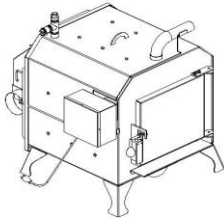


# INSTALLATION AND MAINTENANCE MANUAL FOR THE BILOVAX WOOD-FIRED POOL HEATER

SAVE THESE INSTRUCTIONS AND KEEP THEM WITHIN SIGHT OF THE APPLIANCE FOR FUTURE REFERENCE BY THE USER OR SERVICING PERSONNEL.



## GENERAL INFORMATION

**WARNING: AN IMPROPER INSTALLATION, ADJUSTMENTS, INCORRECT SERVICE OR MAINTENANCE MAY CAUSE A FIRE WHICH COULD RESULT IN LOSS OF LIFE OR SERIOUS INJURIES AND/OR IMPORTANT MATERIAL DAMAGES. TO OBTAIN FURTHER INFORMATION OR ASSISTANCE, PLEASE CONSULT A QUALIFIED INSTALLER, A COMPETENT SERVICE COMPANY OR THE MANUFACTURER.**

**WARNING: It is of the utmost importance to respect the minimum clearances to combustible materials from this appliance as indicated on the nameplate to prevent a fire which could result in loss of life or serious injuries and/or important material damages:**

lateral walls : right side 45 cm (18")                      left side 60 cm (24")  
wall to the back of the appliance: 45 cm (18")  
wall to the front of the door of the appliance: 1,22 m (48")                      floor: must be non-combustible  
from the smoke pipe to all combustible surface : 45 cm (18")

**WARNING : IF THE INSTRUCTIONS CONTAINED IN THIS MANUAL ARE NOT ADHERED TO, THIS COULD RESULT IN A FIRE CAUSING LOSS OF LIFE OR SERIOUS INJURY AND/OR IMPORTANT MATERIAL DAMAGES.**

Approved by



**Manufactured by : L.S. Bilodeau Inc.**

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to CAN/CSA B366.1-M91

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## SECTION 1 : GENERAL INFORMATION

### 1.1) DANGER, CAUTION or WARNING

Understand well the meaning of the following : **DANGER, CAUTION or WARNING**. These words are associated to the safety symbols and labels which you will see on the appliance and in the manual as follows:

#### DANGER

The word **DANGER** indicates the gravest of dangers, those that **will** result in loss of life or major injuries and/or serious property damages.

#### CAUTION

The word **CAUTION** indicates a danger which **could** result in loss of life or major injuries and/or serious property damages.

#### WARNING

The word **WARNING** is use to indicate the dangerous practices which **could** result in light injuries and/or minor property damages.

Your pool heater must be installed by a qualified technician or your warranty will be voided.

#### IMPORTANT NOTICE

With the Bilovax wood-fired pool heater, L.S. Bilodeau Inc. has redefined the notion of a pool heater by proposing an appliance which is simple to use and has a great heating capacity. This great heating capacity comes from uniquely designed heat exchanger coupled to a ultra high-efficiency woodfired burner. Your pool water will rapidly reach the desired temperature even under adverse weather conditions. You will not have to keep the Bilovax pool heater in operation when you will not be using your pool for a few days or an extended period. We suggest that you use the Bilovax pool heater only as per your needs in order to eliminate non-necessary expenses. **It is only permitted to burn wood in the Bilovax pool heater and no other combustible.**

#### WARNING

The warranty for your Bilovax pool heater could be null and void if the water in your pool does not at all times have the following properties and conditions:

CHLORINE or BROME: 1 to 3,0 ppm	PH : 7,2 to 7,6
CALCIUM HARDNESS : 200 - 300 ppm MAX	TOTAL ALKALINITY: 80 to 120 ppm

**A HIGH LEVER OF CALCIUM HARDNESS AND/OR ALKALINITY CAN CAUSE INCRUSTATIONS ON THE WALLS OF THE POOL AND WITHIN THE POOL HEATER. IF THE LEVEL OF CALCIUM HARDNESS GOES OVER 300 ppm, THEN THE WATER LEVEL IN THE POOL MUST BE SUFFICIENTLY LOWERED AND REFILLED WITH FRESH WATER IN ORDER TO OBTAIN AN ACCEPTABLE CALCIUM HARDNESS BECAUSE CALCIUM DOES NOT EVAPORATE AND ACCUMULATES WITH EACH REFILLING OF THE SWIMMING POOL.**

#### CAUTION

Do not store or utilize gasoline or other inflammable vapours or liquids in the immediate proximity of the pool heater or any other heating equipment as this could result in a fire or explosion which **could** cause loss of life or major injuries and/or serious property damages.

**Introduction** : This manual contains instructions for the installation, utilization, maintenance, trouble-shooting and also contains the list of components for safe use the Bilovax pool heater.

L.S. Bilodeau Inc. strongly recommends that the installer consult this manual attentively before attempting the installation of the Bilovax pool heater. If, after having consulted this manual, you still have unanswered questions, please consult the factory or the local distributor to obtain this information. After completing the installation of the pool heater, the installer must leave this manual in the hands of the buyer for future consultation.

**SECTION 2. Calculation of the surface of the pool**

The factors influencing the capacity of a pool heater to heat a given swimming pool include the area and volume of the pool, the ambient temperature, exposure to the prevailing wind and its average velocity and the desired temperature rise of the pool water vs the ambient temperature. A swimming pool situated in a sunny and wind-protected area will be more easily heated than one situated in a windy and less sunny area.

Calculation of the surface of different shapes of swimming pools.

Surface=  $R \times R \times 3.14$       Surface= Length x Width      Surface =  $R1 \times R2 \times 3.14$

**Illustration 1**

1. Determine the surface of the pool in square feet. For an indoor pool, reduce the surface calculation by 1/3.
2. Determine the desired pool water temperature (from 25°C (77°F) to 28°C (83°F)).
3. Determine the average air temperature of the coldest month of utilization.
4. The required temperature rise is the difference what has been determined at 2 and at 3.
5. The Bilovax has a heating capacity of 250 000 btu/hr with a full load of dry hard wood and the user will have to determine, by trial and error, the ratio of full loads of wood to the attainment of the desired pool temperature.

When the pool is not in use, it is a good idea to cover it with an insulated pool cover to reduce heat losses as well as chlorine use and prevent the unnecessary clogging up of the filtration system, the use of a time switch on the pump motor of the pool-filter is highly recommended during the periods where the pool is not in use, i.e.: during night-time.

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**SECTION 3. POOL HEATER INSTALLATION**

**Equipment reception and inspection:**

Upon reception of the pool heater, inspect the exterior of the pool heater to turn up any signs of damage then check the appliance to detect any damage which could have occurred during transportation or fabrication. If the external packaging is damaged, please mention it forthwith to the carrier so that he can write it on the bill of lading. All claims for damage or missing material must be made to the carrier.

**Important notice :** The instructions contained in this manual are destined to be used by a competent installation technician, who has been specially trained and his experienced in the installation of this type

of pool heater. Certain provinces require that the persons doing this type of installation must be holders of the proper permits delivered by competent authorities. If this is the case in your area, please make sure that the technician be in possession of said permit before he can proceed with the installation.

### **CAUTION**

The failure to respect the instructions relative to the installation of this equipment, of its vent and the service instructions contained in this manual could result loss of life or major injuries and/or serious property damages.

**Conformance to codes :** The pool heater will be installed in conformance of all local and provincial and/or state codes. The installation of this appliance as well as the dimension of the smoke pipe, its installation and its termination will have to conform to the following standards or their US equivalents: *CAN/CSA-B140.12-03*, *CAN/CSA-B365-M*, *CAN/CSA-B366.1-M91* and *ULC S629* as well as to the Canadian Electrical Code or its US equivalent, *CAN/CSA-C22.1 CODE 2-03*, Filrst Part, Nineteenth Edition for the electrical portion of the installation. This pool heater can be installed :

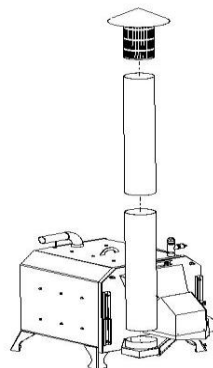
- a) Outdoors with venting through a single-wall 15 cm/ 6" smoke pipe :
- b) Indoors with venting through a type 2100°F chimney as per *ULC S629* standard:

**Positioning of pool heater outdoors:** This appliance must be installed on a cement slab or four 30" by 30" patio stones at least 45 cm (18") from the inner wall of an in-ground pool unless it is separated from the pool by a solid fence, a wall or other solid and permanent barrier. This appliance must be installed at least 1.5 meter (5') from the wall of an above-ground pool. It must also be kept 45 cm (18") minimum away from the fire wood reserve, 60 cm (24") min. away from any structure and 1.2 meter (48") away from any tree or shrub. When installed outdoors, the smoke pipe of 15 cm (6") diam. must be of a minimum length of 2.4 meter (96") and be provided with a conical cap as shown in illustration 4. The installer has the responsibility of preventing the accumulation of water around the appliance, this on a year-long basis by providing adequate drainage an/or by raising the slab on which the pool heater is installed by at least a 10 cm (4 ") over the surrounding ground. Do not install in a location where frost heaving or thawing can cause the pool heater to topple or strain the piping.

### **CAUTION**

If the pool heater is not separated from the pool by a fence or a wall, you will have to install a differential (Class A) circuit breaker on the electrical feed circuit to prevent electrical shocks which could result in loss of life or major injuries and/or serious property damages during the maintenance or the operation of the pool heater.

**Illustration 2**

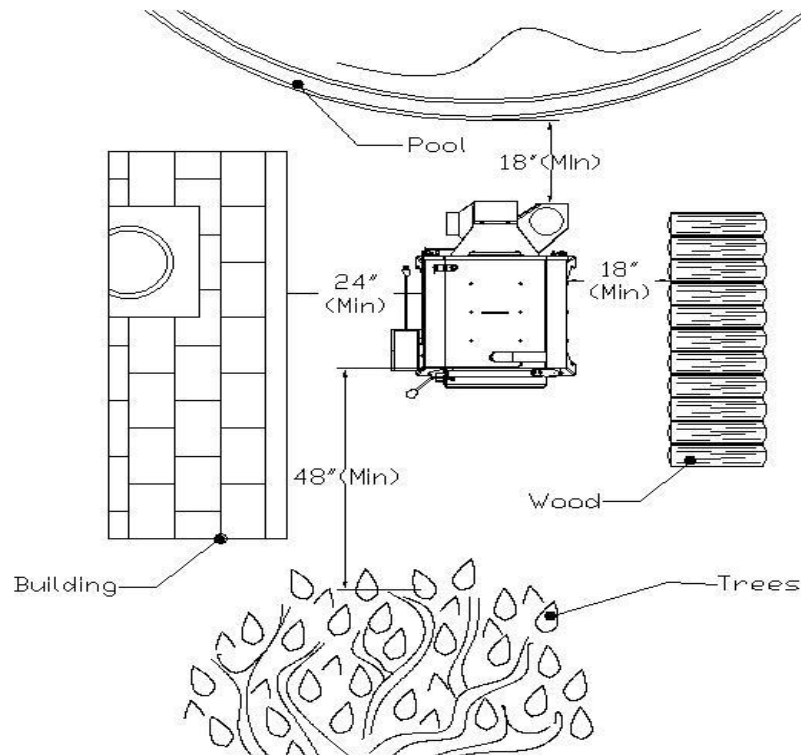


**Smoke pipe 15 cm (6")**  
**Inlet and outlet water pipes 3.8 cm (1 ½")**

**CEMENT SLAB FOR OUTDOOR INSTALLATIONS:** When installed outdoors, the Bilovax pool heater must be installed on a cement slab or four 30" by 30" cement patio stones. The non-combustible surface must also extend for a minimum of 30 cm (12") beyond all sides of the heater.

**OUTDOOR INSTALLATIONS:** The installer must respect all clearances already mentioned in positioning and on illustration 5 to eliminate risks of fire and to insure a sufficient supply of combustion air.

- 1- The Bilovax, when installed outdoors as per manufacturer's instructions, will not require an accessory combustion air intake.
- 2- Always maintain clearances to growing shrubs.
- 3- With outdoor installations, the appliance's smoke pipe must terminate at least 0.92 m (3') above any forced air intake situated within less than 3 m (10').
- 4- Do not install this appliance under an overhang.
- 5- Do not install this appliance directly under a roof overhang not equipped with a gutter. Rain water cascading directly onto the pool heater could hinder its proper functioning.
- 6- Do not install the pool heater where water projected by a sprinkler system could come in contact with it and hinder its proper functioning.
- 7- Do not install the pool heater at less than 0.92 m (3') of the condensing unit of an air conditioner or a heat pump outdoor unit.
- 8- If the user wants to hide the pool heater within an enclosure, all clearances as specified in illustration 5 must be adhered to.



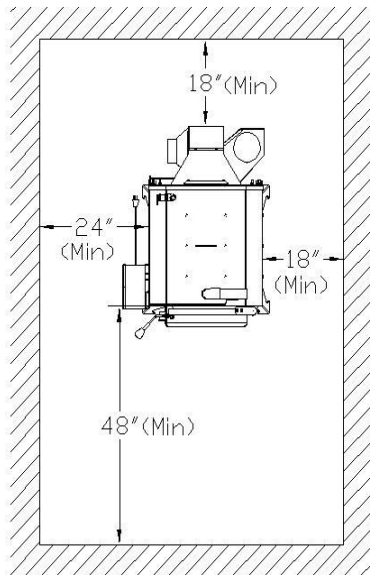
**Illustration 3**

**INDOOR INSTALLATION WITH VENTING THROUGH A CHIMNEY:  
Indoor positioning of the pool heater:**

**CAUTION**

The installer must respect clearances to combustibles of this appliance to prevent a fire which could lead to loss of life or serious injuries and/or serious property damages during the operation of the pool heater : side walls: right side 45 cm (18") left side 60 cm (24"), back wall: 45 cm (18"), wall in front of the appliance loading door: 1.2m (48"), non-combustible floor, minimum clearance of the smoke pipe to any combustible surface: 45 cm (18") as shown in illustration 6.

Position the pool heater where any water leakage will not cause damages to area adjacent to the appliance or to the building's structure. When the area adjacent to the appliance or to the building's structure cannot be protected from leaks, it is recommended to install a drain pan under the pool heater provided with a properly sized outlet. The drain pan must not hinder in any way the supply of combustion air. When installed indoors, make sure that the evacuation of smoke is only done through a type 2100°F chimney approved to the ULC S629 standard of a min. diam. of 15cm (6').



**Illustration 4**

**CAUTION**

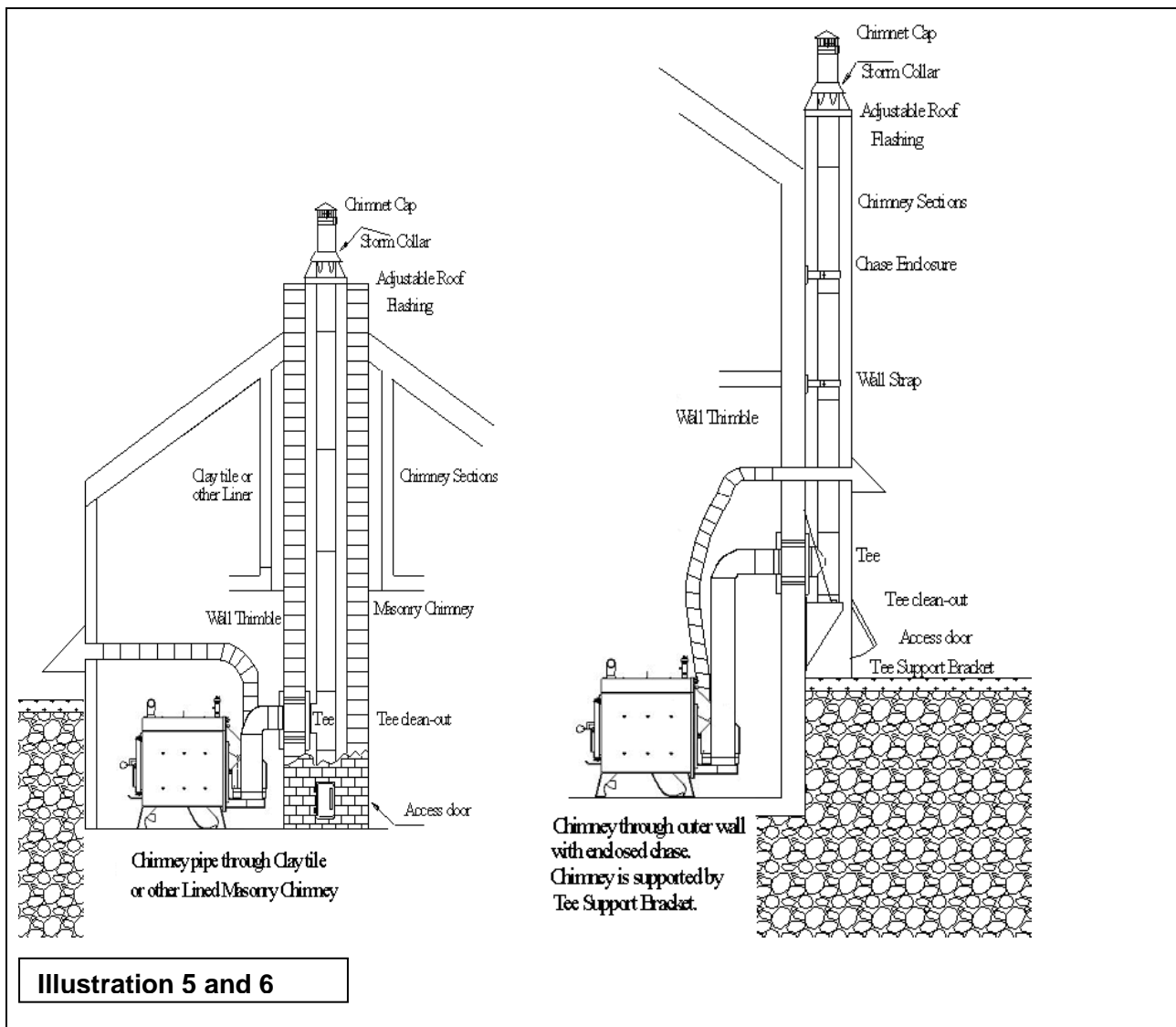
Do not store wood or other combustible material within the minimum safe clearances as shown in illustration 4.

**SLAB OR OTHER NON-COMBUSTIBLE FLOOR:** Indoor installations, the Bilovax pool heater must be installed on cement slab or cement floor.. It must also extend for a minimum of 30 cm (12") beyond all sides of the heater. In all case, it is the responsibility of the installer to protect the floor and to make sure that the floor is not exposed to excessive heat during prolonged periods of use.

**CAUTION**

Chemical products such as chlorine, bromine or any other volatile and corrosive chemical must be stored in a separate room away from the pool heater. Your warranty will be null and void if you fail to heed these instructions.

All the controls and limits are installed and wired at the factory and an electrical circuit of 15 amp. @120 Vac maximum is required.



**COMBUSTION AIR SUPPLY :**

Because of its important needs in combustion air, the Bilovax pool heater must have its own fresh air intake when installed indoors. The installer must provide a dedicated outdoor air intake of 12.7cm ( 5”) diameter min. and of a maximum length of 3m (10’). A combustion air kit carrying the # X-13 part no. is available from the local distributor of the L.S. Bilodeau Inc. products.

**VENTING THROUGH A CHIMNEY :**

Smoke pipe/Vent connector

It is most important to respect the minimum clearances to combustibles from the single-wall smoke pipe, which are 45cm/ 18”, otherwise it will be necessary to use a double-wall smoke pipe and follow the manufacturer’s recommendations as regards minimum clearances to combustibles.



Please make sure that the diameter of the smoke pipe and that of the chimney are the same as the smoke outlet fitting on the Bilovax (15cm/ 6"). The smoke pipe, of minimum 24 gauge, will be fabricated of aluminized or black steel. Smoke pipe sections must be installed with the crimped ends towards the pool heater in order that any condensation be allowed to run back to the appliance. All sections of the smoke pipe are to be held together with three sheet metal screws installed equidistant from each other around the circumference of all joints. Please make sure that the smoke pipe between the appliance and the chimney will be as straight and as short as possible, please note that only one 90° elbow or it's equivalent is permitted.

On any horizontal length, please maintain a slope downwards to the appliance of 6mm per 30cm ( ¼" per 12") of length. To insure a proper draft, the total length of smoke pipe between the appliance and the chimney must never exceed 3m/10' and it must slope upwards to the chimney 6mm per 30cm ( ¼" per 12") of length.

#### **Caution**

**Any section of the smoke pipe or chimney breaching shall not pass through a floor, a ceiling, a wall or partition made of combustible material or through an attic, roof space, closet or other similar concealed space. It is forbidden to install a draft regulator on the smoke pipe because the proper operation of the Bilovax pool heater depends on an induced flow of combustion gases created by the forced circulation of the combustion air. The failure to heed this warning may result in a fire which could cause loss of life or serious injuries and/or important property damages.**

#### **THE CHIMNEY AND IT'S VENT CONNECTOR :**

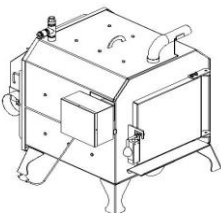
The Bilovax pool heater must be connected to a prefabricated chimney of the 2100° F / 650° C type, approved to the *ULC S629* standard, of 15cm/ 6" dia. installed as per the instructions of the manufacturer as shown in illustrations 7 and 8. The inside diameter of the chimney must also be 15cm/ 6", because an inadequately sized chimney will cause draft problems, which will lead to the formation of creosote deposits thereby augmenting the risks of chimney fires.

Please respect the following recommendations for the selection and installation of the chimney:

- 1) The rain cap or highest part of the chimney must at least 90cm/3' above the roof surface.
- 2) The highest part of the chimney must be at least 60cm/2' higher than any other part of the building or any other obstruction situated within a horizontal radius of 3m/10'.
- 3) The installation of chimney inside of a building is always preferable to the installation of a self-supporting chimney on the outside of a building because an installation on the inside of a building or covered by an insulated chimney box will help the chimney stay warm for longer periods and prevent draft problems which occur when the chimney is too cold.
- 4) Do not install another appliance on the chimney that is used to vent the products of combustion of the Bilovax.
- 5) During the installation of the chimney, follow the manufacturer's instructions to the letter.

#### **WATER PIPES AND CONNECTIONS**

The Bilovax pool heater has been designed so that the total restriction to water flow not be higher than the equivalent of 3m/10' of 3.8cm/1½" plastic pipe approved for continuous operation at 60° C/140° F. A bypass loop is not required but could be useful during maintenance of the pool heater. The inlet and outlet connections will be 3.8cm/1½" and easily adaptable to the plastic pipe specified above. It is highly recommended to install full-flow service valves at the inlet and outlet pipes of the pool heater especially if the pool heater is situated lower than the water level of the swimming pool. All the piping and accessories used in the installation of the pool heater must be able to resist the corrosive effects of the chemicals used to maintain the cleanliness of the pool water. It is recommended to install two all-stainless steel hose clamps where the plastic pipe is joined to the appliance or for any other water connection.



Water inlet and outlet 3.8 cm (1 ½")

**Illustration 7**

**INSTALLATION ABOVE THE LEVEL OF THE POOL :** If the pool heater is installed above the level of the pool, it will be necessary to loop both inlet and outlet pipes above the pool heater to prevent the water draining away from the pool heater when the pump is stopped during off-cycles or maintenance of the filter.

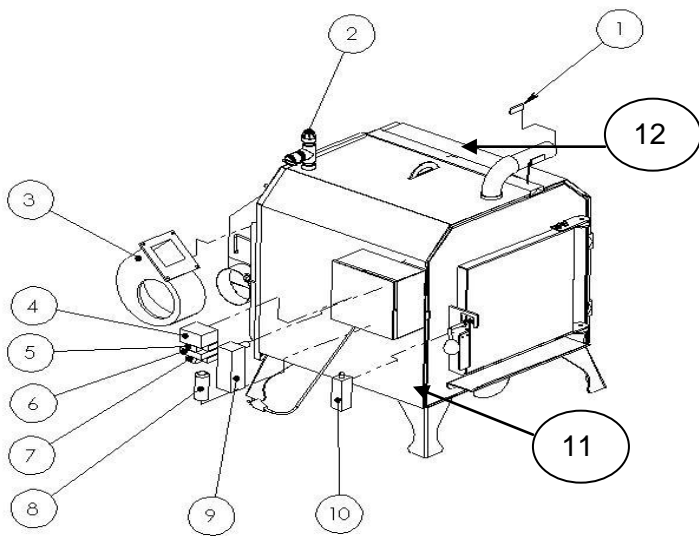
**CAUTION**

**Please make sure that the pool heater is not in operation when the pump is stopped for any reason.**

**AUTOMATIC CHLORINATORS:** If used, an automatic chlorinator, will have to be installed downstream from the pool heater in the return pipe to the pool and at a lower elevation than the outlet of the pool heater. Install a plastic non-return check valve between the outlet of the pool heater and the chlorinator to prevent siphoning back corrosive chemicals into the pool heater.

**PRESSURE RELIEF VALVE :** The Bilovax pool heater is provided with a pressure relief valve to avoid a buildup of pressure in the boiler part of the pool heater in case the pool water pump would fail or be unable to pump an adequate supply of water through the heater. Please connect this valve to a proper drain.

**CONTROLS AND PROTECTION DEVICES:** The Bilovax is provided with ; a low-water detector, a pressure relief valve, a combustion air blower, a low-voltage DC power supply, a relay and a start delay for the combustion air blower, a relay slaved to the low-water detector, a capacitor for the combustion air blower motor, an Aquastat type high-temperature limit controller, and a door switch. All of these controls are required for the safe operation of the Bilovax pool heater and the safety of the users.



**Illustration 8**

1 # Low-water detector-3,8cm/ 1 ½"	2 # Pressure relief valve 1,9cm/ ¾"
3 # Combustion air blower	4 # Low-voltage DC power supply -120 Vac / 12 Vdc
5 # Low-water detector slave relay	6 # Preprogrammed 3 hour timer module
7 # Combustion air blower relay	8 # Capacitor for combustion air blower
9 # L4006A Aquastat type high-temperature limit	10# Safety door switch
11# Water inlet pipe 3,8cm/ 1 ½"	12# Water outlet 3,8cm/ 1 ½"

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## SECTION 4. INSTALLER CHECK-OUT AND START-UP

### General information :

The pool heater will have to be in full working order before making the following verifications. Please consult this manual to know the lighting/starting and stopping procedures for the pool heater. Also make sure that pool water is circulating through the pool heater before starting the verifications. Make doubly sure that all air has been bled out of the pool heater before trying to start it.

- 1) **Pressure test of pipes and inspection for leaks:** Start the pool's filter pump and manually open the pressure relief valve to purge all the air out of the pool heater. When all the air has been purged, check that all the water connections are tight and secure and that water is not leaking or seeping out of the joints between the appliance and the water inlet and outlet pipes. If there are leaks, please make sure to correct them before proceeding any further with the other verifications.
- 2) **Lighting and test-firing of wood heating:** Open the loading door of the Bilovax and make sure that there is nothing inside which could be harmful to it's proper operation, make doubly sure that the combustion air nozzles are not obstructed. Next, load enough newspaper into the combustion chamber to light a small quantity kindling and a half-load of well-dried wood logs (only as far as the middle of the combustion chamber). Whilst keeping the door of the Bilovax partially open, light the fire and wait until it is well lit before closing the door. Once the door is closed, the automated cycle of combustion of the Bilovax initiates, indicated by the start of the combustion air blower.

### CAUTION

**Do not use inflammable liquids or chemical products to light the Bilovax. The failure to heed this warning may result in a fire which could cause loss of life or serious injuries and/or important property damages.**

- 3) **Functional tests and safety checks:**  
After 30 minutes of normal operation, slowly and with great care, crack open the Bilovax loading door and once the combustion air blower has stopped, open the loading door fully and on top of the burning embers, load the combustion chamber full of dry wood logs, then close the loading door. The normal combustion cycle should restart after a short delay. With a full load of wood, the Bilovax should operate at full fire for about 3 hours and it will be possible, during this period, to do all the required functional tests. It will also be possible to do all the safety checks such as simulating a water pump failure by shutting off the pump motor and observing that the low-water detector functions normally when it shuts down the combustion air blower. Another test is to reduce the amount of water flowing through the Bilovax to make sure that the Aquastat high limit shuts off the pool heater when it reaches it's limit temperature.

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## SECTION 5. CONSUMER OPERATION AND MAINTENANCE PROCEDURES

**General information :** Before lighting the pool heater, please make sure that the filter pump is in operation and that water is circulating freely through the filter and that the Bilovax is well purged of air. In a new installation, it is recommended to leave the pump and filter running for at least 24 hours to thoroughly purify the pool water. After 24 hours of operation, check that the chlorine content, the PH level and the total alkalinity of the pool water are within the specified limits before putting the pool heater into operation.

## Pool water chemistry:

### Warning

Your Bilovax pool heater warranty will be null and void if the properties of the water in your pool do not respect the following conditions:

CHLORINE OR BROMINE: 1 to 3,0 ppm	PH : 7,2 to 7,6
CALCIUM HARDNESS: 200 to 300 ppm MAX	TOTAL ALKALINITY: 80 to 120 ppm

A HIGH LEVEL OF CALCIUM HARDNESS AND/OR ALKALINITY MAY CAUSE INCRUSTATIONS INSIDE OF THE POOL HEATER AND ON THE WALLS OF THE POOL. IF THE LEVEL OF CALCIUM HARDNESS ATTAINS MORE THAN 300 ppm, THE WATER LEVEL WILL HAVE TO BE LOWERED SUFFICIENTLY AND THE POOL REFILLED WITH FRESH WATER IN ORDER TO ATTAIN AN ACCEPTABLE CALCIUM HARDNESS. THIS BECAUSE CALCIUM DOES NOT EVAPORATE AND ACCUMULATES WITH EACH REFILL OF THE POOL.

CAUTIONS AND WARNINGS FOR THE USER :

### WARNINGS

1-As a safety precaution, the loading door must be kept closed at all times during the operation of the pool heater.

2-If the combustion gets out of control, cut the electric power to the appliance, keep the loading door well closed and the pool water circulating through the pool heater. Also watch the combustion seal around the loading door.

3-Do not use the pool heater during a power outage because this could damage the appliance and prevent it's proper operation afterwards.

### CAUTION

Do not burn garbage, gasoline, naphta, old engine oil, other flammable liquids or chemical products in the pool heater. The failure to heed this caution could result in an explosion and /or a fire which could cause loss of life or serious injuries and/or important property damages.

### WARNING

If the appliance is damaged by frost, the repairs will not covered by the manufacturer's warranty. Properly drain all the water from the appliance well before the arrival of freezing temperatures.

### WARNING

Do not ingest alcohol or drugs during use or prior to use of the pool. Ingestion of intoxicants can cause drowsiness which can lead to fainting, and thus provoque drowning. Do not heat pool water above 38.9°C/ 102 °F. A temperature of 37.2°C/ 100 °F is considered safe for an adult in good health, heating the pool to a higher temperature increases the risks of causing hyperthermia. However, pregnant women and young children have a lower tolerance threshold and should refrain from entering the pool at these high temperatures.

### Lighting instructions:

Before lighting the pool heater, please make sure that the filter's water pump is running and that all the air has been bled from the pool heater. It is possible to purge the air from the appliance by lightly raising the lever on the pressure release valve. If air starts to come out, wait until some water comes out before releasing the lever of the valve. Open the loading door and inspect the combustion chamber to make sure that there are no ashes in the bottom and that the combustion air nozzles are not plugged and free from any obstruction. Next, load enough newspaper into the combustion chamber to light a small quantity kindling and a half-load of well-dried wood logs (only as far as the middle of the combustion chamber). Whilst keeping the door of the Bilovax partially open, light the fire and wait until it is well lit before closing the door. Once the door is closed, the automated cycle of combustion of the Bilovax initiates, indicated by the start of the combustion air blower. After 30 minutes of normal operation, slowly and with great care, crack open the Bilovax loading door and once the combustion air blower has stopped, open the loading door fully and on top of the burning embers, load the combustion chamber full of dry wood logs, then close the loading door. The normal combustion cycle should restart after a short delay. With a full load of wood, the Bilovax should operate at full fire for about 3 hours depending on the type of wood and how dry it is.

As much as possible, always use properly dried wood for a better performance and less risk of sooting up of the appliance or creating accumulations of creosote. If it is not desired to prolong the firing of the pool heater beyond three hours, simply let the fire burn out on its own.

### **Periodical inspections :**

The Bilovax pool heater is designed and built to last for a long time when installed and used following the instructions and recommendations of the manufacturer. An annual inspection by qualified service technicians is recommended in order to keep the pool heater properly and efficiently. The following inspection points are to be checked regularly in order to increase to the maximum the service life of the Bilovax pool heater.

- 1- When installed outdoors, check periodically the combustion air intake of the pool heater to prevent it being obstructed by rubbish or dead leaves. To prevent restrictions to combustion and ventilating air, always maintain minimum safe clearances free of rubbish, combustibles, fuels and other flammable vapours and liquids. Shrubs and trees are always growing and can encroach within minimum safe clearances of the pool heater, please trim any encroaching tree or shrub at least every three months. Please maintain minimum safe clearances from wood pile to the pool heater. Make sure that the smoke pipe as well as its cap are always well affixed to the appliance.
- 2- When installed indoors, check periodically that the combustion air intake as well as the smoke pipe/vent connector and the visible part of the chimney are all in good operating order and that everything be well secured. Always maintain the minimum safe clearances clear of all rubbish, combustible materials, gasoline and other flammable vapours and liquids.
- 3- Do not store, chlorine, chemical products for pools or other corrosive substances in the same room as the pool heater.
- 4- Whether installed outdoors or indoors, after every month of use, open the access panel situated at the bottom of the smoke fitting to inspect and, if necessary, clean out the smoke conduit situated under the combustion chamber.
- 5- An inspection program is a good measure of preventative maintenance. Keep this manual in a safe place so that it can be consulted if need be by you, the owner, or by a qualified service technician when inspecting or servicing the appliance.

### **Winterization :**

- 1- In temperate regions, for the short term, the pool heater can continue to function during colder periods. However if temperatures fall to the freezing point, do not use the pool heater to maintain the pool water just above freezing as it is not designed to do so. In regions where the temperature falls below freezing around mid-november, all the water must be drained from the pool heater at the same time as as the pool's water pipes and filter are drained. This appliance must not freeze and it's warranty will be null and void if it is damaged by freezing.
- 2- Please make sure to clean out the combustion chamber as well as the smoke conduit situated under the combustion chamber before winterizing the pool heater. At the same time take the opportunity to get the smoke pipe and chimney swept. Even though it's not required, it is preferable to cover the pool heater during the winter with a waterproof tarpaulin to protect it against the elements.

### **WARNING**

**If the appliance is damaged by frost, the repairs will not covered by the manufacturer's warranty. Properly drain all the water from the pool heater well before the arrival of freezing temperatures.**

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## SECTION 6. SPRING TIME INSPECTION AND MAINTENANCE BY A QUALIFIED TECHNICIAN

### General information :

**IMPORTANT :** Only qualified service technicians, with the necessary permits, are authorized to do maintenance and repairs on the Bilovax pool heater. Do not forget that all the components of the system can affect the safe operation of the appliance. Before consulting Section 7, Troubleshooting, please make sure that the pump of the filter is working normally, that the skimmer, strainer and filter are not blocked, that all the valves in the filtration system are fully open and/or in their proper open or closed position.

### CAUTION :

**Do not modify or alter in any manner the pool heater or any of its components. For all repairs, only use new parts supplied by the manufacturer of the appliance, never use or attempt to use used parts to repair the Bilovax pool heater. The failure to heed this caution could result in a fire which could cause loss of life or serious injuries and/or important property damages.**

### Maintenance by a qualified service technician :

To insure safe operation of the pool heater, it is recommended to do the following inspections and maintenance operations during the annual spring time startup.

#### Inspection and cleaning of the combustion chamber:

**IMPORTANT:** During the inspection of the combustion chamber, check that the refractory bricks are properly in place and undamaged. If some of the refractory bricks are damaged, they must be replaced by new ones, the bricks are retained by plates of metal in the shape of a key. Remove the plates so that you can replace the damaged bricks. Please make sure that the combustion air nozzles are in good condition and not obstructed. That the combustion seal on the loading door is in good enough condition for at least another season of heating, that the door switch works properly and that the combustion air blower stops immediately upon the opening of the loading door.

#### Inspection and cleaning of the combustion air blower :

Inspect the blower and its motor to make sure that the assembly is clean and turns freely. If necessary, clean the blower wheel and lubricate the motor bushings.

#### Inspection and cleaning of the smoke conduit:

Open the access door at the rear of the appliance and clean out the smoke conduit, making sure that all the soot and rubbish are removed.

#### Inspection of the combustion air blower controls and relays:

Open the cover of the control panel and make sure that there was no infiltration of water that could have damaged the electrical components inside. If some of the components need to be replaced, you must identify each wire before disconnecting it to prevent wiring errors which could cause dangerous and/or inappropriate operation.

### NOTE

**If any part or the whole of the original wiring must be replaced, please respect the original color code and only use wire rated for operating at a temperature of 105°C or more.**

#### Functional test of the low-water level detector:

Please make sure that the low-water level detector is operating normally by momentarily shutting off the water flow to the pool heater using the service valve at its inlet, the combustion air blower should stop within a short time indicating that the pool heater is starved of water and should shut down. Quickly reset the service valve to its normal position before proceeding to other tests and verifications.

**Check of the L4006A high-limit Aquastat :**

Check that high-limit "Aquastat" operates normally by gradually shutting down the service valve at the outlet of the pool heater. The temperature of the water in the pool heater will rise above the setpoint of the high-limit and the combustion air blower will shut down. Reopen the service valve as quickly as possible and the pool heater should restart as soon as the water temperature in the pool heater will fall to the setpoint less the differential. The high-limit is part of and is in series with other components of the pool heater's control loop which comprises the low-water level detector's relay, the loading door safety switch, the 3 hour timing module and the combustion air blower relay.

**Spring start-up:**

- 1- Inspect and clean the pool heater to make sure that the combustion chamber is free of ashes, that the combustion air nozzles are not obstructed, open the access panel at the rear of the pool heater to inspect and if necessary clean the smoke conduit under the combustion chamber, make sure that the minimum safe clearances are respected, that the air intake of the combustion air blower is not obstructed by leaves or other rubbish.
- 2- Inspect the smoke pipe and it's cap (outdoor installation) or the vent connector/smoke pipe and the chimney (indoor installation). Before starting a new heating season, have the smoke pipe and chimney swept if it was not done before the winter.
- 3- Start the filter pump and let it run long enough to purge all the air out of the pool heater and all the piping. To make sure that there are no air pockets in the pool heater, pull lightly on the lever of the pressure relief valve, if air comes out wait until water starts to come out before releasing it. When you are sure that all the air has been purged out of the pool heater, proceed to the next step.
- 4- To light the pool heater, load enough newspaper into the combustion chamber to light a small quantity kindling and a half-load of well-dried wood logs (only as far as the middle of the combustion chamber). Whilst keeping the door of the Bilovax partially open, light the fire and wait until it is well lit before closing the door. Once the door is closed, the automated cycle of combustion of the Bilovax initiates, indicated by the start of the combustion air blower. After 30 minutes of normal operation, slowly and with great care, crack open the Bilovax loading door and once the combustion air blower has stopped, open the loading door fully and on top of the burning embers, load the combustion chamber full of dry wood logs, then close the loading door. The normal combustion cycle should restart after a short delay. With a full load of wood, the Bilovax should operate at full fire for about 3 hours depending on the type of wood and how dry it is. As much as possible always use well-dried wood to insure a better performance and less buildup of creosote. As per your requirements, reload the pool heater after about 3 hours or let the fire burn itself out.

Electrical wiring and component diagram

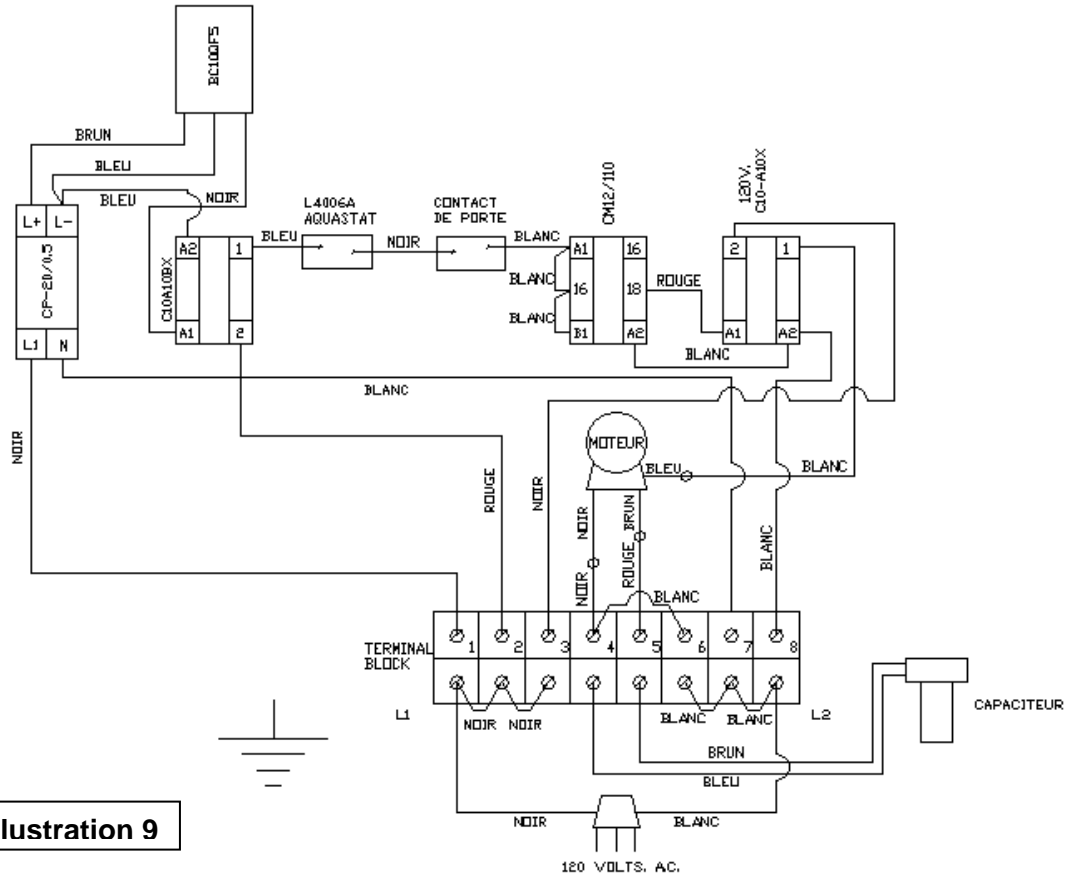


Illustration 9



## SECTION 7. TROUBLESHOOTING

### General information:

**IMPORTANT :** These instructions are for the sole use of qualified service technicians to whom the responsible authorities have issued the necessary permits and who are solely authorised to perform maintenance and repairs on the Bilovax pool heater and its different components. It is most important to remember that all the components of the system can affect the safe operation of the appliance. Before proceeding to the troubleshooting tips contained in this section and referring to the Bilovax pool heater, please make sure that the pump of the filter is working normally, that the skimmer, strainer and filter are not blocked, that all the valves in the filtration system are fully open and/or in their proper open or closed position.

#### CAUTION :

If you must use a jumper to bypass a particular electrical component that you want to isolate for the purpose of troubleshooting, do not forget to remove once your troubleshooting test has been completed. Never, for any reason, leave it in place to keep the pool heater in operation. jamais le laisser en place afin de faire fonctionner le chauffe-piscine. The failure to heed this caution could result in a fire which could cause loss of life or serious injuries and/or important property damages.

#### WARNING :

Never leave the pool heater in operation for more than 30 seconds with the pool filtration system stopped because this could cause important damages to the pool heater. This in turn could result in an unsafe operation of the pool heater.

#### WARNING :

Before proceeding with any troubleshooting test on the pool heater, please make sure that all electrical connections are clean and well tightened and that all wiring is as per the wiring diagrams and conforms to local codes.

### TROUBLESHOOTING TABLE

This table can be used as a fast guide to help solve maintenance and repair problems : IT IS DESTINED FOR THE EXCLUSIVE USE OF QUALIFIED SERVICE PERSONNEL.

PROBLEM	POSSIBLE CAUSES	SOLUTION
THE APPLIANCE REFUSES TO STAY LIT	THE SMOKE CONDUIT SITUATED UNDER THE COMBUSTION CHAMBER IS PLUGGED	OPEN THE ACCESS PANEL AND CLEAN OUT THE SMOKE CONDUIT
THE COMBUSTION AIR BLOWER REFUSES TO START	1-LOADING DOOR IS NOT CLOSED 2-LOADING DOOR SWITCH IS DEFECTIVE 3-TIMING MODULE IS DEFECTIVE 4-WATER IS NOT CIRCULATING IN THE POOL HEATER 5- THE LOW-LEVEL WATER DETECTOR IS DEFECTIVE	1-MAKE SURE DOOR IS CLOSED 2-REPLACE DOOR SWITCH  3-REPLACE TIMING MODULE 4-CHECK THE POSITION OF ALL THE VALVES AND CONDITION OF FILTER 5-REPLACE THE LOW-LEVEL WATER DETECTOR

Parts list Page one

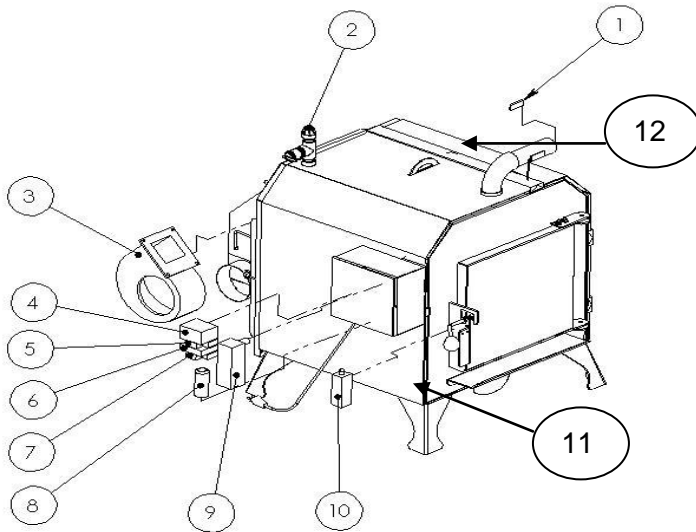


Illustration 10

1 # Low-water level detector-3,8cm/ 1 ½"	2 # Pressure relief valve 1.9cm/ ¾"
3 # Combustion air blower	4 # DC power supply -120 Vac / 12 Vdc
5 # Slave relay of low-water level detector	6 # Preprogrammed 3 hour timer module
7 # Relay of combustion air blower	8 # Capacitor of combustion air blower
9 # L4006A Aquastat type high-temperature limit	10# Safety door switch
11# Water inlet pipe 3.8cm/ 1 ½"	12# Water outlet pipe 3.8cm/ 1 ½"

Parts list Page two

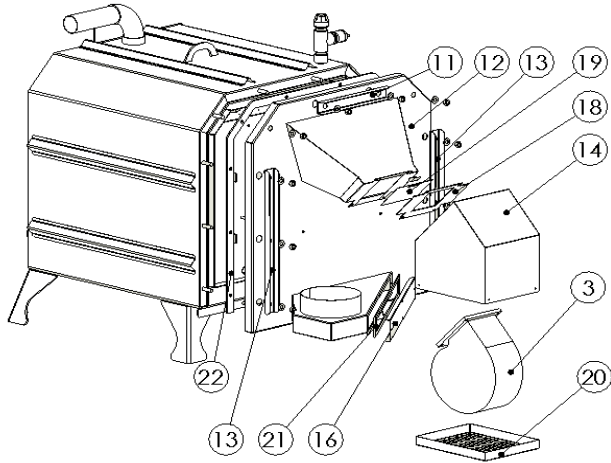


Illustration 11

3 # Combustion air blower	11 # Short bolting channel (1)
12# Removable back of pool heater	13 # Long bolting channel (2)
14 # Housing of combustion air blower	16 # Cleanout door of smoke conduit
18 # Gasket of combustion air blower	19 # Backdraft damper of combustion air blower
20 # Air intake screen of combustion air blower	21# Gasket of smoke conduit cleanout door
22# Gasket of removable back	