

NBE PELLETS SYSTEM

V7 & V10



EN303-5 2012 Class 5
approved by DTI.
Approved for expansion vessel.
Energy class AA.

Manufacturer:
NBE Production A/S
Brinken 6-10 Øster Vrå
Denmark
www.nbe.dk



CONTENT LIST :

Dear Customer.

Thank you for your choosing NBE. This product is designed and manufactured to the highest standards in the EU. In order for you to get the most out of your product, we strongly recommend that you carefully read this manual prior to installation and operation. In the event that you encounter any difficulties during installation or operation, we recommend that you first refer to this manual or the information provided in the support section found at www.nbe.dk.

Note: Help text on all menu items is displayed in the controller and is therefore not described here in this manual. It is recommended to study the menus prior to initial start.

Save this manual, so you always have it available when needed.

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Comments on the Manual



Never handle the auger, blower, nor crawl in the hopper when the system is powered. There will be no warning prior to the activation of these components. The boiler must not be operated without the shield on the burner.



The system is provided with an electrical current of 230V/50Hz. An improper installation or improper repair can cause life-threatening electrical shock. Electrical connections must be performed by the person who has the right skills and training. Performance of electrical installation must be carried out in COMPLIANCE with the relevant rules. Always disconnect the system from the electrical supply prior to starting maintenance work or servicing. The system must be connected to a separate electrical circuit, which is equipped with the proper circuit breaker and earth leakage breaker.



The boiler must be mounted to a functioning chimney. In the event that you smell smoke or see any other indication of improper draft of the chimney, all operation of your system must cease immediately and must remain so until a solution to the draft problem has been resolved. Continuing operation may result in death or injury.



Always read the manual before system installation or repair. If in doubt, seek professional help.



Open top covers etc. with extreme caution. When the boiler is in operation, there is a risk of high temperature surrounding the top covers, which can result in injury. Avoid handling the boiler while it is in operation. Never open the ash tray while the boiler is in operation.



The system may be operated by skilled people. If you are in doubt as to the safe operational use of the boiler, contact your dealer.

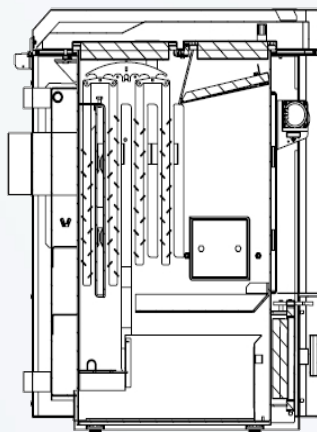
The menu structure etc. for the controller is supported by the help texts found in the control box itself. Due to constant updates and new features, the menu structure of the controller will not be described here in this manual. Instead, it is recommended to browse the controller thoroughly prior to use and to receive an overview of all functions, etc. by your installer.

This manual must be kept at the boiler!

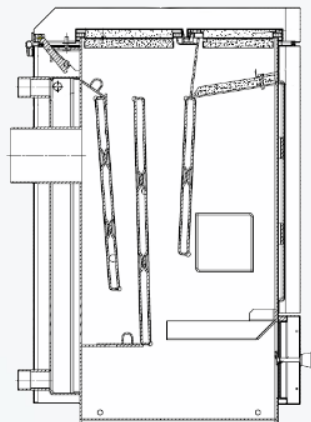
Boiler Specifications

Black Star	BS1016	BS1016	BS2030	BS4050
Height mm:	1017	1017	1017	1130
Width mm:	450	450	550	663
Depth mm:	715	715	778	883
Chimney mm:	130	130	150	150
Outlet:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Inlet:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Filling:	1/2 "	1/2 "	1/2 "	1/2 "
Efficiency:	93,3%	93,4%	94,7%	91,4%
EN Class:	5	5	5	5
Output:	10kW	14kW	24 kW	48kW
300-ELAB-	1683	1700	1765	1859

Black Star	BS20	BS30	BS30	BS40
Height mm:	980	980	980	1084
Width mm:	430	530	530	628
Depth mm:	630	693	693	795
Chimney mm:	130	150	150	150
Outlet:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Inlet:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Filling:	1/2 "	1/2 "	1/2 "	1/2 "
Efficiency:	91,7%	93,0%	92,0%	92,5%
EN Class	3	3	3	3
Output:	10 kW	16 kW	30 kW	40 kW
300-ELAB-	1398	1400	1407	1497



BS1016

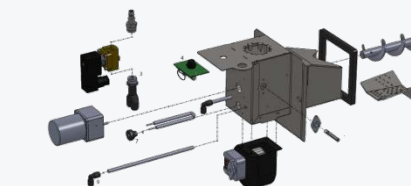


BS20

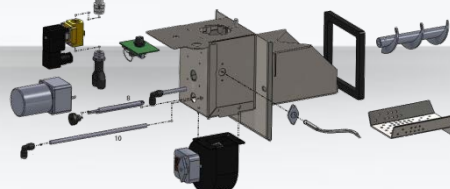
Burner Specifications

10 kW burner:

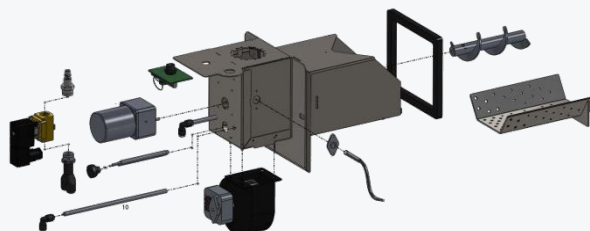
Up to 60kg/day
40 watt/hour
Weight 10kg

**16-24kW burner:**

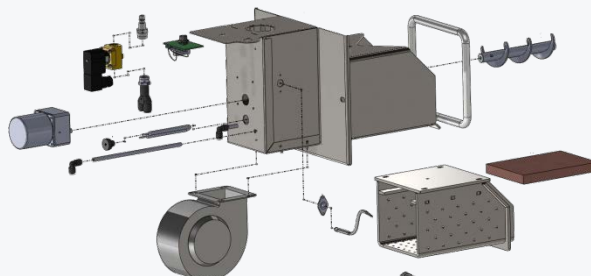
Up to 110kg/day
60 watt/hour
Weight 12kg

**30kW burner:**

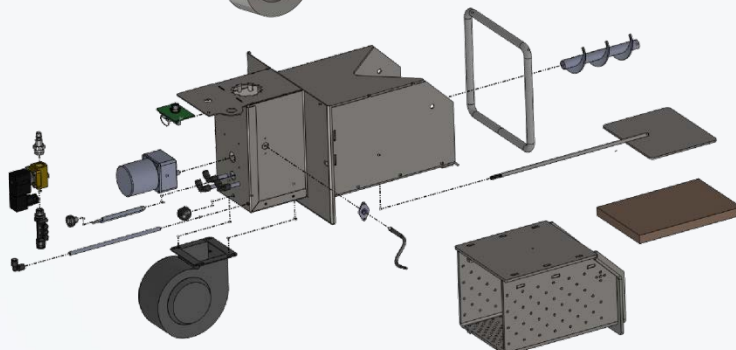
Up to 150kg/day
80 watt/hour
Weight 15kg

**40-60kW burner:**

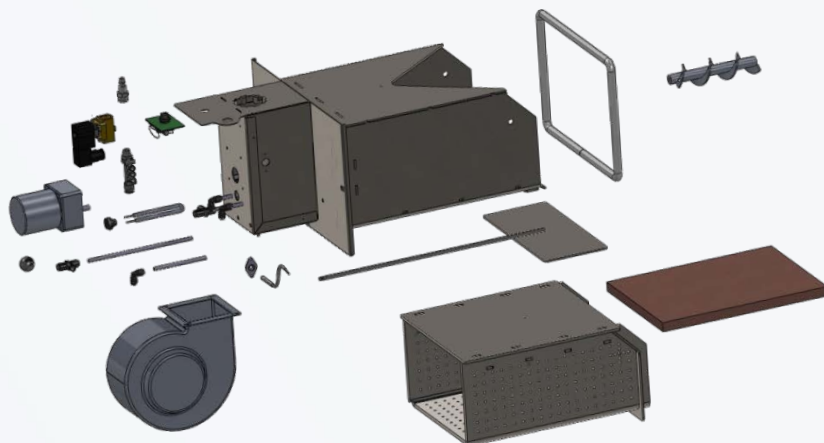
Up to 300kg/day
150 watt/hour
Weight 30kg

**80-120kW burner:**

Up to 600kg/day
200 watt/hour
Weight 40kg

**150-200kW burner:**

Up to 1000kg/day
250 watt/hour
Weight 60kg



Boiler Room Design

The boiler room for biomass boilers must be performed in accordance with the Danish Institute of Fire "Fire Standard No. 32" BTV32. In addition, you must comply with the rules set forth by your local building codes, environmental authorities, and labor inspectorate. If you are in doubt on how to set up your boiler room, we recommend that you contact your local chimney sweeper for guidance.

1. Wall and Ceiling
2. Distance to the Wall
3. Floor
4. Area and Lighting
5. Chimney
6. Air
7. Water Faucet
8. Fuel
9. Prohibited Liquids and Materials in Boiler Room.
10. Permit, Notification and Inspection.



1. Wall and Ceiling

Ceiling surfaces must be constructed with at least Class 1 surface material.

If the ceiling surface happens to be the underside of the roof, the material must be made of non-combustible materials. Wall surfaces must be constructed of at least a Class 2 surface material.

2. Distance to the Wall

Distance from the boiler or flue pipe to any combustible material should be large enough of a distance to prevent temperatures from reaching an excess of 80°C . This requirement applies even if the combustible material is covered with non-flammable material. If the distance is greater than 500 mm, the distance requirement is typically satisfied.

3. Floor

Floors should consist of (or be covered with) non-combustible material under and around the boiler of a distance of at least 300 mm from the boiler sides, and 500 mm from the boiler's front (i.e. the side where the ash is removed).

4. Area and Lighting

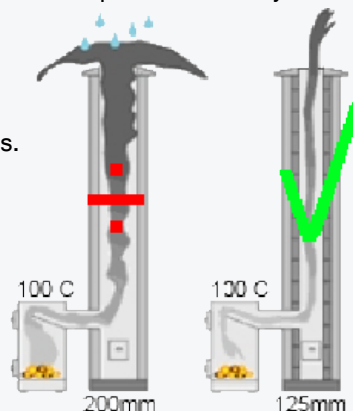
The boiler room and area around the heating system must be large enough to allow for easy operation, cleaning, and maintenance of the heating system and boiler room.

There must be adequate lighting so that supervision and maintenance can be performed safely.

5. Chimney

The chimney must be of a design, aperture area, and height that provides adequate draft conditions and sufficient exiting of flue gasses.

The chimney draft is created by negative pressure resulting from the buoyancy of the hot smoke rising up through the chimney. If there is not enough draft in the chimney, the smoke will not properly rise and will instead seep out through small cracks. This can result in toxic smoke seeping into the house.



Boiler Room Design

The size of the chimney opening must match the amount of flue gases the chimney has to lead away. If the opening in the chimney is too small, this will prevent the smoke from exiting fast enough due to the large resistance in the chimney. This could cause the smoke to turn back; thus allowing for toxic fumes to enter into the house. Simultaneously, the pellet fuel may not be completely burned, due to the lack of oxygen for combustion. This can cause traces of soot to sit in the chimney and create what is called shining soot, which increases the risk of chimney fire.

The chimney opening must also not be too large since cold air can enter the chimney from the top. When the chimney becomes cooled, condensation can occur and develop soot inside the chimney. Soot is mostly a cosmetic problem, because it can penetrate through the chimney and cause ugly brown splotches to appear on the walls inside the house.

In addition, it is important that the chimney protrudes high enough above the roof so the smoke does not bother the surrounding houses. Environmental authorities have the possibility of prosecuting you if there are neighbors that complain about the smoke or odor.

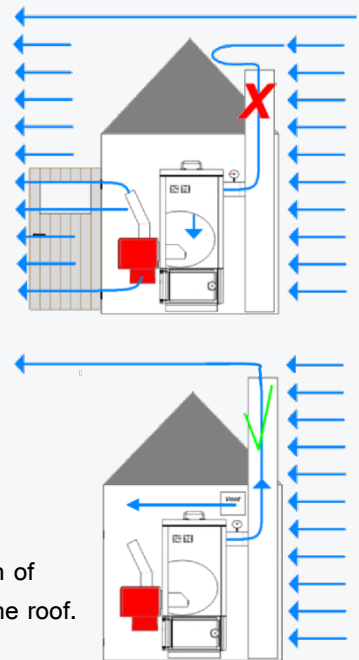
What signs are there, if the chimney is not working?

- Light sensor is sooty or melted.
- Smoke in the hopper.
- Warm drop shaft.
- Smoke billows out of the fan or boiler during startup.

If you have any problems with your chimney, it is a good idea to keep a "diary" of any draft problem; as draft problems are often associated with wind in certain directions.

Wind blowing on one side of the house can cause under pressure on the other side of the house.

Overpressure and under pressure will try to balance out-even through a chimney if possible. It is a good idea to ask your chimney sweeper about the size of the chimney and flues, the location of chimney cleaning doors, and whether it is required to have steps on the roof. He will also perform a fire prevention inspection.



6. Air.

The pellet boiler should be supplied with enough air for combustion. This can be achieved if the pellet boiler is installed in a room which is equipped with a sliding window with an adjustment bracket, an adjustable air vent from the outside, or by providing the combustion chamber with air through a duct from the outside. The area size of the fresh air valve should generally be the same as the internal diameter of the chimney. It should also be mounted on the same side as the chimney to compensate for any pressure differences.

Note: that drum dryers, range hoods, oil burner in the same room, all use high pressure blowers, that steal the air in the room!

7. Water tap.

There must be a tap in the boiler room. If the boiler output is less than 60 kW, a powder extinguisher (at least 5 kg) will suffice.



8. Wood Pellets

The pellets must consist of pure wood, 6-8 mm Max 8% water.

Materials with glue, paint, wood paint or plastics must not be burned.

If the fuel storage is greater than 0.75 m³, the boiler system and fuel storage must be located in a separate fire cell with at least one BD30 door to the other room.

If the fuel storage or hopper is placed in the open or under a shelter, there may be minimum distance to the building that should be observed. Exposed fuel may not be in the boiler room, except logs.

Do not exceed 4.75 m³ fuel in the boiler room, including fuel storage and usage storage.

9. Prohibited liquids and materials in boiler room

The boiler room must be kept clean and contain no combustible materials nor flammable liquids (except oil for oil burners).

The floor must be kept free of spilled fuel, dust and combustible waste as well as waste from other activities in the room. Any burning embers must be extinguished with water and transported to a secure storage location in the open.



10. Permit, notification and inspection

Building permit:

You must obtain a building permit if the burner is situated in a building that is part of the Building Regulations 1995 (commercial buildings); though not for animals and farm buildings.

Notification:

The heating system must be reported to the local council and registered with the chimney sweep.

Inspection:

The chimney sweeper will regularly supervise your biofuel boiler.

If the chimney sweeper becomes aware of any illegality under the rules for fireplaces and chimneys in the building code, he may notify the local council if the owner does not change the illegal conduct.

Insurance:

You must notify your insurance company about your biomass system.

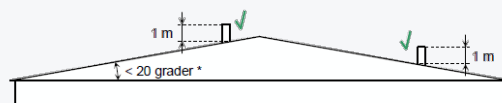


Requirements for Chimney Heights.

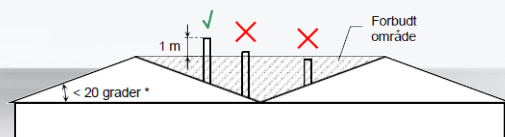
Statutory air pollution requirements for solid fuel boilers up to 1MW.
(Only applicable for newly-built chimneys.)

Buildings with a roof slope that is less than 20 degrees.

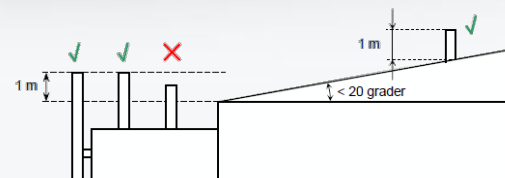
Roofs with a slope of less than 20 degrees is counted as flat.



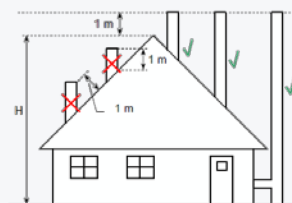
Buildings with a double roof and roof slope that is less than 20 degrees.



Buildings with a roof slope that is less than 20 degrees and is adjacent to another building.

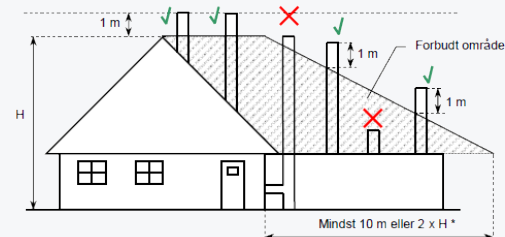


Buildings with a slope greater than 20 degrees.



Buildings with a slope greater than 20 degrees and has an adjacent building with a flat roof.

* Highest value selected.

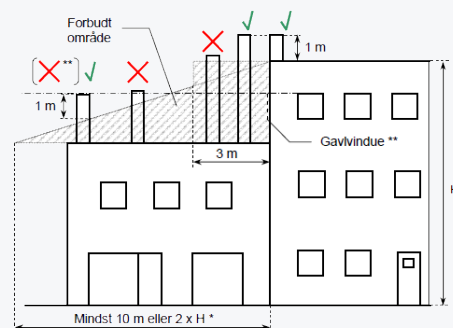


* Højeste værdi vælges

Property block or industrial building with an adjacent building.

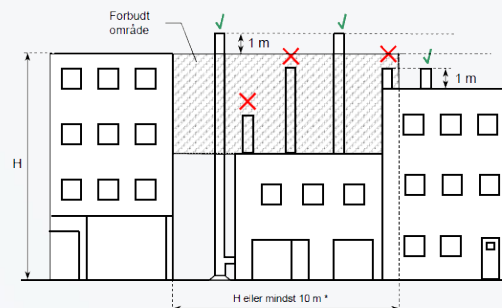
* Highest value selected.

** At gable windows, the chimney must be at least 1 m above the gable window's upper corner.



Property block or industrial building with two adjacent buildings.

* Highest value selected.



* Højeste værdi vælges

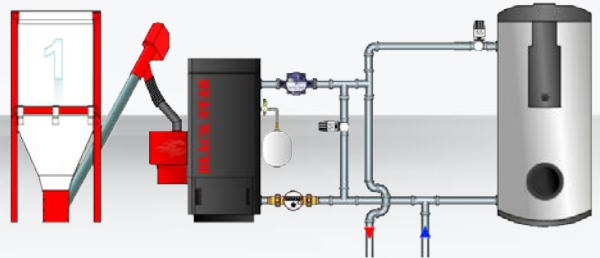
Installation of the Boiler.

A correctly executed installation ensures that the system functions properly.
Both national/local guidelines and requirements must always be observed.

The boiler can be installed on a pressurized system up to max 2.5 bar.

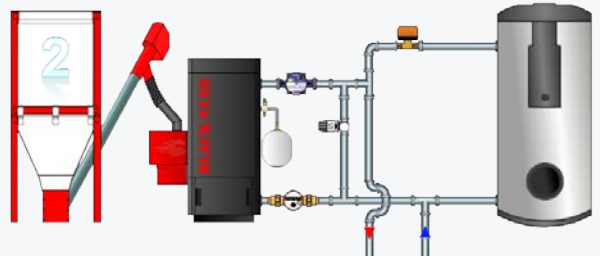
1. Standard.

DHW with mechanical flow control.



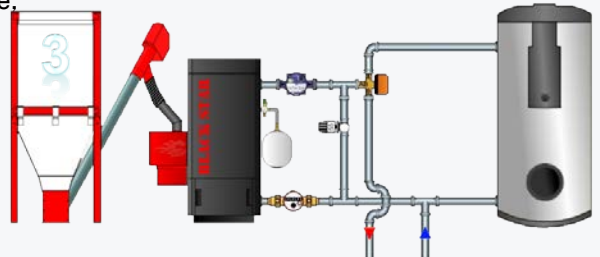
2. DHW with 2 way valve.

- Typically used when DHW is small or when the surface coil is small.
- Heat for the house is supplied while hot water is being produced.



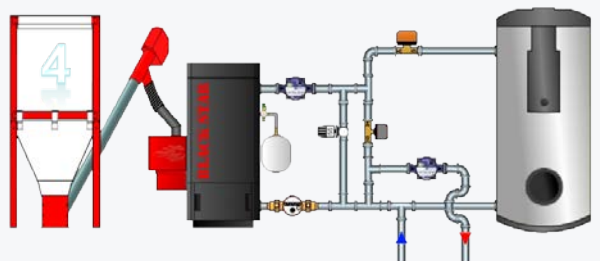
3. DHW with 3 way valve.

- Typically used when the water heater is large, and when the surface coil is large
- The house is not supplied with heat while producing hot water. The house must therefore be able to manage without heat for short periods during the winter.



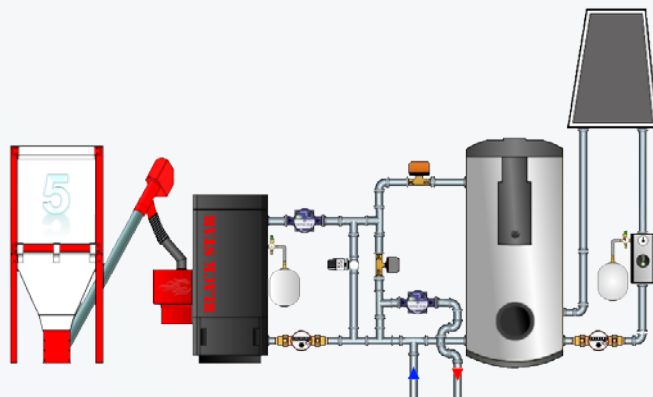
4. Weather compensation.

- Allows you to have a high temperature on the boiler.
- Manage the supply temperature to the house in relationship to the outside temperature and chill factor.



5. Weather compensation and solar heating

Do not go down on equipment ☺



Installation of the Boiler.

General Guidelines:

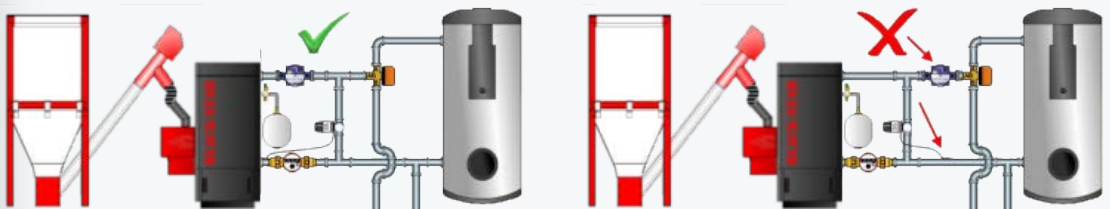
1. The boiler should only be installed by qualified installers with ***"Certificate for installation and service of small biofuel plant"*** and must be installed according to AT guidance on technical equipment - B.4.8 (Applicable in DK)
2. The boiler must **not** be installed on combustible surfaces.
3. Un-insulated smoke pipe must **not** exceed 0.30 m long, and must be provided with an access door.
4. Chimney draft should be a **min.** 5 PA. and be stable. Overpressure must **not** occur. It is always recommended to install a draft stabilizer.
5. The boiler must be installed with an approved mixing valve, and the return must be at min. 55 degrees C otherwise there can not be sustained guarantee on the boiler.



Draft stabilizer



Approved mixing valve

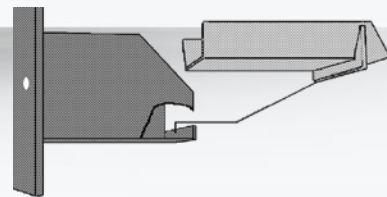


Installation of the burner.

General Guidelines:

Installing the burner on the boiler:

1. Check that the burner is not damaged during transport.
2. Check that the burning grate is inserted correctly in the burner (see image right).
3. Mount the burner and tighten the burner with the 2 wing nuts supplied. Never use locknuts, as the seal between the boiler and the burner can leak over time.
4. Make sure that the burner is horizontal and that all connections are tight.
5. Mount the shield and the connector on the burner.
6. Install electricity for safety cut-off thermostat according to the wiring diagram.

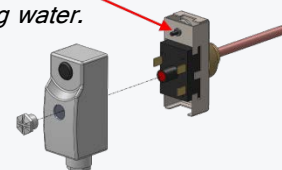


SAFETY THERMOSTAT MUST ALWAYS BE FUNCTION TESTED!

The thermostat can be tested by using an electric kettle. The thermostat must switch off when the temp. feeler is dipped into boiling water.

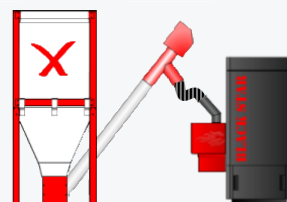
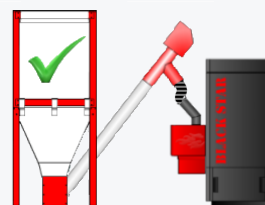
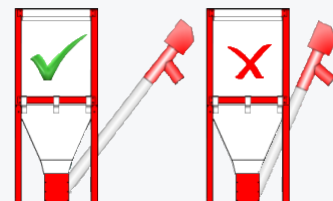
If necessary, adjust the switch-off temperature lower by turning the screw inward.

Reset the thermostat by pressing hard on the red button!



External auger:

7. Install the auger output over the burner.
8. Auger should be at an angle between 0 and 50 degrees.
9. The flexible hose should be angled enough as to allow for the free passage of the wood pellets to the burner without getting stuck in the PVC hose.

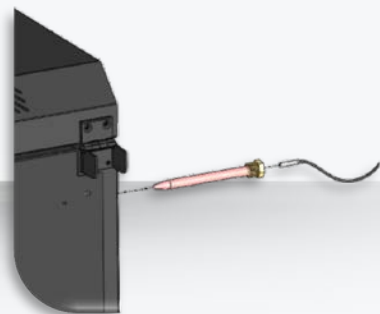


Installation of the Burner.

Temperature sensor on the boiler:

Mount the sensor within a sufficiently long thermo well.

Use a fastening strip or similar to prevent accidental slippage.

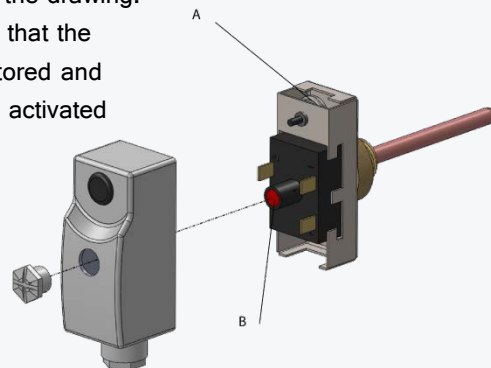
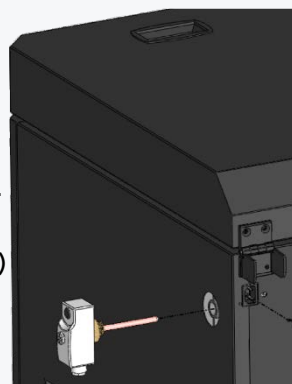


Safety thermostat:

Mount on either the left or right side of the boiler as displayed in image.

Note: Functional testing of the high limit safety thermostat is required before starting up the boiler.

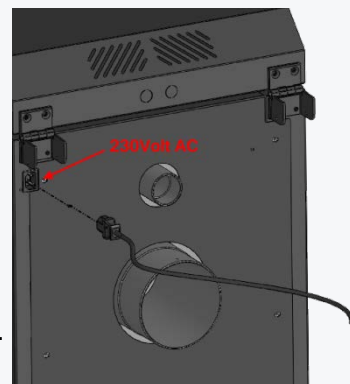
To test, press moderately on the disc (shown in A) in the direction towards the temperature feeler. A small "click" will occur, signaling that the connection between C and C2 is interrupted and that the high limit safety thermostat is triggered. To re-activate the thermostat, press hard on the red button marked (B) in the drawing. You will also hear a "click", signaling that the connection between C, and C2 is restored and that the high limit safety thermostat is activated and ready for use.



Semi cleaning on BS1016, BS2030 and BS4050:

The boiler cleaning system must be connected with 230V AC through the socket located on the back of the boiler.

In the control box, make a connection to output (L5-L10). The cleaning system will run every time the burner conducts a blower cleaning sequence, ie. typically 5 sec. every 10 min. These settings can be configured under the Cleaning menu in the controller.



Wood Pellet Hopper:

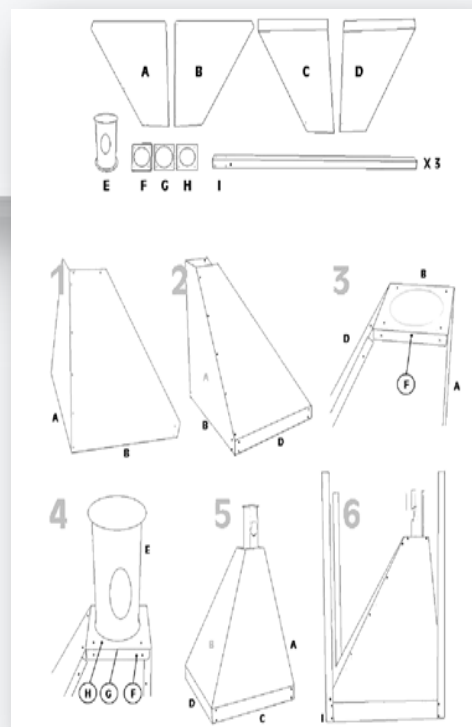
There are several hopper solutions, Examples include a steel hopper, fabric hopper and mini hopper; which is built together with the boiler.

All hoppers can be extended for bulk storage/feeding via the vacuum transport.

Steel Hopper:

Available in 4 different models

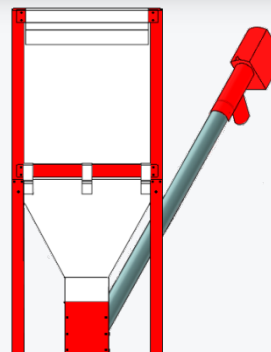
60x60cm	= 200L = 140 kg
80x80cm	= 320L = 220kg
80x140cm ext.	= 500L = 350kg
100x100cm	= 500L = 350kg



Fabric hopper:

Available in 3 different models.
with gate over the auger inlet.

60x60cm	= 300L = 210 kg
80x80cm	= 400L = 280kg
100x100cm	= 500L = 350kg



Mini hopper, built together with boiler:

Available in 3 different models:
Can be mounted to the right or side of the boiler.

BS1016 mini,	150 kg
BS2030 mini,	200kg
BS4050 mini,	250kg

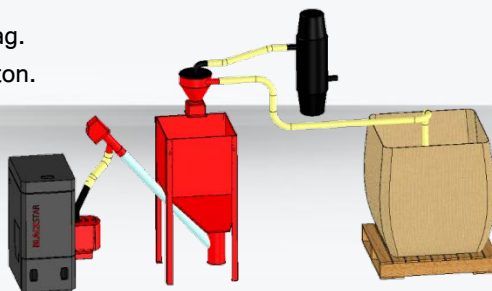


Vacuum Transport

The Vacuum System for wood pellets makes it easy to customize various delivery forms for your system. Here are a few examples of ways to configure your vacuum transport.

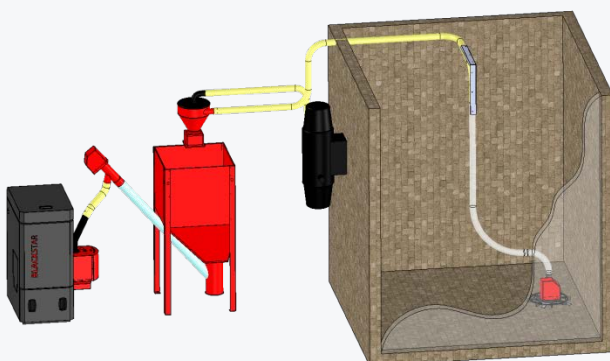
Big bag

Throw the mole in the bag.
Easy way to transport 1 ton.



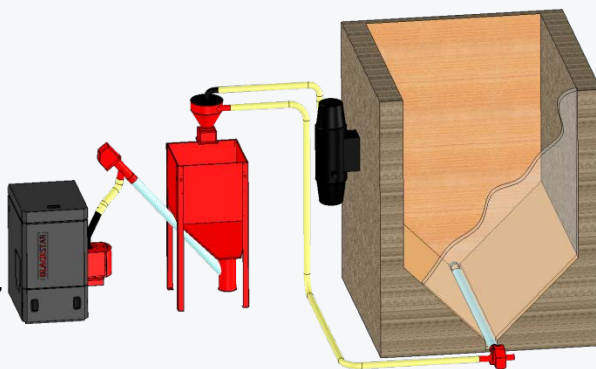
Flat bottom hopper:

Is a top-fed option that maximizes space by minimizing ceiling height requirements.



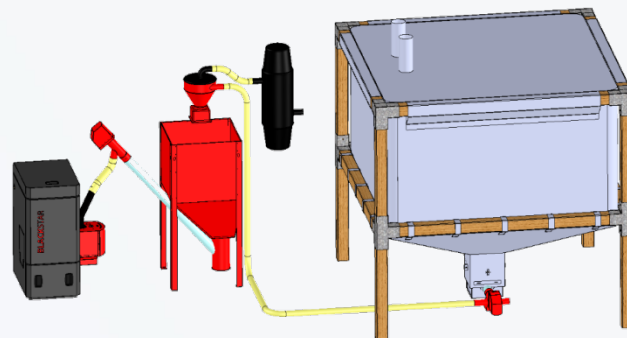
V bottom hopper:

Transports pellets via a bottom auger.
Is a stable and secure way to transport pellets, but requires more headroom.



Fabric hopper:

An inexpensive bulk hopper solution.



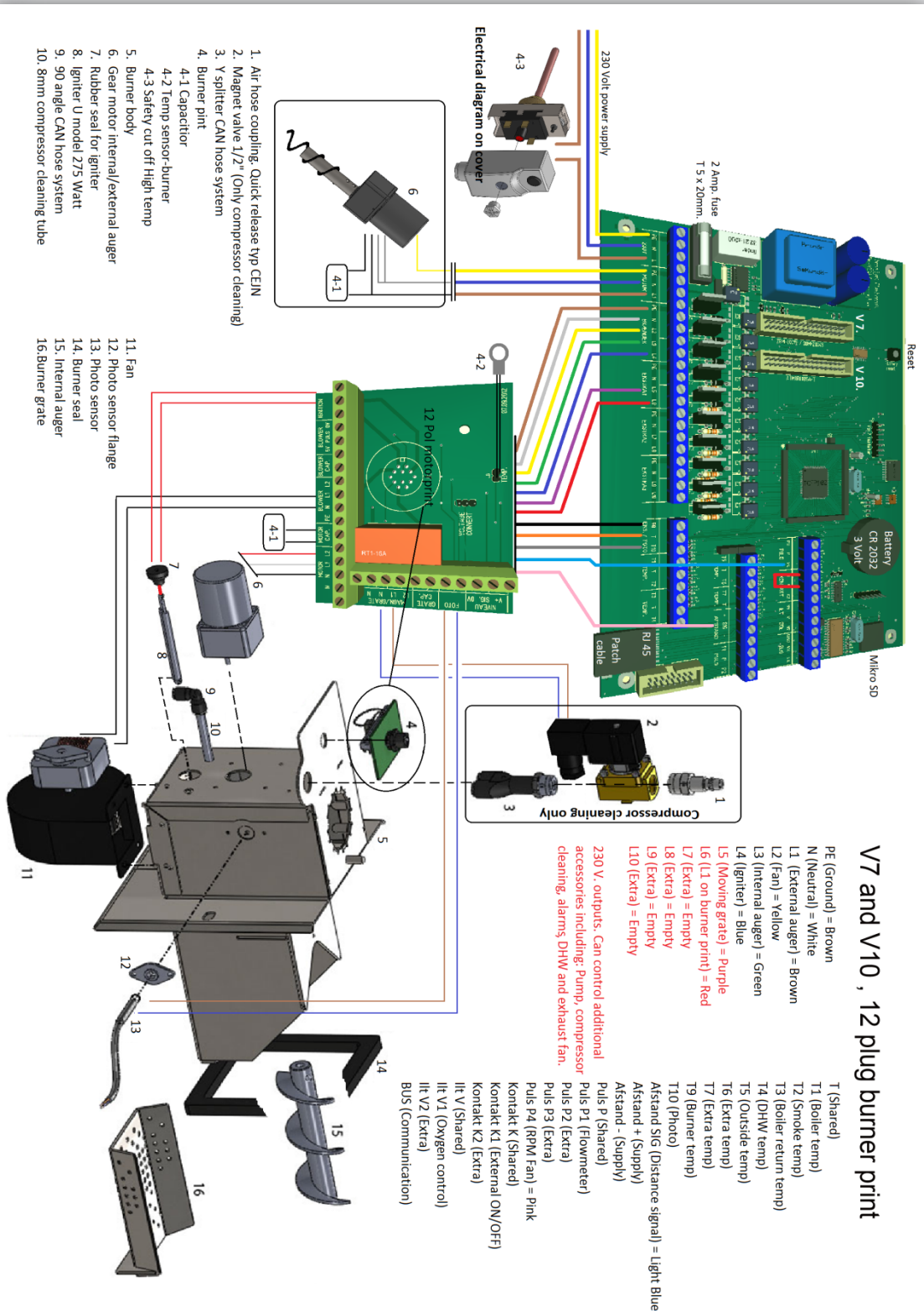
Wiring Diagram.

There may be factory installed wiring on the outputs L5-L10.

L5 may be factory fitted for the moving grate.

L6 may be factory fitted for the compressor cleaning.

Remove these if there is a need for other equipment on the outputs.



Electrical Connection Diagram:

Overview of connectivity.

	IN	OUT	
230	PE-N-L		230Volt AC
SAFETY THERMOSTAT	L-L		Safety thermostat cutoff
MOTOR		PE-N-L1	External auger
BRÆNDER		PE-N-L2	Fan
BRÆNDER		PE-N-L3	Internal auger
BRÆNDER		PE-N-L4	Ignition
EKSTRA 1		PE-N-L5	Circulation pump, can be set to other equipment.
EKSTRA 1		PE-N-L6	Compressor cleaning, can be set to other equipment.
EKSTRA 2		PE-N-L7	Optional output for equipment.
EKSTRA 2		PE-N-L8	Optional output for equipment.
EKSTRA 3		PE-N-L9	Optional output for equipment.
EKSTRA 3		PE-N-L10	Optional output for equipment.
BUS	GRD, TX, RX,		Expansion module
ILT	V1, V, V2		O2 controller
KONTAKT	K-K1		External ON/OFF
KONTAKT	K-K2		Free
PULS	P-P1		Flow meter system
PULS	P-P2		Flow meter solar heating
PULS	P-P3		Free
PULS	P-P4		Fan RPM
AFSTAND	-, SIG, +		Distance sensor for hopper
LAN	RJ45		Internet connection
TEMP.	T- T1		Boiler temperature
TEMP.	T – T2		Smoke temperature
TEMP.	T – T3		Boiler return temperature
TEMP.	T – T4		DHW temperature
TEMP.	T – T5		External temperature
TEMP.	T – T6		Free
TEMP.	T – T7		Free
EKS / FOTO	T – T9		Temperature sensor burner
EKS / FOTO	T-T10		Photo sensor burner

Optional Equipment:

The controller supports the following equipment.
Aids in performing adjustments, cleaning, and knowledge.



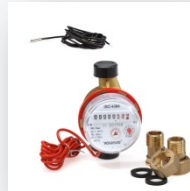
Smoke Temp. Sensor:
Reads the current smoke temperature in the display.



External Temp. Sensor:
Stops burner through an external temperature sensor.



O₂ Control Kit:
Regulates the amount of oxygen in the flue gas. Regulates the quantity of wood pellet and air according to the desired O₂%.



Flow Sensor Kit:
Reads the system flow in the display and calculates the current power consumption for the house.



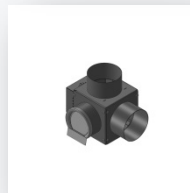
Hot Water Priority Kit:
Produces hot water only when it is needed. Closes hot water tank, when the house is heated. Kits available with either 2 or 3 way motorized valve.



Distance Sensor for Hopper:
Monitors the pellet level in a hopper and reports it in the controller.



Compressor Cleaning System: Cleans the burner head efficiently with high pressure. With this kit you need to use your own compressor.



Exhaust Fan:
Need greater chimney draft? The fan's RPM can be synched with the burner's power output. Can be connected to the burner controller.



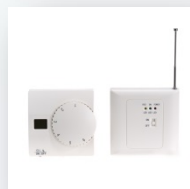
Compressor Cleaning L:
Cleans the burner head efficiently with high pressure. "Low noise" compressor included.



Weather Compensation:
Maintains a high boiler temperature while adjusting the house inlet temperature in relation to the outdoor temperature.



Solar Heating
Use the pellet burner controller to run your solar system.



Wireless thermostat:
Stops the pellet burner with thermostat. Gives a smooth transition to summer time.

Internet Connection.

The web-based controller can be updated automatically from the Internet.
Operating data can also be uploaded to www.stokercloud.dk

How to get the controller on the web:

- Connect the controller to your router through an RJ45 cable. Since this is a direct cable connection no passwords, etc. is required.

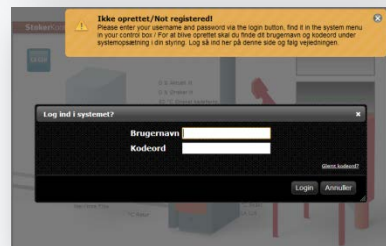
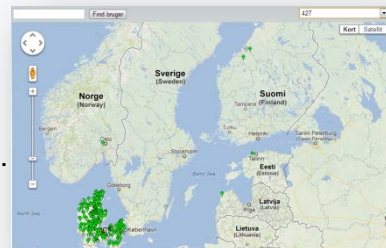
Once connected, a small icon will appear on the screen indicating that the controller is online.

If you do not have the possibility of a direct cable connection, these adapters picture on right, can be used.

They can establish a connection to your router through your household power cables. This provides an easy PLUG and PLAY solution.
- Find your control number and password under the "system" in the controller.
- Go to www.stokercloud.dk and find your controller in the drop-down at the top of the page.

Or type your control number in the search box.
- LOG IN, and follow the instructions.
- Enter your personal information.

New user name and new password.



Styring serienummer	964
Styring kodeord	*****
Nyt StokerCloud kodeord	*****
Nyt StokerCloud kodeord (gentag)	*****
Ønsket brugernavn	jens ✓
Navn	Jens Jensen
Adresse	Smalbyvej
Postnummer	9999
By	Smalby
Land	Danmark
Email-adr	jens.jensen@mail.dk
Sprog	Dansk
Tidszone GMT	1 - Danmark, Amsterda
<input checked="" type="checkbox"/> Jeg accepterer Vilkår og betingelser for brug af StokerCloud	
<input type="button" value="Aktiver"/>	

6. Specify where you live, displayed on www.stokercloud.dk,
If you don't want others to see your exact location, move the needle a little.

Once your configuration are saved you will now have your own page, with your own burner dashboard.

After a short period of time you should see data streaming from the burner.

Do you want data on your mobile phone? Then download our App for the following devices:



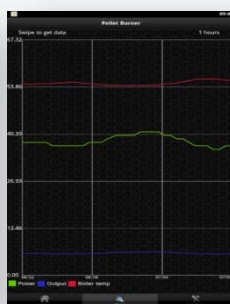
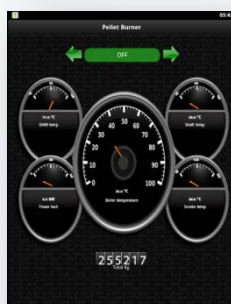
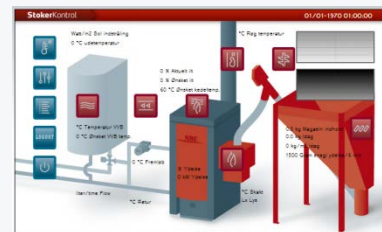
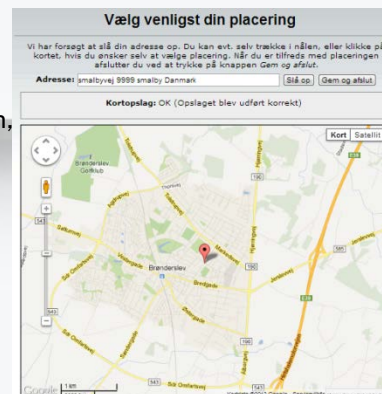
Android Play for android mobile phone.
Search "StokerKontrol"



iTunes for iPhone mobile phone.
Search "StokerKontrol"



WindowsPhone for Windows Mobile phone.
Search "StokerKontrol"



Cloud Service:

If your burner is online via our website www.stokercloud.dk we can help you keep an eye on your system. If something unexpected happens, such as too many ignitions, unstable operation, improper PI regulation etc.. then we have the opportunity to help you ONLINE.



How it works:

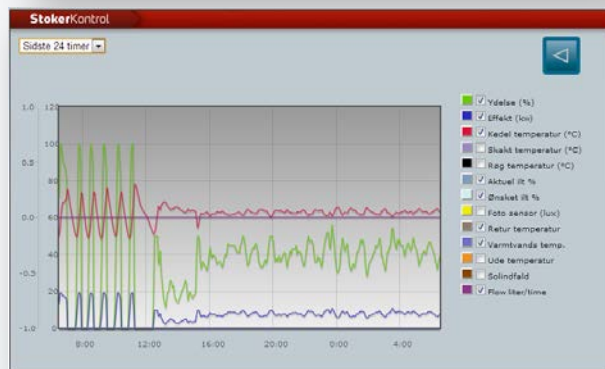
- NBE observes abnormalities on your graphs.
- You will be contacted by E-mail, where we ask your permission to make changes.
- NBE will assess your graphs and the burner reaction pattern, and make adjustments based on the observations.
- You can always see the changes in your LOG.



- After adjusting, it should look like this ...

NBE's Cloud Service ensures:

- Fewest possible number of electrical ignitions.
- Best possible PI regulation.
- An optimized system for your house.
- Lower wood pellet consumption.
- Security in everyday life.
- The latest updates to the controller.



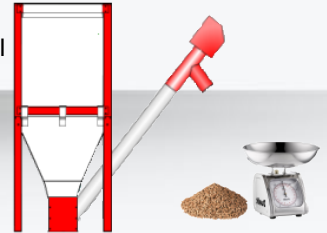
First Time Start-up:

Once the system is assembled, filled with water, and power is connected to the system a few basic adjustments to the burner is required.

1. Fill the auger with pellets by force starting the auger either through the controller or directly via a 230V connection.

2. When the auger appears full, run for an additional 15 min. to ensure correct weighing later.

3. Activate the 6 min. test run in the controller and collect the dispensed pellets with a plastic bag.



4. Using a kitchen scale, weigh the pellets from the test run and enter the amount into the controller under **"Auto calculation"** Repeat again after 7 days!

5. Adjust minimum output as low as possible, typically 10% of the burner's rated output (i.e. if 20kW, set to 2.00kW). If the chimney draft is high, adjust the minimum output up until you have a stable flame at 10% power.

6. Once the burner is activated an ignition will be made.

After approx. 20 minutes the burner will reach a nominal output (100%). If necessary lock the burner output at 100%. Now you can perform an evaluation as to whether the fan is providing suitable supply of air to the flame. If necessary, adjust in the fan menu.



The flame at 100% should fill the entire width of the grate, have redish spikes, and reach the opposite wall.

7. Lock the burner to 50% power. Wait 5 minutes for the flame to stabilize. Again, assess fan performance in relation to the flame.



The flame at 50% should be approx. 10 cm out of the burner and is yellowish in color.

8. Lock the burner to 10% power. Wait 5 minutes for the flame to stabilize. Assess fan performance in relationship to the flame.



The flame at 10% should be small and short.

The photo sensor reading may fluctuate, however it should not have a 0 LUX reading for a period >10 sec. If the chimney draft is too high, increase the minimum effect of the burner to increase flame size.

Cleaning the Burner/Boiler:

Cleaning should be carried out regularly and/or as needed.

There is a big difference in the frequency of maintenance required from system to system. The setup, adjustment, and wood pellet quality play an important role on how frequent maintenance should be performed.

The table is only a suggestion and applies only to the BS1016, BS2030 and BS4050 boilers!

When needed	7 Days	14 days	30 days	1/2 annually	1 annually	
x	x	x	x			Cleaning cinders out of burner head.
			x			Cleaning under the combustion grate for dust and cinders.
				x		Cleaning photo sensor from soot and dust.
				x	x	Cleaning burner fan from dust.
x				x		Cleaning boilers, flues, and take semi cleaning out.
				x	x	Emptying the last smoke channel for ashes.
x			x	x		Empty the ash pan, typically after 1,000-2,000 kg pellets.
x					x	Check gaskets / replace worn gaskets.
x						Adjusting the burner. (weighing the pellets)
x	x	x				Filling the hopper.
				x	x	Emptying the hopper, dust and fines removed.
					x	Chimney sweeper.

Turn off the burner in connection with cleaning.

Turn off the controller and allow to cool for approx. 5 min. Once the burner is completely turned off, it is ready for cleaning. Unplug the burner, remove the shield, drop shaft, and detach the burner from the boiler so work can be easily performed.

Boiler.

All surfaces inside the boiler must be brushed clean from any deposits and the ash can must be emptied. When emptying the ash can, pay special attention to any build-up of ash in the rear smoke chamber and flue, since the Chimney Sweeper may not always be removing the ash from the chimney flue.



*Never dispose of hot ashes in the trash, but let it cool in a metal bucket.
Hot ashes can start burning when it gets oxygen (air).*

Burner head.

Remove any ash or cinders from the grate. Remove any pellet remnants under the burner grate. Wipe the photo sensor clean. When re-inserting the photo sensor, ensure that the sensor points towards the combustion grate. Ensure that there is nothing lodged in the fan and that it can rotate freely.

Hopper.

Since pellets naturally contain dust, you should periodically empty the hopper completely. The more dust that is present in the hopper, the less the auger will dispense, and the more unstable the dosing. The boiler will go out of adjustment with greater risk of downtime. How often one should empty the hopper depends greatly on the design and quality of the pellets you use.



Put 1 dl cooking oil or similar into the hopper each time it is emptied (poured over the last pellets) and the hopper will automatically empty the sawdust.

Start-up after cleaning.

Once the pellet boiler is reassembled, turn on the controller and the burner will start itself up.



Remember to reattach the shield so that the temperature reading on the burner is correct.

Service and Maintenance:

Proper maintenance of your system reduces the risk of unnecessary downtime. The controller has service indicators that informs you when to change parts and perform service. Please note that service indicators are only expectations based on experience. Components can easily have a longer lifetime than suggested by the service indicator. It is recommended to perform an annual inspection of your system once a year.

%			Hours	ON/OFF	RESET	DATE
43	External gear		15000	ON	NEJ	31-12-12
35	Internal gear		15000	ON	NEJ	31-12-12
12	Moving grate gear		10000	ON	NEJ	31-12-12
15	Semi cleaning gear		10000	ON	NEJ	31-12-12
67	Fan		20000	ON	NEJ	31-12-12
112	Igniter		200	ON	NEJ	01-04-12
			Kg			
87	Empty ash container		1000	ON	NEJ	01-12-13
19	Cleaning of semi-cleaning		2000	ON	NEJ	31-12-12
25	Cleaning under burning grate		1000	ON	NEJ	31-12-12
50	Cleaning of fan		5000	ON	NEJ	31-12-12

Start-up visits:

Get a NBE technician to review your system, talk to you about optimization strategies, adjustments, and overall construction of your system.

The visit is free if you transfer your CO2 savings to NBE.

The application form must be completed either during the visit or on our website at www.nbe.dk.

The price of a visit without CO2 transferring will cost 1125, - incl. VAT.

Note: Start up visits are conducted when there are at least 4-5 other customers in the same area that have requested a visit. As such, waiting time may take up to 2-3 months.

Troubleshooting:

We have collected the most typical solutions to small problems.

Problem.	Possible cause.	Possible solution.
Alarm hot drop shaft	Cinders in the burner head.	More air for combustion.
	Back pressure in the boiler.	Clean the boiler etc..
	No draft in the chimney.	Increase the chimney height.
		Clean the burner head regularly.
		Switch to a better quality wood pellets.
Smoke in the hopper.	Ash in the boiler / flue.	Clean the boiler etc..
Smoke setbacks.	No draft in the chimney.	Insulate the smoke pipe.
		Increase the chimney height.
		Submerge a liner in the chimney.
		Increase temperature of the smoke, remove the semi cleaning grates from the boiler.
	Drop shaft sensor defective.	Change temperature sensor on the burner print.
	Unfortunate wind conditions.	Increase the chimney height.
		Close doors, etc..
		Make intake on the same side as the chimney.
Alarm ignition.	Defective ignition.	Replace the electrical igniter with a new one.
	Ignition is located wrong.	Mount it correctly.
	Burner grate is fitted wrong.	Mount it correctly.
	Too high chimney draft.	Install a draft stabilizer in the chimney.
		Set electric ignition power up.
		Reduce the fan speed during ignition.
	Stopped fan.	Check if the fan can run, replace if necessary.
Alarm temperature boiler.	Defective temperature sensor.	Change temperature sensor.
	Temp. sensor fallen off the boiler.	Mount it correctly, attach the sensor with a cable tie.
	Power too low compared to the house.	Make a new adjustment of the burner.
		Adjust the alarm limit down.
		Add more power to the burner if possible.
Alarm motor output.	Fault current on the electric grid.	Supply the burner from another protection group.
	Relay defective.	Send the controller in for repair.
Alarm no fuel.	Hopper is empty.	Fill hopper with wood pellets and restart.
	Flame has gone in operation.	Make a new adjustment of burner.
	Photo sensor is defective.	Change photo sensor with a new one.
	Unstable fuel supply.	Empty auger / hopper for sawdust.
Plug is disconnected.	Burner plug is not fitted.	Insert the plug of the burner.
	Dirt inside the plug to burner.	Clean the plug for pellet dust.
	No connection to the burner print.	Change temperature sensor on the burner print.

Troubleshooting:

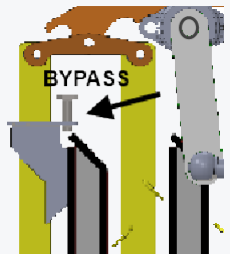
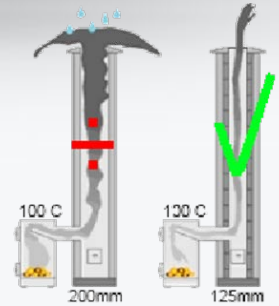
Problem.	Possible cause.	Possible solution.
Alarm RPM	RPM sensor defective.	Change the fan.
		Change to % regulation at the fan.
No power to the controller.	Defective fuse in the controller.	Replace the fuse to a new one.
	Safety thermostat deactive.	Reconnect by firmly pressing the red button.
	The controller has been over-voltage.	Send controller to NBE for repair.
The burner deactivate residual current protection.	Electric ignition is faulty.	Change the electric ignition to a new.
	Current leak in a component.	Note when RCD deactivate, replace the component.
	Cables exposed.	Check cables, insolate them if possible.
Too high pellet consumption.	Lean burning.	Make a new adjustment of the burner.
	Too high chimney draft.	Install a draft stabilizer in the chimney.
	Uninsulated pipes in the instalationen.	Insulate with pipe insulation.
Too many electric ignitions.	Flow in the system is fluctuating.	Set the pressure controlled circulation pump to fixed pressure.
	External thermostat unstable.	Set "External wait" up in the controller.
Unburnt pellets in the ash.	Lean burn.	Make a new adjustment of the burner.
	The grate is placed incorrectly.	Mount it correctly.
	Too many pellets on the grate.	Make a new adjustment of the burner.
	The fan is adjusted too high.	Make a new adjustment of the burner.
	Too high chimney draft.	Install a draft stabilizer in the chimney.
Cinders on the grate.	Blower cleaning is not sufficient.	Adjust the fan% up to clean, and the time between the down.
		Clean the grate mechanical more frequently.
	Poor quality pellets.	Change supplier.
		Mount compressor cleaning.
		Change the grate, to a model that is more open.
	Fat combustion.	Adjust the fan up at 10, 50 and 100% power.
		Adjust the burner power down in "auto calculation"
The boiler condensates.	Too low chimney temperature.	See page 27 about flue gas condensation.

Flue Gas Condensation

When a boiler has an extremely high efficiency (for example $> 93\%$), the flue gas temperatures exiting the boiler are very low. As a consequence of this high efficiency and low chimney temperature relationship, proper precautions must be observed to avoid condensation from developing in the chimney. Leaving condensation untreated will risk the development of soot in the chimney, corrosion in your boiler, as well as possible loss of warranty. **Note:** *that even if there is water in the boiler it may be due to condensation in the chimney.*

Things that can prevent condensation in the boiler and chimney.

1. **High chimney $> 5\text{m}$.**
Provides a good draft in all conditions.
2. **Small clearing in the chimney 125mm-150mm.**
Provides better flow, and can "carry" out more moisture.
3. **Short un-insulated smoke pipe $< 0.3\text{ m}$**
Do not cool down the smoke unnecessarily before it reaches the chimney.
4. **Draft stabilizer.**
Stabilizes the draft, and provides the chimney with dry air.
5. **High boiler temperature $> 70^\circ\text{C}$ degrees.**
10 degrees up in the boiler temperature gives 10 degrees more smoke temperature.
6. **Suitable return temperature $> 55^\circ\text{C}$ degrees.**
Hits the smoke boiler surfaces under 47°C degrees, it starts condensing.
7. **Open bypass in the boiler.**
Release the smoke before the last smoke cooler, 15°C degrees increase in temperature of the smoke, only costs approx. 1% in efficiency.
8. **Heated boiler room.**
Lowers cooling of the boiler and smoke pipe and provides draft stabilizer more hot air to work with.
9. **More oxygen in combustion.**
Increases air flow in the boiler, and carries more moisture, 1% more oxygen costs approx. 0.5% in efficiency.
10. **Remove the retarder. (Turbolator)**
Decreases resistance of the boiler, and get a bad chimney to work better
The gas temperature typically increases to approx. 100°C degrees.
The burner should be basic readjusted after retarder is removed.
11. **Keep the heat on the boiler continuously.**
When using DHW priority on controller, and the boiler starts from cold each time it starts
The boiler is not to dried out between each start.
12. **Mount electric exhaust fan to chimney.**
Helps the flow the right way, from CHIP 6.82
can exhaust fan be connected directly to the controller.



Warranty:

All products purchased from NBE is covered by the current Danish Purchasing Law. This includes 6 months warranty on the products valid from the date of receipt. A 2 year warranty is granted with the completion of the **Warranty Registration**.

Note: Electrical Igniters are not covered under the warranty as they are a wearable part.

The warranty only covers manufacturing and material defects.

In case of product failure of the system when under warranty, NBE will repair the spare part at no charge to the buyer. Buyer will be responsible for the installation or replacement of the part.

If NBE offers repair of the defective part, the purchaser shall send the part to NBE for repair. NBE will return the part once repaired.

Guarantee shall be invalid if product failure is due to circumstances caused by the buyer; either by accident and/or abuse of the product, inadequate cleaning, chimney conditions, as well as circumstances where NBE has no influence. In addition, the warranty is invalid due to misuse of the burner- fx. using fuel that is not approved by NBE

The warranty does not cover parts such as the electrical igniter.

The buyer is obligated to check the goods immediately upon receipt.

If the buyer declares that the delivery was inadequate or defective, the customer must immediately and without delay make a written claim with NBE.

Returns are only made by agreement with NBE.

To the extent that NBE is liable to the purchaser, NBE's liability is limited only to direct loss and not to damages incurred by connected equipment and/or indirect damage, loss of earnings, operating losses, connection costs, etc.

Responsibilities:

NBE assumes no responsibility as a result of the purchaser's legal relations with third parties.

All orders are accepted subject to force majeure, including war, civil unrest, natural disasters, strikes and lockouts, failing supplies of raw materials, fire, damage of NBE or its supplier network, lack of transport opportunities, import / export prohibitions or any other event which prevents or restricts NBE's ability to deliver.

NBE has in cases of force majeure, the right to cancel the transaction or any part thereof, or to deliver the agreed product as soon as the obstacle to normal delivery has lapsed. In cases of force majeure, NBE will not be held responsible for any losses incurred by the purchaser due to non-delivery. NBE will not be held responsible for any changes and/or faults related to price changes, sold out items or changes to specifications in the product manual.

It is the buyer's responsibility to register the equipment to the appropriate authorities. If any disputes arise between the authorities and the purchaser, NBE will be held harmless from any claims or disputes.

The following can be delivered upon request:

- **Exception of the expansion by Labor Inspectorate.**
- **Chimneys endorsements.**
- **Approval of Technology Institute (DTI).**
- **Print charts.**

Material is also available on www.nbe.dk

CE Declaration of Conformity:

EC DECLARATION OF CONFORMITY

No. : 0104-2013

The undersigned, representing the following manufacturer

manufacturer : NBE production A/S

address : Brinken 6-10, DK9750 Oester Vraa, Denmark

or representing the manufacturer's authorized representative established within the Community (or the EEA) indicated hereafter

authorized representative :

address :

herewith declares that the product

Product identification :

Pellets burner:

NBE; BioPel; BMHT; Woody; Scotte; Scotte Plus; Boink; Bio Comfort; Kedel,

is in conformity with the provisions of the following EC directive(s)
(including all applicable amendments)

Reference n °	Title
EN 303-5 2012	Europe Norm
2006/95-EC	Low Voltage Directive
2004/108-EC	EMC directive (EMCD)
97/23/EEC	Pressure Equipment Directive
2006/42-EC	Machinery directive
Arbejdstilsynets bekendtgørelse	Nr. 612

and that the standards and/or technical specifications referenced overleaf have been applied.

Last two digits of the year in which the CE marking was affixed: ...13

Jannich Hansen

Oester Vraa

01/04/2013

Jannich Hansen

(signature)