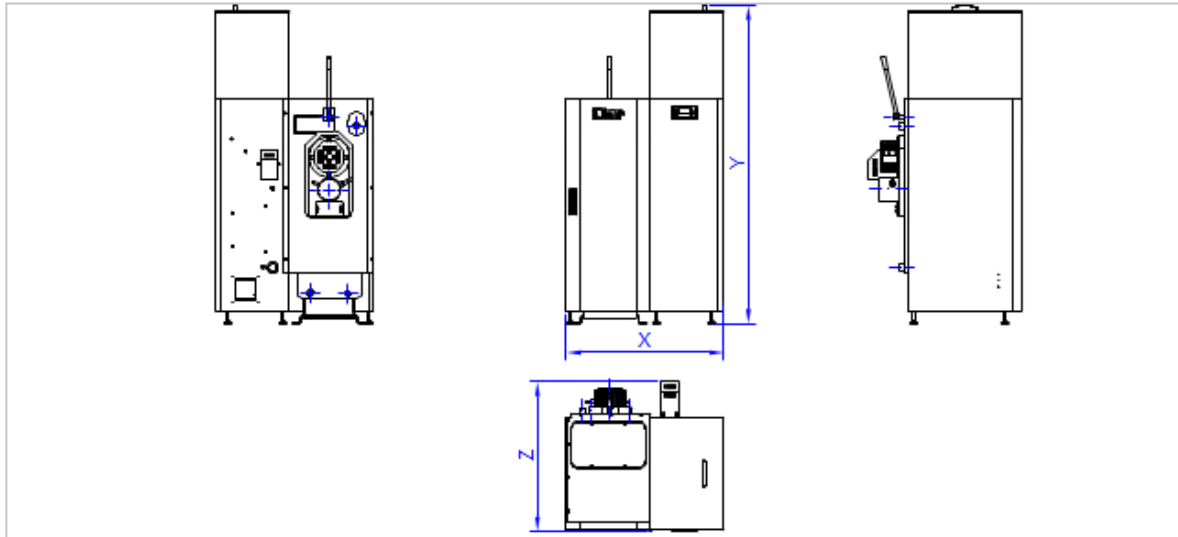
Dimension:	Model	
	SF31 / 400L	SF41 / 400L
A:	570	570
B:	885	885
C:	1455	1455
D:	1665	1665
E:	860	860
F:	790	790
G:	155	155
H:	930	930
I:	160	160
J:	1280	1280
K:	160	160
L:	300	300
M:	205	205
N:	320	320
X – width	1455	1455
Y – height	1485	1485
Z - depth	1030	1030

Figure No. 11. Dimensions of Smart Fire SF31 and SF41 boiler with 400L dispenser

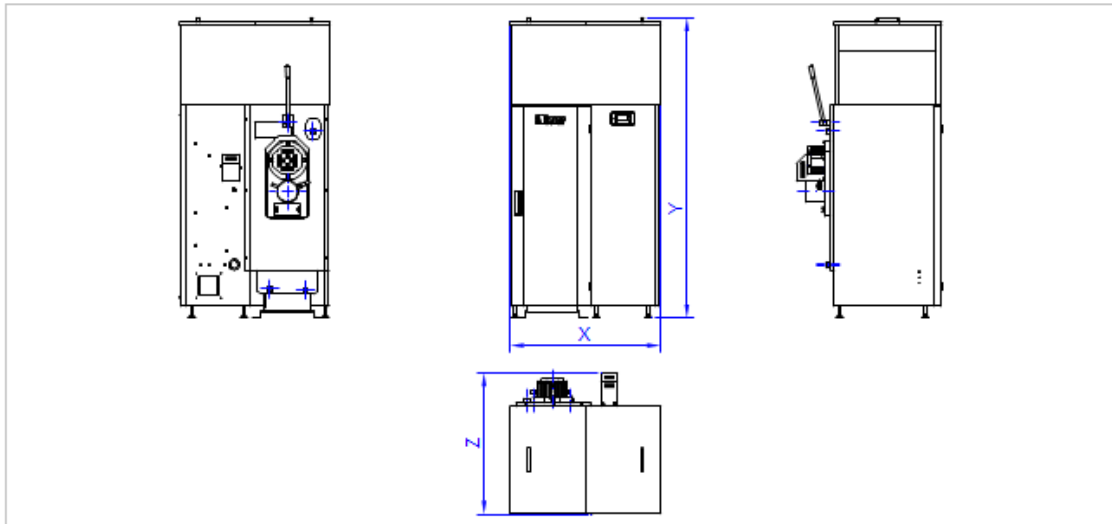


Dimension:	Model	
	SF11 COMPACT	SF15 COMPACT
A:	435	435
B:	350	350
C:	1170	1170
D:	1410	1410
E:	605	605
F:	585	585
G:	155	155
H:	695	695
I:	100	120
J:	1025	1025
K:	160	160
L:	225	225
M:	145	145
N:	195	195
X – width	815	815
Y – height	1200	1200
Z - depth	795	795

Figure No. 12. Dimensions of Smart Fire SF11 COMPACT and SF15 COMPACT boiler



Dimension:	Model	
	SF11 COMPACT with 90L attachment	SF15 COMPACT with 90L attachment
X – width	815	815
Y – height	1655	1655
Z - depth	795	795



Dimension:	Model	
	SF11 COMPACT with 165L attachment	SF15 COMPACT with 165L attachment
X – width	825	825
Y – height	1655	1655
Z - depth	795	795

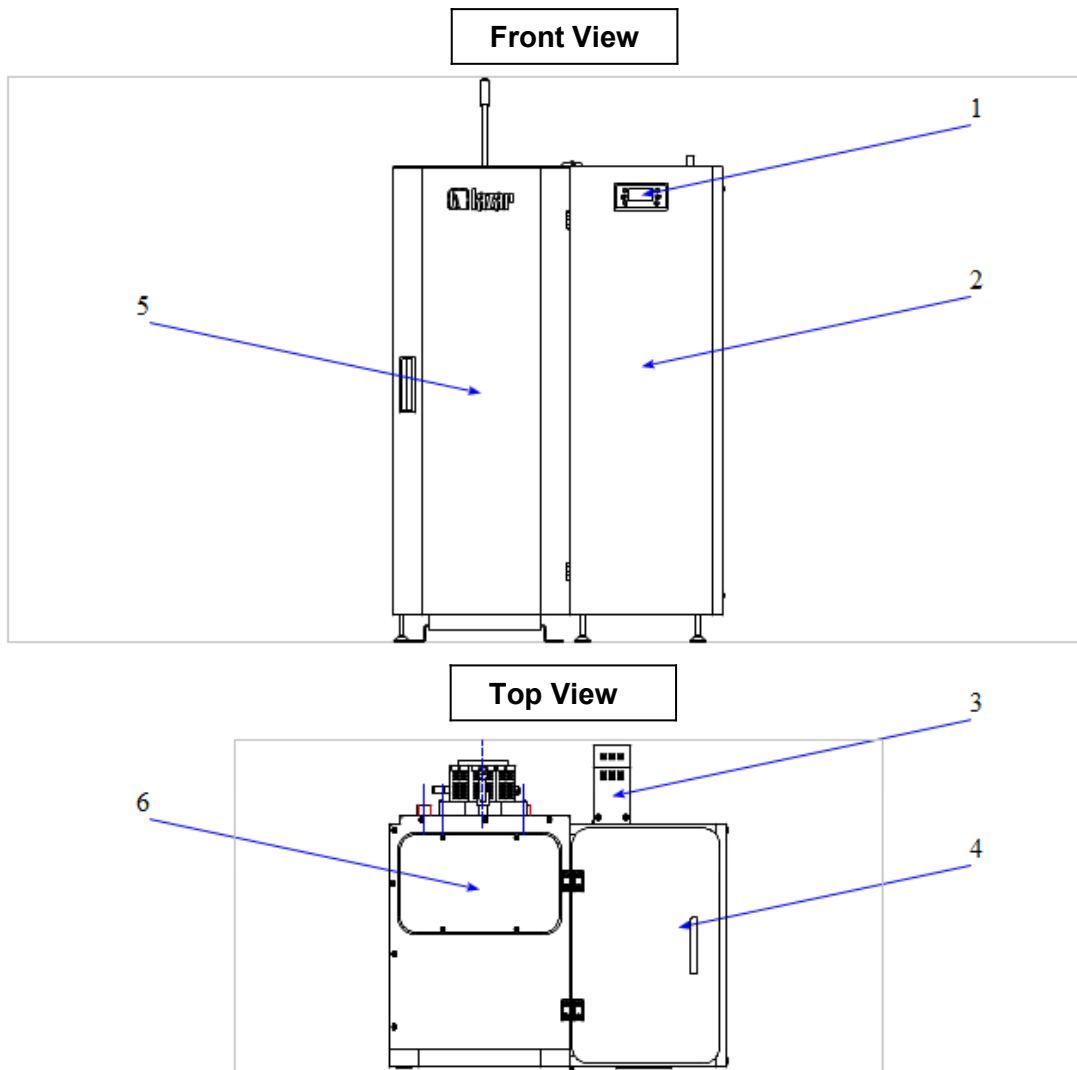


Figure No. 14 Smart Fire SF 11 Compact and SF15 Compact boiler diagram:

- 1- Touch screen panel; 2- Fuel dispenser; 3- Fuel dispenser drive screw system casing; 4- Fuel dispenser flap; 5- Boiler door masking grille; 6- Heat exchanger top part access cover;*

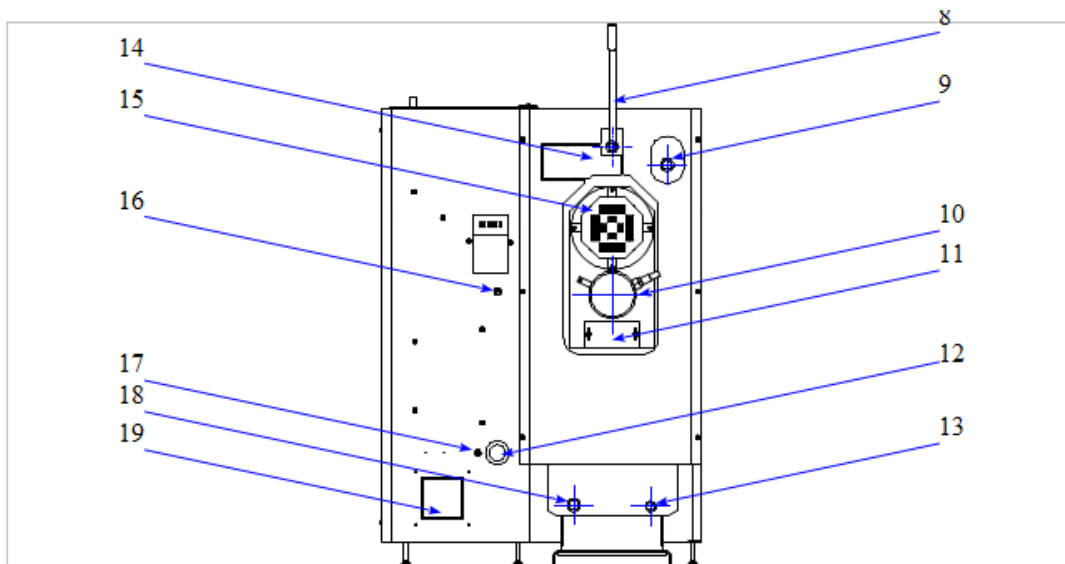


Figure No.15 Smart Fire SF 11, SF15, SF22 and SF41 boiler diagram:

8- Exchanger cleaning system lever; 9- Heating water stub pipe; 10- Exhaust gas breeching with exhaust temperature sensor and Lambda probe (option); 11- Fumes manifold washout hole; 12- Wiring penetration.; 13- Drainage stub pipe; 14- Connection of drive system for exchanger automatic cleaning system (Option); 15- Exhaust fan casing; 16- Safety thermostat reset (under plastic cover); 17- Power cable gland; 18- Return water stub pipe; 19-Air circulation system connection;

7. Protective and Control Instrumentation

7.1 Capacitive proximity switch

The top part of fuel supply pipe, next to the gear of valve, is provided with capacitive proximity switch– Figure No. 16 purposed for detection of excessive fuel accumulated inside dispenser pipe, what is possible before fuel supply to the burner in case of false ignition detection. Capacitive proximity switch protects the fuel supply system against permanent stoppage resulted from jamming by accumulation of excessive fuel.

Capacitive proximity switch is connected do the circuit of boiler door limit switch with serial connection– according to Figure No. 17. Boiler controller displays “BOILER LEAKAGE” message and stops fuel supply and exhaust fan operation upon activation by the capacitive proximity switch analogically to detection with boiler door opening limit switch.

Capacitive limit switch circuit is additionally fitted with sensor interlock switch. Activation of interlock makes boiler controller to ignore detection of excessive fuel by the capacitive sensor, what follows during removal of excessive fuel accumulated inside fuel supply system. Sensor interlock switch is located next to the temperature limit reset button STB – Figure No. 18. By default during boiler sensor interlock switch shall be in ”0” position!



Figure No. 16 Location of capacitive proximity switch

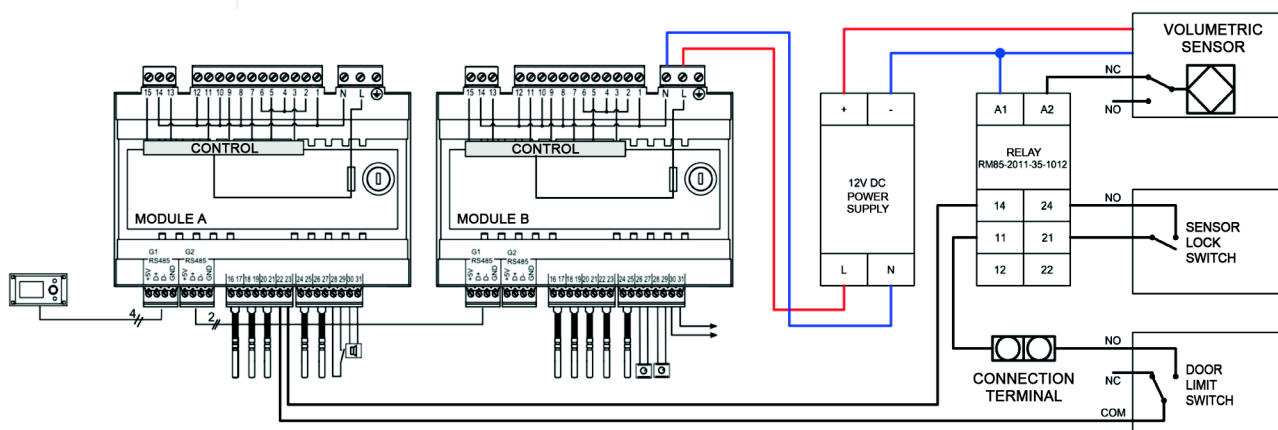


Figure No. 17 Capacitive proximity switch diagram

A fault indicated with "BOILER LEAKAGE" message is generated by open boiler door or activation of capacitive proximity sensor. If proximity sensor is activated, its red LED diode will be highlighted. In this case firstly check that the boiler is put out and then open the combustion chamber and remove fuel remains. Also opening of burner cleaning mechanism is recommended to allow emptying. After combustion chamber cleaning the fuel remains may be removed from fuel supply system. For this purpose:

- Set sensor interlock switch in "1" position;
- Open burner grate in Manual Control menu;
- Activate fuel supply in Manual Control menu and ensure feeder operation for ca. 5 minutes.
- After completion of above steps set sensor interlock switch in "0" position, and then operate the boiler again and check fuel supply system in respect of proper operation.

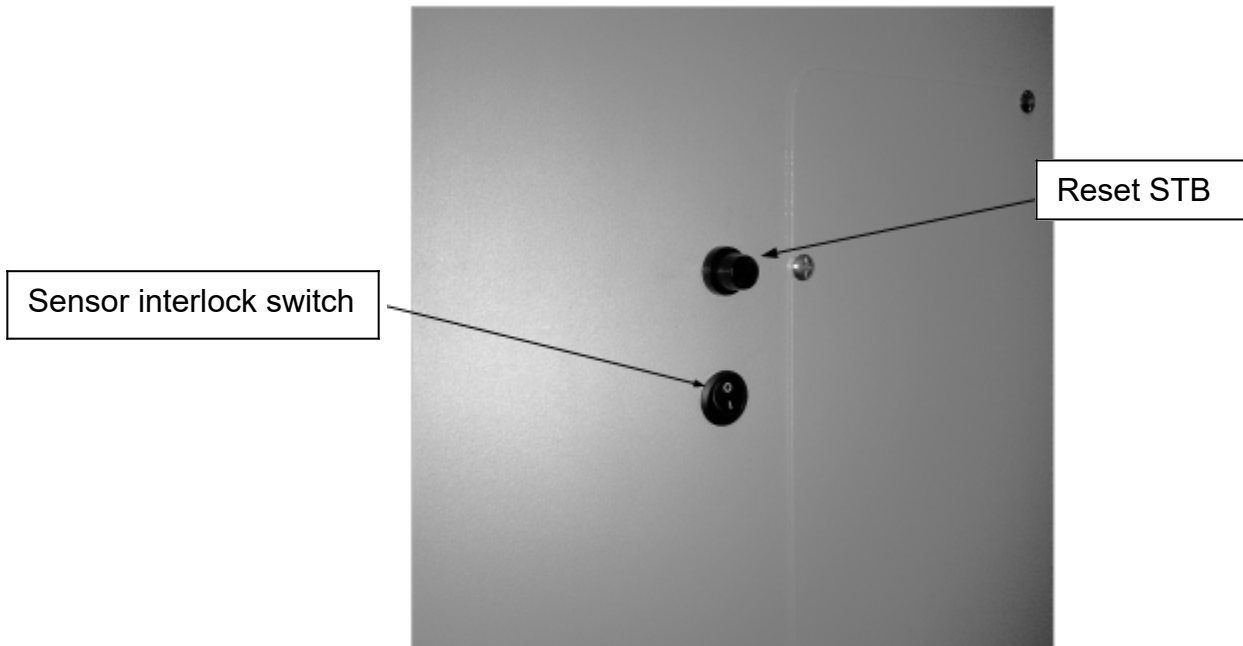


Figure No. 18 Location of sensor interlock switch – default position: “0”

Before any works related to cleaning of burner and combustion chamber, firstly always put out and allow the boiler to cool down– in particular the burner. During any works related to operation of combustion chamber and burner, protective clothing and personal protection equipment is required!

Adjustment is available of capacity sensor sensitivity that has been set initially by boiler manufacturer. To adjust simply rotate a screw of sensor support located next to the red LED diode. Sensor shall be adjusted that it ignores: pellet fed by supply system, wood related dust accumulated around the sensor neither feeder screw when in rotation. If the sensor detects the above correction of sensor position will be required:

- Rotate the screw in anti-clockwise direction to reduce sensitivity;
- Rotate the screw in clockwise direction to increase sensitivity.

Do not change sensor sensitivity more than by half of rotation– 180°. New setting shall ensure proper sensor performance and detection of excessive fuel accumulation inside feeder pipe.

7.2 Primary and secondary air damper

Smart Fire boiler is fitted with individual primary and secondary air intake that supply to the boiler the air required for combustion. Each intake is fitted with the damper that enables use of intake any size (diameter) and consequently volume of supplied primary air and secondary air. Figure No. 19 demonstrates the default position of dampers:

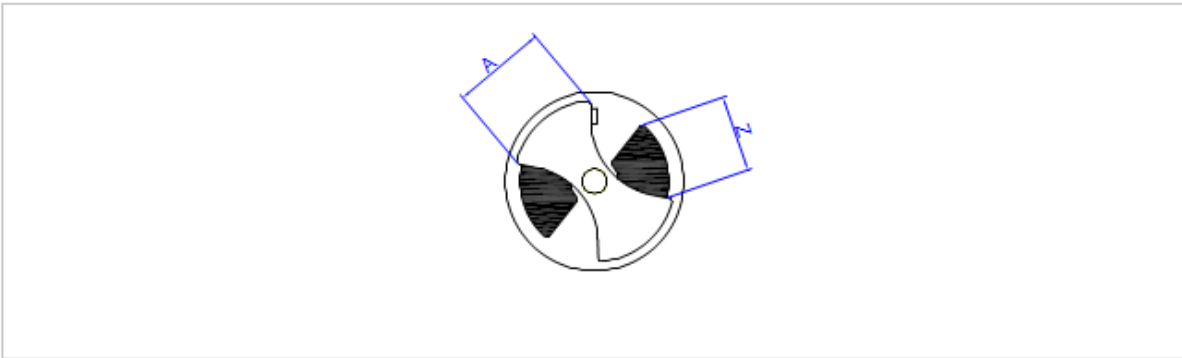
- Primary air damper (bottom one) – when closed maximally ensures supply of sufficient primary air volume under the burner grate.
- Secondary air damper (top one) – when intake is opened half to ensure supply of sufficient air volume to burner secondary air openings.

Adjustment of primary/secondary air is also possible in individual cases. Damper position shall be adjusted on basis of:

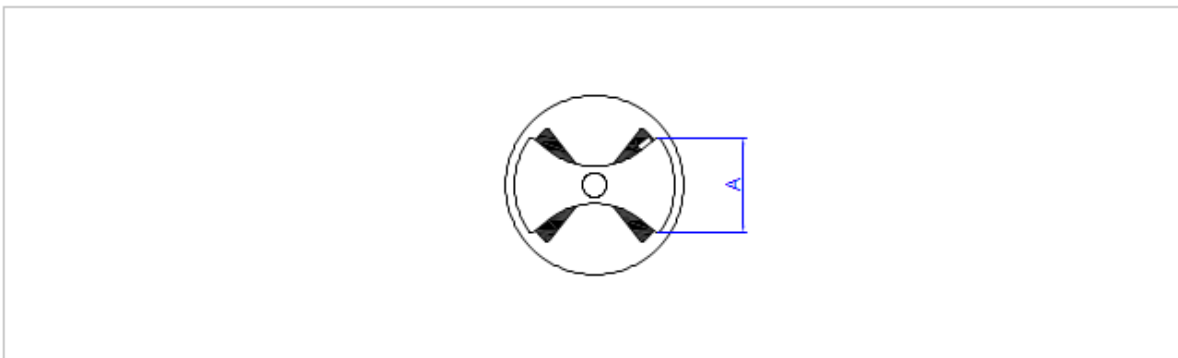
- A flame with combustion chamber access door provided with sight glass. Service engineer is provided with this door that allows visual monitoring of combustion during boiler parameters setup.
- Exhaust gas analyzer reading according to exhaust gas parameters of combustion process.

If necessary close the dampers appropriately to reduce air volume. Air intake reduction shall not be over the cross-section demonstrated on Figure No. 19.

Secondary air damper



Primary air damper



Dimension:	Model				
	SF11	SF15	SF22	SF31	SF41
A:	36.5	31.5	31.5	41.5	41.5
Z:	25	25	25	35	35

Figure No. 19 Air intake default adjustment

8. Operation Manual

8.1 Fuel loading

If fuel inside the dispenser runs out, fuel shall be loaded. Ensure maximum level of fuel always that allows closing of dispenser flap.

Absence of fuel inside the dispenser results in boiler putting out and initiation of start-up procedure required for boiler operation. Absence of fuel will prevent boiler operation and the alarm message will be displayed on the screen.

If before fuel loading the screw feeder located on dispenser bottom is visible, it confirms that fuel runs out completely, and fuel supply system was emptied completely. In this case pellet loading is necessary. For this purpose switch off the boiler controller, empty the ash pan, and then in the Manual Control menu:

- Open the burner bottom grate by going to: MENU >> Manual Control (Sterowanie Ręczne) >> Actuator (Siłownik) = ON and wait 2 minutes, until manual option mode is automatically disengaged, and the screen will display “Boiler OFF” menu;
- Go again to: MENU >> Manual Control >> Actuator = ON and wait 2 minutes, until the grate total opening follows, and the screen again displays “Boiler OFF” menu;
- Run a few times fuel feeder by going to: MENU >> Control Manual >> Feeder = ON, and wait each time 2 minutes, until the screen displays “Boiler OFF” menu – you can continue until you can hear pellet placed inside the ash pan.

Next empty the ash pan. In case of any fuel left in the empty ash pan, it can be placed in the fuel dispenser again. Next turn on the boiler again that will proceed to firing-up mode.

8.2 Boiler operation

Before boiler firing-up:

- Check that enough water is provided in the central heating system;
- Check that dispenser is loaded with fuel.

Upon controller activation the boiler will be switched into the Firing-up mode. This mode includes some steps and ends up with fuel firing up with burner. Next the boiler will automatically switch to Stabilization mode, and then Operation mode. In case of firing-up failure (insufficient flue temperature) the boiler will perform firing-up twice. If the third attempt fails the relevant alarm message will be displayed on screen. Failure may be caused by improper type of fuel or controller set-up. In such case contact the authorized service.

8.3 Boiler operation

Following firing-up, switching to Stabilization mode, boiler controller switches to Operation mode that controls quantity of fuel fed and fan output to ensure high efficiency within whole range of operation. Any boiler operation irregularity demonstrated with displayed message shall be reported to the authorized service.

Before change of any parameter, firstly the user shall check function of the given parameter and effects for boiler and system operation. Any change of parameter shall be recorded to enable restoration of previous settings and quick phone assistance provided by authorized service.

- During boiler operation the fuel is fed on regular basis with pauses between particular doses. The total cycle and time of fuel supply is setup by the manufacturer for nominal maximum and minimum output. Note that poor quality fuel may require correction of parameters. Poor quality fuel is indicated with: boiler switching into Control Mode (Ember Maintenance) or excessive pellet supply to the burner. When changing the parameters always consult controller user manual. Before changing supply parameters firstly verify pellet regarding its quality. Every time check pellet regarding moisture content, hardness and ash content upon immersing the sample into water.
- Factory programmed setting of boiler temperature ensures proper operation of device. However in extreme conditions change of this parameter may be necessary. When changing parameters always consult recommended boiler temperature range and controller user manual.
- Depending on system, setup of following parameters is required: mixer circuit temperature, hot water temperature, heating curves, thermostats and night differential temperature within the week. Initial settings of such parameters will be set by authorized service. Before any change of parameter, firstly consult controller user manual and always record any change of settings. Note that effects related to the change of parameters may be evident following a few hours.
- In case of installed mixing valve also setup of its parameters is available. These parameters are programmed by the authorized service. If change of this parameter is necessary, always record any change of parameter to allow restoration of previous setting.
- Heat exchanger cleaning is recommended with manual cleaning system.
- Burner cleaning follows according to automatically programmed interval (number of operating hours).

During boiler operation note to reload fuel into the dispenser to ensure uninterrupted fuel supply! Fuel dispenser flap must be closed during boiler operation always!

All flaps and access doors shall be closed during boiler operation always!

In case of any irregularity during device operation, release of smoke or leakage– put out the boiler immediately (see chapter 8.5), and then contact the authorized service to obtain further instructions and determine the reason of failure!

8.4 Routine cleaning

Routine cleaning of Smart Fire boiler during period of operation includes:

- Loading fuel inside the dispenser on regular basis– (see chapter 8.1);
- Cleaning of exchanger with mechanical cleaning system;
- Emptying of ash pan– check regarding quantity of ash is required once a month;
- Heat exchanger lower part cleaning.

Before commencement of works related to boiler cleaning, firstly put out the boiler and wait minimum 1h to allow cooling down. After cooling down safe opening of masking grilles and ash pan chamber access doors will be possible to allow cleaning!

Cleaning of exchanger with mechanical cleaning system is recommended on regular basis, namely with repeatedly operated manual lever. This operation shall be delivered at least once a week. To minimize time required for boiler operation, cleaning with fuel loading is recommended at the same time. Long downtime of manually operated cleaning system may result in permanent stoppage.

In case of boilers fitted with exchanger automatic cleaning system driven with electric motor instead of manually operated lever, exchanger cleaning will be provided automatically during burner cleaning.

Quantity of ash generated during combustion depends on quality of fuel and consumption by boiler. Additionally to ash also trace quantities of carbon black may be generated. To remove ash firstly open ash pan chamber access door, by removing two wing bolts located on sides. You can remove ash from ash pan chamber by emptying ash pan tray. During ash removal cleaning of ash pan chamber is recommended, by collecting with brush ash remains and fuel into ash pan tray.

Additionally during heating season, when checking quantity of ash, clean the Lower part of heat exchanger. Depending on the type of boiler the washout hole of exchanger lower part is located:

- Smart Fire SF11, SF15, SF22, SF31, SF41 and SF COMPACT – inside the ash pan chamber, on the rear wall- before opening firstly lower the washout hole from holders by moving it upwards;
- Smart Fire SF11/130 – on the left from ash pan chamber access door- before opening remove 4 fixing nuts (Figure No. 7, item 21).

When closing heat exchanger lower washout hole check gaskets in respect of any sign of wear, as well as tightness of closed washout hole!

8.5 Maintenance and cleaning

Before commencement of works related to maintenance and cleaning, firstly put out and wait minimum 1h to allow the boiler cooling down. After cooling down safe opening of masking grilles, access doors and washout hole will be possible for the purpose of maintenance!

After every heating season, before long downtime, during periodical inspection and repairs of removal of defects careful cleaning of boiler is required and maintenance. Additionally every two months check shall be conducted regarding boiler condition works shall be provided in terms of cleaning and maintenance, if necessary. For this purpose every Smart Fire boiler is fitted with washout hole in:

- Heat exchanger top cover;
- Exchanger lower part;
- Burner;
- Exhaust gas breeching.

According to the general principle, always clean Smart Fire boiler from the top to the bottom of boiler steel body. Cleaning of boiler is necessary, if exhaust temperature significantly increased during boiler continuous operation. If exhaust temperature increased suddenly over the allowed maximum, cleaning of boiler is necessary.

Before cleaning, go to Controller Manual Control menu, and open the grate below the burner:

- Open the burner bottom grate by going to: MENU >> Manual Control (Sterowanie Ręczne) >> Actuator (Siłownik) = ON and wait 2 minutes, until manual option mode is automatically disengaged, and the screen will display “Boiler OFF” menu;
- Go again to: MENU >> Manual Control >> Actuator = ON and wait 2 minutes, until the grate total opening follows, and the screen again displays “Boiler OFF” menu;

To obtain access to heat exchanger top cover, depending on boiler type:

- Smart Fire SF11, SF15, SF22, SF31 and SF41 – remove the top part of boiler body casing (Figure No.2, item 10);
- Smart Fire SF11/130 – remove the fixing screw in masking grille lower edge (Figure No. 7, item 2);
- Smart Fire SF11 Compact and SF15 Compact – remove the masking grille (Figure No. 14, item 6).

To open exchanger top cover remove 4 butterfly nuts. When cleaning the top part of exchanger check is recommended regarding the condition of exchanger mechanical cleaning system, vermiculite lining and sealing of exchanger top cover internal side.

The ash is placed inside combustion chamber with the exchanger manual cleaning system. To obtain access to the combustion chamber remove two clamps fixing the access door. Remove ash with vacuum cleaner or broom, by collecting the ash in ash pan tray. Next clean ash pan chamber and heat exchanger lower part (chapter 8.4).

Check burner surface– in case of evident contamination related to baked ash, clean it carefully. Moreover when checking burner, check also burner cleaning mechanism regarding proper operation. The steel grate located under the burner shall rest on runners without noticeable resistance or collision with the burner and other parts of mechanism.

Clearing of exhaust breeching and the exhaust fan is possible after opening the breeching washout hole located in the lower part of exhaust manifold. Regular checks are required regarding fan operation. Prevent stoppage or failure of exhaust fan resulted from contamination accumulation inside the exhaust manifold and near the fan. Moreover exhaust fan capacitor is recommended every two years, if applicable.

Before any works related to fan, firstly disconnect the boiler from power supply and wait until fan rotor has stopped!

Regular checks are recommended regarding condition and operation of motoreducer of pellet supply system, in particular in respect of any wear of sealing, oil leakage, excessive noise, stable and regular operation, screw joints. Always keep safe distance from and wear gloves. CAUTION! Risk of burns due to motoreducer motor casing temperature of 75°C or 100°C. Replacement of motoreducer motor capacitor is recommended every three years, if applicable.

Smart Fire SF11, SF15, SF22, SF31 and SF41 boiler is provided with motor coupled to the screw with gear. The motor is provided with thermistor that protects against overloading caused by jamming of feeder screw. Any jamming results in motor excessive temperature what activates preventive tripping. To remove the cause of screw feeder jamming:

- **Put out and disconnect the boiler from power supply;**
- Remove the bolt coupling gear wheel driving the valve to screw;
- Remove the gear wheel from screw shaft;
- Remove four bolts fixing motoreducer to the fuel supply pipe flange;

- Rotate motoreducer and screw in anti-clockwise direction;
- Place the motoreducer in right position and install it;
- Place the gear wheel on screw feeder shaft and fix with the screw.

If the cause of jamming was not removed or motor preventive tripping is repeated:

- **Put out and disconnect the boiler from power supply;**
- **Remove pellet from dispenser;**
- **Remove the screw coupling gear wheel driving the valve and screw;**
- Remove the gear wheel from screw shaft;
- Remove four bolts fixing motoreducer to fuel supply pipe flange;
- Remove the screw along with motoreducer out of fuel supply pipe;
- Remove from the fuel supply pipe the object causing jamming of screw, and clean carefully fuel supply system;
- Slide the screw along with motoreducer into fuel supply pipe;
- Place the motoreducer in right position and install it;
- Place the gear wheel on screw shaft and fix with the bolt.

Smart Fire COMPACT boilers are provided with two motoreducers installed in fuel supply system: one driving the valve and the second driving the screw inside the pellet dispenser. Each one is provided with thermistor that protects against loading resulted from jamming. To remove the cause of motoreducer jamming:

- **Put out and disconnect the boiler from power supply;**
- Rotate manually motoreducer by 90° in clockwise direction.

Boiler tightness shall be ensures always. In case of any leakage, repairs shall be provided immediately. It applies in particular to access door of burner chamber and ash pan, as well as washout holes.

8.6 Boiler putting out

To put boiler out you need to go to the respective mode. This mode is performed automatically in manner that ensures safety, combustion of all left pellet with required ventilation. Therefore do not disconnect the device from power supply until automatic putting out is completed.

In case of boiler downtime longer than a week, remove any ash and pellet, clean the boiler and ensure required ventilation. Failure to follow above instructions may result in corrosion!

9. Installation Instructions

Any works related to boiler installation may be delivered exclusively by personnel qualified, experienced with use of appropriate equipment. A person delivering installation works may perform provisions boiler operation, whereas commissioning, inspections and repairs shall be delivered by HKS LAZAR authorized service only.

Any works related to Smart Fire boiler installation shall be delivered pursuant to applicable state and European standards, as well as local regulations regarding boiler installation!

In particular always adhere to the following:

- **Regulation of the Minister of Infrastructure as of 12 April 2002 regarding the technical conditions for buildings and their locations;**
- **Regulation of the Minister of Infrastructure as of 12 March 2009 regarding the technical conditions for buildings and their locations;**
- PN-B-02411:1987 Standard "Heating systems. Built-in solid fuel boiler-rooms – Requirements";
- PN-B-02413:1991 Standard "Heating and heat engineering – Protection of open water heating installations – Requirements";
- PN-B-02414:1999 Standard "Heating and heat engineering – Protection of closed loop system heating installations with membrane expansion vessels – Requirements";
- PN-B-02415:1991 Standard "Heating and heat engineering – Protection of closed loop system heating networks – Requirements";
- PN-B-02416:1991 Standard " Heating and heat engineering – Protection of closed loop system water heating installations, connected to heating networks – Requirements";
- PN-B-02440:1976 Standard "Heating and heat engineering – Protection of hot potable water devices– Requirements";
- PN-EN 12828:2006 Standard "Heating systems in buildings– Designing of central heating water systems";

their amendments or replacing regulations.

9.1 Bringing boiler inside

Bringing the boiler inside should be performed carefully, paying special attention to the electronic elements and wiring. When it is required to uninstall any element, make notes or photographs to enable installation in identical manner. It allows for quick installation of those elements and facilitates work delivered by service engineer.

9.2 Boiler room– boiler position

The room where boiler is to be installed must meet relevant regulations and standards, referring to the solid fuel boilers. In particular pay special attention to the safety of water and electric installation, proper ventilation, fume exhaust system and fire safety. The boiler room shall be tight with efficient ventilation and air supply and shall be separated from other spaces with permanent walls and tight door to prevent smoke penetration to other spaces, in particular those occupied by people.

Boiler position in the room shall ensure unrestricted access required operation, maintenance and repairs. In case of SF11, SF15, SF22, SF31 and SF41 boiler the following requirements apply:

- In front of boiler– min. 1000mm;
- on side of fuel dispenser– min. 1000mm;
- on side– min. 500mm;

- from the back– min. 500mm;
- from above – min. 700mm.

For reference position of Smart Fire boiler inside boiler room that meets above requirements consult Figure No. 20.

In case of SF11/130L boiler, the following requirements apply:

- In front of boiler – min. 1000mm;
- on side of boiler from side of flue chimney breeching– min. 500mm;
- from side– min. 800mm;
- from back– min. 500mm;
- from above– min. 600mm.

In case of SF COMPACT boiler the following requirements apply:

- In front of boiler – min. 1000 mm;
- on side of boiler from side of flue chimney breeching – min. 600mm;
- from side – min. 500mm;
- from back – min. 500mm;
- from above – min. 500mm.

Boiler room must be provided with appropriate supply-exhaust ventilation, with supply duct running under the floor of boiler room, and exhaust duct running under the structural floor. Boiler room must be provided with fire-rated door EI30. Door shall be fitted with self-closer. Boiler room door shall be closed during boiler operation.

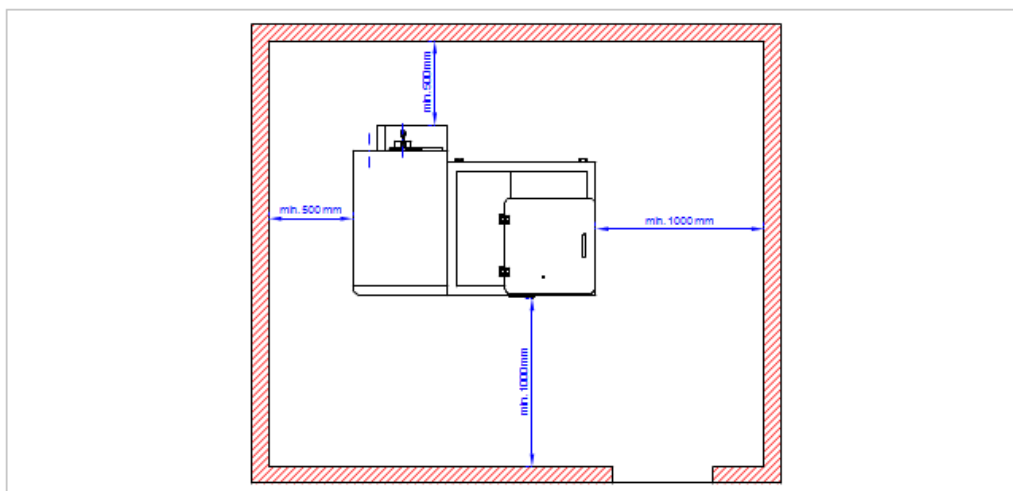


Figure No. 20 Reference position of Smart Fire SF41 boiler with 400L dispenser in boiler room.

9.3 Flue chimney

Due to required low chimney draft, exhaust gas low temperature and possible condensate always check carefully regarding flue liner!

Clay flue liner is recommended or heat-resistant stainless that ensure proper conditions for boiler operation!

Note that boiler operation is affected also with connection of boiler exhaust breeching with the flue liner– for reference connection consult Figure No. 21. Connection must ensure tightness and prevent accumulation or flow of condensate down to the boiler. Chimney connection length shall not be over 3m, with minimum 10° gradient towards the boiler, whereas optimal gradient is 30° ÷ 45°. Non-flammable thermal insulation min. 25mm thick is recommended along the whole connection. Before operation firstly the chimney shall undergo drying and heating.

Chimney draft during operation of Smart Fire SF11, SF15 and SF22 boiler shall never be over 10Pa! In case of Smart Fire SF31 and SF41 boiler chimney draft shall not be over 20Pa!

To ensure proper chimney draft the connection must be provided with flue damper and the flue liner with the draft controller installed below the connection of chimney and flue liner.

Chimney connected to the boiler shall comply with all applicable standards– in particular PN -EN 13384-1, safety requirements and good building practice! If required the chimney shall undergo inspection acceptance performed by competent authorities!

	Model		
	SF 11	SF 15 / SF 22	SF31 / SF 41
Min. chimney draft	1 Pa / 0.01 mbar	1 Pa / 0.01 mbar	5 Pa / 0.05 mbar
Max. chimney draft	8 Pa / 0.08 mbar	8 Pa / 0.08 mbar	15 Pa / 0.15 mbar
Recommended chimney dia.	Ø100 mm ÷ Ø110 mm	Ø120 mm ÷ Ø130 mm	Ø160 mm
Chimney max. Dia.	Ø200 mm	Ø200 mm	Ø200 mm

Table No. 11 Guidelines regarding chimney flue system

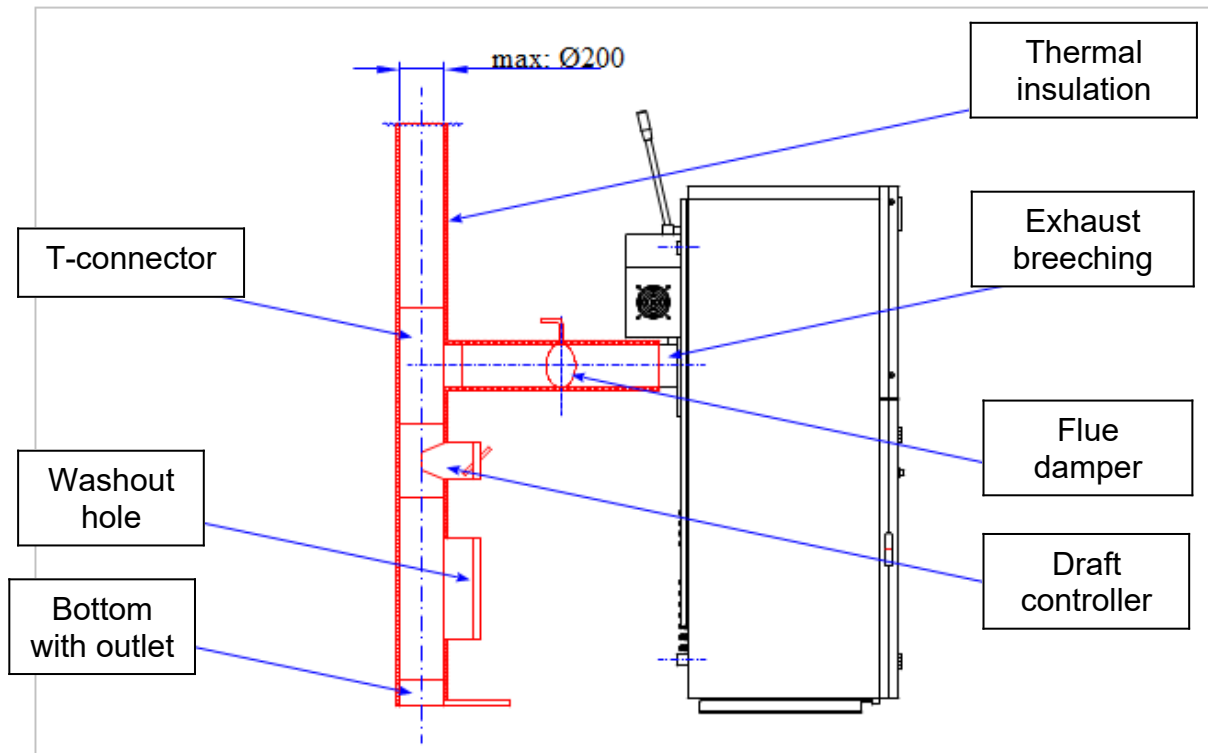


Figure No. 21 Smart Fire boiler chimney flue connection

9.4 Heating system

To protect the boiler against corrosion resulted from return flow of water from central heating system at temperature lower than exhaust dew point, the boiler is provided with Hydraulics TV Kit installed to the rear wall. The kit includes thermostatic valve TV 55°C that ensures min. 55°C temperature of return water flow to the boiler.

System shall be delivered pursuant to applicable standards, regulations and good building practice. During works related to installation user shall consult the following diagram– Figure No. 22 to Figure No. 28.

In case of hot water exchanger of small volume:

- Two-jacket exchanger of volume up to 150L;
- Exchanger with coil of volume up to 220L and coil volume up to 1.4m²;

If min. temperature of hot water is limited to 40°C, the direct connection of exchanger to the boiler is allowed, instead of using TV thermostatic valve – Figure No. 25, Figure No. 26, Figure No. 27 and Figure No. 28.

The following hydraulic diagrams are for reference only and each time central heating system diagram shall be consulted!

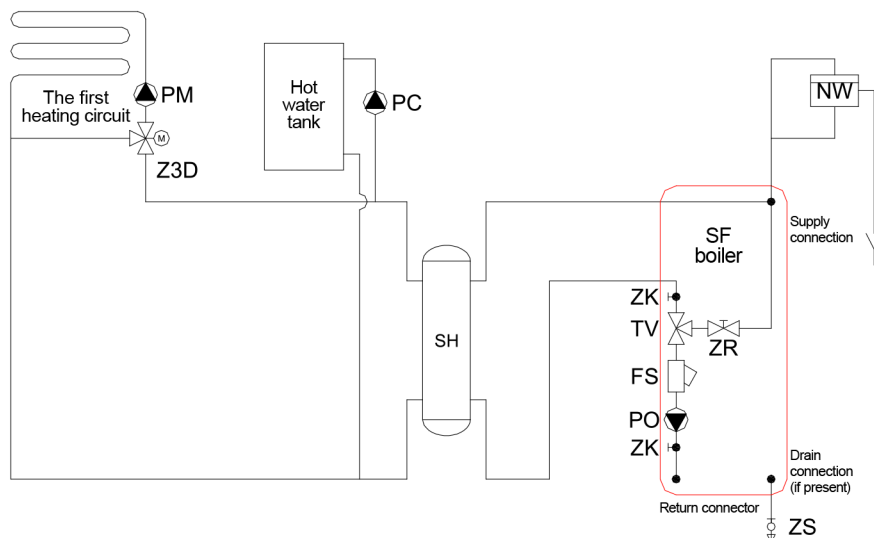


Figure No. 22 System open – heating circuit + hot water exchanger

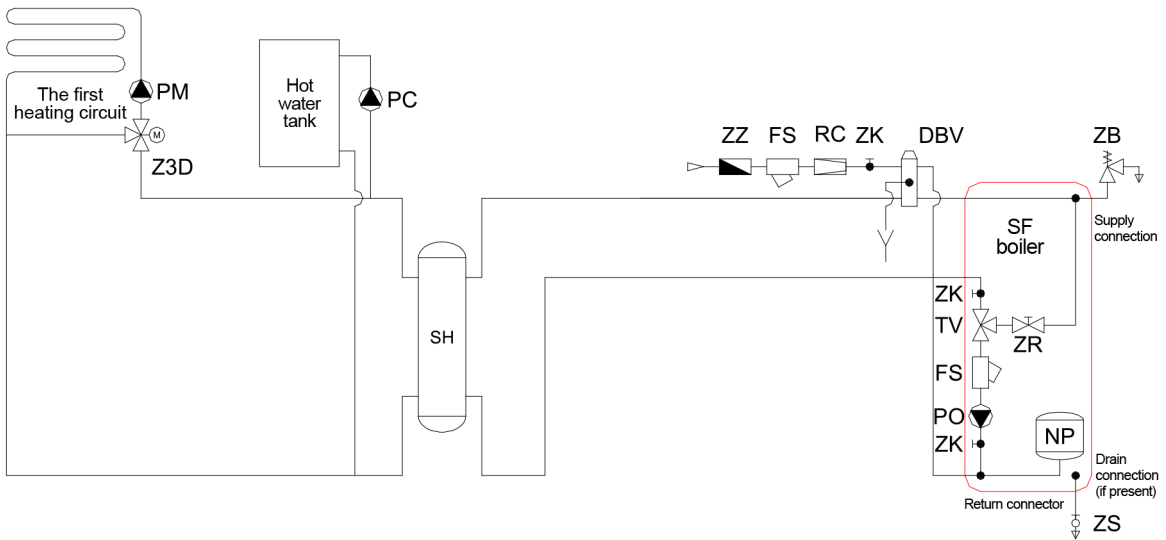


Figure No. 23 Closed system– heating circuit + hot water exchanger

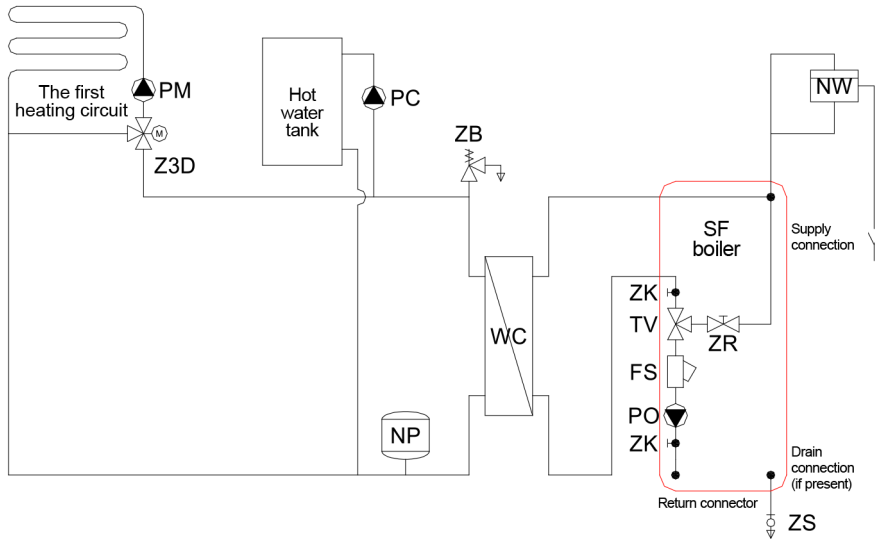


Figure No. 24 Circuit with plate heat exchanger– boiler with open system, hot water exchanger and closed type heating circuit

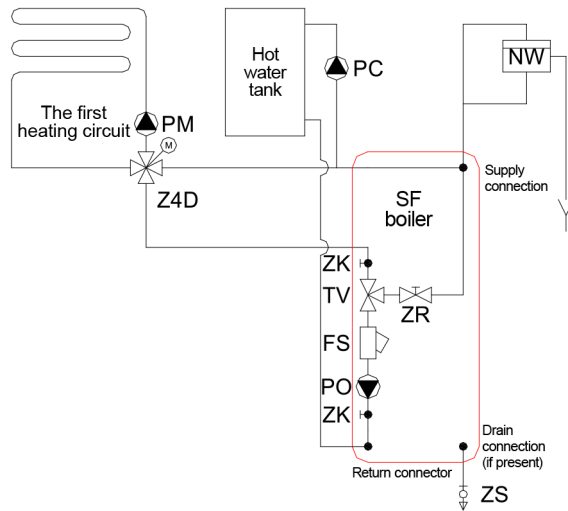


Figure No. 25 Heating circuit open + hot water exchanger connected directly to the boiler

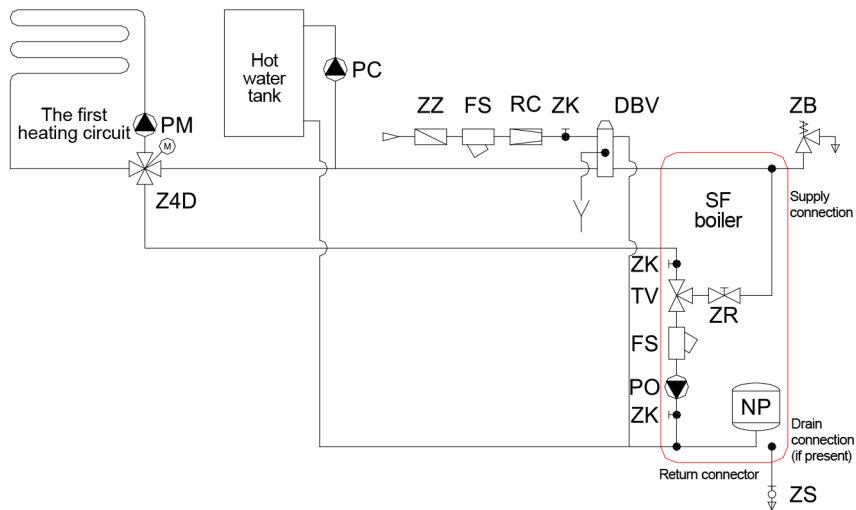


Figure No. 26 Heating circuit closed– heating circuit + hot water exchanger connected directly to the boiler

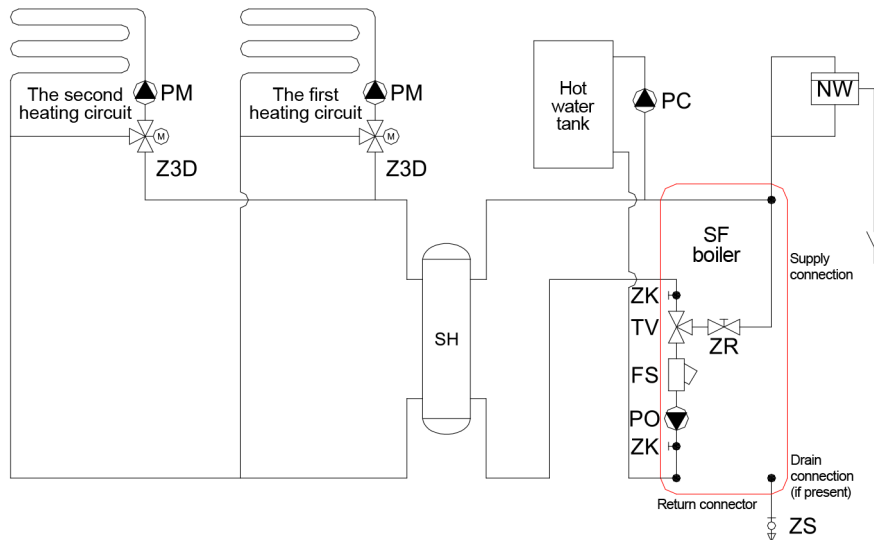


Figure No. 27 Open system– heating circuits + hot water exchanger connected directly to the boiler

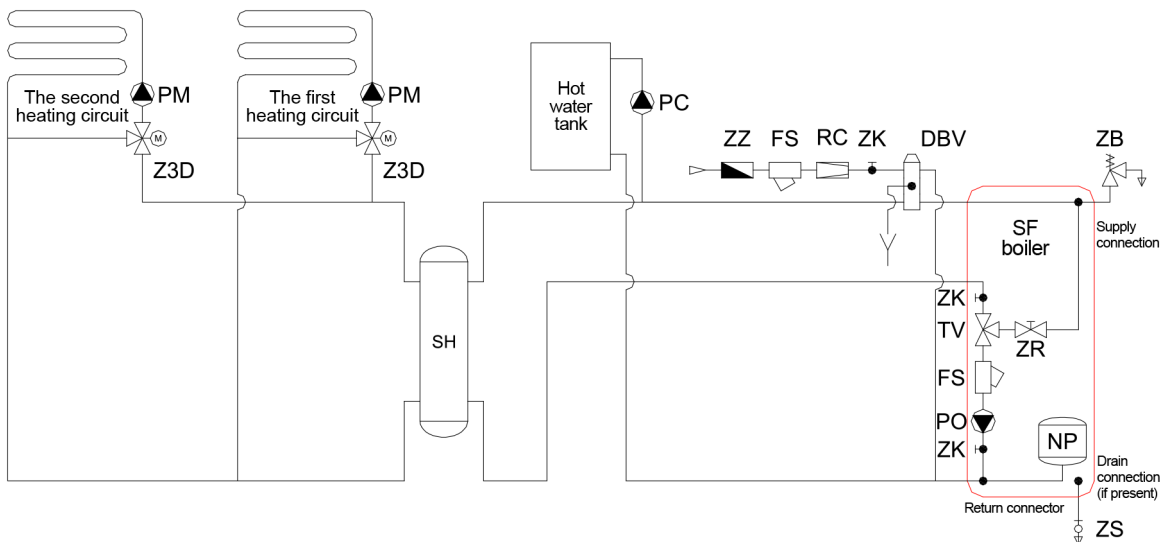


Figure No. 28 Open system– heating circuits + hot water exchanger connected directly to the boiler

The above diagrams are for reference only! Nevertheless, the hydraulic installation must be delivered according to the applicable regulations, standards and good building practice. It must ensure correct and safe operation of the heating devices. If required the installation shall undergo inspection acceptance performed by competent authorities!

9.5 Hydraulic TV Kit

Smart Fire boilers are delivered also along with Hydraulic TV Kit to be assembled by the user. The kit shall be installed to the rear wall of boiler, pursuant to list of components on Figure No. 29, No. 30 and No. 31.

Each hydraulic kit includes the following components:

- Circulating pump: DAB EVOSTA 2 40-70/180;
- Thermostatic valve LK Armatur LK820 (Product Code: 180501) Kvs = 9.0 m³/h.

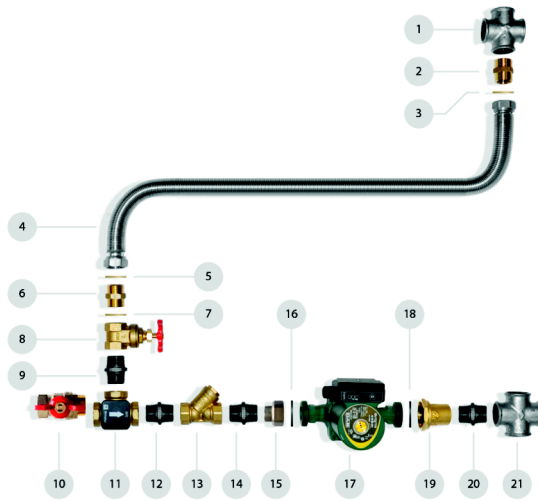


Figure No. 29 Hydraulic kit for Smart Fire SF11 boiler with 130L dispenser – SF11/130L:

1-Cross (boiler supply connector); 2- Brass nipple; 3- Hard gasket; 4- Flexible tube EMICASA; 5- Hard gasket; 6- Brass nipple; 7- Hard gasket; 8- Gate valve (orifice); 9- Nipple; 10- Ball valve (return connection); 11- Thermostatic valve TV 55°C; 12- Nipple; 13- Filter; 14- Nipple; 15 –Half union; 16- Rubber gasket; 17-Pump; 18- Rubber gasket; 19- Half union with valve; 20- Nipple; 21- Cross (boiler return connection);

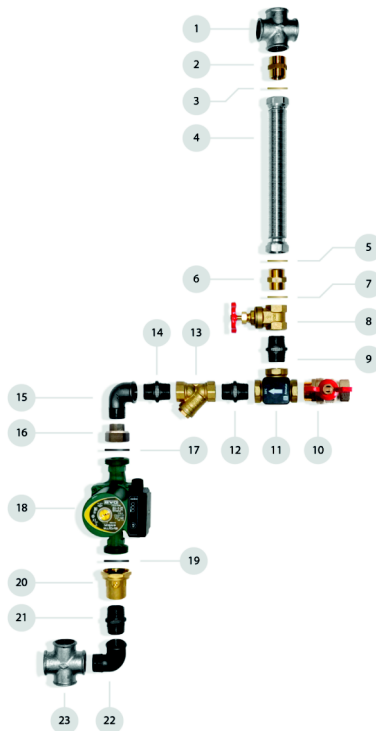


Figure No. 30 Hydraulic kit for Smart Fire SF11 and SF15 boiler:

1 ÷ 14 – Refer to Figure No. 29; 15- Elbow; 16- Half union; 17- Rubber gasket; 18- Pump; 19- Rubber gasket; 20- Half union with valve; 21- Nipple; 22- Elbow; 23- Cross (boiler return connection);

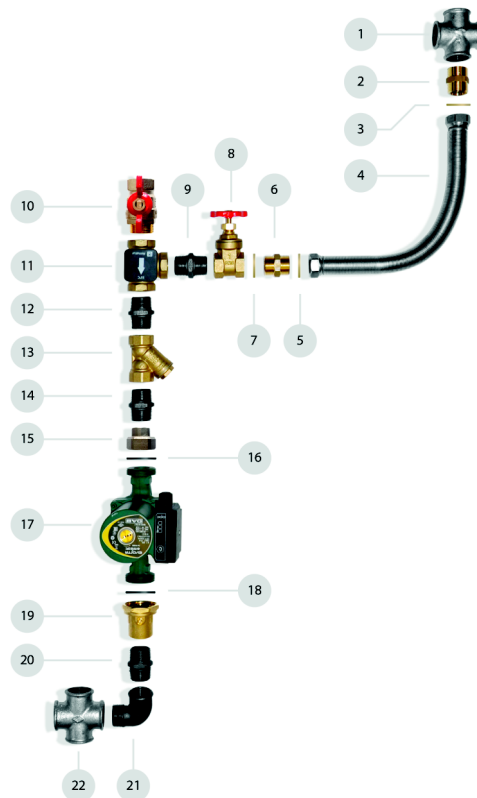


Figure No. 31 Hydraulic kit for Smart Fire SF22, SF31 and SF41 boiler:

1- Cross (boiler supply connection); 2- Brass nipple; 3- Hard gasket; 4- Flexible tube EMICASA; 5- Hard gasket; 6- Brass nipple; 7- Hard gasket; 8- Gate valve (orifice); 9- Nipple; 10- Ball valve (return connection); 11- Thermostatic valve TV 55°C; 12- Nipple; 13- Filter; 14- Nipple; 15- Half union; 16- Rubber gasket; 17- Pump; 18- Rubber gasket; 19- Half union with valve; 20- Nipple; 21- kolanko; 22- Cross (boiler return connection);

10. Service

Works related to commissioning, annual inspection and repairs shall be delivered by HKS LAZAR authorized service only.

10.1 Check before commissioning

User shall report to the boiler manufacturer readiness for commissioning within 7 days since completion of works. Commissioning (the first run) shall be performed by HKS LAZAR authorized service only. The guarantee shall only be valid, if any work in terms of commissioning were delivered by HKS LAZAR authorized service. User shall cover the costs of commissioning pursuant to HKS LAZAR pricelist. Detail data of HKS LAZAR Sp. z o.o. required for reporting readiness for commissioning is available on website, namely: www.hkslazar.pl.

If upon arrival on site authorized service does not perform commissioning due to reasons being beyond its control (installation delivered in poor manner, wrong boiler position, absence of fuel, power supply failure, etc.) the user shall be charged with costs of this commissioning and the next ones. In such case the user shall within 14 days report to the manufacturer readiness for commissioning.

To ensure safety during commissioning a precise check shall be performed of: boiler, installation and boiler room, in particular in respect of proper assembly of all boiler components, in particular those that were disassembled when carrying the boiler to the boiler room. Moreover before commissioning it is recommended to check:

- If boiler has been installed pursuant to instructions in user manual.
- If central heating system is filled with proper volume of water. Water in the heating system must be clean and must not contain many additives. Keep in mind that water may be supplied only to the cooled boiler. Otherwise the device may be damaged.
- Regarding heating system tightness.
- Regarding connection with the chimney.
- Regarding connection to the electric installation.

10.2 Commissioning

Boiler commissioning includes firing up, control and initial adjustment of boiler and boiler room parameters, as well as training for user or operator regarding operation. During the start-up pay special attention to the boiler operation to make any necessary adjustment. Always follow the controller user manual while changing the parameters. In particular note the following points

- Tightness of boiler plugs and washout holes – during the firing up check if the smoke does not escape from beneath the covers, and seal any detected leaks.
- Tightness of upper manifold cover – during the firing up remove the top housing and check if the smoke does not escape from beneath the covers, and seal any detected leaks.
- Tightness of doors – during the firing up check if the smoke does not escape around the doors, and adjust the hinges, if required.
- Tightness of dispenser – during the firing up check if the smoke does not escape from the dispenser, and seal any detected leaks.

After the firing up heat the boiler to the recommended operating temperature (minimum 750°C). When the boiler reaches the expected temperature, check boiler again regarding tightness

During the start-up training shall be provided for the user or operator regarding Inter Fire boiler and controller operation. The start-up, user training and required data should be recorded in the Guarantee.

10.3 Troubleshooting

User shall report any failure of defect to the manufacturer. Within guarantee period only HKS LAZAR authorized service or any entity acting on behalf of HKS LAZAR is entitled to make any repairs. If upon arrival on site authorized service does not make repairs due to reasons beyond its control (installation delivered in poor manner, wrong boiler position, absence of fuel, power supply failure, etc.) the user shall be charged with travel costs, according to HKS LAZAR pricelist.

Before any works related to repairs and troubleshooting, always perform the failure analysis in order to identify reasons. Note that most of reported failures are caused by incorrect parameters, incorrectly installed sensors, incorrect installation and fuel of poor quality. In case of subassembly failure, it should be removed and replaced.

10.4 Annual inspection

The annual inspection is performed by the authorized service, when called by the user. Guarantee is valid, if the annual inspection was performed by HKS LAZAR authorized service. The user covers the costs of annual inspection pursuant to HKS LAZAR pricelist.

The inspection shall be performed on regular basis during the whole period of boiler operation. The inspection must be performed maximum every 8 months and at least every 14 months.

If upon arrival on site authorized service does not perform the inspection due to reasons being beyond its control (installation delivered in poor manner, wrong boiler position, absence of fuel, power supply failure, etc.) the user shall be charged with costs of this inspection and the next ones pursuant to HKS LAZAR pricelist. In such case the user shall within 14 days report again to the manufacture readiness for annual inspection.

During inspection the boiler will be checked regarding adherence to the requirements regarding installation and operation, as well as its condition, in particular:

- sealing of doors (and dispenser flap);
- condition of burner;
- condition of ceramic lining;
- condition of thermal insulation;
- condition of screw feeder;
- auxiliary equipment (e.g. swirlers, exchanger cleaning system, ash removal system, etc.);
- correct operation of controller, fans and fuel supply system;
- check including disassembly and cleaning of exhaust fan, rotor and fan chamber;
- check regarding disassembly and cleaning of capacitive proximity switch, and settings;
- protection against the low-temperature corrosion;
- any unauthorized modifications and repairs.

During the inspection any worn elements shall be replaced and any identified defects shall be repaired. After the inspection the service engineer shall make records in the Guarantee Card along with notes regarding provided repairs and replacements.

11. Disposal

As the boiler components are made from various materials, they should be transported to the licensed waste collection centre to ensure proper disposal and recycling of steel, plastics, etc..

12. Terms and Conditions - Guarantee.

Manufacturer grants 2-year guarantee for Smart Fire boiler and 5- year guarantee regarding exchanger tightness. The territory of coverage under guarantee relates to the territory of HKS LAZAR authorized vendor. The guarantee is void in case of non-adherence to instructions included in boiler user manual, as well as applicable standards and regulations:

1. The boiler installation in the system must be performed by the qualified and licensed fitter pursuant to the instructions included in this manual. Upon completion of works related to installation, the fitter shall make relevant records in the Guarantee Card.
2. Commissioning, repairs and any other activities, not included in the user's responsibility must be performed HKS LAZAR authorized service only.

3. The repair does not include the activities obligatory for the user, namely: boiler firing up, maintenance and cleaning, setting of parameters specified in controller user manual.
4. Absence of protection preventing return of water (temperature below 550⁰C) from the installation voids the guarantee. The manufacturer recommends hydraulic unit with thermostatic valve TV.
5. The guarantee is void if:
 - No commissioning was performed (item 10.1 and 10.2) confirmed with records in the Guarantee Card;
 - No annual inspection was performed (item 10.4.) confirmed with records in the Guarantee Card;
 - Repairs and boiler alterations were provided by unauthorized persons (item 10.3);
 - User did not ensure access to the boiler for HKS LAZAR authorized service or performance of engineering evaluation regarding boiler room, heating system and hot water system.
6. The manufacturer takes no responsibility for the damages resulted from boiler operation, installation or maintenance provided contrary to this manual, as well as applicable standards and regulations.
7. The user is obliged to cover the service costs in case of:
 - unjustified call;
 - defects not covered with guarantee;
 - repairs of damages resulted from user's fault;
 - Impossible repair due to reasons beyond control of service (e.g. no fuel, no chimney draft, no electric energy, central heating system leaks);
 - If user did not ensure access to the boiler for HKS LAZAR authorized service or performance of engineering evaluation regarding boiler room, heating system and hot water system.
8. User should immediately report to service engineer any irregularity or abnormality related to boiler operation.
9. During the guarantee period the user has right to:
 - repairs delivered free of charge (except the user's activities described in the user manual);
 - replacement of the device with new one, when repair is impossible in opinion of HKS LAZAR service.
10. The guarantee does not cover the components subject to normal wear and tear during the boiler operation, namely: screw feeder parts, seals, catalyst, thermal insulation, ceramic elements, burner parts, paint coating, bearings, motoreducer cotter pins, electric motor capacitors, air supply elements.
11. The user shall provide boiler maintenance and cleaning on regular basis pursuant to provisions of this manual.
12. The guarantee does not cover any mechanical damage of boiler.
13. Manufacturer takes no responsibility for incorrect boiler output.
14. It is forbidden to check boiler tightness with compressed air.
15. Damages resulting from failure to follow this manual, in particular the terms and conditions of guarantee shall not be the subject to claims under the guarantee.
16. Manufacturer reserves the right to implement any modification related to boiler design, which are not included in this user manual.

13. Data protection clause

HKS Lazar sp. z o.o. notifies that:

1. The personal data administrator is HKS Lazar Sp. z o.o. with seat in Jastrzębie-Zdrój, at ul.Wodziszławska 15B, hereinafter referred to as the Administrator; The Administrator

- performs processing operations on personal data including: name, surname, place of residence, phone number, fax, email, device incorporation place address.
2. Your personal data is processed for performance of obligations under HKS Lazar Sp. z o.o. guarantee and warranty against defects and can be made accessible to some recipients, namely accounting office, legal office, HKS Lazar sp. z o.o authorized service, an expert in heating technology and related devices– on basis of personal data processing agreement.
 3. Personal data processing will follow on basis of your consent regarding personal data processing and provision of personal data required for conclusion and performance of agreement.
 4. Providing the personal data is voluntary, but necessary to enter into the agreement and performance of obligations arising from the guarantee or warranty for defects, complaint processing, keeping service records by the manufacturer, namely HKS Lazar Sp. z o.o. Absence of personal data prevents conclusion of the agreement regarding guarantee and performance by the manufacturer of obligations arising from the guarantee.
 5. You have the right: to access your personal data any time and the right to correct any inaccurate or incomplete information, or to remove or limit processing of data, to object to the processing of such personal data, data transfer, in particular the right to complain to a national data protection supervisory authority or revoke your consent for personal data processing.
 6. Your personal data does not subject to automated decision-making and profiling.
 7. Your personal data will be processed by the Administrator for 5 years since expiry of the guarantee and claims under guarantee or warranty for defects.

HKS LAZAR sp. z o.o.

For for Client

HKS Lazar sp. z o.o.
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tel. +48 32 472 95 78
www.hkslazar.pl

Guarantee Card and Boiler Integrity and Quality Conformation Smart Fire

(SF 11 130L / 150L / 240L / 400L / COMPACT* - * Delete as appropriate)

(SF 15 150L / 240L / 400L / COMPACT* - * Delete as appropriate)

(SF 22 150L / 240L / 400L* - * Delete as appropriate)

(SF 31 150L / 240L / 400L* - * Delete as appropriate)

(SF 41 150L / 240L / 400L* - * Delete as appropriate)

Boiler serial number Boiler output

User (name and surname)

Address (street, city, postal code)

Phone / Fax:

Boiler thermal protection *: **factory installed hydraulic unit**

*- Delete as appropriate

Parameters setup is to be performed by HKS Lazar authorized service.

HKS Lazar grants guarantee regarding completeness and equipment.

Only completed Guarantee Card is valid.

Measurement Type	Value
Chimney draft (Pa)	
Exhaust gas temperature (°C)	
Boiler room cubic volume (m ³)	
Supply ventilation size (cm ²)	

Hereby the user confirms that:

1. The device revealed no defect during commissioning performed by HKS LAZAR authorized service;
2. He was given the Installation and Operation Manual along with completed Guarantee Card and Boiler Integrity and Quality Conformation along with current HKS LAZAR pricelist;
3. Training was provided regarding boiler operation and maintenance.

Any claims related to this guarantee shall be settled by the court competent for the registered seat of HKS LAZAR.

Date of manufacture	Company stamp	Quality control (signature)
Date of installation (signature, stamp)	HKS LAZAR Service (signature, stamp)	User name, surname, address, date and signature

Annex to Guarantee Card

Records regarding delivered warranty and post-warranty repairs of Smart Fire boiler, and regular annual inspections.
Any remarks shall be included in the following table.

Date	Work Description	Authorized Service Signature and Stamp	Client Signature



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