Wood gasification boilers – Generator

DC15GS

Gasification boiler for wood.

- **Rated power 15 kW**
- **Boiler efficiency 91,2 %**
- **Emission class nr. 5 (Ecodesign)**
- **Log length 250 mm**

DC20GS

Gasification boiler for wood.

- **Rated power 20 kW**
- **Boiler efficiency 90,6 %**
- **Emission class nr. 5 (Ecodesign)**
- **Log length 330 mm**

DC25GS

Gasification boiler for wood.

- **Rated power 25 kW**
- **Boiler efficiency 90,3 %**
- **Emission class nr. 5 (Ecodesign)**
- **Log length 530 mm**

DC32GS

Gasification boiler for wood.

- **Rated power 32 kW**
- **Boiler efficiency 89,3 %**
- **Emission class nr. 5 (Ecodesign)**
- **Log length 530 mm**

DC40GS

Gasification boiler for wood.

- **Rated power 40 kW**
- **Boiler efficiency 88,8 %**
- **Emission class nr. 5 (Ecodesign)**
- **Log length 530 mm**

Wood gasification boilers – Generator

Modern Generator boilers are characterized by a unique combustion chamber, which is lined on both sides with ceramic fittings. These fittings are provided with openings in the lower part for the supply of highly preheated primary air, which ensures the gradual wood pre-drying and combustion. Between the upper combustion chamber and the lower combustion chamber, the boilers are equipped with a gasification nozzle with openings for the supply of preheated secondary air. Through this nozzle, the flames go into the lower combustion chamber with a spherical ceramic space, where all combustible substances are completely burned. The boilers are also equipped with a rear flue gas duct with a finned heat exchanger, ensuring high efficiency, and an exhaust fan to blow flue gases into the chimney. The ATMOS Generator boiler body is made as a weldment from high-quality steel sheets with a thickness of 3 to 8 mm.

Wood gasification (reverse combustion) with subsequent combustion of wood gas at temperature between 1000 and 1250 °C in a ceramic combustion chamber guarantees high-quality wood combustion with high efficiency and a minimum of harmful exhalations.

The air supply and combustion process controlled by the exhaust fan, together with simple or electronic controller according to the customer's needs, allow the boiler to heat up quickly and burn well from the ignition.

Wood boilers ATMOS Generator DC15GS, DC20GS, DC25GS, DC32GS and DC40GS with a large application space lined with ceramics for optimal combustion quality. It's a real wood gas generator.

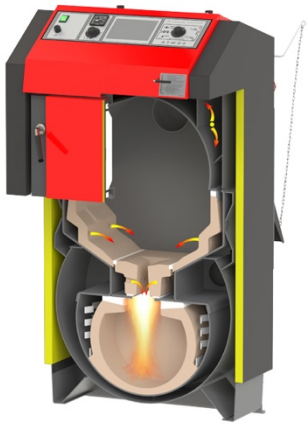
ATMOS GENERÁTOR (DC 15 GS – DC 70 GSX)

The boilers were developed based on development experience and production of wood gas generators (gasification power units for cars under the brand DOCOGEN).

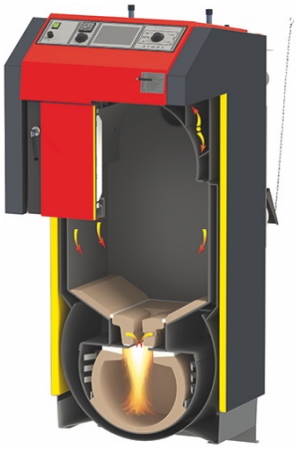
- The boilers are characterized by a special hearth for wood gasification.
- The fireplace is lined on both sides with ceramic moldings, with openings in the lower part for the supply of preheated primary air.
- The ceramic nozzle is equipped with holes in the lower part of the gasification chamber for the supply of secondary air, which is preheated to a high temperature in the rear combustion channel.
- The boiler is characterized by simple operation and easy cleaning.
- The suction fan facilitates quick heating and reduces the exhaust to the boiler room to a minimum.
- The lower combustion chamber consists of a spherical ceramic space, where clean and ecological combustion occurs at a temperature of 1100-1300 °C.
- The rear exhaust duct is equipped with primary and secondary air control, intake fan and Honeywell draft regulator. This allows the boiler to be operated even without a fan at reduced power.
- The boiler's hearth and combustion chamber are made of high-quality sheet metal with a thickness of 6 mm.
- DC 50 GSX and DC 70 GSX are without side ceramic fittings in the hopper.

Advantages of wood gasification boilers ATMOS

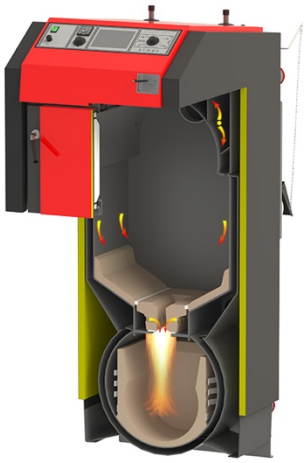
- Option to burn large pieces of wood
- Large space for wood – long burning time – up to 12 hours, depending on boiler type
- High efficiency 88,8 to 91,2 % depending on the type – primary and secondary air is preheated to a high temperature
- Ceramic loading chamber – fuel pre-drying
- Ceramic combustion chamber
- Ecological combustion – boiler according to EN 303-5:2012 class 5, EKODESIGN 2015/1189
- Exhaust fan – dust-free ash removal, smokeless boiler room
- Cooling loop against overheating – without the risk of damaging the boiler
- Automatic shutdown of the boiler after the fuel burns out – flue gas thermostat
- Convenient ash removal – large space for ash (when burning wood, clean it 1x / week)
- Boiler without tubesheet – easier cleaning
- Small size and low weight
- Possibility of choosing a door R / L (right/left) for selected types
- Possibility of connection without accumulation tank
- High Quality



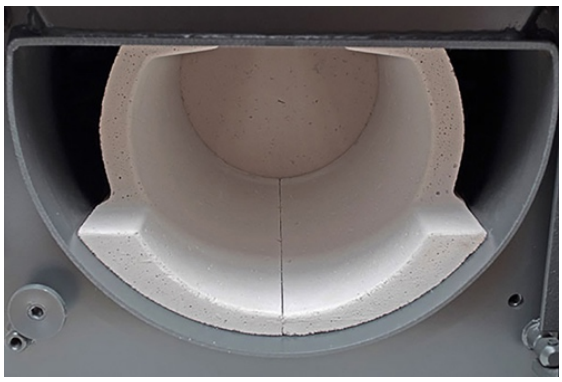
DC15GS, DC20GS, DC25GS, DC32GS, DC40GS ATMOS Generator



DC50GSX



DC70GSX



View of bottom combustion chamber

Flame in the lower combustion chamber

Exhaust fan and flue gas neck

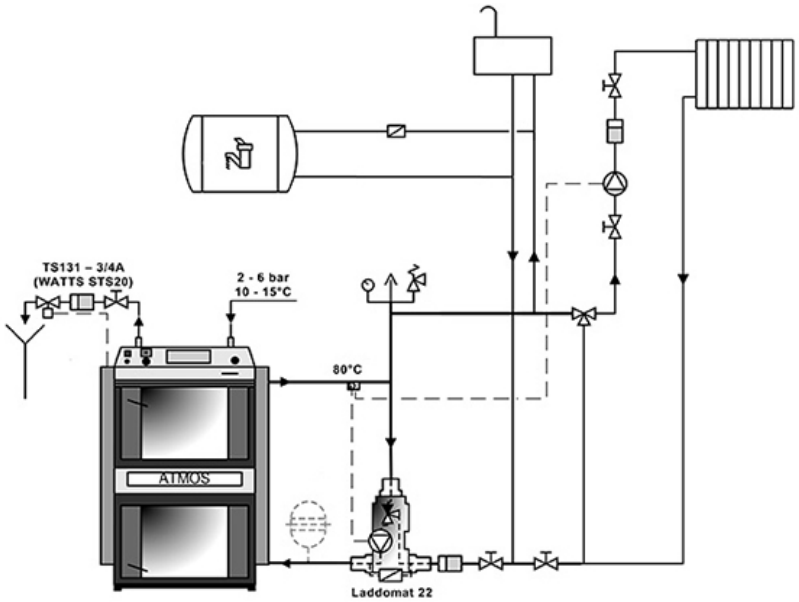
Upper cleaning lid at the rear of the boiler

Installation

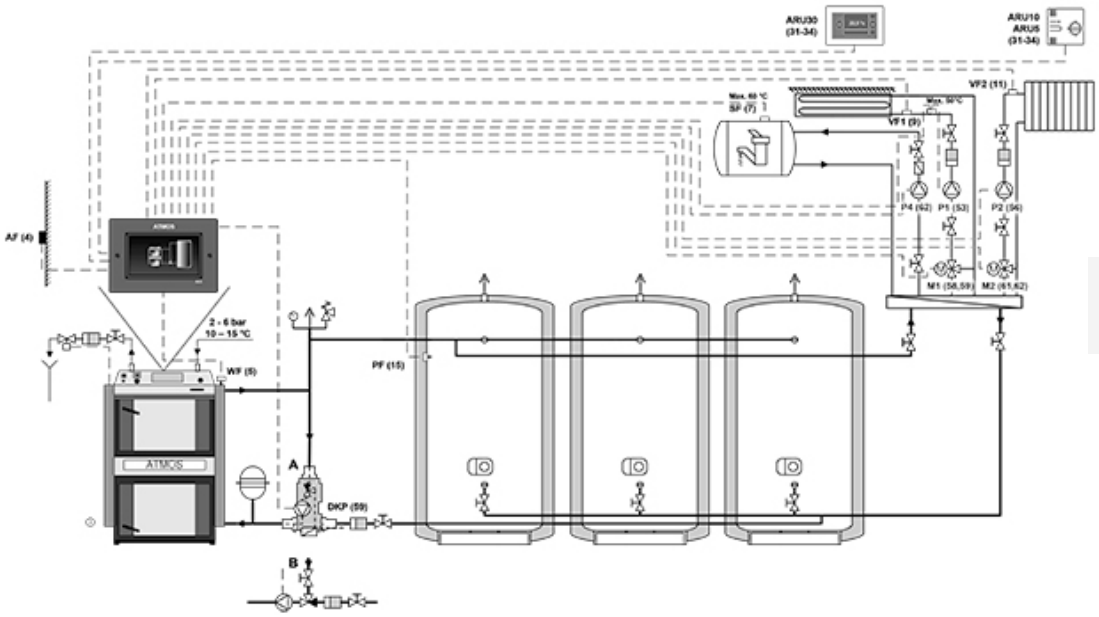
ATMOS boilers must be connected via the **LADDOMAT 22** or ESBE thermoregulation valve (three-way valve controlled by actuator in case of using electronic regulation ATMOS ACD 03/04) to achieve keeping the minimum temperature of water returning to boiler at 65 °C. We keep the outlet temperature of the boiler in the range of 80 – 90 °C and set the temperature of the water to the radiators or floor heating on the mixing three-way valve as needed (e.g. 30 – 80 °C). The default configuration of all boilers includes a cooling circuit to prevent overheating. We recommend installing a boiler with accumulation tanks, which will reduce fuel consumption and increase heating comfort.

Laddomat 22

Cooling loop against overheating and draught regulator FR124



Boiler wiring diagram with Laddomat 22 and accumulation tanks

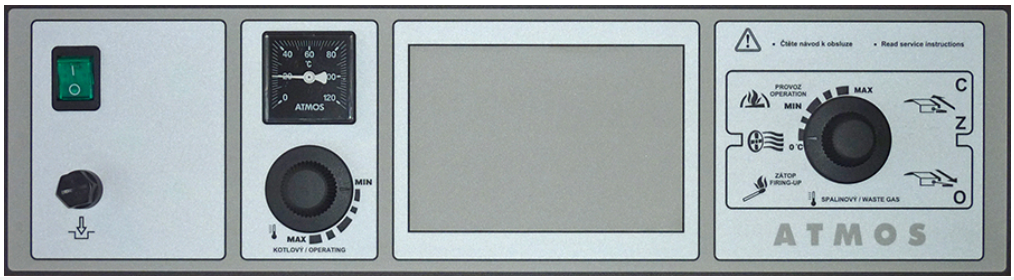


Boiler wiring diagram with ACD 03 control and storage tanks

Boilers regulation

Electromechanical regulation – boiler performance is regulated by an air regulating valve controlled by a draft regulator, FR 124 type, which automatically opens or closes the air valve according to the set water outlet temperature (80 – 90 °C). In addition to performance regulation, the draft regulator helps protect the boiler against overheating. Its advantage is a quick ignition and firing up to the required output when the air valve is fully open. The boilers are equipped with a control thermostat on the instrument panel, which controls the exhaust fan according to the set water outlet temperature (80 – 85 °C) and a flue gas thermostat, which is used to shut down the boiler and turn off the exhaust fan after the fuel has burned out. In the case of connecting a boiler with accumulation tanks, the flue gas thermostat also controls the operation of the pump in the boiler circuit.

The advantage of regulation and design of ATMOS boilers is that the boilers work with a good chimney draft up to 70 % of the nominal power even without a fan.



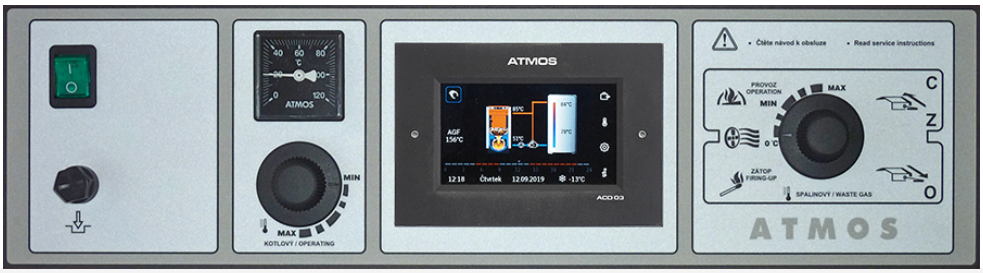
Boiler control panel with standard regulation

Panel composition:
Main off switch, safety thermostat, thermometer, regulator thermostat and combustion thermostat

Electromechanical control is the optimal solution for controlling the operation of the boiler (fan) in a simple way. The design of the panel with standard regulation is the basic design for all manufactured boilers.

Regulace ACD 03

Each boiler can be equipped with a modern touch electronic control **ATMOS ACD 03** for controlling the entire heating system depending on the outdoor temperature, room temperature and time. This regulation is able to control the boiler itself with a fan with many other functions.



Boiler control panel with equithermal regulation ATMOS ACD 03

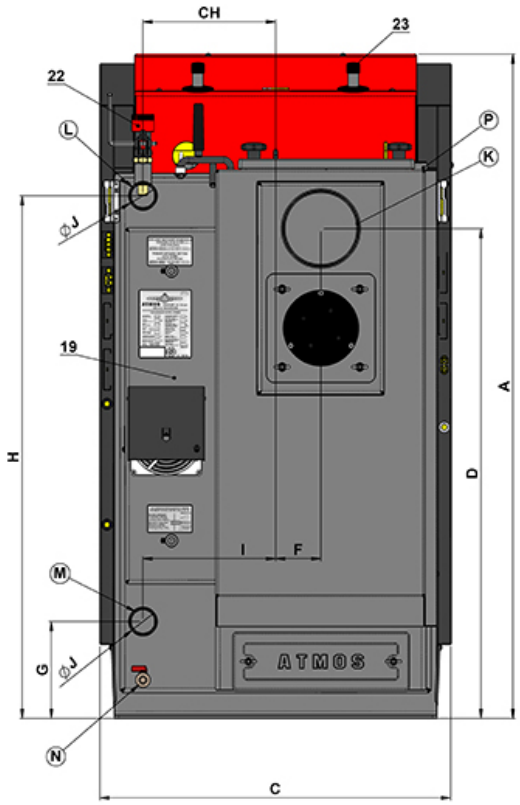
Equithermal regulation ACD 04

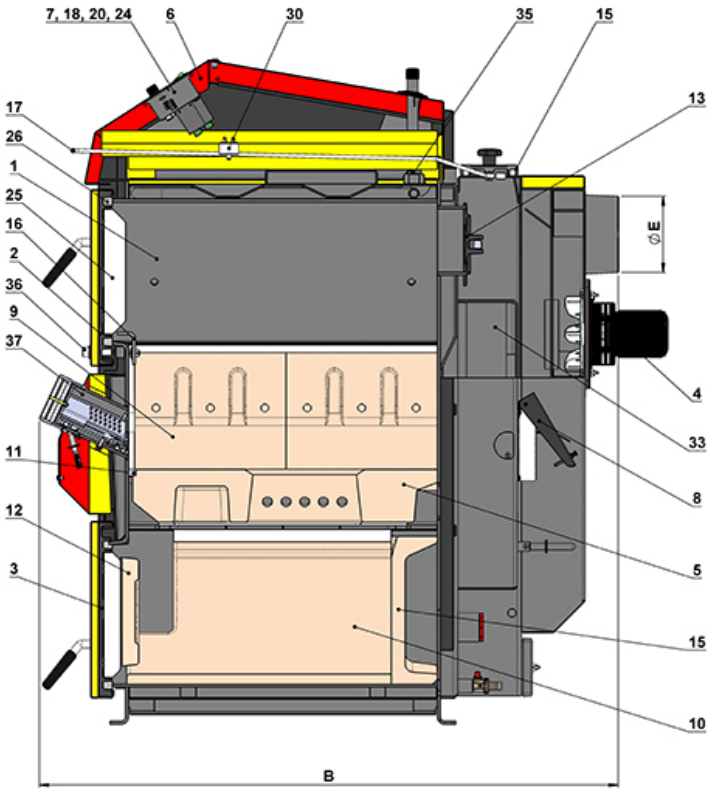
The boilers **DC25GS, DC32GS** can be ordered from the factory with built-in **ATMOS ACD 04** touch screen control.The boilers are allready equipped with all necessary sensors.This unit is designed for comfortable control of the hot water system of the heated building. The controller contains functions for direct control of the boiler, boiler circuit, three heating circuits, domestic hot water, solar, etc.

Boiler wiring diagram with Laddomat 22 and accumulation tanks

Automatic wood ignition

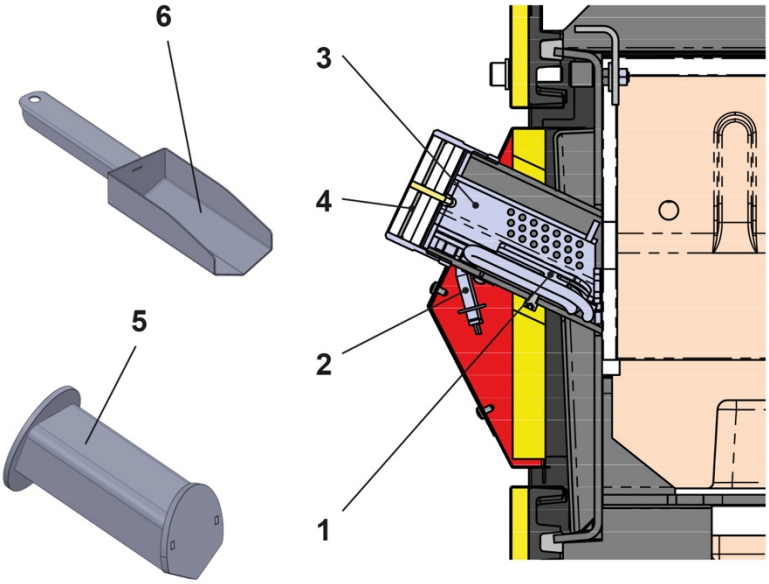
The automatic ignition of wood is used for planned ignition of the boiler, e.g. before coming home in the afternoon or before arriving at the cottage. The ignition of the fuel is very fast (approx. 5 minutes) and allows the operator to arrive “into the heat”. Fuel ignition can be set and scheduled to control ATMOS ACD 04 according to time (weekly program), according to the requirements of the heating system or according to the temperature in the accumulation tank. Automatic wood ignition is intended for the DC40GS boiler.
A device for automatic wood ignition is built in between the upper and lower doors (a chamber with a heating spiral). High-quality wood pellets are used for ignition, which are used to fill the ignition chamber. The amount of pellets corresponds to the size of the shovel that is included in the delivery of the boiler.
The pellets are ignited at the set moment using an electric heating spiral (500 W).





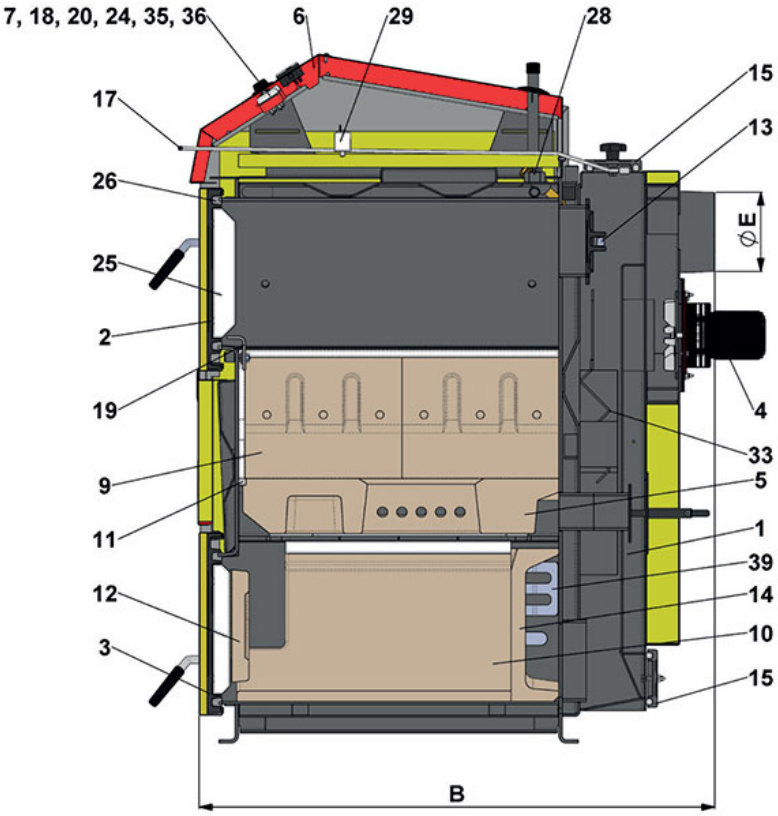
Drawings of boilers with automatic wood ignition

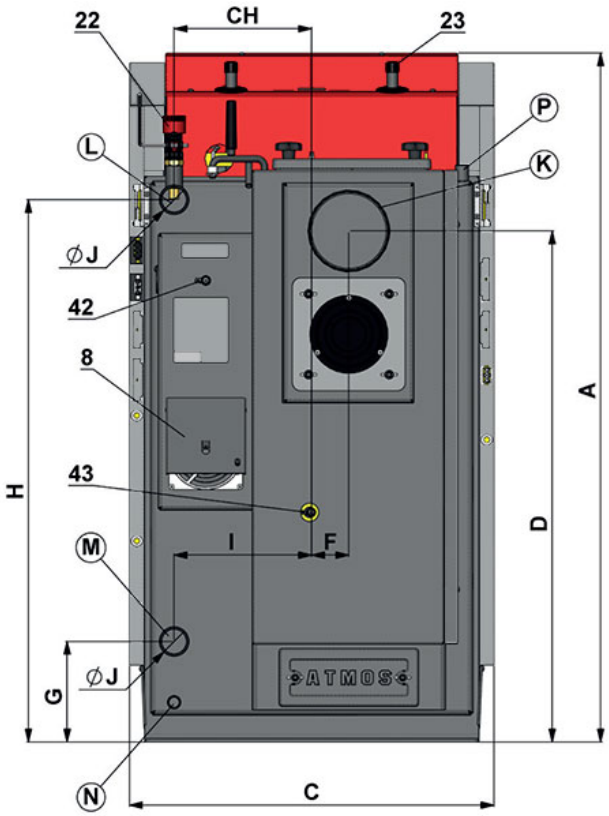
1.	Boiler body	**19.**	Intake duct – air duct
2.	Stocking door (upper)	**20.**	Main switch
3.	Ash-pan door (lower)	**22.**	Draught regulator – Honeywell FR 124
4.	Exhaust fan	**23.**	Cooling loop protecting against overheating
5.	Heatproof shaped piece – nozzle	**24.**	ATMOS ACD 04 controller
6.	Control panel	**25.**	Door filling – Sibral small – thick for upper door small – thin for lower door
7.	Safety thermostat	**26.**	Door sealing – cord 18 x 18
8.	Regulating flap	**30.**	Capacitor for exhaust fan – 1μF
9.	Heat proof shaped piece – for type GD – combustion area side)	**33.**	Tube heat exchanger (tubular)
10.	Heat proof shaped piece – for type GD – spherical space	**35.**	Pocket for thermostats (sensors)
11.	Sealing – nozzle – 12 x 12 (14 x 14)	**36.**	Locking screw
12.	Heatproof shaped piece – half moon	**37.**	Ignition device
13.	Ignition valve		
14.	Heat proof shaped piece – for type GD – rear face of spherical space	**K**	flue gas duct neck
15.	Cleaning lid	**L**	water outlet from
16.	Frame shield	**M**	boiler – water inlet to
17.	Ignition valve pulling rod	**N**	boiler – filling valve
18.	Fuse T6,3A/1500 – type H	**P**	pipe sleeve – sleeve for cooling loop control valve sensor (TS 131, STS 20)



Drawing of the ignition device	
1.	Ignition spiral plate
2.	Ignition spiral
3.	Removable ignition chamber
4.	Screw lid (always tightened during operation)
5.	Removable blanking chamber
6.	Pellet filling scoop

Technical information





Description of the boiler drawing			
1.	Boiler body	**22.**	Draught regulator – HONEYWELL FR124
2.	Filling door – upper	**23.**	Cooling loop protecting against overheating
3.	Ashtray door – lower	**24.**	Fan control thermostat (boiler)
4.	Exhaust fan (S)	**25.**	Door panel – Sibral
5.	Heat-resistant fitting – nozzle	**26.**	Door seal – cord 18 x 18
6.	Control panel	**29.**	Capacitor for exhaust fan – 1μF
7.	Safety thermostat	**33.**	Flue gas brake (DC32GS, DC40GS)
8.	Control flap	**35.**	Waste gas thermostat
9.	Heat-resistant fitting – side of the combustion chamber	**36.**	Safety thermostat (Caution – when overheating push on)
10.	Heat-resistant fitting – spherical space L + R	**39.**	Air braker along spherical space
11.	Nozzle seal	**42.**	Primary air regulation
12.	Heat-resistant fitting – half-moon	**43.**	Secondary air regulation
13.	Firing up valve		
14.	Heat-resistant fitting – rear part of spherical space		
15.	Cleaning lid	**K**	– the flue-gas duct neck
17.	Fire valve stem	**L**	– the boiler water outlet
18.	Thermometer	**M**	– the boiler water inlet
19.	Frame screen	**N**	– filling valve pipe sleeve
20.	Switch with an indicator light	**P**	– sleeve for a sensor of the valve which regulates the cooling loop

Boiler dimensions (mm)							
	DC15GS	DC20GS	DC25GS	DC32GS	DC40GS	DC50GSX	DC70GSX
A	1280	1280	1280	1280	1434	1563	1686
B	670	758	959	959	959	1042	1268
C	678	678	678	678	678	678	678
D	950	950	950	950	1099	997	1086
E	150 (152)	150 (152)	150 (152)	150 (152)	150 (152)	150 (152)	180
F	69	69	69	69	69	70	58
G	185	185	185	185	185	184	184
H	1008	1008	1008	1008	1152	1287	1407
CH	256	256	256	256	256	256	256
I	256	256	256	256	256	256	256
J	6/4″	6/4″	6/4″	6/4″	2″	2″	2″

Specification		Boiler type						
		DC15 GS	DC20 GS	DC25 GS	DC32 GS	DC40 GS	DC50 GSX	DC70 GSX
Boiler heat output	kW	15	20	25	32	40	49	70
Boiler thermal input	kW	16,4	21,9	27,4	35,1	45,0	53,8	77,5
Heating surface	m^2	1,8	2	2,7	2,9	3,2	3,5	4,3
Fuel shaft volume	dm^3 (l)	66	80	120	125	160	210	280
Filling hole dimensions	mm	450 x 260	450 x 260	450 x 260	450 x 260	450 x 260	450 x 310	450 x 310
Prescripted chimney draft	Pa/mbar	16/0,16	20/0,20	23/0,23	25/0,25	25/0,25	25/0,25	26/0,26
Max. working water overpressure	kPa/bar	250/2,5	250/2,5	250/2,5	250/2,5	250/2,5	250/2,5	250/2,5
Boiler weight	kg	302	343	431	436	485	538	690
Gas-outlet pipe diameter	mm	150/152	150/152	150/152	150/152	150/152	150/152	180
Ingress protection of electric parts	IP	20	20	20	20	20	20	20
Electrical power input (auxiliary)	W	50	50	50	50	50	50	50
Electrical input in standby **mode**	W	0	0	0	0	0	0	0
Ignition mode		manual						
Efficiency over the entire performance range	%	91,2	90,6	90,3	89,3	88,8	90,6	90,3
Boiler class		5	5	5	5	5	5	5
Boiler category		1						
Operating mode		non-condensing						
Energy efficiency class		A+	A+	A+	A+	A+	A+	A+
Waste gas temperature at nominal output	°C	134	166	158	171	250	165	161

Waste gas combustion products flow weight at nominal output	kg/s	0,010	0,012	0,015	0,018	0,022	0,025	0,034
Specified fuel (preffered)		Dry wood with a calorific value of 15 – 17 MJ/kg^{-1}, water content 12 – 20 %, diameter 80 – 120 mm						
Average fuel consumption for the heating season	kg.h^{-1}	4,1	5,5	6,8	8,6	10	13	18
Prescribed wood length	mm	250	330	530	530	530	530	730
Combustion time at nominal output	Hours	2	2	3	2	3	3	3
The volume of water in the boiler	l	56	64	80	80	90	120	170
Boiler hydraulic loss	mbar	0,20	0,22	0,22	0,23	0,22	0,23	0,22
Minimum buffer tank volume	l	500	500	500	500	500	500	750
Connecting voltage	V/Hz				230/50			
Minimum return water temperature during operation					65 °C			
EKODESIGN								